Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
Oklahoma

Implementing Agricultural Best Management Practices Decreases Turbidity in Jefferson County's Beaver Creek

Waterbody Improved

High turbidity, due in part to practices associated with wheat and cattle production, resulted in impairment of Beaver Creek and placement on Oklahoma's Clean Water Act (CWA) section 303(d) list of impaired waters in 2008. Implementation of best management practices (BMPs) to promote better quality grazing land and cropland decreased sediment loading into the creek. As a result, Oklahoma removed a 31-mile-long segment of Beaver Creek from the state's 2012 CWA section 303(d) list for turbidity impairment. Beaver Creek is now in partial attainment of its fish and wildlife propagation (FWP) designated use.

Problem

Beaver Creek is a 192,444-acre watershed in Jefferson, Stephens, Cotton, Comanche, and Grady counties in the southwestern part of Oklahoma (Figure 1). Land use in the watershed is primarily pasture for cattle production and wheat crops. Poor grazing land and cropland management contributed to excess sedimentation in the watershed. In the 2008 water quality assessment, monitoring showed that 33 percent of Beaver Creek's seasonal baseflow water samples exceeded 50 nephelometric turbidity units (NTU). A stream is considered impaired by turbidity if more than 10 percent 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 Beaver Creek (OK311200000030 _ 00) to the 2008 and subsequent CWA section 303(d) lists for nonattainment of the FWP designated use due to turbidity impairment.

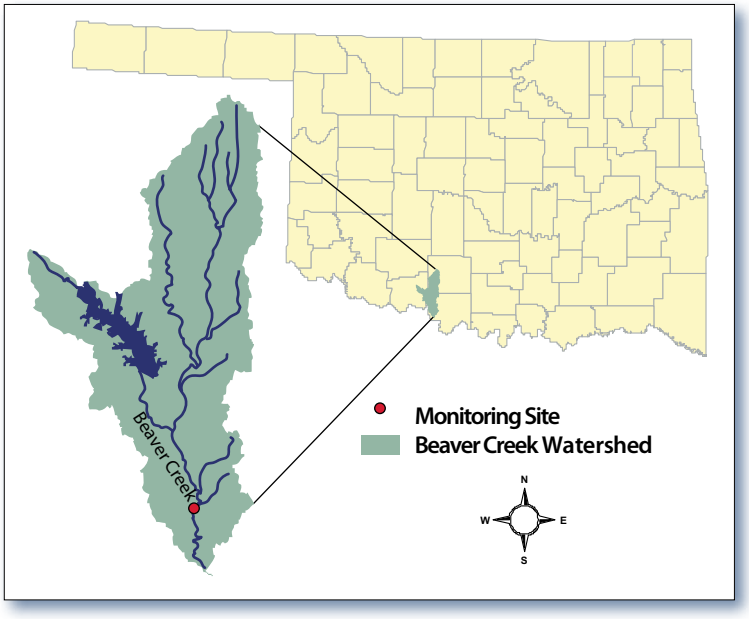

Figure 1. The Beaver Creek watershed is in southern Oklahoma.

Project Highlights

Landowners implemented a large number of BMPs with assistance from Oklahoma's locally led cost-share program and through the local U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) Environmental Quality Incentives Program (EQIP), the Wildlife Habitat Incentive Program (WHIP), general conservation technical assistance program, and Conservation Stewardship Program (CSP). From 2008 to 2011, landowners in the watershed reduced the potential for erosion from cropland by implementing conservation crop rotations and cover crops on 3,633 acres and adopting conservation tillage (e.g., no-till, strip-till, and mulch-till) methods on 2,213 acres. Additionally, terraces were constructed, and at least 28 diversions, 25 grassed waterways, and 67 grade stabilization structures were installed on cropland areas.

To address erosion from grazing lands, prescribed grazing was implemented on 1,911 acres, with 32,919 linear feet of cross-fencing installed to improve grazing land quality and over 20 tanks and 200 ponds constructed for alternative livestock

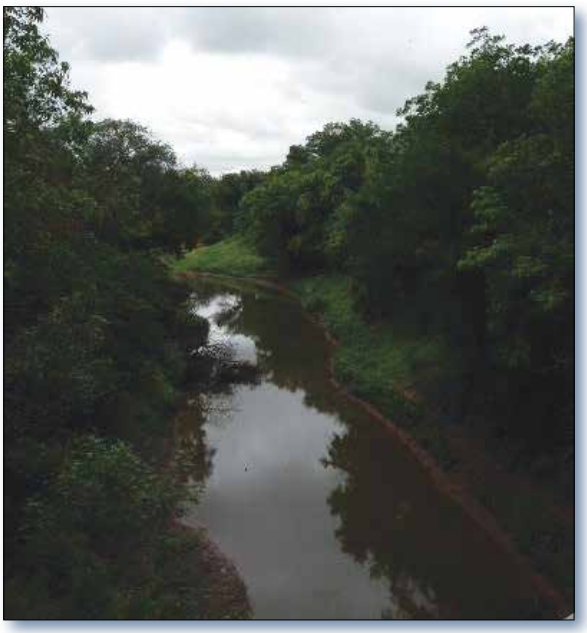

Figure 2. Implementing BMPs helped to restore Beaver Creek.

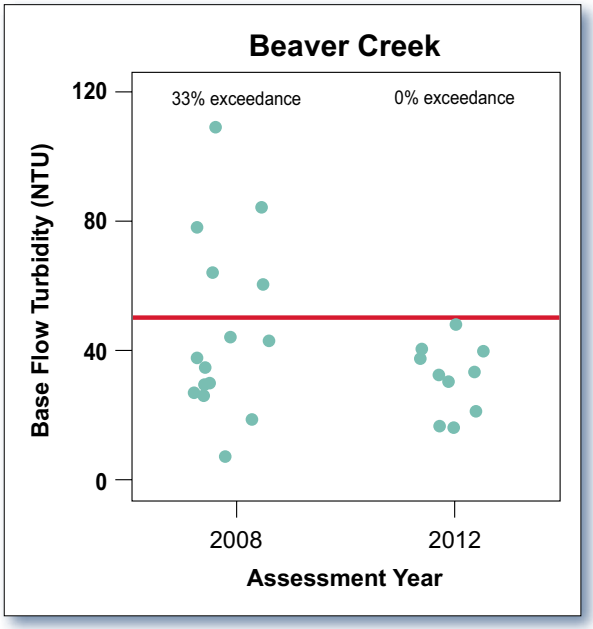

Figure 3. Monitoring data show that turbidity levels in Beaver Creek have declined.

water supply. Nine acres of erosion-susceptible areas received heavy-use protection to reduce sediment runoff. A great deal of brush management helped to promote healthy grazing lands, and forage/biomass planting occurred on 296 acres, trees and shrubs were planted on 25 acres, and 620 acres of critical, erosive land was revegetated. 2,256 acres of pest (weed) management helped to improve the quality of grazing lands and upland wildlife habitat management was instituted on 65 acres. Nutrient management plans were adopted on 1,355 acres.

Continuing BMP implementation will increase the potential for further water quality improvements in the area. In 2012, additional BMPs implemented include conservation crop rotation on 219 acres, conservation tillage on 1,398 acres, prescribed grazing on 1,803 acres, more than 6,000 linear feet of fencing, 72 ponds, 10 water tanks, 28 acres of forage/biomass planting, 361 acres of weed management, nutrient management for 165 acres, four grade stabilization structures, five terraces, and nine cropland diversions.

Results

The OCC's Rotating Basin Monitoring Program, a statewide nonpoint source ambient monitoring program, documented improved water quality in Beaver Creek due to landowners implementing BMPs (Figure 2). In the 2008 assessment, 33 percent of seasonal base flow water samples exceeded the turbidity criteria of 50 NTU. This exceedance was reduced to zero percent in the 2012 assessment (Figure 3). Accordingly, Beaver Creek has been removed from Oklahoma's 2012 CWA section 303(d) list for turbidity impairment and is now in partial attainment of the FWP designated use.

Partners and Funding

The OCC's Rotating Basin Monitoring Program is supported by U.S. Environmental Protection Agency CWA section 319 funds at an average annual cost of $1 million. Monitoring costs include personnel, supplies, and lab analyses for 18 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 CWA section 319 funding supports statewide education, outreach, and monitoring efforts through the OCC's Blue Thumb program.

The Oklahoma cost-share program provided $46,869 in state funding from 2008–2011 for BMP implementation in this watershed through the Stephens County and Jefferson County conservation districts; landowners contributed $30,359 through this program. The NRCS spent approximately $9.5 million for implementation of BMPs in the watershed from 2008 to 2011 through their EQIP, CSP, WHIP, and general technical assistance funds and another $1.8 million in 2012. Landowners provided a significant percentage of funding toward BMP implementation in these programs as well.

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