



NONPOINT SOURCE SUCCESS STORY

Oklahoma

Adding Conservation Practices Improves Water Quality in the Peaceable Creek Watershed

Waterbodies Improved

High turbidity, sulfate and *Escherichia coli* (*E. coli*) bacteria levels resulted in impairment of Peaceable Creek and placement on Oklahoma's Clean Water Act (CWA) section 303(d) list of impaired waters in 2002, 2010 and 2012 for these pollutants, respectively. Pollution from grazing lands contributed to these impairments. Implementing conservation practice systems (CPs) to promote better land management decreased turbidity, sulfate, and *E. coli* levels in the watershed. As a result, Oklahoma removed the following impairments from its CWA section 303(d) lists: turbidity (in 2006) and sulfate and *E. coli* (in 2016). Peaceable Creek now partially supports its warm water aquatic community (WWAC), primary body contact (PBC), and agricultural (AG) designated beneficial uses.

Problem

The Peaceable Creek watershed extends over 93,000 acres (ac) in southeastern Oklahoma (Figure 1). Land use in the watershed is about 52 percent hay and grazing lands and 39 percent forested. Approximately 7 percent of the watershed is developed land, including roads, portions of the city of McAlester, and portions of the McAlester Army Ammunition Plant.

Poor grazing lands management contributed to the listing of a 17.14-mile segment of the stream as impaired for turbidity in 2002 when at least 50 percent of samples exceeded the turbidity criterion. A stream is considered to violate the standard for turbidity if more than 10 percent of baseflow samples exceed 48 nephelometric turbidity units (NTU). In 2010, 11 percent of sulfate samples were above the single sample standard. A stream is considered to violate standards for sulfates if more than 10 percent exceed the single sample standard of 250 milligrams per liter (mg/L). In 2012, Peaceable Creek was also found to be impaired by *E. coli* when the geometric mean of samples collected during the recreation season was 419 colony-forming units per 100 milliliters (CFU/100 mL). The PBC designated use is considered impaired if the recreation season geometric mean exceeds 126 CFU/100 mL for *E. coli*. Oklahoma added segment OK220600030050_00 to the 2002 (for turbidity), 2010 (for sulfates) and 2012 (for *E. coli*) CWA section 303(d) lists for nonattainment of the WWAC, AG, and PBC designated beneficial uses.

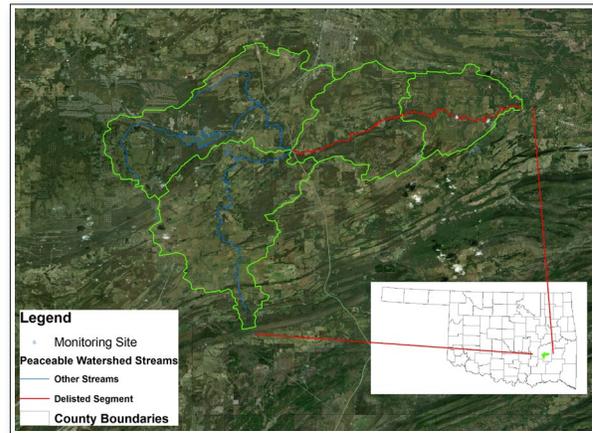


Figure 1. The Peaceable Creek Watershed is in southeastern Oklahoma.

Story Highlights

Landowners in the watershed worked with the Pittsburg County Conservation District, the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), and the Oklahoma Conservation Commission (OCC) to implement CPs through the OCC's Locally Led Cost Share Program (LLCP) and Oklahoma NRCS's Environmental Quality Incentives Program (EQIP), Conservation Stewardship Program (CStWP) and general conservation technical assistance program. From 2000 to 2018, landowners improved many acres of pasture and hay meadows, which reduced runoff of sediment and other pollutants by decreasing erosion and better utilizing available

grazing lands. Specific CPs implemented include forage and biomass planting (1,019 ac), conservation cover (19 ac), conservation crop rotation (120 ac), prescribed burning (275 ac), water well (1), brush management (264 ac), pest management (1,896 ac), fence (30,552 ft), upland wildlife habitat management (151 ac), ponds (108), prescribed grazing (6,947 ac), firebreaks (27,390 ft) and nutrient management (3,240 ac).

Results

The OCC documented improved water quality in Peaceable Creek due to installation of CPs through its statewide nonpoint source Rotating Basin Ambient Monitoring Program (Figure 2). Data compiled for the 2002 integrated report showed that turbidity levels exceeded the standard of 50 NTU at least 48 percent of the time. However by 2006, no samples exceeded the standard. In 2010, sulfate samples exceeded the criteria 11 percent of the time. However, by 2016, 0 percent exceeded the criteria of 250 mg/L. In 2012, the OCC documented an *E. coli* geomean of 149 CFU/100 mL, which violated the standard of 126 CFU/100 mL. By the 2016 assessment, bacteria levels declined, and the *E. coli* geometric mean was 58 CFU/100 mL. Based on these data, Oklahoma removed Peaceable Creek from the CWA section 303(d) list for turbidity in 2006 and for sulfate and *E. coli* in 2016. Peaceable Creek now partially supports its WWAC, AG and PBC beneficial uses.

Partners and Funding

The OCC monitoring program is supported by U.S. Environmental Protection Agency's (EPA) CWA section 319 funding at an average annual statewide cost of \$1 million. Approximately \$500,000 in EPA 319 funds support statewide water quality educational efforts through Blue Thumb. Approximately \$260,883 of these federal and state matching funds have been devoted to Peaceable Creek.

From 2000 to 2018, NRCS supplied more than \$93,000 for CP implementation in Oklahoma through EQIP. Additional funds were provided for other NRCS conservation programs including CStWP, which helped to ensure continued improvements in watershed land management. In addition, many practices were funded by landowners based on recommendations through NRCS general technical assistance. Finally, the OCC,

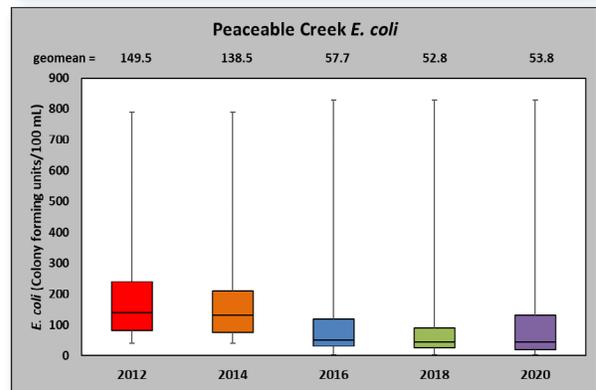
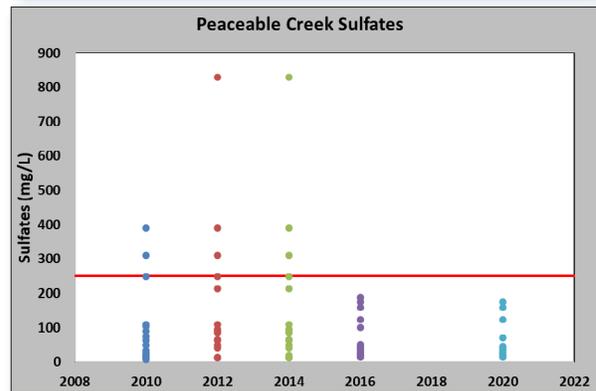
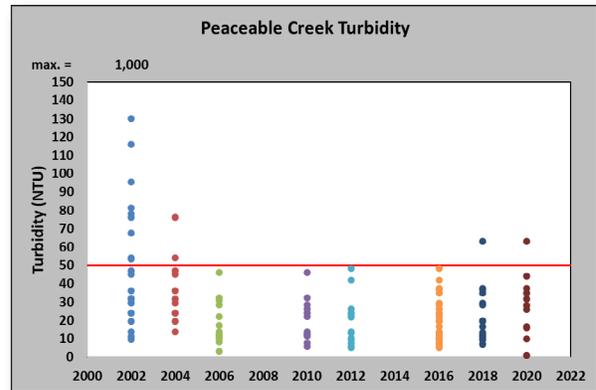


Figure 2. Monitoring data showed that turbidity (top), sulfates (middle), and *E. coli* (bottom) levels declined in Peaceable Creek as CPs were installed.

Pittsburg County Conservation District, and landowners funded more than \$243,619 worth of CPs, at least \$133,557 of which was funded by landowners through the LLCP.



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