NONPOINT SOURCE SUCCESS STORY

Oklahoma

Stewardship Reduces Bacteria Concentrations in Lake Creek

Waterbody Improved

Escherichia coli (*E. coli*) concentrations resulted in impairment of Lake Creek and placement on Oklahoma's Clean Water Act (CWA) section 303(d) list of impaired waters in 2008. Pollution from cropland and grassland contributed to this impairment. Implementing conservation practice systems (CPs) to promote better land management decreased runoff of sediment, bacteria, and other pollutants and resulted in improved water quality. As a result, Oklahoma removed the *E. coli* impairment in 2016 from its CWA section 303(d) list. Lake Creek is now fully supporting its Primary Body Contact (PBC) and all other assessed beneficial uses.

Problem

The Lake Creek watershed covers approximately 27,699 acres (ac) before draining into the North Fork of the Red River in Greer County, Oklahoma (Figure 1). Land use in the watershed is about 51% cropland, 33% forest and shrub land, and 7% range land. Although some of the cropland is irrigated, the majority is in dry land agriculture. The primary agricultural products from the watershed are cotton and cattle.

Water quality monitoring in the early 2000s determined that challenges with cropland and grazing lands management contributed to a 2008 listing of the 13.33-mile stream as being impaired by *E. coli*, when the geometric mean of samples collected during the recreational season were 391 colonies per 100 milliliters (col/100 mL). A waterbody is considered impaired for *E. coli* if the geometric mean of samples collected between May 1 and September 30 is greater than 126 col/100 mL. Based on these results, Oklahoma added segment 311510010040_00 to the CWA section 303(d) lists in 2008 for nonattainment of the PBC beneficial use.

Story Highlights

More than 58 landowners in the watershed worked with the Greer County conservation district, the Natural Resources Conservation Service (NRCS), and the Oklahoma Conservation Commission (OCC) to implement CPs through the OCC's State Cost Share Program (SCSP) and the Oklahoma NRCS's Environmental Quality Incentives Program (EQIP), Conservation Stewardship Program (CSP) and general

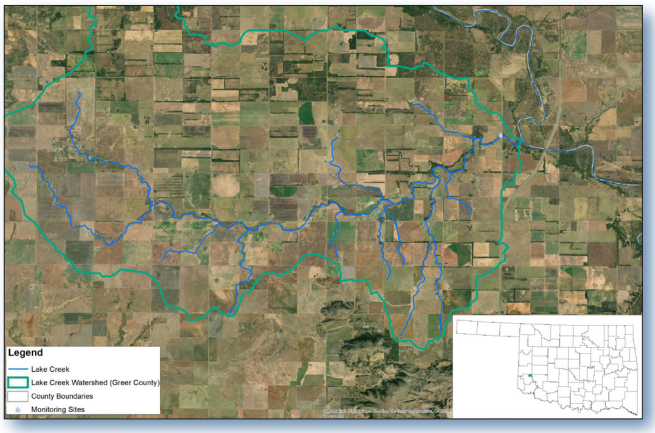

Figure 1. Lake Creek is in southwestern Oklahoma.

conservation technical assistance program. From 2002 to 2020, landowners improved crop land and grazing land management, which reduced runoff of sediment, nutrients, and other pollutants by increasing vegetative cover and reducing bare soil and increasing infiltration.

Landowners implemented access control (135 ac), conservation cover (222 ac), cover crop (699 ac), critical area planting (5.6 ac), fence (2,600 feet [ft]), forage harvest management (14 ac), grassed waterways (7.1 ac), heavy use area protection (10.9 ac), irrigation pipelines (5,573 ft), irrigation water management (73 ac), livestock pipelines (8,319 ft), nutrient management (510 ac), pasture and hayland planting (1,185 ac), pest management (383 ac), ponds (6), prescribed grazing (1,834 ac), pumping plant (1), range planting (4 ac), reduced tillage (1,731 ac), seasonal residue

management (1,071 ac), sprinkler systems (282 ac), terraces (3,512 ft), water wells (5), and well decommissioning (6). In addition, at least 9,600 acres (about 35% of the watershed) were enrolled in the CSP, which facilitated additional practices to improve animal waste, grazing, soil, and nutrient management, but it also meant that outstanding natural resource concerns had already been addressed on those acres.

Results

The OCC documented improved water quality in Lake Creek due to installation of CPs through its statewide nonpoint source Rotating Basin Ambient Monitoring Program. By 2016, *E. coli* concentrations had improved to a geometric mean of 49.1 col/100 mL (Figure 2). Data assessed since then continue with geometric means less than 126 col/100 mL; therefore, Lake Creek is now fully supporting its PBC and all other assessed beneficial uses.

Partners and Funding

The OCC monitoring program is supported by the U.S. Environmental Protection Agency's (EPA's) CWA section 319 funding at an average annual statewide cost of $1 million. Approximately $600,000 in EPA 319 funds support statewide water quality educational efforts through Blue Thumb. Approximately $252,675 of these federal and state matching funds have been devoted to Lake Creek.

From 2002 to 2020, NRCS invested at least $242,000 for CP implementation in Oklahoma through EQIP; additional financial assistance was provided through CSP. In addition, many practices were funded by landowners based on recommendations through NRCS general technical assistance. Finally, the OCC, the Greer County conservation district, and landowners funded more than $33,023 worth of CPs (at least $18,697 of which was funded by landowners through the SCSP).

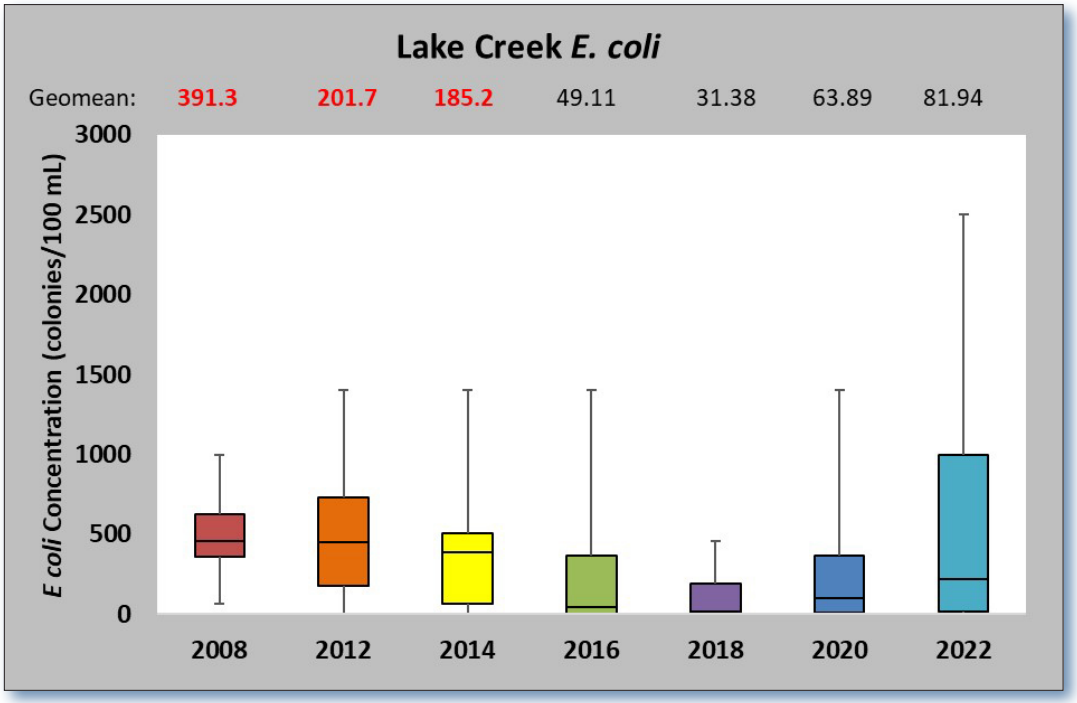

Figure 2. Lake Creek pathogen concentrations decreased with the installation of CPs.

U.S. Environmental Protection Agency
Office of Water
Washington, DC

EPA 841-F-22-001HH
December 2022

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