



# NONPOINT SOURCE SUCCESS STORY

## Oklahoma

### Improvements in Cropland and Grazing Land Management Reduce Bacteria in Deer Creek

#### Waterbody Improved

*Escherichia coli* (*E. coli*) concentrations resulted in impairment of Deer Creek and placement on Oklahoma's Clean Water Act (CWA) section 303(d) list of impaired waters in 2002. Pollution from cropland and grazing lands contributed to this impairment. Implementing conservation practice systems (CPs) to promote better land management decreased runoff of sediment, bacteria, and other pollutants and led to improved water quality. As a result, Oklahoma removed the *E. coli* impairment in 2018 from its CWA section 303(d) list. Deer Creek now fully supports its Primary Body Contact (PBC) and all other assessed beneficial uses.

#### Problem

The Deer Creek watershed covers approximately 218,754 acres (ac) in Caddo, Custer, and Dewey counties in Oklahoma (Figure 1). Deer Creek drains from its headwaters near Putnam in Dewey County to its confluence with the Canadian River in Blaine County. Land use in the watershed is about 28% grazing lands, 61% cropland, and 7% developed. Although some of the cropland is irrigated, the majority is in dry land agriculture. The primary agricultural products from the watershed are wheat and cattle. In addition, a significant number of natural gas wells have been developed in the watershed.

Water quality monitoring in the early 2000s determined that challenges with cropland and grazing lands management contributed to a 2002 listing of the 55.58-mile stream as being impaired by *E. coli*, when the geometric mean of samples collected during the recreational season were above the *E. coli* criteria. 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 colonies per 100 milliliters (col/100 mL). Based on these results, Oklahoma added segment 520620060010\_00 to the CWA section 303(d) lists in 2002 for nonattainment of the PBC beneficial use.

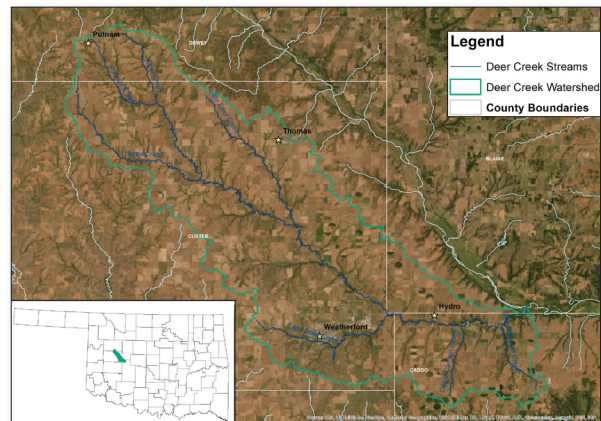


Figure 1. Deer Creek is in western Oklahoma.

#### Story Highlights

More than 265 landowners in the watershed worked with the Custer County, Deer Creek, Dewey County and North Caddo conservation districts; the Natural Resources Conservation Service (NRCS); and the Oklahoma Conservation Commission (OCC) to implement CPs. They received support through Oklahoma NRCS's Environmental Quality Incentives Program (EQIP), Conservation Stewardship Program (CSP) and general conservation technical assistance program; the

Farm Services Agency's Conservation Reserve Program (CRP); and the OCC's State Cost Share Program (SCSP).

From 2002 to 2020, landowners improved crop land and grazing land management, which reduced run-off of sediment, nutrients, and other pollutants by increasing vegetative cover and reducing bare soil and increasing infiltration. Landowners implemented access control (259 ac), brush management (2,654 ac), conservation cover (290 ac), conservation crop rotation (42,653 ac), cover crop (1,257 ac), critical area planting (145 ac), diversion (36,796 feet [ft]), fence (29,923 ft), field border (10,503 ft), forage harvest management (124 ac), grade stabilization structures (48), grassed waterways (122 ac), heavy use area protection (10.9 ac), herbaceous weed control (109 ac), irrigation water management (643 ac), no-till (17,465 ac), livestock pipelines (5,787 ft), nutrient management (10,537 ac), pasture and hayland planting (6,887 ac), pest management (8,092 ac), ponds (9), prescribed grazing (22,152 ac), pumping plants (9), range planting (916 ac), reduced tillage (23,155 ac), seasonal residue management (5,294 ac), sprinkler systems (401 ac), terraces (113,206 ft), upland wildlife habitat management (860 ac), watering facility (7), and water wells (19). In addition, at least 50,000 acres were enrolled in the CSP, which facilitated additional practices to improve the management of animal waste, grazing, soils, nutrients, and energy.

## Results

The OCC documented improved water quality in Deer Creek due to installation of CPs through its statewide nonpoint source Rotating Basin Ambient Monitoring Program. By 2014, *E. coli* concentrations had improved to a geometric mean of 24.3 col/100 mL (Figure 2). Although it was listed in error as not supporting in 2016, data assessed since 2014 continued with geometric means less than 126 colonies/100 mL; therefore, Deer Creek now fully supports its PBC and all other assessed uses.

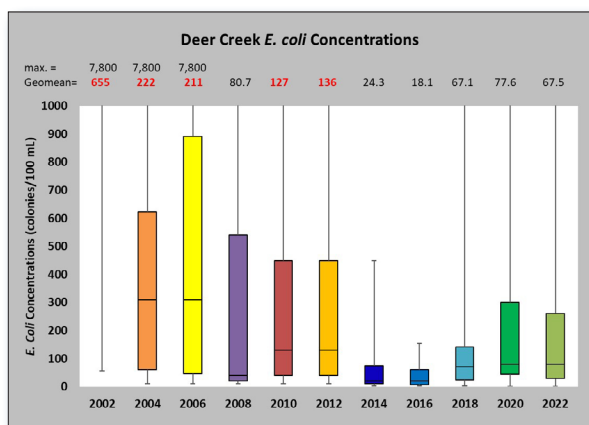


Figure 2. Deer Creek pathogen concentrations decreased with the installation of CPs.

## Partners and Funding

The OCC monitoring program is supported by the U.S. Environmental Protection Agency (EPA) 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 \$564,779 of these federal and state matching funds have been devoted to Deer Creek.

From 2002 to 2020, NRCS invested a minimum of \$898,000 for CP implementation in Oklahoma through EQIP; additional financial assistance was provided through CSP and CRP. In addition, many practices were funded by landowners based on recommendations through NRCS general technical assistance. Finally, the OCC; Custer County, Deer Creek, Dewey County and North Caddo conservation districts; and landowners funded more than \$493,177 worth of CPs (at least \$259,952 of which was funded by landowners through the SCSP).



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