



NONPOINT SOURCE SUCCESS STORY

Oklahoma

Conservation Practices Reduce Bacteria in Pryor Creek

Waterbody Improved

High bacteria levels resulted in the impairment of Pryor Creek and placement on Oklahoma's Clean Water Act (CWA) section 303(d) list of impaired waters in 2002. Pollution from grazing lands contributed to this impairment. Implementing conservation practice systems (CPs) to promote better agricultural land management decreased *Escherichia coli* (*E. coli*) levels in the creek. As a result, Oklahoma removed lower Pryor Creek from its 2014 CWA section 303(d) list for *E. coli*. Pryor Creek now partially supports its primary body contact (PBC) designated beneficial use.

Problem

Pryor Creek is a 55.53-mile stream flowing through Craig, Mayes and Rogers counties before joining the Neosho River (Figure 1). Land use in the 146,775-acre watershed is about 69 percent grazing lands and 22 percent forested. Approximately 4 percent of the watershed is cropland. Challenges with grazing land management contributed to listing the stream as impaired for *E. coli* in 2002 when 20 percent of individual samples violated the individual sample maximum of 406 colony forming units per 100 milliliters (CFU/100 mL) during the recreation season. In 2004 the PBC designated use was considered impaired if more than 10 percent of samples violated the individual sample maximum. The assessment method changed in 2008 and streams were considered to be violating the standard if the recreation season geometric mean exceeded 126 CFU/100 mL for *E. coli*. Oklahoma added a 4.97-mile segment of Pryor Creek (OK121610000050_10) to the 2002 CWA section 303(d) list for nonattainment of its PBC designated beneficial use.

Story Highlights

Landowners in the watershed worked with the Craig, Mayes, and Rogers county conservation districts, the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), and the OCC to implement CPs through Oklahoma NRCS's Environmental Quality Incentives Program (EQIP), Wetland Reserve Program (WRP), and general conservation technical assistance program, and through Oklahoma's Locally Led Cost Share Program (LLCP). CPs installed between 2002 and 2015 focused on reducing erosion and pollutant runoff from cropland and grazing lands in the

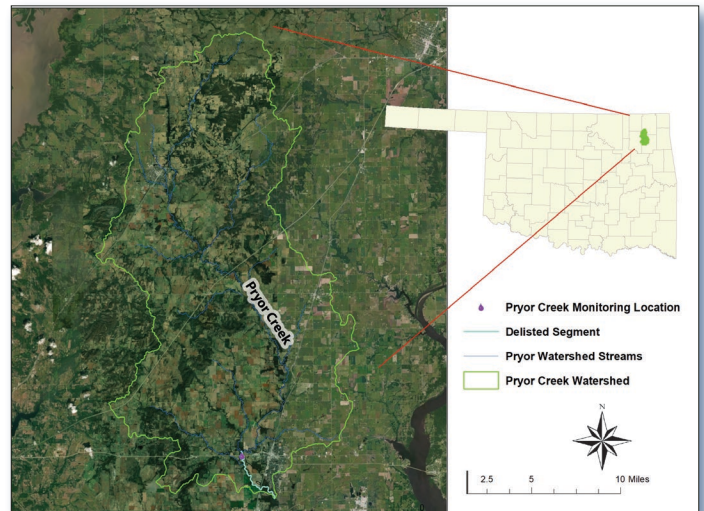


Figure 1. Pryor Creek is in northeastern Oklahoma.

watershed. These included access control (137 acres [ac]), two composting facilities, 35 ponds, conservation crop rotation (2,805 ac), filter strip (11 ac), critical area planting (9 ac), fence (55,615 ft), livestock pipeline (14,021 ft), wetland restoration (62 ac), forage and biomass planting (931 ac), two waste storage facilities, trails and walkways (131 ac), prescribed grazing (37,178 ac), wetland restoration (62 ac), no-till (24 ac), two livestock pumping plants, reduced-till (590 ac), riparian forest buffer (191 ac), terrace (9,216 ft), tree shrub establishment (16 ac), waste recycling (712 ac), heavy use area protection (7 ac), 24 watering facilities, wetland wildlife habitat management (268 ac), forage harvest management (3,821 ac), brush management (562 ac), nutrient management (2,319 ac), integrated pest management (4,639 ac), seasonal residue management (550 ac), and upland wildlife habitat management (2,442 ac).

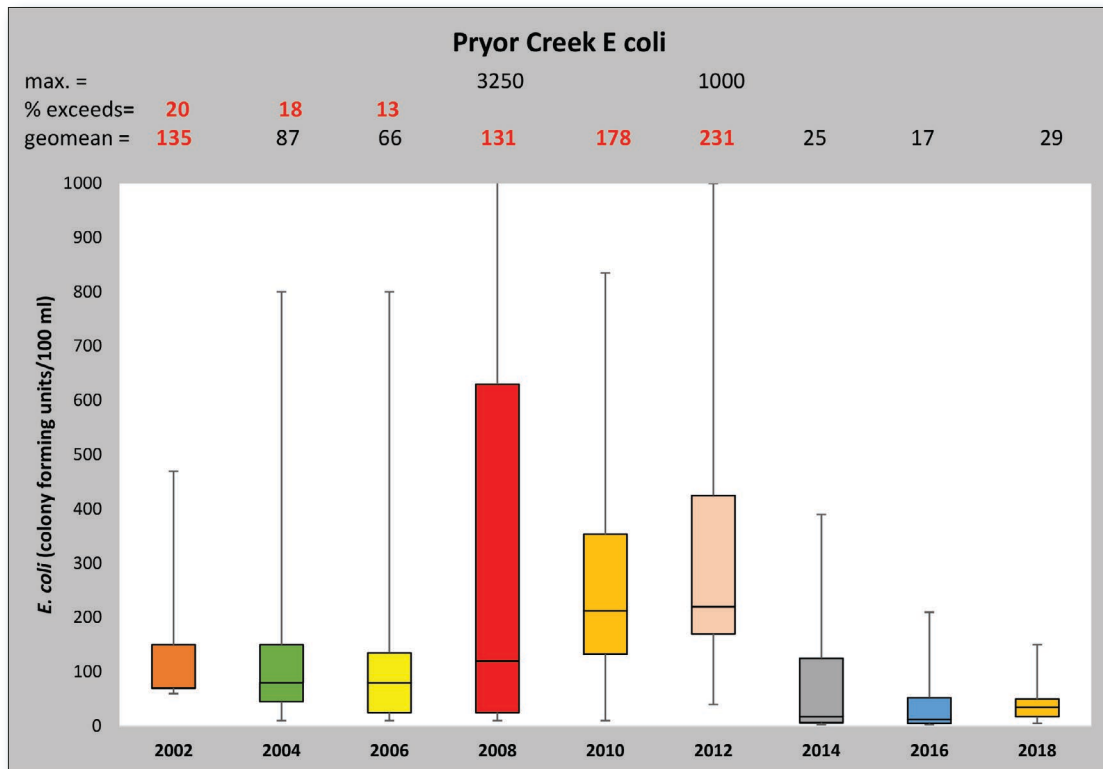


Figure 2. *E. coli* bacteria concentrations decreased in Pryor Creek after installation of CPs.

Results

The Oklahoma Conservation Commission (OCC) documented improved water quality in Pryor Creek due to installation of CPs. The installed CPs worked to decrease the runoff of fecal bacteria to downstream waterbodies. Monitoring data compiled for the 2002 integrated report showed that Pryor Creek *E. coli* levels violated the individual sample maximum 20 percent of the time and the geomean of 135 CFU/100 mL violated the standard of 126 CFU/100 mL (Figure 2). By the 2014 assessment, bacteria levels had dropped, and the *E. coli* geometric mean was 25 CFU/100 mL (Figure 2). Based on these data, Oklahoma removed Pryor Creek from the CWA section 303(d) list for *E. coli* in 2014. Although the stream remains listed for Enterococcus and therefore is only partially supporting its PBC beneficial use, the stream is now delisted for *E. coli* due to installation of CPs.

Partners and Funding

The OCC monitoring program is supported by U.S. Environmental Protection Agency (EPA) CWA section 319 funding at an average annual statewide cost of \$1 million. Approximately \$500,000 in EPA CWA section 319 funds support statewide water quality educational efforts through Blue Thumb. Approximately \$188,416 of these federal and matching state funds have been devoted to Pryor Creek. From 2002 to 2015, NRCS supplied approximately \$125,000 for implementation of CPs in the watershed through EQIP. Additional funds were provided through NRCS for WRP. The state LLCP provided \$54,960 matched by \$65,274 from landowners. In addition, many practices were funded by landowners based on recommendations through NRCS general technical assistance and conservation planning.



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