



NONPOINT SOURCE SUCCESS STORY

Oklahoma

Implementing Agricultural Conservation Practices Improves Bacteria and Turbidity Levels in Main Creek

Waterbody Improved

High bacteria concentrations and elevated turbidity resulted in the impairment of Main Creek and placement on Oklahoma's Clean Water Act (CWA) section 303(d) list of impaired waters in 2004 (*Escherichia coli*) and 2006 (turbidity). Pollution from grazing, hay production and cropland areas contributed to these impairments. Implementing conservation practice systems (CPs) to promote better quality grazing lands and improved cropland management decreased bacteria and turbidity levels in the creek. As a result, Main Creek was removed from Oklahoma's 2010 CWA section 303(d) list for turbidity; it has also been recommended for delisting for *E. coli* on the 2016 CWA section 303(d) list. Main Creek now fully supports its warm water aquatic and primary body contact designated uses.

Problem

Main Creek is a 19.1-mile stream flowing through Woodward and Major counties and into Woods County, Oklahoma, before discharging to the Cimarron River (Figure 1). Land use in the 25,000-acre watershed is primarily pasture and grasslands (40 percent of total) for cattle and hay production. About 27 percent of the watershed is forested and approximately 23 percent is cropland used primarily for wheat production.

Poor grazing and cropland management contributed to excess turbidity and bacteria in Main Creek. It was listed as impaired for *E. coli* in 2004 when the geometric mean of samples collected during the recreational season was 1,058 colony forming units/100 milliliters (CFU). The primary body contact recreation designated use is considered impaired if the geometric mean exceeds 126 CFU for *E. coli*.

Main Creek was also added to the section 303(d) list in 2006 because 17 percent of assessed baseflow turbidity samples violated standards. An Oklahoma stream is considered to violate the turbidity standard when more than 10 percent of baseflow samples are higher than 50 nephelometric turbidity units (NTU). On the basis of these assessment results, Oklahoma added Main Creek (OK620920010180_00) to the 2004 and 2006 CWA section 303(d) lists for nonattainment of the warm water aquatic and primary body contact designated beneficial uses.

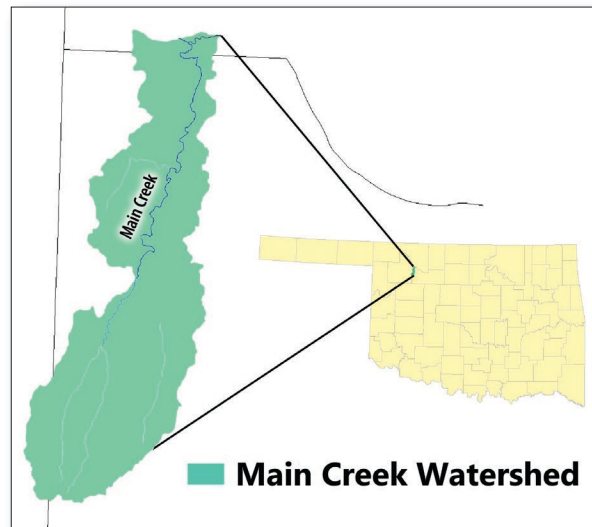


Figure 1. Main Creek is in northwestern Oklahoma.

Project Highlights

Landowners in the watershed worked with the Major, Woods and Woodward county conservation districts, the U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) and USDA Farm Services Agency (FSA) to implement CPs through Oklahoma NRCS's Environmental Quality Incentives Program (EQIP), Oklahoma's general conservation technical assistance program, and FSA's Conservation Reserve Program (CRP). From 2004 to 2010, landowners improved many acres of pasture and grasslands, which reduced runoff of bacteria and other pollutants.

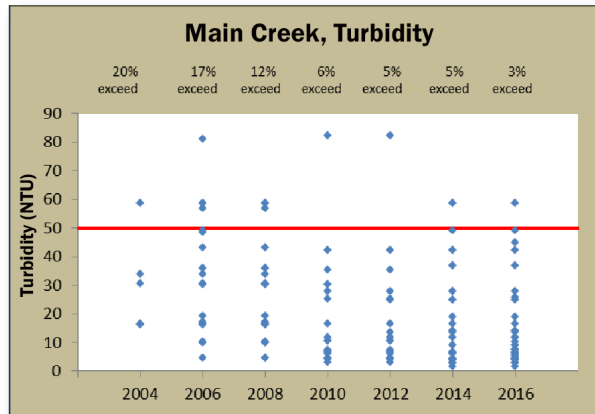


Figure 2. Monitoring data indicate that turbidity levels have met standards since 2010.

CPs installed included 5,537 acres of prescribed grazing, three watering facilities and wells, forage and biomass planting and nutrient management on 183 acres, 1,680 acres of brush management and 130 acres of integrated pest management.

Landowners also focused on reducing erosion and pollutant runoff from cropland through multiple CPs, including 288 acres of conservation crop rotation, 195 acres of cover crops, native grass planting and nutrient management on 181 acres, reduced tillage residue and tillage management on 288 acres, and upland wildlife habitat management on 121 acres.

Partners continued to implement CPs from 2011 through 2016, including 550 acres of livestock access control, 241 acres of brush management, 584 acres of conservation cover, 84 acres of nutrient management, 7,019 acres of prescribed grazing, one well, one pumping plant, one watering facility, 84 acres of no-till residue and tillage management, and 69 acres of reduced-till residue and tillage management.

Results

Through its statewide nonpoint source Rotating Basin Ambient Monitoring Program, the Oklahoma Conservation Commission (OCC) documented improved water quality in Main Creek due to landowners implementing CPs. The installed grazing and cropland management CPs worked to decrease erosion and reduce bacteria. Monitoring data compiled for the 2006 integrated report showed that turbidity in Main Creek was high—17 percent of baseflow samples

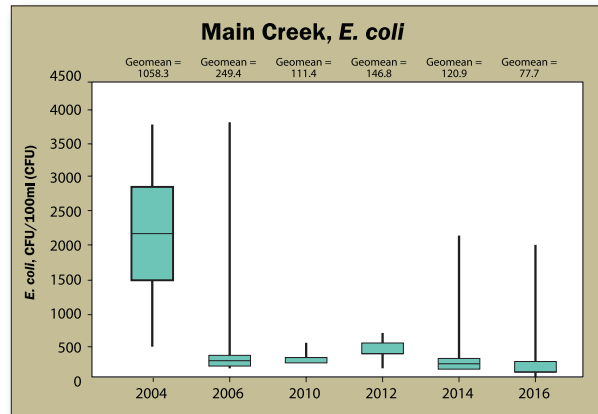


Figure 3. Monitoring data indicate that bacteria levels have declined and are now meeting standards.

exceeded the state standard of 50 NTU. However, by 2010 turbidity values had decreased to a 6 percent exceedance rate. This decreasing trend continued through the 2016 assessment (Figure 2). In addition, Main Creek *E. coli* concentrations violated the state standard of a geometric mean of 126 CFU in 2004 when the geometric mean was 1,058 CFU. However, by the 2016 assessment, the geomean dropped below the criteria (Figure 3). On the basis of these data, Main Creek was removed from the Oklahoma CWA section 303(d) list for turbidity in 2010 and has been recommended for delisting for *E. coli* in 2016. These changes result in full support of its warm water aquatic and primary body contact beneficial uses. Monitoring will continue in Main Creek to ensure these water quality improvements are maintained.

Partners and Funding

The OCC monitoring program is supported by the U.S. Environmental Protection Agency's (EPA) CWA section 319 funds 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. From 2004 to 2010, NRCS supplied approximately \$50,000 for implementation of CPs in the watershed through EQIP. From 2011 through early 2016, NRCS put an additional \$30,000 worth of CPs in the watershed through EQIP. Additional funds were provided through FSA for CRP practices. In addition, a large number of practices were funded by landowners based on recommendations through NRCS general technical assistance and conservation planning.



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