NONPOINT SOURCE SUCCESS STORY

Oklahoma

Implementation of Conservation Practices Improves Bacteria Levels in Commission Creek

Waterbody Improved

High levels of *Escherichia coli* (*E. coli*) bacteria, caused in part by cattle production, led to Commission Creek being added to Oklahoma's 2002 Clean Water Act (CWA) section 303(d) list of impaired waters. Implementing a system of conservation practices (CPs) to improve grazingland and exclude livestock from riparian areas resulted in decreased bacteria in the creek. As a result, Commission Creek was removed from Oklahoma's 2008 CWA section 303(d) list for *E. coli* impairment and is in partial attainment of its primary body contact recreation designated use.

Problem

Twelve-mile-long Commission Creek (OK520620050160 _ 00) flows through Ellis County on the western Oklahoma border with Texas (Figure 1). The majority of the land in the 31,543-acre area is used for wheat and cattle production. A small amount of cotton and sorghum is also produced. Erosion of grazingland, coupled with improper management of livestock wastes and direct livestock access to streams, was potentially the largest nonpoint source (NPS) problem in the watershed, contributing to high levels of fecal bacteria in the stream. In the 2002 water quality assessment, *E. coli* levels exceeded the state criterion, with a geometric mean of 146 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*. A TMDL for *E. coli* and *Enterococcus* was implemented by Oklahoma in 2006.

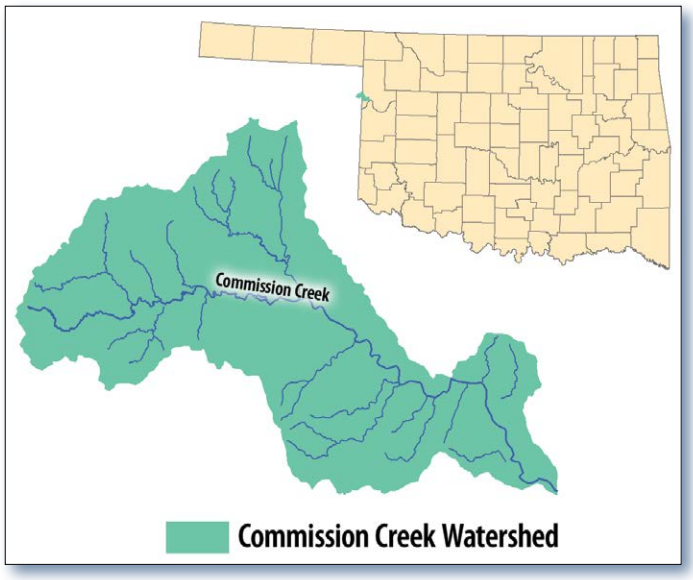

Figure 1. The Commission Creek watershed flows through Ellis County in western Oklahoma.

Project Highlights

Landowners implemented CPs with support from the Oklahoma Conservation Commission's (OCC's) Locally Led Cost Share Program (LLCS), and funds from the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) Environmental Quality Incentives Program, Conservation Reserve Program and Wildlife Habitat Incentive Program. The focus of most CPs in this watershed was to improve rangeland quality and restore natural habitat. Improved water quality was expected from decreased runoff from poor quality land that can carry both sediment and fecal bacteria into waterbodies. From 2006 to 2014, landowners installed eight alternative water supplies and implemented 2,784 acres of prescribed grazing. Brush management on 660 acres also helped improve range quality. In addition, upland wildlife habitat management occurred on 2,466 acres, which produced high quality, diverse, natural vegetation which is less susceptible to erosion.

The OCC NPS education program, Blue Thumb, had an active presence in Ellis County from 2004 to 2010. In 2002, staff from the Ellis County Conservation

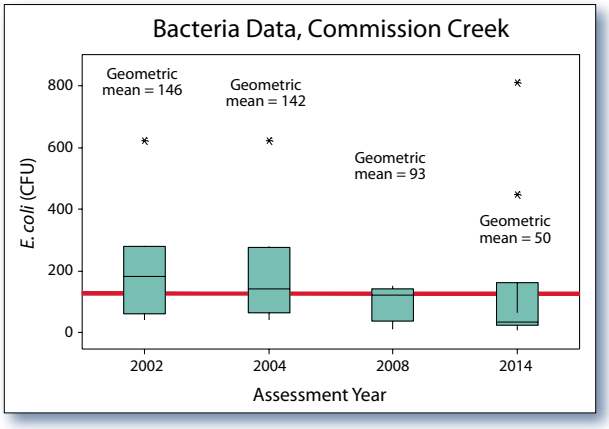

Figure 2. Boxplots indicate the interquartile range (25th-75th percentile) and median of the data for assessment years 2002, 2004, 2008 and 2014. A stream meets criteria for *E. coli* if the geometric mean, based on no more than five years of data preceding the assessment year, is less than 126 colony forming units/100 mL (CFU).

District and local NRCS participated in a Blue Thumb training session. In addition, a local high school teacher and her students monitored a stream in the county and submitted reports on the results to the local newspaper to inform local citizens about potential problems and options to improve water quality. The high school students participated in an annual training about NPS pollution and used an Enviroscape watershed model to teach younger students about NPS dynamics and solutions.

Results

The OCC Rotating Basin Monitoring Program, a statewide nonpoint source ambient monitoring program, documented improved water quality in Commission Creek due to the conservation efforts (Figure 2). The grazingland and nutrient management CPs decreased erosion and bacteria loading, and the CPs designed to improve rangeland and wildlife habitat resulted in denser vegetation and fewer bare spots, which equated to less runoff of soil, nutrients and bacteria from animal wastes into waterbodies. Monitoring data showed that the geometric mean of *E. coli* in the 2008 assessment was 93 CFU, below the state standard of 126 CFU. Hence, Commission Creek was removed from the 2008 CWA section 303(d) list for *E. coli* impairment. The geometric mean in the 2014 assessment was even lower, at 50 CFU, indicating that *E. coli* in Commission Creek has remained low, and the creek is in partial attainment of the primary body contact recreation use. With continued good management, the waterbody is expected to fully attain its primary recreation designated use.

Figure 3. The OCC Rotating Basin Monitoring Program documented improved water quality in Commission Creek, seen here in 2015.

Partners and Funding

The improvement in water quality in Commission Creek was documented by OCC's statewide NPS ambient monitoring effort known as the Rotating Basin Monitoring Program (RBMP). The RBMP is funded in part with U.S. Environmental Protection Agency (EPA) CWA section 319 funds at a total annual cost of $1 million. This funding supports personnel, supplies, lab analyses and other associated costs. Sampling efforts comprise 20 water quality collections at approximately 100 sites every five weeks per five-year cycle. Instream habitat, fish and macroinvertebrate samples are also collected during this period. Statewide educational efforts through OCC's Blue Thumb are also funded by EPA section 319 at a cost of approximately $600,000 annually. The Ellis County Conservation District and landowners in the watershed contributed approximately $5,000 through the LLCS program. NRCS spent a little over $1 million through its programs for implementation of CPs in Ellis County from 2006 through 2014, and implementation continues in the area through various programs.

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