



NONPOINT SOURCE SUCCESS STORY

Oklahoma

Implementing Agricultural Conservation Practices Improves Bacteria Levels in Upper Honey Creek

Waterbody Improved

High bacteria concentrations resulted in the impairment of Honey Creek and placement of the upper segment on Oklahoma's Clean Water Act (CWA) section 303(d) list of impaired waters in 2010, followed by listing of the lower segment in 2012. Grazing and hay production, poultry production, and development contributed to these impairments. Implementing conservation practices systems (CPs) to promote better quality grazing lands and improved waste management decreased bacteria loading into the upper segment of the creek. As a result, the Upper Honey Creek segment was removed from Oklahoma's 2012 CWA section 303(d) list for *Escherichia coli* impairment. Upper Honey Creek is now in partial attainment of its primary body contact designated use.

Problem

Honey Creek flows from Benton County, Arkansas, and McDonald County, Missouri, into Delaware County, Oklahoma (Figure 1). The stream is split into upper (4.64 miles) and lower (4.85 miles) segments. Land use in the 79,000-acre watershed is primarily pasture and grasslands (57 percent) for cattle and hay production. About a third of the watershed is forested (about 33 percent) and approximately 7 percent is cropland for corn, soybeans and wheat production. The lakeside areas of the lower watershed are developed with vacation and retirement homes, and a portion of the city of Grove (pop. 6,692) extends into the near-lake area.

Grazing land management and development contributed to excess bacteria in Honey Creek. In 2008, data showed exceedances of the primary body contact recreational designated use water quality standard, which requires that the *E. coli* geometric mean remains below 126 colony forming units/100 milliliters (CFU). However, an insufficient number of samples were collected to make a final determination for the 2008 assessment. A complete set of data collected for the 2010 assessment showed a geometric mean of 191 CFU, which exceeded standards (Figure 2). On the basis of these assessment results, Oklahoma added the upper segment of Honey Creek (OK121600030445_10) to the 2010 CWA section 303(d) list for nonattainment of the primary body contact designated use due to *E. coli* impairment. The lower segment of Honey Creek was also listed as impaired for *E. coli* in 2012.

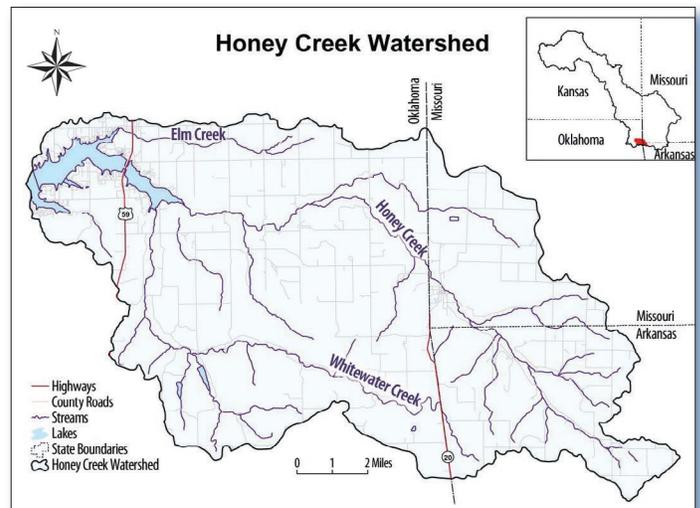


Figure 1. Honey Creek flows from Missouri and Arkansas into northeastern Oklahoma.

Project Highlights

Landowners in the Oklahoma portion of the watershed worked with the Delaware County Conservation District, the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) and the Oklahoma Conservation Commission (OCC) to implement CPs with funding from the U.S. Environmental Protection Agency (EPA) Region 6 section 319 Nonpoint Source Program (NPS), through Oklahoma NRCS' Environmental Quality Incentives Program (EQIP) and general conservation technical assistance program, and through OCC's Locally Led Cost-Share (LLCS) program.

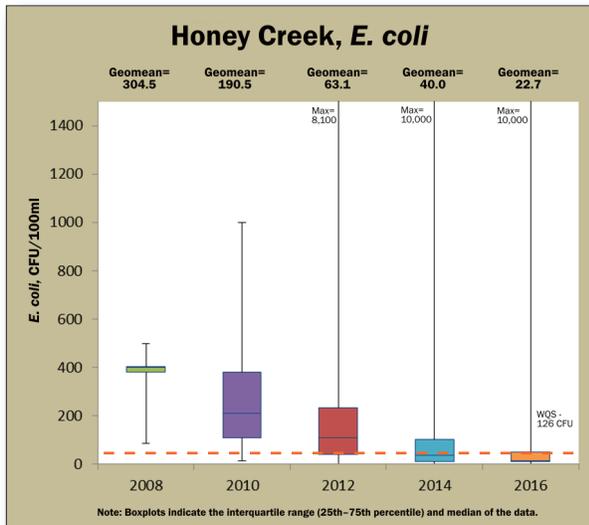


Figure 2. Monitoring data indicate that bacteria levels in Upper Honey Creek have declined.

From 2006 to 2014, landowners installed CPs to address pollution from agricultural areas, including:

- **Pasture and grassland CPs:** Riparian area protection (384 acres) through livestock exclusion; alternative water supplies (includes 48 ponds, 222 water tanks, 6,300 linear feet of pipeline, and 76 wells); grass planting (1,268 acres); cross-fencing (350,397 linear feet); forage harvest management (81 acres); prescribed grazing (2,820 acres); upland wildlife habitat management (142 acres); and integrated pest management (2,370 acres).
- **Animal waste management CPs:** Application of alum to poultry litter (88 times) to reduce soluble phosphorus in applied litter by up to 25 percent; four “cakeout” storage facilities to temporarily house poultry waste; five mortality composters; heavy use area protections (238 areas); 25 winter feeding/cattle waste storage facilities, poultry litter transported out of the watershed (26,627 pounds), poultry litter relocated to low-phosphorus watershed areas (134,888 pounds); eight comprehensive nutrient management plans; and nutrient management (3,103 acres).

Additional CPs included stream channel and riparian wetland restoration along approximately 3,600 feet of stream, eight agricultural energy management plans, herbaceous weed control, additional pest management, and replacement of 16 improperly functioning septic systems.

Results

Through its statewide NPS ambient monitoring program, the OCC documented improved water quality in Honey Creek due to landowners implementing CPs. The installed grazing and animal waste management CPs worked to decrease erosion and reduce bacteria. In 2012, water quality monitoring showed that bacteria concentrations had decreased to a geometric mean of 63 CFU, which meets the water quality standard. This decreasing trend has continued through 2014 and 2016 (see Figure 2). On the basis of these data, the Upper Honey Creek segment was removed from the Oklahoma CWA section 303(d) list for *E. coli* in 2012, resulting in the partial attainment of its primary body contact designated use. Upper Honey Creek remains listed as impaired for Enterococcus bacteria.

Monitoring data also suggest improvements in lower Honey Creek that will hopefully allow for the future delisting and development of success stories that document full support of both segments’ primary body contact beneficial use.

Partners and Funding

Through a series of EPA CWA section 319 projects, the EPA, OCC, and Oklahoma’s Office of Secretary of Energy and Environment invested approximately \$4,133,803 of section 319 and required matching dollars in the watershed for program management, water quality monitoring, and installation of CPs. Using CWA section 319 (\$1,362,879) and matching state dollars (\$817,566), plus matching dollars from landowners (\$1,340,940), more than \$3.29 million has been invested in CPs alone through the CWA section 319 program. Education efforts were supplemented through the Oklahoma Blue Thumb Program. Approximately \$500,000 in EPA CWA section 319 supports statewide education, outreach and monitoring efforts through the Blue Thumb program. The OCC LLCs program provided \$10,933 in state funding for CPs in this watershed through the Delaware County Conservation District; landowners contributed \$19,296 in matching funds. NRCS spent approximately \$475,000 for implementation of CPs in the watershed through NRCS EQUIP. Landowners provided a significant percentage of funding toward CP implementation as well.



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For additional information contact:

Shanon Phillips
Oklahoma Conservation Commission
405-522-4500 • shanon.phillips@conservation.ok.gov