



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Kansas

Cooperative Watershed Management Reduces Bacteria in Kansas' Big Creek

Waterbodies Improved

Nonpoint source pollution from livestock activities had degraded water quality in the Big Creek watershed, prompting the Kansas Department of Health and Environment (KDHE) to add three segments of the creek to the state's 1998 Clean Water Act (CWA) section 303(d) list of impaired waters for bacteria. In cooperation with the local Watershed Restoration and Protection Strategy's (WRAPS) Upper Neosho Project, project partners in Coffey County implemented several livestock and agricultural best management practices (BMPs) throughout the watershed. Bacteria levels dropped, and Big Creek and its tributaries now meet the bacteria criterion for primary contact recreation. As a result, KDHE removed three segments (approximately 56.6 stream miles) in the Upper Neosho watershed from Kansas' 2012 list of impaired waters for bacteria.

Problem

The headwaters of Big Creek (north and south branches) originate in the southwestern corner of Coffey County and parts of Greenwood and Woodson counties in southeastern Kansas. The Big Creek watershed drains approximately 132.5 square miles and is part of the Upper Neosho watershed (Figure 1). Big Creek flows into the Neosho River near the city of LeRoy; the Neosho eventually flows into the Grand Lake in northeast Oklahoma.

Most of the land use in the Big Creek watershed is grassland (72 percent), much of which is used for livestock grazing. Livestock contribute bacteria to the water source by introducing fecal matter. Cropland accounts for 25 percent of the land use in the watershed; it is found primarily along the main stem and impaired tributaries and in the lower portion of the watershed.

During 1992 and 1996, KDHE collected bacteria samples every two months. Of the eight samples taken during the primary recreation season, April through October, three exceeded the state criterion for primary contact recreation of 200 fecal coliform colony forming units (CFU) per 100 milliliters (mL). As a result, KDHE added three segments of Big Creek to the 1998 CWA section 303(d) list for bacteria impairment—the main stem of Big Creek (6.5 miles), Big Creek North Branch (26.7 miles) and Big Creek South Branch (23.3 miles) (see Figure 1 for location of impairments). In 2003, Kansas updated its bacteria standard and specified *E. coli* as the indicator bacteria and the frequency of sampling as

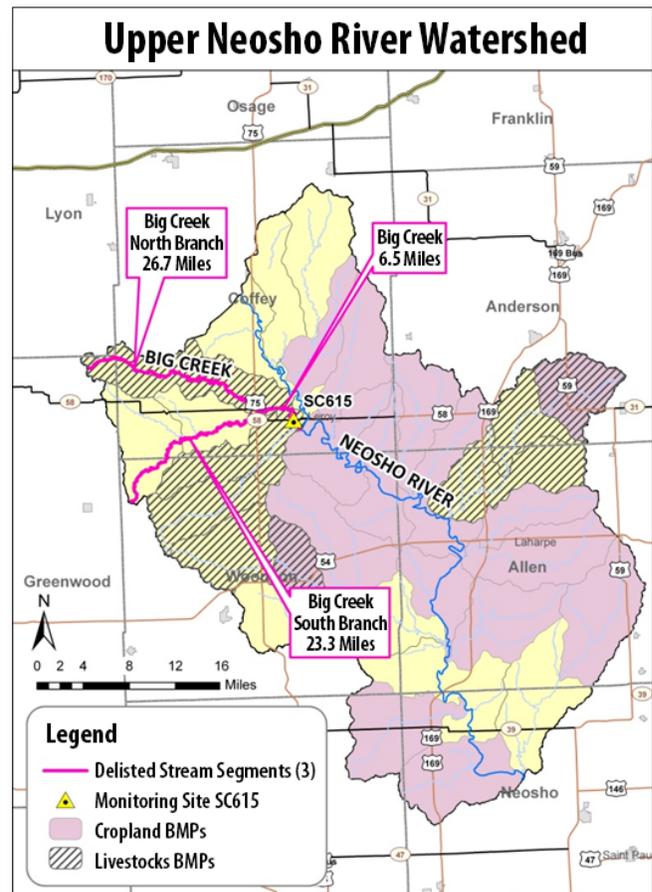


Figure 1. Big Creek is in the Upper Neosho River watershed in southeastern Kansas. Using a cooperative approach, stakeholders implemented numerous agricultural BMPs throughout the watershed.

five samples over a 30-day period. The law does not provide single-sample maximum criteria for streams. The specific *E. coli* bacteria criterion for Big Creek is a geometric mean of 427 CFU/100 mL.

In 2002, EPA approved KDHE's total maximum daily load (TMDL) for Big Creek, which addressed the bacteria impairment. The TMDL identified fecal pollution as the primary suspected contributor of bacteria in the creek and recommended that pollution-reduction activities be directed at small, unpermitted livestock operations and rural homesteads and farmsteads along the river.

Project Highlights

Since 2002, the Coffey County Conservation District, Woodson County Conservation District, U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), Kansas Department of Agriculture's Division of Conservation (KDA-DOC), and Upper Neosho River WRAPS have worked with local landowners to implement agricultural BMPs throughout the watershed. The cropland and livestock BMPs have included implementing 32,332 acres of prescribed grazing; planting 325 acres of pasture and hay land; repairing/restoring 20 agricultural ponds, which serve as alternative watering sources for livestock; planting 228 acres of filter strips (dense grass sod strips that serve as a border around cropland, which can help filter sediment, nutrients and other pollutants in agricultural runoff); adding 25 acres of critical area planting to reduce runoff into the creeks; and installing 91,407 linear feet of livestock fencing, 24 watering facility units and 6,397 linear feet of pipeline to facilitate alternative livestock watering systems. (See Figure 1 for BMP locations throughout the watershed.) In addition, project partners repaired and rehabilitated 30 failing onsite wastewater systems, which had contributed bacteria loading to the creeks.

Results

KDHE conducted intensive monitoring (five samples in a 30-day period) four times over the primary recreation season (April through October) in 2007 and again in 2011 at the monitoring station along Big Creek near LeRoy. The number of samples collected allowed KDHE to calculate eight geometric means, all of which met the *E. coli* bacteria criterion of 427 CFU per 100 mL maximum geometric mean (Figure 2).

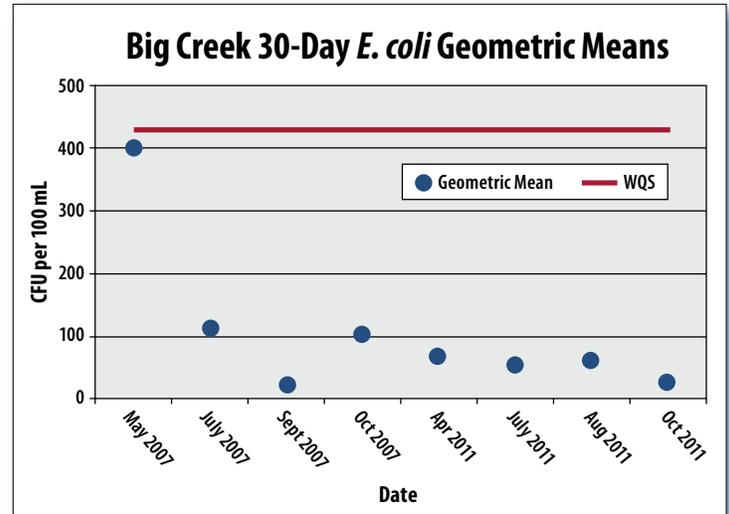


Figure 2. Data show that *E. coli* levels in Big Creek meet the water quality criterion of 427 CFU/100 mL maximum geometric mean.

These data indicate that the main stem of Big Creek, Big Creek North Branch and Big Creek South Branch now meet the state's water quality criterion for bacteria and therefore support their primary recreation designated uses. As a result, in 2012 KDHE removed the three segments (approximately 56.6 stream miles) from Kansas' list of impaired waters for bacteria.

Partners and Funding

The success of this project can be attributed to several local, state and federal partners, including Coffey County Conservation District, Woodson County Conservation District, KDA-DOC, Kansas State University, U.S. Environmental Protection Agency (EPA), EPA Region 7, Kansas Rural Center, Kansas Alliance for Wetlands and Streams, NRCS and participating landowners.

The project was supported by EPA CWA section 319 funds, including a 2003 Upper Neosho WRAPS Development grant (\$30,000), a 2004 Upper Neosho WRAPS Assessment and Planning grant (\$90,000), two Upper Neosho WRAPS Implementation grants in 2009 and 2010 (\$126,188), a Kansas Rural Center grant, and a 2009 KDA-DOC Water Quality Buffer Partnership grant. The Kansas Department of Agriculture's Division of Conservation, NRCS and local landowners provided additional support.



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