Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
Kansas

Cooperative Watershed Management Reduces Bacteria Levels in Mill Creek

Waterbodies Improved

Nonpoint source pollution from grazing land and small animal feeding operations affected water quality in the Mill Creek watershed, prompting the Kansas Department of Health and Environment (KDHE) to add the river and most of its tributaries to the state's 1998 Clean Water Act (CWA) section 303(d) list of impaired waters for bacteria. Project partners implemented several livestock best management practices (BMPs) throughout the watershed. Watershed monitoring data collected between 2000 and 2009 showed that the waterbodies designated for primary contact recreation use in the Mill Creek watershed met the current bacteria criteria. On the basis of these data, KDHE removed five stream segments (totaling 73.7 miles) in the Mill Creek watershed from the 2010 list of impaired waters for the bacteria impairment.

Problem

The headwaters of Mill Creek originate in the upper northeast corner of Morris County in northeastern Kansas. The river flows northeast, draining numerous tributaries before it merges with the Kansas River near the city of Maple Hill (Figure 1). KDHE has designated the Mill Creek main stem, the east and west branches of Mill Creek, and Illinois Creek as "Exceptional State Waters," defined as any surface waters or surface water segments of remarkable quality or of significant ecological or recreational value. In addition, many streams in the Mill Creek watershed have been designated as "Special Aquatic Life Use (SALU)" waters. SALU waters are defined as surface waters that contain combinations of habitat types and indigenous biota not commonly found in the state or as surface waters that contain representative populations of threatened or endangered species. The state affords Exceptional State Waters and SALU waters the highest level of water quality protection.

The Mill Creek watershed is composed primarily of grazing land/grassland (84 percent); cultivated crops cover the Mill Creek floodplain. The livestock grazing density, 38 animal units per square mile, is uniform and moderate throughout the subwatersheds. In 1997 livestock inventories estimated approximately 46,600 cattle and 12,500 hogs within Wabaunsee County. The county is also ranked eighth in the state for the number of sheep (3,000 head).

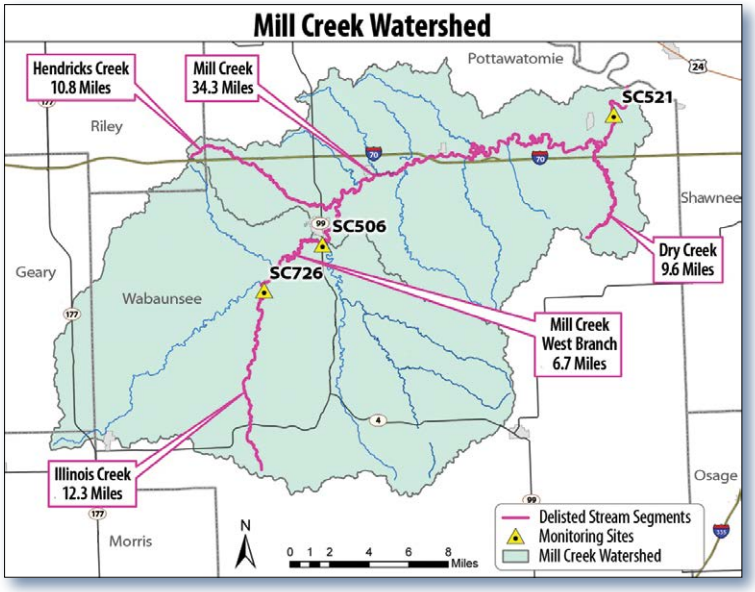

Figure 1. Mill Creek is in the Kansas River watershed in northwestern Kansas. As a result of restoration efforts, five waterbodies in the Mill Creek watershed were removed from the 2010 impaired waters list for bacteria.

Between 1990 and 1997, data collected at the Maple Hill monitoring station (SC521 on Figure 1) showed that fecal coliform bacteria (FCB) levels exceeded the state's water quality standard (200 colony forming units (cfu) per 100 milliliters (mL)) in 13 out of 29 samples. Similar trends at the Mill Creek West Branch monitoring station (SC506) also indicated FCB exceedances in that portion of the watershed.

On the basis of these data, in 1998 KDHE listed Mill Creek and most of its tributaries in the watershed as impaired for failing to meet FCB criteria to support the primary recreation designated use.

A watershed-wide total maximum daily load (TMDL) for bacteria was established in 2000 to direct efforts to reduce bacteria levels in the watershed. The TMDL identified small, unpermitted livestock operations and rural homesteads and farmsteads along the river as suspected nonpoint sources of the FCB impairment.

Project Highlights

Since 2003 the Wabaunsee County Conservation District and the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) have worked with local landowners to implement rangeland and livestock BMPs throughout the watershed to address the bacteria impairment. The BMPs included 32,333 acres of prescribed grazing and 6,054 acres of nutrient management on farms within the watershed. Partners also implemented BMPs to limit livestock access to waterbodies by repairing or restoring 28 agricultural ponds and installing 272 acres of livestock exclusion; 91,407 linear feet of livestock fencing; 32 water supply units (alternative livestock watering sources); and 6,397 linear feet of pipeline for alternative livestock watering systems. In addition, partners planted 228 acres of filters strips (areas of grass or other permanent vegetation) and 66 acres of riparian buffers to protect nearby streams from agricultural runoff. They also repaired or replaced 30 failing onsite wastewater treatment systems.

Results

The state's bacteria standards underwent changes in 2003. *Escherichia coli* replaced fecal coliform as the indicator bacteria, and impairment was determined by a geometric mean greater than 427 cfu/100 mL based on five samples taken over a 30-day period. Routine watershed monitoring for *E. coli* conducted in Mill Creek since 2003 indicated that bacteria levels had decreased to below the new primary contact recreation criterion. In 2008 KDHE conducted intensive bacteria monitoring in Mill Creek watershed during the primary recreation season (April to October). The 2008 monitoring data confirmed that bacteria levels had decreased and were meeting state water quality standards

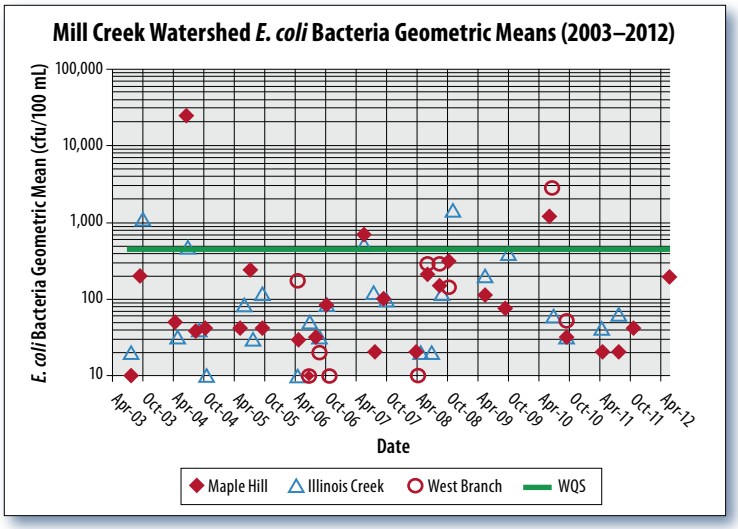

Figure 2. Recent data show that *E. coli* concentrations in the Mill Creek watershed are meeting state bacteria water quality standards for primary recreation (427 cfu/100 mL).

for primary contact recreation (Figure 2). On the basis of these results, KDHE removed five stream segments totaling 73.7 miles—Illinois Creek, Hendricks Creek, Mill Creek main stem, Mill Creek West Branch, and Dry Creek—from the state's 2010 list of impaired waters. An unusual weather event triggered one episode of elevated *E. coli* in summer 2010. However, since then, bacteria levels in Mill Creek watershed have remained low enough to maintain the delisted status of the streams.

Partners and Funding

The Mill Creek watershed is in the Middle Kansas Watershed Restoration and Protection Strategy (WRAPS) project area. Therefore, Mill Creek was part of an EPA-approved, nine-element watershed-based planning process developed for the entire Middle Kansas WRAPS project area, which provided a blueprint for protection and restoration activities to protect and restore surface waters. CWA section 319 funding was used for the project development phase ($51,203) and assessment/planning phase ($75,000) of this project (not BMP implementation). The ultimate success of this project can be attributed to local, state and federal partners who provided key technical and financial support for implementation, including the Wabaunsee County Conservation District (contributed $364,361 to implement BMPs); the Wabaunsee County NRCS office (contributed $119,917 to implement BMPs); and local landowners.

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For additional information contact:

Amanda Reed
Kansas Department of Health and Environment
785-296-7165 • akreed@kdheks.gov