



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Kansas

Collaborative Watershed Management Improves Dissolved Oxygen Levels in Eagle Creek

Waterbody Improved

Nonpoint source pollution from grazing land and cropland affected water quality in the Eagle Creek watershed, prompting the Kansas Department of Health and Environment (KDHE) to add the stream to the state's 1998 Clean Water Act (CWA) section 303(d) list of impaired waters for low levels of dissolved oxygen (DO). The Coffey County Conservation District developed a Kansas Watershed Restoration and Protection Strategy (WRAPS) for Eagle Creek, which guided implementation of agricultural best management practices (BMPs) throughout the watershed. Stream monitoring data collected between 2000 and 2011 show that Eagle Creek now meets the DO criteria required to protect the aquatic life support designated use. As a result, KDHE has removed one segment in the Eagle Creek watershed from the state's 2012 list of impaired waters for the DO impairment.

Problem

Eagle Creek originates in southern Lyon County and flows into the western portion of Coffey County, in east-central Kansas. This relatively small watershed (113.6 square miles) empties into the Neosho River, which flows into the John Redmond Reservoir south of the city of Hartford and the Flint Hills National Wildlife Refuge (Figure 1). Although grazing land/grassland is the predominant land use (63 percent of total) in the Eagle Creek watershed, cropland is commonly situated in bottom areas close to the stream.

To meet the state's water quality standard for supporting aquatic life, DO levels in surface waters must not fall below 5.0 milligrams per liter (mg/L). Monitoring data collected in the upper reaches of the watershed before 1998 included one DO sample that was below 5.0 mg/L. Pursuant to the state's standard, Eagle Creek was cited as impaired in 1998 on the Kansas CWA section 303(d) list for deficient DO levels. Data showed a second low-DO condition in 2001.

Kansas State University analyzed the Neosho headwaters and John Redmond Reservoir using a Soil and Water Assessment Tool (SWAT) model. The results indicated that the watershed contributed excessive nitrogen, phosphorus and sediment to the

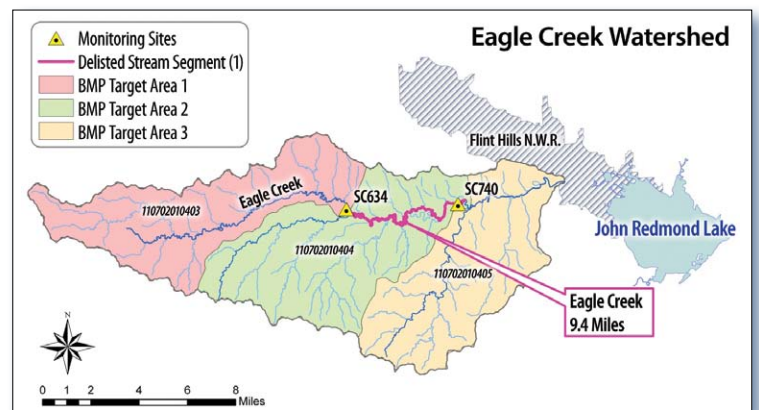


Figure 1. Targeted BMP implementation has restored a 9.4-mile segment of the main stem of Eagle Creek which led KDHE to remove the DO impairment.

reservoir, which serves as a regional water supply for Wolf Creek Nuclear Plant and drinking water supply for thousands of consumers. The SWAT model and local knowledge indicated that cropping in bottom lands and unconfined cattle operations were the primary contributors of nonpoint source pollution.

KDHE developed a total maximum daily load (TMDL) for Eagle Creek in 2003. The TMDL emphasized buffer establishment and stream restoration practices to address the DO impairment.

Project Highlights

In January 2004, KDHE used CWA section 319 funds to partner with the Coffey County Conservation District (CCCD) to develop and implement a watershed plan. Using the SWAT model results provided by Kansas State University, information from TMDLs and evaluation data from the federal Conservation Reserve Program, the CCCD identified Eagle Creek as a target watershed. Through a series of agency and town meetings, federal, state and local stakeholders formed a team to lead the watershed plan implementation effort.

A landowner, who later became an Eagle Creek WRAPS board member, allowed an Emporia State University team to monitor a segment where he



Figure 2. A landowner installed a fence to prevent cattle from accessing the stream.

had implemented a number of BMPs. He had installed a piped “filter” diversion, added critical area planting after removing a livestock wintering area adjacent to the stream, fenced a riparian area, and rotated crops with the beginning of no-till farming. His participation is thought to have informed other landowners and encouraged them to install BMPs (Figure 2).

Watershed landowners implemented numerous practices between 2004 and 2011, including 52.5 acres of critical area planting; 62.5 acres of filter strips; 23.6 acres of grassed waterways; 1874.3 acres of nutrient management planning; 7,045 acres of high-residue management using no-till, strip-till and/or direct seeding; and 1,018 acres of prescribed grazing. Other practices included 7,902 feet of diversion; 8,717 feet of fencing; 1,300 feet of pipeline for livestock water distribution; and 68,818 feet of terraces. Additional practices include eight ponds for livestock distribution and alternative water supplies, one underground outlet (for the diversion filter), two livestock waste systems and five waste storage facilities.

Results

Before 2001 KDHE maintained a monitoring station in the upper reaches of Eagle Creek that was

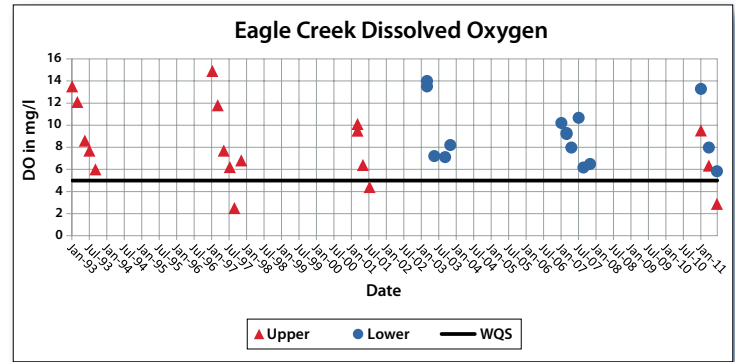


Figure 3. Data show that the lower reach of Eagle Creek meets the DO water quality standard.

presumed to represent the entire stream segment of Eagle Creek from the headwaters to the stream’s confluence with the Neosho River (approximately 32 stream miles). In 2002 KDHE moved the monitoring station farther downstream. Monitoring data collected in the lower reach since 2002 have shown that all DO samples have remained above the water quality standard of 5.0 mg/L since 2002 (Figure 3). As a result, KDHE removed the lower segment of Eagle Creek (approximately 9.4 miles) from the state’s 2012 list of impaired waters for the DO impairment. In 2011 KDHE collected concurrent samples at the original upstream site that showed continued occasional low-DO conditions for the upper reaches. Therefore, Upper Eagle Creek will remain listed as impaired for low DO.

Partners and Funding

The success of this project can be attributed to a number of local, state and federal partners, including Lyon and Coffey County Conservation Districts and their respective Natural Resources Conservation Service offices; Kansas Forest Service; Kansas Department of Agriculture, Division of Conservation; Kansas State University; U.S. Environmental Protection Agency (EPA) Region 7; Kansas Rural Center; Kansas Department of Wildlife and Parks and local landowners. Project funding to date has included several EPA CWA section 319 grants, including a \$5000 grant to develop the WRAPS plan and two grants (\$40,000 and \$74,020) to implement the plan. The project also received approximately \$40,000 in Kansas State Water Plan Funds for implementation.



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