



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

South Dakota

Implementing Best Management Practices Reduces Sediment Loading in Choteau Creek

Waterbody Improved

Nonpoint sources of pollution, including upland erosion from agricultural land uses, contributed to sediment loading entering South Dakota's Choteau Creek. Water quality monitoring demonstrated that elevated total suspended solids (TSS) levels and low dissolved oxygen (DO) concentrations were preventing the creek from supporting its warm-water semi-permanent fish life propagation designated use. As a result, in 2004 the South Dakota Department of Environment and Natural Resources (DENR) added a 42-mile-long segment of Choteau Creek to the state's Clean Water Act (CWA) section 303(d) list of impaired waters for TSS and DO impairment. The Randall Resource Conservation and Development Council (RC&D) led efforts to implement agricultural best management practices (BMPs) in the watershed. The restoration efforts contributed to water quality improvement, prompting the state to remove Choteau Creek from the impaired waters list for DO (2008) and TSS (2012).

Problem

Choteau Creek originates in Douglas and Aurora counties and flows south through Bon Homme, Charles Mix, and Hutchinson counties before discharging into Lewis and Clark Lake, an impoundment on the Missouri River near Yankton, South Dakota (Figure 1). The creek drains 375,000 acres of predominantly agricultural land (including 45 percent grass, 40 percent row crops and 7 percent small grains), 6 percent developed land, 1 percent forest, and 1 percent water and wetlands.

Water quality monitoring conducted in the late 1990s and early 2000s indicated that TSS and DO concentrations violated the criteria in place to support Choteau Creek's warm-water semi-permanent fish life propagation designated use. To meet the criteria, no TSS samples may exceed 158 milligrams per liter (mg/L) and a maximum monthly mean of 90 mg/L; no more than 10 percent of DO concentrations may fall below 4.0 mg/L. Water quality monitoring in the creek showed that more than 10 percent of samples exceeded the TSS criterion of 158 mg/L. In addition, more than 10 percent of samples fell below the DO criterion of 4.0 mg/L. Based on these data, in 2004 DENR added a 42-mile-long segment of Choteau Creek (from Lewis and Clark Lake to the City of Wagner) to South Dakota's CWA section 303(d) list of impaired waters because of TSS and DO impairment.

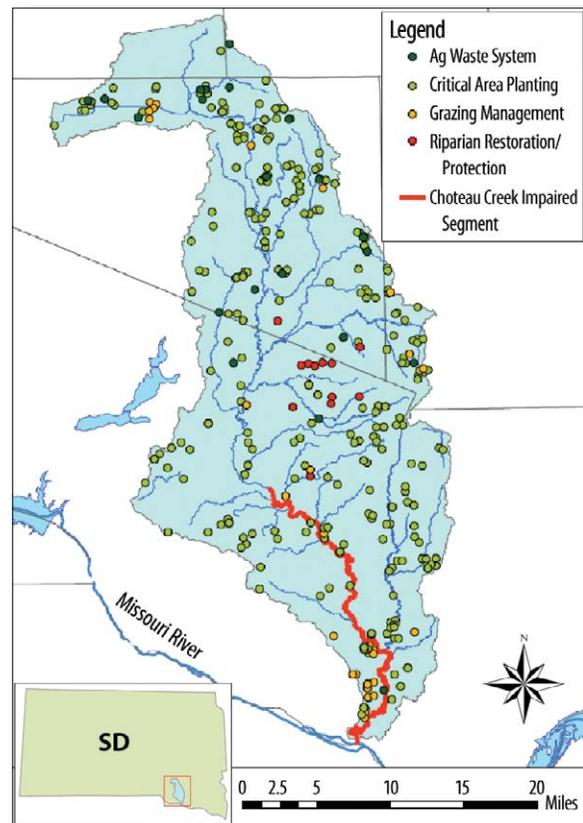


Figure 1. Project partners implemented numerous best management practices in South Dakota's Choteau Creek watershed.

Water quality assessments conducted in 2006 identified agricultural land uses as the major sources of pollutants in the watershed. DENR finalized a TSS total maximum daily load (TMDL) for Choteau Creek in 2010. The TMDL identified upland erosion, as well as streambed and stream bank erosion, as nonpoint sources contributing to TSS impairment. The TMDL noted that these and other factors, including poorly designed road crossings and agricultural pressures in and around the creek, likely contributed to degraded channel stability conditions in the lower portions of Choteau Creek.

Project Highlights

In 2006 the Randall RC&D led the first phase of the Lewis and Clark Lake Watershed Project to restore the beneficial uses of watersheds surrounding the lake (including Choteau Creek watershed) by implementing BMPs to address sediment, nutrients and fecal coliform bacteria. Project coordinators were managed through an agreement between the Randall RC&D and the South Dakota Association of Conservation Districts. The coordinators, who supervised the overall implementation of the multiyear project, were supported by CWA section 319 funds and worked out of the local U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) office. In 2007 project partners formed a steering committee, composed of representatives from 11 conservation districts and federal and state sponsoring agencies, to help target financial and technical assistance resources to guide BMP implementation.

Project partners organized local agricultural producer meetings and workshops, and they distributed educational materials to promote project awareness and to provide producers with information on resources available to support BMP design and installation. USDA NRCS staff partnered closely with local conservation districts to provide technical assistance for designing and installing BMPs.

Between 2006 and 2011, project partners worked with local producers in Choteau Creek watershed to implement a number of agricultural BMPs (see Figure 1), including four animal waste management systems, more than 1,500 acres of grazing management, and 3,200 linear feet of livestock exclusion and riparian restoration and protection (Figure 2). Landowners also implemented more than 8,000 acres of cropland BMPs that help reduce soil erosion, including critical area planting, cropland filter strips, cropland conversion to permanent grass cover, and grassed waterways (Figure 3).

Results

DO sampling conducted in Choteau Creek in 2006 and 2007 showed a high of 13.8 mg/L, a low of 7.6 mg/L, and an average of 10.2 mg/L, indicating that the creek now meets the DO criterion necessary to support its warm-water, semi-permanent fish life propagation designated use. TSS sampling collected from 2009 to 2011 showed a high of 684 mg/L, a low of 3 mg/L, and an average of 84 mg/L. Less than 10 percent of the TSS samples exceeded 158 mg/L, indicating that Choteau Creek also meets the TSS criterion to support its use. On the basis of these data, DENR removed the 42-mile-long segment of Choteau Creek from its impaired waters list for DO (2008) and TSS (2012).

Modeling results indicate that agricultural BMPs implemented in the watershed should yield the following annual loading reductions: 226,620 pounds of nitrogen, 37,407 pounds of phosphorus and 22,453 tons of sediment. In the next phase of the project, partners will continue implementing BMPs throughout the watershed.

Partners and Funding

The project's success is largely attributed to coordination between the local, state and federal agencies and organizations, including the Randall RC&D; Gregory, Hamill, Clearfield/Keyapaha, Todd, Aurora, Bon Homme, Charles Mix, Davison, Douglas, Hutchinson, and Yankton conservation districts; South Dakota Conservation Commission; South Dakota Department of Agriculture; South Dakota DENR; South Dakota Game, Fish and Parks; USDA NRCS; U.S. Fish and Wildlife Service; and U.S. Environmental Protection Agency.

A total of \$1,699,800 in CWA section 319 funds supported technical assistance and training for water quality sampling, project management and BMP implementation. South Dakota, the State Conservation Commission, and watershed landowners provided cash and in-kind matching funds totaling \$1,671,872. USDA provided technical and financial assistance (including \$1,024,039 in Environmental Quality Incentives Program funds) to implement BMPs.



Figure 2. Landowners restored riparian areas to filter runoff and prevent erosion.



Figure 3. Landowners installed grassed waterways to filter runoff.



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