



## Section 319

# NONPOINT SOURCE PROGRAM SUCCESS STORY

# South Dakota

## Implementing Best Management Practices Reduces Polluted Runoff

### Waterbody Improved

When data showed that Medicine Creek was violating water quality standards for conductivity and total dissolved solids (TDS), the South Dakota Department of Environment and Natural Resources (SDDENR) added the creek to the state's 2002 Clean Water Act (CWA) section 303(d) list. Data collected during a 2003–2005 assessment showed that fecal coliform bacteria and total suspended solids (TSS) concentrations also exceeded the standards, prompting SDDENR to add those parameters to Medicine Creek's list of impairments in 2006. The American Creek Conservation District worked with landowners to implement best management practices (BMPs) to reduce sediment, nutrient and bacterial loadings. Water quality has improved, and the state's standards are now being met. As a result, in 2008 SDDENR removed Medicine Creek from the state's impaired waters list for conductivity, TDS, TSS and fecal coliform.

### Problem

The 390,072-acre Medicine Creek watershed is part of the Missouri River Basin in south-central South Dakota's Lyman and Jones counties (Figure 1). The predominant land uses in the watershed include cropland (about 31 percent) and rangeland and pastureland (about 59 percent). The watershed has 38 animal feeding operations. The Lower Brule Indian Reservation is in the northeastern portion of the watershed. Medicine Creek passes through part of the reservation before it joins the Missouri River.

Data showed that high conductivity and TDS levels caused Medicine Creek to fail to support its designated water uses, including warm water marginal fish life propagation, limited contact recreation, fish and wildlife propagation, and stock watering and irrigation. As a result, SDDENR added an 83.4-mile segment of the creek (from U.S. Highway 83 to the creek's mouth) to the CWA section 303(d) list in 2002.

SDDENR developed a total maximum daily load (TMDL) in 2005. Data collected during the TMDL assessment indicated that two additional water quality parameters, TSS and fecal coliform bacteria, violated South Dakota's surface water quality standards. The TMDL study pinpointed nonpoint source agricultural land uses (cropland and pastureland) and animal feeding operations in the watershed as the major sources of TSS and fecal coliform bacteria. Two municipal wastewater

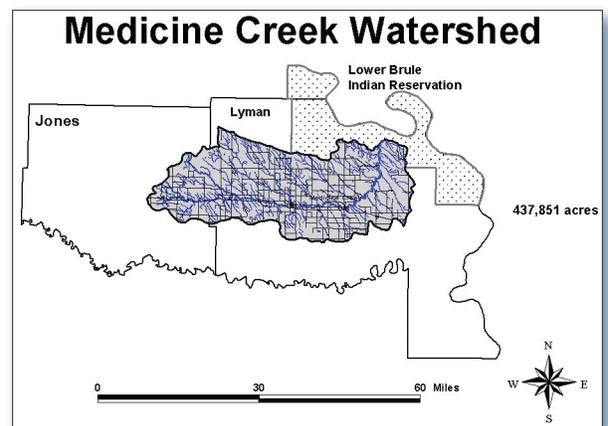


Figure 1. Medicine Creek drains portions of two counties before it enters the Missouri River.

treatment facilities in the watershed (Presho and Kennebec) discharge only periodically and are considered minor sources. The tribal portion of the Medicine Creek watershed was not included in the TMDL study area.

To restore Medicine Creek, the TMDL study recommended that TSS loads be reduced by 20.1 percent and fecal coliform loads be reduced by 18.3 percent. The assessment data show that violations of the conductivity and TDS standards might be attributable to natural conditions (the geologic makeup of the basin) and that the violations occur exclusively during low-flow conditions.

## Project Highlights

Between 2005 and 2010, the American Creek Conservation District worked with landowners to install BMPs throughout the Medicine Creek watershed (Figure 2). The BMPs included animal waste management systems (Figure 3), marginal pastureland riparian buffers, cropland filter strips, conversion of cropland to permanent grass cover, grassed waterways (Figure 4), managed grazing, and the repair or replacement of sediment dams.

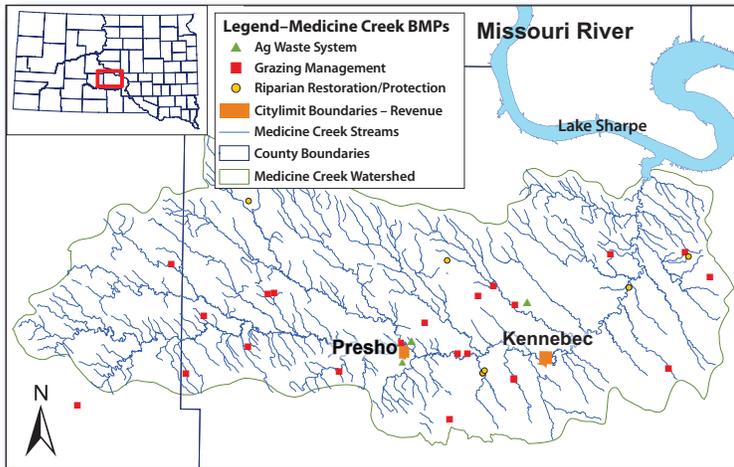


Figure 2. Landowners installed BMPs throughout the Medicine Creek watershed.



Figure 3. Landowners installed animal waste systems like this pond, which collects and holds manure-laden runoff.



Figure 4. Grassed waterways intercept and filter runoff from cropland in the watershed.

To ensure the continued success of this project, the American Creek Conservation District is monitoring the installed practices and promoting the implementation of additional BMPs.

## Results

Water quality monitoring data collected during summer 2008 indicated that Medicine Creek met standards for all of its listed parameters (Table 1). Therefore, in 2008 SDDENR removed the 83.4-mile-long segment of Medicine Creek from the state's impaired waters list for its TSS, conductivity, TDS and fecal coliform impairments.

**Table 1. Water Quality Monitoring Data for Medicine Creek, Summer 2008**

Parameter <sup>1</sup>	Data Results	Water Quality Standard
TSS (in mg/L)	60	263
Conductivity (in $\mu$ mhos/cm)	2884	4375
TDS (in mg/L)	2453	4375
Fecal coliform bacteria (counts/100 mL)	582	2000

<sup>1</sup>mg/L: milligrams per liter;  $\mu$ mhos/cm: micromhos per centimeter; mL: milliliters

## Partners and Funding

The success of the project is largely the result of participation by numerous local, state and federal agencies and organizations, including the American Creek Conservation District; South Dakota Conservation Commission; South Dakota Department of Agriculture; South Dakota Department of Environment and Natural Resources; South Dakota Game, Fish and Parks; Natural Resources Conservation Service, and U.S. Fish and Wildlife Service.

A total of \$243,653 in CWA section 319 funds supported this project. The State Conservation Commission and landowners provided matching funds and in-kind services. The Natural Resources Conservation Service's Environmental Quality Incentives Program provided additional federal funds for BMP implementation.



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