



# NONPOINT SOURCE SUCCESS STORY

## North Dakota

### Long-Term Best Management Practice Implementation Reduces Bacteria Loading in Antelope Creek and the Wild Rice River

#### Waterbody Improved

Antelope Creek in Richland County, North Dakota, was listed on the 2004 Clean Water Act (CWA) Section 303(d) list for fecal coliform and pathogen impairments affecting recreation beneficial uses. Likely contributing sources include animal feeding operations, hobby farms, wildlife and failing septic systems. With support from North Dakota's Nonpoint Source Pollution Management Program, the Richland County Soil Conservation District (SCD) first began monitoring the watershed in 1995, then initiated a watershed implementation project in 2005 to address these impairments. SCD used CWA Section 319 funds to conduct septic system repairs and replacements, decommission wells, build livestock water facilities, add fencing, and implement cover crops to reduce bacteria loading and sediment delivery to streams. Water quality data collected throughout the multiphase project shows declining trends in bacteria levels in Antelope Creek, indicating measurable progress toward fully restoring recreational uses.

#### Water Quality Challenge

Antelope Creek is within a 122,923-acre watershed in Richland County, North Dakota, that flows into the Wild Rice River in the Red River Basin (hydrologic unit code 09020105). The Antelope Creek watershed lies largely within the Lake Agassiz Plain, a very flat landscape that has been widely converted to production agriculture (e.g., corn, soybeans, wheat, sugar beets). This setting makes the creek highly responsive to intense early summer storms, when overland runoff and short-duration high flows can rapidly transport pollutants to nearby waterbodies. Additionally, septic failures attributed to improper installation, poor site locations, inappropriate system selection and inadequate maintenance were affecting water quality in the creek. In 2004, the North Dakota Department of Environmental Quality (ND DEQ) determined that the recreational uses in the Wild Rice River were impaired by pathogens. In 2008, ND DEQ determined that the recreational uses in Antelope Creek, from the headwaters to the Wild Rice River (ND-09020105-005-S\_00), were impaired by fecal coliform/*Escherichia coli*. In addition to bacteria issues, these waterbodies are impaired by sedimentation/siltation and habitat alterations. ND DEQ has promoted addressing these issues at a broader watershed scale to comprehensively address the common sources of water quality degradation.

Subsequent Integrated Reports list these impairments as well as broader water quality use concerns, including the Fish and Other Aquatic Biota designated use not being supported due to sedimentation/siltation and bioassessment indicators.

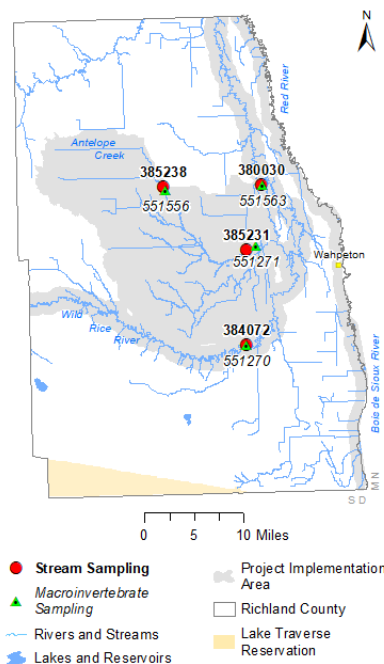


Figure 1. Project area and sampling sites for the current phase (VII) of the Antelope Creek Watershed and the Wild Rice Corridor Implementation Project.

## Project Highlights

From 2006 to 2025, the SCD focused on practical best management practices (BMPs) proven to treat the nonpoint source pollution concerns identified through field reconnaissance, partner input and watershed sampling within the larger Antelope/Wild Rice watershed area (Figure 1). The SCD supported producers, landowners and the public by providing one-on-one technical assistance and coordinating with local partners/contractors. This approach allowed work to continue steadily while building long-term participation across the watershed. The practices installed under this watershed project aimed to improve cropland and pasture management, address failing/damaged septic systems (Figure 2), and properly decommission unused or unsafe wells. This long-term effort produced over 20 years of data, making it possible to assess changes in bacteria levels in Antelope Creek over time in response to conservation practices and septic system management.



Figure 2. Septic system replacement mid-completion.

Best Management Practice	Number Installed	Units	Comments
Waste Management System	1	SYSTEM(s)	
Water Well	6	INDIVIDUAL UNITS	
Onsite Waste Water Treatment System (New/Existing)	261	INDIVIDUAL UNITS	
Fence	20359	LINEAR FEET	
Riparian Herbaceous Cover	211	ACRES	
Streambank & Shoreline Protection	5200	LINEAR FEET	
Cover Crop	11907	ACRES	
Well Decommissioning	96	INDIVIDUAL UNITS	
Watering Facility	3	SYSTEM(s)	

## Results

Overall, decreases were observed at the watershed scale (using data from Antelope Creek and Wild Rice River) in bacteria levels from the pre-BMP phase to Phase V (Figure 3). While exceedances were observed in annual geometric means in Phase I of the BMP implementation, all years, when adjusted for spatial and seasonal variability, showed bacteria levels below the state's water quality criteria for *E. coli* of 126 colony-forming units (cfu)/100 milliliters (mL) (Figure 4). Values presented in these figures are a representation of bacteria levels at the watershed scale rather than individual sites or assessment units.

Given that the primary BMPs implemented in this watershed were septic system repairs/replacements and well decommissionings, significant reductions in bacteria levels were expected and ultimately observed through the data collected. Site-level exceedances have continued to occur in this watershed, including on the Wild Rice River, as illustrated in the recently approved total maximum daily load report for *E. coli* (2024). However, a holistic assessment at the watershed scale illustrates a significant reduction in bacteria levels over the last 20 years. This data highlights temporal improvements in overall watershed health, supporting the water quality improvement goals for the Antelope Creek Watershed and Wild Rice Corridor Implementation Project.

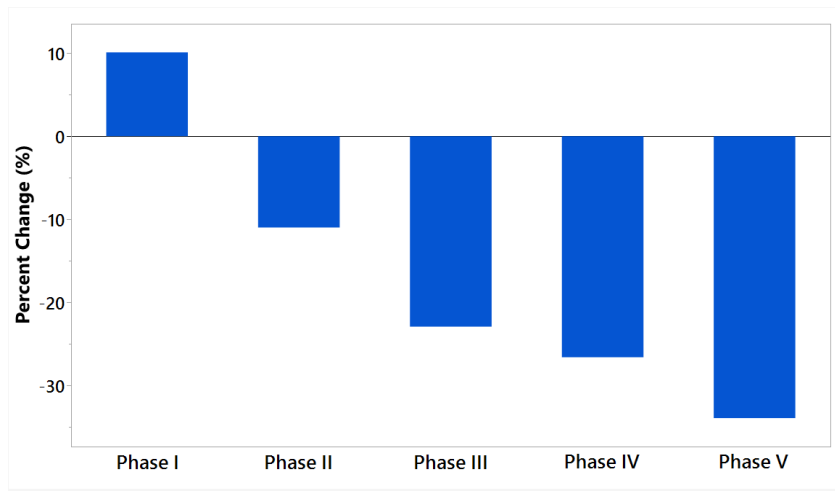


Figure 3. Overall percent change in bacteria levels across all BMP phases in the Antelope Creek Watershed.

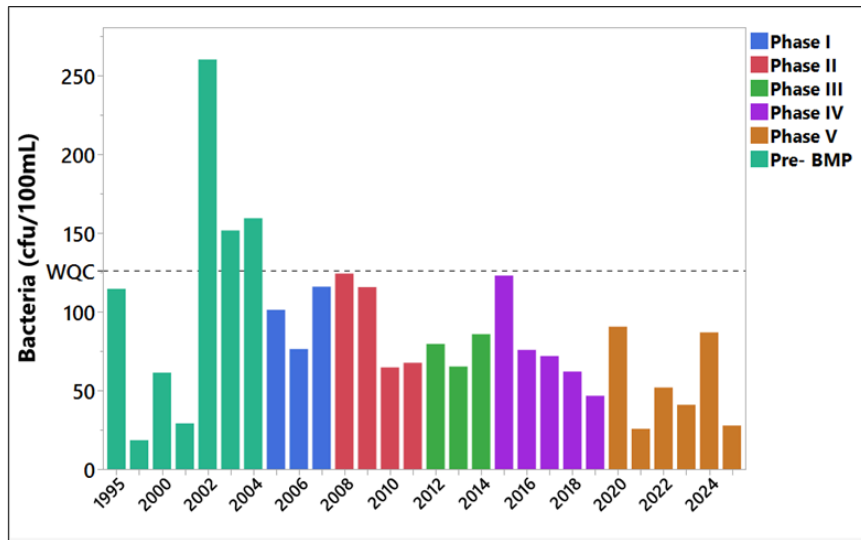


Figure 4. Geometric means of bacteria levels in the Antelope Creek Watershed from 1995-2025. Dashed line represents the current water quality criterion for E. coli.

## Partners and Funding

Partner Type	Agency	Funding	Notes
Federal	USDA FARM SERVICES AGENCY	-	Funding was used to support BMP implementation in the watershed through FSA programs, but was not match for Section 319 funds. Technical assistance was provided to the SCD for use of both FSA and Section 319 funds.
Federal	Clean Water Act Section 319	\$3,845,386	
Federal	USDA NRCS	-	Funding was used to support BMP implementation in the watershed through NRCS programs, but was not match for Section 319 funds. Technical assistance was provided to the SCD for use of both NRCS and Section 319 funds.



U.S. Environmental Protection Agency  
Office of Water  
Washington, DC

### For additional information contact:

**Jennifer Klostreich**  
Richland County Soil Conservation District  
701-642-5997 • [jen.klostreich@nd.nacdnet.net](mailto:jen.klostreich@nd.nacdnet.net)  
**Emilee Novak**  
North Dakota Department of Environmental Quality  
701-328-5240 • [ejnovak@nd.gov](mailto:ejnovak@nd.gov)