



# NONPOINT SOURCE SUCCESS STORY

## North Carolina

### Agriculture Best Management Practice Implementation Improves Smith Creek

#### Waterbody Improved

Smith Creek in Warren County was originally listed as impaired for biological integrity (specifically fish community) in 2002. With no permitted discharges in the watershed, the North Carolina Department of Environment and Natural Resources Division of Water Resources (DWR) and the Warren County Soil and Water Conservation District (SWCD) started a partnership to address agricultural nonpoint source pollution, which was deemed the main culprit. DWR and Warren SWCD began to plan and implement a path to recovery. The nonpoint source pollutants that are targeted in this effort include nitrogen, phosphorus, sedimentation, pathogens/bacteria and low dissolved oxygen. A number of agricultural best management practices (BMPs) were installed during the grant period that resulted in a delisting for the biological integrity parameter in 2016.

#### Problem

The 34,500-acre Smith Creek watershed is in Warren County, North Carolina (Figure 1). The Smith Creek watershed is part of the larger Roanoke River basin. The primary objective of this project is to develop and implement a watershed restoration plan to address the severe sedimentation problems of Smith Creek. The Smith Creek Agriculture Sediment Initiative will restore degraded waters by targeting and implementing BMPs, which will directly reduce sediment delivery to the listed impaired waters. Other benefits can be expected as well because many of the proposed BMPs will prevent off-site movement of pesticides, phosphorus, nitrogen and fecal coliform.

Improvements in streambank stability and habitat for fish and macroinvertebrates will also be realized. Smith Creek was listed on North Carolina's 2002, 2004 and 2006 Clean Water Act (CWA) section 303(d) lists because of biological impairment (specifically fish community impairment). Erosion and sedimentation from agriculture has been identified as the potential source of impairment. The overall goal is removing Smith Creek from North Carolina's CWA section 303(d) list.

#### Project Highlights

The Warren County SWCD wrote and implemented 24 BMP contracts between July 2005 and September 2008. A total of 753 acres were positively affected by

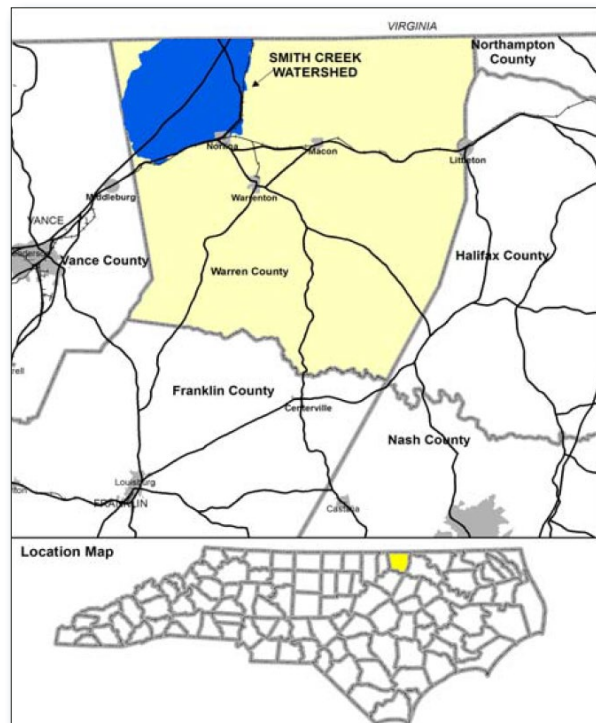


Figure 1. Smith Creek in Warren County is along the North Carolina–Virginia state line.

project BMP implementation. A total of 24,000 feet of livestock exclusion fencing was installed to prevent stream access and provide a buffer between pastureland and Smith Creek (Figure 2). More than 18 water troughs (alternative watering facilities) were installed



Figure 2. Landowners installed cattle exclusion fence to protect surface waters from nonpoint source pollution.

to provide drinking water to cattle, which previously received water from stream access. Stream crossings and stock trails were also installed to allow movement of livestock for alternate grazing purposes. The trails allow cattle to move from one pasture to another, which permits the regeneration of grasses and stabilization of pasture.

## Results

The project's overall effectiveness was evaluated by assessing the installed BMPs and the relative outputs according to the Revised Universal Soil Loss Equation (RUSLE), Nitrogen Loss Estimation Worksheet (NLEW), and the Phosphorous Loss Assessment Tool (PLAT), which showed the following load reductions in Smith Creek: 6,207 pounds per year (lbs/yr) nitrogen, 3,534 lbs/yr phosphorus, and 5,820 tons/yr sediment.

As a result of pollution removal, the health of the creek's fish populations significantly improved. In April 2004, the creek received a rating of *fair*. By June 2014, the rating had improved to *good-fair*, which indicates fish community beneficial use support. As a result, DWR removed the biological integrity impairment (for fish community) from the CWA section 303(d) list in 2016 for the lower segment of Smith Creek, Assessment Unit 12-10c (from State Route 1208 to North Carolina–Virginia state line).

## Partners and Funding

In addition to North Carolina Division of Soil and Water Conservation staff, others who were vital in the implementation phase of the project included Warren County SWCD, NRCS Soil Survey Office, and area NRCS staff. A total of \$130,000 was requested to adequately fund the Smith Creek Agricultural Sediment Initiative and was awarded via the CWA Section 319 Program. In addition, the North Carolina Agricultural Cost Share Program provided \$108,000 for implementation and \$32,000 in technical assistance free of charge.



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### For additional information contact:

**Thomas Hill**, NC Department of Agriculture and  
Consumer Services

919-707-3778 • [Thomas.Hill@ncagr.gov](mailto:Thomas.Hill@ncagr.gov)

**Heather Jennings**, NC Department of Environmental Quality  
919-807-6437 • [Heather.b.jennings@ncdenr.gov](mailto:Heather.b.jennings@ncdenr.gov)