NONPOINT SOURCE SUCCESS STORY

Maryland

Washington County Soil Conservation District Rehabilitates Winders Farm Property and Improves Antietam Creek

Waterbody Protected

In 1996, Antietam Creek was placed on Maryland's Clean Water Act (CWA) Section 303(d) List of Impaired Waters for sediment; in 2002, it was also listed for fecal bacteria impairment. Total maximum daily loads (TMDLs) for sediment and bacteria were developed in 2008 and 2009. The Washington County Soil Conservation District (WCSCD) undertook a comprehensive project to address nonpoint source pollution and bacteria loading to little Grove Creek, a tributary in the Antietam Creek watershed. The project work was consistent with goals outlined in the 2012 Antietam Creek Watershed Restoration Plan. Various agricultural best management practices (BMPs) were installed on the property to reduce runoff and prevent pollutants from flowing into Grove Creek.

Water Quality Challenge

Agriculture, in particular the dairy industry, makes up 42% of the land use in the Antietam Creek watershed. Antietam Creek's restoration plan identifies Little Antietam Creek and Little Grove Creek, where Winders Farm is located, as Phase 1 priority subwatersheds for stream restoration and bacteria BMP implementation The original Winders Farm was a dairy milking facility. The farm was purchased as a heifer facility in 2003. The Maryland Department of Environment (MDE) conducted a synoptic (i.e., a combination of multiple samples from the same location) water quality study and identified Winders Farm as a potential hotspot.

In 2014, MDE conducted focused water quality testing at five sites, including Grove Creek station 18, for nutrients, bacteria, cattle-specific DNA marker-bacteria, and nitrogen source tracking with isotopes (Figure 1). (Nonpoint source pollution runoff from Winders Farm flows directly into the stream at station 18.) Testing indicated that cattle were the substantial source of nitrogen and bacteria at station 18. Bacteria were also identified originating from a septic system.

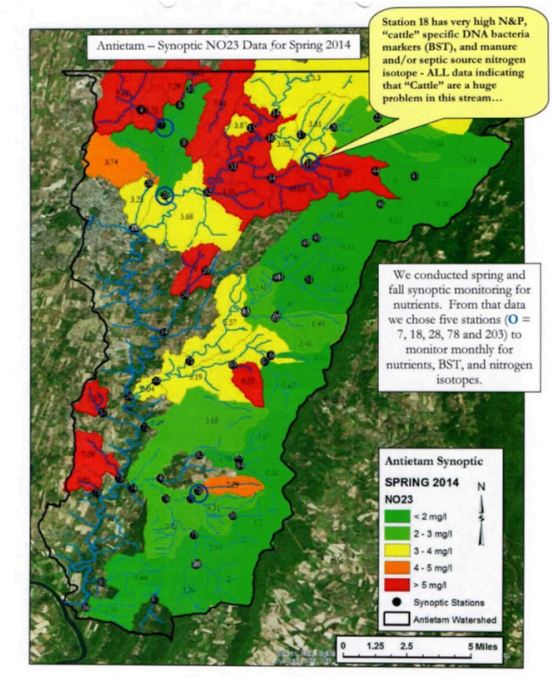

Figure 1. Map showing the location of Antietam Creek synoptic study sites.

Project Highlights

During 2003–2013, WCSCD updated conservation plans, developed Conservation Reserve Enhancement Program (CREP) proposals, and investigated various citizen complaints in watersheds (Figure 2). A comprehensive mitigation project took place in three phases beginning in 2016. Phase 1, completed in 2017, included stream fencing, alternative watering sources for livestock, and riparian forest buffer establishment. This phase of the project was accomplished with state and federal funds made available to the landowner under CREP. Phase 2 was completed 2017–2019 and provided for reduction of bacteria from an antiquated septic system by installing a best available technology (BAT) septic system. Phase 2 also included the installation of agricultural BMPs (loafing lot management) and the design of agricultural BMPs to address excess nutrient and manure runoff from the Winders dairy heifer operation. Phase 3 made use of the project designs developed in Phase 2 and was funded in part by a CWA Section 319 grant. This phase was completed in 2019 and included decommissioning of an existing animal waste storage system, the construction of two waste storage structures and a roofed animal feeding heavy use area, development of roof runoff management, and construction of grassed waterway as part of the loafing lot management BMP (Figures 3 and 4). Matching funds were provided by the Maryland Department of Agricultural Water Quality Cost Share Program (MACS) for the agricultural BMPs. Matching funds for the BAT septic system was provided by the Chesapeake Bay Restoration Fund.

Figure 2. Project area pictures before implementation.

Best Management Practice	Number Installed	Units	Comments
Watering Facility	2	INDIVIDUAL UNITS	
Roof Runoff Management	3	INDIVIDUAL UNITS	
Vegetative Buffer Strips	1	AC	
Stream Exclusion Fencing	1750	LINEAR FEET	
Riparian Forest Buffer	2.36	AC	
Waste Storage Facility	2	INDIVIDUAL UNITS	
Onsite Waste Water Treatment System (centralize)	1	INDIVIDUAL UNITS	
Heavy Use Area Protection	.1	AC	

Results

Upon completion of the Winders Farm project (which spanned three phases of BMP implementation) and pursuant to the Antietam Creek Watershed Restoration Plan, WCSCD issued its final report. The report included measurable environmental results from the project to date include reductions of 0.83 tons of sediment/year, 17.15 pounds of phosphorous/year, 126.4 pounds of nitrogen/year and 271.4 billion bacteria most probable number/year. Nutrient sampling data collected between 2013 and 2021 showed decreasing total nitrogen and total phosphorus concentrations in Antietam Creek (Figure 5).

Figure 3. Project area pictures after implementation.

Partners and Funding

Partner Type	Agency	Funding	Notes
Federal	USDA - CONSERVATION RESERVE ENHANCEMENT PROGRAM	$11,843	
Federal	Clean Water Act Section 319	$92,065	MD Department of Environment - Barnyard runoff project
Federal	USDA - ENVIRONMENTAL QUALITY INCENTIVES PROGRAM	$13,680	Cattle Walkway & Grassed Waterway
Federal	USDA - EQIP/REGIONAL CONSERVATION PARTNERSHIP PROGRAM	$346,805	Roofed Feeding Structure, Roofed Manure Storage Obstruction Removal, & Roof Runoff
State	MARYLAND DEPARTMENT OF ENVIRONMENT - BAY RESTORATION FUND	$6,690	BAT Septic System
State	MARYLAND DEPARTMENT OF AGRICULTURAL WATER QUALITY - COST SHARE PROGRAM	$42,345	Forest Buffer, Water Troughs, Fence, Grassed Waterway, and Well

Technical Assistance Report

Project Name: WCSCD, Antietam Creek Watershed Restoration Plan,Winders Property

Report form for technical assisstance (staf time) supporting BMP implementation funded by 319(h) grant.

Data For Completed BMPs (Project Outcome)								Measurable Environmental Results			
								Load Reduction			
Ref #	Name / Type	Watershed 12-Digit Code	TMDL Allocation Area	Latitude	Longitude	Area In Acres	Length In Feet	Sediment Tons/yr	P lbs/yr	N lbs/yr	Bacteria MPN/Year
	BAT Septic System (1 Each)	021405020200		39.667949	-77.595921		N/A	N/A	N/A	3.10	166 Billion
	Loafing Lot Managemnt	021405020200		39.667949	-77.595921	1	N/A	0.83	17.15	123.30	105.4 Billion
						1	0	0.83	17.15	126.40	

TMDL Allocation Area: MDE will inform you if your project area is affected.
List Load Reduction method used:_ Antietam Creek Watershed Restoration Plan, Table 19, Page 44 for the BAT Septic System
VA, Kings Creek Water Quality Implementation Plan, citation of EPA guidance for Loafing Lot management

Figure 4. Technical assistance provided during the project.

Before (2013 & 2014) and After (2020 & 2021) Analysis along Antietam Creek just downstream from Winders Farm.

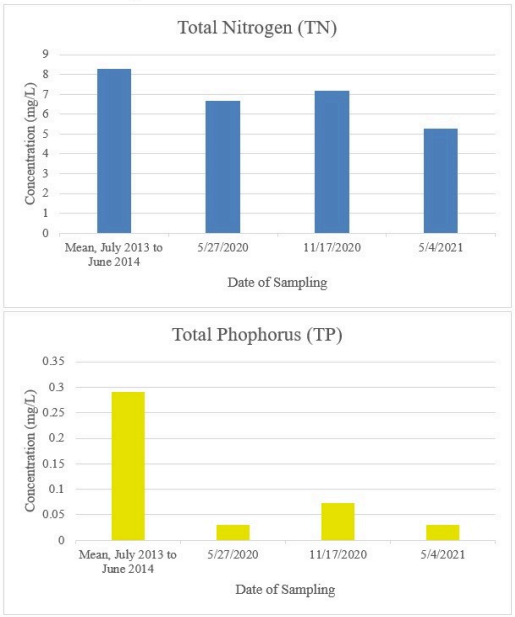

Figure 5. Phosphorous and nitrogen measurements, before and after project implementation.

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

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