Maryland
319 Nonpoint Source Program
2013 Annual Report

Department of the Environment
1800 Washington Boulevard, Suite 540
Baltimore MD 21230-1718

January 31, 2014 (revised April 2014)

Published and distributed by the

Section §319(h) Nonpoint Source Program
Maryland Department of the Environment
1800 Washington Boulevard, Suite 540
Baltimore MD 21230

Phone: 410-537-3906
Fax: 410-537-3873

Lee Currey, Director
Science Services Administration

Jim George, Manager
Water Quality Protection and Restoration Program

Primary Author:
Ken Shanks, Chief
TMDL Implementation Division

MDE Contributors:
Elaine Dietz
Jim George
Connie Louchs
Joe Mills
Robin Pellicano
Eric Ruby
Greg Sandi
Matt Stover

DNR Contributors:
Gabe Cohee

Other Contributors
Additional agency and group contributors to the content of this report are identified in Appendix B by an asterisk.

Maryland's Nonpoint Source Program is funded in part by a Section §319(h) Clean Water Act Grant from the U.S. EPA. Although this program is funded partly by U.S. EPA, the contents of this report do not necessarily reflect the opinion or position of EPA.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

COVER PHOTOGRAPHS (clockwise from top)

- Urbana Community Park bioretention construction, Lower Monocacy River watershed, Frederick County
- Watershed kiosk & pet waste station, Antietam Creek watershed, Washington County
- Stream restoration at Bread & Cheese Creek, Tidal Back River watershed, Baltimore County
- Oyster replenishment in Corsica River, Queen Anne's County
- Ravine stabilization at Budds Landing, Sassafras River watershed, Kent County
- Acid mine drainage mitigation with limestone sand, Casselman River watershed, Garrett County
- Bioretention retrofit in front of public offices, Corsica River watershed, Centreville, Queen Anne's County
- Wetland creation at Galena Elementary, Sassafras River, Kent County
- Center: tree planting at Woodsboro Elementary, Lower Monocacy River watershed, Frederick County

Revised April 2014

Preface

Nonpoint source (NPS) pollution is defined as polluted stormwater runoff associated with rainfall, snowmelt or irrigation water moving over and through the ground. As this water moves, it picks up and carries pollutants with it, such as sediments, nutrients, toxics, and pathogens. These pollutants eventually reach lakes, rivers, wetlands, coastal waters, ground waters and, most of the time in Maryland, the Chesapeake Bay.

NPS pollution is associated with a variety of activities on the land including farming, logging, mining, urban/construction runoff, onsite sewage systems, streambank degradation, shore erosion and others. For example, stormwater flowing off the land carries the nutrients nitrogen and phosphorus into local streams and eventually into the Chesapeake Bay. Under natural conditions, this is beneficial up to a point. However, if excessive nutrients enter a lake or the Chesapeake Bay, and cause nuisance algae blooms, then these nutrients are considered to be pollutants.

The pollution contributed by nonpoint sources is the main reason why many of Maryland's waters are listed as impaired because Water Quality Standards are not being met for designated uses including fishing, swimming, drinking water, shellfish harvesting among others.

Progress in managing NPS pollution in Maryland is presented in this report. It was produced by the Maryland Department of the Environment (MDE) to meet 319(h) Grant conditions (text box) and to demonstrate consistency with three essential elements:

1. EPA Strategic Plan Goal 2 Protecting America's Waters
2. EPA Strategic Plan Objective 2.2 Protect and Restore Watersheds and Aquatic Ecosystems
3. Work plan commitments plus time frame (overall progress is reported in this document).

The FFY13 319(h) Grant award contains a programmatic condition:

"4. Annual Nonpoint Source Program Report

…At a minimum, the report shall contain a brief summary of progress in meeting the schedule of milestones in the approved management program and reductions in nonpoint source pollutant loading and improvements in water quality that has resulted from implementation of the NPS management program. Descriptions of priority Watershed Based Plan accomplishments. Accomplishments should be based on the implementation milestone goals/objectives as identified in each priority plan. The goal information can be displayed in the form of a watershed goal/accomplishment chart showing percent achieved, supplemented by a short narrative that should give the reader understanding of the actions being taken and the outputs and outcomes which are occurring from the actions. If monitoring was completed, a summary of the information should also be included. For example, if 1000 feet of streambank stabilization was completed, then how does that compare to the needs identified in the watershed based plan i.e. what percent of streambank stabilization was completed compared to the overall needs as identified by the plan. Similar comparisons should also be provided for each significant pollutant load reduction…"

Abbreviations Used	
319	Clean Water Act, Section 319(h)
AMD	Acid Mine Drainage
BAT	Best Available Technology
BMP	Best Management Practice
COMAR	Code of Maryland Regulations
DNR	Maryland Department of Natural Resources
EPA	Environmental Protection Agency, United States of America
FFY	Federal Fiscal Year (October 1 thru September 30)
MDA	Maryland Department of Agriculture
MDE	Maryland Department of the Environment
MDP	Maryland Department of Planning
MEP	Maximum Extent Practicable
NGO	Non-Government Organization
NPS	Nonpoint Source
RFP	Request for Proposals
SCD	Soil Conservation District
SRA	Sassafras River Association
SRF	State Revolving Fund
SFY	State Fiscal Year (in Maryland, July 1 thru June 30)
SWAP	Small Watershed Area Plan (another name for a watershed-based plan)
SW Conversion	Converting an existing stormwater facility to provide water quality benefits
SW Retrofit	Adding stormwater management to existing development that had none
TMDL	Total Maximum Daily Load
Trust Fund	Maryland Chesapeake and Atlantic Coastal Bays Trust Fund
WIP	Watershed Implementation Plan for the Chesapeake Bay TMDL
WQA	Water Quality Analysis
WRAS	Watershed Restoration Action Strategy (aka watershed-based plan)
WRE	Water Resources Elements (components of a local comprehensive plan)
WWTP	Waste Water Treatment Plant (sewage treatment)

I. Mission and Goals of the NPS Program

The mission for the 319 Nonpoint Source (NPS) Management Program relates directly to the December 1999 *Maryland Nonpoint Source Management Plan* long-term goal "Meet 100% of designated uses in all waters of the State".

During 2013, the program focused the majority of its efforts on meeting two Management Plan milestones in particular: "By 2010, correct all nutrient-related problems in the Chesapeake Bay and its tidal tributaries sufficient to remove the Bay and the tidal portions of its tributaries from the list of impaired waters under the Clean Water Act", and: "By 2010, correct all sediment-related problems in the Chesapeake Bay and its tidal tributaries sufficient to remove the Bay and the tidal portions of its tributaries from the list of impaired waters under the Clean Water Act".

Both the State and the EPA Chesapeake Bay Program agreed to update the 1999 milestones to be consistent with the Chesapeake Bay total maximum daily load (TMDL). In 2012, Maryland's Chesapeake Bay Watershed Implementation Plan (WIP) included the revised the date for achieving these milestones to 2025, with a check on progress in 2017.

To realize these outcomes, the State's NPS programs are designed to: achieve and maintain beneficial uses of water; protect public health, and; improve and protect habitat for living resources. The State programs use a mixture of water quality and/or technology based approaches including regulatory and non-regulatory programs, and programs that provide financial, technical, and educational assistance.

Through program management and financial/technical support, Maryland's Section §319(h) NPS Program plays a significant role in helping to protect and improve of Maryland's water quality. The NPS Program promotes and funds State and local watershed planning efforts, implementation of NPS projects consistent with watershed plans, water quality monitoring to evaluate progress, stream and wetland restoration, education and outreach, and other measures to reduce, prevent and track nonpoint source pollution loads. The NPS Program also plays a role in promoting partnerships and governmental coordination to reduce nonpoint sources of pollution. Program partners include State agencies, local government (counties, municipalities, Soil Conservation Districts), private landowners and watershed associations.

Consistent with these priorities, selection of NPS implementation projects for 319(h) Grant funding incorporates the following goals:

GOAL 1	To support meeting Total Maximum Daily Load (TMDL) nonpoint source reduction targets.
GOAL 2	To significantly contribute to reducing one or more nonpoint source water quality impairments in a water body identified in Maryland's 303(d) list of impaired water bodies leading toward full or partial restoration.
GOAL 3	To implement projects from EPA-accepted watershed-based plans that will produce measurable nonpoint source pollutant load reduction consistent with Goals 1 and 2.

II. Executive Summary

In accordance with Section 319 of the Federal Clean Water Act, this report documents the activities and accomplishments by the State of Maryland 319 NPS Program. The Maryland Department of Environment (MDE) is the lead agency for administering Section 319, including the 319(h) Grant. In this responsibility, MDE helps to protect and improve Maryland water quality by promoting and funding State and local nonpoint source (NPS) programs for best management practice implementation and tracking, water quality monitoring, education and outreach, and other measures to reduce NPS pollution loads. MDE is also the lead 319 NPS management agency responsible for coordination of policies, funds, and cooperative agreements with state agencies and local governments. Several other state agencies have key responsibilities, including the Maryland Department of Natural Resources (DNR), Maryland Department of Agriculture (MDA), and Maryland Department of Planning (MDP). The 319 NPS Program is housed within MDE's Science Services Administration (SSA). During the past 24 years, Maryland has received over $50.5 million through the 319(h) Grant. (See Appendix A)

In calendar year 2013, there have been notable successes and accomplishments:

- Five implementation projects funded by 319(h) Grant were completed. These projects reported implementing best management practices resulting in pollutant load reductions: nitrogen 56,459 pounds/year; phosphorus 957 pounds/year, and sediment 327 tons/year.
- Corsica River tributary monitoring demonstrated a decline of in-stream nitrogen, which followed a half dozen years of implementing on-the-ground NPS projects.
- In the 10 Maryland watersheds eligible for 319(h) Grant implementation funding, overall nonpoint implementation funded by 319 and other funding sources resulted in significant pollutant load reductions: 56,766 lbs/yr nitrogen; 1,141 lbs/yr phosphorus, and; 373 tons/yr sediment.
- For State Fiscal Year 2013, Maryland State agencies reported expending over $56.7 million for nonpoint source programs and implementation*. This is $7 million greater than any previous year. The increase is a direct result of first time reporting of NPS expenditures by the State's Chesapeake and Atlantic Coastal Trust Fund.

The Program continues to face several challenges and concerns. Although there is a trend toward decreasing pollutant loads from most major nonpoint sources in Maryland, increasing development and impervious area has contributed to an increase in nonpoint source pollution from developed lands including stormwater and new septic systems. To address this, the State is actively pursuing an Accounting for Growth (AfG) program intended to offset new nutrient and sediment loads.

A 2012 State law that requires Maryland's ten largest local governments to adopt a system of stormwater fees has been controversial. Staff funded by Maryland's 319 Program conducted workshops in fall 2013 to engage local government staff on communications issues surrounding this controversy.

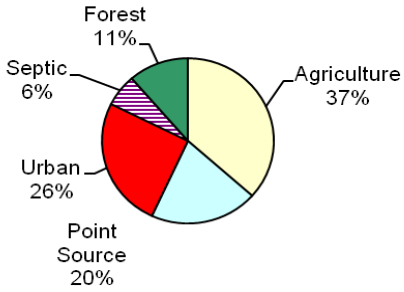
* Does not include all State agencies or NPS expenditures of Federal, local or private funds. The affects of the national trend to decease 319 funding, which began in Federal Fiscal Year (FFY) 2011 and now represents a reduction of about $500,000/year, contributed to reduced implementation by the 319 NPS program in Maryland. However, MDE continues to evaluate and prioritize use of Section 319(h) funding to ensure that Maryland maximizes the benefits derived from the available NPS funding.

III. Overview

Maryland surface waters flow into three major drainage areas:

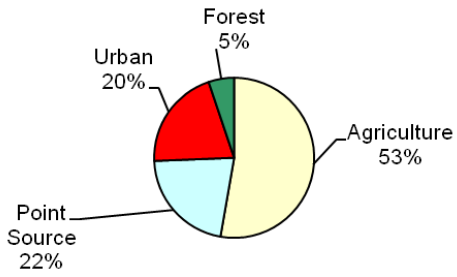
- The Chesapeake Bay watershed receives runoff from of Maryland's mid section and encompasses about 90% of the State. Most 319-funded implementation projects are in this watershed.
- Maryland's Coastal Bays receives runoff from Maryland's eastern-most coastal plain. In 2013, no 319-funded implementation was active.
- The Youghiogheny River watershed, which is part of the Ohio and Mississippi Rivers drainage, receives runoff from Maryland's Appalachian area. One 319-funded implementation effort in this area.

Figure 1. 2013 Total Nitrogen Sources in Maryland



Overall, Maryland has over 9,940 miles of non-tidal streams and rivers. These waters and the Chesapeake Bay have provided a rich bounty that been the foundation for much of Maryland's rich heritage and prosperity. The State's water resources continue to provide food and water for its residents, jobs for the economy and a place where people may relax and enjoy the natural environment. Our quality of life, including drinking water, recreation/tourism, commercial and recreational fishing and wildlife habitats are ultimately dependant upon healthy waters supported by healthy watersheds.

Figure 2. 2013 Total Phosphorus Sources in Maryland



However, Maryland's water resources are under stress from a variety of causes -- with nonpoint source pollution being the greatest single factor. The state's waters are increasingly impacted by and remain impaired due largely to nonpoint sources of pollution and related habitat degradation, which are most commonly due to altered land uses. The lands that are altered from natural conditions contribute various forms of nonpoint point source pollution such as excessive levels of the nutrients nitrogen and phosphorus. The sources of excessive nitrogen and phosphorus in Maryland arise in large part from major land uses as shown in Figures 1 and 2 respectively.

* Data source for the pie charts is the 2011 Chesapeake Bay Model Phase 5.3.2 delivered loads using constant delivery factors. The reported statistics include all of Maryland lands within the Chesapeake Bay Watershed except atmospheric deposition the main body of the Bay and nontidal waters.

Page revised April 2014

Many agencies and programs in Maryland, including State agencies, Counties, Soil Conservation Districts and municipalities, have responsibilities in managing NPS pollution. Contacts for key Federal and State agencies and local governments who were actively engaged with some aspect of 319 NPS management responsibility in 2013 are listed in Appendix B.

The best methods for controlling NPS pollution are frequently called Best Management Practices (BMPs). These BMPs are designed to meet specific needs, like increasing tree cover to capture stormwater (Figure 3 below), grassed buffers to control sediment and phosphorus that could leave farm fields, or wet stormwater ponds to capture sediment and nutrients in urban runoff. Every year, Maryland reports the cumulative total number of BMPs implemented in the State. The most recent reporting, which is through 2012, are summarized in Appendix C.

A wide array of approaches and programs help to prevent, reduce or eliminate pollution from nonpoint sources. The general approach employed in Maryland to manage NPS pollution is summarized in Appendix E.

Demonstrating success in achieving nonpoint source management goals and objectives is an important focus for the program. Each year, at least one success story is submitted to EPA. In 2013, MDE analysis of monitoring data from two tributaries to the Corsica River documented that nitrogen levels have declined following about nine years of implementing nonpoint source best management practices. (see Appendix F).

Figure 3: For more than a half dozen years, the Frederick County Community Development Division Office of Sustainability and Environmental Resources has promoted and managed tree planting as a NPS water quality management technique. This effort has been funded in part thru the 319(h) Grant. One of their approaches involves building partnerships with the County Board of Education and others to encourage increasing the acreage of trees on the lands under their management. An example of the partnerships' continuing success can be seen at the Winsor Knolls Middle School in 2006 where the Potomac River Conservancy planted trees using State funds from the Chesapeake Bay Trust (top). By 2013, tree survival and growth is evident at the site (bottom).
(photos courtesy of Frederick County, Maryland)

IV. Major Accomplishments, Successes and Progress

A. Statewide

1. Overall Best Management Practice Implementation Progress

Maryland's NPS Management Plan includes priority goals for correcting nutrient and sediment-related problems. To gauge progress toward meeting these goals, Maryland tracks implementation progress for selected categories of BMPs that have been recognized by the EPA Chesapeake Bay Program and the Chesapeake Bay States. Every year, Maryland updates the cumulative total of BMPs implemented in each category and the associated nitrogen and phosphorus load reduction. A summary of Maryland's most recently reported information thru 2012 is in Appendix C.

2. NPS Work Plan

Maryland's NPS work plan supported by the 319(h) Grant focuses on three primary areas that contribute to meeting the Maryland Nonpoint Source Management Plan goal "Meet 100% of designated uses in all waters of the State" as summarized below. Additional project status information is presented in Appendix D:

- Implementation to eliminate or reduce impairments consistent with TMDLs. In 2013, 20 319-funded projects included funds for on-the-ground NPS implementation. These projects are located in the watersheds that are eligible for 319(h) Grant implementation funding shown in Figure 4. Additional information on progress in these watersheds is in the next section of this report.
- Monitoring and tracking to gauge progress. Seven 319-funded projects included either monitoring or tracking of implementation progress/results.
- Management/planning necessary to support associated State and local assistance needs. During calendar year 2013, 27 projects in Maryland received Federal 319(h) Grant funds. Two 319-funded projects included management in support of NPS implementation.

3. Success Stories

In the Corsica River watershed in Queen Anne's County Maryland, implementation of BMPs over a half dozen years resulted in documented water quality improvements in two tributary streams (see Appendix F). During 2013, Aaron Run was identified as a candidate success story for reporting next year. MDE identified both of these watersheds by regularly assessing available information for water quality and/or biological improvement:

- Impairments removed from the list of impaired water bodies (303(d) list) in Maryland's Integrated Report are reviewed biennially.
- 319(h) Grant-funded projects' progress and accomplishments are assessed by MDE and reported in each Annual Report. Recent assessments identified potential future success story candidates.
- Candidates for water quality improvement / success stories are solicited from other sources by MDE.

4. Impairments

Maryland's Integrated Report provides the most complete listing of water impairments for the State. During 2013, preparations for the 2014 Integrated Report were underway. The most recent analysis of changes in listings compared findings of the 2012 report to the 2010 report [1]:

- 13 delistings resulted from Water Quality Analyses (WQA), reassessments using newer data that demonstrated water quality standards were being met (12) or corrected a flaw (1). These twelve delistings represent potential success story candidates.
- 21 delistings resulted from MDE biostressor analyses that allowed listings for "cause unknown" to be dropped and replaced with new pollutant-specific impairment listings;
- 24 new listings for conventional pollutants resulting from MDE biostressor analysis (some overlap with the 21 delistings) listed causes including total suspended solids, chlorides, sulfates, or total phosphorus.
- 18 new listings for non-pollutant impairments resulting from MDE biostressor analysis (some overlap with the 21 delistings) listed causes including channelization and lack of riparian buffer;
- Fecal coliform listings in shellfish harvesting waters included 9 new listings and 2 delistings (also see shellfish waters section);
- Chesapeake Bay segments with updated bioassessments resulted in 2 new listings, and;
- Fish tissue assessment for PCBs resulted in 2 new listings, and 2 delistings made on the basis of using a more refined assessment unit scale.

MDE posts water quality assessment maps on the Internet to assist users in visualizing the locations of impairments for categories like bacteria and nutrients:
http://www.mde.state.md.us/programs/Water/TMDL/Integrated303dReports/Pages/WaterQualityMappingCenter.aspx

5. National Water Quality Initiative [2]

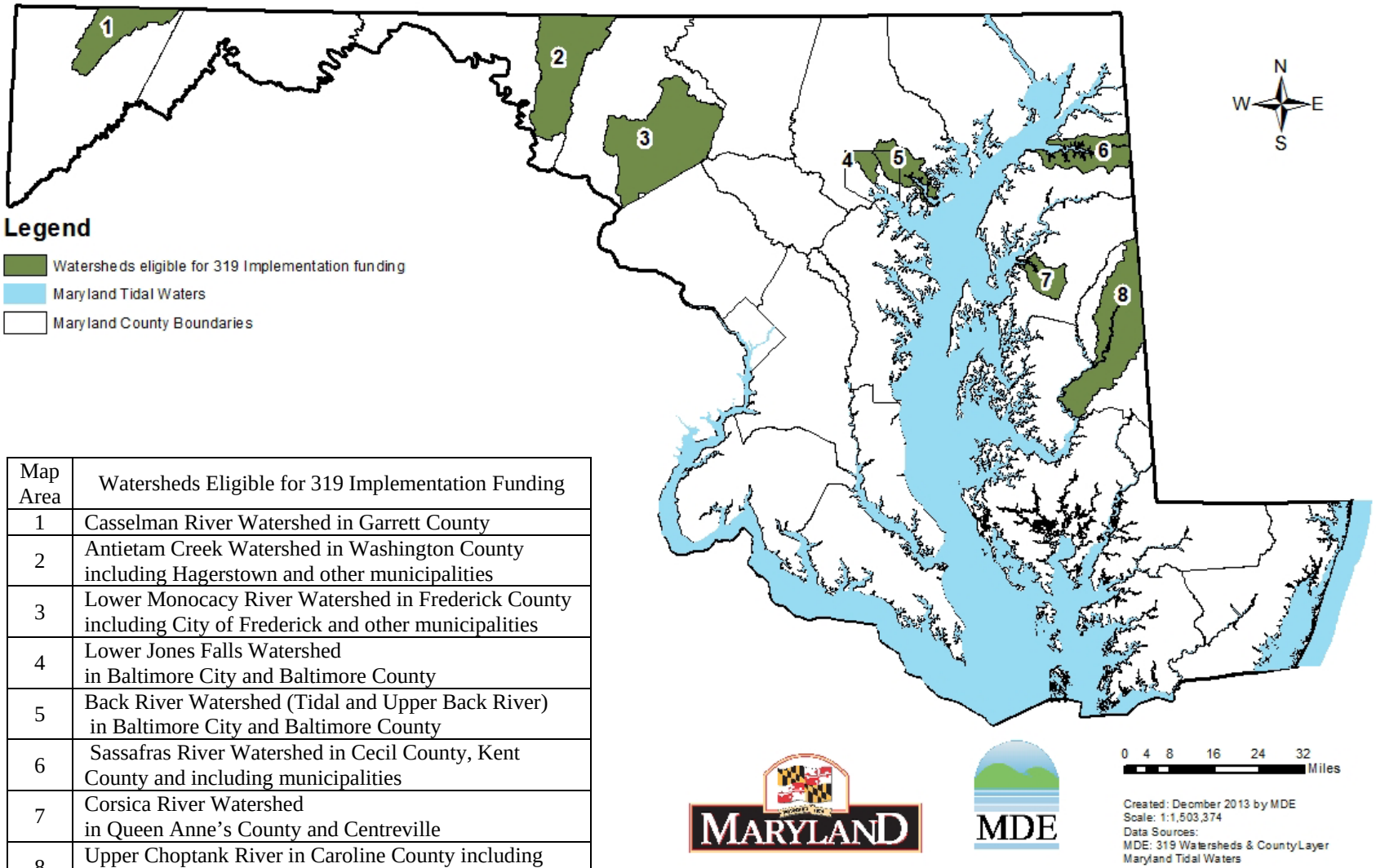
The National Water Quality Initiative works in priority watersheds with impaired streams to help farmers and forest landowners improve water quality and aquatic. With help from state agencies, partners, and the NRCS State Technical Committee, Maryland NRCS chose the Catoctin Creek Watershed to focus on agricultural conservation investments which deliver the greatest water quality improvement benefits.

The NWQI helps farmers in the Catoctin Creek Watershed invest in voluntary conservation to help provide cleaner water for their neighbors and communities. Farmers are implementing conservation and management practices through a systems approach to control and trap nutrient and livestock waste. Since 2012, NRCS Maryland provided over $400,000 in financial assistance for installing conservation practices such as waste storage facilities, prescribed grazing systems and livestock exclusion from stream corridors.

The Catoctin Creek Watershed encompasses the southwestern portion of Frederick County and is framed by Catoctin Mountain on the east and South Mountain on the west. The Catoctin Creek watershed drains an area of 120 square miles, which includes areas of forested mountain slopes, agricultural valleys, and small towns. The area's waters are impaired by sediments, nutrients, impacts to biological communities, and fecal coliform. The land use distribution in the watershed is approximately 43% agricultural, 42% forest/herbaceous and 15% urban, with agricultural land mostly planted in row crops and pasture.

[1] MDE. Maryland's 2012 Integrated Report of Surface Water Quality. Part C pages 30 thru 96.
[2] Page revised April 2014.

Figure 4
Maryland Watersheds Eligible for 319(h) Grant Implementation Funding



Map Area	Watersheds Eligible for 319 Implementation Funding
1	Casselman River Watershed in Garrett County
2	Antietam Creek Watershed in Washington County including Hagerstown and other municipalities
3	Lower Monocacy River Watershed in Frederick County including City of Frederick and other municipalities
4	Lower Jones Falls Watershed in Baltimore City and Baltimore County
5	Back River Watershed (Tidal and Upper Back River) in Baltimore City and Baltimore County
6	Sassafras River Watershed in Cecil County, Kent County and including municipalities
7	Corsica River Watershed in Queen Anne's County and Centreville
8	Upper Choptank River in Caroline County including Denton and other municipalities

B. Watersheds

On December 31, 2013, ten watersheds in Maryland were eligible for 319(h) Grant implementation funding. Figure 4 shows the locations of this watersheds and Table 1 information on the watershed-based plans that EPA reviewed and accepted during their eligibility determination.

Table 1. Watershed-Based Plans In Maryland Accepted by EPA - Eligible for 319(h) Grant Implementation Funding

Major Drainage	River Basin	Plan Watershed	Status	Lead Entity	Plan Name	Plan Date	Internet (1)
Chesapeake Bay	Back River	Tidal Back River	Implementing	Baltimore County Dept. of Environmental Protection and Sustainability	*Tidal Back River Small Watershed Action Plan*	2010	www.baltimorecountymd.gov/Agencies/environment/watersheds/
		Upper Back River	Implementing		*Upper Back River Small Watershed Action Plan*	2008	www.baltimorecountymd.gov/Agencies/environment/watersheds/
	Jones Falls	Lower Jones Falls	Implementing		*Lower Jones Falls Watershed Small Watershed Action Plan*	2008	www.baltimorecountymd.gov/Agencies/environment/watersheds/
	Loch Raven Reservoir	Spring Branch	Completed		*Spring Branch Subwatershed – Small Watershed Action Plan (Addendum to the Water Quality Management Plan for Loch Raven Watershed)*	2008	www.baltimorecountymd.gov/Agencies/environment/watersheds/
	Choptank River	Upper Choptank	Implementing	Caroline County Planning & Codes	*Upper Choptank River Watershed Based Plan*	2010	http://www.carolineplancode.org/
	Chester River	Corsica River	Implementing	Town of Centreville	*Corsica River Watershed Restoration Action Strategy*	2004	www.townofcentreville.org/departments/environment.asp
					Corsica River Targeted Initiative Progress Report: 2005-2011 [includes revised watershed goals]	2012	www.townofcentreville.org/departments/environment.asp
	Potomac River	Antietam Creek	Implementing	Washington Co SCD	*Antietam Creek Watershed Restoration Plan*	2012	http://www.conservationplace.com/
		Lower Monocacy River	Implementing	Frederick County Community Development Division	*Lower Monocacy River Watershed Restoration Action Strategy (WRAS) Supplement: EPA A-I Requirements, Frederick County Maryland*	2008	http://www.watershed-alliance.com/mcwa_pubs.html
	Sassafras River	Sassafras River	Implementing	Sassafras River Association	*Sassafras Watershed Action Plan*	2009	www.sassafrasriver.org/swap/
Casselman & Youghiogheny Rivers	Casselman River	Casselman River	Implementing	MDE Land Management Administration	*Casselman River Watershed Plan for pH Remediation*	2011	http://mde.maryland.gov/programs/Water/319NonPointSource/Pages/casselman.aspx

(1) Internet links in the table are generally associated with the agencies most directly responsible the watershed plan creation and implementation. Additionally, these watershed plans are also available thru MDE: http://mde.maryland.gov/programs/Water/319NonPointSource/Pages/Programs/WaterPrograms/319nps/factsheet.aspx

Within several of the watersheds listed in Table 1, 319(h) Grant-funded implementation projects were completed during calendar year 2013. These projects and the estimated reductions reported for selected pollutants are listed in Table 2. Additional information on these projects is in following sections of this report and in Appendix D.

Table 2. Pollutant Load Reductions Reported by 319 Projects Completed in 2013

Watershed	319 Project Completed	Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment ton/yr
Back River - Tidal	Bread & Cheese Creek	280.1	94.2	214
Corsica River	MDA ag technical assistance	55,821.83	828.36	108.57
	Queen Anne's Co. Board of Ed	5.16	0.36	0.066
Lower Monocacy R.	Green Infrastructure Project	350.9	34.1	4.07
Sassafras River	Galena Elementary wetland	1.38	0.24	0.046
TOTAL		56,459.4	957.3	326.8

Also, in the watersheds listed in Table 1 implementation progress was accomplished using funding from sources other than the 319(h) Grant. Table 3 summarizes these overall pollutant reduction accomplishments. Additional overall implementation progress details are reported in the following sections for these watersheds.

Table 3. 2013 Pollutant Load Reductions Reported by Watershed

Watershed	Sub Watershed	Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment ton/yr
Antietam Creek	All in Maryland	0	0	0
Back River	Tidal	431.2	132.7	228.5
	Upper	319.8	47.7	11.3
Casselman River	All in Maryland	0	0	0
Corsica River	All	55,889	840	109
Lower Jones Falls	All	3.41	0.29	0.10
Lower Monocacy River in Frederick Co.	Lake Linganore only	NA	13	1.2
	All including Lake Linganore	121.43	17.62	1.54
Sassafras River	All in Maryland	1.38	90.24	21.15
Upper Choptank	All in Caroline County	0	0	0
TOTAL		56,766.2	1,141.3	372.8

Notes: 2013 is calendar year. Table includes both 319 and non-319 load reductions.
Zero means nothing reported for 2013. NA means not applicable.

1. Antietam Creek

Location

The Antietam Creek watershed encompasses 290 mi^2 in total. It drains part of Washington County, Maryland (118,400 acres, 185 mi^2) with its headwaters in Pennsylvania. The 54 mile-long Creek flows into to the Potomac River and the Chesapeake Bay. Watershed land use in Maryland is 42% agricultural, 31% forest and 27% developed.

Goals

In the 2012, the Washington County SCD developed the watershed plan to meet TMDLs for sediment and fecal bacteria. The watershed plan accounted for implementation progress achieved prior to 2012 and set NPS pollutant reduction load goals based on 2012 benchmarks:

- Sediment: 12,923 tons/year
- E. coli bacteria: 5.4 million billion MPN/year.

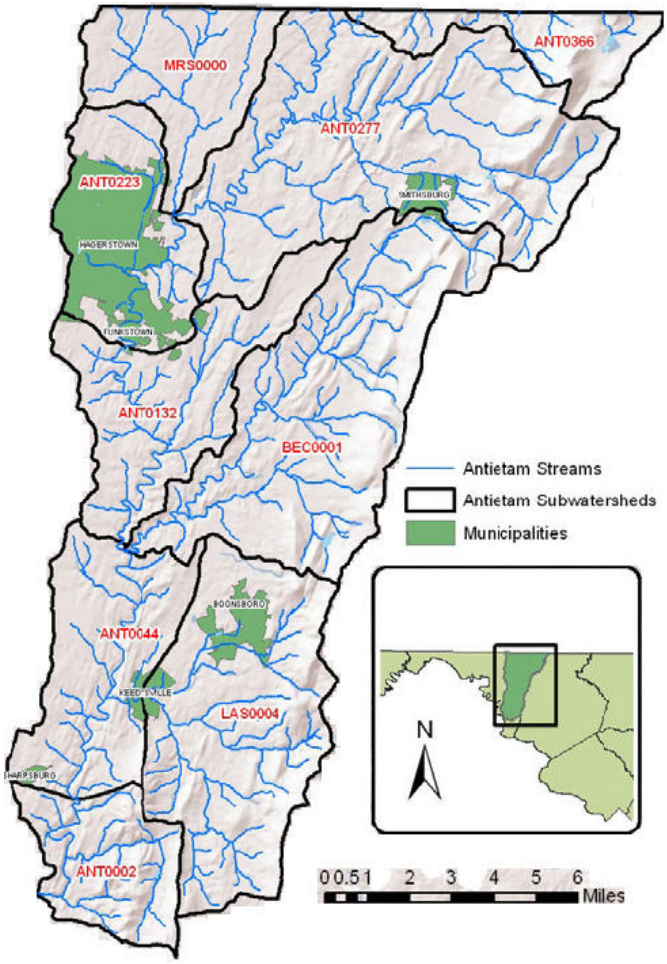


Fig. 5. Antietam Creek Watershed.

Implementation

Washington County Soil Conservation District is the lead plan implementer/reporter. 2012 & 2013 progress to meet watershed plan goals is reported on the next page(s). In the future, pre-2012 NPS implementation efforts will be included.

Figure 6. In 2013, this pet waste management station and public outreach kiosk on Antietam Creek watershed implementation were both dedicated in Washington County's Devils Backbone Park. This is part of on-going local NPS implementation. (Photos: Washington Co. SCD)

Table 4. Antietam Creek Watershed Plan 2013 Implementation Progress Summary (1)

Sediment Reduction Goals			Implementation Progress		Bacteria Reduction Goals			Implementation Progress	
BMP	**Unit**	**Goal**	**2012-13**	**Goal % Achieved**	**BMP**	**Unit**	**Goal**	**2012-13**	**Goal % Achieved**
Cover Crops	acres/yr	4,000	5,620.0	141%	Failing Septics Correction	systems	559	15	3%
Conservation Tillage	acres/yr	6,200	16,084.5	259%	Septic System Upgrades	systems	645	26	4%
SCWQP	acres	9,050	3,956.9	44%	Grass Buffers	acres	35	2.5	7%
Stream Protection not fenced	acres	1,300	40.0	3%	Riparian Forest Buffers	acres	260	56.8	22%
Stream Protection fenced	acres	780	2.6	0.3%	Stream Protection fenced	acres	300	2.6	1%
Buffers (grass/forest)	acres	295	59.3	20%	Stream Protection not fenced	acres	500	40.0	8%
Erodible Land Retirement	acres	130	8.3	6%	Livestock Stream Crossing	units	17	0	0%
No Till	acres/yr	4,800	1,274.4	27%	SCWQPs	acres	15,460	3,956.9	26%
Stream Restoration	acres	0.25	0	0%	Runoff Control Systems	acres	12	4.0	33%
Forest Harvest Practices	acres	250	722.0	289%	Animal Waste Mgmt Systems	units	26	2	8%

(1) 2013 is Calendar year. Washington County Soil Conservation District is the lead plan implementer/reporter. Other entities may not be reporting implementation accomplishments.

Table 5. Antietam Creek Watershed - Completed NPS Implementation Projects and Reported Pollutant Load Reduction

Project Name/Description		Funding Source (1)	Funding Amount (2)		Total Cost (3)	Bacteria (MPN/yr)	Sediment (ton/yr)	Nitrogen (lb/yr)	Phosphorus (lb/yr)
			Federal	State					
Washington County	Lehmans Mill Road Stream Bank Stabilization	SRF Grant		$191,700	$191,700	0	0	101	5.35
	Burnside Bridge Rd Stream Bank Stabilization	SRF Grant		$232,900	$232,900	0	0	101	5.35
		TOTALS	$0	$424,600	$424,600	0	0	202.0	10.7
Antietam Creek Watershed - In Progress NPS Projects with Projected Future Implementation Pollutant Load Reduction									
Wash. County	Greensburg Rd Little Antietam Creek Restoration	319 FFY12 #11	$240,000		$400,000	0	1.07	121	6.42
Washington Co. SCD	Barr Property Stream Restoration	319 FFY13 #10	$148,930		$248,217	0	5.5	47.5	9.9
	Shank/Anderson Project Phase 2 of 3	319 FFY11 #13	$64,266		$107,110	166 billion	2.4	16.5	1.9
Wash. Co. BOE	Washington County Board of Education (BOE) Riparian Buffers	Trust Fund SFY14		$14,374	$21,151	0	16.4	2,124.8	57.2

(1) 319 is the Federal 319(h) Grant. FFY is Federal Fiscal Year. # is project number. For more information on in-progress 319 projects, see Appendix D.
SRF is the State Revolving Fund. The table shows only NPS projects.
Trust Fund is the Maryland Chesapeake and Atlantic Coastal Bays Trust Fund. SFY is State Fiscal Year.
Other is reported State funding from other sources or source information was not available.
(2) Excludes match and leveraged funds. Completed projects = total grant/loan funds expended for project. Projects in progress = grant or loan allocation.
(3) Total includes grant funds, plus match if required, plus additional leveraged funds if reported.
(4) Zero means no progress or not reported. Grey shaded blocks indicate either not reported or not applicable.

2. Back River Watersheds

Location

The Back River watershed is located in Baltimore County and Baltimore City. It is divided into two subwatersheds as shown in the map and table below. EPA accepted the Tidal area watershed plan in 2010 and the Upper Back River area plan in 2008.

Implementation

Projects that are implementing watershed plans goals are summarized on the next pages. All 319-funded projects initiated after 2008 have been in Baltimore County's portion of the watersheds. Other implementation progress contributing to watershed plan goals included in the tables was reported by Baltimore County, including projects conducted by nongovernmental organizations.

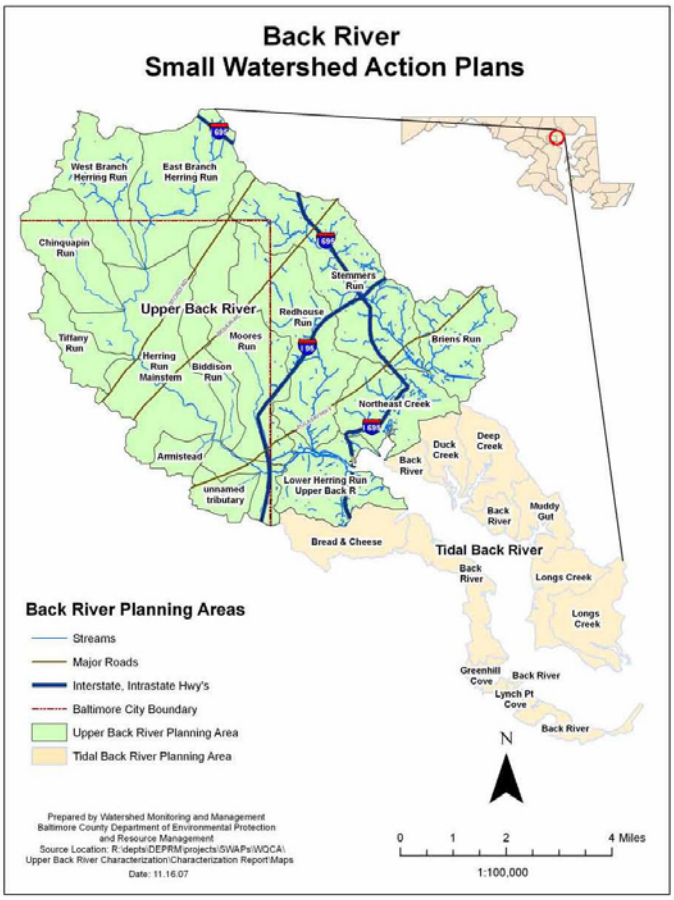


Figure 7. Back River Watersheds.

Table 6. Back River Small Area Watershed Plans	
Upper Back River Watershed	**Tidal Back River Watershed**
Lead NPS Implementers: Baltimore County, Baltimore City Other NPS implementers report progress thru the Lead. Pollutant Load Reduction Goals - Total nitrogen: 48,190 pounds - Total phosphorus: 6,056 pounds Total drainage area: 27,716.7 acres (43.3 mi^2) - Total open tidal water: NA - Baltimore Co.: 55.5%; Baltimore City: 44.5%. - Impervious cover: 30.7 % Land Use - Agriculture: --- - Commercial: 9.9% - Forest: 11.5% - Industrial: 6.5% - Institutional: 8.0% - Residential low density: 8.5% - Residential mid density: 26.5% - Residential high density: 20.4% - Urban open: 6.2% - Water/Wetlands: ---	Lead NPS Implementer: Baltimore County Other NPS implementers report progress thru the Lead. Pollutant Load Reduction Goals - Total nitrogen: 6,498 pounds - Total phosphorus: 679 pounds Total Drainage area: 7,720 acres (12 mi^2) - Total open tidal water: 3,947 acres (6.2 mi^2) - Baltimore County: 100% - Impervious cover: 18.4% Land Use - Agriculture: 4.4% - Commercial: 7.2% - Forest: 32.1% - Industrial: 3.5% - Institutional: 4.4% - Residential low density: 2.4% - Residential mid density: 23.0% - Residential high density: 8.6% - Urban other: 11.4% - Water/Wetlands: 3.0%

Table 7. Tidal Back River Watershed Plan - 2013 Implementation Progress Summary (1)

Goals			Progress (3)					
			Implementation			Pollutant Reduction (2010-2013)		
Category (2)	Unit	Goal	2013	2008-2012	Percent of Goal	Nitrogen (lbs/yr)	Phosphorus (lbs/yr)	Sediment (tons/yr)
Reforestation - Forest Land Mgmt	acres	35	3.79	3.82	21.7%	37.0	1.8	0.2
Buffer Reforestation, Forest Stand Mgmt	acres	156	0	0	0.0%	0	0	0
Nutrient Management	acres	186	0	0	0.0%	0	0	0
Downspout Disconnect, Roof Runoff Mgmt	acres	31	0.11	0.13	0.8%	3.3	0.6	0.2
Stream Channel Restoration	feet	17,040	1,980.0	0	11.6%	371.5	125.3	226.4
Street Trees, Tree/Shrub Establishment	acres	1.7	0	0	0.0%	0	0	0
Stormwater Retrofits & Mgmt Wetlands	acres	6.4	7.67	0	119.8%	40.7	6.4	2.0
Stormwater Conversion, Urban Wet Pond	units	2	0	0	0.0%			
Shoreline Protection/Enhancement	feet	NA	0	1	NA	764	503	1,047
					Total Cumulative Pollutant Reduction	1,216.4	637.1	1,275.96
					Pollution Reduction Goals (Watershed Plan Table 3-2, page 23)	6,498	679	NA
					Percent of Goal Achieved	18.7%	93.8%	NA

1. 2013 is Calendar year. NA is not applicable. Zero means either not reported or not progress.

2. Categories for watershed plan goals tracked by EPA for progress.

3. Baltimore County is the lead for reporting watershed plan implementation progress. Progress above includes completed grant-funded projects in the following table and NGO NPS implementation.

Table 8. Upper Back River Watershed Plan - 2013 Implementation Progress Summary (1)

Goals			Progress (3)					
			Implementation			Total Pollutant Reduction Reported		
Category (2)	Unit	Goal	2013	2008-2012	Percent of Goal	Nitrogen (lbs/yr)	Phosphorus (lbs/yr)	Sediment (tons/yr)
Reforestation - Forest Land Mgmt	acres	50	0.51	1.5	4.0%	10	0	0.1
Buffer Reforestation, Forest Stand Mgmt	acres	200	0	1.36	0.7%	17	2	71.1
Nutrient Management	acres	3,000	0	0	0.0%	0	0	0.0
Downspout Disconnect, Roof Runoff Mgmt	acres	180	1.19	3.81	2.8%	25	4	1.2
Stream Channel Restoration (5)	feet	66,000	0	4,000	6.1%	800.0	272.0	108.5
Street Trees, Tree/Shrub Establishment	units	4,000	18	115	3.3%	6	0	0.0
Stormwater Retrofits & Mgmt Wetlands	units	50	0	1	2.0%	2	0	0.1
Stormwater Conversion, Urban Wet Pond	units	17	4	0	23.5%	310.6	46.50	11.0
					Total Pollutant Reduction	1,171	325.6	192.01
					Pollutant Reduction Goal (Watershed Plan Table 3-2, page 3-8)	48,190	6,056	---
					Percent of Goal Achieved	2.4%	5.4%	---

1. 2013 is Calendar year. NA is not applicable. Zero means not reported or no progress.

2. Categories for watershed plan goals tracked by EPA for progress.

3. Baltimore County is the lead for reporting watershed plan implementation progress. Progress above includes completed grant-funded projects in the following table and NGO NPS implementation.

Table 9. Tidal Back River Watershed - Completed NPS Implementation Projects and Reported Pollutant Load Reduction										
Project Name/Description		**Funding Source (1)**	**Funding Amount (2)**				**Total Cost (3)**	**Nitrogen (lb/yr)**	**Phosphorus (lb/yr)**	**Sediment (ton/yr)**
			Federal	**Match**		**State**				
Baltimore County	Pleasure Island Beach Shoreline	SRF Grant				$2,717,100.00	$4,285,123.00	1,010	53.5	0
	Bread & Cheese Creek stream restoration & stormwater control	319 FFY2010 #11	$556,443	$370,962	(2c)		$1,000,000	280.07	94.19	214
		Trust Fund SFY12				$193,557				
		Trust Fund SFY13				$250,000				
TOTAL reported for completed projects			$556,443.00	$370,962.00		$2,717,100.00	$5,285,123.00	1,290	147.7	214
Tidal Back River Watershed - In Progress NPS Projects with Projected Future Implementation Pollutant Load Reduction										
Baltimore County	Tidal Back River Greening (7 schools, 1 park & ride, 1 community center)	SRF Grant				$385,000	$1,604,694	441	133	24
		Trust Fund SFY13				$787,388				

Table 10. Upper Back River Watershed - Completed NPS Implementation Projects and Reported Pollutant Load Reduction										
Project Name/Description		**Funding Source (1)**	**Funding Amount (2)**				**Total Cost (3)**	**Nitrogen (lb/yr)**	**Phosphorus (lb/yr)**	**Sediment (ton/yr)**
			Federal	**Match**		**State**				
Baltimore County	Redhouse Run/Overlea stream restoration & stormwater control	319 FFY2000 #16	$130,000.00	$86,667	(2c)		$530,000.00	52	9.46	2.67
		Other				$228,899.00				
	Redhouse Run/St. Patricks stream restoration	319 FFY2007 #18	$418,500.00	$279,000	(2c)		$883,016.00	609	32.1	5.37
		Trust Fund SFY10				$186,121.00				
	Upper Back River Stormwater conversions	319 FFY2008 #21	$95,883.81	$63,923	(2c)		$159,806.35	51.7	11.5	2.06
		Trust Fund SFY13				$175,000.00	$703,955.00	371.5	56	11
TOTAL reported for completed projects			$644,383.81	$429,589.21		$590,020.00	$2,276,777.35	1,084.2	109.06	21.10
Upper Back River Watershed - In Progress Projects with Projected Future Implementation Pollutant Load Reduction										
Baltimore City	Moravia Park Elementary Rain Gardens	Trust Fund SFY13				$175,000	$175,000	1.9	TBD	TBD
Baltimore County	Herring Run/Overlook Park stream restoration & buffer planting	319 FFY2011 #7	$358,032	$238,688	(2c)		$1,200,000	1031.1	347.2	786
		Trust Fund SFY12				$273,416				

(1) 319 is the Federal 319(h) Grant. FFY is Federal Fiscal Year. # is project number. For more information see Appendix D.
SRF is the State Revolving Fund. The table shows only NPS projects.
Trust Fund is the Maryland Chesapeake and Atlantic Coastal Bays Trust Fund. SFY is State Fiscal Year.
Other is reported State funding from other sources.
(2) a. Match was State funded. b. Match was not State funded. c. Match may include State and/or local funds.
(3) Total includes grant funds, plus match if required, plus additional leveraged funds if reported.
(4) Zero means not reported. Green shading means project was completed during 2013. Grey shading means not applicable. TBD means to be determined.

3. Casselman River Watershed Implementation

Location

In Maryland, the Casselman River flows about 20 miles from Savage River State Forest into Pennsylvania. The watershed area is 66 square miles and is part of the Mississippi River drainage. Land use in the watershed can be aggregated into three broad categories: forest (89%), agriculture (9%), and developed land (2%).

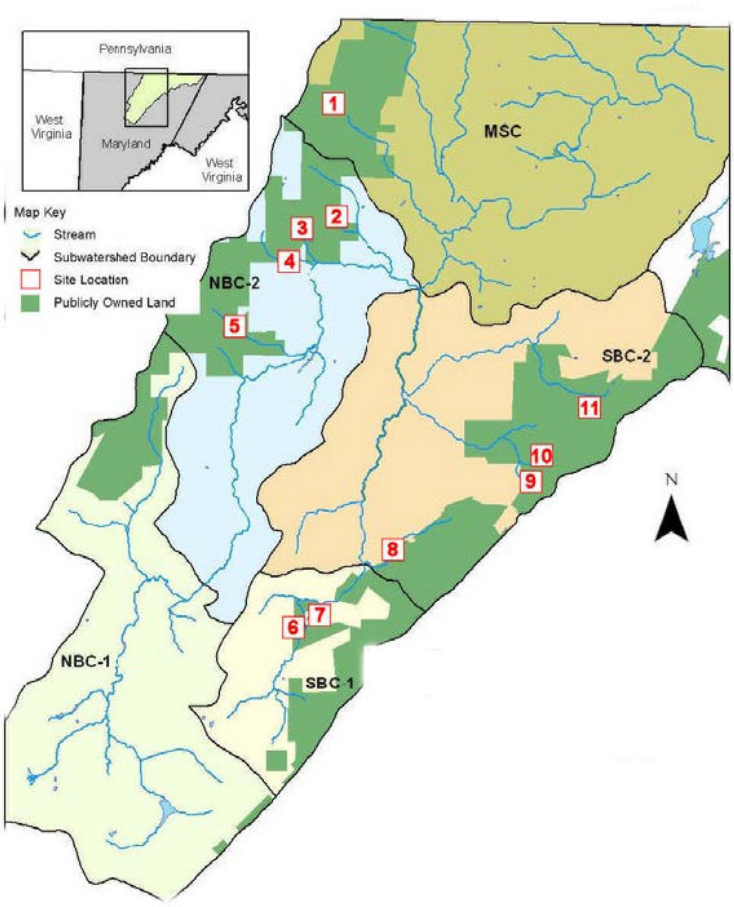


Figure 8. Casselman River watershed Phase 1 AMD mitigation sites.

Goal

MDE's 2011 watershed plan goal is to meet the pH water quality standard of no less than 6.5 pH and no greater than 8.5 pH by increasing alkalinity (mg $CaCO_3$/l). This goal is derived from the Western Maryland pH TMDLs approved in 2008 based on in-stream water quality data collected in 2005 or earlier.

Implementation

MDE is the lead implementer. Phase 1 BMP implementation on public lands was completed in 2013 at all eleven sites (see map) with FFY2009 319(h) Grant funding and other funds. Also in 2013, Phase 2 implementation for private lands began initial site selection and planning using 319(h) Grant FFY2009 and FFY2013 funds.

Table 11. Casselman River Watershed Plan - 2013 Implementation Progress Summary

Subwatershed	Stream	Phase	Site	Status 12/31/13	BMP Type (how many)
MSC	Spiker Run	1	1	Construction complete	Leach Bed (1) and Limestone Sand (1)
NBC-2	Unnamed Tributary 1	1	2		Leach Bed (1) and Limestone Sand (1)
	Unnamed Tributary 2	1	3		Limestone Sand (1)
	Tarkin Run	1	4		Limestone Sand (1)
	Alexander Run	1	5		Limestone Sand (1)
SBC-1	SB Casselman Mainstem	1	6		Limestone Sand (1)
	Unnamed Tributary 12	1	7		Leach Bed (1)
SBC-2	Unnamed Tribs 8a & 10	1	8		Limestone Sand (1)
	Unnamed Tributary 6	1	9		Limestone Sand (1)
	Unnamed Tributary 5	1	10		Limestone Sand (1)
	Big Laurel Run Headwaters	1	11		Leach Bed (1) and Limestone Sand (2)

Figure 9. The AMD mitigation projects in the Casselman River watershed are demonstrating the application of limestone "sand" as an effective technique that offers low operation and maintenance cost compared to other approaches. The project constructed access sites at the stream bank where a truck deposits crushed limestone (left). Then, over time, the limestone particles roughly the size of sand washes into the stream and distributes downstream where it buffers in-stream acidity (right).

Table 12. Casselman River Watershed - In Progress NPS Projects

Project Name/Description		Funding Source (1)	Funding Amount (2)			Total Cost (3)
			Federal	Match	State	
MDE	AMD Remediation Project (4)	319 FFY09 #6	$644,115	$429,410		$1,073,525
	AMD Remediation Project Phase 2	319 FFY13 #5	$401,307	$267,538		$668,845

Table footnotes:

(1) 319 is the Federal 319(h) Grant. FFY is Federal Fiscal Year. # is project number. For more information see Appendix D.

(2) In progress project's Federal funding = 319(h) Grant allocation. Match is mostly State funding but may include other sources. Grey shading means not separately reported.

(3) Total includes grant funds, plus required match, plus additional leveraged funds if reported.

(4) The first AMD remediation project is primarily Phase 1 (implementation on public land) and Phase 2 (implementation on private land) to the degree that project time and funds allow. The second project continues with Phase 1 and 2 until the projects' goal is achieved or project time or funds are exhausted.

(5) Goal for the Casselman River watershed AMD remediation projects overall is to meet the State water quality standard for pH.

Figure 10. Some Casselman River watershed AMD mitigation Phase 1 sites employed excavation & construction of limestone leach beds (left). Upon completion of the leach bed (far left), acidic waters are directed thru the limestone to raise the pH level before the it reaches the stream. (Casselman photos by MDE Abandoned Mine Land Division.)

4. Corsica River Watershed Implementation

Location

The Corsica River, which is 6.5 miles in length, is located in Queen Anne's County. The watershed area is 40 square miles and is part of the larger Chester River Watershed. Land use in the watershed aggregates into three broad categories:
- 66% agriculture,
- 26% woodland,
- 8% developed lands.

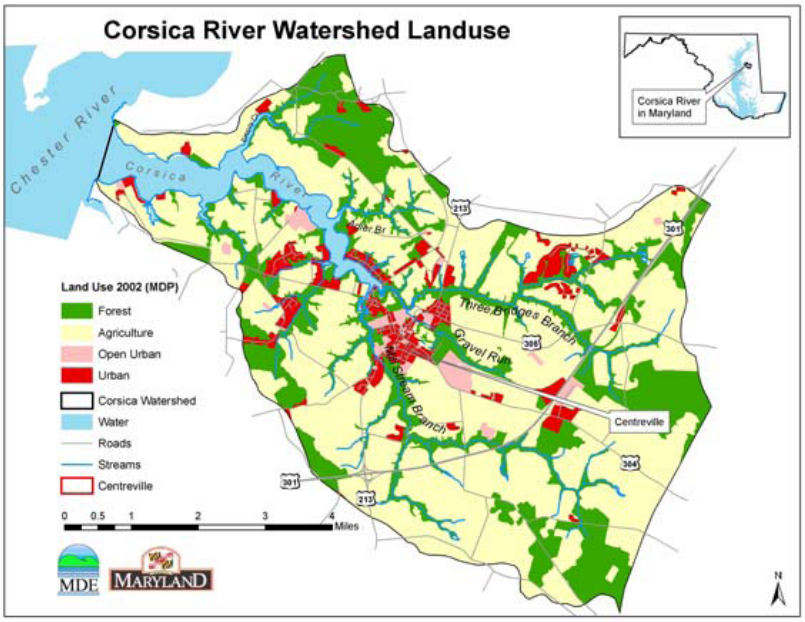


Figure 11. Corsica River Watershed

Goals

The NPS annual TMDL load allocation for nitrogen is 268,211lbs and for phosphorus is 19,380 lbs. Corsica River watershed ambient NPS nutrient loads already met the TMDL when it was approved by EPA, so the TMDL serves as a benchmark to prevent degradation (TMDL page 4 and 20). In addition, other goals were established as listed in the following implementation progress tables.

Implementation

The Town of Centreville is the lead implementer. Queen Anne's County, Queen Anne's Soil Conservation District and the Corsica River Association are cooperating NPS implementers contributing to 2013 reporting. The next pages summarize currently available watershed implementation progress and Appendix G is a map of project locations in Centreville. An implementation progress report for 2005-2011 is available: http://www.townofcentreville.org/departments/environment.asp

Figure 12. The volunteers shown here are planting live oysters this year on an oyster reef in the Corsica River. The oysters were collected thru the Maryland Grows Oysters (MGO) program. (Photo by the Maryland Dept. of Natural Resources and courtesy of the Corsica River Conservancy.)

Table 13. Corsica River Watershed Plan - 2013 Implementation Progress Summary

Goals			Progress (2)					
			Implementation Progress			Total Pollutant Reduction Reported 2005 thru 2013		
Category (1)	Unit	Goal	2013	2005 thru 2012	Percent of Goal Achieved	Nitrogen (lbs/yr)	Phosphorus (lbs/yr)	Sediment (tons/yr)
Agricultural BMPs	units	50	5	6	22%	35,846	4,791	863
Cover Crop (3)	acres	5,500	5,756		105%	32,777	4,393	0
Agricultural Buffers	acres	100	0	94.3	94%	2,173	141	0
Forest Buffers (urban)	acres	200	0	14	7%	28	8	0
Manure Transfer (3)	tons	27.4	0		0%	0	0	0
Oyster Bed Restoration	acres	20	0	11	55%	0	0	0
Rain Gardens & Bioretention	units	408	0	373	91%	150	20	1.5
Septic Tank Upgrades	systems	30	0	18	60%	73.0	0	0
Stormwater Retrofits	acres	300	0 (4)	112.5	37.5%	61.7	5.9	0
Stream Restoration	miles	2	0	0	0.0%	0.8	0.1	0.1
Waste Storage Facilities (ag)	units	1	0	1	100%	210.0	42.0	0
Wetland Restoration	acres	108	0	88.3	82%	0	0	0
					Total Pollutant Reduction	71,320	9,401	864
					Watershed Plan Nutrient Reduction Goal	100,132	6,306	---
					Percent of Goal Achieved	71.2%	149.1%	---

Table footnotes:
1. Categories for watershed plan goals tracked by EPA for progress.
2. 2013 is calendar year. Town of Centreville is the lead implementer/reporter in cooperation with the Corsica Implementers Group. All 319(h) Grant-funded implementation is reported. Zero means no progress or not reported. Grey shading means not applicable.
3. Cover crops and manure transfer are annual BMPs. This table reports only the most recent calendar year.
4. Four retrofits were completed during 2103 but will be reported next year when Centreville's FFY11 319(h) Grant project closes.

Figure 13. In 2012, Queen Anne's County Dept. of Public Works employees initiated work to retrofit the County Board of Education building in Centreville with stormwater infiltration capabilities. Portions of the project received funding assistance from the 319(h) Grant (FFY11 #11). (above, photo by Queen Anne's Co.)
In September 2013 the County Dept. hosted MDE and EPA at an on-site review of the project's bioretention / rain garden area in the front of the Board of Education building. At the time of the visit, vegetation in the project area was still in the early stages of growth. (left, photo by MDE)

Table 14. Corsica River Watershed - Completed NPS Implementation Projects and Reported Pollutant Load Reduction										
Project Name/Description		**Funding Source (1)**	**Funding Amount (2)**				**Total Cost (3)**	**Nitrogen (lb/yr)**	**Phosphorus (lb/yr)**	**Sediment (ton/yr)**
			Federal	**Match**		**State**				
Centreville	Watershed Restoration	319 FFY05 #2	$232,666.15	$155,110.77	2c		$387,776.92	0	0	0
	Watershed Restoration	319 FFY06 #3	$241,974.82	$161,316.55	2c		$403,291.37	62	6	0
	Symphony Village Bioswale	Trust Fund SFY11				$20,000.00				
	Watershed Restoration	319 FFY09 #1	$270,427.25	$180,284.83	2c		$450,712.08	5.33	1.05	0.29
	Stormwater Retrofit near WWTP	Trust Fund SFY11				$30,000.00				
		General Funds				$60,000.00				
	Banjo Lane Coastal Plain Outfall	Trust Fund SFY11				$30,000.00				
		General Funds				$10,000.00				
	Rain Barrel Program	Trust Fund SFY11				$10,000.00				
CRC	Corsica River Rain Garden Project	Trust Fund SFY12				$10,000.00	$50,000.00	62	11	0.29
MDA / Queen Anne's Soil Conservation District	Agricultural Technical Assistance	319 FFY04 #18	$32,379.50	$21,586.33	2a		$53,965.83	4,847	114	0
		319 FFY05 #12	$145,554.24	$97,036.16	2a		$242,590.40	767	79	463
		319 FFY06 #9	$14,272.71	$9,515.14	2a		$23,787.85	2,413	233	0
		319 FFY07 #6	$22,187.16	$14,791.44	2a		$36,978.60	286	10	755
		319 FFY08 #7	$50,780.00	$33,853.33	2a		$84,633.33	46	3	62
		319 FFY09 #4	$58,539.00	$39,026.00	2a		$97,565.00	19,740	6,664	33
		319 FFY10 #10	$61,590.00	$41,060.00	2a		$102,650.00	53,259	802	0
		319 FFY11 #10	$66,700.59	$44,467.06	2a		$111,167.65	45,703	642	492
		319 FFY12 #9	$50,999.97	$33,999.98	2a		$84,999.95	55,822	828	108.6
Queen Anne's County	Corsica and Beyond	319 FFY06 #13	$124,281.44	$82,854.29	2b		$207,135.73	0	0.34	0
	Bioretention Swale	319 FFY08 #19	$50,000.00	$33,333.33	2b		$83,333.33	0.22	0.35	0.739
	County Office Bldg Stormwater	Trust Fund SFY11				$200,000.00	$200,000.00	12	2	0.47
	Bloomfield Park N. Bldg. Permeable Paving	SRF Grant				$200,000.00	$250,000.00	864	173	0
	Bloomfield Park Permeable Pavers	Trust Fund SFY11				$50,000.00	$50,000.00	2	0.33	0.08
	Board of Ed. Bioretention	319 FFY11 #11	$22,431.94	$14,954.63	2b		$37,386.57	5.16	0.36	0.066
TOTAL for completed projects			$1,444,785	$963,190		$620,000.00	$2,957,974.61	183,895.5	9,569.8	1,915.5
Total for projects completed in 2013			$73,432	$48,955		$10,000	$172,387	55,888.99	839.72	108.93

(1) 319 is the Federal 319(h) Grant. FFY is Federal Fiscal Year. # is project number.
Trust Fund is the Maryland Chesapeake and Atlantic Coastal Bays 2010 Trust Fund, which offers grants for NPS projects. SFY is State Fiscal Year.
SRF is the State Revolving Fund. The table indicates if the project listed received a SRF grant or a SRF loan. The table shows only NPS projects.
General Funds are State funds used for NPS implementation (Md Department of Natural Resources budget).

(2) a. Match was State funded. b. Match was not State funded. c. Match may include State and/or local funds.

(3) Total includes grant funds, plus match if required, plus additional leveraged funds if reported.

(4) Zero means no progress or not reported. Green shading means project was completed during 2013. Grey shading means not applicable.

Table 15. Corsica River Watershed - In-Progress NPS Implementation Projects with Projected Future Pollutant Load Reduction										
Project Name/Description		**Funding Source (1)**	**Funding Amount (2)**				**Total Cost (3)**	**Nitrogen (lb/yr)**	**Phosphorus (lb/yr)**	**Sediment (ton/yr)**
			Federal	**Match**		**State**				
Centreville	Watershed Restoration	319 FFY11 #8	$298,998	$199,332	2c		$498,330	3.3	0.3	0
	Pennsylvania Ave BioSwale	Trust Fund SFY13				$6,000	$60,000	2	0	0
	Powell Street Retrofit	Trust Fund SFY13				$94,000	$104,000	1	1	0
	Watershed Restoration	319 FFY12 #7	$115,002	$76,668.00	2c		$191,670	20.6	1.8	0.6
	Stream Restoration near WWTP	Trust Fund SFY12				$250,000	$250,000	TBD	TBD	TBD
MDA / SCD	Agricultural Technical Assistance	319 FFY13 #9	$47,937	$31,958.00	2a		$79,895	TBD	TBD	TBD
Queen Anne's County	Bloomfield Park Permeable Pavers	Trust Fund SFY13				$69,416	$399,416	25	2	0
	Elementary School Bioretention	Trust Fund SFY13				$13,066	$63,066	TBD	TBD	TBD
	Board of Ed. Bioretention	Trust Fund SFY13				$10,518	$72,650	TBD	TBD	TBD
	Board of Ed. Phase 2, Kramer, et al	319 FFY12 #10	$114,276	$76,184.00	2b		$190,460	60.7	7.6	3.03
	Natural Filters Restoration	Trust Fund SFY13				$537,000	$537,000	110.2	10.0	1.5
	Kennard Elementary Riparian Buffer Planting	Trust Fund SFY14				$7,000	$7,000	29.5	1.6	3.8

(1) See footnotes with the Completed Projects Table on the previous page.

Figure 14. In Sept 2013 near Centreville's historic rail road terminal, the Town Watershed Manager shows construction of a bioretention area to MDE and EPA staff (near left, photo by MDE). About a month later, the project is complete and functional with newly planted colorful vegetation. (far left, photo courtesy of Centreville)

5. Lower Jones Falls 2013 Implementation Status

Location

The Lower Jones Falls watershed encompasses 16,550 acres (25.9 mi^2) that drains portions of Baltimore County (30.09%) and Baltimore City (69.91%). About 54 miles of streams in the watershed flow into the tidal Patapsco River and then the Chesapeake Bay. Land use in the watershed is 55.9% residential (11.1% low density, 23.7% mid density and 21.1% high density). Various developed land uses cover 21.7% of the watershed (6.9% commercial, 2.4% industrial, 10.5% institutional and 1.9% highway). Open land uses account for the remaining 22.2% of the watershed area (6.1% open urban, 13.6% forest, 1.3% agriculture, 0.6% bare ground, 0.6% extractive and 0.3% water). Overall impervious cover is 31.8%.

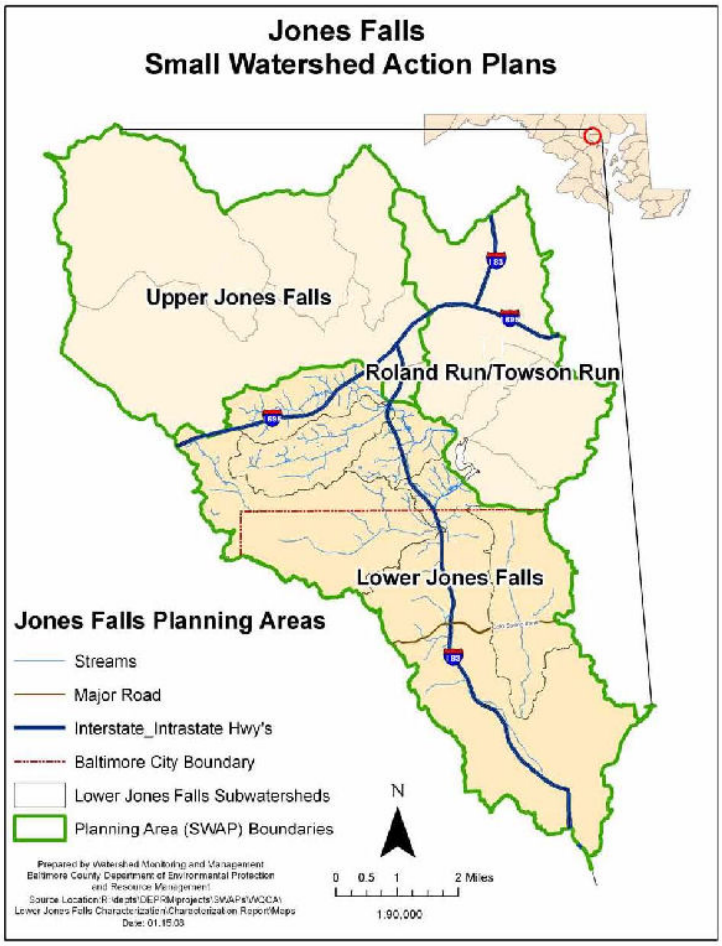


Figure 15. Jones Falls Watershed

Goals

The Lower Jones Falls Watershed Small Watershed Action Plan (Plan) was developed by Baltimore County in 2008 (CWA 104(b) funding) in partnership with Baltimore City and the Jones Falls Watershed Association. The plan accounts for pollutant load reductions prior to 2008, so only reductions after 2008 count toward plan implementation. The Plan was accepted by EPA in 2009 and it calls for the nutrient load reductions shown in the following table (including sanitary sewer overflow abatement). Baltimore County and Baltimore City are lead NPS implementers and reporters of progress for the watershed plan.

Implementation

Progress toward implementing the Lower Jones Falls watershed plan is summarized on the next page. During the period 2008 thru 2013, two in-progress grant-funded NPS implementation projects are identified but no completed projects were identified in this time period. Prior to the 2008 watershed plan, there was one 319-funded project in Baltimore City that was accounted for during plan development: FFY2003 #17 Stony Run Stream Restoration Northern Parkway to Wyndhurst Ave.

Table 16. Lower Jones Falls Watershed Plan - 2013 Implementation Progress Summary (1)								
Goals			**Progress (3)**					
Category (2)	**Unit**	**Goal**	**Implementation**			**Total Pollutant Reduction Reported**		
			2013	**2008-2012**	**Percent of Goal**	**Nitrogen (lbs/yr)**	**Phosphorus (lbs/yr)**	**Sediment (tons/yr)**
Reforestation - Forest Land Mgmt	acres	2	0.53	1.84	92%	8.53	0.62	0.12
Buffer Reforestation, Forest Stand Mgmt	acres	NA	0	0.77	NA	8.84	0.37	40.24
Nutrient Management	acres	2,210	0	0	0%	0	0	0
Downspout Disconnect, Roof Runoff Mgmt	acres	250	0.17	2.54	1%	31.44	2.83	1.15
Stream Channel Restoration (5)	feet	20,000	0	0	0%	0	0	0
Street Trees, Tree/Shrub Establishment	units	1,000	0	0	0%	0	0	0
Stormwater Retrofits, Urban SWM Wetlands	acres	100.0	0	1.29	1%	16.89	1.49	0.51
Stormwater Conversion, Urban Wet Pond	units	NA	0	0	NA	0	0	0
Total Cumulative Pollutant Reduction						65.7	5.3	42.0
Pollution Reduction Goals (Watershed Plan Table 5.4, page 85)						23,146	3,887	205
Percent of Goal Achieved						0.3%	0.1%	20.5%

(1) 2013 is calendar year. NA is not applicable. Zero means either not reported or no progress.
(2) Categories for watershed plan goals tracked by EPA.
(3) Data reported by Baltimore County and Baltimore City, includes results of nongovernmental organization activities.

Table 17. Jones Falls Watershed - In Progress NPS Projects with Projected Future Implementation Pollutant Load Reduction								
Project Name/Description		**Funding Source (1)**	**Funding Amount (2)**		**Total Cost (3)**	**Nitrogen (lb/yr)**	**Phosphorus (lb/yr)**	**Sediment (ton/yr)**
			Federal	**State**				
Baltimore City	Jones Falls Stream Restoration at Mt. Vernon Mills	SRF Loan		$100,664	$115,045	0	0	0
	Jones Falls Stream Restoration (Trout Unlimited)	Trust Fund SFY13		$425,000	$455,000	74	9	1

(1) 319 is the Federal 319(h) Grant. FFY is Federal Fiscal Year. # is project number. For more information see Appendix D.
SRF is the State Revolving Fund. The table shows only NPS projects.
Trust Fund is the Maryland Chesapeake and Atlantic Coastal Bays Trust Fund. SFY is State Fiscal Year.
Other is reported State funding from other sources.
(2) Excludes match and leveraged funds. Completed projects = total grant/loan funds expended for project. Projects in progress = grant or loan allocation.
(3) Total includes grant funds, plus match if required, plus additional leveraged funds if reported.
(4) Zero means no progress or not reported. Grey shaded blocks indicate either not reported or not applicable.

6. Lower Monocacy River

Location

The Lower Monocacy River watershed encompasses 194,700 acres (304 mi^2) that drains portions of Frederick County (87%), Montgomery County (10%) and Carroll County (3%). The mainstem of the Monocacy River is 58 miles long. The Monocacy River drains into the tidal Potomac River and then the Chesapeake Bay. Overall impervious cover is 4% but it is concentrated in two subwatersheds: Carroll Creek (18.6%) and Ballenger Creek (13.4%). Land use in the watershed is:

- 47% Agricultural
- 30% Forest
- 22% Developed land uses

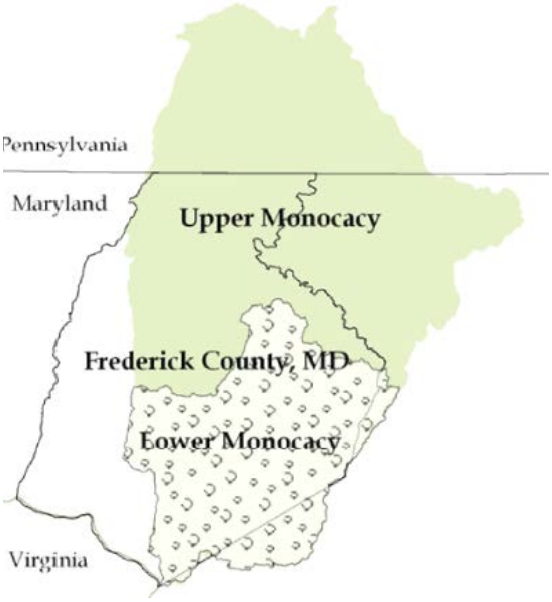


Figure 16. Monocacy River Watershed.

Goals and Implementation

Frederick County's 2004 Lower Monocacy River Watershed Restoration Action Plan addresses 168,960 acres (264 mi^2) within the County. The County's 2008 plan supplement incorporated goals from the Lake Linganore sediment TMDL, which is based on data collected in 2002 and earlier. Frederick County is the lead plan implementer/reporter. The Plan's 25-year goals and implementation progress are presented on the next page.

Figure 17. In 2013, Frederick County constructed a bioretention BMP in the County's Urbana Community Park to treat stormwater runoff from about 6.4 acres of the park, parking lots and roads. The 319(h) Grant provided funding assistance for the project. The BMP includes an under drain, that could be seen during construction (top). In November 2013 shortly after project completion (bottom), the new plantings are ready to play their part in helping to intercept runoff.
(Map and photos are courtesy of Frederick County.)

Table 18. Lower Monocacy River Watershed Plan 2013 Implementation Progress Summary (1)							
Lower Monocacy Goals (2)				**Lower Monocacy Implementation Progress (3)**			
Parameter		**Unit**	**Goal**	**2013**	**2006-2012**	**Cumulative Total**	**Goal % Achieved**
Nitrogen	Agriculture	lbs/yr	582,949		1,905.9	1,905.9	0.33%
	Urban	lbs/yr	67,049	121.43	2,209.4	2,330.9	3.48%
Phosphorus	Agriculture	lbs/yr	57,337		290.0	290.0	0.51%
	Urban	lbs/yr	11,615	17.62	165.3	182.9	1.57%
Sediment	Agriculture	lbs/yr	18,342,280		14.7	14.7	0.00%
	Urban	lbs/yr	2,348,084	3,072.63	49,530.4	52,603.0	2.24%
Lake Linganore Goals				**Lake Linganore Implementation Progress**			
Phosphorus	Agricultural	lbs/yr	601,489.60				
	Urban	lbs/yr	92,106.30	13	48.6	61.6	0.07%
	Forest	lbs/yr	4,186.70				
Sediment	Agricultural	tons/yr	38,401				
	Urban	tons/yr	3,615	1.2	9.6	10.8	0.30%
	Forest	tons/yr	1,033				

(1) 2013 is Calendar year. Frederick County is the lead plan implementer/reporter. Other entities may not be reporting implementation accomplishments. Grey shaded boxes indicate either not reported or not applicable.

(2) Lake Linganore is a Lower Monocacy subwatershed that has its own TMDL for phosphorus and sediment.

(3) 2013 pollutant load reductions above include 2013 load reductions reported by the County's 319 FFY10 #9 project but not reductions generated in earlier years of the project.

Figure 18. At the New Market Middle School in Frederick County, a total of 3.65 acres have been reforested with assistance from the 319 Grant. About 0.65 acres were planted by students in Fall 2011 and Spring 2012 (left). Then in Spring 2013, an additional three acres were planted by a contractor that the County hired with grant funding assistance (right). (Photos courtesy of Frederick County.)

Projects completed in 2013 by Frederick County, with assistance from the 319(h) Grant (FFY10 #9) are listed below. Projects with an * are in the Lake Linganore watershed. Other projects are elsewhere in the Lower Monocacy River watershed.

1- Deer Crossing Elementary School tree planting*,
2- New Market Middle School tree planting*,
3- Spring Ridge Elementary School tree planting*,
4- Urbana Community Park bioretention project
5- Frederick Co. Extension Bldg rain garden,
6- Orchard Grove Elementary School

Table 19. Lower Monocacy River Watershed - Completed NPS Implementation Projects and Reported Pollutant Load Reduction

Project Name/Description		Funding Source (1)	Funding Amount				Total Cost (3)	Nitrogen (lb/yr)	Phosphorus (lb/yr)	Sediment (ton/yr)
			Federal	Match		State				
MDA with Frederick SCD	Agricultural Implementation	319 FFY04 #23	$74,767.61	$49,845.07	(2a)		$124,612.68	1296.3	171.6	4.7
	Agricultural Implementation	319 FFY04 #39	$35,000.00	$23,333.33	(2a)		$58,333.33	609.64	118.36	10
Frederick County	Watershed Restoration	319 FFY05 #17	$216,237.00	$144,158.00	(2b)		$360,395.00	615.9	43.9	8.2
	Urban Wetlands, Bennett Creek Pilot	319 FFY07 #4	$196,732.92	$131,155.28	(2b)		$327,888.20	101.3	18.5	1.6
		319 FFY08 #4	$228,361.26	$152,240.84	(2b)		$380,602.10	149.9	31.4	2.782
	Green Infrastructure (5)	319 FFY10 #9	$284,739.42	$189,826.28	(2b)		$572,971.98	350.94	34.13	4.07
TOTAL for completed projects			$1,035,838.21	$690,558.81		$0.00	$1,824,803.30	3,124.0	417.9	31.4
Lower Monocacy River Watershed - In-Progress NPS Projects with Projected Future Implementation Pollutant Load Reduction										
Frederick County	Villages of Lake Linganore Stormwater Management	SRF Loan 2007A				$3,114,000	$14,146,142	TBD	TBD	TBD
		SRF Loan 2007B				$3,232,142		TBD	TBD	TBD
	Neighborhood Green Infrastructure	319 FFY13 #7	$97,000	$64,667	(2b)		$161,667	29	2	TBD
City of Frederick	Stream Restoration & Education	Trust Fund SFY14		$241,530	(2b)	$272,687	$514,217	1,454.6	99.7	17.7

(1) 319 is the Federal 319(h) Grant. FFY is Federal Fiscal Year. # is project number. For more information see Appendix D.
SRF is the State Revolving Fund. The table shows only NPS projects.
Trust Fund is the Maryland Chesapeake and Atlantic Coastal Bays Trust Fund. SFY is State Fiscal Year.
Other is reported State funding from other sources.
(2) a. Match was State funded. b. Match was not State funded.
(3) Total includes grant funds, plus match if required, plus additional leveraged funds if reported.
(4) Zero means not reported or no progress. Green shading: project was completed during 2013. Grey shading: not applicable. TBD: to be determined.
(5) For the Green Infrastructure project (FFY10 #9), figures reported are cumulative results for the entire project period 7/1/2010 thru 12/31/2013.

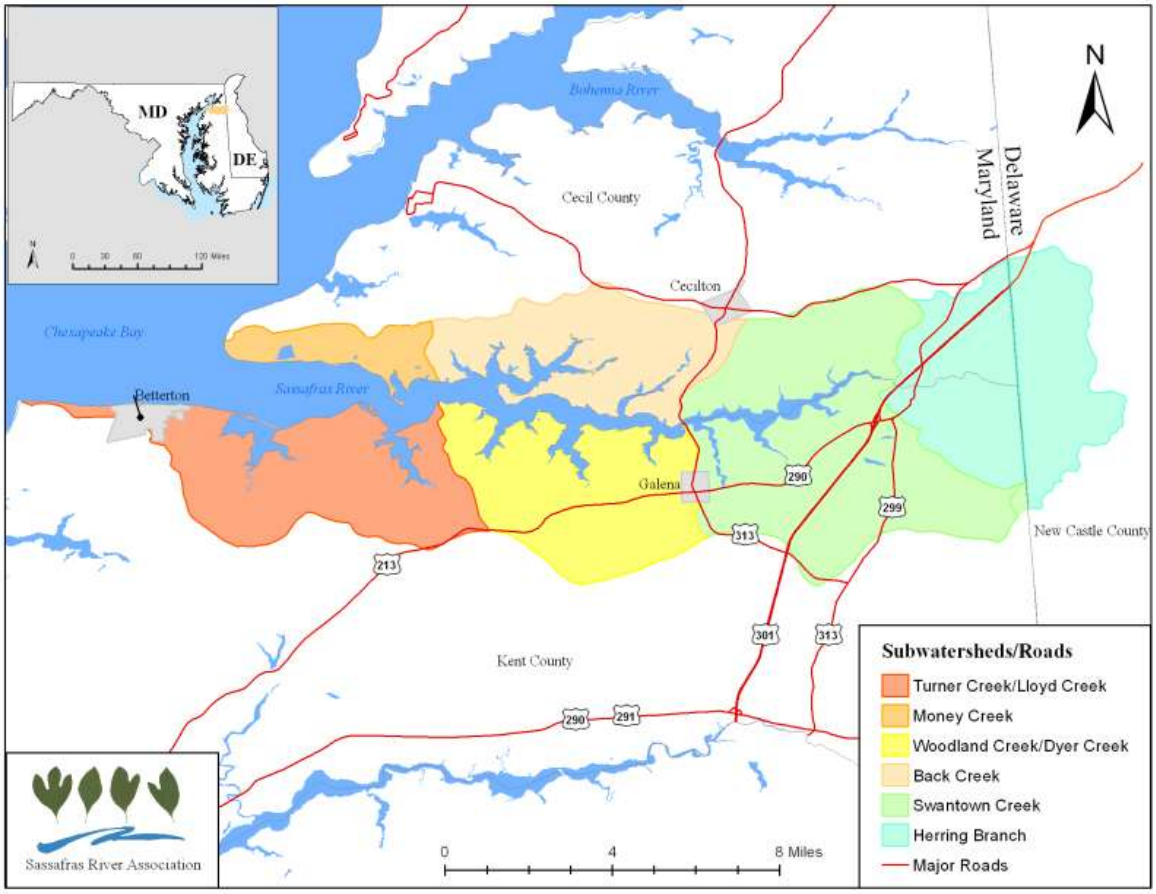


Figure 19. Sassafras River watershed map.

7. Sassafras River Watershed

Location

The Sassafras River watershed encompasses 62,000 acres (96.9 mi^2) that drains portions Kent County, MD (57%), Cecil County, MD (28%) and New Castle County, DE (8%) with 13% of the watershed being surface water. The 20.6 mile-long Sassafras River mainstem flows into the Chesapeake Bay. Impervious area covers 2.2% of the watershed. Land use in the watershed is: 57% agricultural; 24% forest; 4% developed; 14% water, and; 1% wetland.

Goal

The 2009 Sassafras River Watershed Action Plan (SWAP) was developed by the Sassafras River Association (SRA), a private nonprofit organization. The Plan lists numerous goals to be achieved within 10 years that are in part intended to meet the average annual phosphorus TMDL approved in 2002, which is based on 1999 water quality monitoring. The table on the next page lists some of these goals that are being tracked for implementation progress. The SRA is the lead plan implementer and reporter.

Table 20. Sassafras River Watershed Action Plan - 2013 Implementation Progress Summary								
Goals			**Progress (1)**					
			Goal Implementation Progress			**Total Pollutant Reduction Reported**		
Goal Number and Name	**Unit**	**Units Needed**	**2013**	**Previous Years (2009-2012)**	**Percent of Goal Achieved**	**Nitrogen (lbs/yr)**	**Phosphorus (lbs/yr)**	**Sediment (tons/yr)**
#1 Road retrofit, stream restored	project	3	0	0	0%	0	0	0
#2 Stormwater retrofits	project	4	0	1	25%	0	0	0
#5 Septic system upgrades	project	150	0	0	0%	0	0	0
#12 Stabilize eroding ravines	miles	1	0.3	0	30%	0	90	21.1
#13 Stabilize eroding shoreline	miles	0.5	0	0	0%	0	0	0
#14 Increase buffers (stream/shore)	miles	3	0	0	0%	0	0	0
#17 Agricultural cover crops	acres/yr	5,000	0		0%	0	0	0
#20 Innovative ways of more efficient and effective use of nutrients (3)	acres/yr	100	0	20	20%	0	0	0
#21 Wetland creation	projects	5	1	1	40%	1.4	0.2	0.05
#22 Agricultural BMPs	acres	500	0	0	0%	0	0	0

(1) 2013 = Calendar year. This table summarizes completed project results from the following table and received from SRA. Zero means either no progress or not reported. Zero means not reported or no progress. Gray shading means not applicable. SRA is the lead plan implementer/reporter.

Figure 20. In spring 2013, Galena Elementary students (above left) helped plant a constructed wetland next to the school building. This 319(h) Grant-funded wetland creation effort was is led by the Kent Soil Conservation District and the Sassafras River Association. It is designed to intercept stormwater runoff from the school roof and to provide learning opportunities for the students. Later in September 2013, representatives from the District, MDE and EPA Region 3 conducted an on-site review of the completed project (above right). (Left photo is by the Sassafras River Association. Right photo is by MDE)

Figure 21. In 2013, the Budds Landing ravine stabilization project was constructed (left) thru the efforts of the Sassafras River Association in the headwaters of Coppin Creek in the upper Sassafras River watershed. The project area receives stormwater runoff from about 150 acres of mixed low density residential and pasture lands. The completed 1600 linear foot project (right) includes regenerative stormwater conveyance cells, rock grade control step pools, coir fiber logs and live fascines to help slow runoff and promote infiltration. To help pay for the project, the SRA received a $170,864grant from Chesapeake and Atlantic Coastal Bays Trust Fund.
(Photos are by the Sassafras River Association.)

Table 21. Sassafras River Watershed - Completed NPS Implementation Projects and Reported Pollutant Load Reduction

Project Name/Description		Funding Source (1)	Funding Amount (2)				Total Cost (3)	Nitrogen (lb/yr)	Phosphorus (lb/yr)	Sediment (ton/yr)
			Federal	Match		State				
SRA	Budds Landing ravine stabilization	Trust Fund SFY13				$170,864.00	$205,864.00	0	90	21.1
Kent SCD with SRA	Galena Elementary School stormwater wetland	319 FFY12 #8	$14,000.00	$9,333.33	(2b)		$25,000.00	1.38	0.24	0.05
		TOTALS	$14,000.00	$9,333.33		$170,864.00	$230,864.00	1.4	90.2	21.15

Sassafras River Watershed - In Progress NPS Projects with Projected Future Implementation Pollutant Load Reduction

SRA	Rt 301 Stormwater Conveyance	Trust Fund SFY13				$440,000	$880,000	35	465	211,000
	Buffer Restoration	Trust Fund SFY13				$47,557	$52,190	430.8	28.8	5
Kent SCD with SRA	Crawford Treatment Wetlands	Trust Fund SFY13				$145,582	$349,000	2,992.75	863.1	12.454
	Phipps Treatment Wetlands & sediment traps	Trust Fund SFY12				$130,000.00	$180,000	34,284	10,312	119.75
		319 FFY13 #8	$50,000	$33,333	(2b)					

(1) 319 is the Federal 319(h) Grant. FFY is Federal Fiscal Year. # is project number. For more information see Appendix D.
SRF is the State Revolving Fund. The table shows only NPS projects.
Trust Fund is the Maryland Chesapeake and Atlantic Coastal Bays Trust Fund. SFY is State Fiscal Year.
Other is reported State funding from other sources.
(2) a. Match was State funded. b. Match was not State funded.
(3) Total cost includes grant funds, plus match if required, plus additional leveraged funds if reported.
(4) Zero means not reported or no progress. Green shading means project was completed during 2013. Grey shading means not applicable.

8. Upper Choptank River

Location

The Upper Choptank River watershed encompasses 163,458 acres (255 mi^2) and drains parts of three Maryland counties (Caroline, Talbot and Queen Anne's) and parts of Delaware. It flows into the Chesapeake Bay. Impervious area covers 2.2% of the watershed. Land use in the watershed is: 58% agricultural; 31% forest; 8% developed and; 3% water.

Goal

In the 2010, Caroline County developed the Upper Choptank River watershed plan based on Tributary Strategy NPS goals and EPA's Chesapeake Bay Program 2002 pollutant load estimates for the Upper Choptank River watershed. The Plan's NPS pollutant load goals are:

- Total nitrogen reduction: 704,000 lbs/year
- Total phosphorus reduction: 34,500 lbs/year.

Implementation

Caroline County is the lead plan implementer and reporter. Progress toward meeting the watershed plan goals from 2002 thru the present is reported on the following pages.

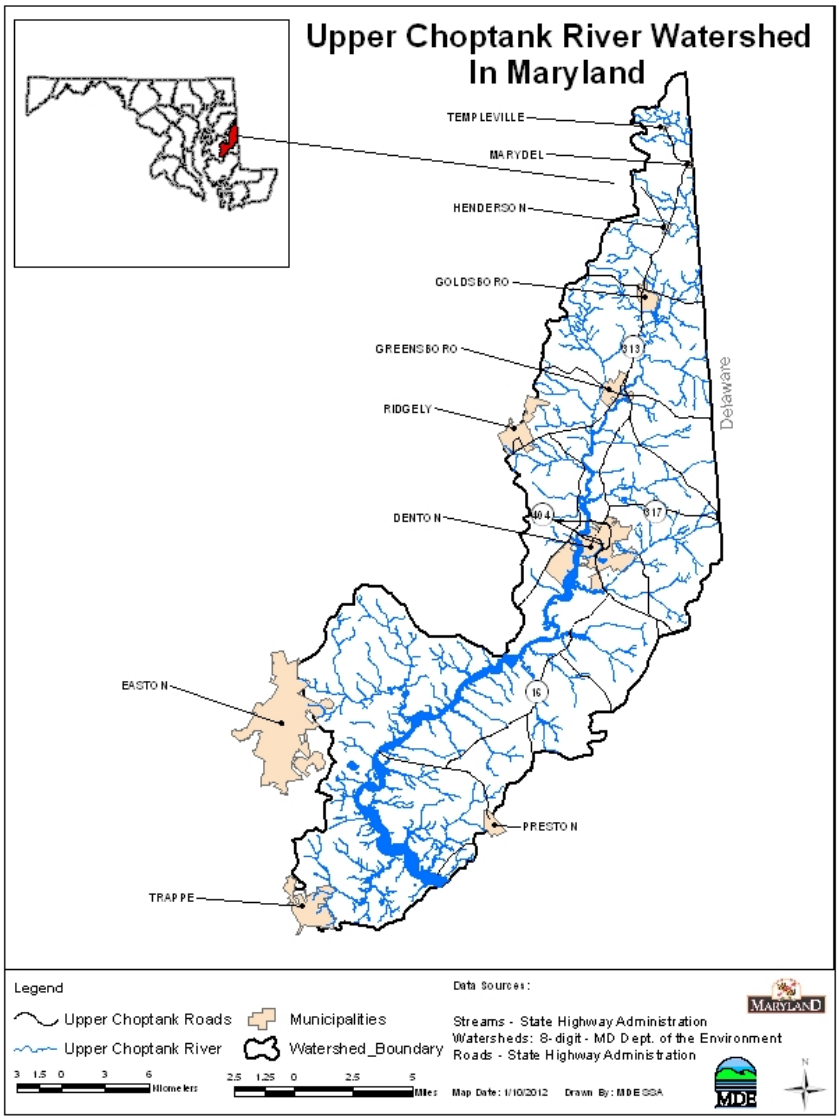


Figure 22. (above) Upper Choptank River Watershed.

Figure 23. (right) At one of Caroline County's 2013 stream clean-ups, volunteers working near the communities of Henderson and Marydel pause for the camera. (Photo courtesy of Caroline County Planning & Codes Administration.

Table 22. Upper Choptank River Watershed Plan Implementation Progress Summary (1)

	BMP	Goal	Units	2013 Progress				Reported Oct 2003 thru 2012 (2)				Cumulative 2003 Thru 2013			
				Units	Nitrogen (lb/yr)	Phosphorus (lb/yr)	Sediment (ton/yr)	Units	Nitrogen (lb/yr)	Phosphorus (lb/yr)	Sediment (ton/yr)	Units	Nitrogen (lb/yr)	Phosphorus (lb/yr)	Sediment (ton/yr)
Agricultural Lands	Cover Crops	50,000	acres/yr	0	0	0	0					0	0	0	0
	Cover Crops - commodity	15,000	acres/yr	0	0	0	0					0	0	0	0
	Buffers Forested	1,000	acres	0	0	0	0	0	0	0	0	0	0	0	0
	Buffers Grassed	5,500	acres	0	0	0	0	64.2	0	0	0	64.2	0	0	0
	Conservation Tillage	20,000	acres/yr	0	0	0	0	1,374.4				1,374.4	0	0	0
	Nutrient Management	48,000	acres	0	0	0	0	6,415.0	0	0	0	6,415.0	0	0	0
	Precission Agriculture	25,000	acres	0	0	0	0	0	0	0	0	0	0	0	0
	Retire Highly Erodible Land	500	acres	0	0	0	0	0	0	0	0	0	0	0	0
	SCWQ Plans	66,000	acres	0	0	0	0	4,699.9	0	0	0	4,699.9	0	0	0
	Wetland creation	1,200	acres	0	0	0	0	12.1	0	0	0	12.1	0	0	0
	Stream Protection w Fencing	130	acres	0	0	0	0	0	0	0	0	0	0	0	0
	Stream Protection w/o Fencing	32	acres	0	0	0	0	0	0	0	0	0	0	0	0
	Tree Planting	100	acres	0	0	0	0	0	0	0	0	0	0	0	0
	Animal Waste Mgmt - Livestock	2	systems	0	0	0	0	1	0	0	0	1	0	0	0
	Animal Waste Mgmt - Poultry	4	systems	0	0	0	0	15	0	0	0	15	0	0	0
	Runoff Control	8	systems	0	0	0	0	2	0	0	0	2	0	0	0
	Pre-2013 Ag BMPs (3)								23,455.6	2,498.2	108		23,456	2,498	108
Developed Lands	Buffers Forested	60	acres	0	0	0	0	0	0	0	0	0	0	0	0
	Erosion & Sediment Control	895	acres/yr	0	0	0	0	0				0	0	0	0
	Nutrient Management	12,000	acres	0	0	0	0	0	0	0	0	0	0	0	0
	Stormwater Management	8,400	acres	0	0	0	0	6.9	0	0	0	6.9	0	0	0
	OSDS Denitrification	5,051	systems	0	0	0	0	0	0	0	0	0	0	0	0
	Septic connections to WWTP	750	systems	0	0	0	0	0	0	0	0	0	0	0	0
	Pre-2013 Urban BMPs (3)							30	675	185	19	30	675	185	19
	TOTAL				0	0	0		24,130.6	2,683.2	127		24,130.6	2,683.2	127
	Completed 319-funded NPS Projects (3)												220,860.6	13,088.1	1,128.71
	TOTAL Cumulative Reduction												244,991.2	15,771.3	1,255.7
	Watershed Plan Goal												704,000	34,500	NA
	Percent of Goal Achieved												34.8	45.7	

1) 2013 is calendar year. Grey shading means not applicable. Zero means no progress or not reported.

2) Ag BMP units implemented were frequently not reported or under-reported in prior year's projects. Pollutant reductions were either not reported or were reported in aggregate for all BMPs that year.

3) NPS implementation (319 and non-319) completed prior the watershed plan commonly reported sufficient information to include here but not in specific BMP categories above.

Table 23. Upper Choptank River Watershed - Completed NPS Implementation Projects and Reported Pollutant Load Reduction									
Project Name/Description		**Funding Source (1)**	**Funding Amount**			**Total Cost (3)**	**Nitrogen (lb/yr)**	**Phosphorus (lb/yr)**	**Sediment (ton/yr)**
			Federal	**Match**	**State**				
MDA / Caroline SCD	Upper Choptank Cover Crop Demo	319 FFY03 #12	$48,161.00	$32,107.33 (2a)		$80,268.33	0	0	461.8
	Upper Choptank Cover Crop Demo	319 FFY03 #21	$114,000.00	$76,000.00 (2a)		$190,000.00	23,097	642	0
	Agricultural Technical Assistance	319 FFY04 #13	$49,949.00	$33,299.33 (2a)		$83,248.33	0	0	393.1
	Upper Choptank Cover Crop Demo	319 FFY04 #20	$150,000.00	$100,000.00 (2a)		$250,000.00	19,465	458	0
	Agricultural Technical Assistance	319 FFY04 #32	$55,990.64	$37,327.09 (2a)		$93,317.73	20,646.14	1,979.37	99.89
	Agricultural Technical Assistance	319 FFY05 #9	$39,167.70	$26,111.80 (2a)		$65,279.50	9,139.8	1,461.3	23.84
	Upper Choptank Cover Crop Demo	319 FFY05 #18	$121,600.00	$81,066.67 (2a)		$202,666.67	33,192	0	0
Caroline SCD	Agricultural Technical Assistance	319 FFY07 #21	$56,256.00	$37,504.00 (2a)		$93,760.00	33,169.01	5,832.24	107.97
	Agricultural Technical Assistance	319 FFY08 #2	$48,314.98	$32,209.99 (2a)		$80,524.97	82,140.24	2,707.31	41.2
Caroline Co.	DPW Stormwater Retrofits	319 FFY10 #7	$46,213.30	$30,808.87 (2b)		$77,022.17	11.39	7.89	0.91
	TOTAL for completed projects		$729,652.62	$486,435.08	$0.00	$1,216,087.70	220,860.6	13,088.1	1,128.71
Upper Choptank River Watershed - In Progress NPS Implementation Projects with Projected Future Pollutant Load Reduction									
Caroline County	Upper Choptank Watershed Restoration	319 FFY12 #6	$140,001	$93,334 (2b)		$233,335	8	0.9	TBD
	Upper Choptank Watershed Restoration	319 FFY13 #6	$140,001	$93,334 (2b)		$233,335	16	2.7	0.68
	Greensboro Stream Restoration	Trust Fund SFY14			$75,000	$75,000	TBD	TBD	TBD
MRC	Agricultural BMPs	Trust Fund SFY14		$18,800 (2b)	$50,031	$68,831	TBD	TBD	TBD

(1) 319 is the Federal 319(h) Grant. FFY is Federal Fiscal Year. # is project number. For more information see Appendix D.
SRF is the State Revolving Fund. The table shows only NPS projects.
Trust Fund is the Maryland Chesapeake and Atlantic Coastal Bays Trust Fund. SFY is State Fiscal Year.
Other is reported State funding from other sources.
MRC is the Midshore Riverkeeper Conservancy.

(2) a. Match is State funding. b. Match is not State funding. c. State and/or local funds.

(3) Total includes grant funds, plus match if required, plus additional leveraged funds if reported.

(4) Zero means either no progress or not reported. Grey shading means not applicable. TBD means to be determined.

V. Areas of Concern/Recommendations/Future Actions

Key challenges addressed by the 319 NPS Program, in collaboration with other state efforts, include: sections:

- Increasing NPS Pollution from Developed Lands
- Resource Constraints versus Measureable Environmental Results
- Reporting NPS Implementation Progress

1. Increasing NPS Pollution from Developed Lands

Maryland has seen tremendous population growth over the last several decades and the trend is projected to continue. From 2000 to 2010, Maryland's population increased about 477,000 to nearly 5,774,000 with an accompanying increase in population density from 542 to 596 per sq/mi. over the same period. An accompanying trend is a decrease in the number of people per household. These trends contribute to increasing development acreage, increasing impervious area as a percentage of the landscape and a tendency for increasing urban stormwater runoff and the nonpoint source pollutant loads associated with it. The State has had two long-standing programs in place to control pollution generated from the development of land. MDE is responsible for administering these two programs that are erosion and sediment control and stormwater management. For over 40 years, Maryland's erosion and sediment control program has required that specific vegetated techniques and structural practices be implemented and plans be designed, reviewed, and approved to control runoff from construction sites. This statewide program has undergone numerous changes and improvements over the last four decades, some of which occurred recently:

- Sediment and Erosion Control
- Accounting for Growth
- Stormwater Fees
- Stormwater Program
- Comprehensive Plans

a. Sediment and Erosion Control

In January 2012, MDE completed a comprehensive two year process of modifying the regulations governing erosion and sediment control. This effort culminated in the adoption of the "2011 Standards and Specifications for Soil Erosion and Sediment Control" (Standards). These Standards improved the design of practices found in previous versions of the document (last edition dated 1994) and was based on current technology and experience and exhaustive public input from various development related communities. Accompanying the Standards were changes to the Code of Maryland Regulations (COMAR 26.17.01) that further improved construction site runoff management. Major improvements included limiting the amount of earth allowed to be disturbed for any project to 20 acres, and decreasing the time that soil is allowed to remain bare. Stabilization is now required to be applied within 3 days to site perimeters and controls and 7 days to inactive areas (previously 7 and 14 days, respectively).

b. Accounting for Growth

To address growth-related increases in NPS pollution, the State is actively pursuing an Accounting for Growth (AfG) program intended to offset new nutrient and sediment loads. This initiative, prompted by the Chesapeake Bay TMDLs for nutrients and sediments, is referenced in Maryland's Phase II Watershed Implementation Plan (WIP) and the State's 2013 and 2015 two-year programmatic Milestone commitments. Staff from Maryland's 319 Program are contributing to policy and technical aspects of the AfG program development. Products of particular interest include best management practice (BMP) cost estimates [PDF] and a load calculating tool [XLS]. The calculating tool reflects stormwater NPS impacts of land use change and septic systems. Although the tool's purpose was to explore AfG policy alternatives, it has broader potential uses. The overall process of developing the AfG policy, which has included a stakeholder advisory group, is being documented on an Accounting for Growth webpage, maintained by 319-funded staff.

c. Stormwater Fees

Maryland's 2012 General Assembly enacted the Watershed Protection and Restoration Program (House Bill 987). This State legislation requires each of the 10 local jurisdictions with Phase 1 MS4 permits to establish a fee program to fund work to address stormwater runoff. It also allowed flexibility in setting fees structures and selecting approaches. These local programs have the potential to generate a much needed funding source to reduce impacts from urban stormwater.

Staff funded by Maryland's 319 Program conducted workshops in fall 2013 on communications issues surrounding this controversy. The workshops were part of Maryland's continuing process of engaging local government partners on the Bay Watershed Implementation Plan. Workshop presentations included an overview [PDF] on communicating about storwmater pollution problems in general and on the need for a stormwater fee in particular.

In addition, we partnered with people who have expertise in communications to share their insights based on recent research, including focus groups. A presentation on communicating about clean water [PDF] focused on the controversy surrounding the stormwater fee. An important message is that local actions, which benefit local communities, are the actions that will restore the Chesapeake Bay as well.

Beyond the matter of stormwarter fees, many of the spring and fall 2013 WIP workshops presentations by local partners highlighted 319 Program supported activities. Good examples of this including two presentations on Antietam conservation project (Spring 2013 workshop presentation) [PDF] (Fall 2013 workshop presentation) [PDF], Addressing Urban Stormwater in Caroline County [PDF], and the Corsica River Targeted Watershed Project [PDF].

d. Stormwater Program

The State's stormwater management program has also undergone numerous changes since it was first implemented in 1982. Recently however, MDE overhauled the way new development runoff is controlled by requiring the use of environmental site design (ESD). This represented a significant sea change in how stormwater management is to be designed. Prior to the passage of the Stormwater Act of 2007 (Act), Maryland allowed large, structural practices to be used to manage runoff from new and redevelopment projects. The Act mandated that MDE alter this approach in order to use ESD to better mimic natural hydrology.

Code Of Maryland Regulations (COMAR 26.17.02) modifications adopted in May 2009 now require better site planning, nonstructural techniques, and small-scale structures to be used to replicate the runoff characteristics of "woods in good condition" and reach a standard of maximum extent practicable (MEP). MEP is to be reached using alternative surfaces, green roofs, rainwater harvesting, rain gardens, micro-bioretention, and landscape infiltration. MDE revised Chapter 5 of the 2000 Maryland Stormwater Design Manual, provided guidance and ESD examples, and reviewed and approved all county and municipal stormwater management ordinances all in an effort to improve Maryland's program. Local implementation for private development and MDE implementation for State and federal construction projects has been ongoing since May 2010.

Additional information related to urban/suburban nonpoint source pollutant control: http://mde.maryland.gov/programs/Water/StormwaterManagementProgram/SedimentandStormwaterHome/Pages/Programs/WaterPrograms/SedimentandStormwater/home/index.aspx

e. Comprehensive Plans

Another ongoing effort to improve NPS management in Maryland is State Agency input and assistance to local governments regarding their Comprehensive Plans, which are used by Counties to establish long term direction for their decisions regarding use of land, resources, etc. During 2009-2010 when local governments were working to integrate Water Resource Elements (WRE) into their Comprehensive Plans, MDE assisted by: 1) developing NPS analysis tools for use by local governments, 2) providing direct staff assistance in using these tools and in meeting NPS program objectives, and 3) reviewing and commenting on the local government's drafts. Now in continuing these efforts, MDE receives proposed changes to local Comprehensive Plans through the State's Clearing House Review process and offers recommendations and assistance designed to promote effective NPS management by local government.

2. Resource Constraints versus Measurable Environmental Results

As federal and state budgets grow tighter, there is a push for all programs to demonstrate their effectiveness at producing results. The national Nonpoint Source Program is under pressure to demonstrate program effectiveness through measurable environmental results. Over the past two decades, the Maryland NPS Program has focused on a *targeted watershed* approach to help target resources in a way that would generate measurable results. Although the logic is compelling, findings of a retrospective assessment of results for the past two decades are not as compelling. Maryland's NPS Program, in coordination with EPA Region III, will evaluate the findings in a manner that has the greatest potential to generate measurable results. In coordination with EPA Region III, the NPS Program will selectively target program resources consistent with the priorities listed here and discussed in the immediately following sections:

- Protection of High Quality Waters
- Biological Restoration Initiative
- Reducing Nutrient and Sediment Pollution to the Chesapeake Bay
- Improvement of Impaired Waters
- Documenting Success Stories

a. Protection of High Quality Waters
The 319 Program is supporting implementation of Maryland's anti-degradation regulations by funding biological monitoring. This is being targeted to Tier II waters in which there are proposed development activities. This monitoring supports MDE decision-making and provides data to evaluate the effectiveness of the anti-degradation policies and support future policy refinements.

b. Biological Restoration Initiative
Maryland uses biological data from streams as one gauge of potential degraded conditions. If the percentage of degraded streams in a watershed exceeds a certain threshold, Maryland formally identifies that watershed on the State's list of impaired waters. Because watersheds that are just below the threshold of impairment may have a higher potential for restoration than those that are significantly more degraded, resources from the 319(h) NPS Program are being directed to these marginally impaired watersheds in an effort to remove them from the State's impaired waters list. The 319(h) Grant funding for this Biological Restoration Initiative (BRI) was coordinated in 2010 with the State's Chesapeake and Coastal Bays Trust Fund (Trust Fund) grant program trough the Trust Fund's targeting scheme. Coordination between Federal 319(h) Grant and the State Trust Fund will continue. It is anticipated that this coordination will assist in providing leveraging opportunities for funding in the future.

c. Reducing Nutrient and Sediment Pollution to the Chesapeake Bay
Nutrient and sediment pollution are the main causes of impairment of our tidal waters. These pollutants have been the focus of EPA's development of TMDLs for the Chesapeake Bay. The 319 Program provided resources to support the development of Maryland's Phase I and Phase II Watershed Implementation Plans (WIP). In addition to this Chesapeake Bay restoration planning, the 319 Program is coordinating implementation grant proposals through Maryland's Trust Fund, which targets resources to areas with the greatest nutrient loading to the Bay and to the BRI target areas discussed above. As attention turns from WIP planning to tracking, reporting and validation of implementation the 319 Program will continue to play a vital role in refining and implementing these systems in coordination with the Chesapeake Bay Regulatory and Accountability Program (CBRAP) grant.

d. Improvement of Impaired Waters
Maryland has a two-track system for targeting resources to improving impaired waters. Both priority tracks are designed to address EPA's Strategic goals of improving living resources and showing observable water quality improvement. They also increase the likelihood of generating success stories discussed below.

One track is to identify waters with high recovery potential for removal from Maryland's 303(d) list. These waters tend to be impaired just slightly beyond the threshold of water quality standards or are conducive to restoration in other ways, e.g., the State has significant control over the sources of impairment. During 2009, MDE assessed the list of waters with biological impairment and ranked them to identify watersheds that have the highest potential for removal from Maryland's 303(d) list. Beginning in 2010, MDE integrated these priorities into the 319(h) grant selection criteria and into the State's criteria for dispersing Trust Fund grant. 319 grant funds were subsequently directed to field assessments of the causes of stream degradation and opportunities for remediation for several highly ranked waters.

Another example of this first track of priority attention is the continued 319 Program funding of acid mine drainage (AMD) restoration projects in Western Maryland. Because theses projects can be engineered to control sources of acidity, they have a high potential for meeting pH water quality criteria thereby resulting in their removal from Maryland's 303(d) list.

One challenge with this track is that soliciting implementation partners and directing funding to these types of projects must compete with the high-profile Chesapeake Bay restoration initiative. The 319 Program will make a concerted effort to balance resources in view of the dominant interest in Bay restoration.

The second track is to show incremental improvement in water quality short of removal from the 303(d) list. The waters prioritized for this objective tend to be intensely degraded with apparent low-cost opportunities for remediation. Due to the intense level of degradation, improvements tend to be more readily observable than cases of less degradation. A classic example of this is the situation of over grazing in or near streams, which cause multiple impacts including elevated bacteria, nutrients and sediments as well as physical stream degradation. Targeting these cases presents the opportunity to address multiple kinds of impairment with the same restoration actions. The 319 Program's pioneering use of the synoptic survey monitoring technique, which collects numerous samples within a watershed, provides information at a fairly high resolution for use in both targeting and evaluation of progress in the future.

e. Documenting Success Stories

Maryland is committed to documenting NPS management & implementation success stories. A challenge in doing this is that site-specific environmental monitoring of NPS best management practice implementation documenting before/after change in terms of in water quality or in-stream biology improvement requires significant effort and investment. This investment is frequently not part of the BMP project itself. Commonly, generating sufficient monitoring documentation requires years of data collection in a local watershed where the environmental improvements produced by the BMPs are not obscured by weather variability and other sources of impairment. Additionally, long term monitoring before and after installation of BMPs has sometimes shown that environmental improvements in receiving streams may take years to appear due to environmental conditions like travel time through groundwater and effects of historic pollutant storage that can linger long after BMPs are installed. Consequently, it is difficult: 1) to identify partners who had initiated their success story monitoring years prior to BMP implementation, 2) to find adequate monitoring data/analysis to verify results, and 3) to assemble documentation that can survive critical technical review.
The success story presented in Appendix F, *Treating Acid Mine Drainage Improves Cherry Creek*, met these challenges and was submitted to EPA in 2012.

To help meet these challenges in the future, MDE continues to seek out partners who volunteer to help generate success story documentation. Additionally, MDE is focusing a percentage of 319(h) Grant funded monitoring on generating monitoring data in watersheds with targeted NPS BMP implementation so that documentation for potential success stories can be developed.

3. Reporting NPS Implementation Progress

Under Section 319 of the Federal Clean Water Act, the States have a responsibility to report annually, including NPS implementation progress and pollution load reductions. In Maryland NPS implementation reporting is conducted for various purposes including the 319 NPS Annual Report for EPA Region III, State annual reporting for the EPA Chesapeake Bay Program and local reporting to meet other requirements (MS4 permit) and interests (local watershed-based plans, local Chesapeake Bay Watershed Implementation Plans). It is important that all of the efforts to track NPS implementation progress draw from the same data sources and consistently track and report information. However, there several concerns:

- Timing
- Privacy and Scale
- NPS Implementer Participation

a. Timing

Maryland has historically generated the 319 NPS Annual Report on a calendar year basis to meet the EPA Region III deadline for submittal (February 1 currently). Reporting by Maryland for the EPA Chesapeake Bay Program (CBP) is on a State fiscal year basis, which is July thru June of the next year. The EPA CBP receives Maryland's report in December and data is finalized by February/March. The result is that BMP implementation data reported in the 319 NPS Annual Report Appendix C is always the most recent finalized CBP submittal, which is from the prior year.

b. Privacy and Scale

Information on private lands BMP implementation, particularly for agriculture, is subject to statutory requirements to maintain privacy. To meet these requirements, data for agricultural BMPs implementation is aggregated to large geographic areas at the County scale or at the scale of watersheds used by the EPA Chesapeake Bay Model. Although some implementation can be reported at finer scales, the underlying data might be at a coarser scale in the Bay Model data set, having been distributed to geographically finer scales via data processing algorithms that use the proportion of available land uses. These data have not been available at the watershed scales tracked and reported for Maryland's 319 NPS Annual Report.

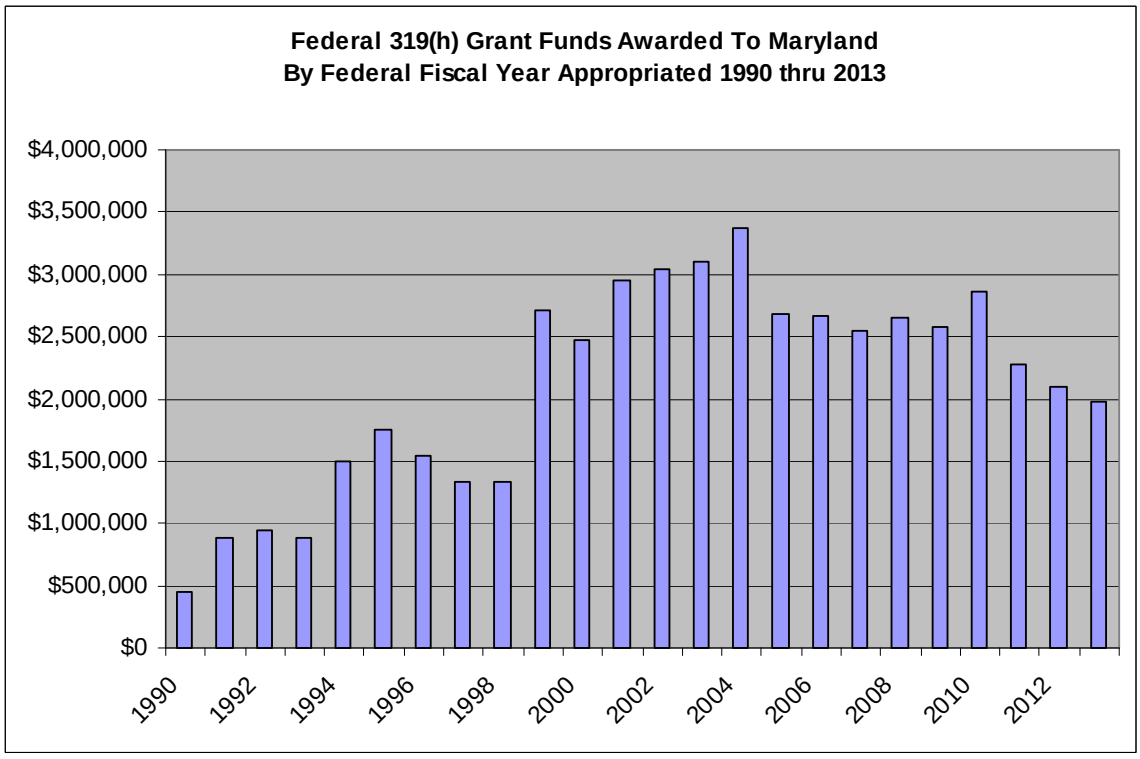
c. NPS Implementer Participation

Counties, soil conservation districts and other entities that do not receive 319(h) Grant funds frequently have little incentive to invest time contributing to the 319 NPS Annual Report. With the exception of the Casselman River watershed, where MDE is the sole BMP implementer and reporter, all other watersheds eligible for 319 implementation funding have one or more NPS implementers that do not report their accomplishments for the 319 NPS Annual Report. BMP implementation tracking by these stakeholders is collected more frequently for use by the EPA Chesapeake Bay Model but this data stream has not been successfully tapped to meet reporting needs of the 319 NPS Annual Report.

Appendix A – Financial Information

Contents

Overview of Federal 319(h) Grant Funds Awarded to Maryland



Grant funding from the Federal Clean Water Act Section 319(h) was first awarded to the State of Maryland in 1990. The chart above shows the Federal funds in each grant award. The table on the next page lists the award amounts and the amount of nonfederal match for each award. The year shown for each grant award is the Federal Fiscal Year (FFY) that the federal funds were appropriated. Upon award, each grant has a maximum life of five years.

As the chart shows, grant award received by Maryland from the FFY 2013 allocation was the smallest since FFY1998 (not adjusted for inflation). This smaller award is a result of a reduction in the national 319(h) Grant appropriation, which similarly affected all States. The allocation to Maryland is based on a national formula for distribution of 319 (h) Grant funds among the States, which has remained unchanged since the early 1990s.

Appendix A – Financial Information

Award Amounts for Federal 319(h) Grant Funds Awarded To Maryland

Since 1990, about $48.6 million in Federal 319(h) Grant funds have been awarded to Maryland as shown in the table below.

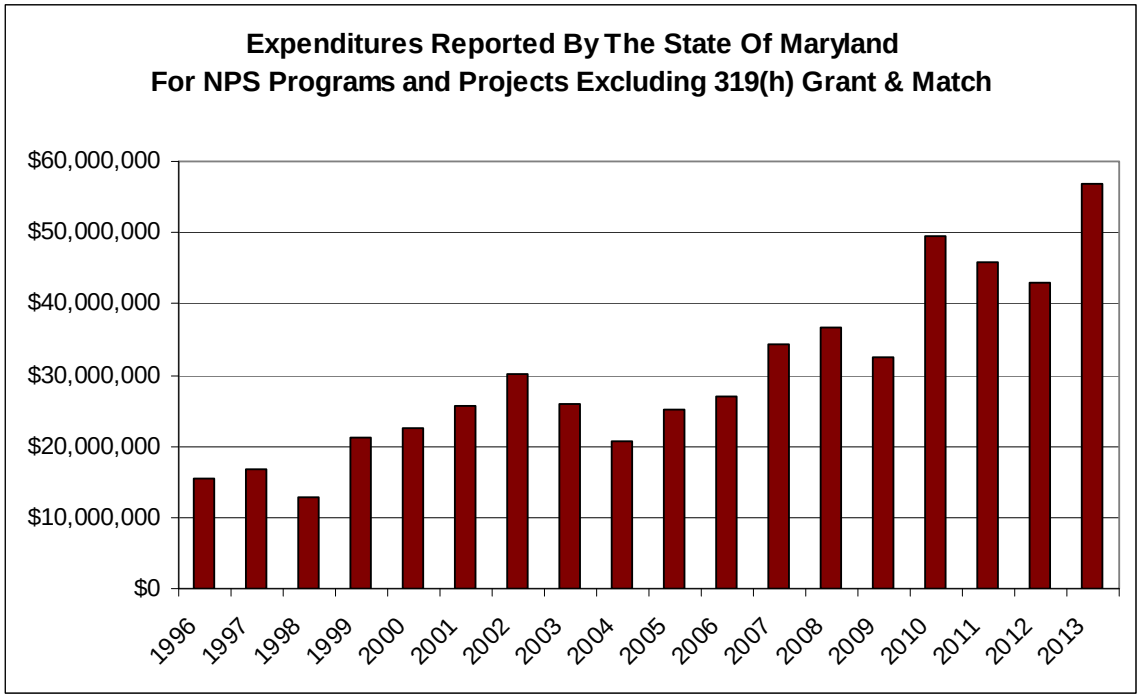
Federal 319(h) Grant Funds Awarded To Maryland By Federal Fiscal Year Appropriated

Federal Fiscal Year (1)	319(h) Grant Allocation (2)	Non-Federal Match (3)	Total Grant + Match
1990	$447,771	$298,514	$746,285
1991	$890,039	$593,359	$1,483,398
1992	$939,298	$626,199	$1,565,497
1993	$877,070	$584,713	$1,461,783
1994	$1,494,413	$996,275	$2,490,688
1995	$1,755,964	$1,170,643	$2,926,607
1996	$1,541,980	$1,027,987	$2,569,967
1997	$1,327,699	$885,133	$2,212,832
1998	$1,327,699	$885,133	$2,212,832
1999	$2,708,298	$1,805,532	$4,513,830
2000	$2,467,576	$1,645,051	$4,112,627
2001	$2,958,486	$1,972,324	$4,930,810
2002	$3,035,576	$2,023,717	$5,059,293
2003	$3,104,500	$2,069,667	$5,174,167
2004	$3,369,190	$2,246,127	$5,615,317
2005	$2,675,598	$1,783,732	$4,459,330
2006	$2,666,655	$1,777,770	$4,444,425
2007	$2,551,736	$1,701,157	$4,252,893
2008	$2,653,500	$1,769,000	$4,422,500
2009	$2,575,782	$1,717,188	$4,292,970
2010	$2,860,785	$1,907,190	$4,767,975
2011	$2,283,639	$1,522,426	$3,806,065
2012	$2,091,000	$1,394,000	$3,485,000
2013	$1,981,000	$1,320,667	$3,301,667
Total	$50,585,254	$33,723,503	$84,308,757

1) Federal Fiscal Year is the year of appropriation. Shaded years closed grants. Other years shown are active grants.
2) Federal grant amount awarded to Maryland by Federal Fiscal Year.
3) Matching funds required for each grant award (40%) from nonfederal sources.

Appendix A – Financial Information

Nonpoint Source Expenditures Reported for Maintenance of Effort



The Federal Clean Water Act's 1987 Amendments include provisions to ensure that the States do not use Section 319(h) Grants to replace State expenditures that already were occurring. This Maintenance Of Effort (MOE) requirement ensures that each State's NPS expenditures are at least equal to or greater than the baseline level set in the 1990s. Maryland's minimum Maintenance Of Effort is $8,447,270 annually.

As a prerequisite for receiving the next 319(h) Grant award, each State is required to document that their nonfederal expenditures for NPS programs and projects in the previous year, not counting match, meet their MOE. MOE expenditures reported by Maryland are cumulative expenditures in a single State fiscal year (July 1 through June 30) by three State agencies: Maryland Department of Agriculture (MDA) ; Maryland Department of the Environment, and Maryland Department of Natural Resources (DNR).

The chart above shows that Maryland consistently surpasses its MOE. In 2013, NPS expenditures by DNR's Chesapeake and Atlantic Coastal Bays Trust Fund were included in the MOE for the first time. Expenditures for nonpoint programs and projects by other State agencies, local governments, private organizations or other entities have not been included in Maryland's MOE reporting to EPA. Therefore, it is likely that the total annual expenditure for nonpoint source programs and projects in Maryland is significantly greater than the dollar amount reported to meet MOE requirements.

Appendix B
List of Agency Cooperators - Maryland Nonpoint Source Program (1)

State Lead Agency	Maryland Department of Environment Science Services Administration 1800 Washington Blvd., Baltimore MD 21230 410-537-3902	Jim George - Director, Water Quality Protection and Restoration Program Ken Shanks - TMDL Implementation Division Eric Ruby - § 319(h) Grant Manager §319(h) Fiscal & Administrative – Sharon Turner, Susan Douglas Projects – Paul Emmart, James Forrest, Jen Jaber, Robin Pellicano, Sekhoane Rathhebe, Gregorio Sandi, Ian Spotts
State Other Agencies	(Maryland) Chesapeake Bay Trust 60 West Street, Suite 45, Annapolis MD 21401	Jana Davis, Executive Director
	Maryland Department of Environment 1800 Washington Blvd., Baltimore MD 21230 160 South Water Street, Frostburg MD 21532	Jay Sakai – Director, Water Management Administration Brian Clevenger – Manager, Sediment, Stormwater & Dam Safety Program Jag Khuman – Director, Water Quality Finance Administration Constance Lyons Loucks – Chief, Acid Mine Drainage Section, Land Mgmt
	Maryland Dept. of Natural Resources 580 Taylor Avenue, Annapolis MD 21401	Matt Fleming – Director, Watershed Services Kevin Smith – Ecosystem Restoration Services Gabe Cohee – Chesapeake and Atlantic Coastal Bays Trust Fund
	Maryland Department of Agriculture 50 Harry S. Truman Parkway, Annapolis MD 21401	John Rhoderick- Office of Resource Conservation Projects – Janet Crutchley
	Maryland Department Of Planning 301 W. Preston Street Suite 1101, Baltimore MD 21201	Joe Tassone- Land Use Planning and Analysis
Federal	US Environmental Protection Agency Region III Nonpoint Source Program Water Protection Division, Mail Code 3WP10 1650 Arch Street, Philadelphia PA 19103-2029	Fred Suffian, Team Leader David Greaves, Maryland Project Officer
	US Department of Agriculture Natural Resources Conservation Service (Maryland Office) 339 Busch's Frontage Road, Suite 301 Annapolis MD 21401-5543	Jon F. Hall, Maryland State Conservationist Thomas Morgart, Asst. State Conservationist for Programs (incl. NWQI)

Appendix B
List of Agency Cooperators - Maryland Nonpoint Source Program (1)

Local Other Agencies & Contributors	Baltimore City	Plan Contact: Kimberly Burgess, Director, Public Works, Surface Water Division
	Baltimore County *	Project contact: Robert Ryan, Manager Capital Programs and Operations Plan/WIP team lead: Steve Stewart, Watershed Management and Monitoring
	Caroline County *	Project contacts: Katheleen Freeman, Debbie Herr Cornwell Leslie Grunden: Upper Choptank River Watershed Planner
	Centerville, Town of *	Project contact: Eva Kerchner, Watershed Manager
	Frederick County *	Project contacts: Shannon Moore, Heather Montgomery, Lisa Orr
	Kent Soil Conservation District *	Project contact: Karen Miller, District Conservationist
	Queen Anne's County *	Project contacts: David MacGlashan and Lee Edgar, Public Works
	Queen Anne's Soil Conservation District	Colin Jones: District Manager Mike Everitt: Corsica Watershed Agricultural Resource Conservation Specialist
	Sassafras River Association *	Plan/Project contact: Pamela Duke, Executive Director
	Washington County	Project Contact: Scott Hobbs, Chief Engineering and Construction, Public Works
	Washington Co Soil Conservation District *	Plan/Project contact: Elmer Weibley, District Manager

(1) Cooperators list is generally limited to contact persons for 319(h) Grant Projects in-progress any time between January 1, 2013 and December 31, 2013. During 2013, MDE also coordinated with local Chesapeake Bay Watershed Implementation Plan (WIP) teams to support local NPS implementation efforts. 2013 coordination by MDE consisted of webinars, a technical meeting series, 2 rounds of regional workshops and 18 "one-on-one" meetings between individual county-based teams and State agency staff.

* Agency or group that made a significant contribution to the Annual Report.

Appendix C
2013 and 2012 BMP Implementation Progress in Maryland

Contents

Appendix C
2013 BMP Implementation Progress In Maryland (1)

From MDE's Analyzing and Tracking Nonpoint Source Data Project, FFY13 319(h) Grant
Robin Pellicano, April 2014

Type of Practice (2)	Statewide Total (3)	Nitrogen Reduction Approx. (lb/yr)	Phosphorus Reduction Approx. (lb/yr)
Animal Composters on Ag Lands	34	311	8
Animal Waste Management Systems-Livestock	759	913,320	103,416
Animal Waste Management Systems-Poultry	558	125,336	14,192
Cover Crops	407,037	734,405	33,562
Dry Detention Ponds and Hydro Structures	50,201	18,330	2,269
Dry Extended Detention Ponds	31,067	68,062	7,020
Filtering Practices	18,713	54,661	5,074
Forest Conservation	104,245	0	0
Forest Harvesting Practices	22,445	15,364	200
Grassed Buffers	51,635	505,470	59,813
Heavy Use Poultry Pads	288	0	0
Infiltration Practices	18,713	68,327	5,920
Nutrient Management Plan Implementation	913,804	1,040,180	183,210
Retirement Of Highly Erodible Lands	25,023	118,298	1,242
Riparian Forest Buffers on Ag Lands	22,339	259,375	31,850
Riparian Forest Buffers on Urban Lands	650	767	2,224
Runoff Control	1,286	939	58
Septic Connections to Sewers	1,325	9,676	0
Septic Denirification	5,136	23,624	0
Soil Conservation Water Quality Plans	989,681	1,126,551	198,422
Stream Protection w/Fencing	805	11,002	1,077
Stream Protection w/o Fencing	48,601	331,934	32,480
Stream Restoration	170,058	7,743	13
Tree Planting on Agricultural Lands	18,575	215,667	26,483
Water Control Structures	1,738	13,057	0
Wet Ponds	66,973	146,726	15,134
Wetland Restoration on Ag Lands	9,260	107,510	13,202

1. For each type of practice in the table, data represents cumulative totals through June 2013 using CBP Model Phase 5.3.2. This data is typically available March of the following year.

2. Nutrient load reduction estimates for each type of practice represent the affect of each BMP acting independently. The nutrient reduction estimates do not account for the potential aggregate affect of multiple BMPs interacting together. For example, an agricultural field may have both cover crops and grassed buffers.

3. These values do not constitute all BMPs implemented. Some BMP reductions are not able to be easily calculated.

Figure 1. 2012 Total Nitrogen Sources in Maryland

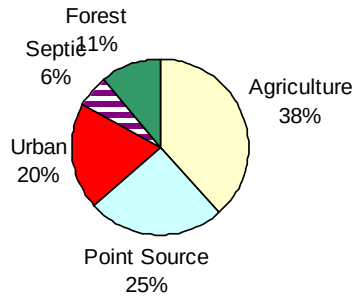
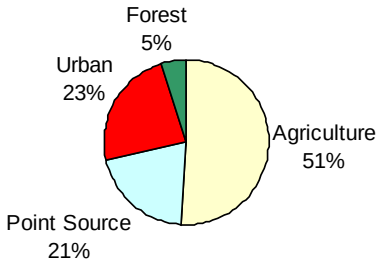


Figure 2. 2012 Total Phosphorus Sources in Maryland



Data source for the pie charts above is the 2011 Chesapeake Bay Model Phase 5.3.2 (N050312 run) delivered loads using constant delivery factors. The reported statistics include all of Maryland lands within the Chesapeake Bay Watershed except atmospheric deposition the main body of the Bay and nontidal waters.

Appendix C
2012 BMP Implementation Progress In Maryland (1)

Type of Practice (2)	Statewide Total	Approximate Pollutant Load Reduction (3)	
		Nitrogen (lb/yr)	Phosphorus (lb/yr)
Animal Composters on Ag Lands	32	291	7
Animal Waste Management Systems-Livestock	689	829,758	93,954
Animal Waste Management Systems-Poultry	549	123,379	13,970
Cover Crops	407,591	735,404	33,608
Dry Detention Ponds and Hydro Structures	48,624	17,755	2,198
Dry Extended Detention Ponds	26,196	57,390	5,919
Filtering Practices	19,425	56,743	5,267
Forest Conservation	102,661	0	0
Forest Harvesting Practices	23,957	16,399	214
Grassed Buffers	50,022	489,681	57,945
Heavy Use Poultry Pads	288	0	0
Infiltration Practices	14,714	53,728	4,655
Nutrient Management Plan Implementation	942,240	1,072,549	188,911
Retirement Of Highly Erodible Lands	23,071	109,068	1,145
Riparian Forest Buffers on Ag Lands	21,795	253,050	31,073
Riparian Forest Buffers on Urban Lands	618	729	2,115
Runoff Control	1,085	792	49
Septic Connections to Sewers	1,240	9,055	0
Septic Denirification	4,401	20,247	0
Soil Conservation Water Quality Plans	970,250	1,104,433	194,527
Stream Protection w/Fencing	759	10,372	1,015
Stream Protection w/o Fencing	46,621	318,413	31,157
Stream Restoration	178,669	8,135	14
Tree Planting on Agricultural Lands	18,905	219,503	26,954
Water Control Structures	1,196	8,985	0
Wet Ponds	54,887	120,247	12,403
Wetland Restoration on Ag Lands	9,037	104,925	12,884

1. Data is generated by MDE's 319(h) Grant-funded project Analyzing and Tracking Nonpoint Source Data (FFY13 #1), Robin Pellicano, January 2014. These values do not constitute all BMPs implemented. Some BMP reductions are not readily calculated.

2. For each practice in the table, data represents cumulative totals through June 2012 using the EPA Chesapeake Bay Program Model Phase 5.3.2.

3. Nutrient load reduction estimates for each type of practice represent the affect of each BMP acting independently. The nutrient reduction estimates do not account for the potential aggregate affect of multiple BMPs interacting together. For example, an agricultural field may have both cover crops and grassed buffers.

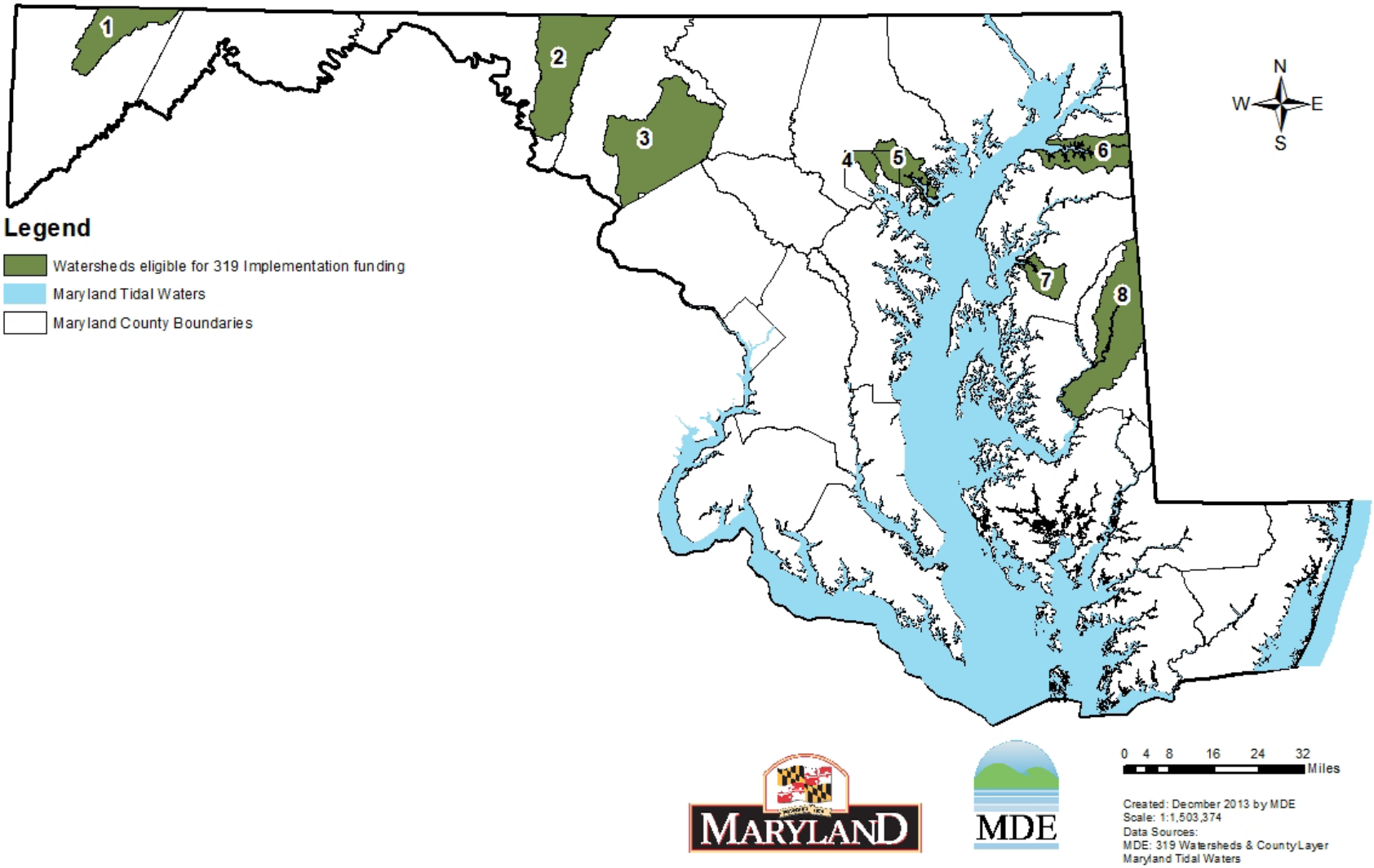
Appendix D
319 Projects In Progress or Completed in 2013

Contents

Addition Information

The US Environmental Protection Agency maintains a nationwide database on the Internet that includes information on projects funded by the 319(h) Grant. Additional project information is available: http://iaspub.epa.gov/pls/grts/f?p=110:199:618139948454479
On the home page, select “Find Projects”. Then, select “Maryland”, grant year, project #.

Maryland Watersheds Eligible for 319(h) Grant Implementation Funding



In-Progress Projects In Calendar Year 2013 Using Federal 319(h) Grant Funds					
Map Area	**Watershed Name (Md 8-Digit #)**	**TMDL or WQA**	**Impairment**	**Project Name (Lead Agency, Grant Year)**	**Status**
	Anacostia River 02140205	Bacteria, PCBs, Sediment, Nutrients, Trash	Bioassessment, biological oxygen demand, fecal coliform, heptachlor epoxide, mercury in fish tissue, nitrogen, PCBs, phosphorus, total suspended solids, trash	Green Streets – Green Jobs Partnership (Chesapeake Bay Trust FFY10 #12)	Project start 2010 Completed 2013
2	Antietam Creek 02140502	Bacteria, BOD, Sediment	Bioassessment, biological oxygen demand, fecal coliform, mercury in fish tissue, nitrogen, PCB in fish tissue, phosphorus, total suspended solids	Little Antietam Cr at Greensburg Road Stream Bank Restoration (Washington County FFY12 #11)	Project start 2012 Anticipate completion 2015
				Watershed Restoration: Barr Property (Washington County SCD FFY13 #10)	Project Start 2013 Anticipate completion 2014
				Watershed Restoration: Shank & Anderson Properties Phase 2 of 3 (Washington County SCD FFY11 #13)	Project Start 2014 Anticipate completion 2014
5	Back River 02130901	Bacteria, Chlordane, Nutrients, PCBs, Zinc	Bioassessment, chlordane, fecal coliform, mercury in fish tissue, nitrogen, phosphorus PCB in fish tissue, total suspended solids, zinc	Bread and Cheese Creek Restoration (Baltimore Co. FFY10 #11)	Project start 2011 Completed 2013
				Herring Run at Overlook Park Stream Restoration and Buffer Planting (Baltimore Co. FFY11 #7)	Project start April 2012 Anticipate completion 2014
				Scotts Level McDonogh Road Watershed Restoration Project (Baltimore Co. FFY12 #5)	Project start anticipated 2014 Anticipate completion 2015
1	Casselman River (Youghioghy River trib.) 05020204	pH, WQA Nutrients	Chlorides, Low pH, mercury in fish tissue, nitrogen, phosphorus	Acid Mine Drainage (AMD) Remediation Implementation (MDE FFY09 #6)	Project start July 2008 Anticipate completion 2014
				AMD Remediation Phase 2 (MDE FFY13 #5)	Project start 2013 Completion anticipated 2015
3	Lower Monocacy River 02140302	Bacteria, Sediments	Bioassessment, fecal coliforms, PCB in fish tissue, phosphorus, sedimentation, total suspended solids	Green Infrastructure Project (Frederick County, FFY10 #9)	Project start 2010 Completed 2013
				Neighborhood Green Infrastructure (Frederick County, FFY13 #7)	Project start 2013 Anticipate completion 2015
8	Upper Choptank River 02130404	None	Bioassessment, fecal colifoms, nitrogen, phosphorus, PCB in fish tissue, total suspended solids	Upper Choptank Watershed Restoration (Caroline County FFY12 #6)	Project start 2012 Anticipate completion 2014
				Denton DPW Stormwater Retrofit (Caroline County FFY13 #6)	Project start 2013 Anticipate completion 2014

In-Progress Projects In Calendar Year 2013 Using Federal 319(h) Grant Funds					
Map Area	**Watershed Name (Md 8-Digit #)**	**TMDL or WQA**	**Impairment**	**Project Name (Lead Agency, Grant Year)**	**Status**
7	Corsica River (Chester River tributary) 02130507	Bacteria, PCBs, Nutrients	Estuarine bioassessment, fecal coliform, nitrogen, phosphorus, PCB in fish tissue, total suspended solids	Watershed Restoration Project (Centreville FFY11 #8)	Project start 2012 Anticipate completion 2014
				Agricultural Technical Assistance (MDA / Queen Anne's SCD FFY12 #9, FFY13 #9)	Multi Year/Grant Project
				Corsica River Watershed Restoration (Centreville FFY12 #7)	Project start anticipated 2013 Anticipate completion 2014
				Board of Ed. Rain Garden Bio-Swale (Queen Anne's Co. FFY11 #11)	Project start 2012 Completed 2013
				Board of Education Kramer Center and Centreville Elementary stormwater retrofit (Queen Anne's Co. FFY12 #10)	Project start 2013 Anticipate completion 2014
6	Sassafras River 02130610	Phosphorus, PCB	Bioassessment, enterococcus, PCB in fish tissue, phosphorus, total suspended solids	Galena Elementary School SWM Retrofit (Kent Soil Conservation District FFY12 #8)	Project start 2013 Completed 2013
				Phipps Farm Treatment Wetlands (Kent SCD FFY12 #8)	Project start 2013 Anticipate completion 2014
	Statewide	N/A	N/A	Grant Administration (MDE FFY11 #3, FFY12 #2, FFY13 #2)	Multi Year/Grant Project
				Md Bioassessment Stream Survey (DNR, monitoring FFY11 #9)	Completed 2013
				Nonpoint Source Management Program (MDE FFY10 #14, FFY12 #3, FFY13 #3)	Multi Year/Grant Project
				Targeted Watershed (monitoring/analysis) (MDE FFY12 #4, FFY13 #4)	Multi Year/Grant Project
				Analysis and Local Technical Assistance (MDE FFY12 #1, FFY13 #1)	Multi Year/Grant Project
				Biological Assessment for Water Quality Protection and TMDL Implementation (MDE FFY11 #12, FFY12 #12)	Multi Year/Grant Project
				Water Quality Protection Pilot (MDE FFY10 #13)	Project start 2011 Completed 2013

Completed Implementation Projects Using Federal 319(h) Grant Funds In Calendar Year 2013					
Map Area	**Watershed Name (Md 8-Digit #)**	**Project Name (Lead Agency)**	**319 Funding**		**Accomplishments**
			Federal $ Grant Year	**Match $**	
	Anacostia River 02140205	Green Streets – Green Jobs Partnership Chesapeake Bay Trust	$285,000 estimated FFY10 #12	$190,000	Federal grant funds provided pass thru grants to local entities listed here to pay for green streets/jobs projects, and to pay for additional technical assistance to the participating entities: - City of College Park $35,000 (2 projects' concept/designs) - Town of University Park $15,000 (project design) - City of Tacoma Park $20,000 (project plan) - Forest Trends $20,000 (assessment & financial plan for Bladensburg) - Town of Bladensburg $15,000 (4 assessments & 4 concept plans) - Low Impact Development Center, Inc. $30,000 (plan for Capital Heights) - City of Mt. Rainer $35,000 (bioretention cell designs) - City of Hyattsville $35,000 (concept design and guidance documents) Pollutant load reduction outcomes: N/A
5	Back River 02130901	Bread and Cheese Creek Restoration Baltimore County	$556,443 FFY10 #11	$370,962	The Federal Grant paid for stream restoration along 1,380 linear feet of Bread & Cheese Creek in southeast Baltimore County. Two stream reaches were addressed: 825 linear feet in Oak Lawn Cemetery and 555 linear feet near Berkshire Elementary. . Pollutant load reduction outcomes: 280.07 lb/yr nitrogen, 94.19 lb/yr phosphorus, 214 tons/yr sediment
7	Corsica River (Chester River tributary) 02130507	Agricultural Technical Assistance Maryland Dept of Agriculture, with the Queen Anne's SCD	$51,000 FFY12 #9	$34,000	Federal grant funds paid for a State employee working for the SCD office who provided technical assistance to farmers, resulting in: - 11 new Soil Conservation and Water Quality Plans for 2,720 acres - Promoting BMPs resulting in a grade stabilization structure, a grassed waterway and 74 acres of riparian herbaceous cover. - Identification and concentration on hot spot areas resulting in 1 landowner allowing water quality monitoring on their property. - Promoting CREP: enrolled 75 acres, with 6 different owners - Promoting cover crops: sign up include over 5700 acres for 37 owners Pollutant load reduction outcomes: 55,821.83 lbs/yr nitrogen, 828.36 lbs/yr phosphorus, 108.57 tons/yr sediment.

Completed Implementation Projects Using Federal 319(h) Grant Funds In Calendar Year 2013					
Map Area	**Watershed Name (Md 8-Digit #)**	**Project Name (Lead Agency)**	**319 Funding**		**Accomplishments**
			Federal $ Grant Year	**Match $**	
		Board of Education Rain Garden Bio-Swale Queen Anne's County	$11,249 FFY11 #11	$7,500	Federal grant paid for successful design/construction of stormwater retrofit rain garden on County Board of Education property that treats rooftop runoff. The project is also a public demonstration of this type of nonpoint BMP. This completed project was visited by EPA in September 2013. Pollutant load reduction outcomes: 5.16 lb/yr nitrogen, 0.36 lb/yr phosphorus, 0.066 tons/yr sediment
3	Lower Monocacy River 02140302	Green Infrastructure Project Frederick County	$284,739 FFY10 #9	$189,826	Federal funds contributed to six diverse project objectives/products: - Urban wetlands program: assessment, tracking and GIS. - Urban forest program: goal setting, outreach, tree planting. - Urban stream program: implementation: retrofit bioretention, tree planting - GIS resource assessment tool: system devolement & updating - Land conservation tools: viewshed analysis, coordination, workshops. - Education/outreach tools: website. coordinator Pollutant load reduction outcomes: 5.16 lbs/yr nitrogen, 0.36 lbs/yr phosphorus, 0.066 tons/yr sediment
6	Sassafras River 02130610	Galena Elementary School SWM Retrofit Kent Soil Conservation District	$14,993 FFY12 #8	$9,996	Federal funds paid for successful design and construction of a stormwater wetland that captures/treats runoff from the school building roof. Additionally, the project proves educational opportunities for school children and serves a demonstration site for this type of nonpoint source BMP. Pollutant load reduction outcomes: 1.38 lbs/yr nitrogen, 0.24 lbs/yr phosphorus, 0.046 tons/yr sediment

Appendix E

General Approach and Schedule to Implement Applicable Management Measures

From the *Maryland Nonpoint Source Management Plan*, December 1999

Page 1 0f 2

Category / Priority		Implementation Timeline (Years)		
		1998-2002	2003-2007	2009-2012
Agriculture	Statewide	Farmers using commercial fertilizers must have n & P based plans by 2002	Soil Conservation Water Quality Plans (SCWQP) on 50% of all farms by 2003	
		Farmers using animal manure or sludge must have n & P based plans by 2002	SCWQP implemented on 25% of all farms by 2003	
			Farmers using animal manure or sludge must have N&P based plans by July 1, 2004	
	Watershed Focus	Tributary Strategies	Agricultural Priority Watersheds**	
		Agricultural Priority Watersheds**		
Forestry	Statewide	Riparian Forest Buffer (RFB) goal of 43 mi/yr	RFB goal of 43 mi/yr	600 miles of RFB created by 2010
	Watershed Focus	Coastal Bays		
		Special Streams Project		
		Monocacy		
		Anacostia		
		Susquehanna		
		Town Creek		
		Rock & Carroll Creek		
Urban runoff: developing and developed areas	Statewide			
	Watershed Focus	Washington - Baltimore Metro Area, Roland Run, Redhouse Run, Severn River SWM plan		
		Anacostia Watershed		

Appendix E

General Approach and Schedule to Implement Applicable Management Measures

From the *Maryland Nonpoint Source Management Plan*, December 1999

Page 2 0f 2

Category / Priority		Implementation Timeline (Years)		
		1998-2002	2003-2007	2009-2012
Marinas and Recreational Boating	Statewide	96 Certified Clean Marinas by 2002	125 Certified Clean Marinas by 2004	270 Certified Clean Marinas by 2010
				Marine Sewage Pumpout Program goal of 460 facilities by 2010
	Watershed Focus	Chesapeake Bay		
		Coastal Bays		
		Deep Creek Lake		
Channelization and Channel Modification, dams, and shoreline erosion	Statewide			
	Watershed Focus	Chesapeake Bay Shoreline		
		CWAP Priority Watersheds		
		Anacostia Northwest Branch		
		Anacostia Town Park Stream		
Wetlands	Statewide	3000 acres by 2002	10,500 acres by 2007	15,000 acres by 2010
	Watershed Focus	CWAP Priority Watersheds		
		Coastal Bays		

Appendix F

Success Story 2013

Implementing Best Management Practices Reduces Nitrogen in Two Corsica River Tributaries

Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
Maryland

Implementing Best Management Practices Reduces Nitrogen in Two Corsica River Tributaries

Waterbodies Improved

Algae blooms in the upper tidal reaches of Maryland's Corsica River prompted the Maryland Department of the Environment (MDE) to add the river to the state's Clean Water Act (CWA) section 303(d) list of impaired waters in 1996 for impairment of aquatic life and recreational use. MDE developed a total maximum daily load (TMDL) for nitrogen and phosphorus. After six years of restoration efforts, water quality monitoring in two nontidal Corsica River tributaries shows a significant decrease in nitrogen concentrations. These improvements indicate that project partners are making progress toward meeting the Corsica River nutrient TMDL.

Problem

The six-mile-long Corsica River is a tidal tributary on Maryland's Eastern Shore. It flows through Queen Anne's County and the town of Centreville before entering the Chester River, which discharges into the Chesapeake Bay (Figure 1). Major land uses in the 40-square-mile watershed are agriculture (64 percent), woodland (28 percent) and developed areas. The nontidal portions of the Corsica River are designated for aquatic life protection and contact recreation; most of the estuarine portions are designated as shellfish harvesting areas.

Algal blooms and other water quality problems in the tidal portions of the Corsica River prompted MDE to add this watershed assessment unit to the CWA section 303(d) list in 1996 for impairment by nutrients, suspended sediment and fecal coliform bacteria. Water quality surveys conducted in 1997 found that the local eutrophication problems (the overenrichment of aquatic systems caused by excessive nutrient input) tended to be the greatest slightly downstream of the tidal/nontidal interface. Data showed chlorophyll *a* concentrations (a measure of algal content) as high as 146 micrograms per liter (μg/L).

MDE developed a TMDL for nitrogen and phosphorus, which EPA approved in 2000. According to the TMDL, the major source of nutrient loading was agricultural runoff (85 percent); other sources were forest and urban nonpoint sources and the town of Centreville's wastewater treatment plant (WWTP). The TMDL established the following water quality goals for the Corsica River: (1) chlorophyll *a* concentrations should remain below 50 μg/L, and (2) dissolved oxygen (DO) levels should remain above the state's minimum water quality standard, 5 milligrams per liter (mg/L).

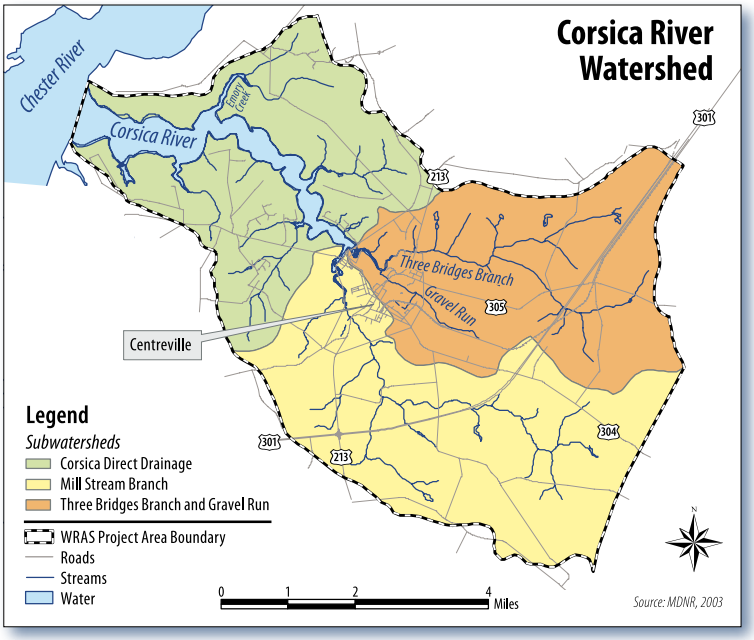


Figure 1. The Corsica River's three subwatersheds are part of the Corsica River Watershed Restoration Action Strategy (WRAS).

Project Highlights

In 1998 the Maryland General Assembly passed the Water Quality Improvement Act, which required that all agricultural operations with gross annual income over $2,500 and any livestock operations with more than eight animal units develop and implement nutrient management plans. All plans were developed by 2004, helping to reduce nutrient pollutant loading.

In 2004 the town of Centreville, along with several key local partners and with support and cooperation from MDE and the Maryland Department of Natural

Resources (MDNR), finalized the *Corsica River Watershed Restoration Action Strategy* (WRAS). The plan outlined implementation strategies needed to protect and restore the watershed. In 2005 EPA accepted the Corsica River WRAS, which was highlighted as one of the nation's best watershed plans at the CWA section 319 nonpoint source annual meeting. That same year, Maryland's governor selected the Corsica River for the state's targeted restoration watershed program.

Watershed partners have worked to implement agricultural best management practices (BMPs) since 2004. Over the last several years, farmers have annually planted increasing acres of cover crops. Since 2010, annual cover crop coverage has exceeded the WRAS goal of 3,000 acres per year. Other agricultural BMPs implemented include approximately 5 acres of natural buffer, 30 acres of grassed buffers, 30 acres of riparian herbaceous cover, 3 acres of grassed waterways and 2 miles of stream fencing.

In 2005 the Maryland Department of Agriculture (MDA) received CWA section 319 funds to promote and partially reimburse cover crop planting on farm fields in the watershed. Since then, CWA section 319 funds have also supported efforts by an MDA agricultural technician to help local farmers select and target agricultural BMPs.

Figure 2. From 2009–2010 the town of Centerville and MDNR converted an existing stormwater management pond into a multi-cell pond-wetland complex to more effectively capture and treat runoff.

In 2006 the town of Centreville and Queen Anne's County began a series of CWA section 319-funded projects, including urban stormwater infiltration projects and support for education and outreach efforts. Local partners installed stormwater wetland ponds and bio-retention practices, which capture and hold excess stormwater runoff during heavy precipitation events. The town installed stormwater retrofits on 112 acres (Figure 2). Local residents volunteering through the Corsica River Conservancy have installed more than 300 rain gardens.

Maryland legislation established the Bay Restoration Fund in 2004. It supports upgrading WWTPs with enhanced nutrient removal technology, improving on-site septic systems and implementing cover crops to reduce nutrient loading to the Chesapeake Bay. As of May 2012, 13 on-site septic systems in the Corsica River watershed were enhanced with nitrogen-reducing treatment capability. In 2010 the town of Centerville completed upgrades of its WWTP to include biological nutrient reduction technology. In addition, Centerville now applies its WWTP discharge to farmland through spray irrigation for nine months each year, which has greatly reduced the amount of discharge directly entering the upper tidal reaches of the Corsica River.

Results

Monitoring data from 2005–2011 show decreasing trends of instream nitrogen and phosphorus concentrations in the nontidal tributaries of the Three Bridges Branch and Gravel Run subwatershed. Groundwater monitoring conducted on crop fields in the watershed during 2005–2007 spring sampling periods indicates that cover crop planting may be reducing nutrient loadings.

The upgrades to Centerville's WWTP have also reduced nutrient loading. Comparing discharge monitoring records from 1997 (before upgrades) to the period 2007–2012 (after upgrades) shows that total nitrogen loads from the plant have declined by 87 percent (from 11,175 pounds per year to 1,424 lb/yr) and that total phosphorus loads have declined by 96 percent (from 2,395 lb/yr to 92 lb/yr).

Partners and Funding

Key partners have included local government entities (the town of Centreville, Queen Anne's County and the Queen Anne's Soil Conservation District), local watershed groups (Corsica Conservancy and the Chester River Association), state agencies (MDE, MDA and MDNR), and federal agencies (EPA and the U.S. Department of Agriculture's Natural Resources Conservation Service [NRCS]). To date, partners have invested almost $3.5 million in nonpoint source implementation projects. Maryland's agricultural cost-share program and NRCS have provided funding to implement BMPs in the watershed. From 2004 through 2012, $450,000 in federal CWA section 319 funds supported agricultural technical assistance to local farmers for selecting and targeting BMPs. Another $920,000 funded urban BMP implementation and provided local nonpoint source program support. As of May 2012, Maryland's Bay Restoration Fund had provided more than $150,000 for 13 septic system upgrades in the Corsica River watershed. The WWTP upgrade and capital cost of seasonal land treatment (farmland application of discharge) totaled about $4.5 million.

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

EPA 841-F-13-001P
April 2013

For additional information contact:

Eva Kerchner, Watershed Manager/Zoning Officer
Town of Centreville
410-758-1180 • ekerchner@TownofCentreville.org

Ken Shanks, TMDL Implementation Division Chief
Maryland Department of the Environment
410-537-4216 • kshanks@mde.state.md.us