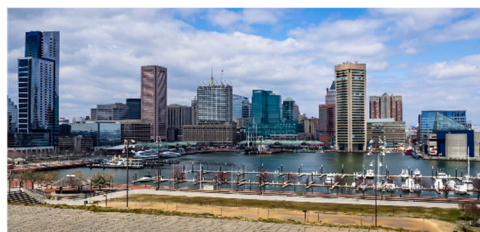
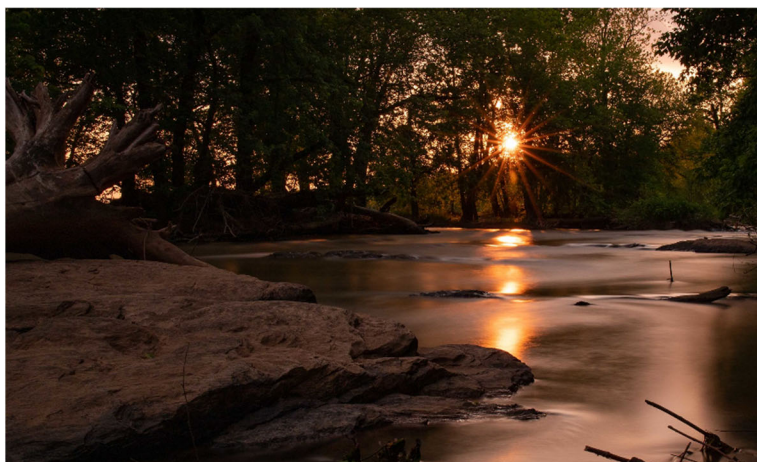


# Maryland's 2021-2025 Nonpoint Source Management Plan



Revised February 2022<sup>1</sup>

**Produced and distributed by:**

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**Maryland**  
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# Abbreviations List

319	Federal Clean Watershed Act Section 319(h), addresses nonpoint sources
AMAP	NRCS Agricultural Management Assistance Program
AWEP	NRCS Agricultural Water Enhancement Program
AMD	Acid mine drainage
BMP	Best Management Practice
BRF	Bay Restoration Fund (Maryland)
CAC	Citizens Advisory Committee
CBIG	Chesapeake Bay Implementation Grant
CBNERR	Chesapeake Bay National Estuarine Research Reserve
CBP	Chesapeake Bay Program
CBRAP	Chesapeake Bay Regulatory and Accountability Program (EPA grant to states)
CES	Cooperative Extension Service (University of Maryland)
COMAR	Code of Maryland Annotated Regulations
CMP	Coastal Management Plan (relates to the Coastal Zone Management Act)
CREP	Conservation Reserve Enhancement Program (USDA Farm Service Agency)
CRP	Conservation Reserve Program (USDA Farm Service Agency)
CSO	Combined Sewer Overflow
CSREES	Cooperative State Research Education and Extension Service
CWA	Clean Water Act (Federal)
CWRAC	Coastal and Watershed Resources Advisory Committee
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act
DNR	Department of Natural Resources (State of Maryland)
DoD	U.S. Department of Defense
EPA	US Environmental Protection Agency
EQIP	Environmental Quality Incentives Program (NRCS)
FFY	Federal Fiscal Year (October 1 thru September 30)
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FIP	Forestry Incentive Program
FSA	Farm Service Agency (USDA)
GIS	Geographic Information Systems
IBI	Index of Biotic Integrity
ICPRB	Interstate Commission on the Potomac River
IPM	Integrated Pest Management
MACS	Maryland Agricultural Cost Share Program
MBSS	Maryland Biological Stream Survey
MCBP	Maryland Coastal Bays Program (private nonprofit group)
MDA	Maryland Department of Agriculture
MDE	Maryland Department of the Environment

MDE-LMA	Land Management Administration
MDH	Maryland Department of Health
MDOT	Maryland Department of Transportation
MDP	Maryland Department of Planning
MEA	Maryland Energy Administration
MHT	Maryland Historic Trust
MS4	Municipal Separate Storm Sewer System
MWCOG	Metropolitan Washington Council of Governments
MWMC	Maryland Water Monitoring Council
NEIEN	National Environmental Information Exchange Network
NOAA	National Oceanographic and Atmospheric Agency
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Point Source, sources of pollution not traced to single point of origin
NRCS	National Resources Conservation Service (part of the US Dept. of Agriculture)
PDA	Public Drainage Association
PFA	Priority Funding Area
RCA	Resource Conservation Area
SARE	Sustainable Agriculture Research and Education (grant program)
SAV	Submerged Aquatic Vegetation
SCD	Soil Conservation District (local government entity, agricultural programs)
SCWQP	Soil Conservation and Water Quality Plan
SHA	State Highway Administration (part of Maryland Dept. of Transportation)
SMCRA	Federal Surface Mining Control and Reclamation Act
SWAP	Small Watershed Action Plan (synonyms: WIP, WRAS)
SWQAC	State Water Quality Advisory Committee
SRF	State Revolving Fund
STAC	Scientific and Technical Advisory Committee
TEAM	Teaching Environmental Awareness in Maryland
TMDL	Total Daily Maximum Load
UME	University of Maryland Extension
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WET	Water Education for Teachers
WHIP	Wildlife Habitat Incentive Program (NRCS)
WIP	Watershed Implementation Plan (synonyms: WRAS, SWAP)
	Woodland Incentives Program
WQIA	Water Quality Improvement Act
WRAS	Watershed Restoration Action Strategy (synonyms: WIP, SWAP)
WRP	Watershed Reserve Program
WSSC	Washington Sanitary Sewer Commission

# Executive Summary

## Motivation and Scope

*Maryland's 2021-2025 Nonpoint Source Management Plan* (Plan) addresses two federal requirements: 1) The Federal Clean Water Act Section 319(b) requires preparation of a state nonpoint source management program plan for approval by the US Environmental Protection Agency (EPA). EPA approved Maryland's first Nonpoint Source Plan in 1999. 2) EPA adopted new guidelines in 2013 that require states to update or revise their nonpoint source (NPS) management program at least every five years.

The Nonpoint Source Program, responsible for this document, is housed in the Maryland Department of Environment's Water and Science Administration. With an annual budget of approximately \$2 million/year, this Program is a relatively small in comparison to the much larger array of State nonpoint source management activities, which had documented State expenditures of more than \$100 million in SFY 2020. EPA requires this Plan to serve as an umbrella document that references the many diverse NPS management components that are led by various State programs in Maryland.

This document, which covers the years 2021-2025, will be updated or revised at least every five years to meet EPA requirements. During intervening years, program documents that are identified as Components of the Maryland Nonpoint Source Management Program may be updated or revised independently of this document. In addition, the table of milestones identified in the appendix of this document will be updated annually to gauge progress of selected programs and to support EPA oversight.

## Organizing Principles, Objectives, Milestones and General Strategies

This Plan is founded on several organizing principles that align with the technical nature of nonpoint source pollution management including types of pollutants, pollutant sources, geographies, and types of water bodies. In addition, the Plan is closely aligned with the eight key elements of an effective NPS Program identified in EPA guidance. With these in mind, the Plan identifies eight objectives, outlined below:

- **Objective 1 – Regional Coverage:** Ensure that the Program addresses the three broad geographic regions of the State: The central Chesapeake Bay drainage, the far western drainage in the Casselman and Youghiogheny Rivers, and the coastal bays and Atlantic Ocean drainage.
- **Objective 2 – Multiple Scales:** Ensure that the Program is attentive to multiple scales of geography at which different NPS issues are managed.
- **Objective 3 – Pollutants and Stressors:** Ensure that the Program is comprehensive and addresses the many types of NPS pollutants and stressors.
- **Objective 4 - Pollutant Sources:** Ensure that the Program is comprehensive and addresses the wide range of pollutant sources.
- **Objective 5 – Types of Waterbodies:** Ensure that the Program is comprehensive and addresses the various types of waterbodies impaired by nonpoint source pollution.
- **Objective 6 – Protection and Restoration:** Ensure that the Program balances protection and restoration needs.
- **Objective 7 – Priority Setting:** Ensure that the Program has explicit means of setting priorities to ensure that NPS problems are addressed in a timely, efficient, and effective manner.
- **Objective 8 – Program Management and Evaluation:** Ensure that the Program has procedures to promote efficient fiscal and functional management and metrics by which these can be evaluated.

The Plan identifies milestones, which represent specific, near-term metrics for the objectives. The milestones address both technical aspects of the State's nonpoint source management activities and administrative aspects of the 319 Grant Program administered by the Maryland Department of Environment's Water and Science Administration (MDE WSA). The milestones set annual commitments for the five-year period 2021-2025. To the degree possible the milestones are organized in groups for each objective outlined above for the Statewide Milestones. However, Objective 1 (Regional Coverage) is addressed within the Watershed Milestones and Objective 2 (Multiple Scales) is addressed implicitly, for example, by having statewide programs, watershed scale initiatives and on-the-ground projects. The following is a summary of the Milestones:

- **Milestones for Objective 3 – Pollutants and Stressors**

Milestones are identified for pollutants including nitrogen, phosphorus, sediment, bacteria, chloride, PCBs, mercury, temperature, trash, and other emerging contaminants.

- **Milestones for Objective 4 - Pollutant Sources**

Specific sources of NPS pollution are listed with the milestones associated with them including agriculture, on-site disposal systems, urban/suburban stormwater, erosion & sediment control, forestry, resource extraction, and hydromodifications.

- **Milestones for Objective 5 – Types of Waterbodies**

- Phase I MS4 jurisdiction stormwater waste allocation (WLA) implementation plans for reservoir TMDLs.
- Annual reports for major drinking water reservoir technical advisory groups.
- Milestones for watersheds with EPA-accepted plans that are eligible for 319(h) Grant implementation funding are organized by major drainage area with milestones listed for each watershed.
  - Atlantic Coastal watersheds: Assawoman Bay
  - Chesapeake Bay watersheds - Antietam Creek, Back River (tidal and non-tidal waters), Choptank River (upper), Corsica River, Gwynns Falls (middle), Jones Falls (lower), Monocacy River (lower), and the Sassafras River.
  - Western Maryland Watersheds – Casselman River and Youghiogheny River: Casselman River, Upper Jennings Run, Cherry Creek.

- **Milestones for Objective 6 – Protection and Restoration**

Focus areas with milestones listed included antidegradation programs and projects, 303(d) Program vision, and reviews of proposed projects thru the State Clearinghouse.

- **Milestones for Objective 7 – Priority Setting**

Priority milestones identified include geographic area selection for biological monitoring, priorities for Maryland's 319(h) Grant funds, 303(d) Program vision priorities and alternatives.

- **Milestones for Objective 8 – Program Management and Evaluation**

Particular areas identified include: Chesapeake Bay Two-Year Milestones, NPS impairments, and Maryland's Integrated Report, NPS BMPs (implementation progress and verification protocols), 319 Annual Report and milestone progress reporting, tracking implementation of EPA-accepted watershed plans, finding from targeted watershed monitoring, success story reporting, Chesapeake Bay two-year milestone (progress reporting and adoption of new milestones), investment for NPS programs and implementation, updating components of Maryland's 2021-2025 NPS Management Plan (Continuing Planning Process and State Monitoring Strategy).

Although the organizing principles and objectives of the Plan are driven strongly by technical factors, the strategies for achieving the objectives reflect the more subjective context in which the Program functions. These are identified as “General Strategies” in the Plan and include:

- **Clean Water Act Section 303(d)**, which defines a structured management framework that includes:
  - Setting water quality standards
  - Monitoring the water according to those standards
  - Evaluating the monitoring data according to those standards to identify waters that are not meeting standards
  - Determining pollutant limits in the form of total maximum daily loads (TMDLs)
  - Implementing pollution reduction actions to restore water quality
- **The Chesapeake Bay TMDLs and Watershed Implementation Plans**, which provides valuable infrastructure that the Maryland’s Nonpoint Source Program can build upon.
- **Protection via the Clean Water Act Antidegradation Requirements**, which because of its legal foundation, can be parlayed into a valuable tool of Maryland’s Nonpoint Source Program.
- **Partnerships**, of which many are unique to Maryland.

## Assessment and Monitoring

Chapter 3 of the Plan addresses water resource assessment and monitoring. Assessing the current health of Maryland’s water resources relies on a variety of monitoring activities including ambient monitoring of long-term fixed stations in free-flowing rivers and tidal water bodies, sampling of benthic and fish species in small streams, and assessment of fish tissue that indicate bioaccumulation of toxins. Understanding the causes of water resource degradation and quantifying the sources of pollution depends on yet different kinds of monitoring. Guiding management actions and determining whether those actions are improving water quality requires additional kinds of monitoring.

Maryland’s Nonpoint Source Program is a beneficiary of all these types of existing monitoring activities. In addition, the Program helps to steer State monitoring policy and practices through *Maryland’s Comprehensive Water Monitoring Strategy*, the monitoring of selected projects funded by the 319(h) grant, various targeted watershed monitoring initiatives, participation in the National Water Quality Initiative to target agricultural implementation, participation in the National Nonpoint Source Monitoring Program via the Corsica River restoration initiative, and in various regional and national monitoring forums. In addition to guiding policies and practices, many of these monitoring functions serve the important role of demonstrating observable progress in restoring water quality and biological integrity.

The NPS Program also, on occasion, conducts monitoring activities in support of TMDL development projects. This function will likely take on additional importance as Maryland engages in EPA’s 303(d) Long-Term Vision framework.

The 2021-2025 Plan places a greater emphasis on water quality protection. As part of this, the NPS Program plays an important role in providing capacity to conduct biological monitoring of high-quality waters that are experiencing development pressure.

The NPS Program also recognizes the importance of atmospheric sources of pollution. The Program is integrated with the monitoring of pollutants affecting the acidity of non-tidal streams and the nutrient loads to the Chesapeake Bay.



## Statewide Partnerships and Programs

Chapter 4 of the Plan addresses the statewide perspective of the NPS Program. Given the strategic role that partnerships play in the NPS Management Program, institutional relationships are vital. The three State departments of Environment (MDE), Natural Resources (DNR) and Agriculture (MDA) have lead roles in Maryland's NPS Program. The Departments of Health and Mental Hygiene (DHMH), Transportation (MDOT) and Planning (MDP), the latter of which is responsible for State land use management policy, also have important functions that are integrated into the State's NPS Management Program.

Several programs that are closely related to NPS control and watershed management are also integrated with the overall functioning of Maryland's NPS Management Program. These include the Clean Water Act Section 303(d) Program, which provides the framework for water quality based management; the Animal Feeding Operations (AFO) Program, which manages agricultural animal waste; the Antidegradation Program, focused on protecting high quality waters; the Clean Lakes Program under the federal Clean Water Act; the Coastal NPS Management Program under the federal National Oceanic and Atmospheric Administration, which includes the exercising of state federal consistency determination authority; the Clean Marina's Program; mining programs that address active and abandoned mines of various types; the Source Water Protection Program programs under the Safe Drinking Water Act and other groundwater management programs; Stormwater and Erosion Control programs; air pollution control programs; climate change programs and associated strategic plans; Maryland's Critical Areas Program; and Wetland protection programs. In addition, Maryland NPS management agencies coordinate with various federal programs managed by the US Forest Service, the US Department of Agriculture, the National Park Service, the Army Corps of Engineers, the Federal Energy Regulatory Commission, and the National Estuary Program within the US Environmental Protection Agency.

The many institutions and programs utilize a variety of management measures and approaches to prevent and solve nonpoint source problems. A common foundation that integrates these is a watershed-based approach, which utilizes an iterative process of planning that includes prediction of beneficial outcomes, directs implementation of best management practices, requires evaluation of individual practices and the effects of cumulative practices relative to the predicted outcomes and adjusts based on those evaluations. Within that broad planning context numerous nonpoint source management practices are available for the wide variety of program areas identified above.

Financial resources are a vital element of Maryland's NPS Management Program, which further highlights the strategic importance of partnerships. Maryland's core Section 319 NPS Program, responsible for this plan, is small relative to the many other entities across the State that have roles in NPS pollution management. Consequently, the Section 319 Program invests some of its \$2 million/year budget in developing and maintaining the partnerships that are necessary to better coordinate the distributed resources.

Although Maryland invests significant financial and institutional resources each year toward nonpoint source pollution controls and water resource protection, those resources are finite, which motivates the need to set priorities. Priority setting occurs in a variety of ways within the context of the NPS Program from broad strategic levels down to selecting among specific best management practices based on cost-effectiveness and other practical considerations.

At a strategic level, Maryland's Nonpoint Source Program has focused primarily on restoration of polluted water bodies in the past. The current Plan signals a shift toward greater investment of resources toward the protection of high-quality waters. This is reflected, in part, through greater integration with the Clean Water Act Antidegradation program, including 319(h) grant funding, to support monitoring associated with that program. It is also reflected in the strategic coordination with the 303(d) Vision framework, which explicitly incorporates protection as an element of the framework. Another strategic priority is to invest NPS Program resources broadly across the State, represented by three geographic regions of western Maryland, the central Chesapeake Bay region and the Atlantic Ocean and coastal bays region.

At the level of administering the 319(h) grant, priorities are reflected in grant selection criteria. These criteria prioritize investments toward implementing Total Maximum Daily Loads (TMDLs), adherence to priorities expressed in watershed-based plans that meet EPA guidelines, and cost-effectiveness in terms of pollutant loads reduced. More generally, within the context of water quality restoration, priority-setting recognizes two legitimate, yet competing, objectives. The first is to restore impaired waters to meet water quality standards. The second is to demonstrate measurable improvement in water quality short of full restoration. These objectives compete in the sense that the first case tends to steer resources to waters that are marginally impaired, thus most likely to be fully restored. The second case tends to steer resources to waters that are severely polluted and thus more likely to show measurable improvement in response to a limited investment.

Other factors that affect priorities of the Program include the protection of human health, which motivates investments in addressing bacteria and toxic substances, addressing problems for which solutions are more certain, which has motivated investments in restoring waters impacted by abandoned mine drainage, consideration of ecosystem value of a watershed, and practical considerations such as landowner willingness and readiness to proceed with implementation.

Given the many situations and factors in which priority-setting can arise, the NPS Management Program operates under the principal that the criteria for decision-making should be transparent and explicit for each situation. Specific examples of applying technical priority-setting methodologies include the targeting of non-tidal streams for restoration via source identification related to PCBs (Polychlorinated Biphenyls) and project selection under the Chesapeake and Coastal Bays Trust Fund.

Technical assistance and the use of technology transfer to foster NPS management among local partners is another important statewide function of the Program. One example is the Watershed Assistance Collaborative, designed by Maryland DNR, to unify project-level expertise, human resources, and financial assistance available from several organizations under a single umbrella. Another example is assistance in developing watershed plans. Plans developed under Maryland's past Watershed Restoration Action Strategy Program continue to guide implementation. Watershed-based planning assistance has since evolved in alignment with the EPA Section 319 guidance requirements. Another means of delivering technical assistance is Maryland's TMDL Data Center, which consolidates tools, guidance, and other resources with a focus on urban stormwater control.

A particular technology that is transferred via the TMDL Data Center is Maryland's Assessment Scenario Tool (MAST), which was, in essence, a simplified version of the Chesapeake Bay watershed model. This on-line tool allows users to develop BMP implementation scenarios that closely match the load reduction results of the full-blown Bay model. It allows multiple users, e.g., all of Maryland's counties, to share results with the State, which can be integrated and output into the special format that may be input into the full Bay watershed model. It was eventually developed into the Chesapeake Assessment and Scenario Tool (CAST) which is the new online modeling platform used by the Chesapeake Bay Partnership.

Another noteworthy means of technology transfer and avenue of technical assistance is the Watershed Stewards Academy. The Academy delivers a rigorous curricula and hands-on training to develop Master Watershed Stewards, who represent increasing social capital with the capacity to accelerate NPS implementation in Maryland.

With so much nonpoint source management activity occurring in Maryland, the task of accounting for it all is a huge challenge. MDE's 319 NPS Program plays a central role in guiding the reporting of NPS implementation from a wide variety of sources to the State as it relates to Chesapeake Bay restoration. Yet BMP tracking is only one measure of progress. Maryland's NPS Program also strives to integrate the tracking of pollution load reductions, various water quality parameters at a variety of geographic scales including the assessment of continued maintenance of high-quality waters.

## **Watershed Management to Achieve NPS Goals**

As noted in the discussions about organizing principles and priorities, Maryland's NPS Management Program makes an explicit commitment to the western region outside of the Chesapeake basin, the Central/Chesapeake region, and the Atlantic and Coastal Bays region, which are defined by watershed boundaries. A related organizing principle, which derives from both physical and practical bases, is the notion of nested watershed management. For example, NPS nutrients and sediment management goals, and implementation plans, are set at different watershed scales, with increasing detail, nested within each other:

- Chesapeake Bay TMDLs limits nitrogen, phosphorus, and sediment. The State Watershed Implementation Plan (WIP), composed of local-scale WIPs, represents a very broad strategy for addressing the TMDLs.
  - Baltimore Harbor TMDL limits phosphorus
    - Gwynns Falls, within the Baltimore Harbor TMDL, has a TMDL that limits sediment. The local jurisdiction's watershed plan describes how the nutrient and sediment TMDLs will be achieved.
      - Scotts Level Run within the Gwynns Falls watershed is targeted by the local jurisdiction for neighborhood watershed scale implementation and assessment.

Although this ideal of nested watershed planning and implementation is not replicated everywhere throughout Maryland, a very large number of such plans do exist, so many so that itemizing them all is beyond the scope of this Plan. The Plan does, however, highlight several representative examples organized by the three regions.

In Western Maryland areas draining to the Chesapeake Bay, the Casselman River, Cherry Creek, Upper Jennings Run, and the Youghiogheny River, acidification and associated metals leaching caused by abandoned mines continues to impact water quality. Maryland has developed total maximum daily loads (TMDLs) for these impaired waters and has subsequently established watershed-based plans that have been accepted by EPA Region 3's Section 319 NPS Program. Within this context Maryland has successfully restored the pH in Aaron Run, leading to its removal from the State's 303(d) list of impaired waters for pH. Maryland continues to invest in restoring tributaries of the Casselman River that have similar pH impairments.

Deep Creek Lake, a prominent reservoir in Maryland's western region outside of the Chesapeake Bay watershed, is another point of attention. The Deep Creek Lake watershed plan guides important milestones to address governance, funding and technical issues during the period covered by this NPS Management Plan.

Both localized and regional NPS management issues are addressed in the Chesapeake Bay basin of Maryland. In many cases, the restoration actions of most interest to local stakeholders, which provide benefits like improved micro-climates through shade-trees, reduced local flooding, improved aesthetics, and property values, provide mutual benefits for the down-stream water resources including the Chesapeake Bay.

Beginning in the early 1980s, a management infrastructure has been developed to address over enrichment of the Chesapeake Bay by nutrients. It is natural for Maryland's Nonpoint Source Program to take advantage of this infrastructure.

The opportunities created by this infrastructure include a nearly statewide nonpoint source watershed modeling system, an implementation tracking system, and a robust monitoring system. Watershed-based restoration planning, conducted since the late 1980s, has served as a training ground for many individuals and institutions involved in Maryland's NPS management. Most recently, this has taken the form of the 2010 Chesapeake Bay TMDL, which sets nutrient and sediment pollution load limits, and Maryland's various iterations of the Bay Watershed Implementation Plan (WIP), a broad plan for reducing pollution to meet those limits by 2025. The Bay TMDL and WIP are part of a federal accountability framework. This framework includes a process of setting 2-year Milestone commitments intended to promote near-term, incremental progress.

Another management framework in the Bay watershed is a partnership between the US Department of Agriculture (USDA) and the US Environmental Protection Agency (EPA) and the states called the National Water Quality Initiative (NWQI). The purpose of this cooperative effort is to target a portion of USDA funding to implement conservation practices in targeted watersheds. In the past watersheds were selected through a prioritization analysis, which had singled out the Corsica River and Catoctin Creek. More recently Maryland, and the USDA Natural Resource Conservation Service (NRCS) jointly selected the Prettyboy Reservoir as a targeted watershed. This watershed is now the focus of agricultural management activities, which are being closely monitored by State NPS Program staff.

Maryland's Corsica River has been the focus of targeted restoration and monitoring under a state initiative started in 2005, which was founded on prior State-led watershed planning. The initiative has succeeded in its design to spin off the governance and funding to local partner leadership. The intensive monitoring of this watershed has earned it recognition among a select group of 28 National Nonpoint Source Monitoring Program projects. Of note, monitoring has shown statistically significant reductions in nitrogen and phosphorus concentrations in two of three tributaries to the main tidal river.

Maryland's Coastal Bays and Atlantic Ocean represent the third and final geographic region to which the NPS Management Plan gives explicit attention. Maryland's Coastal Bays are part of the Clean Water Act National Estuaries Program. NPS watershed planning and implementation is conducted thru cooperation facilitated by the Maryland Coastal Bays Program, which is a nonprofit organization. In August 2014, nutrient TMDLs for the entire Maryland Coastal Bays system were approved EPA. These TMDLs help to guide NPS management by identifying baseline pollutant loadings, pollutant sources and by setting pollutant reduction targets. In January 2014, Maryland's Coastal Bays Program released a draft update of the *Comprehensive Conservation Management Plan for Maryland's Coastal Bays (CCMP)*. The CCMP will guide important milestones to address governance, funding and technical issues for the period covered by this NPS Management Plan. In 2019, the first watershed plan in Maryland's Coastal Bays was conditionally approved by EPA.

## **Public Education, Outreach and Financial Assistance**

Maryland's leadership in public education relating to NPS management is exemplified by the State requirement that all public-school students must complete an environmental literacy program that is locally designed to meet standards adopted by the Maryland State Board of Education. With so many education efforts going on throughout the State of Maryland, it is impossible to list them all; however, the periodic NPS Management Plan update process provides a means of maintaining a comprehensive and fresh directory.

In addition to entities that provide education and outreach services, the Plan identifies institutional means by which Maryland citizens may participate in, and influence, public policy related to nonpoint source management. The Plan identifies key advisory, oversight, and coordinating bodies for the three departments of Agriculture, Environment and Natural Resources.

Another important resource included in the Plan is a summary listing of financial assistance programs and grants managed by private, state, and federal entities (other than section 319). These financial support programs address manure management, wetlands creation, land conservation, research, mine lands reclamation, septic systems, green infrastructure, education, pollution prevention, forest management, coastal management, watershed planning, implementation design and many other nonpoint source management related subjects.

## **Plan Accountability and Maintenance**

In accordance with EPA's 2013 Nonpoint Source Program Guidance, the State of Maryland intends to review and update this plan on a five-year cycle. During intervening years, the table of Milestones will be updated to reflect the status of commitments. In several cases, the Milestone table indicates that new commitments will be adopted during the five-year period as new information becomes available.

For the most current information about Maryland's Nonpoint Source Management Program See: <https://mde.maryland.gov/programs/Water/319NonPointSource/Pages/index.aspx>

# Chapter 1 – Introduction

## 1.A Vision

Ensuring a clean environment and excellent quality of life for Marylanders.

Maryland’s vision is to implement dynamic and effective nonpoint source pollution control programs. These programs are designed to achieve and maintain beneficial use of water; improve and protect habitat for living resources; and protect health through a mixture of water quality and/or technology-based programs; regulatory and/or non-regulatory programs; and financial, technical, and educational assistance programs. (*Maryland Nonpoint Source Management Plan*, December 1999)

## 1.B Mission

Maryland’s Nonpoint Source Management Program (Program) mission is to protect and restore the quality of Maryland’s air, water, and land resources, while fostering smart growth, a thriving and sustainable economy, and healthy communities.

## 1.C Goals

The Program has the following seven broad goals to advance its mission and vision:

1. Improving and protecting Maryland’s water quality.
2. Promoting land redevelopment and community revitalization.
3. Ensuring safe and adequate drinking water.
4. Reducing Maryland citizen’s exposure to hazards.
5. Ensuring the safety of fish and shellfish harvested in Maryland.
6. Ensuring the air is safe to breathe.
7. Providing excellent customer services to achieve environmental protection.

The objectives and milestones that guide and measure progress toward these broad goals are presented in the next chapter – Objectives & Milestones. They replace the 2015-2019 *Maryland Nonpoint Source Management Plan* goals and milestones. They are intended to align with, or drive refinements to, other strategic documents such as Maryland’s Continuing Planning Process (2007), the State of Maryland’s Comprehensive Water Monitoring Strategy (2009) and Maryland’s Phase III Watershed Implementation Plan for the Chesapeake Bay TMDL (2019). Many of the Program objectives and milestones were developed and approved in cooperation with EPA’s Chesapeake Bay Program and other partners.

## 1.D Purpose

The updated Maryland Nonpoint Source Management Program Plan (the Plan) is drafted to address two federal requirements: 1) The Federal Clean Water Act Section 319(b) requires preparation of a State nonpoint source management program plan for approval by the US Environmental Protection Agency (EPA). EPA most recently approved Maryland’s program plan in 1999. 2) EPA adopted new guidelines in 2013 that require states to update or revise their nonpoint source (NPS) management program plan at least every five years.

The 319 Nonpoint Source Program, responsible for this document, is housed in the Maryland Department of Environment’s Water and Science Administration. With an annual budget of approximately \$2 million/year, this Program is a relatively small in comparison to the much larger array of State nonpoint source management activities, which had documented expenditures of more than \$177 million in expenditures for SFY 2020. EPA requires this Plan to serve as an umbrella document that references the many diverse NPS management components that are led by various State and local government agencies.

The Plan provides explanations of many, but not necessarily all, NPS management programs in the State. It presents goals, objectives, and milestones for some aspects of NPS management in Maryland, which are intended to serve as benchmarks for gauging progress by selected programs toward NPS pollution reduction and water quality improvement, and to support review and approval by EPA. The document does not anticipate all future revisions that may be instituted by the various lead State and local government agencies from time to time.

## 1.E Document Overview

The Maryland NPS Management Program Plan was developed in part as a response to the 1987 amendments to the Federal Clean Water Act, Section 319 (“Section 319”) provisions to address problems caused by pollution from nonpoint sources (NPS). Unlike point source pollution, which generally comes from a pipe, NPS pollution comes from dispersed sources generally associated with stormwater that runs off the land or infiltrates thru the ground. The two most pervasive sources of NPS pollution known in Maryland are agriculture and urban runoff. Other sources of NPS pollution in Maryland include acid mine drainage, construction activities, on-site sewage systems (septics), hydromodification and silviculture (forestry). Atmospheric pollutants from a variety of sources, which are deposited to the ground and surface waters, also warrant attention.

Since the inception of the Federal Section 319 program, Maryland has received nearly \$65.5 million in 319(h) Grants (FFY1990 thru FFY2020). These funds have been used to help build Maryland’s NPS Management Program, implement various NPS programs, and implement practices to reduce nonpoint source pollution.

Section 319(b) requires each state to produce a plan to manage NPS pollution.

**(b) State management programs**

**(1) In general**

The Governor of each State, for that State or in combination with adjacent States, shall, after notice and opportunity for public comment, prepare and submit to the Administrator for approval a management program which such State proposes to implement in the first four fiscal years beginning after the date of submission of such management program for controlling pollution added from nonpoint sources to the navigable waters within the State and improving the quality of such waters.

The December 1999 document, *Maryland Nonpoint Source Management Plan*, was an umbrella for many NPS efforts, programs, and projects in Maryland. During the next thirteen years, Maryland nonpoint sources programs were updated and revised numerous times including many changes that occurred in partnership with the EPA Chesapeake Bay Program. During this time, 1999 Plan document was not formally revised to reflect these changes.

In November 2012, EPA issued *Section 319 Program Guidance: Key Components of an Effective Nonpoint Source Management Program*. In addition, in April 2013 EPA issued *Nonpoint Source Program and Grants Guidelines for States and Territories*. Together, the new guidance presented new EPA expectations for the contents of states' NPS management programs and required states to update their NPS program at least every five years.

This document is designed to update and revise the 2015-2019 Management Plan to reflect current program status and direction while also meeting EPA's new requirements in compliance with Section 319(b). It continues to be an umbrella document that touches on many of the diverse NPS effort and programs in Maryland. This document also expands and enhances the 1999 Plan by addressing variety of regulatory, nonregulatory, financial, and technical assistance programs needed to improve and maintain surface and groundwater quality.

### **1.E.1 Document Structure**

This document is an update and revision to the 2015-2019 *Maryland Nonpoint Source Management Plan*. This document also designates other specifically named programs, plans and documents that are "components" of the Maryland NPS Management Program Plan. These components, such as the Phase III Chesapeake Bay Watershed Implementation Plan, are fully integrated into the Maryland NPS Management Program Plan and revisions to these components are, therefore, also revisions to this document. Additionally, these components are also necessarily managed and revised to meet divergent schedules and requirements that differ from the annual milestone and five-year update requirements applied to this document. To promote access to revisions of the Maryland NPS Management Program Plan components, an appendix lists these components and Internet links to the latest revisions.

### **1.E.2 Document Timeframe**

This document will be updated or revised at least every five years to meet EPA requirements. During intervening years, program documents that are identified as Components of the Maryland Nonpoint Source Management Program may be updated or revised independently of this document. For example, in accordance with EPA's Chesapeake Bay Program requirements, Chesapeake Bay milestones are updated on a two-year cycle. Therefore, this document may be updated as necessary so that it reflects significant changes in NPS watershed planning and implementation policies and priorities that rise.

### **1.E.3 Using this Document**

- Abbreviations. Technical and programmatic content is frequently referenced by acronyms. A list of all acronyms used in the document can be found on pages 4 and 5.
- Components of the Plan. The NPS Program encompasses an array of programs that generally have independent mandates and schedules for action and update. Therefore, this document frequently identifies components and provides Internet links to find them in the *Appendix A Components of Maryland's 2021-2025 Nonpoint Source Management Plan*.
- Internet Sources. The *Appendix B Internet Sources for the Maryland NPS Management Plan* lists many of the programs and projects referenced in this document with Internet links for them. Whenever the text mentions public availability via the Internet, additional information is commonly listed in this appendix.



## **1.F Process for Drafting, Review and Approval**

Updating and revising the plan began with a cooperative effort in 2020-2021 between MDE and its partners to identify relevant nonpoint source public education and outreach, standing public input mechanisms and financial assistance opportunities. State agency program input and review was conducted from late 2020 thru 2021. EPA guidance and review of early document drafts was conducted from the last half of 2021 thru 2022. Input from local government agencies that were active participants in the State 319 NPS Program was solicited during the second half of 2021. Input and review comments from all these sources were used for the draft plan released for public review.

The plan was revised in 2021 to incorporate aspects of the Phase III Chesapeake Bay Watershed Implementation Plan and additional State priorities for controlling Nonpoint Source pollution. The plan also includes updates to milestones, statewide goals, and objectives to reflect new priorities for the nonpoint source program.

In accordance with the Federal Clean Water Act Section 319(b) and recent EPA guidance, the final *Maryland's 2021-2025 Nonpoint Source Management Plan* is submitted to EPA for approval.

# Chapter 2 - Objectives and Milestones

## 2.A Organizing Principles

The complexities of nonpoint source pollution explain a great deal about why this class of pollution persists. This Plan deals with that complexity by adopting several organizing principles that naturally align with the Program objectives and advance the Program towards its broader goals laid out in Chapter 1. The objectives in turn drive the organization of the Program milestones, which serve as tangible outcomes and metrics by which the Program's success can be measured. This chapter concludes with a presentation of several key general strategies through which the NPS Program will strive to meet the objectives and milestones. Some of these strategies constitute other programs into which the NPS Program strives to be well-integrated.

To a large degree, the organizing principles, and closely associated objectives, derive from a technical foundation. Specifically, the subject matter is organized to address various functional elements:

- *pollutants,*
- *pollutant sources,*
- *geographies, and*
- *types of water bodies.*

The Program objectives and milestones follow these technically based organizing principles. Most notably, the milestones are grouped into two broad geographic categories: *statewide* and *watersheds*. Similarly, many of the statewide milestones are organized by pollutant sources, like agricultural, *urban/suburban*, and *silvicultural (forestry) stormwater runoff*. Aligning the objectives and milestones to this technical foundation not only brings organizational structure to this complex subject, it helps to ensure the Program is comprehensive.

Another organizing principle of this Plan is to address the eight key elements of a dynamic and effective Nonpoint Source Program set forth by EPA. These are summarized below.

### **Eight Key Elements of an Effective NPS Program<sup>3</sup>:**

1. Goals, objectives, strategies
2. Partnerships: Strengthen partnerships including federal, interstate, local entities.
3. Programs: Integration with other programs. Statewide & on-the-ground initiatives.
4. Protection & Restoration
5. Identify and prioritize via watershed-based process in support of #4
6. Seven program components pursuant to Section 319(b) that identify:
  - a. BMPs (systems of management measures)
  - b. Programs (regulatory and non-regulatory)
  - c. Processes & coordination
  - d. Schedule (legal authorities, resources, institutional relations)
  - e. Funding other than the 319(h) Grant
  - f. Federal program coordination

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<sup>3</sup> For a full recitation of the eight key elements of an effective NPS Program see (PDF): [https://www.epa.gov/sites/default/files/2015-09/documents/key\\_components\\_2012.pdf](https://www.epa.gov/sites/default/files/2015-09/documents/key_components_2012.pdf)

- g. Evaluation and Monitoring to determine program effectiveness
- 7. Efficient program management including financial aspects
- 8. Program Review and Evaluation

## 2.B Objectives

The objectives outlined below address both technical aspects of the State’s nonpoint source management activities and administrative aspects of the 319 NPS Program. Because EPA requires that this Management Plan provide a comprehensive description of the State’s nonpoint source pollution management, some of the functions are beyond the direct control of the 319 Program administered by the MDE WSA. Nevertheless, the 319 Program in MDE WSA strives to be aware of and integrated with the comprehensive set of programs through partnership building and maintenance.

Although the following objectives are not intended to be a one-to-one correspondence with the eight key elements of an NPS program, they are developed with those key elements in mind. Finally, the objectives are intended to reflect general near-term commitments; specific near-term that reflect these objectives are identified in the next section, entitled “Milestones”.

### Objective 1 – Regional Coverage

Ensure that the Program addresses the three broad geographic regions of the State:

- Western Region<sup>4</sup> (Casselman River and Youghiogheny River: Casselman River, Upper Jennings Run, Cherry Creek outside of the Chesapeake Bay drainage), broadly characterized by fresh, cold-water fisheries,
- Central Region (the Chesapeake Bay and its tidal and nontidal tributaries), broadly characterized by warmer fresh waters,
- Coastal Region (Coastal Bays outside of the Chesapeake Bay drainage), broadly characterized by Maryland’s coastal bays and Atlantic Ocean

*Relation of this Objective to the Eight Key Components of an Effective Program:*

- #2 (Partnerships) This objective nurtures partnerships in the three key regions of the State. For example, a [Maryland Department of Agriculture Gypsy Moth program](#), in coordination with the US Department of Agriculture Forest Service, is responsible for the [Gypsy Moth Cooperative Suppression Program](#) in Western Maryland. This program is critical to protecting vast areas of forest cover, the loss of which would generate massive loads of sediment and nutrient pollution.
- #3 (Programs) This objective promotes integration with programs that are unique to different regions of the State.
- #4 (Protection & Restoration) This objective is supported by the integration of the NPS Program with the antidegradation program, under Section 303 of the Clean Water Act, to ensure protection in the three key regions of the State.
- #5 (Priorities) This objective represents a prioritization criterion that gives weight to directing resources to on-the-ground projects are considered in all three regions.
- #6 (7 Program elements) The implementation of these seven key elements benefit from the objective of ensuring that the NPS Program gives attention to the State’s three key regions.

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<sup>4</sup> This Plan acknowledges, and is sensitive to, other definitions of “Western” Maryland, which include more geographic area than the watersheds that are outside of the Chesapeake Bay drainage.

#7 (Efficient & Effective Program Management) This objective promotes Program effectiveness by ensuring comprehensive geographic coverage. Attentiveness to the three key regions also helps ensure awareness of opportunities to leverage funds and technical assistance that are unique to these regions, like the Eastern Brook Trout Joint Venture in Western Maryland and the National Estuaries Program in Maryland's Coastal Bays.

#8 (Program Review and Evaluation) Having the explicit objective of comprehensive regional coverage ensures that this important criterion is included in evaluating the Program's effectiveness, including the reporting of implementation progress.

## **Objective 2 – Multiple Scales:**

Ensure that the Program is attentive to multiple scales of geography at which different NPS issues are managed:

- Global, which can, for example, be a scale at which atmospheric deposition of mercury might need to be addressed.
- National, which can, for example, be a scale at which policies are necessary to address certain types of nonpoint source problems.
- Interstate, which can, for example, be of critical importance in addressing upstream and downstream watershed management.
- State, a management scale at which many significant regulatory and non-regulatory programs are often defined.
- Watershed, the natural scale at which environmental systems function, but which can range widely in size due to the nesting of small watersheds within larger ones.
- County, the scale at which a great degree of management activities for both local government and agricultural are organized.
- Municipal, another important management scale, which correlates strongly with urban stormwater management activities, and within which is a wide range of scale from small towns to large cities.
- Site Scale, which is often the ultimate scale at which decisions must be made regarding specific on-the-ground restoration actions.

### *Relation of this Objective to the Eight Key Components of an Effective Program:*

#2 (Partnerships) This objective promotes a more comprehensive view of the geographic scope that should be addressed by Maryland's NPS Program. For example, pollution from distant atmospheric emission, like mercury, necessitates regional and even international responses. At the other end of the scale, the identification of highly localized sources of PCBs entails strategies that telescope into specific sites. The investigation and cleanup of sites that are contaminated by toxic substances involves a partnership with MDE's Land Management Administration and special laboratories capable of analyzing samples for PCBs. (See Objective 4 for further discussion of PCBs).

#3 (Programs) This objective motivates the establishment and maintenance of a wide variety of partnerships necessary to span the wide range of scales.

#4 (Protection & Restoration) This objective, which is intended to ensure protection of high-quality waters receives its share of resources, entails strategies and regulations developed at the state scale and operations that function at the site scale.

#5 (Priorities) This objective recognizes that decisions and priorities regarding nonpoint source management must consider multiple geographic scales.

- #6 (7 Program elements) The implementation of these seven key elements benefit from the objective of ensuring that the NPS Program calls for addressing problems across a wide range of scales.
- #7 (Efficient & Effective Program Management) The effectiveness of the Program is enhanced by developing and operating nonpoint source management at the necessary geographic scales.
- #8 (Program Review and Evaluation) Because NPS pollution problems necessitate management solutions at varying scales, this objective motivates Program reviews and evaluations at varying scales.

### **Objective 3 – Pollutants and Stressors**

Ensure that the Program is comprehensive in addressing the many types of pollutants and stressors:

- 303(d) List of Impaired Waters: Integration of the NPS Program with the Clean Water Act 303(d) Program will help to ensure comprehensive attention to a wide variety of pollutants. These include nutrients, sediments, pH, bacteria, thermal impacts, physical degradation of streams, chlorides, temperature, trash, and other emerging contaminants.

*Relation of this Objective to the Eight Key Components of an Effective Program:*

- #2 (Partnerships) This objective promotes integration with programs that have a unique role in addressing different kinds of pollutants, such as the Maryland Department of Agriculture, which has key responsibilities regarding the proper handling and use of pesticides.
- #3 (Programs) This objective ensures that Maryland’s NPS Program addresses a wide array of pollution, not just nutrients and sediments, which is a dominant issue in the Chesapeake Bay region. For example, the management of road salt deserves increasing attention like that given by the Maryland State Highway Administration [Statewide Salt Management Plan](#).
- #4 (Protection & Restoration) This objective helps to ensure that the NPS Program focuses attention on pollutants and stressors that are most important for the protection of high-quality waters. Often, these are stressors like change in hydrology and temperature rather than pollutants that typically receive more attention.
- #5 (Priorities) This objective will promote a balancing of priorities and resources to ensure that all pollutants receive some level of attention. For example, although the manufacture of carcinogenic PCBs was banned in 1979 this pollutant is very long-lived and likely persists in high concentrations in localized areas (hot spots). Because a small amount of PCBs can bioaccumulate in the tissue of fish, creating a risk to human health and wildlife, Maryland’s NPS Program recognizes that a modest field monitoring effort to identify hot spots is a priority.
- #6 (7 Program elements) The implementation of these seven key elements benefit from the objective of ensuring that the NPS Program gives attention to the full range of pollutants.
- #7 (Efficient & Effective Program Management) The effectiveness of the Program is enhanced by ensuring that the full range of pollutants and stressors are given due attention.
- #8 (Program Review and Evaluation) This objective helps promote the transparent expectation of Program evaluations that are comprehensive regarding a wide variety of pollutants. Linkage to Maryland’s biennial Integrated Water Quality Monitoring and Assessment Report, which includes the 303(d) list, is in and of itself an evaluation tool to this end.

## **Objective 4 - Pollutant Sources**

Ensure that the Program is comprehensive in addressing the wide range of pollutant sources including:

- Acid Mine Drainage
- Agriculture
- Urban/Suburban stormwater
- Forest (silviculture and harvesting)
- Septic Systems
- Industrial
- Upland pollutant sources
- Atmospheric
- Stream and shoreline degradation (hydromodification)
- Marinas/Boatyards

*Relation of this Objective to the Eight Key Components of an Effective Program:*

- #2 (Partnerships) The Plan's commitment to address a wide variety of pollutant sources will necessitate the development and maintenance of partnerships. For example, although greenhouse gas strategies are often associated with the management of atmospheric sources, significant mutually beneficial partnership opportunities lie within the forestland and farm animal management sectors.
- #3 (Programs) Many, if not most, existing environmental programs are defined relative to pollutant source sectors. The objective of ensuring that the NPS Program gives due attention to all pollutant source sectors naturally promotes alignment with most other relevant programs.
- #4 (Protection & Restoration) Although we think that we understand the cause-and-effect relationship with stressors and impacts on high-quality waters, the ensuring attention is given to all pollutant source sectors will help ensure that a relevant pollutant source is not overlooked.
- #5 (Priorities) This objective is a necessary ingredient to ensure that a comprehensive universe of potential NPS pollution sources is considered when establishing management priorities.
- #6 (7 Program elements) The implementation of these seven key elements benefit from the objective of ensuring that the NPS Program gives attention to the full range of pollutant sources.
- #7 (Efficient & Effective Program Management) Committing to being knowledgeable about multiple source sectors is an integral NPS Program process that ensures a wide range of opportunities are considered regarding NPS management options. This, in turn, promotes effective management solutions.
- #8 (Program Review and Evaluation) This objective promotes the tracking of progress comprehensively among source sectors.

## **Objective 5 – Types of Waterbodies**

Ensure that the Program is comprehensive in addressing the various types of waterbodies impaired by NPS pollution including:

- Streams
- Rivers (tidal and nontidal)
- Wetlands
- Lakes/Impoundments
- Bays
- Atlantic Ocean
- Groundwater

*Relation of this Objective to the Eight Key Components of an Effective Program:*

- #2 (Partnerships) Because some entities identify with waterbody types, this objective promotes the development of diverse partnerships that align with the physical environment as defined by differing water body types. Examples include the relationships with State and local lake/reservoir managers, people with expertise in the biological monitoring of non-tidal streams, and very notably the relationship with people that have expertise or advocacy interests concerning the Chesapeake Bay.
- #3 (Programs) Similar to partnerships, this objective promotes integration with programs that identify with specific types of waterbodies. Examples include the Maryland Coastal Bays Program (part of EPA's National Estuaries Program), the Susquehanna and Potomac River Basin Commissions, and MDE's Waterways and Wetlands Program.
- #4 (Protection & Restoration) Admittedly, Maryland's antidegradation program is currently focused on high-quality non-tidal streams. This is due in part to the prevalent metrics currently used (non-tidal biological stream data) and the physical reality that non-tidal streams are some of the only remaining high-quality waters. This objective, by highlighting this observation, reveals a potential opportunity for the NPS Program to give this greater attention within the institutional structure of Maryland's antidegradation program.
- #5 (Priorities) This objective engenders attentiveness to the full spectrum of water body types. This is important in a state like Maryland where so much attention is directed to the Chesapeake Bay at the risk of other waters not being given due attention. An example is the need to protect drinking water supplies that include reservoirs, groundwater, and some rivers.
- #6 (7 Program elements) The implementation of these seven key elements benefit from the objective of ensuring that the NPS Program addresses the full range of water body types.
- #7 (Efficient & Effective Program Management) The effectiveness of the Program is enhanced by explicit attention to varying types of waterbodies promoted by this objective.
- #8 (Program Review and Evaluation) This objective commits the NPS Program to review and evaluation across the varying types of water bodies.

**Objective 6 – Protection and Restoration**

Ensure that the Program balances protection and restoration needs

*Relation of this Objective to the Eight Key Components of an Effective Program:*

- #2 (Partnerships) This objective promotes the strengthening of the NPS Program partnership with the MDE's Environmental Assessment and Standards Program, responsible for the State's [Antidegradation Program](#) and the Department of Natural Resources' Monitoring and Non-Tidal Assessment (MANTA) Division Maryland DNR is responsible for the [Maryland Biological Stream Survey](#) (MBSS) Program, a foundation for Maryland's Antidegradation program, and the [Stronghold Watersheds Program](#).
- #3 (Programs) See Partnerships.
- #4 (Protection & Restoration) Maryland's NPS Program objective of "Protection and Restoration" is directly aligned with this Key Component of an effective State NPS Program.
- #5 (Priorities) This objective makes protection an explicit priority of Maryland's Nonpoint Source Program. This will help ensure that Program resources are devoted to this function in addition to the traditional focus on water quality restoration. For example, the NPS Program, in collaboration with Maryland's antidegradation program, prioritizes the monitoring of waters near which significant development activities are being considered.
- #6 (7 Program elements) Adopting "Protection" as an objective of Maryland's NPS Program helps to promote alignment of the seven program elements under 319(b) with both protection and restoration in mind.

- #7 (Efficient & Effective Program Management) Adopting “protection” as an explicit objective raises its profile. This will help direct more time and resources toward protection relative to restoration thereby making the NPS Program effective on more fronts. Attentiveness to protection also helps promote awareness of opportunities to leverage funds and technical assistance that are available for this function. Another example of the enhancement of program effectiveness promoted by a focus on protection is the strengthening that it promotes the maintenance of a watershed’s resilience to extreme climatic events. This has a significant effect on nonpoint source pollution because the frequency of extreme weather events is predicted to increase because of global climate change; greater attention to precipitation events and their impact on surface waters is needed.
- #8 (Program Review and Evaluation) Having the explicit objective of protection ensures that this important criterion is included in evaluating the Program, including the reporting of success in protecting Maryland’s high-quality waters.

### **Objective 7 – Priority Setting**

Ensure that the Program has explicit means of setting priorities to ensure that NPS problems are addressed in a timely, efficient, and effective manner. Examples of these include:

- Human Health Protection
- Drinking Water Supply Protection
- Transparent Methodologies for Targeting Restoration
- Transparent criteria for awarding grant funding

#### *Relation of this Objective to the Eight Key Components of an Effective Program:*

- #2 (Partnerships) Part of a healthy process of setting priorities involves the consideration of varying viewpoints and expertise of partners. An example might be the insight gained from State Highway Administration partners who must consider risks associated with highway accidents caused by icy roads as it relates to salt management, or risks associated with collisions with trees when considering opportunities for reforestation.
- #3 (Programs) The integration with other programs promotes more informed and nuanced priority setting. An example is the Maryland’s Chesapeake and Coastal Bays Trust Fund, which provides major grants each year for nonpoint source controls. By legislation, their priority is to target grants that have the greatest nutrient reduction per dollar expended. This priority tends to direct resources to severely polluted areas for which there might be little likelihood of removal from Maryland’s list of impaired waters (303(d) list). This is a very worthy priority; however, it must be balanced with the legitimate priority of seeking to remove waters from the 303(d) list, which tends to direct waters to places that have greater potential for recovery.
- #4 (Protection & Restoration) This objective recognizes the importance of priority-setting. Given very limited resources for the traditional priority of restoration, the protection of high-quality waters is at risk of being given no attention. This objective, which promotes robust priority setting, reflects how Maryland’s NPS Program has come to shift more resources to protection.
- #5 (Priorities) This objective directly aligns with this Key Component of an effective NPS Program.
- #6 (7 Program elements) Explicit priority-setting is essential to establishing a strategic approach for any program. It promotes structured criteria, which can form the basis for adaptive management and are the stepping off point for review and upgrades to the program.
- #7 (Efficient & Effective Program Management) To the degree that strong priority-setting is an element of program effectiveness, this objective helps to ensure that end.
- #8 (Program Review and Evaluation) The objective of priority-setting promotes the establishment of transparent, quantified decision-making processes and associated metrics. This greatly enhances the ability to review and evaluate the Program.



## **Objective 8 – Program Management and Evaluation**

Ensure that the Program has procedures to promote efficient fiscal and functional management and metrics by which these can be evaluated. Examples of these include:

- 319 Program Annual Report
- 319 Grant Reporting and Tracking System (GRTS)
- Annual Maintenance of Effort reporting: Ensuring that existing levels of state funding is not withdrawn in response to the receipt of federal funds
- 319 Program Milestones (See next section)
- BMP Implementation Reporting
- Annual Success Stories
- Implementation Monitoring: Maintain robust implementation monitoring projects that demonstrate observable progress in reducing pollution.

*Relation of this Objective to the Eight Key Components of an Effective Program:*

- #2 (Partnerships) In a program that spans many activities that are not under the direct control of MDE’s core 319 Program, healthy partnerships determine the breadth of what can be reasonably evaluated. For example, these partnerships determine, in part, what level of commitment can be made in setting milestones that are critical to gauging success.
- #3 (Programs) The cooperation of other programs that influence nonpoint source pollution is critical to instituting meaningful systems to evaluate Maryland’s Nonpoint Source Program as a whole. This objective recognizes and focuses attention on that need.
- #4 (Protection & Restoration) This objective aligns with the protection and restoration components through explicit metrics for both that are included in Maryland’s Nonpoint Source Program milestones.
- #5 (Priorities) This objective promotes the establishment of transparent, quantified decision-making processes and associated metrics that are the hallmark of managing priorities. This greatly enhances the ability to review and evaluate the Program.
- #6 (7 Program elements) This objective provides a framework for ensuring attention to the seven program elements are given appropriate attention.
- #7 (Efficient & Effective Program Management) This Program Management and Evaluation objective is directly aligned with the management aspect of this Key Component of an Effective NPS Program.
- #8 (Program Review and Evaluation) This Program Management and Evaluation objective is directly aligned with the evaluation aspect of this Key Component of an Effective NPS Program.

## **2.C Milestones for Objectives**

The 319 Program Milestones outlined below represent specific, near-term metrics for the objectives outlined in the previous section. The milestones address both technical aspects of the State’s nonpoint source management activities and administrative aspects of the 319 NPS Program administered by the Maryland Department of Environment’s Water and Science Administration (MDE WSA).

The Milestones set annual commitments for the five-year period 2021-2025. It is broadly organized in two groups: Statewide Milestones and Watershed Milestones. To the degree possible the milestones are organized in groups for each objective outlined above for the Statewide Milestones. However, Objective 1 (Regional Coverage) is addressed within the Watershed Milestones and Objective 2 (Multiple Scales) is addressed implicitly, for example, by having statewide programs, watershed scale initiatives and on-the-ground projects.

The following is a narrative summary of Maryland’s NPS Program milestones that are fully presented in *Appendix Milestones for Tracking Progress – Maryland’s 2021-2025 Nonpoint Source Management Plan*. The objectives outlined below are described in the previous section. For reasons discussed immediately above, the summary begins with Objective 3.

- **Milestones for Objective 3 – Pollutants and Stressors**
  - Milestones associated with pollutants including nitrogen, phosphorus, sediment, bacteria, chloride, PCBs, mercury, temperature, trash, and other emerging contaminants.
- **Milestones for Objective 4 - Pollutant Sources**
  - Specific sources of NPS pollution are listed with the milestones associated with them including agriculture, on-site disposal systems, urban/suburban stormwater and erosion & sediment control, forestry, resource extraction, and hydromodifications.
- **Milestones for Objective 5 – Types of Waterbodies**
  - Phase III WIP for the Chesapeake Bay TMDL
  - Phase I MS4 jurisdiction stormwater waste allocation (WLA) implementation plans for reservoir TMDLs.
  - Annual reports for major drinking water reservoir technical advisory groups.
  - Milestones for watersheds with EPA-accepted plans that are eligible for 319(h) Grant implementation funding are organized by major drainage area with milestones listed for each watershed.
    - Chesapeake Bay watersheds: Antietam Creek, Back River (tidal and non-tidal waters), Choptank River, Corsica River, Gwynns Falls, Jones Falls, Monocacy River, Sassafras River.
    - Western Maryland – Casselman River and Youghiogheny River: Casselman River, Upper Jennings Run, Cherry Creek.
- **Milestones for Objective 6 – Protection and Restoration**
  - Focus areas with milestones listed included antidegradation programs and projects, 303(d) Program vision, and reviews of proposed projects thru the State Clearinghouse.
- **Milestones for Objective 7 – Priority Setting**
  - Priorities milestones identified include geographic area selection for biological monitoring, priorities for Maryland’s 319(h) Grant funds, 303(d) Program vision priorities and alternatives.
- **Milestones for Objective 8 – Program Management and Evaluation**
  - Particular areas identified include: Chesapeake Bay Two-Year Milestones, NPS impairments, and Maryland’s Integrated Report, NPS BMPs (implementation progress and verification protocols), 319 Annual Report and milestone progress reporting, tracking implementation of EPA-accepted watershed plans, finding from targeted watershed monitoring, success story reporting, Chesapeake Bay two-year milestone (progress reporting and adoption of new milestones), investment for NPS programs and implementation, updating components of Maryland’s 2021-2025 NPS Management Plan (Continuing Planning Process and State Monitoring Strategy).

## 2.D General Strategies

Several broad strategies provide frameworks via which Maryland’s 319 Nonpoint Source Program can achieve many of its objectives. Being integrated with these broader strategies leverages their institutional capacity to the benefit of the NPS Program. It also promotes partnerships, which are vital to the effectiveness of non-regulatory programs like the 319 NPS Program.

Although strategies should be driven by the objectives, they tend to be more subjective and dependent on specific institutions. For example, because we live in the United States our nonpoint source management strategies are embedded in the institutional framework of the federal Clean Water Act. The general strategies adopted by Maryland's Program are further influenced by the context of the Chesapeake Bay and associated Bay Program partnership.

### **2.D.1 Clean Water Act Section 303(d)**

Maryland's Nonpoint Source Management Program is strongly focused on the water quality-based management framework, which is codified in Section 303 of the federal Clean Water Act. This logical framework aligns well with the technical foundation that drives the Nonpoint Source Program's objectives. It also imposes accountability and promotes programmatic evaluation and adaptive management. Key features of the water quality-based management framework include:

- Setting water quality standards
- Monitoring the water according to those standards
- Evaluating the monitoring data according to those standards to identify waters that are not meeting standards
- Determining pollutant limits in the form of total maximum daily loads (TMDLs)
- Implementing pollution reduction actions to restore water quality

These activities are conducted in a cyclic manner so that lessons learned at each step of this framework inform the other steps. This results in continual refinement of each element.

During the late 1990s and first decade of the 2000s, significant resources were devoted to developing TMDLs. The result of that was the establishment of many pollution limits and associated reduction goals. The US Environmental Protection Agency (EPA) has recently begun to urge more attention and resources be focused on pollution reduction planning and action to achieve the goals established by TMDLs. The strategic vehicle for this is the EPA 303(d) Long Term Vision framework.

In December of 2013, EPA finalized its documentation of a Long-Term Vision for Assessment, Restoration, and Protection under the CWA Section 303(d) program (the 'New Vision'), with a focus on demonstrable improvement in water quality for watersheds prioritized by States. The vision goals incorporate the concept of adaptive management, placing an emphasis on the need for States to set their own priorities and pace, and allowing flexibility for States to make decisions regarding their waters' protection efforts.

The New Vision consists of six elements or goals, which, along with their expected timelines for adoption by the States, are specified by EPA. The elements are enhanced *Engagement* (beginning 2014); watershed *Prioritization* (2016); *Protection* (2016); programmatic *Integration* (2016); incorporation of TMDL *Alternatives* (2018), and *Assessment* (2020). Overall evaluation will take place in 2022. Details of the New Vision, and full descriptions of these elements, are available from EPA at [https://www.epa.gov/sites/default/files/2015-07/documents/vision\\_303d\\_program\\_dec\\_2013.pdf](https://www.epa.gov/sites/default/files/2015-07/documents/vision_303d_program_dec_2013.pdf).

The Prioritization goal, as the foundation to guide planning and implementation of the other goals, required that by 2016, States review, prioritize, and report priority watersheds or waters for restoration and protection. To that end, Maryland's methodology to prioritize the State's watersheds for TMDL development, TMDL revision and, where appropriate, alternative means of protection and restoration rely on robust anti-degradation within high quality waters, robust stormwater permitting priorities, and coordination with the agricultural sector. Many of these updated targeting strategies are demonstrated in the State's Phase III Chesapeake Bay Watershed Implementation Plan ([Phase III WIP](#)).

To achieve this vision, EPA is strongly promoting the integration of state programs that implement Section 303(d) and Section 319 of the Clean Water Act. Relative to other states in which these two programs reside in separate units of government, Maryland is well positioned, because both programs reside within the Watershed Protection, Restoration, and Planning Program in the Water and Science Administration of the Maryland Department of Environment.

### **2.D.2 Chesapeake Bay TMDLs and Watershed Implementation Plans**

The Chesapeake Bay is integral to the State of Maryland, both physically and culturally. As the largest estuary in the United States, it has served as a national laboratory for developing and testing methods of regional water quality management. Beginning in the early 1980s, a management infrastructure has been developed to address over enrichment of the Bay by nutrients. It is natural for Maryland's Nonpoint Source Program to take advantage of this infrastructure.

The opportunities created by this infrastructure include a nearly statewide nonpoint source watershed modeling system, an implementation tracking system, and a robust monitoring system. Watershed-based restoration planning, conducted since the late 1980s, has served as a training ground for many individuals and institutions involved in Maryland's NPS management. Most recently, this has taken the form of the 2010 Chesapeake Bay TMDL, which sets nutrient and sediment pollution load limits, and Maryland's Bay Watershed Implementation Plan (WIP), which is a broad plan for reducing pollution to meet those limits by 2025. The Bay TMDL and WIP are part of a federal accountability framework. This framework includes a process of setting 2-year Milestone commitments intended to promote near-term, incremental progress.

Although Chesapeake Bay restoration is a high priority, Maryland's NPS Program is acutely aware that other NPS pollution issues deserve adequate attention. As a general strategy, Maryland's NPS Program uses the Bay restoration infrastructure to support other NPS pollution issues. This strategy recognizes that local water quality benefits are of most interest to local partners; however, local restoration activities also have downstream benefits. Similarly, this strategy recognizes that restoration actions intended to address concerns of local interest, such as stream restoration or bacteria, can also address concerns of the Chesapeake Bay, particularly nutrients.

### **2.D.3 Protection via the Clean Water Act Antidegradation Requirements**

Maryland's 319 Program recognizes the value of protecting high-quality waters as a general strategy that guides priorities and activities. Protection is part of the 303(d) Long-term Vision framework, but worth expanding upon here. Because the Anti-degradation Policy is part of the Clean Water Act mandate, integral to water quality standards, it carries significant weight from a legal and regulatory perspective. Thus, any NPS Program objective or strategy that can be linked to this legal framework has a greater chance of making an impact.

Investing in protection also makes technical and logical sense. Avoiding impairments is less costly, particularly to taxpayers, than restoring impaired waters. Further, the track record for restoring impaired waters is not very good due, not only to the costs, but the technical challenges. High-quality waters also have benefits beyond those inherent in the waters themselves. They buffer water quality degradation in their proximity, along the lines of 'dilution being the solution to pollution'. Similarly, high-quality waters also increase the resilience of watersheds to extreme weather events that are predicted because of climate change. For these and other reasons, Maryland's NPS Program is placing more emphasis on protection than has been the case traditionally.

### **2.D.4 Partnerships**

Because the 319 NPS Program generally depends on non-regulatory tools the development and maintenance of cooperative partnerships is an essential general strategy.

Maintaining partnerships takes time and the investment of time is often not fully appreciated by the authorities that fund the 319 NPS Program. However, implementation actions typically involve a variety of partners meeting regularly to work out many details of projects like those reflected in [319 Nonpoint Source Success Stories](#). In addition to the role of partnerships in specific restoration projects, they increase the efficiency of operations among many entities that have similar goals. Partnerships also accelerate technology transfer (knowledge and methods) among parties with similar responsibilities, for example among local governments.

It is also becoming increasingly clear that environmental restoration is going to necessitate behavior change down to the individual homeowner level. Recycling is a good example. Thirty years ago, recycling was a relatively foreign concept to many homeowners, whereas it is now widely accepted as a routine behavior. Urban stormwater management at the homeowner level is starting on a similar path; partnerships will be a key part of the education and outreach needed for homeowners throughout entire communities to adopt the use of rain barrels, rain gardens, pervious pavers, and more natural vegetation. A small amount of additional stormwater management for each house in a subdivision can add up to a large benefit.

Maryland's NPS Program is integrated with a wide array of federal, state, and local programs through partnership. Although many partnerships are referenced throughout this Plan, Section 6 on *Public Outreach, Education and Funding* provides a single location that identifies many of Maryland's key partnerships.

A key NPS Program partnership in Maryland involves close cooperation between two federally mandated NPS programs: the MDE-administered State NPS Program under Section 319 of the Clean Water Act and the Maryland DNR-administered Coastal Nonpoint Source Pollution Control Program under the Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA). These two agencies cooperate at many levels of NPS management as described in Chapter 4 section 4.J. The Coastal NPS Program focuses on issues in the coastal zone but much of the legal and regulatory framework (enforceable policies) that supports the program applies statewide.

### **2.D.5 Water Quality Trading**

Maryland's [Water Quality Trading](#) (WQT) program accelerates the restoration of the Chesapeake Bay and its local waters, while reducing cost of implementation efforts. By establishing a marketplace for reducing nutrients -- nitrogen, phosphorus, and sediment -- WQT can attract public and private partnerships among different sectors.

This statewide program allows entities who have gone above and beyond to have the ability to sell their water quality credits or allows entities who need to meet permit requirements to achieve short-term goals by purchasing credits from the market.

Maryland's WQT Program encourages participation from diverse stakeholders and sectors. In 2020, the program added Oyster Aquaculture as a certified Best Management Practice (BMP) for trading. There have already been several certified oyster credits and a few trades as well. The Trading program would like to encourage further participation in these types of credits and trades as they directly link to improvement of the Chesapeake Bay and local Maryland waters.

The trading program's multisectoral market allows farmers to connect with local communities and jurisdictions. MDE has been working with the Maryland Department of Agriculture to encourage farmers to participate in the trading program and hope to have agricultural trades soon. Maryland already has an extensive cover crop program, and the trading program will create more incentives to farmers.

Credits used in impaired waters must be generated in the impaired water or upstream of the credit user's discharge. The use of a credit may not cause or contribute to local water quality impairments or prevent the attainment of local water quality standards.

### **2.D.6 Other Strategic Frameworks**

Maryland's Nonpoint Source Management Program also strives to integrate with other relevant programs to restore and protect water quality as applicable. These programs are identified in Component #3 of EPA's Section 319 Program Guidance: [Key Components of an Effective State Nonpoint Source Management Program](#) (PDF - November 2012).

# Chapter 3 – Resource Assessment and Monitoring Programs

## 3.A Water Monitoring and Evaluation Strategy

The 2009 [State of Maryland's Comprehensive Water Monitoring Strategy](#) document provides a thorough overview of the strategy, objectives, programs, and evaluation methods that are components of Maryland's NPS management program. In addition to the detailed information in the monitoring strategy document, the following subsections highlight some monitoring and evaluation elements that help to measure long and short-term effectiveness of the State NPS management program. MDE will be evaluating and potentially updating the strategy as described in Chapter 8 of the monitoring strategy.

Long-term and short-term monitoring station data collected in Chesapeake Bay waters is used to assess effectiveness of NPS (and point source) implementation progress and effectiveness.

### 3.A.1 Biological Monitoring

#### Maryland Biological Stream Survey

Biological impairments were initially listed in Maryland's 2002 Integrated Report. Much of the data that identified these impairments were collected by the [Maryland Department of Natural Resources Maryland Biological Stream Survey \(MBSS\)](#) in monitoring cycles ("rounds") conducted during 1995-1997, 2000-2004, and 2007-2009. MBSS completed its Round 4 sampling in 2018. This effort, using statewide probability-based or random stratified stream sampling, is designed to provide an unbiased statistically rigorous representation of Maryland's non-tidal stream conditions. Round 5 of MBSS monitoring began in 2021 on a more detailed stream map (1:24,000) and plans to sample a site in each of Maryland's 84 primary sampling unit watersheds each year. Stream condition trends will be evaluated over a period of up to 20 years.

Field and laboratory services in the collection and analysis of benthic and fish biological samples are provided to 1) support implementation of Maryland's antidegradation program and 2) demonstrate localized long-term water quality improvement associated with nonpoint source related TMDL implementation projects.

For many construction and restoration projects, counties and state agencies now require watershed stream biota assessments using MBSS sampling and analysis protocols (e.g., see MS4 Jurisdictions below). To meet training needs, DNR's Monitoring and Non-Tidal Assessment program conducts annual [MBSS Training and Certification](#) programs for State and local agency staff, consultants, and individuals. Certifications offered include benthic macroinvertebrate sampling, benthic macroinvertebrate laboratory processing and subsampling, fish sampling, fish crew leader, and fish taxonomy.

#### Stream Waders

The volunteer citizen data generated through this [program](#) provide important expansion of temporal and spatial monitoring coverage beyond the capacity of government agencies. The additional data contribute to improved understanding of water quality trends in streams.

Volunteers recruited and trained by Maryland DNR monitor instream water quality and collect aquatic invertebrates. The quality-assured data collected by the volunteer Stream Waders supplement more in-depth monitoring by MBSS. Participants learn about the relationship between land use and stream quality, stream stewardship, and local action to improve watershed management.

### **3.A.2 Chesapeake Bay Monitoring Program**

Maryland conducts long term water quality monitoring in the Chesapeake Bay and the streams that flow to the bay. The State contributes the data collected to the federal Chesapeake Bay Program (CBP). The CBP is a cooperative effort involving Federal agencies, Washington DC and the States within the Chesapeake Bay drainage area that collects and shares water quality data. The Bay Program partners who contribute monitoring data and assessment helps them to detect changes and trends that may occur, to model past changes and future scenarios, and to better understand conditions so that informed management decisions can be made.

The CBP also conducts a Resource Lands Assessment, which is a multi-state regional perspective on the resource lands that remain in the Chesapeake Bay watershed. The Bay Program partners use the CBP GIS models and expert understanding to consider resource land values to help inform decisions, strategies and cooperation between jurisdictions and other cooperators like land trusts.

Additionally, the CBP maintains a Quality Assurance Program that helps to ensure that the information contributed by more than 40 agencies and research institutions are scientifically valid and comparable among the researchers across the drainage area. This consensus on quality assurance protocols allows Maryland and the other Bay Partners to generate data that is useful and understandable by all.

### **3.A.3 Shellfish Harvesting Waters and Beaches**

Monitoring in shellfish harvesting waters is conducted in accordance with the National Shellfish Sanitation Program (NSSP), which is a federal/state cooperative program recognized by the U. S. Food and Drug Administration (FDA) and the Interstate Shellfish Sanitation Conference (ISSC) for the sanitary control of shellfish produced and sold for human consumption. Sometimes unacceptable bacteria levels are found. In these cases, the monitoring is expanded to include targeted intensive monitoring called a Pollution Source Survey (Sanitary Survey) to locate sources of fecal pollution. When MDE's monitoring identifies a source of indicator bacteria, MDE contacts the local health department to request follow-up to correct the problem.

Beaches used for water contact recreation are subject to water quality monitoring in accordance with Code of Maryland Regulations (COMAR) 26.08.09. Local Health Departments are required to assess their beaches for potential sources of pollution at the beginning of the beach season using sanitary surveys. MDE works with local health departments to enhance beach water quality monitoring and maintain the beach water quality public notification process in Maryland. Water quality assessment begins prior to the beach season when local health departments collect water samples from beaches and perform beach Pollution Source Surveys to ensure that there are no nearby pollution sources that may adversely impact water quality. MDE provides local health departments with a recently developed technology-based data collection system to conduct beach Sanitary Surveys.

MDE uses NOAA National Weather Service precipitation reports to track the amount of precipitation affecting Conditional Shellfish Harvesting Areas and beaches. MDE has established that rainfall levels, greater than or equal to 1 inch in 24 hours, may result in an adverse pollution condition based on an investigation and extensive data analysis done for shellfish harvesting waters in 1987.



If greater than an inch of rain over 24 hours falls in a conditional shellfish harvesting area, that area is closed to harvesting for three days. This information is reported on a telephone hotline and posted on MDE's Conditional Shellfish Harvesting Map webpage. The objective of this effort is to help prevent food borne illness related to NPS pollutants.

During swimming beach season, a precipitation amount for each beach is posted daily on Maryland's Healthy Beaches website under the Current Conditions section. This website and many local health department beach websites discourage the public from bathing at beaches following a significant rain event because of the deterioration of water quality due to stormwater. The objective of this effort is to rapidly provide local health departments and bathers with information on potential precipitation-related water quality conditions at the beach. This is important because water quality tests used at beaches require a 24-hour analysis time before information can be distributed.

### **3.A.4 Fish Tissue Monitoring**

Fish tissue monitoring commonly measures mercury and PCBs that generally arise from NPS.

Fish Consumption Advisories. Evaluations are used to generate fish consumption advisories for the public via the Internet. (See Appendix Internet Sources) Nearly all the mercury (in the form of methylmercury) found in fish tissue ultimately derives from atmospheric deposition of various forms of mercury originating from combustion, especially electrical generating units. MDE and Maryland DNR co-fund annual Young-of-Year Fish Surveys that contribute to fish tissue analysis for mercury and PCBs. MDE and DNR share field work and laboratory expense, with the analytical work done at the University of Maryland (UMCES/HPL). UMCES and Smithsonian Environment Research Center staff are leads on reporting and documentation. Additionally, Maryland DNR works with NOAA and others to periodically model atmospheric deposition of many constituents, including mercury. The output of these models is used by MDE for TMDL development scenarios, such as baseline, post-implementation, and conditions under projected future federal regulations. This allows MDE to estimate the reduction needed and the effectiveness of programmatic measures, facilitating a reasonable assurance of implementation.

Polychlorinated Biphenyls (PCBs). To help identify water bodies that are impaired by PCBs, MDE's monitoring program includes targeted intensive studies. This monitoring uses caged Asiatic clams as indicator organisms because their filter-feeding leads to accumulation of PCBs in their tissues. Monitoring results support decisions on listing impairments, consumption advisories, and on additional monitoring in specific water bodies to progressively improve identification of PCB contamination sources. The end goal is to identify and mitigate PCB sources so that edible fish tissue will have lower PCB concentrations.

### **3.A.5 NPS Implementation Monitoring**

Monitoring funded by the 319(h) Grant is targeted to watersheds where significant 319-funded NPS implementation is occurring. This monitoring is designed to demonstrate observable improved water quality in response to implementation actions. Emphasis is on impaired water bodies with TMDLs and the support of local efforts to address implementation goals.

A notable example of this is the long-term monitoring of the Corsica River, which has been selected as one of EPA's 28 National Water Quality Monitoring Program (NWQMP) Projects. The Corsica River is a tributary to the Chester River on Maryland's Eastern Shore in Queen Anne's County and encompasses the town of Centreville. The objectives of the NWQMP are 1) to scientifically evaluate the effectiveness of watershed technologies designed to control nonpoint source pollution; and 2) to improve our understanding of nonpoint source pollution<sup>5</sup>. Through well-designed, long-term monitoring and statistical analyses, Maryland's NPS Program has been able to document observable reductions of nitrogen and phosphorus concentrations at a subwatershed scale.

Maryland was among the first States in 2012 to create a cooperative monitoring agreement with US Department of Agriculture Natural Resources Conservation Service (NRCS) to support the [NWQI](#) effort. The National Water Quality Initiative (NWQI), initiated jointly by the US Department of Agriculture Natural Resource Conservation Service (NRCS) and EPA in 2010, is a targeted watershed restoration initiative. Maryland currently supports water quality monitoring in two NWQI watersheds: Catoctin Creek in Frederick County, and Prettyboy Reservoir in Baltimore and Carroll Counties. MDE and NRCS are currently discussing the possibility of establishing a new agreement to perform monitoring in the Prettyboy Reservoir watershed to further assess the effectiveness of agricultural BMP implementation. The agencies are also discussing the potential for submitting a third watershed for NWQI status.

Monitoring and evaluation funded by NPS implementation partners (not 319-funded) has successfully measured environmental improvements generated by NPS implementation in half of success stories reported by Maryland to EPA's 319 program. This type of on-going monitoring is encouraged by MDE and is one of the criteria used to help select NPS implementation projects for 319(h) Grant funding.

### **3.A.6 Supporting TMDL Development**

Monitoring targeted to support TMDL development is an essential step in establishing load allocations for NPS pollutants. In watersheds with documented biological impairments, monitoring and evaluation aimed at biological stressor assessment is conducted to determine the relative contribution of the nonpoint sources present. The results are used to help draft TMDLs and to target NPS implementation.

### **3.B Water Quality Impairment and Improvement Tracking**

The sources of most water quality impairments in Maryland are nonpoint sources (NPS). The component of Maryland's NPS Management Program that tracks and reports on impairment and water quality improvement statewide is *Maryland's Integrated Report of Surface Water Quality* (Integrated Report). This program gathers and assesses water quality data on Maryland surface waters at least every other year. It also reports on documented impairments, completion of Total Maximum Daily Load documents approved to address impairments and change in impairments that may lead to their elimination.

Sources of surface water impairment, and risks and threats to water quality and aquatic habitat, are identified by [Biological Stressor Assessments](#) conducted by MDE.

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<sup>5</sup> D.E. Line, D.L. Osmond, and G.D. Jennings. 2000. *Section 319 NonpointSource National Monitoring Program Successes and Recommendations*. NCSU Water Quality Group, Biological and Agricultural Engineering Department, NC State University, Raleigh, North Carolina., [http://www.bae.ncsu.edu/programs/extension/wqg/319monitoring/doc/nmp\\_successes.pdf](http://www.bae.ncsu.edu/programs/extension/wqg/319monitoring/doc/nmp_successes.pdf)

General categories of impairment tracked in the Integrated Report include bacteria, ions (such as chlorides, sulfates), oxygen demand (BOD, COD, NBOD), nutrients (nitrogen and phosphorus), pH, sediments, toxic substances (such as metals, polychlorinated biphenyls (PCBs) and pesticides), temperature, trash, and other emerging contaminants.

The Integrated Report, and a [searchable database](#) that is the basis for the impairments listings in the report, is posted on the Internet.

Reduction of NPS impairment is also reported in success stories for local areas where sufficient documentation is available to measure changes before and after NPS implementation. Success story reporting has proven to be difficult because monitoring needed to accumulate enough data to support analysis is frequently nonexistent and/or expensive. Even so, success story reporting is an important component of Maryland's NPS Management Program.

### **3.C Processes and Priorities for Detailed Assessments**

#### **3.C.1 Overall Priorities**

Water body impairments listed in Maryland's Integrated Report are categorized according to the next steps that the State will take to address the impairment such as additional assessment to better determine the source of the impairment and/or drafting a TMDL. These categories are identified and described in the report's Part A Introduction. In general, individual circumstances that cause an area to be prioritized for detailed assessment include the factors listed below. Each of the categories of priorities above has its own internal processes and methods for prioritization:

- Human health protection requiring better understanding of water quality problems, particularly relating to shellfish or fish consumption, bathing beaches and episodic problems like fish kills and significant algae blooms.
- The Integrated Report listing indicates that insufficient data is available.
- Biological impairment needs additional assessment to support the Integrated Report.
- Modeling to develop a TMDL requires additional data.
- Watershed plan implementation outcome assessment, particularly if a measurable result is anticipated.
- Watershed planning needs, such as clarifying impairment spatial or temporal distribution.
- Special projects aimed at program effectiveness enhancement, innovation, and efficiency.
- Emerging water quality pollutants of concern such as chlorides, pesticides, and other pollutants that may be having significant effects on aquatic life and/or human health.

#### **3.C.2 Biological Impairments**

Biological impairments were initially listed in Maryland's 2002 Integrated Report. Much of the monitoring analysis that identified these impairments was collected by the Maryland Department of Natural Resources Maryland Biological Stream Survey (MBSS) in monitoring cycles ("rounds") conducted during 1995-1997, 2000-2004, and 2007-2009. A fourth sampling round was initiated in 2014 and completed in 2018. The primary goal of the Round 4 MBSS monitoring effort was to sample sites visited in Round 1 (1995-1997) to assess changes/trends over the last 20-year period. These MBSS efforts focus on statewide probability based or random stratified stream sampling efforts designed to provide an unbiased statistically rigorous representation of Maryland's non-tidal stream conditions. Round 5 of MBSS monitoring began in 2021 on a more detailed stream map (1:24,000) and plans to sample a site in each of Maryland's 84 primary sampling unit watersheds each year.

For many construction/restoration projects, some counties and state agencies now require watershed stream biota assessments using Maryland Biological Stream Survey (MBSS) sampling and analysis protocols. To meet the need for individuals trained and qualified in these methods, DNR's Monitoring and Non-Tidal Assessment program conducts annual MBSS Training and Certification programs for State and local agency staff, consultants, and individuals on MBSS stream sampling/analysis protocols. Certifications offered include benthic macroinvertebrate sampling, benthic macroinvertebrate laboratory processing and subsampling, fish sampling, fish crew leader, and fish taxonomy (<https://dnr.maryland.gov/streams/Pages/mbsstraining.aspx>).

### **3.C.3 High Quality Waters**

Monitoring and assessment of high-quality waters (Tier II) is prioritized in three ways:

- If State review of a proposed project finds that a significant potential for degradation may arise, then the stream area is prioritized for focused monitoring/assessment.
- Existing Tier II waters are considered for ongoing monitoring to gauge their continuing health conditions.
- Potential Tier II candidates are identified for monitoring/assessment to quantify existing conditions.

### **3.D Water Quality Pollutant Load Reduction Tracking**

Every year, the State of Maryland collects reports from local governments and State agencies on NPS BMP implementation progress. The reports are gathered by MDE, and the collected data is submitted to the EPA Chesapeake Bay Program. Summary information on the numbers of NPS BMPs implemented and estimated pollutant load reductions for nitrogen and phosphorus will be presented in an appendix of the *Maryland 319 Nonpoint Source Program Annual Report*. The EPA Chesapeake Bay Program gathers similar NPS BMP implementation progress reporting from all the states in the Chesapeake Bay drainage and uses it for new runs of the Chesapeake Bay Model. Summary results of the most recent model run, are posted on the Internet. (The data file posted for download shows reported and projected pollutant loads for nitrogen, phosphorus, and sediment for each of the Chesapeake Bay States including Maryland.) (See Appendix Internet Sources)

Additionally, local watershed plans for that are accepted by EPA as eligible for 319(h) Grant implementation funding must meet EPA's expectation that NPS implementation progress will be reported at least annually. Each of these watersheds is identified in the *Maryland 319 Nonpoint Source Program Annual Report* and progress is reported each year in that report.

### **3.E Atmospheric Deposition**

Air pollution is an important environmental concern for both Maryland water quality and for the Chesapeake Bay. Pollutants in the air can move to the earth's surface, a process collectively called atmospheric deposition, in precipitation (rain, snow, fog), particles, aerosols, and gases. Air pollutants reaching the earth through precipitation or as dry deposition originate from various sources and can be harmful to the environment and public health.

### 3.E.1 Assessment of Atmospheric Deposition

Forms of air pollution that have significant impacts on Maryland water quality are most associated with burning of fuels for generating electricity, industrial operations, or operating motors for transportation or other purposes. Exhaust and stack emissions to the air from industries and electric utilities as well as from cars, trucks, boats, trains, and airplanes are sources of air pollution that contribute to degradation of Maryland streams, rivers, lakes, and bays. Air pollution that does not fall directly on open water can be transported from land to streams by storm water runoff or through groundwater flow. Some air pollution is carried by wind over great distances before it reaches Maryland waterways.

While there are many air pollutants that can affect water quality, there are three that have the most significant water quality effects in Maryland. All three of these air pollutants originate from sources both inside and outside of the State:

- Nitrogen oxides (NO<sub>x</sub>) are mostly from burning coal (electric utilities) and petroleum (transportation sources). The Chesapeake Bay's "airshed" for NO<sub>x</sub> extends from Tennessee to Ontario and encompasses an area over 5.5 times larger than the Bay's watershed. Atmospheric deposition of NO<sub>x</sub> contributes more than one quarter of the excessive nitrogen levels and eutrophication in the Chesapeake Bay. This eutrophication underlies reduced dissolved oxygen levels, nuisance algal blooms, dieback of underwater plants (due to reduced light penetration), and reduced populations of fish and shellfish. TMDLs for large water bodies, like the Chesapeake Bay, directly address atmospheric deposition of NO<sub>x</sub>. In general, NO<sub>x</sub> from utility emissions affecting Maryland frequently arise from states west of the Chesapeake watershed. Mobile source emissions concentrate along the East Coast, particularly in the population corridor between Washington, D.C. and Baltimore. As expected, utility sources account for much of the nitrogen deposition in the western portion of the Chesapeake watershed. Alternately, mobile sources account for most of the nitrogen deposition to the Chesapeake Bay, lower portions of western shore tributaries, and the Delmarva Peninsula.
- Sulfur dioxide (SO<sub>2</sub>) emissions are mostly from burning coal (electric utilities). Atmospheric deposition of SO<sub>2</sub> causes increasing acidity in streams (in the form of sulfuric acid). Streams in Maryland that are most sensitive to increasing acidity are concentrated in the southern Coastal Plain (74% of the streams in the region) and the Appalachian Plateau (52% of the streams in the region). Most SO<sub>2</sub> air pollution in Maryland originates outside of the State.
- Mercury emissions are mostly from burning coal (electric utilities) but also from cement kilns and incinerators. Atmospheric deposition of mercury is the primary source of this pollutant in water bodies. Once in the aquatic environment, mercury accumulates in the food chain and tends to concentrate in fish that may be consumed by people. Water quality impairments and Fish Consumption Advisories associated with mercury are frequently believed to be results of atmospheric deposition.

### 3.E.2 Monitoring Associated with Atmospheric Deposition

In Maryland, MDE (Air and Radiation Management Administration) operates 22 air monitoring stations and two haze cameras. As required by the Clean Air Act, MDE's annual Ambient Air Monitoring Network Plan details the network's operation. In summary, the air monitoring stations measure ground-level concentrations of pollutants subject to national standards and air toxics. They also take meteorological and other research-oriented measurements. Although monitoring takes place statewide, most of the stations are concentrated in the urban/industrial areas that have the highest population and greater numbers of pollutant sources. One of Maryland's air monitoring stations near Frostburg, Maryland is located at 2,563 feet elevation to help measure ambient air quality and interstate pollutant transport. In January 2010, EPA strengthened the health-based National Ambient Air Quality Standard for nitrogen dioxide (NO<sub>2</sub>) by setting a new 1-hour 100 ppb standard. To comply with associated new requirements, MDE installed a new near-road NO<sub>2</sub> monitor.

### 3.E.3 Atmospheric Acid Deposition Relation to Biological Impairment

Maryland's biological stressor identification program has found that atmospheric deposition of acidity is the likely source of low pH contributing to biological impairment in some watersheds with naturally low acid neutralizing capacity. In the watersheds listed below, biological impairments associated at least in part with low pH have been identified where the only known sources of acidity are natural conditions and atmospheric deposition.

- Mattawoman Creek watershed exhibits inherently poor buffering capacity and natural sources of organic acidity. Nontidal streams here are extremely susceptible to acidification from atmospheric deposition.
- Little Tonoloway Creek watershed has localized biological impairment related to pH in areas where the geology has little buffering capacity partly because of local siliciclastic bedrock such as sandstone.
- Licking Creek watershed includes areas with very low buffering capacity associated with siliciclastic bedrock types (such as sandstone). Atmospheric deposition is the probable source of acidity that exceeds the natural acid neutralizing capacity. All impaired stream areas in this watershed occur on one unnamed tributary draining an area with sandstone geology that is largely undeveloped and nearly 100% forested. Furthermore, this area is largely public land that includes the Indian Spring Wildlife Management Area.
- St. Mary's River watershed has geology with inherently poor buffering capacity as well as natural sources of organic acidity. The nontidal streams in the watershed are extremely susceptible to acidification from atmospheric deposition.

MDE anticipates that the pH-related biological impairments in these watersheds will be reduced or eliminated because of continuing implementation of clean air regulations and more stringent emission reduction standards under the Federal Clean Air Act Amendments of 1990 and the Maryland Healthy Air Act.

# Chapter 4 – Maryland NPS Goal Initiatives

## 4.A Introduction

NPS programs and initiatives that apply across the State of Maryland, or in at least two of Maryland’s three major drainage areas, are considered statewide programs.

## 4.B Institutional Relationships

In Maryland, three State agencies have key institutional lead roles for the State NPS Management Program (See Appendix Internet Sources):

- Maryland Department of Agriculture (MDA):
  - Agriculture, fertilizer management, pesticides regulatory & non regulatory program, technical assistance (see Appendix Internet Sources)
  - State financial assistance for agricultural BMP implementation
- Maryland Department of Natural Resources (MDNR):
  - Ambient, biological, and Chesapeake Bay monitoring and analysis
  - Coastal nonpoint source program
  - Forest management
  - State financial assistance for urban NPS implementation
- Maryland Department of the Environment (MDE):
  - 319(h) Grant management with associated Federal financial NPS implementation funding
  - Regulatory controls for sediment & erosion control, waterway construction, stormwater management, concentrated animal feeding operations, discharge permits, drinking water protection, wetland permits (tidal and nontidal), withdrawals from groundwater and surface water
  - Nonregulatory programs for NPS watershed planning
  - NPS implementation tracking

Additionally, State, and local health and environmental agencies are responsible for essential components of the State NPS management program. The Maryland Dept. of Health (MDH) is the primary State agency responsible for managing public health programs and services in Maryland. MDH’s functions are related to essential elements of the state NPS management program, such as water quality protection, fish/shellfish consumption advisories, and shellfish. MDH and MDE both work closely with County agencies, some of which have delegated authority, responsible for public health and environmental programs such as those associated with bathing beaches, private drinking water wells, and onsite sewage disposal systems. MDH, MDE, and collective representatives of the local agencies maintain a memorandum of understanding that identifies the many interrelated responsibilities, working relationships and cooperative arrangements that affect the agencies. For example, within the memorandum, county health departments monitor water quality at bathing beaches, MDE conducts a sanitary survey if certain chronic problems are found, and samples from both sources undergo DHMH lab analysis for fecal bacteria indicators.

These lead State and local agencies work together and cooperate at many levels to coordinate activities, particularly regarding Chesapeake Bay programs. Additionally, they have close working relationships with other State and regional entities to facilitate NPS management within certain categories or geographic areas:

- Baltimore Regional Metropolitan Council: Baltimore reservoir watersheds.

- Interstate Commission on the Potomac River: Potomac River watershed, technical expertise, interstate cooperation.
- Maryland Dept. of Transportation State Highway Administration: roadway NPS
- Maryland Environmental Service: technical expertise.
- Susquehanna River Basin Commission: technical expertise, interstate cooperation.
- Washington Suburban Sanitary Commission: Washington DC reservoir watersheds.
- Washington Metropolitan Council of Governments: Anacostia River watershed.

Lastly, the Maryland Department of Planning (MDP) assists in preventing future NPS through policy and program implementation related to smart growth and local comprehensive planning. Maryland's smart growth policies and programs work to ensure that a higher percentage of future population and job growth in Maryland (about 1 million new residents and 600,000 new jobs by 2035) occur in higher-density areas with public sewer. By achieving higher-density development and avoiding new septic tank installation, smart growth results in lower per household NPS loads than development outside of Maryland's growth areas. In addition, MDP provides guidance to more than 100 counties and municipalities with land use planning responsibility to ensure that state requirements for comprehensive plans are implemented. State requirements for comprehensive plans include the development of a Water Resources Element, which can be used to ensure that proposed land use plans and amendments have the least NPS impact possible. (See Appendix Internet Sources under MDP and Plan Maryland)

## 4.C Program Integration

### 4.C.1 Integration Among State Programs

In addition to the integration among agencies in the Maryland that have direct responsibility for NPS management programs, there are several other programs that are closely related to NPS control and watershed management that are also integrated with the overall functioning of Maryland's NPS Management Program:

- **303(d) Program** – EPA has led the development of a 303(d) Program Vision, which is a strategic plan for carrying out water quality-based management under the federal Clean Water Act. In addition to redirecting the focus of programs responsible for developing Total Maximum Daily Loads, this initiative promotes the integration of the Clean Water Act Section 303(d) and 319 Programs. (See Chapter 2)
- **Abandoned Mine Lands Division (AML D)**– In 2009 MDE's Nonpoint Source helped the AMLD in MDE's Frostburg office to create watershed restoration plans to address acidic, metals laden waters from historic mines in the region.
- **Animal Feeding Operations Program** – In 2009-2010, key components of Maryland's regulatory program were put in place and hundreds of operations required review, inspection and potentially permits. To help expedite this work, MDE's NPS Management Program contributed a technical staff position to the new program. MDE's AFO Program works closely with MDA throughout the registration process for AFOs and during compliance activities, in which both agencies have individual responsibilities. MDE also works with the US Department of Agriculture's Natural Resources Conservation Service (NRCS) and the Soil Conservation Districts. The AFO Program has much interaction with non-governmental organizations including the Maryland Farm Bureau and the University of Maryland Extension. In 2020, MDE developed a new general permit and is issuing revised permits for operations required to have them. (See Appendix Internet Sources)



- **Antidegradation Program** – Protection of high-quality waters is recognized as a vital function of the State NPS Program. (See Antidegradation and Healthy Waters).
- **Clean Lakes Program** – In Maryland, Federal CWA requirements for Clean Lakes programs are integrated into the State’s water quality management programs. For the public water supply reservoirs, routine monitoring is conducted to address Safe Drinking Water Act requirements. Additionally, public water supply reservoirs serving Baltimore and Washington DC have long-standing coordinating bodies that include all State and local agencies with NPS management responsibilities and other key stakeholders to ensure that all needs are addressed. Special projects focusing on lakes are conducted during TMDL development, watershed planning/management (Deep Creek Lake, Urieville Lake, and others) and in support of the National Lakes Assessment.
- **Coastal Protection Programs** (see coastal NPS management program)
- **Construction** – Maryland’s sediment control regulatory program that began in 1970 requires construction activities to control runoff and sediment movement. MDE administers the State program and sometimes delegates local operation of the program to a local government agency, including permitting and inspections. MDE periodically reviews the locally run programs.
- **Marinas** – A suite of regulatory requirements and nonregulatory incentives in Maryland are integrated to address marinas, including NPS associated with them. Critical Area requirements and MDE regulatory programs to protect wetlands, to meet stormwater management, and to control sediment, erosion and oil, all dovetail to set minimum requirements for marina development, expansion, and operation. Additionally, the [Clean Marinas Program](#) and Boat Sewage Pumpout Grant Program in MDNR are offered to encourage and support marina operators by promoting voluntary adoption of good stewardship practices. (See Marinas Program)
- **Mines that are inactive or abandoned** – MDE administers the State program to meet requirements of the Federal Surface Mining Control and Reclamation Act of 1977. Maryland’s permits for active mines require reclamation of coal and noncoal mines. For abandoned coal mines, MDE’s program integrates Federal and State funding to complete land reclamation and acid mine drainage mitigation projects on impacted lands. (See Mining Programs)
- **Monitoring programs** – The two lead State agencies responsible for ambient monitoring, MDE and MDNR, coordinate their programs and operations to ensure that this work is accomplished effectively and efficiently. Additionally, the Chesapeake Bay Program and the Maryland Coastal Bays Program both provide interagency forums that contribute to coordination among Federal, State, and local agencies. (See Chapter 3)
- **Source Water Protection** – MDE administers the State program, cooperates with EPA to meet Safe Drinking Water Act programmatic requirements, and works closely with local government and private operators to effectively meet Act requirements. For wellhead protection, MDE partners with well owners to develop/update protection plans. MDE’s Water Supply Information and Permitting System (WSIPS), which has been in use since April 2014, will enable online permit applications and online submittal of compliance data and documentation. (See Groundwater Management Programs)

- **Urban Runoff** – Maryland’s “Stormwater Management Act” became effective in late 2007. MDE is responsible for implementing the Act, improving stormwater management in Maryland, and issuing permits to local governments. Environmental Site Design requirements aimed at avoiding increased stormwater impacts apply to new development and significant redevelopment. Maryland maintains the [StormwaterPrint Internet portal](#) to distribute information. Beginning in 2013, Maryland law required that the large local jurisdictions permitted for stormwater discharge (Phase I MS4 permits) adopt a funding mechanism to pay for local programs such as construction and maintenance of stormwater facilities. Although some communities continue to take advantage of Stormwater Maintenance Fee Programs, the law was repealed in 2020 and several large jurisdictions have chosen not to take advantage due to political reasons.
- **Watershed planning programs** – In Maryland, MDE cooperated closely with EPA in response to the Chesapeake Bay TMDL to develop the State’s Watershed Implementation Plan (WIP) and cooperatively assisted local governments in developing their own WIP to meet the TMDL. Most other watershed planning in Maryland is generally led by local government programs. MDNR offers technical and financial assistance to local government and nonprofit organizations in watershed based NPS planning thru the Watershed Assistance Collaborative. For jurisdictions seeking eligibility for 319(h) Grant implementation funding, MDE offers technical and/or financial assistance.
- **Wetlands Protection Programs including CWA Section 404** – MDE regulates activities tidal and nontidal wetlands, waterways, and their 100-year floodplain. Many provisions are consistent with or exceed federal Clean Water Act requirements. As a result of Maryland’s requirements and cooperative processing and review of applications, the U.S. Army Corps of Engineers has issued a State Programmatic General Permit for numerous minor activities, provided that MDE issues an authorization. Maryland has a statewide wetland conservation plan and a mandate to achieve a no net loss of wetland acreage and function, and to strive for an overall resource gain. MDE encourages sound wetland creation, restoration, and enhancement projects, and the Wetlands and Waterways Program reviews and authorizes many projects identified in MS4 permits. Additional coordination occurs within MDE to review guidance related to nonpoint source management.

#### 4.C.2 Integration with Federal Programs

Additionally, Maryland NPS management agencies coordinate with Federal programs:

- Land Management
  - **U.S. Forest Service** – Maryland DNR and local agencies and academic and research institutions are collaborating with the USDA Forest Service Northern Research Station on the Baltimore Cooperating Experimental Forest, which is the focus of the Baltimore Ecosystem Study. This long-term study focusing partially urbanized areas, particularly in the Gwynns Falls Watershed, has potential to explore the relationships between long term landscape management and NPS water quality outcomes.
  - **National Park Service** – In the Coastal Bays (Assateague National Sea Shore) and in the Chesapeake Bay (Blackwater National Wildlife Refuge, Antietam National Battlefield, and others), the National Park Service is an important partner in protecting water quality and managing shore erosion. Additionally, the National Park Service is one of the Federal agencies cooperating with Maryland thru the Chesapeake Bay Program focusing on water access and recreation.
  - **Dept. of the Interior** – In Western Maryland, our Abandoned Mine Lands Division manages funds from the Abandoned Mine Land Reclamation Program. They continue to mitigate pollution from several sites through Successive Alkalinity Producing Systems (SAPS), Limestone leach beds, and limestone stream dosers.

- Water Management
  - **Corps of Engineers** – Maryland State and county agencies cooperate with the Corps’ missions to conduct environmental cleanup, restore ecosystems, and participate in the Chesapeake Bay Program. This cooperation is particularly beneficial in the context of projects protecting and restoring areas potentially affected by NPS such as ecosystem restoration, floodplain management, shoreline erosion, watershed assessment & planning and beneficial use of dredged material.
  - **Federal Energy Regulatory Commission (FERC)** – Maryland State agencies are working with FERC and others to consider effective management approaches regarding sediment and nutrients that periodically collects behind dams, such as in the Susquehanna River upstream of the Conowingo Dam.
  - **National Estuary Program** – The Maryland Coastal Bays are part of this EPA program. Under the Federal CWA Section 320, a Comprehensive Conservation and Management Plan for the Maryland Coastal Bays was adopted in 1999 and is currently being revised. Additionally, State agencies and nonprofit organizations have cooperated with the program to implement numerous local protection and restoration projects including Atlantic white cedar restoration, beach restoration, conservation easements, forest and forested wetlands restoration, and marsh/shoreline restoration. (See Chapter 3 and Appendix Internet Sources)

#### 4.D Management Measures

Maryland actively cooperates with the EPA Chesapeake Bay Program and the other states in the Chesapeake Bay drainage to review potential management measures and best management practices (BMPs) and to determine which are most effective in achieving and maintaining water quality standards potentially affected by NPS nutrients and sediment. Consistent with the consensus developed by EPA and the Chesapeake Bay states, Maryland tracks and reports implementation progress for 76 approved BMP types related to our Chesapeake Bay annual progress assessment, these BMPs are listed in the *Maryland 319 Nonpoint Source Program 2020 Annual Report*, Appendix B (see Appendix Internet Sources). The implementation progress reporting data is tracked by local jurisdictions and State agencies, gathered by MDE where quality assurance and assembly occur before it is reported to EPA.

Management measures that are anticipated to contribute significantly to attaining goals in a watershed-based plan are identified in the plan as a prerequisite for becoming eligible for 319(h) Grant funding for implementation. In general, nutrient and sediment watershed-level management measures are generally a subset of the statewide consensus list. For other 319- eligible plans that are designed to address impairments like bacteria or pH, the watershed plan list of management measures is consistent with EPA expectations. These plans are listed in the MDE’s 319 NPS Annual Report along with Internet links.

The backbone of the program is the application of management measurements, developed by EPA and NOAA. Management measures are defined as economically achievable measures to control the addition of nonpoint pollution to coastal waters. However, most of these measures are applied statewide. These measures reflect the greatest degree of pollution reduction achievable using the best available nonpoint pollution control practices, technologies, processes, siting criteria, operating methods, or other alternatives. Management measures focus on seven major categories of nonpoint source pollution:

- Acid Mine Drainage
- Agricultural runoff
- Urban runoff
- Silvicultural (forestry) runoff

- Marinas and recreational boating
- Stream channelization, channel modification, dams, streambank & shoreline erosion
- Salt Management.

The State has also developed management measures for wetlands, riparian areas, and vegetated treatment systems that apply generally to various categories of nonpoint source pollution.

The federal program requires that each state program have enforceable policies and mechanisms for most of the management measures, this ensures the authority to implement the Best Management Practices (BMPs). The state is also required to track the program's implementation and effectiveness.

The following list identifies the NPS pollution management measures that the state is required to implement on all applicable land uses. Each management measure has associated enforceable policies and mechanisms (or backup authority) to insure implementation. If these original management measures fail to produce the necessary water quality improvements, the state then must implement additional management measures to address remaining water quality problems. For a complete definition of each of the management measures please see the Management Measures descriptions that follow.

#### **ACID MINE DRAINAGE**

1. Limestone Leach Beds
2. Prevention/Control Technologies
3. Limestone Sand Dumps
4. Successive Alkalinity Producing Systems
5. Active and Passive Alkalinity Dosers

#### **AGRICULTURE**

6. Erosion and Sediment Control
7. Confined Animal Facility (Large Units)
8. Confined Animal Facility (Small Units)
9. Nutrient Management
10. Pesticide Management
11. Grazing Management
12. Irrigation Water Management

#### **FORESTRY**

13. Forestry Preharvest Planning
14. Streamside Management Areas
15. Road Construction / Reconstruction
16. Road Management
17. Timber Harvesting
18. Site Preparation and Forest Regeneration
19. Fire Management
20. Revegetation of Disturbed Areas
21. Forest Chemical Management
22. Wetlands Forest Management

#### **URBAN**

##### *Urban Runoff in Developing Areas*

23. New Development
24. Watershed Protection
25. Site Development

*Construction Activities*

- 26. Construction Erosion and Sediment Control
- 27. Construction Site Chemical Control

*Existing Development*

- 28. Existing Development

*Onsite Disposal systems*

- 29. New Onsite Disposal System
- 30. Operating Onsite Disposal Systems

*Pollution Prevention*

- 31. Pollution Prevention

*Roads, Highways and Bridges*

- 32. Planning, Siting and Developing Roads and Highways
- 33. Bridges
- 34. Construction Projects
- 35. Construction Site Chemical Control
- 36. Operation and Maintenance
- 37. Road, Highway, and Bridge Runoff Systems

**MARINAS**

*Siting and Design*

- 38. Marina Flushing
- 39. Water Quality Assessment
- 40. Habitat Assessment
- 41. Shoreline Stabilization
- 42. Stormwater Runoff
- 43. Fuel Station Design
- 44. Sewage Facility

*Marina and Boat Operation and Maintenance*

- 45. Soil Waste Management
- 46. Fish Waste Management
- 47. Liquid Material Management
- 48. Petroleum Control
- 49. Boat Cleaning
- 50. Public Education
- 51. Sewage Facilities Maintenance
- 52. Boat Operation

**HYDROMODIFICATION**

*Channelization and Channel Modification*

- 53. Physical and Chemical Characteristics of Surface Waters
- 54. Instream and Riparian Habitat Restoration

*Dams and Levees*

- 55. Erosion and Sediment Control
- 56. Chemical and Pollutant Control
- 57. Protection of Surface Water and Instream and Riparian Habitat

*Shoreline Erosion*

- 58. Streambank and Shoreline Erosion

*Wetlands*

- 59. Protection of Wetlands and Riparian Areas
- 60. Restoration of Wetlands and Riparian Areas

61. Vegetated Treatment Systems

#### **SALT MANAGEMENT**

62. Smart Salt Training

63. Equipment Upgrades to Brine Application

### **4.E Approaches to Solving NPS Problems**

To solve NPS water quality problems in the most feasible and efficient ways available, Maryland's NPS Management Program works diverse related programs and with partners and stakeholders to select and apply the best tool for the job. Several examples summarized below to illustrate the range of approaches that are being used.

#### **4.E.1 Watershed and Water Quality-based Approaches to Meet Standards Directly**

In Western Maryland, in-stream water quality is impaired by low pH caused acid mine drainage from abandoned coal mines. To meet water quality standards, MDE's Abandoned Mine Land Division evaluates conditions, devises solutions, and implements mitigation practices stream-by stream using a watershed-scale approach. Success has been demonstrated in numerous areas of the North Branch Potomac River. The most recent example is the mainstem of Aaron Run, which is a direct tributary to Savage River and several small tributaries of the Casselman River. To meet the goal of attaining the State water quality standard for pH, planning encompassed the watershed and implementation measures were implemented to meet and maintain the pH standard all along the mainstem. A parallel approach is currently being implemented in the Upper Jennings Run watershed where a watershed plan for pH mitigation has been tentatively accepted by EPA but is being updated to address sediment loads. Updates to the Upper Jennings Run Plan are expected to be submitted to EPA in 2022 and accepted in 2023.

A strategy to maintain water quality improvements and to protect aquatic species from abandoned mine runoff that is currently being treated by older BMPs in Cherry Creek is being developed through Maryland's first anti-degradation watershed plan. The draft plan proposes maintaining WQ improvements seen in this watershed through the replacement and improvement of existing BMPs treating acid mine drainage pollution.

In other parts of the State, local governments have volunteered to plan and implement NPS best management practices to reduce NPS nitrogen, phosphorus, and sediment. These jurisdictions crafted watershed-based plans to address local water quality restoration goals in ways that will also benefit the Chesapeake Bay. A list of these plans and summaries of progress toward meeting their goals is presented annually in Maryland's NPS Program Annual Report.

#### **4.E.2 Iterative Technology-Based Approaches**

An example of a technology-based approach employed in Maryland to address NPS water quality problems is the State program to upgrade septic systems with Best Available Technology (BAT) on-site sewage disposal systems that reduce nitrogen discharged to groundwater. This program is funded by the State's Bay Restoration Fund to provide grants to property owners who volunteer for the upgrade. MDE's list of BAT systems that are eligible for grant reimbursement is updated as new BAT systems are certified and under-performing systems are dropped from the list. Funding priorities are targeted to areas that are likely to provide the earliest benefit the Chesapeake Bay.

There are approximately 420,000 septic systems in Maryland. Of these, 52,000 systems are located within the “Critical Area,” land within 1,000 feet of tidal waters. A conventional septic system does not remove much nitrogen, instead delivering about 23.2 pounds of nitrogen per year to the groundwater. An upgraded, nitrogen-removing Best Available Technology (BAT) unit reduces a system’s nitrogen load in half.

In accordance with Maryland State Law, the Bay Restoration Fund prioritizes upgrades as follows:

1. Failing OSDS in the Critical Areas
2. Failing OSDS outside the Critical Areas
3. Non-conforming OSDS in the Critical Areas
4. Non-conforming OSDS outside the Critical Areas
5. Other OSDS in the Critical Areas, including new construction
6. Other OSDS outside the Critical Areas, including new construction

On November 24, 2016, Maryland Department of the Environment finalized a regulatory action which reforms the universal requirement that Best Available Technology for Removal of Nitrogen (BAT) septic systems be installed outside the Chesapeake Bay and Atlantic Coastal Bays Critical Area (Critical Area) for all new construction. Instead, the [final regulation](#) would allow the installation of conventional septic systems outside of the Critical Area. Under the regulation, BAT is still required for large septic systems with design flow of 5,000 gallons per day or greater. Additionally, local governments would not be preempted from requiring a BAT system outside the Critical Area to protect public health or waters of the State.

As of 2021, the Maryland Department of the Environment has upgraded over 12,000 conventional septic systems by either hooking the dwelling to a public sewer connection or installing a nitrogen removing BAT through the Bay Restoration Fund (BRF) Onsite Sewer Disposal System (OSDS) grant program and regulatory requirements. This program will continue to prioritize systems in the Critical area.

### **Bermed Infiltration Ponds (BIPs)**

Bermed infiltration ponds have been utilized since the late 1980’s in specific Eastern Shore Counties of Maryland. BIPs were permitted as a component of on-site sewage disposal systems (OSDS), also known as septic systems, in marginal landscapes that could not meet the normal design requirements. A BIP is part of a conventional system in which the treated sewage effluent is discharged to a pond structure. Soils excavated to create the pond are piled above the surrounding ground to create an enclosed berm or dam like structure around the pond.

Household wastewater enters a septic tank, where it settles into three layers; solids at the bottom, liquid in the middle, and fats, oils and greases which rise to the top. Septic tank liquid effluent is then conveyed and discharged near the bottom of the pond for additional treatment and final disposal. Biological organisms in the pond, along with dilution, provide treatment of the wastewater, after which the water moves into surficial groundwater beneath/surrounding the pond or evaporates.

To protect public health and the environment, MDE is taking a series of steps relating to bermed infiltration ponds, or BIPs. These steps include requiring that requests for new connections or expansion of dwellings to existing BIPs be considered on a case-by-case basis. Starting in August 2021, new construction of BIPs will be suspended for 15 months as MDE explores viable and sustainable solutions for communities served by these ponds. During this period, MDE will perform an in-depth assessment under an [action plan](#) developed by the department. MDE will coordinate with local health directors to discuss strategies to support homeowners and communities moving forward.

#### **4.F Resources Available**

Maryland's NPS management programs rely on diverse resources to work toward achieving the programs' goals and objectives. An important element of the Federal Clean Water Act's 1987 amendments was creation of the Federal nonpoint source grant project under Section 319(h). Maryland uses 319(h) Grant funds to help pay for selected portions of the State NPS Management Program and to provide financial assistance to local jurisdictions to help manage NPS issues and to help pay for NPS implementation. To encourage NPS implementation, Maryland periodically issues requests for proposals (RFP) for grant funding assistance.

An additional measure the resources invested in NPS management and implementation is reported at least annually to EPA. This reporting is submitted to meet a requirement in the Federal Clean Water Act's 1987 amendments called maintenance of effort. To ensure that States use Federal 319(h) Grant funds to augment existing State resources rather than displace them, the dollar value of resource expenditure by each state prior to the federal grant was determined and set as a minimum for future year expenditure. Each year the states verify that their minimum resource expenditure threshold is surpassed as a prerequisite for receiving the next 319(h) Grant. Maryland's report of resource expenditure in state fiscal year 2020 was over \$177M, which is more than 22 times the required threshold. A summary of this information is in Maryland's Annual Report (see Appendix Internet Sources). This resource expenditure report is limited to selected state agency programs, which represents a fraction of all the resources that are available and/or expended. Resources associated with local government and private entity programs and implementation that contribute to NPS management are not tracked for maintenance of effort reporting.

#### **4.G Agricultural Programs**

Maryland integrates delivery of many agricultural programs thru local Soil Conservation Districts (SCDs). Thru the SCDs, personnel and operating support from Maryland Department of Agriculture, USDA Natural Resources Conservation Service (NRCS) and county governments are all provided to farmers. Farmers have a one-stop shop for learning and applying for programs and financial assistance and securing technical assistance to evaluate resource concerns on their farmland and develop best management practices (BMPs) to address potential water quality problems. All local SCD offices offer financial and technical assistance funded by Maryland Department of Agriculture and the Federal NRCS programs. Some local SCD offices also have locally funded support personnel. Examples of programs delivered through soil conservation districts include the USDA NRCS Environmental Quality Incentive Program (EQIP) and Conservation Reserve Enhancement Program (CREP), Maryland Agricultural Water Quality Cost Share Program (MACS) and Maryland Cover Crop Program and local sediment and erosion control programs and stormwater protection programs.



SCDs have sponsored forums for assessing agricultural resource concerns and necessary measures or BMPs to include in Maryland's Watershed Implementation Plan to address TMDLs. Stakeholders include representatives from county resource agencies, USDA: NRCS and FSA, farm bureau, Maryland Department of Agriculture, University of Maryland Extension, watershed groups, farmers, and others. Policy and program development are coordinated through the State Soil Conservation Committee. Established by law, this committee is comprised of state and federal agricultural and natural resource agencies as well as regional representatives of soil conservation districts. The committee is a forum for collaborative efforts directed at water quality improvement and other resource concerns on agricultural land.

#### **4.G.1 Agriculture Phosphorus Initiative**

Maryland's [Agriculture Phosphorus Initiative](#) enacted an immediate ban of additional phosphorus on soils high in phosphorus and requires comprehensive information on soil phosphorus conditions to be reported every six years to monitor trends. Since February 2019, the department has compiled soil phosphorus data for 1,120,668 acres of regulated farms. An updated economic study is being completed consistent with regulations. The report will provide further insights about potential resource needs as the tool is fully implemented.

#### **4.G.2 Lawn Fertilizer Law**

Maryland's [lawn fertilizer law](#) took effect October 1, 2013. The statewide nutrient management requirements ensure wise use of fertilizer and reduce NPS loads of nitrogen and phosphorus to local streams and the Bay. Lawn care professionals hired to apply fertilizer to lawns must be certified by the Maryland Department of Agriculture or work under the direct supervision of an individual who is certified. Homeowners are required to obey fertilizer application restrictions, use best management practices when applying fertilizer, observe fertilizer blackout dates, and follow University of Maryland recommendations when fertilizing lawns.

#### **4.G.3 Nutrient Management**

In Maryland, all farmers grossing \$2,500 annually or more, and livestock producers with 8,000 pounds or more of live animal weight, are required to run their operations using a nutrient management plan that addresses both nitrogen and phosphorus inputs, according to Maryland's Water Quality Improvement Act (WQIA) of 1998. This requirement applies to all agricultural land used to produce plants, food, feed, fiber, animals, or other agricultural products. Farmers must update their nutrient management plans at least once every three years or more frequently if their operation changes. Education and certification for individuals statewide who must comply with Maryland's [Nutrient Management Program](#) requirements are essential mechanisms for helping to ensure that nutrients are being managed according to State law and regulation.

To help farmers and producers affected by this requirement, MDA offers a variety of continuing education and certification courses on how to comply with the State's nutrient management law. These opportunities are designed to help farmers and crop consultants learn about managing nutrients so that water quality is protected. The program makes it easier and more cost efficient for farmers to comply with Maryland's nutrient management law by training them to write their own nutrient management plans. These plans describe the annual amounts of primary nutrients that farmers should apply to maximize crop yields while minimizing water pollution.

Training and certification of farmers takes place during a two-day workshop. During the session, farmers work with a University of Maryland Extension expert to develop a nutrient management plan for their own operations. Once certified, farmers are required to attend six hours of continuing education classes once every three years. In cooperation with the University of Maryland, voucher training courses are also offered and required for farmers and individuals who apply nutrients to 10 or more acres.

#### **4.G.4 Confined Animal Facilities**

The Water Quality Improvement Act has been recognized as enhancing existing efforts to ensure the proper management of animal waste. Farmers will be required to develop nutrient management plans that address proper utilization of animal waste as it is applied to the land. In addition, the law establishes an Animal Waste Technology Fund to encourage the development and implementation of economically feasible technologies that help protect the public health and the environment by reducing the amount of nutrients from animal waste that are released to state waters.

#### **4.G.5 Pesticide Management**

The State developed its Integrated Pest Management (IPM) Program to implement the pesticide management measure, specifically by conducting training efforts for both professional crop consultants as well as gardeners. This program continues to be offered through the Maryland Cooperative Extension Service and publications are available to the public from their website.

In January 2014, the Pesticide Reporting and Information Work group issued a report of its findings and recommendations. The report called for the MDA to contract with USDA's National Agricultural Statistics Service (NASS) to develop and implement a statewide survey of pesticide use for the years 2014 and 2015. The report also recommended that MDA convene an advisory group to inform survey design. The Workgroup was created in response to 2013 State legislation (HB775/SB675). It reviewed issues associated with pesticide use, tracking and reporting. It was chaired by elected State legislators and it included representatives from State agencies (MDA, MDE, DHMH, MD DNR), agricultural industry, environmental advocates, pesticide industry, the public, and environmental health experts.

#### **4.G.6 Grazing Management**

The state has developed several programs to ensure that grazing activities are managed to protect sensitive areas such as streambanks, wetlands, estuaries, ponds, lake shores, and riparian areas. In 2011, the Maryland Agricultural Cost Share program added pasture development or renovation to its list of BMPs eligible for State financial assistance. The implementation of these programs has been reliant on landowner incentives-based programs. Through application of the Conservation Reserve Enhancement Program (CREP), substantial progress has been made in the implementation of practices such as grass buffers, riparian forest buffers, wetland restoration, and the retirement of highly erodible land.

Additionally, the state's Agricultural Sediment Control Law and regulations prohibit agricultural operations from introducing soil or sediment into waters of the state. This authority can be used to address several erosion problems caused by improper grazing practices.

The University of Maryland now offers the "[Maryland Grazing School](#)" which is designed with producer interests in mind, while providing the tools necessary to protect water quality. The most recent class was held in September 2021.

## 4.H Antidegradation and Healthy Waters

Existing uses of water bodies are protected under the [State anti-degradation policy](#) in Maryland regulation ([COMAR 26.08.02.04-1](#)). Waters exhibiting significantly higher quality than the minimum standards receive additional protection under State regulation. These high quality streams (Tier II waters) are identified using biological and other data. They are listed in the State regulations and maps showing their locations are publicly available via MDE's Water Quality Mapping Center.

Highlights of Antidegradation and Critical Area programs are discussed below, along with protection strategies and goals for Chesapeake Bay restoration which are also described in detail in [Maryland's Phase III WIP](#). Many of the programs described in the Partnerships and Integration section also have protection components. See also Cherry Creek watershed plan in previous section.

### 4.H.1 Antidegradation

Protection through [federal](#) and [state](#) antidegradation requirements can be a valuable tool for Maryland's Nonpoint Source Program. Maryland Biological Stream Survey (MBSS; see Biological Trend Monitoring below) data are used to designate Tier II streams, i.e., high quality waters that have water quality significantly better than the minimum requirements specified in [water quality standards](#). For activities requiring state approval or permitting, Tier II antidegradation reviews prevent degradation to high quality waters, which help to preserve many of the plant and animal communities that make our state unique. High quality waters can also increase the resilience of watersheds to extreme weather events with climate change.

Antidegradation Goals:

- *Prioritize monitoring of Tier II at-risk watersheds.* Through the Chesapeake Bay Program's Maintain Healthy Watersheds Goal Implementation Team, MDE has begun the Maryland Healthy Watersheds Assessment (MDHWA). The two-year project will create a relative state watershed health baseline and will identify vulnerability indicators. It is anticipated that by the spring of 2022, the MDHWA project will be complete, and results can be used to identify vulnerable Tier II streams and develop other management actions for protection.
- *Identify Tier II watersheds within watersheds targeted for TMDL development.* Practices that may co-benefit TMDL implementation goals and antidegradation protection for Tier II waters will be identified using the results of the MDHWA. TMDL implementation may then be targeted into Tier II watersheds.
- *Outside of targeted TMDL watersheds, focus on Tier II watersheds within Phase I MS4 jurisdictions.* Pilot outreach protection programs within Phase I MS4 jurisdictions. Clarify existing antidegradation regulations and technical guidance.

Antidegradation goals will be reported and updated as part of the Maryland Chesapeake Bay WIP two-year milestones.

### 4.H.2 Chesapeake Bay WIP Goals

- Develop guidance, products, and factsheets
  - Identify existing guidance documentation and elevate the level of awareness for underutilized, but useful resources.

- Identify existing resource screening and evaluation tools. Review to determine if all high quality/high value resources are adequately incorporated.
- Coordinate the co-development of guidance, products, or factsheets by State environmental and natural resource agencies to identify opportunities for protecting multiple high quality/high value water resources.
- Align products with county needs and ongoing initiatives.
- Coordinate outreach and unify messaging
  - Beginning with State environmental and resource agencies, compile a comprehensive list of water resource protection outreach opportunities, and the timing of each opportunity, while prioritizing the opportunities that will a) benefit multiple resources, b) reach a large audience, or c) have a high potential for overlap with current Bay restoration actions (e.g., MS4 permit monitoring requirements and the monitoring of Tier II waters).
  - Develop a methodology to identify existing and new opportunities to make protection outreach more efficient, and provide a consistent, consolidated message from State agencies.
  - Streamline outreach materials so that local governments have an easier-to-understand menu of resource protection options and partners to choose from.
- Improve cross-jurisdictional cooperation and coordination
  - Develop user-friendly GIS based and online products to relate where multiple resources occur and where such important areas cross county boundaries.
  - Identify areas where the level of high quality/value resource protection could be strengthened across jurisdictional boundaries and explore opportunities for collaboration.
- Better leverage work completed by the Maintain Healthy Watersheds Goal Implementation Team (GIT) into protection initiatives
  - Provide outcomes to counties for use during the comprehensive planning process.
  - Provide communities and public-private partnerships with guidance on scientifically supported actions on a stream segment-catchment scale to enhance protection beyond conservation and stream restoration, to address stream health, vulnerabilities, and threats.
  - Use outcomes to develop or improve MDE strategies for the protection of Tier II streams.
- Streamline the Tier II Stream Review Process Across Key State Agencies
  - Pilot study with one agency review program.
  - Based on study outcomes, develop coordination plans, policies, conditions, etc.
  - Identify and work with other relevant agencies to develop similar coordination plans.
- Improve high quality resource protection at the county level
  - Develop guidance for local governments for updating comprehensive plans for consistency of language, up-to-date maps, web links, and basic healthy streams protection policy.
  - Provide information for counties to address high quality water protection at each stage of the planning process.
- Recommend new or modifications of existing legislation, regulation, policy, ordinances, etc.
  - Work with stakeholders to identify protection gaps, discuss possible methods and capacity to address protection gaps, and identify economic and environmental consequences of those methods.

- Identify programs that offer some protection to each resource and evaluate the level of protection conferred.
- Identify gaps in protection.
- Facilitate discussion and formulation of new programs to address identified gaps in protection and key challenges.
- Prioritize recommendations based on this information.

## 4.1 Atmospheric Deposition

Maryland has been very aggressive in controlling air pollution generated within the State's borders:

- Most point sources emitting 25 tons per year of nitrous oxides (NO<sub>x</sub>) to the atmosphere are controlled by regulations.
- Numerous Maryland regulations control NO<sub>x</sub> from diverse sources including consumer products, industry, electricity generation and fuels.

Robust regional and national programs are needed to support Maryland's efforts.

### 4.1.1 Federal

The *Federal Clean Air Act* requires the EPA to set National Ambient Air Quality Standards (NAAQS, 40 CFR Part 50) for pollutants considered harmful to public health and the environment. EPA must designate areas as meeting (attainment) or not meeting (nonattainment) the NAAQS. The *Clean Air Act* also requires states to develop a general plan to attain and maintain the NAAQS and specific plans to attain the standards for each designated nonattainment area. The specific plans, known as State Implementation Plans (SIPs), are prepared by state and local air quality management agencies, and submitted to EPA for approval. Currently, parts of Maryland are designated as nonattainment. There are persistent problems largely caused by emissions generated in upwind states. EPA has established health-based standards for six common air pollutants including two that are relevant to NPS water pollution management: nitrogen dioxide and sulfur dioxide.

### 4.1.2 State

Several State laws and programs are highlighted because they have significant connection to State NPS management:

- Maryland Healthy Air Act of 2006 (Annotated Code of Maryland Environment Title 2 Ambient Air Quality Control Subtitle 10 Healthy Air Act Sections 2-1001 – 2-1005)
  - This State law was enacted to reduce emissions for nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), and mercury from the largest coal-burning electric power plants. It also initiated Maryland's move to an integrated multi-pollutant approach for managing air pollutants. The pollutants addressed by the Act are all relevant to NPS water quality management:
    - NO<sub>x</sub> reductions are required. (Atmospheric deposition of nitrogen is a significant percentage of the total nitrogen pollutant load to the Chesapeake Bay and other water bodies. The Chesapeake Bay TMDL accounts for this nitrogen source and reductions in atmospheric deposition of nitrogen are needed to meet the TMDL.)
    - The Act required 70% reduction of NO<sub>x</sub> by 2010 compared to 2002. Emissions monitoring demonstrate that this goal has been met.
    - The Act also requires a Phase 2 emissions reduction of 75% for NO<sub>x</sub> by 2013 compared to 2002.

- SO<sub>2</sub> reductions are required. (Atmospheric deposition of SO<sub>2</sub>, a constituent of acid rain, is a secondary contributor of acidity in streams impacted by acid mine drainage. Reduction of atmospheric deposition of SO<sub>2</sub> can help meet current TMDLs for pH.)
  - The Act required 80% reduction of SO<sub>2</sub> by 2010 compared to 2002. Emissions monitoring demonstrate that 93% reduction for SO<sub>2</sub> was achieved.
  - The Act also requires a Phase 2 reduction of 85% for SO<sub>2</sub> by 2013 compared to 2002. This goal is already surpassed.
- Mercury emissions controls are required. (Atmospheric deposition of mercury is a significant contributor to elevated mercury levels in fish. Various water bodies in Maryland are currently subject to mercury TMDLs and/or to Fish Consumption Advisories that MDE issues to protect human health. Reduction of atmospheric mercury deposition can help to meet the TMDLs and to reduce the need for the Advisories. ([Milestones](#) for mercury are in Appendix Milestones.)
  - The Act required that 80% of mercury emissions to be controlled by 2010.
  - The Act also requires that 90% of mercury emissions be controlled by 2013.
- Greenhouse gases controls are required. (Increasing levels of atmospheric carbon dioxide have been linked to increasing acidity in some marine waters. However, this water quality impact has not been identified in Maryland waters.)
- Maryland Clean Cars Act of 2007
  - Beginning with the 2011 model year, the Act requires that California vehicle emission standards be met by new cars and light duty trucks sold in Maryland.
    - By 2020, the effect of the Act combined with other related transportation program could be up to about 9.48 million tons NO<sub>x</sub> reduction by 2020. By 2027, nitrogen pollution could be reduced by 2027 tons/day.
    - Other California standards continue to apply in Maryland:
      - Requires increasing percentage of zero emissions vehicles in overall new vehicle sales, and
      - Requires more stringent NO<sub>x</sub> standards for 2015-2025 automotive model years.
- State Implementation Plan
  - To meet Federal Clean Air Act requirements, Maryland's revised [State Implementation Plan](#) is undergoing revisions at this time to update rules for 2018-2028 regional haze. This plan will flesh out more details on reducing atmospheric pollutants relevant that are likely to support NPS water quality management.

#### 4.1.3 Program Integration – Mercury Example

Nearly all the mercury found in fish tissue (in the form of methylmercury) can be traced to atmospheric deposition of various forms of mercury originating from combustion, especially by electrical generating units. To protect human health, State and Federal agencies collaborate to maximize efficiency in addressing mercury impairments.

Data from atmospheric deposition monitoring sites for many constituents including mercury is periodically used in modeling by Maryland DNR's Power Plant Research Program, working with NOAA, to estimate deposition across Maryland's land/water surface. Deposition data and model output is used by MDE's TMDL Program to generate scenarios of baseline conditions, potential results of implementing source controls or future Clean Air Act regulations. These outputs allow MDE to estimate the mercury load reduction needed and the effectiveness of programmatic measures, facilitating a reasonable assurance of implementation.

To measure the levels of mercury in fish, fish tissue collected during an annual young-of-year fish survey and other fish surveys, particularly in lakes, for analysis. MDE and Maryland DNR share expenses field and laboratory work. Tissue analysis is conducted by the University of Maryland (UMCES/HPL). UMCES and Smithsonian Environmental Resource Center staff lead reporting and documentation. Analytical findings are the basis for issuing public fish consumption advisories and for identifying surface waters with mercury impairments. The impaired water bodies are listed in Maryland's Integrated Report each even calendar year and they are prioritized for new TMDLs. [Milestones](#) for mercury are in Appendix B.

## **4.J Coastal NPS Management Program**

Maryland's coastal zone includes the Atlantic shore, the coastal bays, the Chesapeake Bay, and its tributaries. Section 6217 of the Coastal Zone Act Reauthorization Amendments (CZARA) of 1990 called on states "to develop and implement management measures for nonpoint source pollution to restore and protect coastal waters." In December 1999, the US National Oceanic and Atmospheric Administration (NOAA) and US Environmental Protection Agency (EPA) approved Maryland's Coastal Nonpoint Pollution Control Program, which is administered by Maryland Department of Natural Resources (DNR).

### **4.J.1 Federal Consistency**

[Federal consistency](#), a key provision of the national Coastal Zone Management Act (CZMA), gives coastal states a strong voice regarding federal actions that have foreseeable effects on coastal resources and coastal uses. It advances State-Federal-industry coordination to protect coastal resources and avoid or minimize coastal use conflicts. It is designed to foster early consultation, cooperation, and coordination to ensure that State policies and priorities are considered with Federal actions. These State policies and priorities include Critical Area, water and air quality, sediment and erosion control, stormwater management, tidal and nontidal wetlands, forest, development, and agriculture. Under the CZMA, Federal agency activities that have coastal effects must be consistent to the maximum extent practicable with federally approved enforceable policies of a state's Coastal Zone Management Program (CZMP). In addition, the statute requires non-Federal applicants for Federal authorizations and funding to be fully consistent with approved enforceable policies of state CZMPs.

Federal consistency is best applied as a proactive tool for engaging agencies, developers, and applicants early in the project lifecycle to help high-priority projects align with enforceable policies, proceed in a timely manner, and gain broad public support. Maryland's enforceable policies serve as project evaluation standards during the Federal Consistency Review process, and in doing so, help implement Maryland's statewide NPS Management Program. With the exception of the enforceable policies that are explicitly limited to the coastal zone or other limited geographic area, all of the listed Maryland enforceable policies are appropriately applied statewide. In this sense, while the policies support Federal Consistency Review implementation, they can also support State Consistency Review which is implemented through interagency review networks such as MDP's [Maryland Clearinghouse](#), Maryland DNR's [Power Plant Research Program](#), and Maryland State Highway interagency review.

#### 4.J.2 Strengthening and Expanding Maryland's Use of Federal Consistency

In an ongoing effort to strengthen and expand Maryland's use of Federal Consistency, Maryland DNR (Chesapeake and Coastal Service, CCS) has been applying the following 5-step, iterative process to guide its work:

1. Clarify, update, and make publicly accessible the enforceable policies of the Maryland Coastal Program.
2. Evaluate and improve the Federal Consistency Review process to make it more effective in shaping federal actions and more accessible and understandable for stakeholders (including federal agencies, applicants, Maryland leaders, and Coastal Program partners).
3. Engage stakeholders such as senior State leadership and the public to solicit input on when and how to apply Federal Consistency to advance State priorities and how to measure success.
4. Make necessary Program Changes to strengthen and expand Maryland's use of Federal Consistency (e.g., expand list of federal activities, receive approval for interstate Federal Consistency review, update policies to incorporate legislative and regulatory changes).
5. Monitor and evaluate Maryland's use of Federal Consistency with respect to enhanced State-Federal coordination and advancing State priorities (e.g., to what extent does Coastal Consistency review process modify projects to achieve key State and Federal goals such as habitat restoration, Bay clean up and balancing multiple coastal uses such as navigation, fishing, and combat readiness training).

Maryland continues to implement five-step process described above. In support of Step 1 above, Maryland received NOAA approval for its *Enforceable Coastal Policies* on April 8, 2011. As a condition of this approval, Maryland and Department of Defense developed and signed the *Maryland-Department of Defense Coastal Zone Management Act Memorandum of Understanding* on May 8, 2013. This historic MOU, the first of its kind in the Nation, outlines how DoD facilities and projects will meet the federal law requirements of the Coastal Zone Management Act to ensure that their actions affecting these resources are consistent with State policies.

Maryland's Coastal Program is a networked program that includes several State Agencies including Maryland DNR, MDE, MDA, MDP, Maryland Department of Transportation (MDOT) and Maryland Historic Trust (MHT). With Maryland DNR (CCS) as the administrator of the Program, Maryland's Federal Consistency Coordinator resides in MDE (Water and Science Administration). Federal Consistency Review generally involves considerable intra-agency and interagency coordination to ensure that all appropriate enforceable policies are considered in reviewing federal actions that have reasonably foreseeable coastal effects (i.e., coastal resource impacts or coastal use conflicts). Importantly, since Federal Consistency Review is a networked process, it mirrors and supports the State-wide NPS Management Program.

To support more effective, timely, and comprehensive Federal Consistency Reviews, Maryland DNR (CCS) is currently developing an online interactive educational, communication and application portal called the [MD Coastal Pilot - Your Guide for Navigating Federal Consistency and Keeping Your Project Consistent with Maryland's Coastal Policies](#). Like a ship's pilot, the coastal Pilot online tool would help those subject to Maryland's Federal Consistency program successfully navigate and align with Maryland's enforceable coastal policies. The Coastal Pilot is currently anticipated to include three modules:

Module 1: Understanding Federal Consistency and How It Works in Maryland. This module will integrate the existing materials from Maryland, other Coastal States, and NOAA to provide a graphical, easy-to-navigate hypertext online tool to explain Federal Consistency, why it is important, how it may affect them, how the process works, and where to go for more information.



Module 2: Is My Project Subject to Federal Consistency? This module will be a self-assessment tool used by federal agencies, developers, applicants, and other stakeholder to help them determine whether their project is subject to Maryland's Federal Consistency program.

Module 3: MD Coastal Consistency Online Application. Once a federal agency, developer or applicant determines that their project is may be subject to Maryland's Federal Consistency Program, this module will help them provide the necessary information and facilitate early coordination and consultation to promote the timely review while ensuring projects are consistent with Maryland's enforceable policies.

#### **4.J.3 Clean Marina Program**

Maryland DNR's [Clean Marina Program](#) began in the 1990s in response to marina nonpoint source pollution issues identified through the Coastal NPS Pollution Control Program. The statewide Clean Marina Program is the primary program in Maryland to reach marinas and related facilities and influence operations to implement NPS BMPs and to promote clean boating behaviors that protect water quality.

The Program aims to increase voluntary adoption of pollution prevention practices by marinas and recreational boaters, and to build market demand for environmentally responsible marinas. Maryland's program offers a combination of incentives, technical assistance, confidential compliance assistance and public outreach and education including:

- [Maryland Clean Marina Guidebook](#) provides best management practices for all areas of marina operation including marina siting and design, fuel storage, stormwater handling, and vessel maintenance. The *Guidebook* also enumerates state and private resources and gives a comprehensive overview of laws and regulations that apply to marinas.
- Marine facilities are encouraged to adopt the best practices in the Guidebook through the Clean Marina Awards which certify a marina as a Maryland Clean Marina when a significant portion of the Guidebook's recommendations are adopted, and a site inspection is conducted.
- Annual workshops introduce the program to new participants and continue education about environmental best practices and emerging topics for certified marinas.
- Maryland certified Clean Marinas are listed on Maryland DNR's [website](#) and are promoted to boaters through advertising and through exhibits at area boat shows/events.
- Clean Marina Partners are small boating facilities like public boat ramps, private community piers, and charter boat liveries that adopt applicable Clean Marina practices. They are also listed on Maryland DNR's website and promoted to boaters.
- Marinas interested in seeking the Award can begin by signing a Clean Marina Pledge which indicates a desire to become certified within one year; these facilities are promoted on the program website.
- The Clean Boater Pledge Program and other resources for boaters, professional divers, and boating instructors are designed to promote practices environmentally responsible behavior.

#### **4.J.4 No Discharge Zones**

Discharge of untreated vessel sewage is prohibited anywhere within 3 nautical miles of the U.S. Coast. Under section 312 of the federal Clean Water Act, additional measures to control vessel sewage are available to states through the establishment of No Discharge Zones (NDZ). NDZs are established by states after petitioning EPA regarding areas the state determines need additional protection. A No Discharge Zone is an area of water where the discharge of all boat sewage -- including that which is treated by onboard marine sanitation devices -- is prohibited. Maryland has sought NDZ designation in areas with:

- high concentration of boats
- resources sensitive to boat sewage

- water contact activities
- strong local support for added protection, and
- adequate pumpout facilities for safe and sanitary removal and treatment of sewage from all vessels

Complete and current information on our NDZs can be found here:

<https://dnr.maryland.gov/boating/Pages/pumpout/ndz.aspx>

#### **4.J.5 Future Directions for Coastal Management**

The Coastal NPS Management Program’s primary goal is to implement, as appropriate, all the management measures in Maryland’s coastal zone. A fifteen-year strategy has been developed that will guide the Program toward this goal. On a five-year cycle, action plans will be drafted that include detailed objectives and milestones. The five-year action plan for the period –2021-2025 can be accessed by following this [link](#). To achieve full implementation of the management measures, the Program will continue to work with federal, state, and local partners to improve the efficiency and effectiveness of our existing programs, provide technical and financial assistance and conduct outreach activities. In the short term, Maryland’s Coastal NPS Program will coordinate with the statewide NPS Program to focus technical and financial assistance in priority watersheds identified pursuant to the Maryland Clean Water Action Plan. The Program will track the implementation of management measures and will attempt to evaluate their effectiveness through water quality monitoring and other appropriate techniques. Where management measures have shown to be ineffective over time, the Program will seek out and promote additional management measures (e.g., emerging technologies such as floating wetlands).

### **4.K Climate Change**

#### **4.K.1 Priority**

At the state level, the State charges the Maryland Commission on Climate Change (MCCC) with advising the Governor and General Assembly "on ways to mitigate the causes of, prepare for, and adapt to the consequences of climate change." An executive order established the MCCC in 2007 and the State codified it into law in 2015.

The State expects the MCCC, in concert with the Governor’s Chesapeake Bay Cabinet, to play a central role in advancing Maryland’s Chesapeake Bay climate adaptation actions. The MCCC and its workgroups annually provide recommendations and strategies that align with the two-year Bay restoration milestones addressing climate change.

A 26-member steering committee leads the MCCC with broad representation, including State agency cabinet members. Maryland aligns the climate aspects of its Bay restoration strategy with the four workgroups of the MCCC: Adaptation and Response; Education, Communication, Outreach; Mitigation; and Scientific and Technical.

The MCCC is required to [report](#) to the Governor and the legislature annually, and include recommendations of future plans for consideration. The working groups are required to develop [work plans](#) that are updated annually.

#### 4.K.2 Climate Action Plan

Maryland's Climate Action Plan guides state-level adaptation planning with two climate adaptation strategies: addressing sea level rise and coastal storms, and addresses changes in precipitation and temperature. The Plan's strategies generally include:

- Reduce greenhouse gas emissions will also reduce Maryland's nitrogen oxide emissions, which will reduce NPS nitrogen pollution loads to surface waters.
- Slowing the rate of sea level rise that can help reduce sediment loads (associated with shoreline erosion) and improving habitat quality.

The Climate Action Plan includes a section on future steps and direction implementation guidance that includes many recommendations for addressing climate change that relate to NPS management interests including:

- Agriculture
  - Intensify water management and conservation through research, funding, and incentives.
  - Evaluate the effectiveness of BMPs under future climate change scenarios.
- Forest and Terrestrial Ecosystems
  - Strengthen State and local programs to slow the loss and fragmentation of forest and terrestrial ecosystems to new development.
  - Review and revise forestry best management practices.
  - Develop new conservation easement mechanisms.
- Bay and Aquatic Ecosystems
  - Amend legal mechanisms to designate and protect temperature-sensitive streams.
  - Increase on-the-ground implementation of existing stream restoration practices.
  - Reduce impervious surface cover.
  - Adjust bay and watershed restoration priorities considering a changing climate.
- Water Resources
  - Assess, target, and protect high quality water recharge areas.
  - Prevent inundation and overflow of on-site disposal systems (OSDS).
  - Revise Clean Water Revolving Fund criteria to require environmental site design.
- Population Growth and Infrastructure
  - Reduce regional air quality impacts in Maryland.
  - Accelerate use of improved stormwater management strategies and environmental site design (ESD).
  - Increase urban tree canopy.

#### 4.K.3 Nuisance Flood Planning

Precipitation may combine with tidal or wind-driven nuisance flooding to impair stormwater management infrastructure. As a changing climate drives sea levels higher and precipitation events to greater severity, repeated nuisance impacts will become significant stressors on infrastructure, emergency services, and public health. The areas impacted by nuisance flooding will increase gradually in the coming years as changing climate elevates water levels and drives precipitation patterns to new extremes.

Maryland's commitment to address climate change is reflected in a variety of [plans and strategies](#). The Maryland Commission on Climate Change Adaptation and Response Working Group tracks progress. The State

also incorporates local plans in addressing climate change. Six local governments developed plans between 2008 and 2018 that either directly or indirectly address climate change impacts. Furthermore, 15 of Maryland's counties and Baltimore City have specifically mentioned climate change and its effects in their [comprehensive plans](#).

In accordance with Maryland House Bill 1427 (2019), on or before October 1, 2020, local jurisdictions that experience nuisance flooding were required to develop plans to address nuisance flooding. Local jurisdictions shall update their nuisance flooding plan every five years and publish it on the local jurisdiction's website. Each jurisdiction must also submit their plan to the Maryland Department of Planning, which provides [guidance](#) on developing the plans.

Because of the Governor's State of Emergency proclamation issued in March 2020 for COVID-19, the deadline for submitting nuisance flooding plans to the Maryland Department of Planning has been extended to the 30th day after the date on which the State of Emergency is terminated.

It is not known at this time how many nuisance flood plans will be submitted. While municipalities may submit their own plans, they are encouraged to work with their respective counties to develop joint plans where appropriate.

#### **4.L Critical Area Commission for the Chesapeake and Atlantic Coastal Bays**

The ribbon of land within 1,000 feet of the tidal influence of the Chesapeake and Atlantic Coastal Bays or the landward edge of tidal wetlands, the tidal waters themselves, and the land under those waters, are all within Maryland's Critical Area. The Critical Area currently encompasses about 10% of the land in Maryland. In cooperation with the Critical Area Commission, local critical area management programs are implemented by 64 local governments following established criteria that accomplish overall State goals. Through this work, the Critical Area Commission helps to minimize adverse impacts on water quality; conserve fish, wildlife, and plant habitat; and establish land use policies for development in the Critical Area.

The [Critical Area Commission](#)'s primary responsibilities are the following:

- Review and approve State projects on State-owned land in the Critical Area
- Review and approve State or local agency actions resulting in major development on private lands or lands owned by local jurisdictions
- Review and approve all changes to a jurisdiction's Critical Area Program, including growth allocation and changes or updates to ordinances, regulations, and maps that govern the local program
- Review and approve changes to State regulations governing land use policies for development in the Critical Area.

Requirements of the State Critical Area Law, with oversight by the State commission, are important tools for limiting increases in NPS pollution that would otherwise arise from conversion of land to more intensive uses. In particular, limiting disturbance in the Critical Area buffer - 100 feet from tidal waters, wetlands and tributaries - is an important counterbalance to developing Bay shorelines for residential and commercial uses.

Enforcement of Critical Area regulations is primarily a local government responsibility with State oversight. The Critical Area Law requires local governments to comprehensively review their Critical Area programs every six years to ensure that local programs are up to date and that requirements are incorporated into local codes

and ordinances. Local Critical Area maps must be reviewed, updated, and approved by the Critical Area Commission at least once every 12 years. Critical Area staff review and maintain program status reports internally. More information on the mapping update and updated maps can be found here:

[https://dnr.maryland.gov/criticalarea/Pages/map\\_update.aspx](https://dnr.maryland.gov/criticalarea/Pages/map_update.aspx)

<http://webmaps.esrgc.org/cbca/desktop/Map>

#### **4.M Demonstration Projects**

Implementation projects funded by the 319(h) Grant frequently serve as demonstration projects when they are located on publicly accessible public land. In many cases, interpretive signs accompany the project to enhance the on-site demonstration opportunity. As reported in the Maryland 319 Nonpoint Source Program Annual Report, some of these projects are in frequently visited locations and/or have become reoccurring demonstrations. Some of the most recent examples include:

- Denton, MD Caroline County Emergency Services parking lot: pervious asphalt.
- Baltimore County's Scotts Level Branch employed communications specialists before and after several iterative stream restoration projects to garner and maintain community support and involvement.
- Kent County's Galena Elementary School: bioretention / rain garden retrofit that involve students planting and monitoring the site.
- Queen Anne's County Board of Education administrative offices in Centreville: bioretention / rain garden at the front entry to the building.
- Washington County's Devils Backbone Park: watershed outreach kiosk & pet waste management station.

#### **4.N Groundwater Management Programs**

Three State agencies have responsibility for statewide management of groundwater in Maryland:

- Maryland Department of the Environment (MDE, lead agency) regulates potential pollution sources and water use, partners with State and local agencies to implement protection programs, and partners with the State agencies and the US Geological Survey to conduct technical projects on groundwater quality and resource availability. MDE also uses Clean Water Act Section 106 funding to assist coordination of groundwater protection activities.
- Maryland Department of Natural Resources (DNR) Maryland Geological Survey (MGS) conducts assessments of water supplies and groundwater resources including ongoing statewide monitoring of groundwater quality and levels.
- Maryland Department of Agriculture (MDA) Regulates controls and BMPs for pesticide storage and application to help minimize contamination of surface and groundwater. Nutrient management plans establish short and long-term strategies for reducing nutrient levels in groundwater and surface waters.

Maryland has had an active program to protect drinking water sources since the Maryland Wellhead Protection Program was approved in 1991. To meet requirements of the 1996 Safe Drinking Water Act, Maryland in 1999 began conducting source water assessments that delineated the land surfaces that could impact a well or surface water intake, identified potential contaminant sources (including nonpoint sources), and assessed the vulnerability of the water supply to those contaminants. By 2006 these assessments had been conducted for more than 3600 public water systems in Maryland. The program strategy is to protect water sources used for public drinking water by managing the land surface around the well(s) or intake(s), including preventing contamination from nonpoint sources. MDE works with local governments to help them develop and implement protection plans.

There are no federal or State requirements for implementing source water protection programs, although many local communities in Maryland have taken steps to protect their drinking water sources. Maryland law requires that all counties and municipalities that exercise planning and zoning authority adopt a water resources element (WRE) in their comprehensive plans and that WRE must identify drinking water and other water resources that will be adequate for the needs of existing and future development proposed in the comprehensive plan. These local jurisdictions may address groundwater recharge or zones of significant groundwater/surface water interaction. To support this consideration, the Maryland Geological Survey has published groundwater recharge area / aquifer outcrop maps, aquifer analysis, and other technical materials.

Onsite sewage disposal systems (OSDS) serve about 420,000 Maryland homes. Conventional OSDS designs discharge nitrogen into the groundwater that eventually reaches surface water contributing to water quality problems, particularly in tidal surface water. To reduce nitrogen discharges from OSDS, Maryland's Bay Restoration Fund (BRF) was established to provide funding for OSDS upgrades to best available technology. Thru June 2012, at least 3,732 upgrades were funded by the program, which reduced nitrogen discharged to groundwater by 86,582 pounds per year.

Administration of the BRF program for OSDS upgrades is delegated to either a county agency or to the county office of the Maryland Department of Health. The local agency or office priorities distribution of funding based on several factors such as proximity to tidal waters (Chesapeake Bay Critical Area), to streams, or to other areas that are identified as needing specific protective effect.

Large onsite sewage disposal systems discharging more than 5000 gallons per day may be required to obtain a permit from MDE authorizing the discharge. Permit limits for the quantity of effluent discharged, as well as for common wastewater constituents that may impact groundwater quality, are set in the discharge permit. The amount of nitrogen allowed to be discharged may be reduced below normal permit limits depending upon a site's proximity to well head protection areas.

#### **4.0 Mining Programs for Coal**

Coal mines operated without any reclamation laws until 1955, when minimal standards were enacted. In 1967 and 1969, major changes to Maryland's Strip-Mining Law required more adequate standards to address environmental impacts. Further amendments were enacted in 1972 and annually since 1974, as Maryland's reclamation requirements began to resemble the current regulatory program standards promulgated under the SMCRA in 1977. In 1972, Section 319 of the Clean Water Act identified acid mine drainage as a nonpoint source pollution problem. In 1977, the Federal Surface Mining Control and Reclamation Act (SMCRA) mandated minimum requirements for surface mining operations in all coal-producing states.

The federal Abandoned Mine Reclamation Program was created under SMCRA to repair the environmental damages of mines inadequately restored or abandoned before the passage of the act. The law was intended give each state the primary role in implementing its own regulatory and AML programs. Maryland gained primacy in 1982. The 1995 amendments to SMCRA and the Appalachian Clean Streams Initiative, which was funded from 1992 through 2008 (when it was eliminated), elevated the significance of abandoned mines as a water quality problem as well as a human welfare and safety problem.

Currently, the Federal government through the U.S. Office of Interior continues to fund the Abandoned Mine Reclamation Fund from taxes on the active coal mine industry to help pay for acid mine drainage (AMD) mitigation. There have been several Congressional reauthorizations since 1977 to SMCRA which each time has changed the original SMCRA law to some degree. The latest, as of the date of this document, is the passage of the Tax Relief and Health Care Act of 2006 Pub. L. No. 109- 432 which included the Surface Control and Reclamation Act (SMCRA) Amendments of 2006 (hereinafter referred to as AML Reauthorization of 2006).

#### **4.O.1 Surface Mining Control and Reclamation Act**

Title IV of the Surface Mining Control and Reclamation Act (SMCRA) requires that an Abandoned Mine Reclamation Fund pay for the reclamation of abandoned coal mines using fees assessed on active mining operations. SMCRA requires that 50% percent of the reclamation fees collected in each state (referred to as State-Share) with an approved reclamation program be allocated to that state for use in its approved reclamation program. Additional funds are allocated to states based on the amount of historical (pre-1977) coal production. The statutory minimum amount of funding a state can receive is \$3 million. These states are referred to as “Minimum Program States”, which includes Maryland. SMCRA requires that money in the reclamation fund be directed only to projects in the following order of priority:

1. Protection of public health, safety, general welfare, and property from extreme danger of the adverse effects of coal mining practices
2. Protection of public health, safety, and general welfare from the adverse effects of coal mining practices
3. Restoration of land and water resources and the environment previously degraded by the adverse effects of coal mining practices including measures for the conservation and development of soil, water, woodland, fish and wildlife, recreation resources, and agricultural productivity.

The most recent amendments to SMCRA allow enhanced focus on NPS management issues:

- 1987 amendments authorized states to set aside up to 10% of the state-share portion of their annual abandoned mine land reclamation grants for acid mine drainage protection activities on eligible sites.
- 1990 amendments specified adverse economic impacts on local communities as a reason to give higher priority to AMD problems.
- 2006 amendments extend federal AML fee collection authority to 2021 at reduced rates and address a host of other provisions to the AML program. Changes in federal law resulted in substantial increases in AML funding to states and tribes and focuses AML reclamation on projects that benefit public health and safety. Other notable changes made by the 2006 Amendments include: 1) Acid Mine Drainage Abatement Set-aside allotment increased from 10% to 30% of State-Share, 2) the 30% cap on waterline allotment lifted, 3) Lien provisions streamlined, and 4) redefined priorities for AML funding, reducing the number to only three priorities (Priorities 1, 2, and 3).

Maryland employs the 30% Acid Mine Drainage Account (30% set aside) to help fund the operation and maintenance of AMD mitigation efforts.

#### **4.O.2 Federal Clean Water Act**

The 1972 Clean Water Act (CWA) contains several provisions that apply to the control of mine drainage to meet water quality standards including NPDES permitting for active mining. CWA 1987 Amendments Section 319 identified AMD as a NPS pollution problem. States are encouraged to address AMD in their Statewide Nonpoint Source Management program and to use Section 319(h) Grant funding to address AMD issues. MDE administers NPDES permits for mining, which include comprehensive requirements including reclamation to the extent required under COMAR 26.20 for active coal mines.

#### 4.O.3 State Management of Active Coal Mines

MDE regulates active coal mining. Modern mining permits are written and enforced so that active mines contribute relatively little to the acid mine drainage problem. Although active mining is treated from a regulatory perspective as point source pollution, EPA recognizes AMD from abandoned mines which are often “remined” under the current regulatory standards, as a nonpoint source pollution problem.

Below is a description of the various control and treatment technologies used to prevent acid mine drainage from current mining.

- Backfilling and Grading. Mine operators are required to restore all disturbed mining areas to their approximate original topography. All spoil shall be transported, backfilled, compacted, and graded to eliminate highwalls, spoil piles, and depressions. Coal operators shall either cover or treat all exposed coal seams after mining and all acid forming, toxic-forming, combustible, or any other hazardous materials. Backfill shall be selectively hauled or conveyed and compacted, when necessary, to prevent leaching of acid-forming and toxic-forming materials into surface and groundwater.
- Revegetation. Mine operators are required to plant vegetation on regraded and disturbed mining areas to stabilize the soil, minimize sediment and water runoff, and establish a permanent vegetative cover compatible with approved post-mining land-use. The newly planted area shall:
  - be compatible with the approved post-mining land use
  - have the same seasonal characteristics of growth as the original vegetation
  - be capable of regeneration and plant succession
  - be compatible with the plant and animal species of the area, and
  - meet the requirements of applicable state and federal seed, poisonous and noxious plant, and introduced species laws and regulations.
- Waste Handling. All mine waste shall be disposed of properly. Coal mine waste is managed to: 1) minimize the adverse effects of leachate and surface water runoff; 2) ensure mass stability and prevent mass movement during and after construction; 3) ensure that the final disposal facility is suitable for reclamation and revegetation compatible with natural surroundings and the approved postmining land use; 4) create no public hazard; and 5) prevent combustion.
- Disposal of Excess Spoil. Excess spoil shall be placed in designated, permitted disposal areas in a controlled manner. These disposal areas should minimize the adverse effects of leachate and surface water runoff on surface and groundwater, ensure mass stability, and prevent mass movement during and after construction. The final fill must be suitable for reclamation and the vegetation compatible with natural surroundings and the approved post-mining land use.

#### 4.O.4 State Management of Abandoned Coal Mines

MDE also mitigates legacy water quality problems by reclaiming AMD-impacted areas. In areas that had historic coal mines, like in Western Maryland, they were simply abandoned without any thought of water pollution issues. When water encounters the remnants of sulfur in the abandoned mines it creates sulfuric acid which dissolves metals like iron and aluminum from the rock. When the water exits the mines through portals or seeps people and animals can be exposed to acidic solutions causing dermatitis and other health problems. Additionally, it then mixes with uncontaminated water where the pH balance will be restored causing those metals to drop out of solution and coat the stream bed, destroying benthic habit. The objectives of this work relating to NPS management include restoring the eligible land, water, and environment degraded by coal mining so that: public health and safety are protected; water impairments are mitigated, and uses of the land and water meet expectations.



There are several basic approaches to prevent or mitigate the detrimental impact of legacy AMD on streams: prevention/control; active treatment, and passive treatment. Treatment options need to be operated in perpetuity for as long as mine drainage is generated. For this reason, treatment options can be expensive. While control options are more permanent solutions, they are often difficult to execute, and the technologies have been slow to develop. Assessing AMD sites for possible use of a control/treatment technology involves analyzing four basic criteria: water chemistry, flow rate, available land, and level of funding.

Prevention/Control Technologies during reclamation of abandoned coal mine sites aim to prevent the formation of contaminated drainage at abandoned mine sites using methods which eliminate or slow the interaction of water and/or air with coal. The following techniques have been used to prevent the formation of AMD:

- Diversions - Structures are installed to divert surface water runoff away from abandoned mine openings and spoil areas preventing infiltration into the mine.
- Backfilling - This method entails injecting a fluid-cementing substance into underground mines that seal the mine from oxygen and water thus preventing AMD.
- Regrading and Capping - This method is used to reclaim surface mines by regrading and revegetating the disturbed mine area and capping the site with a low-permeability material aimed at reducing surface water infiltration into the acid-producing spoil.
- Mine Seals - Mine seals are used to exclude the passage of oxygen (air) to the acid producing environment of underground workings. The seals may be either wet or dry and are used for sealing all mine entries, shafts, and boreholes open to mine workings. Seals should be air-tight to be effective.

Active treatment systems are used at abandoned coal mine sites to treat AMD by adding chemical reagents to contaminated water that add alkalinity (counteracting acidity) and facilitate the removal of metals. Dosers downstream of AMD sites are typically employed to introduce these chemicals to the streams. Six chemical reagents are typically used: limestone (calcium carbonate); hydrated lime (calcium hydroxide); pebble quick lime (calcium oxide); soda ash briquettes (sodium carbonate); caustic soda (sodium hydroxide), and ammonia (anhydrous ammonia).

Passive treatment systems are another treatment method that directs the contaminated water to constructed natural or engineered systems designed to remove or neutralize pollutants by exposing them to air, limestone, pond vegetation, neutralizing ditches, buried channels, or wetlands. Compared to active treatment methods, passive methods generally require more land area but may utilize less costly reagents and require less operational attention and maintenance. The most used passive systems are listed below:

- Aerobic Wetlands are used for low-acid AMD to collect flows, settle out sediments, and increase residence time so that metals in the water can precipitate.
- Anaerobic Wetlands are used for highly acidic AMD. They are commonly underlain with and organic muck (substrate) and a layer of limestone.
- Anoxic Limestone Drains used to help neutralize acidic water. They are buried channels where AMD is directed thru crushed limestone
- Alkalinity Producing Systems combine the technology of anoxic limestone drains and anaerobic wetlands
- Limestone Ponds are ponds constructed over an acidic seep or other acidic discharge to promote neutralization.
- Reverse Alkalinity Producing Systems combine alkalinity producing systems and limestone pond systems for use on seeps/discharges that are not anoxic.
- Open Limestone Channels are long channels lined with limestone that neutralize water and precipitate metals in the channel before the water reaches a stream.

- Limestone Sand Dumps are deposited on the banks of small high pH streams with low metals which use the water to distribute the particles downstream neutralizing acidity and allowing aquatic organisms to recolonize areas with better water chemistry.

#### **4.P Mining Programs for Non-Coal**

An operator must obtain a permit from the Maryland MDE Mining Program to conduct surface mining for sand, gravel, clay, limestone, granite, shale, and dimension stone. As with coal mining, the operator must reclaim and restore the mined land and use performance standards as required under the law. Code of Maryland Regulations 26.21.01 The State Mining Act of 1975 was enacted to mitigate the effects of land disturbance, to eliminate public safety hazards, to prevent the waste of state resources and to establish the Surface Mining and Reclamation Fund. A surface mining operator's license and surface mine permit must be obtained for each site from the MDE's Minerals, Oil, and Gas Division.

Applications for a surface mining permit must be accompanied by a reclamation fee (\$30 per acre). In addition, the applicant must submit a mining and reclamation plan detailing the mining operation, the means for minimizing environmental effects, and the method of site reclamation. A permit will be granted after establishing that no environmental or safety hazards will be created by the mine operators and all permits and licenses are obtained.

Mining operators who abandon their facilities without adequate land reclamation are subject to bond forfeiture and legal proceedings by MDE to force compliance with the surface mining permit (non-coal) provisions. However, the industry is generally operating in compliance with reclamation laws.

MDE administers the Surface Mine Land Reclamation Fund to provide money for reclamation of non-coal surface mines that were not reclaimed prior to passage of the Surface Mining Act. The fund receives money from license and permit fees, bond forfeitures, fines from violations, and reclamation fees.

#### **4.Q Priorities for Protection, Restoration, Watershed Planning, and Implementation**

Maryland has several important programs that focus on protecting natural or rural landscape attributes that also tend to protect water quality, including Program Open Space, the Rural Legacy Program, and the Maryland Agricultural Land Preservation Fund. In some cases, these programs have worked for decades to protect river corridors in places like the Gunpowder River State Park, the Patapsco River State Park and Zekiah Swamp Natural Environment Area. Because these protection programs have much greater funds than the 319(h) Grant, 319 funds for watershed planning and implementation are primarily targeted to restoration. The exception is that a small percentage of 319 funds in past years have been used for water quality monitoring in areas of healthy waters designated as Tier II.

##### **4.Q.1 Priorities for Investing 319(h) NPS Grant Funds or NPS Program Resources**

Priorities for investing 319(h) NPS grant funds or NPS program resources in watershed planning and implementation are generally based on needs, requirements, and implementer interest:

- Effective Appropriate use of Federal CWA Section 319(h) funds. Consistent with legal obligations, Section 319(h) Funds will be efficiently used to generally maximize water quality benefits.
- NPS impairment is documented and a TMDL has set the pollutant load reduction. Local governments are encouraged to adopt locally developed WIPs designed to meet pollutant reductions associated with the State Phase II WIP and to implement their local WIPs consistent with locally developed milestones. Implementation is driven by local priorities and interests.

- Willing Local Implementer. Local governments and nongovernmental organizations have independently created scores of watershed-based plans to meet local priorities that frequently include goals related to NPS management and waters quality protection. Most commonly, local implementers drive planning, prioritization, and on-the-ground implementation. In many cases, State agencies have regulatory roles that affect plan implementation, but they frequently do not directly participate in the implementation. A fraction of these plans is designed to support obtaining 319(h) Grant funding for implementation. After EPA accepts a watershed plan for 319(h) Grant project implementation funding, then MDE cooperates with the local plan sponsor(s) to assist in reporting implementation progress thru the Maryland 319 NPS Program Annual Report. Implementation is driven by local priorities and interests.
- Permit Requirement. Stormwater discharge permits have requirements that tend to parallel NPS watershed plan implementation except that the runoff is collected in and discharged from a Municipal Separate Storm Sewer System (MS4). All of Maryland's Phase I MS4 permits are in the Chesapeake Bay drainage. These permit holders are required various types of measures to reduce urban stormwater runoff, including reduction of impervious land cover. Implementation is driven by permit requirements.
- Source Water Protection. In the Chesapeake Bay drainage, five large surface water impoundments owned by Baltimore City and the Washington Suburban Sanitary Commission serve millions of Marylanders. Protection of these reservoirs is guided by a watershed-based plan in partnership and cooperation with other governmental jurisdictions within the reservoir watershed. Implementation of these plans is driven by the need to maintain water quality for public consumption. There is no current intent to seek 319(h) implementation funding.
- Antidegradation. Protection of high-quality waters is a priority (See Antidegradation and Healthy Waters in this Chapter).
- Geographic Representation. Attention to the major geographic parts of Maryland is a priority (See Chapter 2).
- Pollutant Representation. Given Maryland's proximity to the Chesapeake Bay, and the dominance of nutrient pollution as a problem, the Program is sensitive ensuring that other types of nonpoint source pollution are given attention, including bacteria, toxic substances, thermal/heat, chlorides, pH, and hydro-modification.

#### **4.Q.2 Additional Factors for Directing Financial Resources**

Additional factors that are considered when directing financial resources to implement restoration projects include, are not limited to, the following:

- Human health (particularly regarding source water and/or bacteria impairment).
- Impairment causes and solutions are understood (particularly when stressor analysis identified impairment source and/or a good track record achieving solutions is demonstrated).
- Value of the watershed (particularly associated with willing implementers and/or public water supply)
- Likelihood of achieving demonstrable environmental results (particularly associated with active monitoring programs and likelihood of documenting success stories).
- TMDL has defined NPS reductions necessary.
- Readiness to proceed is a necessary factor in project proposal selection.

In addition to the priorities and factors considered above, State-administered grant programs that fund NPS implementation projects use eligibility requirements and selection goals/criteria to help ensure that funds are efficiently invested. Examples are listed in Chapter 6 for the Section 319(h) Grant and for Maryland's Chesapeake and Atlantic Coastal Bays Trust Fund.

#### 4.Q.3 Technical Rationales for Restoration Priorities

Finally, the NPS Program continues to promote technical rationales for setting restoration priorities. The following is a brief outline of these.

- **Rationales for Targeting Restoration:** Maryland's 319 NPS Program has developed and communicated three broad rationales for targeting restoration. The rationales reflect multiple objectives, which lead to the adoption of multiple strategies. Although these strategies compete for resources, like the way protection and restoration objectives compete, they are recognized as legitimate objectives.
  - **Removal from the 303(d) list of impaired waters.** This is the ultimate objective for restoration within the context of the federal Clean Water Act. This objective tends to steer resources to waters that are not extensively impaired under the logic that it is easier to restore a waterbody that is only slightly impaired. However, it remains very difficult to restore any waterbody to a condition of meeting water quality standards. Consequently, demonstrating progress via this objective, even when targeting the least impaired waters, is a long-term proposition.
  - **Incremental Local Water Quality Improvement.** This objective seeks to show measurable local water quality improvement, which is difficult due to natural variability<sup>6</sup>. This objective tends to steer resources to waters that are extensively polluted. The logic is that a significant of change can be achieved via less effort and expense because the causes are egregious. The classic example is livestock in the stream, whereby exclusion of the animals will produce notable, rapid results. Admittedly, highly urbanized areas are an exception to this.
  - **Maximum Pollutant Load Reduction.** This objective strives for cost-effective pollution reduction to benefit downstream water quality problems, like excess nutrient enrichment of the Chesapeake Bay. This objective overlaps significantly with the objective of seeking incremental local water quality improvement.

#### 4.Q.4 Applications of Prioritization Rationales

These prioritization rationales have been used in a variety of ways outlined below, which also provide examples of links to other programs and efforts.

- **PCBs (polychlorinated Biphenyls):** For PCBs, Maryland has adopted the targeting principle of focusing on the maximum pollution load reduction. Several rationales drive this targeting approach. First, a primary concern with PCBs is that they bioaccumulate in fish resulting in human health risks. This motivates the desire to reduce the maximum amount of the source. Second, PCBs that are widely disbursed in the environment are difficult to control, aside from what is trapped incidentally by urban stormwater devices and other places that tend to trap sediments. This motivates a strategy to seek out any "hot spot" sources that might be amenable to direct remediation. To this end, Maryland conducts source identification monitoring as a follow-up to statewide screening monitoring studies conducted in 2005 and 2007. The screening monitoring was designed in response to fish tissue monitoring that indicated areas of bioaccumulation.
- **Chesapeake and Coastal Bays Trust Fund:** This funding source, which focuses on nonpoint source controls, is targeted by State statute on maximum pollution load reduction to the Chesapeake and Coastal Bays. The logic is that the State seeks to maximize the reduction of nonpoint source pollution reaching the Bay per dollar invested. In addition to coordination on targeting, the 319 NPS grant has links with the Trust Fund grant via joint RFPs, when possible, grant proposal review committee participation, implementation tracking and resource leveraging.

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<sup>6</sup> As a rule of thumb, a 30% reduction of nonpoint source pollution is needed to measure a statistically significant reduction in pollution. Source: Dr. Jean Spooner, NC State University.

## 4.R Technical Assistance

### 4.R.1 Watershed Assistance Collaborative

Not all communities have the capacity to successfully undertake and carry out NPS planning and implementation. Maryland's [Watershed Assistance Collaborative](#) actively coordinates critical technical support for local communities to attain the capability to conduct NPS restoration and protection work. This program was initiated in 2008 to provide technical assistance to local governments and other local entities that are interested in advancing water quality planning and implementation projects. The Collaborative is a partnership including Maryland's State agencies, the Chesapeake Bay Trust, University of Maryland Extension, and University of Maryland Environmental Finance Center. The Collaborative offers tools, resources, and outreach, with five Regional Watershed Restoration Specialists in UMD Extension directly assisting local partners.

**Connection with State NPS Program:** Because not all communities have the capacity to successfully undertake and carry out NPS planning and implementation, this program actively provides critical technical assistance and related support for local communities to work toward attaining a locally driven capability to conduct NPS restoration and protection work. An example of the Collaborative's success is the Sassafras River Watershed Plan, which is eligible for 319(h) Grant implementation funding. Several NPS implementation projects have been successfully completed as reported in Maryland 319 NPS Annual Report.

### 4.R.2 Watershed Restoration Action Strategy Program

This program was initiated in 2000 by Maryland DNR to provide technical assistance to local governments interested in NPS planning and implementation at the local watershed scale. The program concluded in 2006 following a state agency reorganization and shift to purely financial assistance for NPS watershed planning through the 319(h) Grant. During the program's operation, about 20 watershed plans were completed by local governments who accepted technical and funding assistance through Maryland DNR and MDE using funds from the 319(h) Grant (EPA) and Coastal Zone (NOAA). (See Appendix Internet Sources)

**Connection with State NPS Program:** Two local watershed plans initially completed through this technical assistance program are currently eligible for 319(h) Grant implementation funding and continue to use that fund source to conduct NPS implementation: Corsica River (Town of Centreville) and Lower Monocacy River (Frederick County). Other local jurisdictions with NPS watershed-based plans developed with this program's technical assistance continue to implement their plans using other funding sources: Anacostia River (Prince George's County), Bush River and Deer Creek (Harford County), Pretty Boy Reservoir (Baltimore County), and others. (Also see Watershed Assistance Grant Program.)

### 4.R.3 TMDL Data Center

Maryland's TMDL Data Center is a web-based resource that consolidates valuable technical assistance information designed to support nonpoint source implementation planning. It includes maps and a database of key information about Maryland's TMDLs and associated allocations, which can be accessed in a variety of ways. Several guidance documents are assembled that address general NPS implementation information as well as pollutant-specific suggestions and references to more detailed sources. The Data Center also provides detailed technical methods of developing quantified reduction strategies in the face of changing watershed models and base data such as land cover and BMP inventories and treatment efficiencies.

**Connection with State NPS Program:** Because TMDLs can be technical and are intended to bring quantitative accountability to the subject of water quality restoration, this Data Center is a valuable pathway for providing technical assistance to partners involved in NPS management. It was launched in 2014 as a technical assistance delivery system to support local governments that are required to develop watershed-based plans to meet stormwater waste load allocations (WLAs) pursuant to Phase I MS4 permits. Although WLAs are classified as point sources within the context of TMDLs, many of the technical approaches to managing urban stormwater pollutants align directly with nonpoint source management.

#### **4.R.3 Healthy Waters Round Table Regional Service Project**

Local governments are committed to helping Maryland reach its Chesapeake Bay pollution reduction targets, but many jurisdictions lack the capacity to effectively plan, finance, and implement restoration projects – particularly those that treat and manage stormwater and flooding. In 2016, local government partners in the [Healthy Waters Round Table](#) identified key gaps in capacity to meet water quality goals. Six participating jurisdictions – Cambridge, Easton, Oxford, Salisbury, and Talbot and Queen Anne’s Counties – joined with the Maryland Department of the Environment and the Chesapeake Bay Foundation to hire a [circuit rider](#) staff position that the localities all share.

Achievements to date include planning and prioritization to install 42 cross-jurisdictional water quality projects, including ditch retrofits, bioretention systems, and tree plantings – all located on properties within collaborating jurisdictions.

**Connection with State NPS Program:** The Healthy Waters Round Table Regional Service Project models a structure for enhancing water quality improvement capacity in Maryland’s rural jurisdictions and provides a road map for similar efforts in the future. A program called Envision the Choptank is looking to emulate this project within the Choptank watershed on Maryland’s Eastern Shore.

#### **4.R.4 Lawn to Woodland Program**

Lawn to Woodland helps Maryland residents who own 1-4 acres of land convert unused lawn to forest cover at no cost. Under guidance of the Maryland Forest Service, bare-root tree seedlings are planted and protected with tree shelters by a contractor. Weed mats are also included to help with weed control, and three years of maintenance and planting advice are provided. This program can be limited to some counties based on available funding.

### **4.S Technology Transfer**

#### **4.S.1 Maryland Assessment Scenario Tool (MAST)**

The Maryland Assessment Scenario Tool (MAST) was a web-based nitrogen, phosphorus, and sediment load estimator first developed in June 2011 with a combination of state and federal grant (CBRAP) funding at the Maryland Department of the Environment. The immediate need was to provide local jurisdictions, such as counties, with a streamlined environmental planning tool to provide input into the Chesapeake Bay TMDL watershed implementation plan (WIP) process.

Users could specify geographical areas and then select best management practices (BMPs) to apply in that area. MAST would process the scenario and estimate how much nitrogen, phosphorus, and sediment reduction was achieved by BMPs entered in a scenario along with an estimate of costs for implementing those practices.

With continued funding from the U.S. EPA, the tool was expanded in 2012 and applied to Virginia (the tool was titled VAST) and then to the entire Chesapeake Bay watershed (titled CAST). The functionality of the CAST family of tools has been expanded further and is now considered the official Chesapeake Bay Model. Users may sign up and interact with the model as well as see raw data from the various jurisdictions.

#### **4.S.2 Stormwater Management and Restoration Tracking (SMART) Tool**

The [Stormwater Management and Restoration Tracking \(SMART\) Tool](#) is an interactive Internet GIS method for property owner/managers to voluntarily report implementation of twenty types of urban stormwater management BMPs. The tool is a non-regulatory product of the University of Maryland Extension and the Maryland Sea Grant Program. The tool involves on-site certification of BMPs by independent specialists and was pilot tested in several Maryland counties in early 2014 and is available statewide for use by homeowners.

#### **4.T Tracking Implementation**

Maryland's 319 NPS Program is integrated into the State's tracking of nonpoint source implementation progress (See Chapter 3 – Resource Assessment and Monitoring Programs). Assessing this progress takes several forms, which entail tracking and evaluation of information:

- **BMP implementation:** Evaluating the level of BMP implementation is an indirect measure of water quality improvement, because BMPs are presumed to have water quality benefits. Maryland's 319 Program is directly responsible for tracking all NPS BMP implementation in the Chesapeake Bay watershed, which makes up most State land. This tracking also identifies BMPs that benefit local water quality improvement initiatives.
- **Pollution Load Reductions:** Tracking pollution load reductions is hugely challenging. However, we in the Chesapeake Bay region are fortunate that the EPA Chesapeake Bay Program maintains a watershed model that is used to estimate nutrient and sediment load reductions. As noted above, Maryland's 319 Program tracks BMP implementation. This data is reported to the Bay Program to support annual progress evaluations that are expressed in terms of pollution load reductions.
- **Localized Restoration:** Localized improvement in water quality, resulting from specific projects and targeted watershed initiatives, helps to demonstrate incremental progress. Maryland's 319 Program invests a significant fraction of its budget tracking the effect of localized restoration efforts. The Program also solicits other examples of localized restoration to help EPA document the benefits of nonpoint source management. Some of the more notable examples are documented as formal [success stories](#). One of the more noteworthy success stories is the [Corsica River initiative](#), which has shown significant nitrogen and phosphorus reductions at a watershed scale.
- **Protection:** Localized impacts on high quality waters can result from new development despite antidegradation policies. Maryland's 319 Program tracks development activities near high-quality waters and targets monitoring to potentially effected waters.

## 4.U TMDLs

### 4.U.1 Overall

The USEPA has developed a vision for Section 303(d) of the federal Clean Water Act. It consists of six elements or goals: Engagement, Prioritization (of a state's watersheds), Protection (i.e., of unimpaired watersheds), Alternatives (to traditional TMDL development), Integration (with other major environmental statutes), and Assessment (of overall results). The Engagement and Prioritization components are implemented first, followed by Protection, Alternatives and Integration, with Assessment last. The first 'cycle' of full implementation of the New Vision began with the 2016 Integrated Report of Surface Water Quality (IR) and is to be completed by 2022. New TMDL development focuses on (1) the protection of public health, and (2) the protection of aquatic life in all of Maryland's waterways.

Maryland developed and submitted its list of priority watersheds in 2016 after presenting the information at four public meetings. The presentation can be found here:

[https://mde.maryland.gov/programs/Water/TMDL/Integrated303dReports/Documents/prioritiz\\_IR\\_Pubmeet\\_hdt.pdf](https://mde.maryland.gov/programs/Water/TMDL/Integrated303dReports/Documents/prioritiz_IR_Pubmeet_hdt.pdf).

The full documentation of this prioritization is available in the 2016 IR Part G available at:

[https://mde.maryland.gov/programs/Water/TMDL/Integrated303dReports/Documents/Integrated\\_Report\\_Section\\_PDFs/IR\\_2016/Final\\_2016\\_IR\\_Part\\_G.pdf](https://mde.maryland.gov/programs/Water/TMDL/Integrated303dReports/Documents/Integrated_Report_Section_PDFs/IR_2016/Final_2016_IR_Part_G.pdf).

### 4.U.2 Chlorides

An example of an emerging pollutant of concern that has a high priority in Maryland is chloride. Biological stressor analysis has identified chloride as the probable cause of biological impairment in numerous watersheds throughout the State. MDE has developed a chloride monitoring network to determine the spatial and temporal extent of chloride loadings that led to the biological impairments.

Maryland has identified 28 MDHUC 8-digit non-tidal watersheds within the State as impaired by chlorides ([Integrated Report Category 5](#)). The largest contributor to chloride impairment in Maryland is the addition of deicing salt in the wintertime on roads, parking lots, and sidewalks. It only takes one teaspoon of salt to pollute five gallons of water. With current technology, there is no traditional, structural Best Management Practice (BMP) to remove salt once it enters the surface and eventually the groundwater.

These chloride impaired waters have shown concentrations that spike above both the acute and chronic EPA water quality standards for chlorides. In the past few decades, chloride concentration trends have shown an increase in both surface and groundwater, in drinking water reservoirs, wells, and finished water. High concentrations of salt can impact human health, cause damage to public and private infrastructure, impact soil health and uptake in plants, and degrade freshwater aquatic life. High concentrations of salt in stormwater can cause the mobilization and leaching of metals. MDE has developed a [story map](#) that describes salt impacts.

In 2010, the Maryland General Assembly passed a bill requiring our State Highway Administration to develop a Salt Management Plan in 2011. The plan includes a broad suite of best management practices designed to



reduce the amount of winter salt applied to state owned roads. The plan has led to approximately 50% less salt being applied on state owned roads. A revision to this plan was provided in 2020 and can be located [here](#).

### **Goals**

Maryland has no statewide numeric criteria for chloride in non-tidal waters. Because there is no effective structural Best Management Practice (BMP) to remove it, an adaptive management approach to reducing salt application will be taken. Water quality standards will be achieved by reducing in-stream chloride concentrations to levels that do not inhibit the growth and propagation of freshwater fish and other freshwater aquatic life. Reducing salt application will also address human health, drinking water treatment, and other concerns.

Chloride pollution regulatory controls will be applied statewide; therefore, a statewide 4b TMDL alternative demonstration will be explored to address both currently identified surface water impairments associated with road salt application in Maryland, as well as any that are identified in the future.

In addition, a statewide salt training program is being developed. A voluntary salt training program will improve the effectiveness of applicators and decrease the amount of salt applied to roads, parking lots, and sidewalks. There will be a training course for both operators and property managers to spread awareness and education about this pollutant. Encouraging new practices such as anti-icing with brine, snowplows with new technologies to monitor salt application rates, and increasing plowing effectiveness are just a few strategies that will be implemented. Milestones for chlorides are in Appendix B: Milestones.

Salt monitoring studies will continue as these programs are implemented to document reductions. Monitoring is focused on drinking water reservoirs and chloride impaired streams. Adoption of best application and storage practices will also be considered as a metric for success.

### **4.U.3 Polychlorinated Biphenyls**

As of 2021, MDE developed 25 TMDLs to address PCB impairments in Maryland waters. MDE has scheduled 3 additional PCB TMDLs for completion for the years 2021 thru 2025. Milestones for PCBs are in Appendix B: Milestones.

### **4.U.4 Temperature**

MDE has been working over the past years reviewing and updating the water body use classification (e.g., Use Class III). MDE has also developed a new assessment methodology that determines which water bodies have temperature impairment. As a result of this effort new temperature impairment listings for 101 watersheds were put on the integrated report. MDE has included these new temperature listings in its prioritization framework to establish a timeline to address these listings through the TMDL process. Milestones for temperature are in Appendix B: Milestones.

### **4.U.4 Trash**

MDE has also developed a new assessment methodology that determines which water bodies have a trash impairment. MDE will include trash listings in its prioritization framework to establish a timeline to address these listings through the TMDL process. Currently one TMDL for the Baltimore Harbor has been completed, and another TMDL for the Anacostia watershed is anticipated in the 2021-2025 period. Milestones for trash are in Appendix B: Milestones.

## 4.V Training

### 4.V.1 Coastal Training Program

The Chesapeake Bay National Estuarine Research Reserve (CBNERR) promotes educational opportunities and scientific study of the Bay to better inform restoration efforts. Through the [Coastal Training Program](#), CBNERR provides accurate scientific information about coastal resources to decision makers in the watershed. The Coastal Training Program targets state, county, and local government; academic institutions; the agricultural community; watershed and environmental groups; industry and private businesses; developers; and citizens. The program focuses on issues related to managing development along the shoreline, watershed management and sustainability, coastal hazards and resiliency, and climate change.

Individual trainings range from seminars to hands-on skill training, participatory workshops, lectures, and technology demonstrations. Participants benefit from opportunities to share experiences and network in a multidisciplinary setting, often with a reserve-based field activity. CBNERR works in partnership with many organizations in the Bay region to deliver these professional training programs. Since 1994, National Estuarine Research Reserve workshops and seminars across the country have reached over 13,000 coastal decision-makers. These programs have resulted in better-informed decision-making around coastal resource issues and improved coastal stewardship at local and regional levels. (See Appendix Internet Sources)

**Connection with State NPS Program:** The Maryland Coastal Training program focuses on issues related to managing development along the shoreline, watershed management and sustainability, coastal hazards and resiliency and climate change. NPS skill-based training and information is provided to local decision-makers thru Maryland's Watershed Assistance Collaborative with the intent of accelerating on the ground implementation of BMPs.

### 4.V.2 Watershed Stewards Academy

The training offered by the Watershed Stewards Academy is designed to empower residents to improve water quality in local streams. The Academy provides training, shares resources, assists in forming partnerships and coordinating efforts. It works with a consortium of support professionals, Master Watershed Stewards, and their communities to reduce pollutants, infiltrate stormwater and restore natural systems. Trainees receive knowledge from lecturers, training in using watershed assessment tools for analyzing stormwater runoff, and hands-on experience leading stormwater management and behavior change projects. There are currently six Academy locations with two more being planned on a regional basis: Anacostia River (PG County), Anne Arundel County, Cecil County, Harford County, Howard County, and the National Capital region. Trainees pay a fee to cover costs of materials/activities. (See Appendix Internet Sources). Planned locations: Upper Eastern Shore, Middle Eastern Shore.

**Connection with the State NPS Management Program:** The Watershed Stewards Academy is a key on-going NPS management program to build grassroots understanding and participation by training interested individuals who want to actively improve their ability to protect and restore water quality. Trainees who become Master Stewards also magnify program results by involving others in their community. MDE continues to support this program as it incorporates elements of climate resiliency and helps to create local leaders who serve as ambassadors to our restoration programs.

#### **4.V.3 Maryland Smart Salt Certification**

MDE is working to develop a training program for the owners and winter maintenance professionals that manage small roads (e.g., Homeowner's Associations (HOA) roads), parking lots, and sidewalks to complement our State Highway Administration's Snow College. The training will focus on enhanced practices that lead to lower use of this pollutant during winter storms and ice events. Trainees will learn about the impacts of salt to human health, the environment, and infrastructure, best management practices for applying salt in various weather conditions, proper storage, proper application rates, and spill cleanup. The curriculum for this program will be developed by July 2022 and beta testing will begin shortly after. The program is designed to reach an audience that has varying degrees of knowledge of salt pollution and winter maintenance.

**Connection with the State NPS Management Program:** The Smart Salt Certification Program is a priority for MDE's nonpoint source program as a key component of its strategy to reduce salt pollution within Maryland. Trainees who become certified will be able to apply the knowledge they get to application as well as pass along what they've learned to others in their organizations and help to spread word of the training to others in their industries.

#### **4.W Environmental Justice**

Recent guidance from EPA and within MDE have focused on ensuring that all nonpoint source pollution reduction programs identify ways to incorporate elements of environmental justice (EJ) into their planning and implementation. Further instruction on how to incorporate EJ into Maryland's program is expected during the 2021-2025 planning period, but no specifics have been provided to date.

MD's 319 Grant program is currently looking into ways it can foster such programs through a potential grant award for Envision the Choptank & the Chesapeake Bay Foundation. The grant would help to fund a portion of a "circuit rider" position within Choptank River watershed on Maryland's Eastern Shore. This position would provide a number of benefits by helping disenfranchised communities to:

- Build local capacity and local leaders
- Identify locations for water quality restoration
- Identify locations for flood mitigation
- Provide technical support for design
- Provide support for managing grants and projects with local leaders

MDE believes that this project is a good example of how to build capacity within disenfranchised communities within an area of the State that needs greater focus on environmental justice in the face of rising challenges due to climate change.

This program is also in line with recent guidance received from EPA headquarters on how to build capacity in EJ communities using 319 resources. MDE will continue to develop more detail of this section as more information is learned from the Envision the Choptank project, and through support of the Watershed Stewards Academy. One potential outcome is a network of watershed stewards that would serve as conduits for local implementation that would prioritize disenfranchised or underserved communities. Completion of those edits will be done by 12.1.23.

# Chapter 5 – Watershed Management to Achieve NPS Goals

## 5.A Framework

Maryland State nonpoint source management, planning, TMDLs and implementation are conducted in a watershed-based framework consistent with State policy and programs. In each of Maryland’s three major watershed drainage areas, NPS management and planning are focused to address the unique circumstances found there. Within each major watershed drainage area, NPS goals may be set for the regional watershed, the local watershed, and a stream segment scales at the same time. This nested approach characterizes Maryland’s NPS management framework.



For example, NPS nutrients and sediment management goals, and implementation plans, are set at different watershed scales, with increasing detail, nested within each other:

- Baltimore Harbor TMDL limits phosphorus
  - Gwynns Falls TMDL, within Baltimore Harbor watershed, limits sediment. The local jurisdiction’s watershed plan describes how the nutrient and sediment TMDLs will be achieved.
    - Scotts Level Run within the Gwynns Falls watershed is targeted by the local jurisdiction for neighborhood watershed scale implementation and assessment.

For TMDLs in Maryland that set limits at different watershed scales for the same pollutant, the intent is to eliminate water quality impairments at the scale of each TMDL. Therefore, all the TMDLs remain in force and the most stringent TMDL limit must be met even though the less stringent TMDLs might be surpassed.

Watershed plans designed meet TMDLs and other NPS goals that address the same pollutant at different watershed scales are in effect nested. Together these watershed plans show how NPS implementation can be accomplished and contribute to meeting goals at different scales.

## 5.B Maryland's Major Watershed Drainage Areas

Waterways in the State of Maryland naturally flow in three major drainage areas. Nonpoint source management in each of these drainage areas has evolved watershed management approaches tailored to address the unique circumstances of each:

- Chesapeake Bay watershed: Over 90% of Maryland is in the Chesapeake Bay watershed. Here, the partnership between the States and federal EPA Chesapeake Bay Program provides a cooperative management umbrella and large-scale goals. Within this umbrella, numerous local watershed management efforts are nested that contribute to meeting State-level Chesapeake Bay goals and serve local NPS management needs.
- Coastal Bays watershed: The Coastal Bays are embayments formed between the mainland and barrier islands in the Atlantic Ocean. In these watersheds, the Maryland Coastal Bays Program, which is a local nonprofit group, provides a forum for State and Federal agencies and Worcester County to work toward common water quality and resource management interests.
- Youghiogheny River and Casselman River watersheds: These mountainous watersheds in Garrett County, Maryland drains north into Pennsylvania and West Virginia, and eventually to the Ohio River and the Mississippi River. With their legacy of resource extraction, these watersheds are addressed thru State and local cooperation on watershed management at the local watershed scale.

## 5.C Chesapeake Bay Drainage Area

Following renewal of the Chesapeake Bay Agreement (Chesapeake 2000) and completion of the last State NPS Management Plan, progress toward meeting some of the ambitious Chesapeake Bay restoration goals did not meet expectations. To help re-focus Chesapeake Bay Restoration efforts in December 2010, EPA completed the *Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment* (Bay TMDL) and the State of Maryland completed *Maryland's Phase I Watershed Implementation Plan for the Chesapeake Bay Total Maximum Daily Load* (Phase I WIP). Then in October 2012, the State of Maryland developed greater detail for implementing the Bay TMDL in *Maryland's Phase II Watershed Implementation Plan for the Chesapeake Bay TMDL* (Phase II WIP). More recently, *Maryland's Phase III Watershed Plan for the Chesapeake Bay TMDL* (Phase III WIP) was submitted and accepted by EPA in 2019.

### 5.C.1 Chesapeake Bay Agreement

For over thirty years, cooperative partnership between Maryland, Virginia, Pennsylvania, Washington DC, US EPA, and the Chesapeake Bay Commission has been fostered thru the Chesapeake Bay Agreement. Since the original 1983 signing, the Agreement has been renewed and reinvigorated, was joined by the State of West Virginia, and was amplified by the 2009 Presidential Executive Order. The most recent renewal of the partnership embodied in the 2014 Chesapeake Bay Agreement now brings all the States the drain to the Chesapeake Bay into the partnership with the addition of Delaware and the State of New York. The Agreement also involves collaboration from the Federal Leadership Committee for the Chesapeake Bay, including the federal agency members listed below:

- U.S. Environmental Program Agency
- U.S. Department of Agriculture
- U.S. Department of Commerce
- U.S Department of Defense
- U.S. Department of Homeland Security
- U.S. Department the Interior
- U.S. Department of Transportation

These federal agencies collaborated in working to meet Presidential Executive Order 13508 by producing a strategy in 2010 and action plan in 2012. These documents summarize the many areas of cooperation between federal and state agencies that benefit Maryland and the Chesapeake Bay. (See Appendix Internet Sources, Executive Order 13508)

Maryland is striving to attain the goals and outcomes in the 2014 Chesapeake Bay Agreement. The schedule identified in the Agreement affects Maryland's NPS management program most directly in the water quality goal where the 2017 Watershed Implementation Plans Outcome expects the signatories "to achieve a 60% of the nutrient and sediment pollution load reductions necessary to achieve applicable water quality standards compared to 2009 levels". To address this outcome, progress assessments will be conducted, and the results will be used to support NPS management decisions. If significant changes are made in Maryland's NPS management program, they will be reflected in future updates to this document. (See Appendix Internet Sources: Chesapeake Bay Agreement)

In 2020, Maryland received an allocation of nitrogen and phosphorus that it will need to mitigate to meet TMDL goals. This additional allocation is due to the influence of climate change. Maryland submitted an addendum to the Phase III WIP to show its plan to reduce the additional allocation by 2025. This plan was due January 15, 2022.

### **5.C.2 Chesapeake Bay TMDL**

The Bay TMDL specifies the amount of nitrogen, phosphorus, and sediment that the Chesapeake Bay may receive while continuing to maintain water quality standards and it identifies specific pollution reduction requirements. This TMDL is comprised of 294 separate TMDLs (98 impaired bay segments for each of three pollutants: nitrogen, phosphorus, and sediment). Maryland is responsible for 58 impaired segments and the 174 TMDLs that apply to them.

Because this is the first multi-jurisdictional TMDL on this scale, EPA requires an enhanced "reasonable assurance of implementation" element in the TMDL to ensure that load outcomes are met. The reasonable assurance being required is Maryland's Final Phase I, Phase II, and Phase III WIPs, which were approved by EPA.

The Bay TMDL calls for all pollution control measures to be in place by the end of fiscal year 2025.

### **5.C.3 Chesapeake Bay WIP**

Maryland's Watershed Implementation Plan (WIP) for the Chesapeake Bay TMDL is a component of the State NPS Management Program that guides NPS implementation to meet the Bay TMDL. The State WIP is a roadmap for how the Bay TMDL will be achieved and maintained. It is also documentation of "reasonable assurance" that the Bay TMDL will be implemented. The Phase I WIP provides an overall picture of how reductions can be achieved. The Phase II WIP presents a more detailed picture of nutrient loading reductions at the scale of major river basins.

Maryland's Phase I WIP built on current restoration efforts and identified 58 options to reduce nitrogen, phosphorus, and sediment for wastewater, urban run-off, septic systems, agriculture, and air pollution. While the final Phase I WIP addressed the overall funding need for calendar 2012 through 2017, it did not break down the costs sufficiently to determine responsibility for costs as would be needed in an overall spending plan. The Phase I WIP focused on the following three approaches for bridging the remaining loading gaps: (1) develop new technology and approaches before calendar 2017; (2) increase the scope of implementation of existing strategies such as upgrading wastewater treatment plants and increasing the number and efficiency of stormwater runoff controls; and (3) improve regulatory requirements.

Maryland's Phase II WIP set the framework for allocating the pollutant loads on a major river basin scale and provided greater detail about proposed pollution controls but does not actually state the detailed level reductions proposed since EPA was continuing to evaluate proposed strategies by watershed model runs. The Phase II WIP strategies were designed using the Maryland Assessment and Scenario Tool (MAST), which is a simplified proxy model for the Chesapeake Bay watershed model that allows users to test implementation strategies.

Maryland's Phase III WIP, approved by EPA in 2019, sets the framework for allocating the pollutant loads on a major river basin scale and providing greater detail about proposed pollution controls. The Phase III WIP strategies were designed using the Chesapeake Assessment and Scenario Tool (CAST), which is the new Chesapeake Bay watershed model that allows users to test implementation strategies. The Phase III WIP also identifies sector strategies in [Appendix B](#), (page B-14) that includes forestry strategies that are incorporated into our State's NPS strategy for Natural Resources.

#### **5.C.4 Chesapeake Bay Milestone Goals**

In May 2009, the Chesapeake Bay partners including Maryland discarded the broad 10-year goal framework used over the prior 30 years and committed to new voluntary 2-year incremental goals called milestones for reducing nitrogen, phosphorus, and sediment loads. The 2-year milestones for the Maryland portion of the Chesapeake Bay watershed are integrated into the State's restoration policy framework and they are informative components of Maryland's NPS Management Plan. Maryland's [annual progress storymap](#) publicly distributes tracking of Maryland's progress toward these milestones and related program information.

Maryland's Chesapeake Bay Milestone Goals are publicly available on the Internet. (See Appendix Internet Sources) These two-year milestones are components of the State NPS Management Plan. They are designed to facilitate achieving Maryland's overall Chesapeake Bay WIP goals by 2025 following a timeline:

- December 2010: EPA published the final Bay TMDL and Maryland's Phase I WIP was completed.
- October 2012: Maryland's Phase II WIP and two-year milestones submitted to EPA.
- November 2017: Meet 60% of the Bay TMDL targets and submit to EPA final Phase III WIP detailing calendar 2018 to 2025 actions.
- December 2025: Meet final Bay TMDL targets.

#### **5.C.5 Chesapeake Bay WIP Tracking**

Maryland continues to develop and enhance NPS management, implementation, and progress tracking for the Chesapeake Bay drainage area in the State thru the WIP process in cooperation with the EPA Chesapeake Bay Program. Public distribution of program documents is provided thru the Department of the Environment's Internet home page including the Phase I WIP, the Phase II WIP, the Phase III WIP, and the 2-year milestones. Updates to the WIP documents will be components of the State NPS Management plan and will be posted on the Internet. (See Appendix Internet Sources)

### 5.C.6 Partnerships, Coordination, and Outreach

Maryland's Chesapeake Bay area is the focus of a very extensive array of coordination and outreach efforts at all levels. Some examples of ongoing entities that conduct coordinating and outreach activities related to Bay or statewide NPS management (not complete list):

- Anacostia River Watershed Restoration Partnership: Maryland State agencies, Washington DC, Montgomery County, Prince George's County, and citizen representatives voluntarily partner thru the Metropolitan Washington Council of Governments (MWCOG). Annual memoranda of understanding provide funds for coordination by MWCOG. Adopted the current Restoration Plan in February 2010. NPS issues are addressed in standing Anacostia watershed coordinating bodies: the Management Committee and the Steering Committee.
- Baltimore Reservoir Technical Advisory Group: The voluntary body serves to coordinate management and protection of Baltimore's three public drinking water reservoirs. It is coordinated by the Baltimore Metropolitan Council. Its membership includes Baltimore City, five counties (Anne Arundel, Baltimore, Carroll, Harford, Howard), two soil conservation districts (Baltimore and Carroll), and three State agencies (MDP, MDA and MDE).
- Chesapeake Bay Cabinet: Maryland State agencies' Secretaries meet periodically to coordinate work between and among the agencies.
- Chesapeake Bay Commission: Legislative representatives from MD, PA, VA meet periodically to coordinate efforts among the states.
- Chesapeake Bay Program: Federal agencies maintain local offices focused on Bay work and coordinate work between the Federal agencies and among the States. Maryland participates in various Program committees for this regional voluntary agreement.
- Chesapeake Bay Workgroup: Maryland State agencies lead technical managers meet periodically to coordinate work between and among the agencies.
- Children's Environment Health and Protection Advisory Council: This State body established by statute in 2000 to identify environmental health issues for children and seeks to protect children in Maryland from exposure to environmental hazards. Its members include experts appointed by the Governor, the Governor's Office for Children, representatives of the State legislature and State agencies MDH, MDA, MDE, Dept. of Housing and Community Development, and the Dept. of Human Services.
- Critical Area Commission for the Chesapeake and Atlantic Coastal Bays. State and local members focused on buffers and 1000 ft adjacent to tidal waters.
- Dredged Material Management Plans Executive Committee: This State body was established by statute in 2001. The Committee oversees development of State plans to manage dredged material from the Port of Baltimore. The Committee ensures that the management program is environmental sound and economically effective. Members represent the Governor, three State Departments (Environment, Natural Resources, and Transportation), the Dredged Material Placement Program Management Committee, the US Army Corps of Engineers, and the Chesapeake Bay Foundation.
- Environmental Health Liaison Committee: The Committee was voluntarily created in 2000 to review and address updating a memorandum of understanding between MDH, MDE, Local Health Officers and Local Environmental Health Directors. The MOU, and its updates, sets forth the working relationships and cooperation among these entities. Examples of NPS issues addressed under the MOU include safeguarding water quality affecting shellfish harvesting waters and public bathing beaches.



- Governor’s Emergency Management Advisory Council: The State body was created by Executive Order pursuant to federal law to advise and coordinate on all matters emergency management including hazardous materials spills, and vulnerability assessment.
- Federal Leadership Committee for the Chesapeake Bay: Federal agencies with responsibilities to carry out the federal Strategy for Protecting and Restoring the Bay.
- Interstate Commission on the Potomac River: State representatives.
- Patuxent River Commission: Members named in State law include MDP, MDA, MDE, Maryland DNR, each of the seven Counties in the watershed, and representatives of business and academia. Meet periodically to coordinate protection and restoration of water quality. Adopted the 2015 Policy Plan in March 2014.
- Pesticide Advisory Committee: The State body was established by Executive Order. Its missions include ensuring proper handling, safeguarding human health, and protecting environmental resources. Members represent the State legislature, State agencies (MDH, DNR, MDA, MDE), the Maryland Agricultural Commission, the University of Maryland, and various fields of expertise.
- Susquehanna River Basin Commission: Commissioners represent the US Army Corps of Engineers and States (MD, NY, PA).

Outreach aligned with Maryland’s Chesapeake Bay priorities and issues is a high priority.

### **5.C.7 National Water Quality Initiative - Catoctin Creek and Prettyboy Watersheds**

The National Water Quality Initiative (NWQI) works in priority watersheds with impaired streams to help farmers and forest landowners voluntarily implement more conservation practices. The purpose of this cooperative effort between the US EPA, the USDA-NRCS and the States is to target a portion of Environmental Quality Incentives Program (EQIP) funding to fund conservation practices in targeted watersheds to expedite agricultural NPS conservation practice implementation and to promote accelerated water quality improvement.

Partnership: In Maryland, several agencies cooperated to select the Catoctin Creek watershed: the Maryland NRCS office, the NRCS State Technical Committee, the Maryland Dept. of Agriculture and MDE. The Catoctin, Carroll County, and Baltimore County Soil Conservation Districts are also partnering to provide the technical support necessary to effectively employ the funding support and to rapidly implement the conservation practices. To monitor in-stream water quality conditions as one gauge of project results, a memorandum of agreement is being renegotiated so that the Maryland NRCS office provides funding support for monitoring and MDE conducts the monitoring and analysis.

The Catoctin Creek watershed encompasses the southern portion of Frederick County between Catoctin Mountain on the east and South Mountain on the west. The watershed drains 120 square miles including forested mountain slopes, agricultural valleys and small towns. Some local streams exhibit impairments associated with sediments, nutrients, biological communities, and face coliform bacteria. Land use in the watershed about 43% agriculture (mostly row crops and pasture), 42% forest/herbaceous and 15% urban.

The Prettyboy watershed, an 80 square-mile watershed that flows through Carroll and Baltimore counties, feeds the Prettyboy Reservoir. The Prettyboy Reservoir is one of three reservoirs in the Baltimore Metropolitan System that collectively provides water to 1.8 million consumers in Baltimore City and surrounding areas. Approximately 15% of the watershed is developed, 47% is agricultural and 38% is forest, wetlands, and water. Land use changes, including the loss of forests, farms, and riparian vegetation, coupled with increased stormwater runoff, septic systems, the impacts of roads and increasing deer populations, have caused concerns about water quality and the future protection of this vital source of drinking water.

Status: Funding became available, and implementation of conservation practices began in 2012 and has continued each year thru 2020. During that time over \$400,000 in financial assistance has contributed to installing conservation practices such as waste storage facilities, prescribed grazing systems and livestock exclusion from stream corridors.

### **5.C.8 National Nonpoint Source Monitoring Program Project – Corsica River Watershed**

Maryland’s Corsica River watershed has become a laboratory for nonpoint source management and assessment techniques. The Corsica River is a tributary to the Chester River and Chesapeake Bay on Maryland’s Eastern Shore in Queen Anne’s County and encompasses the Town of Centreville. In 2005, Governor Robert Ehrlich proclaimed the Corsica River to be a State targeted watershed. The original intent was to invest significant State and federal resources in the watershed for a 5-year period, build local funding and governance structures and then spin it off to be a locally managed initiative.

In great part, that effort was implemented successfully, although it required a little more time than anticipated. Following years of funding by the Clean Water Act Section 319(h) Grant for a local watershed manager, the Town of Centreville adopted a storm water fee ordinance intended to fund a part-time watershed manager and other needs. Early on, the Corsica Implementers Committee (CIC) was established to promote collaboration among cooperating government agencies. The CIC, which among other successes, developed a 6-Year progress report that also revised NPS implementation goals that meets EPA guidance thereby maintaining eligibility for 319(h) grant implementation funding. Aside from institutionalizing governance and funding structures, significant implementation progress has been made, including land conservation. Perhaps most noteworthy has been the successful demonstration of observable in-stream water quality improvements at a subcatchment scale.

Although the original commitment of State and federal resources was limited to 5-years, the success of the monitoring element of the Corsica River initiative has prompted a continued commitment of Section 319 funding and State staffing. The Corsica has been accepted as one of EPA’s approximately 28 National Nonpoint Source Monitoring Program (NNSMP) projects. This affords the Corsica initiative with special technical assistance from EPA. The objectives of the NNPSMP are 1) to scientifically evaluate the effectiveness of watershed technologies designed to control nonpoint source pollution; and 2) to improve our understanding of nonpoint source pollution<sup>7</sup>. (For more information, see Appendix Internet Sources)

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<sup>7</sup> D.E. Line, D.L. Osmond, and G.D. Jennings. 2000. Section 319 NonpointSource National Monitoring Program Successes and Recommendations. NCSU Water Quality Group, Biological and Agricultural Engineering Department, NC State University, Raleigh, North Carolina., [http://www.bae.ncsu.edu/programs/extension/wqg/319monitoring/doc/nmp\\_successes.pdf](http://www.bae.ncsu.edu/programs/extension/wqg/319monitoring/doc/nmp_successes.pdf)

## 5.C.9 Other Priorities in the Potomac River Basin

### Upper Jennings Run

Upper Jennings Run, located in Allegany County, Maryland is a tributary of Evitts Creek which drains into the Potomac River at Cumberland, MD. This part of Maryland is in the Appalachian Mountains and is characterized by steep slopes and valleys with some areas of bottomland sphagnum bogs that produce naturally acidic drainage water. Upper Jennings Run is also impaired by AMD from previous mining operations and sediments. MDE's AMLD completed a watershed plan to mitigate pH impairments, which received EPA's tentative acceptance, while MDE's WSA is working to update the plan to mitigate sediment impairment.

The watershed plan is being updated to address local sediment impairments and will be submitted to EPA for review in 2022. It is anticipated that completion of the plan will occur in late 2022 or early 2023 based on other priorities.

## 5.D Coastal Bays

Streams in the eastern half of Worcester County, Maryland, flow toward coastal bays formed by barrier islands near the mainland in the Atlantic Ocean. These coastal bays are unique in Maryland because slow flushing and evaporation commonly cause some areas to be saltier than the open ocean. In this drainage area, NPS watershed planning and implementation is conducted through cooperation facilitated by the Maryland Coastal Bays Program, which is a nonprofit organization partnering with the National Estuary Program.

Cooperators include:

- Local government: Worcester County and towns of Berlin and Ocean City
- State agencies including the Departments of Natural Resources, Agriculture, Environment, and Planning, and Transportation.
- Federal agencies: EPA, Fish & Wildlife Service, National Park Service, and the US Geological Survey.

From 1999 through present, these government entities focused their cooperation on water quality issues across the 175 square mile watershed by using a comprehensive conservation and management plan (CCMP) entitled *Today's Treasures for Tomorrow: Towards a Brighter Future, The Comprehensive Conservation and Management Plan for Maryland's Coastal Bays*. The 1999 CCMP addressed a multitude of natural resource and environmental issues.

Under the umbrella of the CCMP and consistent with the TMDLs, watershed management plans produced between 2002 and 2006 focus on the major Coastal Bays watersheds: Assawoman Bay, Isle of Wight Bay, Newport and Sinepuxent Bays, and Chincoteague Bay. Priorities for watershed planning and plan implementation are driven by local needs and State agency regulatory responsibilities. (No current intent to seek 319(h) Grant implementation funds.) Total maximum daily loads (TMDLs) and water quality analyses (WQAs) have been approved for watersheds within the larger Coastal Bays watershed, including: Assawoman Bay, Big Mill Pond in the Chincoteague Bay watershed, Chincoteague Bay, Herring and Turville Creeks in the Isle of Wight Bay watershed, Newport Bay, and the northern coastal bays system (Assawoman Bay, Isle of Wight Bay, St. Martin River). In August 2014, nutrient TMDLs for the entire Maryland Coastal Bays system were approved by EPA. These TMDLs will help to guide NPS management by identifying baseline loadings, pollutant sources and by setting pollution reduction targets.

In 2011, a 13-year progress report (1999 thru 2011) summarized progress toward meeting the CCMP's numerous goals and objectives. In consideration of these findings, a draft update to the CCMP was released in January 2014 for public review. In April 2014, two public workshops were held to facilitate public understanding and input. The revised CCMP was completed at the end of 2014 and the Maryland Coastal Bays Program continues to work with local, state and federal agencies to implement the plan.

The nutrient control strategy for the Coastal Bays watershed is embodied in the Total Maximum Daily Loads of Nitrogen and Phosphorus for Assawoman Bay, Isle of Wight Bay, Sinepuxent Bay, Newport Bay and Chincoteague Bay in the Coastal Bays Watersheds in Worcester County, Maryland section 5.0 Assurance of Implementation and in the Draft CCMP. In 2020, EPA conditionally approved a watershed-based plan for Assawoman Bay. This plan focuses on the Maryland portion of Assawoman, but coordination with the Delaware Department of Natural Resources and Environmental Control (DNREC) promises to provide plans for the Delaware portion of Assawoman Bay at some point in the next few years. Additional plans for the remaining Coastal Bays are being planned as well.

## 5.E Western Maryland: Youghiogheny River and Casselman River Watersheds

### Ohio River Basin

Streams in Garrett County, Maryland, in the Youghiogheny and Casselman River watersheds flow northward into Pennsylvania. This part of Maryland is in the Appalachian Mountains and is characterized by steep slopes and valleys with some areas of bottomland sphagnum bogs that produce naturally acidic drainage water. These watersheds are headwaters to part of the Ohio-Mississippi River watershed which is a national water quality priority. Some federal efforts (e.g., NRCS Mississippi River Basin Healthy Watersheds) exclude some States and are not truly watershed focused (e.g., excluding MD, WV, PA as Ohio River headwater states) or lack the level of funding necessary to address water quality efforts, as is being done on an estuarine scale in the Chesapeake Bay, on a continental scale.

pH mitigation efforts in both watersheds were begun by MDE's Abandoned Mine Lands Division (AML) in the past. More recent mitigation efforts in the Casselman will be inspected to ensure proper function and determine if material is needed for BMPs. Additionally, MDE is working with Trout Unlimited to assess potential temperature impairments which may be impacting naturally reproducing Brook Trout habitat.

MDE is working with its AMLD to create the State's first ever watershed protection plan for Cherry Creek, a tributary of Deep Creek Lake. BMPs in this watershed mitigating acid mine drainage have reached the functional end of their lifespan and will need replacement to continue to protect water quality and aquatic organisms.

A watershed plan for Deep Creek Lake was developed in 2014 by the Deep Creek Watershed Plan Steering Committee for the Garrett County Commissioners and MD Department of Natural Resources (Lake Owner). This plan does not provide specific reductions of pollutants and is not A-I compliant however and is not likely to be revised into an A-I plan.

In these river basins, NPS watershed planning and implementation is conducted on a watershed-by-watershed basis considering the unique issues that characterize each area. Priorities for watershed planning and implementation in this watershed consider several factors in addition to those listed in Chapter 4:

- Statutory requirement. Plan implementation is driven by the requirement to protect wild character traits. This purpose also serves to protect water quality. (Maryland Scenic and Wild River Act: Youghiogheny River).
- Government ownership/management. Plan implementation is driven by the need to serve multiple public use needs while maintaining water quality standards. (Deep Creek Lake). Impairment correction by a government agency is likely to be successful. Implementation is driven by the likelihood that water quality impairment can be successfully eliminated, TMDLs can be met, and water quality standards can be maintained. (Cherry Creek and Casselman River acid mine drainage mitigation by MDE).

# Chapter 6 – Education, Outreach, and Funding

## 6.A Public Involvement

### 6.A.1 Environmental education for students

In 1989, Maryland became the first state to require a comprehensive, multidisciplinary program of [environmental education](#) that is infused within current curricular offerings in various academic subjects. State mandates for Environmental Literacy have evolved since then, with a [preK-12 regulation](#) and in 2011 an added [high school graduation requirement](#). The goal of Maryland’s environmental education program is to advance students’ knowledge, confidence, skills, and motivation to enable them “to make decisions and take actions that create and maintain an optimal relationship between themselves and the environment, and to preserve and protect the unique natural resources of Maryland, particularly those of the Chesapeake Bay and its watershed.” Environmental literacy [standards](#) are periodically reviewed and revised, most recently in 2020, and include topics such as human impact on natural processes and resources.

While Environmental Literacy is intentionally interdisciplinary, it aligns well with the [Next Generation Science Standards \(NGSS\)](#), a set of rigorous and internationally benchmarked standards for K-12 science education that Maryland adopted in 2013. NGSS incorporates content and practices, calling for the learning to relate to the interests and life experiences of students or be connected to societal or personal concerns that require scientific or technological knowledge. In addition, the Chesapeake Bay Watershed Agreement signed in 2014 includes an [Environmental Literacy Goal](#): to enable students in the region to graduate with the knowledge and skills to act responsibly to protect and restore their local watershed.

This goal calls for a [Meaningful Watershed Educational Experience](#) -- a sustained unit of study that includes classroom learning, outdoor investigations, and student stewardship action -- to occur at least once in elementary, middle, and high school years for every student in the watershed. This intersection of these standards and approaches to learning drives a statewide network of formal educators at schools and numerous environmental education partners to work together to provide unique, relevant, experiential, and powerful learning for students.

**Connection with State NPS Management Program:** This group of programs and requirements help to develop children that have the knowledge and skills to further our goals of environmental restoration and protection. Having an education component allows interaction with not only the children, but their families as well. It also helps to provide outreach to the next generation of environmental advocates in Maryland that can help to solve numerous Nonpoint Source problems as time progresses.

### 6.A.2 Environmental education for teachers

The statewide network of formal educators and non-formal environmental education (EE) providers supports schools' efforts to achieve Environmental Literacy among Maryland students in multiple ways. Myriad opportunities for professional learning are offered throughout the year, constantly evolving to serve needs of educators and to keep up with current practices, including increasing teachers' comfort with facilitating outdoor investigations, means to incorporate climate change content throughout many topics, weaving in ways to provide virtual and at-home learning, and accommodations to address equity in education. Some examples of the kinds of opportunities include:

- Inservice learning for currently practicing teachers and environmental educators offered by state and federal government agencies and a host of nonprofit partners
- Region-wide and state-specific online and in-person learning specifically about the MWEE, its elements, and how to apply it to locally required curriculum - including training for teachers as well as for those who facilitate/lead MWEE training
- Pre-service content and practical experiences for students in teacher preparation programs at higher education institutions (those studying to become certified classroom teachers)
- Continuing education and graduate credit programs that include environmental literacy content and practices
- Planning and technical assistance provided for school district administrators, curriculum writers, and classroom teachers to intertwine science and environmental literacy among multiple disciplines, and using the Meaningful Watershed Educational Experience (MWEE) approach to learning
- Coordination among funders and practitioners to help provide ample, accessible, and equitable support to implement strong EE programs
- Online resources such as [Bay Backpack](#), which supports hands-on environmental learning and is shared among the partners working together to meet the Chesapeake Bay Watershed Agreement Environmental Literacy goal. By providing educators with information about [funding opportunities](#), [field studies](#), and [curriculum guides and lesson plans](#) related to the Chesapeake Bay, Bay Backpack helps educators find the tools they need to give their students MWEEs. Another resource is the [Maryland Association for Environmental and Outdoor Education \(MAEOE\)](#), which compiles information on opportunities for professional learning, hosts an annual statewide EE conference, and manages the [Maryland Green Schools program](#) that helps schools with sustainable practices and other stewardship efforts and provides annual certification awards.
- Among Maryland's state agencies, the [most comprehensive environmental education provider is the Department of Natural Resources](#), which offers many professional learning opportunities, technical assistance and funding for schools, through its aquatic resources and wildlife education programs, and public lands such as Maryland State Parks and National Estuarine Research Reserves.

This multifaceted fabric that supports educators, schools, school districts, and ultimately provides a foundation for students of all ages to develop a relationship with the environment and sense of environmental ethics and stewardship, is what makes Maryland's environmental education program a respected model regionally and nationally.

**Connection with State NPS Management Program:** The resources provided in this section is not just limited to traditional "teachers" within K-12. This section also looks at specialty education for environmental advocates to help spread knowledge of pollution issues in our State and to provide educators with the tools they need to make the message resonate with their audiences. A well informed, engaged public helps to promote and advocate for our restoration and protection programs throughout the State.

### 6.A.3 Conservation Education

The information offered through this Maryland Department of Agriculture [program](#) is designed to support understanding of NPS management by homeowners, school children and the general public. This statewide effort promotes voluntary incorporation of beneficial NPS management into daily living at the grassroots scale. A series of factsheets and displays educate citizens about actions they can take to improve water quality, including trying pesticide alternatives, using fertilizers wisely, controlling soil erosion, composting, and conserving water. Educational information is also provided to students through interactive games that convey watershed concepts.

Established in 1990, the Maryland Envirothon is sponsored by local soil conservation districts and the State Soil Conservation Committee. The goal of the Maryland Envirothon is to increase environmental knowledge and understanding while motivating young people to care for the environment by practicing stewardship in their homes, schools, and communities. Hundreds of Maryland high school students have met this challenge and are now more concerned and informed about protecting natural resources in the world around them. A fun and engaging way for high school students in grades 9-12 to learn about natural resources, make informed decisions about the environment, and earn scholarship money for college. Designed by soil conservationists, naturalists, foresters, wildlife experts, and other natural resource professionals, the Maryland Envirothon is a problem-solving competition that challenges students to work as a team to answer questions and conduct hands-on projects focusing on natural resource issues.

**Connection with State NPS Management Program:** The goal of the Maryland Envirothon is to increase environmental knowledge and understanding while motivating young people to care for the environment by practicing stewardship in their homes, schools, and communities. Hundreds of Maryland high school students have met this challenge and are now more concerned and informed about protecting natural resources in the world around them. This program is a field oriented problem-solving competition that challenges students to work as a team to answer questions and conduct hands-on projects focusing on natural resource issues.

### 6.A.4 Climate change

Maryland is committed to advancing the capacity of State and local government agencies, infrastructure organizations, and businesses to develop and implement sound climate change initiatives. These climate initiatives will ensure current and future public health, security, and economic prosperity. To achieve this vision, the State, in partnership with the Association of Climate Change Officers, has established the [Maryland Climate Leadership Academy](#). The [Maryland Commission on Climate Change](#) (MCCC) workgroup on Education, Communication, and Outreach is another institutionalized avenue for local engagement. The MCCC Adaptation and Response Working Group coordinates closely with Maryland's Bay restoration process and includes local engagement in its annual work plan.

**Connection with State NPS Management Program:** The effects of climate change on nonpoint source pollution are increasing every year. Recent estimates from the Chesapeake Bay Program have indicated that Maryland needs to reduce an additional 1.2 million lbs. of nitrogen from entering the Bay to achieve our 2025 TMDL targets. Incorporating this program will help with mitigation of nonpoint source contributions of this pollutant.



### 6.A.5 Education and Homeowner Tips

This Maryland Department of Agriculture program provides outreach and education targeted to homeowners, school children and the public. A series of factsheets and displays educate citizens as to actions they can take to improve water quality including trying pesticide alternatives, using fertilizers wisely, controlling soil erosion, composting, and conserving water. Educational information is also currently provided to students thru interactive games that convey watershed concepts.

**Website:** (outreach and education tools are frequently updated)

[http://mda.maryland.gov/resource\\_conservation/Pages/environmental\\_education.aspx](http://mda.maryland.gov/resource_conservation/Pages/environmental_education.aspx)

**Connection with State NPS Management Program:** The materials provided by the Maryland Department of Agriculture part of the broader effort to inform the public that how they maintain their properties has a direct impact on the State's waterways. By using practices and materials identified in these outreach materials, citizens can make an impact on reducing nonpoint source pollution in the developed sector.

### 6.A.6 Manure Matching Service

MDA's Agriculture's Manure Matching Service helps farmers to properly utilize animal waste. Via lists of sending and receiving operations, farmers with excess animal manure are linked to recipients that may use the manure as a nutrient source or for alternative products and processes. The goal of the service is to reduce the potential impact from animal waste runoff to Maryland's streams, rivers, and the Chesapeake Bay by establishing a marketplace where farmers can sell their excess manure to buyers who need the valuable nutrients it contains for crop production or alternative use business ventures.

**Web site:** [https://mda.maryland.gov/resource\\_conservation/Pages/manure\\_management.aspx](https://mda.maryland.gov/resource_conservation/Pages/manure_management.aspx)

**Connection with State NPS Management Program:** This service is a nonregulatory statewide program that reduces the potential for excessive amounts of manure application on land and the increased risk of NPS pollution. The matching service is designed so that it can support the Manure Transport Program.

### 6.A.7 Nutrient Management Program Continuing Education and Certification

In Maryland, all farmers grossing \$2,500 annually or more, and livestock producers with 8,000 pounds or more of live animal weight, are required to run their operations using a nutrient management plan that addresses both nitrogen and phosphorus inputs, according to the Water Quality Improvement Act (WQIA) of 1998. This requirement applies to all agricultural land used to produce plants, food, feed, fiber, animals or other agricultural products. Farmers must update their nutrient management plans at least once every three years or more frequently if their operation changes. To help farmers and producers affected by this requirement, MDA's Nutrient Management Program offers a variety of continuing education and certification courses on how to comply with the State's nutrient management law. These opportunities are designed to help farmers and crop consultants learn about managing nutrients so that water quality is protected.

The program makes it easier and more cost efficient for farmers to comply with Maryland's nutrient management law by training them to write their own nutrient management plans. These plans describe the annual amounts of primary nutrients that farmers should apply to maximize crop yields while minimizing water pollution.

Training and certification of farmers takes place during a two-day workshop. During the session, farmers work with a University of Maryland Extension expert to develop a nutrient management plan for their own operations. Once certified, farmers are required to attend six hours of continuing education classes once every three years. In cooperation with the University of Maryland, voucher training courses are also offered and required for farmers and individuals who apply nutrients to 10 or more acres.

The Nutrient Management Program provides training, certification and licenses for individuals who provide crop consulting services related to soil fertility. Classes include composting livestock mortalities, fertilizer application to turf grass, and phosphorus management on cropland.

**Connection with the State NPS Management Program:** Education and certification for individuals statewide who must comply with Maryland's Nutrient Management Program requirements are essential mechanisms for helping to ensure that nutrients are being managed according to the State law and regulation. This activity is designed to reduce NPS pollutant loads to surface and groundwater at the site and operation level.

#### **6.A.8 Nutrient Management Program: Fertilizer Use Act (for turf mgt & homeowners)**

The Maryland Department of Agriculture publicizes information that is important in implementing Maryland's lawn fertilizer law. The intent of the law is to protect the Chesapeake Bay from excess nutrients entering its waters from a variety of urban sources, including golf courses, parks, recreation areas, athletic fields, businesses, and hundreds of thousands of suburban and urban lawns. Nutrients, primarily nitrogen and phosphorus, are key ingredients in lawn fertilizer. When it rains, excess nutrients can wash off the land and into the streams and rivers that feed the Chesapeake Bay. Once in our waterways, excess fertilizers fuel the growth of algae blooms that block sunlight from reaching Bay grasses, rob the water of oxygen and threaten underwater life. While certain restrictions on fertilizer use have been in place for farmers since 2001, additional stakeholder involvement is needed if Maryland is to meet new nutrient reduction goals outlined in its Watershed Implementation Plan (WIP) to restore the Bay. Maryland's new lawn fertilizer law affects fertilizer manufacturers and distributors, lawn care professionals and homeowners.

New phased-in restrictions affect all lawn fertilizer products sold and distributed in Maryland. The changes are aimed at helping lawn care professionals and homeowners maintain healthy lawns without applying unnecessary amounts of nitrogen and phosphorus. All lawn care professionals must pass an exam to be certified to apply fertilizer in Maryland. The rules apply to professionals for hire as well as individuals responsible for turf management at golf courses, public parks, airports, athletic fields, businesses, cemeteries, and other non-agricultural properties. MDA also provides training and licensing. Additionally beginning October 1, 2013, homeowners and do-it-yourselfers will be required to follow University of Maryland recommendations when fertilizing lawns. Mandatory restrictions, like those imposed for lawn care professionals apply.

**Connection with the State NPS Management Program:** These statewide nutrient management requirements are keystones in Maryland's approach to ensuring wise use of fertilizer and to reducing NPS loads of nitrogen and phosphorus.

### **6.A.9 Harry R. Hughes Center for Agro-Ecology, Inc.**

This University of Maryland-funded organization brings together diverse interests from the agricultural, forestry, and environmental communities for the purpose of protecting the Chesapeake Bay watershed while retaining working landscapes that support industry. To promote this mission, the Harry R. Hughes Center offers education and outreach, in addition to funding scientific research and policy analysis. Outreach activities include the following:

- Workshops on research topics, such as tools to preserve working landscapes
- Presentations to local governments and community groups
- Briefings to House and Senate committees

**Connection with the State NPS Management Program:** The Center funds scientific research, conducts policy analysis and provides outreach/education that contribute to informed decision making on NPS issues. Because it is a 501(c)(3) organization associated with the University of Maryland College Park, it is uniquely positioned to facilitate cooperative discussion, consensus building, interdisciplinary decision making valuable to effective NPS management, particularly regarding agricultural NPS issues. The Hughes Center is a key partner in distributing updates to Chesapeake Bay WIP efforts for the State and helping to coordinate outreach meetings with our partners in Bay restoration.

### **6.A.10 Maryland Sea Grant (Program and Extension)**

The Maryland Sea Grant Program is one of 32 university-based programs around the nation that foster innovative marine research, education, and outreach in coastal communities. Research efforts around the Chesapeake Bay seek to improve the efficacy of restoration activities. Maryland Sea Grant also supports a variety of programs and resources in marine and environmental sciences for K-12 students and teachers, undergraduate and graduate students, and the public. Chesapeake Quarterly, an award-winning publication of Maryland Sea Grant, is used by managers, citizens, and others to explain important aspects of Bay science, culture, and history.

Maryland Sea Grant Extension, a partnership between Maryland Sea Grant and University of Maryland Extension, provides Maryland citizens with objective technical information on diverse issues related to the Chesapeake Bay and the state's coastal waters. Serving as a bridge between university-based research and potential users, the Maryland Sea Grant Extension Program brings together the experience and expertise of specialists in aquaculture, seafood technology, marine economics, community planning, science education, water quality, and related fields to offer information, instruction, and advice to a range of stakeholders. The Sea Grant Extension Program's cadre of specialists conduct research, facilitate workshops and training seminars, produce targeted publications and videos, and develop websites and other media. Maryland Sea Grant Extension's efforts focus on coastal water quality, among other areas. Program areas related to NPS are their new Watershed Protection and Restoration, and Sustainable Communities programs. Maryland Sea Grant receives funding from the National Oceanic and Atmospheric Administration and the State of Maryland.

**Connection with the State NPS Management Program:** The University of Maryland Sea Grant program is an active partner in the State NPS Management Program. Currently, its statewide services address water issues, particularly watershed restoration, including working to help Marylanders install green design projects like stream restoration and rain gardens, and providing technical assistance and funding to support watershed restoration activities. Maryland Sea Grant also offers an Internet listing of sources for technical and financial assistance called the Maryland Watershed Restoration Assistance Directory. They also have five Maryland Sea Grant Extension Watershed Specialists who work directly with groups and communities that are interested in NPS planning and implementation at the watershed scale. The work of these Specialists is frequently provided in cooperation with the Watershed Assistance Collaborative.

### **6.A.11 Watershed Assistance Collaborative**

Although the Watershed Assistance Collaborative (Collaborative) is a collection of some entities already listed in this group of resources, its whole is greater than the sum of its parts. In recognition that not all jurisdictions currently have the capacity to implement large-scale non-point source restoration and protection efforts, Maryland's State agencies, the Chesapeake Bay Trust, University of Maryland Sea Grant Extension Program, University of Maryland Environmental Finance Center, NOAA and the EPA joined together to create the Watershed Assistance Collaborative (Collaborative) in the Fall of 2008. The Collaborative is a partnership that provides services, financial and technical assistance to communities to advance restoration activities and projects. By leveraging resources of existing programs, the Watershed Assistance Collaborative exists to provide coordinated capacity building opportunities to local implementers.

One strategy of the Collaborative is to provide funding for planning and design, which enables smaller jurisdictions to compete for larger capital funding. Another strategy of the Collaborative has been to fund five regional watershed specialists who work with local governments, citizen groups and individuals to solve funding problems, navigate through technical and administrative issues and who provide many other services.

**Connection with the State NPS Management Program:** The Collaborative provides project-scale assistance to local parties that have an interest in nonpoint source pollution control. The Collaborative is closely integrated with the State's Bay TMDL implementation efforts and the State's Chesapeake and Coastal Bays Trust Fund, which is closely coordinated with Maryland's 319(h) grant

## **6.B Funding**

Major sources of NPS program funding in Maryland are described below. In addition, an estimated \$1.6 billion will be spent by local governments through 2025 to complete requirements in Phase 1 and 2 MS4 (stormwater) permits. Additional sources of funding may be added to the NPS plan in the future if they provide significant impacts to our NPS planning efforts.

### **Chesapeake Bay Funding**

In FY00-19, Maryland spent approximately \$11 billion on Chesapeake Bay restoration activities, \$4.7 billion of which has been appropriated within the last five years. This amount includes funding for activities that directly reduce nutrient and sediment inputs to the Bay (e.g., cover crops and wastewater treatment plant upgrades), activities that support the broader commitments of the 2014 Watershed Agreement (e.g., monitoring, education, outreach), and activities that prevent or minimize future degradation of the Bay (e.g., land conservation).

Meeting Maryland's existing [Phase III WIP](#) (also see **Nutrients** in Section II.), and 2014 [Chesapeake Bay Watershed Agreement](#) commitments, addressing the impacts of climate change, implementing a [Conowingo WIP](#), and offsetting future growth will be challenging. Central to success will be an emphasis on maximizing and continually improving the cost effectiveness of Maryland's three primary Chesapeake Bay restoration funding programs: the Bay Restoration Fund (BRF), the Chesapeake and Atlantic Coastal Bays Trust Fund (Trust Fund), and the Maryland Agricultural Water Quality Cost Share (MACS) Program. These programs are briefly explained below. Leveraging these fund sources with other, more focused state programs (e.g., [Program Open Space](#), [Water Quality Revolving Loan Fund](#)), federal programs (e.g., [Conservation Reserve Enhancement Program](#)), local funds, and the private sector is essential.

### 6.B.1 Bay Restoration Fund (BRF)

The [BRF](#) provides grants for projects that reduce nutrient and sediment loads to the Bay. The BRF is composed of two separate funds, the Septic Fund, and the Wastewater Fund. The Septic Fund pays for septic upgrades to Best Available Technology, and prioritizes these based on proximity to the Bay, which results in the most cost-effective reductions per pound of nitrogen. The septic ranking scheme also prioritizes failing systems, which provides the important co-benefit of protecting public health. The Septic Fund also pays for cover crops, another cost-effective practice, through [Maryland's Cover Crop Program](#). It also is used as our State match for section 319 NPS funding.

The Wastewater Fund is used for wastewater treatment plants, and pays for sewer improvements to reduce overflows, improving climate resiliency of sewer systems, septic connections, and stormwater projects. Projects are rated and ranked based on which projects provide the most cost-effective nutrient reductions in dollars per pound. As opportunities for low-cost nutrient reductions are used up, per pound costs will increase; therefore, non-nutrient co-benefits such as public health benefit and sustainability are also factored in.

**Connection with the State NPS Management Program:** This grant is the keystone the State NPS Program's effort to reduce NPS nitrogen impacting groundwater and surface water. Expenditures of these funds may be used to meet match requirements for Federal grants to Maryland under CWA Section 319(h) and for the Chesapeake Bay Restoration and Accountability Grant (CBRAP). This grant has demonstrated great success in implementing technologies that make measurable improvements in groundwater nitrogen concentrations.

### 6.B.2 Chesapeake and Atlantic Coastal Bays Trust Fund

#### Trust Fund

The State of Maryland established the [Trust Fund](#) in November 2007 to provide a dedicated source of funding for the most effective projects to reduce nutrients and sediment in the Chesapeake Bay and its tributaries. The Department of Natural Resources administers the Trust Fund. A portion of revenue generated from motor fuel tax and rental car tax is allocated solely for NPS pollutant reduction through the Trust Fund. An estimated \$50M per year may be available for on the ground activities related to nonpoint source implementation projects. Proposals for grants are evaluated using several criteria, including readiness and ability to proceed, cost effectiveness, co-benefits, and geographic targeted areas.

#### Scientific Advisory Panel

Trust Fund Scientific Advisory Panel (SAP) members are scientists and technical experts appointed by the Governor. Through geographic targeting and financial oversight, the SAP maximizes reductions in pounds of nutrients and sediment per dollar spent. The role of the SAP includes:

- Annually provide recommendations on the use of funds of the Trust Fund for the following fiscal year
- Monitor the distribution of funds from the Trust Fund
- Review the categories of grants made in the previous year to assess nutrient loading reduction estimates, cost efficiencies, and the effectiveness of any innovative nonpoint source pollution reduction measure
- Review and suggest changes to the proposed annual work plan.

**Connection with the State NPS Management Program:** Part of the revenue generated from motor fuel tax and rental car tax is earmarked solely for NPS pollutant reduction thru the Trust Fund. Up to 50 million dollars per year may be available for on the ground activities related to nonpoint source implementation projects. Grants awarded through this program are awarded annually and will vary from traditional BMP implementation to the Innovative Technology grant which focuses on development of new pollution reduction strategies for nutrients and sediment.

### **6.B.C Conservation Grants and Loans to Farmers**

The Maryland Department of Agriculture (MDA) provides conservation [grants and loans](#) to help farmers offset the cost of installing best management practices on their farms to protect natural resources and comply with federal, state and local environmental requirements.

Since 1985, the [Maryland Agricultural Water Quality Cost Share](#) (MACS) program has provided publicly supported grant funds to assist tenant farmers and farm owners with the implementation costs of BMPs to control water quality problems on their property. BMP cost-share is up to 87.5% of eligible project costs. The amount of grant support provided also depends on the cost-effectiveness of the proposed BMP when compared to other alternatives for that site or other eligible funding caps.

Between 1998 and 2018, the MACS program has awarded nearly \$100 million in state funded grants to address water quality concerns on agricultural land in Maryland. The Maryland Department of Agriculture will be further evaluating the program to ensure full alignment with the agricultural sector's Chesapeake Bay WIP goals.

Another cost-share example is MDA's Agriculture's [Manure Matching Service](#), a nonregulatory statewide program that reduces the potential for excessive amounts of manure application on land and associated increased risk of NPS pollution. Farmers with excess animal manure are linked to recipients that may use the manure as a nutrient source or for alternative products and processes. The goal of the service is to reduce the potential impact from animal waste runoff to Maryland's streams, rivers, and the Chesapeake Bay by establishing a marketplace where farmers can sell their excess manure.

**Connection with the State NPS Management Program:** The statewide MACS program a keystone in Maryland's NPS Program. It is voluntary and nonregulatory. This State funding assistance program is designed to complement other Federal (NRCS) and State programs for technical and financial assistance so that more agricultural BMPs are implemented and less NPS pollution occurs. For example, it is common for Soil Conservation District technical assistance to coordinate State MACS funding and Federal funding so that financial incentives are maximized and more BMPs are voluntarily implemented. The work accomplished with MACS grant assistance accounts for a significant portion of the agricultural NPS implementation and pollution load reduction across Maryland.

### **6.B.D Clean Water Act Section 319 Funds**

Maryland's portion of federal 319 funds have been used to help build Maryland's NPS Management Program, implement various NPS programs, and implement practices to reduce nonpoint source pollution. With an annual budget of about \$2M/year, this program is relatively small in comparison to the much larger array of State nonpoint source management activities. In Maryland, the opportunity for [319 funding](#) is offered to local and State entities including county and municipal agencies, Soil Conservation Districts, State agencies, and State institutions of higher learning.

A wide variety of NPS activities are eligible for funding:

- Implementation (in-the-ground projects resulting in measurable NPS pollution reduction)
- Protection (projects that prevent water quality degradation from nonpoint sources)
- Watershed assessment, priority planning, implementation progress tracking
- State NPS management program(s)
- Education/outreach (in association with other 319-funded NPS projects)
- Demonstration projects (showing the overall effectiveness of an adopted approach in solving a particular water quality problem)

Eligible implementation projects may use Best Management Practices (BMPs) such as stream restoration, wetland creation or restoration, and riparian buffers. Before securing grant funds for an implementation project, however, the EPA must have accepted a watershed plan that encompasses the work area and identifies the work as a high priority. The watershed plan can be accepted in advance, or it can be developed during the grant project, with assistance provided by the Department of the Environment.

**Connection with the State NPS Management Program:** This grant, along with other Federal and State funding, is essential for funding management work in the State's NPS Program. It also is an incentive for implementing NPS BMPs, particularly in watersheds, and/or for pollutants, that are not served by other funding assistance programs in Maryland.

#### **6.B.E Water Quality Revolving Loan Fund**

The [Maryland Water Quality Revolving Loan Fund](#) (WQRLF) provides below market interest rate loans and loan principal forgiveness (where applicable) to local governments and other eligible entities to finance water quality improvement projects. Since its 1987 inception through June 30, 2019, the WQRLF has provided approximately \$2.73 billion in financing for water quality projects. The goal of the program is to achieve these improvements by reducing the amount of nutrients being discharged into the Chesapeake Bay. Projects eligible for funding include wastewater treatment plant improvements and upgrades, eliminating failing septic systems, combined sewer overflows and sanitary sewer overflows, nonpoint source projects such as urban stormwater control, and sewer system rehabilitation.

**Connection with the State NPS Management Program:** In Maryland, the revolving loan provides a funding alternative that reaches customers and can help to fill funding assistance gaps that other NPS financial assistance programs are less able to serve. Currently, this funding source is less available for NPS work compared to past years because of a State priority to rapidly complete nutrient management upgrades at publicly owned sewage treatment plants. In future years, Maryland will likely be able to ramp up NPS assistance thru this funding source.

#### **6.B.F Chesapeake Bay Trust**

The [Chesapeake Bay Trust](#) is a nonprofit grant-making organization dedicated to improving the watersheds of the Chesapeake Bay, Maryland Coastal Bays, and Youghiogheny River. Created in 1985 by the Maryland General Assembly, the Trust's goal is to increase stewardship through grant programs, special initiatives, and partnerships that support K-12 environmental education, on-the ground watershed restoration, community engagement, and the underlying science of these three realms. Through grants, the Trust engages hundreds of thousands of students and volunteers in projects that have a measurable impact on the natural resources of our region. Grantees include schools, local governments, community groups, faith-based groups, watershed organizations, and other not-for-profit entities. In 2019, over \$11 million was invested in almost 400 projects through grants ranging from \$250 to over \$300,000.

**Connection with the State NPS Management Program:** The Chesapeake Bay Trust offers a number of grants that help to mitigate nonpoint source pollution. These grants include Environmental Education, Living Shorelines, Green Infrastructure, Restoration, tree planting, and watershed assistance monies that are ideal for smaller grant projects. Smaller non-profits and individual landowners are encouraged to visit the Trust's website for more information on how to apply for small grants that can help to mitigate nonpoint pollution from your property.

### **6.B.G Chesapeake Bay Implementation Grant (CBIG)**

Section 117(e)(1)(A) of the Clean Water Act authorizes the EPA to award Chesapeake Bay Implementation Grants (CBIG) to Maryland and the other signatory jurisdictions of the 2014 Chesapeake Bay Watershed Agreement. The intent of the funding is to assist Maryland in achieving the goals of the Agreement by supporting the implementation of the Agreement's management strategies. Particular focus is given to projects that address the Agreement's Water Quality goal by reducing nonpoint source nutrient and sediment pollution; however, Maryland's CBIG funds have also supported progress towards the Sustainable Fisheries, Vital Habitats, Toxic Contaminants, Healthy Watersheds, Stewardship, Land Conservation, Environmental Literacy, and Climate Resiliency goals.

**Connection with the State NPS Management Program:** In recent years, these funds have been used to support special-purpose programs such as: the Special Rivers Project, the Tributary Strategy Program, Maryland's Agricultural Cost-Share Program, and the Chesapeake Bay Trust's Watershed Assistance Grant Program.

### **6.B.H Chesapeake Bay Regulatory and Accountability Program (CBRAP)**

CBRAP grants aid the seven jurisdictions in implementing and expanding their respective regulatory, accountability, assessment, compliance, and enforcement capabilities in support of reducing nitrogen, phosphorus, and sediment loads delivered to the Bay to meet the Bay TMDL.

These grants help each of the seven Bay jurisdictions to:

- Develop/revise regulations/policies, and develop and implement WIPs and two-year milestones;
- Implement regulatory, tracking, verification, reporting, assessment, and/or monitoring commitments of the jurisdictions' WIPs and/or two-year milestones or in response to EPA's evaluation of these documents;
- Issue, reissue, and enforce permits and enforce regulations;
- Develop and implement verification programs following the CBP partnership's established verification protocols and policies;
- Develop and implement nutrient and sediment credit trading and offset programs;
- Develop and implement technical assistance and guidance documents to support WIP and/or two-year milestone implementation;
- Provide technical and compliance assistance to landowners; and
- Provide compliance assistance to local governments and regulated entities.

**Connection with the State NPS Management Program:** In recent years, these funds have been used to support the Chesapeake Bay Trust's Watershed Assistance Grant Program. These funds are also used by MD state agencies to support programs that help to develop and enforce permits that help to mitigate nonpoint source pollution within our State.



### **6.B.I Abandoned Mine Land Grant**

The U.S. Department of the Interior provides annual grants to MDE to construct reclamation projects that reclaim disturbed lands and reduce water pollution from abandoned coal mines. Abandoned mines can pose a serious threat to water quality, especially in the form of highly acidic water, rich in metals. About 200 abandoned mine sites exist in Maryland, according to MDE's Land Management Administration. The Abandoned Mine Land Grant is authorized in Title IV of the federal Surface Mining Control and Reclamation Act (SMCRA).

Maryland receives an annual allocation of \$3 million from the federal Office of Surface Mining to reclaim abandoned mines. The Department of the Environment uses this funding to pay contractors who carry out reclamation projects. Federal funding comes from the fees paid by active coal mine operations on each ton of coal mined.

**Connection with the State NPS Management Program:** This Federal funding source is an important compliment to other Federal and State programs for mitigating NPS problems associated with acid mine drainage. NPS successes achieved in the North Branch Potomac River watershed, including Aaron Run, and ongoing work in the Casselman River watershed rely on the complimentary assistance provided thru these programs

### **6.B.J Conservation Reserve Program and Conservation Reserve Enhancement Program**

The federal Conservation Reserve Program (CRP) is a voluntary program that compensates landowners who agree to adopt certain conservation practices to set aside farmland that meet program criteria. Participants enroll in contracts between 10-to-15-year duration and establish vegetative covers that reduce soil erosion, improve water quality, and enhance or create wildlife habitat on environmentally sensitive cropland or, in some cases, on marginal pastureland. Nationally, the CRP protects millions of acres of American topsoil from erosion and is designed to safeguard the Nation's natural resources. In Maryland, the CRP is usually bypassed for the Conservation Reserve Enhancement Program (CREP), which specifically addresses resource issues to improve the water quality of the Chesapeake Bay and provides more attractive incentives. The USDA established CREP to improve water quality by filtering agricultural runoff and to enhance wildlife habitat. In 1997, Maryland was the first state approved to participate in CREP.

The CREP targets the most environmentally sensitive lands to address important resource protection issues, focusing on riparian grass and forest buffers, wetland restoration and protection of highly erodible lands. Both CRP and CREP offer 10-to-15 year contracts with annual rental payments, as well as cost-share assistance for adopting conservation practices. In Maryland, two State programs offer farmers increased incentives in addition to the traditional CRP competitive bid process: The Maryland Department of Agriculture MACS program provides cost share for BMP installation and \$100/acre as an additional signing incentive, and the Maryland Department of Natural Resources offers purchase agreements for conservation easements.

**Connection with the State NPS Management Program:** These programs contribute to the State NPS Program statewide by providing financial assistance for implementing NPS BMPs.

### **6.B.K Environmental Quality Incentives Program**

The federal Environmental Quality Incentives Program (EQIP) is a voluntary conservation program that provides financial and technical assistance for farmers and ranchers to address soil, water, air and related natural resource management issues on their land. These programs address reductions in nonpoint source

pollution and the conservation of water resources. It is the responsibility of the State Conservationist, with advice of a technical committee, to identify which specific conservation practices are eligible. Examples of practices include nutrient management, manure management, integrated pest management, irrigation water management and wildlife habitat enhancement. Owners of land in agricultural production, or persons who are engaged in livestock or agricultural production on eligible land, may participate. Eligible land includes cropland, rangeland, pastureland, private non-industrial forestland, and other farm or ranch lands. Recently, forest management and conservation practices related to organic production have been given stronger emphasis in the Program. A certain amount of EQIP funding is reserved for forest improvement activities, especially those that restore forests to healthy and productive conditions or targets invasive species for removal.

**Connection with the State NPS Management Program:** EQIP is an important incentive tool for NPS implementation that compliments State programs like the Maryland Agricultural Cost-Share. Together, the Federal and State programs rise incentives to levels that greatly improve success in meaningfully assisting farm owner/operators and in achieving more NPS BMPs and measurable environmental improvements.

#### **6.B.L Regional Conservation Partnership Program (RCPP)**

The 2014 Farm Bill authorized the US Dept. of Agriculture to create the RCPP. The RCPP has about \$400 million is available for financial assistance during the first year and about \$1.2 billion over five years that is provided thru three funding pools:

- Critical Conservation Areas will receive 35% of available funding. The Chesapeake Bay drainage is one of eight eligible areas. This program, replaces the former Chesapeake Bay Watershed Initiative, will be a major conduit for federal funding assistance for agricultural conservation and NPS management.
- Regional or multi-state projects will receive 40% of available funding.
- State-level projects will receive 25% of available funding.

RCPP assistance will be delivered in accordance with rules of the Environmental Quality Incentives Program (EQIP), Conservation Stewardship Program (CSP), Agricultural Conservation Easement Program (ACEP), and Healthy Forests Reserve Program (HFRP), and in certain areas, the Watershed Operations and Flood Prevention Program.

**Connection with the State NPS Management Program:** RCPP contributes to the State NPS Program statewide by providing financial assistance for implementing NPS BMPs.

#### **6.B.M Onsite Disposal Systems Grant (Bay Restoration Fund)**

Maryland's Bay Restoration Fund provides grants for homeowners and businesses to upgrade their septic systems, or on-site disposal systems (OSDS), to the Best Available Technology (BAT) for reducing nitrogen pollution. The Bay Restoration Fund, administered by the Department of the Environment, was signed into law in 2004 to upgrade Maryland's wastewater treatment plants and septic systems. The State has a Bay milestone goal of upgrading at least 3,000 septic units by 2011. Special priority goes to failing systems in the Critical Area, within 1,000 feet of tidal waters.

**Connection with the State NPS Management Program:** This grant is the keystone the State NPS Program's effort to reduce NPS nitrogen impacting groundwater and surface water. Expenditures of these funds may be used to meet match requirements for Federal grants to Maryland under CWA Section 319(h) and for the Chesapeake Bay Restoration and Accountability Grant (CBRAP). This grant has demonstrated great success in implementing technologies that make measurable improvements in groundwater nitrogen concentrations.

### **6.B.N Chesapeake Bay Innovative Nutrient and Sediment Reduction Grant**

This National Fish and Wildlife Federation (NFWF) manages this EPA-funded program to expand the collective knowledge of the most innovative, sustainable, and cost-effective strategies that reduce excess nutrient loads in specific tributaries to the Chesapeake Bay. To achieve this goal, the program awards competitive grants to projects that target and reflect the diverse conditions (e.g., urban, rural, suburban) and sources of nutrients (e.g., agricultural, stormwater, other non-point sources) that exist throughout the Chesapeake watershed. Collectively, these projects help the Chesapeake Bay Program meet its goals for restoring the health and resources of the Bay ecosystem. Priorities for funding include:

- Field-scale demonstrations of innovative technologies, conservation practices and Best Management Practices (BMPs) that have potential to significantly reduce excess nutrient loads
- Demonstrations, within targeted small watersheds, of the most effective and efficient strategies for implementing nutrient load reductions contained in state Tributary Strategies
- Water quality trading demonstrations (including point source to non-point source) and other market-based strategies to reduce nutrient loads to the Bay and its tributaries, and
- Proposals that will demonstrate strategies that overcome barriers to adoption of the most effective and efficient BMPs; and conservation practices for reducing excess nutrient loads

**Funding:** Individual grants run from \$200,000 to \$1 million. Projects must include a 1:1 match with a non-federal partner. Primary funding for the Program is provided through a cooperative agreement with the Environmental Protection Agency.

**Connection with the State NPS Management Program:** This program contributes to the State NPS Program statewide by providing competitive grants to projects that target and reflect the diverse conditions and sources of nutrients that exist throughout the Chesapeake watershed.

### **6.B.O National Coastal Wetlands Conservation Grant Program**

This U.S. Fish and Wildlife Service (USFWS) program was established in 1990 to provide matching grants to States for the acquisition, restoration, management, or enhancement of coastal wetlands. Coastal States that border the Atlantic Ocean, the Gulf of Mexico, the Pacific Ocean, and the Great Lakes are eligible. Under the program, the USFWS prioritizes projects that are:

- Consistent with the criteria and considerations outlined in the National Wetlands Priority Conservation Plan
- Located in States with dedicated funding for programs to acquire coastal wetlands, natural areas, and open spaces, and
- Located in maritime forests on coastal barrier islands

Additional ranking factors developed by the USFWS include giving credit to projects that benefit threatened and endangered species, promote partnerships, and support conservation and recovery programs. The Program will not provide grants to support planning, research, monitoring activities, construction, or repair of structures for recreational purposes.

**Funding:** Typically, between \$13 million and \$17 million in grants are awarded annually through a nationwide competitive process. Funding for the Program comes from excise taxes on fishing equipment, and motorboat and small engine fuels. States provide 50 percent of the total costs of a project. If, however, the State has established and maintains a special fund for acquiring coastal wetlands, other natural areas or opens spaces, the Federal share can be increased to 75 percent. Grants awarded under the National Coastal Wetlands Conservation Grant Program cannot exceed \$1 million for an individual project.

**Connection with the State NPS Management Program:** This program contributes to the State NPS Program statewide by providing matching grants to States for the acquisition, restoration, management, or enhancement of coastal wetlands, funding projects that will have wide-reaching benefits for local economies, people, and wildlife – boosting coastal resilience, reducing flood risk, stabilizing shorelines and protecting natural ecosystems.

#### **6.B.P Wetland Program Development Grants**

Since 1990, the EPA's Wetland Program Development Grants (WPDGs) have promoted the coordination and acceleration of research, investigations, experiments, training, demonstrations, surveys, and studies relating to the causes, effects, extent, prevention, reduction, and elimination of water pollution. States, Tribes, local governments, interstate associations, intertribal consortia, and national non-profit, nongovernmental organizations are eligible to apply. While WPDGs can be used to build and refine any element of a comprehensive wetland program, implementation projects are not eligible for funding under this program and preference will be given to funding projects that address these three priority areas:

- Developing a comprehensive monitoring and assessment program
- Improving the effectiveness of compensatory mitigation, and
- Refining the protection of vulnerable wetlands and aquatic resources

**Funding:** The EPA's Mid-Atlantic Region awarded approximately \$1.4 million in 2009. Individual awards were expected to range from \$250,000 to \$400,000.

**Connection with the State NPS Management Program:** This program helps to advance the State NPS Program statewide by promoting the coordination and acceleration of research, investigations, experiments, training, demonstrations, surveys, and studies relating to the causes, effects, extent, prevention, reduction, and elimination of water pollution, including nonpoint sources.

#### **6.B.Q Section 106 Water Pollution Control Program Grant**

Section 106 of the Clean Water Act authorizes EPA to provide federal assistance to States, territories, the District of Columbia, Indian Tribes, and interstate agencies to help bring impaired water bodies into attainment with water quality standards. The grant supports the establishment and implementation of ongoing water pollution control programs. Prevention and control measures supported by State Water Quality Management programs include permitting, pollution control activities, surveillance, monitoring, and enforcement; advice and assistance to local agencies; and the provision of training and public information. In Maryland, 106 grants have been used to help support water quality/biological monitoring, the State integrated report, enhanced tidal monitoring, aquatic resource surveys, NPDES program/permitting, regulatory monitoring, and TMDLs. Increasingly, EPA and states are working together to develop Basinwide approaches to water quality management. The Water Pollution Control Program is helping to foster a watershed protection approach at the state level by looking at states' water quality problems holistically and targeting the use of limited finances available for effective program management.

**Funding:** Section 106 allocations are generated every year, according to formulae developed by EPA, which provides allotments directly to states and interstate agencies. Maryland receives approximately \$2.5 million annually.

**Connection with the State NPS Management Program:** This Federal grant provides important support for ongoing NPS-related work in Maryland, particularly as a compliment to other Federal and State NPS funding.

### **6.B.R Section 604(b) Water Quality Management Planning Grant Program**

Section 604(b) of the Clean Water Act provides funding to support State water quality planning activities under 205(j) and 303(e) of the Act. The Water Quality Management process described in 40 CFR Part 130 and the CWA provide the authority for a consistent national approach for maintaining, improving, and protecting water quality while allowing States to implement the most effective individual programs. The process is implemented jointly by EPA, States, interstate agencies, and areawide, local, and regional planning organizations. Water Quality Management Planning grants ([Federal Assistance listing 66.454](#)) awarded under Section 604(b) assist States (including territories and the District of Columbia), Regional Public Comprehensive Planning Organizations (RPCPOs), and Interstate Organizations (IOs) to determine the nature and extent of point and nonpoint source water pollution and to develop water quality management plans.

**Funding:** Approximately 1% of [Clean Water State Revolving Fund allotments](#) (or \$100,000 if greater).

**Connection with the State NPS Management Program:** This Federal grant provides important support for ongoing NPS-related work in Maryland, particularly as a compliment to other Federal and State NPS funding.

### Funding Summary

The following table summarizes funding described in this section, which includes many, but not all, federal, state, and local funding sources in Maryland.

Source	Amount	Year(s)
Bay Restoration Fund	\$1.2 B	2005-2018
Chesapeake & Atlantic Coastal Bays Trust Fund	\$50 M	Annually
Maryland Agricultural Water Quality Cost Share (MACS)	\$100 M	1998-2018
CWA Section 319	\$2.0 M	Annually
Water Quality Revolving Loan Fund	\$2.73 B	1987-2019
Chesapeake Bay Trust	\$11 M	2019
Phase I and II stormwater permit requirements	\$1.6 B	Through 2025
Chesapeake Bay Implementation Grant (CBIG)	\$4.6 M	Annually
Chesapeake Bay Regulatory and Accountability Program (CBRAP)	\$2.0 M	Annually
Abandoned Mine Land Grant	\$3.0 M	Annually
Conservation Reserve Program and Conservation Reserve Enhancement Program (CREP)	TBD	Annually
Environmental Quality Incentives Program (EQIP)	TBD	Annually
Regional Conservation Partnership Program (RCPP)	TBD	Annually
Onsite Disposal Systems Grant (Bay Restoration Fund)	Varies	Annually
Chesapeake Bay Innovative Nutrient and Sediment Reduction Grant (NFWF)	\$200K - \$1 M	Annually
National Coastal Wetlands Conservation Grant Program	Varies	Annually
Wetland Program Development Grants	Varies	Annually
CWA Section 106	~\$2.5M for MD	Annually
CWA Section 604(b)	Approximately 1% of CWSRF	Annually

# Chapter 7 – Adaptive Management, Program Review, and Accountability

Section 303 of the federal Clean Water Act provides a logical framework that aligns well with the technical foundation that drives the Nonpoint Source Program’s objectives. It also imposes accountability and promotes programmatic evaluation and adaptive management. Activities are conducted in a cyclic manner, from setting standards to implementing restoration actions, so that lessons learned at each step of the framework inform the other steps. EPA’s Long-Term [Vision](#) for Assessment, Restoration, and Protection under the CWA Section 303(d) program supports adaptive management by focusing on demonstrable improvement in water quality for watersheds prioritized by States. The Vision goals emphasize flexibility for States to set their own priorities and pace for TMDL development.

The components of the Chesapeake Bay TMDL [accountability framework](#) also support adaptive NPS management. Chesapeake Bay Program partners develop short-term milestones to assure restoration progress. Milestones identify the restoration practices, programs, policies, and resources that jurisdictions commit to implementing over two-year periods. EPA evaluates jurisdictions’ progress toward achieving their milestone commitments and may take appropriate federal actions, as necessary, to help jurisdictions remain on track. Milestones include annual evaluations to gauge progress toward restoring Chesapeake Bay by 2025. Milestones provide Maryland the opportunity to adaptively manage the restoration process, incorporate new science on practice performance, and apply lessons learned.

In addition, EPA has a statutory obligation under Clean Water Act § 319(h)(8) to determine that states make satisfactory progress in meeting the schedule of relevant annual milestones specified in their NPS management programs and is prohibited from awarding grants under § 319(h) in the absence of such a determination. This is an essential reason that EPA requires NPS management program plans be updated and kept current – so that program objectives and milestones are relevant for each grant period. Having an updated NPS management program is an essential foundation for a finding of satisfactory progress. In accordance with EPA’s 2013 Nonpoint Source Program Guidance, the State of Maryland intends to review and update this plan on a five-year cycle.

In compliance with Clean Water Act Section 319, Maryland [reports annually](#) to EPA about progress in meeting nonpoint source management programs goals and, to the extent information is available, reductions in NPS pollutant loading and improvements in water quality. The following mechanisms assist EPA Region 3 in making satisfactory progress determinations and ensuring that Maryland’s Nonpoint Source Program has procedures to promote efficient fiscal and functional management and metrics by which these can be evaluated.

Examples of these include:

- 319 Program Annual Report
- 319 Grant Reporting and Tracking System (GRTS)
- Annual Maintenance of Effort reporting: Ensuring that existing levels of state funding is not withdrawn in response to the receipt of federal funds
- 319 Program Milestones (See next section)
- BMP Implementation Reporting
- Annual Success Stories

- Implementation Monitoring: Maintain robust implementation monitoring projects that demonstrate observable progress in reducing pollution.

Biological and water quality monitoring funded by Maryland's 319(h) grant is targeted to watersheds where significant 319-funded NPS implementation is occurring. This monitoring is designed to demonstrate observable improvements in response to implementation actions. Emphasis is on impaired water bodies with TMDLs and support of local implementation efforts.



# Appendix A - Components of Maryland's 2021-2025 Nonpoint Source Management Plan

The Maryland NPS Management Program is comprised of various components listed below that may be updated or revised as necessary to meet diverse needs and requirements. Updates and revisions to these components are intended to be updates and revisions to the State Program. The links to the Internet for each component are provided so that the most current version continues to be accessible.

## Annual Reports

The Maryland 319 Nonpoint Source Program Annual Report is produced by the Maryland Department of the Environment. (See Appendix Internet Sources, 319(h), MDE 319 NPS Program)

## Chesapeake Bay Watershed

Maryland programs for NPS planning and implementation focused on the Chesapeake Bay are addressed in several documents listed below and are publicly accessible. (See Appendix Internet Sources, Chesapeake Bay WIP) Some of these, such as the milestones, will be updated or revised in consideration of implementation progress:

- 2014 Chesapeake Bay Watershed Agreement
- Maryland's Phase I Watershed Implementation Plan for the Chesapeake Bay Total Maximum Daily Load
- Maryland's Phase II Watershed Implementation Plan for the Chesapeake Bay TMDL
- Maryland's Phase III Watershed Implementation Plan for the Chesapeake Bay TMDL
- Two-Year Milestones

## Continuing Planning Process

The Federal Clean Water Act Section 303(e) and EPA regulations require that each state maintain a Continuing Planning Process (CPP) document. Maryland's CPP explains State processes for administering its water programs. It also describes methods used to develop plans for protecting, maintaining, and improving water quality. Maryland's CPP document was first completed in 1976, and has been updated in 1986, 2001 and 2007. (see Appendix Internet Sources, Continuing Planning Process)

## Enforceable Policies

The listing of enforceable policies was last updated in 2011 including statewide authorities with emphasis on coastal areas. (See Appendix Internet Sources, Coastal Policies)

## Integrated Report

Maryland's Integrated Report of Surface Water Quality is produced by the Maryland Department of the

Environment every second year in accordance with Federal Clean Water Act Sections 303(d), 305(b) and 314. (see Appendix Internet Sources, 303(d))

### **Monitoring Strategy**

The State of Maryland's Comprehensive Water Monitoring Strategy was produced by the Maryland Department of the Environment in 2009. (See Appendix Internet Sources, Monitoring Strategy)

### **State Revolving Fund**

In order to rate and rank candidate project for funding by the State Revolving Fund, the Maryland Department of the Environment uses the Integrated Project Priority System for Water Quality Capital Projects, Point Source and Nonpoint Sources, which is reviewed and approved by EPA. (See Appendix Internet Sources, Water Quality Revolving Fund)

### **Success Stories**

In Maryland, at least one success story is produced each year by the Maryland Department of the Environment to meet specifications set by EPA. (See Appendix Internet Sources, Success Stories)

# Appendix B - Internet Sources for Maryland's 2021-2025 Nonpoint Source Management Plan

Name	Topic	Entity	Link
303(d)	New Vision / guidance for States	EPA	<a href="http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/programvision.cfm">http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/programvision.cfm</a>
	Maryland Integrated Report	MDE	<a href="https://mde.maryland.gov/programs/water/tmdl/integrated303dreports/pages/index.aspx">https://mde.maryland.gov/programs/water/tmdl/integrated303dreports/pages/index.aspx</a>
319(h)	MDE 319 NPS Program	MDE	<a href="https://mde.maryland.gov/programs/Water/319NonPointSource/Pages/index.aspx">https://mde.maryland.gov/programs/Water/319NonPointSource/Pages/index.aspx</a>
	Maryland 319(h) Grant	MDE	<a href="https://mde.maryland.gov/programs/Water/319NonPointSource/Pages/factsheet.aspx">https://mde.maryland.gov/programs/Water/319NonPointSource/Pages/factsheet.aspx</a>
	EPA 319(h) Grant	US EPA	<a href="http://water.epa.gov/polwaste/nps/cwact.cfm">http://water.epa.gov/polwaste/nps/cwact.cfm</a>
Abandoned Mine Lands	restoration & acid mine drainage mitigation	MDE	<a href="https://mde.maryland.gov/programs/LAND/mining/Pages/AbandonedMineLandsDivision.aspx">https://mde.maryland.gov/programs/LAND/mining/Pages/AbandonedMineLandsDivision.aspx</a>
Agriculture	State agency program	MDA	<a href="http://mda.maryland.gov/Pages/homepage.aspx">http://mda.maryland.gov/Pages/homepage.aspx</a>
Anacostia Restoration Partnership	watershed restoration and protection	interagency	<a href="http://www.anacostia.net/index.html">http://www.anacostia.net/index.html</a>
Animal Feeding Operations	Maryland program	State of Md	<a href="https://mde.maryland.gov/programs/land/recyclingandoperationsprogram/pages/afinfo.aspx">https://mde.maryland.gov/programs/land/recyclingandoperationsprogram/pages/afinfo.aspx</a>
Beaches Program	Maryland management under the federal law	MDE	<a href="https://mde.maryland.gov/programs/Water/MHB/Pages/Maryland-Healthy-Beaches-Home.aspx">https://mde.maryland.gov/programs/Water/MHB/Pages/Maryland-Healthy-Beaches-Home.aspx</a>
Chesapeake Bay Agreement 2014	Chesapeake Bay Agreement 2014	US EPA	<a href="http://www.chesapeakebay.net/chesapeakebaywatershedagreement/page">http://www.chesapeakebay.net/chesapeakebaywatershedagreement/page</a>
Chesapeake Bay Commission	legislative cooperation by MD, PA, VA	interstate	<a href="http://www.chesbay.us/">http://www.chesbay.us/</a>
Chesapeake Bay Program	watershed restoration and protection	Federal	<a href="http://www.chesapeakebay.net/">http://www.chesapeakebay.net/</a>
Chesapeake Bay Program Data	downloadable data	US EPA	<a href="http://www.chesapeakebay.net/data">http://www.chesapeakebay.net/data</a>
Chesapeake Bay Trust	State grant funding program	State of Md	<a href="https://cbtrust.org/">https://cbtrust.org/</a>
Chesapeake Bay WIP	implementation plans, milestones, initiatives	MDE	<a href="https://mde.maryland.gov/programs/Water/TMDL/TMDLImplementation/Pages/Phase3WIP.aspx">https://mde.maryland.gov/programs/Water/TMDL/TMDLImplementation/Pages/Phase3WIP.aspx</a>
ChesapeakeStat	Chesapeake Bay restoration tracking	EPA	<a href="http://stat.chesapeakebay.net/?q=node/130">http://stat.chesapeakebay.net/?q=node/130</a>
Clean Marina Program	voluntary marina participation/recognition	MDNR	<a href="https://dnr.maryland.gov/boating/Pages/cleanmarina/home.aspx">https://dnr.maryland.gov/boating/Pages/cleanmarina/home.aspx</a>
Climate Change	Maryland programs and plan	State of Md	<a href="http://climatechange.maryland.gov/Coaplan/">http://climatechange.maryland.gov/Coaplan/</a>
Coastal NPS Program	Maryland Dept. of Natural Resources program	MDNR	<a href="https://dnr.maryland.gov/ccs/Pages/default.aspx">https://dnr.maryland.gov/ccs/Pages/default.aspx</a>
Coastal Training Program	Training decision makers in NPS-related issues	State of Md	<a href="http://www.coastaltraining-md.org/">http://www.coastaltraining-md.org/</a>
Continuing Planning Process	MDE document	State of Md	<a href="https://mde.maryland.gov/programs/Water/TMDL/TMDLImplementation/Documents/www.mde.state.md.us/assets/document/cpp_071107.pdf">https://mde.maryland.gov/programs/Water/TMDL/TMDLImplementation/Documents/www.mde.state.md.us/assets/document/cpp_071107.pdf</a>
Critical Area Commission	focus on buffers & 1000 ft adjacent to tidal waters	State of Md	<a href="https://dnr.maryland.gov/criticalarea/Pages/default.aspx">https://dnr.maryland.gov/criticalarea/Pages/default.aspx</a>
Executive Order 13508	Federal agencies commitments to the Chesapeake Bay	U. S. agencies	<a href="http://executiveorder.chesapeakebay.net">http://executiveorder.chesapeakebay.net</a> <a href="http://executiveorder.chesapeakebay.net/EO_13508_FY13_Action_Plan.pdf">http://executiveorder.chesapeakebay.net/EO_13508_FY13_Action_Plan.pdf</a>
Fertilizer Regulation	lawn application limitations	MDA	<a href="http://mda.maryland.gov/Pages/fertilizer.aspx">http://mda.maryland.gov/Pages/fertilizer.aspx</a>
Fish Consumption Advisory	public health	MDE	<a href="https://mde.maryland.gov/programs/marylander/fishandshellfish/pages/fishconsumptionadvisory.aspx">https://mde.maryland.gov/programs/marylander/fishandshellfish/pages/fishconsumptionadvisory.aspx</a>
Green Infrastructure Funding	EPA list/links to opportunities	US EPA	<a href="http://water.epa.gov/infrastructure/greeninfrastructure/gi_funding.cfm">http://water.epa.gov/infrastructure/greeninfrastructure/gi_funding.cfm</a>
iMap	Interactive mapping & data portal	State of Md	<a href="http://imap.maryland.gov/Pages/applications.aspx">http://imap.maryland.gov/Pages/applications.aspx</a>
MDE	State agency program	MDE	<a href="https://mde.maryland.gov/Pages/index.aspx">https://mde.maryland.gov/Pages/index.aspx</a>
MDP	Maryland Department of Planning	State of Md	<a href="http://planning.maryland.gov/">http://planning.maryland.gov/</a>
Monitoring Strategy	Maryland document	MDE	<a href="https://mde.maryland.gov/programs/Water/TMDL/MD-AWQMS/Documents/Maryland_Monitoring_Strategy2009.pdf">https://mde.maryland.gov/programs/Water/TMDL/MD-AWQMS/Documents/Maryland_Monitoring_Strategy2009.pdf</a>
National Estuary Program	home page	EPA	<a href="https://www.epa.gov/nep">https://www.epa.gov/nep</a>

Natural Resources	State agency program	MDNR	<a href="https://dnr.maryland.gov/Pages/default.aspx">https://dnr.maryland.gov/Pages/default.aspx</a>
National Water Quality Initiative	Federal program	USDA	<a href="http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/eqip/?cid=stelprdb1047761">http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/eqip/?cid=stelprdb1047761</a>
Nonpoint Source	home page for Maryland NPS Program	MDE	<a href="https://mde.maryland.gov/programs/Water/319NonPointSource/Pages/index.aspx">https://mde.maryland.gov/programs/Water/319NonPointSource/Pages/index.aspx</a>
Patuxent River Commission	river restoration and protection	interagency	<a href="https://planning.maryland.gov/Pages/OurWork/PaxRiverComm/PatuxentRiverCommInfo.aspx">https://planning.maryland.gov/Pages/OurWork/PaxRiverComm/PatuxentRiverCommInfo.aspx</a>
Pesticide Regulatory Program	State agency program	MDA	<a href="http://mda.maryland.gov/plants-pests/pages/pesticide_regulation.aspx">http://mda.maryland.gov/plants-pests/pages/pesticide_regulation.aspx</a>
Pesticide Work Group	addresses Md issues on use, tracking, reporting	MDA	<a href="http://mda.maryland.gov/about_mda/Pages/Pesticide-Information-and-Reporting-Workgroup.aspx">http://mda.maryland.gov/about_mda/Pages/Pesticide-Information-and-Reporting-Workgroup.aspx</a>
SMART Tool	Stormwater Mgmt and Restoration Tracker	U of Md Exten	<a href="https://extension.umd.edu/programs/environment-natural-resources/program-areas/watershed-protection-and-restoration-program/stormwater-management-and-restoration-tracking-smart-tool">https://extension.umd.edu/programs/environment-natural-resources/program-areas/watershed-protection-and-restoration-program/stormwater-management-and-restoration-tracking-smart-tool</a>
StormwaterPrint	State & local urban stormwater mgmt maps	MDE	<a href="https://mde.maryland.gov/programs/Water/StormwaterManagementProgram/Pages/StormwaterPrint.aspx">https://mde.maryland.gov/programs/Water/StormwaterManagementProgram/Pages/StormwaterPrint.aspx</a>
Stream Health	Local stream information maps	MDNR	<a href="http://www.streamhealth.maryland.gov/">http://www.streamhealth.maryland.gov/</a>
Stronghold Watersheds	Greatest aquatic biodiversity maps	MDNR	<a href="http://www.streamhealth.maryland.gov/stronghold.asp">http://www.streamhealth.maryland.gov/stronghold.asp</a>
Stormwater Management	program for urban/developed lands	MDE	<a href="https://mde.maryland.gov/programs/Water/SSDS/Pages/index.aspx">https://mde.maryland.gov/programs/Water/SSDS/Pages/index.aspx</a>
Success Stories	Documentation of NPS implementation success	MDE	<a href="https://mde.maryland.gov/programs/Water/319NonPointSource/Pages/index.aspx">https://mde.maryland.gov/programs/Water/319NonPointSource/Pages/index.aspx</a>
		US EPA	<a href="https://www.epa.gov/nps/success-stories-about-restoring-water-bodies-impaired-nonpoint-source-pollution">https://www.epa.gov/nps/success-stories-about-restoring-water-bodies-impaired-nonpoint-source-pollution</a>
Susquehanna River Basin Commission	interagency watershed coordination & cooperation	interstate	<a href="http://www.srbcb.net/">http://www.srbcb.net/</a>
TMDL New Vision	Federal program direction described	US EPA	<a href="https://www.epa.gov/tmdl/new-vision-implementing-cwa-section-303d-impaired-waters-program-responsibilities">https://www.epa.gov/tmdl/new-vision-implementing-cwa-section-303d-impaired-waters-program-responsibilities</a>
Water Quality Revolving Fund	loans and grants for clean water and drinking water capital programs	State of Md	<a href="https://mde.maryland.gov/programs/Water/WQFA/Pages/water_quality_fund.aspx">https://mde.maryland.gov/programs/Water/WQFA/Pages/water_quality_fund.aspx</a>
			<a href="https://mde.maryland.gov/programs/Water/WQFA/Pages/drinking_water_fund.aspx">https://mde.maryland.gov/programs/Water/WQFA/Pages/drinking_water_fund.aspx</a>
		US EPA	<a href="http://water.epa.gov/grants_funding/cwsrf/cwsrf_index.cfm">http://water.epa.gov/grants_funding/cwsrf/cwsrf_index.cfm</a>
Watershed Restoration Action Strategy	Local watershed plans, 2000-2006 assistance	MDNR	<a href="https://dnr.maryland.gov/waters/Pages/Watershed-Action-Strategy.aspx">https://dnr.maryland.gov/waters/Pages/Watershed-Action-Strategy.aspx</a>
Watershed Assistance Collaborative	technical assistance	MDNR	<a href="https://dnr.maryland.gov/ccs/pages/healthy_waters/wac.aspx">https://dnr.maryland.gov/ccs/pages/healthy_waters/wac.aspx</a>
Watershed Stewards Academy	training residents to protect/restore water quality	U of Md Exten	<a href="https://extension.umd.edu/programs/environment-natural-resources/program-areas/watershed-protection-and-restoration-program/watershed-stewards-academy">https://extension.umd.edu/programs/environment-natural-resources/program-areas/watershed-protection-and-restoration-program/watershed-stewards-academy</a>
Water Quality Mapping Center	geographic information distribution	MDE	<a href="https://mde.maryland.gov/programs/water/waterquality/Pages/WaterQualityMaps.aspx">https://mde.maryland.gov/programs/water/waterquality/Pages/WaterQualityMaps.aspx</a>

# Appendix C – Milestones for Tracking Progress

## Maryland’s 2021 – 2025 Nonpoint Source Management Plan

The following annual milestones coincide with Maryland’s NPS Management Program objectives presented in Chapter 2 of Maryland’s 2021-2025 Nonpoint Source Management Plan (Plan). The Management Plan is intended to achieve and maintain water quality standards and to maximize water quality benefits among other broad strategic goals presented in Chapter 1 of the Plan. These milestones, in concert with the Plan’s goals and objectives, address Key Component #1 of EPA’s Section 319 Program Guidance entitled, “Key Components of an Effective State Nonpoint Source Management Program (November 2012).”

The following milestones are organized into two broad groups: Statewide Milestones and Watershed Milestones. To the degree possible the milestones are further organized in groups for each objective. However, in some cases, the category in which to place a milestone is subjective. For instance, an evaluation metric for stormwater permit could be placed under Objective 4 (*Pollutant Sources*) or Objective 8 (*Program Management and Evaluation*).

However, for practical reasons, separate milestone categories are not included for the first two objectives, 1) “*State Regional Coverage: Ensure that the Program addresses the three broad geographic regions of the State*”, and 2) “*Multiple Scales: Ensure that the Program is attentive to multiple scales of geography at which different NPS issues are managed*.” Objective 1, *State Regional Coverage*, is addressed in large part by the Watershed Milestones. Objective 2, *Multiple Scales*, is addressed throughout the categories of milestones. For example, a milestone under the “pollutants” category for mercury pollution reflects the need for strategies and actions on a large geographic scale. This is because a significant proportion of mercury in Maryland’s waters comes from atmospheric deposition the sources of which are of national and even international origin. At the other end of the scale, Maryland’s NPS Program invests in the identification of highly localized sources of PCBs, which is reflected as another annual milestone.

Each year, the following tables will be included in Maryland’s 319 Annual Report with updates to reflect annual progress. The Annual Reports will be posted to the 319 Program webpage following EPA review. Maryland’s 2021-2025 Nonpoint Source Management Plan will be updated to reflect the status.

Objective 3: Pollutants & Stressors	Lead	2021	2022	2023	2024	2025
<b>Annual Nitrogen Nonpoint Source Loads to Bay:</b> Used to show progress on nutrient load reductions. (Reported by state fiscal year)	MDE	Report progress	Report progress	Report progress	Report progress	Report progress
<b>Nitrogen: For all watersheds with EPA-accepted plans, overall total annual reduction by NPS implementation completed during the past year:</b> (Cumulative lbs/yr nitrogen starting 2021 including annual practices)	MDE	500 Report progress	1,000 Report progress	1,500 Report progress	2,000	2,500 Report progress
<b>Annual Phosphorus Nonpoint Source Loads to Bay:</b> Used to show progress on nutrient load reductions. (Reported by state fiscal year)	MDE	Report progress	Report progress	Report progress	Report progress	Report progress
<b>Phosphorus: For all watersheds with EPA-accepted plans, overall total annual reduction by NPS implementation completed during the past year:</b> (Cumulative lbs/yr phosphorus starting 2021 including annual practices)	MDE	100	200	300	400	500
<b>Sediment: 319-funded projects Estimated annual reductions in pounds of sediment to local water bodies:</b> Annually determine NPS load reductions of nitrogen and include information in NPS annual report. (Cumulative starting in 2021 lbs/yr)	MDE	150,000	300,000	450,000	600,000	750,000
<b>Sediment: For all watersheds with EPA-accepted plans, overall total annual reduction by NPS implementation completed during the past year:</b> (Cumulative lbs/yr sediment starting 2021excluding annual practices.)	MDE	5 million	10 million	15 million	20 million	25 million
<b>Bacteria:</b> Annual Report on Monitoring Results for Maryland Beaches	MDE	report findings	report findings	report findings	report findings	report findings
<b>Bacteria:</b> Conduct Annual Meetings of County Beach Management Programs	MDE	report findings	report findings	report findings	report findings	report findings
<b>Bacteria:</b> Conduct annual Shoreline Field Surveys near Shellfish Waters to identify pollutant sources of concern (part of a 7-year cycle).	MDE	15 Surveys	15 Surveys	15 Surveys	15 Surveys	15 Surveys
<b>Bacteria:</b> Conduct annual Sanitary Surveys of relevant data for all shellfish growing areas. These are reviews of all potential pollution sources in a shellfish growing area, which are informed by Shoreline Field Surveys.	MDE	49 Surveys	49 Surveys	49 Surveys	49 Surveys	49 Surveys

Objective 3: Pollutants & Stressors	Lead	2021	2022	2023	2024	2025
<b>Chloride:</b> Development of a Statewide Implementation Strategy in the form of a 5S plan to address chloride impairments in a consistent manner across the State. This path was discussed with Region 3 staff, and MDE's ultimate goal is a 4b plan.	MDE		Target Draft	Target Final		
<b>Chloride:</b> Certify 150 individuals over the life of this 5-year NPS State Management Program Plan through the Annual Parking lots and Sidewalks Salt Application Management Training by MDE designee.	MDE		Begin Training	50 certified	100 certified	150 certified
<b>Chloride:</b> Track and report the # of personnel trained through the Annual Road Salt Application Management Training by StateHighway Administration.	MDE	Report result	Report result	Report Results	Report result	Report result
<b>Chloride:</b> Update Maryland's 319 Program webpage to summarize Maryland's existing chloride mitigation activities, information about chloride pollution, and partnerships established within and outside of the State.	MDE		Report result	Report result	Report result	Report result
<b>PCBs:</b> Develop one new PCB TMDL over the life of this 5-year NPS State Management Program Plan.	MDE					1
<b>Temperature:</b> Update Maryland's 319 Program webpage to summarize state initiatives designed to reduce temperature. Project Summer 2022 for completion.	MDE		report status			
<b>Trash:</b> Update Maryland's 319 Program webpage to summarize status of TMDLs designed to reduce trash. Project Summer 2022 for completion.	MDE		report status			

Objective 4: Pollutant Sources	Lead	2021	2022	2023	2024	2025
<b><u>Agricultural Milestones</u></b>						
Maintain Annual Cover Crop Implementation Acreage Levels	MDA	600,000	601,000	602,000	603,000	604,000
Maintain Annual Nutrient Management Plan Acreage Levels	MDA	890,000	891,000	892,000	893,000	894,000
Maintain Annual Soil Conservation and Water Quality Plan Acreage Levels	MDA	860,000	861,000	861,000	861,000	861,000
Maintain Annual Manure Transported out of Chesapeake Bay watershed (tons)	MDA	50,000	51,000	52,000	53,000	54,000
Maintain Annual Conservation Tillage (Inc. High Residue) Acreage Levels	MDA	824,000	824,000	824,000	824,000	824,000
Plant Riparian Forest Buffers (Acres/year)	MDA	100	200	300	400	500
Wetland Restoration (Acres/year)	MDA	100	150	200	250	300
Phosphorus Management Tool – Maintain use of PMT for operations in the high-risk group, medium-risk group, and low-risk group. (# of operations utilizing the tool by risk group)	MDA	Report # of operations by category	Report # of operations by category	Report # of operations by category	Report # of operations by category	Report # of operations by category
<b><u>On-site Disposal Systems</u></b>						
Upgrade septic systems to nitrogen removal technology (systems/year)	MDE	1,200	1,200	1,200	1,200	1,200
<b><u>Urban/Suburban Stormwater and Erosion &amp; Sediment Control</u></b>						
Stormwater retrofits of land without sufficient controls (cumulative pounds of nitrogen reduced/year). (May be refined in future Chesapeake Bay 2-Yr Milestones.)	MDE	20,000	22,000	24,000	26,000	28,000
Complete the redevelopment of the MS4 geodatabase that will aid MDE in the assessment of management programs and improve current Phase I MS4 stormwater data tracking, collection, and validation of BMPs:	MDE	Report status	Report status	Report status		
Online BMP Reporting Tool for Non-MS4 local governments:	MDE	Report status	Report status	Report status		
SMART Homeowner BMP Tracking Tool: Track number of BMPs	UMD	Report status				Report status
Online BMP Reporting Tools for Phase II MS4 and Non-MS4 local governments: Make the tool available to users.	MDE	Report status				



Objective 4: Pollutant Sources	Lead	2021	2022	2023	2024	2025
Local Stormwater WLA Implementation Plans: Review Plans submitted as part of Phase I MS4 requirements. (Number of jurisdictions, which may include multiple plans for each jurisdiction) Anticipate salt plans in 2024.	MDE	4	5		11	
Erosion and Sediment site “inspection coverage rate” conducted by MDE(Source: Annual Enforcement & Compliance Report)	MDE	Report rate	Report rate	Report rate	Report rate	Report rate
<b>Forestry</b>						
Lawn-to-Woodland Program: Track and report the number of landowners assisted and acres forested through the Lawn-to-Woodland Program, which provides landowners with trees, tools and technical assistance for planting and maintaining a healthy tree canopy that will support a myriad of environmental, economic and recreational benefits.	DNR	Report Status & acres	Report Status & acres	Report Status & acres	Report Status & acres	Report Status & acres
Maryland’s 5 million trees by 2030 initiative (Report status of program and # of trees planted)	MDE	Report Status & acres	Report Status & acres	Report Status & acres	Report Status & acres	Report Status & acres
Planting Forests on 38,000 acres by 2030 from baseline as part of Maryland’s revised 2021 Greenhouse Gas Reduction Act (GGRA) plan goals.	DNR	Report acres	Report acres	Report acres	Report acres	Report acres
<b>Resource Extraction</b> (information source: Annual Enforcement & Compliance Report)						
Coal Mining site “inspection coverage rate” conducted by MDE	MDE	report rate	report rate	report rate	report rate	report rate
Non-Coal Mining site “inspection coverage rate” conducted by MDE	MDE	report rate	report rate	report rate	report rate	report rate
<b>Hydromodifications</b> (information source: Annual Enforcement & Compliance Report)						
Non-tidal wetlands and floodplains permit site “inspection coverage rate”	MDE	report rate	report rate	report rate	report rate	report rate
Tidal wetlands permit site “inspection coverage rate”	MDE	report rate	report rate	report rate	report rate	report rate

Objective 5: Types of Waterbodies	Lead	2021	2022	2023	2024	2025
<b>Statewide Lakes and Reservoirs</b>						
Lakes/Reservoirs: Triadelphia and Liberty chlorides/temperature monitoring Study (Trends analysis to help determine if we can see drops in salt levels, started in 2019)	MDE					report results
Patuxent Reservoirs Annual Report of the Technical Advisory Committee	WSSC	report	report	report	report	report
<b>Central Maryland – Chesapeake Bay Drainage</b>	Watersheds with EPA-accepted watershed plans that are eligible for 319(h) Grant implementation funding.					
<b>Antietam Creek Watershed.</b> Water quality goal is to reduce annual pollutant loads: 12,923 tons/yr sediment, approx. 3 million-billion <i>E. coli</i> MPN. (see the Washington County Soil Conservation District’s 2012 watershed plan Tables 8, 10, 13, 18, and 19)						
Watershed plan milestones: Report progress in the 319 Annual Report.	WCSCD	report	report	report	report	report
Assess Implementation Progress toward sediment and bacteria reduction watershed plan milestones and update plan if needed.				assess	update	
Update watershed implementation plan		Draft	Finalize			
<b>Back River – Tidal Watershed.</b> Water quality goal is to reduce annual nutrient loads: 6,498 lbs/yr nitrogen and 679 lbs/yr phosphorus. (see Baltimore County’s 2010 watershed plan Table 3-2 and Appendix A-1)						
Watershed plan milestones: Report progress in the 319 Annual Report.	Baltimore County	report	report	report	report	report
Assess action items progress: Stormwater retrofit and Stream restoration					assess	
<b>Back River – Upper Watershed.</b> Water quality goal is to reduce annual nutrient loads: 48,189.6 lbs/yr nitrogen and 6,055.8 lbs/yr phosphorus. (see Baltimore County’s 2008 watershed plan Table 3-2 and Appendix A Table A-2)						
Watershed plan milestones: Report progress in the 319 Annual Report.	Baltimore County	report	report	report	report	report
Assess plan implementation progress, particularly: open space tree planting, impervious area removal on institutional land.					assess	

Objective 5: Types of Waterbodies	Lead	2021	2022	2023	2024	2025
<b><u>Choptank River – Upper Watershed.</u></b> Water quality goal is to reduce nutrient loads from 2002 levels by 39% for nitrogen (704,000 lbs/yr) and 28% for phosphorus (34,5000 lbs/yr). (see Caroline County’s 2010 watershed plan, Table 11)						
Watershed plan milestones: Report progress in the 319 Annual Report.	Caroline County	report	report	report	report	report
Assess BMP implementation progress and update plan if needed.		assess	update			
<b><u>Conococheague Creek Watershed.</u></b>						
Plan is being drafted and will come to MDE for review. MDE anticipates review in Spring 2022 and submission to EPA in late summer of 2022 for review. Milestones for implementation will be added upon acceptance.	Washington County		Submit to EPA			
<b><u>Corsica River Watershed.</u></b> Water quality goal is to continue meeting the Corsica TMDL for nitrogen and phosphorus. (see Centreville’s 2012 watershed plan Update, Table 1)						
Watershed plan milestones: Conduct outreach to the owners of this plan to increase 319 project implantation and Report progress in the 319 Annual Report.	Centreville	report	report	report	report	report
Assess implementation progress for BMP goals and update plan if needed.			assess	update		
<b><u>Gwynns Falls – Middle Watershed.</u></b> Water quality goal for 2017 is to reduce annual nutrient loads: 35,350 lbs/yr nitrogen and 5,915 lbs/yr phosphorus. (see Baltimore County’s 2014 watershed plan Table 3-24 and Appendix A Table A-2)						
Report implementation progress in the 319 Annual Report.	Baltimore County	report	report	report	report	report
<b><u>Jones Falls – Lower Watershed.</u></b> Water quality goal is to reduce annual pollutant loads: 23,146 lbs/yr nitrogen, 3,887 lbs/yr phosphorus, 204.9 tons/yr sediment. (see Baltimore County’s 2008 watershed plan Table 5.4)						
Watershed plan milestones: Report progress in the 319 Annual Report.	Baltimore County	report	report	report	report	report
<b><u>Monocacy River – Lower Watershed.</u></b> Water quality goal is to reduce annual pollutant loads: 649,998 lbs/yr nitrogen, 68,952 lbs/yr phosphorus, 10,345 tons/yr sediment. (see Frederick County’s 2008 watershed plan page 16 and Table “X” p34)						
Watershed plan milestones: Conduct outreach to the owners of this plan to increase 319 project implantation and Report progress in the 319 Annual Report.	Frederick County	report	report	report	report	report
Assess implementation progress and update plan if needed.					assess	update
<b><u>Sassafras River Watershed.</u></b> Water quality goal is to reduce annual pollutant loads: 462,225 lbs/yr nitrogen, 12,602 lb/yr phosphorus, 1,143 tons/yr sediment. (see the Sassafras River Association’s 2009 watershed plan Table 5.4)						
Watershed plan milestones: Conduct outreach to the owners of this plan to increase 319 project implantation and Report progress in the 319 Annual Report.	SR Assoc.	report	report	report	report	Report
<b><u>Central Maryland – Chesapeake Bay Drainage</u></b>	Plans not designed to seek 319(h) implementation funds.					
<b><u>Phase III Watershed Implementation Plan for the Chesapeake Bay TMDL.</u></b>						

Evaluate 2025 progress for pollutant load reductions to be achieved for nonpoint sources of nitrogen, phosphorus, and sediment. Report Annually.	MDE	Update Progress	Update Progress	Update Progress	Update Progress	Report
<b><u>Western Maryland – Casselman River and Youghiogheny River</u></b>		Watersheds with EPA-accepted watershed plans that are eligible for 319(h) grant implementation funding.				
<b><u>Casselman River Watershed Management Plan</u></b> Water quality goal is to meet the pH water quality standard.(see MDE’s 2011 watershed plan Chapter 3.2)						
Watershed plan milestones: Report progress in the 319 Annual Report, including, number/percentage of pH-impaired stream segments, NPS Program Success Stories and implementation progress.	MDE	report	report	report	report	report
Percentage of impaired stream segments remediated and meet the State water quality standard for pH.	MDE	report	report	report	report	report
Report 303(d) stream segments that achieve pH criteria via Maryland’s Integrated Report.	MDE		report		report	
<b><u>Cherry Creek Watershed Protection Plan</u></b> Water quality goal to be determined when the plan is finalized.						
Plan completion anticipated in 2022. Potential milestones TBD.	MDE	Draft	Finalize	report	report	report
<b><u>Upper Jennings Run Watershed Plan</u></b> Water quality goal to be determined when the plan is finalized.						
Tentatively accepted pH mitigation Plan is being updated to include sediment. Report progress in the 319 Annual Report.	MDE	report	Finalize sediment	report	report	report
<b><u>Coastal Region – Coastal Bays and Atlantic Ocean</u></b>						
<b><u>Coastal Bays Conservation and Management Plan</u></b> Water quality goal to be determined when plans are finalized.						
Assawoman Bay is conditionally approved: Report progress in the 319 Annual Report.	MCBP		report	report	report	report
Next steps are to create plans for Assateague, Isle of Wight, Newport, and Sinepuxent Bays. Report progress on creation of these plans and incorporate updates to milestones for any new plans in updates to this NPS plan.	MCBP					

**Objective 6 – Protection and Restoration:** Because many restoration activities are addressed under Objective 3 (Pollutants and Stressors) and Objective 4 (Pollutant Sources), the milestones associated with Objective 6 (Protection and Restoration) are focused on protection.

Objective 6: Protection and Restoration	Lead	2021	2022	2023	2024	2025
Conduct biological monitoring of approximately 30 sites annually to support implementation of Maryland’s Antidegradation Policy in areas with pending significant development projects. Produce a report of results annually.	MDE	monitor & report	monitor & report	monitor & report	monitor & report	monitor & report
303(d) Program Vision: For the 2020 reporting cycle and beyond, in addition to the traditional TMDL development priorities and schedules for waters in need of restoration, Maryland will identify protection planning priorities and approaches along with schedules to help prevent impairments in healthy waters, in a manner consistent with each State’s systematic prioritization. (See Objective 7, Priorities, for a related objective)	MDE		report results		report results	
Develop Antidegradation Review process for individual projects identified under a County’s Comprehensive Plan.	MDE	report results	report results	report results	report results	report results
Fully integrate the Antidegradation review into the General Permit for Discharges of Stormwater Associated With Construction Activity (Maryland General Permit No. 14-GP	MDE	report results	report results	report results	report results	report results
Conduct State Clearinghouse reviews of state and federally funded projects to ensure consistency with the State Anti-degradation Policy (approximately 400/year)	MDE	report results	report results	report results	report results	report results

Objective 7: Priority Setting	Lead	2021	2022	2023	2024	2025
Biological monitoring to support implementation of Maryland's Antidegradation Policy in areas with pending significant development projects. Produce a list of about 30 high-priority monitoring sites annually.	MDE	list & report	list & report	list & report	list & report	list & report
Award 319(h) Grant funding annually according to prioritization criteria. Provide scopes of work for each selected project.	MDE	report	report	report	report	report
303(d) Program Vision: Priorities - For the 2020 integrated reporting cycle and beyond, Maryland will review, systematically prioritize, and report priority watersheds or waters for restoration and protection in the biennial integrated reports to facilitate State strategic planning for achieving water quality goals.	MDE	report		report		report
303(d) Program Vision: Alternatives - By 2022, Maryland will use alternative approaches, in addition to TMDLs, that incorporate adaptive management and are tailored to specific circumstances where such approaches are better suited to implement priority watershed or water actions that achieve the water quality goals, including identifying and reducing nonpoint sources of pollution. (Assess alternatives to influence priorities)	MDE				report	

Objective 8: Program Management and Evaluation	Lead	2021	2022	2023	2024	2025
<b>319 Semi-Annual Reports:</b> Report semi-annually on progress on implementing the active Section 319 grant work plans ensuring status reports (evaluations) are current for at least 90% of the active grant projects in the GRTS database.	MDE	2 semi-annual reports	2 semi-annual reports	2 semi-annual reports	2 semi-annual reports	2 semi-annual reports
MDE will continue to input current information in the Watershed Plan Tracker (WPT) throughout the five-year life of this Plan to ensure accuracy of data.	MDE	Updated WPT	Updated WPT	Updated WPT	Updated WPT	Updated WPT
<b>Chesapeake Bay Two-Year Milestones:</b> As part of the CB partnership process, Maryland submits a 2-year milestone evaluation as well as new milestones or revisions for the subsequent 2-year timeframe on odd years. Maryland’s 2-year milestones will be maintained on our website, along with evaluations by the Chesapeake Bay program, here: <a href="https://mde.maryland.gov/programs/Water/TMDL/TMDLImplementation/Pages/milestones.aspx">https://mde.maryland.gov/programs/Water/TMDL/TMDLImplementation/Pages/milestones.aspx</a>	MDE	assess progress/ report findings/ post eval.	Update milestones	assess progress/ report findings/ post eval.	Update milestones	assess progress/ report findings/ post eval.
Produce Maryland’s Integrated Water Quality Monitoring and Assessment Report <u>every even calendar year (Integrated Report)</u> . Post the report on the Internet following EPA approval.	MDE		report		report	
<u>Number of water bodies identified in Integrated Report as being primarily NPS impaired that are partially or fully-restored<sup>1</sup>:</u>  Partially or fully restore water bodies identified in state’s Integrated Report primarily impaired by NPS. (cumulative watersheds)  Partially restored means at least one water quality criterion is achieved in cases where the waterbody has multiple waterquality criteria violations (Cumulative starting in 2021).	MDE	0	0	1	2	3
Report NPS BMP implementation progress annually.	MDE	report	report	report	report	report
BMP Implementation Verification Protocols: Revised documentation due to EPA Chesapeake Bay Program	MDE	report				
Produce Maryland’s 319 NPS Program Annual Report (319 Annual Report). Annually report if findings necessitate a future NPS Management Program Plan update. Post the report on the Internet following EPA review.	MDE	report	report	report	report	report

Report progress achieved toward goals for 319-eligible watershed plans in Maryland's 319 Annual Report.	MDE	report	report	report	report	report
Report significant findings from targeted watershed monitoring plans in Maryland's 319 Annual Report.	MDE	report	report	report	report	report
Report at least one success story documenting water quality and/or ecological improvement annually. If none can be documented during a given year, then report at least two programmatic success stories within the same required year.	MDE	report	report	report	report	report
Evaluate progress on each of these 319 Program milestones and report the status in Maryland's NPS Program Annual Report.	MDE	report	report	report	report	report
Maintain/increase State agency investment in NPS programs and implementation. Report annually on total state expenditures by state fiscal year. (See Annual Report Appendix A)	MDE	report	report	report	report	report
Continuing Planning Process (CPP) update for consistency with this NPS Program Management Strategy	MDE		update & report			
State Monitoring Strategy Update	MDE			update & report	State Monitoring Strategy Update	MDE
Diversity, Equity, Inclusion, and Environmental Justice (DEIJ): Based on the lessons learned in the Envision the Choptank circuit rider project, update the NPS management plan to include more specific DEIJ goals for the nonpoint source program.	MDE			NPS plan update by 12/1/23		