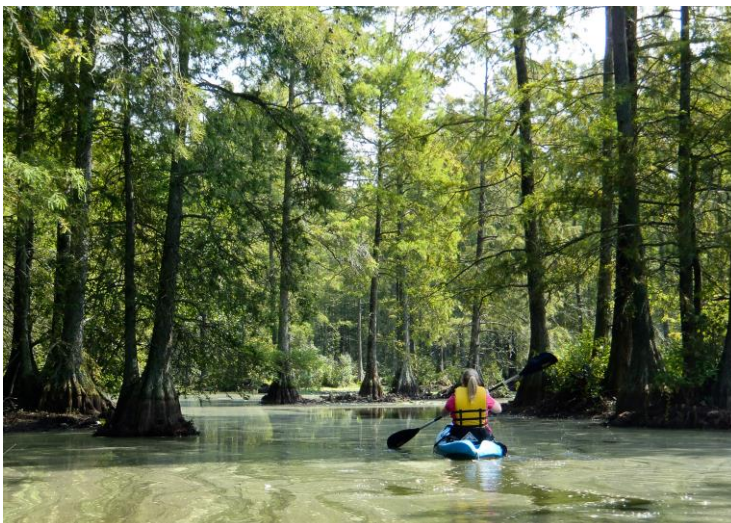




# NANTICOKE RIVER WATERSHED MANAGEMENT PLAN



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### Visioning Conference Committee:

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***“The Nanticoke region will mindfully and intentionally conserve natural and cultural resources in a way that enhances the unique social, economic, and environmental make-up of the area with a particular focus on passing on natural and cultural legacies and preserving continuity of land use in connection with cultural significance.”***

***“The Nanticoke region will draw and retain youth and young families by providing quality jobs and job training within an economy that celebrates and preserves local identity, encourages innovation, reflects the true cost of doing business, and grows within the carrying capacity of both human and natural communities.”***

***~Nanticoke Visioning Conference Participants, March 2010***

## Top Level Summary

The Watershed Management Plan (WMP) is intended to be used as a resource for local governments, conservation and community groups, and individuals in the Nanticoke Watershed. The plan contains a thorough review of the current state of the watershed and provides an in-depth analysis of action steps that can be taken, individually or collaboratively, to best serve the community while protecting the beauty and uniqueness of this region. The following references to green infrastructure refer to the use of vegetation, soils, and natural processes to manage water and create healthier urban environments. At the scale of a city or county, green infrastructure represents the patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water. Below is a top-level summary of the recommendations for this plan. For further discussion of these elements, see the implementation section beginning on page 44.

### Recommendations:

This Watershed Management Plan recommends collaboration and partnership between conservation and community groups, local governments, and state agencies on:

- Identifying and securing funding for key Watershed Implementation Plan (WIP) strategies on suitable public and private lands including:
  - Installing of grass and forested stream buffers;
  - Increasing urban tree canopy;
  - Implementing storm water retrofitting; and
  - Wetland restoration.
- Using green infrastructure-based methodologies to determine where growth and development fits with minimal impact on water quality, and working with developers to ensure best management practices are applied;
- Working with farmers and foresters to apply the most feasible and beneficial best management agricultural practices;
- Developing an outreach campaign for individual landowners in the watershed on nonpoint source pollution and ways to address the issue on a household scale;
- Strategically focusing conservation and restoration efforts with regard to green infrastructure on existing areas identified as having important natural and cultural resources (e.g. Rural Legacy Areas, Certified Heritage Areas, Scenic Byways, water trails) and other critical natural and cultural resources;
- Promoting and developing recreational opportunities that showcase the natural and cultural heritage of the Nanticoke Watershed; and
- Promoting and developing programs that, in accordance with our community vision for the future of the Nanticoke River Watershed, serve to:
  - Support and improve the local economy;
  - Protect and celebrate the rich natural and cultural heritage; and
  - Retain and enrich the quality of life in local and unique communities.

# Introduction

## What is a Watershed Management Plan?

A Watershed Management Plan (WMP) is a design to help control and improve conditions within a watershed, and ultimately, for a specific waterway. Every WMP should address the following elements:

- Building and strengthening partnerships within the community, stakeholders and other organizations;
- Developing a watershed characterization;
- Setting goals and objectives for improving watershed health;
- Developing an implementation plan and identifying solutions; and
- Measuring progress and making adjustments as needed.

Numerous plans focus on remediating impairments in the waterways. Though there have been Total Maximum Daily Loads (TMDLs) set for nutrient and sediment pollution in portions of the Nanticoke River, the current plan contains proactive goals to engage the community and protect the Nanticoke River from future degradation.

The following section provides additional details about the process the Nanticoke Watershed Alliance (NWA) employed to develop a comprehensive Management Plan for the Nanticoke Watershed. This document will serve as a blueprint for future Alliance efforts and will be an important tool for local and state governments in their efforts to meet the TMDL requirements.

## Nanticoke River Watershed Management Plan

From the project's inception, the Nanticoke Watershed Alliance (NWA) sought to develop a Watershed Management Plan that successfully captured the vision of what residents and communities within the watershed's boundaries wish to see the area look like in the future. In keeping with this idea, the NWA implemented a long-range campaign to build relationships with various communities and stakeholder groups and sought input in the development of this plan from a wide range of watershed stakeholders including elected officials, environmentalists, tourism experts, urban planners, historians, watermen, citizens, and business owners. This input formed the basis for a common vision for the Nanticoke Watershed to make the plan a reality.

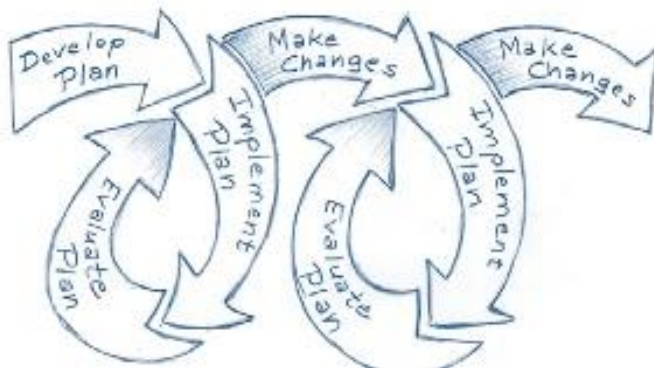
This Watershed Management Plan uses green infrastructure as a foundation for the efforts and recommendations herein. For the purposes of this plan, green infrastructure is defined as a "natural life support system" consisting of an interconnected network of open spaces and natural areas such as wetlands, forests, working landscapes, parks and other areas of green space. The network can be seen as a chain of large, un-fragmented "hubs" connected by "links" of these types of landscapes. Green infrastructure networks help sustain air and water quality, support wildlife, maintain ecological processes, and provide essential elements to enhance the quality of life for residents, visitors, and businesses.

Many of the items above are discussed in greater detail throughout the remainder of this report. It is important to emphasize that this plan was developed directly from the ideas of a diverse group of people interested in maintaining and enhancing the health and vitality of the Nanticoke River Watershed.

## How to Use This Plan

The primary purpose of this plan is to guide local governments, conservation groups, and other entities to prioritize their initiatives for meeting TMDL requirements and protecting and enhancing green infrastructure. Local governments within the Nanticoke Watershed can use this plan to weigh the potential impacts future development could have on the environment, the community, the local economy, and tourism. The plan consolidates key findings from a number of other studies and plans that concern the health and vitality of the Nanticoke River. It further provides recommendations on how to achieve goals for watershed restoration.

This plan should be seen as a living document and reviewed, updated, and enhanced over time. For all Watershed Management Plans, general planning processes are followed:



Source: U.S. EPA Watershed handbook

To ensure the plan remains timely and relevant, the following items are recommended:

- The WMP will be reviewed and revised every five years by the NWA.
- Though this plan contains some recommendations that would need to be implemented by local governments, other conservation groups or individual stakeholders, the NWA will create an Annual Plan of Action for projects within its organization's scope. The Annual Plan of Action should review results from the prior year, prioritize implementation items for the upcoming year, and provide a methodology for utilizing upcoming funding opportunities.
- The Annual Plan of Action should examine opportunities to work in partnership with local and state officials, conservation groups, businesses, and residents.
- At the end of the fifth year, the goals and progress of the implementation section should be revisited and new priorities added, with the overall process starting again by matching the implementation section with the upcoming Annual Plan of Action.

# Public Participation and Visioning Initiative

## Introduction

Public and stakeholder participation is the driving force behind the development of this WMP. Prior studies have been performed, and when brought together, they provide a major portion of the framework and analysis for the WMP. The goal of the NWA was to gather all existing information in one place and to actively engage the Nanticoke River watershed community. While the NWA has continuously worked to engage diverse stakeholders, a highly concerted outreach effort was made for developing this plan based on the needs of all residents.

Beginning in 2006, the Nanticoke Watershed Alliance began developing a green infrastructure assessment for the Nanticoke Watershed. As part of this process, we wanted to incorporate not only ecological resources, but also our watershed's rich cultural, historical, and recreational resources. In 2008-09, the NWA performed extensive public outreach aimed at developing a community-supported vision for the Nanticoke Watershed. A broad spectrum of stakeholders, including those representing watermen, farmers, development, social services, tourism, recreation, faith-based organizations, historical societies, conservation groups, state and local government, businesses, and other members of the community, participated in this process. All stakeholders throughout the geographic extent of the Nanticoke Watershed, without regard to age, race and ethnicity, gender, background, and interests, were included. The Alliance recognizes that without seeking input from *all* residents, any effort to develop a future vision for the Nanticoke would not adequately reflect the interests of those who live and work in the area. This section includes the results of this effort, an assessment of current resources, and recommendations resulting from these efforts.

## Listening Sessions

In 2009, the Alliance performed a series of listening sessions that asked questions about what residents valued about the Nanticoke Watershed. Several listening sessions were held and a questionnaire was developed to gain input from as broad and diverse a group as possible. The listening sessions and questionnaire asked questions such as:

*"What words would you use to describe your community and the Nanticoke region?"*

*"What do you value the most about your community?"*

*"What do you consider the symbols that reflect the uniqueness of this region?"*

*"If [certain] places were lost or destroyed what impact would that have on you and your families' quality of life?"*



A clear common theme spread throughout the responses. Following are some of the sentiments expressed by the participants in describing the Nanticoke Watershed:

- Small town feel
- Slow-paced country life
- Abundance of wildlife
- Retreat to quiet from the “hustle and bustle”
- Vast rural landscape
- Scenic views
- “God’s Country”
- Abundance of outdoor recreation
- Tranquil
- A sense of community
- Rich history
- Exemplary of the Chesapeake Bay region

All participants agreed that a high value should be placed on vibrant towns, a rural feel, a sense of community, and the extensive recreational opportunities provided by nature, wildlife, culture, and history when considering growth, development, and planning for the future of the region.

## Visioning Conference



In March of 2010, stakeholder input efforts culminated in a visioning conference attended by roughly 50 diverse individuals. A planning committee was created to guide the visioning process and the event was named (by consensus) *Land, River, Culture, Community: People of the Nanticoke Uniting for the Future*. The conference summary and full report

can be found online at: [nanticokeriver.org/programs/green-infrastructure-initiative/](http://nanticokeriver.org/programs/green-infrastructure-initiative/).

The visioning conference presented a unique opportunity for diverse stakeholders throughout the region to begin an in-depth investigation of a common vision for the future. Using the principles of the Future Search conference model, attendees investigated the past, reviewed the present, envisioned an ideal future, discovered common values, and identified action steps to move forward with common goals.

Conference facilitators asked the group to identify present trends – social, economic, technological, political, environmental, etc. – that people believe are shaping the future of the Nanticoke region. Participants then voted to determine what they saw as the top trends:

### Top Trends

- Increase in population
- Increase in government/local control
- Increase in land conversion
- Increase in traffic (roads, river, etc.)

**Other identified trends:**

- Decreased small town vitality
- Increased obesity
- Decreased experiential education for kids
- Increased environmental/pollution awareness
- Increased ecotourism
- Increased climate change
- Increased renewable energy sources

Participants were led through a series of discussions and exercises resulting in the identification of three areas of common ground: natural and cultural resource conservation, population growth, and economic development. Participants then drafted two comprehensive value statements:

**Statement 1: “The Nanticoke region will mindfully and intentionally conserve natural and cultural resources in a way that enhances the unique social, economic, and environmental make-up of the area with a particular focus on the passing on natural and cultural legacies and preserving continuity of land use in connection with cultural significance.”**

**Statement 2: “The Nanticoke region will draw and retain youth and young families by providing quality jobs and job training within an economy that celebrates and preserves local identity, encourages innovation, reflects the true cost of doing business, and grows within the carrying capacity of both human and natural communities.”**

They also identified strategies to implement these value statements. Many of these action items are listed in the implementation section of the Watershed Management Plan, but for a complete listing of stakeholder recommendations, visit [nanticokeriver.org/programs/green-infrastructure-initiative/](http://nanticokeriver.org/programs/green-infrastructure-initiative/).

The sentiments expressed by conference participants regarding their vision for the future of the Nanticoke region, including the final value statements and specific action items, form a central piece of this document. The Nanticoke Watershed Alliance has combined stakeholder recommendations with the TMDL requirements set forth in the Chesapeake Watershed Implementation Plan to create a comprehensive set of recommendations (listed in the implementation section).

Public and stakeholder participation should be more than “an event.” The NWA will continue to seek public and stakeholder input on this plan throughout each phase of review and revision. Moreover, the plan’s implementation will require the efforts of several entities, including state and local government, Alliance partnerships, and individuals. The NWA is committed to involving community members with the planning and implementation process.

# Watershed Characterization

## Introduction

Characterization of the watershed is a crucial component for the development of a watershed management plan. This process involves the review of existing plans and studies, and analyses to fill in any missing information. This section provides a snapshot of the environmental conditions surrounding future development plans and recreational opportunities along the Nanticoke River.



## Current Studies and Reports

The Nanticoke River and its surrounding subwatersheds have been well-studied and documented in a number of publications. NWA reviewed many of these studies in the process of developing this plan, including (but not limited to) the following:

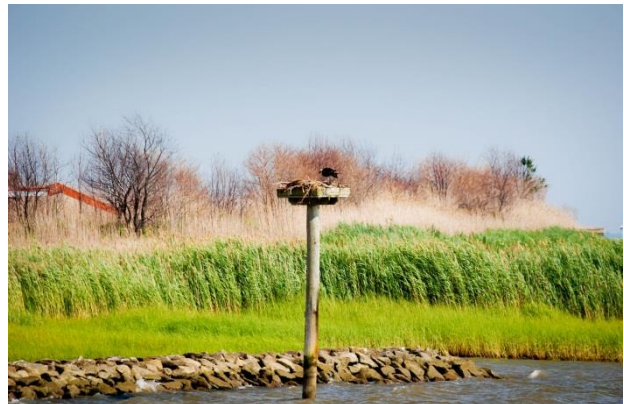
- Maryland Watershed Implementation Plan (WIP)
- Delaware Watershed Implementation Plan (WIP)
- U.S. EPA’s Watershed Handbook
- Condition of Non-tidal Wetlands in the Nanticoke River Watershed, Maryland and Delaware, Delaware Department of Natural Resources and Environmental Control (DNREC) and Maryland Department of Natural Resources (DNR)
- Nanticoke River Watershed Restoration Plan, The Nanticoke Restoration Workgroup
- Draft Comprehensive Management Plan and Environmental Assessment: Captain John Smith Chesapeake National Historic Trail, National Park Service
- Nanticoke River Watershed Assessment, Chesapeake Conservancy
- Wicomico, Dorchester (MD) and Sussex County (DE) Comprehensive Plans
- Heart of the Chesapeake Country Heritage Area Management Plan, Dorchester County Department of Tourism
- Lower Eastern Shore Heritage Area Management Plan, Lower Eastern Shore Heritage Council
- 2012 Five Year Nanticoke River Report Card, Nanticoke Watershed Alliance
- 2009, 2010, & 2011 Nanticoke River Report Card, Nanticoke Watershed Alliance
- 2007 & 2008 State of the Nanticoke River, Nanticoke Watershed Alliance

The NWA synthesized much of this information herein to provide an “existing conditions” summary of the Nanticoke Watershed.

## Physical Characteristics<sup>1</sup>

The Nanticoke River is a major tributary of the Chesapeake Bay, draining approximately 2,072 square kilometers (800 square miles), which includes approximately one quarter of Delaware. The headwaters of the Nanticoke River form a band of wetlands along the western edge of the geographic divide, located in western Sussex County, Delaware. From Delaware, the main stem flows west into Maryland, forming the boundary between Dorchester and Wicomico Counties. Marshyhope Creek forms in southwest Kent County, Delaware, and flows through a section of Sussex County, Delaware, and Caroline County, Maryland, before joining the Nanticoke in Dorchester County, Maryland. The watershed is over 88.5 miles long and the total rise in elevation is 19.8 feet, giving the river a very low gradient. The river's main stem is navigable up to Seaford, Delaware, but the upstream limits of estuarine or salt water seldom extend beyond six miles from the mouth. The river is tidal along the major channels up to dams on Broad Creek in Laurel, Delaware, and on Deep Creek in Concord, Delaware. Marshyhope Creek is tidal up to the dam in Federalsburg, Maryland. Much of the main stem of the Nanticoke River and its tributaries upstream of the dams have been altered by channelization and ditching.

Many federal, regional, and local entities have focused on the Nanticoke River and surrounding watershed for protection due to the abundance of rare fauna and flora and unique biological communities. The Nature Conservancy listed the Nanticoke River watershed as one of their "Last Great Places" and has targeted significant conservation efforts in this region. Maryland and Delaware contain approximately 200 plant species and 70 animal species that are rare, threatened, or endangered at the state level, including over 20 plant and five animal species that are globally rare. Many of these species are found in unique natural communities in the watershed including coastal plain ponds, xeric dunes, and Atlantic white cedar swamps. Furthermore, the Nanticoke Watershed is important for waterfowl and fisheries, is a focus area of the North American Waterfowl Management Plan, and is a reintroduction site for American shad.

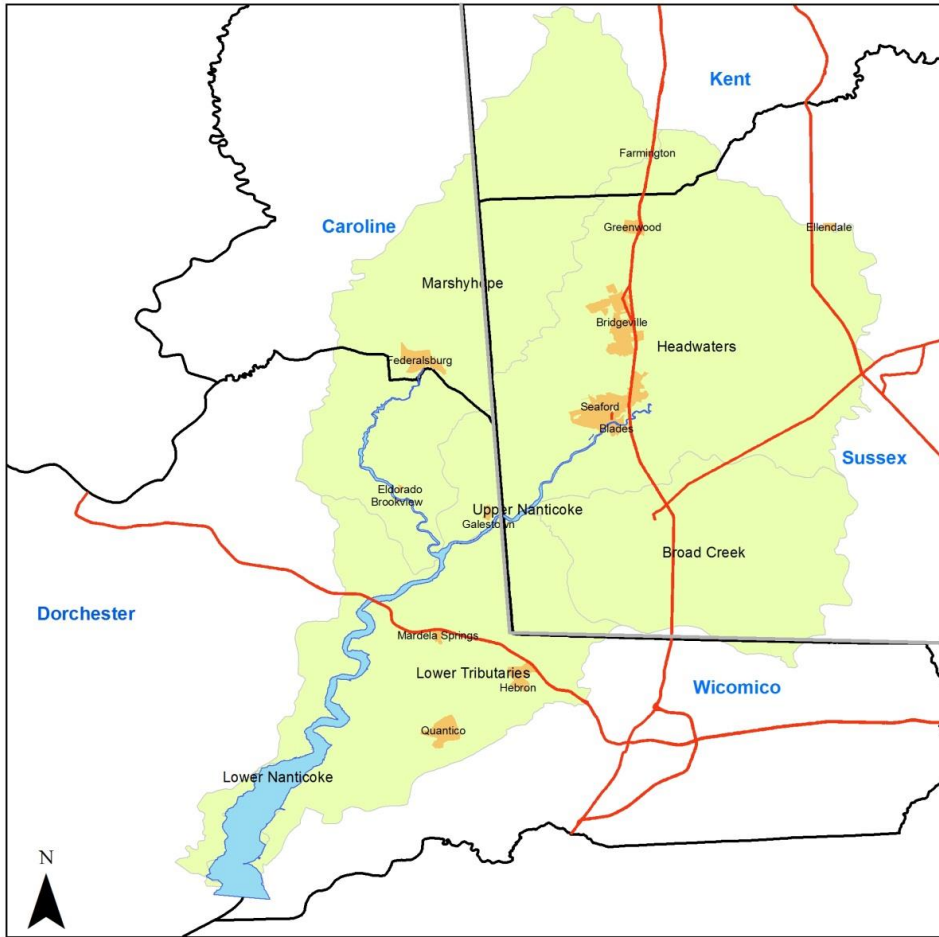


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<sup>1</sup> Information in this section comes from the report titled, *Condition of Nontidal Wetlands in the Nanticoke River Watershed, Maryland and Delaware* at [www.dnrec.delaware.gov/Admin/DelawareWetlands/Documents/Nanticoke%20Wetland%20Profile\\_final.pdf](http://www.dnrec.delaware.gov/Admin/DelawareWetlands/Documents/Nanticoke%20Wetland%20Profile_final.pdf).



# Nanticoke Watershed



## Legend

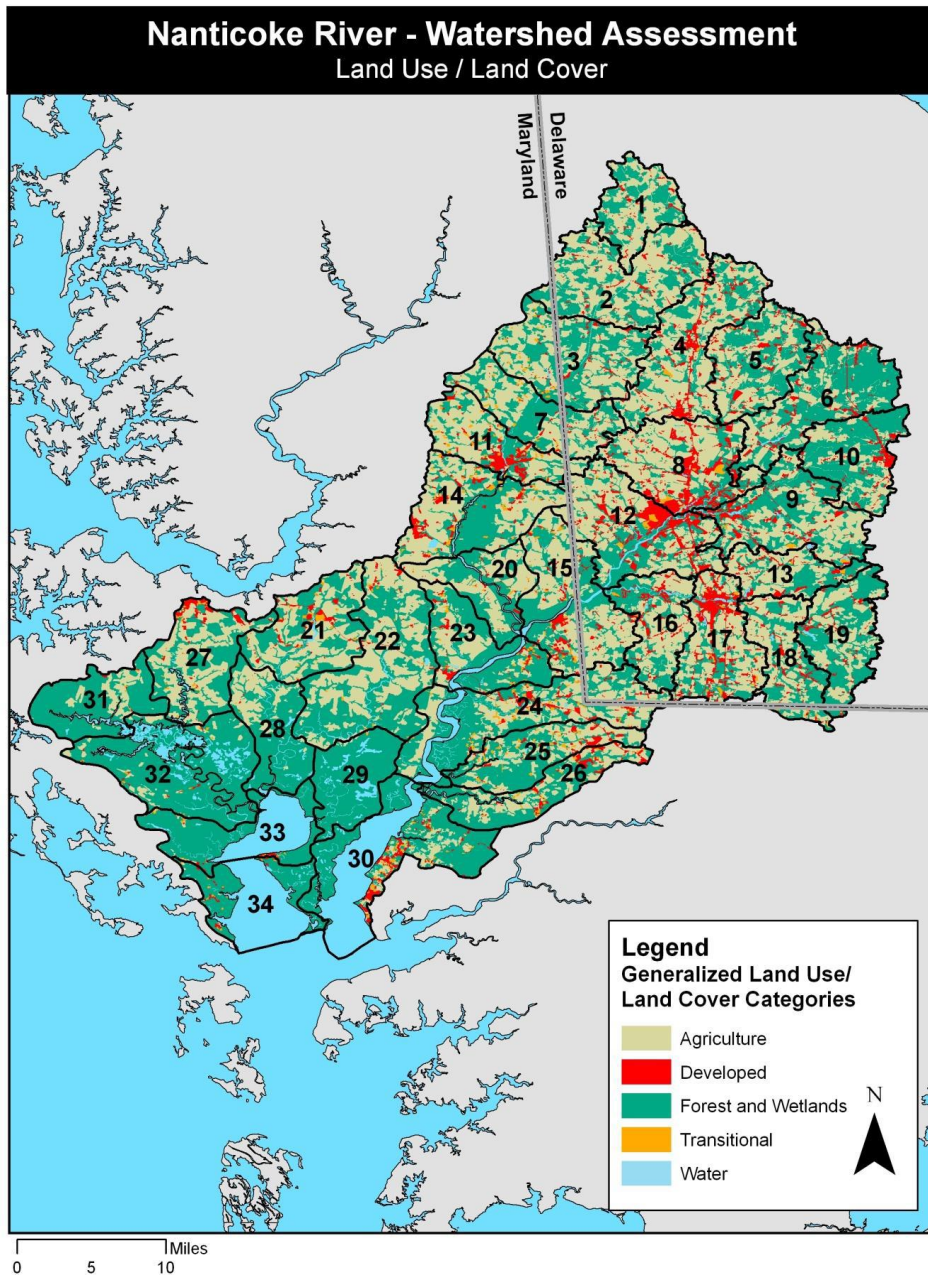
-  State\_Line
-  Nanticoke Watershed
-  U.S. Highways
-  Maryland Municipalities



## Land Use /Land Cover

Five categories of land use/land cover make up the Nanticoke Watershed: agriculture (45%), forest and wetlands (42%), developed (8%), transitional (1%), and water (4%). See following sections and maps for a discussion of each land use category:

\*\*This map includes both the Nanticoke and Fishing Bay Watersheds. While the Fishing Bay Watershed is a part of our overall service area, we have not included it as part of our Watershed Management Plan assessment.



Source: Nanticoke River Watershed Assessment, Chesapeake Conservancy

## Land Use/Land Cover Acreage & Percentages by Sub-watershed

\*\*Fishing Bay subwatersheds have been removed from the table.

N=Natural

RFW=Rural Forest/Wetland

RA=Rural-Agriculture

MR=Mixed-Rural

DI=Development Influenced

Watershed & Category	% Agriculture	% Developed	% Forest & Wetlands	% Transitional	% Water	Acres of Total Watershed
1 RA	54%	4%	42%	0.04%	0.19%	13,236.18
2 RA	58%	4%	38%	0.10%	0.21%	27,928.95
3 RA	50%	4%	45%	1%	0.33%	25,659.30
4 DI	60%	10%	29%	1%	0.33%	27,705.51
5 MR	48%	8%	44%	0.13%	0.20%	19,328.02
6 RFW	32%	7%	60%	0.07%	1%	24,438.63
7 RA	52%	3%	43%	2%	0.24%	18,053.05
8 DI	57%	19%	21%	1%	1%	24,029.04
9 MR	45%	9%	43%	1%	1%	24,369.90
10 RFW	31%	9%	61%	0.09%	0.11%	16,775.79
11 DI	56%	11%	28%	4%	1%	16,021.26
12 DI	50%	18%	29%	1%	2%	27,420.48
13 RA	55%	9%	34%	1%	1%	11,382.15
14 RA	53%	6%	37%	3%	2%	25,318.69
15 RA	52%	6%	38%	2%	2%	27,209.97
16 RA	53%	8%	36%	0.43%	2%	15,132.07
17 DI	54%	20%	24%	1%	1%	19,225.00
18 RA	53%	7%	39%	1%	0.41%	15,809.88
19 RFW	38%	5%	56%	0.27%	1%	17,673.44
20 MR	50%	2%	44%	1%	4%	14,403.05
23 RFW	30%	4%	58%	2%	6%	18,520.24
24 MR	37%	4%	47%	3%	9%	33,155.26
25 RFW	38%	5%	52%	4%	2%	16,269.92
26 RFW	35%	7%	54%	2%	3%	15,825.24
30 N	8%	4%	45%	2%	42%	34,464.67

Source: Nanticoke River Watershed Assessment, Chesapeake Conservancy

## Agriculture

Agriculture makes up 45% of land cover in the Nanticoke Watershed. As such, agricultural commodities are the major contributor to the area's economy. Poultry farms are abundant throughout the watershed and the greater Eastern Shore, with the largest commodity crops being corn, wheat, and soybeans that provide feed for the region's poultry industry. Other crop rotations include sweet corn, peppers, cucumbers, peas, watermelons, and pumpkins. In addition, niche farming in the watershed is growing, such as grapes for wine production, organic produce, and grass-fed dairy products.



Agriculture is important not only for the economy, but for the cultural heritage it represents and the ecological services it provides. Farms can provide important habitat for birds and other wildlife, prevent runoff, and filter nutrients. When best management practices (BMPS) are applied, an acre of well-managed farmland is less harmful than the cumulative impacts of an acre of pavement or other impervious surfaces. In this manner, farms can be an ally in protecting the resources of the Nanticoke Watershed.

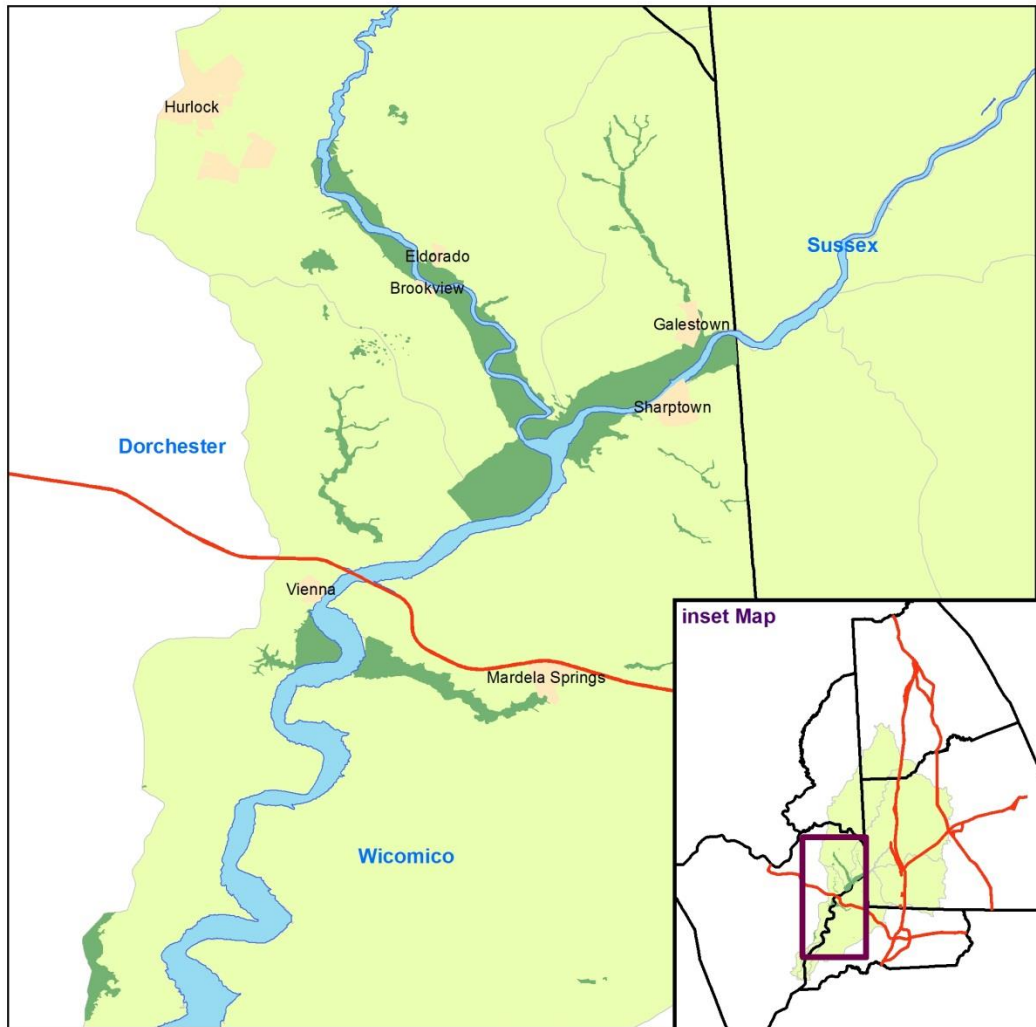
## Forest and Wetlands

Wetlands and forests make up 42% of land cover in the Nanticoke Watershed. The health and existence of vibrant wetlands, and their adjacent forests, are important to any water-based ecosystem. Wetlands are generally defined as areas where soils are saturated either permanently or seasonally. Wetlands provide a number of benefits to human communities, including flood mitigation, drought protection, pollution filtration, shoreline stabilization, and climate change mitigation. In addition, wetlands serve as a reservoir of biodiversity and provide opportunities for recreation and tourism. Forests and wetlands in the Nanticoke Watershed play an integral role in the health of the river and watershed communities.

Because of the important ecosystem services wetlands and adjacent rivers provide, agencies within Maryland and Delaware have made a number of efforts to assess the health of wetlands. Maryland has identified several Wetlands of Special State Concern (WSSC) or wetlands that have been designated as having a State-identified issue within the Nanticoke Watershed (see page 16). These wetlands have been identified for a variety of reasons – information on location-specific wetland concerns can be found through the Maryland Department of Natural Resources. Delaware has published a report card of all non-tidal wetlands in the Nanticoke Watershed, dividing assessments into three categories: severely stressed, moderately stressed, and minimally or not stressed (see page 17).



## Wetlands of Special State Concern



\* Delaware data layers not available at the time of this report

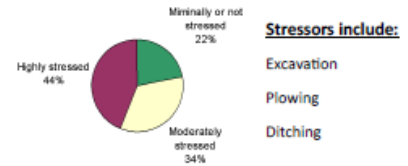
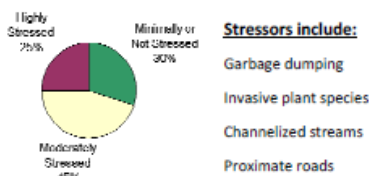
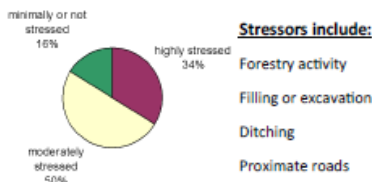
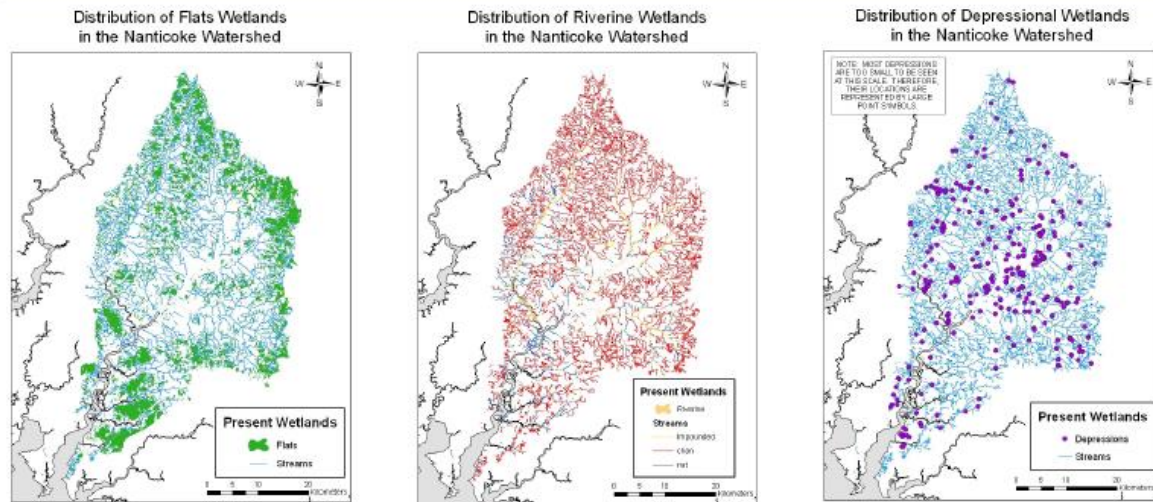
Purple square indicates the locations of Maryland-designated Wetlands of Special State Concern.

### Legend

- U.S. Highways
- Maryland Municipalities
- Wetlands of Special State Concern - MD
- Nanticoke Watershed



## Report Card: Non-tidal Wetlands of the Nanticoke Watershed



Sampling occurred 1999-2000, and 2003

Source: Delaware Dept. of Natural Resources and Environmental Control

## Developed/Transitional

Developed land makes up 8% of the watershed, and lands adjacent to development transitioning into low-level development (sprawl) make up 1%. Developed land consists primarily of impervious (paved) surfaces that provide no absorption of precipitation, thereby channeling polluted runoff directly into storm sewer systems or waterways. When a watershed reaches 10% impervious surfaces, water quality is substantially degraded<sup>2</sup> and remediation becomes challenging and expensive.<sup>3</sup> Within a developed area, a number of measures can be taken to limit this negative impact including compact growth patterns, low-impact development, inclusion of residential green space, riparian buffer and wetland

<sup>2</sup> Maryland Department of Natural Resources, "Land Conservation=Fish Conservation," 2012, p. 1  
[www.dnr.state.md.us/fisheries/fhep/pdf/CBC\\_Land\\_Consevation\\_Fish\\_Consevation\\_Fact\\_Sheet.pdf](http://www.dnr.state.md.us/fisheries/fhep/pdf/CBC_Land_Consevation_Fish_Consevation_Fact_Sheet.pdf)

<sup>3</sup> Courtney M. Greiner, "Principles for Strategic Conservation and Restoration," 2010, p. 1.  
[www.pugetsoundnearshore.org/technical\\_papers/conservation\\_and\\_restoration\\_principles.pdf](http://www.pugetsoundnearshore.org/technical_papers/conservation_and_restoration_principles.pdf)

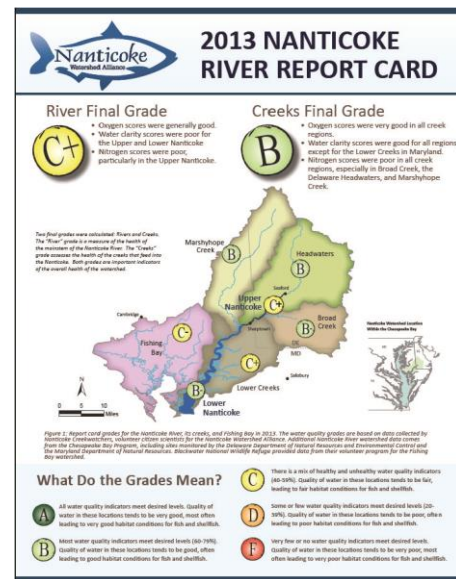
preservation, curbside planter and rain garden installations, and tree plantings. Any development should include as many of these measures as possible, regardless of scale.

## Water

Water makes up 4% of the watershed. When assessing the water quality of a river system, it is important to consider that all activities occurring on land have an impact on the river's health. A total maximum daily load (TMDL) report was developed in 1998, which focused on non-point source reductions of nitrogen and phosphorus. The Nanticoke TMDL looked to repair polluted waters through investigating land use practices and dealing with increased channelization of streams and ditches leading into the Nanticoke. The TMDL also indicates original green infrastructure in the watershed, meaning previously forested areas have been removed over time. The lack of larger forested buffers between agricultural areas and the river have led to increased non-point source runoff. Natural streams that were straightened and deepened for agricultural drainage have also led to significant impacts on the river. As such, it has been recommended previously that forested buffers be enhanced and channelized streams be restored to natural configurations.

In 2008, the NWA published the first *State of the Nanticoke* report based on information collected by the Nanticoke Creekwatchers, a group of volunteers committed to monitoring the river and its tributaries on a bi-weekly basis from April to November. The initial report provided important baseline water quality information.

In late 2010, the Nanticoke Watershed Alliance and its partners released the first Nanticoke River Report Card\*\* and has continued to release an annual report card each year, including a Five Year Report Card in 2013. During that time, the river's grades have ranged from a C to a C+. Creeks' grades have ranged from a B- to a B. These grades are in the higher range of major Chesapeake Bay tributaries, cementing the Nanticoke River as one of the most pristine rivers in the Chesapeake Bay. The report cards indicate that a reduction in nitrogen loads is needed throughout the region, and water clarity issues need to be addressed throughout the navigable portion of the river and in some of the lower creeks. Generally, methods for managing such issues involve increasing forested buffers and greatly limiting further removal of existing forests. Since this plan deals primarily with green infrastructure, these issues will be discussed later in greater detail. All water quality reports developed by the NWA can be found online at [nanticokeriver.org/publications/creekwatcher-reports/](http://nanticokeriver.org/publications/creekwatcher-reports/).



\*\*Fishing Bay Watershed is included in the report card due to its relevance and proximity to the Nanticoke River.

# Natural and Cultural Resources

## Introduction



The Nanticoke Watershed has abundant natural and cultural resources within its boundaries and has often been referred to as one of the most pristine of the tributaries feeding into the Chesapeake Bay. The watershed is characterized by a uniquely rural feel and contains vast tracts of marshes, forests, and working farmlands. An incredibly rich ecological diversity exists in the watershed, including one of the largest populations of Bald Eagles in the Northeast, one of the most diverse waterfowl populations in Maryland, and more rare and endangered plants than any other landscape on the Eastern Shore. It has been

designated as a River of Exceptional Recreational and Ecological Significance (ERES) by the State of Delaware and includes several rural legacy areas and natural heritage areas in Maryland.

The region has a rich cultural history, including acting as a conduit for the Underground Railroad, Native American settlements, shipbuilding and other maritime industries, and one of the major voyages of Captain John Smith in 1608. Several places along the Nanticoke River remain much like the landscape John Smith witnessed on his voyage over 400 years ago. As such, an excellent opportunity exists to capitalize on the rural character of the landscape, abundant culture, and relatively pristine waters in order to ensure watershed protection.

## Green Infrastructure

The Conservation Fund defines green infrastructure as the “strategically planned and managed network of natural lands, working landscapes, and other open spaces that conserve ecosystem values and functions and provide associated benefits to human populations.” Green infrastructure generally consists of “hubs” and “corridors.”

- **Hubs** are ecologically significant, unfragmented natural areas that provide a number of beneficial ecosystem services and other benefits to human communities. These hubs may include large protected areas, such as state and regional parks managed for natural and recreational values; community parks and natural areas where natural features and ecological processes are protected and/or restored; and private farms and forests that remain in a predominantly open and undeveloped state. Large contiguous blocks of interior forests are an essential component of the network.



- Corridors are the linear natural habitats that link hubs together. These corridors may include riparian corridors or smaller, narrower forested landscapes that allow animals, seeds, and pollen to move from one area to another, as well as protecting the health of streams and wetlands by maintaining adjacent vegetation.

The identification of green infrastructure begins by assessing existing forests, wetlands, grasslands, and water resources that provide essential ecological functions to human communities. Green infrastructure can be extended further to include cultural and historic resources and recreational features. Any aspect of the landscape that improves the quality of life for those living or exploring within its boundaries should be included in a green infrastructure assessment.

The Maryland Department of Natural Resources (DNR) published its first green infrastructure assessment in 2003. For Delaware’s green infrastructure, The Conservation Fund developed a “Delaware Ecological Network” that complements Maryland DNR’s efforts. Though these networks are depicted as finite areas, the scale at which they were developed is broad and therefore may need to be further refined. Additionally, an identified green infrastructure network does not imply these areas are necessarily protected but rather serves as a strategic guideline for government agencies, conservation organizations, and other entities instead of a haphazard, “protect everything” approach. The map on page 21 shows the combined network in Maryland and Delaware for the Nanticoke Watershed.

## Protected Lands

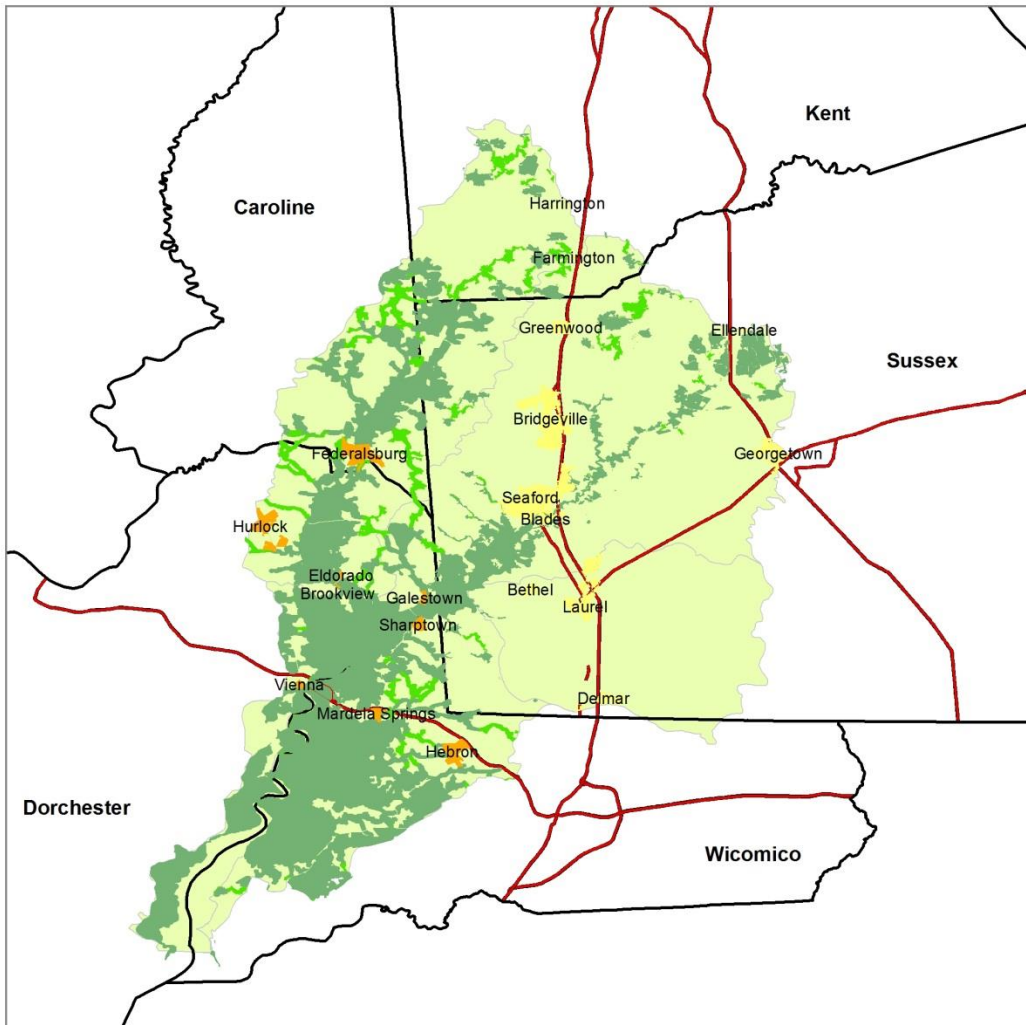


Protected lands consist of landscapes designated to be preserved for their natural or cultural value by the local, state or federal government, a private land trust or other conservation organization, or through a public/private partnership. Preservation is broadly used in this case since many of these lands are set aside for public use. Certain areas, such as park space, trails, and boat launches, are designated to encourage public enjoyment and education.

Protected lands can be owned by a government or private entity. In many cases, these are lands where development or clearing of land is unlikely due to legal restrictions. There is the possibility that those lands could be sold, but in most cases the entity has pledged to protect them in perpetuity for public use, scientific study, or similar issues.

Other areas specifically restrict development or require investigation of an area to help ensure development does not harm endangered species or habitat. This document includes

## Green Infrastructure Hubs and Corridors



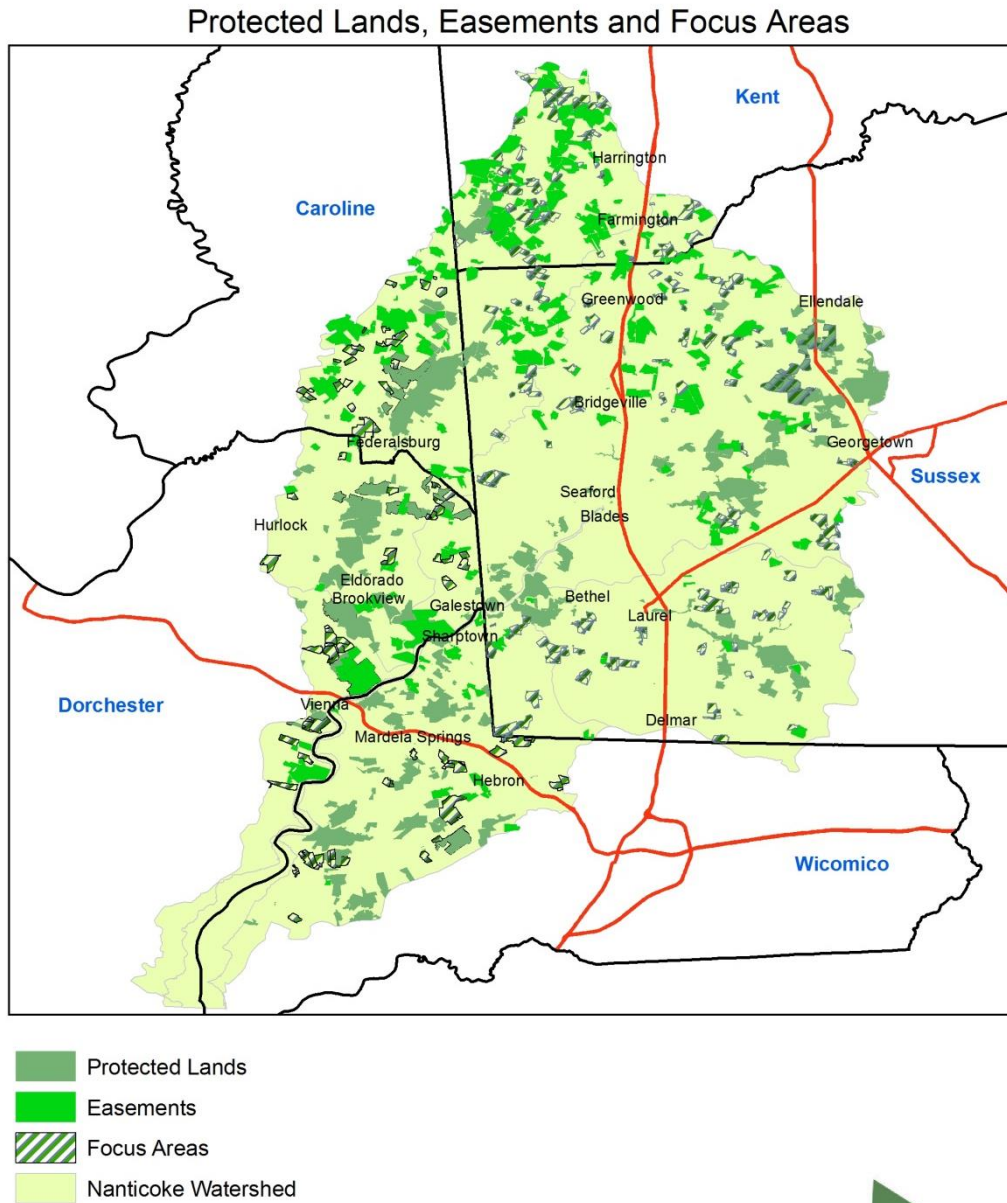
### Legend

- Delaware Municipalities
- Maryland Municipalities
- Green Infrastructure Hubs
- Green Infrastructure Corridors
- U.S. Highways
- Nanticoke Watershed



a map that shows all natural and cultural resource areas for Maryland and Delaware, since each state has different designations.

Maryland and Delaware have a variety of “protected lands” under different designations. Some are protected for agricultural purposes, some to prevent sprawl or conserve sensitive habitat, and others for public use and enjoyment. The map below illustrates those.<sup>4</sup>



<sup>4</sup> Though finite areas for resource conservation and enjoyment are meant to be depicted in these maps, they may not be fully representative of the specific area. In both cases, the state governments provide Geographic Information System (GIS) data that is

An “easement” is a legal term giving an entity the right to use land in a certain manner without owning fee simple absolute (holding title to the land) as in a real estate contract. Easements vary based on the terms of the contract and the entity holding the easement. In this instance, land use is restricted from development for a certain period of time or is to be used in a way that is protected.

“Focus lands” are not designated for preservation but are recognized by the state as having natural and cultural value. These lands serve as a guide for future landscape protection and are not bound by any legal designation. Examples include Maryland’s Rural Legacy Areas and Targeted Ecological Lands.

### **Certified Heritage Areas – MD**

Maryland’s Heritage Areas are “locally designated and State-certified regions where public and private partners make commitments to preserving historical, cultural, and natural resources for sustainable economic development through heritage tourism.”

Three Heritage Areas in the Nanticoke Watershed have been certified by the State of Maryland through the Maryland Heritage Area Authority (MHAA) and the Maryland Historical Trust (MHT) under the Maryland Department of Planning (MDP): Heart of the Chesapeake Country Certified Heritage Area (Dorchester County, MD), the Lower Eastern Shore Certified Heritage Area (Wicomico County, MD), and Stories of the Chesapeake Certified Heritage Area (Caroline County, MD). For more information and/or to view management documents related to these heritage areas, visit [mht.maryland.gov/heritageareas.html](http://mht.maryland.gov/heritageareas.html).

### **Rural Legacy Areas – MD**

Maryland created the Rural Legacy program to establish greenbelts of forests and farms around rural communities. These greenbelts preserve rural communities’ cultural heritage and sense of place, in addition to providing critical green infrastructure and other benefits. The Nanticoke Watershed has three rural legacy areas: Marshyhope Agricultural Security Corridor (Caroline and Dorchester Counties), Nanticoke Rural Legacy Area (Dorchester County), and Quantico Rural Legacy Area (Wicomico County).

### **Agricultural Preservation Easements – MD**

Working farms are important landscapes in the Nanticoke Watershed for both their ecological and cultural values. The Maryland Agricultural Land Preservation Foundation (MALPF) has preserved a large number of acres through easements on some of Maryland’s best agricultural lands in order to preserve productive farmland and woodland to produce food and fiber, curb the expansion of poorly planned urban development, reduce the spread of urban blight and deterioration, protect agricultural land and woodland as open space, protect wildlife habitat, and enhance the environmental quality of the Chesapeake

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overlaid on other map layers under a variety of coordinate systems. Each area in question should be specifically investigated. There is also the possibility that some resource preservation areas were not included by the agency publishing the GIS information.



Bay and its tributaries. MALPF is a state-sponsored program administered locally by participating counties to preserve farmland and forests from development with agricultural easements within county designated priority preservation areas.

### **Agricultural Preservation Districts/Easements – DE**

Although Delaware does not have a rural legacy program, an effort is underway to protect farms, considered to be the cornerstone of rural Delaware. The Delaware Agricultural Lands Preservation Foundation preserves historic structures, wildlife habitats, important environmental features, wetlands, and forests. The Foundation permanently designates critical farmland as conservation easements. A number of agricultural easements are in the Nanticoke Watershed in Delaware that protect the rural qualities and agricultural history of the area. Land must first be in an Agricultural Preservation District before an owner can apply to sell the development rights to the state. Easements are permanently protected from development through the purchasing of development rights, whereas districts are protected for 10 years.

### **National and State Register of Historic Sites – MD and DE**

The National Register of Historic Places “recognizes districts, buildings, structures, objects and sites for their significance in American history, archeology, architecture, engineering, or culture, and identifies them as worthy of preservation.” The National Register, a program of the National Park Service, is administered at the State level by the Maryland Historical Trust (MHT) and the Delaware Dept. of Natural Resources and Environmental Control’s Division of Historic and Cultural Affairs. MHT manages a state register of historic properties for Maryland. No separate state register exists for Delaware.

The National Park Service has recognized many properties and historic districts within the Nanticoke Watershed in both Maryland and Delaware, including historic homes and hotels, rural churches, and African American schools. Historic “districts” designate multiple properties within a small area as historically significant. These places reflect the diverse history of the Eastern Shore and the Nanticoke Watershed. For more information on historic properties in the Nanticoke Watershed, visit the National Inventory, at [www.cr.nps.gov/nr/](http://www.cr.nps.gov/nr/), and the Maryland Inventory, at [www.mdihp.net/](http://www.mdihp.net/)

### **Important Bird Areas**

The Important Bird Areas (IBA) Program is administered by the National Audubon Society as “a global effort to identify and conserve areas that are vital to birds and other biodiversity.” IBAs are not protected from development but serve as a guide for conservation efforts and county and regional planning. In addition, because studies have shown that birding ecotourism brings significant economic



benefit to local communities, county economic development and tourism offices would do well to highlight the IBAs to entice more visitors to the area.

The Nanticoke Watershed contains four IBAs: Nanticoke, Idyllwild, Southern Dorchester County, and a small portion of the Somerset-Wicomico Marshes. For more information on the IBA program, visit [mddc.audubon.org/birds-science-education/important-bird-areas/](http://mddc.audubon.org/birds-science-education/important-bird-areas/).

### **Maryland's Critical Areas Program**

The Chesapeake Bay Critical Area Act was passed in 1984 in an effort to address the impact of land development on habitat and aquatic resources. Critical Areas are defined as “all land within 1,000 feet of the Mean High Water Line of tidal waters or the landward edge of tidal wetlands and all waters of and lands under the Chesapeake Bay and its tributaries.” The statewide Critical Area Commission (CAC), housed under the Department of Natural Resources, works with local governments to oversee the development and implementation of local land use programs directed towards the Critical Area. The goals of the CAC are to minimize adverse impacts on water quality that result from pollutants discharged from structures or conveyances or that have run off from surrounding lands; to conserve fish, wildlife, and plant habitat in the Critical Area; and to establish land use policies for development in the Critical Area which accommodate growth and address the fact that, even if pollution is controlled, the number, movement, and activities of persons in the Critical Area can create adverse environmental impacts. For more information on the Critical Area Program, visit [www.dnr.state.md.us/criticalarea/](http://www.dnr.state.md.us/criticalarea/).

## **Recreational Opportunities**

Many residents and visitors use the Nanticoke River and its tributaries for recreational purposes, with several municipalities along the river that provide immediate recreational opportunities. Numerous existing and potential access points border the river as indicated on the map on the following page.

### **Scenic Byways**

Three scenic byways pass through or are in close proximity to the Nanticoke Watershed: Blue Crab Scenic Byway (Wicomico Co.), Chesapeake County Scenic Byway (Dorchester Co.), and the Harriet Tubman Underground Railroad Byway (Dorchester and Caroline Co.). The river is highly accessible to scenic byway tourists and general traffic along these roadways, and this visibility increases the opportunity for additional recreational users.

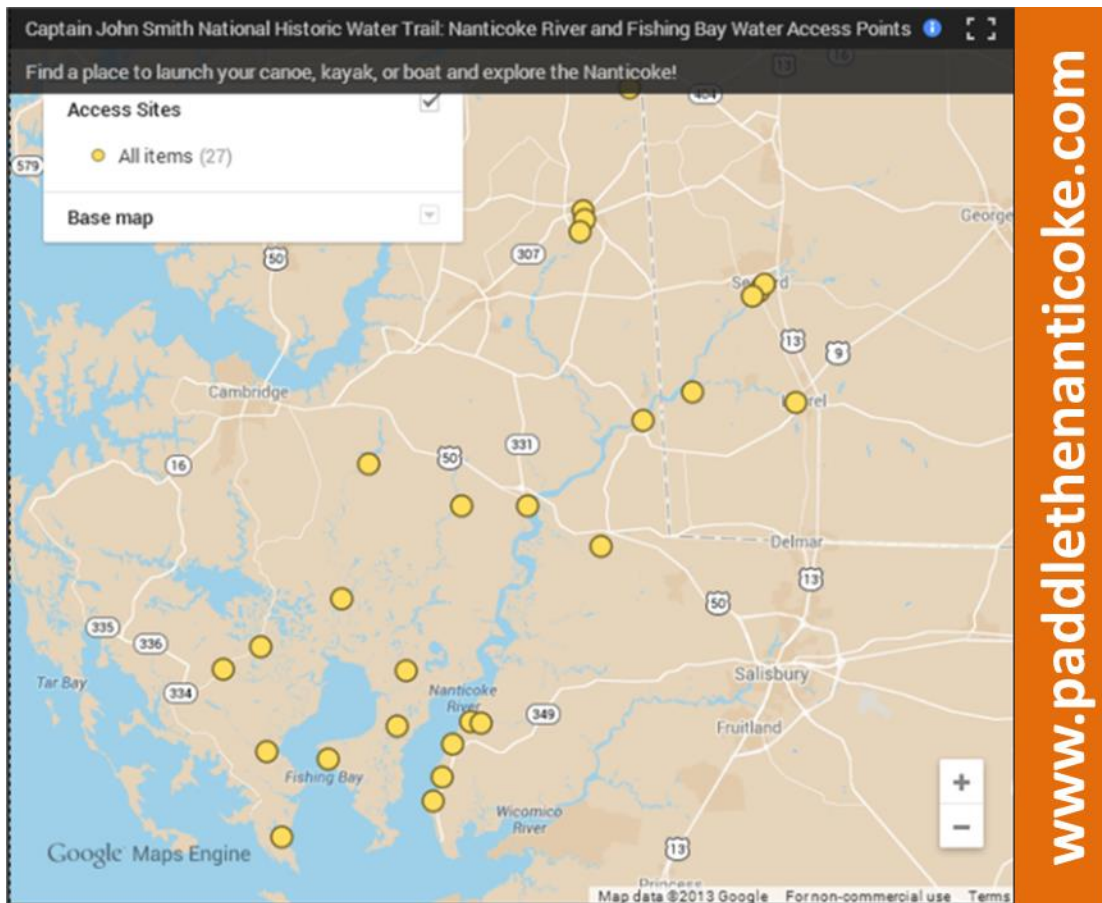


### **Captain John Smith Chesapeake National Historic Trail**

The Captain John Smith Chesapeake National Historic Trail is a joint initiative by the National Park Service and the States of Maryland and Delaware with the potential to

greatly increase the amount of activity on the river. This water trail follows Captain Smith's journey along the Nanticoke River. In 2011, the Comprehensive Management Plan examined several alternatives for recognizing the historical and cultural significance of the river. The plan focuses on providing guided tours of the trail and pointing out historically significant and evocative areas along the Nanticoke.

Visit the newly updated [www.paddlethenanticoke.com](http://www.paddlethenanticoke.com) to view an interactive map of access sites, information on cultural attractions, restaurants, places to stay and more. See below for an image of the interactive access site map. Each point links to site characteristics, directions and more.



The Comprehensive Management Plan can be found online at: [parkplanning.nps.gov/document.cfm?parkID=466&projectID=18545&documentID=42803](http://parkplanning.nps.gov/document.cfm?parkID=466&projectID=18545&documentID=42803).

The focus of recreation on the Nanticoke should be low-impact in nature. Educational programs combined with recreational opportunities are ideal for creating new generations who appreciate the resources and history of the Nanticoke, which is important for developing future stewardship of the river. The plans for the Captain John Smith trail fit within these low-impact goals. A need for additional educational opportunities remains that target recreational users to promote responsible stewardship. A comprehensive education and outreach program is important in meeting these goals.

## **Regional Festivals and Events**

A variety of annual festivals and events highlight the natural and cultural resources of the Nanticoke Watershed. A large component of creating a vibrant local economy is to celebrate these resources.

### **Dorchester County**

Annual Eagle Survey at Blackwater National Wildlife Refuge: January

Nause Waiwash Native American Festival: Vienna: September

Hurlock Fall Festival: October

Blackwater National Wildlife Refuge Open House: October

National Outdoor Show: Church Creek: October

Annual Nanticoke Wade-In (changes location along Nanticoke River; typically in July)



### **Wicomico County**

Westside Heritage Festival: Mardela Springs: May

Delmarva Chicken Festival: (changes locations on Delmarva): June

Sharptown Heritage Festival: Sharptown: September



### **Sussex County**

Seaford Heritage Festival: Seaford: May

Annual Delmar Day in the Park: Delmar: June

Delmarva Chicken Festival: (changes locations on Delmarva): June

Nanticoke Riverfest: Seaford: July

AFRAM Festival: Seaford: August

Woodland Ferry Festival: Seaford: September

Apple Scrapple Festival: Bridgeville: September

Wings and Wheels Festival: Georgetown: October





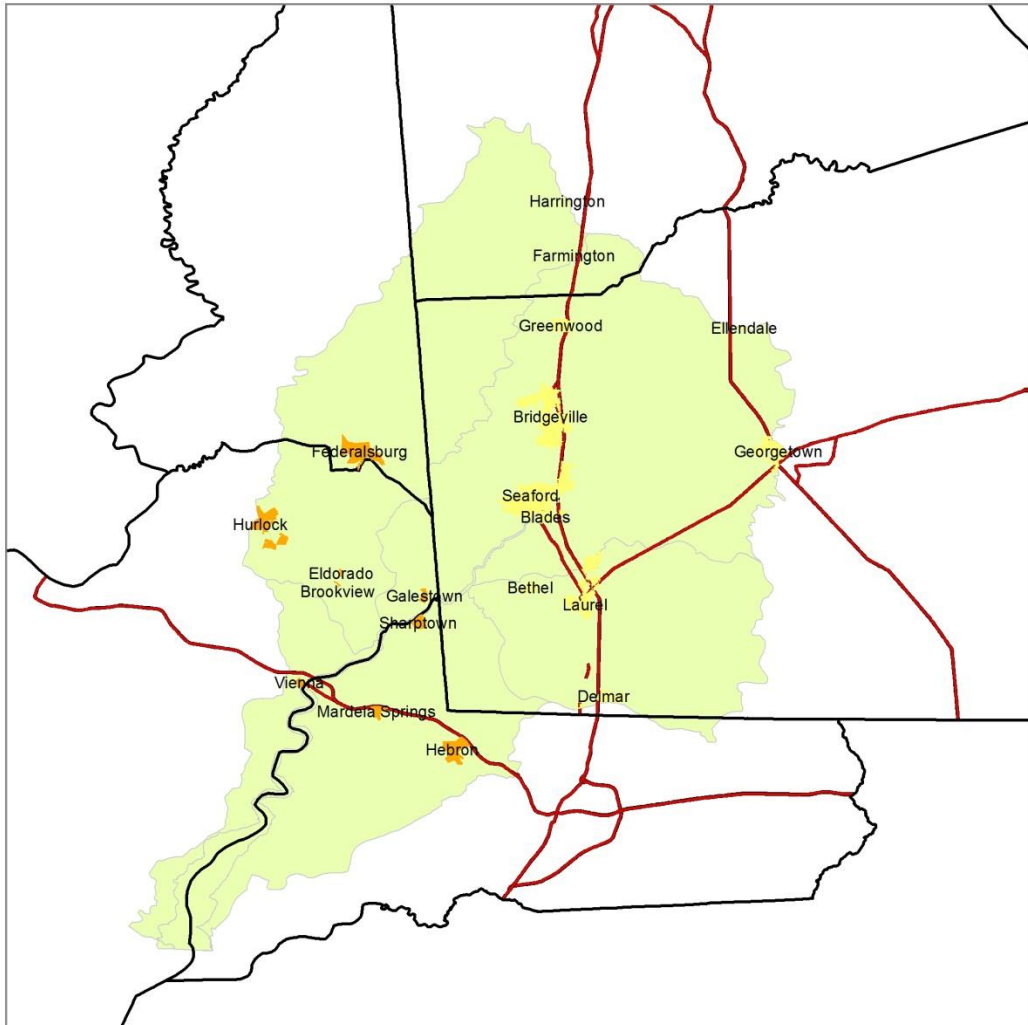
## Growth and Development

The Nanticoke Watershed contains numerous types of development – rural villages, urbanized areas, sprawl development, residential, commercial, and industrial. The watershed encompasses several jurisdictions, including two states, five counties, and various municipalities. Some communities have done an impressive job in protecting the watershed, while other communities’ future growth plans need modification to improve watershed protection. This section examines the different jurisdictions and their growth plans, as well as identifying partnership opportunities in these communities.

A map depicting municipalities in Maryland and Delaware within the watershed, and a map showing potentially affected green infrastructure within existing municipal boundaries are provided on the following pages.



## Municipalities within the Nanticoke Watershed



### Legend

-  Delaware Municipalities
-  Maryland Municipalities
-  U.S. Highways
-  Nanticoke Watershed



## Potentially Affected Green Infrastructure within Existing Municipal Boundaries



### Legend

- Affected Green Infrastructure
- Nanticoke Watershed



An important strategy for conservation of the Nanticoke Watershed is building partnerships between organizations and local governments on issues involving development. Many problems in the watershed will need to be solved through education, behavior change, and legislation at the local level.

Furthermore, in order to more fully understand the impacts on water quality in the Nanticoke River system as land use changes, a pollution impact analysis should be performed that investigates the change in nitrogen and phosphorus as a result of the potential growth envisioned in local comprehensive plans, either through a particular planning period, or through build-out. If possible, the analysis should be completed for each tributary to the Nanticoke River and should separate out the nitrogen and phosphorus changes expected for each pollution sector, specifically, agriculture, urban storm water, septic tanks, forest, and wastewater treatment plants (WWTPs).

This analysis is particularly important for efforts related to Maryland's Watershed Implementation Plan, where in order to meet the Environmental Protection Agency's (EPA) Bay TMDL requirement to "account for growth," all new urban storm water and septic tank loads must be offset through additional best management practices (BMP) implementation above what is needed to meet the Bay TMDL. It would also be useful to understand the current pollution impacts from these sources, so that decision-makers can prioritize BMPs that will have the most impact (e.g. timing of addressing failing septic tanks in Mardela Springs and upgrading the Sharptown WWTP).

The change in forest and agricultural land, including existing green infrastructure, that would result due to expected land use change within the watershed could also be analyzed.

## **Maryland**

### **PlanMaryland**

The State of Maryland has recently developed its first strategic plan for long-term sustainability. PlanMaryland is a road map to help the State accommodate the 1 million additional residents Maryland is projected to have by 2035, while also working to protect the Chesapeake Bay and save more than 300,000 acres of farmland and forest. The plan will help the state target its infrastructure investments so that an estimated \$1.5 billion per year can be saved during the next 20 years. PlanMaryland will further spur economic development, revitalization, and job creation in cities, towns, and communities, which already have the public investment in facilities to support growth.

PlanMaryland serves to:

- Improve coordination between state agencies and local governments on smart growth because too often the actions of the state have been at cross-purposes to achieve the goals of smart growth;
- Stimulate economic development and revitalization in towns, cities, and other existing communities that have facilities to support growth;



- Help accommodate a projected 1 million additional residents, 500,000 new households, and 600,000 new jobs by the year 2035;
- Improve existing and planned communities without sacrificing agricultural and natural resources;
- Save 300,000+ acres of farmland and forest over the next 25 years;
- Save Maryland an estimated \$1.5 billion per year in infrastructure costs during the next 20 years through an effective smart-growth approach to land use; and
- Address the rapid pace of land consumption, which since 1970 has escalated at double the rate of housing growth and triple the rate of population increase.

### **Priority Funding Areas**

Under the State’s Priority Funding Area (PFA) Law, both municipalities and counties may locally designate certain areas as a PFA; however, that designation is subject to a “concurrence” process by the MDP. Under State Law, PFAs are those areas selected (within the local Comprehensive Plan) as a designated growth area, which have a residential zoning density of at least 3.5 dwelling units per acre and are designated for service within the 10-year County Water and Sewer Plan. If not residentially zoned, other zoning districts proposed to be a PFA must be within a designated growth area, be an “employment center,” and be designated for service within the 10-year County Water and Sewer Plan. Upon submittal to MDP, the locally designated PFA is reviewed to ensure that all State PFA Law requirements are met, and if so become a PFA (Eligible for Funding). Should the MDP determine that locally designated PFA’s do not meet State Law, these areas are designated as a PFA (Area Not Meeting Criteria).

The designation of PFAs is directly linked to the State’s Finance and Procurement Article, in that all county and municipal requests for State Funding are reviewed in the context of the subject property’s PFA designation. If a local request for State Funds is within a PFA (Eligible for Funding), if the request meets all requirements of the funding source, and the funds are available, the issuing agency may grant the request. However, if a local request for State Funds is within a PFA (Area Not Meeting Criteria), prior to a funding request being approved, a Special Exception must be granted by the State’s Smart Growth Coordinating Committee (a part of the State Board of Public Works).

### **Sensitive Species Project Review Areas**

Maryland designates certain regions throughout the state as areas where sensitive species of plants and/or animals could exist. These areas are not protected from development per se, but the state does require a review if sensitive species exist and a plan to protect and mitigate any problems caused by potential development.

Organizations can assist this effort by providing a head start in examining the possibility that sensitive species exist in and around these areas and the overall health of these areas. Working to restore sensitive species in Sensitive Species Project Review Areas and seeking stronger preservation designations can prove especially beneficial.

## Critical Area Law

Maryland regulates development 1,000 feet adjacent to all tidal waters and from the landward edge of a tidal marsh. This includes portions of the Nanticoke River and its tidal tributaries. Three different designations differentiate the type of development allowed: Intensely Developed Areas (IDAs), Limited Development Areas (LDAs), and Resource Conservation Areas (RCAs).

IDAs are located along tidal waters in urban areas where development already exists. At times, municipalities seek to re-designate LDAs as IDAs for development. Organizations and residents can work with the local government to prevent or limit development in areas close to tidal waters, and if development is inevitable, work to create environmentally friendly designs.

***LDAs and RCAs have the best potential for restoration. Because of modifications to the Critical Area law in 2008, many local jurisdictions are in the process of modifying local Critical Area laws, and new maps are being created. A Critical Area Mapping Update Project online tool can be found at [www.dnr.state.md.us/criticalarea/mapupdate](http://www.dnr.state.md.us/criticalarea/mapupdate). The final versions of all maps are expected to be complete by 2015.***

## Comprehensive Land Use Planning

The Planning and Zoning Enabling Act ([Article 66B of the Annotated Code of Maryland](#)) requires that county and municipal plans be implemented by laws, ordinance, and regulations consistent with the Act and its “visions.”

The Planning & Zoning Enabling Act provides a blueprint for the implementation of local policies and regulations regarding land use and growth management. Each county and municipality within Maryland is required to review its comprehensive land use plans and implementation provisions every six years.

The eight “Visions” of the Planning & Zoning Enabling Act include the following:

1. Development is concentrated in suitable areas.
2. Sensitive areas are protected.
3. In rural areas, growth is directed to existing population centers and resources are protected.
4. Stewardship of the Chesapeake Bay and the land is a universal ethic.
5. Conservation of resources, including a reduction in resource consumption, is practiced.
6. Economic growth is encouraged and regulatory mechanisms are streamlined.
7. Adequate public facilities and infrastructure under the control of the county or municipal corporation are available or planned in areas where growth is to occur.
8. Funding mechanisms are addressed to achieve these “Visions.”

Web Link: [www.mdp.state.md.us/OurWork/CompPlans/ViewPlans.shtml](http://www.mdp.state.md.us/OurWork/CompPlans/ViewPlans.shtml)

## ***County Land Use Planning***

### **Wicomico County**

Certification Date: February 1998

Population: 98,733

Wicomico County intersects two major highways and sits in the center of the Delmarva Peninsula. Due to the county's location and other advantages, growth and development will likely change the complexion of the county, its cities and towns. The blend of urban and rural environments creates a landscape patchwork that includes an urban core, farm fields, forests, wetlands, rivers, and streams. Wicomico County also includes several quaint small towns, historic villages, and scattered small cross-roads settlements.

The Nanticoke River drains into the Chesapeake Bay in southwest Wicomico County. The municipalities of Mardela Springs, Sharptown, and Hebron, as well as several unincorporated rural villages, are located along the Nanticoke River and its tributaries. The greatest concentration of green infrastructure in the watershed lies within the county (outside municipalities), making Wicomico County an extremely important county to focus private and governmental resources to help prevent degradation of important natural resources.

According to the county's 2010 comprehensive plan, no urban-type growth areas were proposed within the county's jurisdiction that will affect the Nanticoke Watershed. However, the county has designated land around its municipalities as "Town Transition" areas that allow for substantial growth. The county is currently finalizing its 2014 comprehensive plan and more information can be found at [www.wicomicocounty.org/294/Comprehensive-Plan](http://www.wicomicocounty.org/294/Comprehensive-Plan).

It is important to note that three rural villages lie along the Nanticoke River. The villages of Bivalve, Tyaskin, and Nanticoke are located along the eastern edge of the mouth of the Nanticoke River. Though no county growth plans are currently located in these areas, infill development is permitted and could greatly affect the Nanticoke River and the Chesapeake Bay. Outreach opportunities relating conservation issues to local residents have the potential to be highly beneficial.

The cities of Salisbury and Fruitland, and the town of Delmar make up the "metro core" of Wicomico County, the most populous area on the Eastern Shore. Moreover, these areas are expected to absorb the bulk of new growth on the Lower Shore over the next 20 years. Even though no current plans indicate any extension of municipal services significantly infringing into the watershed or diminishing existing green infrastructure, development plans can change if market forces push an increase in housing development.

Local conservation organizations, community groups, and individuals can work with the City of Salisbury to create an urban growth boundary to prevent continued encroachment into the watershed. Conservation groups can work with landowners to encourage easements and other conservation techniques to stabilize westward expansion of the metro core toward the Nanticoke Watershed.

## **Dorchester County**

Certification Date: September 1996

Population: 32,618

Dorchester County is Maryland's largest county and contains vast natural areas, including substantial coastal areas, wetlands, forests, and agricultural lands. Most of the county's developable area is centered around Cambridge. Northern Dorchester County contains the most potential for growth and development due to the availability of developable land and proximity to major transportation routes. Maintaining the attractive rural landscape and vital natural resources, especially agriculture, is exceptionally important but must be balanced with the ability to provide opportunities for residential growth. Expansion in north Dorchester County is expected to be toward the Hurlock/Secretary/East New Market areas and away from other areas in an effort to preserve pristine areas along the Marshyhope Creek and the Nanticoke River. In south Dorchester County, agricultural and maritime cultures are to be protected and enhanced through tourism promotion, keeping developmental growth at a minimum. South Dorchester County has many sensitive areas that need to be preserved.

Dorchester County has six municipalities within the Nanticoke River and Marshyhope Creek watersheds – Vienna, Brookview, Eldorado, Galestown, Hurlock, and a portion of East New Market. Additionally, there is one “joint planning area” on the northern edge of the Marshyhope Creek heading into Caroline County. Joint planning areas are proposed developmental regions where future development is considered appropriate with the consultation and input from nearby communities.

Dorchester County operates under their 1996 comprehensive plan, with a water resources element added in 2009 and a slight amendment in 2012. Organizations and individuals have the opportunity to play an enormous role with the county due to the current state of the comprehensive plan. With no changes in zoning, outdated rules and ideas may apply for new development that could greatly affect the Nanticoke River, Marshyhope Creek, and surrounding ecosystem. Organizations could potentially work with the county in requesting a moratorium on development until the current comprehensive plan is reviewed and updated. Nonprofits could assist the cash-strapped county in seeking funds for completing a comprehensive plan and zoning ordinance changes. At a minimum, such groups could reach out to the county to discuss potential areas of concern and ask for greater protections in vital and sensitive areas.



## **Caroline County**

Certification Date: April 2010

Population: 33,066

Caroline County contains abundant natural areas including large forest tracts, several rivers and streams, such as the Choptank and Tuckahoe Rivers and Marshyhope Creek, vast wetlands, and several large fresh water aquifers. The county faces suburban development and cultural changes but remains firmly committed to agriculture as the main industry. Protecting and preserving agriculture, natural resources, and the rural and scenic countryside are among the county's highest priorities, thereby directing growth to targeted areas. The county is currently working to expand the use of transferable development rights (TDR) program in order to further protect the unincorporated areas from unwanted sprawl that in turn increases the cost of providing services to residents.

The Nanticoke River and Marshyhope Creek watersheds cover portions of central and southeastern Caroline County. However, the Nanticoke River Watershed makes up an insignificant portion of the county and is not slated for development. The town of Federalsburg is located in the center of the Marshyhope Creek sub-watershed, and any future development will have the greatest effect on its health.

The county recognizes in the 2010 Comprehensive Plan that a majority of the watershed is part of the area's green infrastructure system. No development plans are indicated within the watershed, outside of municipal controlled areas, per the future land use plan. The county is considering adding lands to the current Rural Legacy area north of Federalsburg (east of MD 313), thus preserving the rural makeup of the watershed. An opportunity exists in working with area farmers to implement Best Management Practices for reducing nitrogen and phosphorus non-point source runoff.

### ***Municipal Land Use Planning***

Article 66B of the Annotated Code of Maryland requires municipalities that maintain zoning authority over the jurisdiction to develop a comprehensive plan. Article 66B further requires municipalities to address specific issues within their growth plans. Additionally, the 2006 House Bill 1141 requires municipalities to address the impact projected growth will have on infrastructure, water resources, schools, libraries, and public safety.

Each jurisdiction is discussed below.

## **Sharptown**

Certification Date: August 2008

Population: 651

Sharptown is located in the northwestern tip of Wicomico County along the Nanticoke River, approximately two miles from the Delaware State line. The town's character has not changed significantly since its shipbuilding and industrial days. The town and its residents prefer that the area remain a small, tight-knit, "bedroom" community, offering a Main Street with a mix of residences and small businesses as well as a park environment promoting healthy recreation. Sharptown recognizes and plans for inevitable growth but does discourage sprawl and encourages a growth pattern with the least impact on water resources and community infrastructure.

Of the three municipalities located in Wicomico County, Sharptown is the only one directly bordering the Nanticoke River. The town recently completed an update of its comprehensive plan, which does not call for any substantial growth. However, future residential growth is planned along the river. This presents an excellent opportunity for organizations to work with the town, prior to annexation of these lands, to ensure that future growth is designed to encourage environmental sustainability.

The town has an aged wastewater system that is likely more of a detriment to the health of the watershed than storm water runoff from future development. Organizations can work with the town to explore funding resources to help reduce nutrient issues from point sources, both wastewater and storm water, which flow directly into the Nanticoke.

North and south along the river near Sharptown's future growth areas lie a variety of easements and federal lands that prevent future development directly along the river.

## **Mardela Springs**

Certification Date: February 2011

Population: 347

Mardela Springs is located in the northwestern portion of Wicomico County and is dissected by US Route 50. Historically, English settlers first moved to what would become Mardela Springs in 1664, drawn by good farmland, natural springs, and Barren Creek, a tidal waterway draining into the Nanticoke River. The natural springs became a great tourism attraction in the mid- to late-1800s and gave way to the name of the town Mardela (Maryland/Delaware) Springs. This close-knit community focuses on its sense of uniqueness and pride of place as the guiding force and strongest motivation for the goals, objectives, and recommendations specified in the Comprehensive Plan.

Mardela Springs has traditionally been a low-growth community. While the community does plan on remaining small, any growth plans will infringe on the surrounding green infrastructure. In addition, the town has a significant issue with aging and failing septic systems that are likely contributing to pollution problems in the Nanticoke River. Providing education and outreach to the community concerning environmentally-friendly design and growth can be helpful in protecting the watershed's resources.

**Hebron**

Certification Date: July 2010

Population: 1,084

Hebron is another small town that prides itself on its unique character, culture, and history. The town of Hebron has endorsed the “Visions” statement in the 1992 Planning Act, and particularly that growth is concentrated in existing population and business centers or growth areas adjacent to these centers. Hebron asserts that areas designated for growth must provide quality neighborhoods: places where people want to live. Hebron’s Comprehensive Plan includes a “Sensitive Areas Element,” aimed at identifying and protecting its streams and stream buffers, 100-year flood plains, endangered species habitats, steep slopes, and agricultural and forest lands intended for resource protection and conservation.

The town of Hebron is located in an area without dense green infrastructure but is surrounded by important buffers between developed areas and the metro-core, as well as the county’s rural/agricultural buffers. Their comprehensive plan indicates a desire for significant growth over the next 20 years, despite data that this growth could substantially exceed pollution limits. A recommendation is to work with the town and the developer of the recently annexed area to reduce the impact of growth on Rewastico Creek and the Nanticoke River.

**Vienna**

Certification Date: September 2009

Population: 271

The town of Vienna, located on the western bank of the Nanticoke River in southeastern Dorchester County, has a rich history and was once known as “the town on the Nanticoke River” until being officially named Vienna on July 11, 1706. The town served as a port capable of handling large ships carrying goods from England, as an important trade center when a tobacco warehouse was built in 1762, and as the first shipyard on the Nanticoke River. Vienna has made sustainability its major driver in development and growth management strategies. The town acquired Rural Legacy land adjacent to the municipal growth area and intends to preserve this area for agricultural and environmental benefits. The land is part of a “greenbelt,” providing enhanced wildlife and water quality protections for the town and its surrounding environment.

Vienna completed its comprehensive plan in 2009, and the town’s consultant developed conceptual, environmentally sensitive plans for some of the proposed developments. The developer did not adopt these designs, but the town may require changes to the plans to gain approval. Organizations can continue working with the town for all future annexation plans and incorporating environmentally sustainable design concepts into planning and zoning codes for any future development.



As part of the implementation of Vienna’s comprehensive plan, the town purchased and set aside a 275-acre greenbelt in the critical area purchased through Program Open Space funds and held in easement by the Maryland Environmental Trust. The remaining 125 acres on the western end of Vienna has been annexed into the town and will be developed sometime in the future, though no immediate plans exist. As part of the annexation agreement, Vienna developed a zoning overlay and a set of standards described in a “pattern book” that includes the minimum requirements for any type of development.

**Galestown, Eldorado, and Brookview**

Certification Date: n/a

Population: 217

The Towns of Galestown, Eldorado, and Brookview are located along the Nanticoke River (Galestown) and Marshyhope Creek (Eldorado and Brookview). These communities have not created comprehensive plans nor established planning commissions to date. The county is responsible for controlling and approving development in these areas. Public sewer is not available; therefore, future development could be especially hazardous to the watershed since septic tanks or small, package wastewater treatment plants will have to be installed. These systems are not ideal for development over the long-term, and alternate solutions need to be explored.

**Hurlock**

Certification Date: September 2009

Population: 2,092

Hurlock is located in northern Dorchester County, one of Maryland's counties that borders the Chesapeake Bay, and can be accessed through a variety of roads including State



Routes 307, 331, and 392. This town has always been a typical Eastern Shore community: vibrant with a historic downtown business district and a wealth of natural resources. Historically, Hurlock became a major transport for passengers and products when the Delaware Railroad station was built in 1867. Later, when the Baltimore, Chesapeake, and Atlantic Railway intersected the Delaware Railroad, the town became the industrial and commercial hub of the northern part of Dorchester County. Hurlock is currently home to several industries and businesses related to food and poultry products, trucking, and other manufacturing. Hurlock's Comprehensive Plan was drafted with community participation that raised important issues, including the necessity to encourage employment opportunities close to Hurlock and bring more life back to the downtown with future development and revitalization of existing structures.

The eastern portion of the town is within the Marshyhope Creek watershed. Some development is planned within the watershed, but not in areas that will affect green infrastructure. Moreover, a conceptual greenbelt preventing further expansion into the watershed and further protect the area's natural resources has been developed.

Though these concepts are included in the town's 2009 Comprehensive Plan, they are not reflected in the local zoning ordinances. Organizations and individuals have an opportunity to work with the town in developing annexation standards, as well as working with the town to preserve these areas within the proposed greenbelt.

## **Federalsburg**

Certification Date: January 2009

Population: 2,739

The town of Federalsburg sits on the Marshyhope Creek, one of the major tributaries of the Nanticoke River. The upper reaches of the creek are flat, lack defined floodways, and are characterized by poorly developed natural drainage patterns, making the location of Federalsburg at the head of the tidal waters of the Marshyhope Creek vulnerable to potential flooding overflow. The damming of Marshyhope Creek in the eighteenth century led to the development of a host of water-powered industries; including iron furnaces, flour mills, sawmills, shipyards, and wool-carding mills. Agricultural production surrounded the town and remained a major industry for the area. As a result of the Smart Growth initiatives in the 1990s, Federalsburg experienced a 10.8% growth rate during that decade—the second consecutive decade in which the rate of growth for the preceding ten years exceeded double-digits and the second consecutive decade in which the town's growth rate exceeded that of the county.

The town of Federalsburg adopted an update to their comprehensive plan in 2009, in part to meet 2006 state requirements to reassess growth areas in order to ensure services were available. In 1996, the town had significant annexation and development plans, pushing municipal boundaries into Dorchester County and extending them further into Caroline County. The 2009 amendment modified and reduced the town's growth areas.

Current plans still expand the existing limits to a level great enough to cause concern by both counties involved. The town has adopted two appendices that recognize these concerns for the areas surrounding the town and indicates the town's interest in working with the county planning offices. Organizations should consider contacting all parties involved to keep dialogue open about future development and to further assist in the conservation of surrounding green infrastructure.

## **Delaware**

### **State Strategies for Policy and Spending**

The Strategies for State Policies and Spending provide a policy framework for planning in Delaware. Developed by the Cabinet Committee on Planning Issues to fulfill its directives under Title 29, Chapter 91 of the Delaware Code, the strategies provide a framework for the infrastructure and service investments by state agencies. The strategies further provide overall regional planning guidance for counties and local jurisdictions and are based largely on local desires and planning efforts, which were enabled and required by Titles 9 and 22 of the Delaware Code and certified by the state as directed by Title 29, Chapter 91 of the Delaware Code.

As with the 1999 and 2004 Strategies for State Policies and Spending documents, the 2010 State Strategies update aims to coordinate land-use decision-making with the provision of infrastructure and services in a manner that makes the best use of natural and fiscal resources. The importance of such coordination lies in the fact that land-use decisions are made at the local level, while the bulk of infrastructure (e.g., roads and schools) and services (e.g., emergency services and social services) that support land-use decisions are funded by the state. Thus, the development of this document in conjunction with local governments and citizen input helps to create a unified view toward growth and preservation priorities that all levels of government can use to allocate resources.

Web Link:      [stateplanning.delaware.gov/strategies/](http://stateplanning.delaware.gov/strategies/)

### **Preliminary Land Use Service (PLUS)**

According to 29 Del. Code §9201, The Preliminary Land Use Service (PLUS) is a State review of development projects, which is designed to take place in the early stages of the development process. The PLUS process would involve reviews by all applicable state agencies at the start of land development.

This new, up-front process proposes:

1. To identify and mitigate potential impacts of development which may affect areas beyond local boundaries;
2. To fully integrate state and local land use plans; and

3. To bring state agency staff together with developers and local officials early in the process.

Projects that are subject to PLUS review, unless otherwise specified in the Memorandum of Understanding (MOU) of the local jurisdiction in which the project will be located, are:

- Major residential subdivisions with internal road networks and more than 50 units, excluding previously recorded residential subdivisions of any size which have not been sunsetted;
- Any non-residential subdivision involving structures or buildings with a total floor area exceeding 50,000 square feet, excluding any previously approved and recorded non-residential subdivision regardless of floor area size, or any site plan review involving structures or buildings with a total floor area exceeding 50,000 square feet, excluding any previously approved and recorded non-residential site plan review regardless of floor area size;
- Rezoning, conditional uses, site plan reviews and/or subdivisions within environmentally sensitive areas as identified within any local jurisdiction's comprehensive plan as certified under Title 29, §9103;
- Annexations inconsistent with the local jurisdiction's comprehensive plan as certified under Title 29, §9103;
- Applications for rezoning if not in compliance with the local jurisdiction's comprehensive plan as certified under Title 29, §9103;
- Any other project which is required to be referred to the state for pre-application review by local jurisdiction regulations;
- Any local land use regulation, ordinance, or requirement referred to the Office of State Planning Coordination by a local jurisdiction for the purpose of providing the jurisdiction with advisory comments. The land use regulations, ordinances, or requirements that are to be referred to the Office of State Planning Coordination may be specified in a jurisdiction's Memorandum of Understanding;
- County and municipal comprehensive plans as required by Titles 9 and 22 of the Delaware Code; and

Web Link: [stateplanning.delaware.gov/plus/plus.shtml](http://stateplanning.delaware.gov/plus/plus.shtml)

## **Comprehensive Land Use Planning**

### ***County Land Use Planning***

Delaware State Law ([29 Delaware Code, § 9103](#)) requires all three Delaware counties to develop and maintain a comprehensive land use plan to address future growth within the county and the necessary services and infrastructure to support planned future growth. Within the watershed there are two Counties: Kent and Sussex. Each jurisdiction is discussed below:

**Kent County**

Certification Date: November 2008

Population: 162,310

Kent County possesses a wealth of natural resources including wetlands, woodlands, flood plains, coastal areas, waterways, underground aquifers, open space, and the animals and plants that inhabit these areas; a portion of these natural resources are located within the Nanticoke and Marshyhope watersheds. To ensure the protection of these resources, the county has developed and implemented a series of zoning and subdivision codes that define a regional growth zone within central Kent County along U.S. 13 and U.S. 113 highway corridors. This growth zone has allowed for greater intensity of agricultural and forest preservation within the eastern and western sections. In addition, the county has expanded its protection of the natural resources by prohibiting the use of On-Site Wastewater Treatment plants, further reducing the numbers of units that could be built on a given parcel of land. Finally, to meet the requirements of the State's Watershed Implementation Plan, the county will review the requirements for single lot subdivisions and evaluate the potential of actual development of these lots to better understand the impacts of stand-alone septic systems within the watershed.

Three small areas of the Nanticoke River and Marshyhope Creek watersheds are located in southwestern Kent County. Kent County has a similar makeup to Sussex County in the respect that most of the green infrastructure is located on the outer edges of the watershed and away from development along U.S. Route 13.

Two municipalities lie within the watershed—the small town of Farmington and the growing community of Harrington. For development within the county, the 2008 Comprehensive Plan allows for one dwelling unit per acre growth throughout the watershed, except in those places shown as “out of play” by the state. This could have a significant negative effect on water quality for Marshyhope Creek if allowed to occur, especially if accompanied by increased installation of septic systems.

**Sussex County**

Certification Date: October 2008

Population: 197,145

The natural environment in Sussex County includes wetlands, waterways, beaches, upland forests, farmland, meadows, and other open space that supports a wide variety of plant and wildlife species. Approximately one third of all lands fall within the Chesapeake Bay watershed. To protect and preserve these resources, the county has developed land use policies that attempt to support local growth within and around existing infrastructure. In the case of Sussex County's portion of the Bay watershed, nine municipalities are included.

In addition to directing growth in areas with existing infrastructure, the county continues to partner with local, State, and Federal organizations to preserve agricultural and forest lands within the watershed. To meet the requirements of the State's Watershed Implementation Plan, the county will need to further implement elements of its comprehensive land use plan to develop ordinances that balance the county's strong property rights beliefs with the protection of resources; this may include revisions of ordinances for open space preservation, wetland and water protection, forest mitigation, etc.

The largest proportion of the Nanticoke watershed in Delaware is within Sussex County's jurisdictional boundaries. The county has experienced significant growth since 2000 and will likely continue to be an attractive place for development in the future. The majority of planned future growth will occur along the Route 13 corridor, linking Seaford and Blades into Bridgeville. No green infrastructure hubs or corridors are located in this area. Growth to the southwest of Blades and Seaford should be of greater concern since many of the lands in this area are protected and the state has indicated they are "out of play" for future development.

Development of rural subdivisions scattered throughout the Sussex County portion of the watershed is also a significant concern. Sussex County's rural zoning permits one unit per acre, leading to a potential increase in the development of sizeable subdivisions served by septic systems.

Web Link to County Comp Plans: [stateplanning.delaware.gov/information/counties.shtml](http://stateplanning.delaware.gov/information/counties.shtml)

### **Municipal Land Use Planning**

Delaware has 57 incorporated municipalities, all of which are required to keep comprehensive plans up to date under Delaware State Law ([22 Delaware Code, § 702](#)). Within the Nanticoke Watershed there are eleven local jurisdictions with comprehensive land use plans. These include Bethel, Blades, Bridgeville, Delmar, Ellendale, Farmington, Georgetown, Greenwood, Harrington, Laurel, and Seaford.



Each jurisdiction is discussed below:

**Bethel**

Certification Date: July 2008

Population: 171

Bethel is a small historic town with a rich history of agriculture and maritime heritage. Plans are to maintain its small town character while allowing for modest growth and redevelopment consistent with the surrounding and community character. To meet this vision, the town recognizes that many of the larger adjacent parcels and the large parcel within town could develop out of character with the community under present Sussex County development regulations. To avoid future conflicts, the town proposed and completed revisions to existing subdivision and zoning codes and annexation requirements that require cluster development, large areas of open space, and preservation of historical and cultural resources.

The town is small and has a sizeable undeveloped area within current municipal limits. One point of concern is that future land use designation for the undeveloped area within town limits is "agricultural/residential." Though the area is small, the possibility for sprawl development patterns is possible and working with the town officials could be a helpful exercise.

**Blades**

Certification Date: April 2008

Population: 1,241

The town of Blades is part of the larger region influenced by Seaford, Laurel, and the outlying areas of Sussex County. Through its comprehensive planning process, the town seeks to preserve its community character and integrity of existing neighborhoods while encouraging new growth while preserving its current community character. As part of the implementation of the 2008 comprehensive plan, Blades has developed a Source Water Protection Ordinance, revised existing sanitary sewer agreements with Seaford and Sussex County to limit future septic systems within and on the edge of town, and has revised local ordinances to expand natural resource protection.

Like many smaller towns in southern Delaware, Blades has seen substantial development over the past decade and growth possibilities continue; therefore, care should be taken to preserve the surrounding green infrastructure.

An educational and outreach program for Blades (and similar communities) that explains both how revenues can be increased and the environment buffered from adverse issues when green infrastructure is maintained can be of great benefit.

**Bridgeville**

Certification Date: September 2006

Population: 2,048

Since the adoption of the 2006 land use plan, Bridgeville has sought to encourage high quality development compatible with the town's historic character and small town charm. To do so, the town has created regulations that require improved protection of natural resources, has grown local partnerships like the one with Woodbridge Agricultural and Environmental Science Programs to restore wetland and forest resources, and has developed regulation that requires new development to "pay its way."

In 2011, Bridgeville began updating its comprehensive plan for development over the next five years. Conservation and environmental groups, along with residents and interested parties, can express their interest in matching growth plans with the goals of the Nanticoke Watershed Management Plan.

**Delmar**

Certification Date: October 2010

Population: 1,597

As part of Delmar's 2010 comprehensive land use plan update, the town seeks to preserve and protect existing and new development which will achieve the preservation of historic sites, retain open space, and conserve natural areas to create and provide a sense of community. To implement this vision, the town has developed both a short-term and long-term plan for annexations that included the revision of local codes and regulations and has developed a plan for short-term and long-term wastewater treatment and disposal.

Similar to Bridgeville, the town does not have any green infrastructure near the town limits or in proposed growth areas. However, organizations and individuals should encourage the application of smart development principles as Delmar grows.

**Ellendale**

Certification Date: October 2009

Population: 381

Ellendale sits on the outer edge of both the Delaware and Chesapeake Bay watersheds and is rich in both forestry and agricultural heritage. The town seeks to ensure this heritage by focusing on in-fill development; however, during the recent housing market boom, the town allowed several large annexations to occur to ensure that future development is in keeping with the town's rich heritage. In 2006, the town revised and improved local zoning and subdivision codes and revised necessary sanitary sewer agreements to lessen the impact of failing septic systems within and on the outskirts.

Conservation groups should consider working with this small community in a similar way as recommended for Blades. Both communities are small, in an attractive area for future growth, and surrounded by important green infrastructure that buffers existing development from surrounding watersheds.

**Farmington**

Certification Date: November 2004

Population: 110

Farmington is a small historic town that wishes to maintain a small town character while allowing for modest growth and redevelopment consistent with its rural surroundings. To ensure the sentiment expressed by residents in the comprehensive plan development process, the town developed a modest growth and annexation plan to include lands along U.S. 13. The plan allows for moderate commercial activities, while encouraging in-fill development within the town for any new planned residential development. With Farmington's location along U.S. 13, the current slowdown in development provides a good opportunity to reach out to this rural area.

**Georgetown**

Certification Date: January 2010

Population: 6,422

Georgetown sits on the headwaters of three major watersheds, the Broadkill River, the Indian River, and the Nanticoke River. Located west of U.S. 113, the Nanticoke Watershed has experienced a mix of development, and agricultural and forest preservation activities. The town, through its most recent comprehensive plan update, calls for modest growth in keeping with the existing natural resources. In addition, the town is currently developing a Master Plan to further strengthen environmental protection while allowing for moderate development. A comprehensive plan was approved in 2010. Outreach to the town on environmentally-friendly development and planning methods could prove beneficial for the watershed.

**Greenwood**

Certification Date: January 2008

Population: 973

Greenwood is located north of Bridgeville and is the last municipality in Sussex County heading north on U.S. 13 before entering Kent County. The town did not see growth similar to most other Sussex County communities, due at least partially to issues with their wastewater treatment plant.

Future plans will focus redevelopment activities within the existing town, integrate new development, and support environmental and agricultural activities through improved local codes and ordinances. Since the update of the 2008 comprehensive land use plan, the town has struggled to implement these objectives due to a moratorium for new growth as a result of limited sewer resources. As Greenwood begins to resolve these wastewater challenges, a series of revised subdivision and zoning codes have been put in place. These codes require clustering of new development and removal of failing septic systems.

Additionally, the codes encourage annexation of larger neighboring industrial properties by requiring these properties to be connected to local sewer and water, plus redevelop to the revised and improved standards.

**Harrington**

Certification Date: March 2004

Population: 3,562

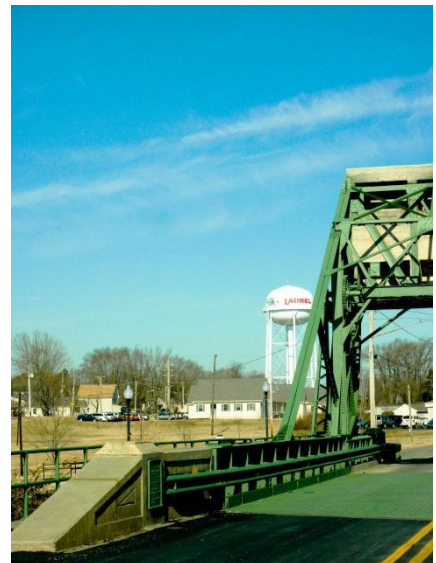
Harrington has a history of steady, sustainable growth and maintains that growth is necessary for the health and well-being of the community. Since the adoption of this land use plan and to “manage new growth” while revitalizing its downtown, the town has focused on in-fill growth within the community and new development at U.S. 13, centered around existing services outside of the Chesapeake Bay Watershed. In addition, new zoning and subdivision codes and annexation policies to better protect all aspects of the community have been established. Currently, the town has only a small portion of lands for future annexation within the watershed, and at this time, has no intention of moving forward on future annexations due to the current economic conditions and lack of services such as sewer and water.

**Laurel**

Certification Date: August 2011

Population: 3,708

The town of Laurel, through its most recent comprehensive land use plan update, has recognized the importance of ensuring the health of the Bay resources. The 2011 update calls for the adoption of Forest Canopy Goals, identifies necessary infrastructure improvements, and encourages annexation of lands to provide a greater level of natural resource protection. In addition to these items, residents, members of Council, and the planning Commission considered the impacts of a large annexation area both along the U.S. 13 corridor and the Delaware Route 24 corridor. The final future land use and annexation maps within this update reflect a balanced approach for future annexations. The update further recognizes the need for continued investment into the sewer system to ensure a high level of treatment for existing development and to provide for proposed future development.



## Seaford

Certification Date: January 2010

Population: 6,928

The City of Seaford is a historical riverside community. As the largest community within the Nanticoke River Watershed, the city serves as hub for employment and services for western Sussex County. Seaford has experienced continued growth throughout its history—first around the former DuPont Nylon Factory and more recently along the U.S. 13 corridor. The city continues to revise local codes and regulations to protect natural resources and to secure orderly managed growth through phasing of local infrastructure such as the sewer service. These policies and regulations have allowed the city to continue to evaluate this service and ensure a high level of treatment, further protecting its resources.

Through its efforts of land use management, Seaford has identified areas for future infrastructure as part of their long-term annexation plans, which allows for the potential reduction of direct stream discharge.

Organizations should work with the City of Seaford to encourage the buffering of development from waterways and discourage removal of existing green infrastructure.

Web-Link: All comprehensive land use plans referenced in this section are available at the following: [stateplanning.delaware.gov/information/municipalities.shtml](http://stateplanning.delaware.gov/information/municipalities.shtml)

## Plan Implementation

### Introduction

Implementing the Nanticoke Watershed Management Plan will be a multifaceted effort that, by nature of its magnitude and scope, must include county and municipal governments, local and regional conservation organizations, and individual stakeholders (in addition to the Nanticoke Water Alliance). In particular, this plan is intended to be highly compatible with the EPA's Chesapeake Watershed Implementation Plan (WIP) process. The EPA has developed a Bay-wide Total Maximum Daily Load (TMDL), or "pollution diet," and has been working with each state to divide responsibility for a portion of that TMDL. In Phase I, the EPA allocated these TMDL portions at the state level. Phase II seeks to further apportion pollutant reduction requirements, by source sector, to the county level. Political boundaries can be a significant challenge for river conservation, and the Nanticoke Watershed Alliance understands that these invisible lines should have no bearing when it comes to the protection of an entire river. This plan and the overall efforts of the NWA are intended to bring implementation of these TMDLs back to the level of the watershed.

Each WIP developed at the state level includes WIP strategies—a general menu of best management practice (BMP) options that can be applied to reduce pollution. In the



following sections, the NWA has made implementation recommendations that highlight the most relevant BMPs from this list of options with regards to the characteristics and make-up of the watershed. In addition, a large amount of stakeholder input from the NWA’s visioning effort has been incorporated. This document and the recommendations herein should therefore represent what the diverse visioning participants throughout the Nanticoke Watershed wish to see for the future of the surrounding communities. For the ease of local governments and planners, recommendations that come directly from the potential strategies outlined in Delaware and Maryland’s WIP are indicated.

Examples: “Minimizing application of lawn and garden chemicals<sup>MD</sup>”

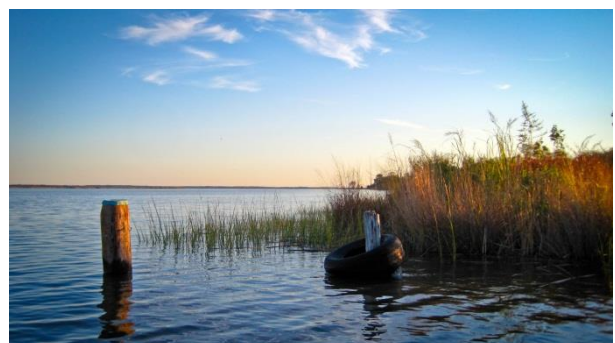
“The development of a Nutrient Management Plan<sup>MD, DE</sup>”

With limited resources, much of this plan will require outreach and coordination among many entities within the watershed, plus a commitment to take on implementation strategies as they apply to each mandate, mission and ability. This section will provide a list of recommended strategies to address, both individually and collectively, the issues. As a next step, conservation organizations and county/municipal governments will need to prioritize their own efforts and coordinate with both new and existing partners to implement the following strategies. The Nanticoke Watershed Alliance will use the information in this document to create an internal Annual Plan of Action each year for projects within its scope, based on the strategies and action items from the implementation section. The annual plan will identify specific geographic areas to focus restoration, outreach, and other projects, and to outline appropriate partnerships and funding opportunities for these projects.

## Water Quality

There are three main issues affecting most waterways: direct dumping/pollution, point source pollution, and non-point source pollution. Most direct polluting issues must be dealt with through policing of the waterway, site cleanup, and outreach to the community to educate residents about the dangers of littering and dumping. Conservation organizations in the watershed currently perform many of these duties and should continue with community education and outreach for stewardship of the river, monitoring water quality, and performing cleanup activities.

Point source and nonpoint source pollution are more difficult issues that can be addressed in a number of different ways. Following are recommendations on how to address these issues.



## Point Source Pollution

Point source pollution comes from either municipal wastewater treatment plants discharging effluent into the Nanticoke River, industrial discharge permits, or storm sewer systems discharging urban runoff into the stream. In some older communities, storm water and sanitary sewer systems are combined. On one hand, this allows for the treatment of storm water prior to discharge into the river. Unfortunately, during large precipitation events, the wastewater of a treatment plant's capacity can be exceeded, leading to the possibility that some wastewater is not treated for the appropriate amount of time. This may lead to higher amounts of nitrogen and phosphorus being discharged into the river.



Several communities across the region are working to separate the combined wastewater and storm water system,<sup>MD</sup> creating a more environmentally friendly option for waterways (though storm water remains untreated). Federalsburg is one community in the process of separating these systems, even though the process is arduous and expensive. It is recommended to record which communities have a combined system, and if so, to note if any are in the process of separating these systems.

## Wastewater Treatment

The Delmarva region has a variety of wastewater treatment systems, and the systems are classified in a variety of ways. These classifications generally examine the level of nutrient removal and the capacity of the wastewater treatment facility. An inventory can be developed of the capacity of each wastewater treatment plant in the watershed, the nutrient treatment levels, and any plans to upgrade the systems. Wastewater treatment plant operations and maintenance can sometimes be complicated. At times, a subdivision will be treated by a privately owned and operated “package” plant. Furthermore, certain companies privately own and operate wastewater treatment systems and receive payment from residents hooked into the system. It would be beneficial to document the number of private treatment plants in the watershed and the owner/operator for current and future plants.

Lastly, perhaps the simplest way to address the impact of wastewater treatment plants on water health is to cease discharging the effluent into the stream.<sup>MD</sup> Land application of wastewater treatment plant effluent is one and may be the easiest way to reduce nutrient discharge into a stream. Currently, this application is being performed at some facilities, including the one in Hurlock, Maryland.

Though the discharge method is simple, the process of finding suitable land can be an obstacle. First, the land must have the necessary soil capable of handling the discharge. Soil

surveys can be easily accessed on the web at [websoilsurvey.nrcs.usda.gov/app/HomePage.htm](http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm). Using this data, maps can be made to generalize where proper soils for land application of discharge exist.

Once potential suitable land is found, ownership of the land must be determined. Farmers are often open to allowing land application at no cost since it is free irrigation and the discharge is loaded with essential nutrients for plant growth. Government-owned lands are more difficult since some are in public use, and it can be challenging to receive approval for use of the land. In Delaware, there are two types of spray sites—designated spray sites and spray on demand sites. Spray on demand allows farmers to use the spray water only when needed versus having a designated spray site, which must be used to dispose of the water. Designated sites often have limited crop types and use of the crops is not for human consumption. Conservation groups could find suitable lands for the discharge of effluent in and around municipalities that discharge directly into a stream. This will require creating an additional inventory of land, ownership, and soils.

The distance from the wastewater treatment plant to the land where effluent will be applied is usually the largest obstacle to land application because of the price of infrastructure. There will be a need to advocate for state and federal grant funding in order to make land application a reality. Following is a summary of how conservation groups can help in making wastewater treatment plants healthier for the watershed.

- Develop an inventory of wastewater treatment plants in the area that documents the following:
  - Treatment levels;
  - Wastewater treatment plant capacity;
  - Owner and operator of current and future facilities; and
  - Whether the effluent is stream discharged or land applied.
- Develop an education and outreach program to seek buy-in from permitting agencies, plant managers, political leaders, and landowners to land apply the effluent.
- Develop an inventory of potential suitable lands for land application of effluent:
  - Develop a soils suitability map for the watershed by sub-watershed;
  - Contact landowners to determine willingness to have lands used for land application; and
  - Determine the distance the wastewater treatment plant is from suitable lands.
- Find potential funding sources for the design and construction of land application systems.
- If land application is not a possibility, explore funding opportunities to upgrade existing wastewater treatment plants to the highest quality (tertiary treatment levels).<sup>MD</sup>

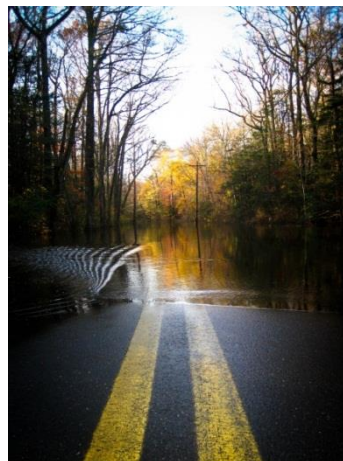
As restrictions on wastewater treatment plant nutrient discharge become more stringent, communities will have to be more creative in order to expand. Growth can continue in most communities by removing effluent discharge from the stream and onto land. Better

treatment capabilities help, but eventually permitted nutrient limits will be exceeded. Land application is a good investment for communities looking to grow *smartly* over the long term. However, it is important to note that spray/land application turns a point source into a nonpoint source. Furthermore, it is likely that even when designed and operated according to requirements, spray systems still add some nitrogen and phosphorus to the environment. States can address this issue when developing and revising onsite regulations for land application of effluent.

## Nonpoint Source Pollution

Nonpoint source pollution (runoff) comes from rainfall that picks up excess nutrients, sediments, bacteria, and other pollutants as it moves over and through the ground. There are three primary types of nonpoint source pollution: urban/suburban, agriculture, and forestry. Sources of nonpoint pollution include:

- septic systems;
- excess fertilizers, herbicides, and insecticides from agricultural lands and residential areas;
- nutrients, sediments, oil, and grease from paved areas such as roads and parking lots;
- sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks;
- bacteria and nutrients from livestock and pet waste;
- atmospheric deposition; and
- hydro modification (channelization or other modification to the natural flow of water).



### Urban/Suburban

#### *Storm Sewer*

In urbanized areas with a high percentage of impervious surfaces (roads, parking lots, buildings, etc.), municipalities create storm sewers to direct water away from these surfaces and into existing waterways. This water can carry lawn fertilizer, herbicides and insecticides, pet waste, oil and grease from vehicles, and many other pollutants. While not beneficial for the environment, storm sewers tend to be standard practice to deal with urban runoff and do not require much creative engineering and/or design. Existing and new development in the watershed can cause direct harm where outfalls lead into the Nanticoke River.



There are many ways to reduce nutrients from existing and new



stormwater systems. Beginning with existing stormwater systems, individuals and local governments can solve many issues. For homeowners, simple solutions can significantly reduce the amount of nutrients discharged into the Nanticoke River. Solutions include:

- Installing rain barrels;
- Planting rain gardens and trees;
- Disconnecting downspouts, directing runoff into pervious areas;
- Minimizing overwatering of lawns onto impervious surfaces;
- Minimizing application of lawn and garden chemicals<sup>MD</sup> and following proper application instructions;
- Preventing pet waste, litter, grass clippings, and leaves from entering storm drains;
- Cleaning up spilled brake fluid, oil, grease, and antifreeze properly;
- Disposing of used oil, antifreeze, paints, and other household chemicals properly (not in storm sewers or drains) through a household hazardous waste collection program; and
- Purchasing household detergents and cleaners low in phosphorous.<sup>MD</sup>



Additionally, many organizations already have established programs that conservation groups in the watershed can learn from and adopt themselves. The Parks and People Foundation in Baltimore receive donated rain barrels from a candy factory. The Foundation then trains residents to make the barrels in a workshop and gives them a rain barrel as a gift for their participation. Worcester County, Maryland, has a rain garden creation guide used for education and outreach purposes. The possibilities are ample for groups to be involved in helping everyday citizens reduce storm water impacts.

Local governments can take the lead to reduce storm water pollution by changing or instituting new practices and regulations. These include:

- Reducing turf fertilization on public lands;
- Adopting more protective storm water requirements for redevelopment;
- Starting a community reforestation program;
- Restoring the banks and buffers of local waterways;
- Improving or starting a storm water facility maintenance program;
- Street sweeping; and
- Detecting and eliminating illicit discharges.

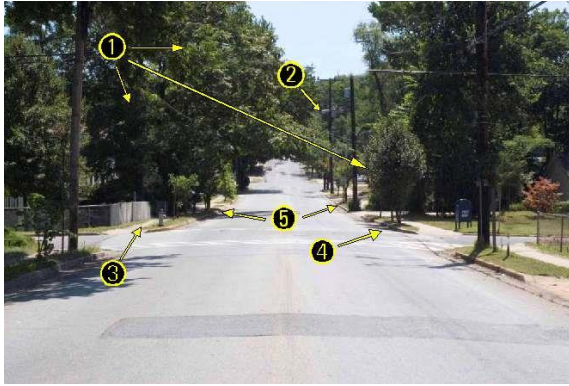
Source: Center for Watershed Protection

Existing systems can be retrofitted, often in a cost-effective manner. “Green streets” are the easiest way to handle this problem. There are many creative ways to create a green street, but the general concept is the same. In most cases, curb gutters are utilized but are converted into storm water planters. Basically, planters are built over the gutter and runoff



is directed into the planters. Vegetation inside the planters filters nutrients from the water prior to going into the waterway.<sup>MD</sup>

**BEFORE**



1. Tree Canopy: Non-native and low-growth trees reduce habitat and contribute to "urban heat island" effect.
2. Street Lighting: Sodium and mercury vapor street lights are inefficient, powered by dirty coal energy which emits carbon into the atmosphere. Lights are also located above the trees, which results in less light reaching the sidewalk.
3. Walkability / Accessibility: Broken and narrow sidewalks limit access for disabled persons and strollers and may violate the Americans with Disabilities Act (ADA).
4. Bike Access: Lack of dedicated bike lanes reduce safety, discourage bike use, and promote cars as the only way to get around on wheels. The wide street promotes speeding, making it even less safe for bikes and pedestrians.
5. Storm water: The storm water drains debris and pollutants directly into local rivers through the underground sewer system. This poisons fish and other wildlife, promotes illness among people, and contributes to the death

of the Chesapeake Bay.

**AFTER**



1. Tree Canopy: Native large canopy trees increase habitat, clean air, and cool streets, sidewalks, and homes.
2. Street Lighting: Light emitting diode (L.E.D.) streetlight fixtures are extremely efficient and will be powered by clean wind energy. The lights will be closer to the street to maintain effectiveness to public safety.
3. Walkability / Accessibility: ADA compliant (36" wide) sidewalks promote wellness, walking, and community.
4. Bike Access: Clearly marked bike lanes promote safety, wellness, an alternative to cars, and offer connectivity to bike trails and transit.
5. Storm water: "Bio-retention" gardens and tree boxes are the destination for storm water instead of the sewer system. The water is then naturally filtered of pollutants and debris, helping restore rivers and the Bay.
6. The "bump-out" design produces a "wiggle" in the street, slowing traffic for bike and pedestrian safety

Source: Town of Edmonston, MD

New storm sewer system design does not have to be costly if properly planned at the beginning of the process. Local governments will be required to develop flexible rules for storm sewer design allowing natural filtration of water prior to going into outfalls.<sup>MD</sup> Peninsula Regional Medical Center in Salisbury has created onsite systems that direct parking lot runoff to landscape planters located within the parking lot. The raised planters allow infiltration through pervious pavers. Other ways to require environmentally sound development to occur are numerous. Organizations and individuals can work with local governments to adopt development rules that incorporate environmentally sound design and demonstrate that projects can be done at a price that will not slow development.

*Septic Systems/Non-Storm Sewer*

Septic systems exist where there are no sewer services, typically outside the municipal limits of a town or city. These are considered onsite systems and treat all wastewater from

a household or a small community. These systems can contribute excess nutrients, bacteria, and other pollutants that have a negative impact on water quality in the Nanticoke River. To minimize impacts to the river, households with existing septic tanks should follow proper maintenance procedures including:

- Inspecting the system and having it pumped every three years;
- Practicing water conservation;
- Avoiding dumping household hazardous wastes such as oil-based paints, solvents and large volumes of toxic cleaners;
- Using phosphate-free and non-toxic household products; and
- Caring properly for the septic drain field.

For more information on the importance and steps for proper care of septic systems, refer to the EPA Homeowners Guide to Septic Systems, available at [www.epa.gov/owm/septic/pubs/homeowner\\_guide\\_long.pdf](http://www.epa.gov/owm/septic/pubs/homeowner_guide_long.pdf). Residents may consider upgrading to a newer, nitrogen-removing septic system, particularly if they are in the Critical Area within 1000-ft of the Nanticoke or its tributaries.<sup>MD</sup> Grant money may be available from the State of Maryland to pay for a portion or all of the upgrade. In addition, residents can employ the same types of simple solutions mentioned in the section above.

County governments can choose to incorporate planning and zoning codes that limit growth on septic systems in areas where no wastewater facilities exist.

### *Development*

Whether new construction and/or disturbance of vegetation occurs on a single household or large-scale community level, the opportunity exists for sediment to erode into the Nanticoke River. Excess sediment in waterways can block sunlight penetration necessary for underwater plant growth and increase water temperatures, leading to decreased shoreline stabilization and a more challenging environment for aquatic animals such as fish, crabs, and oysters. There are a number of best management practices to reduce erosion at construction sites including:

- Preserving existing vegetation;
- Seeding/mulching/covering bare soil immediately;
- Using sediment barriers to trap soil in runoff;
- Protecting slopes and channels from gullyng;
- Installing sediment traps and settling basins; and
- Preserving vegetation near all waterways.



### Agriculture

Agricultural lands can contribute significant amounts of nutrients, sediment, and bacteria into waterways. In the Nanticoke Watershed, farms may contribute these pollutants

through crop production and livestock (primarily chicken) operations. Hydro-modification for purposes of drainage and water management can exacerbate any water quality issues. Several agricultural best management practices associated with these activities can greatly reduce the negative impact farms can have on water quality in the Nanticoke Watershed. Perhaps most importantly, the development of a Nutrient Management Plan<sup>MD, DE</sup> considers all activities within an individual farming operation and addresses nutrient pollution in a systemic approach. These plans are an essential part of any effort to reduce agricultural pollution, required by both Maryland and Delaware. For more information about Delaware's nutrient management regulations, visit [dda.delaware.gov/nutrients/index.shtml](http://dda.delaware.gov/nutrients/index.shtml). For Maryland's regulations, visit [www.mda.state.md.us/resource\\_conservation/nutrient\\_management/index.php](http://www.mda.state.md.us/resource_conservation/nutrient_management/index.php). Both states will perform audits for nutrient management plan compliance as part of the Chesapeake Watershed Implementation Plan.

Farmers can employ a variety of practices for the management of nutrients, sediment, and bacteria.

- Cover crops, both traditional and commodity,<sup>MD, DE</sup> protect soils from erosion during the winter months and remove residual nutrients from fertilizer that may otherwise flush into the Nanticoke River.
- Conservation tillage—either no-till or minimal till farming<sup>MD, DE</sup>—greatly reduces the disturbance of surface soil by planting seeds directly into vegetative cover or crop residue, thereby reducing soil erosion from farm fields.
- Precision agriculture,<sup>MD, DE</sup> a method of applying crop science to more precisely match fertilizer applications with crop needs, makes more efficient use of fertilizer resulting in less nutrient leaching and saves farmers money (fertilizer costs).
- Planting streamside grass or forest buffers<sup>MD, DE</sup> will remove nutrients from runoff, stabilize the soil, and can provide important wildlife habitat.
- Wetland restoration<sup>MD, DE</sup> can provide additional nutrient removal and soil stabilization.
- Reestablishing/reconnecting floodplains to adjacent tax ditches and stream sides<sup>MD, DE</sup> or redirecting storm flows to wetland areas<sup>MD, DE</sup> can provide significant additional filtration of nutrients and sediment.



Additional best management practices exist specifically for poultry farming.

- Poultry waste structures<sup>MD, DE</sup> protect chicken manure from rain, thereby minimizing the leaching of nutrients and bacteria into the soil or runoff.

- Manure relocation programs<sup>MD, DE</sup> provide additional pollution prevention by moving excess manure out of the Chesapeake Bay Watershed to areas that can safely handle it.
- Manure application setbacks<sup>MD, DE</sup> and riparian buffer setbacks<sup>MD, DE</sup> can be applied, avoiding the application of chemical fertilizers or manure near streams and drainage ditches.
- Poultry manure incorporation,<sup>MD, DE</sup> where the manure is incorporated into the soil at the time of application, can prevent leaching before crops have the opportunity to make use of nutrients.
- Vegetative environmental buffers,<sup>MD, DE</sup> the strategic planting of trees and shrubs near poultry houses, can filter harmful or unpleasant emissions, conserve energy, create a more attractive landscape and screen routine operations.
- Poultry litter windrowing<sup>MD, DE</sup> (allowing manure to compost inside a poultry house) can reduce the amount of available manure.
- Potential alternative uses of manure,<sup>MD, DE</sup> for example as a source of energy, can be explored as a new technology.

## Forestry

Forestry is an important industry in the Nanticoke Watershed. While improperly managed harvesting sites can produce a great deal of erosion and sedimentation, foresters can employ a number of best practices to reduce negative impacts to waterways. A resource conservation plan, though not required, is highly recommended for landowners to identify and recognize the value of forest land and better predict the effects of any resource activity, thereby minimizing potential environmental degradation. Following are some key best practices to include in any resource conservation plan:

- Pre-harvest planning
- Streamside management
- Forest wetlands protection
- Proper road construction and maintenance
- Responsible timber harvesting
- Re-vegetation
- Forest chemical management



Pre-harvest planning should serve as a blueprint for efficient forest harvesting, site preparation and road systems, and streamside management. The use of topographic maps, aerial photographs, and soil surveys, along with field trips to determine site conditions, can identify natural drainage channels, threatened and endangered species habitat, topography, and soil types. These elements should factor into determining the boundaries of timber harvest activities, location and design of roads and landings, selection of harvesting method, and reforestation techniques.



Creating streamside management zones can mitigate against detrimental changes in water temperature, stabilize banks, and filter nutrients and sediment. Minimizing or avoiding activities in wetland forest areas will protect green infrastructure and reduce sediment and nutrient pollution. Efficient road construction and maintenance will minimize sedimentation through incorporating drainage structures and properly installing stream crossings. In timber harvesting activities, it is advisable to minimize the density and location of skid trails, select an efficient timber transport system, minimize soil compaction and saturation, minimize amount of soil disturbance, and avoid streamside management zones. Re-vegetating areas impacted by harvesting operations or road construction can additionally reduce erosion and filter nutrients. Finally, minimizing and using appropriate management and application of chemicals will reduce pollutants and save foresters money in terms of fertilizer, pesticide, and herbicide costs. More information about forestry best management practices can be found at [www.epa.gov/owow/watershed/wacademy/acad2000/forestry/](http://www.epa.gov/owow/watershed/wacademy/acad2000/forestry/).

Following is a summary of how conservation groups can help in reducing nonpoint source pollution in the watershed.

- Implement storm water retrofitting in urban areas, municipalities, and counties in the watershed.
  - Work with municipalities and county governments to identify potential storm water retrofitting projects in their communities.
  - Identify agencies/organizations that could take the lead or partner with the NWA on retrofitting projects.
  - Develop a prioritized list of retrofitting projects based on location in the watershed, feasibility of the project, and willingness of the county/municipality to undertake the project.
  - Identify and secure funding for implementation of retrofitting projects.
- Perform outreach to individual landowners in the watershed on nonpoint source pollution and ways to address the issue at the household scale.
  - Compile an inventory of current outreach efforts in the Nanticoke Watershed.
  - Prioritize areas within the watershed with the most need for this type of outreach, i.e. areas with severe water quality issues and/or areas where no current outreach programs exist.
  - Create a list of agencies/organizations that could take the lead or partner with the NWA on performing an outreach campaign on minimizing household pollution.
  - Identify and secure funding for implementing a nonpoint source pollution outreach campaign.
- Manage development.
  - Identify methods of managing, concentrating and/or limiting development e.g. Targeted Investment Areas, Low Impact Development, Transfer of



- Development Rights, construction best management practices, planning and zoning regulations.
  - Identify agencies and organizations currently working on the above activities and/or would be interested in doing so either separately or in conjunction with the NWA.
  - Stay abreast of the issuance of development permits within the watershed and perform outreach accordingly.
  - Promote development in Targeted Investment Areas and out of green infrastructure.
  - Ensure/advocate for the application of construction best management practices for approved developments.
  - Promote Low-Impact Development (LID).
- Implement agricultural best management practices (BMPs).
    - Identify partners at the state and local level that could take the lead or assist in the implementation of agricultural BMPs.
    - Develop a prioritized list of projects that implement agricultural BMPs, based on location in the watershed, feasibility of the project, and willingness of the landowner.
    - Identify and secure funding for implementing agricultural BMPs.
  - Implement forestry best management practices (BMPs).
    - Identify partners at the state and local level that could take the lead or assist in the implementation of forestry BMPs.
    - Develop a prioritized list of BMP implementation based on location in the watershed, feasibility of the project, and willingness of the landowner.
    - Identify and secure funding for implementing forestry BMPs.

## Natural and Cultural Resources

As noted in this plan and indicated on previous maps, there are several ways to protect land unique to each state, and many private organizations are involved in conserving land. These efforts should continue in order to protect lands and resources in harm's way of development, such as wetlands of special concern, green infrastructure in growth areas where land conversion is planned, public access sites, land within designated agricultural preservation districts and heritage areas. Each area will need to be analyzed to understand its existing use and potential.



Furthermore, opportunities exist to work with state, local, and private partners to implement restoration activities on public and private lands. Activities such as tree plantings,<sup>MD, DE</sup> wetland restoration,<sup>MD, DE</sup> streamside grass and forest buffers

installations,<sup>MD, DE</sup> and creation of other natural filters<sup>MD, DE</sup> will protect the water quality and green infrastructure within the Nanticoke Watershed and provide assistance to local governments as they develop and implement the Phase II Watershed Implementation Plan strategies.

- Strategically focus conservation and restoration efforts with regard to green infrastructure, existing areas that have been identified as having important natural and cultural resources (e.g. Rural Legacy Areas, Certified Heritage Areas, Scenic Byways, water trails) and other critical natural and cultural resources.
  - Identify partners at the state and local level that could take the lead or assist in the implementation of conservation and restoration.
  - Develop a prioritized list of conservation and/or restoration projects based on location in the watershed, feasibility of the project, and willingness of the landowner.
  - Identify and secure funding for implementing conservation and restoration efforts.

## Recreational Opportunities



With an abundance of recreational opportunities on land and the river, there are immense opportunities to promote and increase tourism in the watershed. The NWA has been working with the National Park Service, Chesapeake Conservancy, and other partners to develop recreational and educational opportunities on the Captain John Smith Chesapeake National Historic Trail, with particular attention to increasing access along the river. The NWA is also the managing entity for the Maryland portion of the trail and has developed a

centralized informational website on paddling activities in the Nanticoke River, located at [www.paddlethenanticoke.com](http://www.paddlethenanticoke.com).

## Community Vision

### Top Trends

Participants of the NWA visioning conference worked to create a shared picture of the present trends in society—social, economic, technological, political, environmental, etc.—that people believe are shaping the future of the Nanticoke region. A vote determined the foremost trends. Following is a summary of the discussion of these top trends and the recommendations made by participants in how these issues should be addressed.

## Population

The different groups and presenters at the conference recognized the significant population growth throughout Maryland's Lower Eastern Shore and southern Delaware. Presenters realized that several factors pointed to continued growth, including the increase in retired persons with more disposable income looking to move to the area, reasonable housing prices, and increased access to the area with the development of road infrastructure. The discussion concerning the state and local government's role in development decisions and protection of environmental resources follows.

Development and population growth often go hand in hand, whether development occurs in response to an increase in population or in an effort to bring more people to a particular area. While some solutions focus on "building up, not out" and aim to redevelop infill space, this solution does not always occur, for a variety of reasons. A third focus is assisting communities to determine if a development's location poses a threat to the watershed. The following goals look at this additional step and other issues dealing with population.

- Review growth trends for each region upon publishing of 2010 Census data.
- Review municipal and county designated growth areas.
- Develop policies and principals to help steer growth into existing urban areas.
- Work with local governments and agencies to understand the effect of development on the watershed and its ecosystem.
- Provide educational and outreach opportunities for residents, business owners, and government officials concerning development issues.
- Advocate for the proper location of growth areas and state funding districts (Priority Funding Areas and State Strategies for Spending districts) outside of the Nanticoke Watershed's identified green infrastructure and other identified sensitive areas.

## Government and Development

Two presenters focused on what governments can do to curtail and manage growth. Although growth was not necessarily viewed as a negative impact, participants felt that the focus should be on "growing up"—meaning there should be a focus on infill growth and not on new subdivision development. Concerning the enforcement of this practice, participants mentioned that although there are current laws that help control sprawl, these are not generally enforced. The group and presenter emphasized the need for responsible decisions to be made by local officials. This goal will be important for conservation and community groups to pursue as part of the implementation of this plan.

The outreach session noted that local government has the tools required to prevent degradation of the river and the ecosystem, but development pressures sometimes entice policymakers to make decisions that pose permanent negative effects on the environment.

Organizations and individuals concerned with growth can work with government officials within the watershed to understand how growth and development issues will affect the watershed and ultimately, its residents.

### Land Conversion

Directly related to development, land conversion is the change in agricultural and forested land use to developed (suburban/urban). While many studies show that agriculture runoff poses a major problem for waterways if BMPs are lacking, land conversion is also a main culprit in non-point source nutrient runoff. Development can cause many other issues as well, including increased vehicle usage (air quality issues) and an increase in impervious spaces.



The main issues with land conversion are the loss of green infrastructure or the conversion of green hubs and connectors to developed land. The loss of potential areas where green infrastructure could be increased but is eliminated due to poor development policies and land conversion is also of importance.

Land conversion is approved by local governments based on a given jurisdiction's comprehensive plan and zoning regulations. On non-developed lands, the underlying zoning district either allows development, or

regulations are changed to allow for development. Annexation is another issue within municipalities. Many Maryland jurisdictions and municipalities within the watershed have updated their comprehensive plans recently. Organizations, local governments, and stakeholders will be able to use the information in this Watershed Management Plan to better determine where development in the Nanticoke region should occur and where it should be restricted.

### Traffic

Participants viewed traffic in terms of increased vehicular traffic throughout the region with the resulting probable increase of boat traffic on the Nanticoke River. Though the group recognized vehicular traffic increases with population growth, participants could not develop a consensus on the overall effect of more vehicles. There was discussion about the development of road infrastructure adversely affecting communities but how this connected to the health of the Nanticoke River was unclear.

From a tourism aspect, participants discussed the need to get people to the river. Three scenic byways cut through the watershed and bring many visitors to the Nanticoke area. Questions arose as to how to harness the economic power of tourists while still managing traffic concerns.

Increased vehicular traffic and an emphasis on tourism brought additional concerns about increased traffic, both land and river, to the Nanticoke area. A major concern was that in increasing tourism for the economy, increased river traffic meant a possible increase in river degradation. This plan will draw together responsible environmental stewardship practices and increasing tourism.

Though traffic in the watershed was one of the major issues discussed, it was not linked to specifically causing harm to the watershed. Increased traffic was more of an indicator that population increased throughout the area, and that more tourists were traveling to the Nanticoke area.



Increased river traffic and any adverse relationship between river traffic and environmental control, as well as efforts to mitigate increased recreation in the watershed through traffic-lessening methods, such as group tours and public transit, should be examined. Environmental stewardship education and outreach are key tools to promote tourism while simultaneously protecting the river and environment.

### Economic Development and Tourism

Although local economic development and tourism were not major issues discussed by the group, the tie between both items provided a central theme in many conversations and was a focus of one of the speakers. A discussion arose on how to encourage and benefit from tourists while managing traffic and environmental issues. Throughout the plan, the effects of decisions on local economic development opportunities and the tourism industry will need to be considered in all aspects of the implementation process.

The efforts put forth by the NWA to bring together residents and stakeholders throughout the watershed in the development of an overall vision for the future of the Nanticoke Watershed had several additional components that may not fit into the previous sections. However, these elements are important points to include because they paint a clearer and more holistic picture of what stakeholder participants desire from government, nonprofits, businesses, and communities. The elements below are direct recommendations on how to implement the two common ground value statements developed at the end of the visioning process.

*Statement #1: The Nanticoke region will mindfully and intentionally conserve its natural and cultural resources in a way that enhances the unique social, economic, and environmental make-up of the area with a particular focus on the passing on natural and cultural legacies and preserving continuity of land use in connection with cultural significance.*

Education	Regulations, Enforcement, Government Involvement
<ul style="list-style-type: none"> <li>• Develop youth environmental education and field experiences</li> </ul>	<ul style="list-style-type: none"> <li>• Gain government and local support for protecting Nanticoke Watershed resources</li> </ul>
<ul style="list-style-type: none"> <li>• Young people need to have environmental school projects</li> </ul>	<ul style="list-style-type: none"> <li>• Establish green zones</li> </ul>
<ul style="list-style-type: none"> <li>• Create a mentoring program for leadership development</li> </ul>	<ul style="list-style-type: none"> <li>• Limit new development, grow/conserves in the right places, better planning, less sprawl</li> </ul>
Collaboration	Economic Development
<ul style="list-style-type: none"> <li>• Network grant resources</li> </ul>	<ul style="list-style-type: none"> <li>• Support sustainable ecotourism</li> </ul>
	<ul style="list-style-type: none"> <li>• Provide economic incentives to recycle</li> </ul>
	<ul style="list-style-type: none"> <li>• Recognize dollar value of green infrastructure and resources</li> </ul>

*Statement #2: The Nanticoke region will draw and retain youth and young families by providing quality jobs and job training within an economy that celebrates and preserves local identity, encourages innovation, reflects the true costs of doing business, and grows of both human and natural communities.*

Regulations, Enforcement, Government Involvement	Economic Development	
	Local Focus	Create innovative green jobs and industries
<ul style="list-style-type: none"> <li>• Gain government and local support for protecting Nanticoke Watershed resources</li> </ul>		
<ul style="list-style-type: none"> <li>• Pesticide regulations, laws, control</li> </ul>	<ul style="list-style-type: none"> <li>• Promote local agriculture, farmers markets and community supported agriculture enterprises</li> </ul>	<ul style="list-style-type: none"> <li>• Develop new industries that are low impact and/or reuse waste</li> </ul>
<ul style="list-style-type: none"> <li>• Apply state/federal dollars to support starting local businesses or creative use of tax structure</li> </ul>	<ul style="list-style-type: none"> <li>• Promote localism—“Salisbury Bucks” spent locally and purchased at discount</li> </ul>	<ul style="list-style-type: none"> <li>• Create new ideas/approaches for traditional careers – farming, aquaculture, ecotourism</li> </ul>
<ul style="list-style-type: none"> <li>• Develop municipal visioning plans</li> </ul>	<ul style="list-style-type: none"> <li>• Start chain of local ES community stores which sell products and produce produced locally</li> </ul>	<ul style="list-style-type: none"> <li>• Revitalize Nanticoke Seafood Plant as an aquaculture industry, education center, heritage museum, and tourism destination</li> </ul>
<ul style="list-style-type: none"> <li>• Provide tax incentives for rehab of residential and commercial building</li> </ul>	<ul style="list-style-type: none"> <li>• Provide low or no rent for business space in downtowns</li> </ul>	
<ul style="list-style-type: none"> <li>• Make recycling easier—curbside in all communities</li> </ul>	<ul style="list-style-type: none"> <li>• Market and promote local businesses</li> </ul>	<ul style="list-style-type: none"> <li>• Use river and rail systems to transport goods</li> </ul>
	Reuse Resources	
<ul style="list-style-type: none"> <li>• Work with local county property tax assessment to have a reduced property tax for ten years to incentivize revitalization of old, dilapidated houses into enviro-green house</li> </ul>	<ul style="list-style-type: none"> <li>• Redevelop, restore and “green” existing structure, perform in-fill instead of sprawl</li> </ul>	<ul style="list-style-type: none"> <li>• Develop activities to correspond to heritage i.e.: river cruises, walking trails, local crafts and farmers markets</li> </ul>
	<ul style="list-style-type: none"> <li>• Develop an appliance refurbishing a recycling program</li> </ul>	<ul style="list-style-type: none"> <li>• Develop and promote low impact tourism: Harriet Tubman, Capt. John Smith, ghost tours, birding, cycling, paddling, boating, fishing, hunting, eating and heritage tours</li> </ul>
Collaboration, Civic Engagement, Leadership Development	Science and Technology	
<ul style="list-style-type: none"> <li>• Start competition for who can be the greenest, e.g. “best solar panel system” or “lowest energy bill”</li> </ul>	<ul style="list-style-type: none"> <li>• Seek out renewable energy sources</li> </ul>	
	<ul style="list-style-type: none"> <li>• Expand access to broadband</li> </ul>	
<ul style="list-style-type: none"> <li>• Create umbrella organization of heritage groups in the Nanticoke Watershed that would provide means of communicating, organizing efforts, create unified story and help apply for funding</li> </ul>		
<ul style="list-style-type: none"> <li>• Programs to revitalize downtowns</li> </ul>		
<ul style="list-style-type: none"> <li>• Have visioning exercises on growth and future population scenarios</li> </ul>		
<ul style="list-style-type: none"> <li>• Develop community gardens in vacant lots, work with community to ensure its ongoing use and oversight.</li> </ul>		



## Next Steps



Many recommendations in this plan revolve around the development and execution of education/outreach programs and restoration activities. However, organizations within the watershed may have limited resources and will likely have to choose their target audiences and programs. The recommended path for creating and targeting education/outreach programs, restoration activities, and other projects follows:

- Use this plan to create a complete list of programs that the organization has the ability to accomplish (not necessarily the capacity).
- Work at the county-level to identify overlap of implementation recommendations in the Nanticoke Watershed Management Plan and in the Phase II Chesapeake Watershed Implementation Plan.
- Create a list of potential partner agencies/organizations, including whether they are in the process of performing needed activities, if they would be better suited to lead a specific effort, and/or if they have resources that could contribute to a partnership.
- Develop a finalized list of programs and activities that do not have an agency focusing on those issues currently and consider taking the lead on important issues.

The completed Watershed Management Plan will be distributed to all watershed towns/counties and partner organizations. In addition, the Nanticoke River Watershed Atlas was completed in 2012 and consists of 13 sections and corresponding maps highlighting watershed features and characteristics. The Watershed Atlas is an update of the 1996 version and includes the latest information from geospatial maps and technical experts. Both documents will serve as outreach tools to the watershed community and facilitate implementation of restoration efforts.

## Potential Implementation Project Funding and Support

**Program Open Space (POS)** is a nationally recognized program in Maryland that acquires land to be used for public recreation and open space areas. The program has two components. The first, Localside POS, is a grant funding opportunity for local jurisdictions for the planning, acquisition, and/or development of recreation land or park facilities to reach goals of conservation and recreation for citizens. The second component, Stateside POS, acquires state parklands, forests, wildlife habitat, natural, scenic, and cultural resources for public use. A portion of stateside funds is dedicated to capital improvements, critical maintenance, and operations inside state parks. Program Open Space is recommended for sub-watersheds characterized as natural, rural-forest/wetland, and development-influenced (Table 1).

Web link: [www.dnr.state.md.us/land/landconservation.asp](http://www.dnr.state.md.us/land/landconservation.asp)

Federal land managing agencies recommend natural areas to Congress to be protected and managed by the National Wildlife Refuge System in order to ensure a lasting refuge for wildlife. As human civilization and development increases, land space suitable for wildlife habitats disappears and wildlife populations themselves decline. **U.S. Fish & Wildlife Service National Wildlife Refuges** oppose this trend by protecting targeted areas from encroachment and by preserving and, where appropriate, restoring the conditions and habitats that wildlife requires in order to survive. The refuge system is beneficial for sub-watersheds characterized as natural.

Web link: [www.fws.gov/refuges/index.html](http://www.fws.gov/refuges/index.html)

The **National Park Service (NPS)** is a bureau of the U.S. Department of the Interior that safeguards park land, cares for and tells the stories of the National Parks, and helps citizens care for their communities. Many Native American Indian tribes, local governments, nonprofit organizations, businesses and individual citizens can ask for NPS assistance in revitalizing their communities, preserving local history, celebrating local heritage, and creating nearby opportunities encouraging exercise and outdoor recreation for children and families. The NPS administers dozens of affiliated sites, including the National Register of Historic Places, National Heritage Areas, National Wild and Scenic Rivers, National Historic Landmarks, and National Trails. The National Park Service is recommended for sub-watersheds characterized as natural.

Web link: [www.nps.gov/aboutus/index.htm](http://www.nps.gov/aboutus/index.htm)

**DNREC** (Delaware Division of Natural Resources and Environmental Control) offers **conservation easements** allowing a landowner to limit the type or amount of development on property while retaining private ownership of the land. The easement is signed by the landowner, the easement donor, and the State of Delaware, Division of Parks and Recreation (State Parks), the easement recipient. The easement is then recorded with the County Register of Deeds and is a permanent encumbrance on the property pertaining to current and all future owners. Although easement acquisition is viewed as the surest and

most effective tool for land conservation, careful planning of specific properties to target and in what order is equally important for maintaining habitat connectivity and minimizing the corrosive effects of habitat fragmentation. DNREC acquisition programs are recommended for sub-watersheds characterized as rural—specifically, forests and wetlands—but also for development-influenced sub-watersheds.

Web link:

[www.dnrec.delaware.gov/OpenSpaces/Documents/What%20is%20a%20Conservation%20Easement.pdf](http://www.dnrec.delaware.gov/OpenSpaces/Documents/What%20is%20a%20Conservation%20Easement.pdf)

**MARBIDCO's** (Maryland Agricultural and Resource-Based Industry Development Corporation) mission is to facilitate Maryland's farm, forest, and seafood businesses achieve sustainable viability and profitability now and into the future. The corporation is quasi-public, broadly authorized to: (1.) develop agricultural industries and markets, (2.) support appropriate commercialization of agricultural processes and technology, (3.) assist with rural land preservation efforts, and (4.) alleviate the shortage of nontraditional capital and credit available at affordable interest rates for investment in agricultural and resource-based businesses. MARBIDCO offers loans and rural business assistance programs to be applied for including: **Maryland Resource-Based Industry Financing Fund Loan**, Rural Business Equipment and Working Capital Loan Fund, Forestry Equipment and Working Capital Loan Fund, Maryland Vineyard Planting Loan Fund, Rural Business Energy Efficiency Improvement Loan Fund, Maryland Shellfish Aquaculture Loan Fund, Local Government Ag/RBI Project Cost Share Program, and Maryland Value Added Producer Grant Program. MARBIDCO is specifically designed for sub-watersheds characterized as rural, including forests/wetlands, and agriculture.

Web link: [www.marbidco.org/about/about\\_us.html](http://www.marbidco.org/about/about_us.html)

**Maryland Agricultural Land Preservation Foundation (MALPF)** purchases agricultural preservation easements from landowners of eligible farmland or woodland to protect prime productive farmland from development by selling the development rights and permanently restricting the use of the land to agricultural use. MALPF easements are best suited for sub-watersheds characterized as rural-agricultural as well as mixed-rural.

Web link: [www.malpf.info/overview2.html](http://www.malpf.info/overview2.html)

**CREP Watershed Grant Program (Conservation Reserve Enhancement Program)** is a voluntary land retirement program that assists agricultural producers protect environmentally sensitive land, decrease erosion, restore wildlife habitat, and safeguard ground and surface water. CREP offers farmers and ranchers financial packages for conserving and enhancing the natural resources of their farms through temporary (10-15 years) or permanent easements. The program best suited for sub-watersheds characterized as rural-agriculture.

Web link: [www.apfo.usda.gov/FSA/webapp?area=home&subject=copr&topic=cep](http://www.apfo.usda.gov/FSA/webapp?area=home&subject=copr&topic=cep)

**EQUIP watershed grants (Environmental Quality Incentives Program)** provide financial assistance to owners of land in agricultural or forest production, or to persons engaged in livestock, agricultural or forest production on eligible land with natural resource concerns. EQUIP assists producers in developing conservation plans to improve soil, water, plant, animal, air and related resources on agricultural land and non-industrial private forestland, and helps meet Federal, State, Tribal, and local environmental regulations. EQUIP watershed grants are best used for sub-watersheds characterized as rural-forest/wetlands and rural-agriculture.

Web link: [www.nrcs.usda.gov/programs/eqip/index.html#who](http://www.nrcs.usda.gov/programs/eqip/index.html#who)

**Environmental Protection Agency** offers various **watershed grant programs** to encourage successful community-based approaches to protect and restore the nation's watersheds. Programs include: Nonpoint Source Pollution Funding, Targeted Watershed Grants, Wetlands Funding, National Estuary Program Funding Strategies, Regional Grant Opportunities, and Environmental Education Grants Program. EPA watershed grant programs are designed to offer funding to sub-watersheds characterized as rural-agriculture and rural forest/wetlands.

Web link: [water.epa.gov/grants\\_funding/shedfund/watershedfunding.cfm](http://water.epa.gov/grants_funding/shedfund/watershedfunding.cfm)

**Rural Legacy** provides the focus and funding necessary to identify and protect the most valuable agricultural land, natural resources, and cultural heritage from sprawl development. Protection is provided through the acquisition of easements and fee interests from willing landowners by the Rural Legacy Sponsors and local governments. Local governments and private land trusts can identify these valuable land areas and apply for funds to accompany existing conservation efforts or create new ones. This program helps conserve sub-watersheds characterized as mixed-rural.

Web link: [www.dnr.state.md.us/land/rurallegacy/index.asp](http://www.dnr.state.md.us/land/rurallegacy/index.asp)

County governments offer programs to fund the purchasing of development rights (PDR) from rural landowners with public money to conserve rural land. **Transfer of Development Rights or TDR programs** are used to assist private developers in purchasing the development rights from a landowner in a designated “sending zone” (an area designated for agricultural preservation) and then transfer those rights to desired development areas (the “receiving zone”). The major benefit of the TDR program is that private dollars rather than public dollars preserve land. Transfer and purchasing of development rights are recommended for sub-watersheds characterized as mixed-rural and development-influenced.

Web link: [www.agprint.maryland.gov/programs.html](http://www.agprint.maryland.gov/programs.html)

**ESLC (Eastern Shore Land Conservancy)** is a nonprofit organization that works with community groups, government agencies, and landowners in Dorchester and Caroline Counties (as well as Talbot, Kent, Queen Anne, and Cecil Counties) to protect land through

donated and purchased conservation easements. Conservation easements are permanent unique agreements between the organization and the landowner that restrict future development to a degree that is mutually agreed upon but meets the broad guidelines of the ESLC and the IRS (to ensure eligibility for various tax deductions). ESLC is a Rural Legacy Program and permanent CREP easement sponsor. ESLC also partners with other conservation organizations and local governments in its rural land preservation efforts. The organization can best assist in conserving sub-watersheds characterized as mixed-rural.

Web link: [www.eslc.org/pages/plconservationoptions.php](http://www.eslc.org/pages/plconservationoptions.php)

**LSLT (Lower Shore Land Trust)** is a nonprofit organization that assists landowners in Somerset, Wicomico, and Worcester counties to protect land through donated or purchased easements in order to sustain a diverse and healthy wildlife population, natural buffers that maintain water quality, and preserved scenic vistas and landscapes surrounding sites of historical and cultural importance. Conservation easements are permanent unique agreements between the organization and the landowner that restrict future development to a degree that is mutually agreed upon but meets the broad guidelines of the LSLT and the IRS (to ensure eligibility for various tax deductions). LSLT is a Rural Legacy Program and permanent CREP easement sponsor. LSLT also partners with other conservation organizations and local governments in its rural land preservation efforts. The organization can best assist in conserving sub-watersheds characterized as mixed-rural.

Web link: [www.lowershorelandtrust.org/pages/howitworks.php](http://www.lowershorelandtrust.org/pages/howitworks.php)

**MET (Maryland Environmental Trust)** is a statewide land trust that works with individual land owners and local land trusts. MET is designed to provide the information and tools necessary for permanent protection of natural, historic, and scenic resources. MET also provides grants to environmental education projects through the Keep Maryland Beautiful Program. MET is best suited for sub-watersheds characterized as mixed-rural.

Web link: [www.dnr.state.md.us/met/](http://www.dnr.state.md.us/met/)

**TNC (The Nature Conservancy)** is an international conservation organization that works with landowners, communities, cooperatives, and businesses to protect land through easements, private reserves, and incentives. A conservation easement is a restriction placed on a piece of property to protect its associated resources. The easement is either voluntarily donated or sold by the landowner and constitutes a legally binding agreement that limits certain types of uses or prevents development from taking place on the land in perpetuity though the land remains in private hands. The Nature Conservancy is active in both Maryland and Delaware.

Web link: [www.nature.org/aboutus/privatelandconservation/index.htm?s\\_intc=subheader](http://www.nature.org/aboutus/privatelandconservation/index.htm?s_intc=subheader)

## Conclusion

Many government entities, conservation organizations, community groups, and individuals are helping to make great strides in protecting the watershed. This plan is meant to be a guide for all stakeholders of the watershed, recognizing that limitations exist and that areas of focus and expertise are different among the various entities. All stakeholders must address limited resources by working with new and existing partners to solve these issues and by strategically filling gaps where current programs and efforts do not exist. Strong new partnerships with local governments need to be established. Conservation organizations, community groups, and individuals will benefit by working alongside governments and avoiding the pitfalls that many environmental organizations run into when there is the perception that future growth and development will be halted. Reaching out to local governments and other stakeholders, working cooperatively to advocate for changes, and creating partnerships are the most important pieces of making this plan successful in protecting the Nanticoke Watershed, the health of the environment, and ultimately, the health of all individuals.





## Glossary of Acronyms

**AFRAM** - African American

**BMP** - Best Management Practice

**CAC** - Critical Area Commission

**CREP** - Conservation Reserve  
Enhancement Program

**DNR** - Maryland Department of Natural  
Resources

**DNREC** - Delaware Department of Natural  
Resources and Environmental Control

**EPA** - Environmental Protection Agency

**EQUIP** - Environmental Quality  
Incentives Program

**ERES** - Exceptional Recreational and  
Ecological Significance

**ESLC** - Eastern Shore Land Conservancy

**IBA** - Important Bird Areas

**IDA** - Intensely Developed Areas

**LDA** - Limited Development Areas

**LID** - Low Impact Development

**LSLT** - Lower Shore Land Trust

**MALPF** - Maryland Agricultural Land  
Preservation Foundation

**MARBIDCO** - Maryland Agriculture and  
Resource Based Industry Development

**MDP** - Maryland Department of Planning

**MET** - Maryland Environmental Trust

**MHAA** - Maryland Heritage Area  
Authority

**MHT** - Maryland Historical Trust

**MOU** - Memorandum of Understanding

**NPS** - National Park Service

**NWA** - Nanticoke Watershed Alliance

**NWR** - Nanticoke Wildlife Refuge

**PDR** - Purchasing of Development Rights

**PFA** - Priority Funding Area

**PLUS** - Preliminary Land Use Service

**POS** - Program Open Space

**RBI** - Resource-Based Industry

**RCA** - Resource Conservation Area

**TDR** - Transferrable Development Rights

**TMDL** - Total Maximum Daily Load

**TNC** - The Nature Conservancy

**WIP** - Watershed Implementation Plan

**WMP** - Watershed Management Plan

**WSSC** - Wetlands of Special State Concern

**WWTP** - Wastewater Treatment Plant