



2009 NANTICOKE RIVER REPORT CARD

River Final Grade



- Oxygen scores were generally high.
- Water clarity scores were very high for the Upper Nanticoke, but somewhat low for the Lower Nanticoke.
- Nitrogen scores were low, particularly in the Upper Nanticoke.

Creeks Final Grade



- Oxygen scores were very high in all creek regions.
- Water clarity scores were very high for all regions except for the Lower Creeks in Maryland.
- Nitrogen scores were low in all creek regions.

Two final grades were calculated: Rivers and Creeks. The "River" grade is a measure of the health of the mainstem of the Nanticoke River. The "Creeks" grade assesses the health of the creeks that feed into the Nanticoke. Both grades are important indicators of the overall health of the watershed.

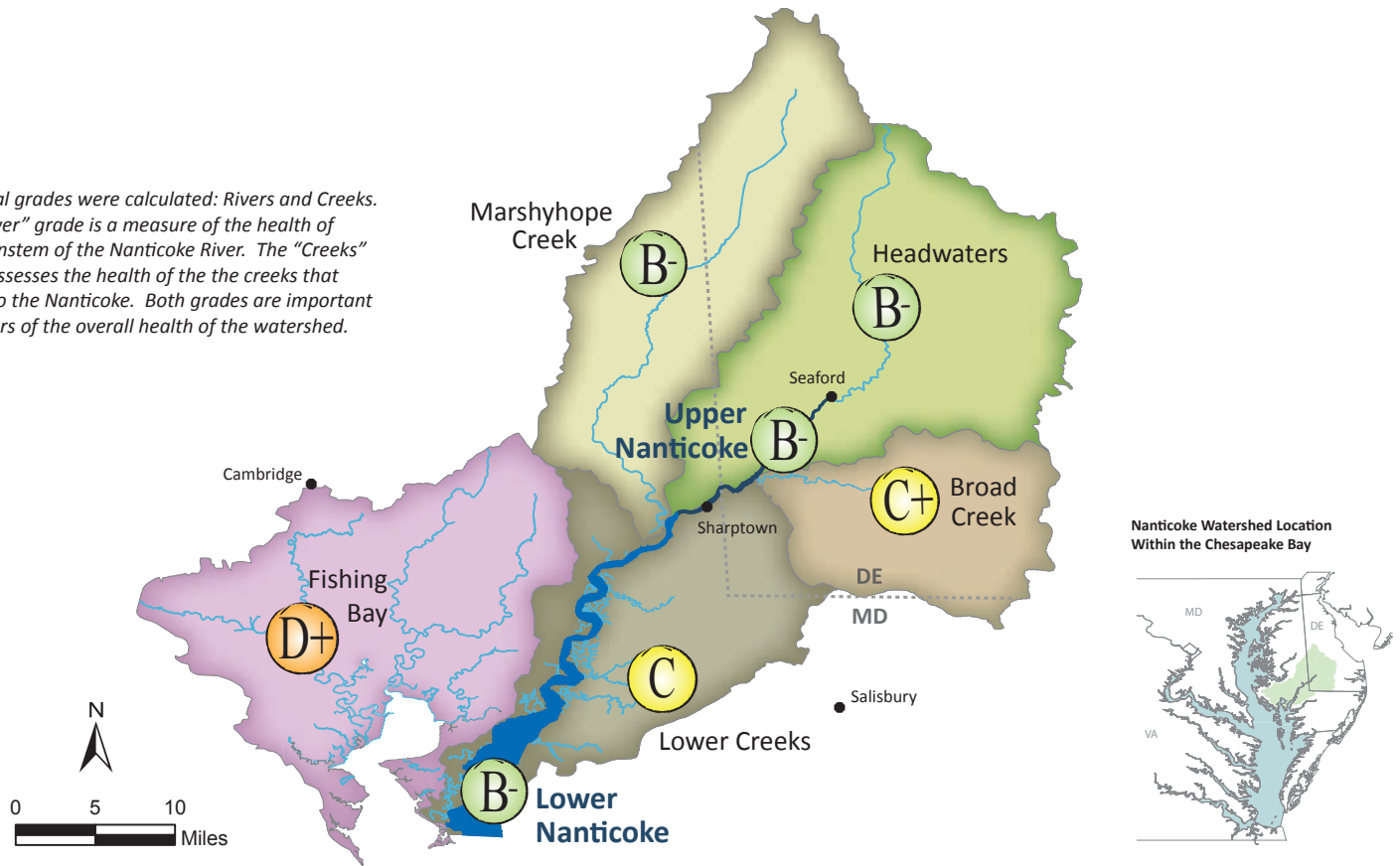


Figure 1: Report card grades for the Nanticoke River and its creeks in 2009. The water quality grades are based on data collected by Nanticoke Creekwatchers, volunteer citizen scientists for the Nanticoke Watershed Alliance. Data from two Chesapeake Bay Program monitoring sites on the Nanticoke River were also included for analysis.

What Do the Grades Mean?



All water quality indicators meet desired levels. Quality of water in these locations tends to be very good, most often leading to very good habitat conditions for fish and shellfish.



Most water quality indicators meet desired levels (60-79%). Quality of water in these locations tends to be good, often leading to good habitat conditions for fish and shellfish.



There is a mix of healthy and unhealthy water quality indicators (40-59%). Quality of water in these locations tends to be fair, leading to fair habitat conditions for fish and shellfish.



Some or few water quality indicators meet desired levels (20-39%). Quality of water in these locations tends to be poor, often leading to poor habitat conditions for fish and shellfish.



Very few or no water quality indicators meet desired levels. Quality of water in these locations tends to be very poor, most often leading to very poor habitat conditions for fish and shellfish.

SCORES SHOW NEED FOR NITROGEN REDUCTION

Overall scores for the six regions within the Nanticoke Watershed ranged from B- to C (Figure 2). Fishing Bay Watershed, though not part of the Nanticoke River system, was also scored because it can play a role in the overall health of our watershed. Fishing Bay received the lowest score overall (D+).

Dissolved oxygen and water clarity generally scored well, indicating a healthy ecosystem. Some poor clarity scores occurred in the lower sections of the river and creeks. Decreased water clarity in those areas may be partly due to the open water habitats there - these areas are more prone

to excessive algae growth and winds that churn up sediments. Total nitrogen scores were low in all sections; the lowest score was in Broad Creek, which received an F. Total phosphorus scores were slightly better, but could also be improved. Treated wastewater from sewage treatment plants, septic systems and industrial activities and the over-application of fertilizer on agricultural and residential lands result in excess nutrient loading to the Nanticoke - it is clear that future conservation efforts should target nutrient pollution, nitrogen in particular. Both bacterial indicators (fecal enterococcus and fecal coliform) scored similarly, ranging from B+ to D. Enterococcus is an indicator of water quality for recreational activities - swimming, boating, or fishing. Coliform is used to assess harvestable shellfish waters. For an explanation of the different pollutants and ways we can help, see pg. 3, "Make Choices For A Healthier Nanticoke."

River Region	Dissolved Oxygen	Water Clarity	Total Nitrogen	Total Phosphorus	Fecal Coliform	Fecal Enterococcus	Overall Health Index
Upper Nanticoke	A	A	D	B-	B	C	B-
Lower Nanticoke	B+	D+	C-	C	B+	B+	B-
Headwaters	A	A-	D-	B+	C-	C+	B-
Marshyhope Creek	A+	A	D-	C+	C-	B-	B-
Broad Creek	A+	A+	F	C+	C-	C-	C+
Lower Creeks	A-	C-	D-	C-	C-	C	C
Fishing Bay**	C+	D	C	F	D+	D	D+

Figure 2: A breakdown of grades for each reporting region, by water quality indicator. The Overall Health Index (total score) is calculated by averaging the numeric scores of all indicators.

**Scores for Fishing Bay Watershed were included in this report due to its relevance and proximity to the Nanticoke, but were not included in calculations for the Rivers and Creeks "Final Grade."

PARTNERING FOR PROGRESS ON THE NANTICOKE

Since the Nanticoke flows through both Delaware and Maryland, it is essential to have bi-state participation in monitoring and conservation efforts. In 2007, the Nanticoke Watershed Alliance began to develop a volunteer monitoring program through grants from both the Chesapeake Bay Trust and the Delaware Department of Natural Resources and Environmental Control. Residents in both states who were passionate about their beautiful and iconic river volunteered to become Creekwatchers - in just two years, the Nanticoke Creekwatchers program has expanded to regularly monitor 37 sites throughout the Nanticoke and neighboring Fishing Bay Watersheds (Figure 3).

While the Creekwatchers program is largely volunteer-driven, there are many partnerships that have been essential to the program's continued success. Envirocorp Labs in Harrington, DE donates all lab analyses and helps to arrange the pickup of water samples spread across the watershed. This extremely generous and supportive partnership saves the Creekwatchers program thousands of dollars every year.

Additionally, staff at Johns Hopkins University in Baltimore, MD assist with data management and analysis, and many local small businesses and landowners permit water access and/or the use of their property as a sample drop off site. Without each of these valuable partnerships, the Creekwatchers program would not have been able to grow and experience the success that has been achieved so far in just a few short years.

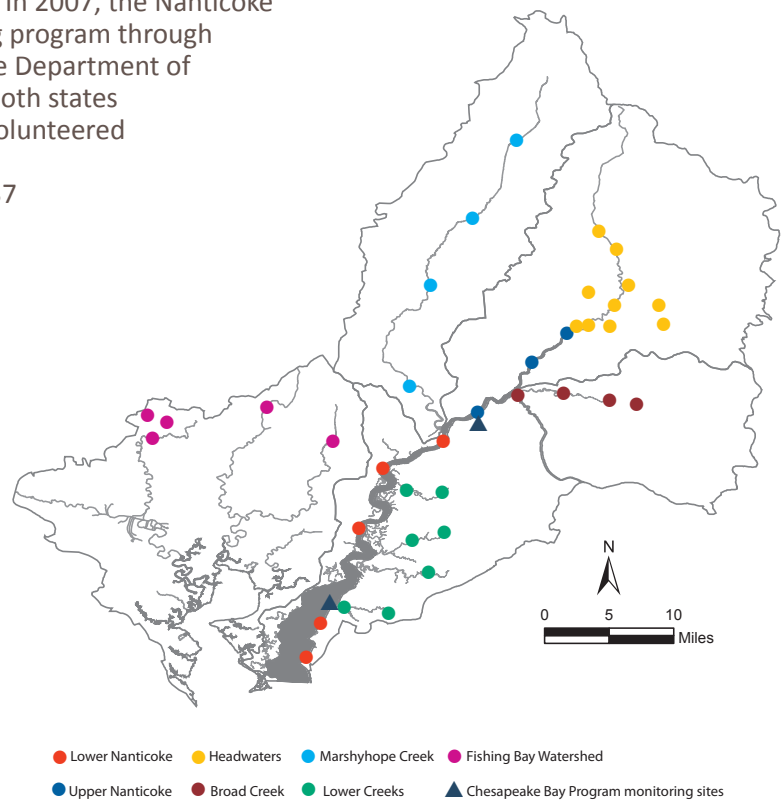
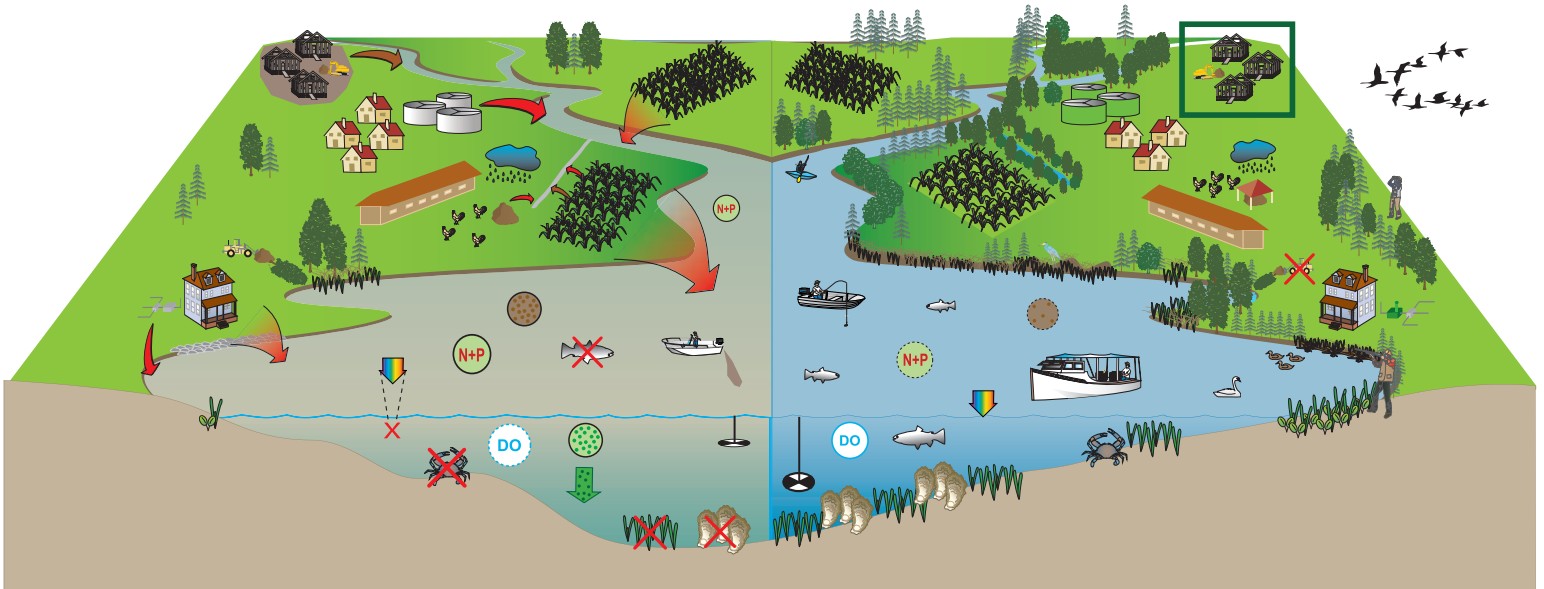


Figure 3: Creekwatchers and Chesapeake Bay Program monitoring stations used in the 2009 report card.

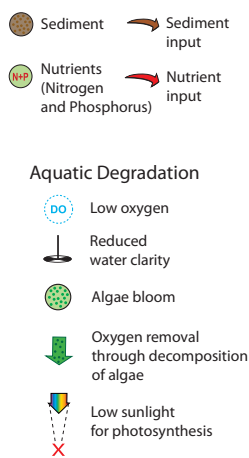
MAKE CHOICES FOR A HEALTHIER NANTICOKE



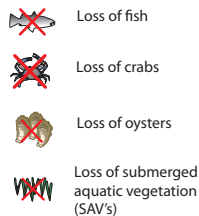
Pollution Sources



Pollutants



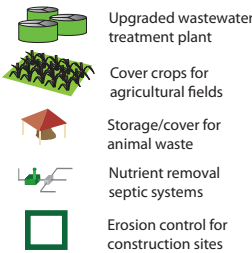
Species Loss



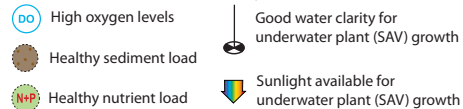
Habitat Destruction



Best Management Practices



Better Water Quality



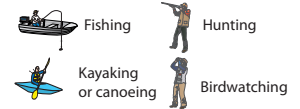
Habitat Recovery



Healthy River



Healthy Recreation Activities



Pollutants

Sediments, or soil pollution, can enter surface waters from eroding stream banks and places with decreased plant cover such as some agricultural lands and construction sites. Excess sediment creates cloudiness (turbidity), which reduces the amount of light reaching aquatic vegetation. Many species, especially crabs and young fish, rely on these grasses for habitat.

Nitrogen and Phosphorus are key nutrients found in many fertilizers that are used on both agricultural and residential lands. Excess amounts of these nutrients can result in algal blooms, which deplete the amount of oxygen in the water available for fish and other organisms native to the Nanticoke River and its tributaries.

Human and Animal Waste can add excess nutrients to the Nanticoke, in turn reducing the amount of oxygen availability. It also can lead to a buildup of bacteria that may cause illnesses in humans who come in contact with contaminated waterways.

Healthier Choices

Cover Crops help farmers manage soil fertility, soil quality, water usage, weeds, pests, diseases, and wildlife. Cover crops also help take up excess nutrients and prevent soil erosion.

Stream Buffers consist of strips of trees and other vegetation that improve water quality in streams by filtering pollutants, reducing flooding and erosion, and providing shade to shallow water habitats.

Rain Gardens use native, water-loving plants to filter rainwater runoff from roofs, driveways, walkways, parking lots, and compacted lawn areas. Rain gardens can cut down on the amount of pollution reaching creeks and streams by up to 30%.

Living Shorelines are planted or undisturbed shorelines that protect property from erosion and provide habitat for fish, birds and other wildlife. They also protect water quality by trapping excess nutrients and sediment.

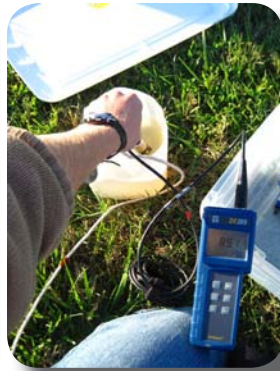
Upgraded Wastewater Treatment Plants and Septic Tanks can help prevent excess nutrients found in human waste from entering the Nanticoke River. They can also remove harmful bacteria.

VOLUNTEERS ARE THE STARS OF THIS PROGRAM!

In 2007, the Nanticoke Watershed Alliance began recruiting members of the local community to create a team of citizen scientists that would monitor the health of the Nanticoke River. Many of the original Nanticoke Creekwatchers have remained with the program since its inception, and the data they collect have played an integral role in efforts to protect the health of the Nanticoke River.

The hard work of the Nanticoke Creekwatchers has not gone unnoticed. In 2009 the Environmental Protection Agency granted approval for the data collected by these volunteers to be used in Chesapeake Bay restoration efforts, thanks in large part to extensive training and our volunteers' adherence to strict scientific protocol in their sampling efforts. Creekwatchers were also recognized by the State of Delaware, receiving both the Governor's Outstanding Volunteer Award and the Jefferson Award for Service.

Today, over 30 volunteers regularly monitor 37 sites in two states and five counties across the Nanticoke River Watershed. These volunteers show a true passion for the beauty and majesty of the Nanticoke, one of the Chesapeake's greatest jewels. Every two weeks from April to November, rain or shine, they head out to collect the data that make this report card possible. Our volunteers form the backbone of this program - we could not succeed in our efforts without their dedication and passion for the Nanticoke River!



Photos from left to right: Nanticoke Creekwatchers celebrate end of 2008 water monitoring season; a Creekwatcher measures dissolved oxygen; Alliance volunteers have fun while planting a rain garden.

ABOUT THE ALLIANCE

The Nanticoke Watershed Alliance is a consortium of non-profit organizations, local businesses, industry, state and federal agencies who all work together to ensure a bright future for the iconic Nanticoke River. The Alliance is a venue for sharing information and creating open and honest dialogue around river issues and potential solutions. Some of our key efforts include:

- Monitoring the health of the Nanticoke River system.
- Working to create strong bi-state relationships and effective conservation for the entire Nanticoke Watershed.
- Developing a watershed management plan to ensure the Nanticoke maintains its high level of ecological health and cultural significance.
- Engaging volunteers in restoration activities, rain garden planting, outreach at festivals, oyster gardening, and stream clean-ups.
- Working with a host of partners to ensure access along the entire length of the river. Current projects include the John Smith water trail map and guides.

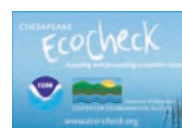
The Nanticoke Watershed Alliance strives to support the local community through service projects and other outreach events. If you are interested in joining the Alliance in making the Nanticoke Watershed a cleaner, healthier, more beautiful place to live, contact us online at www.nanticoke.org.

Support the Alliance!

- Join our team of dedicated volunteers and help with water monitoring, restoration and cleanups, outreach efforts and more.
- Make a tax-deductible donation to support our work for the river and its communities.
- Become an Alliance partner. Businesses and organizations can join the Alliance's "Partners In Conservation" program and become a part of ongoing dialogue associated with the conservation of the Nanticoke River.
- Stop by our offices to say hello! Our office is located in the small, rural river town of Vienna, MD and is typically open from 9-4 Mon-Fri.

For more information, visit www.nanticoke.org

The Nanticoke Watershed Alliance would like to thank the Chesapeake Bay Trust for funding this report card, the Chesapeake Bay Trust and DE Department of Natural Resources and Environmental Control for the generous funding of data collection and water monitoring efforts, and of course a special thanks to our dedicated Creekwatchers. In addition, this project would not be possible without the contributions and support of the following organizations and agencies:



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