



2010 NANTICOKE RIVER REPORT CARD

River Final Grade



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

Creeks Final Grade



- Oxygen scores were very good in all creek regions.
- Water clarity scores were very good for all regions, except for the Lower Creeks in Maryland.
- Nitrogen scores were poor 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.

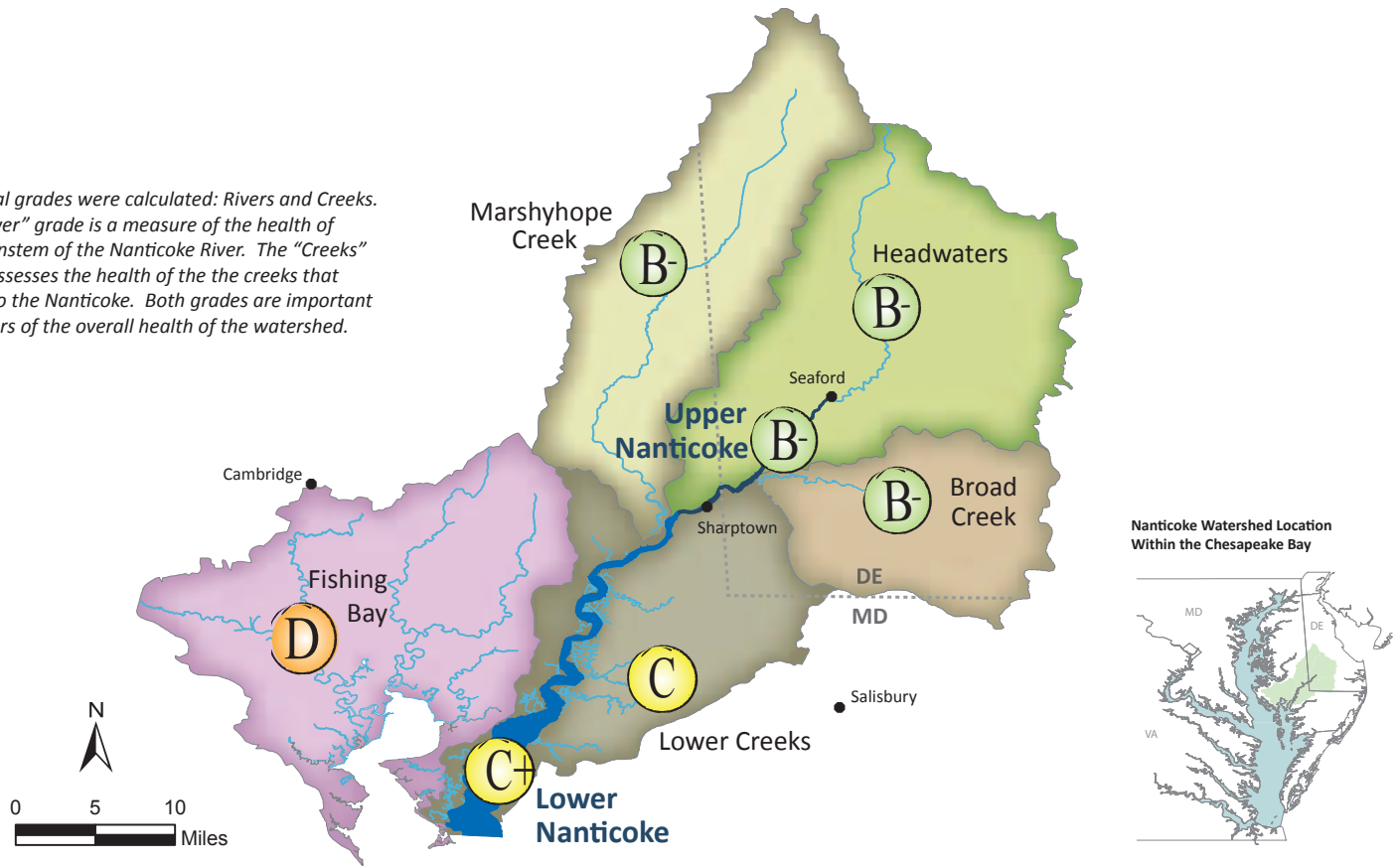


Figure 1: Report card grades for the Nanticoke River and its creeks in 2010. The water quality grades are based on data collected by Nanticoke Creekwatchers, volunteer citizen scientists for the Nanticoke Watershed Alliance. Data from two Chesapeake Bay Program monitoring sites on the Nanticoke River 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.

PHOSPHORUS SCORES OFFSET BY NITROGEN SCORES

Overall scores for the six regions within the Nanticoke Watershed ranged from B- to C (Figure 2). In a reversal of last year's scores, the Nanticoke River received a C+ overall, while the creeks scored a B-. Fishing Bay Watershed, though not part of the Nanticoke River system, can play a role in the overall health of our watershed. For the second straight year, Fishing Bay received the lowest score overall (D).**

As with previous years, dissolved oxygen and water clarity continued to score well, indicating a generally healthy ecosystem. The poorest 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 habitat; these areas are more prone to excessive algae growth and winds that churn up sediments.

Total nitrogen grades continued to be poor in all sections; the lowest grades were in Broad Creek and Marshyhope Creek, which received F's. The "best" nitrogen score was found in the Lower Nanticoke with its C- rating. Total phosphorus scores, however, improved slightly from 2009, which may simply reflect the low amount of rainfall during the summer of 2010. The continued high nitrogen scores could reflect a problem with pollution sources that provide steady outputs of nitrogen, such as wastewater treatment facilities or septic tanks without nutrient reduction systems. Further, the slight changes in scores from 2009 and 2010 may also be due to year-to-year variables, such as heavy rainfalls coinciding with field or lawn fertilization.

Fecal enterococcus, a bacterial indicator of water quality for recreational activities, showed across the board declines from last year's scores. This year's scores ranged from B- to D. Fecal enterococcus represents the potential presence of animal and human waste in the water. The change in fecal enterococcus scores may be due to increased pressure on wastewater treatment systems, septic leaks, and livestock waste entering waterways.

River Region	Dissolved Oxygen	Water Clarity	Total Nitrogen	Total Phosphorus	Fecal Enterococcus	Overall Health Index
Upper Nanticoke	A-	A	D	B-	C	B-
Headwaters	A-	A	D-	B+	C	B-
Broad Creek	A+	A	F	B	D	B-
Marshyhope Creek	A+	A	F	B-	C+	B-
Lower Nanticoke	A+	D+	C-	C-	B-	C+
Lower Creeks	B	C+	D-	D	C+	C
Fishing Bay**	D-	C	C-	F	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." Fishing Bay scores are based on five sampling sites only, which are monitored by Dorchester Citizens for Planned Growth (DCPG). See Figure 3 for the locations of these sites.

A POLLUTION "DIET" FOR THE NANTICOKE

As a major tributary of the Chesapeake Bay, the Nanticoke River plays an important role in the success (or failure) of the Watershed Implementation Plans or pollution "diets" mandated by the EPA. These diets will target nutrient (phosphorus and nitrogen) and sediment pollution--with a steady stream of water quality goals that must be met by 2025.

The Nanticoke watershed comprises the largest watershed in Delaware and a sizeable area in Maryland. (See Figure 3 at right for a graphic of the watershed.) Meeting pollution reduction goals requires that all members of our community pitch in to reduce pollution and to improve the water quality of the Nanticoke and the Bay itself. Pollution targets include stormwater, wastewater, and septic systems. The diet also aims at improving agricultural practices to reduce runoff.

Although helping the Nanticoke may seem overwhelming and best left to municipalities and large landowners, small-scale, private landowners can make a difference. Following some of the practices on the next page can help your county, state, and the entire watershed to meet pollution "diet" targets, while improving the health, beauty, and resources of your local waterways.

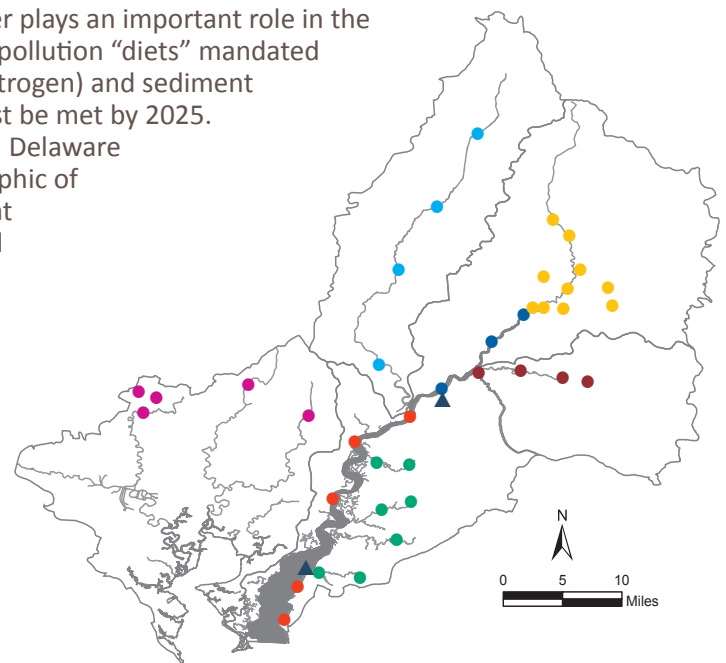
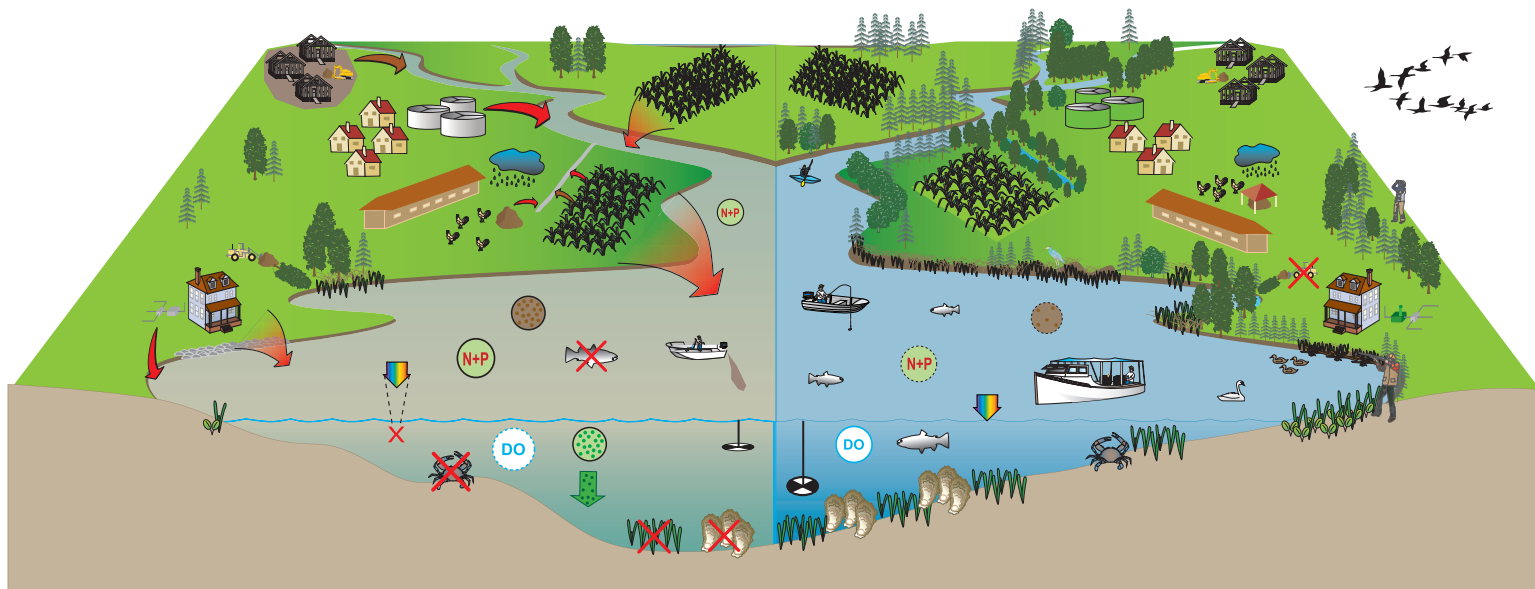


Figure 3: Creekwatchers and Chesapeake Bay Program monitoring stations used in the 2010 report card.

- Lower Nanticoke
- Headwaters
- Marshyhope Creek
- Fishing Bay Watershed
- Upper Nanticoke
- Broad Creek
- Lower Creeks
- ▲ Chesapeake Bay Program monitoring sites

MAKE CHOICES FOR A HEALTHIER NANTICOKE



Pollutants

● **Sediments**, or soil pollution, can enter surface waters from eroding stream banks and lands with decreased plant cover, such as some agricultural acreage 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.



Figure 4: Agricultural buffer strips can reduce sediment and nutrient runoff and improve the health of the Nanticoke, as seen at a farm participating in the NWA's agriculture buffer project.

Actions for a Healthier Nanticoke

1. Install **rain barrels** to reduce the amount of water needed for gardens and lawns by storing rainwater. Rain barrels also store water, which prevents excess stormwater runoff during heavy rain events.
2. Plant **rain gardens** at your home, school, or other public locations. 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%.
3. Upgrade your septic system to one that includes advanced nutrient reduction.  **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.
4. Volunteer in your community in long-term positions or for short-term projects, such as buffer strip plantings or installation of living shorelines.  **Buffer strips** consist of strips of trees and other vegetation that improve water quality in waterways by filtering pollutants, reducing flooding and erosion, and providing shade to shallow water habitats. (See Figure 4 at left for an example of an agricultural buffer.)  **Living Shorelines** protect property from erosion and provide habitat for fish, birds and other wildlife. They also protect water quality by trapping excess nutrients and sediment.
5. Plant  **cover crops**. 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.
6. Protect and manage  **forests**. Contiguous forest buffers in critical areas, in particular, provide key habitat for wildlife and birds. They also absorb large amounts of nutrients. Native trees are uniquely adapted to local climate, which reduces dependency on external watering and fertilization.

DEDICATION AND SERVICE: THE NANTICOKE'S CREEKWATCHERS AND PROGRAM SUPPORTERS

Successful Creekwatching requires a team. During the 2010 season, 38 Creekwatchers monitored 38 different sites throughout the Nanticoke watershed and in the Fishing Bay watershed. Citizen scientists included members from community groups, including DCPG and the Nanticoke Watershed Preservation Group. Every other week from April through November, Creekwatchers strap on their sandals (or boots) and obtain water samples and measurements at their assigned sites. Without dedicated Creekwatchers, the amount and quality of data obtained about the health of the river would be greatly reduced, thereby limiting public access to information about the waterways in their communities.

Envirocorp Labs Inc. of Harrington, Delaware, generously supports the Creekwatchers program through lab work each sampling period. After Creekwatchers drop off water samples, Envirocorp processes them and provides us with the results. Without Envirocorp's support, the program would be unable to share crucial information about nutrients and bacteria in local waterways. Technical advisors from the Delaware Division of Natural Resources and Environmental Control, Maryland's Department of Natural Resources, Salisbury University, EcoCheck, and the University of Maryland Center for Environmental Science provide critical feedback about the program and its protocol. Finally, funding from the Chesapeake Bay Trust and DNREC helped pay for the report card production, program management, and equipment.

Thanks to all of our team members!

Photos from left to right: Creekwatchers celebrate the end of the 2010 season; a family enjoys fish printing at the Shad Planking Event in Vienna; Creekwatcher Rob Hutton measures water depth in Seaford.



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, ensuring access and effective conservation for the entire Nanticoke Watershed.
- Developing a watershed management plan and an updated river atlas 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.

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.nanticokeriver.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.
- Say hello at our office or at outreach events. Our office is located in Vienna, Maryland, and is open from 9:00 am-4:00 pm, Mondays through Fridays.

For more information, visit www.nanticokeriver.org.

The Nanticoke Watershed Alliance would like to thank the following organizations for their contributions and support of the Creekwatchers program during the 2010 season:



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