2021 NANTICO KERVER REPORTORIO

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Nanticoke Creekwatchers returned to a normal routine in 2021. Unfortunately, none of the program's six subwatersheds saw improvements. The Lower Nanticoke and Marshyhope Creek slipped to a C and a C+, respectively, as chlorophyll *a* grades steeply declined in both of these segments. Although it did not improve, the Delaware Headwaters retained a B, the only segment to score above a C+.



Figure 1 (Above): Grades for the Nanticoke River, its creeks, and Fishing Bay in 2021. The map also includes trends, indicating if grades improved, declined, or were flat when compared with 2020 grades. Figure 2 (Above-right): Sites and segments included in the 2021 Report Card.

Indicators and Grades

WHAT WE MEASURE AND WHAT THEY MEAN

TOTAL NITROGEN

Nitrogen is a naturally-occurring element that is required for plants to grow and is commonly found in residential and agricultural fertilizers. Excessive amounts in waterways fuel algal blooms and cause low dissolved oxygen and fish kills. Excessive nitrates (a form of nitrogen) in drinking water also cause health issues.

TOTAL PHOSPHORUS

Phosphorus is the other major nutrient required for plant growth; excessive amounts create algal blooms. While nitrogen greens plants, phosphorus encourages plants to flower and bloom. Phosphorus binds with soil and often increases in waterways following heavy rain events, especially where buffers are not present.

CHLOROPHYLL A (TIDAL)

Chlorophyll a measures the amount of algae present in the water. While algae is naturally-occurring, excessive algal blooms create dense mats, preventing light from reaching waterway bottoms, along with other water quality issues.



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WATER CLARITY (TIDAL)

Water clarity is the measurement of how far light penetrates the water column. Aquatic grasses cannot grow without light, and murky waters make it difficult for freshwater mussels and saltwater oysters to grow.

CONDUCTIVITY (NONTIDAL)

Conductivity measures the concentration of ions in nontidal waterways. (At tidal sites, Creekwatchers collect salinity data.) As compounds enter waterways through runoff, they break down into smaller parts. Excessive ion concentrations can decrease pH levels, making waterways more acidic and injuring plants and animals.

DISSOLVED OXYGEN

Dissolved oxygen tells us how much oxygen is present in the water. Like us, aquatic critters need oxygen in order to live. When algal blooms begin to decompose, dissolved oxygen decreases.

HOW WE GRADE AND THE GRADING SCALE

GRADING SYSTEM

Similar to many water quality monitoring programs in the Chesapeake Bay region, Nanticoke Watershed Alliance uses the Mid-Atlantic Tributary Assessment Coalition's (MTAC) Tidal and Nontidal Protocols in order to assess the health of our waterways. You can view the protocol at <u>ian.umces.edu</u>.

FROM A TO F

Each region receives a grade for each parameter. This grade is an average of all sites within each region. (Conductivity is not measured in the Upper Nanticoke or Lower Nanticoke regions since all sites in those regions are tidal, and conductivity is a nontidal measurement.) Grades range from A to F, as shown below.



The River

OVERALL, THE RIVER SCORED A C, DECLINING FROM A C+ IN 2020.

The RIVER grade is comprised of two segments: Upper Nanticoke and Lower Nanticoke. The UPPER NANTICOKE is a much smaller segment and runs from the Seaford Boat Ramp (DE) to Sharptown's Cherry Beach (MD). The LOWER NANTICOKE incorporates the middle and lower sections of the river, covering the area from Riverton to Nanticoke, MD. The Upper Nanticoke is tidal freshwater (less than 0.5 parts per thousand or ppt), while salinity levels in the lower Nanticoke vary from oligohaline (0.5 - 5.0 ppt) to mesohaline (5 - 18 ppt).



RIVER HIGHLIGHTS

- The Lower Nanticoke declined in all parameters except for Total Phosphorus, which remained flat. The Lower Nanticoke's overall grade dropped from 2020's C+ to a C in 2021.
- The Lower Nanticoke's chlorophyll a score worsened most, dropping two letter grades from a C+ to a C-.
- The Upper Nanticoke was generally flat. Water clarity made a slight improvement from a D+ to a C-.

Figure 3 (above): The UPPER NANTICOKE and LOWER NANTICOKE sites.

The River



In the Upper Nanticoke and Lower Nanticoke segments, CHLOROPHYLL A grades continued a downward spiral. Although the Upper Nanticoke was flat when compared to 2020 grades, the segment once again scored a D+, tying Broad Creek in the CREEKS region for the worst score in this parameter. In 2021, the Lower Nanticoke was not far behind, scoring only a C-. This is the lowest chlorophyll *a* grade the Lower Nanticoke has received since the Creekwatchers Program started collecting chlorophyll *a* samples

TOTAL NITROGEN worsened in the Lower Nanticoke, although the program collected far fewer samples in 2020 than in 2021, so that should be taken into consideration. (When compared to 2019 results, the Lower Nanticoke was flat, scoring a C- both years.) The Upper Nanticoke scored an F in 2021, matching previous years. TOTAL PHOSPHORUS grades were flat in both segments.

WATER CLARITY modestly improved in the Upper Nanticoke and remained flat in the Lower Nanticoke. DISSOLVED OXYGEN remained mostly flat, although the Lower Nanticoke climbed back to an A+.

Excessive nutrients continue to plague the length of the river, as algal blooms reduce the health and enjoyment of the river (and other waterways) during warm season months. Reducing total nitrogen and total phosphorus should be a major goal along the length of the river. Retaining forested buffers along waterways, protecting wetlands, reducing lawn and fertilizer applications, and inspecting and pumping out septic systems every three years are all steps we can take to improve the Nanticoke River's health.

The Creeks

OVERALL, THE CREEKS SCORED A C+ FOR THE THIRD CONSECUTIVE YEAR.

The Creeks region is made up of four different segments: MARSHYHOPE CREEK, DELAWARE HEADWATERS, BROAD CREEK, and LOWER CREEKS. Most of the sites within the Creeks region are tidal freshwater or nontidal. The Lower Creeks segment contains several brackish sites.

Results for this region were mixed. DELAWARE HEADWATERS retained its crown as the highest scoring segment, keeping its B.



MARSHYHOPE CREEK dropped to a C+, largely due to the dramatic drop in the chlorophyll *a* grade from a B+ in 2020 to a C in 2021. The other two segments, Broad Creek and Lower Creeks, both scored Cs, as they had in 2019 and in 2020.

CREEK HIGHLIGHTS

- Chlorophyll a was worse in all segments except for DE Headwaters. The Marshyhope Creek worsened greatly, dropping from a B+ to a C.
- Total Phosphorus improved in all segments.
- Total Nitrogen worsened in all segments, with the Lower Creeks dropping most dramatically from a C- in 2020 to a D in 2021. Lower Creeks had not scored a D in Total Nitrogen since 2018.
- Water clarity slightly improved in all segments except for DE Headwaters, which dropped from a B to a B-.

The Creeks



Figures 7-10 (top): BROAD CREEK, DELAWARE HEADWATERS, LOWER CREEKS, AND MARSHYHOPE CREEK 2021 grades and indicator healths. See Page 3 for more info about indicators and grades.

Fishing Bay

FISHING BAY SCORES A D+, ITS CONSISTENT GRADE SINCE 2018.

Fishing Bay neighbors the Nanticoke River. Along with the Wicomico River, they empty into the Tangier Sound. Due to this influence, Nanticoke Creekwatchers monitor four sites in Fishing Bay, and we include Fishing Bay in the Nanticoke River Report Card. Unfortunately, this will likely be the final year that we include Fishing Bay in our report card due to lack of data collection in 2022.

Once again, Fishing Bay scored a D+ overall. The region was flat when compared to 2020, with no movement in any of the parameters.

FIGURE 12

A



Figures 11 and 12 (above): Fishing Bay sites and Fishing Bay's 2021 grades.

Thanks!

Nanticoke Creekwatchers make the difference! Thanks to our 2021 Creekwatchers for sharing their time and energy and for helping us track the health of our local waterways.

Mike Allera Amy Ash **Courtney Atkinson Richard Ball** Kate Bullock Erin Burgee Susan Burgee Amber Cockey Elijah Cockey Guinevere Cockey Isabel Cockey **Robin Cockey Cindy Cowall David Cowall** Brittany DiSalvo Charles Emery

Jessica Gaull Max Horan Gordon Hill Tedi Kohinke Ed Kordell Jeff Malcolm Kim McGurk Karan Ortiz **Kathy Porter** Christian Raubenstine Diane Raubenstine Bonnie Rose Dave Rose Julia Stoshak **Gary Tompkins** Howard Vanderslice

Robin Weber

Thanks also to the following supporters!

Delaware Department of Natural Resources and Environmental Control

Chesapeake Monitoring Cooperative

Landowner partners

Want to spend more time outdoors, learn how to use water quality monitoring equipment, and meet new friends? We couldn't do our important work without our volunteers. <u>Visit NanticokeRiver.org</u> or our social media accounts to view current volunteer opportunities, as well as special events and online and in-person programs, or <u>contact</u> <u>BethWasden@NanticokeRiver.org</u>.



Check out Nanticoke Creekwatchers data at:
The Chesapeake Bay Program's Water Quality database | <u>data.ChesapeakeBay.net/WaterQuality</u>.
Select "Non-traditional/Volunteer-based Partner Data" in the "Data Stream" Selection.

• The Chesapeake Data Explorer site | <u>cmc.vims.edu</u>. Use the map to view site data.

About the NWA

WE CAN ALL MAKE A DIFFERENCE! LEARN MORE ABOUT HOW TO HELP IMPROVE THE HEALTH OF OUR RIVER, CREEKS, AND LOCAL WATERWAYS BY VISITING NANTICOKERIVER.ORG AND FOLLOWING US ON SOCIAL MEDIA.



Visit NanticokeRiver.org by scanning this code with your device's camera.





The Nanticoke Watershed Alliance would like to thank the following organizations for their contributions and support of the Creekwatchers program during the 2021 season:





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