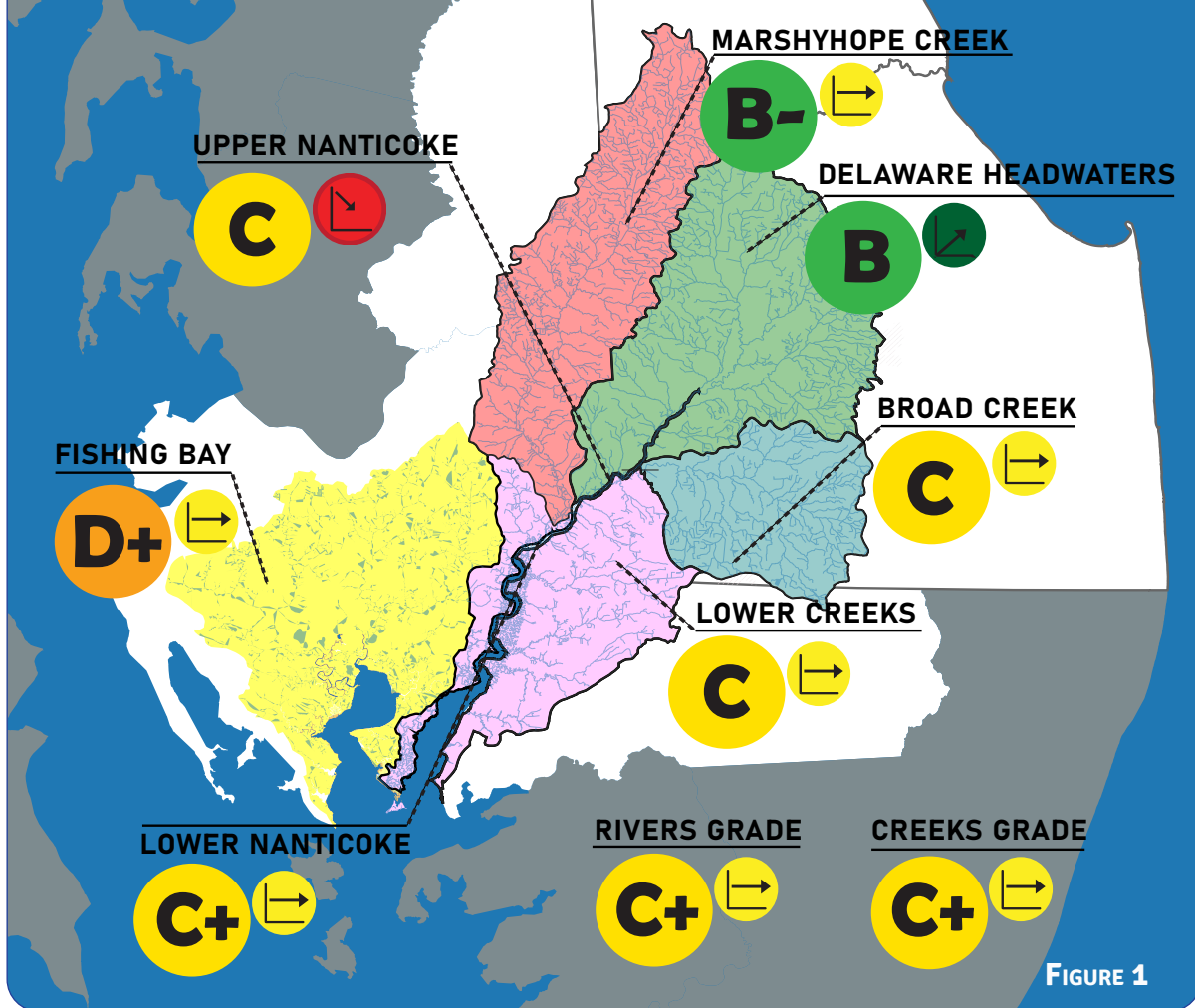




2020 NANTICOKE RIVER REPORT CARD

www.NanticokeRiver.org

2020 Nanticoke River and Fishing Bay Grades



Nanticoke Creekwatchers was not immune to COVID-19's influence. While Creekwatchers took an equal number of field measurements as in a normal season, the chlorophyll *a* spring season was shorter than normal. More critically, Creekwatchers only collected nutrients seven times during the season, as opposed to 17, and they started collecting nutrients in late May instead of late March. The reduced number of data must be considered in relation to total phosphorus and nitrogen grades.

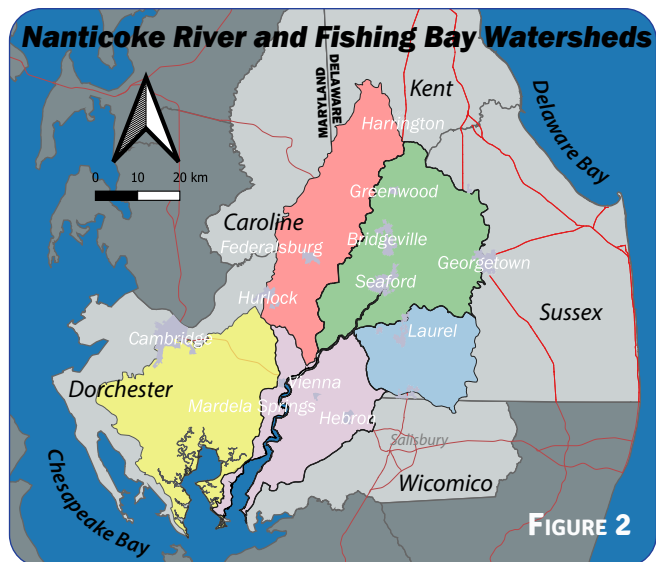


Figure 1 (Above): The map shows the 2020 grades for the Nanticoke River, its creeks, and Fishing Bay. The map also includes trends, indicating if grades improved, declined, or were flat when compared with 2019 grades. Figure 2 (Above-right) shows an area map.

Indicators and Grades

WHAT WE MEASURE AND WHAT THEY MEAN

TN

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.

TP

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.

CA

CHLOROPHYLL A

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.

WATER CLARITY

WC

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.

DISSOLVED OXYGEN

DO

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.

CONDUCTIVITY (NONTIDAL)

CO

Conductivity measures the concentration of ions in nontidal waterways. 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.

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 ian.umces.edu.

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.

A

B

C

D

F

EXCELLENT

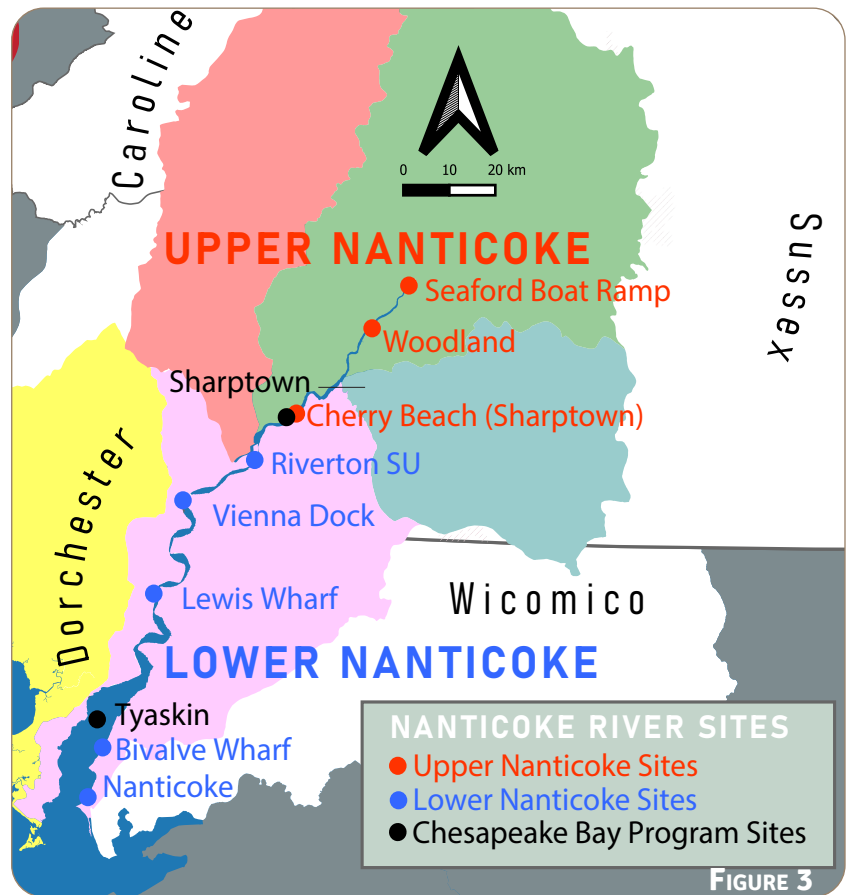
MODERATE

POOR

The River

OVERALL, THE RIVER SCORED A C+ IN 2020, MATCHING ITS GRADE IN 2019.

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).



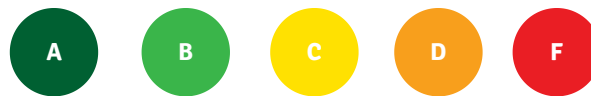
River Highlights

- Water clarity worsened in the Upper Nanticoke and remained flat in the Lower Nanticoke.
- Total phosphorus greatly worsened in both areas.*
- Total nitrogen greatly improved in the Lower Nanticoke, while worsening in the Upper Nanticoke.*
- The Upper Nanticoke declined from 2019's C+ to a C in 2020.

*We collected far fewer nutrient samples in 2020 than in normal years, which should be taken into account when examining nutrient results.

Figure 3 (above): The map shows the sites that comprise the UPPER NANTICOKE and LOWER NANTICOKE segments.

The River



In the Upper Nanticoke and Lower Nanticoke segments, **CHLOROPHYLL *a*** grades remained flat in the Upper Nanticoke and slightly improved in the Lower Nanticoke. Notably, for the first time since the Creekwatchers Program has been collecting chlorophyll *a* samples, the Upper Nanticoke scored worse than Broad Creek, which typically has the worst chlorophyll *a* grade of all six segments. (In 2019, these two segments scored the same grade.) Note that Nanticoke Creekwatchers took two fewer chlorophyll *a* samples in the spring season than in normal years.

TOTAL NITROGEN worsened in the Upper Nanticoke and slightly improved in the Lower Nanticoke. **TOTAL PHOSPHORUS** grades worsened in both segments when compared with 2019 grades. However, Nanticoke Creekwatchers collected only 7 nutrient samples (compared with 17 taken in a normal season), so this reduced data should be taken into consideration.

WATER CLARITY slightly declined in the Upper Nanticoke and remained flat in the Lower Nanticoke. The Lower Nanticoke improved to a D and the Upper Nanticoke received a C-. **DISSOLVED OXYGEN** remained mostly flat, although the Lower Nanticoke dropped from an A+ to an A.

Excessive nutrients continue to plague the length of the river. Reducing total nitrogen and total phosphorus should be a major goal, as excessive nutrients increase algal blooms, which bring a host of problems from reducing recreational enjoyment of the river to impairing the river's ability to support aquatic species. **The Upper Nanticoke continues to be a prime area for water quality improvements, especially since the river northeast of Seaford boasts some of the highest water quality conditions and most pristine habitat in the entire watershed.**

Figures 4 & 5 (above): The graphic shows the UPPER NANTICOKE and LOWER NANTICOKE'S overall grades and indicator health. See Page 3 for more about indicators and grades.

The Creeks

OVERALL, THE CREEKS SCORED A C+ IN 2020, MATCHING THE 2019 GRADE.

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 contains several brackish sites.

Results for this region were mixed. **DELAWARE HEADWATERS** improved from 2019's B- to a B in 2020, while **MARSHYHOPE CREEK** held steady at a B-. The other two segments, Broad Creek and Lower Creeks, both scored Cs, as they had in 2019.

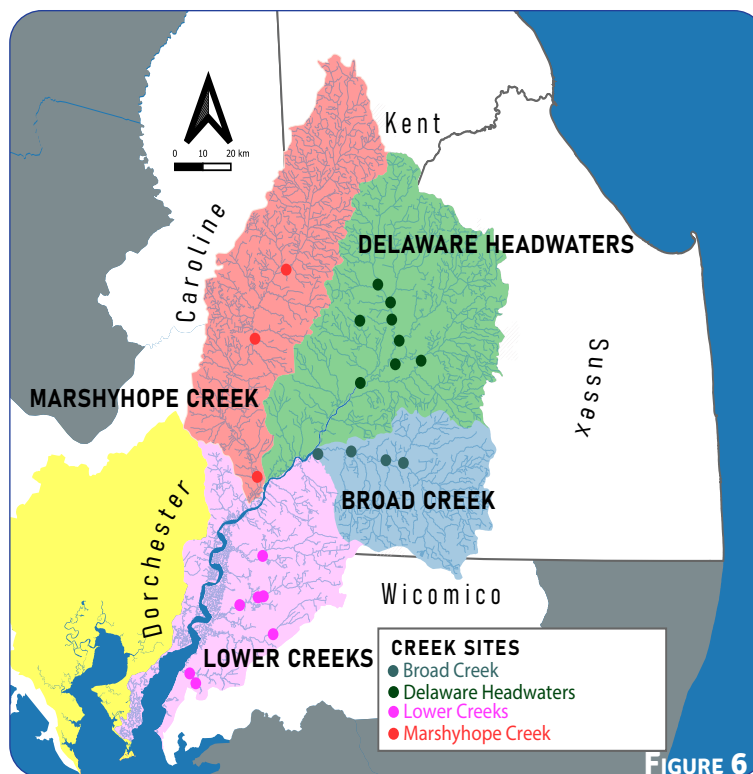


FIGURE 6

Likely due to the reduced number of samples taken, both Total Phosphorus and Total Nitrogen grades were broadly worse or improved, respectively. Both **DELAWARE HEADWATERS AND MARSHYHOPE CREEK** improved in Total Nitrogen, but the limited number of samples taken in 2020 must be taken into consideration when examining these grades. All segments scored worse Total Phosphorus grades, with **DELAWARE HEADWATERS** scoring the highest, a B.

Creek Highlights

- All segments improved in chlorophyll *a*.
- All segments worsened in total phosphorus.
- Only Broad Creek scored an F in total nitrogen in 2020; DE Headwaters and Marshyhope Creek improved to a D and a D-, respectively, although these changes were likely due to the reduced number of samples.

Figure 6 (above): The map shows the sites that comprise the CREEKS segments.

The Creeks

FIGURE 7



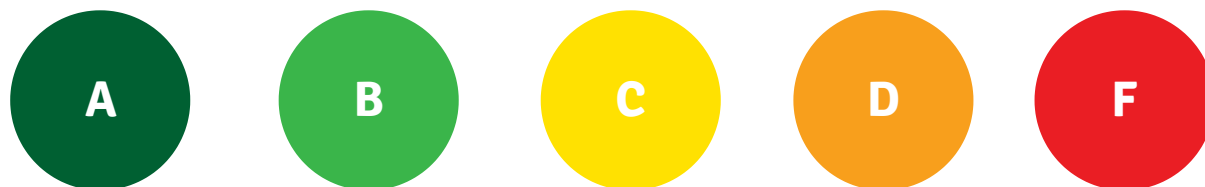
FIGURE 8



FIGURE 9



FIGURE 10



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



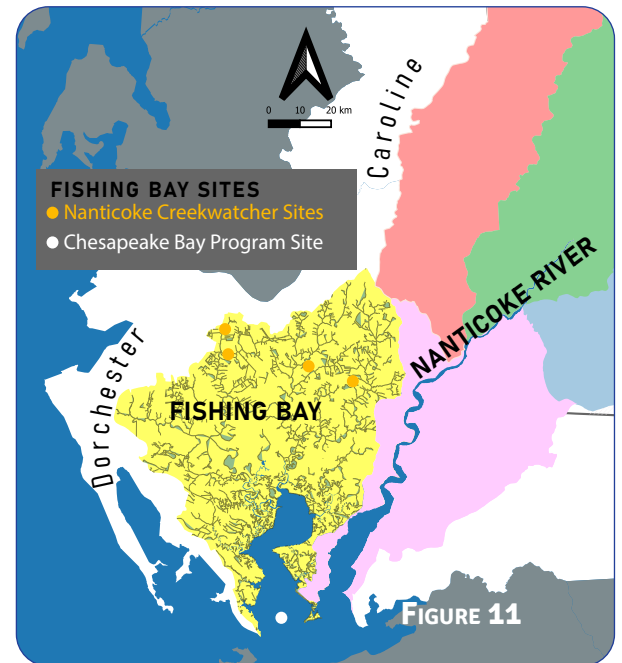
Fishing Bay

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.

Unlike other Creekwatchers, the volunteers who monitor the Fishing Bay sites collected the same number of nutrient samples in 2020 as in 2019, so the data are directly comparable.

Once again, Fishing Bay scored a D+ overall. **Total Phosphorus worsened, with Fishing Bay earning an F in 2020. Otherwise, the region's parameter grades were very similar to 2019 grades.**



Fishing Bay

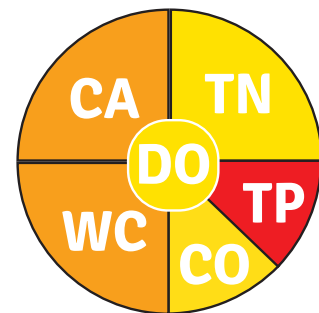


FIGURE 12



Figures 11 and 12 (above): A map shows Fishing Bay's location, and a graphic shows its grade and indicator health. See page 3 for more info about indicators and grades.

Thanks!

The citizen scientists who collect water samples, take measurements in waterways, and make observations at their adopted sites are the heart of this program. During the uncertainty of 2020, we could count on dedicated and motivated Creekwatchers, and we especially appreciate their efforts during the COVID pandemic. Thanks to our Creekwatchers!

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Kathy Porter
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Dave Rose
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Nan Zamorski
Rick Zamorski

Thanks also to the following supporters!

Delaware Department of
Natural Resources and
Environmental Control

Chesapeake Monitoring
Cooperative

Private landowners who
allow us to sample

Volunteers make our Creekwatchers Program happen!
Want to join the team? [Visit NanticokeRiver.org](https://NanticokeRiver.org) to view
current volunteer opportunities, as well as special events
and online and in-person programs.



Nanticoke Creekwatchers data can now be downloaded from:

- the Chesapeake Bay Program's Water Quality database | data.ChesapeakeBay.net/WaterQuality.
Select "Non-traditional/Volunteer-based Partner Data" in the "Data Stream" Selection.
- the Chesapeake Data Explorer site | cmc.vims.edu. 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.



The Nanticoke Watershed Alliance would like to thank the following organizations for their contributions and support of the Creekwatchers program during the 2020 season:



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