



# 2019 NANTICOKE RIVER REPORT CARD

[www.NanticokeRiver.org](http://www.NanticokeRiver.org)



# Summary and Trends

Continued impacts from 2018's record-breaking rainfall influenced grades in 2019. The River scored a C+, the same grade as in 2018, while the Creeks declined to a C+. Fishing Bay scored a D+, matching its 2018 grade. In particular, nutrients that entered waterways during 2018's rain events caused widespread algal blooms throughout most of the season.

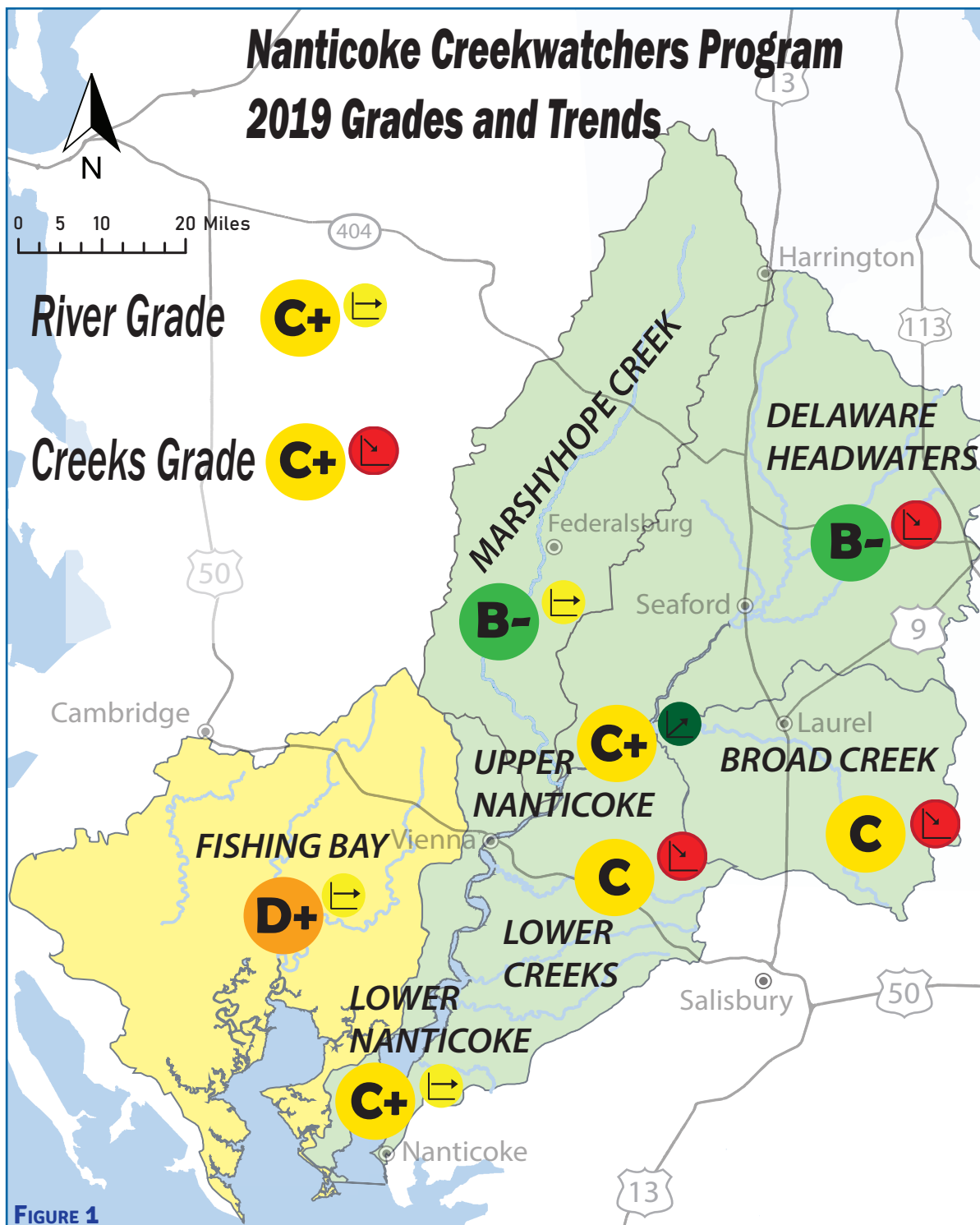


Figure 1 (Above): The map shows the 2019 grades for the Nanticoke River, its creeks, and Fishing Bay. The map also includes trends, indicating if grades improved, declined, or were flat when compared with 2018 grades.

# 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](http://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

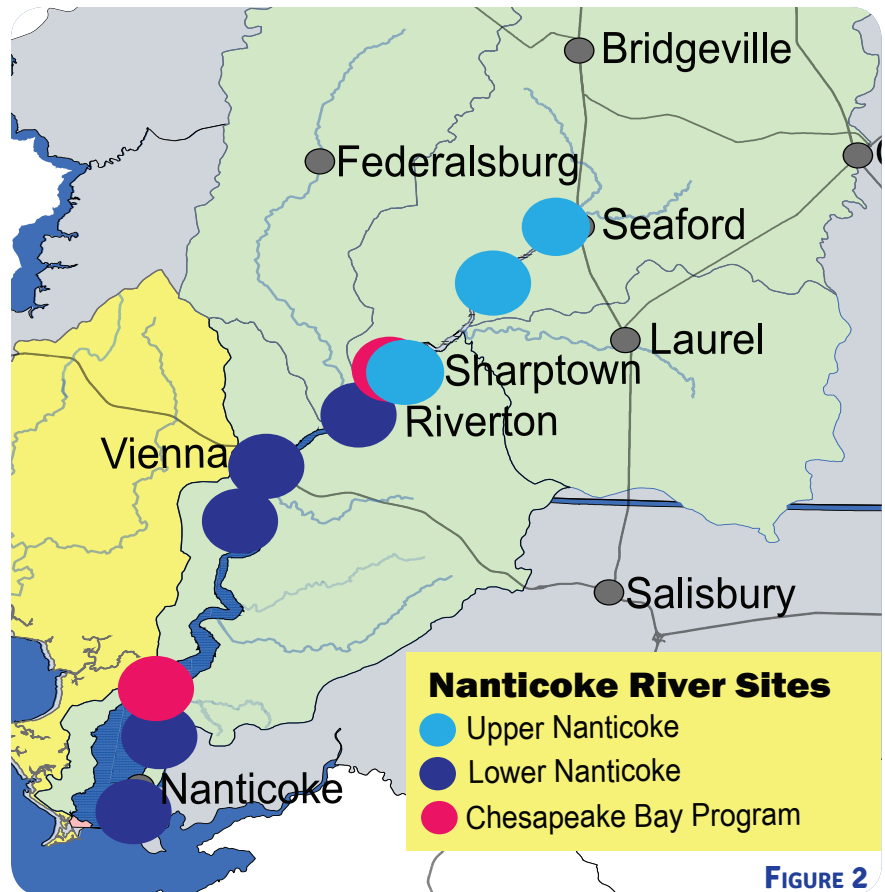
MODERATE

POOR

# The River

**OVERALL, THE RIVER SCORED A C+ IN 2019, MATCHING ITS GRADE IN 2018.**

From Seaford, DE, to Sharptown, MD, the **UPPER NANTICOKE** makes up a much smaller area than the **LOWER NANTICOKE**, which runs 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). The early part of the year experienced lower than average salinity readings due to the heavy rainfall experienced in 2018.



As a hot and dry summer set in, salinity levels increased, exceeding the typical average in late summer and autumn. This extreme seesawing of conditions broadly impacted parameters. Although we do not include biological assessments in the report card, the lack of salinity (or higher salinity than normal) also impacted fisheries habitat, including the disruption of oyster-growing in the lower Nanticoke. Invasive fish like northern snakeheads are also able to expand their territory when brackish waters turn to freshwater for periods of time.

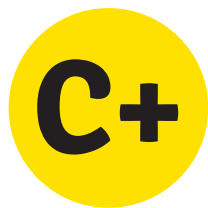
## River Highlights

- Water clarity and total nitrogen improved in both segments.
- Chlorophyll a worsened in both segments.

*Figure 2 (above): The map shows the sites that comprise the UPPER NANTICOKE and LOWER NANTICOKE segments.*



# The River



Upper  
Nanticoke

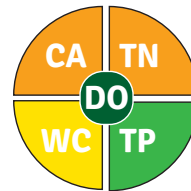


FIGURE 3



Lower  
Nanticoke

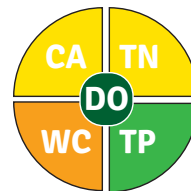


FIGURE 4



In the Upper Nanticoke and Lower Nanticoke segments, **CHLOROPHYLL A** grades greatly worsened in 2019. While heavy rainfalls continually flushed waterways in 2018, those same rain events introduced excessive amounts of nutrients, including phosphorus and nitrogen. The dry, hot weather during the late spring and summer of 2019 provided perfect growing conditions for steady algal blooms. The Upper Nanticoke region matched Broad Creek (see the Creeks on pages 6-7) with the worst chlorophyll a score—a D. The Lower Nanticoke was a full grade above, scoring a C.

Although **TOTAL NITROGEN** grades vastly improved when compared with 2018, **NITROGEN** remains excessive throughout the river. Both the Upper Nanticoke and the Lower Nanticoke segments improved in 2019, with the Upper Nanticoke scoring a D+ and the Lower Nanticoke scoring a C-. **TOTAL PHOSPHORUS** grades were mixed in 2019, with the Lower Nanticoke dropping to a B- and the Upper Nanticoke improving to a B. In 2019, **WATER CLARITY** slightly improved in both river regions. The Lower Nanticoke improved to a D and the Upper Nanticoke received a C-. Generally a strong indicator in the Nanticoke River, **DISSOLVED OXYGEN** slightly improved in both river segments in 2019, with both segments scoring A+s.

Until nutrients can be reduced in the mainstem of the river, algal blooms will continue to impair the river's health. Beyond causing potential health risks to pets and humans, algal blooms also reduce dissolved oxygen as they decay. Further, they reduce water clarity, creating murky water that makes it impossible for aquatic grasses, which have not been seen in the Upper Nanticoke and Lower Nanticoke regions in decades, to establish footholds. **Reduction of nutrients entering our river should be a major priority for us all.**

*Figures 3 & 4 (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.*

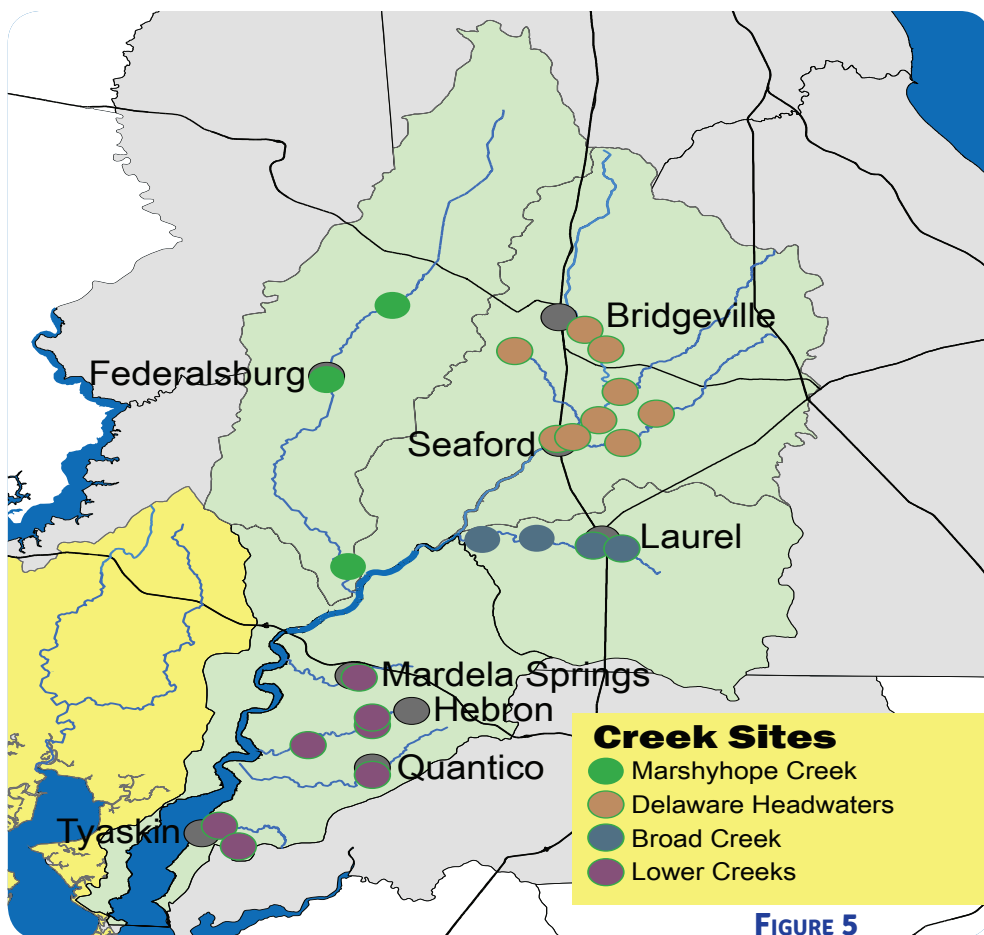
# The Creeks

**OVERALL, THE CREEKS SCORED A C+ IN 2019, DROPPING FROM A B- IN 2018.**

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. The **LOWER CREEKS** showed a slight improvement. **MARSHYHOPE CREEK** was flat. Both the **DELAWARE**

**HEADWATERS** and **BROAD CREEK** showed declines when compared with 2018. All creeks segments except for **LOWER CREEKS** scored Fs in **TOTAL NITROGEN**, continuing a long-term trend. **TOTAL PHOSPHORUS** was mostly unchanged, except for worsening in the Lower Creeks. As was true for the River, **CHLOROPHYLL A** grades declined across all four creek segments when compared with 2018 grades. **After several years of scoring C+, for the first time, Broad Creek dropped to a C overall.**



**FIGURE 5**

## Creek Highlights

- Lower Creeks improved in nitrogen but worsened in phosphorus.
- All segments received worse grades in chlorophyll a.
- Nitrogen continues to be highly excessive in most creeks segments.

*Figure 5 (above): The map shows the sites that comprise the CREEKS segments.*



# The Creeks

FIGURE 8



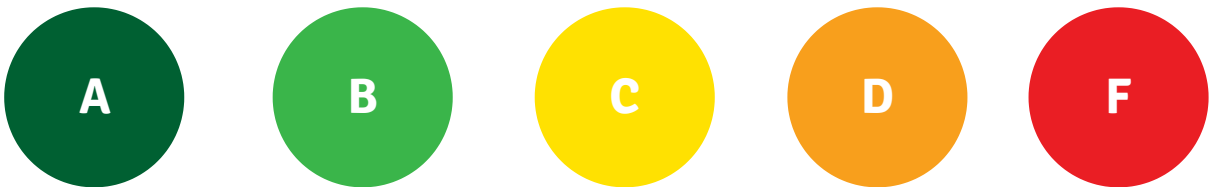
FIGURE 9



FIGURE 10



FIGURE 11



Figures 6-9 (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.



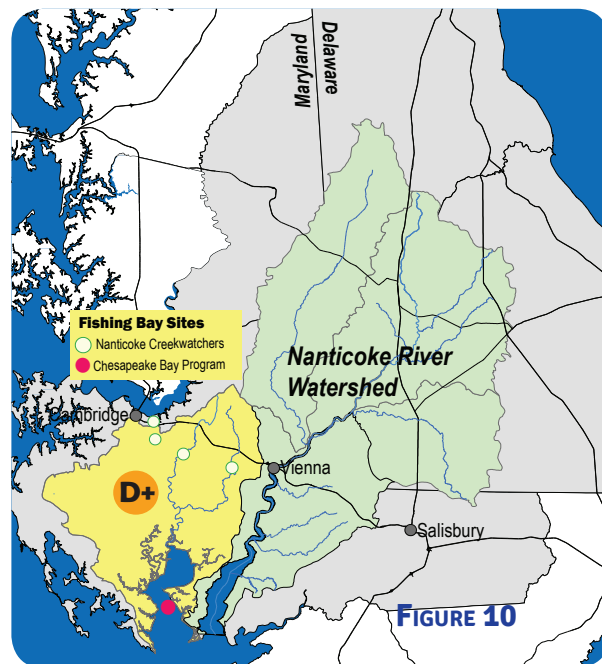
# Fishing Bay

## FISHING BAY REMAINED FLAT, RETAINING A D+.

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, Fishing Bay has long shown widespread water quality issues, and this trend continued in 2019.

**During the 2019 season, Fishing Bay scored a D+ overall, with DISSOLVED OXYGEN and TOTAL NITROGEN being the only two indicators that scored higher than a D; both of these indicators scored Cs and improved when compared with 2018's grades.**



## Fishing Bay

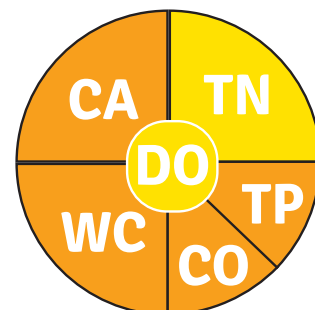
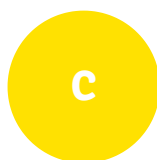


FIGURE 11



*Figures 10 and 11 (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.*



# Become a Citizen Scientist!



Nanticoke Watershed Alliance relies on citizen scientists to gather data at Nanticoke Creekwatchers sites each season. Whether volunteering for a single season or for ten, your investment in our community's waterways is vital, as Creekwatchers drive our program's success. Although we hold primary training in March, we continue to train and certify new volunteers throughout the season.

Minors at least 13 years of age are welcome to participate while volunteering with a parent or guardian.

Visit [www.NanticokeRiver.org](http://www.NanticokeRiver.org) to view sites that currently need to be adopted, or contact [BethWasden@NanticokeRiver.org](mailto:BethWasden@NanticokeRiver.org) to learn more about the program or to sign up!

New in 2020, the Nanticoke River Grass Watchers Program is a perfect opportunity for kayakers and other adventurers who enjoy exploring the Nanticoke River and its creeks, as well as the many ponds in the area. It's also a great option for those unable to commit to the schedule and rigors of the Nanticoke Creekwatchers Program.

Through this program, volunteers seek and identify river grasses (or Submerged Aquatic Vegetation [SAV]) in waterways and report findings either through a smartphone app or a website. Volunteers who wish to gather higher quality data can be field trained and certified in Tier 2 protocol. Tier 2 volunteers are able to reserve and use field kits.

Contact [BethWasden@NanticokeRiver.org](mailto:BethWasden@NanticokeRiver.org) to sign up, or visit [www.NanticokeRiver.org/SAV/](http://www.NanticokeRiver.org/SAV/).

## HELP US FIND RIVER GRASSES

While fishing  
or paddling  
or going for a walk  
or just exploring.

[WWW.NANTICOKERIVER.ORG/](http://WWW.NANTICOKERIVER.ORG/)  
SAV

# 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. Nanticoke Creekwatchers have been collecting data since 2008. Thanks to everyone who assisted in 2019!

Mike Allera  
Richard Ball  
Brett Connor  
Rebecca Connor  
Cindy Cowall  
David Cowall  
Colden Fees  
David Fees  
Debbie Fees  
Jeff Hampton  
Rebecca Hampton  
Gordon Hill

James Johnson  
Nykeria Johnson  
Shanekia Johnson  
John King  
Tedi Kohinke  
Greg Meyer  
Shayne Meyer  
Bonnie Rose  
Dave Rose  
Bob Sellers  
Julia Stoshak  
Howard Vanderslice

Nan Zamorski  
Rick Zamorski

*Thanks also to our incredible, long-term supporters!*

*Delaware Department of Natural Resources and Environmental Control*

*Envirocorp Lab Inc.*

## DOWNLOAD OUR DATA!

Nanticoke Creekwatchers data from 2017 through 2019 may be viewed and downloaded from the Chesapeake Data Explorer, an online database of nontraditional water quality data throughout the Chesapeake Bay region. Visit [cmc.vims.edu](http://cmc.vims.edu) to view or download Nanticoke Creekwatchers data and to explore the many Bay volunteer monitoring programs and their datasets. Thanks to the Chesapeake Monitoring Cooperative for providing this service.

### Quick Plots

Dissolved oxygen mg/L | Enterococcus CFU | Water temperature deg C | Bacteria (E.Coli) MPN |

### Water Quality Parameters

Export Plot

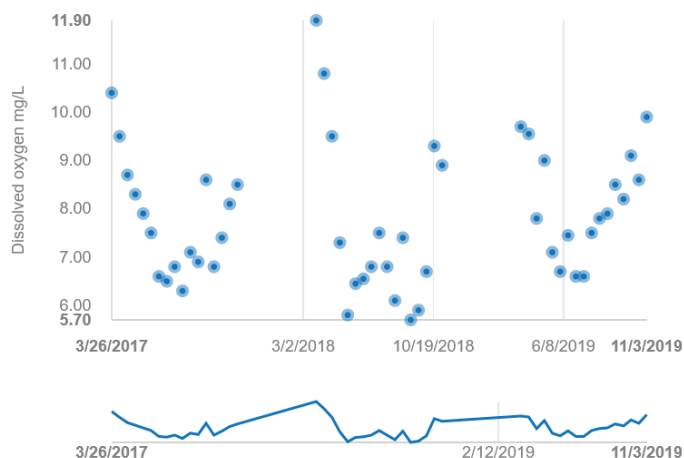
Download Data

Dissolved oxygen mg/L

Depth (m)

0.5

Values displayed on graph are daily means of duplicate samples.



Please note that parameters are consolidated in the plot where sampling methodologies may be different. Please click the "Show

+ Show Details

**FIGURE 12**

*Figure 12 (above): A screenshot displays a plot of total nitrogen data collected at the GRBR1 (Coverdale Rd.) site from 2017-2019 at the Chesapeake Data Explorer site.*



# Choose a Healthier Nanticoke!

The Nanticoke Watershed Alliance can help you plant for pollinators, protect our waterways, beautify ditches, and provide valuable habitat and shade for aquatic critters in pond settings. We have a number of low-cost programs for homeowners, businesses, and churches in the Delaware portion of the Nanticoke River watershed and would love to talk to interested organizations and homeowners in the Maryland portion of our watershed. Let's work together to nurture a healthier Nanticoke!





# About the NWA

THE NANTICOKE WATERSHED ALLIANCE WORKS WITH CHURCHES, FARMERS, HOMEOWNERS, BUSINESSES, GOVERNMENT AGENCIES, AND OTHER NONPROFIT ORGANIZATIONS THROUGHOUT THE NANTICOKE RIVER WATERSHED TO HELP CREATE A HEALTHIER PLACE TO WORK, LIVE, AND PLAY.



LET'S GET STARTED! VISIT [NANTICOKERIVER.ORG](http://NANTICOKERIVER.ORG) TO:



DONATE.



Sign up to  
**VOLUNTEER** for a day  
or long-term.



CONTACT US to arrange  
a site visit.

JOIN our mailing list.

DISCOVER programs and  
special events.

The Nanticoke Watershed Alliance would like to thank the following organizations for their contributions and support of the Creekwatchers program during the 2019 season:



Project Supervisor/Author  
Beth Wasden

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