Midshore Rivers

Report Card 2016

EXECUTIVE SUMMARY

Midshore Riverkeeper Conservancy (MRC) is pleased to release our seventh annual River Report Card, produced from data collected by our scientists and Riverkeepers who patrol and test our rivers during the sampling season at least weekly, and complemented by data assembled by approximately 50 volunteer Midshore Creekwatchers who, pursuant to MRC's protocols and under MRC's supervision, sample from over 115 strategic sites from May to October.

In this regard, MRC's River Report Card is based on the most comprehensive testing data available for each of our rivers.

MRC's data is utilized by numerous government and scientific organizations such as the National Oceanic and Atmospheric Administration (NOAA), the Virginia Institute of Marine Science (VIMS), the Army Corps of Engineers, and the University of Maryland Center for Environmental Science (UMCES).

Highlights from 2016:

- *Water clarity for the second straight year was the best it has been in decades;*
- *Anecdotal evidence suggests that subaquatic grasses for the second straight year have shown a marked rebound;*
- *The summer showed a resurgence in blue crab populations;*
- *Significant challenges remain in reducing nitrogen and phosphorus levels that continue at unacceptable levels.*

Once again, MRC used its data at numerous levels: identifying and curtailing pollution emanating from industrial sources; assisting NOAA and the Army Corps of Engineers in their oyster restoration efforts in our rivers; educating over 1,000 students and teachers in our four-county area; identifying strategic locations for restoration projects and obtaining the funding to implement those projects.

Through these types of efforts, MRC staff and volunteers are continuing to work at every level to ensure that our rivers improve over time. With the support of our community, we can continue to provide leadership and innovation in finding ways to restore and protect our waterways.

Thank you for your support!
***Jeffrey Horstman**, Executive Director*

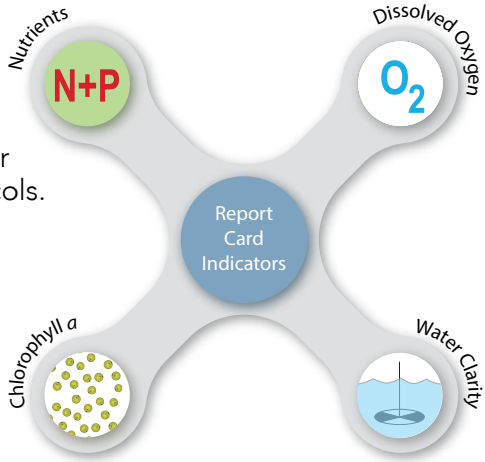
Cover photograph by Jay Fleming Photography.

GRADING OUR RIVERS

A	B	C	D	F

Our data was collected by our Riverkeepers and scientists and approximately 50 Midshore Creekwatchers (acknowledged on inside back cover), who are trained by our Riverkeepers in methodology and protocols.

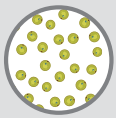
Our testers measured water clarity, dissolved oxygen, temperature, pH, and salinity. They sampled for nitrogen, phosphorus, and chlorophyll *a*. Observations of flora and fauna were also recorded, and unusual occurrences or observable sources of pollution were reported to our Riverkeepers.



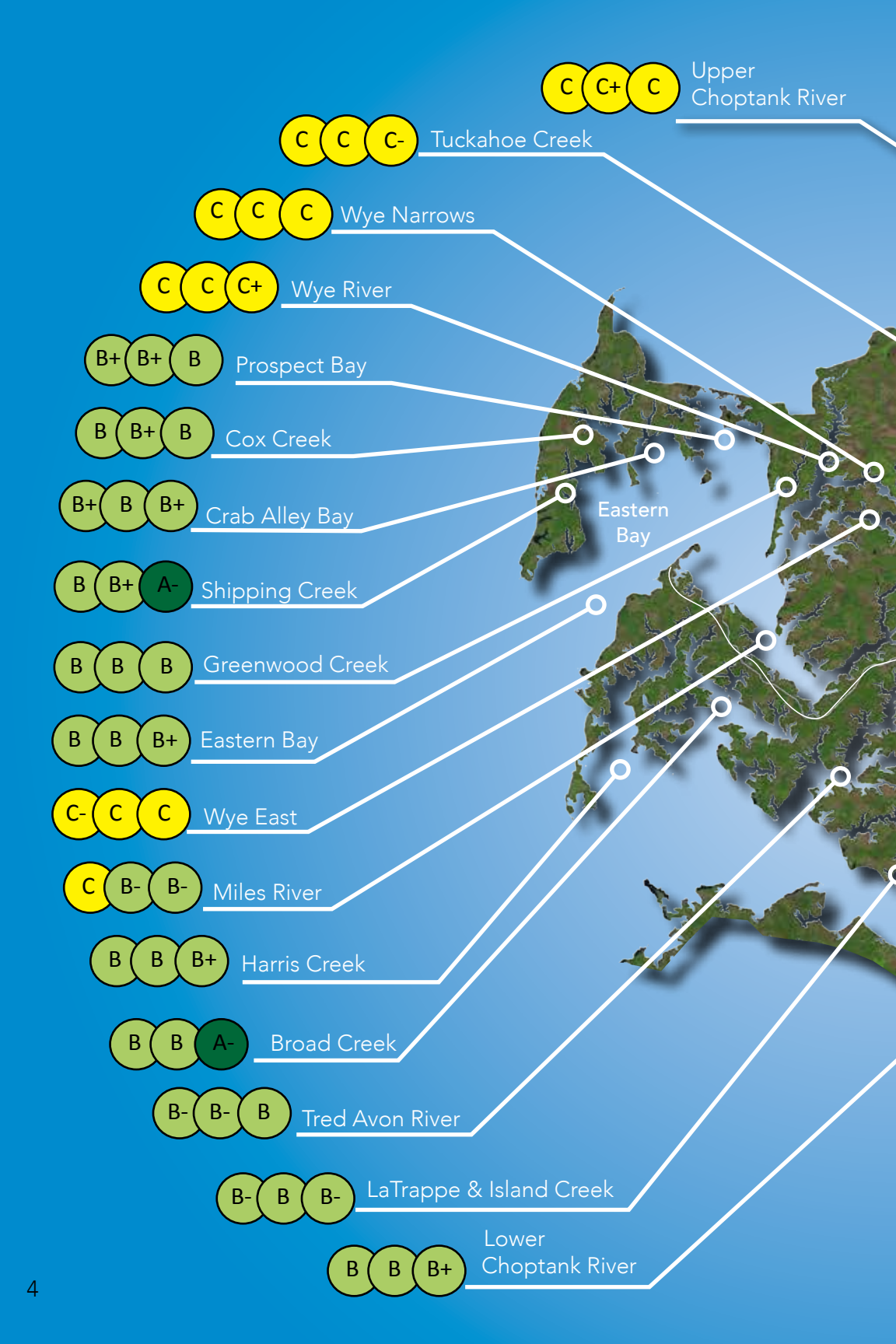
Nutrients, such as **nitrogen** and **phosphorous**, are essential for the development of all organisms. Nutrients naturally enter our waterways through the atmosphere and soil, but human activity has caused excess nutrients to enter our rivers. Primary sources include agricultural fertilizers, lawn fertilizers, septic systems, and wastewater. Excess nutrients cause excessive growth in algae and declines in dissolved oxygen concentrations.

Oxygen is essential for life and is a key indicator of ecosystem health. Underwater, oxygen is found in the form of dissolved oxygen and without it, aquatic wildlife can become stressed or die. Low levels of oxygen in the water are most often a result of eutrophication: excess nutrients in the water, causing excessive algae growth. As the algae die, decomposition by bacteria depletes the available oxygen.

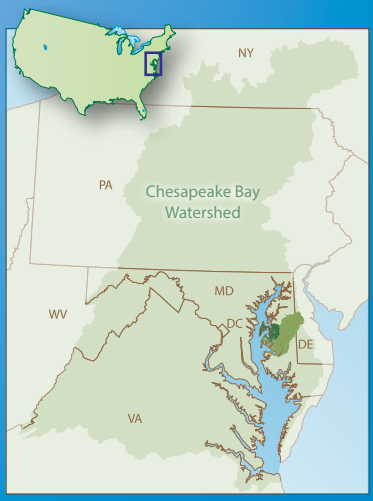
Clear water is essential for the life of underwater grasses. Sunlight must be able to reach these plants in order for them to grow. Our rivers become murky when excess nutrients and sediments are washed into the waterways and fuel algae growth.



Chlorophyll is the green pigment found in all plants that use the sun for photosynthesis. Measuring the amount of this pigment (as chlorophyll *a*) in our rivers measures the amount of phytoplankton present. When fed by excess nutrients, phytoplankton can quickly bloom, blocking out light from reaching underwater grasses and leading to oxygen depletion. The best way to reduce the amount of phytoplankton in our rivers is to minimize the amount of nutrient pollution entering our waterways.


C C+ C
Upper Choptank River
C C C-
Tuckahoe Creek
C C C
Wye Narrows
C C C+
Wye River
B+ B+ B
Prospect Bay
B B+ B
Cox Creek
B+ B B+
Crab Alley Bay
B B+ A-
Shipping Creek
B B B
Greenwood Creek
B B B+
Eastern Bay
C- C C
Wye East
C B- B-
Miles River
B B B+
Harris Creek
B B A-
Broad Creek
B- B- B
Tred Avon River
B- B B-
LaTrappe & Island Creek
B B B+
Lower Choptank River
Eastern Bay

2016 REPORT CARD GRADES



Grades by Year

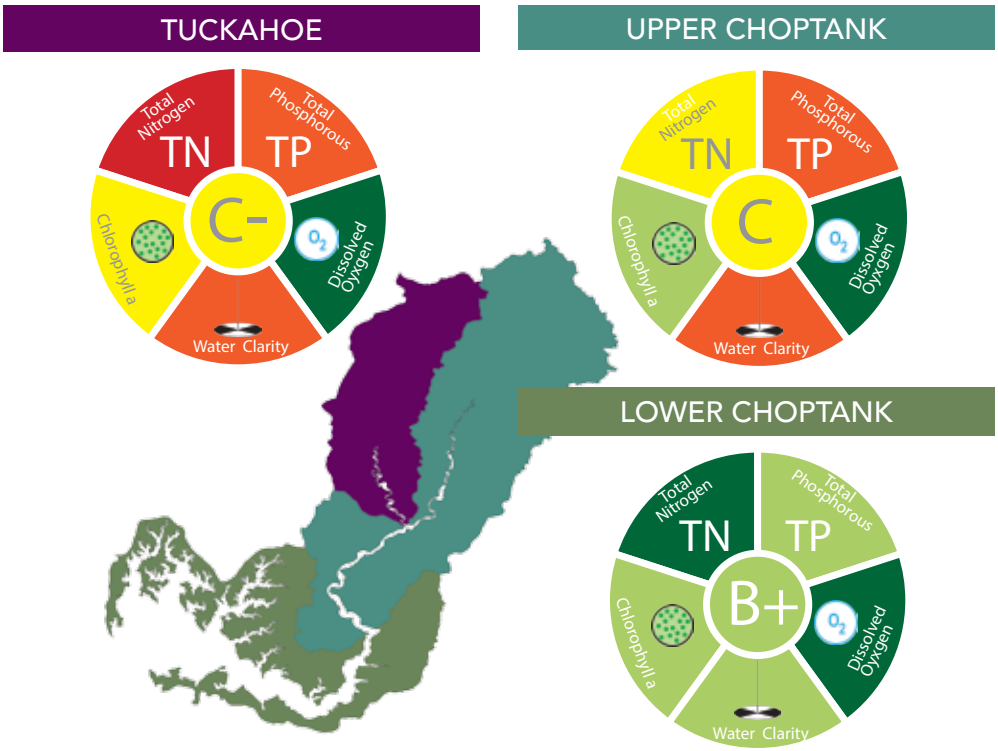
2014 2015 2016

Symbol credit: IAN UMCES Symbol Library

RIVERKEEPER COMMENTARY

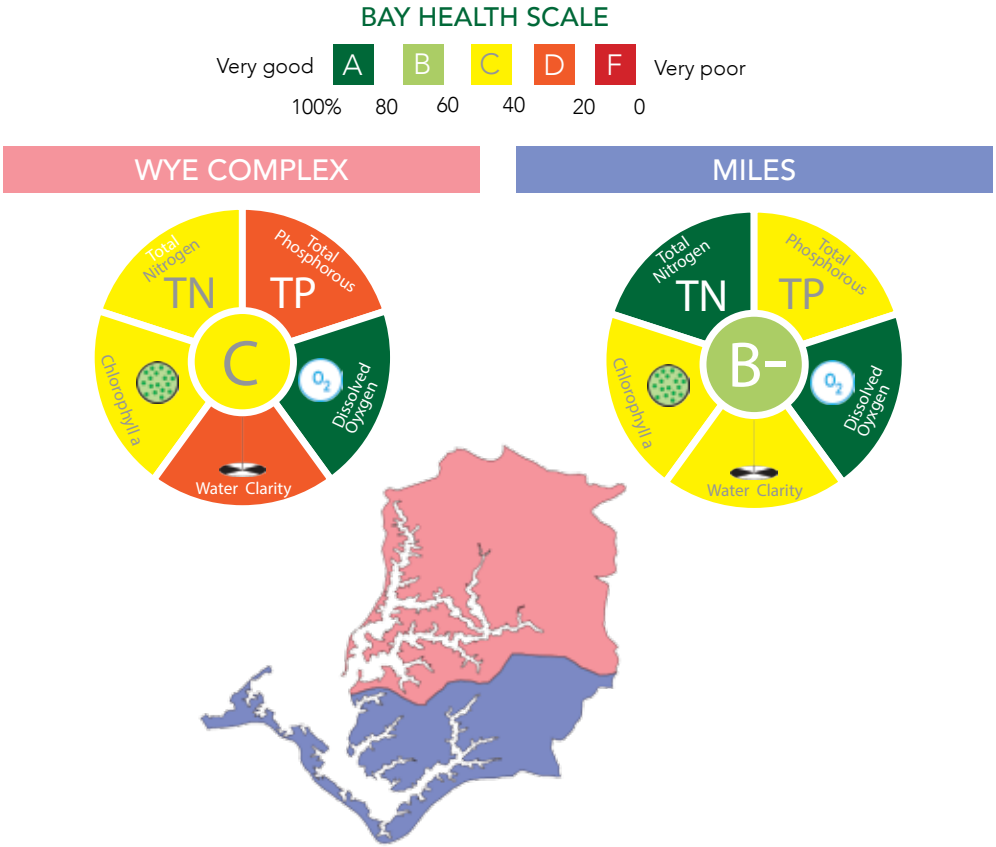
The **Choptank River** experienced a slight improvement in water quality this year, marking four years of incremental improvements in the overall score. You'll notice in this year's report card that the Choptank River has a new look—a divide between the upper and lower portions of the 71-mile-long tributary. Over the years, vigilant studies and analysis of the river have shown that, while we typically recognize it as one body of water, differing influences on water quality reflect two major systems: the lower portion, which is mostly influenced by the waters of the Chesapeake Bay; and the upper portion, which is mostly influenced by inputs from the surrounding watershed. By looking at the river as two systems, we can more accurately situate water quality improvement practices in areas where they will have the best chance of controlling pollutants, improving habitat, and increasing the resiliency of the systems.

The Lower Choptank scored better than the Upper Choptank in nutrients and water clarity. A large factor responsible for these differing grades is location. The Lower Choptank, located at the mouth of the river, is affected by the Chesapeake Bay, whereas the Upper Choptank has greater input from land, with less tidal flow. Tuckahoe Creek is very similar to the Upper Choptank and the C- grade it received reflects the high concentrations of nitrogen, phosphorus, and low water clarity creating poor water quality.

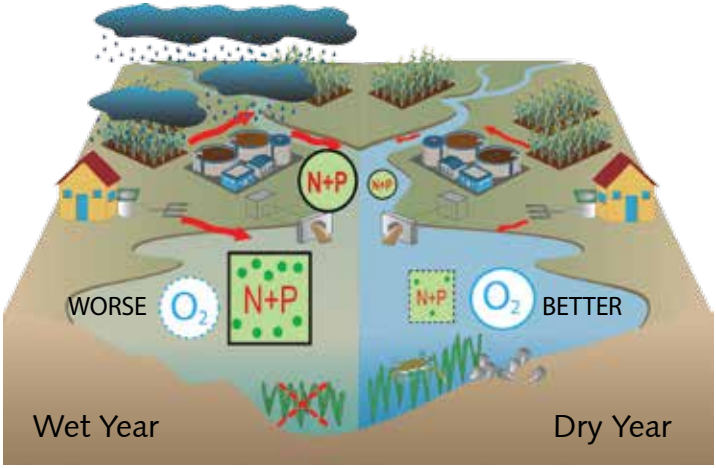


Upper portions of the **Wye River**, **Wye East**, and **Wye Narrows** remain problematic. The **Miles River** saw improvements in nitrogen and phosphorus levels; however worsening dissolved oxygen kept the overall grade at a B-. As we point out in the following pages, weather patterns and nutrient sources are the main factors determining water quality, though tidal flushing plays a part as well.

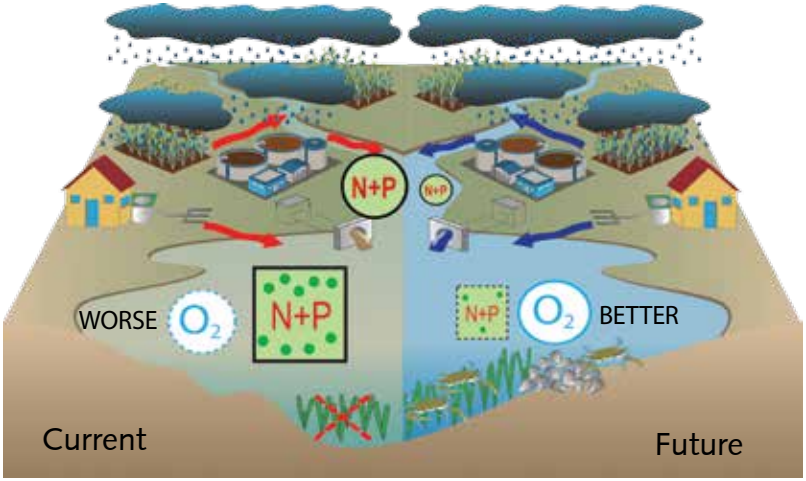
Our 2016 report card takes a hard look at the subwatersheds that comprise the upper portion of the Choptank River. Here, you'll notice the challenges we face with high levels of nitrogen and phosphorus in the streams. Over the years, these nutrients will make their way to the main stem of the river and continue to show up in our sampling results. You'll also notice that the lower parts of the river, Harris Creek and Broad Creek, for example, are seeing signs of improvement. Oyster restoration efforts in these areas are showing early signs of success. Oysters are invaluable to the health of our waters, and we are hopeful that our hard work, both on the water and in the legislature, will continue to help improve water quality.



POLLUTION SOURCES + TRANSPORT = WATER QUALITY



Weather affects water quality. Wet years increase nutrient transport, and high flow in streams delivers the nutrients to tidal waters, creating poor water quality. Dry years lead to better water quality due to less precipitation moving the nutrient pollution to streams and tidal waters. This is what occurred in 2015 and 2016 when below-normal precipitation and stream flow reduced nutrient inputs allowing for a rebound in grasses and aquatic life.



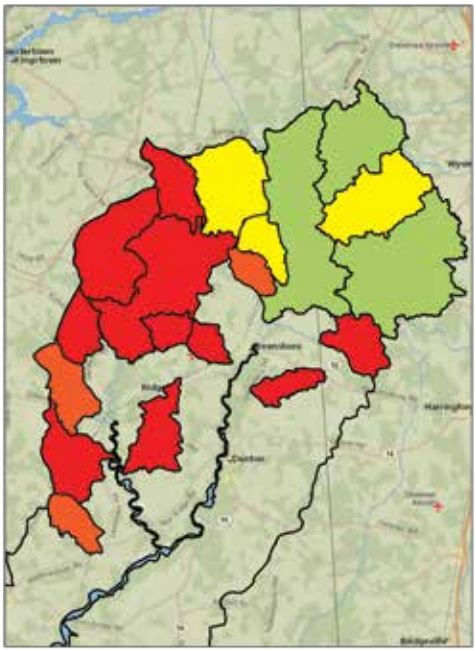
In this illustration all sources of nutrient pollution have been reduced. Wastewater treatment plants have been upgraded, septic systems use best available technology, and farms effectively use fertilizer and implement as many best management practices as possible to limit transport of nutrients off the farm field. Weather no longer dictates water quality. This is the direction that we are headed as we continue to implement more projects and upgrade waste water systems.

EXPLORING SUBWATERSHEDS

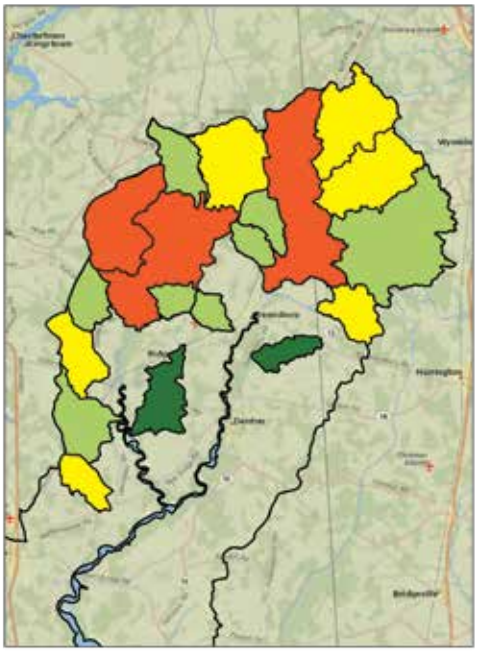
One of the most important indicators of watershed health is nutrient concentrations in feeder streams that flow into tidal waterways.

The maps below provide grades for total nitrogen and total phosphorus for subwatersheds of the Choptank River. These subwatersheds are monitored monthly by scientists at University of Maryland Center for Environmental Science, United States Geological Survey, Maryland Department of Natural Resources, and Delaware Department of Natural Resources and Environmental Control. Many of the subwatersheds received F grades for total nitrogen (TN>3.61 mg/L), but, fortunately, many of these subwatersheds have improving TN trends, indicating that agricultural best management practices might be impacting pollution sources. Total phosphorus in two subwatersheds received A grades with the majority receiving Bs and Cs. Unfortunately, there were no subwatersheds with improving phosphorus trends.

Total Nitrogen (TN) Grade



Total Phosphorus (TP) Grade



Fisher, T. R., T. E. Jordan, K. W. Staver, A. B. Gustafson, A. I. Koskelo, R. J. Fox, A. J. Sutton, T. Kana, K. A. Beckert, J. P. Stone, G. McCarty, and M. Lang. 2010. The Choptank Basin in transition: intensifying agriculture, slow urbanization, and estuarine eutrophication, pps. 135-165, IN: M. J. Kennish and H. W. Paerl (eds), Coastal Lagoons: Systems of Natural and Anthropogenic Change, CRC Press.

F	D	C	B	A

SUBMERGED AQUATIC GRASSES (SAV)

After many years of decline, submerged aquatic vegetation (SAV) has begun to rebound in Midshore rivers, indicating improving water quality. The 2015 Virginia Institute of Marine Science aerial survey showed a 50% increase in the abundance of underwater grasses in the Choptank River, as well as signs of new grass beds in freshwater segments that were never reported before. These figures are part of a larger comeback—overall in 2015, the Chesapeake Bay saw a 21% increase* in underwater grasses and preliminary 2016 results indicate that SAV had another excellent year in most areas of the Bay.

The return of underwater grasses in our Midshore rivers generated a lot of excitement and opportunity at MRC. Last year our Miles-Wye Riverkeeper, Jeff Horstman, led a team of DNR scientists and volunteers to a giant bed of widgeon grass on the Miles River, where seeds were harvested for a reseeding project taking place later this year. Early last summer, Choptank Riverkeeper, Matt Pluta, and Watershed Scientist, Tim Rosen, set out to explore the resurgence first-hand, paddling seven miles through the remote freshwater section of the Tuckahoe River, where they followed interconnected beds of wild celery, a dominant freshwater grass species.

We're very excited to report that in 2017 MRC will launch an extension of our Creekwatcher program to include citizen-monitoring of SAV.

Working in collaboration with DNR, our SAV monitoring program will collect data on diversity, abundance, and distribution of grasses in our tributaries. DNR and the Chesapeake Bay Program will use the data to measure progress toward water quality goals and to better understand species. Underwater grass abundance is a health indicator for our rivers. Beginning next year, MRC will add this parameter to our Report Card and include the data when analyzing grades for different waterways, providing a more accurate understanding of the diverse ecosystems we fight tirelessly to protect.

*Source: Chesapeake Bay Program - http://www.chesapeakebay.net/presscenter/release/annual_monitoring_finds_more_than_91000_acres_of_underwater_grasses_in_bay

What can YOU do to help raise the grade?

IN YOUR BACKYARD

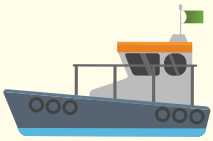
Lawn fertilizer is rich in nitrogen, a major source of water pollution. Reduce or eliminate fertilizer and plant native grasses to create natural habitats and a healthy lawn. Install a rain garden to filter pollutants and reduce runoff. Properly dispose of your pet's waste.

GROW OYSTERS

Participate in oyster restoration efforts. Oysters filter pollution and create important habitat. Yet, they are in decline in the Chesapeake Bay. Ask us about opportunities to raise juvenile oysters at your dock that can be relocated to local sanctuary reefs.

GIVE VOICE TO OUR RIVERS

The support of community leaders is vital to improving the health of our rivers. Engage with your town, county and state political leaders. Email them, write them, call them—tell them relentlessly that you want them to support clean water initiatives.



CLEAN BOATING

Only discharge waste into a pumpout facility. Never discharge in the river. MRC's pumpout boat offers FREE pumpouts on the Miles and Wye Rivers. Don't allow gas or oil to spill into rivers or onto parking lots. Dispose of boat debris in trash cans.

SUPPORT CLEAN WATER ORGANIZATIONS

Donations of money, time and expertise are invaluable. MRC provides opportunities to help, including water quality monitoring, fundraising events, letter writing, oyster restoration, educational programs, and advocacy.

BECOME A CREEKWATCHER!

Thank you to our 2016 Creekwatchers: Dick Bemis, Mike Bilek, Edward Binseel, Maura Bollinger, Roger Bollman, Jack Broderick, Stan Brown, Betty Brunetti, Peter Dunbar, Donna Ford, Roger Galvin, Brice Gamber, Gil Gleim, Mitch Hager, Peter and Susan Hale, Linda and Rich Harrison, George Hoffman, Joe Jelich, Kim Kaestner, Ron Ketter, Bob and Barb Lawrence, Annabel and Ron Lesher, Lois Lindsey, Janet Mackey, Steven Masterman, Gail McConaughy, Jack and Jill Meyerhoff, Jack Moore, Phil Morrison, Brian O'Hare, Leslie Passano, Carmen Perry, Bob Petizon, William "Randy" Smith, Nick Stoer, George Strother, Kevin Sullivan, Mario and Elaine Tama, Marty Wells, Bob and Bev Wolffe, Earle "Roo" Wood, Lee Yerkes.

HOW WE USE OUR REPORT CARD

Outreach

Data Sharing

Oysters

Grants

Advocacy

Events

Education

Assessments