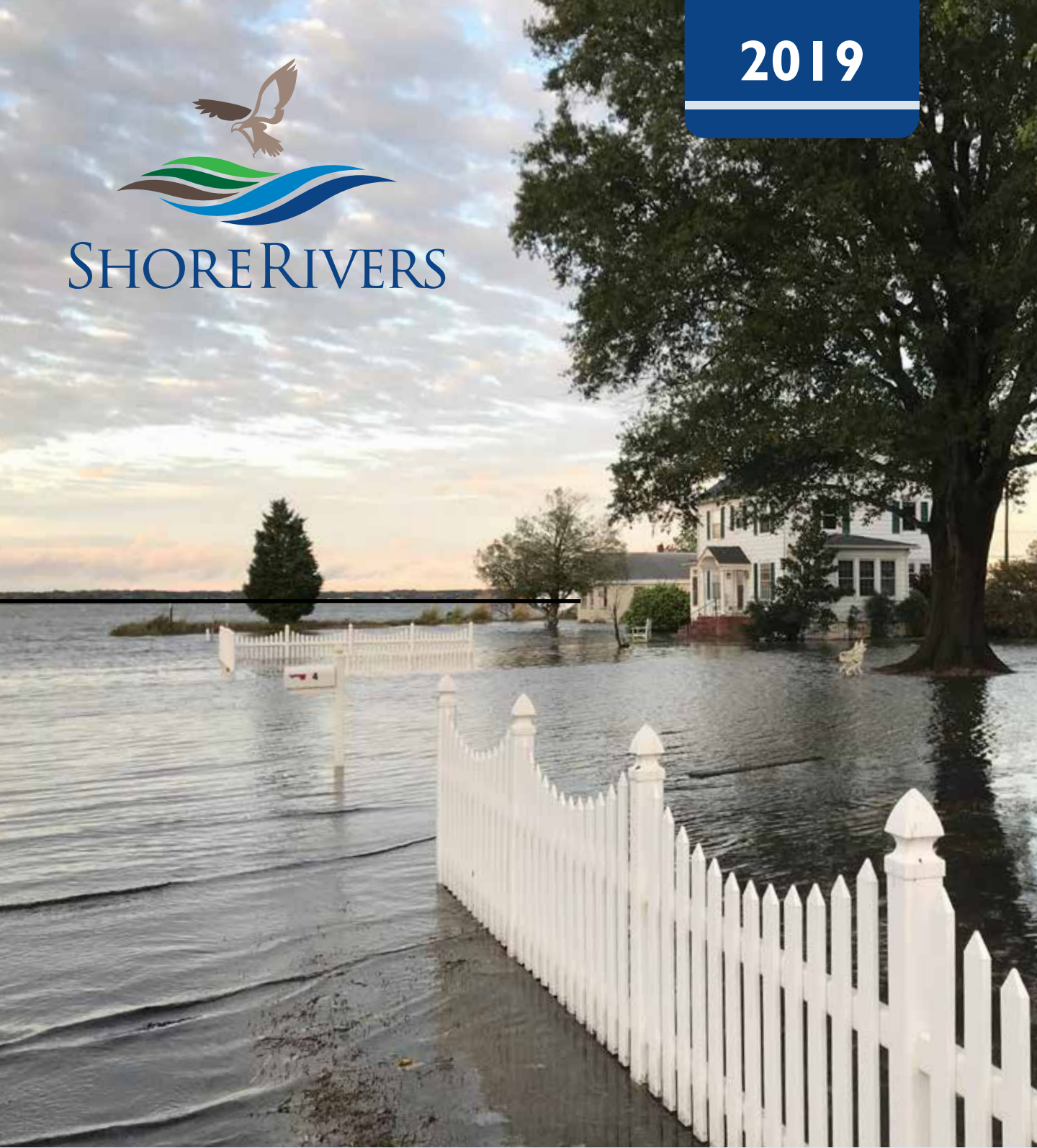


2019



SHORE RIVERS



River Report Card

Sassafras | Chester | Miles & Wye | Choptank

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Science is a quest for truth. Our scientific water quality monitoring program is, in essence, a quest for the truth about our rivers. How healthy are our rivers? What pollutes them? How can we fix them? Is it safe to swim? How will climate change impact me? In our work to improve water quality **for the benefit of our entire community**, these are scientific questions with scientific answers.



Each year for more than a decade, ShoreRivers has released an annual River Report Card based on the **rigorous scientific collection and analysis of more than 10,000 data points collected at nearly 200 water quality monitoring stations**. Our staff and trained volunteers follow protocols developed by experts from the University of Maryland, the Maryland Department of Natural Resources (MD DNR), and many others.

Our Report Card typically focuses on the primary pollutants on Maryland’s Eastern Shore – **nutrients and sediment** – and the resulting impacts to water quality such as low dissolved oxygen, algal blooms, and poor water clarity. That remains important work and the backbone of our Report Card, yet in our scientific quest for truth, we recognize there are additional things to consider. Each year, we search for new truths and expand our analysis. Our goal is to produce a comprehensive “benchmark” of all things river related.

Last year, for the first time, we initiated a region-wide **public health program through bacteria monitoring** and the SwimGuide application. This year, we are expanding our submerged aquatic vegetation (SAV) monitoring through MD DNR’s **SAV Watchers** program and we have added information on another serious issue – climate resiliency. In addition to our annual grade, we sincerely hope this new information is helpful.

And how did our rivers fare in 2019? Overall, as the weather dried out after a historically wet 2018, **water quality improved**...yet science is showing that each of our rivers and tributaries are unique, with their own story. Details inside!

Thank you for making our work possible – together, we will clean these rivers.

Jeffrey Horstman, Executive Director



Cover Photo: High tide in Dorchester County
 This Page: Renowned photographer Dave Harp chasing the Washington College crew team on the Chester
 All Report Card photos from ShoreRivers unless otherwise credited



ShoreRivers uses Mid-Atlantic Tributary Assessment Coalition (MTAC) scientific protocols to collect and evaluate water quality data. A numeric **Water Quality Index (WQI)** is calculated using established thresholds for water quality parameters, then converted to a letter grade. We send a special thank you to our **Sassafras Sampler, Chester Tester, and Creek Watcher** volunteers for their continued dedication to our monitoring program and to our rivers. Overall, ShoreRivers monitors nearly **200 sites** for water quality.

We use **grade blocks** to communicate an overall water quality grade for ShoreRivers, grades for each water quality parameter, and grades for each river and sub-watershed. Grades are color coded according to the **Bay Health Scale** below.

Oxygen is essential for life and is a key indicator of ecosystem health. Underwater, oxygen is found in the form of dissolved oxygen. 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 that cause excessive algae growth. As algae die, decomposition by bacteria depletes the available oxygen.



Nutrients, such as total nitrogen (TN) and total phosphorus (TP), are necessary 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, stormwater, and wastewater. Excess nutrients cause algal blooms and declines in dissolved oxygen concentrations.



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.



Clarity promotes the growth of underwater grasses, commonly referred to as submerged aquatic vegetation, or SAV. Sunlight must be able to reach these plants in order for them to grow. Our rivers become murky when excess nutrients and sediments wash into waterways and fuel algae growth.



sassafras river



Sassafras Riverkeeper
Zack Kelleher

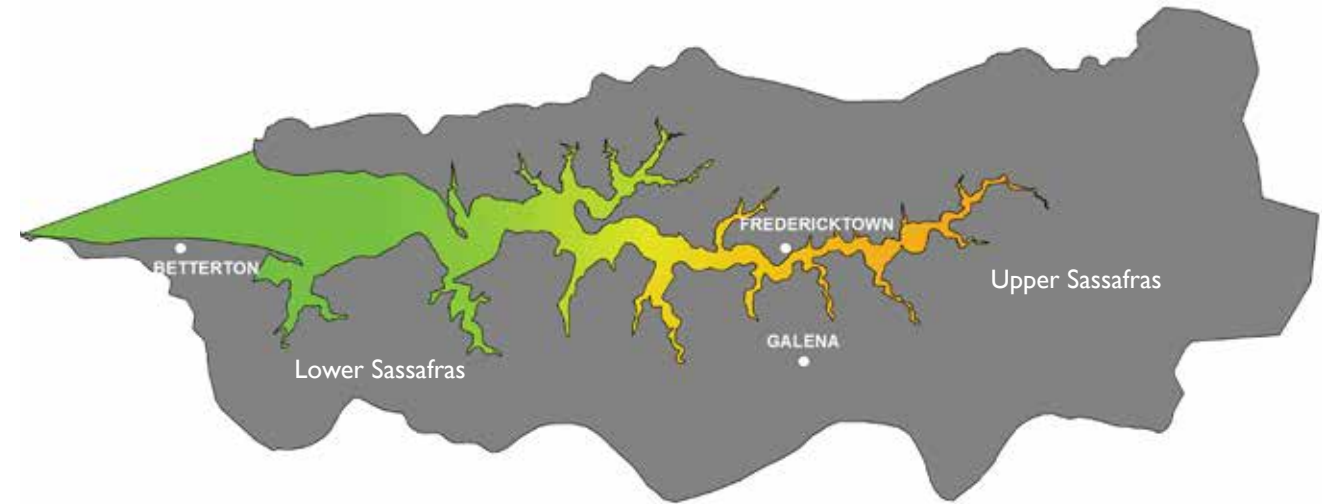
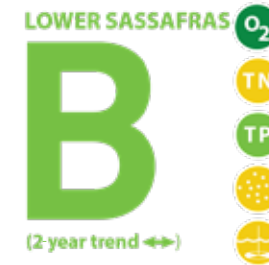
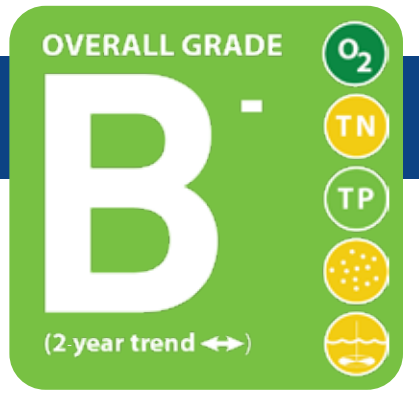
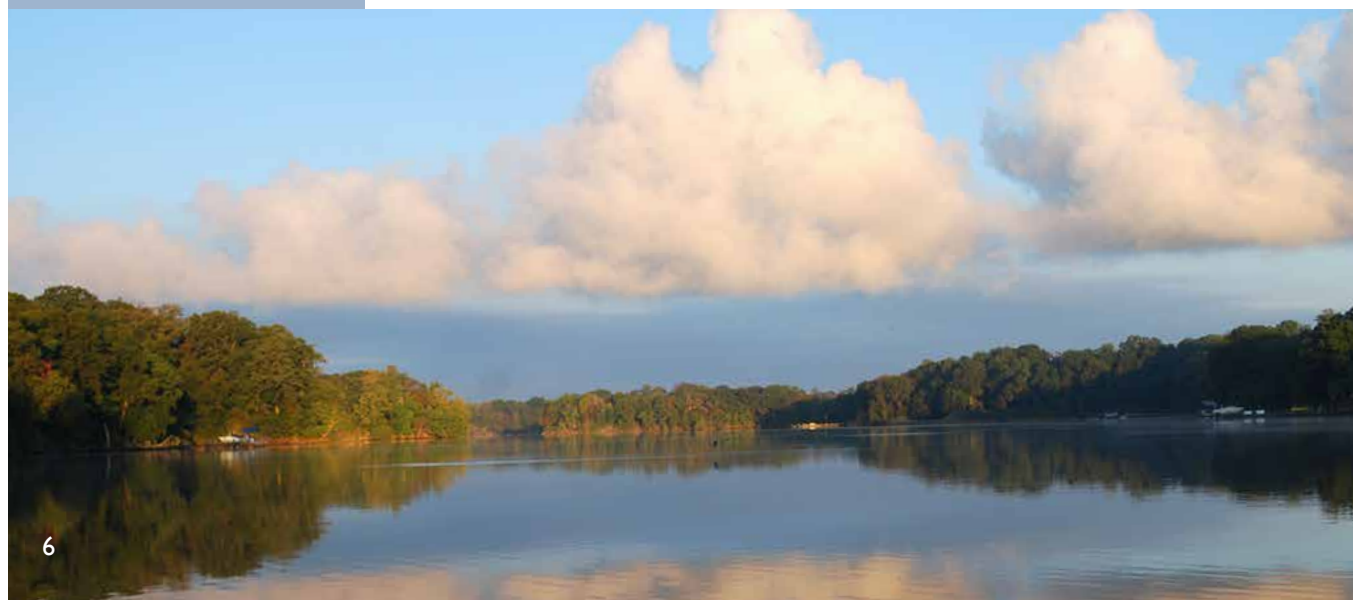
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2019 showed us how persistent the **impacts of increased rainfall** can be in regards to the health of our rivers but also how quickly these natural systems can bounce back if given the chance. The twice-average amount of rainfall we received in 2018 continued to impact the river until mid-summer in 2019, when a dry spell allowed the Sassafras to return to normal salinity levels for the first time in over three years.

Unfortunately, the **excess sediment and nutrient pollution** that enters the river every time it rains can remain in the river system for a long time. In 2019 we saw significant increases in nitrogen levels (23%), moderate increases in phosphorus levels (6%), and decreases in clarity (5%) throughout the river. These excess nutrients fuel algal growth, promote the spread of invasive plant species, and make the river less inhabitable for native plants and animals.

We still have a lot of work to do. The data points we collect continue to show that the majority of pollution in the Sassafras is coming from within our watershed. There are a wide range of actions you can take as an individual that can positively impact local water quality. **Planting native plants, eliminating the use of yard fertilizers, maintaining and repairing septic systems, and increasing your buffer can all drastically reduce the amount of nutrient pollution that flows into our waterways.** Together these actions can make a tremendous difference in the health of the Sassafras.

photo by liz clark



SHORE RIVERS





Chester Riverkeeper
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For the first time in five years, the Chester River grade improved! After a string of recent C+'s, the 2019 grade is a B-.

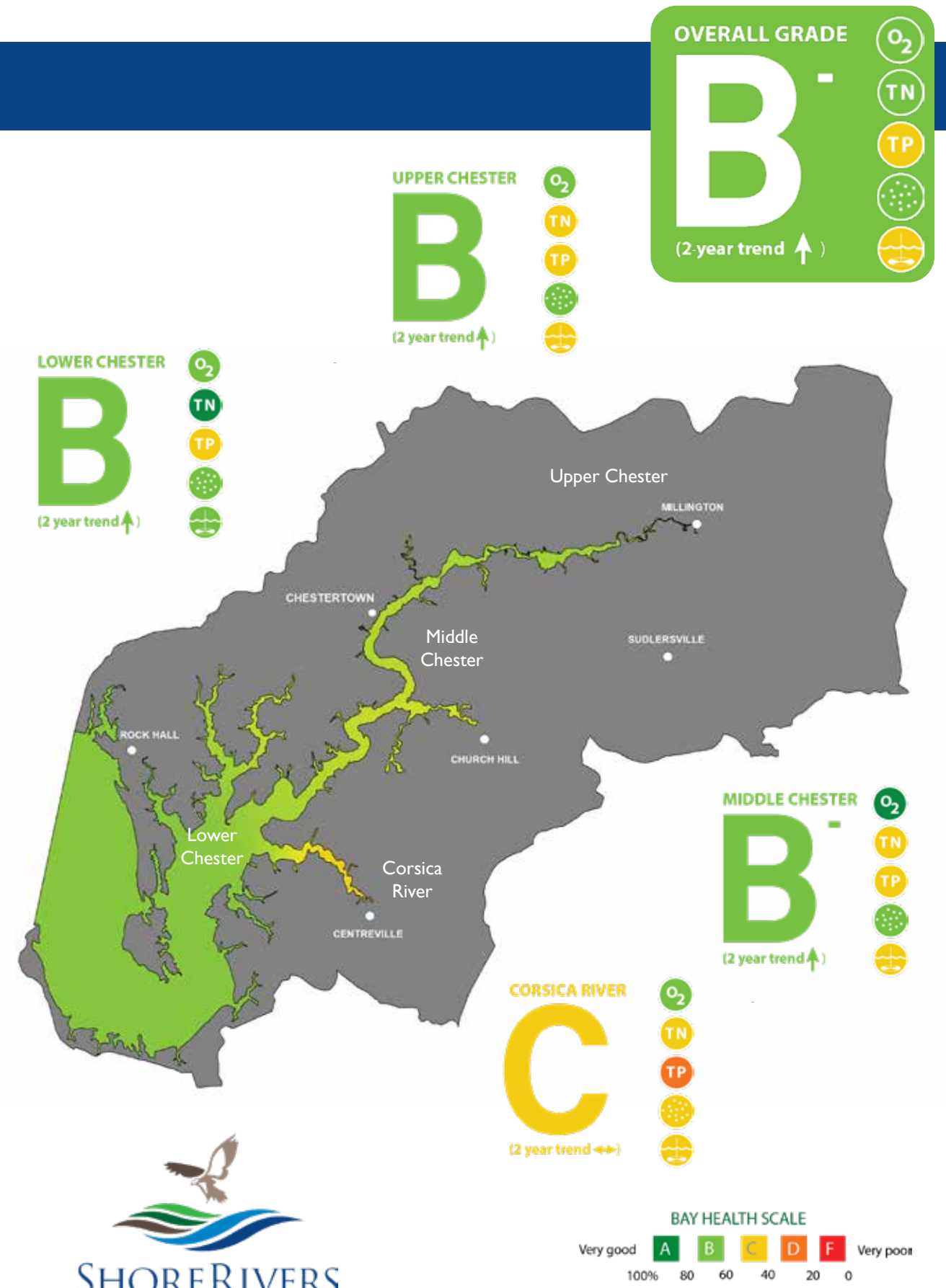
The main takeaways from the 2019 monitoring season on the Chester are: overall water quality improved (particularly nutrient pollution and water clarity), dissolved oxygen in the channel of the lower Chester decreased likely due to a larger Bay-wide deoxygenated dead zone, submerged aquatic vegetation (SAV) continues to aggressively rebound, and climate change poses an increasing threat.

We attribute the overall improvement to a few key factors. First, the Chester was able to **rebound from historic rains and increased polluted runoff** in 2018. Second, **SAV continues the expansion we've seen over the past few years**. SAV is particularly helpful as it traps sediment, absorbs nutrients, and promotes water clarity. Last but not least, the continued **restoration efforts** by organizations like ShoreRivers, government, and many landowners are making a difference.

many landowners are making a difference.

An exception to the improvement was dissolved oxygen levels in the deep channel in downriver areas. These areas are more susceptible to Bay-wide impacts and the low dissolved oxygen is consistent with a **dead zone in the Bay that was larger and lasted longer in 2019 than in the previous year**.

Lastly, **climate change and sea level rise** are causing nuisance flooding and increased erosion and posing an ever larger threat to our property and infrastructure. We're excited about improving water quality on the Chester, but we have much more work to do!



ShoreRivers water quality report

OVERALL GRADE

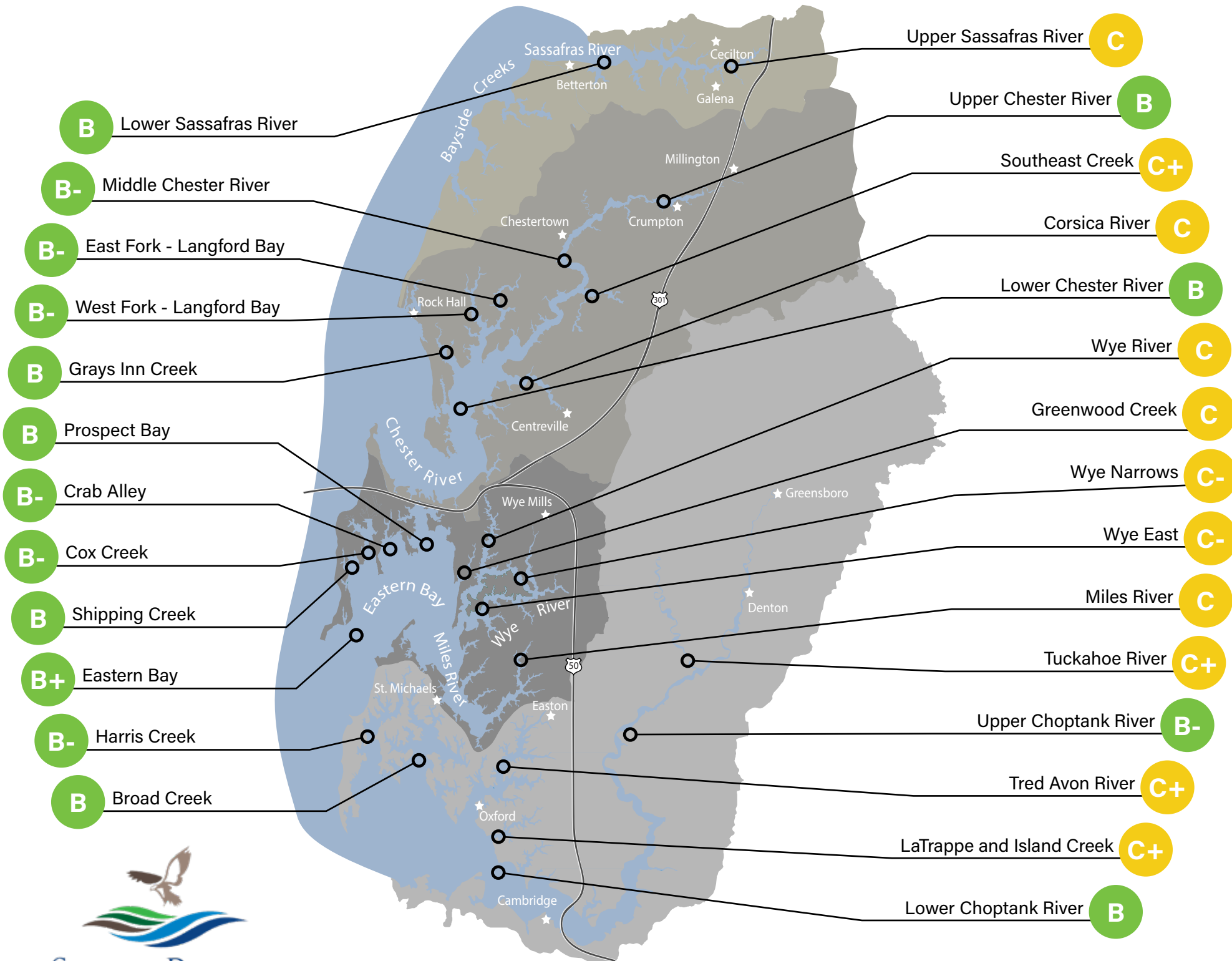
B⁻

(2-year trend ↑)

O₂

TN

TP



In 2019, many of our rivers and tributaries rebounded from the stress caused by historic rainfall in 2018. With less polluted runoff, we recorded less nutrient pollution and improved water clarity. Yet, recent climate predictions show that extreme rainfall may become increasingly common, washing more pollution into our waterways. Sea levels are also projected to rise by three feet or more by the year 2100, threatening our low-lying communities and infrastructure.

To create a more resilient Eastern Shore, we must accelerate our efforts to reduce nutrient pollution, restore critical habitat, and prepare for climate change.



eastern bay + miles & wye rivers



Miles-Wye Riverkeeper
Elle Bassett

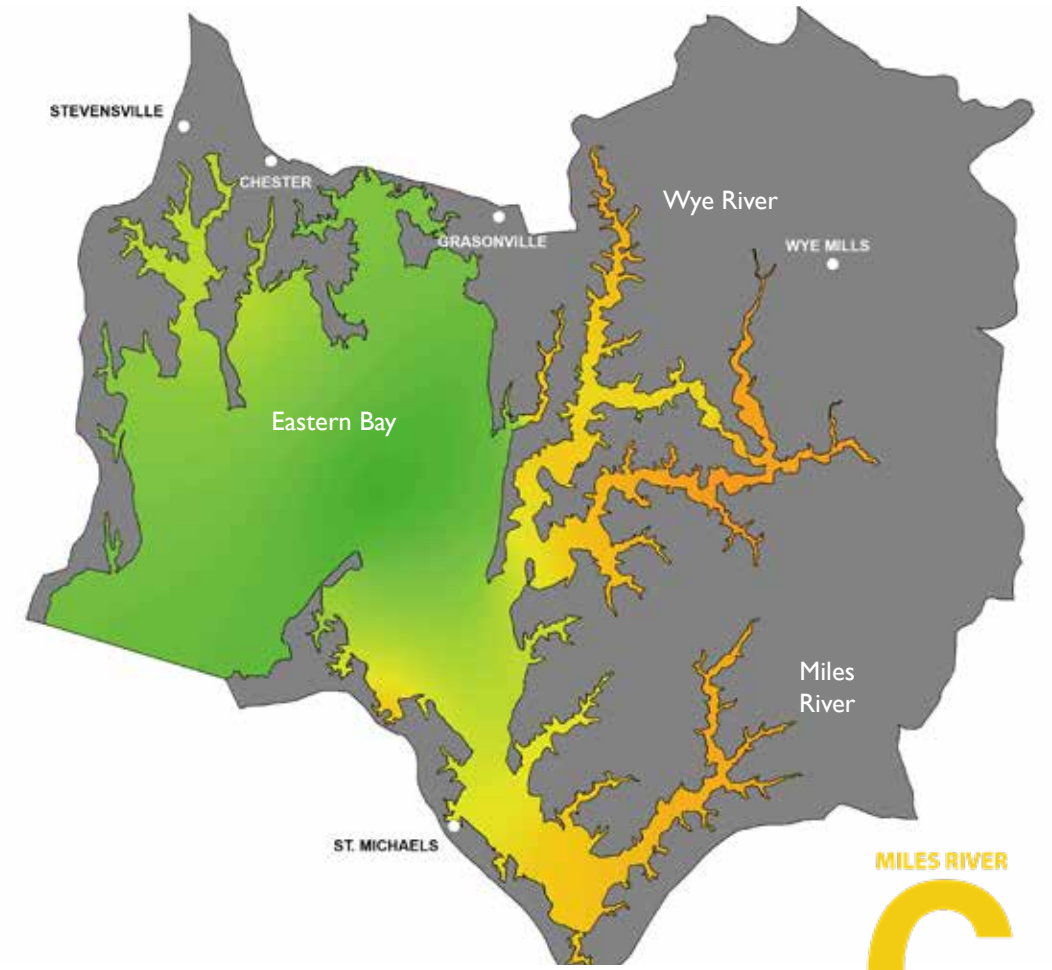
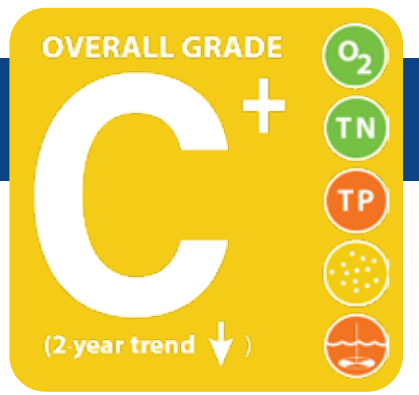
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2019 ShoreRivers
Shaw Bay Raft Up

In 2019, the **Miles River in particular saw a decline in water quality**. Specifically, we recorded low dissolved oxygen, high amounts of nitrogen and phosphorus, and poor clarity. The headwaters and tributaries including Leeds, Glebe, and Goldsborough creeks were the culprits of bringing down the overall score of the Miles. The mainstem and harbor for comparison scored fairly well. That data show that our water quality declines as we travel upstream, which indicates that pollution sources are coming from our own yards and surrounding land uses.

The Eastern Bay and Wye River watersheds received similar grades to 2018. Prospect Bay and Shipping Creek received the highest water quality scores within Eastern Bay. The Wye River showed a slight improvement in health over 2018. However, the Wye East and Wye Narrows continue to score the poorest of all the tributaries in these watersheds due to high levels of phosphorus pollution, high algae levels, and poor water clarity.

Restoration within the Wye East and Miles River watersheds is a priority in 2020. These data show that we have an excess amount of nutrients and sediment entering these river systems. **ShoreRivers is working on a community resiliency project in Wye Mills** to address both stormwater and pollution loading in the community. Additionally, we are implementing programs such as **River-Friendly Yards, Marylanders Grow Oysters, natural filters**, and much more throughout these watersheds. Please reach out to me if you might be interested in working towards healthier waterways.



choptank river



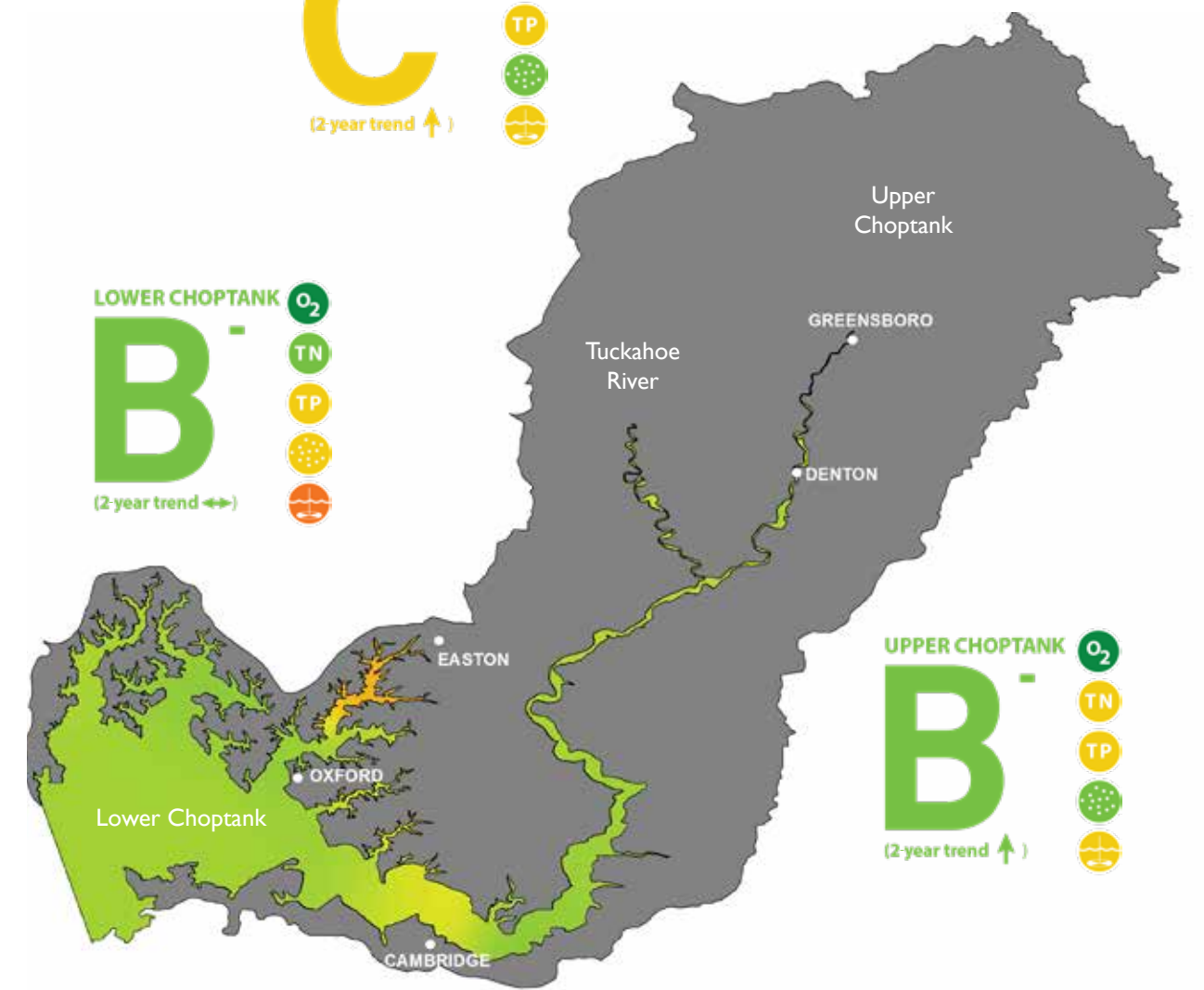
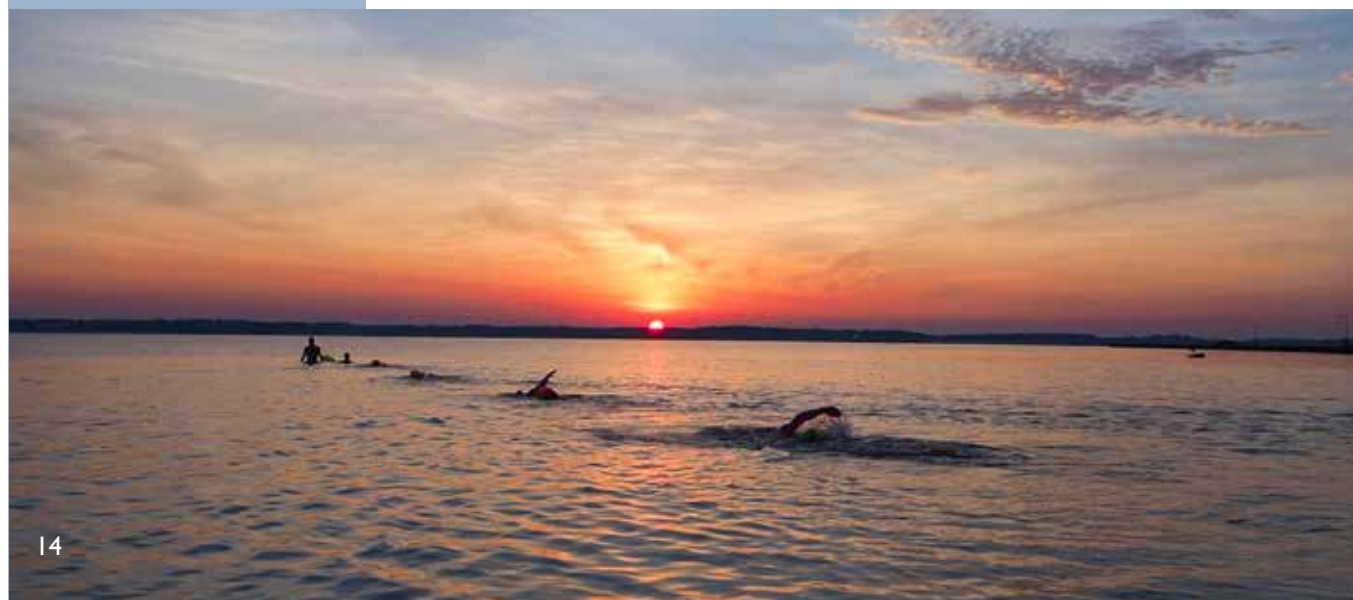
Choptank Riverkeeper
Matt Pluta

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Water quality in 2019 was impacted by the lingering effects of historic rainfall in 2018 – the resultant **low salinity was the big story of the year**. Salinity in the lower Choptank averaged just 10.4 parts per thousand (ppt) for the summer – about five ppt lower than average. Maryland’s largest oyster hatchery draws water from the Choptank River to grow and reproduce oysters, and unfortunately 2019’s low salinity halted production. With no oysters, **ShoreRivers unfortunately canceled our Marylanders Grow Oysters program for the year**, hindering our oyster restoration efforts. Climate change forecast models predict an increase of at least five inches of precipitation in the Choptank region over the next century, bringing more freshwater and nutrient pollution that threatens the equilibrium of the river.

As the **impacts of climate change** increase and more precipitation falls, nitrogen pollution is expected to increase 22% in the Choptank River, according to local climate change experts. This tells me that our opportunity to raise the bar on nutrient management efforts and to prioritize our natural resources is now. **As we continue to experience increased pollution loads we must work harder to make our rivers more resilient.**

Overall in 2019, the Choptank River saw **moderate improvements in dissolved oxygen levels**, and **modest declines in both nitrogen and phosphorus (nutrient) pollution**, with the Upper Choptank and Tuckahoe River showing the largest improvements. On the other hand, **water clarity and algae levels were slightly worse than last year**, and were particularly poor in the Choptank tributaries.



submerged aquatic vegetation



photo by dave harp

Submerged aquatic vegetation (SAV or underwater grasses) has expanded more than fivefold in the past six years within the ShoreRivers territory.

SAV resurgence is a sign of improving water quality and a key resiliency component to combat pollution and climate impacts in our rivers by:

- Improving water clarity
- Trapping sediment
- Absorbing nutrient pollution
- Oxygenating the water
- Providing critical habitat
- Reducing erosion

These benefits create an environment that is more favorable to SAV growth. This positive feedback loop is one likely reason for the rapid recovery of underwater grasses.

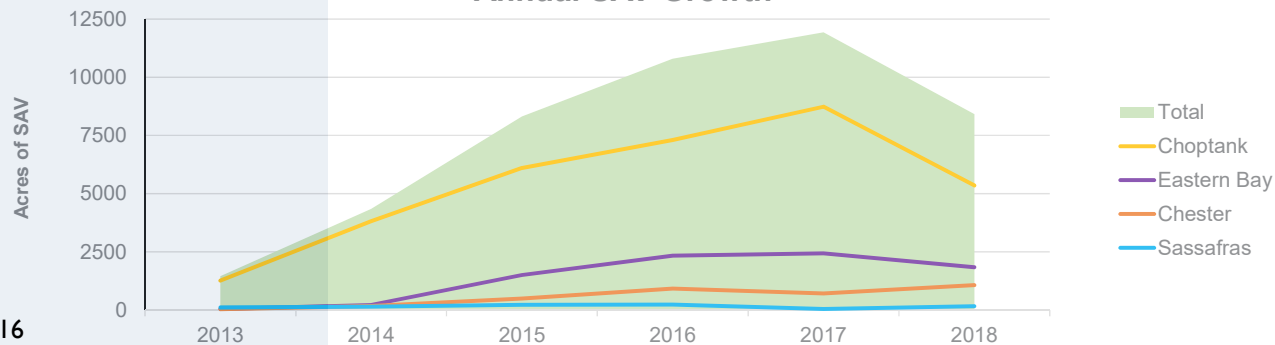
Bay-wide, approximately 100,000 acres of SAV were mapped in 2018. While this is encouraging, **aggressive restoration and protection measures are required** to achieve the U. S. Environmental Protection Agency's goal of 130,000 acres of SAV in the Chesapeake by 2025.

SAV data courtesy of the Virginia Institute of Marine Science and the Maryland Department of Natural Resources

ShoreRivers is working to accelerate the SAV recovery in partnership with the Maryland Department of Natural Resources. We are harvesting native seeds from established beds (see above photo) and planting in strategic locations in each of our watersheds. We are also advocating for state-wide regulations to increase SAV protection with a **dedicated buffer zone and more frequent mapping**.

The below chart shows recent SAV growth in the ShoreRivers territory. Note that most experts agree that due to sampling complications associated with historic rainfall, the reported acres in 2018 are likely underestimated, and although the 2019 data is not yet finalized, early estimates show SAV continues to expand.

Annual SAV Growth



swimmable ShoreRivers



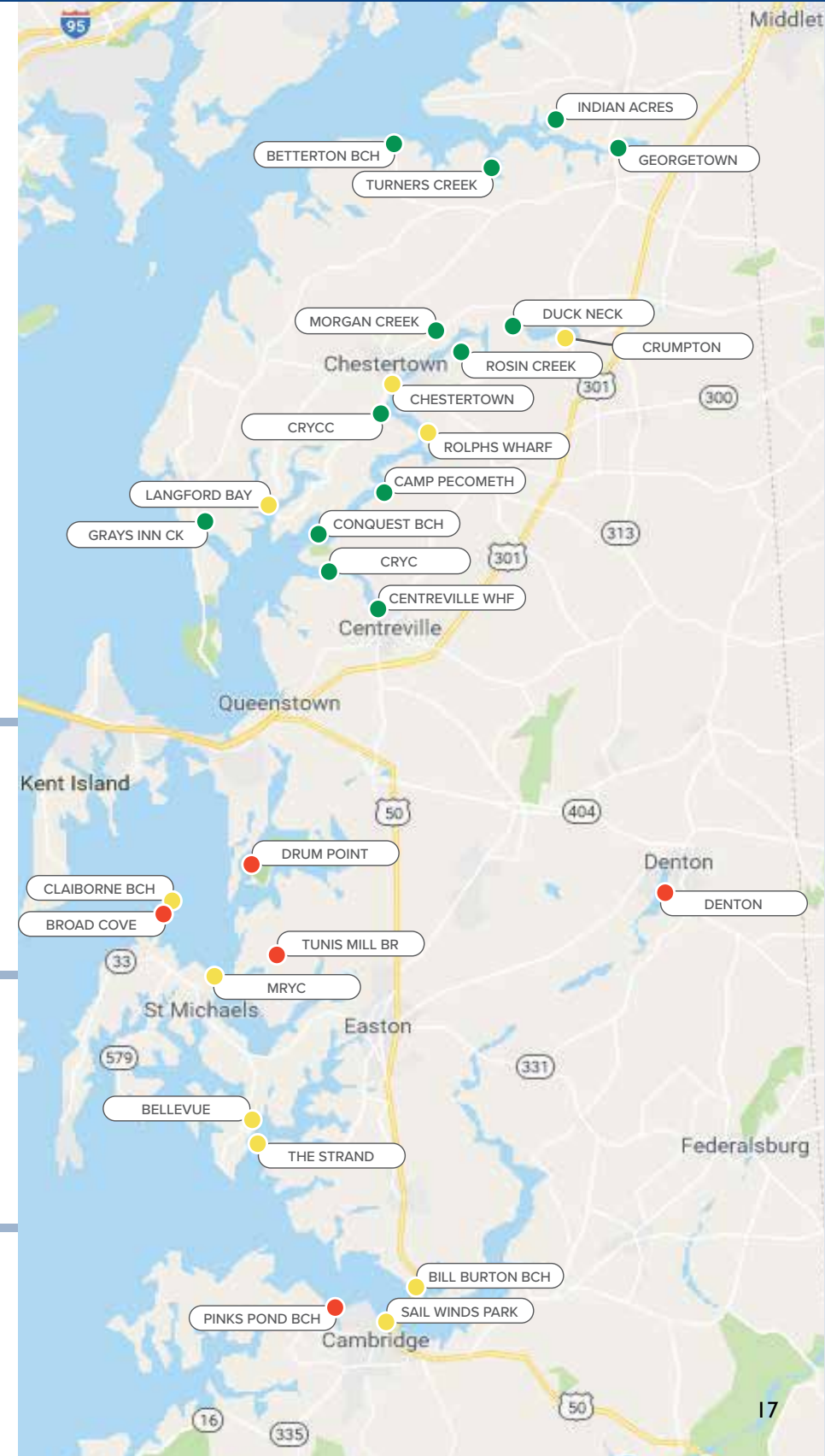
ShoreRivers samples for enterococci bacteria pollution at 28 popular swimming areas on the mid and upper Eastern Shore. Enterococci bacteria is designated by the Environmental Protection Agency (EPA) as a common indicator of waterborne illnesses.

Visit www.shorerivers.org/swim for the latest results, safe swimming tips, and more information on our bacteria monitoring program.

95% or More of samples passed water quality standards in 2019

60-95% of samples passed water quality standards in 2019

60% or Fewer of samples passed water quality standards in 2019





According to its own assessment, Maryland is one of the most vulnerable states to impacts from climate change. On Maryland's Eastern Shore, scientific reports from NOAA confirm that climate change is causing sea level to rise and weather events to be more severe and frequent. **Climate change is impacting our environment, our economy, and our culture.** Here are just some of the local negative impacts:

- Earlier and more frequent algal blooms
- Increased nutrient and sediment pollution washing into our rivers
- Loss of property from accelerated erosion and rising waters
- Warmer waters that lead to native species stress and the expansion of invasive species

ShoreRivers is promoting climate resiliency by advocating for climate-smart legislation, restoring natural landscapes, and educating all ages to be stewards of the environment. For more on our resiliency efforts, check out the Spring 2020 ShoreRivers Advocate: www.shorerivers.org/advocate

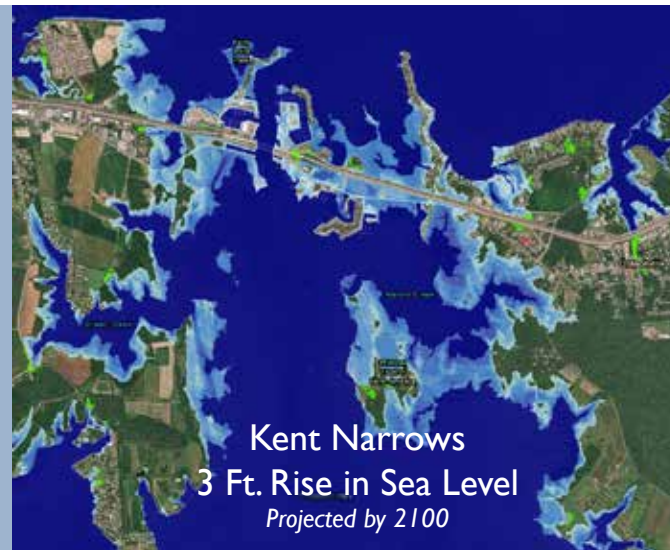
Here are some things you can do to make the Eastern Shore more resilient to negative impacts of climate change:

- Plant native trees, shrubs, and grasses to absorb carbon, provide a cooling effect, and reduce polluted runoff
- Reduce impervious areas on your property by using gravel paths and patios and wood decking as opposed to hardscaping
- Don't build in flood prone areas or near the water's edge
- Help slow erosion with living shorelines and marsh grasses

Projected Chesapeake Sea Levels:

2050: 2.7 ft increase
2100: 3.0 ft increase

mapping courtesy of NOAA
<https://coast.noaa.gov/slr/>



Be a part of the movement for clean water by volunteering for ShoreRivers!

Our work is made possible through the support of a dedicated network of volunteers, members, and supporters. Here are just a few ways you can support our vision of healthy waterways across Maryland's Eastern Shore. To learn more about changing your habits, volunteering, or becoming a member, please visit:

www.shorerivers.org/take-action

Change Your Habits: Everyone has a role to play by implementing river-friendly habits. Eliminate fertilizer use on your property to reduce nutrient pollution. Plant native plants and reduce turf grass area to reduce runoff and create critical habitat for birds and pollinators.

Volunteer: Our volunteers help us grow oysters, survey underwater grasses, monitor water quality, educate the public at events, and so much more. If you are interested in learning more about volunteer opportunities and donating your valuable time for a great cause, please visit our website linked above.

Join Us: When you join ShoreRivers, you are adding your voice to ours and making an affirmative statement that you support healthy rivers. Our Riverkeepers need your voice when they are advocating for river-smart policies in Annapolis, our educators need your voice when they are teaching the next generation about environmental stewardship, and our restoration team needs your voice when they are applying for funding to implement dozens of innovative projects.



ShoreRivers by the Numbers:

- 135 Restoration Projects
- 47 Tons of Nitrogen Reduced/Yr
- 7 Tons of Phosphorus Reduced/Yr
- 3,700 Tons of Sediment Reduced/Yr
- ~20,000 Gallons of Sewage Pumped in 2019
- 2,500 Students Educated/Yr



THANK YOU!



SHORE RIVERS

Our work is made possible by the generous support of our sponsors, members, foundations, and volunteers.

www.shorerivers.org/join

Report Card Sponsors

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