2021 Magothy River Index

Magothy River Assn., Inc.
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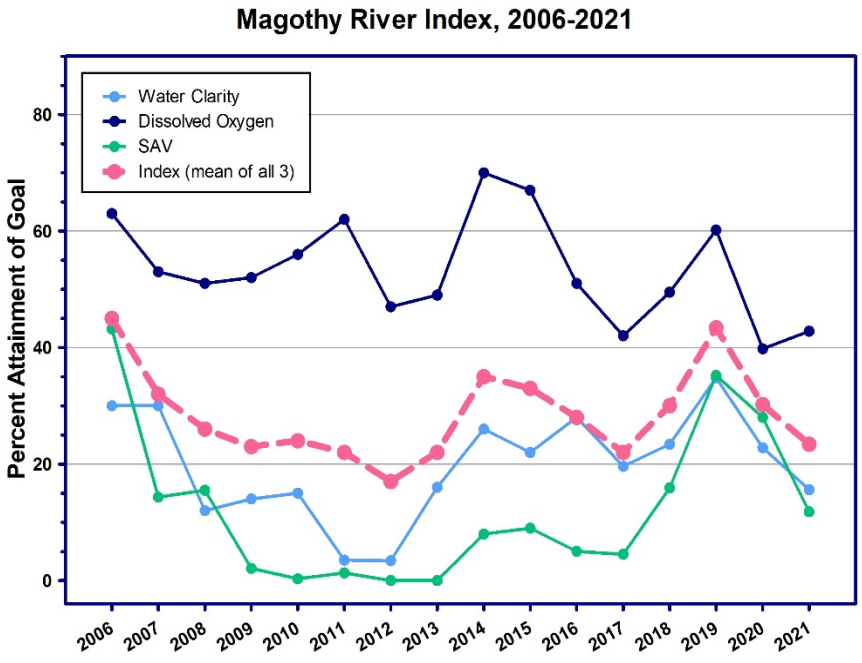
Prepared for "State of the Magothy" 3/16/22 by the MRA

Presented as a Zoom event

Magothy River Health Showed Mixed Results Again in 2021

The Magothy River Association's annual "Magothy River Index", first presented in 2003, assesses water quality in the tidal river. The Index is based on three criteria established by the Chesapeake Bay Program for ecosystem health, and is expressed as percent attainment of a desirable goal and as a letter grade where 0-20% is an F, 21-40 is a D and 41 to 60 is a C. The criteria are percent attainment of:

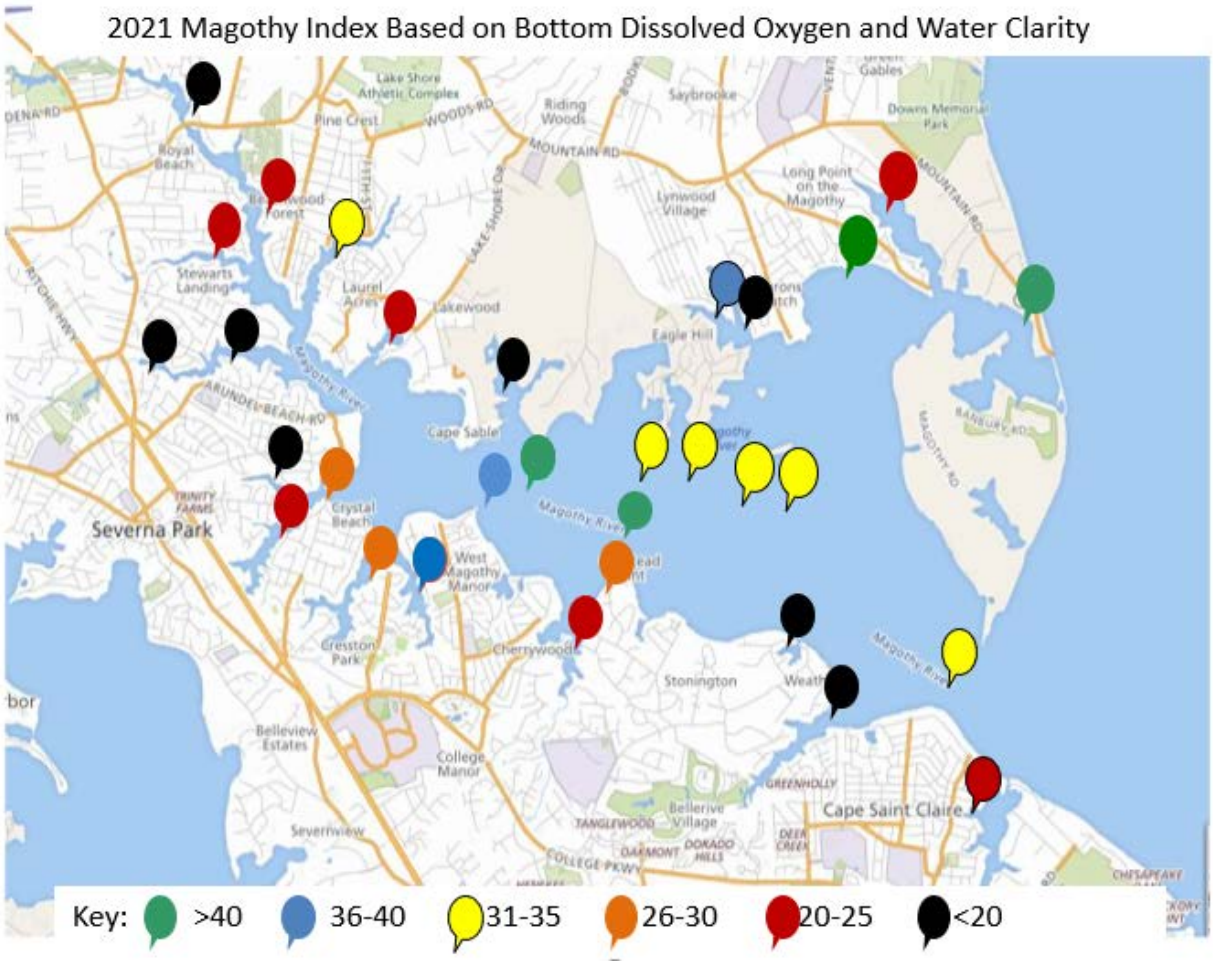
- water clarity based on Secchi disk depth of at least 1 meter
- dissolved oxygen of at least 5 mg/L in the deepest water at each station and
- achievement of the Chesapeake Bay Program Goal of 579 acres of submerged aquatic vegetation (SAV).



SAV requires water clarity for growth and provides dissolved oxygen as well as key food and habitat for fish and crabs while reducing the impact of wave action on the shore. Most fish, shellfish and aquatic invertebrates require at least 5 mg/L dissolved oxygen in the water column for their growth and reproduction. In 2021, BayLand Consultants & Designers Inc. surveyed only one creek in our watershed; they found seven acres of horned pondweed, the early season grass. The Virginia Institute of Marine Science (VIMS) aerial data for 2021 showed a decline from 123.1 acres of SAV in 2020 to 61.2 acres in 2021. Adding the Bayland coverage to the VIMS coverage gives us a total of 68.2 acres, which is 11.8 % of our goal. The VIMS coverage was reduced again this year because previously documented grass beds were reduced in the extent to which they grew out from the shore into deeper water. The majority of these grasses on the north shore were Redhead, Widgeon Grass, Waterweed and Milfoil. A primary cause for the low acerage of SAV was the low water clarity seen throughout the mainstem and in tributaries in 2021. In both 2020 and 2021, we can see that both water clarity and SAV acreage tracked downward. Low water clarity was due to the presence of phytoplankton, not sediments. In contrast, the concentration of dissolved oxygen in the deepest parts of the water column increased in 2021, although we did see low oxygen concentrations in the deep water of the mainstem during the warmest periods of the summer at most of our open water stations (see map below).

The identification of grasses was carried out by MRA volunteers who assessed SAV beds by kayak. Again this year MRA participated in the Chesapeake Bay Program's SAV Watchers. Volunteers received training in how to identify and geolocate SAV and were given Secchi Disks to measure water clarity. Volunteers then paddled in their neighborhood creeks and mainstem and monitored the presence and types of grasses. This information is key to "groundtruthing" the images seen in aerial photography taken by VIMS.

In addition to the SAV coverage, this year's index is based on data collected by volunteers from eight open water mainstem sites, two upstream mainstem sites and 20 creek or cove sites sampled from piers. We did not include the most upstream site of Cattail Creek in the final index since we don't sample in the headwaters of any of the other creeks. This years index is 23.4, which is a D.



In the figure above, the Index is calculated for each station using only bottom DO and water clarity data, since we don't have SAV coverage goals for creeks. When comparing to 2020, water quality declined at almost all sites due to low water clarity. Five of the eight open water stations were in the yellow zone (31 to 35% achievement of water clarity and dissolved oxygen goals), which is lower than we have seen in many years. We did have two open water stations in the green and one in the blue. It is disappointing to see poor water quality in the upper tidal portions of the river, as well as scattered throughout the watershed in various creeks. On the other hand, Mill Creek showed greatly improved water quality. This creek has been the site of more County restoration projects than any other creek in the county, so it is reassuring to see improved water quality. It is also encouraging to see good water quality in Eagle Cove and in Sillery Bay. It's disappointing to

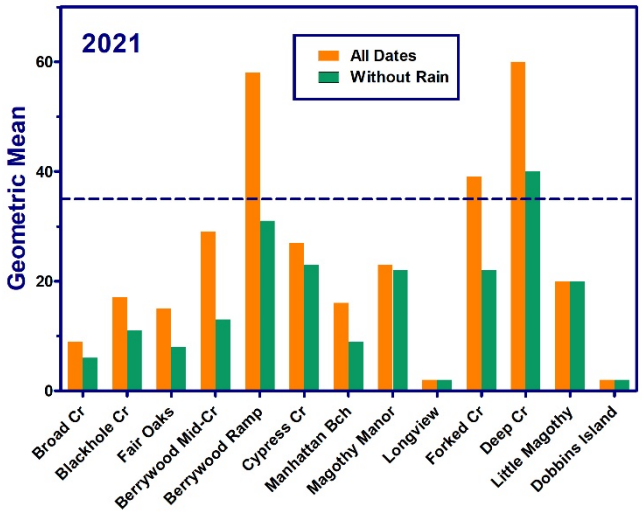
see poor water quality on Cornfield Creek, especially since there is good SAV growth on both shores of that creek but water clarity was poor there in 2021.

Algal blooms are caused by excess nutrients, brought by stormwater and leaching from septic systems. Could it be that more gardeners at home during the Covid pandemic applied more fertilizer to their lawns? We do see green lawns that come right to the shoreline on both sides of the River, and it is very likely that these landscapes release nutrients into the nearby tidal water. Septic systems release dissolved nitrogen into our waterways 24/7, even if they are functioning perfectly. They are not designed to reduce nutrients; they are designed to reduce fecal bacteria. Even the newer N-reducing systems still release N, just less than the traditional systems. Anne Arundel County is working on septic-to-sewer conversion projects for communities in the Critical Area. If your community is interested in making this conversion, you can find information at aahealth.org.

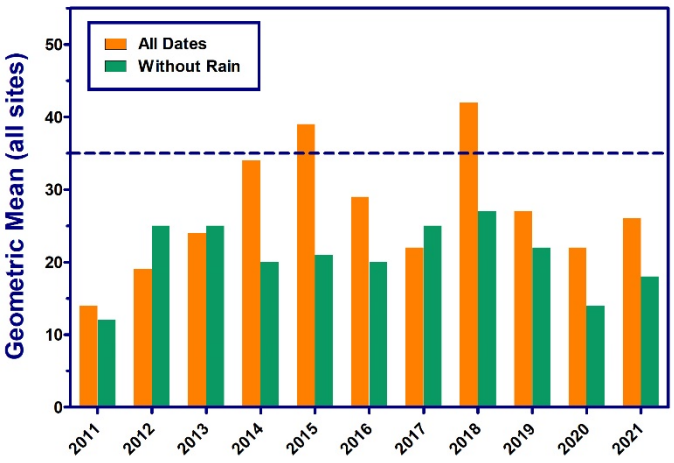
We thank our volunteer monitors for their dedicated work again this year: Steve Troy, Mike and Trish Lehman, Chris Kerchner, Paul Spadaro, Bob Royer, Jim Crafton, Chuck McClain, Roger Winstanley, Larry and Angela Turner and Tom Caperna. We sincerely thank waterfront property owners for access to their piers.

Good Bacterial Water Quality in 2021

Our waterways were safe for recreational use this summer at all sites except for three that were above the safe level after heavy rains: Deep Creek, Forked Creek,and the Berrywood restoration site at the headwaters of Cattail Creek. We monitor the population of enterococci (*Enterococcus faecalis*) in our waterways as this bacterium is an indicator of recent input of fecal waste. Most sites are sampled biweekly by students at AACC in the Clearwater program. Water samples are collected on Wednesday mornings, processed by filtration at the lab, and results, expressed as colony forming units or CFU/100 ml, are posted on Dr. Tammy Domanski's website : https://sites.google.com/view/aaccecoperationclearwater. In the figures to the right, bacterial numbers are expressed as the geometric mean, which enables us to see the summary for each site each season. The dotted line is drawn at 35 CFU/100 ml, which is the upper limit for safe recreational use. Heavy rains producing stormwater runoff sweep pet and wildlife waste into our creeks. By showing both dry weather conditions and all weather conditions, we can see which sites are most impacted by stormwater. The good news is that if we calculate the percent of the time that our waterways were swimmable, we would have a 90%



Enterococci (CFU/100 ml) at Magothy sites



score. Also note that the site behind Dobbins Island had excellent bacterial water quality all summer. The second figure shows the trend for the last ten years. Wet summers typically result in higher bacterial counts. It is important to note that **swimming in the 48 hours following a heavy rain is not recommended**.

Congratulations to AACC Student Evann Magee for Receiving MRA Scholarships

Evann Magee is in his second year of studying Environmental Science and ecological restoration at Anne Arundel Community College. He is pursuing a second career following changes that occurred during the COVID pandemic. He is also learning about the use of drones in research and hopes to be able to apply this knowledge to ecological monitoring. He has learned about the impacts of stormwater on water quality and understands the need to work with homeowners, farmers, developers and anyone who is interested in clean water. He wants to create change through education and activism. Evann will join MRA in several Earth Day activities this spring.

President's Statement: Communities that push back, win back. Working together we can restore the Magothy for generations to enjoy.

Lake Waterford Study: MRA has been monitoring water quality in Lake Waterford since 2019 to determine if it is suitable for fish stocking. Not only did we determine that water quality would not support fish stocking because of very low oxygen levels but we also witnessed a toxic blue-green algal bloom in summer 2019. We have determined that both the sediments and the water column are enriched in nitrogen (N) and the lake is sending N downstream to the River. Anne Arundel County Dept. of Public Works is planning to dredge the lake to improve water quality. We thank the County DPW for stepping in again this year to protect the yellow perch spawn just below the dam by setting out material to prevent sediments from entering the upper Magothy from the industrial area uphill and by clearing the beaver dam so that yellow perch could swim up to the headwaters to spawn.

MRA Volunteers in Action:

- Interested in monitoring for SAV by kayak or other small boat? MRA participates in the Chesapeake Bay SAV Watcher program. We will provide instruction on SAV identification and methods for monitoring and ask that you go out at least twice between May and September to look for grasses in an area of your choice. Please contact sally.hornor@gmail.com to find out more and to volunteer.
- Interested in growing oysters at your pier? Contact Paul at president@magothyriver.org
- Help monitor construction sites for sediment runoff; contact Brad Knopf at bdknopf@gmail.com.
- Do you have stories about growing up on the Magothy that you would like to share in our Living History project? Contact Andrea Germain at a3germain@gmail.com.
- Join MRA (MagothyRiver.org); only $25 for individuals and $35 for communities.

This index prepared by Sally Hornor with graphics support from Tom Caperna.