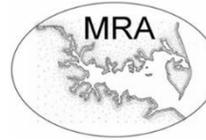


2019 Magothy River Index

Prepared for "State of the Magothy" 3/27/20 by the MRA
Event sponsored but postponed by the Environmental
Center at Anne Arundel Community College due to Covid-19



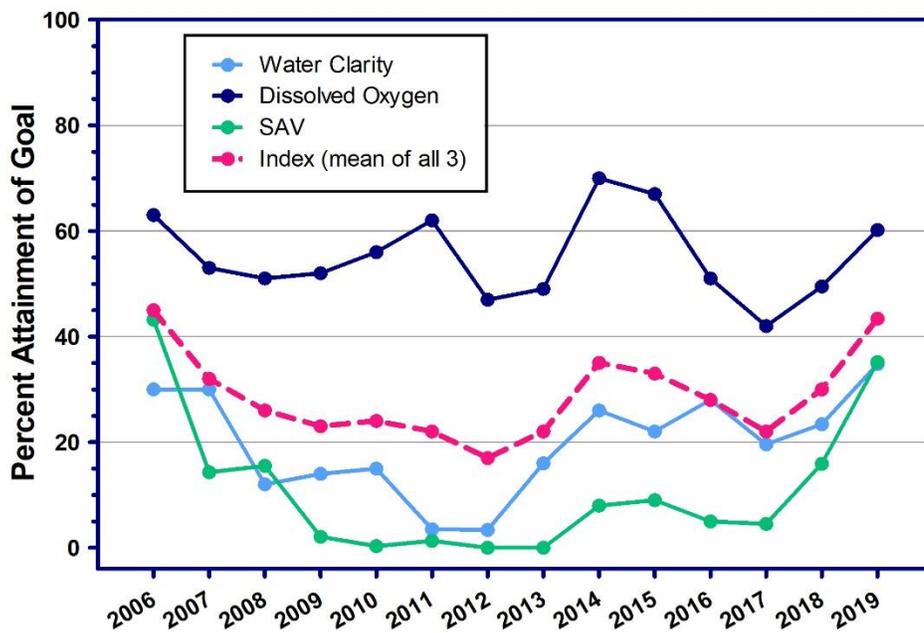
Magothy River Assn., Inc.
P. O. Box 550
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Magothy River Health Again Improved in 2019

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 544 acres of submerged aquatic vegetation (SAV).

Magothy River Index, 2006-2019



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 and aquatic invertebrates require at least 5 mg/L dissolved oxygen in the water column for their growth and reproduction. In 2019, BayLand surveyed one creek, Old Man, and two coves, Ross and Spriggs. They found 13 acres of submerged grasses in those areas. While Ross Cove and Old man Creek had primarily horned pondweed, which is gone by end of June, they found four grasses in

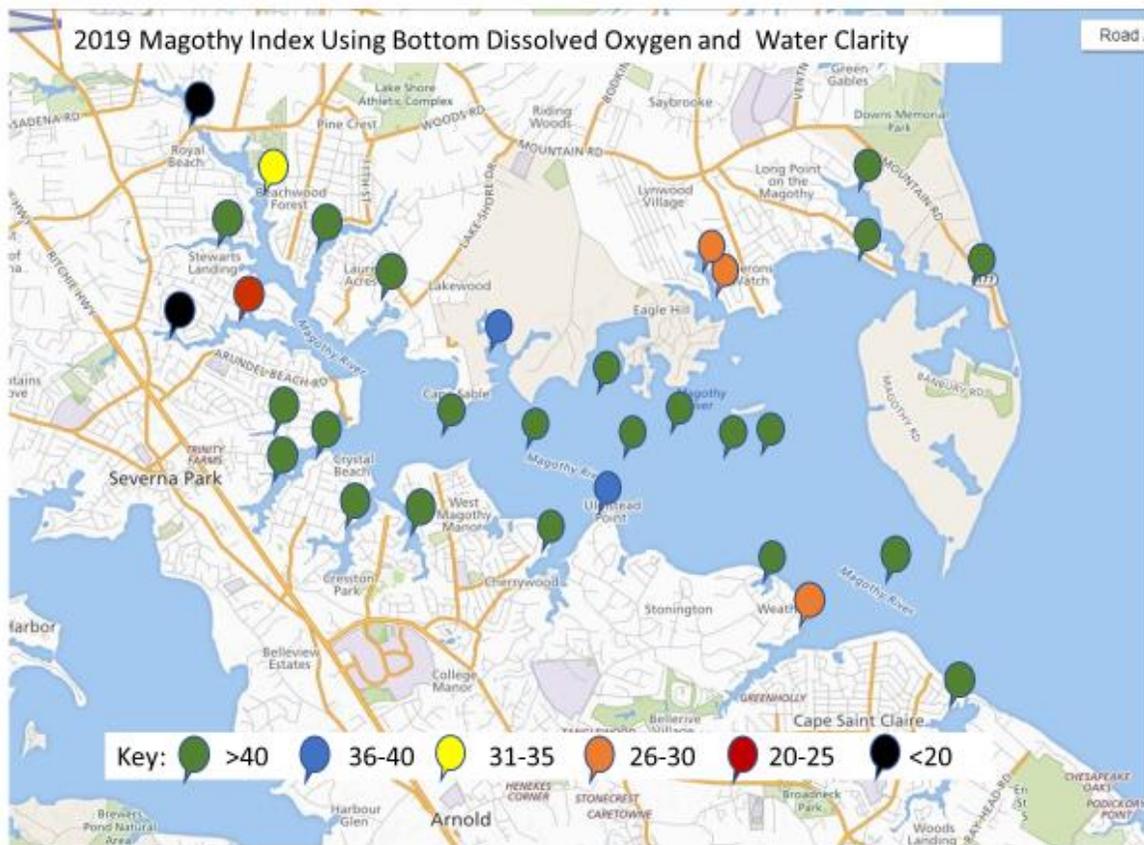
Spriggs Pond, including the native grasses Curly Pondweed and Sago. VIMS aerial data for 2019 showed 183.4 acres of SAV throughout the watershed. This is more SAV than we have seen in over ten years. The majority of these grasses were in dense beds composed of redhead and milfoil found on both shores of Cornfield Creek and around Eagle Cove and the Inner Harbor at Gibson Island. There were also dense beds of waterweed (*Elodea*), redhead and milfoil in the Little Magothy. All together we had a record coverage of 191 acres of SAV, which is 35% of optimal acreage. MRA volunteers did extensive surveys by boat as part of their circumnavigation effort and we were able to "groundtruth" these beds and identify the diversity of grass species.

Why have the grasses increased in the last two years? Certainly an important component is the presence of Dark False Mussels. They are filter feeders that remove both algae and sediments from the water column, resulting in

greater water clarity. They have remained in the River for the last two years due to high rainfall in 2018 which caused the River's salinity to remain very low during the summer of 2018 and until August of 2019. We received little rainfall during the summer of 2019, thus salinity finally returned to near normal by the end of summer. Once aquatic grasses become established, they are able to pump oxygen into their roots, oxygenating sediments. Simultaneously they are able to release oxygen into the water column. Both of these actions may help explain the greater DO this year. Water temperature and pH were about the same as the last two years, only salinity was significantly different.

This year's index is based on data collected by volunteers from nine open water mainstem sites, two upstream mainstem sites and 19 creek or cove sites. 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 year's index is 43, which is a C- and higher than what we have seen for over ten years. All indicators are up substantially this year, with the grasses showing the greatest improvement.

In the figure below, 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. We had only two very poor water quality sites this year; these two sites with black marks are both shallow water sites that receive a large amount of stormwater due to the heavily impervious watershed. Cattail Creek remains our most impaired creek, despite the recent restoration work at the headwaters. Full function of this restoration project may not yet be attained. Most creeks on the Magothy are improved from last year, including Old Man, North Cypress, Cypress, Dividing, Mill, and the Little Magothy. Gray's Creek was unchanged while Deep Creek showed a slight downturn. Both Ross Cove and Lake Placid showed improvement. The open water of the mainstem of the River continues to have good water quality throughout. We added one site in the mainstem this year which is in the area of future reef ball emplacement by Md DNR and MRA.



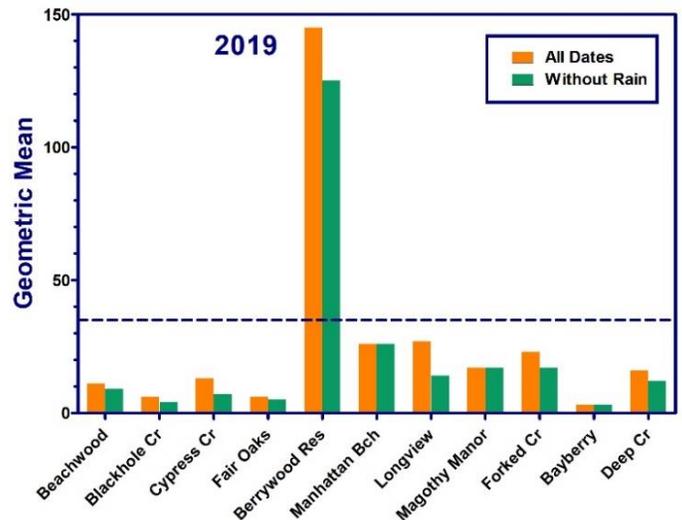
We thank our volunteer monitors for their dedicated work again this year: Steve Troy, Mike Lehman, Charles Haslup, Chris Kerchner, Paul Spadaro, Bob Royer, Jim Crafton, Kristen Vickery, Chuck McClain, Jim Palmer, Roger Winstanley, and Tom Caperna. We sincerely thank waterfront property owners for access to their piers. Charles Germain and Mike Maguire were our drone videographers, with boat support from Paul Spadaro. See Youtube Germain MRA for some fun and interesting drone videos.

Good Bacterial Water Quality in 2019

Our waterways were safe for recreational use this summer at all sites that are swimmable. 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 AACCC in the Magothy 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/aacccoperationclearwater>.

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 produce stormwater runoff, sweeping 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. We had very little rain during the swim season in 2019, contributing to the good bacterial water quality. The only high count was at the Berrywood restoration site. Water at this point is shallow but it is used for recreation by the community. As is true for all of our headwater creek sites, it receives runoff from a large watershed. 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**. While the fecal bacteria that are enumerated are not in themselves likely to cause disease, they indicate the presence of pathogenic bacteria when the enterococci count is elevated.



Enterococci (CFU/100 ml) at Magothy sites



Congratulations to AACC Student Alexander Thompson for Receiving MRA

Scholarships This is the second year that Alex has received funding from MRA. He earned a BS in Environmental Biology at Beloit College in 2016 and is now working toward an AS in calculus and engineering at AACC. He hopes to eventually earn an MS in environmental engineering and to work in stormwater management and stream restoration. Alex has worked and volunteered in the environmental field with the West & Rhode Riverkeeper, the Watershed Stewards Academy and the Annapolis Maritime Museum. He is currently working with the AACC Environmental Center flying drones for environmental surveys.



President's Statement: The health of the Magothy is improving. We know what to do. We need your help to keep this encouraging progress moving forward. Please join the Magothy River Association. Working together, we can restore the Magothy for generations to enjoy. To join, go to Magothyriver.org.

Lake Waterford Study: The MRA began monitoring water quality in Lake Waterford in 2019 to determine if it is suitable for fish stocking. Not only did we determine that water quality would not support fish, but we also learned that the lake had a toxic blue-green algal bloom in summer 2019 that caused MDE and the Health Dept.



to close the lake to all contact from June through September. In October, Jeremy Testa of Univ. of Md Center for Environmental Science assisted us by collecting sediment cores. We have been able to measure nutrients in the sediments and in water flowing downstream from the dam and we will continue to work with the County to find ways to improve water quality.

MRA Volunteers in Action:

- Interested in monitoring for SAV by kayak or other small boat? This year MRA will participate 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.
- Contact Paul Spadaro at president@magothyriver.org to volunteer for water quality monitoring or to help in circumnavigation of the river.
- 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 \$20 for individuals and \$25 for communities.

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