2020 Magothy River Index

Magothy River Assn., Inc.
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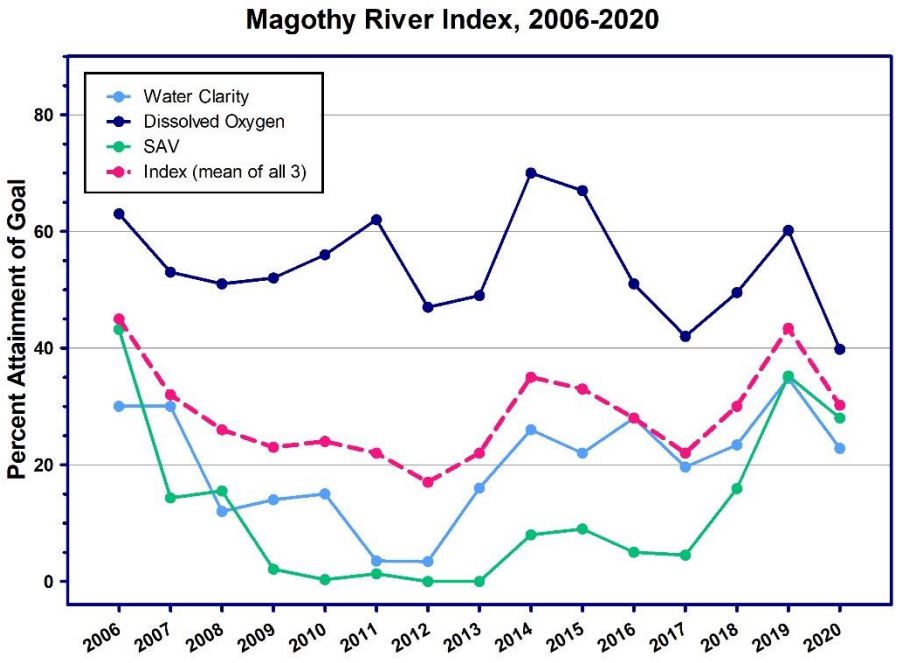
Prepared for "State of the Magothy" 3/17/21 by the MRA

Presented as a Zoom event

Magothy River Health Showed Mixed Results in 2020

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:

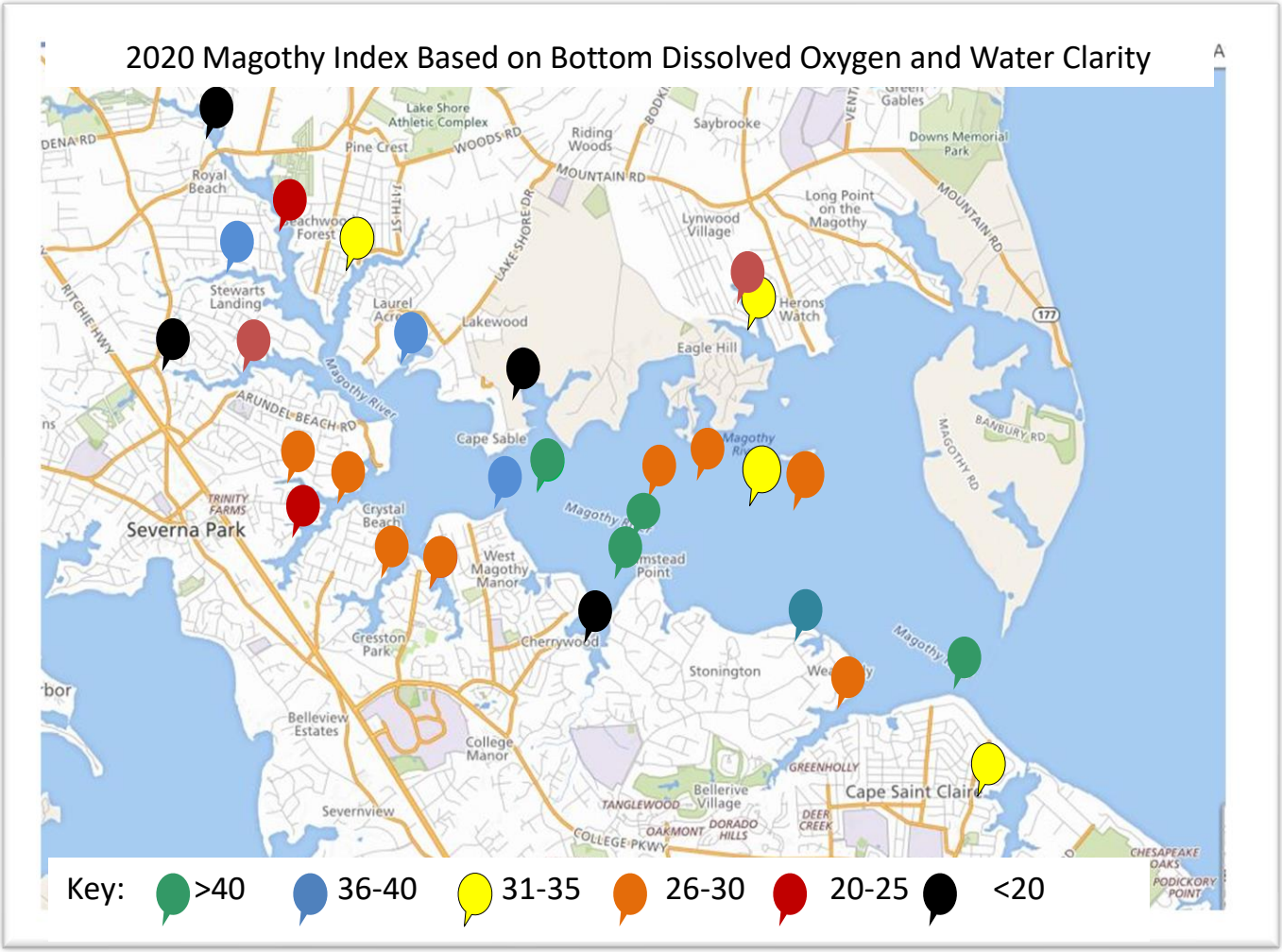
- water clarity based on Secchi disk depth of at least 1 meter
- dissolved oxygen of at least 5 mg/L in the deepest water at each station and
- achievement of the Chesapeake Bay Program Goal of 579 acres of submerged aquatic vegetation (SAV).



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 and aquatic invertebrates require at least 5 mg/L dissolved oxygen in the water column for their growth and reproduction. The Chesapeake Bay Program moved the goal post from a goal of 544 acres to 579 acres as an aspirational goal for SAV coverage, based on improved mapping. In 2020, BayLand Consultants & Designers Inc. surveyed Dividing, Deep and Grays Creeks and Hunters Harbor. They found 83 acres of submerged grasses in those areas. The only grass found in Dividing Creek was the early season Horned pondweed while this grass plus seven other later season grasses were found at the other sites. Other key grasses were Milfoil, Redhead, Sago and Waterweed. Virginia Institute of Marine Science (VIMS) aerial data for 2020 showed a decline from 183.4 acres of SAV in 2019 to 123.1 acres in 2020. Adding the Bayland coverage to the VIMS coverage without counting areas twice gives us a total of 164 acres, which is 28 % of our goal. The VIMS coverage was reduced this year because although they found grasses in most of the same beds, the beds did not extend as far from the shore as they had in the last two years. As in 2019, the majority of these grasses on the north shore were in dense beds composed of Redhead and Milfoil found on both shores of Cornfield Creek, around Eagle Cove, and the Inner Harbor at Gibson Island. There were also dense beds of Waterweed, Redhead and Milfoil in the Little Magothy.

This year MRA participated in the newly established Chesapeake Bay Program's SAV Watchers, led by Brooke Landry of MD Dept. of Natural Resources. MRA volunteers were joined in this effort by two college student interns, Mallary Sellers and Sydney Sholly. 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 16 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 years index is 32, which is a D. Almost all stations had both lower bottom DO and lower clarity.



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. Our deepest station, MR6 (depth 7 m or 23 feet), had bottom DO concentrations less than 1 mg/L from early June through early September and our second deepest station, F (depth of 5 m or 16 feet), had bottom DO less than 1 mg/L from early July through August. These sites qualify as "dead zones". Fortunately, neither of these are areas where there are oyster reefs or reef balls.

Why have DO and water clarity declined in 2020? Low water clarity in our River is caused by either an increase in sediments or by algae blooms. Although we do see sediments flowing into creeks after a heavy rain, the clays and silts settle out of the water column within a few days and are not carried to the mainstem. The

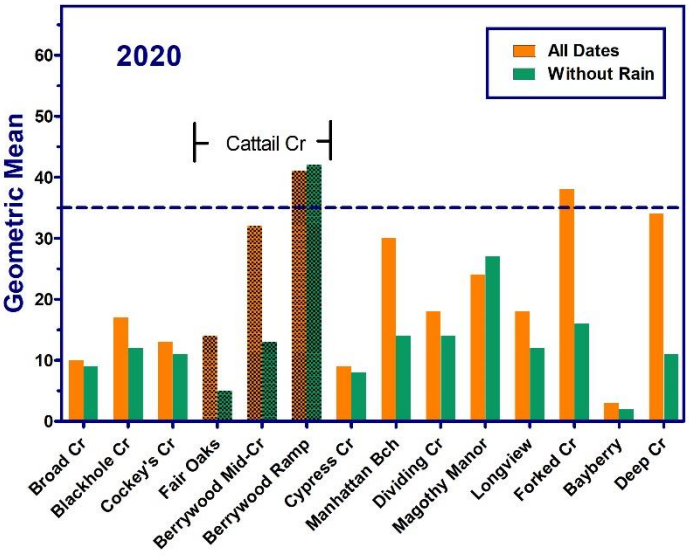
culprit that caused the low water clarity in both creeks and mainstem in 2020 was a microscopic alga in the dinoflagellate group. These algae have a reddish-brown hue, causing mahogany tides. Not only did we not see many Dark False Mussels this year that might have filtered algae in shallow water, but we saw wave after wave of algal blooms. Indeed, in December 2019, there was a massive mahogany tide that spread from Baltimore to Herring Bay. This phenomenon sometimes occurs in the winter but in 2019 it was more severe than usual. The combination of losing important filter feeders and having so many dinoflagellate blooms left our waters dark enough to significantly reduce Secchi Disk depth in both creeks and the mainstem. Apparently the creeks were too salty to support mussel reproduction in 2020. Even though we had an above normal rainfall in 2020, it was not enough to lower salinity.

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 called gardening stores during the summer to see if their fertilizer sales had increased; some said no and others said maybe a little. We did receive heavy rain in early August that flooded roads that have never flooded before. It may be that the timing and severity of rainfall are more significant than total volume.

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, Chuck McClain, Jim Palmer, Roger Winstanley, and Tom Caperna. We sincerely thank waterfront property owners for access to their piers.

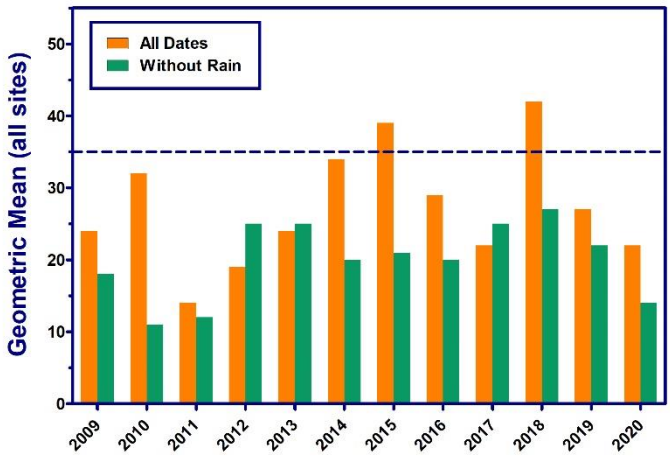
Good Bacterial Water Quality in 2020

Our waterways were safe for recreational use this summer at all sites that are swimmable despite some heavy rains. 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.



Enterococci (CFU/100 ml) at Magothy sites

In the figures to the right, bacterial counts are graphed 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. By showing both dry weather conditions and all weather conditions, we can see which sites are most impacted by stormwater. Heavy rains producing stormwater runoff sweep pet and



wildlife waste into our creeks. The high counts at the Berrywood restoration site are problematic since this shallow water is used for recreation by the community. 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 Alexander Thompson for Receiving MRA Scholarships

This is the third 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. He has earned his drone pilot license through coursework at AACC.

President's Statement

: In 2021 we will be celebrating the Magothy River Association's 75 anniversary: 75 years of leadership and stewardship preserving and protecting our watershed home. We are volunteer strong. We are ready, willing and able to face whatever challenges the Magothy River in the next 75 years.

Lake Waterford Study:

The MRA monitored water quality in Lake Waterford in 2019 and 2020 to determine if it is suitable for fish stocking. Not only did we determine that water quality would not support fish because of very low oxygen levels but we also witnessed a toxic blue-green algal bloom in summer 2019.

In October 2019, 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. Currently the County is considering dredging the lake to improve water quality.

MRA Volunteers in Action:

- Interested in monitoring for SAV by kayak? 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.
- MRA meets every third Wednesday evening at 7:30 via Zoom these days. We hope to meet at the Berrywood Clubhouse again after the pandemic.

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