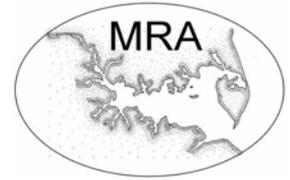


Magothy River Index

for 2013



Presented at "State of the Magothy," Wed. 2/19/14, by the Magothy River Association

Magothy Health Was 22% in 2013 (Grade: D-)

The Magothy River Association's annual "Magothy River Index," first presented in 2003, assesses the ecosystem health of the tidal river. Status is expressed as a percent (%) of a desirable goal (more is better), and also as a letter grade (0-20% is F, 80-100% is A).

MRA assessed ecosystem health based on three factors: water clarity (April-October Secchi depth ≥ 1 meter) and dissolved oxygen (DO, June-September water column DO ≥ 5 milligrams/liter or mg/l), both from MRA volunteers' data, and submerged aquatic vegetation (SAV) area from the Virginia Institute of Marine Science (VIMS). SAV need adequate water clarity to grow, and fish and shellfish need adequate DO to survive.

The 2013 mean score, **22% or D-**, was the same as in 2011, up slightly from 2012 (Fig. 1, magenta line). SAV status stayed the same as in 2012 (**no SAV mapped** for the second time since 1992), DO status rose slightly, and clarity status rose sharply, which raised the mean.

SAV & water clarity linkage

Water clarity (Secchi depth) data from 5 long-term monitoring sites were positively correlated with SAV area over 1992-2013 (Fig. 2): **more clarity usually meant more SAV**, and vice versa. Of the 5 sites, 4 are in creeks which had little or no SAV over that period, so water clarity from sites that were closer to SAV beds presumably would show a stronger relationship. Note that the clarity levels during the increasing SAV period, about 20-40%, were also observed during the first three years of SAV decline (2005-2007), with lower clarity (< 20%) starting in 2008. It appears there was a **1-year lag** between changes in water clarity and changes in SAV area.

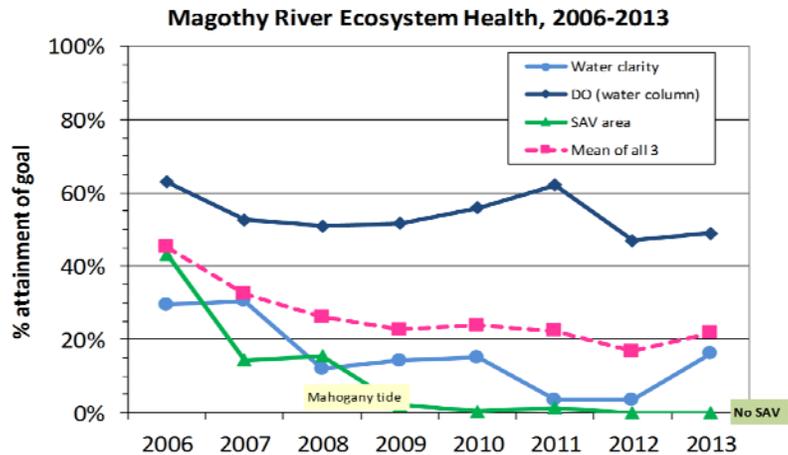


Fig. 1. Magothy ecosystem health status by year, 2006-2013, using data from 6 mainstem and 10 creek sites.

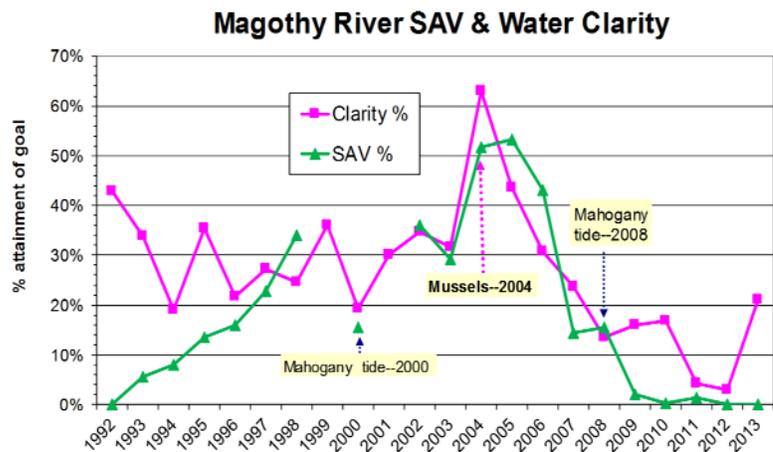


Fig. 2. Water clarity and SAV goal attainment by year for the 5 long-term monitoring sites, 1992-2013; 4 are in creeks.

Mainstem DO and water clarity showed very different trends over 12 years

Magothy water quality monitoring by the MRA has two components: in the creeks off piers, starting in 1992, and in the mainstem by boat, starting in 2002 (Fig. 4). In the mainstem, Dick Carey, and in 2013 Paul Spadaro, sampled 6 sites consistently, 5 over oyster reefs, and 1 at the same spot sampled by the state (MR6), which is about twice as deep as the other sites.

The trends in DO and clarity status at the mainstem sites (Fig. 3a & 3b) shows very different patterns. DO status (Fig. 3a) remained fairly constant from 2003-2013, with the exception of low DO during the very hot summer of 2005. DO concentrations were always lower at MR6, probably because it is deeper.

In contrast, clarity status (Fig. 3b) got much worse in 2003, possibly due to high flow, better in 2004-2007, possibly due to the increase in mussels and their filtration in 2004-2005, and then sharply worse in 2008, with only a slight uptick in 2010 since then. No one site was consistently better or worse.

The possible causes of these clarity changes are not clear. The mussels were all but gone by 2006, yet water clarity did not drop until 2008, two years later. We suspect that the “crash” in water clarity that began in 2008 was due to increased algal growth, which clouds the water along with suspended sediments. State data for algae (chlorophyll) and suspended sediments, collected at MR6, both showed increasing levels in 2010-2011 (see the graphs in the 2012 Magothy Report Card).

You can help reduce algae levels by reducing the size of your lawn, and using less or no fertilizer on it.

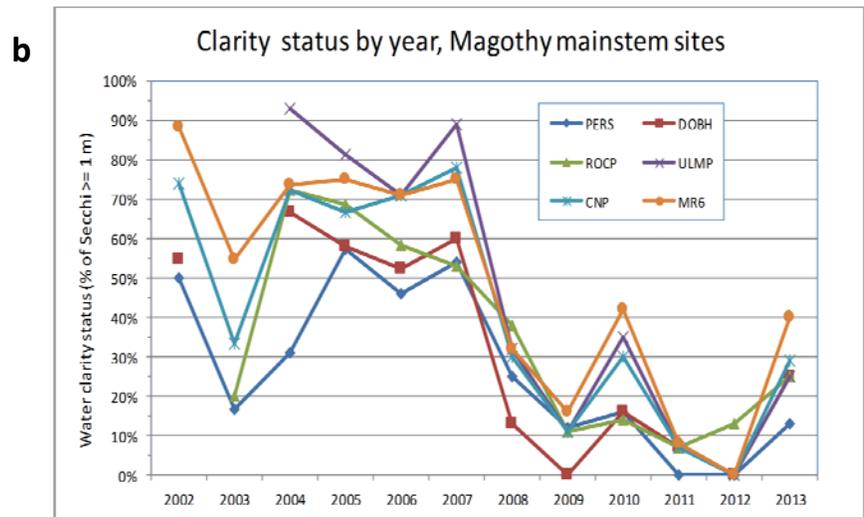
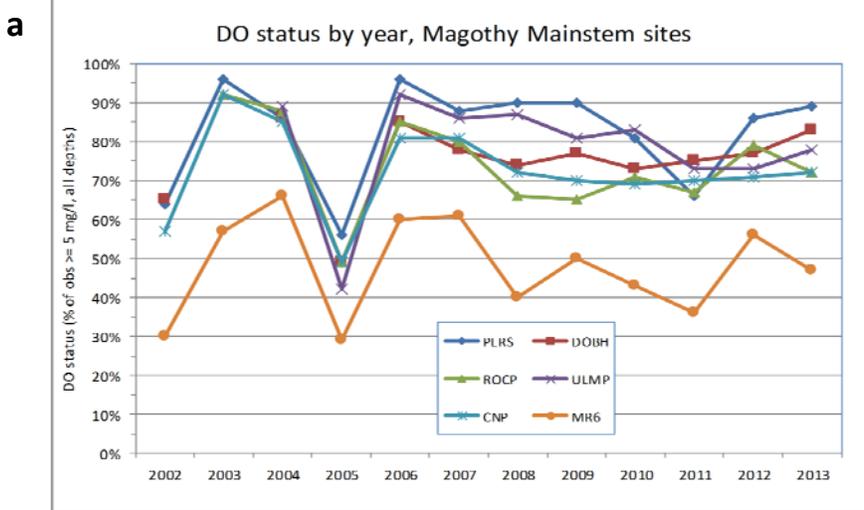


Fig. 3, a-b. Graphs of Magothy DO status (a) and water clarity status (b), 2002-2013. Note how the changes happened at different times.



Fig. 4. The source of the data in the two graphs above: the 6 mainstem sites that were sampled by boat. MR6 is green.

Beachwood Park progress in 2013!

We made lots of progress in 2013 towards making Beachwood Park more accessible and enjoyable for all. MRA volunteers worked with Anne Arundel County Parks & Recreation staff as well as other volunteers, including those from Eagle Cove School (ECS), to accomplish these improvements. Thanks to all who helped!

In 2013, we accomplished:

- Late 2012: MRA volunteers mapped out nature trail, the trail parallel shore line, with 3 river over looks
- March 2013: MRA volunteers cut nature trail path
- April 2013: MRA volunteers along with ECS volunteers mulched trail
- County improved Beachwood street lighting
- May 2013: MRA added trail and park signage and built two trail benches

- June 2013: first tour of our nature trail given by county staff to senior citizens who went to Beachwood when it was an amusement park
- Summer 2013: county put in off street parking
- Fall 2013: MRA and ECS volunteers finished mulching the Nature trail and ECS built two more benches.

In 2014, we plan:

- To finish the nature trail by adding more signs
- To have students at ECS make concrete leaf impressions to help visitors identify trees
- To use QR code technology on the signage and link to the park web site for additional information
- To continue to improve river access

To volunteer to help, contact beachwoodparkmd@gmail.com



Fig. 5. Kelly Kalinowski and Paul Spadaro cutting a fallen tree that was blocking water access. Photo by Zach Sparks for the Pasadena Voice .



Fig. 6. Beachwood Park cleanup results, October 2013. Photo by Sally Hornor.

“As long as the Magothy is out of balance its health will remain poor, but we know what we need to do to improve it: limit our impervious surface and use of fertilizers, control storm water run-off and plant more oysters, trees and grasses.” — MRA President Paul Spadaro

The MRA is proud to honor two students’ commitment to our watershed by awarding them MRA’s two scholarships in 2013: E. Gordon Riley Scholarship: **Anica McMahon**

Brent Kurrle Scholarship: **Greg Wolf**

Both support studies in Environmental Science at Anne Arundel Community College. Contact the AACC Science office (Dragun 238, 410-777-2260) to apply for MRA’s 2014 scholarships.



Get Involved!

Action	Result (or details)
Join the Magothy River Association: see www.magothyriver.org and click "Join Us."	Contact President Paul Spadaro at 410-647-8772 or president@magothyriver.org
Volunteer to help with oyster gardening, the new wetland plant floats (page 3), and with monitoring of water quality and oysters.	Contact Carl Treff to sign up for oyster gardening and the wetland floats magothyriversavers@yahoo.com ; Dick Carey to help with oyster monitoring magothyriverdiver@gmail.com ; or Paul Spadaro to help with water quality monitoring president@magothyriver.org
Plant more native trees. Cut trees down <i>only</i> when they pose an imminent threat to people or property.	Trees absorb nitrogen, reduce air pollution, provide food and habitat to animals, shade houses, and help hold soil
Install rain gardens and stormwater retrofits in your yard and neighborhood.	Reduces the quantity of stormwater runoff, and improve its quality, as was done in Manhattan Beach.
Replace some of your lawn with native flowers and shrubs; fertilize it only in the fall (if needed).	Reduces your use of fertilizer, lawn chemicals, water, and gas for mowing; increase habitat and food for animals, reduce harmful effects of runoff.
If you have a septic system, maintain it on schedule. Consider upgrading to a nitrogen removing system (priority is failing septic systems in the Critical Area).	Reduces nitrogen runoff into ground water and nearby streams. Grants may be available for septic upgrades—see http://www.ahealth.org/programs/env-hlth/well-septic-systems/brf/instructions
Reduce energy use and air pollution. Buy energy efficient cars and appliances and electric-powered yard tools, and use them in ways that minimize energy use.	Reduces greenhouse gas and nitrogen emissions; slows global climate change; saves you money.

The first pilot study of water gardens on the Magothy started in 2013, with 30 community members growing aquatic plants, with 8 wetland plant floats (shown at right), 2 SAV floats, and 20 wetland plant buckets tested. Thanks to Dr. Steve Ailstock and Mike Norman, AACC, for planning and organizing the project, Bruce Lenderking for building the prototype float, and all the volunteers who helped.



Mark your calendars for Magothy River Day on Saturday, June 14, 2014 at Lake Waterford Park in Pasadena. The Nautical Wheelers Band will provide great music again under the trees, and MRA and other organizations will have displays. Hope to see you there!

See <http://www.magothyriver.org> for more details!



Printed on 100% post-consumer recycled paper.

Thanks to:

- The MRA volunteers who helped with outreach events, did water monitoring, grew and planted oysters and SAV, and monitored oysters and SAV.
- Dr. Peter Bergstrom, NOAA Chesapeake Bay Office & MRA (writing, layout, data analysis, and graphs).
- Chesapeake Bay Trust and MD DNR for support for MRA projects.
- Dr. Bob Orth and Dave Wilcox at VIMS for SAV data.
- Everyone who gave comments.

