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 2014 mean score, 32% or D, was substantially higher than the 22 we found last year. We have not had such a high score since 2007 (Fig. 1). The improvement in the index was due to both a significant increase in dissolved oxygen concentrations in the water column and to improved water clarity. As of this printing, we have not received a report from VIMS on SAV in the Magothy. There may have been a small patch of widgeon grass (*Ruppia*) by Stonington, but no quantitative data were available. Water quality was no doubt improved by both the cooler summer of 2014 and the filtering activity of dark false mussels. There may also have been a reduction in sediments and pollutants entering our creeks thanks to the installation of stormwater management systems by the County. Although there was little or no SAV mapped by VIMS, volunteers in kayaks did locate many beds of “early season” submerged aquatic vegetation, primarily horned pondweed or *Zannichellia palustris* (Fig.4).
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. 2). In the mainstem, Dick Carey, and in 2013-14 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 trend in DO status (Fig. 3a) shows significant improvements in 2014, most likely due to the cooler temperatures. DO concentrations were always lower at MR6, probably because it is deeper.

In contrast, clarity status (Fig. 3b) showed a mixed response in 2014. High values in water clarity in 2004-2007 are attributed to filtration and removal of sediments and algae by mussels. We hypothesize that greater water clarity in 2013-2014 is due to both the mussels and to the cooler temperatures resulting in less algal growth. Indeed, we had very little mahogany tide-colored water in 2014.

2014 SAV Hunt

We had a successful launch for the SAV Hunt this year thanks to the help of Jeff Reagan and many volunteers who traveled the shorelines of our creeks and river to locate and identify underwater grasses (Fig. 4). About a dozen groups reported their findings on this Google map. Most of the grass that was seen was horned pondweed, Zanichellia palustris, a grass that is considered “early season” because it doesn’t persist beyond June. Nevertheless, it does provide habitat and food for wildlife in May and June. We wanted to document the presence of these grasses since they are not recorded in the VIMS aerial surveys. We hope to continue and improve monitoring next year.
Dark False Mussels Have Returned

We have seen great improvements in water clarity in our creeks where the dark false mussels, *Mytilopsis leucophaeata*, are found, see Fig. 5. This is very similar to what we saw in 2004-2005 when the mussels were last in abundance. Our hypothesis is that mussels do well in years when we have enough rain to reduce salinity in our creeks. We also learned this summer that they grow best at depths of 4-6 feet, thanks to an experiment that Steve Troy carried out at his pier on Dividing Creek, see Fig. 6. Mussels were also seen in Mill Creek and in Cattail Creek on pilings and oyster cages. Over the course of this summer, it appears that the mussels reproduced at least twice, leading to very high biomass in some areas. The floating gardens that were placed in Dividing Creek were covered with mussels on their undersides when they were returned to the AACC Environmental Center at the end of the summer. We scraped off the mussels and weighed them; they weighed 75 pounds!

The downside of the mussels is that when dogs eat them, they can become very sick or even die of liver failure. This same phenomenon happened in 2005. We don’t know what makes the mussels toxic. It may be that they concentrate a toxin produced by algae; certain blue-green algal toxins are known to cause liver failure when dogs drink water that is supporting an algal bloom. Or perhaps the dogs ate dead mussels that contained bacterial toxins produced during decomposition. The key message is to not permit dogs to eat the mussels, whether dead or alive. Keep dogs on a leash when near the water. If dogs do eat some mussels, keep a close watch on them and if they appear sick, call your veterinarian immediately. Dr. Carl Rogge, a veterinarian from Severna Park, has assisted the Magothy River Assn in composing a one page brochure about the effects of harmful algal blooms and dark false mussels. We will post this information on our Facebook page.

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“I am encouraged to report that the health of the Magothy has improved. We are on the right track. As good stewards, we must continue to take proactive steps to protect the river and not be bullied into thinking that we cannot control development. This is where we live; this is our home.”

— MRA President Paul Spadaro

The MRA is proud to honor two students’ commitment to our watershed by awarding them MRA’s two scholarships in 2014: E. Gordon Riley Scholarship: **Greg Wolf**

James Gutman Scholarship: **Kevin Gautrey**

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 2015 scholarships.
Ways To Get Involved!

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<th>Action</th>
<th>Result (or details)</th>
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<td>Join the Magothy River Association: see <a href="http://www.magothyriver.org">www.magothyriver.org</a> and click &quot;Join Us.&quot;</td>
<td>Contact President Paul Spadaro at 410-647-8772 or <a href="mailto:president@magothyriver.org">president@magothyriver.org</a></td>
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<tr>
<td>Volunteer to help with oyster gardening, the wetland plant floats and with monitoring of water quality, SAV and oysters.</td>
<td>Contact Carl Treff to sign up for oyster gardening and the wetland floats <a href="mailto:magothyriversavers@yahoo.com">magothyriversavers@yahoo.com</a>; Dick Carey to help with oyster monitoring <a href="mailto:magothyriverdiver@gmail.com">magothyriverdiver@gmail.com</a>; or Paul Spadaro to help with water quality monitoring <a href="mailto:president@magothyriver.org">president@magothyriver.org</a></td>
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<td>Plant more native trees. Cut trees down only when they pose an imminent threat to people or property.</td>
<td>Trees absorb nitrogen, reduce air pollution, provide food and habitat to animals, shade houses, and help hold soil</td>
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<tr>
<td>Install rain gardens and stormwater retrofits in your yard and neighborhood.</td>
<td>Reduces the quantity of stormwater runoff, and improve its quality, as was done in Manhattan Beach.</td>
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<tr>
<td>Replace some of your lawn with native flowers and shrubs; fertilize it only in the fall (if needed).</td>
<td>Reduces your use of fertilizer, lawn chemicals, water, and gas for mowing; increase habitat and food for animals, reduce harmful effects of runoff. For more info, see <a href="http://mda.maryland.gov/SiteAssets/Pages/fertilizer/HowToFertilizeYourLawn.pdf">http://mda.maryland.gov/SiteAssets/Pages/fertilizer/HowToFertilizeYourLawn.pdf</a></td>
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<td>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).</td>
<td>Reduces nitrogen runoff into ground water and nearby streams. Grants may be available for septic upgrades—see <a href="http://www.aehealth.org/programs/env-hlth/well-septic-systems/brf/instructions">http://www.aehealth.org/programs/env-hlth/well-septic-systems/brf/instructions</a></td>
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2014 was the second year for water gardens on the Magothy, 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 floats, and all the volunteers who helped.

Mark your calendars for Magothy River Day on Saturday, June 13, 2015 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!

Thanks to:
- the MRA volunteers who helped with Beachwood Park, especially Kelly Kalinowski
- Volunteers who grew and planted oysters, especially Carl Treff and Brad Knopf
- the water quality monitors: Steve Troy, Dave Kemp, Mike and Trish Lehman, Chris Kerschner & Paul Spadaro.
- Jeff Reagan and all the kayakers who monitored SAV.
- Peter Bergstrom who developed the Magothy River Index.
- Sally Hornor who prepared the 2014 Index.
- Anne Arundel County Dept. of Public Works for stormwater restoration projects.

Magothy River Index for 2014

Printed on 100% post-consumer recycled paper.