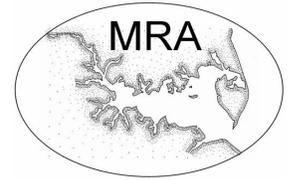


# Magothy River Index

for 2008



Presented at "State of the Magothy," Wed. 2/18/09, by the Magothy River Association

## Aquatic health fell to 30% in 2008

The Magothy River Association's "Magothy River Index" is an assessment of the aquatic health of the tidal river, produced annually by the MRA since 2003. It reports the status of vital habitats and water quality in the Magothy in the previous year. Status is expressed as a percent (%) of a desirable goal (more is better). We assessed aquatic health based on three factors: water clarity (Secchi depth) and dissolved oxygen (DO) data collected by MRA volunteers, and Submerged Aquatic Vegetation (SAV) data collected by the Virginia Institute of Marine Science (VIMS). SAV need adequate water clarity to grow, and fish and shellfish need adequate DO to survive. SAV, in turn, provides food and habitat for fish and shellfish. The 2008 status, 30%, was the lowest value we've measured, down from 42% last year (Fig. 1). The dark false mussels that filtered so much water in 2004 probably improved the status that year (65%), when SAV, water clarity, and DO all improved (Fig. 3, next page).

### Magothy River Aquatic Health Status

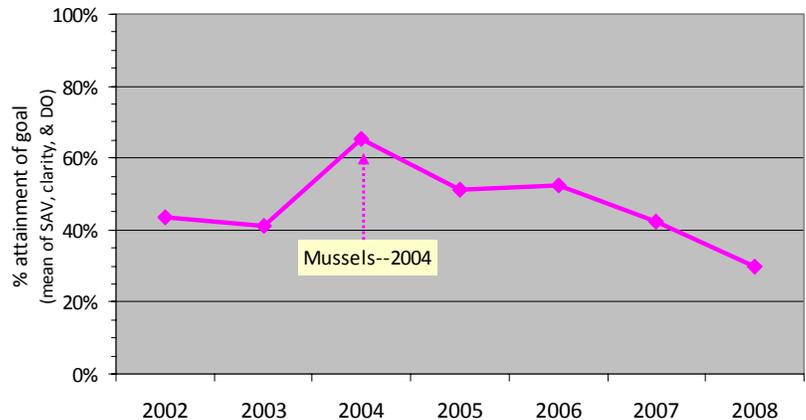


Fig. 1. Magothy aquatic health status by year, 2002-2008.

*We are at a cross roads on how we deal with the recent declines in Magothy aquatic health. I am optimistic that watershed residents will make the right choices to help to reverse this trend.*

(MRA President Paul Spadaro)

## SAV area rose and then fell, 2002-2008

Submerged Aquatic Vegetation (SAV) area in the Magothy peaked in 2004-05, and then declined in 2006-2008 (see Fig 3, next page). SAV area increased slightly in 2008 to 90 acres from its 2007 low of 83 acres, which was the lowest area mapped since 1995. The Magothy restoration goal is 579 acres. The map at right (Fig. 2) shows 2007 SAV distribution (the latest map available) as green, blue, or yellow shapes, which were mainly in the lower river on the south shore and near Gibson Island. For maps of SAV in other years, see <http://www.vims.edu/bio/sav/> and click on "Reports" in the blue bar.

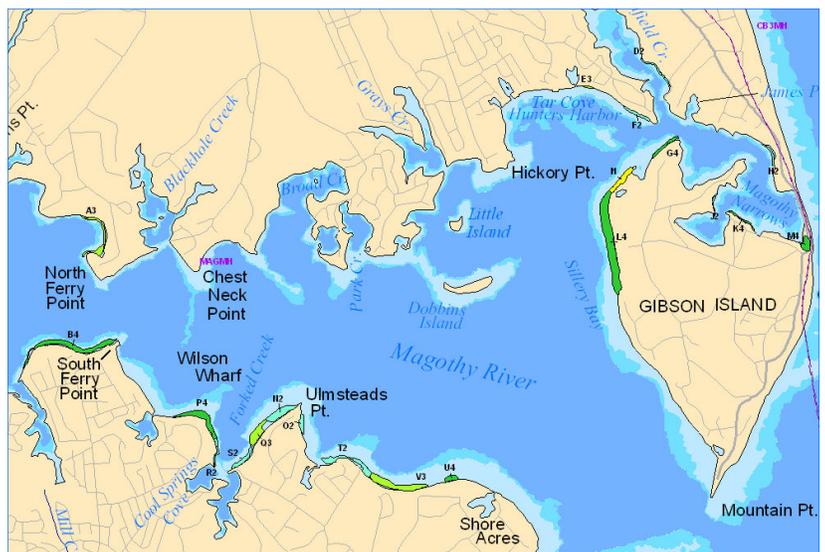


Fig. 2. Map of 2007 Magothy SAV beds by VIMS.

# Dissolved oxygen and water clarity status fell in 2008

The water quality status in Fig. 3 uses data from 8-12 long-term MRA sampling sites, not the new “Surf Team” data described on the next page.

The Magothy **dissolved oxygen goal** is DO > 5 mg/l through the whole water column. DO status rose in 2004 when mussels were abundant, dipped in 2005 when the summer was hot and calm, and then recovered to earlier levels, but fell again in 2008 (Fig. 3).

The Magothy **water clarity goal** is Secchi depth  $\geq$  1.0 meter, which should allow SAV growth. Water clarity status declined in 2003 when a wet year followed several years of drought, peaked in 2004-05 when dark false mussels were abundant, and declined in 2006-07 after the mussels died back. The sharp drop in 2008 was probably caused by mahogany tides, which lasted from July through October at two long-term sampling sites in creeks. Mahogany tides have been seen in the Magothy before, but had not been this severe since 2000. We think the drop in water clarity in 2008 did not cause a drop in SAV area because few of our long-term sites are near SAV.

Magothy Aquatic Health Components, 2002-2008

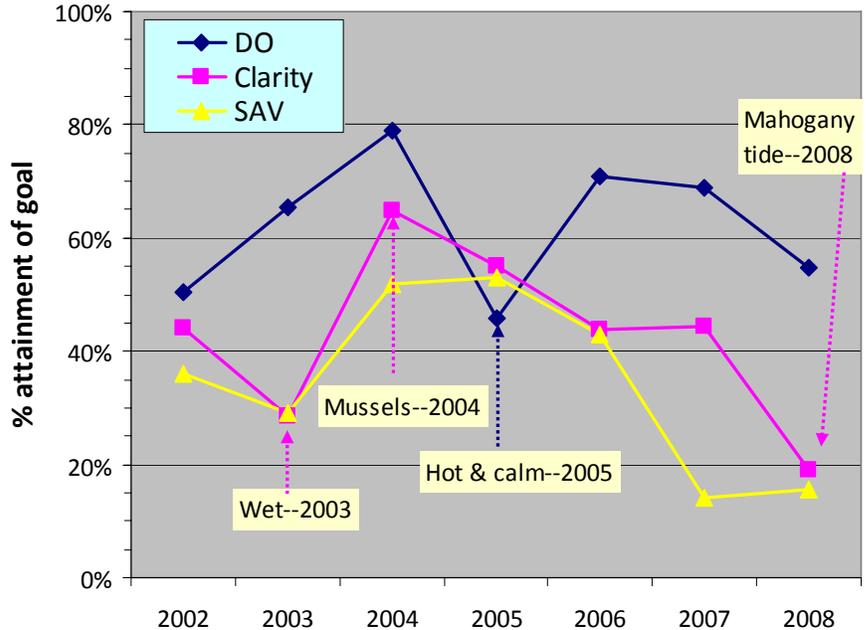


Fig. 3 Graph of aquatic health components by year, 2002-2008 .

### What’s a mahogany tide?

Several Magothy creeks had persistent mahogany tides in summer and fall 2008. It’s not a tide but an algae bloom, caused by one of two groups of dinoflagellates. Both produce a red-brown mahogany color, reducing water clarity. When the dinoflagellates die and fall to the bottom, their decomposition can reduce DO levels. To learn more, see: <http://www.dnr.state.md.us/Bay/hab/prorocentrum.html>

# Bacteria status was good in 2008

Bacteria levels (enterococci) are tested by Dr. Sally Hornor, Anne Arundel Community College, at several beaches each summer. There were 3 sites sampled in 2007, and 1 of them, Mago Vista, had a geometric mean slightly above the action level (red symbol, Fig. 4). In 2008, none of the 6 sites had geometric means above the action level, so the 2008 bacteria status for the river was 100% (no red symbols). These data exclude samples taken after rain. Contact Dr. Hornor if you want testing at your beach in 2009 (for a fee): [clearwater@severnriver.org](mailto:clearwater@severnriver.org)



Fig. 4. Map of Magothy bacteria status, 2007-2008.

# Water clarity varied along the river in 2008

The MRA Creek Watchers (CW) "Surf Team" led by Carl Treff completed their first year of data collection in 2008. The map at right (Fig. 5) shows all of the active sites through fall 2008. At these sites, volunteers collected water quality data in at least 6 of the 7 months (April-October) that make up the growing season for Submerged Aquatic Vegetation (SAV).

The results for water clarity (Secchi depth) give us our first detailed look at how this changes along the length of the river, especially in the creeks. Past monitoring efforts did not sample as many stations. As in Fig. 3, clarity status was the % of Secchi depths that were  $\geq 1.0$  meter.

Fig. 6 shows that the sites near SAV beds (green symbols, all in the lower river) had the best water clarity status in 2008, with 14% or more of the values at or above 1 meter. All of the other sites, which did not have SAV nearby, had worse status, except the two sites that are the farthest upriver. Those two sites may have been upriver of the mahogany tides.

The Severn River shows a similar pattern of better water clarity near SAV, except most SAV occurs in the middle of that river, near Round Bay, rather than in the lower river.

The Surf Team also collected salinity data, and their median values ranged from 4-7 parts per thousand (ppt).

If we can add more CW sampling sites near SAV on the lower river in 2009, we'll get a better idea of how clear the water needs to be to allow SAV growth in the Magothy. Contact Carl Treff to volunteer at

[MRACreekWatchers@yahoo.com](mailto:MRACreekWatchers@yahoo.com)

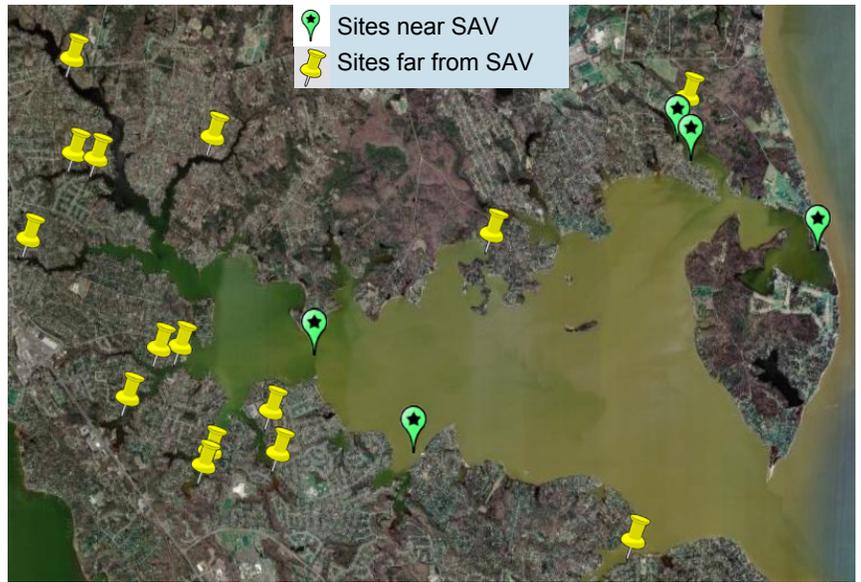


Fig. 5 MRA CW Surf Team active sampling sites, 2008.

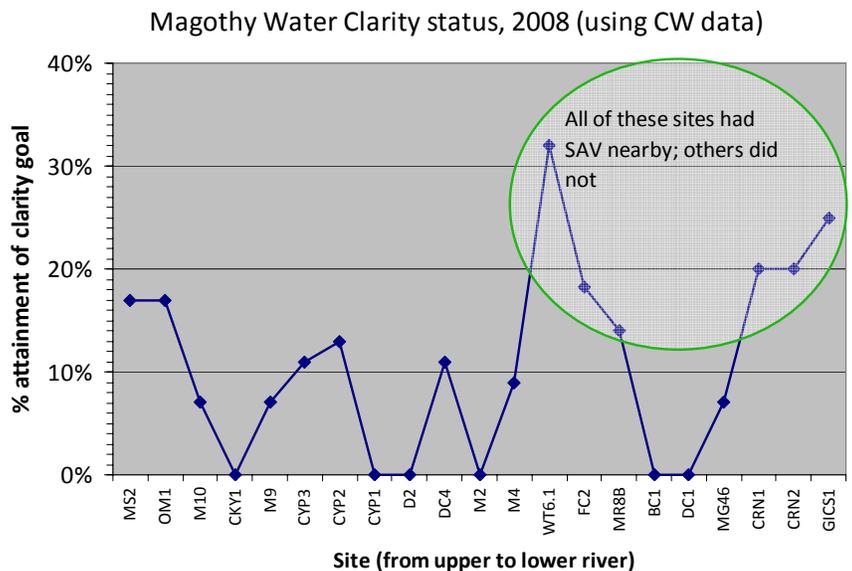


Fig. 6. Water clarity status in 2008 using CW data.



# Our homework

Action	Result
Plant more native trees; cut them down only when dead and/or dangerous.	Trees absorb nitrogen, reduce air pollution, provide food and habitat to animals, shade houses, etc.
Replace some of your lawn with native flowers and shrubs; fertilize it only in the fall (if needed). Plant a rain garden if you have a good place for one.	Reduce 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 (grants may be available from MDE).	Reduce nitrogen runoff into ground water and nearby streams. To apply for grants for upgrades see: <a href="http://www.mde.state.md.us/water/cbwrif/osds/imp.asp">http://www.mde.state.md.us/water/cbwrif/osds/imp.asp</a>
Reduce your energy usage. Buy energy efficient cars and appliances, and use them wisely to minimize energy use.	Reduces greenhouse gas and nitrogen emissions; slows global climate change; saves you money.
Volunteer for MRA habitat restoration projects (oysters and SAV), including monitoring of both habitats.	We improve some of our vital habitats. Please contact Dick Carey to help with oysters and/or diving at <a href="mailto:diver@magothyriver.org">diver@magothyriver.org</a> , or Carl Treff to help with SAV at <a href="mailto:magothyriver savers@yahoo.com">magothyriver savers@yahoo.com</a> .
Volunteer to be an MRA "Creek Watcher," especially on the Surf Team (doing water monitoring).	We get a better picture of the river's problem areas. Please contact Carl Treff to find out how you can help, at <a href="mailto:MRACreekWatchers@yahoo.com">MRACreekWatchers@yahoo.com</a> .
Join the Magothy River Association: see <a href="http://www.magothyriver.org//Membership_form.htm">http://www.magothyriver.org//Membership_form.htm</a>	Or, contact President Paul Spadaro at 410-647-8772 or <a href="mailto:president@magothyriver.org">president@magothyriver.org</a> .

*Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it is the only thing that ever has.*  
(Anthropologist Margaret Mead)



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