

# Magothy River Index – 2002

## The Magothy River Index–2002

February 19, 2003

### “State of the Magothy River”

The Magothy River Association (MRA) is dedicated to the preservation and improvement of the water quality, plants, and wildlife of the Magothy River and its watershed. Founded in 1946, it is an all-volunteer group representing about 46 communities along the Magothy River Watershed. We devote our efforts to projects that protect the welfare of the river and its inhabitants.

The Magothy River Association’s Magothy River Index is a new annual assessment of the health of the tidal river for communication to the residents of the watershed. Its format is based on similar reports by the Chesapeake Bay Foundation on the whole Bay, and by the Potomac River Association on Breton Bay in Saint Mary’s County. We hope that this index is useful to residents of the watershed to learn more about the status of vital habitats water quality in the previous year. We plan to issue this report each year in late winter, and hope to add more data to it each year as they become available. Updated versions and additional details on methods and data sources will be available soon on our web site, [www.magothyriver.org](http://www.magothyriver.org). Suggestions on how to improve the report are welcome, and can be sent to principal author Peter Bergstrom at [sav2@magothyriver.org](mailto:sav2@magothyriver.org).

The factors used in the Index are divided into two categories: Vital Habitats and Water Quality. Habitats are good places for the fish and wildlife of the Magothy to live, such as fish, crabs, turtles, and birds. Water quality is another way to measure the quality of the Magothy as a habitat for aquatic life. Unfortunately, some factors for which we have data have no goal, and we do not have any assessments of how many fish and wildlife we had in the Magothy in 2002, so we cannot use them in the Index. Several important factors for which we cannot calculate an index value are discussed after the Water Quality section. We did not calculate an overall average index value, because so many important factors have no goal or no data available.

## VITAL HABITATS

**Tidal and Non-Tidal Wetlands:** These are important habitats for fish and wildlife, and they are greatly reduced in the Magothy watershed compared to what was here in the past. Wetlands once made up 7.5% of the watershed, which we used as our interim goal. They now cover 2% of the watershed, so currently wetlands are 27% of this goal. [>>More Information](#)

**Submerged Aquatic Vegetation (SAV):** These underwater bay grasses provide crucial habitat for fish, crabs and numerous other aquatic creatures. The Chesapeake Bay Program goal for SAV restoration in the Magothy is 585 acres. In 1998, the last year with complete Magothy surveys and no local dieback, there were 198 acres of SAV mapped in the Magothy, or 34% of the CBP goal. This index is provisional until the 2002 SAV data are available next year. MRA volunteers have been doing SAV restoration for several years; see our web site for details. [>>More Information](#)

**Forested Stream Buffers:** These buffers improve water quality and provide wildlife habitats. In 1997 (the latest year with data), 23% of Magothy streams had at least a 100 foot wide forested buffer, also called a riparian forested buffer. Ideally, this would be 100% (our goal), and we can increase this by planting trees along streams that lack them (see Conclusions section). The Chesapeake Bay Foundation has started a new program to encourage planting forested stream buffers in suburban areas of Lancaster County, PA. [>>More Information](#)

## WATER QUALITY

**Water Clarity:** To allow the return of submerged aquatic vegetation (SAV) the Chesapeake Bay Program (CBP) has adopted the goal of improving water clarity (in rivers with higher salinity such as the Magothy) so that at least 22% of surface light reaches the bottom, at the restoration depth for SAV in that river (1.3 meters in the Magothy). MRA volunteers collected the water clarity data used for this index in shallow water (where SAV grows) at three stations in two groups, all sampled monthly on the same day:

- 1) “Upper creeks:” data from two creek stations were averaged to represent conditions in the smaller, upriver creeks.
- 2) “Mainstem:” data from the Ulmstead pier represents conditions near shore in the wider part of the river and the mouths of the larger creeks.

We found that the water clarity at the Upper creek sites in 2002 only achieved 26% of the goal, while the Mainstem site achieved 56% of the goal. [>>More Information](#)

**Dissolved Oxygen:** Dissolved oxygen is important to the survival of the organisms we cherish in the Magothy River. Most aquatic animals require adequate dissolved oxygen to survive. State water quality standards require a minimum of 5.0 milligram per liter (mg/l) of dissolved oxygen, the level needed by many fish. Oysters can survive with less dissolved oxygen, as little as 2.0 mg/l. MRA volunteers collected the dissolved oxygen data used for this index near the bottom (where oysters live) by at four stations in two groups, all sampled weekly on the same day:

- 1) “Midriver” is the same station (WT6.1) that is also sampled monthly by Maryland Department of Natural Resources, located between North & South Ferry Points, which has no oysters.
- 2) Three “Oyster sites” were all at oyster restoration sites and had similar water quality, so their results were averaged and reported as a single value.

We found that the dissolved oxygen at the Oyster sites was generally higher (better for oyster growth and survival) than dissolved oxygen at the Midriver site (see table for details). This is encouraging and shows that we picked oyster restoration sites where there is usually enough dissolved oxygen for oyster survival (94% of our samples). [>>More Information](#)

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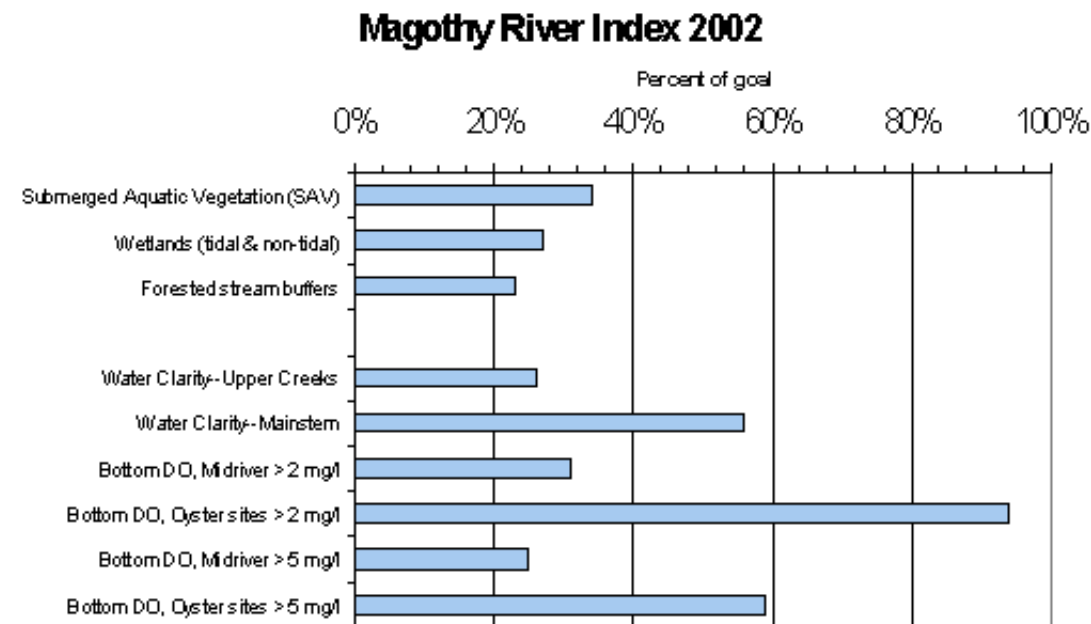
Indicator	What	Where	2002 Index
<b>VITAL HABITATS</b>			
Submerged Aquatic Vegetation (SAV)	% of historical amount (provisional, see text)	All tidal waters	<b>34%</b>
Wetlands (tidal & non-tidal)	% of historical amount (estimated)	Whole watershed	<b>27%</b>
Forested stream buffers	% of stream miles with 100 foot or wider buffers	All nontidal streams	<b>23%</b>
<b>WATER QUALITY</b>			
Water Clarity	% of clarity goal achieved (median of monthly data)	Upper creeks (2)	<b>26%</b>
		Mainstem	<b>56%</b>
Bottom Dissolved Oxygen (DO)	% of weekly data that met level needed by oysters (> 2.0 mg/l)	Mid-river (WT6.1)	<b>31%</b>
		Oyster restoration sites (3)	<b>94%</b>
	% of weekly data that met level needed by fish, and state standard (> 5.0 mg/l)	Mid-river (WT6.1)	<b>25%</b>
		Oyster restoration sites (3)	<b>59%</b>

All index values are a percentage of a goal or ideal condition, so the ideal value would be 100%.

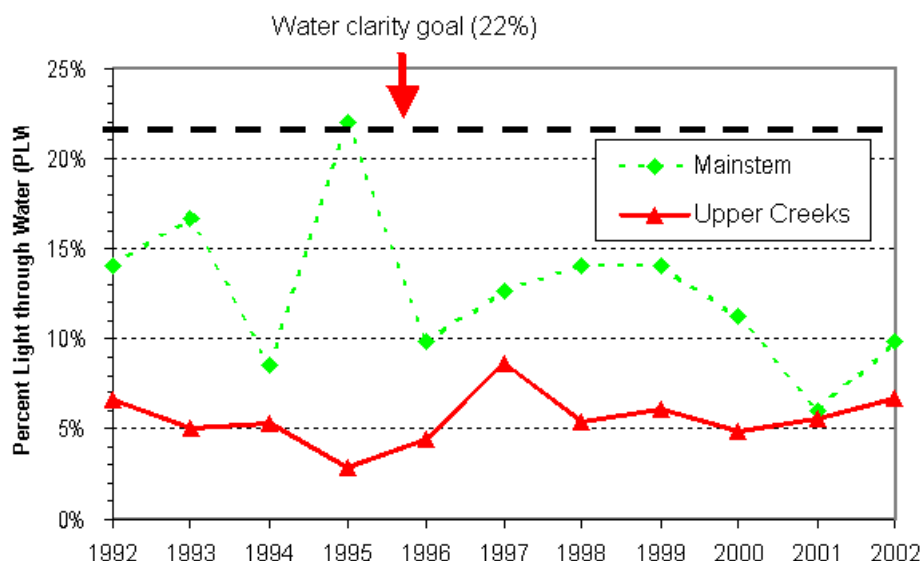
These data are graphed in a bar graph below. Dissolved oxygen (DO) conditions for oysters at the restoration sites have the highest index value (94%). In contrast, wetlands, forested stream buffers, water clarity in the upper creeks, and Mid-river DO data compared to the state standard had the lowest index values (23-27%).

For most of the index values, we do not have comparable data from past years to see how they are

changing over time. These data are available for the water clarity index. MRA volunteers sampled water clarity at the same three stations since 1992, and the line graph below with data from previous years shows that water clarity in 2002 was higher (better) than in 2001, but lower (worse) than in some previous years. 1995 had the best clarity at the Mainstem site, the only year in which the goal was met, while 1997 had the best clarity in the Upper creeks. Magothy water clarity does not appear to have any trend over time, or to respond in a predictable way to rainfall amount. Data from past years (since 1978) are also available for SAV area, but they are not shown because 2002 SAV data are not available yet.



**Water clarity by year at creek and mainstem sites, compared to 22% goal  
(Using data collected by MRA volunteers, 1992-2002**



**MAGOTHY**

## ENVIRONMENTAL FACTORS NOT USED IN THE INDEX

These environmental factors were not included in the index because the available data have no goal and thus could not be expressed as a percentage, or because data are missing.

**Fish Consumption Advisories:** The Maryland Department of the Environment (MDE) issues these based on toxic contaminant levels found in fish caught in each river, using models of your risks from

eating various amounts of fish. The Magothy is listed for two fish species: Channel Catfish and White Perch. The recommended limits for the general population are 2 meals per month for channel catfish and 1 meal per month for white perch; see the web site for limits for women of childbearing age and for children. Some nearby rivers had lower limits (showing higher contaminant levels). Obviously we would rather not see any fish advisories for our river, but it is very hard and expensive to clean up past chemical contamination. See: [http://www.mde.state.md.us/assets/document/fish/advisory\\_summary.pdf](http://www.mde.state.md.us/assets/document/fish/advisory_summary.pdf)

**Non-tidal Tributary Health:** in March 2002, Magothy River Association (MRA) volunteers sampled 11 points on Magothy non-tidal tributary streams for benthic invertebrate animals (insects living on the bottom of streams). Ten of the 11 sites had Poor quality based on these samples. The one site rated Fair was on Magothy Branch (the non-tidal Magothy) above Lake Waterford, just upstream of Jumpers Hole Road. MRA volunteers will do similar sampling on other Magothy non-tidal streams in 2003. Statewide, half (51%) of the small streams sampled by DNR were rated Poor, about a third (38%) were rated Fair, and the rest (11%) were rated Good. The Fair and Good sites were in watersheds with less developed land than the Magothy watershed, which has about 25% developed land. Some MD coastal plain watersheds have 5% developed land or less.

**Oysters:** Although the MRA has conducted extensive oyster restoration efforts for a number of years, there is no easy way to locate or count the total number of oysters in a river. Even if we knew our current oyster population size, we don't know the historical abundance of oysters in the Magothy.

**Fish, Crabs and Turtles:** These are also hard to count, but for different reasons: they move around and are hard to catch. Maryland DNR did summer fish surveys in the Magothy in the past (1989-1991) using a seine net in the shallows and trawls at various depths, and documented a total of 37 finfish species. Summary tables from the report on this sampling will be added to the MRA web site [www.magothyriver.org](http://www.magothyriver.org). There are no known surveys of Magothy crabs or turtles. Magothy turtles include snapping turtles and diamondback terrapins. Terrapins need natural shorelines to nest, and these are becoming rare on the Magothy.

**Birds:** One of our more visible waterbirds is the Osprey, which spends the warmer months here, and spends the winter in South America. Local resident George Kerchner counted osprey nests on the Magothy in 1996 when he found 25 active nests. Ospreys have increased so much that their nest sites may be limited in the Magothy. If you are a waterfront property owner and are interested in erecting a nest platform, contact [sav2@magothyriver.org](mailto:sav2@magothyriver.org) for more information.

There are no confirmed bald eagle nests in the watershed, but eagles are sometimes seen flying over the river, sometimes in pairs. They prefer to nest in undisturbed wooded waterfront tracts, of which there are few on the Magothy. They nest on the Severn and South rivers most years.

Recent efforts to map mute swans and their nests by MD DNR and other agencies noted a few mute swan nests on the Magothy, but not as many as on the Severn and South rivers. The nests are being mapped as part of an effort to control this exotic and invasive species in Maryland, which competes with native waterfowl and damages SAV beds. For more details see: <http://www.dnr.state.md.us/wildlife/inv2002egg.html>

## **CONCLUSIONS: What you can do to help the Magothy**

- Increase oyster beds to increase filtration capacity and fish habitat. You can do oyster gardening and help with oyster nurseries ([oysterinfo@magothyriver.org](mailto:oysterinfo@magothyriver.org)), and do diving to support oyster restoration ([diver@magothyriver.org](mailto:diver@magothyriver.org))

- Increase Submerged Aquatic Vegetation (SAV) through “Grasses for Masses” to improve water quality and increase fish and shellfish habitat (Contact [magothyrsavers@yahoo.com](mailto:magothyrsavers@yahoo.com)), and help with surveys of current SAV locations (Contact [sav2@magothyriver.org](mailto:sav2@magothyriver.org))
- Reduce your lawn area and your use of lawn fertilizer, and use native plants. See: <http://www.nwf.org/backyardwildlifehabitat/previoustips3.cfm>
- Reduce your use of vehicles and other internal combustion engines. These add nitrogen to the air, and much of this reaches the water. Car pool, combine trips, buy more fuel-efficient vehicles and four-cycle boat motors, and use electric yard tools instead of gas tools.
- Encourage best management practices including nutrient management at horse farms and other farms in the watershed
- Plant trees along streams that lack them or have a narrow forested buffer, to increase the number of stream miles that have forested buffers.
- If you have a septic system, keep it pumped out and in good repair
- Minimize and when possible reduce the amount of pavement and other impervious surfaces in your yard, since they increase runoff to the river. This can be done by using gravel or porous pavers for driveways and parking lots.
- Install rain barrels, rain gardens, and other structures to retain and improve the quality of runoff before it leaves your yard. For more information see: [http://www.arlingtonecho.org/r\\_barrels.htm](http://www.arlingtonecho.org/r_barrels.htm) (Rain barrels) [http://www.arlingtonecho.org/r\\_gardens.htm](http://www.arlingtonecho.org/r_gardens.htm) (Rain gardens)