Potentially Attainable

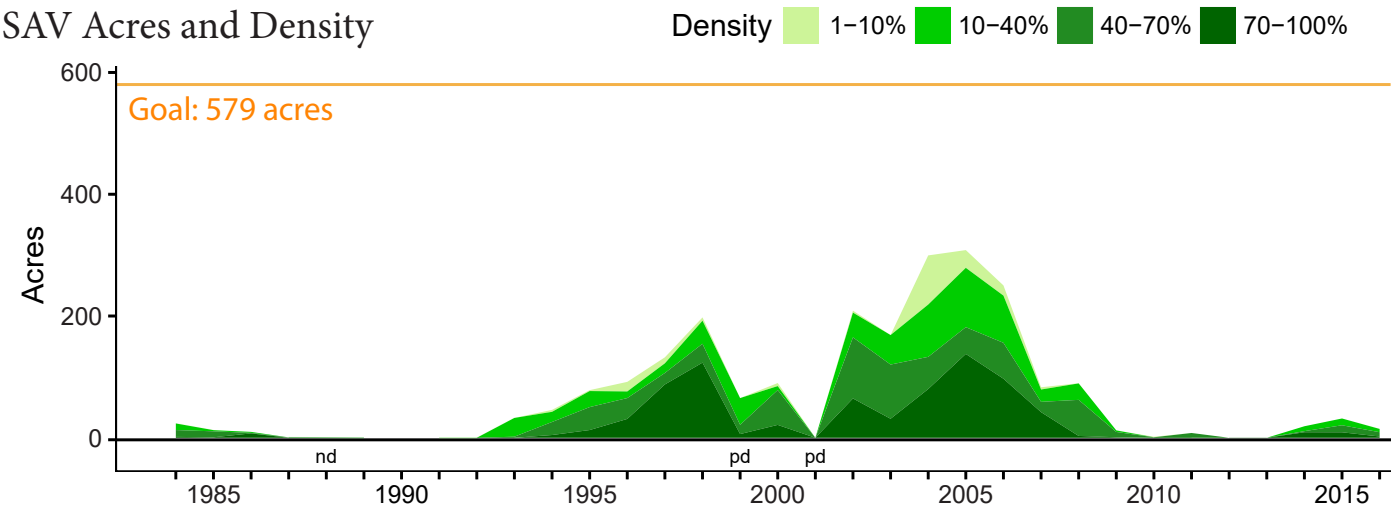
Magothy River (MAGMH)

Abundant diversity will assist with long-term submerged aquatic vegetation (SAV) resilience in this system, but water quality improvements are necessary to reach the SAV restoration goal.

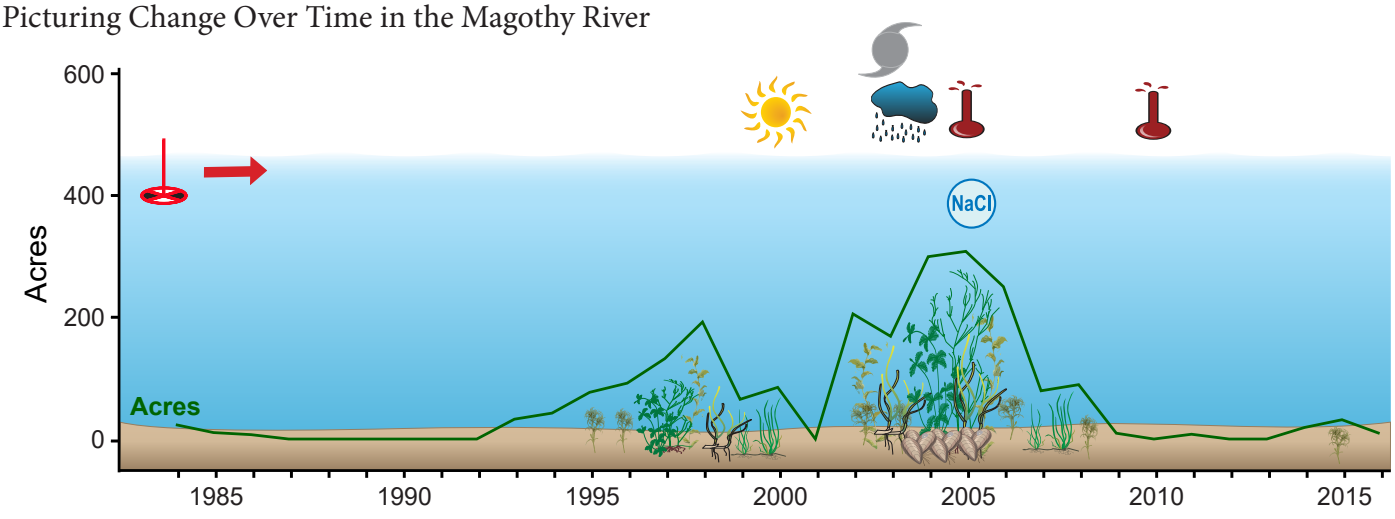
Executive Summary

There is abundant observational data for the Magothy River that indicates impressive species diversity relative to actual SAV abundance. Although SAV has been abundant at times, it is susceptible to the river's poor water quality that results, in part, from stormwater runoff and sewage spills from the county's sewer lines. With increased sewer capacity and repairs, there is potential for improvements in water quality that would facilitate an expansion of SAV in the river. The 579-acre SAV restoration goal is potentially attainable with water quality improvements.

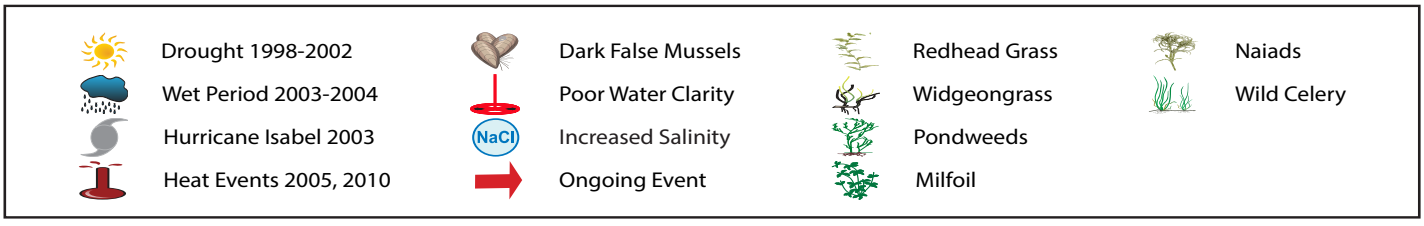
SAV Acres and Density



Picturing Change Over Time in the Magothy River



Key



Potentially Attainable

Take Home Points

Goal - Potentially Attainable

The SAV restoration goal for the Magothy River is 579 acres and has never been achieved, but it is potentially attainable with improvements in water clarity.

Historical Coverage

Fluctuating SAV abundance; relatively high diversity

SAV was most likely abundant in the Magothy River prior to population expansion in the Chesapeake Bay watershed–particularly prior to the founding of Baltimore and Annapolis, the two major cities to the north and south of the river. The earliest recorded evidence of SAV, however, is from wild celery herbarium specimens dated to 1902. Additional specimens from the mid- to late 1940s include redhead grass, widgeongrass and hornwort. Surveys that took place in 1963 indicated that sago pondweed and redhead grass were the most abundant species present along with large stands of milfoil, although throughout the 1960s and 1970s, several species were observed, including common waterweed, horned pondweed, naiads and muskgrass. In 1979, 473 acres of SAV were observed during an aerial survey, but by the time the Bay-wide aerial survey began in 1984, only 24 acres remained. SAV cover did not increase again until the mid- to late 1990s when it reached 198 acres in 1998. The expansion was interrupted in 1999 when the population plummeted, possibly due to drought conditions that lasted through 2002. Although droughts sometimes favor SAV because they result in decreased runoff and associated sediment and nutrient pollution, they may also lead to changes in salinity that affect SAV community composition and abundance. Observational data from the Bay-wide survey's ground truthing efforts indicate that most of the SAV in the Magothy River in the 1990s were freshwater species that could have been impacted by increased salinity. In 2002 when the SAV population expanded again it may have coincided with an expansion of widgeongrass, which has a broad salinity tolerance and has become one of the more commonly observed species in the river. The drought was followed by Hurricane Isabel in 2003 which facilitated the growth of dark false mussels in 2004-2005. Dark false mussels are efficient filter feeders and contribute to water clarity, so the sustained coverage between 2004 and 2006 may have been attributed to their presence. When salinity conditions return to normal after wet years or storm events and the salt content of the water increases again, dark false mussels die back. In 2007, SAV cover declined and has remained low since that time. Regardless of fluctuations in cover, SAV species diversity in the Magothy River has been impressive. Although sparse in some cases, fresh to salt tolerant plants have been observed, including widgeongrass, redhead grass, milfoil, several species of pondweeds including sago and horned, wild celery, naiads and water starwort.

Key Events

Drought between 1999-2002; Hurricane Isabel in 2003; and dark false mussels 2004-2005

Several climatic events have directly or indirectly impacted SAV cover in the Magothy River over the last several decades. The regional drought that lasted from 1999-2002 may have caused an initial reduction in freshwater species but may also have facilitated the establishment of widgeongrass, which once established has a broad salinity tolerance. In 2003, Hurricane Isabel affected the Bay and its watershed by delivering copious freshwater to the Bay. This allowed for the establishment of dark false mussels in areas where they're not normally abundant and in 2004-2005, increases in dark false mussel populations were noted in the Magothy River. These filter feeders contributed to increased water clarity conditions for several years. Dark false mussels were noted again in some creeks of the Magothy River in 2014 and 2015 when there was a slight increase in SAV abundance, but not in the quantities needed to filter the whole river.

Vulnerability/Resilience

Poor water clarity; high diversity

Stormwater runoff and overflowing sewer lines are an issue on the Magothy River. While the southern side of the river is dominated by tree-lined residential communities on public sewer, there are occasional sewer line overflows that discharge into the Magothy River and contribute to reduced water quality and clarity conditions. Mill, Cypress and Cattail creeks are particularly vulnerable to these sewer line overflows and resultant sewage spills. The species diversity observed in the Magothy River will contribute to its resilience in the long-term, however, but the persistent water quality issues need to be resolved in order for the underwater grasses to truly reestablish in this river. Once they do, plenty of habitat is available for the river to meet its SAV restoration goal.

Management Implications

Nutrient and sediment reductions

Without intervention, nutrient and sediment loading to the Magothy River will continue to hamper full SAV recovery. Reductions in both would most likely lead to a full recovery, so all efforts to reduce loading via best management practices that favor water clarity improvements are recommended.

References

Stevenson and Confer 1978; Orth and Moore 1983, 1984; Moore et al. 2000, 2004; Orth et al. 2010a, 2017; Patrick and Weller 2015; Lefcheck et al. 2018

www.vims.edu/bio/sav/SegmentAreaChart.htm (abundance data)

www.vims.edu/bio/sav/maps.html (species information)

www.eyesonthebay.org (Maryland water quality data)

www.aacounty.org (Anne Arundel County sewer and septic information)