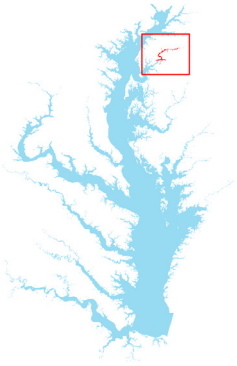
Attainable

Middle and Upper Chester River (CHSOH, CHSTF)

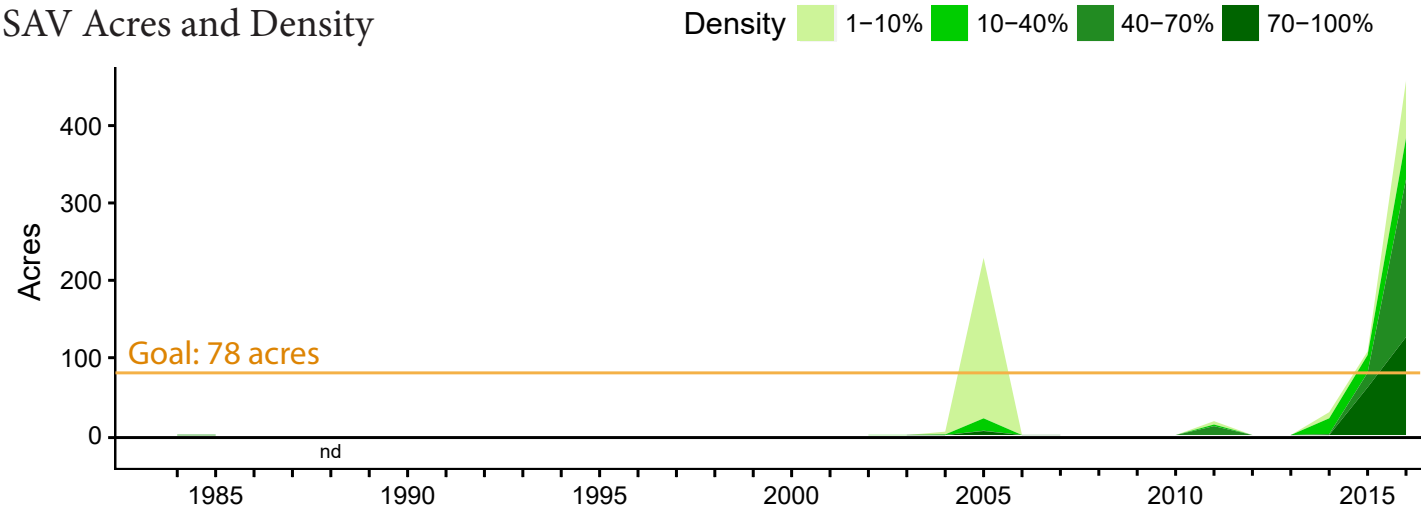


The middle and upper Chester River runs through a predominantly rural and agricultural watershed, but recent improvements in water clarity facilitated by implementation of agricultural best management practices (BMPs) has spurred a recovery of submerged aquatic vegetation (SAV).

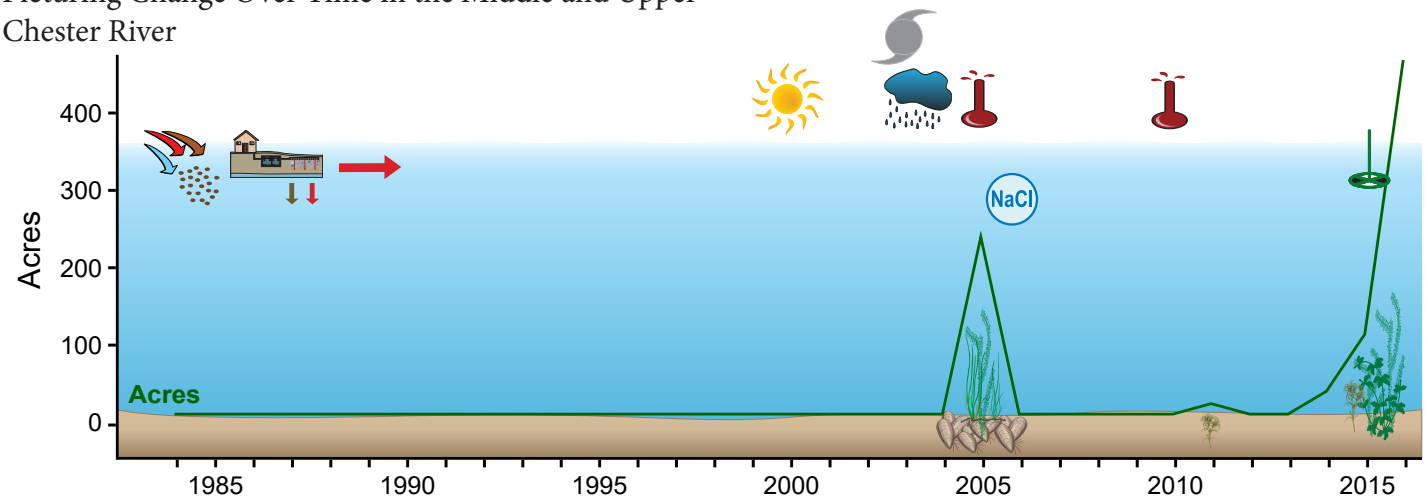
Executive Summary

After decades with little measurable SAV, the middle and upper portions of the Chester River have shown signs of recovery in recent years. Chesapeake Bay-wide and local improvements in water quality and clarity have led to a resurgence of SAV well beyond the 78-acre combined restoration target for the two segments. Implementation of agricultural BMPs in this predominantly rural and agricultural watershed that lead to long-term reductions in sediment and nutrient loading to the system will facilitate the sustained recovery of SAV here.

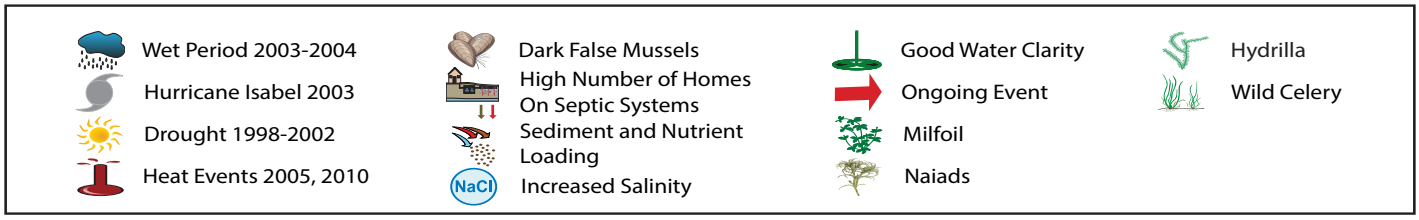
SAV Acres and Density



Picturing Change Over Time in the Middle and Upper Chester River



Key



Attainable

Take Home Points

Goal - Attainable

The combined SAV restoration target for the tidal fresh and oligohaline portions of the Chester River is 78 acres and is attainable. It was exceeded in 2005, 2015 and in 2016.

Historical Coverage

SAV absent from 1984-2003, higher SAV cover since

SAV was most likely abundant in the middle and upper Chester River prior to population expansion in the Chesapeake Bay watershed. Freshwater species of SAV were documented there as early as 1947, when wild celery and naiads were collected for herbarium vouchers. In the 1960s and 1970s, several other species were observed, including milfoil, wild celery, common waterweed, hornwort, naiads and muskgrass, a freshwater macroalgae. Data from the Bay-wide aerial survey indicate that SAV cover was absent between 1984 and 2003. In 2004, four acres were mapped and then in 2005, SAV acreage skyrocketed to 229 acres. All SAV disappeared again the following year and remained virtually absent until 2011 when 17 acres were mapped. In 2014 there were 30 acres and then by 2016, SAV neared 460 acres in cover with most of that observed in the upper, tidal fresh portion of the river and was composed primarily of wild celery and hydrilla.

Key Events

Hurricane Isabel in 2003; dark false mussels 2004-2005; Bay-wide improvements in water quality

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, dark false mussel increases were noted in the region. These filter feeders contribute to increased water clarity conditions when present in abundance, which may have facilitated the quick expansion of SAV in the middle and upper Chester River in 2004 and 2005. 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 and leave SAV vulnerable to decreased water clarity, as seen in 2006. In 2011, SAV again began to recover in the middle and upper Chester River, likely in response to improvements in water clarity that resulted from implementation of agricultural BMPs and also potentially facilitated by another increase in dark false mussel abundance.

Vulnerability/Resilience

Agriculture and septic

The Chester River is in a predominantly agricultural watershed, leaving it vulnerable to sediment and nutrient pollution from agricultural fields and livestock operations. Furthermore, the small towns and villages in the river's watershed rely primarily on old and potentially failing septic systems, further contributing to nutrient loading to the river. The increasing use of agricultural BMPs, however, will lead to a long-term improvement in water quality and promote SAV recovery and system resilience. Additionally, the freshwater regions of the Bay host up to 15 species of SAV, so diversity and the potential for resilience from diversity are naturally higher in these areas.

Management Implications

Nutrient and sediment reductions

With a small acreage goal compared to the system's apparent potential, the goal is attainable and SAV cover will be easily maintained with further reductions in nutrient and sediment loading via BMPs. Additionally, efforts to maintain the rural nature of the watershed should be taken, as sprawl and development are often correlated with decreased water quality and the loss of aquatic habitats. Watershed residents should be encouraged to upgrade old septic tanks and leach fields to modern, high-efficiency on-site wastewater treatment systems.

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)