



Manokin River (MANMH1, MANMH2)



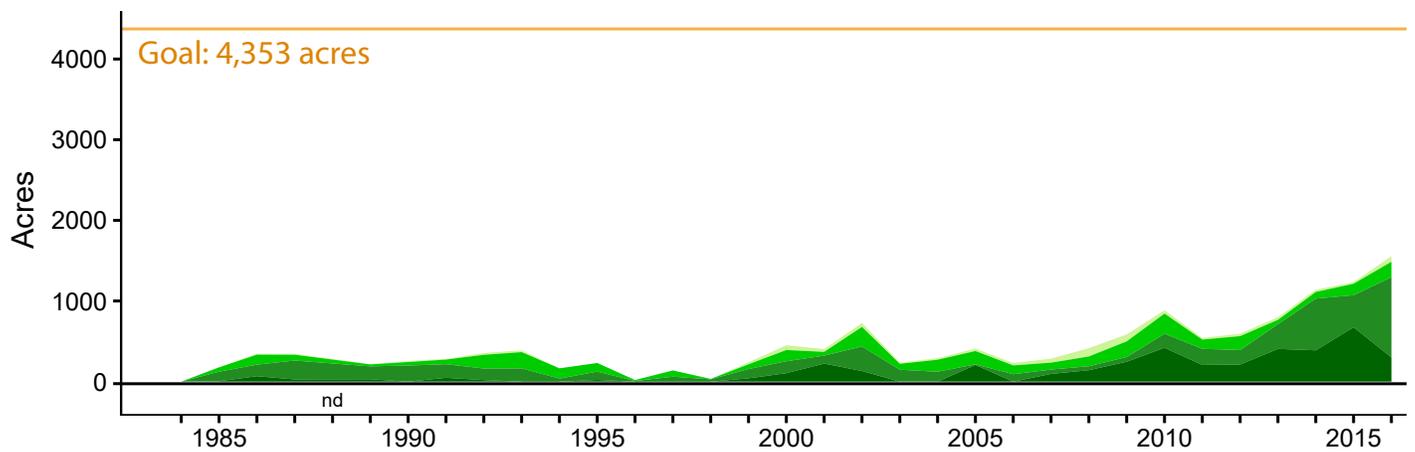
Moderately dense submerged aquatic vegetation (SAV) beds are found along both shores of the Manokin River and consist of eelgrass and widgeongrass.

Executive Summary

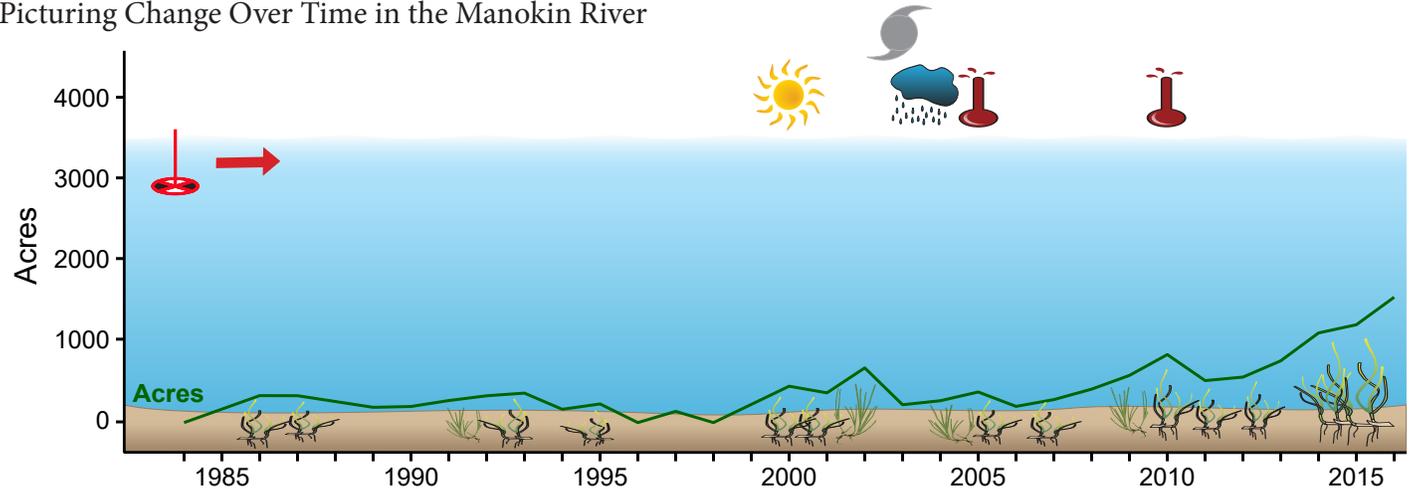
SAV beds consisting of dense eelgrass and widgeongrass once dominated the extensive shoal areas of the Manokin River. In the 1960s, SAV achieved maximum historical coverage during the driest period recorded in recent history. Since the annual Chesapeake Bay-wide aerial survey began in the 1980s, abundance fluctuated, but showed no real trend until 2000 when it began to slowly recover. Increases and decreases in SAV abundance were driven by changes in water quality, hot summers and a resurgence of widgeongrass. The restoration goal of 4,353 acres of SAV for this segment has never been attained but is potentially attainable if water clarity can improve.

SAV Acres and Density

Density ■ 1-10% ■ 10-40% ■ 40-70% ■ 70-100%



Picturing Change Over Time in the Manokin River



Key

	Drought 1998-2002		Heat Events 2005, 2010		Eelgrass
	Wet Period 2003-2004		Poor Water Clarity		Widgeongrass
	Hurricane Isabel 2003		Ongoing Event		

Goal - Potentially Attainable

The goal of 4,353 acres has never been attained, but is potentially attainable if water clarity can improve and the recent expansion of widgeongrass continues.

Historical Coverage

Historical and recent distribution well known

The 1930s eelgrass epidemic had a dramatic effect on eelgrass in the Bay. However, recovery was rapid from the growth and expansion of the plants that persisted, and historical records indicate that abundance reached peak coverage in the 1960s during an extended dry period. SAV data from the aerial survey show growth and expansion of widgeongrass, along with a few areas that support eelgrass, near the mouth of the river with peak abundance and distribution observed in 2016.

Key Events

Tropical Storm Agnes

In June 1972, Tropical Storm Agnes resulted in the loss or reduction of almost all SAV beds in this segment. SAV remained very sparse in this segment through the 1980s and 1990s.

Vulnerability/Resilience

Water clarity

Periods of varying rainfall in the 1980s and 1990s influenced water clarity and facilitated the changes noted in SAV distribution.

Eelgrass is susceptible to heat events, but widgeongrass dominates here

Eelgrass is a cold-water SAV species in the Bay near its southern distributional boundary in the mid-Atlantic. However, eelgrass has been a very minor component of the SAV beds in this segment recently and the beds are now dominated by widgeongrass. Some eelgrass beds developed in the 1990s but disappeared or were severely reduced after heat events in 2005 and 2010. Widgeongrass is much more tolerant than eelgrass of temperature extremes, and has shown recent increases here. However, widgeongrass populations can be highly variable on an annual basis and are expected to fluctuate in an increasingly warmer Bay. They also typically require more light for growth than eelgrass and therefore their expansion would likely be most evident in the shallowest nearshore SAV habitats.

Management Implications

Nutrient and sediment reductions; oyster aquaculture

Managers will need to focus on improving water clarity by reducing both sediment and nutrient pollution. Managers will be unable to do much about temperature as this is a global issue, but by improving water clarity, plants may be able to tolerate periods of warmer water. In addition, managers may have to address the emerging issue of oyster aquaculture if it is initiated in this region.

References

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