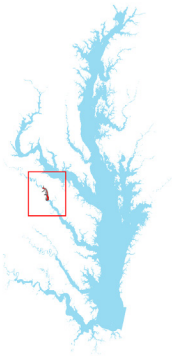
Attainable

Middle Rappahannock River (RPPOH)

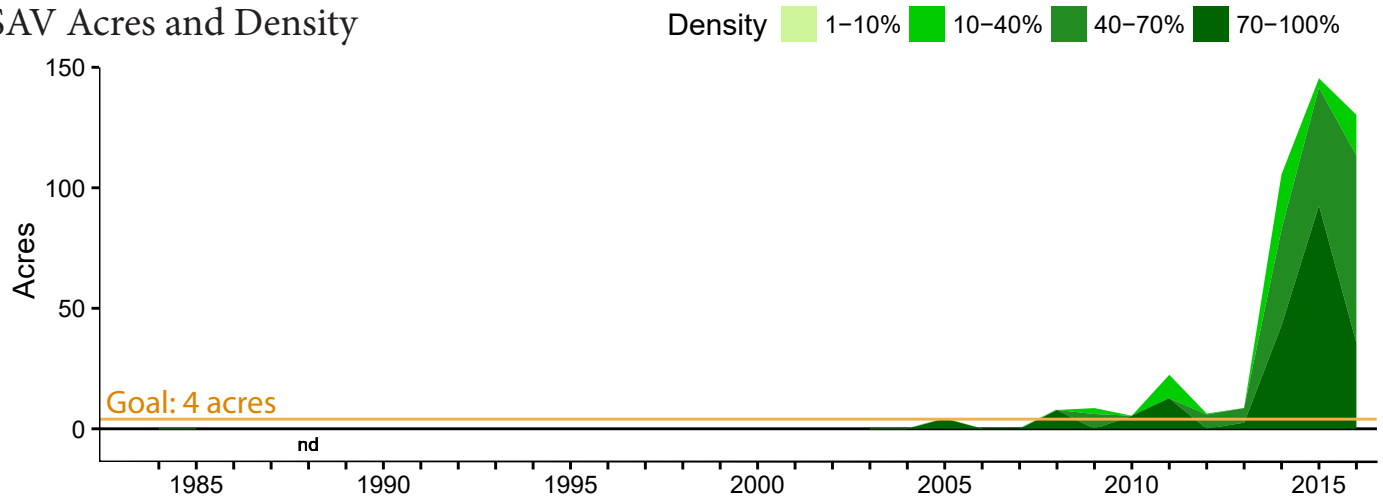


Recent expansion of submerged aquatic vegetation (SAV) beds dominated by a diversity of SAV species have been observed along the shorelines of the several small tributaries found in this section of the Rappahannock River.

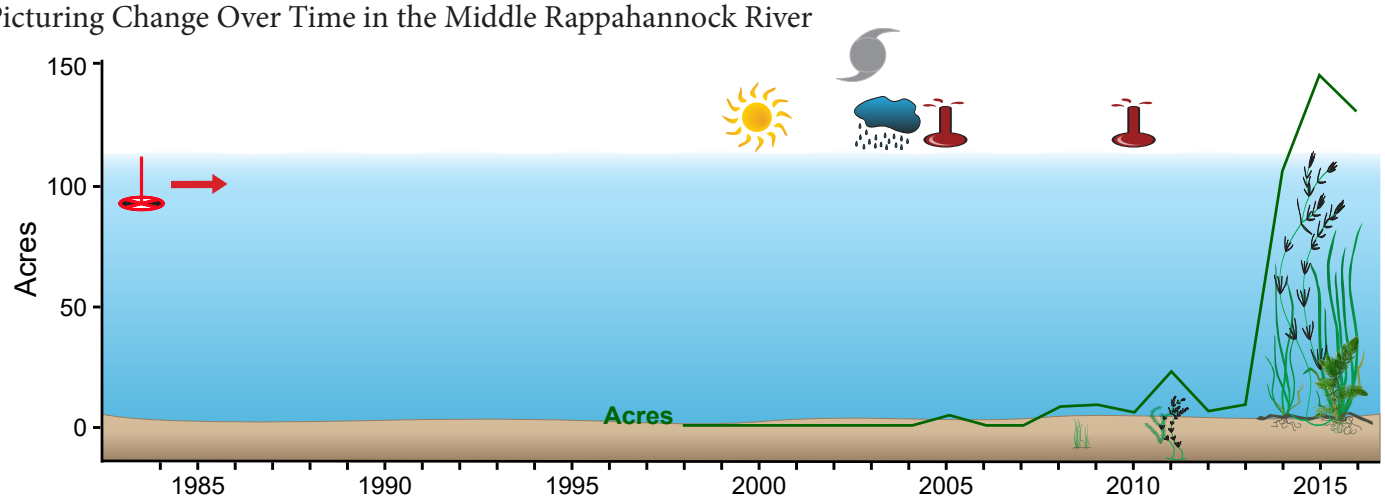
Executive Summary

Historical aerial photography shows no evidence of SAV beds in this segment prior to 1978. Small fringing beds of SAV were first observed in a ground survey in 1978 and then in SAV aerial mapping photography in 2005. Since that period, SAV beds consisting of hornwort, naiads and hydrilla have expanded, especially in Bridge Creek. The segment has regularly exceeded its SAV goal of four acres since 2008 (although this goal is likely an underestimation of historical abundances due to the absence of historical imagery suitable for SAV mapping). The canopy forming SAV species now found here can typically grow to the water's surface; this makes them more resistant to the naturally high turbidity found here, near the river's zone of turbidity maximum which characterizes this segment. Most SAV beds in this segment are found in the several large tributaries of the middle Rappahannock River that provide protection from the high energy environment characteristic of the expansive mainstem Rappahannock River shorelines.

SAV Acres and Density



Picturing Change Over Time in the Middle Rappahannock River



Key

Attainable

Take Home Points

Goal - Attainable

The goal of four acres, which is low due to the absence of historial data, was first achieved in 2005 and has been regularly achieved from years 2008-2016.

Historical Coverage

Historical coverage not well known

The only historical data available for this segment is from a 1978 ground survey that took place in several secondary creeks, including Bridge and Occupacia creeks. SAV species noted were hornwort, wild celery and several species of naiads. While the Chesapeake Bay-wide aerial survey began here in 1998, SAV was not observed until 2005. It remained in low abundance until 2014 when it increased, reaching a high of 146 acres in 2015 with significant abundance in Bridge Creek. Almost all the SAV is located inside the small creeks entering the mainstem or in and around marshes. Species noted more recently were hornwort, hydrilla, southern naiad and wild celery.

Key Events

Hydrilla introduction

Hydrilla was observed in this segment in the Bay-wide aerial surveys conducted in the 2000s. While present, it has not achieved the density and abundance noted in the Potomac, Pamunkey, Mattaponi and Chickahominy rivers, and is found in a number of marsh creeks.

Vulnerability/Resilience

Salinity

This section of the middle Rappahannock River is in an important transition area susceptible to salinity changes which could affect the composition of SAV beds in this segment. Drought conditions would likely favor hornwort and naiads while wet conditions would favor expansion of hydrilla.

Water clarity

Nutrients and suspended sediment will continue to play a dominant role in influencing SAV populations by altering the amount of light the beds receive. Naturally high turbidity will limit SAV growth to favor canopy formers in the creeks. High energy environments along shorelines of the mainstem Rappahannock River combined with high turbidity will limit most SAV growth there.

Management Implications

Nutrient and sediment reductions; water diversion for human consumption

Managers should continue to focus on reducing nonpoint source nutrient and sediment pollution to promote SAV growth in creeks and along mainstem shorelines. Water diversion for human consumption in upriver areas may increase salinity, causing periodic SAV losses to these principally freshwater species.

References

Stevenson and Confer 1978; Orth and Moore 1983, 1984; Moore et al. 2000, 2001, 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)

http://vecos.vims.edu/ (Virginia water quality data)