Attainable

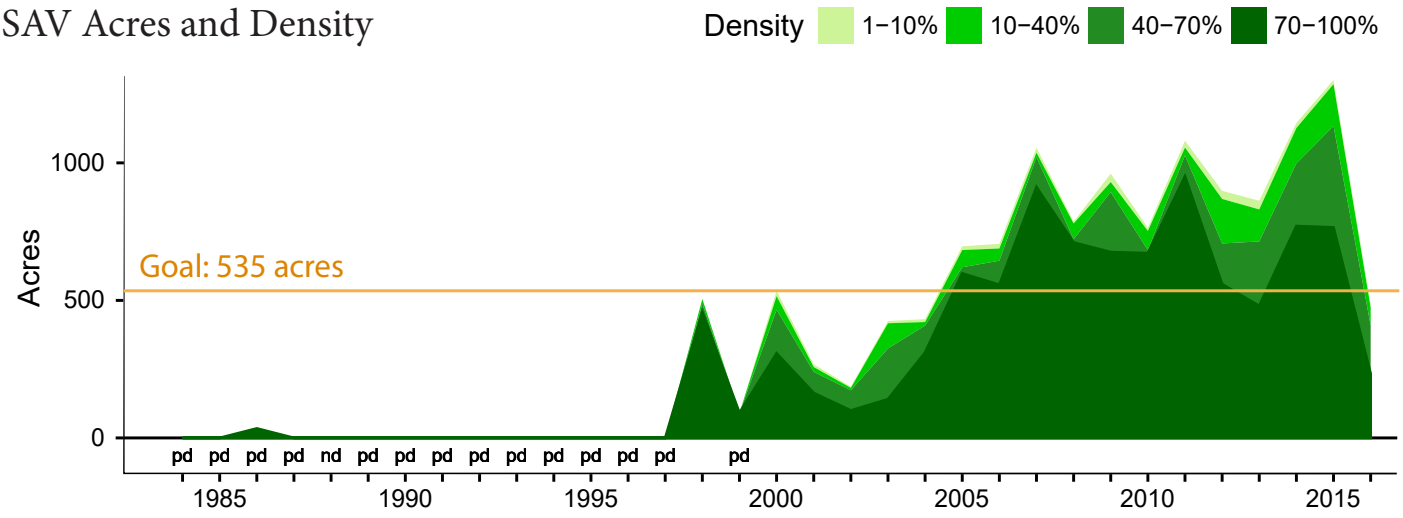
# Chickahominy River (CHKOH)

**Dense beds of submerged aquatic vegetation (SAV) are dominated by hydrilla and naiads along the shoal areas and many small tributaries of this river.**

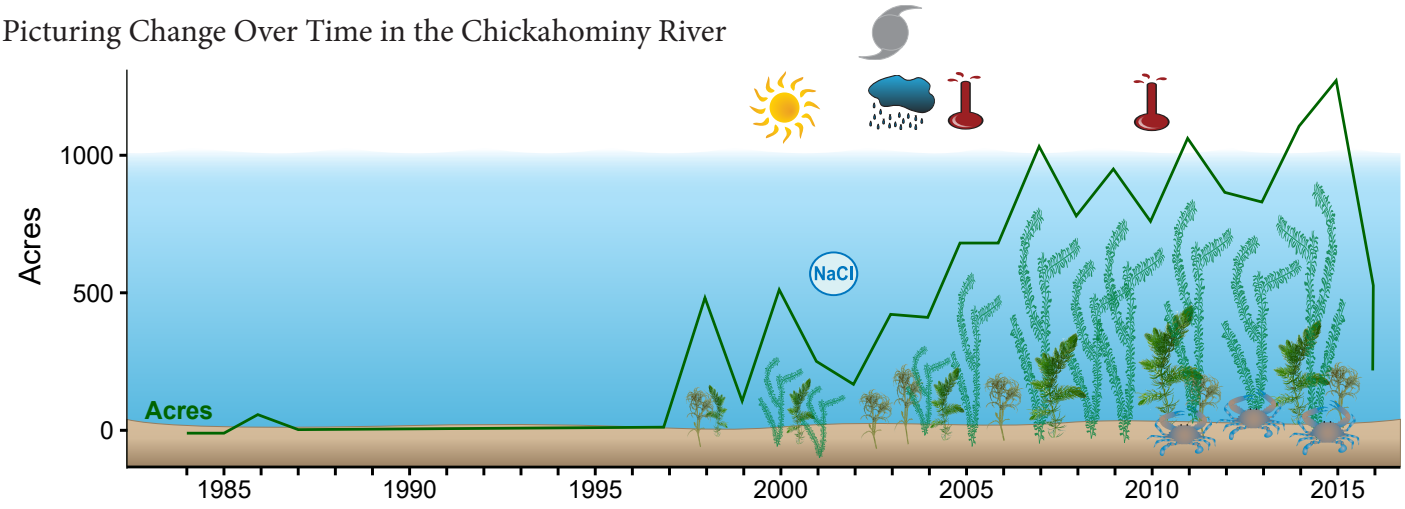
## Executive Summary

Historical aerial photography from 1937 to 1969 revealed no evidence of SAV beds. In 1978 however, aerial and ground SAV surveys found numerous small beds of SAV consisting of hornwort, naiads, pondweed and wild celery throughout the length of the Chickahominy River and its tributaries, totaling 91 acres. In 1998, the Chesapeake Bay-wide aerial survey found very similar abundance, diversity and distribution of SAV in this system to that found in 1978. After a historic drought which elevated salinity in the system and caused large declines from 2001-2002, SAV has been increasing since then, reaching its highest abundance of 1,301 acres in 2015. Hydrilla was first documented in ground surveys in 2000, and its introduction and spread has contributed to the abundance of SAV found today. As a result, this segment has attained its restoration goal of 535 acres from 2005 through 2015. Hydrilla dominance is mainly limited to the upper river, where salinities generally remain below 1 psu, and spiny naiad dominates in the lower tidal river where seasonal salinity intrusion regularly occurs.

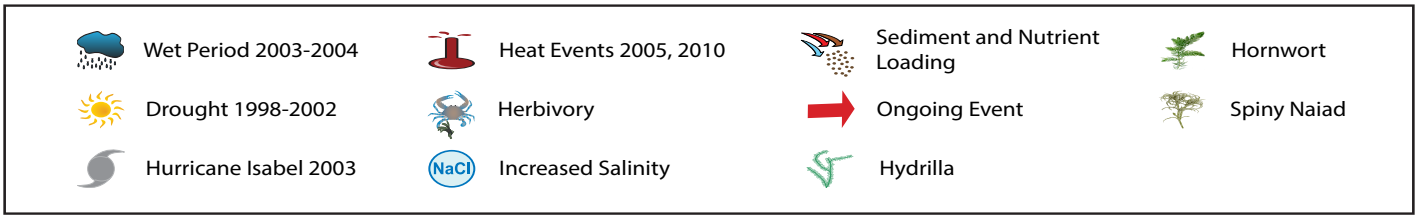
## SAV Acres and Density




## Picturing Change Over Time in the Chickahominy River




### Key



Attainable

# Take Home Points

## Goal - Attainable

The goal of 535 acres was achieved from 2005-2015.

## Historical Coverage

*Historical coverage not well known*

No SAV could be seen on historical photographs taken at approximately 10-year intervals between 1937 and 1969. In 1978, aerial and ground SAV surveys showed a diverse community occurring in small beds throughout the system, which totaled 91 acres. The Bay-wide aerial survey in 1998 showed a similar abundance. Shortly after hydrilla was documented in 2000, SAV declined from 2001-2002. This occurred when below average light conditions were combined with a historic drought that elevated salinity above what SAV can tolerate, especially hydrilla which is quite sensitive to even low salinity. Since the 2001-2002 period of decline, SAV increased, reaching its highest abundance of 1,301 acres in 2015, with three species regularly reported–hydrilla, hornwort and spiny naiad.

## Key Events

*Hydrilla introduction*

Ground surveys first documented hydrilla in 2000, though its introduction could have been earlier. Populations would likely have been introduced from the tidal freshwater Potomac River or from lakes in that area where hydrilla first appeared in the 1980s. Dispersal mechanisms to the Chickahominy River were most likely by human activities or birds.

## Vulnerability/Resilience

*Salinity*

This section of the middle James River is an important transition area susceptible to salinity changes that could affect the SAV beds in the Chickahominy River. Drought conditions raise salinity and lead to significant reductions in the freshwater species found here. These periodic fluctuations have kept a distinct separation of SAV species: hydrilla dominates upriver where conditions are typically fresh, and spiny naiad is found in the lower river as it is not as susceptible to the stress from salinity.

*Water clarity*

Nutrients and sediment will continue to play a dominant role in influencing SAV populations by altering the amount of light. The availability of light in the early growing season has been found to be of particular importance in this system, as these canopy forming plants are most vulnerable to low light conditions during their spring and early summer growth, before they have been able to reach the water's surface.

*Herbivory*

Recent information suggests herbivory of new propagules, especially by blue crabs, may play an important role in limiting populations of wild celery.

## Management Implications

*Nutrient and sediment reductions; salinity*

Managers should continue to focus on reducing nonpoint source nutrient and sediment pollution to promote SAV growth in creeks. Water diversion for human consumption in upriver areas may increase salinity, causing reductions to the freshwater species historically found here.

## References

Stevenson and Confer 1978; Orth and Moore 1983, 1984; Moore et al. 1999, 2000, 2004; Orth et al. 2010a, 2017; Shields et al. 2012; 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)