Attainable

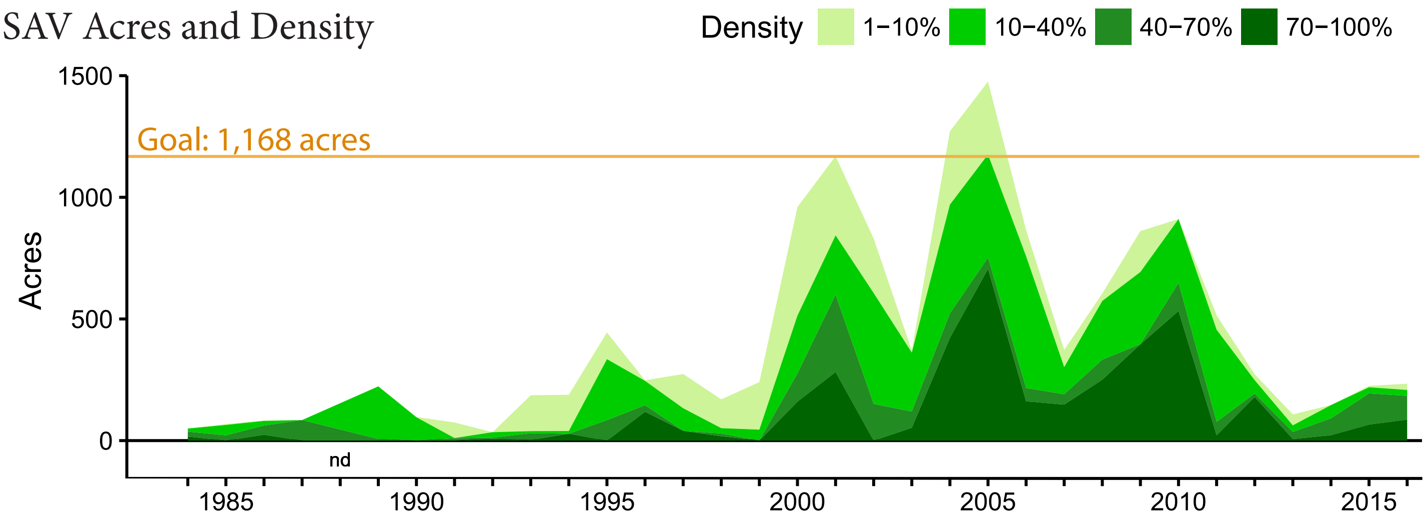
Sassafras River (SASOH1, SASOH2)

Although the Sassafras River sits in a heavily agricultural watershed and is subject to nutrient loading that reduces water clarity and promotes harmful algal blooms (HABs), submerged aquatic vegetation (SAV) has at times been abundant and diverse.

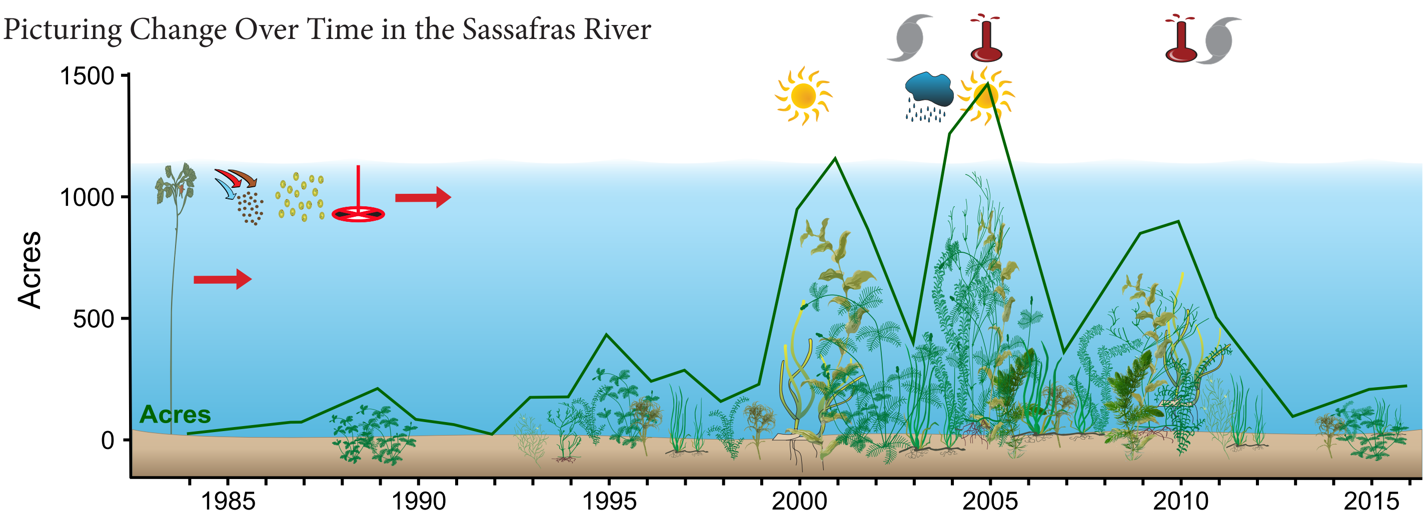
Executive Summary

Although the Sassafras River sits in a heavily agricultural watershed and is subject to nutrient loading that reduces water clarity and promotes HABs, SAV has at times been abundant and diverse, and has exceeded its restoration goal of 1,168 acres on three occasions. Extensive beds of emergent, floating plants are widespread in the river's creeks and coves, but at their current expanse, these populations will not eliminate the possibility of reaching the SAV restoration goal again in the future. Further reductions in nutrient and sediment loading will be necessary, however, to reach and maintain SAV acreage that exceeds the restoration goal.

SAV Acres and Density



Picturing Change Over Time in the Sassafras River



Key

- Drought 1998-2002, 2005
- Wet Period 2003-2004
- Hurricane Isabel 2003
- Tropical Storm Lee 2011
- Heat Events 2005, 2010
- Harmful Algal Blooms
- Poor Water Clarity
- Sediment and Nutrient Loading
- Invasive Water Chestnut
- Ongoing Event
- Widgeongrass
- Common Waterweed
- Hydrilla
- Pondweeds
- Milfoil
- Water Stargrass
- Redhead Grass
- Naiads
- Wild Celery
- Hornwort

Attainable

Take Home Points

Goal - Attainable

The combined goal for the Sassafras River of 1,168 acres is attainable and has been exceeded on three occasions: 2001, 2004 and 2005. In 2005, SAV acreage reached its peak of 1,476 acres. Although SAV acreage has generally declined since 2010, continued improvements in water quality will make it more likely for SAV to expand and persist in this tributary.

Historical Coverage

Species diversity and abundance has fluctuated over time

SAV was most likely abundant along the shoreline and in the many small creeks and coves of the Sassafras River prior to significant population increases in the Chesapeake Bay watershed. Herbarium specimens and observational data from ground surveys conducted in the 1940s through 1990s indicate that several species were present in the Sassafras River including wild celery and milfoil (the two most abundant species present), but also redhead grass, common waterweed, hornwort, widgeongrass, water stargrass, hydrilla and multiple species of pondweeds and naiads. The Chesapeake Bay-wide aerial survey showed minimal SAV cover until 2000, when it expanded dramatically and reached 960 acres. SAV cover varied between 2000 and 2010, but with the exception of a few sparse years, generally remained high and exceeded the river's restoration goals on three occasions during that decade. Since 2010, SAV has remained at low cover. Although there is limited data to determine exactly why that is, it is most likely due to a combination of multiple influencing factors, including reduced water clarity caused by nutrient and sediment pollution, HABs (*Microcystis* in particular), and competition from two species of floating emergent vegetation: water chestnut and American lotus. Water chestnut is an aquatic invasive species that is actively managed in attempts at eradication, but American lotus is native species that provides multiple ecosystem services even though it precludes SAV establishment in areas where it grows.

Key Events

Drought followed by Tropical Storm Lee

A region-wide drought in 2005 most likely increased salinity that led to a decrease in these freshwater SAV in 2006-2007. Tropical Storm Lee in 2011 resulted in continued low levels of SAV which have persisted through the present.

Vulnerability/Resilience

Water clarity and nutrient loading

Although much of the Sassafras River shoreline is protected by riparian buffers, the Sassafras River watershed is primarily agricultural, making it susceptible to nutrient and sediment runoff that decreases water clarity. Increased nutrients could also result in proliferation of HABs which can also lead to low dissolved oxygen and fish kills.

Management Implications

Nutrient and sediment reductions; BMPs; HABs; invasive species management

SAV recovery can be facilitated, at least in part, through reductions in nutrient and sediment loading. All efforts should be made to implement BMPs that do this. Reductions in nutrient loading will improve water clarity by decreasing the likeli¬hood of algae blooms, including blooms of the cyanobacteria *Microcystis*. Management efforts to eradicate invasive water chestnut should also be continued.

References

Stevenson and Confer 1978; Orth and Moore 1983, 1984; Orth et al. 1994, 2010a, 2017; Moore et al. 2000, 2004; 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)