Attainable

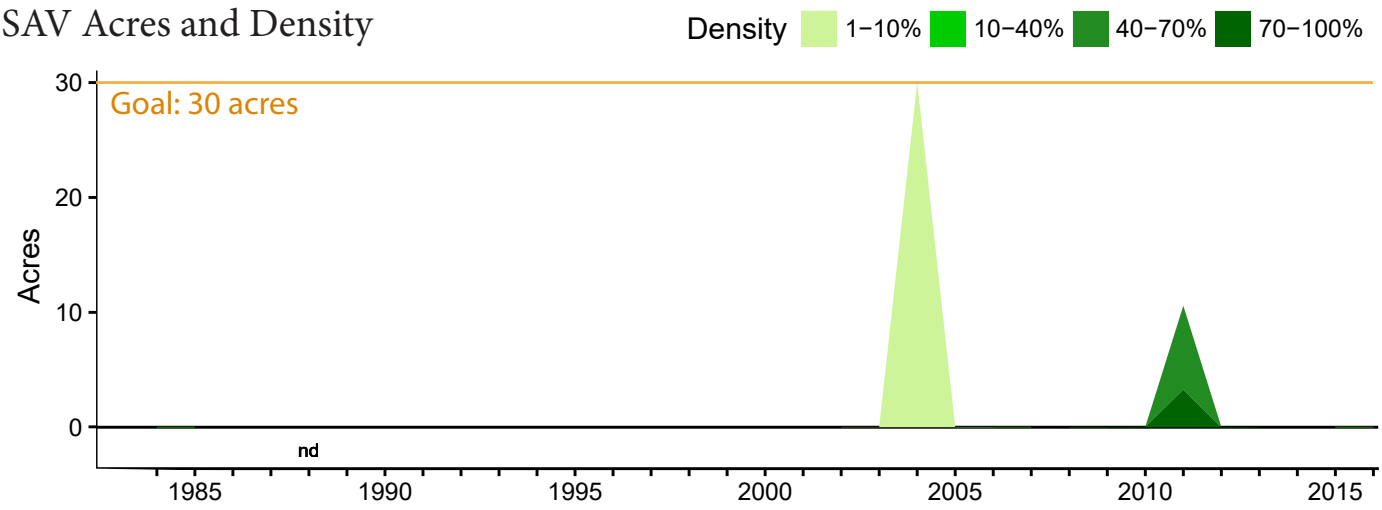
Back River (BACOH)

Back River is a heavily developed tributary with persistent water quality issues that have prevented the recovery of submerged aquatic vegetation (SAV) to date.

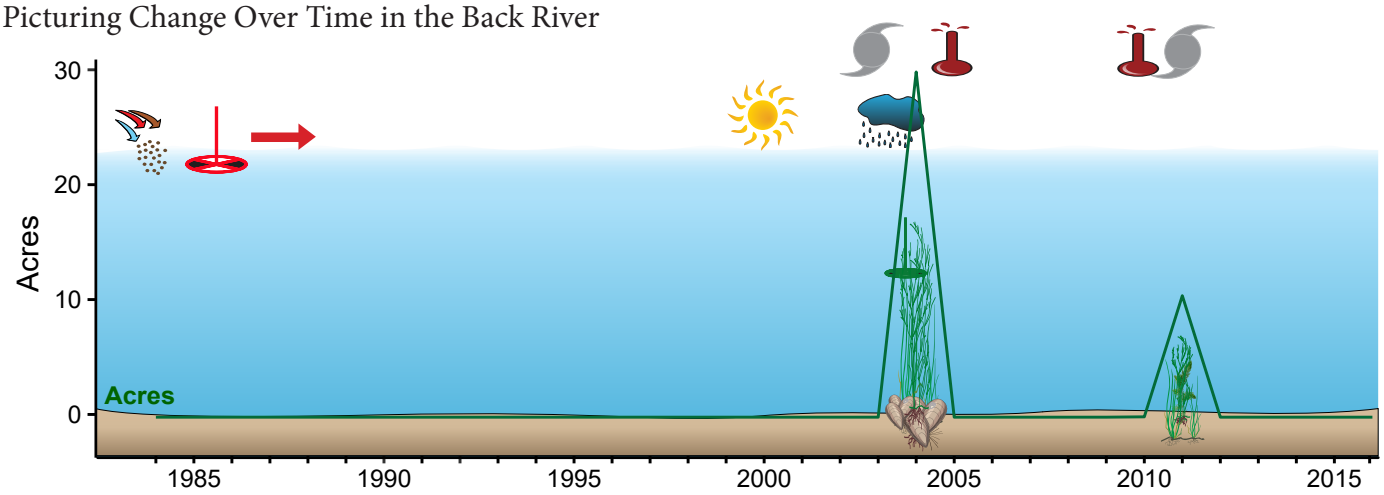
Executive Summary

Back River is a heavily developed tributary with persistent water quality issues that have prevented the recovery of SAV to date. Extreme weather in 2003 (Hurricane Isabel) facilitated the rapid expansion of dark false mussels in 2004, however, which resulted in improvements in water clarity. This led to a short-term recovery of SAV that met the 30-acre restoration goal. This suggests that the efforts underway to increase the capacity of the Back River Wastewater Treatment Plant (WWTP) may allow for the recovery of SAV in the tributary if nutrient pollution is reduced as a result.

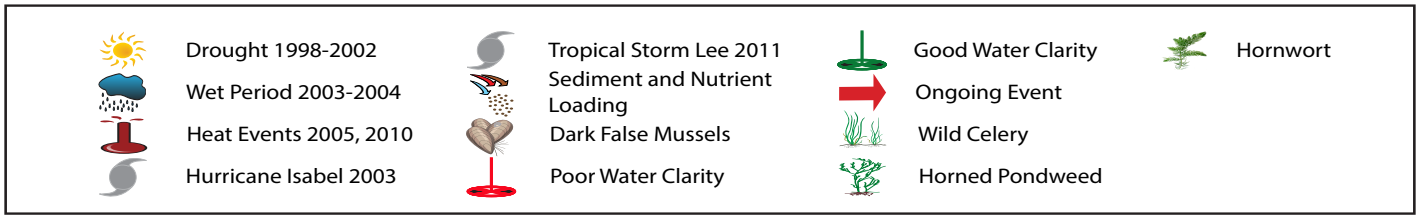
SAV Acres and Density



Picturing Change Over Time in the Back River



Key



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Take Home Points

Goal - Attainable

The 30-acre goal for this segment was established based on 2004 data when SAV covered 30 acres of the river's bottom. Although SAV has not recovered in Back River to that extent since, the goal is considered attainable due to the rapid, albeit brief, nature of the 2004 recovery and because it is a relatively small goal. The goal for this segment is low based on minimal historical information; it is likely that at one time this river supported more SAV than observed in recent decades.

Historical Coverage

Historically diverse but minimal since Chesapeake Bay-wide survey began in 1984

Herbarium specimens from the 1940s indicate that SAV was present in Back River prior to recorded observations and surveys conducted in the 1960s and 1970s indicate that SAV was particularly diverse during those decades. Poor water clarity in the following decades, however, has led to an almost complete loss of SAV in the river since that time. Data from the Bay-wide aerial survey indicates that SAV has been absent in all but two years of the survey: 2004 and 2011. In 2004, 30 acres of SAV were observed, which is the basis of the segment restoration goal. Species observed include horned pondweed, wild celery and hornwort.

Key Events

Hurricane Isabel introduced dark false mussels in 2003, leading to short-term recovery of SAV in 2004

In 2003, high flows from Hurricane Isabel spread dark false mussels to several tributaries of the Bay in which they were not normally abundant. The sudden, dense appearance of filter feeders cleared the water and allowed for the short-term recovery of SAV in 2004.

Vulnerability/Resilience

Potential for overflow from sewage treatment plants; habitat and limited seed availability

Back River is in a heavily developed watershed, so land use related stressors make the system vulnerable to degradation in a number of ways. The Back River WWTP cannot meet the demands of the high population density in Baltimore County and frequently exceeds the permitted amount of nitrogen allowed to be released into the waterway. This leads to long-term and persistent algae blooms that reduce the sunlight necessary for SAV to recover. Fortunately, in 2017 a $430 million treatment plant improvement project was initiated that aims to alleviate the overflow problem. With reduced nutrient pollution to the river, water clarity may improve and allow SAV to recover–indicated by the recovery of SAV in the nearby Middle River. Residents living on or near Middle River are on sewers that also discharge to the Back River WWTP, but Middle River itself is not subject to the treatment plant's overflow problems, hence the difference in SAV abundance between the neighboring rivers. Due to the long-term absence of SAV, a viable seed bank may not be present, so direct seeding may be necessary to facilitate recovery. Because Back River is in the upper, freshwater portion of the Bay, restoration should focus on both acreage and diversity to increase future resilience.

Management Implications

Nutrient and sediment reductions

Improvements in water clarity brought on by improvements in wastewater treatment may allow for either the natural or facilitated restoration of SAV to Back River. With a relatively small acreage goal, it will be attainable through reductions in nutrient and sediment loading. All efforts should be made to continue improving WWTP capacity and efficiency, as well as to implement other best management practices that lead to the increased reduction of nutrient and sediment loading.

References

Stevenson and Confer 1978; Orth and Moore 1983, 1984; Moore et al. 2000, 2004; Orth et al. 2010a, 2017; Patrick and Weller 2015; Landry and Golden 2018; 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)

www.environmentalintegrity.org/wp-content/uploads/2017/02/Bay-Wastewater.pdf (sewage and WWTP info)