

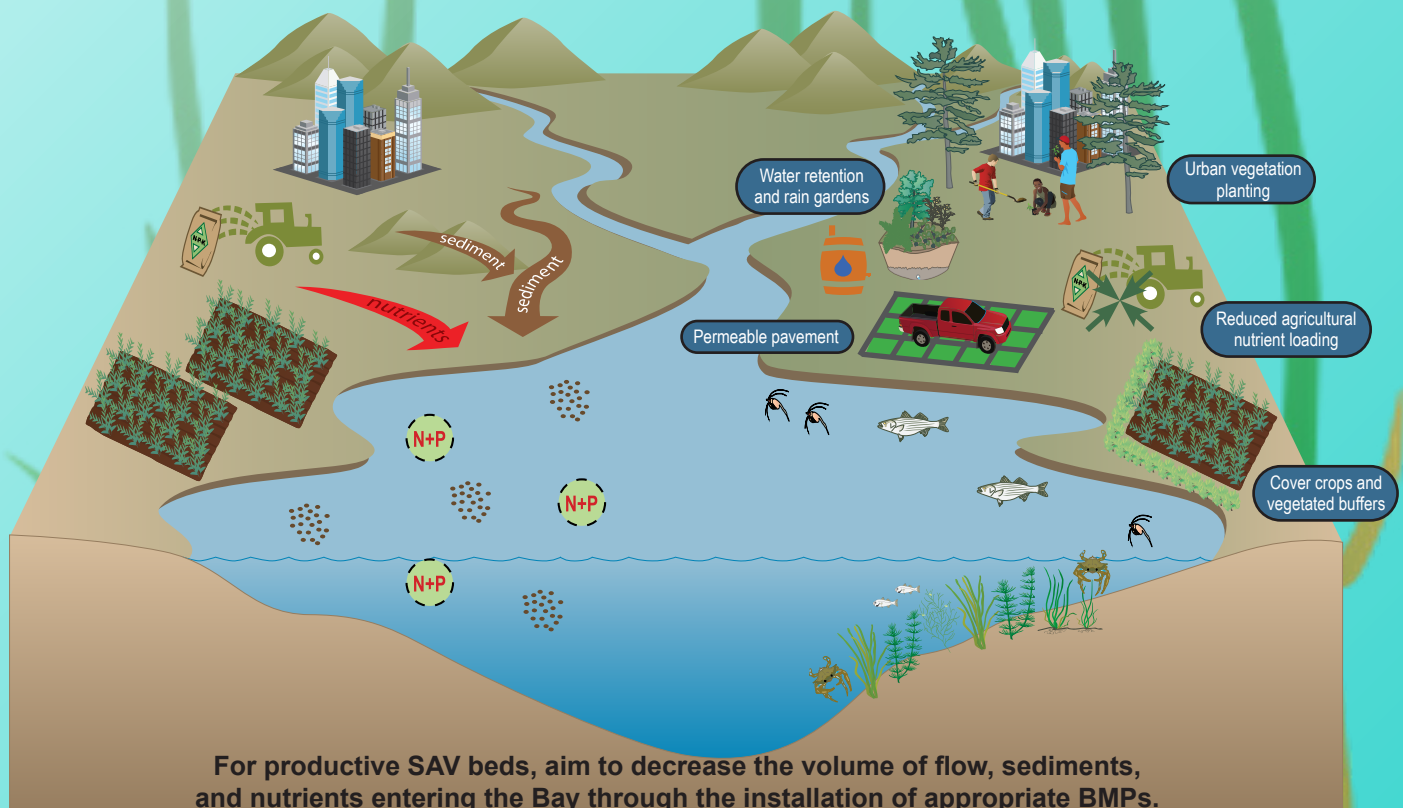
Best Management Practices for SAV Resilience and Recovery

Beds of submerged aquatic vegetation (SAV) are composed of flowering, underwater plants that provide critical habitat and other ecosystem services in the nearshore waters of Chesapeake Bay. SAV beds provide food and shelter for wildlife like blue crabs, striped bass, and waterfowl; reduce shoreline erosion by slowing currents and wave energy; and improve local water clarity by trapping sediments and processing nutrients. Unfortunately, however, SAV populations throughout the Chesapeake Bay have declined over the past century due to decreased water quality. Decreases in water quality are linked to nutrient and sediment pollution from activities on land (e.g., construction, agriculture). These pollutants enter the Bay, often by way of surface waters, and cause algal blooms and general cloudiness that reduce water clarity, limiting the amount of sunlight that reaches SAV, stunting its growth.

Best management practices, or BMPs, are conservation and technological practices that can reduce the amounts of pollutants that enter waterways. The installation and continued maintenance of a variety of BMPs that intend to reduce the flow of nutrients and sediments into the Chesapeake Bay will be most effective in protecting, conserving, and restoring SAV.

Some BMPs that reduce the flow of stormwater and in turn, nutrients and sediments, into waterways include

- Permeable pavement installation and redirecting runoff from impervious surfaces (e.g., rooftops) to permeable surfaces (promotes infiltration of water into surface soils, keeping it from entering stormwater drainage systems)
- Bioretention, rain garden, and detention/retention basin installation (decreases peak flow volumes by storing excess runoff)
- Cover crop planting and conservation tillage on agricultural lands (intercepts rainfall and soil moisture during the non-cash crop season)
- Infiltration practices on agricultural lands like vegetated crop buffer planting (increases infiltration rates and capacities, reducing surface runoff)



The Chesapeake Bay Program supports measures to ensure SAV protection and expansion throughout the watershed by implementing BMPs. A study done to identify the BMPs that likely have the largest effect on SAV persistence determined that minimum daily discharge* was among the most important variables for predicting SAV health and abundance. As such, the installation of BMPs that attenuate peak flows through reductions in surface runoff is a management strategy that should be considered as a priority to maintaining healthy SAV habitats in the Chesapeake Bay. This is an important finding because it shows that not one BMP alone is important in supporting SAV persistence. Rather, a suite of BMPs should be used watershed-wide and locally to manage and control the volume of flows and the subsequent flux of sediments and nutrients into the tributaries that eventually drain to the Chesapeake Bay.

Lower flow volumes of water entering waterways, compared to higher, more flashy flow volumes of water, improve SAV health through multiple mechanisms. BMPs that attenuate peak flows through reductions in surface runoff should be prioritized. Reduction of flow volumes will be of particular importance when considering the influences of climate change and the continued urbanization observed in watershed land use change; which increase flow volumes through more frequent and intense storm events and increased impervious surfaces, respectively. BMPs that are not aimed directly at decreasing flow volumes but provide ancillary benefits that are typically associated with lower flow volumes (e.g., decreased nutrient and sediment loads) should also be considered. Additionally, opportunities where BMP implementation can improve both upland and downstream water conditions (e.g., nutrient management on agricultural lands) should be considered and prioritized as well.

BMP effectiveness will vary and is a function of many variables. As such, local knowledge of primary environmental stressors should be considered. These recommendations should be implemented where the most opportune situations exist. When evaluating BMP effectiveness for improving SAV health the following should be considered: the land use within the watershed, the proximity of BMPs to the Chesapeake Bay, and the size of the drainage area. When BMPs are implemented at great distances from the bay, their net effectiveness can be attenuated by the many other influencing factors that are occurring between the source and receiving waters (i.e., other tributaries, point source nutrient contributions, land use, etc.).

For example, if a drainage area to an SAV bed is relatively small and is dominated by urban land uses, the attenuation of peak flows from this highly impervious drainage area may prove to be most effective. This may be achieved through a single detention/retention basin near the downstream end of the contributing area. If a drainage area to an SAV bed is large and is dominated by agricultural land use, attenuation of peak flows may not be readily achieved through implementation of a single BMP. Rather, widespread reduction of surface runoff through multiple BMPs such as cover crops and riparian buffers may provide the greatest benefits to SAV health.

For more information on this study and SAV, please visit the Chesapeake Bay Program's Submerged Aquatic Vegetation Workgroup website:

<https://www.chesapeakebay.net/who/group/submerged-aquatic-vegetation-workgroup>

* Tetra Tech determined the minimum daily discharge for each year represented in the study; therefore, these values represent annual minimum daily discharge, but for simplicity, they are referred to as minimum daily discharge in this fact sheet.

