# Submerged Aquatic Vegetation Program

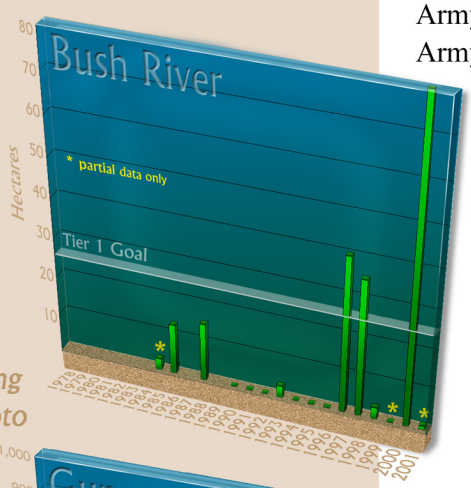
## ABERDEEN PROVING GROUND, MARYLAND

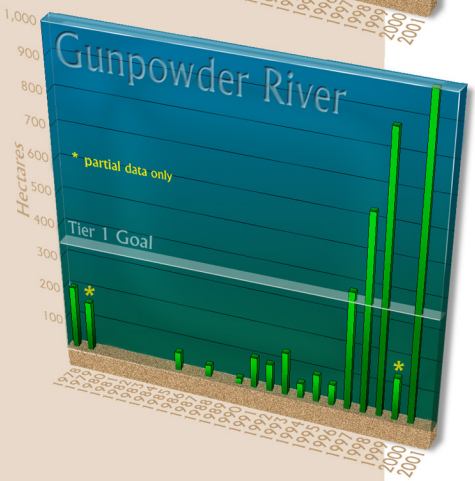
Submerged Aquatic Vegetation (SAV)

Underwater grasses, known collectively as submerged aquatic vegetation (SAV), are crucial to the ecological health of the Chesapeake Bay. Although this vegetation appears to float aimlessly in the current, the reality is that SAV has great significance: it filters and traps sediment, absorbs excess nutrients, and prevents erosion. An ecosystem in itself, SAV provides food, dissolved oxygen, and shelter for waterfowl, fish, shellfish, and invertebrates. Unfortunately, due to poor water quality and disturbance of SAV beds, more than half of this critical vegetation has disappeared from the Chesapeake Bay.

Recognizing the consequences of this loss, the US Army Environmental Center (USAEC); Aberdeen Proving Ground's Department of Safety, Health and the Environment; and the US Army Research Laboratory joined forces in 1996 to form the Army Submerged Aquatic Vegetation Program. The partnership has since grown to include local, state, and federal agencies that share scientific knowledge and coordinate Chesapeake Bay SAV restoration efforts.

USAEC's research and restoration work consists of a three-pronged approach to calculate the quantity of the vegetation, quality of the water, and methods for restoration. This multi-faceted approach allows researchers to see monthly and yearly trends in SAV coverage and water quality while giving them the ability to locate ideal sites for restoration activities.




*Ground-truthing with aerial photo data of the Bush and Gunpowder Rivers*

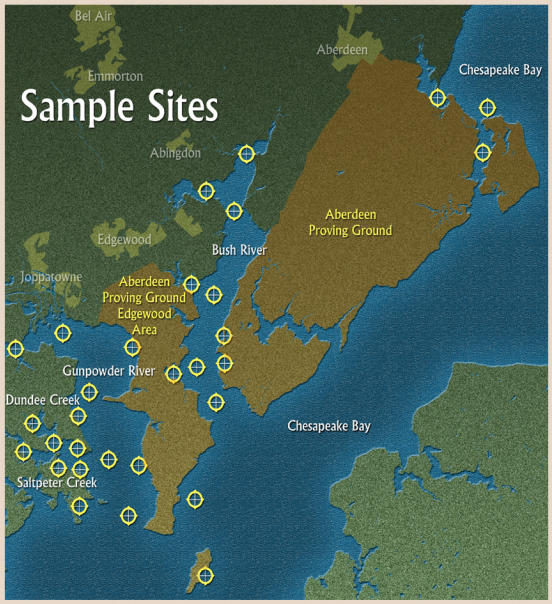
**Due to poor water quality and disturbance of SAV beds, more than half of this critical vegetation has disappeared from the Chesapeake Bay.**

*By examining the data collected by historical aerial photography and ground-truthing, researchers have discovered that both rivers have been below Tier 1 goal for many years. In 1996 this goal was reached for both rivers, but in 1998 the Bush River coverage dropped below the goal, and in 1999 both rivers were once again below the goal. The year 2000 saw resurgence but, due to security concerns, no data were collected in 2001. The data for 2002 are still being analyzed to determine the effects of that year's drought. Currently, 2003 flights are being conducted.*

## A THREE-PRONGED APPROACH

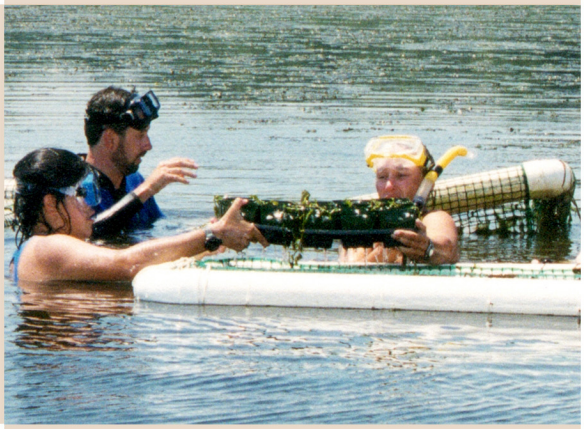
First, to discover the size of the beds, researchers use ground-truthing, which involves a hand-held GPS that continuously records locations of the outer fringes of the SAV beds. Along with ground-truthing, aerial photo data collected by the Virginia Institute of Marine Science are used for monitoring the beds. From this information, the area of the beds is calculated. The bed's species composition and percent cover is also recorded. Most historic data come from aerial photographs taken for use in agriculture, which show beds of SAV in the surrounding waters through the years. Until recently, according to this aerial data, both the Bush and Gunpowder Rivers' coverage has been below the Tier I goal, defined as the total acreage of SAV visible in aerial photos taken from 1971 to 1990.

USAEC's second tactic involves biweekly monitoring during the growing season, May through October. Twenty-five sites in the Bush and Gunpowder Rivers are monitored for local water quality conditions. Additional sites around Pooles Island and Spesutie Island are also sampled when access can be acquired. The variables recorded include salinity, dissolved oxygen, conductivity, temperature, and two different light measurements. Since light availability is the controlling factor of SAV success, both secchi disk depth and light attenuation measurements are recorded.




*To monitor the water quality, researchers survey various sites in the Gunpowder and Bush Rivers, as well as other locations surrounding the Aberdeen and Edgewood areas of Aberdeen Proving Ground, Md. The variables recorded include salinity, dissolved oxygen, conductivity, temperature, and two different light measurements.*

*Various species of submerged aquatic vegetation are grown in large outdoor tanks at Aberdeen Proving Ground, Md. Not only can the larger, more mature plants be used in restoration efforts, but researchers can also avoid taking plants from healthy beds in the Chesapeake Bay.*



Finally, after analyzing the water quality data, USAEC initiates restoration activities. Starting in the spring and continuing throughout the summer, researchers identify sites for various restoration efforts. While some sites require divers, others may be reached easily at low tide, allowing volunteers to be involved. In some areas, seed dispersal is an ideal method of plant propagation. Sites that are hand planted are arranged in grids, and mixtures of SAV are planted to determine the most successful combinations and densities.

*Starting in the spring and continuing throughout the summer, researchers identify sites for various restoration activities. While some sites require divers, others may be reached easily at low tide, allowing volunteers to be involved.*