Oyster Aquaculture and Submerged Aquatic Vegetation (SAV) in Maryland

INTRODUCTION

Submerged aquatic vegetation (SAV) grows in the shallow waters of the Chesapeake Bay and its tributaries. It provides ecological benefits like water filtration, sediment stabilization, and wildlife habitat. Because SAV is sensitive to poor water quality, the growth of SAV is an indicator of Bay health and the success of restoration efforts.

From 2015-2018, SAV rebounded in mid-salinity regions of the Bay—even appearing in areas where it had not been seen for decades. It also began to grow in some shallow-water oyster aquaculture farms. SAV is a protected resource in the Bay. As a result, some oyster growers may be subject to laws that restrict or alter their operations.

The question remains: what impact does oyster aquaculture have on SAV in the Chesapeake Bay? Recent research studies are beginning to provide answers.

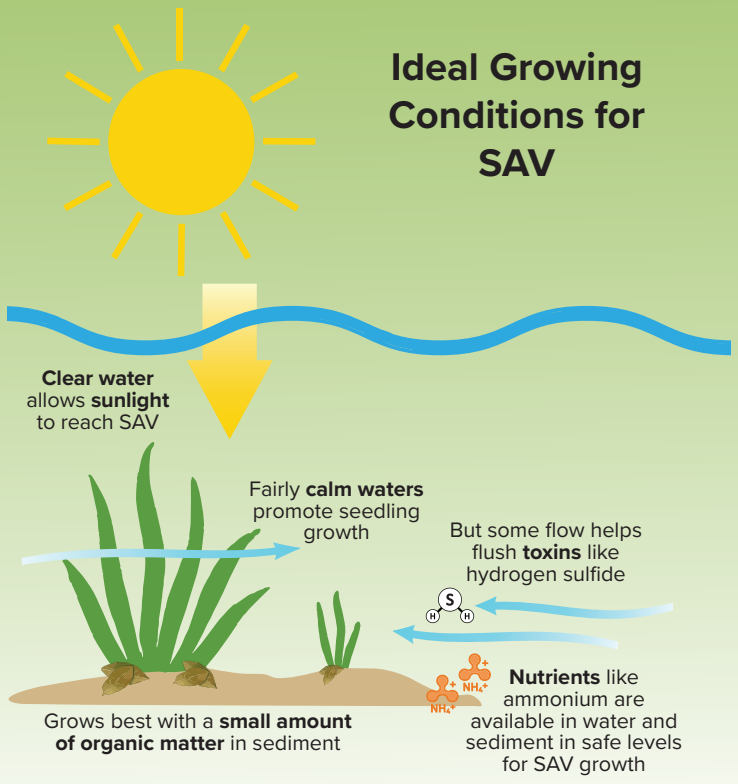
CURRENT STATUTES

Current aquaculture leasing statutes in Maryland take a precautionary approach, assuming oyster farms could harm SAV. New oyster leases cannot be sited in areas that contained SAV in the most recent five-year period of Bay SAV distribution data on record. If SAV begins to grow on an established water-column lease in Maryland, gear placement may be limited to 10% of that area (or more with permission from the Maryland Department of Natural Resources). This provision is set to sunset in June 2027, after which gear placement will be seasonally restricted in areas with SAV, similar to the current practice for submerged land leases with SAV encroachment.

SAV Needs the Right Conditions to Grow

SAV grows best in **clear water** where **sunlight** can reach its underwater leaves. Strong **currents** can dislodge SAV, so to stay rooted in the sediment, it needs fairly **calm waters**. But if currents move too slowly, naturally occurring **toxins** like hydrogen sulfide, produced by microbes in the sediment, can build up to unsafe levels. Organic matter can fuel this toxin production, so SAV tends to grow best when the sediment contains only a **small amount of organic matter**. SAV also needs access to **nutrients**, such as ammonium, from the sediment or water to grow. However, if ammonium concentrations are too high, it can damage the plants or cause algae to overgrow.

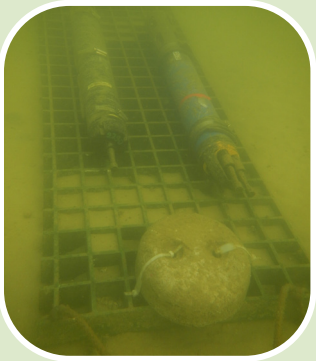
Ideal Growing Conditions for SAV



STUDY: EFFECTS OF BOTTOM-CAGE OYSTER AQUACULTURE ON SAV IN SOUTHERN MARYLAND

Researchers studied **two bottom-cage oyster farms** in St. Mary's County and Calvert County, Maryland. They measured habitat conditions both inside the oyster farms and in bare areas adjacent to the oyster cages. They looked at water quality, sediment, and water movement.

They found that the effects of oyster farms on SAV depend on the interplay between oyster cages and the physical environment.



Water Quality and Sediment

Impacts of oyster cages on water quality and sediment depend on the balance between how quickly oysters filter water and deposit their waste, and how quickly waves and currents flush old water and waste out and bring new water into a farm. Oyster filtration can clear slow-moving water of microscopic algae, providing more light for SAV to grow. However, organic oyster waste is more likely to collect in the sediment under calm conditions. This can increase the amount of toxic sulfide and ammonium in the sediment, impeding SAV growth.

Water Movement

Oyster cages also affect the physical environment, but the strength of the effect varies based on cage spacing and water depth. Cages spaced close together in shallow water tend to create calm conditions within a farm, slowing currents and dampening waves. This could help delicate SAV seedlings take root. However, these conditions are also more likely to create larger "no-grow zones" directly under cages and cast shade throughout farms. Widely spaced cages in deeper water tend to have less of an effect on water movement.

Will these factors affect SAV growth on my oyster farm? That depends on the local environment. If conditions are already near the thresholds for SAV habitat, a farm could tip the balance—either helping or hindering SAV growth.

CONSIDERATIONS FOR POLICYMAKERS AND OYSTER GROWERS

Because oyster farms do not have universally predictable effects on SAV, a one-size-fits-all law or regulation is not practical. Even so, this study offers takeaways that could be useful for policymakers and oyster growers.

Policymakers

This research shows that shade and sediment toxin buildup have fewer impacts on SAV when oyster farm cages are widely spaced. There is also less physical disturbance of sediment as workers maintain and harvest oysters. These findings support that the 10% gear placement provision for SAV encroachment is reasonable, as long as gear is not densely concentrated. Continued monitoring of SAV beds that extend into oyster farms will help clarify cage impacts in a wider range of conditions.

Oyster growers

Widgeon grass, the most common mid-salinity SAV species in the Chesapeake Bay, has natural boom-and-bust cycles that can seem unpredictable. If conditions are right and there is SAV nearby producing seeds, new SAV beds can appear in shallow waters. Future changes to laws and regulations may also impact how growers must respond to SAV that extends into an oyster lease.

Because of this, some growers may prefer a more conservative approach when siting a lease, aiming to reduce the chance of SAV growing on their farm. The **Virginia Institute of Marine Science's SAV Map** is a helpful tool, showing areas where SAV has not grown in the past 30 years and where there are no nearby SAV beds. These areas tend to be less suitable for SAV, making it less likely SAV will grow there in the future.

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Scientists are also conducting research on the impacts of floating oyster cages on SAV in the Bay.

Stay tuned for more research findings on SAV and oyster aquaculture.

Sea Grant MARYLAND

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