

STAR – February 26th, 2026

*Chesapeake Bay Program*



# Monitoring Submerged Aquatic Vegetation in Chesapeake Bay



# Integrated, Tiered, Hierarchical Approach



	Who is monitoring?	Year started	Location	Purpose	Parameters monitored
<b>Tier 3</b> <b>Sentinel Sites</b> 	Chesapeake Bay Program SAV Workgroup and Partners	2023	~ 15 sites throughout Chesapeake Bay	Monitors multiple parameters in greater detail at a significantly smaller number of locations. Focuses on identifying causal relationships by intensively monitoring drivers of change, ecosystem responses, and ecological processes.	Parameters measured in Tier 2, plus cover of each SAV species, canopy height, epiphyte loading, shoot density, biomass, indications of disease or herbivory, temperature, pH, salinity, chl a, turbidity, Secchi depth, water column depth, DO
<b>Tier 2</b> <b>SAV Watchers</b> 	Watershed Monitoring Groups and Volunteers	2019	Tributaries throughout Chesapeake Bay	Monitors a limited number of habitat characteristics at a large number of locations. Useful for broad-scale condition assessment and for identifying and quantifying driver/response relationships.	SAV species composition and total cover, presence/absence of seeds, flowers, epiphytes, filamentous macroalgae, indications of human impacts, water column and Secchi depth, sediment type, and shoreline type
<b>Tier 1</b> <b>Aerial Survey</b> 	Virginia Institute of Marine Science	1984	Bay-wide	Characterizes SAV acreage and density and progress towards SAV restoration goals. Useful for quantifying SAV habitat distribution and density throughout the Bay and its tributaries.	SAV acreage and visual cover

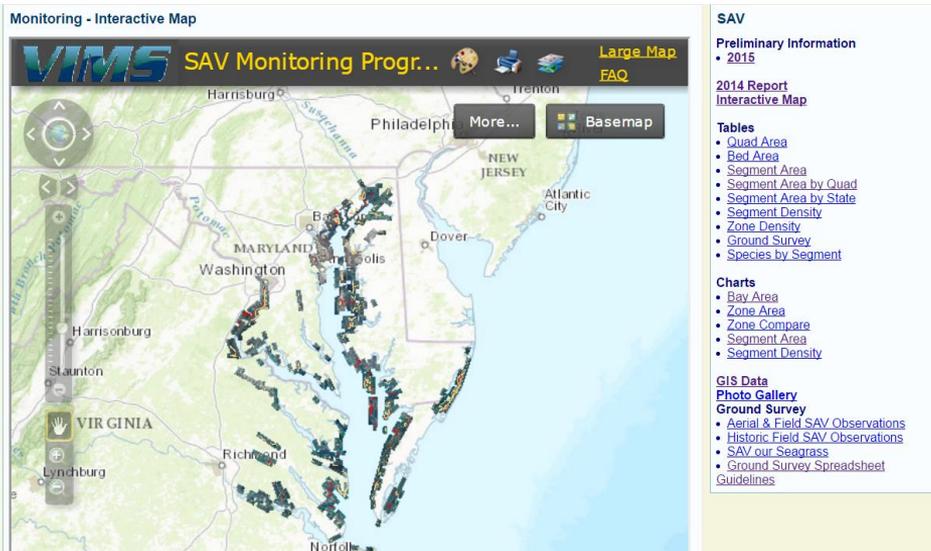
# Integration

**Changes in SAV habitat extent or condition detected at Tiers 1 and 2 can direct process-based investigations at Tier 3, and statistical and explanatory models built on Tier 2 and 3 data can be used to interpret and predict patterns and conditions at larger scales.**



Tier  
1

## VIMS Bay-wide Aerial Survey



- Bay-wide Aerial Survey, conducted by VIMS annually May-Oct
- 180+ flight lines using high resolution multispectral imagery
- Ongoing since 1984
- Funded by Federal/State partnership
- Includes the use of satellite imagery to supplement aerial imagery
- Exploring increasing use of satellite data to increase program efficiency and expand temporal coverage

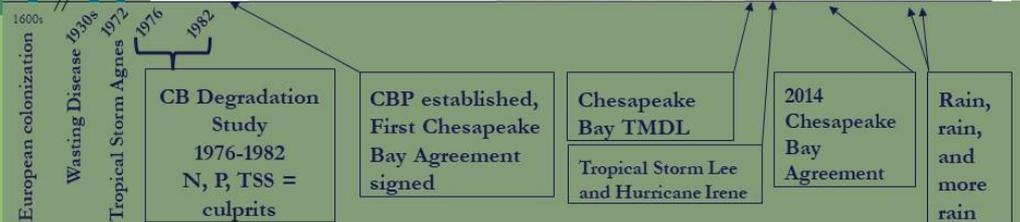
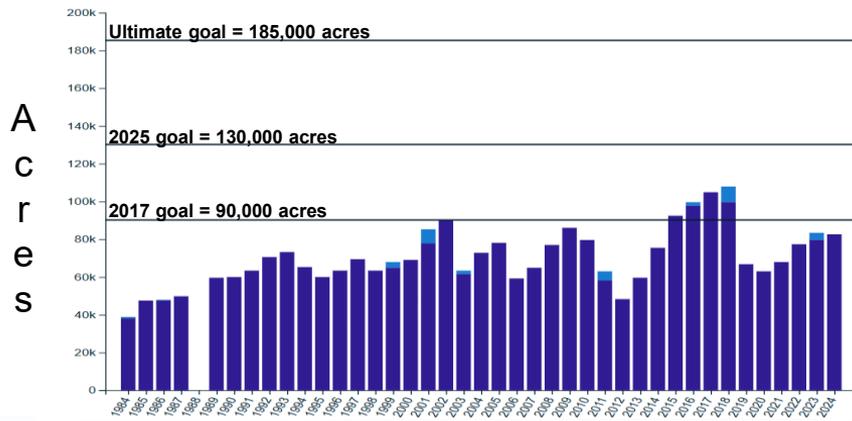
Tier 1



# VIMS Bay-wide Aerial Survey

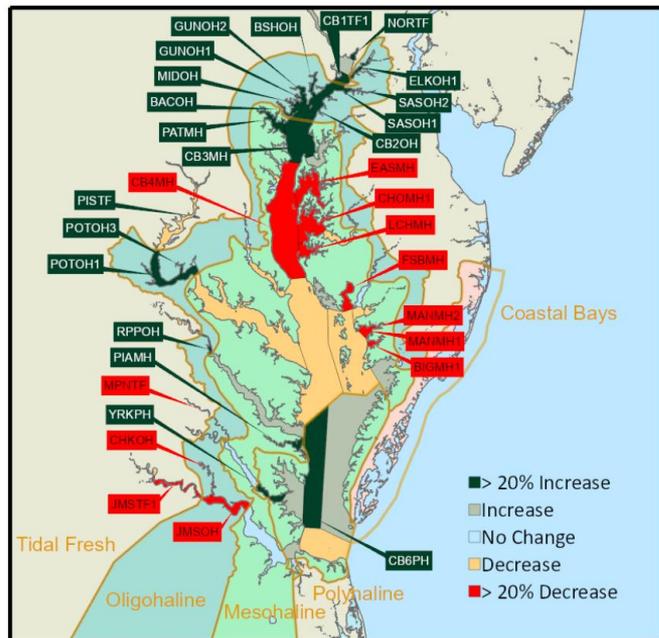
## Progress towards the Bay-wide SAV goal

Submerged Aquatic Vegetation Abundance (1984-2022)



## FINAL SAV #s were slightly down in 2024:

- 83,250 acres were mapped in 2024.
- 83,419 total acres of SAV estimated for 2023.
- This is 64% of the Chesapeake Bay Program's 130,000-acre restoration target and 45% of its 185,000-acre goal.
- It is a 114% increase from the 38,958 acres observed during the first underwater grass survey in 1984, but a 0.2% decrease from the 83,419 acres reported in 2023.



<https://www.chesapeakeprogress.com/abundant-life/sav>

<https://www.vims.edu/research/units/programs/sav/access/maps/index.php>

Tier  
2

## Chesapeake Bay SAV Watchers



**Chesapeake Bay SAV Watchers is a program to provide volunteer scientists with an engaging and educational experience with SAV while also generating useful data for Bay scientists and managers.**

**This is the first official SAV monitoring program for volunteer scientists developed by the Chesapeake Bay Program (SAV Workgroup GIT Funding)**

[www.chesapeakebaysavwatchers.com](http://www.chesapeakebaysavwatchers.com)

Tier  
2

# Chesapeake Bay SAV Watchers – It's a Pyramid Scheme



Tier  
2

## Chesapeake Bay SAV Watchers – For Most Anyone



This program is for everyone:  
individuals, riverkeepers, watershed  
organizations, and school groups!



Volunteers can be a:

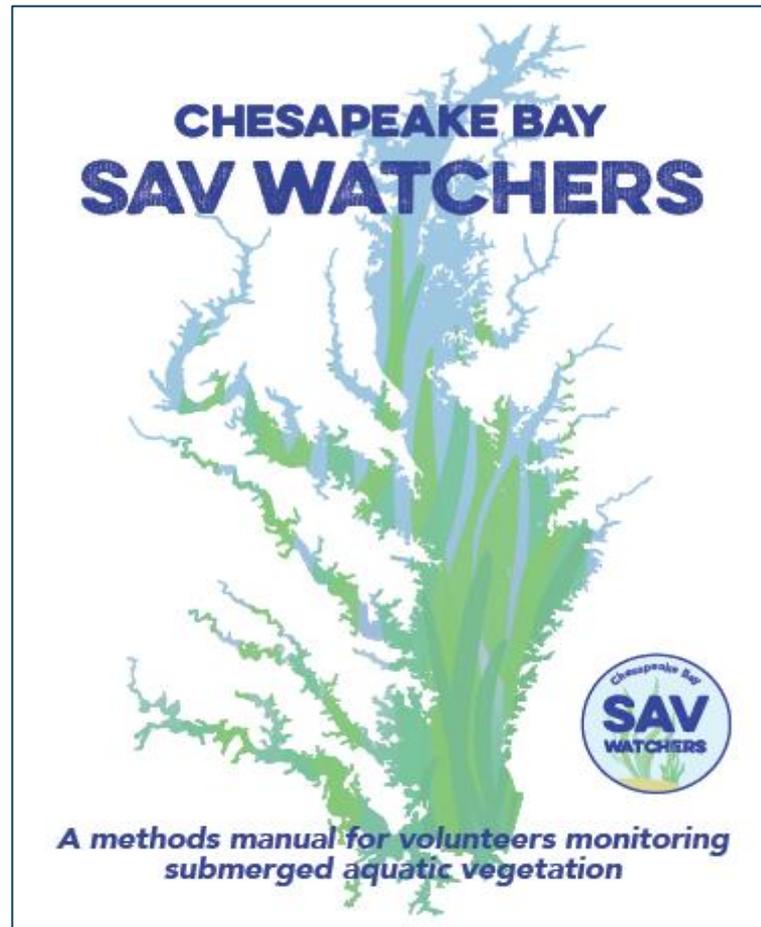
1. Non-certified Volunteer
2. Certified Volunteer Monitor
3. Certified Trainer

Tier  
2

## Chesapeake Bay SAV Watchers – Parameters Collected



- Total SAV Cover
- SAV species present
- Reproductive status of plants
- Epiphyte presence
- Macroalgae presence
- Microseira (cyanobacteria) presence
- Shoreline features
- Water depth
- Secchi depth
- Bottom type



Tier  
2

# Chesapeake Bay SAV Watchers – Data Collection



## Datasheets

Chesapeake Bay SAV Watchers

Name	Site ID	Date	Month (day/year)	Tides	Height	Wind	Site ID format	YYMMDDhhmmFL	Density scale	0 Above 0-10% 10-15% 15-20% 20-25%
General area description										
Site ID:	SAV Species	Flowers/seeds	Flowers	SAV at surface	Present	Absent	Site ID key for the following			
GPS coordinates	Secchi Depth	Water Depth	Bottom sediment	Epiphytes	Erosion	Human Impact	Total SAV	Lyngbya	Macroalgae	Emergent plants
Lat	Long	Sampling time	Shoreline type(s)	SAV Species	Flowers/seeds	SAV at surface	Lyngbya	Macroalgae	Emergent plants	Water density
Site ID:	SAV Species	Flowers/seeds	Flowers	SAV at surface	Present	Absent	Site ID key for the following			
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SAV species (abbreviation and common name)	Light	Shoreline types	Macroalgae
GA Hornwort	GA Western waterweed	MA Pencil leather milfoil	MA Green ballmoss
GA Water penny	MA Water penny	MA Common waterweed	MA Green submersive
GA Broadleaf waterweed	MA Hydrilla	MA Hornwort	MA Red submersive
MA Waterweed	MA Najas	MA Northern naiad	MA Red submersive
MA Common waterweed	MA One stemmed elodea	MA Spikerdock	MA Brown submersive

ALL data eventually ends up in Survey123 database!

## ArcGIS Survey123

### SAV WATCHERS

#### Guide to Submitting Data and Observations

##### Download the ArcGIS Survey123 app to your smartphone

All Chesapeake Bay SAV Watchers volunteers will use the ArcGIS Survey123 platform to submit data for the Chesapeake Bay SAV Watchers Program. It is recommended that volunteers collect and submit data using a smartphone equipped with the ArcGIS Survey123 app or to be sure to have the survey link handy. This section will review the steps involved in this process.

##### Download the Chesapeake Bay SAV Watchers survey

In order to contribute data to the Chesapeake Bay SAV Watchers Program, all observers will need access to the survey link or to have downloaded the survey. This can be done using the ArcGIS Survey123 app on a smartphone or online at <https://arcgis123.survey123.com>. This section will review the steps involved in this process.

##### Android

1. Open the Google Play Store.
2. Type "ArcGIS Survey123" into the search bar to locate the app. A list of suggested results will appear as you type.
3. Select the ArcGIS Survey123 app from the list to open its Play Store page.
4. Tap the "Install" button to download the free app to your device and install it.



##### ArcGIS Survey123

Chesapeake Bay SAV Watchers volunteers should use the ArcGIS Survey123 platform to submit SAV observations.

##### On a smartphone

1. Open the ArcGIS Survey123 app and select "While using the app" to allow ArcGIS Survey123 to take pictures and record videos. Then select "Allow" for ArcGIS Survey123 to send you notifications.
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Scan the QR Code to get online access to our "Chesapeake Bay SAV Watchers" ArcGIS Survey. Users are given the option to use their browser or the ArcGIS Survey123 App.

FIND OUR SURVEY



10:39 89%

ay123.arcgis.com

Chesapeake Bay SAV WATCHERS

On the go way to record your SAV Watcher observations. A replacement for "Water Reporter." Follows a similar format to the datasheets.

Surveyor Name\*

Group ID

Email

Date\* 03/13/2024

# Chesapeake Bay SAV Watchers – Resources



Instructions for measuring each data parameter are in the methods manual and pocket guide and instructions for Survey123 are in the Guide to Submitting Data and Observations!



## SAV WATCHERS

### Guide to Submitting Data and Observations

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#### Apple

1. Open the App Store.
2. Tap the magnifying glass icon in the bottom right corner to open the search bar.
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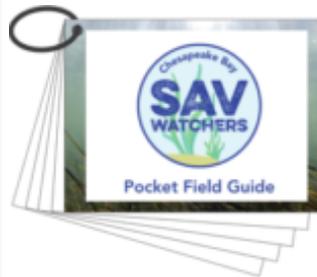


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#### Bottom sediment

##### Overview:

Indicate the type of sediment found at the site.

##### Significance:

The bottom of the monitoring site beneath the water column is called the sediment. SAV needs sediment to anchor and stabilize itself in moving water. Different SAV species prefer different types of bottom sediment, ranging from sand to mud. Sometimes SAV grows on peat, which is another type of sediment that is common in some areas of the Bay. SAV abundance is generally limited in areas with peat as sediment. In this way, sediment type can help explain why certain species of SAV are present or absent in certain areas, which in turn helps managers and scientists prioritize specific areas of the Bay for SAV restoration.

##### Equipment:

Paddle, pole, or other long and rigid material.

##### Method:

1. Position yourself comfortably and securely over the monitoring site.
2. Extend your paddle, or other material, downward and push it through the top few inches of sediment. Take note of how easily the paddle penetrates the bottom sediment.
  - a. If the paddle penetrates the sediment relatively easily, it is soft. Soft sediment in the Chesapeake Bay is likely mud or peat. See the "Pro tips" below for instructions on how to differentiate between types of soft sediment.
  - b. If penetration is slow and requires more effort, the sediment is sandy.
  - c. If you cannot push your paddle into the sediment, it is hard. Hard bottom sediments in the Chesapeake Bay will likely consist of gravel or rock.
3. Repeat these steps two more times in the monitoring site. The most common type

of sediment (mud, sand, peat, or hard) observed at the monitoring site should be the one recorded.

##### Pro tips:

- If you press on the bottom, and there is some resistance but the sediment does not feel hard, stir the sediment gently with your paddle. If small chunks of dark material float to the surface, the sediment is most likely peat. If the bottom is soft and your paddle penetrates easily, it is most likely mud.
- You can also use your hand to determine if the sediment is muddy, sandy, peat-based, or hard. Be careful not to cut yourself on shells or other materials that may be hidden in the sediment.



Press a paddle into the bottom sediment at a sampling site to collect data on sediment type. (Dor Shuman)



Feeling the sediment with your fingers can help distinguish between types of sediment. (Dor Shuman)

Tier  
2

# Chesapeake Bay SAV Watchers – YouTube Instructional Videos

A screenshot of a web browser displaying a YouTube playlist. The address bar shows the URL: https://www.youtube.com/playlist?list=PLckKSX\_fLQ2kVDCeBQhfPudJthdHvW3p0. The browser's bookmark bar includes "Wiley online Library", "New Tab", "SAV WG", and "Brooke's Bookmarks". The YouTube interface shows the channel name "Chesapeake Bay SAV Watchers" with 17 videos and 9 views, last updated on Apr 4, 2019. The playlist contains five videos:

1. Monitoring SAV in the Chesapeake Bay (Chesapeake Bay SAV Watchers) - Integration Application-Network - 5:13
2. SAV Recovery in the Chesapeake Bay (Chesapeake Bay SAV Watchers) - Integration Application-Network - 5:44
3. Introduction to Submerged Aquatic Vegetation (Chesapeake Bay SAV Watchers) - Integration Application-Network - 3:29
4. Materials Available for Chesapeake Bay SAV Watchers (Chesapeake Bay SAV Watchers) - Integration Application-Network - 1:31
5. Secchi Depth (Chesapeake Bay SAV Watchers) - Integration Application-Network

[https://www.youtube.com/playlist?list=PLckKSX\\_fLQ2kVDCeBQhfPudJthdHvW3p0](https://www.youtube.com/playlist?list=PLckKSX_fLQ2kVDCeBQhfPudJthdHvW3p0)

Tier  
2

## Chesapeake Bay SAV Watchers – Train-the-Trainer Certification Events



### Chesapeake Bay SAV Watchers Trainer Training Event Sign up

The Chesapeake Bay Program's SAV Workgroup is offering two "Trainer training" events this summer for the SAV Watchers volunteer SAV monitoring program. As a trainer, you'll be officially certified to train your organization's volunteers to follow the established protocol and monitor SAV in tributaries throughout the Chesapeake Bay.



[https://www.youtube.com/playlist?list=PLckKSX\\_fLQ2kVDCeBQhfPudJthdHvW3p0](https://www.youtube.com/playlist?list=PLckKSX_fLQ2kVDCeBQhfPudJthdHvW3p0)

Tier  
2

# Chesapeake Bay SAV Watchers – Signed Certifications



*This is to certify that*

\_\_\_\_\_

*has successfully completed the  
Chesapeake Bay SAV Watchers  
Volunteer Monitor Trainer Certification course on*

\_\_\_\_\_

*(date of completion)*

\_\_\_\_\_

*(name of watershed group or riverkeeper)*

*J. Brooke Landry  
Chair, Chesapeake Bay Program's  
SAV Workgroup*



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*(date of completion)*

\_\_\_\_\_

*(name of watershed group or riverkeeper)*

*J. Brooke Landry  
Chair, Chesapeake Bay Program's  
SAV Workgroup*



Tier  
2

# Chesapeake Bay SAV Watchers – Quarterly Newsletter



Subscribe to our Newsletter here:

<https://forms.gle/yYwkDPShvBjFCiby5>



[www.chesapeakebaysavwatchers.com](http://www.chesapeakebaysavwatchers.com)

Tier  
2

# Chesapeake Bay SAV Watchers – Upcoming Events



## SAV Watchers Trainer Events to be on the lookout for in 2026:

- Havre de Grace Maritime Museum Env. Center
- Washington College
- Virginia Institute of Marine Science - ESL
- Virginia Commonwealth University/TNC
- Coastal Bays
- Mallows Bay

## 2025 Stats:

- 70+ New Trainers in 2025!
- 110+ new data points, 2,747 points total
- Held both 2-day and 1-day trainings

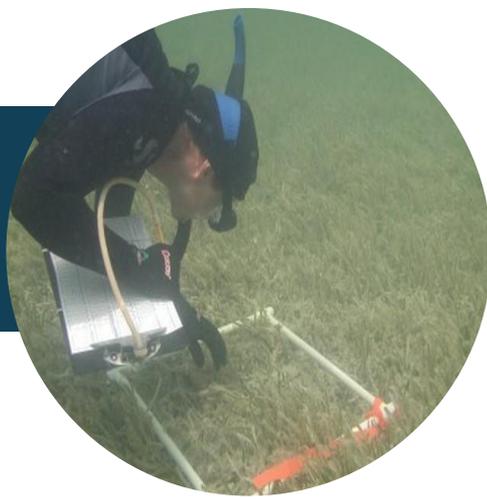
## 2025 Program Stats - Participating Organizations



[www.chesapeakebaysavwatchers.com](http://www.chesapeakebaysavwatchers.com)

Tier  
3

## SAV Sentinel Site Program

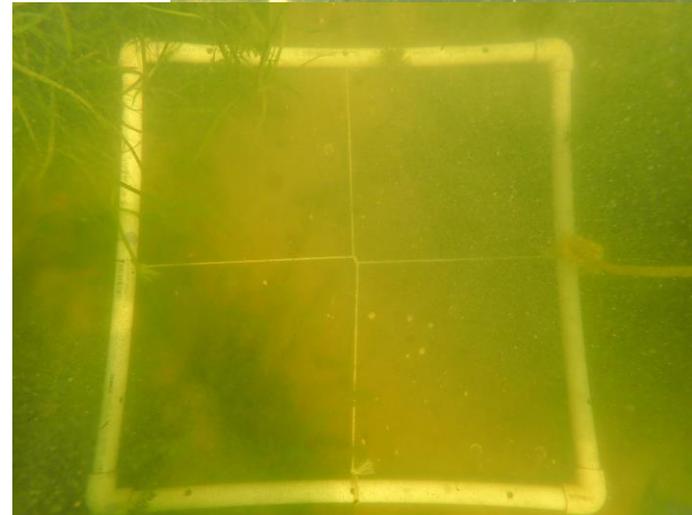
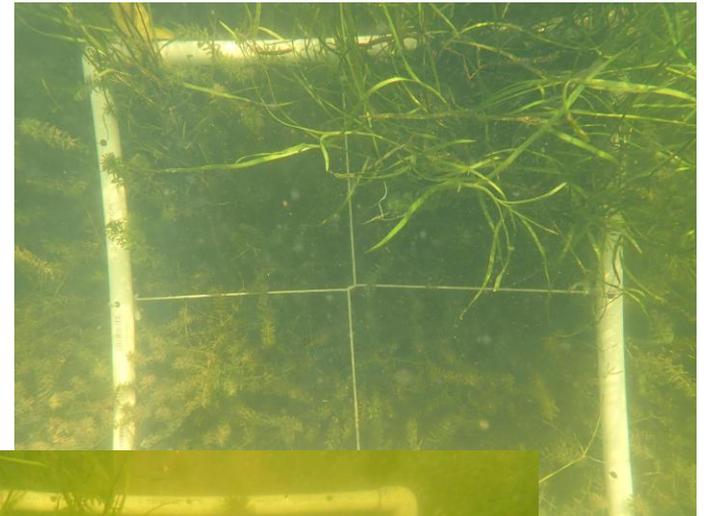


The Chesapeake Bay SAV Sentinel Site Program forms the third tier of the Chesapeake Bay SAV Monitoring effort. SAV sentinel sites are located in each of the Bay's four salinity zones (tidal fresh, oligohaline, mesohaline and polyhaline) and are monitored using a standardized, in-depth data collection protocol. These sentinel sites are a combination of existing, long-term sites and new sites where Bay scientists monitor changes in SAV habitat characteristics and resilience indicators.

## SAV Sentinel Site Program - Applications

### Sentinel Sites are Useful for:

- Early Detection of Changes
- Monitoring Trends and Patterns
- Indicator of Ecosystem Health
- Research and Scientific Study
- Risk Assessment and Management
- Decision Support for Policy and Management
- Validation of Models
- Community Engagement and Education
- Adaptive Management

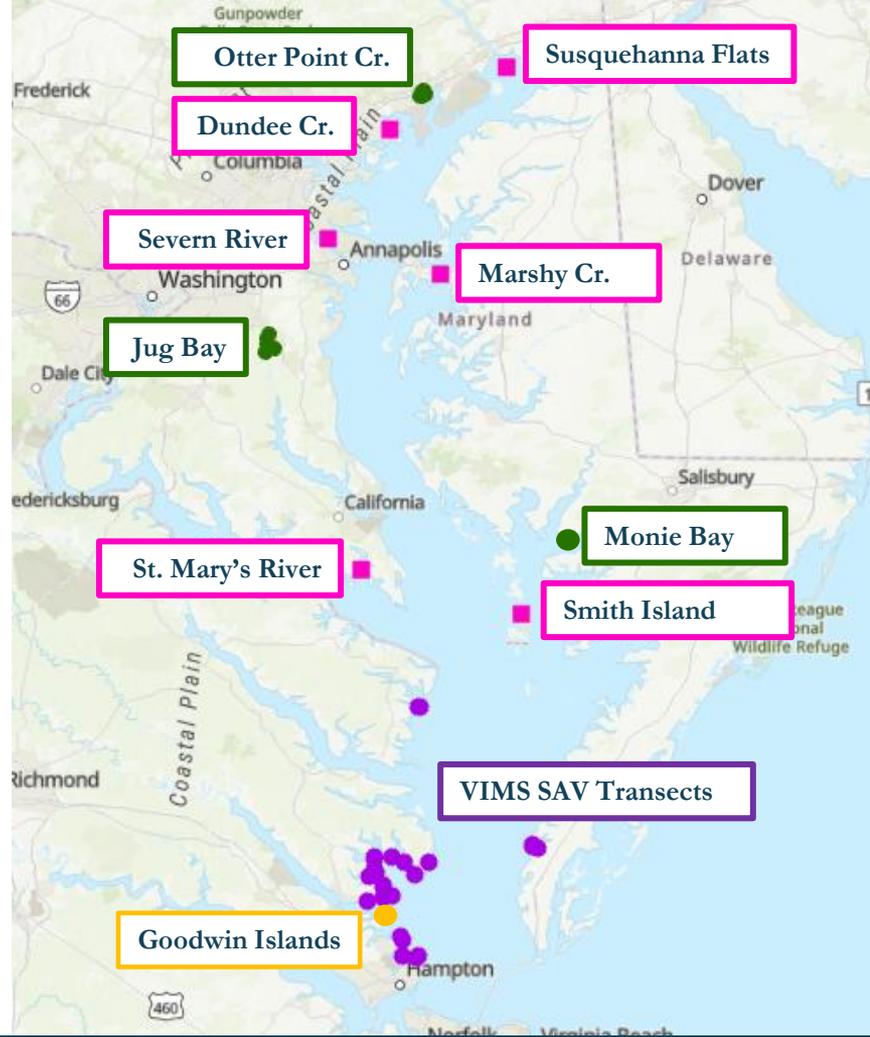


Tier  
3

## SAV Sentinel Site Program - Locations

### SAV Sentinel Sites to be monitored in 2026:

- Maryland DNR and Partner Sites
- VIMS sites
- CB- NERR MD
- CB-NERR VA



Tier  
3

## Chesapeake Bay SAV Sentinel Site Program – Parameters and Protocol

### General Information:

- Date
- Time
- Site name
- Surveying organization
- Name of data collector(s)
- General site coordinates

### Physical Parameters:

- Waypoint
- Water depth
- Sediment/substrate type
- Bottom disturbance

### Water Quality:

- Secchi Depth
- Light Attenuation
- Salinity
- Temperature
- pH

### Biological Parameters:

- Total SAV % cover, including macroalgae
- Cover of each species present, including macroalgae
- Canopy height
- Epiphyte loading
- Shoot density
- Presence/absence of reproductive structures
- Indications of disease/lesions
- Indications of herbivory

## Chesapeake Bay SAV Sentinel Site Monitoring Protocol



A Chesapeake Bay Program SAV Workgroup  
Technical Guidance Document

V2b, Updated Summer 2025

Tier  
3

## Chesapeake Bay SAV Sentinel Site Program – Monitoring Schedule

Survey Timeframe	Months	SAV Community Peak Biomass
Early-summer	May/June	Zostera/Zannichellia
Mid-summer	July	Mesohaline/estuarine SAV community
Late-summer	August/ September	Tidal Fresh/Oligohaline SAV community



### Monitoring Schedule

At new or previously established SAV Sentinel Sites, survey three times during the growing season. Peak biomass varies depending on the salinity regime/SAV community at the SAV Sentinel Site. The following monitoring schedule ensures that a survey takes place during peak biomass of each of the Bay's SAV communities.

# Chesapeake Bay SAV Monitoring Program

STAR 2.26.2026



# Questions?

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