Chesapeake Bay Program
Submerged Aquatic Vegetation Workgroup

2019 Annual Meeting

Potomac River Fisheries Commission

Colonial Beach, Va

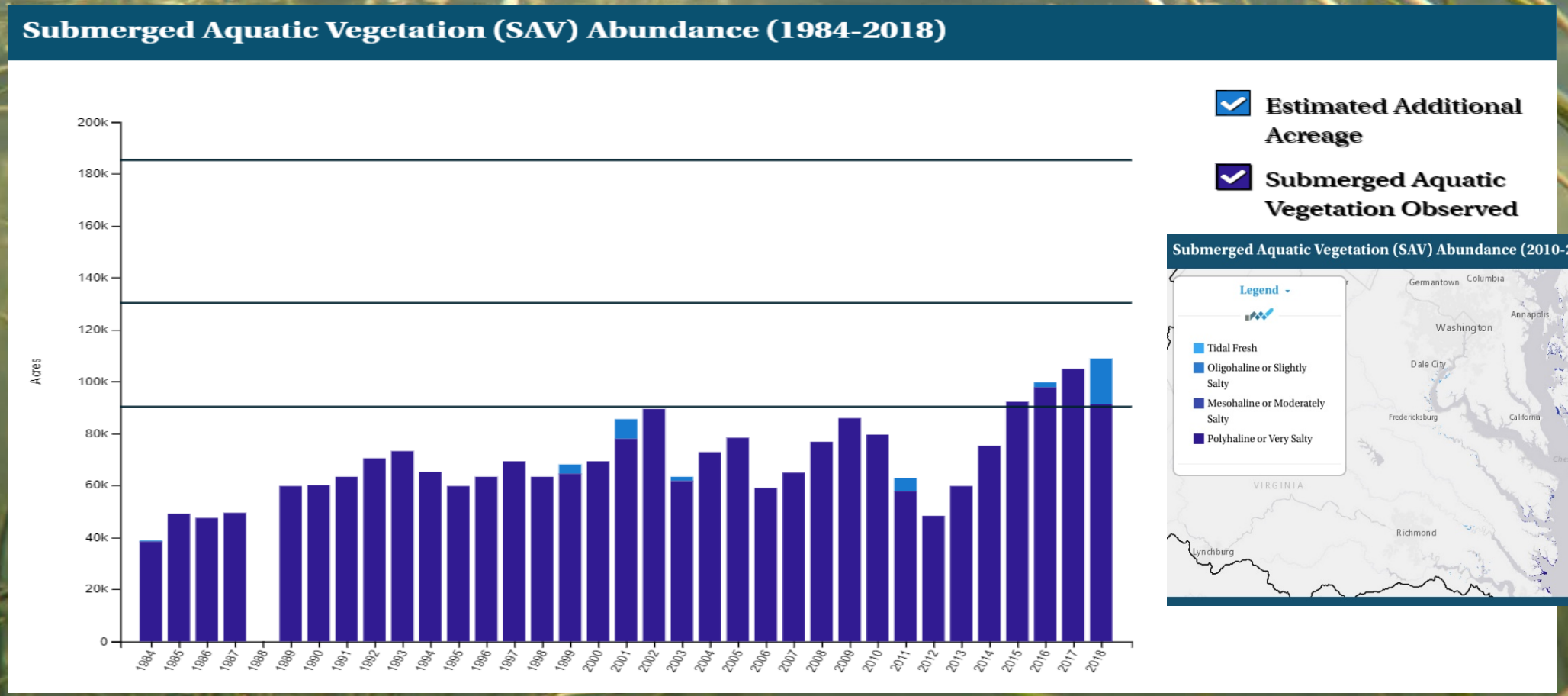
June 27, 2019

Chesapeake Bay Program

Science. Restoration. Partnership.

2018 SAV#s

According to preliminary data from the Virginia Institute of Marine Science (VIMS), 91,559 acres of underwater grasses were mapped in the Chesapeake Bay in 2018. However, 22 percent of the Bay was not fully mapped due to prolonged turbidity, weather conditions and security restrictions. Using 2017 levels for the unmapped areas, it is estimated that the Bay may have supported 108,960 acres of SAV in 2018. This is a 4 percent increase from 2017 figures and 59 percent of the partnership's 185,000-acre goal.



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.

www.chesapeakebaysavwatchers.com

Developed with 2018 Goal-team Funding. GIT Lead: Brooke Landry, Contracted to UMCES, IAN

Chesapeake Bay SAV Watchers

Tier 1: Water Reporter

CHESAPEAKE BAY
SAV WATCHERS

Guide to the Introductory Monitoring Program (Tier 1)

Download the *Water Reporter* app to your smartphone

All *Chesapeake Bay SAV Watchers* volunteers will use the *Water Reporter* platform to submit data for the Introductory Monitoring Program. It is recommended that volunteers collect and submit data using a smartphone equipped with the *Water Reporter* app. This section will review the steps involved in this process.

Android

1. Open the Google Play Store.
2. Type "The Water Reporter" into the search bar to locate the app. A list of suggested results will appear as you type.
3. Select the *Water Reporter* 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.

Apple

1. Open the App Store.
2. Tap the magnifying glass icon in the bottom right corner to open the search bar.
3. Type "The Water Reporter" into the search bar to locate the app. A list of suggested results will appear as you type.
4. Select the *Water Reporter* app from the list to open its App Store page.
5. Tap the "Get" button to download the free app to your device and install it.

Create your *Water Reporter* user account

In order to contribute data to the *Chesapeake Bay SAV Watchers* Introductory Monitoring Program, all observers will need to create a user account. This can be done using the *Water Reporter* app on a smartphone or online at https://www.waterreporter.org. This section will review the steps involved in this process.

WATER REPORTER

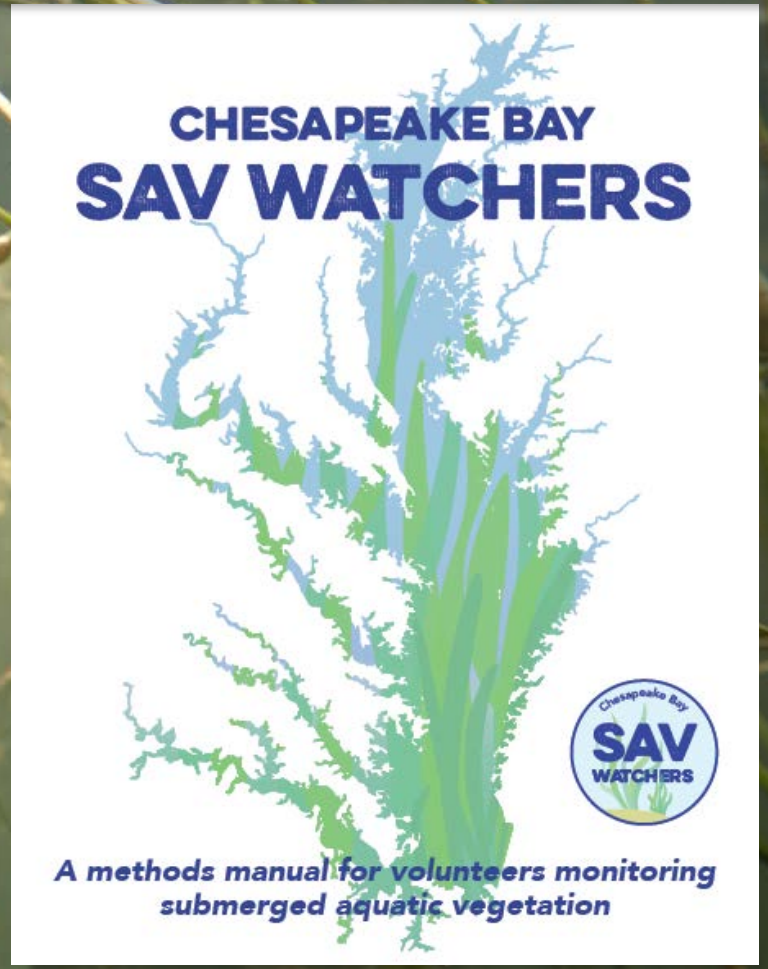
Chesapeake Bay SAV Watchers volunteers should use the Water Reporter platform to submit Tier 1 SAV observations.

On a smartphone

1. Open the *Water Reporter* app and select "SIGN UP" to create a new account.
2. Enter your email address and a password. Use an address that you check regularly so that you receive an email notification when *Chesapeake Bay SAV Watchers* administrators or other users connect with you via the app.

1

Tier 2: Detailed Methods Manual

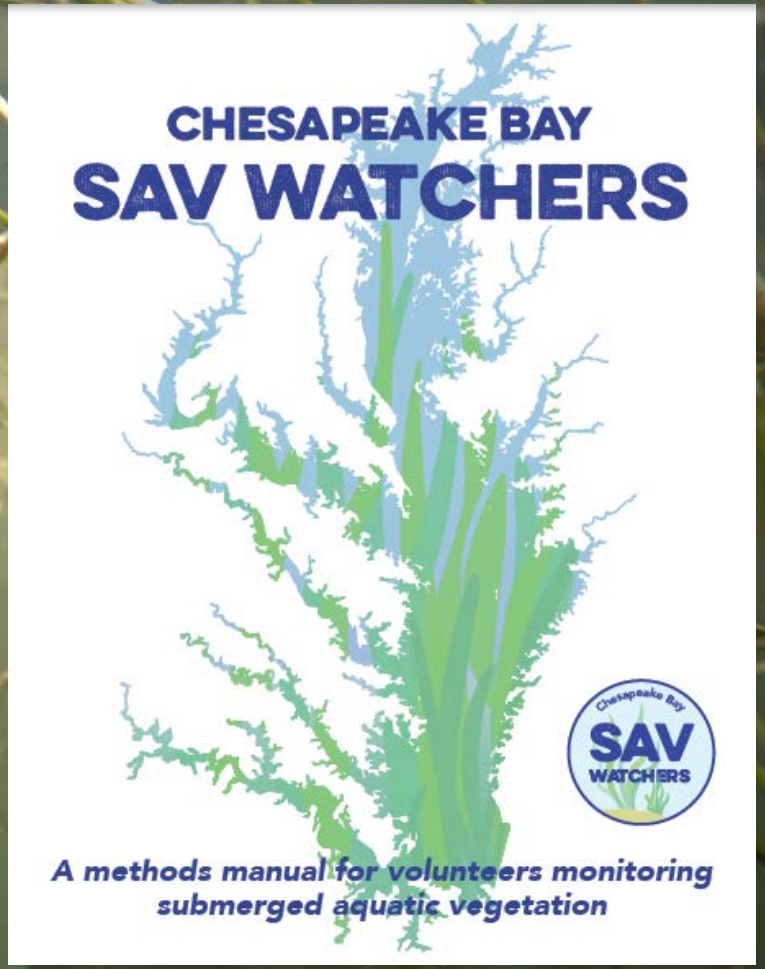


www.chesapeakebaysavwatchers.com

Chesapeake Bay SAV Watchers

TABLE OF CONTENTS

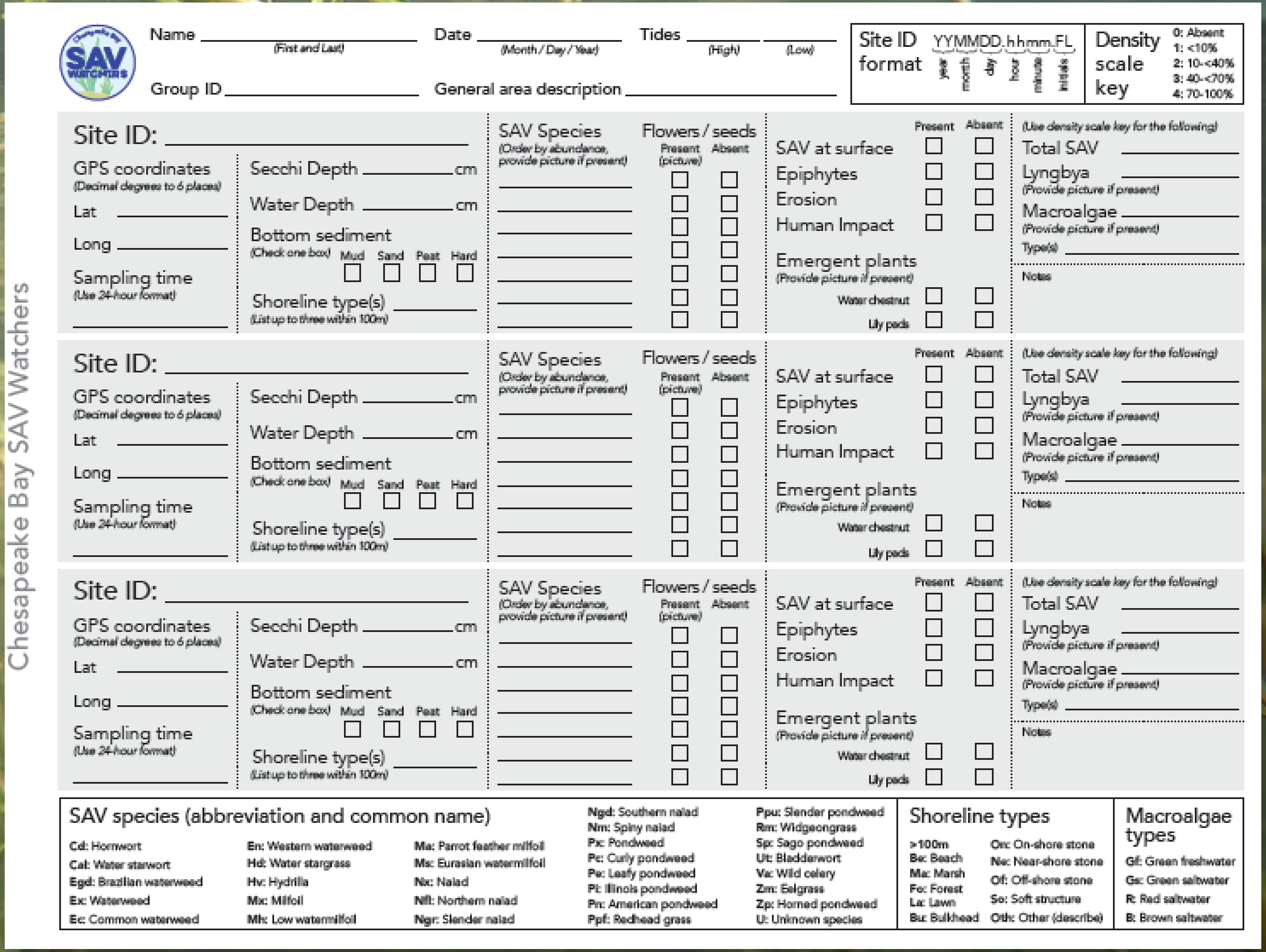
Tier 2: Detailed Methods Manual



www.chesapeakebaysavwatchers.com

Chesapeake Bay SAV Watchers

Tier 2: Data Sheet



www.chesapeakebaysavwatchers.com

Chesapeake Bay SAV Watchers

Pocket Guide

Chesapeake Bay SAV WATCHERS

Pocket Field Guide

SAV species list

Cd - Hornwort - *Ceratophyllum demersum*
Cal - Water starwort - *Callitriche sp.*
Egd - Brazilian waterweed - *Egeria densa*
Ex - Unknown waterweed - *Elodea sp.*
Ec - Common waterweed - *Elodea canadensis*
En - Western waterweed - *Elodea nuttallii*
Hd - Water stargrass - *Heteranthera dubia*
Hv - Hydrilla - *Hydrilla verticillata*
Mx - Unknown milfoil - *Myriophyllum sp.*
Mh - Low watermilfoil - *Myriophyllum humile*
Ma - Parrot feather milfoil - *Myriophyllum brasiliense/aquaticum*
Ms - Eurasian watermilfoil - *Myriophyllum spicatum*
Nx - Unknown naiad - *Najas sp.*
Nfl - Northern naiad - *Najas flexilis*
Ngr - Slender naiad - *Najas gracillima*
Ngd - Southern naiad - *Najas guadalupensis*
Nm - Spiny naiad - *Najas minor*
Px - Unknown pondweed - *Potamogeton sp.*
Pc - Curly pondweed - *Potamogeton crispus*
Pe - Leafy pondweed - *Potamogeton epihydrus*
Pi - Illinois pondweed - *Potamogeton illinoensis*
Pn - American pondweed - *Potamogeton nodosus*
Ppf - Redhead grass - *Potamogeton perfoliatus*
Ppu - Slender pondweed - *Potamogeton pusillus*
Rm - Widgeongrass - *Ruppia maritima*
Sp - Sago pondweed - *Stuckenia pectinata*
Ut - Bladderwort - *Utricularia*
Va - Wild celery - *Vallisneria americana*
Zm - Eelgrass - *Zostera marina*
Zp - Horned pondweed - *Zannichellia palustris*
U - Unknown species

2

Tier 1 monitoring parameters

Basic observer and site information
Photo required (if present)
SAV species

WATER REPORTER

4

Hornwort

Ceratophyllum demersum

Cd

Location: Freshwater tributaries

General ID: Lacks true roots, but stems can grow up to 3 m long. Brittle, stiff leaves grow in whorls of 9 or 10. Whorls are denser toward the end of the stem. Leaves fork into linear, flat segments. Fine teeth grow on one side of the leaf margin.

Similar morphology: Eurasian watermilfoil

Fun facts:

- Neither a dicot nor a eudicot, but is closely related to eudicots
- Found in all 50 states
- Most often found in slow-moving waters

Oligohaline

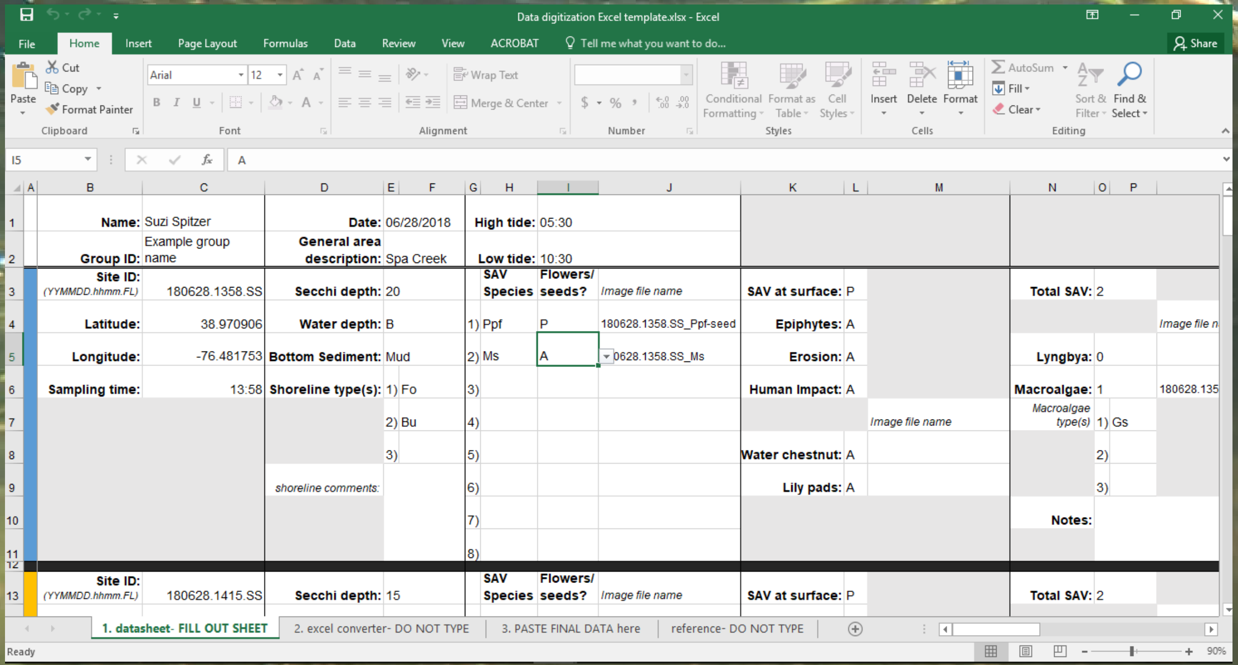
Order Ceratophyllales • Family Ceratophyllaceae

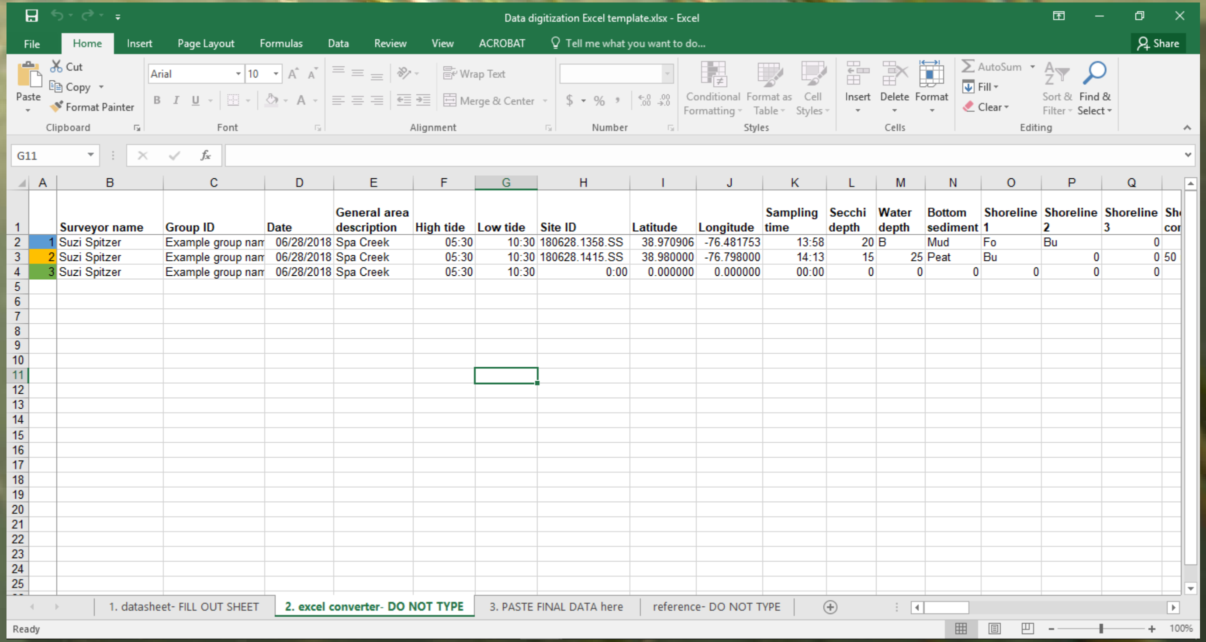
6

www.chesapeakebaysavwatchers.com

Chesapeake Bay SAV Watchers

Tier 2: Data Digitization





www.chesapeakebaysavwatchers.com

Chesapeake Bay SAV Watchers

Training and Certification

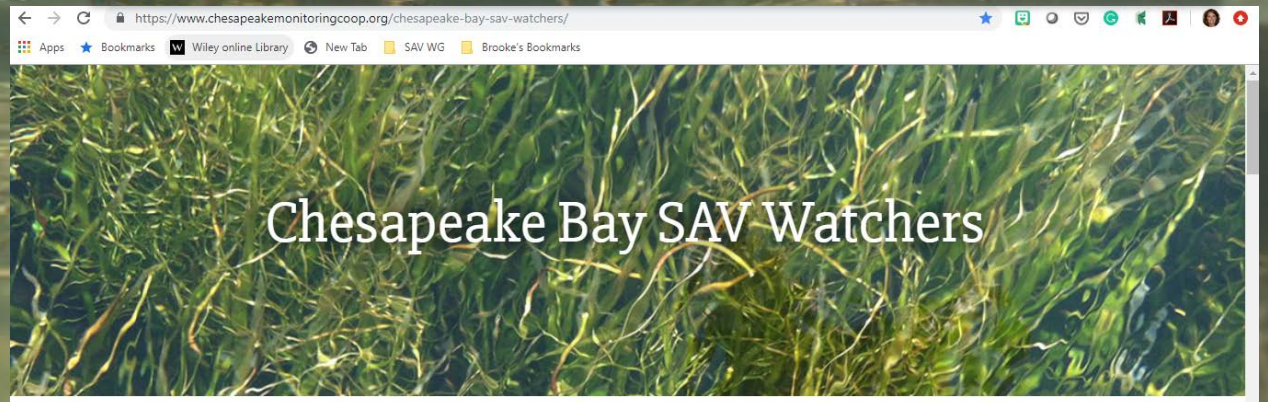
Chesapeake Bay SAV Watchers
Advanced Monitoring Program Training: Sample Agenda

This training course will take place over the course of two days, with an afternoon session on day 1 and a morning session on day 2. The training will include both classroom (day 1) and field (day 2) sections designed to ensure complete understanding of *Chesapeake Bay SAV Watchers* protocols and SAV species identification skills. The course is designed to prepare trainees to train other volunteer monitors to properly observe, identify, and record SAV observations based on the needs of SAV scientists and experts. In order to receive certification, *Chesapeake Bay SAV Watchers* participants must attend the training course and pass the written and practical assessments. Once certified, trainers are encouraged to attend training sessions periodically for review as needed.

www.chesapeakebaysavwatchers.com

Chesapeake Bay SAV Watchers

Website (redirects to Chesapeake Monitoring Cooperative page)



Home » Chesapeake Bay SAV Watchers

Chesapeake Bay SAV Watchers

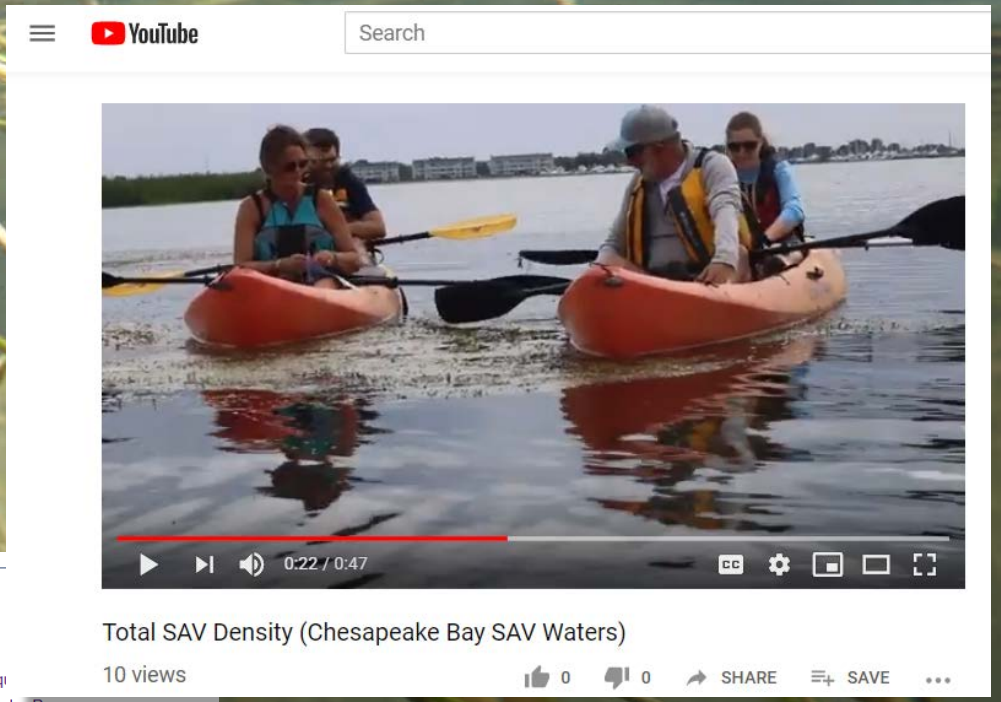
Chesapeake Bay SAV Watchers is a program to provide volunteer sc

Resources

- Data Sheet
- Data Sheet (Large Print)
- Pocket Guide
- Tier 1 Monitoring Program Guide
- Tier 2 Methods Manual and SAV Info
- Data digitization Excel template

Tutorials

- Introduction to Submerged Aq
- SAV Recovery in the Chesapeake Bay
- Monitoring SAV in the Chesapeake Bay
- Materials Available for Chesapeake Bay SAV Watchers
- Secchi Depth
- Water Depth
- Total SAV Density
- SAV Species
- Epiphytes
- Other Macrophytes
- SAV Flowers and Seeds
- SAV at Surface
- Bottom Sediment
- Shoreline Type
- Visible Shoreline Erosion
- Marine Debris



https://www.youtube.com/watch?v=RanG2bWoyzw&feature=youtu.be

www.chesapeakebaysavwatchers.com

SAV Regulatory Review

See Molly Brown's Presentation

Completed with 2018 Goal-team Funding. GIT Lead: Becky Golden, Contracted to Chesapeake Legal Alliance

SAV Workgroup and Member Updates

1. SAV observations; aquaculture project updates (Erin Shields, VIMS, 20 min)

2. Kent Island SAV restoration project (Mark Lewandowski, MD DNR, 15 min)

3. Plans and Progress for pre-processing aerial imagery to support SAV monitoring (Lien Pham, VIMS, 20 min)

4. Boater Behavior Change Project (Rebecca Murphy, ShoreRivers, 20 min)

5. HGIT proposal– SAV restoration protocol (Becky Golden, MD DNR, 15 min)

6. SAV Syn segment description project (Brooke, 10 min)

Development of Small-scale SAV Restoration Protocol – 2020 HGIT Proposal

- **Review of GIT Funding**
  - $860,000 in FY19 Funds will be made available by EPA to Goal Teams
  - Project Criteria
- **Status of Proposal:**
  - Timeline
  - Habitat GIT Project Priority #3
  - Workgroup Participation and Feedback are Vital!
- **Project Goal and Justification:**
  - Accelerate SAV recovery through direct restoration
  - Facilitate collaboration between partner agencies and organizations
  - Promote and facilitate more effective and efficient SAV restoration activities
  - Increase volunteer opportunities and stewardship
- **Proposed Outcomes:**
  1. SAV restoration protocols (one for each salinity regime)
  2. Education and Outreach materials (website, start guides, etc.)
  3. Presentations to SAV Workgroup and HGIT
  4. SAV restoration manual
- **Estimated costs:** $50,000 for salary and costs of printed materials
- **Cross-Goal Benefits and Potential Collaborators**: Water Quality GIT, Fostering Chesapeake Stewardship GIT, CBP Communication, Web and GIS Teams

Chesapeake Bay
SAV Restoration Protocol
for Local Jurisdictions
and NGOs

SAV Syn Segment Description Project

2-Page Segment Description

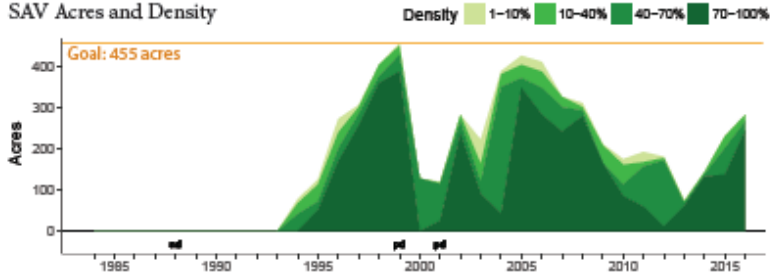
SAV Segment Severn River (SEVMH)

Beds of SAV dominated by widgeongrass are prevalent in the Round Bay region of the Severn but limited elsewhere.

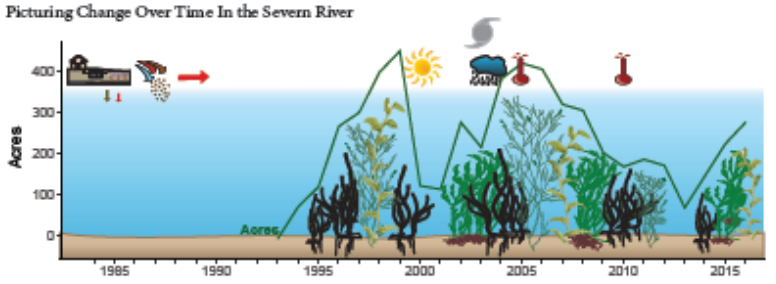
Executive Summary

SAV records from the Severn River date back to 1893 and indicate that species diversity was higher then than it is now. At the onset of the Baywide aerial survey, SAV in the Severn was minimal, but began recovering in the mid-1990s and has since fluctuated in abundance, with the majority observed in Round Bay. Although the Severn River watershed has maintained extensive forested land (generally associated with improved water quality conditions), many of the river front communities are still operating on septic, which is potentially contributing to a chronic nutrient problem and therefore reduced SAV cover. The 455 acre SAV restoration goal is attainable with continued efforts to reduce nutrient and sediment pollution to the system.

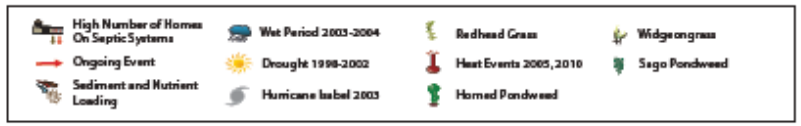
SAV Acres and Density



Picturing Change Over Time In the Severn River



Key



Take Home Points

Goal - Attainable

The goal of 455 acres is attainable and was reached in 1999. With continued improvements in water quality and clarity through reductions in sediments, nitrogen and phosphorus, there's no reason to believe that the 455-acre goal will not be reached again in the future.

Historic Coverage

High diversity indicated from historical records, minimal SAV coverage 1984-1994; recovery, but, now abundance from 2000 to present

SAV was most likely abundant in the Severn River prior to population expansion in the Chesapeake Bay watershed--particularly prior to the founding of Annapolis, which sits at the mouth of the river and expands northward towards its headwaters. SAV was documented in the Severn River as early as 1893, when sago pondweed herbarium specimens were collected. In the decades following and up through the 1970s, several other species were collected or observed, including redhead grass, widgeongrass, milfoil (first appearing in the 1960s), horned pondweed, wild celery, common waterweed, hornwort and naiads. Data from the baywide aerial survey indicates that SAV cover was minimal between 1984 and 1994. In 1994, SAV began to recover and expanded to an all-time recorded high of 455 acres in 1999. Common species currently observed in the Severn include widgeongrass, redhead grass, sago pondweed and horned pondweed. Freshwater species have also been noted in the upper, freshwater reaches of the river.

Key Events

SAV resurgence starting in 1994

There is limited concrete data to explain the resurgence of SAV in the 1990s, but anecdotal reports indicate that SAV disappeared from the Severn in the 1970s due to a combination of rapid development, highway construction and an active campaign to reduce its cover using herbicides. The herbicides used were long-lasting and may have remained in the sediments until the 1990s, when SAV recovery was first noted.

Vulnerability/Resilience

Forested watershed but still dominated by septic

Although development in the Severn River watershed has slowed, many of the riverfront communities are still on old and failing septic systems. Because of this, there remains a nutrient loading problem in the river despite extensive tree canopy and maintenance of forested land.

Management Implications

Nutrient and sediment reduction

Without intervention, nutrient and sediment loading to the Severn will continue to hamper full SAV recovery. Reductions in both would most likely lead to a full recovery, so all efforts to reduce loading via best management practices that favor SAV recovery are recommended. Watershed residents should be encouraged/required to upgrade old septic tanks and leach fields to modern, high-efficiency on-site wastewater treatment systems.

References

Stevenson, and Confer, 1978; Moore et al. 2004; Orth et al., 2010, 2017; Patrick and Weller 2015; Lefcheck et al. 2018

http://web.vims.edu/bio/sav/SegmentAreaChart.htm (abundance data)

http://web.vims.edu/bio/sav/maps.html (species information)

http://eyesonthebay.org (for water quality in the Maryland waters)

http://www.aacounty.org (for Anne Arundel County sewer and septic information)

92 CBP Segments were grouped where feasible to reduce total number of right ups to 64

JJ, Brooke, Melissa, Paige, Bill and the rest of the SAV Syn team. Going to Tetra Tech for final formatting, copy editing, and fact-checking.

Should be complete by September

Water Chestnut in the Potomac River

See Nancy Rybicki's presentation

ISBW14: Chesapeake Bay 2020

World Seagrass Conference and International Seagrass Biology Workshop 14

****

Hotel Annapolis
(The Graduate Annapolis)
Annapolis, MD
August 10th – 14th, 2020
'Signs of Success'

Official event of the World Seagrass Association. WSA President = Jessie Jarvis

ISBW14: Chesapeake Bay 2020

Schedule at a glance

World Seagrass Conference

Monday (Day 1)

9:00am – 10:30 am	**PLENARY 1**
10:30am-11:00am	***Coffee Break***
11:00am – 12:30pm	**Session 1 (2 concurrent)**
12:30 – 2:00pm	***Lunch***
2:00pm-3:30pm	**Session 2 (2 concurrent)**
3:30pm – 4:00pm	***Coffee Break***
4:00pm-5:30pm	**Session 3 (2 concurrent)**
6:00pm – 8:00pm	**Welcome Reception**

Tuesday (Day 2)

9:00am – 10:30 am	**PLENARY 2**
10:30am-11:00am	***Coffee Break***
11:00am – 12:30pm	**Session 4 (2 concurrent)**
12:30 – 2:00pm	***Lunch***
2:00pm-3:30pm	**Session 5 (2 concurrent)**
3:30pm – 4:00pm	***Coffee Break***
4:00pm-5:30pm	**Session 6 (2 concurrent)**
6:00pm – 8:00pm	**Formal Poster Session**

ISBW

Thursday (Day 4)

9:00am – 10:30 am	**PLENARY 3**
10:30am-11:00am	***Coffee Break***
11:00am – 12:30pm	**Workshop Session 1 (4 concurrent)**
12:30 – 2:00pm	***Lunch***
2:00pm-3:30pm	**Workshop Session 2 (4 concurrent)**
3:30pm – 4:00pm	***Coffee Break***
4:00pm-5:30pm	**Workshop Session 3 (4 concurrent)**
6:00pm – 9:00pm	**Evening activity TBD**

Friday, (Day 5)

9:00am – 10:30am	**PLENARY 4**
10:30am-11:00am	***Coffee Break***
11:00am – 12:30pm	**Workshop Session 4 (4 concurrent)**
12:30 – 2:00pm	***Lunch***
2:00pm-3:30pm	**Workshop Session 5 (4 concurrent)**
3:30pm – 4:00pm	***Coffee Break***
4:00pm – 5:30pm	**CLOSING Ceremony/Awards**
6:00pm – 9:00pm	**Conference Close-out Dinner**

Wednesday (Day 3)

8:00am – 5:30pm	**Field Trips**
6:00pm – 9:00pm	**Free night/entertain yourself** (off-site) **Recommend: Dinner Under the Stars on West St.**

Summary

5 days
4 Plenaries
6 Sessions w/ Talks – 72 total Talks
20 Workshops
1 Poster Session, possibly 2?
10 Sponsors
~4-6 Field Trip Options

ISBW14: Chesapeake Bay 2020

Committee Recruitment

Planning and Organizing	Scientific	Sponsorship and Budget	Field Trips
Logistics and Details Works with Event Planner We have an Event Planner!!!	Review and Select Session and Workshop Topics; Reviews abstracts	Finds money; keeps tabs	Determines field trip locations; works with field trip leaders; deals with transportation logistics

So far: Brooke, Katie May, Bill, JJ, Katia, Cassie, Jessie, Erin, Becky G, Jud, Manuel, Becky S.

Fill out the following Google Form if you're willing to help
https://forms.gle/2m9yxFGbTcLMYQmd8

STAC Microplastic Workshop

See Bob Murphy's presentation

STAC Workshop: Exploring Satellite Image Integration for the Chesapeake Bay SAV Monitoring Program

Workshop Objectives

1. Review and determine the science and technology essential to integrate satellite image assessment into the Chesapeake Bay SAV Monitoring Program.

2. Define the feasibility of the integration (related to the science), and document costs, benefits, and any potential disadvantages of the integration (logistical, financial, scientific).

3. Determine the steps, information necessary, and timeline in which to officially integrate satellite data and imagery into the SAV monitoring program.

Steering Committee

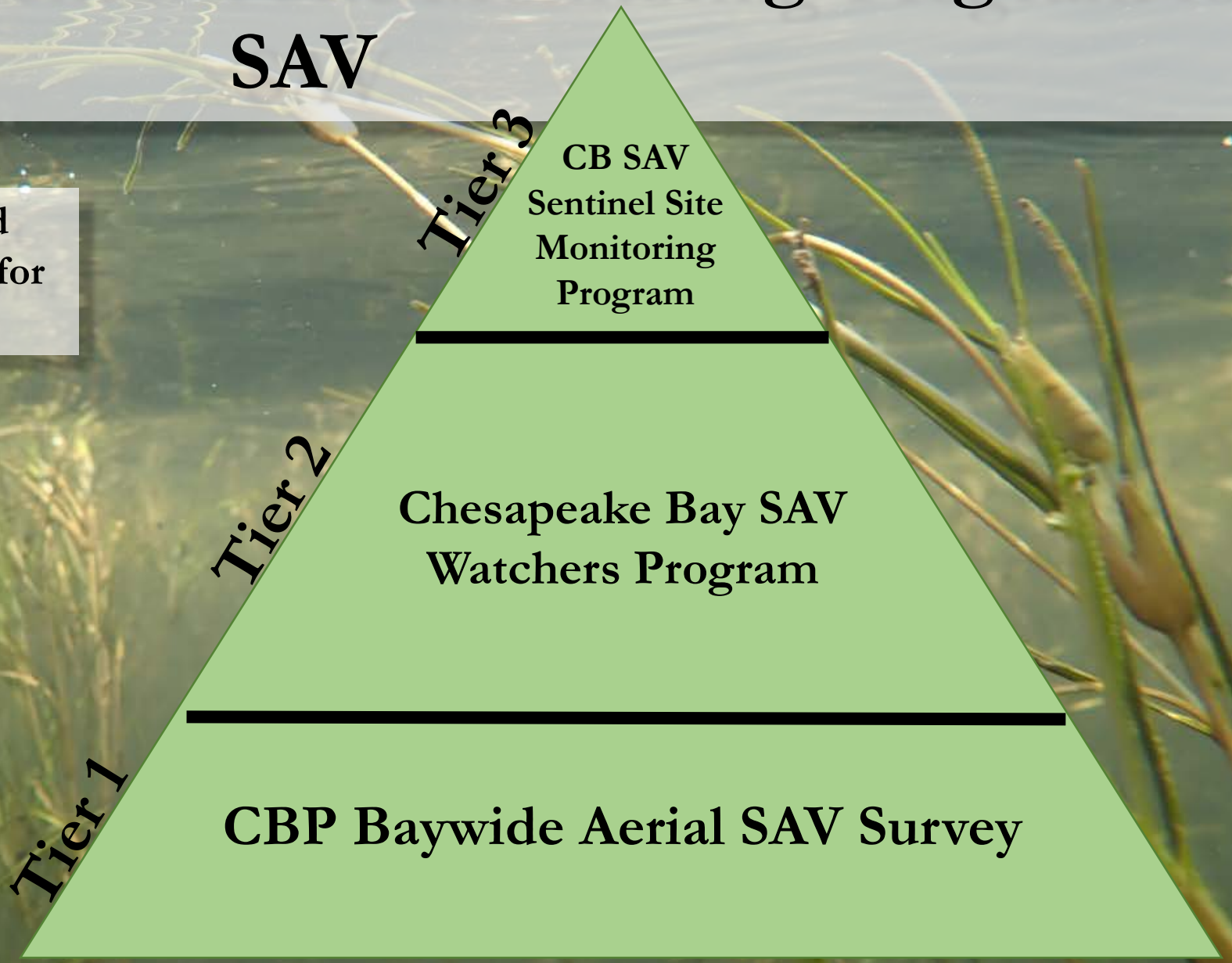
Brooke Landry, Chair, Chesapeake Bay Program SAV Workgroup, Biologist, MD DNR **(Workshop Co-Chair)**
Peter Tango, Chesapeake Bay Monitoring Coordinator, USGS, CBP **(Workshop Co-Chair)**
Bill Dennison, Vice President for Science Application, UMCES, **STAC Member**
Robert (JJ) Orth, Professor of Marine Science and Director of CBP SAV Monitoring Program, VIMS
David Wilcox, Manager of CBP SAV Monitoring Program, VIMS
Richard Zimmerman, Professor of Ocean, Earth, and Atmospheric Science, Remote Sensing expert, ODU

Living Shorelines and SAV

See Lorie Staver's presentation

Chesapeake Bay Sentinel Site Monitoring Program for SAV

We're working towards a 3-Tiered Hierarchical Monitoring approach for Chesapeake Bay SAV



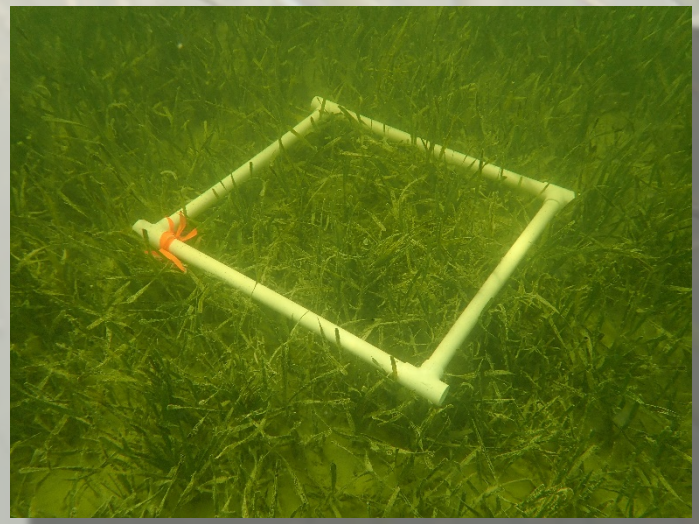
Chesapeake Bay Sentinel Site Monitoring Program for SAV

Proposed Methodology:

- **Survey once annually during peak biomass at low tide.**
- **Run the transect perpendicular to the shore from the mean low water line to the outer extent of the SAV bed**
- **Survey within a 0.25m^2 quadrat at eleven evenly spaced locations along the length of the transect.**

At each survey point along the transect, measure and record the following non-biological and biological parameters:

1. coordinates
2. water depth
3. time
4. date
5. secchi depth?
6. total sav cover (including macroalgae?)
7. cover of each species present, including macroalgae
8. canopy height
9. epiphyte loading
10. shoot density
11. presence/absence of reproductive structures



Chesapeake Bay Sentinel Site Monitoring Program for SAV

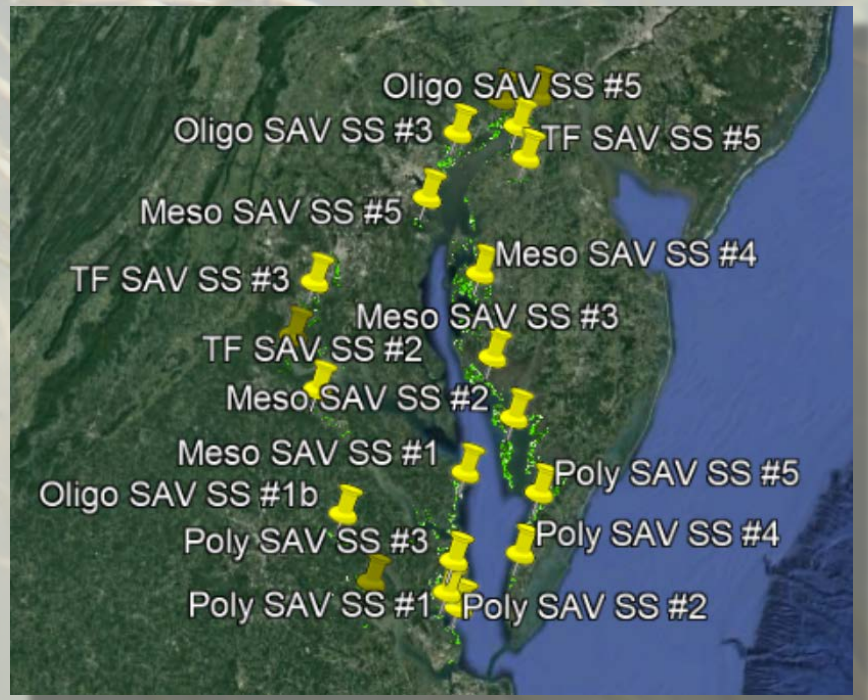
Proposed Sites:

Tidal Fresh

1. York/Pamunkey. No established monitoring sites in the vicinity.
2. Rappahannock TF. No established monitoring sites in the vicinity.
3. Potomac TF. USGS/Rybicki?. May have established sites present.
4. Susquehanna Flats. Md DNR/UMCES/SMCM. Established sites?
5. Chester River TF. No established monitoring sites in the vicinity.

Oligohaline

1. James/Chickahominy. VIMS. Established monitoring sites present.
2. Potomac/Aquia. No established monitoring sites in the vicinity.
3. Dundee Creek. No established monitoring sites in the vicinity.
4. Elk River. Md DNR. Established monitoring site present.
5. Sassafrass River. No established monitoring sites in the vicinity.



Chesapeake Bay Sentinel Site Monitoring Program for SAV

Proposed Sites:

Mesohaline

1. Mouth of Great Wicomico. VIMS. Established monitoring sites present.
2. Smith Island. Md DNR. Established monitoring sites present.
3. Honga River. Md DNR. Established monitoring sites present.
4. Choptank River/Broad Creek. Md DNR. Established monitoring sites present.
5. Severn River: Md DNR. Established monitoring sites present.

Polyhaline

1. Plum Tree Island NWR. VIMS. Established monitoring sites present.
2. Mouth of York. Goodwin Island. CB NERRS/CBSS? Established sites present.
3. Mobjack Bay. VIMS. Established sites present.
4. Eastern shore/Hungars and Jabobus Cr. VIMS. Established sites present.
5. Eastern shore/Pungoteague Cr. No established sites in the vicinity.