

Growing and Improving: Recommendations for Chesapeake Bay SAV Watchers, a Volunteer Monitoring Program

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Program Evaluation Report

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Abstract

Chesapeake Bay Submerged Aquatic Vegetation (SAV) Watchers is a volunteer monitoring program that collects detailed information about SAV habitats in Chesapeake Bay and its tidal tributaries. While the program originated and remains centralized in Maryland, it is designed to be Bay-wide and has the potential for ecological and societal impact across state boundaries, including Virginia. Now in its sixth year and with plans to grow, it is imperative to reassess program goals to ensure that all key players involved, from scientists to volunteers, are meeting expectations and having meaningful experiences. This project focused on three central questions: 1) what is the SAV specific scientific literacy of SAV Watchers trainers and volunteers, 2) what is the effectiveness of the program, including successes and areas for improvement, and 3) what are the anticipated challenges of expansion into Virginia? To answer these questions, certified SAV Watchers trainers and volunteers participated in the evaluation process, which involved a survey and conducting focus groups to capture participant perspectives. Three main themes emerged: 1) Growth and Development, 2) Invest Further, Achieve More, and 3) Sustained Engagement. These themes informed seven overall suggestions for the program, as well as five specific suggestions for expanding into Virginia. This report also provides a framework for evaluating participatory science programs while incorporating community voices. This approach ensures meaningful engagement and sustained success for SAV Watchers participants and partners, advancing SAV science, restoration, and conservation efforts throughout Chesapeake Bay.

Background

In this time of climate and environmental change, scientists need more data and information than they can feasibly collect, often due to resource restrictions (Bowser et al., 2020). At the same time, there is still a lack of awareness and concern in our society about climate change and the changing environment (Pew Research Center 2023, 2024). This challenge holds true for the health of submerged aquatic vegetation (SAV) in the Chesapeake Bay, where the area of SAV coverage has increased in recent years, but detailed information about species and habitat condition is lacking (Chesapeake Bay SAV Watchers, 2024; Submerged Aquatic Vegetation, 2024). SAV in the Bay is important as it provides critical habitat for key species, improves water quality by absorbing excess nutrients, and can decrease shoreline erosion by reducing wave energy (Orth et al., 2017). Due to its importance, one of the goals set in the 2014 Chesapeake Bay Watershed Agreement is to restore 185,000 acres of SAV Bay-wide (Chesapeake Bay Program, 2014). Participatory science offers a potential solution to both fill data gaps surrounding SAV as well as foster environmental stewardship and ultimately contribute to improved management of SAV in Chesapeake Bay (Cooper et al., 2007; Devictor et al., 2010).

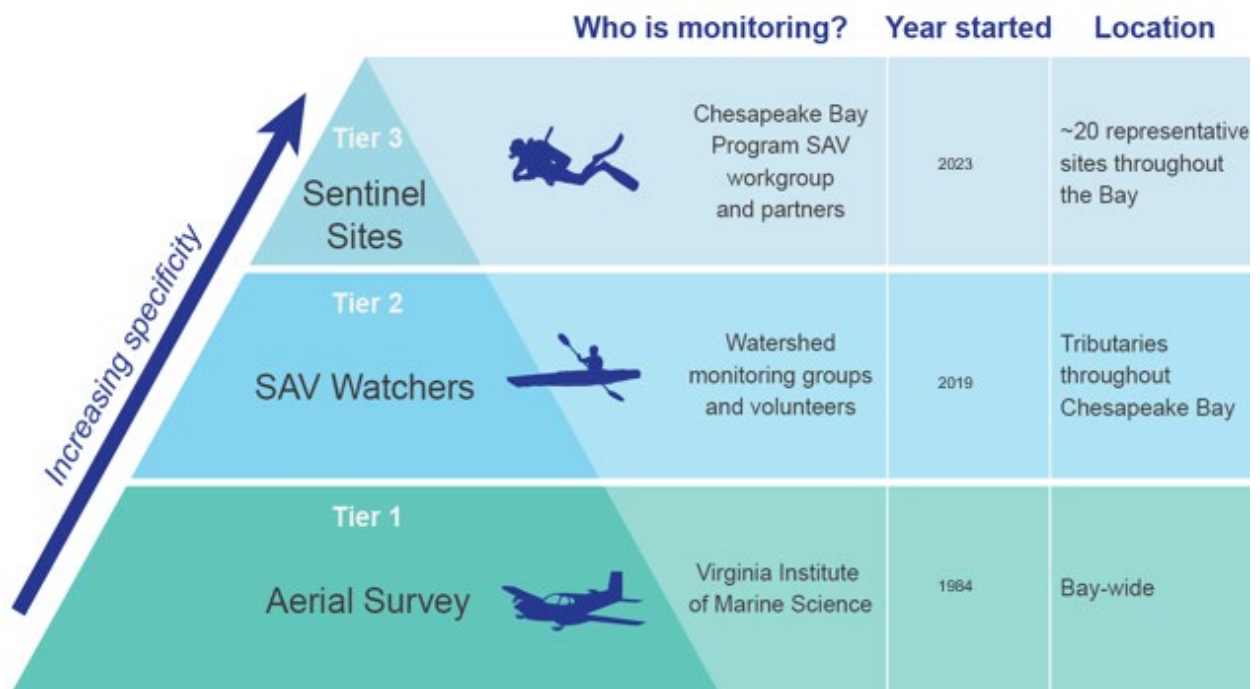
Participatory science, an umbrella term for work that engages the public in some part of the scientific process, allows the public an opportunity for authentic learning and understanding of science in the context of the real world (National Academies of Sciences, Engineering, and Medicine, 2018; U.S. EPA, 2022). A sense of place can also be developed or strengthened through participatory science, promoting stewardship and connection to nature within communities (Toomey et al, 2020). This involvement can also help facilitate partnership building between scientists or environmental managers and communities. Within these partnerships, trust can be built along with increased interest and buy-in from community members (Cvitanovic et al., 2018; U.S. EPA, 2022). Additionally, involving communities in the scientific process increases their

capacity to understand and communicate the issues while providing them with lived experiences and direct observations they can draw upon to make change locally (Allen et al., 2023).

Chesapeake Bay SAV Watchers is a volunteer monitoring program that began in 2019 and uses participatory science to collect detailed information about SAV habitats in Chesapeake Bay and its tidal tributaries. This program was developed by the Chesapeake Bay Program’s SAV Workgroup and is coordinated by the Workgroup chair. While there is an aerial survey mapping SAV coverage throughout the Bay by another agency, it cannot provide extensive local-scale detail on species diversity or habitat conditions. Therefore, the Chesapeake Bay Program has integrated SAV Watchers into the Bay-wide monitoring framework to fill that data gap and provide better informed restoration efforts and management decisions, as shown in Figure 1 (Webster et al., 2021, p. 3; *Chesapeake Bay SAV Watchers, 2024*).

Figure 1

Chesapeake Bay Program’s SAV Monitoring Framework



Note: The SAV Watchers program is situated within a three-tiered hierarchical framework for monitoring Chesapeake Bay underwater grasses. Adapted from “Co-creating and evaluating a citizen science program for monitoring submerged

aquatic vegetation in Chesapeake Bay,” by S. Webster et al., 2021, *Regional Studies in Marine Science*, 46(July 2021), p. 3 (<https://doi.org/10.1016/j.rsma.2021.101906>). BY-NC-ND.

Although the program was designed to be Bay-wide, it began in Maryland and remains centralized there. The program coordinator recognizes that SAV Watchers is limited in growth due to a lack of locally-based coordination and resources in Virginia. However, there is potential for ecological and societal impact over state boundaries in Virginia as well, and it is important to leverage the power of community engagement and volunteer scientists from as broad a reach as possible. In the summer of 2024, The Nature Conservancy in Virginia expressed interest in assisting with and organizing the expansion of the program, resulting in a SAV Watchers Train-the-Trainer event in August 2024 to introduce and gauge interest in the program in Virginia. Strategically expanding this program into Virginia will provide many benefits to the community, for scientists, and for Chesapeake Bay resource managers. It provides a way for more people to understand the importance of SAV and builds their scientific skills, while collecting additional useful data for Bay scientists and managers.

With potential expansion on the horizon and the SAV Watchers program reaching over five years of engagement, it became apparent that a program evaluation could be beneficial to ensure continued success and strategic expansion. It is imperative to revisit program goals to ensure that all key players involved, from scientists to volunteers, are meeting expectations and having meaningful experiences. Without the continuity of effective engagement, volunteers can become uninterested, and participatory science monitoring programs can become less effective over time. To evaluate the SAV Watchers program, a multipronged approach was used to answer the following questions: 1) what is the SAV specific scientific literacy of SAV Watchers trainers and volunteers, 2) what is the effectiveness of the program, including successes and areas for improvement, and 3) what are the anticipated challenges of expansion into Virginia?

Methods

The main objectives of this project were to systematically evaluate the present Chesapeake Bay SAV Watchers Program, identify areas for possible improvement, and propose a strategy for expansion into Virginia (VA) waterways. The aim was to gain a better understanding of the program based on the multiple perspectives of program volunteers, trainers, and the program coordinator. The SAV Watchers program uses a “train-the-trainer” approach. Trainers refer to people who have undergone SAV Watchers training by the program coordinator and have been certified in their knowledge of SAV identification and the monitoring protocol. Certified trainers include Riverkeepers, watershed organization staff, teachers, and others, and should be confident enough in their skills to teach their volunteers or students.

To meet objectives, criterion-i sampling, a purposive sampling technique, was used to create a sampling frame and target all certified trainers, including the newly certified VA trainers, and their volunteers (Palinkas et al., 2015). This included all 12 certified VA trainers, 59 Maryland (MD) trainers, and all of their volunteers, the number of which is unknown. There was a reliance on the trainers to communicate information to their volunteers for this study. There are not yet trained volunteers in VA. Second, a semi-structured interview with the program coordinator was conducted. Third, three focus groups were facilitated, one per target group.

Through online surveys hosted on Qualtrics, questions were asked about each participant’s experience to better understand their perspectives on the program and gauge their grasp of the scientific skills that are necessary to participate in the program. The survey questions inquired about background and optional demographic information, workshop experience, challenges, successes, and improvement suggestions (see Appendix A). While many of the questions were the same for all participants, there were some that were tailored to the group’s specific experience. For example, while trainers are asked about the Train-the-Trainer event, the volunteers are asked about

the training they received from their certified trainer. The MD trainer prong in the survey aimed to understand their experiences, perspectives, and approach to training participants. The VA trainer survey inquired about opinions on the ability of the program to succeed in the state and with the trainer's organization or existing volunteers. To assess scientific skills, questions were based on embedded assessment instruments developed by Becker-Klein et al. (2023) and applied by Bianco et al. (2023). All survey questions were validated by external reviewers to ensure that the questions were clear and helped answer the research questions. Simultaneously with survey data collection, a semi-structured interview was conducted with the program coordinator, who certifies all program trainers, to gain knowledge of their teaching strategy, goals, and experiences with the program (see Appendix B).

In the survey, participants had the choice to opt into participating in a focus group to further discuss their perspectives and hear them directly recount their experiences. All who had indicated a willingness to participate in the focus groups were invited to participate. The questions were informed by the survey results and interview with the program coordinator, revealing where more detail and perspectives were needed. The interview and focus groups were facilitated via Zoom, and each lasted no longer than 90 minutes (see Appendix B). Interviews were recorded digitally, and audio was transcribed using transcription tools in MaxQDA and in Word for Microsoft 365. Transcripts were thematically coded with an inductive approach in MAXQDA (Bernard, 2018). Through a member checking process, participants received summaries of key ideas and takeaways from their contributions to the focus group and had the opportunity to verify or amend them to best reflect their experiences. Participants were incentivized to participate in the survey with the option to receive a SAV Watchers branded sticker. They were incentivized to participate in the focus groups with the option to receive a SAV Watchers branded sun shirt.

Participant Information

In total, the survey received responses from 19 MD trainers, 11 MD volunteers, and 9 VA trainers. Focus groups included 7 MD trainers, 5 MD volunteers, and 2 VA trainers. Volunteers were mostly retired, with half of them currently or previously working in Science, Technology, Education, and Mathematics (STEM). Most obtained graduate or professional degrees. Most volunteers began the program after 2020, but there was representation from each year of the program. All were active volunteers, meaning they surveyed the last monitoring season in 2024. Including both MD and VA trainers, most trainers work full-time and currently or previously worked in STEM. The majority have bachelors, or graduate or professional degrees. While most were recently certified in 2024, there was representation from training cohorts in 2019, 2020, 2021, and 2023. About half of the MD trainers who responded to the survey had trained volunteers and implemented SAV Watchers with their volunteers. Two limitations could be that demographic information was optional, and the survey was self-filtering, as participants would need to be comfortable with interacting with the online survey to participate in the study. Lastly, in the focus groups, all volunteers participated in the program through the same organization, and their experiences could be specific to one or a few trainers.

Results

Three overarching themes became apparent from the survey, interview, and focus groups: 1) Growth and Development, 2) Invest Further, Achieve More, and 3) Sustained Engagement. These themes highlight program successes, areas where goals have been met but how that happens could be further improved, and where post-training continued engagement could enrich the program experience.

Growth and Development

Growth and development is an overarching theme that became apparent and echoed by volunteers, MD trainers, and the program coordinator. The most common adjectives used in the focus groups were positive words such as “good”, “helpful”, and “able”. This well-regarded program garnered support from trainers and volunteers with varying but similar motivations. These motivations for involvement have led to successes at the individual volunteer level and for the overall program.

Volunteer Motivations

The most common volunteer motivations resulted in two categories: 1) to help Chesapeake Bay conservation and monitoring efforts and 2) personal interest. In the focus groups, volunteers described these in more detail. To help with Bay conservation, three noted a desire to help fill data gaps, and two also mentioned they were already involved in volunteer water quality monitoring. One of these water quality monitors was more inclined to get involved to help a neighbor participating in the program. One volunteer had observed a decline in SAV, which led them towards stewardship:

I've lived at the same property for like 50 years. And so as a kid, I used to crab, and there was [SAV] like everywhere in front of where we lived. And it was just acres of it. And it was...[the] water was crystal clear, and there was tons of stuff in the water. And then I moved away to college...And then I came back, and there was no more [SAV]. It was all gone, and it has never come back...I just feel it's important to raise the awareness of... protecting and growing those beds and whatever we can do to figure out what's causing it to disappear. Lastly, one volunteer noted they were curious about SAV, as they are already active on the water and would see it, but they had no understanding of whether it was beneficial or detrimental to the environment.

Volunteer Successes

Enjoyable. It was noted by volunteers, MD trainers, and the coordinator that many people enjoy it. One volunteer noted enjoying being involved as a community member, and two volunteers noted that it is fun and appreciate that it gets them out on the water. One trainer emphasized that people enjoy going out on the water and that helps recruit volunteers because “It's very unique, and it's not just scooping up a water sample. So it really engages a wide audience from the very, very science-minded to the very not science-minded people who just like to kayak and go boating.” This feedback was echoed by the program coordinator. One trainer noted that getting volunteers on the water like this helps encourage them to engage with their local resources.

Stewardship. Stewardship was mentioned in focus groups with volunteers, MD trainers, and the coordinator. As volunteers engage with their local waterways and resources, it was noticeable that the program fosters SAV stewardship, which was a primary goal for the SAV Watchers program's inception. One trainer emphasized that the program is a fantastic way to engage volunteers in stewardship opportunities and noted the increase in volunteers participating in their community. Another indicator is that many volunteers acknowledged that their knowledge of SAV in the Bay has increased since participating and displayed a deeper understanding, which was noted by one volunteer:

Is it a good thing or a bad thing? I now know emphatically it's a good thing when you see it, and it's good on a lot of different levels. And...it's variable -- it's very -- sometimes it's there, and sometimes it's not.

A few also noted that they have seen variations in the amount and timing of growth for SAV species, indicating that they understand not just what their data look like during each survey, but also that they have begun preliminary data analysis and tracked changes over time. Trainers noted the program helps facilitate conversation between volunteers and trainers, as some volunteers are

asking questions to their trainers based on what they have observed during monitoring and inquiring to learn more. Notably, when asked which part of the scientific process volunteers see themselves involved in, 100% of respondents identified collecting samples and/or recording data, but 36% also chose discussing results and asking new questions.

As volunteers described the goals for the data they are collecting, most identified various ways the data could be used. Many understood that these data ground truth the aerial surveys and how the data are overall useful in Chesapeake Bay conservation. One volunteer acknowledged, “This SAV has so much to do with so many things... And it just is such a huge reflection of the overall health.” One volunteer also brought up that they are collecting more specific information that the aerial survey could miss, such as bottom sediment type. They help answer the extra questions beyond detection and quantification.

Additionally, one volunteer thought more locally in regard to establishing SAV protection zones and brought up that they are motivated to monitor because they have observed hydraulic clambers ripping up SAV from the bottom of their local waterway. The coordinator noted that the stewardship goal of the program has been and continues to be met, pointing to an increase in SAV violation reports from neighbors. As one trainer remarked, volunteers become prideful and take ownership of the area that they are monitoring, creating stronger advocates for SAV.

Some volunteers also noted that for their local organization, the goal is also to expand areas where there is SAV, which has led them to become more interested in restoration. Those who had participated in restoration were enthusiastic about it as they described how their observations can help their organization target sites for seed harvesting and then they can be part of that process. Volunteers also hoped that their observations are helping their organization target sites for restoration. One volunteer in the focus group wanted to be more involved in the harvesting and planting after hearing others discuss their restoration volunteer experiences. For the future of SAV,

volunteers seemed to understand the complexity of the situation and that “it's not an easy solve” with restoration, “What I've learned is just, it's just not an easy, like just plant more seed and it's going to come back. It's more complicated.”

Ingenuity. When it comes to how volunteers engage with the program, their ingenuity is a success described by them and identified by trainers. During the focus groups, trainers bragged about how their volunteers create tips and tricks, and that they share those with other volunteers. Volunteers described how they created their own systems to make monitoring more feasible, comfortable, and enjoyable for them, which also helped improve volunteer confidence. As one volunteer noted, “One of the things that made a world of difference in going out is getting the right set up.” For example, two volunteers mentioned tailoring their field and identification guides to the common species in their monitoring area to reduce the amount of information they need to sift through in the field. For recording data in the field, volunteers mentioned voice recording observations on their phones or using scrap pieces of paper to be transcribed onto the datasheet on dry land. While one volunteer created a laminated copy of the datasheet and writes on it with a grease pen to record data, another puts the datasheet in a plastic sheet cover. Other systems volunteers have implemented include creating their own Secchi disc, putting a phone holder on their kayak, developing an anchor, using a hook rather than a rake, and adding floats to equipment. To add to the information being collected, one volunteer even incorporates drone footage into their monitoring. These examples underscore the volunteer commitment to monitoring and their strong interest.

Trainer Motivations

Similarly to the volunteers, both MD and VA trainer motivations included 1) to help Chesapeake Bay conservation and monitoring efforts and 2) personal interest, but also 3) to attract volunteers. MD trainers included additional reasons such as interest in assessing SAV in local

areas, developing a similar program in another state, or they were already monitoring SAV. Since VA trainers were part of the first training in the state, the program is still new, and some were there to evaluate if it is something their organization should do. One VA trainer remarked:

I want to increase awareness, knowledge, and access to the Bay and about the Bay's issues, and I wanted to do it in a fun manner. SAV and kayaking is appealing to many, and I've had a lot of positive responses when mentioning it to others.

Overall Successes

Growth. One common success that both the coordinator and MD trainers noted is the program's growth, geographically and in the number of organizations and volunteers involved. One trainer reflected on their program growth, sharing that, "We have great retention, and we've continued to see the program grow every year, whether that's through volunteers wanting to take on additional sites, they can go out and monitor more, or just new volunteers get involved." They noted that it is their most successful volunteer program and mentioned the accessibility and flexibility of the program, as it allows weekend participation. They also highlighted having people come from outside of the watershed and local communities to monitor.

Through the program coordinator and MD trainer focus groups, a common thread was the program's growth through word of mouth and partnerships. Many trainers noted that they had pre-existing partnerships or worked with the Maryland Department of Natural Resources (MD DNR) on SAV-related projects, which is the agency that the Workgroup chair is affiliated with, and that is why they decided to bring it to their organizations. Additionally, some have heard about it from other organizations or a conference. The program coordinator reflected:

The first couple years, we were advertising and asking people...if they wanted to participate or if we could do training events at their organizations. And now, we're getting to the point where people are emailing us and calling us to set things up.

Program growth indicates organizational interest and buy-in, which can be observed in many ways. According to the survey, the top three things MD trainers enjoy about the program are: 1) contributing to conservation efforts, 2) conducting the monitoring, and 3) community building. An indication of program interest is seen in the number of volunteers trained. About half of the MD trainers that responded to the survey reported having trained more than 6 volunteers, with 24% training 6-15 volunteers and 24% training 25+ volunteers. When asked in the survey about which part of the scientific process trainers see themselves involved in, similar to the volunteers, 100% identified collecting samples and/or recording data.

Importantly, 67% of MD trainers also chose 1) disseminating conclusions/translating results into action and 2) discussing results and asking new questions. This indicates that they see themselves as part of the process of moving scientific progress forward for this program. Some organizations and trainers are interested in the data at their local level, with about half of the trainers indicating that they are evaluating and tracking their organization's data over time independently. About a third of trainers reported that their organizations are using these data for education and outreach, while some are using the data for general updates. A few also use the data to advocate for state policies and restoration priorities.

Data and discoveries. The program has also been successful in data collection, unveiling new information, and assisting in restoration, as mentioned by the coordinator, MD volunteers, and MD trainers. In addition to increasing stewardship, another goal of the program has been to contribute more data to the aerial survey. The coordinator noted they work closely with the mapping crew to submit the data and ensure they are using it. SAV Watchers has been contributing data since 2019, and in the five years of data collection, the program has revealed information about species that are not normally detected in the aerial survey.

For example, horned pondweed (*Zannichellia palustris*) is one of the first bay grasses to appear in early spring, but as summer temperatures increase, it releases its seeds and dies back as summer grass comes up (Maryland Department of Natural Resources, n.d.). This plant is often missed on the aerial survey due to this timing. With more eyes on the water and varying monitoring times in the year, volunteers have been able to show how extensive that plant is in the spring. Although it has been present in the Bay for decades, it has been generally overlooked. The coordinator remarked, “The summer grasses really eclipse it because they're...prevalent while everybody's out on the water, and they can see them.” Scientists are learning more about spring grasses and horned pondweed in the Bay and are hypothesizing that they help prepare the environment for the summer plants to grow. It also has the potential to provide early fisheries habitat.

Overall, this information has shown the coordinator that in order to better protect SAV from things like dock and pier construction and shoreline alteration, they need to do a better job of mapping it. Additionally, at a more local level, some organizations have been able to utilize the data successfully to prioritize areas for restoration and seed harvesting. All of these are data use wins for the program.

Materials and resources. Lastly, a success of the program that was mentioned by the coordinator and MD trainers is the materials and resources available. The program has many resources available on the website, including the datasheet, a large print version of the datasheet, a pocket field guide, a guide to submitting data and observations, the methods manual, and videos reviewing different concepts needed to understand the monitoring protocol. The coordinator commented that trainers have mentioned that they appreciate the methods manual and all the associated materials.

According to the survey, the resources are highly used by trainers during training events for their organization's volunteers: 93% of trainers report using the pocket field guide, 87% of trainers report using the methods manual, 73% of trainers report using online information and videos, and 53% of trainers report using the guide to submitting data and observations. One trainer complimented the program videos, remarking that they are a wonderful resource with every parameter you collect as part of the protocol. Some trainers have even adapted the resources for their local areas by pulling out the species they knew would be in the area. One organization noted that they will curate these materials specific to site salinity to help volunteers due to the widespread salinity ranges and geographic range their program encompasses.

While motivations may vary, there are collective goals that have been met. The way that this program has gained momentum and attracted participation has led to successes that will continue to flourish and develop as the program progresses.

Invest Further, Achieve More

A second broad, overarching theme was apparent: successful volunteer monitoring projects require investments in time, communication, partnerships, data management, and more. Specifically, two areas were identified by participants for further investment: 1) program infrastructure and 2) data use.

Program Infrastructure

Program infrastructure refers to how the program is built and functions. The specific topics discussed under this area include species identification, the Train-the-Trainer event, training with volunteers, program communication, data recording, and funding.

Species Identification. The most frequently mentioned challenge of this program is species identification. Each focus group mentioned it, including the coordinator who shared:

One of the things that I get the most feedback on is the actual SAV identification component...It is difficult, and it takes a lot of practice. And, depending on the genus we're talking about, they can be very, like, minute differences in species, which is why we tell them it's fine to identify the plants to the genus level.

Trainer Species Identification. Some trainers noted that their post-training confidence is low after the Train-the-Trainer event because they have difficulty identifying species. Based on survey results, MD trainers were more confident post-training to train volunteers than this first group of VA trainers, with 82% of MD trainers split between reporting “extremely” or “moderately” confident, and 66% of VA trainers reporting “moderately” (22%) or “slightly” confident (66%). To increase their confidence, 47% of MD trainers and 100% of VA trainers selected more time practicing on the water. Many VA and even MD trainers added specific comments about needing more time to practice species identification and learn about the species, especially prior to training volunteers.

While many trainers in the MD trainer focus group indicated low confidence post-training in identifying species, some cited feeling confident in reaching out to the coordinator for assistance, and that doing so increased their confidence in training and leading volunteers. Additionally, some mentioned that more time and practice are what helped them. Some trainers from both states mentioned ideas for improving the Train-the-Trainer event to increase their confidence in species identification, including looking at live samples and getting hands on with them in the classroom prior to seeing them in the field, smaller groups to identify species, longer workshop time, repeated identification practice, tailored training to species specific to the locality, and more time in the field. Those in the focus groups with less confidence also mentioned how learning with live specimens for the first time while navigating the water and field conditions was challenging. However, most MD

trainers have not let species identification be a barrier for implementing the program, although it is important to note that 29% did select species identification as a barrier.

To assist with the identification challenges, the coordinator has already been working towards improvements and creating more hands-on identifying opportunities for trainers. One of those solutions is to have specimens available in-person for learning, whether live or preserved. While herbarium specimens can be used, they are delicate and can fall apart. They have begun working with resin to preserve plants in their living state without them falling apart, but in resin they can decompose and lose color. However, they are continuing to work on improving techniques. Notably, even trainers are working on this for their volunteers as well. One of the MD trainers also mentioned wanting to try preserving SAV in resin and another MD trainer is planning to have an aquarium with the SAV species.

Volunteer Species Identification. Most volunteers in the focus group seemed somewhat comfortable with species identification, noting that their confidence was increased knowing that their trainer is an available resource. For example, many send photos of species they are unsure of to their trainers for verification. They also mentioned that their confidence often improved with time, practice, and familiarity with local species, reviewing identification resources with photos, and participating in the in-person training. In terms of resources, the majority of volunteers reported that they use the pocket guides during monitoring at least half of the time, while the majority rarely use the methods manual during surveys. This could be due to their organization having customized materials available, such as a manual cheat sheet, so they do not have to flip through the methods manual's pages while on the water. Lastly, 45% of volunteers use the available online videos prior to surveying at least half of the time, while the other half rarely or never use them. While these resources are available, some volunteers still sought other materials to help increase species

identification confidence, such as online botanical drawings and photos, with the latter being the best.

However, low volunteer confidence, or perceived confidence, was identified as a barrier to implementation and was mentioned by a handful of trainers in the survey and focus group. One MD trainer noted, "Participants do not feel confident enough to do the monitoring on their own once the training is complete. So either I'm a lousy trainer, or the training format isn't working." There was one volunteer that seemed extremely uncomfortable and unsure, indicating more training and a check-in would be helpful. Another volunteer noted that their hesitation with species identification is due to the amount of time in between surveys, as they only survey twice per year and forget in between. One MD trainer also mentioned how a low frequency of monitoring can make both volunteer engagement and knowledge continuation difficult:

I think it would just be helpful for the data we're collecting and be in a better sense where the grasses are, and for keeping their volunteers engaged, if there was a slightly more stringent requirement for them for frequency of monitoring.

Similarly, a trainer mentioned in the survey that the program could be improved with a schedule for monitoring, as it can then be more reliably collected. One of the ways trainers attempt to remedy the knowledge-time gap is to provide refresher workshops and opportunities to review methods, whether these are in-person, remote but live on videoconferencing, or with a video recording of training and short review videos.

Species Identification Quiz. While there is hesitation across the board with species identification, results for the identification quiz were mostly correct. The average score for the quiz overall was 85% but increased to 90% when the partially correct answers were included. Those partially correct are included in the following results because, in a real monitoring scenario, they typically would be able to see all angles of the plant, know the salinity of the site, or take photos to

help them identify. Many were able to explain how they deduced their answer, and some noted that they were unable to identify or distinguish between species without knowing the salinity of the site, which is a good indication that they comprehend SAV ecology. For example, one volunteer commented, “Tough to identify the photos without the context of salinity. When I have questions on identity, I rely on my local experts [trainers].” Additionally, some people likely used common vernacular for typical species found at their site since they likely do not see the similar ones in the area as well. For example, some identified Eurasian watermilfoil (*Myriophyllum spicatum*) as just “milfoil”, “watermilfoil”, or “*Myriophyllum*”, while there are three other milfoils options on the data sheet: Low watermilfoil (*Myriophyllum humile*), Parrot feather milfoil (*Myriophyllum brasiliense/aquaticum*), and Unknown milfoil (*Myriophyllum sp.*)

The most difficult for species identification was Widgeon grass (*Ruppia maritima*), with 60.7% of survey respondents being correct. This question received two comments about the quality of the photos, making it difficult to identify. It is important to note that the photos used were from the training presentation for the Train-the-Trainer event. One reason for the difficulty in identification could also be that this is not a common species for most of the MD trainers and volunteers to see, as it is found more in the middle to lower Bay in mesohaline and polyhaline salinity ranges. Similarly, only 57% of MD volunteers were correct in identifying Eelgrass (*Zostera marina*), likely for the same reason. The last tricky species was Hydrilla (*Hydrilla verticillata*), but only for MD trainers and volunteers. While VA trainers were all correct in identifying Hydrilla, only 79% of MD trainers and 57% of MD volunteers were correct. Overall, VA trainers had a higher average score with 94%, with MD trainers at 90% correct and MD volunteers at 82%. This could be due to how recent the Train-the-Trainer event was for the VA trainers versus their counterparts. The information was fresher and more recent, and the coordinator might have improved portions of the training since some MD trainers were originally introduced to the program.

The Train-the-Trainer Event. The Train-the-Trainer event is a requirement to become a certified trainer and is integral to prepare trainers to lead their own program. In the survey, about 61% of MD and VA trainers combined reported that one of the most important things they learned in the training event was SAV anatomy/species identification. Interestingly, 76% of MD trainers also highlighted the importance of learning how to do the field monitoring protocol, while 56% VA trainers emphasized more practicing the protocol in the field. One caveat could be that some MD trainers may not have been able to practice the protocol in the field during their training event with the program coordinator, while all VA trainers were given that opportunity. Fifty-six percent of VA trainers also indicated value in learning the importance of SAV monitoring in the Bay.

In addition to improvements to the Train-the-Trainer event to increase identification confidence, trainers had other ideas for how to strengthen this training. For example, 35% of MD and VA trainers combined selected interactivity, and 31% selected length, with comments indicating they wanted more interactivity and more workshop time. However, most selected the “other” option. Many individual suggestions focused on SAV identification and monitoring in the field, as discussed above. Trainer comments included needing more time on the water for practicing data collection and data reporting protocols, suggesting a briefer lecture and less time on the importance of SAV. A few comments mentioned requiring pre-training preparation, such as watching the existing protocol videos or pre-reading materials, to open more time to cover more difficult topics like species identification without needing to workshop into multiple days.

When the idea of extending the training event to multiple days was proposed in the focus group, trainers seemed hesitant. Some cited that it could be difficult for some to travel multiple days, making program inaccessible for organizations to adopt. Virtual pre-training, synchronous or asynchronous, seemed well accepted, as it will provide extra time to learn and serve as a reference to refresh while reducing the need to travel. However, some cautioned that it should not be too

soon before the in-person event to ensure knowledge continuity because it can be hard to retain that information over a long period. One additional idea is to have a required information session on Zoom that provides all of the program information and background to understand prior to the training.

Some trainers indicated they need more guidance for how to train and implement the program with volunteers, with 24% of MD trainers and 44% of VA trainers indicating their confidence would increase with more instructions on how to train volunteers. This was mentioned mostly in the survey and with the VA trainer focus group. About half of the MD trainers who participated in the survey had not established SAV Watchers with volunteers yet, while the MD trainer focus group was comprised of trainers who had all implemented the program. Therefore, the need for this guidance may not have been applicable to those in the MD focus group, as they might have had the confidence or organizational infrastructure to be ready to implement it. Comments in the survey from both MD and VA trainers included wanting any tips or training on how to keep a program engaging, how to teach methodology and explain concepts, and what is the most important information to share while training volunteers. There were a few questions about how to organize programs, for example, whether there should be one group monitoring event or if volunteers should monitor independently. Lastly, trainers were interested in receiving the training materials used in the Train-the-Trainer event for them to utilize for their training. It was clear that the lack of this type of guidance could potentially be a barrier for implementation, especially in VA, as one trainer mentioned, “If you're going to implement it with our group, we need a little bit more instruction, a little more guidance.”

Training with Volunteers. One of the most discussed subjects in the MD trainer focus groups was training with volunteers. Many in both trainer focus groups indicated feeling confident in their general ability to lead or teach, citing that they either already work with volunteers in that

capacity or work in a role that requires public speaking skills. This was clear in how high the volunteers rated their trainers from a scale of 1 to 10, with 10 being the best, on their ability to answer questions and lead a group. Most trainers received a 9 or 10, with rankings from 72% of volunteers on their trainer's ability to answer questions and 90% of volunteers on their trainer's ability to lead the group. Trainers offered training for volunteers in a variety of formats, including providing only in-person training, virtual training synchronously and asynchronously, and a hybrid approach. The number throughout the year varied, for example:

We host two trainings each year -- one virtual one to do general information, procedures, and plant ID in March before everyone is assigned a location. We do another one in June, where we go to the field with kayaks to go over procedures in the field.

While some feel confident in their ability to lead and teach, there can still be barriers to onboarding volunteers. Thirty-five percent of MD trainers indicated that one barrier to program implementation was that they were short on resources, which could include funding for equipment or access to watercraft. Some indicated a lack of public access sites to launch at as well. The need for resources was also highlighted by about 31% of MD and VA trainers combined, who selected that a monitoring equipment loan program could improve this program.

When it came to training with volunteers, many emphasized that in-person training or opportunities are necessary. One trainer mentioned in the survey that in-person is beneficial and an interest of trainers and volunteers alike. Many volunteers noted that the in-person training was helpful, especially if they started out having only done the virtual training. One volunteer mentioned that they should have had in-person training when they began the program, as it was extremely useful. Another volunteer cited that it improved their confidence. These stories influenced another volunteer to be interested in participating in one:

I think, based on what I've heard from the other folks on this call, I'm going to do an in-person training if I can when they offer it. It might helpful to fill in some of the blanks, maybe?

Communication. There is a need for increased communication between trainers and volunteers. Only 18% of volunteers reported receiving the program newsletter from their trainer. While it is uncertain whether volunteers meant an organization-specific newsletter or the coordinator's program newsletter, this indicated a potential lack in communication to volunteers. Some reported having low confidence in doing the protocol and are seeking more feedback from their trainers. One volunteer noted wanting more details about how to do the methods and some verification that they are doing the protocol right and filling out the datasheet correctly. Another volunteer used the survey to ask for clarification on the best way to submit photos to their group, since they are using a hard copy of the datasheet. Some are seeking feedback about whether extra details are helpful, such as drone footage, as it can be time-consuming to go above and beyond.

In the focus group, volunteers also mentioned that it would be beneficial to be reminded of resources available to them, such as picture catalogs, as they get lost in their email inboxes. In reference to resources, it was also suggested that timelines and reports of growth variations in different areas be shared during the season. These communications are important to volunteer data collection efforts, as most volunteers reported in the focus group that their confidence was increased knowing trainers were available to help, especially regarding species identification.

Data Recording. Another area where increased communication between volunteers and trainers would be valuable relates to comfort levels with technology for data collection. The coordinator and many trainers discussed that volunteers tend to be averse to technology, specifically in reference to a new-to-the-program data reporting tool via mobile application. In fact, VA trainers mentioned that the same tool is used for another project, and it actually deters

volunteers from wanting to participate. However, it was interesting that many of the volunteers who participated in the focus group already use their phone for monitoring, even though their organization does not yet use the tool.

Volunteers use their phones to take photos of SAV for identification assistance, to type in notes in lieu of a datasheet, or even to record themselves speaking out their observations. When using their phones instead of a datasheet, they transferred the data over once off the water. A few volunteers in the survey even mentioned they want this type of data reporting tool, and one volunteer mentioned wanting a mobile application that could help them identify. One volunteer remarked, “An easy-to-use phone app would be very helpful, to eliminate the need to take pencil-on-paper notes while monitoring. I have to use a canoe, so maneuvering while taking notes is cumbersome.” One trainer commented in the survey that more information on how to train volunteers on the mobile application could be helpful for their volunteers to better learn how to use the mobile application.

It is important to note that volunteers who filled out this online survey and participated in the focus groups on Zoom were likely more familiar with technology, as these methods required being comfortable with those platforms and may not be representative of all volunteer perspectives. The program coordinator is looking at this mobile application to also help with picture data collection to verify volunteer data and increase credibility, as it has been a challenge to get volunteers to take photos and difficult to match up photos with data points. The coordinator explained, “As you can visualize it [data] in the map, you can see their picture attached to the point instead of having to...open a file with pictures with, like, very long specific file names.”

Funding. Lastly, a need for funding was mentioned in focus groups by both the coordinator and MD trainers. In general, funding stability and quantity are major concerns for volunteer monitoring programs and have been demonstrated to limit growth (Green et al. 2013; Deutsch &

Ruiz-Córdova, 2015). While the overall program received program development funds, there is no current budget available for coordination of SAV Watchers, and as the coordinator comments, “the fact that we're not a funded program has been a hindrance.” The coordinator has had to be strategic to make travel for training and time for coordination, communication, and data management work. An important note is that coordinating this program is not the main job for the coordinator. For individual organizations or trainers implementing the program, they have had some success securing start-up or expansion funding or being able to make it work with diverse funding sources. But overall, there was interest in more financial investment.

Program infrastructure is the foundation of which a program functions. From species identification to data recording, the experiences of trainers and volunteers represent effectiveness of current infrastructure and highlight how participants’ needs in the program may have changed since its inception.

Data Use

A second component of the investment that is needed in volunteer monitoring programs related to data use and communicating those data uses.

The Maryland Code defines a SAV protection zone as “an area delineated by the Department for the protection from uprooting and [for the] the restoration of submerged aquatic vegetation” (Md. Code Ann., Nat. Res. § 4-1006.1, 2023). Every 3 years, these delineated zones are updated and must include “where submerged aquatic vegetation has been mapped by SAV surveys during at least 1 of the previous 3 years” (Md. Code Ann., Nat. Res. § 4-1006.1, 2023). SAV surveys refer to the Virginia Institute of Marine Science’s (VIMS) annual aerial survey and other surveys that use methods approved by the Chesapeake Bay program and MD DNR. Importantly, the SAV beds must be mapped and delineated, which the SAV Watchers protocol does not do. Therefore, there have been limits observed in data use, as mentioned in the volunteer focus group. One volunteer

noted that there was a time when they were able to expand the SAV protection zones, but not recently. It was also brought up in the survey by volunteers that they felt their data were disregarded when it comes to protection zone designation and noted that recent legislation may help with that. Trainers echoed these sentiments and one remarked, “The data was not used to identify SAV protection zones and that was really frustrating to the point where some volunteers came back to us and said, what is the point of us collecting this type of data.”

One of the primary goals of this program is to collect more data for the Chesapeake Bay Program to better understand, manage, and restore SAV. There can be additional goals and ways the data are used at a state level and at the individual organization, where certified trainers implement the program. As seen in volunteer and trainer motivations, the majority of people participating in this volunteer monitoring effort to help with Chesapeake Bay conservation efforts want the data to be used for policy and to help protect SAV in the area. When the data cannot or have not been well used to help do that, it can be frustrating. Specifically, this is seen when it comes to the regulation of SAV protection zones in MD, which the coordinator is aware of and noted receiving comments from frustrated Riverkeepers about how data is not guiding policy. The coordinator understands these frustrations and assured:

[These data] it frequently sparks the need for additional surveys. So a lot of times it'll be like, okay, we'll have SAV Watchers' data there that indicates that there's a conflict at that site. And so, as part of the permit requirements or permit conditions, we ask that they hire an independent consultant to do an SAV survey. So we do use the data.

The issues tend to be mostly when it comes to dock and pier regulations and hydraulic clambers destruction of horned pondweed. The coordinator explained an example where MD DNR was contacted about a dock extension permit application. Based on the VIMS aerial survey, the location did not have any SAV present. But there were many public comments concerned about the SAV in

that area. One volunteer mentioned that they have provided public comment based on their data. Additionally, while SAV Watchers is helping scientists better understand horned pondweed, trainers and volunteers noted they have not yet been able to see it mapped and protected from destructive practices.

When data is not being used in the ways program participants see potential for, it can make them feel discouraged, which was expressed by one trainer. They shared:

I'd like to see SAV Watcher data inform regulation that currently doesn't happen. It's kind of like, what's the point of collecting this data if we're not using it towards the count, especially when we're considering horned pondweed, which the VIMS fly over often misses.

However, as mentioned by the program coordinator, SAV Watchers data are used, just not as quickly or in ways participants may like to see.

Data use communication. It can be challenging when program participants do not understand how the data are used and what the impacts are. This need for further communication is underscored in how well volunteers report their own understanding. While 65% of volunteers reported that they understood how their SAV Watchers data are used and why it is useful, the remaining 35% reported that they were unsure. Additionally, when asked in the focus group about how these data are used, some were having difficulty describing it. One volunteer noted:

I mean, I think the hesitation is because I'm not really sure. You know, I know I've seen, sort of, the maps that sometimes it, it sort of populates with information that I've submitted, but not all of it, over the years.

Many understood they are fulfilling larger data needs from the Chesapeake Bay Program and mentioned that it verifies the aerial SAV imagery. But the full data pathway and how this is done were unclear to them. It is important that everyone in the program fully understands the goals and data uses in order to have better individual experiences and data collection effort.

It became clear during focus groups that there is a shortcoming in the communication of data uses and in timely reports from both the overall program and individual trainers. In fact, 47% of trainers and 55% of volunteers reported that this program could be improved for them if there were more feedback on data impacts and uses. One VA trainer noted that, for volunteer monitoring programs in general, people are more likely to be invested when they understand the data pathways, how it will be used, and the longevity of the program. This program has created SAV stewards who care about the SAV beds they monitor, one trainer notes. The volunteers are deeply connected to the data impacts and often need encouragement that their effort is useful, as described by a MD trainer:

We do have a lot of volunteers that kind of feel beaten down when they go out a bunch, they don't find anything, or they find it once and then it's gone. Or they feel like they're just submitting data into the void. So, it really works to make them feel appreciated and really showcase to them how that data is being used through all work and through state goals -- what they're working towards essentially.

From the overall program level, some trainers are interested in getting data reports with metrics such as how many volunteers the program had, how many acres of SAV were observed, what species, where they are, and if the amount is changing. One trainer mentioned even receiving a broad document that shows the data pathways, where the data goes, and to whom, after the data are collected by individual organizations. Along those lines, another trainer noted that they use the VIMS SAV maps and would like to see them more frequently updated with current SAV Watchers data. One trainer noted:

I think it's right now to me, this is a little bit of a feel-good program. And I would love for the metrics to be used to make more management decisions or help...drive goals, identify where we are in goals.

From the local organizational level, most volunteers are looking for SAV indicators to be added to annual reports for their local waterways. A trainer commented on this in the survey, “My volunteers often ask for last year's results or products to help them feel like the data that they have collected is useful.” Thinking about the request for more communication from trainers to volunteers, one volunteer wanted some metrics and feedback so they can understand the bigger picture and what other SAV Watchers are seeing in their waterways. One volunteer also mentioned it would be nice to see changes over multiple years. In the focus group, volunteers mentioned wanting to learn more about their organization’s restoration successes as well.

Identifying data uses is important to help volunteer monitoring projects remain goal- and change-driven. Additionally, considering the unintended data uses helps the project achieve more beyond the scope of the original goals. Communicating these potential pathways and providing updates can foster participant engagement.

Sustained Engagement

The final theme from the participants suggests that sustained engagement beyond the initiation of a volunteer monitoring program is important, especially regarding post-training communications.

A surprising outcome that was highlighted by the volunteer focus group and the MD trainer focus group is that they wanted more post-training communication with their counterparts.

Unprompted, one volunteer noted:

I think...what would be really helpful is, if somebody has mentioned about, having some sort of forum where we can communicate with each other. Because. I mean frankly, just even this talking with other people and their experiences, it's very, it's very useful. And it also gives you, that there's so much of it... am I doing this right? So if we can, so pass things off to each to other, we can sort of get that confidence.

In the survey, 45% of volunteers reported that this program could be improved for them if there were more community-building opportunities. Whether it is between volunteers of the same organization or volunteers in the program, this was an echoed sentiment. One trainer commented that volunteers get involved in these efforts for the social aspects as well, and it would be great to connect more like-minded environmental people.

Trainers had a similar interest in having a way to connect with each other. Their focus was mostly on forming collaborations, coordinating efforts, and sharing resources. One MD trainer noted that nearby trainers could combine training efforts to offer more regional training. This was also mentioned by one VA trainer in the focus group, who said the program could improve by establishing a communication network for the VA SAV Watchers. Another VA trainer commented in the survey that one of the most important aspects of the training was “getting contacts for other SAV trainers and community science experts.” As was highlighted by trainers, collaboration and partnership are important for successful programs.

Overall, it is important to ensure that after programs are initiated, there is a continuation in strategic engagement.

Suggestions

Based on the resulting themes from the interview, focus groups, and survey, there are potential strategies to help strengthen the overall program and streamline the program expansion into Virginia. Many of the overall program suggestions below are also applicable to the expansion of the program and should similarly be considered.

Overall

1. *Ensure in-person training opportunities and refreshers*

At the organizational level, it was clear that in-person training was beneficial to volunteers and that it could help with species identification. It may benefit the program and volunteers to ensure that each person involved in the program has had at least one in-person experience to practice the methods on the water and better learn species identification. Specifically, it is suggested that these in-person trainings include identifying live samples of SAV. For volunteers, refreshers could continue to be available, with an emphasis on in-person and on the water. At the program-wide level, it is encouraged that trainers continue to have in-person training and field opportunities. In-person refreshers may also be considered for trainers, as they can also help increase confidence.

2. *Increase communications about data use*

The overall program could develop 1) a data pathway factsheet and 2) an annual report. Volunteers and trainers alike need to understand where their data are going, how their data is being used, and how they can communicate the impact of their effort. While the trainers receive this information at the Train-the-Trainer event, it is unclear how this knowledge is transferred to the volunteers. Having a standardized data pathways factsheet may help trainers better explain the overall goals of the program.

An annual report could be beneficial to help trainers and volunteers be able to communicate their annual impacts, but also gives them feedback, encouragement, and fosters interest in continuing to contribute to the project. This report can include metrics, such as how many volunteers the program had, acres of SAV observed or number of surveys, what species are where, and if the coverage is changing. As the data details in an annual report require time and more expedited data processing, another way to help document achievement could be to ensure the VIMS SAV maps are updated annually. However, a summary of this information may be valuable.

The program may also consider encouraging organizations or trainers to develop their own data pathway summaries and annual reports to meet the needs and interests of their volunteers. This may be more important if data are used by the organization and if volunteers are involved in additional efforts, such as restoration. It could be helpful to provide a template for trainers to use to summarize their organization's efforts.

3. *Formalize feedback pathways and adjust accordingly*

The program coordinators and individual trainers could formalize ways to receive feedback. A few years ago, the program sent out a survey and was able to understand more about what trainers wanted to see. For example, one outcome was that trainers wanted increased communication, and so the coordinators began a newsletter. For this study, the survey sent out received many ideas, and areas for improvement have been identified. Creating a formal and habitual pathway for this feedback from trainers may help with the continual improvement of this program. At the organizational level, trainers can also be encouraged to facilitate similar means of feedback with their volunteers. For example, trainers could introduce their volunteers to Survey 123, the mobile data reporting tool, provide them training, and then request feedback to see how feasible it is as a tool for them, rather than discounting the idea completely.

Other areas where feedback could be useful include ensuring that materials are working and are up to date, and that participants have what they need to be successful. In this survey, there was a suggestion to update training materials, manuals, and the field guide with better quality photos, perhaps even from some of the volunteers or participating organizations. Whether these are post-training evaluation forms or annual surveys, this feedback may help ensure continued success through multiple types of changes, such as regulatory, technological, environmental, or programmatic.

4. *Ensure Train-the-Trainer event is effective and efficient*

One thing that could also be refined by receiving more formal feedback is the Train-the-Trainer event. The coordinators are exploring two-day workshop options for trainers to allow for more time to learn species identification. Trainers had mixed reviews in response to this proposal in the focus groups. While more time for training will be ultimately beneficial, there was caution expressed about both days being in-person and the proximity of the timing of them. The coordinators could consider adding a Zoom option if one day of training does not include going into the field or viewing SAV species in person. It could also be an option for those who might be travelling further for the training, to reduce their travel time and cost. The other concern was whether the two training dates were too far apart from each other. Some trainers cited that they would likely forget information from the first day of training. In this case, it may be helpful to have some sort of homework for the trainers so that they have some accountability to be prepared for the second day of the workshop.

With extending the training, it could also be beneficial to adjust the order of learning. The first workshop could be focused on the program background, SAV ecology, and methods, with an introduction to identification. The second workshop could then be more centered around species identification and practicing methods in the field. This model may also be conducive to the first one

having the Zoom option. Regardless of the workshop model, it is encouraged that they be implemented with proper feedback and strategy.

5. *Provide trainers with more resources and additional “how to” training*

The overall program may consider creating more structure for trainers to implement the program, especially for those who do not have prior experience leading volunteer groups. This could happen in a variety of ways. First, it could be helpful to have a checklist for trainers to know what things they need to do to prepare for their own volunteers and to have a guide with tips on how to lead their organizations. It may also help to ensure training materials, such as PowerPoints, are more accessible. Additionally, an optional workshop or meeting to facilitate the trainers forming a training strategy could be beneficial. This could also be on Zoom to reduce travel time and costs. Including a handout or guide with questions to steer the trainers’ thoughts and planning process would create a clear takeaway for trainers (see Appendix C).

6. *Foster community and collaboration*

The coordinator may consider continuing to expand efforts to foster community among the SAV Watchers trainers and the trainers of volunteers. While the program started a Friends of Chesapeake Bay SAV Watchers Facebook group, it currently does not have many members. Joining this group may take more encouragement and invitations to the individual trainers. It also could be promoted as an exciting group that they now get to join as certified trainers. However, it may be helpful to ask trainers what type of platform or engagement would be most convenient and effective. Potentially, a Listserv or semi-annual Zoom meeting might work for trainers better. Overall, it was clear this could be beneficial for resource sharing and coordination of efforts.

For volunteers to engage in this group, it may require buy-in from the trainers, as they are the ones communicating primarily with volunteers. Individual organizations and trainers could similarly entice volunteers by promoting it as an exciting community that they get to join. However, some

organizations may decide that their volunteers would benefit more from a more localized group, especially if they have added anything to their datasheet or have taken more ownership over the program. In that case, organizations and trainers may be encouraged to determine a platform that would work best for their volunteers (Facebook, Zoom meetings, in-person meetings, etc.). No matter which approach is taken, any steps towards building volunteer community may improve their confidence and experience.

7. *Secure funding for increased coordination efforts*

It could be beneficial for SAV Watchers to secure funding to better support the program with an additional staff member. However, as seen with many volunteer monitoring programs, funding can be a challenge. Funding stability and quantity can be dynamic and diverse, which means it can be difficult to have security and sustainability (Deutsch & Ruiz-Córdova, 2015; Green et al. 2013). If more salary time is not feasible, it could be useful to get funding to begin an equipment loan monitoring program (watercraft, Secchi discs, rakes, etc.) to help trainers or organizations get started. For organizations and trainers who have not been able to secure start-up funding, it may limit overall program growth. In the survey, 35% of MD trainers indicated one barrier to program implementation was that they were short on resources, which could include funding for equipment or access to watercraft. Additionally, the coordinators could assist trainers in applying for small grants or seed funding to initiate their efforts. While it may continue to be a challenge, creative solutions forward may help with program longevity.

Expansion

1. *Invest in state expansion leading organization*

It may be important that the program coordinators invest time into training, assisting, and supporting the champions of this program expansion at The Nature Conservancy (TNC) in Virginia. This organization has a background in coordinating large community efforts like this and has pre-

existing partnerships with many groups that would be interested in participating. However, they may still require additional training beyond what a typical trainer would receive if they are taking on the role of leading at the state level for other trainers in Virginia. It is encouraged that the training suggestions for the overall program be taken into account here, including in-person training. It could work well to follow a slow roll-out method, with TNC in Virginia shadowing trainings and slowly taking on more responsibilities with oversight from MD DNR coordinators. If TNC in Virginia would like to take more of a facilitation role rather than a training and coordination role of other trainers in the state, then there may still be an investment in time and communication to ensure needs specific to Virginia and organizations are being met.

2. Strategically engage by identifying goal audiences and leaning on partnerships

It is encouraged that the expansion of this program be strategic and realistic, as it is important to acknowledge that this program may not work for everyone everywhere. This program requires volunteers to be able to navigate on the water while recording data, which could prove to be difficult for some audiences physically or due to a lack of watercraft. While not discussed in the themes, an important takeaway from the survey with VA trainers was that 33% think there will be challenges with expansion of the program into VA and 44% indicated maybe. There was a spread in results for how well VA trainers saw this program working with their organization. With 10 being the best, there was about an even split between “8”, “7”, “6”, and “5”. Some of the comments and the focus group participants mentioned that the success of the program will depend on the groups targeted for data collection.

One comment suggested younger-aged volunteers might be better for the program, but it should be noted that age is not a factor in the ability to be a good volunteer and should not be a barrier. Being comfortable with the multitasking required to maintain water safety and record data could be a better parameter to gauge the best groups for the program, as one survey comment

mentioned that they had “a limited number of volunteers experienced with safe paddling on the water and data collection simultaneously.” While this should be a consideration, it should also not limit this program’s expansion. The groups suggested in the focus group for potential engagement included: Chesapeake Bay Foundation, James River Association, Tidewater Oyster Gardeners, Master Naturalists, Advanced Placement students, school groups participating in Envirothon and Blue Crab Bowl, Watermen’s Museum, and local parks.

TNC in Virginia could lean on their pre-existing partnerships to assist with program expansion, as they are well situated with groups across the state. One of the difficulties for expansion mentioned by the coordinator, prior to working with TNC in Virginia, was the location of MD DNR and Chesapeake Bay Program. In their experience, people in VA are less involved in the Chesapeake Bay Program world because it is housed in Maryland. As seen in the focus group with MD trainers, pre-existing partnerships and word of mouth were primary ways organizations got involved in the program. TNC in Virginia may help bridge that partnership and distance gap by helping bring more VA groups into the Chesapeake Bay fold.

3. Consider Train-the-Trainer event format and trainer backgrounds

When implementing the Train-the-Trainer events in Virginia, the program may consider that backgrounds in SAV and Chesapeake Bay conservation may be more diverse. Many of the MD trainers appeared to already be in the SAV restoration or education world. That may not be the case with some of the VA trainers, as was mentioned in the VA trainer focus group. It may be helpful to do a poll or knowledge survey prior to trainings to see what the participants’ baselines are to determine if more time needs to be spent in certain areas. Some VA trainers noted having some introduction to SAV prior to joining SAV Watchers, but were still uncomfortable with identification after only one day of training. Some have no background, as one VA trainer commented on the program working with their organization, that they “do not live or work near the Bay and knew nothing of the aquatic

vegetation before being put in the class.” This also may be true for MD trainers, and in fact, those with some background in restoration or education of SAV seemed to still find species identification a challenge. The proposal to implement two-day Train-the-Trainer events may assist with this challenge, particularly for VA trainers. Regardless, trainer backgrounds may need to be considered to help inform event format to ensure success.

4. *Create a regional communication plan*

A communication plan could be created between the MD DNR coordinators and TNC in Virginia to ensure there is appropriate support and follow-up with VA trainers. Reported by VA trainers, there was limited communication after the workshop in August 2024, leaving some confused as to what their next steps were. There could be a follow-up after their initial training with actionable steps forward, and then periodic check-in communication after that. Along those lines, MD DNR coordinators and TNC in Virginia may delegate communication as they see fit to consolidate efforts. Communication was something that the coordinator noted was a constraint in expansion prior to this partnership and could be where TNC in Virginia helps fill gaps. There could also be regular communication between the two groups to stay updated and work towards a collective goal.

5. *Consider data use in Virginia*

Data use specific to Virginia and local organizations may be a consideration as this program is expanding. While the goal is to assist with Chesapeake Bay Program monitoring efforts, these data can be used in other ways as well, as is seen with MD trainers and organizations. Mapping these potential avenues and connecting with organizations that could benefit from this information could help engage more people in SAV stewardship and ensure success in the program. It is encouraged that the messaging is clear about potential data impacts.

Conclusions

In conclusion, the SAV Watchers program is valuable for fostering stewardship and filling data gaps in Chesapeake Bay SAV coverage. As mentioned by a MD trainer, “It’s special program for sure, and I think doing this type of focus group and research and stuff is really important to continuing to improve it and making sure it’s impactful and everyone’s getting something out of it.” With improved engagement and increased monitoring by SAV Watchers, the Chesapeake Bay Program can have a better understanding of SAV in Chesapeake Bay. Our understanding of SAV in Chesapeake Bay could also be increased by bridging the gap between this volunteer program and the robust potential of stewardship in Virginia. By better harnessing the power of volunteers, we not only progress our scientific understanding of natural phenomena and changes, but we are enhancing the experiences that build stewardship and environmental literacy in local communities – where small changes can have big impacts in our world. The suggestions for this program and expansion may assist in the improvement or expansion of volunteer monitoring programs in the Chesapeake Bay region or those that follow a “train-the-trainer” model of engagement. Lastly, the approach used creates a general framework that other volunteer monitoring programs can use to evaluate their own programs (see Appendix D).

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Appendix A

Survey Questions

Volunteer Survey

What is your role with Chesapeake Bay SAV Watchers?

- I volunteer with another organized group (i.e. Riverkeeper, local watershed organization, etc.) for SAV Watchers (in other words, I have attended an SAV Watchers training event or have received training from a certified SAV Watchers Trainer)
- I am a certified SAV Watchers Trainer (in other words, I have passed a test on my knowledge of SAV identification and the SAV Watchers protocol)

What year did you begin volunteering with the SAV Watchers program?

- 2019
- 2020
- 2021
- 2022
- 2023
- 2024
- I can't remember

When was the last time you monitored SAV as part of the program?

- 2019
- 2020
- 2021
- 2022
- 2023
- 2024
- Unsure
- Have not since training

Where do you survey for SAV Watchers? Select all that apply.

- Eastern Shore of MD
- Western Shore of MD

Approximately how many times have you gone out to monitor SAV as part of the program (in total)?

- 0-5 times
- 6-11 times
- 12-20 times
- More than 20 times

What was/were your motivation(s) for becoming a SAV watcher? Check all that apply.

- My organization was looking for programs to attract volunteers
- I have a personal interest in SAV
- I want to help Chesapeake Bay conservation and monitoring efforts
- It might look good on my resume
- Other (please specify) _____

On a scale from 1 (poor) to 10 (excellent), rate how well was your SAV Watchers trainer able to answer your questions?

- 1 (poor)
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 (excellent)

On a scale from 1 (poor) to 10 (excellent), rate how well was your SAV Watchers trainer able to lead your group?

- 1 (poor)
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 (excellent)

In the field, do you record your observations in the survey app or on a data sheet?

- Survey app
- Datasheet
- Both
- It varies
- Other (please specify) _____

When do you turn in your SAV Watchers data to your group lead?

- After each collection day
- End of summer
- Other (please specify) _____

How often do you use the Pocket Field Guide during your SAV Watchers surveys?

- Always
- Usually
- About half the time
- Rarely
- Never

How often do you use the methods manual during your SAV Watchers surveys?

- Always
- Usually
- About half the time
- Rarely
- Never

How often do you use the Guide to Submitting Data and Observations during your SAV Watchers surveys?

- Always
- Usually
- About half the time
- Rarely
- Never

How often do you use the online informational and training videos prior to doing SAV Watchers surveys?

- Always
- Usually
- About half the time
- Rarely
- Never

Do you receive the program newsletter from your trainer?

- Yes
- No
- Unsure

Are there any ways in which this program could be improved for you? Check all that apply.

- More community building opportunities
- Better communication
- Easier monitoring methods
- More feedback on data impacts and uses
- Other (please specify) _____

If applicable, please explain your response to the previous question about program improvement.

Do you understand how your SAV Watchers data is used and why it is useful?

- Yes
- No
- Unsure

Do you go back and view your SAV Watchers data online on the real-time map?

- Yes
- No
- Sometimes

Are you evaluating and tracking your group's SAV Watchers data overtime independently?

- Yes
- No

What parts of the scientific process do you see yourself involved in as a volunteer in this program?
Check all that apply.

- Choosing or defining question(s) for study
- Gathering information and resources
- Developing explanations (hypotheses)
- Designing data collection methodologies
- Collecting samples and/or recording data
- Analyzing samples
- Analyzing data
- Interpreting data and drawing conclusions
- Disseminating conclusion/translating results into action
- Discussing results and asking new questions

MD Trainer Survey

What is your role with Chesapeake Bay SAV Watchers?

- I volunteer with another organized group (i.e. Riverkeeper, local watershed organization, etc.) for SAV Watchers (in other words, I have attended an SAV Watchers training event or have received training from a certified SAV Watchers Trainer)

I am a certified SAV Watchers Trainer (in other words, I have passed a test on my knowledge of SAV identification and the SAV Watchers protocol)

What year did you become a certified SAV Watcher Trainer?

- 2019
- 2020
- 2021
- 2022
- 2023
- 2024
- I can't remember

Have you established a monitoring program with volunteers yet?

- Yes
- No
- No, but am planning to soon

When was the last time you monitored SAV as part of the program?

- 2019
- 2020
- 2021
- 2022
- 2023
- 2024
- Unsure
- Have not since training

What was/were your motivation(s) for becoming a SAV watcher trainer? Check all that apply.

- My organization was looking for programs to attract volunteers
- I have a personal interest in SAV
- I want to help Chesapeake Bay conservation and monitoring efforts
- It might look good on my resume
- Other (please specify) _____

Approximately how many times have you monitored SAV with volunteers?

- 0-5 times
- 6-11 times
- 12-20 times
- More than 20 times

Approximately how many trainings have you led?

- 0-2 trainings
- 3-5 trainings
- 6-9 trainings
- More than 10 trainings

Approximately how many volunteers have you trained?

- 0-5 volunteers
- 6-15 volunteers
- 16-25 volunteers
- More than 25 volunteers

Where do you survey for SAV Watchers? Select all that apply.

- Eastern Shore of MD
- Western Shore of MD

What were the most important things you learned by participating in the SAV Watchers Train-the-Trainer event? Select your top three.

- SAV ecology
- SAV anatomy species identification
- Importance of SAV monitoring in the Bay
- Field monitoring protocol
- Practicing the protocol in the field
- Data upload and management
- How to train your own volunteers
- Other (please specify) _____

How confident did completing the training make you feel in your ability to train volunteers?

- Extremely confident – I was ready to train anyone and knew I'd do great!
- Moderately confident – I felt like I had a good understanding of the material and was capable of training others, but I was still a bit hesitant
- Slightly confident – I felt like I knew most of the material, but was not sure I'd be able to train others effectively
- Not confident at all – I did not feel I had a grasp of the material and could not train others
- Unsure

What could have been improved to increase your confidence? Check all that apply.

- More in-depth information overall
- More time practicing monitoring methods on the water
- More time learning in the classroom
- More time to work with program coordinators one-on-one
- More instruction on how to train volunteers
- Other (please specify) _____

If applicable, please explain your response to the previous question about increasing confidence.

In general, what could be improved for the trainers' workshop? Check all that apply.

- Content flow - did the order of topics in the classroom and field portions make sense?
- Interactivity of the workshop – i.e. was there ample engaging, structured activities?
- Facilities - i.e. how was size of room training event was held in, were there plenty of parking options, etc.
- Length of workshop
- Other (please specify) _____

If applicable, please explain your response to the previous question about workshop improvement.

Have you encountered any barriers in applying the information learned in the training with volunteers? *A barrier in this context pertains to any obstacle that has made it difficult to train volunteers (i.e. lack of resources, confusion on methods, low confidence, etc).*

- Yes
- No
- Unsure

What barriers have you encountered in applying the information learned in the training? Check all that apply.

- Low confidence about ability to train
- Inability to identify SAV species
- Confusion about monitoring methods
- Lack of understanding of purpose
- No volunteers interested
- Short on resources (i.e. unable to afford supplies, no access to watercraft, etc.)
- Other (please specify) _____

In the field, do you record your observations in the survey app or on a data sheet?

- Survey app
- Datasheet
- Both
- It varies
- Other (please specify) _____

When do you turn in your SAV data to the SAV Watcher program coordinator (Brooke Landry)?

- After each collection day
- End of summer
- Other (please specify) _____

How often do you use the Pocket Field Guide during your SAV Watchers surveys?

- Always
- Usually
- About half the time
- Rarely
- Never

How often do you use the methods manual during your SAV Watchers surveys?

- Always
- Usually
- About half the time
- Rarely
- Never

How often do you use the Guide to Submitting Data and Observations during your SAV Watchers surveys?

- Always
- Usually
- About half the time
- Rarely
- Never

How often do you use the online informational and training videos?

- Always
- Usually
- About half the time
- Rarely
- Never

Which of the following resources do you use for training volunteers? Check all that apply.

- Pocket field guide
- Methods manual
- Guide to Submitting Data and Observations
- Online information and training videos

How valuable is the program newsletter for you?

- High – I gain a lot from it and would be very disappointed if it was no longer available
- Moderate – I sometimes gain useful information from it
- Low – I rarely gain useful information
- None – I do not gain anything from the newsletter
- Do not view
- Do not receive

What do you enjoy most about the program overall? Select your top three.

- Conducting the monitoring
- Community building
- Learning about science
- Contributing to conservation efforts
- Other (please specify) _____

Are there any ways in which this program could be improved for you? Check all that apply.

- More community building opportunities
- Better communication
- Monitoring equipment loan program
- Easier monitoring methods
- More feedback on data impacts and uses
- Other (please specify) _____

If applicable, please explain your response to the previous question about program improvement.

Do you understand how your SAV Watchers data is used and why it is useful?

- Yes
- No
- Unsure

Do you go back and view your SAV Watchers data online on the real-time map?

- Yes
- No
- Sometimes

Are you evaluating and tracking your group's SAV Watchers data overtime independently?

Yes

No

If you are part of an organization, how is your organization using the SAV Watchers data? Check all that apply.

Newsletter

State of the river reports

General updates

Education and outreach

Identifying sites for restoration

We are not using the data

Other (please specify) _____

What parts of the scientific process do you see yourself involved in as a certified trainer in this program? Check all that apply.

Choosing or defining question(s) for study

Gathering information and resources

Developing explanations (hypotheses)

Designing data collection methodologies

Collecting samples and/or recording data

Analyzing samples

- Analyzing data
- Interpreting data and drawing conclusions
- Disseminating conclusion/translating results into action
- Discussing results and asking new questions

VA Trainer Survey

Have you begun establishing a SAV Watchers monitoring program with volunteers yet?

- Yes
- No
- No, but am planning to soon

What was/were your motivation(s) for becoming a SAV watcher trainer? Check all that apply.

- My organization was looking for programs to attract volunteers
- I have a personal interest in SAV
- I want to help Chesapeake Bay conservation and monitoring efforts
- It might look good on my resume
- Other (please specify) _____

Where would/will you survey for SAV Watchers? Select all that apply.

- Eastern Shore of VA
- Western Shore of VA

What parts of the scientific process do you see yourself involved in as a certified trainer in this program? Check all that apply.

- Choosing or defining question(s) for study
- Gathering information and resources
- Developing explanations (hypotheses)
- Designing data collection methodologies
- Collecting samples and/or recording data
- Analyzing samples
- Analyzing data
- Interpreting data and drawing conclusions
- Disseminating conclusion/translating results into action
- Discussing results and asking new questions

What were the most important things you learned by participating in the SAV Watchers Train-the-Trainer event? Select your top three.

- SAV ecology
- SAV anatomy species identification
- Importance of SAV monitoring in the Bay
- Field monitoring protocol
- Practicing the protocol in the field
- Data upload and management
- How to train your own volunteers
- Other (please specify) _____

How confident did completing the training make you feel in your ability to train volunteers?

- Extremely confident – I was ready to train anyone and knew I'd do great!
- Moderately confident – I felt like I had a good understanding of the material and was capable of training others, but I was still a bit hesitant
- Slightly confident – I felt like I knew most of the material, but was not sure I'd be able to train others effectively
- Not confident at all – I did not feel I had a grasp of the material and could not train others
- Unsure

What could have been improved to increase your confidence? Check all that apply.

- More in-depth information overall
- More time practicing monitoring methods on the water
- More time learning in the classroom
- More time to work with program coordinators one-on-one
- More instruction on how to train volunteers
- Other (please specify) _____

If applicable, please explain your response to the previous question about increasing confidence.

In general, what could be improved for the trainers' workshop? Check all that apply.

- Content flow - did the order of topics in the classroom and field portions make sense?
- Interactivity of the workshop – i.e. was there ample engaging, structured activities?
- Facilities - i.e. how was size of room training event was held in, were there plenty of parking options, etc.
- Length of workshop
- Other (please specify) _____

If applicable, please explain your response to the previous question about workshop improvement.

On a scale from 1 (poor) to 10 (excellent), rate how well do you see this program working in your organization and with your volunteers?

▼ 1 (poor) ... 10 (excellent)

If applicable, please explain your response to the question above about the program.

Do you anticipate challenges associated with the expansion of SAV Watchers into Virginia?

- Yes
- No
- Maybe

Please explain your answer to the previous question about anticipating challenges with the expansion of SAV Watchers into Virginia.

If applicable, what is one thing that should change to ensure that this program succeeds in VA? *We define success as meeting program goals, including collecting robust SAV data throughout Chesapeake Bay, providing engaging educational experiences for volunteers, etc.*

Are there any ways in which this program could be improved for you? Check all that apply.

- More community building opportunities
- Better communication
- Monitoring equipment loan program
- Easier monitoring methods
- More feedback on data impacts and uses
- Other (please specify) _____

If applicable, please explain your response to the previous question about program improvement.

Monitoring Quiz (completed by all)

The next few questions may include pictures or videos. Please use these to inform your answer from the perspective of a data collector. You may use all the SAV Watchers resources typically available to you while monitoring in the field.

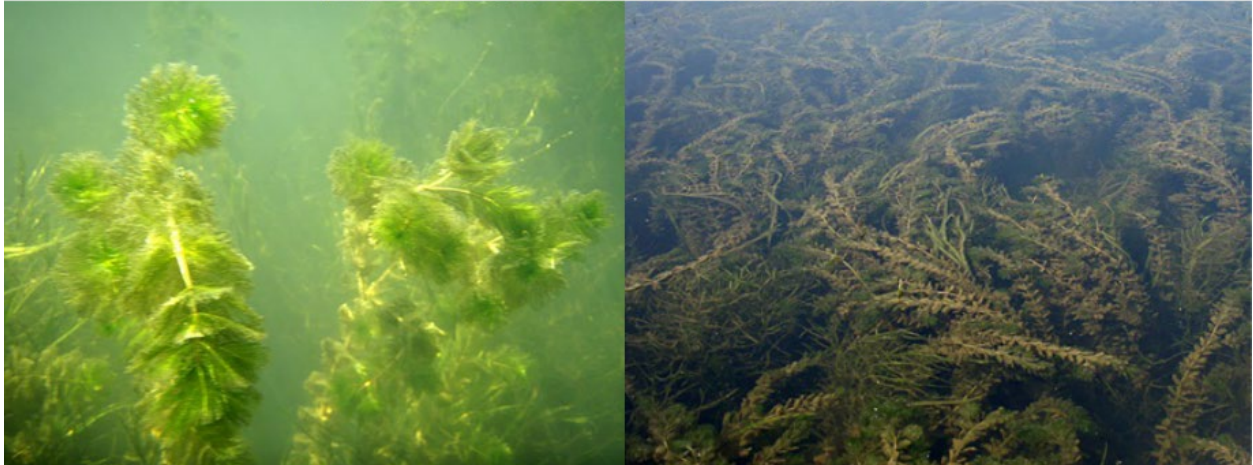
You will be presented with photos of 7 different SAV species. Please name the species for each and describe how you know (i.e. what features did you use to decide?). In other words, which species of SAV is this and how can you tell?



1)

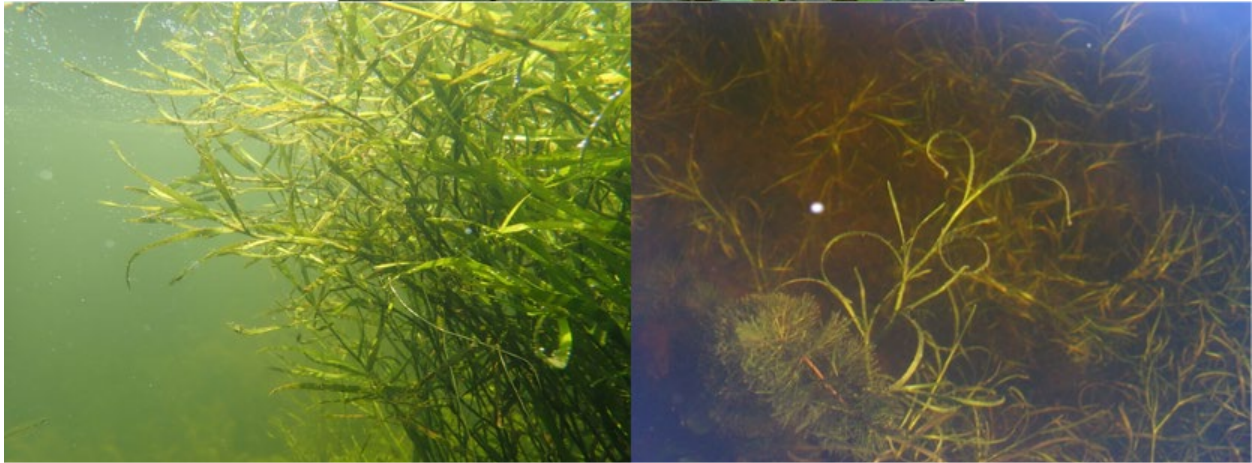
Which species of SAV is this and how can you tell?

2)



Which species of SAV is this and how can you tell?

3)



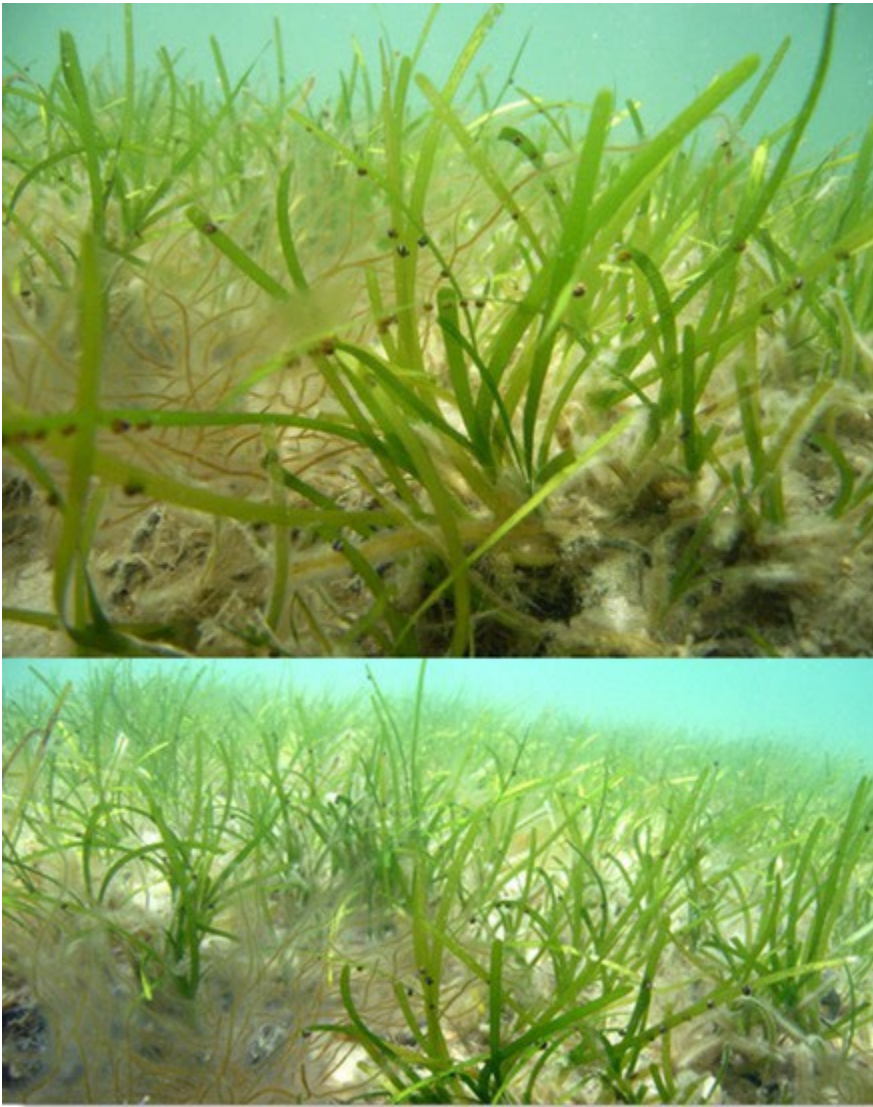
Which species of SAV is this and how can you tell?

4)



Which species of SAV is this and how can you tell?

5)



Which species of SAV is this and how can you tell?

6)



Which species of SAV is this and how can you tell?

7)



Which species of SAV is this and how can you tell?

In the next few questions, you will be presented with descriptions, pictures, and videos. As you view these, follow along and record the observations asked in the question as if you were the one collecting the data.

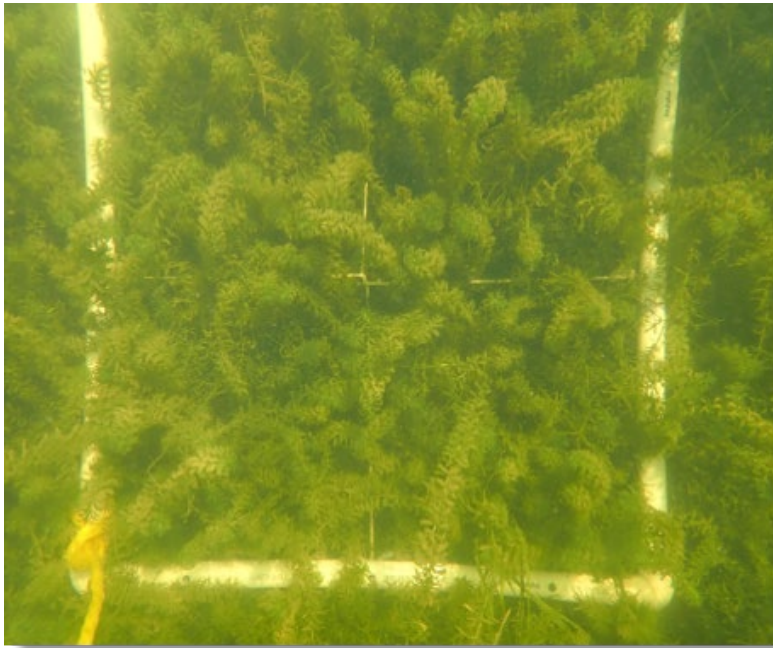


What would you call the shoreline type behind Brooke in this video?

When determining sediment type, use your kayak paddle or boat hook. If the sediment gives a little and you notice floating chunks of black woody material after you disturb it, it's probably ____.

- Mud
- Sand
- Peat
- Hard

SAV Watchers must approximate the density of SAV at their site.



What is the density in this quadrat based on the Braun-Blanquet scale given below?

- 0: Absent
- 1: < 10%
- 2: 10-<40%
- 3: 40-<70%
- 4: 70-100%



Watching the surveyor pull up the rake, what would you estimate is the total SAV density?

- 0: Absent
- 1: < 10%
- 2: 10-<40%
- 3: 40-<70%
- 4: 70-100%

Epiphytes are present on SAV in which of the following photos? Select all that apply.



Demographic Survey (optional for all)

Which of the following best describes you? Check all that apply.

- Asian or Pacific Islander
- Black or African American
- Hispanic or Latino
- Native American or Alaskan Native
- White or Caucasian
- Multiracial or Biracial
- Prefer to self-describe: _____
- Prefer not to say

What is your age range?

- 18-24 years old
- 25-34 years old
- 35-44 years old
- 45-54 years old
- 55-64 years old
- 65-74 years old
- 75-84 years old
- 85+ years old

How do you describe yourself?

- Male
- Female
- Non-binary
- Prefer to self-describe: _____
- Prefer not to say

What best describes your employment status over the last three months?

- Working full-time
- Working part-time
- Unemployed and looking for work
- A homemaker or stay-at-home parent
- Student
- Retired
- Other

Do you currently work, or have you previously worked, in the STEM (Science, Technology, Engineering, and Mathematics) field?

- Yes
- No
- Unsure

What is the highest level of education you have completed?

- Some high school or less
- High school diploma or GED
- Some college, but no degree
- Associate's or technical degree
- Bachelor's degree
- Graduate or professional degree (MA, MS, MBA, PhD, JD, MD, DDS etc.)
- Prefer not to say

Did you take any courses, or earn a degree in the STEM field?

- Yes
- No
- Unsure

Is there anything else you would like to mention about the SAV Watchers program that I have forgotten to ask? Let me know here!

Appendix B

Interview & Focus Group Questions

Program Coordinator Interview

1. What is the goal for SAV specific scientific literacy of SAV Watchers trainers and volunteers post-training?
2. What do you consider to be the most important parts of the SAV Watchers trainer event?
3. How, if at all, do trainers and volunteers struggle with understanding any of the concepts pertaining to the SAV Watchers program and protocol?
 - If so, which ones?
 - How, if at all, have you overcome those struggles?
4. From your perspective, what are some successes for the SAV Watchers program?
5. From your perspective, what could be improved in the SAV Watchers program?
6. From your perspective, what challenges are you encountering, if any, in establishing the program in VA?
7. What are some ways that these challenges can be overcome?
8. How, if at all, have the volunteers or trainers told you about any of their successes or perceived successes of the program?
9. How, if at all, have volunteers or trainers given you feedback about areas of improvement for the program?
10. How often, if at all, do trainers or volunteers reach out to you for scientific support or with science related questions?
 - If so, what are these typically related to? What are some examples of questions?
11. What else would you like to mention?

MD Volunteer Focus Group

1. How would you describe the goal of SAV Watchers to a friend?
2. Why did you decide to participate in SAV Watchers?
3. How has this initiative met your expectations?
4. Where has the program not met your expectations?
5. How would you describe what the SAV Watchers data being used for – AKA how is it being used?
6. Based on the survey, majority of volunteers want to hear more insights on data impacts and uses. If you are able, describe what that might look like for you and what frequency you would like. What metrics should be reported?
7. While thinking about data...how do feel about the new survey 123 data entry platform? What do you think about the current paper datasheet? What do you prefer?
8. What training did you receive for SAV Watchers? Describe the full process and what you had to do. Feel free to compare and relate to each other's experiences.
9. How confident did you feel about monitoring after your first training?
10. What additional resources, if any, would improve the volunteering experience for you?
11. How has your knowledge about SAV and importance changed due to your participation?
12. Do you have any last thoughts to share?

MD Trainer Focus Group

1. How did you find out about SAV Watchers and your initial training event?
2. How confident did you feel about training and leading your own volunteers for SAV Watchers? Describe your initial confidence level post-training and the process that followed leading up to you being able to train volunteers.
 - a. What steps did you take to feel more confident?

3. Describe any prior experience in leading other volunteer programs that helped you implement SAV Watchers?
4. Describe how you approached training volunteers. What did the training look like? What did you do and how has it been refined since you began?
5. What do you think of doing the classroom portion in the winter and then doing the field component in the summer?
6. What resources do you wish were available to you and would help you with your trainings?
7. How has this initiative met your expectations, if you had any?
8. Where has the program not met your expectations?
9. If you asked for assistance in starting your program, did you receive that help from the program coordinator and what did it look like?
10. How have you been able to financially support this program for your volunteers? What are the resource gaps?
11. Based on the survey, trainers and volunteers alike want to hear more insights on data impacts and uses. If you are able, describe what that might look like for you and what frequency you would like. What metrics should be reported?
12. While thinking about data...how do you handle data management?
13. What are some success from your individual programs? Brag here! What are you most proud of?

After participants are walked through draft resources and proposals:

14. What do you think of this training series?
15. Would you like a template like this to adjust for your own volunteer trainings?
16. What do you think about this breakdown for the “classroom” training on zoom?

17. What do you think of creating space and time to help trainers think about program implementation?
18. Do you have any last thoughts to share?

VA Trainer Focus Group

1. How did you find out about SAV Watchers and the training event?
2. What were your motivations for attending the SAV Watchers training event?
3. How confident do you feel about training and leading your own volunteers for SAV Watchers? Describe your initial confidence level post-training and how you feel currently.
4. How well do you see this program working for your volunteers and organization?
5. Describe your experience in training and leading volunteer programs prior to SAV Watchers, if any?
6. What challenges, if any, do you anticipate associated with the expansion of SAV Watchers into Virginia?
7. What changes, if any, would you make so that the SAV Watchers program could be successful?
8. Thinking about other volunteer programs that your organization participates in, what aspects makes those programs successful for your volunteers?
9. What specific groups or organizations can you think of or are aware of that would be interested in being part of SAV Watchers in Virginia?

After participants are walked through draft resources and proposals:

10. What do you think of this training series?
11. What do you think about this breakdown for the “classroom” training on zoom?
12. What do you think about the built-in strategy time?

13. What do you think of creating space and time to help trainers think about program implementation?

14. Do you have any last thoughts to share?

Appendix C

Training Strategy Guide



Chesapeake Bay SAV Watchers Training Strategy Development & Reflection Guide

Reflect on your experience as a student in the SAV Watchers training and begin developing your own trainers strategy. The goal of this guide is to help you be able to train your volunteers to be SAV Watchers. Answer the questions in the way that works best for you (i.e. bulleted lists, sentences, pictures, etc). These questions will be discussed at the optional SAVvy Surveyors training.

1. What has been the most beneficial part of this training for you? How can you replicate this for your volunteers?
2. What are the most important skills and concepts you want volunteers to walk away with working knowledge on?
3. How will you assess your volunteer's mastery of knowledge (i.e. formal exam, demonstration, etc)?
4. What parts of this workshop have been the most difficult for you as a student? Why?
5. How would you approach teaching these difficult concepts? Try to brainstorm at least three different methods (i.e. lecture, group discussion, hands on, self-learning, etc).
6. Think about what other components need to be considered or planned and draft them here. For example, how many days of training? How many people? What resources do you need?

Appendix D

General Evaluation Framework for Volunteer Monitoring Programs

It is suggested that you use an external auditor to help answer these questions for your own program. If this is done internally, it is encouraged to ensure that multiple people are contributing feedback for replication of data and inclusive perspectives. Ask volunteers, trainers, partners, and coordinators to all participate and provide feedback.

Growth and Development

- 1) What are the goals of this program? List all of them.
- 2) How does the program achieve these goals? Identify at least one action for each goal. There should be a clear pathway of achievement.
- 3) Why should someone get involved with this project? (i.e. informs policy, it's educational, helps the community, etc.)
 - a. Look at your goals in question 1 and means of implementing in question 2. Are the reasons you identified in question 3 clearly identified in the goals and means of implementation? *If not, consider if you need to reframe goals or adjustment means of implementation. It is important to communicate outcomes to volunteers that are achievable.*
- 4) Does the program seem enjoyable to volunteers? Are there any complaints pertaining to its enjoyability?
- 5) Do participants feel like they can be creative and explore ingenuity? Provide examples.
- 6) Have participants applied knowledge learned through this program in other ways? Provide examples.
- 7) How has the program grown since its inception? (i.e. number of volunteers, grants, geographic range, etc.)

- 8) How has the program contributed to scientific research, data, and discoveries? Provide examples.
- 9) Are the available materials and resources up to date, accessible, and effective?

Invest Further, Achieve More

- 10) What is the most challenging part of the program for participants? How do you know?
- 11) Is the program taking steps towards improving this? What are those or what should they be?
- 12) Are the volunteer/trainer workshops effective? How do you know?
- 13) Does the program attempt to provide in-person training opportunities? Why or why not?
- 14) Does the program provide post-training support? In what ways? (i.e. newsletter, refresher training, office hours, etc.)
- 15) Are there barriers to program implementation for some communities? What is lacking? (i.e. resources, interest, community champion, etc.)
- 16) Do you have funding for over a year? What is the stability of your funding? Where are the gaps?
- 17) Is there a formal pathway for program feedback? (i.e. after training, newsletters, etc.)
- 18) How is data recorded by participants? Does it work for all participants? Does it need to be updated? (i.e. mobile application, paper datasheet, etc.)
- 19) How is the data used? How does the program update participants on impacts and data uses?

Sustained Engagement

- 20) Is there a way for participants to connect? (i.e. quarterly meetings, social media, etc.)