Submerged Aquatic Vegetation (SAV) Workgroup February Meeting Minutes

February 17, 2021 9:00 am – 4:30 pm| Virtual Meeting

Attendees:

Brooke Landry* (MD DNR)	Megan Ossmann (CRC)	Beth Zinecker (Underwood & Associates)	Nancy Rybicki (USGS)
Todd Beser (DoD Army)	Cindy Johnson (VADEQ)	Ken Moore (VIMS)	Dave Riter (Baltimore County)
Elle Bassett (ShoreRivers)	Lorie Staver (UMCES)	Bill Dennison (UMCES)	JJ Orth (VIMS)
Victoria Hill* (ODU)	Zack Kelleher (ShoreRivers)	Alyson Hall* (VIMS)	Enie Hensel* (VIMS)
Erin Shields (VIMS)	Lori Brown (DE DNREC)	Greg Brennan (Spa Creek Conservancy)	Magdalene Ngeve (UMD)
Maile Neel (UMD)	Lauren Alvaro* (VIMS)	Matt Budinger (Baltimore County Public Schools)	Megan Fitzgerald (EPA)
David Wilcox* (VIMS)	Bob Murphy (TetraTech)	Cassie Gurbisz* (St. Mary's)	Erin Reilly (James River Association)
Tish Robertson (VADEQ)	Mike Bott (DE DNREC)	Charles Leasure (USACE)	Chris Guy (USFWS)
Don Weller (Smithsonian)	Kelly Somers (EPA)	Marc Hensel* (VIMS)	Stephanie Kubico (EPA)
Emi McGeady (Severn River Association)	Carl Friedrichs (VIMS/CBNERR-VA)	Mark Lewandowski (MD DNR)	Matt Pluta (ShoreRivers)
Jon Lefcheck (Bigelow Ocean Lab)	Mark Frondorf (Potomac Riverkeeper Network)	Sally Hornor (AACC)	Brittany Haywood (DNREC)
Cathy Wazniak (MD DNR)	Andy Howard (DE DNREC)	Mike Johnson (VMRC)	Jonathan Watson (NOAA)
Mike Naylor (MD DNR)	Katia Engelhardt* (UMCES AL)	David Tyler Maginnes (Maginnes Productions)	Mike Mansolino (EPA Region III)
Erica Smith (VIMS)	Christopher Patrick* (VIMS)	Peter Tango (CBP)	Rebecca Murphy (UMCES)
Michael Norman (AACC)	Matthew Robinson* (DC DOEE)	Jesse Iliff (Arundel Rivers Federation)	Jameson Brunkow (James River Association)
Dave O'Brien (NOAA)	Emily French (VIMS)	Becky Golden* (MD DNR)	Malee Jinuntuya (ODU)
Andy May (USACE)	Jerry Biehl	Carl Cerco* (USACE)	Lewis Linker (CBP)
Richard Zimmerman (ODU)	Judy O'Neil (UMCES)	Becky Swerida (MD DNR)	Stefanie Simpson* (TNC)
Theaux Le Gardeur (Gunpowder Riverkeeper)	Becky Thur (MD DNR)		

* indicates Presenter. Contact Brooke (brooke.landry@maryland.gov) for presenter's contact info if needed.

Presentation slides are posted on the CBP calendar page:
https://www.chesapeakebay.net/what/event/sav_workgroup_meeting_february_2021

The following meeting notes complement the slides and highlight discussion points – they do not summarize the slides or information given during each presentation. Please refer to the slides themselves and contact the presenter directly with questions.

Highlighted text indicates an Action Item.

SAV Workgroup updates (Brooke Landry, Md DNR)

- **2019 SAV Status, 2020 report will be out later this spring**
- SAV Monitoring Programs: SAV Watchers and SAV Sentinel Sites
- STAC Satellite Workshop
- Community Based Social Marketing Project
- SAV and Climate Change Project
- SAV Restoration Protocol and Technical Guidance Document Development
- SAV Segment Descriptions
- SAV Management Strategy and 2-Year Workplan
- ISBW14 and World Seagrass Conference 2022

Questions/comments:

- Becky S: Is the SAV Watchers program moving forward in terms of COVID?
    - Brooke: Last year, a CCC intern developed a virtual online training platform. Part of the program is a certification program to train trainers on the protocol, who can then certify their volunteers. I have all the material to offer a virtual training session but hope to do it in person in late spring/early summer.
    - Elle B: We did continue with this volunteer program this past summer and had a ton of interest. We created our own virtual training, though it was tricky to send people out without equipment, so we had to make some adjustments. Happy to be a resource if anyone has questions.
    - Dave W: This field data is really helpful while working through the imagery as well.
        - Brooke: Yes, this and other ground data are vital to ground truthing the aerial imagery.
- Ken M: Will there be an easy or more formal way for citizen SAV voucher samples to be submitted for species verification if needed? In the past volunteers have had some issues with freshwater/oligohaline species identifications. Therefore, some of the observations could not be used.

    - Brooke: One aspect of the protocol is they are supposed to take pictures of each site and species, though it is hard to get volunteers to do and to keep organized. Maybe we can talk about physical specimens with Elle's crew.
- Magdalene N: Is the certification process for SAV watchers free of charge (are all the resources provided for free/at a cost)? And do you prefer training groups versus individuals, or whatever works?
    - Brooke: Yes, all free of charge and available online. With the certification process, I typically schedule a day for a bunch of people to get together for the training.

VIMS Research Program updates (Chris Patrick and colleagues, VIMS)

1) Update on the Satellite Work (Dave Wilcox)
   Questions/Comments:
    - Brooke: You said some of the scenes were taken on days you didn't task for – so did they take them when they had a chance, was it incidental, etc.?
        - Dave: You put your request in the system, it gets processed, and then areas are acquired, and they go up on the main server. There's no traceback, so we don't actually know.
        - Brooke: Something to keep in mind is that the priority of these satellite agencies is not always earth observations, so this kind of data collection is not a priority.
        - Dave: It appears that they alternate days between commercial and government data collection.
    - Ken M: Have you seen improvements in satellites getting the outer edge?
        - Dave: An advantage of the satellite imagery is that it has better control over the spectral imagery and is calibrated in a way you can more readily analyze it.
    - Mark F: Our freshwater river system is at the western end of the Chesapeake Bay watershed (outside of the Target 14 zone) and we are confronted with heavy nuisance algae . Is it possible to direct satellite imagery further to the west and does the imagery easily differentiate between SAV and algae? We've been trying to compel VA DEQ to address algal impairment in the Shenandoah.
        - Victoria H: It is very difficult to separate SAV and algae in the satellite imagery as they are very similar spectrally. We are using machine learning to improve our classifications.
        - Brooke: This would be outside of the SAV monitoring program and federal requirements but will hopefully eventually find a way to figure this out.
    - Greg B: Is this all visible spectrum?
        - Dave: Tapping into near infrared as well.
    - Carl F: What is the difference in resolution (pixel size) between the satellite images you are using and previous aerial surveys?
        - Dave: The aerial survey we are using is 24cm, the satellite imagery is 0.4 and 0.3 pan-sharpened, which means the spectral bands are at 1.8, 1.24.

    - Brooke: A new satellite launched this year should have even higher resolution (WorldView Legion constellation, 29cm)
- Nancy R: Working to map SAV in the three reservoirs in the Susquehanna – target 17 includes the reservoirs. Can this area be more of a part of the future research you are doing? It would help with our research.
    - Dave: In our contract we have to be careful that we are staying within the guidelines of the U.S. gov needs, so we would need guidance from the Bay Program to make sure we could do that.
    - Brooke: The SAV monitoring program is federally required through a 2017amendment to the Clean Water Act, which is why we are able to get this contract to get this imagery.

2) The role of biodiversity across scales on large scale stability in delivery of ecosystem services (Chris Patrick)

   Questions/Comments:

- Magdalene N: Could you share a link to your paper, the one you referred to which was recently published? Nice presentation!
    - Erin S: Here's a VIMS news release on his paper. https://www.vims.edu/newsandevents/topstories/2021/biodiversity_regional.php
    - Chris P: here is a link to the actual paper: https://esajournals.onlinelibrary.wiley.com/doi/10.1002/fee.2297
- Ken M: What if we include algae in the mix?
    - Chris: If we broaden our definition and include algae and phytoplankton then we would get different results. If our management goal is vascular macrophytes, then these results are good.
- Carl F: How about the role of non-native species? Some of the increases in SAV in freshwater are thought to be non-native – would this be a potential benefit in the lower bay?
    - Chris: We've had a couple of non-natives like water chestnut and hydrilla and Eurasian water milfoil. In some analyses from the ground observation surveys, we've found that where hydrilla is present, it doesn't reduce diversity – acts as a foundational species that stabilizes sediment and helps other species persist. The single best predictor of species diversity in the upper bay was the presence of hydrilla – so there are definite benefits. Nancy Rybicki's work in the Potomac yielded similar results.
        - Nancy R: Brooke and I have been talking about a statement from the SAV workgroup about hydrilla – making the point that we don't treat it differently than the natives because the exotics can be pioneer species and help stabilize environments. **[Action Item: Brooke L. and Nancy R. will work together to develop an SAV Workgroup statement on the ecosystem services provided by non-native species and explain that the SAV Workgroup's position is that these are protected, non-native species…not invasives to be removed. Statement should include clarification that**

outside the Chesapeake – in lakes and ponds – Hydrilla can easily become invasive and is frequently managed and that Hydrilla should never intentionally be transported from a watershed lake/pond into the Bay.]

- Brooke: They are not invasive species, just non-native. They count toward SAV restoration goals and are protected like other SAV.
- Matt Robinson: I think what Nancy said is a good idea – may help with organizations like NPS that seek to actively remove hydrilla.

3) Baywide Analysis of Factors Driving Widgeon Grass (Marc Hensel)
   Questions/Comments:
   - Brooke: We all acknowledge that WQ drives SAV trends – but we keep calling Ruppia an unstable species. But it is responding to WQ, so why are we calling it unstable? It's the WQ that's unstable.
     - Marc: Hoping that we will be able to better predict Ruppia trends and other species.
     - JJ Orth: We're also interested in the recovery and understanding those dynamics.
   - Carl: Did you show a positive relationship between TSS and Ruppia?
     - That was correct, and we need to dive a little deeper into this result. It's possible it's being correlated with salinity.
   - It seems that the Ruppia die-offs are tracking with the Zostera die-offs, which are from the heat wave events. Is anyone doing any work on this – could ruppia be responding negatively to heat?
     - Marc: From these bay-wide analyses, temp does not show up as a predictor in the mesohaline Ruppia zone.
4) Ruppia seed-based planting experiment (Enie Hensel)
   Questions/comments: None
5) Differences between epifauna in Ruppia and Zostera (Lauren Alvaro)
   Questions/Comments:
   - Ken M: One of the other big differences is the timing of their abundance. The epifaunal communities could be there at different times. Are you thinking of reflecting this in your sampling?
     - Lauren: Right now, the sampling is taking place only in the summer but might look into sampling at more times since that does seem to be important.
6) Assessing seed quality and germination rates of Widgeon Grass (Alyson Hall)
   Questions/Comments:
   - Magdalene N: Do you know anything about how long these seeds remain viable?
     - Enie: Dr. Ailstock said 10 years, stored at 4 degrees Celsius

The role of SAV in sediment-water nutrient cycling (Carl Cerco, USACE)
Questions/Comments:

- Lewis L: Regarding the seasonal biomass – we saw the shoot biomass went to zero for Vallisneria. We may be seeing enhanced denitrification in summer and then enhanced

organic material loading to the water column in Sept/Oct. I'll amplify Cassie's call for those seasonal analyses.

- Ken M: We've taken samples over time and watched the changes in the concentrations over the SAV beds and DIN decreases, chlorophyll decreases, etc. Perhaps some of those decreases have to do with the epifauna or sediment settlements – in your model is this representative of one square meter of everything in the bed or just based on the biology of the plants?
    - Carl: The surface of the bay is divided into 11,000 cells (1 km x ½ km) and can't get smaller than that. The SAV impact is going to get averaged over that cell.
    - Cassie G: Leads into the question I was going to ask – what are the parameters and rates that you're least confident in in the model? What would be most useful to get empirical data for? **[Action Item: Brooke L. will follow up with Cassie G. and Carl C. to discuss data needs to ensure the model works appropriately.]**
    - Carl: The sediment diagenesis model is much better than the SAV model. Detailed by time, primary production would be wonderful to have (a daily time series or different times of year). The actual denitrification measures would be good for comparison.
    - Carl: We still include the interaction of SAV and sediments and effectively we enhance settling and the presence of SAV, but again we have this resolution issue, where it's all averaged over one kilometer by half a kilometer. So, if you had an SAV bed that occupies half a model cell, that settling impact is going to be averaged over that entire cell.
- Dick Z: It seems to me that what you're showing is that SAV is behaving like most other herbaceous plants- they're extracting nutrients from the water column and from the sediment and turning it into biomass and, in this case the biomass is getting exported out and so those nutrients are being recycled and I think that's probably very characteristic of how all these SAV are going to be performing. Other than the root biomass in the ground, there's no way to bury large quantities of the nitrogen they are taking up – they are recycling and reprocessing and pushing it back out.
    - Carl: I think the model is behaving reasonably, but was hoping for feedback from the group – does this seem realistic? We need to discuss the impact, especially in terms of management significance.
- Dick Z: In the denitrification component of the model, are you considering oxygen or are you just assuming that it's all anaerobic?
    - Carl: Not assuming it's all anaerobic. We haven't discussed the sediment diegensis model, where the sediment is divided into the aerobic and anaerobic layers. In this model independent of SAV, that's how the primary denitrification occurs.
    - Dick: What I was thinking about is the fact that there are anaerobic pathways and there are also aerobic facilitated pathways and, given the fact that the roots may be releasing oxygen below ground, that may provide you with an alternative pathway for denitrification if you're not including it in the model already. You might consider

trying pumping somewhere between 5 and 10% of the photosynthetically produced oxygen during the daytime and see if you can enhance aerobic under those circumstances and you might increase your potential to remove nitrogen.
    - Ken M: The model is showing that bare sediments are performing better than SAV, yet you expect that to be at least equal. Need to think more about that – suggests that SAV has no real role but doesn't fit in what we are seeing happening.
    - Dick: A lot of it depends on how you average the results – for bare sediments there is not a lot of biomass exchange, but SAV is producing new leaves and exporting them, which contributes to repopulating the water column with nitrogen. Bare sediment system is probably more closed.
- Lewis L: Wanted to ask about above and below ground biomass of SAV during the growing season- at the end of the season when plants die off, is there any strategy in plants to move from the above ground to the below ground and store carbon and nutrients in the below ground?
    - Dick: Yes, all deciduous trees do that, it's the natural cycle. There's evidence in the seagrasses as well – if they have a good summer, you can see that the rhizomes are fatter and higher in sugar in the fall and you get better initial growth in the spring. They rely on the below ground reserves.
    - Lewis: So do we have that in the simulation?
    - Carl: We have piece-wise functions that dictate the transfer of root to shoot throughout the annual cycle. But not sure if specific storing material in autumn is in the model.

Blue Carbon Market Opportunities and Lessons Learned from VA Seagrass Project (Stefanie Simpson, TNC)

Questions/Comments:

- Brooke: Do we need to establish the fact that we are going to sell carbon credits before we begin the restoration work?
    - Stefanie: We can go back within the past 5 years and establish a project start date.
- Brooke: Who are you selling the credits to?
    - Stefanie: We have several corporations that have reached out about wanting to buy. Still working out all the legal agreements with the state, who may decide to keep the credits.
- Dick Z: Do you sell the credits on a rotating annual basis or is it a one-time purchase? How do you deal with the fact that these are dynamic systems (in the event of a hurricane for example, what happens to the credits)?
    - Stefanie: We have a verification event to generate the credits at least every 5 years to prove their carbon benefits. They must be good for at least 100 years, based on a risk assessment. This allows us to come up with a buffer of credits to account for storms, invasive species, etc. So, if a storm does come through, we have credits that are still

good set aside to offset that loss. Sea level rise is also incorporated in this in terms of how resilient a site is.

- Dave O: How does the blue carbon market compare with more traditional in-kind mitigation credits? The scale of the sales and the financial aspects, etc.
    - Stefanie: Projects are only eligible if they are not mitigation projects.
- Ken M: What is the nonprofit partnership here when it's often federal money?
    - Depends on the project, but the VA project is state-owned, but managed by TNC and VIMS. The state DEQ will own the revenue, which can only be used for project monitoring and management.
- Alyson H: Reminded me of the need for commercial production of seeds for large-scale restoration. Do you see blue carbon always using local infrastructure and organizations like the VA project, or do you think it will need to be taken to a commercial scale?
    - Stefanie: Need to do a lot more pilot projects to determine how we can scale. For the time being, will still likely be at the local level.
- Becky S: One big problem is not enough funding for monitoring – we often talk about how to enter this carbon market world. Could some of the funding that would be available through the credit sales be available for monitoring by the partners?
    - Stefanie: Yes, the concept of this money being used to support monitoring is why we think it's so beneficial. It's useful to include a verification in the upfront project cost.
- Brooke: A lot of what we do in the CB is more passive restoration through WQ improvements? Is that type of restoration available for credits?
    - Stefanie: Improved WQ is an eligible activity, so theoretically yes, but the challenge will be demonstrating the science that shows how the improvements lead to the SAV recovery. Published values can be used in the methodology.
- Brooke: Lefcheck et al. 2018 established that management actions in the CB to reduce nutrient loading was responsible for long-term SAV recover. Would that suffice?
    - Stefanie: Theoretically, yes.

Brooke: A lot of the plants we have are freshwater and not as much is known about their carbon sequestration potential. What kind of data would you say we need to demonstrate their eligibility?

- Stefanie: A big part of the carbon storage is in the sediment accumulation – I would suggest prioritizing this for research.

- Jerry B: Can Stefanie give more information regarding SAV sediment accumulation as an offset to rising sea levels? Specifically, where is the data regarding the work done in VA?
    - Stefanie: That's outside of my knowledge but that would be an interesting study.
    - Brooke: I think there's some data showing the difference between systems based on the leaf structure and rhizome systems. We can hopefully find the data, but more research may be necessary. **[Action Item: Brooke L. will follow up with Jerry to provide more information about sediment accumulation rates.]**
    - Becky S: Similar situation with wetland marshes and tidal – less information about freshwater wetlands and sediment accumulation. Similar data need for wetlands?

    - Stefanie: Yes, that's a big data need as well, we are also trying to focus on these projects.
- Matt R: I'd be really interested in having a discussion at a future meeting, or through another venue, about potential C sequestration impacts from freshwater SAV and wetland restoration if anyone is interested. **[Action Item: Brooke L. will follow up with Matt R. to discuss data needs re: fresh and brackish SAV community C sequestration potential.]**

Shallow Water Use Conflicts (Brooke Landry, Md DNR)

Questions/Comments:

- Brooke: The question that I want to talk to everybody about today is how do we assess habitat trade-offs and make these decisions to support projects and how can we do it better?
- Dave O: I would support another SAV WG discussion of this issue, as well as a STAC workshop. We're only going to see more of these conflicts, many of them living shorelines. Right now, we don't really have a way to make those habitat trade-offs.
- Becky S: I just reviewed a funding application for a portion of this project. In general, I've been trying to understand the specific impacts of different types of living shorelines. There's been innovation in different types of living shorelines with different materials, and I've been trying to establish how to monitor the long-term impacts of these projects such as presence of SAV and elevation vegetation. I would like to know from you any specifics about the design that could make it friendlier to SAV and what info about living shorelines design would the group be interested in knowing more about?
    - Brooke: Hard to identify the impacts of a living shoreline on SAV because they are often so small. The SAV at the site typically follows what the SAV is doing in the rest of the system (Lori Staver and Cindy Palinkas, UMCES, are working on this and that is their general result to date). Also, not a lot of pre-construction monitoring at these sites. This site has done a lot of pre-construction monitoring which could inform the impact on the area.
    - Brooke: Not sure about woody debris. Phase I is already complete and looks great, very natural looking, and SAV has recruited naturally in the area. This influenced my decision to support the project.
- Ken M: VA has a straightforward policy – those guidelines require the minimum encroachment necessary to complete the project, and if there is encroachment then there's a $2 per square foot fee. There needs to be assessment ahead of time to determine the impacts. Suggest guidelines for these types of projects.
- Mike N: When I first started with SAV WG in 1994, the first thing we wrestled with was how to protect SAV from disruption. Resulted in a document on protecting SAV in the Chesapeake Bay from disruption. Didn't differentiate between disruptions, just said to avoid or minimize. So, there is published guidance from the Bay Program to address this exact issue.

- JJ O: The biggest issue is the massive anthropogenic influx of nutrients and sediment. We will probably lose eelgrass no matter how much restoration we do if we don't deal with the climate impacts.
- Ken M: Every square inch of SAV is being counted towards meeting the Bay WQ goals, which is more valuable than living shorelines.
    - JJ: We have reached our restoration goal in very few of the segments.
    - Brooke: That is one parameter to consider when making these decisions – how close is a segment to reaching its goal?
- Dave: Mitigation costs are now on the order of $25 a square foot, just to give an update.
- Matt R: It's very hard to find tidal freshwater living shoreline examples. This is timely because we are about to embark on a multi-year planning project for tidal restoration in the Anacostia – SAV, living shoreline, etc. There is some science about this in the region that is siloed – for SAV beds that are pre-existing, they return pretty quickly after a living shoreline is established. Fisheries GIT has established thresholds for hardened shorelines on species. Can we compile all this science and come up with a rating system depending on how it impacts individual goals (SAV, fisheries, WQ, etc.)?
    - Brooke: Yes, we need to talk about the trade-offs and accept that there will be trade-offs in any situation. When these conflicts arise how do we weigh one goal over the other?
    - Dave O: Matt, how does SAV recover if it's been buried by structures and channelward fill?
        - Matt R: I believe it has to do with new sediment accreting over time and if there is SAV in the vicinity so that it recolonizes the area. The reduction in deflection by replacing hardened structure is believed to help with accretion of appropriate sediment and reduction of energy effects (scouring) on nearshore SAV trying to return. Does that make sense?
- Mike J: I review joint project applications for shoreline projects, piers, etc. I see quite a few living shorelines projects with SAV in the area. We do have an unwritten policy where we try to avoid impacts to SAV, or at least minimize or mitigate for any impact. We do have new guidelines as a result of new VA code passed last year, making living shorelines the required method for people to protect their property whenever science says it's feasible, so this group will definitely have a lot to talk about in the future.
    - Brooke: That's similar to how it works here in MD too.
- Becky S: Does this group think it is valuable to look at individual design types when making these decisions? I ask because I have an opportunity to get some of this before and after monitoring data on a piecemeal basis, and am working to create a public database with that information, but want to know if it's even an area of interest. Do we want this individual monitoring data as different types of projects go in? What's most useful?
    - Brooke: All the data would be incredibly helpful. Knowing the different impacts among differently types of living shorelines would be useful.

    - Becky S: Hearing a need for freshwater examples and variation in size and scope of projects.
    - Becky G: Would be helpful to include project performance – are these shoreline projects doing what they are supposed to be doing?
    - Becky S: I'm plotting to try to plan a living shorelines summit which could be a venue for discussion.
- Bob M: Evamaria Koch looked at the effects of shoreline modification on SAV several years ago. It would be worthwhile to revisit her work.
    - Becky S: I was Eva's graduate student and am trying to do just that. I would love to talk about collaboration opportunities Bob. **[Action Item: Becky S. will follow up with Bob M. about collaboration opportunities.]**
    - Bob: One of Eva's presentations (hosted on DNR website): https://dnr.maryland.gov/ccs/Documents/training/koch.pdf
- Mike N: Can SAV seed restoration be added to the project, with the goal to come in and seed in front of the living shoreline after the project is done?
    - Brooke: I've been talking to the living shoreline people at DNR about incorporating SAV seeding into living shoreline projects. A lot more experimentation needs to be done. I've been generally recommending seeding after the project settles, maybe a year or so afterwards.
- Brooke: One of the other things that led me to think that this living shoreline design is better than what's happening now - a lot of times when there is an SAV impact involved in one of these permit applications or construction applications, the Corps recommends a bulkhead or riprap revetment. That doesn't seem to me like the best long-term solution – we need migration corridors for these SAV species.
    - Mike N: Hard to generalize about the Army Corps as there is a completely different office in MD vs. VA The two have very different interpretations of their own regs.
    - Becky S: The standard that I've heard is to replace a bulkhead if it is less than 85% degraded.
    - Matt R: But there is a nationwide policy from USACE governing the installation for LSs
    - Becky S: Otherwise in MD you have to 'prove' that a living shoreline will not work well in order to do a bulkhead or revetment etc. (which is easy to do)
- Megan F: For locations that are bounded on the upland side with non-natural infrastructure (parking lots), I'm wondering how SLR is considered for LS impacts to SAV. If there is nowhere for the natural habitats to migrate to.
    - Brooke: I've been asking this question for a while. Years ago, there was a NOAA-funded project that looked at the effect of hardened shorelines on SAV and other things. A next step is a GIS exercise to take shoreline layers and combine them SLR projections and land use data to figure out where SAV is going to be able to migrate in the future. Hoping that some questions will be answered during the SAV and climate change project we have coming up.
- Matt R: PPT on Cindy Palinkas' work: https://cbtrust.org/wp-content/uploads/Cindy.pdf

- Matt R: What can we do today to keep this conversation going? Another meeting in the future?
    - Brooke: Let's get a list of folks who are interested in further conversation:
        - Matt Robinson
        - Dave O'Brien
        - Becky Golden
        - Megan Fitzgerald
        - Bob Murphy
        - Beth Zinecker
        - Erin Reilly
        - Becky Swerida
        - Jonathon Watson
        - Mike Johnson
        - Katia Englehart
        - Nancy Rybicki
        - John Watson
        - Todd Beser
        - Ken Moore
        - Emily French
        - Angie Sowers
- Andy M: Prior to my time with the Baltimore district, I was also the state of Maryland tidal wetlands division chief and responsible for implementation of the living shoreline act within the state of Maryland and I will say, on behalf of the Corp and also, from my perspective, as a state wetlands regulator, the core often faces challenges with comments that it gets from the National Marine Fisheries Service with regards to living shorelines. I think it's a challenge of balancing the habitat trade-offs at the state level and within the USACE. We have a required consultation process that we must abide by that sometimes gets us pushback.
- Jonathon W: National Marine Fisheries Service must advocate on behalf of our resources. LS can often involve shallow water fill- we advocate for avoidance and minimization to the extent practicable. Understand that the Corp must balance our concerns with others. Definitely warrants further discussion.
- Brooke: If you raised your hand that you're willing to continue in this conversation that's great, so I will email all of you all and we'll start a conversation on how to move this forward at another SAV meeting. **[Action Item: Brooke L. will develop clear objectives and schedule a follow-up meeting with those listed above as interested participants in further discussions.]**
- Rochelle Seitz and friends work on shoreline hardening threshold effects on fish: https://www.chesapeakebay.net/documents/Threshold_effects_of_altered_shorelines_and_other_stressors_on_forage_species_in_Chesapeake_Bay.pdf

- **Member research updates and highlights**

  1) SAV/Aquaculture interactions (Cassie Gurbisz, SMCM)

  Questions/Comments:

- Brooke: So at the CBL pier, is there enough SAV there that's stable?
    - Cassie: There aren't many leases with SAV growing in the leases because of the regulations. It wasn't to find easy access sites with SAV, with leases, etc. We designed the study to look at a bunch of variables that are related to SAV habitat and the extent to which they are different in the control vs. impact areas and comparing those to the SAV habitat thresholds.
- Dave W: Are the lease areas fully used?
    - Cassie: In MD it's use it or lose it, not like Virginia.
- Mike N: 25% of the lease needs to be planted annually in MD and 100% of the lease needs to be used over time unless a special exception is made
- Greg B: Do you think that fear of SAV growing in a lease would make people destroy it if it's getting too close?
    - Cassie: I haven't heard anything like that, but it's not unreasonable.
- Mike N: In order to get the army corps of engineers to agree to have a regional general permit for aquaculture in Maryland, the state of Maryland agreed to put in a prohibition for establishing leases on SAV.
- JJ: Does MD DNR have any prohibitions on size?
    - Mike N: No prohibitions on size, but you do have to plant 25% of your lease every year and a requirement to eventually use 100% of your lease.
- Ken M: Originally the idea that oyster aquaculture improved WQ for seagrass, but a lot of work shows that it doesn't – seagrass varied the same in areas with and without aquaculture. I can get you that background info if that would be helpful. Anecdotally, the growers liked having eelgrass because it blocked a lot of the sediment that would bury the shellfish.
- Erin S: Wanted to mention that the National Shellfisheries Association annual meeting is having a special session on bivalve SAV interactions – March 23rd, virtual, we will be presenting our work https://www.shellfish.org/annual-meeting

2) Maryland SB350 – Aquatic Plant Aquaculture Lease proposal (Becky Golden, Md DNR)
   Questions/Comments:
    - Link to bill: http://mgaleg.maryland.gov/2021RS/bills/sb/sb0350T.pdf
    - Elle B: You mentioned that a new lease can't go in an existing SAV protection zone area – but what about areas already suffering from macroalgae? Can we use this as a lease area?
        - Becky G: Yes, I think that would be fine.
3) SAV Restoration in the Anacostia River (Matt Robinson, DC DOEE and Katia Englehart, UMCES AL)
   Questions/Comments:
    - Here's a story map on recent SAV restoration success in the Anacostia: https://storymaps.arcgis.com/stories/a8db9238e4e549beaa9e0b23d612f118
    - JJ: Do you intend to leave the cages up for a while to help provide propagules?

    - Matt: Yes, the cages will stay up indefinitely. Most of what we see is hydrilla. We haven't quantified how much succession we've seen; it's been mostly a qualitative assessment.
- Ken M: Have you noticed any plasticity?
    - Katia: In greenhouse experiments, I've been finding that they respond to the same conditions but have different morphologies. I think there's also a genetic component. Need to do more research in order to separate those two. We see long distance dispersal in the Potomac – some of these genotypes are the longest clones in the world. We also see genetic structure in the Hudson River.
- Becky S: Want to try to plant Val to battle hydrilla at the Otter Point Creek CBNERR site near the Bush river? Just offering up a nice site that I can monitor for you! **[Action Item: Brooke L. will follow up with Becky S. to discuss SAV restoration options for OPC.]**
- Jonathon W: Thanks Matt and Katia! Good to be aware of mitigation options in the Potomac/Anacostia. I will keep it in mind if/when compensatory mitigation options are recommended in this area in the future.
- Dave O: What techniques were used to identify the different genotypes?
    - Katia: Microsatellites mostly.
- Brooke: Have you ever gotten genetic material of Val from Deep Creek Lake?
    - Katia: No
    - Brooke: It would be interesting to see the difference between that and the Chesapeake Bay – I'll get you some samples. **[Action Item: Brooke L. will work with Julie B. to get Vallisneria samples from DCL for Katia.]**
- Brooke: A couple of years ago Katia and Maile wrote a chapter for our third technical synthesis on this very topic on restoring grasses in the Chesapeake Bay and it's an absolutely brilliant chapter summarizing this type of information. If anybody would like a copy, I am happy to send it to you.

4) Automated detection of SAV from satellite imagery using Artificial Intelligence (Victoria Hill, ODU)

Questions/Comments:

- Brooke: What's the resolution on the planet imagery?
    - Victoria: A 3m x 3m pixel
- David W: Have you been able to repeat some of the field work to verify the leaf area index in the Bay?
    - Victoria: We haven't been to South Bay since 2019, hoping to get out this spring/summer. A few years ago, we collected rhizomes and have a good idea of leaf to root biomass.
- Ken M: Did you ever analyze the bathymetry?
    - Victoria: It does get deeper off the edge of the bed, which makes it harder to see. I hope with more frequent imagery we'll be able to merge images

together to get a clearer picture of those hard to see areas. The two issues are how low the tide must be and the turbidity, and those two are hard to tease apart if you don't have the data.
    - Dave W: What sort of bathymetry do you have?
    - Dick Z: It's 3-meter produced by the NOAA coastal folks. It's bathy-topo LIDAR.
    - Dave W: There's an attempt to put that together for the Bay – problem is breaks where data is not available.

Workgroup business

- Brooke: Hoping to change our meeting structure to more of a quarterly format to encourage us to meet more frequently and take the burden off having just one day.
- Proposing February (half day), May (2-hour update), August (field trip day), and November (2-hour meeting).

Adjourn