Joint Wetland Workgroup and Climate Resiliency Workgroup Meeting

December 13-14, 2021

December 13th 1:30 – 4:00 pm | December 14th 2 – 4:30 pm

Day 1 Meeting Materials
Day 2 Meeting Materials

This meeting was recorded for internal use to ensure the accuracy of meeting notes

---

Action Items

- Send the Wetlands Factsheet for Virginia to Laura McKay, Ben McFarlane, KC Filippino, and Rachel Peabody.
- Follow up with BeKura Shabazz (firstallianceconsulting@gmail.com) with the VIMS living shorelines StoryMap once it is complete.
- Rachel Felver follows up with Kevin Du Bois on the definition used for living shorelines in the first phase of that Communications and Guidance on Shoreline Protection Options for Coastal Landowners project.
- Add Amanda Poskaitis to the Wetland Workgroup and mailing list (poskaitisa@nwf.org).
- Share information from the percent hardened shoreline layer with the Modeling Workgroup as they prepare for Phase 7 and the Integrated Trends Analysis Team to build shoreline condition into summaries.
- Continued coordination between Wetlands and Climate Resiliency workgroups on tidal marsh restoration planning efforts – several workshops planned for 2022.

Two-Day Cross-Workgroup Meeting Goals

- Exchange information on living shoreline projects involving threshold setting, targeting criteria, and social behavior.
- Discuss projects in the context of potential application to assist with assessing shoreline vulnerability, resilience, and promoting restoration action.

Monday, December 13th

1:30 pm **Welcome and Introductions**

Mark Bennett (USGS), Climate Resiliency Workgroup Chair

Julie Reichert-Nguyen (NOAA), Climate Resiliency Workgroup Coordinator

Summary

Julie Reichert-Nguyen shared that the major goals of the meeting are information exchange of the work that is happening, especially overlapping interests of Wetlands Workgroup (WWG) and Climate Resiliency Workgroup (CRWG) surrounding living shorelines, nature-based projects, and coastal resiliency. Julie then introduced the new CRWG Staffer, Jamileh Soueidan.

1:40 pm **Increasing use of Living shorelines and natural and nature-based features to build coastal resilience**

Pam Mason (VIMS), Wetland Workgroup Co-chair

Community resilience to storm-driven coastal flooding is improved with the presence of natural and nature-based features (NNBFs) such as living shorelines, wetlands, wooded areas, and beaches. They can provide multiple benefits for a local community, including mitigating the impacts of storm surge and sea-level rise and allowing communities to take advantage of programmatic incentive programs like FEMA's Community Rating System and nutrient reduction crediting. VIMS Center for Coastal Resources Management (CCRM) has developed a geospatial protocol and NNBF ranking methodology with the goal of incentivizing the protection and creation of NNBFs by highlighting the multiple benefits these features can provide, identifying target areas where new or restored NNBFs would benefit buildings, including critical infrastructure, that lack in benefits from existing NNBFs.

Summary

Pam Mason explained that work has focused on trying to increase the use of natural and nature-based features (NNBFs) as a component of coastal community resilience. The goals of this project has been to map existing NNBFs at less than 10 ft elevation, identify and rank existing NNBFs, and identify target areas for new NNBFs. The study area entails coastal VA lands at less than 10 ft in elevation and represents vulnerable areas to tidal flooding. The project identified ~350,000 mapped landscape-based NNBFs in study area. The study also linked NNBFs with buildings that they benefit by mapping inundation pathways (IPs). The project used IPs to find NNBFs that lie between the shoreline and building and in the path of rising water. IPs can also determine how many buildings each NNBF benefits. NNBFs are rank based on four criteria: flooding mitigation services, the number of buildings it benefits, critical community facilities, and existing programmatic incentives. Each of these four criteria are assigned scores of low, medium, or high. Incentive programs include FEMA Community Rating

System (CRS) and TMDL credit and this work added maps to the Adapt VA platform.

This work also identified areas that lack NNBFs and determined target areas to create or restore shoreline NNBFs that would benefit coastal buildings. Suitable areas for living shorelines were identified and ranked, then these two categories were overlayed to identify areas without NNBFs that would be suitable for a living shoreline. There are fact sheets available to learn more about each NNBF, which include descriptions, benefits, and restoration tips. Some next steps for this effort includes working with localities to refine messaging and communicate and to build on the current project with sea level rise projections, co-benefits, offshore NNBFs, and incorporate other new information.

Discussion

Nicole Carlozo commented that it seems like this would be a good next step of Maryland's Coastal Resiliency Assessment. Did the project team do any thinking about wave attenuation benefits of features on islands or peninsulas to nearby parcels which may not follow those lowest elevation inundation pathways? Pam responded that they did discuss this in their IP work and advanced four years ago but took a lot of time. Pam commented they would have had to use a different approach for offshore features so they have not done this work yet.

BeKura Shabazz asked what kind of programs can this data bring to our communities to help them get more involved in this work? Pam responded that there is another project at VIMS putting together a story map about living shorelines that will include opportunities for people to get involved. Pam offered to share it when it is complete (BeKura's email: firstallianceconsulting@gmail.com). Pam added that they also work a lot with social scientists in trying to engage communities. An example is working with local government in Newport News on some of these projects.

In chat box, A.K. Leight asked do you have any early evidence that this resource is being considered/used by practitioners? There was no response to this question.

2:10 pm **Communications and Guidance on Shoreline Protection Options for Coastal Landowners**

Gina Hunt (MD DNR)

This is a behavior-based approach (community-based social marketing) to increase the adoption of living shorelines or keep existing shorelines natural, among property owners along the Chesapeake Bay and its tributaries. The research results of a previous study to identify adoption barriers were used to design outreach strategies and materials to encourage shoreline property owners to keep a natural shoreline or install a living shoreline. The outreach materials were created to educate property owners as well as assist

organizations with planning and implementing outreach. The project will be complete next month and include toolkits for each jurisdiction. The presentation provided an overview of the implementation plan for the outreach materials.

Summary

This climate resiliency project, *Social Marketing to Improve Shoreline Management*, has focused on the development of a community-based social marketing (CBSM) strategy that would encourage shoreline property owners to adopt environmentally sensitive practices in relation to shorelines. The study involved the identification of 11 behaviors to improve shoreline management, a survey of shoreline management experts, and a survey of shoreline property owners.

Phase II has focused on the development of communications products and deliverables based on the recommendations of the Implementation and Evaluation Plan. The primary audience has been shoreline property owners along the Chesapeake Bay and tidal tributaries. Two behaviors have been the focus: keeping a natural shoreline and installing a living shoreline. The implementation plan includes outreach guidance packaged as a set of tools and while it is not fully completed, it will be within a few weeks. The plan also includes social science tools in addition to outreach materials, such as commitments, social diffusion, and testimonials. Other materials produced are state-specific toolkits that include several resources for the person conducting the outreach and a new website being developed for Chesapeake Bay Program about behavior change campaigns that will house these materials.

Discussion

Denise Clearwater asked are shoreline deliverables in draft form to allow for additional edits? Rachel Felver responded that yes, they can still take edits to the materials if you have any. Gina Hunt added that all the materials except for the video will be editable.

Kevin Du Bois commented that it would be great if civic leagues or other neighborhood publications would publish lists of those who have made the commitment. Rachel Felver agreed with Kevin's idea commenting that they are only thinking through the next step, which is a pilot, but she will make sure to keep that in mind when they get to that point! Kevin recommended that they also make a ribbon to be added to other NGO flags that a homeowner might already be displaying.

Rachel Felver commented that they may be starting with a pilot project before all the materials will be available, but they can keep everyone updated on this project as they progress.

Julie Reichert-Nguyen commented it would be great to collaborate with the work that Pam Mason presented on targeting areas for living shorelines.

Kristin Saunders commented that the water keepers would be a good place to distribute these materials and this information. Additionally, she recommended that this information be shared with folks organizing the wetland-related workshops on outcome attainability.

Kevin Du Bois asked how did you vet the contractors? What is your definition of a living shoreline? Gina Hunt responded that the contractor list mostly came from the states, but she would have to go back and check. All the contractors have worked with state agencies on other living shoreline projects. They need to address how we're going to keep this list updated. There is not definition of a living shoreline in the materials and the picture referenced came from the steering committee members so she's unsure where it came from. Rachel Felver added that they do define living shorelines in phase one of this project and she can follow up with that information. Kevin Du Bois recommended that any wetland restoration that includes or is backed by a structure that will prevent marsh migration and lead to drowning with sea level rise not be considered a "living shoreline."

Denise Clearwater strongly recommended not releasing the documents to the general public until they can be reviewed by regulatory agencies. Rachel Felver responded that they had representatives from MD, VA and DE regulatory agencies on their steering committee that approved the materials.

2:40 pm **Mapping percentage of hardened shoreline in MD and VA**

Justin Shapiro (CRC), Fisheries GIT Staffer

Building off results from a GIT-funded study establishing a connection between shoreline hardening and living resources decline, the Fish Habitat Action Team, in conjunction with the Bay Program's GIS team, created mapping layers highlighting hardened shoreline percentages for Virginia and parts of Maryland. These layers utilize inventory data obtained from VIMS. With mapping products in hand, the Forage and Fish Habitat Action Teams are looking for opportunities to present these results to a local planning audience and plan to explore avenues for potential indicator development.

Summary

Previous studies that served as the background for these data layers were the 2015 NOAA/SERC study and the VIMS GIT-funded study. The current status are that all the Virginia layers are complete four Maryland counties are complete and four more counties are being inventoried with a goal of 2022 for completion.

The next steps for the project are providing support for NOAA's 2021 State of the Ecosystem Report and other simple calculations. The data will be used to help develop Fish Habitat and Forage Indicators. The audience is local planners and groups focused on living shorelines that could utilize these layers in funding Request for Proposals (RFPs) or guide restoration projects.

Discussion

Kevin Du Bois commented that in some cities, bulkheads were installed where they aren't necessary but because they were the common process. It would be interesting to combine all these projects and use the data to determine areas that need living shorelines or have failing bulkheads and use social marketing materials to get more living shorelines implemented.

Pam Mason commented she likes to use the term retrofit and that they can use Shoreline Management Model (SMM) for structural replacement where the conditions are otherwise good and can identify for a living shoreline. Kevin Du Bois commented that a lot of shoreline landowners are also recreational anglers and if they knew the role of living shorelines in forage fish and fish habitat, it might help to persuade a homeowner to retrofit. Gina Hunt responded that there's only a few forage species where you can show that impact. Gina said they struggled with the messaging when putting together the behavior change materials because they wanted to be accurate but not too scientific. In the end they took the statement out but left the implication of the connection.

Peter Tango commented that linking the shoreline hardening layer to riparian zone characterization (500m and 1000m) would extend the valuation of shoreline condition with near-landscape condition as targets of more or less high integrity to fish, birds, mammals.

Donna Marie Bilkovic commented that they have a new project with NOAA CBP to valuate living shorelines for coastal communities and will survey recreational fishers to better understand the perceptions and value to this audience.

Rachael Peabody commented that In South Hampton Roads, Virginia, they have nonprofits that are good at obtaining grants and installing living shorelines and working with homeowners. It would be good to work with these organizations and provide this information to help them obtain money to do more difficult restoration projects. Kevin Du Bois agreed with this idea and said that since cost is always a factor, bringing money to the table to get a unique bulkhead removal/retrofit story would be well worth it.

Gina Hunt commented that they plan to reach out to nonprofits for our behavior change materials and that it would be great to follow up and discuss potential areas/organizations for a pilot project. Rachael Peabody suggested the Southern James River as a great place to start. Amanda Poskaitis offered to help disseminate through NWF (poskaitisa@nwf.org). Justin Shapiro commented this might be a good topic at the next fish habitat meeting.

3:10 pm **Discussion**

- *How can the information from these projects assist with forecasting vulnerability and informing climate resilience decision-making for restoration activities?*

- *What opportunities are there to build this information into a resilience indicator? What would that indicator look like?*
- *Are there any science needs from what we heard today that we should include in the STAR science needs database?*

Chris Spaur commented that he is concerned that many of these places are very vulnerable and that the benefit of restoration is negligible. Chris asked how do we provide a consideration of magnitude of benefits for the work that is going on? Pam Mason responded that there are efforts to provide magnitude – flood water levels is one element, energy and erosion as well. Pam said she thinks there have been some conversations about how much tidal marsh can add, as well as several papers that look at the value of marshes in SLR and storms. Chris replied that he is more concerned that we are overselling the benefits for our own long-term detriment. Pam responded that she shares some of the same concerns. The project we did also focuses on preventing development for CRS credits. Scope and scale are part of the answer. I think people are working on this and we will have more information. Nicole Carlozo commented she thinks this point relates to how we communicate and the need to make sure that we communicate that NNBFs are only one piece of the puzzle. A.K. Leight added that they wonder if this also gets at communicating the 'endurance' of shoreline structures as unfortunately, no structure remains forever.

Breck Sullivan asked does the modeling team know about the shoreline hardening data, and do you think it could help with their tributary modeling? Justin Shapiro responded that he is not sure if they are aware, as they have been meaning to set up a meeting with them soon. Breck replied that now would be a great time since they are planning Phase 7 of the model. Breck added that this can also be brought back to Integrated Trends and Analysis Team as they have tributary reports that highlight changes, so characteristics of the shoreline might be something we want to include in those summaries.

Julie Reichert-Nguyen commented that some of the new infrastructure money will be used for nature-based projects like tidal wetland restoration and living shorelines. It would be beneficial if we had some idea of how we want to target these resources. Chris Spaur replied that many of these systems may depend on engineering and will not be self-sustaining. Chris asked how do we factor SLR into this targeting? Chris thinks we should not specify tidal vs. nontidal to maximize restoration of all wetlands. Pam Mason replied that this has been a big part of the conversation – often nontidal wetlands are adjacent to tidal wetlands. Projects designed to be sustainable over time need to allow for tidal wetlands and nontidal wetlands to convert or move back in the landscape. Regardless of where you focus the restoration, we need to have a more wholistic view of restoration to satisfy the Bay Program goals and the jurisdiction goals. Kevin Du Bois commented that Wetlands Watch is forming a coastal retreat working group to try to define where and how this could potentially happen. Kevin asked if this ever leads to a list of retreat areas, how could it dovetail with where ecological restoration could occur? What opportunities do we have for collaboration? Carin Bisland responded that it is probably pretty apparent to everyone but the catch-22 is really that we need to have tidal wetlands to help with resilience to climate change while climate change is

impacting our ability to restore and protect them. Kevin agreed with Carin, stating Tidal wetlands as a carbon sink can buffer future effects of climate impacts.

Julie Reichert-Nguyen commented that as all these new groups and committees are being formed, it would be great to explore where there are opportunities to collaborate and how to prioritize where we work. Pam Mason replied that one of the good ways to collaborate is to have some folks be on more than one team – we are happy to have more people join the Wetland Workgroup. Amanda Poskaitis expressed interest in the Wetland Workgroup and asked to be added to the list (poskaitisa@nwf.org).

Chris Spaur commented that typically, fossil fuels are used to restore tidal wetlands. If dredged material from dredging that was already going to occur is used, then net carbon impacts are probably beneficial. Chris is not sure how long it takes to have net benefit otherwise though if fossil fuels that weren't going to be combusted are used for the restoration. Carin Bisland commented that since 1991 the focus has been almost entirely on nontidal wetlands and that only very recently had the Chesapeake Bay Program started talking about tidal wetlands.

Justin Shapiro commented that he would not be on the second day of the meeting but to please reach out if anyone has thoughts/questions about the hardening layers and collaboration with the fish habitat team (justin.shapiro@noaa.gov).

Peter Tango commented that he thinks a resilience indicator can take root considering the variety of thresholds available in the literature that define ecosystem response to shoreline condition. Species and communities of living resources are sensitive to degradation across fish, shellfish, grasses, benthic macroinvertebrates, community waterbirds - you can define the response function where "reference" conditions, least disturbed and perhaps most robust to stressors represent a desired state. As habitats show increased signs of impact/degradation/hardening, the more you want to move them towards the reference state. You could develop a frequency distribution of the 1000m segments of shoreline as the present state. Measures over time can inform you about changes in the distribution of disturbance and locations of improvement and degradation to inform the state of bay resilience.

3:45 pm **Announcements**

- **Draft of Federal Commitment to the Chesapeake Executive Council Directive NO. 21-1 Collective Action for Climate Change**
  Draft document with high-level recommendations on how Federal agencies can begin implementing the 2021 Executive Council Climate Change Directive.

Summary

Building on the Climate Change Directive signed by the Bay Program Executive Council, we learned that there is an effort to draft a federal commitment document on how the fed agencies will implement what is in the EC Directive. This is a high-level document right now without specific actions.

Discussion

Mark Bennet commented that we just wanted to make members of the WG aware that this document is being drafted. Kevin Du Bois commented that there was a concern that the original document had a heavy water quality focus, and several agencies wanted to emphasize species and habitats and other related factors. We wanted to make sure that the directive addressed impacts to water quality and natural resources. Laura Cattell Noll shared comments from Jennifer Starr that said local governments are concerned about climate change and these issues, so we recommend that the people drafting this think about how local governments can be partners in the work, and opportunities to leverage local funds to match federal dollars. Kevin Du Bois added that programs where we can partner with local governments are REPI, Sentinel Landscapes, and joint Compatibility Use Plans.

4:00 pm **Adjourn**

Participants: A.K. Leight, Alana Hartman, Alex Gunnerson, Alice Millikin, Alison Rogerson, Alison Santoro, Allison Breitenother, Amanda Poskaitis, Amy Goldfischer, Andrew Larkin, Angie Wei, Anna Hamilton, Ashley Gordon, BeKura Shabazz, Ben McFarlane, Ben Sagara, Mark Biddle, Breck Sullivan, Carin Bisland, Chris Guy, Chris Spaur, Danielle Algazi, Dave Goerman, Debbie Herr Cornwell, Denise Clearwater, Donna Marie Bilkovic, Erin Knauer, Frederika Moser, Gina Hunt, Greg Noe, Heather Beaven, Jackie Specht, Jaclyn Woolard, Jamileh Soueidan, Jennifer Dietzen, Jennifer Starr, Jim George, John Kuriawa, Julie Reichert-Nguyen, Justin Shapiro, Karen Duhring, Katie Davis, Kevin Du Bois, Kristin Saunders, Laura Cattell Noll, Lauren Taneyhill, Mandy Bromilow, Mark Hoffman, Pam Mason, Matt Wessel**,** Megan Fitzgerald, Megan Ossmann, Melissa Yearick, Mike Eisner, Michelle Campbell, Mark Bennet, Nicole Carlozo, Nora Jackson, Peter Tango, Rachael Peabody, Rachel Felver, Regina Poeske, Richard Tian, Sally Claggett, Sarah Hilderbrand **,** Sean Corson, Steve Strano, Taryn Sudol, Whitney Katchmark, Wilmelie Cruz

Tuesday, December 14th

2:00 pm **Welcome, Introductions, and Day 1 Recap**
Pam Mason (VIMS), Wetland Workgroup Co-chair

2:10 pm **Update on "Synthesis of Shoreline, Sea Level Rise, and Marsh Migration Data for Wetland Restoration Targeting"**
Molly Mitchell (VIMS)

The goal of the project is to compile existing information about Sea Level Rise inundation under forecasted climate change, topography of bay shorelines, shoreline condition, existing wetland area and potential migration corridors, and additional relevant data and develop a methodology that synthesizes the information in a format that can be used to assist with marsh conservation and restoration decisions. This presentation focused on the first goal.

Summary

Molly Mitchell began her presentation with an overview of which project components were completed in September 2021 and which activities are still in progress. Molly then detailed the scope of the project, explaining that the project will not be running models nor a specific methodology to be applied across the Chesapeake Bay, but it will be providing a dataset that could help inform management decisions. Molly then provided some background on marsh change in response to climate change, noting that this project focuses on marsh migration, not marsh accretion. Molly listed the data types investigated for the inventory and included that 115 data sources have been identified across 14 topics, which have been subdivided into 50 sub-categories. Metadata factsheets have been provided.

From the literature review of marsh response to climate change, Molly identified landscape-scale models, site-specific models, and combination and cross scale models as the three main types of models. Molly provided a list of both strengths and weakness of the available data. The next phase of the project focuses on marsh model comparison at three test sites in the Middle Peninsula of Virginia to identify how different model parameters affect marsh migration pathways. Molly then explained the proposed comparison methodology along with the challenges. She emphasized the goal is use the least difficult information to obtain that allows for effective management decisions. The three test areas identified for this comparison allow for the target testing to cover different elevations, marsh configurations, and social considerations.

Discussion

Christopher Spaur asked about the estimated lifespan of the project's benefits, specifically if there are any types of lifespan considerations in this project? Christopher referenced Blackwater as an example where the lifespan of a project's benefits was considered. Molly responded saying that project life is one consideration for marsh migration activities. Molly noted that there is a difference between marsh restoration and preservation, indicating that in preservation the project life consideration should be the ability of the marsh to sustain itself through migrating. If the marsh has limited opportunities to migrate then sediment accretion should be the primary focus. She added that this project is seeking to identity the marshes that do have migration pathways, so in that sense a component of project life is built into this work.

Jim George asked if the topology is of a shallow gradient, sea level rises slowly, and there is already marsh on the fringe of it, is it a fair assumption that the marsh will simply migrate inland and more complex models are unnecessary? Molly responded that is what they are hoping to see as a result of the model comparison project, but that it depends a lot on what is happening inland from these areas. For example, a marsh by an urban area will not have the capacity to move inland. Molly added it can also help inform management and planning decisions, so that there is not development in marsh migration pathways. Pam Mason added that in addition to developed land, behaviors can have a large affect on marsh migration and that there is a Goal Implementation Team (GIT) funding project that has been approved that will focus on understanding marsh mowing. Pam expressed that with this project, the idea is to establish a framework with existing data and models to understand what the marsh response is and what the implications for management and behavior are.

Lew Linker commented that he and the modeling team would like to work with Molly going forward. Lew stated that in preparing for 2035 and adapting Chesapeake Bay Program models for climate change, there are four steps that need to be taken. The first step entails determining the boundary of the watershed and tidal waters at a very fine scale and the second step requires identifying the location of tidal wetlands given their impact on water quality. The third step is to determine what to expect of sea level rise based on different climate change timeframes and the fourth step would be to evaluate potential loss in relation to management implications. Lew said that for step 3, Molly's work would be helpful in answering the question of what to expect from sea level rise at different increments. Lew said step 4 this builds on Pam's comments and deals with the management implications that are associated with the estimated quantification of the loss or gain of wetlands due to sea level rise.

2:40 pm **Shoreline Property Owner Motivations, Perceptions, and Drivers**
Amanda Guthrie (VIMS)

In Virginia, shoreline property owners decide if and how to modify their shoreline for erosion control (e.g., living shorelines, riprap). To understand property owner decision making, Amanda Guthrie and the rest of her team conducted two surveys (in 2018, and 2020) to assess the factors owners considered, their motivations, and their perceptions of various shoreline modification types. The team showed that one of the primary factors considered is effectiveness, yet there are misunderstandings on which shoreline modifications are most effective at erosion control and withstanding storm damage. Overall, property owners are aware that living shoreline marshes do support water quality and provide habitat for bay species.

Summary

Amanda Guthrie began by defining the living shoreline spectrum, which ranges from planted marsh to oyster sill and rock sill to breakwater. Amanda shared data illustrating that permits for living shorelines in Virginia have been increasing in recent years but are far from being the major shoreline options of bulkheads and riprap. She then shared some key findings from her study on the decision process of armoring, such as that bulkheads are often viewed as effective and durable while natural shorelines are considered more aesthetic. Amanda also shared that neighboring shorelines often predict modification type and property owners are more likely to armor if the property is of higher value, lower in elevation, and experiencing higher erosion rates.

Amanda stated that the objective of their project was to evaluate property owners' motivations when deciding if and how to alter their shoreline for erosion control. Amanda explained the methodology behind their 2020 study and then discussed the results of the study, with a focus on client-contractor interactions by the type of permit they requested and how many different contractors a client would typically solicit.

Amanda stated that for the motivations of shoreline owners taking erosion prevention measures, motivations varied based on the permits they were applying to. People applying for bulkheads are typically repairing old structures, while people applying for a living shoreline are typically new structures. The five most frequent motivations were effectiveness, the ability to withstand storms, restoration of the shoreline, costs, and the effect on property value. Across the board, applicants of all permits were concerned by costs. Amanda then explained opinions of permit applicants on the impacts of shoreline modifications on ecosystem services, like erosion prevention effectiveness, the ability to withstand storms, sea level rise adaptability, species support, aesthetics, water quality support. Amanda then shared some conclusions on perception and decision making. Bulkhead applicants may solicit multiple contractors and tend to be more focused on cost. Contractors are key messengers, while other sources applicants may search are websites, neighbors,

and local and state government employees. People are not typically reaching out to scientists or nonprofits. Some other conclusions from her study were that applicants care about erosion effectiveness and the ability to withstand storm damage and that living shorelines are valued aesthetically and are seen as good for species and water quality, but are not viewed as effective against erosion and storms. Moving forward, we need to have better information on erosion control of living shoreline practices.

Discussion

Rachel Peabody asked about the specific questions used in the study and the possible differences between understandings of the terms flooding vs erosion in the surveyed applicants. Amanda responded that yes, she does have that information, but it has not yet been linked to the questions about perception.

Pam Mason asked about the term "withstanding storms," and whether or not it refers to the structure itself or the upland property it is protecting. Amanda responded that the perception is that the structure of bulkheads themselves is most resilient to storms. Pam said this is interesting because most bulkheads are not effective long term against storms and can have a high failure rate. Amanda noted that perhaps perceptions are more focused on the short term.

Julie Reichert-Nguyen asked about the availability of living shoreline contractors, and if there is a shortage or need for more information based on the study results that indicated most living shoreline applicants only contacted one contractor. Amanda responded with a two-part response, saying that she is planning on examining a dataset for coastal Virginia that shows which contractor installed which modification type. Amanda also stated that a partner on a larger project learned through interviews with contractors that many felt there was little competition. Amanda said that it's likely there are both areas that have neither enough information about contractors nor contractors available. Julie responded that Amanda may want to connect with Gina Hunt about contractors as she presented yesterday on a similar topic and may be able to provide contractor information.

Nicole Carlozo asked if the individuals surveyed all knew what a living shoreline was. Amanda responded that there was a fact and definition sheet provided with the survey, but she is not certain the applicants read it or what their level of knowledge is regarding living shorelines as the focus of the study was more on perceptions, not understanding.

Nicole Carlozo added that Maryland's ecological effects of sea level rise project is working to monitor and model wave attenuation benefits of natural marshes and starting with one living shoreline site to begin understanding living shoreline effectiveness. Nicole mentioned that this is just a starting place, but there is a need to monitor different living shoreline types in different energy conditions and at different scales to provide proof of effectiveness for homeowners to

increase the chance they might be open to living shorelines. Amanda responded that she has been following similar studies in coastal Virginia and the Gulf of Mexico on wave attenuation and that the effectiveness of living shorelines for erosion control and storms is the deciding factors for most homeowners.

In the chat, Kevin Du Bois commented that neighboring shorelines often affect the shoreline modification type, which feeds into yesterday's discussion on trying to do a pilot project for an unnecessary bulkhead removal followed by a living shoreline restoration. Based on Kevin's experience in Norfolk, he inspected every site prior to a wetlands board hearing and frequently would meet with homeowners before they even applied. Kevin's understanding is that this practice was uncommon across the Commonwealth of Virginia and he suggested maybe that is a practice that needs to change to boost government influence on management outcome. Kevin commented that the hedonic pricing model says that properties with trees (riparian buffers) and wetlands are more valuable than those without those features and that perhaps we need to publicize this information more broadly. Kevin said he finds it interesting that when you raise a bulkhead or rip rap without increasing the grade behind it, the structure becomes a dam and does not allow flood waters to recede - causing more damage. Kevin added insight that bulkheads are the most expensive, which is why homeowners shop around for the best cost. Kevin emphasized that public, neighborhood projects, demonstrating long standing effectiveness and durability are very important to drive perception.

Verbally following up on his previous comments in chat, Kevin suggested that to change the paradigm on homeowner preferences for hardened shorelines, there must be one on one outreach with homeowners about the benefits of living shorelines. Kevin suggested that going forward a large number of non-governmental advocates, including trusted community members, should speak early with homeowners about the benefits of living shorelines. Amanda agreed and said that to change the paradigm we must work through established and trusted social channels, as a known individual will be the best messenger. Julie responded that many communities have local green teams that could be utilized in this case and remarked that these efforts sound similar to outreach from the agricultural workgroup on implementing best management practices (BMPs). Rachel Peabody mentioned a program called the Elizabeth River Project's River Star Homes program as a model for what Kevin was speaking about on outreach and linked to the website here: https://elizabethriver.org/river-star-homes. She added that the James River Association is also start to pick up this work.

In the chat, Nicole Carlozo asked if there is a way to work through organizations like the Chesapeake Bay Landscape Professional (CBLP) Certification? Taryn Sudol responded that UMD Watershed Restoration Specialists cover Maryland but focus a bit more on stormwater than tidal. They also run the Watershed

Stewards Academy and the CBLP. There was no other response to this question due to a lack of time.

Amanda Guthrie thanked everyone and put her contact information in the chat: agguthrie@vims.edu.

3:10 pm **VIMS Shoreline Management Model**

Karen Duhring (VIMS)

The Shoreline Management Model (SMM) uses decision tree logic combined with available GIS data to generate tidal shoreline erosion control best practice recommendations. The model output shows where living shoreline approaches may be suitable for both undefended and armored shorelines where retrofits are possible. The SMM framework was described and it was explained where to view the model output.

Summary

Karen Duhring began by providing background about the purposes and intent of the shoreline management model. Karen then shared factored into the model, such as base shoreline, shoreline inventory and post inventory. Karen then discussed model outputs, like shoreline best management practice recommendations and special considerations. She provided some scenario examples and spatial outputs.

Karen next stated model limitations, such as the shoreline management suitability factors that are not included. She then talked about model products like its dedicated website, Adapt VA interactive map, and the Virginia Locality portals. Karen also detailed shoreline management model applications, and regional applications with a more in depth look at the resources available for Maryland. Karen concluded by providing resources like the shoreline management model manual for GIS professionals and the shoreline decision support tool.

Discussion

Christopher Spaur asked about whether this model can address side effects of the Chesapeake Bay Total Maximum Daily Load (TMDL), like the installation of shore stabilizing BMP efforts in natural areas. Karen indicated that Christopher is correct in the sense that there are many shore stabilization efforts in Virginia that are driven by TMDL credits. Christopher followed up by asking if this model can emphasize living shorelines where they still exist. Pam Mason responded that VIMS Center for Coastal Resources Management (CCRM) has been recommending that natural shorelines be left alone and where needed, an NNBF could be implemented, or a marsh could be planted.

Lew Linker asked about slide 15, saying that the Phase 6 model utilized the VIMS shoreline data and that the Phase 7 model will be a much finer scale. Lew asked

if the SMM has a comparably fine resolution that would allow this data to be used in Phase 7. Karen responded that model is built on heads-up digitizing of very high-resolution data so the Phase 7 model would be compatible, perhaps with some aggregating. Lew also asked about the timeline of data availability for Maryland. Pam Mason responded that the data for the tidal shoreline of Maryland should be done by the end of 2022. Denise Clearwater added in the chat that all sites with rare, threatened, and endangered species, plus other appropriate areas, will be under a generic code of ecological considerations.

Nicole Carlozo asked who the audience for this tool beyond regulators is and if contractors have been interested in this tool or provided feedback. Karen said that the model has been available in Virginia for many years and been through multiple iterations. Karen added that through her anecdotal experience in trainings, it has been used by both regulators and the general public, specifically in the pre-application and permitting process. Rachel Peabody added that many local wetland boards will use this tool to help with decision making and before making site visits for an applicant. Kevin Du Bois added in the chat that it's a great tool to encourage contractors to get into the business of living shoreline implementation.

Amanda Poskaitis asked could this information be merged with MERLIN, Maryland Department of Natural Resource's (DNR) online GIS tool. Denise Clearwater responded that the SMM tool will be hosted by VIMS, so parts of it could be utilized. Denise also added that this SMM tool goes beyond just guidance, but also as part of the regulatory process. Pam Mason and Denise said there could be a way to incorporate the two tools but there would need to be a conversation between Maryland DNR and VIMS. Amanda then responded that she uses MERLIN all the time and it's easily accessible to folks so it could be beneficial.

Ben McFarlane asked if there have been surveys or outreach to the regulators and contractors who use the model? Karen said this has been considered often, but that there hasn’t been ay action. Pam added that in the past there have been focal groups, but there has been nothing formal in the last few years. Pam also shared that there is internal quality assurance, quality control and there are informal lines of communication with the regulators.

3:40 pm **Discussion**

- *How can the information from these projects assist with forecasting vulnerability and informing climate resilience decision-making for restoration activities?*

Discussion

Lew Linker stated that while this could definitely be useful for the TMDL regulatory modeling under 2035 climate scenarios, that is not the end all be all and could be applied elsewhere for scientific purposes. He added that these

discussions will have influence as the modeling team begins work on Phase 7. Pam responded that she is pleased with the progress where wetlands are now a land use/land cover in the Chesapeake Bay Program models.

Kevin Du Bois said that in follow up to the first day's conversation around replacing derelict bulkheads with living shorelines and the importance of social marketing for living shorelines, he recommends completing a pilot project (perhaps in Norfolk) as a success project. Rachel Peabody added the Elizabeth River Project (ERP) completed a project similar to this a few years ago and this might be a strong example moving forward. Pam responded that ERP could possibly present on one of these topics going forward, especially since this would be more recent. Kevin Du Bois added that there should be multiple projects and that bringing the financial resources of ERP forward can be a great opportunity to change the paradigm to be move in favor of living shorelines. Julie Reichert-Nguyen added that she is putting together a position announcement for a summer internship focusing on nature based solutions, and one of the tasks could focus on compiling examples for retrofitting bulkheads to living shorelines. Pam suggested also adding a narrative/communication element, potentially having the intern produce a StoryMap to communicate this narrative.

Nicole Carlozo added that Maryland DNR has funded a few bulkhead removals through the Resiliency through Restoration program and replaced them with living shorelines. She said it would be interested to see how those areas are showing up on the VIMS tools and offered to present on these topics at a future meeting. Rachel Peabody expressed interest in this topic.

Pam Mason announced that if anyone in attendance enjoyed the day's conversation, she encouraged them to join the Wetlands Workgroup.

Nicole Carlozo made an announcement in the chat that if anyone is certified through the Association of Climate Change Officers, they will receive information via email about a webinar in January on Maryland's Resiliency Program.

- *What opportunities are there to build this information into a resilience indicator? What would that indicator look like?*
- *Are there any science needs from what we heard today that we should include in the STAR science needs database?*

In reference to science needs, Julie added that perhaps more information on marsh accretion and sediment movement would be helpful and that these efforts should include academic partners. Pam agreed that this is generally an area that always needs more information. Julie and Pam also stated they would like to do another joint meeting between the Wetland Workgroup and Climate Resiliency Workgroup.

4:15 pm **Virginia Wetland Factsheet and Local Engagement Worksheet**

Kevin Du Bois (DoD Chesapeake Bay Program)

**This was a WWG-specific presentation. **

Kevin provided an update on the creation and distribution of a Virginia Wetland Fact Sheet targeted towards wetland boards and will discuss key provisions and gather feedback on a Local Engagement Worksheet to help form the basis for attempts to gauge the use, value and effectiveness of the factsheet.

Summary

Kevin Du Bois began his presentation on the Wetland Factsheet by providing context on the initial thoughts behind the factsheet in the Logic and Action plan. Kevin explained that this is a communication document targeted for a specific state and its officials, in this case Virginia, and it includes how wetlands factor in to different natural resource components. This fact sheet for Virginia is a pilot project, so they distributed it first to VIMS for feedback. The fact sheet also identifies primary and secondary audiences at the state, local, and non-governmental levels. Kevin asked for feedback from Wetland Workgroup members on how to best get this information out. Kevin concluded that he thinks the biggest challenge now is measuring the success of the factsheet, so he is also requesting feedback on methods for measuring the effectiveness of the document.

In the chat, Rachel Peabody suggested sending the factsheet to herself and Laura McKay, CZM. Similarly, KC Filippino asked for the document to be sent to her and Ben McFarlane at the Hampton Roads Planning District Commission as it could be a possible Regional Environmental Committee topic. Kevin requested that if you send the factsheet to another entity, please let us know so we can track the distribution for potential future surveys on effectiveness.

4:30 pm **Adjourn**

Participants: Julie Reichert-Nguyen, Megan Ossmann, Amy Goldfischer, Breck Sullivan, Alex Gunnerson, Pam Mason, Alison Santoro, Ben McFarlane, Adrienne Kotula, Denise Clearwater, Jamileh Soueidan, Jennifer Starr, Jim George, Alice Millikin, Breck Sullivan, gpodniesen, Molly Mitchell, Amanda Guthrie, Karen Duhring, Kevin Du Bois, Amanda Poskaitis, Mark Biddle, Chris Guy, Danielle Algazi, Dave Goerman, Debbie Herr Cornwell, Donna Bilkovic, Fredrika Moser, Joel Carr, Kayla Clauson, KC Filippino, Kevin Hess, Kristin Saunders, Lauren Taneyhill, Lew Linker, Megan Fitzgerald, Melissa Yearick, Michelle Campbell, Mark Bennet, Nicole Cai, Nicole Carlozo, Nora Jackson, Rachel Peabody, Richard Tian, Scott Phillips, Taryn Sudol, Todd Lutte, Whitney Katchmark