Wetlands Workgroup and Climate Resiliency Workgroup Joint Meeting

December 13th & 14th, 2021

Chesapeake Bay Program
Science. Restoration. Partnership.

Purpose of the Joint Meeting

- 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.

Workgroups

Wetlands Workgroup Contacts:

- Chair: Pam Mason
- Chair: Todd Lutte
- Staffer: Megan Ossmann

Climate Resiliency Workgroup Contacts:

- Chair: Mark Bennet
- Coordinator: Julie Reichert-Nguyen
- Staffer: Jamileh Soueidan

Scientific Technical Assessment and Reporting (STAR) Team

- Chair: Scott Philips
- Coordinator: Breck Sullivan
- Staffers: Amy Goldfischer and Alex Gunnerson

Relevant Links

- Day 1 Meeting Materials
- Day 2 Meeting Materials
- Meeting Minutes
- Climate Resiliency Workgroup
- Wetlands Workgroup

Contents

Day 1: WWG & CRWG Joint Meeting Presentations

Increasing use of Living Shorelines and Natural and Nature-Based Features to Build Coastal Resilience

Presenter: Pam Mason (VIMS)

Summary: Pam Mason and the researchers at the Virginia Institute of Marine Science (VIMS) created a geospatial protocol to map natural and nature-based features (NNBF; i.e. wetlands, wooded areas, beaches, and living shorelines), rank these NNBFs, and identify regions where NNBFs may be implemented for management purposes. NNBFs are shown to improve community resilience, such as mitigating coastal flooding caused by sea level rise and storm surge. This project identified ~350,000 NNBFs and ~170,000 primary building structures, with the end goal of understanding which structures are within the path of flooding or rising water (i.e. inundation pathways), thus identifying areas that would benefit from NNBFs. The NNBFs are ranked based on four criteria: flooding mitigation services, the number of buildings it benefits, critical community facilities, and existing programmatic incentives (Fig. 1; i.e. FEMA's Community Rating System and nutrient reduction crediting). Lastly, this protocol identified areas that lacked NNBFs and would benefit from their restoration and/or conservation efforts. Currently, the project mapped all the shorelines of Virginia. Application of the approach for Maryland shorelines may be a feasible next step.

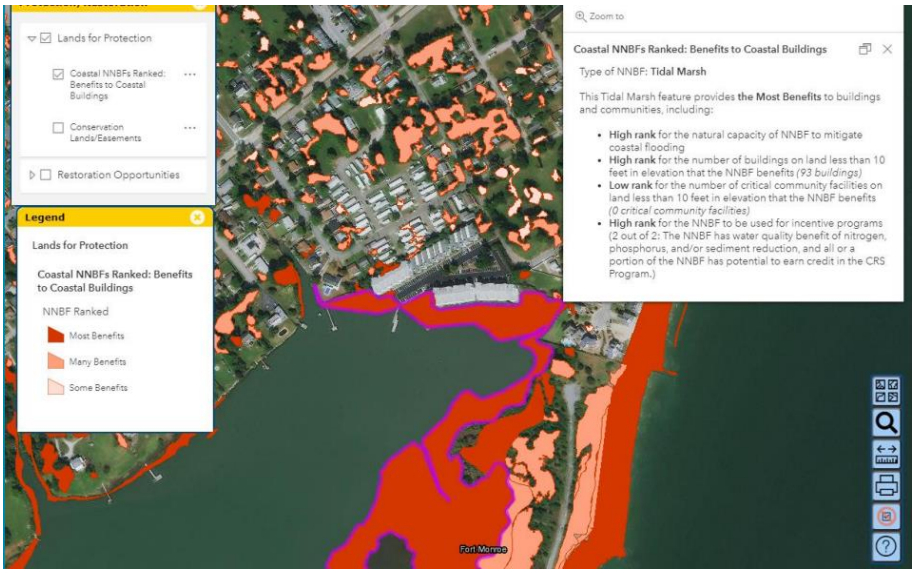


Fig. 1. VIMS researchers have developed a web-app to help the public and regulators determine which areas of shoreline would benefit from NNBFs by developing a ranking system.

Link to the web app (explore "Protection/Restoration Opportunities" for NNBF and flood mitigation benefits information)

Link to Project Pages (on the VIMS/CCRM website)

Communications and Guidance on Shoreline Protection Options for Coastal Landowners

Presenter: Gina Hunt (MD DNR)

Summary: The climate resiliency project, *Social Marketing to Improve Management*, focused on understanding behavior-based approaches to increase the adoption of living shorelines and preservation of existing natural shorelines by private property owners within the Chesapeake Bay Watershed. Phase I of this research identified 11 behaviors to improve the management and adoption of living shorelines through a survey of shoreline property owners, while Phase II has developed communication products and

deliverables to address 2 of the 11 behaviors (i.e. keeping the shorelines natural and installing living shorelines). These products focus on providing information to property owners regarding both the implementation and installation of living shorelines and the preservation of existing living shorelines. The products include 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 that is currently under development for the Chesapeake Bay Program about behavior change campaigns that will house these materials.

Mapping the Percentage of Hardened Shoreline in MD and VA

Presenter: Justin Shapiro (CRC/NOAA Affiliate)

The Fisheries Habitat Action Team, in conjunction with the Chesapeake Bay Program's GIS team, utilized the results from previous research investigating the link between living resources decline and hardening shorelines to develop mapping layers of hardened shorelines within the VA and MD region (Fig. 2). The information on shoreline hardening is extracted from the comprehensive shoreline inventories developed by Center for Coastal Resources Management, VIMS. Currently all of the shorelines within VA have been mapped, while four MD counties remain to be mapped. 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 targeted audience for the project is local planners and groups focused on living shorelines that could utilize these layers in applying for funding or guiding restoration projects.

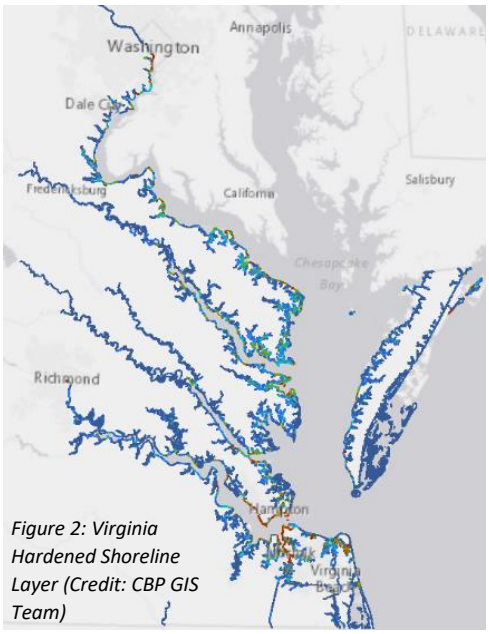


Figure 2: Virginia Hardened Shoreline Layer (Credit: CBP GIS Team)

Access to GIS layers: Virginia & Maryland

Day 1 Discussion Highlights

- Opportunities for collaboration and project expansion:
    - MD Coastal Resiliency Assessment can potentially work alongside VIMS in mapping NNBFs and expanding the existing ArcGIS web app
    - Use of VIMS NNBF decision-making web app and StoryMap to expand outreach efforts in VA communities
    - Collaboration between VIMS and MD DNR to utilize social science research and NNBF GIS layers to help target outreach efforts in regions that would benefit from living shoreline implementation
    - Collaboration between VIMS NNBF project and Fisheries GIT Hardened Shoreline project to identify opportunities to retrofit failing hardened infrastructure with living shorelines
        - Beneficial to collaborate with local Non-Governmental Organizations (NGOs) who help find funding for homeowners to finance retrofitting projects

- Concerns shared by meeting participants:
    - Whether the benefits of living shorelines are being oversold through outreach efforts
        - Communications should focus on living shorelines being "one piece of the puzzle" to address flooding, shoreline erosion, etc.
- Suggestions shared by meeting participants:
    - In communications, emphasize the longevity of shoreline structures (e.g., bulkheads, rip rap) and that no structure remains forever
    - Support efforts to ensure that projects are designed to be sustainable over time and allow for tidal and nontidal wetlands to convert or migrate
    - The development of a resiliency indicator using thresholds related to an ecosystem's response (e.g., species/communities degradation) to shoreline condition and shoreline stabilization strategies based on a defined ideal state (e.g., least disturbed, most resilient characteristics)
    - There is a need to start thinking about the federal infrastructure law and how it could support living shoreline stabilization projects
        - Influx of money necessitates a discussion and plan on how best to direct it

Day 2: WWG & CRWG Joint Meeting Presentations

Update on "Synthesis of Shoreline, Sea Level Rise, and Marsh Migration Data for Wetland Restoration Targeting"

Presenter: Molly Mitchell (VIMS)

*This project was proposed by the Wetlands Workgroup, and co-supported by the CRWG and the Fish Habitat Action Team and funded with CBP GIT funding in 2021.

Fig. 3. An overlay of the marsh migration pathways for the three different models (i.e., landscape-scale, site-specific, and combination and cross scale) being tested.

Summary: The goal of this ongoing project is to compile and provide datasets for management purposes that synthesize existing information about sea level rise (SLR) inundation and include forecasted climate changes, topography and condition of shorelines, existing wetland, and potential migration corridors. Through this research, 111 data sources have been identified across 14 topics, which have been subdivided into >50 sub-categories and organized into metadata factsheets. Additionally, this project examined the use of landscape-scale models, site-specific models, and combination and cross scale models as a means of assessing potential for marsh migration. 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. These sites allow for the target testing to cover different elevations, marsh configurations, and social considerations.

Shoreline Property Owner Motivations, Perceptions, and Drivers

Presenter: Amanda Guthrie (VIMS)

Summary: This research aimed to evaluate property owners' motivations and perceptions when deciding if and how to alter their shoreline for erosion control through two surveys conducted in 2018 and 2020. Data showed that permits for living shorelines in VA increasing in recent years but are far from the favored shoreline armoring options (e.g., bulkheads, riprap). When choosing how to armor their shoreline property, owners were concerned with effectiveness, the ability to withstand storms, restoration of the shoreline, costs, and the effect on property value. Results from the surveys indicated that property owners perceived bulkheads as effective and durable, while living and natural shorelines were perceived as aesthetically appealing. Furthermore, the data showed 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. Lastly, this research investigated the means by which property owners sought out information regarding shoreline modification and armoring. It was shown that owners that chose bulkheads were likely to consult with more than one contractor, unlike those that chose other methods (e.g. rip rap and living shorelines). The results indicated that property owners with bulkheads were less likely to seek out additional information regarding different methods of shoreline protection and that website and social connections were important in disseminating information. It was found that property owners typically did not reach out to NGOs or scientists when making their decision.

VIMS Shoreline Management Model

Presenter: Karen Duhring (VIMS)

Summary: Researchers at VIMS developed a Shoreline Management Model which uses decision tree logic combined with GIS data to provide decision-makers with best management practices (BMPs) recommendations when addressing shoreline erosion. The purpose of this model is to identify living shoreline suitability and provide management recommendations. The outputs of this model include 11 different shoreline BMP recommendations, including 5 different cases for special considerations (Fig. 4.; i.e., ecological conflicts, land-use management, highly modified areas, special geomorphic features, or there is no action

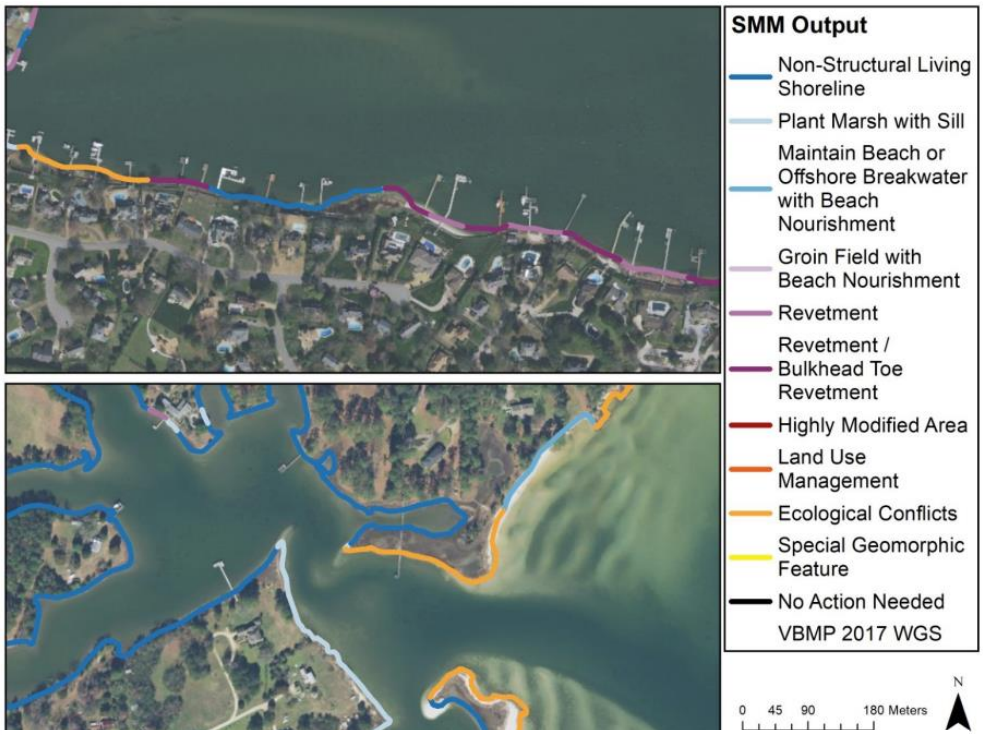
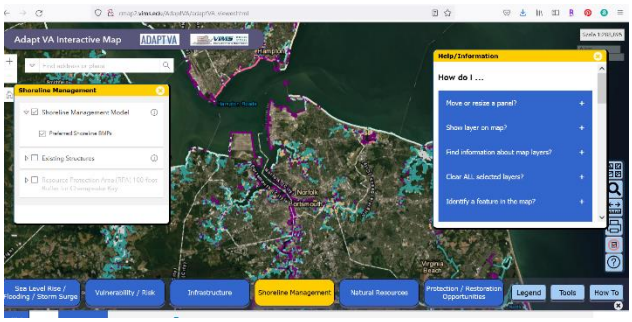


Fig. 4. Sample output from the Shoreline Management model with the 11 different shoreline BMP recommendations

needed). However, this model is not without its limitations, as it does not include certain factors (e.g., erosion and flooding potential, stabilization need, sediment type and hardness, conflicting land and water uses, and costs). This highlights the need for site specific assessments to ground truth the recommendations made by the model. The model is complete for tidal Virginia shoreline and currently in development for Maryland.



The Virginia data is currently available from two web locations. To see the whole coastal area use this Adaptva link and select Shoreline Management.

Day 2 Discussion Highlights

- Opportunities for collaboration and project expansion:
  - There is a need to think about how these projects can be used in assisting with forecasting vulnerability and informing climate resilience decision-making
    - Opportunities for collaboration with the Chesapeake Bay Program modeling team related to the Total Maximum Daily Load (TMDL) nutrient and suspended sediment targets under the 2035 climate scenarios
  - Consider use of a pilot project to expand social marketing understanding related to the replacement of derelict bulkheads with living shorelines where appropriate
    - The Elizabeth River Project was identified as an organization already conducting this work; it would be worthwhile to have them present their research
  - Potential collaboration between MD DNR and VIMS Shoreline Management Model (SSM) team to see how retrofitted data are presented in the SMM
- Suggestions shared by meeting participants related to living shorelines research and social marketing:
    - Provide more information on living shoreline contractors
    - Monitor different living shoreline types under different wave energy conditions to provide proof of effectiveness for homeowners
    - Utilize trusted community members and organizations to aid with outreach efforts when communicating shoreline stabilization preferences for homeowners

Public Attendance for CRWG & WWG Joint Meeting

A.K. Leight
Adrienne Kotula (VA CBC)
Alana Hartman (WV DEP)
Alex Gunnerson (CRC)
Alice Millikin
Alison Rogerson (DE DNREC)
Alison Santoro (MD DNR)
Allison Breitenother (MD DNR)
Amanda Guthrie (VIMS)
Amanda Poskaitis (NWF)
Amy Goldfischer (CRC)
Andrew Larkin (NOAA)
Angie Wei (UMCES)
Anna Hamilton (Tetra Tech)
Ashley Gordon
BeKura Shabazz (First Alliance Consulting)
Ben McFarlane (DCVA)
Ben Sagara
Breck Sullivan (USGS)
Carin Bisland (EPA)
Chris Guy (FWS)
Chris Spaur (USACE)
Danielle Algazi (EPA)
Dave Goerman (PA DEP)
Debbie Herr Cornwell (MD Dept. of Planning)
Denise Clearwater (MDE)
Donna Marie Bilkovic (VIMS)
Erin Knauer (Ecosystem Planning & Restoration)
Fredrika Moser (MD Sea Grant)
Gina Hunt (MD DNR)
Greg Noe (USGS)
Heather Beaven
Jackie Specht (TNC)
Jaclyn Woolard (EPA)
Jamileh Soueidan (CRC)
Jennifer Dietzen (DOEE)
Jennifer Starr (Alliance for the Bay)
Jim George (MDE)
Joel Carr (USGS)
John Kuriawa (NOAA)
Julie Reichert-Nguyen (NOAA)
Justin Shapiro (CRC)
Karen Duhring (VIMS)
Katie Davis
Kayla Clauson (DE DNREC)
KC Filippino
Kevin Du Bois (DoD)
Kevin Hess (PA DEP)
Kristin Saunders (UMCES)
Laura Cattell Noll (Alliance for the Bay)
Lauren Taneyhill (NOAA)
Lew Linker (EPA)
Mandy Bromilow (NOAA)
Mark Bennet (USGS)
Mark Biddle (DE DNREC)
Mark Hoffman (CBC)
Matt Wessel
Megan Fitzgerald (EPA)
Megan Ossmann (CRC)
Melissa Yearick (USC)
Michelle Campbell (DOEE)
Mike Eisner
Molly Mitchell (VIMS)
Nicole Cai
Nicole Carlozo (MD DNR)
Nora Jackson (NVRC)
Pam Mason (VIMS)
Peter Tango (USGS)
Rachael Peabody (VMRC)
Rachel Felver (CBP)
Regina Poeske (EPA)
Richard Tian (UMCES)
Sally Claggett (USFS)
Sarah Hilderbrand (MD DNR)
Scott Phillips (USGS)
Sean Corson (NOAA)
Steve Strano (NRCS)
Taryn Sudol (MD Sea Grant)
Todd Lutte (EPA)
Whitney Katchmark
Wilmelie Cruz (NOAA)