

Coastal Wetlands Plan

for the York River, Piankatank River, and Mobjack Bay



YORK RIVER &
SMALL COASTAL BASIN
ROUNDTABLE

June 2023

Saltmarsh cordgrass along a small inlet off Mobjack Bay.
Credit, Virginia Department of Conservation and Recreation, Natural Heritage (DCR-DNH), Gary P. Fleming.

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Introduction and Summary

The tidal and adjacent nontidal wetlands (hereafter, referred to as coastal wetlands when discussed together) along the York River, Piankatank River, and Mobjack Bay of the Middle Peninsula provide unique habitats in Virginia and the Chesapeake Bay watershed. These bodies of water also include ecologically sensitive areas with freshwater marshes, such as Dragon Run and the Mattaponi and Pamunkey rivers. The existing 27,000 acres of tidal marshes and more than 195,000 acres of nontidal wetlands in this region are important habitats for a diverse array of fish, wildlife, and plants (CCRM, 2019).

Wetlands can also reduce shoreline erosion, enhance water quality, provide long-term carbon storage, offer recreational opportunities, and hold significant cultural, economic and social value among local communities. However, these special areas face many threats, including land development, land use change, rising sea levels, increasing storm intensity and frequency, and habitat degradation due to invasive species and polluted stormwater runoff.



Salt marsh complex. Credit, DCR-DNH, Gary P. Fleming.



Kings Creek Marsh, Hayes, Virginia. Credit, Aileen Devlin, Virginia Sea Grant.

This Coastal Wetlands Plan (“Plan”) for the York River, Piankatank River, and Mobjack Bay intends to enhance coordination and collaboration among partner organizations and landowners to respond to these threats to coastal wetlands and the communities they support. In order to comprehensively protect wetlands, conservation, restoration, creation, and enhancement activities must include both public and privately owned lands. Approximately 1% of the shoreline in Virginia is publicly owned (Pogue et. al, 1999), meaning almost all of Virginia’s shoreline and coastal wetlands are privately owned. However, many collaborative funding opportunities are restricted to working only on public lands. We recognize that all landowners in the region play a key role in the success of wetlands efforts and often receive benefits from the presence of wetlands on their lands including shoreline protection, enhancement of property values, flood mitigation, and recreational opportunities, such as hunting.

The Plan was developed collaboratively by the Habitat Restoration Steering Committee (“Committee”) of the York River and Small Coastal Basin Roundtable (“Roundtable”). The Roundtable is composed of representatives of local governments, planning district commissions, community associations, non-profit organizations, academic institutions, private industry, and state and federal agencies. Currently, more than 100 members representing upwards of 45 organizations take part in Roundtable activities. The Committee has been meeting since 2020 and its mission is to “strengthen and restore estuarine habitat complexes, including oyster reefs, marsh, riparian buffers, and living shorelines through collaborative projects that provide sustained ecosystem services and economic value” for the Roundtable watersheds.

Over the next five years, Roundtable partners pledge their collective support toward implementing six strategies and 14 goals of the Plan. The strategies involve making progress in the face of changing conditions, anticipating marsh migration, improving coordination among wetlands stakeholders, increasing public education about wetlands and their benefits, prioritizing

LIVING SHORELINES

“Living Shorelines” in the Virginia Code are defined as “a shoreline management practice that provides erosion control and water quality benefits; protects, restores, or enhances natural shoreline habitat; and maintains coastal processes through the strategic placement of plants, stone, sand fill, and other structural and organic materials. When practicable, a living shoreline may enhance coastal resilience and attenuation of wave energy and storm surge.

Habitat Restoration Steering Committee Mission

Strengthen and restore estuarine habitat complexes, including oyster reefs, marsh, riparian buffers, and living shorelines through collaborative projects that provide sustained ecosystem services and economic value.

partnerships with underserved communities, and addressing knowledge gaps in wetlands management and restoration. The Committee expects that the plan will be a living document and updated as new information, consensus, and tools are developed.

- Strategy 1
- Conserve, restore, create, and enhance coastal wetland areas in the face of changing conditions.
- Strategy 2
- Conserve tidal wetlands migration corridors.
- Strategy 3
- Improve coordination among partners on regional coastal wetlands efforts.
- Strategy 4
- Increase community members’ knowledge and appreciation of the role wetlands play in protecting coastal communities and ecosystems.
- Strategy 5
- Prioritize partnership building and projects with underserved communities impacted by wetlands losses.
- Strategy 6
- Support research and development of guidance to close knowledge gaps for wetlands management and restoration.

WORDS TO KNOW

- Conserve** means protecting existing healthy marshes from encroachment or development.
- Enhance** means improving the function of degraded marsh areas.
- Restore** means creating tidal and adjacent non-tidal wetlands areas through engineered changes in hydrology.
- The term “**underserved communities**”, as described by Executive Order 13985 refers to populations sharing a particular characteristic, as well as geographic communities, that have been systematically denied a full opportunity to participate in aspects of economic, social, and civic life.

Acknowledgments

This effort was led by the National Oceanic and Atmospheric Administration (NOAA) Chesapeake Bay Office (NCBO) on behalf of the York River and Small Coastal Basin Roundtable (“Roundtable”) with technical support from Virginia Institute of Marine Science (VIMS), Center for Coastal Resources Management (CCRM).

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- Chesapeake Bay Foundation**
- Chesapeake Bay Program, Wetlands Working Group**
- Friends of Dragon Run**
- Hampton Roads Planning District Commission**
- Middle Peninsula Planning District Commission**
- Soil and Water Conservation Districts**
- The Nature Conservancy**
- NOAA National Centers for Coastal Ocean Science**
- U.S. Army Corps of Engineers**
- U.S. Department of Defense, Chesapeake Bay Program**
- Virginia Marine Resources Commission**
- Virginia Department of Wildlife Resources**
- Virginia Coastal Zone Management Program**
- Virginia Department of Conservation and Recreation**
- Virginia Department of Wildlife Resources**
- Virginia Department of Environmental Quality**
- Virginia Institute of Marine Science**
- Center for Coastal Resources Management**
- Center for Shoreline Studies**
- Chesapeake Bay National Estuarine Research Reserve - Virginia**
- Wetlands Watch**

The Region and the Value of Its Wetlands

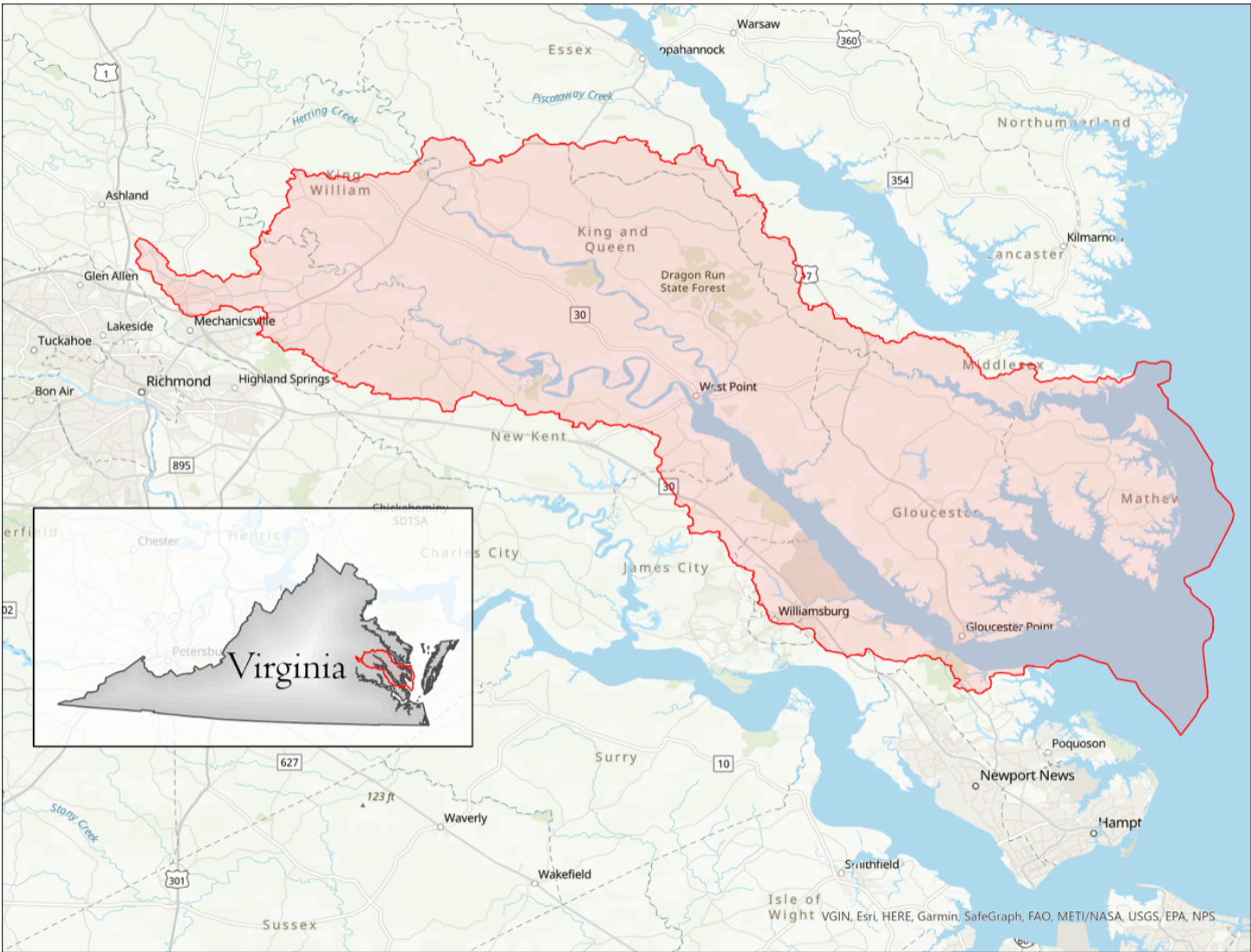
The geographic scope of this Plan includes the coastal wetlands of the York River, Piankatank River, and Mobjack Bay.

In 2022, the National Oceanic and Atmospheric Administration (NOAA) announced a [Middle Peninsula Habitat Focus Area](#) (HFA) in Virginia. The selection of this area as an HFA will concentrate NOAA’s efforts to support the restoration and conservation of tidal wetlands (and other estuarine habitats) in the York and Piankatank rivers and Mobjack Bay, as called for in this Plan.



Ribbed mussels. Credit, CCRM.

Figure 1: This map illustrates the region this Plan focuses on, including the York River, Mobjack Bay, and Piankatank River’s tidal watersheds. Credit, NOAA National Centers for Coastal Ocean Science.



Egret wading in the marsh. Credit, VIMS

More than one-third of threatened and endangered species in the United States live only in wetlands, and nearly half use wetlands at some point in their lives (EPA, 2023). Virginia’s coastal wetlands are vital habitats for our native plants and animals, including several of the state’s [Species of Greatest Conservation Need \(SGCN\)](#), like Mabee’s salamander, spotted turtle, glossy Ibis, diamondback terrapin, the American black duck, and other migratory birds. Wetlands also provide habitat for rare plant species such as the sensitive joint-vetch and swamp pink.

Wetland habitats support local commercial and recreational fishing and hunting. In fact, estuaries nationally provide habitat for 68% of the U.S. commercial fish catch and 80% of recreational fish catch (“Estuary Habitat,” 2022). Marshes are the highest valued and most visited shoreline habitats by anglers. Marshes and living shorelines generate four times as many benefits as hardened shorelines to recreational fishing in the Middle Peninsula (Scheld & Bilkovic, 2023). A flourishing wetland ecosystem also supports many ecotourism activities including activities such as education, birding, kayaking, and hiking.

Threats to Wetlands

Changing climate conditions, including the rate of coastal erosion and sea level rise, along with development impacts from dredging, depositing sediment, and shoreline hardening, directly and indirectly, impact our wetlands. The most recent available shoreline structures survey for the study area, which was conducted in 2014, indicates that of the 1,862 miles of shoreline in our region, 118 miles, or approximately 6%, is hardened (CCRM, 2019).

Survey results of the York River estuary marshes taken in 1980 were reevaluated in 2010 to reveal a 32% loss and 11% gain in marsh area, with a net overall loss of 21% (Mitchell et al., 2017).

Lower elevation areas experiencing high energy from wave and wind action saw marsh loss, while marsh gains occurred mostly in the upper watershed. Climate change is expected to increase the frequency and intensity of storms, making coastal wetlands more vulnerable to increased losses (White et al., 2022).



Mabee’s Salamander. Credit, Virginia Department of Wildlife Resources, Matt Neff.



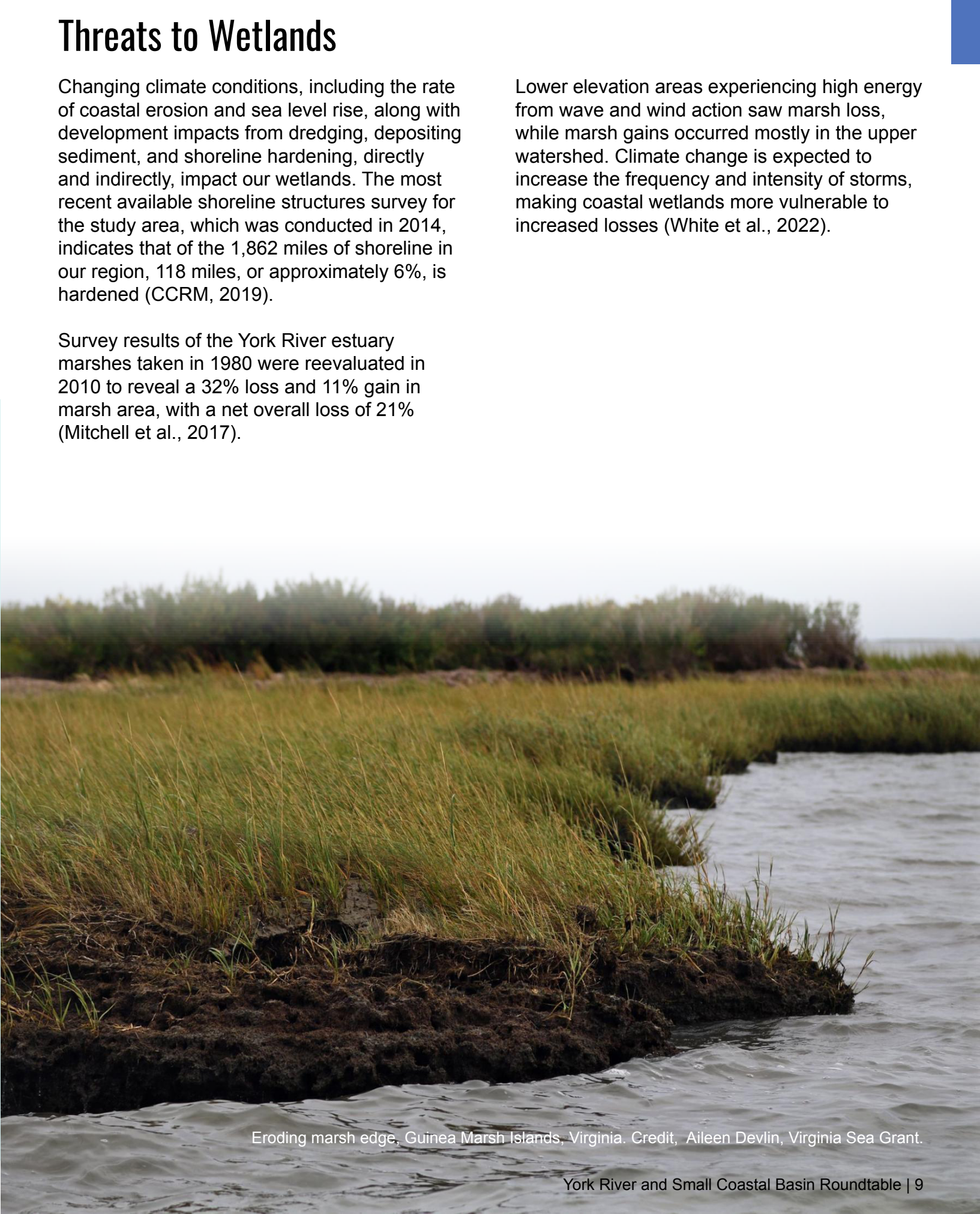
Black duck being banded. Credit, Virginia Department of Wildlife Resources, Ben Lewis.



Sensitive Joint Vetch. Credit, Virginia Department of Conservation and Recreation, Gary P. Fleming.



Diamondback terrapin in the marsh. Credit, National Centers for Coastal Ocean Science.



Eroding marsh edge, Guinea Marsh Islands, Virginia. Credit, Aileen Devlin, Virginia Sea Grant.



Low elevation marsh absorbing wave energy. Credit, NOAA.

Sea level rise is a significant threat to wetlands and is directly related to climate change. Between the early 1970s and 2009, sea level rose approximately eight inches in the York River estuary (Mitchell et al., 2017). Marsh change varied by watershed, with some showing an increase in marsh area while others showed losses. If water levels exceed the capacity of wetland plants and the marsh surface to accumulate sediment, there will be marsh loss. In these situations, the low marsh plants will drown and the area will convert to open water. With rising water levels, low marsh plants will move to higher elevation areas occupied by high marsh plants. In turn, the high marsh vegetated community will move into former upland areas after the soil

is sufficiently saturated. Over time, where conditions are suitable (e.g., favorable slope, lack of manmade barriers), this process will cumulatively result in the marsh moving landward in a process commonly called marsh migration. In some locations, the landward transgression of the marsh could result in a net gain in area offsetting some of the marsh loss along the water edge (Kirwan & Megonigal, 2013; Kirwan et al., 2016). As these upland areas are increasingly densely populated and developed, natural marsh migration will be in conflict with many existing human uses and activities, putting coastal marshes at increased risk due to the lack of marsh migration corridors (Nunez et al. 2021).

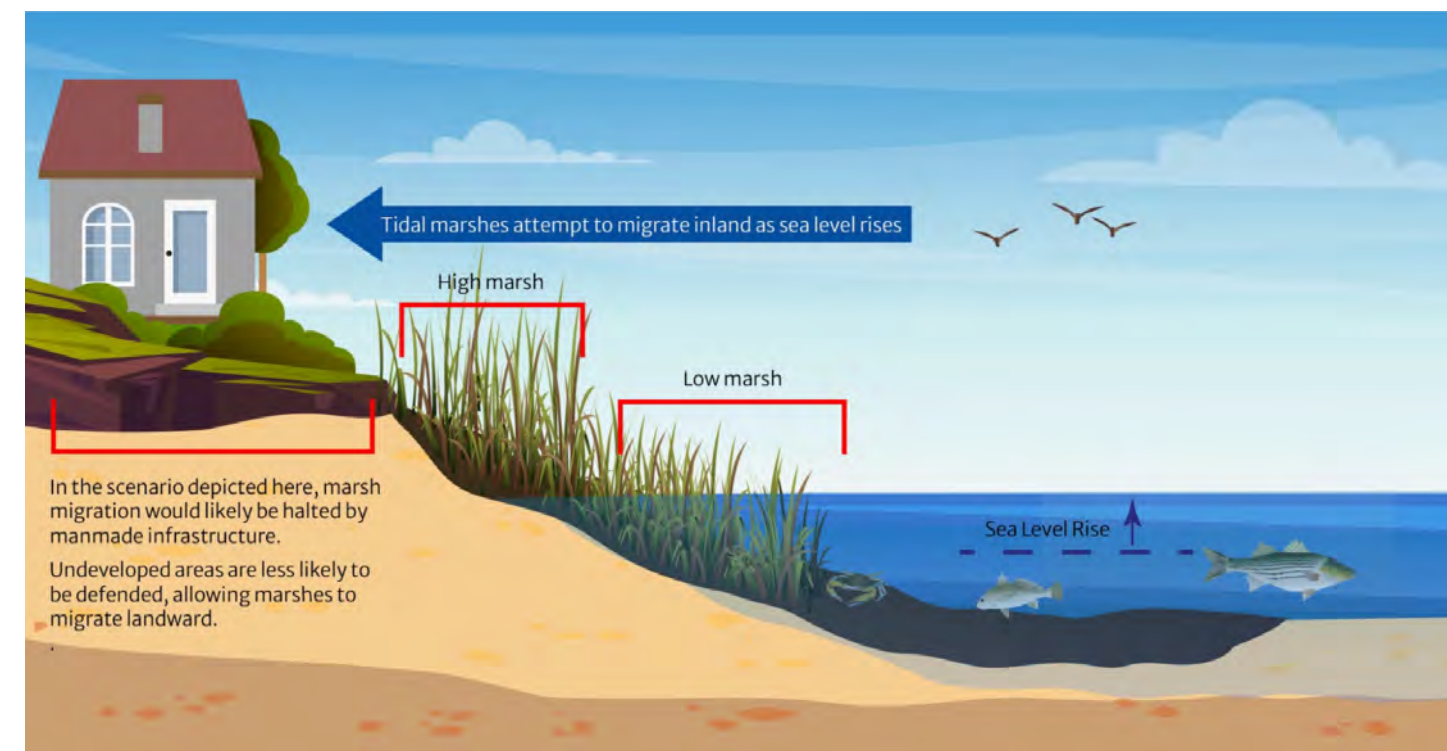


Figure 2: Illustration of marsh migration as sea level rises and how human infrastructure and land uses may impede landward migration. Credit, Green Fin Studio.

Climate change poses additional threats to wetlands as the predicted increase in storm frequency and intensity can be expected to lead to more flash flooding, increased stormwater runoff velocities, and stronger wave action. This combination of effects may remove a significant amount of wetland plants, causing soil instability and exacerbating erosion (Erwin, 2009; Mitchell et al., 2023). One indicator of change is that in the Tidewater region of Virginia, where the Middle Peninsula is located, there has been a 7.2% increase in rainfall over the past century (Chesapeake Bay Program, 2020). This will likely increase these harmful effects on wetlands.

Policy Drivers

Many policies have contributed to wetlands conservation and restoration.

- The Virginia Tidal Wetlands Act of 1972 directly sought to protect wetlands across the Commonwealth.
- Virginia established the Wetlands Mitigation - Compensation Policy, last revised in

1982, to help prevent the loss of wetlands to development by creating a two-tiered mechanism to determine whether wetland impacts were allowed or minimized, and if subsequent compensation is required.

- The state also established the Virginia State Wetlands Plan 2021-2025 (VSWP). The third iteration of the VSWP focuses on monitoring and assessment, regulatory, and planning, and sustainability objectives.
- In 2021, Virginia also completed Phase One of its [Coastal Resilience Master Plan](#) to address the unique climate change related threats facing its coastal regions.
- In 2014, the [Chesapeake Bay Watershed Agreement](#) established a goal to continually increase wetlands' capacity to provide water quality and habitat benefits. The Agreement's specific Bay-wide goal is, by 2025, to "create or establish 85,000 acres of tidal and non-tidal wetlands and enhance the function of an additional 150,000 acres of degraded wetlands."

Federal and state partners are not currently on track to meet the Agreement’s wetlands goal. In response, the Chesapeake Executive Council released [Directive No. 21-1 Collective Action for Climate Change](#) to prioritize conserving and restoring wetlands and other habitats for both increased resilience to climate impacts and to assist in meeting national goals for achieving 30% of lands and waters conserved by 2030 ([Federal Executive Order on Tackling the Climate Crisis at Home and Abroad](#)). Between 2010 and 2021, there has been only an 18.8% achievement of the wetland restoration goal, with 16,000 acres of wetlands being created or restored on agricultural lands (“Wetlands,”

2023). In 2023, the Virginia Wetlands Action Plan, which highlights Virginia activities working toward the Chesapeake Bay Program wetland outcome was completed. The Virginia section begins on page 56 ([Wetland Action Plan](#)).

The York River Roundtable’s Wetlands Plan seeks to help address these challenges by providing information on the current status of wetlands within the Middle Peninsula as well as outlining conservation, restoration, and enhancement strategies to help advance progress through improved implementation, coordination, communication, partnership-building, and research.

Current Status and Future Projections

The main watersheds comprising this report—the York River, Mobjack Bay, and Piankatank River and their associated tributaries—cover a total area of more than 2 million acres with more than 27,000 acres of tidal marshes in the combined watersheds, and more than 195,000 acres of nontidal wetlands (CCRM, 2019). Between 2001 and 2016, wetlands in these watersheds decreased by 1.6% (NOAA Office of Coastal Management, 2023). This decrease can be attributed to the threats to wetlands discussed earlier in this report.



Aerial view of marsh. Credit, VIMS.



Low salt marsh. Credit, DCR-DNH, Gary P. Fleming.

Sea level rise is a serious threat to wetland loss and coastal marshes will attempt to migrate inland as sea level rises. To better understand marsh migration pathways in our region, the Chesapeake Bay Program funded a study by the Center for Coastal Resources Management, VIMS, entitled “Synthesis of Shoreline, Sea Level Rise, and Marsh Migration Data for Wetland Restoration Targeting” (Mitchell et al., 2022). The study examined three areas in the Middle Peninsula to assess pathways for marsh migration (see Fig. 3). The maps below present findings from this research at three locations in the Middle Peninsula area, the Mid-Pamunkey River, Carter’s Creek (north shore of the York

River), and Ware River in Gloucester County. For the watersheds, projected areas to be inundated by sea level rise (SLR) by 2050 vary from 37,810 acres for the intermediate SLR projections and 40,892 acres on the high end of projections. For 2075, these projections increase from 46,706 acres for the intermediate SLR scenario to 53,195 acres in the high SLR scenario (Mitchell et al., 2022). Examples of marsh migration within the study’s focus area are provided in Figure 4. The orange and green shown in the maps indicate multiple marsh model agreement, highlighting the vulnerability of these areas to inundation in future years.

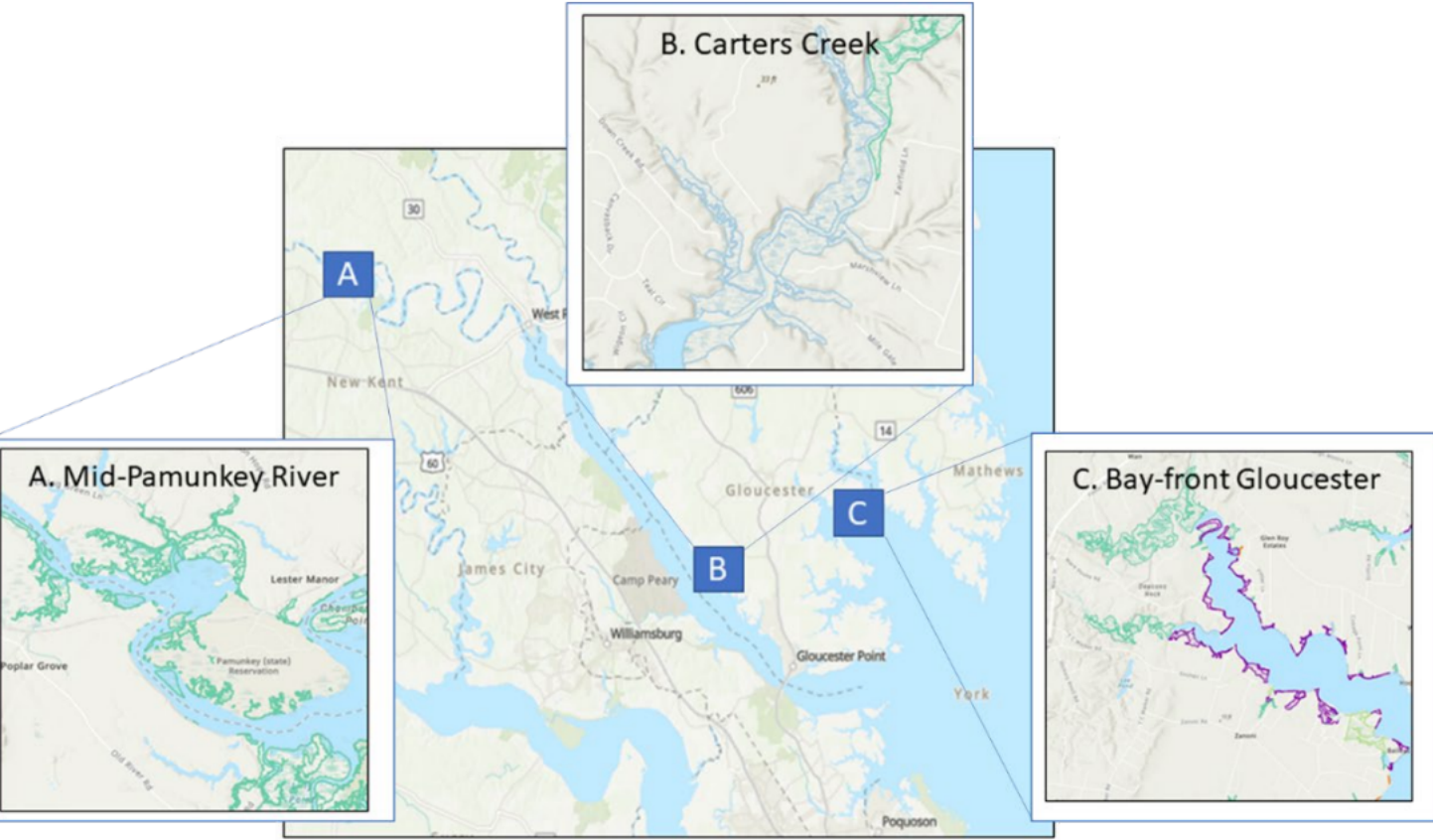


Figure 3: Three areas were examined combining 4 different marsh migration models: freshwater riverine marsh (A), brackish embayed marsh (B), and high-energy saline marsh (C).

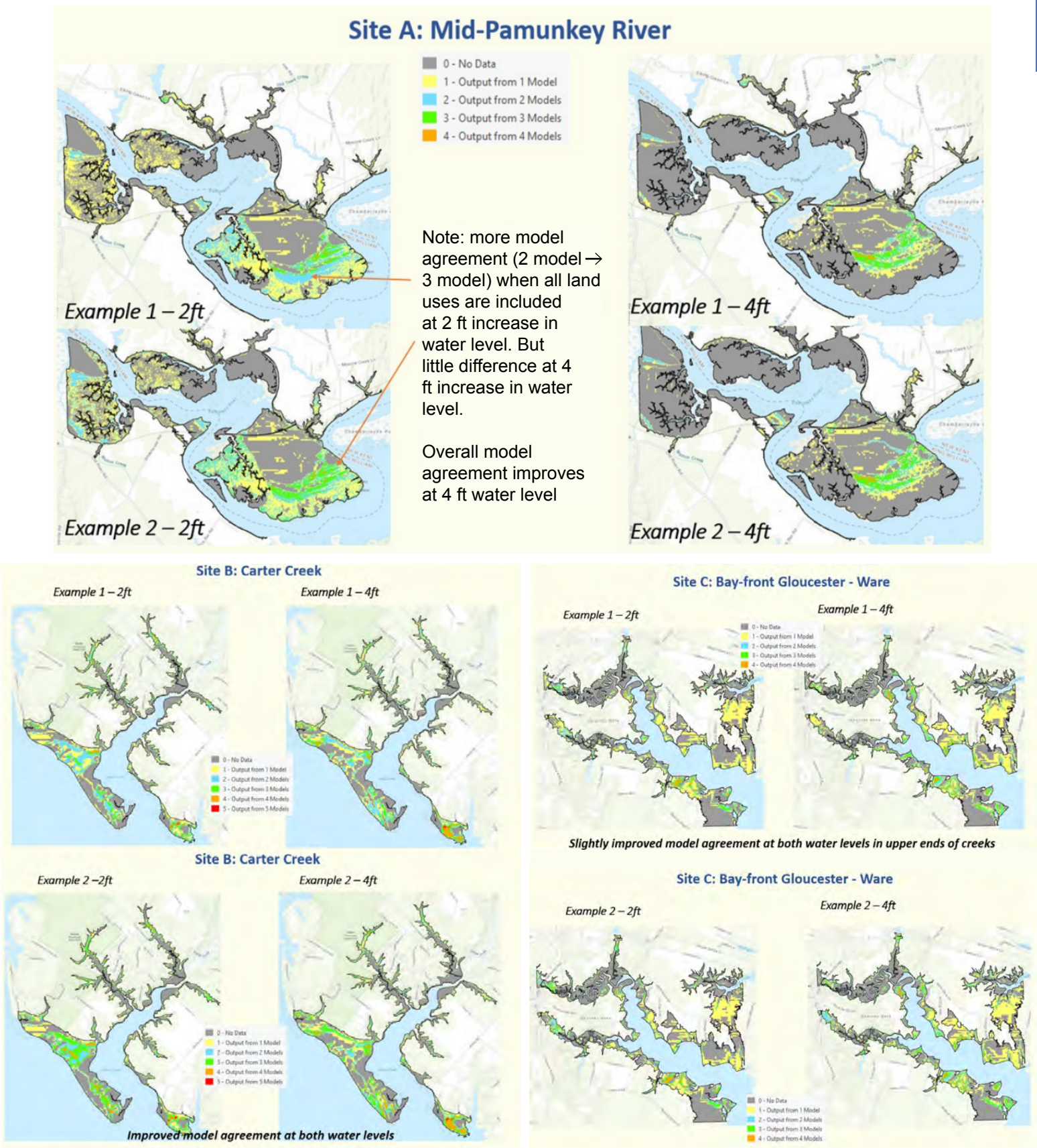
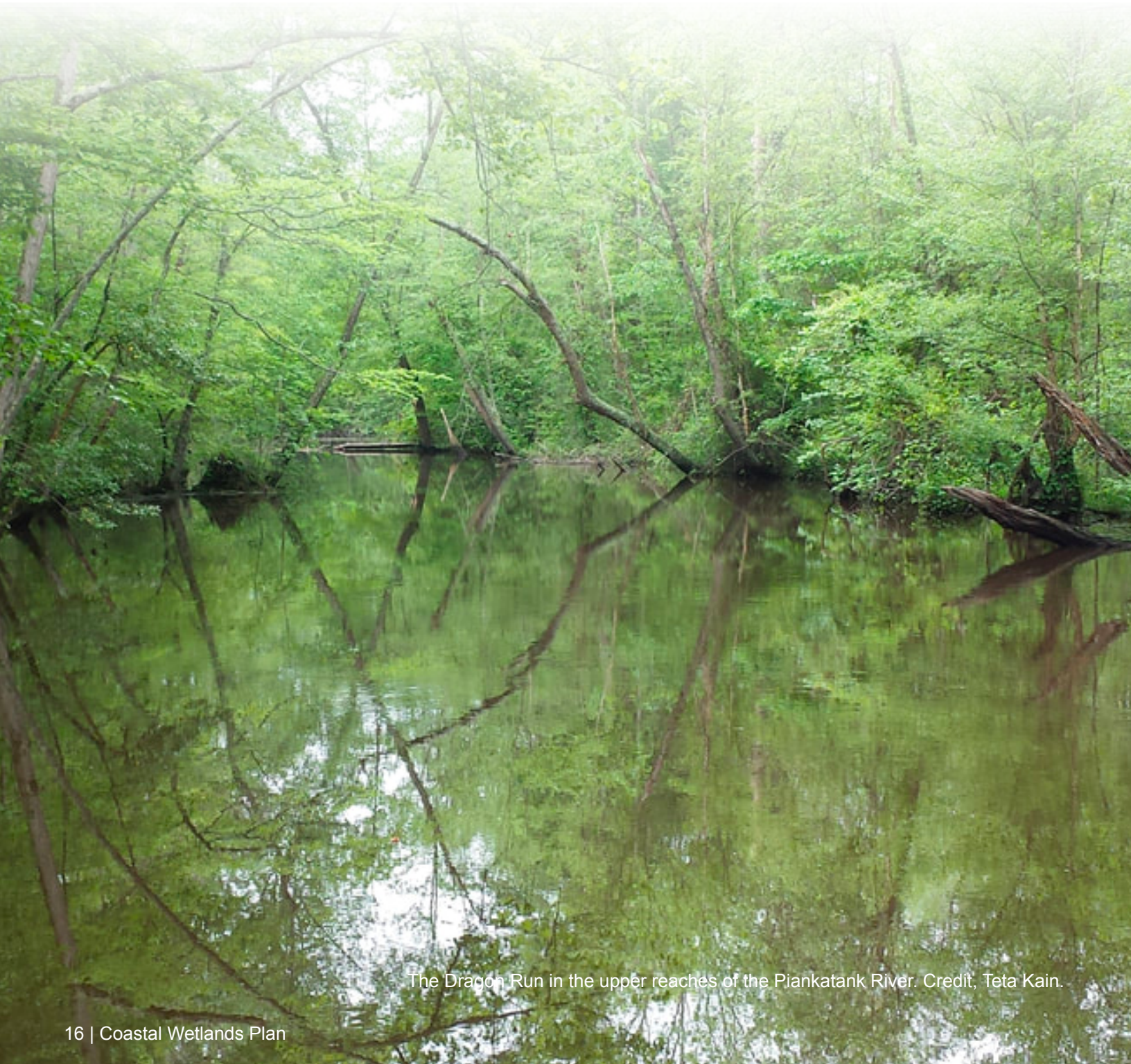


Figure 4: Results for each of the three focus areas from the marsh migration study of the Middle Peninsula. A: Mid-Pamunkey River output (level of agreement) obtained from applying a multi-marsh migration model approach. B: Carter Creek output (level of agreement) obtained from applying a multi-marsh migration model approach. C: Bay-front output (level of agreement) obtained from applying a multi-marsh migration model approach.

Wetland Strategies

The Roundtable developed six Wetland Strategies to address threats facing wetlands in our region. These Strategies are broad, long-term themes to support conservation, restoration, creation, and enhancement under which specific, shorter-term goals were then established.



The Dragon Run in the upper reaches of the Piankatank River. Credit, Teta Kain.

Strategy 1

Conserve, restore, create, and enhance coastal wetland areas in the face of changing conditions

Conservation, restoration, creation, and enhancement are each distinct and critical approaches for sustaining wetland habitat.

Conservation of existing marshes protects them from encroachment, development, or land use change, including erosion. Marshes can be conserved through compliance with existing wetlands laws and regulations, through the acquisition of ownership, and through voluntary actions, such as establishing conservation easements of wetlands and uplands adjacent to (landward of) wetlands that prevent development encroachment and allow for marsh migration. Conservation can also include actions that protect a wetland from adverse impacts, including implementing marsh sills or oyster breakwaters to reduce erosion of the marsh edge from wave energy.

Restoration of coastal wetlands can be accomplished with hydrological modifications (drain tile removal, ditch plugs, runnels), surface level modifications (bank grading, fill placement

or removal, or thin layer deposition), removing barriers to marsh migration, and, as elevation allows, planting native marsh vegetation in areas where vegetated wetlands used to exist.

Creation means constructing new coastal wetlands where they did not previously exist, such as formerly upland (non-aquatic sites) or new tidal marsh islands.

Enhancement of degraded wetlands involves improving marsh functions that provide ecosystem services by removing marine debris and invasive species, protecting native vegetation, or establishing agricultural and forestry best management practices.

Wetland conservation, creation, restoration, or enhancement projects could be small-scale, such as creating a living shoreline at a waterfront home along the Piankatank River, or large-scale, such as wetland restoration or conservation in the Guinea Marshes of Mobjack Bay.



Low salt marsh. Credit, DCR-DNH, Gary P. Fleming

Strategy 2

Conserve tidal wetlands migration corridors

The future persistence of marshes depends on the opportunity for landward movement as sea level rises, allowing for continued provision of the benefits marshes provide to coastal communities and ecosystems. Critical to the potential for marsh migration is engagement with landowners to provide available resources and incentives for conservation of projected wetland migration corridors. To protect migration corridors and support potentially inundated coastal properties, federal, state, tribal, and local governments, and non-profit organizations could consider strategic land acquisitions and easement purchases (including rolling easements) from willing sellers, and provide information to communities on land donations. Separate from the benefits to migrating wetlands, public or non-profit property owners that acquire these lands or easements could receive multiple benefits such as nature-based flood mitigation, Community Rating System credits (which can reduce flood insurance premiums), and recreational opportunities for people including pocket parks,

birding areas, and shore landing sites for kayakers on water trails. The U.S. Department of Agriculture offers three easement programs for wetlands projects: [Wetlands Reserve Easements](#), [Agricultural Conservation Easement Program](#), and the [Wetlands Reserve Enhancement Program](#). These programs provide financial and technical assistance to private landowners and tribes, focusing on agricultural lands, through the purchase of a wetland reserve easement to restore, conserve, and enhance wetlands on lands that were farmed or are prior converted wetlands.

Land conservation, or land holding, entities such as the Middle Peninsula Chesapeake Bay Public Access Authority and the Virginia Outdoor Foundation also accept donations of coastal lands. There are limitations to this overall strategy with regard to property ownership, such as who owns the land in perpetuity and how that entity finances long-term stewardship costs. Work to develop solutions to these barriers would be beneficial.

Strategy 3

Improve coordination among partners on regional coastal wetlands efforts

The complexity of wetland conservation, enhancement, and restoration work necessitates collaborative efforts among practitioners with expertise in research, wetland ecosystems, policy, engineering, community engagement, funding, training, outreach, and more. By working in coordination across disciplines, partners can accomplish more to help sustain and strengthen wetland benefits

to communities. For example, partners can collaborate to evaluate low and high marsh areas to determine how to implement wetland conservation and restoration in a way that protects bird habitat provided by high marsh vegetation as well as fish habitat that relies on low marsh vegetation, rather than restoring only one marsh type potentially at the expense of the other.

Strategy 4

Increase community members' knowledge and appreciation of the role wetlands play in protecting coastal communities and ecosystems

Building public awareness around wetland benefits and services is a building block and launch point for engaging and collaborating with residents and landowners to conserve, enhance, and restore wetlands and marsh migration corridors in their communities. Communicating how coastal wetlands provide a broad range of ecosystem services can help advance public understanding of these benefits to coastal communities.

Examples of community engagement activities include “K through Gray” public education experiences, series, and workshops, signage at public access sites with wetlands, and promotion of online wetland information portals. The Chesapeake Bay Program Wetland Workgroup published a factsheet,

[“How Wetlands and Living Shorelines Support Virginia Plans and Policies.”](#) as a resource to increase stakeholder awareness around these coastal systems. Additionally, many sectors are engaged in wetlands outreach including federal, state, regional, and local governance entities, universities such as VIMS, and many non-profits in coastal Virginia. An important consideration for wetlands outreach is the range of the intended audiences as well as what factors influence landowners' shoreline management decisions. It is important to recognize that peoples of differing ages, native languages, variable levels of comfort with science information, decision-makers, shoreline and wetlands landowners, and non-wetland landowners are all part of the coastal community.

Black needlerush salt marsh. Credit, DCR-DNH, Gary P. Fleming.

Strategy 5

Prioritize partnership building and projects with underserved communities impacted by wetlands losses

Climate change impact inequality exists because some areas experience a higher degree of community vulnerability, which can stem from a combination of factors such as wealth disparity, social identity, and access to resources, services, and decision-making processes ([“Social Dimensions of Climate Change,” 2023](#)). Underserved communities, including those in rural coastal areas, are often disproportionately affected by the impacts of climate change, such as the loss of wetlands and the benefits they can provide to communities. To address these differences and advance environmental justice, it is important for agencies and organizations involved in wetlands restoration and conservation to collaborate with underserved and climate-vulnerable communities on approaches and projects that can be tailored to the social, economic and cultural needs of each community.

ENVIRONMENTAL JUSTICE

The Virginia Environmental Justice Act defines environmental justice as “the fair treatment and meaningful involvement of every person, regardless of race, color, national origin, income, faith, or disability regarding the development, implementation, or enforcement of any environmental law, regulation, or policy.” For more information about environmental justice factors in the York, Piankatank, Mobjack Bay region, go to <https://ejcgreen.epa.gov>.

Strategy 6

Support research and development of guidance to close knowledge gaps for wetlands management and restoration

Our collective understanding of wetlands management and restoration best practices continues to develop and evolve over time. Several knowledge gaps remain that could be closed by additional ecological research and development of guidance for project practitioners, decision-makers, and communities alike. Priority topics include:

- Improved mapping of existing wetlands to better target conservation, enhancement, and restoration efforts.
- Research on strategies intended to enhance marsh resilience to climate change impacts, including assessing project design options 1) to maximize marsh persistence and minimize damage from extreme storm events and 2) to incorporate multiple habitat types in one place (e.g., oysters, wetlands, vegetated riparian buffers, and submerged aquatic vegetation [SAV]).
- Assess the role of oyster restoration in the context of marsh projects, specifically oyster structure as a component of erosion control for marsh persistence, and biogeochemical synergies and tradeoffs.
- Explore options for tidal freshwater wetland restoration, including the potential impacts of dams, culverts, dykes, and ditches on wetlands habitat.
- Examine the potential for beneficial use of sediment for marsh restoration in this region, considering the logistics of appropriate timing, equipment, and distance/ proximity of dredging operations to marshes in need of restoration, as well as property owners’ willingness to receive the dredged sediment.

- Assess locations for the suitability of potential use of thin or thick layer placement of dredge materials for marsh restoration in this region of the Chesapeake Bay.
- Assess regional marsh sediment trapping effectiveness or marsh vertical accretion rates and enhance monitoring to assess required sediment volume and in-situ soil development necessary to maintain marsh platform elevation under varying sea level, water quality, and wetlands community types. This includes obtaining new elevation and bathymetry data at targeted sites and the development of decision support tools.
- Explore the role of carbon in existing and newly restored marshes, including the potential for economic monetization, and the threat to carbon stocks from sea level rise absent interventions such as marsh migration corridors.
- Examine the impact of invasive species on marshes (e.g., *Phragmites*) and, if determined to be harmful, assess approaches to assist with removal (including a cost/benefit analysis of different approaches).
- Quantify fish and shellfish use of tidal wetlands and fish productivity enhancements from wetland restoration projects.
- Quantify the flood mitigation role/value of tidal and nontidal wetlands.
- Understand the scope and impact of wetland mowing on ecosystem services.



Marsh grass restoration project. Credit, VIMS.

Five-year Goals

Leveraging the strengths and expertise of many organizations, including those of the York River and Small Coastal Basin Roundtable’s Habitat Restoration Steering Committee, this collaborative, regionally specific plan has been developed to protect valuable remaining wetlands and to enhance marsh resilience in the face of changing conditions. These strategies and goals were developed by regional wetlands experts and managers who participated in the development of the plan, using their best professional judgment and information available at the time. They used their expertise and knowledge to set goals that they believe are reasonably attainable over the next five years.



Example of using rock to protect adjacent coastal wetland. Credit, CCRM.

Strategy 1: Conserve, restore, enhance, and create coastal wetlands in the face of changing conditions.
A. Restore or create 50 acres of coastal wetlands through large-scale restoration projects and living shoreline implementation.
B. Conserve 50 acres of coastal wetlands by protecting them from erosion.
C. Enhance the function of 50 acres of coastal wetlands.
D. Support the Middle Peninsula Planning District Commission’s Fight the Flood Program in their efforts to monitor Joint Permit Applications and coordinate with applicants to connect them to grants/loans for their living shoreline project
Strategy 2: Conserve and expand tidal wetlands migration corridors.
A. Identify tidal wetlands migration corridors in the region by expanding initial modeling efforts.
B. Conserve 50 acres of uplands identified as potential tidal wetlands migration corridors.

Strategy 3: Improve coordination among federal, tribal, state, and local governments and nonprofits on coastal wetlands restoration and conservation efforts.

- A. Maintain partner engagement and progress on the Plan’s goals by convening bimonthly meetings of the York River Roundtable Habitat Restoration Steering Committee and an annual regional meeting.
- B. Continue and expand engagement with local and state government environmental and wetlands staff to identify training or other professional needs.
- C. Partner and coordinate with the Virginia Security Corridor Sentinel Landscape team to integrate efforts on the Middle Peninsula within a larger Commonwealth strategy for wetland conservation, enhancement, and restoration.

Strategy 4: Increase community members’ and decision makers’ knowledge and appreciation of the role wetlands play in protecting coastal communities and ecosystems.

- A. Increase public access and interpretive signage on existing infrastructure (e.g., posts, railings, piers, kiosks, buildings) that does not result in ground disturbance at publicly owned wetlands areas or adjacent uplands.
- B. Broadly share informational resources, including those on the [multiple benefits of wetlands](#) to communities.
- C. Continuously support a community-based social marketing campaign with measurable outcomes connecting the public to wetlands contributions to coastal community resiliency and Chesapeake Bay seafood (based on [“Save the Crabs -Then Eat ‘Em”](#)).

Strategy 5: Prioritize partnership building and projects with underserved communities impacted by wetlands losses.

- A. Work in partnership with underserved community members to restore and conserve wetlands, as identified in Strategy 1, in a way that supports their priorities for projects in their communities, whether on their privately owned lands or in community spaces.

Strategy 6: Support research and development of guidance to close knowledge gaps for wetlands management and restoration.

- A. Develop, collaborate, coordinate, manage, and/or support at least three collaborative research projects on topics identified.

Site Selection

The Roundtable recommends the following sites in the York River, Piankatank River, and Mobjack Bay for wetlands conservation, restoration, and enhancement projects.

The Chesapeake Bay Program’s Goal Implementation Team-funded Marsh Adaptation Project Team is collaborating with members of the Roundtable’s Habitat Steering Committee on the development of a data compilation map and interpretation framework that includes resilience, conservation value, and social vulnerability metrics for wetlands restoration and conservation site selection. The Roundtable will incorporate its results as they become available and update these sites as appropriate.



Marsh surrounding Taskinas Creek. Credit, CCRM.

Private properties in the York, Piankatank, Mobjack Bay tidal watershed area

Owned by: various individual homeowners, community associations, hunting clubs, non-profit organizations, and private academic institutions

Wetlands approaches include: restoration, conservation, or enhancement

Note: Most coastal wetlands in the Plan area are owned by private citizens; these recommended actions would be voluntary. Example sites could include those identified in the [Gloucester County Shoreline Management Plan](#) (i.e. at Puritan Bay in the York River and at Hell Neck on the Piankatank River).

Dragon Run in Piankatank Tributary

Owned by: private property owners and some large continuous public parcels

Wetlands approaches include: conservation

Note: Friends of Dragon Run has offered to identify potential locations within that freshwater tidal marsh.

New Point Comfort Natural Area Preserve in Mobjack Bay

Owned by: The Nature Conservancy, with a conservation easement owned by Virginia Department of Conservation and Recreation

Wetlands approaches include: conservation

Note: A living shoreline site design is being developed by Virginia Institute of Marine Science for the Middle Peninsula Planning District Commission.

Middle Peninsula State Park in York River

Owned by: Virginia Department of Conservation and Recreation

Wetlands approaches include: restoration or conservation

Note: U.S. Army Corps of Engineers is partnering with Virginia Department of Conservation and Recreation to study and potentially design a living shoreline at this site.

York River State Park in York River

Owned by: Virginia Department of Conservation and Recreation

Wetlands approaches include: enhancement

Note: *Phragmites* removal is a priority in Taskinas Creek.

Catlett Islands & Machicomico State Park in York River

Owned by: Chesapeake Bay National Estuarine Research Reserve - Virginia & Virginia Department of Conservation and Recreation

Wetlands approaches include: restoration, conservation, or enhancement

Note: These sites are adjacent. On behalf of the Chesapeake Bay National Estuarine Research Reserve - Virginia, the Virginia Institute of Marine Science Shoreline Studies Program developed a living shoreline design for a site within and a shoreline management plan for the entire Machicomico State Park. Small enhancement work at Catlett Islands (removal of 5-6 isolated *Phragmites* patches) may be appropriate.

Goodwin Island in York River

Owned by: Virginia Institute of Marine Science/ Chesapeake Bay National Estuarine Research Reserve - Virginia

Wetlands approaches include: conservation or enhancement

Note: This island is a component of Chesapeake Bay National Estuarine Research Reserve - Virginia.

Guinea Marsh Wildlife Management Area in Mobjack Bay

Owned by: Virginia Department of Wildlife Resources

Wetlands approaches include: restoration, conservation, or enhancement

Note: This site is a potential marsh migration corridor.

U.S. Coast Guard Training Center in Wormley Creek, York River

Owned by: U.S. Coast Guard
Wetlands approaches include: restoration or conservation
Note: Conceptual designs have been developed for this high-energy site.

Middle Peninsula Chesapeake Bay Public Access Authority’s Virginia Coastal Wilds sites through the York, Piankatank, and Mobjack Bay

Owned by: Middle Peninsula Chesapeake Bay Public Access Authority
Wetlands approaches include: restoration, conservation, or enhancement
Note: The sites vary in size and wetlands condition.

Big Island in Mobjack Bay

Owned by: Middle Peninsula Chesapeake Bay Public Access Authority primarily
Wetlands approaches include: restoration or conservation
Note: The Virginia Department of Conservation and Recreation could be a potential partner.

Colonial National Historical Park in York River

Owned by: National Park Service
Wetlands approaches include: restoration, conservation, or enhancement
Note: National Park Service will be designing and implementing a wetlands restoration project from Felgate Creek to Naval Weapons Station (revegetate current fringe wetlands and convert non-vegetated wetlands area to tidal wetlands behind the breakwaters at Felgate’s Creek and along the eastern stretch of Indian Fields Creek). *Phragmites* removal may be included in their actions.

Naval Weapons Station Yorktown & Naval Station Cheatham Annex in York River

Owned by: U.S. Navy
Wetlands approaches include: restoration, conservation, or enhancement
Note: Some work is already underway to build a living shoreline at Penniman Spit and oyster structures along the shoreline at Naval Weapon Station Yorktown to prevent shoreline erosion and wetlands impacts.



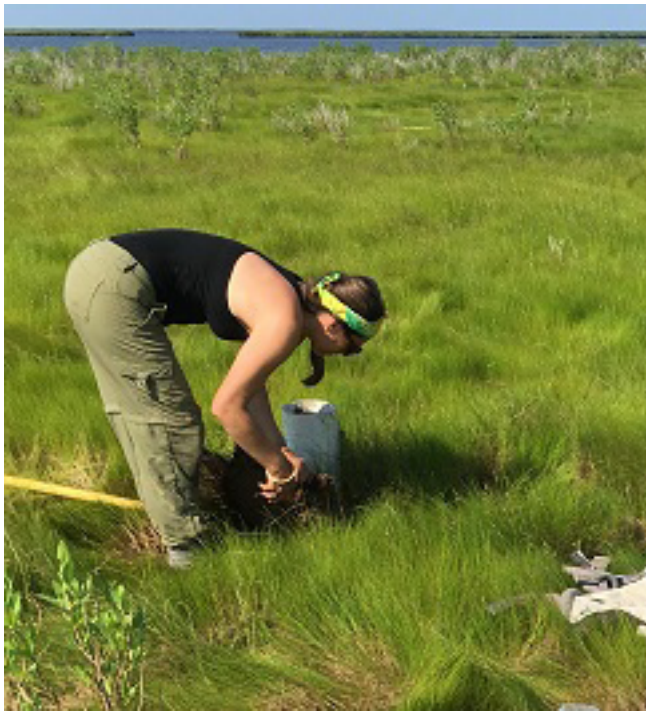
Revegetation of coastal wetlands. Credit, Ecosystem Restoration and Management, Inc.

Recommended Monitoring Criteria

As funding and circumstances allow, the Roundtable recommends the following monitoring criteria for wetlands projects implemented in the Roundtable region:

- To assess shoreline stabilization, use the following:
 - Elevation (changes due to erosion/accretion can indicate shoreline stability in response to external forces).
 - Shoreline position (provides information about the impacts to the shoreline from wave energy or erosion).
- To assess habitat and biodiversity, use the following:
 - Vegetation cover and zonation (percent cover, area, shoot density, biomass), as increased vegetative coverage and density can improve shoreline stability and resilience. Well-established vegetation provides nursery, refuge, and forage areas for finfish, crustaceans, ducks, and colonial waterbirds. Marsh vegetation zonation (to include low marsh, high marsh, and the marsh ecotone) can also indicate shoreline stability and marsh restoration success.

The Roundtable also recommends using photography taken at the same wetland site over time, preferably seasonally georeferenced photos that include a single control point, to document changes in vegetation and elevation. If you are considering including socio-economic monitoring metrics for your wetlands restoration, conservation, and enhancement projects, we recommend that you consult [AdaptVA](#) (2017), and [A Guide for Incorporating Ecosystem Service Valuation Into Coastal Restoration Projects](#) (2015) produced by The Nature Conservancy with funding from NOAA.



Wetland monitoring. Credit, CCRM.

References

ADAPTVA, 2023. Adapt Virginia website. Center for Coastal Resources Management, Virginia Institute of Marine Science, William & Mary, Gloucester Point, Virginia. ADAPTVA. <http://adaptva.com/>

Center for Coastal Resources Management (CCRM). 2019. Virginia Shoreline and Tidal Marsh Inventory, Virginia Institute of Marine Science, William & Mary, Gloucester Point, Virginia. <http://www.vims.edu/ccrm/research/inventory/virginia/index.php>.

Chesapeake Bay Program (CBP), 2020. Chesapeake Progress. Accessed August 10, 2022. <https://www.chesapeakeprogress.com>.

EPA, 2023. Why Are Wetlands Important website. <https://www.epa.gov/wetlands/why-are-wetlands-important>.

Erwin, K.L. 2009. Wetlands and global climate change: the role of wetland restoration in a changing world. *Wetlands Ecol Manage* 17, 71–84 (2009), doi: doi.org/10.1007/s11273-008-9119-1.

“Estuary Habitat | NOAA Fisheries.” NOAA Fisheries. Accessed August 9, 2022. <https://www.fisheries.noaa.gov/national/habitat-conservation/estuary-habitat>.

Kirwan, M. and J. Megonigal. Tidal wetland stability in the face of human impacts and sea-level rise. *Nature* 504, 53–60 (2013), doi: <https://doi.org/10.1038/nature12856>.

Kirwan, M. L., D. C. Walters, W. G. Reay, and J. A. Carr (2016), Sea level driven marsh expansion in a coupled model of marsh erosion and migration, *Geophys. Res. Lett.*, 43, 4366–4373, doi: [10.1002/2016GL068507](https://doi.org/10.1002/2016GL068507).

Mitchell, M., J. Herman, D. M. Bilkovic, and C. Hershner. 2017. Marsh persistence under sea-level rise is controlled by multiple, geologically variable stressors, *Ecosystem Health and Sustainability*, 3:10, doi: [10.1080/20964129.2017.1396009](https://doi.org/10.1080/20964129.2017.1396009).

Mitchell, M., J. Hendricks, D. Schatt, and M. Berman. 2022. Road accessibility from county seat under flooding: Middle Peninsula, Northern Neck, Southside. William & Mary, doi: doi.org/10.25773/22ma-q818

Mitchell, M., K. Nunez, J. Herman, and C. Tombleson, C. 2022. Scope of Work 8: Synthesis of Shoreline, Sea Level Rise, and Marsh Migration Data for Wetland Restoration Targeting. Center for Coastal Resources Management, Virginia Institute for Marine Science. Final report to the Chesapeake Bay Trust.

NOAA Office for Coastal Management, 2023: NOAA’s Coastal Change Analysis Program (C-CAP) 2001 Regional Land Cover Data - Coastal United States, <https://www.fisheries.noaa.gov/inport/item/48330>.

Nunez, K., Y. Zhang, D. M. Bilkovic, and C. Hershner (2021). Coastal setting determines tidal marsh sustainability with accelerating sea-level rise. *Ocean & Coastal Management*, 214, 105898. <https://doi.org/10.1016/j.ocecoaman.2021.105898>.

Pogue, P. and V. Lee. 1999. Providing Public Access to the Shore: The Role of Coastal Zone Management Programs, *Coastal Management*, 27:2-3, 219-237, doi: [10.1080/089207599263848](https://doi.org/10.1080/089207599263848).

Scheld, A. and D.M. Bilkovic. 2023. Personal communication.

“Social Dimensions of Climate Change.” World Bank. Accessed March 30, 2023. <https://www.worldbank.org/en/topic/social-dimensions-of-climate-change>.

“Wetlands.” Chesapeake Progress. Accessed August 10, 2022. <https://www.chesapeakeprogress.com/abundant-life/wetlands>.

White, E.E., E. A. Ury, E. S. Bernhardt, et al. Climate Change Driving Widespread Loss of Coastal Forested Wetlands Throughout the North American Coastal Plain. *Ecosystems* 25, 812-827 (2022).

Appendix: Funding Opportunities

Several funds encourage clean water and wetlands conservation and restoration, including the [Resilient Virginia Revolving Loan Fund](#), the [Virginia Shoreline Resiliency Fund](#), and the [Community Flood Preparedness Fund](#). Resources for private landowners include [Fight the Flood](#), [Wetlands Work](#), and the [Virginia Conservation Assistance Program](#). Funding for coastal resilience or habitat restoration grant awards from the [National Fish and Wildlife Foundation](#) and [NOAA Restoration Center](#) can also be spent on projects located on private or public lands. It is important to note that the availability and restrictions associated with these programs vary geographically and over time.

Virginia’s Coastal Zone Management Program (Virginia CZM) provides funding opportunities for living shoreline studies, designs, and implementation projects. All funds provided to Virginia CZM are from NOAA’s Office for Coastal Management. In addition, the U.S. Environmental Protection Agency’s Chesapeake Bay Program has made monies available for wetland projects via the states’ Chesapeake Bay Implementation Grants.

There is an influx of funding for habitat restoration, including wetlands, coming from the federal government through the [Bipartisan Infrastructure Law](#) (BIL) and the [Inflation Reduction Act](#). Virginia CZM and the Chesapeake Bay National Estuarine Research Reserve in Virginia (CBNERR-VA) will be applying for BIL funding on an annual basis and are well-positioned to assist public entities in the Middle Peninsula with proposals for land acquisition, and habitat restoration planning, engineering, and design.



www.yorkriverroundtable.org



Researchers fly a drone to map habitat on Goodwin Island.
Credit, Chesapeake Bay National Estuarine Research Reserve - Virginia.