

POCOMOKE SOUND CORRIDOR RESILIENCY DESIGN FRAMEWORK

SEPTEMBER 2024

Photo credit: Jay Fleming TNC


ACKNOWLEDGEMENTS

Funding for the Pocomoke Sound Corridor Resiliency Framework was provided by the Environmental Protection Agency through the Chesapeake Bay Trust.



THE POCOMOKE SOUND

INTRODUCTION

 Project Boundary

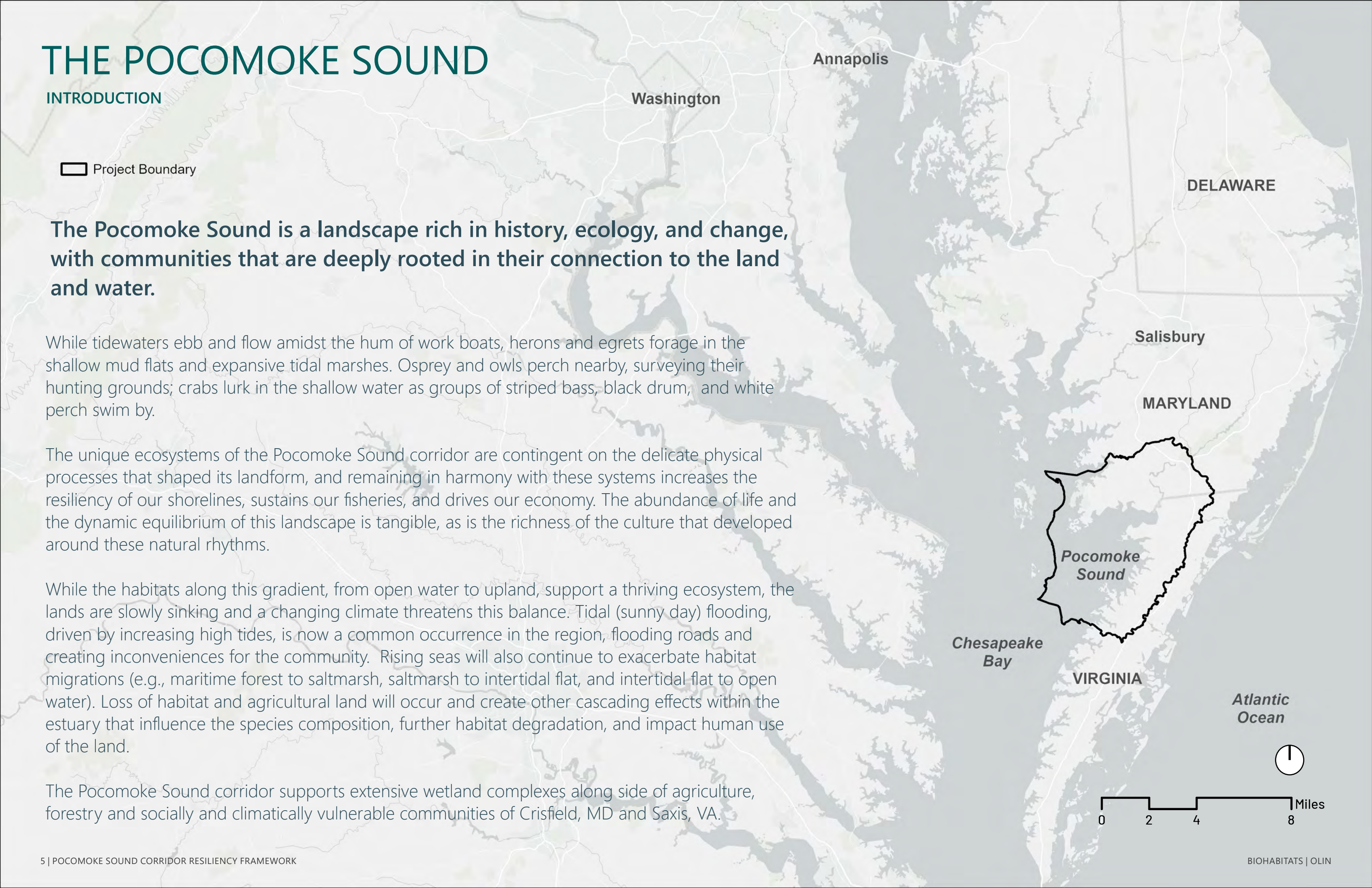
The Pocomoke Sound is a landscape rich in history, ecology, and change, with communities that are deeply rooted in their connection to the land and water.

While tidewaters ebb and flow amidst the hum of work boats, herons and egrets forage in the shallow mud flats and expansive tidal marshes. Osprey and owls perch nearby, surveying their hunting grounds; crabs lurk in the shallow water as groups of striped bass, black drum, and white perch swim by.

The unique ecosystems of the Pocomoke Sound corridor are contingent on the delicate physical processes that shaped its landform, and remaining in harmony with these systems increases the resiliency of our shorelines, sustains our fisheries, and drives our economy. The abundance of life and the dynamic equilibrium of this landscape is tangible, as is the richness of the culture that developed around these natural rhythms.

While the habitats along this gradient, from open water to upland, support a thriving ecosystem, the lands are slowly sinking and a changing climate threatens this balance. Tidal (sunny day) flooding, driven by increasing high tides, is now a common occurrence in the region, flooding roads and creating inconveniences for the community. Rising seas will also continue to exacerbate habitat migrations (e.g., maritime forest to saltmarsh, saltmarsh to intertidal flat, and intertidal flat to open water). Loss of habitat and agricultural land will occur and create other cascading effects within the estuary that influence the species composition, further habitat degradation, and impact human use of the land.

The Pocomoke Sound corridor supports extensive wetland complexes along side of agriculture, forestry and socially and climatically vulnerable communities of Crisfield, MD and Saxis, VA.





CHAPTER 1 //

FRAMEWORK OVERVIEW

Photo credit: Matt Kane


FRAMEWORK OVERVIEW

The Pocomoke Sound Corridor Resiliency Framework is a high level, forward-looking landscape scale plan that addresses ecosystem and community resiliency and adaptation as sea level rises and flooding increases within the region.

The Framework is the first phase of a multi-phase effort. Future phases will incorporate community engagement, identify specific types and locations of restoration projects, and eventually lead to the implementation of projects that bolsters the regions' ecosystem and community adaptation and resiliency.

Recognizing that the Pocomoke Sound corridor can be a leader among similarly positioned communities facing sea level rise, the major towns of Saxis and Crisfield have been working actively to develop plans and projects focused on adaptation and resiliency in the presence of rising tides and increased flooding. This Framework intends to connect and support these ongoing efforts as discussed in further detail within the Existing Conditions section. Furthermore, the Framework offers a range of strategies that can be adapted for use by other communities around the Chesapeake Bay region.

VISION



A resilient Pocomoke Sound includes both human and ecological communities that are connected to each other and live synergistically with changing lands and water through strategies that protect, adapt, and mitigate future climate change.



CHAPTER 2 //

GEOGRAPHIC CONTEXT

Photo credit: Jay Fleming TNC

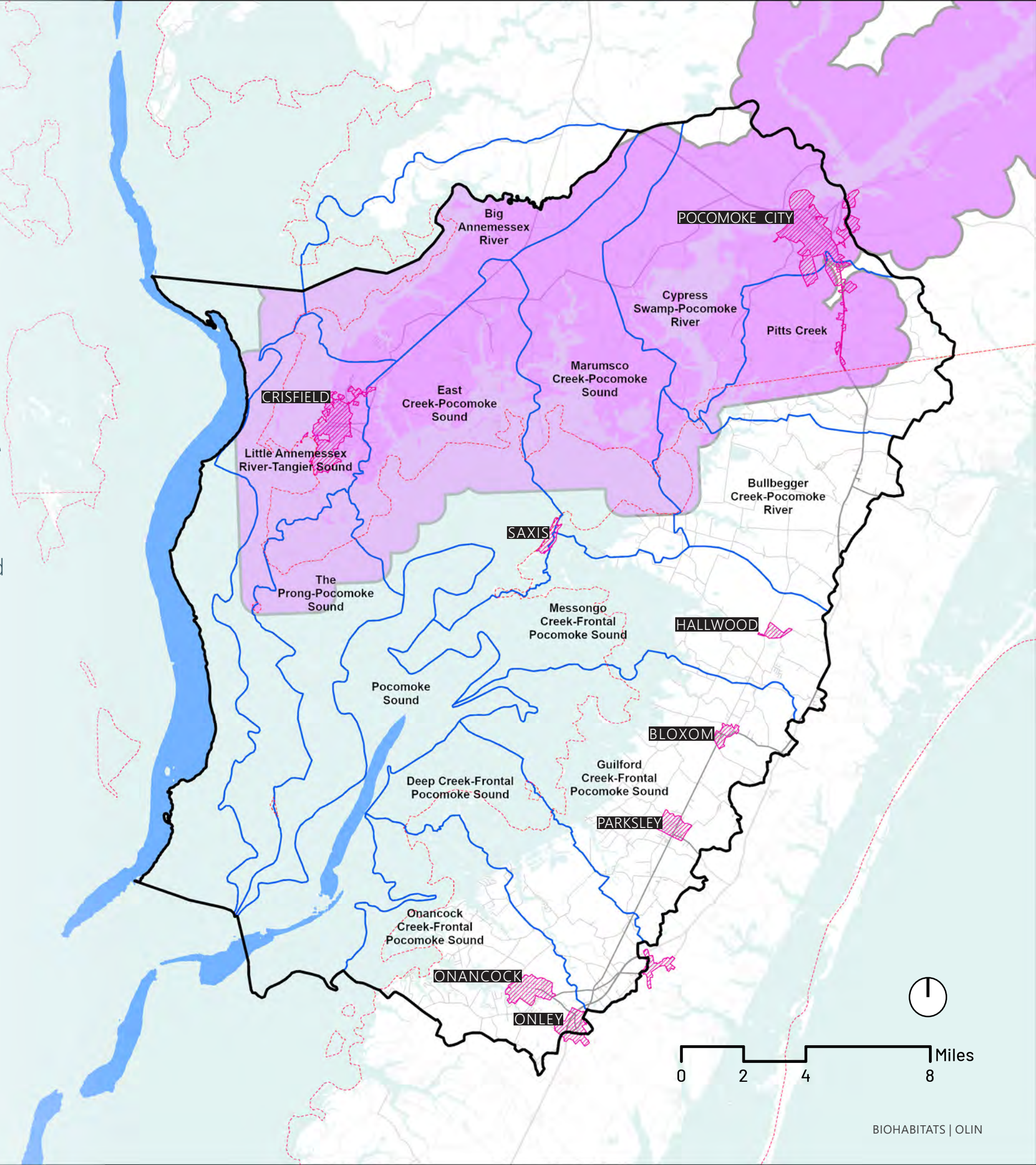
PROJECT AREA BOUNDARY

GEOGRAPHIC CONTEXT

- Watersheds (HUC12)
- Bay Channel ($\geq 15m$)
- Pocomoke Coastal Heritageshed
- Communities

As the southernmost estuary along the eastern Chesapeake Bay, Pocomoke Sound and its surrounding human and ecological communities are shared between Maryland and Virginia. The Pocomoke Sound corridor encompasses 343,572 acres (536 square miles), including the Pocomoke Sound, some portions of the Tangier Sound, and the Maryland and Virginia coastal communities that border these waters. This border was determined by watershed boundaries combined with community and physiographic features, including the expansion of the northwestern boundary in order to fully encompass the Crisfield peninsula. According to the National Land Cover Database (NCLD), the study area covers approximately 309 square miles of land and 227 square miles of water.

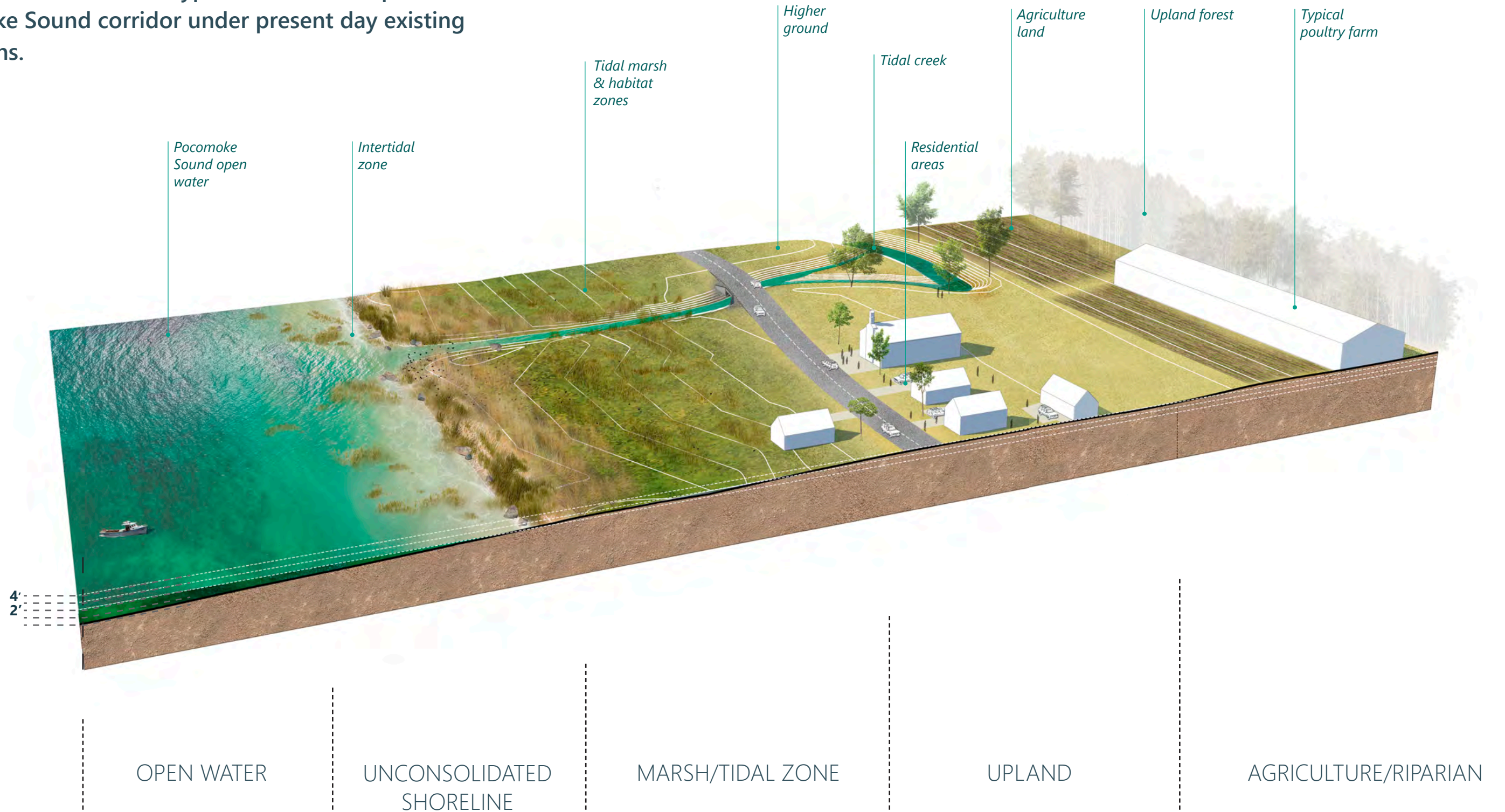
The Pocomoke Sound region is sustained by the brackish tides of the Chesapeake Bay and by freshwater tributaries flowing from land. The main tributary to the Pocomoke Sound is the Pocomoke River, which is the deepest river for its width in the United States, and the second deepest in the world. Other tributaries include the Little Annemessex River, East Creek, and Marumsco Creek in Maryland, and Onancock Creek, Messongo Creek, and Guilford Creek in Virginia. The mouth of the Pocomoke River marks the divide between Worcester and Somerset County, Maryland to the north and Accomack County, Virginia to the south.



BASELINE SCENARIO

EXISTING CONDITIONS

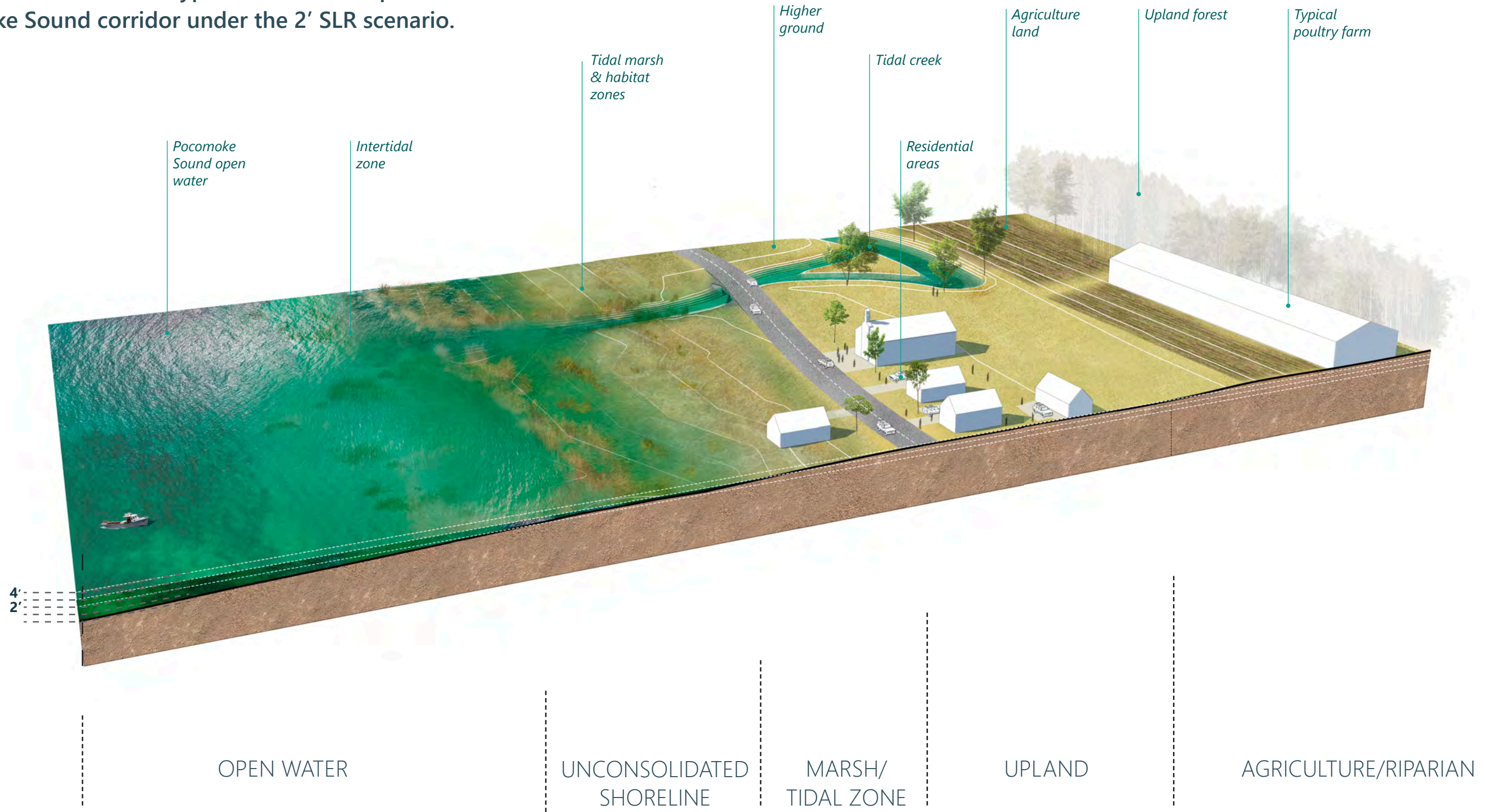
This graphic illustrates a hypothetical landscape in the Pocomoke Sound corridor under present day existing conditions.



BASELINE SCENARIO

EXISTING CONDITIONS + 2' SLR

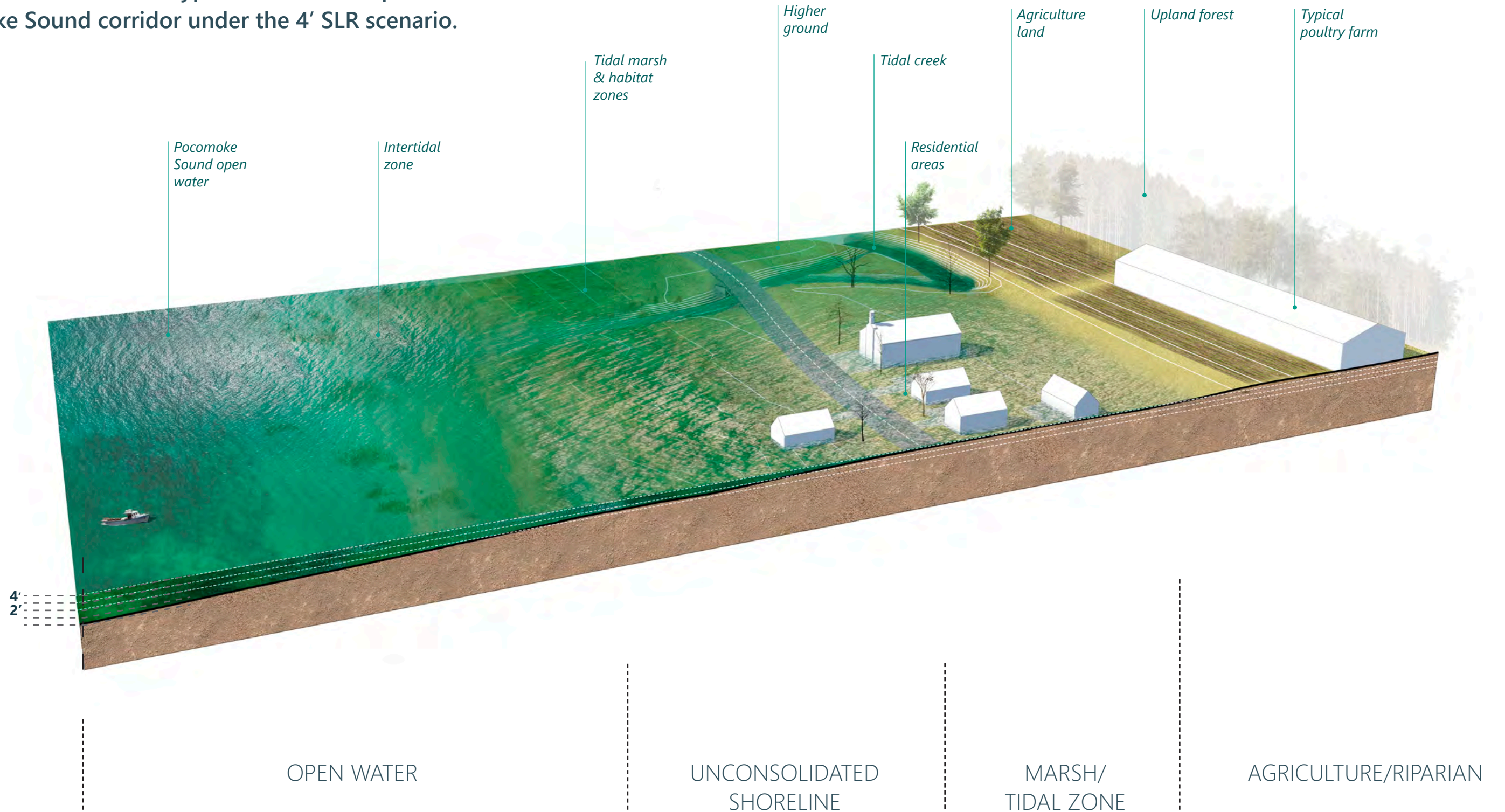
This graphic illustrates a hypothetical landscape in the Pocomoke Sound corridor under the 2' SLR scenario.



BASELINE SCENARIO

EXISTING CONDITIONS + 4' SLR

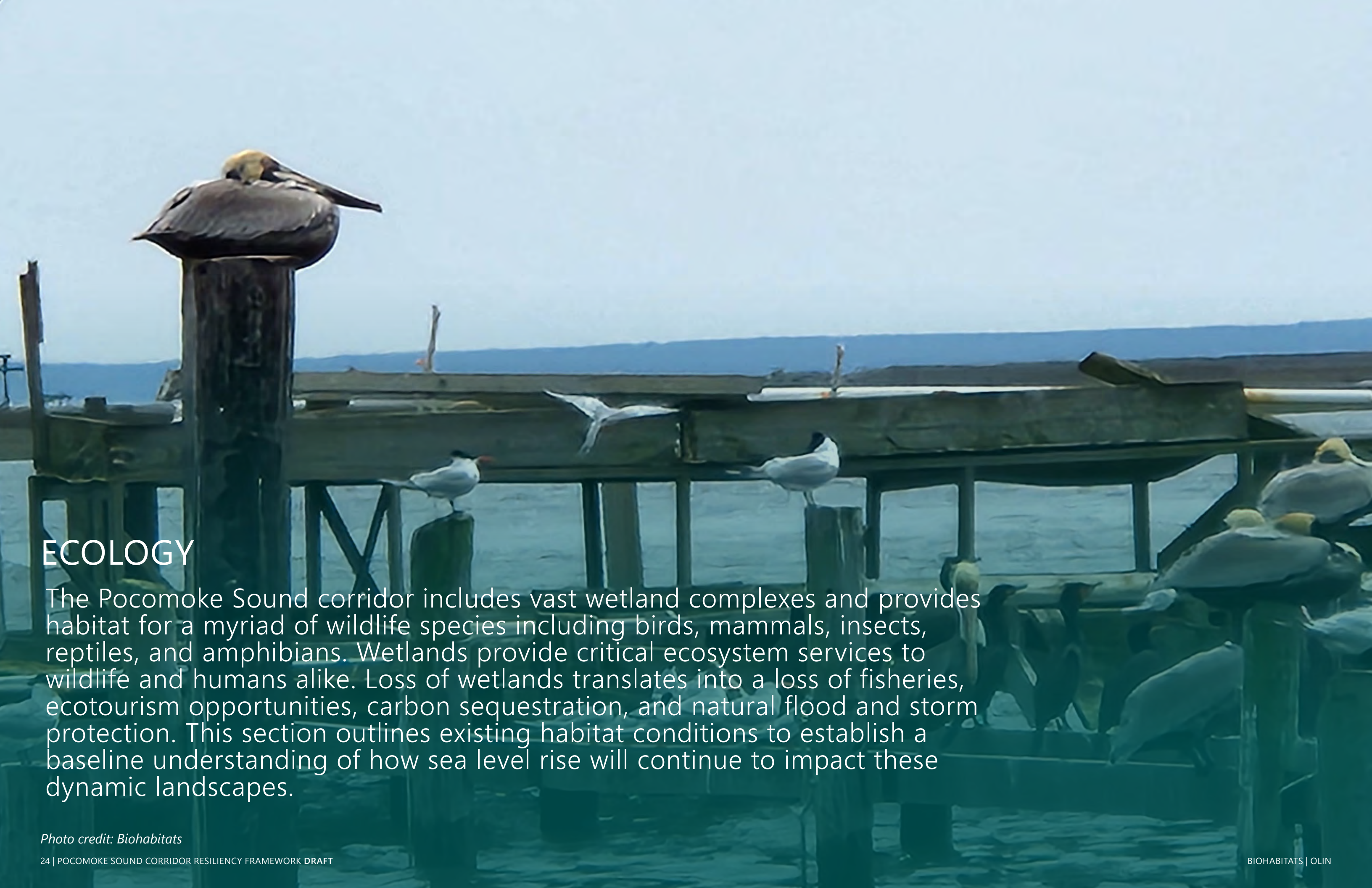
This graphic illustrates a hypothetical landscape in the Pocomoke Sound corridor under the 4' SLR scenario.



CHAPTER 4 //

EXISTING CONDITIONS

Photo credit: Jay Fleming TNC



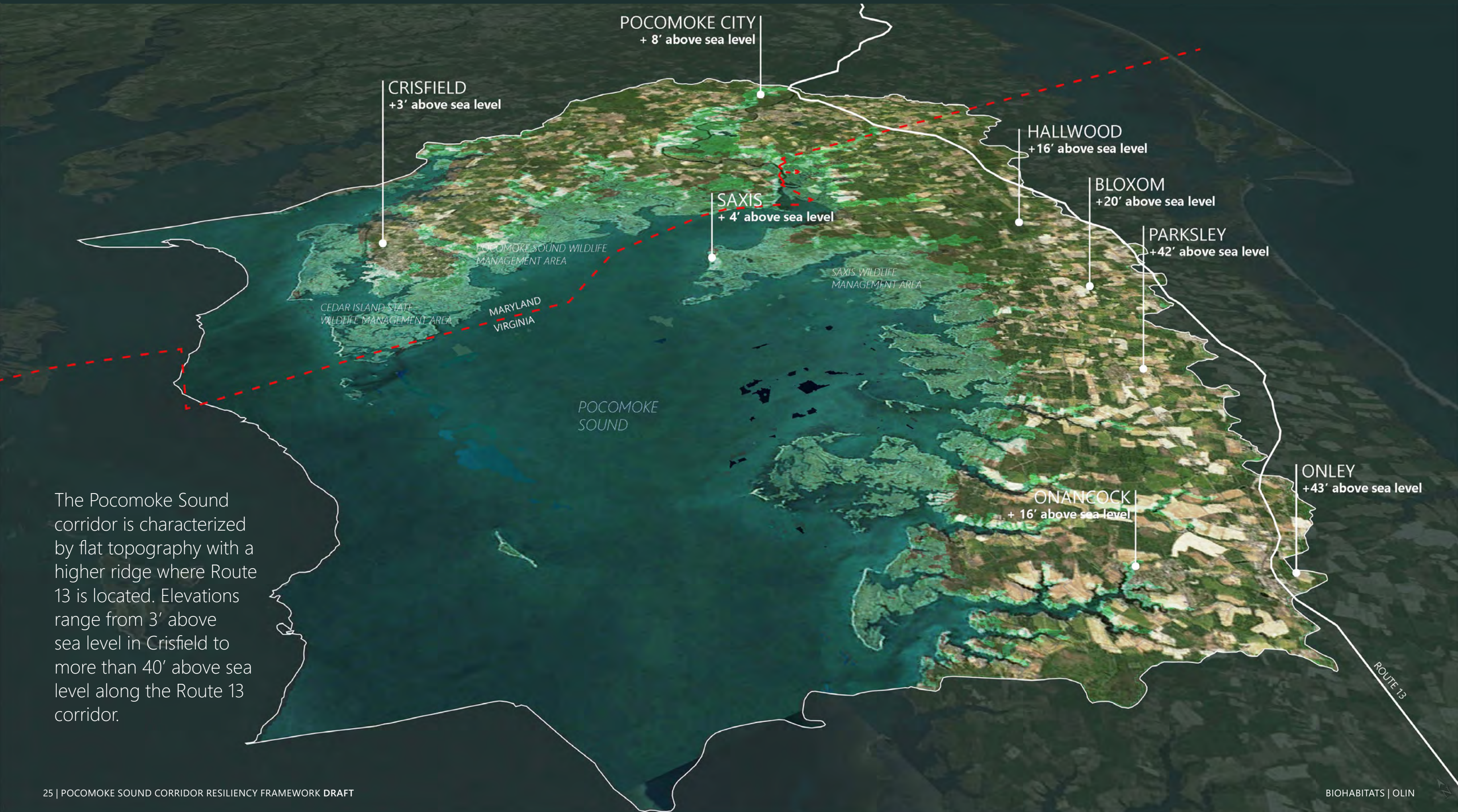
ECOLOGY

The Pocomoke Sound corridor includes vast wetland complexes and provides habitat for a myriad of wildlife species including birds, mammals, insects, reptiles, and amphibians. Wetlands provide critical ecosystem services to wildlife and humans alike. Loss of wetlands translates into a loss of fisheries, ecotourism opportunities, carbon sequestration, and natural flood and storm protection. This section outlines existing habitat conditions to establish a baseline understanding of how sea level rise will continue to impact these dynamic landscapes.

Photo credit: Biohabitats

TOPOGRAPHY

EXISTING CONDITIONS - ECOLOGY

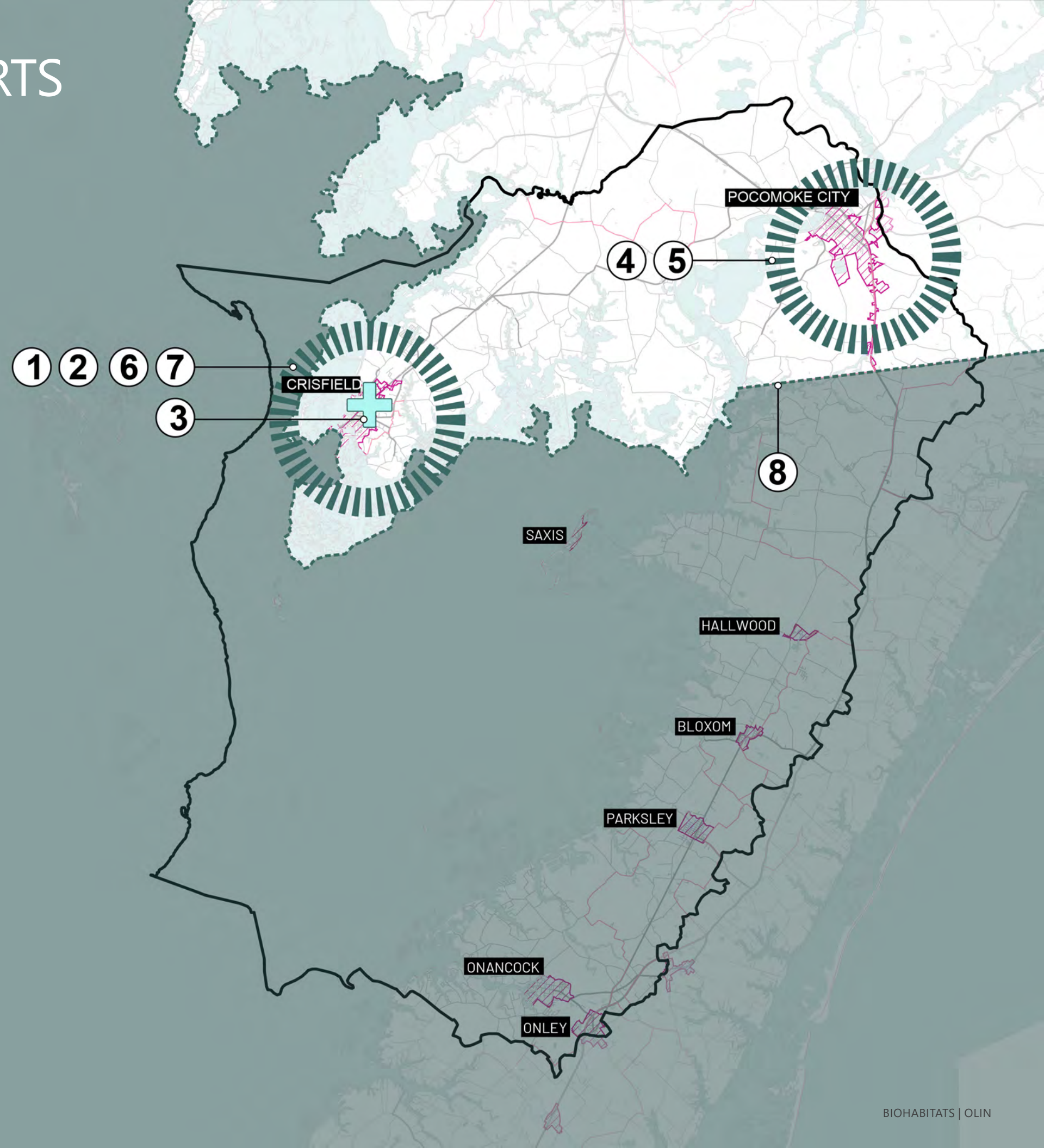


The Pocomoke Sound corridor is characterized by flat topography with a higher ridge where Route 13 is located. Elevations range from 3' above sea level in Crisfield to more than 40' above sea level along the Route 13 corridor.

EXISTING & ONGOING EFFORTS

MARYLAND

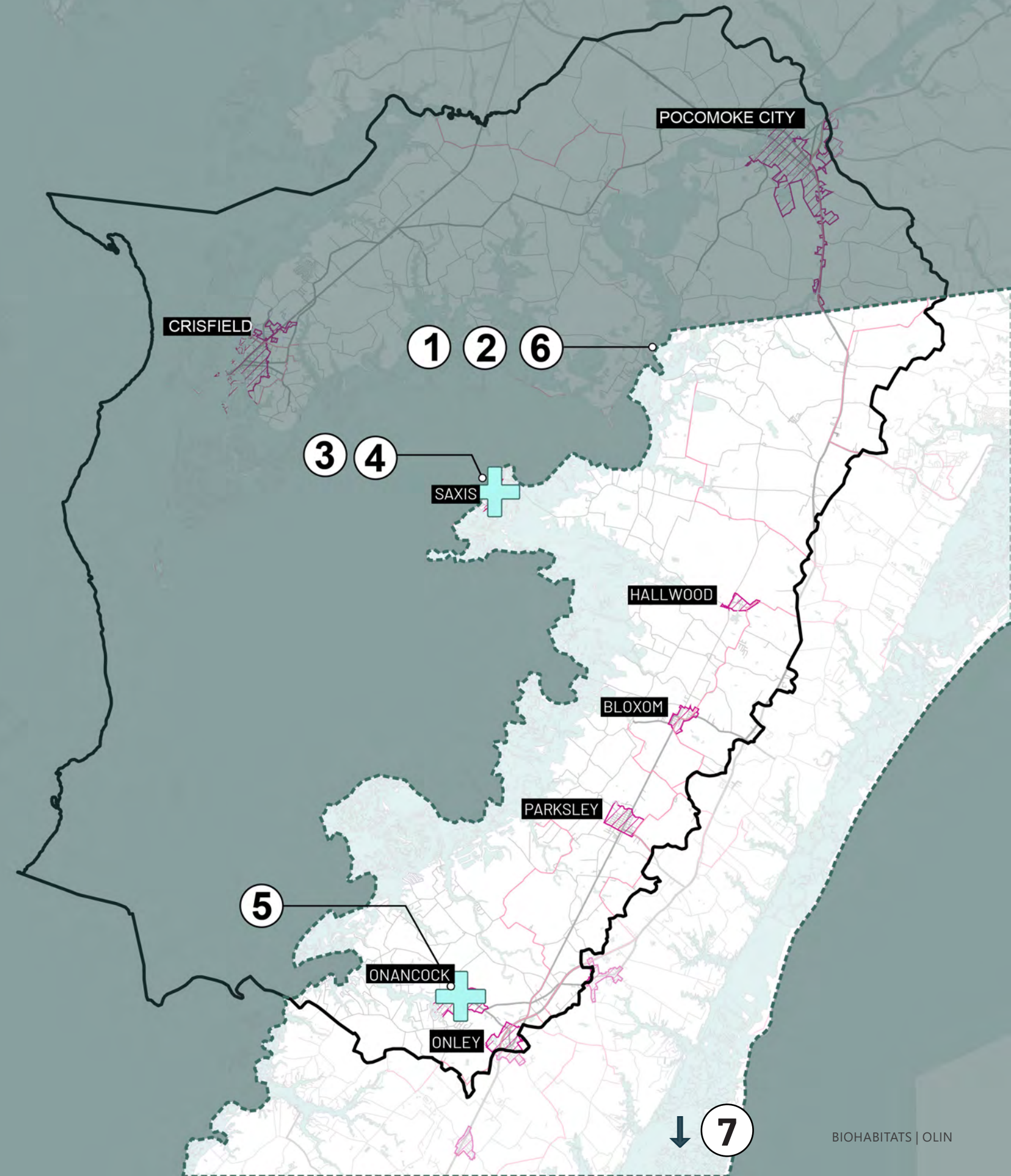
- 1 Staying Afloat: Assessing the Long-Term Financial Impacts of Sea-Level Rise Adaptation Solutions in a Historic Coastal Community (NOAA Adaptation Sciences Grant)**
- 2 Crisfield Mitigation Projects (including 2024 FEMA BRIC)**
- 3 EPA Nature-Based Solutions / Climate Resiliency Academy**
- 4 Resiliency through Restoration/ Targeted Resiliency Area (MDNR)**
- 5 Pocomoke City NOAA Effects of Sea Level Rise (ESLR) Program**
- 6 Crisfield Vision Plan**
- 7 Crisfield Community Action Plan**
- 8 Marshes for Tomorrow**



EXISTING & ONGOING EFFORTS

VIRGINIA

- ① Eastern Shore of Virginia Hazard Mitigation Plan
- ② Climate Equity Atlas
- ③ Adaptation and Resilience Plan for Saxis, VA
- ④ Resilience Adaptation Feasibility Tool (RAFT): Saxis
- ⑤ Resilience Adaptation Feasibility Tool (RAFT): Onancock
- ⑥ Virginia Coastal Resilience Masterplan
- ⑦ Oyster Village Coastal Adaptation and Resilience Plan



EXISTING & ONGOING EFFORTS THEMES

- Developing resilience strategies together with community members, as employed through the NOAA Staying Afloat project, UVA's Climate Equity Atlas, and other recent regional initiatives demonstrate the importance of aligning strategies with community priorities and connecting to existing community leaders. The EPA Climate Resiliency Academy offers an exciting and new precedent for local leadership and capacity building.
- Several communities in the Pocomoke Sound have had success with federal grants such as NOAA, NFWF, and FEMA-BRIC, which are strengthened by local partnerships. State grants in Maryland have furthered some local resiliency projects, and upcoming resiliency funding in Virginia can be connected to identified future priorities.
- Strong partnerships with regional universities and NGOs have enabled numerous research and funding opportunities:
 - George Mason University (NOAA Staying Afloat project, 2 NOAA ESLR projects)
 - University of Maryland Environmental Finance Center (EFC) (NOAA Staying Afloat project)
 - University of Virginia Equity Center (Climate Equity Atlas)
 - University of Virginia Environmental Institute (Climate Equity Project)
 - The Institute for Engagement & Negotiation at the University of Virginia (RAFT)
 - Old Dominion University Resilience Collaborative / Old Dominion University Sea Grant Climate Adaptation and Resilience Program (RAFT, Climate Equity Atlas)
 - Virginia Coastal Policy Center at the William & Mary Law School (RAFT, Climate Equity Atlas)
- Linking numerous initiatives together as building blocks of engagement and funding point to the opportunities for cohesive, regional planning. The numerous Crisfield studies, the Delmarva Restoration & Conservation Network, and Marshes for Tomorrow are examples of this.



CHAPTER 5 //

FUTURE RESILIENCY STRATEGIES - ECOLOGY

Photo credit: Biohabitats

ECOLOGY – PLANNING FOR CHANGING CONDITIONS

FUTURE RESILIENCY STRATEGIES

// PROTECT



These strategies protect vulnerable communities and habitats through the use of structural barriers (i.e., bermed roadways) and identifying and protecting critical existing habitats (i.e., long-standing SAV bed) through the use of natural based solutions (NBS) such as living breakwaters.

// ADAPT & MIGRATE



These strategies align to specific social or ecological management objectives to offset the scope and scale of resource loss and preserve the social fabric and ecological integrity of the Pocomoke Sound corridor.

STRATEGIES: PROTECT

FUTURE RESILIENCY STRATEGIES - PROTECT

Strategies that protect emphasize interventions that can protect existing community and natural resources by creating resiliency to sea level rise while also providing ecological value. These strategies are organized within two areas:

1 Nature-Based Solutions (NBS)

Nature-based solutions use natural features and processes to mitigate the effects of storm surge and rising sea levels while enhancing ecosystems.

2 Green-Gray Infrastructure

Green-gray infrastructure strategies combine conventional gray infrastructure approaches, such as bulk heads, with natural systems to provide both resiliency and ecological benefits.

These strategies can be combined for the purpose of maintaining or protecting natural areas and community infrastructure. Examples of scenarios where nature-based solutions and green-gray infrastructure might be employed:

- Sheltering existing or potential SAV habitat
- Providing supplemental oyster substrates
- Protecting marshes in a manner that supports a natural successional trajectory from high marsh to low marsh to SAV as sea level rises
- Reinforcing marshes that protect coastal communities
- Buffering wave energies along critical marsh migration corridors
- Providing supplemental habitat for economically important species like fish, oyster, and waterfowl
- Supporting opportunities for a broader place-based ecotourism economy, such as oyster reefs to support opportunities for oystering industries

NATURE-BASED SOLUTIONS

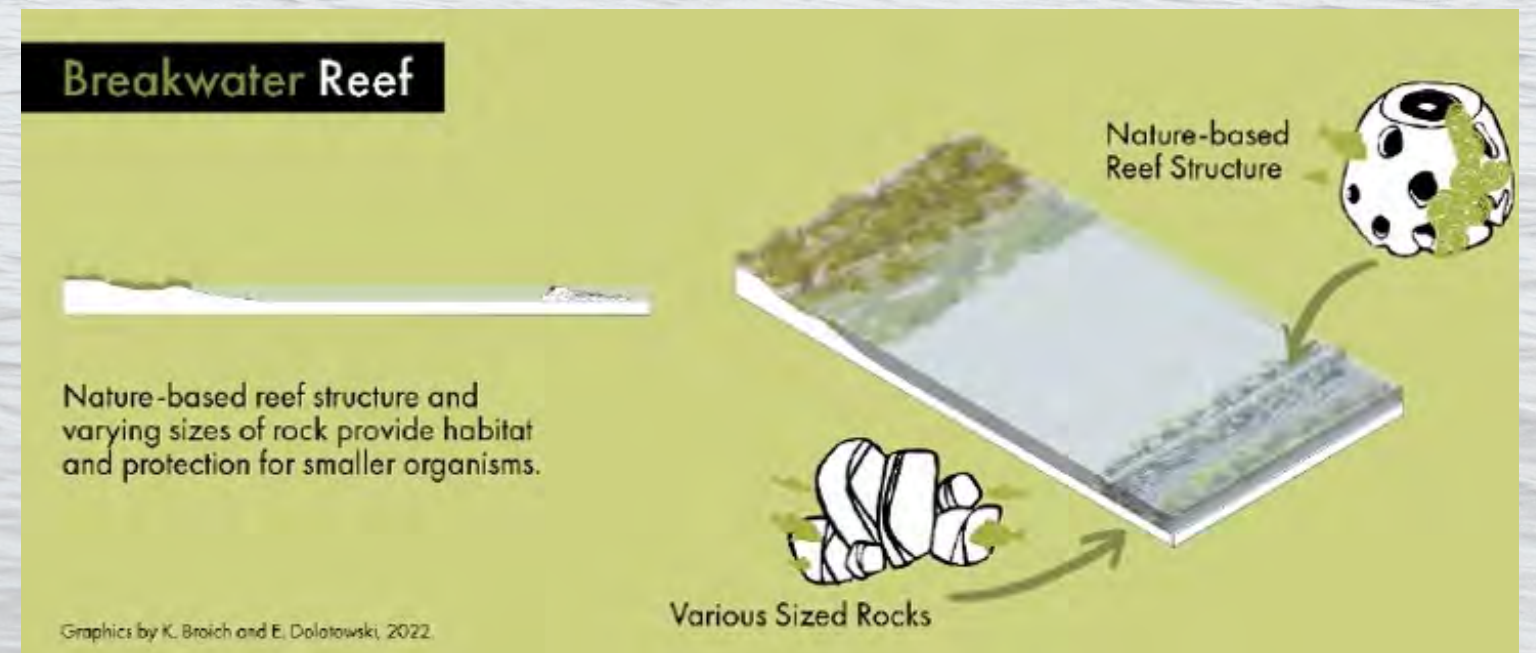
FUTURE RESILIENCY STRATEGIES - PROTECT

1 Living breakwaters

Living breakwaters serve the same functions as traditional breakwaters and can complement other gray or green infrastructure, but their design is modeled to mimic natural analogs. As a result, these breakwater may incorporate more gradual slopes to attenuate wave energies and provision of habitat. In addition, living breakwaters may incorporate a wide variety of natural substrates including wood and cobble among the larger structural elements to encourage colonization by aquatic invertebrates that provide forage for fish and other ecosystem functions.

Living breakwaters can be positioned adjacent to fast land to replace bulkheads or placed near shore as islands, reefs or sills. Depending on the intended function, living breakwaters can be constructed as reefs or sills that are generally submerged and trip incoming waves or can be constructed to higher elevations to address the energies of more extreme conditions and storm surge. In larger applications, living breakwaters can be constructed in series to create a mosaic of nearshore habitats and incorporate elements like oyster reefs, high marsh or other habitats to mimic barrier island and/or coastal dune habitats.

Living breakwaters serve the same function as their engineered analogues, but they incorporate elements that are designed to provide habitat and other ecological functions.



Credit: US Army Corps of Engineers

NATURE-BASED SOLUTIONS

FUTURE RESILIENCY STRATEGIES - PROTECT

2 Living shorelines

A living shoreline is an approach to shoreline stabilization that establishes a gently sloped beach that supports dense stands of marsh vegetation. **The combination of slope and vegetation attenuates wave energy, trap sediments, provide water quality benefits, and provision for habitat.**

To establish the gentle shoreline gradients, living shorelines do require space and sometimes require the construction of reinforced marsh toes or sills at the low tide elevation to transition to the natural bottom grade.

To buffer against higher wave energies and provide additional protections, living shorelines can be combined with living breakwaters, jetties/groynes and landform levees or their gray alternatives.



Living shorelines utilize natural means of stabilizing land and protecting from erosion while providing a gradient of habitat types.



NATURE-BASED SOLUTIONS

FUTURE RESILIENCY STRATEGIES - PROTECT

3 Tidal marsh restoration

Healthy marshes naturally buffer coastal energy and absorb floodwaters to protect vulnerable communities while providing vital habitat and other ecosystem services.

Marsh restoration is a strategy to make natural marshes more resilient to climate threats, so they can still provide these critical social and ecological functions. Marsh restoration involves studying existing marshes to understand their current condition and their vulnerability to sea level rise or other climate or anthropogenic threats.

Restoration strategies could include drainage improvement to offset impacts of built structures like roadways, elevated causeways, and levees that disrupt natural movement of water on the landscape. Alternatively, marshes threatened by sea level rise can be reinforced through the beneficial reuse of dredged material where natural sediment accumulation is outpaced by projected sea level rise. In engaging in restoration activities to address future scenarios, restoration strategies should consider phasing plans that mimic natural disturbance patterns and minimize ecological debt. **Ecological debt is incurred when a resource is disturbed and the recovery trajectory is the rate in which that debt is paid.**

To minimize the debt, the phasing plan should consider the proportions of undisturbed, recently disturbed, recovering, and recovered marsh at a given time and ensure these ratios are aligned with species conservation goals and preservation of adequate stands of local genotypes to support natural recruitment and regeneration options. Furthermore, the phasing should factor in adaptive management and provisioning for the habitat mosaic throughout the planning horizon and not just the endpoint.



*Blackwater NWR, Eastern Shore, MD
Photo Credit: Dagny Leonard, The Conservation Fund*

Marsh restoration involves understanding the site-specific dynamics that will determine the future of a marsh habitat. Restoration strategies, such as runneling and revegetation, not only include habitat enhancements for the near term, but must consider long-term resiliency and adaptation as sea levels rise.

NATURE-BASED SOLUTIONS

FUTURE RESILIENCY STRATEGIES - PROTECT

4 Inland wetland restoration

Non-tidal wetlands serve similar functions to tidal marshes to protect communities, provide water quality benefits, and provision for habitat. In the Pocomoke sound, much of the fast land at the tidal fringe is considered tidally influenced non-tidal wetland. As sea level rises, these areas will slowly transition to tidal wetland and the non-tidal fringe will migrate inland. **Providing space for migration to happen when planning other resiliency strategies will be important to preserving the long-term integrity of the region's ecology while also providing the economic and social benefits of flood protection.**

In targeted areas where wetland areas have been drained by ditching, the network of non-tidal wetlands and their associated social and ecological benefits can be expanded. One strategy that could provide multiple benefits is converting targeted sections of ditch pathways to stream and wetland complexes to restore natural drainage patterns. These complexes still provide for drainage, but spread the flow pathway across broad areas that provide enhanced nutrient processing and habitat. Shallow excavations to support this conversion can be used to construct shallow landform levees or raise adjacent lands to provide additional protections.

The expansion of nontidal wetlands and stream and wetland complexes adjacent and downstream waterways to improve the overall water quality and clarity in Pocomoke Sound for the benefit of aquatic life.



*Bacon Ridge Natural Area Inland Wetland restoration
Credit: Biohabitats*

The Pocomoke Sound contains large land areas where inland wetlands can be protected and restored. As sea levels rise, facilitating the inland migration of wetlands will be instrumental to maintaining ecological integrity and protecting from flooding.

NATURE-BASED SOLUTIONS

FUTURE RESILIENCY STRATEGIES - PROTECT

5 Sand dunes

Sand dunes are essentially naturally occurring levees formed by the accumulation of windblown sand along coastlines. **Where sand dunes have not naturally formed, they can be constructed as a nature-based solution that protects inland areas and marshes from coastal flooding while providing habitat.**

In their natural setting, these landforms are dynamic, yet resilient to coastal processes and function to block waves and prevent storm surges from penetrating inland where flooding can disrupt local ecosystems and economies.

As a green infrastructure strategy, sand dunes offer a more aesthetic and natural alternative to rip rap or earthen levees. Sand dunes can be planted with native beach grasses to provide stability, slow the wind, and add habitat value.



Photo credit: Shutterstock



Photo credit: Virginia Institute of Marine Science

Sand dunes can be constructed as an aesthetically pleasing nature-based solution that provides habitat and protects inland areas from coastal flooding.

NATURE-BASED SOLUTIONS

FUTURE RESILIENCY STRATEGIES - PROTECT

6 Oyster reefs

Oyster reefs are extremely productive habitats that provision for not only the growth and propagation of oyster but for all the fish and nekton that feed on them.

Complementary to their habitat functions, oyster reefs offer a myriad of complimentary ecosystem services including water filtration and wave dissipation that provide broader benefits to the Pocomoke Sound.

Oyster reefs and their analogues can be constructed as green infrastructure to provide effective barriers to buffer against the effects of sea level rise and storm surges, especially when used in combination with other nature-based solutions and green-grey infrastructure strategies including living breakwaters and marsh restoration. When used in combination, the benefits can be stacked and lead to more resilient living infrastructure, and includes enhancing/protecting the region's natural infrastructure and helping to sustain the socio-ecological fabric of the region.

If installed correctly, there is almost no downside to installing an oyster reef. They provide high-quality habitat, dissipate wave energy, improve water quality, and can be combined easily with other nature-based solutions.



NATURE-BASED SOLUTIONS

FUTURE RESILIENCY STRATEGIES - PROTECT

7 Drainage ditch retrofits

Ditches primarily function as conduits to drain the landscape. Efficient drainage is important to support social goals related to flood prevention or agricultural production, but the most efficient ditches also efficiently convey nutrients and other pollutants to downstream waterbodies and only provide limited habitat.

In the Pocomoke Sound corridor, ditches can also serve as conduits for tidal flow exacerbating the impacts of nuisance (sunny day) flooding on roadways. To provide ecological uplift with ditching strategies, ditches can be graded with more gradual side slopes to allow for vegetation establishment.

These vegetated side slopes provide habitat, uptake nutrients, and trap sediments from stormwater while the increased width and associated flow area compensates for the roughened, less efficient flow within the ditch.

In areas where land use conversion is possible, and space is available, ditch pathways can be converted to wide and shallow stream and wetland complexes that optimize conveyance capacity while enhancing ecological and water quality benefits. Buffer plantings can also complement ditches and provide enhanced water quality and habitat.

Drainage ditch retrofits can be a relatively low-impact method of improving habitat and water quality while restoring natural drainage patterns to the landscape.



Photo Credit: Conservation Corridor



Photo credit: More Organics

GREEN-GRAY INFRASTRUCTURE

FUTURE RESILIENCY STRATEGIES - PROTECT

1 Landform levees

Landform levees are horizontal levees used to protect against storm surges and flooding and generally require the use of pumps and tide gates. **The landform levee may have an engineered core to ensure the necessary infrastructure protection, but the slope, layout and surface materials of the levee are modeled after natural analogs like dunes.** Landform levees can be positioned to complement and or blend into existing habitats and established with native plant communities to blend into the landscape.

Landform levees can also be used as a basis of elevated roadways or trail networks. When used for road networks, it is important to maintain connectivity to high value habitats on the landscape and bridges may need to be incorporated to make the roadway permeable to the ebb and flow of the tidal prism and wildlife.

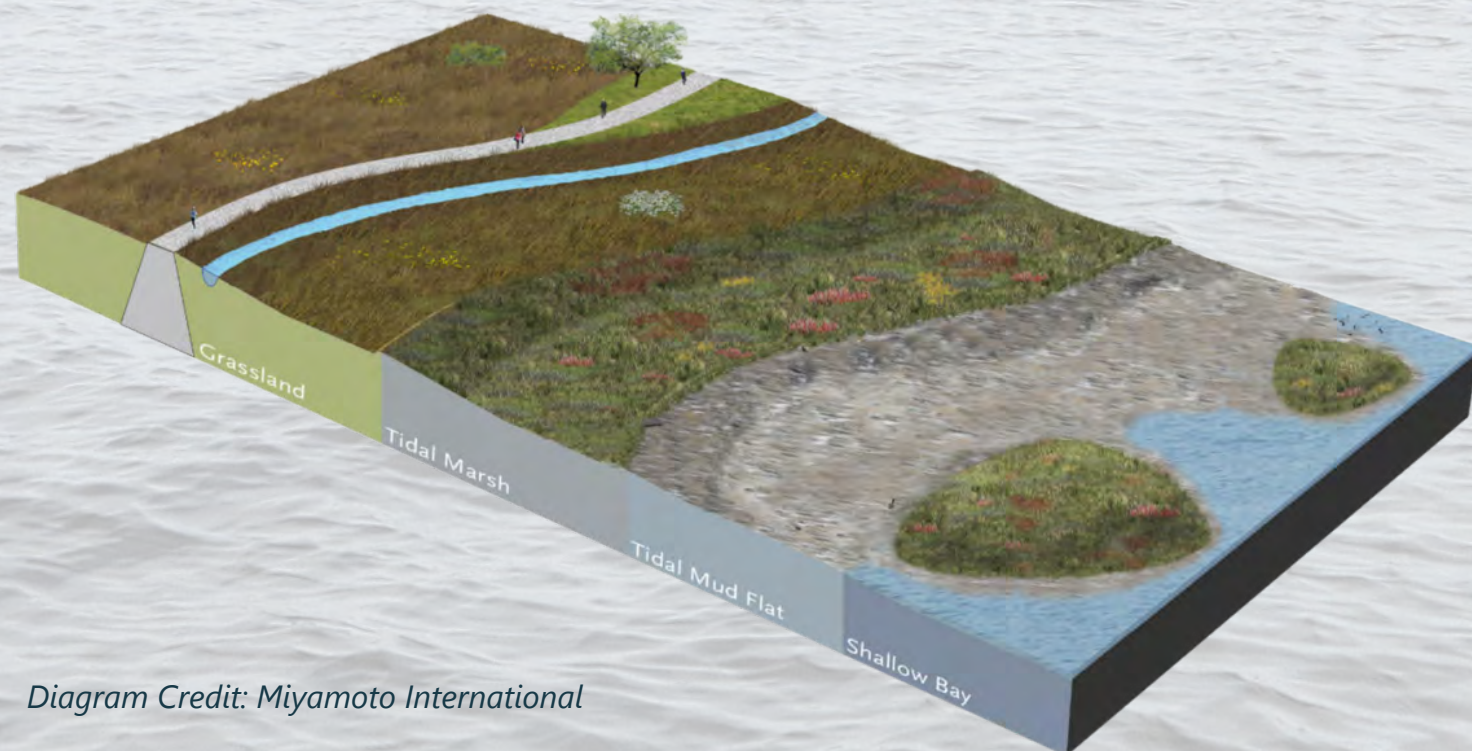


Diagram Credit: Miyamoto International



Palo Alto, CA.
Photo Credit: San Francisco Estuary Partnership

Roads and trails can be incorporated into landform levee structures, while maintaining habitat connectivity and protecting from storm surge.

GREEN-GRAY INFRASTRUCTURE

FUTURE RESILIENCY STRATEGIES - PROTECT

2 Elevated roadways

Elevating roadways in key locations will allow natural tidal flows to feed a vast area of existing and future wetlands. Raised (bermed) roadbeds and increasing land elevation can leave wetlands with nowhere to go as sea levels rise. Coastal tidal marshes can migrate into adjacent uplands if the area inland of the marsh is unimpeded by man-made barriers such as seawalls.

Creating permeability in the landscape for strategic wetland migration zones will be critical to minimizing the loss of wetlands.

Elevated roadways can be used in combination with bermed roadways to provide both storm surge protection for developed areas and permeability for marsh migration. Elevated roadways may be used in combination with berms that can protect and extend the life of freshwater wetlands.

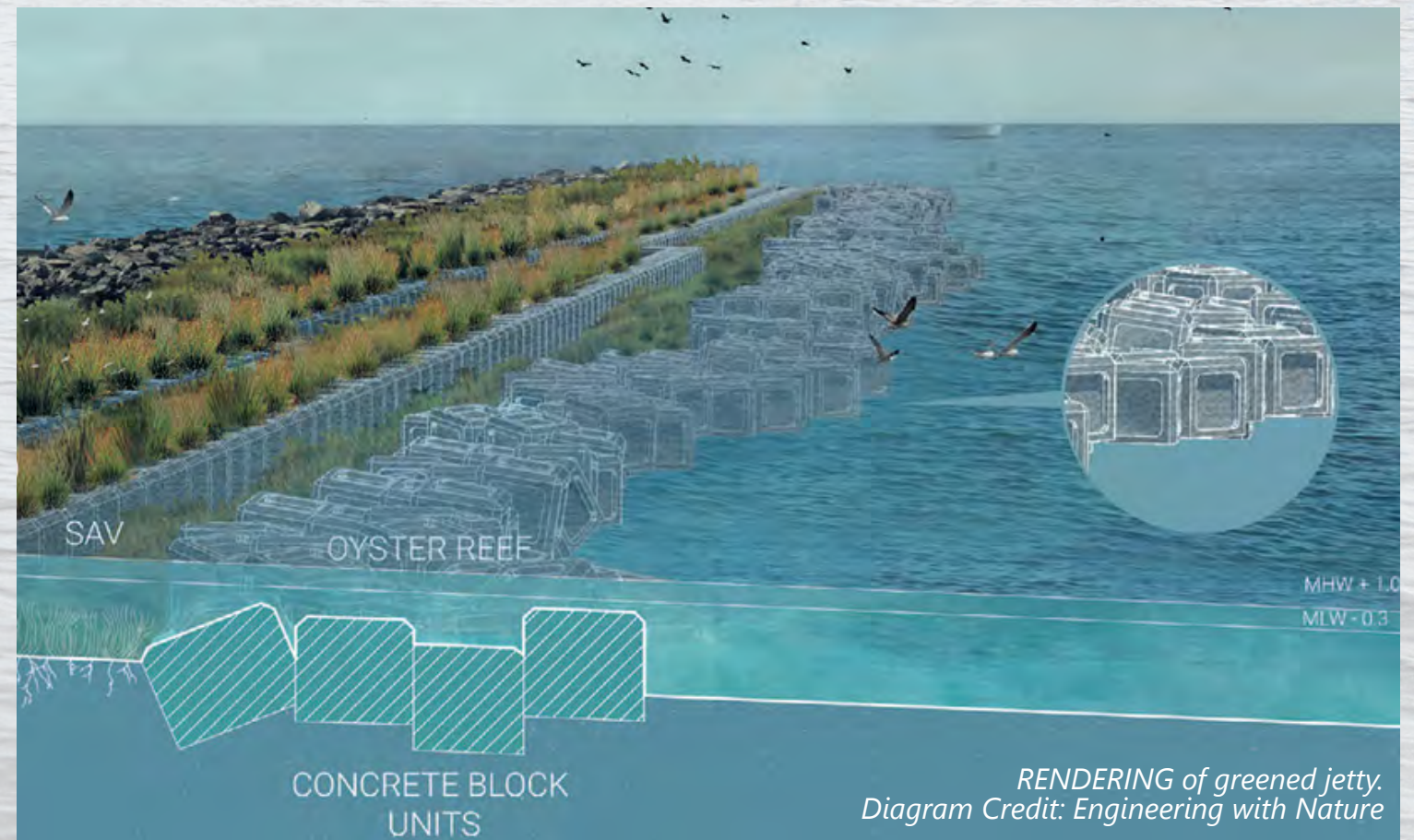
Where roadways are bermed or left unmodified, replacing culverts is another option to help facilitate the migration of wetlands and reduce flooding. Culvert replacement typically consists of removing the existing culvert and replacing it with a new structure such as a bigger culvert or open-bottomed arch.

3 Groins/jetties

Groins and jetties are constructed generally perpendicular to the shore in a manner that buffers the energies of the prevailing winds. The intent of these structures is to optimize the length of natural shoreline condition and encourage natural accretion of sediments to sustain the shoreline. Their construction can vary and include many of the elements referenced under living breakwaters.



Photo Credit: Sacramento Business Journal



RENDERING of greened jetty.
Diagram Credit: Engineering with Nature

GREEN-GRAY INFRASTRUCTURE

FUTURE RESILIENCY STRATEGIES - PROTECT

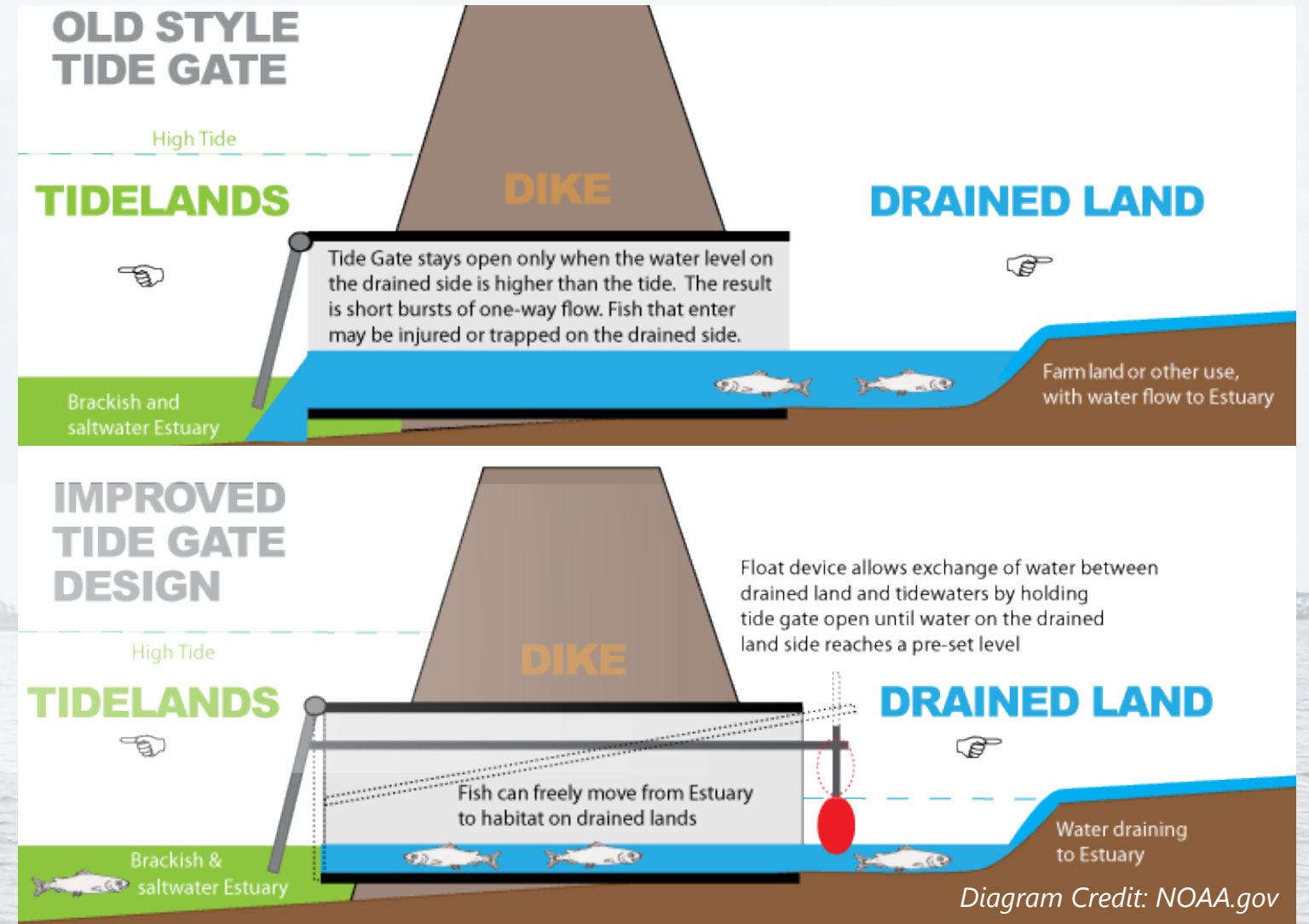
4 Fish-friendly and self-regulating tide gates

No tide gate is entirely fish friendly, but existing and proposed tide gates can be modified to allow for safer passage of fish and other nekton when **suitable habitat exists upstream**. Most commonly, fish friendly tide gates incorporate a system of floats to control the gate closure and allow for passage on the incoming tides. If no suitable habitat exists upstream, fish screens which prevent fish from entering the controlled area may be the best option to prevent entrapment. The size and life strategies of target species of concern should be considered in selecting and siting tide gates.

Self-regulating tide gates are a type of tide gate that can support multiple ecological objectives. These tide gates can be set to allow the normal tidal prism to ebb and flow normally so that tidal creeks, marshes, and other tidal or tidally influenced habitats are sustained on the side regulated by the gate; however, the gates will close once water levels on the unregulated side reach a designated flood stage. **The configuration of these gates makes them fish friendly and a good option for preserving the integrity of upstream habitats, but regular inspection and maintenance are required to ensure proper function and protection.**

5 Fish-friendly pump intakes

The most effective pumping strategies often involve some form of sump, which is a low area where fish may naturally congregate and get sucked into the pump. To prevent harm to fish and other nekton, pump intakes and sumps **should be sited offline from established natural flow paths and screened off to minimize the risk of target species being drawn into the pump** or getting trapped against the screening during pump operations.



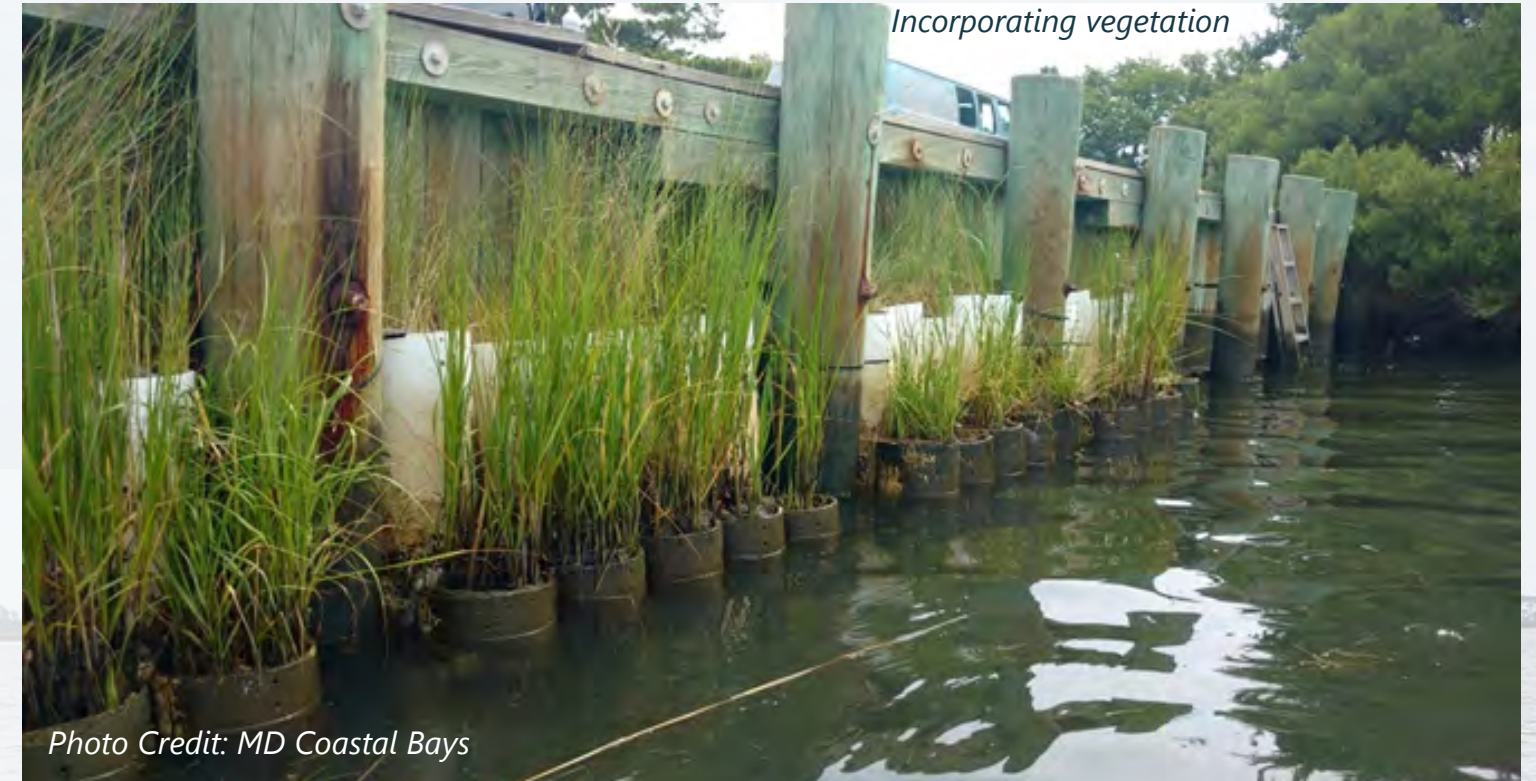
GREEN-GRAY INFRASTRUCTURE

FUTURE RESILIENCY STRATEGIES - PROTECT

6 Green bulkheads

Green bulkheads consist of retrofits to existing bulkheads or new bulkheads that provision for habitat and other ecological functions. Design of new and retrofit bulkheads can consist of substituting traditional construction materials with natural or green construction materials that are more favorable for colonization by aquatic life, such as oysters.

The design of green bulkheads should consider complex surfaces that provide pockets for refuge and attenuate energy. These complex surfaces could include vegetation, oyster baskets, or other features that are analogous to habitats of the region. Retrofits could also consider natural buffers on the landward side.



Incorporating vegetation

Photo Credit: MD Coastal Bays



Companies such as Artecology manufacture specialized bulkhead additions such as Vertipools™ (below) and Nature Bricks™ (Right Center.)

Photo Credit: Artecology



Photo Credit: Artecology

Oyster baskets, aquatic plants, textured blocks, and other specialized add-ons are a few of many ways bulkheads can be built, capped, or retrofitted for ecological uplift.



Oyster baskets

Photo Credit: Maine Geological Survey

STRATEGIES MATRIX

FUTURE RESILIENCY STRATEGIES - PROTECT

RECOMMENDED PRACTICES	Threat Protection								Habitat Provisioning
	Sea Level Rise		Wave Energy		Shoreline Erosion		Flooding		
NATURE -BASED SOLUTIONS									●
Living breakwaters		○	●		●	○			●
Living shorelines		○	●	○	●	○			●
Tidal marsh restoration	●	○	●	○	●	○			●
Inland wetland restoration							●	○	●
Sand dunes	●		●	○	●	○	●		●
Oyster reefs			●	○	●	○			●
Drainage ditch retrofits							●	○	●
GREEN-GRAY INFRASTRUCTURE									
Landform levees (integrating roads)	●			○		○	●		●
Elevated roadways with aquatic passage									●
Groins/jetties			●		●	○			●
Fish-friendly & self-regulating tide gates								○	●
Fish-friendly pump intakes								○	●
Green bulkheads			●		●	○			●

Many of the nature-based solutions and green-gray infrastructure can be used as a standalone (primary) resiliency strategy or implemented in combination to complement one another. The matrix identifies applications for each and its suitability as a primary and/or complementary strategy.

LEGEND	Primary	Complementary
Good	●	○
Better	●	○
Best	●	○

STRATEGIES: ADAPT & MIGRATE

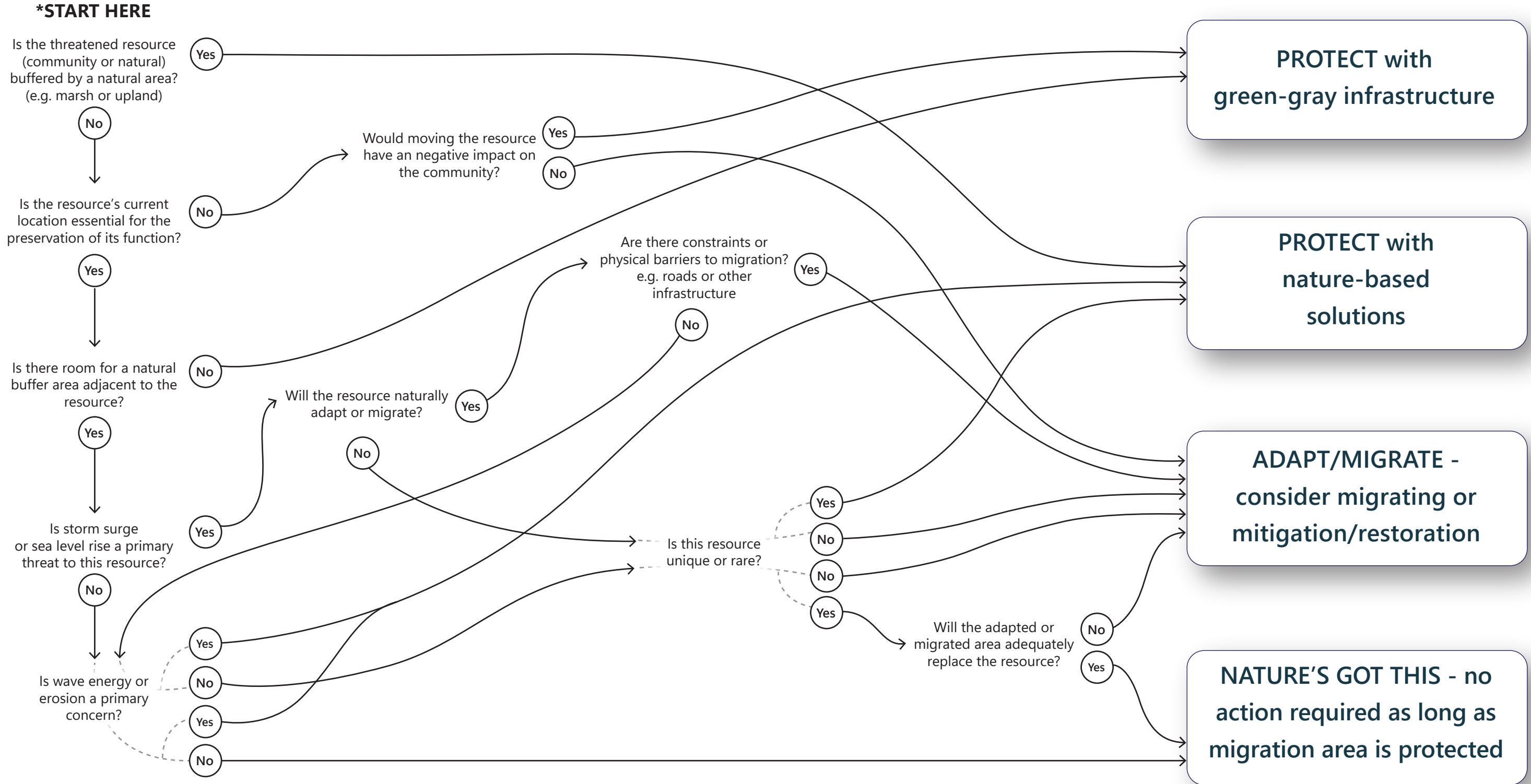
FUTURE RESILIENCY STRATEGIES

Adapt and migrate strategies foster habitat migration and ensure that the region continues to support a diversity of habitat types (e.g., saltmarsh). As sea levels rise, the suitability (water levels) that correspond to a given habitat type will also begin to move inward. A general transect of habitat types in the Pocomoke Sound corridor from shallow water to upland areas includes:

- 1 **Oyster Reefs**
- 2 **Submerged aquatic vegetation (SAV) zones**
- 3 **Marsh**
- 4 **Streams and riparian areas**

FUTURE RESILIENCY STRATEGIES DECISION FLOWCHART

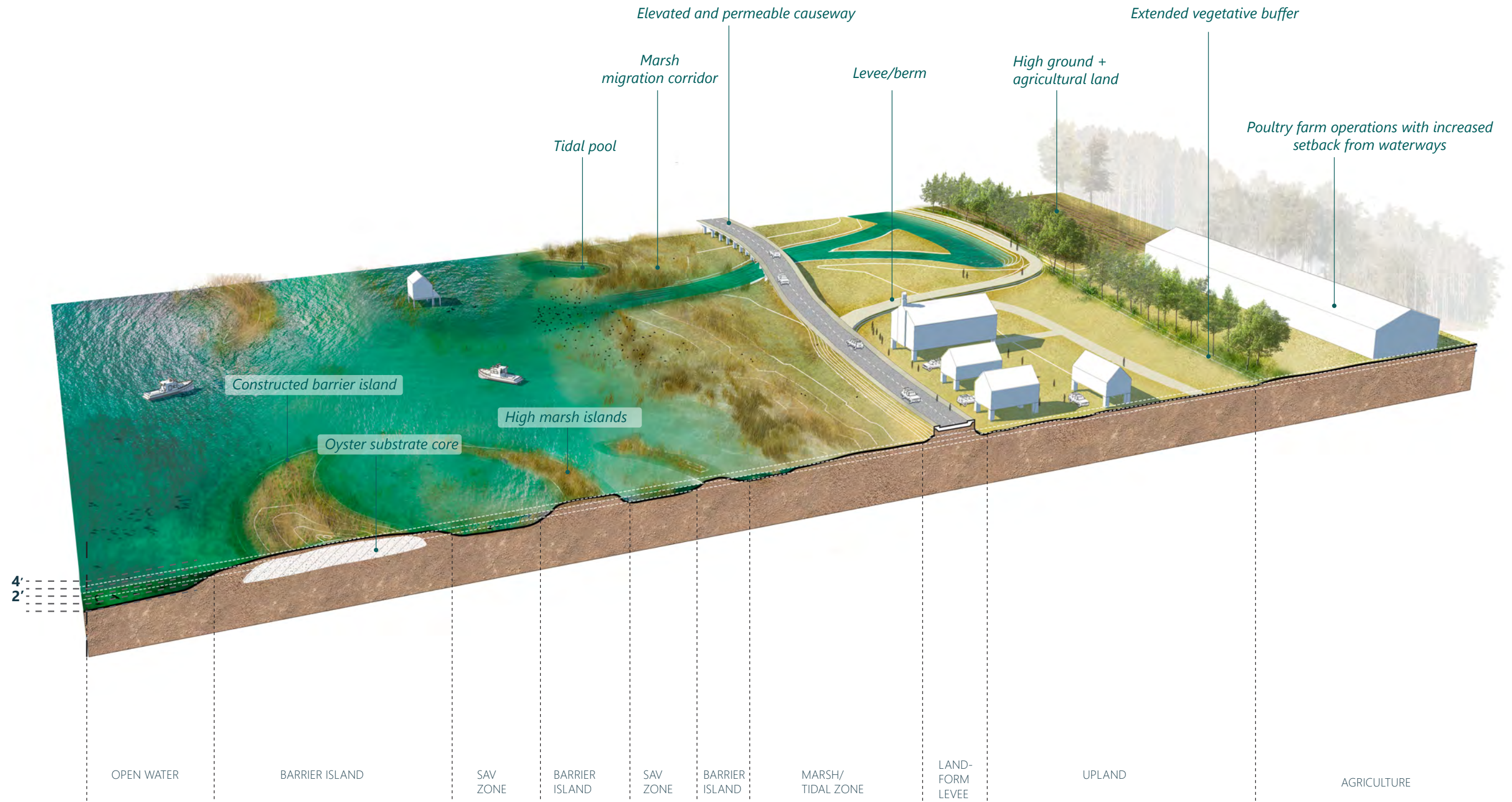
FUTURE RESILIENCY STRATEGIES



The purpose of this flowchart is to help practitioners identify the appropriate strategies (or combination of strategies) to protect resources based on site constraints and threats. This flow is intended to complement the Strategies Matrix presented in the Protect Strategies section.

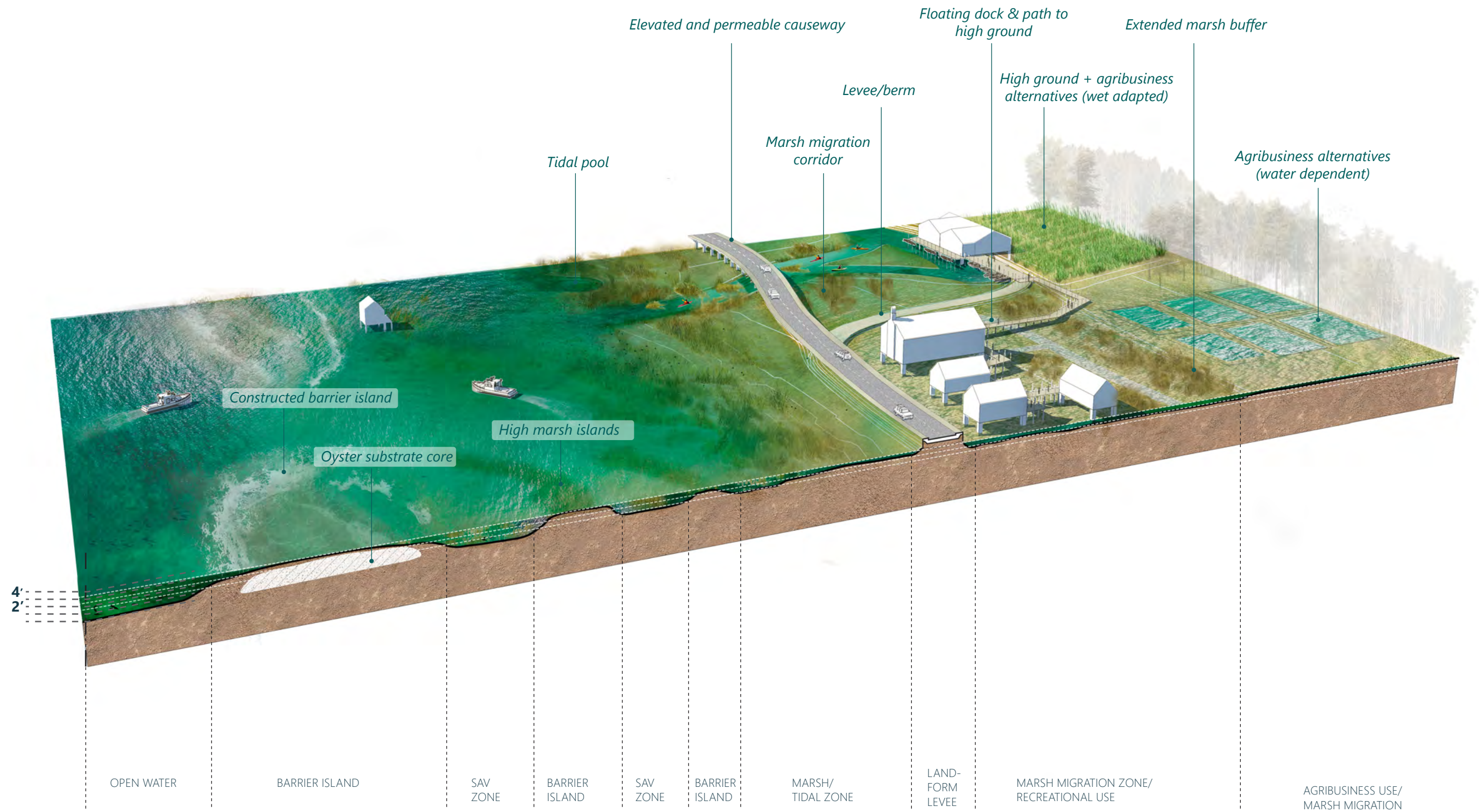
FUTURE STRATEGIES

PROTECT + 2' SLR



FUTURE STRATEGIES

ADAPT/ MIGRATE + 4' SLR





CHAPTER 6 //

FUTURE RESILIENCY STRATEGIES - COMMUNITY

Photo credit: Julie Donofrio OLIN



COMMUNITY ENGAGEMENT

This framework is built upon the understanding that the community and culture of the Pocomoke Sound corridor are as essential as the natural resources. The residents of the Pocomoke Sound corridor care deeply about protecting their communities and their history, while also understanding that environmental and economic investments are essential to protecting their quality of life and ability to plan for the future. Community engagement must be woven through each of the economic and environmental strategies, so that residents are able to align new investments with their own unique priorities, and that investments are made in harmony with a changing landscape.

Photo credit: The Nature Conservancy

COMMUNITY ENGAGEMENT

FUTURE RESILIENCY STRATEGIES

1 Create Pocomoke Sound Advisory Board

Create a Pocomoke Sound Advisory Board, consisting of local leaders, county planners, elected officials, and nonprofit leaders, to regularly convene and align planning efforts and policy application. Ensure that the group is representative of each of the region's racial and ethnic backgrounds.

- Working with local ambassadors will be important to maintaining local trust and developing adoptable solutions for communities. Identify existing local leaders for this role, and consider ways to equitably compensate them for their time investments and local environmental and community expertise.
- Create an awareness campaign so that residents are aware of the activities even if they do not participate in planning or engagement efforts.
- Such a strategy could correspond for the recommendation of a resilience authority, included in the Staying Afloat project, the NOAA AdSci Flood Adaptation Assessment for Enhanced Community Resilience in Crisfield (2024).

2 Build local capacity through regional network

With national resources and a focus on the Chesapeake region as a climate hotspot, local partners are well-poised to receive state and federal dollars in support of climate adaptation. However, internal capacity is a major hurdle in proactively mitigating climate-related hazards.

- Continue coordinating communication between capacity-building groups like TNC, Chesapeake Bay Trust, and existing academic and research partners to ensure all programs work towards common outcomes and shared resources.
- Utilize engagement processes as means of building civic and community capacity through knowledge sharing, networking and skill development.
- Consult the Rural Resilience Framework for data and recommendations for capacity building and extending the engagement timeline for planning projects.
- Evaluate success and replicate current EPA Crisfield Resilience Academy as strategy to build community capacity and knowledge.



Photo Credit: Biohabitats



Photo Credit: OLIN / Andrea Binz

COMMUNITY ENGAGEMENT

FUTURE RESILIENCY STRATEGIES

3 Engage Communities Individually

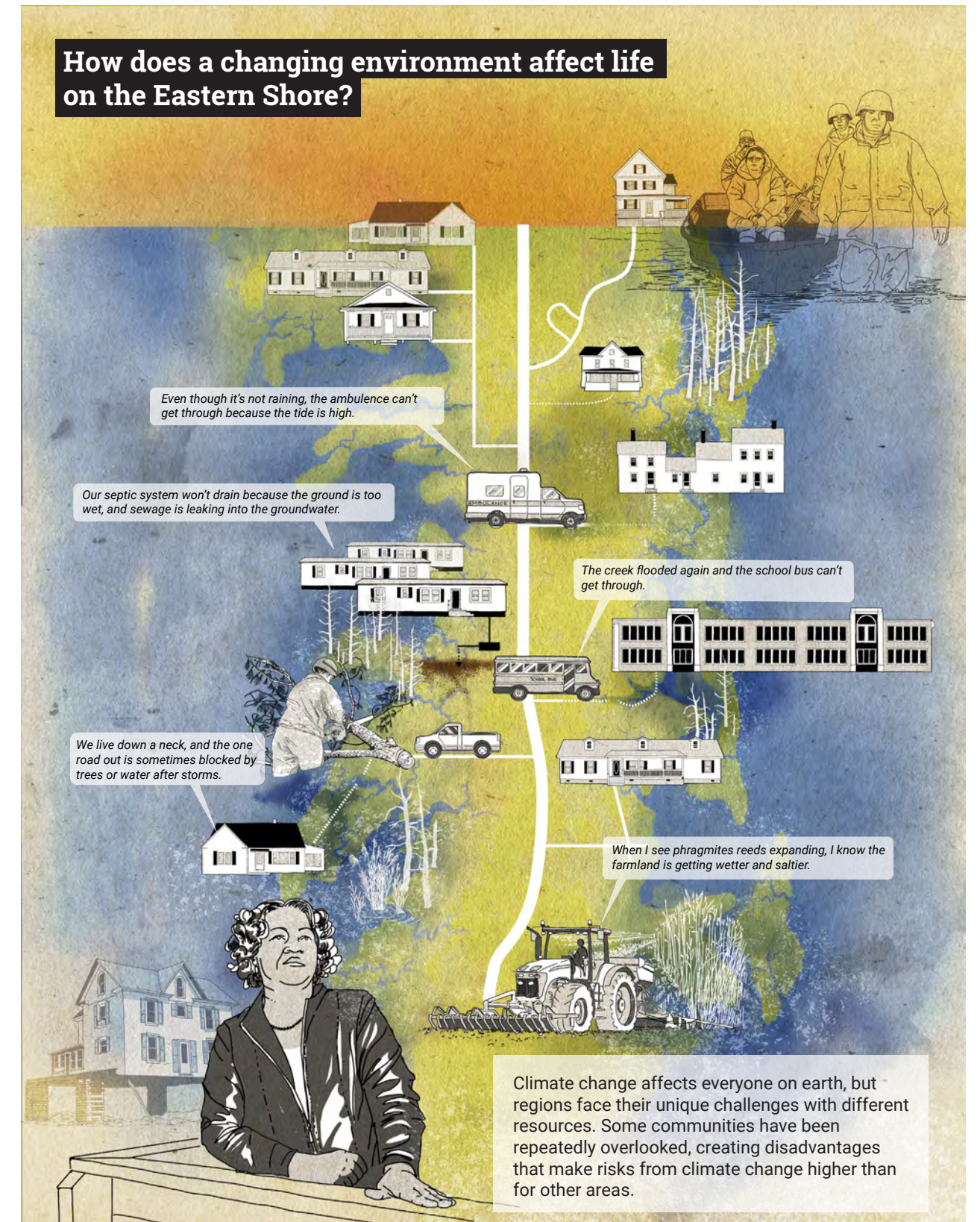
The Pocomoke Sound area is composed of many small communities, each with their unique characteristics and voices. Each must be engaged separately to identify unique concerns that can then be addressed through partnerships and holistically through TNC and region-wide partners when needed.

- Evaluate resiliency goals for each community, and then describe how interventions (both presented and new ideas) can help to meet these goals.
- Engagement activities must always consider that climate change and risks may not be the highest priority for business owners and residents. Activities must include time and space to listen to primary concerns and determine if resiliency actions could address and improve them.
- Quality of life concerns should focus community members toward common needs and values, as illustrated in Climate Equity Atlas poster (right).
- Initiatives should include qualitative data gathering to identify community priorities, and meeting with local leaders in the faith community, government, small businesses, and local industry.

4 Build on Prior Plans and Priorities

Communities like Crisfield, Saxis, and Pocomoke City have been regularly and recently engaged regarding resiliency and economic development concerns. Future engagement in these areas should build on priorities identified in prior planning efforts and expand according to their priorities.

- Crisfield recently received funding from FEMA-BRIC for adaptation strategies to protect social and economic health using tide gates and other physical and policy solutions. Prior planning and engagement had identified these measures, while weighing efficacy, cost-benefits, and feasibility of adaptation options.
- See Themes from Existing and Ongoing Efforts for additional recommendations.



CLIMATE EQUITY is the goal of recognizing and addressing the unequal burdens made worse by climate change, while ensuring that all people share the benefits of climate protection efforts. Achieving equity means that all people—regardless of their race, color, gender, age, sexuality, national origin, ability, or income—live in safe, healthy, fair communities.

INLAND FLOODING is caused by coastal creek flooding or insufficient drainage infrastructure during storm events.

STORM SURGES from hurricanes or other storm events can cause high tides and flooding along coastal areas.

SUNNY DAY FLOODING occur on days when the tide is higher but there are no storm events, like flooding from spring tides when the winds blow from the northeast.

SALINIZATION is when soil and water get saltier after being flooded with saltwater. Many plants can no longer grow in salty soil, leading to ghost forests, marsh migration, and farmland loss.

COMMUNITY ENGAGEMENT

FUTURE RESILIENCY STRATEGIES - COMMUNITY

5 Involve agricultural community and watermen

As the agricultural community is so fundamental to the culture and economy of the Pocomoke Sound corridor, TNC and partners should work regularly with representatives of this community to understand their priorities, needs, and discuss the co-benefits of supporting agriculture and resiliency simultaneously.

- Promote research that can introduce tools that integrate science and the carbon market into agricultural land protection, and yield regional co-benefits.
- Work with TNC Ag team members to integrate regional TNC work into regenerative agriculture expertise.
- Include discussions of the poultry industry's role in the economy and the environment to understand its impacts comprehensively.
- Develop a holistic framework considering quality of life, such as housing conditions, living wages, personal and job safety in addition to environmental exposures. Consider engagement approaches that are conducted in a safe space (individual conversations with trusted liaisons, etc.).



Photo Credit: Jay Fleming TNC

6 Further rural engagement

While the communities of Crisfield, Saxis and Pocomoke City have been engaged regarding future resiliency, areas along Route 13, especially in Virginia, and those surrounding Pocomoke City in Maryland, have not. Working with these communities is important for understanding their resilience goals and identifying priority projects that can sustain their quality of life.

- Increase engagement in overlooked areas such as communities along Route 13, outside of Pocomoke City, and in agricultural communities. These areas have concerns and vulnerabilities that are distinct from the bayside and especially seaside communities.
- Recognize the strategic position of this corridor as it is substantially free from SLR induced flood risks.
- Identify symbiotic community growth and economic development opportunities supporting community goals.



Photo Credit: LA County Public Works

COMMUNITY ENGAGEMENT

FUTURE RESILIENCY STRATEGIES

7 Evaluate true costs

When community members need to weigh important, sometimes conflicting priorities, it is helpful to demonstrate the costs and benefits of those decisions, and to relate data to lived experience. Participatory budgeting and conducting cost benefit analyses is a helpful approach to helping set priorities when resources are limited. Evaluating these tangible costs and data is an essential component of engagement processes.

- Use participatory engagement processes to understand costs and benefits relative to other community priorities in true costs.
- Create materials for participatory budgeting that can be used region-wide to establish shared understanding of SLR impacts. This would add efficiency and enable smaller communities and organizations to take part. Consider working with a local university, consultant or research entity on the creation of such materials.
- Conduct cost-benefit analysis for any large scale physical or programmatic programs.



8 Incorporate youth programming

Talking to children and young people about the future can yield different conversations than with more seasoned residents. Young people can have inspiring visions for the future, and what they believe to be a resilient future. Incorporating such feedback into an engagement process can ensure not only capturing a well-rounded profile of the community, but ensuring that the future residents of Pocomoke Sound corridor feel included and compelled to advocate for its future, and are well-prepared as a future workforce to sustain economic resilience.

- Integrate youth-oriented learning and fun into engagement processes, creating activities that will engage children and young people at appropriate levels.
- Create long-term partnerships with schools and community colleges in the area, especially with middle schools, when children are especially engaged with activities about local history and culture, and sea level rise.
- Incorporate learning and education about the Pocomoke Sound's unique biodiversity into local science curriculum, providing opportunities for hands-on learning alongside local scientists within the natural environment.





COMMUNITY STRATEGIES

Community strategies are aimed to bolster the economy, culture and social infrastructure of the Pocomoke Sound corridor. Combined with the natural solutions, they create an integrative approach to sustaining high quality of life and a resilient future.

Photo credit: Biohabitats

RESILIENT ECONOMIC STRATEGIES

FUTURE RESILIENCY STRATEGIES

1 Create a regenerative economic strategy for the Pocomoke Sound corridor

The impacts of climate change and SLR will impact the economic structure of the Pocomoke Sound corridor. Planning for economic resiliency will include integrating and adapting existing economies and aligning workforce development strategies with potential future markets to create a forward-looking Pocomoke Sound economy.

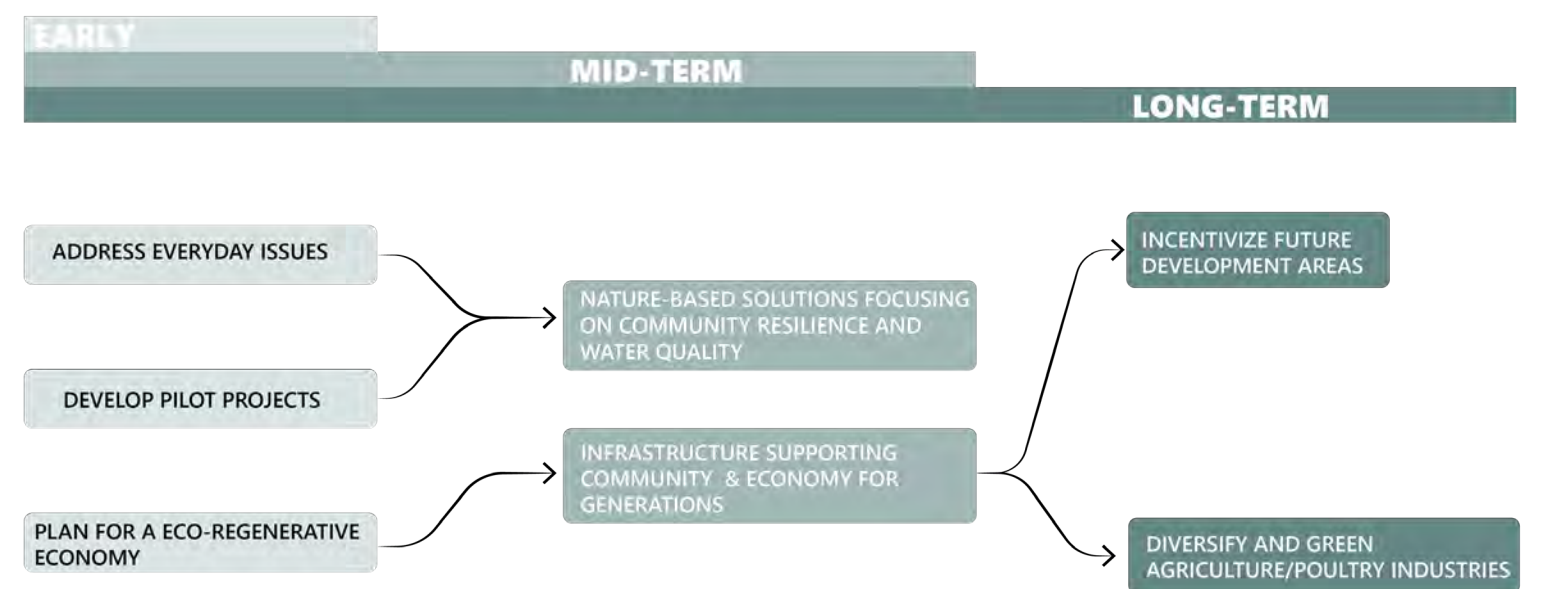
- Link future economic development potential to existing industries and strengths of the region, such as agriculture and manufacturing (e.g. expanding biochar production from byproducts of poultry industry) to retain population.
- Shift agricultural production to respond to changing environmental conditions and emergent technologies (e.g. oyster hatcheries, cultivating salt marsh hay and switchgrass that can be used for restoration plantings and biofuel producers).
- Work with economists and planners to evaluate opportunities to diversify the jobs base and ensuring workforce opportunities, especially along Route 13.
- Review current and future opportunities for expanding eco-tourism, considering job wages and seasonality, regional themes, hyper-local issues and opportunities, and ability to attract visitors from nearby population centers (e.g. Washington/ Baltimore/ Annapolis/ Norfolk/ Virginia Beach).



2 Integrate resilient infrastructure and economic strategy

A resilient economy must be supported by resilient infrastructure, so that jobs and communities can be efficiently connected, and will be less susceptible to uncertainties.

- Integrate resilient infrastructure planning with a comprehensive plan for economic development.
- Develop a comprehensive infrastructure 'backbone' strategy to ensure that major community connection corridors are flood free.
- Highlight the Pocomoke Sound corridor as a leader in adapting industries in conjunction with climate adaptation.
- Provide opportunities for research and education in conjunction with demonstration projects, involving local schools and regional universities.
- Install resilient infrastructure solutions (e.g. elevated roads and trails) that enable continuation of tourism / aquaculture in bayside communities, and could be an attractor unto themselves.



Economic Conceptual Phasing for Pocomoke Sound (Credit: OLIN)

RESILIENT ECONOMIC STRATEGIES

FUTURE RESILIENCY STRATEGIES

3 Plan for higher ground

Analyses have shown that areas along Route 13 and around Pocomoke City will be more resilient to future sea level rise and storm surge than areas along the coast or Bay. Future planning and engagement should identify community centers and common linkages along Route 13, as this area has not been as engaged, and will bear significant change as communities impacted by SLR and storm loss migrate inwards.

- Identify future resilient, flood proof growth areas in upland areas along Route 13 that could be focus areas for local economic development and affordable housing.
- Consider annexation to coordinate land use and zoning controls through local government, and respond to population growth needs.
- Incentivize use of high ground through zoning and incentives, such as transfer of development rights of flood prone areas.
- Prioritize affordable housing in future growth areas.
- Ensure that critical infrastructure is protected and located on high ground.



Photo Credit: Jay Fleming TNC

4 Evaluate economic vulnerabilities

The long-term industries of the seafood industry, agriculture, and tourism in the Pocomoke Sound are vulnerable to future climate impacts, while emergent industries may bring potentially harmful environmental effects. Identifying opportunities for new job sectors while balancing the viability of existing industries is an important step forward in a holistic economic approach.

- Flood, sea level rise and storm surge mapping should identify potential losses of homes and employment areas, so that they can be accommodated in nearby higher ground, and residents and jobs can stay local.
- Understand the implications of natural resources depletion (e.g. subsidence) in developing new economic centers.
- Replicate the community partnership of the NOAA Staying Afloat project in Crisfield, which reviewed adaptation scenarios with community members, together with costs and impacts.
- Levees and roads should be designed to maintain connectivity to existing and future residential areas and job centers.
- Emergency Warning and evacuation routes are invested in continually through complementary economic plans.



Photo Credit: Jay Fleming TNC

HISTORY & CULTURE

FUTURE RESILIENCY STRATEGIES

5 Connect heritage and resiliency

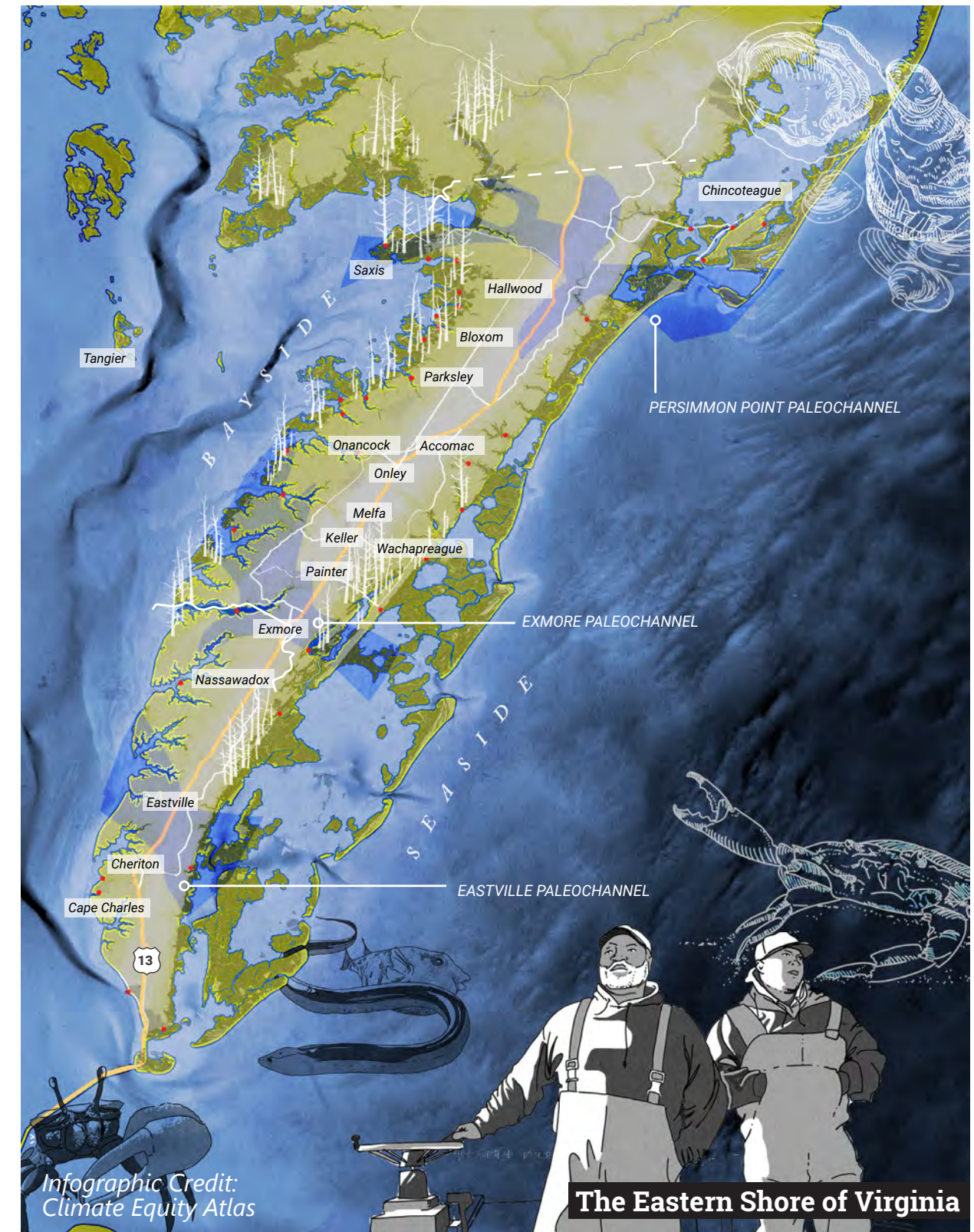
Local history and culture are integral to the Pocomoke Sound region. Future studies should look towards amplifying these resources and integrating them into an overall resiliency framework.

- Partner with heritage organizations, destinations like the Lower Eastern Shore Heritage Area, and state agencies to identify and map national and state identified historic resources that overlap with restoration focus areas.
- Highlight community character through engagement as a means to identify intersection between cultural heritage and resiliency, and uplift shared visions and values. This was a powerful tool in identifying commonalities that would contribute to conversations around resiliency in the Climate Equity Atlas process (see poster, right), and for navigating, negotiating, and mobilizing change.
- Connect environmental resilience projects to heritage tourism to increase funding. See project partner matrix for additional resources.

6 Protect the Pocomoke cultural landscape

The cultural landscape of the Pocomoke Sound corridor, and the Chesapeake Bay overall, is one of its most notable qualities, having defined a regional identity that has driven the economies of Maryland and Virginia for generations. Much like its people, economy and natural landscape are unique to this place, so is the experience of this place. Working with community members to draw out the aspects of the area that should be considered part of a regional heritage approach is a great opportunity to identify additional heritage assets worthy of protection, and seek regulatory and financial resources necessary to ensure their tangible and intangible longevity.

- Highlight local scenic resources and cultural landscapes that are eligible for state and national designation and protection from future development.
- Gather community input to inform the identification of historic resources that are in potential near-and long-term flood risk areas and need additional protection.
- Highlight aspects of the local economy that are integral in local cultural heritage and ensure their long-term viability or adaptation. Partner with heritage organizations and state agencies to acknowledge, identify and map the connection between heritage preservation and economic resilience.






Infographic Credit:
Climate Equity Atlas

PALEOCHANNELS

The ancient Eastern shore was once a series of islands. The channels between the ancient islands have now filled with sediments forming underground paleochannels where both fresh and saltwater can move more readily than in most of the rest of the Eastern Shore.

MARSH MIGRATION occurs when saltwater infiltrates into previously dry, non-salted areas and change the ecology.

GHOST FORESTS are created when trees at the edges of sea or marsh areas experience soil salinization and can no longer survive with a high level of salt. In this part of the country, most of these dead white tree stands at the edges of marshland used to be pine forests.

-  Ghost forests
-  Public boat access points
-  Marshland

COMMUNITY HEALTH

FUTURE RESILIENCY STRATEGIES

7 Integrate public health into advocacy

Communities in the study region are experiencing a number of health stressors such as low life expectancy and chronic disease. Many of these are being worsened by shifting land use and industries, and increased flooding, causing property loss and compromised living conditions. Homes in close proximity to poultry production are exposed to toxic ammonia emissions, and frequent flooding has increased mold growth in homes and businesses, leading to respiratory concerns. Research and advocacy are needed to increase understanding of these risks and possible solutions.

- Work with local environmental organizations to update regulations to ensure clean and safe air and drinking water amid flooding and manufacturing growth.
- Refer to federal and state social vulnerability maps to identify areas of vulnerability, points of origin, and associated stressors.
- Partner with public health agencies and academic partners to identify funding opportunities, such as Justice40, linking public health to environmental and economic resiliency. Identify grant funds to support longitudinal analysis.
- Link flood protection and resiliency measures to ensuring long-term health of residents, reducing risk of property loss and compromised living conditions.



Photo Credit: Biohabitats

8 Plan for community resiliency

Long-term resilience is a factor of both community networks and mitigating environmental impacts. Several health stressors currently at play in the Pocomoke Sound corridor may be exacerbated by sea level rise, as illustrated in the Natech analysis, and as habitable land becomes more scarce and condensed. Proactive environmental advocacy, sound economic growth, and investment in thriving community connections are all essential for safe and thriving community futures.

- Identify locally based community organizations that can be foundational for building and sustaining networks of community resiliency, such as places of worship, community centers, and cultural hubs.
- When evaluating future growth areas, ensure that future development is designed to have access to open space, is proximate to community centers to maintain personal connections and access to goods and services, and not located in close proximity to contaminated land or water.



Photo Credit: Jay Fleming TNC

POLICY

FUTURE RESILIENCY STRATEGIES

9 Implement state level resiliency policies

Maryland and Virginia have differing degrees of investment in resiliency planning. For example, Maryland has a resiliency program and has addressed ecosystems services through its GreenPrint, whereas Virginia is in the process of a statewide coastal resiliency plan, including vulnerability mapping. Some areas have achieved success through regional partnerships, such as Building Resilience in the Southeast and PLACE including Mississippi, Alabama, and Florida. The Pocomoke Sound initiative can be an impetus to unite state policies towards a mutually beneficial end.

- Policies must be implemented through the state legislature, as Virginia has no home rule provisions for counties or cities.
- Coordination between advocacy organizations, and city and county planners will be important for policy development and plan alignment.
- Virginia announced resiliency funding opportunities in 2024. Partners should identify opportunities to obtain this funding to support priority projects.
- Further investigation into state-level initiatives that integrate with resiliency is needed.



Photo Credit: TNC

10 Incentivize farmland innovation

As agriculture is a fundamental aspect of the economy and culture of the Pocomoke Sound, maintaining its viable productivity is essential to a sustainable future. Areas of Prime Farmland should be identified, especially where it intersects with sea level rise.

- Agricultural activities should be cataloged and evaluated to identify which best support community resiliency priorities.
- Future studies should address the potential economic impacts of agricultural land conversion, which has historically occurred at the edges of farm tracts. Such an assessment would consider real estate market demands, environmental implications, and regional agricultural economics.
- Develop innovation programs with a regenerative ethos focused on economically sustainable viable crop and animal husbandry programs tailored to the Pocomoke Sound corridor.
- Identify legislative and policy tools to incentivize greater stewardship of Pocomoke land and waters.



Photo Credit: OLIN / Dennis McGlade

NATURAL RESOURCE PRESERVATION

FUTURE RESILIENCY STRATEGIES

11 Partnerships for nature-based solutions

There are numerous nature-based solutions such as oyster reefs, SAVs, and marsh migration that provide important ecological benefits while preventing shoreline erosion and mitigating the effects of SLR. Ensuring that key areas of the shoreline are preserved for these restoration efforts will help build long-term resiliency while building a pathway for future stewards of the land. Each of these will take thoughtful and continuous collaboration with local partners.

- Work with organizations like the Chesapeake Bay Trust and state agencies like Maryland DNR to identify and work with long-term property owners likely to engage in a pilot program. The Virginia Coast Reserve is a model for this.
- Enhance public education and awareness through outreach campaigns focused on ecological benefits.
- Identify partners to pilot and integrate environmental education with local school programs, like the Chesapeake Oyster Alliance, and create outdoor classrooms/ learning centers to engage youth.



Photo Credit: The Nature Conservancy

12 Encourage regional conservation strategies

Restoration efforts are not constrained by state boundary lines. Any preservation, conservation, or adaptation efforts will need to engage agencies in both Maryland and Virginia concurrently to establish a holistic understanding of necessary efforts and guidelines. TNC's Resilient Protection Frameworks is an example of this, promoting resilience easements and coastal resilience management plans.

- Evaluate existing state regulatory programs for effectiveness and establish criteria with relevant state and federal agencies for more comprehensive regulatory guidelines designating protection and restoration areas.
- Evaluate existing commercial aquaculture operations against current and potential SAV zones and whether they are in compliance with the Clean Water Act guidelines.
- Consider rolling easements and other development restrictions, like zoning enforcements of designated open areas, within a designated buffer from the shoreline to protect development and increase restoration area potential.

See: https://cbtrust.org/wp-content/uploads/15770_Existing-Chesapeake-Bay-Watershed-Statutes-and-Regulations-Affecting-SAV.pdf



Photo Credit: Jay Fleming TNC



APPENDIX C: TASK 6 //

COMMUNITY ENGAGEMENT NEEDS

COMMUNITY

ECONOMY

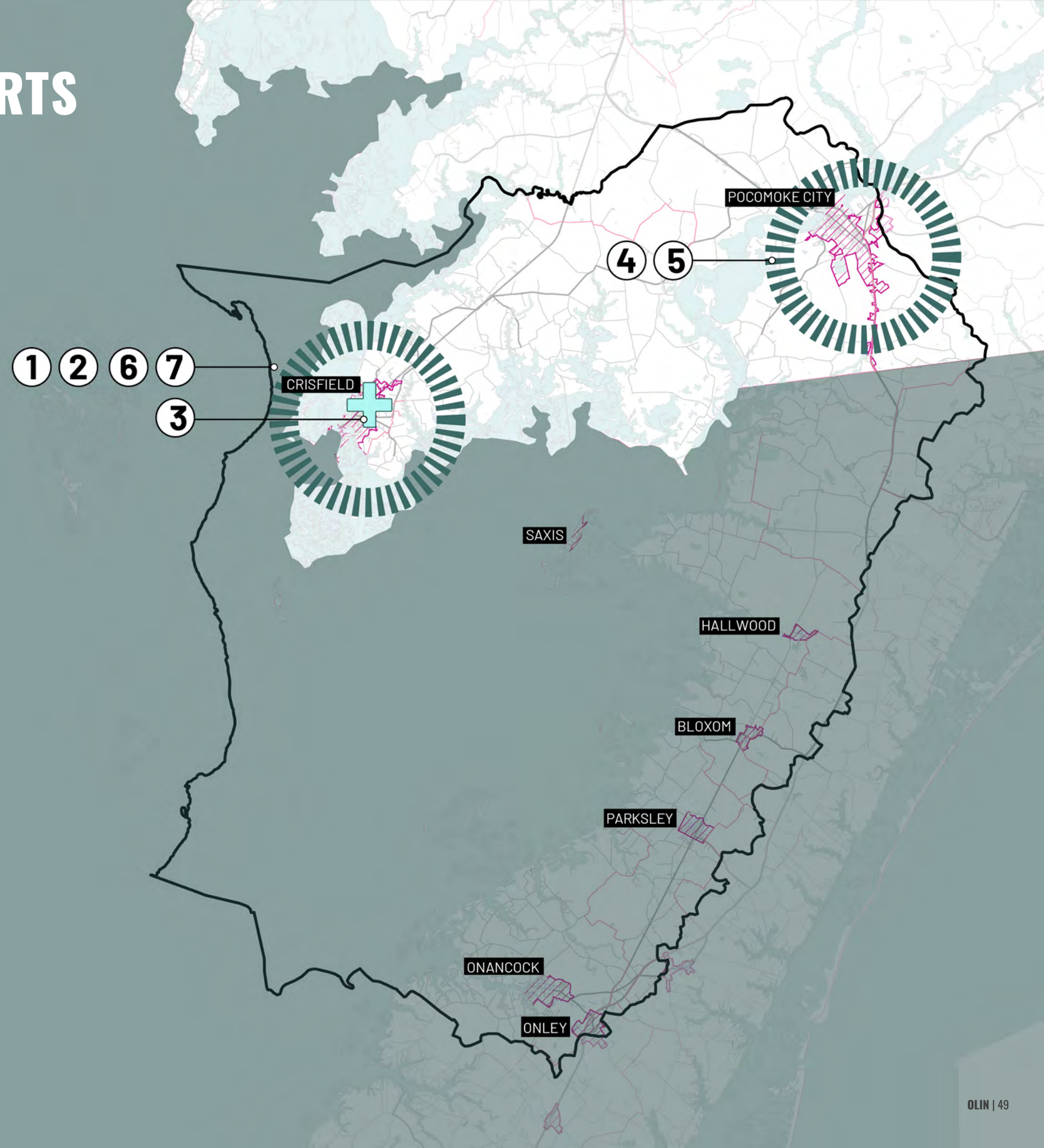
VULNERABILITY

ENGAGEMENT

COMMUNITY PLANNING EFFORTS

MARYLAND

- 1 Staying Afloat: Assessing the Long-Term Financial Impacts of Sea-Level Rise Adaptation Solutions in a Historic Coastal Community (NOAA Adaptation Sciences Grant)**
- 2 Crisfield Mitigation Projects (including 2024 FEMA BRIC)**
- 3 EPA Nature-Based Solutions / Climate Resiliency Academy**
- 4 Resiliency through Restoration/ Targeted Resiliency Area (MDNR)**
- 5 Pocomoke City NOAA Effects of Sea Level Rise (ESLR) Program**
- 6 Crisfield Vision Plan**
- 7 Crisfield Community Action Plan**



COMMUNITY PLANNING EFFORTS

MARYLAND

1 Staying Afloat: Assessing the Long-Term Financial Impacts of Sea-Level Rise Adaptation Solutions in a Historic Coastal Community (2021-2024)

Project Partners:

> NOAA, George Mason University (flooding analysis), University of Maryland Environmental Finance Center (EFC) (Adaptation Benefit-Cost Analysis), EPA Office of Research and Development (ORD), TNC

Project Goals:

- > Assessment of adaptation strategies, a cost-benefit analysis and feasibility for selected SLR strategies
- > Developed a long-term policy analysis and a decision framework for Crisfield.

Engagement Strategies:

- > Ethnographic research helped to define resilience strategies before the project commenced.
- > TNC worked closely with the grant administrator, the Mayor of Crisfield, and a community advisory group.
- > Created an accessible storymap <https://storymaps.arcgis.com/stories/fbe0ca80c30c44b5a94dfc4c8da32cc1>

2 Crisfield Mitigation Projects (FEMA) (ongoing)

Project Partners:

> City of Crisfield, FEMA BRIC- DTA grant; Maryland Dept. of Emergency Management

Project Goals:

- > \$40 million BRIC funding received for Southern Crisfield Flood Mitigation Project (3.5 ft) in July 2024
- > Additional planning and grant applications for Northern Crisfield Flood Mitigation Project (5 ft)

Engagement Strategies:

- > Builds off of community priorities identified during NOAA project
- > Coordination with Somerset County officials, Crisfield leaders, and local partners

3 EPA ORD Nature-Based Solutions / Crisfield Resilience Academy (ongoing)

Project Partners:

> City of Crisfield, EPA ORD. Many local nonprofits and state and regional entities are listed as partners.

Project Goals:

> Developing nature based solutions that could augment the additional infrastructural investments from BRIC.

Engagement Strategies:

- > Utilizing similar community engagement techniques as NOAA to work according to community priorities and build civic capacity.
- > Fall 2024, the Crisfield Resilience Academy will begin. The academy brings community members together with researchers to build a deeper understanding of the issues and gain practical knowledge to advocate for resiliency priorities. <https://www.epa.gov/gcx/crisfield-resilience-academy>

4 Resiliency through Restoration/ Targeted Resiliency Area (ongoing)

Project Partners:

> Maryland Dept. of Environmental Protection, Pocomoke City

Project Goals:

- > Implementation of nature-based pilot projects, H+H modeling, and cost-benefit analysis to address climate change impacts and enhanced resiliency of local communities.
- > Target sites in Pocomoke City are Cypress Park alongside 6 other sites

Engagement Strategies:

> Initial listening session that drew few people, Facebook targeted surveys, and a second community meeting

5 Pocomoke City NOAA Effects of Sea Level rise (ESLR) Program

Project Partners:

> TNC, NOAA, GMU, MD DNR, and Resources for the Future

Project Goals:

- > Technical assistance effort as a part of the NOAA ESLR program, using community-informed decision-making approaches similar to Crisfield Staying Afloat project.
- > Identifying additional nature-based solutions for Pocomoke City, building on prior work with MD DNR. Will align community resilience goals with government flood adaptation planning and modeling frameworks.

6 Crisfield Vision Plan (2023)

Project Partners:

> City of Crisfield, Salisbury University

Project Goals:

> Visioning focus on business development, infrastructure, youth and recreation, and housing

Engagement Strategies:

- > Engaged 50 residents and interest group leaders to help shape plan
- > Creating a community calendar to inform residents about events is a top priority

7 Crisfield Community Action Plan (2016)

Project Partners:

> City of Crisfield, EPA, USDA, FTA, CDC

Project Goals:

> Focus on healthy food and local food production, as well as local economy decline

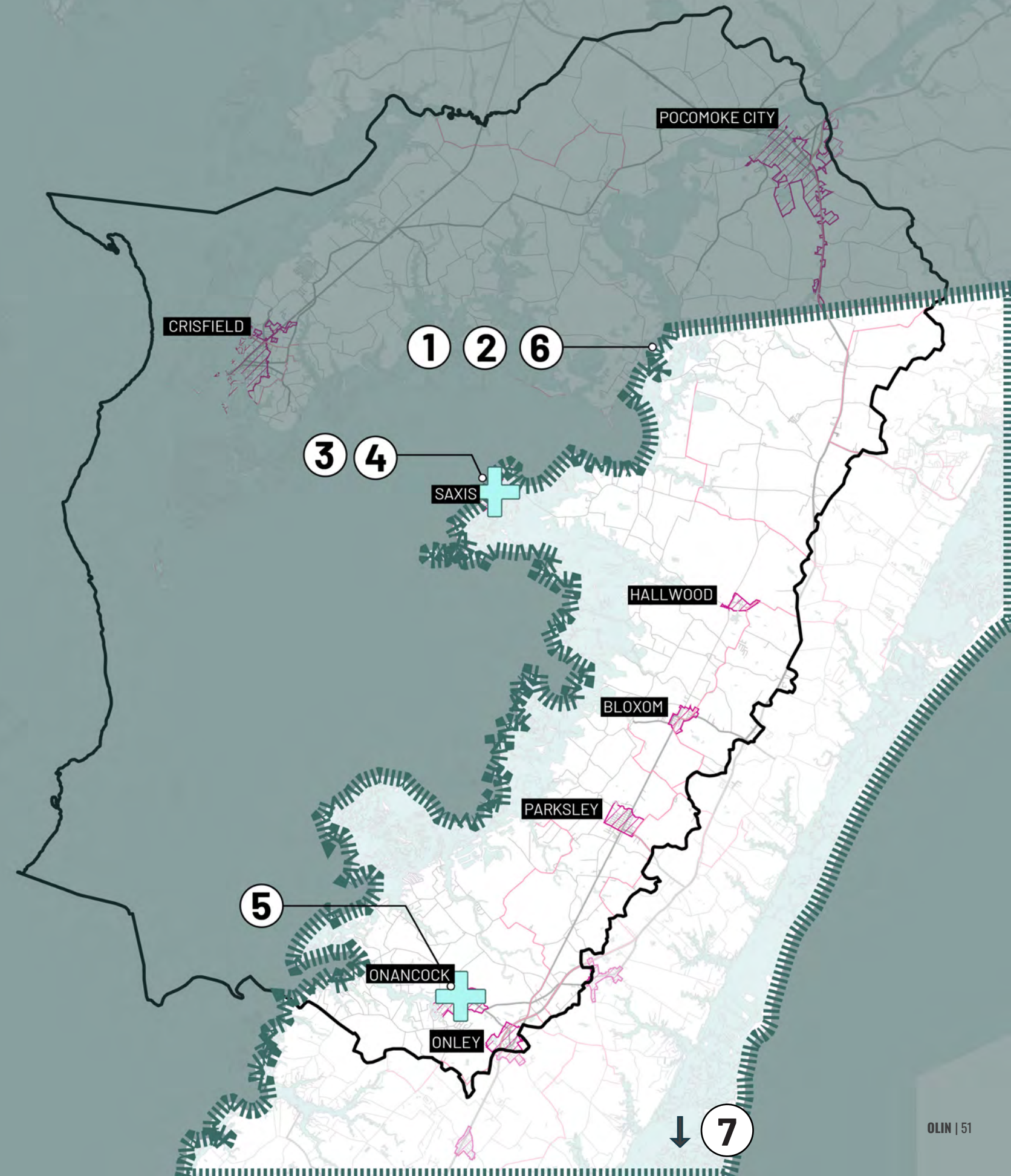
Engagement Strategies:

> Local steering committee, workshops (40 community members), site tours

COMMUNITY PLANNING EFFORTS

VIRGINIA

- 1 Eastern Shore of Virginia Hazard Mitigation Plan
- 2 Climate Equity Project
- 3 Adaptation and Resilience Plan for Saxis, VA
- 4 Resilience Adaptation Feasibility Tool (RAFT): Saxis
- 5 Resilience Adaptation Feasibility Tool (RAFT): Onancock
- 6 Virginia Coastal Resilience Masterplan
- 7 Oyster Village Coastal Adaptation and Resilience Plan



COMMUNITY PLANNING EFFORTS

VIRGINIA

1 Eastern Shore of Virginia Hazard Mitigation Plan (2021)

Project Partners:

> Accomack-Northampton Planning District Commission, FEMA, VA Dept. of Emergency Management

Project Goals:

> Update to the previous hazard mitigation plan in 2006 with a broader range of disasters and understanding of community resiliency

Engagement Strategies:

> Plan was developed during the pandemic and all engagement was conducted virtually. Lack of broadband access in the Eastern Shore inhibited digital engagement, but it has been expanded in the years since.

2 Climate Equity Atlas (extension of Climate Equity Project)

Project Partners:

> University of Virginia Equity Center, UVA Environmental Institute, William and Mary Coastal Policy Center, Old Dominion University Resilience Collaborative

Project Goals:

> Address inequity and information gaps to improve climate adaptation while building community capacity

> Production of an open-source data and visualization platform, the Climate Equity Atlas. <https://virginiaequitycenter.shinyapps.io/eastern-shore-atlas/>.

Engagement Strategies:

> Multiple listening sessions and workshops, partnering with community leaders that were already garnering awareness around increased flooding and other concerns.

> Discussing quality of life concerns was best way to engage residents without divisive terms of climate risk

> Worked with artist to produce a poster celebrating the culture of the Pocomoke Sound while also identifying challenges that would speak to a wide range of community concerns.

3 Adaptation and Resilience Plan for Saxis, VA (ongoing)

Project Partners:

> TNC, Town of Saxis

Project Goals:

> Creation of a community-driven adaptation and resilience plan

> Prioritization list of projects to increase flood resilience

Engagement Strategies:

> Project is just getting underway

4 Resilience Adaptation Feasibility Tool (RAFT): Saxis + Onancock

Project Partners:

> The Institute for Engagement & Negotiation at the University of Virginia, the Virginia Coastal Policy Center at the William & Mary Law School, Old Dominion University Sea Grant Climate Adaptation and Resilience Program

Project Goals:

> Scorecard aims to help localities increase resilience to coastal storm hazards

> Saxis scored highly on "Risk Assessment and Emergency Management, but scored poorly on "Planning for Resilience" and "Community Engagement, Health, and Well Being".

> Onancock scored fairly on "Risk Assessment and Emergency Management, but scored poorly on "Policy, Leadership, and Collaboration," "Planning for Resilience," "Community Engagement, Health, and Well Being," and "Infrastructure Resilience."

Engagement Strategies:

> Community leadership workshop with an outcome of a 'Resilience Action Checklist'

6 Virginia Coastal Resilience Masterplan (ongoing)

Project Partners:

> VA Dept. of Conservation and Recreation

Project Goals:

> Phase II builds on Phase I of plan (2021) and provides a more comprehensive picture of flood risk and resilience. Key components include a flood exposure model, flood hazard impact assessment, and planned resilience action analysis.

> Mapping available here: <https://www.dcr.virginia.gov/crmp/cr-web-explorer>

Engagement Strategies:

> Builds on feedback collected from Phase I. Project directors are working with local governments and end users to collect data and share updates via community updates that can be requested online.

7 Oyster Village Coastal Adaptation and Resilience Plan (ongoing)

Project Partners:

> Northampton County, TNC

Project Goals:

> Combat the impacts of rising sea levels and recurrent flooding through nature-based solutions

> While not in the Pocomoke Sound region, the project utilizes similar strategies as other local projects

Engagement Strategies:

> Public meetings aimed to develop resiliency and implementation strategies with residents and community leaders.