J Lee (Instagram: @growingwilder)

Between land and sea lie ecological guardians of the coast—salt marshes.

EXECUTIVE SUMMARY

MARSH FORWARD

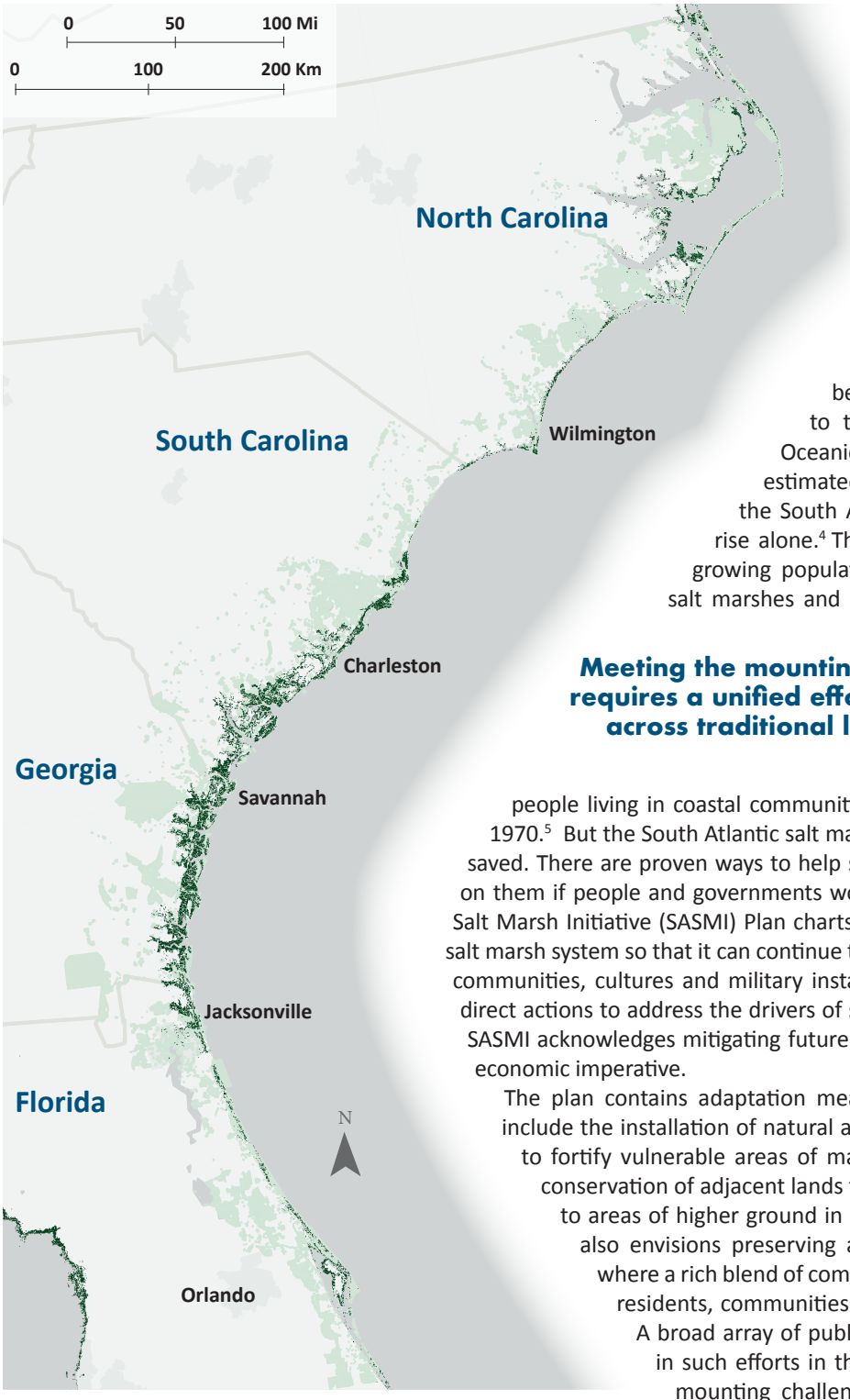
A Regional Plan for the Future of the South Atlantic Coast's Million-Acre Salt Marsh Ecosystem

The South Atlantic region of the United States harbors approximately 1 million acres of salt marshes that benefit fish, wildlife, communities, the economy and national defense. Sustaining this valuable resource in the face of persistent threats will require a concerted effort by all who depend on it.

This is a plan to do just that.

The South Atlantic region of the United States harbors approximately 1 million acres of salt marshes that benefit fish, wildlife, communities, the economy and national defense. Sustaining these valuable resources in the face of persistent threats will require a concerted effort by all who depend on them. Salt marshes are wetlands that fill and drain with the tides.[1] They protect shorelines, coastal communities, and military installations from extreme storm events and mitigate impacts such as flooding, runoff and excess nutrients that can degrade water quality. They also serve as vital habitat for many of our nation's fish and wildlife, including those that support coastal industries and state economies. Salt marshes collectively form an extensive habitat in the South Atlantic region, representing a rich history, many cultures and an irreplaceable way of life. At approximately 1 million acres, this habitat is nearly the size of Grand Canyon National Park but exists in a relatively narrow band that stretches along the coast of four states, from North Carolina to east-central Florida.

Marshes provide food, refuge or nursery habitat for more than 75% of fisheries species, including shrimp, oysters and many popular finfish, such as redfish and flounder.[2] Together these species support subsistence fishing and contribute to valuable commercial and recreational fisheries. In the South Atlantic, recreational fishing alone generates more than $3.9 billion in



The extent of salt marsh within the SASMI geography.

Salt marsh data are taken from NOAA's Coastal Change and Analysis Program (C-CAP). NOAA, Coastal Change Analysis Program (C-CAP) Regional Land Cover 1996 to 2011 (Charleston, SC: NOAA Office for Coastal Management), https://coast.noaa.gov/digitalcoast/data/ccapregional.html.

Protected areas are drawn from the USGS Protected Areas Database (version 3.0). U.S. Geological Survey (USGS) Gap Analysis Project (GAP), Protected Areas Database of the United States (PAD-US) 3.0 Spatial Analysis and Statistics: U.S. Geological Survey data release, 2022. https://doi.org/10.5066/P9KLBB5D.

sales and approximately 39,000 jobs.[3] Many resident and migratory bird species feed and nest among the mud flats, pools and grasses, including imperiled species, such as the federally listed eastern black rail. Some birds, including ducks, arrive annually to overwinter in the tall vegetation. Dolphins and otters, snails and turtles all thrive in the brackish waters along marsh edges.

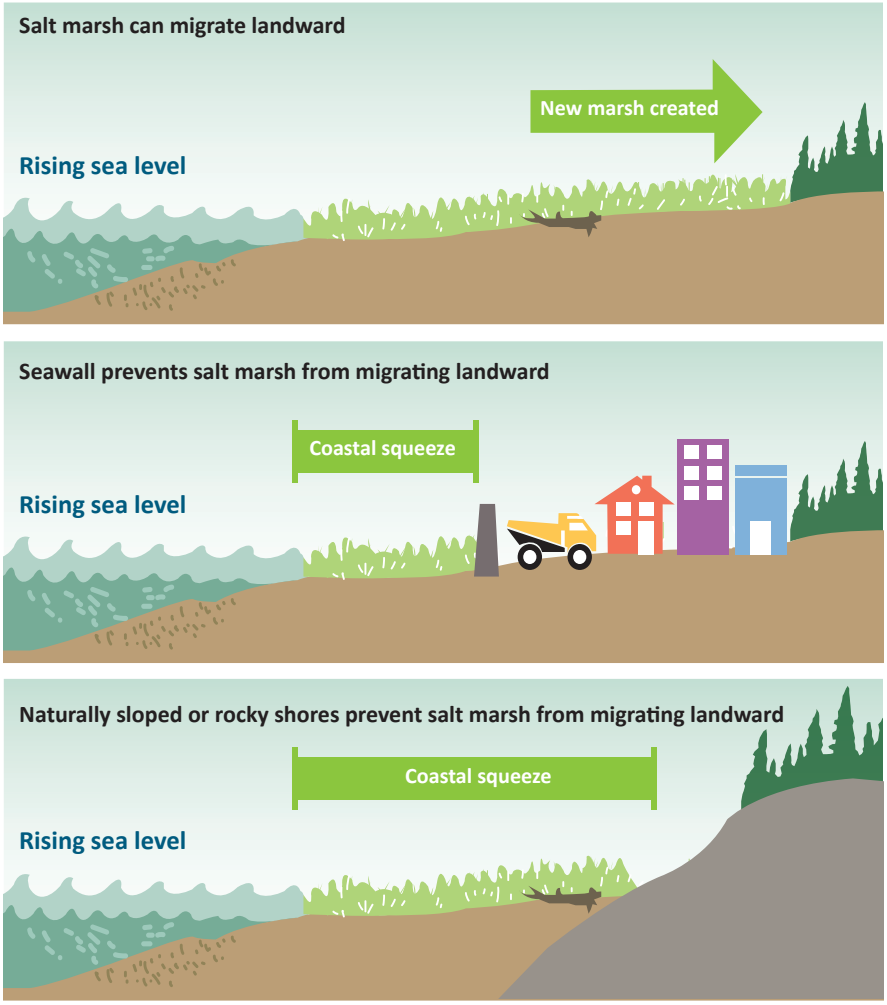
As valued and valuable as salt marshes are, this important habitat is disappearing. As sea levels rise, the marshes are at risk of drowning because their roots and tissues need exposure to the air to survive. According to the National Oceanic and Atmospheric Administration (NOAA), an estimated 14% to 34% of existing salt marshes along the South Atlantic could be lost by 2060 due to sea level rise alone.[4] They also are threatened by the region's rapidly growing population and resulting pressures that can degrade salt marshes and surrounding lands and waters. The number of people living in coastal communities in this region has more than doubled since 1970.[5] But the South Atlantic salt marshes and the vital services they provide can be saved. There are proven ways to help salt marshes and the communities that depend on them if people and governments work together and act swiftly. The South Atlantic Salt Marsh Initiative (SASMI) Plan charts a course for the future of this living, changing salt marsh system so that it can continue to enrich and protect a way of life for the coastal communities, cultures and military installations of the South Atlantic states. Although direct actions to address the drivers of sea level rise are outside the scope of this plan, SASMI acknowledges mitigating future climate change is an environmental, social and economic imperative.

Meeting the mounting challenges that salt marshes face requires a unified effort that transcends and coordinates across traditional local, state and federal boundaries.

The plan contains adaptation measures that can save the salt marshes. These include the installation of natural and nature-based features, such as oyster reefs, to fortify vulnerable areas of marshes, as well as the removal of barriers and conservation of adjacent lands that can support movement of the salt marshes to areas of higher ground in a process known as marsh migration. This plan also envisions preserving an equitable human element of the marshes, where a rich blend of communities continues to include multigenerational residents, communities of color and others bonded to this ecosystem. A broad array of public and private stakeholders already is engaging in such efforts in the South Atlantic states. However, meeting the mounting challenges that salt marshes face requires a unified effort that transcends and coordinates across traditional local, state and federal boundaries.

SASMI brings together leaders from the Southeast Regional Partnership for Planning and Sustainability (SERPPAS)* and other local, state and federal stakeholders from academia, governmental agencies, communities and nongovernmental organizations

* https://serppas.org/



Ocean Wise

Marsh moves upslope as sea levels rise – a process known as marsh migration. Natural features and infrastructure can block this migration resulting in a coastal squeeze that, without appropriate action, can eventually drown out salt marsh.

Mac Stone

Dolphins swim past a ghost forest drowned out by rising waters in the Waccamaw National Wildlife Refuge of South Carolina.

(NGOs) to determine the greatest threats to the salt marsh ecosystem and opportunities for its restoration and resilience in a four-state region along the Atlantic coastline. SASMI's geographic scope extends from North Carolina through Brevard County in east-central Florida. This coalition effort officially launched in May 2021, and since then, SERPPAS and The Pew Charitable Trusts* have brought together approximately 300 diverse partners across North Carolina, South Carolina, Georgia and Florida to support the protection, restoration and migration of this salt marsh expanse. SASMI seeks to help the salt marsh ecosystem survive the threats it faces and to ensure it delivers its multitude of benefits for future generations.

The goal: To enhance the long-term abundance, health and resilience of the approximately 1 million acres of salt marshes within the South Atlantic states to ensure no overall loss of the benefits these wetlands provide to fish, wildlife and people.

The SASMI coalition recognizes that salt marshes:

- Provide South Atlantic communities and more than a dozen military installations an estimated $7,284/acre per year in protective value from storm surge and flooding alone.[6]
- Support businesses and recreation, such as fishing and hunting, as economic drivers for coastal communities.
- Hold cultural and historical value for diverse populations of people.
- Provide important habitat for federally listed and at-risk species.
- Are threatened by sea level rise and encroaching development.

SASMI uses a voluntary, collaborative and nonregulatory approach that complements many existing state, federal and nongovernmental programs for conservation of the South Atlantic salt marshes. The successful regional SERPPAS conservation effort known as America's Longleaf Restoration Initiative provided both inspiration and a model for SASMI. Using that approach, SASMI has brought together additional interested stakeholders to develop and implement an integrated, coordinated and focused 10-year regional plan for the South Atlantic salt marshes.

* https://www.pewtrusts.org/en/research-and-analysis/articles/2021/07/12/how-southeast-stakeholders-are-safeguarding-salt-marshes

STRATEGIES FOR THE SOUTH ATLANTIC SALT MARSH INITIATIVE

Strategy 1: Protect and restore the health and functions of existing salt marshes.

Objective A: Minimize impacts to marsh habitat from adjacent development and sustain ecosystem and community health.

KEY ACTIONS

Pursue and expand requirements and potential cost-share incentives for riparian buffers and development setbacks to help maintain water quality through more natural riparian zones.	Promote the use of low-impact-development (LID) practices for land uses near salt marshes.	Proactively identify proposed development and water resource management actions or projects that do not directly involve marsh management but that may harm marshes and provide feedback and alternatives to planning agencies.	Increase the effectiveness of existing programs that control erosion and polluted runoff.	Enforce existing no-fill regulations at all levels of government.

Objective B: Support hydrologic connectivity, water flows and sediment replenishment that is favorable to salt marshes and broader estuary health.

KEY ACTIONS

Remove culverts and other barriers to free-flowing rivers, restore natural channels and address other forms of hydromodification where necessary to enhance habitat connectivity and restore water flows, as well as associated nutrient and sediment delivery to marshes.	Engage in relevant land and water resource management planning processes to incorporate indicators of salt marsh and estuarine ecosystem health as metrics for success.	Leverage opportunities to partner with the U.S. Army Corps of Engineers (USACE) on development of five-year dredged material management plans, a new USACE directive, and develop criteria to prioritize marsh restoration areas that would benefit from this significant source of sediment and creation of new marshes.	Explore the conservation and restoration potential of flood-prone areas that have been abandoned or willfully sold by landowners through buyout programs. Locate or develop maps that identify areas with multiple National Flood Insurance Program claims and delineate project scenarios in the most flood-prone areas.	Coordinate with the Federal Emergency Management Agency (FEMA) and agencies involved with property acquisition to understand their process for buyout programs and to advance the inclusion of restoration actions.	Promote restoration through delivery of technical assistance, best management practices, tool kits, marketing materials and incentives to private landowners and managers focusing on properties under conservation easement and in flood-prone areas.

Objective C: Expand use of living shorelines to maintain and enhance salt marshes.

KEY ACTIONS

Create a working group to review and promote needed changes to federal and state regulatory procedures and guidance to minimize the use of structures that degrade salt marsh habitat and encourage the use of living shorelines to protect larger-scale community infrastructure such as highways, parks and downtown waterfronts.	Eliminate state and federal policy and regulatory obstacles so that nature-based solutions are easier to permit than bulkheads and other structural shoreline armoring.	Provide added financial and technical capacity to enable local, state and federal governmental agencies to plan, promote and prioritize use of living shorelines where appropriate, including increasing technical assistance to communities and private landowners.	Expand and create cost-share programs to incentivize the use of living shorelines by waterfront property owners and marine contractors. Seek out opportunities in each state to develop nature-based demonstration projects with the U.S. Army Corps of Engineers' Engineering With Nature program.	Expand partnerships with both nonfederal entities and governmental agencies, such as the Department of Defense (DoD), Fish and Wildlife Service (FWS), National Park Service (NPS) and state and local parks, to propose strategic natural and nature-based projects that protect and maintain existing marshes while addressing climate change threats such as sea level rise and storm-related floods.	Pursue federal and state policies that will make governmental agencies a role model in the use of living shorelines to address shoreline stabilization needs on government property.

Objective D: Advance investment in monitoring, mapping and research of measures to protect and restore existing marshes and improve marsh function.

KEY ACTIONS

Create a network of restoration practitioners to coordinate efforts, compile existing guidance material, share best practices on existing techniques and explore new approaches to restoration.	Establish a thin layer placement of sediment work group that can encourage needed scientific research, identify and address regulatory barriers and develop pilot projects to better understand when and how to promote the beneficial use of sediment to maintain marshes as sea level rises.	Encourage continued research into restoration science for salt marshes, including best practices, to better understand and improve future outcomes for stakeholders, fish and wildlife, salt marshes and adjacent ecosystems.	Pursue a coordinated federal and state mapping effort to utilize existing information; identify and address gaps necessary to monitor salt marshes over time.	Identify and assess the vulnerability of degraded and threatened salt marshes to invasive species, boat wakes and other stressors to support objectively prioritized investment of resources for protection and restoration.	Develop a better understanding of the process and implications of tropicalization, including mangrove range expansion, on salt marsh ecosystems.

Strategy #2: Conserve marsh migration corridors and remove or retrofit barriers to ensure salt marshes can shift as sea levels rise.

Objective A: Prioritize public and private investments in conserving migration corridors where salt marshes can thrive in the future as sea level rises.

KEY ACTIONS

Encourage the incorporation of marsh migration priorities into all relevant planning processes and land preservation efforts for conservation organizations, federal, state and local governments.	Work alongside national wildlife refuges, DoD, NPS, Natural Resources Conservation Service (NRCS), U.S. Forest Service, national estuarine research reserves, aquatic preserves and other public land management entities to develop and implement marsh migration actions, including expanded voluntary land conservation, which complement existing management efforts and buffer these areas from harmful encroachment.	Work with communities and willing landowners to develop fee-simple or conservation easement acquisition opportunities that expand and manage these conservation areas where future marsh migration is projected.	Inventory currently conserved lands in federal, state, local and private ownership and assess how working with communities to expand these conservation areas could increase the resilience of both salt marshes and the built environment. Develop additional economic incentives for conservation of private lands to facilitate marsh migration and that are both equitable and inclusive of communities in the marsh migration corridor.	Use and expand taxpayer-funded conservation programs protecting land for future marsh migration. Encourage tax incentives for donation of lands that are considered undevelopable or less developable due to sea level rise. Buy working land conservation easements to prevent urbanization of these properties and to preserve land-use patterns that in the future can transition to salt marshes.

Objective B: Remove and avoid creating new barriers to the migration of salt marshes by including marsh migration as a priority in planning and federal and state investments in public infrastructure, wetland restoration and working lands.

KEY ACTIONS

Seek opportunities and incentives to replace bulkheads and hardened shorelines with natural and nature-based features, such as living shorelines, and allow for marsh migration areas where feasible. This should include phasing out permits allowing collapsed structures to be rebuilt.	Map existing and planned critical infrastructure to determine opportunities for retrofits and relocation that will allow for ongoing and future marsh migration.	Where appropriate, replace culverts with clear span or multi-span bridges, raise roads and other infrastructure with bridges or stilts and convert stormwater systems to natural and nature-based features to encourage water flow and marsh continuity.	Correct potential impediments to marsh migration, such as alterations to water flow, water quality, sediment delivery and other features necessary for new, future salt marshes.	Restore upland habitats to natural conditions to facilitate marsh migration where appropriate and feasible.

Saltmarsh sparrows, which depend on the region's salt marshes for overwintering habitat, have experienced rapid declines over the past decades.

USFWS

Members of the historic Gullah/Geechee community of Sapelo Island, Georgia, prepare a seafood cookout. Salt marshes shelter and support their life on this Sea Island, which is accessible only by boat.

Richard Ellis/
Alamy Stock Photo

CROSSCUTTING APPROACHES

FUNDING

Objective: Secure funding to protect and restore salt marshes and conserve marsh migration corridors.

KEY ACTIONS

Leverage traditional and new federal funding sources and facilitate cross-agency coordination to support landscape-scale projects, ranging from the Land and Water Conservation Fund to Readiness and Environmental Protection Integration (REPI), as well as short-term investments such as the Inflation Reduction Act and Bipartisan Infrastructure Law.

Leverage state and local funding sources and cross-jurisdictional collaboration to support local and regional projects and provide matches for federal funding when necessary.

Work with state NRCS offices to take advantage of programs, such as the Farm Bill program for wetland easements, to protect and restore future migration areas.

Capitalize on and coordinate with local, state and federal resilience planning efforts to prioritize marsh conservation and restoration as a means of enhancing community resilience and to create new funding streams that benefit both.

Create new, innovative financing strategies, including public-private partnerships, to implement the plan.

Identify and pursue opportunities to direct needed conservation funds and create economic development opportunities to those communities that have historically been neglected by such efforts.

Secure funding for additional mapping, monitoring and scientific research on implementing restoration best practices, as well as managing the effects of sea level rise.

Secure a long-term, dedicated fund to support and advance implementation of SASMI priorities during the next decade.

Support capacity building among agency partners to engage in SASMI-related efforts.

Create a list of possible funding sources related to implementing this plan.

CULTURE AND COMMUNITY

Objective: Promote understanding, engagement and collaboration across cultural groups, the military, federal, state and local governments, coastal businesses and communities in implementation of the SASMI plan.

KEY ACTIONS

Develop a framework for spatial prioritization of protection, restoration and marsh migration efforts, with a focus on maximizing co-benefits.

Co-identify and protect sacred burial areas, sites from the National Register of Historic Places and other areas of cultural and spiritual significance in marsh edges and associated uplands.

Identify, connect with and support leaders in underrepresented coastal communities and Indigenous groups to improve understanding of their needs and cultural uses of salt marshes and surrounding upland landscapes.

Identify, partner on and facilitate complementary and synergistic projects for salt marshes that involve and benefit federal, state and local governments, military, land trusts, private landowners and vulnerable and marginalized community members.

Develop and implement a framework for participatory mapping and/or participatory GIS to co-identify sites in need of future protection. Build capacity and facilitate attendance at workshops, planning meetings and local and regional discussions by underserved and underrepresented individuals and groups.

Increase the use of community science and prioritize utilization of native and Indigenous knowledge and lived experience perspectives.

Foster eco-cultural tourism that educates and engages visitors in culturally significant places and low environmental impact activities and emphasizes human dependence on healthy and abundant salt marshes.

Explore the connection between strategic coastal relocation and payments for ecosystem services as a bridge to transition working and culturally significant lands to salt marshes.

A submarine returns to its home port at Naval Submarine Base Kings Bay, Georgia. The base is among those buffered from encroachment and severe weather impacts by salt marshes and protected lands.

APFootage/
Alamy Stock Photos

A commercial shrimping vessel finds safe harbor in the salt marshes. White and brown shrimp are among the many commercially important species that depend on salt marsh habitat.

INTERFOTO/
Alamy Stock Photo

CROSSCUTTING APPROACHES

POLICY

Objective: Expand, develop or leverage existing federal, state, and local policies, programs and incentives to protect and restore salt marshes and conserve marsh migration corridors.

KEY ACTIONS

Conduct a gap analysis of existing state and federal laws, policies and programs relevant to protection and restoration of salt marshes and the conservation of marsh migration corridors to guide implementation of the plan.

Leverage states' interest in coastal management, climate resilience and hazard mitigation, including wetlands regulation and setback requirements, shoreline stabilization requirements and resilience plans to support actions benefiting existing and future salt marshes.

Use existing policy tools and create new ones to provide appropriate incentives for locating development outside flood-prone areas that could otherwise support marsh restoration or migration.

Develop local engagement strategies that support existing efforts and catalyze new efforts based off successful model ordinances, policies and plans relevant to coastal marsh protection.

Collaborate with local and regional planning agencies to integrate relevant strategies, objectives and actions into ongoing planning efforts.

Leverage and inform DoD resilience and conservation requirements and initiatives to promote salt marsh protection both internal and external to installations such as installation-specific integrated natural resources management plans under the Sikes Act.

COMMUNICATION, EDUCATION AND ENGAGEMENT

Objective: Facilitate adoption and implementation of the SASMI Plan by local, state and federal governments, the private sector and other priority stakeholder groups.

KEY ACTIONS

Inventory and develop a suite of effective communication, education and engagement products, activities and tools that inform and mobilize a diversity of stakeholders in support of SASMI. Work with local partners to tailor these materials for key audiences.

Promote and share progress with local, state and federal decision-makers, as well as private stakeholder groups, to build further support and engagement moving forward.

Increase capacity of existing organizations and programs to lead SASMI-related communication, education and engagement efforts including outreach to landowners about voluntary conservation opportunities.

To inform local and regional planning efforts, inventory and publicize recent case studies in each SASMI state that can serve as examples of successful salt marsh enhancement and restoration projects, including those providing resilience benefits to coastal infrastructure.

Leverage new and existing citizen science programs to educate and engage the public.

Familiarize priority stakeholder groups with the ecosystem services and benefits of healthy salt marsh ecosystems, the practices that threaten them and solutions to address those threats.

ENDNOTES

1 National Park Service, "Salt Marshes," accessed April 18, 2023, https://www.nps.gov/subjects/oceans/salt-marshes.htm.
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4 S. Fretwell, A. Wagner, and A. Lee, "A Million Acres of 'Priceless' Marshes Protect NC, SC, GA. Will They Perish in Rising Tides?" The News and Observer, Oct. 26, 2021, https://pulitzercenter.org/stories/million-acres-priceless-marshes-protect-nc-sc-ga-will-they-perish-rising-tides.
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Victoria Bock/Lowcountry Land Trust

Alge Island, South Carolina, conserved in the 1980s, now provides protection from storm surge and flooding for the adjacent community as well as habitat for a variety of species.

Two Key Strategies of the South Atlantic Salt Marsh Plan

The plan centers on two primary strategies to achieve the SASMI goal and from which specific objectives and actions cascade:

- **Protect and restore** the health and functions of existing salt marshes.
- **Conserve** marsh migration corridors and remove or retrofit barriers to ensure salt marshes can shift as sea levels rise.

Four Complementary Crosscutting Approaches

The plan includes four crosscutting approaches that relate to and serve the two primary strategies. These crosscutting approaches center on the following:

- Obtain **funding** necessary to accomplish generational, landscape-scale actions in a critical 10-year time frame in a strategic, coordinated approach to maximize benefits and understand the consequences of irrevocable changes.
- Ensure diverse **cultural and community** engagement and collaboration to shape inclusive, equitable, just and durable SASMI outcomes.
- Build upon existing **policy, laws and programs** at the local, state and federal levels and pursue new policies to plan and implement initiatives to conserve, restore and accommodate the migration of salt marshes.
- Seek opportunities and build capacity to improve **communication, education and engagement** about the importance of the South Atlantic's vast salt marshes and the many ecosystem benefits they provide.

This plan reflects the culmination of two years of intensive study, dialogue and deliberations. This includes understanding that while each of the four SASMI states faces many of the same challenges, these challenges likely vary in severity and extent at the state and local levels. Therefore, achieving landscape-scale success with the regional plan will necessitate a tailored approach to the plan's implementation that is formulated in partnership and coordination with agencies and other partners at the state and local levels. SASMI will complement ongoing efforts and help achieve landscape-scale conservation of one of the last vast areas of salt marshes in the United States. The strategies included in the plan are intended to be a road map for elected officials, state and federal agencies, communities, NGOs, academic partners and others to work together to ensure the long-term abundance, health and resilience of this vital natural resource.

With a million acres at stake, we are unified in our drive to Marsh Forward!

For more information on SASMI and to read the full plan, visit www.marshforward.org