



MARSH FORWARD

**A REGIONAL PLAN FOR THE FUTURE
OF THE SOUTH ATLANTIC COAST'S
MILLION-ACRE SALT MARSH ECOSYSTEM**

A COLLABORATIVE
EFFORT OF THE



**SOUTH
ATLANTIC
SALT
MARSH
INITIATIVE**





Cover image:
J Lee
(Instagram: @growingwilder)

EXECUTIVE SUMMARY



J Lee (Instagram: @growingwilder)

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

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



Salt marsh extent **Protected lands**

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/P9KLB85D>.

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

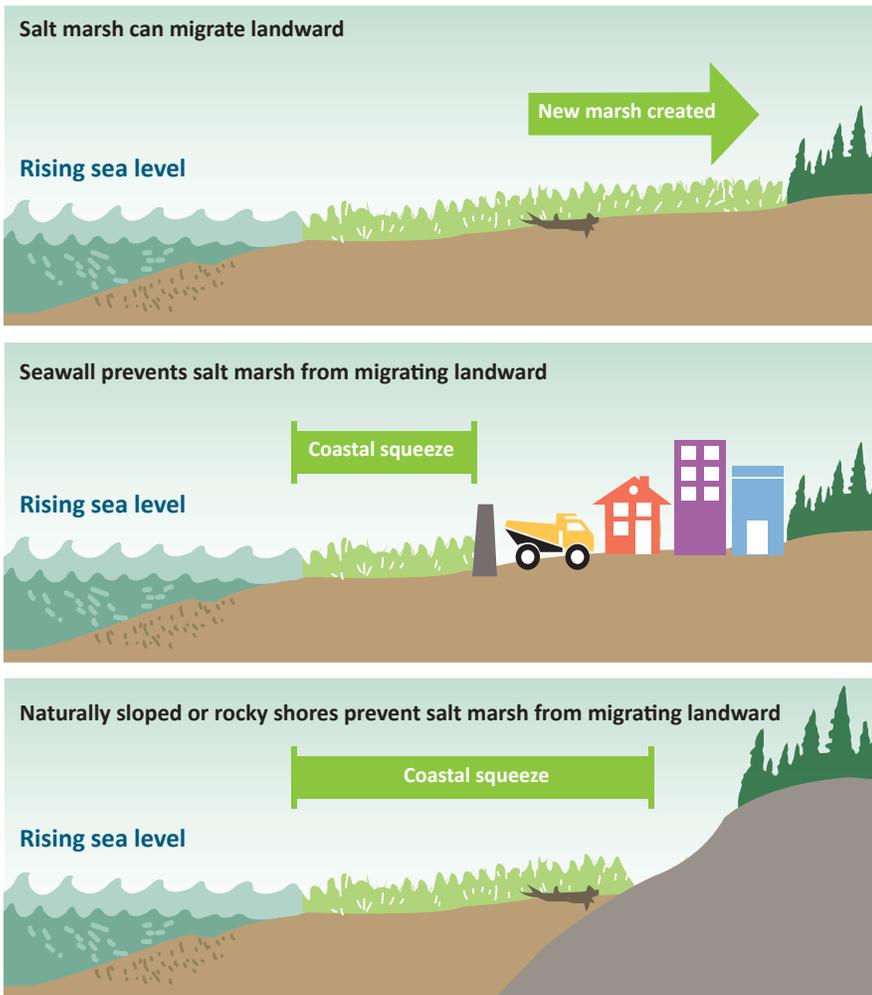
Meeting the mounting challenges that salt marshes face requires a unified effort that transcends and coordinates across traditional local, state and federal boundaries.

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.

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



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.



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, visit www.marshforward.org



Acknowledgments

The SASMI Plan is the product of many dedicated contributors. We would like to thank the Plan writing team led by Sue Mullins and members Shana Jones, Kate Schaefer, and Louise Vaughn.

Former SASMI coordinator Mallory Eastland and working group members Bruce Beard, Holly Binns, Lora Clarke, Joseph Gordon, Cameron Jaggard, William G. Ross Jr., Addie Thornton, and Nancy Walters provided primary support to the writing team in the development of the plan.

The SASMI Steering Committee (Appendix A) contributed extensive feedback on the plan, as well as support and guidance on key decision points. The focused efforts of the SASMI workshop topic teams were instrumental in the success of the SASMI workshop that was the foundation for the plan. Guidance and support were also provided by SERPPAS. Financial support for SASMI and the plan was provided by The Pew Charitable Trusts.



Table of Contents

| | |
|---|----|
| EXECUTIVE SUMMARY | 3 |
| INTRODUCTION: THE CASE FOR CONSERVATION | 10 |
| Culture and Community | 14 |
| A Matter of National Security | 17 |
| A Conservation Imperative | 18 |
| THE PLAN | 21 |
| STRATEGIES FOR THE SOUTH ATLANTIC SALT MARSH INITIATIVE | 24 |
| Protection and Restoration | 24 |
| Conservation of Migration Corridors | 26 |
| CROSSCUTTING APPROACHES | 34 |
| Funding | 34 |
| Culture and Community | 35 |
| Policy | 36 |
| Communication, Education and Engagement | 36 |
| PLAN IMPLEMENTATION | 38 |
| APPENDIX A. SASMI Steering Committee Members | 40 |
| APPENDIX B. Southeast Conservation Blueprint Summary | 41 |
| APPENDIX C. Workshop Summary | 42 |
| APPENDIX D. State Conservation Funds and Tax Incentives to Support Land Conservation and Restoration | 43 |
| APPENDIX E. Federal Programs for Land Conservation | 46 |
| APPENDIX F. Examples of Common Ordinances, Policies and Plans at the Local Level Relevant to the Protection of Coastal Marshes | 48 |
| APPENDIX G. Possible Organizational Structure for SASMI Implementation | 49 |
| REFERENCES | 50 |



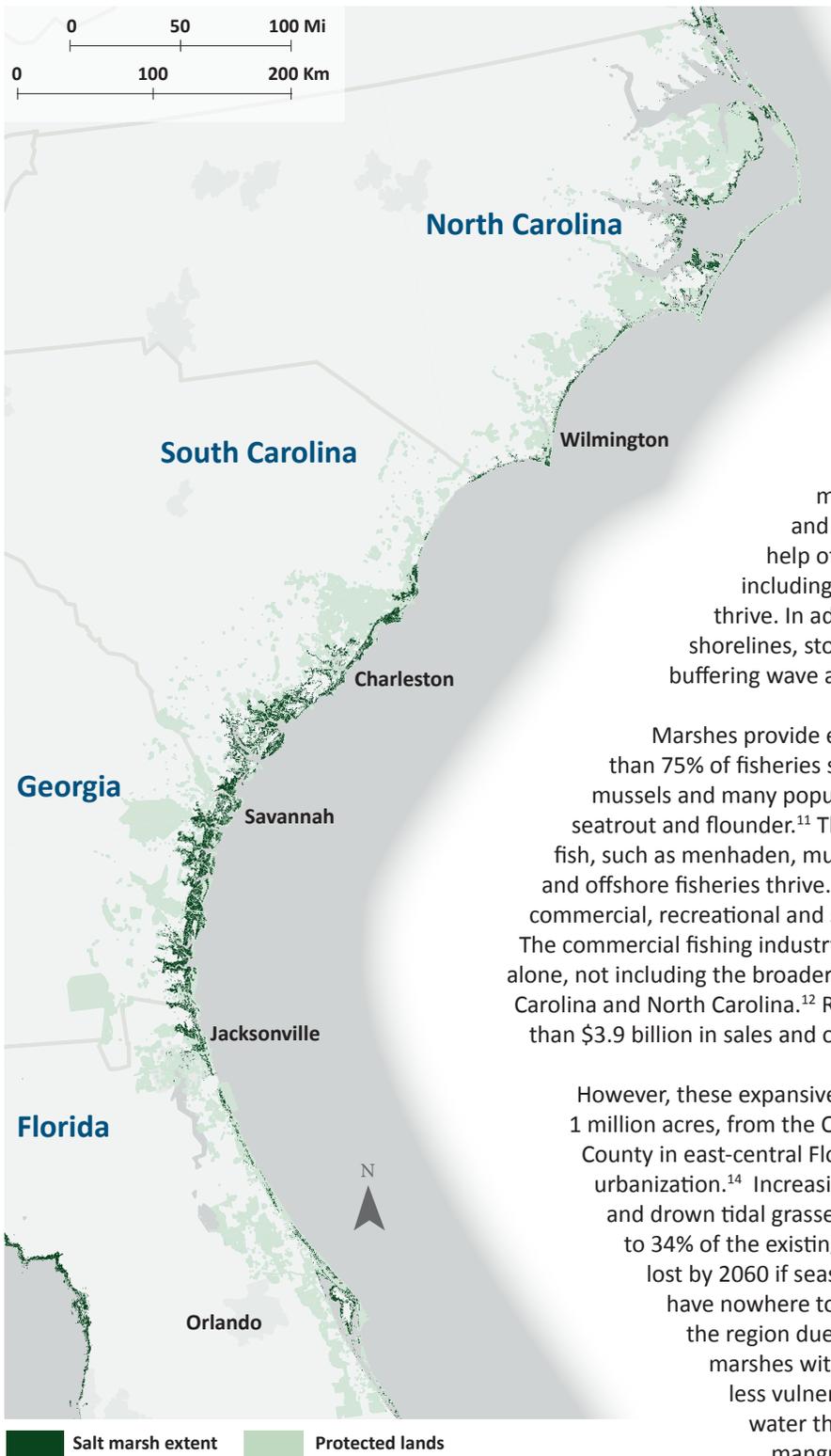
APFootage/Alamy Stock Photos

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 marsh and protected lands.

INTRODUCTION

THE CASE FOR CONSERVATION

At the shifting edge of land and water, salt marshes are the natural guardians of the coast. Salt marshes, which are saline from the seawater that flows in with the tides, are consistently “marshy” because the ground is composed of fine sediment mixed with carbon and nutrient-rich matter. In late summer, healthy emerald-green smooth cordgrass with its fluttering tiny white flowering spikes stands in sharp contrast to the gray-green of the black needlerush that separates the cordgrass from the adjacent uplands. Saltgrass, glasswort, sea lavender, saltmeadow cordgrass, marsh elder and other plants create a mosaic in the vast meadows. Tidal creeks lined with oyster beds serve as the arteries of the salt marsh connecting the marsh’s mosaic of habitats, ranging from deep tidal rivers to sun-parched salt flats at the marsh’s upper edge. These foundational habitats are deeply ingrained in coastal culture and a keystone of healthy fisheries, coastlines, communities and economies.⁷



Salt marshes contribute to the health and resiliency of the larger landscape. These tidal wetlands serve as transition areas between adjacent uplands and nearshore habitats. Healthy salt marshes filter and cleanse runoff of nutrients. Tidal marshes of Georgia can remove up to 32% of nitrogen entering estuaries and, compared to unvegetated wetlands, salt marshes can remove four times more nitrogen pollution.⁸⁻⁹ Despite only covering 2% of the earth’s surface, global tidal wetlands are estimated to provide 50% of all carbon storage in the ocean and have a greater potential than land-based systems to mitigate climate change over time if kept healthy and delivered sufficient sediment.¹⁰ These vital services help other highly productive and important ecosystems, including oyster reefs, mangroves and seagrass beds, thrive. In addition, marshlands can reduce erosion, stabilize shorelines, store floodwaters and protect against storm surge by buffering wave action.

Marshes provide essential food, refuge or nursery habitat for more than 75% of fisheries species, including shrimp, blue crab, oysters, mussels and many popular finfish, such as redfish, gag grouper, spotted seatrout and flounder.¹¹ They also provide habitat for important forage fish, such as menhaden, mullet and pinfish, which help the region’s inshore and offshore fisheries thrive. Together these species help support valuable commercial, recreational and subsistence fishing, as well as working waterfronts. The commercial fishing industry provides over \$183.3 million in landings revenue alone, not including the broader economic impacts in east Florida, Georgia, South Carolina and North Carolina.¹² Recreational fishing in these states supports more than \$3.9 billion in sales and over 39,000 jobs.¹³

However, these expansive salt marsh landscapes covering approximately 1 million acres, from the Outer Banks of North Carolina through Brevard County in east-central Florida, face threats from rising seas and rapid urbanization.¹⁴ Increasing sea levels threaten to erode marsh banks and drown tidal grasses. According to the NOAA, approximately 14% to 34% of the existing salt marshes along the South Atlantic could be lost by 2060 if seas continue to rise as expected and the marshes have nowhere to migrate.¹⁵ These losses are likely to vary across the region due to factors such as tidal range, where those marshes with higher ranges of tidal movement are typically less vulnerable to fragmentation and conversion to open water than those with lower tidal ranges.¹⁶ In the future, mangroves may also alter the most southerly salt marshes, and we need to understand and prepare for these changes.

Human development also eats away at great expanses of once-uninterrupted marsh. Historically, filling, draining and ditching of

Figure 1. 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/P9KLB85D>.



E. Weeks/South Carolina Department of Natural Resources

Clapper rails find food, shelter and a place to raise their young in this highly productive habitat.

coastal wetlands were widely practiced to provide additional acreage for agricultural activities and development.¹⁷ In areas of exploding population growth, innumerable parcels of coastal land are developed for people turning to tidelands as places to live and work. Development along shorelines, along with jetties, groins, riprap, revetments and other structures, generally impedes natural migration and can actually cause greater habitat loss and erosion than the habitats they replace.¹⁸⁻²⁰ Over the past 30 years, at least 28,000 permits have been approved for development in tidal lands across the three states; about 5,000 of those permits were to construct bulkheads.²¹ Hardened structures landward of tidal wetlands can cause “coastal squeeze” by accelerating erosion during storms and preventing inland migration in response to sea level rise.²²

Polluted runoff also impairs the ability of salt marsh to deeply root and can speed up decomposition and subsidence of marsh sediment, sometimes resulting in creek-bank collapse with once vegetated marshes turning into mudflats and open water.²³ Looking farther inland, freshwater systems that nourish the salt marshes with needed sediment, nutrients and freshwater face related challenges from development and climate change.

The degradation and loss of South Atlantic salt marshes undermines their ability to provide valuable ecosystem services to people, as well as support wildlife and fish species. Many salt marsh-dependent bird species are already experiencing steep declines due to impacts of climate change and sea level rise, including the saltmarsh sparrow, Acadian Nelson’s sparrow

and clapper rail.²⁴ The eastern black rail is federally listed as threatened under the Endangered Species Act. South Atlantic coastal marshes provide important habitat across the full annual cycle for these species and many other tidal marsh birds, including the coastal plain swamp sparrow, seaside sparrow and eastern willet.

Diverse other species are also at risk as salt marshes are degraded and lost. Those include high-priority species for conservation that are depleted and have suffered recent



INTERFOTO/Alamy Stock Photo

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.



Jay Fleming/Getty Images

Diamondback terrapins inhabit brackish waters, including salt marsh, almost exclusively. They have suffered declines, in part due to habitat loss and degradation.

declines, such as diamondback terrapin,²⁵ the federally listed threatened green sea turtle²⁶ and Florida manatee²⁷ and the endangered Kemp’s ridley sea turtle.²⁸ The region is also home to anadromous species of fish, including the Atlantic and shortnose sturgeon, whose South Atlantic populations are federally listed as endangered and which have suffered significant declines in part due to hydrologic alterations of freshwater river systems that feed into and contribute to salt marsh health.²⁹⁻³⁰ Conservation of salt marshes is also important for those inhabitants with limited geographic ranges, including

the Atlantic salt marsh mink, the tiger beetle and the Atlantic salt marsh snake.³¹

Despite these challenges, there are opportunities to advance salt marsh conservation, reverse these trends and ensure the long-term persistence, health and function of this habitat. A wealth of local, state and federal laws, regulations and management efforts are focused directly on or otherwise benefit salt marsh conservation, thereby providing a solid footing from which to build on. After decades of large-scale wetland destruction, Florida passed the Warren S. Henderson Wetlands Protection Act in 1984 making dredging or filling in, on or over surface waters without a permit illegal. Florida has also established a comprehensive wetlands protection program that exceeds federal permitting requirements, while affording permitting exemptions for smaller-scale [living shoreline*](#) projects. The Coastal Marshlands Protection Act of 1970 protects Georgia’s marshes and gives the state authority to regulate activities over marshlands, and its Erosion and Sedimentation Act of 1975 requires a 25-foot buffer from the coastal marshland-upland interface. South Carolina’s Coastal Tidelands and Wetlands Act of 1977 protects coastal waters and tidelands as critical areas through permitting requirements that preference marshlands over hardened erosion structures. In North Carolina, the Coastal Area Management Act of 1974 conserves and manages estuarine shorelines and coastal wetlands as focal “areas of environmental concern,” and in 2019 the state streamlined its general permitting process for living shorelines, making



Mark Bias

Manatees swim slowly along the salt marsh edge in the St. Johns River estuary in Jacksonville, Florida.



Kaitlyn Hackathorn/South Carolina Department of Natural Resources

Recreational anglers prepare to release a fish caught along the marsh edge in South Carolina.

it one of the fastest in the nation.³²

Much of the salt marsh within the South Atlantic is regionally recognized as a shared priority for conservation. The [Southeast Conservation Adaptation Strategy \(SECAS\)](#)* “is a regional conservation initiative that spans the Southeastern United States and Caribbean.” “SECAS brings together state and federal agencies, nonprofit organizations, private landowners and businesses, tribes, partnerships, and universities around a shared vision of the future” — “a connected network of lands and waters that supports thriving fish and wildlife and improved quality of life for people.” SECAS also “develops and maintains the [Southeast Conservation Blueprint](#),** a living, spatial plan that identifies priority areas for a connected network of lands and waters.” “The Blueprint identifies priority areas based on a suite of natural and cultural resource indicators representing terrestrial, freshwater, and marine ecosystems. Across most of the region, a connectivity analysis identifies corridors that link coastal and inland areas and span climate gradients.” To date, “more than 2,000 people from over 500 different organizations across the Southeast have actively participated in developing the Blueprint.”³³

In order to create a connected network of lands and waters, 60% of the entire landscape within the SASMI geography is considered a priority for conservation action by the wider conservation community via the Southeast Conservation Blueprint. These priority areas would have the biggest conservation impact, based on a suite of natural and cultural resource indicators (also see Appendix B).³⁴ In particular, the

blueprint recognizes nearly all of the existing salt marsh habitat (95%) as priority areas for conservation action. This signifies that salt marshes within this geography are not just locally important but also regionally significant and represents where the wider conservation community has come together in agreement about the importance of these places. In addition, a national assessment conducted by the NOAA and National Estuarine Research Reserve System identified South Atlantic salt marshes as highly resilient and the larger Southeast region as having the most high-priority acres for future conservation efforts in the lower 48 states.³⁵ Conservation action within these areas of shared priorities can provide multiple benefits for people, fish and wildlife.

CULTURE AND COMMUNITY

Salt marshes are iconic landscapes that have helped shape a rich cultural heritage. “Before European exploration of the Southeast, these lands were inhabited by a number of Native American tribes, such as the Seminole in Florida, the Guale in Georgia, the Yemassee in South Carolina, and the Waccamaw in North Carolina. The Native Americans living along the coast needed to adapt and survive to the ever-changing salt marsh-tidal creek ecosystem, and learn how to live with and sustain themselves off it. Many local plants were used in everyday life: sharp yucca leaves were used for cordage, needles, and medicine; Spanish moss was used as stuffing; and yaupon holly was used in a number of traditional rituals. For food, Native Americans participated in activities very similar to what we practice now, including creating net-like structures to catch



Richard Ellis/Alamy Stock Photo

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.

crabs and fish in the tidal creeks, harvesting oysters, clams and whelks in the marsh mud, and hunting terrestrial animals such as deer which grazed near the marsh platform.”³⁶ There are many sensitive archaeological sites including shell middens and rings that are in danger of eroding or being developed before archaeologists can identify and document them, which could be a great loss to the area’s culture, community and historic record.³⁷⁻³⁹ Existing parks and open space support a number of resources important to both cultures and communities along the South Atlantic coast. Examples include Florida’s Timucuan Ecological and Historical Preserve—considered one of the last unspoiled wetlands on the Atlantic Coast and offering a historical look and preservation of the Timucuan culture—and additional areas such as the Cumberland Island National Seashore in Georgia, Cape Romain National Wildlife Refuge in South Carolina and the Currituck National Wildlife Refuge in North Carolina, among others.

An important stretch of this coastline, reaching from Jacksonville, North Carolina, to Jacksonville, Florida, is also home to the Gullah/Geechee people, who are descended from enslaved Africans forced to work on the plantations that once dotted the shores and inlets of the southern Atlantic coast. These enslaved peoples were drawn primarily from similar cultural groups such as Yoruba and Ibo in the Senegambian region of coastal West Africa where rice was traditionally grown. Prized for their expertise in rice cultivation, enslaved Africans along the South Atlantic Bight largely remained within the narrow tidewater region instead of being sold and transported to other parts of the South. “De wata bring we and de wata

gwine tek we bak” is a Gullah proverb that speaks of the need to be near the water and to smell the marsh. Generations have long been found amidst the cordgrass fishing, picking oysters, digging clams or simply breathing in the air that has the distinctive smell of pluff mud.

The winding waterways parting lands along the coastline made travel to the mainland difficult and rare. The insulation created by water and marsh united these people as a nation within a nation. It was in this setting that the distinct Gullah/Geechee culture with its roots in West African religious, artistic, foodways and linguistic traditions that were blended with European and Native American cultures developed. These unique communities developed distinct dialects and formed an entirely separate creole language called Gullah that blended with their native languages of West and Central Africa. As early as 1862 and after the Civil War, many formerly enslaved Africans in the area bought additional portions of land where their descendants have now lived, farmed and fished for generations. In 1865, U.S. General William T. Sherman issued Field Order 15, which confiscated a 30-mile-deep strip of coastal, rice-growing land from Charleston, South Carolina, to the St. Johns River in Florida. Some freedmen received federal land grants within the region they had worked as enslaved peoples—the sole instance of action on a Reconstruction era policy colloquially known as “40 acres and a mule.”

The ancestors of the Gullah/Geechee pooled their funds and bought plots of 10 to 40 acres that were auctioned due to the Confiscation Acts of 1861 and 1862, laws that provided for the

seizure and sale of former plantations. Therefore, freedmen permanently settled as landowners in the same areas they had inhabited as enslaved people. The Gullah/Geechee people have been able to maintain culturally rich arts, crafts, religion, folklore and food traditions that are deeply connected to their African roots.⁴⁰ The [Gullah/Geechee Nation](https://gullahgeecheenation.com/)* was officially established in 2000, but the nation and the landscape are increasingly pressured by gentrification since the incursion of real estate development and resulting property tax increases.

In 2004, the National Trust for Historic Preservation placed the Gullah/Geechee coast on its list of most threatened places and two years later, Congress created the [Gullah Geechee Cultural Heritage Corridor](https://gullahgeecheecorridor.org/)** to recognize the unique culture of the Gullah/Geechee people who have traditionally resided in the coastal areas and the Sea Islands of North Carolina, South Carolina, Georgia and Florida. These efforts, in addition to international recognition of the Gullah/Geechee Nation by United Nations observers, increased awareness about the plight of the Gullah/Geechee.

Despite receiving recognition at the national and international levels, some Gullah/Geechee landowners continue to struggle to hold on to their ancestral land as new coastal development and the rising sea increasingly challenge their long history of resiliency in the region. About 25% of the heritage corridor throughout the four-state region is expected to be flooded/inundated due to sea level rise under a 2-foot scenario.⁴¹

Gullah/Geechee and other coastal landowners face land ownership challenges as well. Discriminatory tax assessments, tax sales, forced petitions and other forms of legalized discrimination and racial terrorism were historically used to dispossess Black people of their lands.⁴² Heirs' property remains a prominent threat to these communities, especially black landowners.⁴³ This land is jointly owned by descendants of a deceased person whose estate was not transferred to them through formal legal process. Lack of proof of ownership, such as a will or deed, can also disadvantage these communities by making it difficult for heirs to obtain government benefits, such as disaster recovery funding, and can make it difficult for land to remain within the family. Ultimately, these challenges accelerate displacement of communities, perpetuate historic inequities and can drive further urbanization of lands adjacent to salt marshes.⁴⁴

Other cultural and community traditions are at risk of being swept away with the loss of marshes. Many communities that depend on the coast for food may be impacted by declines in the abundance of fish and shellfish, unless we take action to ensure salt marshes persist for future generations. The communities dependent upon fishing for commercial and subsistence purposes are far more likely to be poor, have a greater percentage of minority and tribal populations and/or

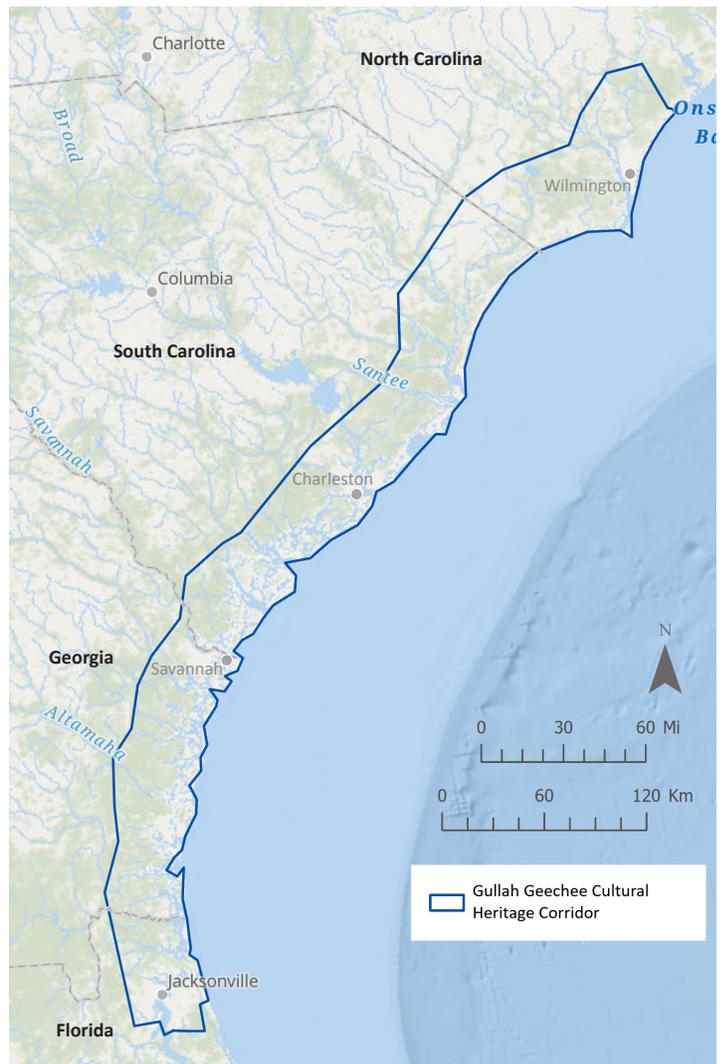


Figure 2. The Gullah Geechee National Heritage Corridor encompasses coastal areas from Jacksonville, North Carolina, to Jacksonville, Florida. It includes the Sea Islands to approximately 35 miles inland.

have residents with less “personal capacity,” such as lower employment and less education, to respond to change brought about by storms and sea level rise.⁴⁵

The cultural significance of salt marsh is in many ways invaluable to multigenerational residents, which is part of the reason it’s so difficult—and in some cases impossible—to quantify them using traditional economic methods. However, numerous studies document the disproportionate impacts sea level rise has and is expected to have on minority and rural coastal populations in the U.S.⁴⁶⁻⁴⁷ Compared to other regions in the U.S., the South Atlantic region has the greatest number of people living in areas vulnerable to inundation. People with low income are 15% more likely to live in these areas.⁴⁸



Mark Bias

An aerial view shows salt marsh adjacent to the runway at Naval Station Mayport in Jacksonville, Florida.

Coastal communities along the South Atlantic increasingly face acute threats from severe storms, flooding, changes in sea level, rising temperatures and unsustainable development. Over time, all of these factors may affect the social vulnerability and resilience of these communities, the working waterfronts that include fishing and shellfish industries and marine construction and their cultural heritage.⁴⁹ Multigenerational residents, tribes and the Gullah/Geechee peoples that remain in the area, including those who have been removed or lost their properties, still care about the condition of their ancestral homeland.

A MATTER OF NATIONAL SECURITY

In addition to coastal communities, working waterfronts and a diversity of wildlife, the South Atlantic is home to more than a dozen coastal military installations and training grounds.⁵⁰ According to a DoD climate risk analysis, the risks of climate change to DoD strategies, plans, capabilities, missions and equipment are growing. Changing precipitation patterns, and more frequent, intense and unpredictable extreme weather conditions create challenges for these coastal installations.⁵¹ Sea level rise exacerbates these threats and represents an encroachment on coastal installations and operations in its own right.

Many of the coastal installations in the South Atlantic are surrounded by or located in close proximity to salt marshes, which can help buffer these changes and shield installations (Figure 3).⁵² But just as shrinking longleaf forests at one time put pressure on the DoD to conserve remaining longleaf pine habitat in order to protect the federally listed red-cockaded woodpecker,⁵³ the reduction in salt marsh habitat could force similar action. As the habitat shrinks, salt marsh-dependent species will concentrate their populations in the remaining habitat. Such concentration may impair an installation’s flexibility in meeting its mission priorities. DoD thus has a direct stake in protecting and expanding off-base salt marshes. DoD

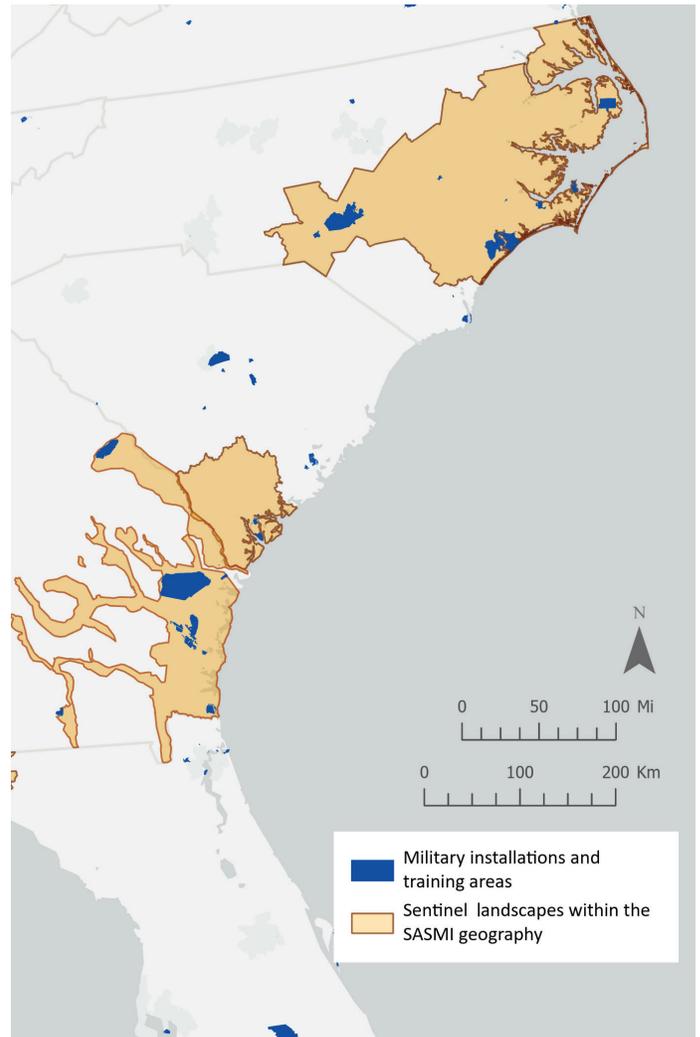


Figure 3. The South Atlantic region includes three sentinel landscapes and over a dozen coastal military installations and training grounds; many of which are surrounded by coastal marsh providing a buffer against storm surge and coastal flooding.

uses the Readiness and Environmental Protection Integration (REPI) Program as a key tool for combating encroachment that can limit or restrict military training, testing and operations. The REPI program protects military missions by helping remove or avoid land-use conflicts near installations and addressing regulatory restrictions that inhibit military activities.

In addition, within the SASMI region are three areas covered by the Sentinel Landscapes Partnership. “Founded in 2013 by the U.S. Department of Defense, Department of Agriculture and Department of the Interior, the partnership’s mission is to strengthen military readiness, conserve natural resources, bolster agricultural and forestry economies, and increase climate change resilience.”⁵⁴ This partnership offers frameworks to help support the restoration and migration of salt marshes. The partnership includes a coalition of federal and



Karl Dudman

Low-lying roadways can harm existing coastal habitat and present a barrier to future migration. Engineering in ways that support natural systems presents an opportunity to make infrastructure and salt marsh more resilient.

state agencies, local governments and other local partners and organizations that work together and with private landowners within a landscape. These focus areas work to minimize encroachment threats and constraints to military missions while also supporting ecologically important landscapes and working lands.

The benefits of salt marshes to military installations are numerous. From overall installation resilience, like reducing storm surge impacts to perimeter roads, to readiness considerations like using sediment dredged from Navy navigational channels to restore adjacent marsh, there are many mutual benefits to SASMI and military installations, training grounds and transportation routes. As these sentinel landscapes span much of the South Atlantic salt marsh geography they offer a foundation to catalyze and coordinate landscape-scale conservation efforts that promote military readiness across the region and between agencies.

A CONSERVATION IMPERATIVE

Depending on the varying estimates of sea level rise, we

could see many of the South Atlantic's salt marshes we know today gone in a matter of decades unless actions are taken today to protect, restore and conserve marshes for the future. Beyond losing hundreds of species and the multigenerational communities that depend on this unique ecosystem, the disappearance of salt marshes would have a devastating impact on flood protection and the other ecosystem services these wetlands provide. In terms of real-time protection from flooding for millions of coastal residents and inland ecosystems, the areas behind existing salt marshes, for instance, experience 20% less property damage from storms.⁵⁵

The cumulative value of salt marsh ecosystem services for which monetary equivalencies have been developed by the field of ecological economics is predicted to be over \$78,000 per acre per year.⁵⁶ These services make salt marshes one of the world's most economically valuable habitats. Applying the ecosystem service valuations of Mitsch and colleagues,⁵⁷ the 1 million acres of salt marshes that this plan is seeking to safeguard are estimated to provide economic contributions of \$78 billion per year in material and indirect use services, to say nothing of their cultural worth.



Canva Pty Ltd/Alamy Stock Photo

A couple enjoys kayaking near Bald Head Island, North Carolina. Kayaking, fishing, wildlife watching and boating are popular salt marsh activities that attract valuable tourism and boost the economy.

Without decisive action, sea level rise, coastal development and other human impacts threaten the function and persistence of salt marshes and the forfeiture of their irreplaceable ecological, economic and social services and benefits. In other instances, climate-change-related effects, such as tropicalization and transition of existing salt marshes to mangrove habitat, could significantly alter portions of the SASMI landscape in ways that are not fully understood.

TACKLING THE ISSUE

Ensuring thriving salt marsh ecosystems into the future means addressing primary threats to their existence today. Sea levels will continue to rise, pressures from development will continue to grow and severe weather will remain a fact of life for the South Atlantic region. Therefore, SASMI's efforts must focus on those factors within our control or risk losing the salt marsh resource along with the tremendous value it provides society. Recognizing that losses are not an option, SASMI must utilize proven strategies and new creative approaches that will enhance the long-term abundance, health and resilience of the

approximately 1 million acres of salt marshes within the South Atlantic states.

A wealth of governmental, nongovernmental and academic organizations and private businesses are involved in advancing salt marsh protection, restoration and migration through technical and financial assistance. SASMI aligns these independent efforts in service to shared priorities around salt marshes to be more effective in saving the habitat at a regional scale. Existing scientific literature, successful case studies from throughout the SASMI region and the input of SASMI's broad and growing coalition of approximately 300 experts represent the vast body of knowledge from which the SASMI Plan and its two core strategies, crosscutting approaches and cascading objectives and key actions were born.

With this plan we endeavor to "marsh forward" in a united effort for the future of the South Atlantic salt marsh ecosystem and, in doing so, realize tremendous benefits for coastal communities, wildlife, the military and the economy into the future.

9 things to know about salt marshes, and why they should be protected

3.8m

The U.S. has approximately 3.8 million acres of salt marshes, including a vast interconnected 1 million-acre stretch from North Carolina to Florida.

75%

Salt marshes and the estuaries that support them provide shelter, food and nursery grounds for more than 75% of commercial and recreational fish species in the country, including white shrimp, blue crab, redfish and flounder.

\$7,284

On average, salt marshes provide \$7,284 of value per acre each year during storms by reducing the impacts of surge and flooding alone, according to a [University of California, San Diego study](#)*.

H₂O

By filtering runoff and excess nutrients, salt marshes help maintain good water quality in coastal bays, sounds and estuaries.

20%

During storms, salt marshes absorb floodwaters and wave energy, decreasing property damage in adjacent communities by up to 20%, according to NOAA.

1.5m

One acre of salt marsh can absorb up to 1.5 million gallons of floodwater, which is equivalent to more than 2.25 Olympic-size swimming pools.

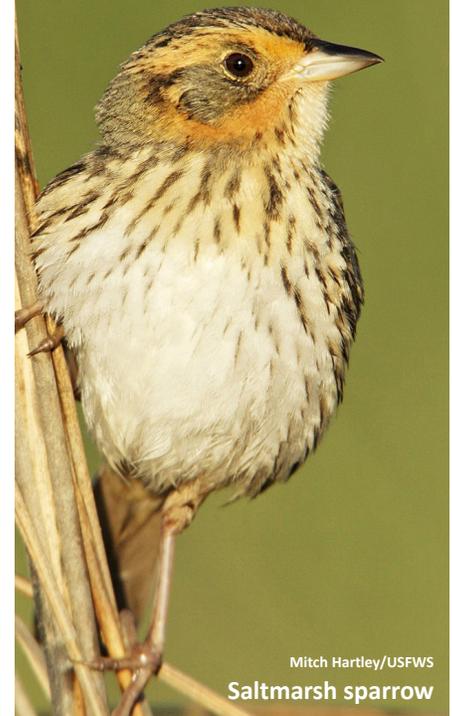
10x

Salt marshes and coastal wetlands sequester and store carbon at a rate 10 times that of mature tropical forests, creating a “blue carbon” that helps to moderate the effects of climate change.

Salt marshes are one part of a complex coastal ecosystem with interdependent habitats. For example, by filtering pollutants, marshes help oyster reefs and seagrass beds, which need clean water to survive. As salt marshes degrade, the health of adjacent coastal habitats and marine life suffers.



Salt marshes provide important habitat for a variety of birds, including popular waterfowl and imperiled species such as the Eastern black rail and saltmarsh sparrow.



*Excerpt modified from: <https://www.pewtrusts.org/en/research-and-analysis/articles/2021/03/01/11-facts-about-salt-marshes-and-why-we-need-to-protect-them>



Cavan Images/Alamy Stock Photo

A stand-up paddleboarder enjoys the serenity of the salt marsh in Wilmington, North Carolina.

THE PLAN

This plan was developed by a writing team in partnership with the SASMI Working Group, the Steering Committee and input from the broader SASMI Coalition. These collaborations included regular meetings, multiple review periods, plan review calls with relevant state agencies and other interests and a virtual workshop attended by over 170 professionals in March 2022 (see Appendix C).

The core actionable components of the plan are as follows:

- **Goal:** What implementation of the plan is designed to achieve.
- **Strategies:** The two overarching strategies to achieve the larger goal.
- **Objectives:** How the strategy is operationalized.
- **Key actions:** High-priority actions necessary to meet specific strategy objectives. These actions are not listed in any priority ranking.
- **Crosscutting approaches:** Four crosscutting approaches and cascading actions in service to SASMI’s two primary strategies.
- **Implementation:** How SASMI will approach implementation of the regional plan in a way that is coordinated with and complements existing regional, state and local efforts.



Judson Patterson/Shutterstock

Redfish, which thrive in the salt marsh, are a prized catch for coastal anglers.

The process to develop this plan was guided by a strategic science-based approach, involvement by both the public and private sectors and collaborative partnerships. The plan identifies and articulates the most significant actions needed to protect the salt marsh ecosystem into the future. This plan is written on a 10-year time frame and will be revisited regularly to evaluate progress and the need to incorporate new information.

Goal of SASMI

The goal of SASMI is 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.

Two Key Strategies of the Plan

Based on the latest science, the plan centers on two primary strategies to achieve the SASMI goal and from which specific objectives and actions cascade. These strategies are:

- Protect and restore the health and functions of existing salt marshes.
- Conserve 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 three primary strategies. These crosscutting strategies 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.

Implementation of the SASMI Regional Plan

Achieving SASMI's ambitious and far-reaching goal will require the development of a formal structure for coordinating activities to implement the plan. This SASMI effort can help align the many independent efforts toward an overarching goal and shared vision to conserve 1 million acres of salt marshes.

CASE STUDY: A Partnership Protects Georgia's Wild Coast

Once the largest unprotected area on Georgia's coast, the 24,000-acre Ceylon Tract in Camden County is now a state-owned Georgia Department of Natural Resources (GA DNR) wildlife management area due to the hard work of numerous partners and Georgia's Outdoor Stewardship Program grants. According to the GA DNR, this ecological treasure is home to over 6,000 acres of salt marsh, 1,000 acres of maritime forest, 19 miles of frontage on the blackwater Satilla River, longleaf pine forests and a variety of rare plants and animals, including nearly 3,000 gopher tortoises. The Department of Defense provided funding to protect this important habitat via a REPI Challenge Award and the Navy provided funding to acquire a restrictive easement to protect the mission of nearby Naval Submarine Base Kings Bay. Other partners included The Nature Conservancy, The Conservation Fund, the Open Space Institute, the U.S. Forest Service, the Georgia Forestry Commission, the U.S. Fish and Wildlife Service, the Knobloch Family Foundation, the Robert W. Woodruff Foundation, the Bobolink Foundation and the Wyss Foundation. This pristine area, once destined for high-density development, will now be preserved into the future for all to enjoy, while providing the undeveloped space needed for marshes to migrate as sea levels rise.⁵⁸ (For more information, contact Jason Lee at jason.lee@dnr.ga.gov.)



Mac Stone

The SASMI Steering Committee and broader coalition will work together to strengthen the capacity to implement this framework state by state in the lead-up to and following release of the plan.

The plan seeks to complement and build on current and planned independent efforts that are in service to a shared vision to perpetuate the over 1 million acres of salt marshes in the SASMI region. We will integrate recommendations into existing plans, initiatives and efforts as appropriate, such as state wildlife action plans, North Carolina's Coastal Habitat Protection Plan, endangered species recovery plans, management plans for state and federally protected lands (such as national wildlife refuges and national estuarine research reserves), community coastal resilience plans, military installation integrated natural resources management plans and others. The plan also seeks to complement other programs, including those where private landowners advance sustainable land management practices around military installations, such as the sentinel landscapes as well as conservation easement and wetland restoration programs funded by the federal Farm Bill, as well as those that address the needs of communities most at risk from salt marsh degradation and loss. Implementing this plan in a coordinated, efficient and place-based manner will depend heavily on continued close partnership with state and federal agencies, as well as other SASMI partners, to identify needs and gaps and use those to prioritize strategic actions at the regional, state and local scales.



North Carolina Coastal Federation

CASE STUDY: North Carolina Creates Cost-Share Program for Living Shorelines

By pooling funding from various sources, the North Carolina Coastal Federation formed and conducts a cost-share program that provides financial assistance to public and private landowners to build living shorelines. Current funding for this cost-share program comes from the North Carolina General Assembly, the North Carolina Land and Water Fund, the North Carolina Community Conservation Assistance Program, the National Fish and Wildlife Foundation, the National Oceanic and Atmospheric Administration and the North Carolina Environmental Enhancement Grant Program. The cost-share program is an incentive for landowners to use nature-based shoreline erosion control methods instead of the traditional hardened structures, such as bulkheads and riprap. Living shorelines protect the shoreline from erosion while also creating habitat and improving water quality. (For more information, contact Sarah Bodin at sarahb@nccoast.org.)

CASE STUDY: Keeping It in the System: Beneficial Use of Dredged Sediment to Increase Resiliency of Coastal Marshes in the Southeast

Researchers from the University of North Carolina at Chapel Hill, NOAA, EA Engineering, and the U.S. Army Corps of Engineers are working together to develop a comprehensive approach for maximizing the beneficial reuse of dredged sediments within their watershed of origin. Using study sites in Beaufort, North Carolina, and Jacksonville, Florida, the team is investigating the thin-layer application of dredged sediment to marshes at risk from drowning due to sea level rise. This technique helps to elevate the marsh, making it more resilient. Specifically, the team will: (1) identify dredged sediment sources and placement sites with regional stakeholders; (2) assess marsh vulnerability and sediment requirements using existing models; (3) prioritize sediment placement options based on the best sites identified; (4) assess protective and ecosystem services of possible restoration projects; and (5) finalize conceptual designs and information to streamline the permitting process and enable project execution by stakeholders. Lessons learned from this project will be shared with the wider community of scientists and land managers. (For more information, contact Trevor Meckley at Trevor.Meckley@noaa.gov or Susan Cohen at susanac@email.unc.edu.)

STRATEGIES FOR THE SOUTH ATLANTIC SALT MARSH INITIATIVE

PROTECTION AND RESTORATION

Despite the challenges facing salt marshes, there are significant opportunities over the next 10 years to protect these important natural systems. Such opportunities are anchored with a solid footing of existing protections that begin with a presumption of public ownership of salt marshes and other laws, regulations and policy supporting salt marsh protection. Numerous local, state and federal agencies can build off existing policies and funding to guide strategic protection and restoration initiatives. There is also a growing groundswell of recognition, support and action to shore up and sustain the vital ecological services and socioeconomic benefits that the region’s existing salt marshes provide fish and wildlife, coastal communities and cultures, the military and more.

Protection and restoration of existing salt marshes is vital to the persistence of this habitat across the Southeast in the face of climate change and unsustainable development. Some of the region’s salt marshes are considered degraded or impaired by practices such as ditching, draining, modifications that restrict tidal flow, invasive species and polluted runoff. Restoration of these areas can take many forms, including hydrologic modification by removing barriers such as bulkheads and riprap, reestablishment of tidal creeks and modification of culverts to provide sufficient tidal exchange. Modification of surface elevation to create suitable salt marshes, through both removal and placement of fill material, the planting of salt marsh plants, creation of living shorelines and eradication of invasive species also has enabled the restoration of thousands of acres of functional salt marshes. These natural and nature-based solutions support salt marsh function and can provide property protection value on par with or greater than conventional hardened shorelines.⁵⁹⁻⁶⁰



A young red mangrove puts down roots in the salt marshes of the Guana Tolomato Matanzas National Estuarine Research Reserve in northeast Florida. Increased tropicalization is allowing mangroves to expand their range north and compete with existing salt marsh habitat.

GTMNERR

Public properties within urbanized areas also provide an opportunity for restoration actions that support not only increased marsh productivity but also societal benefits such as recreational opportunities. These areas also address vital outreach and education needs that are necessary to establish an informed and active constituency that supports the stewardship of salt marshes.

With these actions also comes the recognition that there are variables beyond our control, such as the recruitment of mangroves into former salt marshes. As the climate warms and weather patterns change, tropicalization of salt marsh could allow other plant and animal species to colonize. We must commit to gaining a better understanding of the process and effects of tropicalization, as well as the broader ecological, physical and chemical process of salt marshes, if we are to successfully steward the resource into the future.

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. |

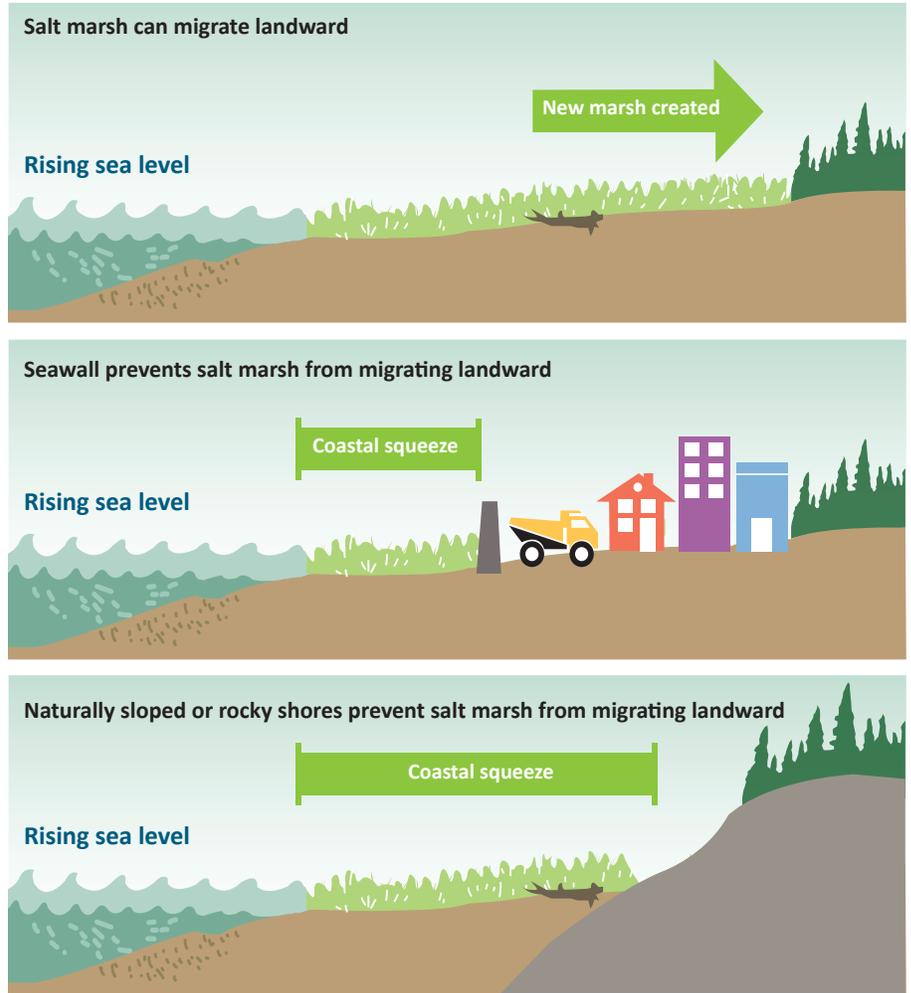
STRATEGIES FOR THE SOUTH ATLANTIC SALT MARSH INITIATIVE

CONSERVATION OF MIGRATION CORRIDORS

Rising sea levels threaten to increasingly inundate and drown out tidal marsh habitat. If conditions are right, the salt marshes can migrate landward into adjacent lowlands as they are increasingly inundated by the tides in a process referred to as marsh migration. If space for migration is available and accessible, the slope of adjacent uplands and relative sea level are generally thought to be primary controls of upland marsh migration. Physical barriers such as urban areas, roads, hardened shorelines and steep topography can preclude the natural ability of salt marshes to migrate (Figure 4). Less quantifiable and perhaps most important of all is how society values tidal marsh benefits and how communities adapt to sea level rise-induced coastal land submergence.

Sea level rise will result in a profound shift in coastal flooding over the next 30 years (Table 1), driving tide and storm surges to reach further inland and permanently inundating some of the region’s existing salt marshes. The impacts of this increasing inundation will be significant and varying across the South Atlantic states (Figures 5-8). “By 2050, ‘moderate’ (typically damaging) flooding is expected to occur, on average, more than ten times as often as it does today and it can be intensified by local factors.”⁶¹ These changes will also impact groundwater and lead to changes in hydrology that impact daily life.⁶² The SASMI Steering Committee reviewed the sea level rise projections and came to consensus that the intermediate projections would form the foundation for the actions identified in the plan, but the charts and maps show what could happen under varying scenarios (Table 1).

The push of salt water inland raises significant issues for governments and



Ocean Wise

Figure 4. 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.

Table 1. Projected sea level rise by decade in the South Atlantic geography (from North Carolina to Brevard County, Florida). Values are based on area-weighted averages of decadal projections for 1-degree grid cells that overlap this area based on NOAA’s 2022 Sea Level Rise Report.

| Sea level rise scenario | 2020 (ft) | 2030 (ft) | 2040 (ft) | 2050 (ft) | 2060 (ft) |
|-------------------------|-----------|-----------|-----------|-----------|-----------|
| Low | 0.36 | 0.56 | 0.79 | 0.98 | 1.1 |
| Intermediate-low | 0.39 | 0.63 | 0.87 | 1.1 | 1.3 |
| Intermediate | 0.4 | 0.65 | 0.92 | 1.2 | 1.5 |
| Intermediate-high | 0.4 | 0.68 | 1 | 1.4 | 1.9 |
| High | 0.4 | 0.7 | 1 | 1.6 | 2.3 |

CASE STUDY: Guana Tolomato Matanzas National Estuarine Research Reserve in Northeast Florida: Wetland Elevation

[The Guana Tolomato Matanzas National Estuarine Research Reserve in Northeast Florida: Wetland Elevation](#)* project explored the effectiveness of four options to manage coastal elevation: (1) thin-layer sediment deposition, (2) berm redistribution, (3) living shorelines and (4) facilitation of mangrove encroachment. The team used remote sensing and field data to refine an existing coastal vulnerability assessment and map vulnerable sites within the reserve. Over the course of this one-year project, the team pulled together land managers and regional scientists to share their diverse experiences with restoration and collaboratively identify wetland management priorities, pilot sites and restoration techniques for use within the reserve. New maps of wetland vulnerability and project workshops will help the reserve prioritize sites and methods for restoring the elevation of wetlands and help build a better regional understanding of how to manage the elevations of wetlands. (For more information, contact Kaitlyn Dietz at collaboration@gtmnerr.org.)



GTMNERR

A researcher monitors elevation changes in the marsh.

private stakeholders. In the South Atlantic states, the state government is the presumptive owner of all land below mean high water, except in a few relatively rare situations. Therefore, the transition of open space, farmland and forestland to marsh creates a conflict between public and private interests that will require careful consideration to ensure best outcomes for landowners and salt marshes, a public trust resource.⁶³

The protection of historic and cultural resources and communities in the path of migrating marshes presents another major challenge. Historic communities, including those of color and other disadvantaged groups, developed in proximity to the water's edge and are often along the front line of marsh migration. The management of cultural resources in a rapidly changing climate has received inadequate attention and funding.⁶⁴ Cultural resource stewardship should be prioritized to protect those sites at greatest risk of destruction from the impacts of climate change.⁶⁵

Fortunately, the South Atlantic region has a large area of low-lying lands into which salt marshes could migrate if land-use and management practices allow for it. However, the inland movement of salt marshes must be facilitated in a way that will ensure protection of vital freshwater and estuarine ecology, as well as historic and cultural resources within both inundated zones and corridors for migration.

CASE STUDY: South Carolina Department of Natural Resources and Partners Launch Marsh Restoration Project

The South Carolina Department of Natural Resources, Georgia Institute of Technology, the South Carolina Aquarium and Robinson Design Engineers are partnering to restore seven acres of degraded salt marshes in Charleston County, South Carolina. Working with community-based volunteers, the group will plant salt marsh grasses, construct living shorelines from recycled oyster shells and excavate tidal marsh channels to restore water flow and renourish the historically important area. Once a thriving salt marsh, the habitat has degraded over time due to drought and other environmental stressors. The project will restore the marshes and reduce threats to the underserved community by improving resilience capacity and enhancing habitat for commercially and recreationally important fish species. The project is located in the historic residential Ashleyville community. Ashleyville was once the historic town of Maryville, the site of one of the most prominent settlement communities. Chartered and settled in 1886, Maryville offered the region's formerly enslaved population safer places to buy land and raise families. (For more information, contact Michael Hodges at hodgesm@dnr.sc.gov.)



G. Sundin/South Carolina Department of Natural Resources

* <https://nerrsciencecollaborative.org/Project/Chapman20>

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. (See Appendix D for a list of existing state tax incentives for conservation.) 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. |

CASE STUDY: Waccamaw National Wildlife Refuge Boundary Modification in South Carolina

The Waccamaw National Wildlife Refuge, located in South Carolina, was created in 1997 to protect freshwater wetlands and protect habitat for wetland-dependent wildlife associated with the floodplain basins of the Waccamaw and Great and Little Pee Dee rivers. The original refuge boundary encompassed approximately 54,000 acres, and the refuge manages 34,000 acres through ownership or lease within the boundary. Due to climate change, coastal South Carolina refuges are struggling with sea level rise, saltwater intrusion, disruption to managed tidal impoundments and other management issues. At Waccamaw, the downstream wetlands had changed or are undergoing a change from fresh to salt water. Refuge leadership sought a boundary adjustment to respond to changing land and habitat conditions and to capture more freshwater wetlands upstream so that the refuge could continue to meet its original purpose. In 2019 the refuge underwent a minor boundary change to better meet its mission as marsh migrates and saltwater intrudes into the refuge. The new boundary removed 6,849 acres from the original boundary and replaced it with 6,638 acres in new (upstream) locations that allowed the refuge to move in the direction that the ecosystem required. Parcels within the new acquisition boundary represent where the refuge can grow via donations, easements or land acquisition in the future. The refuge aids in flood mitigation so much that nearby area residents receive 15% off their federal flood insurance rates due to proximity. The Waccamaw National Wildlife Refuge experience offers a case study for the Southeast Region of the U.S. Fish and Wildlife Service in how to adapt boundaries. This precedent should be helpful to all refuges in the future.⁶⁶ (For more information, contact Pam Wingrove at pamala_wingrove@fws.gov.)



Mac Stone

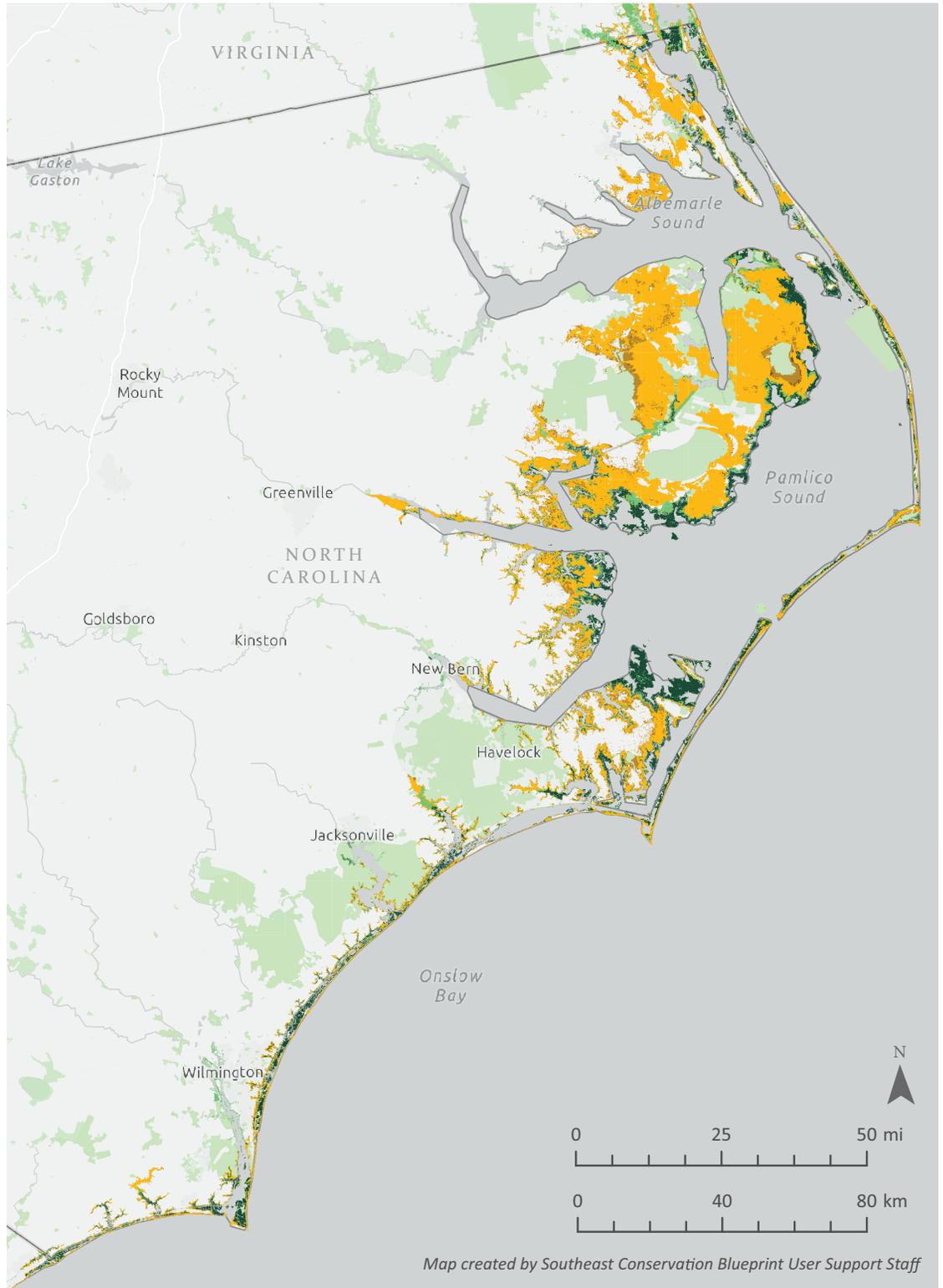
CASE STUDY: Great Marsh Island Restoration in Florida

Mile Point marks the confluence of the St. Johns River and the Intracoastal Waterway, where strong crosscurrents created hazardous navigation conditions and vessel restrictions at the Jacksonville Port Authority in northeast Florida. The U.S. Army Corps of Engineers, Jacksonville District, oversaw modification of the confluence to address these concerns, including improvements to Great Marsh Island. Activities included the restoration of 49 acres of high and low salt marsh through the beneficial use of almost 700,000 cubic meters of dredged sediment, which saved the project nearly \$9 million when compared to the cost of disposing of the sediment at the nearest upland disposal site. Planting of suitable vegetation as well as restoration of low dune and oyster habitat were also conducted. Project partners included the U.S. Army Corps of Engineers Jacksonville District, the Florida Department of Environmental Protection, the Florida Fish and Wildlife Conservation Commission, the National Park Service and the Jacksonville Port Authority. The project was funded in partnership with the Jacksonville Port Authority, which advanced 100% of construction funds under an advanced funds agreement. Work was completed by the Manson Construction Company.⁶⁷ (For more information, contact Aaron Lassiter at james.a.lassiter@usace.army.mil.)



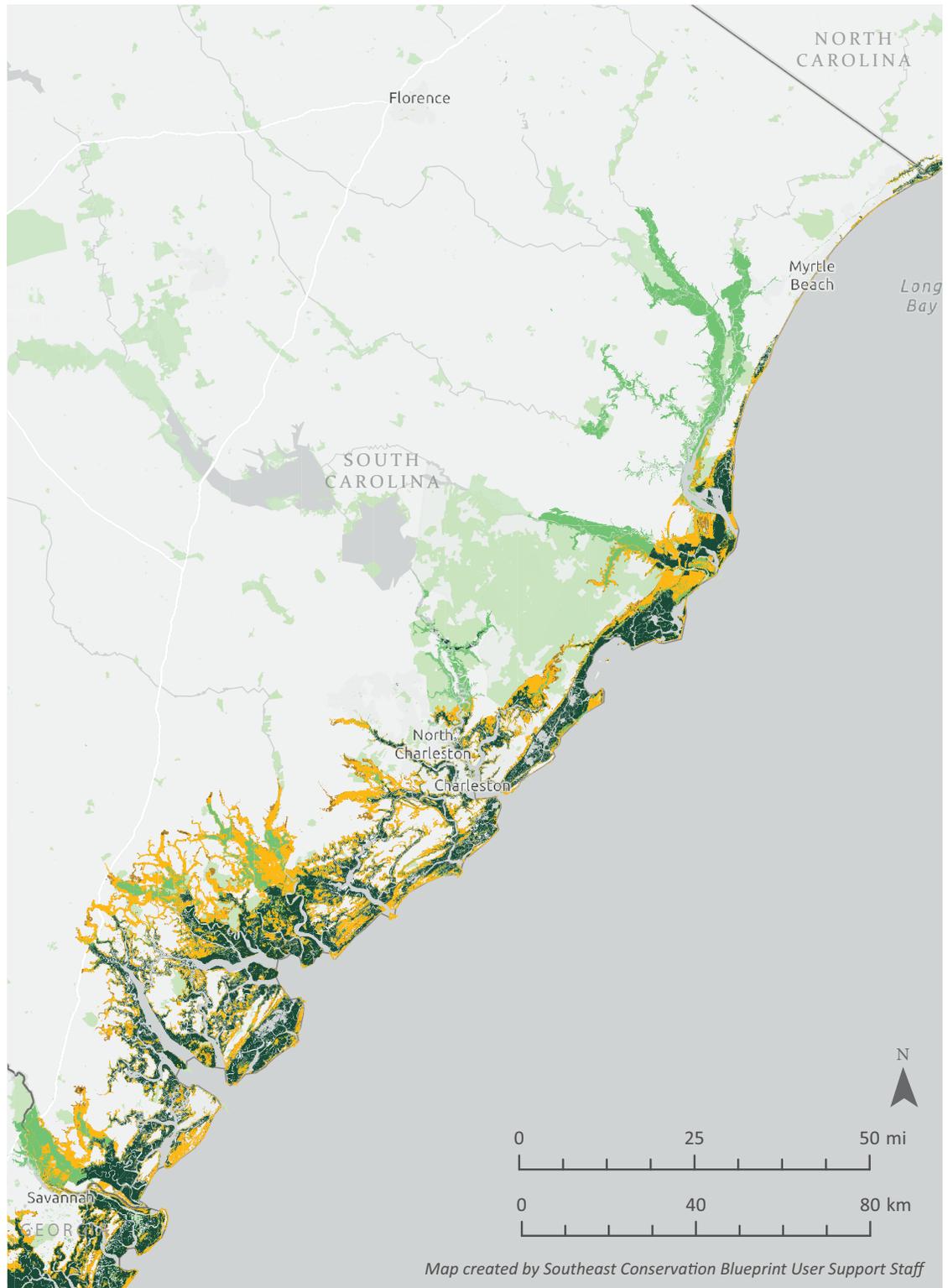
Mark Bias

Figure 5: This map depicts the area of eastern North Carolina, including protected lands, current salt marsh extents and stable coastal wetlands where dense marsh vegetative cover could indicate potential resilience to future change. Projected marsh migration space based on The Nature Conservancy's analysis of data from NOAA's Sea Level Rise Viewer under moderate 1.5 ft and high 3 ft sea level rise scenarios also is depicted. Protected areas are drawn from the USGS Protected Areas Database (version 3.0) ⁶⁸



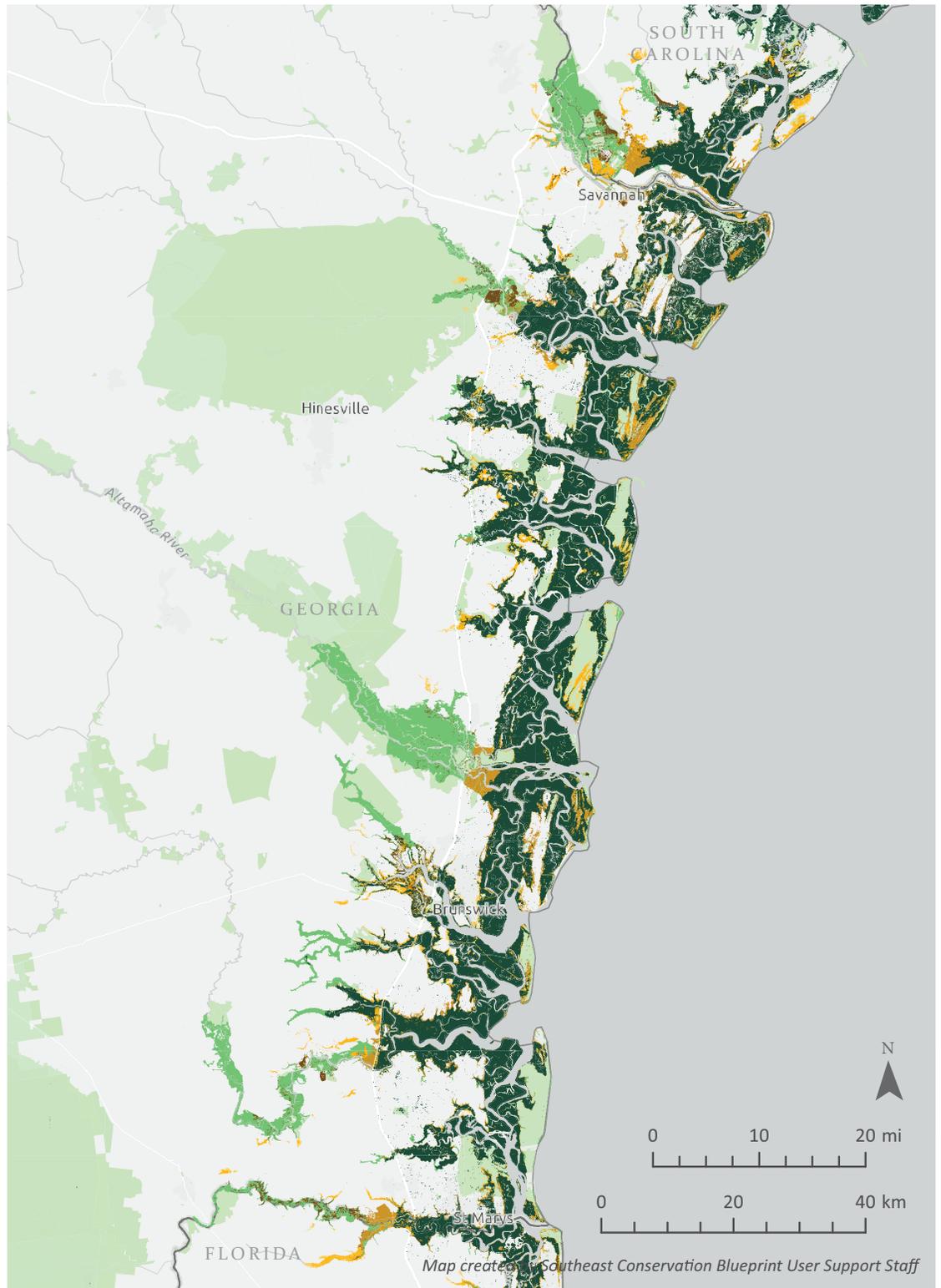
- State boundaries
- Protected lands (PAD-US 3.0)
- Stable coastal wetlands
- Salt marsh extent
- South Atlantic salt marsh migration space (SLR = 1.5 ft.)
- South Atlantic salt marsh migration space (SLR = 3.0 ft.)

Figure 6: This map depicts the area of eastern South Carolina, including protected lands, current salt marsh extents and stable coastal wetlands where dense marsh vegetative cover could indicate potential resilience to future change. Projected marsh migration space based on The Nature Conservancy's analysis of data from NOAA's Sea Level Rise Viewer under moderate 1.5 ft and high 3 ft sea level rise scenarios also is depicted. Protected areas are drawn from the USGS Protected Areas Database (version 3.0) ⁶⁹



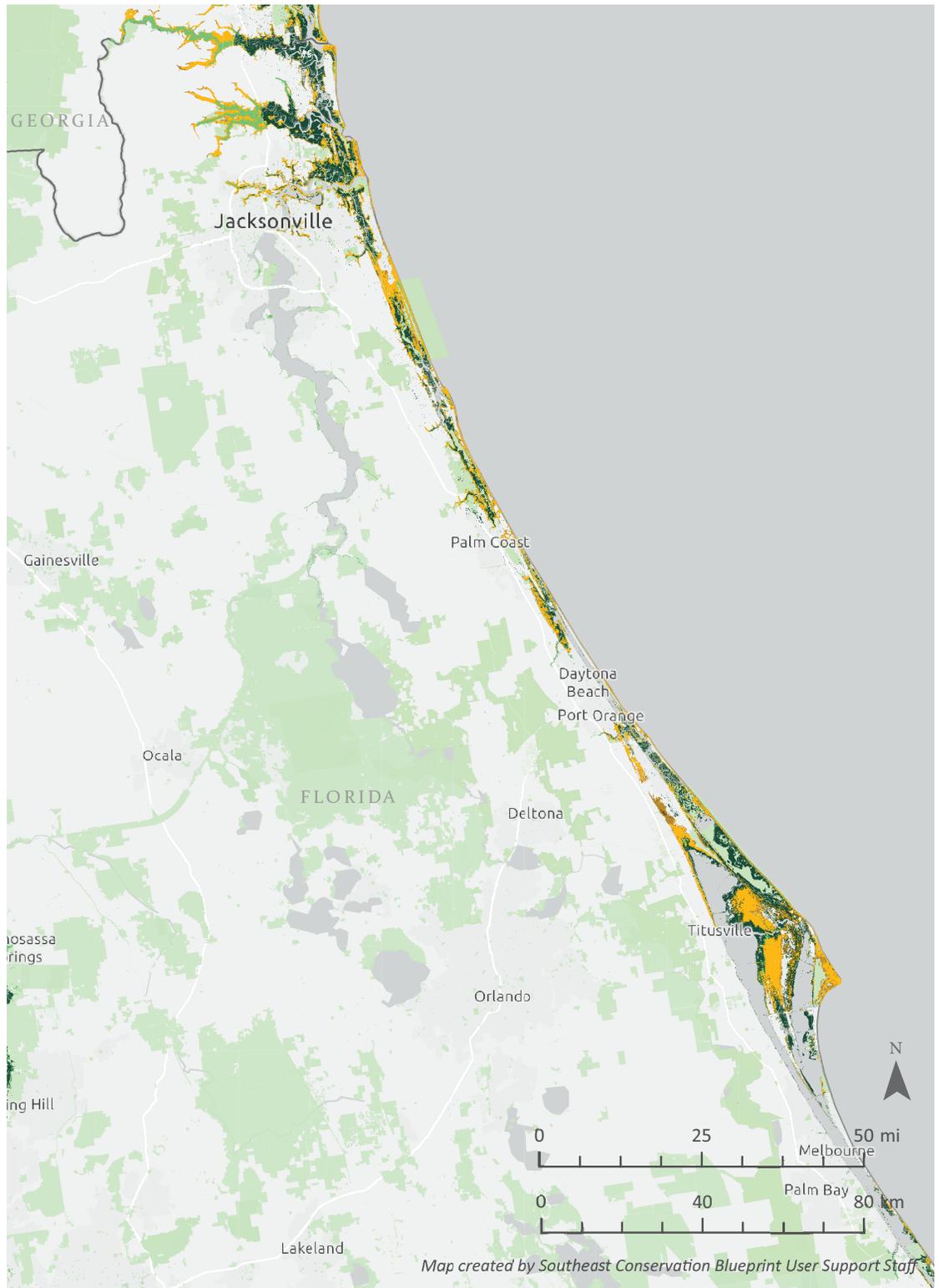
- State boundaries
- Protected lands (PAD-US 3.0)
- Stable coastal wetlands
- Salt marsh extent
- South Atlantic salt marsh migration space (SLR = 1.5 ft.)
- South Atlantic salt marsh migration space (SLR = 3.0 ft.)

Figure 7: This map depicts the area of eastern Georgia, including protected areas, current salt marsh extents and stable coastal wetlands where dense marsh vegetative cover could indicate potential resilience to future change. Projected marsh migration space as modeled using the Sea Level Affecting Marshes Model (SLAMM) under moderate and high sea level rise scenarios is also depicted. Protected areas are drawn from the USGS Protected Areas Database (version 3.0) ⁷⁰



- | | |
|--|---|
|  State boundaries | Results of GA SLAMM model |
|  Protected lands (PAD-US 3.0) | projected salt marsh, 1m SLR by 2100 |
|  Stable coastal wetlands |  Transitional marsh |
|  Salt marsh extent |  Regularly flooded marsh |
| |  Irregularly flooded marsh |
| |  Tidal flat |

Figure 8: This map depicts the area of east-central Florida, including protected lands, current salt marsh extents and stable coastal wetlands where dense marsh vegetative cover could indicate potential resilience to future change. Projected marsh migration space based on The Nature Conservancy's analysis of data from NOAA's Sea Level Rise Viewer under moderate 1.5 ft and high 3 ft sea level rise scenarios also is depicted. Protected areas are drawn from the USGS Protected Areas Database (version 3.0) ⁷¹



- State boundaries
- Protected lands (PAD-US 3.0)
- Stable coastal wetlands
- Salt marsh extent
- South Atlantic salt marsh migration space (SLR = 1.5 ft.)
- South Atlantic salt marsh migration space (SLR = 3.0 ft.)

Whimbrels, which travel from South America to the Arctic each spring, stop along South Carolina's coast to rest and forage in the pluff mud.

Carl Miller



CROSSCUTTING APPROACHES

Successful implementation of the SASMI strategies necessitates a coordinated and collaborative effort leveraging policy, varied and novel funding sources, as well as diverse engagement and buy-in at the local, state and federal levels. The following crosscutting approaches are in service to SASMI's two strategies.

FUNDING

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.

Funding mechanisms available through many federal programs and individual programs from the four SASMI states address or are specifically designed to understand, protect, restore and conserve salt marsh ecosystems, as well as programs positioned to blaze the path for future land conservation in marsh migration. Additional programs could support salt marsh-related efforts, including at the county and municipal levels.

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. (See Appendix E for a list of relevant federal funds.)

Leverage state and local funding sources and cross-jurisdictional collaboration to support local and regional projects and provide matches for federal funding when necessary. (See Appendix D for a list of relevant state funding sources.)

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.



The salt marsh provides fishing opportunities for subsistence, commercial and recreational fisheries throughout the South Atlantic states.

Stephen Morton
Photography

CULTURE AND COMMUNITY

Ensure diverse cultural and community engagement and collaboration to shape inclusive, equitable, just and durable SASMI outcomes.

Salt marsh protection, restoration and migration efforts are inextricably linked to the values and needs of diverse coastal cultures and communities. However, management of salt marsh habitat and broader ecosystems does not always meet the needs of stakeholder groups. This is particularly true of communities and cultures, including Indigenous groups and people of color, who are absent from or have historically been excluded from the decision-making processes or otherwise lack the resources and opportunity to participate. The region’s history of land dispossession, exploitation and marginalization have created unique vulnerabilities for low-income and Black residents and displaced them into low-lying areas that are likely to convert to salt marshes in the coming decades. SASMI presents a clear and present opportunity to advance a more diverse, inclusive and equitable approach to conservation that could yield improved, more durable and just outcomes for salt marshes and people.

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.

POLICY

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.

Salt marshes exist within a dynamic coastal environment and a complex legal, regulatory and policy framework. These include flood protection and resilience efforts, federal laws, such as the Endangered Species Act and the Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat provision, and local plans, ordinances and policies. Coordination and collaboration with SASMI’s federal, state and local partners presents an opportunity to gain a comprehensive understanding of this existing framework, as well as identify and pursue opportunities to strengthen and build upon it in ways that bring improved results for salt marshes and stakeholders.

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. (See Appendix F for examples of common 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. ⁷² |

COMMUNICATION, EDUCATION AND ENGAGEMENT

Seek opportunities and build capacity to improve communication, education and engagement about the importance of the South Atlantic’s vast salt marsh and the many ecosystem benefits it provides.

The SASMI coalition is well poised to develop and implement the large-scale communication, education and engagement efforts necessary to advance actionable strategies of the plan. However, there is a clear need for capacity building and additional resources, including those directed at underserved and underrepresented stakeholder groups, to ensure such efforts are inclusive and equitable and benefit a diversity of stakeholders.

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. |



Cameron Jaggard/The Pew Charitable Trusts

CASE STUDY: Altamaha River Corridor Protection in Georgia

Over the past 20 years, the Georgia Department of Natural Resources has led a concerted effort by a suite of partners to protect the lower Altamaha River—known as “the Amazon of the South.” Together these partners protected a buffer north and south of a 40-mile length of the coastal river, allowing for restoration of the longleaf pine ecosystem and opening thousands of acres to the public for hunting, camping and recreation. The Altamaha is also a critical part of the potential habitat corridor from the Okefenokee National Wildlife Refuge to Fort Stewart and the Georgia coast.

State leadership and federal and nongovernmental partnerships make this work. Examples of tracts protected include the Townsend Wildlife Management Area, Boyles Swamp and the Sansavilla property. These tracts and multiple others on the Altamaha were protected with North American Wetlands Conservation Act and Pittman Robertson

grants from the U.S. Fish and Wildlife Service, the U.S. Forest Service’s Forestry Legacy Program and the NOAA Coastal and Estuarine Land Conservation Program, along with donations from the Robert W. Woodruff Foundation and the Knobloch Family Foundation, and funding from the state of Georgia. Partners include The Nature Conservancy, The Conservation Fund, Rayonier Timber and Land Management and multiple private landowners.

The military engagement from Townsend Bombing Range was essential to the Altamaha protection story and helped create the partnership that led to the designation of the Georgia Sentinel Landscape in 2017. By working to restore longleaf pine habitat and protect gopher tortoise populations, partnerships have protected an entire river corridor that will benefit existing and future salt marshes.⁷³ (For more information, contact Jason Lee jason.lee@dnr.ga.gov.)



PLAN IMPLEMENTATION

This plan is a pathway to the protection, restoration and migration of the great South Atlantic salt marshes. It was developed through large-scale collaboration and partnership, and it will be implemented in similar fashion.

While action and investment at the regional or national scale is important, most implementation of this plan will occur through local, state and subregional actions. Fortunately, a wealth of salt marsh conservation work currently underway is guided by existing plans and initiatives of SASMI partners in North Carolina, South Carolina, Georgia and Florida. These efforts working in concert across the landscape provide valuable progress and momentum toward the SASMI goal and will shape future implementation of the plan.

The SASMI Steering Committee, Working Group and broader Coalition will serve as the initial foundation and co-creators that will design, build out and populate the enduring governance structure necessary to implement the regional plan. Securing landscape-scale conservation of the South Atlantic salt marsh resource will also depend greatly on our ability to secure and direct necessary funding as effectively and efficiently as possible. As it has since SASMI's inception, [America's Longleaf Restoration Initiative \(ALRI\)](#)* provides a potential model framework that can help us navigate these challenges. Appendix G provides an example of how the ALRI governance and funding model could be adapted to SASMI's needs.

SASMI's broad and growing coalition comprises stakeholders and experts with a shared vision for the future health, resilience and abundance of the million-acre salt marsh expanse. Our overarching challenge is to effectively communicate and coordinate with, educate and mobilize these and additional stakeholders to implement the plan. These stakeholders include but are not limited to decision-makers at the local, state and federal levels, as well as private property owners, coastal communities and cultural groups and industries that interact with and impact salt marsh habitat.

Together, as a unified SASMI coalition, we will Marsh Forward to conserve and protect the approximately 1 million acres of salt marshes in the South Atlantic region.

marshforward.org



Appendix A. SASMI Steering Committee Members

| Name | Organization |
|-----------------------|---|
| Chris Baillie | North Carolina Coastal Federation |
| Bob Barnes | The Center for Climate & Security |
| Bruce Beard | Texas A&M University Natural Resources Institute |
| Meredith Belford | Springfield Legacy Foundation |
| Kevin Bryan | Equival Partners LLC |
| Ramesh Buch | North Florida Land Trust |
| Lora Clarke | The Pew Charitable Trusts |
| Margaret Conrad | The Conservation Fund |
| Chris Coppola | U.S. Fish and Wildlife Service |
| Michelle Peppina Covi | University of Georgia Marine Extension and Georgia Sea Grant |
| Mallory Eastland | Coordinator, Salt Atlantic Salt Marsh Initiative (Former) |
| Scott Eastman | Florida Department of Environmental Protection |
| Nathan Edwards | U.S. Army Environmental Command |
| Liz Fly | The Nature Conservancy |
| Angela Glass | Naval Air Station Jacksonville |
| Joseph Gordon | The Pew Charitable Trusts |
| Rachel Hawes | Coastal Conservation League |
| Cam Jaggard | The Pew Charitable Trusts |
| Jenny Lechuga | U.S. Army Environmental Command |
| Jason Lee | Georgia Department of Natural Resources |
| Wade Lehmann | U.S. Environmental Protection Agency Region 4 |
| Carmen Lombardo | U.S. Marine Corps |
| Michelle Lovejoy | Environmental Defense Fund |
| Jan MacKinnon | Georgia Department of Natural Resources |
| Charles McMillan | Georgia Conservancy, Association of Georgia Land Trusts |
| Todd Miller | North Carolina Coastal Federation |
| Patrick Moore | Open Space Institute |
| Heather Nagy | North Florida Land Trust |
| Barbara Neale | South Carolina Department of Health and Environmental Control |
| Eugene Olmi | National Oceanic and Atmospheric Administration |
| Meg Palmsten | U.S. Geological Survey |
| Davina Passeri | U.S. Geological Survey |
| Michael Pattison | U.S. Air Force |
| Bruce Pohlot | International Game Fish Association |
| Emily Purcell | Ducks Unlimited |
| Queen Quet | Gullah/Geechee Nation |
| Kellie Ralston | Bonefish & Tarpon Trust |
| Courtney Reich | Georgia Conservancy, Association of Georgia Land Trusts |
| Bill Ross | Southeast Regional Partnership for Planning and Sustainability |
| Howard Schnabolk | National Oceanic and Atmospheric Administration |
| Matt Schrader | U.S. Army Corps of Engineers |
| Anna Smith | South Carolina Department of Natural Resources |
| Kent Smith | Florida Fish and Wildlife Conservation Commission |
| Robby Smith | U.S. Navy |
| Addie Thornton | Southeast Regional Partnership for Planning and Sustainability |
| James Tillman | U.S. Department of Agriculture Natural Resources Conservation Service |
| Mackenzie Todd | North Carolina Department of Environmental Quality |
| Bill Wikoff | U.S. Fish and Wildlife Service |

Appendix B. Southeast Conservation Blueprint Summary

The Southeast Conservation Blueprint is the primary product of the Southeast Conservation Adaptation Strategy (SECAS). It is a living, spatial plan to achieve the SECAS vision of a connected network of lands and waters across the Southeast and Caribbean. The blueprint is regularly updated to incorporate new data, partner input and information about on-the-ground conditions.

Across 15 states of the Southeast, the blueprint identifies priority areas based on a suite of natural and cultural resource indicators representing terrestrial, freshwater and marine ecosystems. A connectivity analysis identifies corridors that link coastal and inland areas and span climate gradients.

Within the South Atlantic region, the blueprint recognizes more than 13 million acres as places where conservation action would make an impact, based on a suite of natural and cultural resource indicators, toward a connected network of lands and waters. Indicators that occur within the South Atlantic region and drive priority where SASMI seeks to catalyze conservation action are:

Terrestrial indicators

- East Coastal Plain open pine birds
- Equitable access to potential parks
- Fire frequency
- Greenways & trails
- Intact habitat cores
- Resilient terrestrial sites
- South Atlantic amphibian & reptile areas
- South Atlantic forest birds
- South Atlantic low-urban historic landscapes
- Urban park size

Freshwater indicators

- Atlantic migratory fish habitat
- Imperiled aquatic species
- Natural land cover in flood plains
- Network complexity
- Permeable surface

Coastal and marine indicators

- Atlantic estuarine fish habitat
- Coastal shoreline condition
- Estuarine coastal condition
- Islands
- Resilient coastal sites
- Seagrasses
- South Atlantic beach birds
- South Atlantic hardbottom & deep-sea coral
- South Atlantic marine mammals
- South Atlantic marine birds
- South Atlantic maritime forest extent
- Stable coastal wetlands

A draft report for the SASMI region is available here: <https://drive.google.com/file/d/1LSXeaV4KxzmXvM5IP4XhVTKUunn4IVS8/view?usp=sharing>

To explore the blueprint and learn more about the indicators driving priority, go to: <https://blueprint.geoplatform.gov/southeast/>

Appendix C. Workshop Summary

Between March 28 and April 1, 2022, members of the SASMI Coalition gathered virtually to participate in a SASMI workshop. Participants included more than 170 experts representing local, state and federal agencies, DoD, scientists, NGOs, coastal communities, cultural groups, public and private landowners, industry and other stakeholders from across the SASMI geography.

The purpose of the workshop was to develop the foundation for the SASMI Plan, including the actionable strategies, objectives and actions at its core.

In preparation for developing this plan, SASMI’s 40-member steering committee identified eight topics that were the focus of the weeklong workshop. Teams of volunteer subject matter specialists developed white papers that examined key opportunities and challenges, strategies and actions and barriers to salt marsh conservation in the South Atlantic states. These topics and the subsequent papers were used as the basis of the workshop:

| <i>Topic</i> | <i>Team Leaders</i> |
|---|---|
| Cultural and Community Interconnectivity | Queen Quet , Chiefess of the Gullah/Geechee Nation Maria Whitehead , Open Space Institute |
| Conservation and Restoration | Cat Bowler , Audubon North Carolina Coastal Resilience Program Manager Howard Schnabolk , NOAA Marine Restoration Specialist |
| Communication, Education and Outreach .. | Julie Binz , South Carolina Department of Natural Resources and the ACE Basin National Estuarine Research Reserve Manager |
| Funding Mechanisms | Kate Schaefer , Beaufort Open Land Trust |
| Infrastructure and Sustainable Development | Michelle Covi , Marine Extension and Georgia Sea Grant Coastal Resilience DoD Liaison |
| Mapping | Jessie Mandirola , The Pew Charitable Trusts Rua Mordecai , USFWS South Atlantic Landscape Conservation Cooperative Louise Vaughn , Southeast Conservation Adaptation Strategy Mike Wissner , The Pew Charitable Trusts Scott Eastman , Florida Department of Environmental Protection |
| Policy | Shana Jones , Carl Vinson Institute of Government at the University of Georgia/ Georgia Sea Grant Legal Program |
| Marsh Migration | Ashby Worley , The Nature Conservancy (TNC) Coastal Climate Adaptation Director in Georgia Analie Barnett , TNC Landscape Ecologist, Center for Resilient Conservation Science |

The mapping team developed and curated an interactive web map to aid the topic teams in visualizing places for SASMI strategy implementation. Working closely with each topic team, the mapping team helped other teams to visualize places where there are multiple co-benefits, unique opportunities in terms of importance and irreplaceability and potential threats to topic team priorities caused by marsh migration or loss. The mapping team collected and summarized currently existing spatial data in all aspects of the SASMI’s work on salt marsh management and as directed by individual teams according to their diverse needs, and helped identify common themes, data needs and areas of interest across topic teams.

In advance of the workshop, SASMI Coalition members were invited to review and comment on the white papers and select which topics they wanted to discuss at the workshop.

On the first day of the workshop, all participants met virtually for

orientation and presentations and the topic team leaders made a series of presentations to set the stage for discussion. Over the next three days, participants attended 54 small focus group sessions for the topics of their choosing to provide an additional dimension of value to the papers. The topic team leaders prepared focus questions to direct the dialogue in a way that would provide the most value to the team. On the last day of the workshop, the topic team leaders reported to the full group on the outcome of their focus group discussions and then participants were invited to discuss additional issues and actions needed on the path to the plan.

The expertise and dedication of the topic teams was key to the success of the workshop. As a result, workshop participants left with a sense of excitement and ownership in the process of developing the plan and the Plan Writing Team had well-vetted material and additional insights to use in its development.

Appendix D. State Conservation Funds and Tax Incentives to Support Land Conservation and Restoration

| | | |
|----|--|---|
| FL | Florida Department of Environmental Protection, Division of State Lands, Office of Environmental Services | <p>Florida Forever is Florida’s conservation and recreation lands acquisition program. The program is a willing seller program and a property must be on the Florida Forever Priority List to be eligible for acquisition. The Florida Forever Priority List is developed by the Acquisition and Restoration Council and is approved by the Board of Trustees of the Internal Improvement Trust Fund. Projects funded through the Florida Forever must achieve certain goals, including: land acquisition projects; protecting Florida’s biodiversity; protecting, restoring, and maintaining the quality and natural functions of Florida’s land, water, and wetlands; connecting ecological corridors; ensuring available water quantity; increasing natural resource-based recreation and education; preserving archaeological or historical sites; increasing the amount of forestland available for natural resource management; increasing the amount of open space in urban areas; and mitigating the effects of natural disasters and floods. Funding for Florida Forever is allocated annually by the Florida Legislature and is used to carry out the purposes of the Florida Forever Act. Funding allocation could fluctuate depending on legislative priorities. The Acquisition and Restoration Council makes recommendations about Florida Forever land acquisition, management and disposal of state-owned lands.⁷⁴</p> |
| GA | Georgia Department of Natural Resources; Georgia Outdoor Stewardship Program | <p>Georgia Outdoor Stewardship Act (GOSA)⁷⁵ establishes a Board of Trustees to administer the Georgia Outdoor Stewardship Trust Fund, which funds several conservation objectives. Increased priority is given to projects “for which matching funds are available.”⁷⁶ Grants or loans for local parks and trail projects must be between \$500,000 and \$3,000,000, and there is no minimum or maximum grant amount for state stewardship or state acquisition projects.⁷⁷ Property appraisals are required to be considered for an acquisition project and the appraisal must be based on the current fair market value of the land.⁷⁸ GOSA trust fund money can be used to: (1) support state parks and trails; (2) support local parks and trails of state and regional significance; (3) provide stewardship of conservation land; and (4) acquire certain real property critical to protection of clean water, wildlife, hunting, fishing, military buffering or natural resource-based recreation.⁷⁹</p> |
| SC | South Carolina Conservation Bank | <p>The South Carolina Conservation Bank Act⁸⁰ creates the South Carolina Conservation Bank Trust Fund and authorizes the governing board to authorize grants or loans to purchase land for a variety of conservation purposes “at or below fair market value.” The purchase price of land under the program must not exceed fair market value.⁸¹ Trust fund moneys are awarded to projects that meet one or more conservation or financial criteria. Conservation criteria include the value of the proposal for the conservation of: unique or important wildlife habitat; rare or endangered species; certain Indigenous ecosystems; certain riparian habitats, critical wetlands, water quality, watersheds, aquifer recharge areas, estuaries, bays, or beaches; outstanding geologic features; unique historical or archaeological significance forestlands or wetlands; certain farmlands; public outdoor recreation areas; conservation of an area already containing protected lands; amount of lands protected; and public access.⁸² Financial criteria include how the proposal: protects land at a reasonable cost; leverages other funds; purchases conservation easements with a low cost relative to the fair market value; and explores other conservation incentives.⁸³</p> |

NC

North Carolina Land and Water Fund (formerly called The Clean Water Management Trust Fund), administered by the Department of Natural and Cultural Resources

North Carolina established the Land and Water Fund,⁸⁴ which allows trust fund money to be used to “finance projects to clean up or prevent surface water pollution and for land preservation.”⁸⁵ Funds may be used to: acquire land for riparian buffers to protect water quality; acquire conservation easements for protecting surface waters and enhancing drinking water supplies; coordinate with other public programs; restore previously degraded lands to protect water quality; facilitate planning to reduce surface water pollution; finance innovative efforts to improve stormwater management, reduce water pollution, improve water quality, and research water quality problems; to protect areas around military installations or training areas; acquire lands of ecological diversity of North Carolina; acquire historic properties; and protect and restore flood plains and wetlands.⁸⁶ The North Carolina Administrative Code, Real Property⁸⁷ provides information on state acquisition of property and allows an offer to purchase be made that is based on “the just compensation value determined by the Director of the Division of State Property.”⁸⁸

North Carolina also has the North Carolina Parks and Recreation Trust Fund, which provides grants to local governments for outdoor recreation purposes. Trust fund money can be used for: capital projects; repairs and renovations to park facilities; and land acquisition, in addition to other purposes.⁸⁹

Community Conservation Assistance Program

The Community Conservation Assistance Program is a voluntary, incentive-based program designed to improve water quality through the installation of various best management practices on urban, suburban and rural lands not directly involved with agriculture production.⁹⁰

Water Resources Development Grant Program

The Water Resources Development Grant Program provides cost-share grants and technical assistance to local governments throughout the state. Applications for grants are accepted for seven eligible project types: general navigation, recreational navigation, water management, stream restoration, beach protection, land acquisition and facility development for water-based recreation and aquatic weed control.⁹¹

Environmental Enhancement Grant Program

The Environmental Enhancement Grant (EEG) Program offers reimbursement grants to nonprofit organizations for projects that improve North Carolina’s air, water and land quality by addressing the goals of the Smithfield Agreement. EEG awards up to \$500,000 in grants for a three-year grant project. Often, EEG funds allow grantees to leverage the grant to partner with additional funding sources to accomplish significant land acquisition or restoration projects. EEG funds have been used for wetland restoration, land acquisition, stormwater remediation, stream stabilization and buffer installations, among many other projects.⁹²

| | | |
|----|--------------------------------------|---|
| FL | Florida Department of Revenue | Exempts land that is dedicated in perpetuity for conservation purposes and is used exclusively for conservation purposes from ad valorem taxation. Also, exempts land from ad valorem tax that is dedicated in perpetuity for conservation purposes and that is used for allowed commercial uses “to the extent of 50 percent of the assessed value of the land.” “Conservation purposes” means land that is serving conservation purpose: (a) retention of the substantial natural value of the land; (b) retention of lands as suitable habitat for fish, plants, or wildlife; or (c) retention of land for natural value for water quality enhancement or water recharge. ⁹³ |
| GA | Georgia Department of Revenue | <p>Conservation Use Valuation Assessment.⁹⁴ “Real property that is devoted to bona fide conservation uses is assessed at 40% of its current use value.”⁹⁵ Bona fide conservation use means property that is: (1) primarily used for “subsistence farming or commercial production, from or on the land of agricultural products or timber”⁹⁶; or (2) environmentally sensitive property, as certified by the Department of Natural Resources, for the primary use of “maintenance in its natural condition or controlling or abating pollution of surface or ground waters of this state by stormwater runoff or otherwise enhancing the water quality of surface or ground waters of this state.”⁹⁷ The landowner must “maintain the eligible property in bona fide qualifying use for a period of ten years[.]”⁹⁸</p> <p>Georgia Forest Land Protection Act⁹⁹ exempts “forest land conservation use property” from ad valorem tax.¹⁰⁰ The landowner must agree by covenant with the taxing authority to maintain the property in forest land conservation use for 15 years.¹⁰¹ “Forest land conservation use property” must be more than 200 acres and the primary use of the property must be good faith subsistence or commercial production of trees, timber or other wood fiber products from or on the land, which also includes a primary use of conservation or ecological forest management where commercial production of wood or wood products is undertaken for conservation purposes. The property may also have the secondary uses of: the promotion, preservation or management of wildlife habitat; carbon sequestration; mitigation and conservation banking; or the production and maintenance of ecosystem products and services.¹⁰²</p> |
| SC | South Carolina Department of Revenue | A taxpayer can claim a deduction on state income tax in an amount up to 25% of the total amount of the taxpayer’s charitable deduction for a gift of land for conservation or for a qualified conservation contribution. ¹⁰³ Credit may not exceed \$250 per acre of property. ¹⁰⁴ Qualified conservation contribution has the same meaning as defined in Internal Revenue Code Section 170(h). ¹⁰⁵ Gift of land for conservation means a “charitable contribution of fee-simple title to real property conveyed for conservation purposes as defined in Internal Revenue Code Section 170(h)(4)(A) ¹⁰⁶ to a qualified conservation organization as described in Internal Revenue Code Section 170(h)(3).” |
| NC | North Carolina Department of Revenue | North Carolina’s Conservation Tax Credit was repealed in 2014. |

Appendix E. Federal Programs for Land Conservation

Federal programs can have a regional and national impact. Funding agencies should coordinate and communicate about shared goals so that landscapes can be protected across agencies and at scale. Funding applicants can educate funding agencies about crosscutting benefits of land protection. In communities of the South Atlantic salt marshes, conserving marsh migration corridors and their associated uplands at scale provide crosscutting benefits, such as resilience to storms and projected sea level rise, creation of habitat corridors for species with changing habitat ranges due to climate change, protection of working farms and forests that contribute to the local and national economy, protection of military flight space and training grounds to support national defense, protection of cultural resources and human populations central to the success of the country, and expansion of recreational opportunities and fishable, swimmable waters for millions of people. The following highlights several federal initiatives but is not an exhaustive list.

The North American Wetlands Conservation Act (NAWCA) program protects wetlands and migratory bird habitats in the United States, Canada and Mexico. Enacted in 1989, the program has issued \$1.8 billion in grants on over 3,000 projects, protecting over 30 million acres. The program has also attracted \$3.67 billion in partner funds, boasting an average of \$3.20 in landowner and partner contributions for each federal dollar spent. The program is capitalized by appropriations, interest funds from the Pittman-Robertson Act and fines, penalties and forfeitures generated by the regulations of the Migratory Bird Treaty Act.¹⁰⁷ The guiding document for implementation of the NAWCA is the North American Waterfowl Management Plan.¹⁰⁸

The NAWCA scoring rubric accounts for marsh vulnerability in its climate section by assigning a greater number of points to properties that are beneficial to the conservation objectives in perpetuity, as compared to near-term (<10 years). This table serves as a model for how other grant programs can prioritize the long-term benefit of land protection opportunities, especially involving high marsh and future high marsh.

The Atlantic Coast Joint Venture is currently “directing its collective attention” to save habitat for the saltmarsh sparrow, black rail and American black duck and has established a governing Salt Marsh Bird Conservation Plan which recognizes a need to prioritize the marsh-upland transition zone and facilitate migration (ideally onto protected properties) because the species of greatest concern primarily breed in the high marsh. The high marsh habitat is at greater risk to sea level rise and is predicted to decrease in the coming years, even as lower, tidally inundated salt marsh prevails or increases over the same period.

The Migratory Bird Conservation Fund and the USFWS’ Recovery Land Acquisition Grants program will also support land conservation efforts on significant uplands and habitat areas for migratory birds and federally protected species.

The U.S. Department of Agriculture’s Natural Resources Conservation Service (NRCS) provides wetland reserve easements to help private and tribal landowners protect, restore and enhance wetlands which have been previously degraded due to agricultural uses. This program helps provide “habitat for fish and wildlife, including threatened and endangered species, improve water quality by filtering sediments and chemicals, reduce flooding, recharge groundwater, protect biological diversity, provide resilience to climate change and provide opportunities for educational, scientific and limited recreational activities.”¹⁰⁹ Land eligible for wetland reserve easements includes privately held farmed or converted wetland

that can be successfully and cost-effectively restored. Enrollment options include permanent easements, 30-year easements and term easements. Applications are prioritized based on potential to protect and enhance habitat for migratory birds and other wildlife.

Authorized as part of the Coastal Zone Management Act, **NOAA’S Coastal and Estuarine Land Conservation Program** protects coastal lands that are ecologically important or possess other coastal conservation values, such as historic features, scenic views or recreational opportunities. From 2002 to 2019, the program protected more than 110,000 acres through funds to state and local governments to purchase threatened coastal and estuarine lands or obtain conservation easements. Additional funding will be provided via the Infrastructure Investment and Jobs Act.¹¹⁰

The National Coastal Wetlands Conservation Grant Program annually provides grants of up to \$1 million to coastal and Great Lakes states, as well as U.S. territories, to protect, restore and enhance coastal wetland ecosystems and associated uplands. The grants are funded by taxes or import duties collected from the sale of recreational fishing equipment, boats, electric motors and motorboat and small engine fuels under the authority of the Dingell-Johnson Sport Fish Restoration Act of 1950. Approximately \$20 million per year is available to state, local and tribal governments, private landowners, conservation groups and other partners. A state-designated agency is required to submit the proposal, and funds can generally be sub-awarded to other entities. These grants have wide-reaching benefits for local economies, people and wildlife—boosting coastal resilience, reducing flood risk, stabilizing shorelines and protecting natural ecosystems.¹¹¹

This grant program is a premier opportunity to exclusively protect wetlands, marshes and coastal wetlands. This program gives priority to salt marshes, and to marsh migration areas and wildlife that depend on salt marsh (and special priority to maritime forest). In Georgia, this has been a very critical and most used grant opportunity, funding conservation opportunities like those in the Altamaha Corridor and recent Cabin Bluff and Ceylon conservation projects.

Programs nested within the **Clean Water Act** provide for land conservation under certain circumstances. These programs include the State Revolving Fund loans and Section 319/Nonpoint Source grants, for which land conservation is eligible under certain circumstances. The South Atlantic states receive these grants from U.S. Environmental Protection Agency and issue sub-awards to applicants for SRF loans and nonpoint source projects. Please visit the following websites for more information: <https://www.epa.gov/cwsrf> and <https://www.epa.gov/nps/319-grant-program-states-and-territories>.

The 2020 Great American Outdoors Act dedicates funding up to \$9.5 billion for deferred maintenance at national wildlife refuges, national parks and other federal lands and fully funds the Land and Water Conservation Fund (LWCF). Since 1965, LWCF has been one of the most popular federal conservation programs and a common funding source for coastal land protection. Funds come into LWCF from offshore oil and gas royalty payments and are used to support land protection and recreation at the federal, state and local levels. LWCF funds are allocated among federal programs for land acquisition at national wildlife refuges, into specific conservation accounts like the Forest Legacy Program, and state and local applications. Funds may also be used for deferred maintenance for national wildlife refuges and NPS assets.

Within LWCF lies funding for the **Forest Legacy Program**. The Forest Legacy Program began in 1990 and is administered by the U.S. Forest Service with funds from LWCF revenues. The program partners with states, with state forestry agencies typically taking the lead, to protect working forests via fee-simple and conservation easement acquisitions. These efforts have protected over 2.8 million acres. Projects require a minimum 25% nonfederal match, and all projects are reviewed by the lead state agency and a federal panel which will consider past grant performance, “readiness” of the given project, habitat protection value and other factors. Properties must be 75% forested, or there must be a documented plan to reforest to meet the 75% requirement, but that can include cypress tupelo swamps and maritime forests, making current uplands and future salt marsh edges strong candidates for this funding.

Military investment in the salt marsh community is significant and should continue. **The REPI program** is a partnership to mitigate development of adjacent lands that are incompatible with military installations and could lead to subsequent loss of training or testing opportunities. The Office of the Secretary of Defense (OSD) administers the REPI Program. Since 2003, the REPI program has funded cost-sharing partnerships between the military services (Army, Navy, Marine Corps and Air Force), private conservation organizations and state and local governments to maintain compatible land uses around military bases and avoid land-use conflicts.

In 2019, 10 U.S.C. § 2684a (the “REPI statute”) was amended to authorize the use of OSD funds to address climate change. Specifically, the statutory amendment granted under 10 U.S.C. § 2684a gives the REPI program authority to fund projects that maintain or improve “military installation resilience”—increasing the ability of an installation to withstand extreme weather events or changes in environmental conditions. Because resilience projects take different forms in practice, the REPI program has specified that it will exclusively focus on enhancing or developing off-base natural infrastructure.

Military installations, in coordination with their NGO or state or local government partners, submit funding proposals to OSD annually. These funding proposals are evaluated and scored competitively across the services based on several factors, including how the proposals address areas of focus identified in the National Defense Strategy. The highest-scoring proposals receive REPI funds.

REPI also supports larger landscape-scale conservation between bases via sentinel landscapes and the SERPPAS.

REPI began a competitive grant program in 2012, known as REPI Challenge Grants, operating outside their regular cycle and with support from the U.S. Endowment for Forestry and Communities. The grant cycle is announced annually and typically has a narrower focus or call for projects. In recent challenges, the focus areas have included climate resilience measures. Preference is given to projects that have a 1:1 match (including restoration activities, outreach and engagement and in-kind contributions), extensive partners involved and near bases where previous investments have been made. For these reasons, projects within sentinel landscapes are highly favorable.

The Sentinel Landscapes Partnership is a partnership between the USDA, DoD and Department of the Interior to “advance sustainable land management practices around military installations and ranges.”¹¹² The overarching common goals among all sentinel landscapes are to maintain military readiness, preserve local agriculture and forestry and protect natural resources and habitat. Not all of this land protection is specifically for marsh migration, but the broader partnership reinforces the benefit of regional partnerships and leveraging all available funding sources to complete the upland protection required.

Appendix F. Examples of Common Ordinances, Policies and Plans at the Local Level Relevant to the Protection of Coastal Marshes

| | |
|---|---|
| Comprehensive Plan | Serves as the basis for the exercise of many local government powers, particularly the power to zone land and regulate land development. Usually states a community's vision of the future, identifies local priorities and includes maps that show areas for future development. |
| Future Land-Use Map | Usually developed as part of a comprehensive plan, a community's future land-use map describes the areas that are envisioned for growth and development and it describes the character of that development. Future land-use map can also serve as a framework for future zoning. |
| Zoning Ordinance | Establishes permissible types of development and requirements for lots and buildings; often promotes density, reduces impervious surfaces and reduces building footprints; and may include actual or potential for overlay zones that permit particular types of uses across different zoning designations. |
| Flood Damage Prevention Ordinance | Also called a flood plain management ordinance, this ordinance sets standards for development in areas as having a high risk of flooding. This is required in order for citizens of the community to be eligible to buy federally backed flood insurance policies through the federal National Flood Insurance Program. These regulations can promote marsh protection by preserving undeveloped land and natural area in high-risk flood plains. |
| Drainage Control/ Stormwater Management | Regulates the quantity and sometimes the quality of post-construction stormwater runoff. For urbanized areas, these ordinances are based on state and federal requirements, which are increasingly incorporating green space conservation practices. |
| Erosion Control Ordinance | Usually adopted to meet minimum requirements established in a statewide erosion control statute, these ordinances require practices to reduce erosion from construction sites and may require riparian buffers along state waters. These regulations can help control runoff and the buffer requirements can promote marsh protection. |
| Subdivision Ordinance | Provides for minimum standards for the division of parcels of land and generally regulate the construction of residential subdivisions. These regulations may be used to reduce impervious surfaces, discourage cul-de-sacs, promote porous pavement and promote other low-impact-development approaches. |
| Planned Developments/ Conservation Subdivision Ordinance | Allow greater flexibility in development through the use of low-impact-development practices such as cluster development, mixing of uses and alternative, environmentally focused lot designs for developments. These regulations can protect primary conservation areas, preserve open space, allow reduced road widths and other impervious cover reductions. |
| Mosquito Control Ordinance | Often includes, in addition to treatment measures, source reduction activities that may involve habitat modification and/or culvert and hydrology management, as mosquitoes can fly from flood plains, coastal marsh areas or protected habitats to impact urban residential areas. |

Appendix G. Possible Organizational Structure for SASMI Plan Implementation

After the release of the plan, the focus of SASMI will shift to implementing the strategies and actions included in the plan. Below is a potential governance and funding structure that could be adopted, building on the model of ARLI but adapted for SASMI's needs. It includes three elements: (1) establish an enduring SASMI coordination structure, (2) set up a network of implementation teams (ITs) and (3) establish a long-term funding approach. The potential structure below is not final and will be modified based on input from the SASMI steering committee.

FEDERAL AND STATE COORDINATING COMMITTEE (FSCC)

This group, consisting of key federal and state agency leaders, is recommended as the highest-level coordination body. It would meet twice a year, coordinate its own federal and state agency programs with SASMI objectives and seek funding to advance SASMI priorities from within its agencies and other nongovernmental interests to support the initiative. The role of this small group of agencies whose programs naturally align with the goals of the initiative, and who can have influence over funding and policy, has been critically important to the ALRI and would be equally important for SASMI. The commitment to serve on the FSCC could be formalized by a memorandum of understanding similar to the approach taken under the ALRI.

PARTNERSHIP COUNCIL

This existing SASMI steering committee, consisting of federal and state agency reps, NGOs, industry, private landowners and cultural groups would become the second tier of coordination and would continue to provide strategic advice and a structure for coordinating activities. The main purpose of this group is to promote effective communication and collaboration among the many partners working to conserve salt marsh. It serves as a forum where diverse partners can bring together their different objectives, missions, responsibilities and contributions required to make the implementation efforts successful and demonstrate collective progress. As a next step, this group could be formalized by creating a charter, and developing the leadership roles of chair, chair-elect and past chair, each serving a one-year term.

IMPLEMENTATION TEAMS (ITS)

Local ITs have proven very effective for ALRI but the geographic units will be different for SASMI. It is proposed that each state would have an IT coordinator who would manage multiple ITs in the state, or possibly across states. This geographic approach still needs to be determined by SASMI. The overall SASMI coordinator would support all the ITs, an approach that has been effective for ALRI. Each IT would develop its own implementation plan that aligns with the broader regional conservation plan to prioritize actions and make best use of available resources.

SALT MARSH COALITION

This collaborative 300-plus-member network would continue to communicate and collaborate with support from the SASMI coordinator. It would continue to serve as the broadest umbrella of SASMI involvement, a forum for discussion and action on a number of range-wide issues regarding salt marsh conservation.

SASMI LONG-TERM FUND

The potential for a long-term fund to support SASMI capacity and projects is currently being explored. Criteria for funding would be agreed upon by the FSCC and Partnership Council, and as planned, could include land acquisition and easement funds, a revolving fund, funding for living shorelines and other nature-based solutions and community grants that would be available for Implementation Teams in the four states. Funding to establish this long-term fund could come from a mix of private donors and federal agency contributions, similar to the establishment of the National Fish and Wildlife Foundation's Longleaf Landscape Stewardship Fund, possibly NGO managed.

References

- 1 National Park Service, "Salt Marshes," accessed April 18, 2023, <https://www.nps.gov/subjects/1oceans/salt-marshes.htm>.
- 2 National Oceanic and Atmospheric Administration (NOAA), "What Is a Salt Marsh?" accessed April 6, 2023, <https://oceanservice.noaa.gov/facts/saltmarsh.html>.
- 3 National Marine Fisheries Service, "Fisheries Economics of the United States, 2020" (2023), U.S. Department of Commerce, NOAA Technical Memorandum, NMFS-F/SPO-236, <https://media.fisheries.noaa.gov/2023-03/FEUS-2020-final-web.pdf>.
- 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-perishrising-tides>.
- 5 NOAA, Office for Coastal Management, Digital Coast, "Quick Report Tool for Socioeconomic Data," accessed March 15, 2023, <https://coast.noaa.gov/quickreport/#/ACS/ShorelineCounties//2011,2010,2009>.
- 6 F. Sun and R. Carson, "Coastal Wetlands Reduce Property Damage During Tropical Cyclone," *Proceedings of the National Academy of Sciences* 117, no. 11 (2020): 5719-25, <https://doi.org/10.1073/pnas.1915169117>.
- 7 NOAA, "What Is a Salt Marsh?"
- 8 S. Hinshaw, C. Tatariw, N. Flournoy, A. Kleinhuizen, C. Taylor, P. Sobczyk, and B. Mortazavi, "Vegetation Loss Decreases Salt Marsh Denitrification Capacity: Implications for Marsh Erosion," *Environmental Science & Technology* 51, no. 15 (2017): 8245-53, <https://pubs.acs.org/doi/10.1021/acs.est.7b00618>.
- 9 M. Loomis and C. Craft, "Carbon Sequestration and Nutrient (Nitrogen, Phosphorus) Accumulation in River-Dominated Tidal Marshes, Georgia, USA," *Soil Science Society of America Journal* 74, no. 3 (2010): 1028-36.
- 10 F. Wang, X. Lu, C. Sanders, and J. Tang, "Tidal Wetland Resilience to Sea Level Rise Increases Their Carbon Sequestration Capacity in United States," *Nature Communications* 10 (2019): 5434, <https://doi.org/10.1038/s41467-019-13294-z>.
- 11 NOAA, "What Is a Salt Marsh?"
- 12 National Marine Fisheries Service. "Fisheries Economics of the United States, 2020."
- 13 Ibid.
- 14 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>.
- 15 Fretwell, Wagner, and Lee, "A Million Acres of 'Priceless' Marshes Protect NC, SC, GA."
- 16 O. Vinent, E. Herbert, D. Coleman, J. Himmelstein, and M. Kirwan, "Onset of Runaway Fragmentation of Salt Marshes," *One Earth* 4, no. 4 (2021): 506-16, <https://doi.org/10.1016/j.oneear.2021.02.013>.
- 17 K. Gedan and E. Fernández-Pascual, "Salt Marsh Migration into Salinized Agricultural Fields: A Novel Assembly of Plant Communities," *Journal of Vegetation Science* 30 (2019): 1007-15, <https://doi.org/10.1111/jvs.12774>.
- 18 J. Dugan, D. Hubbard, I. Rodil, D. Revell, and S. Schroedter, "Ecological Effects of Coastal Armoring on Sandy Beaches," *Marine Ecology* 29, no. 1 (2008): 160-70.
- 19 P. Mohanty, S. Patra, S. Bramha, B. Seth, U. Pradhan, B. Behera, P. Mishra, and U. Panda, "Impact of Groins on Beach Morphology: A Case Study near Gopalpur Port, East Coast of India," *Journal of Coastal Research* 28, no. 1 (2012): 132-42, <https://doi.org/10.2112/jcoastres-d-10-00045.1>.
- 20 O. Pilkey and H. Wright, "Seawalls Versus Beaches," *Journal of Coastal Research* (1988): 41-64, <http://www.jstor.org/stable/25735351>.
- 21 S. Fretwell, A. Wagner, and D. Raynor, "Coastal Development Boom Endangers Salt Marshes, a Resource Vital to the Southeast Economy," *The News and Observer*, Oct. 26, 2021, <https://pulitzercenter.org/stories/coastal-development-boom-endangers-saltmarshes-resource-vital-southeast-economy>.
- 22 R. Gittman, F. Fodrie, A. Popowich, D. Keller, J. Bruno, C. Currin, C. Peterson, and M. Piehler, "Engineering Away Our Natural Defenses: An Analysis of Shoreline Hardening in the U.S.," *Frontiers in Ecology and the Environment* 13, no. 6 (2015): 301-7, <https://doi.org/10.1890/150065>.
- 23 L. Deegan, D. Johnson, R. Warren, B. Peterson, J. Fleeger, S. Fagherazzi, and W. Wollheim, "Coastal Eutrophication as a Driver of Salt Marsh Loss," *Nature* 490 (2012): 388-92, <https://doi.org/10.1038/nature11533>.
- 24 M. Correll, W. Wiest, T. Hodgman, W. Shriver, C. Elphick, B. McGill, K. O'Brien, B. Olsen, "Predictors of Specialist Avifaunal Decline in Coastal Marshes," *Conservation Biology* 31, no. 1 (2017): 172-82, <https://doi.org/10.1111/cobi.12797>.
- 25 South Carolina Department of Natural Resources, "South Carolina's State Wildlife Action Plan" (Columbia, SC: South Carolina Department of Natural Resources, 2015), <https://www.dnr.sc.gov/swap/index.html>.
- 26 United States Fish and Wildlife Service, Environmental Conservation Online System, "Green Sea Turtle" accessed April 20, 2023, <https://ecos.fws.gov/ecp/species/6199>.
- 27 Florida Fish and Wildlife Conservation Commission (FWC), "Florida's Wildlife Legacy Initiative: Florida's State Wildlife Action Plan" (2019), <https://myfwc.com/media/22767/2019-action-plan.pdf>.
- 28 Ibid.
- 29 United States Fish and Wildlife Service, Environmental Conservation Online System, "Atlantic Sturgeon," accessed April 6, 2023, <https://ecos.fws.gov/ecp/species/E0A7>.
- 30 United States Fish and Wildlife Service, Environmental Conservation Online System, "Shortnose Sturgeon," accessed April 6, 2023, <https://ecos.fws.gov/ecp/species/6635>.
- 31 Florida Natural Areas Inventory, "Guide to the Natural Communities of Florida" (2010), https://www.fnai.org/PDFs/NC/Salt_Marsh_Final_2010.pdf.
- 32 S. Jones and S. J. Pippin, "Stabilizing the edge: Southeastern and Mid-Atlantic shorelines facing sea-level rise," *Columbia Journal of Environmental Law*, Forthcoming, <https://doi.org/10.2139/ssrn.3728230>.
- 33 Southeast Conservation Adaptation Strategy, "About SECAS," accessed April 18, 2023, <https://secassoutheast.org>.
- 34 Southeast Conservation Adaptation Strategy, "Recent Trends in Southeastern Ecosystems (2021): Measuring Progress toward the SECAS Goal" (2021), <http://secassoutheast.org/pdf/SECAS-goal-report-2021.pdf>.
- 35 National Estuarine Research Reserve System and NOAA Office for Coastal Management, University of New Hampshire, and National Estuarine Research Reserve Association, "Marshes in Context," accessed April 20, 2023, https://www.nerra.org/wp-content/uploads/2021/11/Broport_11_7-1.pdf.
- 36 South Carolina Department of Natural Resources, "Guide to the Salt Marshes and Tidal Creeks of the Southeastern United States: History & Culture" (2016), accessed April 18, 2023, <https://www.saltmarshguide.org/guide/history-culture/>.
- 37 D. Thomas, *Native American Landscapes of St. Catherines Island, Georgia: I. The Theoretical Framework* (New York: American Museum of Natural History Anthropological Papers, 2008); E. Reitz, "A Case Study in the Longevity of a Regional Estuarine Fishing Tradition: The Central Georgia Bight (USA)" *Archaeological and Anthropological Sciences* 13 (2021), <https://doi.org/10.1007/s12520-021-01347-8>.
- 38 J. Erlandson, "As the World Warms: Rising Seas, Coastal Archaeology, and the Erosion of Maritime History," *Journal of Coastal Conservation* 16 (2012): 137-42, <https://doi.org/10.1007/s11852-010-0104-5>.
- 39 D. Anderson, T. Bissett, S. Yerka, J. Wells, E. Kansa, S. Kansa, K. Myers, R. DeMuth, and D. White, "Sea-Level Rise 39 and Archaeological Site Destruction: An Example from the Southeastern United States Using DINAA (Digital Index of North American Archaeology)," *PLoS ONE* 12, no. 11 (2017): <https://doi.org/10.1371/journal.pone.0188142>.
- 40 M. Twining and K. Baird, eds., *Sea Island Roots: African Presence in the Carolinas and Georgia* (Trenton, NJ: Africa World Press, 1991), https://www.si.edu/object/siris_sil_429775.
- 41 Southeast Conservation Adaptation Strategy (SECAS). 2022. Southeast Conservation Blueprint 2022. Personal communication, <http://secassoutheast.org/blueprint>.
- 42 A. Kahrl, *The Land Was Ours: How Black Beaches Became White Wealth in the Coastal South* (Chapel Hill, NC: University of North Carolina Press, 2021).
- 43 United States Department of Agriculture, National Agricultural Library, "Heirs' property. Heirs' Property" accessed April 6, 2023, <https://www.nal.usda.gov/farms-and-agricultural-production-systems/heirs-property>.
- 44 F. Rivers James, "The Public Trust Debate: Implications for Heirs' Property along the Gullah Coast," *Southeastern Environmental Law Journal* 15, no. 1 (2008), *Elon University Law Legal Studies Research Paper No. 2009-07*, <https://ssrn.com/abstract=1460744>.
- 45 NOAA Fisheries Service, "Social Indicators for Coastal Communities," accessed April 6, 2023, <https://www.fisheries.noaa.gov/national/socioeconomics/social-indicators-coastal-communities>.
- 46 L. Handwerker, M. Sugg, and J. Runkle, "Present and Future Sea Level Rise at the Intersection of Race and Poverty in the Carolinas: A Geospatial Analysis," *The Journal of Climate Change and Health* 3 (August 2021): 100028, <https://doi.org/10.1016/j.jocl.2021.100028>.
- 47 R. Hardy and M. Hauer, "Social Vulnerability Projections Improve Sea-Level Rise Risk Assessments," *Applied Geography* 91 (2018): 10-20, <https://doi.org/10.1016/j.apgeog.2017.12.019>.
- 48 U.S. Environmental Protection Agency, "Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts," EPA 430-R-21-003 (2021), www.epa.gov/cira/social-vulnerability-report.
- 49 NOAA Fisheries Service, "Social Indicators for Coastal Communities," accessed April 6, 2023, <https://www.fisheries.noaa.gov/national/socioeconomics/social-indicators-coastal-communities>.
- 50 REPI, "REPI Interactive Map," accessed April 20, 2023, <https://repi.osd.mil/map/>.

References

- 51 Department of Defense, Office of the Undersecretary for Policy (Strategy, Plans, and Capabilities), "Department of Defense Climate Risk Analysis" (2021), report submitted to National Security Council.
- 52 Department of Defense, Office of the Undersecretary of Defense (Acquisition and Sustainment) "Department of Defense Draft Climate Adaptation Plan" (2021), report submitted to National Climate Task Force and Federal Chief Sustainability Officer, <https://www.sustainability.gov/pdfs/dod-2021-cap.pdf>.
- 53 United States Fish and Wildlife Service, "Red-Cockaded Woodpecker," accessed April 20, 2023, <https://ecos.fws.gov/ecp/species/7614>.
- 54 U.S. Department of Agriculture, Department of Defense, and Department of the Interior, "The Sentinel Landscapes Partnership," accessed April 18, 2023, <https://sentinellandscapes.org/>.
- 55 NOAA, "Coastal Fast Facts," accessed April 6, 2023, <https://coast.noaa.gov/data/nationalfacts/pdf/hand-out-coastal-fast-facts.pdf>.
- 56 W. Mitsch, B. Bernal, and M. Hernandez, "Ecosystem Services of Wetlands," *International Journal of Biodiversity Science, Ecosystem Services & Management* 11, no. 1 (2015): 1-4, <https://doi.org/10.1080/21513732.2015.1006250>.
- 57 Ibid.
- 58 Personal communication with Georgia Department of Natural Resources, April 20, 2023.
- 59 R. Gittman, A. Popowich, J. Bruno, and C. Peterson, "Marshes with and without Sills Protect Estuarine Shorelines from Erosion Better Than Bulkheads during a Category 1 Hurricane," *Ocean & Coastal Management* 102 (2014): 94-102, <https://doi.org/10.1016/j.ocecoaman.2014.09.016>.
- 60 C. Smith, B. Puckett, R. Gittman, and C. Peterson, "Living Shorelines Enhanced the Resilience of Saltmarshes to Hurricane Matthew (2016)," *Ecological Applications* 28, no. 4 (2018): 871-77.
- 61 W. Sweet et al., *Global and Regional Sea Level Rise Scenarios for the United States: Updated Mean Projections and Extreme Water Level Probabilities Along U.S. Coastlines*, NOAA Technical Report NOS 01 (Silver Spring, MD: NOAA, National Ocean Service, 2022).
- 62 A. Bosserelle, L. Morgan, and M. Hughes, "Groundwater Rise and Associated Flooding in Coastal Settlements Due to Sea-Level Rise: A Review of Processes and Methods," *Earth's Future* 10, no. 7 (2022), <https://doi.org/10.1029/2021ef002580>.
- 63 S. Fagherazzi, S. Anisfeld, L. Blum, E. Long, R. Feagin, A. Fernandes, W. Kearney, and K. Williams, "Sea Level Rise and the Dynamics of the Marsh-Upland Boundary," *Frontiers in Environmental Science* 7 (2019), <https://doi.org/10.3389/fenvs.2019.00025>.
- 64 D. Anderson et al., "Sea-Level Rise and Archaeological Site Destruction."
- 65 M. Heilen, J. Altschul, and F. Lüth, "Modelling Resource Values and Climate Change Impacts to Set Preservation and Research Priorities," *Conservation and Management of Archaeological Sites* 20, no. 4 (2018): 261-84, <https://doi.org/10.1080/13505033.2018.1545204>.
- 66 Personal communication with U.S. Fish and Wildlife Service, April 5, 2023.
- 67 T. Bridges, E. Bourne, B. Suedel, E. Moynihan, and J. King, *Engineering With Nature: An Atlas*, Volume 2. ERDC SR-60 21-2 (Vicksburg, MS: U.S. Army Engineer Research and Development Center, 2021), <http://dx.doi.org/10.21079/11681/40124>.
- 68 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>.
- 69 Ibid.
- 70 Ibid.
- 71 Ibid.
- 72 United States Code Title 16—Conservation, accessed April 6, 2023, <https://www.govinfo.gov/content/pkg/USCODE-2021-title16/pdf/USCODE-2021-title16-chap5C-subchapl-sec670a.pdf>.
- 73 Personal communication with Georgia Department of Natural Resources, April 20, 2023.
- 74 Florida Statutes, Ch. 259, Ch. 259.035, Ch. 259.105.
- 75 Georgia. Code Ann., 12-6A-7(d)(1).
- 76 Georgia Code Ann., 12-6A-1, et seq.
- 77 Ga. R. & Regs., 391-5-13.11(6).
- 78 Georgia Department of Natural Resources, *Georgia Outdoor Stewardship Program, 2020-2021 Conserve Georgia Manual* (Atlanta: GOSP, 2020), at 9.
- 79 Georgia Code Ann. § 12-6A-6 § (a)(1)-(4).
- 80 South Carolina Code Ann. § 48-59-10, et seq.
- 81 South Carolina Code Ann. § 48-59-70(M).
- 82 South Carolina Code Ann. § 48-59-70(D)(1)-(13).
- 83 South Carolina Code Ann. § 48-59-70(E)(1)-(5).
- 84 North Carolina ST § 143B-135.230, et. seq.
- 85 North Carolina ST § 143B-135.234.
- 86 NC ST § 143B-135.234(c).
- 87 1 NC ADC 6B.0200 Acquisition of Real Property.
- 88 1 NC ADC 6B.0203(c)(2).
- 89 NC ST § 143B-135.56; <https://www.ncparks.gov/more-about-us/parks-recreation-trust-fund/parks-and-recreation-trust-fund>.
- 90 North Carolina Department of Agriculture and Consumer Services, "Cost Share Programs – CCAP," accessed April 20, 2023, <http://www.ncagr.gov/SWC/costshareprograms/CCAP/index.html>.
- 91 North Carolina Department of Environmental Quality, "Water Resource Grants," accessed April 20, 2023, <https://www.deq.nc.gov/about/divisions/water-resources/water-resources-grants>.
- 92 North Carolina Department of Justice, "Environmental Grants," accessed April 19, 2023, <https://ncdoj.gov/protecting-the-environment/eeg/>.
- 93 Florida Stat. § 196.26
- 94 Georgia Code Ann. § 48-5-7.4.
- 95 <https://dor.georgia.gov/table-conservation-use-land-values>.
- 96 Georgia Code Ann. §48-5-7.4(a)(1).
- 97 Georgia Code Ann. §48-5-7.4(a)(2).
- 98 Georgia Code Ann. § 48-5-7.4(d).
- 99 Georgia Code Ann. § 48-5-7.7.
- 100 <https://dor.georgia.gov/georgia-forest-land-protection-act>.
- 101 Georgia Code Ann. § 48-5-7.7.
- 102 Ga. Code Ann. § 48-5-7.7(c).
- 103 South Carolina Code Ann. § 12-6-3515(A).
- 104 South Carolina Code Ann. § 12-6-3515(C)(1).
- 105 26 U.S.C. § 170(h) (defining "qualified conservation contribution" generally as a qualified real property interest, to a qualified organization, exclusively for conservation purposes).
- 106 26 U.S.C. § 170(h)(4)(A) (including the preservation of land areas for outdoor recreation; the protection of a relatively natural habitat of fish, wildlife, or plants or similar ecosystem; the preservation of open space; and the preservation of an historically important land area or a certified historic structure).
- 107 U.S. Fish and Wildlife Service (USFWS), "North American Wetlands Conservation," accessed April 20, 2023, <https://www.fws.gov/program/north-american-wetlands-conservation>.
- 108 North American Waterfowl Management Plan, accessed April 20, 2023, <https://nawmp.org/>.
- 109 Natural Resources Conservation Service, "Wetlands Reserve Easements," accessed April 18, 2023, <https://www.nrcs.usda.gov/conservation-basics/conservation-by-state/louisiana/wetlands-reserve-easements-wre>.
- 110 NOAA, "The Coastal and Estuarine Land Conservation Program," accessed April 20, 2023, <https://coast.noaa.gov/czm/landconservation/>.
- 111 USFWS, "National Coastal Wetlands Conservation Grants," accessed April 20, 2023, <https://www.fws.gov/service/78-national-coastalwetlands-conservation-grants>.
- 112 Sentinel Landscapes, "The sentinel landscapes partnership," accessed April 18, 2023, <https://sentinellandscapes.org/>.



For more information on SASMI, please visit
www.marshforward.org