SOUTH ATLANTIC COASTAL STUDY (SACS)

Institutional and Other Barriers

FINAL REPORT

AUGUST 2022

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1. Introduction

1.1 South Atlantic Coastal Study Authority

The South Atlantic Coastal Study (SACS) was authorized by Section 1204 of the Water Resources Development Act of 2016 (WRDA 2016) with the following language:

> *(a) IN GENERAL - The Secretary shall conduct a study of the coastal areas located within the geographical boundaries of the South Atlantic Division of the Corps of Engineers to identify the risks and vulnerabilities of those areas to increased hurricane and storm damage as a result of sea level rise.*
>
> *(b) REQUIREMENTS - In carrying out the study under subsection (a), the Secretary shall-*
> *(1) conduct a comprehensive analysis of current hurricane and storm damage reduction measures with an emphasis on regional sediment management practices to sustainably maintain or enhance current levels of storm protection;*
> *(2) identify risks and coastal vulnerabilities in the areas affected by sea level rise;*
> *(3) recommend measures to address the vulnerabilities described in paragraph (2); and*
> *(4) develop a long-term strategy for-*
> *(A) addressing increased hurricane and storm damages that result from rising sea levels; and*
> *(B) identifying opportunities to enhance resiliency, increase sustainability, and lower risks in-*
> *(i) populated areas;*
> *(ii) areas of concentrated economic development; and*
> *(iii) areas with vulnerable environmental resources.*
>
> *(c) REPORT - Not later than 4 years after the date of enactment of this Act, the Secretary shall submit to the Committee on Environment and Public Works of the Senate and the Committee on Transportation and Infrastructure of the House of Representatives a report recommending specific and detailed actions to address the risks and vulnerabilities of the areas described in subsection (a) due to increased hurricane and storm damage as a result of sea level rise.*

Implementation guidance for the SACS was provided by the Assistant Secretary of the Army for Civil Works (ASA-CW) in November 2017, stating that the SACS would be conducted in accordance with planning guidance applicable to watershed assessments and be modeled after the North Atlantic Coast Comprehensive Study (NACCS) with data to be evaluated consistently with the NACCS to the maximum extent practicable.

The NACCS was authorized following Hurricane Sandy, "to help local communities better understand changing flood risks associated with climate change and to provide tools to help those communities better prepare for future flood risks. It builds on lessons learned from Hurricane Sandy and attempts to bring to bear the latest scientific information available for state, local, and tribal planners" (USACE n.d.). As part of the NACCS study, USACE published the *North Atlantic Coast Comprehensive Study: Resilient Adaptation to Increasing Risk; Institutional and Other Barriers Report* (NACCS IOB) (USACE 2015), which identified institutional and other

barriers that hinder or obstruct protection of the affected coastal areas. A separate report, *Hurricane Sandy Coastal Projects Performance Evaluation Study*, focused on the performance of existing USACE projects impacted by Hurricane Sandy to determine their effectiveness and make recommendations for improvements (USACE 2013). In accordance with guidance, these two reports are being leveraged as the foundation for this SACS Institutional and Other Barriers Report (IOB Report).

1.2 Purpose and Applications

The purpose of this report is to identify barriers to providing comprehensive coastal protection and document policies or improvements that could potentially counter these barriers, thus increasing collaborative capabilities to reduce risk more effectively. This report builds on the institutional barriers identified in the 2015 NACCS IOB and revealed additional barriers, lessons learned, and updates detected since the NACCS. Outreach was performed within the SACS study area to ascertain barriers and opportunities for improvements based on stakeholder input. Project Performance Evaluations (PPEs) assessed existing federal USACE Coastal Storm Risk Management (CSRM) projects to determine their effectiveness in protecting the coast from storm damages and identified institutional and other barriers that impede project efficiency.

This report provides valuable information about existing impediments to successful CSRM. Decision-makers and policy-makers can use the information provided herein to better identify and address institutional and other barriers, improve overall coastal resilience, and provide a more comprehensive approach to protecting coastal environments and communities from coastal storm damages.

1.3 Community Resilience and Risk Management

Per the SACS authority (summarized in **Section 1.1**), the study aims to identify risks, address vulnerabilities, and enhance resilience and lower risks. Risk depends upon exposure, hazards, performance, and vulnerability. Policies, programs, and CSRM measures (at various levels of government) offer the opportunity to reduce risk. However, even with the best coastal storm risk management measures in place, residual risk is inevitable. **Figure 1.1,** adopted and modified from the Natural Research Council (2013), highlights this concept of residual risk. Each CSRM measure has the potential to incrementally reduce risk. These risk management measures can include structural, nonstructural, and natural and nature-based feature (NNBF) solutions. Many of these risk management measures can be implemented across levels of government, while some measures, such as floodproofing and insurance, are implemented by individual businesses or homeowners. While complete risk avoidance is likely unachievable, with comprehensive risk management measures, the residual risk can be significantly reduced.

> *"**Risk** is the chance of an undesirable outcome in any given situation. It is a measure of the probability and consequence of uncertain future events and it includes:*
>
> - *Potential for gain (opportunities)*
> - *Exposure to losses (hazards)"*
>
> USACE Institute of Water Resources n.d.

> ***Resilience** is the "ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions"*
>
> The White House Office of the Press Secretary 2013

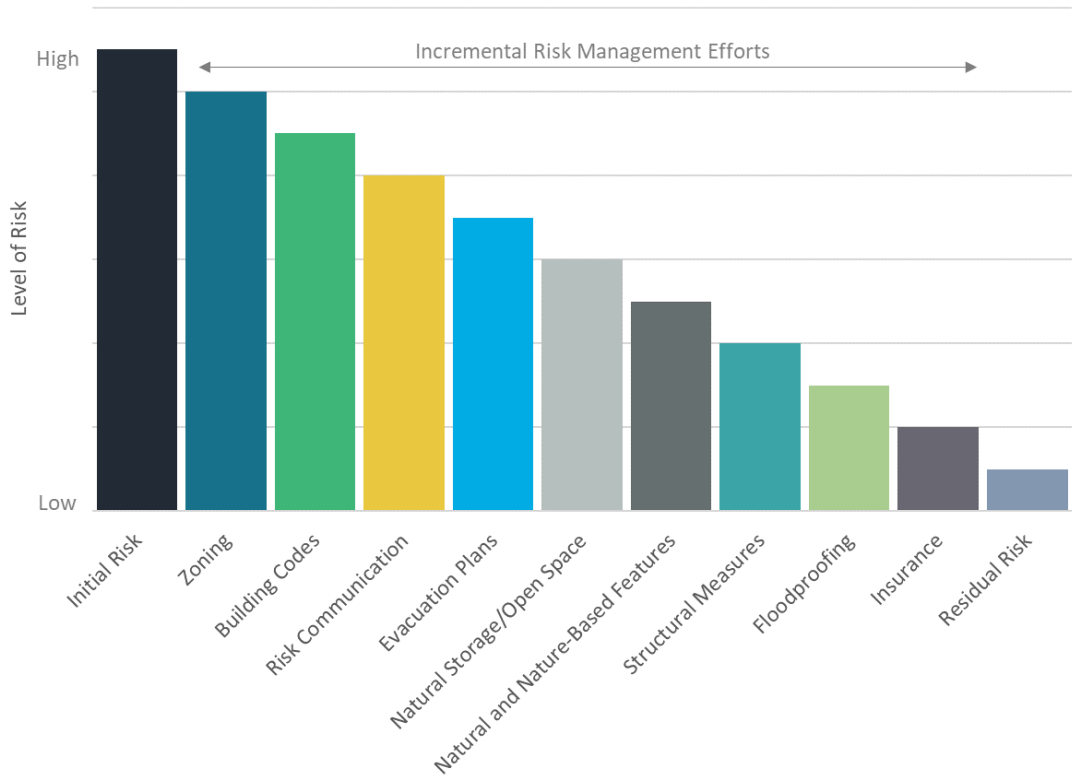

Figure 1.1 Illustration of Incremental Risk Management and Residual Risk (Modified from the Natural Research Council 2013)

1.4 Institutional Landscapes

There are thousands of laws and regulations, directives, Executive Orders, and policies across many layers of government that influence community resilience. Several significant federal acts, programs, Presidential Policy Directives, and Executive Orders that affect CSRM are highlighted in the NACCS IOB Report (USACE 2015). The institutional landscape that shapes a community's resilience to coastal storms is dynamic; there have been several changes to policies, programs, and renewed interest in community resilience to coastal storms since Hurricane Sandy. This report is not a comprehensive compilation of every policy and program that shapes the institutional landscape within the SACS area of responsibility; rather, it provides examples of the types of policies, programs, and efforts that influence coastal storm risk.

Table 1.1 provides examples of recent federal policy and program updates geared toward improving coastal resilience and minimizing identified institutional and other barriers. The contents of this table reflect advances in programs and policies since the inception of NACCS. In general, federal agencies increasingly acknowledge the importance of incorporating resilience principles into agency policies and programs.

Table 1.1 Summary of Recent Federal Policy or Program Updates Related to Coastal Resilience

Year	Program/ Initiative	Description	Benefit	Agency
2016	Water Infrastructure Improvements for the Nation Act (WIIN)	Planning requirements for USACE flood risk management and ecosystem restoration projects that all USACE flood risk management project feasibility reports consider natural infrastructure, either exclusively or in conjunction with traditional structural measures (Congressional Research Service 2020).	These changes in USACE policy, since Hurricane Sandy, open opportunities for CSRM studies to reduce community coastal flood risks under changing future conditions and may have a greater likelihood for inclusion of natural and nature-based features, which may include several co-benefits such as habitat, ecosystem, and environmental quality benefits.	USACE
2017	Establishment of the Recovery Support Function Leadership Group	A federal interagency body designed to identify and facilitate resolution of operational and policy challenges related to the National Disaster Recovery Framework (NDRF) and recovery-related elements of Presidential directives for National Preparedness and Critical Infrastructure Security and Resilience. Engages interagency leadership in a forum designated for the exchange of relevant information, associated planning and exercises, and decision-making.	Improves the effectiveness and unity of effort for coordinated federal recovery responsibilities, as well as resolves operational, resource, and policy issues related to interagency recovery actions at the national level.	FEMA
2018	Bipartisan Budget Act of 2018	Provided supplemental disaster funds to USACE and other agencies in response to damages from Hurricanes Harvey, Irma, Maria and Matthew.	Additional federal resources will be available to help respond to and recover from natural disasters impacting coastal areas.	Various
2019	Additional Supplemental Appropriations for Disaster Relief Act, 2019	This bill provided supplemental appropriations to several federal departments and agencies for expenses related to the consequences of recent wildfires, hurricanes, volcanoes, earthquakes, typhoons, and other natural disasters.	Additional federal resources will be available to help respond to and recover from natural disasters impacting coastal areas. This bill and the Bipartisan Budget Act of 2018 help alleviate the NACCS-identified barrier related to a lack of funding for coastal resilience efforts.	Various
2019	Establishment of the Mitigation Framework Leadership Group	The Mitigation Framework Leadership Group (MitFLG) provides a coordinating structure for mitigation across the federal government and with partners in mitigation nationally. The MitFLG operates according to the National Mitigation Framework (NMF).	This framework will strengthen the nation's disaster resilience by expanding mitigation awareness, coordination, and action. Mitigation is a cornerstone of a culture of preparedness against disasters. This initiative can help address multiple barriers identified within the NACCS by improving federal agency coordination and increasing the public's understanding and acceptance of risk management measures.	FEMA

Year	Program/ Initiative	Description	Benefit	Agency
2019	National Mitigation Investment Strategy	FEMA and its federal partners produced the National Mitigation Investment Strategy to increase our nation's resilience to natural hazards. Its purpose is to coordinate the use of federal, state, local, and private resources to help communities survive and thrive in the face of natural disasters.	The National Mitigation Investment Strategy works to motivate communities to invest in mitigation; shrink barriers to investing in mitigation and improves access to risk information and funding; and make investing in mitigation standard practice. This initiative helps address the lack of a national/regional strategy for CSRM, which was identified as a barrier in the NACCS.	FEMA
2020	Building Resilient Infrastructure and Communities Program (BRIC)	This program supports "states, local communities, tribes, and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards," replacing the prior Pre-Disaster Mitigation Grant Program.	The BRIC program supports projects that are cost-effective, decrease risk, comply with the latest international building codes, and are consistent with FEMA-approved hazard mitigation plans (FEMA 2021). The NACCS identified the tendency toward reactionary funding as a barrier to CSRM. BRIC helps alleviate this barrier by focusing on proactive mitigation efforts.	FEMA
2020	Digital Coast Act	NOAA's Digital Coast Act provides the data, tools, and training that communities use to manage their coastal resources.	A tool available to all stakeholders with a shared responsibility to implement actions that strengthen coastal resilience. This can help communities and individuals better understand their risk, alleviating a NACCS-identified barrier.	NOAA
2020	Various Risk Assessment Policies and Procedures	Policies implemented in 2020 mandate that all systems of accounts should be analyzed to maximize benefits, with the level of detail of the analysis dependent upon the availability of data, tools, and the value to decision-making (U.S. Department of the Army 2020). Since Hurricane Sandy, USACE also requires all planning and engineering studies to address climate change and incorporate sea level rise and associated adaptation, as outlined in Engineer Pamphlet 1100-2-1. At least three sea level rise scenarios must be considered and incorporated into studies that are tidally influenced, regardless of the size or scale of the study or project (USACE 2019b).	Updates to policies and procedures help to capture a more complete picture of risk, and potential project benefits, in addressing flood risk management. According to the NACCS, the focus on least-cost solutions when justifying projects presented a barrier to CSRM and limited the ability to consider wider benefits. These new requirements help address this barrier.	USACE

Year	Program/ Initiative	Description	Benefit	Agency
2021	Building Community Resilience with Nature-based Solutions	Guide for local communities to learn about the value of nature-based solutions and how to move from planning to implementation. The guide includes six sections: (1) What are nature-based solutions? (2) The business case, (3) Planning and policy-making phase, (4) Implementation phase, (5) Federal funding opportunities, (6) Key takeaways and resources.	Helps communities identify and engage the staff and resources that can be used to implement nature-based solutions to build resilience to natural hazards, which may be exacerbated by climate change. This helps address the NACCS-identified barrier related to the public acceptability of risk management measures.	FEMA
2021	National Flood Insurance Program (NFIP) – Risk Rating 2.0	The NFIP Risk Rating 2.0 will phase out prior subsidies and instead correlate annual flood insurance premiums with modeled flood risks for each property. Flood risks will be characterized by a range of flood frequencies as opposed to the current/past practice which uses the 1-percent AEP event. Risk Rating 2.0 will also base insurance premiums on individual property features, such as foundation type, elevation of the lowest floor, and replacement cost of the home or structure (Congressional Research Service 2021).	The introduction of Risk Rating 2.0 may result in significant changes in the cost of insurance for homeowners in areas of flood risk, better communicating the potential consequences of living within a high hazard area. These changes help address the difficulties of individuals and communities understanding their risk, a NACCS-identified barrier.	FEMA
2021	Coastal Barrier Resources Act (CBRA)	The CBRA protects coastal resources by limiting federal investment in designated areas. The interpretation of the intent was changed in 2019 to increase flexibility in utilizing sediment resources within a CBRA unit for beach nourishment purposes. Current CBRA guidance states that sand from within the system cannot not be used for beach nourishment outside of the system.	Current CBRA guidance limits opportunities for the beneficial use of dredged material. Depending on stakeholder perspective, this may be seen as a benefit as it limits the flexibility of beach nourishment to manage risk and increases reliance on nonstructural measures. However, such limitation can also be viewed as a constraint to supporting community resilience through effective regional sediment management and implementation of natural and nature-based solutions.	USFWS
2021	Engineering With Nature (EWN) – International Guidelines on Natural and Nature-Based Features (NNBF) for Flood Risk Management	The USACE Engineering With Nature (EWN) Initiative and international partners released international NNBF guidelines in September 2021 to address the full project life cycle, including conceptualization, design, engineering, construction, and maintenance. The effort draws from organizations across all of the relevant sectors, including government, academia, NGOs, engineering firms, construction companies, etc.	Stakeholder coordination during SACS emphasized the need for NNBF design guidelines to provide a technically sound engineering approach for NNBF and their integration with more conventional, structural measures. The NACCS also identified the lack of design criteria for NNBF as a barrier.	USACE

Year	Program/ Initiative	Description	Benefit	Agency
2022	National Environmental Policy Act (NEPA)	In 2020, the Council on Environmental Quality (CEQ) "modernized" the NEPA to, in part, improve the efficiency and review times of federal agencies by simplifying requirements as they relate to the terms "direct," "indirect," and "cumulative effects" (The National Law Review 2022). However, on April 20, 2022, the CEQ issued a Final Rule to generally restore the NEPA regulations that were in effect before the 2020 rule (CEQ 2022).	This change restores the focus on cumulative effects, which may include those related to climate change.	DOI/CEQ

Augmenting these federal policies and programs are several state and local policies and programs that influence the institutional landscape around CSRM, shown in **Table 1.2**. These local programs and policies are unique to the region that they serve and are ever evolving. Several other local programs and tools exist to support community resilience, many of which are captured in the *SACS Coastal Program Guide* (USACE 2022).

Table 1.2 List of Local Programs and Policies that Influence the Institutional Coastal Storm Risk Management Landscape

State/ Territory	Year	Policy
North Carolina	1969	North Carolina Dredge and Fill Law
North Carolina	1974	Coastal Area Management Act
North Carolina	2002	Endangered Species Act
North Carolina	2009	Beach and Inlet Management Plans
North Carolina	2015	State Environmental Policy Act
North Carolina	2020	ReBuild NC
South Carolina	1977	Development of Beach Erosion Control Policy
South Carolina	1978	Special Project Standards for Tidelands and Coastal Waters
South Carolina	1978	Specific Project Standards for Beaches and the Beach/Dune System
South Carolina	1995	Beach Restoration Fund
Georgia	1966	Georgia Natural Areas
Georgia	1970	Coastal Marshlands Act
Georgia	1973	Endangered Wildlife Act
Georgia	1975	Georgia Erosion and Sedimentation Act
Georgia	1975	Georgia Heritage Trust Act
Georgia	1979	Shore Protection Act
Georgia	1991	Georgia Environmental Policy Act
Georgia	1998	Georgia Coastal Management Act
Georgia	2010	Protection of Tidewaters Act
Georgia	2019	Georgia Department of Natural Resources Requirements for Beach Nourishment Projects
Florida	1965 (as amended)	Coastal Construction Serving No Public Purpose
Florida	1965 (as amended)	Beach Management, Funding, Repair and Maintenance Strategy
Florida	1965 (as amended)	State and Local Participation in Authorized Projects and Studies Relating to Beach Management and Erosion Control
Florida	1965 (as amended)	Shore Erosion Emergency
Florida	1971 (as amended)	Coastal Construction Control Lines
Florida	1978 (as amended)	Coastal Construction and Excavation in Barrier Beach Inlets
Florida	1986 (as amended)	Beaches Funding Program
Florida	1993 (as amended)	Review of Innovative Technologies for Beach Nourishment
Florida	1995 (as amended)	Rigid Coastal Armoring Structures
Florida	2008	Inlet Management Plans
Florida	2011	Coastal Partnership Initiative Grants

State/ Territory	Year	Policy
Florida	Unknown	Florida Resilient Coastlines Program
Florida	Unknown	Resilience Implementation Grants (RIGs)
Florida	2021	Senate Bill 1954
Florida	2021	Resilient Florida Grant program
Florida	2021	Comprehensive Statewide Flood Vulnerability Data Set and Assessment
Florida	2021	Statewide Flooding and Sea Level Rise Resilience Plan
Florida	2021	Regional Resilience Entities
Florida	2021	Florida Flood Hub
Alabama	2013	Coastal Area Management Program – Limits on Dredging and/or Filling
Alabama	2013	Coastal Area Management Program – Shoreline Stabilization and Erosion Mitigation
Alabama	2013	Coastal Area Management Program – Construction and Other Activities on Gulf Front Beaches and Dunes
Mississippi	2003	Coastal Wetlands Protection Act
Mississippi	2010	Beneficial Use Law
Puerto Rico	1978	Puerto Rico Coastal Zone Management Program
Puerto Rico	2011	Puerto Rico Climate Change Council
Puerto Rico	2011	Coastal Adaptation Project
Puerto Rico	2015	Community Plans for Adaptation to Climate Change
U.S. Virgin Islands	2019	Virgin Islands Coastal Zone Management - Permits for Development (V.I. Code tit. 12, § 910)

In addition to government policies and programs to reduce coastal storm risks, private-sector entities may also take action to reduce risks to their assets. For example, hospitals may design facilities to withstand and continue operations during severe hurricanes and coastal storms. Non-government organizations (NGOs) may also support a resilient institutional landscape by providing policy recommendations and tools to support resiliency and provide guidance to government agencies. Strategic land acquisition by NGOs may also reduce exposure and minimize development in areas subject to significant coastal hazards.

These federal, state, regional, and local policies and programs, as well as private sector and NGO efforts, form the institutional landscape that create barriers or promote resilience of the communities they serve. Each region or territory may face different challenges based on the policies and programs that influence their ability to build resilience. These policies and programs that shape coastal storm risk are continually revised as politics change, science and technology evolve, funding fluctuates, and lessons are learned following coastal storms. This SACS IOB report summarizes the institutional barriers and project performance within the SACS study area, as influenced by the policies and programs that form the institutional landscape.

1.5 Structure of Report

Institutional barriers and policy recommendations identified as part of the SACS are detailed in Section 2 and are categorized by themes consistent with the NACCS IOB Report. These institutional barriers and policy recommendations were summarized from various stakeholder outreach efforts from across the SACS area of responsibility. Geographical trends in barriers are also presented throughout this section. Section 3 discusses the barriers that emerged from PPEs and performance improvement recommendations based on USACE input and evaluation. Section 4 provides a summary of findings and final conclusions.

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2. Stakeholder-Identified Institutional and Other Barriers

2.1 Basis of Analysis

For the purposes of this report and for consistency with NACCS, *institutional barriers* are defined as barriers posed by agency silos and overlapping or competing missions that inhibit necessary coordination among agencies/levels of government, and/or that otherwise impede the attainment of SACS goals. *Other barriers* include laws, regulations, agency guidance and programs at federal, state, or local levels that: (1) contribute to the vulnerability of coastal populations, ecosystems, and/or infrastructure, (2) work at cross purposes with policies and measures that reduce risk and/or increase resilience, (3) increase flood risk in the coastal zone (tidally influenced), (4) conflict with the goals of improving coastal resilience or reducing risk, (5) expose federal investments or increase financial exposure of federal taxpayers, and (6) impede the ability of decision makers, at all levels of community and political governance, to support or make hard decisions, pursue innovative solutions, or lead change supportive of SACS goals.

SACS Goals

1. Provide a common operating picture of coastal storm risk
    a. Provide decision-makers at all levels with a comprehensive and consistent regional assessment of coastal storm risk.
2. Identify high-risk locations and focus current and future resources
    a. Enable resources to be focused on the most-vulnerable areas.
3. Identify and assess risk management actions
    a. Assess actions to reduce coastal storm risk to vulnerable populations, public health and safety, areas of concentrated economic development, and environmental and cultural resources.
4. Promote and support resilient coastal communities
    a. Ensure a sustainable coastal landscape system, considering future sea level rise scenarios.
    b. Provide information to stakeholders to optimize existing efforts to manage coastal storm risk.
5. Promote sustainable projects and programs
    a. Develop and provide consistent key products to support coastal studies and projects.
    b. Regionally manage projects through regional sediment management and other opportunities.
6. Leverage ongoing actions
    a. Leverage multiple ongoing studies and construction efforts to inform, and be informed by, the SACS.

The institutional and other barriers identified in the SACS were based on stakeholder input. Stakeholder input was solicited from in-person and virtual workshops. A series of 14 in-person field workshops (with opportunity for virtual attendance) was held throughout the study area (**Figure 2.1**). Institutional and other barriers to reducing risk was one of four topics for discussion within breakout groups as well as policy changes or legislative solution that could improve coastal resilience. Workshop participants included stakeholders from federal and state agencies, local governments, non-governmental technical organizations, and academia. During summer and fall 2020, a second series of workshops was held specific to a set of 21 high-risk focus areas selected throughout the SACS study area to develop actionable strategies to manage coastal storm risk in each local area. Because of the COVID-19 pandemic, these workshops were held virtually as a series of three webinars for each focus area. During the webinars, stakeholders reviewed the identified barriers and policy recommendations from the field workshops and provided additional input specific to each focus area. Additional follow-up correspondence with agency stakeholders in preparations of other SACS products that pertain to institutional and other barriers was also considered in development of this report.

Figure 2.1 Field Workshop Locations and Dates

A total of 307 stakeholders attended the field workshops, with 240 in person and an additional 67 participating via virtual platform. Attendance at each workshop ranged from 7 to 38 participants, with Southeast Florida and Puerto Rico reporting the two largest in-person stakeholder attendance totals. The majority of field workshop stakeholders were from local government agencies (30-percent), followed by state agencies, federal agencies, academia, NGOs, private companies, and tribal communities (**Figure 2.2**). For the focus area workshops, 624 unique stakeholders participated. Attendance at individual workshops ranged from 5 to 67 participants, with the Southeast Florida Focus Area Kickoff workshop reporting the largest stakeholder attendance total. Florida

reported the highest total stakeholder attendance for both the field and focus area workshops. Stakeholder participation is summarized in **Figure 2.3**, with the focus area workshop participation represented as the average number of stakeholders from the series of three virtual workshops within each state or territory.

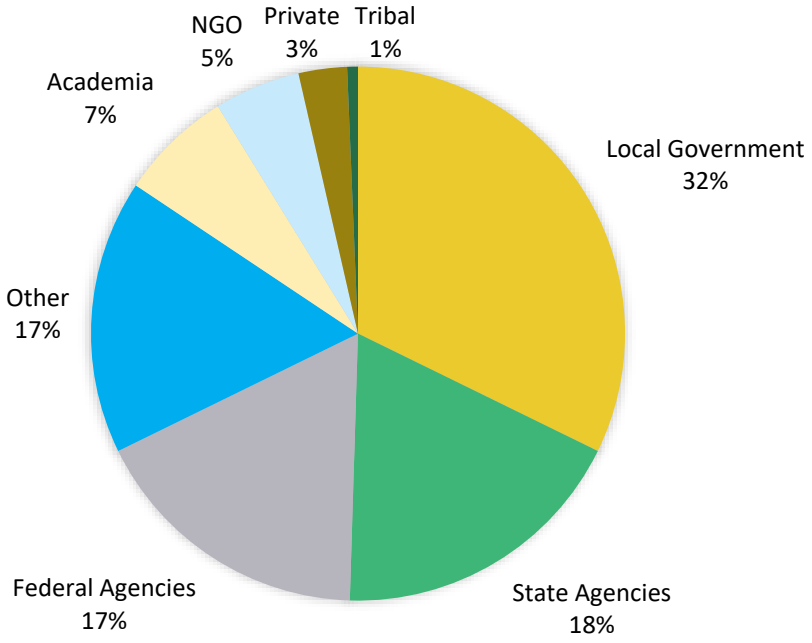


Figure 2.2 Field Workshop Stakeholder Affiliations

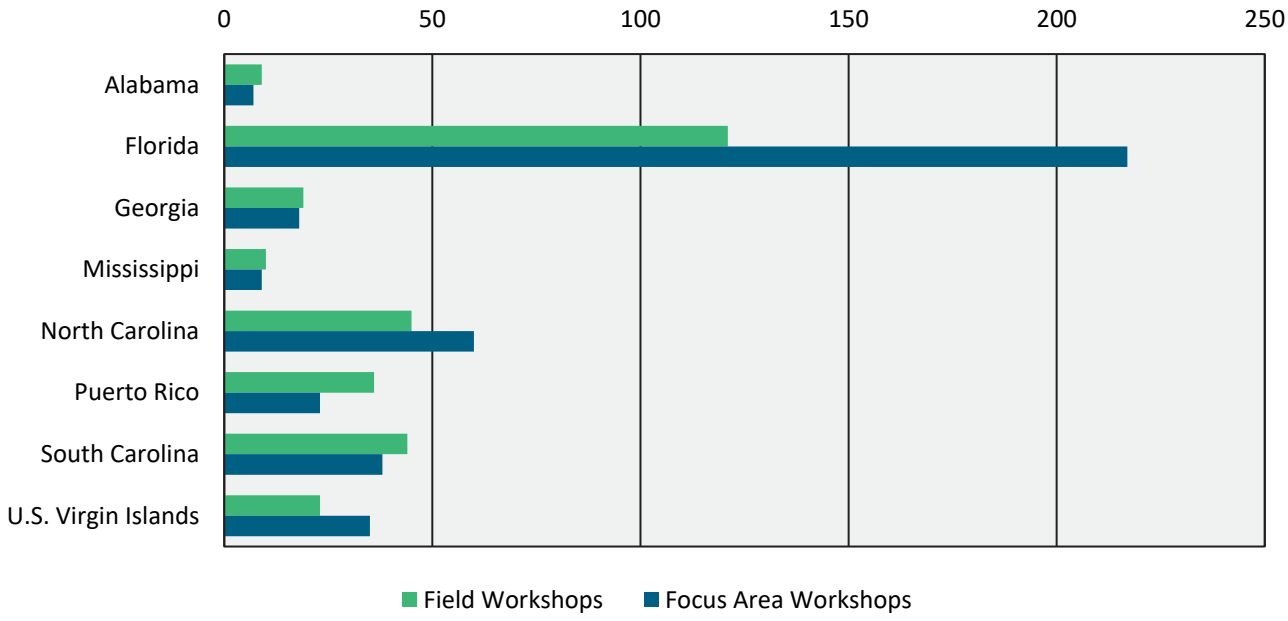


Figure 2.3 Workshop Stakeholder Attendee Counts

While this report builds off the NACCS Institutional and Other Barriers (IOB) Report, there are disparities in the data collection approaches used to inform each respective report. The NACCS IOB Report employed literature reviews, expert interviews with selected stakeholders knowledgeable about coastal policies, and interagency validation through webinars and meetings. Within this report, data about institutional and other barriers as well as opportunities for improvement was received directly from stakeholders during various workshops and conversations. While direct feedback from a broad range of stakeholders was collected as part of the NACCS, it was not the primary source of information in developing the NACCS IOB Report. Perspectives are likely to differ between the policy experts interviewed to inform the NACCS IOB Report and the stakeholder feedback elicited from all levels of government that informed this report. The differences in the source data for the NACCS and SACS IOB reports may influence the conclusions and findings between the respective studies.

Over 1,000 pieces of input were received from the stakeholders during the regional workshops, including over 700 recommended potential policy ideas. SACS stakeholder feedback was grouped into the six themes identified within NACCS. **Figure 2.4** shows the percentage breakdown for each theme. A key purpose of collecting stakeholder input was to investigate if/how the themes and barriers identified in the NACCS IOB Report are pertinent in the SACS area and identify any other important factors impacting the southeast coastal region. While barrier themes were consistent across the NACCS and SACS, specific barrier subthemes emerged.

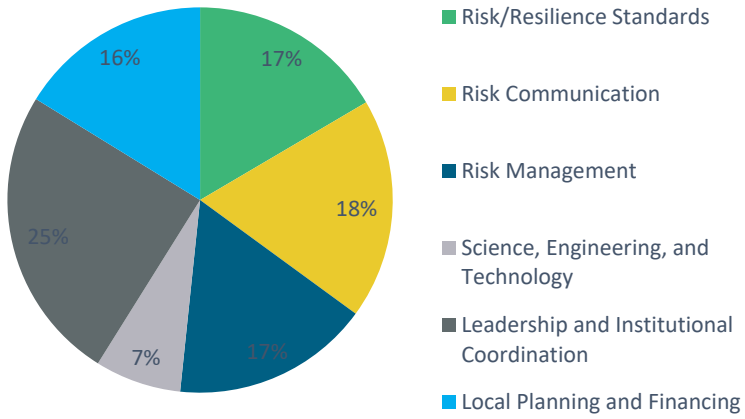


Figure 2.4 Percentage Breakdown of Results by Barrier Theme

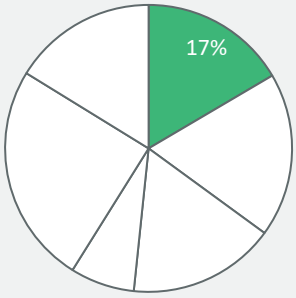
Subthemes unique to the SACS were created to identify trends in the feedback and capture differences between the two studies that may arise from the different study areas, time elapsed, or differing methodologies. Discussion of the subthemes, organized by major theme, is provided in the following sections. Stakeholder feedback regarding opportunities for action is also categorized and discussed under each theme.

2.2 Risk/Resilience Standards

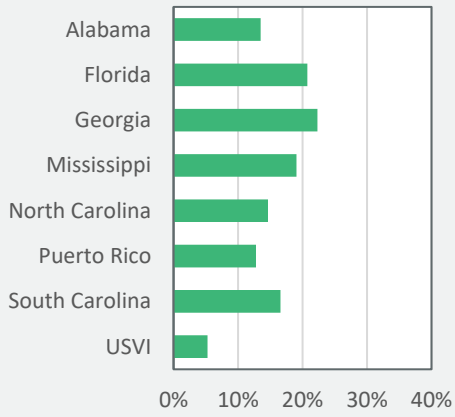
2.2.1 Risk/Resilience Standards – Institutional and Other Barriers

Risk/resilience standards provide a unified language and standardized framework that can be used across jurisdictions and across agencies. Standards ensure that different groups are working towards the same goal and with the same set of tools. However, federal, state, and local risk/resilience standards for coastal hazards are often outdated or nonexistent, thus contributing to current and future risk. Barriers related to risk/resilience standards comprised 17 percent of all barriers identified by SACS stakeholders and were relevant to stakeholders across the region, with particularly high percentages in Georgia, Mississippi, and Florida.

Risk/Resilience Standards – Percentage of Total Responses



Risk/Resilience Standards – Responses by State/Territory



Within this theme, inflexible agency rules and ineffective standards comprised over 50 percent of SACS stakeholder feedback. **Table 2.1** depicts the breakdown of these subthemes and specific stakeholder feedback associated with each one.

Agency stakeholders in Puerto Rico cited the need for better standards for coastal construction. Within the Cabo Rojo Focus Area, critical infrastructure is located within the Category 5 Hurricane maximum of maximum inundation extent and/or the 1-percent annual exceedance probability flood zone. While building codes in regulatory flood areas incorporate storm surge, Puerto Rico stakeholders noted that the modeling methods used to create these zones did not capture the full risk, including sea level rise, erosion, and wave attack. Stakeholders also mentioned the lack of implementation and enforcement of a standard coastal construction setback line. The Cabo Rojo Focus Area Action Strategy (FAAS) within the SACS Puerto Rico Appendix proposes several measures to consider when addressing these needs and barriers.

Stakeholders in Georgia and Florida were particularly concerned with barriers regarding the USACE dredged material policy “least-cost” requirement. Many locations and projects need sand sources and the requirement to choose the cheapest option often means moving sand to offshore disposal sites, which results in missed opportunities for beneficial use. Stakeholders recommended reassessing this policy to better capture the financial benefits of beneficial use projects and updating the benefit-cost ratios. Chatham County Georgia’s FAAS outlines several opportunities for Regional Sediment Management projects, including the use of beach quality material on back-bay beaches and using non-beach quality material from Savannah Harbor for marsh restoration.

Table 2.1 Risk/Resilience Standards Barriers by Subtheme

Subtheme (% Response)	Example Feedback
Lack of flexibility in agency rules **30%**	• Funding requirements to rebuild damaged infrastructure to its original state rather than to a higher standard • Lack of flexibility to experiment with new policies, procedures, and management strategies • Difficulty in modifying maintenance agreements or past authorities (e.g., incorporation of dunes not allowed) • Historic preservation rules and regulations restrict certain risk management measures • Some state regulations prevent the construction of living shorelines • Federal restrictions on the use of federal grant program funds
Ineffective standards **25%**	• Stormwater management requirements implemented on a parcel-by-parcel basis instead of watershed scale • Gaps in regulations regarding protection of wetlands and other environmental habitats • Lack of requirements to consider future impacts of climate change and sea level rise • Insufficient setbacks from coastal zone and critical habitat areas • Hesitation to change zoning/land use policies
Complicated and/or expensive permitting process **15%**	• Difficulty permitting natural and nature-based features • Complexity of multiagency permitting processes • Lengthy permitting process
Limitations of regulatory flood risk maps and associated programs **10%**	• Current maps are not representative of compound flood risk • Maps are only reflective of the current sea level • Reliance on outdated modeling in some areas • Limited state-level input on mapping • Current program incentivizes rebuilding in flood-prone areas • Current premiums do not reflect true risk
Lack of national/regional policy or strategy for risk management **10%**	• Need for holistic, long-term plan • Lack of standardization in federal programs • Need for more comprehensive vulnerability assessments
Other **<10%**	• Lack of standards to define acceptable levels of risk • Authorities that justify projects are too focused on economic justification, thus limiting their ability to consider wider benefits • USACE dredged material disposal 'least-cost' requirement can create missed opportunities for beach nourishment.

Florida stakeholders mentioned other standards that often prevent the implementation of regional sediment management strategies. Sediment quality requirements for beach placement limit the utilization of fine sediment materials, which prevents many beneficial use opportunities. Florida turbidity requirements also limit the use of fine sediment materials in ecosystem restoration projects because of possible impacts to the health of marshes and seagrass beds. Environmental testing requirements aimed at preventing contamination can also act as a barrier to using material stored at Dredged Material Management Areas (DMMAs). While these standards are important for protecting both environmental health and existing habitats, they present challenges to implementing effective regional sediment management strategies.

Additionally, stakeholders in Florida mentioned the need for a standardized approach to determining coastal storm risk and incorporating it into possible solutions. Specifically, stakeholders mentioned the lack of a standard method of incorporating sea level rise into construction standards and building codes across all jurisdictions.

Limitations of regulatory flood maps and associated programs accounted for 10 percent of the barriers identified by SACS stakeholders. The NACCS IOB Report noted that the 1-percent annual exceedence probability flood insurance maps may not consider the full potential consequences of a natural disaster. As discussed in **Section 1.4**, FEMA made several changes to the National Flood Insurance Program through Risk Rating 2.0that shifted away from the current binary flood risk of being either in or out of the floodplain to a graduated probabilistic flood risk. This shift in the National Flood Insurance Program may help address barriers to CSRM related to regulatory flood mapping. While updated maps will not include climate change and future potentail risk, they may provide a more accurate representation of current risks.

Similarly, as mentioned in **Section 1.4**, a memorandum dated April 3, 2020, issued by the Department of the Army's Office of the Assistant Secretary of Civil Works, discussed the need for an assessment of regional economic development and other social effects in justifying projects. This shift in project justification may reduce or eliminate some of the barriers identified by stakeholders (classified as 'Other' in **Table 2.1**) related to project justification metrics. As the institutional landscape is continually evolving, changes to policies and programs may eliminate these institutional barriers identified by stakeholders.

The NACCS IOB Report identified the lack of risk/resilience standards as a recurring theme, with emphasis on specific barriers or subthemes, such as the lack of flexibility in agency rules to rebuild to higher standards, the lack of standards to define acceptable levels of risk, ineffective standards, limitations with project design standards and flood insurance rate maps, and the lack of a national or regional strategy for risk management. SACS stakeholders mentioned all NACCS subthemes, while also emphasizing complicated and/or expensive permitting processes. **Figure 2.5** compares all subthemes within the risk/resilience theme that emerged in both the NACCS and the SACS.

Figure 2.5 Risk/Resilience Standards Subthemes Identified by Stakeholders in the NACCS and the SACS

2.2.2 Risk/Resilience Standards – Opportunities for Action

Stakeholders identified several opportunities to update existing or develop new standards, policies, and regulations related to coastal storm risk. At a national level, many stakeholders suggested that having a more cohesive and stronger strategy for coastal storm risk management would provide communities and regional governments with a clearer path forward. **Figure 2.6** provides examples of specific opportunities identified by stakeholders, building off opportunities highlighted in the NACCS IOB Report.

Risk/Resilience Standards – Opportunities for Action

- Plan regional coastal storm risk management projects and include a broader consideration of benefits beyond the typical benefit-cost ratios.
- Develop a national strategy for flood risk management, a national coastal policy, and/or a national vulnerability study.
- Develop standards for “tolerable” risk, risk management, performance metrics, vulnerability, resilience, etc.
- Assemble a team of federal leaders, governors, and regional/local champions for resilience to develop the national strategy for coastal storm risk management and resilience.
- Add criteria in federal agency grant programs to provide funding for improvements to community infrastructure damaged by disasters to increase long-term resilience.
- Update codes and standards to account for climate change effects.
- Simplify and streamline the permitting process, particularly for projects that utilize NNBF.
- Revise regulations to encourage green infrastructure, living shorelines, and pilot programs to test new solutions.
- Require sea level rise adaptation in planning and capital improvement projects.
- Adjust FEMA funding regulations to incentivize rebuilding stronger rather than in-kind replacement.
- Hold developers accountable for identifying, acknowledging, and providing documentation of potential risks and how they have been mitigated.
- Encourage the beneficial use of dredged material instead of least-cost disposal requirements.

Figure 2.6 Risk/Resilience Standards Opportunities for Action Identified by SACS Stakeholders, Building off the NACCS IOB Report

2.3 Risk Communication

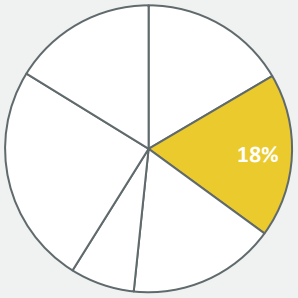
2.3.1 Risk Communication – Institutional and Other Barriers

Clear risk communication helps decision-makers, community leaders, and individuals understand their risk and builds engagement and support for risk management efforts. Barriers related to risk communication comprised 18 percent of all barriers identified by stakeholders and were relevant to stakeholders across the region, with particularly high percentages in Alabama and South Carolina.

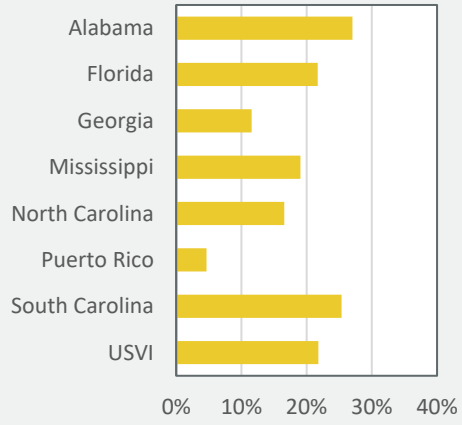
Within this theme, public acceptability of risk management measures comprised nearly a quarter of SACS stakeholder feedback. **Table 2.2** depicts the breakdown of these subthemes and specific stakeholder feedback associated with each one.

Without clear communication and understanding of the long-term risks, South Carolina stakeholders noted that decision-makers often focus more on short-term economic gain rather than long-term risk management planning. The real estate industry exacerbates these issues by continuing to focus development in hazard-prone waterfront areas, neglecting or lacking full understanding of the future costs of this development. Stakeholders noted that throughout the region there is a general unwillingness to pay for solutions now that could reduce costs in the future.

Risk Communication – Percentage of Total Responses



Risk Communication – Responses by State/Territory



Stakeholders in the Grand Strand FAAS workshop highlighted the need for better risk communication and education across the community. In an effort to improve risk communication of immediate risks, the Grand Strand strategy proposed better flood warning systems, especially for the Intracoastal Waterway. Stakeholders also proposed increasing roadside warning signs to display shallow coastal flooding dates.

Denial of sea level rise is a risk communication challenge that emerged among SACS stakeholders. This barrier was not as prominent in the NACCS IOB Report. The prevalence of misinformation and distrust in science may have worsened nationally since the publication of the NACCS IOB Report or the SACS may have gathered input from stakeholders more likely to encounter this communication challenge. Stakeholders in South Carolina, Florida, and Alabama noted that trust in federal agencies, data, and policies had diminished. Denial of climate change and sea level rise presents a major barrier to gaining public support for risk management efforts.

Table 2.2 Risk Communication Barriers by Subtheme

Subtheme (% Response)	Example Feedback
Difficulties of individuals and communities in understanding their risk **30%**	• Lack of understanding or belief in sea level rise and distrust of scientific institutions • Inaccurate perception of risk • Ignoring government guidance, such as evacuation orders • False sense of security in communities not recently impacted by storm events • Lack of understanding risk amongst transient populations and new residents • Limited disclosure of risk during real estate and rental transactions
Public acceptability of risk management measures **25%**	• Public perception of risk management measures is often negative • Risk management measures may conflict with coastal culture • Fear of being on the cutting edge, resistance to change, and desire to maintain the status quo • Desire for beachfront property • Competing interests between sustainable development and tourism • Perception that hard structures provide more protection that natural and nature-based solutions
Limited education in environmental science, ecology, climate change, and the cost of inaction **20%**	• Lack of clear, digestible public outreach • Prevalence of misinformation • Need for education of younger generation • Lack of understanding that risk management solutions will lower future costs • Need for specialized education programs for builders and developers
Lack of community engagement about risk management options **15%**	• Limited public engagement in permitting process • Lack of risk communication to vulnerable communities • Lack of public information campaigns to increase awareness • Lack of communication and engagement regarding mitigation options and planned projects leads to indifference • Absentee owners not engaged in local community
Short-term mindset **10%**	• Political emphasis on short-term agendas rather than long-term goals • Vulnerable populations are focused on meeting immediate needs, such as housing and food, reducing the ability to consider long-term risks from climate change and sea level rise • Lack of consideration or understanding of the long-term costs of floodplain development • Difficulty in planning for risks that may occur decades in the future
Other **<5%**	• Lack of understanding or miscommunication of current risk standards • Lack of public understanding of agency and/or governmental responsibility in risk management process

The NACCS IOB Report identified the lack of risk communication as a recurring theme, with emphasis on specific barriers or subthemes, such as public acceptability of risk management measures, difficulties of individuals and communities in understanding their risk, and the lack of community engagement about risk management options. SACS stakeholders mentioned all NACCS subthemes, while also emphasizing additional subthemes, such as limited education in topics related to risk and risk management and short-term mindsets. **Figure 2.7** compares all subthemes within the risk communication theme that emerged in both the NACCS and the SACS.

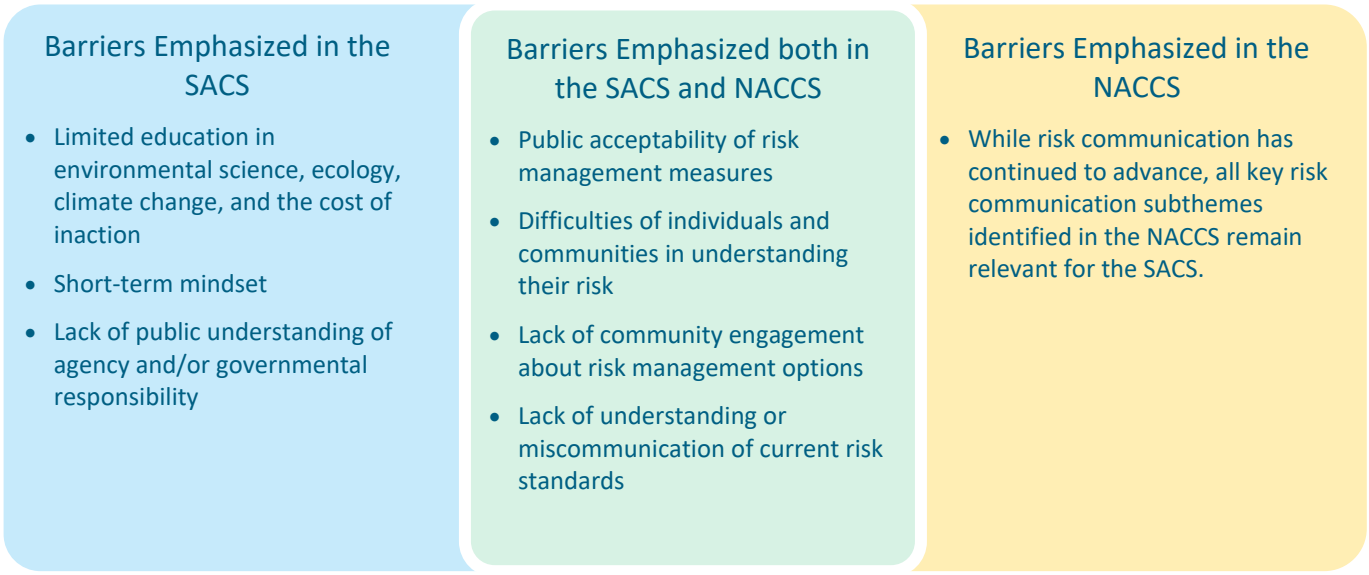


Figure 2.7 Risk Communication Subthemes Identified by Stakeholders in the NACCS and the SACS

2.3.2 Risk Communication – Opportunities for Action

Stakeholders identified opportunities to better communicate risk by improving the general public's education and knowledge of coastal storm risk, sea level rise, and risk management solutions. Stakeholders suggested not only teaching younger generations more about sustainability and the environment as it relates to living on the coast, but also improving outreach to local residents, contractors, developers, and—in particular—local leaders and decision makers. Without comprehensive understanding of future impacts, efforts to address coastal storm risk will become outdated and inadequate.

Creating meaningful community involvement is necessary for ensuring lasting support for risk management efforts. Improved education and increased public engagement can foster communities with a better understanding of their risks and an increased public and political commitment to fund projects that help manage those risks. **Figure 2.8** provides examples of specific opportunities identified by stakeholders, building off the NACCS IOB Report.

Risk Communication – Opportunities for Action

- More community involvement, engagement, and transparency to better communicate risks to stakeholders and convey how best to manage their risks.
- Improvements to risk communication resources (e.g., public participation sessions to identify the needs of the community and vulnerable populations, develop programs to educate the public about the hazards, use FEMA flood risk maps to better communicate risk, and deploy knowledgeable staff to help communities better understand applicable recovery programs).
- Improve public education on coastal storm risk, sea level rise, climate change, and risk management solutions.
- Identify new and better ways to communicate risk.

Figure 2.8 Risk Communication Opportunities for Action Identified by SACS Stakeholders, Building off the NACCS IOB Report

2.4 Risk Management

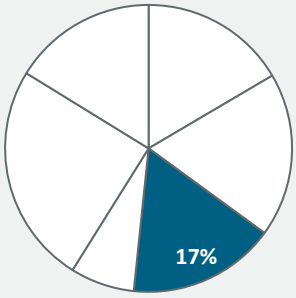
2.4.1 Risk Management – Institutional and Other Barriers

Effective risk management requires clear, comprehensive plans and policies that can be easily and continuously enforced by available local staff. Barriers related to risk management comprised 17 percent of all barriers identified by stakeholders and were relevant to stakeholders across the region, with particularly high percentages in Puerto Rico and the U.S. Virgin Islands.

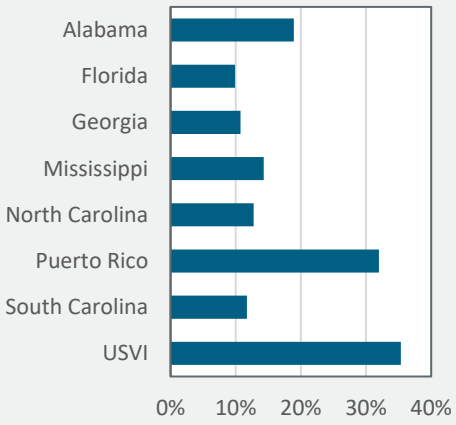
Within this theme, the lack of staff capacity and expertise comprised 35 percent of SACS stakeholder feedback. **Table 2.3** depicts the breakdown of these subthemes and specific stakeholder feedback associated with each one.

The NACCS IOB Report specifically discussed "the lack of capacity and capability at the local level to develop and integrate resilience plans with other regional and local development plans." SACS stakeholders expanded this barrier to include other capacity and capability issues. Staff shortages at the local level led to overburdened staff and a tendency to focus on immediate needs, rather than long-term risk management and resilience plans. Smaller communities with fewer resources also find it challenging to access staff with the right technical skillset to meet specific needs, such as grant writing, climate science, or resilient building expertise. Communities often need to hire an outside consultant who may not have an adequate understanding of the local needs.

Risk Management – Percentage of Total Responses



Risk Management Responses by State/Territory



Relaxed or limited enforcement of existing regulations, such as building and zoning codes, emerged as a major barrier among SACS stakeholders but was not discussed within the NACCS IOB Report. While enforcement is an issue throughout the southeast United States, this is a particular challenge for the U.S. Virgin Islands and Puerto Rico. Significant unpermitted development along the coastline and many exceptions within the permitting process result in ecosystem degradation and construction in high-risk areas.

Table 2.3 Risk Management Barriers by Subtheme

Subtheme (% Response)	Example Feedback
Lack of staff capacity and expertise, particularly at the local level **40%**	• Shortages of qualified staff • Limited time and resources to focus on resilience planning; focus is often on immediate perceived needs • Difficulty finding the right technical expertise • Staffing shortages in general • Lack of training opportunities
Relaxed or limited enforcement of existing regulations at the local level **25%**	• Lack of implementation and relaxed enforcement of coastal construction regulations, setbacks, and building codes • Existence of permit loopholes and overreliance on variances and exceptions
Limited comprehensive land use planning at local and state levels **10%**	• Limited planning for climate adaptation, land use, and capital improvements • Lack of watershed-level planning
Compassion-driven approaches to disaster recovery avoid tough issues of risk management and building resilience **5%**	• Attention focused on reacting to disasters, rather than proactive planning • Emphasis on speed of recovery rather than building resiliency
Other **20%**	• Special interest groups have undue influence on government agencies • Private property rights prevent cohesive implementation of flood risk measures • Lack of operation and maintenance for existing infrastructure • Complexity of programs and policies at all levels of government • Inconsistent or conflicting execution of programs at local level • Dealing with rising insurance rates and new flood risk maps

The NACCS IOB Report identified risk management challenges as a recurring theme, with emphasis on specific barriers or subthemes, such as the lack of capacity and capability at the local and state level, the complexity of programs and policies at all levels of government, and inconsistent or conflicting execution of programs at local levels. SACS stakeholders mentioned many of the NACCS subthemes, while also emphasizing additional subthemes, such as challenges with the enforcement of existing regulations, and a need for more comprehensive land use planning at local and state levels. Challenges related to balancing old and newly emerging floodplain management ordinances surfaced as a subtheme in the NACCS IOB Report but was not a focus of the SACS feedback. **Figure 2.9** compares all subthemes within the risk management theme that emerged in both the NACCS and the SACS.

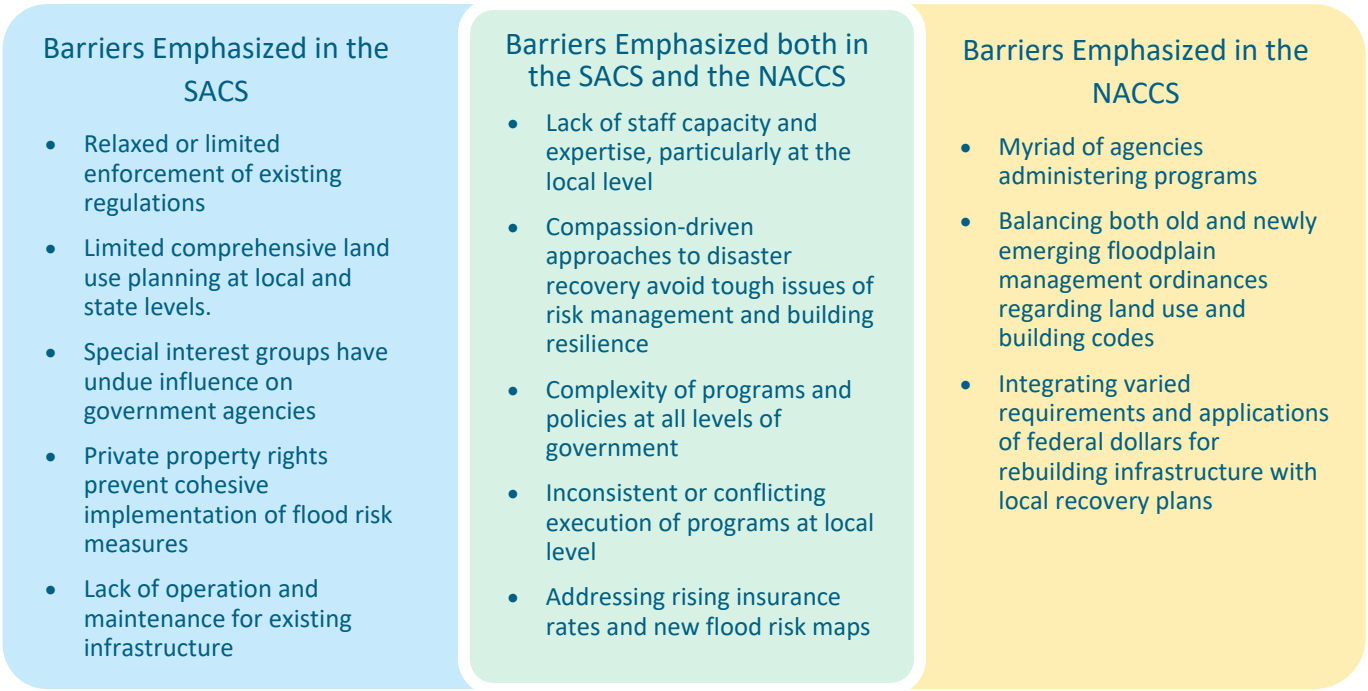


Figure 2.9 Risk Management Subthemes Identified by Stakeholders in the NACCS and the SACS

2.4.2 Risk Management – Opportunities for Action

Several opportunities for action to address risk management barriers and improve coastal resilience were identified. Better enforcement of existing regulations was a principal opportunity, including a reduction in waivers, variances, and exemptions. Imposing stricter building and development requirements was also highly suggested—particularly greater setbacks, higher base floor elevations, and more prohibitive zoning in flood zones. **Figure 2.10** provides examples of specific opportunities identified by stakeholders, building off opportunities identified in the NACCS IOB Report.

Risk Management – Opportunities for Action

- Floodplain management policies should be strengthened, made more adaptable, and mandated to include current and future risk.
- Future risk should be incorporated or accounted for in flood mapping and insurance programs.
- Federal and state programs should provide strategic post-disaster recovery and mitigation planning and regional and community development planning.
- Streamline and simplify complicated programs to help communities develop proactive strategic plans (while considering future risk) to rebuild smarter and stronger.
- Impose stricter building and zoning codes.
- Enforce existing regulations, especially at the local level.
- Establish or improve state and local buyout programs for properties in flood-prone areas.
- Include coastal resilience and climate change impacts in local land use plans.
- Toughen overall climate change mitigation initiatives.
- Update and improve maritime regulations.
- Continue to further strengthen the Community Rating System of the NFIP.
- Update Coastal Barrier Resources Act to allow for more dredging options.
- Encourage adaptive strategies in the planning process.

Figure 2.10 Risk Management Opportunities for Action Identified by SACS Stakeholders, Building off the NACCS IOB Report

2.5 Science, Engineering, and Technology

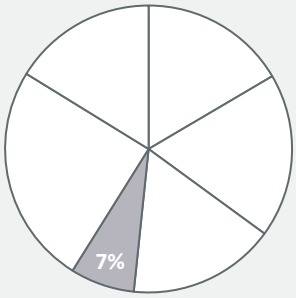
2.5.1 Science, Engineering, and Technology – Institutional and Other Barriers

The use of current, credible, and accurate science, engineering, and technology is critical to developing appropriate risk management plans, strategies, and solutions. Barriers related to science, engineering, and technology comprised 7 percent of all barriers identified by SACS stakeholders and were relevant to stakeholders across the region, with particularly high percentages in Mississippi and Georgia.

Within this theme, data gaps comprised nearly a quarter of SACS stakeholder feedback. **Table 2.4** depicts the breakdown of these subthemes and specific stakeholder feedback associated with each one.

Benefit-cost analysis for project approval has, historically, been focused most heavily on economic considerations. As USACE and other agencies move to a more comprehensive analysis, tools and methodology require additional development. The need to consider regional economic development, environmental quality, and other social effects was especially highlighted within the Puerto Rico focus areas. Within the focus areas, it was noted that expansion of the USACE Regional Economic System model for application in Puerto Rico and USVI would help support the computation of regional economic development benefits for potential projects. The lack of social vulnerability data in USVI also inhibits use of the Social Vulnerability Index-Explorer tool to understand other social effects from potential USACE projects.

Science, Engineering, and Technology – Percentage of Total Responses



Science, Engineering, and Technology – Responses by State/Territory

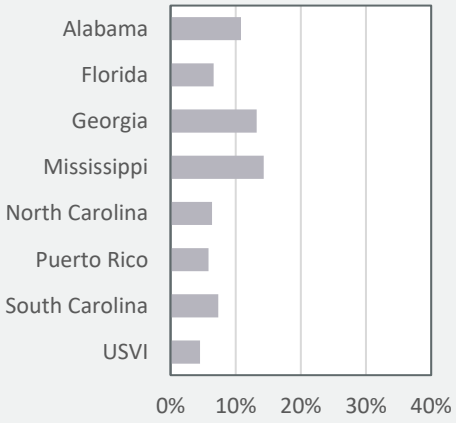


Table 2.4 Science, Engineering, and Technology Barriers by Subtheme

Subthemes (% Response)	Example Feedback
Data gaps in climate change, social science, environmental benefits, wave, wind, and elevation data. **20%**	• Lack of quality shoreline erosion data (specifically in Puerto Rico) • Limited localized data • Coarse spatial resolution of national scale tools
Benefit-cost analyses not capturing full suite of benefits **15%**	• Difficulty incorporating ecosystem services, wildlife, and natural resources into project planning and implementation • Benefit-cost analyses do not usually support natural and nature-based solutions • Difficulty in quantifying social vulnerability and other social impacts into a benefit-cost analysis
Lack of environmental monitoring, performance metrics, and best practices **15%**	• Lack of measured water levels in bays and estuaries to assist in storm surge modeling • Limited pilot projects available for reference • Limited environmental monitoring before, during, and after construction of infrastructure projects and natural disaster events
Data collection, management resources, and other standards are not coordinated across agencies **10%**	• Inconsistent data interpretation • Lack of uniform data • Lack of coordinated research across state boundaries • Inconsistent study and planning timeframes
General uncertainty and unknowns regarding climate change, risk, and alternative risk management measures **10%**	• Inconsistent or uncertain science • Lack of understanding of economic value of ecosystem services
Other **30%**	• Limited tools designed for the local scale, lack of decision support tools, and confusion regarding the applicability of existing tools • Difficulty obtaining sand resources and lack of data regarding sand sources • Limited and outdated design criteria and guidelines for mitigation projects • Limited data to support the consideration of impacts in back-bays, concurrent flooding, and interrelationship of certain coastal features • Lack of hurricane prediction tools and modeling capabilities that consider the impacts of climate change • Challenges for predicting maintenance requirements for dynamic or geomorphic features, which lead to a tendency towards building traditional structures

The NACCS IOB Report identified barriers related to science, engineering, and technology as a recurring theme, with emphasis on specific barriers or subthemes, such as data gaps in climate change, environmental benefits, wave, wind, and elevation data. The lack of data collection coordination across agencies also emerged as a subtheme in NACCS. SACS stakeholders mentioned all of the NACCS subthemes, while also emphasizing additional subthemes, such as the lack of environmental monitoring, performance metrics, and best practices. **Figure 2.11** compares all subthemes within the science, engineering, and technology theme that emerged in both the NACCS and the SACS.

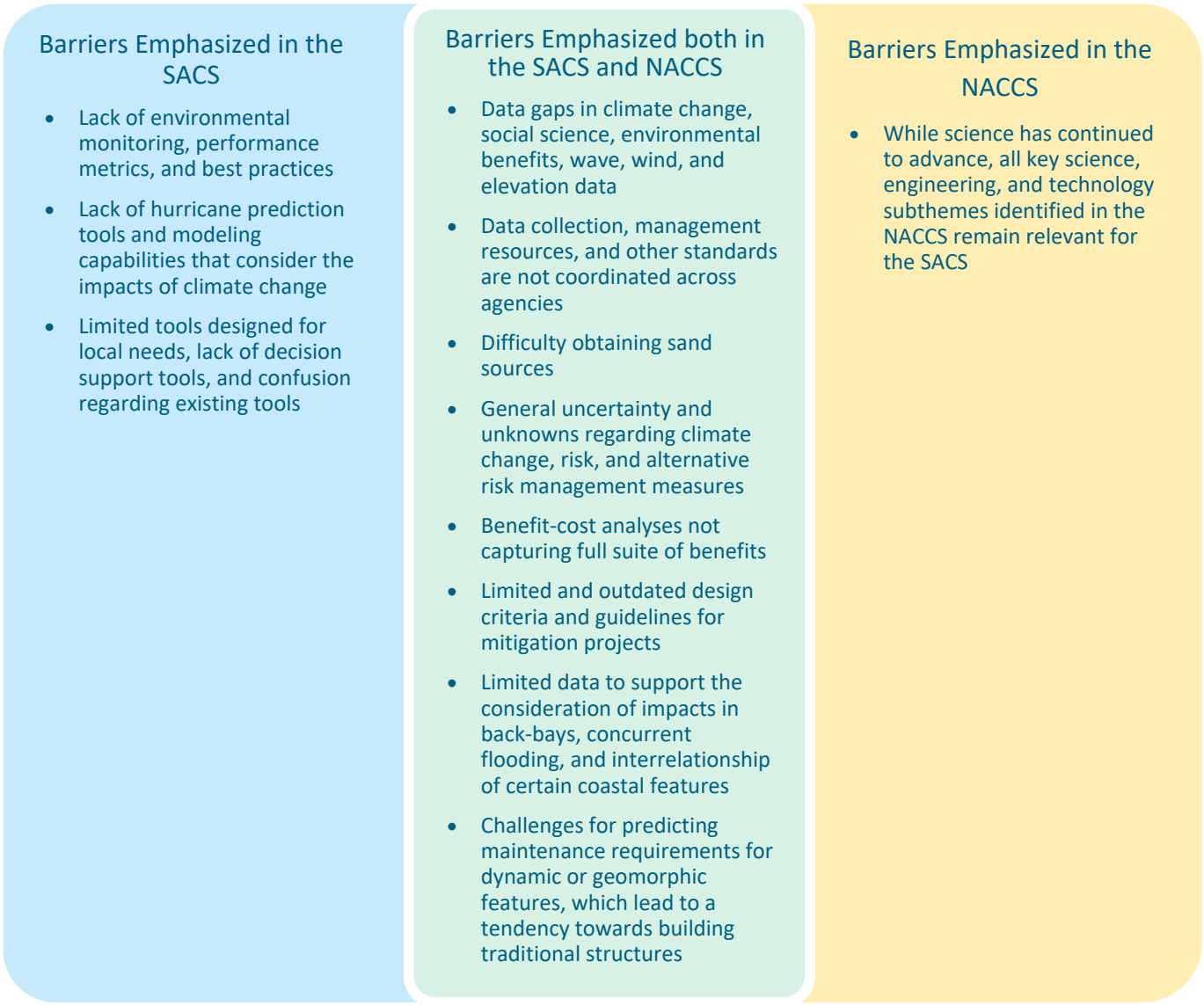


Figure 2.11 Science, Engineering, and Technology Subthemes Identified by Stakeholders in the NACCS and the SACS

2.5.2 Science, Engineering, and Technology – Opportunities for Action

Developing regionally consistent data and modeling, improving data collection processes, and enhancing monitoring practices were all cited as key opportunities for CSRM. Improving the basics of scientific understanding and the ability to wield more innovative solutions to CSRM could improve current and future costs, benefits, and overall outcomes.

Specific opportunities identified included developing guidance for the incorporation of green infrastructure into coastal projects, funding for regional studies and the development of regional projects, and updated data collection to provide a clearer understanding of the problems specific to an area.

South Carolina stakeholders specifically cited the need for new or previously found data from regional studies to be made available to local jurisdictions and archived for fast retrieval. Stakeholders in the USVI discussed improving the awareness of current planning tools for development and making those tools more accessible to the public and local communities. **Figure 2.12** provides examples of specific opportunities identified by SACS stakeholders, building off the NACCS IOB Report.

Science, Engineering, and Technology – Opportunities for Action

- Improve coordination of pre- and post-storm data collection and development of standards.
- Develop better design guidance for coastal storm risk management and natural and nature-based alternatives.
- Integrate approaches that combine risk management measures and address regional and watershed solutions.
- Create a centralized climate change resilience resource for improving the accuracy of modeling and mapping true exposure to hazards.
- Increase rigorous instrumentation and monitoring of existing projects to help address operation and maintenance and adaptive management requirements.
- Increase capacity in the areas of science and engineering at the local level and investment at the national level.
- Create and improve use of planning tools and make them more accessible to local communities.
- Use previous studies as models to create a structured decision-making process.

Figure 2.12 Science, Engineering, and Technology Opportunities for Action Identified by SACS Stakeholders, Building off the NACCS IOB Report

2.6 Leadership and Institutional Coordination

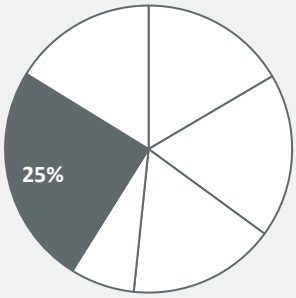
2.6.1 Leadership and Institutional Coordination – Institutional and Other Barriers

Strong leadership and coordination across different agencies and levels of government are fundamental to the success of risk management efforts. Clear and coordinated messages from the federal government reduce confusion for local leaders and individuals and provide clarity on how coastal storm risk could and should be addressed. Barriers related to leadership and institutional coordination comprised 25 percent of all barriers identified by stakeholders and were relevant to stakeholders across the region, with particularly high percentages in Mississippi and North Carolina.

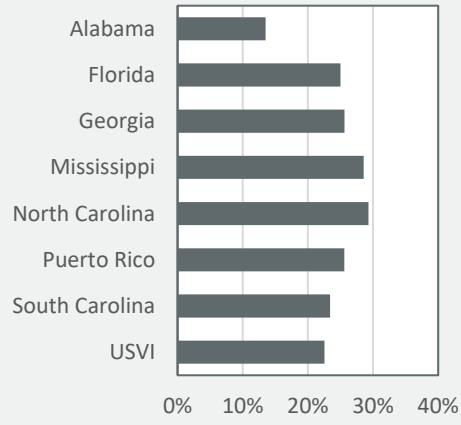
Within this theme, limited coordination and leadership comprised nearly 50 percent of SACS stakeholder feedback. **Table 2.5** depicts the breakdown of these subthemes and specific stakeholder feedback associated with each one.

Stakeholders across the SACS area of responsibility discussed challenges with coordination between agencies and across jurisdictions. Coastal hazards often present regional challenges which require regional solutions; however, stakeholders cited a lack of regional coordination and regional consistency in methods to address these challenges. Individual communities also have their own priorities and long-term goals, which may be inconsistent with neighboring areas. At the federal level, stakeholders noted agency plans and implementation strategies are not aligned, even when trying to address problems in the same areas.

Leadership and Institutional Coordination – Percentage of Total Responses



Leadership and Institutional Coordination – Responses by State/Territory



Stakeholders in Florida, Georgia, and South Carolina particularly noted a lack of political commitment to address long-term issues. Stakeholders perceive economic development goals often taking priority over coastal resiliency, leading to continued development of vulnerable areas. Many coastal communities rely on tourism and the tax base from beachfront properties and are therefore hesitant to limit development along the coast. Because of the term length of local politicians, stakeholders also felt that there is little incentive for political leaders to make potentially unpopular decisions to achieve long-term risk management goals.

Table 2.5 Leadership and Institutional Coordination Barriers by Subtheme

Subtheme (% Response)	Example Feedback
Limited coordination and leadership at all levels **50%**	• Limited regional communication and coordination • Lack of coordination between federal, state, and local governments • Competing goals between agencies or jurisdictions • Duplication of efforts • Agencies working in silos for state-owned/managed properties, such as historical, cultural, and recreational areas
Lack of political commitment to make hard decisions about long-term coastal storm risk management solutions **30%**	• Resistance to regulations, such as increased freeboard requirement and limiting development in vulnerable areas • Prioritizing economic development over resilience • Lack of political acceptance of the problem • Limited political support for disaster mitigation • Lack of urgency • Hazard mitigation actions, such as relocation and planned retreat, are perceived as threats because of near-term economic consequences
Inconsistent implementation of planning laws, policies, procedures, and permitting requirements at all levels **10%**	• Lack of follow-through from plans • Local government turnover and general political uncertainty • Building codes, design storms, and base flood elevation requirements vary by county/city
Other **10%**	• Policy makers use outdated science surrounding coastal issues • Additional coordination challenges resulting from conflicting federal and local policies in Puerto Rico and the U.S. Virgin Islands • Increasing complexities of institutional governance

The NACCS IOB Report identified leadership and institutional coordination as a recurring theme, with emphasis on specific barriers or subthemes, such as limited coordination and leadership at all levels of government, and the lack of political commitment to make hard decisions about long-term CSRM solutions. SACS stakeholders mentioned all the NACCS subthemes, while also emphasizing additional subthemes, such as challenges with policy-makers who are not up-to-date with the current science regarding coastal issues. **Figure 2.13** compares all subthemes within the leadership and institutional coordination theme that emerged in both the NACCS and the SACS.

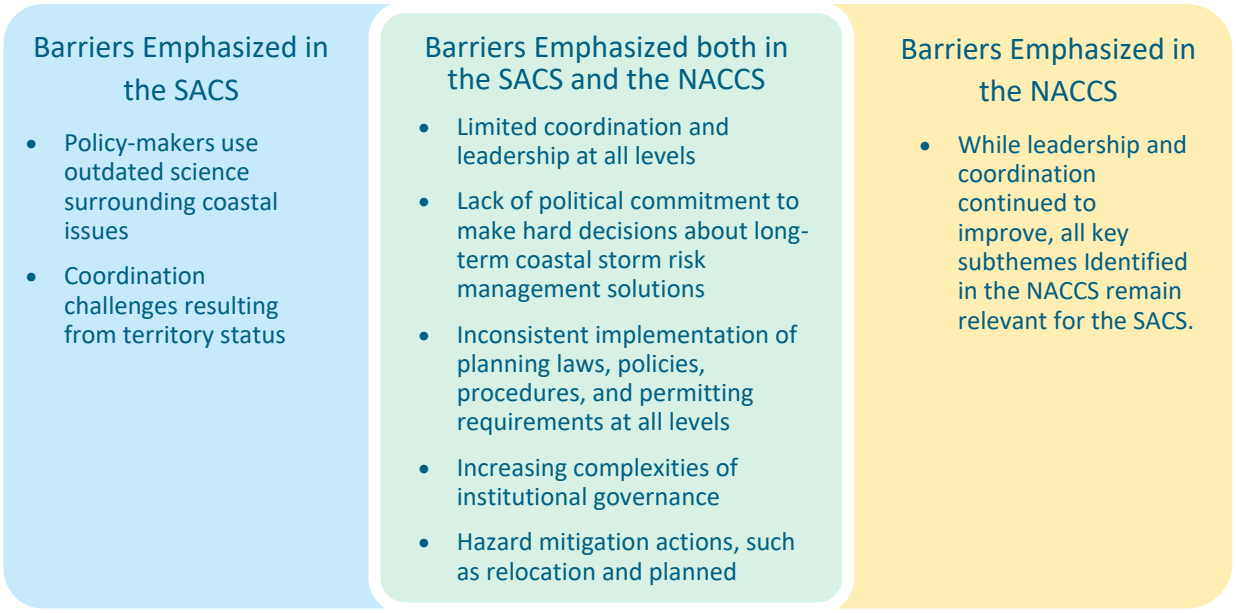


Figure 2.13 Leadership and Institutional Coordination Subthemes Identified by Stakeholders in the NACCS and the SACS

2.6.2 Leadership and Institutional Coordination – Opportunities for Action

Stakeholder recommendations for this theme included increasing communication between agencies and different levels of government, promoting pre-disaster planning, and increasing acknowledgement and guidance related to climate change hazards at the federal level. **Figure 2.14** provides examples of specific opportunities identified by SACS stakeholders, building off the NACCS IOB Report.

Leadership and Institutional Coordination – Opportunities for Action

- Enhance coordination within and across agencies and encourage regional collaboration between state and local governments.
- Promote pre-disaster planning and NNBF, blended and nonstructural solutions in support of community resilience, and coastal storm risk management.
- Empower government participants to help local authorities make decisions.
- Incorporate NNBF and hybrid solutions into existing decision support and communication resources.
- Leverage public-private partnerships and interagency funding.
- Seek process improvements for federal program rules to encourage greater efficiency and ease of use, such as simplifying the grant application process.
- Acceptance and acknowledgment of climate change among policy-makers and stakeholders.
- Provide technical resources, funding, and long-term support to local communities.

Figure 2.14 Leadership and Institutional Coordination Opportunities for Action Identified by SACS Stakeholders, Building off the NACCS IOB Report

2.7 Local Planning and Financing

2.7.1 Local Planning and Financing – Institutional and Other Barriers

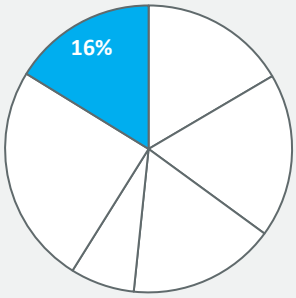
Easily accessible, flexible, and continuous funding sources are critical to the long-term success of risk management measures. Barriers related to local planning and financing comprised 16 percent of all barriers identified by stakeholders and were relevant to stakeholders across the region, with particularly high percentages in North Carolina and Puerto Rico.

Within this theme, lack of funding for buyouts, beach management, comprehensive studies, and other risk management measures comprised 73 percent of SACS stakeholder feedback. **Table 2.6** depicts the breakdown of these subthemes and specific stakeholder feedback associated with each one.

Stakeholders in Charleston, South Carolina expressed interest in buyouts and other incentives for helping residents move to less-hazardous locations. However, they noted insufficient funding for these adaptation strategies.

Florida stakeholders also mentioned the high cost of mobilization and demobilization as a major barrier for regional sediment management projects. Regional sediment management projects require significant planning and coordination, which can lead to high overall costs. One possible solution to this barrier is through the coordination of maintenance dredging projects with a placement strategy. This eliminates the need for offloading at a DMMA, which would reduce the overall project cost.

Local Planning and Financing – Percentage of Total Responses



Local Planning and Financing – Responses by State/Territory

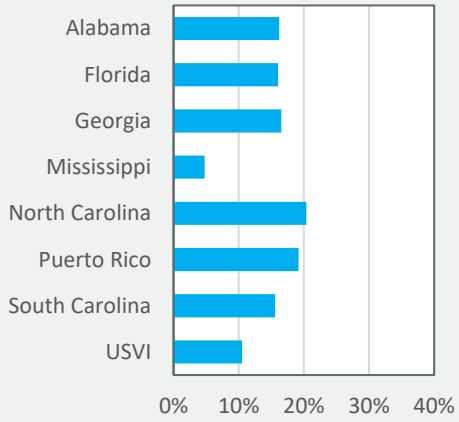


Table 2.6 Risk Communication Barriers by Subtheme

Subtheme (% Response)	Example Feedback
Lack of funding **65%**	• Insufficient funding for buyouts and related incentives for relocating communities • Limited statewide support and funding for a comprehensive study • Lack of recurrent state/federal funding for beach management • High cost of upgrading and improving existing infrastructure • Limited local funding for proactive risk management measures • Reimbursement projects financially straining to county governments • Lack of funding for monitoring studies • Lack of funding to cost-share on federal projects • Lack of budget for local staff and enforcement • Lack of ongoing funding sources; funding tends to be reactionary
Limits on funding **10%**	• Siloed funding • Statutory limitations on funding • Various diverse rules and policies regarding federal and nonfederal cost-sharing requirements that make innovation difficult
Lack of incentives for coastal storm risk management **5%**	• Lack of green infrastructure incentives • Lack of incentives for homeowners to improve resilience of private property • Lack of incentives to implement projects developed in plans
Complexity of applications for grants and other funding sources **5%**	• Complicated grant process • Length of time to receive reimbursement • Slow receipt of mitigation grants
Other **15%**	• Authorities that justify projects are too focused on least cost solutions, limiting ability to consider wider benefits • Tax base implications if tourism is not maintained as an area's primary focus; limited tax bases to fund coastal efforts • Federal project authorizations and appropriations are not conducive to more comprehensive, regional, or watershed solutions • Policies limit ability to pool resources • Funding has variable time-related spending requirements that complicate recovery process • Policies make it challenging to execute programs during certain time frames or at certain scales

The NACCS IOB Report identified barriers related to local planning and financing as a recurring theme, with emphasis on specific barriers or subthemes, such as policies that disincentivize CSRM and cost-share requirements that make innovation more challenging. SACS stakeholders mentioned all NACCS subthemes, while also emphasizing additional subthemes, such as limits on funding and the complexity of funding applications. **Figure 2.15** compares all subthemes within the Local Planning and Financing Theme that emerged in both the NACCS and the SACS.

Figure 2.15 Local Planning and Financing Subthemes Identified by Stakeholders in the NACCS and the SACS

2.7.2 Local Planning and Financing - Opportunities for Action

The most common stakeholder suggestion for addressing funding concerns was to provide a dedicated and continuous funding source for pre-disaster mitigation projects. This included the suggestion to create a new FEMA grant fund for pre-disaster mitigation efforts, as some FEMA grants can only be used to rebuild.

Overall, increasing a local government's ability to borrow or be granted money was deemed a priority for improving CSRM efforts. Money is necessary to conduct research, provide data, gather technical staff and expertise, and build projects. **Figure 2.16** provides examples of specific opportunities identified by SACS stakeholders, building off the NACCS IOB Report.

Local Planning and Financing – Opportunities for Action

- Create new tax and market-based incentive programs that encourage resilient behavior and reduce vulnerabilities.
- Align funding and spending timetables to better meet requirements for the recovery process (i.e., annual appropriations result in the need to spend recovery funds quickly).
- Encourage agencies to share resources and equipment.
- Explore means to ensure projects are funded to sustain long-term operation, maintenance, monitoring, and adaptive management, including use of public-private partnerships. For NNBF, strive to restore natural processes where feasible, which will reduce long-term maintenance needs.
- Provide resources that help quantify benefits and defray any increase in costs of comprehensive coastal projects.
- Provide dedicated and continuous proactive funding for pre-disaster mitigation projects, such as infrastructure upgrades, beach nourishment, buyout programs, and natural area restoration.
- Expand funding mechanisms and opportunities for local government revenue and borrowing.
- Increase flexibility for state and local use of federal funds.
- Expand funding for Beneficial Use of Dredged Material Program.
- Add flexibility to federal cost-share programs.
- Increase funding for agency staffing, data collection, and monitoring studies.
- Create stricter rules for repetitive loss structures/properties to encourage homeowners to purchase private insurance or relocate to an area of lower risk.

Figure 2.16 Local Planning and Financing Opportunities for Action Identified by SACS Stakeholders, Building off the NACCS IOB Report

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3. Performance Evaluation Results

3.1 Basis

As required under Public Law 113-2 of the Disaster Relief Appropriations Act of 2013, USACE was authorized to conduct an evaluation of the effects of Hurricane Sandy on USACE projects. The Act states, ". . . the secretary shall conduct an evaluation of the performance of existing projects constructed by the Corps and impacted by Hurricane Sandy for the purposes of determining their effectiveness and making recommendations for improvements thereto[.]"

As a result, the USACE Hurricane Sandy Coastal Projects Performance Evaluation Study (USACE 2013) primarily evaluated projects throughout the USACE North Atlantic Division (NAD) area of responsibility, but also included nine projects in the USACE South Atlantic Division (SAD) area. Ten barriers to comprehensive protection were identified related to the effectiveness of federal (USACE) CSRM projects in protecting against coastal storm damages. The identified barriers to comprehensive protection included an evaluation of both institutional and other barriers with the potential to impede USACE project effectiveness. The study reported that, ". . . each institutional barrier may not be a notable impediment by itself, but that the relationship among the barriers can create a combined effect causing more significant impediments overall. The totality of the influence of the institutional barriers is reliant on all of the barriers that exist" (USACE 2013).

The barriers to comprehensive protection identified are as follows:

- Project authorizations did not include addressing **back-bay flooding** through implementation of coastal flood risk management measures.
- Damage reduction provisions can often be met without the use of **dunes** and 'least cost' requirements generally do not consider long-term coastal management benefits.
- **Data** collection, management resources, and standards are often not coordinated across agencies or optimized in a timely way.
- Federal and nonfederal funding must be available at the right time to complete and maintain **beach renourishment** projects as scheduled.
- Challenges in securing **real estate easements** required to implement coastal project features impedes the delivery of more comprehensive coastal storm damage risk management.

- USACE **permitting and construction** requirements address land and water zone uses and values differently, making it more challenging to plan and construct CSRM projects. These competing uses and values can cause schedule delays due to limited or contradicting construction windows and permitting requirements.
- Unintended funding and economic stressors, limited ability to pool resources or incentivize good CSRM, and difficulty executing projects on schedule due to environmental and/or construction windows may impede the success of **future coastal and storm damage reduction** projects.
- Capacity of nonfederal sponsors to support projects that deliver greater risk management may be insufficient to cover **cost-share requirements** for construction and/or long-term operations and maintenance.
- Lack of incentive- and disincentive-based policies for developing **flood plain management plans** can impede the provision of more comprehensive and sustainable coastal flood risk management.
- **Recreational and public groups** often express concern about beach nourishment projects impacting fishing and surfing activities while other projects such as floodwalls and bulkheads impact ocean views and aesthetics.

The study also provided recommendations for how to address these barriers for future projects to provide a more comprehensive approach to protecting coastal areas from damaging storms. Recommendations reported in the *Hurricane Sandy Coastal Projects Performance Evaluation Study* include the following:

- Projects should consider how to address the impacts of back-bay flooding of barrier islands to provide more comprehensive protection or identify the residual risks to ensure public and agency awareness.
- Efficacy of natural and engineered dunes in reducing risks of coastal storm damages should be evaluated. Some projects with high storm berms or those backed by significant dunes generally performed better than projects involving a berm alone.
- Broader range of project benefits should be considered to evaluate the impacts of extreme storm and flooding events more accurately. These include community resilience and recovery, which would be enhanced by explicitly protecting critical infrastructure and basic services.
- USACE should identify a limited number of strategically located projects at which to collect nearshore wave/current and coastal wind data, in coordination with other federal, state, and local agencies and partners; it should also conduct regular surveys of those projects (such as before storm season and after significant storms).
- Projects need to include an adaptive management plan or strategy for changing the design within the authorization to respond to external factors, such as changes in local weather patterns or sediment transport, shifts in development trends or public tolerance for storm risks, or changes in coastal flood risks due to climate change. In addition, coastal flood risk analysis technologies are improving at a remarkable rate. Both external factors and changing

risk analysis and modeling can lead to changes in project planning, design, and nourishment/maintenance. There should be a streamlined institutional mechanism that allows changes in project dimensions during the life of the project. Design standards should allow for flexible use of renourishment material, perhaps based on a volume-of-fill standards, which would allow for adaptive management of the beach fill design features over time to reflect changes in coastal forcing events.

- Use of regional sediment management practices could supplement coastal protection, and regional planning with various federal and nonfederal agencies and stakeholders could be conducted to identify and analyze sand resources.

The study concluded that, "The USACE recognizes that more comprehensive protection can only be realized when individuals and government agencies at non-federal and federal levels collectively recognize, understand, and act to manage and effectively reduce risks attributed to threats posted by flooding and coastal storms."

3.2 Approach

Project performance evaluations were developed for 35 authorized and constructed federal CSRM projects within the SACS study area with a focus on those with remaining years of federal participation that can still be modified under their existing federal authorization. A list of the locations evaluated is provided in **Appendix A**. The PPEs were conducted by USACE district staff through consultation with USACE subject matter experts and local project sponsors with knowledge of project history. The evaluations were designed to assess the effectiveness of the South Atlantic Coastal region's federal CSRM projects and identify recommendations for improvements that strengthen project resilience and effectiveness, and barriers to such improvements. Projects were evaluated based on two metrics; performance under design storm conditions and performance during low-frequency major storms greater than a 100-year event with an emphasis on the most recent major storms that affected the area.

Project performance ratings for high-frequency design conditions was on a scale of 1 to 3 as follows:

1. **Failure:** No or minimal storm damage reduction benefits derived.
2. **Average or above average design performance:** Acceptable amount of expected storm damage reduction benefits; an example of acceptable or above average project design performance.
3. **Well above average design performance:** Majority of expected storm damage reduction benefits derived; an example of exceptional project design performance.

Project performance ratings for low-frequency major storms was on a scale of 1 to 10 as follows:

1-2 **Failure:** No or minimal storm damage reduction benefits derived; hard structures damaged dur to design deficiency.

3-4 **Below average performance:** Minimal expected storm damage reduction benefits derived; considerable-to-some damage to hard structures.

5 **Average performance:** Acceptable amount of expected storm damaged reduction benefits derived; some damage to hard structures.

6-7 **Above average performance:** Acceptable amount of expected storm damage reduction benefits derived; some to minimal damage to hard structures; an example of acceptable performance.

8-9 **Well above average performance:** Majority of expected storm damage reduction benefits derived minimal damage to hard structures; project provided incidental damage reduction.

10 **Exceptional:** Total expected storm damage reduction benefits derived; minimal or no damage to hard structures; project provided incidental damage reduction; an example of exceptional project performance.

The projects evaluated as part of the PPEs included erosion control, shoreline protection, storm damage reduction, CSRM, and beach nourishment projects. **Figure 3.1** provides a summary of project information by state and **Figure 3.2** summarizes the project performance ratings by storm frequency. Most projects were rated as average or above average design performance for high-frequency storm events while low-frequency storm performance ratings showed a broader range of results.

Four of the six USACE projects in Mississippi had the highest performance ratings for both low- and high-frequency storm events. Most of the high-performing projects in Mississippi used some form of hardened structures in their storm damage reduction project designs.

Feedback from each PPE was compiled into a database, cataloging the responses related to institutional and other barriers. Performance improvement recommendations were also summarized and are provided later in this section.

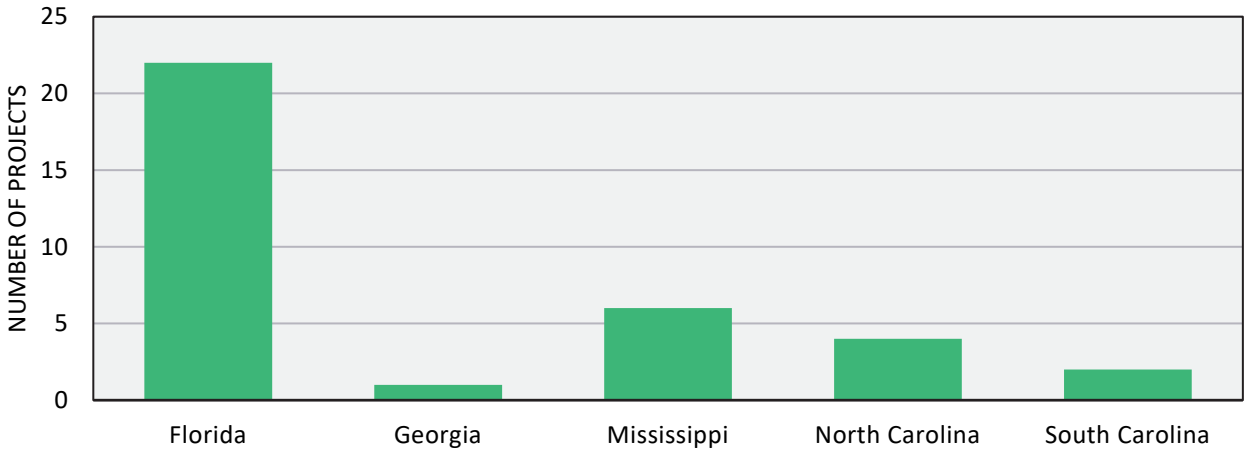


Figure 3.1. Number of Projects Evaluated by State

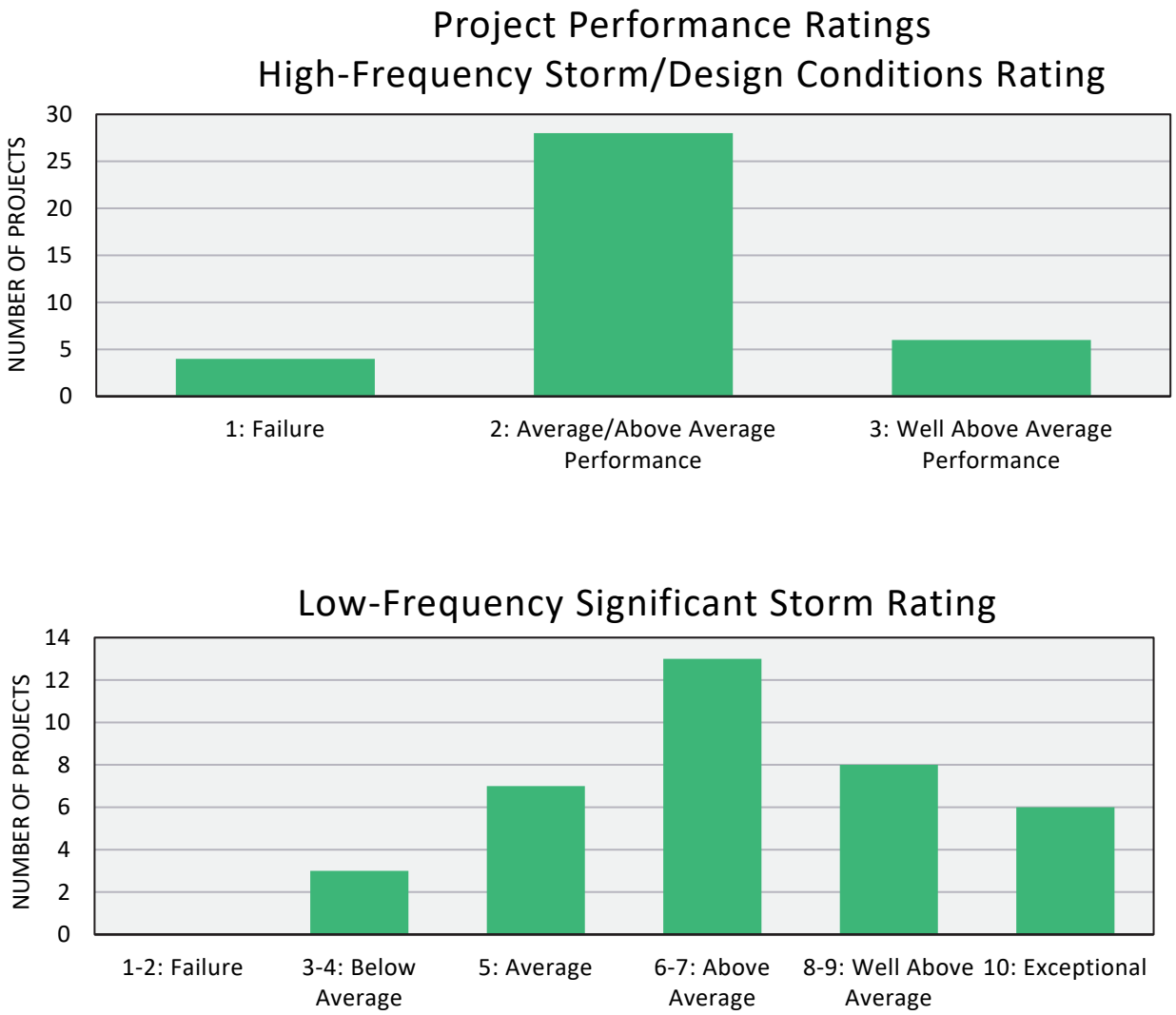
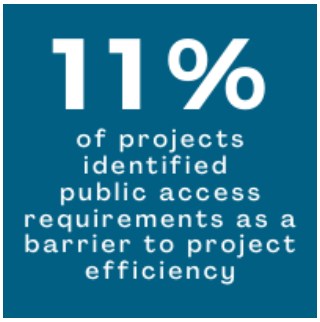


Figure 3.2. Project Performance Ratings by Storm Frequency

3.3 Discussion of Identified Barriers

The following summarizes the institutional and other barriers identified within the USACE SAD study area Project Performance Evaluations.

3.3.1 Public Access Requirements



Stipulated requirements for public access associated with USACE coastal storm risk management projects, especially when it involves crossing over private property, can limit the spatial extent of the project footprint potentially impacting overall project efficiency.

Of the South Atlantic Division's 35 projects that were evaluated, four were identified as being limited in extent because of public access requirements. Specific examples of barriers related to public access requirements included USACE policies requiring projects to be within a specified distance from a public access point and cost-share limitations influenced by lack of public access.

While attending the SACS workshops, stakeholders from southwest Florida identified the USACE requirement for public access as a barrier to cohesive CSRM. The local stakeholders recommended a policy change to modify Florida Department of Environmental Protections' definition of secondary access to include vacation rentals.

3.3.2 Obtaining Easements

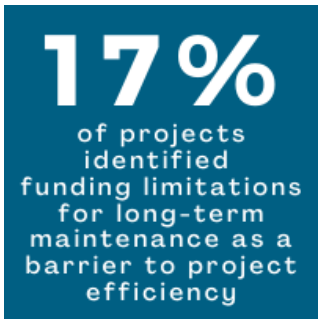
As documented in the *Hurricane Sandy Coastal Projects Performance Evaluation Study* (USACE 2013), real estate easements have halted construction of projects, or resulted in the segmented construction of what would have otherwise been a continuous project. Difficulty in obtaining real estate easements often stems from opposition by adjacent homeowners' who worry about diminishing their ocean views (thereby reducing their real estate value) and public access requirements. Real estate easement costs may also limit a project's economic justification based on benefit-cost analyses. Five of the evaluated projects identified difficulty in obtaining easements as a barrier impacting the project scope and alignment.

During the field workshops, SACS stakeholders in Florida and South Carolina identified real estate easements and their associated costs as a barrier to CSRM projects. Real estate easement needs can make infrastructure enhancements particularly challenging. Revisions to beach easement acquisition policies to allow for temporary access to easements for beach nourishment construction activities was a recommended approach to addressing this barrier.

Additionally, real estate easements are based on dimensions stated in authorizing documents. Federal beach nourishment projects in the northeast United States experienced significant challenges associated with adapting project dimensions (e.g., dune heights) after easements have been secured for initial construction. Including adaptive capacity in authorizing documents and resulting construction easements may alleviate future barriers to adapting projects to changed conditions, including sea level rise.

3.3.3 Maintenance Funding Constraints

The benefits and effectiveness of CSRM projects can depend on the ability to renourish the project as scheduled. Thus, disruption in the ability to renourish projects, via maintenance funding constraints, can compromise the project's ability to reduce risk to the community it serves. Six of the evaluated projects (located within North Carolina, Florida, Georgia, and South Carolina) had periods of delayed renourishment or deferred maintenance as a result of federal funding constraints.



For NNBF that are dynamic and heavily influenced by storms, such as sand dunes and nourished beaches, maintenance needs can be highly unpredictable. This uncertainty in maintenance requirements was identified as a barrier to achieving resilience through NNBF. Additionally, long-term project maintenance and operation is often the responsibility of cost-share partners who do not follow a consistent or standard approach to project maintenance. An opportunity for "more rigorous instrumentation and monitoring of existing projects to help address operation and maintenance and adaptive management requirements" was identified by the NACCS as an opportunity for action (USACE 2015) as well as the restoration of natural processes to reduce long-term maintenance requirements. The NACCS study identified an opportunity for action to "explore means to ensure projects are funded to sustain long-term operation, maintenance, monitoring, and adaptive management, including use of public-private partnerships" (USACE 2015).

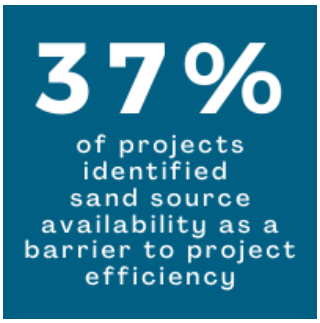
A lack of funding and the overall cost for maintenance activities was identified as a barrier to CSRM by SACS stakeholders from Georgia, Mississippi, Puerto Rico, South Carolina, and the U.S. Virgin Islands during field workshops. The inability to modify maintenance agreements, a lack of maintenance enforcement, and poor communication between jurisdictions regarding maintenance needs were identified as barriers to coastal resilience in Georgia, the U.S. Virgin Islands, and Mississippi, respectively.

Several opportunities for action were identified that could alleviate maintenance funding barriers. SACS stakeholders echoed similar opportunities for policy improvements recommended in the NACCS, suggesting the consideration of the full project life cycle, proactive funding and allocation of funds for maintenance, streamlining of permitting processes for new maintenance projects, and the assessment of risk management benefits achieved by implementing such actions. The development of regional barrier island maintenance plans (particularly in Mississippi) was also suggested as a potential opportunity for action.

3.3.4 Construction or Operations Considerations

Ten of the evaluated projects experienced challenges with project construction or other operations due to environmental, scheduling, or equipment limitations. The lack of needed materials and equipment during construction or operation presented challenges in completing projects on schedule. For example, multiple projects within the same area may have a need for the same equipment. When supplies are limited, coordinating the use of needed equipment and materials among other ongoing projects may present scheduling delays.

3.3.5 Sand Source Availability



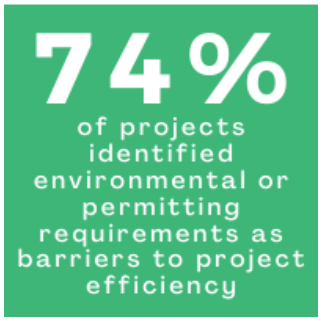
Economically viable, environmentally sustainable, and renewable sand sources for beach nourishment are often a challenge to find. Climate change and sea level rise further stress existing sand sources. Thirteen of the evaluated projects reported that sand sources were limited or nonexistent. Sand sources were noted to be particularly limited in south Florida, and state limitations on sediment quality further limited viable sources. The presence of important environmental resources or geologic features in potential sand borrow areas was also identified as a restricting factor.

During the field workshops, SACS stakeholders echoed sand source availability as a barrier to CSRM. Stakeholders from Florida and South Carolina noted that sand sources that offer the appropriate aesthetic, environmental, and resiliency characteristics are considered valuable and are limited in availability, making prices more competitive and thus less cost-effective overall to procure. As demand on limited offshore resources continues to increase, there is also a concern the sites will become depleted.

Several of the projects that identified limited sand sources referenced the Coastal Barrier Resources Act (CBRA) of 1982 as a barrier to meeting project sand needs. The CBRA was initiated to disincentivize the development on coastal barriers, the interface of land and sea, that protect landward areas from coastal storm impacts.

3.3.6 Environmental or Permitting Restrictions

Permit conditions and time of year restrictions are used to reduce potentially harmful impacts from construction on sensitive ecosystems and habitats. Consultation with other federal entities such as the U.S. Fish and Wildlife Service and National Marine Fisheries Service are also required regarding potential impacts to endangered species and/or critical habitats. The requirement to coordinate with multiple agencies and work within specific times of the year may influence project schedules and budgets. Twenty-six of the evaluated projects (most of them throughout Florida and North Carolina, and one in South Carolina) identified project impacts caused by environmental or permitting restrictions.



Restrictions resulted in the delay or timing of renourishment owing to impacts to resident sea turtles and nesting birds, limitations on placement of beach fill caused by potential impacts to hardbottom habitat, limitations on use of nearby sand sources due to the CBRA, and the need to meet sand standards to mimic natural beach sand for public acceptance and to meet turtle nesting requirements. While project timing restrictions were identified as a barrier, removal of these restrictions could result in detrimental impacts to protected species and habitats.

Opportunities for improvement of project performance were identified to find efficiencies related to sediment quality standards, cultural resources, and requirements of the CBRA. Within the Gulf Coast specifically, opportunities were noted to improve project performance and find efficiencies related to hardbottom buffers, monitoring, and sediment quality requirements included in the state permits, which serve as the water quality certification under the Clean Water Act. Faster and more cost-effective methods, such as drones, for hardbottom monitoring to expedite environmental reviews, provide pre- and post-project comparisons, and

evaluate ephemeral versus nonephemeral hardbottom habitats were identified as opportunities for improvement. While these methods exist, they often do not provide the needed accuracy for data collection.

During the field workshops, SACS stakeholders noted environmental and permitting barriers, including a lack of funding for environmental compliance, and lengthy environmental review and permitting processes, as barriers to CSRM. The permitting processes were also noted as being complex, requiring engagement from multiple agencies. Policy improvements, such as streamlining permitting for repeat and maintenance projects and implementation of penalties for permits that degrade ecosystems, were suggested by stakeholders.

Environmental and permitting barriers that were defined by SACS project evaluations and stakeholder feedback echoed some of the findings from the NACCS. Specifically, the NACCS noted, “Funding has variable time-related spending requirements that complicate the recovery process (e.g., annual appropriations resulting in the need to spend recovery funds quickly, or execution is complicated by the presence of environmental windows)” (USACE 2015).

More recently, the 2020 South Atlantic Regional Biological Opinion for Dredging and Material Placement Activities in the Southeast United States (2020 SARBO) concluded that dredge and material placement activities for USACE authorized beach nourishment projects in the south Atlantic region are not likely to jeopardize the continued existence of species listed in the Endangered Species Act or result in adverse effects to designated critical habitats. The 2020 SARBO should allow for a more streamlined permitting process for projects within the SACS study area requiring the placement of dredged material.

3.3.7 Other Identified Barriers

In addition to the evaluation of specific barriers summarized in Sections 3.3.1 through 3.3.6, other barriers that may have influenced the evaluated projects were identified:

- State of Florida Inlet Management Plan limitations on the amount of sand that can be placed on beaches
- Limitations in the number of hopper dredges that are authorized to work in the United States
- Lack of funding or interest by local stakeholders
- Restrictions on construction of hardened structures, which may help limit sand loss from the project site
- Limitations on the percent of fines in sediment sources
- Limits on adaptive management
- USACE’s project-by-project approach to addressing CSRM
- Separation of USACE business lines between navigation and flood risk management, making regional sediment management approaches challenging
- Methods for quantifying benefits of dune features, which make replacement of dune volume and vegetation difficult to justify

3.4 Performance Improvement Recommendations

The following includes a summary of overall performance improvement recommendations and recent actions that have been taken that address identified barriers.

3.4.1 Recommendations

Performance improvement recommendations for projects varied widely and, in some cases, were highly specific to individual projects. A general summary of performance improvement recommendations for the identified barriers is included in **Table 3.1**.

Table 3.1 Summary of Identified Performance Improvement Recommendations

Institutional Barrier	Recommended Solutions
Public Access Requirements and Obtaining Easements	• Expand project sites to include adjacent areas. • Adjust CBRA boundaries to allow for use of more dredged material. • Refrain from beach construction during active tourist seasons.
Maintenance Funding Constraints	• Maintain current projects though continued monitoring and nourishment and provide funding for annual monitoring and post-event assessments to improve project performance.
Construction and Operations Considerations and Environmental Permitting Restrictions	• Cross-agency coordination and regionalization to coordinate multiple projects concurrently to save time and money through economies of scale. • Better coordination from state, local, and federal agencies about best management practices. • Improve preconstruction and active construction communication with contractors about locations and traversing methods to avoid infrastructure damage.
Sand Source Availability	• Maximize regional sediment management opportunities. • Reevaluate acceptable beach fill construction standards. • Investigate additional borrow sources for sand that, in some areas, could include upland sand mines and, in other areas, particularly in south Florida, evaluating offshore borrow sites.
Environmental or Permitting Restrictions	• Reevaluation of berm elevation and widths in certain projects, including placement of nearshore berms. • Consider revising requirements against hardened structures in areas that may benefit from them. • Account for broader systemwide benefits, including documenting the performance of existing projects with respect to these broader benefits, to provide data used to inform future investment decisions. • Update engineering studies for erosion control structures to determine feasibility. • Consider expanding project footprints in areas where additional threatened or endangered species or critical habitat are a consideration. • More emphasis on long-term environmental benefits during the project permitting phase.

3.4.2 Actions to Address Identified Barriers

Various SACS project elements as well as recent regulatory changes, have been implemented to address many of the identified barriers discussed. The following is a list of elements attempting to address institutional and other barriers in the SACS study area to improve project performance.

- **SACS 2020 South Atlantic Division Regional Sediment Management (RSM) Optimization Update:** This SACS report (USACE 2020a) identifies additional means to streamline existing RSM processes and ensure solutions are increasingly economical and environmentally sustainable across USACE authorities and missions. The RSM Optimization Update provides a framework that can be used to standardize sediment management and maximize opportunities for improved management and coordination.

- **SACS South Atlantic Division Sand Availability and Needs Determination (SAND) Summary Report:** The SAND Report (USACE 2020b) identifies and quantifies sand needs and available sand resources for current beach nourishment projects, both federal and nonfederal, in the SACS study area for the next 50 years.

- **Coastal Hazards System (CHS):** Modeling conducted as part of the SACS will produce current and projected data for wave heights and storm surge elevation within the study area which can be used in evaluating long-term operation and maintenance needs for a project.

- **South Atlantic Regional Biological Opinion (SARBO) for Dredging and Material Placement Activities:** The National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service Southeast Regional Office, Protected Resources Division issued a Biological Opinion that provided an exemption for the "take" of listed species for projects conducting dredge and material placement activities for USACE authorized beach nourishment projects (NOAA 2020). The 2020 SARBO will streamline the permitting process for USACE projects requiring placement of dredged materials within the SACS project area.

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4. Summary

Institutional and other barriers hinder or obstruct CSRM within communities and influence the performance of existing CSRM projects. The institutional landscape that shapes possibilities for CSRM is ever changing, and comprised of policies and programs at the local, state, and federal levels of government, with influence from private sectors and NGOs. Institutional and other barriers may change over time and may be regionally specific. However, there are several institutional and other barriers that transcend specific geographies and have been significant factors in reducing coastal storm risks for many years. This report leveraged the NACCS IOB Report (USACE 2015) as a foundation by which stakeholder feedback on institutional and other barriers was assessed and compiled. Barriers to comprehensive protection identified in the USACE Hurricane Sandy Coastal Project Performance Evaluation Study (USACE 2013) were also considered as the performance of existing CSRM projects in the South Atlantic were evaluated.

4.1 Summary of Identified Barriers and Opportunities

The institutional barrier noted most often by SACS agency stakeholders was limited coordination and leadership across all levels of government. Storm impacts cross jurisdictional boundaries and require intergovernmental and interagency coordination; however, competing priorities, disconnected or redundant efforts, lack of communication, and siloed mentalities lead to missed opportunities or wasted resources. Efforts such as the SACS are trying to address this barrier by building regionally consistent tools and products for use across agencies and jurisdictions.

Lack of funding was the next most noted barrier. Limited funding or challenges accessing consistent funding makes collaboration between agencies and partners even more critical for efficient use of available resources. Stakeholders noted funding was often reactionary following major storm events, whereas more dedicated and continuous proactive funding for pre-disaster mitigation projects was desired. Cost-share requirements to access federal funding were also noted as limiting especially in smaller and more rural communities. The new FEMA BRIC program works to provide a funding source to support communities in reducing risks. However, cost-share requirements and a local capacity to prepare grant applications can remain a challenge for certain communities.

In considering policies to manage coastal storm risks, imposing stricter building and development requirements was the most suggested strategy. Limiting future development in high-risk coastal areas was a top suggestion to reduce the exposure of future populations. In locations where development is occurring, raising building floor elevation requirements and strengthening building standards was recommended. A list of the top barriers under each theme along with the relevant opportunities for action are provided in **Table 4.1**.

Table 4.1 Top Stakeholder-Identified Barriers and Relevant Opportunities for Action

Barrier Theme	Top Subthemes	Relevant Opportunities for Action
Risk and Resilience Standards	Lack of flexibility in agency rules	• Adjust regulations to incentivize rebuilding stronger rather than in-kind replacement • Encourage the beneficial use of dredged material instead of least-cost disposal requirements • Revise regulations to encourage green infrastructure, living shorelines, and pilot programs to test new solutions
Risk and Resilience Standards	Ineffective standards	• Develop or improve standards for "tolerable" risk, risk management, performance metrics, vulnerability, resilience, and other metrics • Update codes and standards to account for climate change effects • Require sea level rise adaptation in planning and capital improvement projects
Risk Communication	Difficulties of individuals and communities in understanding their risk	• More community involvement, engagement, and transparency to better communicate risks to stakeholders and convey how best to manage risks • Develop engaging programs to educate the public about hazards • Deploy knowledgeable staff to help communities better understand their risk • Incorporation of clearer risk disclosures during real estate and rental transactions
Risk Communication	Public acceptability of risk management measures	• Improve public education on coastal storm risk, sea level rise, climate change, and risk management solutions
Risk Management	Lack of staff capacity and expertise, particularly at the local level	• Increase funding for agency staffing, data collection, and monitoring studies • Succession planning to ensure expertise which does exist is not lost through retirement and attribution
Risk Management	Relaxed or limited enforcement of existing regulations, especially at the local level	• Refocus on enforcement of existing regulations • Limit variances and exceptions to existing regulations
Science, Engineering, and Technology	Data gaps in climate change, social science, environmental benefits, wave, wind, and elevation data	• Better coordinated pre- and post-storm data collection and development of standards
Science, Engineering, and Technology	Benefit-cost analyses not capturing full suite of benefits	• Update tools to include a broader consideration of benefits beyond the typical benefit-cost ratios
Leadership and Institutional Coordination	Limited coordination and leadership at all levels	• Enhance coordination within agencies and across agencies, and encourage regional collaboration between state and local governments
Leadership and Institutional Coordination	Lack of political commitment to make hard decisions about long-term coastal storm risk management (CSRM) solutions	• Promote pre-disaster planning and natural, blended and nonstructural solutions in support of community resilience, and CSRM • Acceptance and acknowledgment of climate change among policy-makers and stakeholders

Barrier Theme	Top Subthemes	Relevant Opportunities for Action
Local Planning and Financing	Lack of funding	• Create new tax and market-based incentive programs that encourage resilient behavior and reduce vulnerabilities • Provide dedicated and continuous proactive funding for pre-disaster mitigation projects, such as infrastructure upgrades, beach nourishment, buyout programs, and natural area restoration • Increase funding for agency staffing, data collection, and monitoring studies
Local Planning and Financing	Limits on funding	• Increase flexibility for state and local use of federal funds • Add flexibility to federal cost share programs

Evaluation of selected federal CSRM projects identified additional barriers related to public access requirements, obtaining easements, maintenance funding, construction and operations, sand source availability, environmental or permitting restrictions, beach nourishment limits, and limitations in regional system-wide approaches to addressing CSRM. Several project performance improvement recommendations were identified, summarized in Section 3.4, such as cross-agency coordination and improved coordination from various levels of government, funding and provisions for annual monitoring and post-event assessments, and expanded evaluation of projects benefits. These and several other recommendations summarized from the Project Performance Evaluations were echoed in SACS stakeholder feedback summarized in Section 2. In addition to future recommendations, ongoing actions and products to address identified barriers were summarized in Section 3.4, such as modifications to NEPA requirements, development of key SACS products such as the RSM Optimization Update Report and SAND Report, and NOAA's 2020 SARBO. These products and policy changes will hopefully incrementally support the reduction of residual coastal storm risk.

4.2 Comparison of NAACS and SACS Conclusions Related to Institutional and Other Barriers

The SACS effort built on previous NACCS products identifying institutional and other barriers constraining effective coastal storm risk management. Many significant commonalities were found between the study regions, while key differences emerged within the subthemes. Compared to findings captured within the NACCS IOB Report, stakeholders in the SACS were more concerned about relaxed enforcement of existing regulations, risk communication difficulties with the public and decision makers stemming from a lack of understanding or unbelief in sea level rise, and lack of available funding particularly for proactive measures and ongoing maintenance. These nuances could be due to differences in data collection methodology between the two studies, changes in policy and administration, or a shifting focus in concerns.

Inclusion of Puerto Rico and the U.S. Virgin Islands within the SACS study area also led to unique barriers not highlighted within the NACCS IOB Report. A lack of data in the territories consistent with the continental United States presented challenges. For example, the absence of Puerto Rico and U.S. Virgin Islands specific data within the USACE Regional Economics System (RECONS) model limits the ability to consider regional economic development benefits as part of a benefit-cost analysis. The lack of social vulnerability data in the U.S. Virgin Islands also inhibits use of the Social Vulnerability Index-Explorer tool to understand other social effects from potential USACE projects. Extra levels of bureaucracy were also noted in the territories, as was a lack of enforcement of existing regulations. The need for stronger regulations, particularly a coastal

construction line in Puerto Rico and stronger enforcement of regulatory setbacks in the U.S. Virgin Islands were highlighted by stakeholders within the focus area workshops.

Performance evaluations of federal CSRM projects in the SACS study area also confirmed many similar barriers to comprehensive protection as identified post-Hurricane Sandy. Environmental or permitting requirements were the most consistently identified element as a barrier to project efficiency. While potentially harmful impacts from construction on sensitive ecosystems and habitats should be reduced, time of year restrictions or other permit conditions delayed the timing of renourishments or placed limitations on the beach fill material.

4.3 Conclusion

Institutional and other barriers represent common obstacles to reducing coastal storm risk. The six themes identified in the 2015 NACCS IOB Report were all confirmed as relevant challenges in the current institutional landscape with no new high-level themes emerging. As seen through SACS stakeholder feedback and SAD project performance evaluations, barriers may be unique to or emphasized within certain geographies. The institutional landscape that creates these institutional and other barriers is dynamic, as exemplified by recent policy changes and program modifications. Changes to policies and programs are likely to reduce some barriers, while potentially introducing new ones. Several opportunities for action were presented within the NACCS IOB Report and by SACS stakeholders and project performance evaluations. Such opportunities can be leveraged by policy-makers, individuals, and organizations to help address barriers, manage coastal storm risk, and increase coastal resilience.

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Appendix A. List of Project Performance Evaluations

FLORIDA

- Nassau County Shore Protection Project
- Duval County Beach Erosion Control Project
- St. Johns County, Florida Shore Protection Project
- Brevard County North Reach, Florida Shore Protection Project
- Brevard County South Reach, Florida Shore Protection Project
- St. Lucie County, Fort Pierce Segment, Florida Shore Protection Project
- Palm Beach County, Delray Segment, Florida Shore Protection Project
- Palm Beach County, Jupiter Carlin Segment, Florida Shore Protection Project
- Palm Beach County, North Boca Raton Segment, Florida Shore Protection Project
- Palm Beach County, Ocean Ridge Segment, Florida Shore Protection Project
- Broward County, Segment II, Florida Shore Protection Project
- Broward County, Segment III, Florida Shore Protection Project
- Miami-Dade County, Sunny Isles Segment, Beach Erosion Control and Hurricane Protection Project
- Miami-Dade County, Main Segment, Beach Erosion Control and Hurricane Protection Project
- Lee County, Gasparilla Segment, Florida Shore Protection Project
- Lee County, Captiva Segment, Florida Shore Protection Project
- Sarasota County, Venice Beach Segment, Florida Beach Erosion Control Project
- Manatee County, Anna Maria Island, Florida Shore Protection Project
- Pinellas County, Long Key Segment, Florida Beach Erosion Control Project
- Pinellas County, Treasure Island Segment, Florida Beach Erosion Control Project
- Pinellas County, Sand Key Segment, Florida Erosion Control Project
- Bay County, Panama City Beach Erosion Control and Storm Damage Reduction

GEORGIA

- Tybee Island Shoreline Protection Project

MISSISSIPPI

- Clermont Harbor Hurricane and Storm Damage Reduction
- Cowand Point Hurricane and Storm Damage Reduction
- Downtown Bay St. Louis Hurricane and Storm Damage Reduction
- Hancock County Beaches
- Harrison County Beaches
- Pascagoula Beach Boulevard

NORTH CAROLINA

- Brunswick County Beaches, Ocean Isle Beach Portion, Coastal Storm Risk Management Project
- Carolina Beach Portion, North Carolina Coastal Storm Risk Management Project
- Southern Carolina Beach and Kure Beach, Coastal Storm Risk Management Project
- Wrightsville Beach Coastal Storm Management Project

SOUTH CAROLINA

- Folly Beach Shore Protection Project
- Myrtle Beach, South Carolina Shore Protection Program

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