

SOUTH ATLANTIC COASTAL STUDY (SACS)

WHAT'S IN IT FOR YOU?

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Jacksonville District

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US Army Corps
of Engineers®



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PRESENTATION OUTLINE



1 North Atlantic Coast Comprehensive Study (NACCS) Results

- Planning
- Products
- Advancing Resiliency in the Northeast

2 South Atlantic Coastal Study (SACS) Overview

3 What's in it for you?

- Planning
- Products
- Advancing Resiliency in the Southeast

“Every dollar spent before an event saves four to five dollars in reconstruction costs after.”

– National Research Council, 2014

“Joint planning with stakeholders across sectors, regions, and jurisdictions can help identify critical risks arising from interaction among systems ahead of time.”

– National Climate Assessment, 2018



NORTH ATLANTIC COAST COMPREHENSIVE STUDY



Planning

- Employed a consistent Coastal Storm Risk Management Framework
- Common platform for identifying current and future risk and a range of strategies for each reach of coastline

Products (limited list)

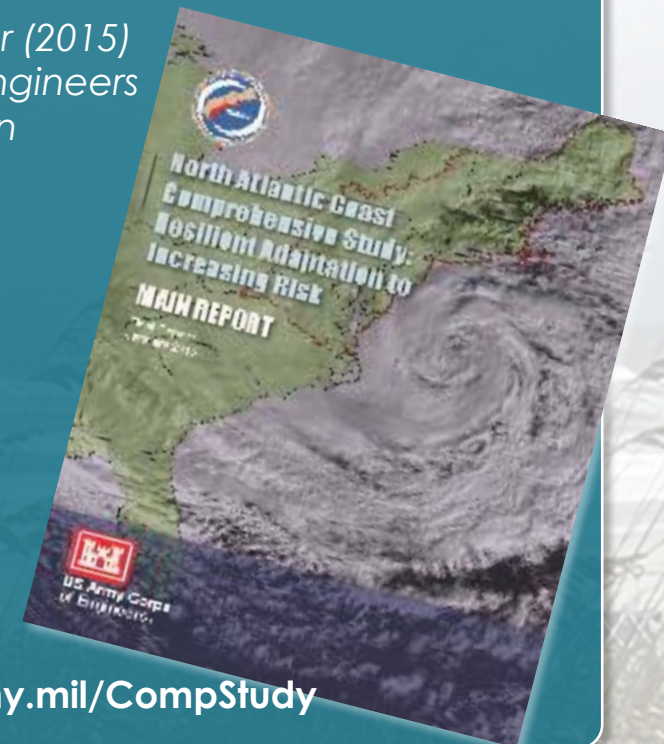
- Geospatial Database
- Extreme Water Level Modeling
- Economic Depth-Damage Functions
- Natural and Nature-Based Features development

Advancing Resilience in the Northeast (limited list)

- Nine follow-on feasibility studies
- Products support multiple non-Corps/Corps efforts
- Technical Assistance to states and DoD installations

"Coastal storm risk management is a shared responsibility, and we believe there should be shared tools used by all decision makers to assess risk and identify solutions. This report provides those tools."

*Commanding Officer (2015)
U.S. Army Corps of Engineers
North Atlantic Division*



www.nad.usace.army.mil/CompStudy



STUDY AUTHORITY

Section 1204, WRDA 2016



- Identify risks and vulnerabilities to **increased hurricane and storm damage as a result of sea level rise (SLR)**.
- **Emphasize regional sediment management** practices to sustain/enhance current coastal storm risk management measures.
- **Recommend measures** to address coastal vulnerability of areas affected by sea level rise.
- **Develop a long-term strategy to address increased hurricane/storm damages resulting from sea level rise**, enhance resiliency and lower risks in –
 - populated areas
 - areas of concentrated economic development; and
 - areas with vulnerable environmental resources
- Submit a report recommending specific and detailed actions.

STUDY GUIDANCE

- Follow planning guidance applicable to watershed assessments
- Model the study after the North Atlantic Coast Comprehensive Study (NACCS)
- Data shall be evaluated consistent with the NACCS to the maximum extent practicable

SCHEDULE

AUG 2018

Study Initiation

AUG 2019

Shared Vision
Milestone

AUG 2021

Recommendations
Milestone

OCT 2021

Draft Watershed
Plan/Report

AUG 2022

Final
Watershed
Plan

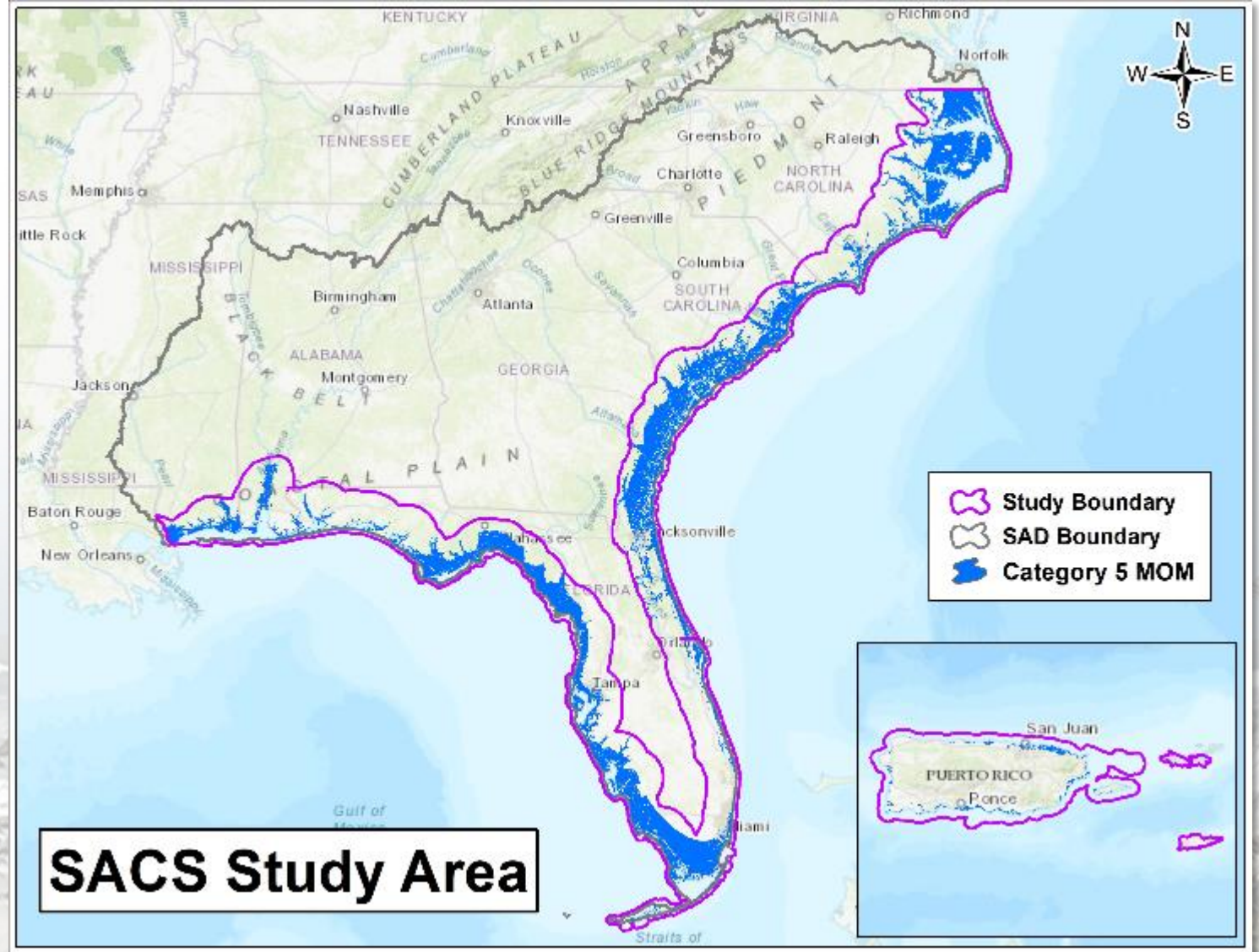
100% Federal funding - \$16M



STUDY AREA



Over 65,000 miles of tidally influenced coastline in the South Atlantic Division (SAD) area of responsibility affected by sea level rise (SLR) where hurricane and storm damages are occurring, or are forecast to occur.





SACS SCOPE



The SACS is:

- a **collaborative effort** with a diverse group of stakeholders to cooperatively address coastal storm risks
- a **comprehensive regional assessment of coastal flood risk for the Tier 1 study area scale**
(additional datasets are incorporated in Tier 2)
- **broadly identifying risk reduction opportunities throughout the study area**
(detailed action strategies will be developed for **Focus Areas**, as examples for lowering risks in areas with high population, concentrated economic development, and vulnerable environmental resources)
- **incorporating sea level rise** as the climate change factor **most relevant** to increased coastal storm damage

SOUTH ATLANTIC COASTAL STUDY KEY PRODUCTS

RISK ASSESSMENT



Assessment based on exposure of population and infrastructure, environmental and cultural resources, and social vulnerability to inundation hazards.



SACS TIER 1 RISK ASSESSMENT
<https://sacs.maps.arcgis.com/apps/MapSeries/index.html?appid=c546eb5072a04632958f2373eb1151cf>

REGIONAL SEDIMENT MANAGEMENT (RSM) OPTIMIZATION



OPTIMIZATION PILOT: 2016 USACE INNOVATION OF THE YEAR

Identifies and quantifies total contribution of RSM principles to projects in the SACS study area that support long-term coastal resiliency.

SAND AVAILABILITY & NEEDS DETERMINATION (SAND)

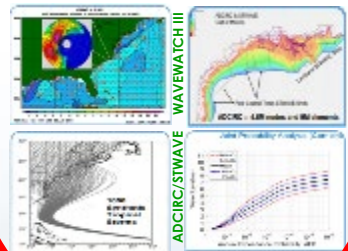
Determines the need and availability of sediment to maintain beaches for the next 50 years.



HYDRAULIC DREDGE WORKING IN ST. AUGUSTINE, FLORIDA

COASTAL HAZARDS SYSTEM (CHS)

Provides current and projected water elevation data for the study area.



GEOPORTAL

Provides the public access to study datasets, products, and documentation.



HABITAT AND ENVIRONMENT DATASETS

POPULATION INFRASTRUCTURE DATASETS

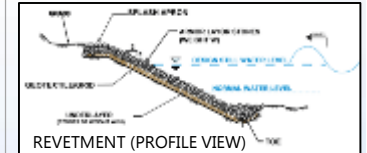
HAZARD DATASETS

FOCUS AREA DATA

DERIVED PRODUCTS

MEASURES & COSTS LIBRARY

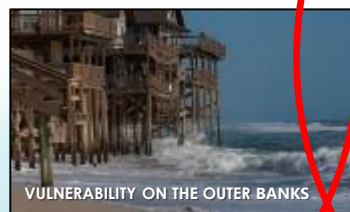
Detailed list of Coastal Storm Risk Management (CSRSM) measures and their costs developed to a screening level for use in USACE and stakeholder planning.



BEACH NOURISHMENT

COASTAL PROGRAM GUIDE

Outreach and information package to help communities better leverage needed resources on a disaster-wide, statewide, or community-wide basis.



VULNERABILITY ON THE OUTER BANKS

STATE & TERRITORY APPENDICES

Specific information for each state and territory will be provided in stand-alone appendices to the main report.



APPENDICES:
 North Carolina
 South Carolina
 Georgia
 Florida
 Alabama
 Mississippi
 Puerto Rico
 U.S. Virgin Islands

PRIORITY ENVIRONMENTAL AREA IDENTIFICATION

Priority environmental areas will be identified using Tier 1 data, the USFWS Planning Aid Report, and stakeholder tools. Resiliency to coastal storms and sea level rise will be evaluated and measures to increase resiliency will be recommended.



TIER 1 ENVIRONMENTAL, CULTURAL & HABITAT EXPOSURE

PLANNING AID REPORT (U.S. FISH AND WILDLIFE SERVICE [USFWS])

Report of priority biological resource habitats in the South Atlantic region that are vulnerable to harm from coastal storms and sea level rise with a focus on areas used by federally listed species. Report will also include a description of risk to coastal national wildlife refuges.



USFWS; BON SECOUR NWR

INSTITUTIONAL & OTHER BARRIERS REPORT

Document identifies institutional and other barriers to providing comprehensive protection for affected coastal areas. The report will include information on the performance of existing federal CSRSM projects and recommendations for improvement.



FLORIDA BEACH AFTER 1962 NOR'EASTER - WITHOUT FEDERAL CSRSM PROJECT

FLORIDA FEDERAL CSRSM PROJECT POST-TROPICAL STORM FAY, 2008

FOCUS AREA ACTION STRATEGIES

Focus area action strategies (FAAS) will use SACS products in combination with other resources to develop actionable risk reduction strategies with stakeholders. FAAS will serve as examples for how vulnerabilities in other high risk locations can be addressed.



SOUTH ATLANTIC REGION HURRICANES





TIER 1 RISK ASSESSMENT




SACS Tier 1 Risk Assessment Viewer

Tier 1 Risk Assessment Overview | Population & Infrastructure | Environment, Culture, & Habitat | Social Vulnerability | Hazards | Composite Risk Index | Risk Index Comparison

South Atlantic Coastal Study

Tier 1 Risk Assessment

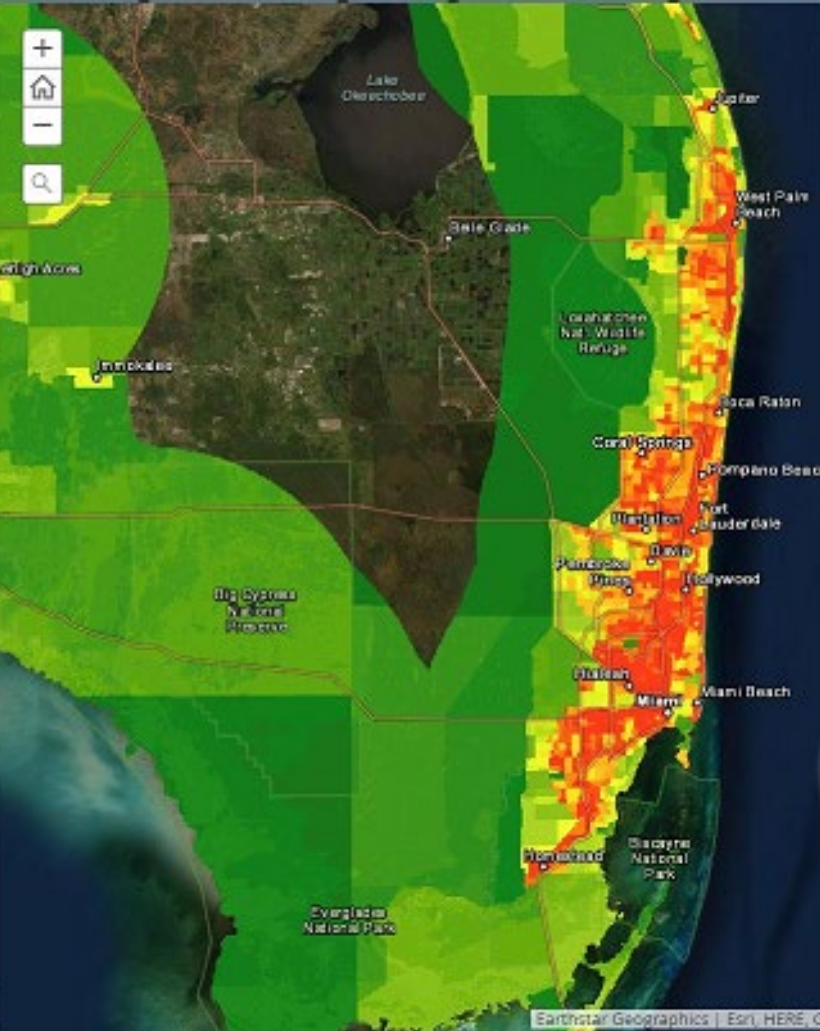
60% Population Infrastructure Index
+
30% Environmental, Cultural, Habitat Index
+
10% Social Vulnerability Index



<https://www.noaa.gov/outreach/photogallery/>

Population Infrastructure Index - 60%




Population Index
• 2015 Census - American Community Survey



LEGEND
Composite_Exposure_Index
Composite Exposure Index

Earthstar Geographics | Esri, HERE, Garmin

SOUTH ATLANTIC COASTAL STUDY KEY PRODUCTS

RISK ASSESSMENT  Assessment based on exposure of population and infrastructure to environmental and cultural resources, and social vulnerability to inundation hazards.	REGIONAL SEDIMENT MANAGEMENT (RS) OPTIMIZATION (SAND)  Identifies and quantifies local contribution of sediment to projects in the SACS study area that support long-term coastal resiliency.	SAND AVAILABILITY & NEEDS DETERMINATION (SAND)  Determines the need and availability of sediment to maintain beaches for the next 50 years.	COASTAL HAZARDS SYSTEM (CHS)  Provides current and projected wave elevation data for the study area.	GEOPORTAL  Provides the public access to study datasets, products, and documentation.	MEASURES & COSTS LIBRARY  Details list of Coastal Storm Risk Management (CSRM) measures and their cost for use in SACS and stakeholder planning.
PROGRAM GUIDE  Outreach and information package to help communities better manage coastal resources on a statewide, statewide, or communitywide basis.	STATE & TERRITORY APPENDICES  Specific information for each state and territory will be provided in state- or territory-specific to the main report.	PRIORITY ENVIRONMENTAL AREA IDENTIFICATION  Priority environmental areas will be identified using Tier 1 data, the USFWS's Planning Aid Report, and stakeholder input. Resiliency to coastal storms and sea level rise will be evaluated and measures to increase resiliency will be recommended.	PLANNING AID REPORT  Report of priority biological resource habitats in the South Atlantic region that are vulnerable to harm from coastal storms and sea level rise with a focus on areas used by threatened and endangered species. Report will also include a description of risks to coastal national wildlife refuge.	INSTITUTIONAL & OTHER BARRIERS REPORT  Document identifies institutional and other barriers to providing comprehensive protection for affected coastal areas. The report will include information on the performance of existing federal CSRM projects and recommendations for improvement.	FOCUS AREA ACTION STRATEGIES  Focus area action strategies (FAAS) will use SACS products in combination with other resources to develop actionable risk-reduction strategies with stakeholders. FAAS will serve as examples for how vulnerabilities in other study area locations can be addressed.

FOR MORE INFORMATION, VISIT THE SACS WEBSITE: <https://www.sacscap.usace.army.mil/SACS/>

U.S. ARMY CORPS OF ENGINEERS | SOUTH ATLANTIC DIVISION



RSM OPTIMIZATION

- Identifies and quantifies total contribution of RSM principles to projects in the SACS study area that support long-term coastal resiliency.
- Key to study's interim and final recommendations to increase sustainability and resilience.



2020
REGIONAL SEDIMENT MANAGEMENT OPTIMIZATION UPDATE
South Atlantic Division, United States Army Corps of Engineers

Logos: U.S. Army, US Army Corps of Engineers, RSM ROK

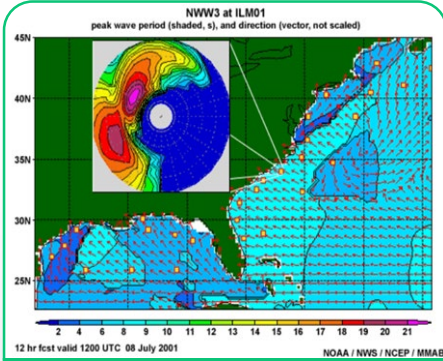
SOUTH ATLANTIC COASTAL STUDY KEY PRODUCTS					
RISK ASSESSMENT <p>Assesses risk based on erosion potential and infrastructure vulnerability to hurricanes and storm surge.</p>	REGIONAL SEDIMENT MANAGEMENT (RSM) OPTIMIZATION <p>Identifies and quantifies local contribution of RSM principles to projects in the SACS study area that support long-term coastal resiliency.</p>	SAND AVAILABILITY & NEEDS DETERMINATION (SAND) <p>Determines the need and availability of sediment to and from beaches for the next 50 years.</p>	COASTAL HAZARDS SYSTEM (CHS) <p>Provides current and projected water elevation data for the study area.</p>	GEOPORTAL <p>Provides the public access to study datasets, products, and documentation.</p>	MEASURES & COSTS LIBRARY <p>Details the list of Coastal Storm Risk Management (CSRM) measures and their cost developed for a geographic level of detail in SACS and stakeholder planning.</p>
COASTAL PROGRAM GUIDE <p>Outreach and information package to help communities better manage coastal resources on a statewide, national, or community-wide basis.</p>	STATE AND FEDERAL APPENDICES <p>Specific information for each state and territory will be provided in state- or territory-specific reports.</p>	PRIORITY ENVIRONMENTAL AREA IDENTIFICATION <p>Priority environmental areas will be identified using Tier 1 data, the USACE Planning Aid Report, and stakeholder input. Resiliency to coastal storms and sea level rise will be evaluated and measures to increase resiliency will be recommended.</p>	PLANNING AID REPORT <p>Report of priority biological resource habitats in the South Atlantic region that are vulnerable to harm from coastal storms and sea level rise with a focus on areas used by threatened species. Report will also include a description of risk to coastal national wildlife refuge.</p>	INSTITUTIONAL & OTHER BARRIERS REPORT <p>Document identifies institutional and other barriers to providing comprehensive protection for affected coastal areas. The report will include information on the performance of existing federal CSRM projects and recommendations for improvement.</p>	FOCUS AREA ACTION STRATEGIES <p>Focus area action strategies (FAAS) will use SACS products in combination with other resources to develop actionable risk reduction strategies with stakeholders. FAAS will serve as examples for how vulnerabilities in other study area locations can be addressed.</p>

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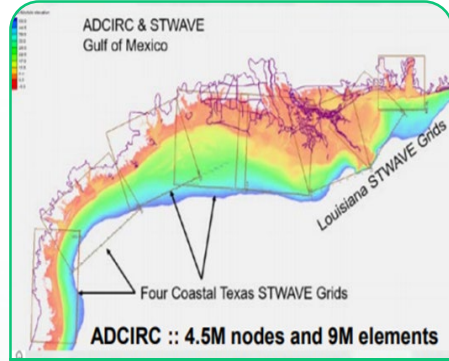
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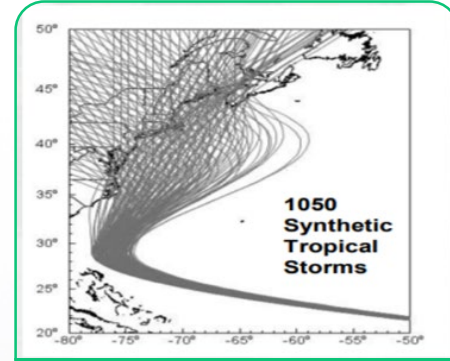
COASTAL HAZARDS SYSTEM



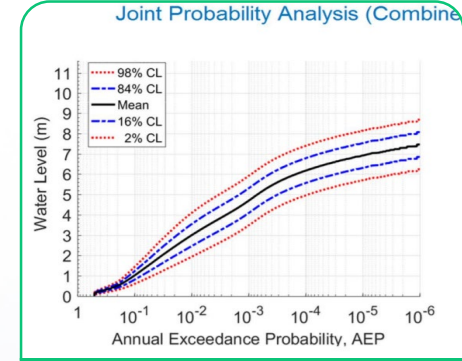
WaveWatch III



ADCIRC and STWAVE



CSTORM Coupler



Joint Probability

- Deepwater Waves for
 - Atlantic / Caribbean Basin
 - Gulf of Mexico Basin

- Southeast Atlantic Mainland
- Northeast Gulf of Mexico
- Puerto Rico and USVI

- 1000's of storms through each ADCIRC / STWAVE Grid

- Report and archive statistics associated with plausible storms

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COASTAL PROGRAM GUIDE Outreach and information package to help communities better manage needed resources on a statewide, substate, or communitywide basis.	STATE & TERRITORY APPENDICES Specific information for each state and territory will be provided in stand-alone appendices to the main report.	PRIORITY ENVIRONMENTAL AREA IDENTIFICATION Priority environmental areas will be identified using Tier 1 data, the USFWS Planning and Report and coastal storms and sea level rise will be evaluated and measures to increase resiliency will be recommended.	REPORT Report of priority biological resource habitats in the South Atlantic region that are vulnerable to harm from coastal storms and sea level rise with a focus on areas used by threatened and endangered species. Report will also include a description of the coastal national wildlife refuge.	INSTITUTIONAL & OTHER BARRIERS REPORT Document identifies institutional and other barriers to providing comprehensive protection for affected coastal areas. The report will include information on the performance of existing federal CSRM projects and recommendations for improvement.	FOCUS AREA ACTION STRATEGIES Focus area action strategies (FAAS) will use SACS products in combination with other resources to develop actionable risk reduction strategies with stakeholders. FAAS will serve as examples for how vulnerabilities in other study area basins can be addressed.

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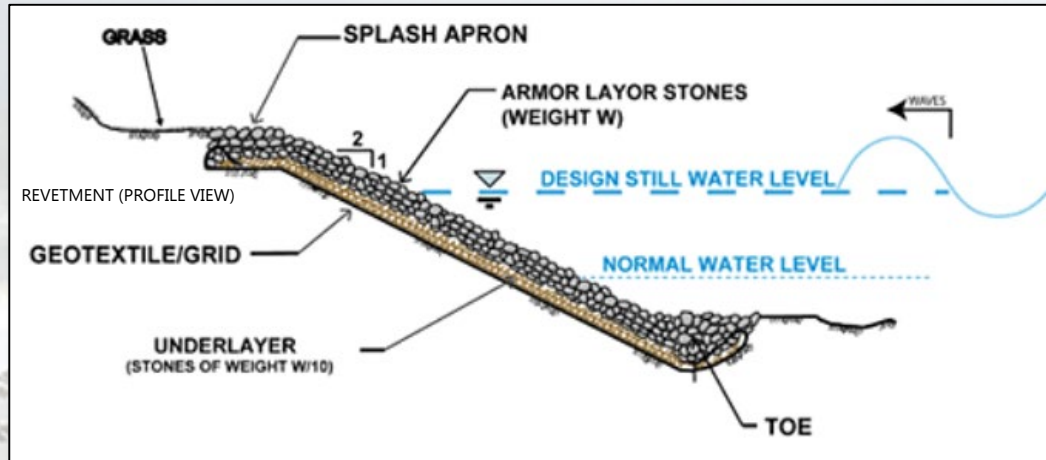
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MEASURES & COST LIBRARY



- Detailed list of structural, non-structural, and natural and nature-based coastal storm risk management measures.
- Cost developed to a screening level for use in stakeholder and USACE planning.



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STATE & TERRITORY APPENDICES & FOCUS AREAS ACTION STRATEGIES



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COASTAL PROGRAM GUIDE Outreach and information (webinars, webinars, etc.) needed resources on a state-by-state, territory, or community-level basis.	STATE & TERRITORY APPENDICES Specific information for each state and territory will be provided in stand-alone appendices to the main report.	PRIORITY ENVIRONMENTAL AREA IDENTIFICATION Priority environmental areas will be identified using Tier 1 data, the CSRM Planning Aid Report, and coastal storms and sea level rise will be evaluated and measures to increase resiliency will be recommended.	PLANNING AID REPORT Report of priority biological resource habitats in the South Atlantic region that are vulnerable to harm from coastal storms and sea level rise with a focus on areas used by threatened and endangered species. Report will also include a description of how to create national wildlife refuges.	INSTITUTIONAL & OTHER BARRIERS REPORT Document identifies institutional and other barriers to provide comprehensive protection of selected coastal areas. The report will include information on the performance of existing CSRM projects and recommendations for improvement.	FOCUS AREA ACTION STRATEGIES Focus area action strategies (FAAS) will use SACS products in combination with other resources to develop actionable risk reduction strategies with stakeholders. FAAS will serve as examples for how vulnerabilities in other high risk locations can be addressed.

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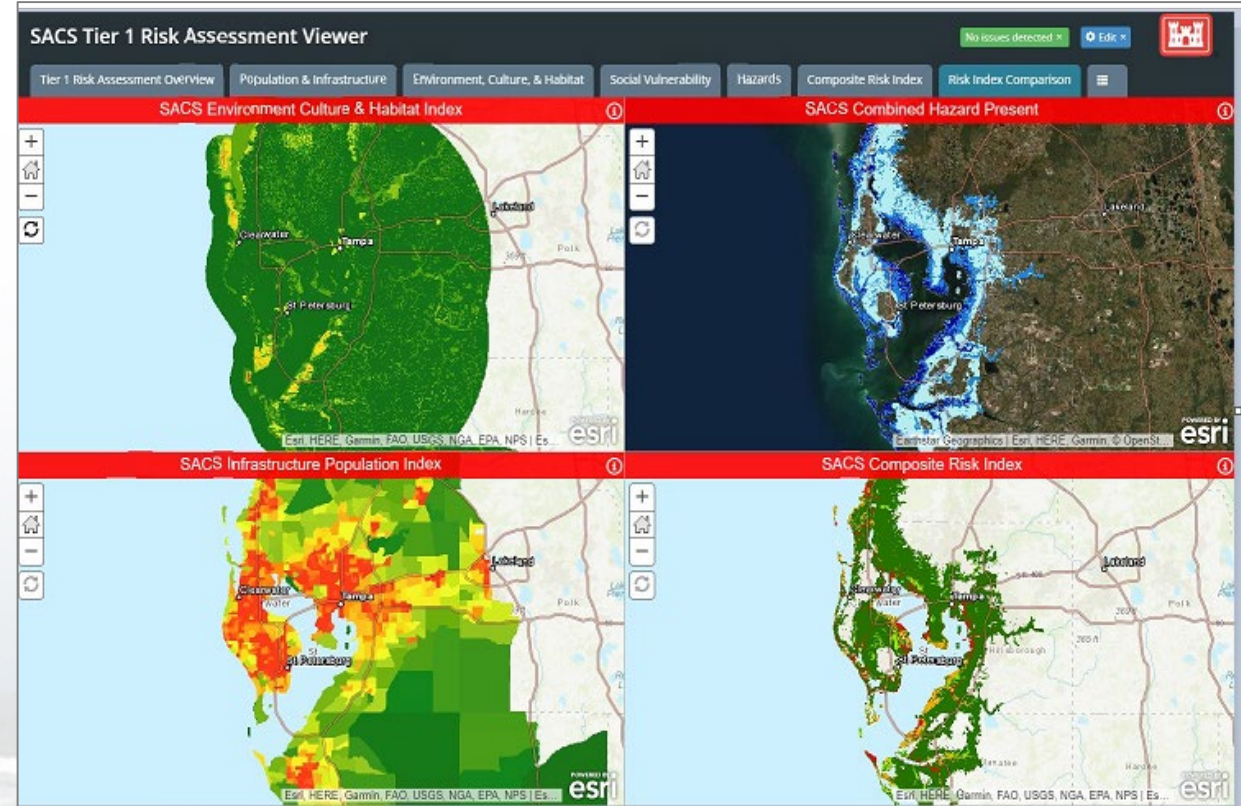
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STUDY RECOMMENDATIONS



- Revisit the scopes and purposes of previously authorized construction projects
- Regional sediment management practices to sustainably maintain/enhance current levels of storm protection
- Identify:
 - activities and areas warranting further analysis
 - study and design efforts
 - institutional and other barriers
- Opportunities for multiagency action





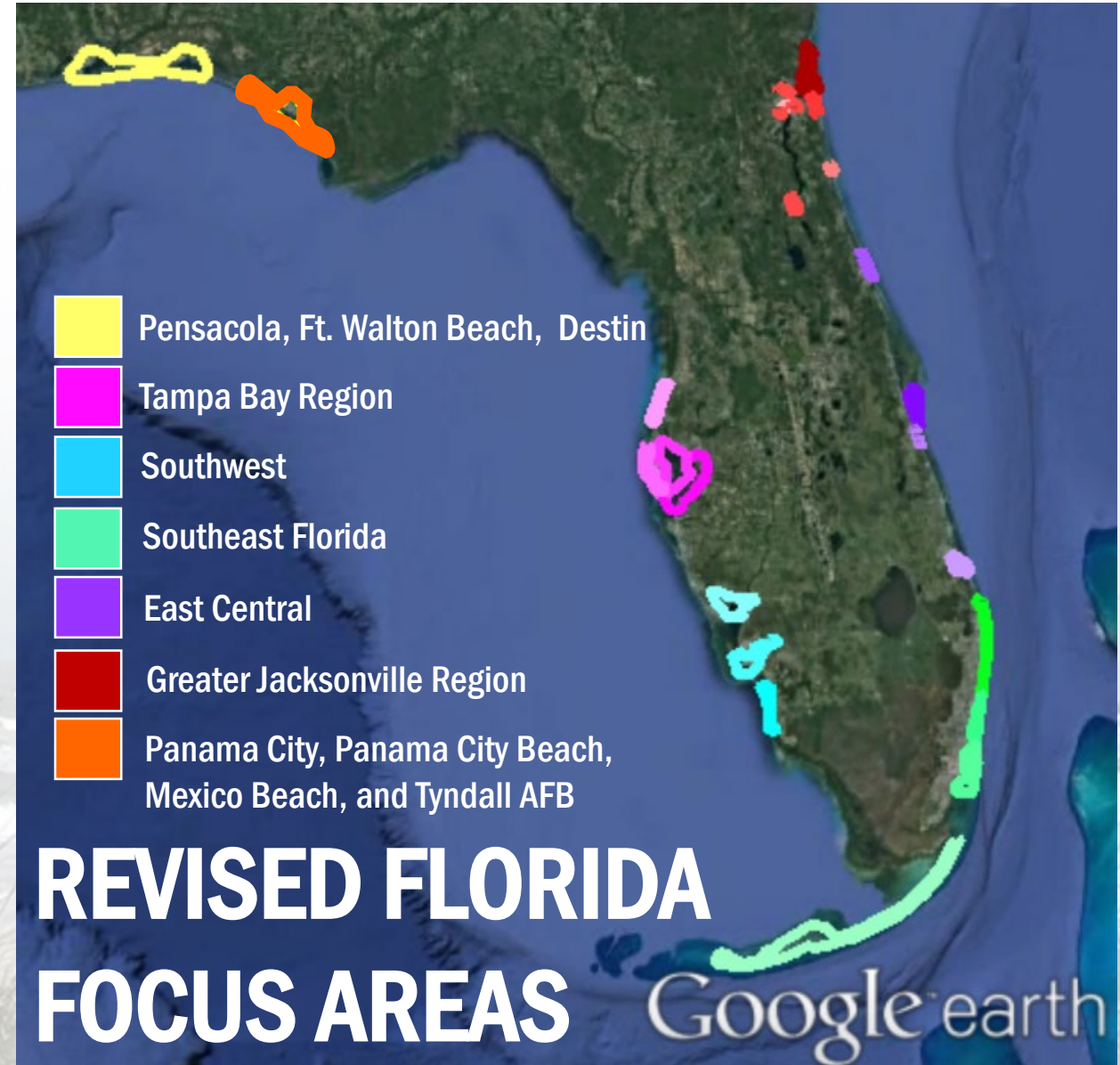
SACS FLORIDA FOCUS AREAS



SACS FLORIDA FOCUS AREAS



- WHAT IS A FOCUS AREA?
- WHAT ARE THE REVISED FOCUS AREAS?
- HOW DID WE GET TO THESE REVISED FOCUS AREAS FOR SACS?
- WHAT'S NEXT IF YOU'RE IN A SACS FOCUS AREA?
- WHAT'S NEXT IF YOU'RE NOT?





WHAT IS A SACS FOCUS AREA?



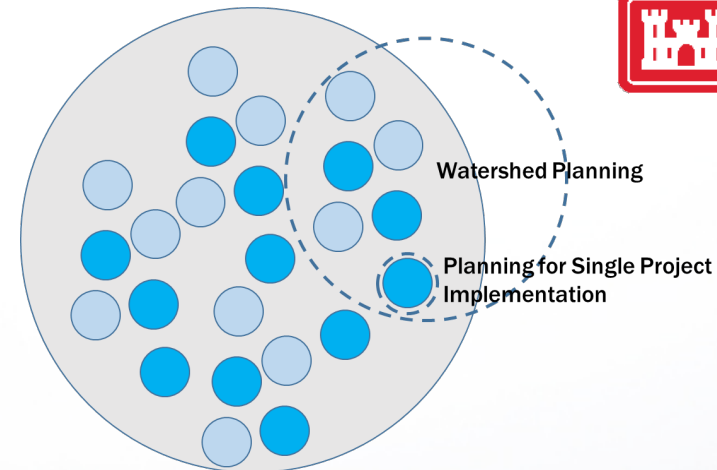
- An area highly vulnerable to storm damages as a result of SLR that warrants additional analysis in the State/Territory Appendix.
- Not a typical “project scale.”
- Geographic size maximizes potential for follow-on stakeholder efforts.
- Stakeholder coordination will take place to preliminarily screen measures and develop ROM costs, if desired.
- Uses a “watershed approach” to address problems. (Watershed Planning Guidance: PB 2019-01, EC 1105-2-411)



WATERSHED APPROACH



- Provides a shared vision of a desired end state.
- Works collaboratively with a broad range of stakeholders to address water resources problems in an integrated and sustainable manner.
- Uses systems approach to understand the connection between natural and man-made systems.
- Seeks long term, holistic solutions rather than piecemeal approaches, regardless of the entity that might ultimately implement the proposed actions.
- Provides a strategic roadmap to inform future investment decisions by multiple agencies.





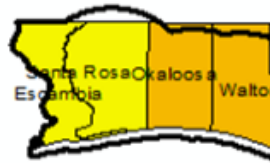
SACS FLORIDA FOCUS AREAS



DRAFT FOCUS

LEGEND

- CRI Very High Risk
- CRI Very High Risk w/ 3 ft SLR



PRELIM RESULT

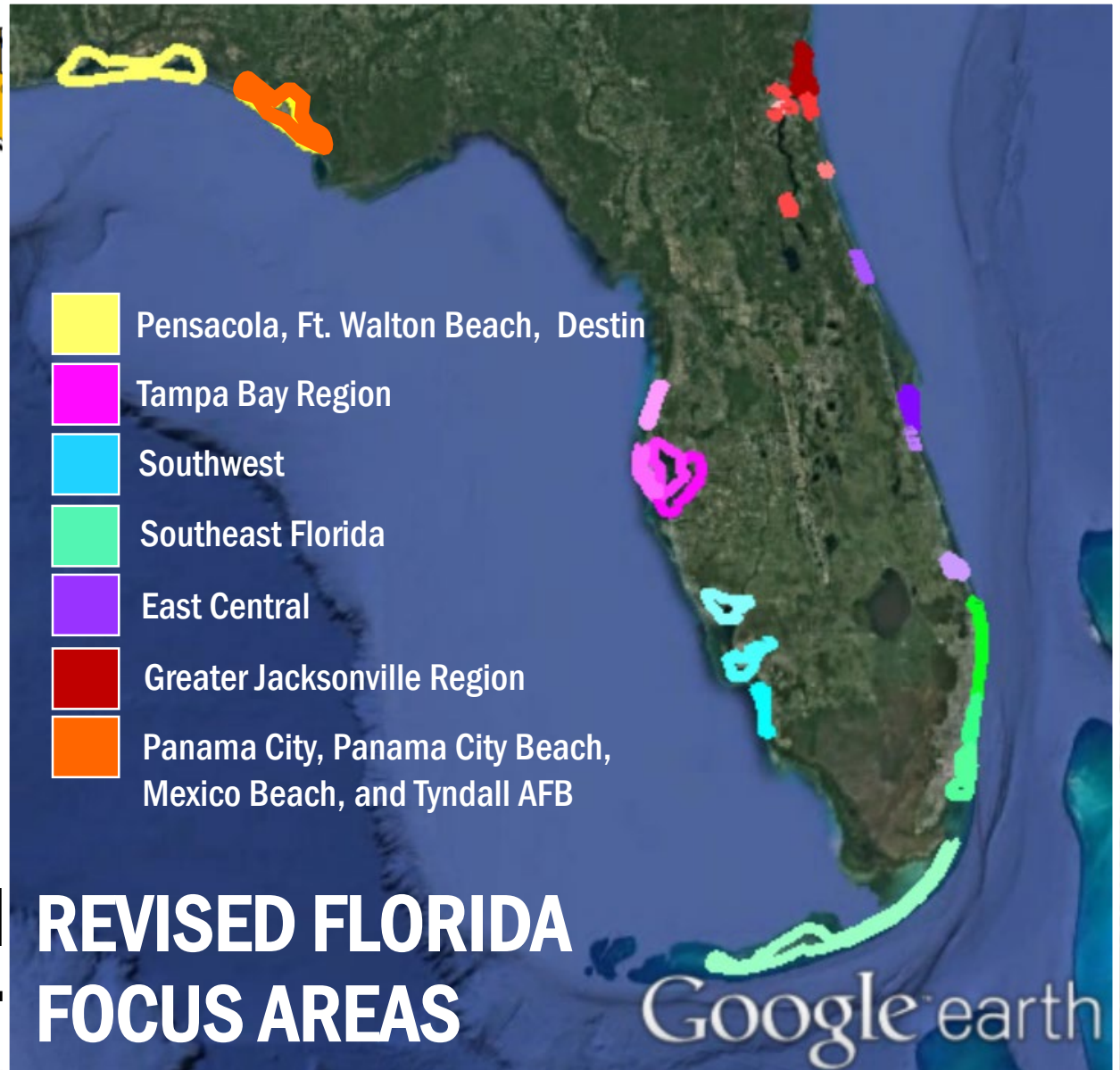


Figure 1. Statewid



IN A FOCUS AREA – WHAT’S NEXT?



- Engage Focus Area stakeholders (i.e., webinars at first to prepare for workshops)
- Hold in-person Focus Area Specific Workshops – Spring/Summer 2020
- Collaborative development of Focus Area Action Strategies by the end of 2020
- Focus Area Action Strategies – What does that REALLY mean?
 - It’s up to all of us!
 - Within our focus area:
 - Do we want to develop an investment strategy among various stakeholders?
 - How do we want to identify suitable risk-reduction measures?
 - Can we solve ALL the problems?



FOCUS AREA ACTION STRATEGIES



North Atlantic Coast Comprehensive Study (NACCS)
United States Army Corps of Engineers

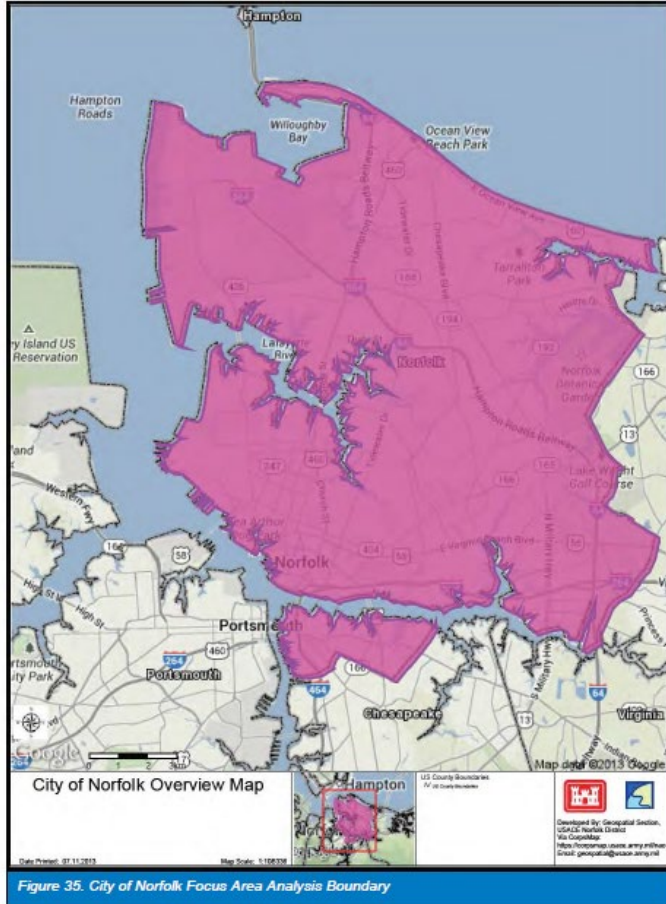


Figure 35. City of Norfolk Focus Area Analysis Boundary

A number of causes contribute to the flooding experienced by the City of Norfolk. The city is surrounded by water on three sides, the Chesapeake Bay to the north, and the Elizabeth River to the West and

92 - D-10: Commonwealth of Virginia



North Atlantic Coast Comprehensive Study (NACCS)
United States Army Corps of Engineers

Table 14. Measures for Additional Analysis


Area	Structural Measures							Non-Structural Measures			Comments
	Beach Replenishment	Berm, Levee	Floodwall, Bulkhead	Flood or Tide Gate	Road Raise	Shoreline Protection	Stormwater Improvements	Bayou/Relocation	House Raising	Natural Storage	
Area 1	X	X	X	X	X		X	X	X		
Bay Shoreline	X										
Pretty Lake			X	X	X		X	X	X		
Mason Creek			X	X			X	X	X		Improve existing tide gate.
Lake Whitehurst		X	X		X						Protect freshwater in lake from outside flooding sources.
Area 2			X	X	X	X	X	X	X		
Watershed Protection			X	X	X		X	X	X	X	
Localized Neighborhoods			X			X	X	X	X	X	
Lamberts Point						X					Erosion protection from storm surge events.
Area 3		X	X	X	X		X	X	X		
West Ghent		X	X				X	X	X		
Fort Norfolk			X				X				
The Hague (Ghent)			X	X	X		X				
Freemason			X				X				
Downtown Norfolk			X				X				Increase level of protection existing Floodwall.
Area 4			X	X	X		X	X	X	X	
Tidewater Dr.			X	X	X		X	X	X	X	
Ohio Creek			X	X	X		X	X	X	X	
Broad Creek			X	X	X		X	X	X	X	
Berkley and Campostella			X		X		X	X	X	X	



FOCUS AREA ACTION STRATEGIES

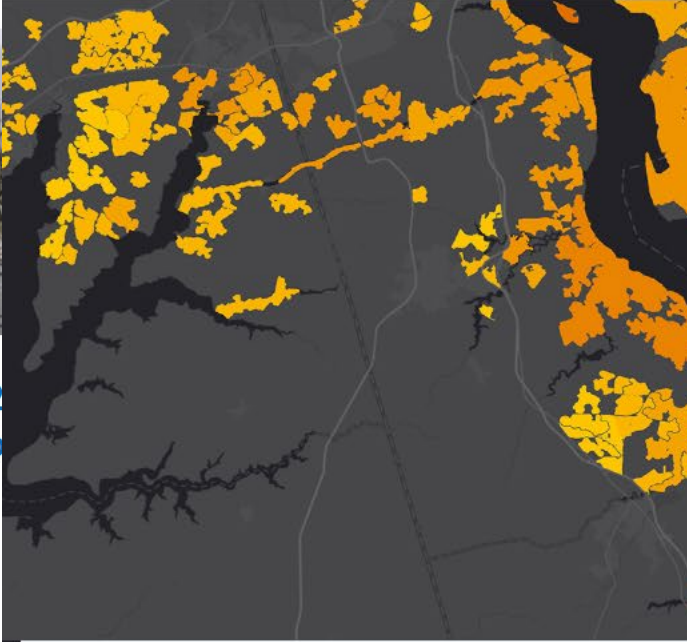


**U.S. DOT's Tool
Infrastructure Resilience**



Coastal Resilience Evaluation

Home Where Should I Do a Resilience Project?




**Transportation Resilience 2
AASHTO Transportation**

**Office of the Assistant
U.S. De**

Coastal Resilienc

**Florida Adaptation
Planning Guidebook**






NOT IN A FOCUS AREA?



Focus area action strategies (FAAS) will use SACS products in combination with other resources to develop actionable risk reduction strategies jointly with stakeholders. FAAS will serve as examples for how vulnerabilities in other high risk locations can be addressed.

- All high risk locations will be referenced in the Florida Appendix, even if not in a Focus Area.
- Study Recommendations can be made for locations within and outside of Focus Areas.
- Various SACS products developed for use across the entire state:
 - Coastal Hazards System
 - Measures & Costs Library
 - Coastal Program Guide





THANK YOU

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