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**Federal  
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### South Atlantic Coastal Study

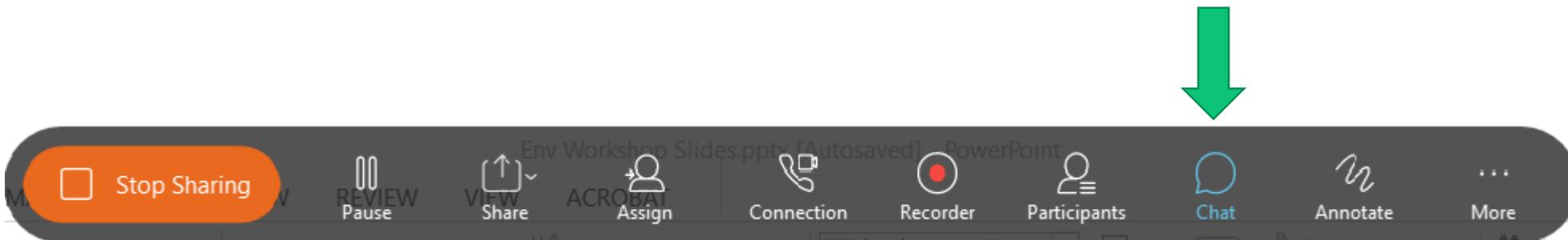




# Housekeeping



- **Everyone is joined in on listen-only mode**
- **There will be a Q&A period at the end of the presentation**
- **Feel free to use the chat function to submit questions during the presentation**
- **Presentation will be recorded**
- **Slides and recording will be posted to the SACS website:**  
<https://www.sad.usace.army.mil/SACS/>



# Environmental Webinar

South Atlantic Coastal Study

July 28, 2020

## CONNECTION INFORMATION:

Webinar: <https://usace.webex.com/meet/Outreach>

Call-In: 888-398-2342

Access #: 7960291

Password: 7227



US Army Corps  
of Engineers®

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# Team Introductions



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**Justin Bashaw**

**Bethney Ward**

**Steve Fox**

**Paul DeMarco**

**Kat McConnell**

**Jason Hales**

**Trevor Lancaster**

**Lisa Clark**

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**Charleston District**

**Savannah District**

**Jacksonville District**

**Mobile District**

**CDM Smith**

**Wilmington District**

**Jacksonville District**

**Regional Environmental Lead**

**North Carolina**

**South Carolina**

**Georgia**

**Peninsula Florida**

**Florida Panhandle, Alabama, Mississippi**

**Puerto Rico, U.S. Virgin Islands**

**Regional Geospatial Lead**

**Regional Outreach Lead/Facilitator**



# Agenda



- **Background**
- **Environmental Resources Exposure, Vulnerability and Risk**
- **Walk through the SACS Environmental Web Mapping Application**
- **Methodology Constraints**
- **Identifying Priority Environmental Resource Areas**
- **How this information will be used in SACS**
- **How you can provide feedback**
- **Next Steps**
- **Q&A**



# Purpose of the SACS Environmental Webinar



- 1 Present the environmental resources at risk to increased coastal storm damages and sea level rise, and to walk through the methodology the team used to develop these conclusions.**
- 2 Obtain feedback from our stakeholders on the at-risk resources, the methodology and the SACS Environmental Web Mapping Application.**
- 3 Discuss criteria to identify the priority environmental areas.**



# Virtual Poll – How familiar are you with the South Atlantic Coastal Study?



**NOT FAMILIAR**

**SOMEWHAT FAMILIAR**

**VERY FAMILIAR**



# SOUTH ATLANTIC COASTAL STUDY KEY PRODUCTS

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



## 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/ops/index.html?appid=c54beb507230463c958f2373e61151cf>

## 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)

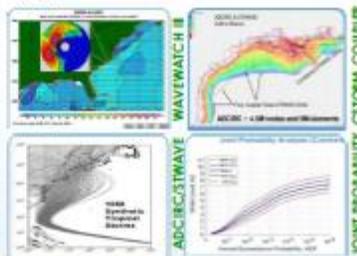
Determines the need and availability of sediment to maintain beaches for the next 50 years.



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 (CSRM) measures and their costs developed to a screening level for use in USACE and stakeholder planning.



REVETMENT (PROFILE VIEW)



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 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 CSRM projects and recommendations for improvement.



FLORIDA BEACH AFTER 1962 NOR'EASTER - WITHOUT FEDERAL CSRM PROJECT POST-STORM



FLORIDA FEDERAL CSRM 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





## SACS Authority – Section 1204 of WRDA 2016



- (a) The Secretary shall conduct a study of the coastal areas located in 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) In carrying out the study in subsection (a), the Secretary shall –
  - (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.



# SACS Definition of Environmental Resources



For the South Atlantic Coastal Study, vulnerable environmental resources are considered to be those natural areas or features that may be adversely affected by exposure to sea level rise or storm surge to the point of loss of habitat for threatened and endangered species and other important or at-risk species\*, or of important protected/managed lands. The natural area's adaptive capacity, or ability to cope with change (either naturally or through planned measures), is also taken into account, as well as its vulnerability to other hazards, such as erosion.

\* A plant or animal is considered “at-risk” when it is proposed for listing as threatened or endangered under the Endangered Species Act, it is a candidate species for listing, or it has been petitioned by a third party for listing (U.S. Fish and Wildlife Service).





# Risk Equation



**Exposure:** What are the natural areas in harm's way?

**Vulnerability:** Are the natural areas susceptible to loss or degradation when exposed to the hazards (storm surge, sea level rise, erosion and wind)?

**Probability:** What is the probability that the natural areas will be exposed to the hazards?

**Hazard:** SACS Tier 1 Combined Hazard plus sea level rise





# Exposure – What are the natural areas in harm’s way?



- Exposure table for each state and territory
- Based on state/territory land cover classifications
- Identifies and describes the natural areas in the footprint of the CAT 5 Maximum of Maximum’s (MOM) footprint

Natural Community/Subcommunity	Description of Community	Suitable Habitat/Protected Species supported (Federal/state listings)	Designated Critical Habitat; Fed, State or local protected lands
Palustrine	Tidal and nontidal; includes forested wetlands (vegetation predominated by trees); scrub-shrub wetlands (veg predominated by shrubs); emergent wetlands (veg predominated by emergent, erect, rooted herbaceous plants); and aquatic beds (submersed and/or floating plants)		
Palustrine Forested Wetlands	Forested wetlands in South Carolina include: Wet Pine Flatwoods which are extensive flat areas with shallow water table, dominated by pines (long leaf, loblolly, slash, and pond); and Bottomland Hardwood Forests and Swamps, which are made up of woody communities primarily found along riverine flood plains with tree species that include oaks, ashes, maples, hackberries, cypress, and tupelo	Support swallow tailed kite, red-cockaded woodpecker, multiple warblers, black bears, American alligator, american chaffseed, canbys dropwort, pondberry	Found in Waccamaw NWR (highest density of nesting STK in SC and northern most range) and Tom Yawkey Wildlife Heritage Preserve, also found in Habcaw Barony and Brookgreen Gardens
Palustrine Scrub-shrub Wetlands	Freshwater wetlands vegetated by evergreen shrubs or low-growing trees such as sweet bay or pond pine. In burned areas, herbaceous plants may dominate. In South Carolina, these wetlands are also referred to as pocosins. The word "pocosins" is derived from a native american word meaning low marshy ground or swamp.	Supports frosted elfin (ARS)	



# Vulnerability – How susceptible to the harm?

- Vulnerability table for each state and territory
- Natural areas from exposure spreadsheet → NOAA's Coastal Change Analysis Program (C-CAP) regional land cover classes
- Describes how each C-CAP class is vulnerable to coastal storm hazards (storm surge inundation, erosion, wind) and sea level rise
- Assigns a vulnerability score to each hazard for each C-CAP class
  - 1: low vulnerability
  - 2: moderate vulnerability
  - 3: high vulnerability
- Vulnerability does not take into account location of the community and probability of the hazard.
- Identified each C-CAP as low, medium or high vulnerability based on a formula that gave more weight to storm surge inundation, erosion and sea level rise.



# Vulnerability Table



Natural Resource Areas	C-CAP Class	Vulnerable to storm surge?	Vulnerable to SLR?	Vulnerable to other hazards?	Inundation from Storm Surge	Inundation/Saltwater Intrusion from SLR	Erosion/Wave Attack	Wind	Total Score	High - Total first 3 columns greater than 7 or Total of all greater than 9. Medium – first 3 columns greater than 5 and total of all - 9 or
Oak Forest (including mixed hardwood and pine)	Mixed Forest (11)	Yes. Vulnerable to loss of salt-intolerant vegetation during storm surge events.	Yes. Vulnerable to loss from saltwater intrusion through surface or groundwater	Yes. Vulnerable to development, fire suppression, conversion to single-aged loblolly pine stands, and introduction of exotic plants. Mixed oak forests containing non-longleaf pine species may be more susceptible to wind damage.	2	3	2	3	10	high
Beach/Dune Communities	Unconsolidated Shore (19)	Yes. Vulnerable to accelerated erosion of berm, dunes, and back bay, and loss of vegetation, during storm surge events.	Yes. Vulnerable to loss of area between berm and dune lines (conversion to intertidal beach); barrier islands vulnerable to overall size reduction with loss from ocean facing and back bay sides.	Yes. Vulnerable to erosion from wave attack and wind, degradation from altered shoreline processes due to armoring, development and human disturbance. These communities often require nourishment due to wind/wave erosion; however, erosion and accretion are natural process seen at numerous places along the shoreline. Silt fences offer some protection against negative effects of wind.	2	3	2	2	9	medium



# Vulnerability Scores



CCAP Class	NC		SC		GA		FL		FL panhandle		AL		MS		PR/USVI		
	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	
Grassland	8	medium	7	medium	7	medium	8	medium	8	medium	8	medium	8	medium	8	medium	
Deciduous Forest	9	medium	9	medium	9	medium	11	high	11	high	11	High	11	high	10	high	
Evergreen Forest	9	medium	9	medium	10	high	10	high	11	high	11	High	11	high	10	high	
Mixed Forest	10	high	10	high	10	high	10	high	10	high	11	High	10	high	10	high	
Scrub Shrub	8	medium	8	medium	7	medium	9	high	9	high	10	High	10	high	9	medium	
Palustrine Forested Wetland	9	medium	9	medium	9	medium	11	high	11	high	11	high	11	high	10	high	
Palustrine Scrub/Shrub Wetland	8	medium	8	medium	8	medium	10	high	9	medium	10	high	10	high	9	medium	
Palustrine Emergent Wetland	8	medium	8	medium	8	medium	9	high	8	medium	8	Medium	8	medium	9	high	
Estuarine Forested Wetlands	7	low	7	low	7	low	6	low	9	medium	9	medium	9	medium	6	low	
Estuarine Scrub-Shrub Wetlands	7	low	7	low	6	low	6	low	7	medium	7	Medium	7	medium	7	medium	
Estuarine Emergent Wetlands	7	low	8	medium	7	medium	7	medium	5	low	5	low	5	low	5	low	
Unconsolidated Shore	9	medium	10	high	8	medium	9	medium	10	high	11	High	11	high	11	high	
Barren Land																8	medium
Open Water	7	medium	6	low	6	low	5	low	6	low	7	Medium	6	low	8	medium	
Palustrine Aquatic Bed	7	medium	8	medium	7	medium	8	medium	8	medium	6	Low	6	low	8	medium	
Estuarine Aquatic Beds	6	low	7	medium	7	medium	8	medium	8	medium	7	medium	7	medium	8	medium	



# Environmental Resources Vulnerability Map



NOAA's Category 5 Maximum of Maximums (MOM)

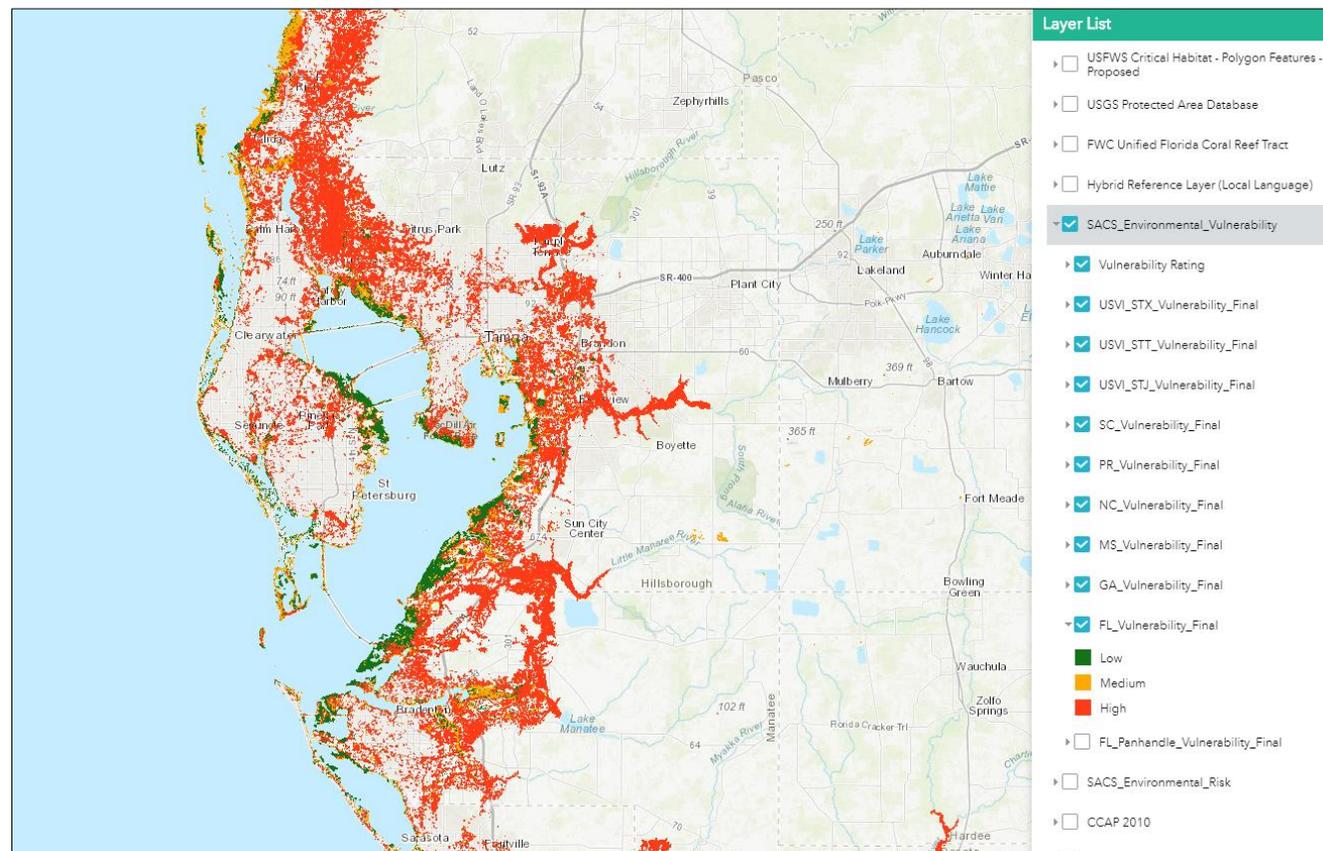
SLOSH inundation layer used to clip the NOAA C-CAP data to the Category 5 MOM footprint

C-CAP landcover classes were reclassified from their C-CAP class value to a vulnerability score

Green: low vulnerability (1)

Orange: medium vulnerability (2)

Red: high vulnerability (3)





# Environmental Resources Inundation Risk Map



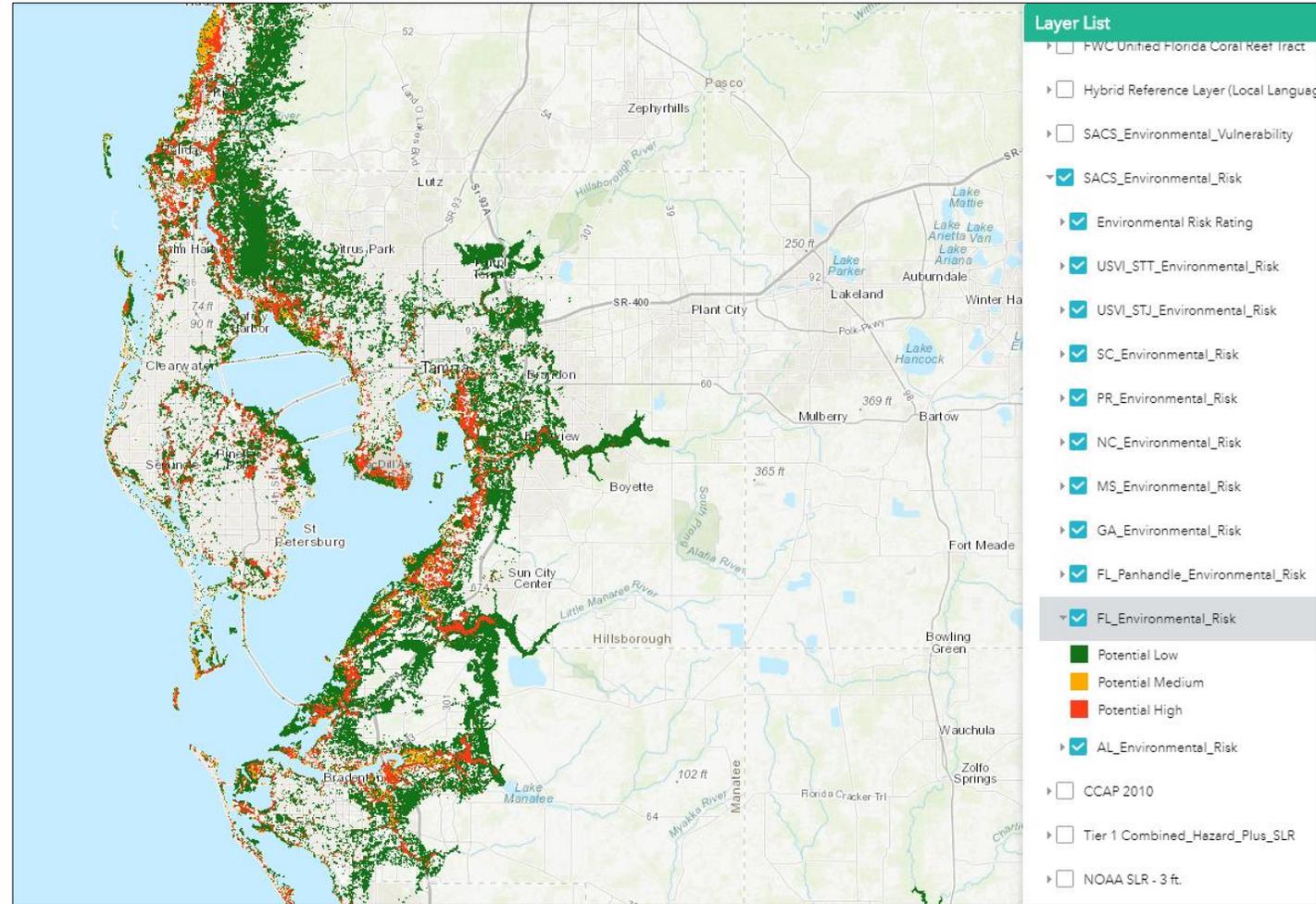
Vulnerability indices multiplied against the SACS Tier 1 Combined Hazard plus sea level rise to represent the environmental risk

Tier 1 Combined Hazard plus SLR shows the areas with a 10% chance of being flooded due to storm surge and sea level rise in any one year, generally represented as 0.1

Green: low potential risk

Orange: medium potential risk

Red: high potential risk





# Launch SACS Environmental Web Mapping Application

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# Clarifications and Questions on Web Mapping Application

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# Constraints of Methodology



- **C-CAP classes located outside of the NOAA's CAT 5 MOM inundation footprint including aquatic beds and open waters are not currently included in the vulnerability or the risk analyses.**
- **The Tier 1 hazard layer's bounding extent is the Cat 5 MOM. When the vulnerability indices are multiplied by the hazard, areas not in the Cat 5 MOM drop out. In the risk map, some C-CAP classes including unconsolidated shore are not included.**



# Identifying Priority Environmental Areas



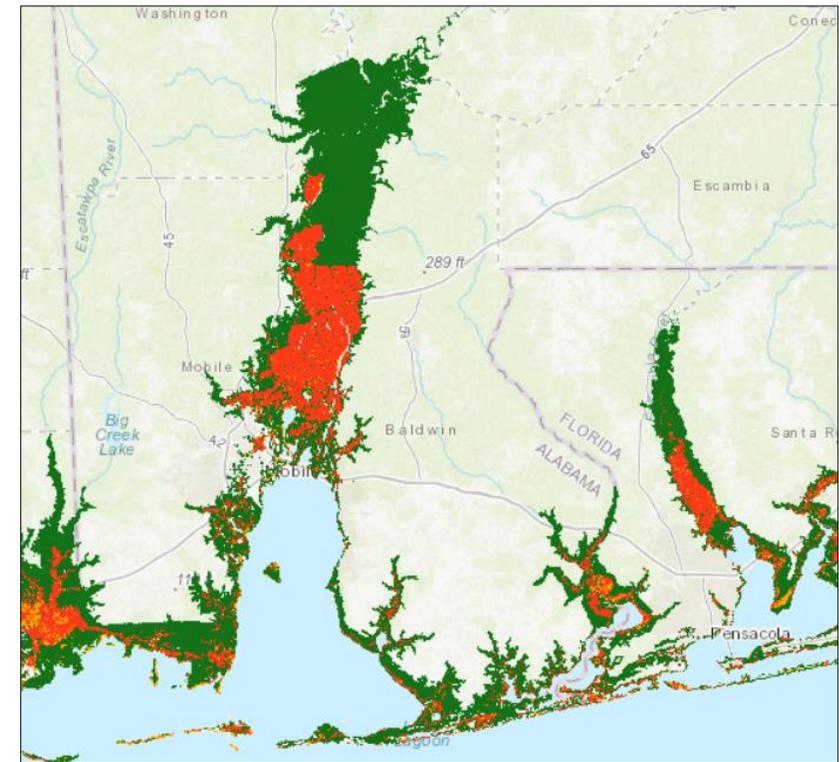
SACS Environmental Analysis identifies the areas at high risk to coastal storm damages as a result of sea level rise

Vulnerability x probability of the hazard = risk

Looking for criteria to identify the highest-risk (top-tier) areas

Examples:

- Critical habitats
- Suitable habitats for listed species
- Managed lands
- State or other entity identified priority areas

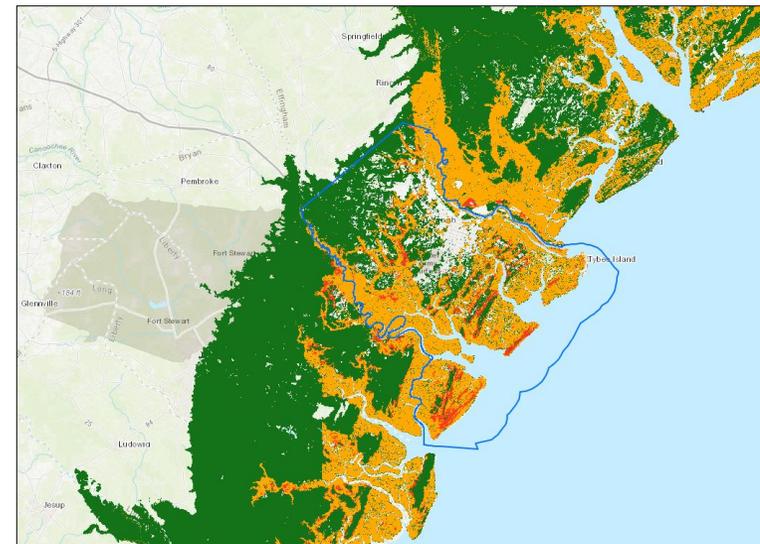
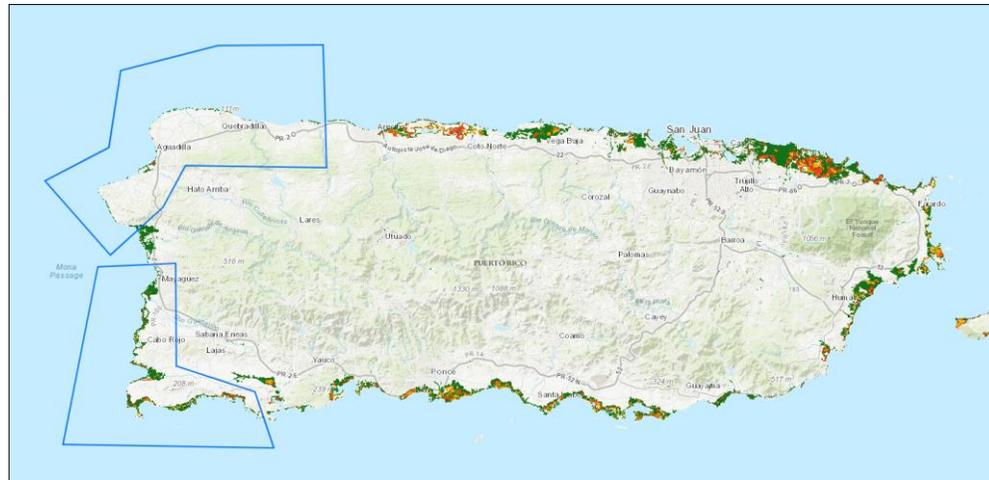




# How will this information be used in SACS?



- Information from the SACS Environmental Resources Inundation Risk Map will be used as input to the focus area action strategies, where at-risk resources are located inside the focus area boundaries.
- For other planning reaches, acknowledgment of at-risk environmental resources will also serve to inform overall recommendations for follow-up studies or strategies.
- An environmental report will be attached to the SACS report that will include vulnerability and risk products, and risk reduction recommendations and strategies.





## Next Steps



- **Link to the SACS Environmental Resources Web Mapping Application and these slides will be provided to stakeholders in a follow-up email**
- **Slides and the webinar recording posted to the SACS website**
- **SACS Environmental Team will identify the priority environmental areas and inform risk reduction measures and strategies for these areas**
- **SACS Environmental Resources Inundation Risk Map will be used in the upcoming Focus Area Action Strategy Meetings in August and September**
- **Stakeholder feedback webinar in September 2020**
- **SACS Draft Report available for public review in October 2021**



# How can you provide feedback?



- **Feedback webinar in September 2020**
- **SACS email address: [SACS@usace.army.mil](mailto:SACS@usace.army.mil)**
- **Reach out to the SACS environmental team! Environmental team email addresses will be provided in a follow-up email.**
- **Additional information on SACS can be found on the SACS website: <https://www.sad.usace.army.mil/SACS/>**
- **Web Mapping Application: <https://sacs.maps.arcgis.com/apps/MapSeries/index.html?appid=f0aa02dd2aa54b4aab34b4bccea3c3d5>**



# Questions and Discussion

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# Thank You



## ADDITIONAL INFORMATION

<https://www.sad.usace.army.mil/SACS/>

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