

The Corps of Engineers and Coastal Storm Risk Management In Puerto Rico

7 April 2016

Presented by:

Dr. Kelly Legault, PhD, P.E.

RSM Regional Center of Expertise

Jacksonville District

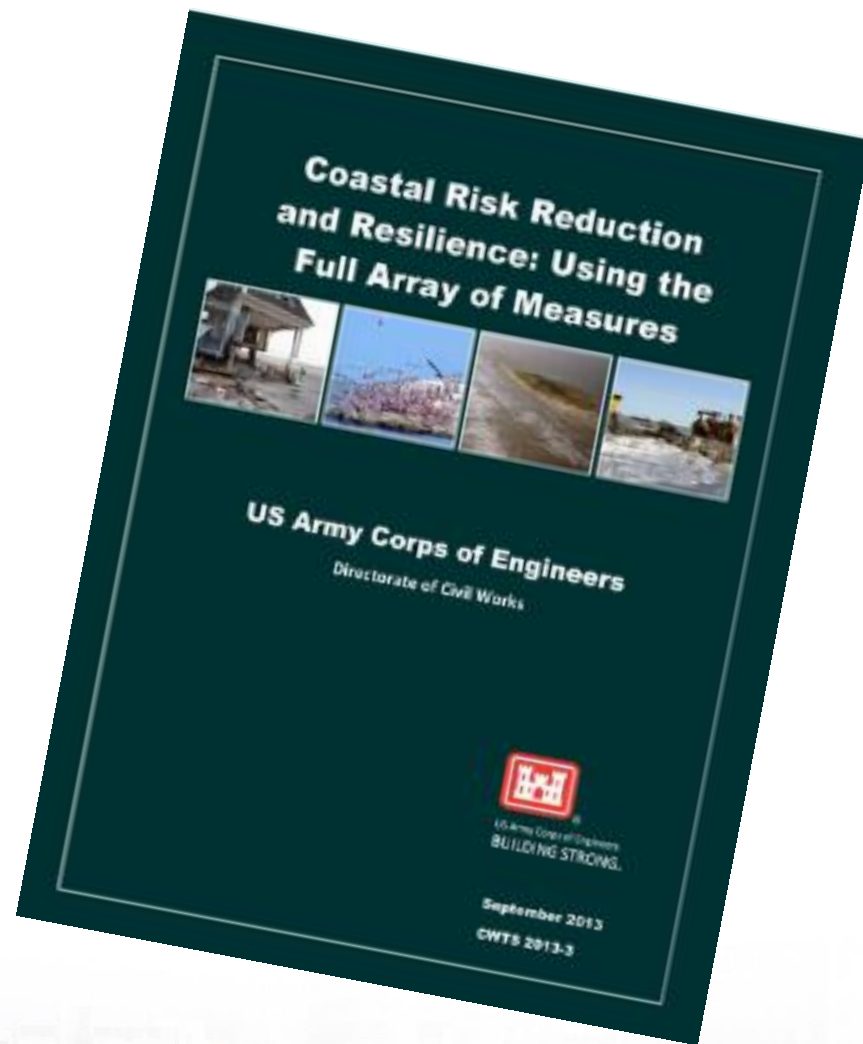


®



AGENDA

- **USACE: Coastal Storm Risk Management Program**
- **Jacksonville District Coastal Experience**
- **CSRM in Puerto Rico**
 - **Why**
 - **How**
 - ▶ **Policy and Budget**
 - ▶ **Puerto Rico's path forward**
 - **What**
 - ▶ **Adapting for a Resilient Future**
 - ▶ **Systems Approach**
 - ▶ **Redundancy**
 - ▶ **Environment**



<http://www.corpsclimate.us/docs>



BUILDING STRONG®



NAVIGATION



FLOOD RISK MANAGEMENT



COASTAL STORM RISK MANAGEMENT



ECOSYSTEM RESTORATION



REGULATORY



MILITARY/INTERAGENCY/
INTERNATIONAL SERVICES



EMERGENCY MANAGEMENT



OVERSEAS CONTINGENCY OPERATIONS

JACKSONVILLE DISTRICT MISSION: Deliver value to the Nation by anticipating needs and collaboratively engineering solutions that support national security, energize our economy, and increase resiliency.



BUILDING STRONG®

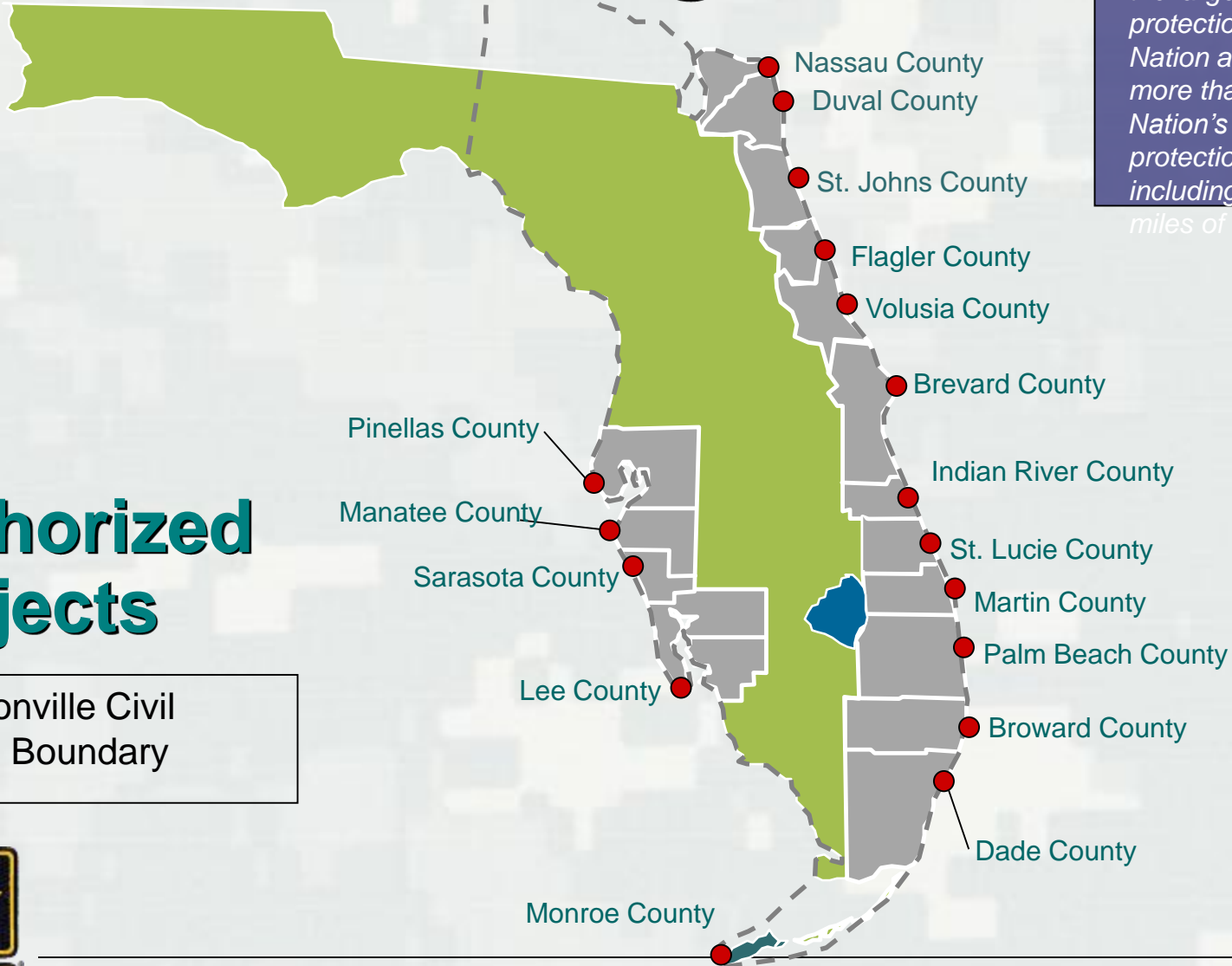
SHORE PROTECTION Jacksonville Program

DID YOU KNOW?

Jacksonville District has the largest shore protection program in the Nation and constructs more than 30% of the Nation's total shore protection projects including more than 125 miles of shoreline.

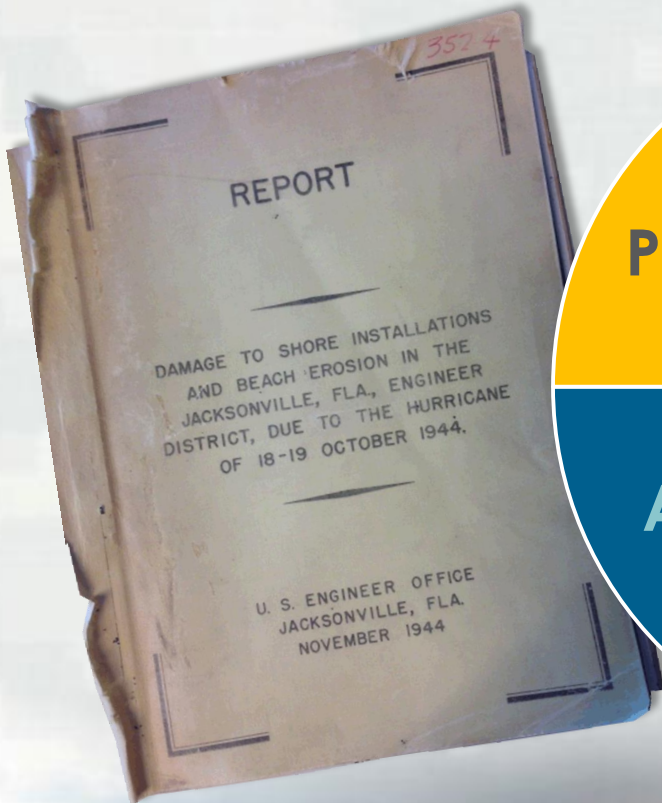
Authorized Projects

Jacksonville Civil Works Works Boundary



BUILDING STRONG®

LEARNING ORGANIZATION Resilience



With Project: located close to point of landfall



Without Project: 30 miles away from landfall

Centers of Expertise

- Coastal Planning
- Engineering Research & Design Center
 - ▶ Coastal Hydraulics Lab
- Institute for Water Resources
- Marine Design
- Survey Engineering and Mapping
- Photogrammetric Mapping
- Curation/Mgmt Archeological Collections
- Environmental and Munitions
- Hydrologic Design
- Rapid Response HTRW

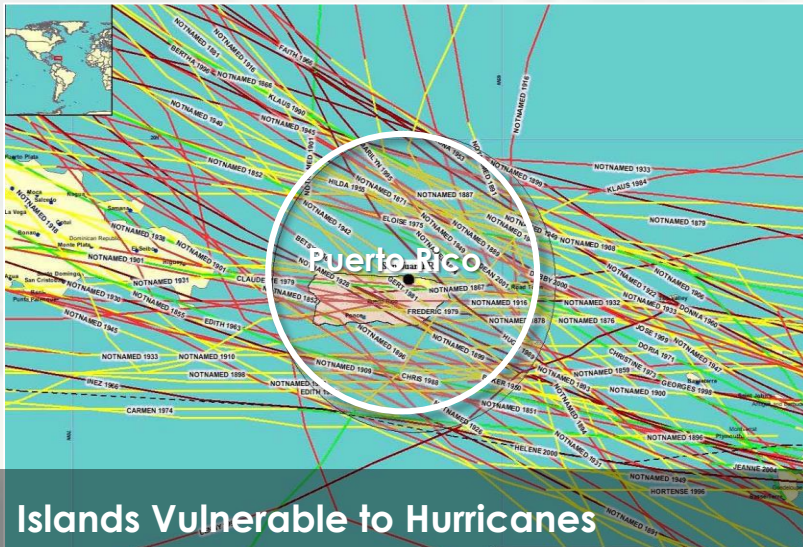




Legend

- Coastal areas with recurring damage | w/o a current project
- Ongoing or constructed USACE coastal project

Note: Information collected from USACE investigations or informal surveys)



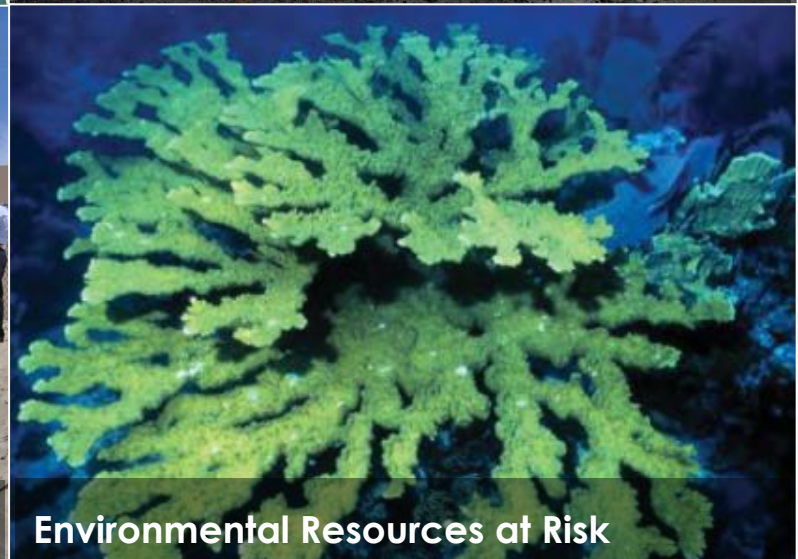
Islands Vulnerable to Hurricanes



Sea-level Rise



Socio-economic Considerations



Environmental Resources at Risk





Critical Infrastructure at Risk



Cultural Resources at Risk



Sand Mining



Recreation at Risk



Why?: Reduce risk to Infrastructure

Why?: Storm response



Ft Pierce Beach, FL post Sandy restoration 100% Federal cost





Why?: Economics



Dade County Beach Erosion Control Project
Before and After



How: Corps Planning Process

- A formalized process that determines, details, and coordinates recommended Federal involvement
- NED Plan: Maximizes national economic development benefits, consistent with protecting the nation's environment, in accordance with national environmental statutes, executive orders, and Federal planning requirements



Benefits of the Corps Planning Process

- Sponsor input throughout the process
- Thorough investigation of the problem and determines Federal solution that COE can support
- Determines Federal funding
- Public coordination and consensus building
- Utilizes Corps expertise
- Can streamline permitting process
- Can provide for multi-year funding

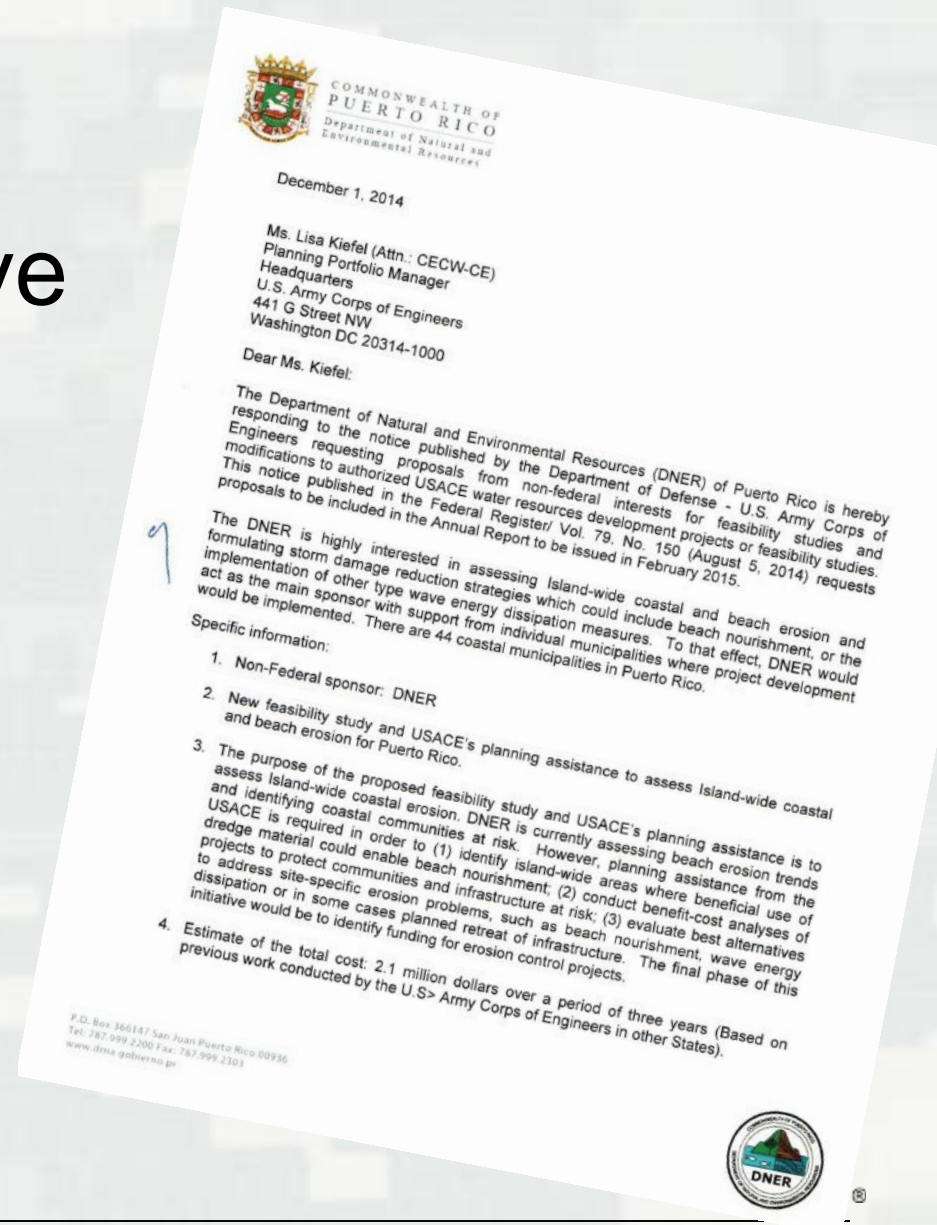


Recent & Ongoing Federal Coastal Actions:

**Puerto Rico Coastal Comprehensive Study Request

WRRDA 2014 Section 2014

- One of only 17 studies nationwide
- Needs WRDA authorization
- Requires Federal Funding
- Will identify vulnerabilities and potentially authorize solutions



Puerto Rico

Regional Sediment Management Study

Figure 1. San Juan RSM Conceptual Sediment Budget

Conceptual Cells A—H, Punta Salinas to Loiza



Rincon Harbor Investigation

Authority:

Planning Assistance to States

Cost to Puerto Rico: \$0

Completed: July 2015

Purpose:

- 1.potential historic erosive effects of dredging the marina basin
- 2.potential effects if the marina basin entrance is re-opened
- 3.alternatives for beneficial use of dredged material
- 4.alternatives for safe boat access if the marina basin is not re-opened



**RINCÓN MARINA INITIAL INVESTIGATION REPORT,
PUERTO RICO - STUDY AREA**

Loiza Continuing Authorities project: Emergency shoreline protection

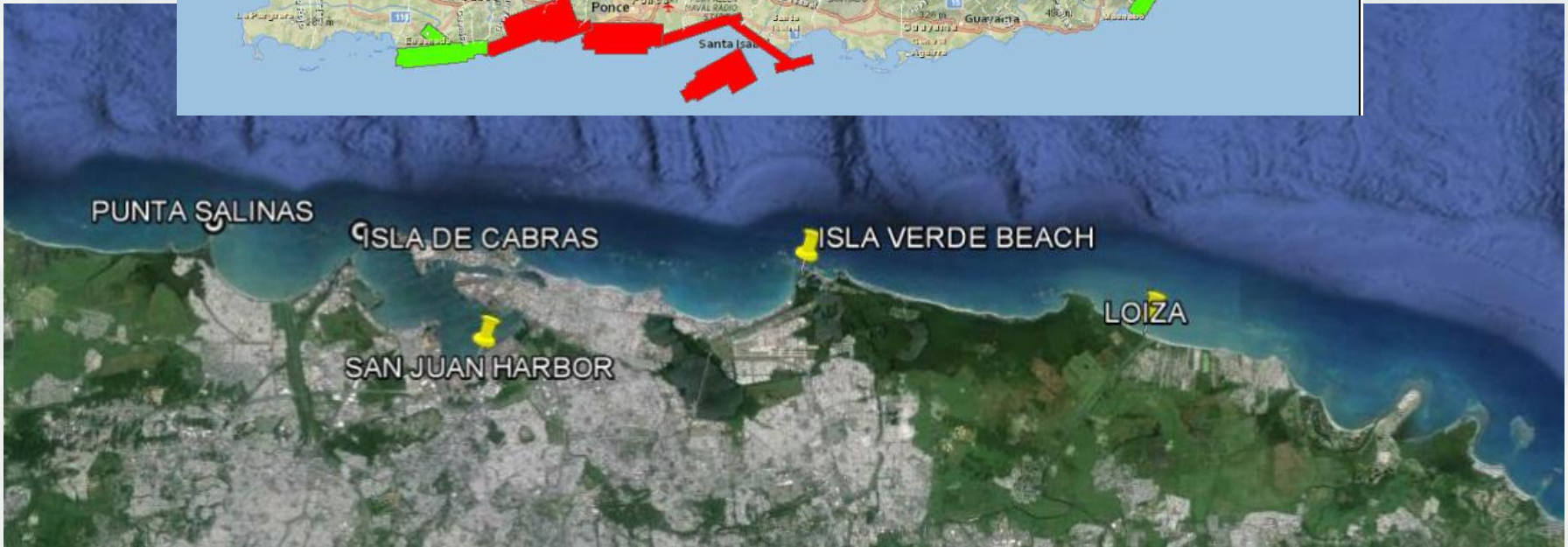
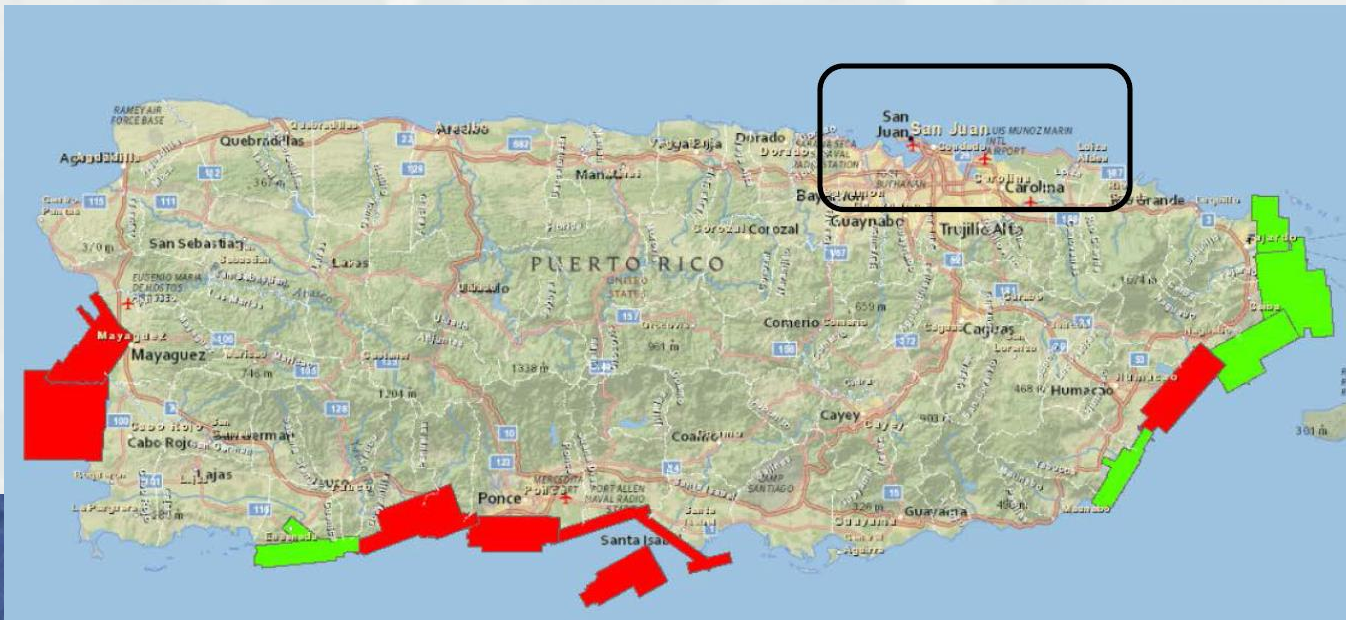
Continuing Authorities
Program
(CAP) Section 14
Emergency Shoreline
Protection

Expedited Feasibility
Expedited Construction
Max \$10M

Will need further review under
Comprehensive Study



Topo-bathy Lidar coverage



What's next

In preparation for the **Comprehensive Study**:

- Gain regional understanding of the coastal systems
 - Develop list of potential projects
- Develop short term/long term goals
- Investigate funding for University collaboration
- Look for renewable sediment sources
- Conduct outreach on benefits of shore protection
 - Puerto Rico Tourism Council
 - DNER
- Continue coordination meetings
 - Outreach to organizations such as ASBPA to help Develop a master plan for Puerto Rico's coastal program
- CERB August 2016 – USACE Coastal Generals board of National Coastal experts



PEOPLE AND TEAMWORK MAKE IT POSSIBLE

THANK YOU



PLACEHOLDERS



DIVERSE USACE PORTFOLIO | CRITICAL MISSION

USACE GOALS

Support National Security

Transform Civil Works

Reduce Disaster Risks

Prepare for Tomorrow

- One quarter of Nation's hydropower
- 299 deep draft harbors (17)
- 627 shallow draft harbors (20)
- 400 miles of coastal storm risk management (137)
- 11,000 miles inland waterways (900 miles)
- 276 locks (6)
- 383 major lakes & reservoirs (720 square mile Lake Okeechobee)
- Emergency operations
- Regulatory responsibilities
- 4340 recreation areas (10)
- 376 million visitors/year (6.2 million)

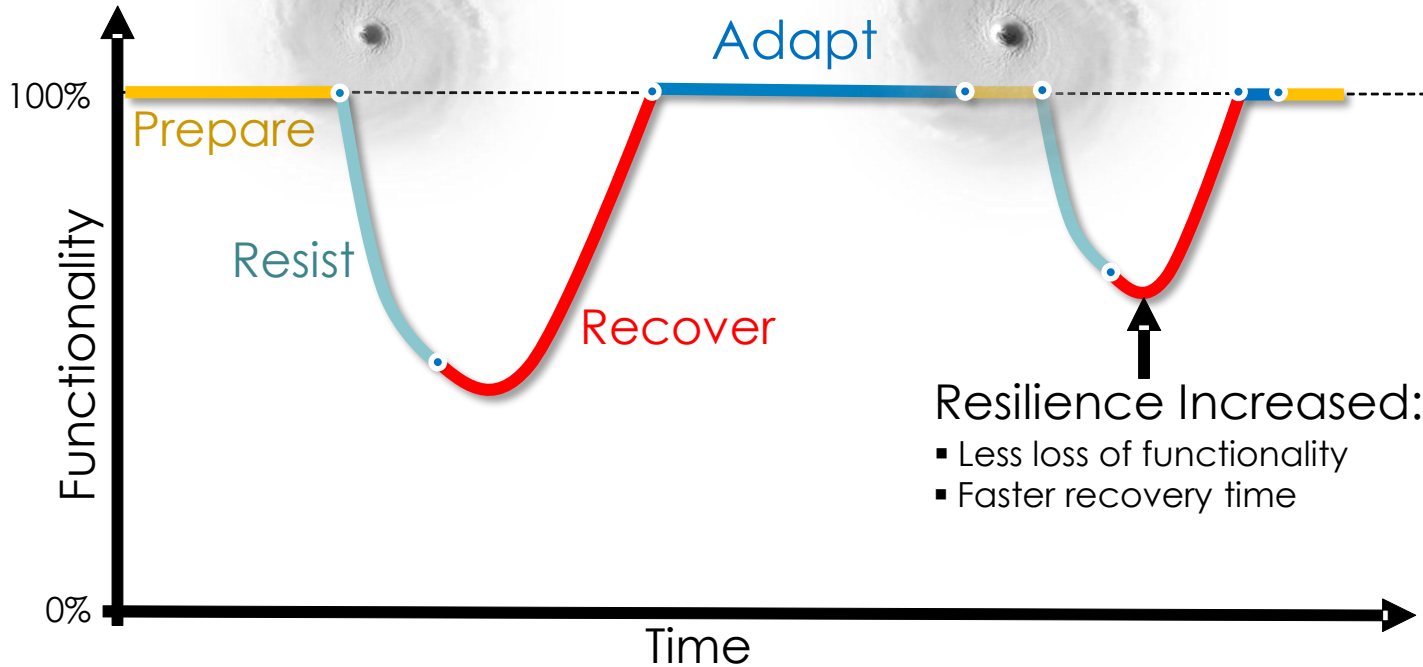
(#) = Jacksonville District Responsibility



U.S. Ports/Waterways Convey > 2B Tons Commerce
Foreign Trade Creates > \$160B Tax Revenues
Cumulative Flood Damage Prevented >\$419B



RESILIENCE



Concept courtesy of North Atlantic Division

Defining Resilience:

Engineering (USACE)

- System's ability to anticipate, resist, recover, & adapt
- Achieves functional performance under the stress of disturbances through time

Ecological (Walker Et Al. 2004)

- System's capacity to absorb disturbance & reorganize while undergoing change
- Retains essentially the same function, structure, identity, & feedbacks

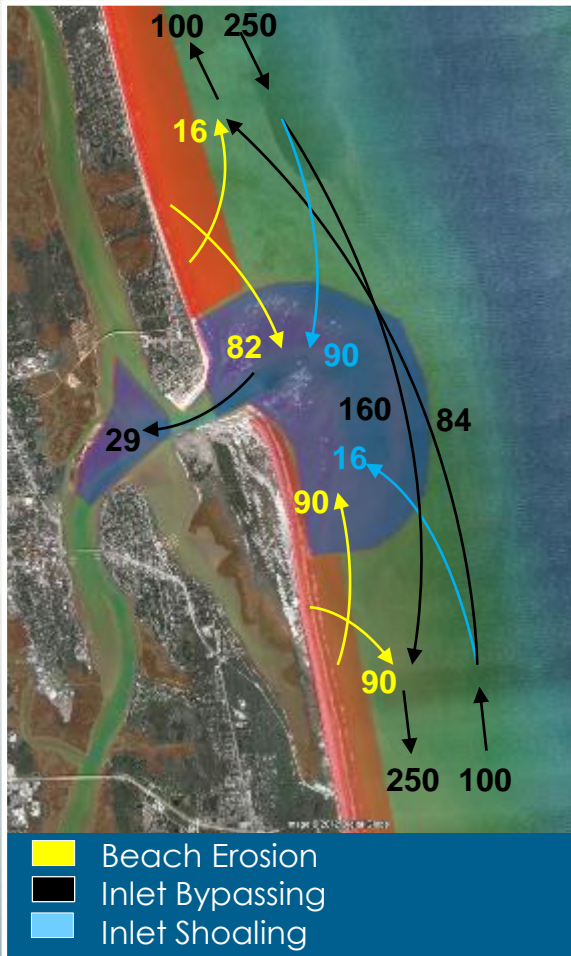
Community (Carri 2013)

- Ability to anticipate risk, limit impact, & bounce back rapidly
- Grows via survival, adaptability, & evolution, in the face of turbulent change



ADAPT: HEALTHY SYSTEMS

Regional Sediment Management



Construction FY15

- Kings Bay/Nassau County
- Jacksonville Harbor/Duval County
- St Augustine Inlet/Vilano Beach
- Ponce Inlet/Volusia County
- Tampa/ Egmont Key
- Jacksonville Harbor/Mile Point (ECO)

Designed FY15/Construction FY16

- Ft. Myers Inlet/Ft. Myers Beach
- Palm Beach Harbor/Town of Palm Beach
- Kings Bay/Nassau County

SEDIMENT BUDGET EXAMPLE
(St. Augustine)





ADAPT: REDUNDANCY

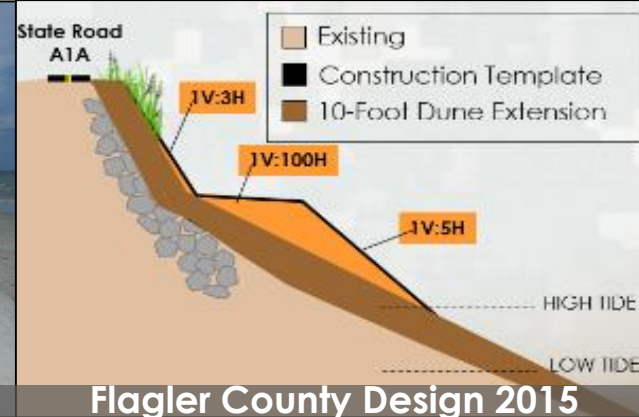
Protection with Structures,
Dunes, Vegetation, Berms



Atlantic Beach 1970



Treasure Island 1990



Flagler County Design 2015

All new studies incorporate redundancy:

- Sarasota County, Lido Key
- Flagler County
- St. Johns County
- St. Lucie County

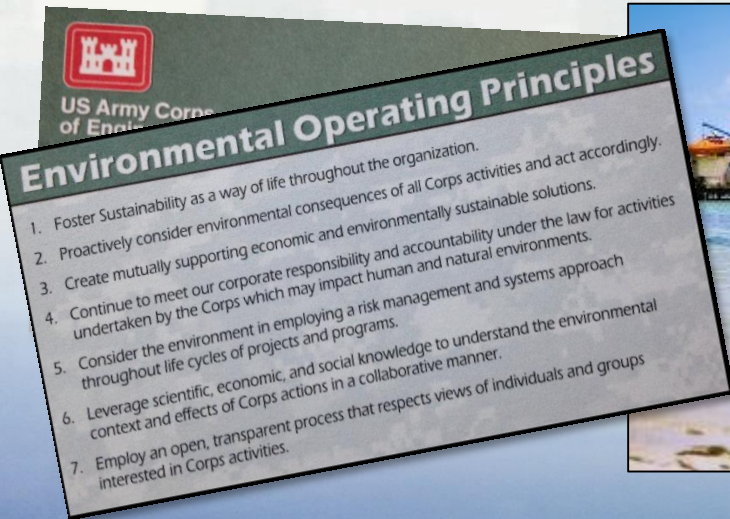


ADAPT: ENVIRONMENT

Healthy Sustainable Projects Depend on Healthy Systems

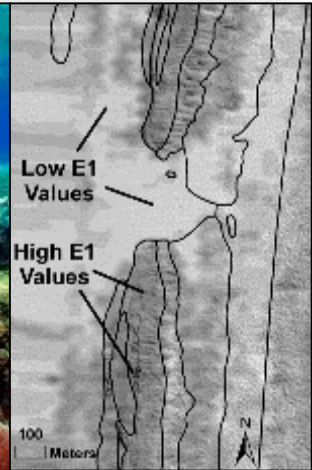
FY15 Focus:

- Turbidity and fate of fines
- Turtles and windows
- RSM: Keeping sediment in the system
- Hardground monitoring and mitigation



Environmental Operating Principles

1. Foster Sustainability as a way of life throughout the organization.
2. Proactively consider environmental consequences of all Corps activities and act accordingly.
3. Create mutually supporting economic and environmentally sustainable solutions.
4. Continue to meet our corporate responsibility and accountability under the law for activities undertaken by the Corps which may impact human and natural environments.
5. Consider the environment in employing a risk management and systems approach throughout life cycles of projects and programs.
6. Leverage scientific, economic, and social knowledge to understand the environmental context and effects of Corps actions in a collaborative manner.
7. Employ an open, transparent process that respects views of individuals and groups interested in Corps activities.

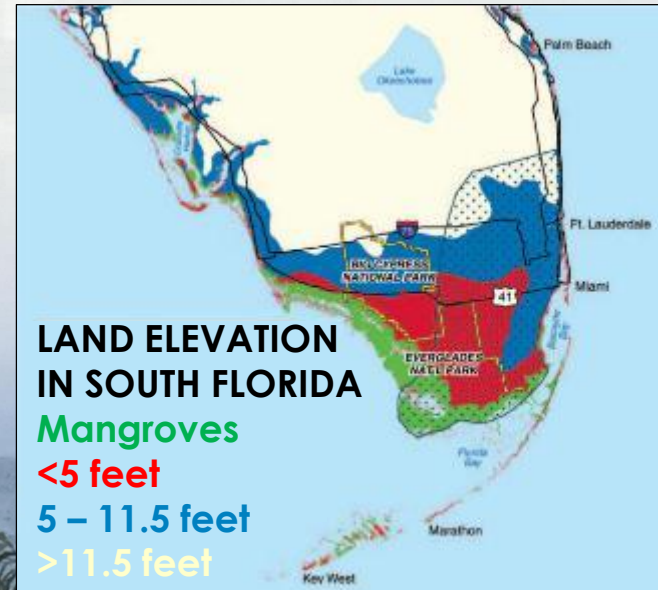




ADAPT: POLICY

JACKSONVILLE DISTRICT IS LEADING CHANGE

- **Sea level rise/climate change: Jacksonville District leader nationally**
 - ▶ ER-1100-2-8162 (Incorporating Sea-level Changes in Civil Works Programs)
 - ▶ ETL-1100-2-1 (Procedures to Evaluate Sea-level Change: Impacts, Responses, & Adaptation)
- **FCCE rules are evolving: adequate versus pre-storm condition**
 - ▶ SAJ is on the National Rule Development Team
- **SMART Planning: No more shelved studies** (SMART= **S**pecific, **M**easurable, **A**ttainable, **R**isk Informed, **T**imely)





PREPARE: CONSTRUCTION & STUDIES

CONSTRUCTION FY15

- Sarasota County, Venice (complete)
- Ft. Pierce (complete)
- RSM placement: Nassau County, Duval County, Volusia County, Egmont Key, St. Johns County

CONSTRUCTION FY16

- Dade County
- Duval County
- Brevard County mitigation
- RSM placement

ONGOING STUDIES:

- St. Johns County
- St Lucie County
- Ft. Pierce
- Lee County, Gasparilla
- Palm Beach County, Jupiter-Carlin

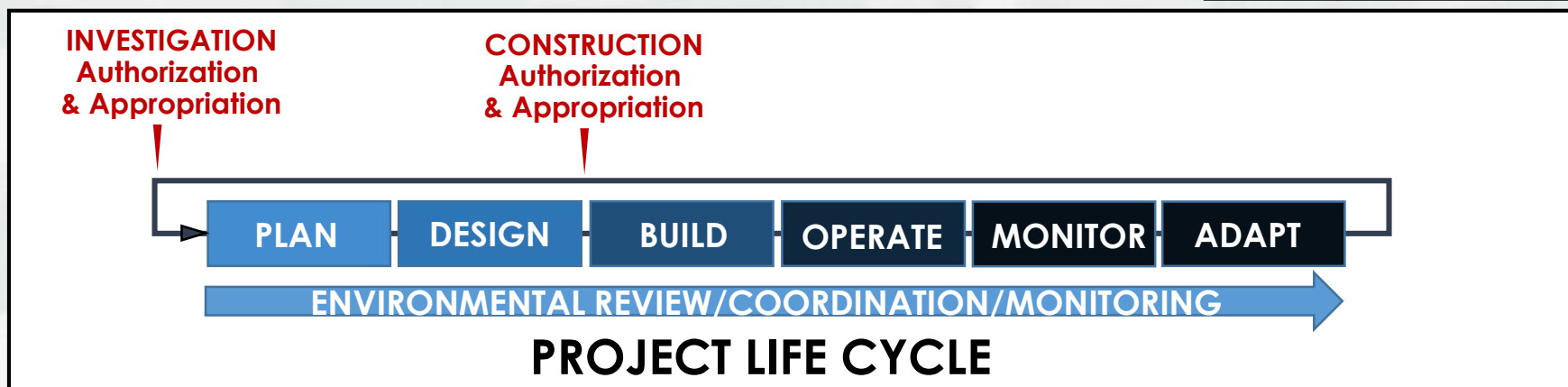




PREPARE: PARTNERSHIPS

Programmatic Updates

- Project life extensions updates
- Authority/Appropriations pending:
 - ▶ Study authorizations: Puerto Rico coastline; South Atlantic Division/Jacksonville District Comprehensive Coastal Study
 - ▶ Construction authorization needed: Flagler County
 - ▶ New Start study appropriation: Collier County, Longboat Key
 - ▶ New Start construction appropriation: Sarasota County, Lido Key



What's next

- Gain regional understanding of the coastal systems
 - Develop list of potential projects
- Develop short term/long term goals
- Determine appropriate types of studies and seek study authority and appropriations.
 - RSM proposal for San Juan harbor submitted
- Investigate funding for University collaboration
- Explore linkages with Navigation dredging
- Look for renewable sediment sources
- Conduct outreach on benefits of shore protection
- Continue coordination meetings
 - Outreach to Florida organizations to help Develop a master plan for Puerto Rico's coastal program



PEOPLE AND TEAMWORK MAKE IT POSSIBLE



THANK YOU





ADAPT: INNOVATION

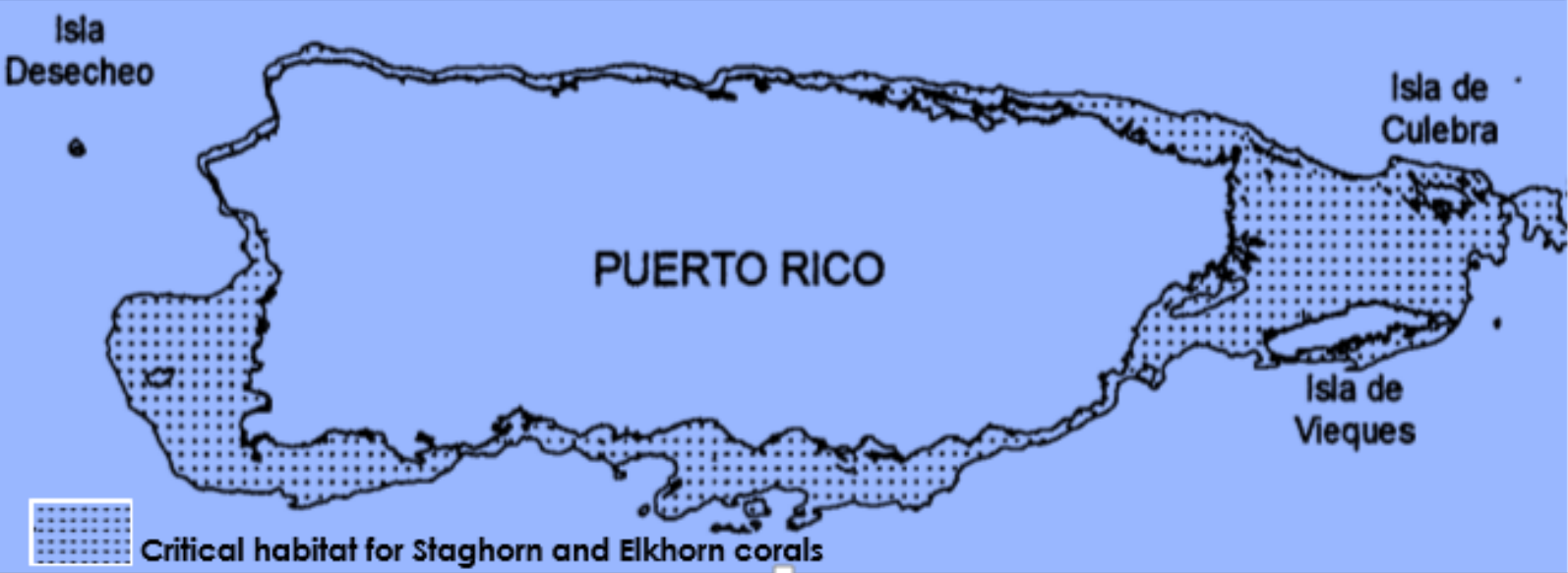


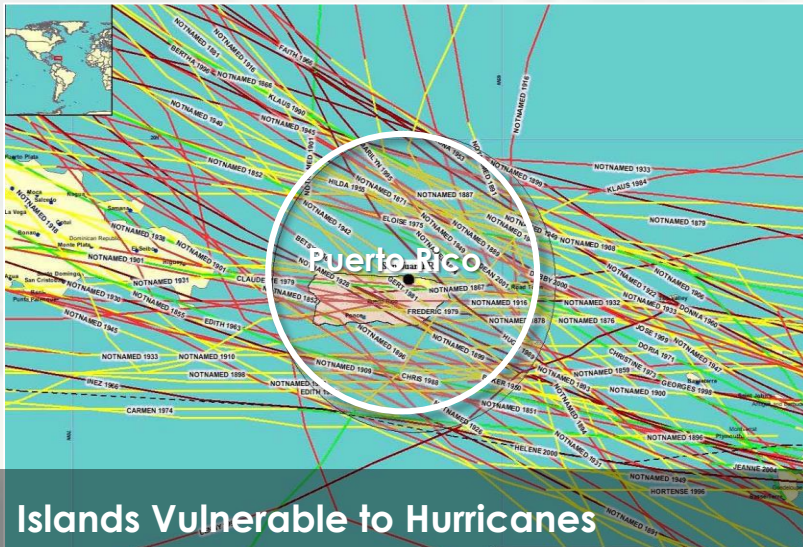
- Egmont Key: silt, fate of fines
- St. Johns County/Vilano Beach O&M nearshore placement & nearshore berms
- Lido Key RSM/coordination: combination of structures/nourishment/modeling/renewable inlet borrow areas



SUMMARY







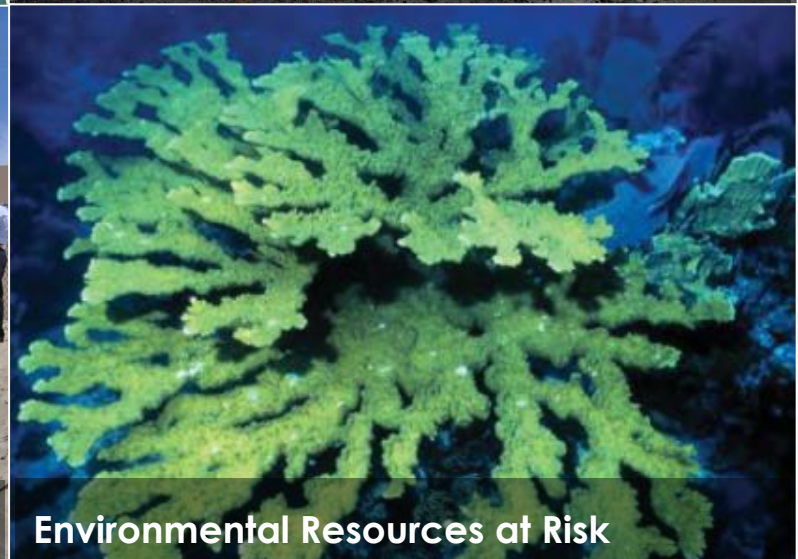
Islands Vulnerable to Hurricanes



Sea-level Rise



Socio-economic Considerations



Environmental Resources at Risk





Critical Infrastructure at Risk



Cultural Resources at Risk



Sand Mining



Recreation at Risk



<http://www.corpsclimate.us/ccacrrr.cfm>



