NATIONAL OCEAN SERVICE

Jeff Payne, Ph.D., Office for Coastal Management
Steve Thur, Ph.D., Acting Director National Centers for Coastal Ocean Science
February 23, 2017


STEWARDSHIP, RECREATION, AND TOURISM
COMMUNITIES
Responsible development protects lives and property by adapting to a changing climate.
PROTECTED AREAS
Protecting special places and keeping coastal areas open to the public supports tourism, recreation, and our economy.
HISTORIC SITES
Preservation connects us to our heritage and culture.
WATER QUALITY
Safeguarding coastal water quality protects human and environmental health, and keeps seafood safe.
CORAL REEFS
Research and conservation helps sustain this source of food, medicine, and protection from coastal storms.
ESTUARIES & WETLANDS
Long-term stewardship helps to protect critical species, fight pollution, and restore habitat.
oceanservice.noaa.gov

PREPAREDNESS AND RISK REDUCTION

PLAN & BUILD

Develop and implement plan to prepare for disaster.

- improving forecasts, observation models, computer systems
- getting information to decision makers faster
- incorporating green infrastructure

DISASTER STRIKES

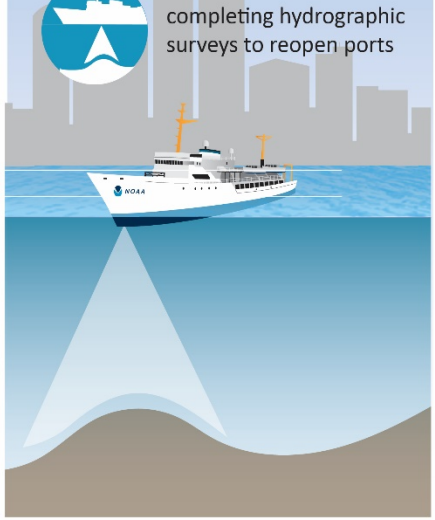
Disasters can be imminent or strike unexpectedly.

- sea level rise
- tsunamis
- coastal storms and hurricanes

RESPOND

Immediately take action following a disaster.

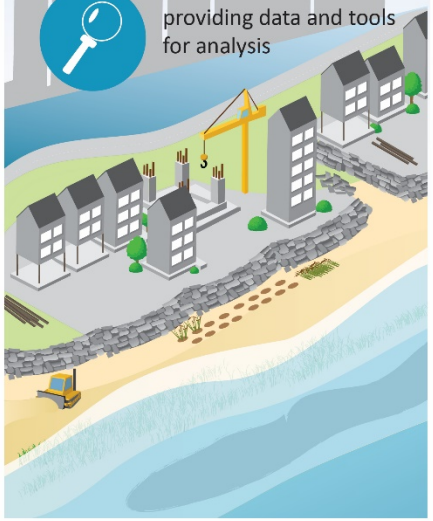
- pollution response
- damage assessment imagery
- completing hydrographic surveys to reopen ports



RECOVER

Assess resilience and manage adaptively.

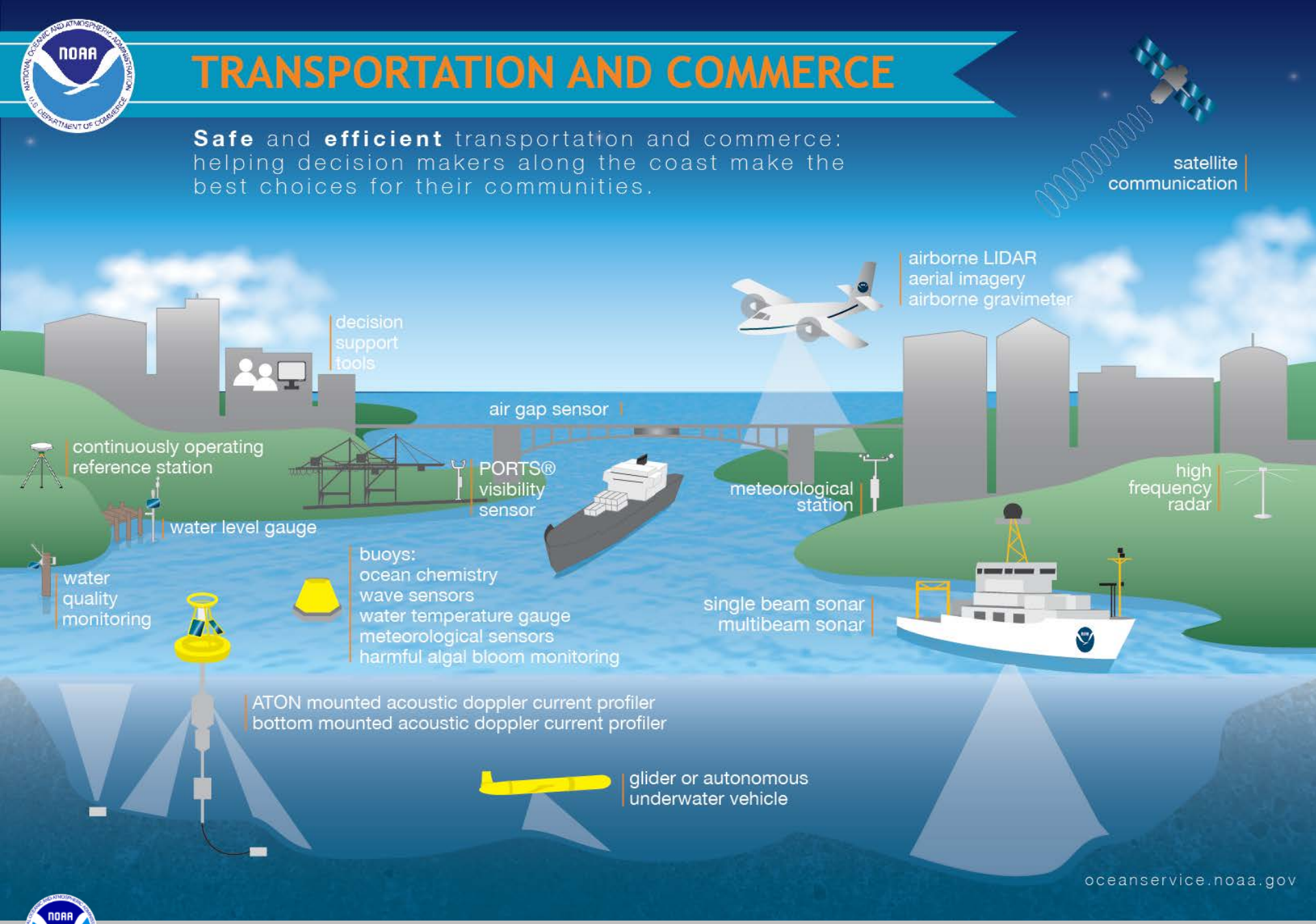
- assessing damage to communities, economy, and environment
- issuing grants to rebuild and restore habitat
- providing data and tools for analysis



Assess and begin planning for the next disaster.

TRANSPORTATION AND COMMERCE

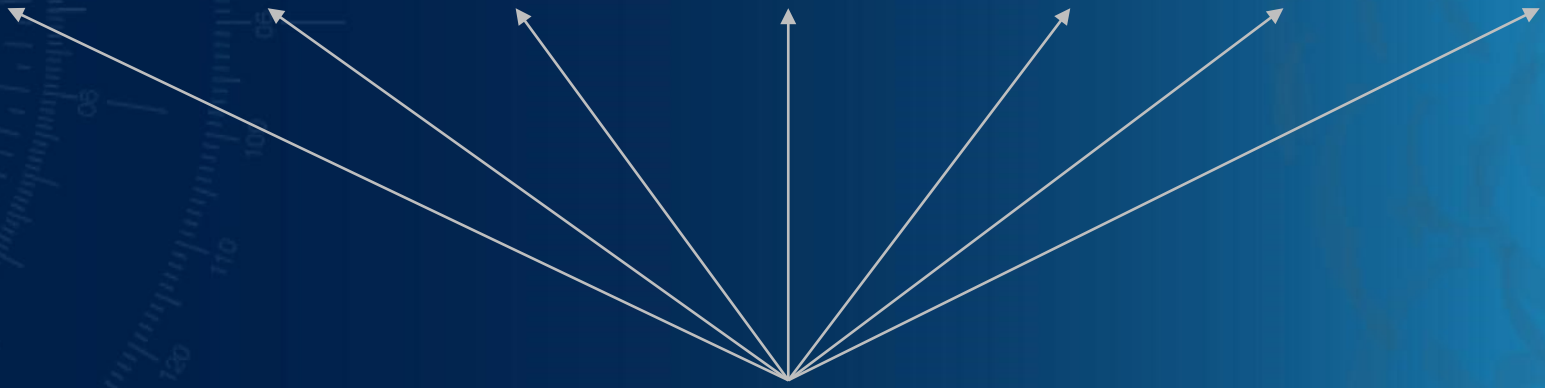
Safe and **efficient** transportation and commerce: helping decision makers along the coast make the best choices for their communities.



Science, Service, Stewardship Continuum

Science ⟷ **Service** ⟷ **Stewardship**

Observe & Monitor | Applied Research | Models & Predictions | Spatial Analysis & Visualization | Information Transfer | Education & Outreach | Management & Decision Making



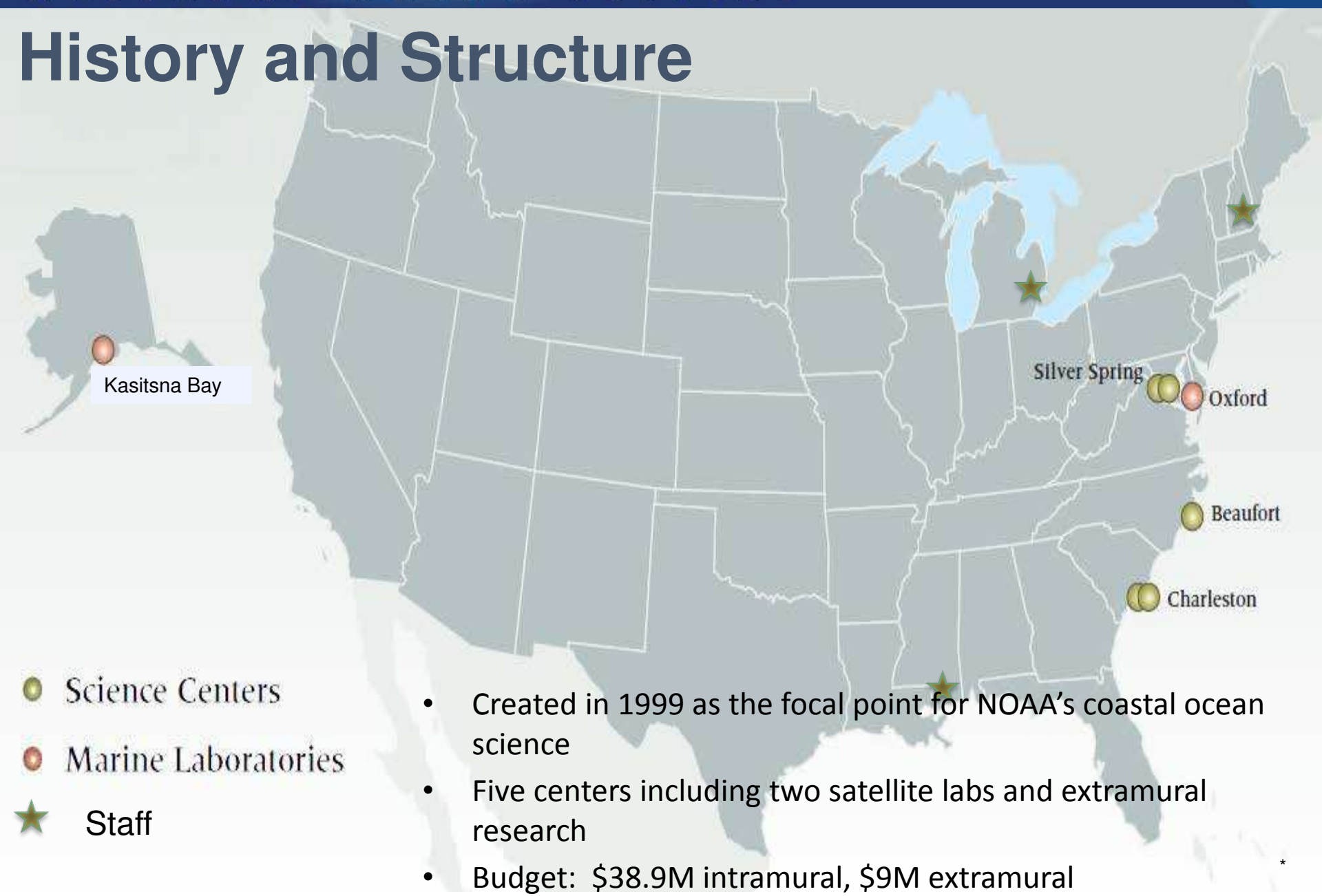
NOAA's National Ocean Service

National Centers for Coastal Ocean Science

Delivering ecosystem science solutions

- for stewardship of the nation's ocean and coastal resources
- in direct support of NOS priorities, offices and customers
- to sustain thriving coastal communities and economies

History and Structure



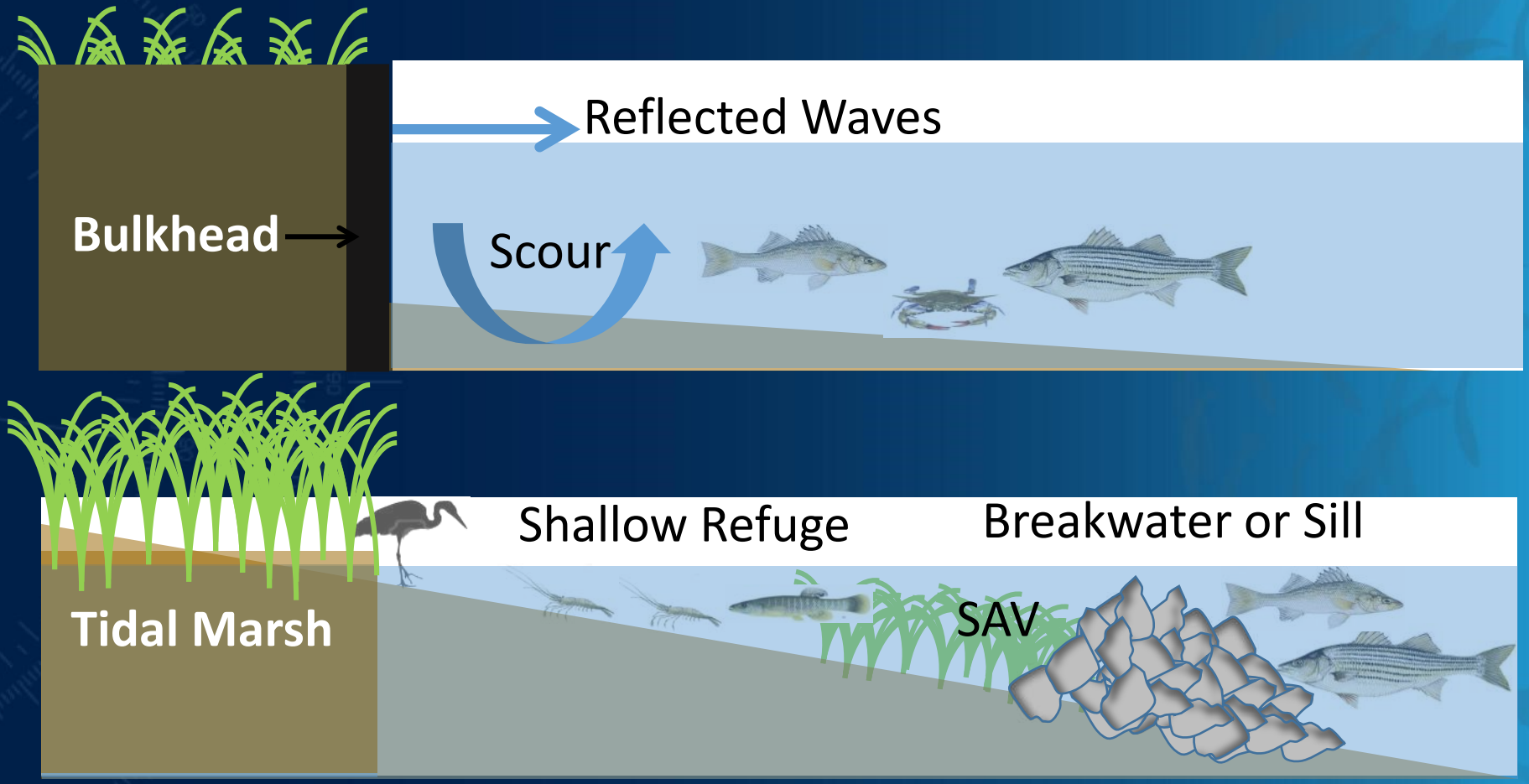
- Created in 1999 as the focal point for NOAA's coastal ocean science
- Five centers including two satellite labs and extramural research
- Budget: $38.9M intramural, $9M extramural

Priorities
NOAA's National Centers for Coastal and Ocean Science

- Marine spatial ecology
- Coastal resilience and climate vulnerability
- Stressor impacts, mitigation and restoration
- Social science
- Monitoring and change detection

Applied Science

What are the ecosystem effects of shoreline type?

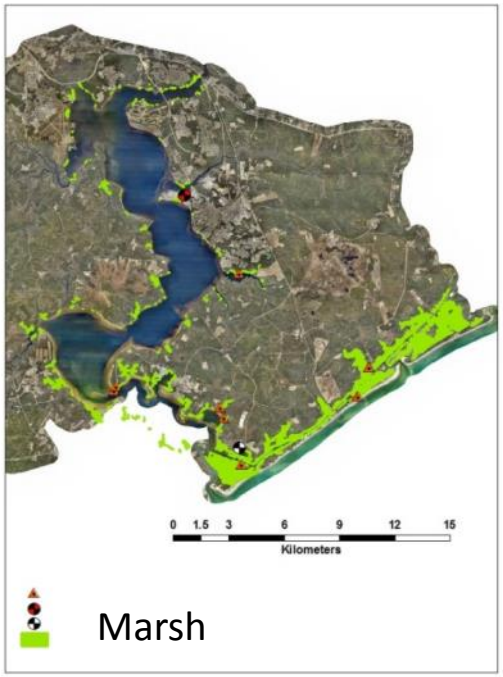


Smithsonian Environmental Research Center

Applied Science

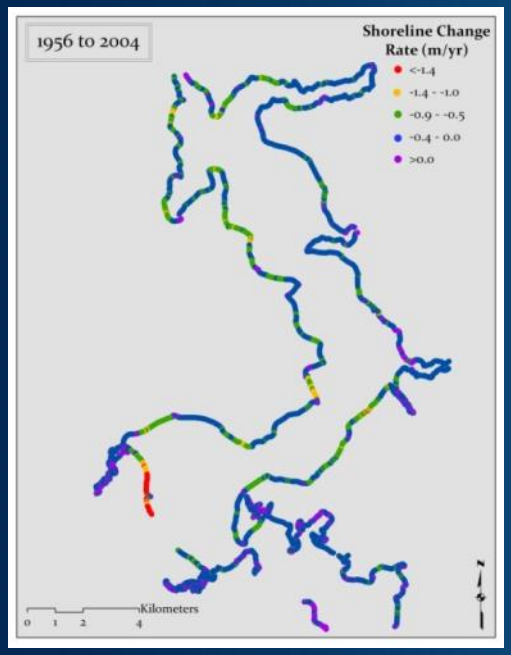
Where are marshes most resilient to erosion?

Estuary Shoreline



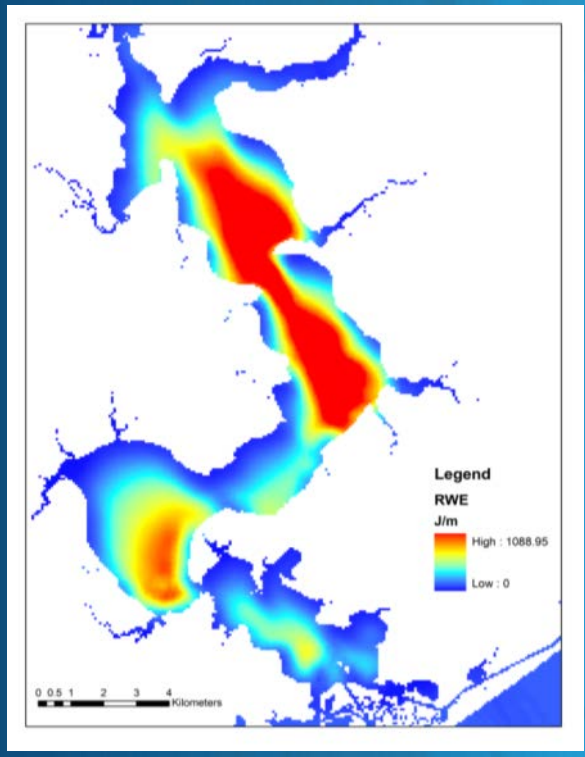
Mapped from small boat

Erosion Rate



Aerial photo. ‘56, ‘89, ‘04

Wave Energy



RWE from Wave Energy Model

Applied Science

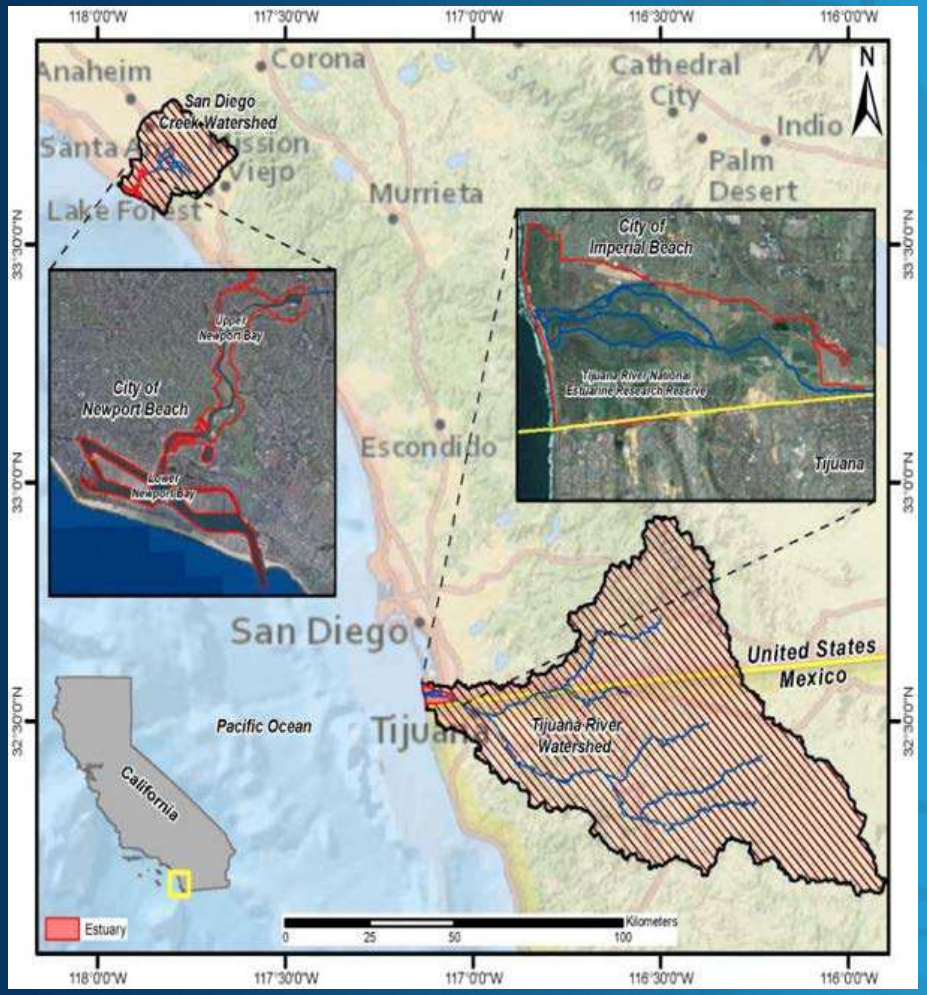
Sediment management effects on NNBF and flood vulnerability?

Newport Beach

- Urban beach community with pleasure boat harbor and tidal salt marsh/estuary

Tijuana River Valley

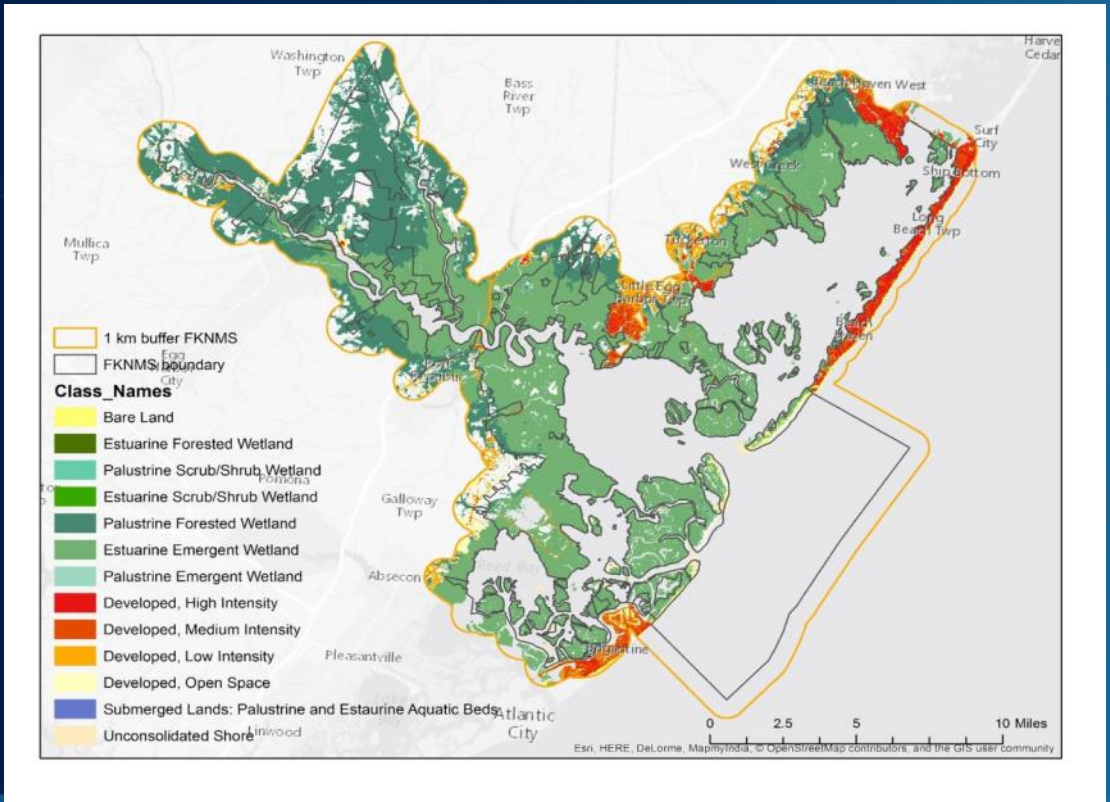
- Rural community with natural floodplain and tidal salt marsh/estuary
- Rapidly growing urban community (MX)



Applied Science

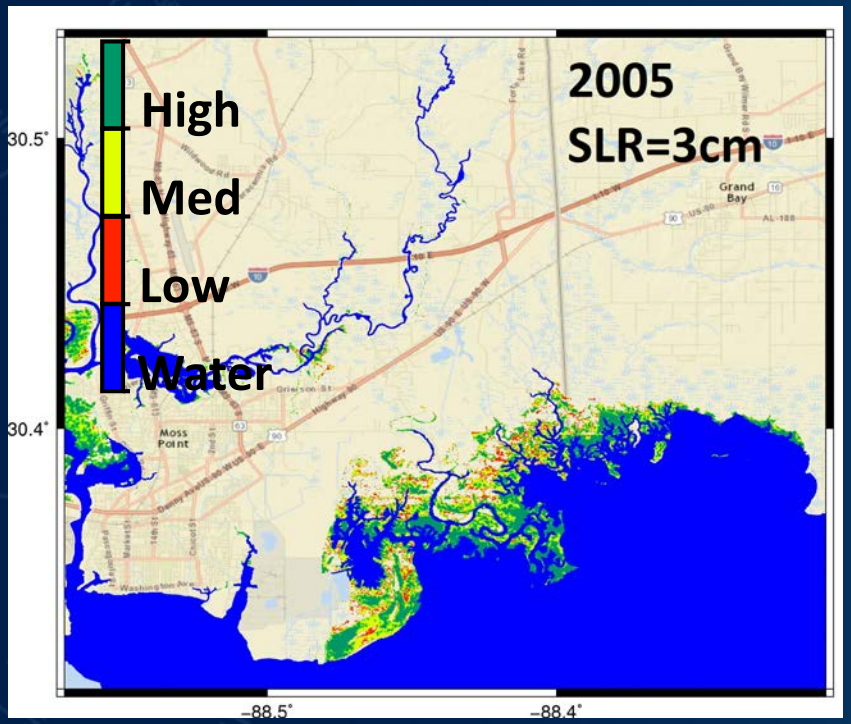
What is the value of marshes for flood protection?

- Value ($$) of damages avoided by having natural habitats
- Value saved from reduced flood insurance costs
- Economic stimulus to the community



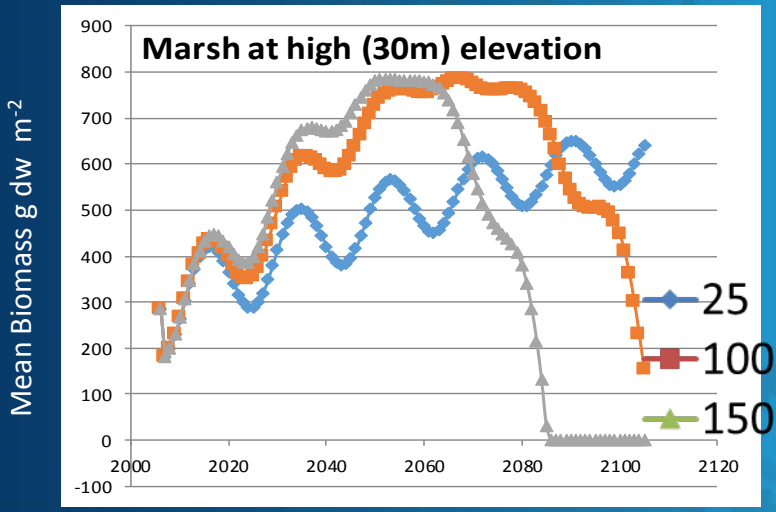
Models and Tools

Solutions to mitigate marsh vulnerability?



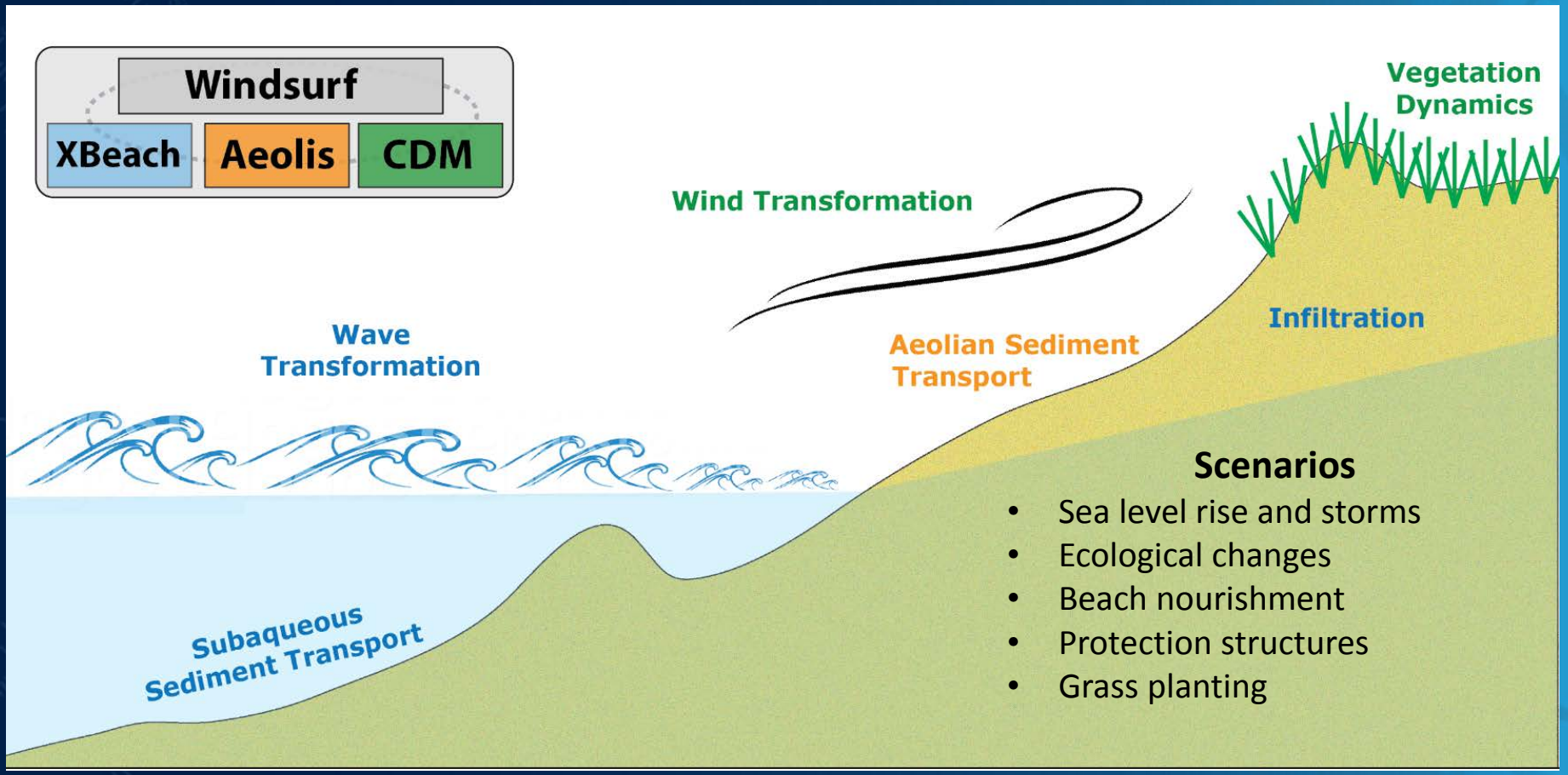
Vulnerability and migration potential
(Hydro-MEM model)

Sea level rise and marsh elevation scenarios (MEM model)



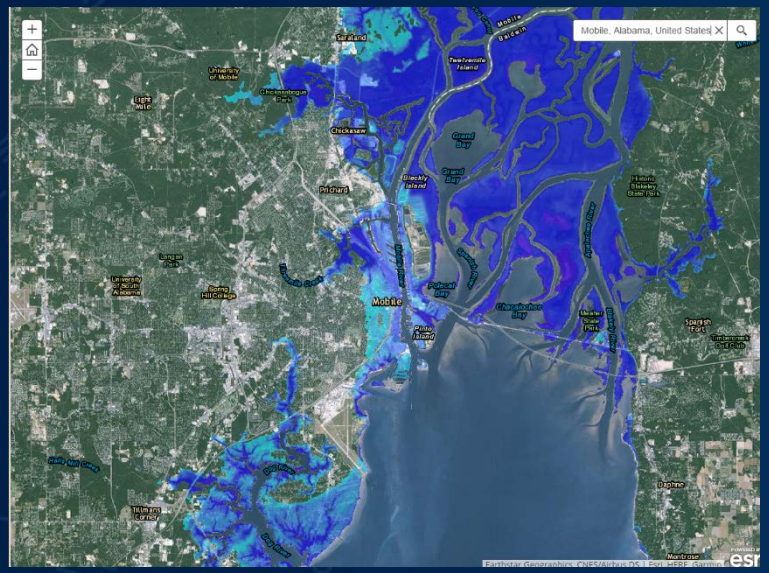
Models and Tools

Beach/dune recovery after storms – climate and policy scenarios?

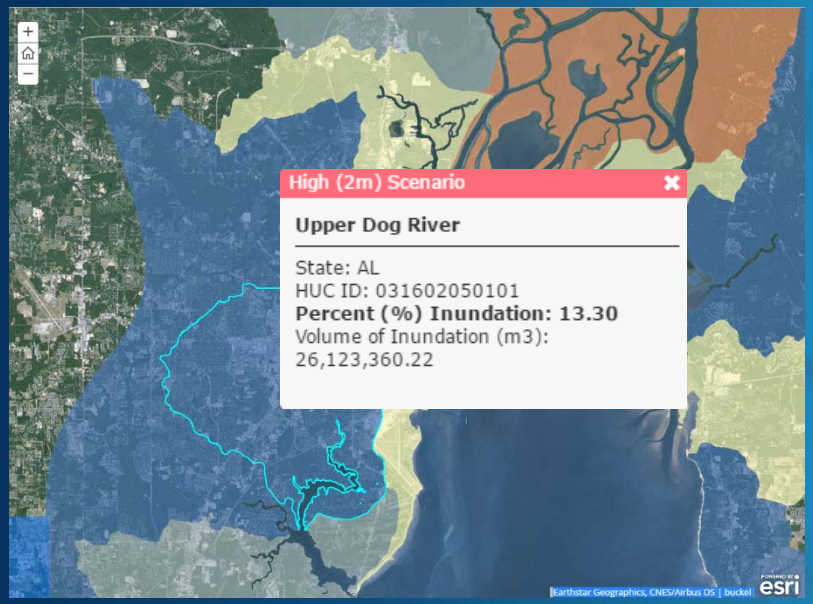


Models and Tools

Geospatial Analytics – Impact of 2 m sea level rise on storm surge?



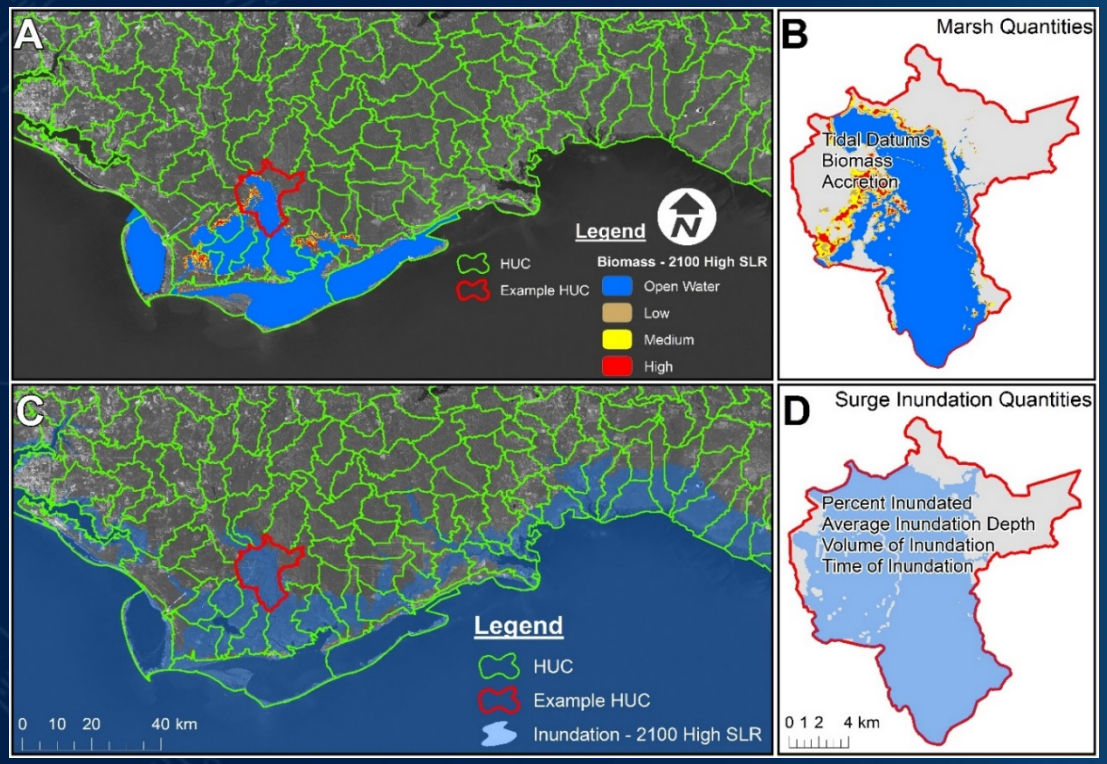
Product development for storm surge model outputs



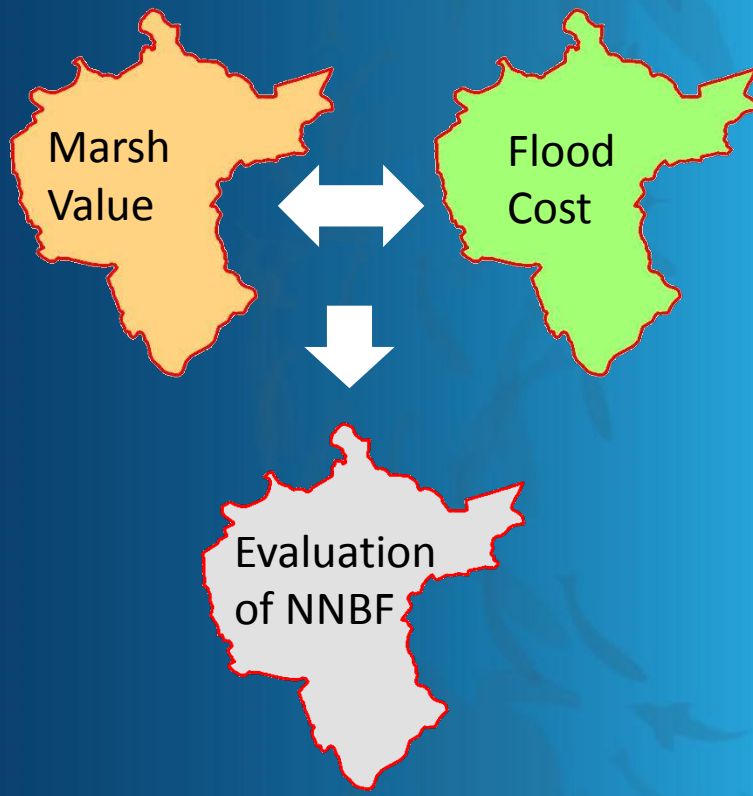
Watershed-level flood analytics

Models and Tools

What is the value of marsh services under scenarios of future conditions?



HUC by HUC Assessment

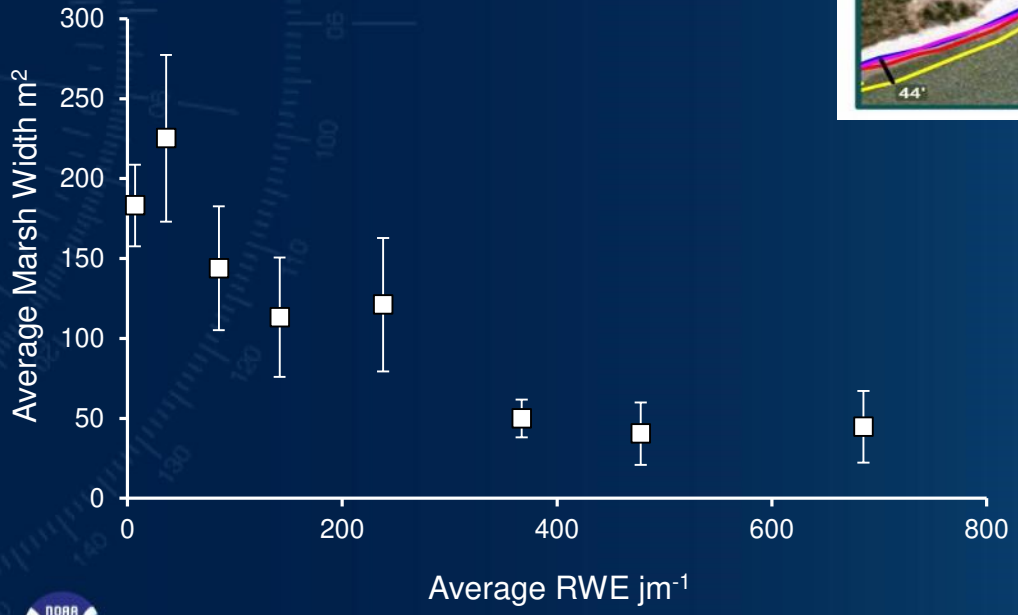


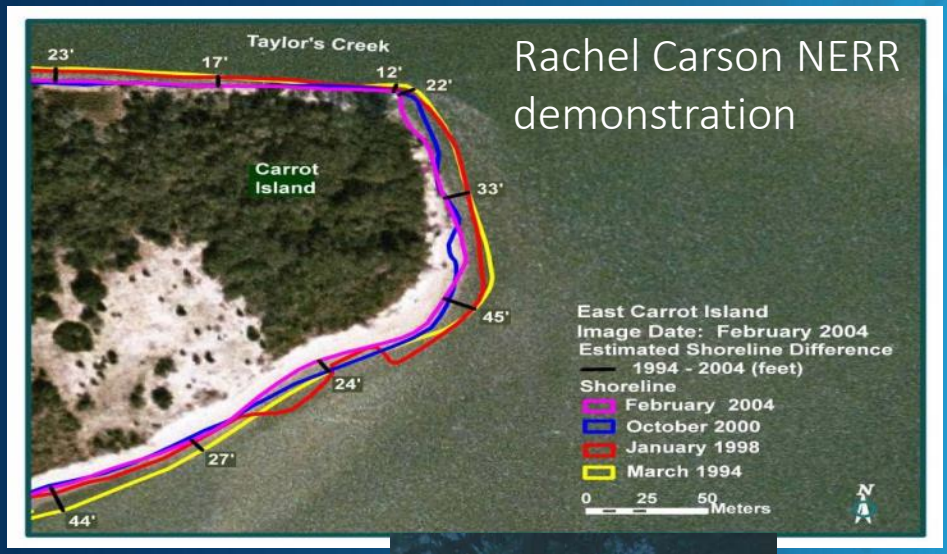
Policy Decisions

Guidance and Metrics

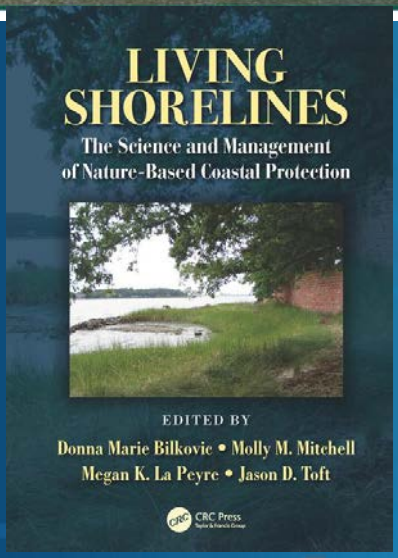
How much wave energy can living shorelines sustain?

Fringing marsh distribution versus wave energy



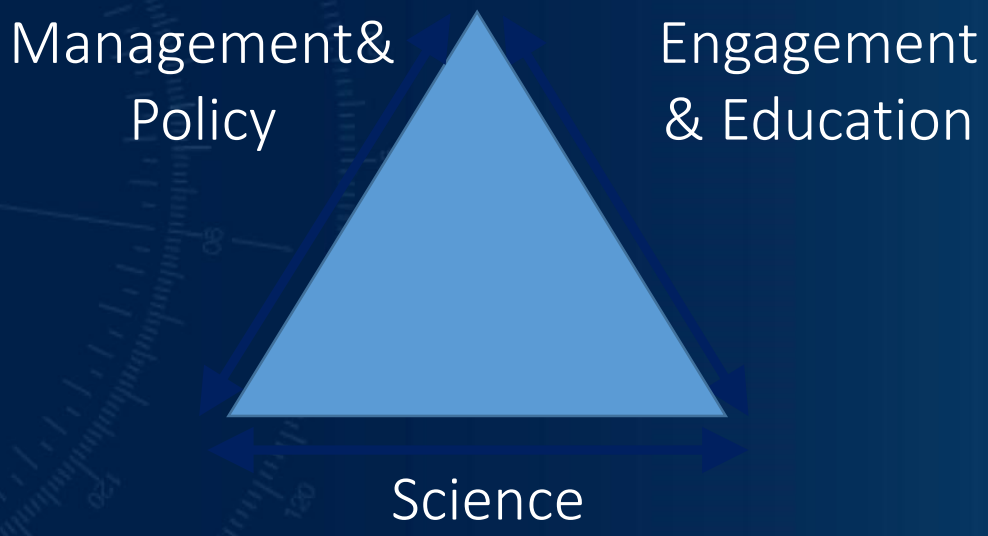


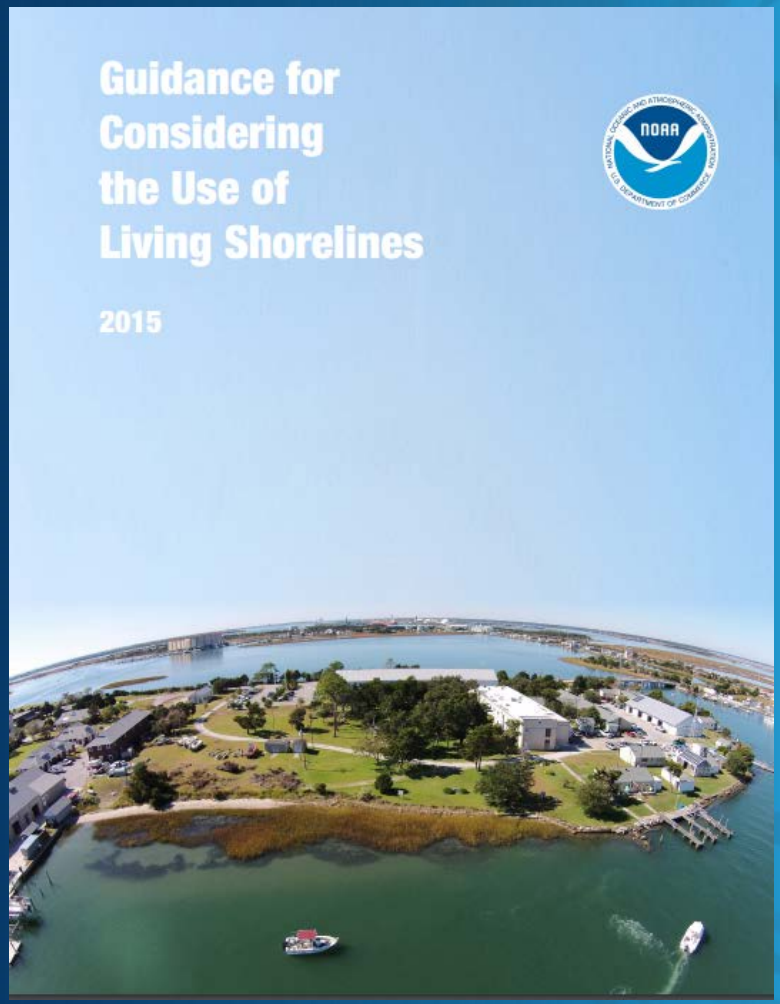
Rachel Carson NERR demonstration



Guidance and Metrics

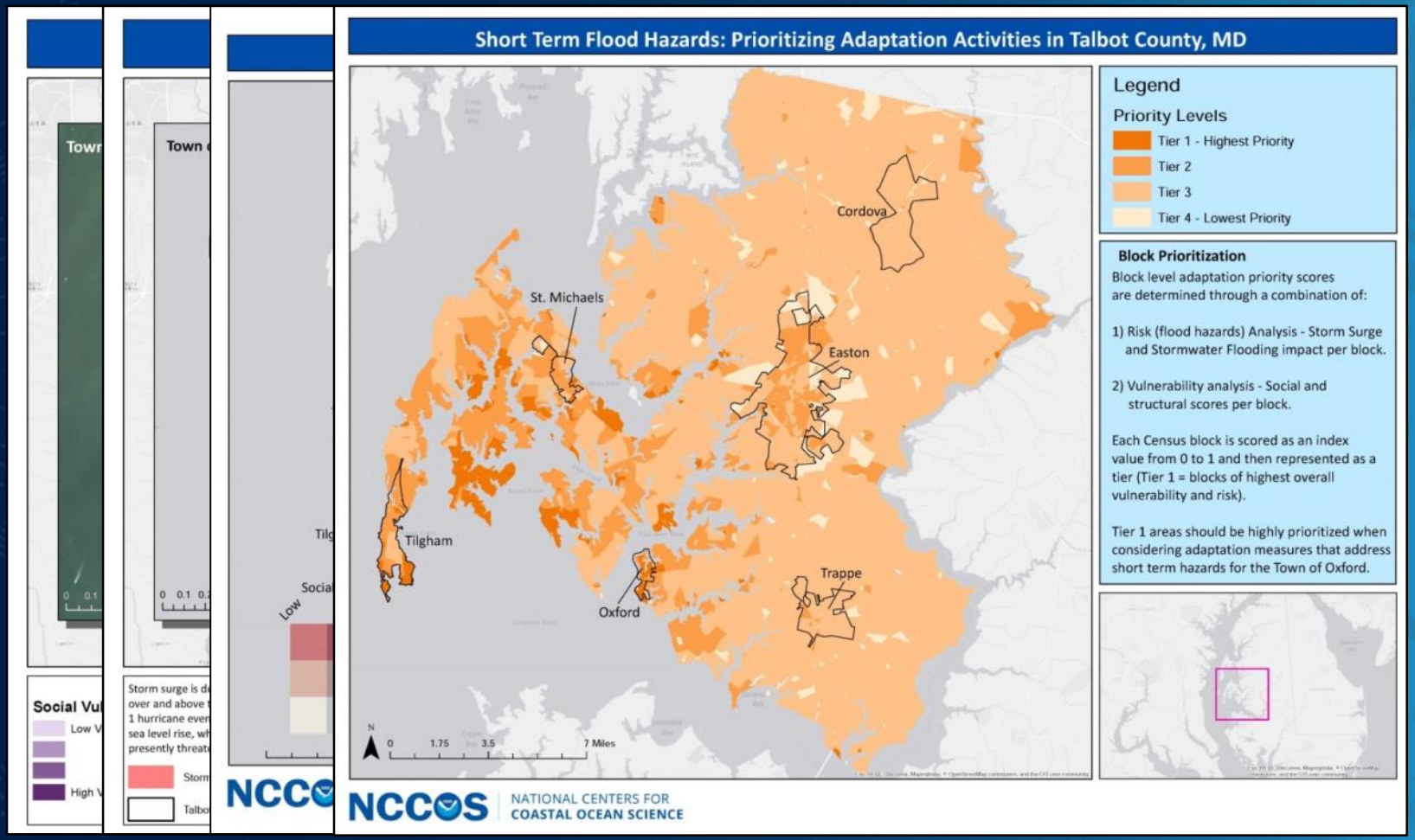
Guidance for installing a living shoreline?





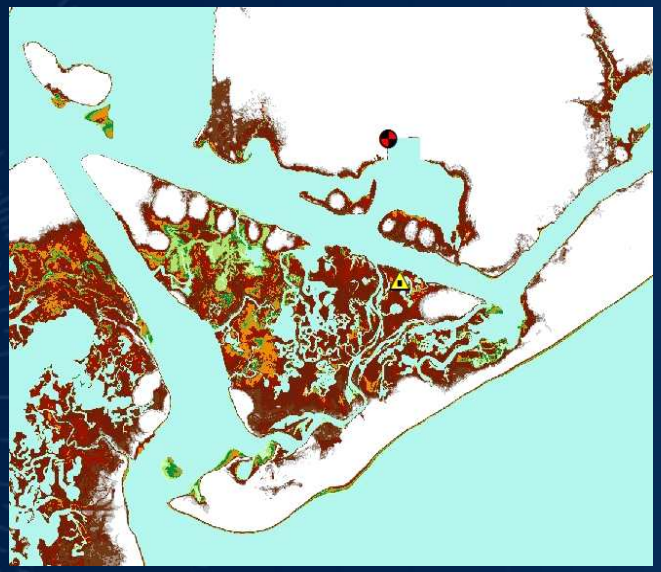
Guidance and Metrics

How can our science inform adaptation?



Emerging Partnerships with USACE

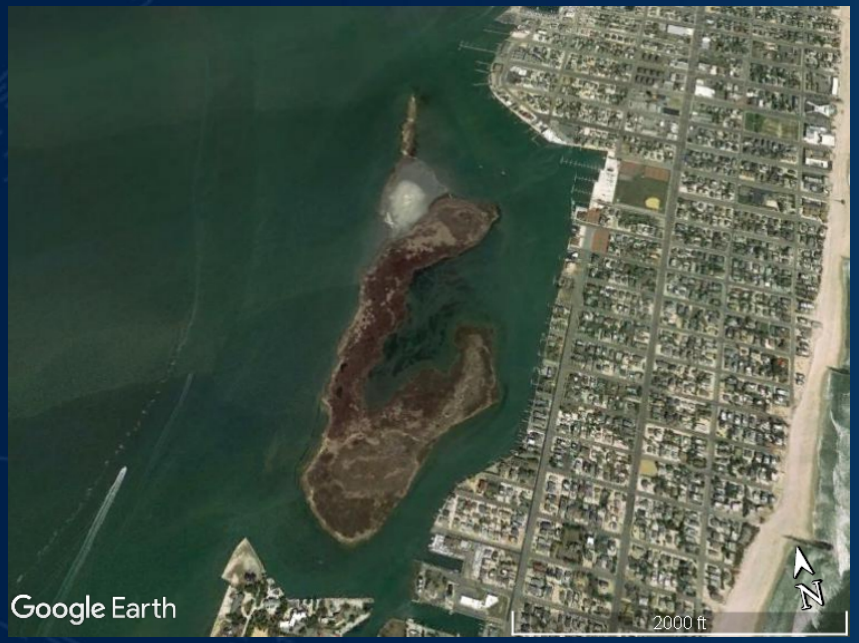
Can thin-layer application of dredged material improve marsh resiliency?



Marine Corps Base Camp Lejeune
NCCOS Beaufort Lab
USACE Wilmington District

Emerging Partnerships with USACE

Can the use of dredged sediment improve ecosystem services?



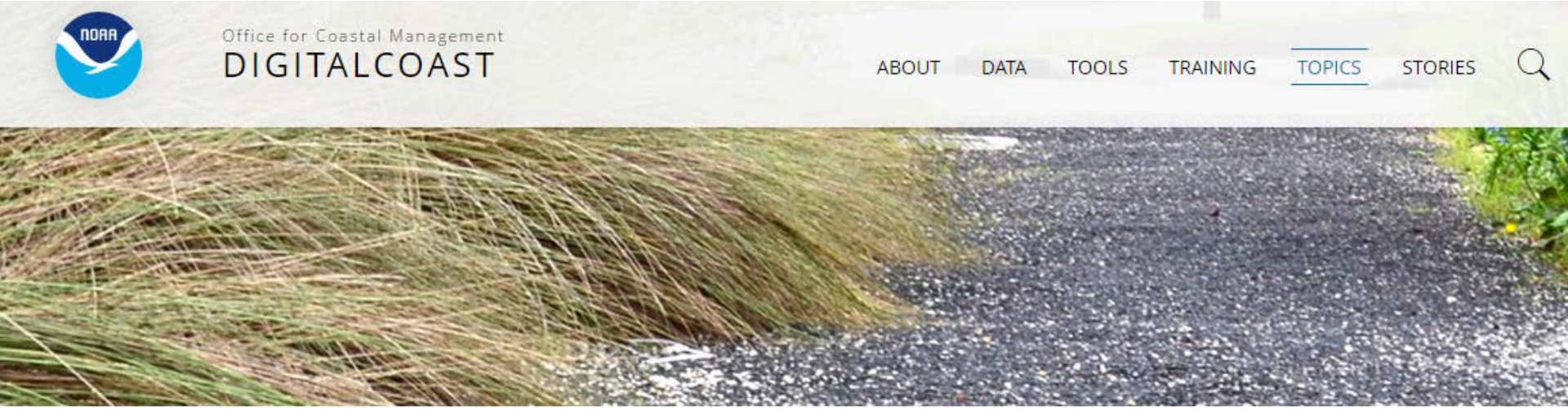
Mordecai Island, NJ
NCCOS- USACE collaboration
USACE Philadelphia District

Office for Coastal Management

Catalyze and influence a broad base of leaders, community residents, and coastal practitioners to ensure:

- Healthy coastal ecosystems
- Resilient coastal communities
- Vibrant and sustainable coastal economies

Advancing Green Infrastructure



Key tools, training, and resources through the Digital Coast:

- Coastal Flood Exposure Mapper
- *A Guide to Assessing Green Infrastructure Costs and Benefits for Flood Reduction*
- Living shoreline guidance
- Introducing Green Infrastructure for Coastal Resilience training
- Climate Adaptation for Coastal Communities training

Coastal Management Program

- Coastal Zone Management Act
- Voluntary state and federal partnership
- 34 federally approved programs
- Comprehensive approach to critical coastal issues

Texas Coastal Management Program

The Texas General Land Office

- Reviews federal actions in the coastal zone to ensure consistency with the program
- Supports protection of natural habitats and wildlife
- Awards approximately $2.2 million annually in grants
  - Example: South Padre Island and Goose Island Marsh Restoration

Texas Coastal Management Program

2016-2020 Strategies

- Increase use of living shorelines
- Update and improve topographic and bathymetry models
- Develop regional sediment management plans to identify potential restoration sites in the vicinity of navigation projects.
- Develop sediment supply studies and source identification mapping

Texas Resiliency Master Plan

- Community, socio-economic, ecological, and infrastructure protection from coastal hazards
- Restoration for multiple types of habitat
- Led by Texas General Land Office, supported by coastal zone management funding
- NOAA on the technical advisory committee

Great Lakes Resilience Study

- Promoting resilience within human and natural coastal systems
- Modeled after Mid-Atlantic Hurricane Sandy study
- Study framework
  - Identify problems and opportunities
  - Assess vulnerability and determine response
  - Complete a “programmatic coastal resiliency plan”
- Themes of interest: green and port infrastructure; sand management and littoral drift study; coastal habitat conservation; erosion; flooding; bluff recession; dune restoration; beach nourishment; shoreline protection; and nearshore water quality

NOAA Coastal Resilience Grants Program

- Nature-based solutions
- Geospatial data and tool development
- Economic research

National Estuarine Research Reserves

- 29 sites in national system
- Over 1.3 million acres protected
- Research, education, stewardship
- “Living laboratories”
- Locally relevant, nationally significant research

Mission-Aransas Research Reserve

University of Texas, Marine Science Institute

- Protects 186,189 acres
- Located 30 miles northeast of Corpus Christi
- Habitat includes tidal flats, seagrass beds, mangroves, and oyster reefs. Serves as the winter home to the critically endangered Whooping Crane.

Mission-Aransas Research Reserve

Aransas County Coastal Resiliency Initiative

Focus: environment, economy, and community

Example Project

- Live Oak Peninsula – Promoting coastal resiliency by protecting important infrastructure

Weeks Bay Research Reserve

Swift Tract
Living Shoreline Project

Focus: Shoreline erosion control, salt marsh habitat protection, and restoration of ecosystem diversity and benthic productivity

- 1.6 miles of breakwaters constructed with oyster shell in Mobile Bay

Coral Reef Conservation

- Coral Reef Conservation Act
- Preserve, sustain, and restore
- National and international leadership
- U.S. Coral Reef Task Force

OFFICE FOR COASTAL MANAGEMENT

Digital Coast Partnership

Digital Coast Data

- Benthic
- Marine boundaries
- Imagery
- Coastal land cover
- Lidar
- Elevation
- Bathymetry
- Socioeconomic data

Digital Coast Data

FLOOD RISK POPULATIONS

Twenty-five percent, or 74,466 people, live in the floodplain in Galveston County, Texas.

COASTAL HAZARDS

84 Billion dollar disasters from 1980-2016

CHANGING LANDS

Texas experienced 5,677 square miles of change between 1996-2010, with the largest change being a 1,327-square-mile loss of forest.

OCEAN ECONOMICS

Offshore mineral extraction is the largest employer among Texas's ocean-dependent economic sectors.

COASTAL LAND COVER AND LAND CHANGE DATA

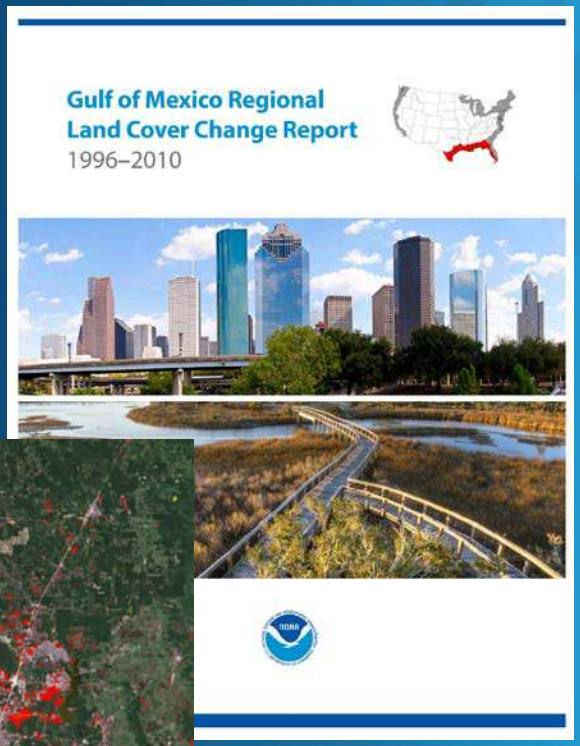
Providing the Best Big Picture View Available

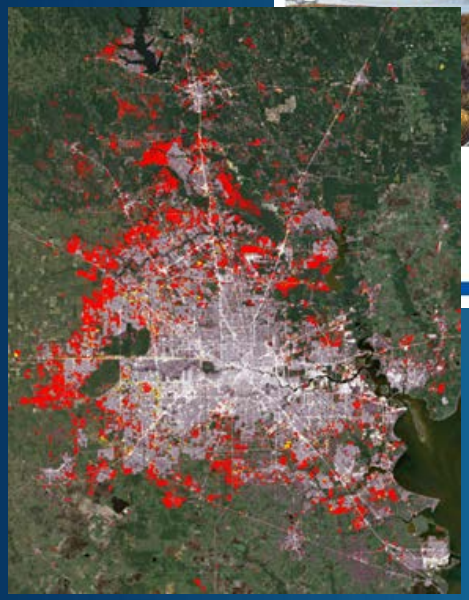
OFFICE FOR COASTAL MANAGEMENT

Coastal Land Cover and Land Change Data

- 17% increase in developed area
  = 580 square miles
  = football field every 26 minutes

- 11% decrease in tree cover
  = 1,325 square miles
  = football field every 12 minutes





Houston development changes (1996 to 2011)

Digital Coast Tools

Types

- Analysis tools
- Data visualization and handler tools
- Simulation tools
- Informational tools

Top Products

- Sea Level Rise Viewer
- Lake Level Viewer
- Historical Hurricane Tracks
- Coastal Flood Exposure Mapper
- Coastal County Snapshots

Conclusion

NOS capabilities to advance resilience and natural infrastructure

- Coastal management
- Coastal intelligence
- Coastal science

Strengthen application and facilitate implementation of natural infrastructure