

# US ARMY CORPS OF ENGINEERS NEW JERSEY BACK BAYS FEASIBILITY STUDY

Flood Risk Management Workshop:  
Atlantic and Cape May Counties

Stockton University  
June 21, 2016

USACE Philadelphia District,  
NJDEP Bureau of Coastal Engineering

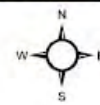


US Army Corps of Engineers  
**PLANNING SMART  
BUILDING STRONG®**



# New Jersey Back Bays CSRM Feasibility Study

- Recent Flooding Events
- Large Area
- Diverse Interests
- Opportunities
  - Systems Approach
  - Climate Change
  - Wiser Use of Floodplains
  - Nature Based Features
  - Risk Management



0 75 150 300 450 600  
Miles

New Jersey Back Bays  
Study Area



# New Jersey Back Bays CSRM Feasibility Study

## Overview

- Chief's report recommending incrementally implementable design and construction opportunities for the region
  - Smaller implementable opportunities
- Comprehensive Solutions
  - System-wide solutions
    - Storm surge barriers/Tidal gates at lagoon entrances
    - Policy/Programmatic strategies
  - Site-specific perimeter solutions
    - Structural, non-structural, NNBF strategies
- NJ Shore Protection Program context



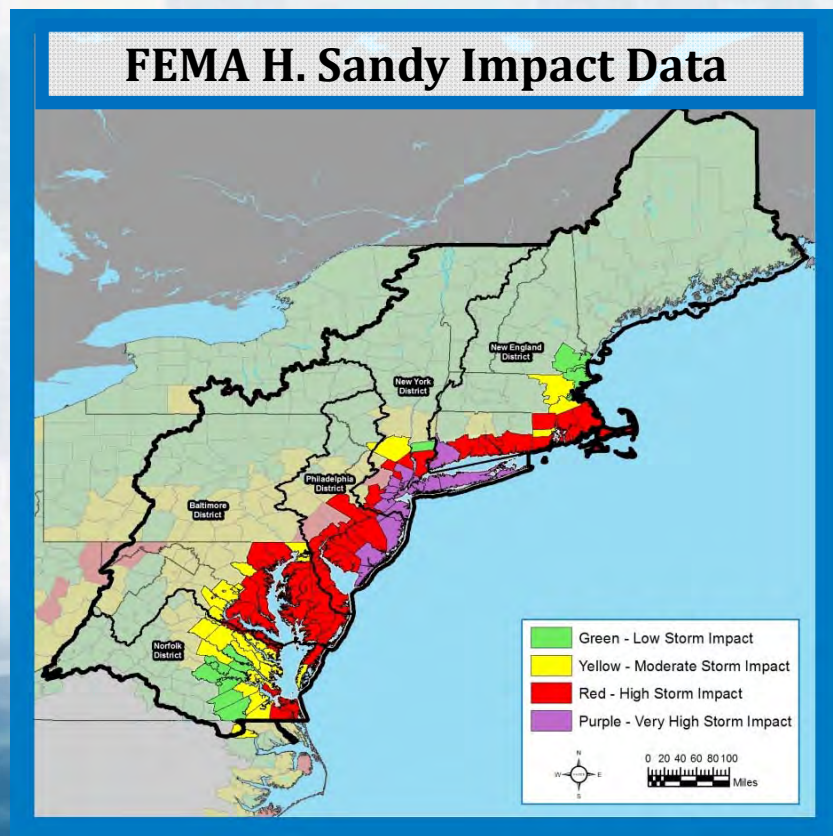
# NACCS Background

“That using up to \$20,000,000\* of the funds provided herein, the Secretary shall conduct a **comprehensive study** to address the flood risks of **vulnerable coastal populations** in areas that were affected by Hurricane Sandy within the boundaries of the North Atlantic Division of the Corps...” (\*\$19M after sequestration)

➤ Released to public 28 Jan 2015

## Goals

- Provide a **Risk Management Framework**, consistent with USACE-NOAA Rebuilding Principles
- Support **Resilient Coastal Communities** and robust, sustainable coastal landscape systems, considering future sea level rise and climate change scenarios, to reduce risk to vulnerable population, property, ecosystems, and infrastructure

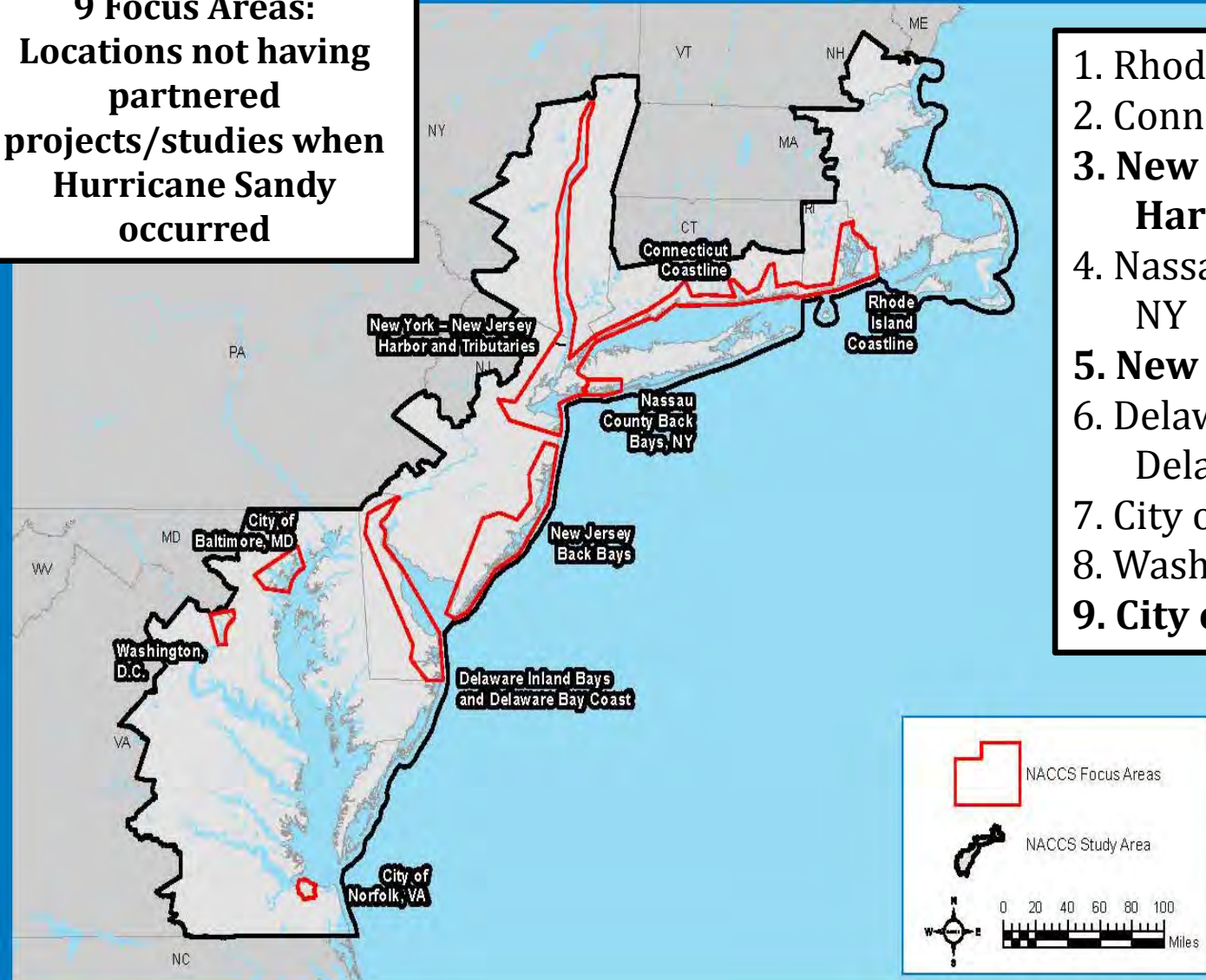


[www.nad.usace.army.mil/CompStudy](http://www.nad.usace.army.mil/CompStudy)

# Future Opportunities: NACCS Focus Areas

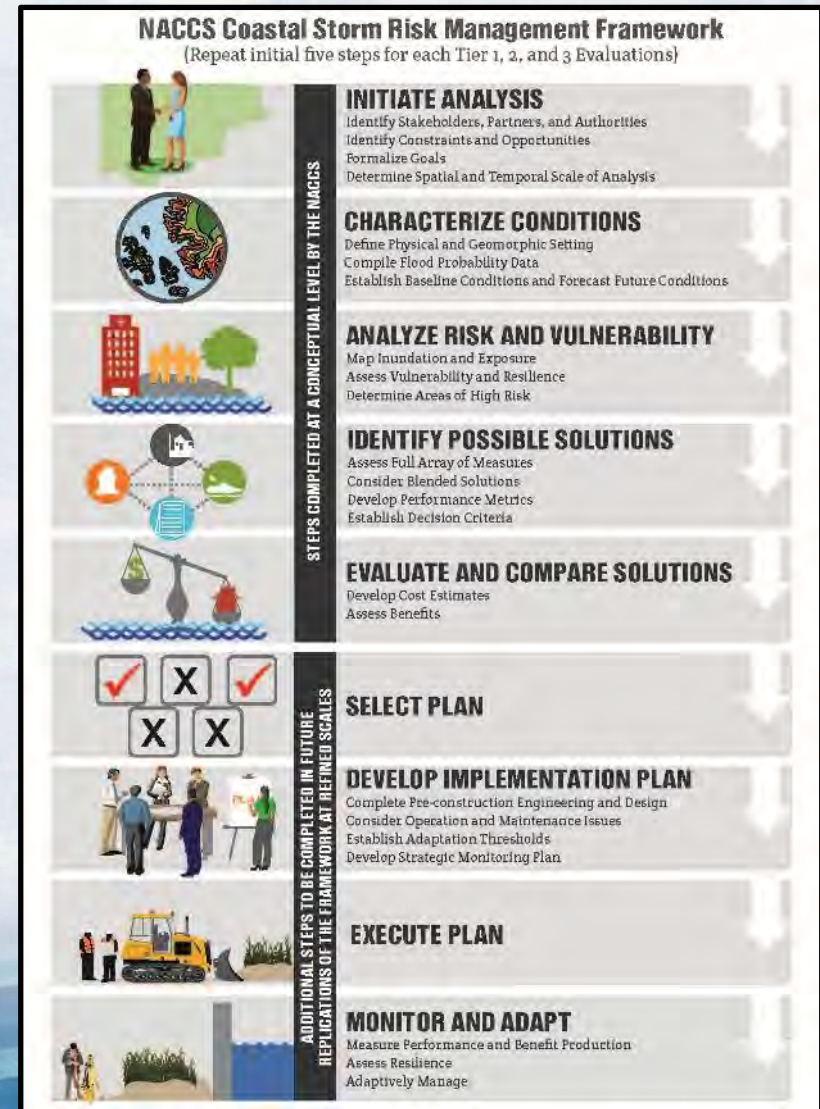
**9 Focus Areas:  
Locations not having  
partnered  
projects/studies when  
Hurricane Sandy  
occurred**

1. Rhode Island Coastline
2. Connecticut Coastline
3. **New York - New Jersey Harbor and Tributaries**
4. Nassau County Back Bays, NY
5. **New Jersey Back Bays**
6. Delaware Inland Bays and Delaware Bay Coast
7. City of Baltimore, MD
8. Washington, D.C.
9. **City of Norfolk, VA**



# COASTAL STORM RISK MANAGEMENT FRAMEWORK

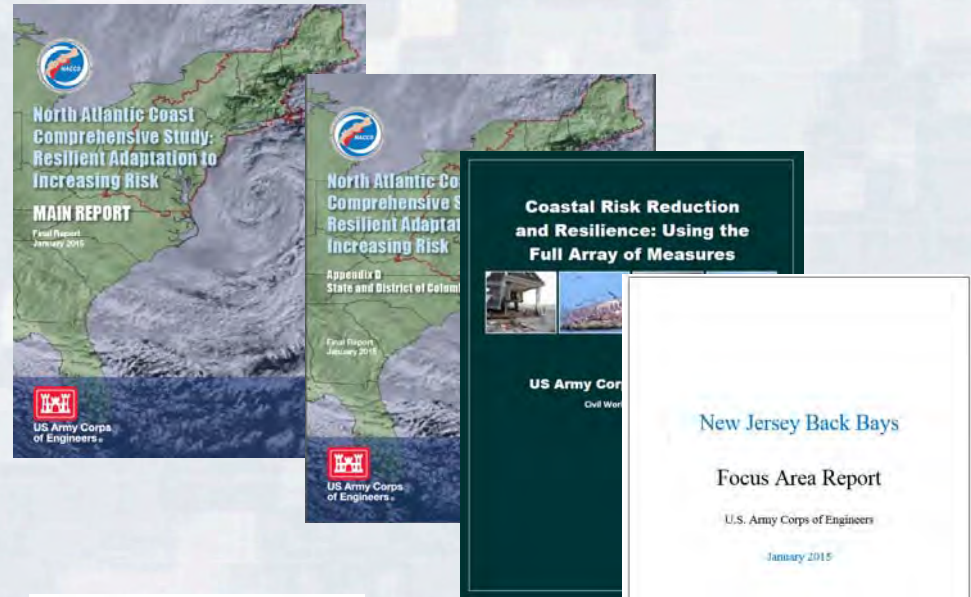
- Managing coastal storm risk is a shared responsibility and requires:
  - Shared tools
  - Common methodology that all parties can follow together to assess risk and identify solutions
- The framework is:
  - A 9-step process
  - Customizable for any coastal area or watershed
  - Repeatable at state and local scales
  - Transferable to other areas of the country



# Existing Literature

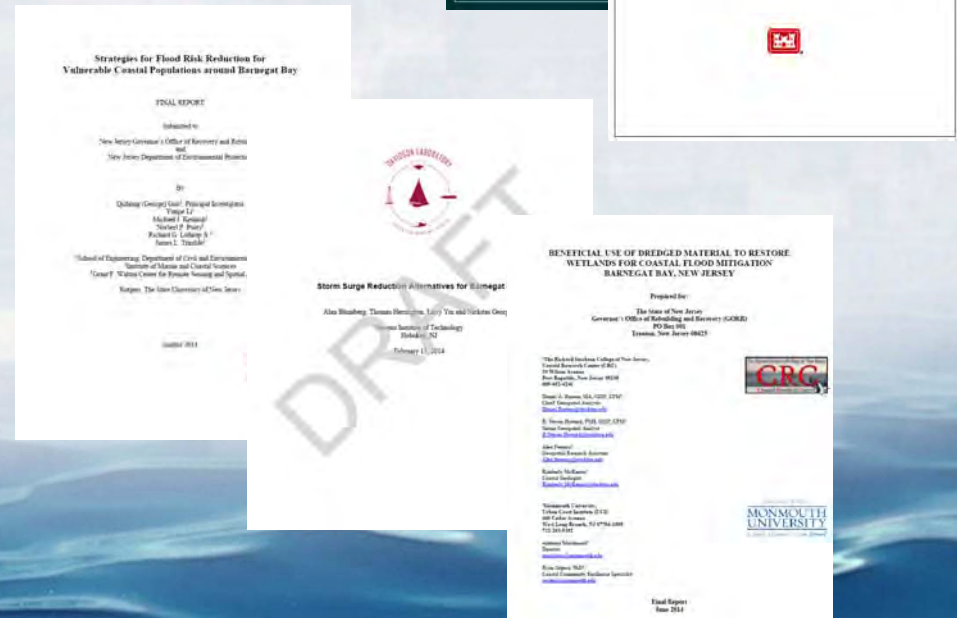
## ➤ NACCS

- Main Report
- New Jersey State Appendix
- Full Array of Measures Report
- New Jersey Focus Area Report



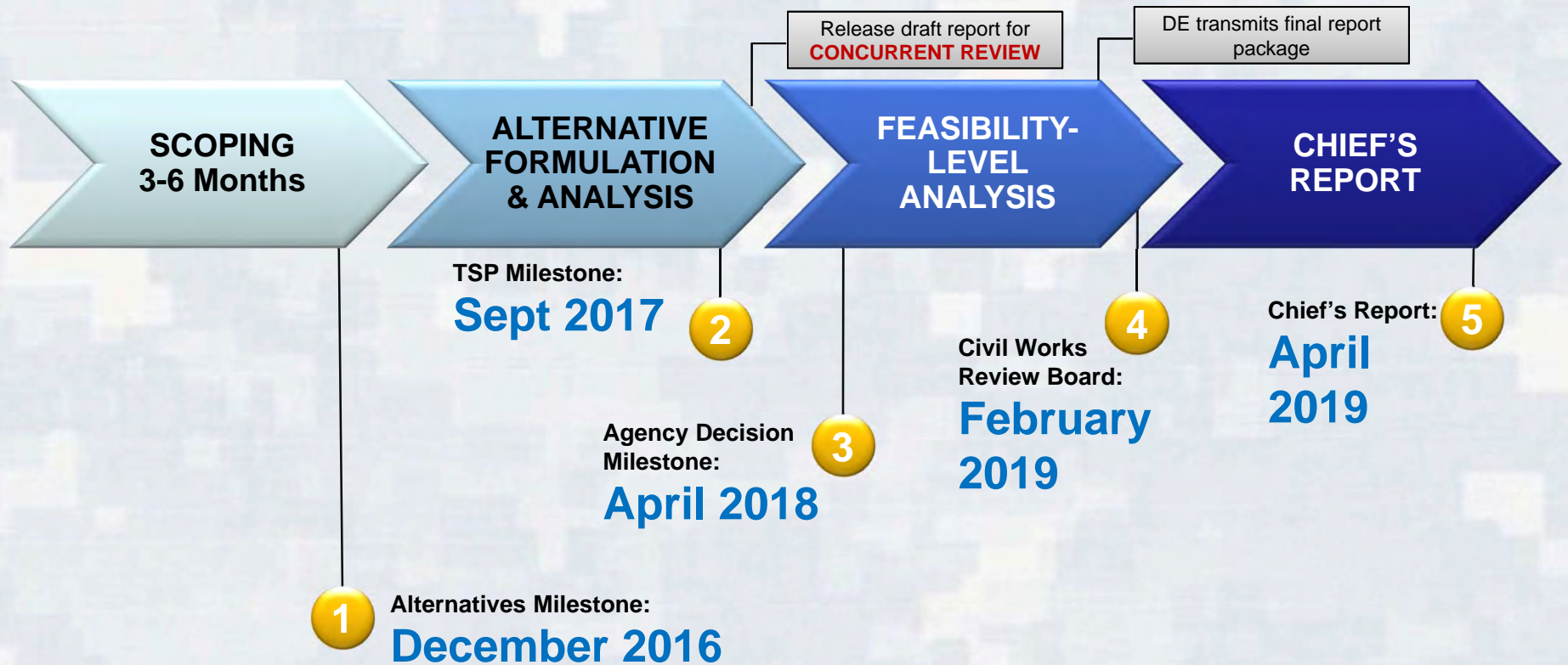
## ➤ State of New Jersey Academic Studies for Barnegat Bay

## ➤ HUD, FEMA, NOAA, DOI, Rockefeller Foundation etc.



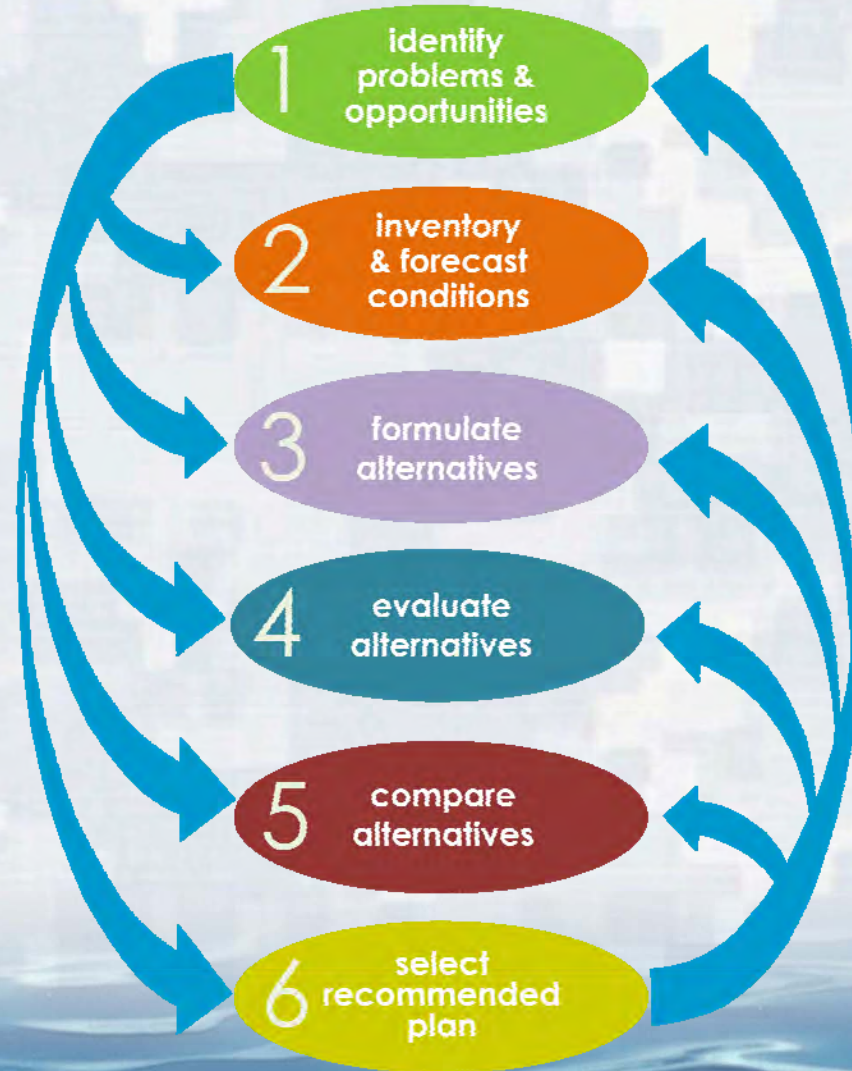
# SMART Feasibility Study Process: NJBB FRM Study

Up to 36 Months



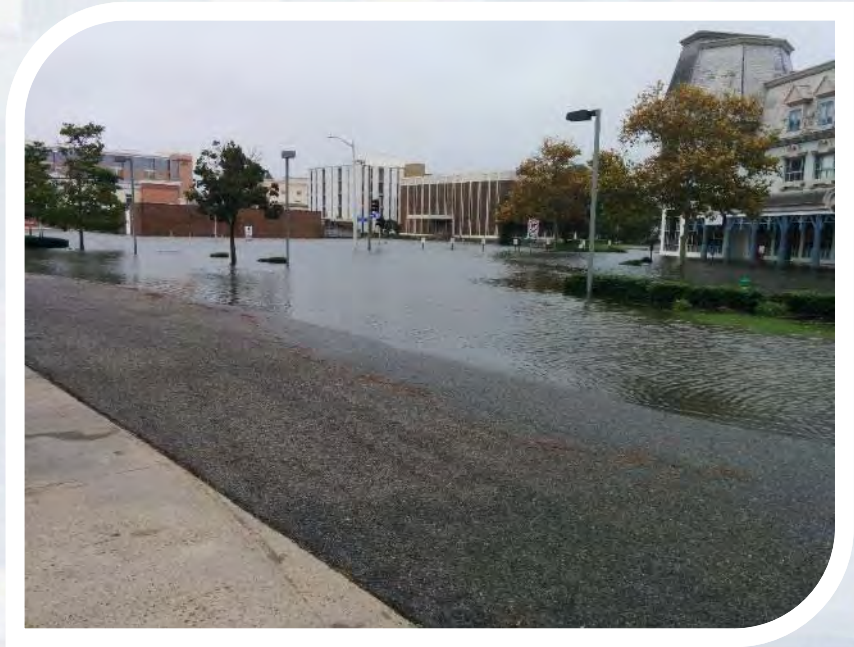


# SIX STEP PLANNING PROCESS



# NEW JERSEY BACK BAYS FLOOD RISK MANAGEMENT STUDY: POST STUDY

- Chief's Report to Congress
- Congress authorizes the project for construction
- Preconstruction, Engineer and Design (PED) phase begins
- Project must be budgeted (“new start” construction currently very competitive)
- Once federal and non-federal funds are both available, construction can begin



# IDENTIFYING THE NATIONAL ECONOMIC DEVELOPMENT (NED) PLAN

- Maximizes economic benefits and relative to project costs
- Structural and nonstructural measures considered
- Without-project damages
- With project damages
- Benefits are damages reduced
- Net benefits are benefits less project costs (total life cycle costs, including environmental mitigation)
- Compare across project scales and between alternatives to determine plan that yields greatest NED benefits



# WORKSHOP PURPOSE

- Identify problems, objectives and potential risk management strategies to address coastal flooding and climate change adaptation for the New Jersey back bays
- Obtain stakeholder input on the conduct of the study
- Municipal-level results will inform region-wide analyses including plan development



# AGENDA

- |                      |   |
|----------------------|---|
| <b>9:15 – 10:00</b>  | <b>US Army Corps of Engineers Presentation</b>                      |
| <b>10:00 – 10:30</b> | <b>Discussion</b>   |
| <b>10:30 – 10:45</b> | <b>Break/Proceed to Break Out Session Rooms</b>                     |
| <b>10:45 – 11:30</b> | <b>Break Out Session #1: Problems, Objectives and Constraints</b>   |
| <b>11:30 – 12:30</b> | <b>Lunch</b>  |
| <b>12:30 – 12:45</b> | <b>Discussion</b>   |
| <b>12:45 – 1:30</b>  | <b>Break Out Session #2: Existing/Potential Management Measures</b> |
| <b>1:30 – 2:30</b>   | <b>Working Groups Report Out/Discussion</b>                         |
| <b>2:30 – 2:45</b>   | <b>Meeting Wrap-up</b>  |



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# **BREAK OUT SESSION #1: PROBLEMS, OBJECTIVES & CONSTRAINTS**



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# WHY IDENTIFY PROBLEMS, OBJECTIVES & CONSTRAINTS?

- Provide clear, common understanding of the problem to be solved
- Used to develop planning objectives for the study
- Identify constraints which may inhibit study objectives
- Municipal-level involvement will inform regional-level problems and objectives.



# DEVELOPING A PROBLEM STATEMENT

## ➤ Definition

Existing, negative condition

## ➤ Example

Coastal flooding of low elevation roads and residences for our municipality during coastal storm conditions with water levels greater than 1 foot above Mean High Water.





# OBJECTIVES

- Specify what the plan should accomplish/achieve
- Results you want to obtain by solving the problem
- A statement of the intended purposes of the planning process
- Example: Manage risk from coastal flooding and sea level rise to protect human life and infrastructure through the use of the full array of coastal risk management measures for our municipality



# CONSTRAINTS

- Statements of things that should be avoided
- Things you cannot change
- Example: Coastal risk management strategy:
  - ▶ 1) increases flooding in adjacent community;
  - ▶ 2) construction is complicated/ prohibited by ordinance



# CONSTRAINTS

## Planning Constraints

- Study-specific
- Environmental

## Study Resource Constraints

- Time
- Money
- Resources

## Legal and Policy Constraints

- Laws
- Regulations
- Code



# Example Statements

## ➤ Problem

Coastal flooding of low elevation roads and residences for our municipality during coastal storm conditions with water levels greater than 1 foot above Mean High Water.

## ➤ Objective

Manage risk from coastal flooding and sea level rise to reduce risk to human life and infrastructure through the use of the full array of coastal risk management measures for our municipality; Maintain economic viability of the working coastline.

## ➤ Constraint

The coastal risk management strategy may: 1) increase flooding in an adjacent community; 2) be complicated/prohibited by ordinance.



**U.S. Army Corps of Engineers  
New Jersey Back Bays  
Flood Risk Management Planning Workshop**

**Coastal Risk Management Strategy Profile**

**OBJECTIVE**

- Describe the objective, or desired end state:

**CONTACT INFORMATION** (Name, Affiliation, Email, Phone):

- Discuss potential agencies/stakeholders/funding sources involved in implementing coastal risk management strategies (CRMS) in relation to this problem:

**PROFILE TITLE:**

**LOCATION** (Describe the precise location of the problem; provide a map if possible):

**CONSTRAINTS** (Discuss any universal, study-specific or legal/policy constraints to implementing CRMS at this location):

**PROBLEM** (Define the problem and its general location)

- Discuss if any work been done on analysis, repairs, advocacy for this problem:

**MANAGEMENT MEASURES** (Discuss any management measures [with potential elevations] which may be included in a comprehensive coastal risk management strategy):

- Provide any specific elevation information of existing management measures:

**HAND IN** at the end of the meeting to an  
USACE Representative or email to  
Jennifer.Vanleuven@usace.army.mil

# OBJECTIVE/CONSTRAINT BREAKOUT SESSION

Proceed  
to Break  
out  
Sessions

Develop  
problem/  
objective/  
constraint  
statements  
and  
themes as  
a group

Complete  
the 'Profile'  
for your  
municipality

Report  
themes to  
the larger  
workshop



**BREAK OUT SESSION # 2:**

**EXISTING & POTENTIAL  
RISK MANAGEMENT MEASURES**



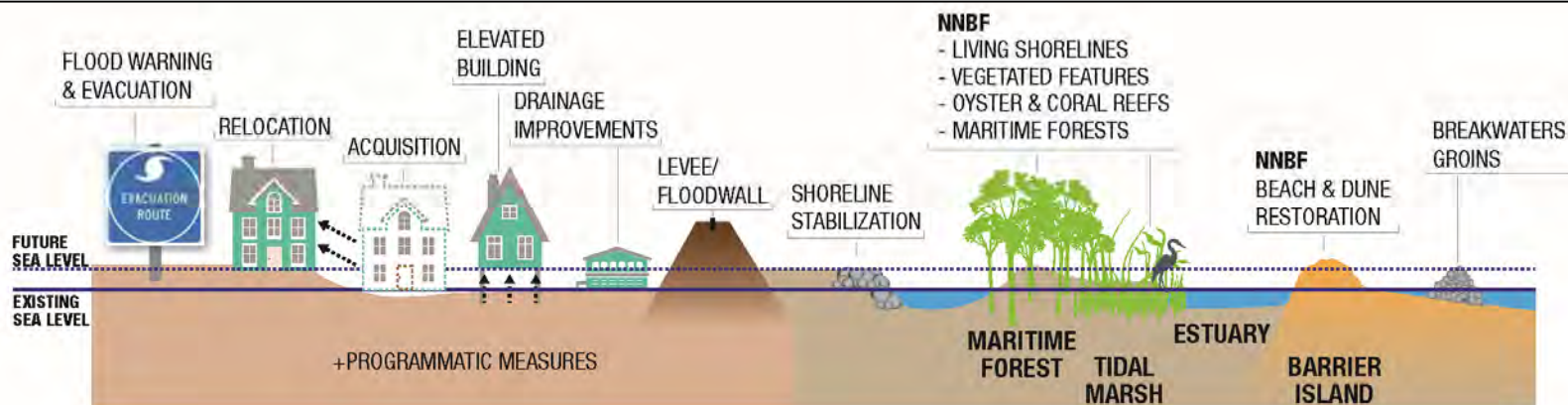
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# Coastal Storm Risk Management Framework:

## Risk Management Measures

- **Structural**
  - Storm surge barriers
  - Levees, breakwaters, shoreline stabilization
  - Natural and Nature-Based Features (e.g., beaches and dunes, living shorelines, wetlands, oyster reefs, SAV restoration)
- **Non-Structural** (e.g., floodproofing, acquisition and relocation, flood warning, etc.)
- **Policy/Programmatic** (e.g., floodplain management, land use planning, State/municipal policy, natural resources, surface water management, education, flood insurance programs, etc.)

### Full Array of Coastal Storm Risk Management Measures





# MANAGEMENT MEASURES

## STRUCTURAL



# MANAGEMENT MEASURES

## STRUCTURAL - LEVEES



# MANAGEMENT MEASURES

## STRUCTURAL – BULKHEADS



# MANAGEMENT MEASURES

## STRUCTURAL – STORM SURGE BARRIERS



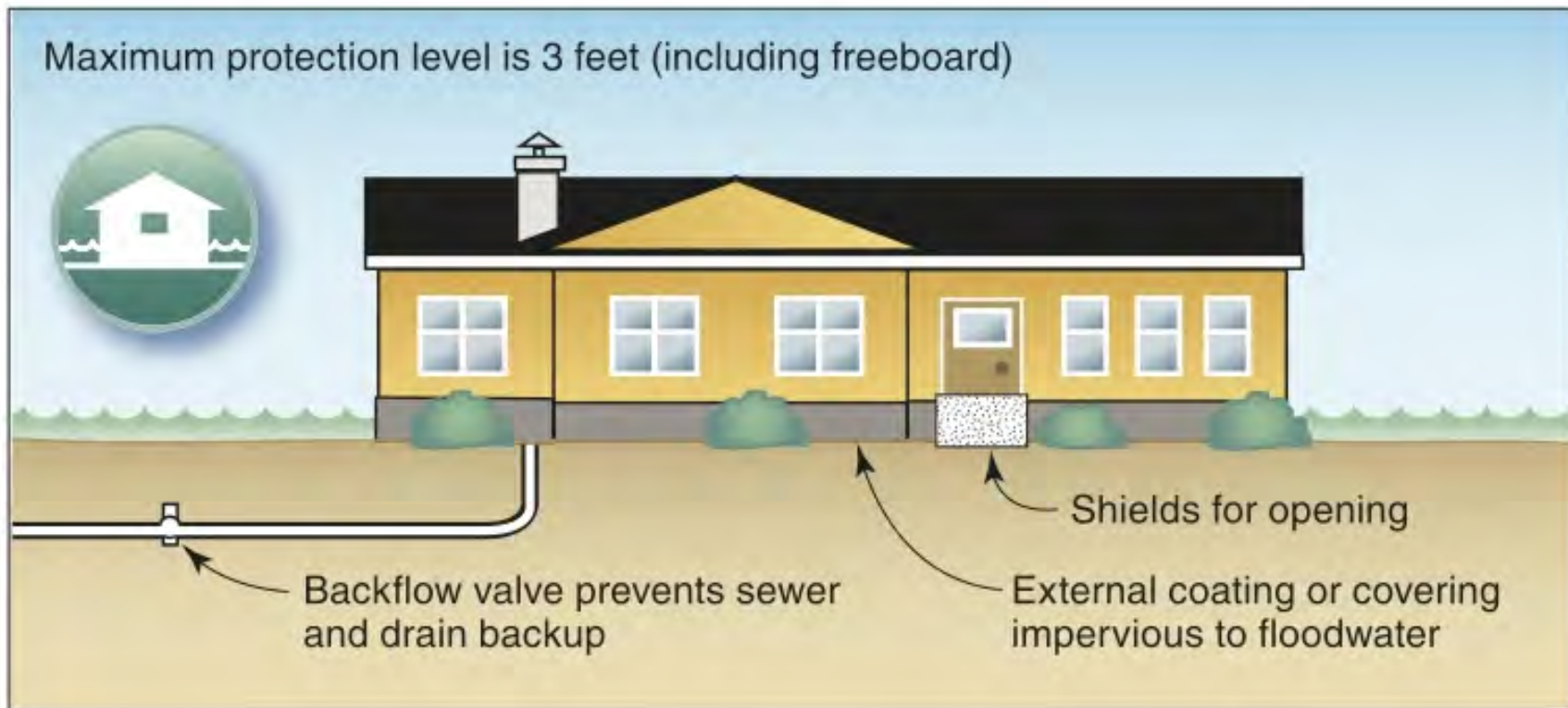
# MANAGEMENT MEASURES

## NON-STRUCTURAL



# MANAGEMENT MEASURES

## NON-STRUCTURAL – DRY FLOODPROOFING



# MANAGEMENT MEASURES

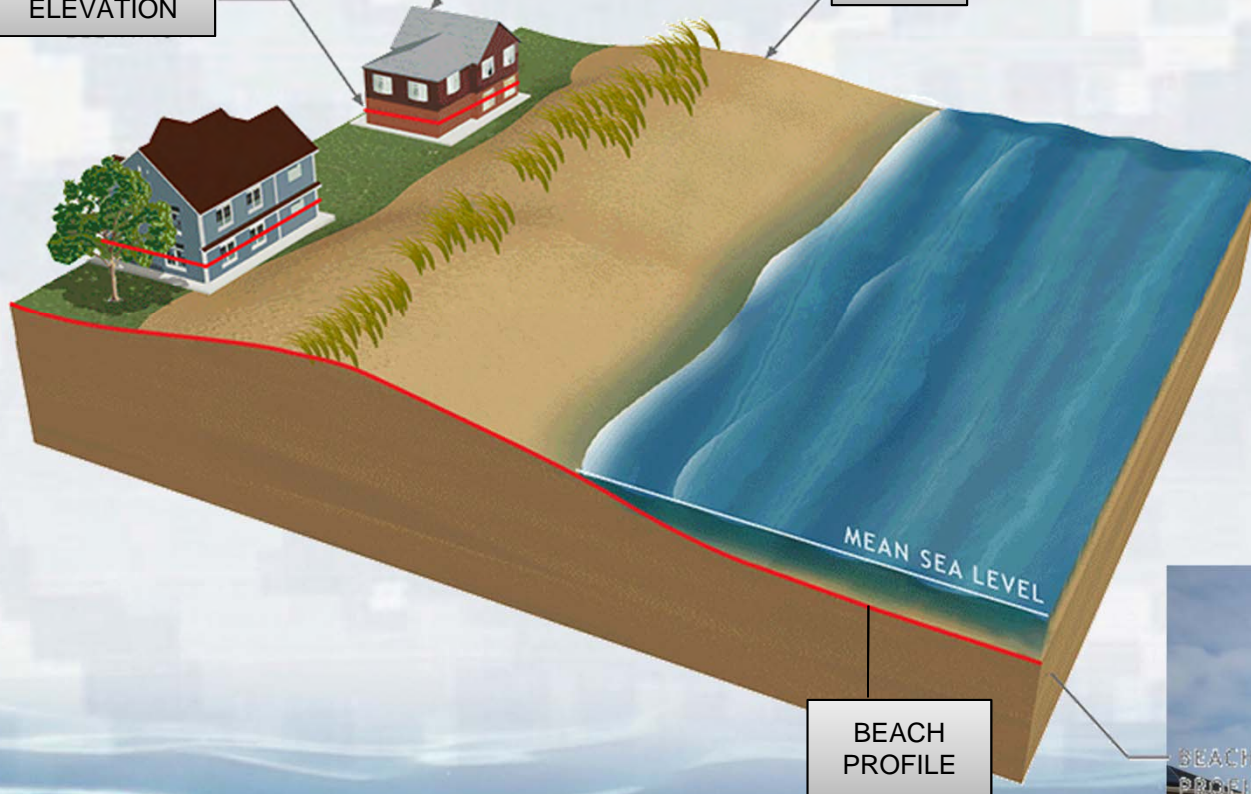
## NON-STRUCTURAL - ELEVATION



BASE FLOOD ELEVATION

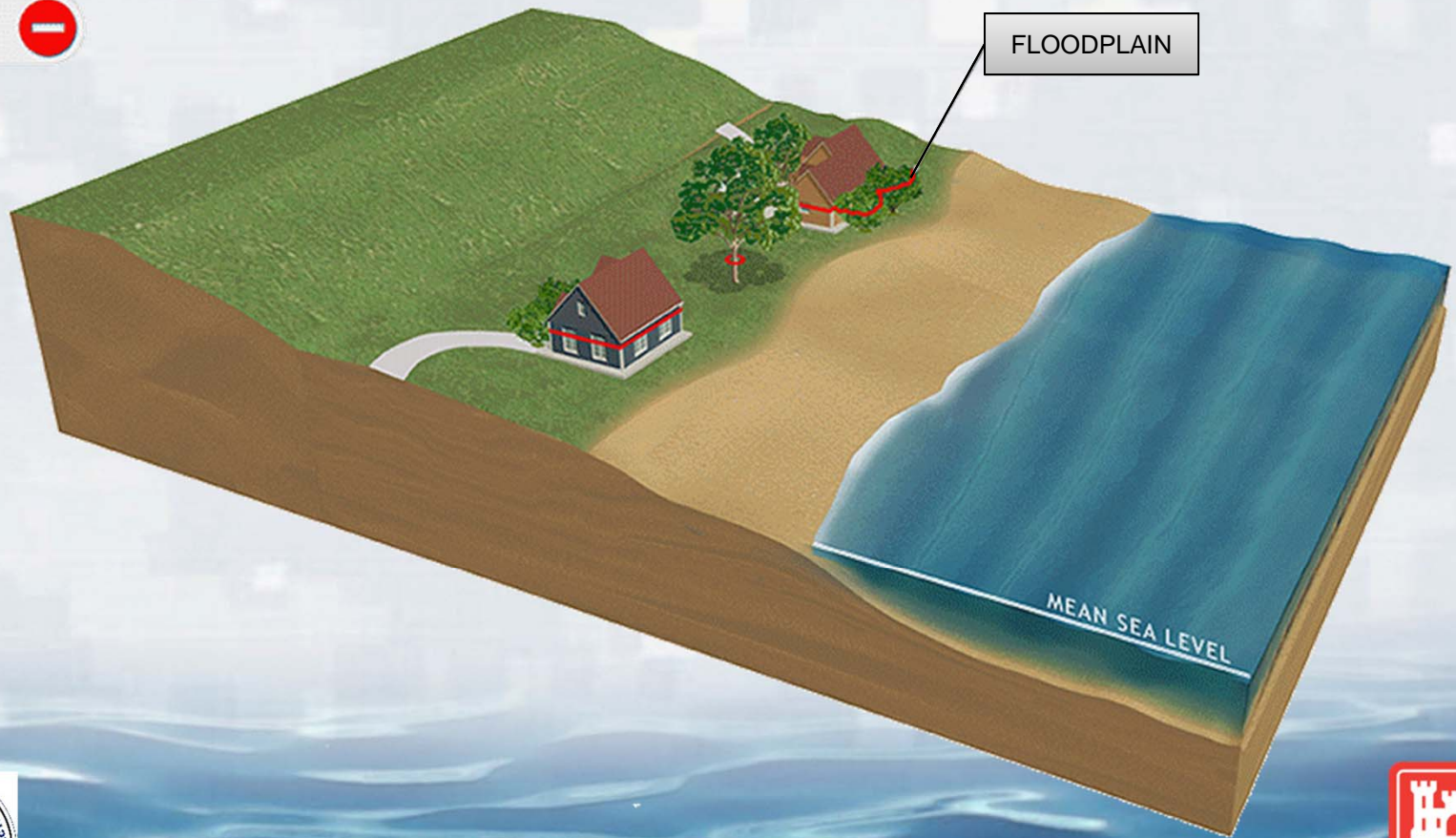
NON ELEVATED STRUCTURES

DUNE



# MANAGEMENT MEASURES

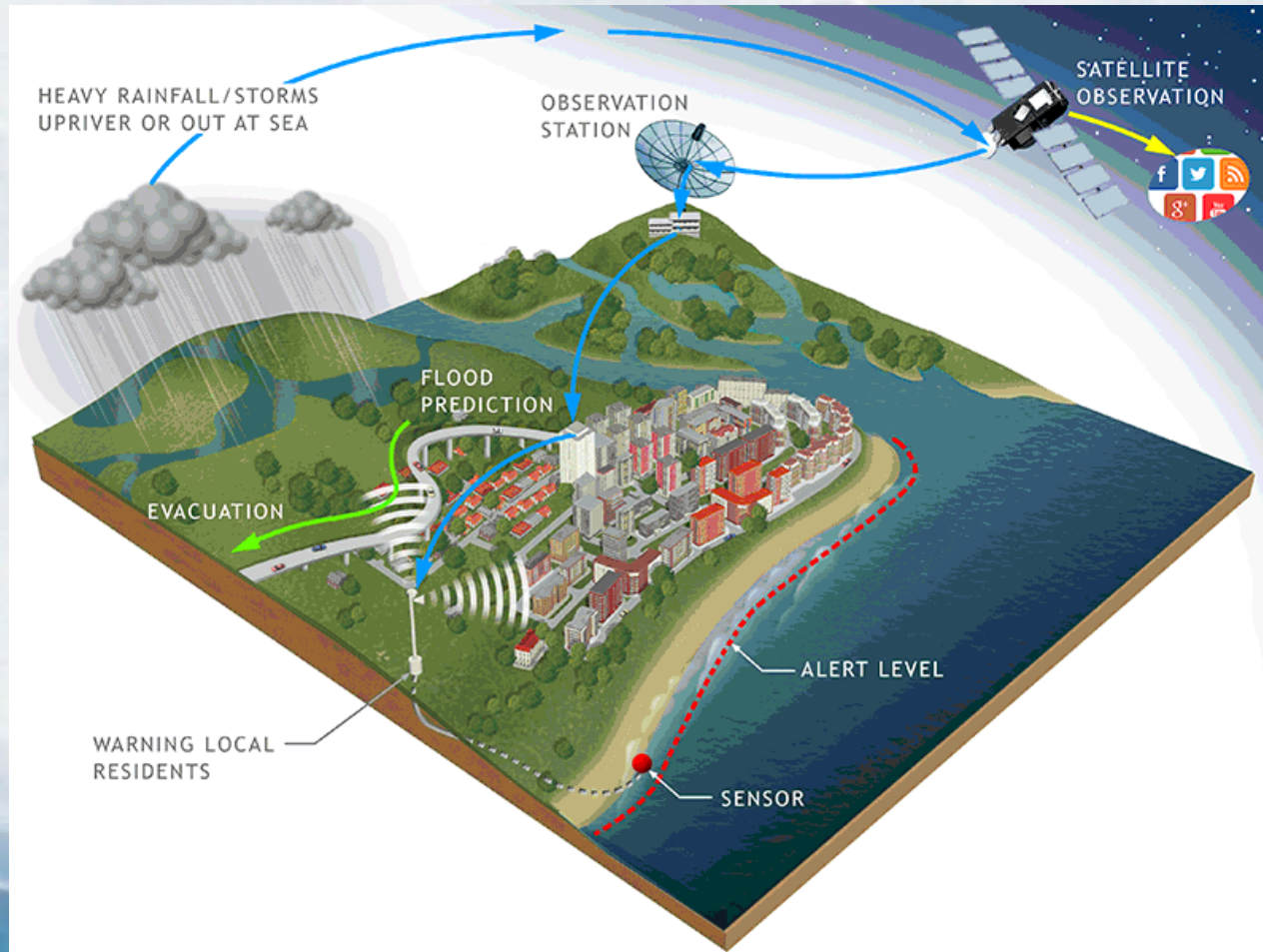
## NON-STRUCTURAL – ACQUISITION OR RELOCATION





# MANAGEMENT MEASURES

## NON-STRUCTURAL – ENHANCED FLOOD WARNING



# MANAGEMENT MEASURES

## NATURAL AND NATURE-BASED

Beach  
Nourishment

Drainage  
Improvements

Living  
Shorelines

Reefs

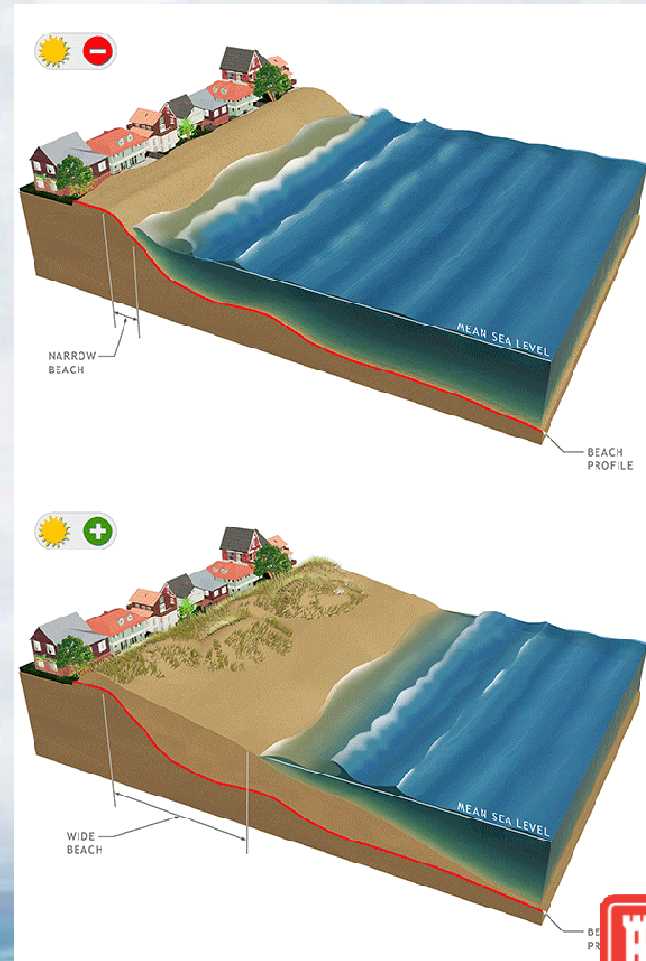
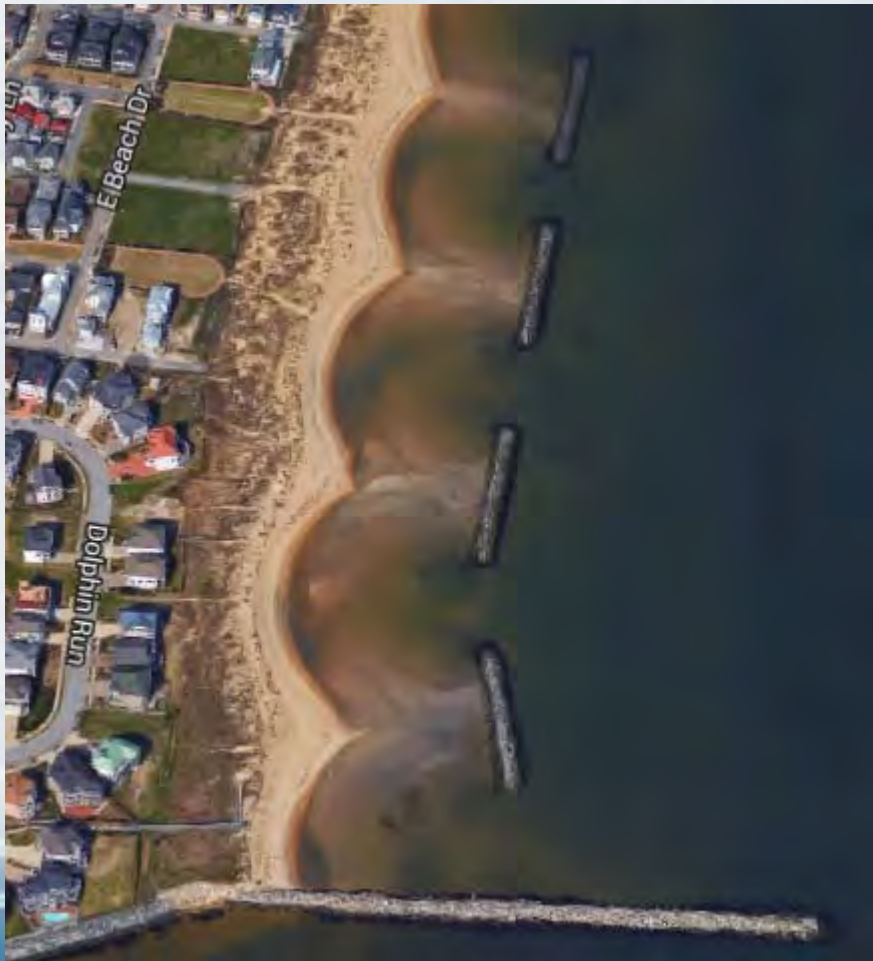
Submerged  
Aquatic  
Vegetation

Wetlands



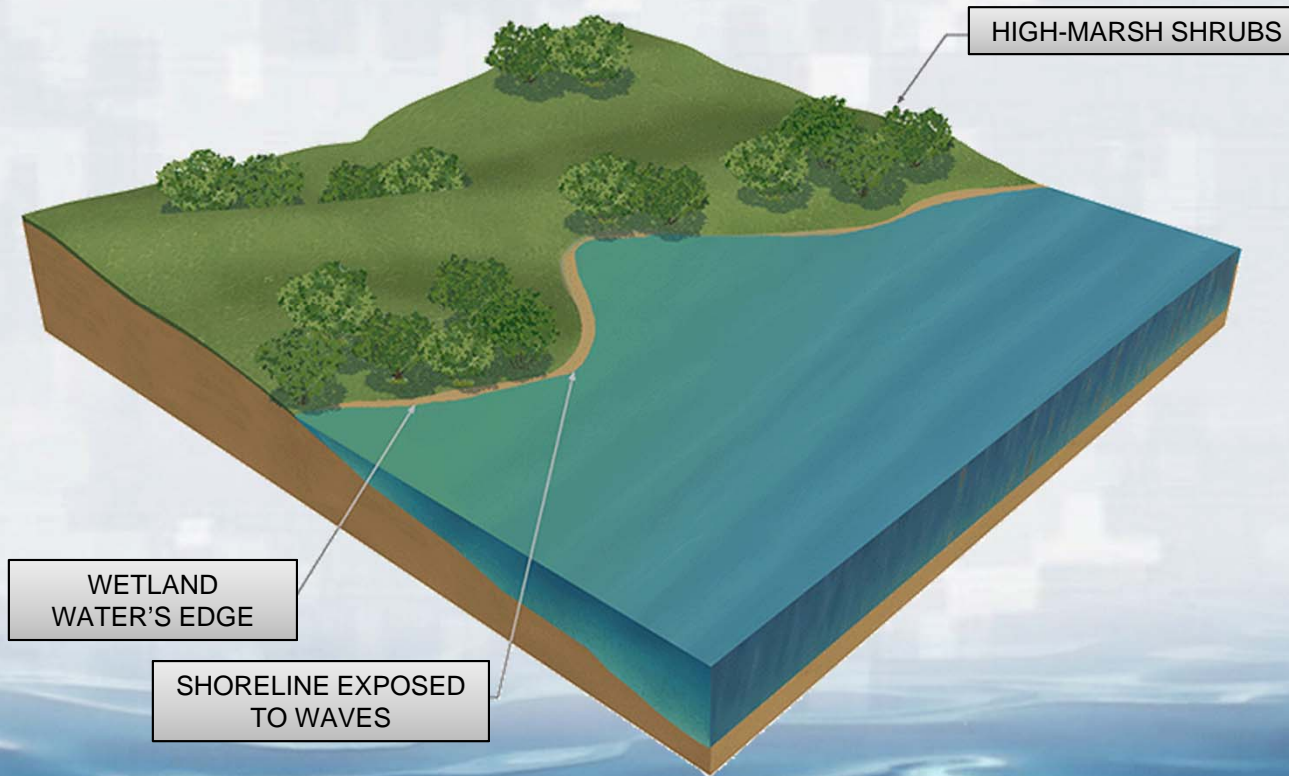
# MANAGEMENT MEASURES

## NATURAL AND NATURE-BASED – BEACH NOURISHMENT



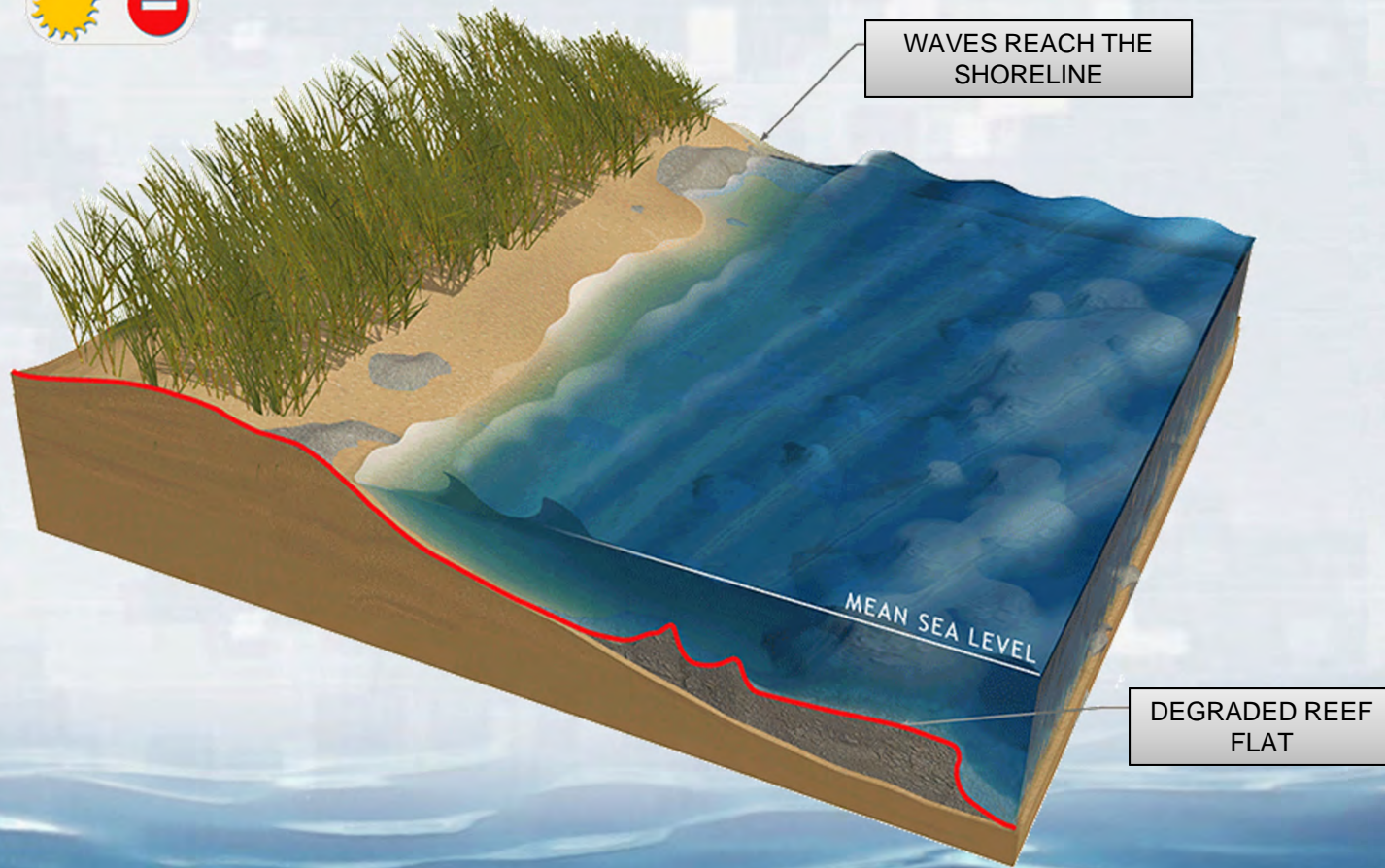
# MANAGEMENT MEASURES

## NATURAL AND NATURE-BASED – LIVING SHORELINES



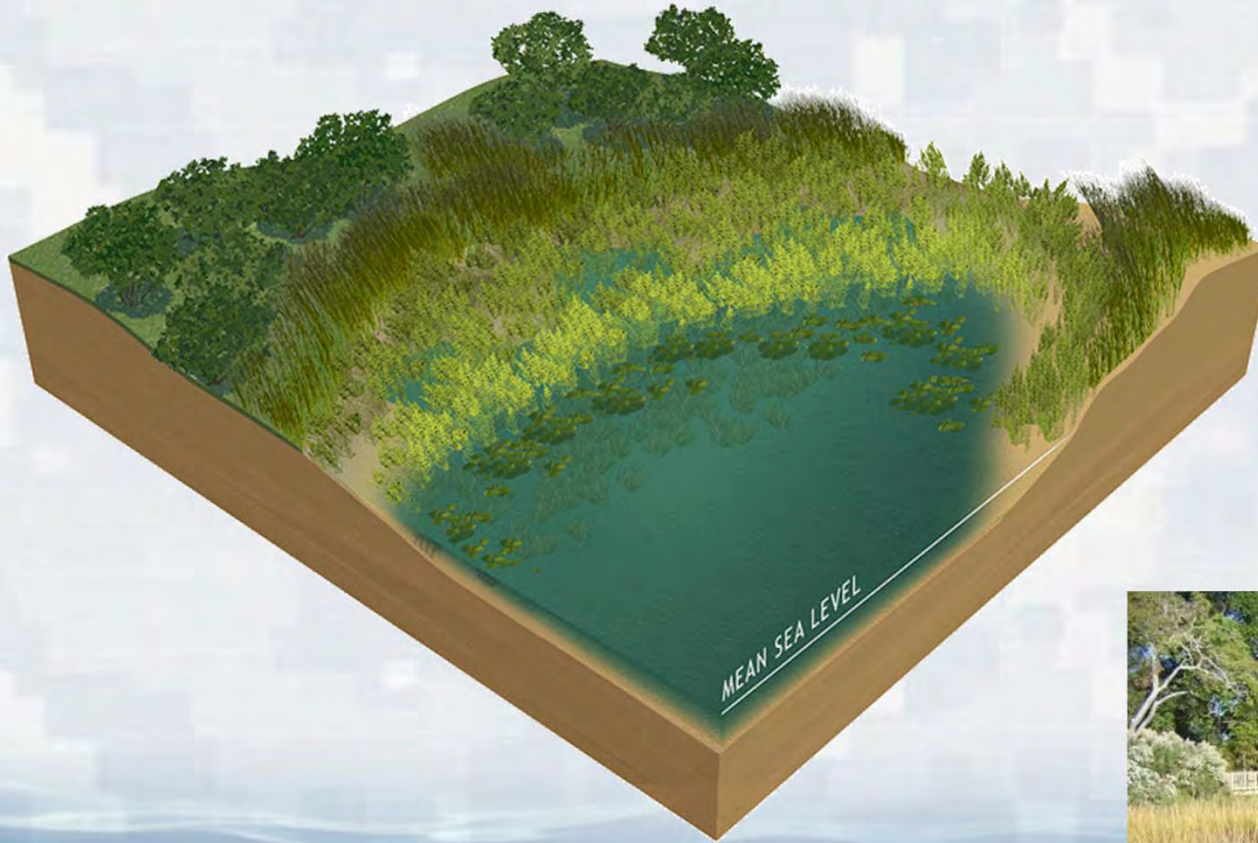
# MANAGEMENT MEASURES

## NATURAL AND NATURE-BASED – REEFS



# MANAGEMENT MEASURES

## NATURAL AND NATURE-BASED – WETLANDS



# MANAGEMENT MEASURES BREAKOUT SESSION

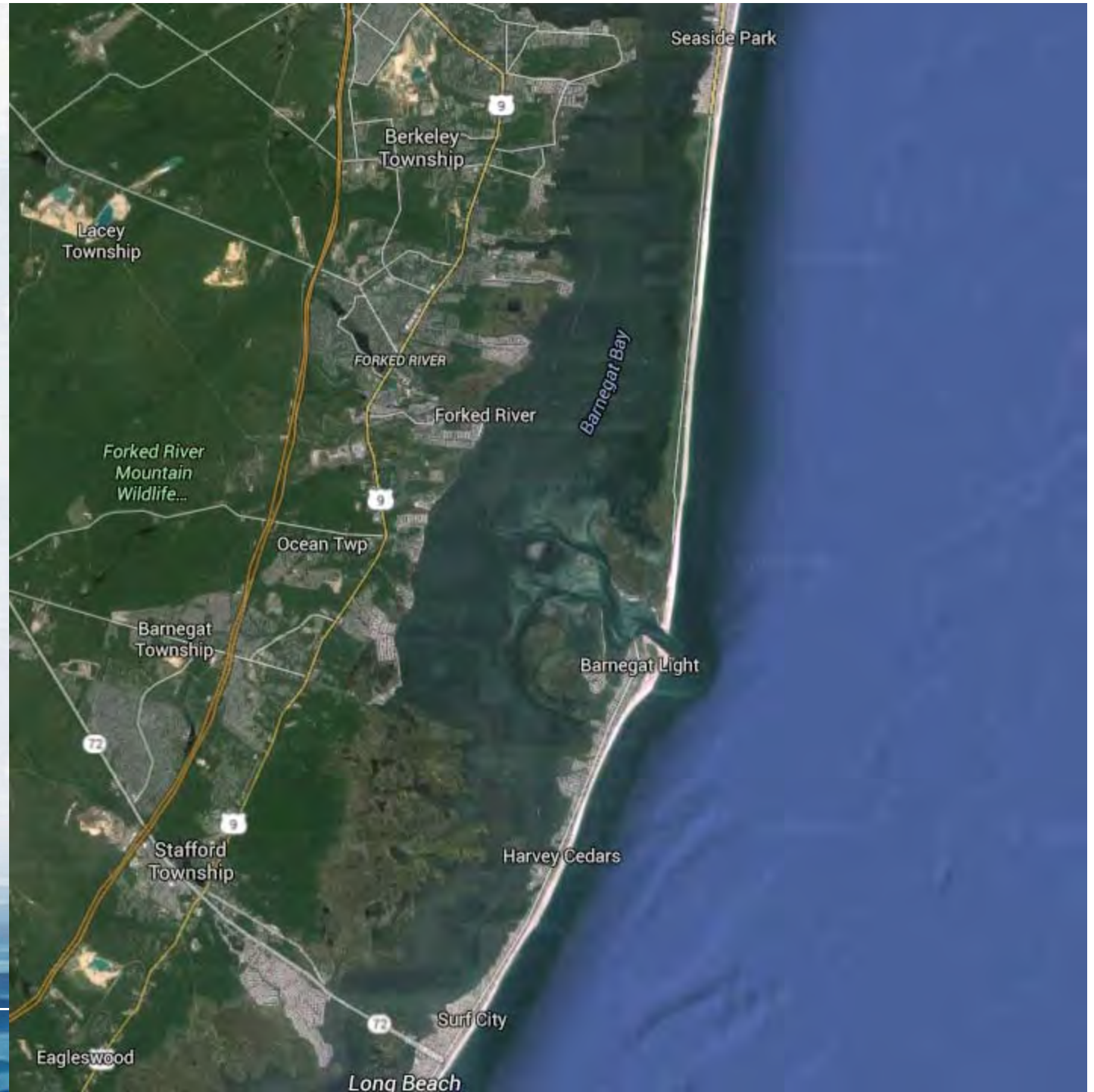
Get into teams

Brainstorm potential  
management  
measures  
individually and as a  
team

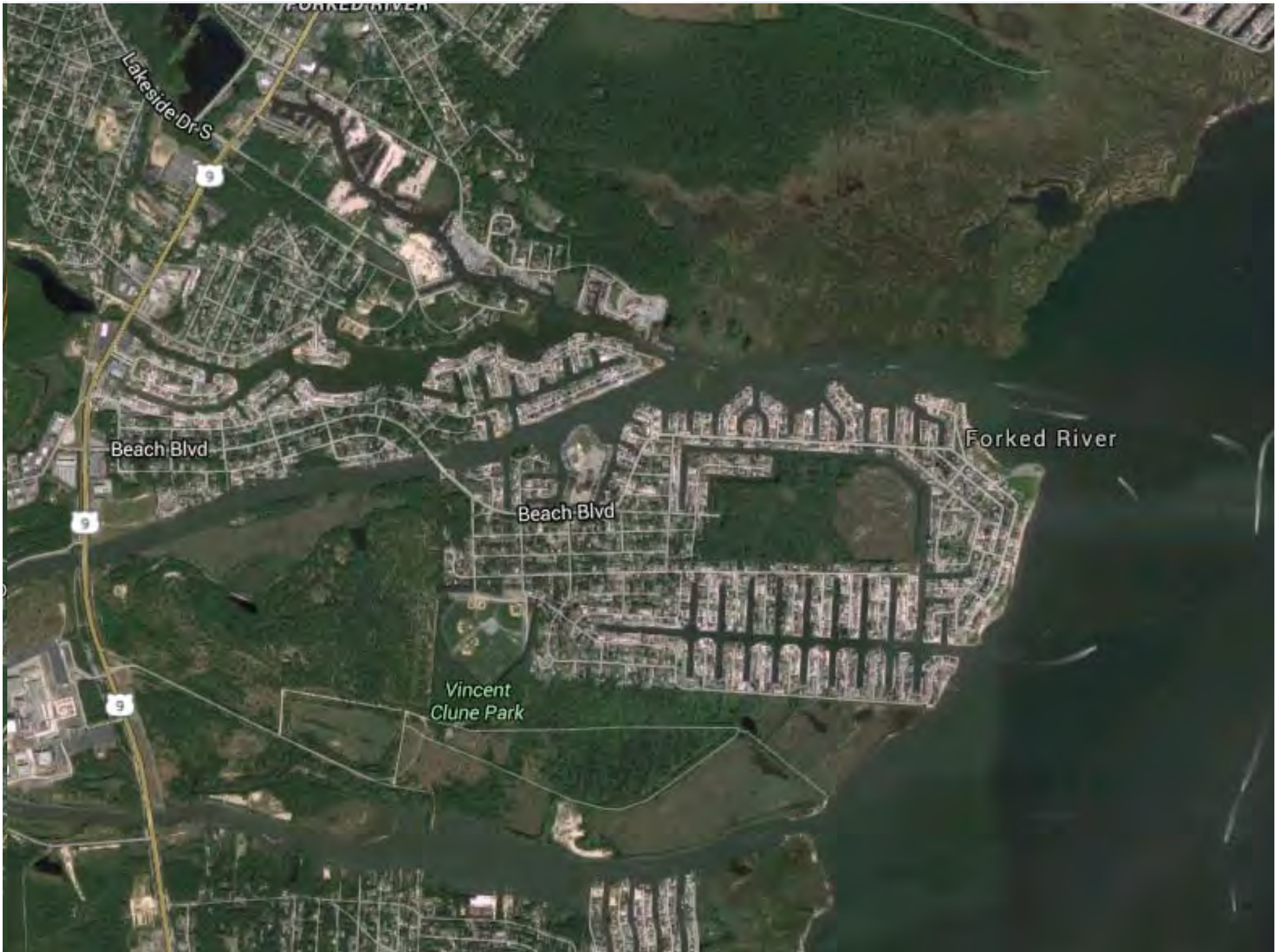
Report  
management  
strategies and  
measure themes for  
your team

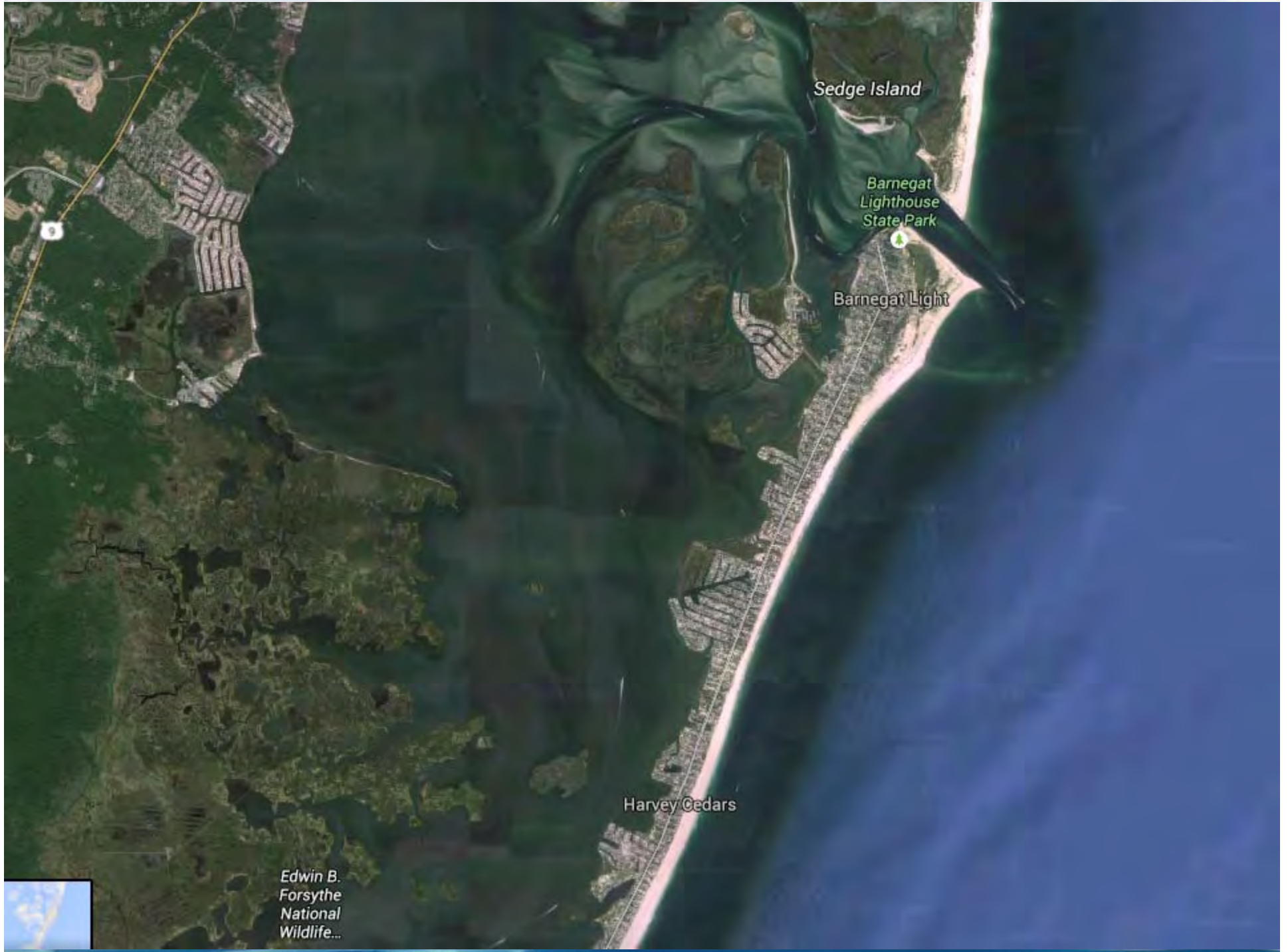


# LOWER BARNEGAT BAY CASE SCENARIO









Sedge Island

Barnegat  
Lighthouse  
State Park

Barnegat Light

Harvey Cedars

Edwin B.  
Forsythe  
National  
Wildlife...



# June 17 Workshop Common Themes

- Existing literature
- Nuisance flooding
- Sea level rise
- Permitting complications
- Resilient regulations
- Solutions on the municipal level
- Funding opportunities





# BREAK OUT SESSION LOGISTICS



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REACH 1	Allenhurst
	Asbury Park
	Avon-by-the-Sea
	Belmar
	Bradley Beach
	Brick
	Brielle
	Deal
	Howell
	Interlaken
	Loch Arbour
	Long Branch
	Manasquan
	Neptune
	Neptune City
	Ocean
	Sea Girt
	South Belmar
	Spring Lake
	Spring Lake Heights
	Wall
	West Long Branch

REACH 3	Barnegat Light
	Beach Haven
	Harvey Cedars
	Long Beach
	Ocean
	Ship Bottom
	Stafford
	Surf City

REACH 6	Bay Head
	Beachwood
	Berkeley
	Brick
	Brielle
	Dover
	Howell
	Island Heights
	Lacey
	Lakewood
	Manasquan
	Manchester
	Ocean Gate
	Pine Beach
	Point Pleasant
	Point Pleasant Beach
	South Toms River
	Wall

REACH 2	Bay Head
	Berkeley
	Brick
	Dover
	Lavallette
	Manasquan
	Mantoloking
	Ocean
	Point Pleasant
	Point Pleasant Beach
	Seaside Heights
	Seaside Park

REACH 7	Barnegat
	Lacey
	Ocean

REACH 8	Barnegat
	Eagleswood
	Little Egg Harbor
	Stafford
	Tuckerton





# Stakeholder Discussion

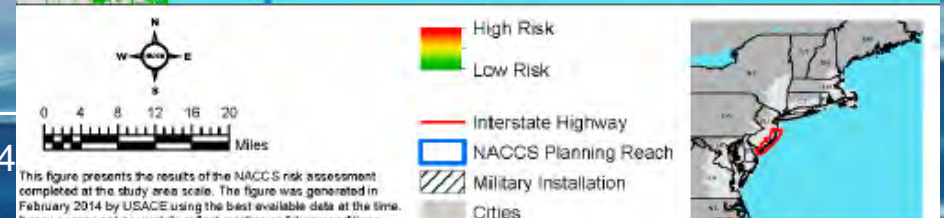


# CLOSING REMARKS/ NEXT STEPS



# NJBB FLOOD RISK MANAGEMENT STUDY SCHEDULE

- April 2016: Agreement Execution
- June 2016: FRM Workshop
- December 2016: Alternatives Milestone
- Early 2017: Alternatives Milestone Webinar
- Mid 2019: Chief's Report



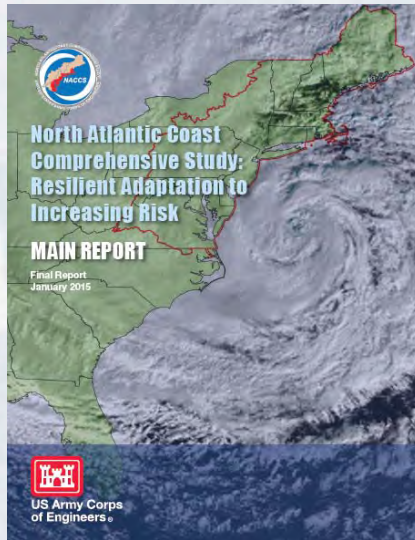


# FRM WORKSHOP OUTCOMES

- Revisit problems/objectives/constraints
- Literature review/Data needs assessment
- Existing condition
- Future without project condition forecast
- Develop alternatives based on management measures
- NEPA Scoping



# Challenge: Tough Choices



**“Addressing these problems requires a paradigm shift in how we work, live, travel, and play in a sustainable manner as the extent of the area at very high risk of coastal storm damage expands.”**

## Preface

### TOUGH CHOICES

The North Atlantic Coast is a dynamic environment that supports densely populated areas encompassing trillions of dollars of largely fixed public, private, and commercial investment. Hurricane Sandy made us acutely aware of our vulnerability to coastal storms and the potential for future, more devastating events due to changing sea levels and climate change. Changing sea levels represent an inexorable process causing numerous, significant water resource problems such as: increased, widespread flooding along the coast; changes in salinity gradients in estuarine areas that impact ecosystems; increased inundation at high tide; decreased capacity for stormwater drainage; and declining reliability of critical infrastructure services such as transportation, power, and communications. Addressing these problems requires a paradigm shift in how we work, live, travel, and play in a sustainable manner as the extent of the area at very high risk of coastal storm damage expands.



# Stakeholder Discussion

