

# NEW JERSEY BACK BAYS COASTAL STORM RISK MANAGEMENT FEASIBILITY STUDY

PUBLIC INFORMATION MEETING  
VENTNOR CITY, NJ  
SEPTEMBER 12, 2018



*"The views, opinions and findings contained in this report are those of the authors(s) and should not be construed as an official Department of the Army position, policy or decision, unless so designated by other official documentation."*



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# Public Information Meeting Purpose

NJBB Study purpose, technical products, and progress

## Public and Stakeholder input

- Study analyses and products
- Study process and schedule
- Management measures
- Other pertinent information relevant to study

Public and Shareholder collaboration towards community coastal resilience in a regional, systems context



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# **State of New Jersey Shore Protection Program**



**State of New Jersey  
Philip Murphy, Governor**

**Department of Environmental Protection  
Catherine McCabe, Commissioner**

**Engineering & Construction  
David Rosenblatt, Assistant Commissioner**

**Division of Coastal Engineering  
William Dixon, Director**

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**New Jersey Department of Environmental Protection  
Division of Coastal Engineering**



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# Division of Coastal Engineering



## Purpose

**To administer beach nourishment and coastal storm risk management projects throughout the State to:**

- ...Provide for protection of life and property along the coast**
- ...Preserve New Jersey's vital coastal resources**
- ...Maintain safe and navigable waterways**



# Shore Protection Fund is Dedicated...



**“To protect existing development and infrastructure from storm surges, sea-level rise, and shoreline migration, through dune creation and maintenance, beach nourishment projects and construction and repair of shore protection structures.”**

**\$25 million dedicated annually  
Realty Transfer Tax (N.J.S.A. C. 13:19-16.1)**

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**New Jersey Department of Environmental Protection  
Division of Coastal Engineering**



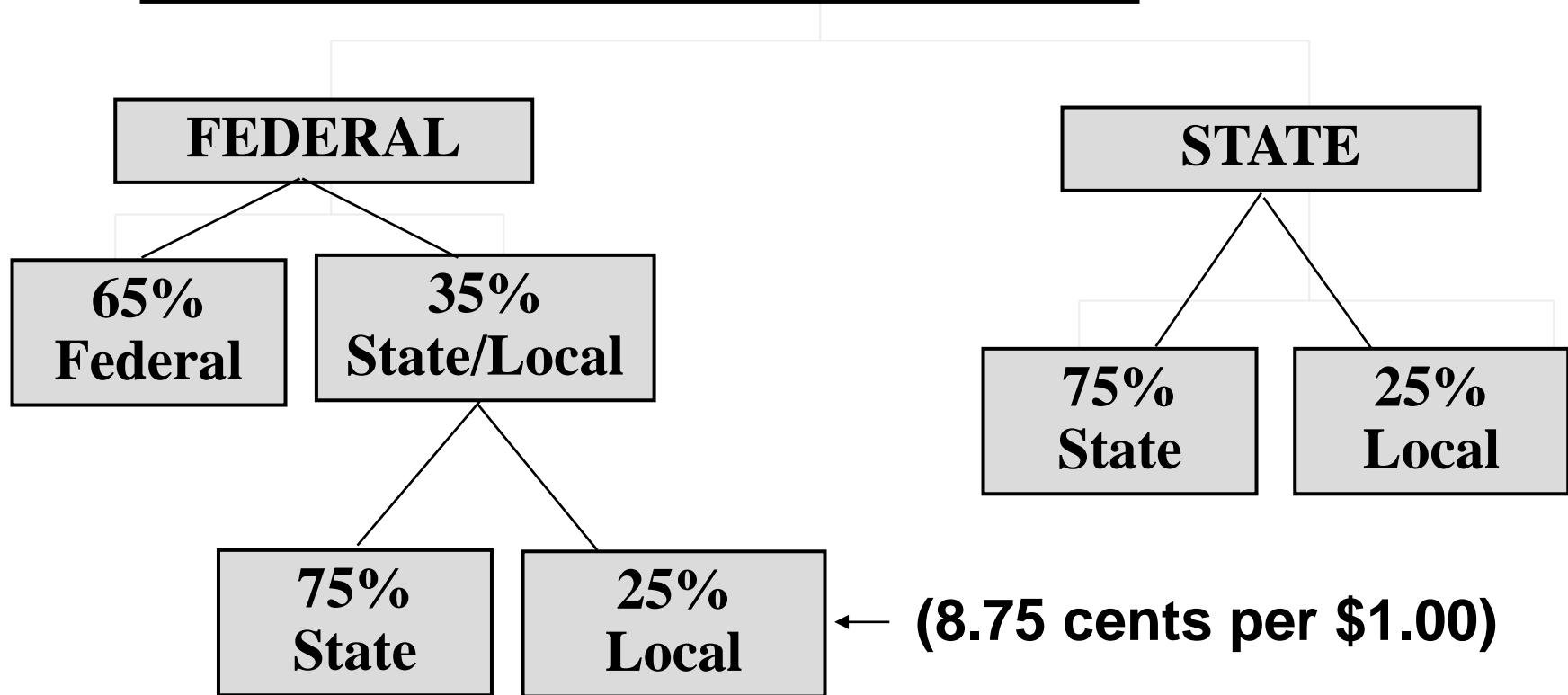
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# Typical Cost Share Breakdown

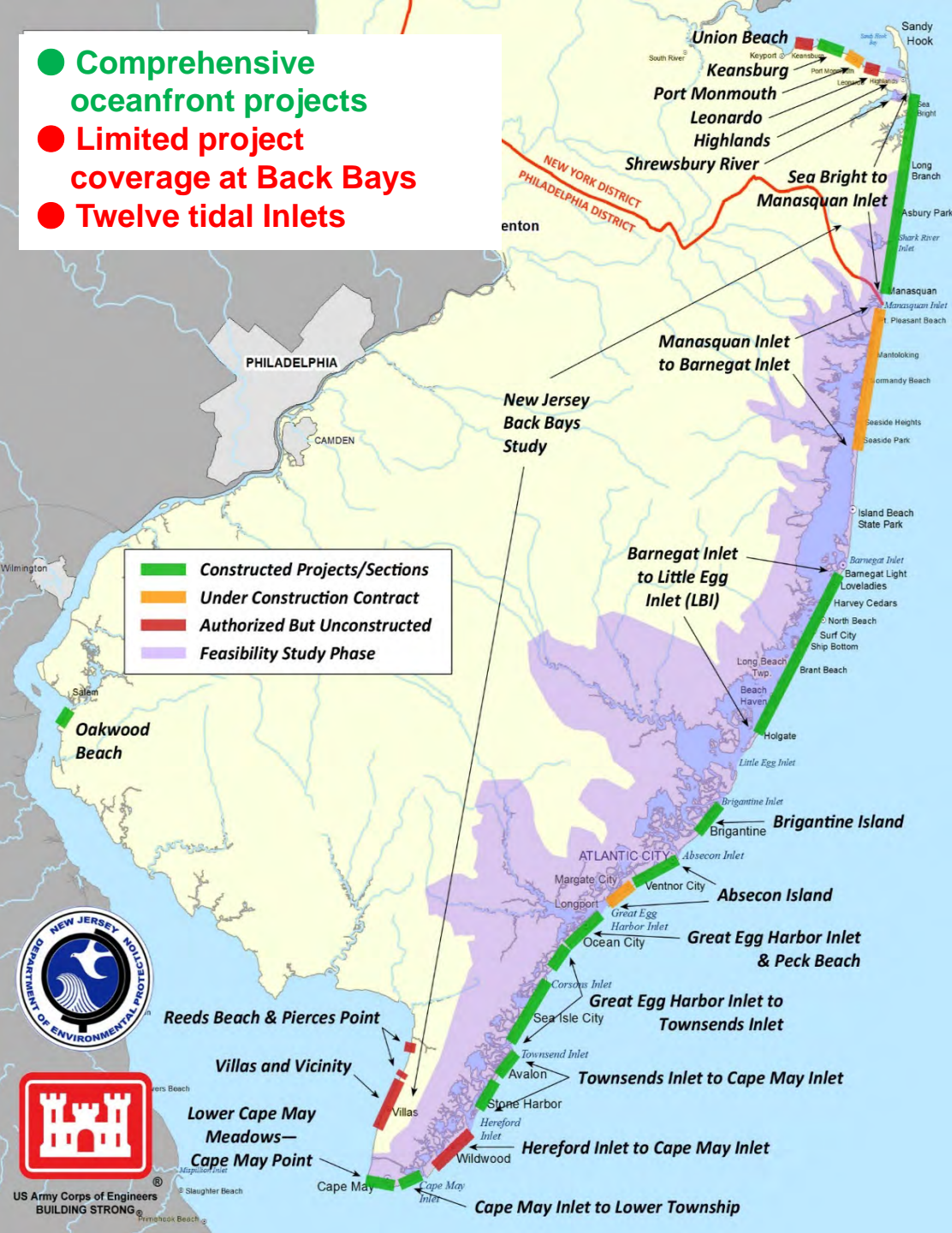


## Coastal Storm Risk Management Projects





- Comprehensive oceanfront projects
- Limited project coverage at Back Bays
- Twelve tidal Inlets



# Study Goals

- Coastal flooding and sea level rise risk management
- Reduce damages that affect population, property and infrastructure, and ecosystems
- Implement system-wide structural, nonstructural, natural and nature-based solutions
- Scaled and incrementally implementable construction opportunities



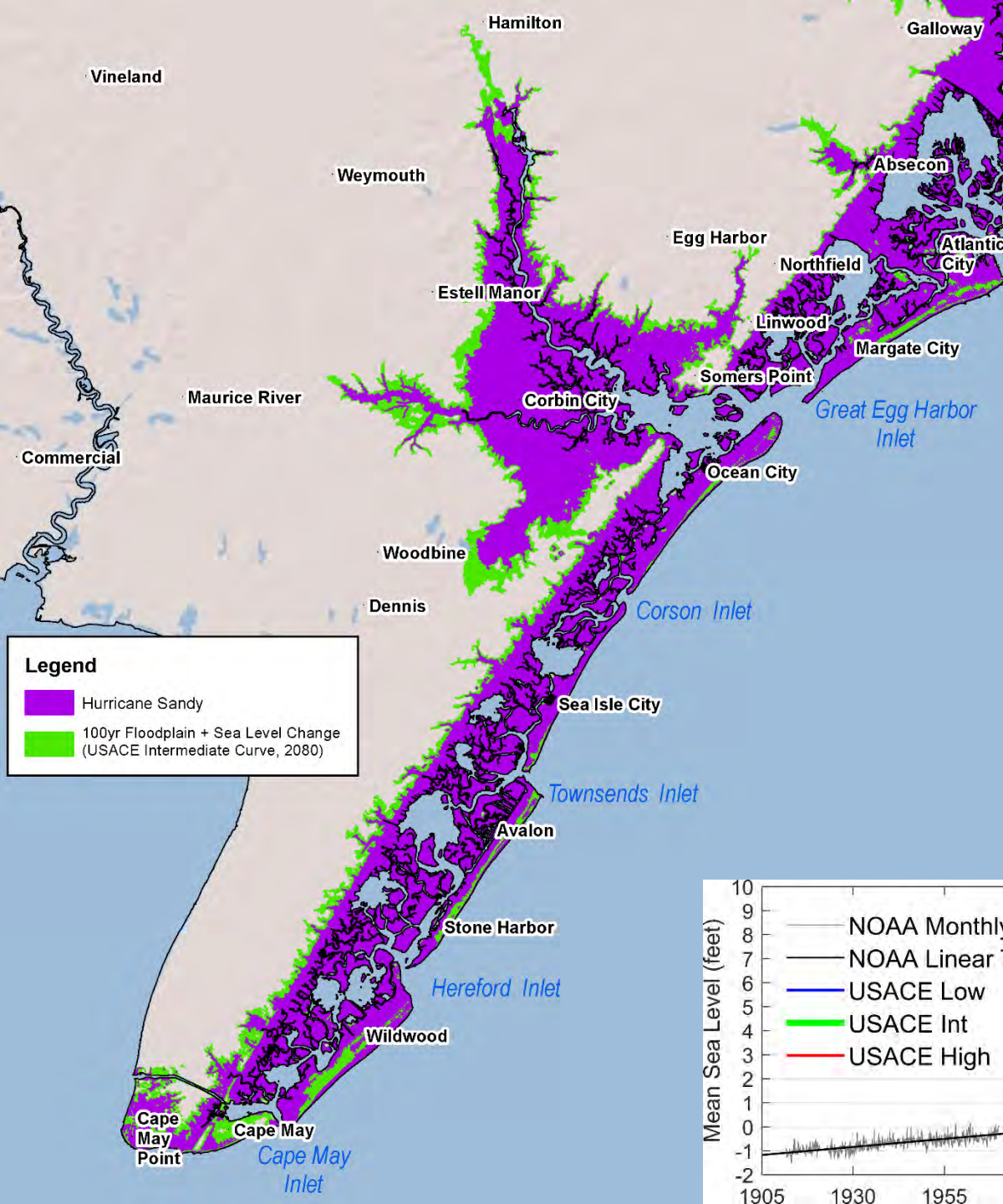
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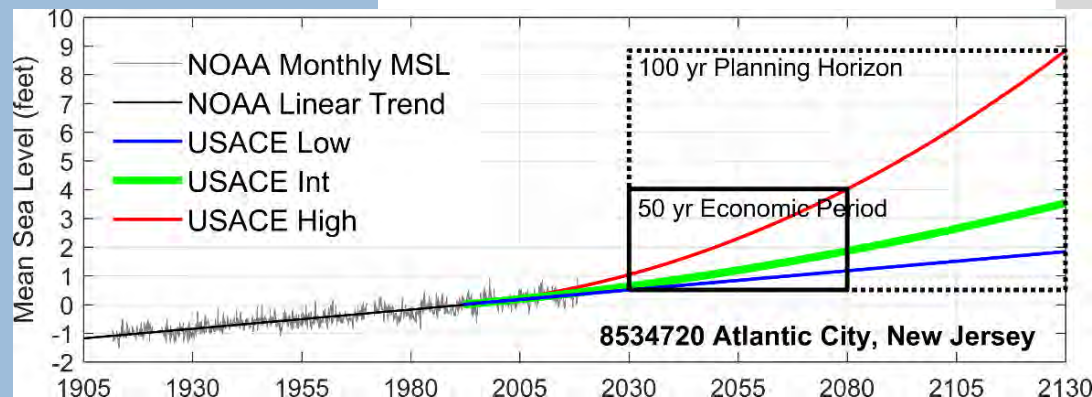


- Hurricane Sandy (October 2012) Mantoloking, NJ
- USACE North Atlantic Coast Comprehensive Study
- Focus Area Studies

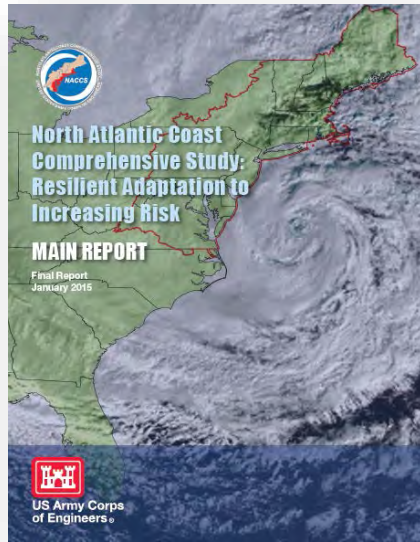




## Southern Study Area Inundation Map with Sea Level Rise



# 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.



# Resilience

The Army Corps of Engineers applies **resilience thinking** through **four principles** that spring from the following definition of resilience:

*“the ability to anticipate, **prepare** for, and **adapt** to changing conditions and **withstand**, **respond to**, and **recover** rapidly from disruptions.”*



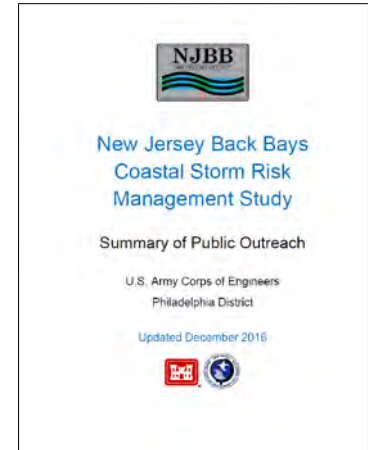
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# Study Accomplishments

- **Public, Stakeholder and agency meeting input incorporation**
- **Technical analyses**
  - **Management measure and alternative plan screening/formulation**
  - **Economic modeling and benefit calculations**
  - **Storm surge barrier hydrodynamic modeling**
  - **Natural and Nature Based Features incorporation**
  - **Sea Level change and risk informed decision making**
- **Environmental impact/NEPA compliance path forward**
- **Robust review process framework commenced**
- **Garnered Congressional, Army Corps & State of NJ Support**
- **Study funding stream authorized and appropriated**

## Public Outreach Summary

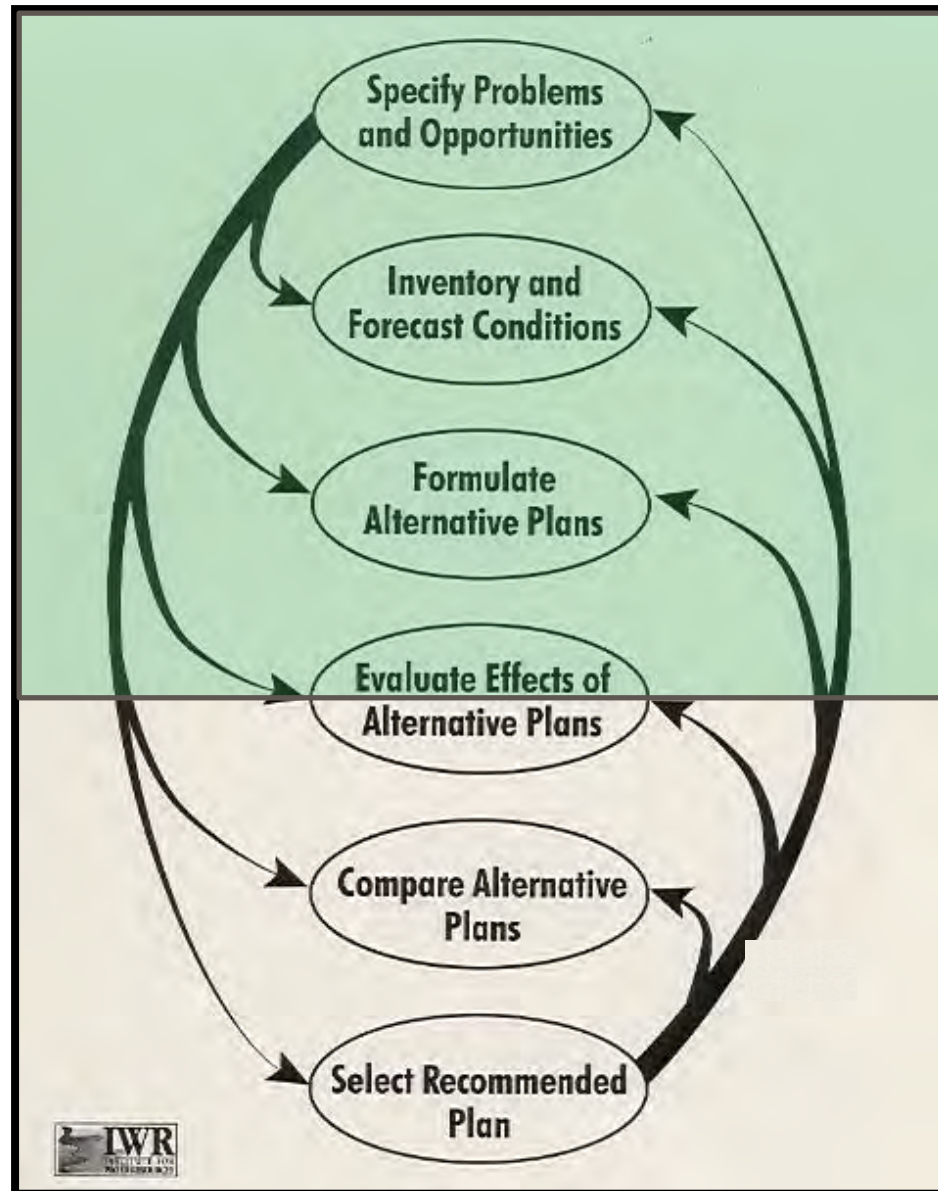


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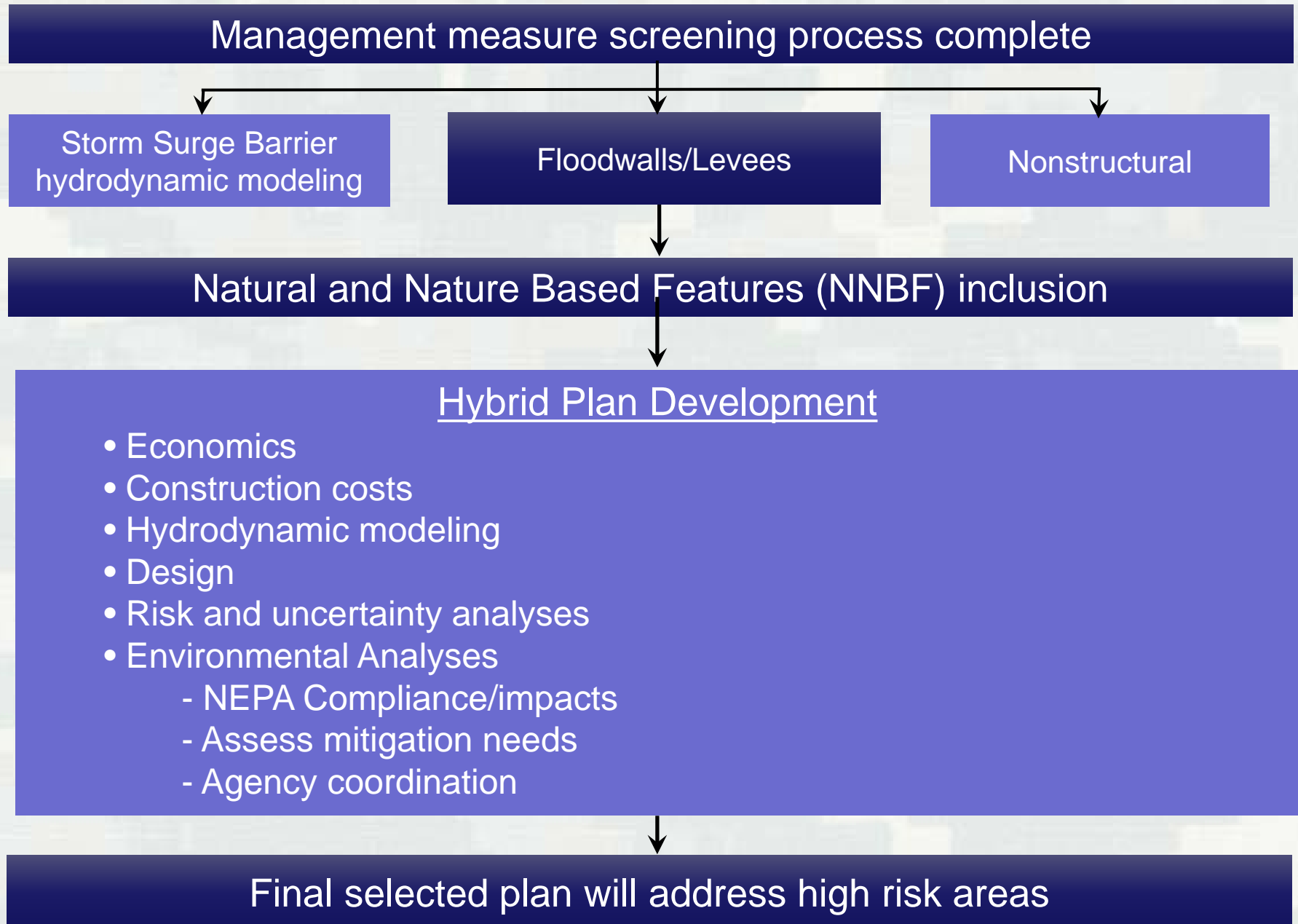




# Six Step Planning Process

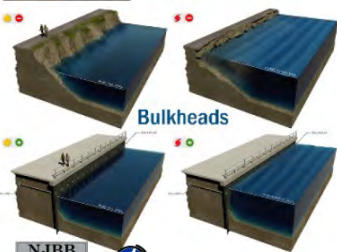
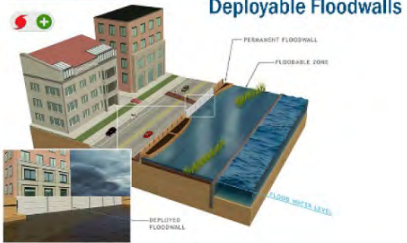
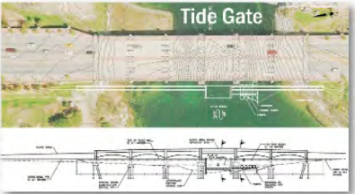


# Overall Study Strategy



## MANAGEMENT MEASURES FOR CONSIDERATION

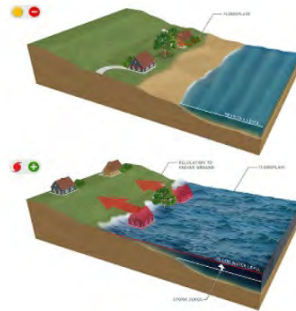
## Structural



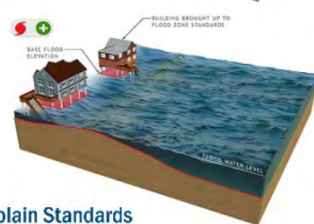
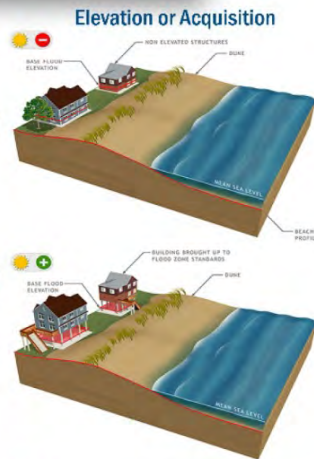
## Non-structural



## Relocation

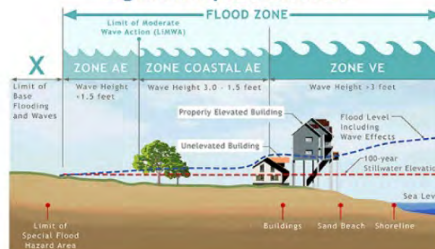


### Enhanced Warning System

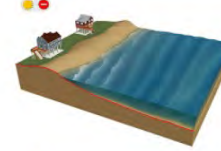


### Elevation or Acquisition

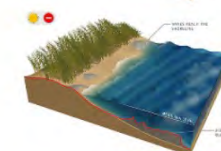
## Higher Floodplain Standards



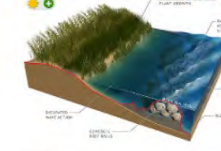
## Natural and Nature-based



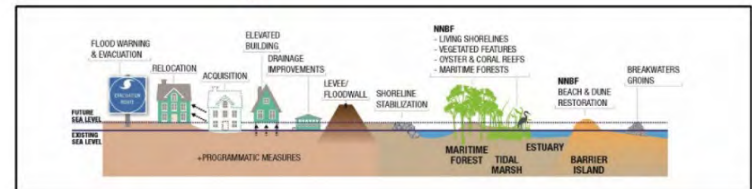
## Beach Nourishment



**Living Shoreline**



## Wetland Restoration





# Preliminary Component Attribute Comparison

	Storm Surge Barriers	Floodwalls & levees	Non structural	Natural and nature based features
Coastal storm risk management	High	High	Medium	Low
Residual risk reduction	Medium	High	Low	Medium
Environmental/water quality impacts	Medium	Medium	Low	Low
Local construction/aesthetic impacts	Low	High	Medium	Low



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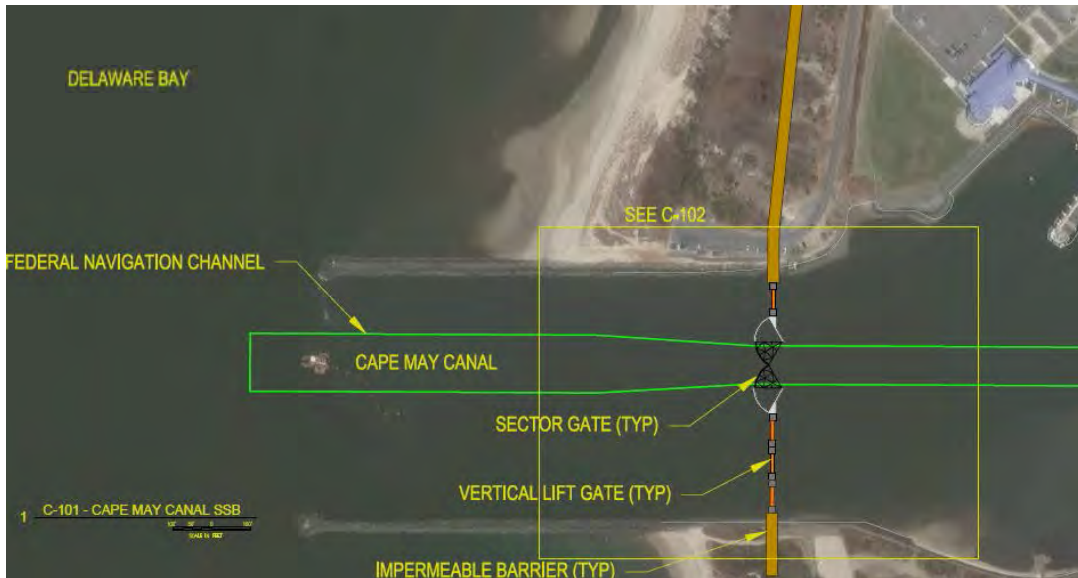


# Structural Measure – Storm Surge Barriers

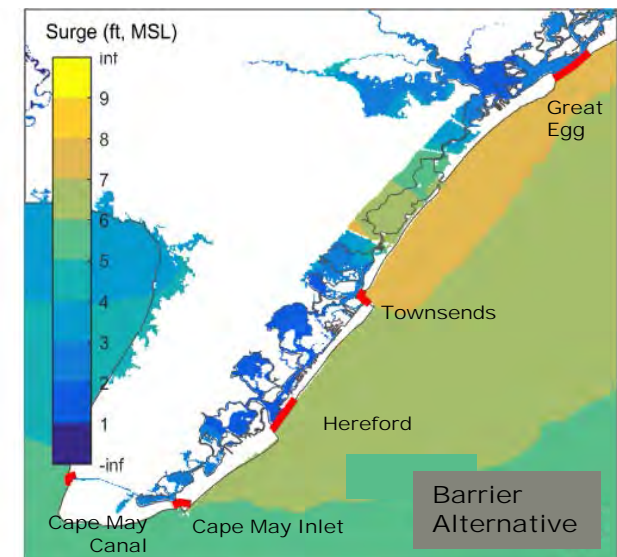
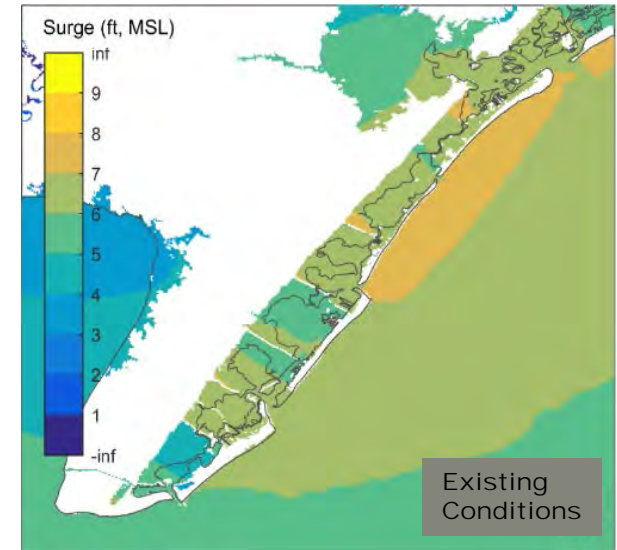
## Seabrook - New Orleans, LA



## Example at Cape May Canal, NJ

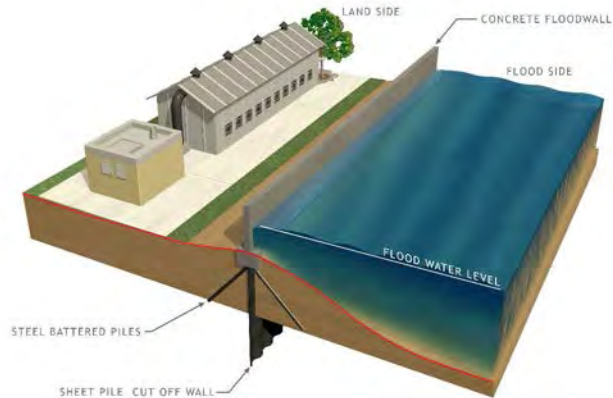


## Modeling

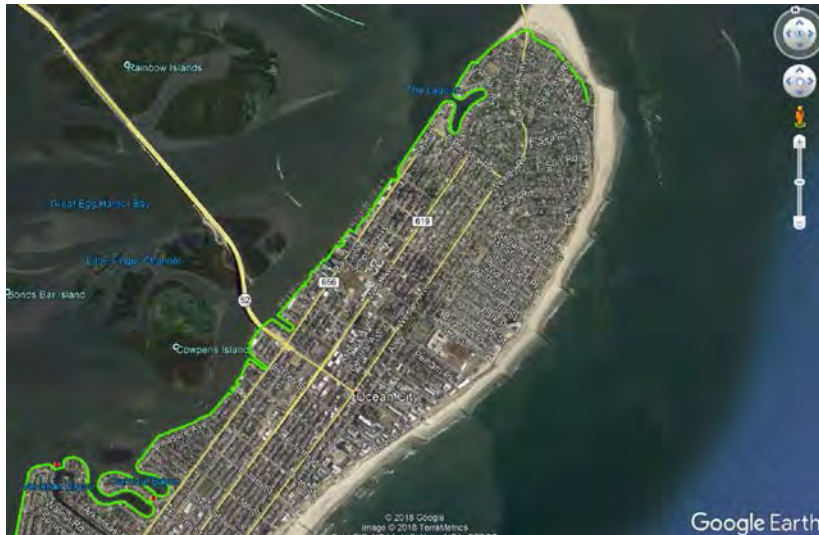


# Structural Measure – Floodwalls & Levees

## Visual Impacts



## Floodwall & Levee Example at Ocean City, NJ



Existing



Floodwall

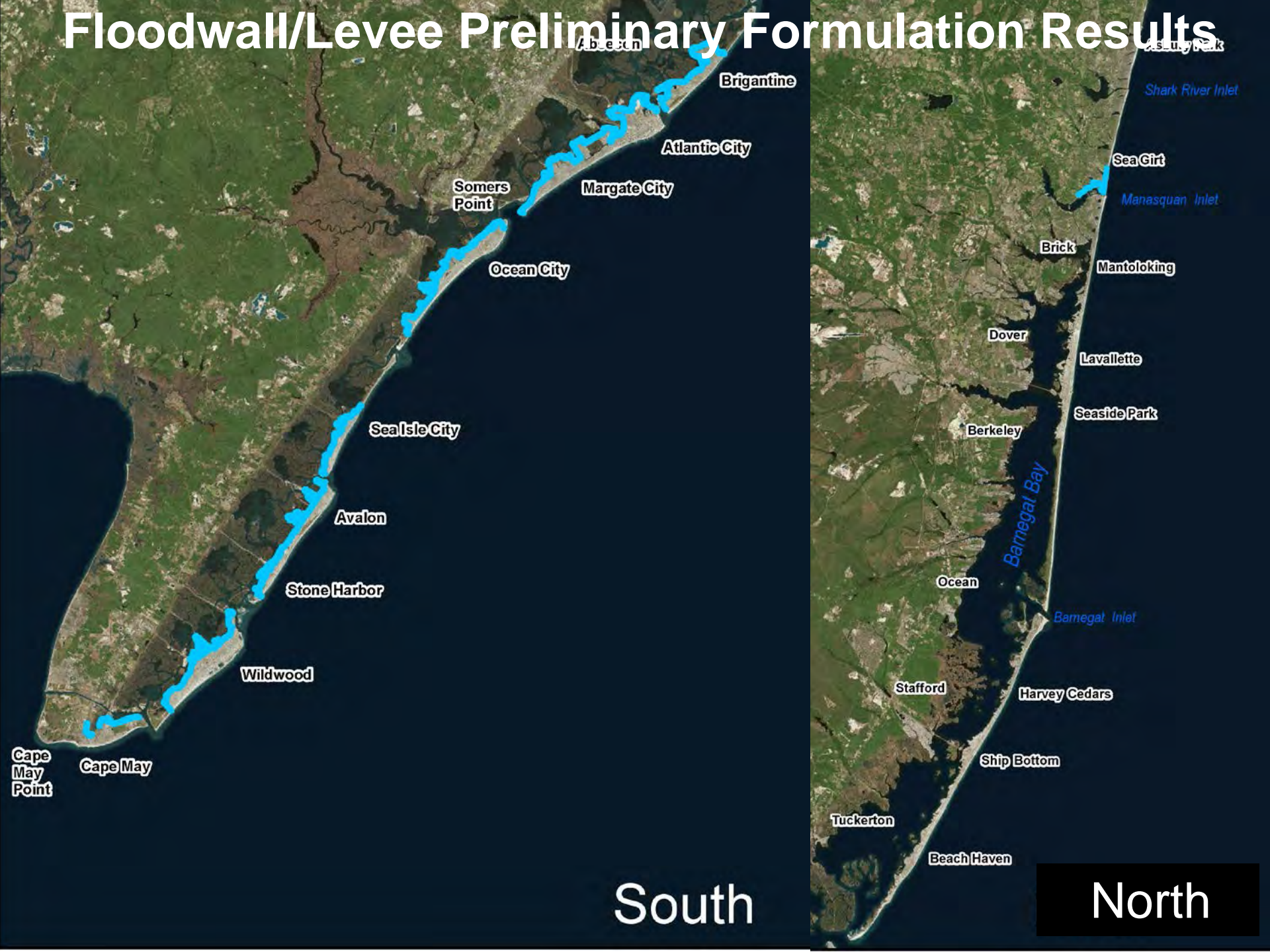


Existing

Floodwall



# Floodwall/Levee Preliminary Formulation Results



# Nonstructural Analyses

## ► Primary Nonstructural measures

- Building retrofit (elevation, floodproofing, ring walls)
- Acquisition and relocation

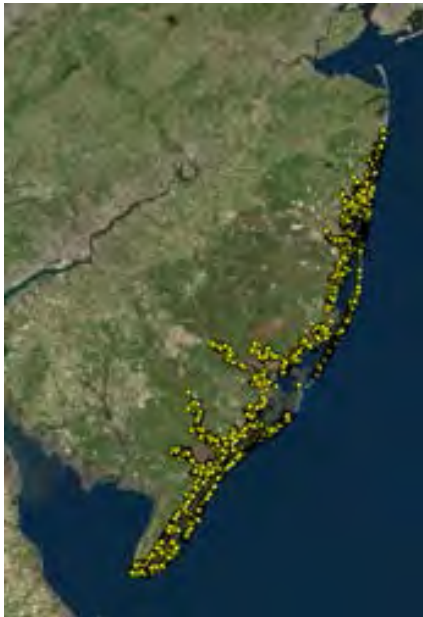
## ► Formulation process

- Develop structure inventory
- Identify Design Flood Elevation (DFE) = FEMA BFE + 3 feet
- Isolate residential structures by floodplain
- Discount previously elevated structures

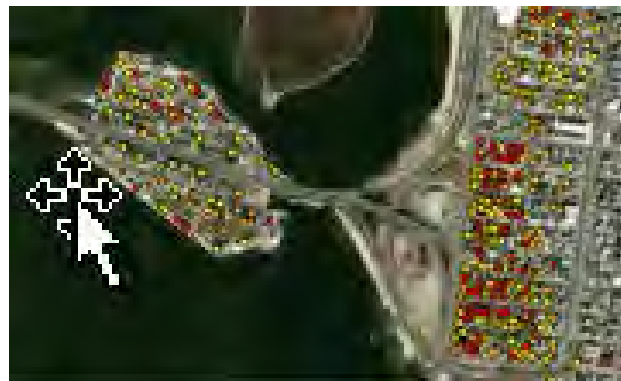
## ► Recommended in combination with structural measures to formulate economically justified hybrid plans



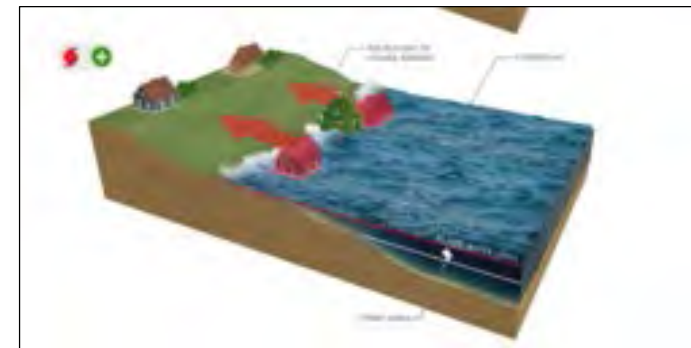
Building Retrofit



Develop structure inventory



Isolate structures by floodplain



Acquisition/Relocation



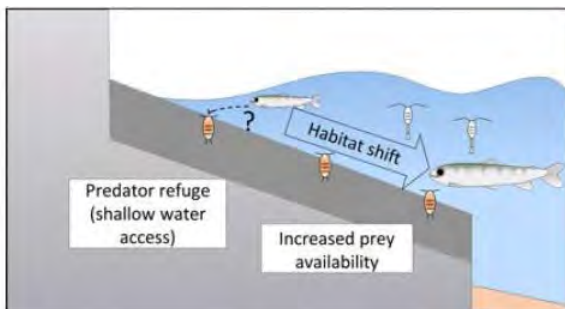
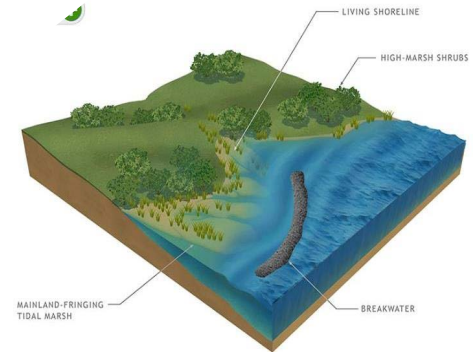
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# Natural and Nature Based Features (NNBF)

- ▶ **Primary NNBF measure under consideration is living shorelines. Current criteria for this measure include:**
  - Unarmored shorelines adjacent to infrastructure
  - Complementary to structural measures such as floodwalls and levees
- ▶ **NJBB study is also considering modifications that can be made to structural measures that can increase their habitat value:**
  - Habitat benches to restore more natural slope along shorelines
  - Textured concrete to support colonization of algae and invertebrates



Conceptual diagram of habitat bench



Textured concrete



Construction of living shoreline in Camp Pecometh, MD



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# System of Economic Accounts

National Economic Development (NED)	<ul style="list-style-type: none"><li>• The National Economic Development criteria examines the return per dollar spent and optimizes the balance between construction and implementation cost and coastal storm damages reduced. (See figure to right)</li></ul>
Regional Economic Development (RED)	<ul style="list-style-type: none"><li>• Regional Economic Development considers the changes in regional economic activity that result from each alternative plan.</li><li>• Regional income and regional employment are two factors that are included in regional economic development</li></ul>
Environmental Quality (EQ)	<ul style="list-style-type: none"><li>• Environmental Quality criteria includes both beneficial and adverse changes in the ecological, aesthetic, and cultural attributes of natural and cultural resources</li></ul>
Other Social Effects	<ul style="list-style-type: none"><li>• Other social effects include urban and community impacts; life, health, and safety factors; displacement; long-term productivity; and energy requirements and energy conservation.</li><li>• Other criteria can be added to this category based on feedback from stakeholders.</li></ul>



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# USACE Economic Analysis

- **Analyze proposed project effectiveness:**
  - ▶ Estimate coastal storm damages over next 50 years if no action taken
  - ▶ Estimate coastal storm damages with proposed project in place
  - ▶ Compare damages reduced with project cost to measure justifiability
- **Maximize National Economic Development (NED) Benefits**

$$\text{Net Average Annual } \underline{\text{NED Benefits}} = \\ \text{Avg. Ann. } \underline{\text{NED Benefits}} - \text{Avg. Ann. } \underline{\text{NED Costs}}$$

$$\text{Benefit-Cost Ratio} = \\ \text{Avg. Ann. } \underline{\text{NED Benefits}} / \text{Avg. Ann. } \underline{\text{NED Costs}}$$



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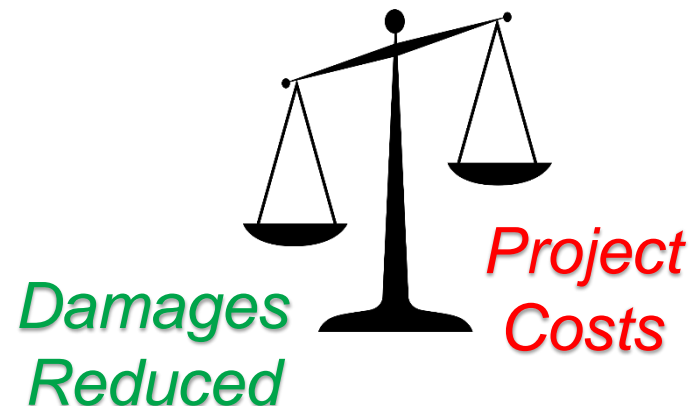
# Balancing Economic Benefits and Construction Costs

## NED Benefits (Damage Reduction)

- Structure Damages
- Content Damages
- Infrastructure Damages
- Vehicle Damages
- Land Value Losses
- Income Losses
- Emergency Costs
- Transportation Delays
- Recreation Losses
- Benefits During Construction

## NED Costs

- Construction
- Real Estate
- Environmental Mitigation
- Operation and Maintenance
- Interest During Construction
- Additional Miscellaneous Costs



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# Stakeholder/Public Coordination and Collaboration

**2016**

**JUNE**

Stakeholder  
Workshops

**NOVEMBER**

NEPA Scoping  
Letter

**DECEMBER**

Public Meeting

**2017**

**DECEMBER**

Federal Register  
Notice of Letter  
of Intent for  
Environmental  
Impact  
Statement

**2018**

**MARCH**

Cooperating Agency  
Letters

**MAY – JUNE**

Local Elected  
Officials Meetings

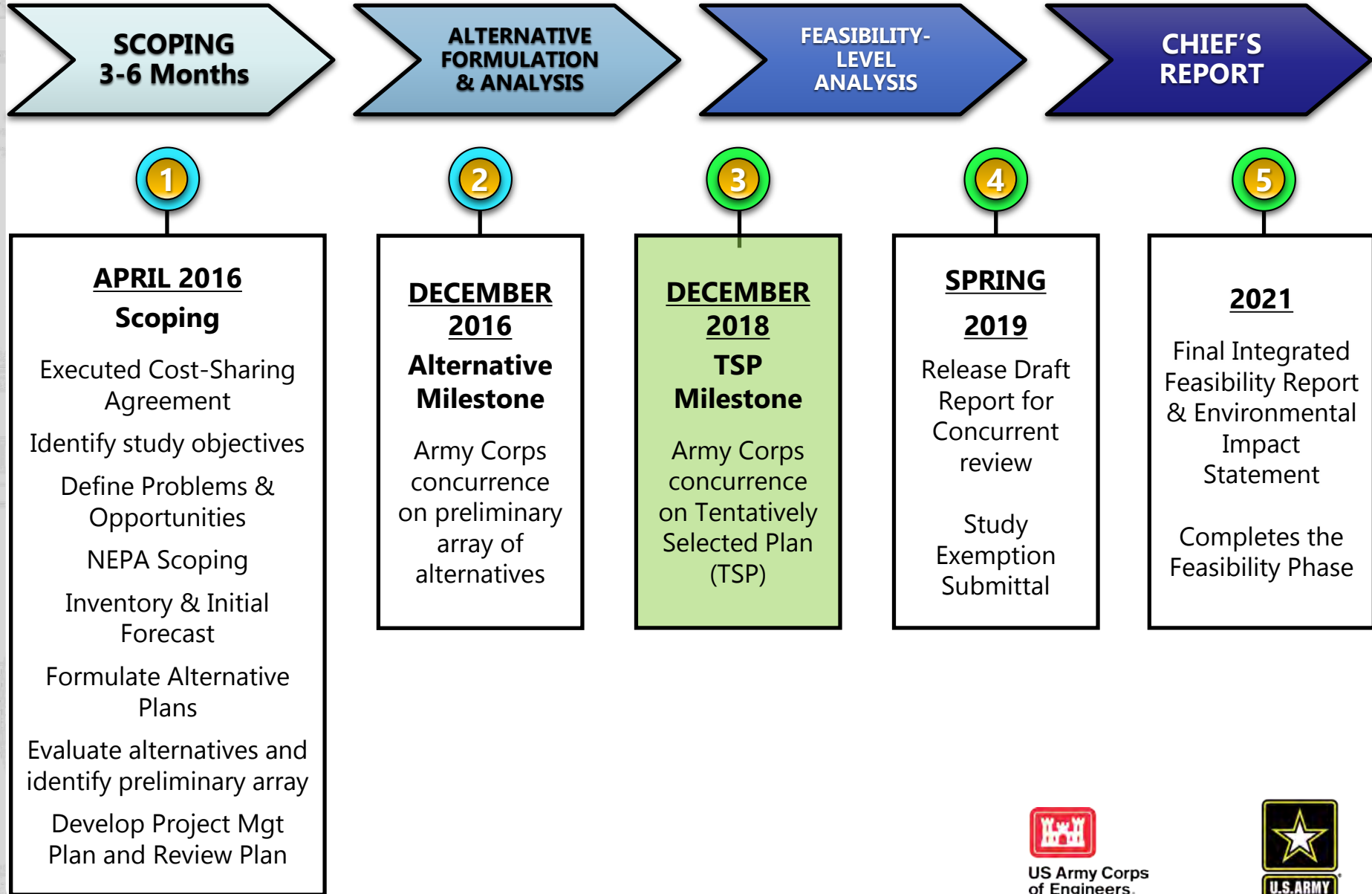
**MAY – OCTOBER**

Environmental  
Agency  
Coordination  
Meetings

**SEPTEMBER**

**Stakeholder /  
Public Meetings**

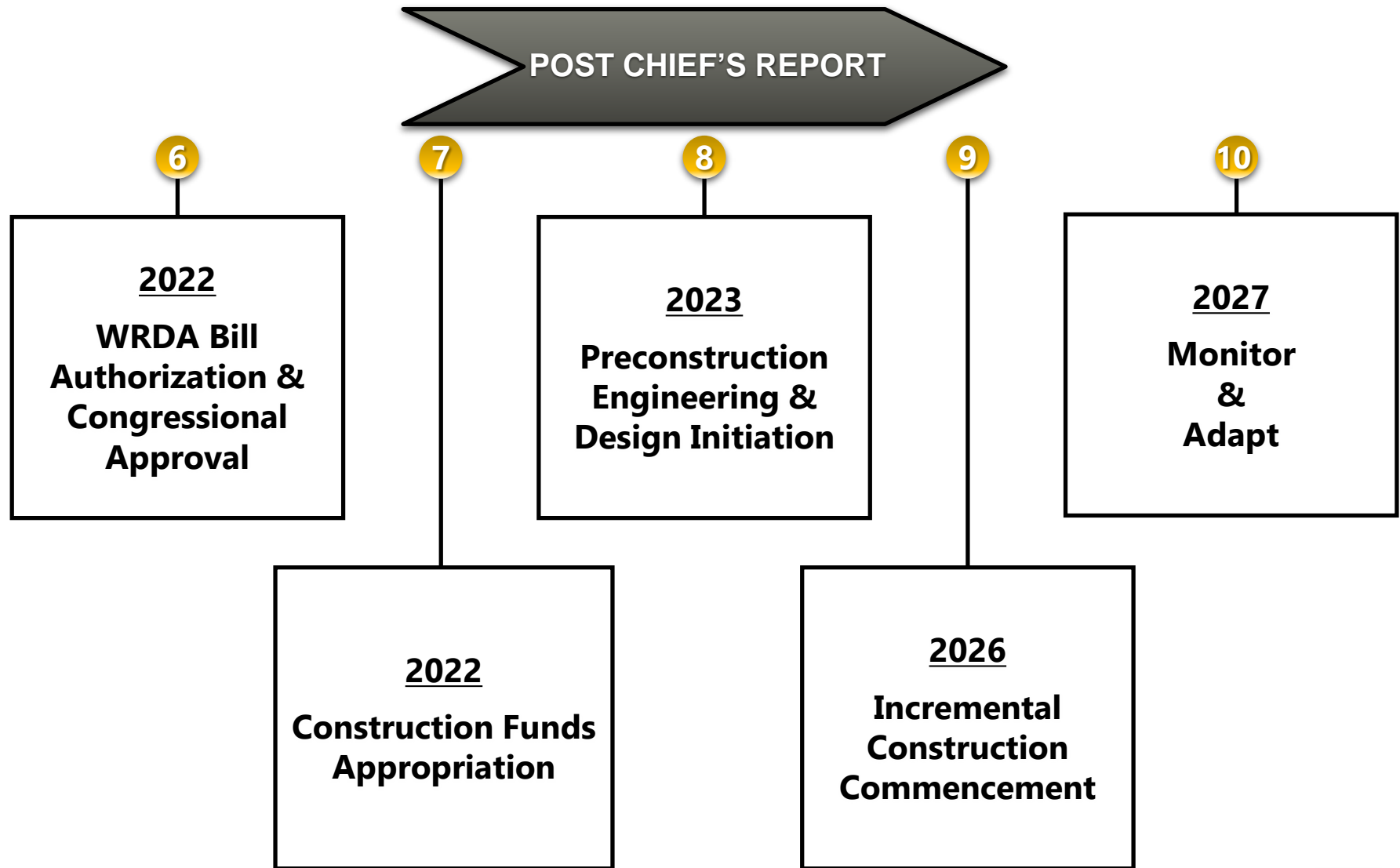
# Feasibility Study Process



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# Design & Construction Process



\* Dates tentative pending funding

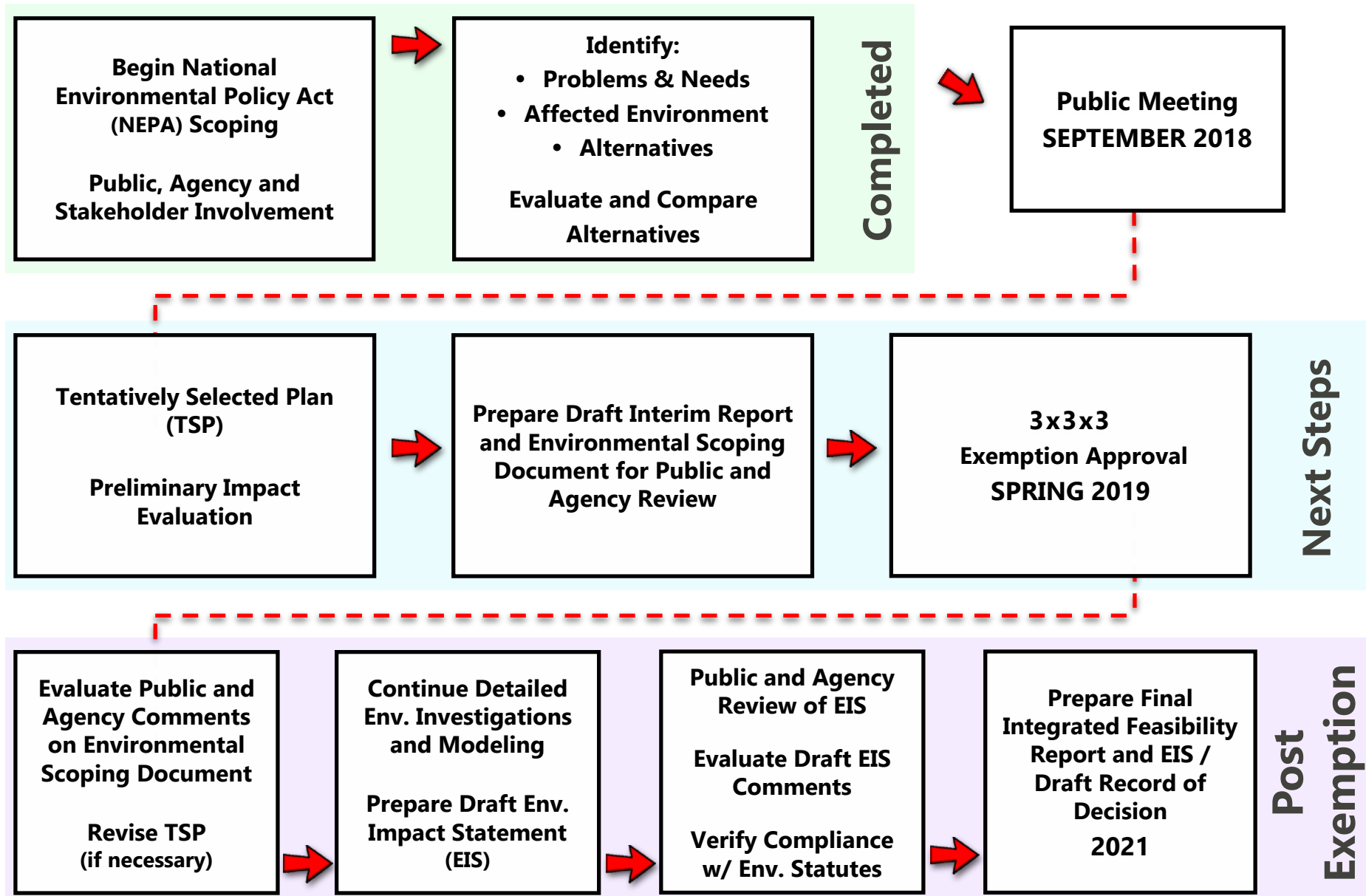


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# NEPA Environmental Compliance Process



# Agency Coordination and Compliance



# Comments & Questions

- Video of meetings, presentation and background material posted on New Jersey Back Bays Webpage next week
- Detailed comments can be submitted by comment form, email or in writing
  - ▶ [PDPA-NAP@usace.army.mil](mailto:PDPA-NAP@usace.army.mil)
  - ▶ U.S. Army Corps of Engineers, Planning Division, 100 Penn Square East, Philadelphia, PA 19107
- Please limit individual questions and comments to two minutes during Discussions
- <http://www.nap.usace.army.mil/> (NJBB link under “Current Issues”)

The screenshot shows the USACE NJBB Webpage. At the top is the US Army Corps of Engineers logo and navigation links: ABOUT, BUSINESS WITH US, MISSIONS, LOCATIONS, CAREERS, MEDIA, LIBRARY, CONTACT. The main heading is 'New Jersey Back Bays Coastal Storm Risk Management'. Below this is a 'Study Background' section with text about historic storms and the study's purpose. A 'Full Array of Coastal Storm Risk Management Measures' diagram is shown, illustrating various measures like dunes, berms, and wetlands. A 'Study Process' section follows, detailing the study's goals and the types of solutions being evaluated. On the right side, there is a 'Contact' section for the Philadelphia District Planning Division and a 'Study Documents' section with links to Factsheets, Study Documents, Presentations, and Maps.

## USACE NJBB Webpage



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