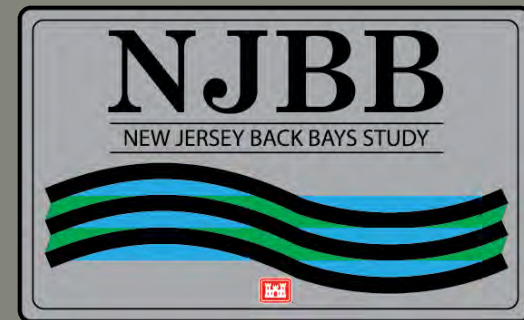


NEW JERSEY BACK BAYS COASTAL STORM RISK MANAGEMENT FEASIBILITY STUDY

PUBLIC INFORMATION MEETING
TOMS RIVER, NJ
SEPTEMBER 13, 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

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)**

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



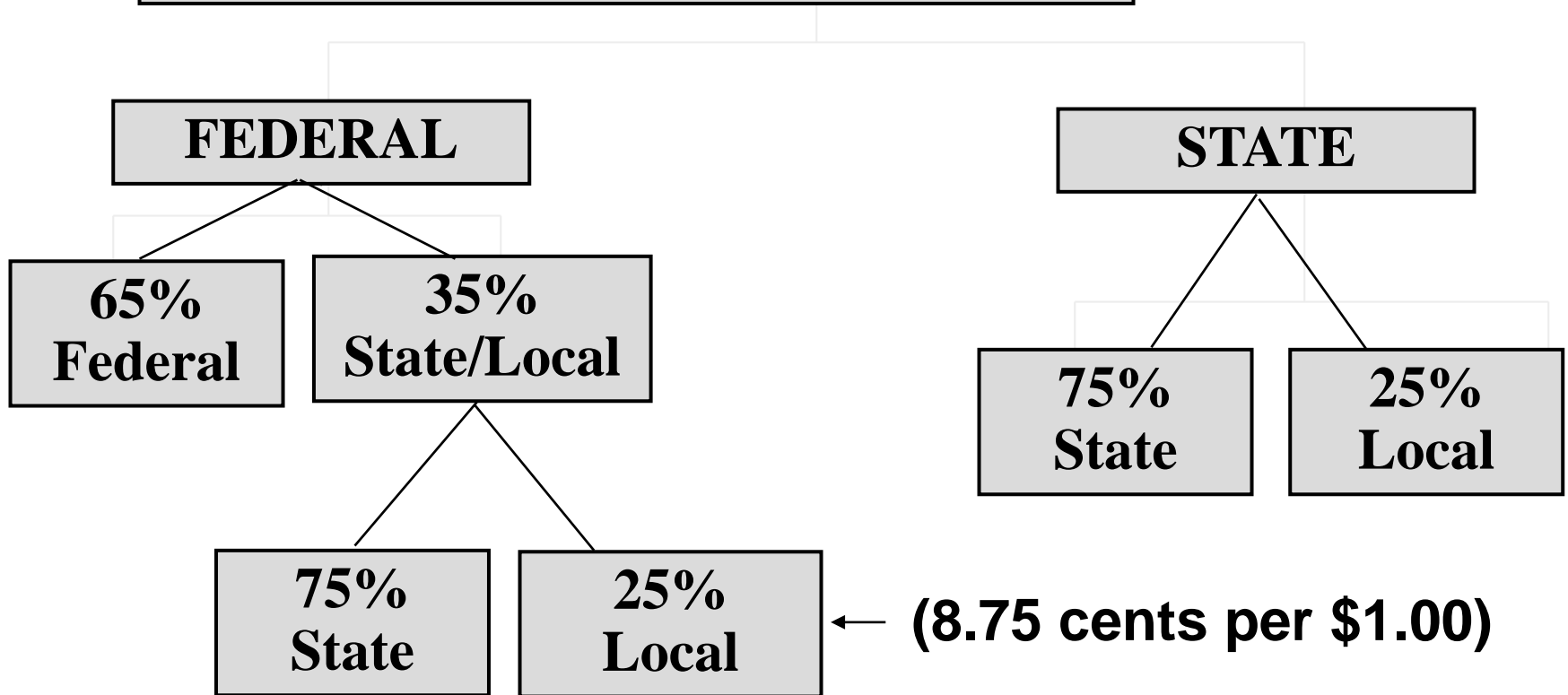
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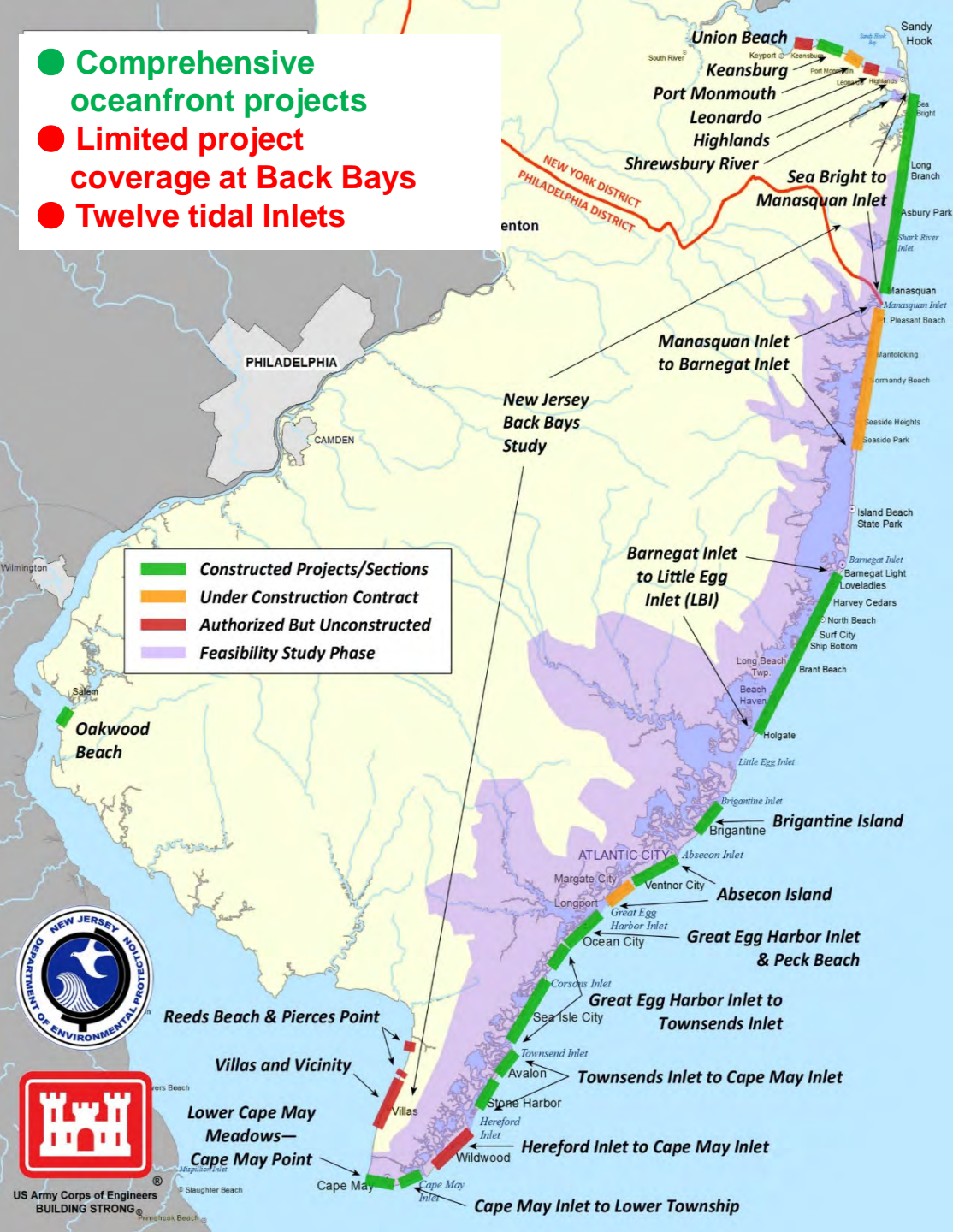
Typical Cost Share Breakdown



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

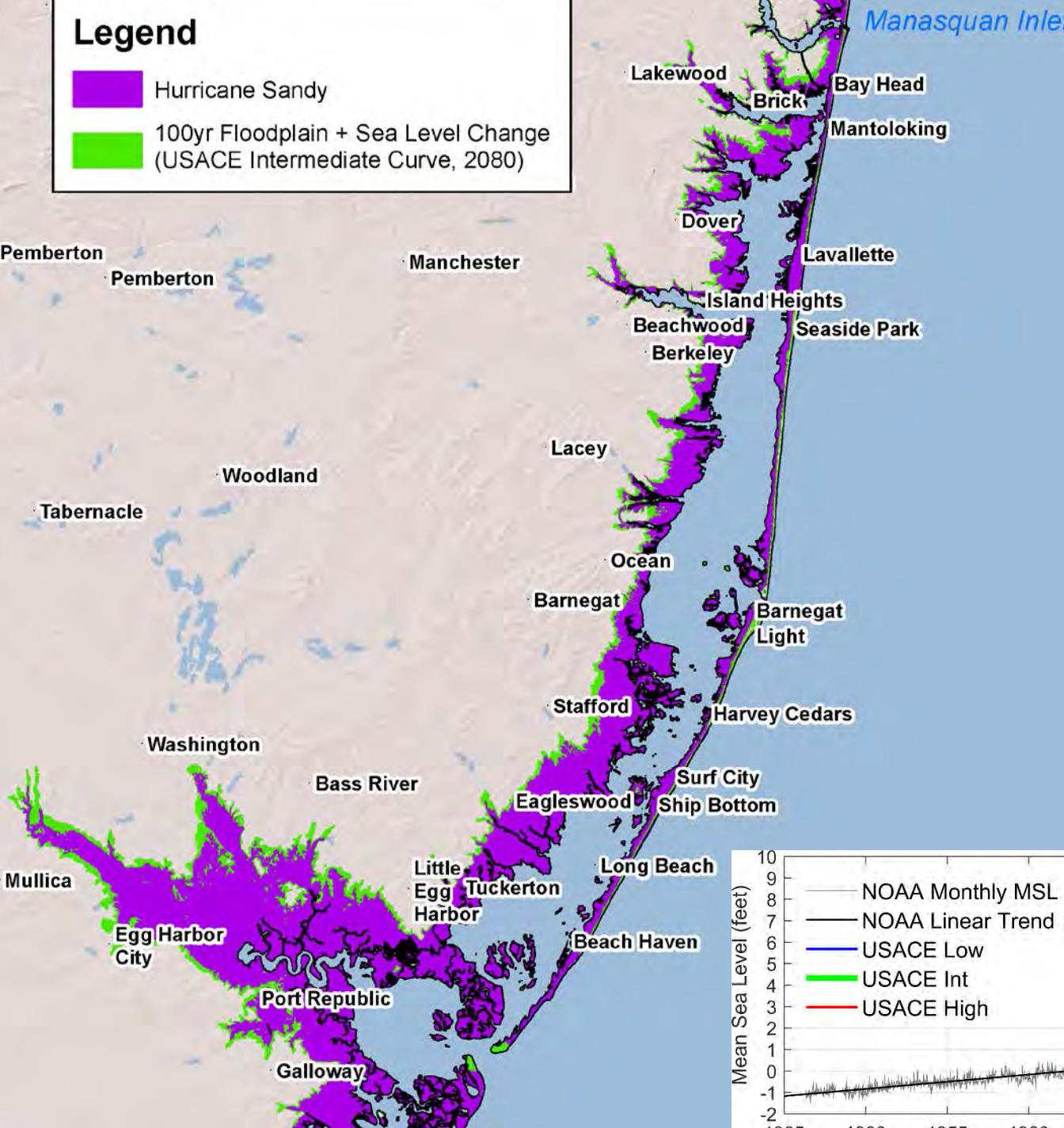




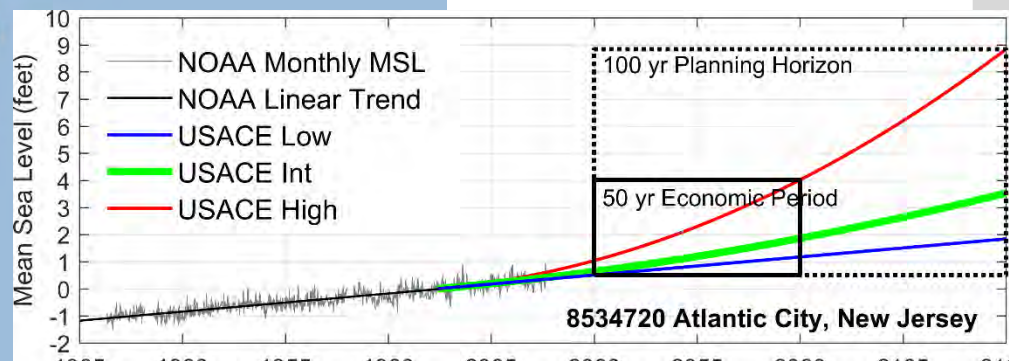
- **Hurricane Sandy (October 2012) Mantoloking, NJ**
- **USACE North Atlantic Coast Comprehensive Study**
- **Focus Area Studies**

Legend

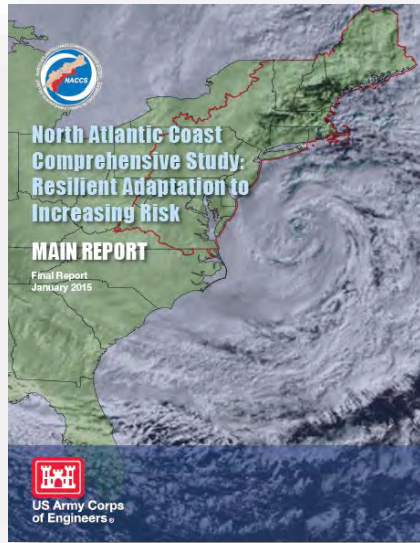
-  Hurricane Sandy
-  100yr Floodplain + Sea Level Change (USACE Intermediate Curve, 2080)



Northern 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.”*



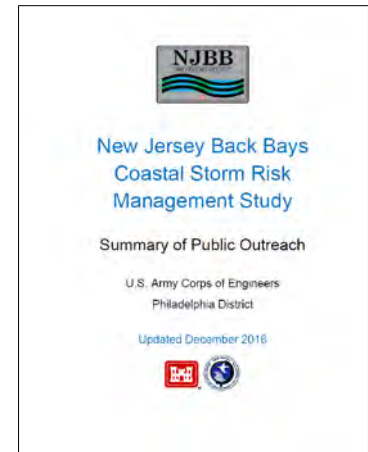
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Study Accomplishments

- **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**

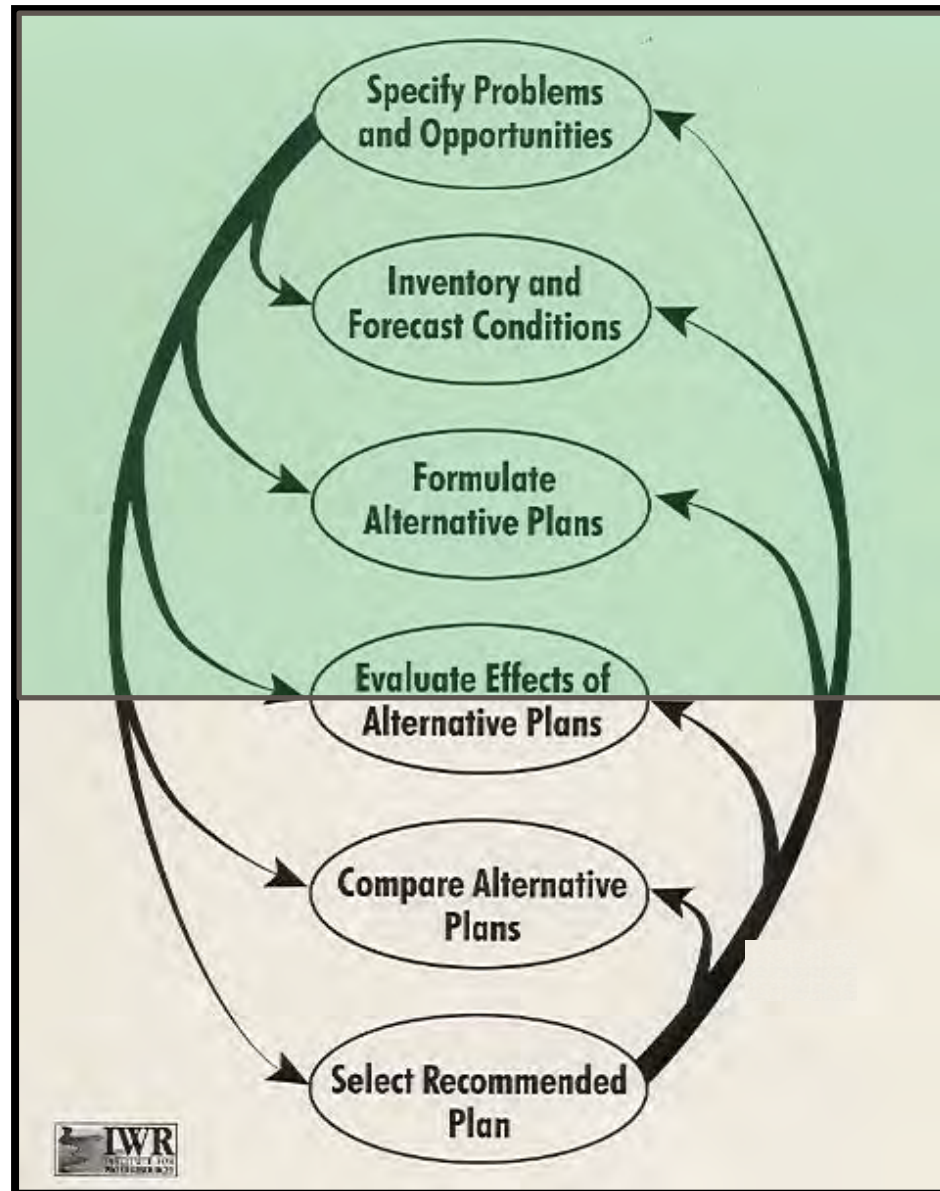
Public Outreach Summary



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Six Step Planning Process



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Overall Study Strategy

Management measure screening process complete

Storm Surge Barrier
hydrodynamic modeling

Floodwalls/Levees

Nonstructural

Natural and Nature Based Features (NNBF) inclusion

Hybrid Plan Development

- Economics
- Construction costs
- Hydrodynamic modeling
- Design
- Risk and uncertainty analyses
- Environmental Analyses
 - NEPA Compliance/impacts
 - Assess mitigation needs
 - Agency coordination

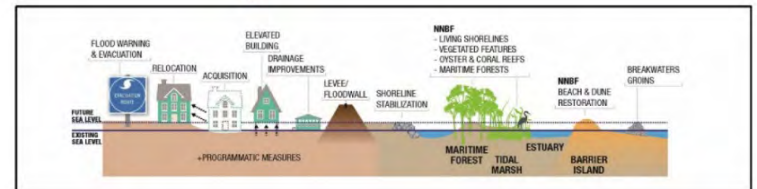
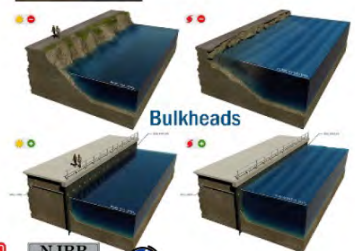
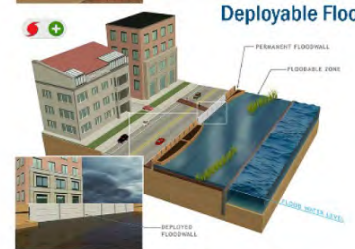
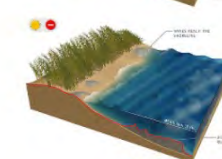
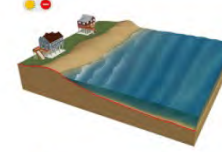
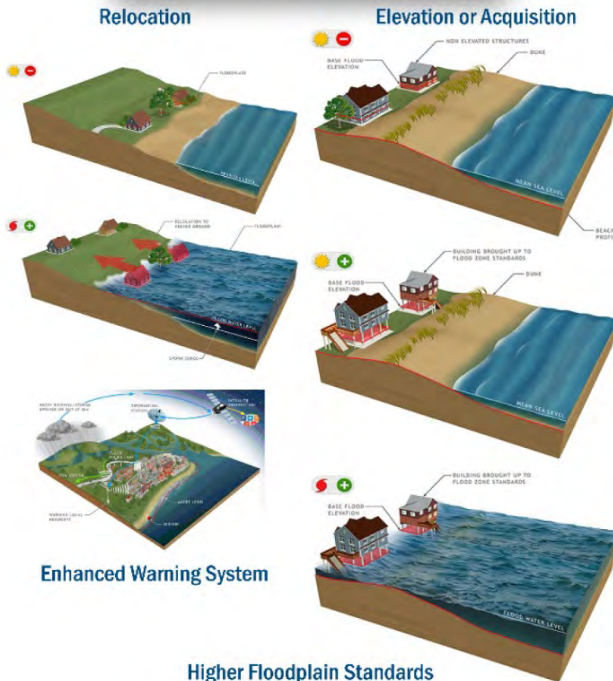
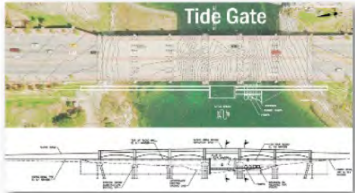
Tentatively selected plan to manage risk in the Study Area

MANAGEMENT MEASURES FOR CONSIDERATION

Structural

Non-structural

Natural and Nature-based



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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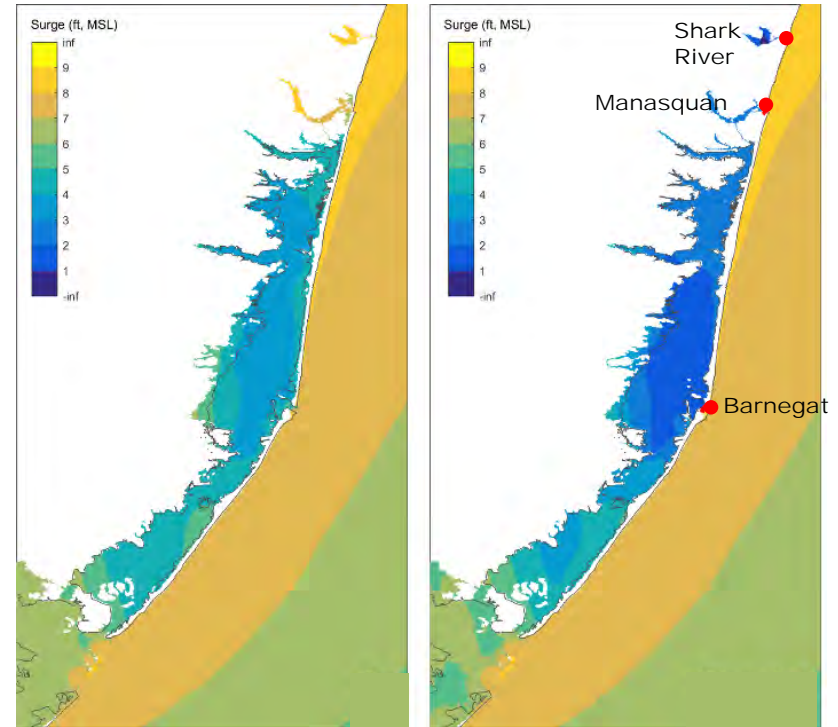


STRUCTURAL MEASURE - STORM SURGE BARRIERS

Seabrook - New Orleans, LA



Example at Barnegat Inlet, NJ



Existing Conditions

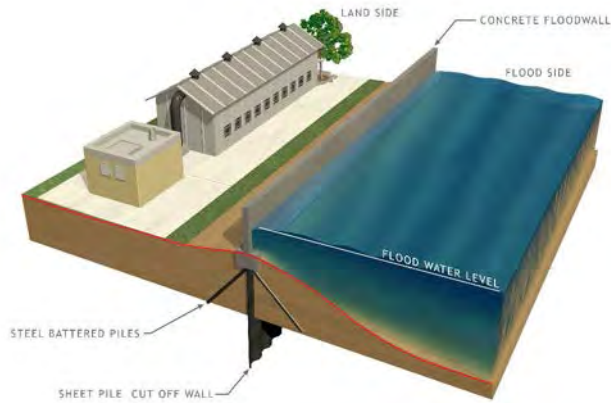
Barrier Alternative



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STRUCTURAL MEASURE – FLOODWALLS & LEVEES



Visual Impacts

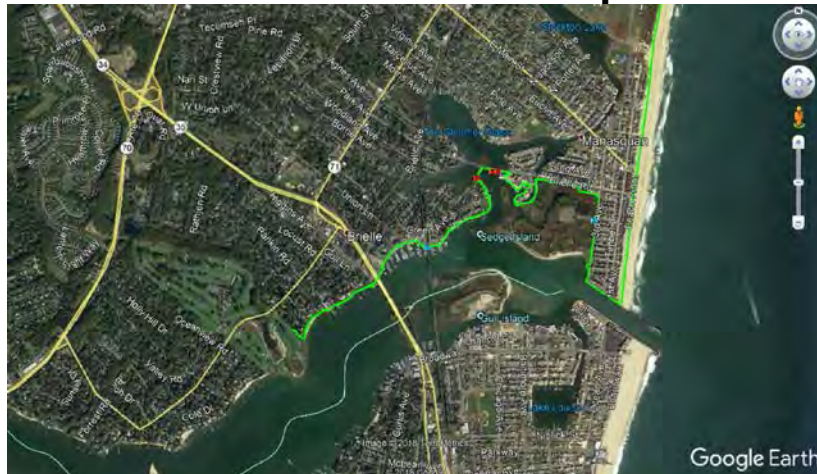
Existing



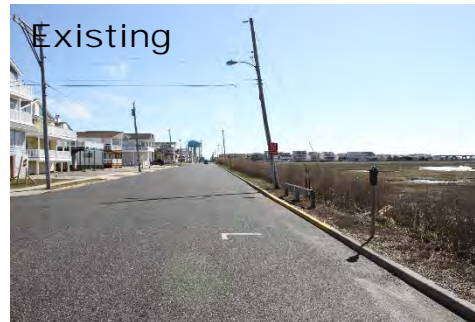
Floodwall



Floodwall & Levee Example at



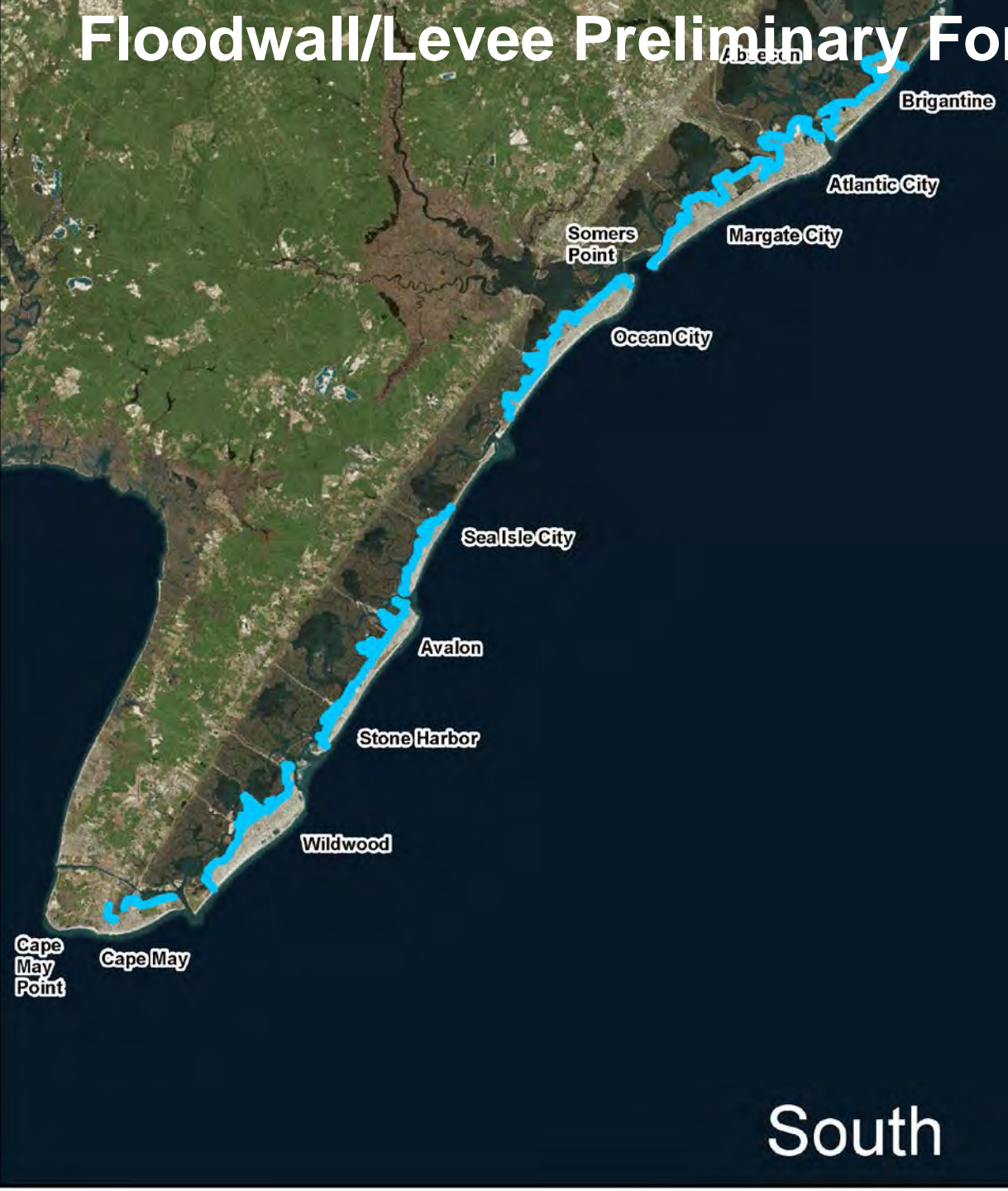
Existing



Floodwall



Floodwall/Levee Preliminary Formulation Results



South



North

Nonstructural Analyses

► Primary Nonstructural measures

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

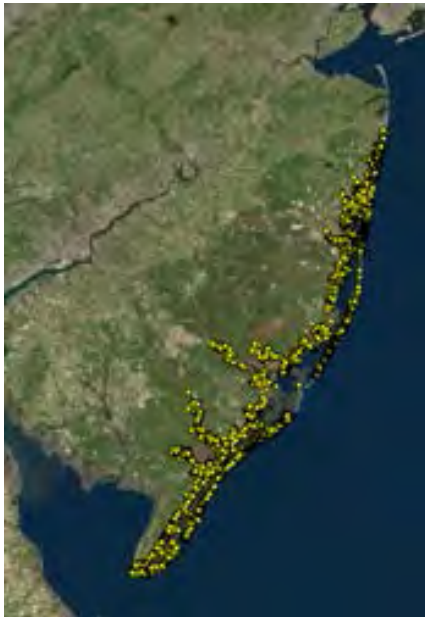
► Recommended in combination with structural measures to formulate economically justified hybrid plans

► Formulation process

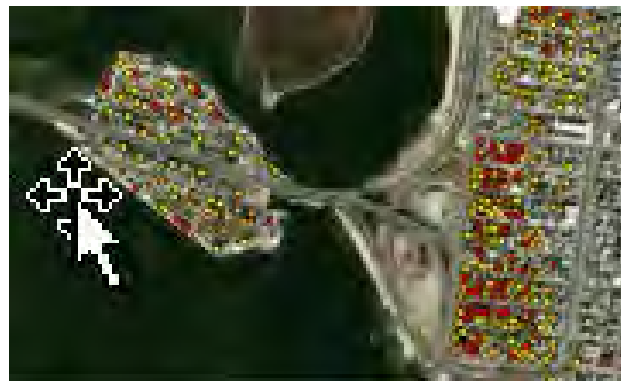
- Develop structure inventory
- Identify Design Flood Elevation (DFE) = FEMA BFE + 3 feet
- Isolate residential structures by floodplain
- Discount previously elevated structures



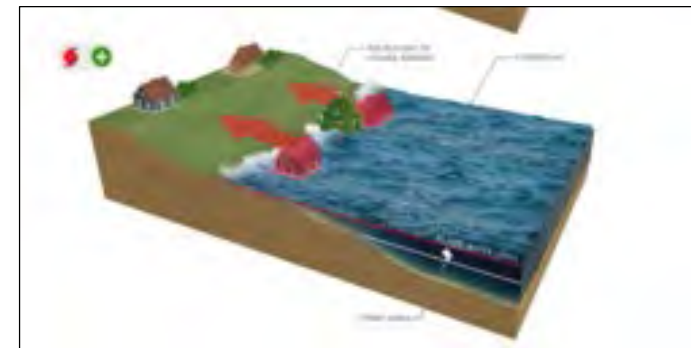
Building Retrofit including elevation



Develop structure inventory



Isolate structures by floodplain



Acquisition/Relocation

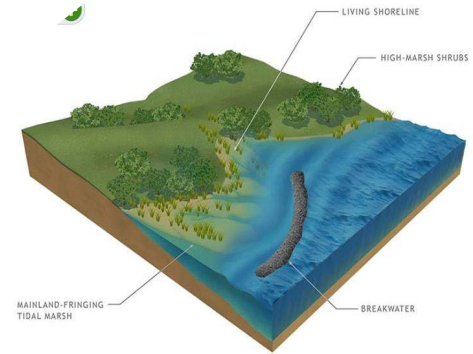


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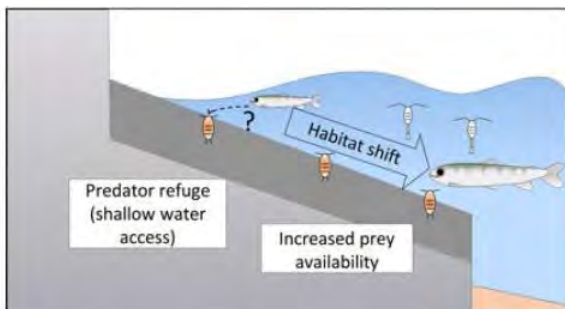


Natural and Nature Based Features (NNBF)

- ▶ **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



Construction of living shoreline in Camp Pecometh, MD



Conceptual diagram of habitat bench



Textured concrete



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System of Economic Accounts

National Economic Development (NED)

- 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.

Regional Economic Development (RED)

- Regional Economic Development considers the changes in regional economic activity that result from each alternative plan.
- Regional income and regional employment are two factors that are included in regional economic development

Environmental Quality (EQ)

- Environmental Quality criteria includes both beneficial and adverse changes in the ecological, aesthetic, and cultural attributes of natural and cultural resources

Other Social Effects

- Other social effects include urban and community impacts; life, health, and safety factors; displacement; long-term productivity; and energy requirements and energy conservation.
- Other criteria can be added to this category based on feedback from stakeholders.



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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**

Net Benefits = NED Benefits – NED Costs

Benefit-Cost Ratio = NED Benefits / NED Costs



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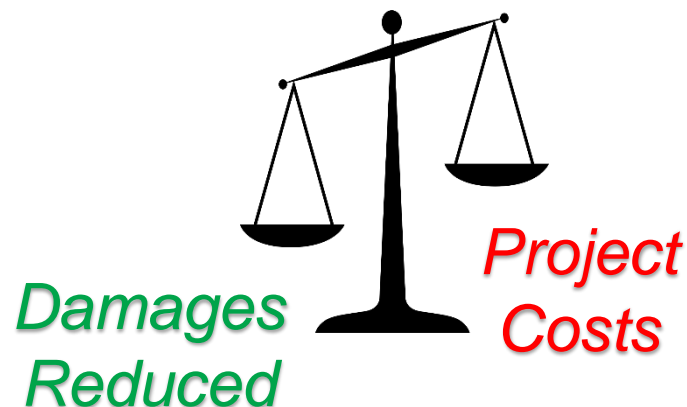
Balancing Economic Benefits and Construction Costs

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

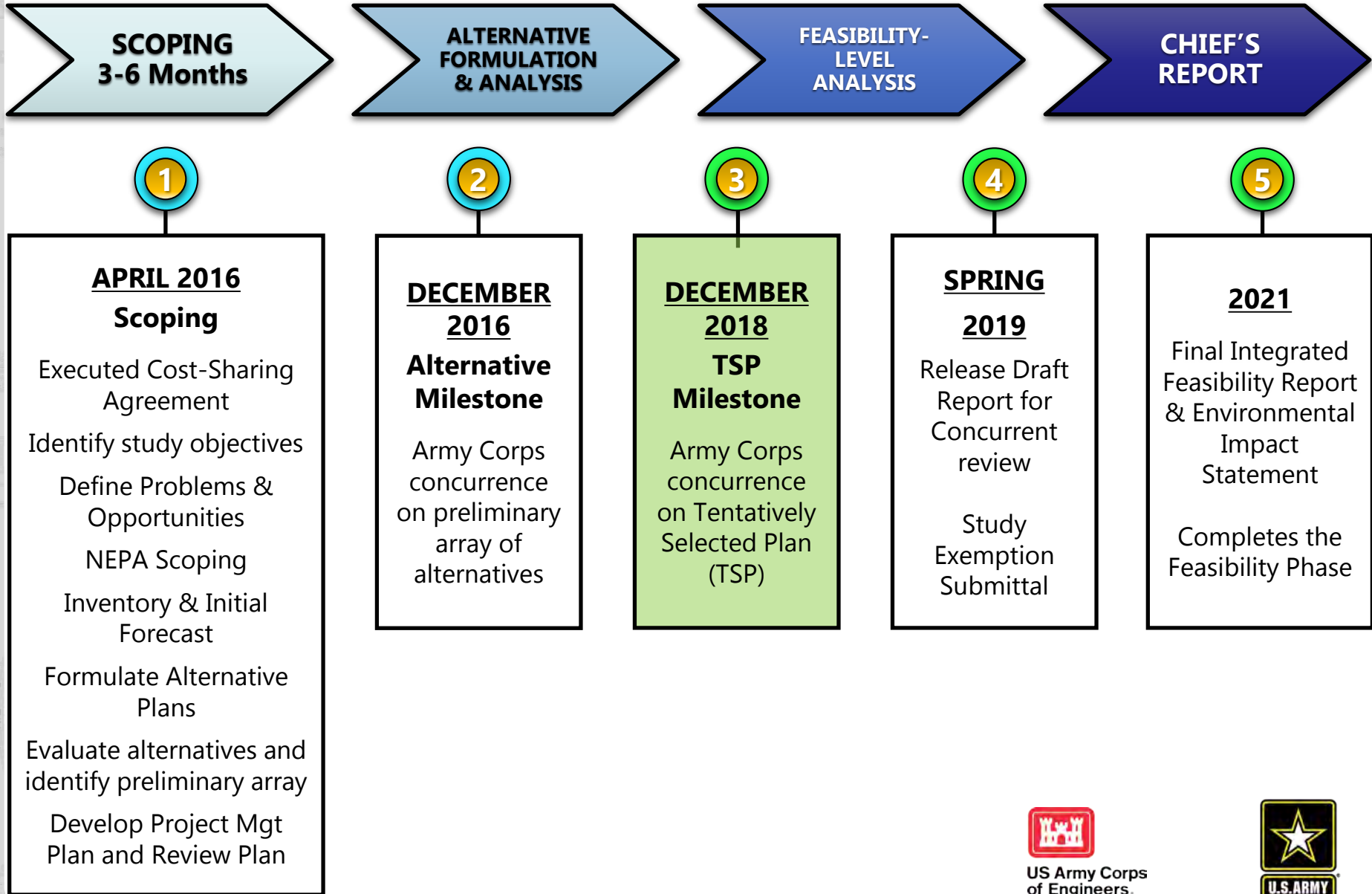
MAY – OCTOBER

Environmental
Agency
Coordination
Meetings

SEPTEMBER

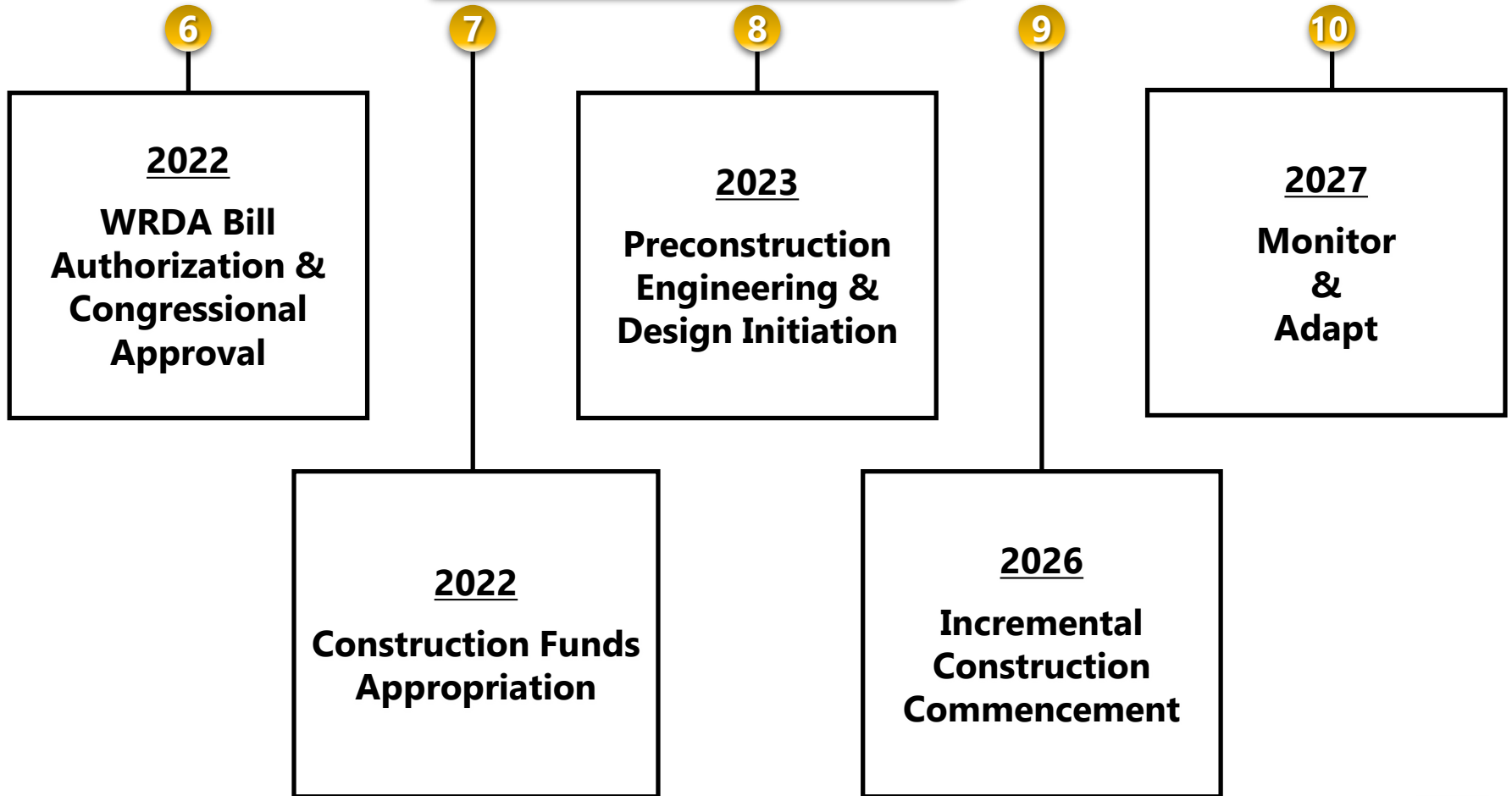
**Stakeholder /
Public Meetings**

Feasibility Study Process



Design & Construction Process

POST CHIEF'S REPORT



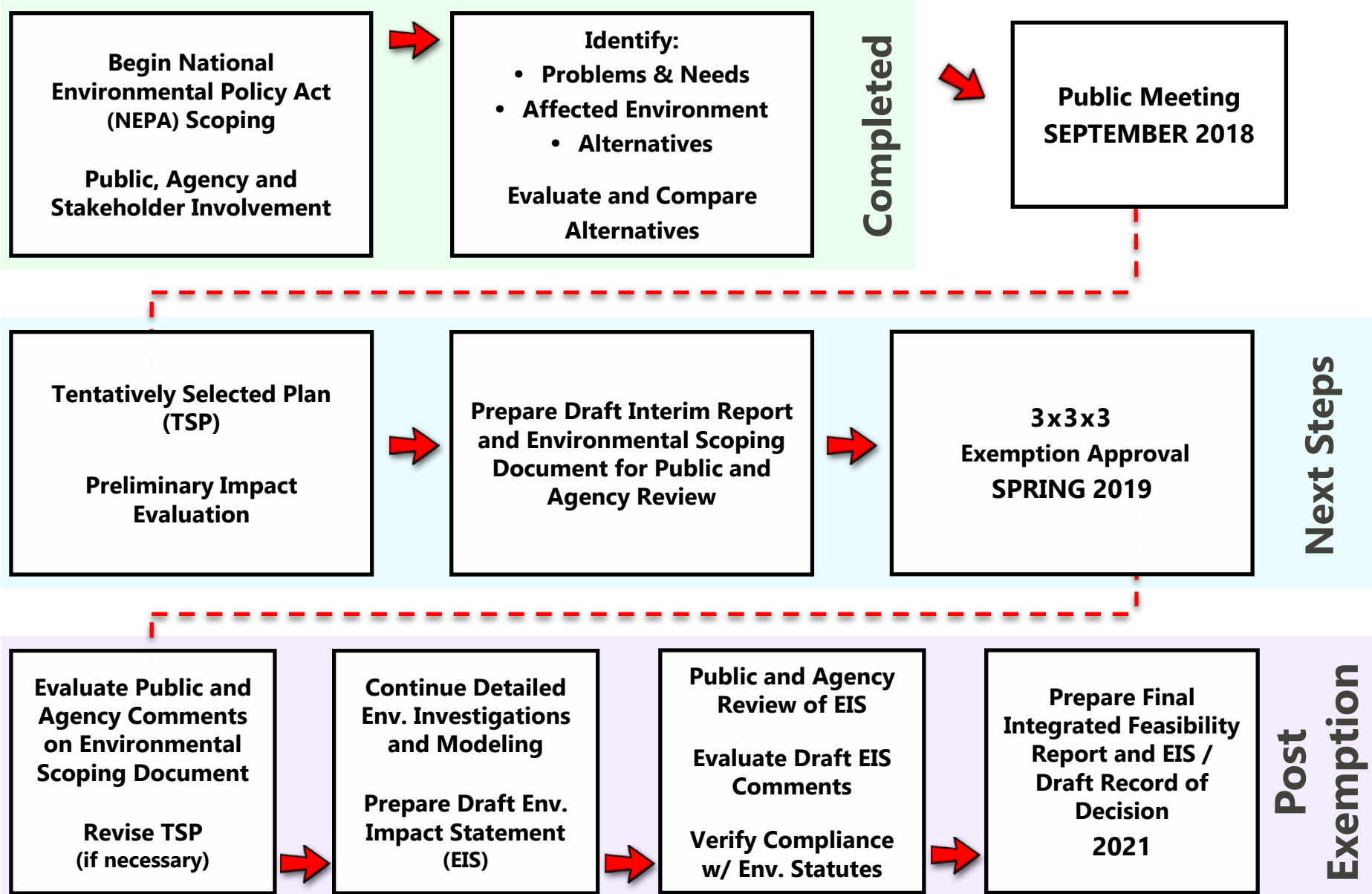
* Dates tentative pending funding



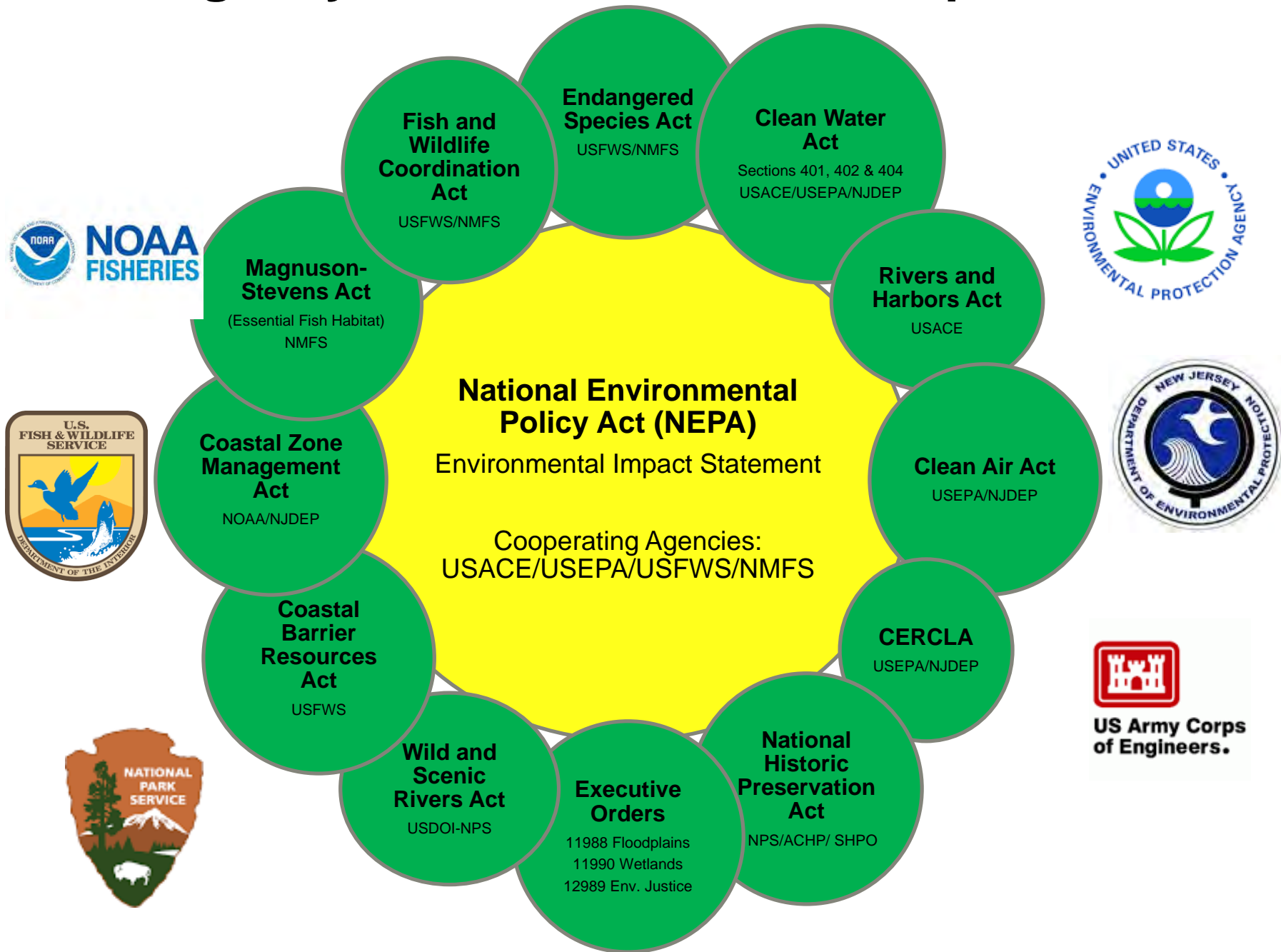
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NEPA Environmental Compliance Process



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
 - ▶ 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 for the New Jersey Back Bays Coastal Storm Risk Management study. The page header includes the US Army Corps of Engineers logo and the Philadelphia District - Marine Design Center. The main content area is titled "New Jersey Back Bays Coastal Storm Risk Management" and includes a "Study Background" section. The background section describes the study's purpose and the study area, which includes the set of interconnected water bodies and coastal lakes that are separated from the Atlantic Ocean. A diagram titled "Full Array of Coastal Storm Risk Management Measures" illustrates various measures such as flood barriers, levees, dunes, and wetlands. The page also includes a "Study Process" section and a "Contact" section with the Philadelphia District Planning Division's address and phone number.

USACE NJBB Webpage



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