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
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
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
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
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

**COASTAL STORM RISK MANAGEMENT FRAMEWORK**

![NACCS Coastal Storm Risk Management Framework](image)

**INITIATE ANALYSIS**
- Identify Stakeholders, Entities, and Authorities
- Identify Constraints and Opportunities
- Formulate Goals
- Determine Spatial and Temporal Scale of Analysis

**CHARACTERIZE CONDITIONS**
- Define Physical and Geographical Setting
- Compile Historical Probability Data
- Establish Baseline Conditions and Forecast Future Conditions

**ANALYZE RISK AND VULNERABILITY**
- Map Inundation and Exposure
- Assess Vulnerability and Resilience
- Determine Areas of High Risk

**IDENTIFY POSSIBLE SOLUTIONS**
- Access Full Array of Measures
- Develop Blended Solutions
- Develop Performance Metrics
- Establish Decision Criteria

**EVALUATE AND COMPARE SOLUTIONS**
- Develop Cost Estimates
- Access Financial

**SELECT PLAN**

**DEVELOP IMPLEMENTATION PLAN**
- Complete Pre-construction Engineering and Design
- Complete Construction and Maintenance Issues
- Establish Adaption Thresholds
- Develop Strategic Monitoring Plan

**EXECUTE PLAN**

**MONITOR AND ADAPT**
- Measure Performance and Benefits/Impacts
- Establish Adapting
- Adjust Policy
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

SCOPING
3-6 Months

ALTERNATIVE FORMULATION & ANALYSIS

TSP Milestone: Sept 2017

Agency Decision Milestone: April 2018

FEASIBILITY-LEVEL ANALYSIS

Release draft report for CONCURRENT REVIEW

Civil Works Review Board: February 2019

Chief’s Report: April 2019

CHIEF’S REPORT

DE transmits final report package

Alternatives Milestone: December 2016
SIX STEP PLANNING PROCESS

1. Identify problems & opportunities
2. Inventory & forecast conditions
3. Formulate alternatives
4. Evaluate alternatives
5. Compare alternatives
6. Select recommended plan
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

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>9:15 – 10:00</td>
<td>US Army Corps of Engineers Presentation</td>
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<tr>
<td>10:00 – 10:30</td>
<td>Discussion</td>
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<td>10:30 – 10:45</td>
<td>Break/Proceed to Break Out Session Rooms</td>
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<tr>
<td>10:45 – 11:30</td>
<td>Break Out Session #1: Problems, Objectives and Constraints</td>
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<td>11:30 – 12:30</td>
<td>Lunch</td>
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<td>12:30 – 12:45</td>
<td>Discussion</td>
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<tr>
<td>12:45 – 1:30</td>
<td>Break Out Session #2: Existing/Potential Management Measures</td>
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<tr>
<td>1:30 – 2:30</td>
<td>Working Groups Report Out/Discussion</td>
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<tr>
<td>2:30 – 2:45</td>
<td>Meeting Wrap-up</td>
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BREAK OUT SESSION #1:
PROBLEMS, OBJECTIVES & CONSTRAINTS
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
CONTRAINTS

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) increases flooding in an adjacent community; 2) be complicated/prohibited by ordinance.
Coastal Risk Management Strategy Profile

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

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

PROFILE TITLE:

PROBLEM (Define the problem and its general location)

OBJECTIVE
• Describe the objective, or desired end state:

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

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

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

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

• 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 Breakout 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
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.)

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**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
Maximum protection level is 3 feet (including freeboard)

Backflow valve prevents sewer and drain backup

Shields for opening

External coating or covering impervious to floodwater
MANAGEMENT MEASURES
NON-STRUCTURAL - ELEVATION

BASE FLOOD ELEVATION
NON ELEVATED STRUCTURES
DUNE
MEAN SEA LEVEL
BEACH PROFILE
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

- HIGH-MARSH SHRUBS
- WETLAND WATER’S EDGE
- SHORELINE EXPOSED TO WAVES
MANAGEMENT MEASURES
NATURAL AND NATURE-BASED – REEFS

WAVES REACH THE SHORELINE

DEGRADED REEF FLAT

MEAN SEA LEVEL
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
June 17 Workshop Common Themes

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