North Atlantic Coast Comprehensive Study: Resilient Adaption to Increasing Risk

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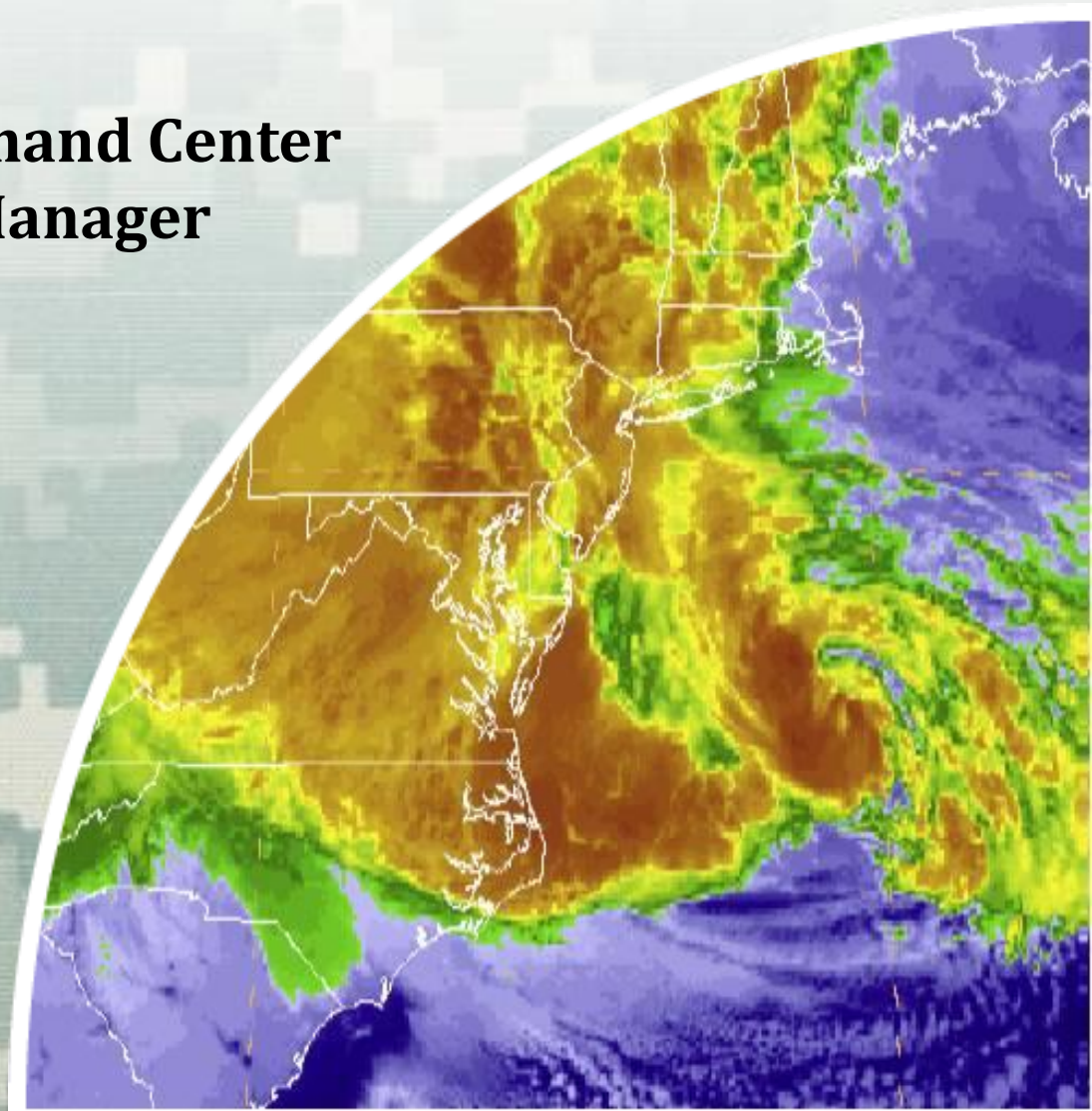
10 July 2014



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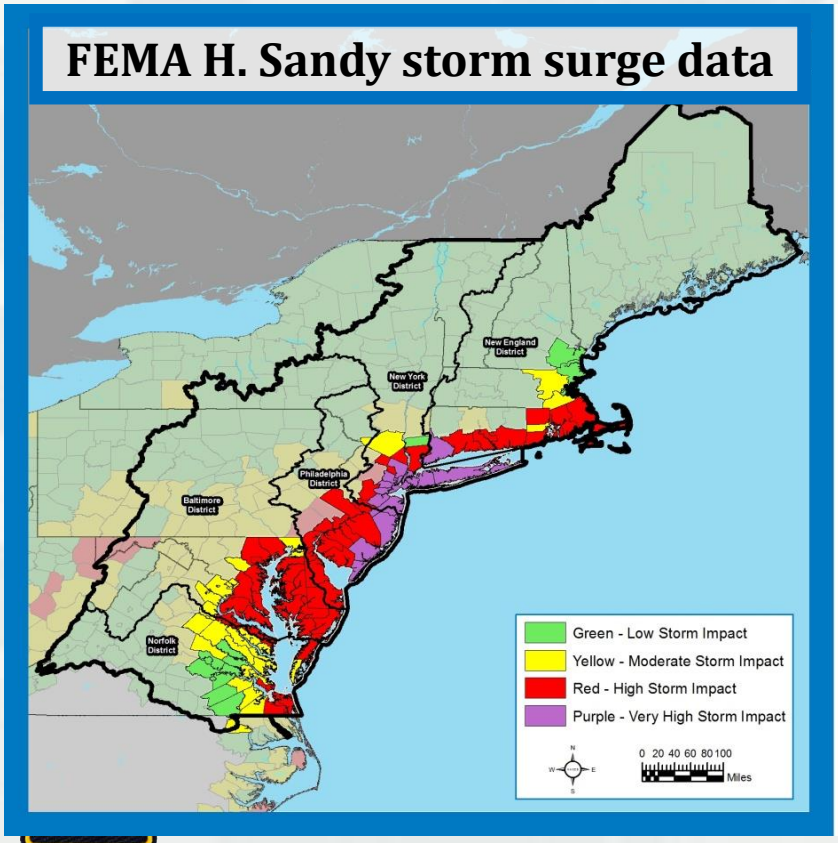
Outline

- Background
- Interagency Collaboration
- Coastal Storm Risk Management Framework
- Draft Report Table of Contents
- Technical Product Rollout
- Schedule

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)

- Complete by Jan 2015



Goals

- Provide a **Risk Reduction 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

Interagency Collaboration

- **Interagency and Tribal Input**
  - Formal and informal letters and email
  - Technical working meetings
  - Panel discussions and meetings upon request
  - Subject Matter Experts embedded in team and via outreach
  - Federal Register notices
  - Public website with subscribe list and opportunity for resiliency input
  - OMB Legislative Review Memorandum with Federal Agencies
- **Interagency Webinar Collaboration Series**
  - Webinar 1 (30 July 2013) Green/Nature Based Infrastructure
  - Webinar 2 (29 August 2013) Ecosystem Goods and Services
  - Webinar 3 (12 September 2013) Numerical Modeling and Sea Level Rise
  - Webinar 4 (25 September 2013) Vulnerability Assessments
  - Webinar 5 (19 December 2013) Policy Challenges and Other Barriers
  - Webinar 6 (24 June 2014) Regional Sediment Management and Systems Approach

NACCS Framework

- Who and what is exposed to flood risk?
- Where is the flood risk?
- What are the appropriate strategies and measures to reduce flood risk?
- What is the relative cost of a particular strategy compared to the anticipated risk reduction?
- What data is available to make a RISK INFORMED decision?
- What data gaps exist/can be closed through the NACCS?

Framework

1. Evaluate exposure through infrastructure, population, environmental, and social .

2. Use index to determine areas of relatively higher risk.

3. Use Full Array of Measures (Structural, Non-Structural & Programmatic, and Natural & Nature-Based), to illustrate how risk could be addressed in each area.

4. Provide parametric unit costs and risk reduction for the illustrative solution sets.

NACCS Coastal Storm Risk Management Framework (Repeat steps for each Tier 1, 2, and 3 Assessments)

Technical Products advanced by NACCS to close identified data gaps

Steps completed at a conceptual level by the NACCS

Initiate Analysis
- Identify Stakeholders, Partners and Authorities
- Identify Constraints and Opportunities
- Formalize Goals

→ •Visioning Sessions Report & Focus Area Analyses
• Institutional & Other Barriers Report

Characterize Existing Conditions
- Define Physical and Geomorphic Setting
- Compile Flood Probability Data
- Establish Baseline Conditions

→ • GIS Geodatabase
• Environmental and Cultural Resources Conditions Report

Analyze Vulnerability and Risk
- Map Inundation and Exposure
- Assess Vulnerability and Resilience
- Determine Areas of High Risk

→ •Storm Suite Modeling
• GIS Geodatabase
• Barrier Island Sea Level Rise Inundation Assessment Report

Identify Possible Solutions
- Assess Full Array of Measures
- Consider Blended Solutions
- Develop Performance Metrics
- Establish Decision Criteria

→ • Natural & Nature-Based Features Report
• Conceptual Regional Sediment Budget
• State Appendix
• Vulnerability Decision Tree

Evaluate and Compare Solutions
- Develop Cost Estimates
- Assess Benefits

→ • Enhanced Depth-Damage Functions for Coastal Storms

Select Plan

Additional steps to be completed in future replications of the framework at refined scales (Tier 3)

Develop Implementation Plan
- Pre-construction Engineering and Design
- Consider Operation and Maintenance Issues
- Establish Adaptation Thresholds

Execute Plan

Monitor and Adapt
- Measure Performance and Benefit Production
- Assess Resilience
- Adaptively Manage

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Future Scenarios

- **Climate Change and Sea Level Rise**
  - Sea level is increasing throughout the study area
  - Increased populations and infrastructure exposed to storm surge and frequency of flooding
  - Shorelines are changing in response to sea level rise
  - Historic erosion patterns will continue and accelerate
- **Socioeconomic**
  - Population is aging (i.e. more difficult to evacuate/relocate during flooding)
  - Population is increasing (more people exposed to flooding)
  - Importance of operating channels and ports will become more critical to regional and national economy
- **Environmental**
  - Habitats subject to more stress with population increase, climate change, and other effects

Future Scenarios

Sea level rise* evaluated for the years 2018, 2068, 2100 and 2118

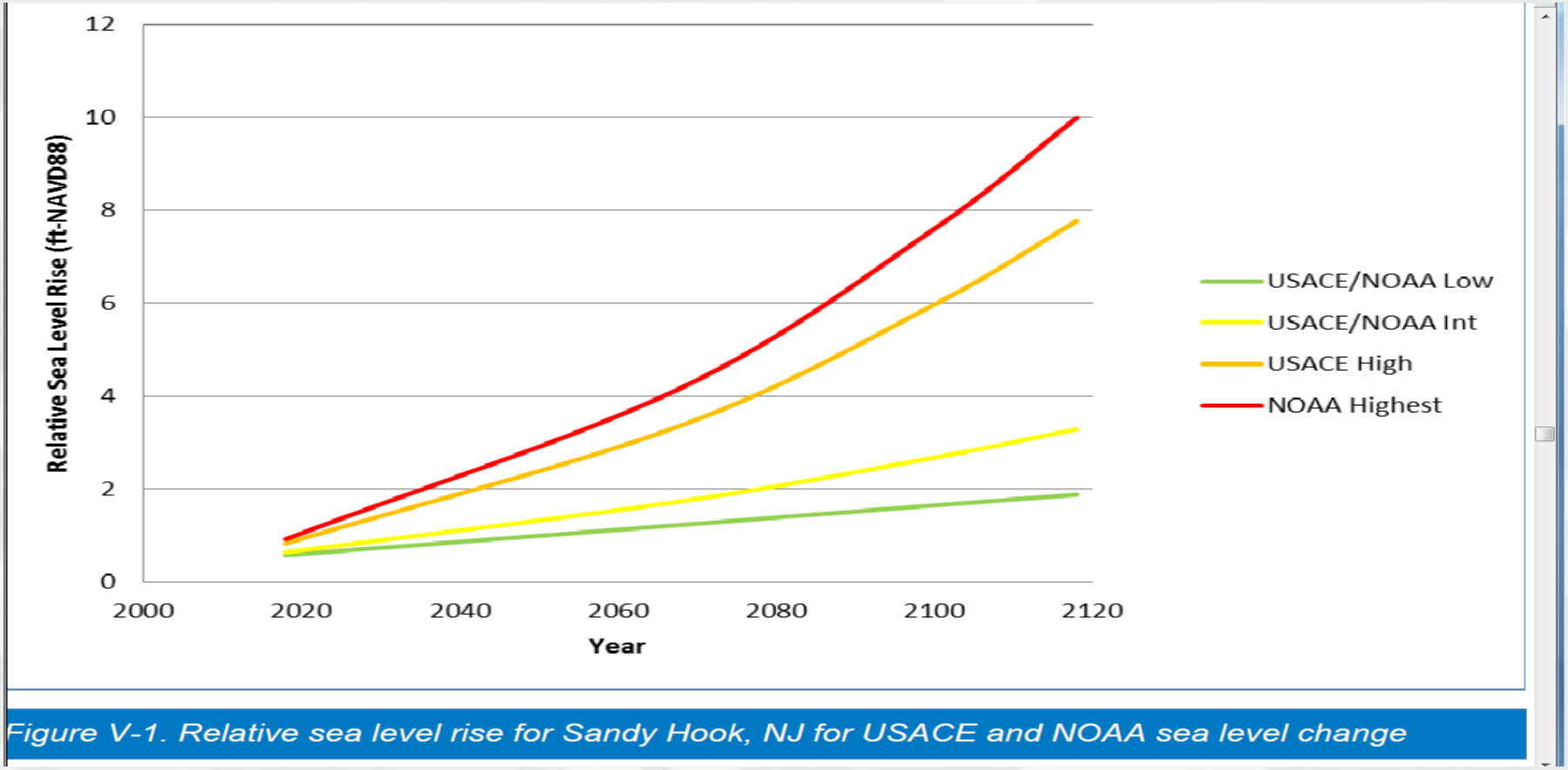
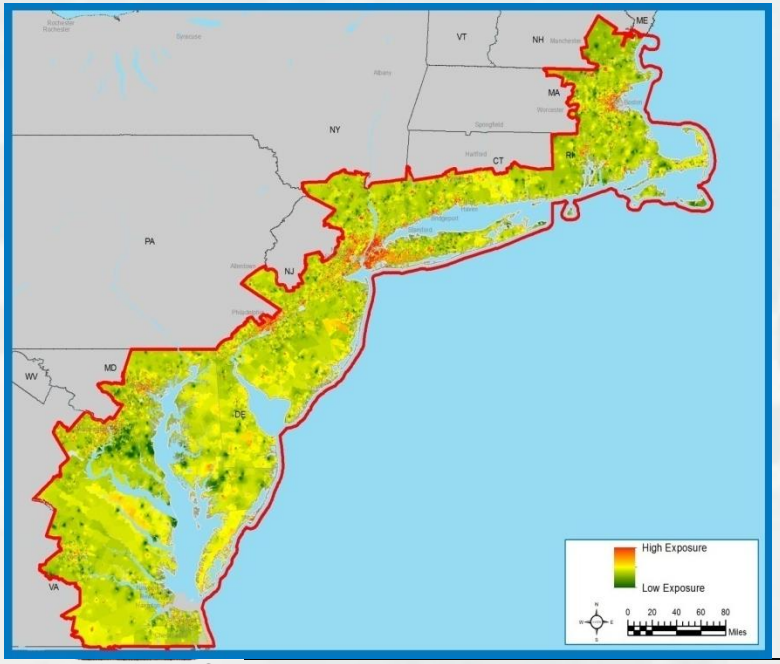


Figure V-1. Relative sea level rise for Sandy Hook, NJ for USACE and NOAA sea level change

***SLR evaluated using both USACE's Engineer Circular (EC) 1100-2-8162 (low, intermediate, high scenarios); NACCS also includes NOAA 's highest**

Flooding Exposure

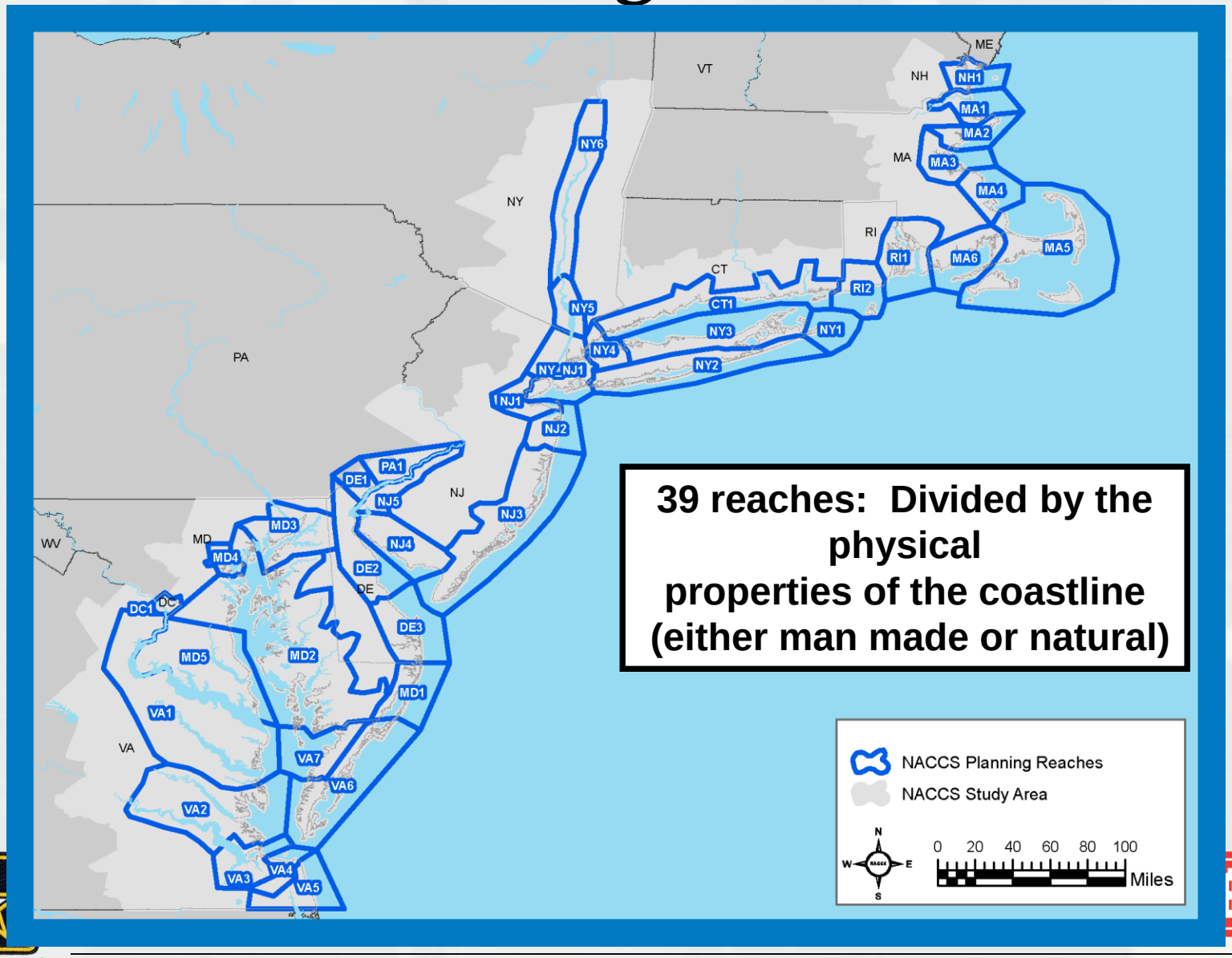
- **Coastal Flood Hazard**
  - SLOSH CAT1-4 Maximum of Maximum
  - FEMA DFIRM
  - 10-percent-annual chance
  - SLR Inundation (USACE high)



- **Exposure Indices**
  - Population **density and infrastructure** (number of people and infrastructure in communities subject to flooding)
  - **Socio-economic groups** (populations that may have more difficulty preparing and responding to flooding)
  - **Environmental** (critical habitat, wetlands and other areas that maintain resiliency of coastal systems)

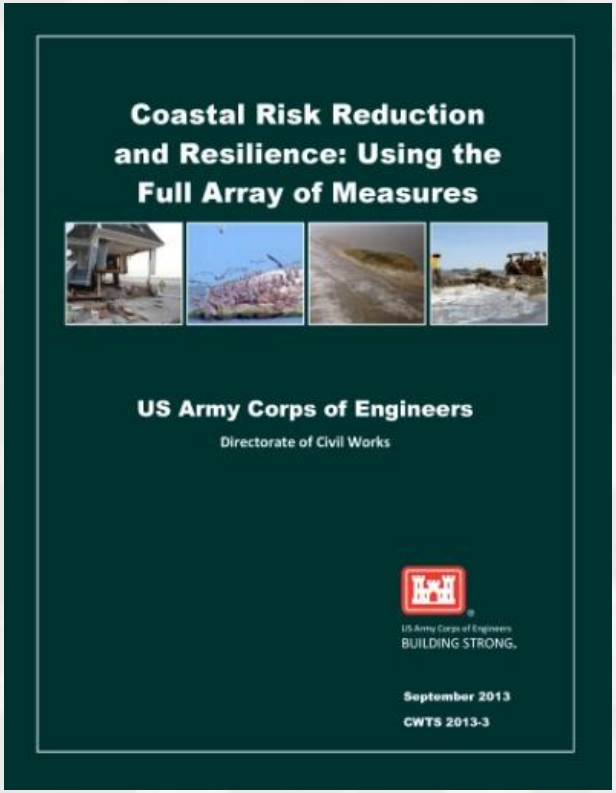
- **Mapping**
  - Flood Hazard
  - Relative Exposure
  - Relative Risk

Planning Reaches



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.)

Nature-Based Features

- **Natural landscapes or engineered ecosystems**, and **blended** solutions
- Intrinsically dynamic, adaptive, and potentially more resilient than built systems

Closing Data Gaps

- **Evaluate performance during Sandy**
- **Identify storm resilient features**
- Provide **tools for benefit evaluation**
- Integrate nature-based features in **coastal risk management systems**
- Work towards building consensus **on nature-based infrastructure, and its coastal storm risk management benefits**

➢ **State/Local Government Initiatives**
➢ **Inter-agency Policy Review**
➢ **International Technical Workshop**
➢ **HUD Initiative: Rebuild by Design**
➢ **Rockefeller Initiative: Structures of Coastal Resilience**

Institutional and Other Barriers

Six themes presented with Policy Challenges, Successes, Opportunities for Actions

- Theme 1: Risk/Resilience Standards
- Theme 2: Risk Communication and Outreach
- Theme 3: Risk Management
- Theme 4: Science, Engineering and Technology
- Theme 5: Leadership and Institutional Coordination
- Theme 6: Economic Stressors and Resources

Findings

- **Shared** responsibility of all levels of Government and partnerships
- Rethink approaches to **adapting to risk**
- Areas of highest (and growing) population density and economically critical urban centers are most **vulnerable**
- Resilience and sustainability must consider a **combination and blend** of measures
- Consider **stormwater and fluvial** aspects of coastal risk management
- **Interior, low-lying** areas highly susceptible to small changes in water level

Outcomes

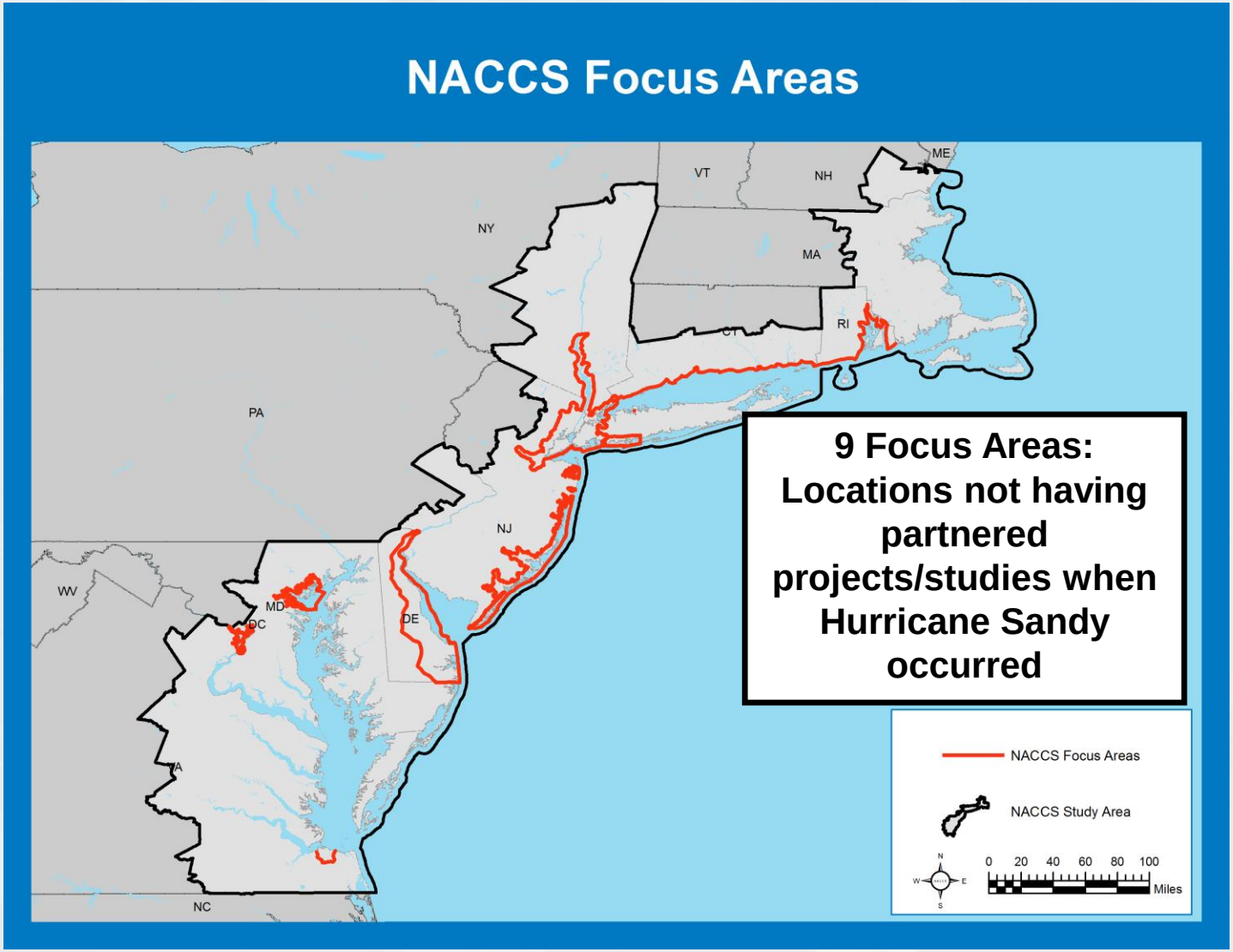
- **State-by-State Risk Reduction Frameworks informing, strengthening and catalyzing the focus on regional** resiliency, redundancy and robustness in ongoing coastal planning and project implementation
- **System-wide framework** and best practices
- **Interagency and Regional alignment**
- **Closed data gaps**
  - Broadened the pool of benefits for benefit-cost-ratio evaluations
  - Developed detailed modeling for future use, including sea level rise scenarios
  - Identified critical habitats and opportunities for using nature-based features (USFWS Planning Aid Report)
  - Developed conceptual regional sediment budget
  - Community Resiliency Survey (NOAA)
  - Collated Technical input

Opportunities

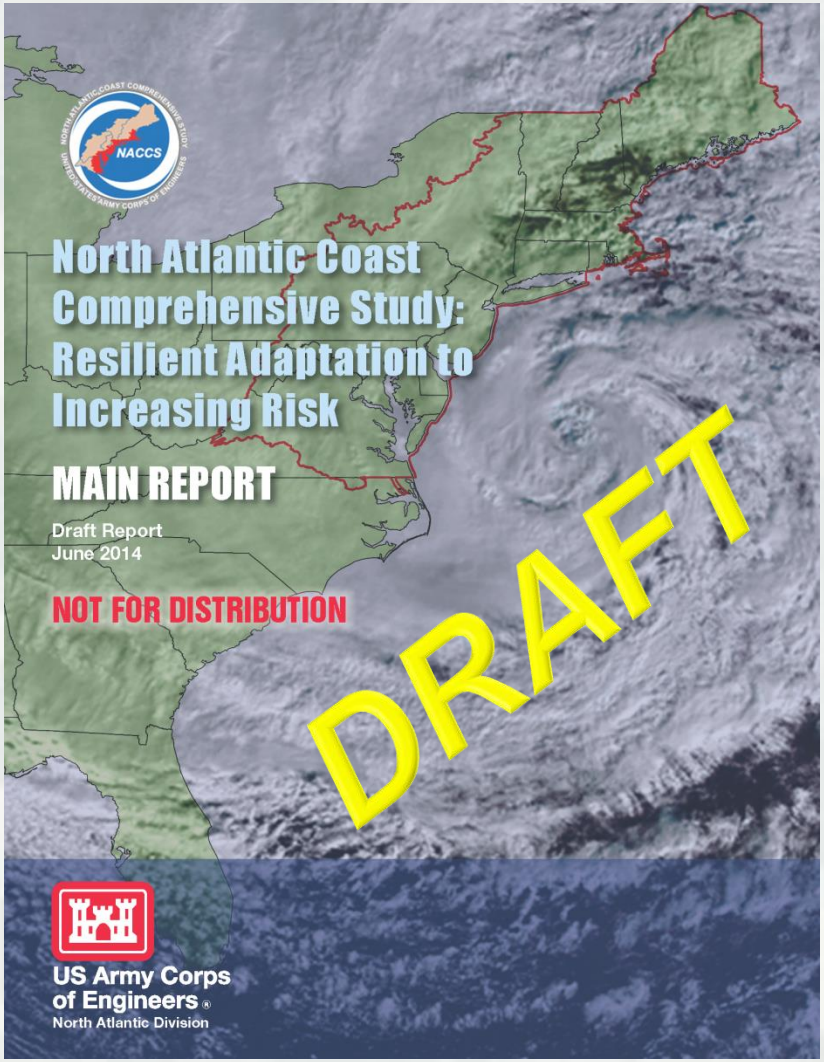
- Identify acceptable **flood risk at a community** and state scale
- **Mitigate** future risk
- **Prioritize** critical infrastructure
- **Rebuild with redundancy**
- Develop **creative incentives** to promote use of resiliency measures
- Utilize a **collaborative regional governance structure**
- Develop **Public-Private Partnerships** for coastal risk management
- Integrate **natural-based features** in coastal risk management systems
- Encourage design **flexibility and adaptive management**
- Advance efforts in the 9 focus areas:

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

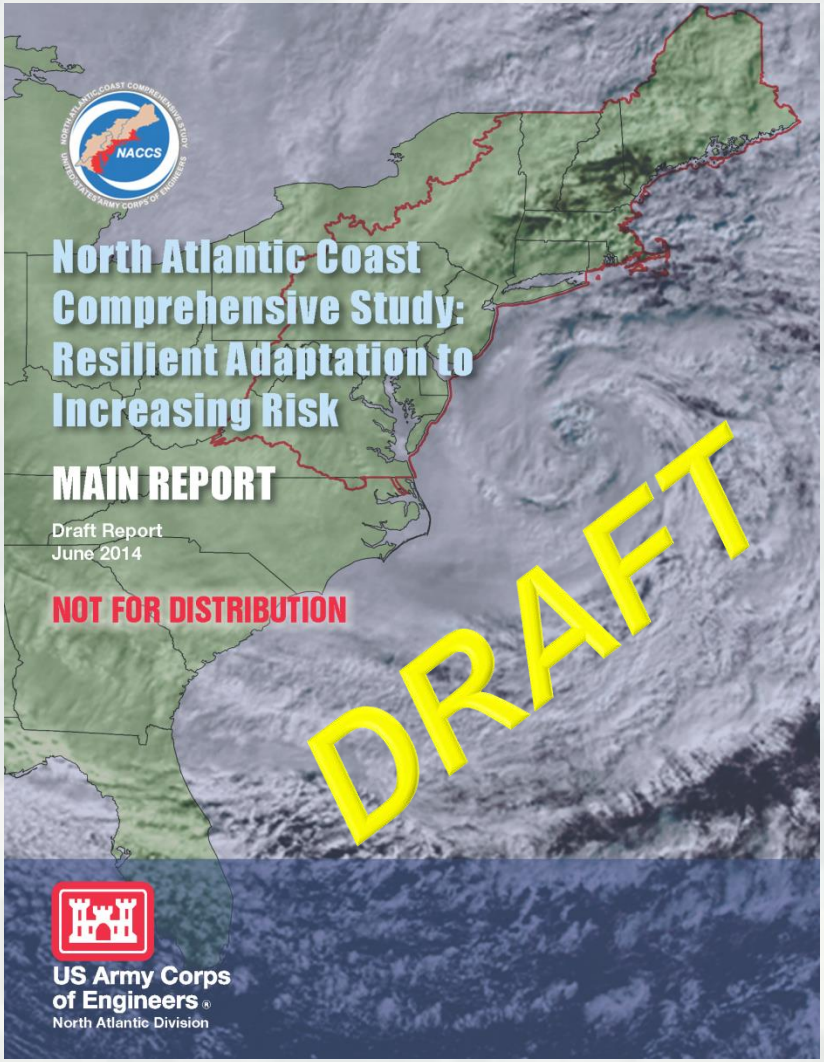
Focus Areas Recommended for Further Evaluation



Draft Report Table of Contents

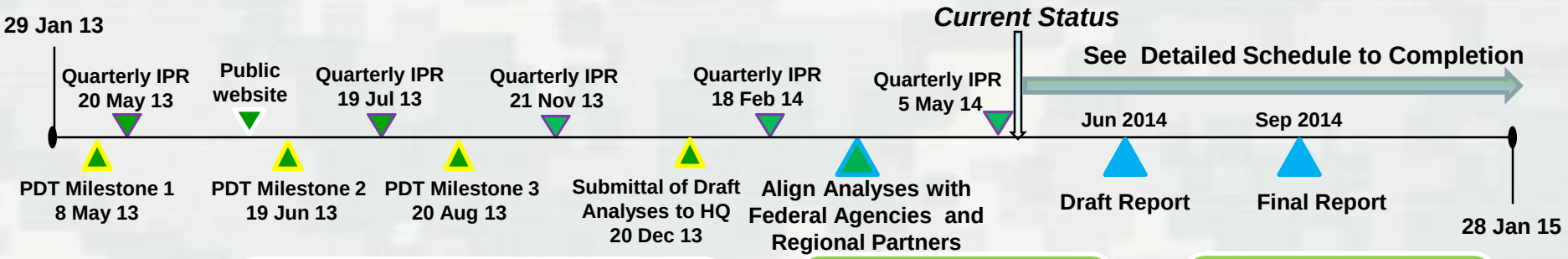


Technical Product Rollout



- JUL 2014
  - NACCS Extreme Water Levels
- SEP 2014
  - Environmental and Cultural Resources Report
  - Institutional and Other Barriers Report
  - Agency Communications and Collaboration Report
    - Visioning Sessions Documentation
  - Website Animations Sample
- NOV 2014
  - Website Animations
  - Coastal Program Guide
  - Depth Damage Functions
  - NACCS Conceptual Regional Sediment Budget
  - Use of Natural and Nature-Based Features in Coastal Systems
- JAN 2015
  - Numerical Modeling Database

Schedule



PMP / SOW approved 27 Mar 13

Phase 1
[Months 1-14]
Interagency & NGO coordination to assemble existing/future conditions.
Assessment & formulation of measures
ATR and HQUSACE (OWPR) Review of Draft Analyses
COMPLETE

Phase 2
[Months 15-18]
Interagency & international validation & collaboration
COMPLETE

Phase 3
[Months 19-24]
Finalize comprehensive report & submit to Congress (January 2015)

PHASE 1 Products

- Storm Suite Modeling
- Coastal (GIS) Geo-database & Analysis
- Economic Depth-Damage Functions
- Sea Level Rise, Exposure Assessments 7 Vulnerability Maps
- Identification of risk & preliminary approaches for system resilience

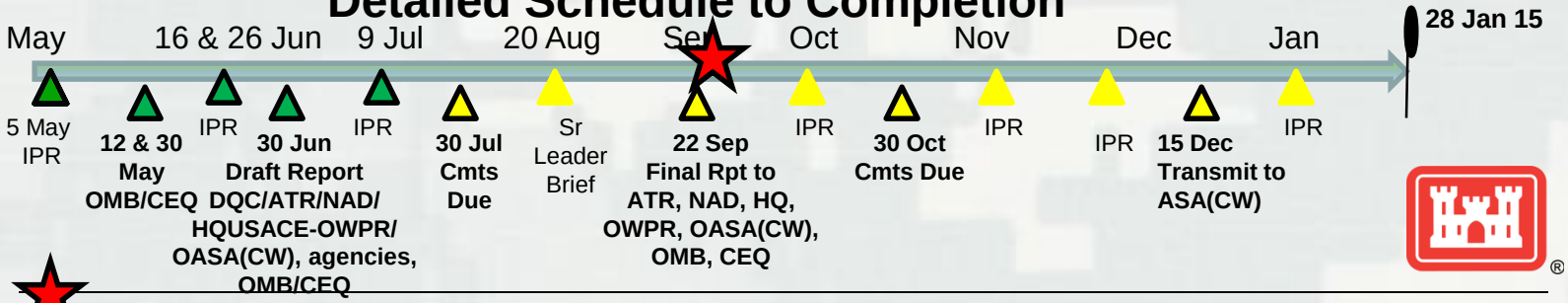
PHASE 2 Products

- Align w/other Regional Plans
- Receive interagency, partner & international comments
- Institutional Barriers
- Additional analyses as warranted.

PHASE 3 Products

- Draft to ATR/CENAD/ HQUSACE, OASA(CW), agencies concurrently (Jun 2014)
- Final to OASA(CW)/OMB/CEQ (Sep 2014)
- Submission of final report to Congress

Detailed Schedule to Completion



Pending significance of comments and onboard resolution
Accomplished milestones (green fill)

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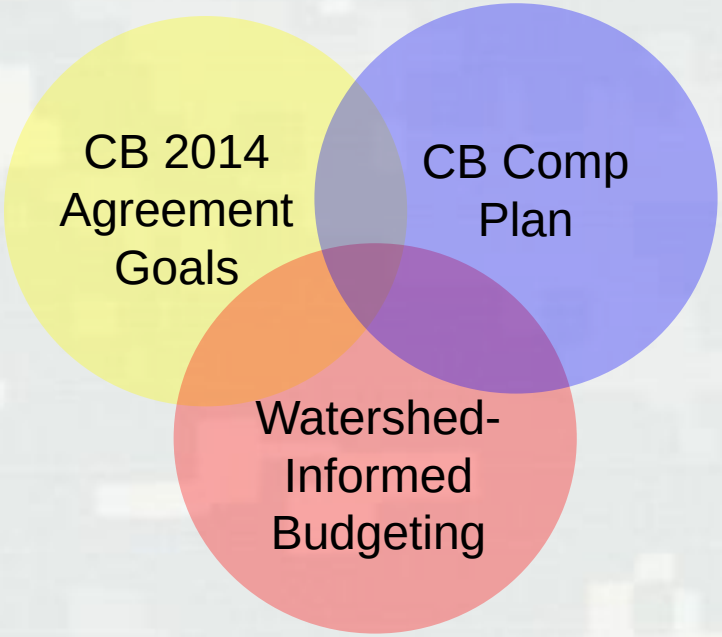
Chesapeake Bay Comprehensive Plan



Authorization:

"The plan shall focus on **integrating existing and future work** of the Corps of Engineers, shall be **developed in cooperation** with State and local governments, other Federal agencies, the Chesapeake Bay Program, the Chesapeake Bay Commission, and the Chesapeake Executive Council, and shall encompass all Corps actions necessary to **assist in the implementation of the goals of the *2000* Chesapeake Bay Agreement**. The plan shall identify additional feasibility studies and research efforts required to better understand and solve the environmental problems of the Chesapeake Bay."

Chesapeake Bay Comprehensive Plan

- *Potential to undertake multiple efforts*
  - ► Integrated Water Resources Management Plan
    - Address needs and USACE (and others?) to contribute to goals and outcomes of the 2014 Chesapeake Bay Agreement
    - Further Chesapeake Bay Management Strategies
    - Identify specific watersheds/projects for further study
  - ► Feasibility studies to lead to construction by USACE
    - Habitat restoration (wetlands, streams, beneficial use of dredged material, oysters, etc)
    - Coastal storm risk management and climate resilience (shoreline protection, wise use of floodplains, riverine/tidal interactions, etc)

What it is not:

- TMDL plan
- Watershed Implementation Plan (WIP)
- Executive Order Action Plan
- Bay Barometer

Informed by all of the above, and more, and to compliment ongoing efforts and implementation

Chesapeake Bay Comprehensive Plan

- Need Stakeholder Input
  - How could the Comprehensive Plan enhance your work in support of the 2014 Bay Agreement?
  - What product(s) are needed?

- Schedule
  - Sep 14 – draft reconnaissance report
  - Dec 14 – scope/cost for watershed plan
  - 2015 – execute agreement with sponsor
  - 2018 – complete watershed plan

Chesapeake Bay Comprehensive Plan

- USACE will be reaching out to Bay partners…starting now.

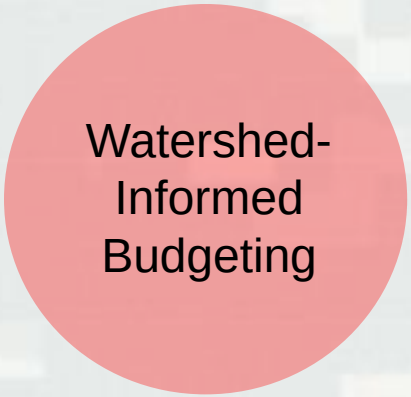
  - Heather Cisar, Chesapeake Bay Coordinator
    - Heather.r.cisar@usace.army.mil
    - 410-962-2911

  - Angie Sowers, Chesapeake Bay Comp Plan Project Manager
    - Angela.sowers@usace.army.mil
    - 410-962-7440

Watershed-Informed Budgeting

"A systems or watershed approach ensures that investments are integrated into a whole that preserves or enhances performance and sustainability at the system level."

- Incorporates integrated water resources management concepts into budget development process
- Considers the interaction of projects (including non-federal) to determine true value
- Improves justification and defense of projects
- Goal oriented, focused on regional needs
- Based on National priorities and objectives
- **Stakeholder input is critical**



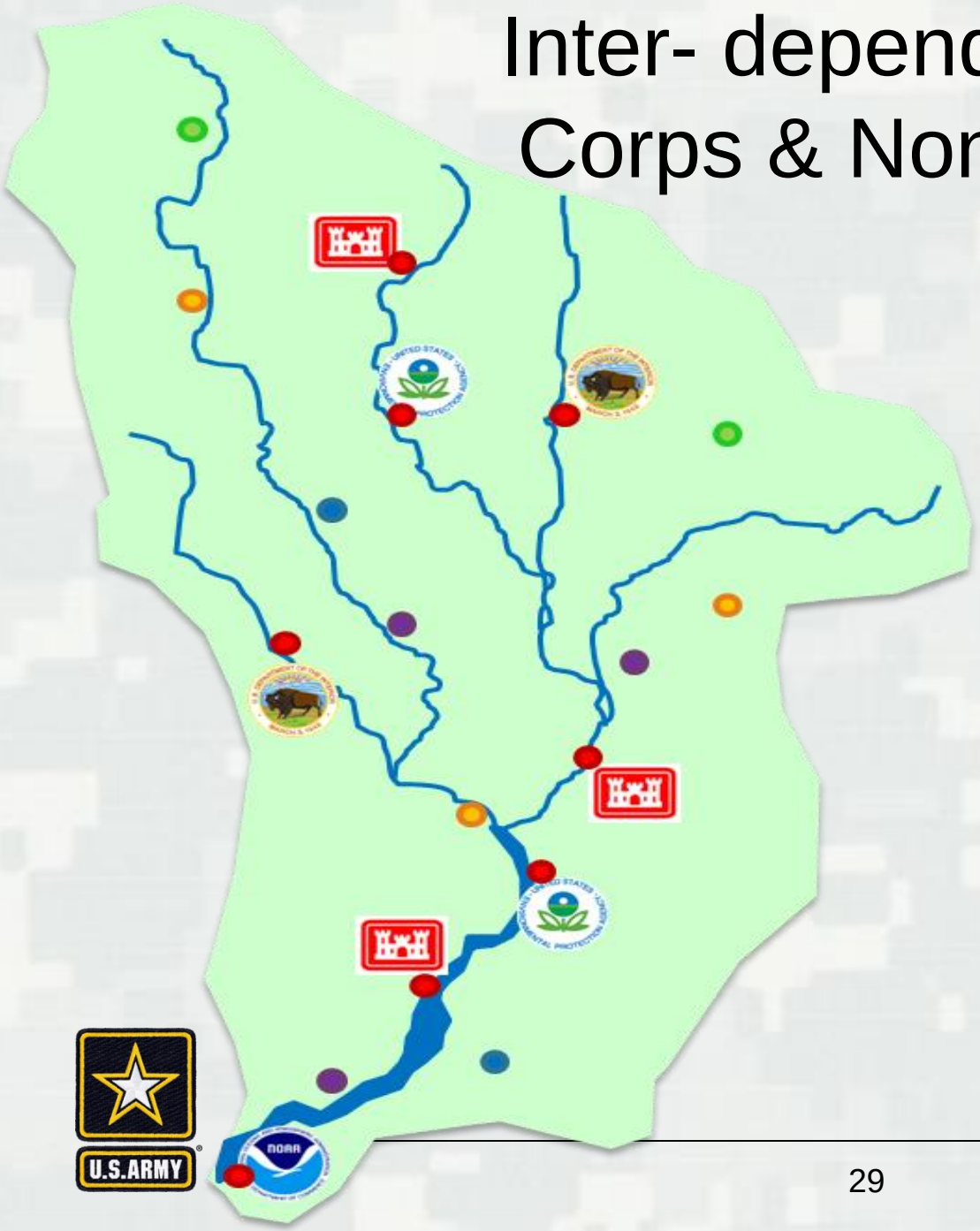
What Is Watershed Budgeting?

- Watershed Project's TOTAL VALUE > Sum of Individual Projects
- ID projects with highest VALUE TO THE NATION
- ***Achievable goal due to performance SYNERGIES of STRATEGIC investments at watershed scale***

INTEGRATED PROJECTS = Optimum Watershed Function

SEPARATE PROJECTS = Reduced Watershed Function

Inter- dependencies Between Corps & Non-Corps Projects



Watershed Informed Budgeting: We Need Your Input

1. ID key **stakeholder projects** that
   a. Meet watershed objectives, AND
   b. are dependent on Corps projects
2. ID how and to what degree **stakeholder projects depend** on Corps projects
3. Use existing or develop new **watershed plans & objectives** (all Corps and non-Corps projects)
4. ID how and to what degree **stakeholder projects** support **watershed objectives**

Watershed Informed Budgeting

- USACE will be reaching out to the FOD and Management Board via email in July.

  - Heather Cisar, Chesapeake Bay Coordinator
    - Heather.r.cisar@usace.army.mil
    - 410-962-2911

  - Michele Gomez, Environmental Program Manager
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    - 410-962-5175