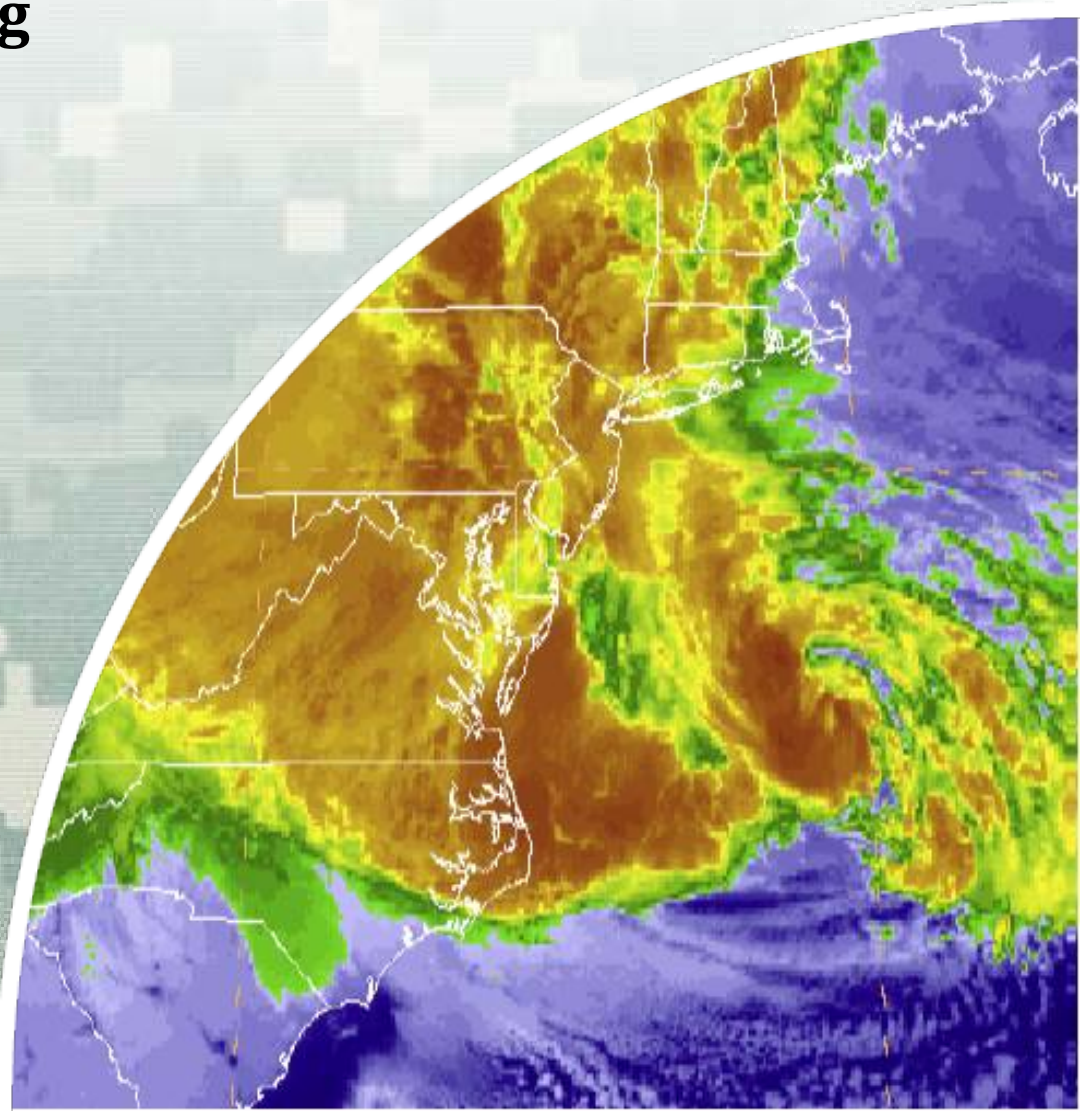


North Atlantic Coast Comprehensive Study

Draft Analyses Webinar: Sea Level Rise and Climate Change Adaptation Planning

U.S. Army Corps of Engineers
National Planning Center for Coastal
Storm Risk Management

8 April 2014



Speakers

- Dave Robbins
Project Manager, NACCS
- Jason Engle
Chief, Coastal Design Section, Jacksonville
District
Climate Change and Sea-Level Rise Lead,
NACCS



NACCS Background

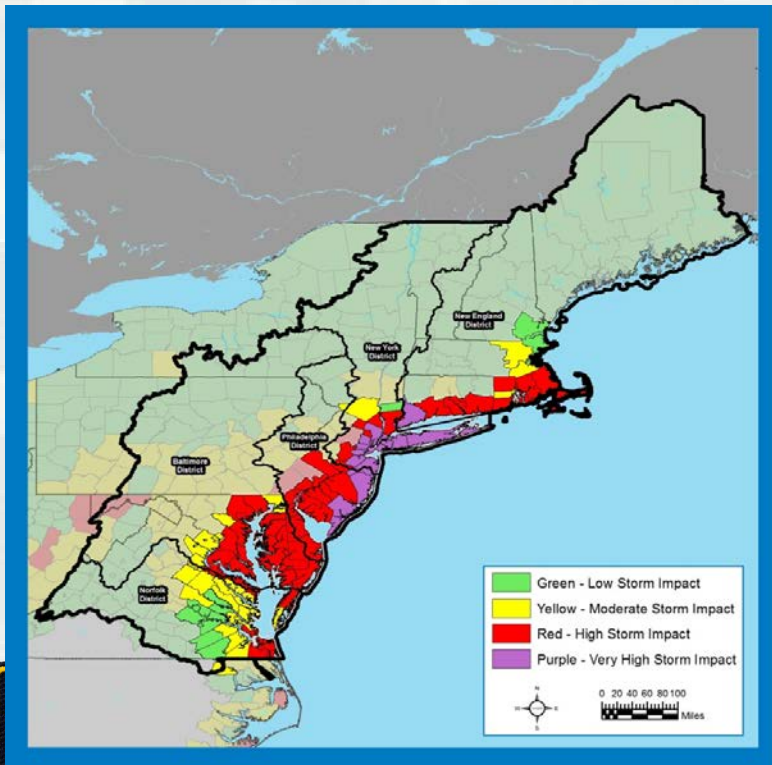
- ❑ Hurricane/Post-Tropical Cyclone Sandy moved to the U.S. Atlantic Ocean coastline 22-29 October 2012
- ❑ Affected entire U.S. east coast: 24 States from Florida to Maine; New Jersey to Michigan and Wisconsin
- ❑ Areas of extensive damage from coastal flooding: New Jersey, New York, Connecticut
- ❑ Public Law 113-2 enacted 29 January 2013



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)

▪ Complete by January 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



Technical Teams

- ❑ USACE Enterprise
- ❑ Agency Subject Matter Experts
 - Engineering
 - Economics
 - Environmental, Cultural, and Social
 - Sea Level and Climate Change
 - Plan Formulation
 - Coastal GIS Analysis



U.S. ARMY

Products

- ❑ Coastal Framework
 - Regional scale
 - Collaborative
 - Opportunities by region/state
 - Identify **range of potential solutions** and parametric costs by region/state
 - Identify activities warranting additional analysis and social/institutional barriers
- ❑ Not a Decision Document
 - No NEPA
 - No Recommendations



Climate Change Considerations in the North Atlantic Coast Comprehensive Study

Jason A. Engle, P.E.
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BUILDING STRONG®

Background

- Intergovernmental Panel on Climate Change predicts continued or accelerated global warming, which will cause continued or accelerated rise in global mean sea-level
- Climate-driven global mean sea level change (SLC) scenarios have been developed by USACE (2014) and NOAA (2012)
- These scenarios are suitable for use in assessing the future impacts of sea level change on the natural environment and human infrastructure
- The application of these SLC scenarios for the North Atlantic Coast Comprehensive Study (NACCS) and consideration of other climate changes are outlined in this presentation

USACE 2013: *ER 1100-2-8162 Sea-Level Change Considerations for Civil Works Programs*

NOAA 2012: *Global Sea Level Rise Scenarios for the United States National Climate Assessment*



NACCS Sea Level Change/Climate Change Tasks

Complete

- Evaluate relative sea level rise scenarios
- GIS mapping of relative sea level rise in 50 and 100 years
- Statistical analysis of historical extreme water levels

Ongoing

- SLC scenario integration into numerical modeling of storms
- Climate change adaptation methods and example



Global vs. Local SLC

- During the 20th century global mean sea level rise stabilized to approximately 1.7mm/yr (IPCC 2007)
- Sea levels are influenced by decadal-scale climate and oceanographic patterns that sea level on a temporary (decadal or shorter) basis, but these fluctuations are NOT associated with long-term sea level change patterns
- RSLC relies on long-term water level records > 30 years to remove non-GMSL sea level fluctuations and capture local/regional land uplift and subsidence

IPCC 2007. *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*



Relative Sea Level Change

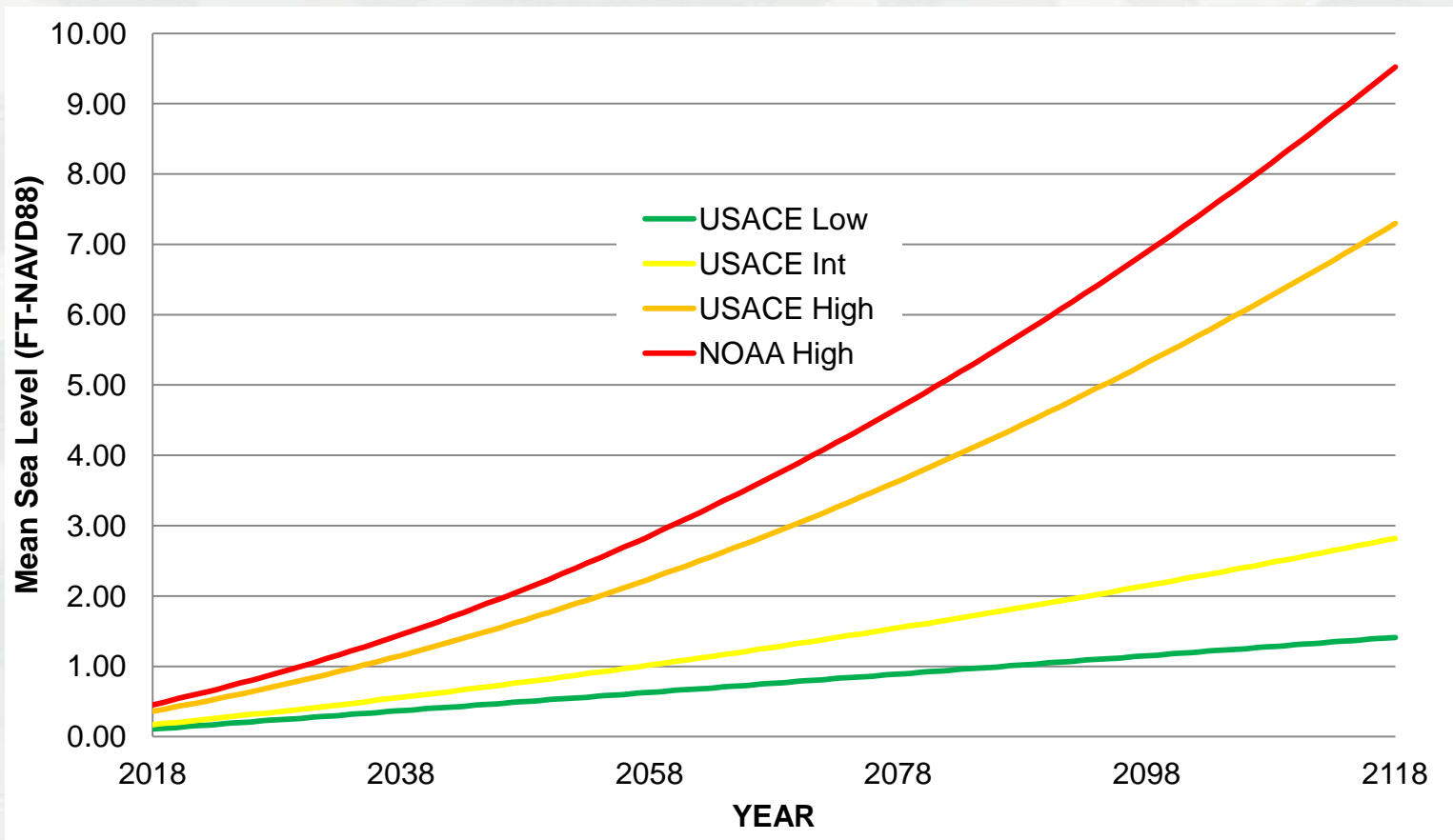
- Relative sea level change (RSLC) is the sum of global mean sea level change and regional/local vertical land subsidence/uplift
- RSLC is required to assess sea level change impacts at specific sites
- RSLC is measured directly by long term water level gages that are referenced to known datums
- 35 NOAA water level gage sites from VA to MA were used for NACCS
- Online RSLC calculator: <http://www.corpsclimate.us/ccaceslcurves.cfm>



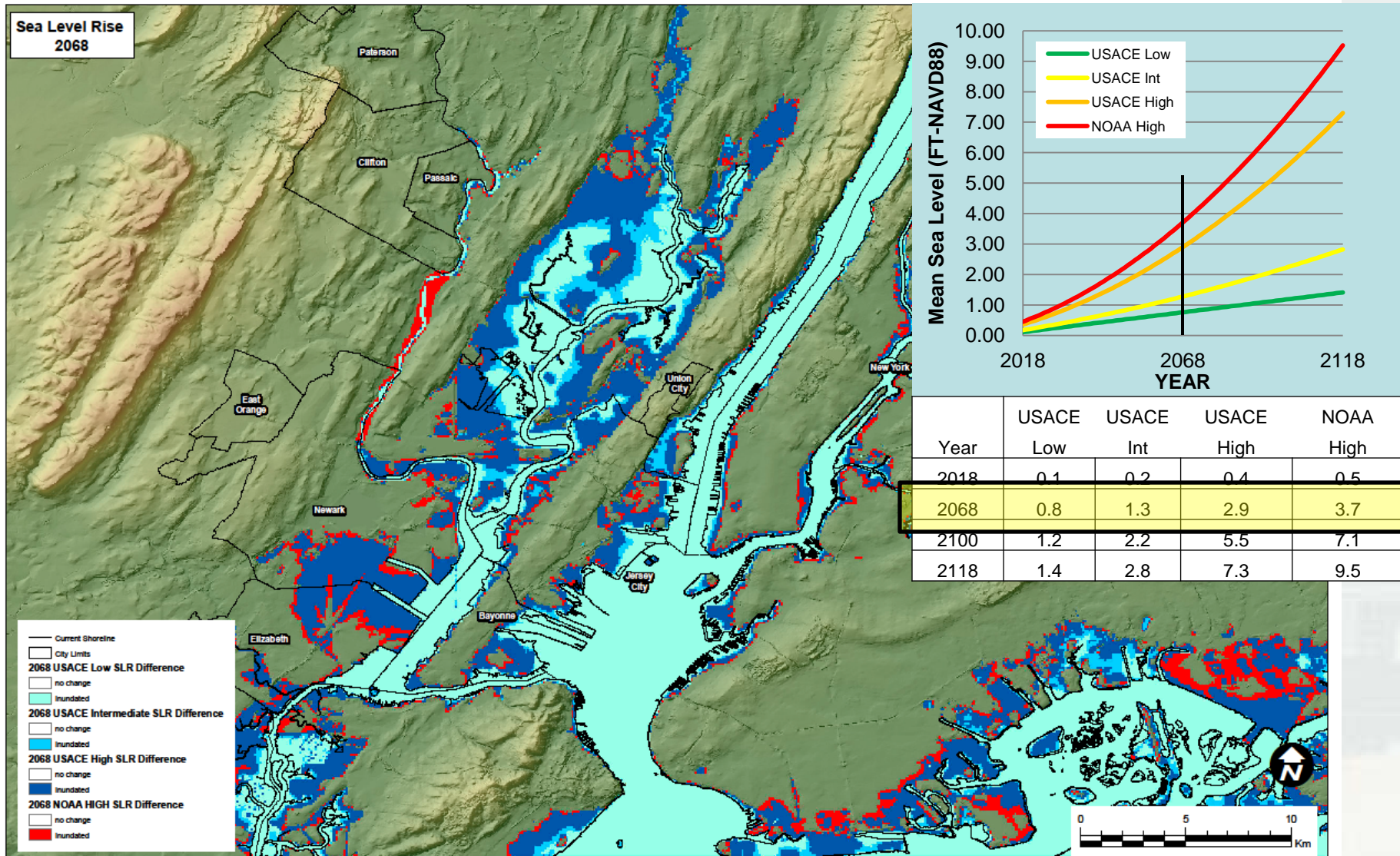
NACCS Relative Sea Level Rise Scenarios

USACE 2013: ER 1100-2-8162 Sea-Level Change Considerations for Civil Works Programs

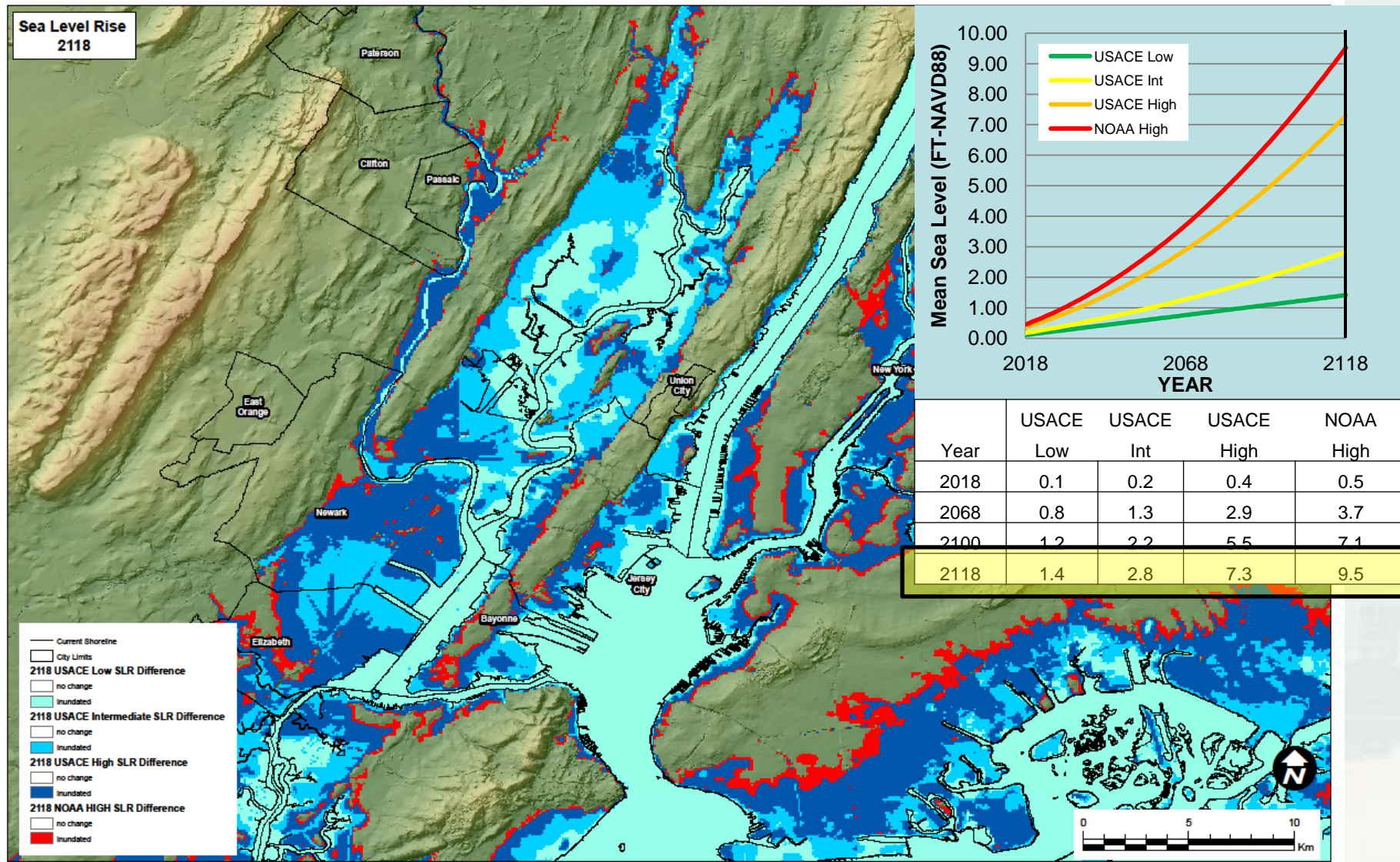
NOAA 2012: Global Sea Level Rise Scenarios for the United States National Climate Assessment



50-Year Sea Level Rise Impacts, Jersey City, NJ



100-Year Sea Level Rise Impacts, Jersey City, NJ



CSTORM Storm Surge and Wave Modeling Sea Level Change Scenario Evaluation

- Storms and future water levels being simulated with ADCIRC and SWAN numerical models
- Products: plausible storm suite that contains hydrographs of tropical storm waves and water levels throughout north Atlantic region (VA to ME)
- Storm database with SLC will be publicly-available for use in subsequent regional and project-level analyses
- CSTORM database will be delivered by January 2015
- Work in progress



Sea Level Rise and Climate Change Adaptation

Climate Change Adaptation Goal: minimize impacts from climate change and maximize resiliency in the coastal landscape.

USACE describes resilience as “the ability to anticipate, prepare for, respond to, and adapt to changing conditions and to withstand and recover rapidly from disruptions with minimal damage.”



Key Concepts

- Climate change means that many natural forces will change in the future; requires consideration of a future that may be substantially different than the past—higher uncertainty
- Uncertainty exists not only with regard to sea level change and wider climate change, but also with regard to responses such as morphological, ecological and socioeconomic change
- Scenario-based approaches to climate change adaptation are less quantitative, more flexible due to uncertainty in climate forecasts and impacts
- Critical climate change thresholds (such as critical RSLC values) established up front so that future actions are keyed off of observed changes
- ‘Low-Regret’ adaptation measures are those that have both immediate and future benefits, e.g. incorporation of nature-based features like dunes or marshes



NACCS Climate Change Adaptation Products

Overview of scenario-based adaptation planning

Development of example adaptation plan

- Typical bay/barrier island shoreline
- RSLC and extreme water level forcing
- Future 'without-action' condition; flooding frequency, erosion
- Potential measures and adaptation plan formulation



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What Happens Next?

- The NACCS team will receive comments for integration into the NACCS report
 - ▶ Mid-April 2014
- Integration
 - ▶ Mid-April/May 2014
- Draft Final Report production
 - ▶ June 2014
- Final USACE vertical team review
 - ▶ July - December 2014
- Submit to Congress
 - ▶ **January 2015**



Review Information

- Review documents are DRAFT and NOT FOR DISTRIBUTION
- Download the documents via AMRDEC
 - ▶ See email from No-Reply@amrdec.army.mil
- Review the draft analyses documentation
- Follow the link to the feedback form
 - ▶ Keep the feedback questions in mind during your review
 - ▶ Complete the online feedback form
- Tune into subject-specific webinars
- All feedback forms due by **April 14, 2014**



What Happens Next?

- ▶ Technical Challenges with accessing document and comment forms?
- ▶ General issues or for further coordination?
- ▶ Contact via email:

Dave Robbins

Baltimore District, USACE

Email: David.W.Robbins@usace.army.mil



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Questions



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