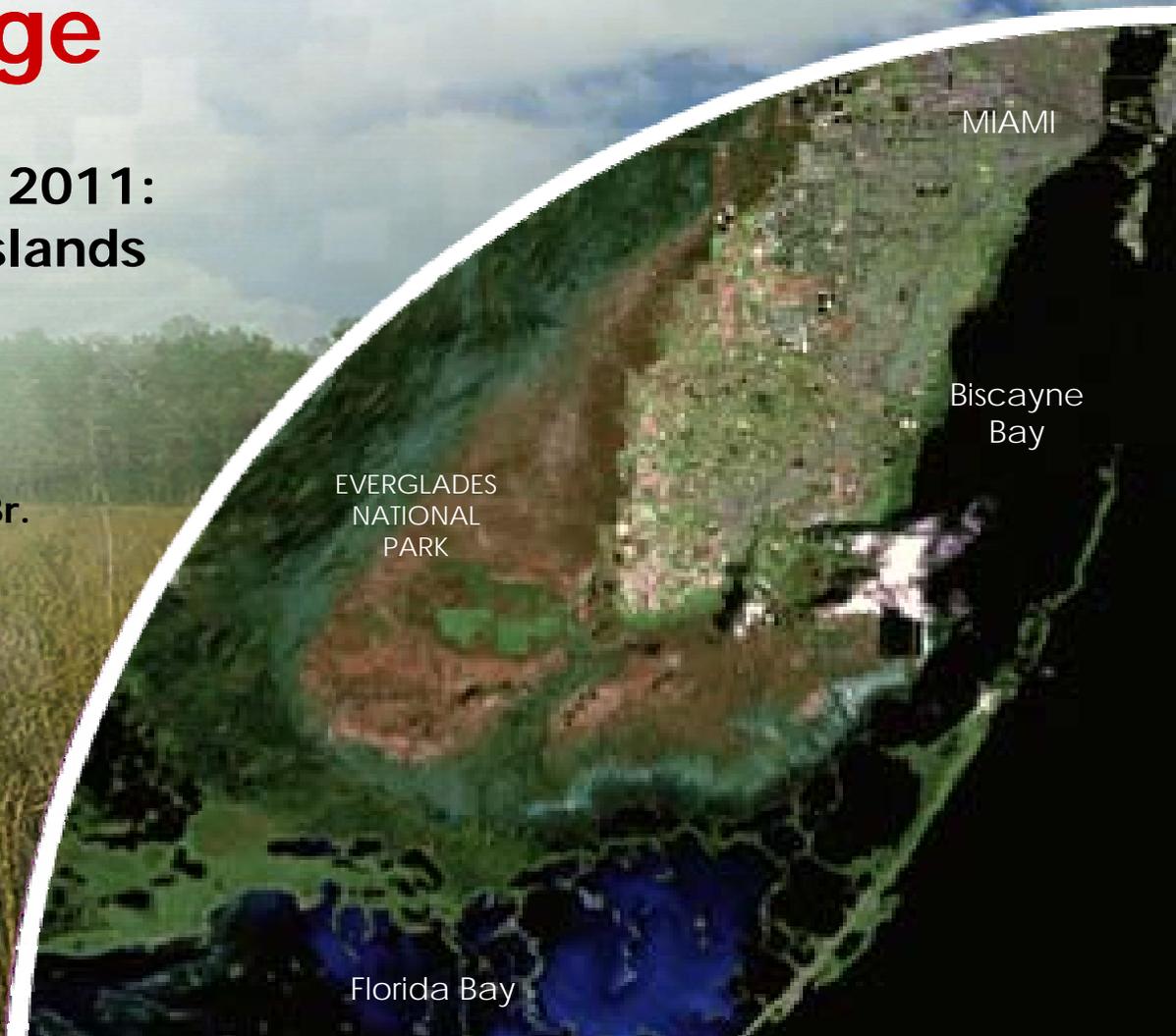


Development and Application of USACE Guidance on Sea Level Change

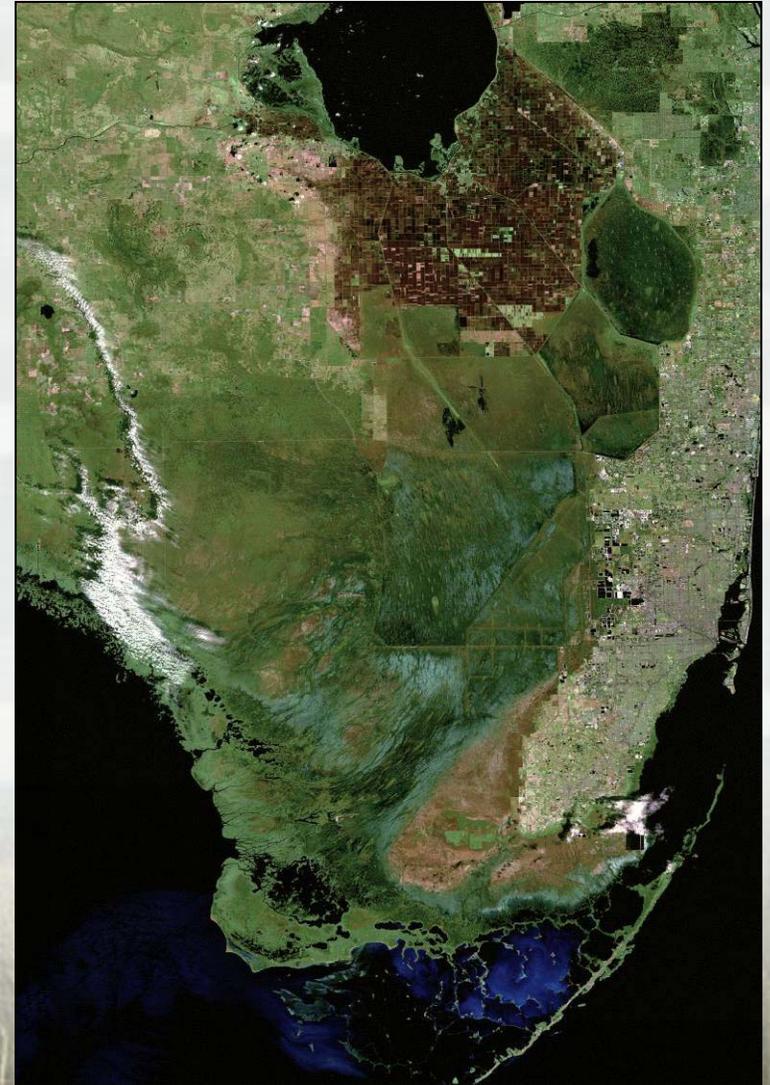
Climate Change in the Caribbean 2011:
Puerto Rico and the U.S. Virgin Islands
San Juan, PR -- November 16, 2011

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Presentation Outline

- Overview of USACE National Sea Level Change (SLC) Program
- Current EC1165-2-212 guidance on SLC projections
- South Florida SLC Projections
- Upcoming Civil Works Technical Letter
- Next Steps



The SLC CWTL is part of an integrated programmatic effort - some elements are shown here



IPET/HPDC Lessons Learned Implementation Team (FY06...)



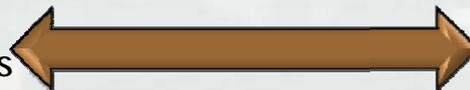

Responses to Climate Change (FY10 -14)




Global Change Sustainability (FY11-20)



Nationwide Datum Standard EC, ER, EM, Comprehensive Evaluation of Project Datums



Engineer Circular 1165-2-211



Engineer Circular 1165-2-212



Sea-Level Change Civil Works Technical Letter

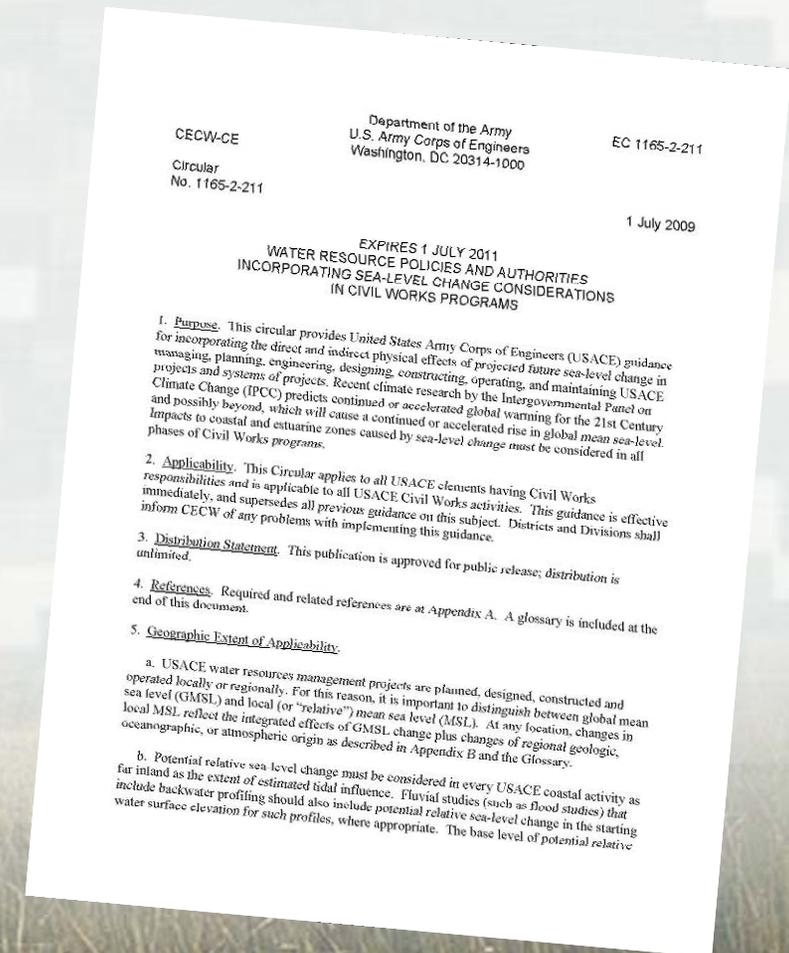


Comprehensive Evaluation of Projects With Respect to Sea Level Change



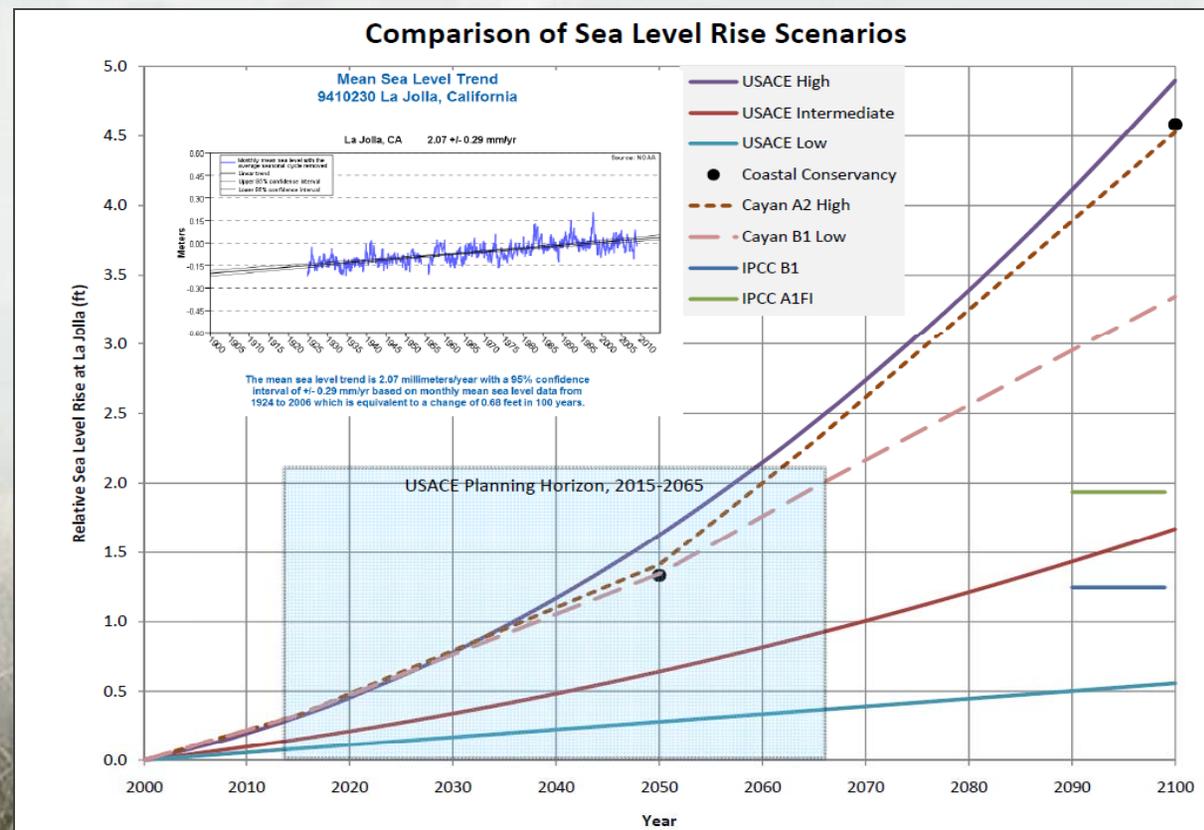
Recent Corps Guidance on Incorporating Sea Level Change Considerations

- EC1165-2-211 expired July 1, 2011
- EC 1165-2-212 replaced it effective October 1, 2011
- Applies to all phases of Corps Civil Works activities as far inland as extent of new tidal influence
- Will expire September 30, 2013
- A more complete replacement document is now being prepared

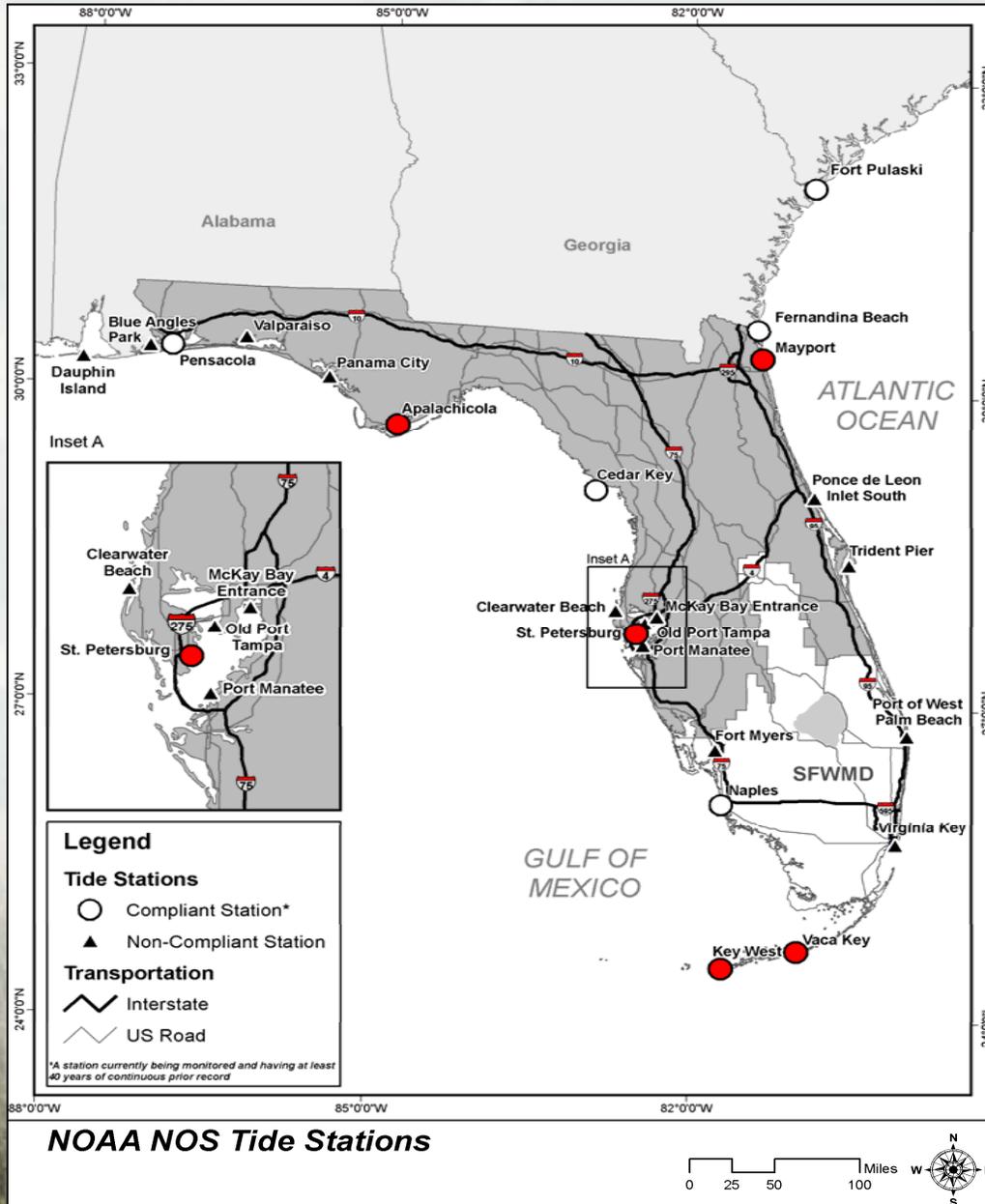


EC 1165-2-212 Incorporating Sea Level Change Considerations in Civil Works Programs

- Three estimates of future SLC must be calculated for all Civil Works Projects within the extent of estimated tidal influence:
 - Extrapolated trend
 - Modified NRC Curve I
 - Modified NRC Curve III
- Requires creativity, funds to evaluate options



NOAA Tide Stations in Florida

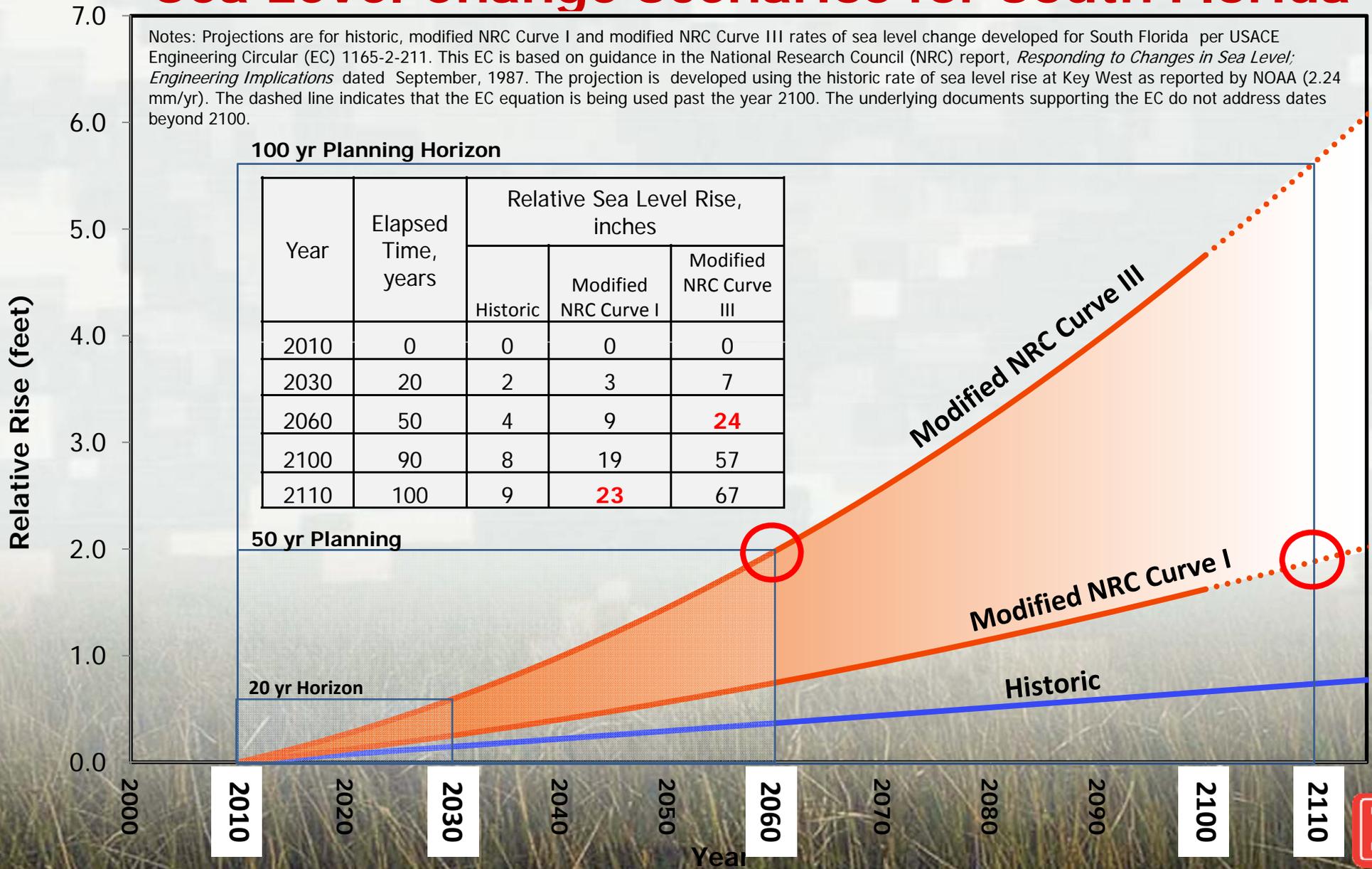


- Key West has the longest non-continuous U.S. tide station record with 130+ years.
- Per EC1165-2-211 and 212, a Compliant Tide Station is a station currently being monitored and having at least 40 years of continuous prior record.
- Compliant Tide Stations in Florida are: Key West, Vaca Key, Naples, St. Petersburg, Cedar Key, Apalachicola, Pensacola, Mayport and Fernandina Beach.
- There are also other currently monitored NOAA tide stations in Florida with less than 40 year or non-continuous records.
- Most of Florida is very stable geologically, so sea level change is similar around the state.



Sea Level Change Scenarios for South Florida

Notes: Projections are for historic, modified NRC Curve I and modified NRC Curve III rates of sea level change developed for South Florida per USACE Engineering Circular (EC) 1165-2-211. This EC is based on guidance in the National Research Council (NRC) report, *Responding to Changes in Sea Level; Engineering Implications* dated September, 1987. The projection is developed using the historic rate of sea level rise at Key West as reported by NOAA (2.24 mm/yr). The dashed line indicates that the EC equation is being used past the year 2100. The underlying documents supporting the EC do not address dates beyond 2100.



SLC Civil Works Technical Letter

- Utilize **national interdisciplinary team** within Corps and include outside agency experts, addressing **full range of Corps missions and project types**
- Convey to the field the **level of detail** required as a function of project type, planning horizon, and potential consequences
- Identify the **potential for adaptation** throughout project life or project phasing
- Develop a **road map that lays out the engineering and planning procedure** for full range of projects
- Develop **region-by-region information** and examples
- Include tools that can be used to address **sensitivity and communicate risk**



External Experts

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Navy (Tim McHale, Shun Ling)

Bureau of Reclamation (Mike Tansey)

FEMA (Mark Crowell, Tucker Mahoney)

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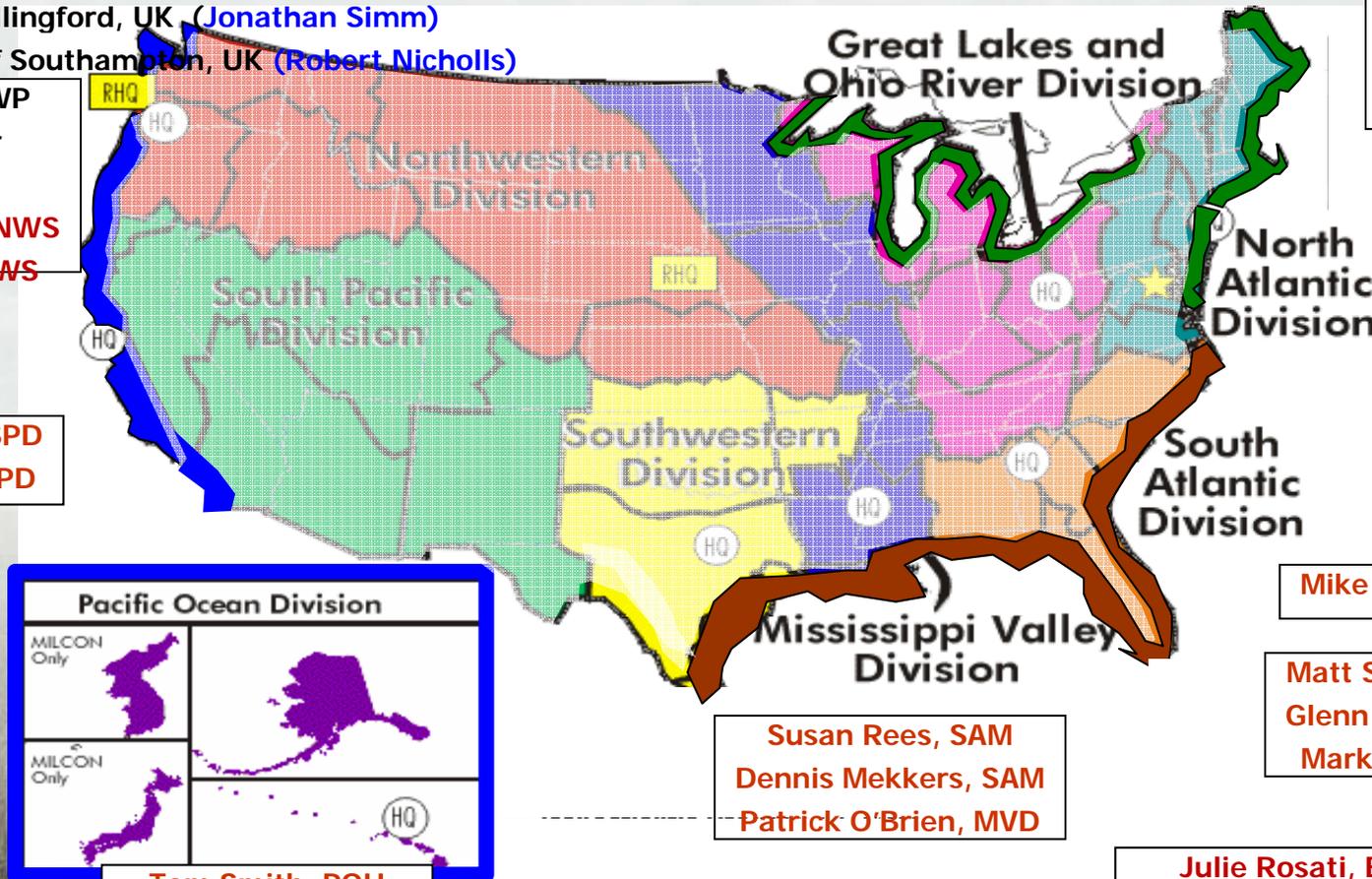
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Approach

- Recognize we can't predict the future without uncertainty
- Be prepared to implement flexible planning and engineering adaptations accounting for a range of possible changes
- Determine level of detail and accuracy required with respect to potential risks and consequences
- Differentiate “planning” vs “engineering” issues but also determine where they overlap



USACE Mission Areas

- Navigation
 - Breakwaters and Jetties
 - Harbors
 - Navigation Channels and Ocean Disposal Sites
- Hydropower
- Reservoir Regulation; Water Supply
- Coastal Storm Damage Reduction
 - Beach fills
 - Shoreline protection structures
- Flood Damage Reduction
 - Dams, levees, floodwalls
- Ecosystem Restoration
- Emergency Response
- Recreation
- Regulatory

**Climate change
has the potential to
impact all USACE
mission areas**



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