Coastal Resilience: The Challenge

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Coastal Resilience: The Challenge

- Global Trends
- The Northeast US Perspective: Sandy’s Impact
- Hurricane Sandy Coastal Projects Performance Evaluation Study
- Coastal Storm Risk Reduction Measures
- Towards Coastal Resilience
Global Trends

Intergovernmental Panel on Climate Change Assessment Reports
Global Trends

1986-2005 to 2081-2100

- Surface temperature has successively increased over the last 3 decades more than any decade since 1850
- Contrast in precipitation will increase between wet to dry regions as well as seasonally

Change in average surface temperature

Change in average precipitation
Global Trends

Projections of global mean sea level rise over the 21st century relative to 1986–2005

- Rate of SLR since mid-1800’s has been larger than the mean rate during the last 2000 years
- Rate of SLR expected to increase
The Northeast US Perspective: Sandy’s Impact

- Hurricane Sandy impacted the Atlantic coastline in October 2012
- Affected entire east coast; **26 States** Florida to Maine, west to Great Lakes
- Greatest areas of impact NJ, NY, CT
- **286 lives lost** (159 in the US)
- **$65B in damages** in the U.S.
- Extensive **community dislocations** continuing today in some area

Public Law 113-2, enacted 29 January 2013
The Northeast US Perspective: Sandy’s Impact

USACE-NOAA Infrastructure Systems Rebuilding Principles
(February 2013)

- Collaboration across multiple scales of governance (i.e., local, State, Tribal, and Federal) and with relevant entities outside the government to develop long-term strategies that promote public safety, protect and restore natural resources and functions of the coast, and enhance coastal resilience
- Improve coastal resilience by pursuing a systems approach that incorporates natural, social, and built systems as a whole
- Promote increased recognition and awareness of risks and consequences among decision makers, stakeholders, and the public

Hurricane Sandy Rebuilding Strategy: Stronger Communities, A Resilient Region (August 2013)

North Atlantic Coast Comprehensive Study: Resilient Adaption to Increasing Risk (in progress; due January 2015)
Hurricane Sandy Coastal USACE Partnered Projects Performance Evaluation Study

- Record storm tides and waves throughout North Atlantic Division
- Widespread back-bay flooding throughout the Region
- Damages less where projects in place than locations without projects
- Greater consistency in specifying level of risk reduction is needed
- Projects performed as designed; better than expected
  - Protective dunes and high storm berms performed well
  - Damages at greater at project edges relative to project interior
- Findings support a strategy to implement a systems approach to comprehensive coastal protection
Coastal Storm Risk Reduction Measures

- **Structural**
  - Storm surge barriers, levees, breakwaters, groins
  - Beach fill, dunes

- **Natural and Nature-Based Features**
  - Salt marshes
  - Living shorelines, wetlands, oyster reefs,

- **Non-Structural**
  - Floodproofing, elevation, flood warning systems,
  - Evacuation, Acquisition

- **Policy/Programmatic**
  - Floodplain management, land use planning
  - State/Local Coastal Zone Policies, Flood Insurance Programs
  - Natural resources/surface water management

http://www.corpsclimate.us/ccacrrr.cfm
The Challenge: Towards Coastal Resilience

West Africa
Aug 2012

Thailand, Cambodia
Sep 2013

Peru, Chile, Bolivia
Oct 2013

Devon, Cornwall UK
Feb 2014

The Risk Management Process
National Research Council (2012)
Disaster Resilience: A National Imperative