Storm Surge/Coastal Inundation State of the Union

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Presentation Outline

• “Houston, We Have a Problem”
  • Coastal population trends and sea-level rise (SLR)
    • Increased vulnerability to storm surge/inundation
  • Lack of Federal level coordinating body
    • Disjointed data sources
    • Conflicting efforts
    • Insufficient coordination
    • Inefficient integration of new S&T

• A Possible Way Foreword
Coastal County Population, Texas to Maine 1900 - 2000

A growing percentage of the U.S. population resides in the coastal zone.
Miami: Then and Now

The 1926 Miami Hurricane: $140-157 Billion Today

Miami Beach 1926

Miami Beach 2006

Wendler Collection

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Sea-Level Rise (SLR)

• Combination of SLR and increasing coastal population density is making our Nation increasingly vulnerable to storm surge/coastal inundation

• Why: rising sea-level provides a higher “base” for future surge/inundation events thus producing an increasing threat to:
  • Coastal communities
  • Ecosystems (wetlands, critical species, habitat loss, etc)
  • Transportation systems (highway systems, ports, rail)
  • Economic viability (tourism, transport of goods, natural resources)
  • Energy
Vulnerability

- From 1980-2003, population density increased in coastal counties by 28% (Crossett et al., 2004)

- Over half of the Nation’s economic productivity is located within coastal zones

- 72% of ports, 27% of major roads, and 9% of rail lines within the Gulf Coast region are at or below 4 ft elevation (CCSP, SAP 4-7)

- Storm surge of 23 ft: 67% of interstates, 57% of arterials, almost half of rail miles, 29 airports, and virtually all ports in the Gulf Coast area subject to inundation (CCSP SAP 4-7)
Current Challenges

• Insufficient inter/intra-governmental coordination and communication on S&T

• Lack of standards
  • Models
  • Observations
  • Verification

• No storm surge/coastal inundation coordination body

• Poor linkage between government/academia
Partnering Agencies

• FEMA
  • Mitigation, planning, mapping, response & recovery, post-storm observations, and education,

• NASA
  • Remote sensing (LIDAR, altimetry)

• USGS
  • Storm tide observations, mapping

• U.S. ACE
  • Modeling, S&T, shore/community protection

• NOAA
  • Prediction, warning, S&T, modeling, mapping, real-time water observations, remote sensing, and outreach/education

• NIST
  • Risk-based storm surge maps for design in coastal regions
Expertise Needed for Storm Surge/Coastal Inundation

GIS  Modeling  Cartography
Statistics
Remote Sensing/Lidar
Oceanography  Sociology
Emergency management
Instrumentation
Physics
Bathymetry
Meteorology
Geology
Coastal Morphology
Geodesy

What agency houses all this expertise? Storm surge/coastal inundation requires a “community approach.”
Do we currently have a “Community Approach?”

- “Community Approach”
  - A team drawn from all parts of the community
  - Common ownership
  - Group of participants having common interests and goals
  - Group of interdependent individual/entities efficiently interacting with each other
Conclusion

We don’t have a functional community-based method

The lack of a community approach is hindering progress and limiting opportunity

We are not adequately servicing the needs of our constituents/customers
Example

• HAZUS
  • FEMA’s software program for estimating potential losses from disasters
  • Included models: earthquake, hurricane wind, and floods
    • Currently lacks a storm surge component

• If surge could be added to HAZUS
  • Which model would we use?
  • What would be basis of decision?
  • Who would develop/maintain model?
  • Would that model incorporate the collective expertise of the entire community?
Establishing a Community Approach

• Communication: effectively translate findings into coherent information that can be easily understood by decision makers, the general public, and other scientists

• Coordination: consider findings not in isolation but as part of a broader knowledge base

• Sharing: strengthening collective efforts by pooling resources and expertise

• Governance: a body of individuals which consists of members from the “community” whose purpose is to set goals, develop plans, and oversee progress
A Proposed Plan

• Develop an interagency working group (IWG) under the auspices of the President’s National Science and Technology Council/Committee of Environment and Natural Resources/Subcommittee on Disaster Reduction (SDR)

• Why SDR?
  • The SDR facilitates US Government and private/academic activities to reduce vulnerability to natural hazards
  • SDR has already developed priority science and technology interagency actions for coastal inundation that will help the Nation become more resilient
    • IWG could facilitate the development of a more detailed interagency plan, promote improved coordination, and oversee progress
SDR Inundation Grand Challenges

• Provide hazard and disaster information where and when it is needed

• Understand the natural processes that produce hazards

• Develop hazard mitigation strategies and technologies

• Reduce the vulnerability of infrastructure

• Assess disaster resilience

• Promote risk-wise behavior
IWG Purpose

• Evaluate existing storm surge/coastal inundation research, data, and agency operating plans
  • Identify gaps and areas of improvement
  • Define overall needs going forward

• Establish a road map and set priorities

• Establish clear roles for the participating agencies based on available resources, expertise, and infrastructure

• Coordinate agency priorities, planning, and budget processes

• Serve as the primary channel for communicating collective expertise and fostering sound policy making at the National level
Expected Benefits of SDR/IWG

• Coastal communities will be safer from storm surge/coastal inundation:
  • Through improved observations, modeling, and decision support tools, forecasters will have the necessary information to improve forecasts, warnings, and lead time
  • Coastal communities provided with necessary information, spanning appropriate time scales, to protect life and property

• Disaster resilient communities experience less loss of life and help protect our communities:
  • Improved tools, datasets, and other coastal management information will promote sound coastal planning, policy making, and decisions
Partnerships for the Protection of Coastal Communities

The objective is to:
- provide the right information
- in the right format
- at the right time
- to the right people
- to make the right decisions