

Coastal Resilience Solutions for Shoreline Municipalities

Charting a Course to Resilience

- Annual Meeting -
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Michael J. Donahue, Ph.D.
Vice President and Director,
National Coastal and Ecosystem Restoration Practice



Presentation

- Introduction to AECOM
- Our Vulnerable Shoreline: the Imperative for Action
- Realities for Vulnerable Communities
- Toward More Resilient Communities
- References: Additional Coastal Resiliency Resources
- Closing Remarks

Introduction to AECOM

- Global network: design, engineering, construction and management professionals
- Top-ranked design firm by Engineering News-Record
- Includes Design and Consulting Services, Management Services, Construction Services, and AECOM Capital
- Approx. 90,000 employees on seven continents and in more than 150 countries
- Fortune 200 company, over \$18B in 2017 revenue
- Water Business Line houses dedicated practices for:
 - National Coastal and Ecosystem Restoration
 - Great Lakes Services

Our mission is to deliver safe and secure infrastructure to those who need it most, to create opportunities for the leaders of tomorrow and to protect our planet so that, together, we can realize our dream of a better world.



Our Vulnerable Shoreline: the Imperative for Action

- A significant number of US and Canadian coastal communities in the Great Lakes-St. Lawrence River System are vulnerable to flooding.
- Near-record lake levels, coupled with the increasing frequency of extreme weather events, has exacerbated vulnerabilities.
- As a region with maritime origins, most mid-sized/large communities are located along a highly developed coast.
- Long-term climate trends suggest a “new normal” for coastal communities.
- The focus on coastal community resilience, for good reason, has never been more intense.
- Retaining the status quo is unacceptable- the consequences of inaction are severe (e.g., safety, critical services, infrastructure, quality of life).



Realities for Vulnerable Communities

- **This isn't just a Gulf Coast/East Coast issue- it's a North Coast issue as well.** Extreme weather events elsewhere tend to be more dramatic and pronounced but, cumulatively, impacts on the Great Lakes-St. Lawrence region are severe.
- **Understand and accept the “new normal”.** Climate-induced impacts are here to stay; waiting for a return to an earlier state is an exercise in futility. Retreat and adapt are acceptable alternatives.
- **Learn to live with the Lakes.** Our ability to adapt to fluctuating lake levels (and extreme weather events) will always exceed our ability to control the system (and its climate).
- **To understand the Lakes, we need to turn our backs to them.** Most issues/concerns (e.g., stormwater flooding, coastal development) originate on the land and therein lies the solution.
- **Prepare for the worst and hope for the best.** Lake level fluctuations and extreme weather events are largely unpredictable: embracing and planning for uncertainty is essential.
- **It is better to anticipate and prevent than to sin and repent.** In light of high profile coastal storms, more communities – even those never affected- are considering preventive measures.
- **Expand the tool kit and put it to use.** Short and long-term strategies for community resiliency are increasingly available, and relevant to both “built” and natural shorelines.

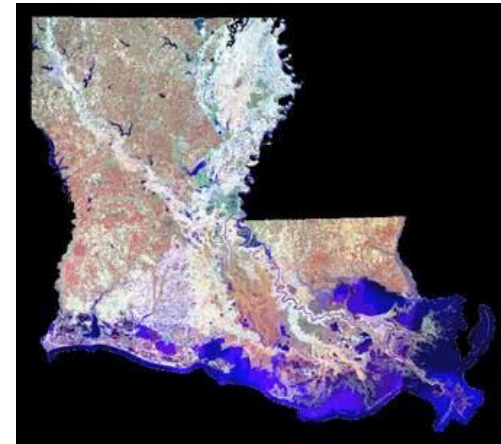
Toward More Resilient Communities

.....moving beyond post-disaster responses – and toward a more resilient coast.

- “Changing Course” International Design Competition
- Texas Coastal Resiliency Master Plan
- Rebuild by Design – Meadowlands, NJ (post-Hurricane Sandy)
- Climate Ready Infrastructure and Sensitive Sites Protocol
- Great Lakes Early Warning System

Changing Course International Design Competition

- **Impetus:** Vulnerability of Lower Mississippi Delta residents, businesses, quality of life and ecological attributes to sea level rise, land subsidence and extreme weather events.
- **Approach:** Teams of engineers, scientists and planners from dozens of countries entered the competition.
- **Challenge:** develop a 50 year vision for a Mississippi River Delta that restores the river's natural land-building capacity and achieves a self-sustaining coastal ecosystem and high-functioning navigation system.
- **Significance:** The winning teams recognized that:
 - A sustainable future requires working with, rather than against, nature.
 - The cost of massive infrastructure investments can outweigh prospective economic/ecological benefits.
 - Retrofit and retreat are viable/inevitable options on some instances.



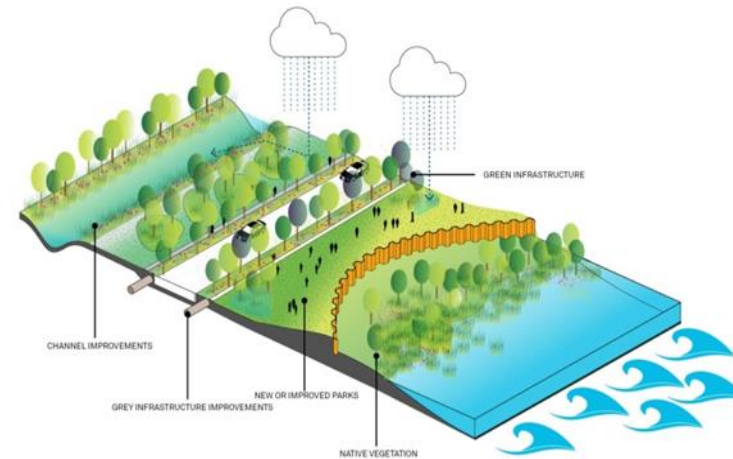
Texas Coastal Resiliency Master Plan

- Describes state of the coast and a path forward to coastal community resiliency.
- Identifies coastal Issues of Concern: Habitat Loss; Shoreline Erosion; Flood Damage; Dune Degradation; Water Quantity/Quality Impacts; Coastal Resource Impacts; Abandoned/Derelict Vessels, Structures and Debris.
- Provides Resiliency Strategies, and Tier 1 (High Priority) projects.
- Phase 1 released just prior to Hurricane Harvey; updates will expand focus to vulnerable inland areas.
- Technical Advisory Group with strong municipal representation.



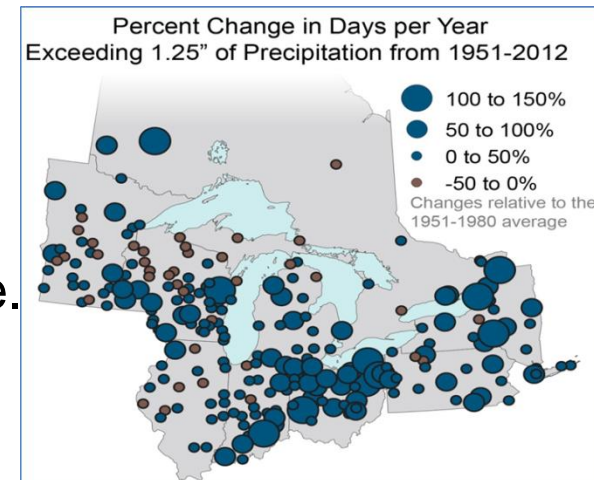
Rebuild by Design: Meadowlands, NJ Resiliency Project

- State of NJ was awarded \$150M in 2013 to address the region's flood and resiliency vulnerabilities (U.S. Housing and Urban Development).
- Competition called for development of a pioneering resiliency solution- a flood control project that incorporates green/grey infrastructure, improves public access, and accommodates future storm events.
- Entailed multidisciplinary collaboration between engineers, urban planners, landscape architects, ecologists, environmental scientists, and economists.
- Featured Low Impact Development (LID) measures to reduce stormwater runoff, improve interior drainage via enhanced conveyance and storage, retrofits and reinforcements of existing infrastructure, wetland/ecosystem restoration, and reinforcement of tidal surge/flood protection alignments.



Climate Ready Infrastructure and Sensitive Sites Protocol

- NOAA-funded GLSLCI project (partners: U. of Michigan, Gary, IN)
- Provides Great Lakes-St. Lawrence coastal communities with a convenient means to inventory vulnerable assets and determine pre-emptive/response actions in the event of an extreme weather event.
- Describes how extreme weather can impact strategic sites and critical infrastructure.
- Provides a strategic sites inventory process including a risk matrix.
- Pilot tested in Gary, IN
- Yields recommendations to decision-makers on short and long-term actions to address risk to strategic sites and critical infrastructure.
- Ongoing education/outreach opportunities to vulnerable coastal communities.



Great Lakes Early Warning System

- Unmet need identified by the IJC's Science Advisory Board.
- Region lacks a comprehensive process for tracking and monitoring ecological/economic threats and stressors and responding to them.
- Project underway to identify/prioritize threats and stressors (short and long-term) and address them via Great Lakes Early Warning System.
- Expert's Workshop held in Windsor, Ontario in May 2018; report and recommendations expected in August 2018.
- Likely framework is a "system of systems"; a methodical collection and analysis of data and mechanisms to respond.
- Potential to include lake level and related coastal resiliency issues.



References- Additional Coastal Resiliency Resources

- **Great Lakes Coastal Resilience Planning Guide-** online guide for sharing solutions, best practices, and lessons learned for building resilience, as well as tools, data and maps, and publications.
<https://coast.noaa.gov/digitalcoast/tools/gl-resilience.html>
- **Coastal Resilience-** online resource and decision support tool from The Nature Conservancy to address the devastating effects of climate change and natural disasters. <http://coastalresilience.org/about/>
- **Great Lakes Coastal Resilience Planning Guide -** guidebook shows how Great Lakes counties and municipalities can use science-based information to address coastal hazards and incorporate concerns for climate change in local planning efforts. <https://toolkit.climate.gov/tool/great-lakes-coastal-resilience-planning-guide>
- **Planning for Coastal Resilience: Best Practices for Calamitous Times** (Timothy Beasley) - includes case studies and “resilience profiles” of coastal communities, and guidelines for increasing resilience.
<https://www.amazon.com/Planning-Coastal-Resilience-Practices-Calamitous/dp/1597265624>

Thank you!

Mike Donahue
Vice President and Director,
National Coastal and Ecosystem Restoration Practice
AECOM

michael.donahue@aecom.com

734.646.4638