Gulf Coast Community Handbook

Lindsay M. Cross
Tampa Bay Estuary Program
National Estuary Program (NEP): Local watershed programs making a difference
Partners vital to our success
Priority Issues in Tampa Bay

Water and Sediment Quality

Dredged material management

Bay Habitats

Spill Prevention and Response

Fish and Wildlife

Public Access

Invasive Species

Education

Climate Change
Climate Ready Estuaries

Program through US Environmental Protection Agency to work with National Estuary Programs and coastal management community to:

1. Assess climate change vulnerabilities
2. Develop and implement adaptation strategies
3. Engage and educate stakeholders
Gulf Coast Community Handbook

• Identify adaptation strategies that incorporate resiliency to climate change as a component of habitat restoration and protection plans
• Focus on specific case studies from the Gulf region
• Guidebook for other coastal communities that provides concrete examples of how to improve habitat resiliency along the Gulf coast
Handbook Contents

• Executive Summary
• Introduction
• Overview of Climate Change Science
  • Sea Level Rise
  • Storm Impacts and Extreme Weather
  • Changes in Precipitation and Temperature
  • Impacts to Flora and Fauna
  • Ocean Acidification
  • Gulf of Mexico Impacts
  • Storm Impacts
• Gulf of Mexico Case Studies
• Step-by-Step Recommendations
• Recommended Readings
Overview of Climate Science

Intergovernmental Panel on Climate Change

National Climate Assessment

Restore America’s Estuaries
Predicted impacts of climate change. Source: US Environmental Protection Agency
Sea Level Rise

- Local measurements (St. Pete Pier) document ~ 1”/decade
- Rate expected to increase
- Communities can use scenarios based on the “tolerance of risk”

<table>
<thead>
<tr>
<th>Scenario</th>
<th>SLR by 2100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest</td>
<td>6.6 feet</td>
</tr>
<tr>
<td>Intermediate-High</td>
<td>3.9 feet</td>
</tr>
<tr>
<td>Intermediate-Low</td>
<td>1.6 feet</td>
</tr>
</tbody>
</table>

Source: thisnessofthat.blogspot.com; Allison et. Al., The Copenhagen Discussions, 2009; NOAA (2012)
Storm Impacts and Extreme Weather

- Sea level rise may increase intensity of extreme weather events
- Major flooding more common
- Barrier islands vulnerable

Source: Tom McKenzie, unknown
Changes in precipitation and temperature

- Warmer air temperatures will impact precipitation patterns and intensity
- Greater variability predicted

Source: Irfan Khana, IPCC, jungeree.com
- Examples of habitat migration or squeeze
- Changes in habitat ranges
Ocean Acidification

- pH decrease of 0.1 = 25% increase in acidity
- Threatens marine creatures
  - Coral reefs
  - Shellfish
  - Algae

Source: University of Queensland, IPCC 2007
Additional Gulf of Mexico Impacts

- Land subsidence could exacerbate sea level rise
  - Oil and gas extraction
  - Pumping of groundwater
- Significant wetland losses
  - Louisiana loses a football field-sized wetland every hour

Sources: nrcs.usda.gov, polarsat.com
Case Studies

- Highlight activities at Gulf Coast NEPs and NERRs
- Examples of collaborative projects as well as individual initiatives
Coastal Bend Bays & Estuaries, TX
Galveston Bay, TX
Barataria-Terrebonne Estuary, LS
Mobile Bay, AL

Tampa Bay, FL
Sarasota Bay, FL
Charlotte Harbor, FL
National Estuarine Research Reserves

Mission-Aransas, TX
Grand Bay, MS
Weeks Bay, AL
Apalachicola, FL
Rookery Bay, FL
Visualizing Sea level rise in Sarasota Bay:
Sarasota Bay Estuary Program

- Web-based sea level rise visualization tool
- 3 sea level rise and 3 (additive) storm height scenarios
- Overlays for conservation areas and drainages

Source: SBEP
Habitat creation at North Lido Park, FL: Sarasota Bay Estuary Program

- Mosaic of wetland habitats, including a new tidal channel with connection to Sarasota Bay
- Fill material used to create rolling dunes
- Restoration tested during tropical storm Debby

Source: Jay Leverone, Sara Kane
Adaptation plan for Punta Gorda, FL: Charlotte Harbor NEP

- Extensive community-based effort
- Vulnerability, Adaptation and Acceptability Games
- Suite of strategies for adaptation, protection, planned relocation and accommodation through 2200

Source: Lisa Beever
Effects of Everglades restoration on sharks in Rookery Bay, FL: Rookery Bay NERR

- Restoration in Everglades will improve distribution of freshwater
- Sharks indicate healthy salinity regimes

Source: RBNERR, US Army Corps of Engineers
Making marshes in Nueces Bay, TX: Coastal Bend Bays & Estuaries NEP

- 160-acre intertidal marsh restoration
- Marsh terraces and berms created at higher elevation
- Will combat erosion and subsidence

Source: HDR, Lammon Aerial Photography
Coastal habitat mosaics, Schultz Preserve, FL: Tampa Bay Estuary Program

- Upland, spoil-created peninsula restored to braided tidal creek system
- 120 acres of subtidal, marsh and coastal uplands
- Tidal emergent wetlands can migrate upslope

Source: Hillsborough County, Aerial Innovations
Impact on critical coastal habitats; Tampa Bay

Tampa Bay Estuary Program

- Modeling of 40 cm (~1.3’) to 2 meters (~6.6’) SLR
- Impact to coastal habitats under 2 scenarios:
  - Allow Habitat migration
  - Protect dry land

Source: Ed Sherwood
King Tide Photo Initiative:
Sarasota Bay and Tampa Bay Estuary Programs

- Summer 2012: >150 photos documenting extremely high tide
- Winners judged by community members

Source: NASA, Larry Stults
Step-by-Step Recommendations

- Assess current vulnerabilities
- Map areas that may become inundated
- Identify habitats for protection and preservation
- Prioritize strategies that incorporate environmental benefits
- Engage business community
- Develop post-disaster recovery plans

Source: Tracy Skrabal, rosiemade.com
Gulf Coast Community Handbook

Case Studies from Gulf of Mexico Communities for Incorporating Climate Change Resiliency into Habitat Planning and Protection

A report to the US Environmental Protection Agency, Climate Ready Estuaries Program

Developed by Lindsay M. Cross, Tampa Bay Estuary Program

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Electronic and hard copies available

www.tbeptech.org/DATA/cre/gulfcoasthandbook.pdf

lcross@tbep.org

(727) 893-2765