The Southwest Florida Feasibility Study and Climate Change

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July 30, 2008
Gulf of Mexico

Lake Okeechobee
- Land Use Decisions
- Infrastructure Investments
- Conservation Planning

Legend

Storm Surge
- Tropical Storm
- Category 1
- Category 2
- Category 3
- Category 4/5

- SWFFS Boundary
- County Boundaries
- Roads
Anticipated SWF Climate Changes

- Sea Level Rise
- Increased Severe Storms
- Increased Rainfall and Average Temperature
- Water Chemistry Changes (pH, DO, etc.)
- Landforms migration to maintain relative position within the coastal energy gradient (Pethick 2001)
- Migration of Barrier Islands if not hardened
- Mangrove ability to accrete sediment (Singh 2003)
- Habitat migration with landform changes
- Expansion of invasive species ranges
- Water Table Changes
Habitat Structure-2000
Southwest Florida

Symbols courtesy of the Integration and Application Network (ian.umces.edu/symbols/), University of Maryland Center for Environmental Science.
Principals from Capitol Hill Oceans Week
(National Marine Sanctuary Foundation, June 3-5, 2008)

- Maintain heterogeneous geophysical processes and gradients
- Maximize connectivity among these (Braun TNC)
- Enable natural world to change (Shumway TNC)
- Hydrologic restoration, migratory corridors, oyster reefs
- Protect refugia, gradients (latitudinal/elevational), heterogeneity, gene flow/connectivity (Larsen Ecoadapt)
- Reduce non-climate stresses (invasive species, pollution, etc)
- Protect freshwater sources

http://nmsfocean.org/chow2008/
Protect:

- Latitudinal and Elevational Gradients
- Heterogeneity and Refugia
- Gene Flow / Connectivity
Hydrologic Restoration
Protect Freshwater Sources
Estero Bay STELLA Runs

**Green:** Natural System Model Flows

**Blue:** Resulting Flows

All Tier 1&2 Projects

No Projects

By Richard Punnett
Reduce Non-Climate Stresses

- Protective Water Quality Targets
  - Estero Bay TN of 0.5 mg/l greater than TMDL
  - Caloosahatchee load reduction of 1.2 m lb/yr
- Invasive Species Removal
  - Reduce Exotic Species Cover
  - Remove spoil and fill ditches
- Restored freshwater flow regimes
Protect Restoration Investments in the Context of Sea Level Rise
Most investment above sea level rise predictions

<table>
<thead>
<tr>
<th>Area</th>
<th>Tier 1</th>
<th>Tier 2</th>
<th>Tier 3</th>
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<tbody>
<tr>
<td>Above 10'</td>
<td>85%</td>
<td>90%</td>
<td>91%</td>
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<tr>
<td>Lands in Conservation</td>
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<tr>
<td>Wetlands</td>
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<td>Water</td>
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<td>Shore Protection Almost Certain</td>
<td>7%</td>
<td>5%</td>
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<td>Project Description</td>
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<td>Belle Meade Stormwater Master Plan/Central Flow-way Restoration</td>
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<td>South Belle Meade Flow-way</td>
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<td>Hickey Creek Swamp</td>
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<td>41 Culvert Emplacement west of Tamiami Trail Culverts Project</td>
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<td>Spring Creek Flow-way</td>
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<td>Southwest Unacquired Yucca Pens</td>
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<td>Yucca Pen Creek West</td>
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<td>Estero River North</td>
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<td>Mouth of Orange River</td>
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<td>Bone Fish Springs Acquisition</td>
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<td>Flow-way north of Alico Road (Alico Mine Flow-way) (Tam-Alico)</td>
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<td>Alico Flow-ways West</td>
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Relevant Findings

• Consideration of predicted sea level rise can be used to reduce risk and assess benefits of restoration investments.
• The SWFFS includes alternatives which are predominately above long-term (200 year) sea level rise predictions.
• Issues of climate change mitigation and adaptation are best addressed thru interagency partnerships that CERP, CHNEP, and SWFRPC promote.
  • SWFFS implementation protects latitudinal and elevational gradients, heterogeneity, connectivity, refugia.
  • SWFFS implementation protects freshwater resources for ecosystem health and human use.
  • SWFFS implementation reduces non-climate stresses.
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