FCE ASM 2013

SCENARIOS AND MODELING CCT

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CENTRAL QUESTIONS
OVERVIEW: WHERE WE ARE

- Scenarios (climate change, water use)
  - Engaging with stakeholders in common scenarios development

- Modeling and synthesis
  - Bits and pieces approach (various)
  - All at once approach (ELM)

- Synthesis paper
SCENARIOS

• Plausible outcomes, not projections
  – Focus on a manageable number of plausible but different outcomes
  – Better understand relationships between drivers and response variables
• Loosely linked (bottom up, opportunistic)
• Common storylines enhance likelihood of opportunistic integration and synthesis
A LOT OF RESOURCES...

Past and Projected Trends in Climate and Sea Level for South Florida

Validating climate models for computing evapotranspiration in hydrologic studies: how relevant are climate model simulations over Florida?

Jayantha Obeysekera

Scenario-Based Projection of Extreme Sea Levels

The Atlantic multidecadal oscillation and its relation to Probabilistic Projection of Mean Sea Level and Coastal Extremes

Jayantha Obeysekera, P.E., M.ASCE; Joseph Park, P.E.; Michelle Irizarry-Ortiz, P.E.; Jenifer Barnes; Paul Trimble

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A LOT OF RESOURCES…

• Teams
  – Florida Climate Change Task Force
  – Water, Sustainability, and Climate for South Florida
  – Tampa Bay ULTRA

• Workshops/Meetings
  – Hydrology of the Everglades in the Context of Climate Change (FAU, March 2012)
  – Predicting Ecological Changes in the Florida Everglades in a Future Climate Scenario (FAU, February 2013)
  – National Climate Assessment Southeast Regional Town Hall Meeting (USF, February 2013)
Problem: Poor resolution—south Florida not even modeled in some GCMs!!!
## Downscaling to Date (2060)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Global Models</th>
<th>Statistically Downscaled Data</th>
<th>Dynamically Downscaled Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Temperature</td>
<td>1 to 1.5°C</td>
<td>1 to 2°C</td>
<td>1.8 to 2.1°C</td>
</tr>
<tr>
<td>Precipitation</td>
<td>-10% to +10%</td>
<td>-5% to +5%</td>
<td>-3 to 2 inches</td>
</tr>
<tr>
<td>Sea Level Rise</td>
<td>1.5 feet</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Florida Coastal Everglades
Long Term Ecological Research

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Water Budget Modeling

Shark Slough

Taylor Slough
Hydrodynamic Modeling

- When run for “typical” time period, groundwater discharge is 14 mm/mo.
- Mean annual groundwater discharge from Zapata and Price (2012) is 15 mm/mo.
P Budget Modeling

(a) Dry season: Jan – mid-June 2002, (mg m$^{-2}$ y$^{-1}$)

(b) Wet season: mid-June – December 2002 (mg m$^{-2}$ y$^{-1}$)
ELM Habitat Suitability Scenario
Both Scenarios

Habitat Classes, at Simulation-End
- Open Water/Slough
- Mangrove Forest
- Buttonwood Forest
- Mangrove Scrub
- Buttonwood Scrub

Red polygons are 1995 mangrove habitats

Base

SL_0.5

SL_0.5_FL1.5x
SYNTHESIS PAPER

• Synthesis Science in the Florida Coastal Everglades: Understanding Ecosystem Responses to Presses and Pulses in a Social Ecological System

• Core group
  – Onsted, Rains, Fitz, Saunders, Madden

• Working Meetings
  – October 2012
  – February 2013

• Progress!
PRODUCTS TO DATE

Provide a list of products your group has generated relevant to the listed questions, including theses, manuscripts, presentations and leveraged proposals

Highlight those from the past year
BREAKOUT GROUP AGENDA

• Scenarios
  – Seek interest in scenarios development
  – Plan workshop (what, when, where)
  – Is there a Childers (2006) for climate-change and water-use scenarios?

• Modeling
  – Connecting existing and/or planned data collection and modeling efforts
  – Begin prioritizing investments (time, money)