



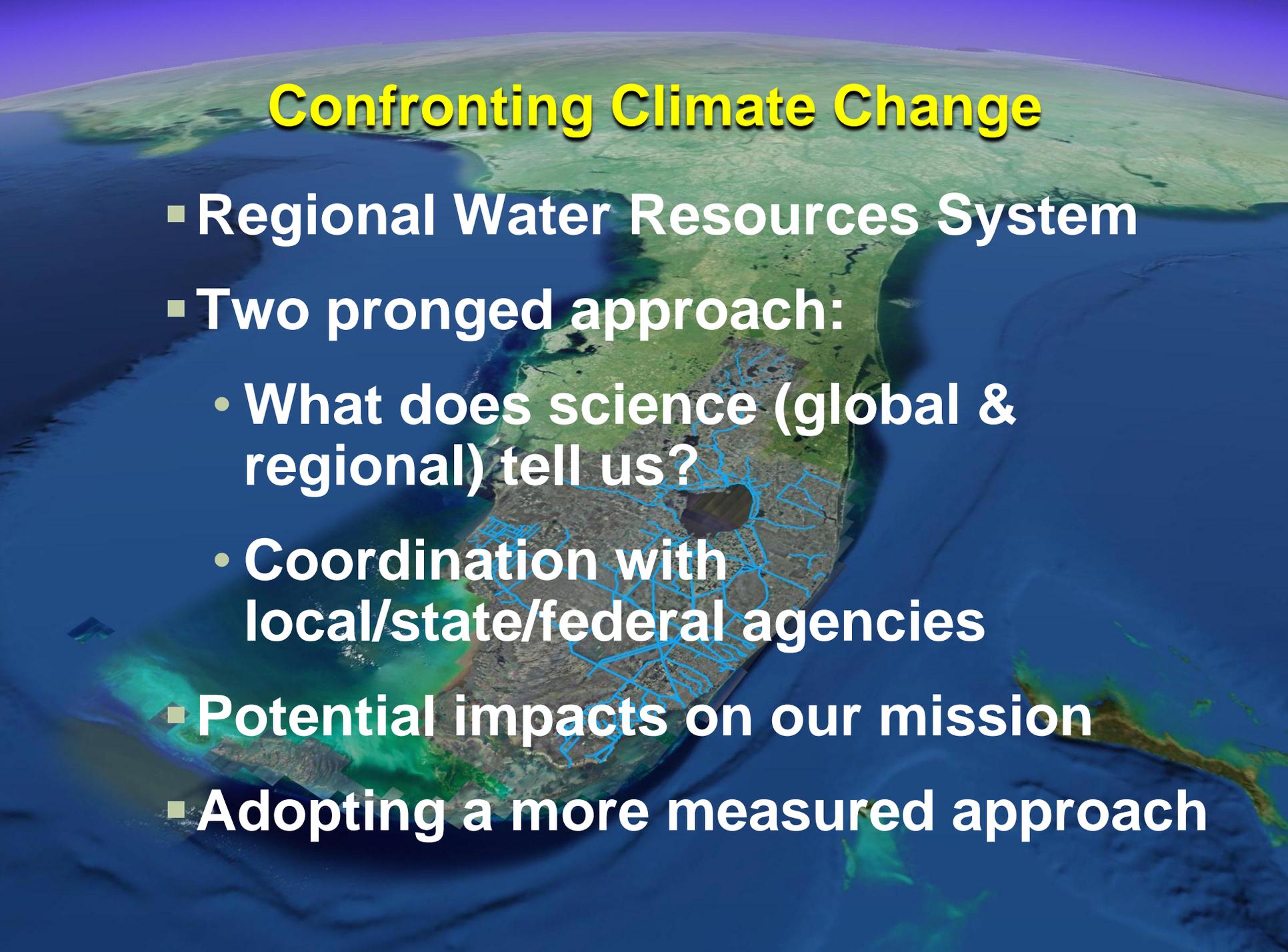
Climate Change and Water Management in South Florida

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Joint WRAC/LO Committee Meeting
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Confronting Climate Change

An aerial satellite-style view of a coastal region, likely the Chesapeake Bay area. The land is green and brown, with a complex network of blue lines overlaid, representing water resources or a network. The ocean is dark blue, and the sky is a gradient of purple and blue.

- **Regional Water Resources System**
- **Two pronged approach:**
 - **What does science (global & regional) tell us?**
 - **Coordination with local/state/federal agencies**
- **Potential impacts on our mission**
- **Adopting a more measured approach**

Confronting Climate Change (cont.)

- Two Important Questions:
 - Which decisions are likely to be affected and could benefit from adaptation strategies (**Type I**) in the short term?
 - Which decisions are likely to be affected but for which adaptation strategies (**Type II**) could be deferred without serious consequences?

Interdepartmental Climate Change Group at SFWMD

District Leadership Team Members

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Staff (Over 30) members from:

Creative Services

Operations & Maintenance

Everglades Restoration

Regulation

Intergovernmental Programs

Restoration Sciences

Modeling

SCADA & Hydro Data
Management

Office of Counsel

Water Supply

SFWMD White Paper

DRAFT

**CLIMATE CHANGE
AND WATER MANAGEMENT
IN SOUTH FLORIDA**

November 12, 2009

Interdepartmental Climate Change Group
South Florida Water Management District

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Includes: What is known, What is probable, What is possible, and Information gaps

Change: Types and Potential Impacts

Climate Change Type

Natural Cycles
 El Nino... (3-7yrs)
 AMO* (multi-decadal)
 Solar Cycle
 Glacial (~thousands of years)



Human Induced Greenhouse Gases
 Global Warming

Quartet of change (Drivers)

- Rising Seas
- Temperature
- Rainfall, floods, and droughts
- Tropical Storms & Hurricanes

Water Management Impacts

- Direct landscape impacts (e.g. storm surge)
- Water Supply (e.g. droughts, saltwater intrusion)
- Flood Control (e.g. urban flooding, hurricanes)
- Restoration (e.g. ecosystem impacts, both coastal and interior)

Sources of Sea Level Rise

What causes the sea level to change?

Terrestrial Water Input

Terrestrial water storage, extraction of groundwater, building of reservoirs, changes in runoff, and seepage into aquifers

Land-based Ice (Glaciers, Ice Sheets in Greenland, Antarctica)

Exchange of the water stored on land by glaciers and ice sheets with ocean water

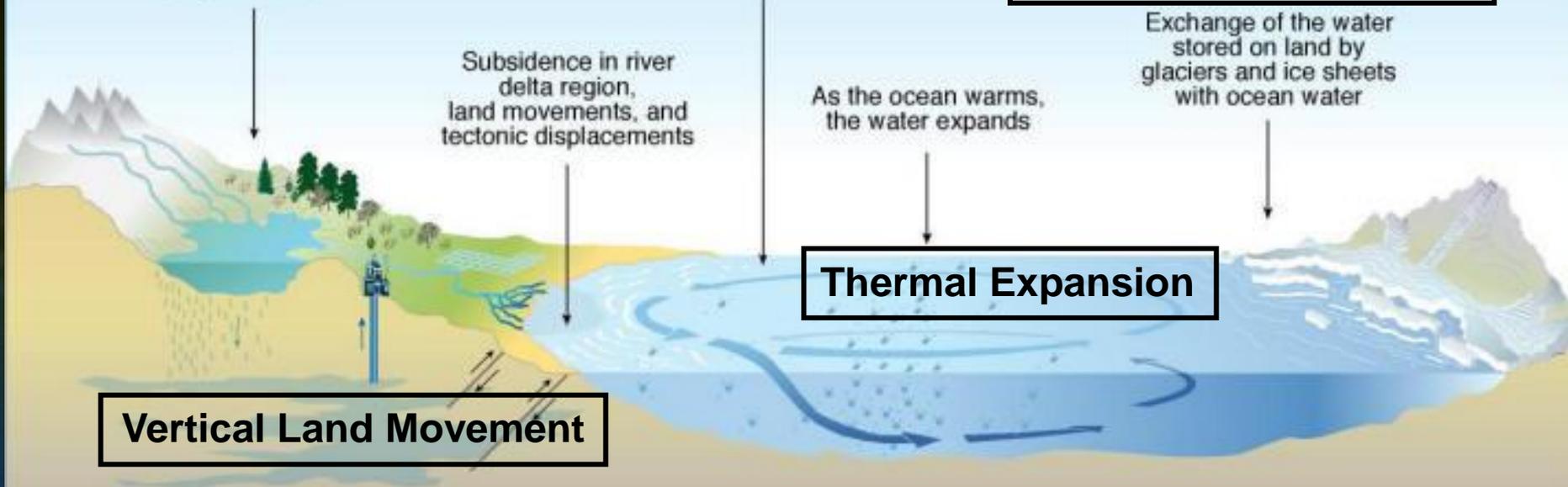
Surface and deep ocean circulation changes, storm surges

Subsidence in river delta region, land movements, and tectonic displacements

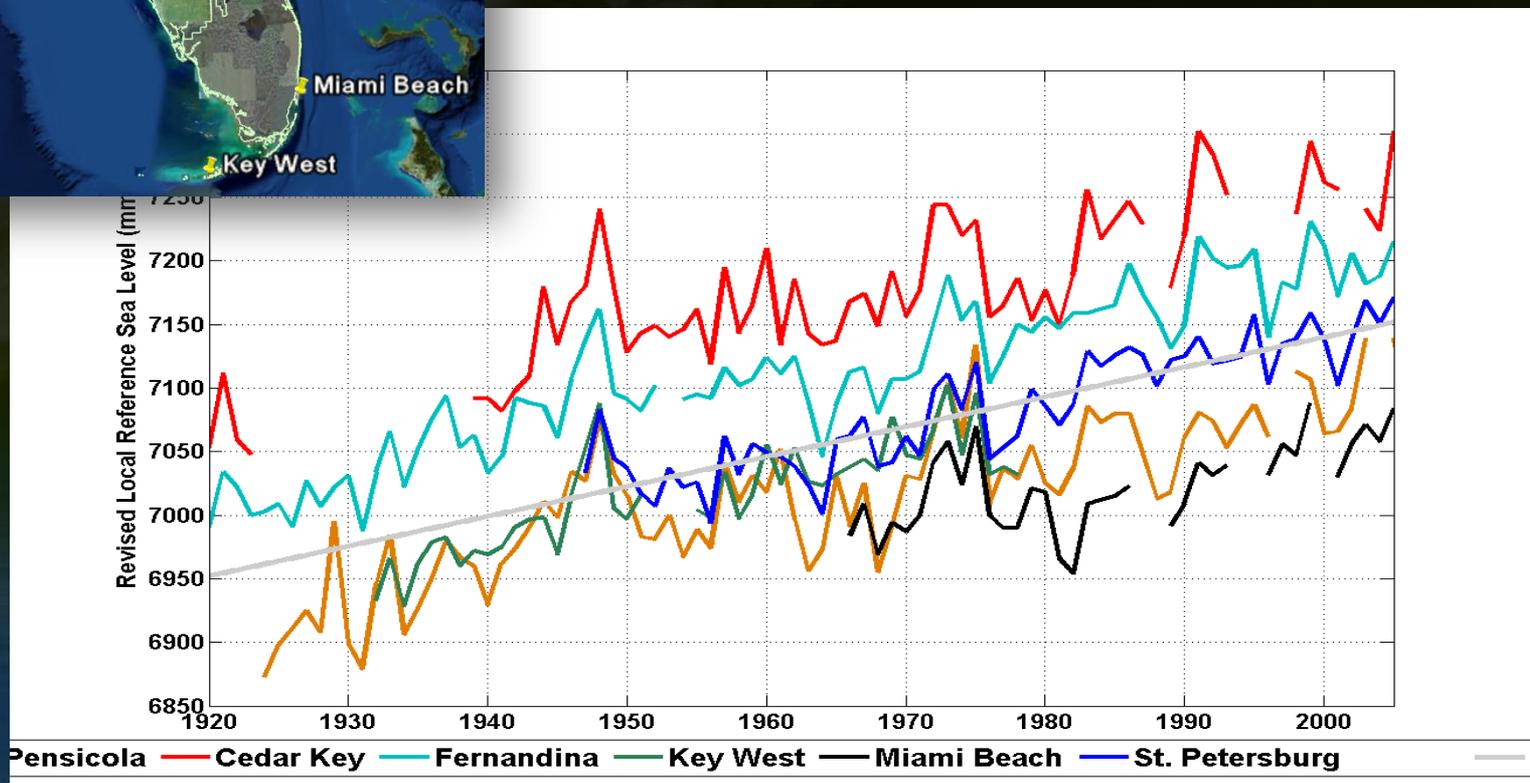
As the ocean warms, the water expands

Thermal Expansion

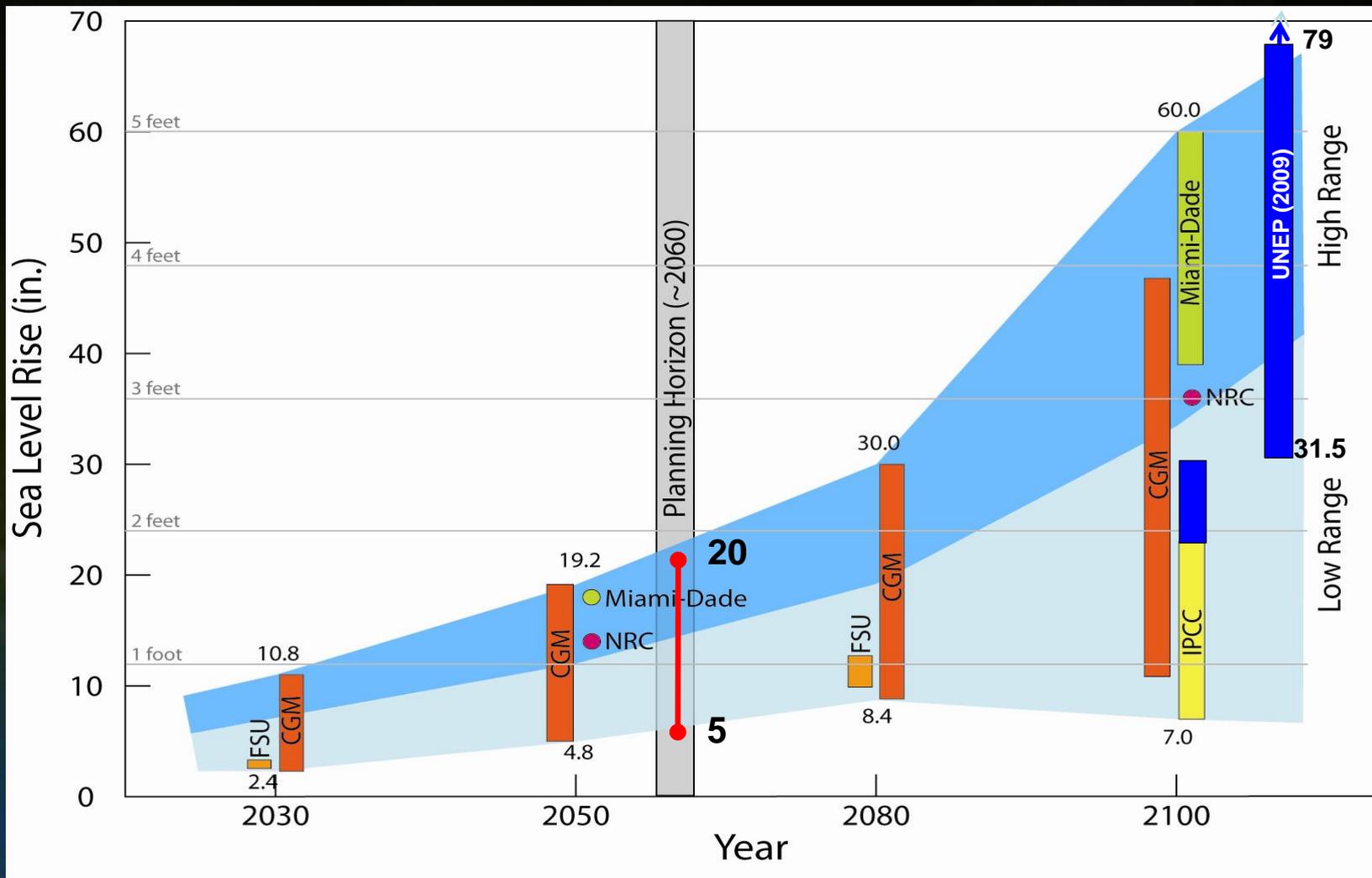
Vertical Land Movement



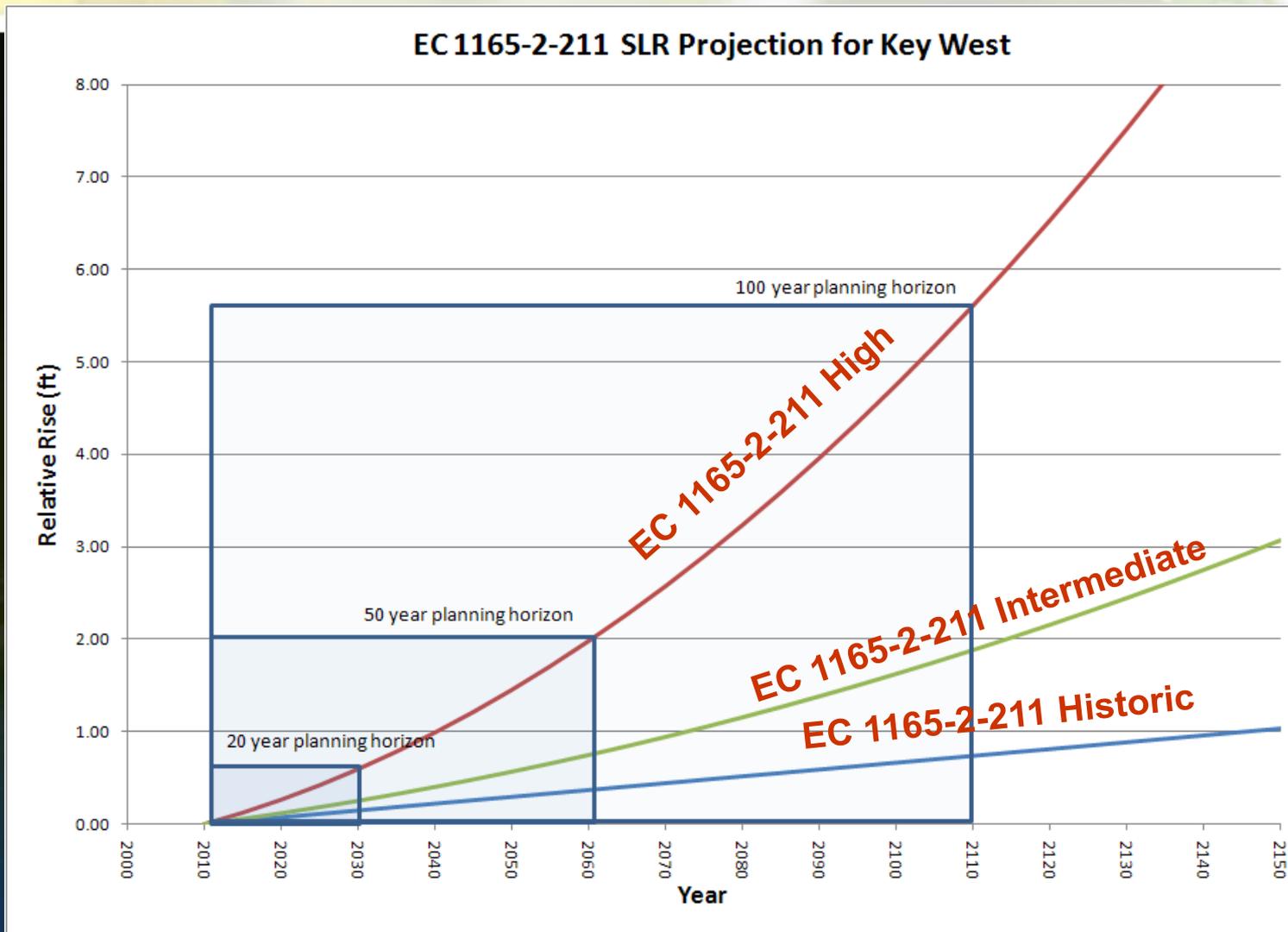
Rising Seas – already a reality



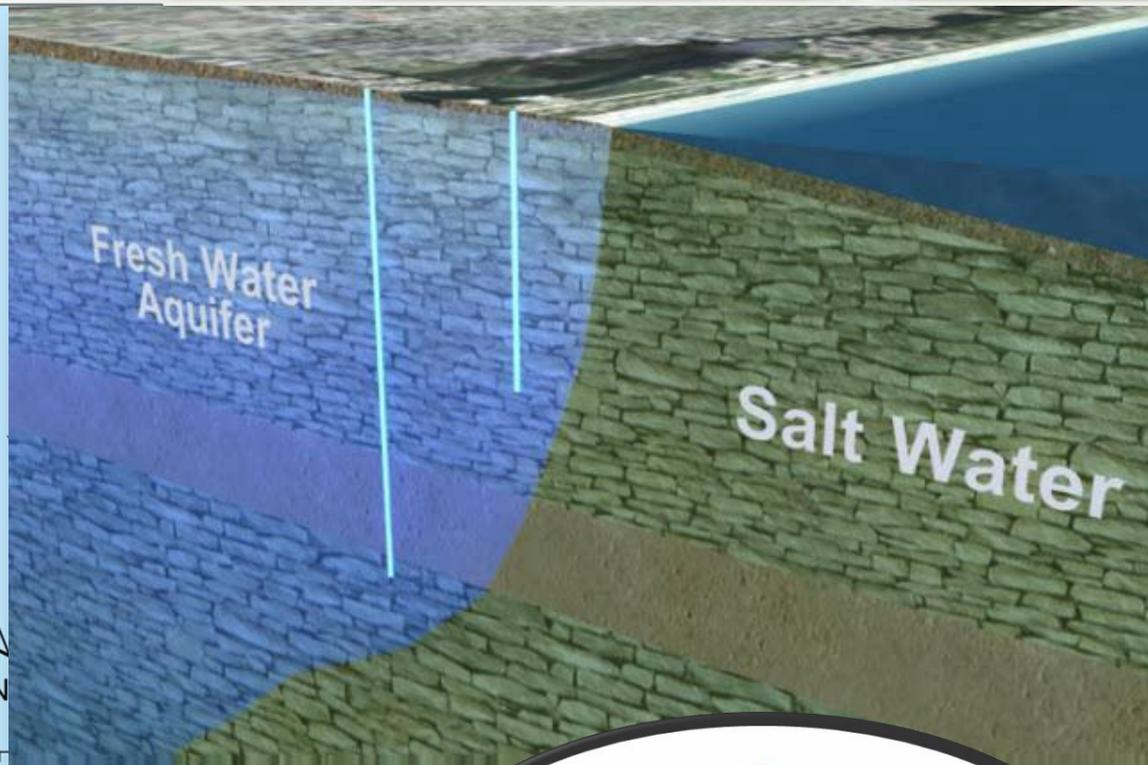
Future Projections: Considerable Spread



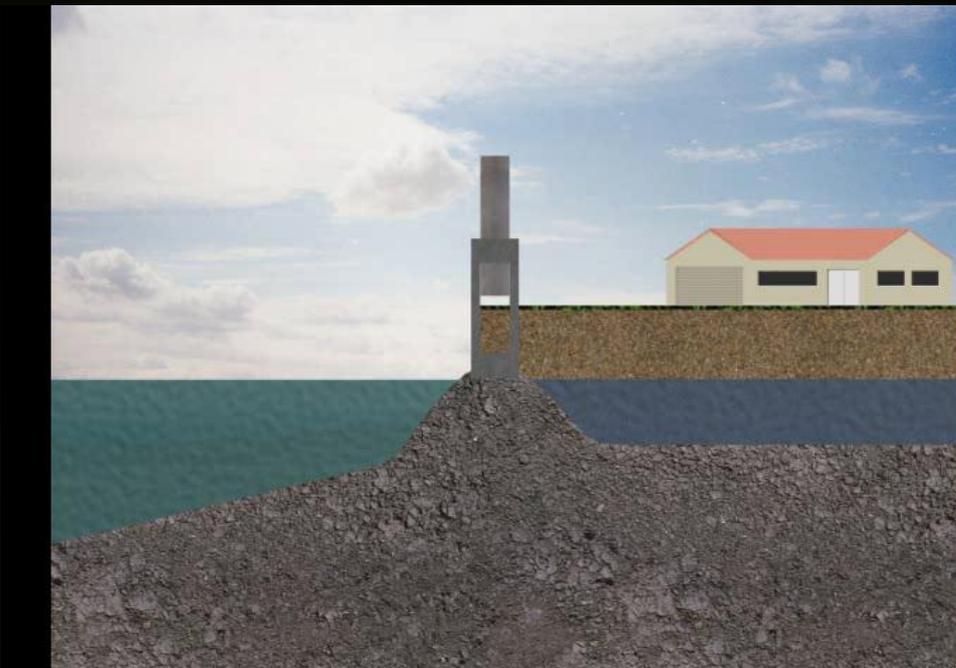
U. S. Army Corps of Engineers' Engineering Circular (EC 1165-2-211) Released July 2009



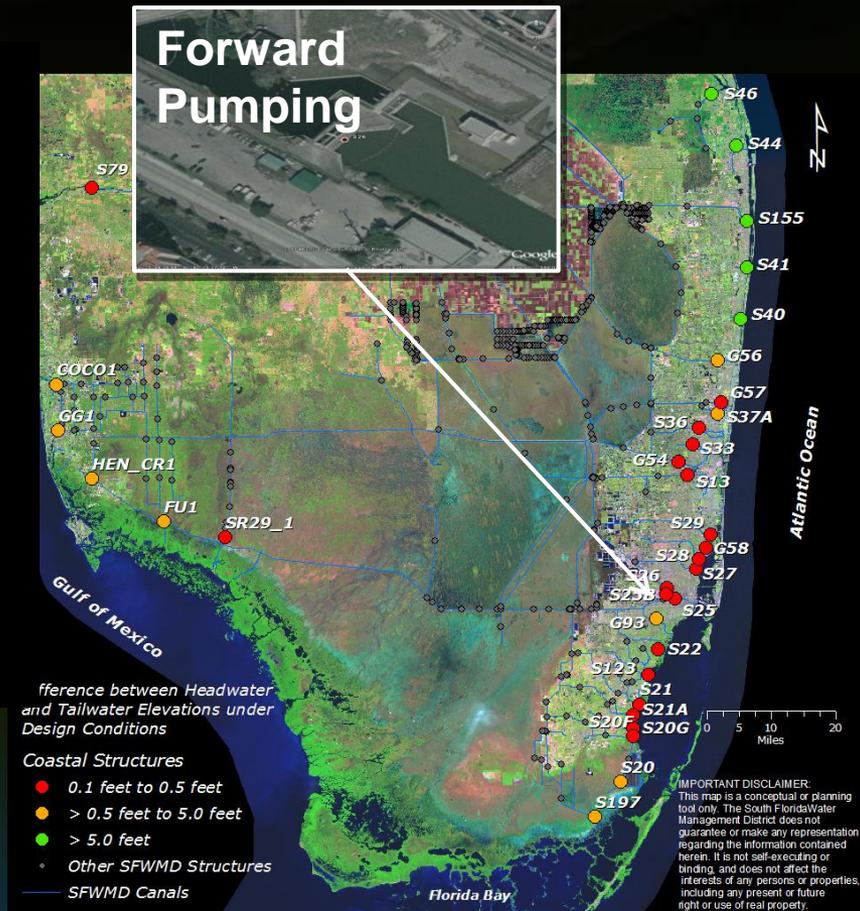
Rising Seas: Water Supply Impacts Saltwater Intrusion



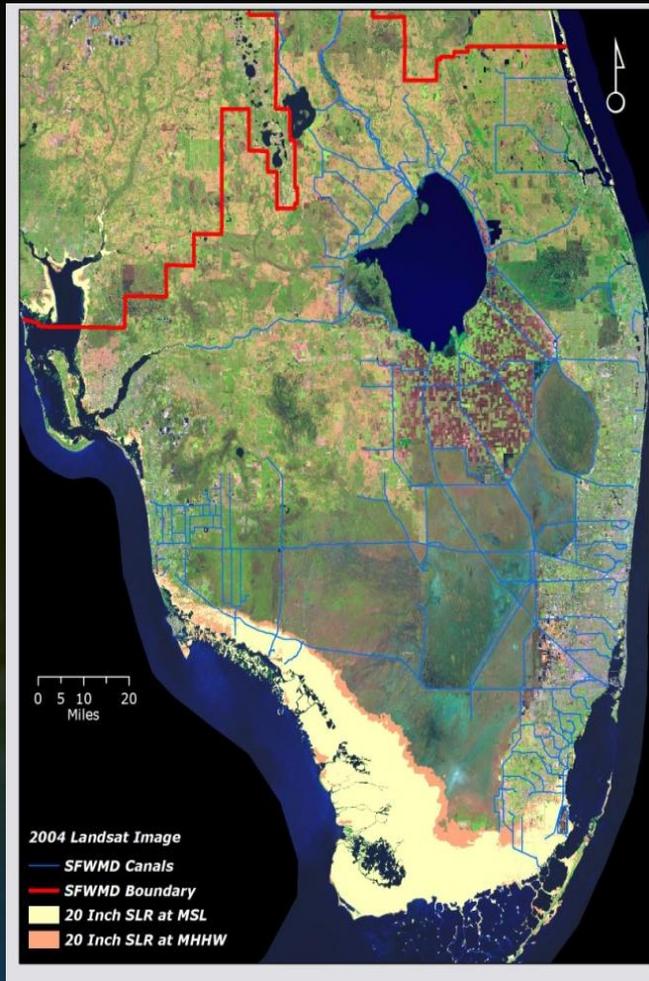
Rising Seas: Flood Control Concerns



- Small water level difference across coastal structures during high tides and local storms
- Flooding during high tide and storm surge



Rising Seas: Southern Everglades Restoration



- Relocation and possible reduction of mangrove forests
- Forced migration of wading birds north
- Potential peat collapse, coastal erosion, and redistribution of sediments
- Salinity intrusion into freshwater marshes can: discharge toxic hydrogen sulfide, cause coastal fish kills, and increase habitat loss

Conclusions

- History is not sufficient to make predictions.
- Sea Level Rise is more certain but significant uncertainties exist in projections.
- Current Climate Change projections:
 - 5 to 20 inches of sea levels by 2060. Need regional information and coordination with other agencies
 - Increase in temperature up to 7° F and Evapotranspiration up to 15%
 - Change in rainfall up to ±20 percent
 - Changes in the strength and frequency of tropical storms and hurricanes. Exact extent is uncertain

Preliminary Recommendations

TASK	FY10	FY11	FY12	FY13	FY14
Continue to analyze historical trends & uncertainties of regional climate projections	■				
Jointly with other agencies develop modeling tools, and agree on planning parameters	■				
Understand vulnerabilities		■	■	■	■
Develop & implement <u>Type I</u> adaptation strategies	■	■	■	■	■
Develop & implement <u>Type II</u> adaptation strategies					■

Local Government Climate Change Initiatives

- Primarily focus on greenhouse gas reduction and green initiatives
 - 16 cities have task forces/committees
 - 57 cities and 2 counties part of “Cool Mayors” program
 - 3 counties (Monroe, Orange and St. Lucie)

- Only 2 counties are looking at water resources – Broward and Miami-Dade

State and Federal Climate Change Initiatives

- 5 federal and national and 3 international initiatives
- Department of Environmental Protection – Initiated process to look at water resource impacts from climate change

Questions!

Recent cabinet meeting of the island nation, Maldives

