SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Climate Change and Sea Level Rise Planning and Adaptation Strategies

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sfwmd.gov

Climate Change & Sea Level Rise

- A global phenomenon
- Impacts & actions are local
- SFWMD's primary focus is on regional water management issues and coordination with federal/state/local governments

Climate Change Stressors
- **Rising Seas**
- **Increasing Temperature**
- **Changing Precipitation**
- **Changing Tropical Storms and Hurricanes**

→

Affected Mission Elements
- **Flood Control**
- **Water Supply**
- **Natural Systems**
- **Water Quality**

SFWMD White Paper Conclusions

- History is not sufficient to make predictions
- Current Climate Change Projections for planning:
  - **5 to 20 inches** of sea level rise by 2060; need regional information and coordination with other agencies
  - Increase in temperature up to 7º 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

Adaptation Planning

Review state of the science

Assess climate vulnerability

Identify critical information gaps

Consider & prioritize key issues of concern

Explore potential adaptation strategies

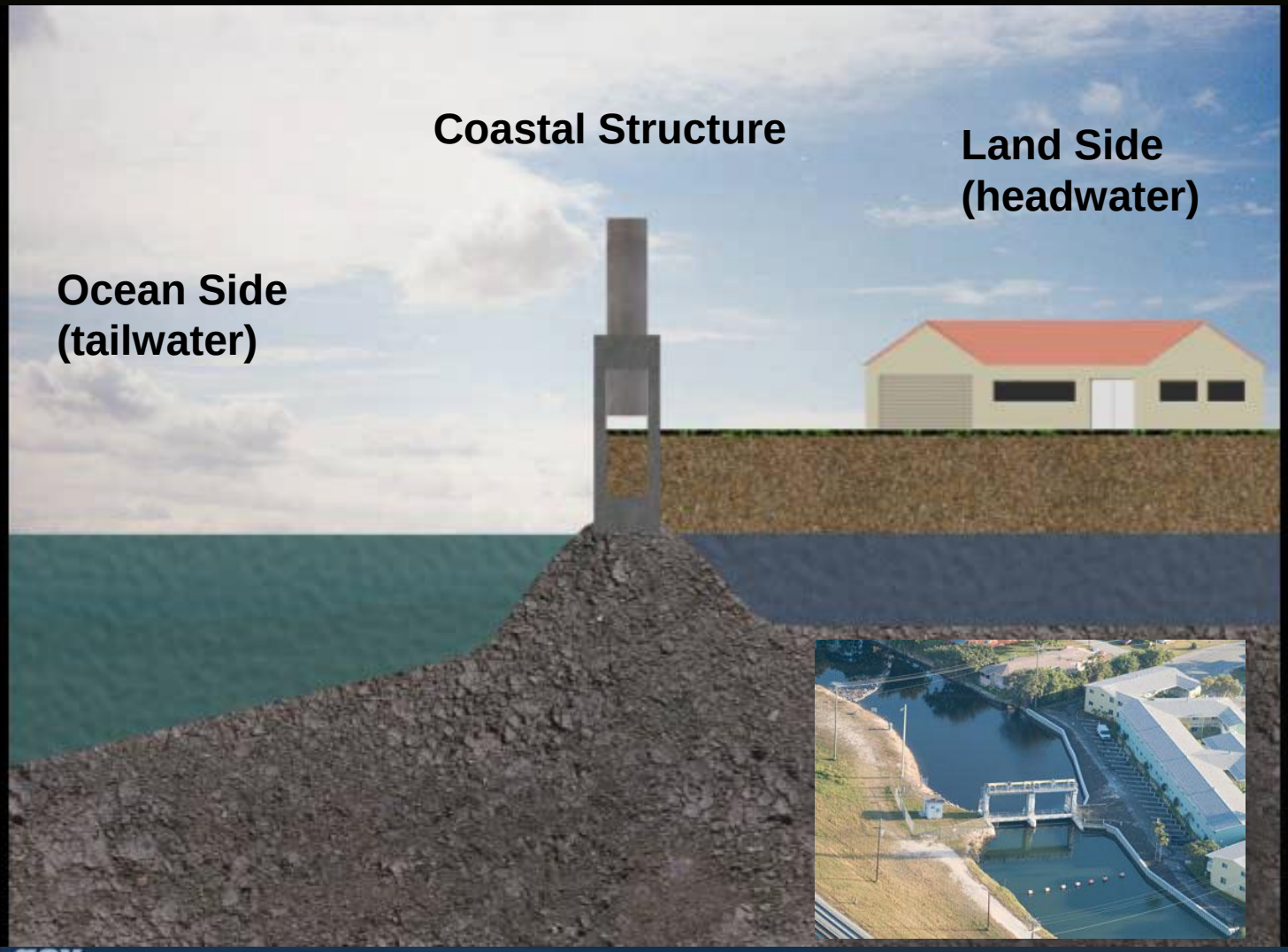
Identify opportunities &
mechanisms to affect change

Recommend action strategies
(short, medium, long-term)

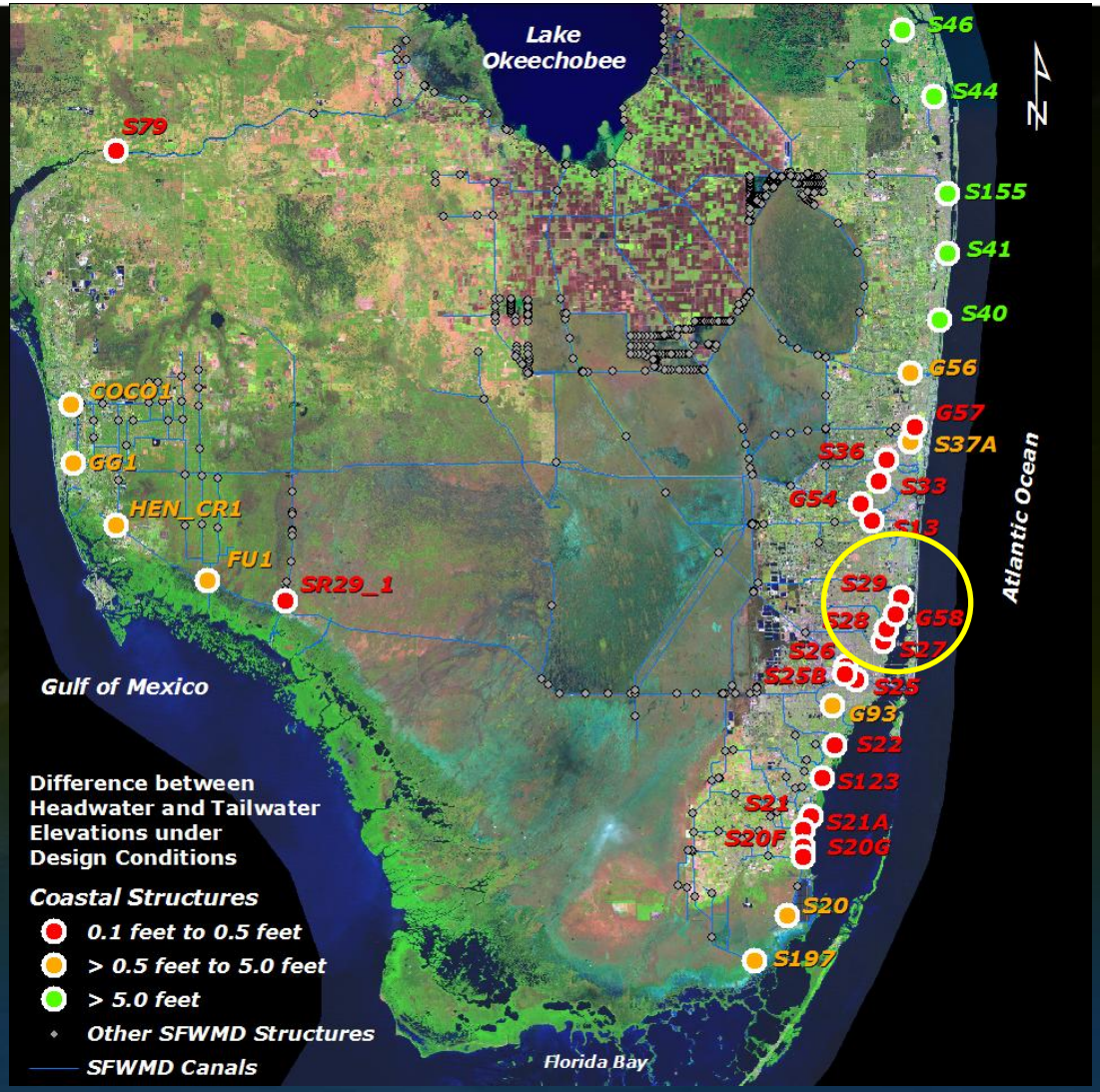
Vulnerability & Adaptation

Climate Stressor	Key Mission Elements Affected	Key Climate Vulnerabilities	Adaptation Strategies
Rising Seas	• Flood Control • Water Supply • Natural Systems • Water Quality	• Reduced flood discharge capacity at coastal structures • Reduced flood capacity in secondary canal system • Saltwater intrusion • Inundation of coastal wetlands, changes in ecology	• Forward pumping • Determine saltwater/ freshwater interface • Update saltwater intrusion monitoring network • Identify utilities at risk • Implement water conservation • Alternatives sources of water Supply • Incorporate sea level rise in planning efforts • Regional coordination

Rising Seas: Flood Control

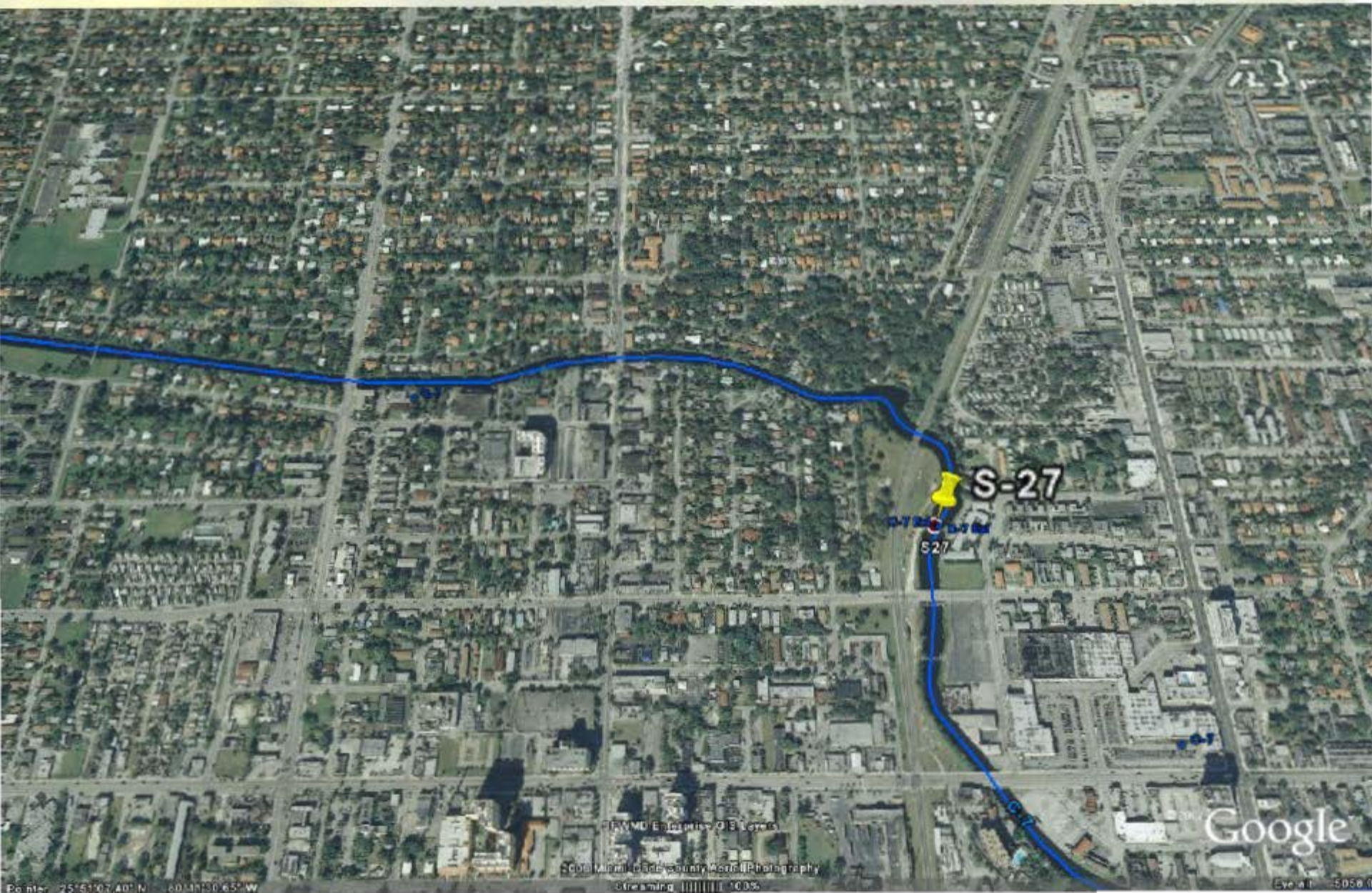


Preliminary Assessment of Vulnerable Structures



- Palm Beach County structures all have > 5.0 feet difference between headwater and tailwater
- Need to evaluate secondary drainage system and locally permitted stormwater systems

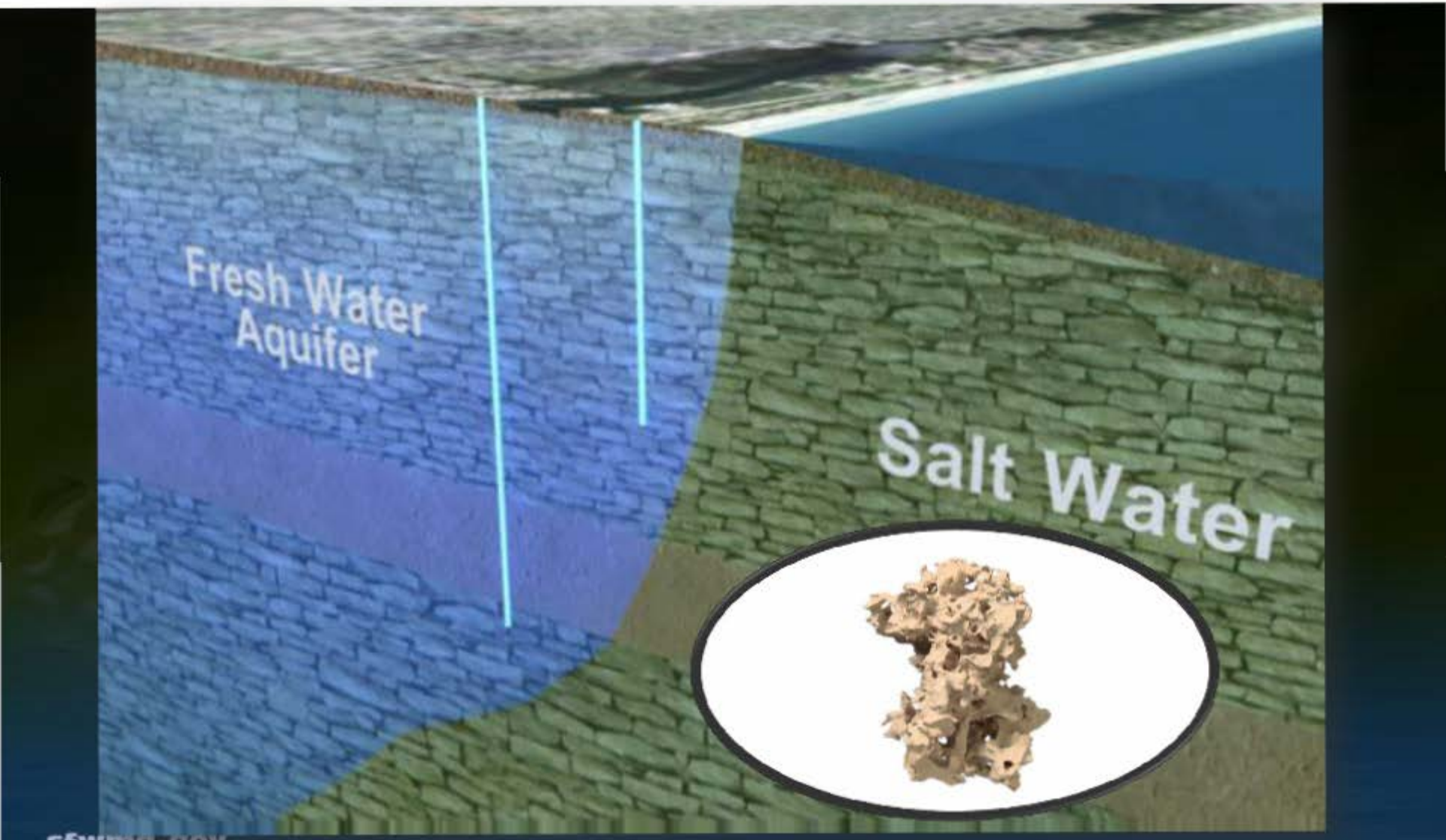
Area Surrounding S-27 Structure



Data and Modeling Needs
(To be jointly developed by Federal/State/Local Agencies)

Climate Change Vulnerability	Task
Flood Control	Datum conversion/operating Rules
	Coastal Digital Elevation Models (DEMs)
	Linking canal routing to groundwater models
	Integrated Groundwater/surface water rainfall/runoff module
	Model certification/Peer review
Saltwater Intrusion	Development of density dependent flow model codes
	Model certification/Peer review
	Acquire storm surge results
	Convert county groundwater models
	Apply Sea Level Rise scenarios
Everglades Restoration	Updating 2x2/RSM for NAVD88
	Climate scenario development
	Evaluation of system-wide performance of CERP

Rising Seas - Water Supply Impacts
Saltwater Intrusion



Water Supply

- Look at opportunities and technologies to reduce additional saltwater intrusion (using reuse as a hydraulic barrier)
- Implement water conservation measures
- Develop water supply options

Planning for Climate Change

1. Some Key Points:

Despite some debate, the scientific concern is:

- Climate is warming
- Sea Levels will rise
- Precipitation patterns will change– more intense rain and longer droughts.

Planning for Climate Change

2. What should we do now?

a. Realize that stationarity is dead.

b. Plan for change.

c. Adopt for adaptive management strategies whenever possible.

Planning for Climate Change

3. Near-Term Issues for Palm Beach County (the next decade or so).

- Increasing salt water intrusion because of sea level rise
- Potential for increased inland flooding for 2 reasons:
  - Sea level and ground water elevation will reduce drainage
  - Increased heavy rainfall will compound flooding, especially in inland low-lying areas.
- For long-term structures, build increased water management factors into planning and implementation.

Planning for Climate Change

4. Planning for the Longer Term

- Develop strategies for coastal development- which allow for sea level rise (e.g., Netherlands, Louisiana) policy of incremental adaptation.
- Develop local water retention and removal strategies at household level and up.
- Identify flood-prone areas more precisely and adapt building design to flood risk.
- Consider the potential impact of climate change in every current and long-term activity

Planning for Climate Change

5. Note: Four-County Coalition on Climate Change and Planned Annual Meeting

Planning for Climate Change

6. Also Florida Atlantic University's Climate Initiative:

Cross-University
Broad-based

Planning for Climate Change

7. Goals and Outreach

1. Synthesize current information on climate change impacts to natural systems and human-dominated built environments

2. Organize forums for communicating synthesized data

3. Develop collaborative relationships amongst governmental, non-governmental, business and academic organizations to set climate change research priorities based on consensus

4. Develop natural system and human-dominated environment adaptation solutions that can be applied at the local, regional and international level.

Planning for Climate Change

8. Goals Research Technology

1. Apply FAU strengths in engineering, geosciences and biological technology, as well as social and economic research strengths, to assess climate change impacts, including sea level rise and ocean acidification

2. Provide new science, engineering and planning solutions to assist in adaptation to climate change with economic considerations

3. Apply urban planning and social sciences to assess human impacts and responses to a changing climate and to guide policymakers to ensure the future sustainability of South Florida.