

UF Water Institute
Florida Water & Climate Alliance Webinar
January 18, 2022



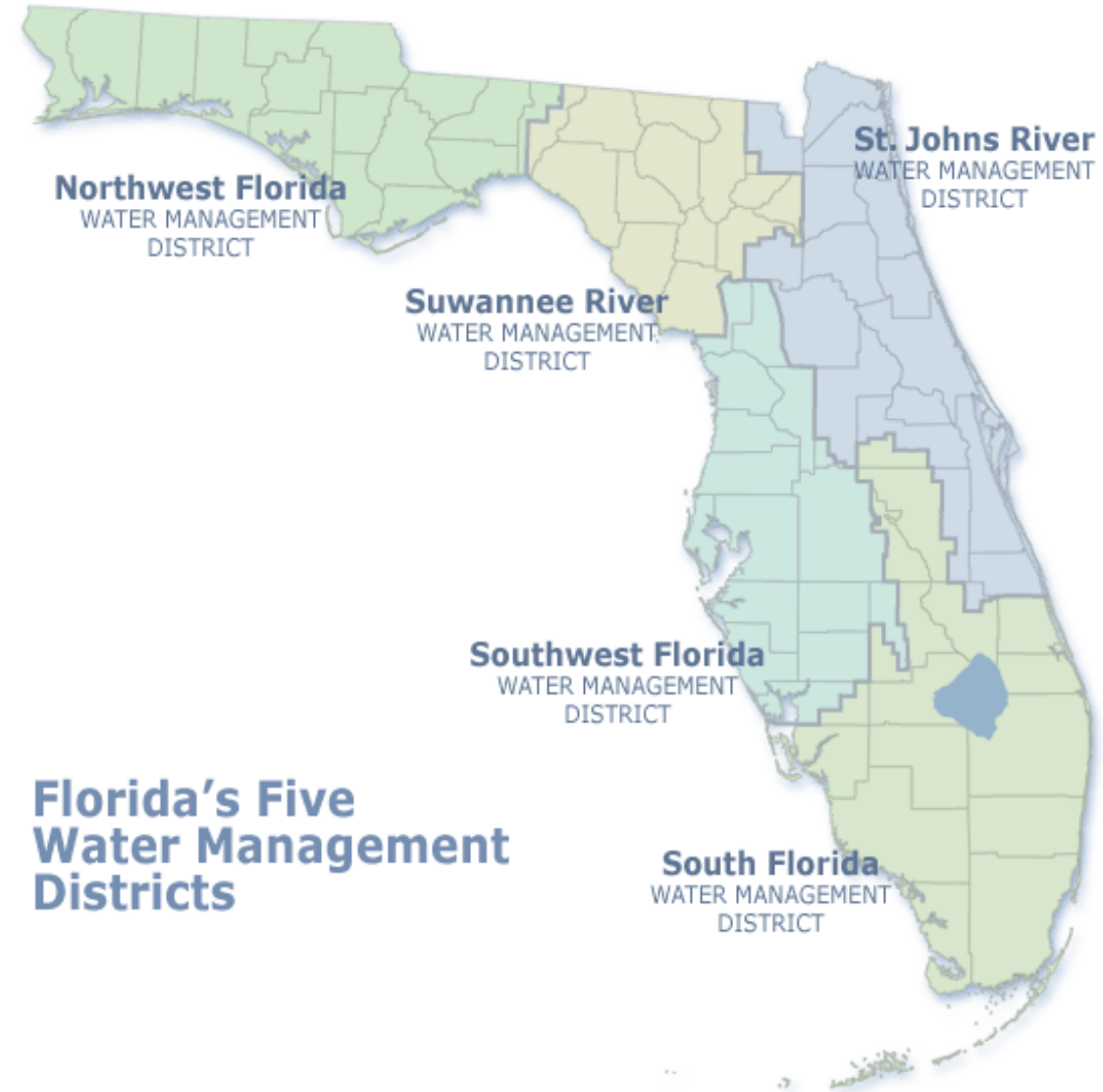
South Florida's Approach to Monitoring and Reducing Saltwater Intrusion Potential

Mark Elsner, P.E., Water Supply Bureau Chief

Who We Are

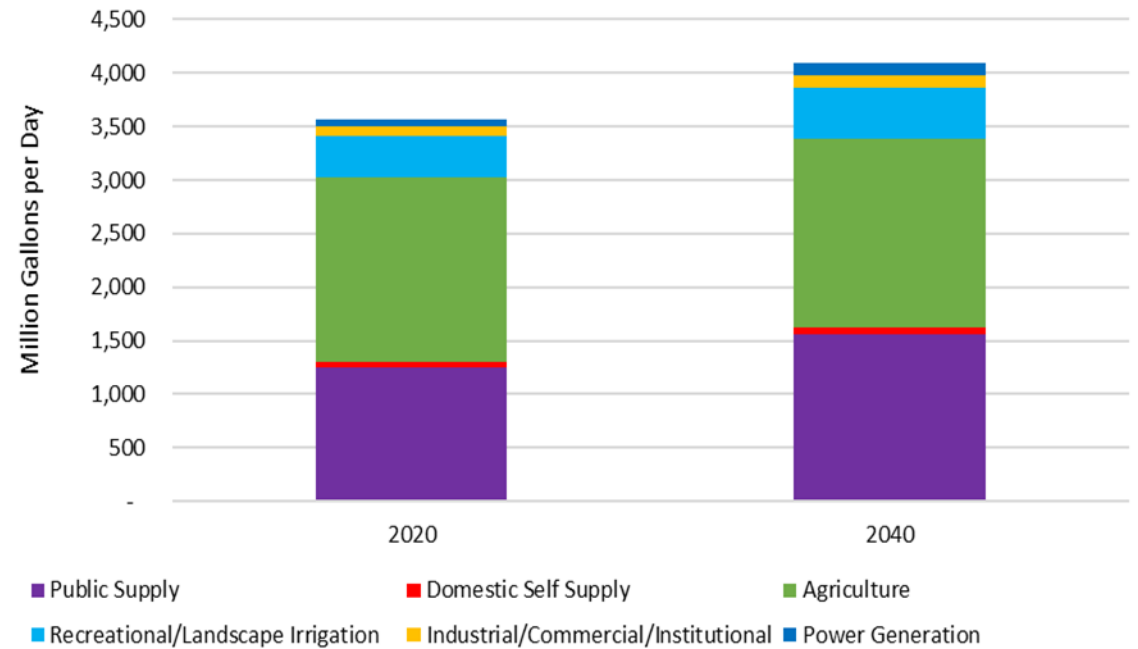
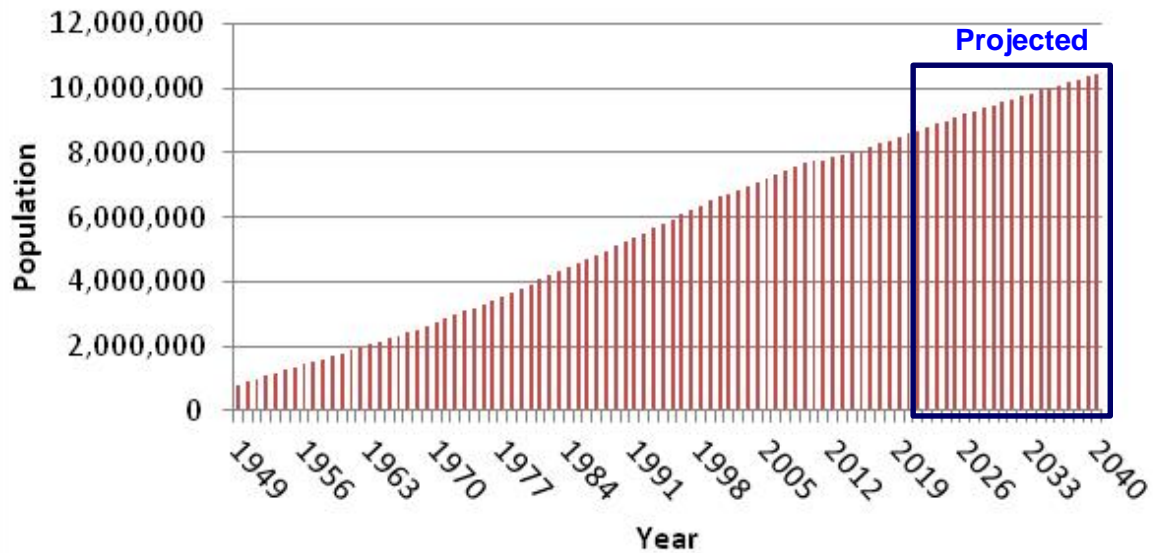
- Created in 1949, oldest and largest of the state's five water management districts
- 16 counties from Orlando to the Florida Keys
- Serve a population of 9 million residents

MISSION: to safeguard and restore South Florida's water resources and ecosystems, protect our communities from flooding, and meet the region's water needs while connecting with the public and stakeholders.



Districtwide Population Growth and Demands

SFWMD Population

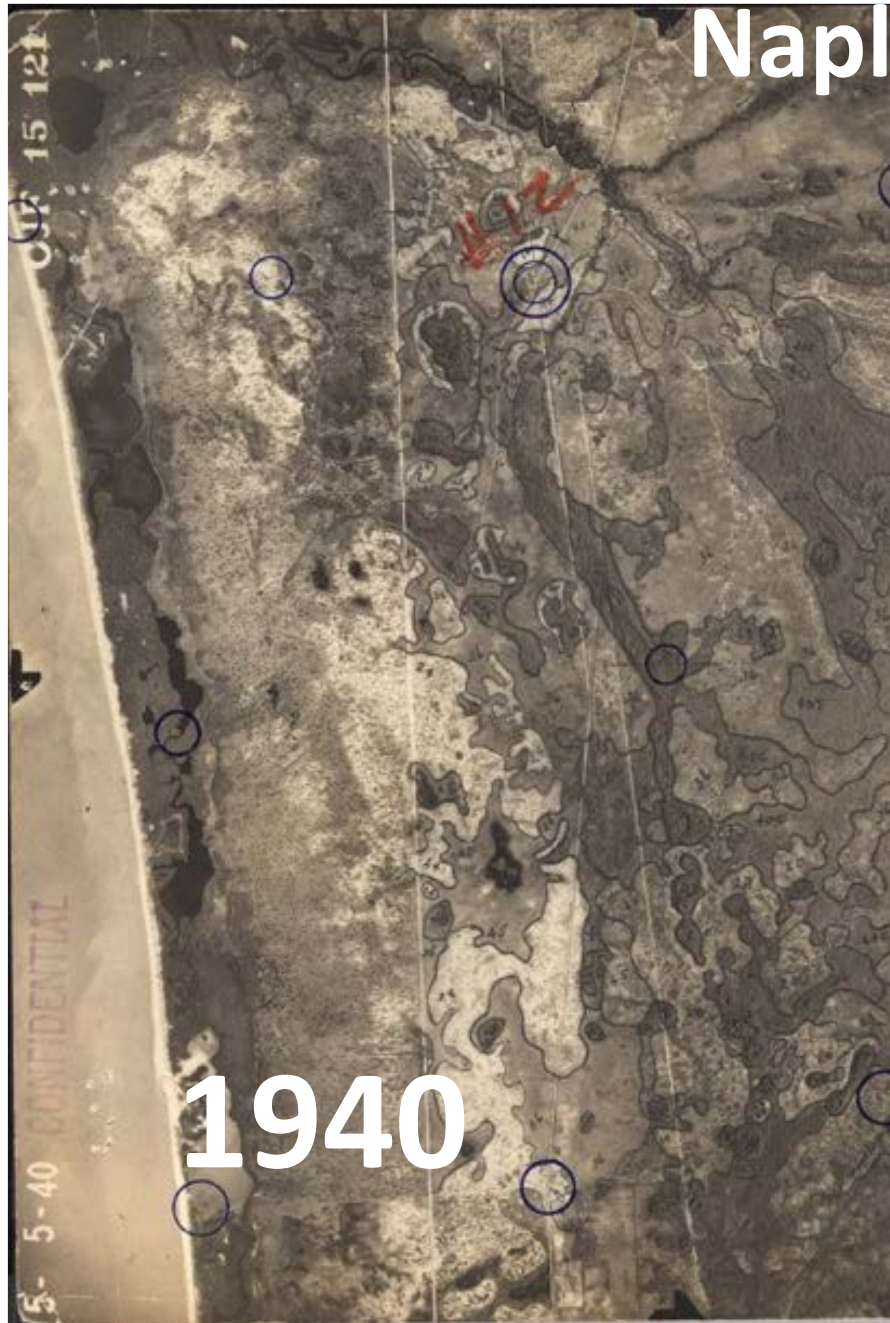


Miami

1940

2016

Naples



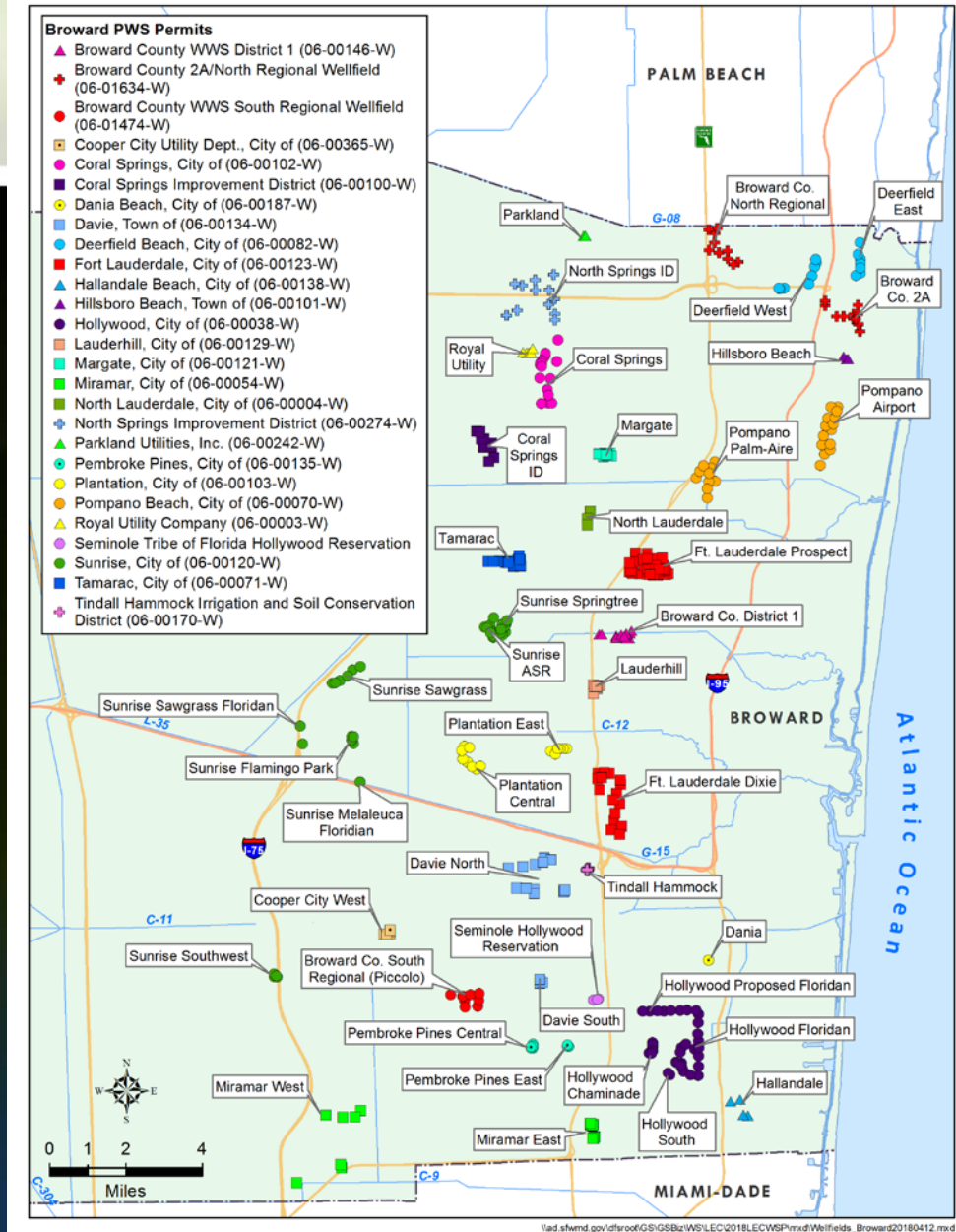
1940



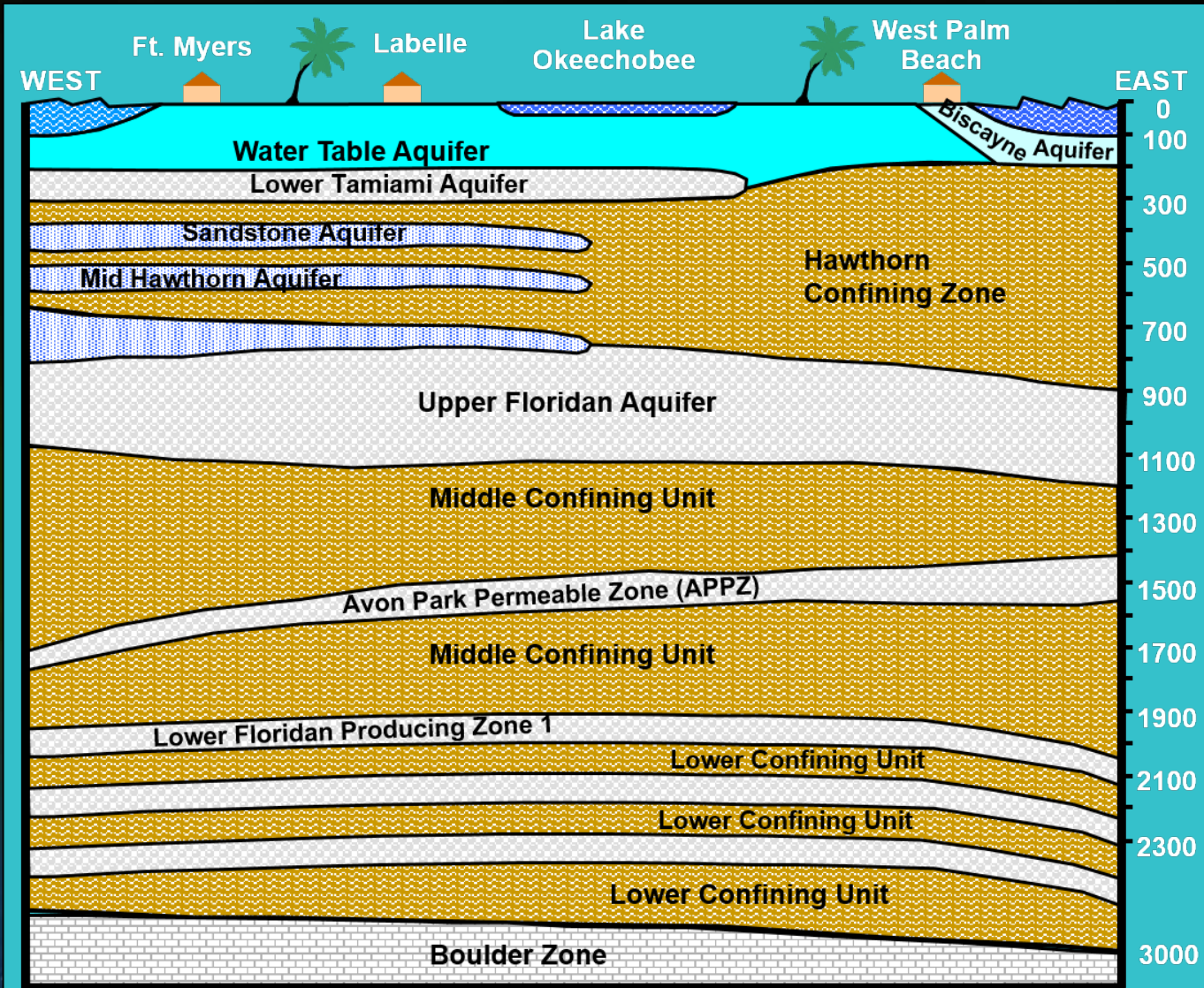
2015

Water Supply Relevance

- Wellfields are a major water supply sources – protect investment
- Once saltwater enters wells, very difficult – if not impossible, to reverse
- Highly expensive to relocate wellfields and associated infrastructure (pipelines, treatment plants and processes, etc.)
- Other sources of water more expensive to treat (e.g., Floridan aquifer – reverse osmosis)



South Florida Groundwater Systems



- Fresh groundwater
 - Surficial/Biscayne aquifer
 - Lower Tamiami aquifer
 - Sandstone aquifer
 - Mid-Hawthorn aquifer
- Saline groundwater (chloride >250 mg/L)
 - Upper Floridan aquifer
 - Avon Park Permeable Zone
- Seawater (chloride >19,000 mg/L)
 - Boulder Zone

Integrated Approach

- Water Use Permitting
- Wellfield design – Coastal & Inland Wellfields
- Regional water management system
- Alternative water supply development
- Saltwater interface mapping
- Groundwater modeling
- Water supply planning



Water Use Permitting

Applicant's Handbook for Water Use Permit Applications

WITHIN THE SOUTH FLORIDA WATER
MANAGEMENT DISTRICT

EFFECTIVE MARCH 2021



sfwmd.gov

In Florida, water is a public resource

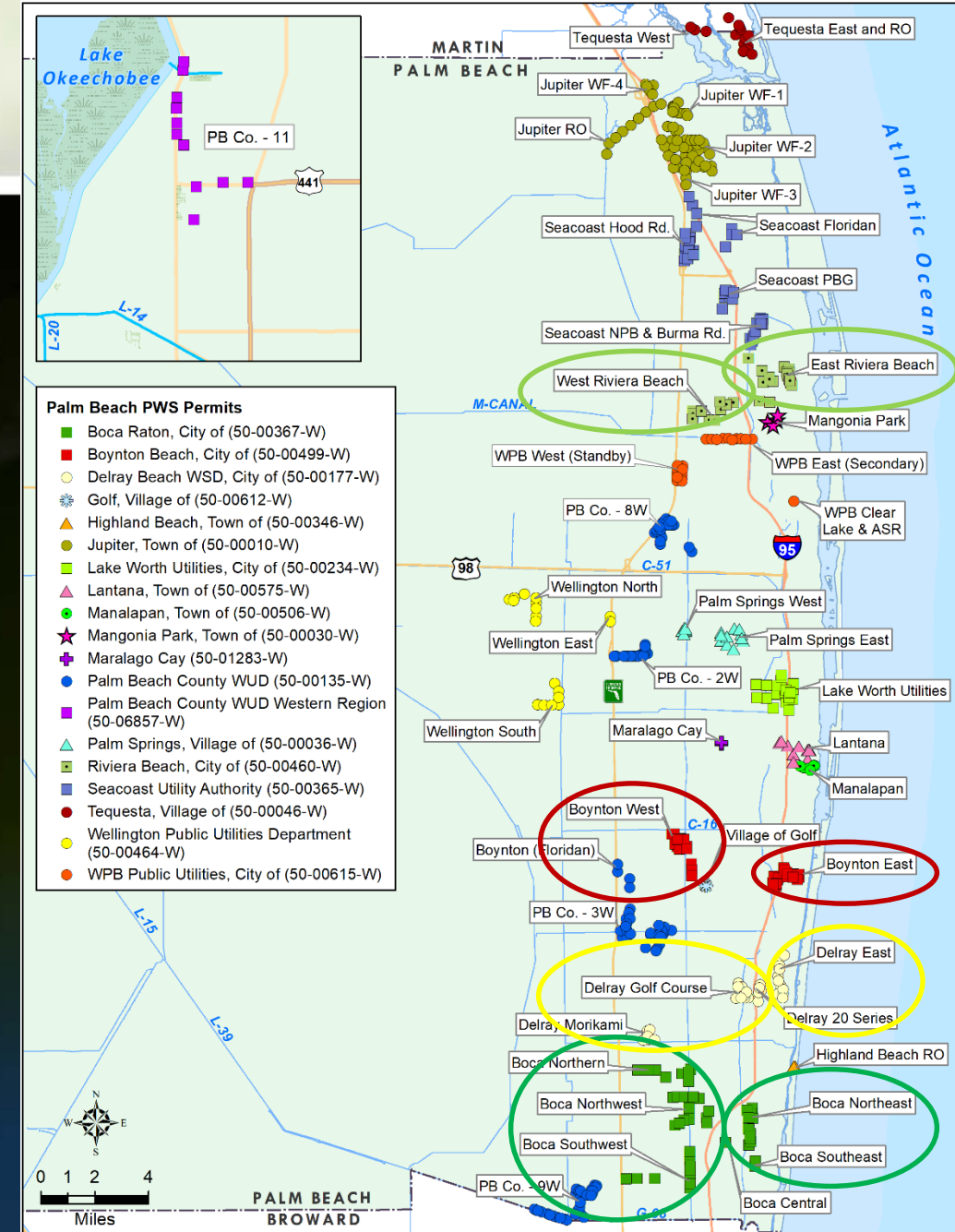
- Statewide permit system for rights to use water resources
- To obtain a permit, proposed water use must be:
 - reasonable-beneficial
 - not interfere with presently existing legal uses of water
 - consistent with the public interest

Permitting process includes:

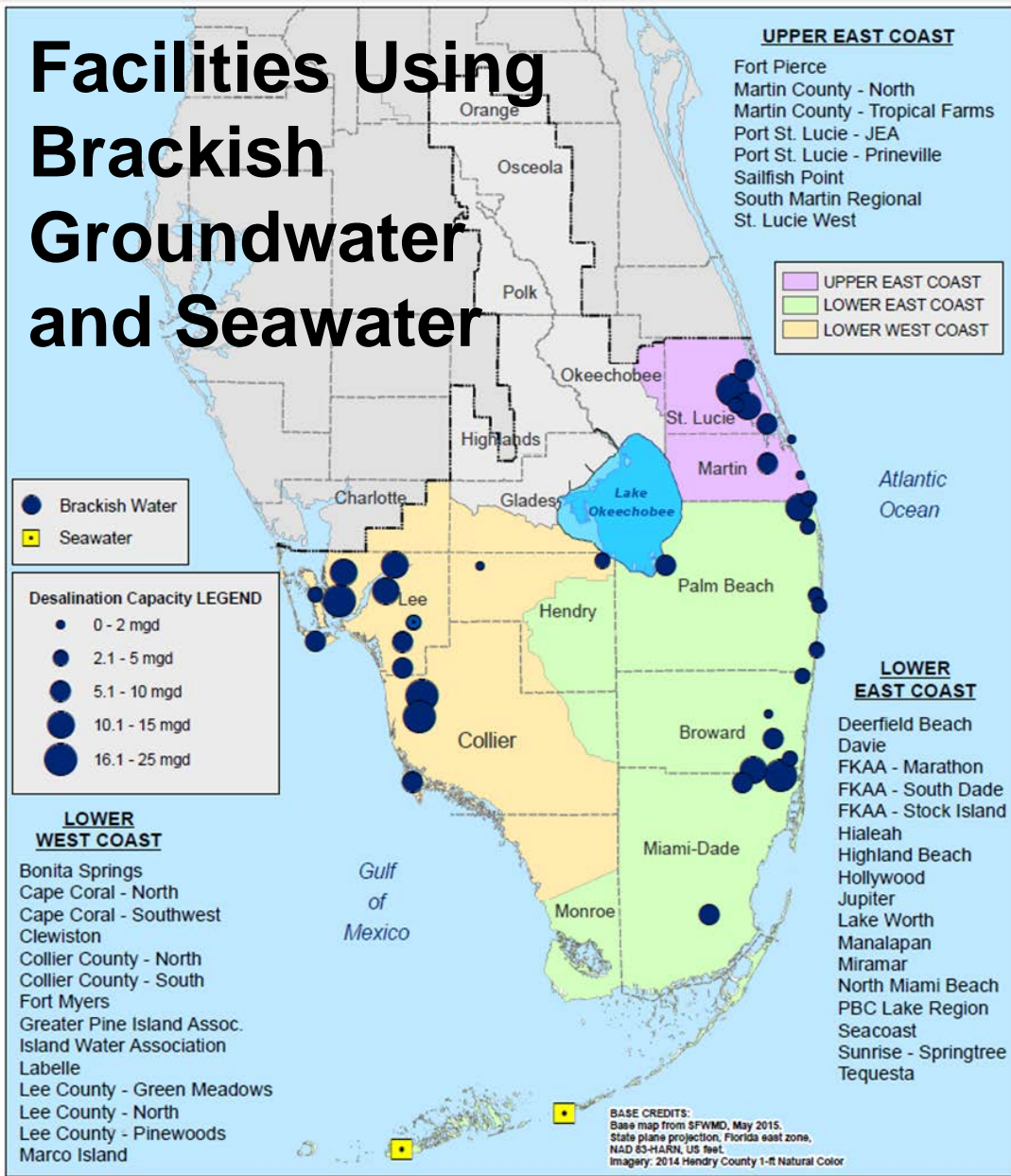
- Analytical modeling demonstrating water use not harmful to the water resources of the area
 - Will not cause harmful saltwater intrusion
- Based on at least a 1-in-10 year drought
- Wellfield operating plans
- A monitoring plan to assess the effects of the water use
- Saline water monitoring plan

Wellfield Design

- Several coastal utilities have inland and coastal wellfields
- Ability to shift pumpage as needed based on conditions
- Wellfield operational plans
- Several utilities have also developed brackish ground water - provides flexibility especially during dry periods



Facilities Using Brackish Groundwater and Seawater



Alternative Water Supplies

➤ Brackish Groundwater and Seawater

- Number of Facilities 40
- Total Capacity 293 mgd



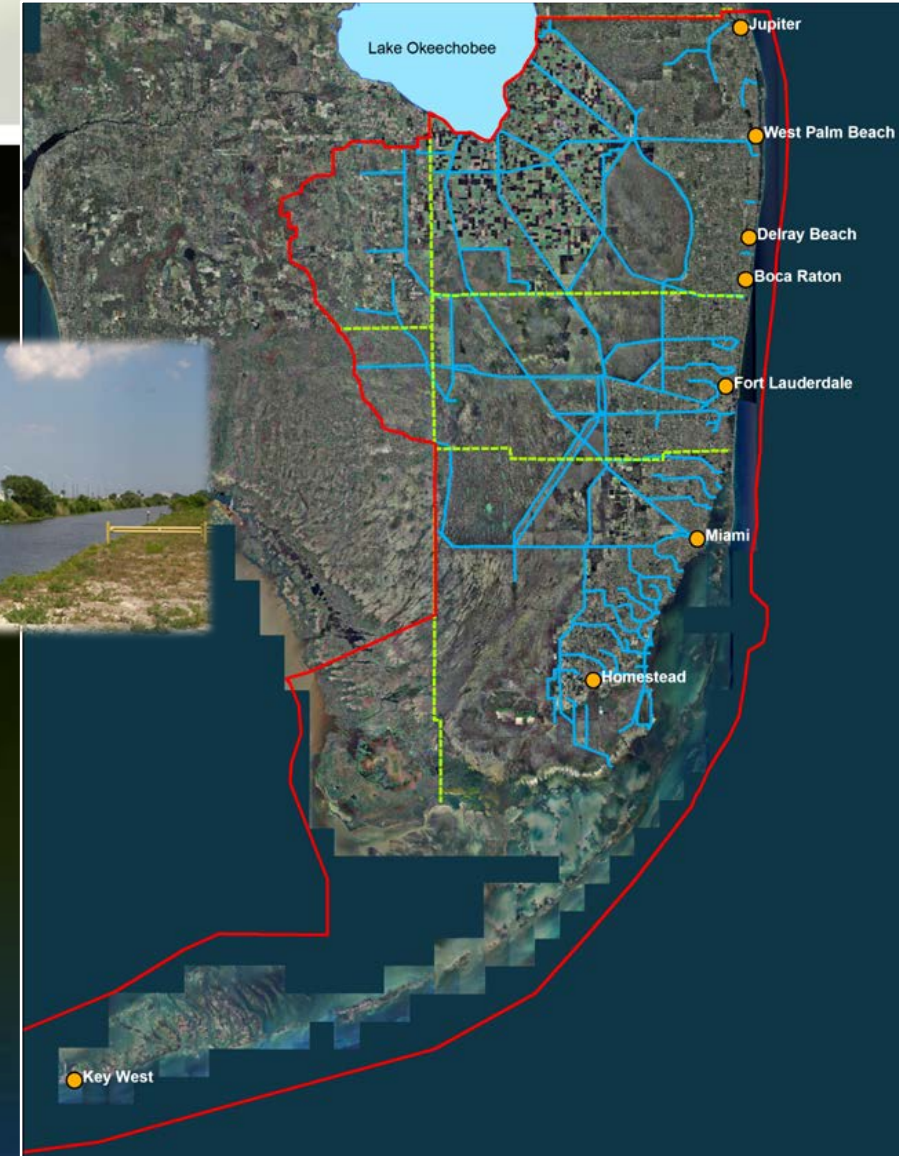
➤ Wastewater Reuse

- 300 mgd being reused
 - Primarily via green space irrigation
- 600 mgd being disposed
 - Deep well injection
 - Ocean discharge



Regional Water Management System

- Over 2,100 miles of canals
- Over 915 water control structures
- Over 620 project culverts
- 89 pump stations
- Regional network moves more than 20 million acre-feet during an average year



Saltwater Interface Mapping

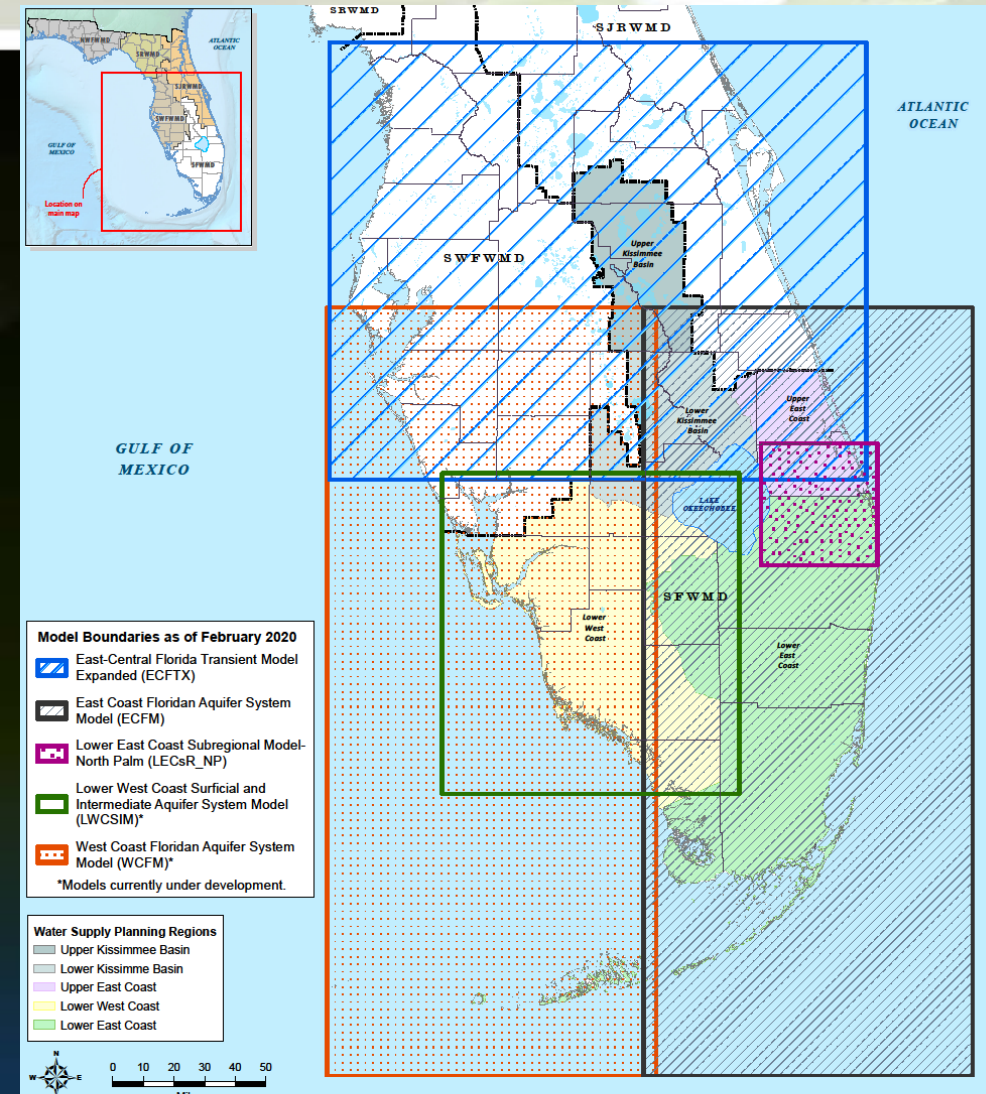
- Saltwater interface mapping every 5 years
 - latest in 2019
- Maps show the saltwater interface line designated by 250 mg/L chloride concentration
- Effort informs water use permitting, water supply planning and water users of the position of saltwater interface and any movement

Broward County Saltwater
Interface Map - 2009, 2014 & 2019



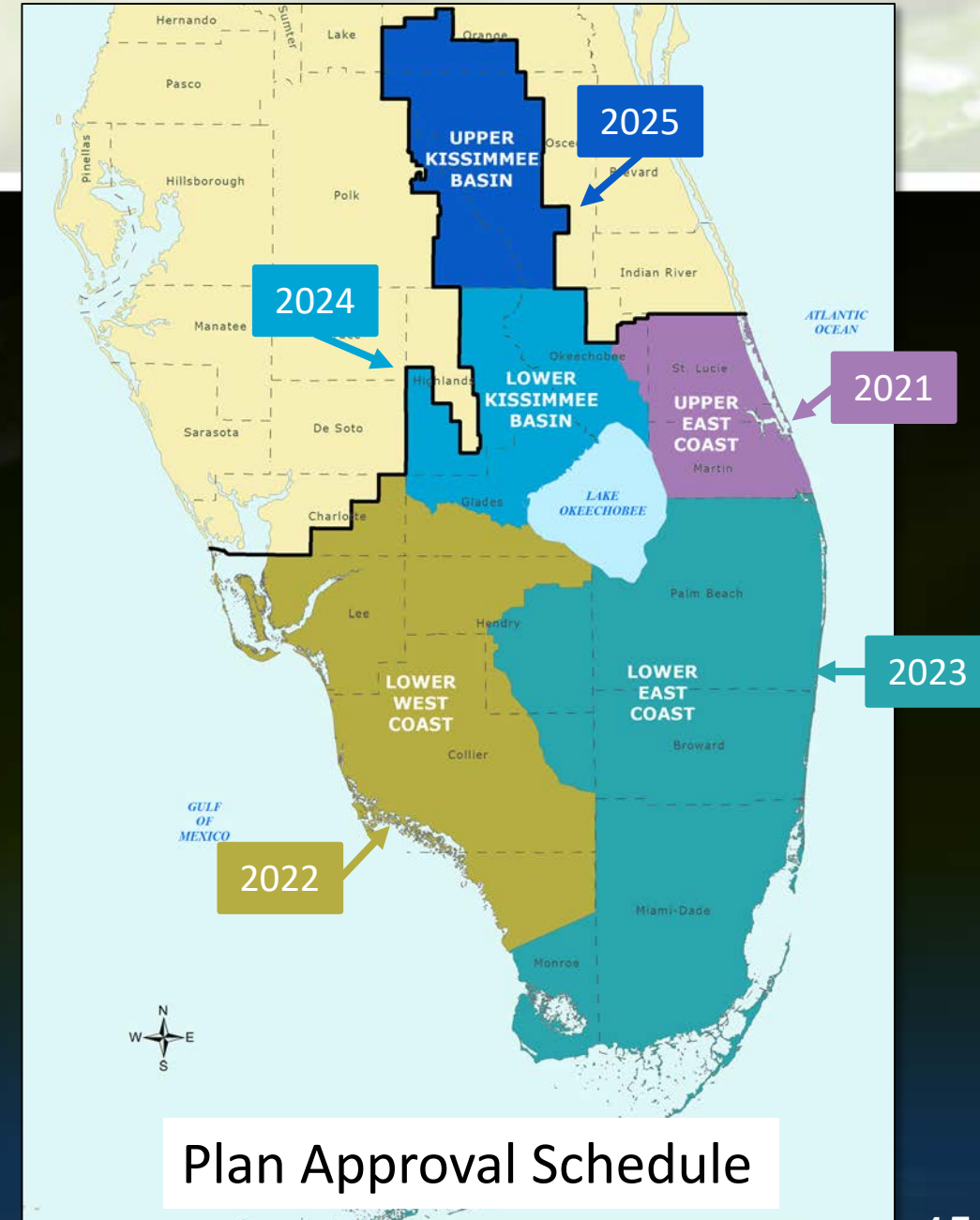
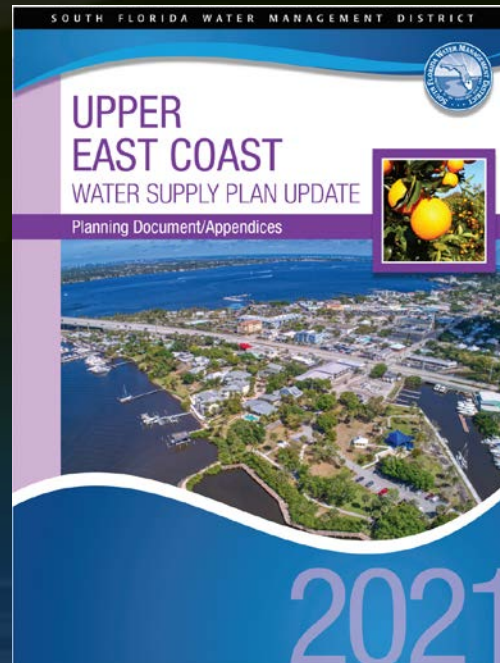
SFWMD Regional Groundwater Modeling

- Regional evaluation of groundwater resources
- Used for determining regional trends
- All models simulates ground water levels and flow and direction
- Floridan Aquifer System models also evaluate water quality changes
- Surficial models being developed/updated with the ability to evaluate water quality and sea level rise



Water Supply Planning

- Current and future look at water needs
- Strategies and sources to meet future water demands and the needs of the environment
- Based on at least a 20-year future planning horizon
- Updated every 5 years



Understanding Potential Impacts of Sea Level Rise on Fresh Groundwater

East Coast Surficial Model (ECSM) under development

- SEAWAT Model Code
- Simulate and evaluate the effects of sea-level rise and saltwater intrusion on the groundwater system

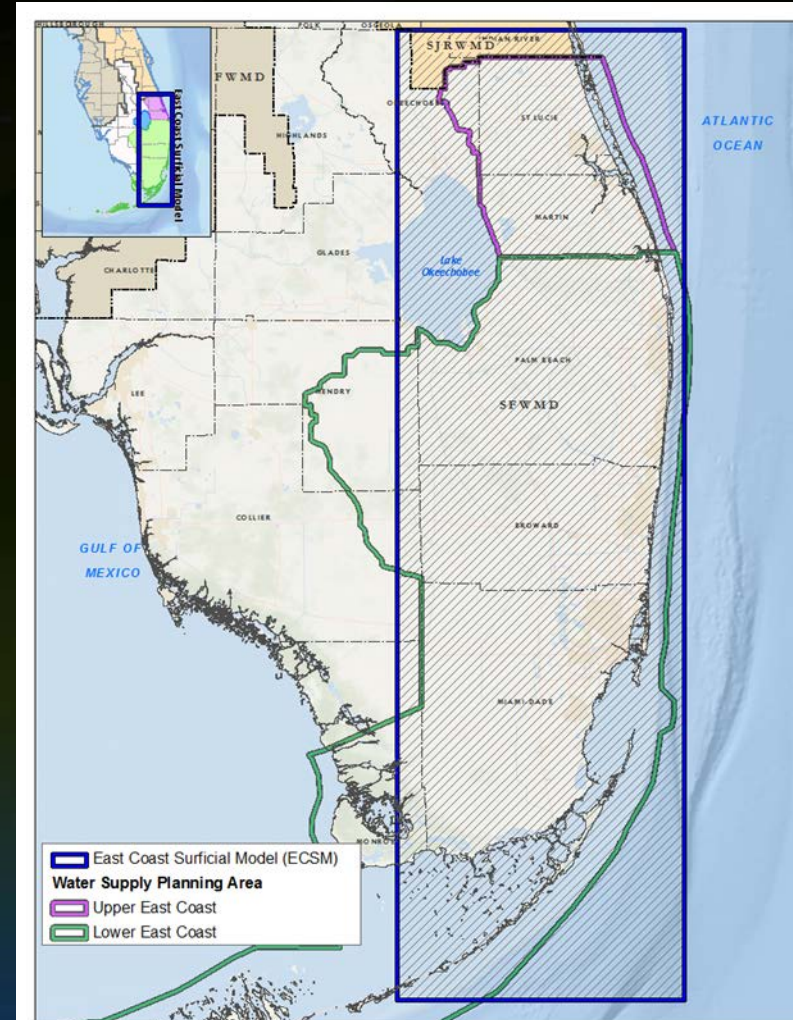
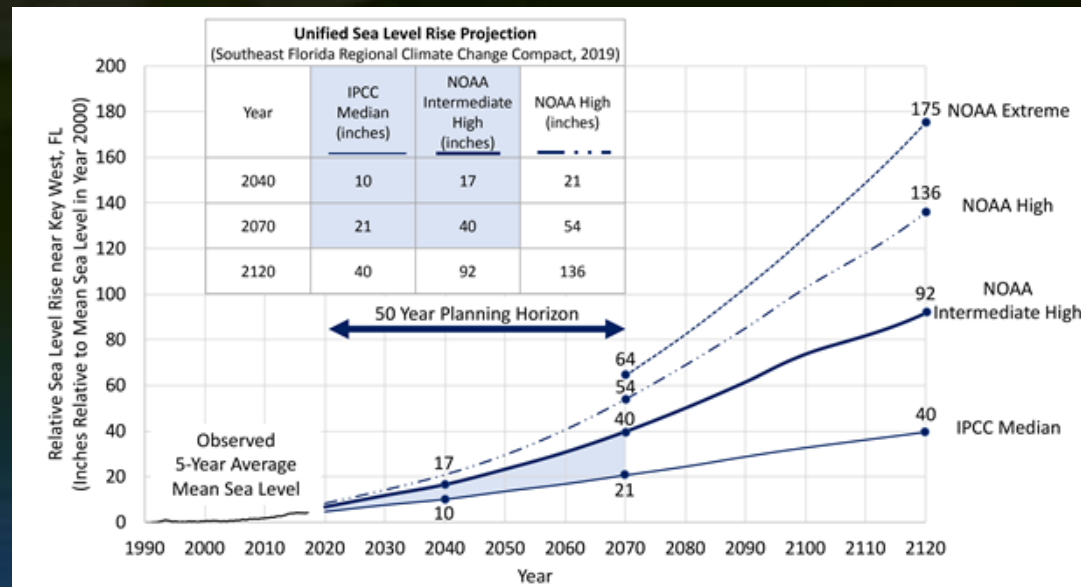


Figure: Unified Sea Level Rise Projection for Southeast Florida 2019
Reference: [Unified Sea Level Rise Projection Southeast Florida](#) (SFRCCC)

Thank You Questions?

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