Agenda

WATER RESOURCES ADVISORY COMMISSION
Upper East Coast Water Supply Plan Update
Kick-off Workshop

June 25, 2015, 9:00 AM
Stuart City Hall, Commission Chambers
121 SW Flagler Avenue
Stuart, FL 34994

1. Welcome and Introductions – Mark Elsner, Administrator, Water Supply Development Section, SFWMD

2. Overview of Plan Update – Mark Elsner

3. Demand Estimates and Projections - Cynthia Gefvert, Section Leader, Water Supply Development Section, SFWMD

4. Update on CERP Projects in UEC Planning Area – Beth Kacvinsky, Lead Project Manager, Restoration Planning and Coordination Unit, SFWMD

5. Minimum Flows and Levels and Water Reservations Update – Toni Edwards, Senior Scientist, Coastal Simulation Unit, SFWMD

6. Dispersed Water Management Program Update – Boyd Gunsalus, Lead Environmental Scientist, Dispersed Water Management Unit, SFWMD

7. Overview of Upper East Coast Floridan Modeling – John Mulliken, FAS Model Coordinator, Water Supply Development Section, SFWMD

8. 2016 Plan Update Issues Discussion

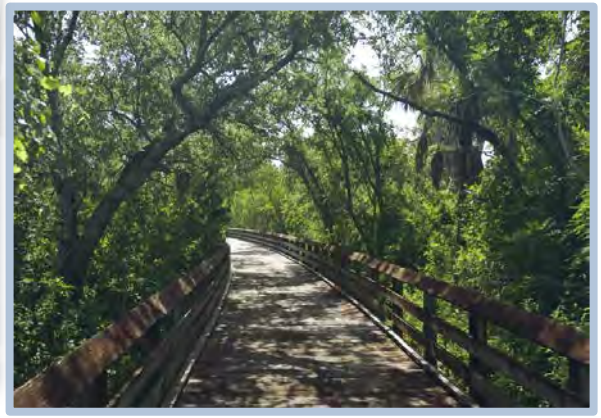
9. Next Steps – Linda Hoppes, Lead Planner, Water Supply Development Section, SFWMD

10. Adjourn

Overview of Upper East Coast Water Supply Plan Update

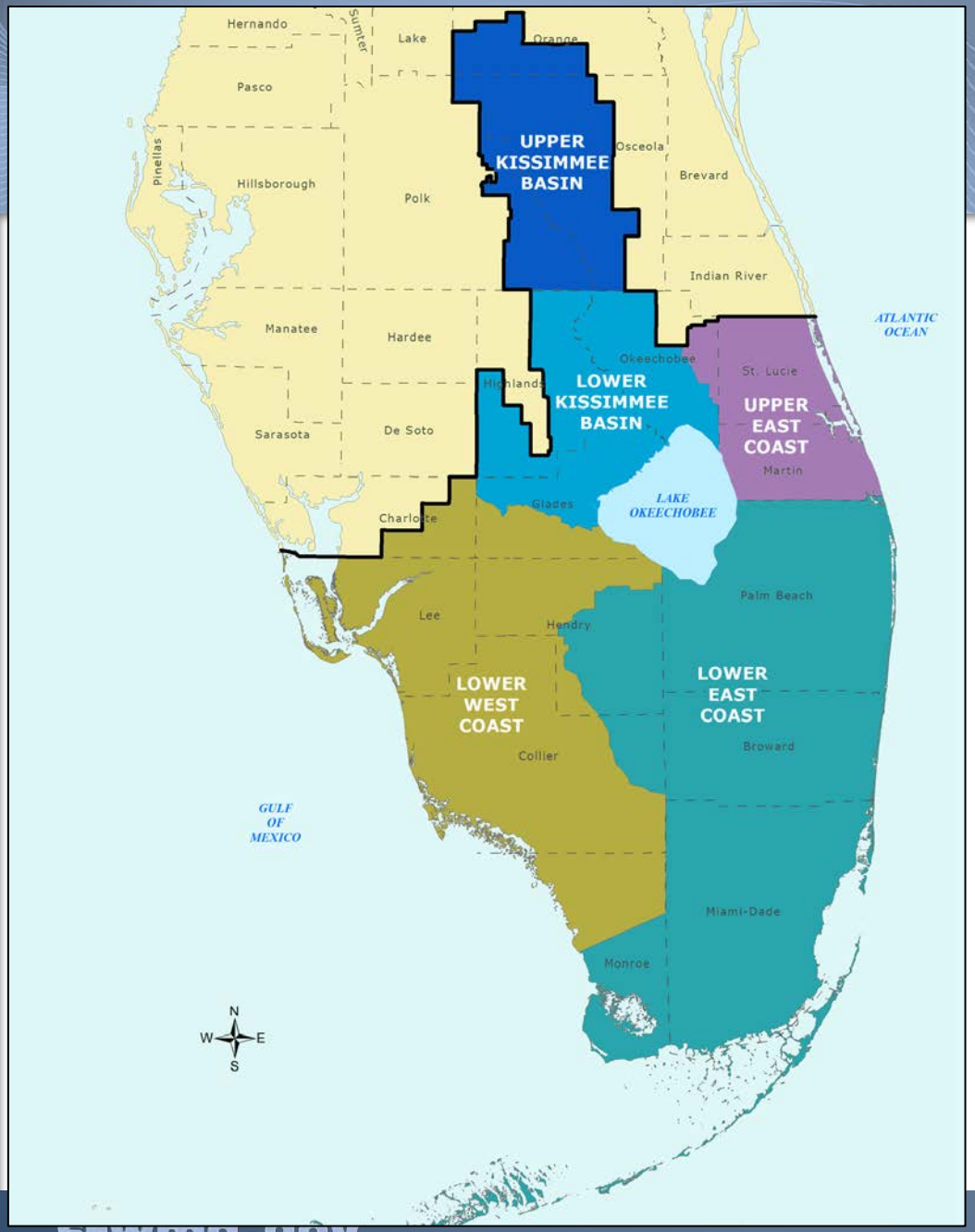







Mark Elsner, PE
Administrator
Water Supply Development Section, SFWMD
Upper East Coast Water Supply Plan Update Workshop
Stuart, FL

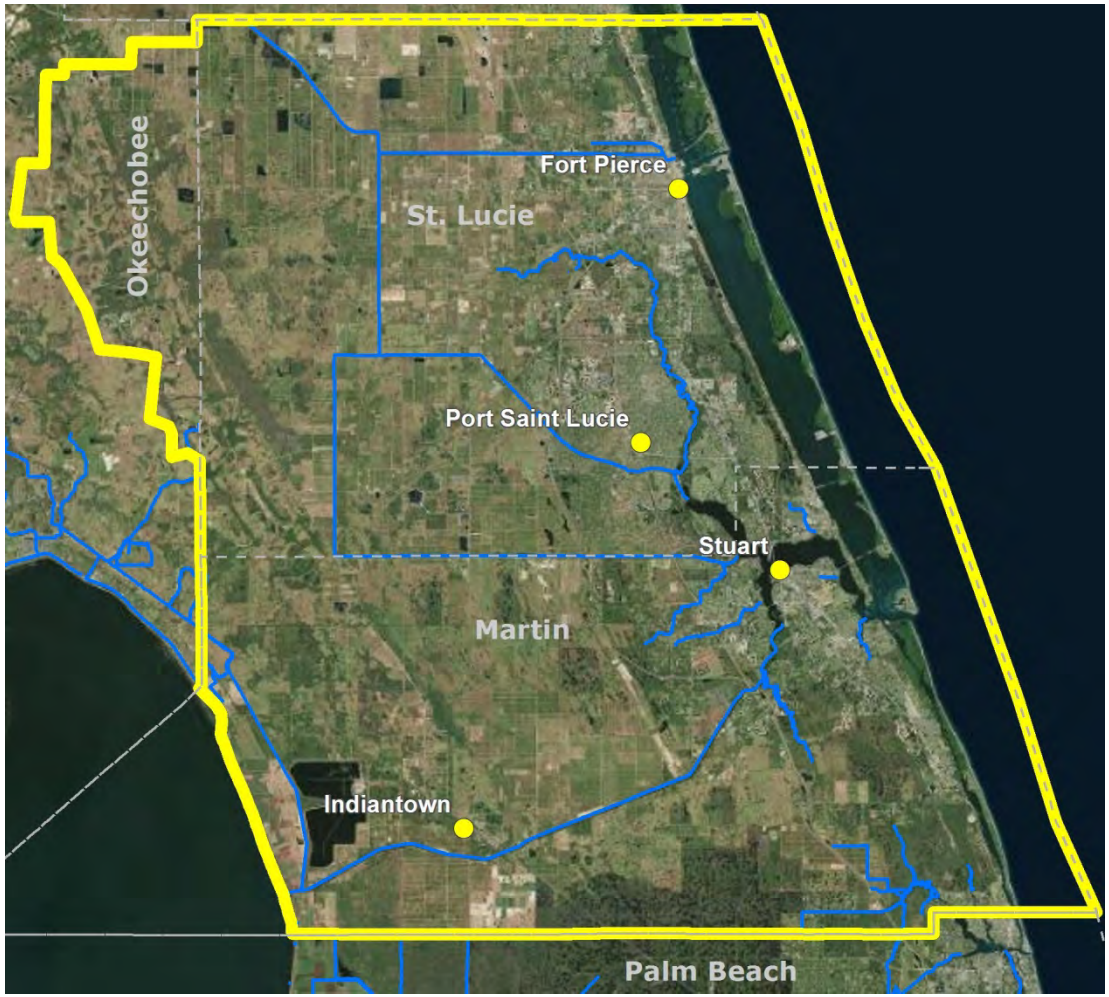
June 25, 2015



Regional Water Supply Plan Requirements

- **20-year planning period**
- **Demand estimates and projections**
- **Resource analyses/issue identification**
- **Evaluation of water source options**
- **Water Resource Development**
  - Responsibility of Water Management
- **Water Supply Development**
  - Responsibility of Water Utilities/Users
- **Minimum Flows and Levels (MFLs)**
  - Prevention or Recovery Strategies

Upper East Coast (UEC) Planning Area



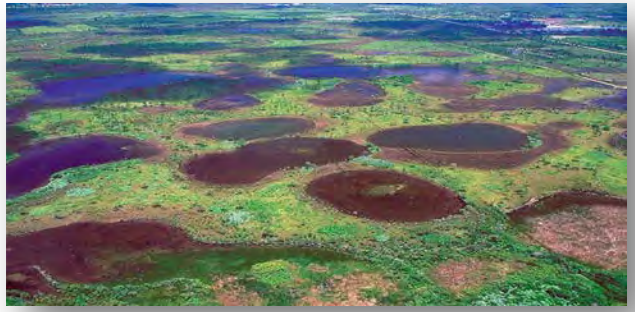
- **The geographic area Includes:**
  - *St. Lucie County*
  - *Martin County*
  - *NE Okeechobee County*
- **7 municipalities**
- **17 public water supply utilities**
- **Major agricultural industry**
- **Significant environmental features**

Importance of Public Involvement

- **Active participation to ensure plan reflects needs of planning area**
  - *Agricultural Interests*
  - *Public Water Suppliers*
  - *Environmental Community*
  - *County Commission/City Council*
  - *County/City Planning Staff*
  - *Adjacent Water Management District*
- **Opportunities for public participation**
  - *WRAC & WRAC Special Issues Workshops*
  - *Governing Board meetings*
  - *One-on-one meetings*
  - *Others*

2011 UECWSP – Water Supply Issues

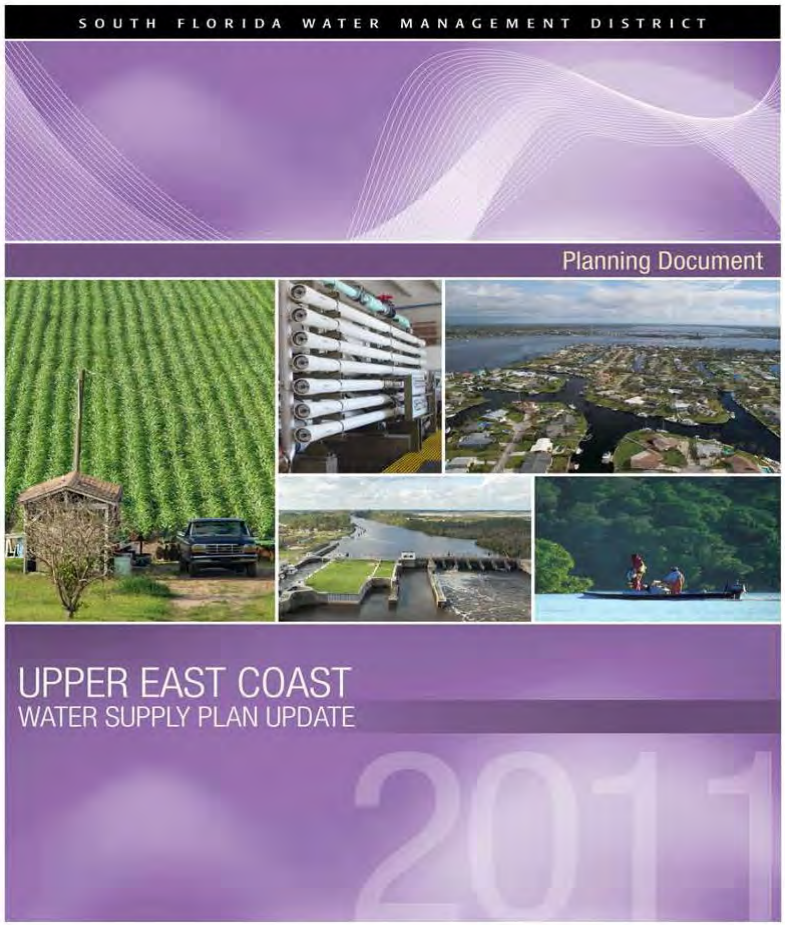
- Increases in withdrawals from surficial aquifer limited
  - Wetlands
  - Salt water intrusion
- Surface water availability (storage) limited
- Freshwater discharges affecting health of coastal resources
  - Timing
  - Volume



2011 UECWSP –Water Source Options

- Conservation
- Reclaimed Water
- Surficial Aquifer System
- Aquifer Storage & Recovery
- Reservoirs
- Surface Water
- Floridan Aquifer System
- Seawater

2011 UECWSP – Public Water Supply Overall Conclusion



The needs of the region can continue to be met with appropriate management and diversification of water supply sources during a 1-in-10 year drought condition through 2030.

2011 UECWSP – Public Water Supply

- **Public Water Supply**
  - Continued use of ***surficial aquifer***
  - Freshwater aquifers withdrawals maximized
    - No additional water available in coastal areas
  - Increased use of ***Floridan aquifer***
  - Look for opportunities for increased efficiency through water ***conservation***

2011 UECWSP – Recreation/Landscape Irrigation

- **Landscape Irrigation**
  - Continued use of ***surficial aquifer***
  - Freshwater aquifers withdrawals maximized
    - No additional water available in coastal areas
  - Increased use of ***reclaimed water***, especially in areas where fresh water aquifers are maximized
  - Look for opportunities for increased efficiency through water ***conservation***

2011 UECWSP – Agricultural Irrigation

- **Agricultural Irrigation**
  - Continued use of ***surface water*** as primary source and ***Floridan aquifer*** as supplemental source
  - Increases in ***storage*** via CERP project and other options should enhance surface water availability
  - Look for opportunities for increased efficiency through water ***conservation*** and Best Management Practices (BMPs) Program
  - Stormwater retention/tail water recovery where possible

2011 UECWSP – Natural Resources

- **Natural Resources**
  - Implementation of surface water ***storage*** projects will improve water resource management
    - CERP Indian River Lagoon – South
    - Ten-Mile Creek Reservoir/Stormwater Treatment Area
  - Established ***Minimum Flows and Levels*** to protect resources from significant harm

2011 UECWSP – Reclaimed Water

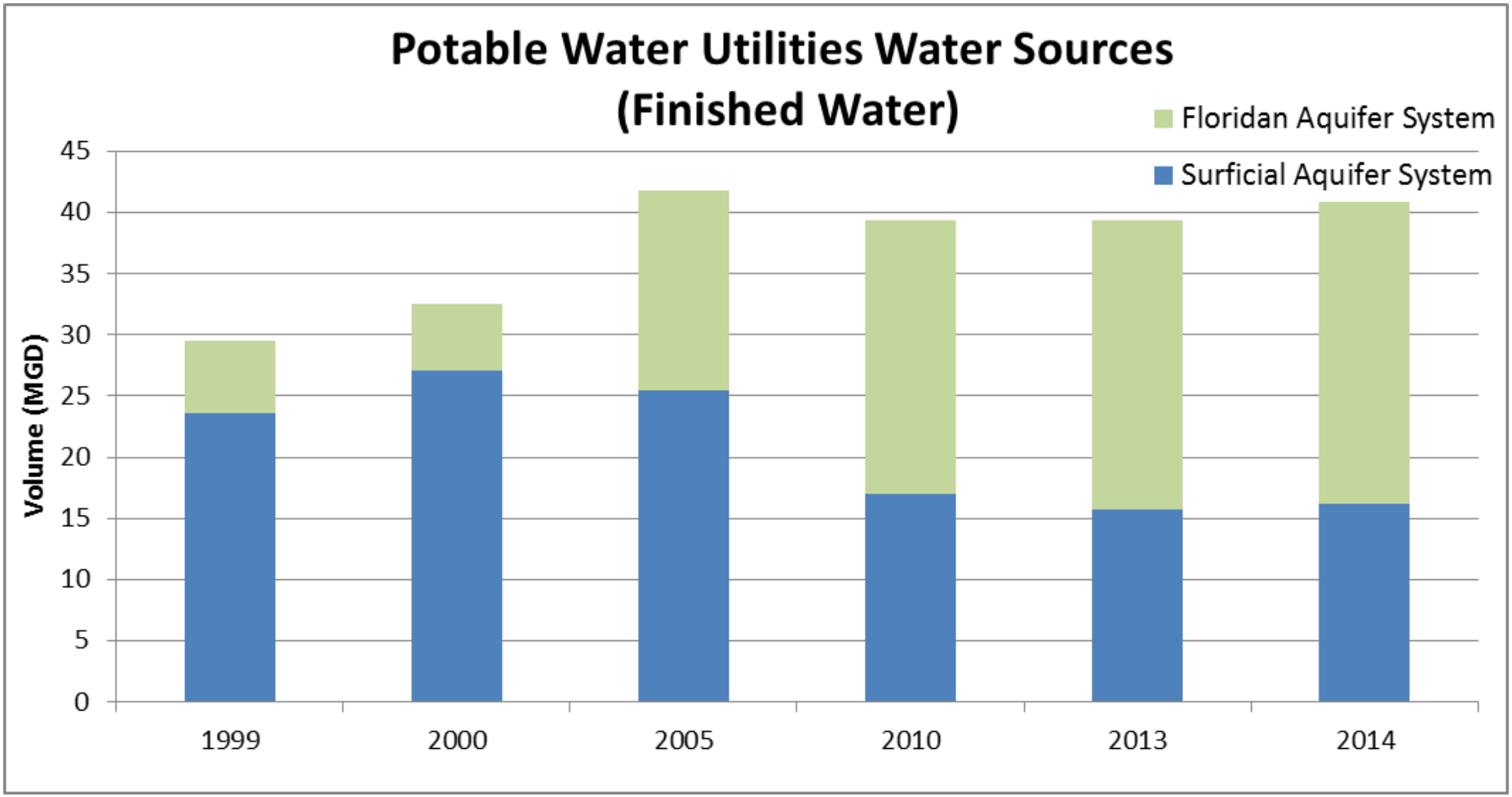
- The use of reclaimed water projected to increase significantly over the next 20 years
  - Port St. Lucie is consolidating and regionalizing its wastewater systems and is planning to incorporate additional storage and supplementation
  - Martin County and the City of Stuart are interconnecting to maximize water reuse
  - Fort Pierce Utilities Authority is planning to construct its Mainland Water Reclamation Facility by 2018
    - Provide more than 11 MGD of cooling water to the Treasure Coast Energy Center
    - Public access irrigation
  - Wastewater flow are projected increase from 23.7 MGD to over 40 MGD by 2030



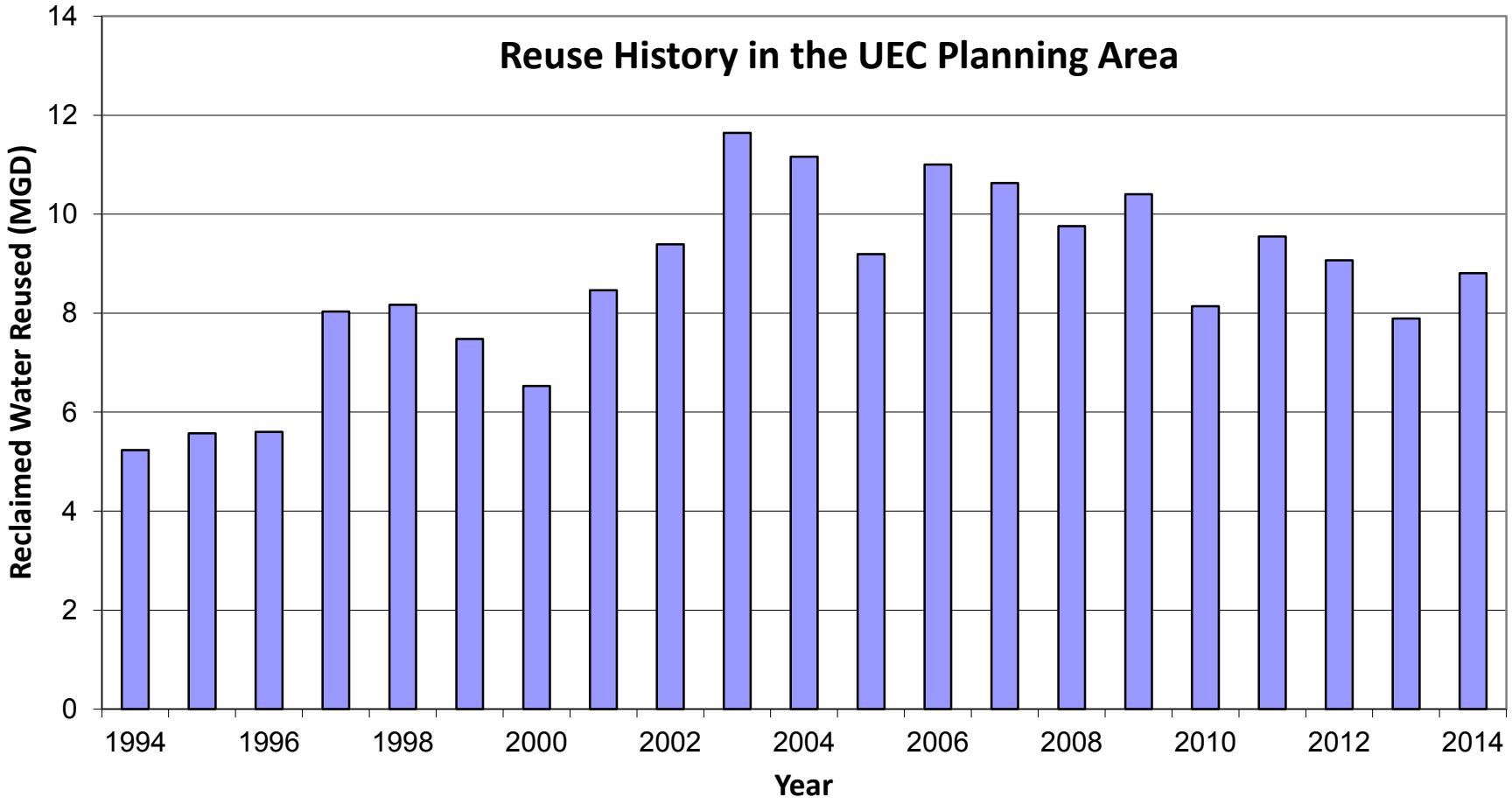

2011 UECWSP – Additional Future Direction

- Complete East Coast Floridan Aquifer model
  - *Collaborate with local users for data*
- Continue aquifer monitoring programs
- Implement CERP
- Continue to encourage and promote water reuse and conservation measures
- Continue to identify the impact of sea level rise on utility wellfields at risk of saltwater intrusion
- Continue to coordinate with local governments and utilities on water supply related elements such as the water supply facility work plan that is due within 18 months of adoption of the UEC Plan Update

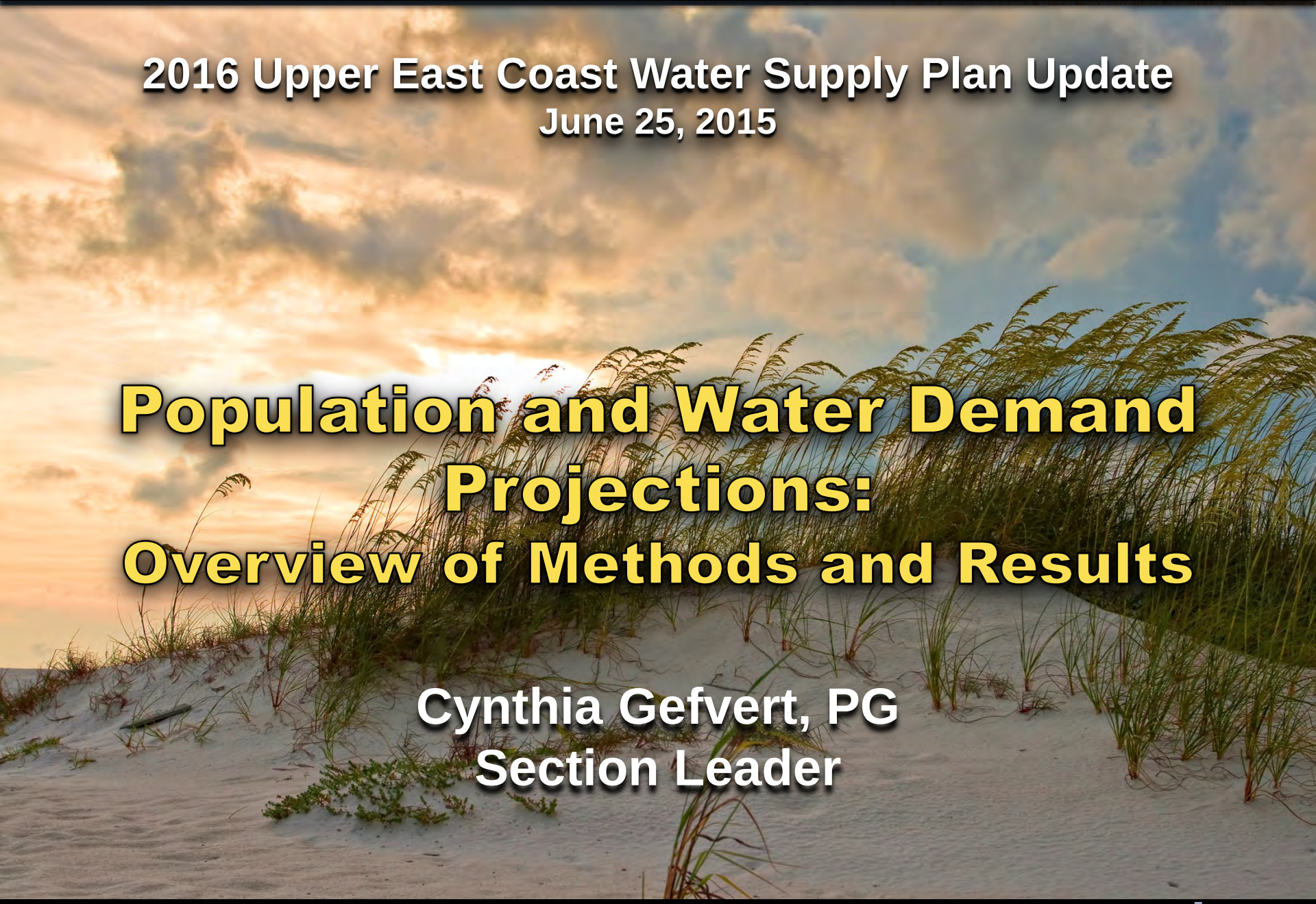
UEC Public Water Supply
Surficial and Floridan Aquifer Use



UEC Reuse History 1994 - 2014



Questions



2016 Upper East Coast Water Supply Plan Update

June 25, 2015

Population and Water Demand Projections: Overview of Methods and Results

Cynthia Gefvert, PG
Section Leader

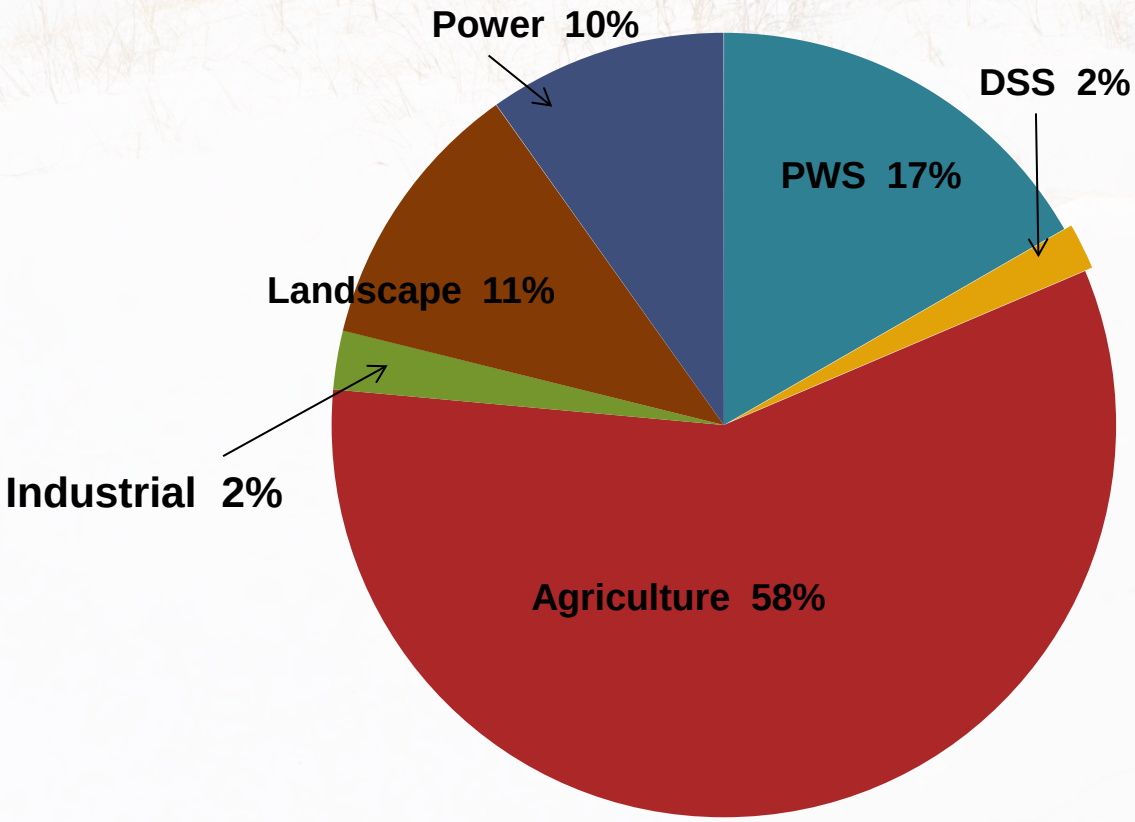
Since the Last Plan

- Recovery from the Great Recession has been slow – growth in population decreasing
- In 2015
  - slow pace of residential development
  - favorable relative prices for land
  - opportunity for agricultural retention/expansion continues
  - citrus continues to struggle

Water Supply Categories

The 2013 Water Supply Pie

- Public Water Supply
- Domestic Self-Supply
- Agricultural Self-Supply
- Industrial/Commercial Self-Supply
- Recreation/Landscape Self-Supply
- Power Generation

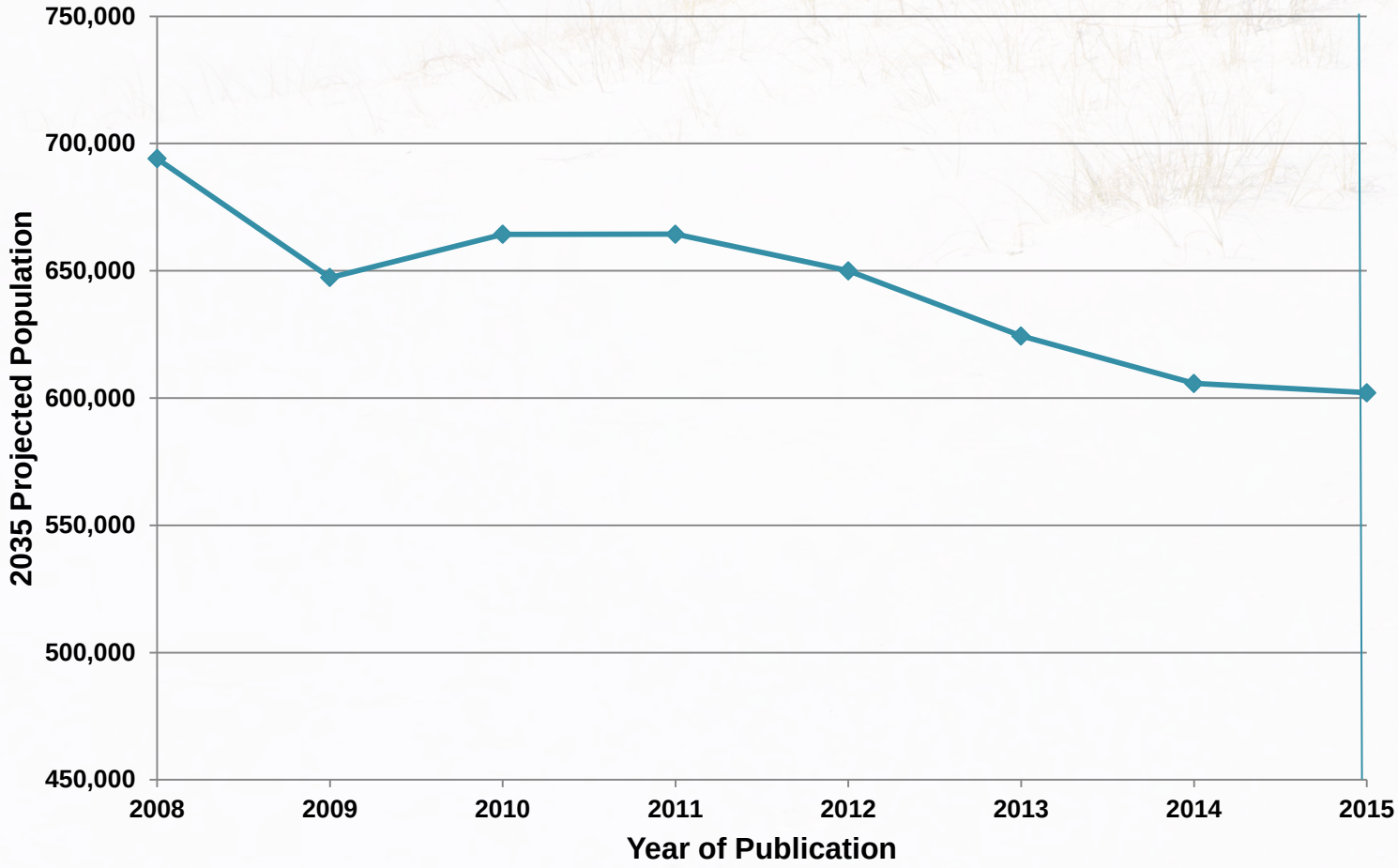


Population and Public Water Supply Demand Projections

- Method described in Section 373.709, F.S.
  - Update every 5 years
  - Utilize best available data
  - Start with BEBR medium projections
  - Control county population to BEBR medium

BEBR = Bureau of Economic & Business Research

Changes in UEC BEBR 2035 population projections

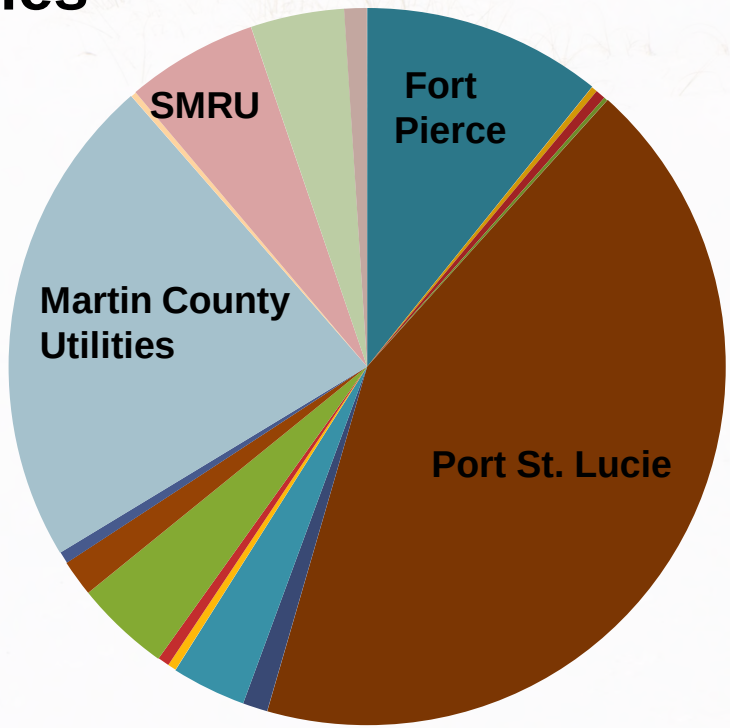


BEBR = Bureau of Economic & Business Research

Population Served by Public Water Supply

17 Public Water Supply Utilities

- 2000 218,204
- 2010 380,068
- 2013 399,317
- *2020* *469,583*
- *2030* *564,700*
- *2040* *632,700*



Population Projection Sources

- 2040 Service Area maps for each utility
- 2010 Population – Census Block data
- 2040 Population
  - *Florida Population by County BEBR, April 2014*
- County growth plans
- Local growth plans

The Process

- Coordinated with 17 utilities to update service area maps, 2010 populations and learn future plans and projects
- Distributed populations to the service areas
  - 2013 estimates
  - projections to 2040
- Follow-up meetings to to review and update :
  - population projections
  - finished water
  - projected demands
  - future plans and projects

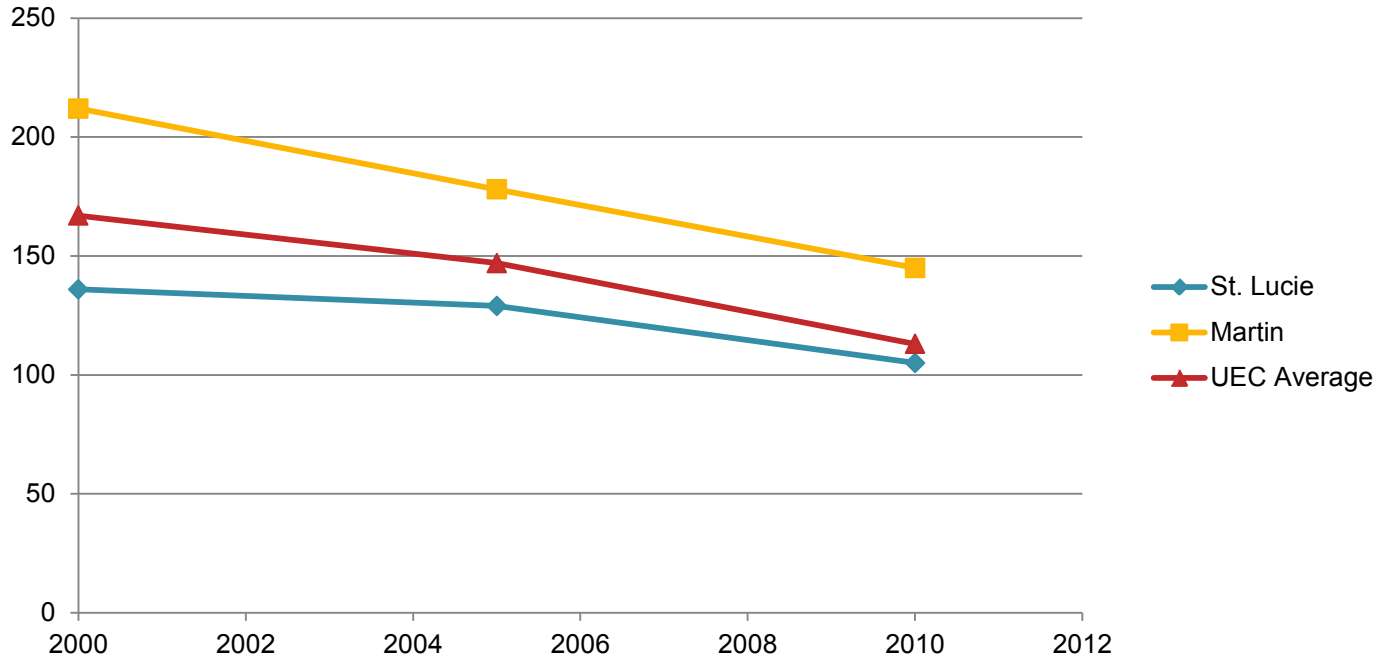
Population by County

County	2013	2040	% Change
St. Lucie	282,762	454,200	60.6
Martin	150,709	183,500	21.8
NE Okeechobee	543	618	13.8
UEC Planning Area Total	**434,014**	**638,318**	**47.1**

Method to Project Finished Water Demands

- 2010 - 2013 average utility service area population estimate
- 2010 - 2013 average finished water demand
- Compute 2010-2013 average finished water “planning per capita usage”
- Multiply “planning per capita usage” by 2040 service area population to compute 2040 finished water demand

Historical Per Capita Usage



County	2000 gpcd	2005 gpcd	2010 - 2013 gpcd
St. Lucie	136	129	105
Martin	212	178	145
UEC Planning Area Average	**167**	**147**	**113**

Why Are Per Capita Rates Declining?

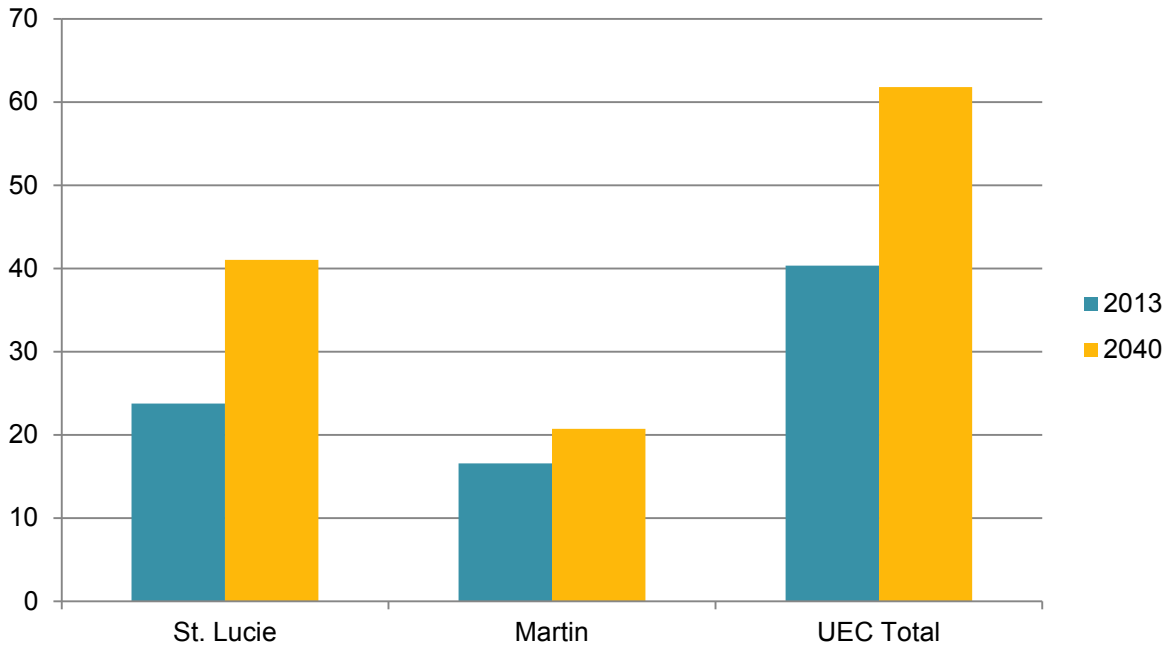
- New construction is more water efficient
- Improved effectiveness of conservation programs
- Year-round landscape irrigation rule implemented in 2010
- Slow economy

Public Water Supply

Finished Water Demand

County	2013 Population (estimate)	2013 Water Demand (MGD)	2040 Population (projected)	2040 Water Demand (MGD)
St. Lucie	256,196	23.8	453,200	41.0
Martin	143,121	16.6	179,500	20.7
NE Okeechobee	0	0.0	0	0.0
UEC Planning Area Total (PWS)	**399,317**	**40.4**	**632,700**	**61.7**

PWS Finished Water: Comparison of 2013 Use and 2040 Projections



County	2013 (mgd)	2040 (mgd)	Change
St. Lucie	23.8	41.0	73%
Martin	16.6	20.7	25%
UEC Planning Area Total	**40.4**	**61.7**	**53%**

Domestic Self-Supply

County	2013 Population	2013 (MGD)	2040 Population	2040 Estimate (MGD)
St. Lucie	26,566	2.7	1,000	0.1
Martin	7,588	1.1	4,000	0.6
NE Okeechobee	543	0.1	618	0.1
UEC Planning Area Total (DSS)	**34,697**	**3.9**	**5,618**	**0.8**

Agricultural Self-Supply: Commercially Grown Crop Categories

Total Irrigated Acreage – UEC Planning Area

- Citrus
- Other Fruits and Nuts
- Vegetables, melons & berries
- Sugarcane
- Other Field Crops
- Sod
- Greenhouse/ Nursery

Agricultural Self-Supply:
Florida Dept of Agriculture and Consumer Services

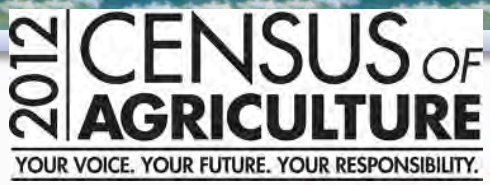
- 2013 – Sections 570.93 and 373.709 F.S. changed to require FDACS to develop agricultural projections for all water management districts
- First round of projections – September 2014
  - Six scenarios
  - Projections to 2035
- Next round expected in summer 2015
  - One scenario
  - Projections done at one time for entire state

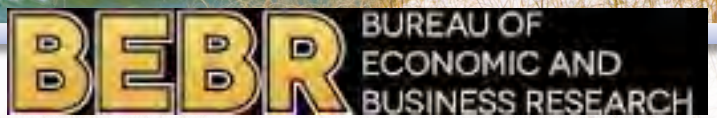
Agricultural Self-Supply: SFWMD Projection Method

- Evaluate trends and projected land use to develop acreage projections
- Acreage projections and AFSIRS model used to develop water demand projections
  - Plan to identify and meet demands during a 1-in-10 year drought event
- What is considered?
  - Market conditions, trends, input from agricultural stakeholders
  - Crop specific studies and future outlooks
  - County Land-use plans
  - Regional specialization
  - SFWMD land acquisition and leases

Agricultural Field-Scale Irrigation Requirements Simulation

Data & Information Sources Used





Agricultural Self-Supply: 2010 & 2040 Acres

Total Acres by County by Crop Category - 2010									
	Citrus	Irrigated Pasture	Other Fruits & Nuts	Vegetables Melons Berries	Sugarcane	Other Field Crops	Sod	Greenhouse / Nursery	Total
St. Lucie	41,535	20,539	55	3,625	-	-	1,208	759	67,721
Martin	14,613	16,371	59	4,214	10,379	1,458	1,877	112	49,083
NE Okeechobee	3,651	1,787	1	1,030	-	-	2,126	60	8,655
UEC Planning Area Total	59,799	38,697	115	8,869	10,379	1,458	5,211	931	125,459

DRAFT - Total Acres by County by Crop Category - 2040									
	Citrus	Irrigated Pasture	Other Fruits & Nuts	Vegetables Melons Berries	Sugarcane	Other Field Crops	Sod	Greenhouse / Nursery	Total
St. Lucie	34,184	20,539	71	10,400	2,000	416	1,520	2,180	71,310
Martin	-2,904	16,371	76	10,793	20,952	2,522	4,023	1,960	59,601
NE Okeechobee	3,012	1,787	1	1,818	-	-	639	125	7,382
UEC Planning Area Total	40,100	38,697	148	23,011	22,952	2,938	6,182	4,265	138,292

Agricultural Self-Supply - Historical Acres

Irrigated Agricultural Acres by County				
County	2000	2005	2010	2015 Estimate
St. Lucie	115,339	70,313	67,721	63,210
Martin	63,506	58,304	49,083	53,027
NE Okeechobee	6,978	8,044	8,655	6,632
Irrigated Pasture		19,000		
UEC Planning Area Total	**185,863**	**155,661**	**125,459**	**122,868**

Agricultural Self-Supply – Draft Demand

Draft Gross Irrigation Demands for Average Conditions by County (MGD)

County	2013	2040	Difference 2013 to 2040 (MGD)	Difference 2013 to 2040 (percent)
St. Lucie	82.0	90.2	8.2	10.0%
Martin	68.5	83.8	15.3	22.3%
NE Okeechobee	11.9	12.6	0.7	5.8%
UEC Planning Area Total	**162.5**	**186.7**	**26.0**	**16.0%**

SFWMD & FDACS Projected Water Demands

Summary of Agricultural Water Demand Projections (MGD)							
	2010	2015	2020	2025	2030	2035	2040
FDACS lowest projection	168.7	166.0	163.7	161.0	158.3	155.5	NA
SFWMD Draft projection	159.9	159.8	162.5	176.7	181.9	180.8	186.7
FDACS highest projection	168.7	170.4	172.2	174.2	175.9	177.5	NA
Note: NA = not projected							

Industrial/Commercial/Institutional Self-Supply

Demands (MGD)							
County	2013	2015	2020	2025	2030	2035	2040
St. Lucie	1.5	1.6	1.6	1.7	1.8	1.8	1.9
Martin	2.5	2.6	2.7	2.8	3.0	3.0	3.1
NE Okeechobee	0	0	0	0	0	0	0
UEC Planning Area Total:	**4.0**	**4.2**	**4.3**	**4.5**	**4.8**	**4.8**	**5.0**

Highlights:

- No distinction between gross and net water demand

Recreational/Landscape Self-Supply

Demands (MGD)							
County	2013	2015	2020	2025	2030	2035	2040
St. Lucie	14.7	15.2	16.8	18.3	19.7	21.1	22.3
Martin	9.9	10.0	10.4	10.8	11.1	11.3	11.6
NE Okeechobee	0.09	0.09	0.09	0.09	0.09	0.09	0.09
UEC Planning Area Total	**24.7**	**25.4**	**27.4**	**29.2**	**30.9**	**32.5**	**33.9**

Highlights:

- Includes: Golf courses, ball fields, parks, medians, community common areas, landscaped areas around commercial property, cemeteries, schools, etc.
- AFSIRS applied to projected acres to estimate demand
- No distinction between gross and net water demand

Power Generation Self-Supply

Demands (MGD)							
County	2013	2015	2020	2025	2030	2035	2040
St. Lucie	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Martin	12.0	17.4	18.4	19.4	20.4	21.4	22.4
In planning (FPL Proposed)	0	0	0	7.5	15.0	22.5	37.5
UEC Planning Area Total	**14.8**	**20.2**	**21.2**	**29.7**	**38.2**	**46.7**	**62.7**

Highlights:

- Martin County plant is FPL Martin
- St. Lucie County plant is TCEC
- Location of proposed plant(s) to be determined in the future
- No distinction between gross and net water demand

Total Demand Projections

(gross water)

Water Use Category	2013 (MGD)	2040 (MGD)
Public Water Supply	48.3	75.3
Domestic Self-Supply	4.1	0.8
Agricultural Self-Supply (draft for 2040)	159.9	186.6
Industrial/Commercial/Institutional Self-Supply	6.7	5.0
Recreational/Landscape Self-Supply	31.2	33.9
Power Generation Self-Supply	27.2	62.7
Total for UEC Planning Area	**277.4**	**364.3**

Projection Comparisons: 2011 Plan to 2016 Plan Average Demands (MGD)

Water Use Category	2011 UEC Plan 2030 Projection	2016 UEC Plan 2040 Projection
Public Water Supply	96.4	75.3
Domestic Self-Supply	0.7	0.8
Agricultural Self-Supply	137.0*	186.6
Industrial/Commercial/Institutional Self-Supply	9.4	5.0
Recreational/Landscape Self-Supply	45.0	33.9
Power Generation Self-Supply	51.3	62.7
Grand Total for UEC Planning Area	**339.8**	**364.3**

***irrigated pasture not included**

QUESTIONS?

Update on CERP Projects in UEC Planning Area

Upper East Coast Water Supply Plan Update

June 25, 2015

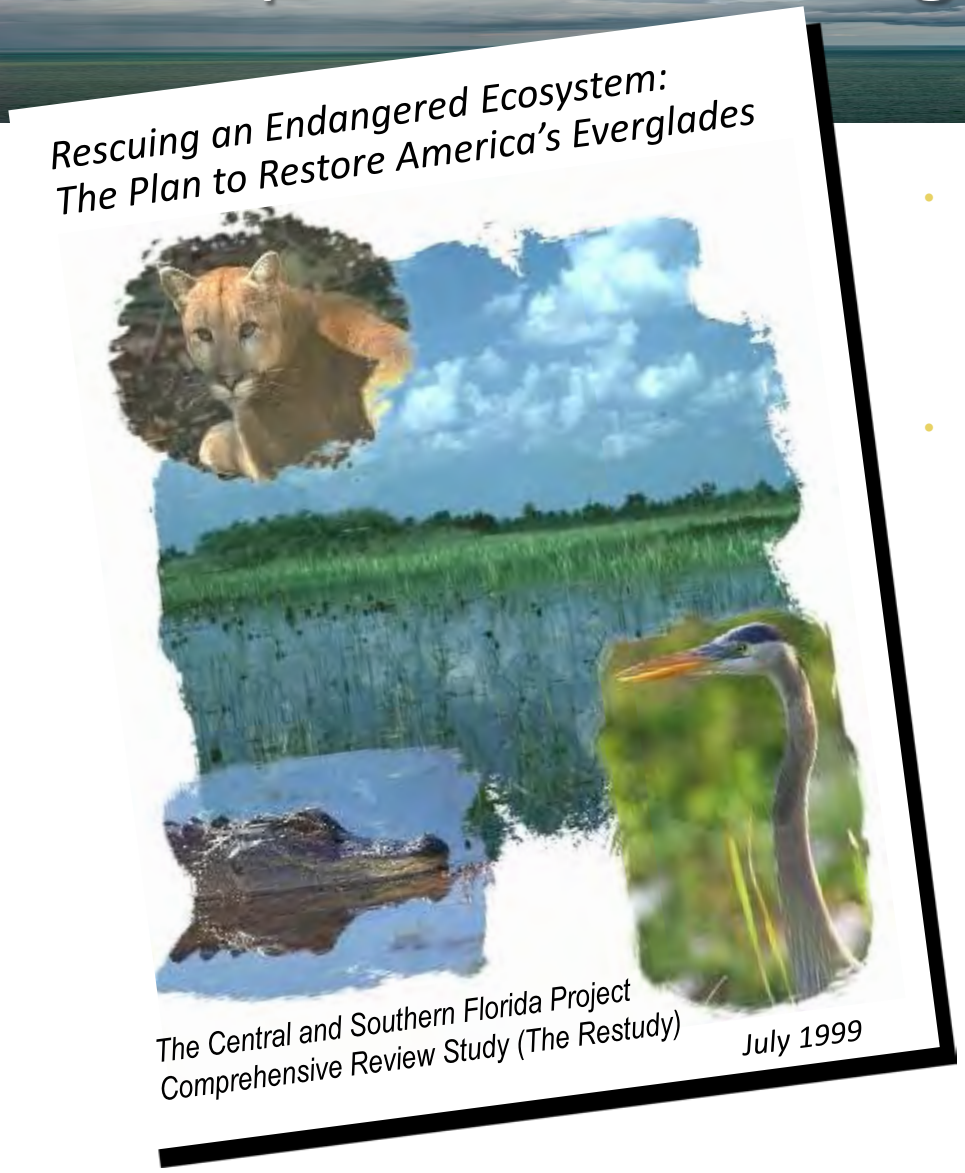
Beth Kacvinsky, Lead Project Manager

Office of Everglades Policy and Coordination

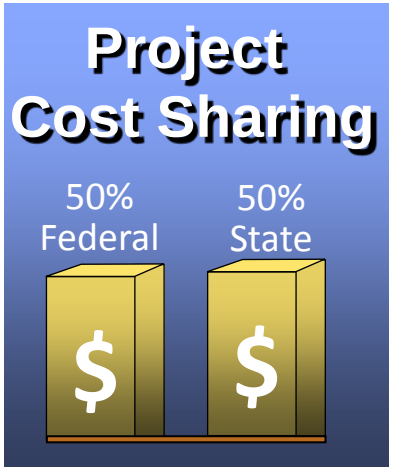
Presentation Outline

- Comprehensive Everglades Restoration Plan (CERP)
  - Indian River Lagoon South (IRLS)
  - Ten Mile Creek
  - Loxahatchee River Watershed Restoration

Comprehensive Everglades Restoration Plan

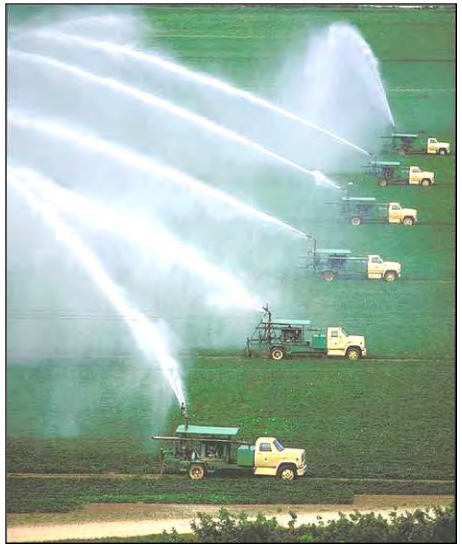


- July 1,1999, Secretary of the Army and State of Florida presented plan to Congress.
- Approved by Congress as the Framework for Everglades Restoration in the Water Resources Development Act of 2000 (WRDA 2000).

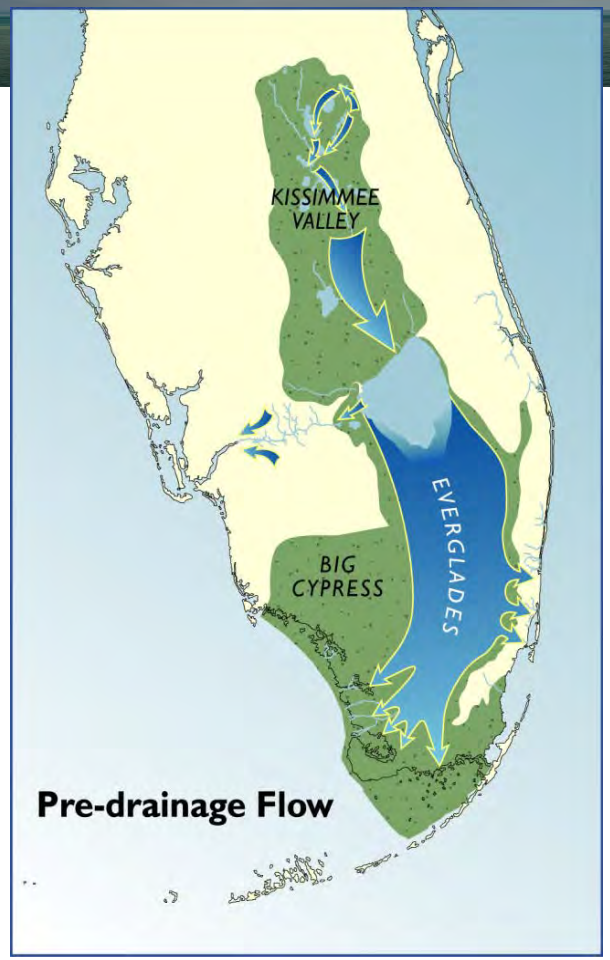


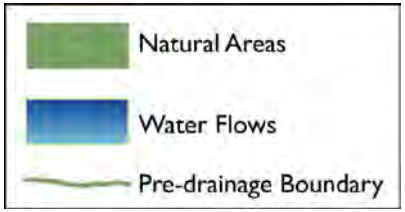
Comprehensive Everglades Restoration Plan

- Restore and improve quality, quantity, timing and flow of water
- Provide sustainable water supply to meet environmental, agricultural and urban needs



CERP - The Goal





Comprehensive Everglades Restoration Plan

- Includes 68 components to be implemented over 35 years
- Features include:
  - Aquifer Storage & Recovery
  - Surface Water Storage Reservoirs
  - Stormwater Treatment Areas
  - Seepage Management
  - Removing Barriers to Sheetflow
  - Operational Changes
  - Reuse Wastewater

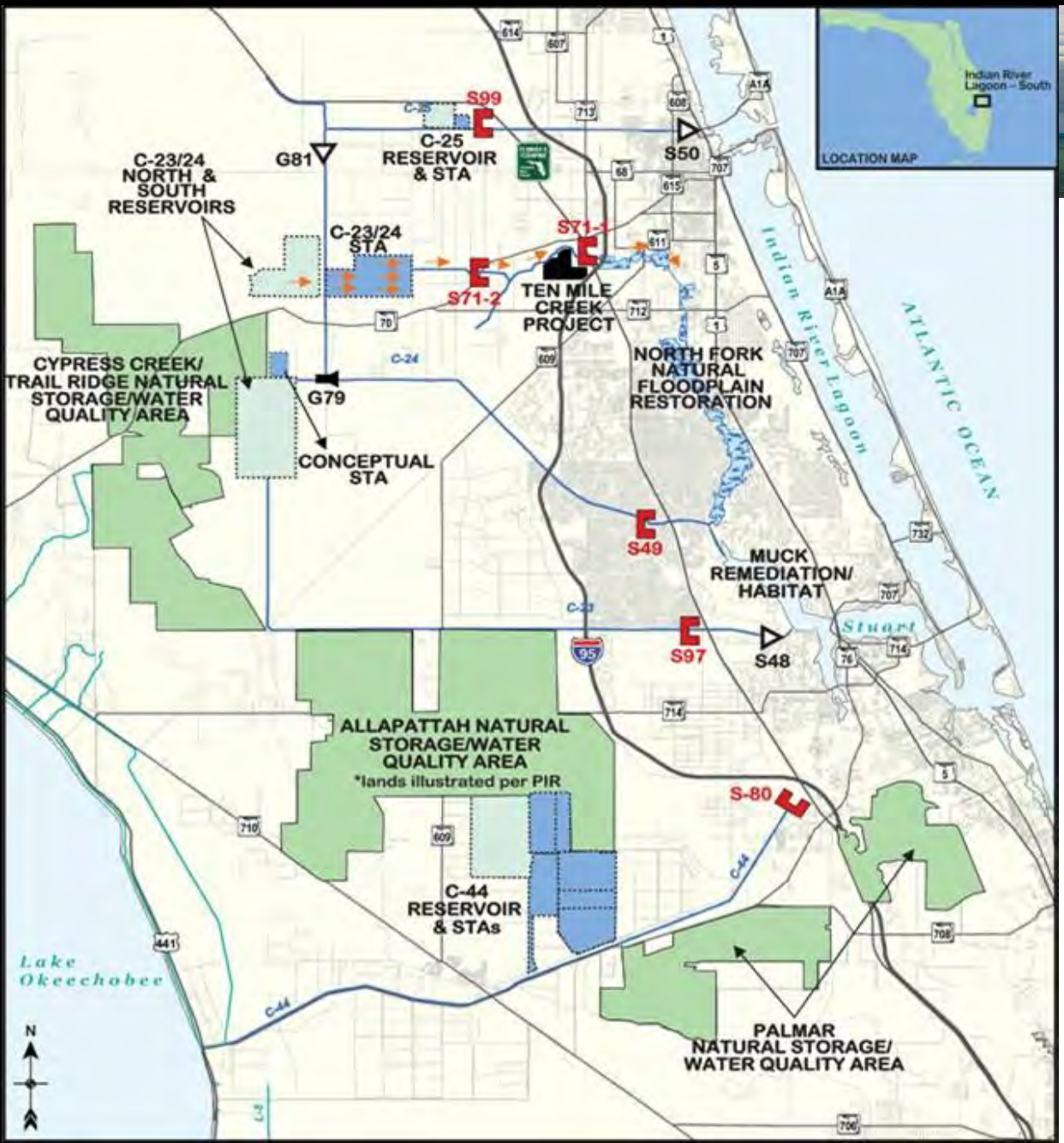
CERP Implementation

FOUNDATION AND CERP PROJECTS UNDER CONSTRUCTION OR WITH COMPLETE/NEARING COMPLETE PROJECT IMPLEMENTATION REPORTS

- Foundation Projects
  - Kissimmee River
  - C-111 South Dade
  - C51/STA-1E
  - Modified Water Deliveries
- 1st Generation CERP
  - Site 1 Improvement
  - Indian River Lagoon South
  - Picayune Strand
- 2nd Generation CERP
  - C-43 Reservoir
  - Broward County Water Preserve Areas
  - C-111 Spreader Canal
  - Biscayne Bay Coastal Wetlands

Indian River Lagoon South (IRLS)

- Improve habitat quality in estuarine ecosystems
- Improve functional quality of wetlands ecosystems
- Improve water quality
- Maintain existing level of flood control
- Maintain or improve water supply for urban and agricultural use
- Maintain a healthy ecosystem that supports recreational and commercial interests



IRL-S Footprint

IRL-S FootprintC-44 Basin

1. C-44 Reservoir
2. C-44 Stormwater Treatment Area (East)
3. C-44 Stormwater Treatment Area (West)
4. Pal-mar Complex – Natural Storage and Water Quality Area

C-23/C-24 Basins

5. C-23/C-24 - North Reservoir
6. C-23/C-24 - South Reservoir
7. C-23/C-24 - Stormwater Treatment Area
8. Allapattah Complex – Natural Storage and Water Quality Area
9. Cypress Creek/Trail Ridge Complex Natural Storage and Water Quality Area

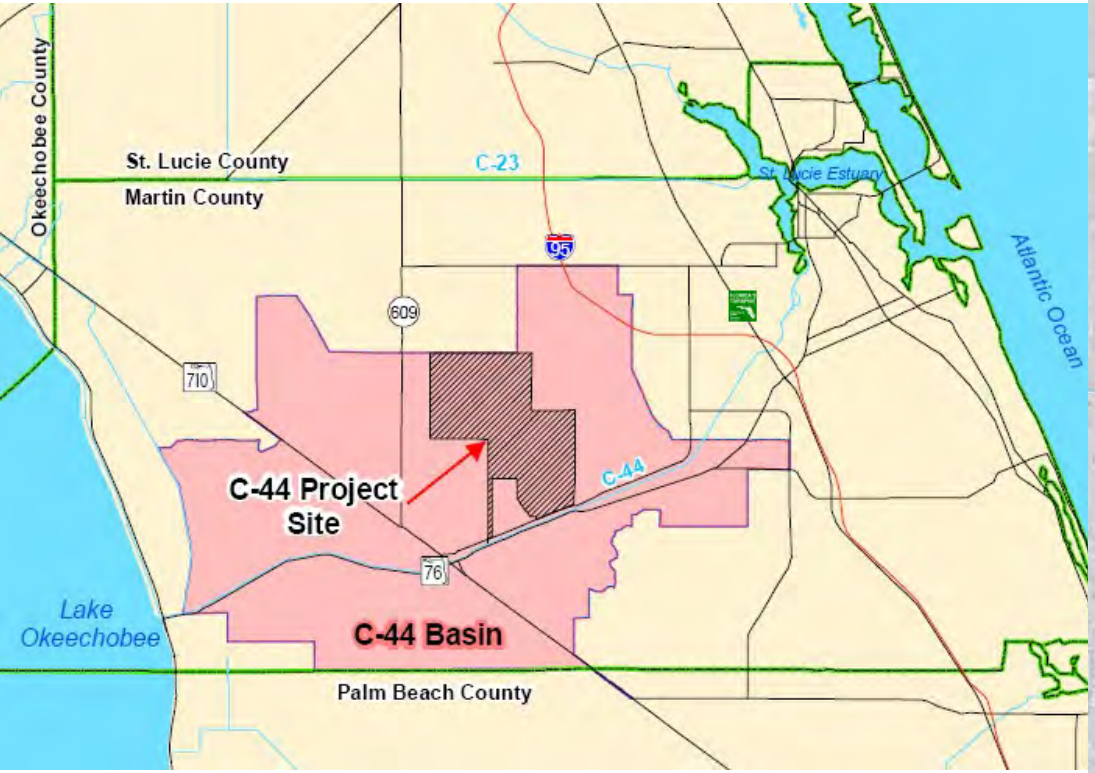
C-25, North Fork & South Fork Basins

10. C-25 Reservoir
11. C-25 Stormwater Treatment Area
12. North Fork Natural Floodplain Restoration
13. Muck Remediation & Artificial Habitat

Project Milestones

- Project Implementation Report (PIR) complete – August 2004
- Project authorized – WRDA 2007
- Water reservations rule (for North Fork, St. Lucie River) – Adopted February 11, 2010
- Project Partnership Agreement (PPA) – Sept. 2010
- PPA Amendment – August 2014

C-44 RSTA Project Location and Footprint

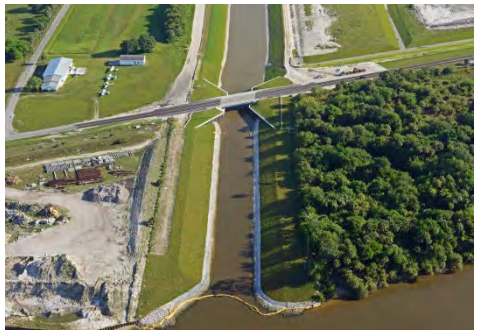


C-44 Reservoir/STA (RSTA)

- 3,400-acre reservoir water depth of 15 feet
  - 50,600 acre-feet of storage
- STA 6,300 acres with emergent vegetation
- 1,100 cubic feet per second (cfs) capacity
  - pump station located four miles north of the C-44 Canal
- Project currently under construction

C-44 RSTA Construction Status

- Contract 1
  - Intake Canal and Access Road
  - Citrus Boulevard Bridge and Turn Lanes
  - East Access Road, Canal and Spillway
  - Completed by USACE in July 2014
  - $36.8 Million



- Communication Tower
  - Replaces backbone Indiantown Tower
  - 300’ height
  - Completed by SFWMD in December 2013
  - $5.4 million

- Interim System Discharge Spillway
  - Increase groundwater stages throughout 2/3 of the property
  - Completed October 2014 by SFWMD
  - $167,300.00

C-44 RSTA Construction Status

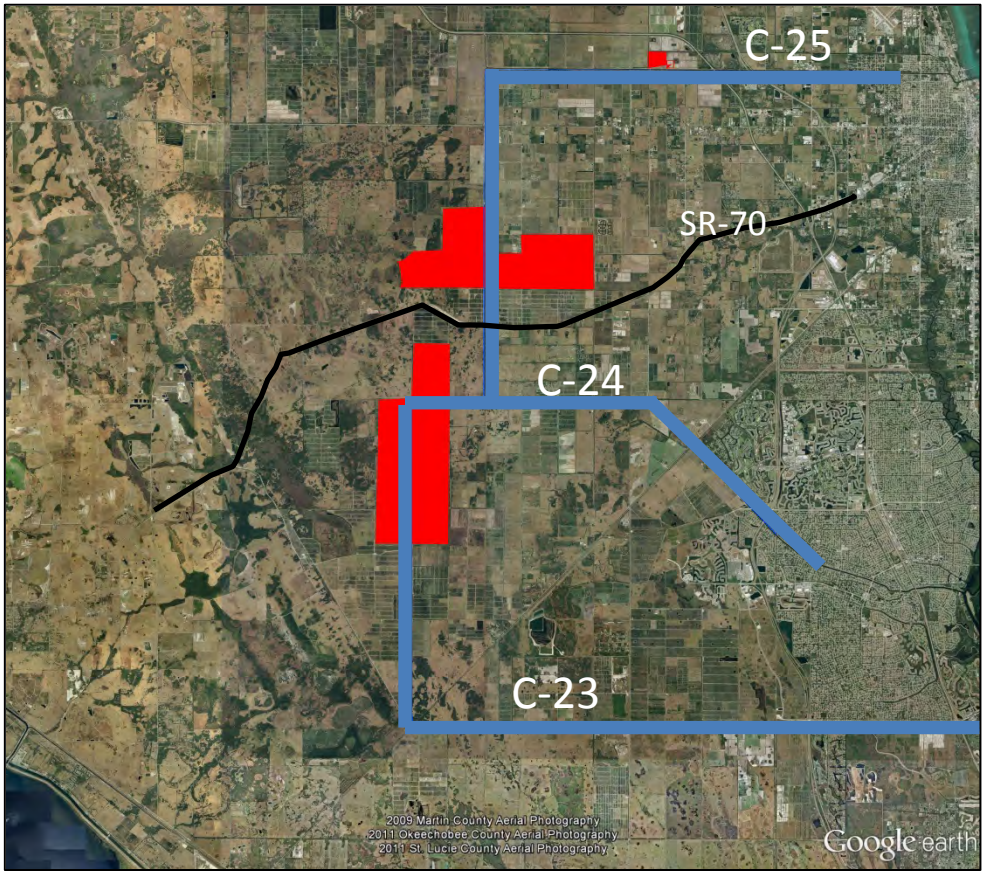
- Currently Under Construction by SFWMD
  - System Discharge and Construction Trailer Facilities (Shoreline Foundation, Inc.)
    - $5,377,745.00
    - August 2014 – November 2015
  - Stormwater Treatment Area (Blue Goose Construction, Inc.)
    - $100,792,387.00
    - October 2014 – August 2017
  - Reservoir Pump Station (Harry Pepper & Associates, Inc.)
    - $40,289,146.00
    - April 2015 – September 2018

C-44 RSTA Construction Status

- Schedule for Construction by USACE
  - Contract 2 (Reservoir)
  - Award Expected July 2015
  - NTP August 2015
  - 4-year construction period – (through August 2019)

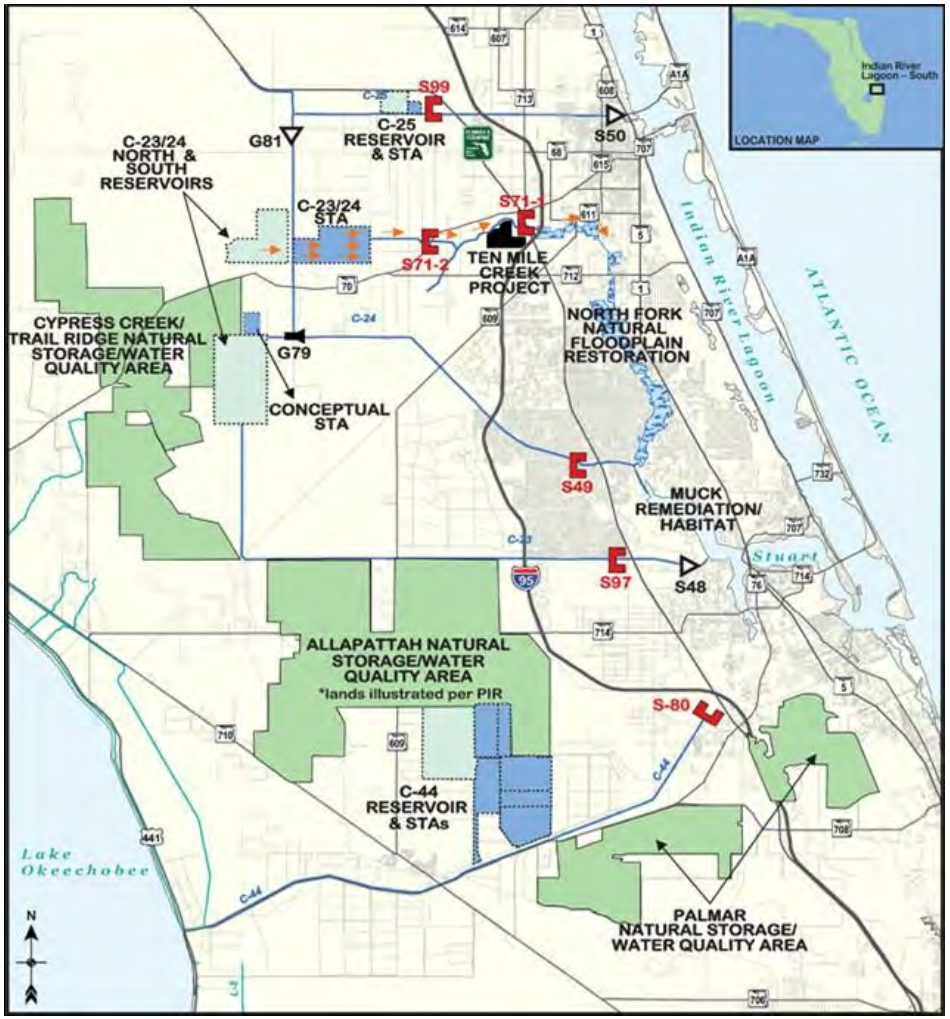
C-23/C-24 and C-25 Reservoirs and STAs

- C-23/24
  - Two reservoirs will capture water from C-23 and C-24 basins
  - ~ 90,000 acre-feet storage
  - STA provides water quality treatment and allows diversion to North Fork St. Lucie River
- C-25
  - 900 acres for reservoir and STA
  - ~5,400 acre feet



Natural Water Storage and Treatment Areas

- ~30,000 acre-feet of storage through restoration of on-site wetlands (~ 1/3 acre foot/acre of land)
- Construction work to include:
  - Ditch filling/plugging
  - Installation of water control structure
  - Construction of berms
  - Activities associated with prescribed burns
  - Treatment/removal of exotic/invasive plants and animals



Loxahatchee River Watershed Restoration Project LRWRP

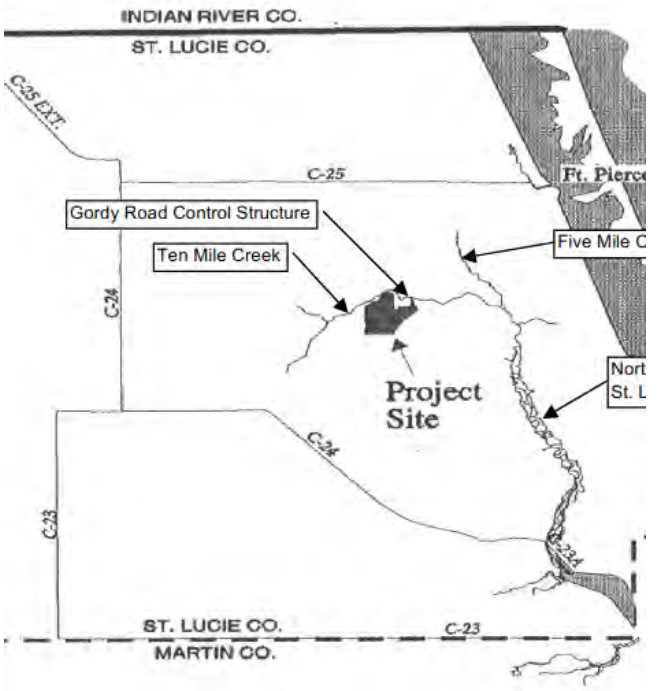
- Planning effort re-initiated in early FY15
- Refined scope
  - Improve the Quality, Quantity, Timing and Distribution of water deliveries from watershed to the Loxahatchee River and Estuary
  - Improve hydrologic connections between the protected natural areas that are the headwaters to the 'National Wild and Scenic' Loxahatchee River NW Fork and its tributaries

LRWRP Current Status

- Completed compliance package and submitted for review by USACE South Atlantic Division
  - Report synopsis, risk register, schedule, budget and project management plan
- Identified Project Delivery Team and sub-teams
  - Plan Formulation, Engineering, Ecological, Modeling and Recreation
- Developed project goals, objectives and performance measures
- Currently identifying management measures and screening tools

Ten Mile Creek

- Critical Restoration Project authorized in WRDA 1996
- 550-acre reservoir and 160-acre wetland treatment cell
- Provision in U.S. Senate 2016 Appropriations Bill to de-authorize the project
  - Will allow SFWMD to repair, own and operate
  - Provides the long term solution to allow modification to provide up to 4 feet of storage in the reservoir




Questions?

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Upper East Coast Water Supply Plan Public Workshop
June 25, 2015

Minimum Flows & Levels and Water Reservations Update

Toni Edwards, Senior Scientist
Coastal Ecosystems Section

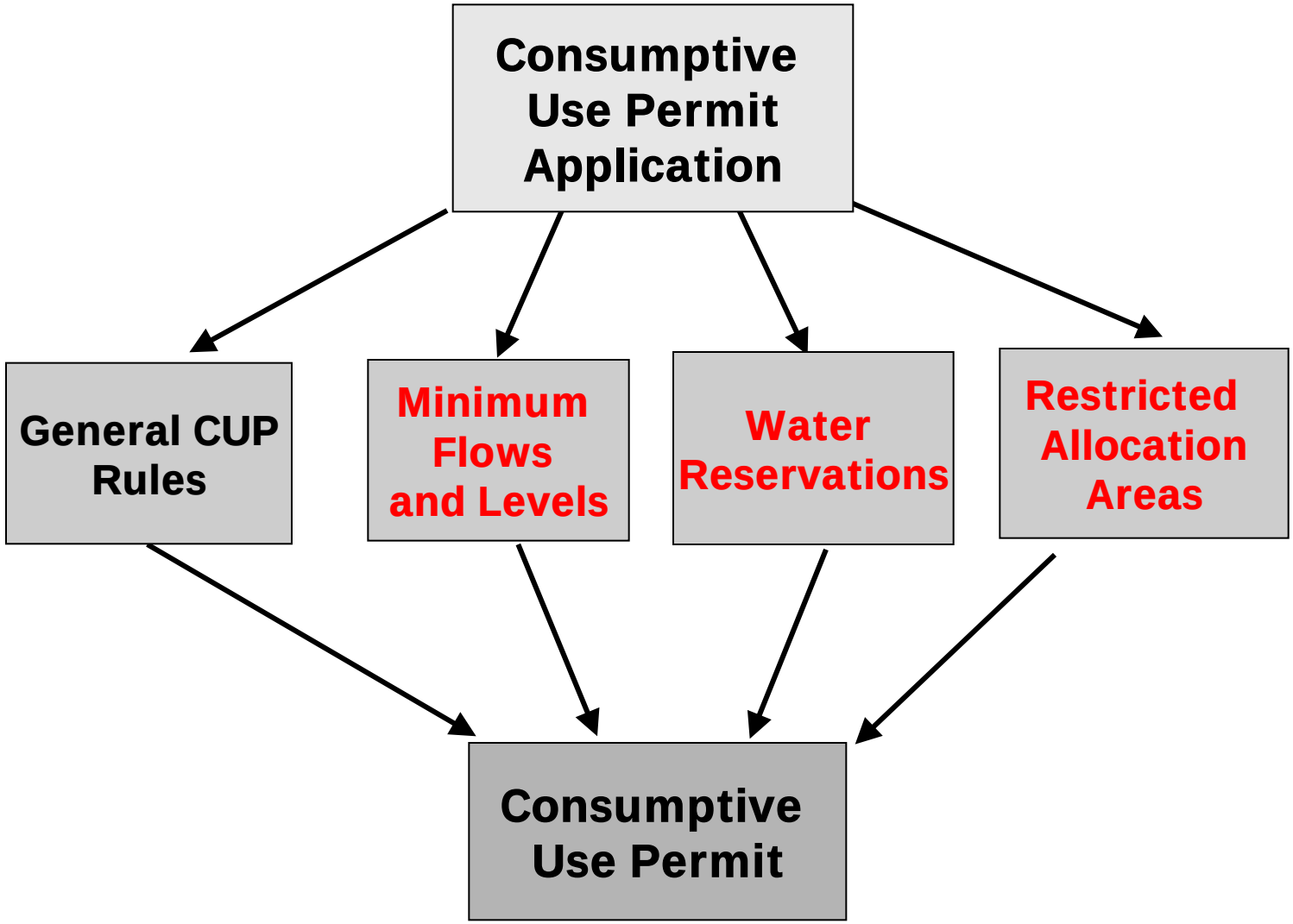
sfwmd.gov

Water Resource Protection Tools

- **Minimum Flows and Levels (MFL)**
- **Water Reservations**
- **Restricted Allocation Areas (RAA)**

All three are adopted by rule in the Florida Administrative Code

Factors Considered in CUP Permitting

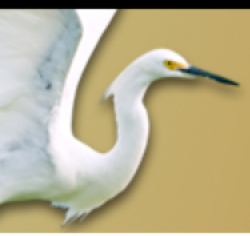


Minimum Flows and Levels (MFL)

Statutory Authority: Chapter 373, Florida Statutes (F.S.)

- **Minimum Flows and Levels** - Point at which further withdrawals will cause "significant harm" to the water resources or ecology of an area
- **Significant Harm:** Temporary loss of water resource functions that takes more than two years to recover, but is less severe than serious harm
- Applies to both surface waters and groundwaters

Water Resource Protection Conceptual Model



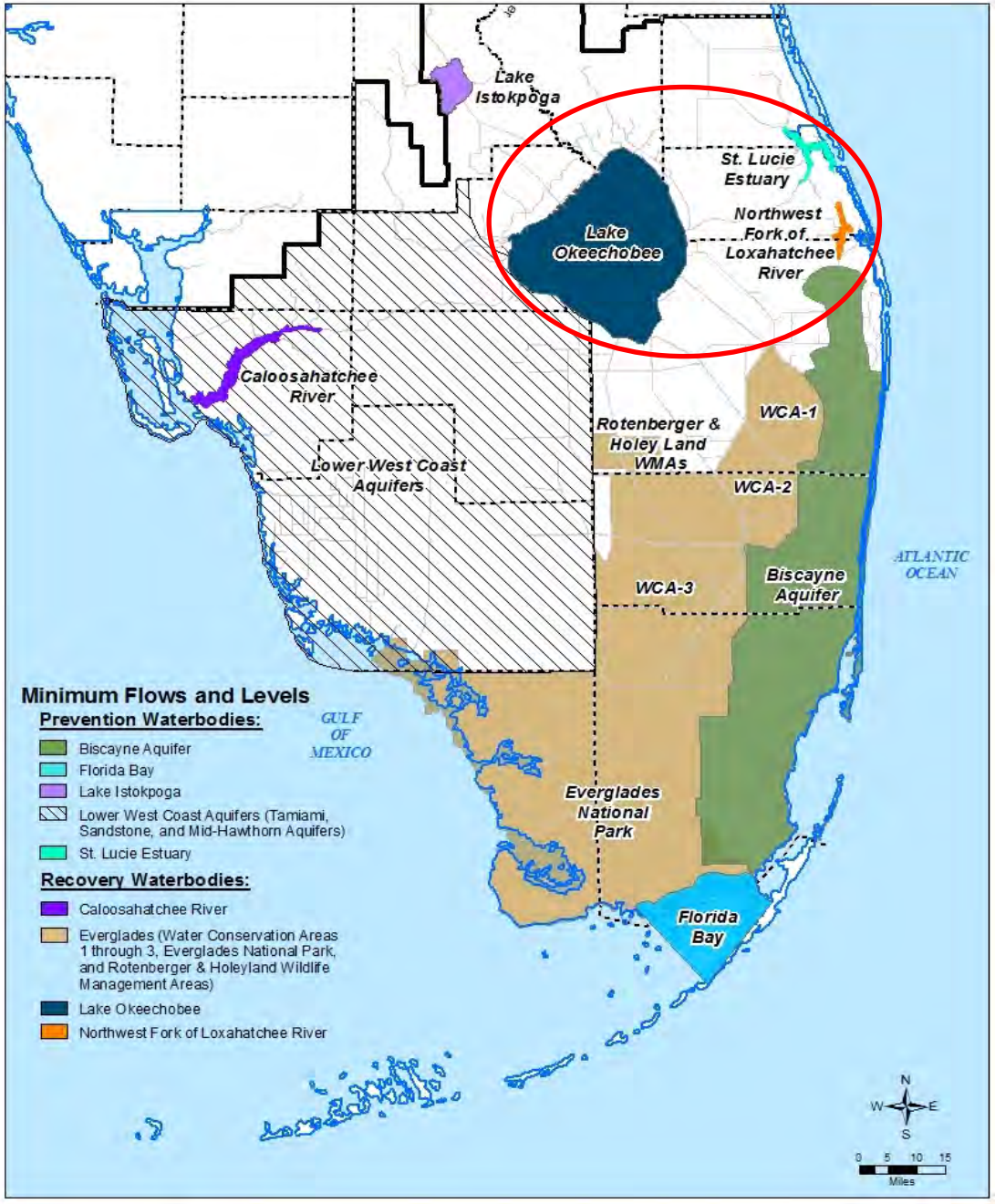
	Water Resource Protection Tools	Water Resource Protection Standards	Observed Impacts
Water Levels/Flow Decreasing	Permittable Water Reservation of Water	NO HARM (1-in-10 Level of Certainty*)	Normal Permitted Operations Environmental Restoration
	Phase I Water Shortage Phase II Water Shortage	HARM	Temporary loss of water resource functions taking 1 to 2 years to recover
	MINIMUM FLOWS & LEVELS		
Drought Severity Increasing	Phase III Water Shortage	SIGNIFICANT HARM	Water resource functions require multiple years to recover (> 2 year)
	Phase IV Water Shortage	SERIOUS HARM	Permanent or irreversible loss of water resource functions

** 1-in-10 Level of Certainty – Reasonable assurance that the proposed use will not harm water resources or ELUs up to a 1 in 10 year drought condition.*

MFL
Recovery and Prevention Strategies

Subsection 373.0421(2), F.S.

- **Recovery Strategy** for those not meeting the MFL at the time of adoption
  - ✓ Achieve recovery to the established minimum flow or level as soon as practicable
- **Prevention Strategy** for those that are meeting the MFL but not expected to meet it in 20 years
  - ✓ Prevent the existing flow or level from falling below the established minimum flow or level
- Strategies developed in concert with the planning process; 20-year period coincides with regional water supply plan horizon
- Adopted simultaneously with MFL rule adoption in the SFWMD



Minimum Flows and Levels in the SFWMD

With Prevention Strategies

- Biscayne Aquifer – 2001
- Lower West Coast Aquifers – 2001
- St Lucie Estuary – 2002
- Lake Istokpoga – 2006
- Florida Bay – 2006

With Recovery Strategies

- Caloosahatchee River – 2001
- Everglades – 2001
- Lake Okeechobee – 2001
- Northwest Fork of Loxahatchee River – 2003

Cover 7.2 million acres districtwide

Lake Okeechobee Adopted MFL

Subsection 40E-8.221(1), F.A.C

Lake level of 11' NGVD

An MFL "exceedance" occurs when:

- Lake level declines below 11', for > 80 consecutive or non-consecutive days, during an 18-month period
- 18 month period shall not include more than one wet season (May 31 through October 31)

An MFL violation occurs when an exceedance occurs more than once every 6 years

Lake Okeechobee Recovery Strategy

Subsection 40E-8.421(2), F.A.C.

- Environmental Enhancement Projects
  - ✓ Native vegetation planting, sediment scraping, etc.
- Lake Water Consumptive Use Constraints
  - ✓ Restricted Allocation Areas
- Water Shortage Restrictions
  - ✓ Phases I through 4 as needed
- Capital Projects to Improve Storage Capacity in and adjacent to lake
  - ✓ Rehabilitation of Herbert Hoover Dike, reservoir construction, etc.

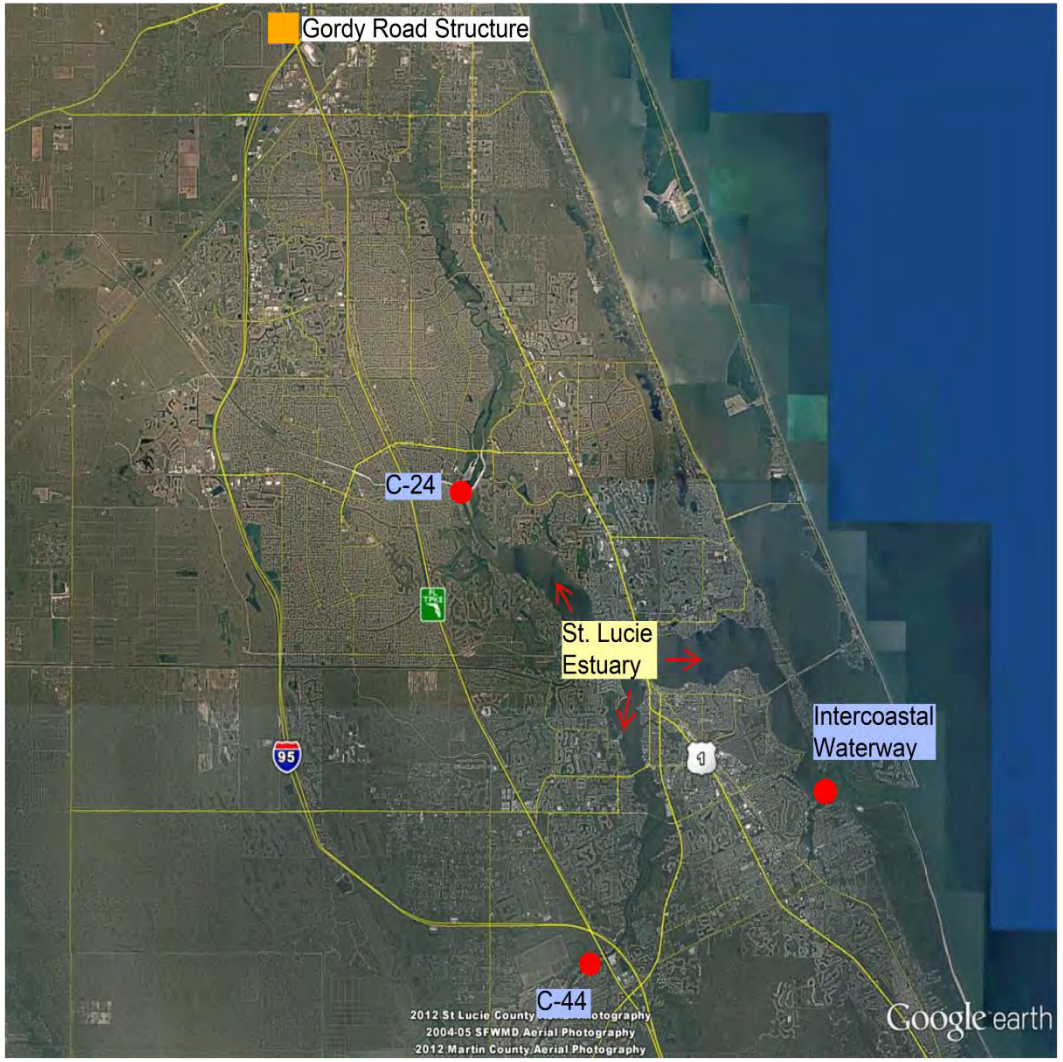
St. Lucie Estuary Adopted MFL

Section 40E-8.341, F.A.C.

Mean monthly flow of 28 cfs from the Gordy Road structure

An MFL violation occurs when:

- Flow declines below 28 cfs, for two consecutive months, during a 365-day period, for two consecutive years



St. Lucie Estuary Prevention Strategy

Subsection 40E-8.421(5), F.A.C.

- Operational Protocols
- Research and Monitoring
  - ✓ Oysters and benthic infauna (as part of RECOVER)
  - ✓ WQ, flow, salinity (by SFWMD)

NW Fork of Loxahatchee River Adopted MFL

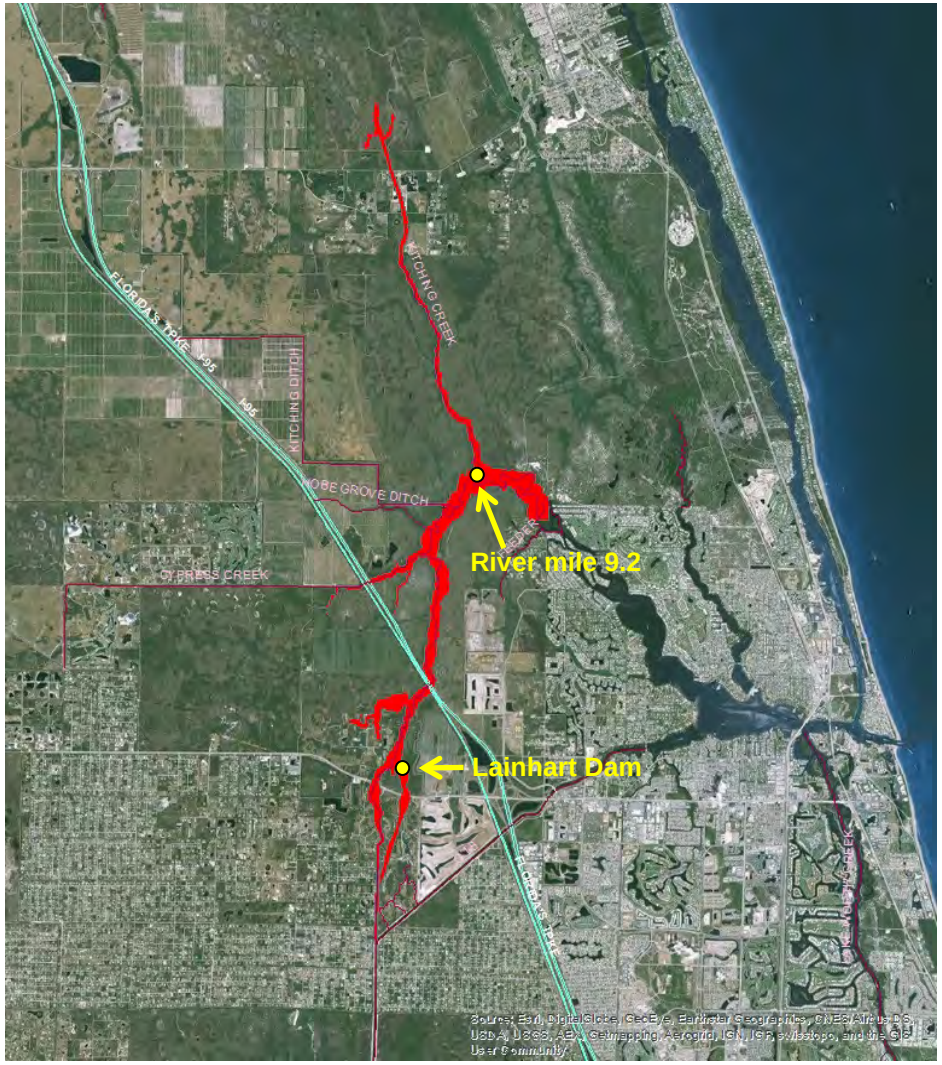
Subsection 40E-8.221(4), F.A.C.

Flow of 35 cfs over Lainhart Dam; and average daily salinity of ≤ 2 at river mile 9.2

An MFL exceedance occurs when:

- Flows decline below 35 cfs for > 20 consecutive days; or
- Salinity, expressed as 20-day rolling average, is > 2 ppt at river mile 9.2

An MFL violation occurs when an exceedance occurs more than once in a 6-year period



NW Fork of Loxahatchee River Recovery Strategy

Subsection 40E-8.421(6), F.A.C.

- Structural Improvements
- Operational Protocols
- Regulatory Activities


Lainhart Dam


G-160 Water Control Structure

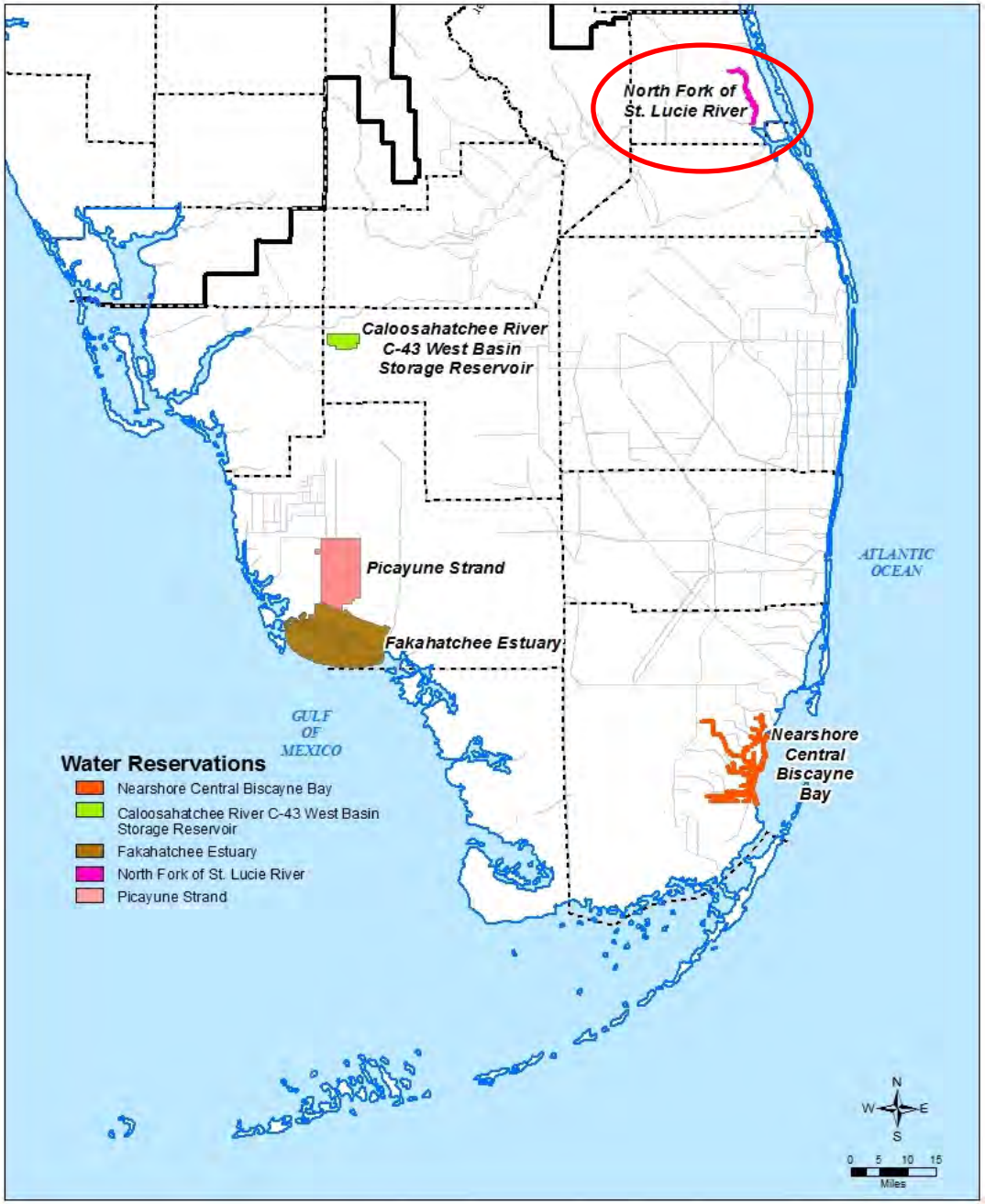
Water Reservation Functions and Considerations

Statutory Authority: Chapter 373, F.S.

- Reserves water for the protection of fish and wildlife or public health and safety
- Prevents use of reserved water from the water source
- Protects existing legal uses unless they are contrary to the public interest
- Required for CERP projects

Water Reservations Do Not…..

- Prevent use of unreserved water or water allocated under CUPs
- Establish an operating regime
- Drought-proof the natural system
- Ensure wildlife proliferation



Water Reservations in the SFWMD

- Picayune Strand – 2009
- Fakahatchee Estuary – 2009
- North Fork of the St. Lucie River – 2010
- Nearshore Central Biscayne Bay – 2013
- Caloosahatchee River C-43 West Basin Storage Reservoir – 2014

Cover 343,674 acres districtwide

North Fork of St. Lucie River Adopted Water Reservation

Section 40E-10.051, F.A.C.

Mean monthly flow of 130 cfs over Gordy Road Structure from November 1 through May 31

- For protection of fish and wildlife
- Prospective reservation - water available when CERP projects are complete

North Fork of St. Lucie River

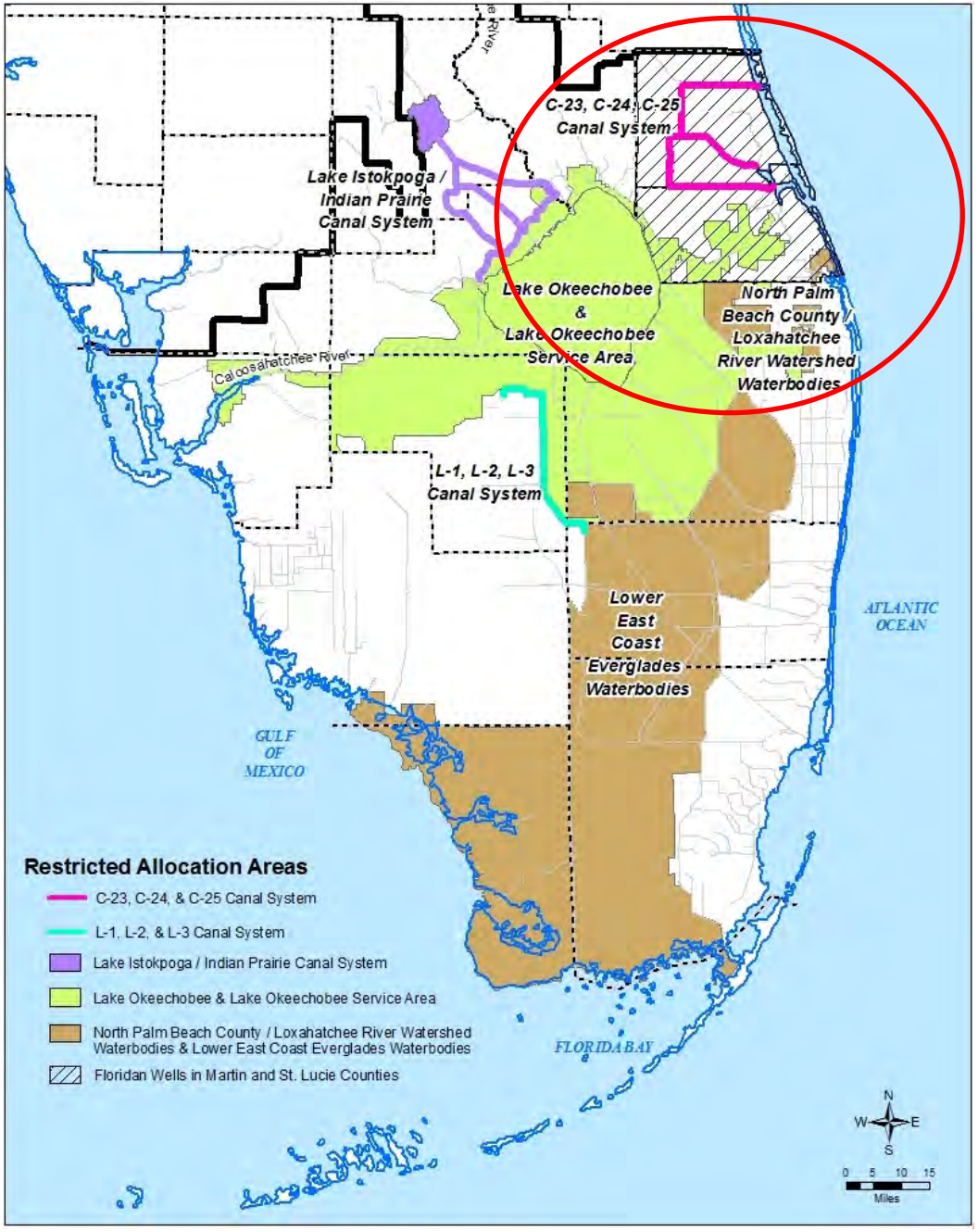
Fish and Wildlife Resources Protected:

- 17 linear miles of low salinity habitat
- Important nursery area for estuarine and marine organisms - protects larvae and juveniles from marine predators
- Habitat and foraging area for recreationally important fish and shellfish

Restricted Allocation Areas (RAA)

Areas from which new or increased water allocations are restricted

- Implemented where water to meet projected needs is lacking
- Protect water for natural systems and future restoration projects (CERP)
- May be designated as part of MFL recovery or prevention strategies
- Existing legal uses are protected and maintained unless contrary to the public interest
- Listed in Section 3.2.1 of the *Applicant's Handbook*



Restricted Allocation Areas in the SFWMD

- C-23, C-24, & C-25 Canal System- 1981
- L-1, L-2, & L-3 Canal System - 1981
- Lake Istokpoga/Indian Prairie Canal System - 1981
- North Palm Beach County /Loxahatchee River Watershed - 2007
- Lower East Coast Everglades Waterbodies – 2007
- Pumps on Floridan Wells in Martin and St. Lucie Counties - 2007
- Lake Okeechobee & Lake Okeechobee Service Area – 2008

Cover 7.5 million acres districtwide

Restricted Allocation Areas in the Upper East Coast Planning Area

C-23, C-24, and C-25 Canal System

- No additional surface water allocations above existing allocations
- No increase in surface water pump capacity

Northern Palm Beach County/Loxahatchee River Watershed

- Water allocations are limited to base condition uses described in *Applicant's Handbook*

Pumps on Floridan Wells in Martin and St. Lucie Counties

- No pumps on flowing Floridan wells in Martin or St. Lucie County, except under *Applicant's Handbook* guidelines

Lake Okeechobee and Lake Okeechobee Service Area

- Water allocations are limited to historical condition water uses occurring from April 1, 2001 to January 1, 2008

Summary

More than one water resource protection tool can apply to a waterbody:

- Northwest Fork Loxahatchee River: MFL and RAA
- St Lucie Estuary/River: MFL and Reservation
- Lake Okeechobee: MFL and RAA

Over 8 million acres are protected with these tools, or about 75% of the SFWMD

Questions?

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Dispersed Water Management Program
Public-Private Partnerships for Water Resources Protection

Upper East Coast
Water Supply Plan Update Workshop
June 25, 2015

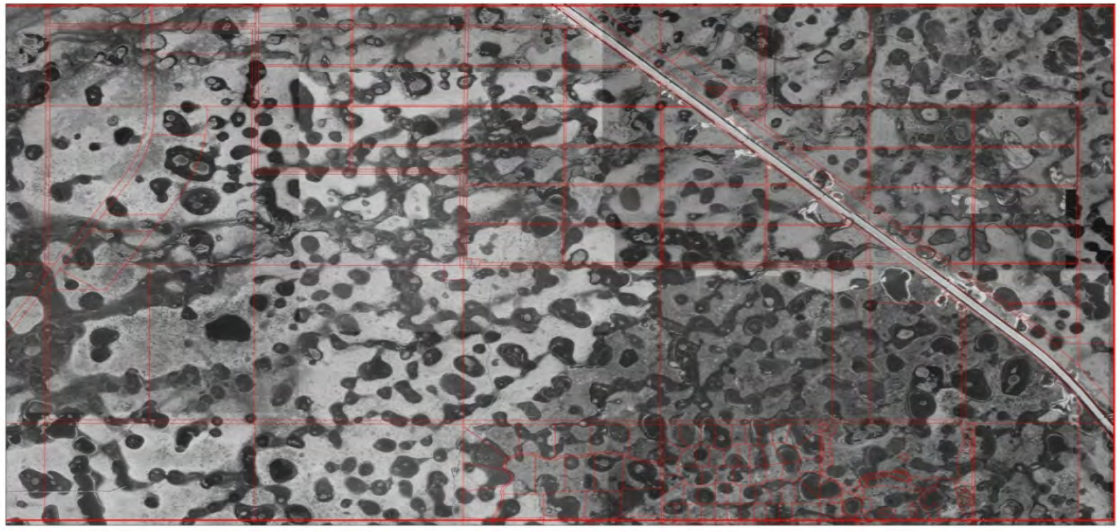
Boyd E. Gunsalus, Lead Environmental Scientist
SFWMD Okeechobee Service Center

Dispersed Water Management (DWM)

Definition: Shallow water distributed across parcel landscapes using relatively simple structures

Why do Dispersed Water Management?

Nine Gems
2006 and 1958 Aerial Imagery

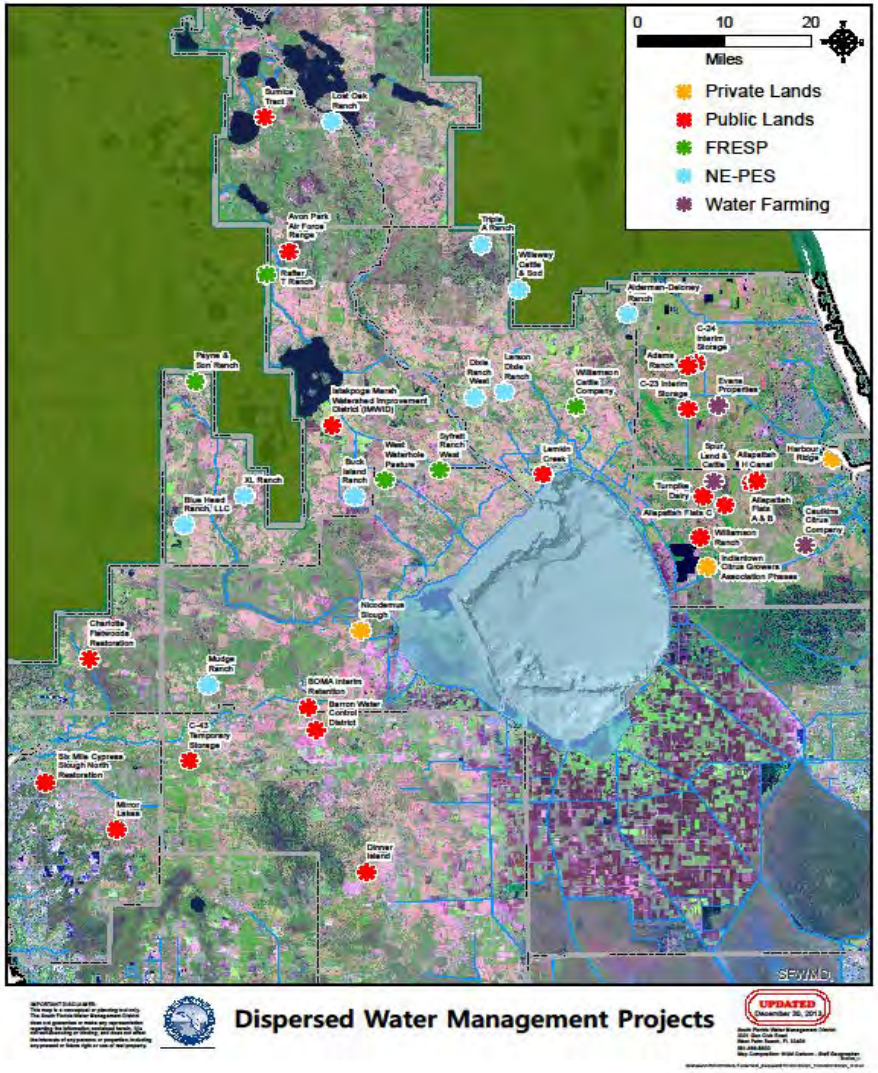


Program Benefits

- Increased water storage
- Less water sent to Lake Okeechobee and estuaries
- Reduced nutrient loadings
- Increased groundwater recharge
- Improved habitat
- Higher soil moisture in dry season
- Rapid implementation

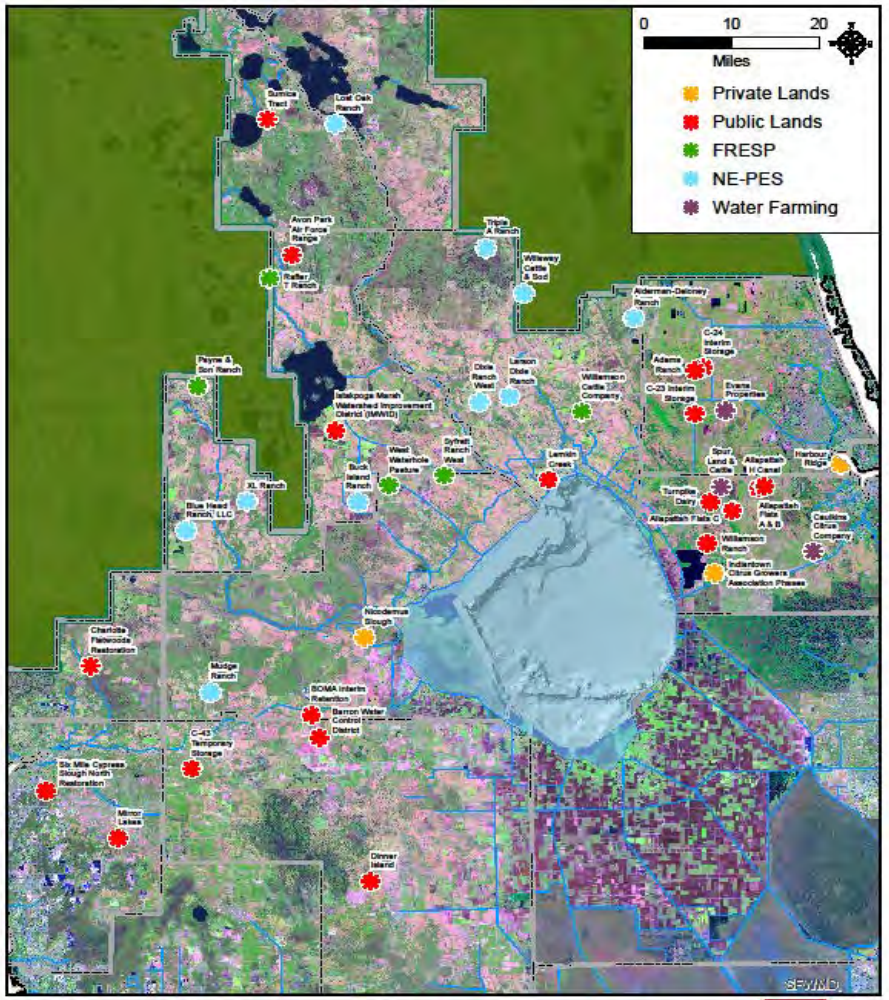
Primary Project Types

- Florida Ranchlands Environmental Services Project Pilot
- Northern Everglades - Payment for Environmental Services
- Regional - Private lands
- Public Lands
- Water Farming

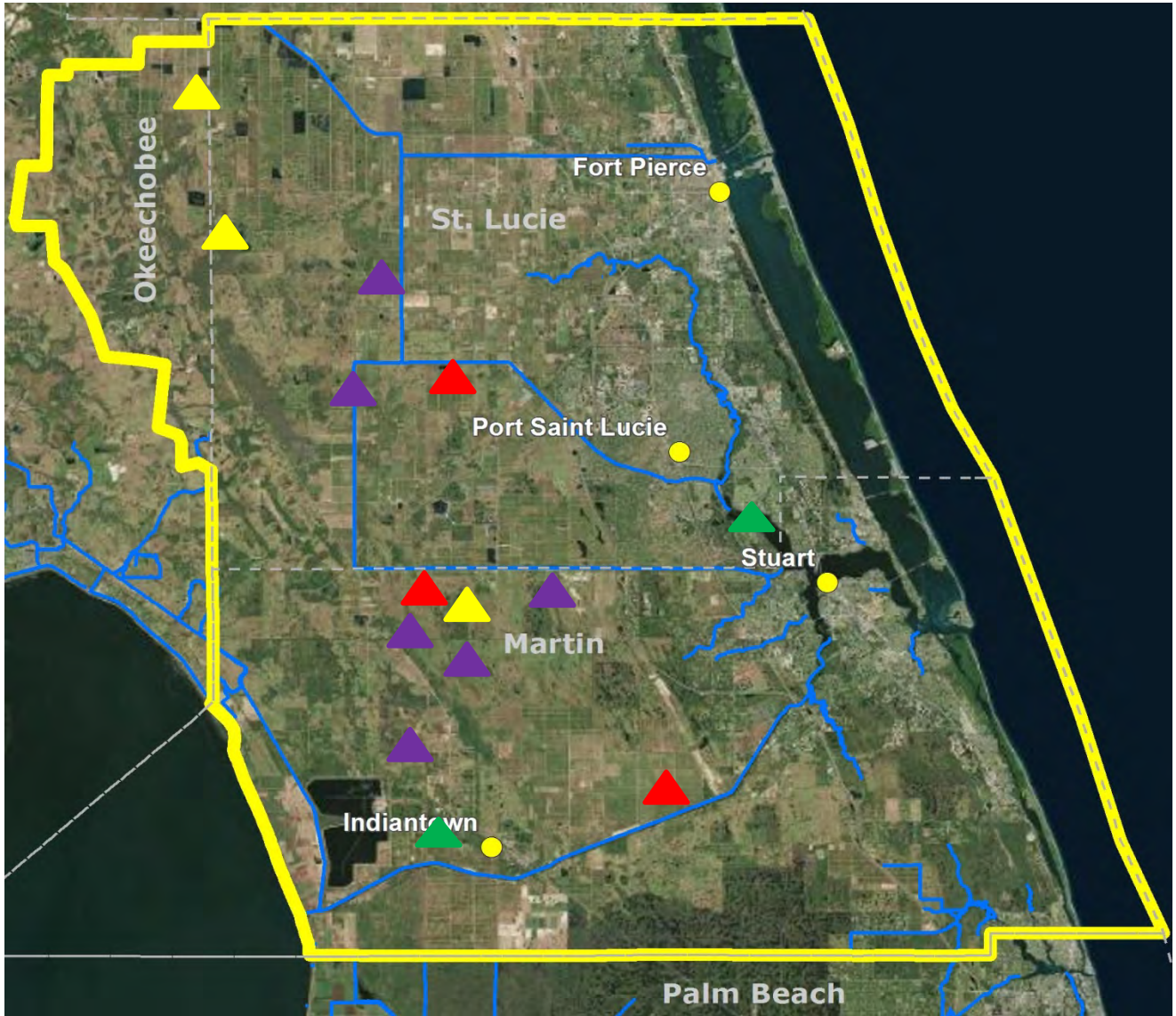


Summary of Created Additional Storage

- 92,973 acre-feet of operational storage
- Another 101,198 acre-feet permitted/planned



DWM Projects within the Upper East Coast Planning Area



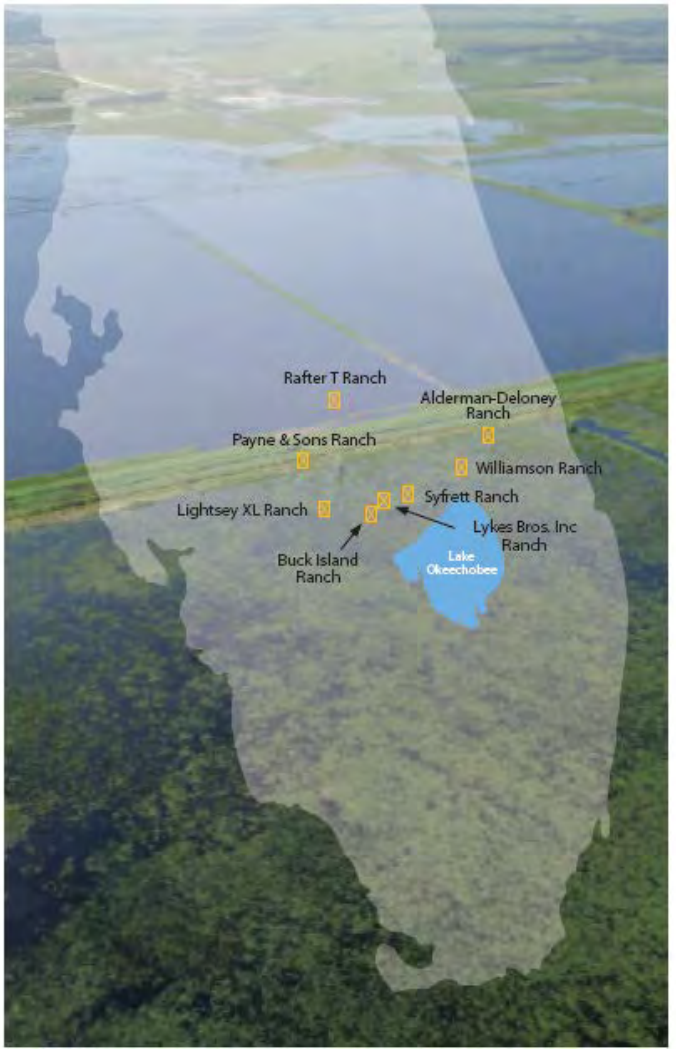
- Private Lands
- Public Lands
- NE-PES
- Water Farming

Dispersed Water Management Projects
Upper East Coast Watershed Overview

- **Allapattah Flats (Hydrologic Restoration)**
  - Williamson Ranch (533 acres)
  - Turnpike Dairy (96 acres)
  - Parcels A & B (12,725 acres)
  - Parcel C (6,142 acres)
- **C-23/C-24 Reservoir & STA Complex**
  - North Reservoir (2,800 acres)
  - South Reservoir (6,200 acres)
  - Stormwater Treatment Area (2,900 acres)
  - Interim Measures
- **Harbour Ridge Property Owners Assoc.**
  - Retain excess discharges from C-23 (95 acres wetlands/lakes)
- **Water Farming**
  - Pilot Projects on Fallow Citrus Lands

Florida Ranchlands Environmental Services Projects (FRESP)

- Public/private collaboration
- Field test market-based payment for water retention and/or phosphorus reduction
- Eight pilot projects; initially 3 years of operation



Example: FRESP

Rafter T Ranch – Highlands County

Northern Everglades Payment for Environmental Services (NE-PES)

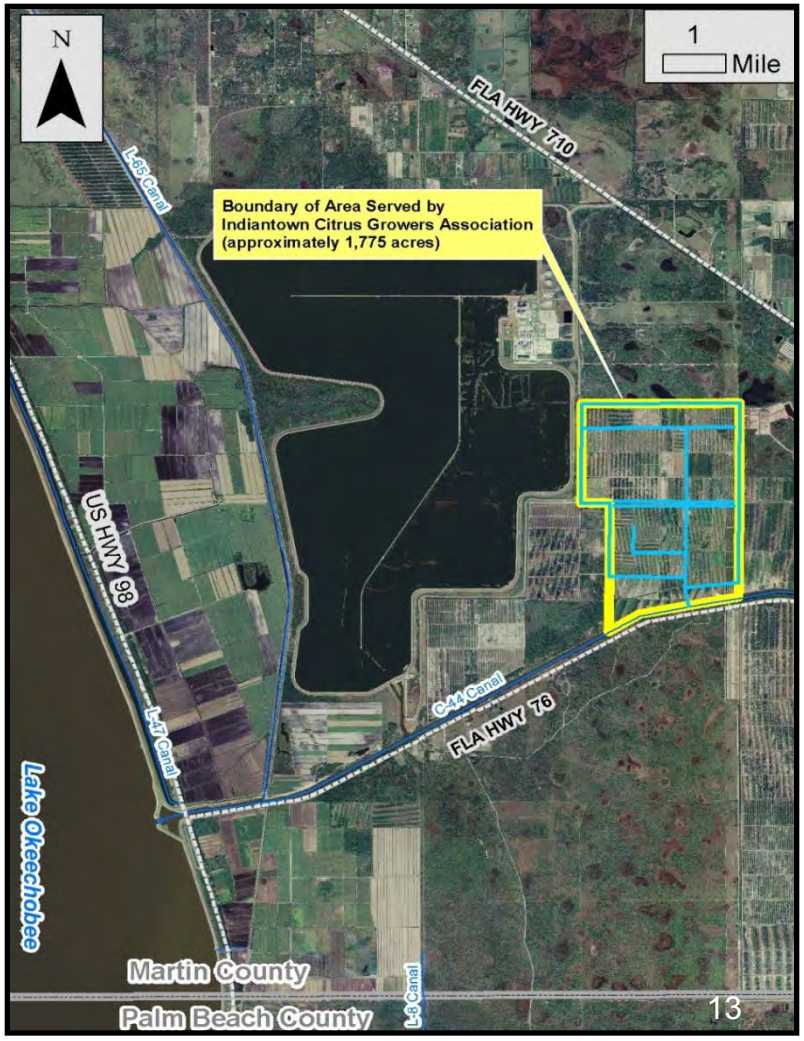
- 2011 Competitive bid process based on success of FRESP
- Eight initial contracts (NE-PES 1)
  - Total 4,800 acre-feet/year
  - Average cost - $163/acre-feet
- Six new projects added in 2014 (NE-PES 2, 8 projects)
  - Total 6,700 acre-feet/year
  - Average cost $123/acre-feet
  - Design/Permitting phase
    - 97,748 acre-feet

Example: NE Payment for Environmental Services

Dixie Ranch – Okeechobee County

Private Lands Project -Indiantown Citrus Growers Assoc. (Cost-Share)

- 1,775 acres
- Phase I: pump rehabilitation
- Phase II: Internal canal widening (FDACS)
- Phase III: Internal structures 60+ (NRCS, SLRIT)
- Storage within system:
  - 7,000 acre-feet
- St. Lucie Canal estimated volume during LO regulatory releases:
  - 3,550 acre-feet



Public Lands Projects

Projects on District owned lands or in cooperation with other public entities

- Total projects:
  - Twenty Three (23)
- Total operational projects:
  - Twelve (12)
- Total acre-feet:
  - 24,354 acre-feet operational
  - 3,805 acre-feet construction

Public Lands Interim Projects
Current Status

- **C-23/C-24 Reservoir & STA Complex**
  - **North Reservoir: approx. 2800 acres**
  - Added 190 acre-feet over 300 acres
  - Working with Lessee on 1,000 acres
  - **South Reservoir: approx. 6200 acres**
  - 1000 acres in Planning/operational Phase
  - Copper Field Study
  - Stormwater Treatment Area: approx. 2900 acres
  - Working with lessees to identify additional areas

- **Allapattah Parcels A & B, Williamson Ranch & Turnpike Dairy WRP**
  - Agreements with NRCS for Wetland Reserve Program (WRP) projects
  - **Parcels A & B**: 4,743 acre-feet of retention (Const. beginning this dry season)
  - **Williamson Ranch**: 387 acre-feet of retention (Completed)
  - **Turnpike Dairy**: 5 acre-feet of retention (Completed)

The Water Farming Concept

The Evolution of DWM?

- The Challenge:
  - Damaging wet-season discharges
  - State struggling to fund long-term projects for water resource restoration (CERP)
  - Citrus industry devastated by Citrus Greening, etc.
- The Opportunity:
  - Lots of fallow citrus land in watershed
  - Significant infrastructure already in place
- The Concept:
  - Brought to us by the Indian River Citrus League
  - Utilize fallow citrus lands for near-term storage of excess wet season flows
  - Compensate citrus owner for providing environmental service as a commodity
  - “Build the bridge”

Water Farming

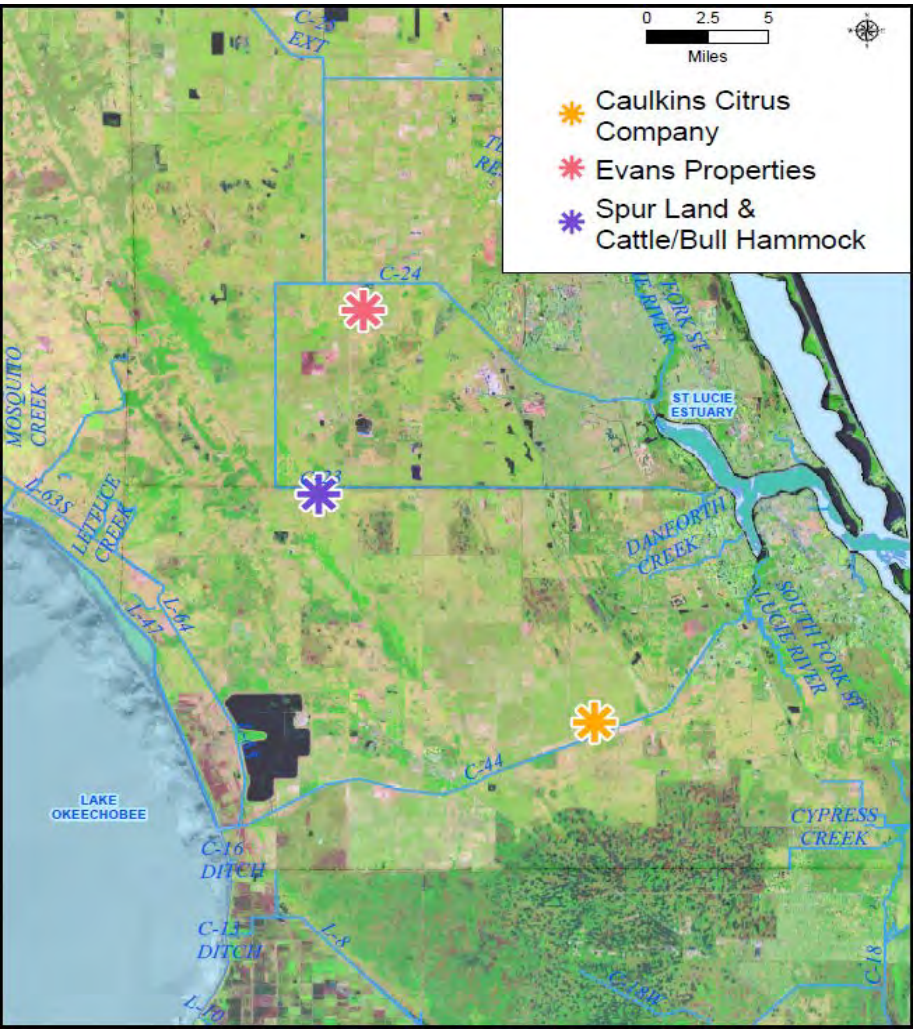
Cooperative Agreements for Feasibility Studies

- **Indian River Citrus League**
  - Studied multiple WMAs on two privately-owned fallow sites
  - Report completed April 2012
  - Recommended moving forward with pilot testing (underway)

- **Gulf Citrus Growers Association**
  - Studied storage potential on public and private sites
  - Completed October 2013
  - Pilots and future projects pending additional funding source

Water Farming

St. Lucie River Basin Pilot Study



- Request for Proposals
  - Above-ground flooding of fallow grove
  - Retention in existing facilities only
  - High percolation sites
- Five Competitive Submittals
  - Three selected pilot sites
  - Pilot Study Funding
    - $1.6M SFWMD Funds
    - $1.5M FDEP 319 Grant
  - 3-Year Agreements

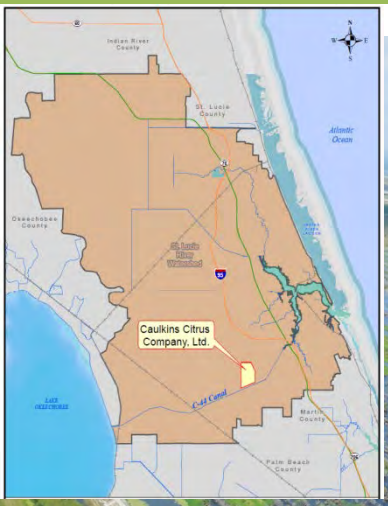
Water Farming

St. Lucie River Basin Pilot Study

- Goals of Pilot Study
  - Reduce volume discharged from direct rainfall
  - Reduce regional system volume being discharged to estuary
  - Reduce load of TN and TP to estuary
  - Monitor and document costs and benefits
  - Make an informed decision regarding future role of Water Farming.

Water Farming

Pilot Site 1 – Caulkins Citrus



- Project Summary
  - 450 Acre Fallow Grove
  - Construction of perimeter levee
  - Water diverted via pump from C-44 Canal
  - 413-acre impoundment – 4 feet deep
  - Deep sands with no confining layer
    - Anticipated high percolation rate
  - Proposed retention = 6,780 acre-feet/year

Water Farming

Pilot Site 1 – Caulkins Citrus (cont.)

- Construction complete
- Operational Feb. 1, 2014
- Estimated Annual Volume Pumped: 6,780 acre-feet
- Volume Pumped 2014: 11,840 acre-feet
- Water Budget/Seepage Analysis Study Ongoing

Water Farming

Pilot Site 2 – Evans Ideal 1000

- Project Summary
  - 970 acres fallow grove
  - Annual retention volume 3,635 acre-feet
  - Water staged to top of bed, and utilizing existing above-ground impoundment
  - $147 per acre-feet/year
  - Operational May 2015

Water Farming

Pilot Site 3 – Spur Land & Cattle

- Project Summary
  - 60 acres fallow grove
  - Water stored 4 feet deep
  - Annual retention volume 870 acre-feet
  - Utilizing adjacent wetland/slough for additional water quality treatment
  - $81 per acre-feet/year
  - Operational January 2015

Water Farming

Potential Hurdles

- Potential seepage
  - Impacts on neighboring properties
  - Geotechnical required
- Chemical contamination
  - Phase I/II Assessments
  - Potentially high remediation costs
  - Copper is primary concern

Water Farming

Potential Hurdles (cont.)

- Wetlands creation and/or expansion
  - "Baseline hydrologic condition"
  - State reversion protection in place
  - Federal permit in process
- Wildlife habitat creation
  - USFWS Safe Harbor Agreement
    - In process, but difficult to obtain

Water Farming

What's Next?

- Pilot Study Completion
  - Data collection
    - Storage capabilities
    - Water quality
  - Contract optimization
    - Cost
    - Structure
  - Seasonal analysis
- Explore Funding Options
  - Legislative
  - Sister agencies
- Long-term projects?
  - Depends on pilot results

DWM Economic Benefits - Public

- Avoids high cost of land acquisition & management
- Keeps land on local tax rolls
- Supports community economy
- Reduces land conversion

DWM Economic Benefits - Landowner

- In some cases, underlying ag use is maintained
- Income diversification
- May decrease irrigation or feed costs in dry season
- Income stream may replaces losses from non-production

DWM Challenges

- Projects are temporary
- Limited operational flexibility
- Small volumes per acre require numerous contracts
- Comparisons to regional projects is apples to oranges
- Dispersed Water Management is not the solution to all of our resource challenges.

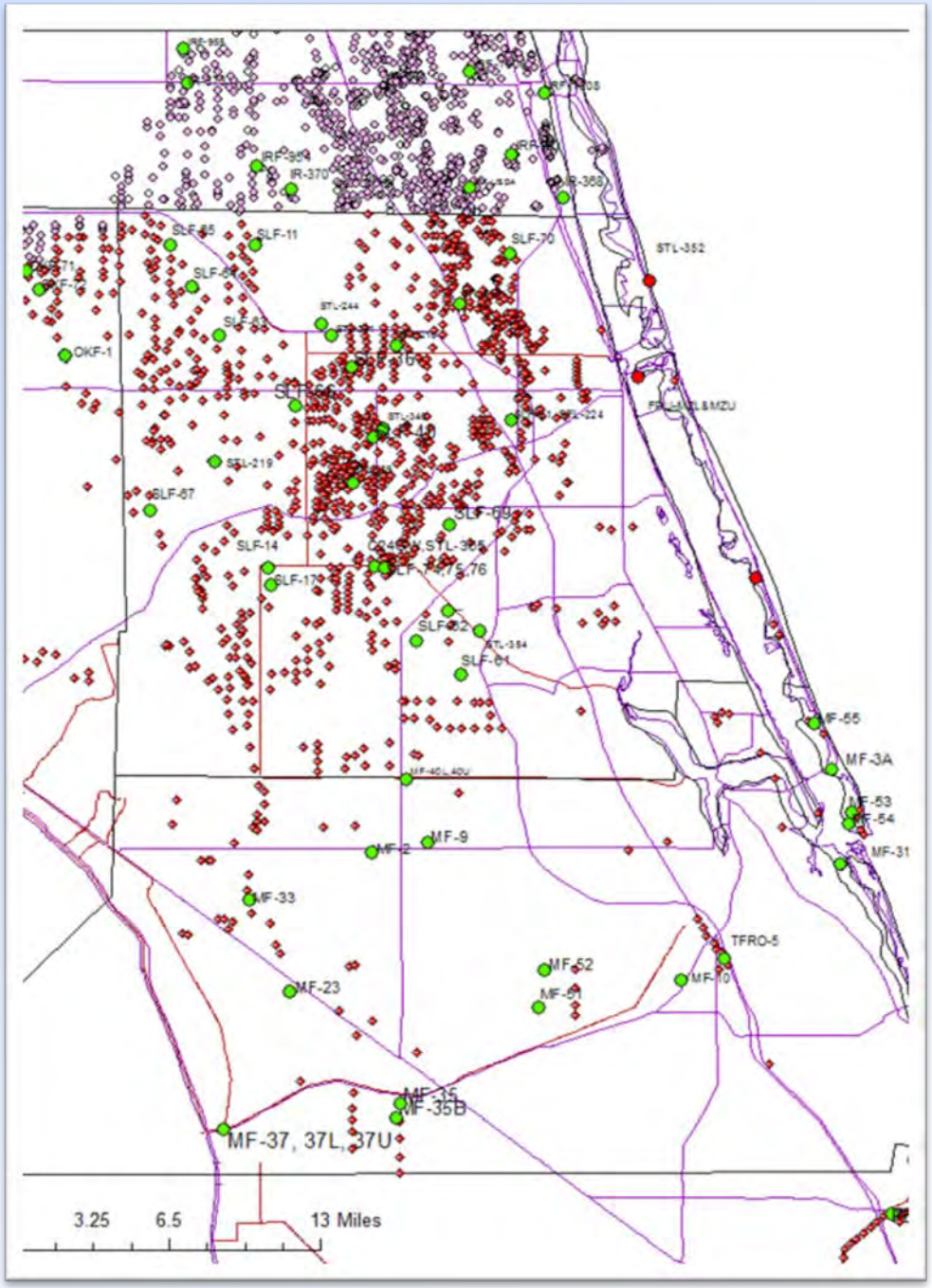

Questions?

Overview of Upper East Coast Floridan Aquifer Modeling

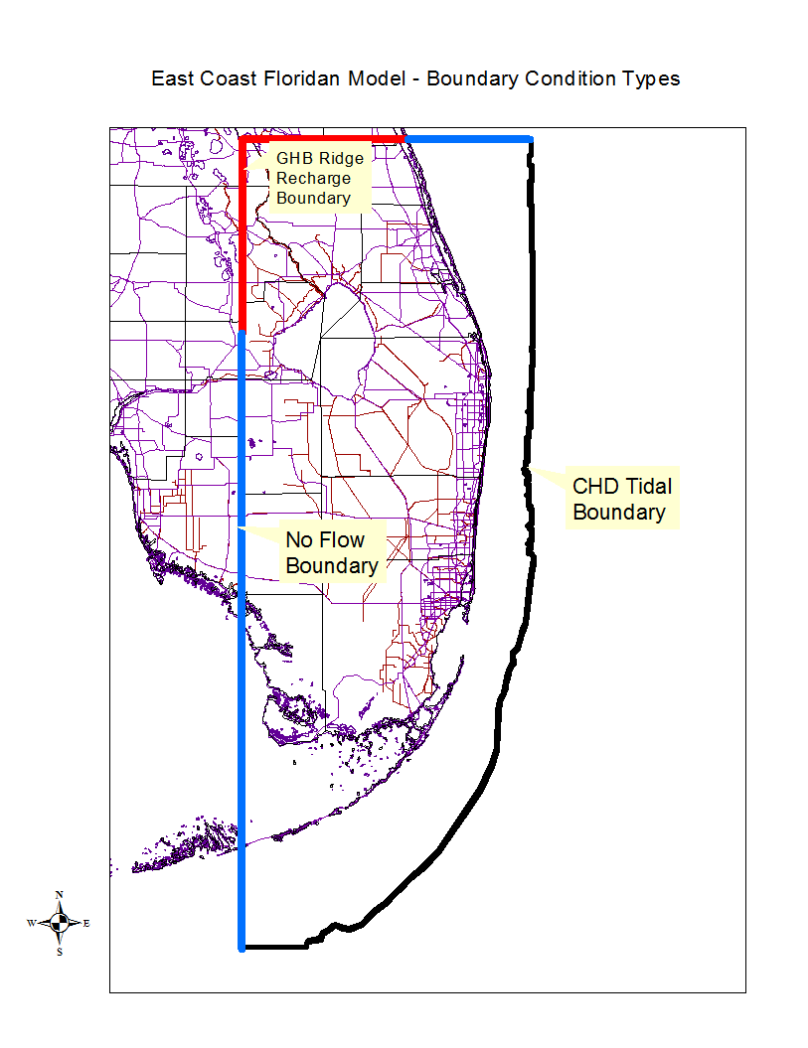
John Mulliken
Floridan Aquifer Modeling Coordinator
Water Supply Bureau

June 25, 2015

Permitted Floridan Aquifer Wells in UEC Planning Area



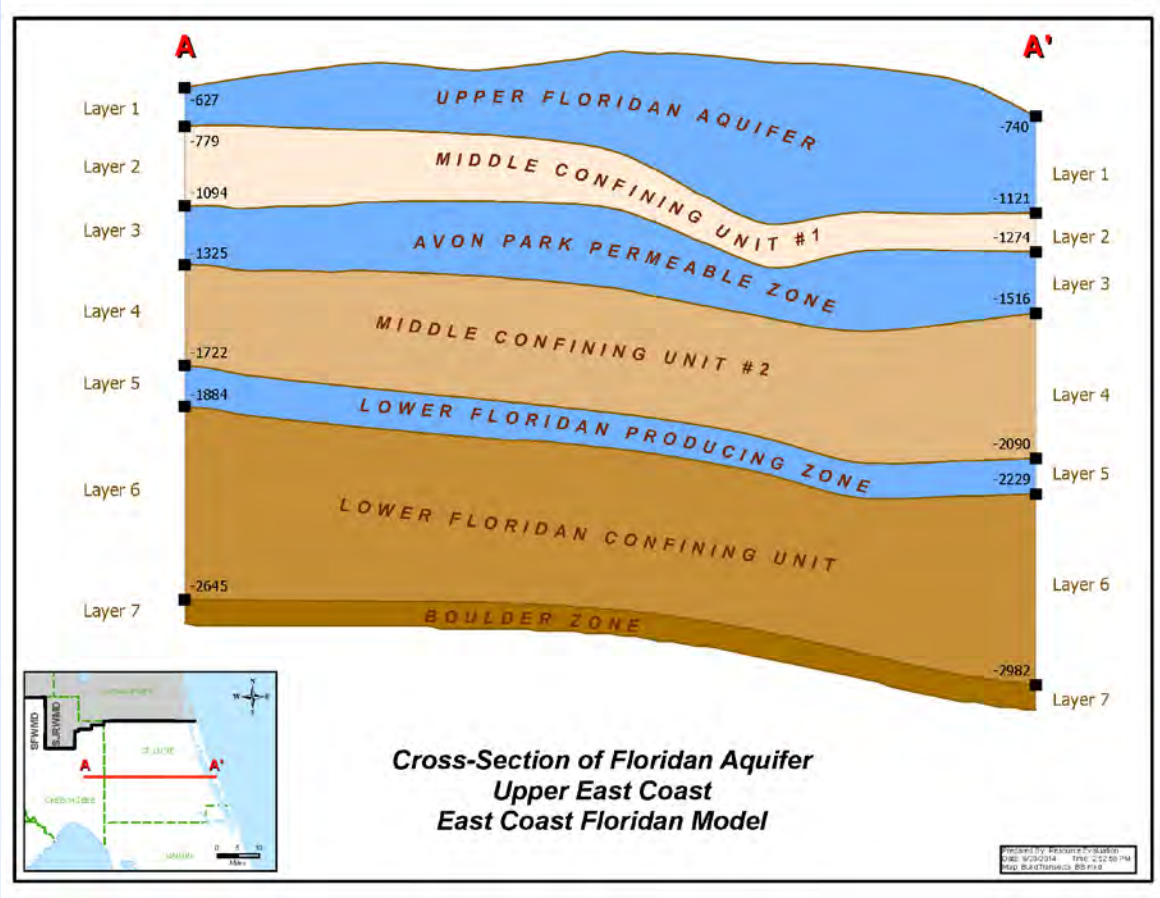
UEC Floridan Aquifer System Model Analysis



- **First application of East Coast Floridan Model (ECFM)**
  - Simulates water quality in addition to water levels and flows
- **Meetings with stakeholders and adjacent water management district**
- **Two public meetings**
  - Objective and Approach
    - June 26, 2014
  - Assumptions and Results
    - June 3, 2015

Model Overview

- Cell Size: 2,400 feet X 2,400 feet
- Calibration Period: 1989 through 2012
- Monthly Stress periods
- Vertical Extent: Upper Floridan Aquifer (Layer 1) to the Boulder Zone (Layer 7)
- Includes Water Quality (TDS) - Changes through Time



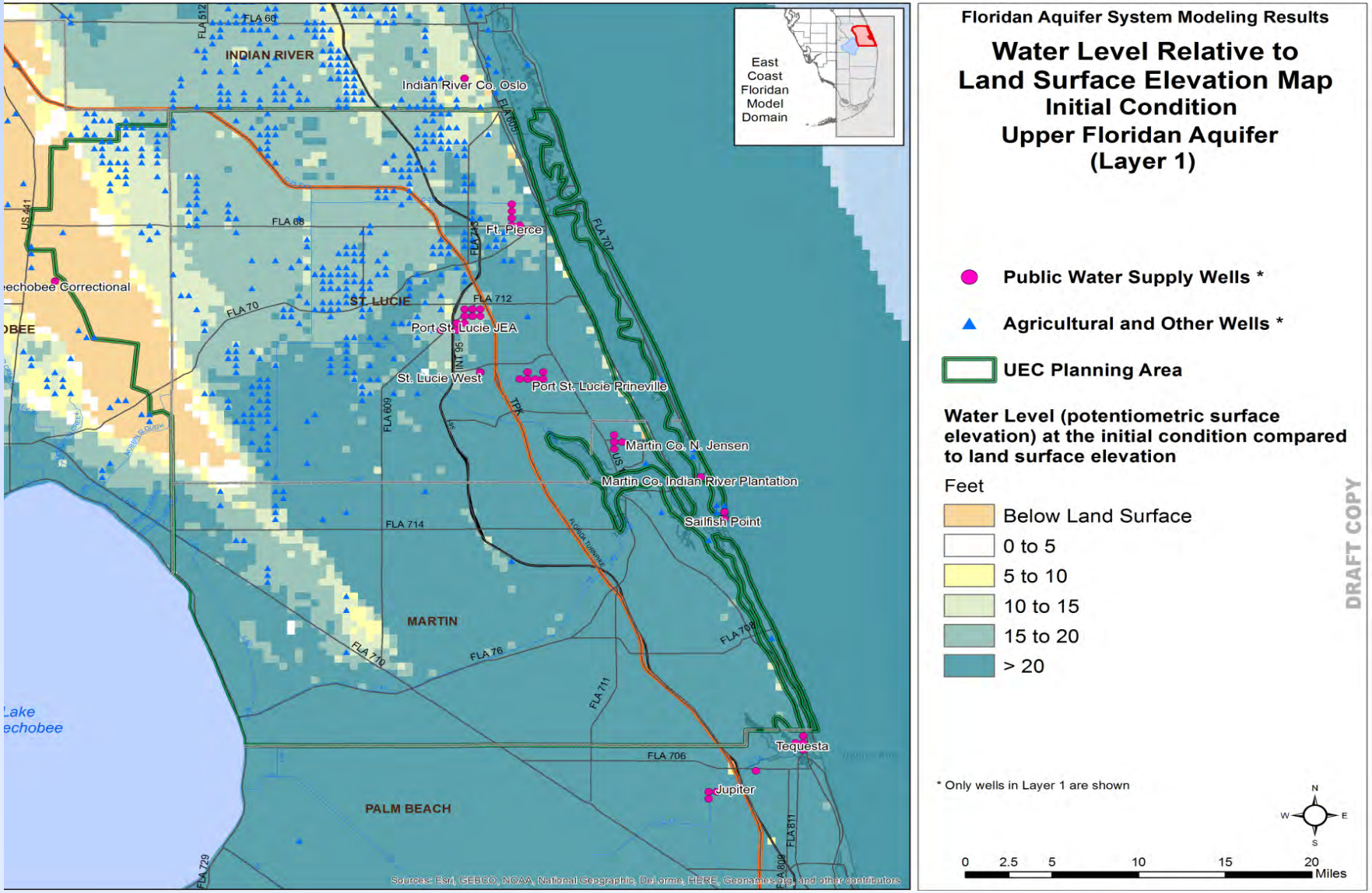
Cross-Section of Floridan Aquifer
Upper East Coast
East Coast Floridan Model

Model Simulations

- **Initial Condition**
  - Starting point for both 2013 and 2040 model runs
  - Initial water level and water quality
- **2013 Model Run**
  - Current demands are applied for each year of the 24 years of the computer simulation
- **2040 Model Run**
  - Future demands are applied for each year of the 24 years of the computer simulation

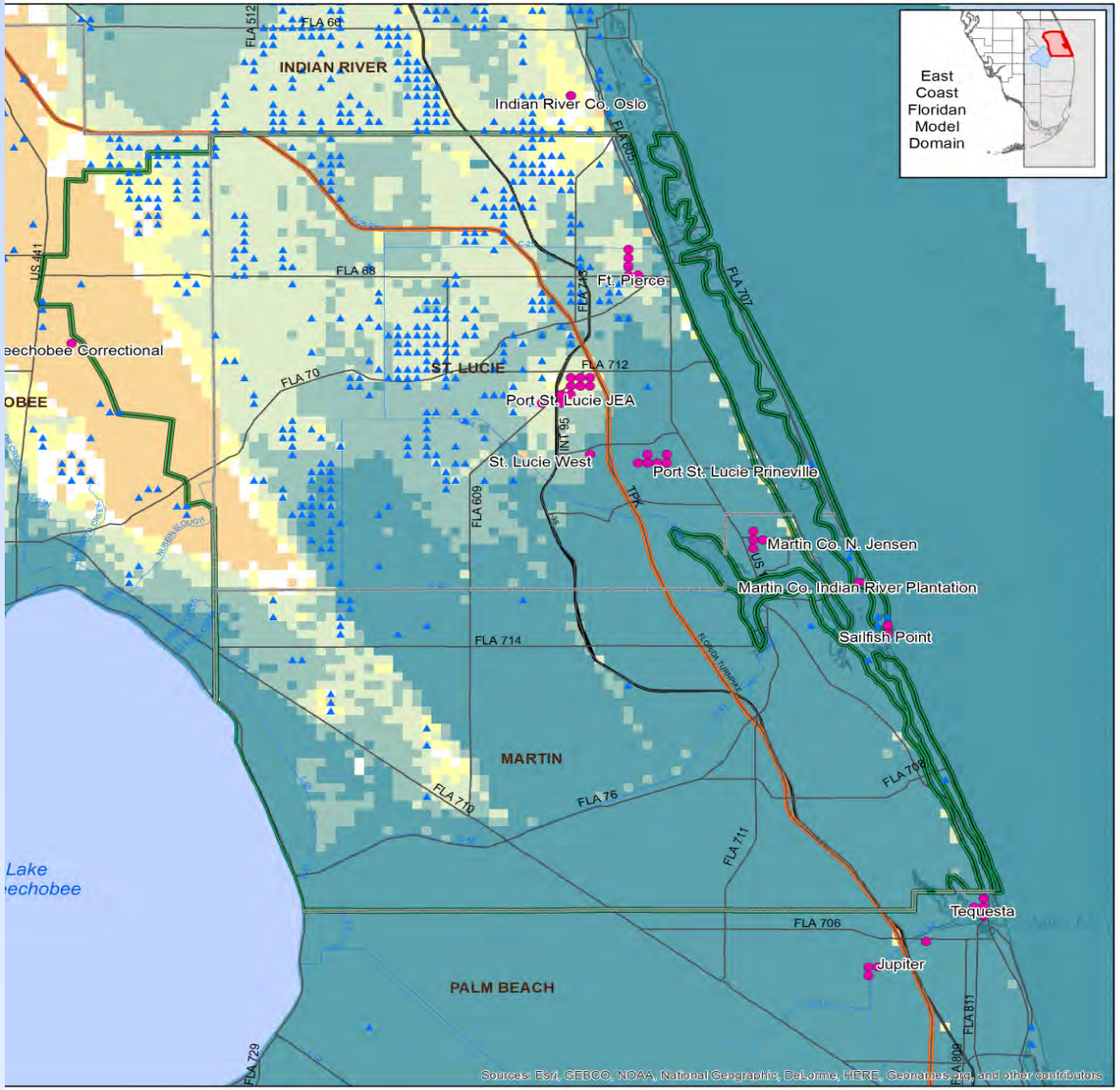
Water Level: Initial Condition

Relative to Land Surface - Layer 1



Water Level: 2013

Relative to Land Surface - Layer 1



Floridan Aquifer System Modeling Results

Water Level Relative to Land Surface Elevation Map
2013 Model Run
Upper Floridan Aquifer (Layer 1)

- Public Water Supply Wells *
- Agricultural and Other Wells *
- UEC Planning Area

Water Level (potentiometric surface elevation) in a 1 in 10 year rainfall deficit during the 2013 model run (Month 220) compared to land surface elevation

Feet

- Below Land Surface
- 0 to 5
- 5 to 10
- 10 to 15
- 15 to 20
- > 20

DRAFT COPY

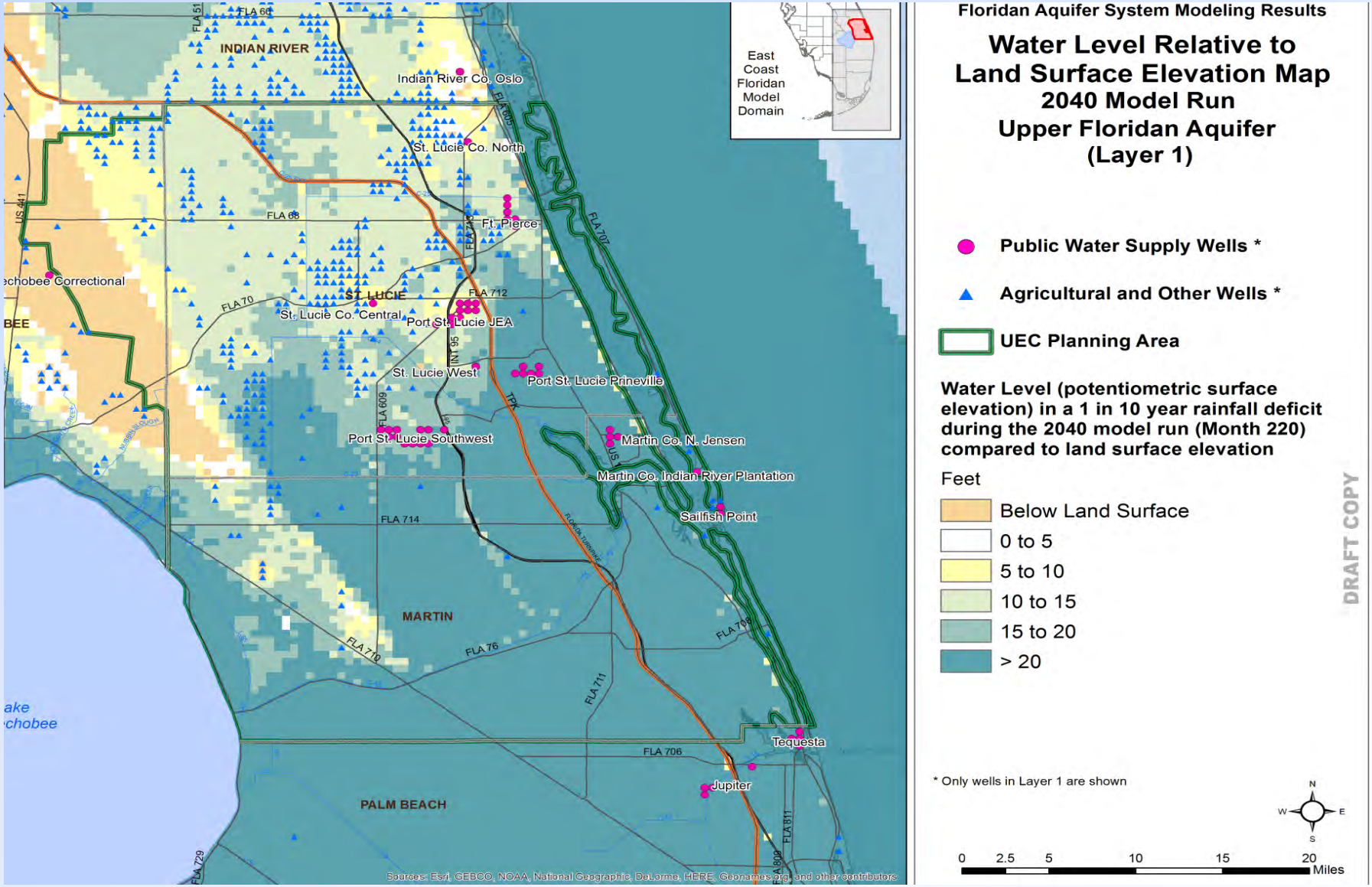
* Only wells in Layer 1 are shown

N W E S

0 2.5 5 10 15 20 Miles

Water Level: 2040

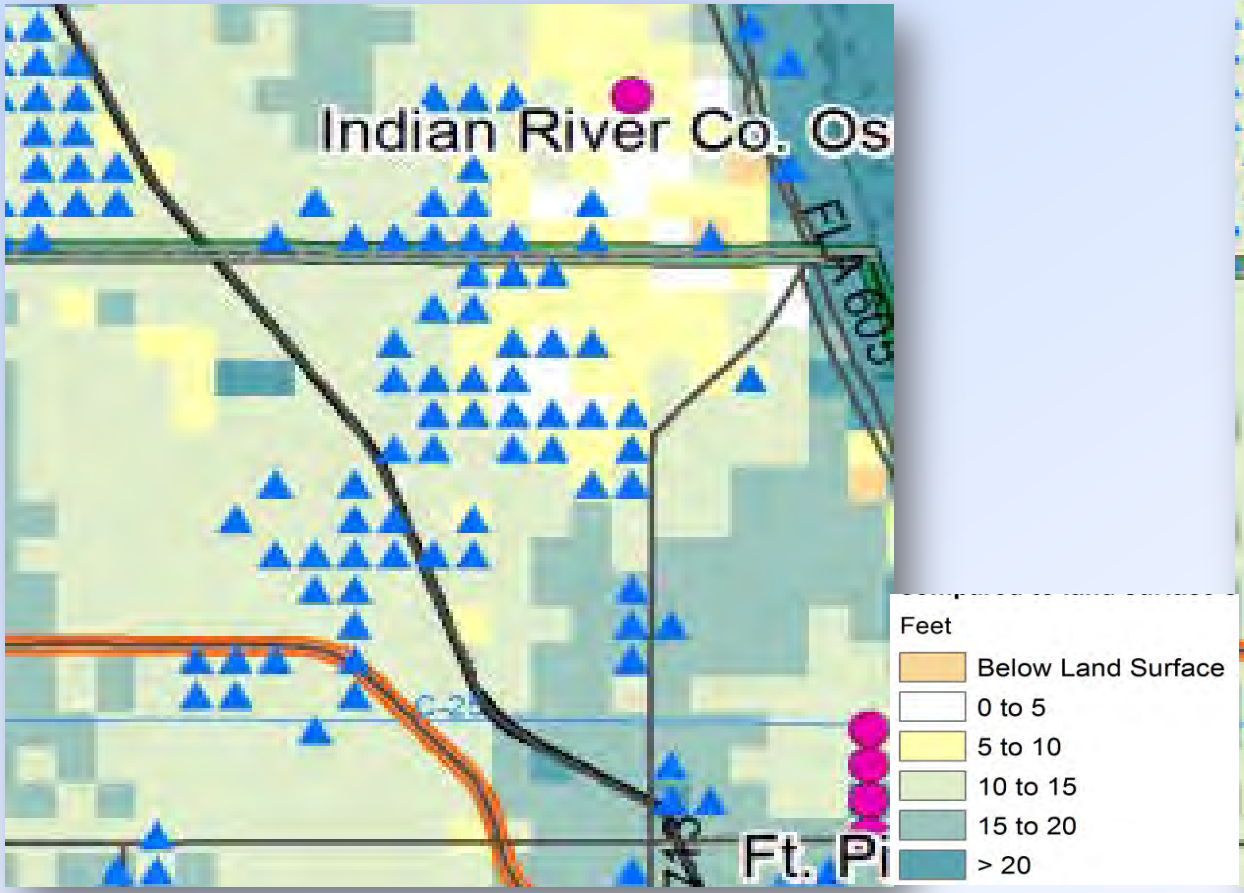
Relative to Land Surface - Layer 1



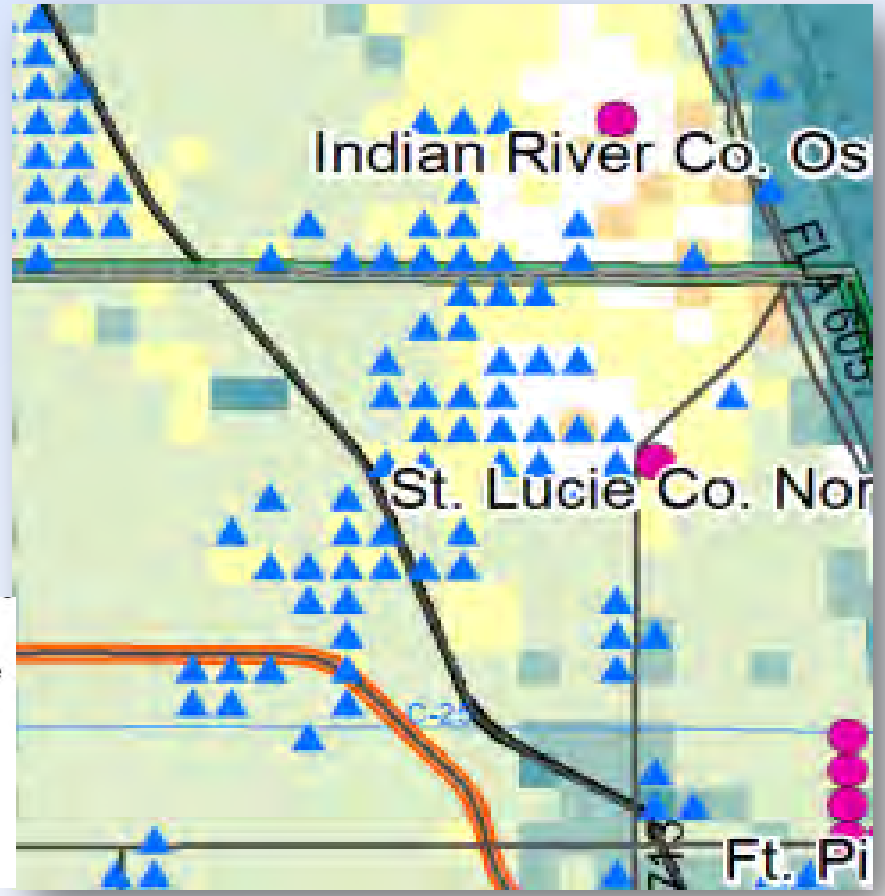
Water Level: NE St. Lucie County

Layer 1

2013 -- 1 in 10 year rainfall deficit condition



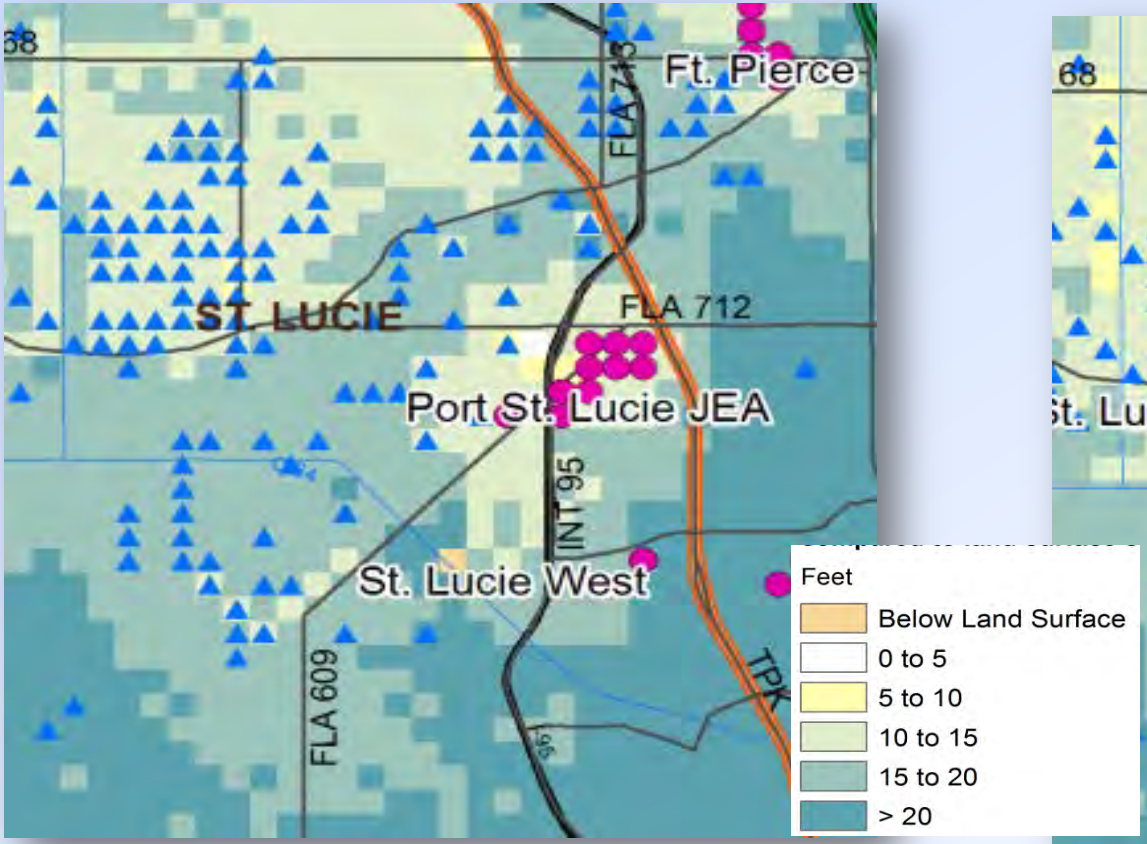
2040 -- 1 in 10 year rainfall deficit condition



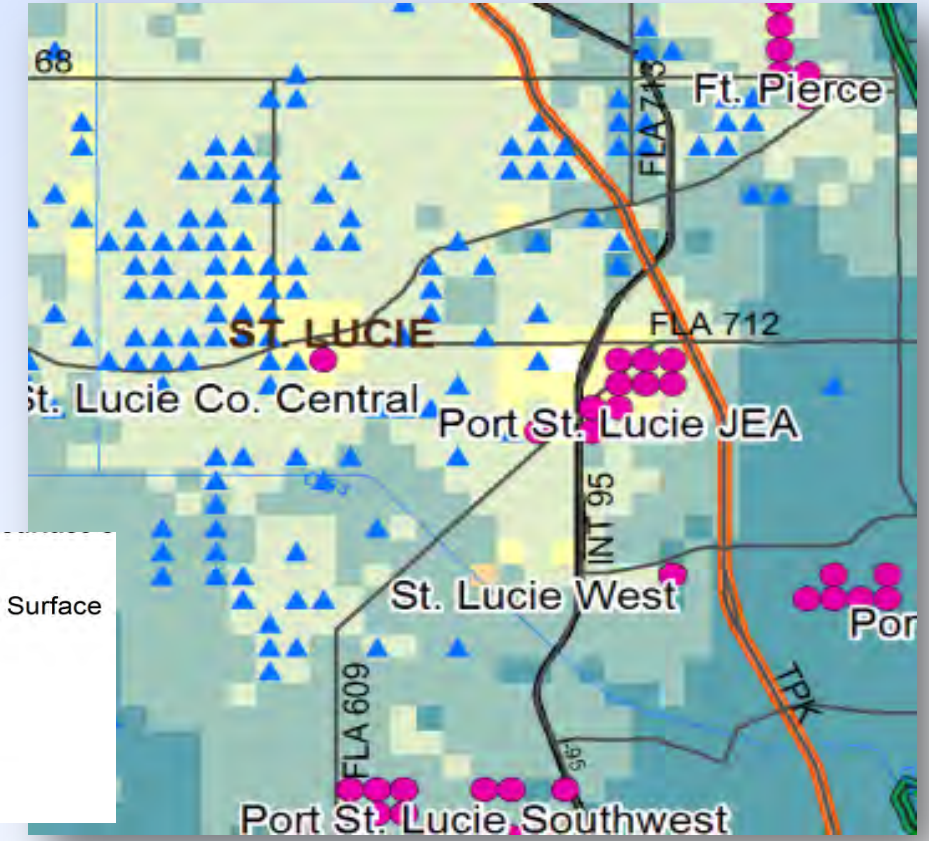
Water Level: Central St. Lucie County

Layer 1

2013 -- 1 in 10 year rainfall deficit condition

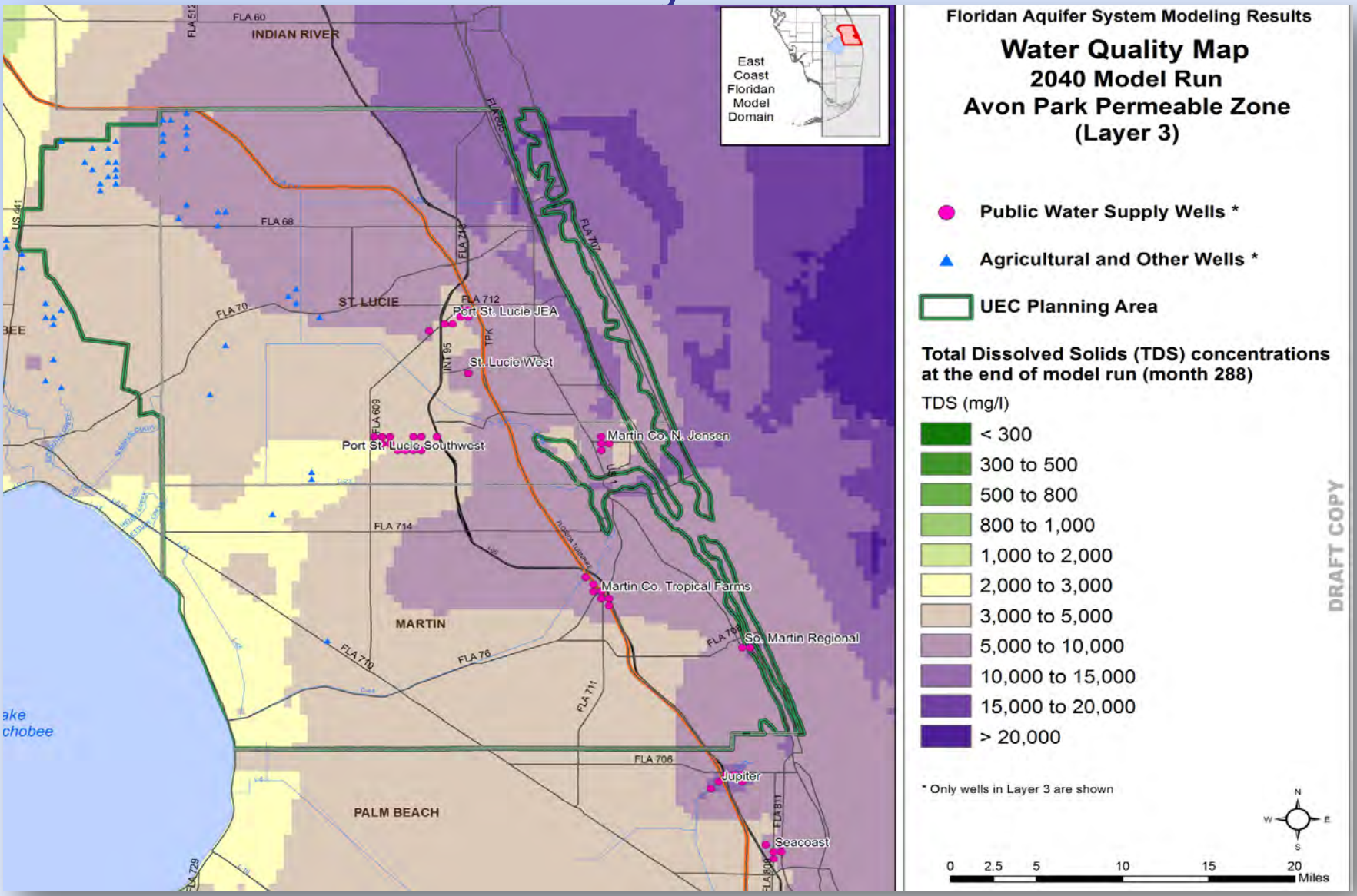


2040 -- 1 in 10 year rainfall deficit condition



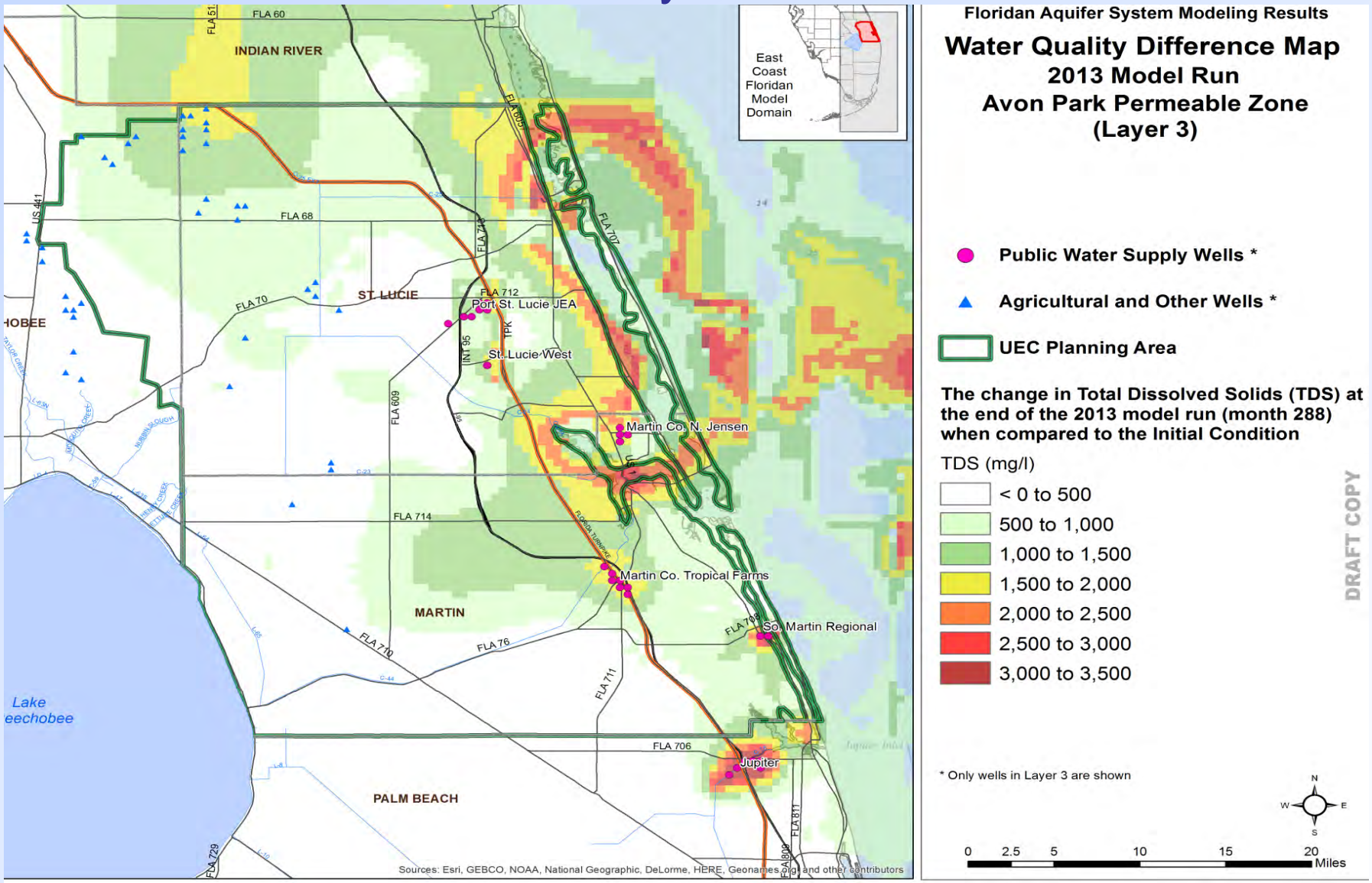
Water Quality: 2040

Layer 3



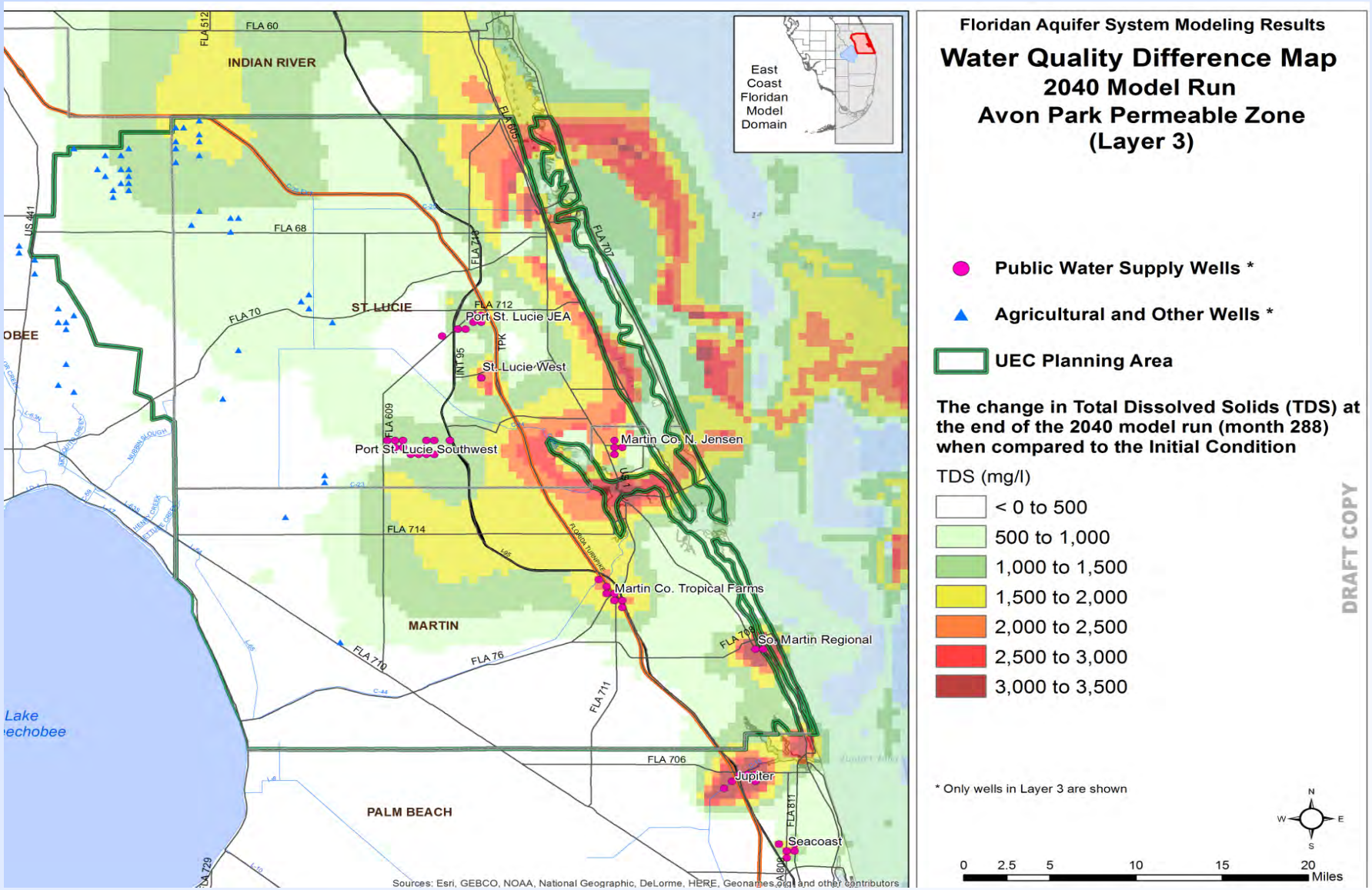
Water Quality Change: 2013

Layer 3



Water Quality Change: 2040

Layer 3



Draft Conclusions

- **Upper Floridan Aquifer (UFA) results**
  - Continued withdrawals at current rates (2013) in southern Indian River County and northern St. Lucie County will have a combined effect on water levels and water quality
    - Increased withdrawals at projected future rates (2040) will have larger effect on water levels and water quality
  - Potential decreases in water levels increases the risk of artesian flow reductions for agricultural users in portions of St. Lucie County
  - Remaining areas show little or no change in water quality or water level through the model simulations
- **Avon Park Permeable Zone (APPZ) results**
  - Water quality degradation will likely continue for Public Water Supply (PWS) utilities in St. Lucie, Martin and N. Palm Beach counties

Draft Recommendations

- Successful long-term management of the Floridan Aquifer System (FAS) for PWS will likely require a combination of:
  - Additional wells with greater spacing between wells
  - Lower capacity wells in the APPZ
  - Continued refinement of wellfield operational plans
- District will work with agricultural industry to:
  - Better understand FAS use as it relates to surface water availability
  - Better define water quality tolerances for crops
- Continue District coordination with St. Johns River Water Management District

Discussion

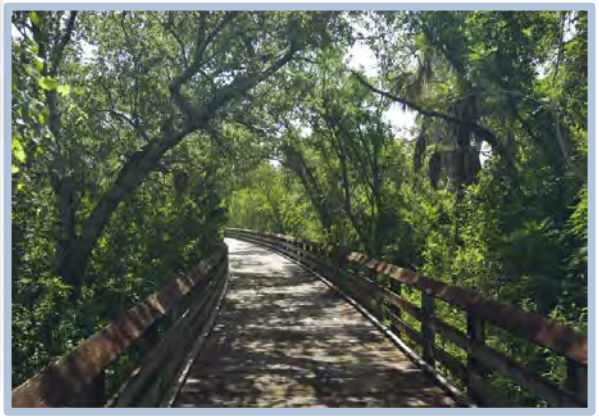
2016 UECWSP Update
Potential Water Supply Issues

- Increases in withdrawals from surficial aquifer limited
  - Wetlands
  - Salt water intrusion
- Surface water availability (storage) limited
- Freshwater discharges affecting health of coastal resources
  - Timing
  - Volume
- Long-term use of the Floridan Aquifer
  - Water quality
  - Water levels
- Others ??

Next Steps








Linda Hoppes, AICP
Lead Planner
Water Supply Development Section, SFWMD
Upper East Coast Water Supply Plan Update Workshop
Stuart, FL

June 25, 2015

Next Steps

Ongoing	Meetings with stakeholders
June 4	WRAC Presentation
June 11	Governing Board Presentation
June 25	UEC Plan Update Kick-off Public Meeting
Nov.	Distribute Draft Plan
Dec.	Public Workshop
Jan. 2016	Draft Plan to Governing Board
March 2016	Final Plan to Governing Board

UEC Water Supply Plan Information

- **Plan information, including modeling and workshops, can be found at: www.sfwmd.gov/watersupply**
- **Workshop information can be found at:**
  - SFWMD Calendar
  - WRAC agenda webpage
- **Workshop announcements sent by email**

Questions

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Upper East Coast Water Supply Plan Update Kick-off Public Workshop

SIGN IN SHEET
June 25, 2015
Stuart City Hall, Stuart, FL 34994

PLEASE PRINT CLEARLY

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Steve Lamb

Upper East Coast Water Supply Plan Update Kick-off Public Workshop

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