SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lower West Coast Water Supply Plan Public Meeting
March 23, 2017

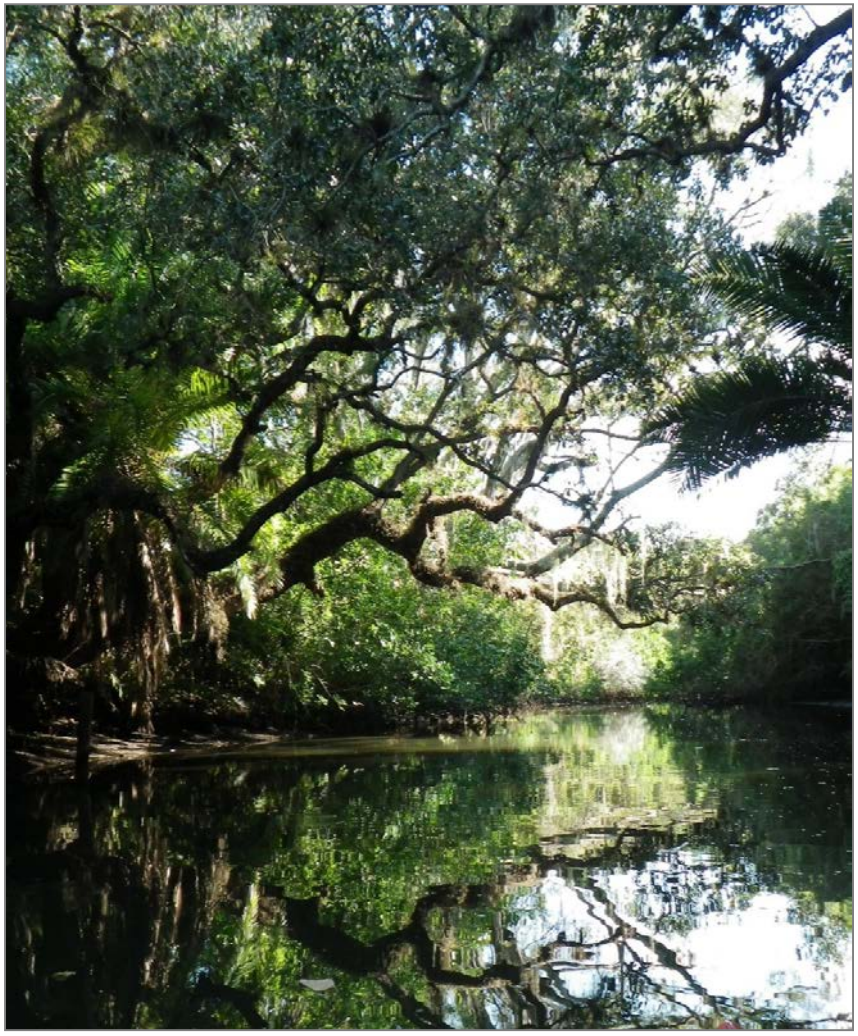
Protecting Water Resources in the South Florida Water Management District

Toni Edwards, Senior Scientist
Coastal Ecosystems Section

Giant bulrush, *Scirpus californicus*, over Lake Okeechobee
From: http://sfwmd.gov

sfwmd.gov

Water Resource Protection Tools

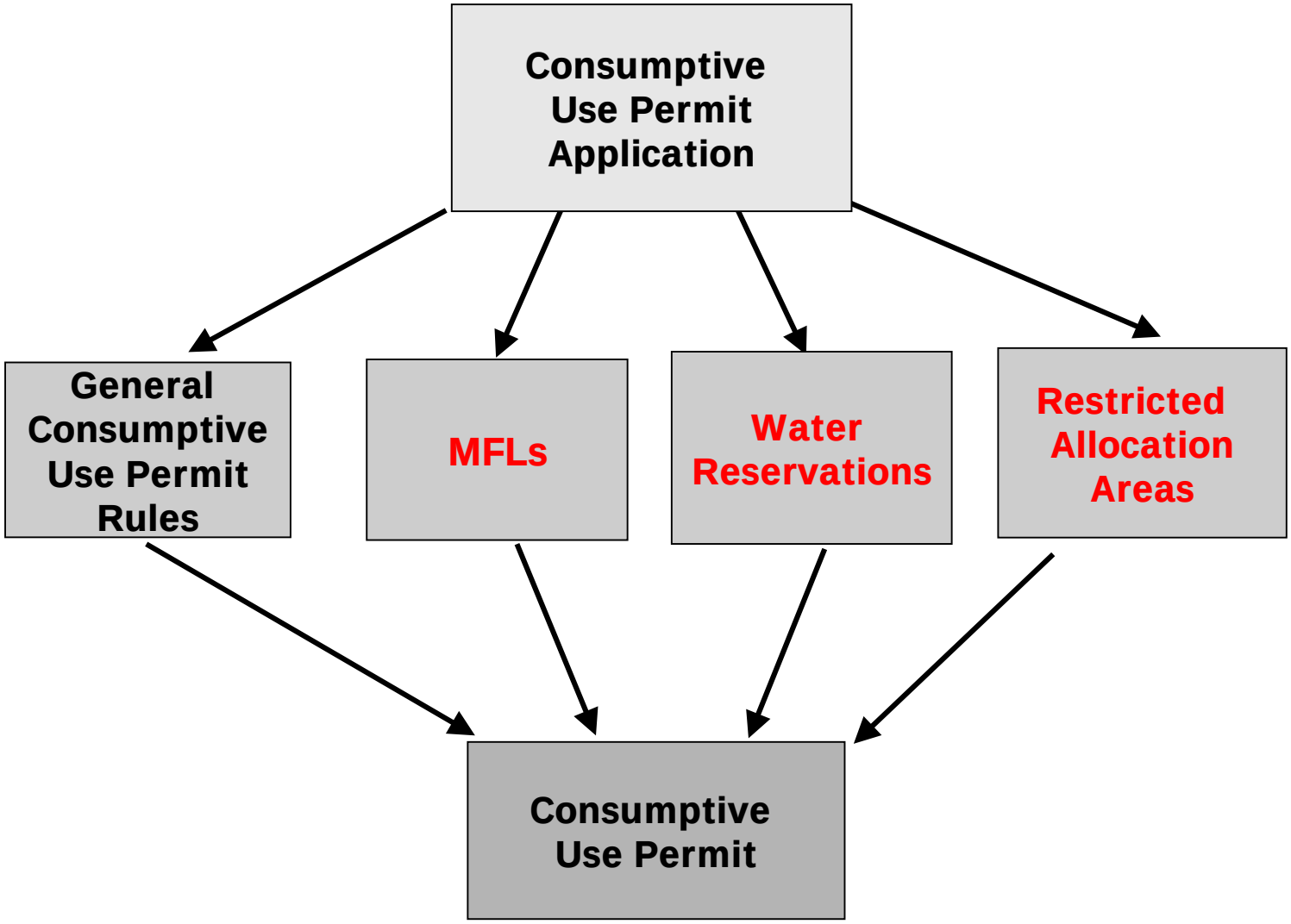


Estero River
From: http://www.shminhe.com/images/134557.html

- **Minimum Flows and Minimum Water Levels (MFL)** – ***new name in Ch. 373, Florida Statutes (F.S.), same acronym (MFL)***
- **Water Reservations**
- **Restricted Allocation Areas (RAA)**

All three are adopted by rule in the Florida Administrative Code (F.A.C.)

Factors Considered in CUP Permitting



Minimum Flows and Minimum Water Levels (MFL)

Statutory Authority:

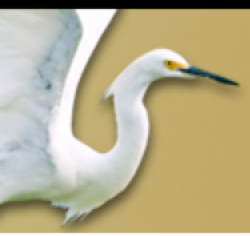
Chapter 373, F.S.

Defined in 40E-8.021, F.A.C.

- **Minimum Flows and Minimum Water 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
- May be adopted for both surface waters and ground waters

Great blue heron, *Ardea herodias*, in Big Cypress National Preserve
From: https://www.flickr.com/photos/andrei_deev/444685936

Water Resource Protection Conceptual Model



Water Levels/Flow Decreasing

Drought Severity Increasing

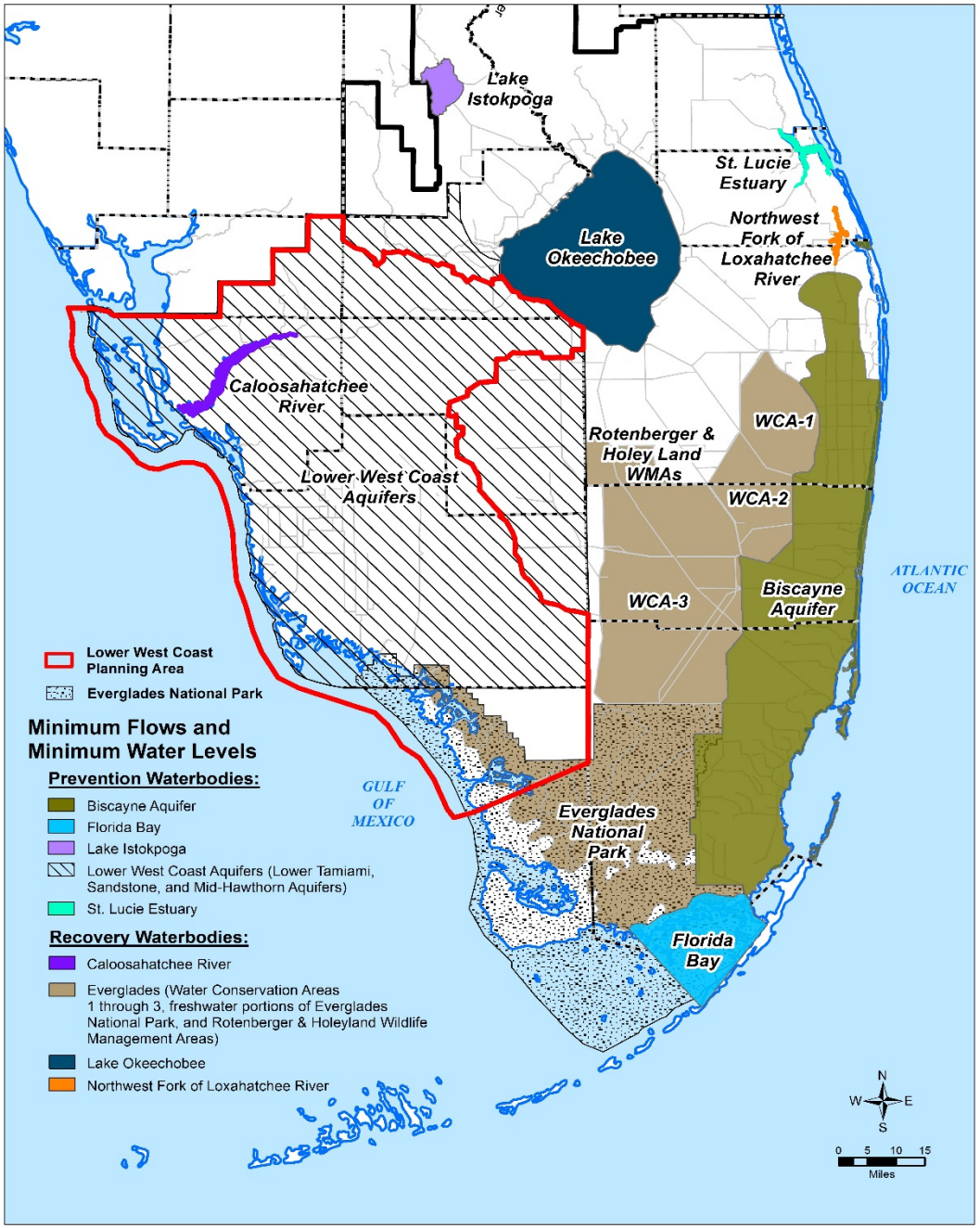
Water Resource Protection Tools	Water Resource Protection Standards	Observed Impacts
Permittable Water Reservation of Water	NO HARM (1-in-10 Level of Certainty*)	Normal Permitted Operations Environmental Restoration
Phase I Water Shortage Phase II Water Shortage	HARM	Temporary loss of water resource functions taking 1 to 2 years to recover
MINIMUM FLOWS & MINIMUM WATER LEVELS		
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 interfere with existing legal water users up to a 1-in-10 year drought condition (a drought condition that occurs only once in 10 years).*

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 MFL 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 MFL
- 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 Minimum Water 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

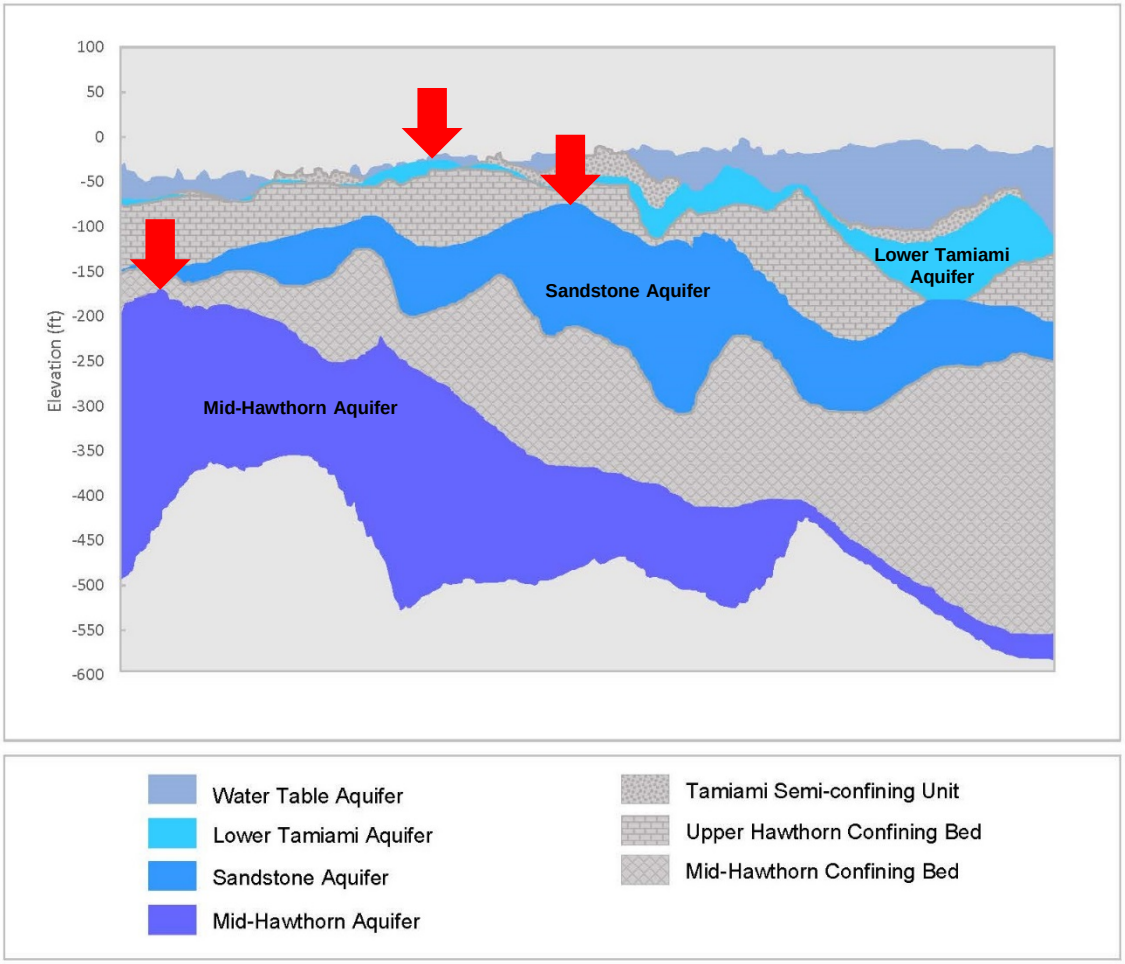
With Recovery Strategies

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

Cover > 6 million acres districtwide

Lower West Coast Aquifers Adopted MFL

Generalized Hydrogeologic Cross-Section



Adopted in 2001

Section 40E-8.331, F.A.C.

The minimum levels for the

- **Lower Tamiami aquifer**
- **Sandstone aquifer**
- **Mid-Hawthorn aquifer**

shall equal the structural top of the aquifer

An MFL violation occurs when:

Water level drops below the top of the uppermost geologic stratum that comprises the aquifer, at any point in time

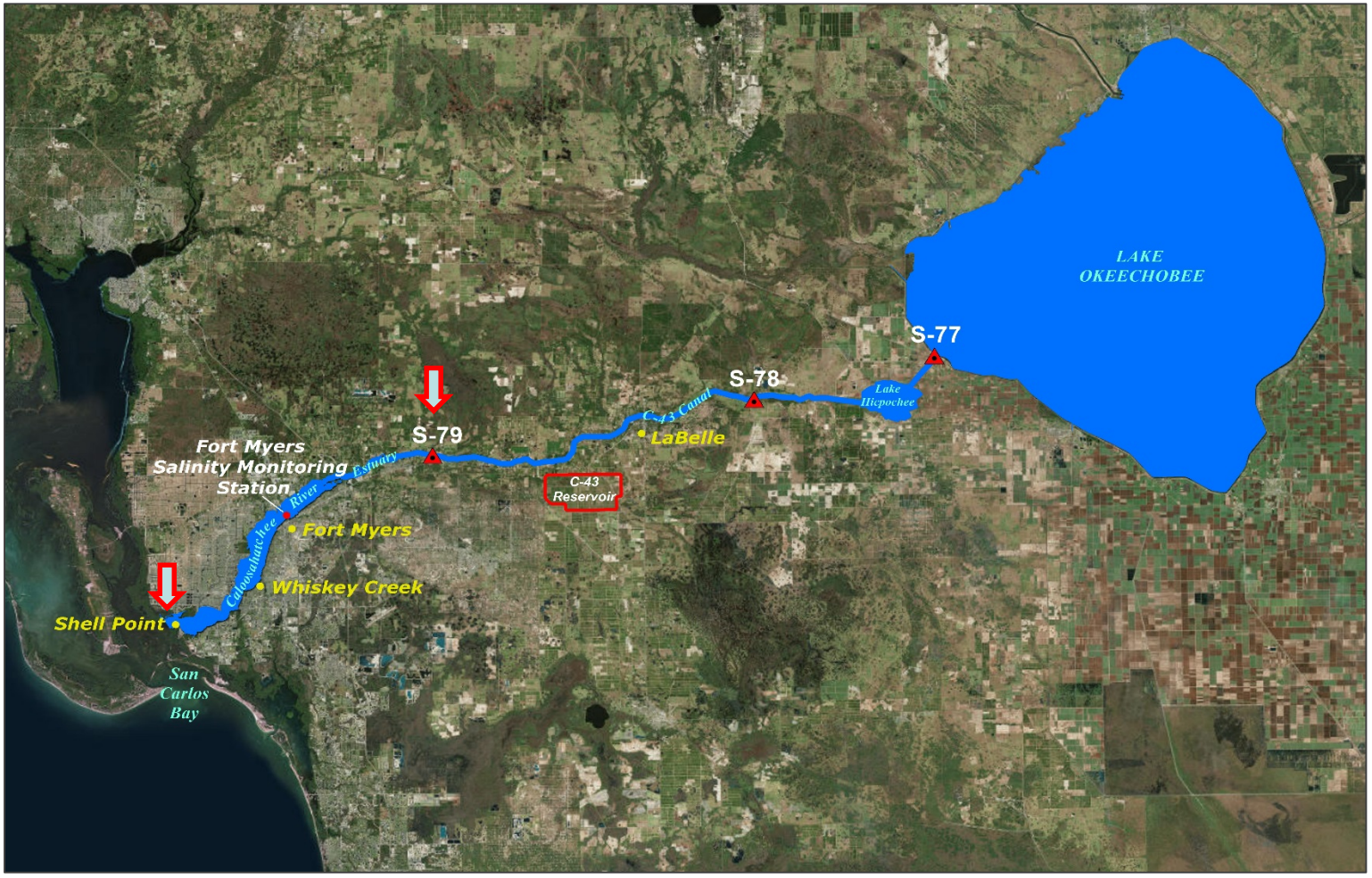
Lower West Coast Aquifers Prevention Strategy

Subsection 40E-8.421(4), F.A.C. and LWC Water Supply Plan

- Establish ”no harm” maximum permittable regulatory levels for each aquifer
  - Maximum developable limits in Section 3.9.3 of the *Applicants Handbook for Water Use Permit Applications in the South Florida Water Management District*
- Implement rule criteria to prevent harm through consumptive use permitting process
  - Consumptive use permitting criteria in Rule 40E-2.301, F.A.C.
- Construct and operate water resource and supply development projects
  - Alternative water supply and water conservation projects
- Implement Chapter 40E-21, F.A.C. water shortage plan as needed to prevent serious harm during drought conditions in excess of 1-in-10 year level of certainty

Caloosahatchee River Adopted MFL

40E-8.021(2), F.A.C. Caloosahatchee River – Surface waters that flow through the S-79 structure, combined with tributary contributions below S-79 that collectively flow southwest to San Carlos Bay.



Caloosahatchee River Adopted MFL

Adopted in 2001

Subsection 40E-8.221(2), F.A.C.

Minimum mean monthly flow of 300 cfs at the S-79 water control structure
(necessary to maintain sufficient salinities at S-79)

An MFL exceedance* occurs when (at the Ft. Myers salinity monitoring station):

- 30-day average salinity exceeds 10 ppt; *or*
- Single-day average salinity exceeds 20 ppt

An MFL violation occurs when at least one exceedance occurs in each of two consecutive 365-day periods (return frequency)

Rolling 730-day Window	
365 Days	365 Days
Exceedance 1	Exceedance 2

= Violation

* *Exceedance = MFL is not being met*

Caloosahatchee River Recovery Strategy

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

Components listed in LWC water supply plan:

- Caloosahatchee River (C-43) West Basin Storage Reservoir
- Water reservation rule [Subsection 40E-10.041(3), F.A.C.] to ensure intended benefits of reservoir

Caloosahatchee River Recovery Strategy

Caloosahatchee River (C-43) West Basin Storage Reservoir

- Will capture and store excess **basin runoff** and a **portion of Lake Okeechobee regulatory releases**
- Will provide a **more natural, consistent flow of fresh water** to the Caloosahatchee estuary (improve timing, quality and quantity of water deliveries)
- Will **improve salinity balance** by reducing peak discharges during wet season and providing essential flows during dry season

Sunset over the Caloosahatchee Estuary
Photo from: http://141.232.10.32/pm/ssr_2014/area_cre_2014.aspx

Caloosahatchee MFL Reevaluation

Last MFL reevaluation completed in 2003
Current reevaluation began in 2013

Main Steps and Objectives:

- Evaluate new data and information obtained since 2003
- Develop and apply models and a resource-based approach to:
  - Understand water sources and their contributions to the estuary
  - Assess responses of multiple ecological indicators to flow scenarios
  - Reevaluate MFL criteria
- Conduct technical analysis and revise MFL criteria as needed
- Draft technical report
- Conduct independent scientific peer review on technical approach, analysis and report
- Gain public input
- Revise MFL rule as necessary

Caloosahatchee MFL Reevaluation

Reevaluation Activities Completed

- Researched effects of flows on:

Ichthyoplankton	Oysters (*Crassostrea virginica*)
Zooplankton	Blue crabs (*Callinectes sapidus*)
Phytoplankton	Smalltooth sawfish (*Pristis pectinata*)
Benthic macrofauna	Tape grass (*Vallisneria americana*)

- Completed additional data collection and analysis, and model development and update:
  - tidal basin
  - hydrodynamic salinity model (CH3D)
  - *Vallisneria* model

Ichthyoplankton, zooplankton, and phytoplankton
From: TEDEd https://youtu.be/xFQ_fO2D7f0 and https://www.youtube.com/watch?v=0MFGGBBxSf8

- Drafted Science Summary (*Assessment of the Responses of the Caloosahatchee River Estuary to Low Freshwater Inflow in the Dry Season*)
- Held public Caloosahatchee Science Symposium (September 14 and 15, 2016)
- Finalized Science Summary based public input

Caloosahatchee MFL Reevaluation

Remaining Reevaluation Activities to be Completed

- Complete model calibration, verification, and application to estimates of water contributions to the estuary
- Complete reevaluation and revision of MFL criteria (if needed)
- Draft Technical Report (ongoing)
- Conduct peer review and hold additional public meetings (spring and summer 2017)
- Finalize Technical Report based on peer review recommendations and public input
- Draft revised MFL rule language as necessary and gain public input (fall 2017)
- Hold policy discussions with Water Resources Advisory Commission (WRAC) and SFWMD Governing Board
- Initiate rulemaking as appropriate

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 for consumptive uses
- Protects existing legal uses unless they are contrary to the public interest
- Required for Comprehensive Everglades Restoration Plan (CERP) projects per federal Water Resources Development Act of 2000
- May be used as recovery or prevention strategy

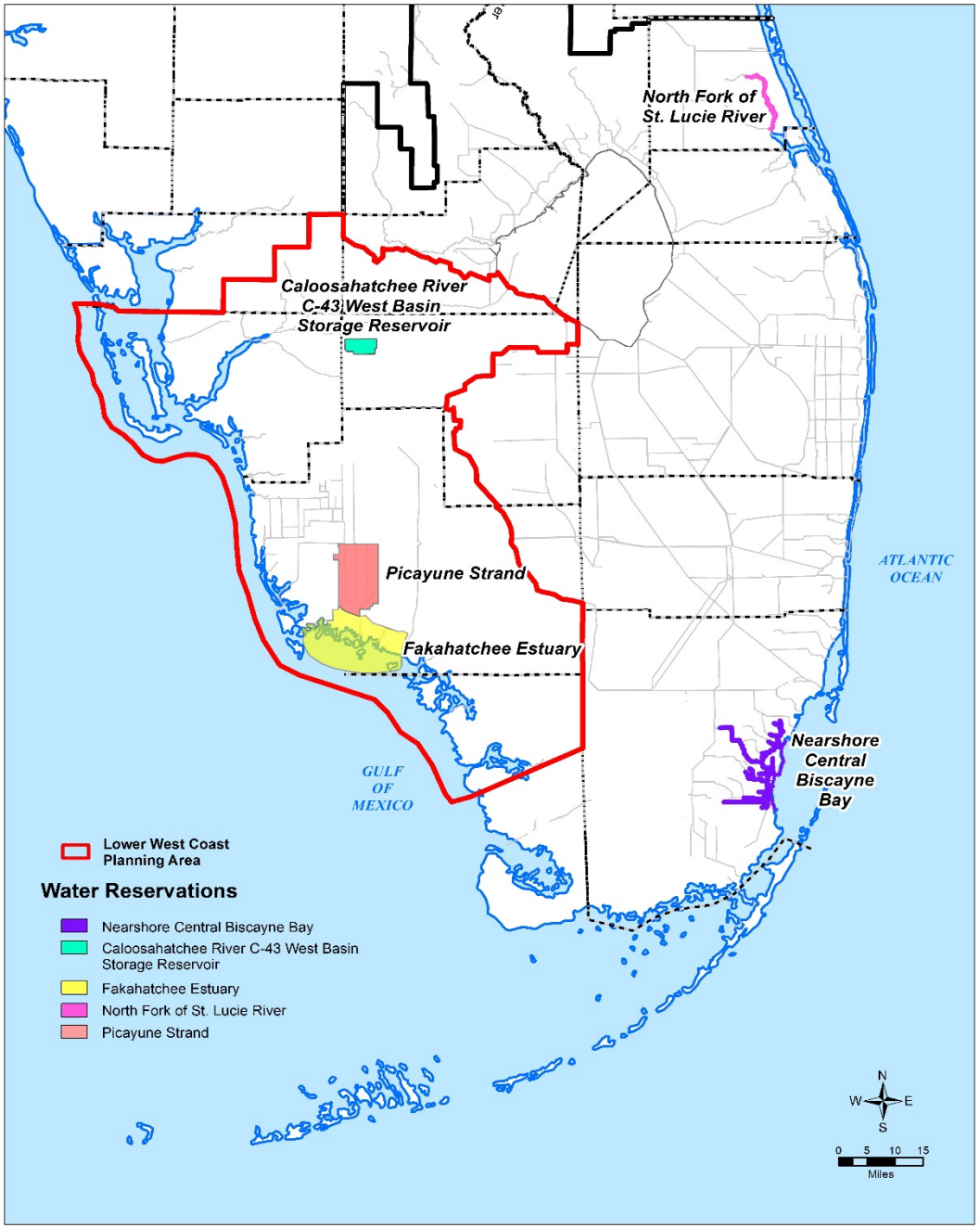
Osprey, *Pandion haliaetus,* and bass, *Micropterus* sp. on Merritt's Mill Pond
From: http://nykography.weebly.com

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

American aliigator *Alligator mississipiensis*
From http://www.photodrom.com

Top photo: SFWMD S-26 water control structure; Bottom photo: Drought conditions
From: http://sfwmd.gov



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

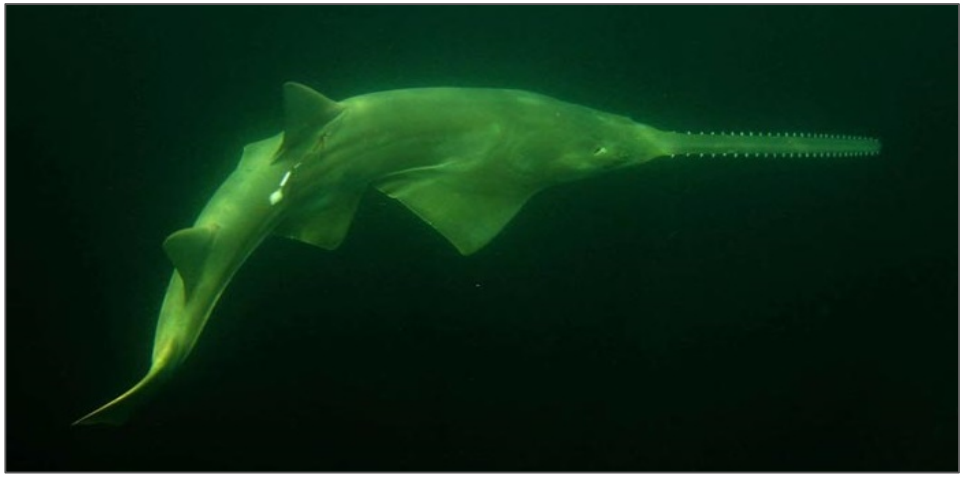
Cover 344,574 acres districtwide

Caloosahatchee River (C-43) West Basin Storage Reservoir Adopted Water Reservation

Subsection 40E-10.041(3), F.A.C.

All surface water contained within and released, via operation, from the reservoir

- Reservation adopted by rule in 2014 for protection of fish and wildlife



Smalltooth sawfish, *Pristis pectinata*
From: http://www.fisheries.noaa.gov

Double crested cormorants, *Phalacrocorax auritus*, with roseate spoonbill, *Platalea ajaja*, coming in for a landing
From: https://tockify.com/apogeephoto/detail/99/1490328000000

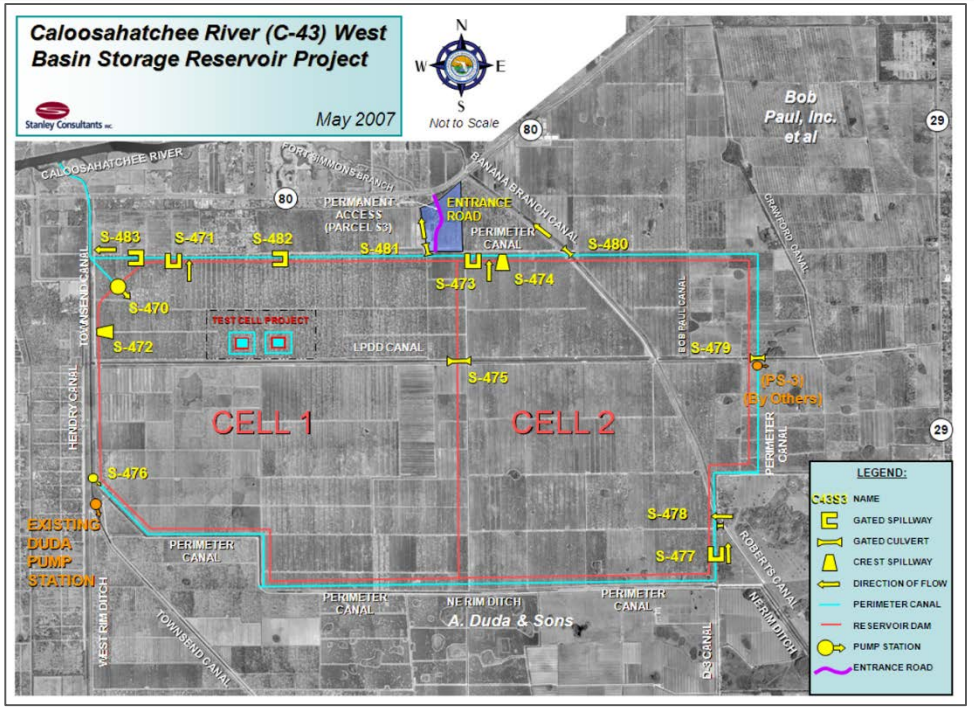
- Prospective reservation - water available when reservoir is built and operational
- CERP project being constructed through SFWMD/USACE cost share agreement

Caloosahatchee River (C-43) West Basin Storage Reservoir

Key Features and Timeframes:

- Above-ground reservoir with 10,700-acre footprint and 2 cells
- 170,000 acre-feet of water storage (> 55 billion gallons)
- Normal pool depth when full: 15’ - 25’
- Two pump stations (S-470 and S-476)

C-43 reservoir site preparation
From: http://sfwmd.gov



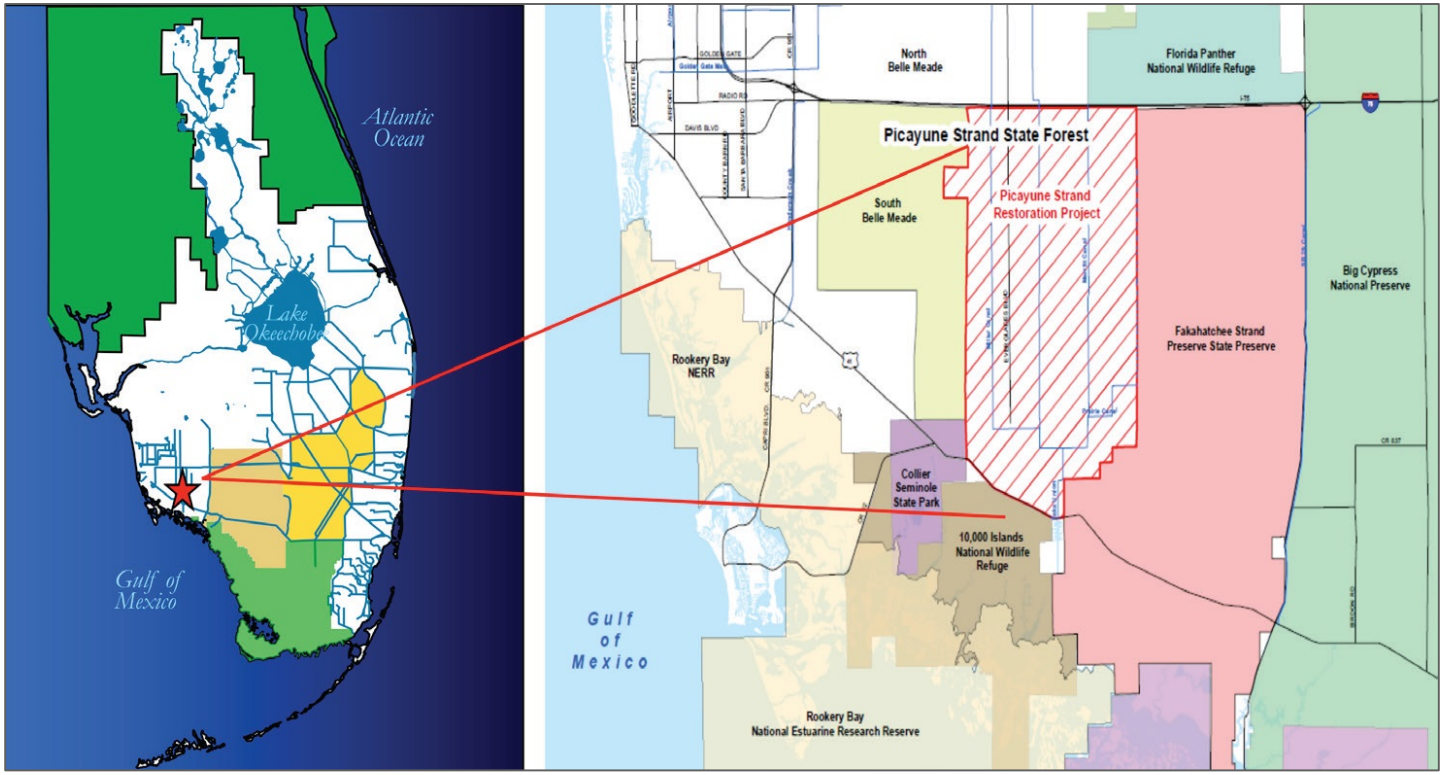
C-43 reservoir site plan
From: http://www.saj.usace.army.mil

- Site prep and construction began in **2015**
- Construction to be complete by **2022**
- Operational testing and verification to follow (**1-2 years**)

Picayune Strand
Adopted Water Reservation

Picayune Strand – Previous 55,000 acres of failed 1960s Southern Golden Gate Estates development (drained and altered hydrology)

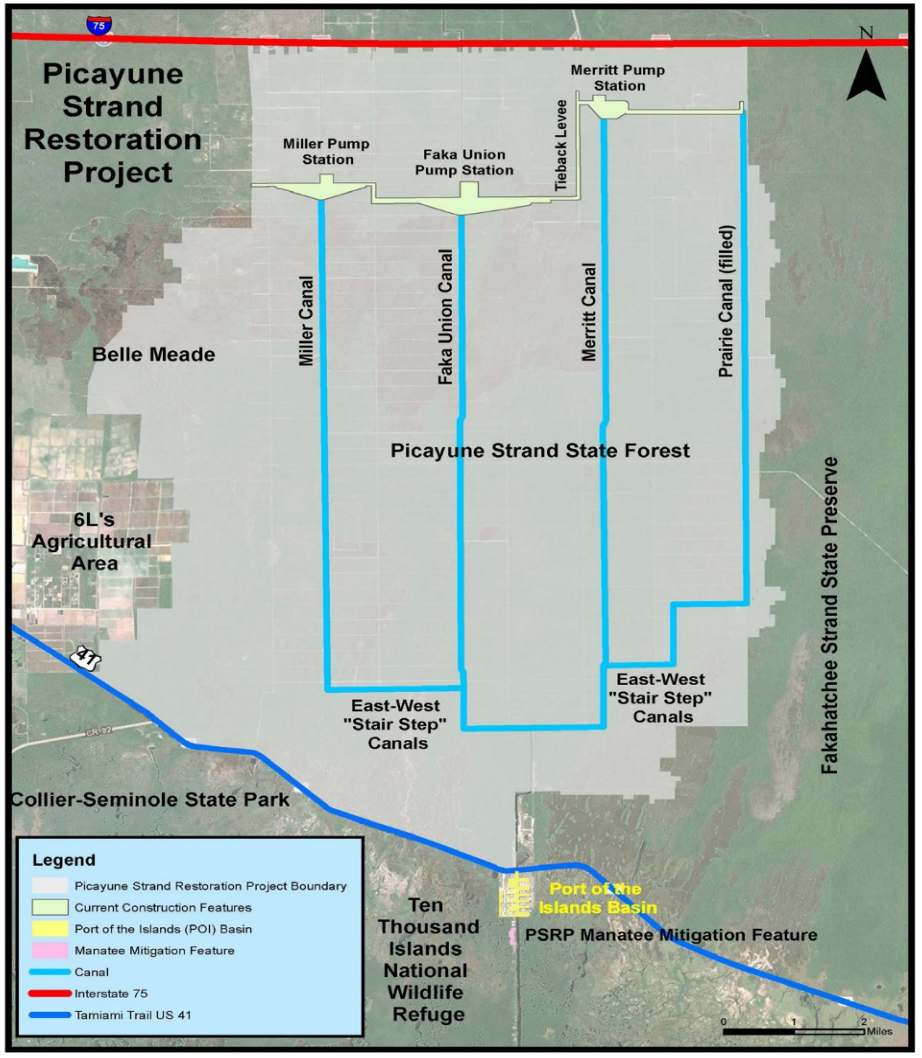
40E-10.021(2), F.A.C. Picayune Strand - The area located southwest of the Florida Panther National Wildlife Refuge, north of the Ten Thousand Islands NWR, east of the South Belle Meade State Conservation and Recreation Lands (CARL) Project, west of the Fakahatchee Strand Preserve State Park, and northeast of Collier-Seminole State Park



Picayune Strand Adopted Water Reservation

Subsection 40E-10.041(1), F.A.C.

- Reservation adopted by rule in 2009 for protection of fish and wildlife
- Required for CERP Picayune Strand Restoration Project (PSRP) being completed through SFWMD/USACE cost share agreement to <u>restore pre-drainage condition</u>
- Protects existing water in strand and water made available through PSRP

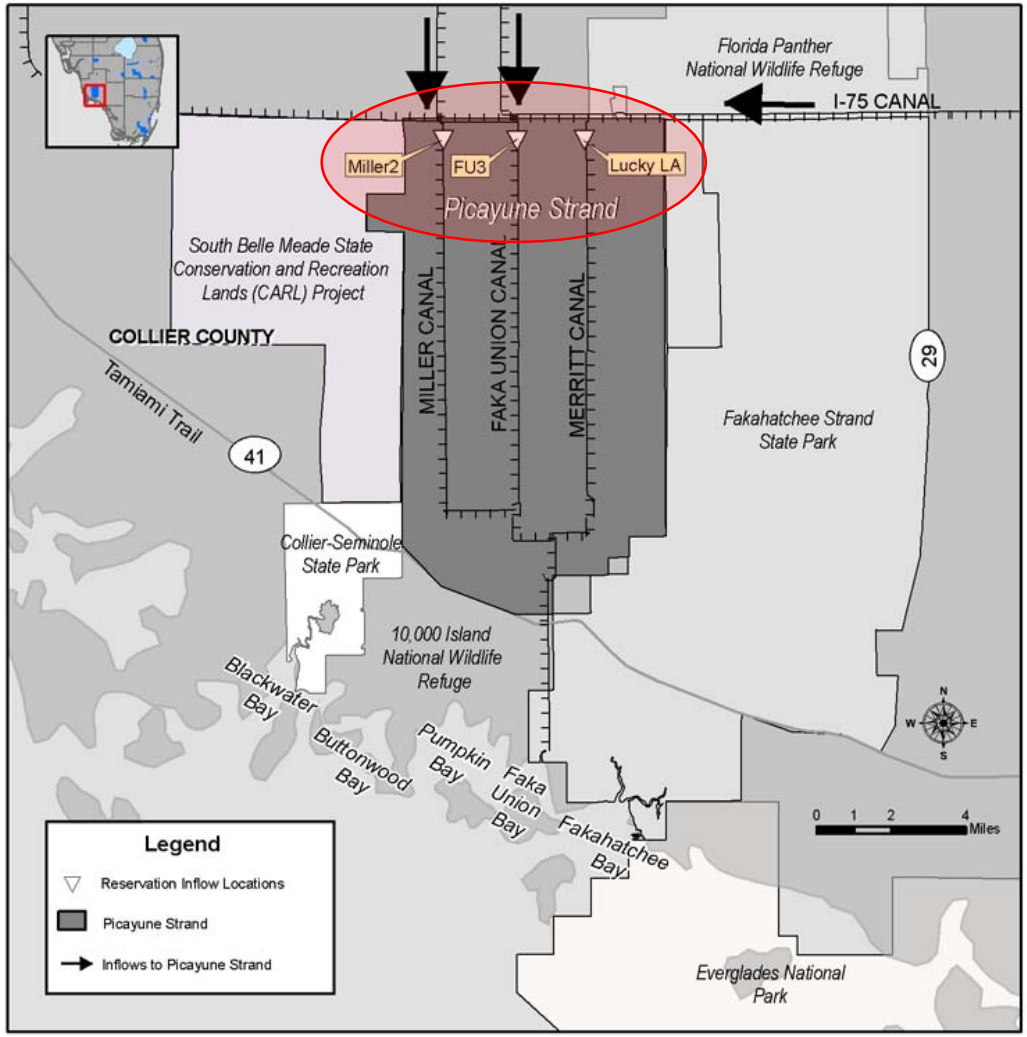


From: http://www.saj.usace.army.mil

Picayune Strand Adopted Water Reservation

Water Reserved:

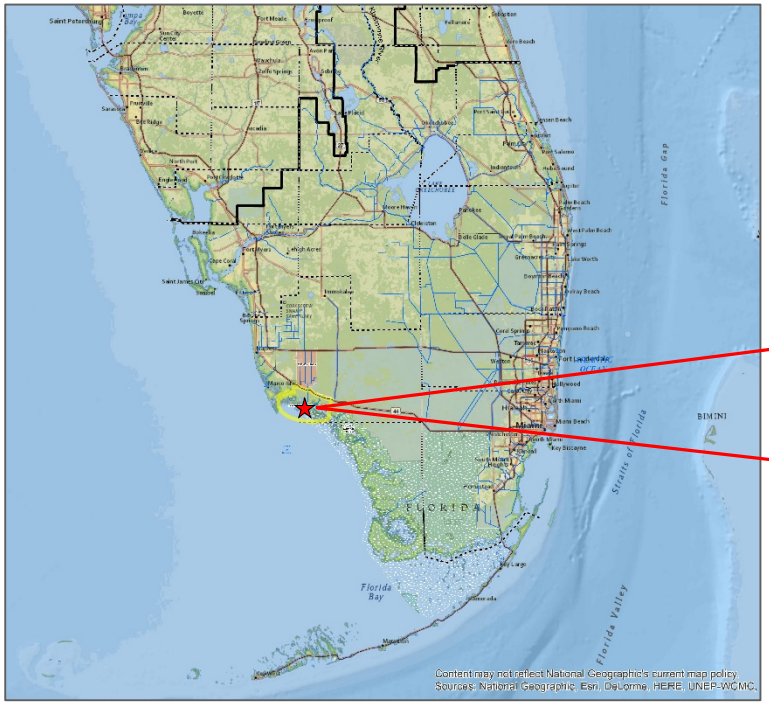
- All surface water contained within Picayune Strand
- All surface water flowing into Picayune Strand simulated at weirs:
  - Miller2 (Miller Canal)
  - FU3 (Faka Union Canal)
  - Lucky LA (Merritt Canal)
- All groundwater in the water table and unconfined portions of the Lower Tamiami aquifer underlying Picayune Strand

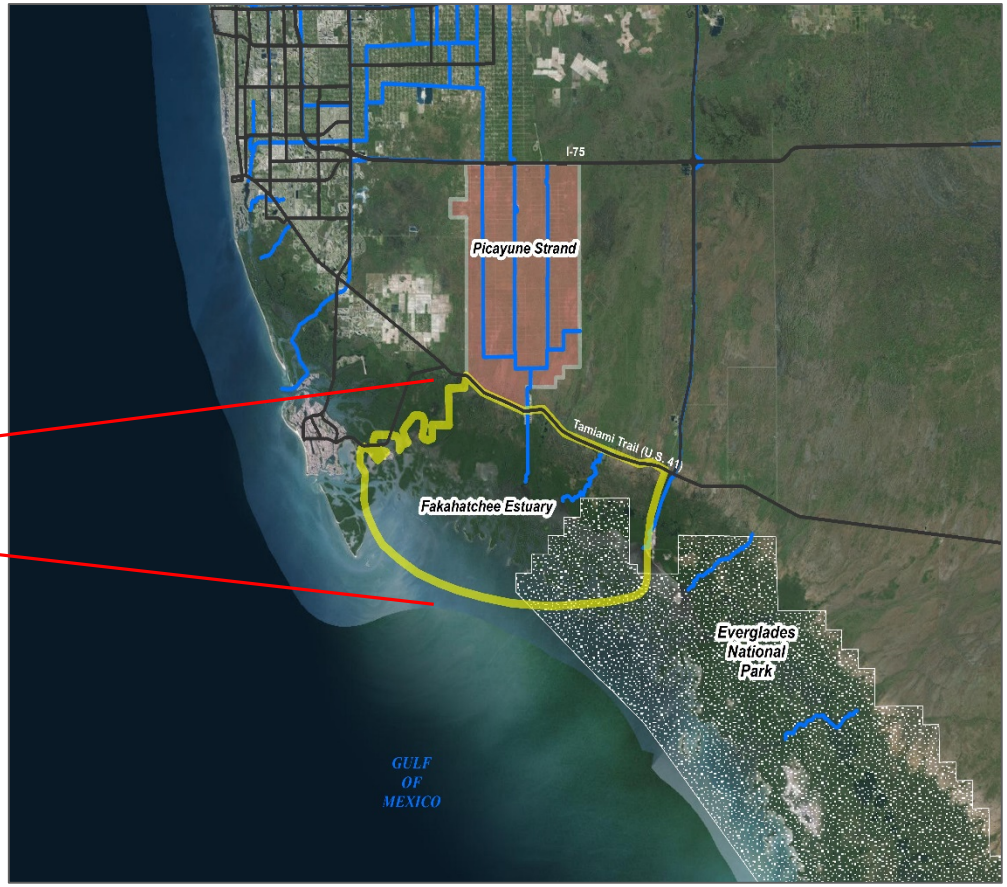


Historic inflow locations into Picayune Strand from Miller, Faka Union and Merritt Canals

Fakahatchee Estuary
Adopted Water Reservation

40E-10.021(1), F.A.C. Fakahatchee Estuary - The area within the Ten Thousand Islands region including the following river/bay systems, from west to east: Blackwater River/Blackwater Bay, Whitney River/Buttonwood Bay, Pumpkin River/Pumpkin Bay, Wood River, Little Wood River and Faka Union Canal/Faka Union Bay, and Fakahatchee Bay.





Fakahatchee Estuary
Adopted Water Reservation

Subsection 40E-10.041(2), F.A.C.

- Reservation adopted by rule in 2009 for protection of fish and wildlife
- Supports CERP Picayune Strand Restoration Project (PSRP) objective to improve flows to coastal estuaries
- Protects water made available to estuary through PSRP

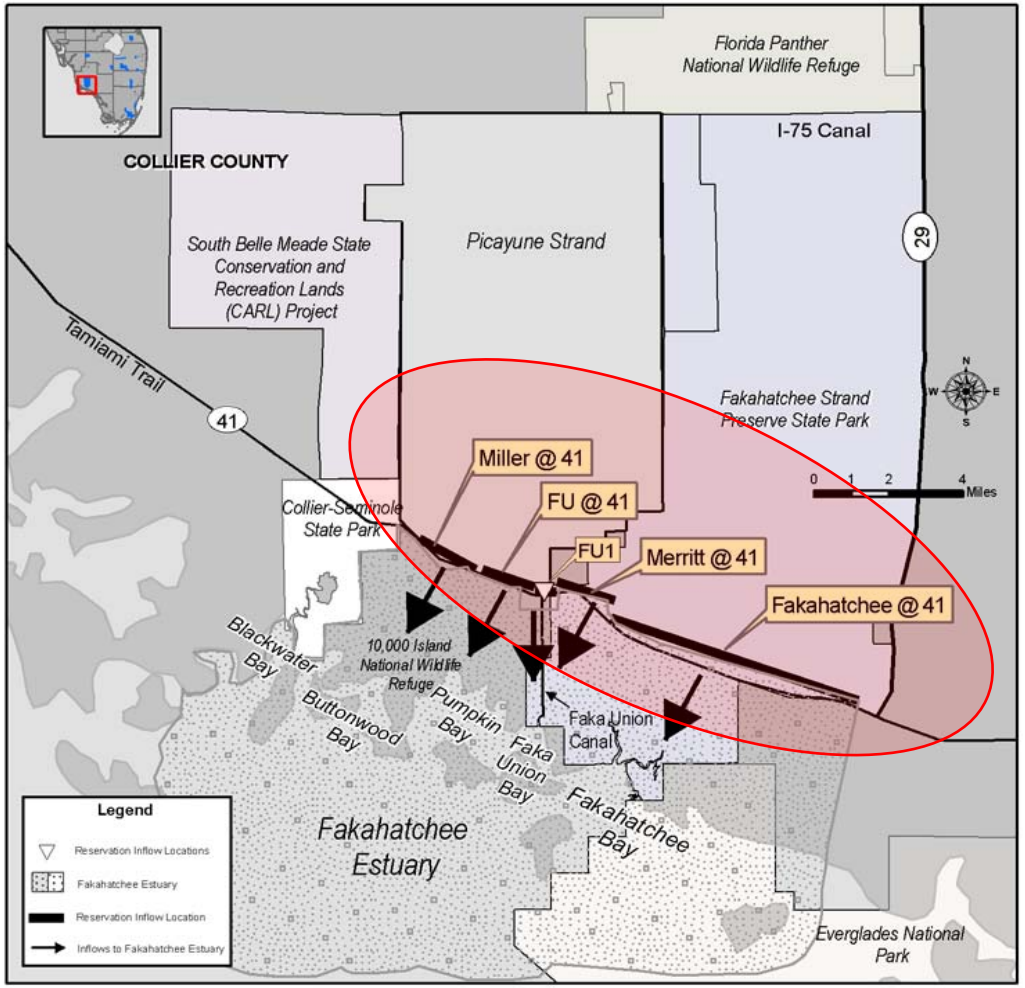
Fakahatchee Estuary
From: http://orchidswamp.org/the-park/natural-history/

Fakahatchee Estuary Adopted Water Reservation

Water Reserved:

- All surface water flowing into Fakahatchee Estuary simulated at weir:
  - FU1 (Faka Union Canal)

  and transects:
  - Miller@41
  - FU@41
  - Merritt@41
  - Fakahatchee@41
- All groundwater in the water table and unconfined portions of the Lower Tamiami aquifer underlying Fakahatchee Estuary



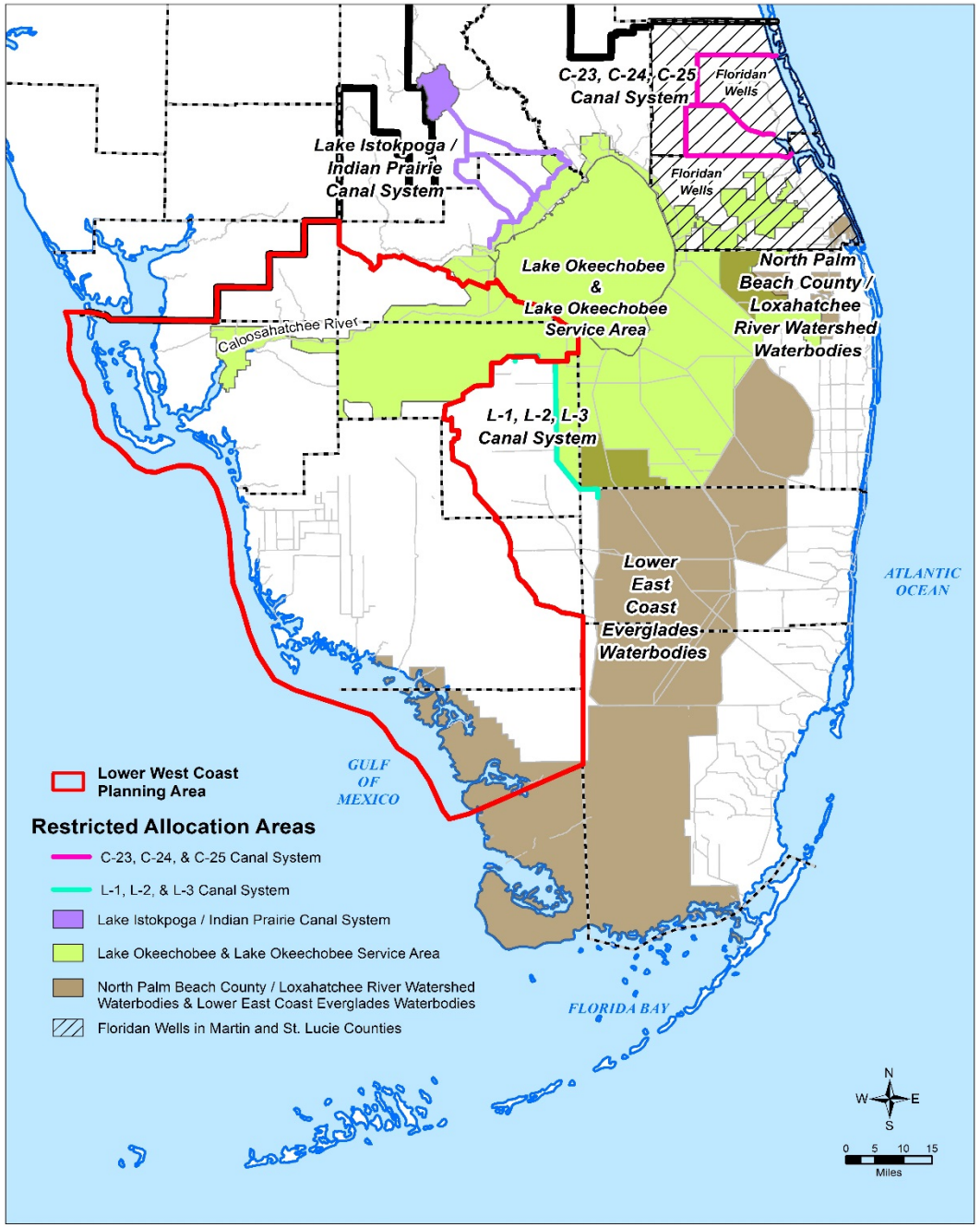
Historic inflow locations into Fakahatchee Estuary from Picayune Strand

Restricted Allocation Areas (RAA)

Areas from which new or increased water allocations are restricted

- Implemented where there is a lack of water available to meet the projected needs of the region
- Protect water for natural systems and future restoration projects (CERP)
- May be designated as part of MFL recovery or prevention strategies
- Listed in Section 3.2.1 of the *Applicant's Handbook,* incorporated by reference in Rule 40E-2.091, F.A.C.

Wild American flamingos, *Phoenicopterus ruber*, in Stormwater Treatment Area 2
From: http://whqeps02p:8085/wildlife/#/asset/1353 (SFWMD website)



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 > 4.9 million acres districtwide

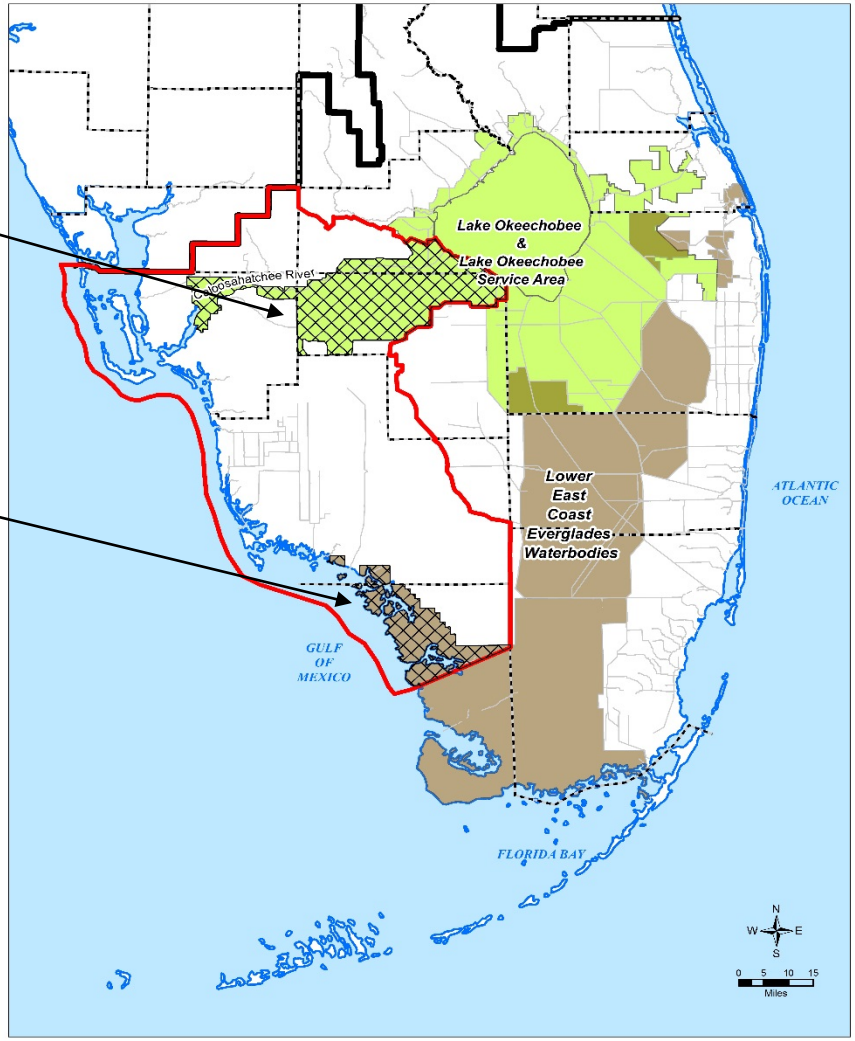
Restricted Allocation Areas in the Lower West Coast Planning Area

Lake Okeechobee and Lake Okeechobee Service Area

Water allocations are limited to base condition water uses that occurred from April 1, 2001 to January 1, 2008

Lower East Coast Everglades Waterbodies

Water allocations are limited to base condition water uses permitted as of April 1, 2006



Summary

More than one water resource tool can protect a waterbody:

Caloosahatchee River

- MFL and C-43 Reservoir Water Reservation
- Lower West Coast Aquifers MFL (full coverage)
- LOSA Restricted Allocation Area (partial coverage in upper reaches)

Lower West Coast Aquifers

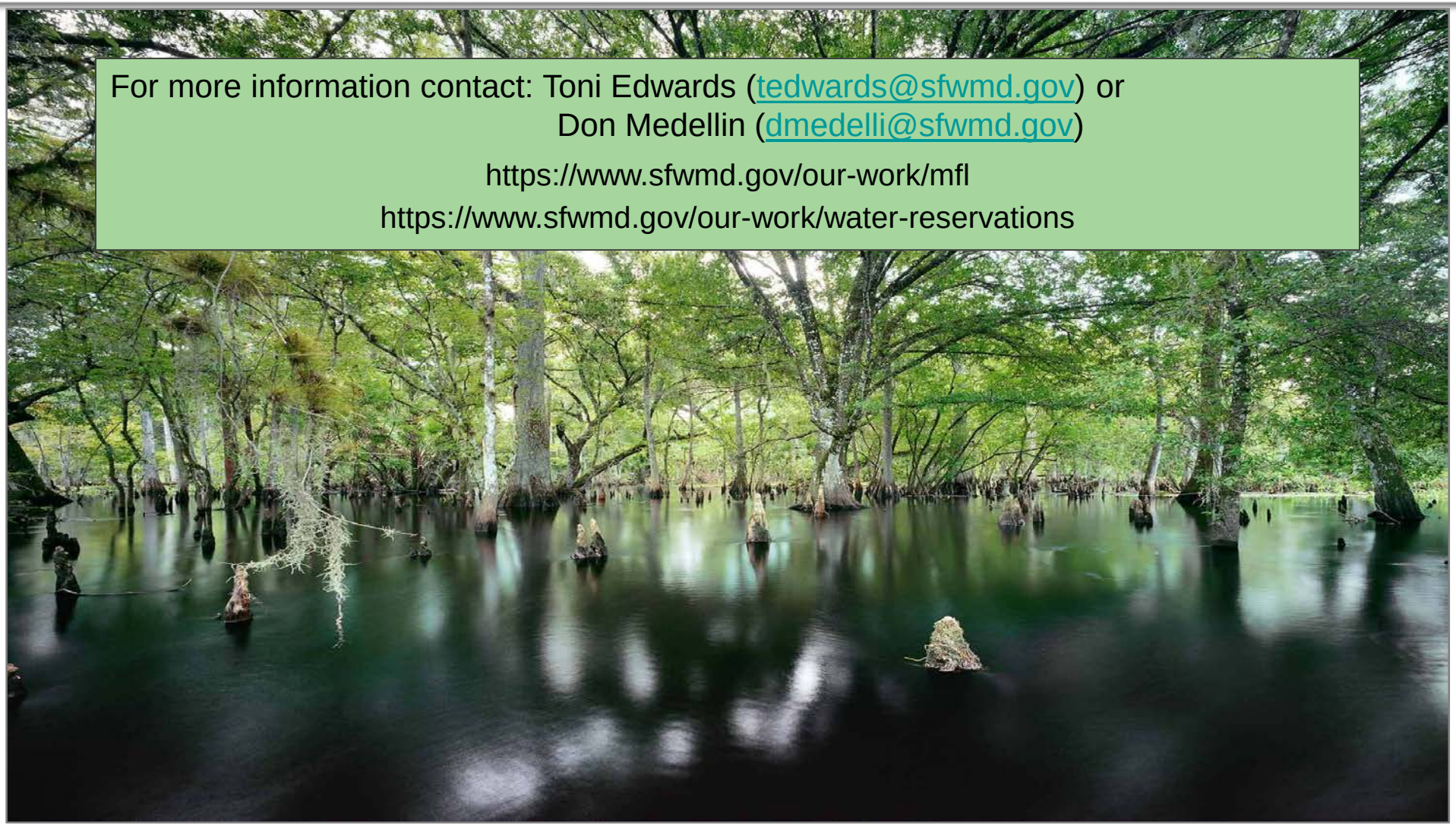
- MFL
- Caloosahatchee River MFL and C-43 Water Reservation (partial coverage)
- LOSA Restricted Allocation Area (partial coverage)

Picayune Strand and Fakahatchee Estuary

- Water Reservations
- Lower West Coast Aquifers MFL (full coverage)
- Everglades Waterbodies Restricted Allocation Area (small area)

These tools protect 7.4 million acres, or about 69%, of the SFWMD

Questions?



For more information contact: Toni Edwards (tedwards@sfwmd.gov) or
Don Medellin (dmedelli@sfwmd.gov)

https://www.sfwmd.gov/our-work/mfl

https://www.sfwmd.gov/our-work/water-reservations

From: http://www.timeandlight.com/data/photos/93_1fisheating_creek__10.jpg