

2019 Lower Kissimmee Basin Water Supply Plan Update



Mark Elsner, P.E.

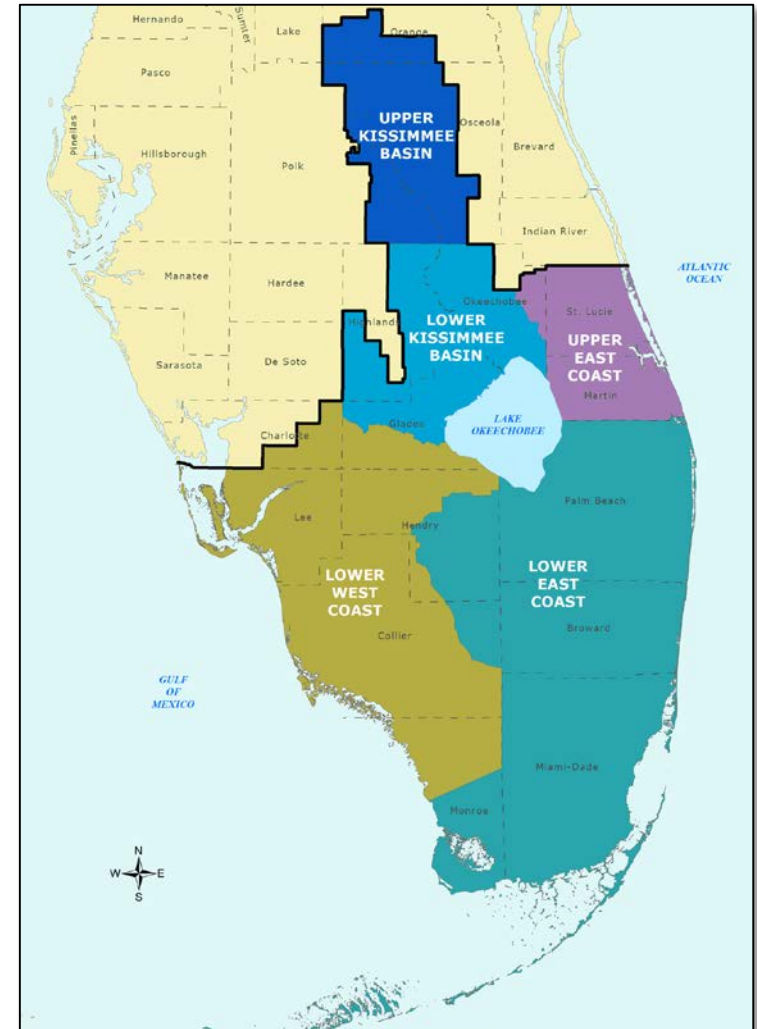
Water Supply Bureau Chief

2019 LKB Stakeholder Kickoff Meeting
March 27, 2019

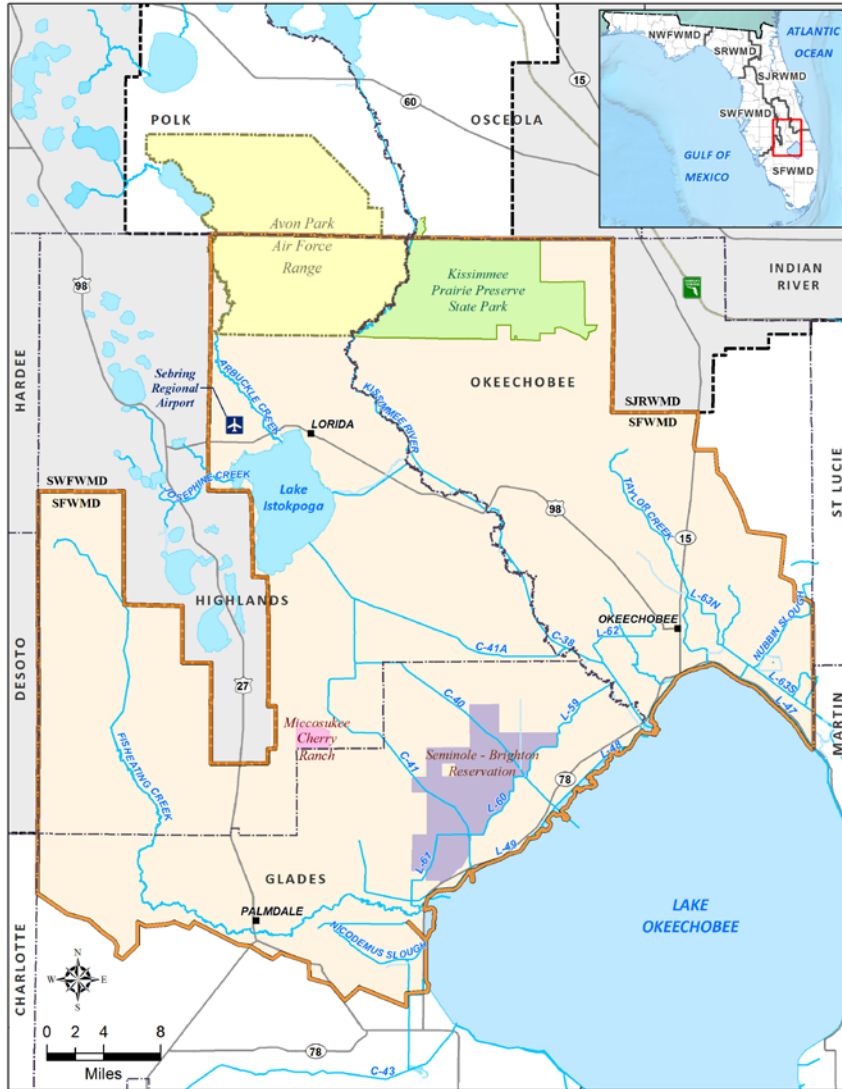


Water Supply Plan Requirements

- 20-year planning period
- Demand estimates & projections
- Resource analyses
- Issues identification
- Evaluation of water source options
- Water resource development
 - Responsibility of water management district
- Water supply development
 - Responsibility of water users
- Minimum Flows & Minimum Water Levels
 - Recovery & prevention strategies



LKB Planning Area



- Portions of Okeechobee, Highlands, and Glades counties
- Major agricultural industry
- Seminole Tribe of Florida Brighton Reservation

Public Participation

- Stakeholder workshops
- One-on-one meetings & discussion with stakeholders
- Meetings with stakeholder groups
- Governing Board presentations
- Draft documents distributed/posted on website
- Comments on drafts prior to Governing Board approval



LKB Water Supply Plan Update Process

Individual
Meetings with
Stakeholders

Distribution of
Draft Chapters

Draft Plan
to Governing
Board

Lower Kissimmee Basin Water Supply Plan

Kickoff
March 2019

Urban and
Agricultural
Demand
Projections

Environmental
Needs

Water Resource
Analysis

Stakeholder
Workshops

Water Source
Options and
Conservation

Water
Resource
and Water
Supply
Projects

Board Approval
Dec. 2019

2014 Lower Kissimmee Basin Water Supply Plan



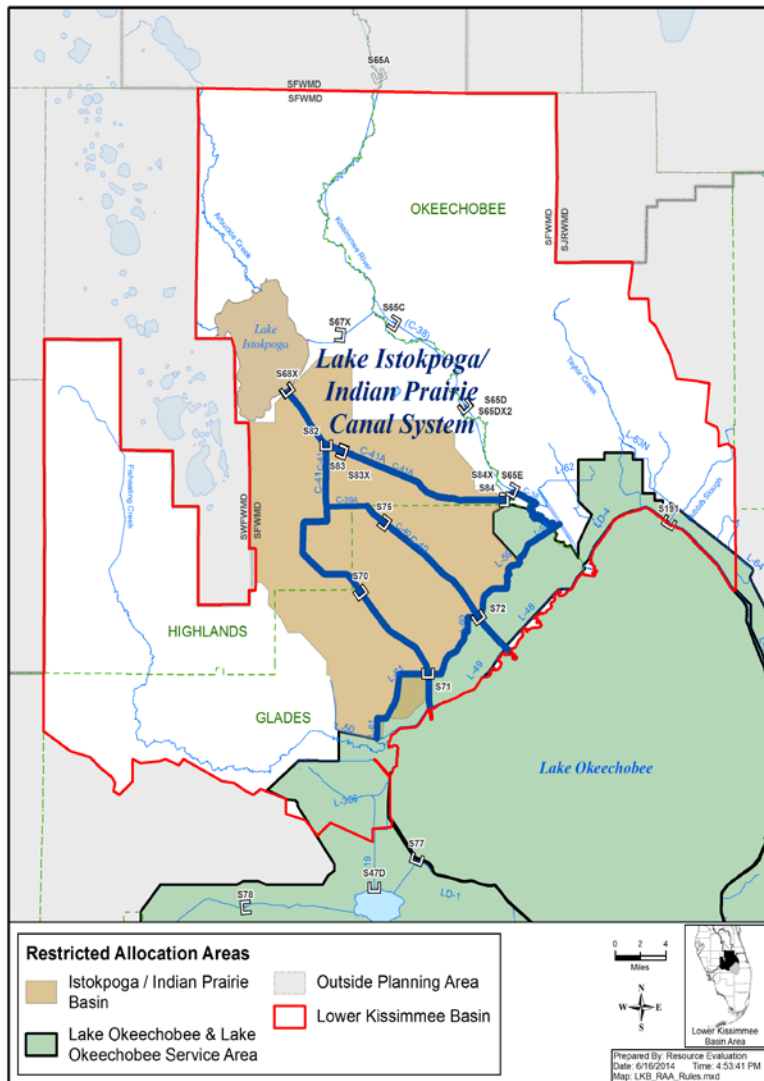
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Summary of 2014 Water Resource Considerations

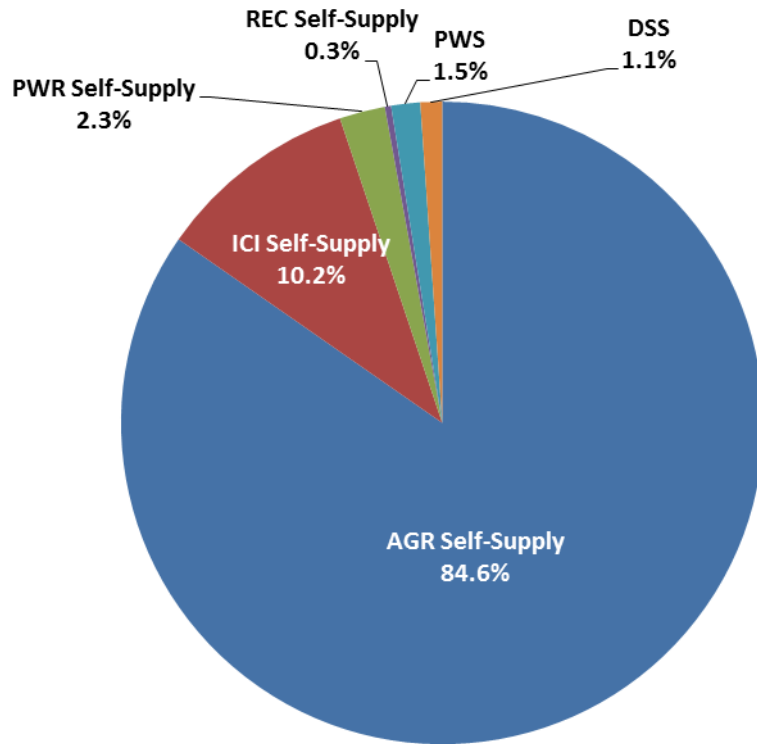


- Limited surface water availability
 - Lake Istokpoga/Indian Prairie Basin
 - Lake Okeechobee and LOSA
- Seminole Tribe of Florida Brighton Reservation water rights
- Kissimmee River Basin Water Reservation development
- MFLs – SFWMD and SWFWMD

2014 LKB Water Supply Plan

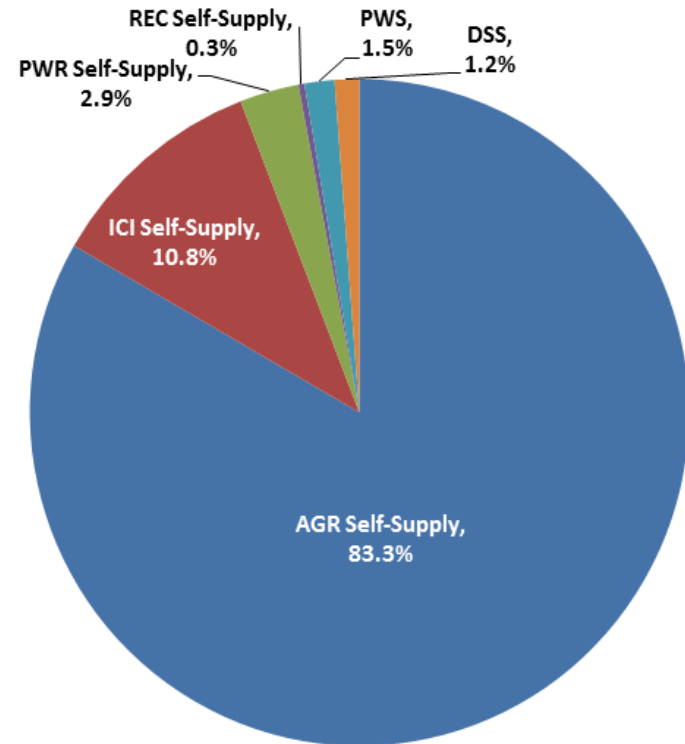
Estimated Water Demands

2010



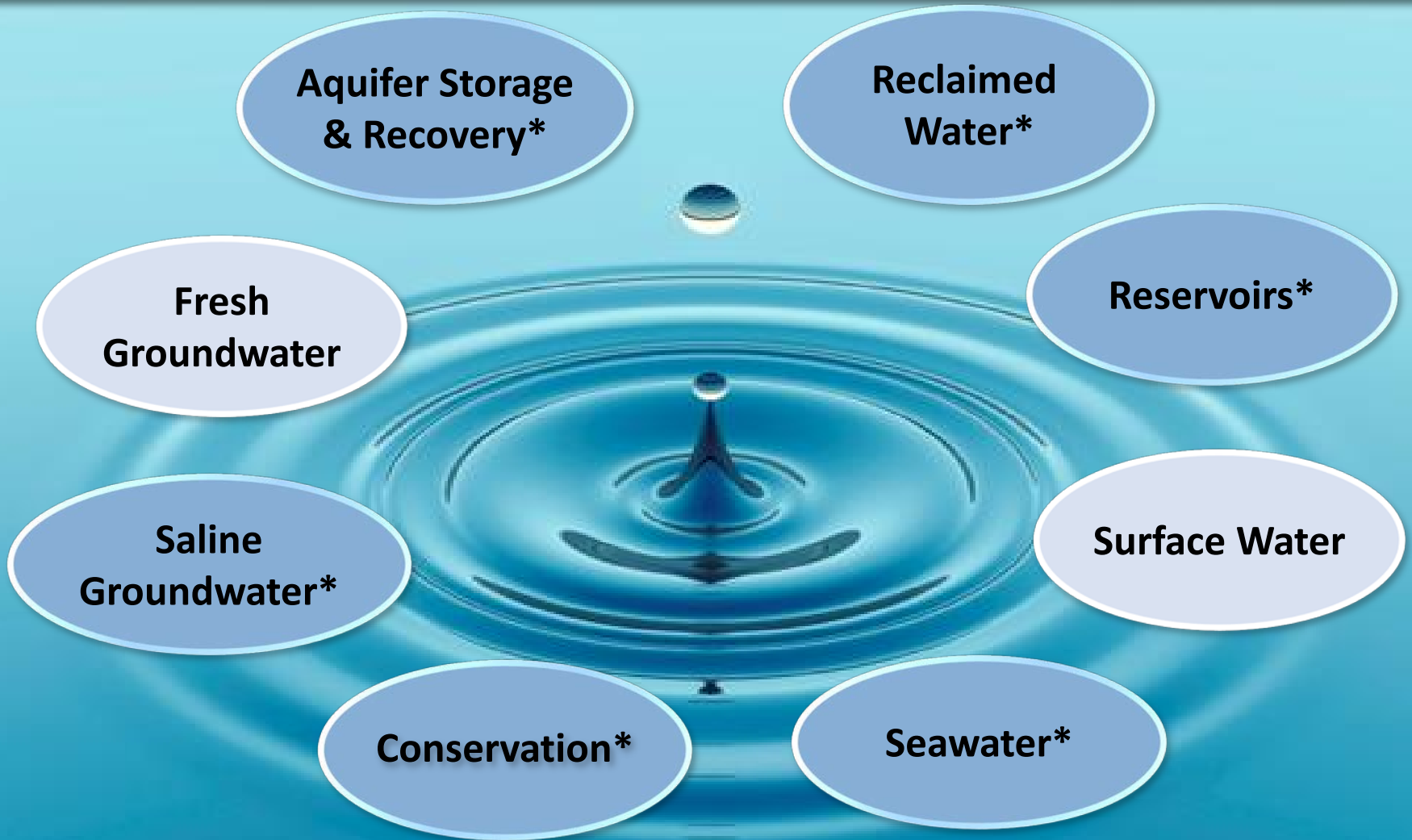
Total = 192 mgd

2035



Total = 222 mgd

Water Source Options



* Alternative water source

Resource Evaluation

➤ Surface water

- Restricted Allocation Areas – restrict availability of new surface water
- Minimal projected demand for new surface water through 2035

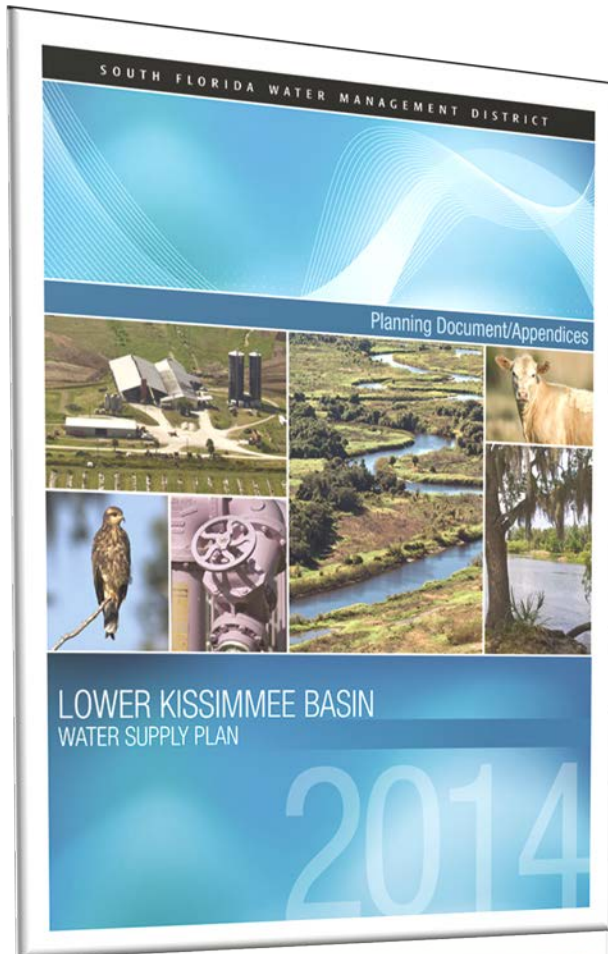
➤ Groundwater

- Updated LKB groundwater model to evaluate:
 - 2035 projected demands
 - Drawdown potential under MFL lakes
- No adverse impacts projected to SFWMD or SWFWMD MFL lakes

2014 Future Direction

- Complete development of Kissimmee River Basin Water Reservation
- Coordinate with SWFWMD to refine modeling of LKB region and MFL lakes
- USACE complete HHD rehabilitation and revise the regulation schedule
- Continue to implement MFL recovery and prevention strategies
- Water users and SFWMD collaborate to increase understanding of the aquifers
- Continue to promote water conservation opportunities within the planning area

2014 Lower Kissimmee Basin Water Supply Plan Conclusion



- The future water demands of the region can be met through the 2035 planning horizon with appropriate management and continued development of available groundwater sources
- Additional water from Lake Okeechobee from operational flexibility within the existing LORS08 schedule, or a revised regulation schedule subsequent to HHD repairs could return the Lake to an MFL prevention status, enhance existing permitted users level of service and support environmental needs

Progress Since the 2014 LKB Plan

- Restoration & construction projects
 - Kissimmee River Restoration Project
 - Lake Okeechobee Watershed Restoration Project
 - Herbert Hoover Dike Rehabilitation
- Regulatory protection efforts
 - Kissimmee River and Chain of Lakes Water Reservation
 - Lake Okeechobee System Operating Manual (LOSOM)
- Hydrologic studies & modeling
 - East Central Florida Transient Expanded Model
 - CERP Aquifer Storage and Recovery Regional Study
 - Continued Floridan groundwater monitoring

A photograph of a swampy forest, likely a cypress swamp. The water is calm, reflecting the surrounding green trees and foliage. A large, thick tree trunk is prominent in the foreground on the right side. The overall scene is vibrant with greenery and natural light filtering through the canopy.

Questions?

2019 Lower Kissimmee Basin Water Supply Plan Update



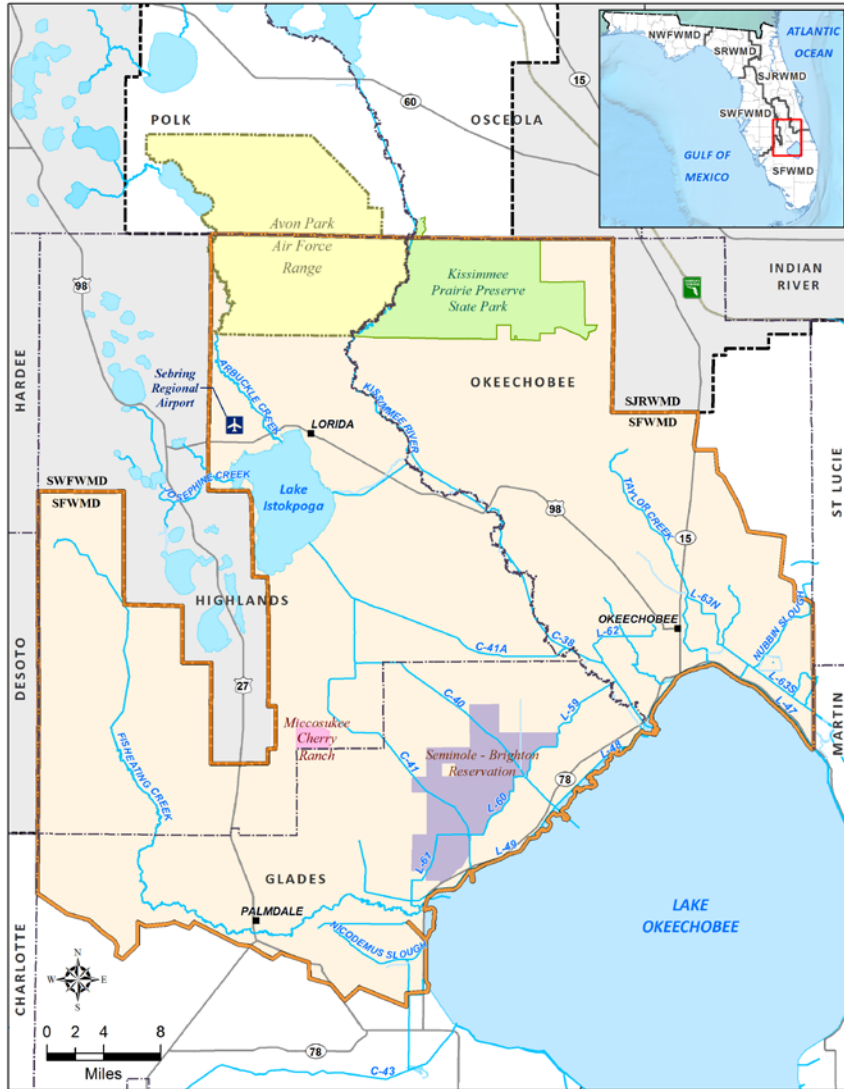
Natalie Kraft

Water Supply Plan Manager

2019 LKB Stakeholder Kickoff Meeting
March 27, 2019

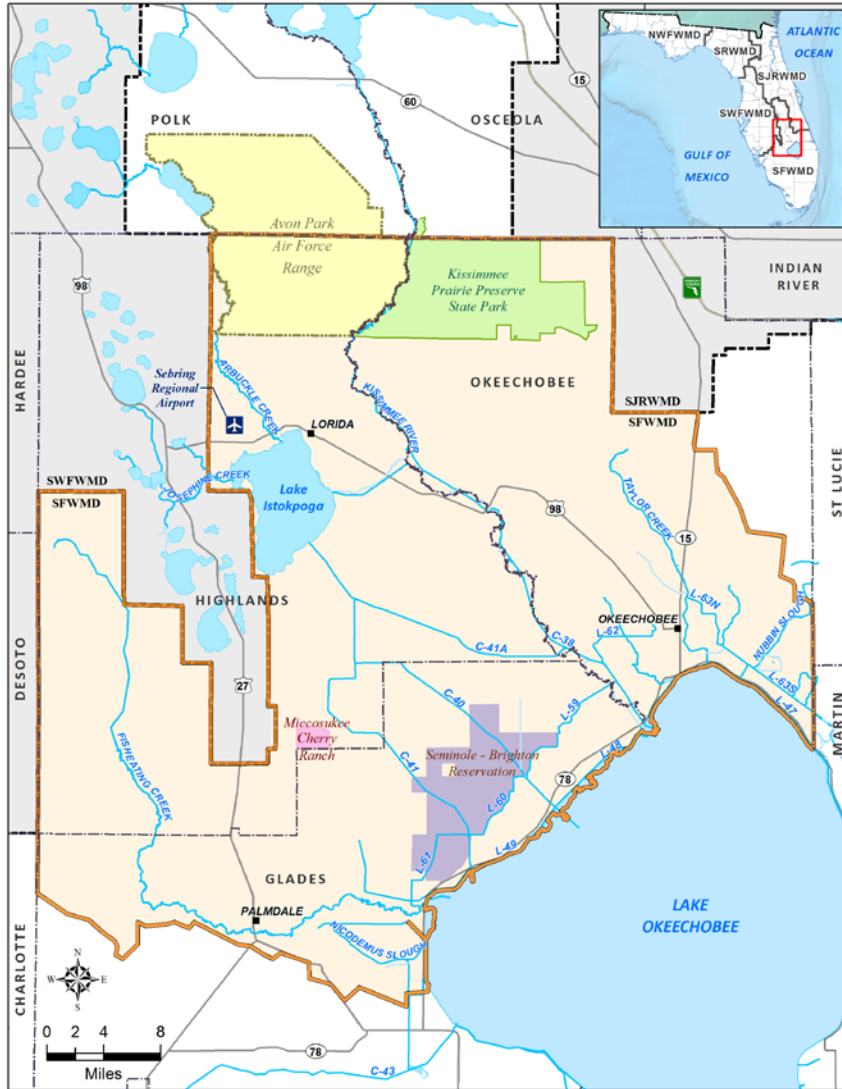


LKB Planning Area



- Portions of Okeechobee, Highlands, and Glades counties
- 1,805 square miles
- Important natural and water resources
 - Kissimmee River
 - Lake Istokpoga
 - Kissimmee Prairie Preserve State Park

LKB Planning Area



- Population:
 - 2017 52,496 people
 - 2040 58,662 people
- 6 utilities
- Seminole Tribe of Florida Brighton Reservation
- Major agricultural industry

Statutory Goal of LKB Water Supply Plan

Section 373.709, Florida Statutes

*To identify sufficient water supply sources and future projects to meet existing and future reasonable-beneficial uses during 1-in-10 year drought conditions through **2040** while sustaining water resources and related natural systems.*

Objectives of 2019 LKB Plan Update

1. **Water Supply:** Identify sufficient sources of water to meet reasonable-beneficial uses projected through 2040 under 1-in-10 year drought conditions without causing harm to natural resources
2. **Natural Systems:** Protect and enhance environmental systems, including the Kissimmee River, Lake Istokpoga, Fisheating Creek, Taylor Creek, Nubbin Slough, and other federal, state, and locally identified natural resource areas
3. **Conservation:** Encourage water conservation measures to improve the efficiency of existing and future water use

Objectives of 2019 LKB Plan Update

4. **Linkage with Local Governments:** Provide information to support local government comprehensive plans. Promote compatibility of the plan update with tribal and local government land use decisions
5. **Compatibility and Linkage with Other Efforts:** Promote compatibility and integration with the following planning-related activities:
 - Other state and federal water resource initiatives in the planning region;
 - Existing and proposed environmental projects;
 - Modifications to operating schedules for the regional systems, including Lake Okeechobee; and
 - Water use permitting process, Minimum Flow and Minimum Water Level (MFL) criteria, and Water Reservations

2019 LKB Water Supply Plan Organization

- Chapter 1: Introduction
- Chapter 2: Demand Estimates & Projections
- Chapter 3: Water Conservation
- Chapter 4: Resource Protection
- Chapter 5: Water Source Options
- Chapter 6: Water Resource Issues & Analyses
- Chapter 7: Water Resource & Supply Development Projects
- Chapter 8: Future Direction

Water Conservation

Agriculture

- FDACS and the Environmental Quality Incentives Program promote BMPs, which mostly affect water quality but some can result in increased water use efficiency
- Mobile Irrigation Labs evaluate irrigation system efficiency and offer recommendations for operational improvements
- FSAID* data are being used to estimate potential agricultural conservation savings
 - Efficiency gains come from irrigation system changes and scheduling or sensor-based automation
 - 2040 estimated savings: 16.7 mgd

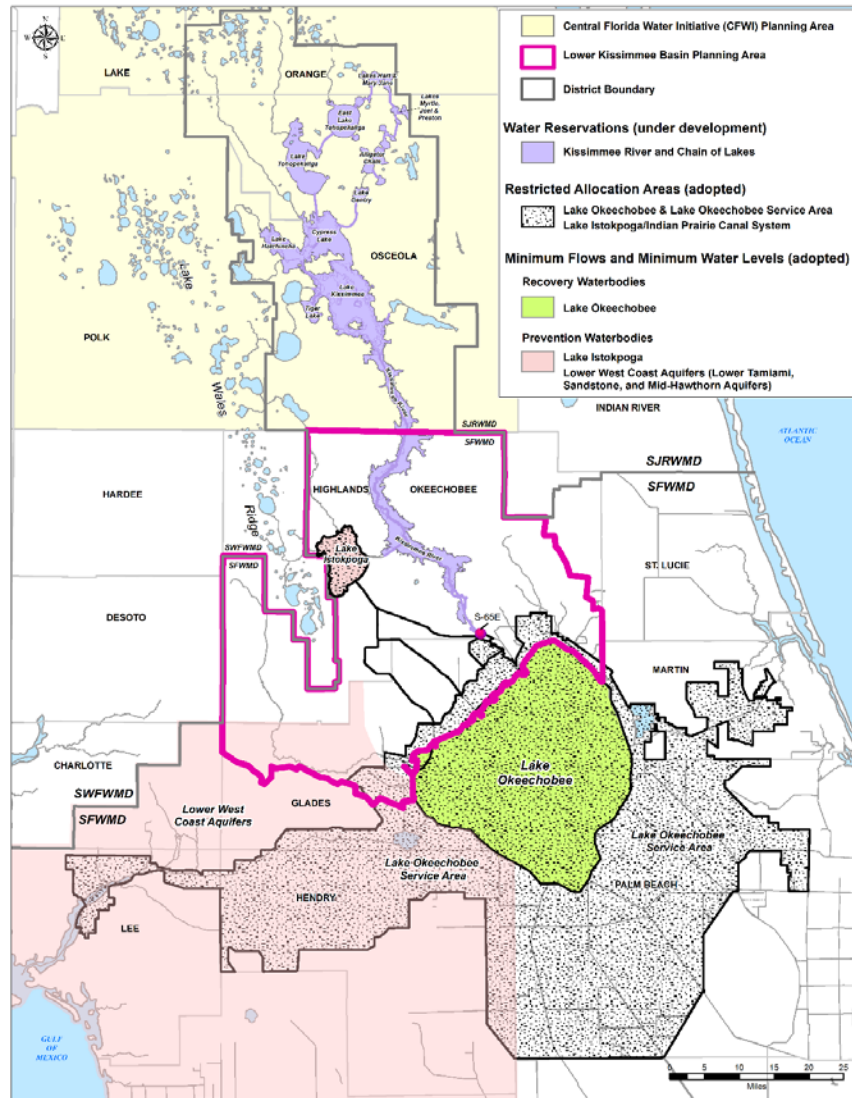
Water Conservation

Urban

- All non-agricultural water users combined account for a small percentage of water use in the LKB
- Conservation measures in place for urban water users include:
 - Year-Round Irrigation Rule
 - Utility conservation rate structures
 - Water efficient fixtures & appliances



Water Resource Protection



➤ Minimum Flows and Minimum Water Levels

- Lake Istokpoga
- Lower West Coast Aquifers
- Lake Okeechobee

➤ Water Reservations

- Kissimmee River and Chain of Lakes

➤ Restricted Allocation Areas

- Lake Okeechobee Service Area
- Lake Istokpoga/Indian Prairie Canal System

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Questions?



Kissimmee River

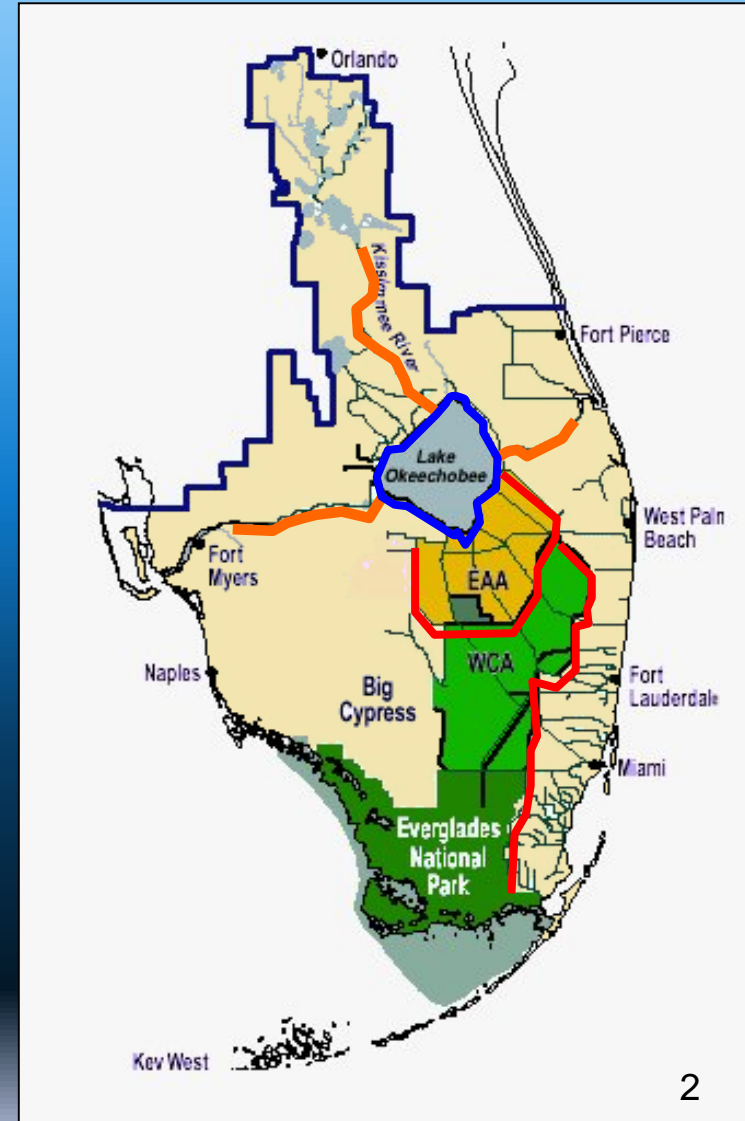
South Florida Ecosystem Restoration

Matt Morrison, Bureau Chief
South Florida Water Management District

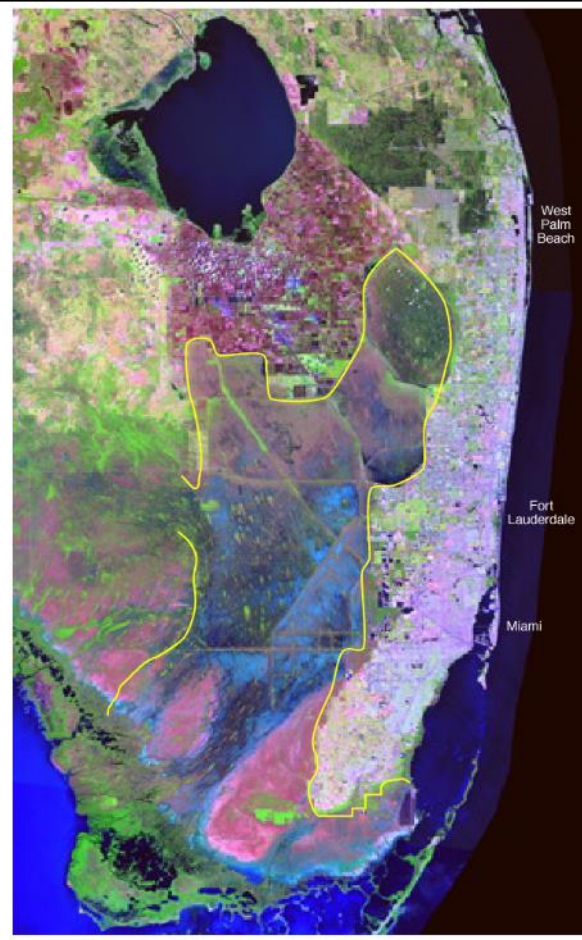
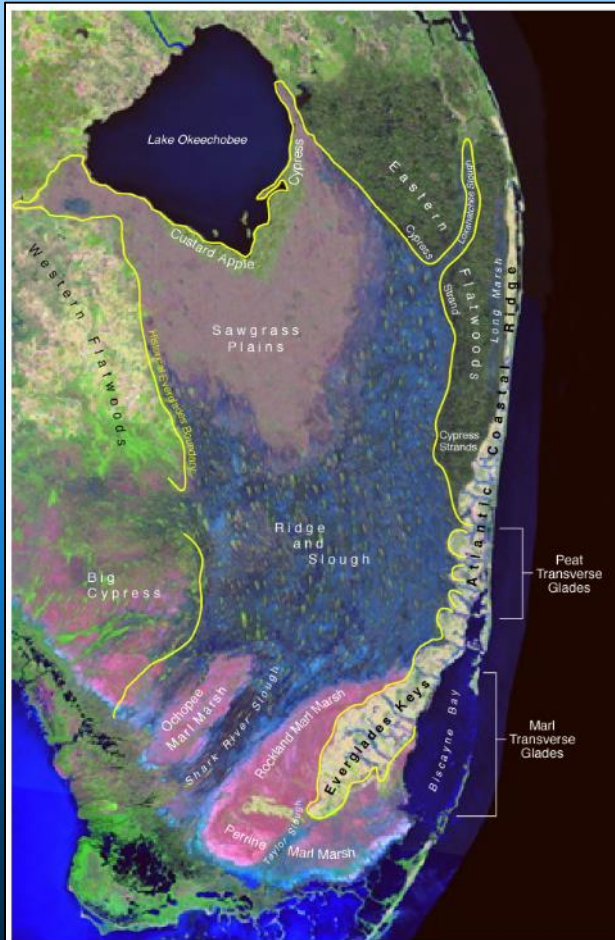
April 3, 2019

Major Features of the C&SF Project

- River Channelization ■
- Herbert Hoover Dike ■
- Water Conservation Areas ■
- Protective Levees ■
 - Everglades Agricultural Area
 - Lower East Coast
- Drainage Network ■
 - Regional Canals
 - Salinity Structures
- Today's expanded system
 - 2,100 miles of canals, 2,000 miles of levees/berms, 657 structures, 621 culverts and 77 pump stations
 - Serves 41% of the state's population, or 8.1 million people



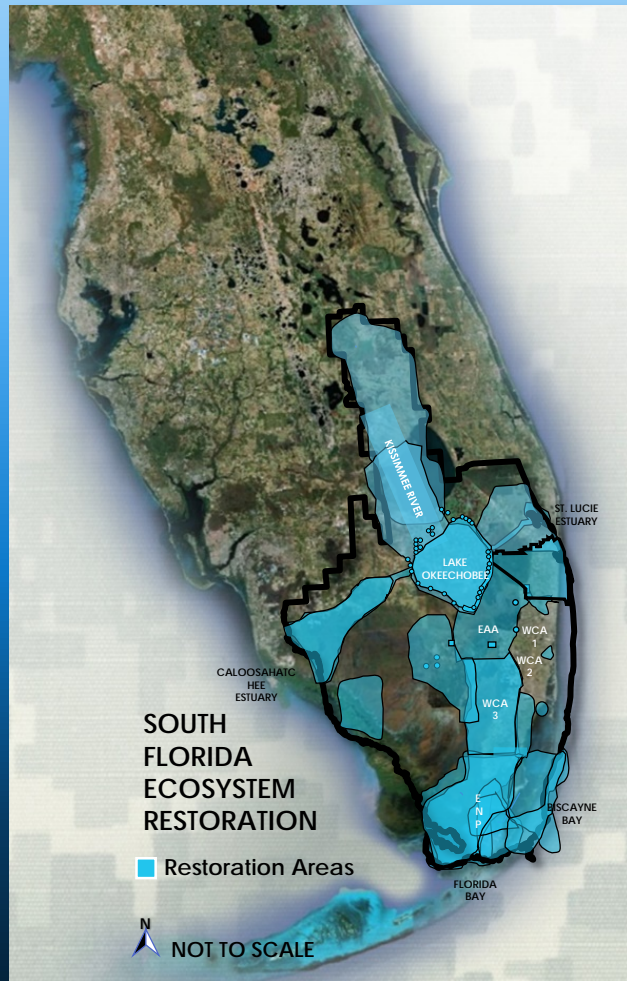
Unintended Consequences of C&SF Project



- Declining estuary health
- Wading bird populations in the Everglades have declined by 90%
- 68 Federally-listed threatened and endangered species
- Exotic and invasive plants and animals have altered the ecosystem

- Disruption in quantity, timing and distribution of water
- Degradation of water quality
- Peat soils in the Everglades have oxidized and caused subsidence

South Florida Ecosystem Restoration



NON-CERP & FOUNDATION PROJECTS

- Modified Water Deliveries to Everglades National Park
- Kissimmee River Restoration
- C-111 South Dade
- C-51/Storm Water Treatment Area (STA) 1E
- Restoration Strategies
- Tamiami Trail Bridging & Roadway Modifications
- Herbert Hoover Dike (HHD) Rehabilitation
- Seminole Big Cypress Critical Project

CERP GENERATION 1 PROJECTS

- Indian River Lagoon (IRL) – South
- Picayune Strand
- Site 1
- Melaleuca Annex Facility

CERP GENERATION 2 PROJECTS

- C - 43 Reservoir
- Broward County Water Preserve Areas (WPA)
- C-111 Spreader Canal Western Project
- Biscayne Bay Coastal Wetlands Phase 1

DECEMBER 2016 AUTHORIZATION

- Central Everglades Planning Project (CEPP)

OCTOBER 2018 AUTHORIZATION

- Everglades Agricultural Area Storage (CEPP-PACR)

CURRENT PLANNING EFFORTS

- Loxahatchee River Watershed Restoration
- Western Everglades Restoration
- Lake Okeechobee Watershed Restoration
- Lake Okeechobee System Operations Manual

Restoration Strategies: Key Projects

Schedule

2012

- 57,000 ac of STA ✓

2012-2016

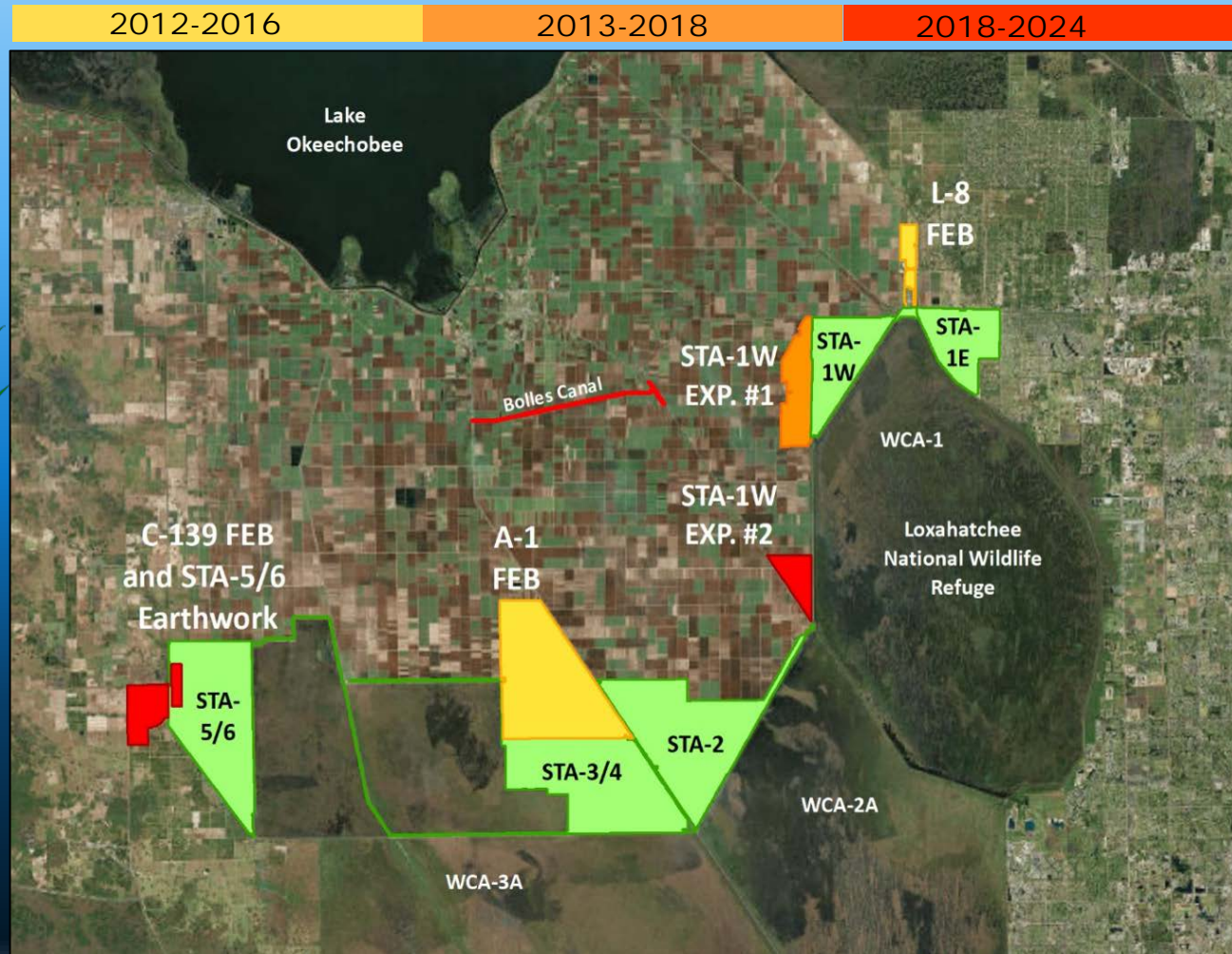
- L-8 FEB (45,000 ac-ft) ✓
- A-1 FEB (60,000 ac-ft) ✓

2013-2018

- STA (4,700 ac) ✓

2018-2024

- STA (1,800 ac)
- C-139 FEB (11,000 ac-ft)
- STA Earthwork (800 ac)



Modified Water Deliveries to Everglades National Park

Goals & Objectives:

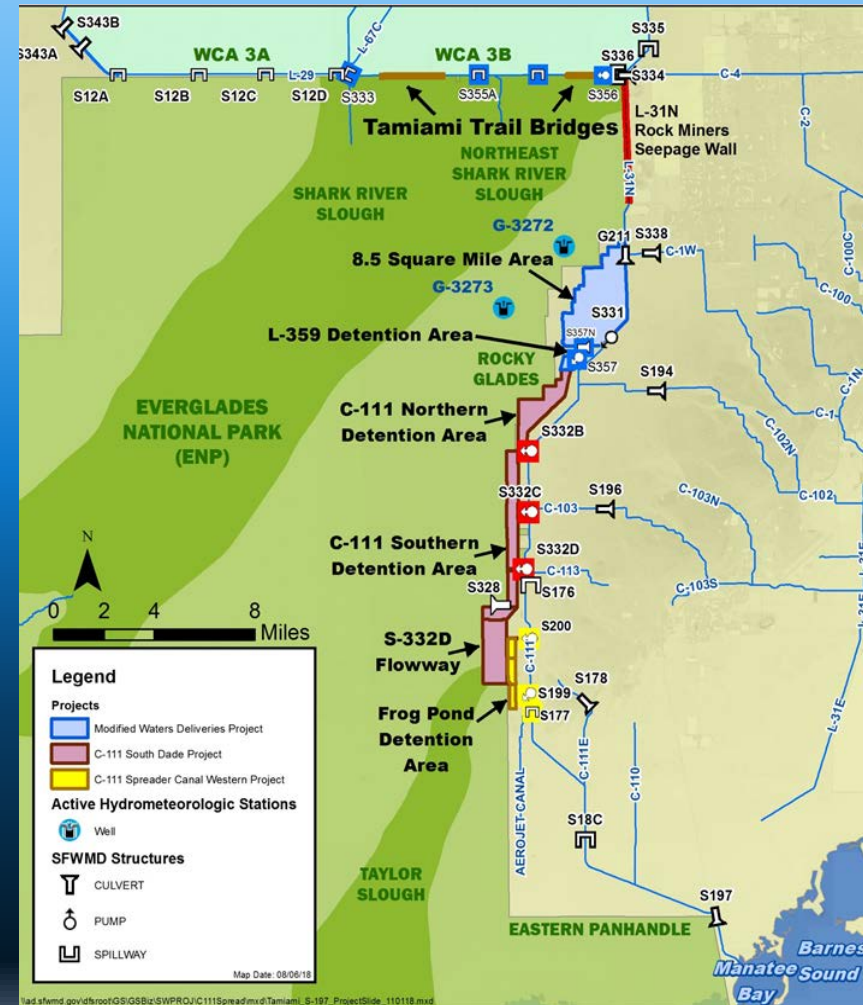
- To restore natural hydrologic conditions in Everglades National Park as directed by the ENP Protection and Expansion Act of 1989 that added Northeast Shark River Slough to ENP.

Major components:

- Tamiami Trail modifications
 - 1 mile bridge
 - S355A and S355B
- Conveyance Seepage Features
 - S-356 Pump Station
 - S357 Pump Station
 - S-331 Command and Control Center
 - Partial degrade of L-67 Extension
- 8.5 Square Mile area protection features

Status:

- Developing the Combined Operational Plan (COP) that is expected to be completed in May 2020.



C-111 South Dade Project

Goals & Objectives:

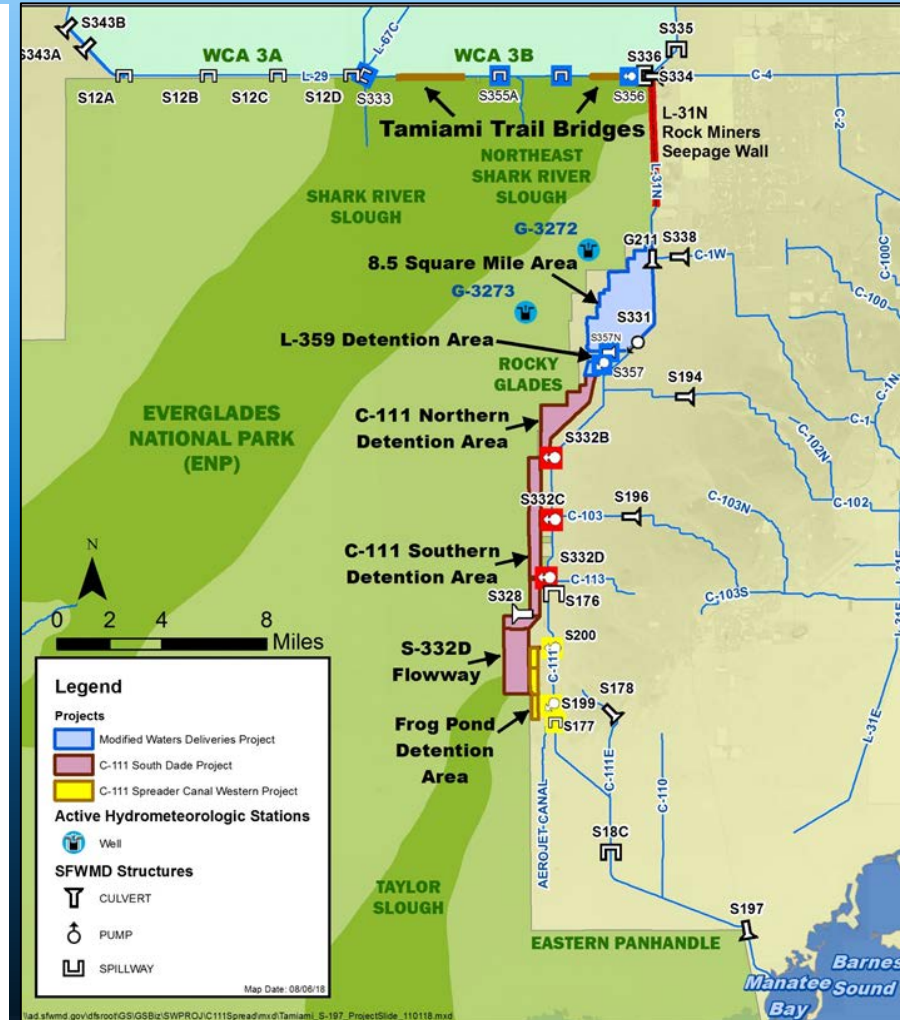
- To restore the critical ecosystem in the area and reduce seepage losses from Everglades National Park (ENP) and provide increased flows to Florida Bay through Taylor Slough.

Components:

- Detention Areas and Flowway

Status:

- Construction of major C-111 South Dade Project components were completed in 2018 by the USACE and SFWMD. Components of the C-111 South Dade and other projects will be operated in accordance with a Combined Operational Plan.



C-111 Spreader Canal Project

Goals & Objectives:

- Provide ecosystem restoration of freshwater wetlands, tidal wetlands and near-shore habitat as well as flood protection maintenance and recreation opportunities.

Components:

Located in south Miami-Dade County, the project includes:

- 2 pump stations
- A 540 acre detention area
- Culverts and plugs that create a nine-mile hydraulic barrier keeping freshwater in the adjacent Everglades National Park.
- Additional water to Taylor Slough and Florida Bay advanced by SFWMD's Florida Bay project.

Status:

- SFWMD increased pumping capacity at S-199 and S-200, pumps started testing in July 2018, regular operations begin in September 2018.



Goals & Objectives:

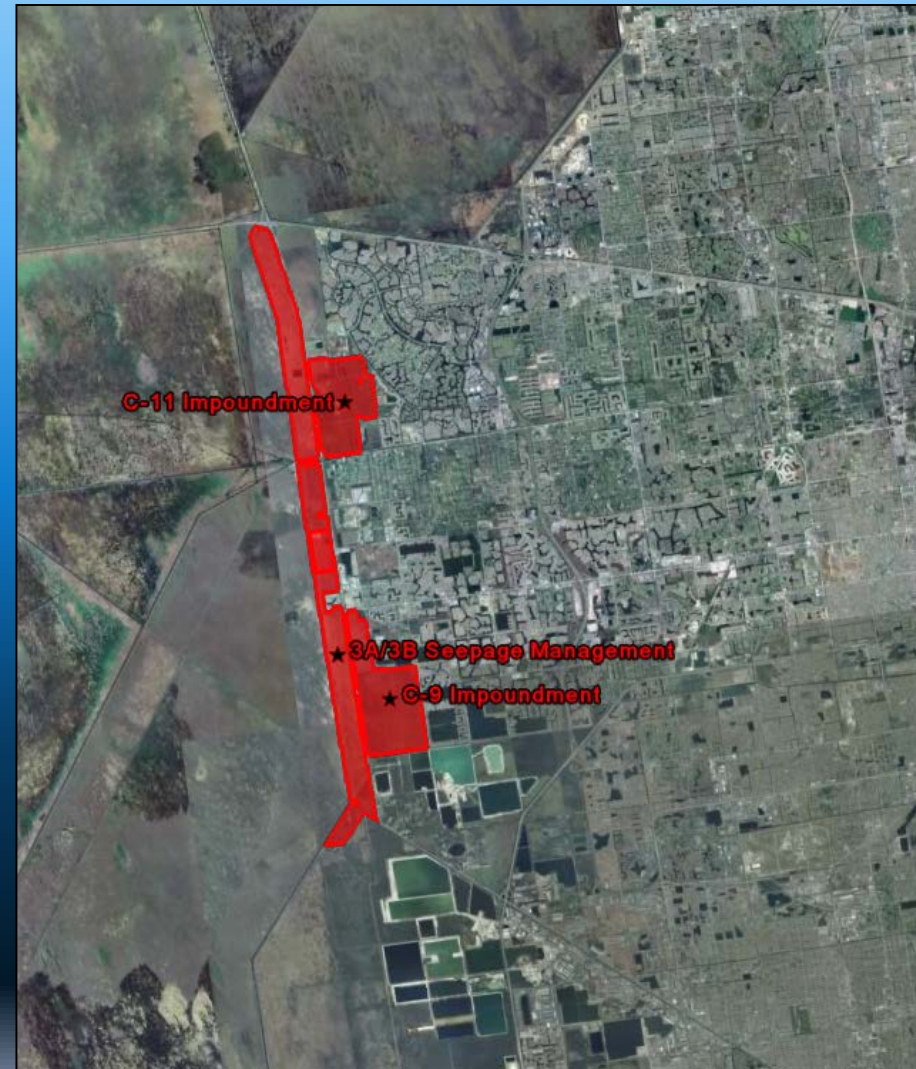
- Divert stormwater away from S-9 Pump Station and WCA 3A
- Capture local runoff in storage impoundments
- Reduce seepage losses from the Everglades
- Protect existing legal water users and maintain existing level of flood protection

Components:

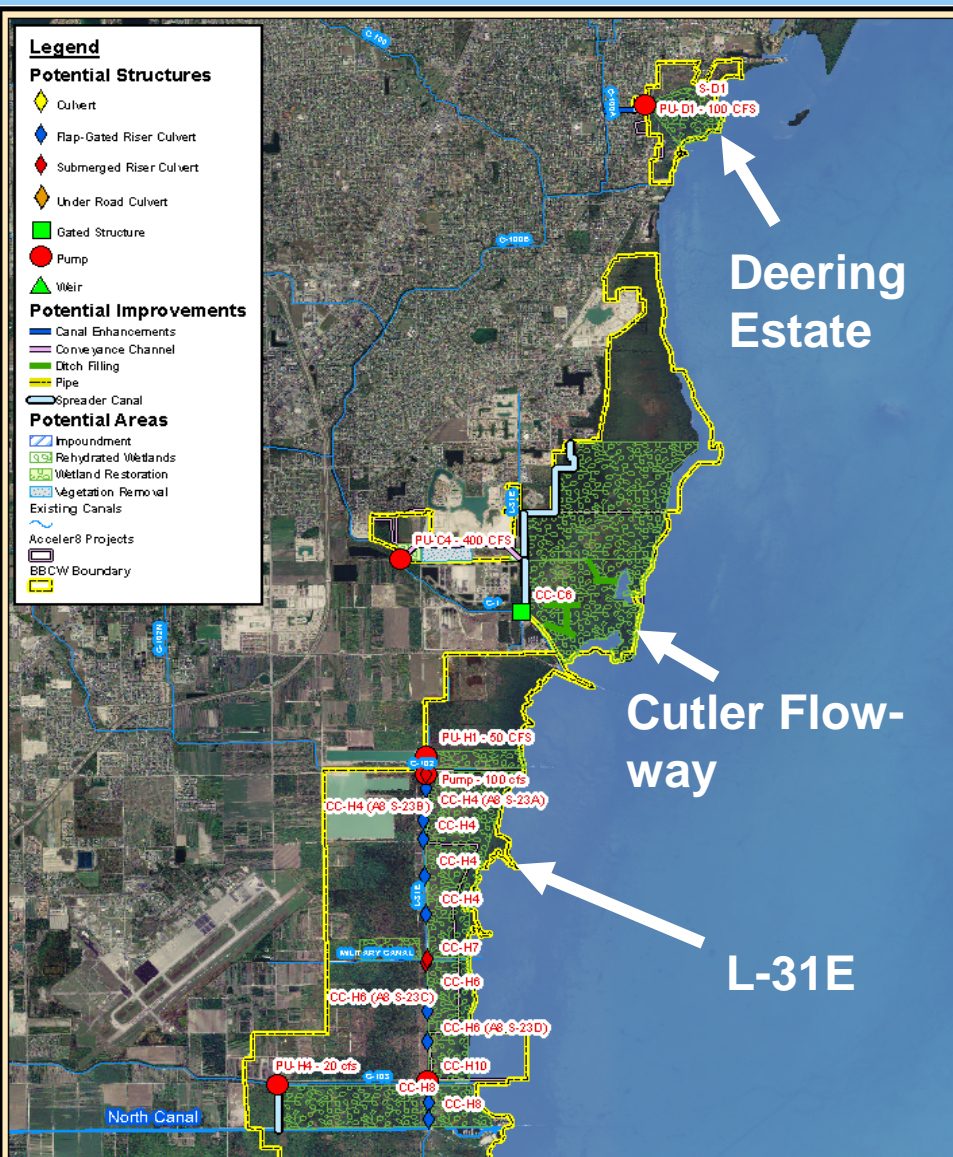
- C-11 Impoundment
 - 1,068 acres – 4,592 ac-ft of storage
- C-9 Impoundment
 - 1,641 acres – 7,056 ac-ft of storage
- WCA 3A/3B Seepage Management
 - 4,633 acre wetland
 - 14 miles of levee/berm, water control structures

Status: C-11 Impoundment in design

Broward County Water Preserve Areas



Biscayne Bay Coastal Wetlands Phase



Goals & Objectives:

- Restore or enhance freshwater wetlands, tidal wetlands, and near shore Bay habitat.

Phase 1 Components:

- Deering Estate - complete
- Cutler Wetlands
- L-31E Flowway

Status:

- Phase 1:
 - Cutler Wetlands design update underway
 - L-31E culverts complete, 2nd interim pump station in design
- Phase 2 planning – USACE currently developing a Project Management Plan

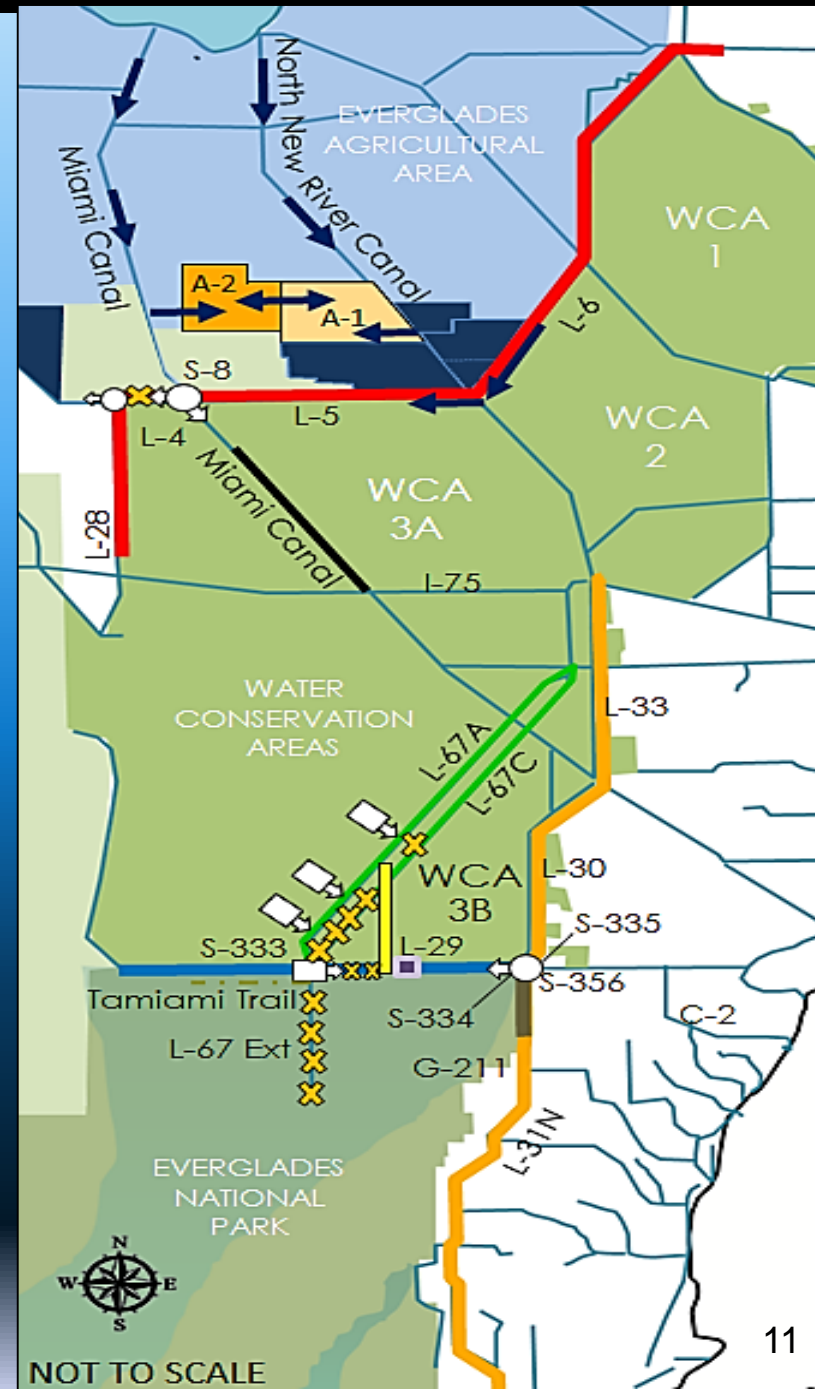
Central Everglades Planning Project

Goals & Objectives:

- Increase storage, treatment and conveyance of water south of Lake Okeechobee

Project Features:

- Remove and/or plug canals and levees within the central Everglades
- Improve hydroperiod and flow through Everglades National Park while protecting urban and agricultural areas to the east from flooding
- Sends ~210,000 ac-ft of water south from the Lake



Central Everglades Planning Project

Post Authorization Change

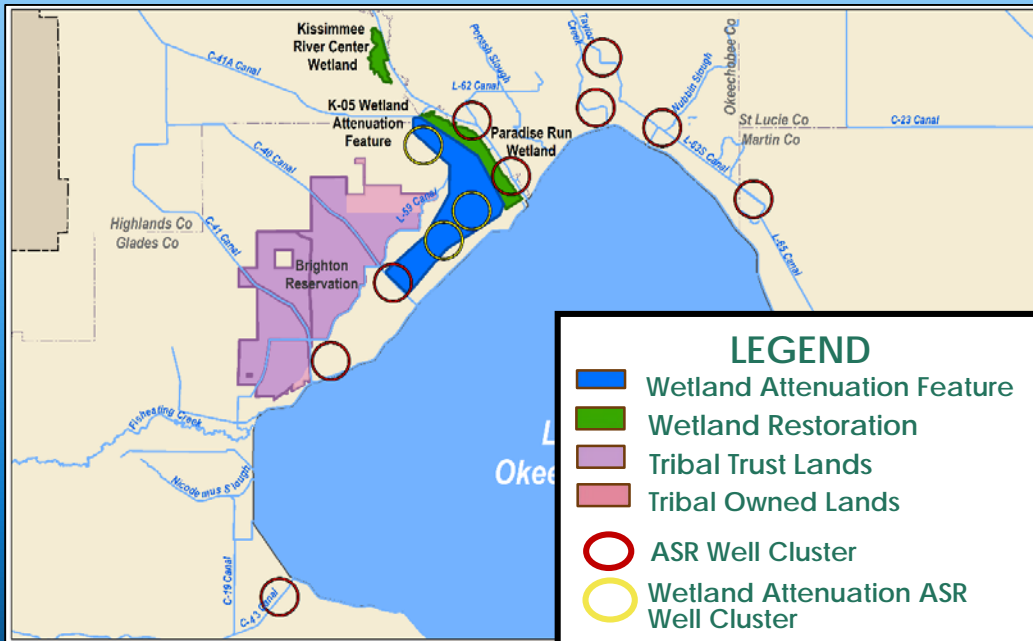


Goals & Objectives

- Reduce damaging discharges to the northern estuaries
- Provide additional water storage, treatment and conveyance south to the Everglades.
- Together with Congressionally-authorized projects, the project will reduce Lake Okeechobee discharges by 63 percent and send an average annual 370,000 ac-ft of water to the central Everglades

- 240,000 acre-foot reservoir
- Reservoir ~ 10,500 acres and ~ 23 feet deep
- Stormwater Treatment Area (STA) ~ 6,500 acres
- Multiple purpose operations consistent with Comprehensive Everglades Restoration Plan (CERP) – environmental benefits and other water related needs
- Alternative preserves the A-1 FEB identified in “Restoration Strategies” which is consistent with CEPP

Lake Okeechobee Watershed Restoration Project



Components:

- Wetland attenuation feature provides ~48,000 ac-ft of storage (~13,700 acres)
- 80 Aquifer Storage and Recovery wells provide ~ 448,000 ac-ft of storage per year
- Paradise Run and Kissimmee River Center provide ~ 4,700 acres of wetland restoration
- Total project footprint: 18,403 acres
 - Acres on private land: 11,867 acres
 - Acres on public land: 6,537 acres

Goals & Objectives:

- Improve the quantity, timing, and distribution of flows into Lake Okeechobee to maintain ecologically desired lake stage ranges more often.
- Improve estuary discharges from Lake Okeechobee to improve the salinity regime and the quality of oyster, submerged aquatic vegetation, and other estuarine community habitats in the Northern Estuaries.
- Increase the spatial extent and functionality of aquatic and wildlife habitat within Lake Okeechobee and the surrounding watershed.
- Increase availability of the water supply to the existing legal water users of Lake Okeechobee.

Loxahatchee River Watershed Restoration Project Study Scope

Goals & Objectives:

- Restore flows to the Loxahatchee River Northwest Fork
- Enhance vegetative communities in the Loxahatchee Estuary
- Increase spatial extent and function of remaining natural areas
- Restore watershed connections among the Loxahatchee River headwater natural areas to improve hydrology, sheetflow, hydroperiods, natural storage and vegetative communities
- Restore abundance and diversity of native plant and animal species

Status:

- The draft Project Implementation Report released for public and agency review on March 22, 2019



NW Fork Loxahatchee River



Loxahatchee Floodplain

Loxahatchee River Watershed Restoration Project

Tentatively Selected Plan – Alternative 5r

Flow Way 3

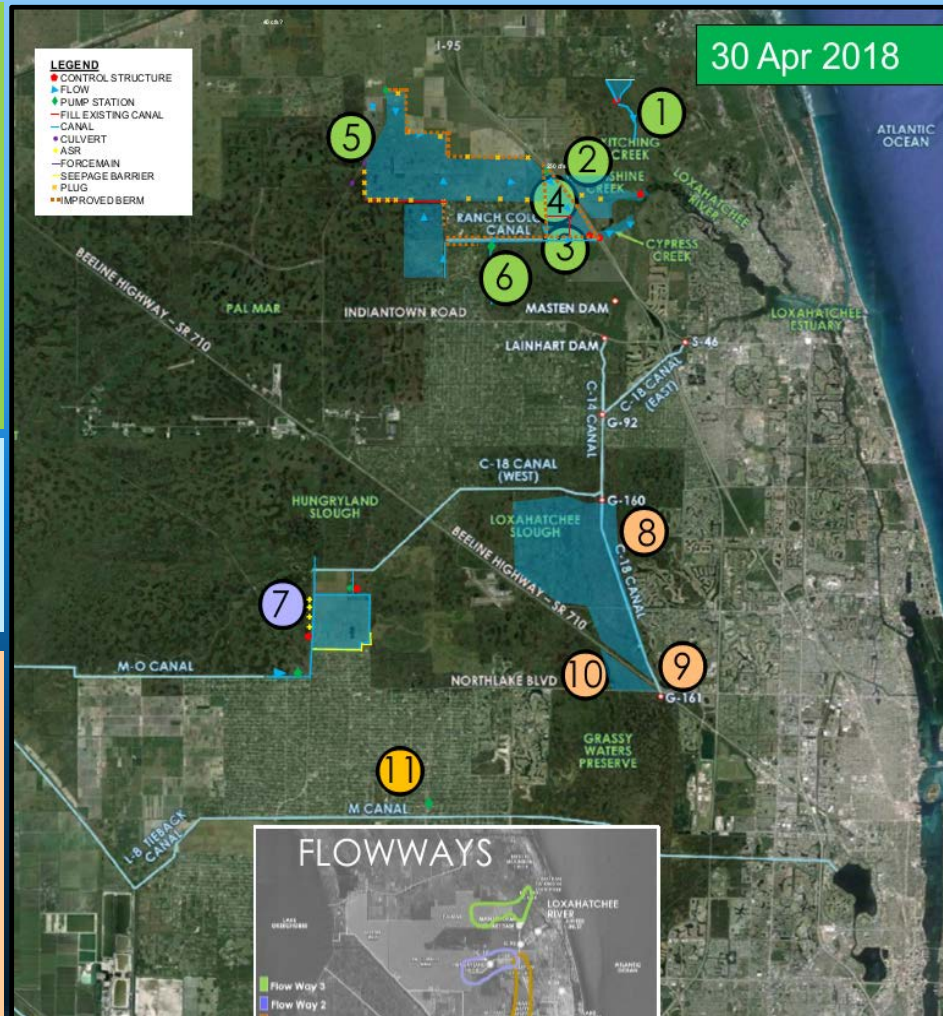
- 1 - Kitching Creek
- 2 - Moonshine Creek
- 3 - Cypress Creek Canal
- 4 - Gulfstream West
- 5 - Palmar East
- 6 – Mack Dairy Road Spreader Canal

Flow Way 2

- 7 - C-18W Reservoir (9,500 ac/ft & 4 ASR)

Flow Way 1

- 8 - G-160 Structure
- 9 - G-161 Structure
- 10 - Grassy Waters Triangle
- 11 - M-1 Pump Station



Western Everglades Restoration Project

Goals & Objectives:

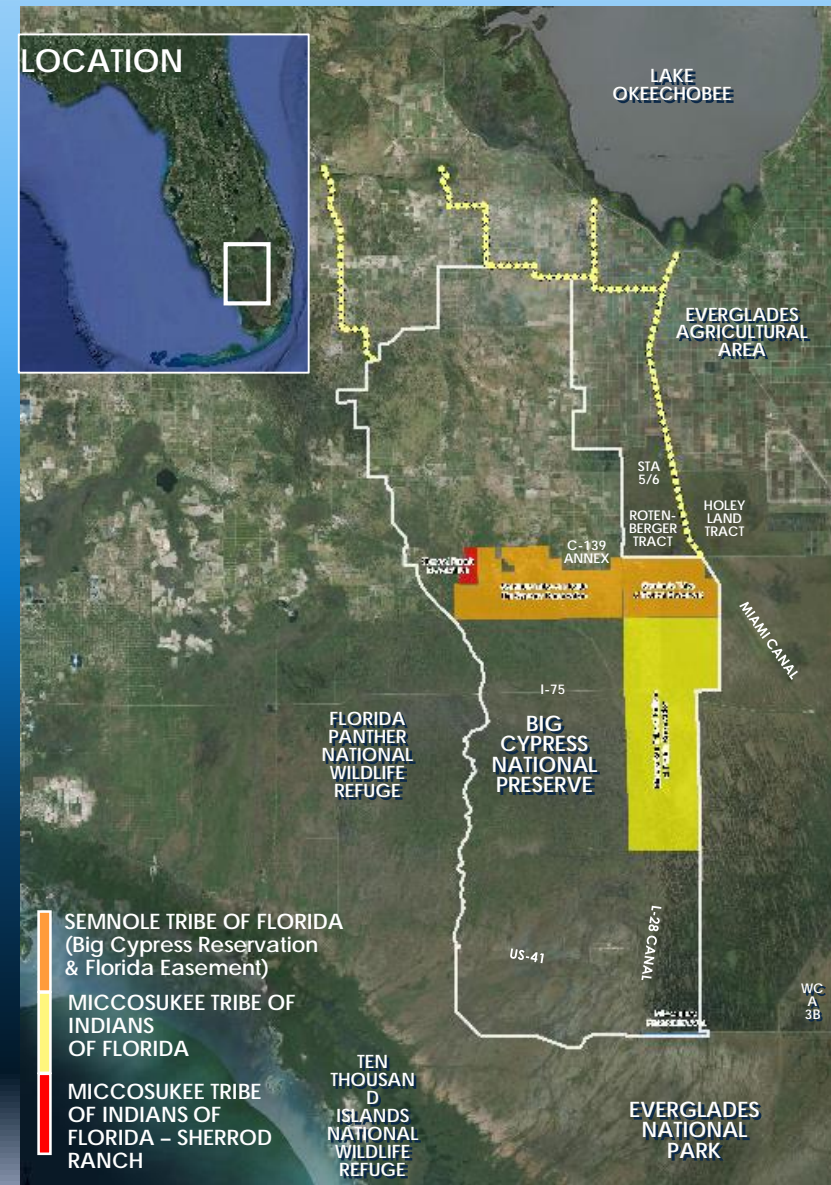
- Restore sheetflow and hydroperiods; re-establish ecological connectivity and ecological resilience; restore low nutrient conditions; and reduce wildfires associated with altered hydrology.

Components:

- The proposed TSP, Alternative H, includes:
- Wingate Mill STA (~ 3,300 acres) and flow –way into BCNP and Big Cypress Seminole Indian Reservation.
- North Feeder STA (~ 2,200 ac) on the C-139 Annex
- Rerouting North Feeder Canal and C-139 Annex flows to WCA3A
- In-line weir and plug on L-28 Interceptor north of I-75
- Backfilling canals and removing levees south of I-75
- Removing the L-28 Tieback levee and filling part of the L-28 South canal
- Installing three gated structures between WCA 3A and BCNP , and a pump to move water west in L-29 canal.

Status:

- Team will seek Governing Board input on the proposed TSP in the Spring of 2019.



Lake Okeechobee System Operations Manual (LOSOM)

Lake Okeechobee – Rita Island, Lake Harbor, John Stretch Memorial Park, EAA



Purpose:

- Reevaluate and define operations for the Lake Okeechobee regulation schedule that take into account nearly complete additional infrastructure, such as C-44 and C-43, which will soon be operational components of the water management system.

Potential Benefits:

- Manual will result in a new water management schedule that addresses the congressionally authorized purposes that include flood risk management; water supply for agricultural irrigation, municipalities and industry, environment, and Native American Tribes; navigation; enhancement of fish and wildlife; and recreation.

Status:

- Scoping meetings for the National Environmental Policy Act (NEPA) held in February and March 2019. Public Comment period open until April 22, 2019.



Kissimmee River

Discussion

Overview of the Agricultural Industry in the Region



Lykes Bros. Inc.

2019 LKB Stakeholder Kickoff Meeting
March 27, 2019



Demand Estimates & Projections



Nathan Kennedy, Ph.D.

Lead Economist

2019 LKB Stakeholder Kickoff Meeting
March 27, 2019



Water Use Categories

1. Public Water Supply
2. Domestic Self-Supply
3. Agriculture
4. Industrial/Commercial/Institutional
5. Recreational/Landscape
6. Power Generation

Population Projections

Define Current and 2040 Service Area Boundaries

- Coordination with utilities

Calculate 2010 – 2017 Baseline Population Estimates

- US Census and BEBR* annual reports

Calculate 2020 – 2040 Projected Utility Service Area Populations

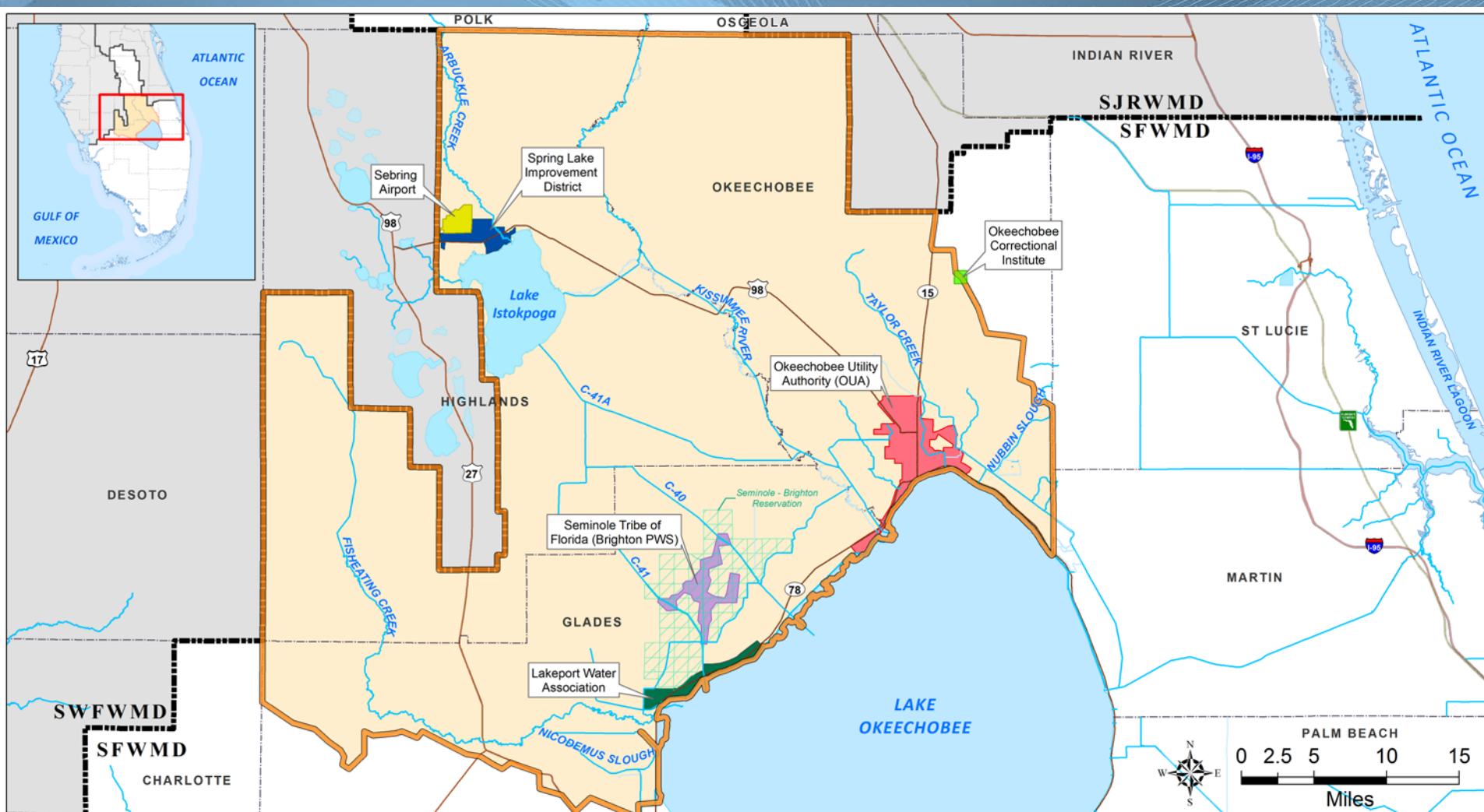
- Projections based on county growth rates published by BEBR

Review Population Projections with Stakeholders

- Adjustments made with local input

* The University of Florida's Bureau of Economic and Business Research (BEBR) produces Florida's official state and local population estimates and projections.

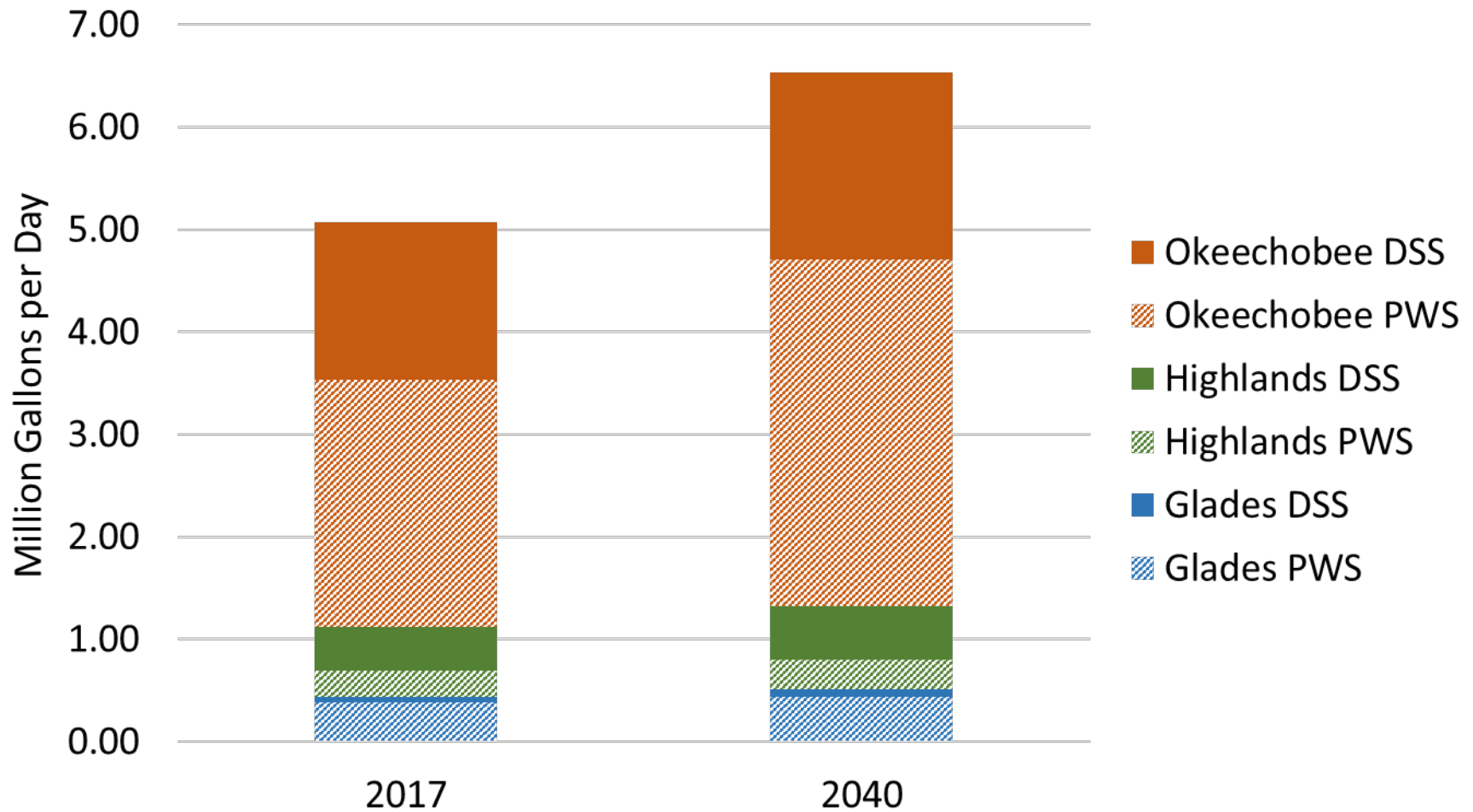
Lower Kissimmee Basin Utility Service Areas



Lower Kissimmee Basin Population

County	PWS Utility or DSS Area	2017	2040
Glades	Lakeport Water Association	1,289	1,497
	Seminole Brighton Reservation	703	815
	Okeechobee Utility Authority (Glades Portion)	1,492	1,734
	DSS Total	578	672
	Glades County Total	4,062	4,718
Highlands	Spring Lake Improvement District	2,705	3,201
	DSS Total	6,140	6,862
	Highlands County Total	8,845	10,063
Okeechobee	Okeechobee Utility Authority (Okeechobee Portion)	22,146	24,547
	Okeechobee Correctional	1,900	1,900
	DSS Total	15,543	17,434
	Okeechobee County Total	39,589	43,881
LKB Planning Area PWS Total		30,235	33,694
LKB Planning Area DSS Total		22,261	24,968
LKB Planning Area Total		52,496	58,662

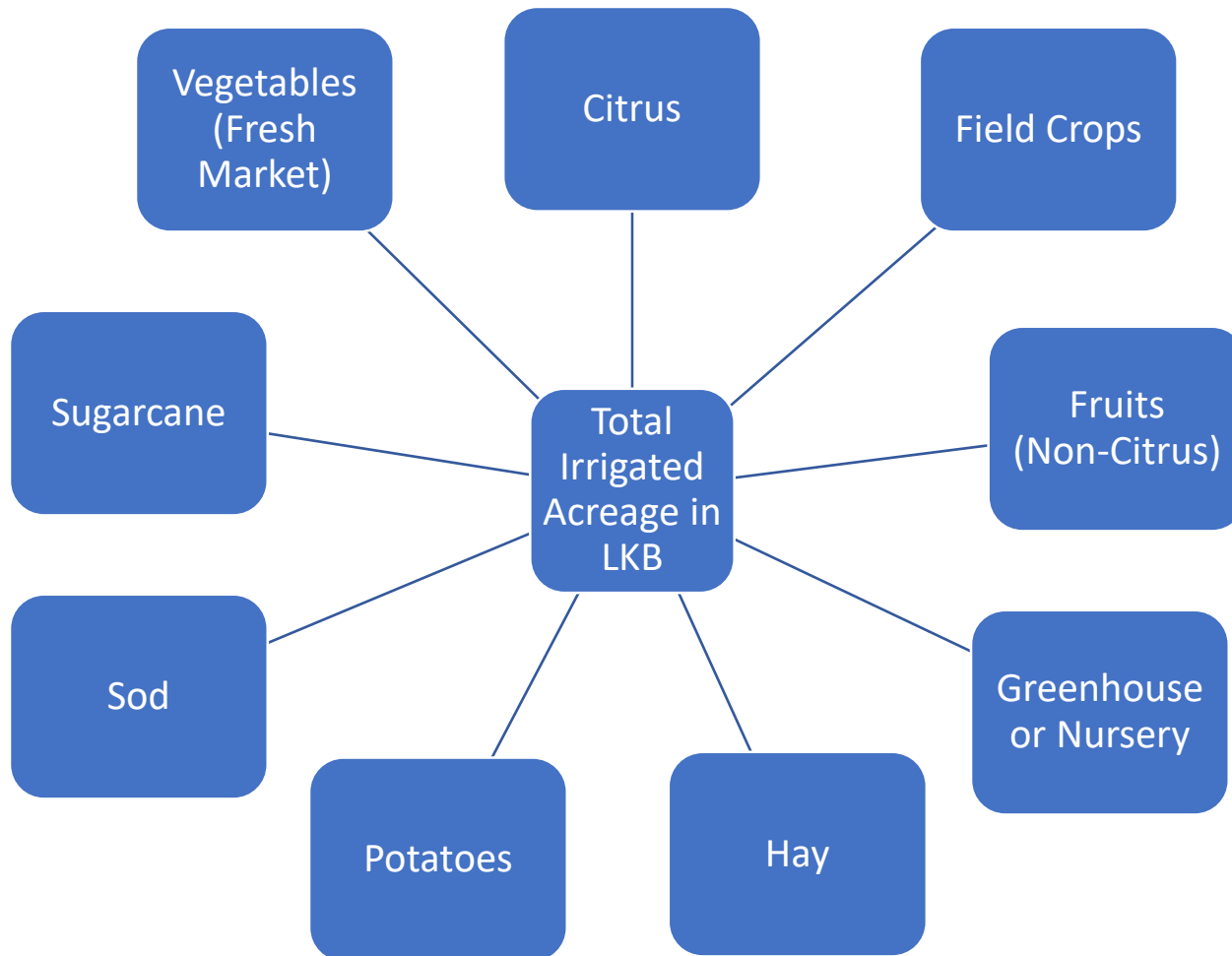
Public Water Supply and Domestic Self-Supply Demands



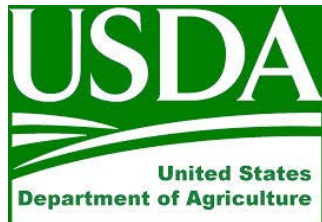
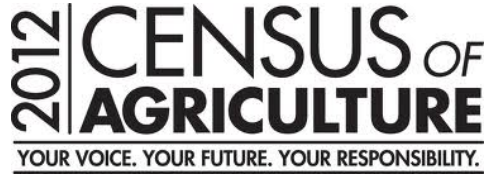
Water Use Categories

1. Public Water Supply
2. Domestic Self-Supply
3. Agriculture
4. Industrial/Commercial/Institutional
5. Recreational/Landscape
6. Power Generation

Crop Categories

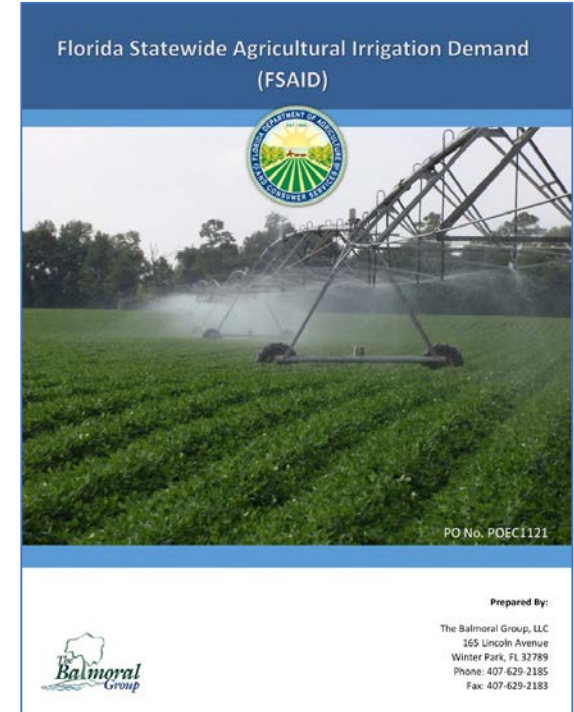


Data Sources for Agricultural Projections



Statutory Basis for Projections

- 2013 legislation (Section 570.93, Florida Statutes) requires FDACS to develop statewide agricultural demand projections
 - Acreage – historical, current, and 20-year projection, by crop
 - Demands for average rainfall and 1-in-10 year drought, by crop
 - Metered data factored into estimates of historical and current demands
 - Consult with stakeholders
- FDACS now publishes the annual FSAID report



Statutory Basis for Projections

- Section 373.709, Florida Statutes: Agricultural demand projections in water management districts' regional water supply plans should be based on best available data
 - Must consider data of future demands provided by FDACS
 - Any deviation from data must be described
 - FDACS data are presented with adjusted data

Basic Components of Agricultural Demand Projections

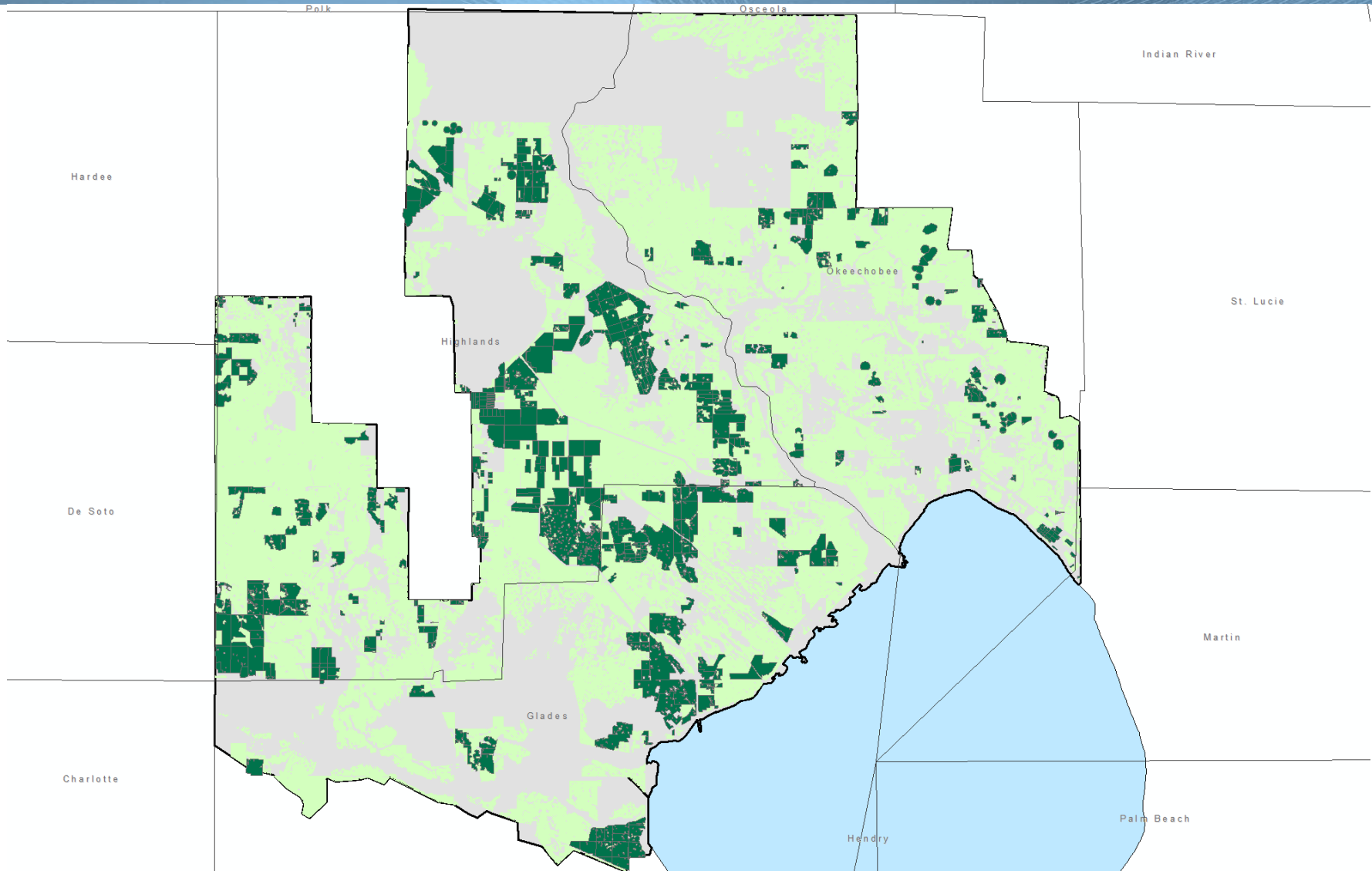
Irrigated Acreages

- FSAID Irrigated Lands Geodatabase
- SFWMD land use map and acreage projections

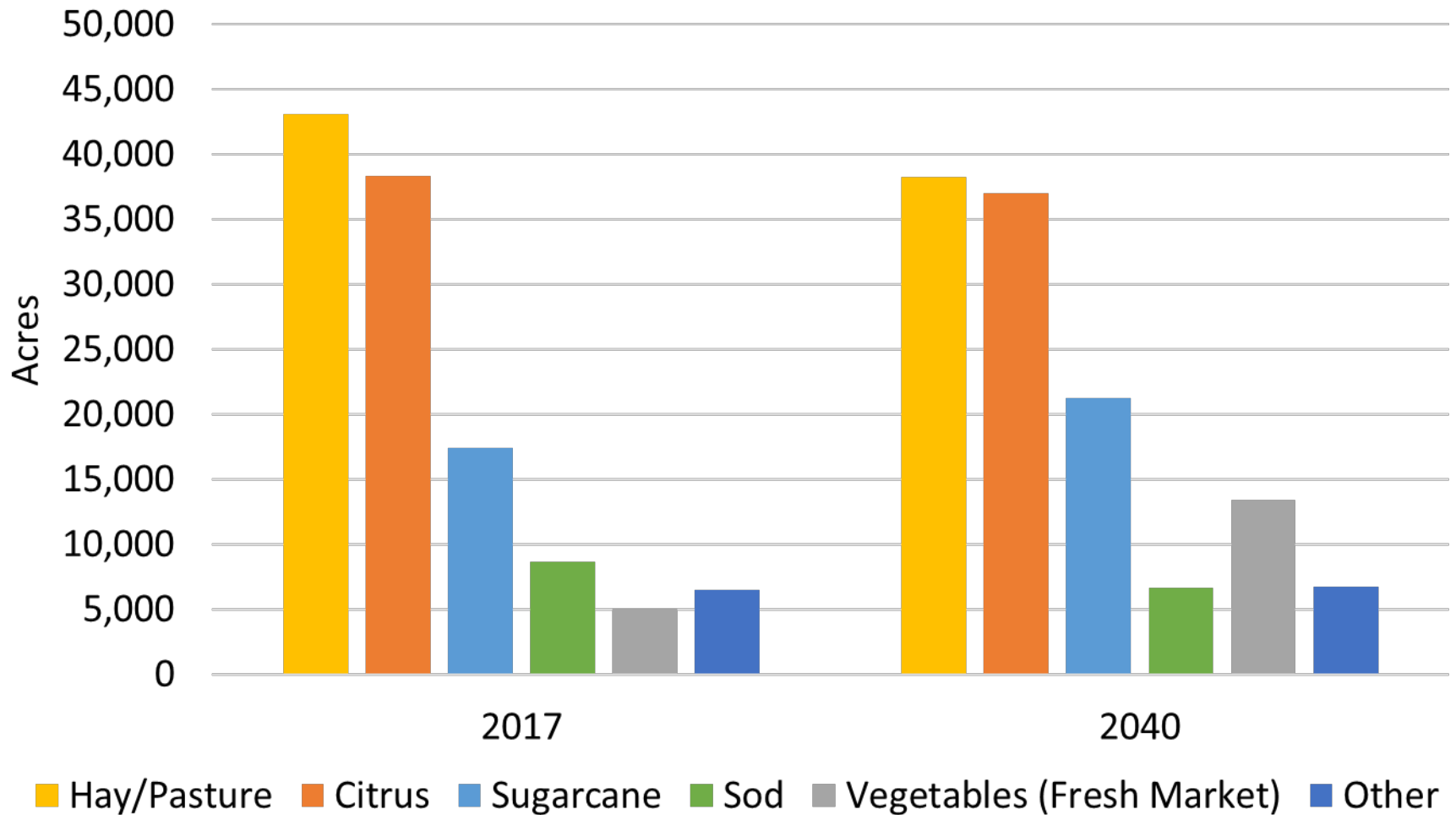
Water Demand Models

- FSAID water use model
- Agricultural Field Scale Irrigation Requirements Simulation (AFSIRS) model

Lower Kissimmee Basin Irrigated Agricultural Areas



Agricultural Acreage



Basic Components of Agricultural Demand Projections

Irrigated Acreages

- FSAID Irrigated Lands Geodatabase
- SFWMD land use map and acreage projections

Water Demand Models

- FSAID water use model
- Agricultural Field Scale Irrigation Requirements Simulation (AFSIRS) model

AFSIRS and FSAID

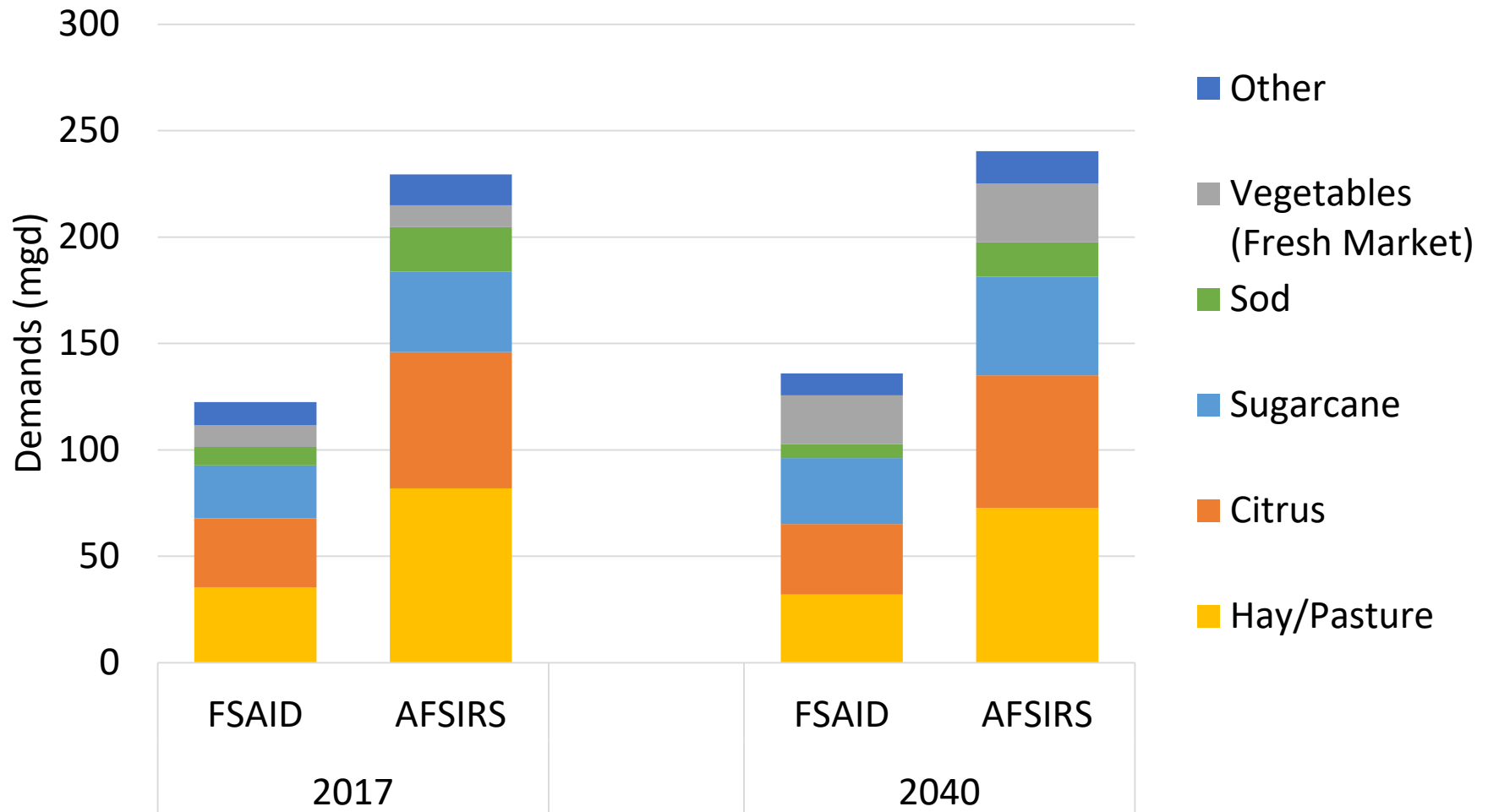
Water Demand Model Comparison

AFSIRS	FSAID
Built with data from University of Florida field experiments	Built with available reported water use from all water management districts
Uses a wide range of location-specific environmental variables	A limited set of environmental variables are used directly in the model
Does not consider changing irrigation intensities in response to crop profitability	Irrigation intensities vary in response to crop profitability

Use of AFSIRS in 2019 LKB Plan Update

- AFSIRS model is similar to the model used to establish water use permit allocations in the region
- AFSIRS estimates are consistent with previous planning efforts for the LKB and other planning areas
- Unique aspects of agricultural production in the LKB may be under-represented with statewide FSAID model

Agricultural Demands



Livestock Water Demands

- 374,000 head of cattle (22% of state herd)
- FDACS estimates water demands at 6.94 mgd
- No change projected in livestock population or water demand



Agriculture Demands Summary

Agriculture Sub-Category	Demands (mgd)	
	2017	2040
Crops	229.49	240.35
Livestock	6.94	6.94
Aquaculture	0.60	0.60
LKB Planning Area Total	237.03	247.89

Water Use Categories

1. Public Water Supply
2. Domestic Self-Supply
3. Agriculture
4. Industrial/Commercial/Institutional
5. Recreational/Landscape
6. Power Generation

Industrial/Commercial/Institutional

County	Demands (mgd)	
	2017	2040
Glades	0.68	0.79
Highlands	0.95	1.08
Okeechobee	0.07	0.08
LKB Planning Area Total	1.70	1.95

Water Use Categories

1. Public Water Supply
2. Domestic Self-Supply
3. Agriculture
4. Industrial/Commercial/Institutional
- 5. Recreational/Landscape**
- 6. Power Generation**

Recreational/Landscape

County	Demands (mgd)	
	2017	2040
Glades	0.00	0.00
Highlands	0.41	0.42
Okeechobee	0.67	0.72
LKB Planning Area Total	1.08	1.14

Water Use Categories

1. Public Water Supply
2. Domestic Self-Supply
3. Agriculture
4. Industrial/Commercial/Institutional
5. Recreational/Landscape
6. **Power Generation**

Lower Kissimmee Basin Draft Water Demands Summary

Water Use Category	Demands (mgd)	
	2017	2040
Public Water Supply	3.05	3.39
Domestic and Small Public Supply	2.02	2.42
Agriculture	237.03	247.89
Industrial/Commercial/Institutional	1.70	1.95
Recreational/Landscape Irrigation	1.08	1.14
Power Generation	0.00	0.00
LKB Planning Area Total	244.88	256.79

A photograph of a swampy forest, likely a cypress swamp. The water is calm, reflecting the surrounding green trees and foliage. A large, thick tree trunk is prominent in the foreground on the right side. The overall scene is vibrant with greenery and natural light filtering through the canopy.

Questions?

Groundwater Modeling for the Lower Kissimmee Basin Water Supply Plan Update



Peter J. Kwiatkowski, P.G.

Resource Evaluation Section Administrator

2019 LKB Stakeholder Kickoff Meeting
March 27, 2019



Agenda

- Purpose
- ECFTX Model
- Example Model Results
- Status

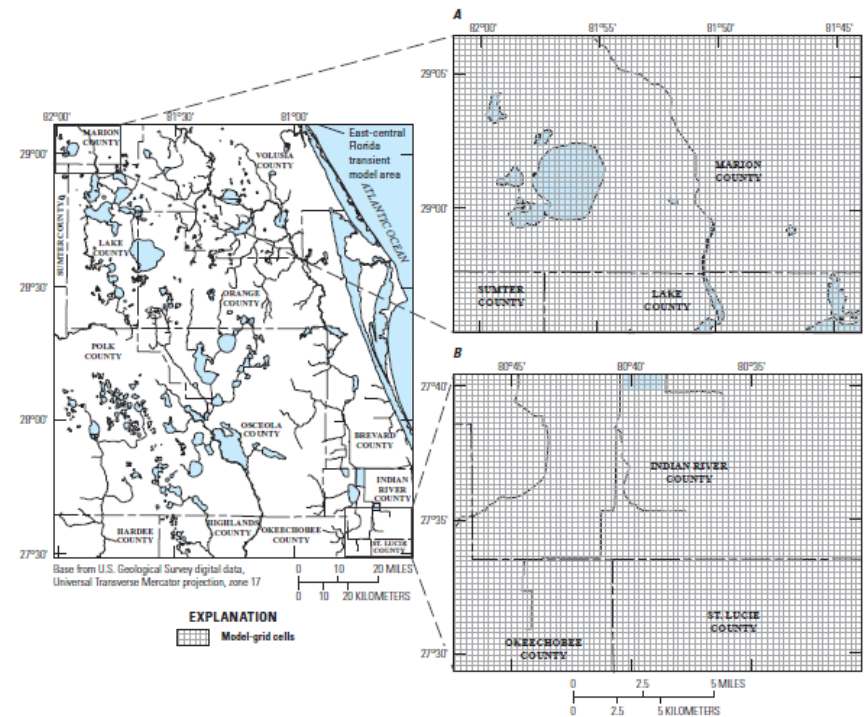
Purpose

- Groundwater modeling is being conducted using the East Central Florida Transient Expanded (ECFTX) Model to:
 - Simulate effects of groundwater withdrawals on natural systems, including lakes, wetlands, and aquifers
 - Evaluate whether water supply demands can be met over the 20-year planning horizon

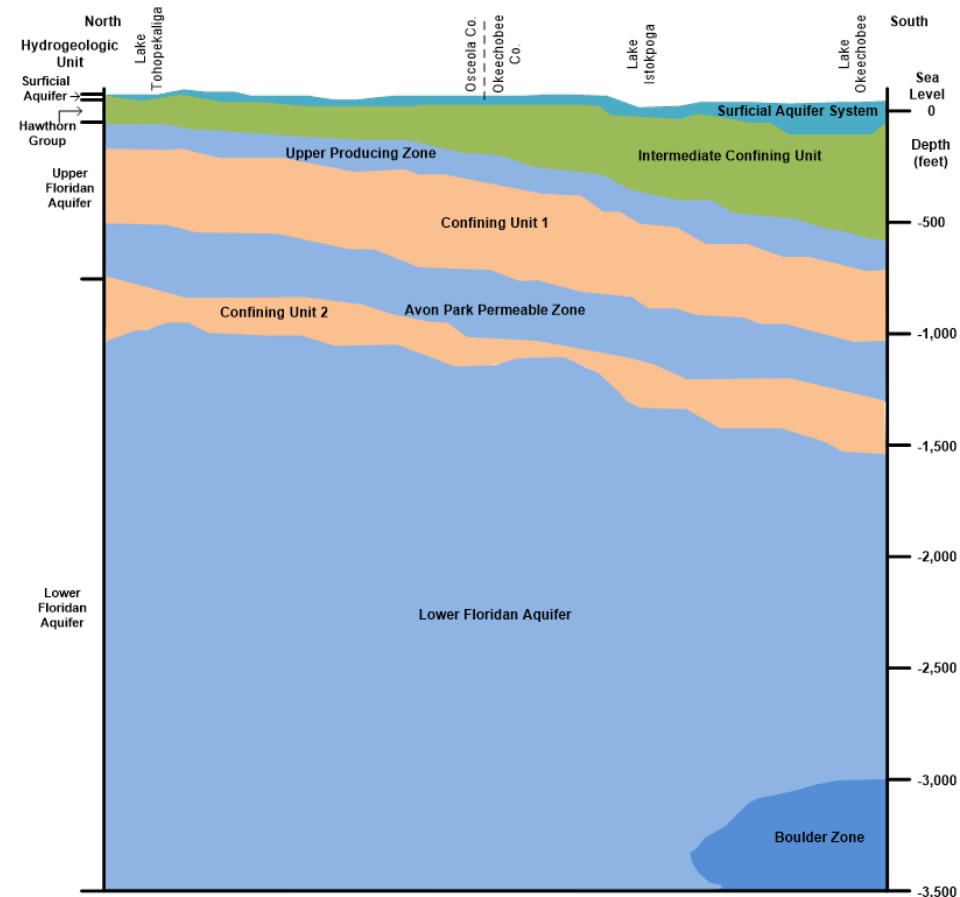


ECFTX Groundwater Flow Model

- Use USGS MODFLOW computer code
- Overlay uniform grid over area to be simulated
- Grid spacing: 1,250 ft × 1,250 ft
- 603 rows and 740 columns
- 11 layers
- Calibration period: 2003 to 2014
- Calibrate to measured water levels and flows within agreed upon criteria



Hydrogeology



Model Layer Hydrostratigraphic Conceptualization

Model Layer	Hydrostratigraphic Conceptualization
1	surficial aquifer
2	intermediate confining unit
3	UFA-upper
4	Ocala low-permeability zone (OCAPlpz)
5	Avon Park high-permeability zone (APhpz)
6	middle confining unit I
7	Overlap unit of the LFA
8	middle confining unit II
9	LFA-upper
10	Glaucinite marker low permeability unit (GLAUC-lpu)
11	LFA-basal

Model Input

Hydrologic Process/Component	General Comment
1. Rainfall	Radar rainfall adjusted with rain gauge data
2. Evapotranspiration (ET)	USGS PET data, crop coefficients, and AFSIRS program to calculate ET
3. Recharge and Return Flow	NRCS/Curve number to calculate runoff and infiltration from daily rainfall and return flow from water use classes
4. Springs, Drains, and Drainage Wells	Use drains package to simulate springs; DRT package to simulate agricultural drains and drainage wells
5. Lakes and Rivers	Simulates water levels at lakes and rivers
6. Fully 3D Groundwater Flow	Simulates groundwater flow in 11 layers
7. Pumping Wells and Rapid Infiltration Basins (RIBs)	All water use classes for pumping wells and injection wells to simulate RIBs
8. Lateral Boundaries	General head boundaries based on observed heads or water levels

Peer Review Panel

➤ Groundwater modeling experts

- Louis Motz, Ph.D., Associate Professor Emeritus, University of Florida
- Mark Stewart, Ph.D., Professor Emeritus, University of South Florida
- Peter Anderson, P.E., M.S., Principal Engineer, Tetra Tech GEO

➤ Benefits

- Receive and incorporate comments during model development
- Address concerns prior to model calibration

Model Scenarios and Approach

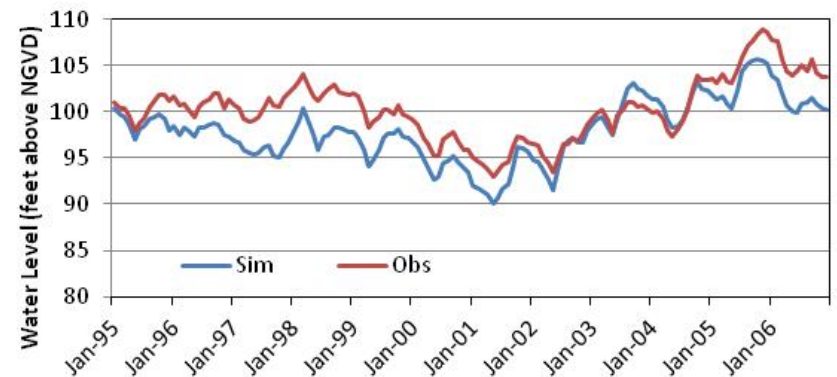
- Calibration simulation: 2003 to 2014
- Scenarios include rainfall from 2003 to 2014, includes wet and dry years
- Reference condition: 2017
- Future simulation: 2040
- Compare simulated water levels and flows between reference condition and future simulation
- Evaluate effects of groundwater withdrawals on aquifers and natural systems

Example Model Output: Change in Water Levels

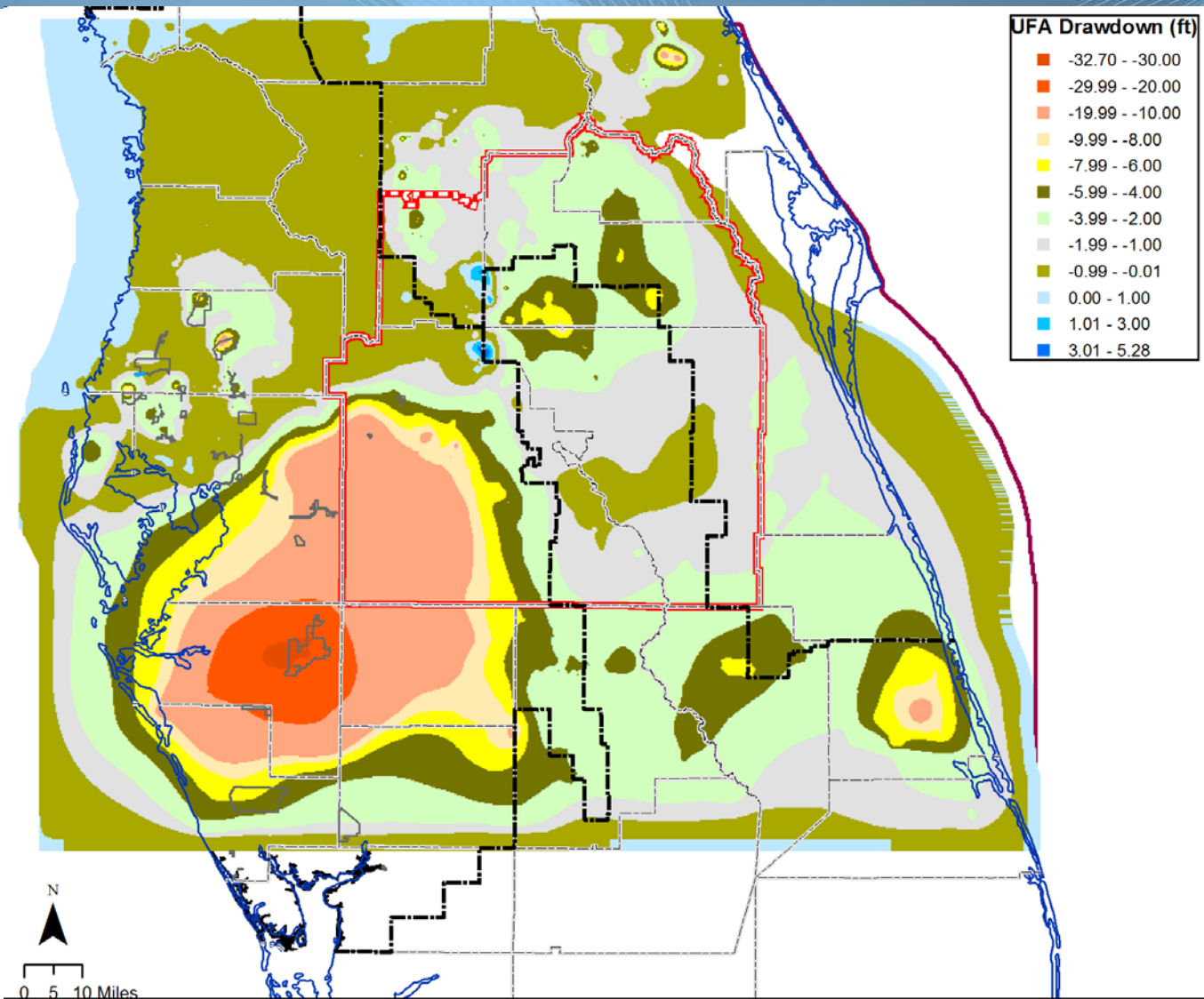
**ECFT Model Results:
Lake Level**



**ECFT Model Results:
Upper Floridan Aquifer**



Example Model Output: Change in Water Levels in UFA



Status

➤ Model calibration is complete

➤ Next:

- Finalize and incorporate water demands into model input files
- Reference condition (2017)
- Future simulation (2040)
- Analyze and share model results

A photograph of a swampy forest, likely a cypress swamp. The water is calm, reflecting the surrounding green trees and foliage. A large, thick tree trunk is prominent in the foreground on the right side. The overall scene is vibrant with greenery and natural light filtering through the canopy.

Questions?

Next Steps



Natalie Kraft

Water Supply Plan Manager

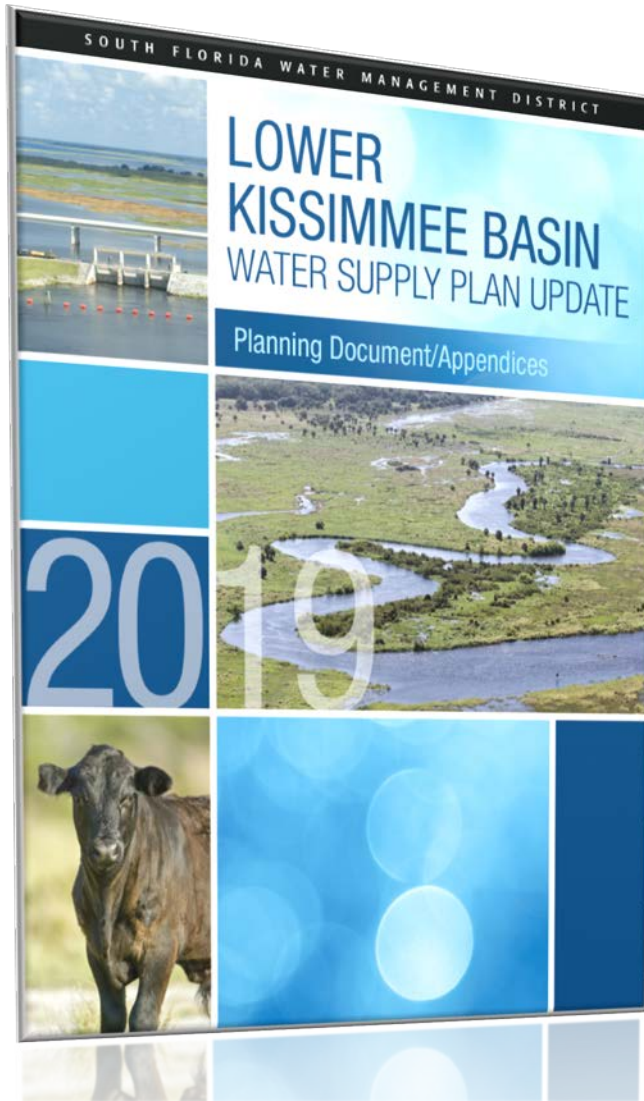
2019 LKB Stakeholder Kickoff Meeting
March 27, 2019



Next Steps

- Continue coordination with utilities, agricultural operations, state agencies, and other stakeholders
- Groundwater model simulations
- Stay up to date with progress of regional projects
- Next stakeholder meeting: Summer 2019

Need Water Supply Plan Information?



- Plan information can be found at www.sfwmd.gov/lkbplan
- Workshop announcements sent via email

Staff Resources

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A photograph of a swampy forest, likely a cypress swamp. The water is calm, reflecting the surrounding green trees and foliage. A large, thick tree trunk is prominent in the foreground on the right. The scene is dense with vegetation, including various types of trees and hanging moss.

Questions?