SOUTH FLORIDA WATER MANAGEMENT DISTRICT (SFWMD)
WATER RESOURCES ADVISORY COMMISSION (WRAC)

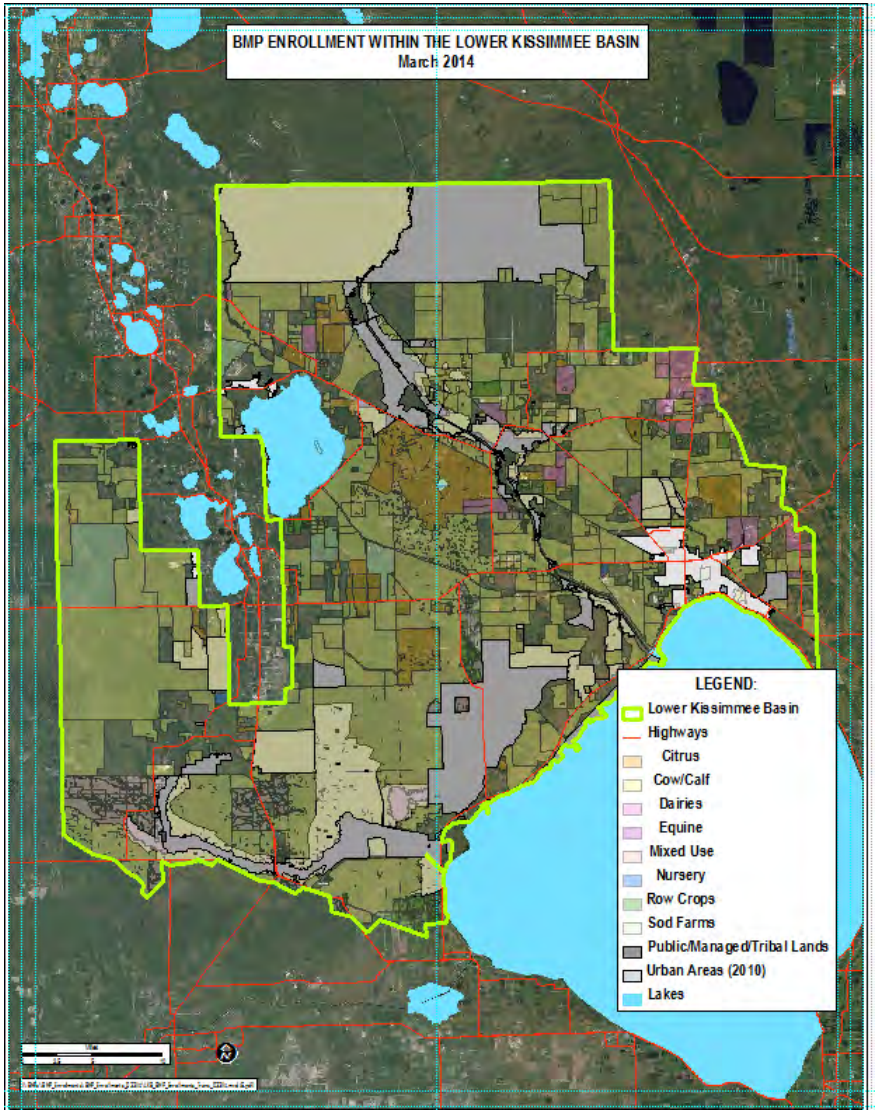
2014 LOWER KISSIMMEE BASIN WATER SUPPLY PLAN WORKSHOP PRESENTATIONS

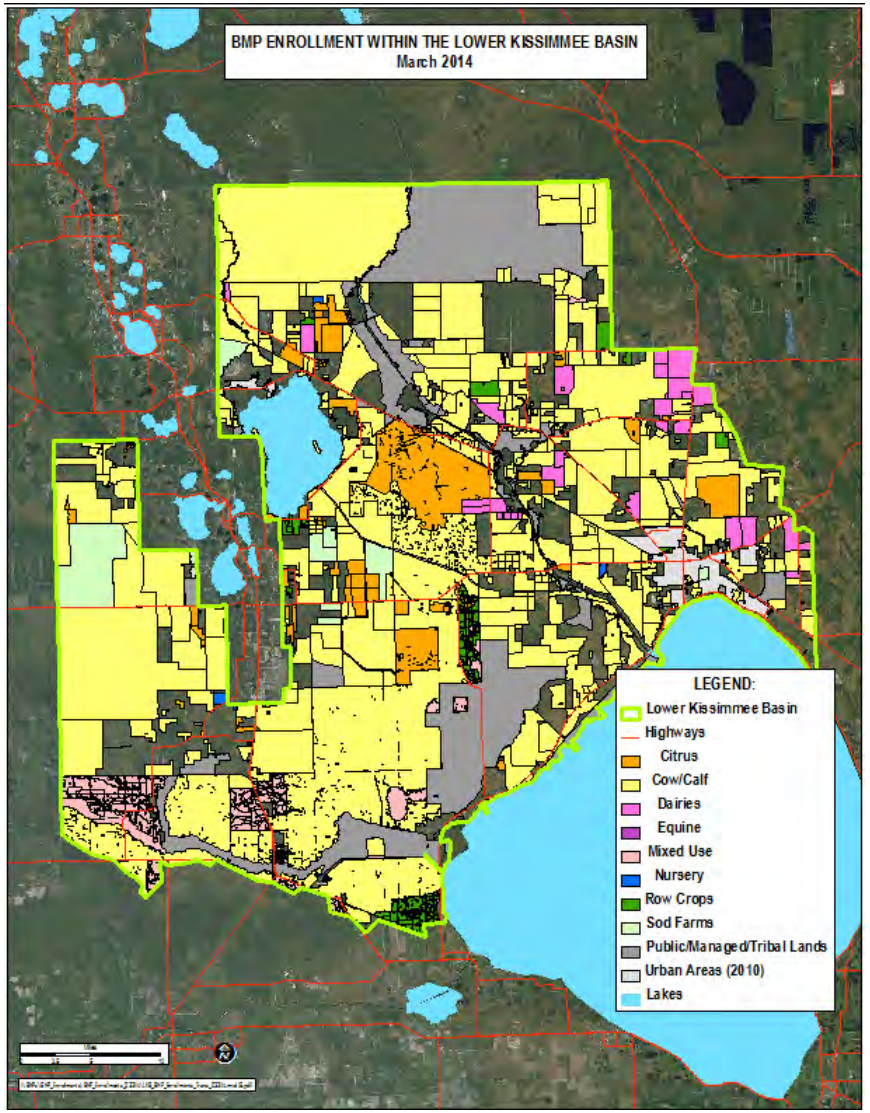
Wednesday, July 9, 2014, 1:30 PM
SFWMD Okeechobee Service Center - Meeting Room
3800 NW 16th Boulevard
Okeechobee, FL 34972

Overview of Florida Agriculture

(BMP Enrollment in the Lower Kissimmee Basin)

Bonnie Wolff Peaez, FDACS


BMP ENROLLMENT WITHIN THE LOWER KISSIMMEE BASIN
March 2014
LEGEND:
Lower Kissimmee Basin
Highways
Citrus
Cow/Calf
Dairies
Equine
Mixed Use
Nursery
Row Crops
Sod Farms
Public/Managed/Tribal Lands
Urban Areas (2010)
Lakes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Urban Areas (2010)
Lakes

The Process of Developing the Statewide Agricultural Projections

The Balmoral Group

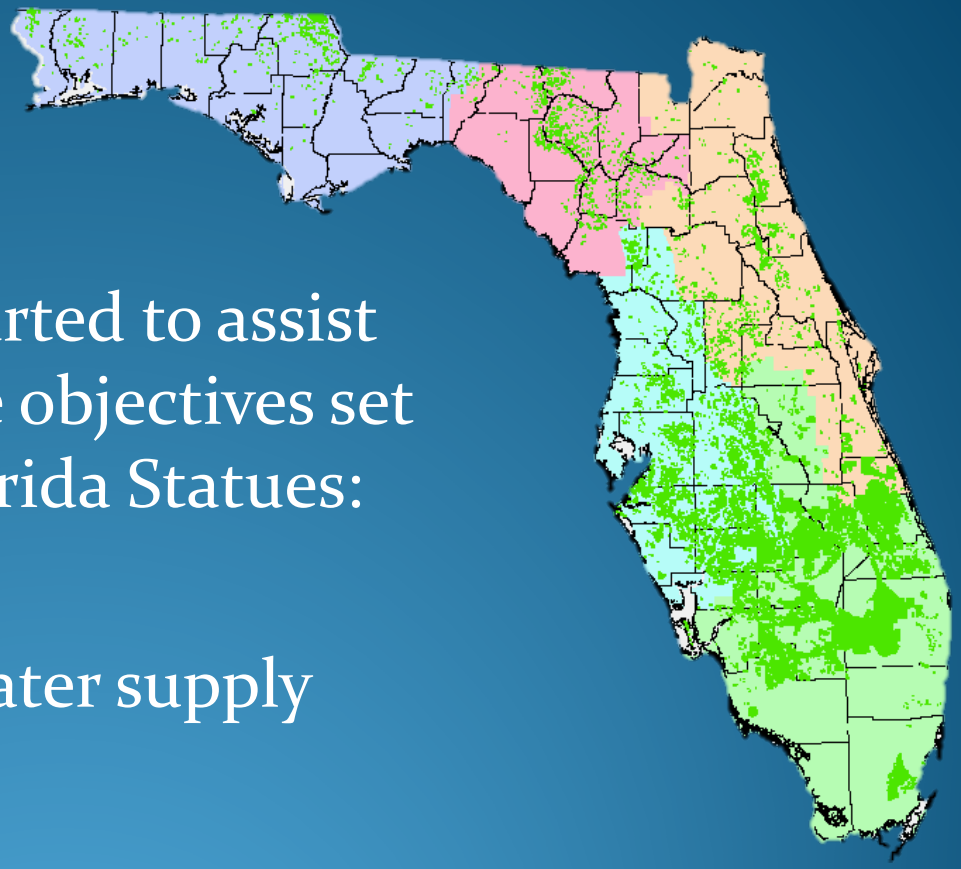
FSAID Overview

Outline

FSAID

- Florida Statewide Ag Irrigation Demand
- Funded by FDACS
- Develop statewide estimates of Ag water demand and projections

FSAID



The FSAID project was started to assist the FDACS in meeting the objectives set forth in Ch 570.085(2) Florida Statues:

Develop an agricultural water supply planning program

- 20-yr planning period
- Crop-specific, spatially distributed irrigation demand for historic, current, and future conditions.

FSAID

Background

The current project builds off a previous SJRWMD project that developed parcel-level irrigation demands to assist in water conservation planning and groundwater modeling.

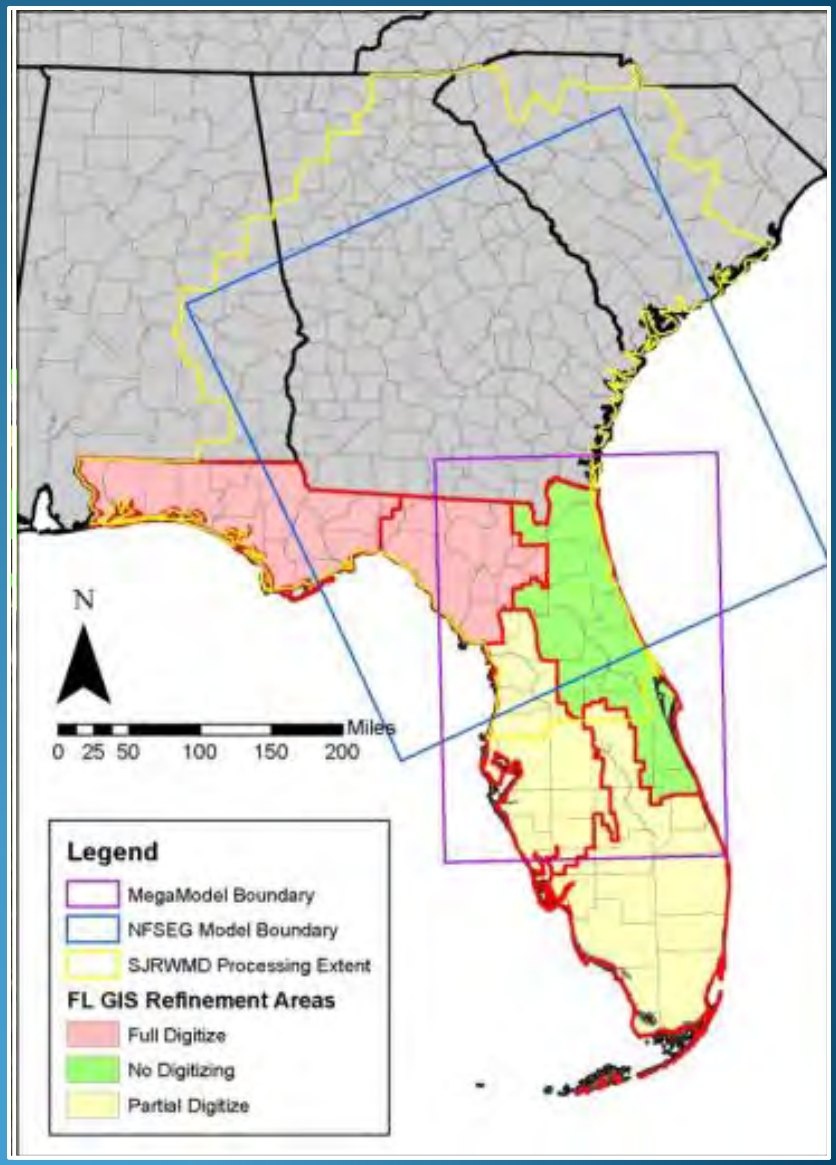
This work utilized existing GIS information available:

Irrigated Areas

FLUCCS

NASS Crop Data Layer

CUP Polygons/Points



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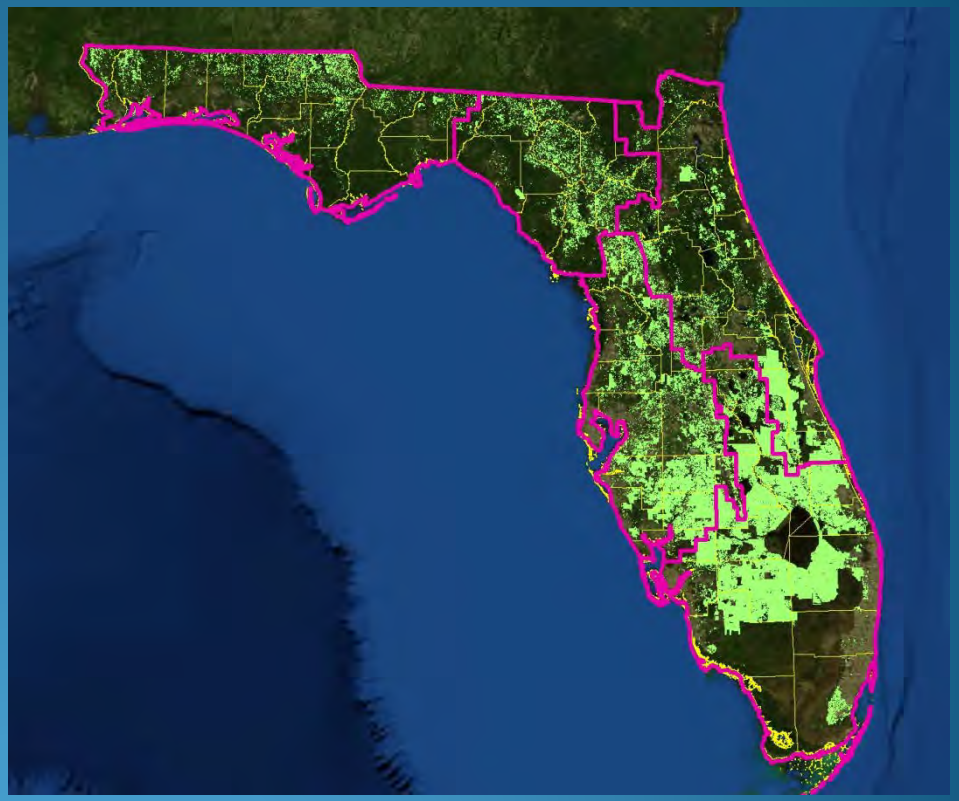
Task Description

1. Develop Statewide Geodatabases
    1. (Ag Land and Irrigated Land)
2. Refinement of Irrigated Land Geodatabase
3. Irrigation Estimates
4. Additional Ag-Related Water Requirements
5. Agricultural Projections

FSAID

Task 1

- Completed the Ag Land Geodatabase (ALG)
- The ALG includes all of the following layers: the ILG, Land Use (FLUCCS), and CUP polygons. NASS CDL is include as attributes only.



Total Land in Farms, Ag Census 2007 =	9,231,570 acres
FSAID ALG 2010 =	**8,613,315 acres**
Total Land in Farms, Ag Census 2012 =	9,548,342 acres

FSAID

Task 2 Overview

The Irrigated Areas layer was refined for areas lacking refined GIS layers.

- NWFWMD and SRWMD – Extensive Refinement
- SWFWMD and SFWMD – Moderate Refinement
- SJRWMD – No refinement

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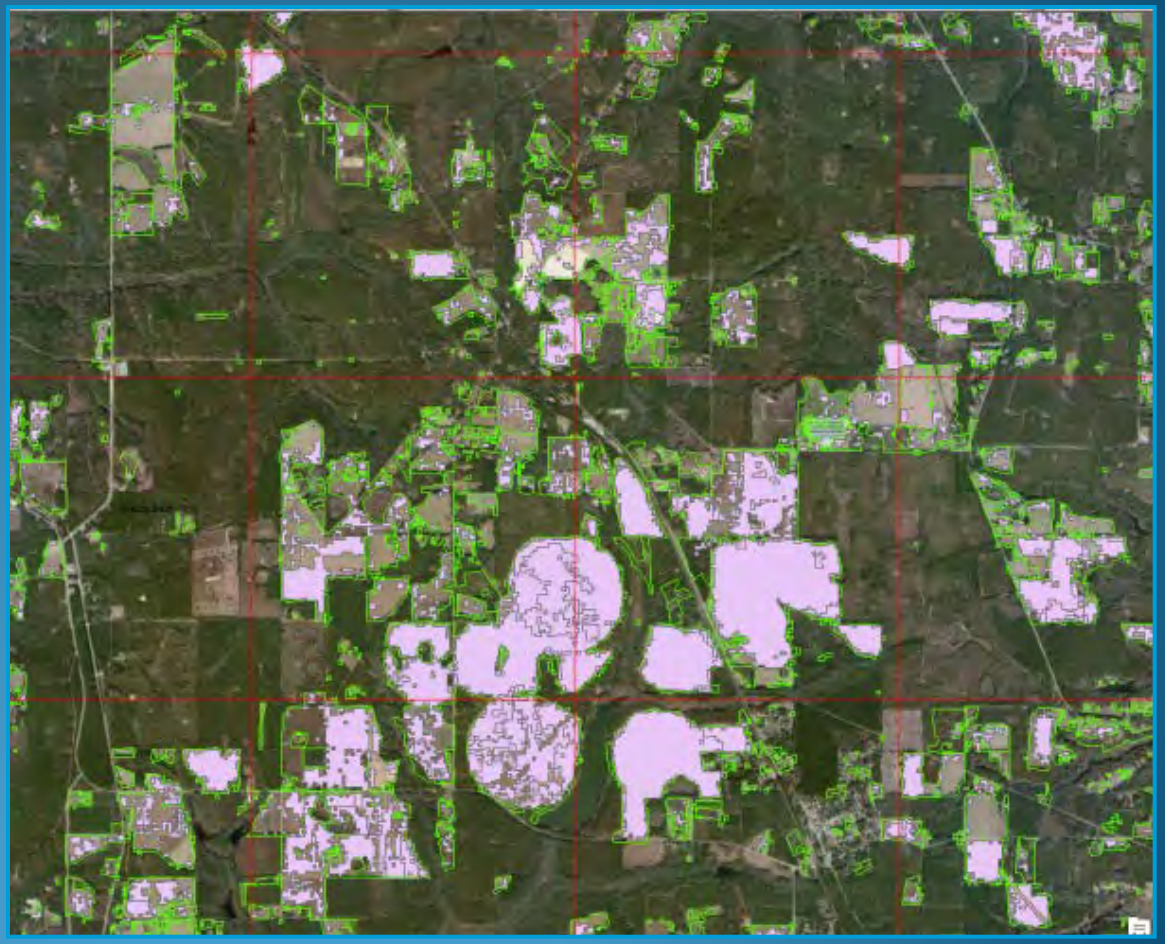
Task 2 – NWF and SR refinements

Before

Auto processing

Union of FLUCCS and NASS Polygons



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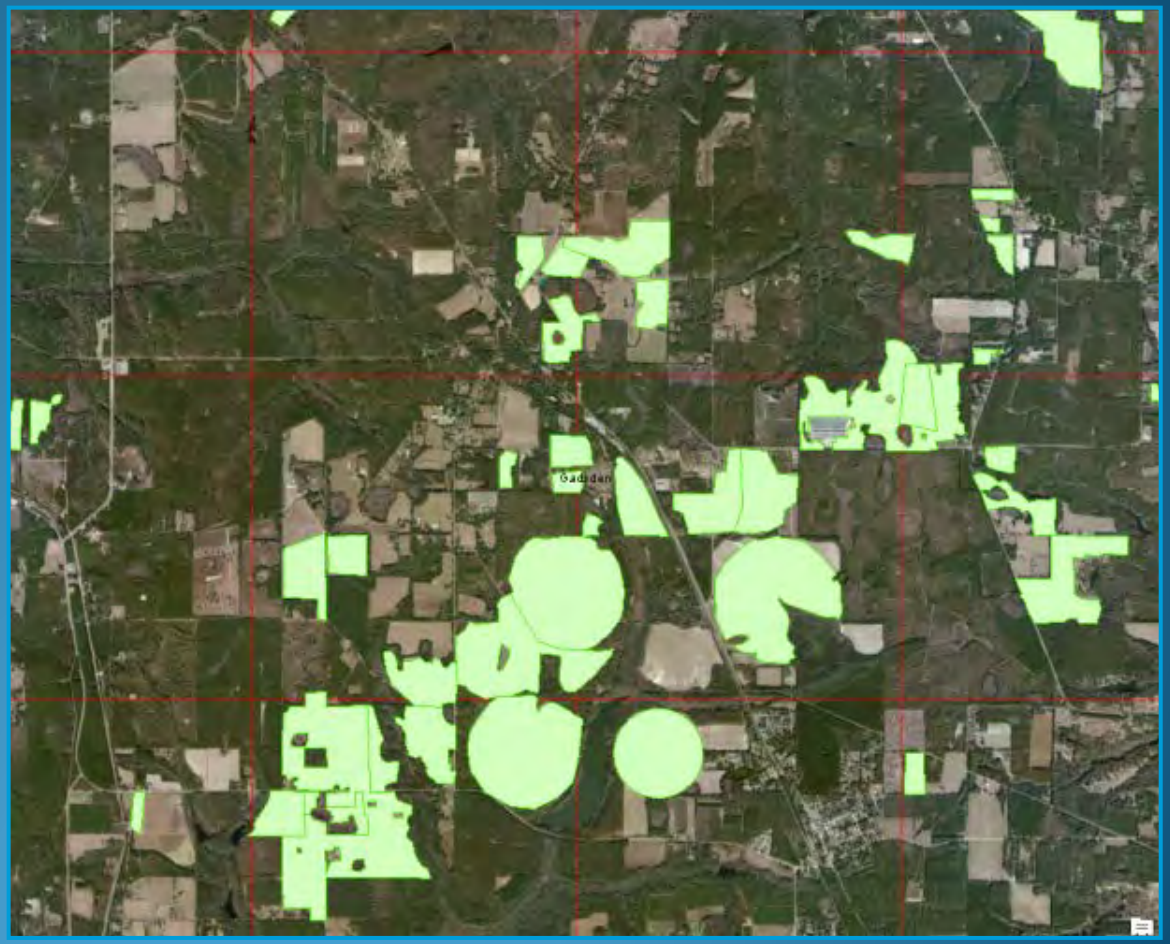
Task 2– NWF and SR refinements

After

Manual Refinement of FLUCCS coverage

Takes into consideration:

- Known withdrawal locations
- CUP boundaries
- Historic Aerial imagery (approx. 2008-2012)
- NDVI visualization



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Task 2 – SWF and SF refinements

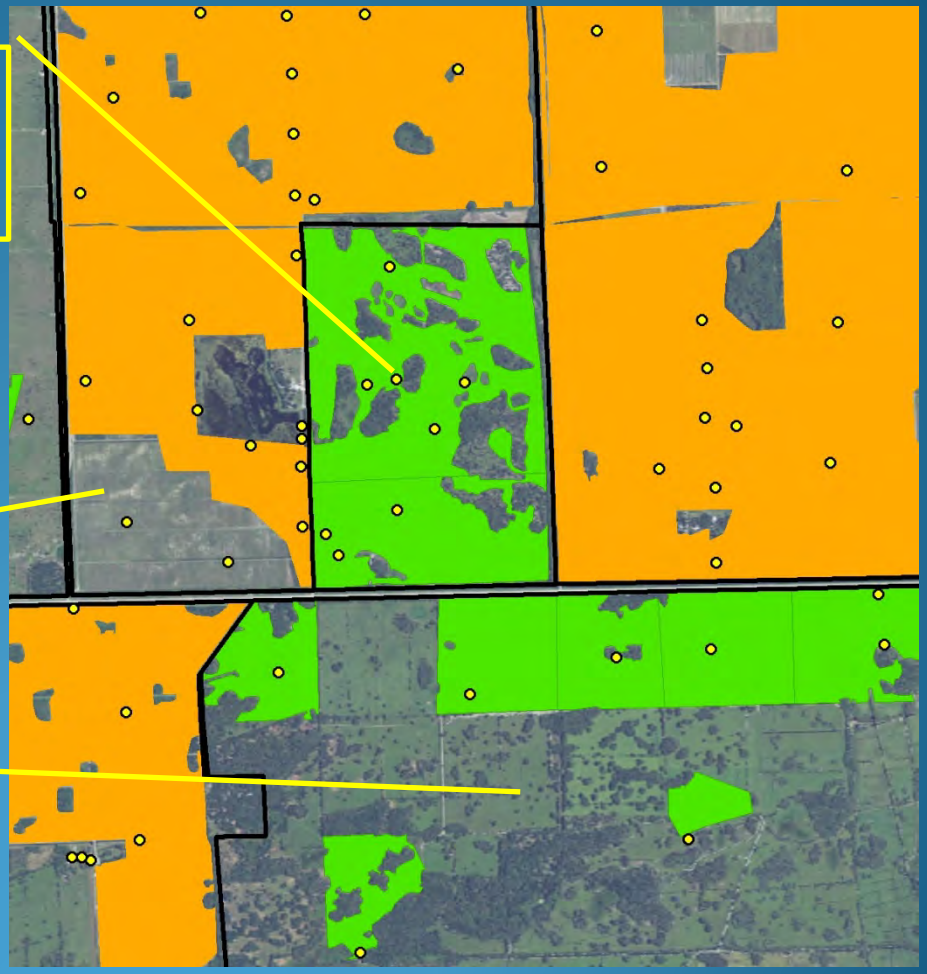
Example:

Irrigated Pastures and Non-irrigated Citrus refinement in SFWMD

FLUCCS-based refinement

Non-Irrigated Citrus*

Withdrawal Point (non-livestock) refinements



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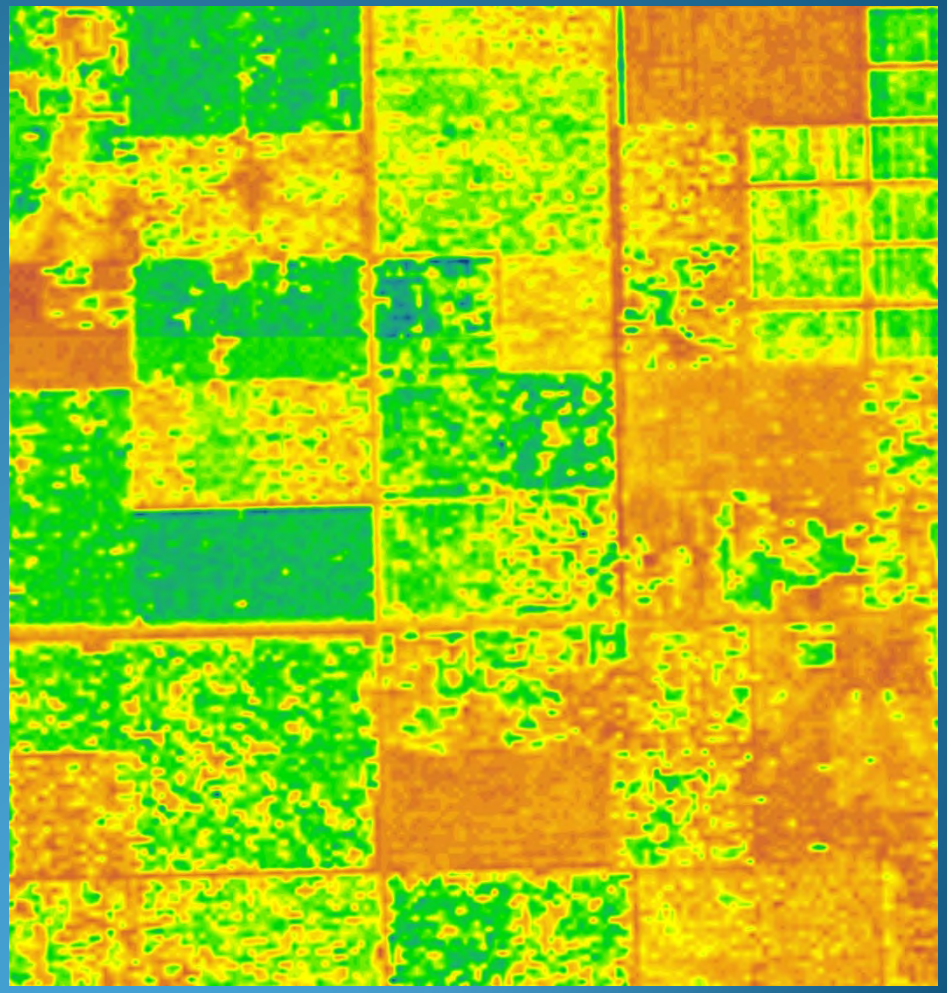
Task 2 – NDVI Example

The NDVI visualization was very helpful at identifying potential Non-Irrigated Citrus.

But this is a snapshot of one moment in time and trees can be replanted.

Confirmation was based on Google Earth time-enabled Imagery.



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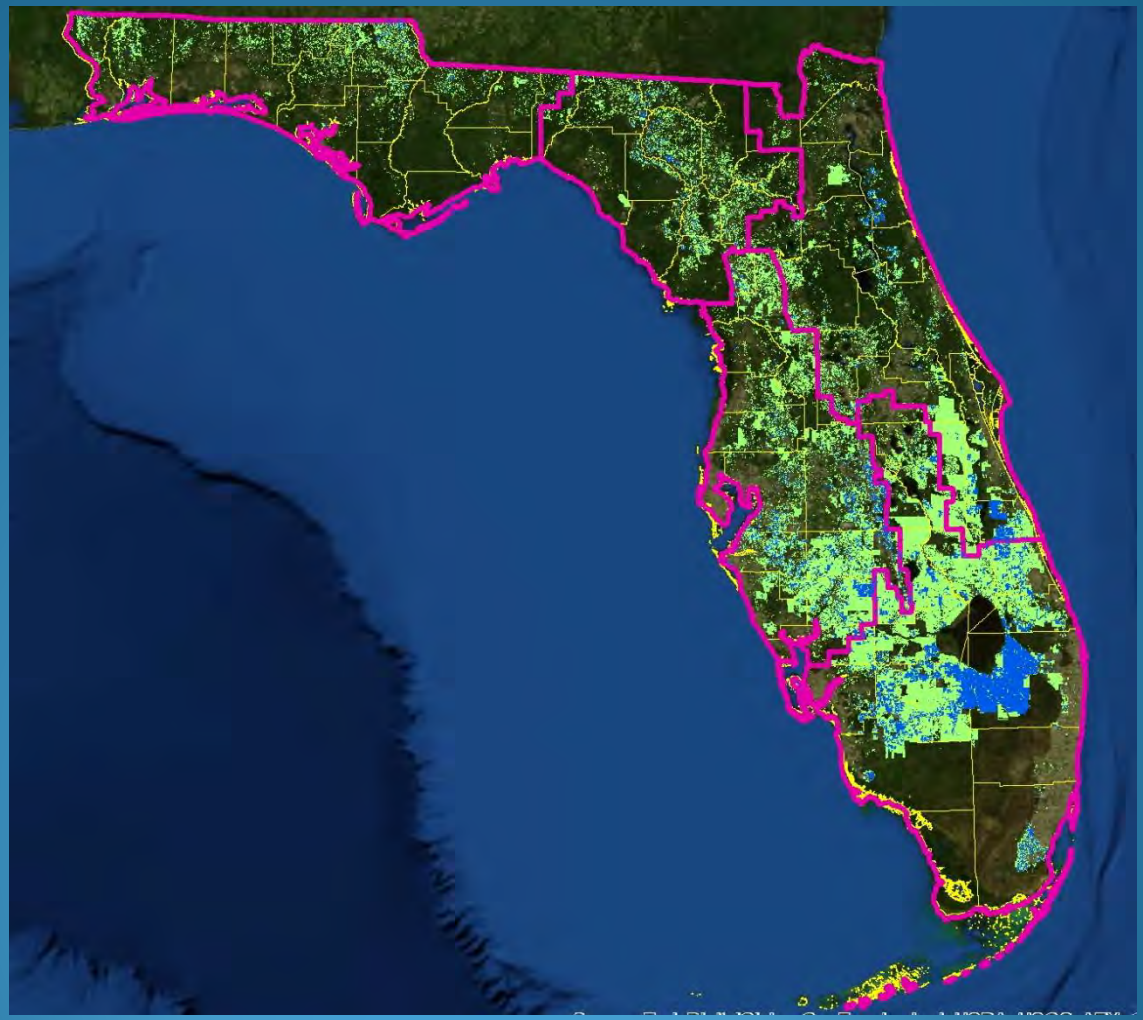
Task 2 – Results



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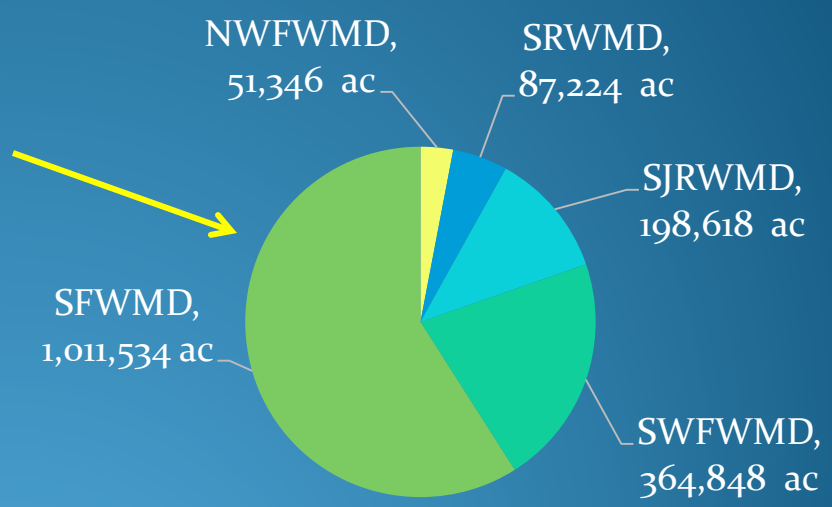
Task 2 – Results

Statewide Irrigated Acreage Summary	
FSAID 2010	1,713,570
Ag Census 2007	1,550,994
Ag Census 2012	1,492,217
WMD RWPSs	1,936,901



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Task 3 Overview

- The ILG was parameterized to support batch-mode simulations of AFSIRS.
- Analysis of sensitivity to weather datasets complete
  - 3 sets of rainfall data tested
  - 3 sets of reference/potential ET tested
- AFSIRS is run for each polygon (n = 27,304)
  - Double- and Triple Cropped Fields are separate AFSIRS runs, but are merged back together for final processing.
  - Crop growing dates determined for North, Central, and South Florida regions.

FSAID

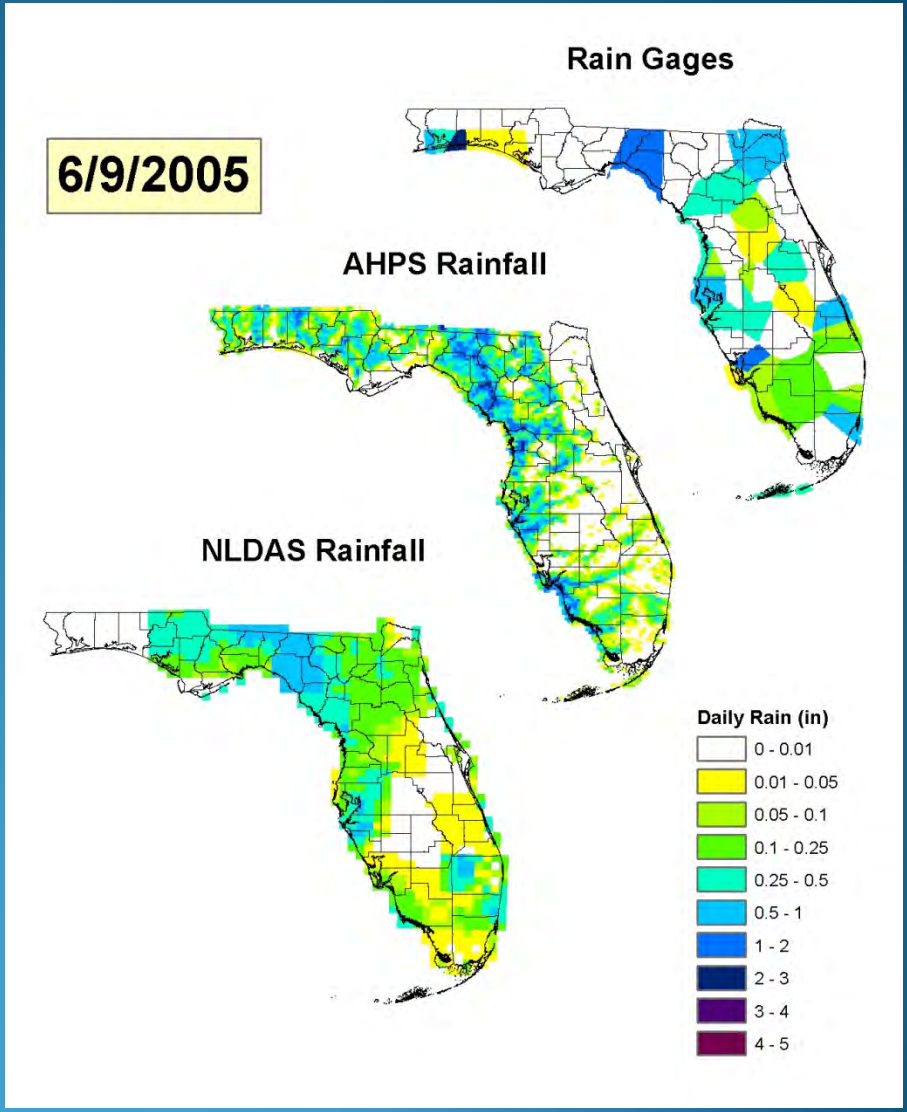
Task 3 Rainfall Data

AFSIRS required daily rainfall input for a discrete (point) location.

Gage Data – discrete point data that is inferred to other areas (Theissen polygons)

Gridded Data – spatially-averaged data from remote sensing equipment

- AHPS – 3-4km spacing
- NLDAS – 12km spacing



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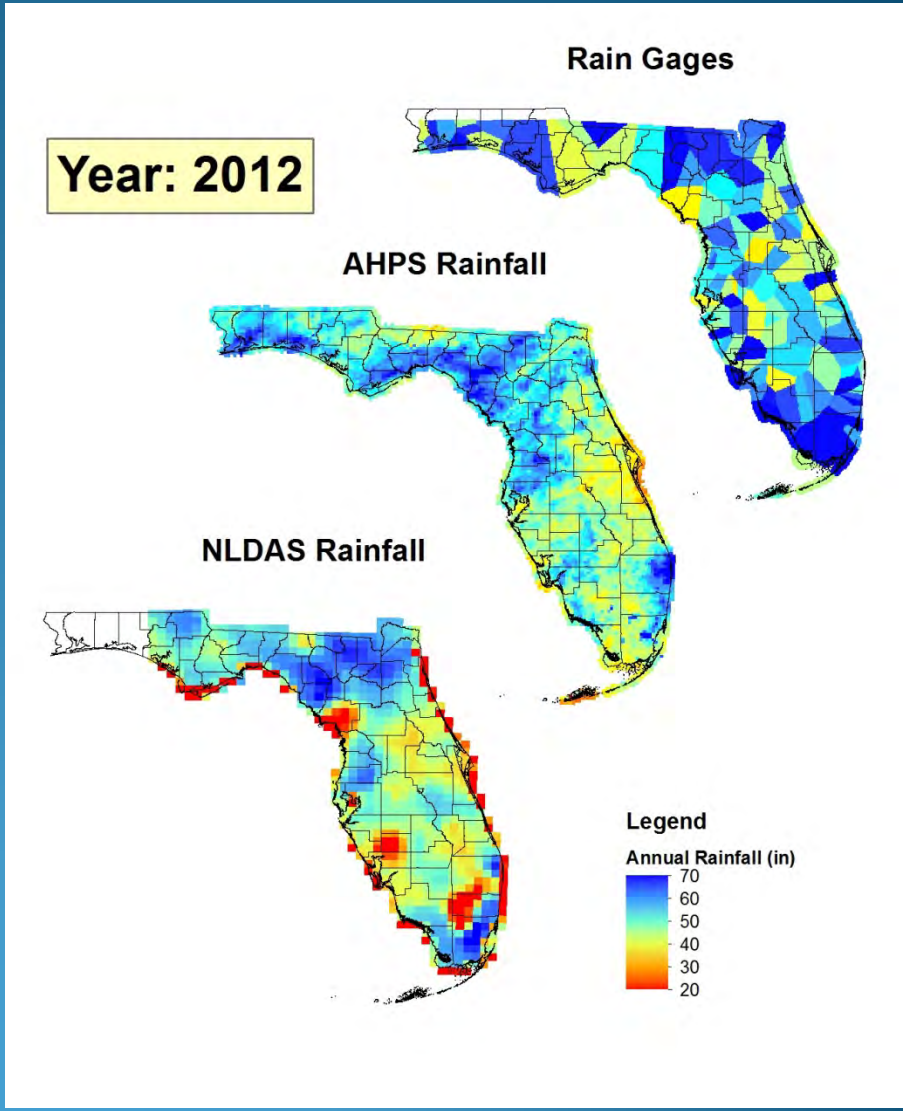
Task 3 Rainfall Data

Analysis of annual rainfall totals confirms trade-off between gage and gridded rainfall data.

- Gages offer 'true' peak events and droughts for a discrete location
- Gridded data offers more accurate spatial representation.

Gage rainfall ultimately used for FSAID (AHPS has a limited period of record)



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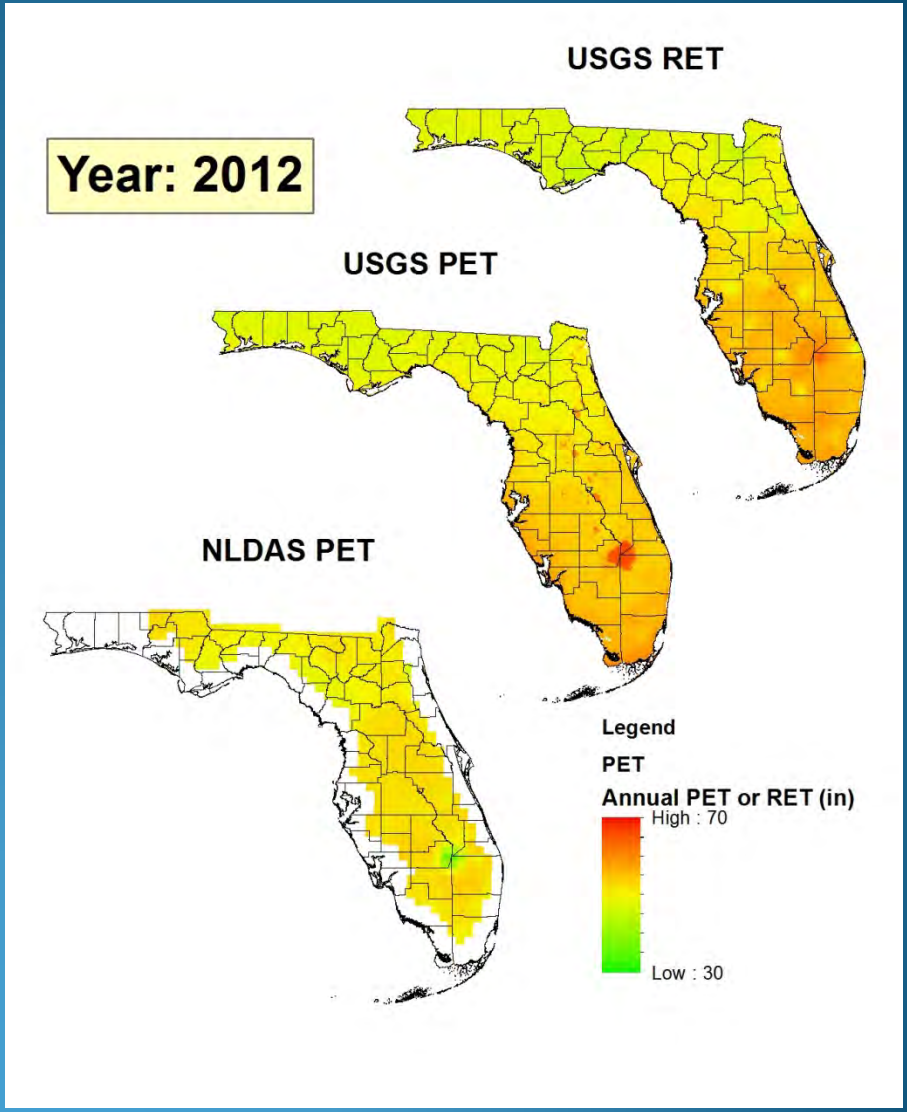
Task 3 ET Data

3 sources of data were considered:

- NLDAS PET
- USGS GOESDCS PET
- USGS GOESDCS RET

USGS RET was ultimately used for FSAID to align with current industry standard (ASCE Penman-Monteith method).



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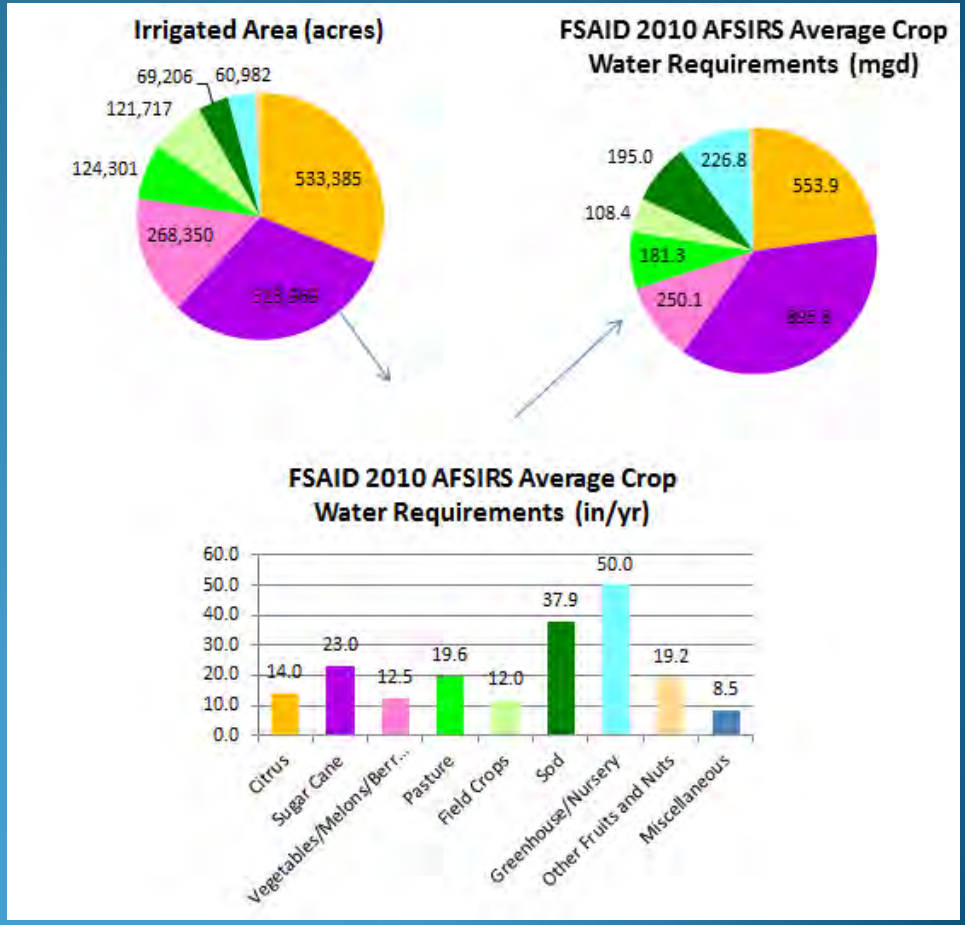
Task 3 AFSIRS Results

Statewide Ag Crop Demand, 2010	
FSAID 2010	2427.1 mgd
FSAID 2010	19.0 in/yr
FRIS 2008	16.7 in/yr
FRIS 2003	14.8 in/yr
FRIS 1998	20.9 in/yr
FRIS 1994	16.3 in/yr
FRIS 1988	22.3 in/yr
FRIS 1984	23.0 in/yr
FRIS 1979	18.6 in/yr



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Task 4 Other Water Demand

Considered for FSAID

- Livestock Demand = 19.1 mgd
- Dairy Demand = 18.2 mgd
- Aquaculture = 23.9 mgd
- Frost Protection (not included in annual estimates)
  - Worst year (2010) Demand = 53,942 MG
  - Best year (1998) Demand = 7 MG

Not Considered for FSAID

- Crop Establishment / Fertigation
  - While some WMDs permit for this separately, these quantities of water are assumed to be integrated with regular irrigation use.

FSAID

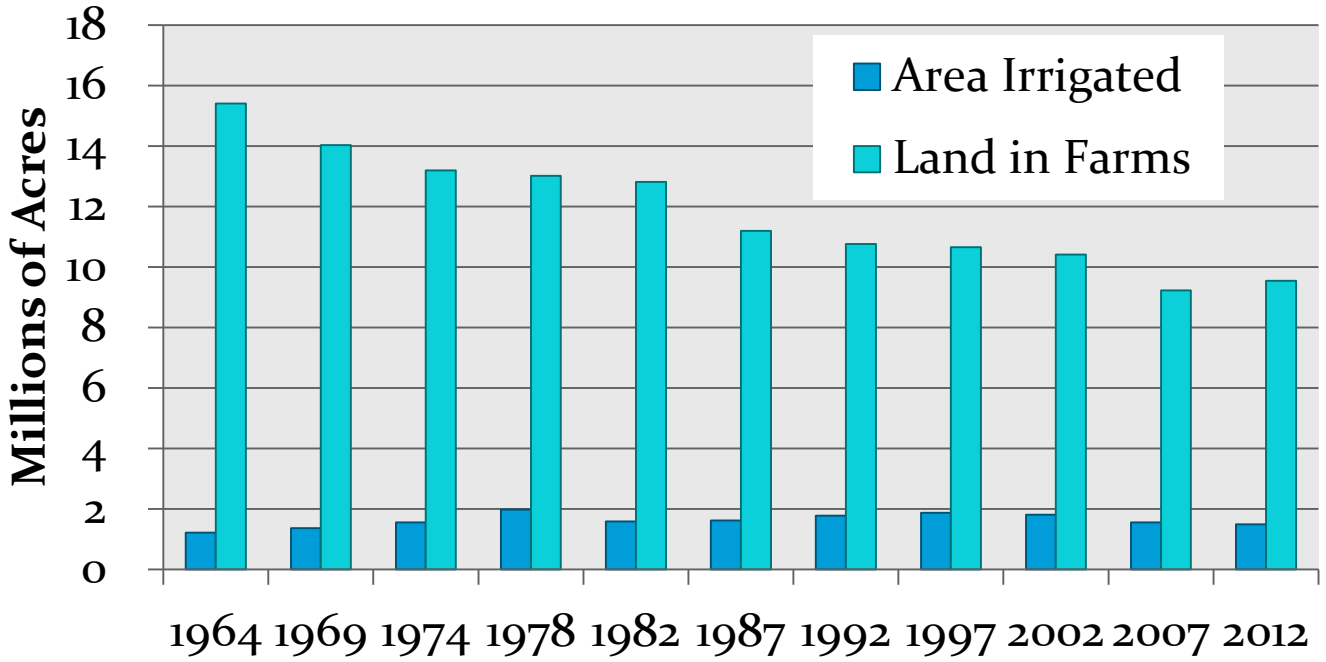
Task 4 Results

Water Use Component	Average Annual Demand (mgd)
Irrigation	2427.1
Livestock/Dairy	37.3
Aquaculture	23.9
Subtotal	2488.2
Frost Protection (Ave)	33.1

Statewide Ag Demand (mgd) Summary	
FSAID 2010	2,488
USGS 2000	3,923
USGS 2005	2,766
WMD RWPSs	2,154

FSAID

Task 5 Background



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Task 5 Overview

- Utilized econometric modeling to estimate three types of potential change scenarios
  - Change in Irrigation Intensity/Conservation
  - Increasing or Decreasing Area
  - Change of Crop Types
- Projections in 5-year increments (2015, 2020, 2025, 2030) based on upper and lower bounds of the likely scenarios.

FSAID

Task 5 Results

Scenario	Predicted Average Annual Irrigation	Predicted Dry Year Annual Irrigation
	mgd	mgd
2010		
Base Case	2,582.8	2,854.2
2015		
Increase in Irrigation Intensity	2,610.5	2,885.1
Conservation Scenario	2,545.0	2,812.4
Crop Mix Change	3,907.9	4,287.6
Irrigated Acreage Change	2,556.6	2,826.7
2020		
Increase in Irrigation Intensity	2,608.9	2,883.6
Conservation Scenario	2,547.2	2,814.5
Crop Mix Change	3,902.7	4,279.9
Irrigated Acreage Change	2,592.8	2,864.3
2025		
Increase in Irrigation Intensity	2,610.5	2,885.1
Conservation Scenario	2,545.0	2,812.4
Crop Mix Change	3,708.4	4,072.5
Irrigated Acreage Change	2,600.4	2,872.2
2030		
Increase in Irrigation Intensity	2,610.4	2,884.9
Conservation Scenario	2,545.2	2,812.7
Crop Mix Change	3,708.4	4,072.5
Irrigated Acreage Change	2,597.1	2,868.1

Questions?

Tim Desmarais, P.E.
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407. 629.2185 ext 106

Dispersed Water Management Overview

Jeff Sumner, SFWMD

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

Lower Kissimmee Basin
Water Supply Plan Workshop
July 9, 2014

Jeffrey M. Sumner, PE
SFWMD Director of Agricultural Policy

Dispersed Water Management (DWM)

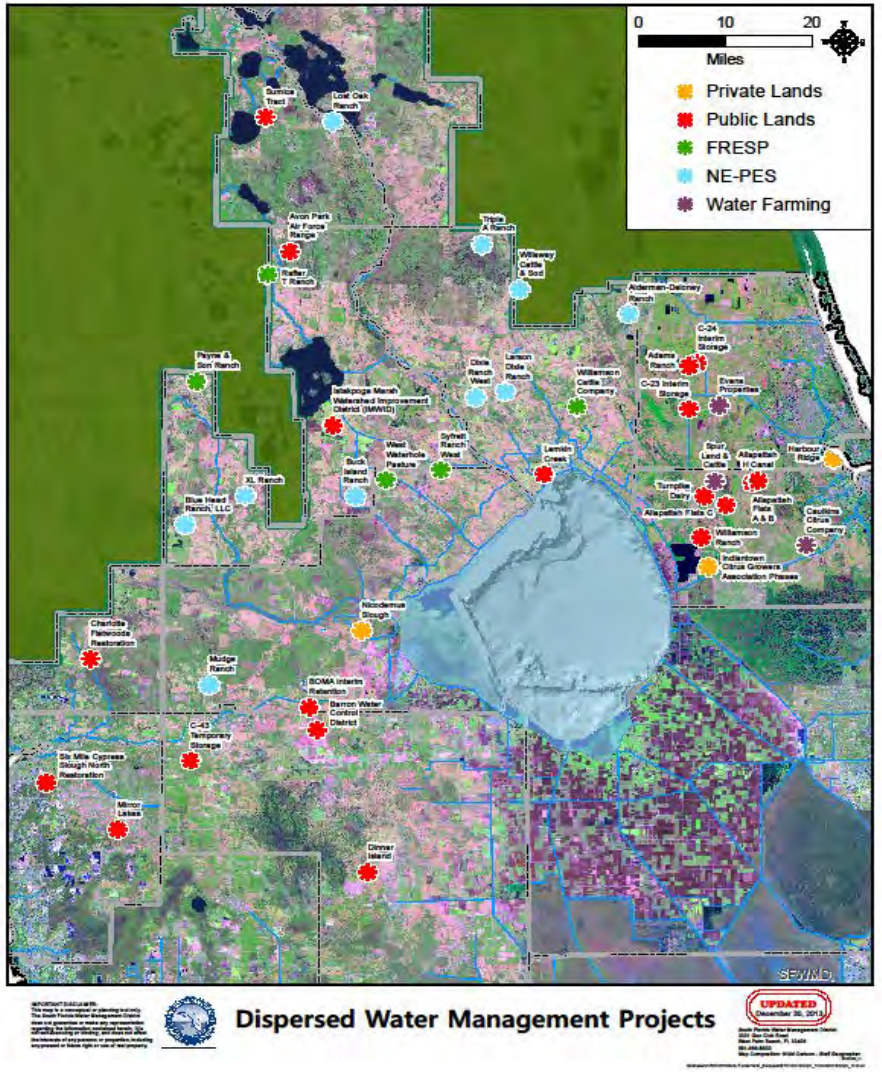
Definition: Shallow water distributed across parcel landscapes using relatively simple structures

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

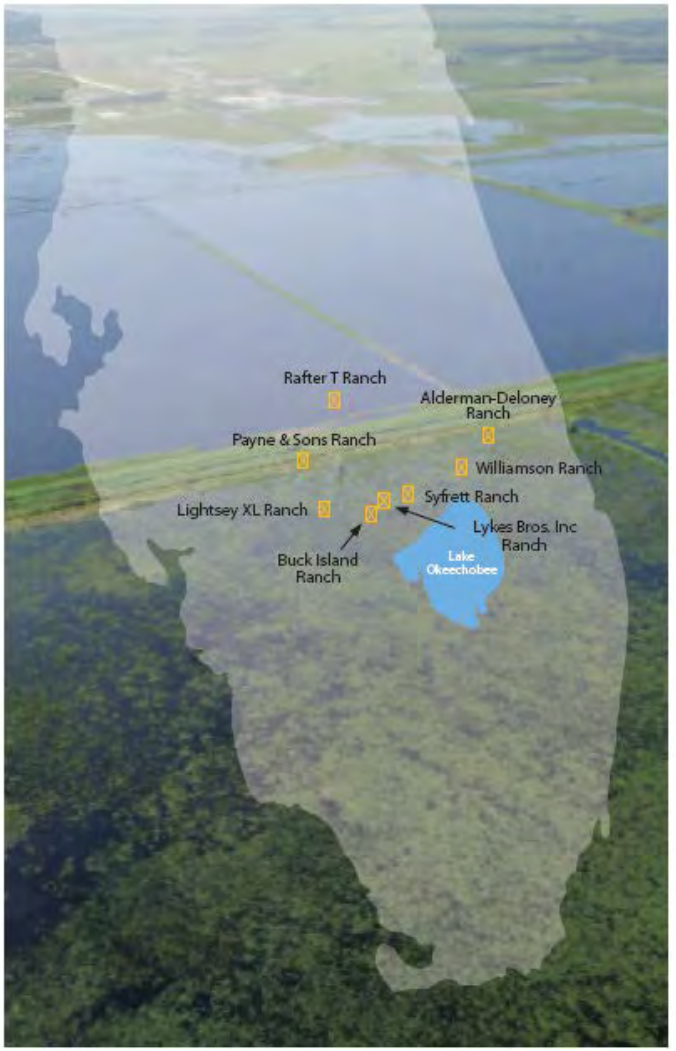
Primary Project Types

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



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



Florida Ranchlands Environmental Services Projects (FRESP)

Design Challenges Addressed

Who is eligible to participate?

- Ranchers enrolled in FDACS BMP Program & located in NE

What are the environmental services to be provided?

- Stormwater Retention and/or Nutrient Removal

Calculating the services above a baseline:

- Services must be above and beyond regulatory requirements

Wetland permitting issues

- Can we ensure that creation of wetlands through this program won't be a disincentive to participate?

Florida Ranchlands Environmental Services Projects (FRESP)

STATUS

- Three now operating under NE-PES Program
- Two now operating under NRCS Wetland Reserve Program (WRP)
- Two continuing under extended agreements

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 ac-ft/yr
  - Average cost - $163/ac-ft
- Two new projects added in 2013 (NE-PES 2, 19 proposals)
  - Total 3,858 ac-ft/yr
  - Average cost $112/ac-ft
  - Award period left open, subject to additional funding
    - 2014 Legislative Funding
    - Starting additional negotiations

Example: NE Payment for Environmental Services

Dixie Ranch – Okeechobee County

Example: Private Lands Projects

Nicodemus Slough – Glades County

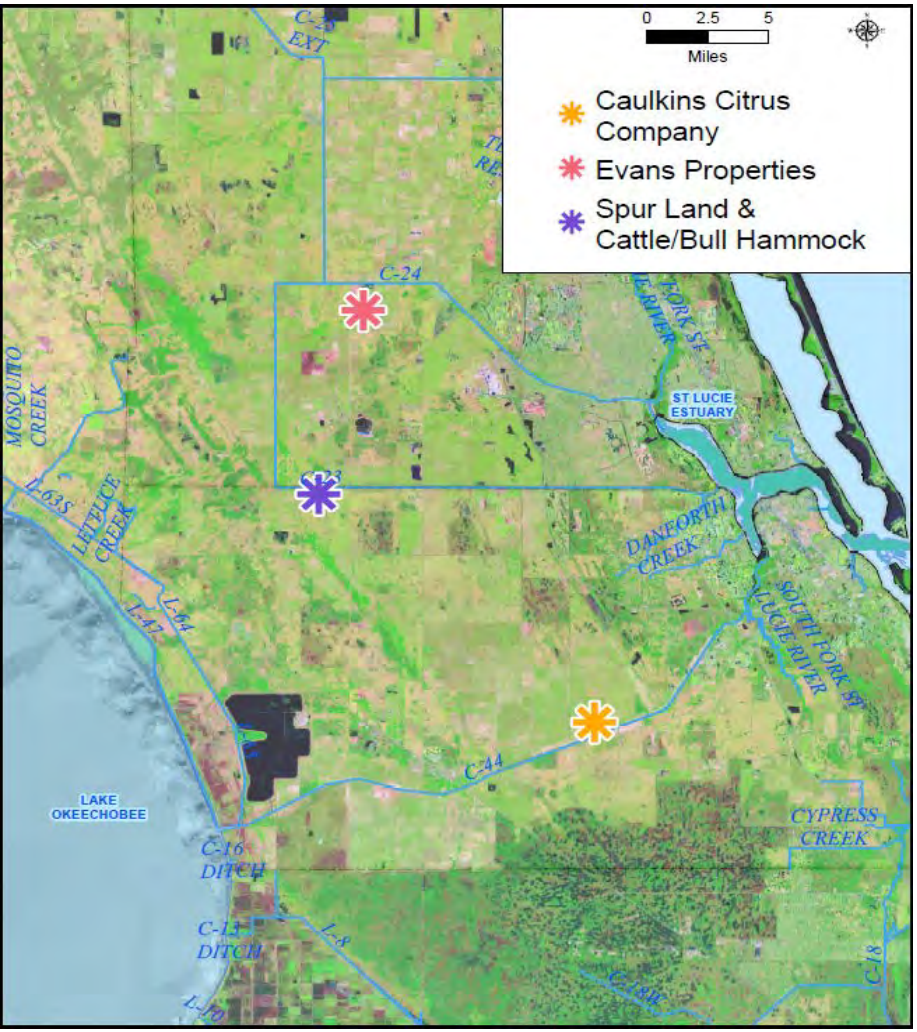
The Water Farming Concept

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

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 = 6,700 ac-feet / yr

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 the Draft Lower Kissimmee Basin Water Supply Plan

Cynthia Gefvert and Chris Sweazy, SFWMD

2014 LOWER KISSIMMEE BASIN WATER SUPPLY PLAN

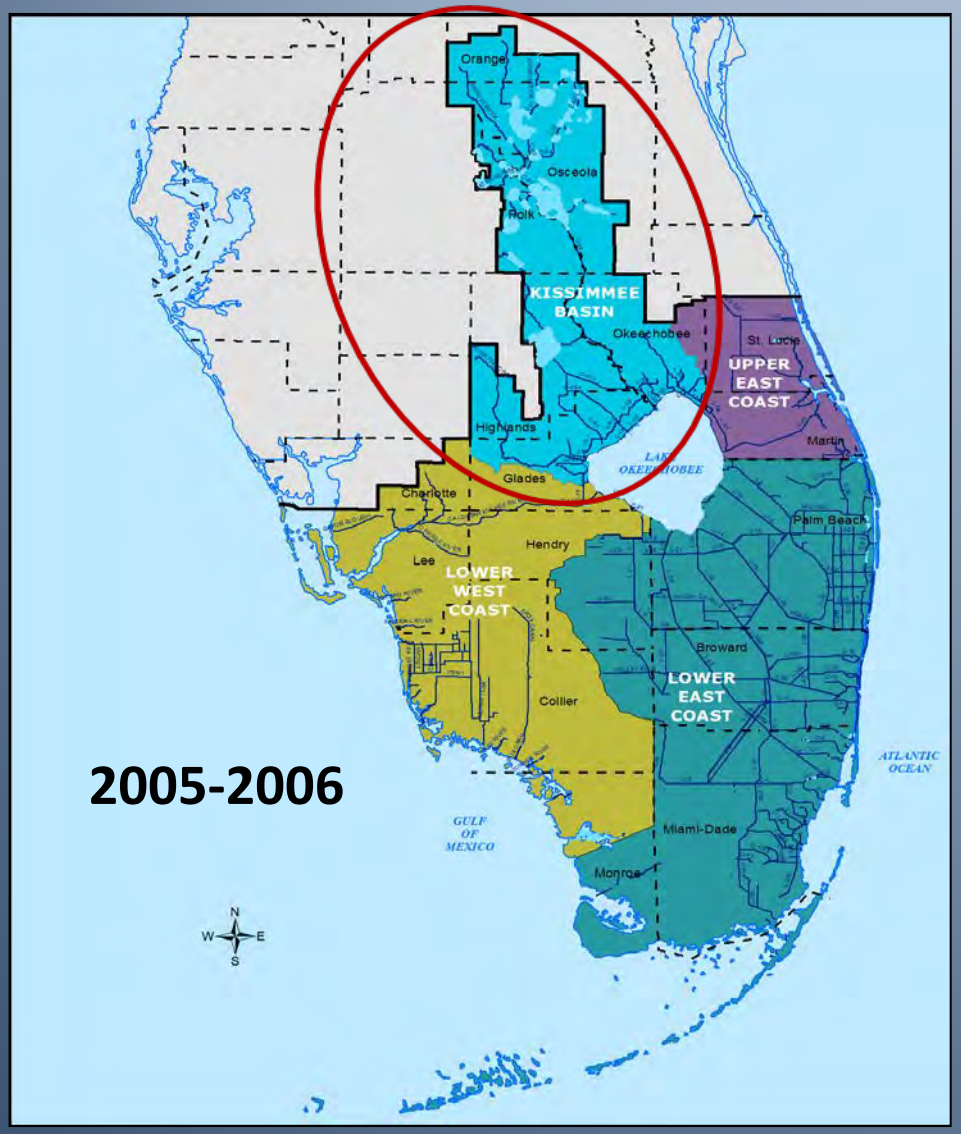
WRAC Issues Workshop
Water Supply Plan Update

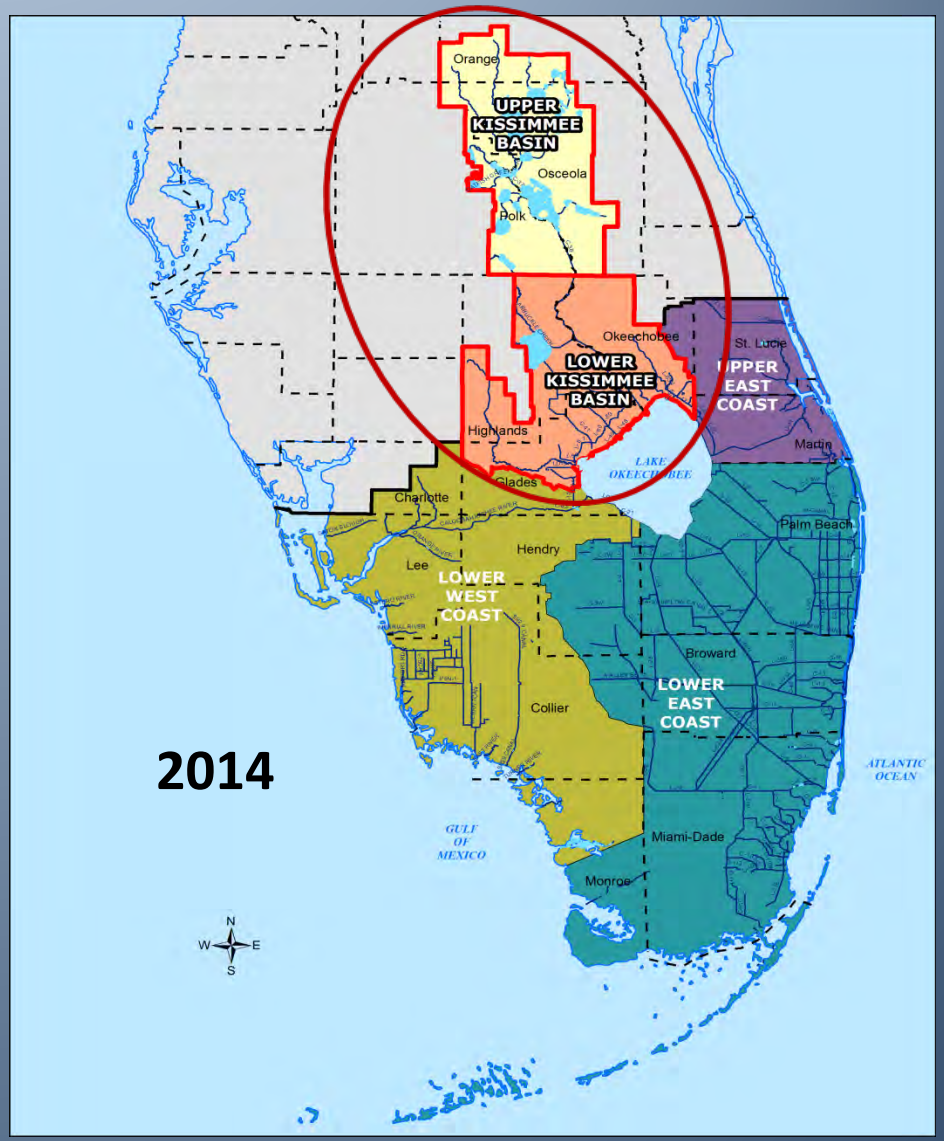
Chris Sweazy

Lead Hydrogeologist, SFWMD

July 9, 2014

Kissimmee Basin Planning Area





What is the Use of Regional Water Supply Plans?

- Advanced look at future use and supports develop strategies to meet projected demands while sustaining the needs of the environment
- Identifies needs for future work to improve the clarity of water supply conditions.
- Tool for local governments required to respond with updates to Water Facilities Element of their Comprehensive Plan

Regional Water Supply Plan Requirements

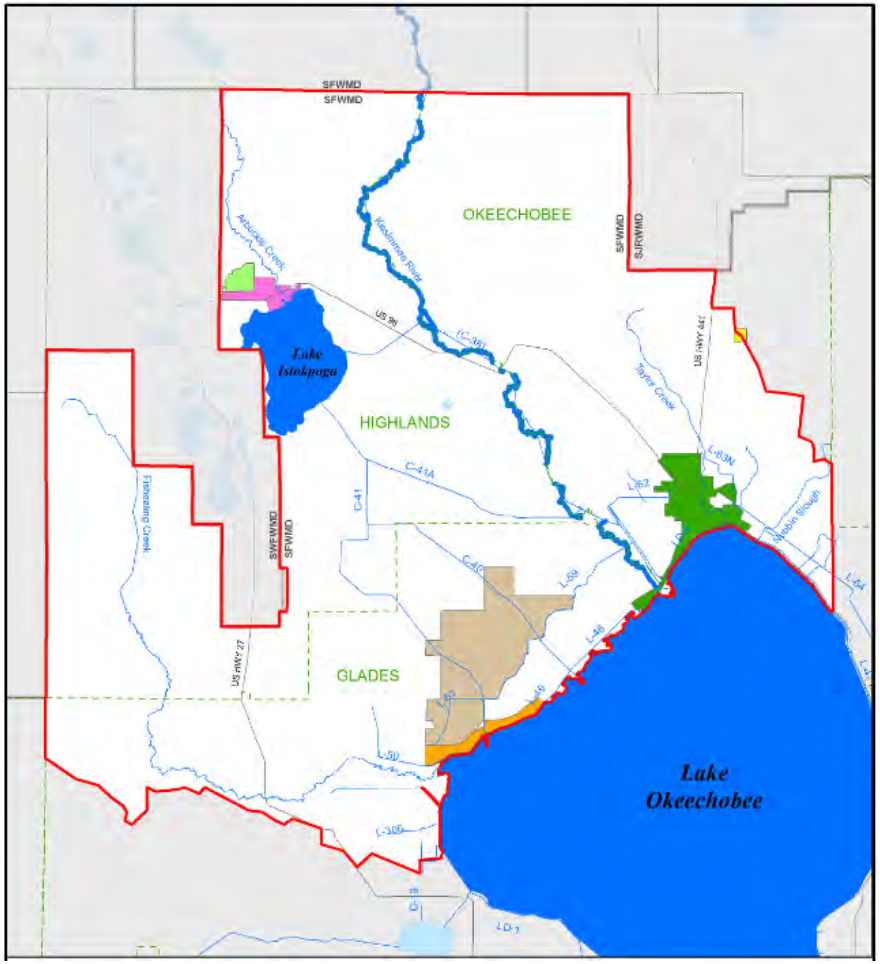
- At Least a 20-year Planning Period
- Updated Every Five Years
- Demand Estimates and Projections
- Resource Analyses/Issue Identification
- Evaluation of Water Source Options, Including Conservation
- Water Resource Development
  - Responsibility of Water Management
- Water Supply Development
  - Responsibility of Water Utilities/Users
- Minimum Flows and Levels (MFLs)
  - Prevention or Recovery Strategies

2014 LKB Plan Process

- Water Resources Advisory Commission (WRAC)
  - Serves as overall forum
- Two WRAC Issues Workshops held to date *(February and today)*
- Coordination with local stakeholders, Seminole Tribe, special interest groups, SWFWMD and local agencies

- Draft LKB Water Supply Plan distributed/posted June 20
  - Informational presentation to GB tomorrow *(July 10)*
  - Proposed presentations to WRAC *(August and September)*
  - Presentation of plan for approval to GB *(September)*

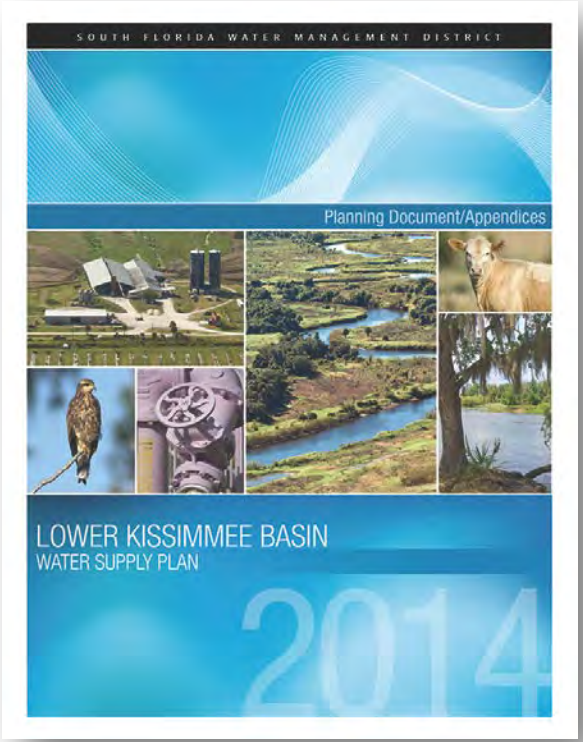
Lower Kissimmee Basin (LKB) Description



- Includes portions of Okeechobee, Highlands and Glades counties
- Major agricultural industry
- Largest urban area – City of Okeechobee *(23,000 residents)*
- Seminole Tribe of Florida – Brighton Reservation
- 6 public water supply utilities
- Lake Istokpoga & Lake Okeechobee
- Kissimmee River

2014 Draft LKB Plan Update Documents

Plan/Appendices



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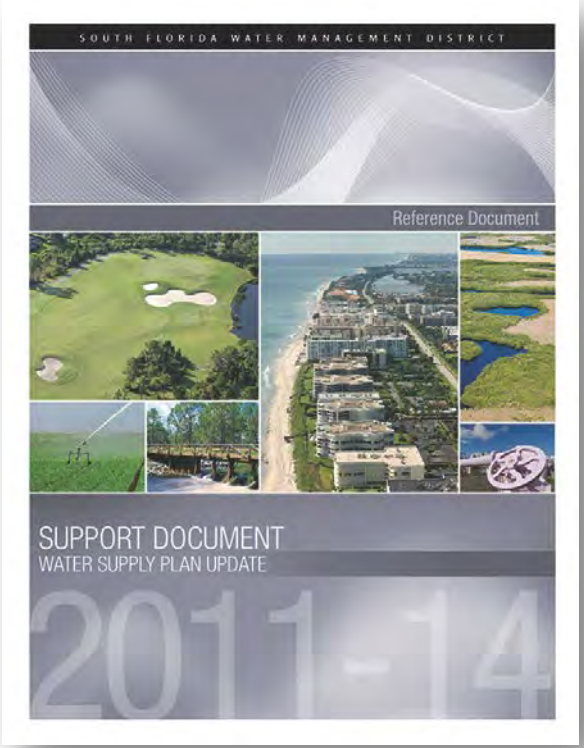
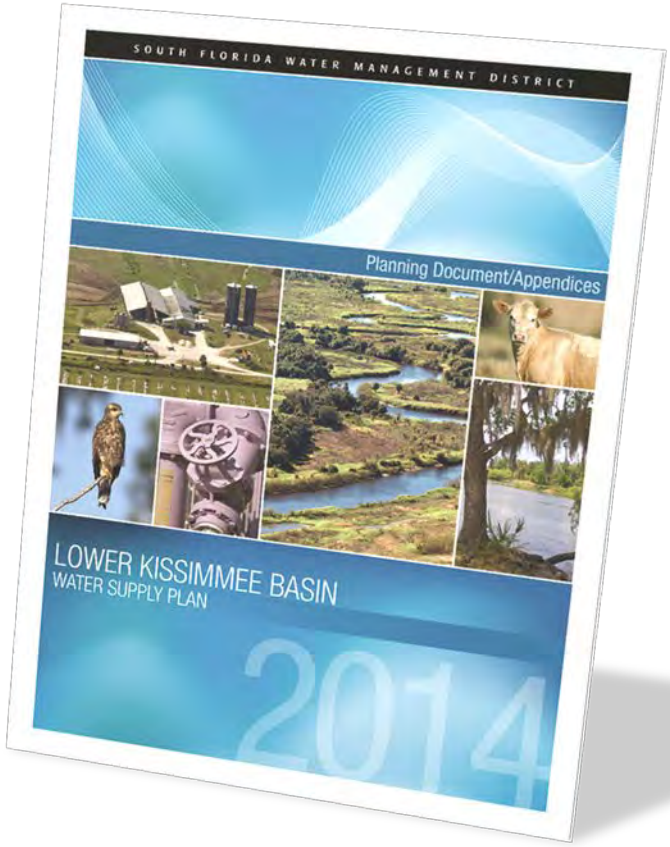
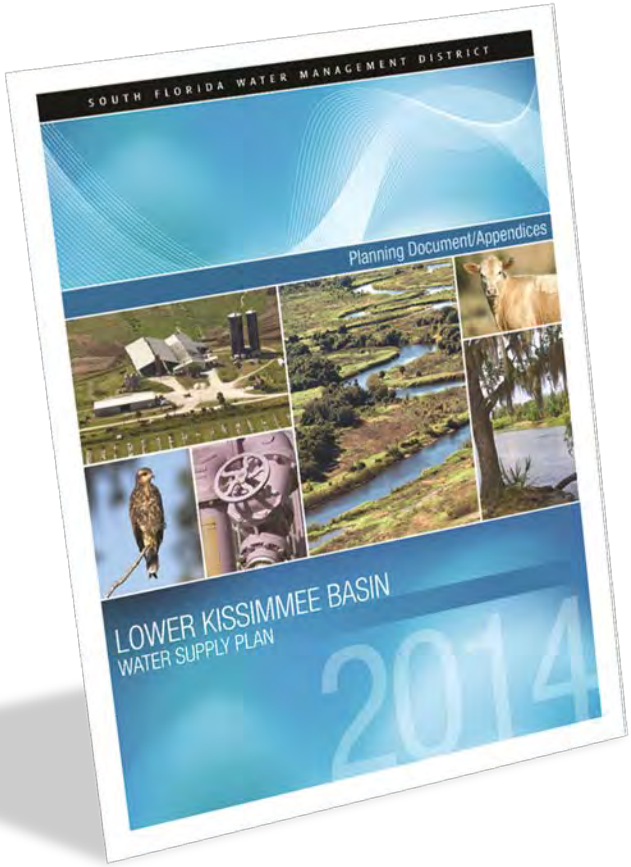


LKB WSP Outline

- **Executive Summary**
- **Chapter 1: Introduction**
  - Purpose, Plan Goal and Objectives
  - Overview of Planning Area and Process
  - Water Supply Planning to 2035
- **Chapter 2: Demand Estimates and Projections**
  - Summary of Water Use Demands by Category
  - Population and Water Use Trends
  - Demand Projections in Perspective



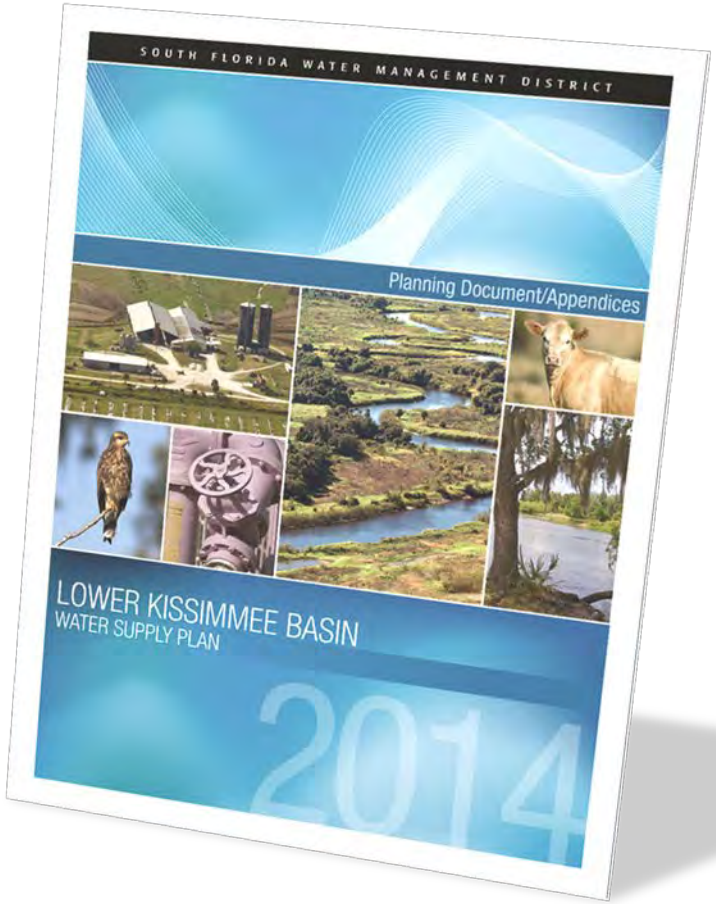
LKB WSP Outline (cont.)



- **Chapter 3: Water Resource Analyses**
  - Resource protection overview, MFLs, restricted allocation areas, overview of water resources, and water resources evaluation and analysis
- **Chapter 4: Water Resource Development Projects**
  - Water resource projects such as monitoring, modeling,, and hydrogeologic studies and analysis. Other projects such as dispersed water management
- **Chapter 5: Evaluation of Water Source Options**
  - Surface water, groundwater, reclaimed water, storage, and conservation
- **Chapter 6: Water Supply Development Projects**
  - Utility summaries
- **Chapter 7: Future Direction**

LKB WSP Appendices

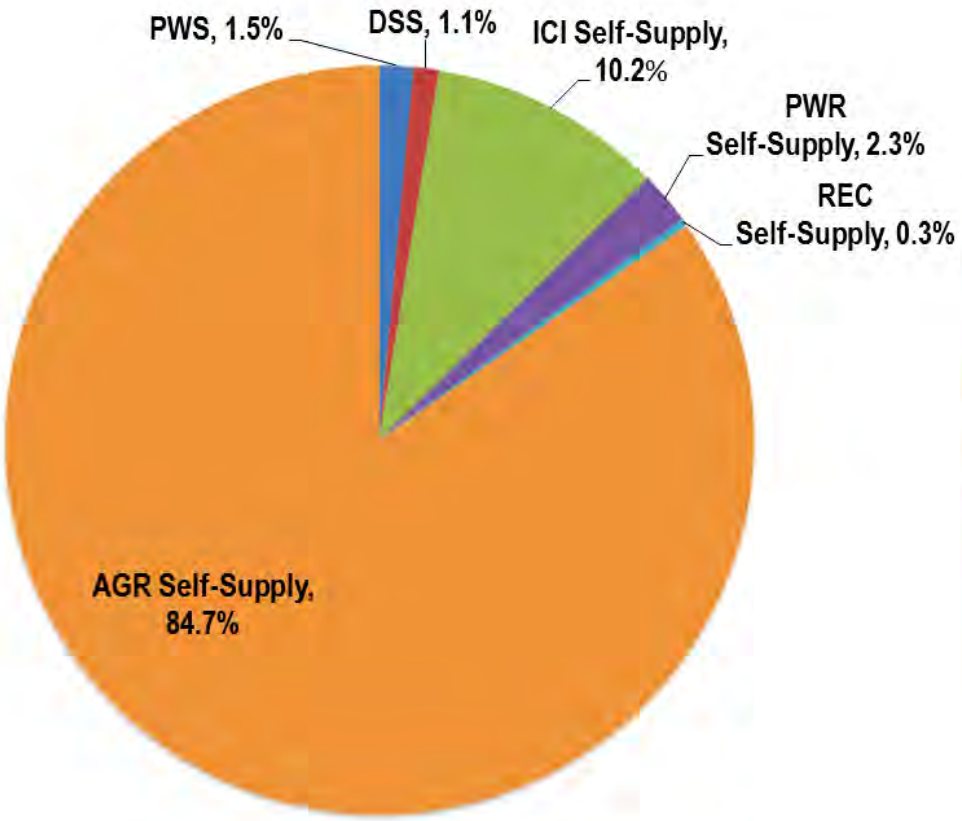
- **Appendix A**
  - Demands and Projections
  - Methodology
- **Appendix B**
  - Minimum Flows and Levels & Recovery and Prevention Strategies
- **Appendix C**
  - Potable Water and Wastewater Treatment Utilities
- **Appendix D**
  - Information for Local Government Comprehensive Plans



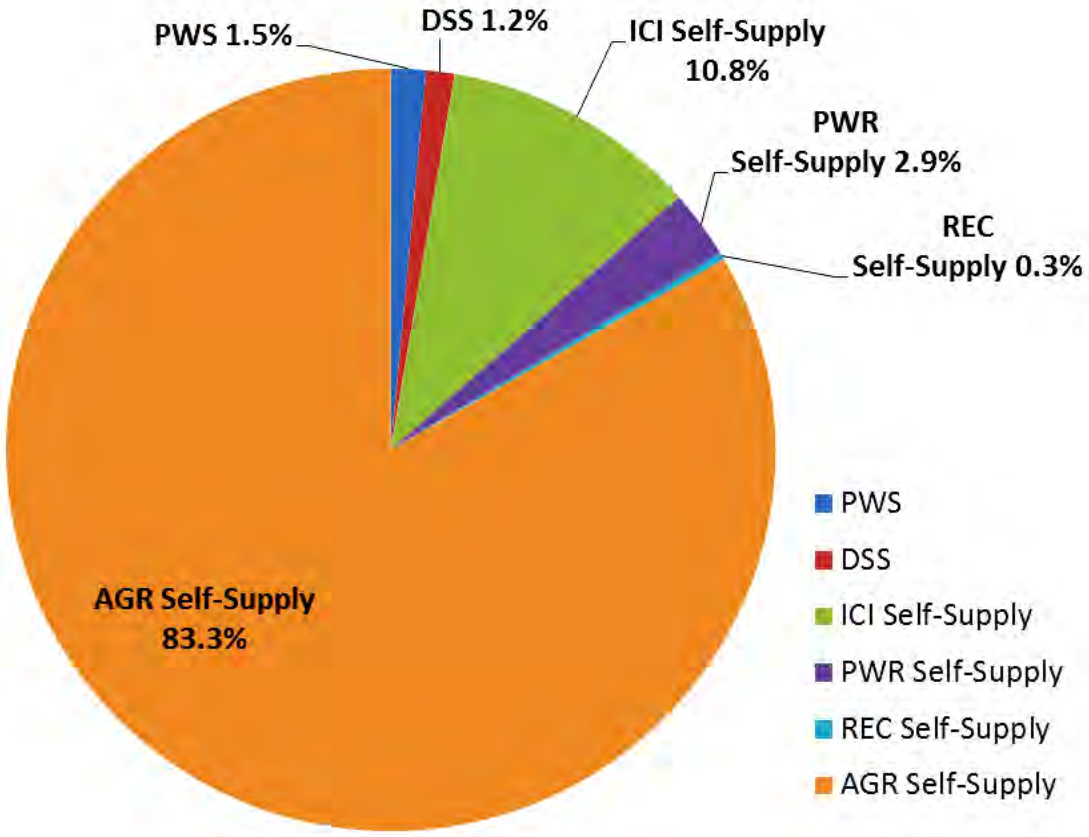
Total Demands for the LKB Planning Area

SUMMARY OF DEMANDS				
Use Category	**2010 (MGD)**	**2035 (MGD)**	**Change (MGD)**	**Percent Change**
Public Water Supply	2.8	3.4	0.6	21.4
Domestic Self-Supply	2.1	2.6	0.5	23.8
Commercial & Industrial Self-Supply	19.5	23.9	4.4	22.6
Power Generation Self-Supply	4.4	6.4	2.0	45.5
Recreational & Landscape Self-Supply	0.61	0.65	0.04	6.6
Agricultural Self-Supply	162.5	185.0	22.5	13.8
Total Water Use	192.0	222.0	30.0	15.6

LKB 2010 and 2035 Demands



2010 Demand = 192 MGD

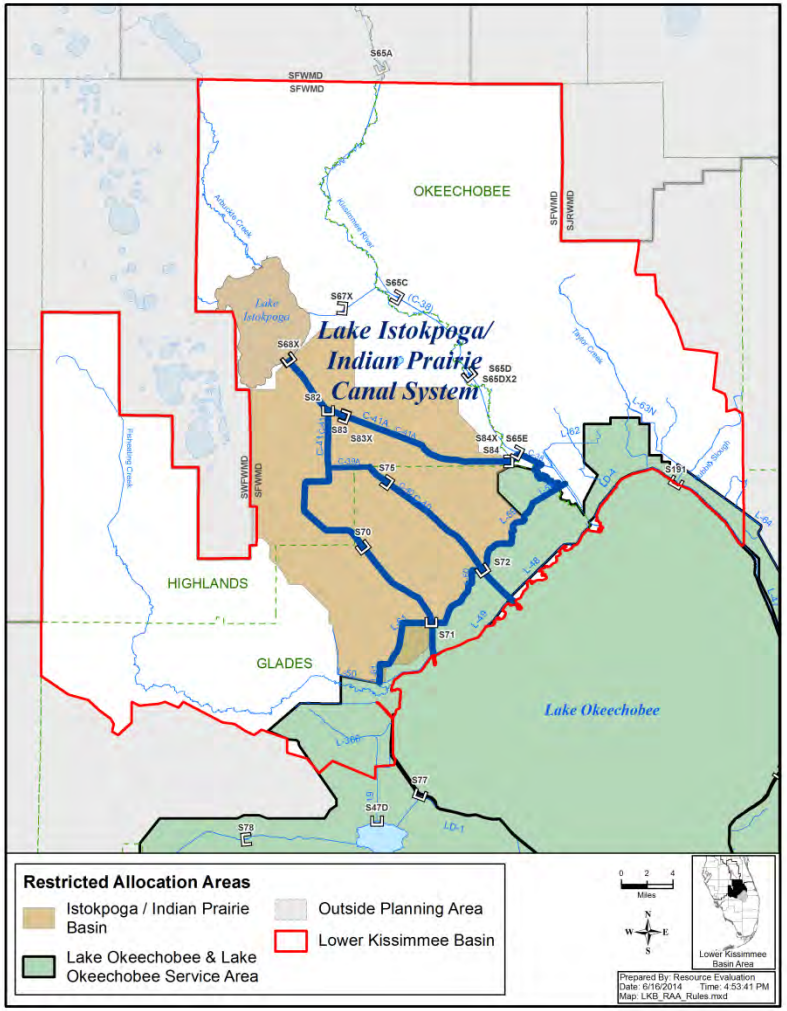


2035 Demand = 222 MGD

Changes Since 2005-2006 KB Plan Update

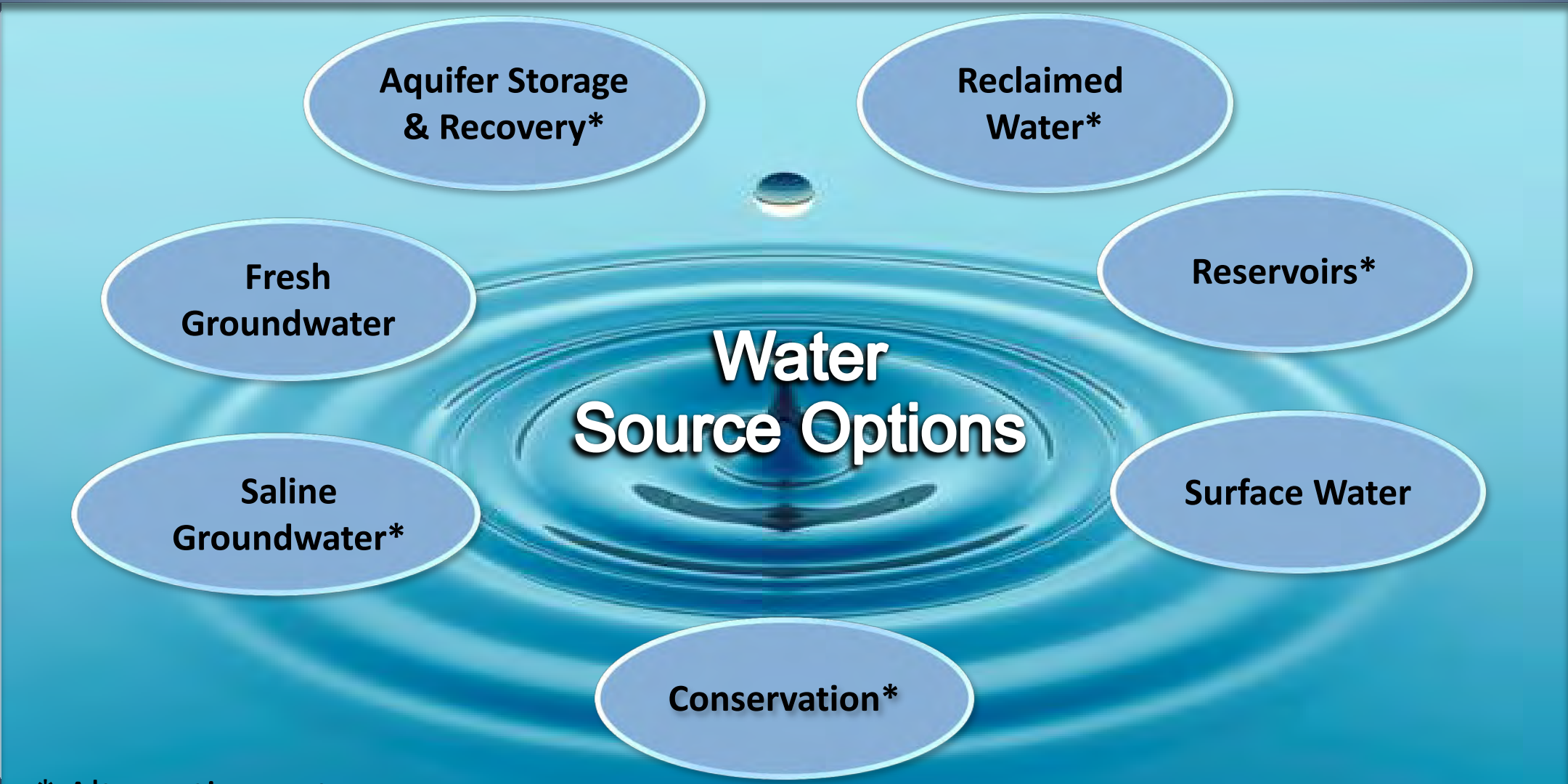
- **Lake Okeechobee Regulation 2008 schedule**
  - Change in status of Lake Okeechobee MFL
  - Additional allocations limited
- **Lake Okeechobee water shortage management**
- **Lake Istokpoga MFL**

Water Resource Considerations in LKB



- **Limited surface water availability**
  - Lake Istokpoga/Indian Prairie Basin
  - Lake Okeechobee & LOSA
- **Seminole Tribe of Florida – Brighton Reservation water rights**
- **Kissimmee River Basin Water Reservation**
- **Irrigated Pasture**
- **MFLs – SFWMD & SWFWMD**
- **LORS 2008**

Water Source Options



* Alternative water source

Evaluation of Demands and Resources

- Surface water availability
  - Addressed under previous plans
  - Minimal projected demand for new surface water
- Groundwater availability
  - Updated LKB groundwater model
  - Evaluated drawdown potential on MFL lakes

Plan Findings

- Surface water availability
  - Addressed by existing restricted allocation area rules
  - Minimal projected demand for new surface water
- Groundwater availability
  - No additional drawdown projected under SWFWMD MFL lakes that are in recovery
  - Sufficient groundwater appears to be available for the increase in projected needs of the basin though 2035

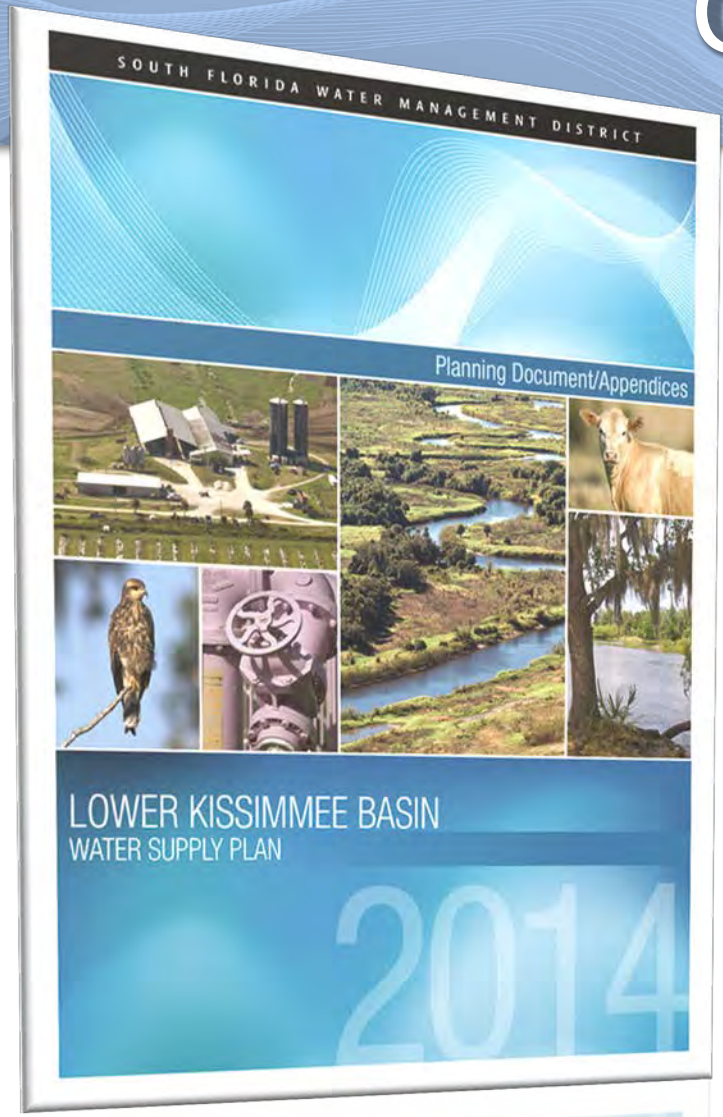
LKB Future Direction

- Complete development of Kissimmee River Basin Water Reservation
- Coordinate with SWFWMD to refine modeling of LKB region and MFL lakes
- USACE to 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

LKB Future Direction
(Cont.)

- Promote plugging & abandonment of flowing wells
- Promote development of tail-water recovery ponds
- Encourage water conservation measures through more efficient irrigation methods and automated weather stations
- Promote metering of water consumption
- Work with FDAC and agricultural stakeholders on methodologies and data sources for future crop projections

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**
- **Completion of USACE Herbert Hoover Dike Rehabilitation Project and subsequent revision to the Lake Okeechobee regulation schedule could improve LOSA level of certainty**

Next Steps

Chris Sweazy, SFWMD

What's Next?

February	*Initial WRAC Discussion*
Feb - Mar	*Individual stakeholder meetings*
April 16	*Kick-off public workshop*
July 9	*2nd public workshop*
July 10	**GB informational presentation**
July 24	**Deadline for comments on Draft Plan**
August 7	**SFWMD WRAC presentation**
September 4	**SFWMD WRAC presentation**
September 11	**SFWMD Governing Board Approval**

LKB Water Supply Plan Information

For further information including Plan documents, can be found at: www.sfwmd.gov

- ✓ then type in search box:

  "Lower Kissimmee Basin Water Supply Plan"

Link Local Governments & Utilities with Water Supply Planning

After the District Governing Board approves the Water Supply Plan:

- All local governments must amend their comprehensive plan to incorporate a water supply facilities work plan for at least a 10 year period within 18 months of water supply plan
- Utilities identify the projects to be developed
- Utilities complete Annual Progress Reports

Submit Comments

Comments Due: Thursday July 24th

Send to: Chris Sweazy (csweazy@sfwmd.gov)

Questions?