

The Everglades & Northern Estuaries; St. Lucie Estuary-Indian River Lagoon & Caloosahatchee Estuary

Water Flows & Current Issues

Florida Senate
Select Committee

August 22, 2013



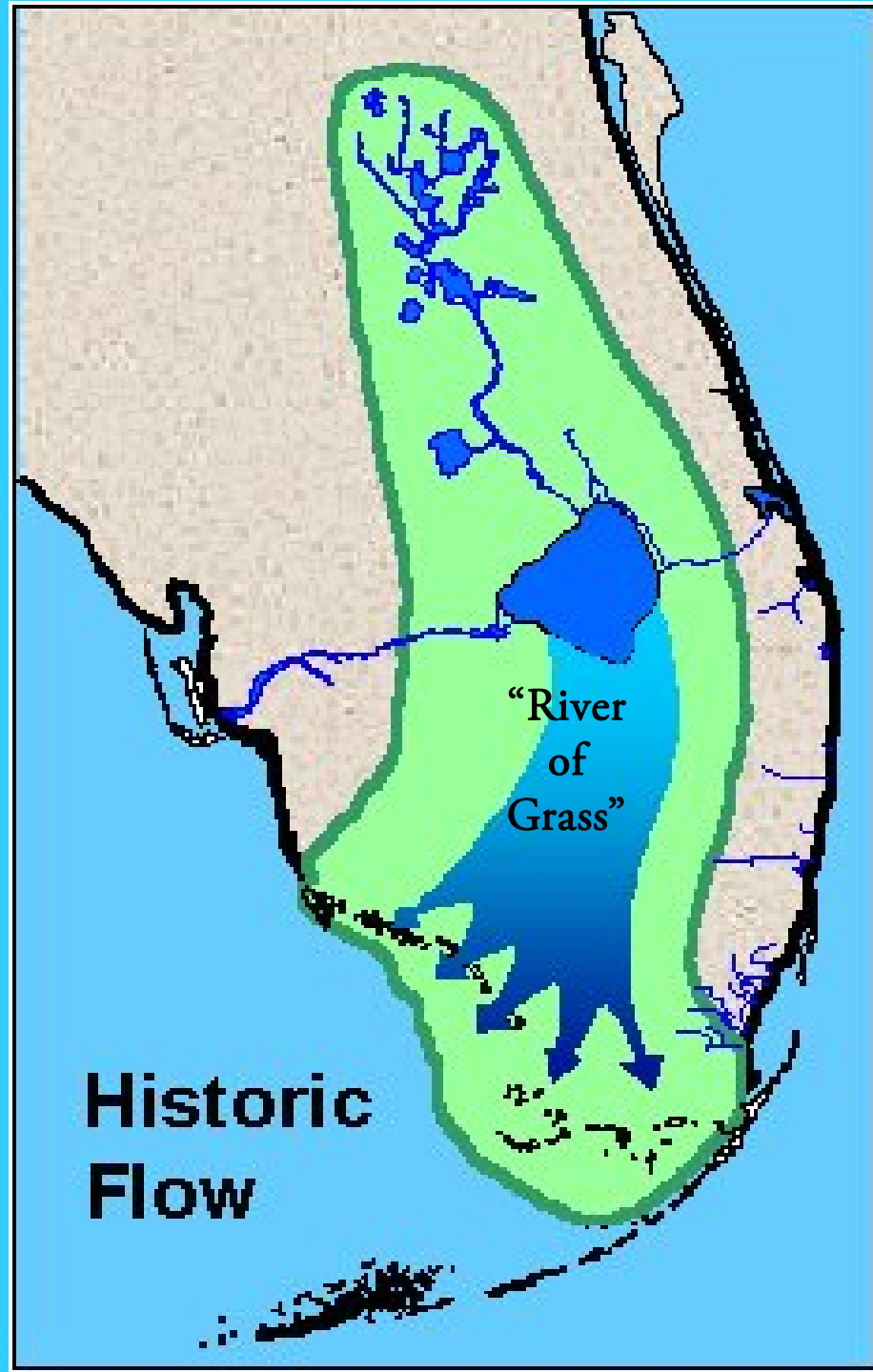
Upper Chain of Lakes (8) flow south
into Lake Kissimmee

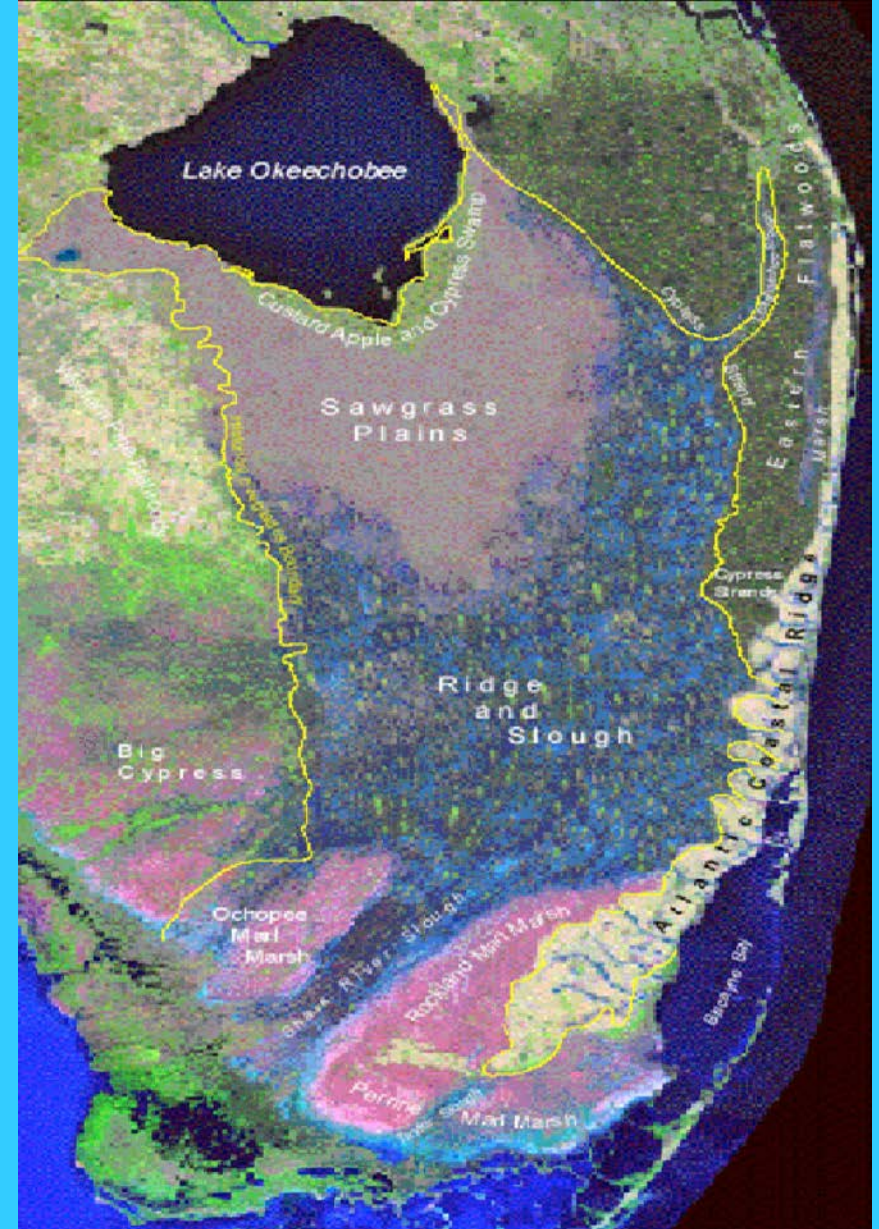
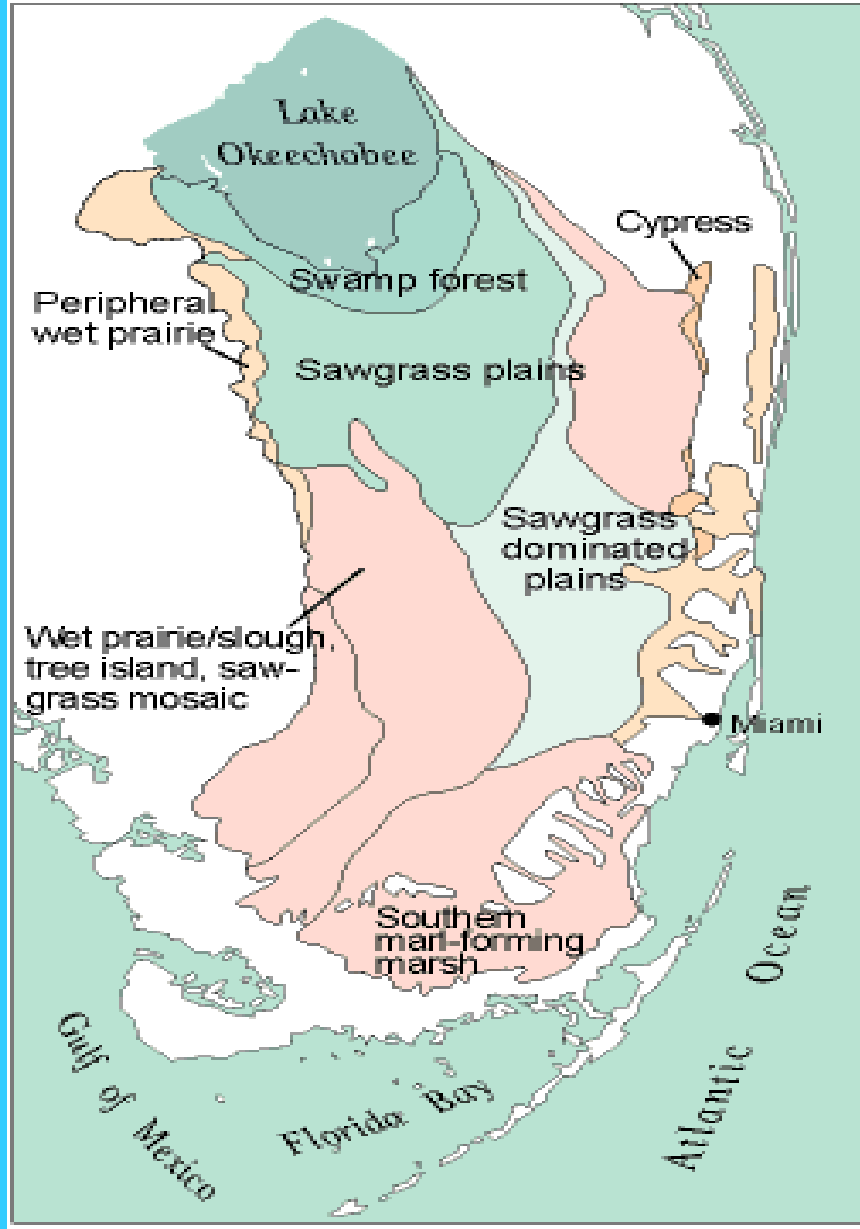
Lake Kissimmee flows south into the
Kissimmee River – 105-mile Oxbow
River with 2-mile-wide floodplain

Water takes 6-8 Months to reach Lake
Okeechobee

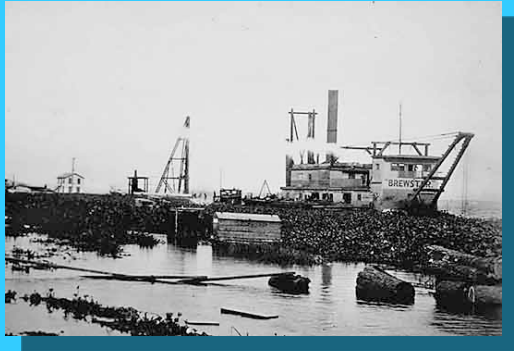
Lake Okeechobee flows south through
“River of Grass”, 60-mile-wide shallow
(1 ft deep) river flowing at 1 mile in 4
days.

Water takes 16 Months to reach
Florida Bay





Expansion of the Canal and Levee System



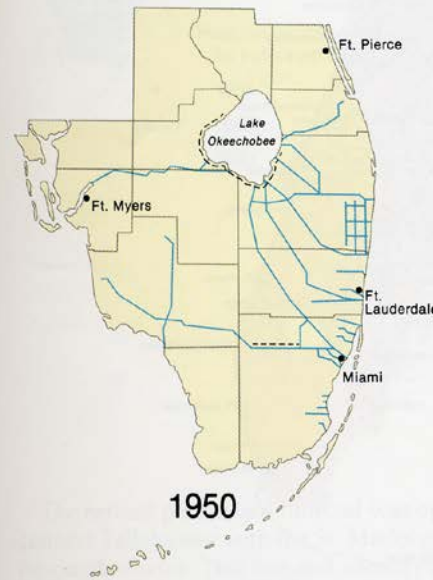
1911



1920



1930



1950



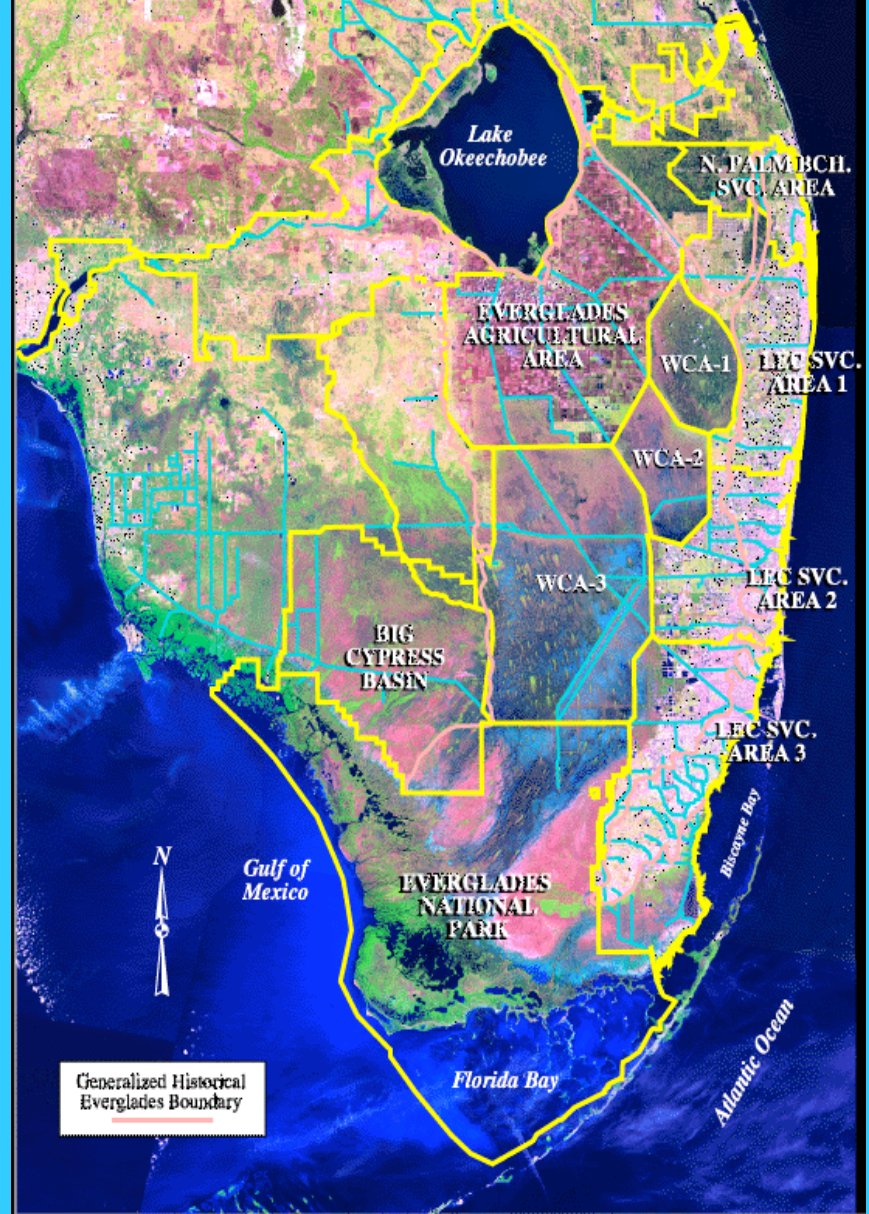
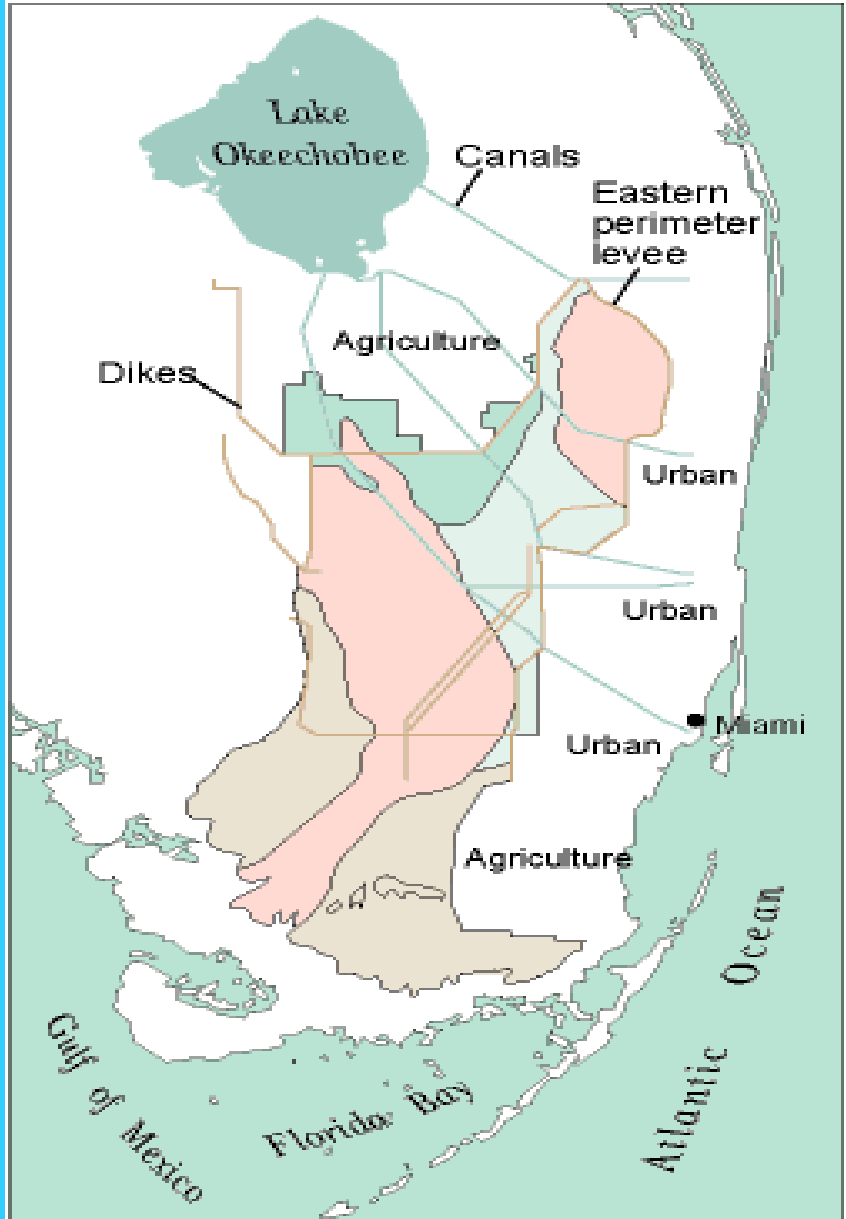
1960



1970

Major canal

Major levee





Expanding population demands for Land, Flood control, and Water Supply encroaching on the Everglades.

Hurricanes in 1926 & 1928

1926 AND 1928
DEVASTATING HURRICANES
... LOSS OF 2,500 LIVES

HOOVER DAM AUTHORIZED 1930

... COMPLETED 1937

The poster features a blue header with the years '1926 AND 1928' in white. Below it, the text 'DEVASTATING HURRICANES' is written in red, with '... LOSS OF 2,500 LIVES' in black below that. A central illustration shows a coastal town with a long dike extending into the sea. To the right of this illustration, the text 'HOOVER DAM AUTHORIZED 1930' is written in red inside a jagged orange border. At the bottom, '... COMPLETED 1937' is written in blue.

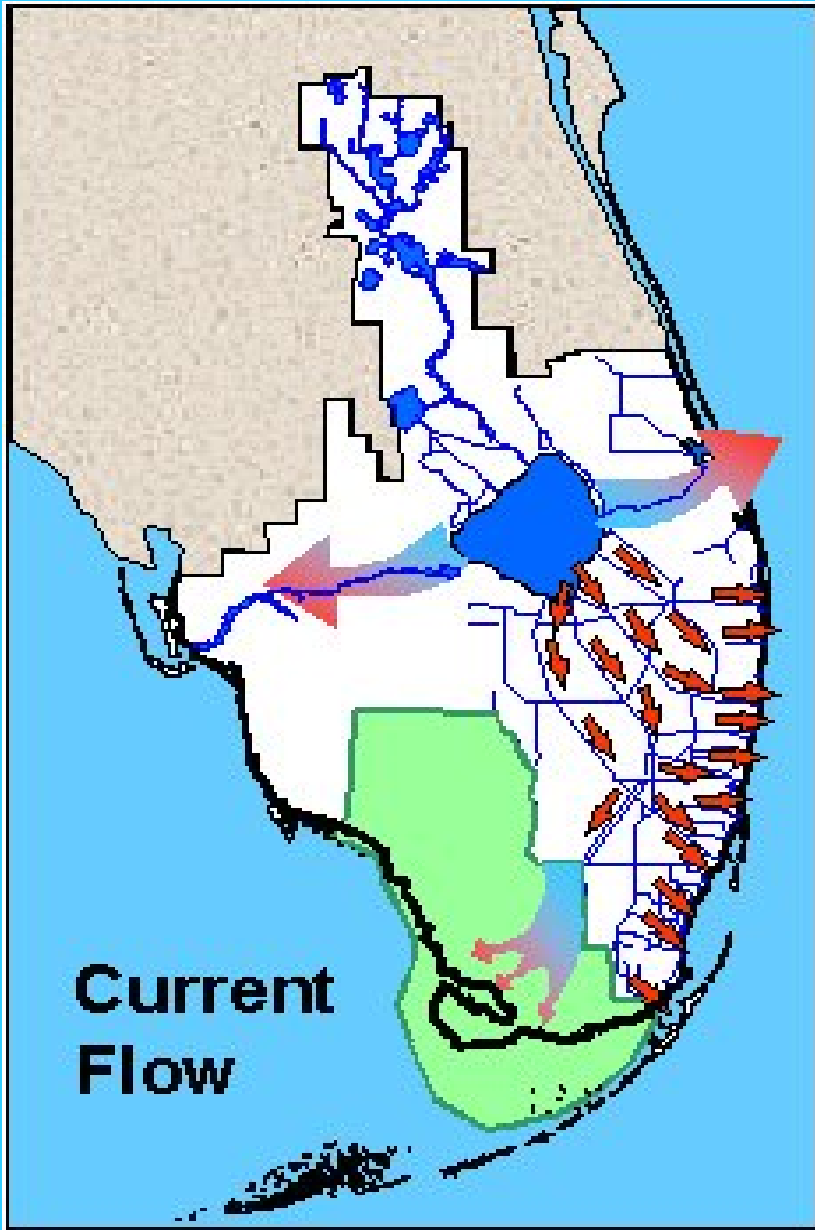




Dam Lake Okeechobee- Stop the flow to the River of Grass (Killed the River of Grass)

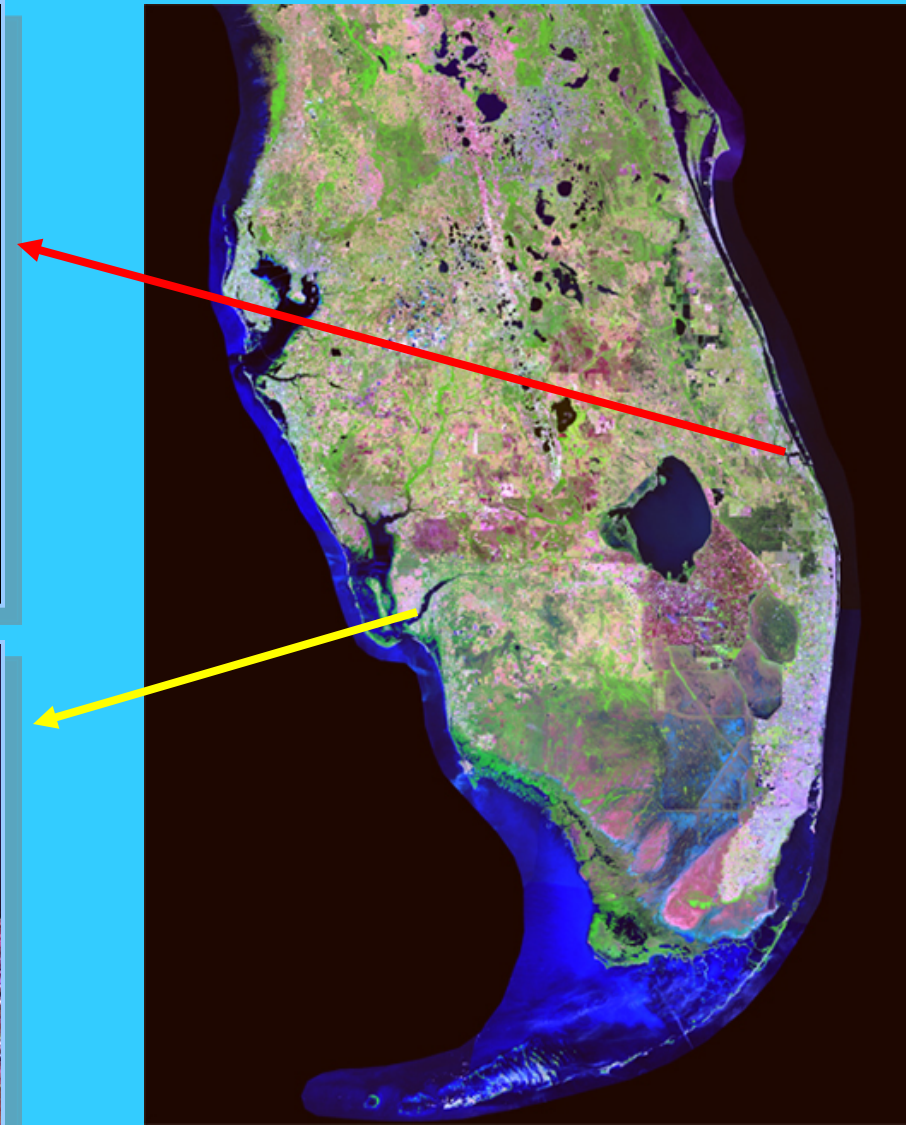
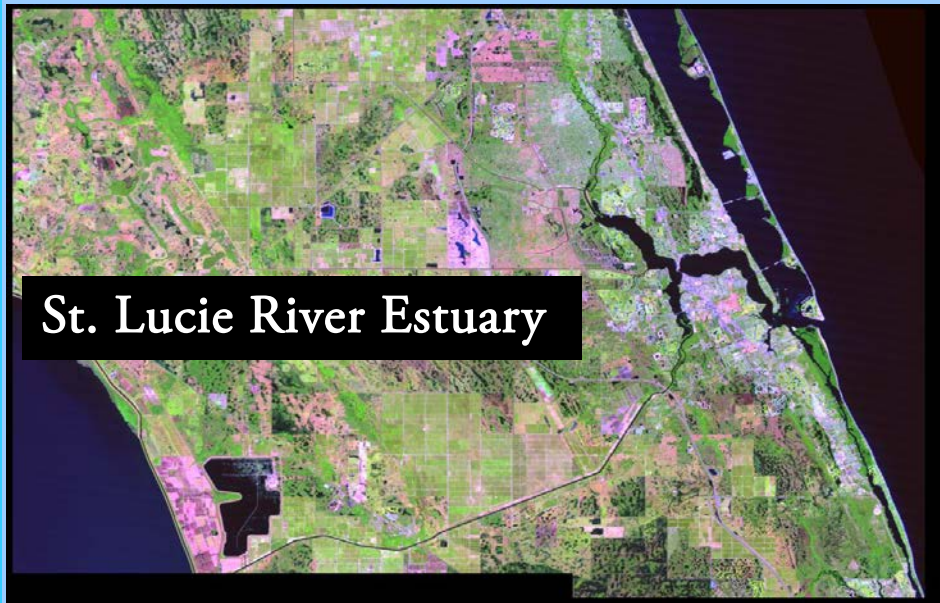


**Killed the Kissimmee River- 1962-1970 Dug C-38 Canal
up 105 mile oxbows-drained floodplain**



1.7 Billion Gallons per Day of freshwater is wasted to the Atlantic Ocean and Gulf of Mexico! (\$5.9 million/day)

South Florida's Northern Coastal Estuaries



Major Impacts

Caloosahatchee Estuary

“Dark Water”
at Point Ybel,
Sanibel

Photo by: Greg Rawl
Illustrative of past
high discharge events
Mid-2000

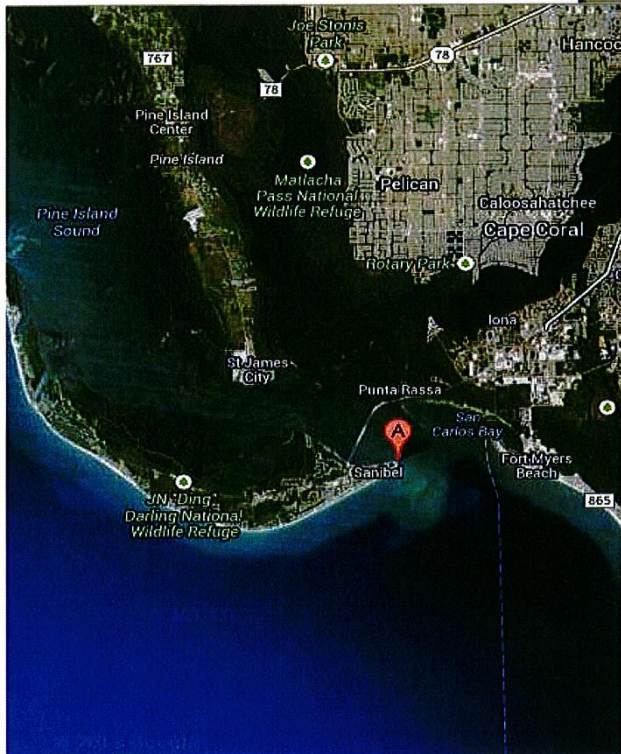




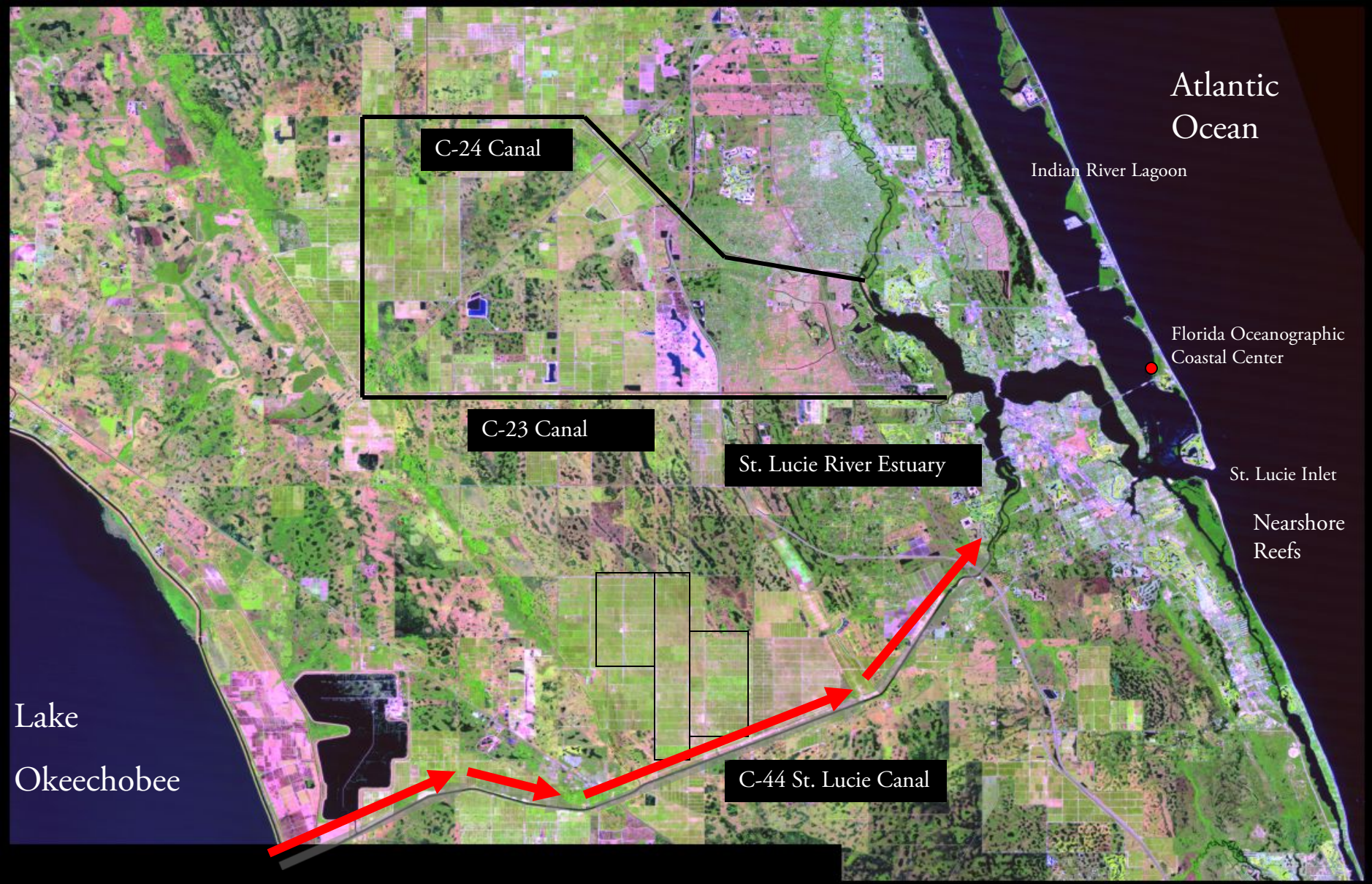
Photo by: John Cassani

Toxic Algae in the Caloosahatchee River From Lake Okeechobee (2005)



Photo by: John Cassani

Caloosahatchee River Water Treatment Plant Closed Due To Toxic Algae (2005)



Atlantic
Ocean

Indian River Lagoon

Florida Oceanographic
Coastal Center

St. Lucie Inlet

Nearshore
Reefs

St. Lucie River Estuary

C-24 Canal

C-23 Canal

C-44 St. Lucie Canal

Lake
Okeechobee

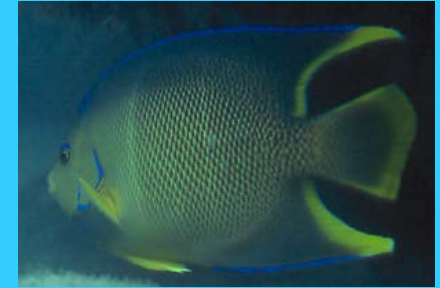


Discharges from Lake Okeechobee to the St. Lucie River Estuary and Indian River Lagoon

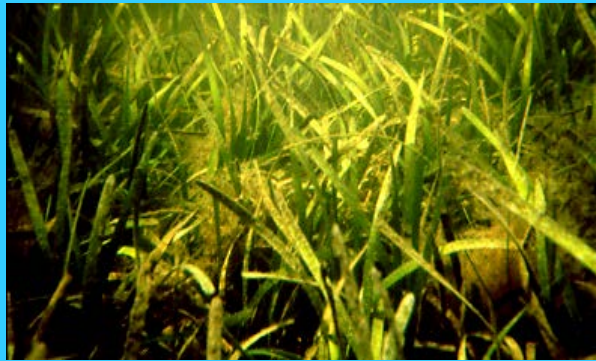


Discharges from Lake Okeechobee and St. Lucie Canal to the Estuary. Up to 4.6 Billion Gallons per Day!

Loss of Fisheries & Coastal Habitat



Seagrass Beds



Oyster Reefs



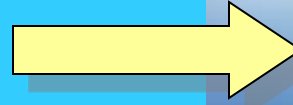
Mangroves

Coral Reefs



Indian River Lagoon Seagrass Beds

Before Discharges

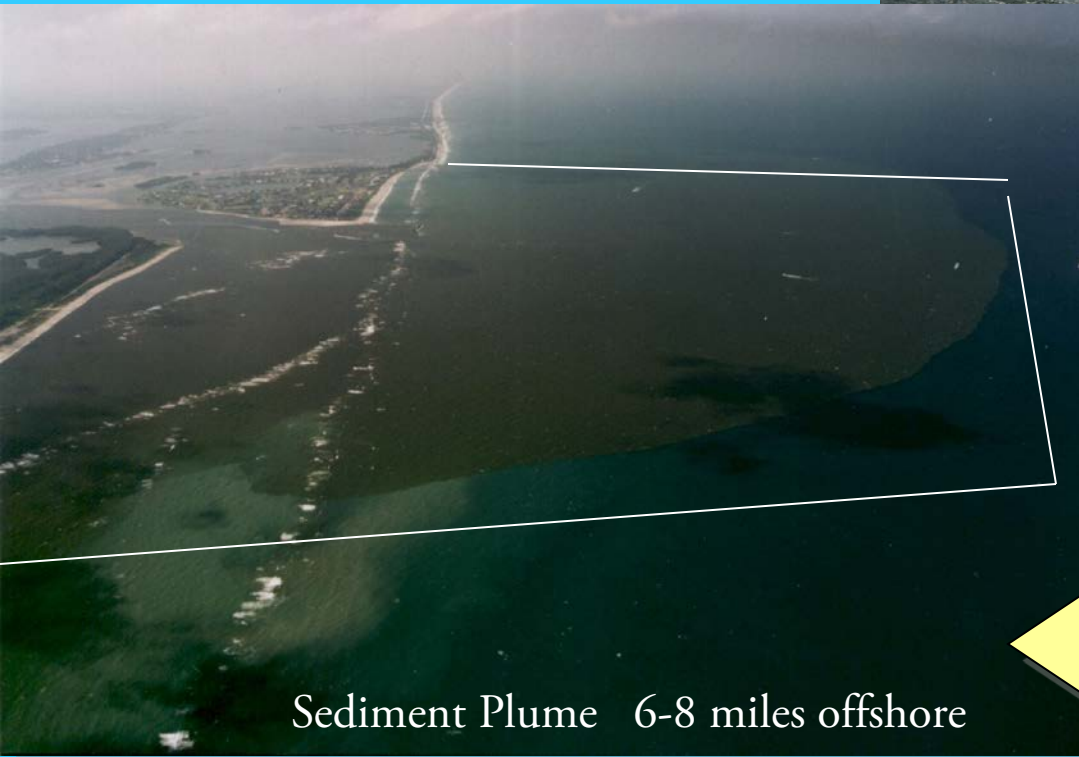


During Discharges



St. Lucie Inlet Nearshore Reefs

Before Discharges 



 During Discharges

St. Lucie River Estuary Muck Bottom



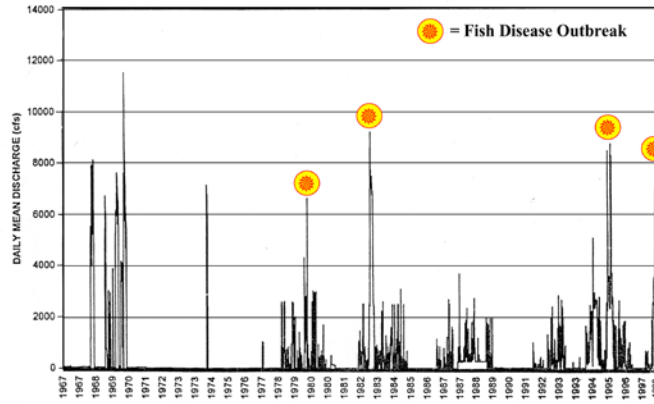
4-8 ft. thick on bottom

7.9 million cubic yards ++

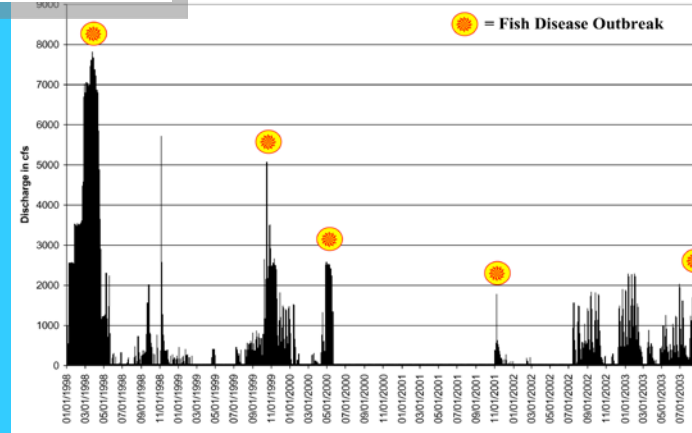
Fish Lesions and Abnormalities



St. Lucie Canal Discharge
1967 - 1998



St. Lucie Canal Discharge
1998 - 2003

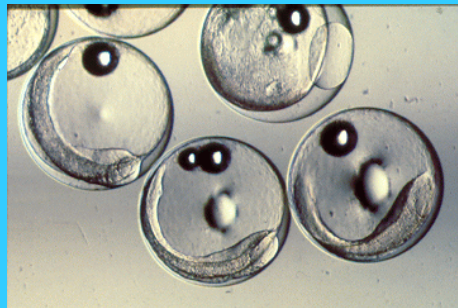
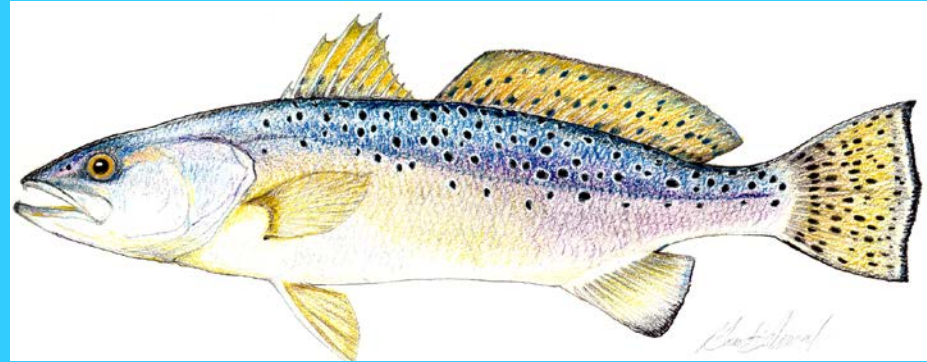


33 Species of Fish
6% of the population

Direct Effects on Fisheries


Economically important Spotted Seatrout

Reproduction is inhibited by low salinity levels in the estuary.



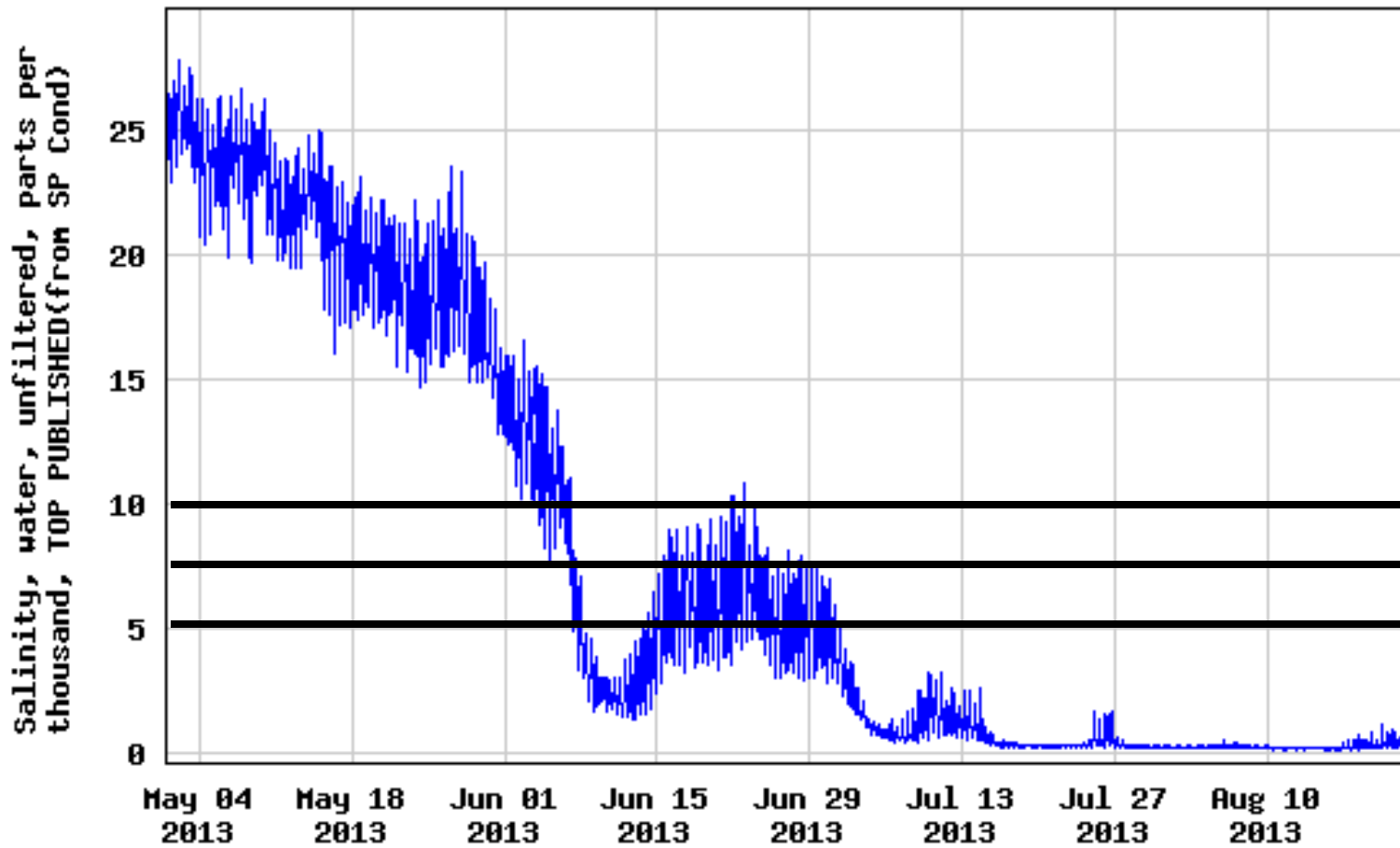


0 0.5 1 2 Miles

FOS 

-  Florida Oceanographic Coastal Center
-  Martin Co./NOAA Reefs
-  Historic Oyster Reefs





----- Provisional Data Subject to Revision -----

Stress

Harm

Death

74 Days

Salinity Tolerance for Oysters



Death

7 Days For Spat & Juveniles

14 – 28 Days For Adults

Pollution Discharges from Lake Okeechobee & C-44 Basin to the St. Lucie River Estuary and Indian River Lagoon- State Aquatic Preserve



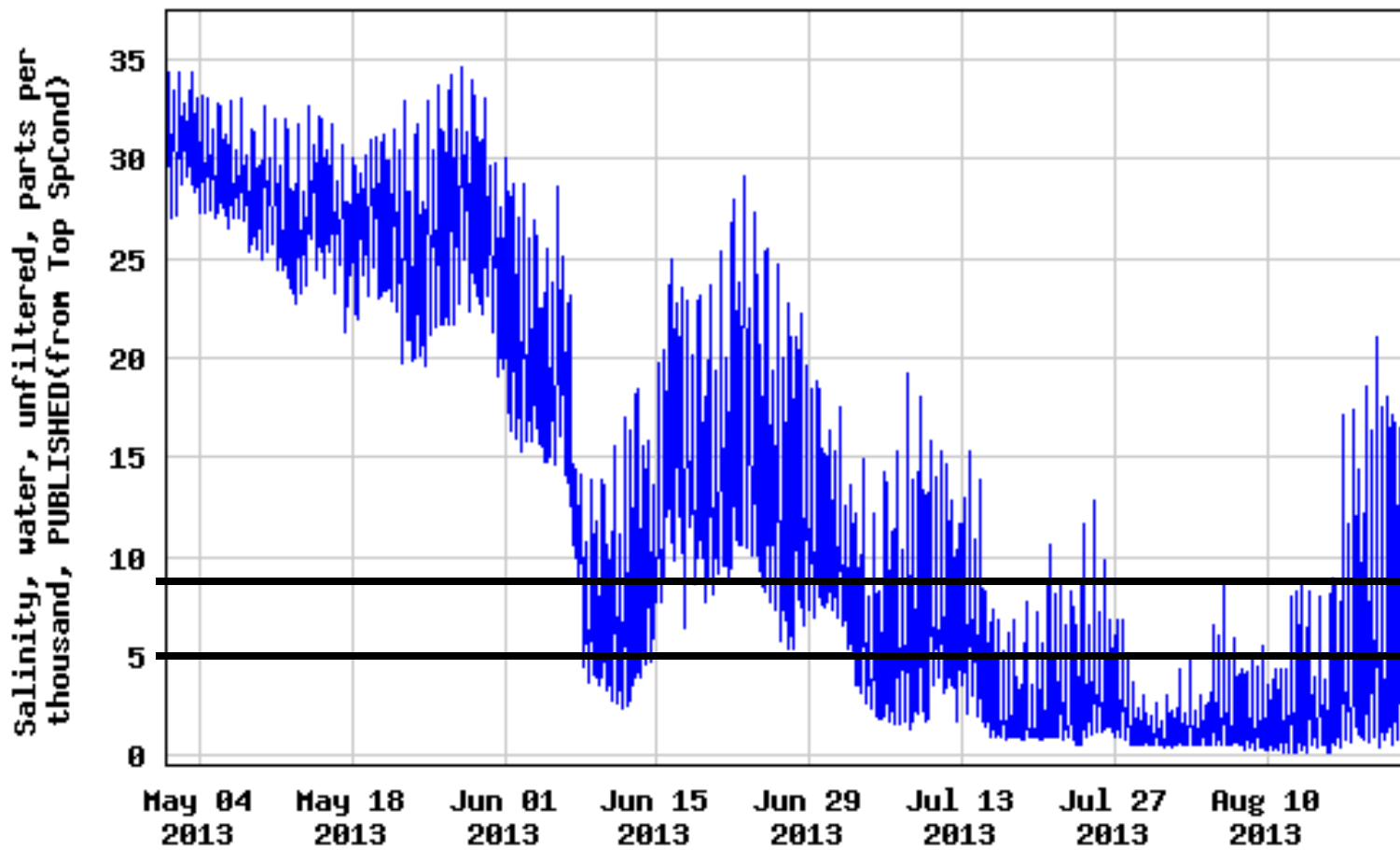
Pollution over the St. Lucie Inlet State Preserve Reef and Hobe Sound National Wildlife Refuge

St. Lucie Inlet 7-6-13

(photos by J. Thurlow-Lippisch)



Pollution Discharges from Lake Okeechobee & C-44 Basin to the St. Lucie River Estuary and Indian River Lagoon- State Aquatic Preserve- covering 700 acres of Seagrass Habitat 6-28-13 (photos by J. Thurlow-Lippisch)



----- Provisional Data Subject to Revision -----

Death

Death

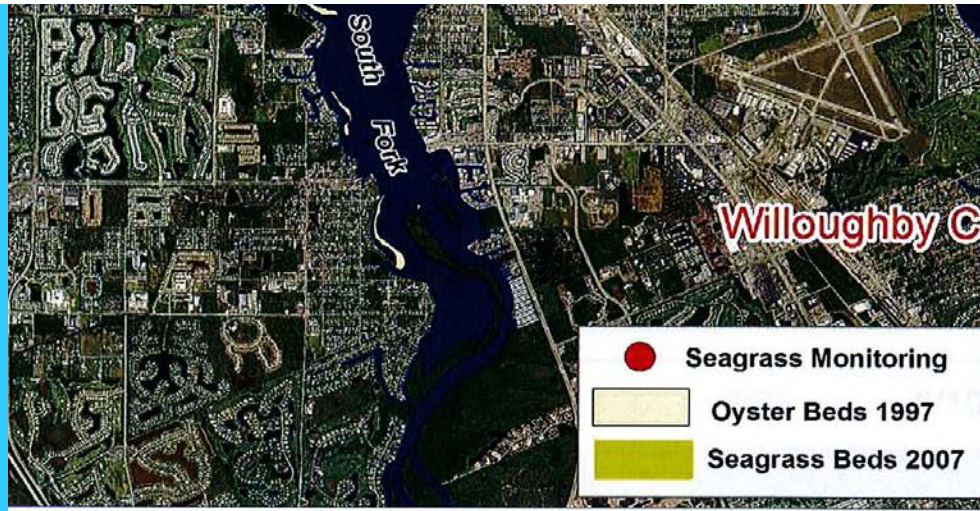
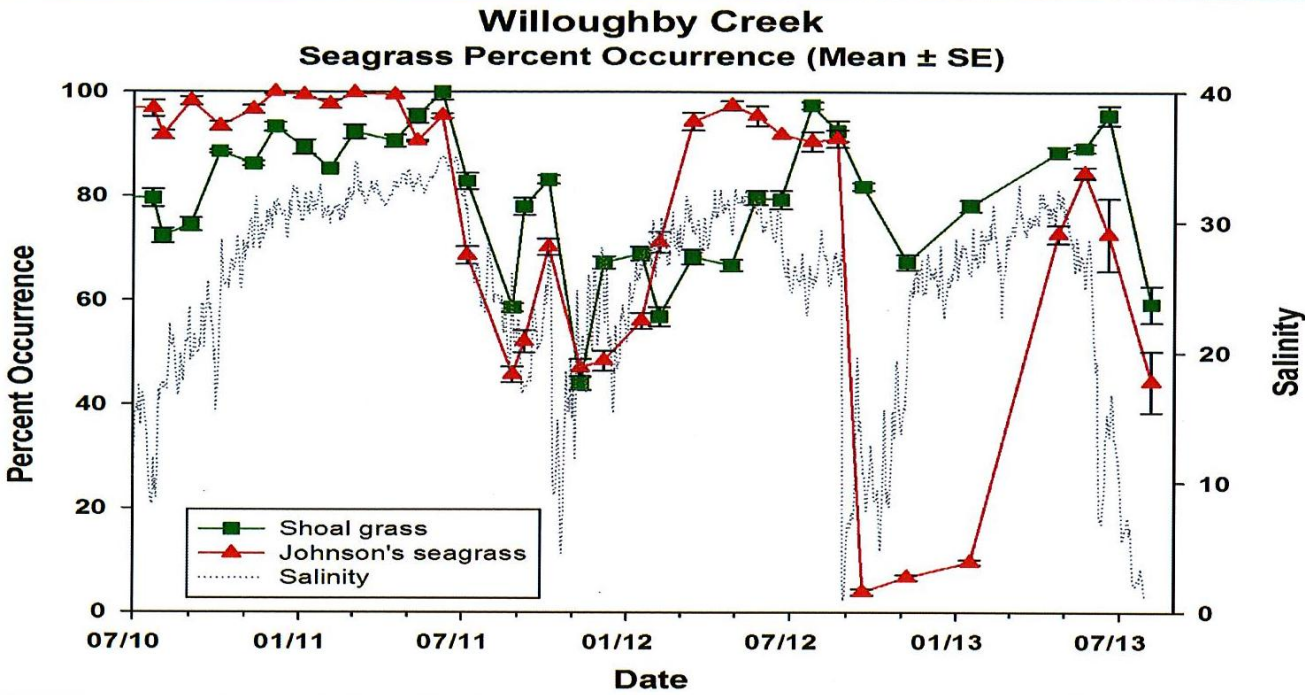
49 Days

Salinity Tolerance for Seagrass

Death

14 days < 9 ppt

3 days < 5ppt



Effects of Freshwater Discharges on Seagrasses – Johnson's Seagrass is a Threatened Species under the ESA

St. Lucie River Estuary Water Quality Outlook

This information is provided by the Florida Oceanographic Society with support of the Marine Resources Council. It is collected by the Citizen Volunteer Water Quality Monitoring Network. For complete data go to our website at: <http://www.floridaoceanographic.org/water.htm>

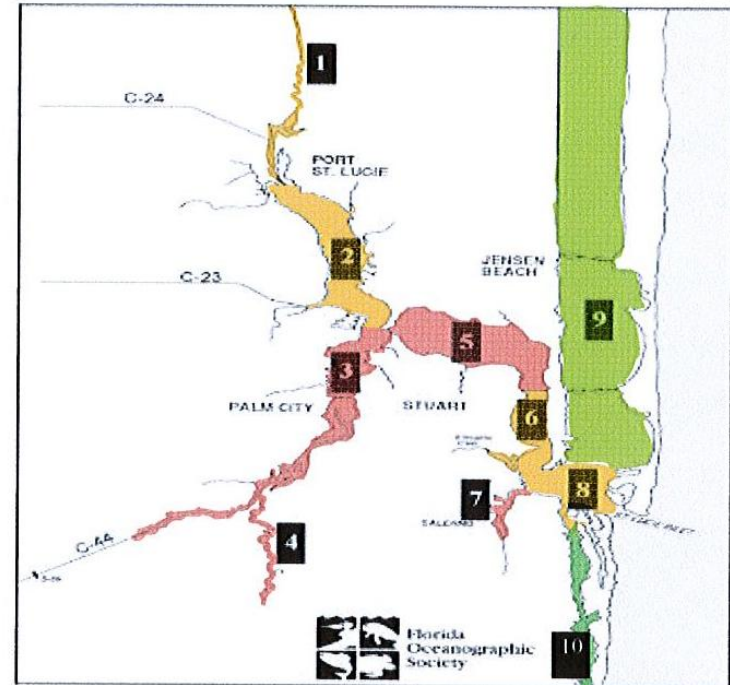
For sample results related to bacteria levels go to:
www.martincountyhealth.com and click on the Environmental Health link.

Posted:

07/18/13

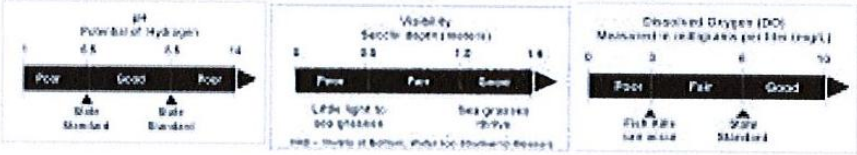
Overall Grade:	65.2%	D	POOR
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Zone/ Location	Water Temp. Deg. F	pH	Visibility (Secchi) Meters	Salinity ppt	Dissolved Oxygen mg/L	Location Score	Grade
1. Winding North Fork	82	7.7	0.60 Fair	0.0 Poor	6.5 Good	66% Poor	D
2. North Fork	82	7.5	0.64 Fair	0.5 Poor	3.8 Fair	61% Poor	D
3. South Fork	78	7.6	0.45 Poor	0.0 Poor	6.2 Good	56% Destructive	F
4. Winding South Fork	79	7.2	0.50 Fair	0.0 Poor	2.8 Poor	56% Destructive	F
5. Wide Middle River	80	7.6	0.42 Poor	1.7 Poor	5.3 Good	56% Destructive	F
6. Narrow Middle River	83	7.7	0.83 Fair	2.0 Poor	3.3 Fair	61% Poor	D
7. Manatee Pocket	81	7.6	0.08 Poor	0.0 Poor	8.1 Good	56% Destructive	F
8. Inlet Area	83	8.2	0.98 Fair	24.5 Poor	4.6 Fair	61% Poor	D
9. Indian River Lagoon	79	8.2	1.37 Good	26.0 Fair	5.0 Fair	81% Good	B
10. Intracoastal Waterway South	80	8.0	1.50 Good	32.0 Good	5.6 Good	97% Ideal	A



Grading				
A	B	C	D	F
90-100	80-89	70-79	60-69	0-59
IDEAL	GOOD	SATISFACTORY	POOR	DESTRUCTIVE

Salinity (Parts per Thousand)				
Zones	Description	Good	Fair	Poor
1 & 4	Winding North & South Forks	2 to 8	1 to 2 or 8 to 15	< 1 or > 15
2 & 3	Inner St. Lucie Estuary (North & South Fork)	15 to 25	10 to 15 or > 25	< 10
5	Wide Middle St. Lucie River	> 20	15 to 20	< 15
6	Narrow Middle St. Lucie River	> 25	20 to 25	< 20
7	Manatee Pocket	> 27.5	20 to 27.5	< 20
8, 9 & 10	Inlet, Indian River Lagoon, & Intracoastal Waterway South	>30	25 to 30	< 25



Comment: The data above may indicate areas of concern in the St. Lucie Estuary. Citizens should call the Florida Department of Environmental Protection (DEP) at 871-7662 or the South Florida Water Management District (SFWMD) 223-2600 to ask about the quality of a specific area and report observations of pollution.



Health Warnings posted in the St. Lucie River Estuary – 2004, 2005, 2006, 2010, 2012 and 2013



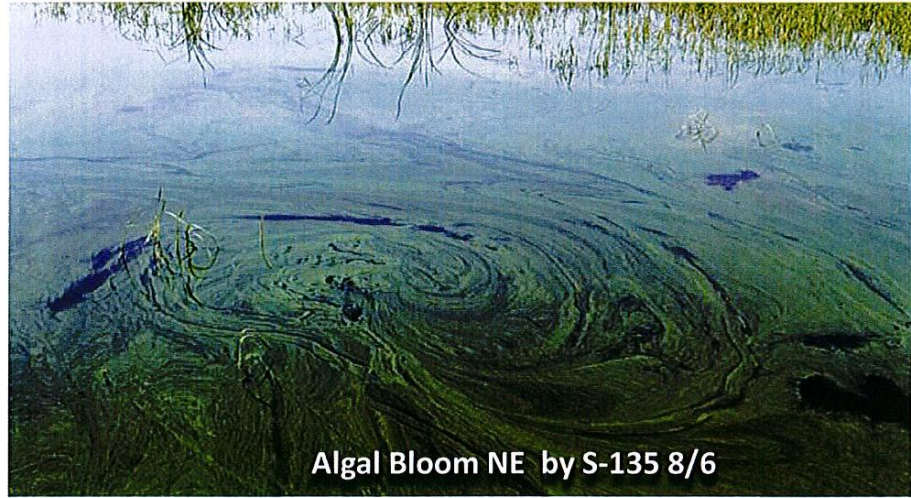
Green Algae Bloom Observed in St. Lucie River along shoreline in Rio by Douglas Ashley – 7-13-13

Algal Blooms

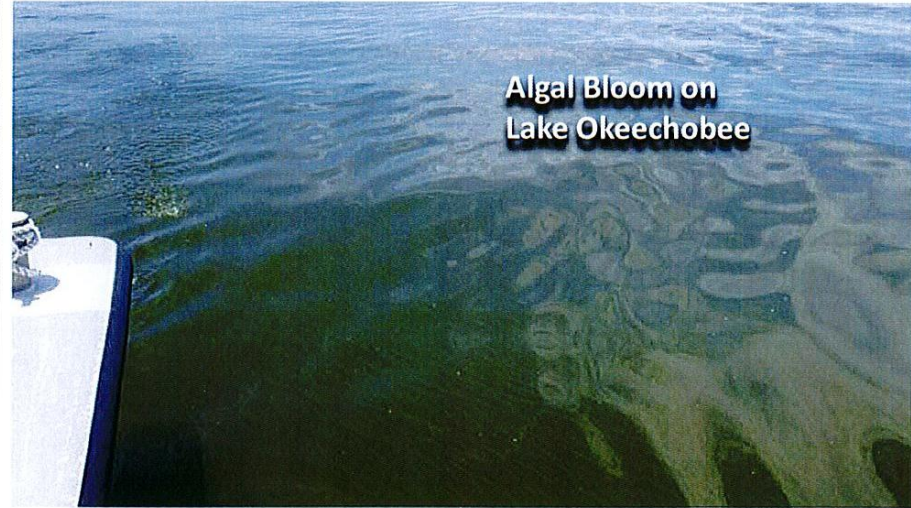


Lake Okeechobee

Current Conditions



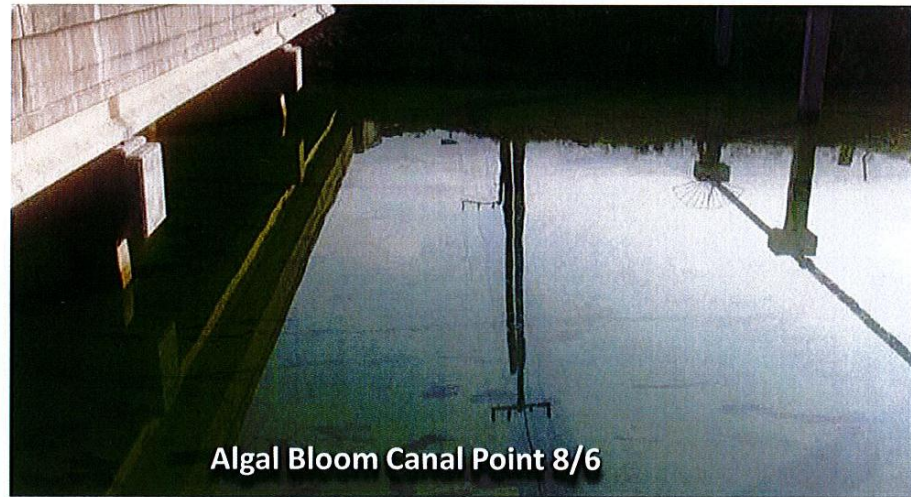
Algal Bloom NE by S-135 8/6



Algal Bloom on
Lake Okeechobee

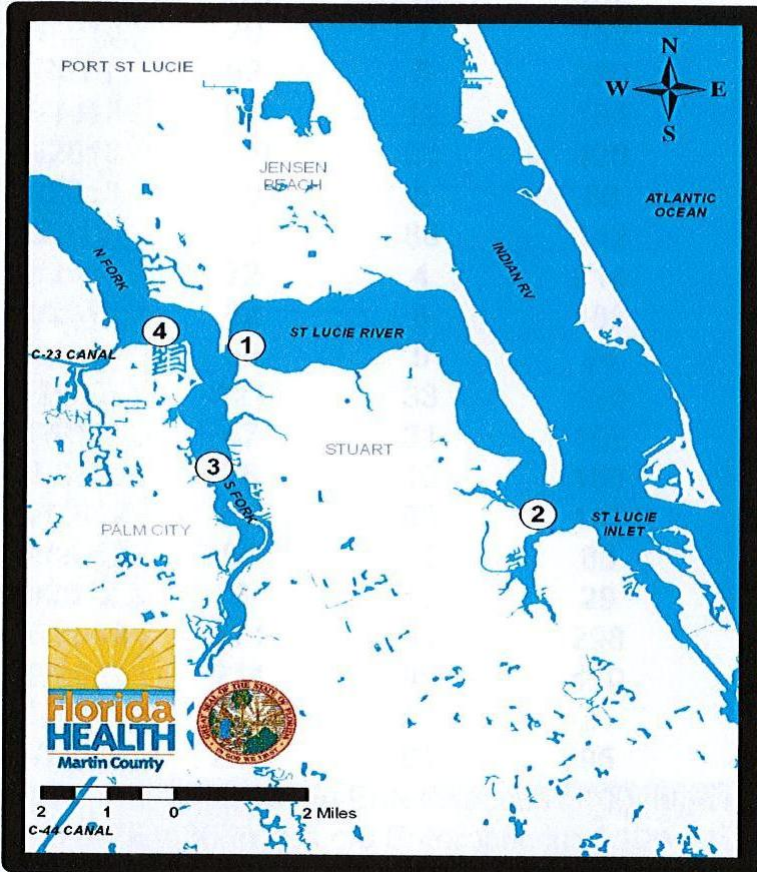


Algal Bloom NE 8/6

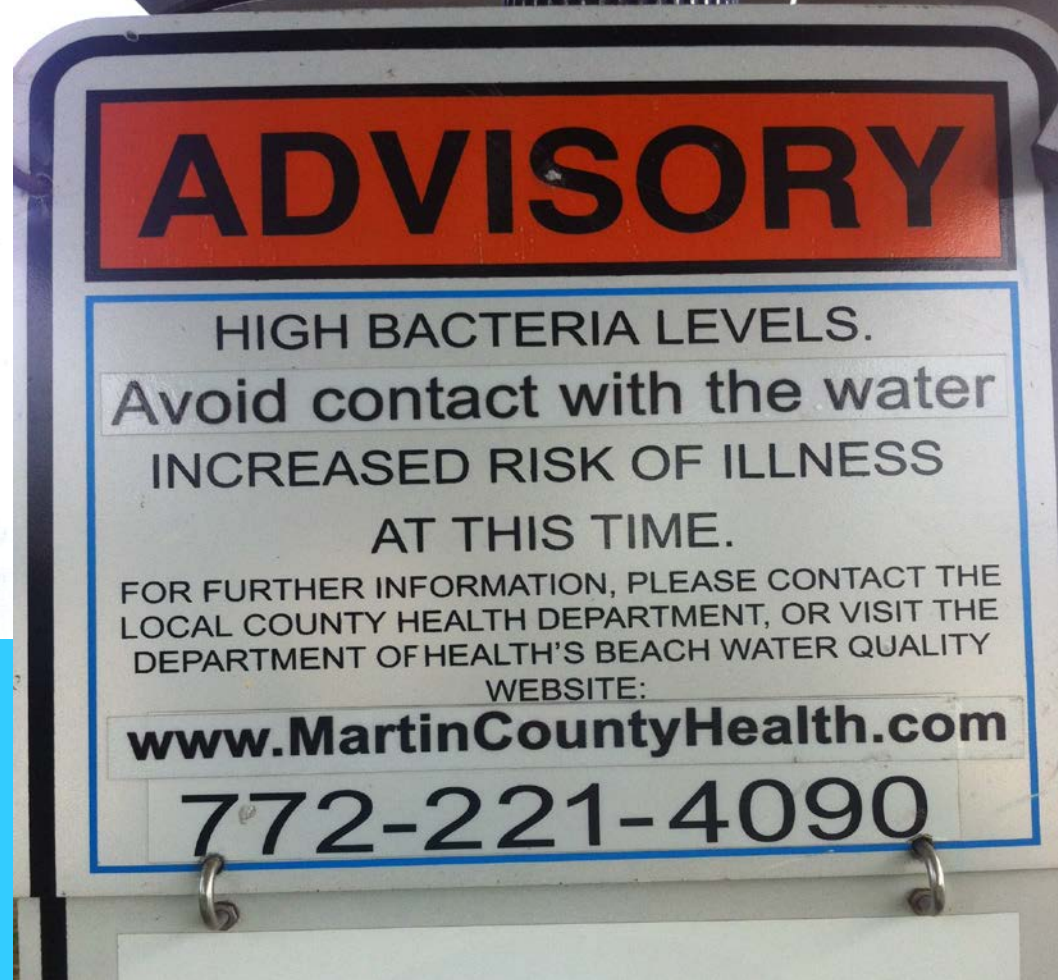


Algal Bloom Canal Point 8/6

FLORIDA DEPARTMENT OF HEALTH - MARTIN COUNTY
ST LUCIE ESTUARY BACTERIA MONITORING



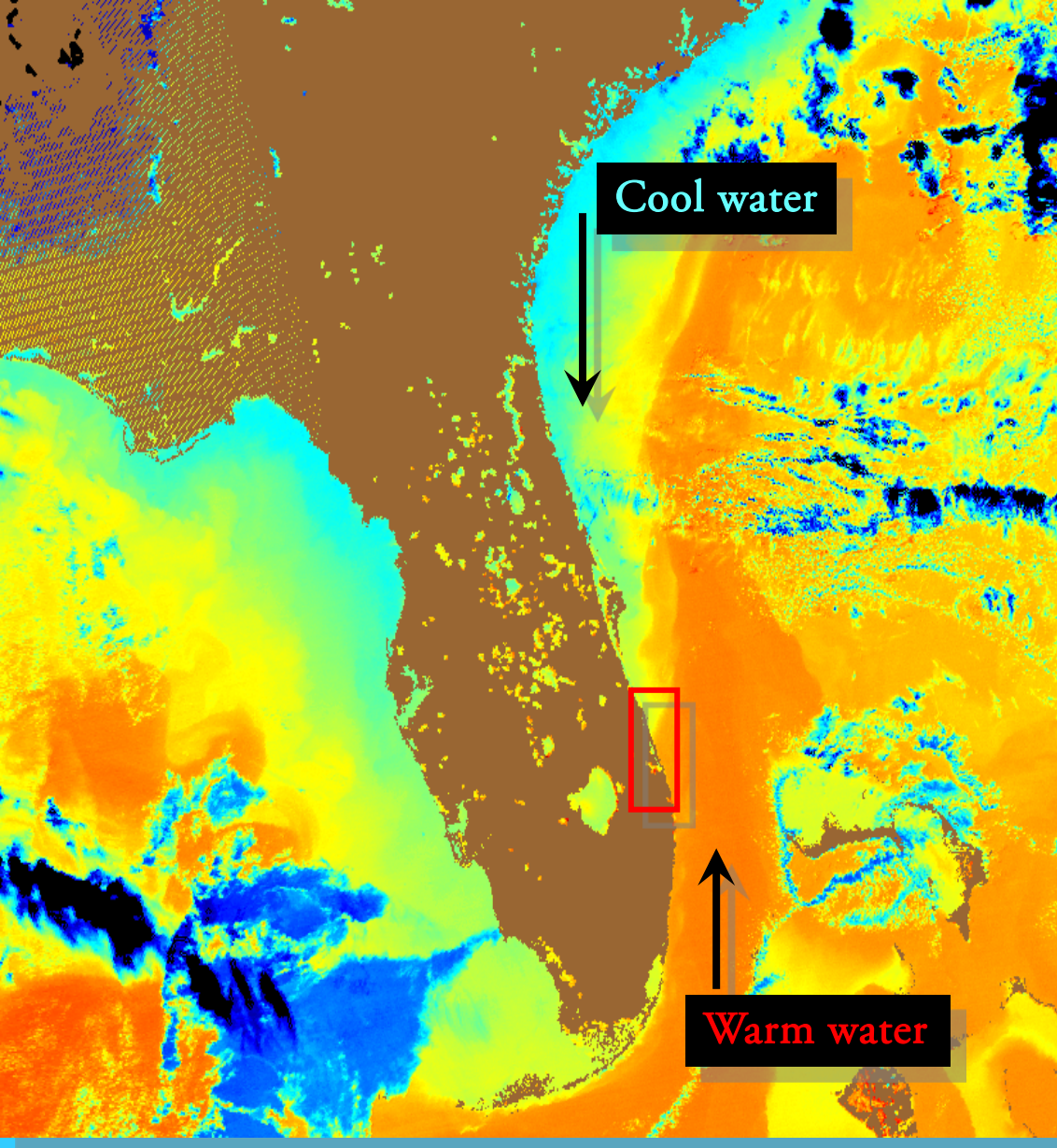
Date	Roosevelt Bridge (1)	Sandsprit Park (2)	Leighton Park (3)	E of Bessey Creek (4)
7/15/2013	1140	354	1440	1480
7/8/2013	910	156	1020	1560
7/2/2013	790	216	2020	1080
6/24/2013	560	102	1640	1400
6/17/2013	302	86	700	590
6/12/2013	Not sampled	134	Not sampled	Not sampled
6/10/2013	600	122	1620	1500



Highest Bacteria Levels Observed
Health Warnings Posted
Avoid Contact with Water

Most Biodiverse Ecosystem in North America

- 2100 plant species
- 2200 animal species
 - 800 fish species
 - 310 bird species



Uniqueness of the Indian River Lagoon Estuary



Indian River Lagoon Economic Assessment and Analysis Update

Contract No. 24706

For the
Indian River Lagoon National Estuary Program

In cooperation with
St. Johns River Water Management District
South Florida Water Management District

Final Report
August 18, 2008



HAZEN AND SAWYER
Environmental Engineers & Scientists

Executive Summary

The Indian River Lagoon is an Estuary of National Significance and one of twenty-eight (28) national estuary programs in the U.S. The Indian River Lagoon National Estuary Program is working toward the goals of attaining and maintaining the water and sediment quality needed to support a healthy seagrass-based ecosystem, endangered and threatened species, fisheries and recreation in the Lagoon.

Study Purpose

This study updated the economic values of the Indian River Lagoon that were estimated in 1995. The study area for this project is the Indian River Lagoon, including Mosquito Lagoon and Banana River Lagoon, and associated tributaries including but not limited to the St. Lucie River Estuary, St. Sebastian River, Turkey Creek, Crane Creek, Moore's Creek, and the inlets of Ponce de Leon Inlet, Port Canaveral Inlet, Sebastian Inlet, Ft. Pierce Inlet, St. Lucie Inlet, and Jupiter Inlet. The residents surrounding the Indian River Lagoon are located in the counties of Volusia, Brevard, Indian River, St. Lucie and Martin. The uses and values presented in this study represent the year 2007.

Economic Value of the Indian River Lagoon

The 2007 economic value of the Indian River Lagoon is provided in Table ES.1. Overall, residents and visitors of the five Indian River Lagoon counties received about \$3.7 billion in benefits in 2007 because of the existence of the Indian River Lagoon in its 2007 environmental condition.

Table ES.1
Estimated Annual Economic Value of the Indian River Lagoon
in its Existing Environmental Condition, 2007

Indian River Lagoon Related-	Value
(1) Recreational Expenditures	\$1,302,000,000
(2) Recreational Use Value	\$762,000,000
(3) Non-Use Value of Lagoon	\$3,400,000
(4) Real Estate Value, annualized	\$934,000,000
(5) Income Generated in IRL Counties	\$629,700,000
(6) Restoration, Research, Education Expenditures	\$91,000,000
(7) Commercial Fishing Dockside Value	\$3,800,000
Total Annual Value	\$3,725,900,000

40548-001\Wpdocs\Report\ER2 Final



Indian River Lagoon – Economic Value \$ 3.725 Billion 2007



Water-Related Benefits to Martin and St. Lucie Counties

TOTAL: \$840 million annually

Sales - ***\$519 million/yr***

Marinas

Boat sales/repairs

Fishing tackle/bait/charters

Personal income - ***\$206 million/yr***

6,600 jobs supported—Marine Industries

Guide/commercial fishing

Repair personnel

20,500 jobs supported—Tourism

Food/beverage services

Hotel/motel personnel

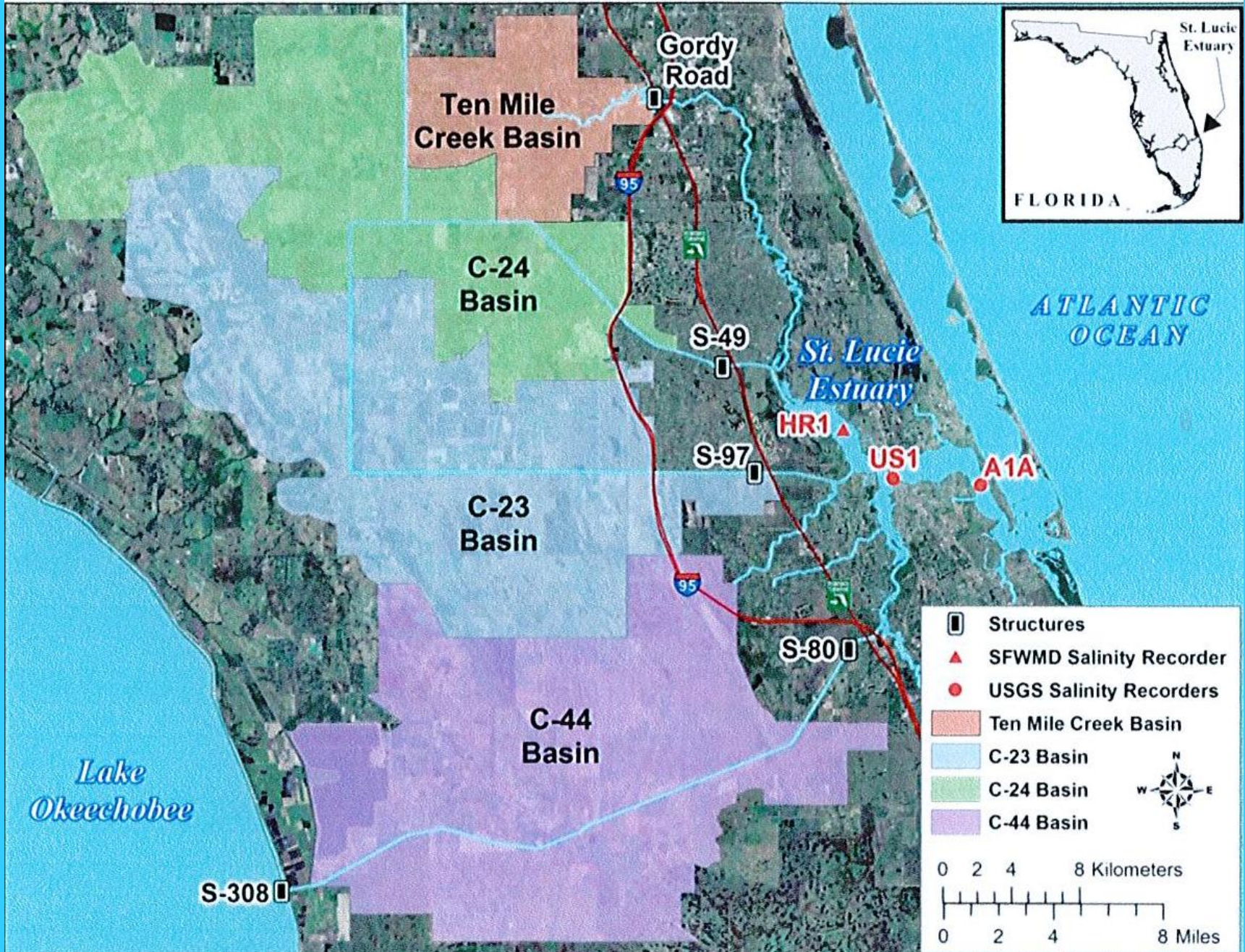
Tourism - ***\$115 million/yr***

Visitation to beaches/hotels

Recreational fishing/boating

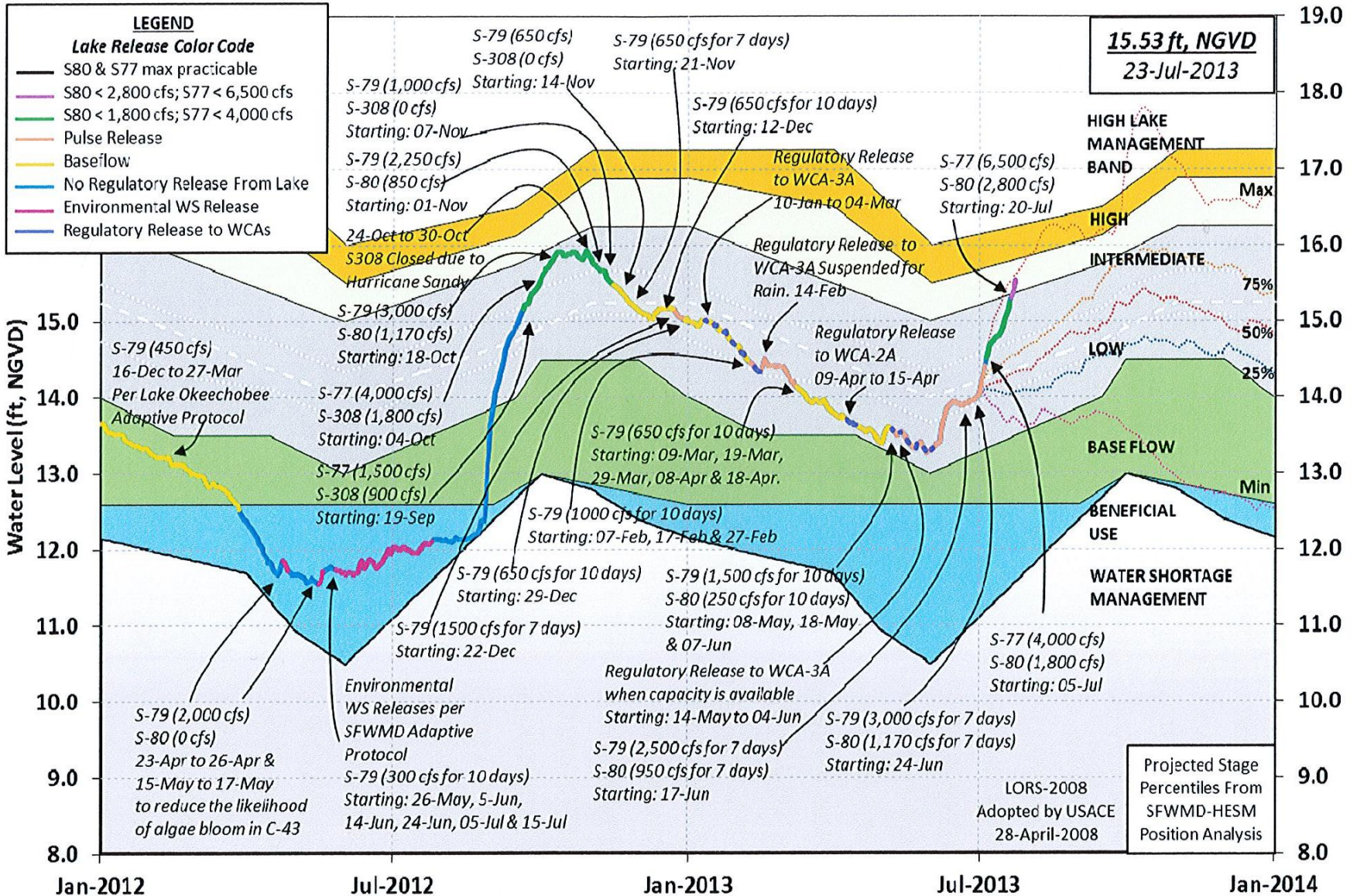
PLUS-Property Values - ***\$588 million Plus (Martin County)***





St. Lucie Estuary Watershed – 517,000 acres

Lake Okeechobee Water Level History and Projected Stages



2008 LORS

Part D: Establish Allowable Lake Okeechobee Releases to Tide (Estuaries)

Note: This operational guidance provides essential supplementary information to be used in conjunction with other supporting documentation including text within the Water Control Plan.

When conducting Base Flow releases, flows can be distributed East and West up to 650 cfs as needed to minimize impacts or provide benefits through S-80 and S-79

Apply Meteorological Forecasts on a Weekly Basis; apply Seasonal and Multi-Seasonal Climate/Hydrologic Outlooks on a Monthly Basis

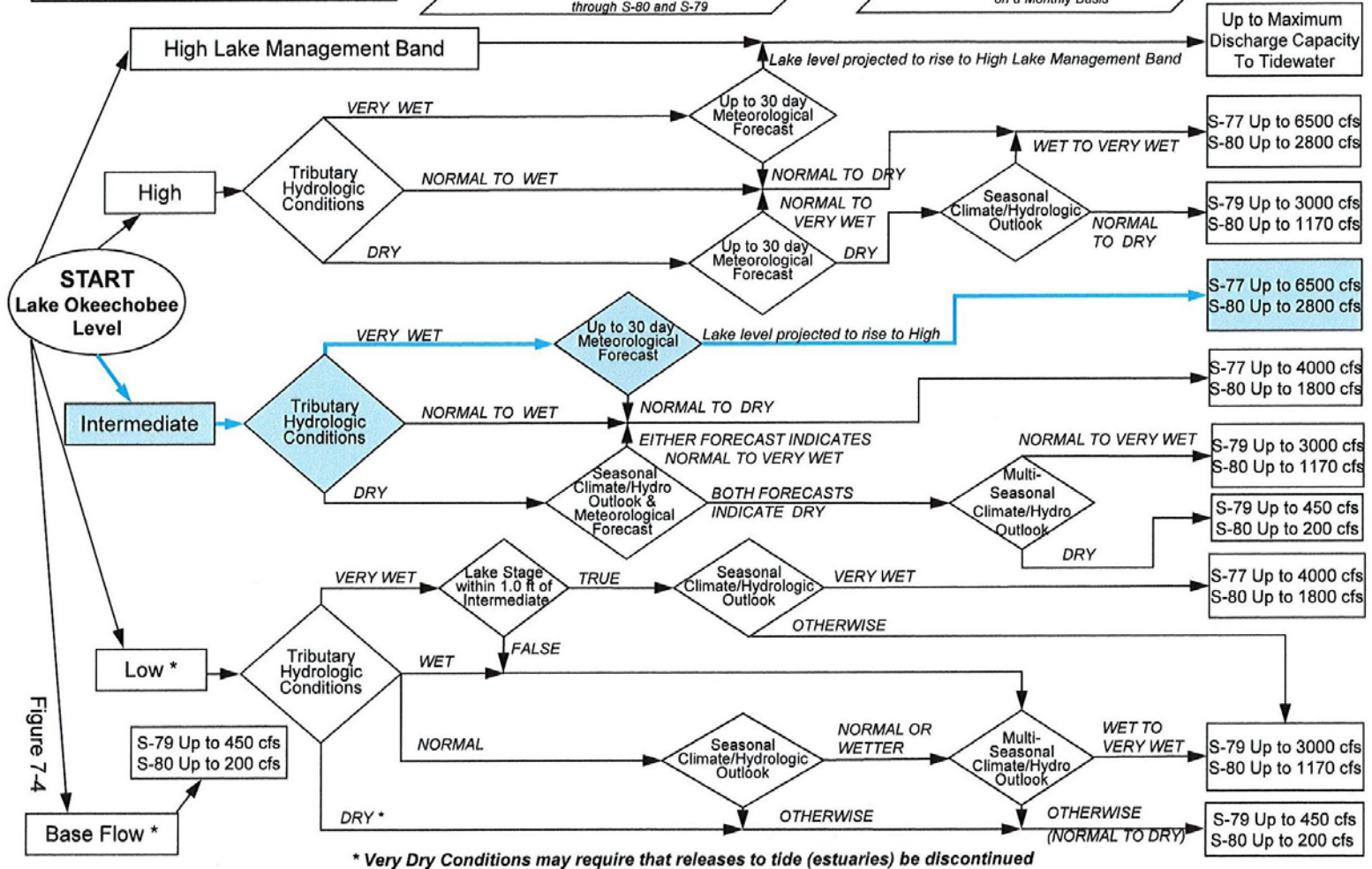
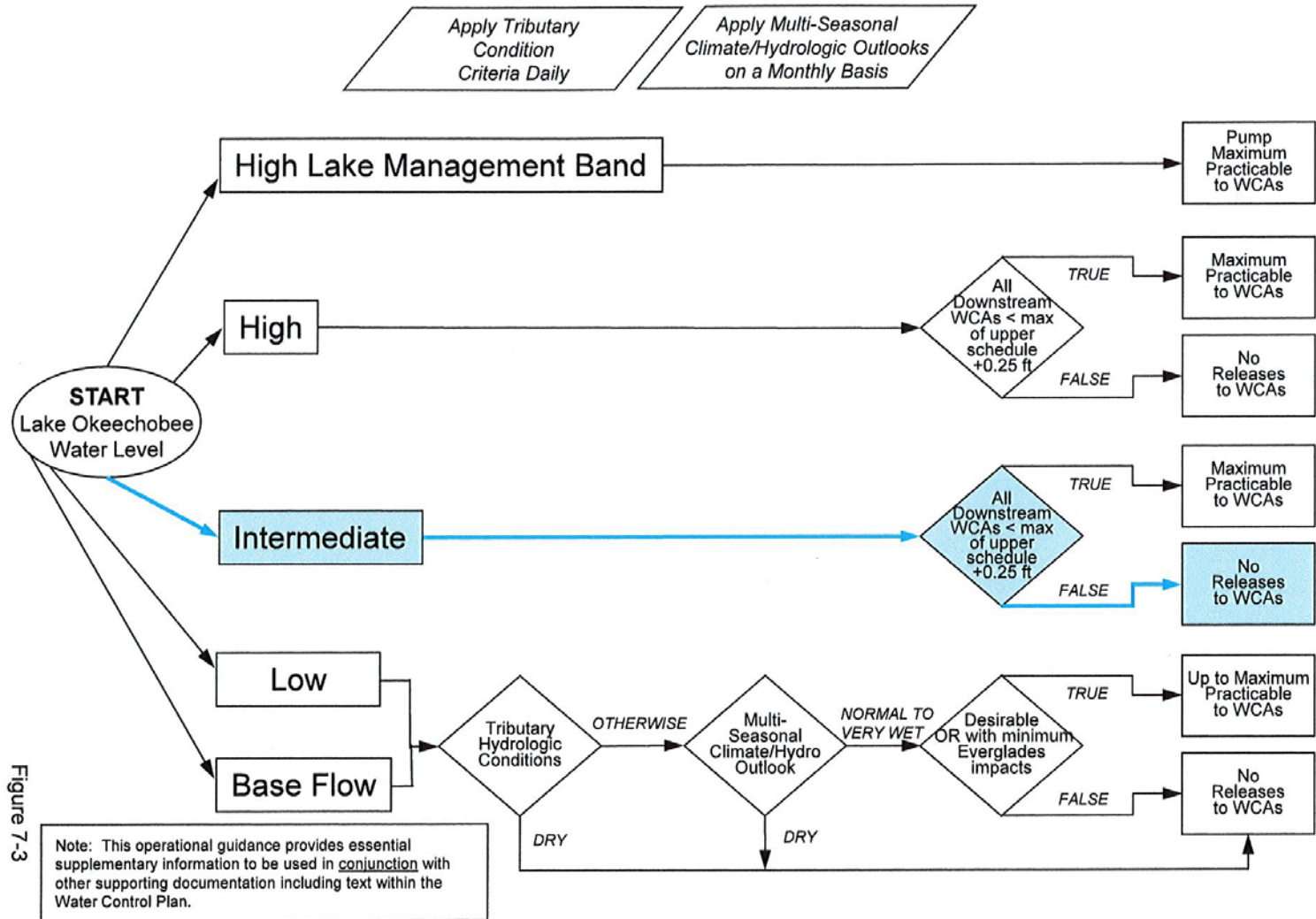


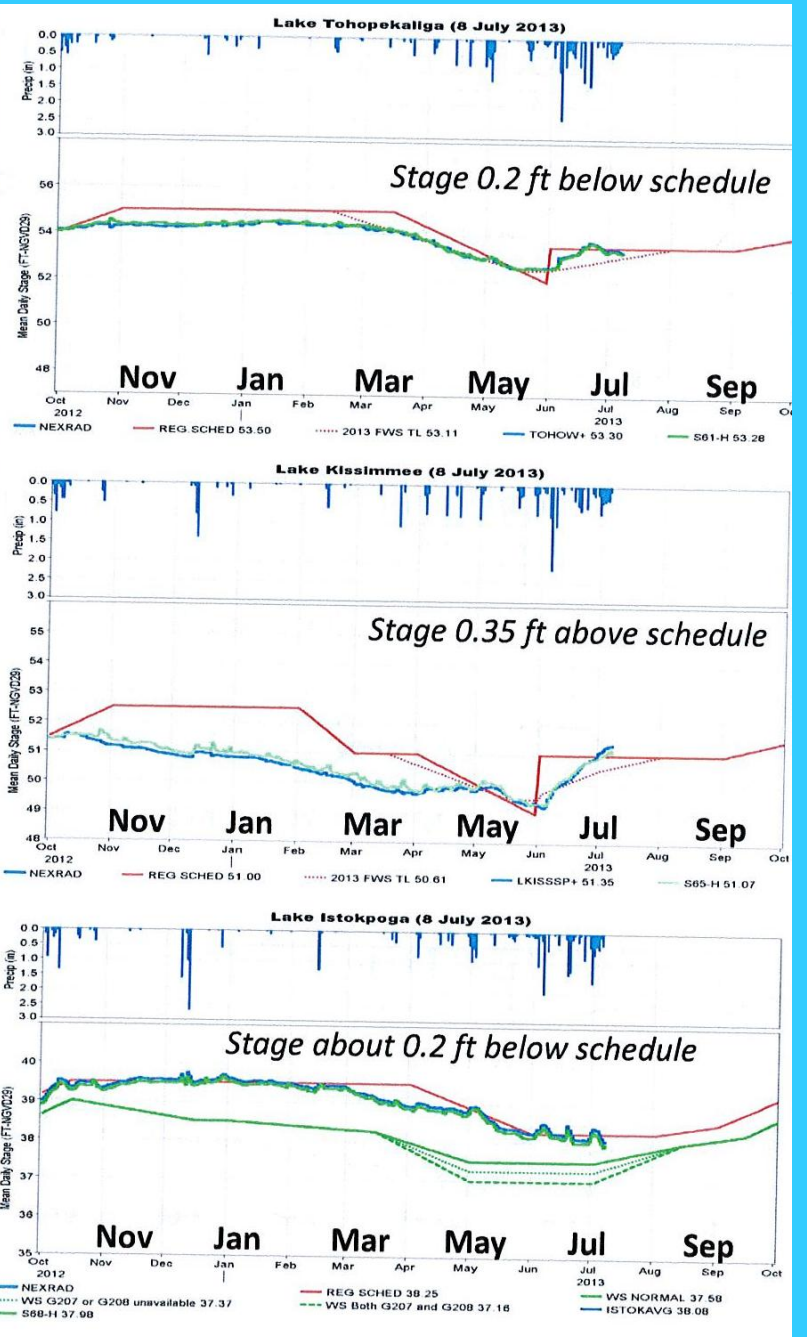
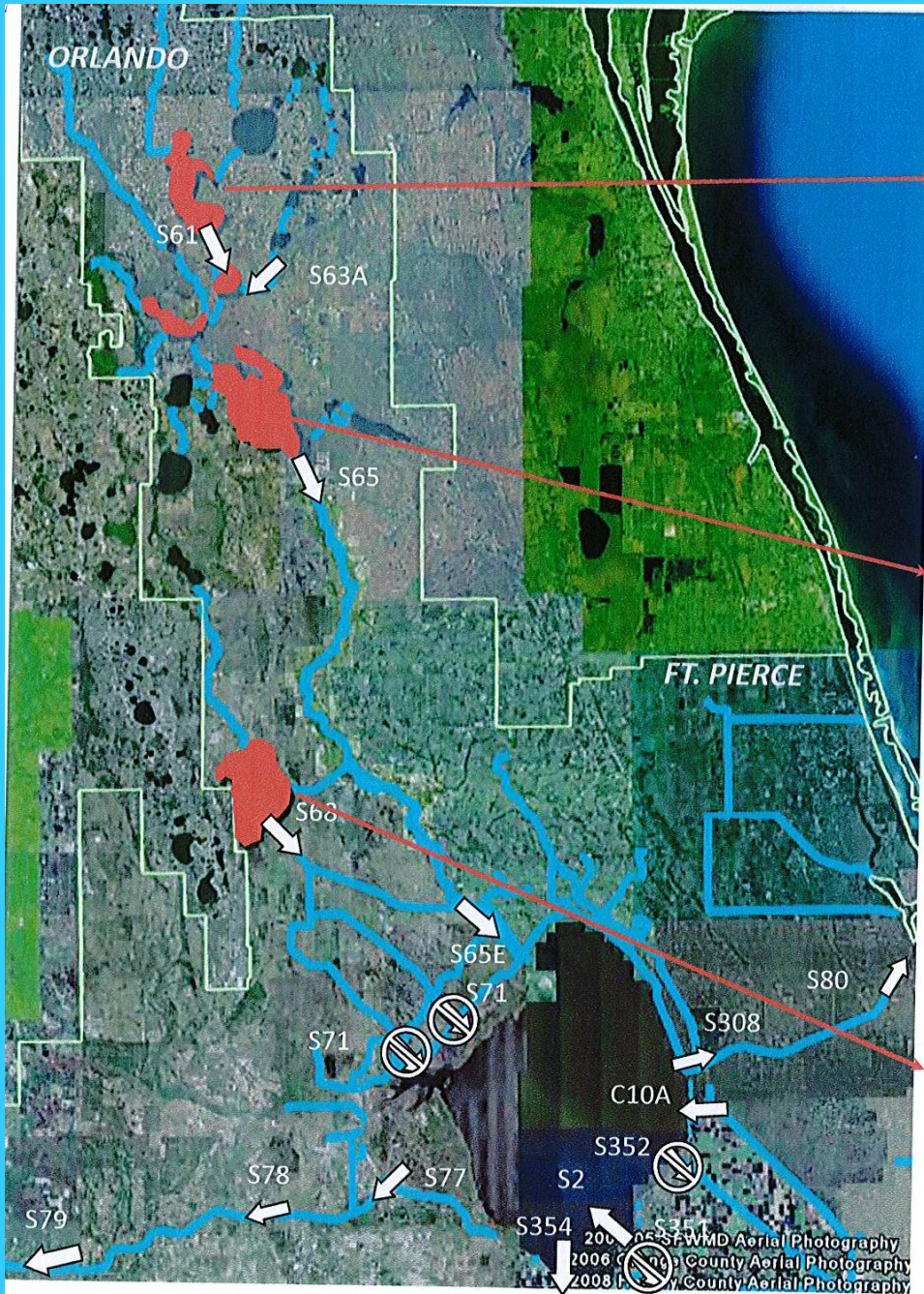
Figure 7-4

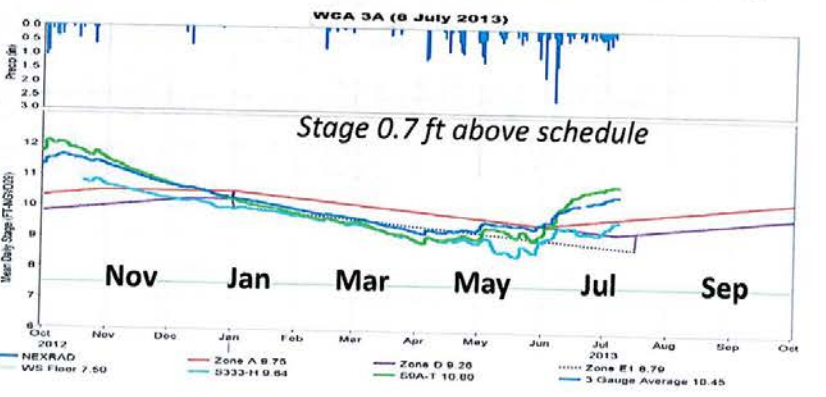
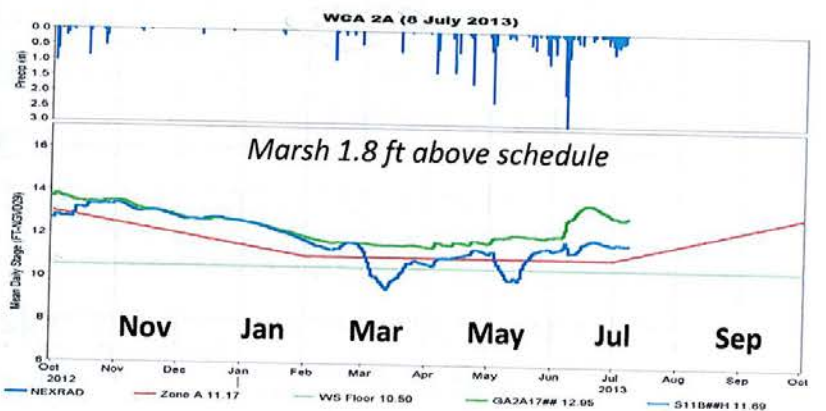
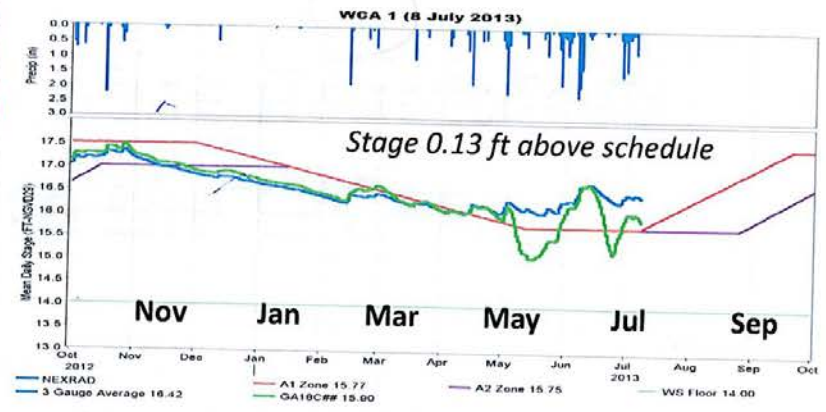
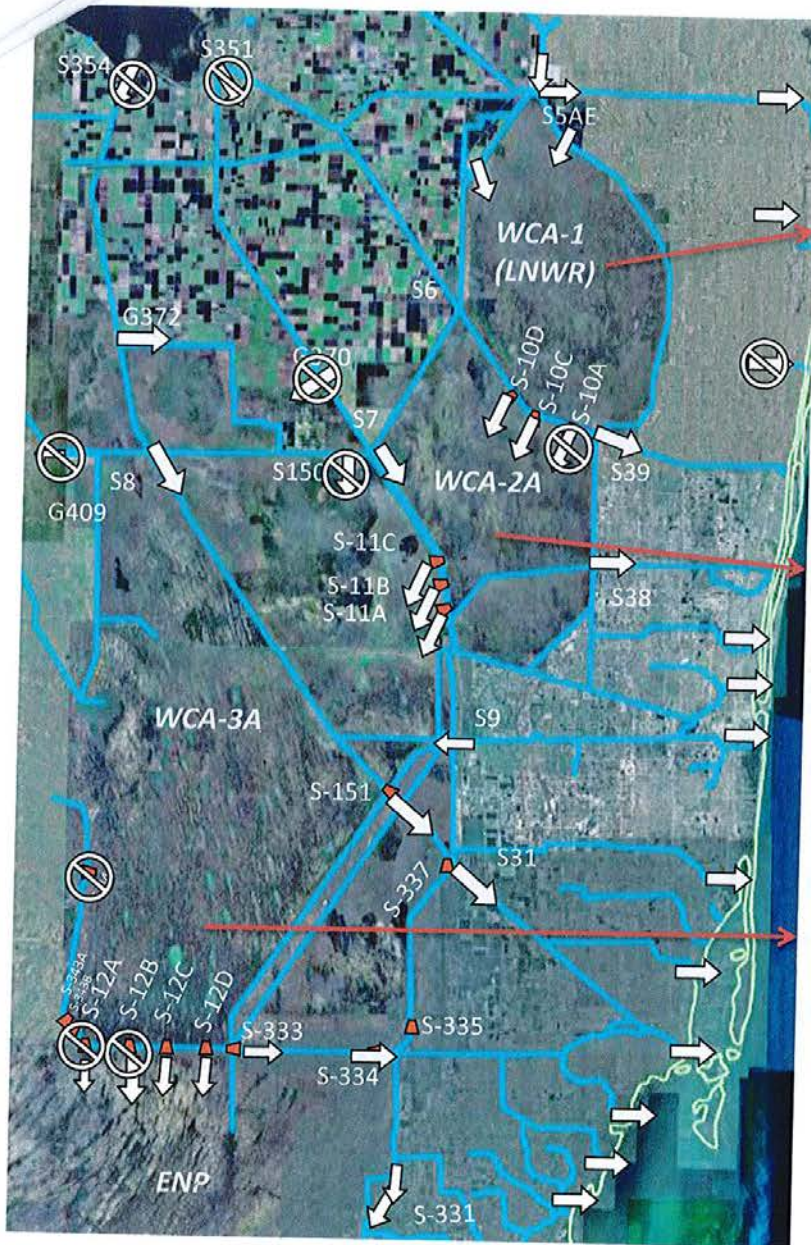
* Very Dry Conditions may require that releases to tide (estuaries) be discontinued

2008 LORS

Part C: Establish Allowable Lake Okeechobee Releases to the Water Conservation Areas

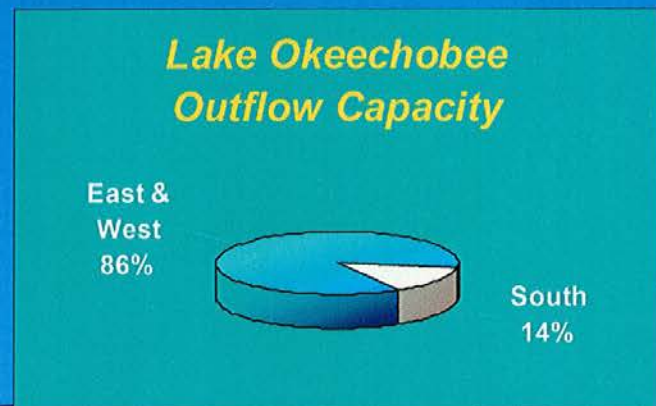
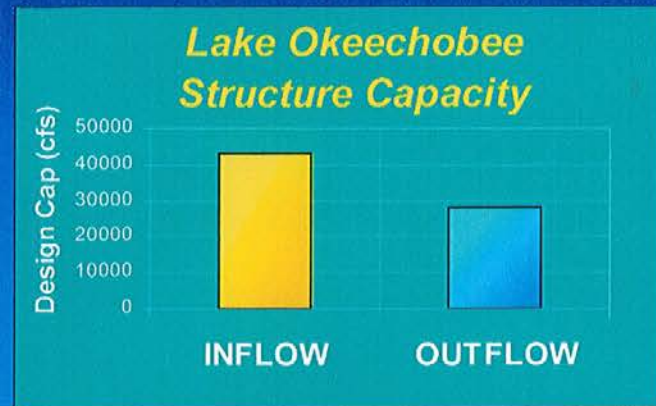






Lake Okeechobee Design Discharge Capacities

- Inflows to the lake frequently exceed total outflow capacity
- Outflow capacity to the St. Lucie & Caloosahatchee far exceeds outflow capacity to the Water Conservation Areas



Now What?

Restoration Plans & Efforts for the Greater Everglades Ecosystem



Kissimmee River

Channalized 1962-1971

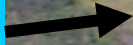
C-38 Canal



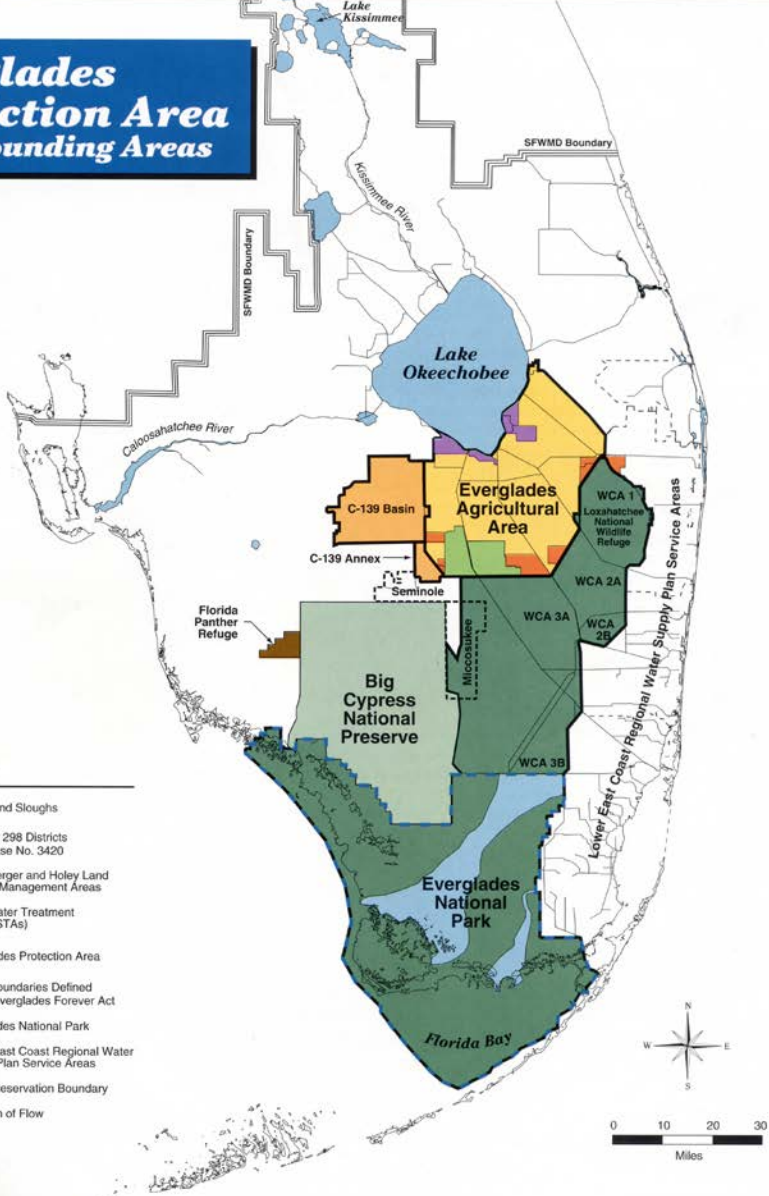
Kissimmee River

Restoration- July 11, 2001

**C-38 Canal
(filled in)**

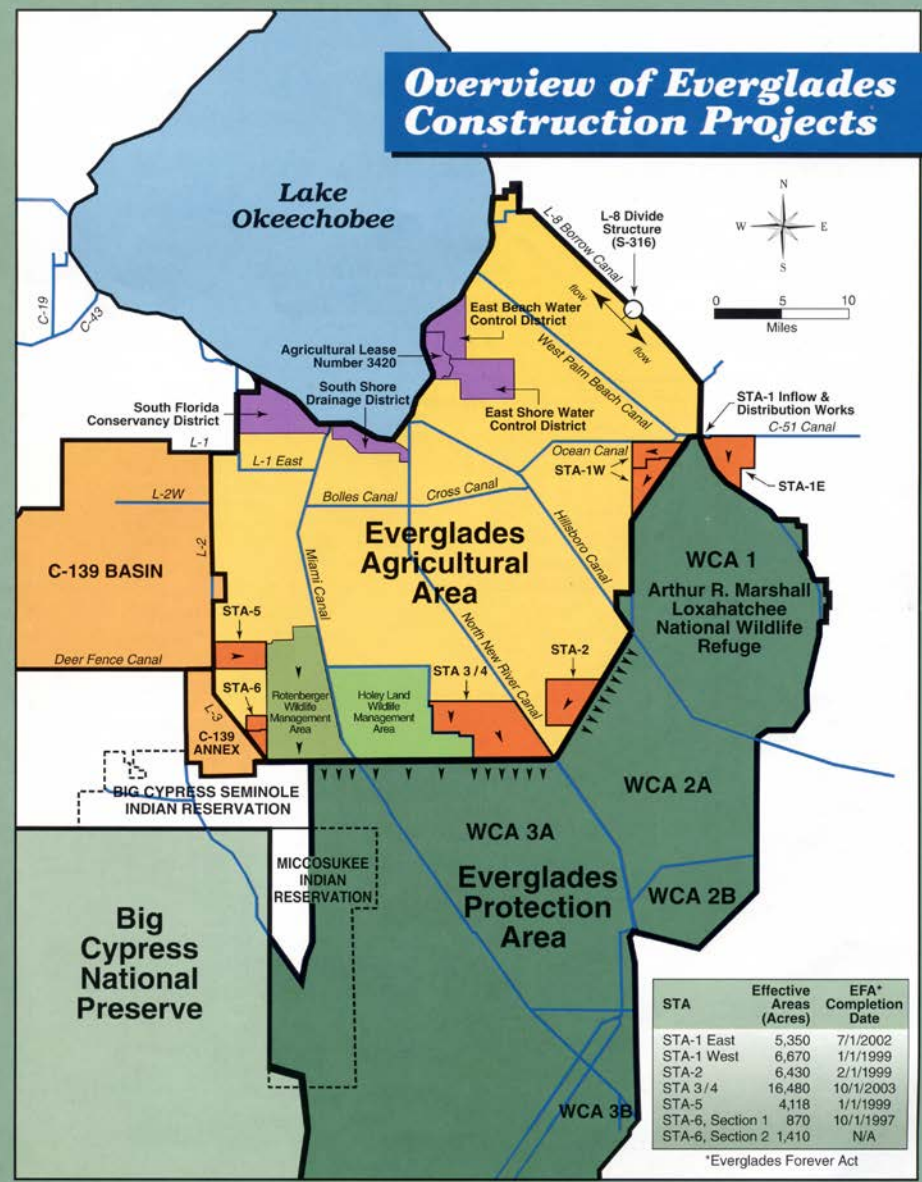


Everglades Protection Area & Surrounding Areas



- LEGEND**
- Lakes and Sloughs
 - Chapter 298 Districts and Lease No. 3420
 - Rotenberger and Holey Land Wildlife Management Areas
 - Stormwater Treatment Areas (STAs)
 - Everglades Protection Area
 - Legal Boundaries Defined by the Everglades Forever Act
 - Everglades National Park
 - Lower East Coast Regional Water Supply Plan Service Areas
 - Indian Reservation Boundary
 - Direction of Flow

Overview of Everglades Construction Projects



STA	Effective Areas (Acres)	EFA* Completion Date
STA-1 East	5,350	7/1/2002
STA-1 West	6,670	1/1/1999
STA-2	6,430	2/1/1999
STA 3/4	16,480	10/1/2003
STA-5	4,118	1/1/1999
STA-6, Section 1	870	10/1/1997
STA-6, Section 2	1,410	N/A

*Everglades Forever Act



1994 Everglades Forever Act – Projects \$ 1.8 Billion

*Rescuing an Endangered Ecosystem:
The Plan to Restore America's
Everglades*



*The Central and Southern Florida Project
Comprehensive Review Study
(The Restudy)*

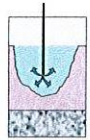
On December 11, 2000, the President signed the Water Resources Development Act (WRDA) of 2000, approving:

Comprehensive Everglades Restoration Plan

A series of environmental and other improvements over 30+ years with an estimated cost of ~~\$7.8 billion~~ (**\$ 14 billion**)

Comprehensive Everglades Restoration Plan

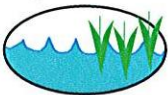
68 Components



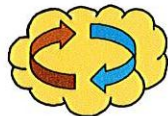
Aquifer Storage & Recovery – 330 Wells



Surface Water Storage Reservoir – 170,000 acres



Stormwater Treatment Areas (STAs) – 36,000 acres



Reuse Wastewater at 2 Regional Plants



Seepage Management

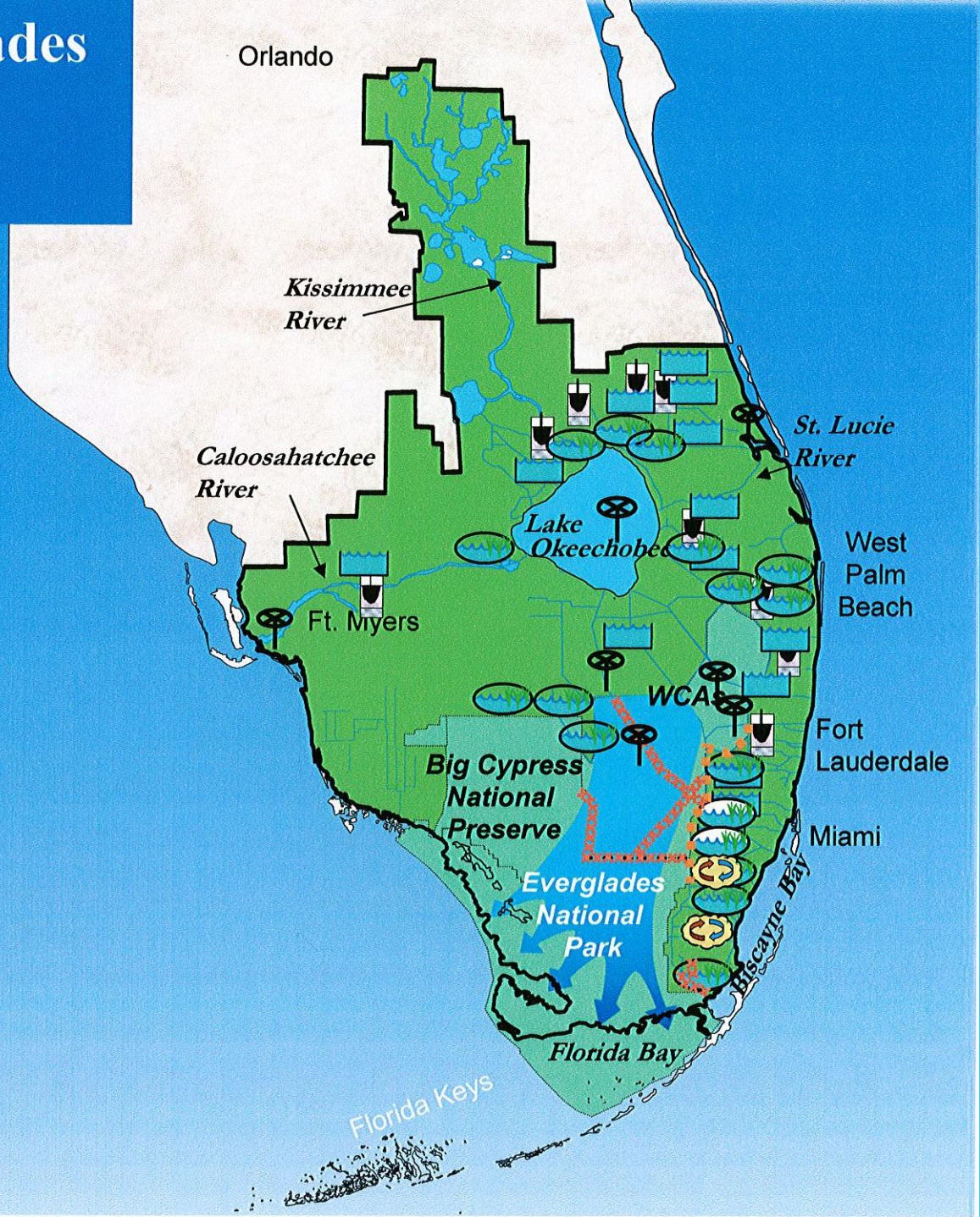


Removing 240 miles of Barriers to Sheetflow



Operational Changes

Florida
Seawater
Society



\$1.75 billion deal aims to protect Everglades

Florida would pay U.S. Sugar to go out of business and get firm's land.

BRAND STODOFF
THE ASSOCIATED PRESS
WELLINGTON, Fla. — U.S. Sugar Corp., the nation's largest producer of cane sugar, would go out of business in a \$1.75 billion deal to sell its nearly 300 square miles of land to Florida for Everglades restoration, the company and the state's governor said Tuesday.



U.S. Sugar Corp. CEO Robert Budge, left, walks with Florida Gov. Charlie Crist, and South Florida Water Management District Board Vice Chair Shannon Estévez at a news conference Tuesday.

Under the deal, announced at a news conference with Republican Gov. Charlie Crist and company representatives, the state would buy U.S. Sugar's holdings in the Everglades south of Lake Okeechobee, the virtual heart of the ecosystem.

Negotiations are still ongoing, but officials hope to sign an agreement by September. Once the deal is in place, U.S. Sugar would be allowed to farm the 187,000 acres of land for six more years before closing.

Crist said the deal is "as monumental as the creation of our nation's first national park, Yellowstone."

"This represents, if we're successful, and I believe we will be, the largest conservation purchase in the history of the state of Florida," Crist said.

The land would be used to help restore a more natural flow to the wetlands that has been stymied for years by agriculture and development. Farming in the region has long been considered a hindrance to restoration.

The deal wouldn't end sugar production in the Everglades. At least 250,000 acres of land used by other companies would remain operational.

U.S. Sugar CEO Robert Baker called the deal "monumental" but also was saddened to see the demise of his company, which

employs 1,200 people.

"We built a company that right now is the pillar of the agriculture community in Florida," Baker said. "Because of that, I stand here today with mixed feelings. On the other hand, I'm excited about what we're doing here today."



He said the company's decision to sell had nothing to do with profits, though the entire American sugar industry has struggled with stiff competition from cheap foreign imports.

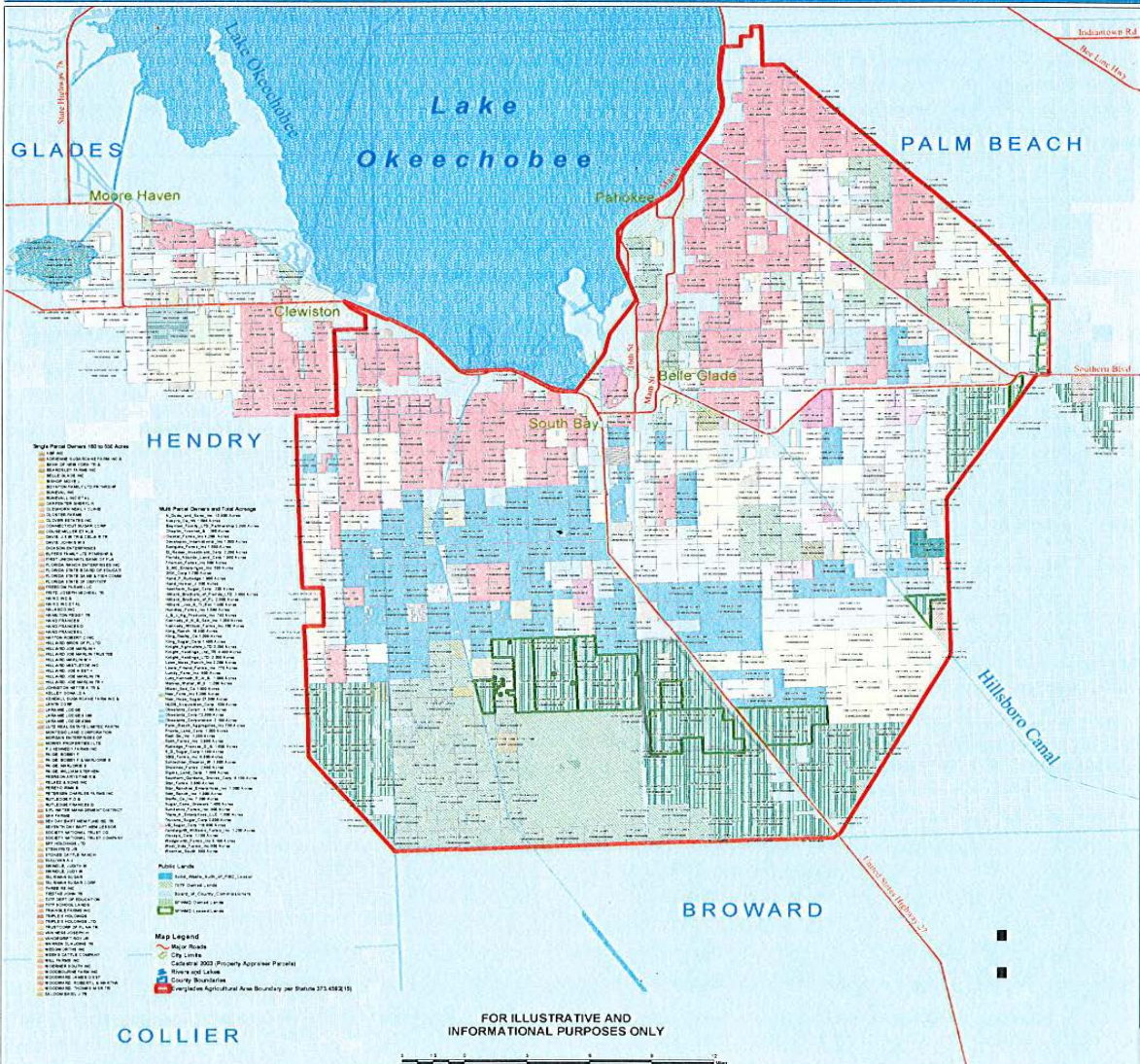
U.S. Sugar has also in recent years been facing hefty bills to clean up its water before it enters the Everglades ecosystem.

Baker acknowledged that the sugar industry's presence in the Everglades has led to years of "putting faces" as the state works to restore the once famed River of Grass.

David Guest, an attorney who has fought over Everglades restoration for years and is a longtime foe of U.S. Sugar, called Tuesday's announcement a victory.

"In the old days, you didn't just beat your opponent, you also ate them," Guest said. "Today, we're eating U.S. Sugar."

Aggregate Ownership Greater than 160 Acres Located Within the Everglades Agricultural Area Based on 2003 Department of Revenue County Tax Parcel Data



June 24, 2008

187,000 acres

US Sugar Corp. farmlands
 (red color on map)



Information from:
 Florida Department of Revenue - 2003 County Tax Parcel Data
 Division of State Lands - GIS Land Records Mapping System
 Division of State Lands - Board of Trustees Land Data System
 GIS Geographic Information Systems - Enterprise Data
 SWFWMD GIS Ownership and Lease Data

Data and information about individual parcels depicted on this map can be found at the QIS Web Map:
[HTTP://GISWEB.DEPR.STATE.FL.US/DSL/FLORIDA/FLORIDAPRO/](http://gisweb.depr.state.fl.us/dsl/FLORIDA/FLORIDAPRO/)

NOTICE
 This map depicts ownership of land areas greater than 160 acres located within the Everglades Agricultural Area. Ownership and acreage calculations are based primarily on 2003 county tax parcel data provided by the Florida Department of Revenue.

Current ownership may differ from the 2003 tax data that this map is based on.

Acreage calculations for aggregate ownership areas of over 1,000 acres are rounded down to the nearest 100 acres.

Prepared by Timothy Patterson, GIS Coordinator
 March 9, 2006
 Florida Department of Environmental Protection
 Division of State Lands
 Bureau of Survey and Mapping
 GIS and Land Records Mapping Section
 2nd 200 Can Building
 3800 Governmental Blvd.
 Tallahassee, FL 32399
 Phone: 904.249-2818

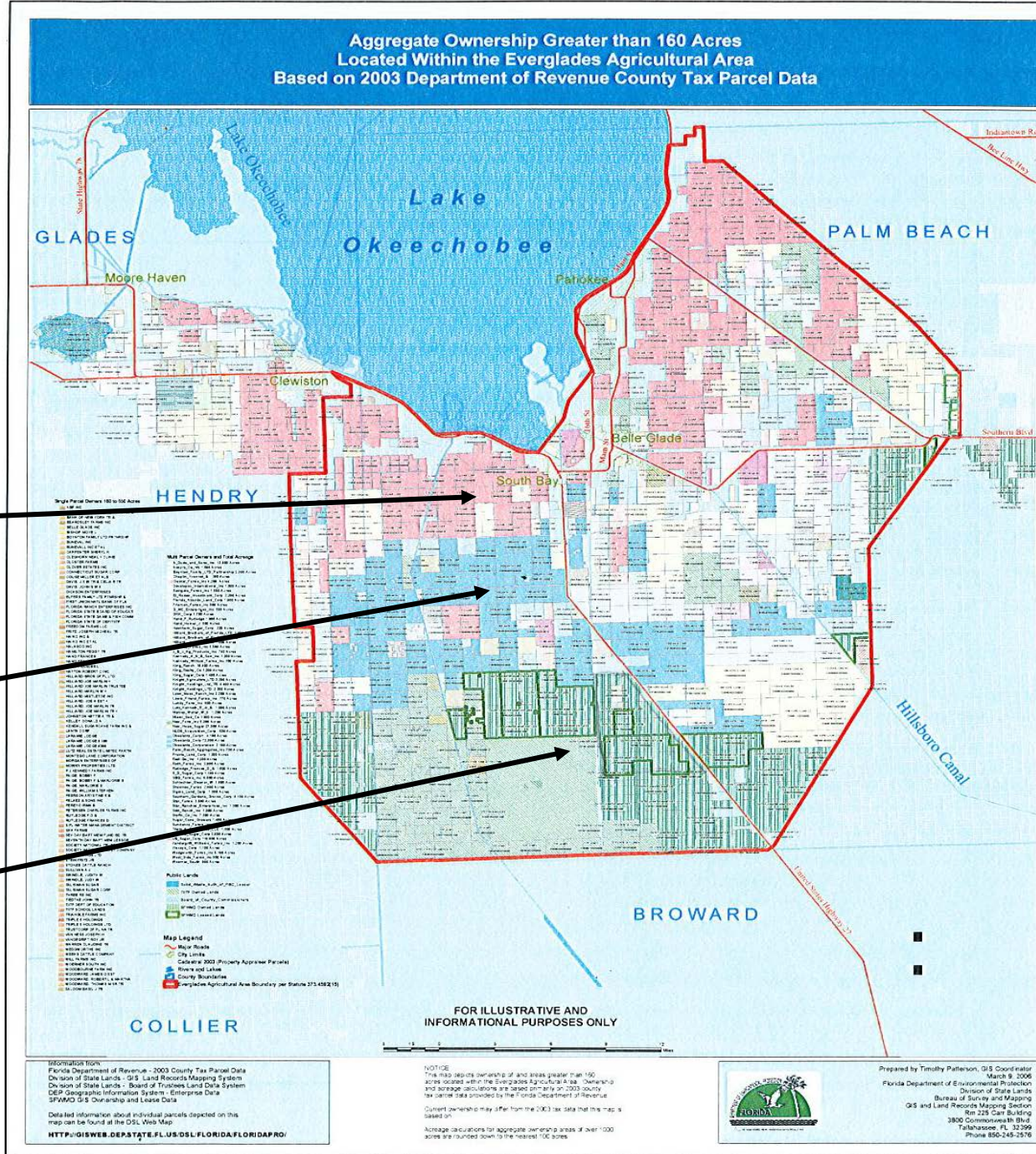
187,000 acres US Sugar Corp. farmlands (red color on map)

Build the "Missing Link" between Lake Okeechobee and the Everglades

US Sugar
23,000 acres

Florida Crystals
32,000 acres

State-Public
76,000 acres





Governor Shares Proposal to Achieve Everglades Restoration Vision in Tough Economic Climate - APRIL 1, 2009

TALLAHASSEE – After gathering key input from the public, legislators and South Florida’s communities and in recognition of the nation’s current economic climate, Governor Charlie Crist today shared details of a revised strategy to acquire land for Everglades restoration from the United States Sugar Corporation. The approach incorporates today’s fiscal realities by saving \$800 million at closing, providing ready access to strategically located acreage for restoration projects and preserving thousands of jobs.

“By taking this fiscally conservative approach, we can secure this once-in-a-lifetime opportunity to restore and revive the Everglades despite continued economic challenges,” said Governor Crist. “The proposal represents a balance for both the environment and the economy by allowing us to acquire hundreds of square miles of prime property in affordable steps.”

Under the proposal, the district would initially invest approximately **\$530 million for 72,500 acres of property** south of Lake Okeechobee – a land mass nearly twice the size of Orlando. Approximately 32,000 acres of that land, currently in citrus production, would be available to the district within a year after closing. The United States Sugar Corporation would lease back the other approximately 40,500 acres of sugar cane land for \$150 per acre per year for at least seven years. **The district would have an option to purchase the remaining 107,500 acres of United States Sugar Corporation property for restoration within the first 10 years after closing.**

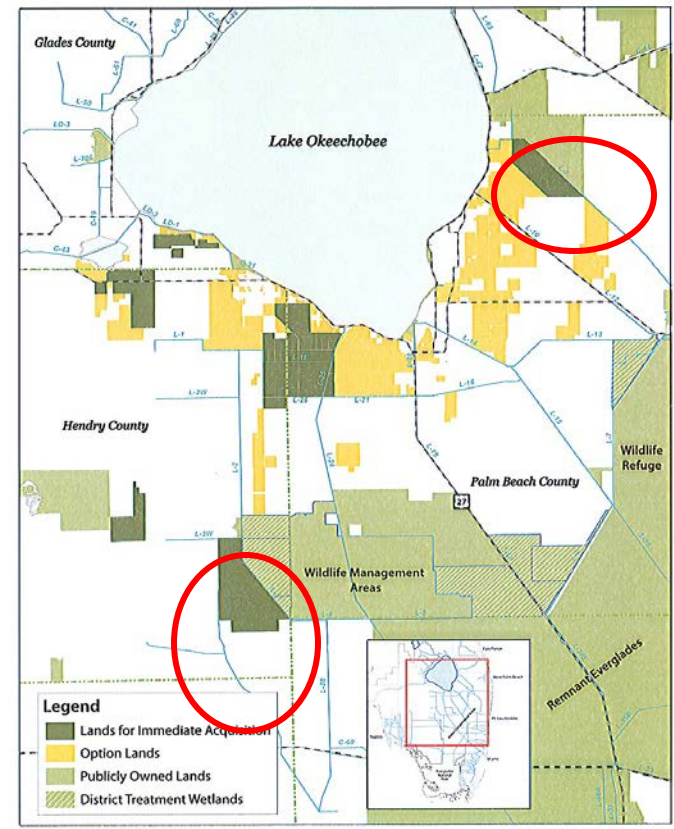
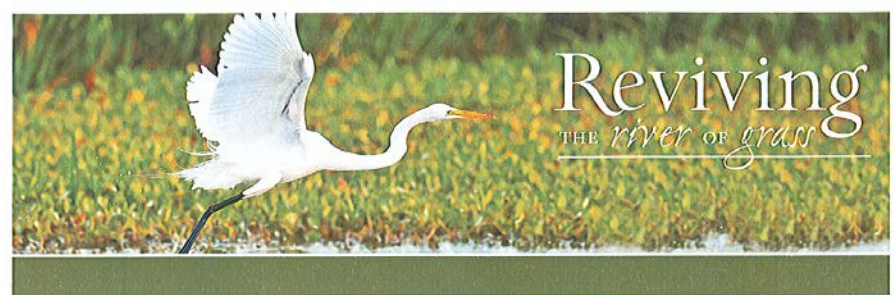
Highlights of the proposed acquisition terms include:

- Reducing the immediate public investment by 60 percent, or \$800 million, in addition to **reducing annual debt service payments by an estimated \$65 million.**
- Tripling the land lease rate to **\$150 an acre per year to generate a minimum of \$40 million in revenue** and avoid at least \$11 million in land management costs.
- Potentially freeing up revenue over the coming years for “shovel-ready” restoration projects that could create jobs and deliver environmental benefits to the Everglades Protection Area and Florida’s coastal estuaries.
- Sustaining regional agriculture.
- Keeping 1,700 direct jobs intact and protecting 10,000 indirect jobs for at least another decade with the continued operation of the United States Sugar Corporation’s mill and refinery.

Environmental goals of the acquisition include:

- Increasing the availability of water storage, significantly reducing the potential for harmful discharges from Lake Okeechobee to the St. Lucie and Caloosahatchee rivers and estuaries when lake levels are high.
- Delivering cleaner water to the Everglades during dry times and greater water storage to protect the natural system during wet years.
- Preventing tons of phosphorus from entering the Everglades every year.
- Significantly reducing the need for “back-pumping” water into Lake Okeechobee from the Everglades Agricultural Area.
- Relieving some pressures on the Herbert Hoover Dike while the federal government undertakes repairs by providing alternative water storage alternatives.
- Improved flexibility in managing Lake Okeechobee levels in a more environmentally friendly way.

www.sfwmd.gov/riverofgrass



US Sugar Corp purchase reduced- 73,000 ac \$530 M in April 2009
Then to 27,000 acres for \$197 M - October 2010- 10-year option



CENTRAL EVERGLADES PLANNING PROJECT



Restoring the Heart of the Everglades

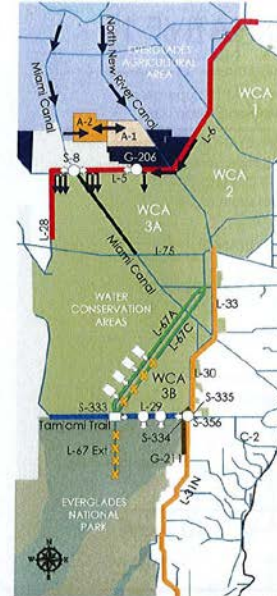
Central Everglades Planning Project (CEPP)

Proposed Final Array of Alternatives

Kim Taplin, Chief
Central Everglades Branch
U.S. Army Corps of Engineers
Jacksonville District

December 7, 2012

•CENTRAL EVERGLADES



PROPOSED ALTERNATIVE 3

STORAGE AND TREATMENT

- Construct A-2 FEB and integrate with A-1 FEB operations
- Lake Okeechobee operation refinements within LORS

DISTRIBUTION/CONVEYANCE

- Diversion of L-6 flows and L-5 canal improvements
- Spreader canal: ~3 miles west of S-8 (3,000 cfs), ~3 miles east of S-8 (800 cfs) and ~1.5 miles east of G-206 (400 cfs)
- Backfill Miami Canal from S-8 to I-75

DISTRIBUTION/CONVEYANCE

- Increase S-333 capacity to 3,000 cfs
- Four 500 cfs gated structures in L-67A, 0.5 mile spoil removal west of L-67A north and south of structures
- 6,000-ft gaps in L-67C levee at each structure
- Two 500 cfs pumps out of WCA-3B at existing agricultural canals with improvements to agricultural canals in WCA-3B
- Tamiami Trail western 2.6 mile bridge and L-29 canal max stage at 9.7 ft (FUTURE WORK BY OTHERS)
- Degrade entire L-67 extension levee

SEEPAGE MANAGEMENT

- Increase S-356 to 1,000 cfs
- Partial depth seepage barrier south of Tamiami Trail 5 miles along L-31N
- Full depth penetrating seepage barrier from S-335 to S-334
- G-211 operational refinements and use coastal canals to convey seepage



35

RESTORING THE HEART OF THE EVERGLADES

CENTRAL EVERGLADES

WHAT'S NEXT? CENTRAL EVERGLADES

- Reduce undesirable discharges to east and west coast estuaries
- Deliver "new" sources of clean water to the Central Everglades and Everglades National Park
- To restore habitat in the Central Everglades and Everglades National Park, focusing on the "River of Grass"

2

RESTORING THE HEART OF THE EVERGLADES

CENTRAL EVERGLADES



PROPOSED ALTERNATIVE 4

STORAGE AND TREATMENT

- Construct A-2 FEB and integrate with A-1 FEB operations
- Lake Okeechobee operation refinements within LORS

DISTRIBUTION/CONVEYANCE

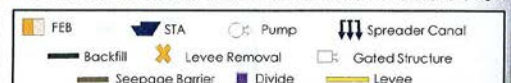
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DISTRIBUTION/CONVEYANCE

- Increase S-333 capacity to 3,000 cfs
- Two 500 cfs gated structures in L-67A, 0.5 mile spoil removal west of L-67A north and south of structures
- Include levee in WCA 3B
- Degrade L-67C levee in Blue Shanty flowway
- One 500 cfs gated structure north of Blue Shanty levee and 6,000-ft gap in L-67C levee
- Degrade L-29 levee in Blue Shanty flowway, divide structure east of Blue Shanty levee at terminus of western bridge
- Tamiami Trail western 2.6 mile bridge and L-29 canal max stage at 9.7 ft (FUTURE WORK BY OTHERS)
- Degrade entire L-67 extension levee

SEEPAGE MANAGEMENT

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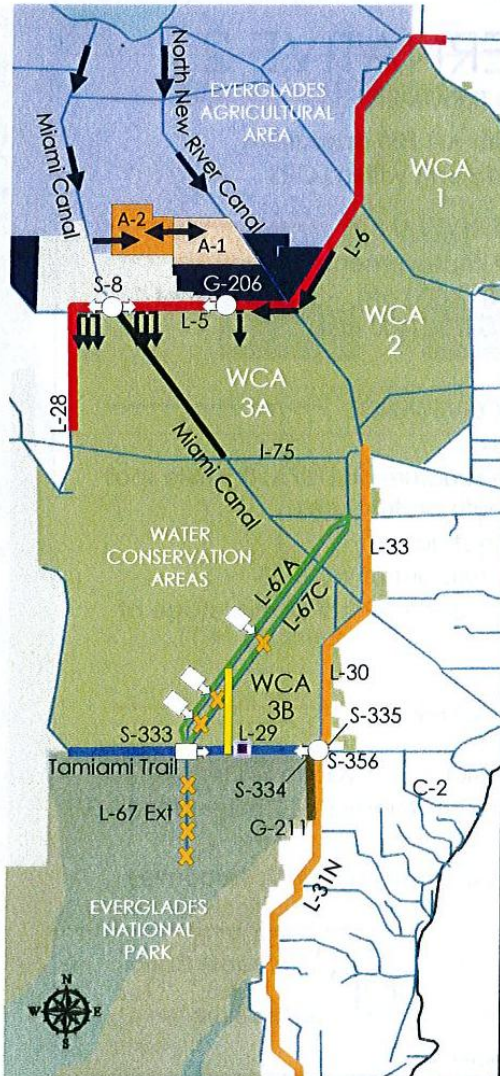
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RESTORING THE HEART OF THE EVERGLADES

CENTRAL EVERGLADES



Central Everglades Planning Project – Nov. 2011 to Apr. 2013 Including “Key Projects” Mandated State WQ Improvements



PROPOSED ALTERNATIVE 4

STORAGE AND TREATMENT

- Construct A-2 FEB and integrate with A-1 FEB operations
- Lake Okeechobee operation refinements within LORS

DISTRIBUTION/CONVEYANCE

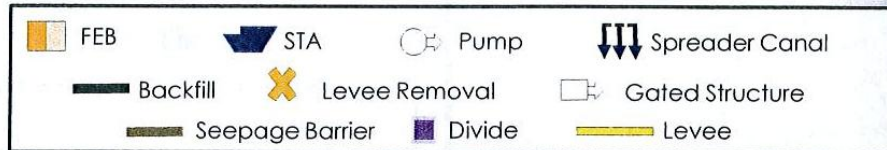
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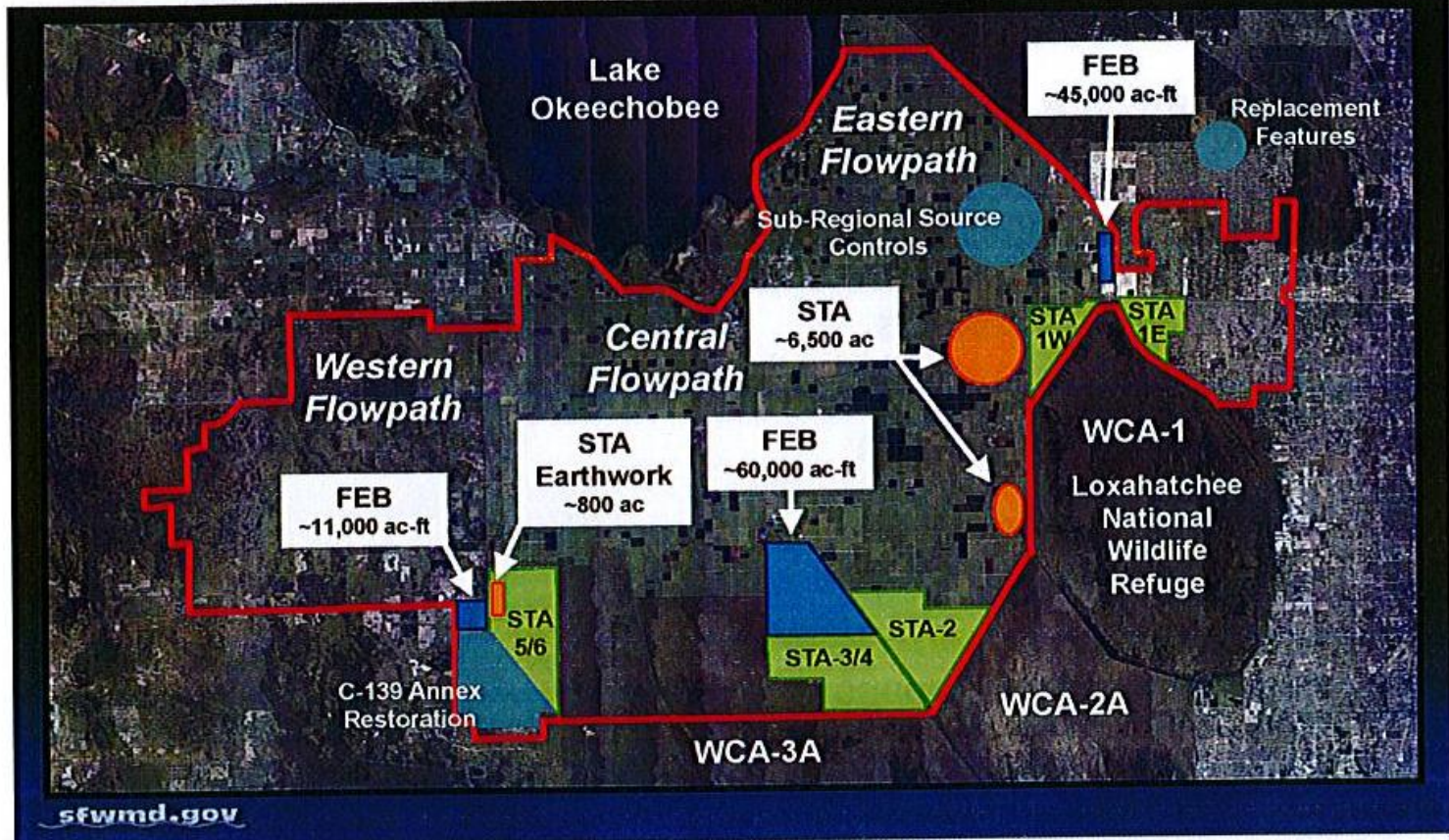
Principals' Meeting October 6, 2011



Florida

Governor- Rick Scott
SFWMD – Melissa Meeker

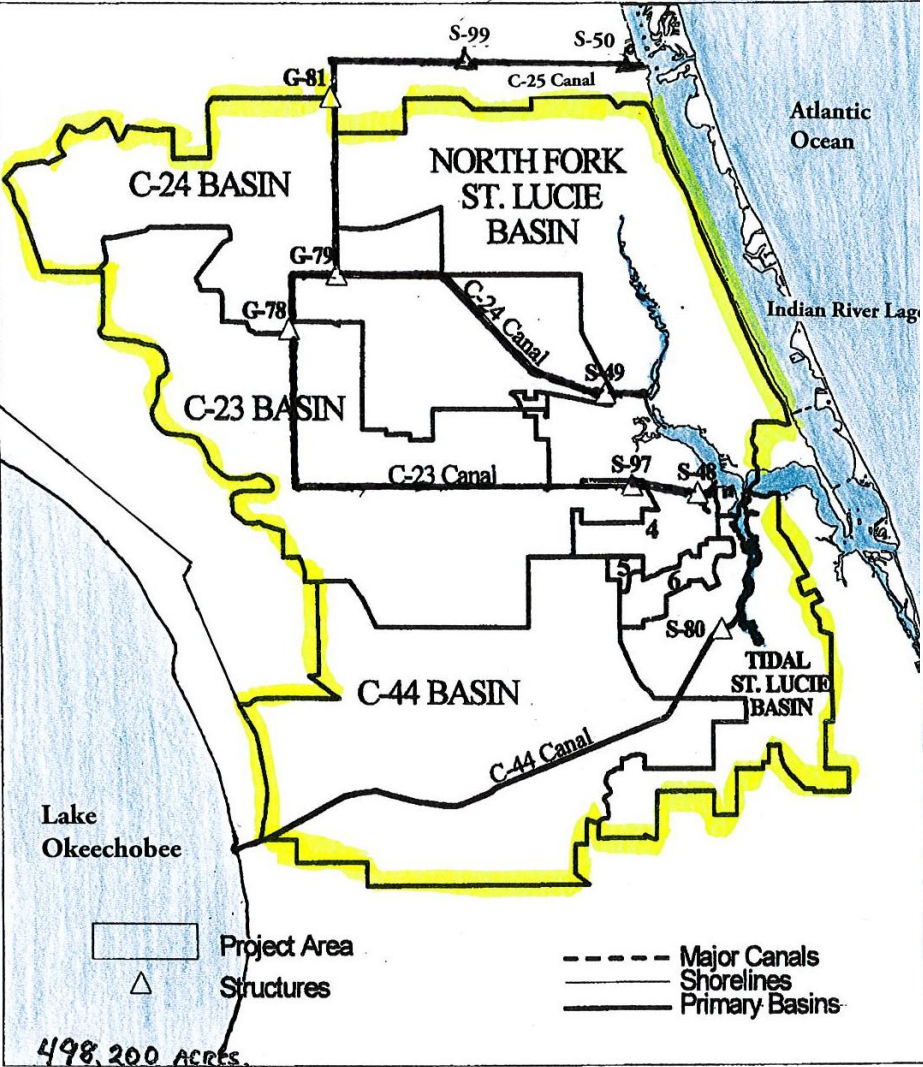
Restoration Strategies – Key Projects



“Restoration Strategies” – Mandated Water Quality Treatment projects - \$ 880 Million – State of Florida – (CS/HB 7065-May 28, 2013)

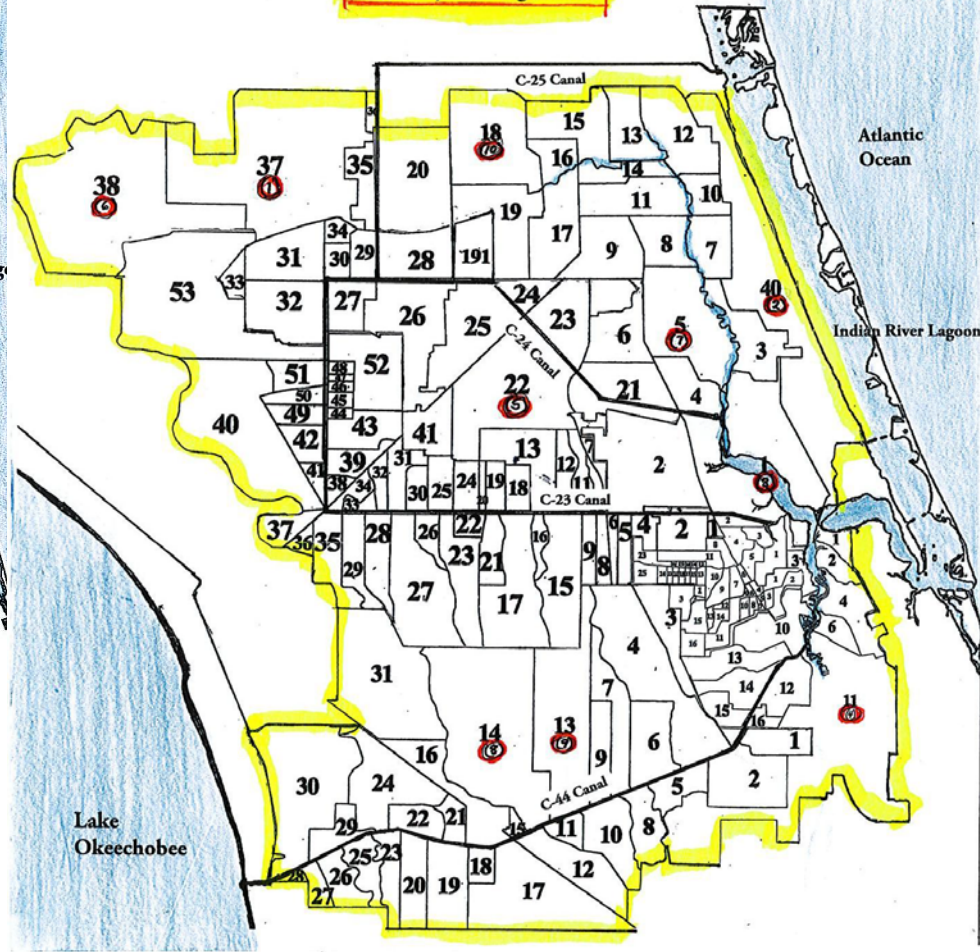
St. Lucie River Estuary Watershed

Primary Drainage Basins



St. Lucie River Estuary Watershed

Secondary Drainage Basins



8 Basins – 186 Secondary Basins

St. Lucie River Estuary Watershed



Indian River Lagoon-South Plan

12,000 acres above ground Storage Reservoirs

9,000 acres STA manmade wetlands

90,000 acres Natural Area Storage

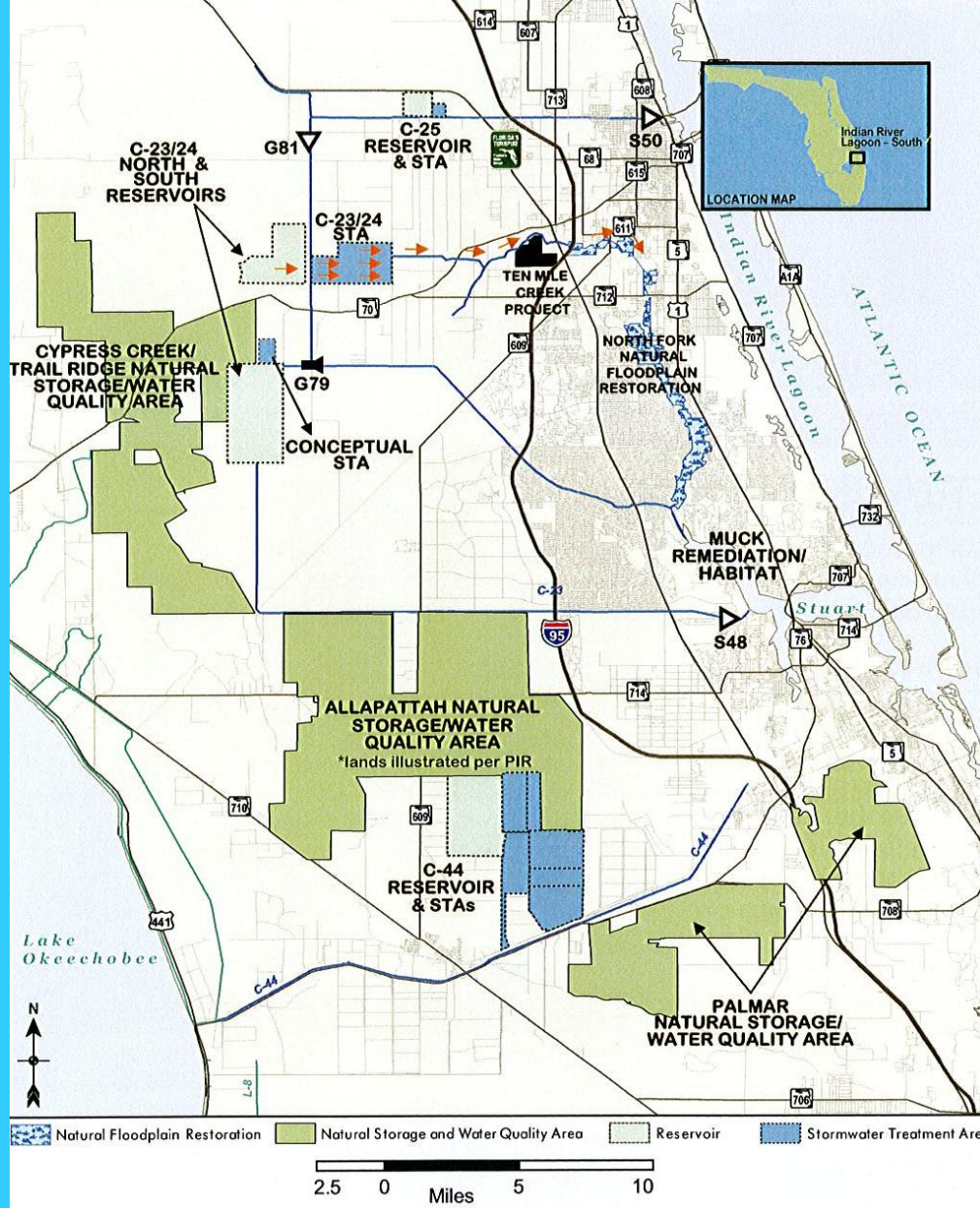
2,650 acres benthic habitat created- 922 acres submerge aquatic habitat restored

7.9 million cubic yards of muck removed

889 acres of restored oyster habitat

41% reduction in Phosphorus

26% reduction in Nitrogen



C-44 BASIN COMPONENTS

- C-44 – Reservoir
- C-44 – Stormwater Treatment Area
- Palmar Complex – Natural Storage and Water Quality Area

C-23/24 BASIN COMPONENTS

- C-23/24 – North and South Reservoirs
- C-23/24 – Stormwater Treatment Area
- Allapattah, Cypress Creek and Trail Ridge Complex – Natural Storage and Water Quality Area

C-25, NORTH FORK AND SOUTH FORK BASIN COMPONENTS

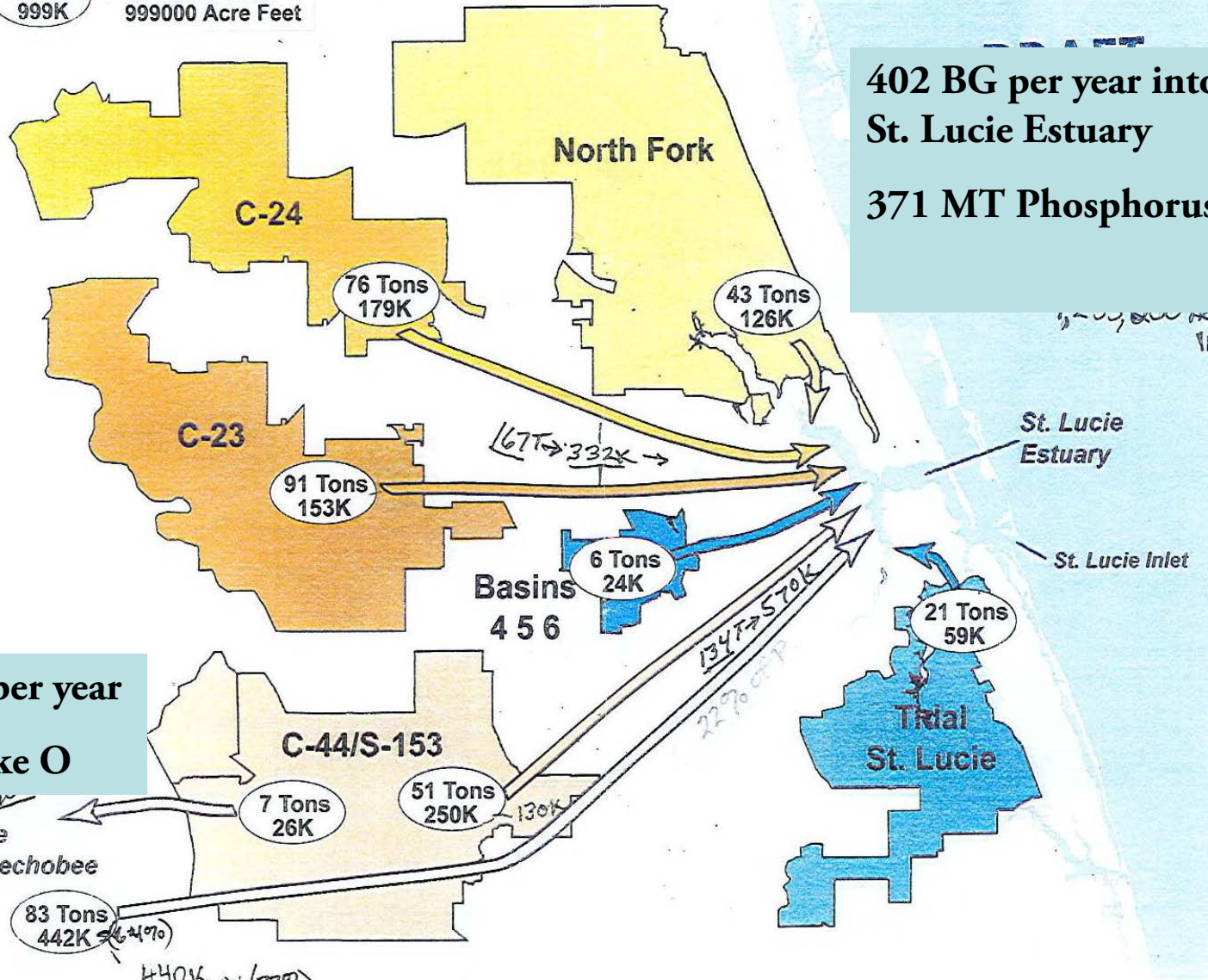
- C-25 – Reservoir
- C-25 – Stormwater Treatment Area
- North Fork Natural Floodplain Restoration Muck Remediation and Artificial Habitat



Part of Comprehensive Everglades Restoration Plan

99 Tons = 99 Metric Tons
999K = 999000 Acre Feet

402 BG per year into
St. Lucie Estuary
371 MT Phosphorus



144 BG per year
From Lake O

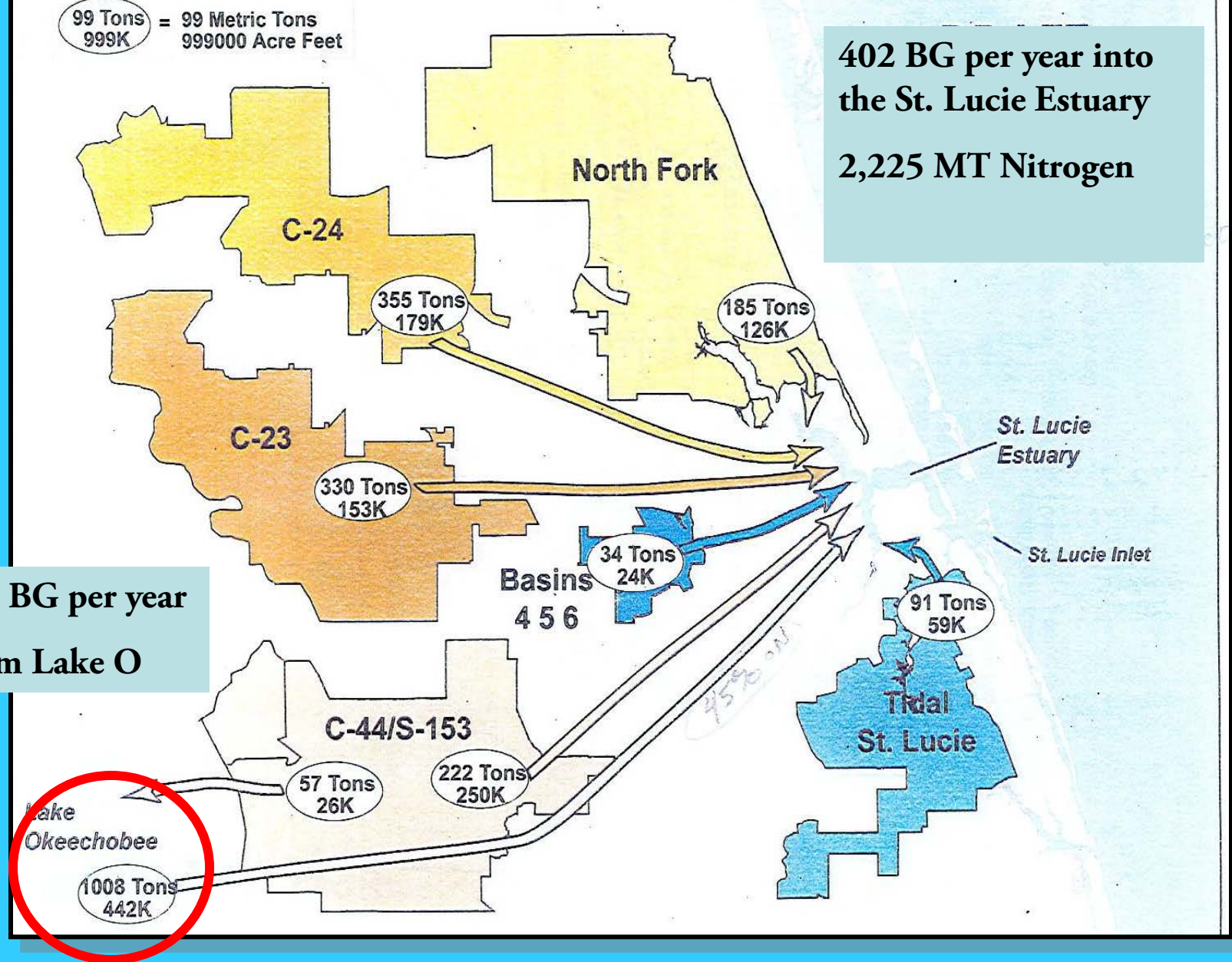


Annual Phosphorus Loads by Basin to the St. Lucie Estuary
Period of Record 1995-2005 SFWMD

99 Tons = 99 Metric Tons
999K = 999,000 Acre Feet

402 BG per year into
the St. Lucie Estuary
2,225 MT Nitrogen

144 BG per year
From Lake O



Annual Nitrogen Loads by Basin to the St. Lucie Estuary

Period of Record 1995-2005 SFWMD

DRAFT

BASIN MANAGEMENT ACTION PLAN

for the Implementation of Total Maximum Daily Loads for Nutrients and Dissolved Oxygen Adopted by the Florida Department of Environmental Protection

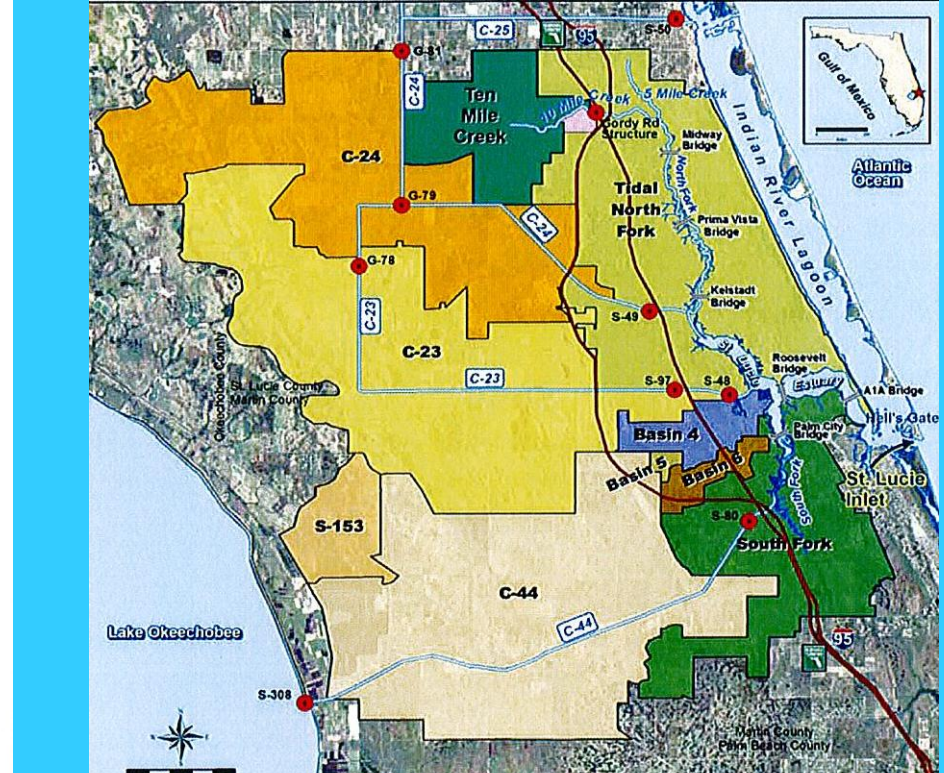
in the

St. Lucie River and Estuary Basin

developed by the
St. Lucie River and Estuary Basin Technical Stakeholders

in cooperation with the
Florida Department of Environmental Protection
Division of Environmental Assessment and Restoration
Bureau of Watershed Restoration
Tallahassee, Florida 32399

April 2013



Draft St. Lucie River and Estuary Basin Management Action Plan – April 2013

TABLE 8: ACRES BY ENTITY

ENTITY	BASINS 4, 5, AND 6 (ACRES)	C-23 (ACRES)	C-24 (ACRES)	C-44 S-153 (ACRES)	NORTH FORK (ACRES)	SOUTH FORK (ACRES)	TOTAL (ACRES)
Agriculture	2,445	84,744	63,488	65,937	3,967	18,176	238,757
Copper Creek CDD	-	-	2	-	-	-	2
FDOT District 4	171	306	137	270	864	636	2,384
Fort Pierce MS4	-	-	-	-	3,706	-	3,706
FPL Pond	-	-	-	6,501	-	-	6,501
Hobe St. Lucie Conservancy District	-	-	-	2,949	-	1,945	4,894
Martin County MS4	4,989	1,738	-	2,231	4,378	7,763	21,099
Natural Lands	7,830	23,706	15,701	37,163	33,129	18,987	136,516
North St. Lucie River WCD	-	-	4,028	-	32,491	-	36,519
Okeechobee County MS4	-	574	30	-	-	-	604
Pal Mar WCD	-	-	-	1,161	-	4	1,165
Port St. Lucie MS4	-	326	1,258	-	34,118	-	35,702
Sewall's Point MS4	-	-	-	-	457	-	457
St. Lucie County MS4	-	-	-	-	3,995	-	3,995
St. Lucie County Non-MS4	-	763	2,172	-	1,146	-	4,081
Stuart MS4	-	-	-	-	353	2,386	2,739
Tradition CDD	-	-	923	-	6	-	929
Troup-Indiantown WCD	-	-	-	13,649	-	-	13,649
Turnpike	147	10	-	-	528	226	911
Verano CDD	-	-	36	-	-	-	36
Total	15,582	112,167	87,775	129,861	119,138	50,123	514,646

TABLE 6: TN STARTING LOADS BY ENTITY

Nitrogen

ENTITY	BASINS 4, 5, AND 6 (LBS/YR)	C-23 (LBS/YR)	C-24 (LBS/YR)	C-44 S-153 (LBS/YR)	NORTH FORK (LBS/YR)	SOUTH FORK (LBS/YR)	TOTAL (LBS/YR)	TOTAL (MT/YR)
Agriculture	17,051	470,081	574,852	350,703	24,355	126,080	1,563,122	709.02
Copper Creek CDD	-	-	14	-	-	-	14	0.01
FDOT District 4	952	1,510	950	1,176	4,277	3,649	12,514	5.68
Fort Pierce MS4	-	-	-	-	17,041	-	17,041	7.73
FPL Pond	-	-	-	41,022	-	-	41,022	18.61
Hobe St. Lucie Conservancy District	-	-	-	13,374	-	10,819	24,193	10.97
Martin County MS4	26,394	5,947	-	8,243	19,806	40,423	100,813	45.73
Natural Lands	15,128	14,991	24,792	49,942	43,326	26,980	175,159	79.45
North St. Lucie River WCD	-	-	37,251	-	160,152	-	197,403	89.54
Okeechobee County MS4	-	3,184	121	-	-	-	3,305	1.50
Pal Mar WCD	-	-	-	6,758	-	22	6,780	3.08
Port St. Lucie MS4	-	1,515	8,275	-	146,691	-	156,481	70.98
Sewall's Point MS4	-	-	-	-	1,771	-	1,771	0.80
St. Lucie County MS4	-	-	-	-	18,114	-	18,114	8.22
St. Lucie County Non-MS4	-	1,594	16,757	-	5,409	-	23,760	10.78
Stuart MS4	-	-	-	-	1,614	12,384	13,998	6.35
Tradition CDD	-	1	7,057	-	31	-	7,089	3.22
Troup-Indiantown WCD	-	-	-	62,219	-	-	62,219	28.22
Turnpike	789	51	-	-	2,651	1,286	4,777	2.17
Verano CDD	-	-	257	-	-	-	257	0.12
TOTAL	60,314	498,874	670,326	533,437	445,238	221,643	2,429,832	1,102.18

Total Required Reduction 1,053,414 (Lbs/yr) 477 (MT/yr)

Target Load 1,136,633 (Lbs/yr) 515 (MT/yr)

Final St. Lucie River and Estuary Basin Management Action Plan – May 2013

TABLE 7: TP STARTING LOADS BY ENTITY

Phosphorus

ENTITY	BASINS 4, 5, AND 6 (LBS/YR)	C-23 (LBS/YR)	C-24 (LBS/YR)	C-44 S-153 (LBS/YR)	NORTH FORK (LBS/YR)	SOUTH FORK (LBS/YR)	TOTAL (LBS/YR)	TOTAL (MT/YR)
Agriculture	3,920	150,255	136,471	66,809	5,988	26,869	390,312	177.04
Copper Creek CDD	-	-	3	-	-	-	3	0.00
FDOT District 4	200	464	226	175	818	659	2,542	1.15
Fort Pierce MS4	-	-	-	-	3,879	-	3,879	1.76
FPL Pond	-	-	-	8,361	-	-	8,361	3.79
Hobe St. Lucie Conservancy District	-	-	-	2,689	-	2,563	5,252	2.38
Martin County MS4	5,930	2,250	-	1,431	4,339	8,419	22,369	10.15
Natural Lands	3,383	19,795	11,341	3,525	9,639	5,054	52,737	23.92
North St. Lucie River WCD	-	-	9,063	-	36,821	-	45,884	20.81
Okeechobee County MS4	-	937	38	-	-	-	975	0.44
Pal Mar WCD	-	-	-	1,008	-	4	1,012	0.46
Port St. Lucie MS4	-	518	2,206	-	32,292	-	35,016	15.88
Sewall's Point MS4	-	-	-	-	384	-	384	0.17
St. Lucie County MS4	-	-	-	-	4,127	-	4,127	1.87
St. Lucie County Non-MS4	-	838	3,961	-	1,273	-	6,072	2.75
Stuart MS4	-	-	-	-	379	2,727	3,106	1.41
Tradition CDD	-	-	1,903	-	7	-	1,910	0.87
Troup-Indiantown WCD	-	-	-	12,623	-	-	12,623	5.73
Turnpike	170	16	-	-	506	233	925	0.42
Verano CDD	-	-	63	-	-	-	63	0.03
TOTAL	13,603	175,073	165,275	96,621	100,452	46,528	597,552	271.03

Total Required Reduction 404,166 (Lbs/yr) 183 (MT/yr)

Target Load 127,016 (Lbs/yr) 57 (MT/yr)

DRAFT

BASIN MANAGEMENT ACTION PLAN

for the Implementation of Total Maximum Daily Loads for Nutrients and Dissolved Oxygen Adopted by the Florida Department of Environmental Protection

in the

St. Lucie River and Estuary Basin

developed by the

St. Lucie River and Estuary Basin Technical Stakeholders

in cooperation with the

Florida Department of Environmental Protection
Division of Environmental Assessment and Restoration
Bureau of Watershed Restoration
Tallahassee, Florida 32399

April 2013

TMDL – BMAP Implementation June 2013 - Adopted & Enforceable

2013 – 2018 “First Phase” -30% Reduction

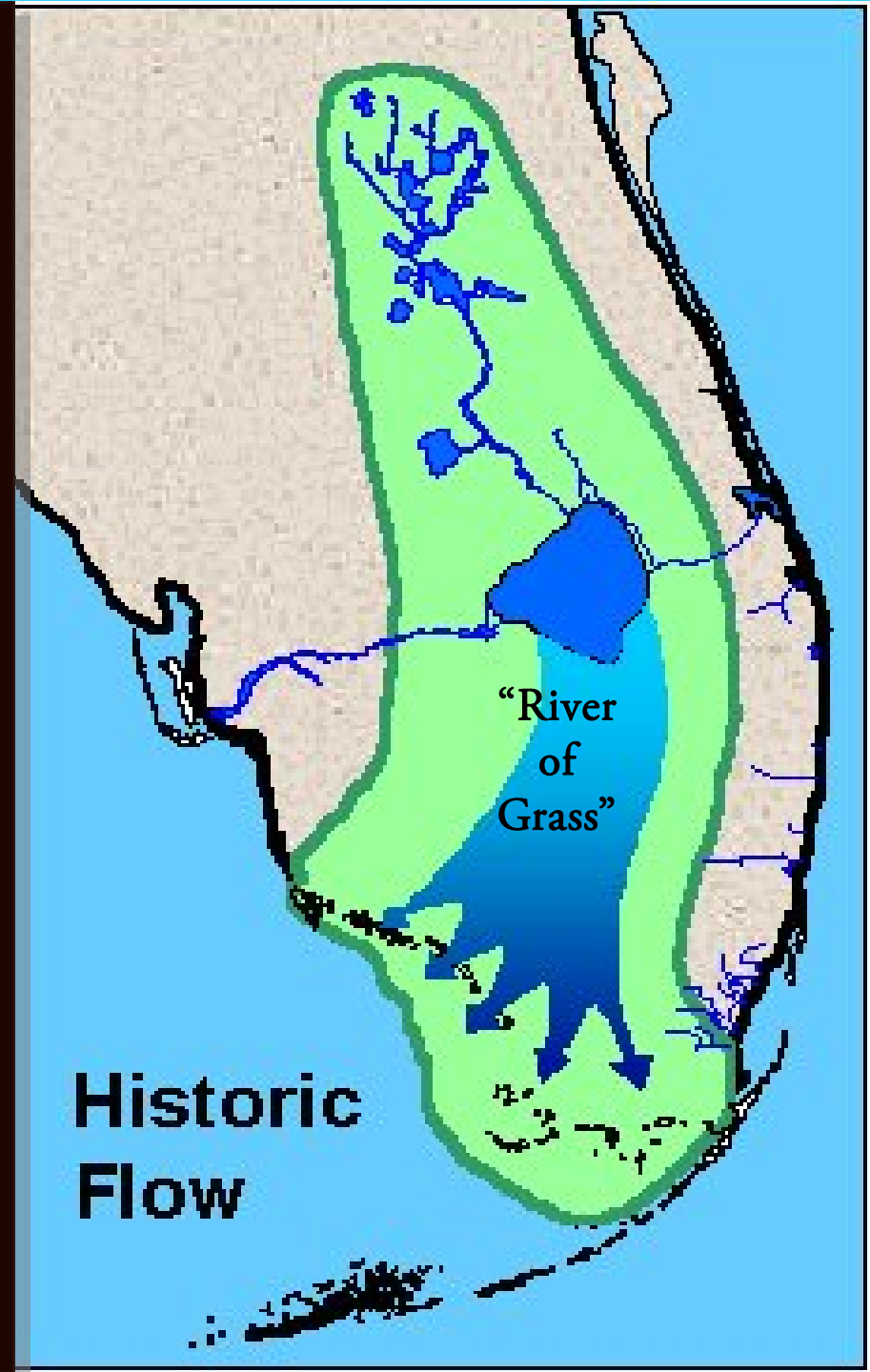
2018 – 2028 “Second & Third Phase” Remaining 70% Reduction

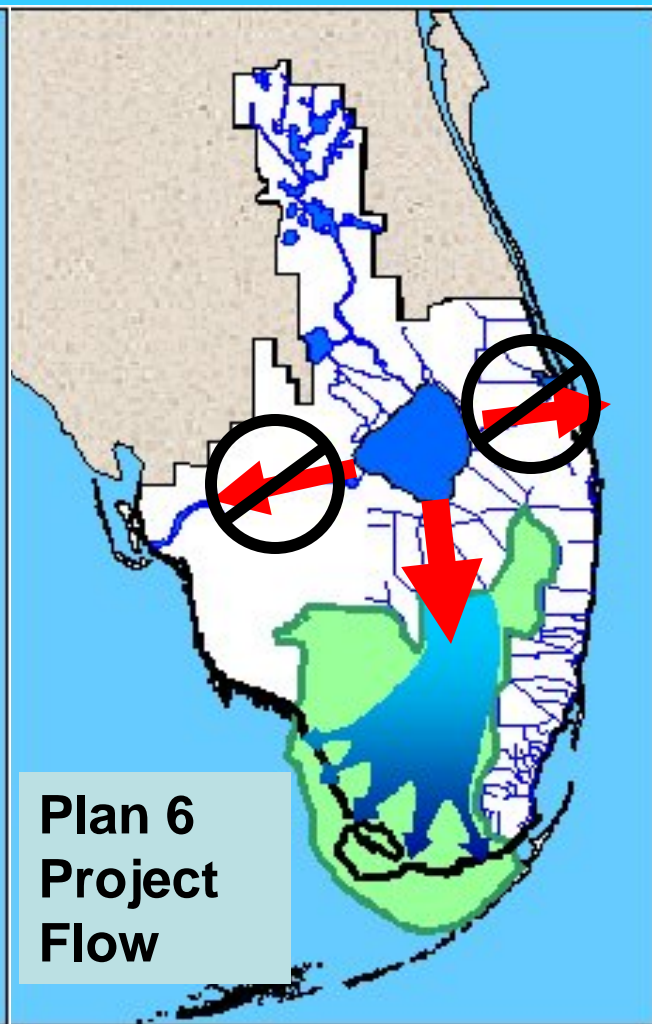
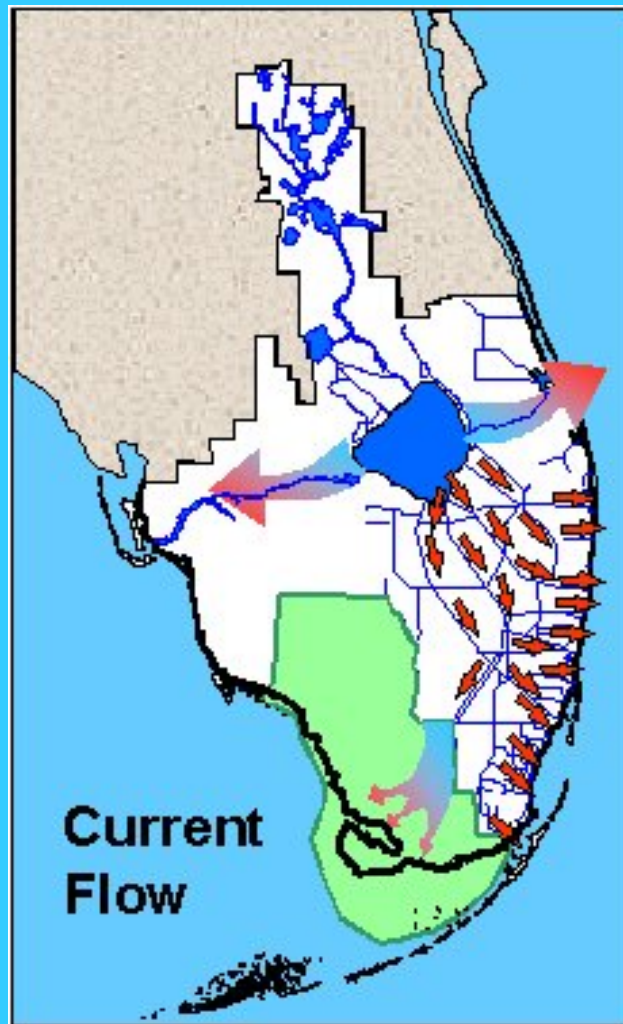


Plan 6 Project

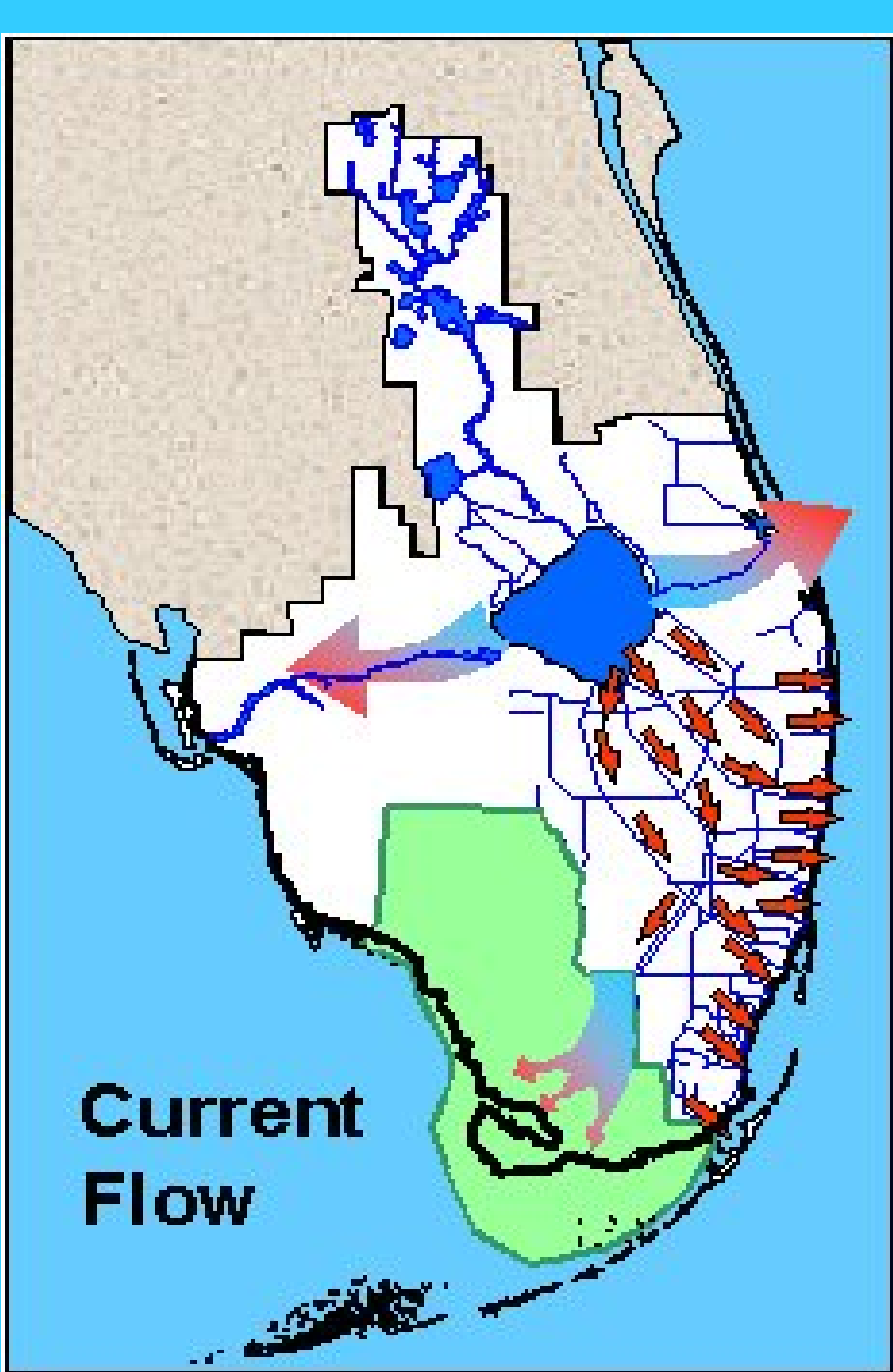
**Stop the destructive
discharges to the
Northern Estuaries and
Restore the River of Grass**

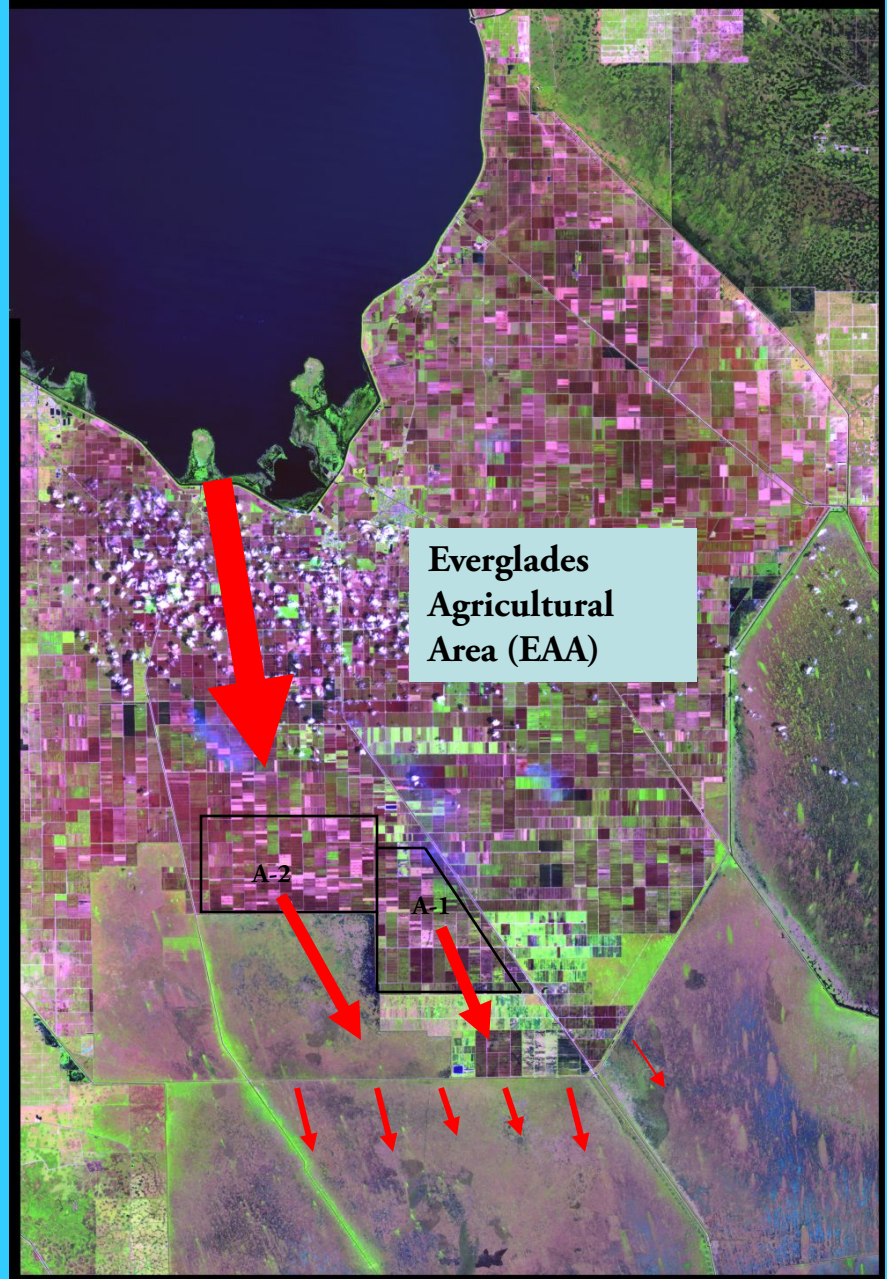




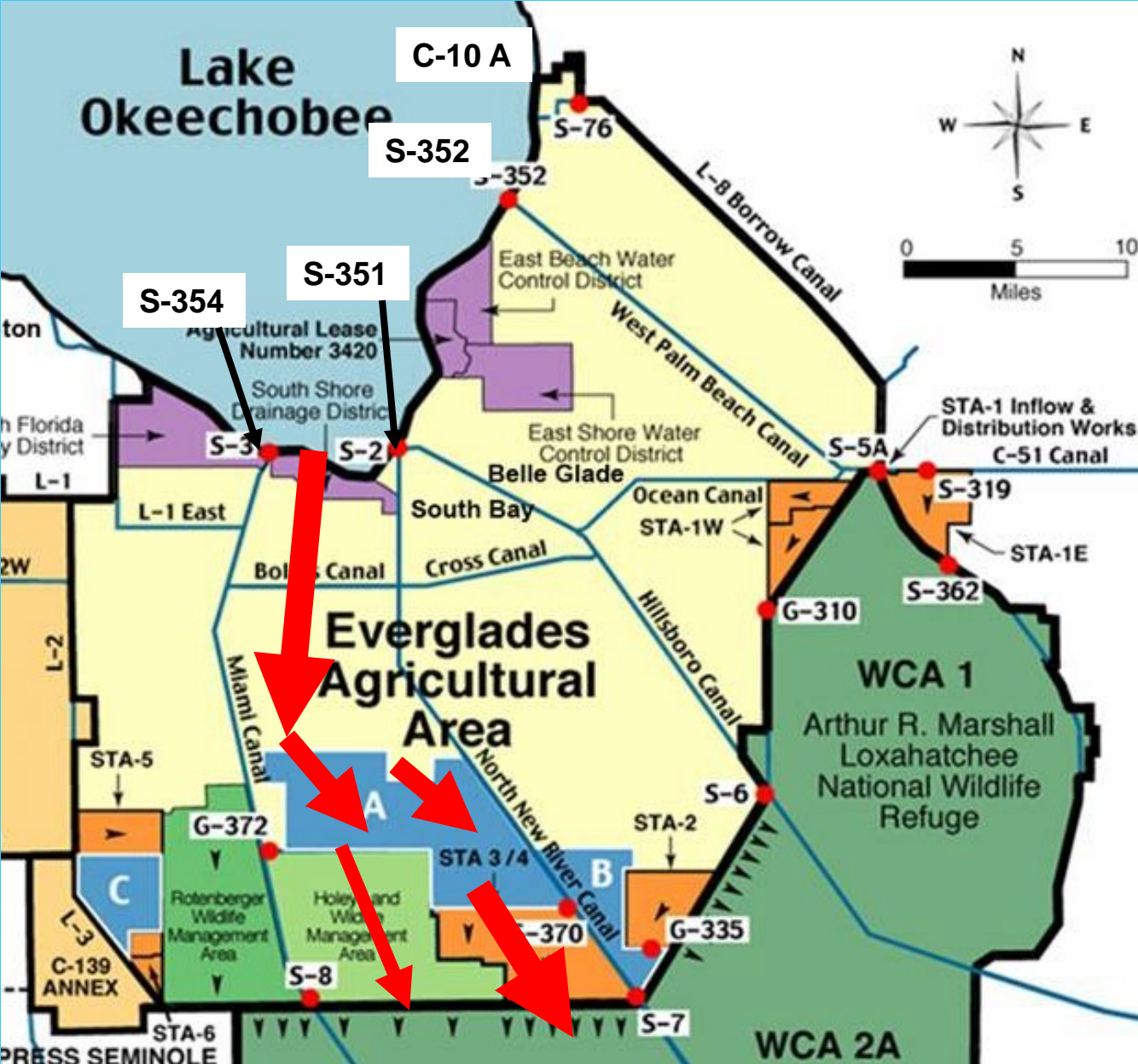


Historic, Current & Plan 6 Project Flow





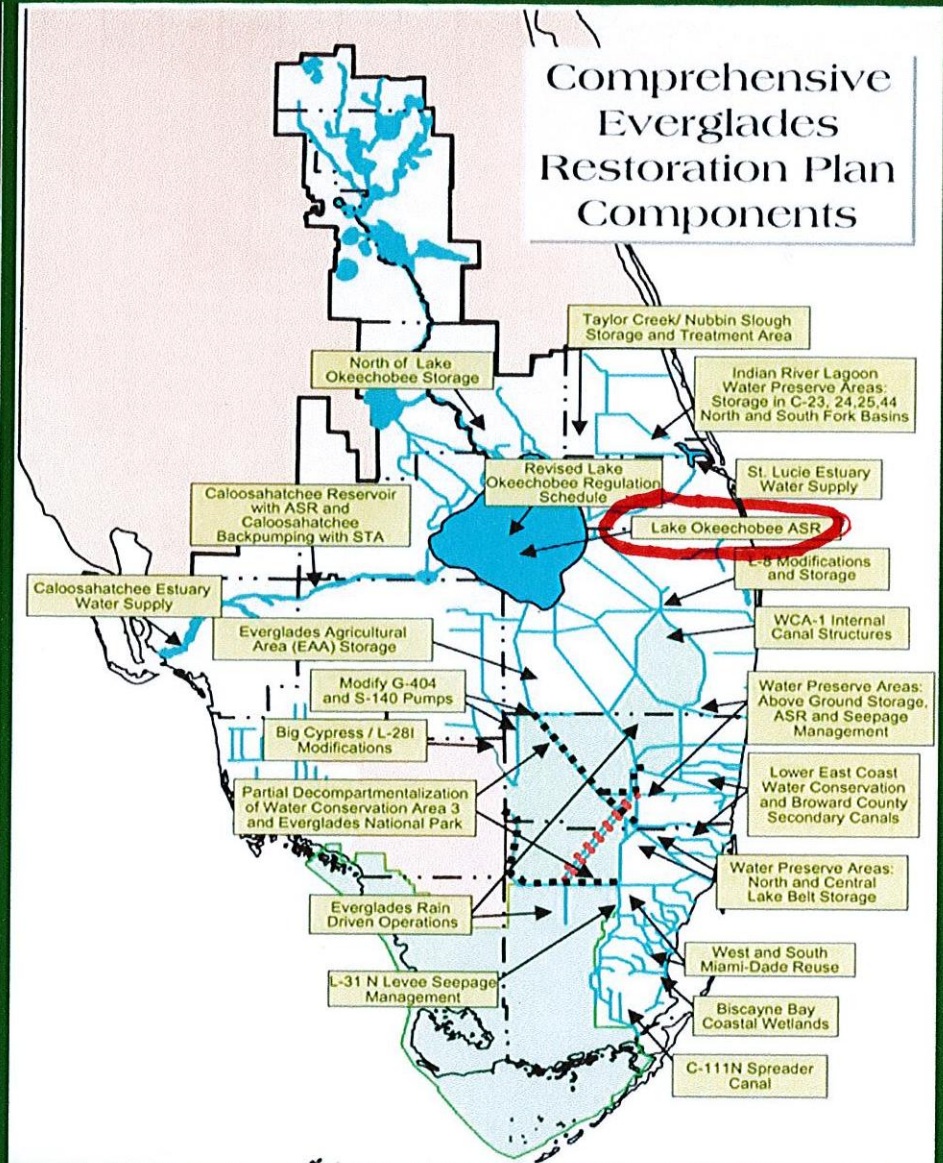
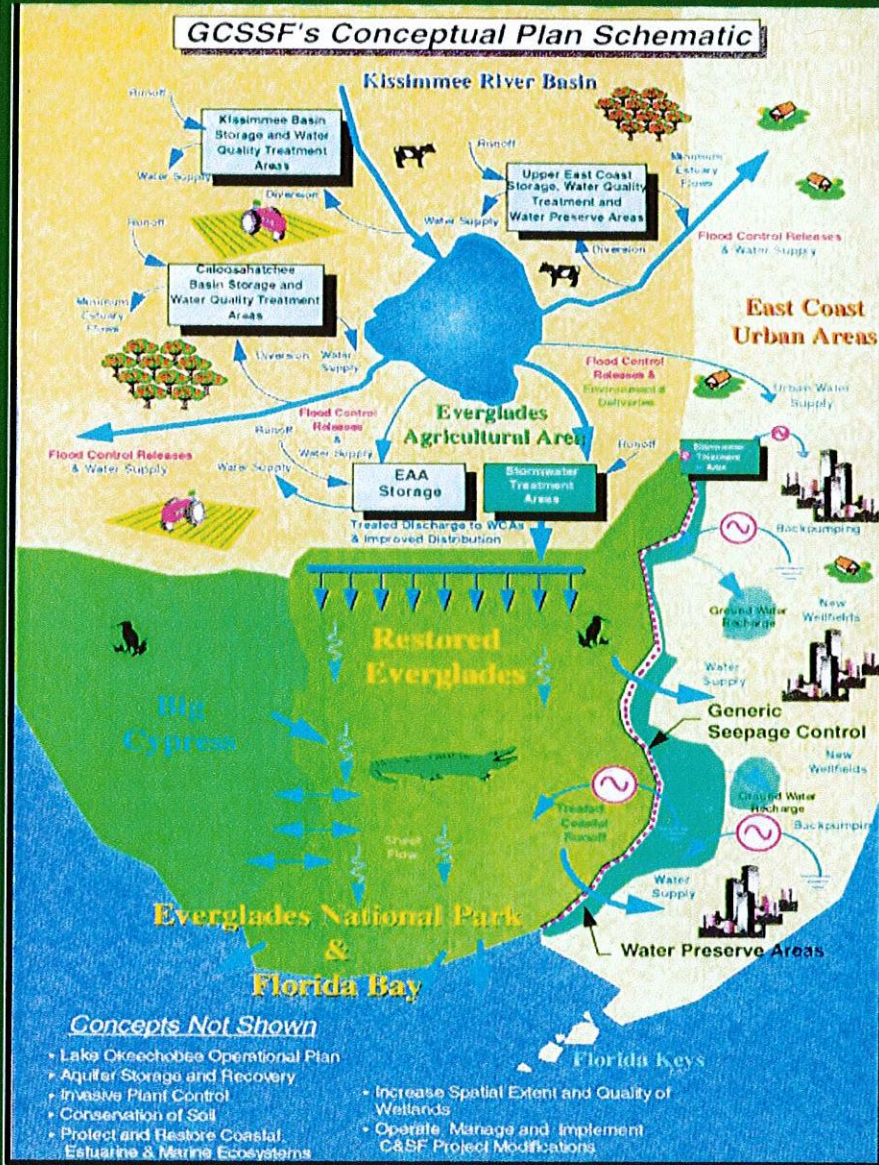
Plan 6 Project – Stop destructive discharges to the Northern Estuaries and Restore the River of Grass



1. Becomes THE Primary outflow for Lake Okeechobee, not the Estuaries
2. Stops harmful discharge releases from Lake Okeechobee to the Northern Estuaries
3. Replaces the Lake Okeechobee ASR Project of CERP with a project of greater flow & capacity
4. Restores water flows south to the Everglades
5. Provides for healthy water levels in Lake Okeechobee
6. Maintains Water Quantity, Quality, Timing and Distribution for South Florida and Everglades Restoration

Plan 6 Project – Stop destructive discharges to the Northern Estuaries and Restore the River of Grass

Early Conceptual Plans - Everglades Restoration



Lake Okeechobee ASR Project-
200 wells – Proposed CERP

Current Average Annual
Discharge Volumes and
Current Maximum Flood
Discharge Rates

1548 cfs

S-308
7300 cfs

St Lucie Estuary
20 %

C-10 A
900 cfs

442 K AF per Year

2.21 M AF per Year

S-77
9300 cfs

S-352
900 cfs

To the Everglades
13 %

Caloosahatchee Estuary
44 %

S-351
1500 cfs

287 K AF per Year

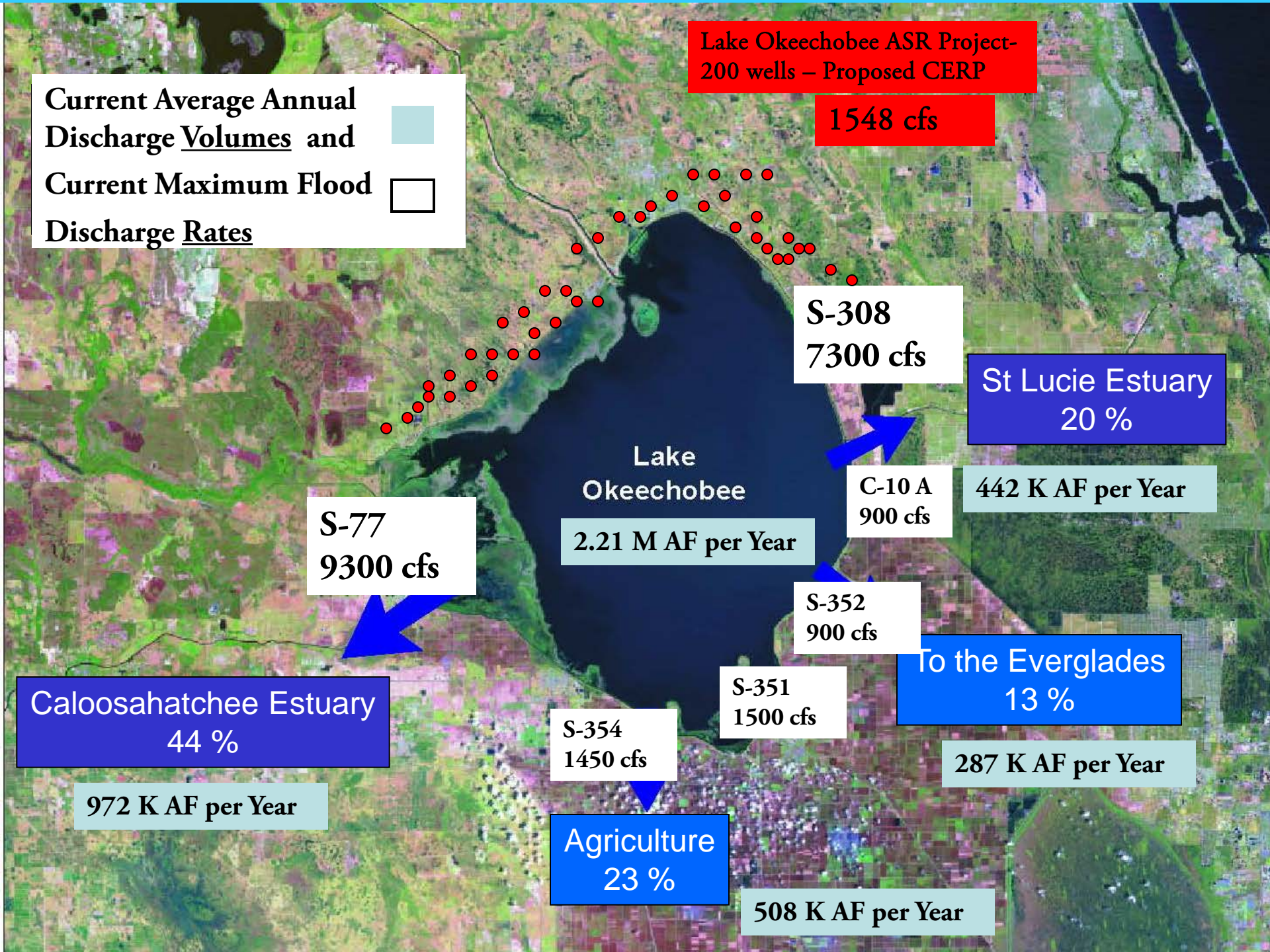
972 K AF per Year

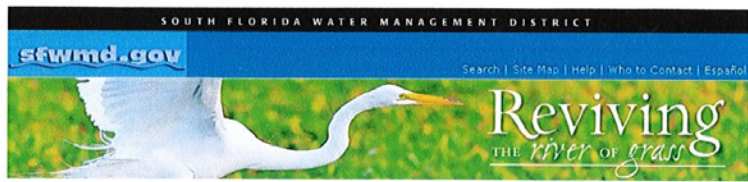
S-354
1450 cfs

Agriculture
23 %

508 K AF per Year

Lake
Okeechobee





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- Weather
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DISTRICT ACQUIRES 26,800 ACRES TO REVIVE THE RIVER OF GRASS

Background

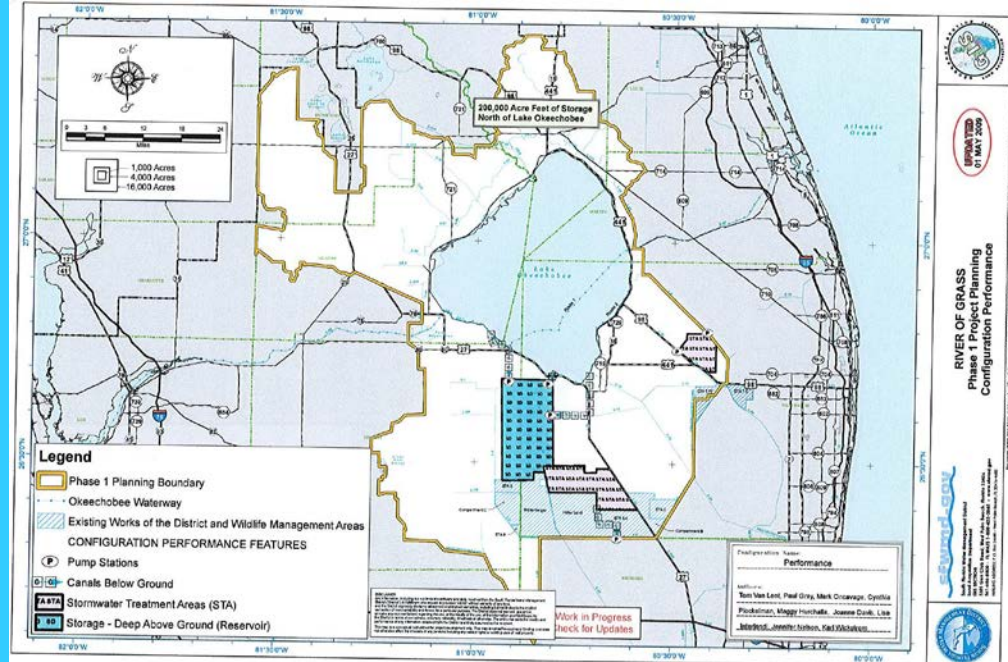
June 2008: Governor Charlie Crist announced that the South Florida Water Management District would begin negotiating an agreement to acquire as much as 187,000 acres of agricultural land owned by the United States Sugar Corporation for Everglades restoration. Acquiring the enormous expanse of real estate offers water managers the opportunity and flexibility to store and clean water on a scale never before contemplated to protect Florida's coastal estuaries and to better revive, restore and preserve the fabled River of Grass.

December 2008: Following extensive negotiations, due diligence and public deliberation, the South Florida Water Management District's Governing Board voted to accept the negotiated proposal to acquire more than 180,000 of agricultural land for \$1.34 billion, contingent upon financing and affordability.

May 2009: After gathering key input from the public, legislators and South Florida's communities and recognizing the nation's current economic climate, the South Florida Water Management District and U.S. Sugar Corporation amended the agreement providing for an initial purchase of close to 73,000 acres for \$536 million, with options to purchase the remaining 107,000 acres during the next ten years when economic and financial conditions improve.

August 2010: In light of continued economic impacts, a decline in District revenues and the need to address recent federal court orders related to Everglades restoration, the Governing Board approved on August 12, 2010, a second amended and restated agreement for purchase and sale of land from the U.S. Sugar Corporation. Under the modified purchase, the District will utilize \$197 million in cash on-hand to take ownership of 26,800 acres of strategically located land with high restoration potential while preserving the option to acquire 153,200 acres of additional lands, if future economic conditions allow.

- ☒ Kissimmee
- ☒ Lake Okeechobee
- ☒ Everglades
- ☒ Coastal Areas



Department of the Interior - DOI
Everglades Restoration Initiatives

A Conceptual Discussion to Integrate Water Flow and Water Quality in Everglades Restoration

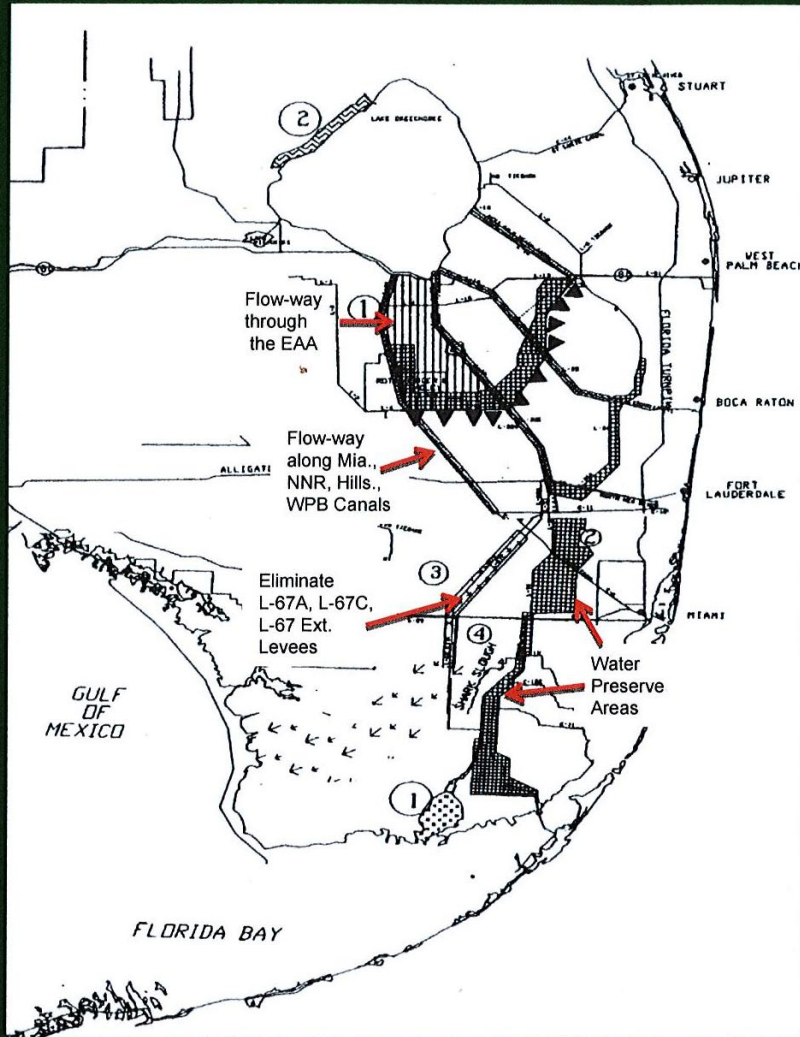
Shannon Estenoz and Robert Johnson
NRC/CISRERP IV Meeting,
August 23, 2011

Early Conceptual Plans - Everglades Restoration

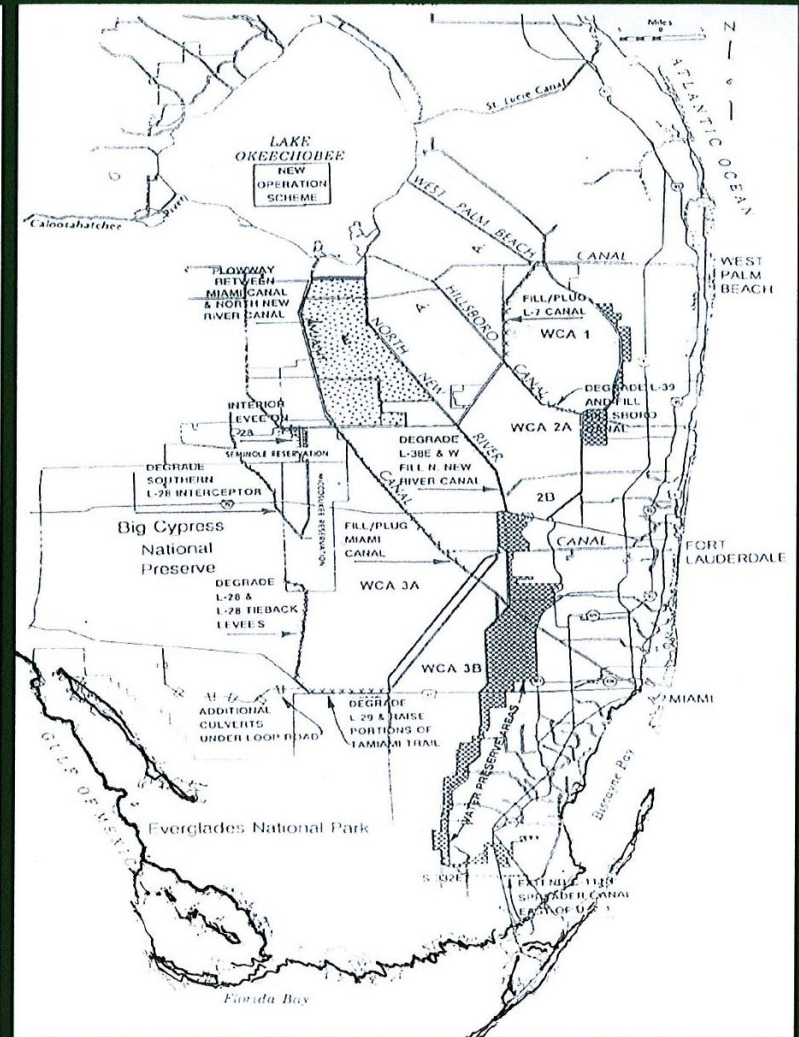
Science Sub-Group Report, Minimum Plan, 1993. C&SF Restudy Recon. Report, Plan 6, 1994.

Reconnect Lake Okeechobee to the Everglades-River of Grass- Move Water South

Early Conceptual Plans - Everglades Restoration



Science Sub-Group Report, Minimum Plan, 1993.



C&SF Restudy Recon. Report, Plan 6, 1994.



Florida
Oceanographic
Society

Reconnect Lake Okeechobee to the Everglades- River of Grass- Move Water South

Greater Everglades Restoration

1 – Stop the destructive discharges to the Northern Estuaries and reconnect the “River of Grass” between Lake Okeechobee and the Everglades.

2- Restore the Kissimmee River, its valley and flood plain.

3 - Manage Lake Okeechobee as a “lake” between 12.5 ft and 15.5 ft.

4 - Enforce treating water pollution at the source of the problem, not downstream.



What about our Future?

