

Everglades and Estuaries

Getting the Water Right in South Florida

Mark Perry, Executive Director
Florida Oceanographic Society
July 24, 2014



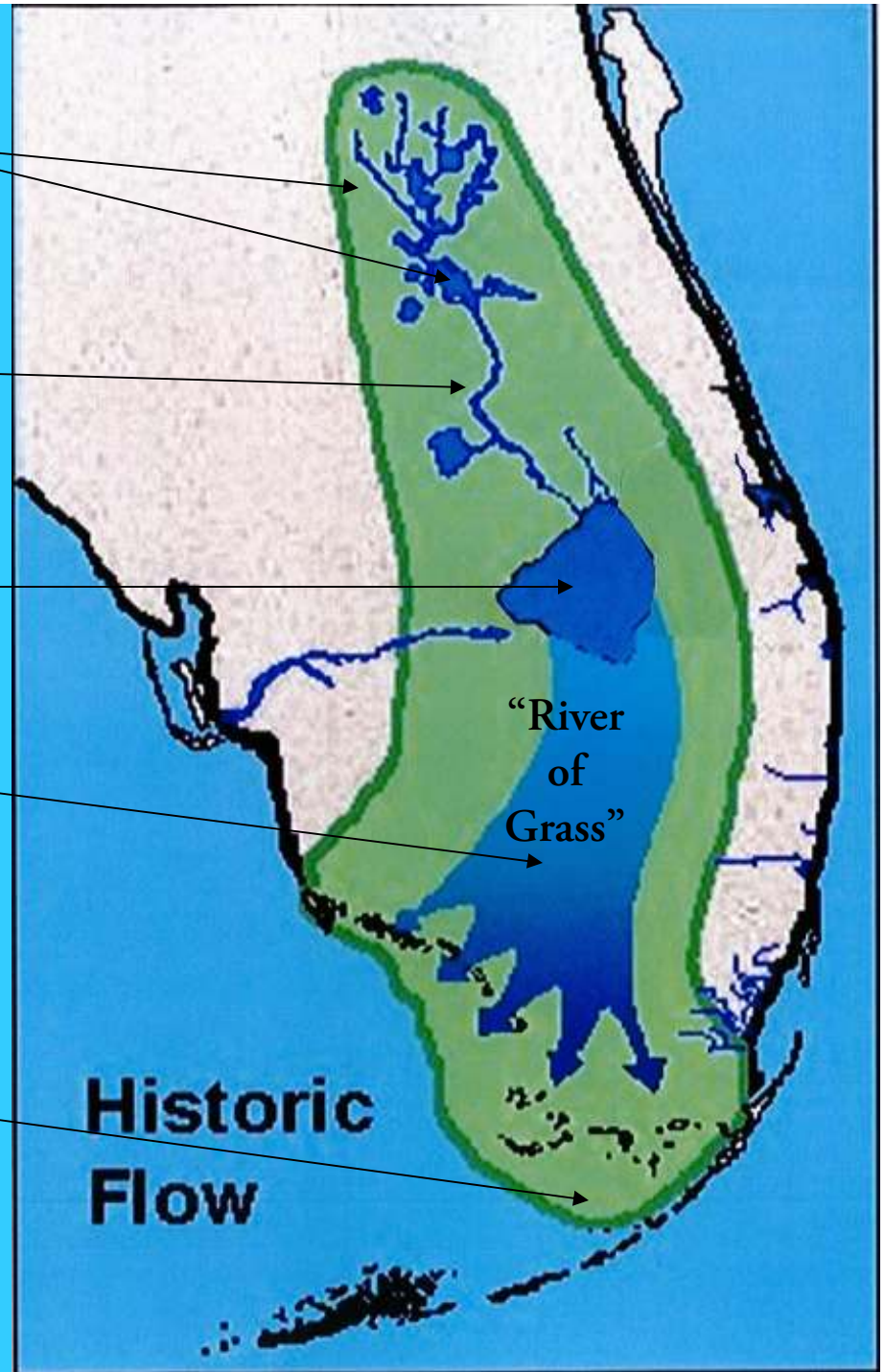
Upper Chain of Lakes flow south
into Lake Kissimmee

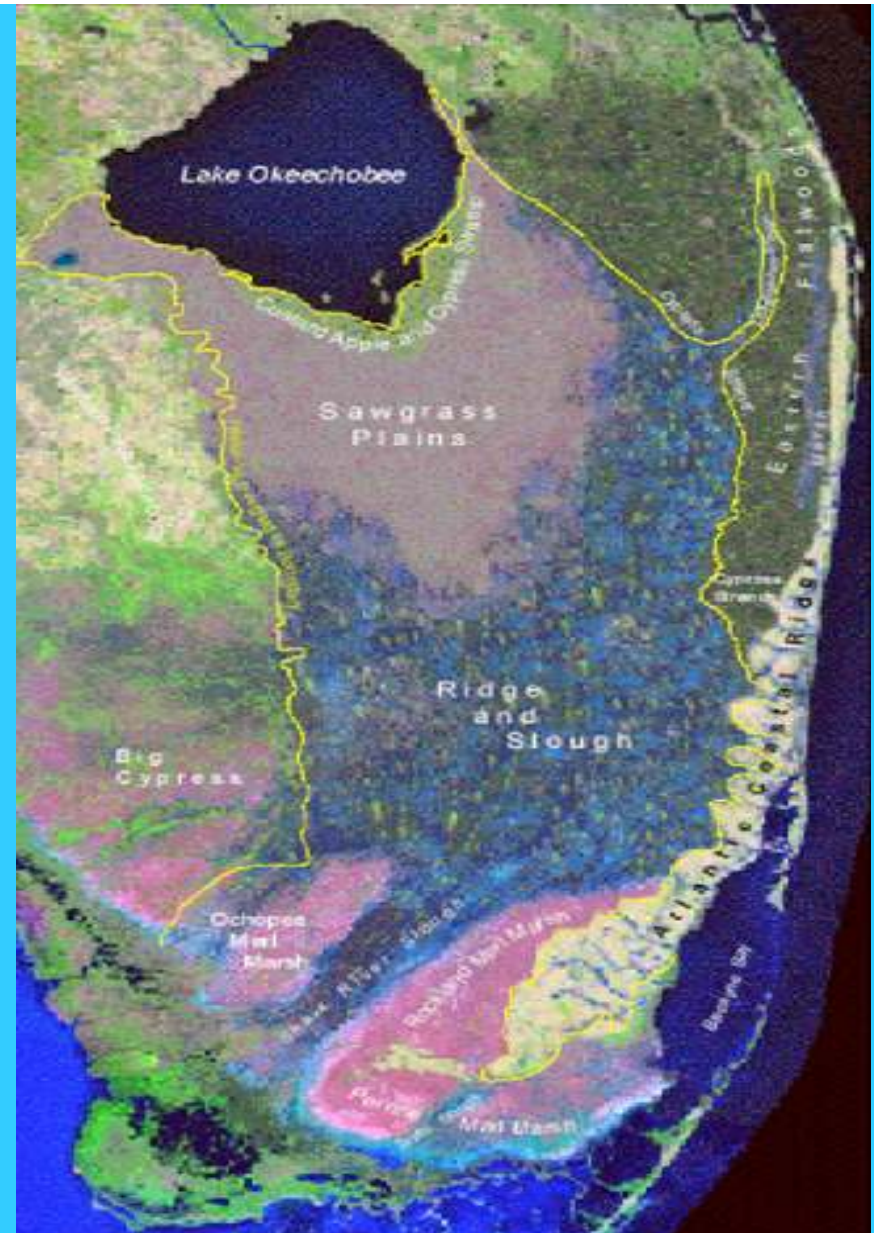
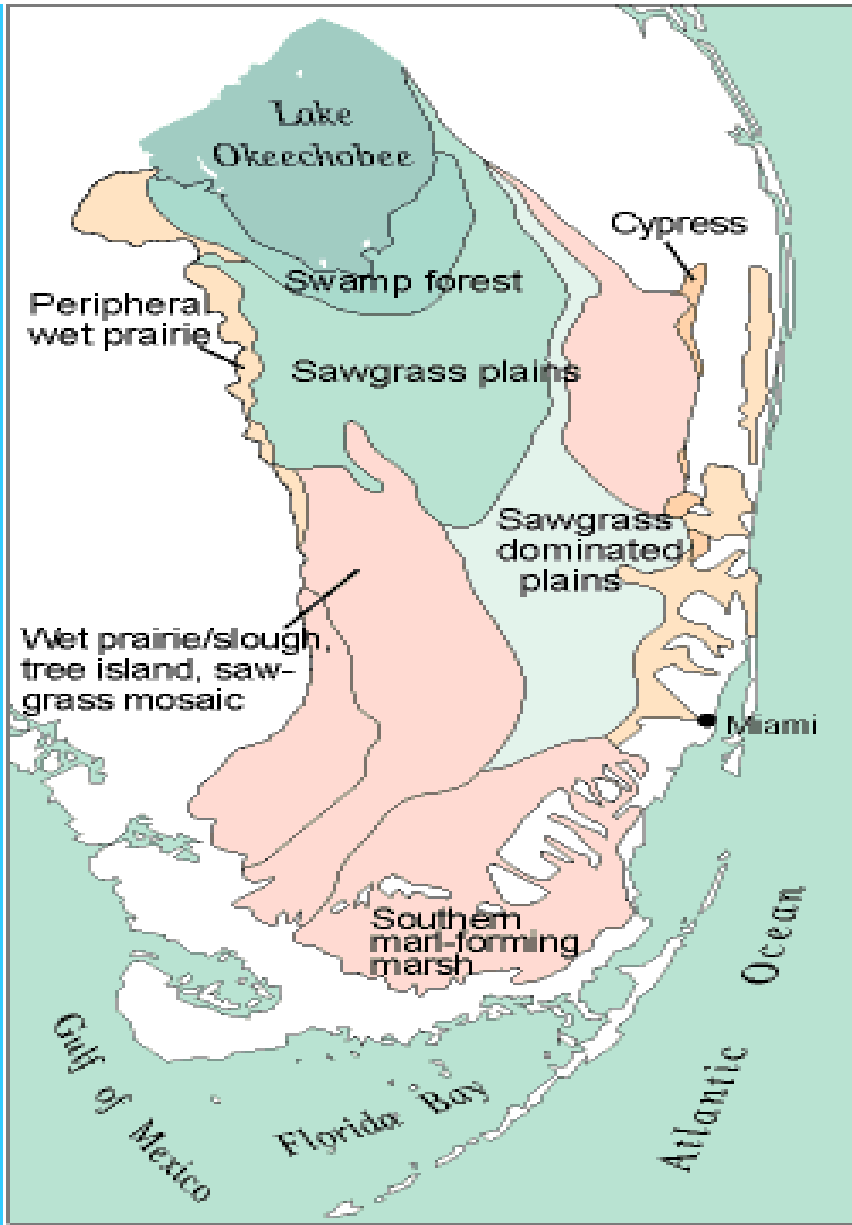
Lake Kissimmee flows south into the
Kissimmee River – 105-mile Oxbow
River with 2-mile-wide floodplain

Water takes 6-8 Months to reach
Lake Okeechobee

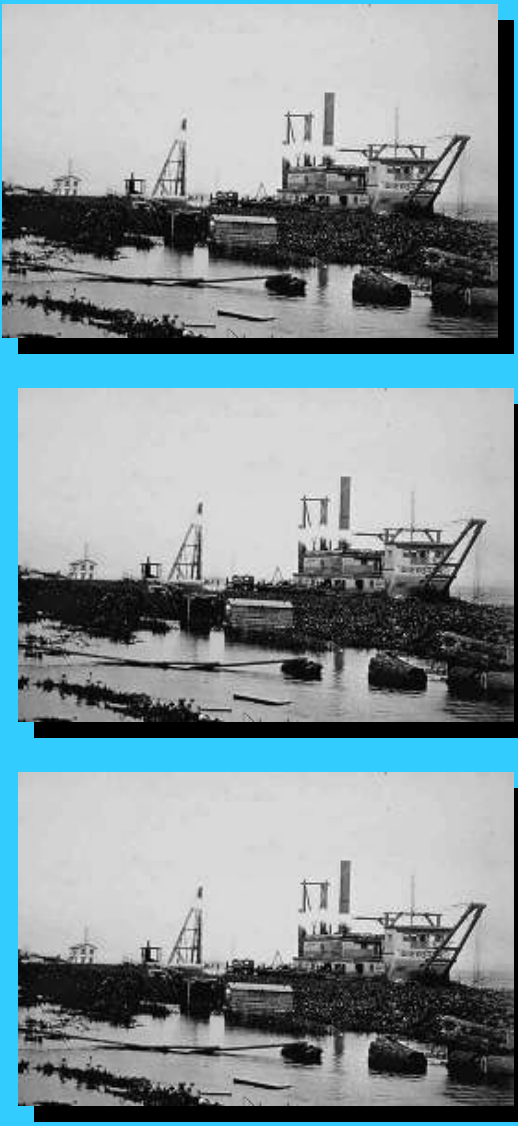
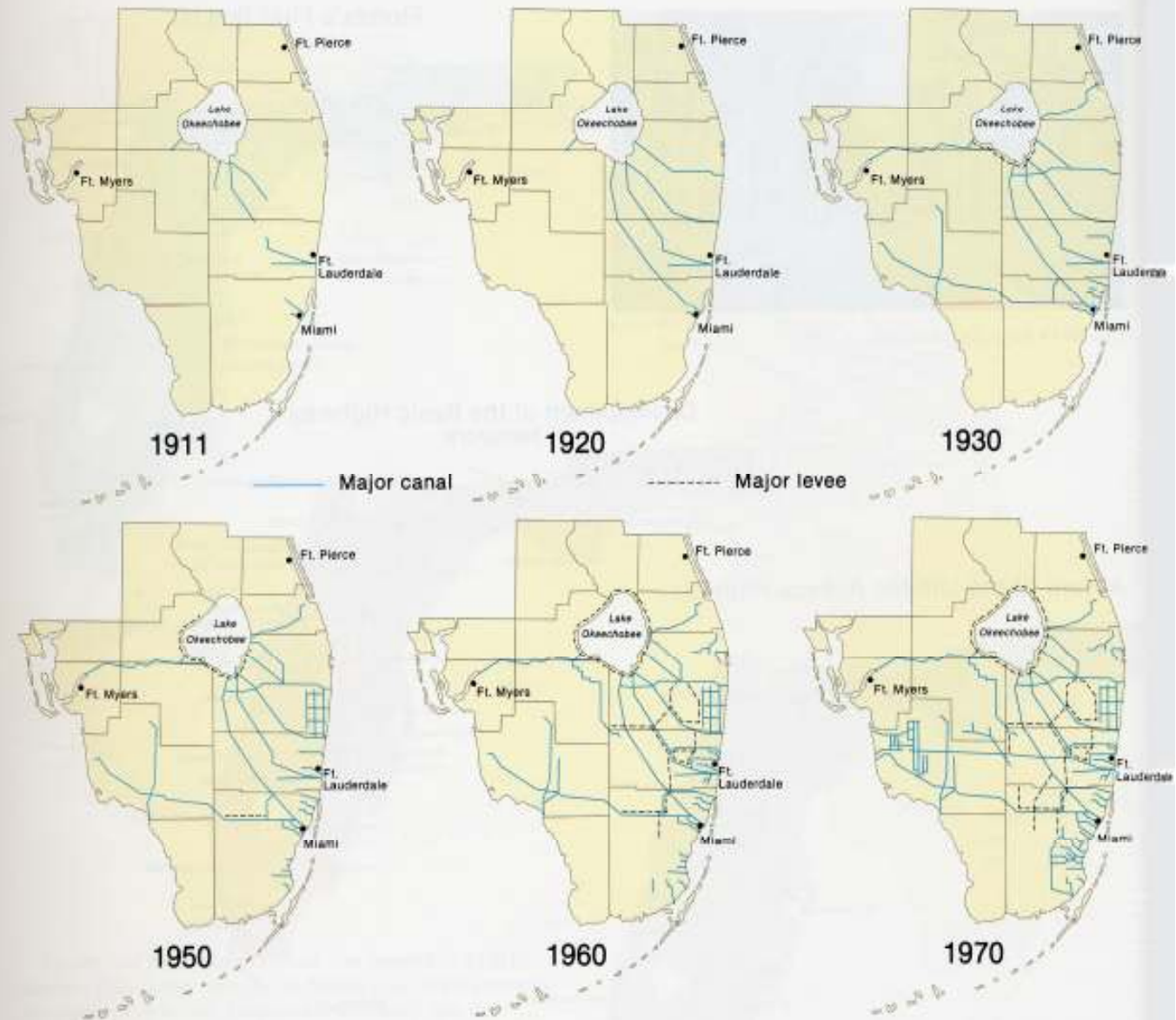
Lake Okeechobee flows south through
“River of Grass”, Everglades - 60-mile
wide shallow (1 ft deep) river flowing at
1 mile in 4 days.

Water takes 16 Months to reach
Florida Bay

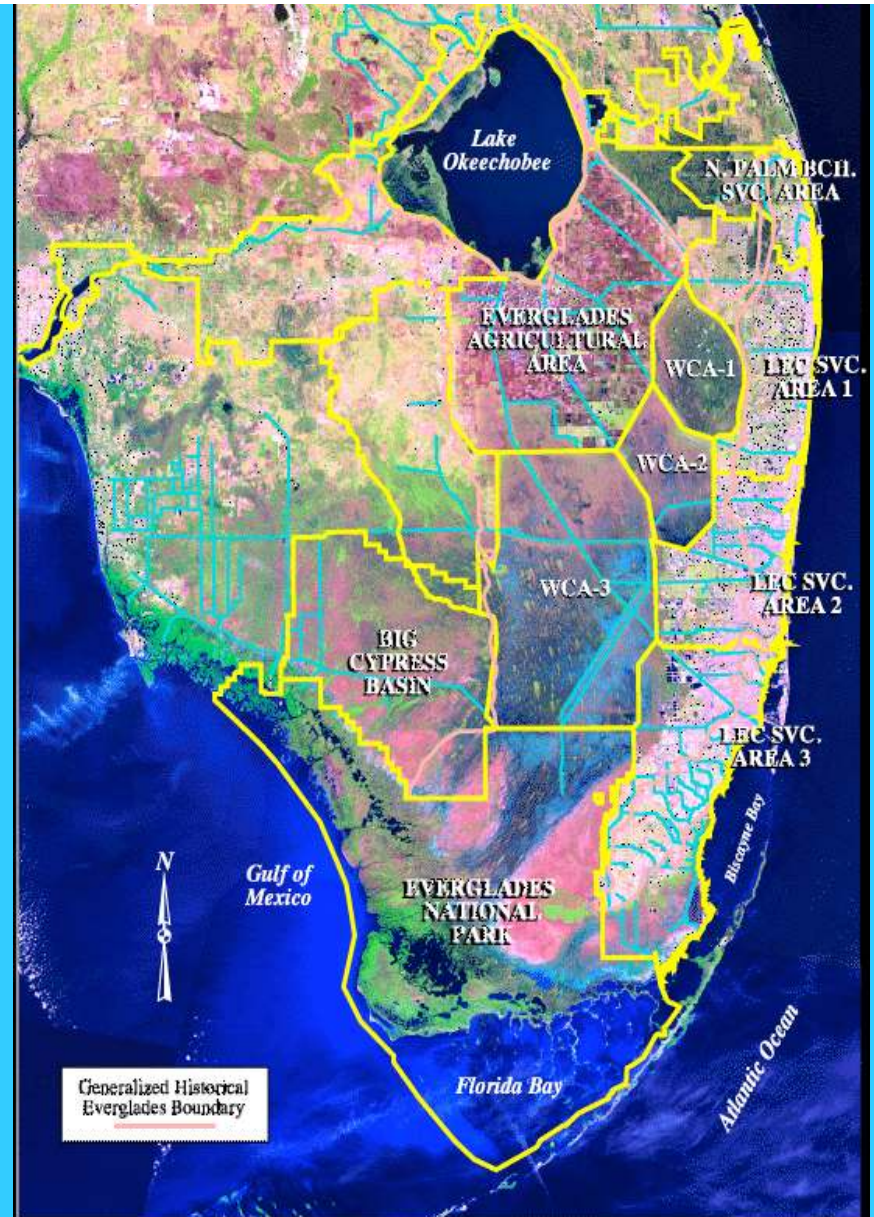
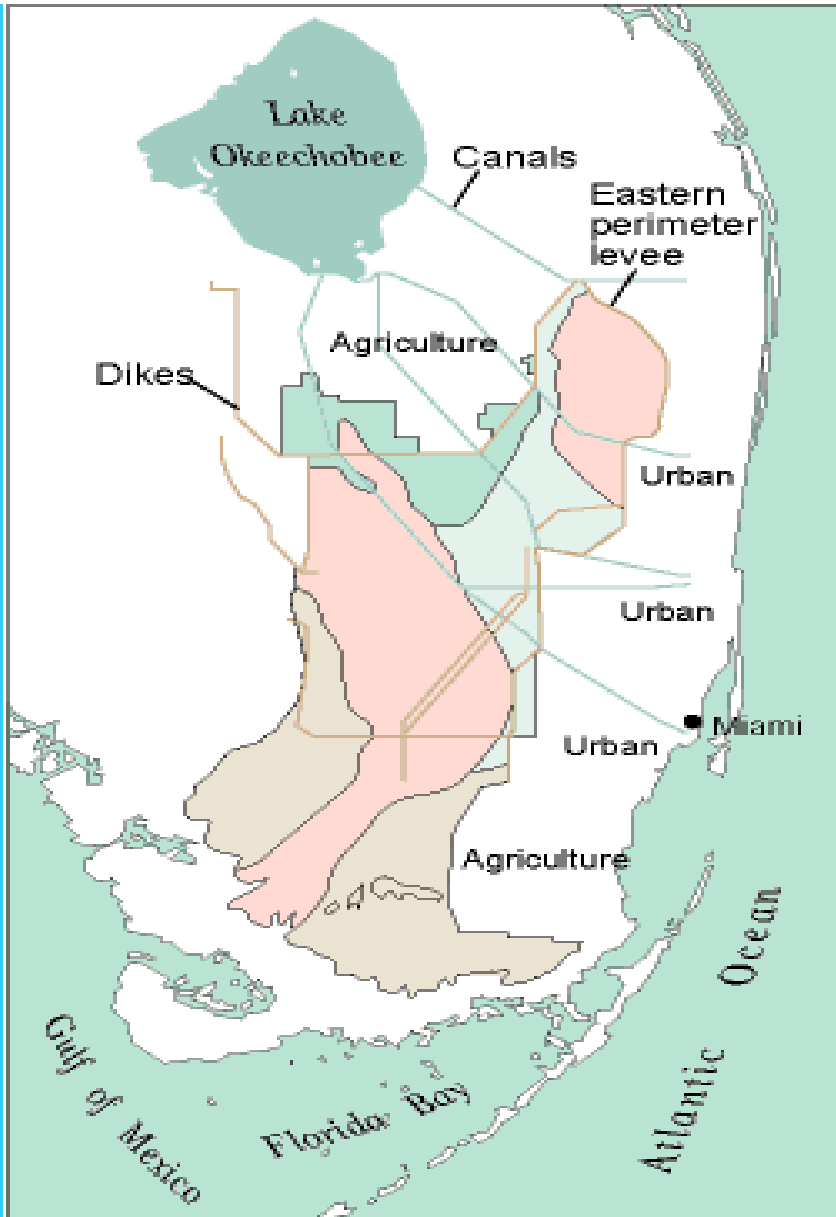


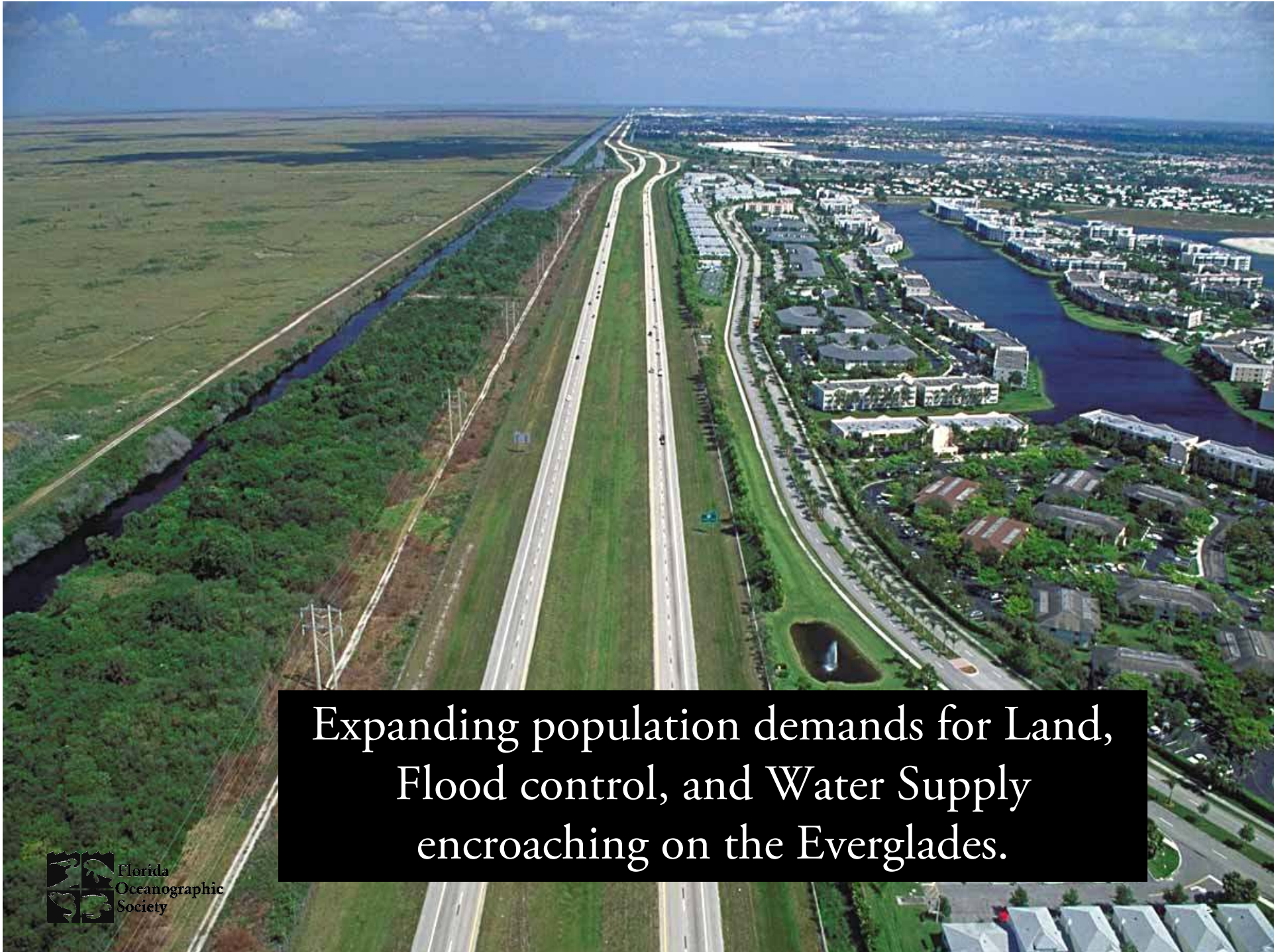


Expansion of the Canal and Levee System



“Drain The Swamp”





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

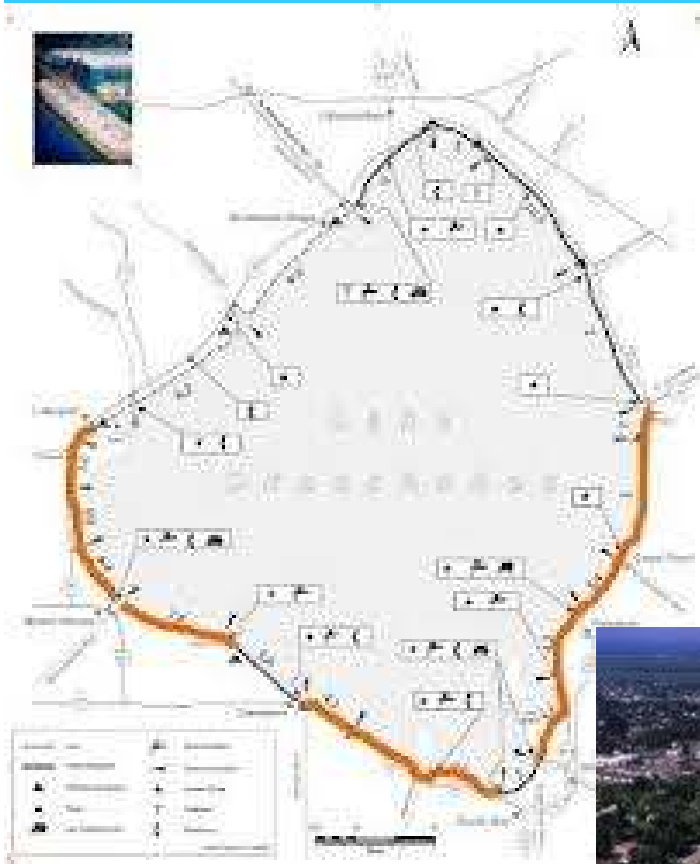
HOOVER DIKE AUTHORIZED 1930

... COMPLETED 1937

This is a historical poster with a white background and a blue border. At the top, it reads '1926 AND 1928' in large blue letters. Below that, 'DEVASTATING HURRICANES' is written in red, followed by '... LOSS OF 2,500 LIVES' in black. A central illustration shows a long dike extending from a town on the left towards the ocean on the right. To the right of the dike, a jagged red border contains the text 'HOOVER DIKE AUTHORIZED 1930' in red. At the bottom, '... COMPLETED 1937' is written in blue.



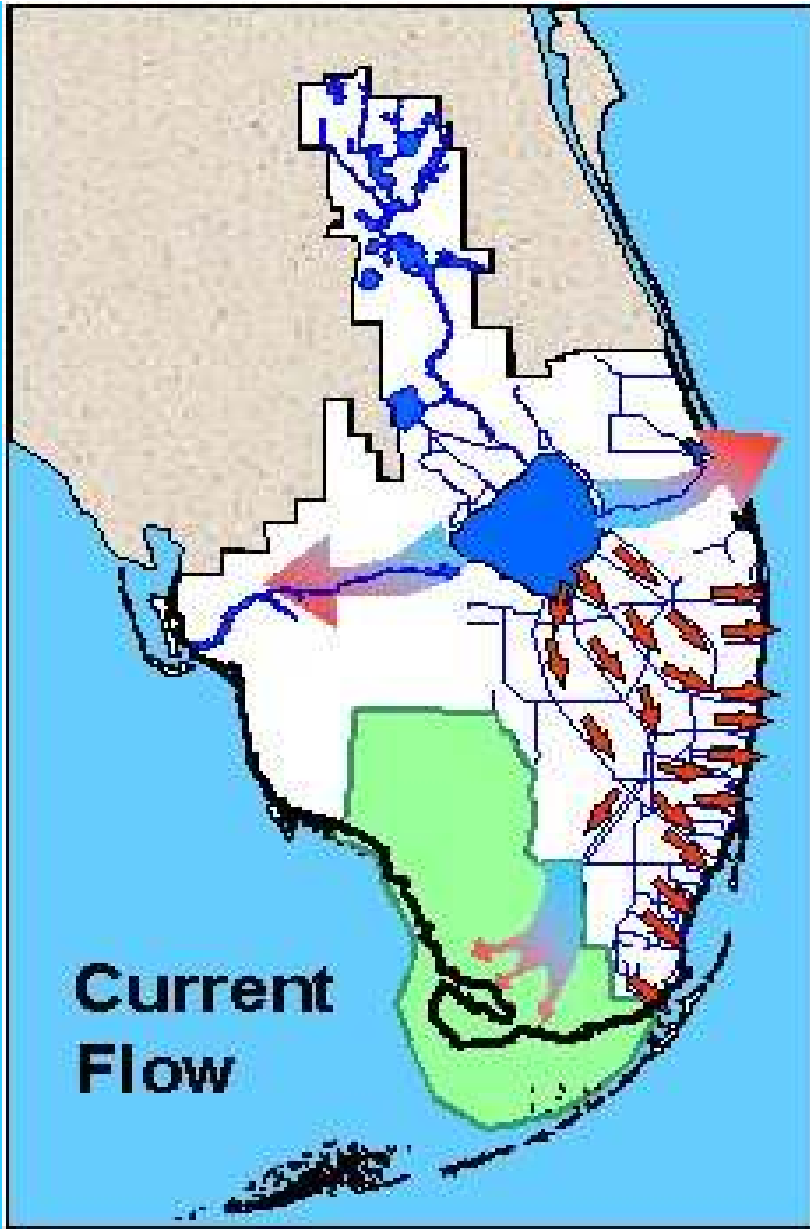
“Dam The Lake”



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

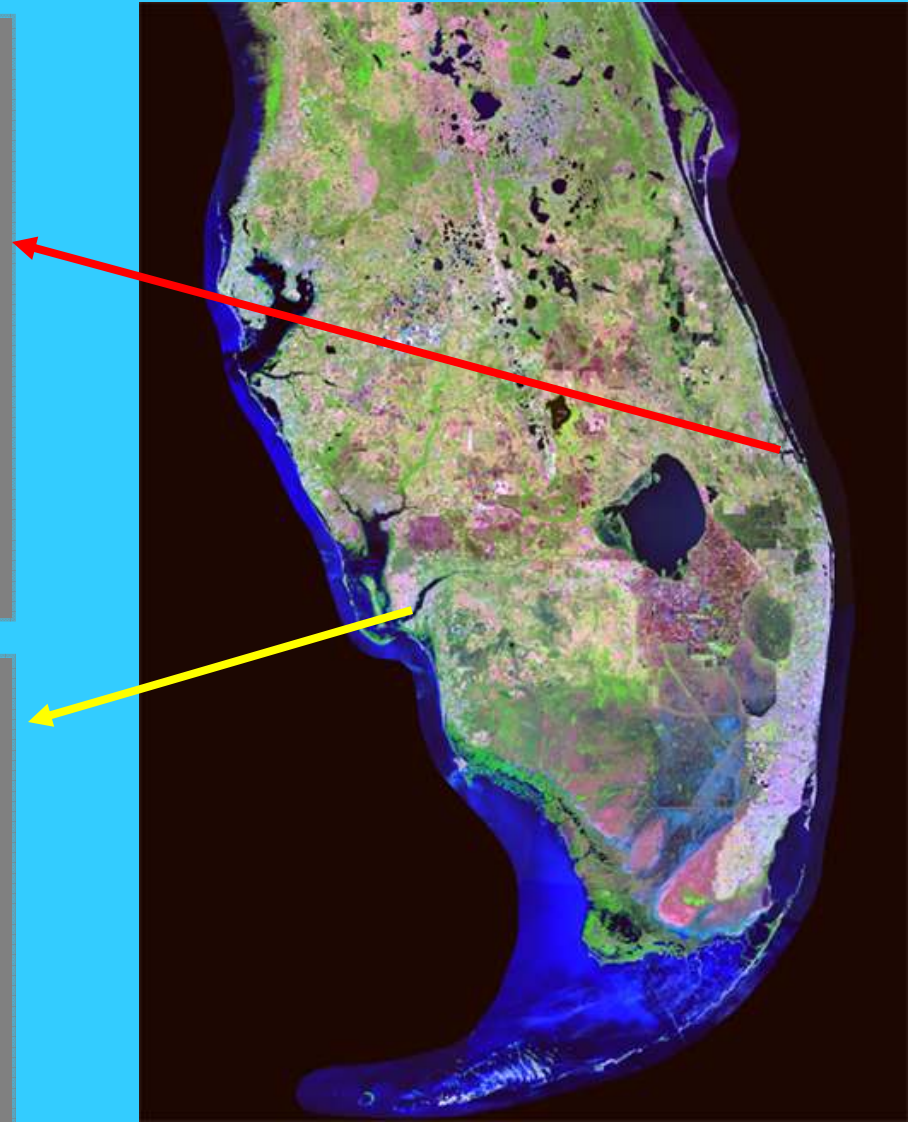


Killed the Kissimmee River- 1962-1970 Dug C-38 Canal up 105 mile oxbows-drained floodplain



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

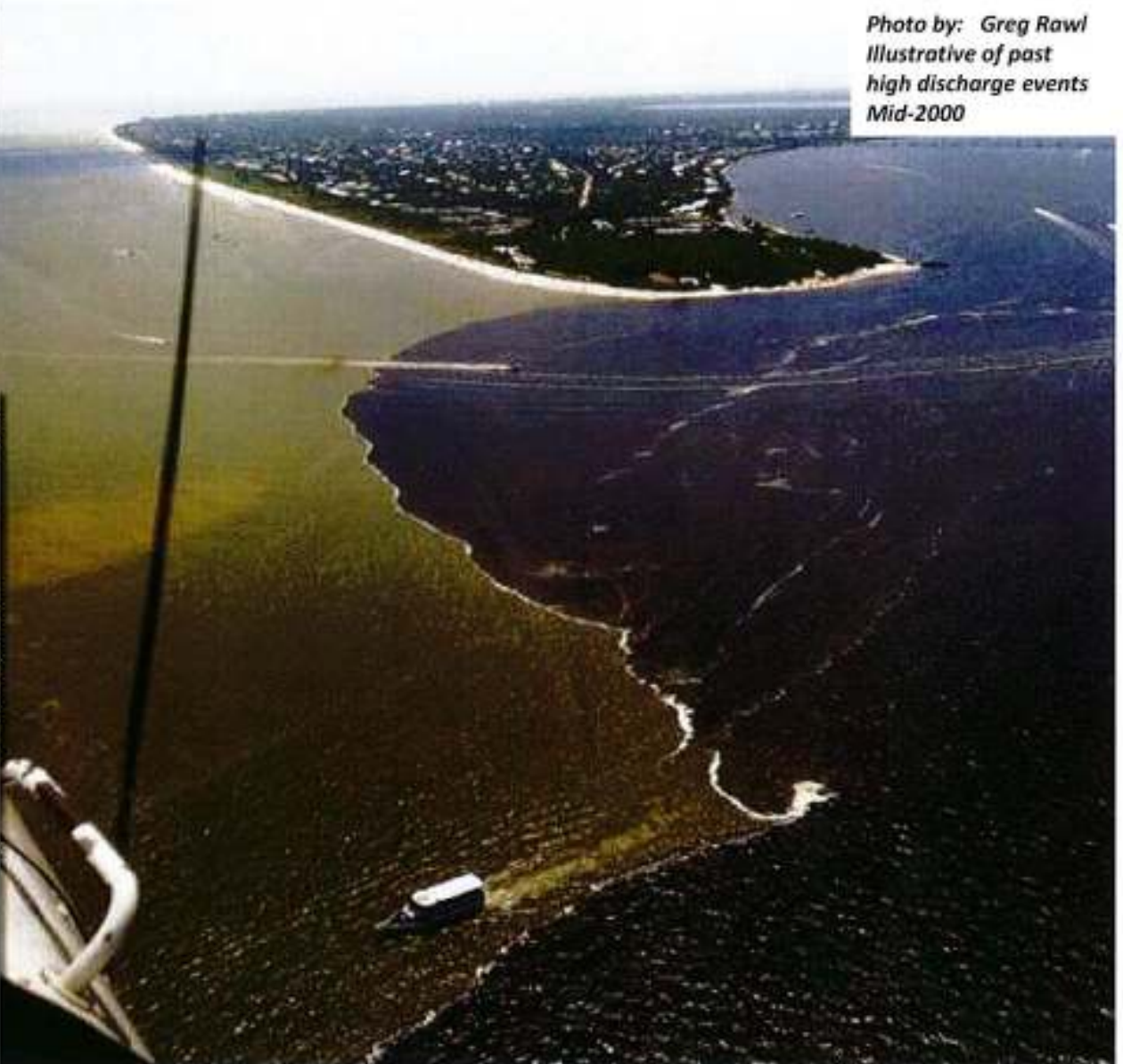


Major Impacts

Caloosahatchee Estuary

“Dark Water”
at Point Ybel,
Sanibel

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



Caloosahatchee Estuary at the Gulf of Mexico



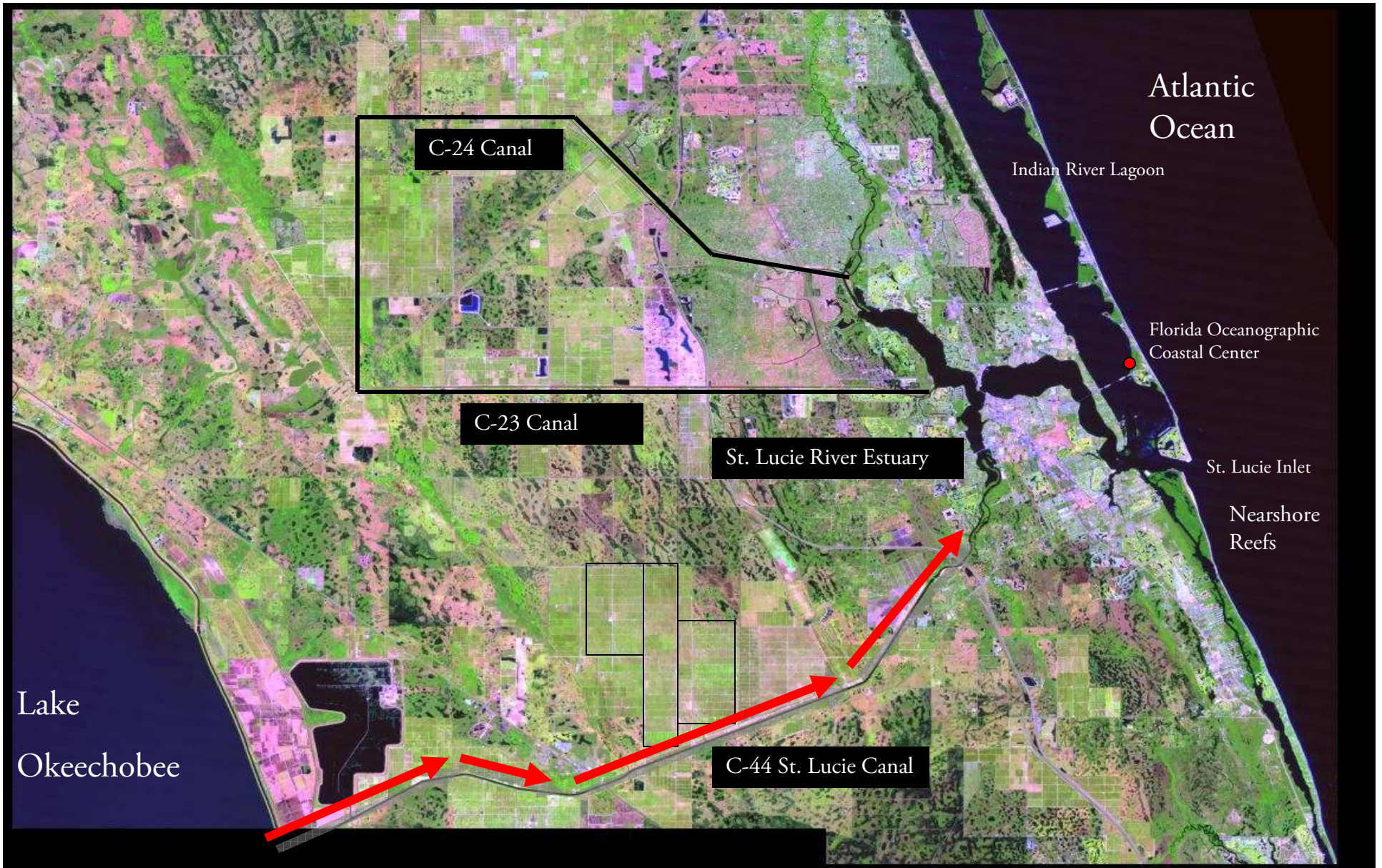
Photo by: John Cassani

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)

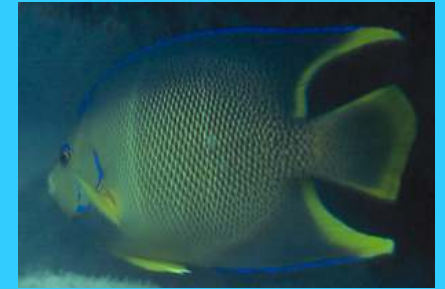
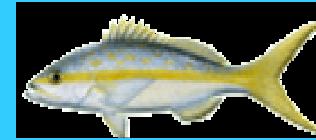
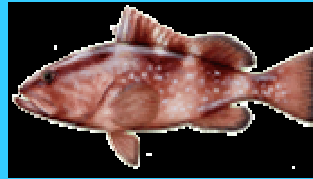


Discharges from Lake Okeechobee to the St. Lucie River Estuary and Indian River Lagoon

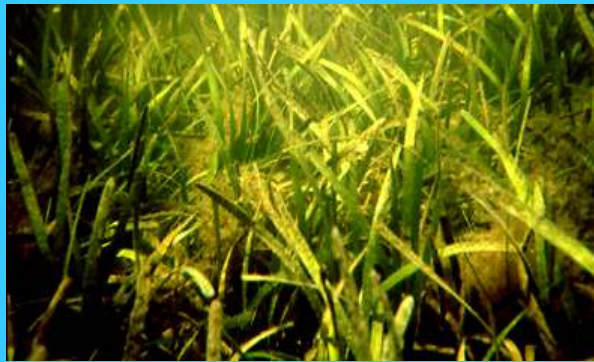


Discharges from Lake Okeechobee and St. Lucie Canal to the Estuary. Up to 4.6 Billion Gallons per Day!

Loss of Fisheries & Coastal Habitat



Seagrass Beds



Oyster Reefs



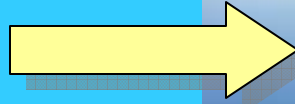
Mangroves

Coral Reefs

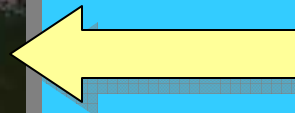


Indian River Lagoon Seagrass Beds

Before Discharges

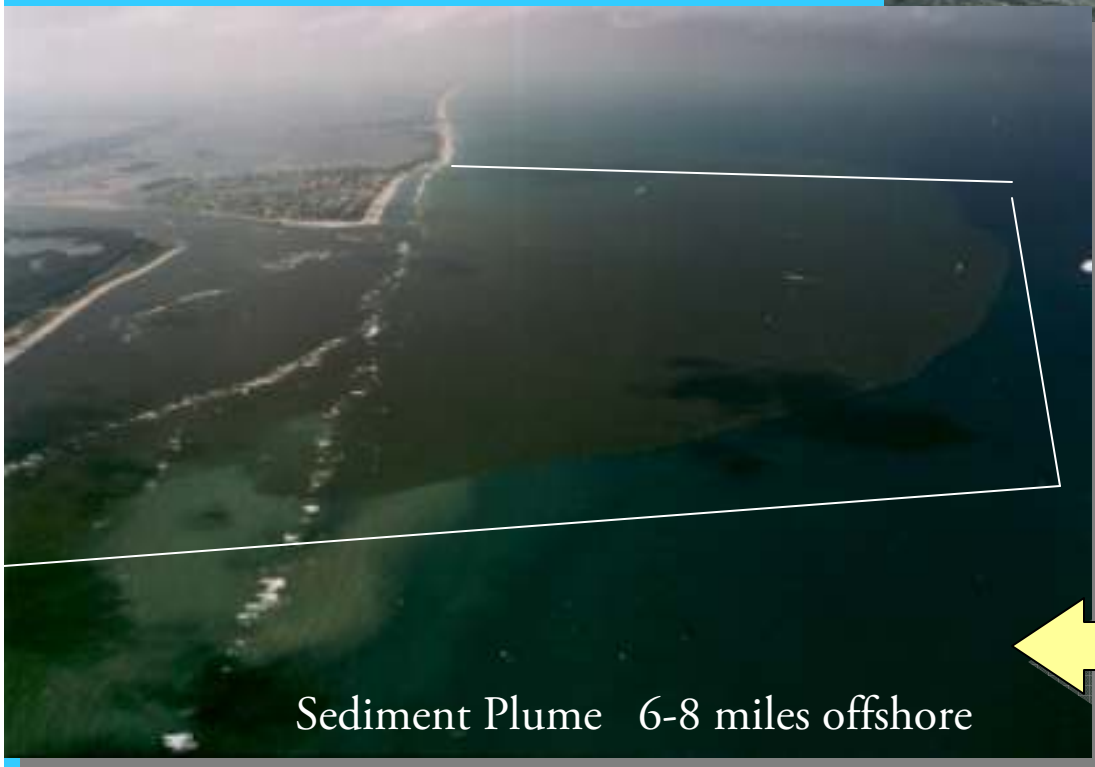
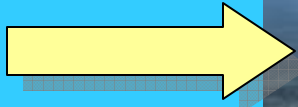


During Discharges

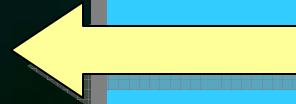


St. Lucie Inlet Nearshore Reefs

Before Discharges



Sediment Plume 6-8 miles offshore



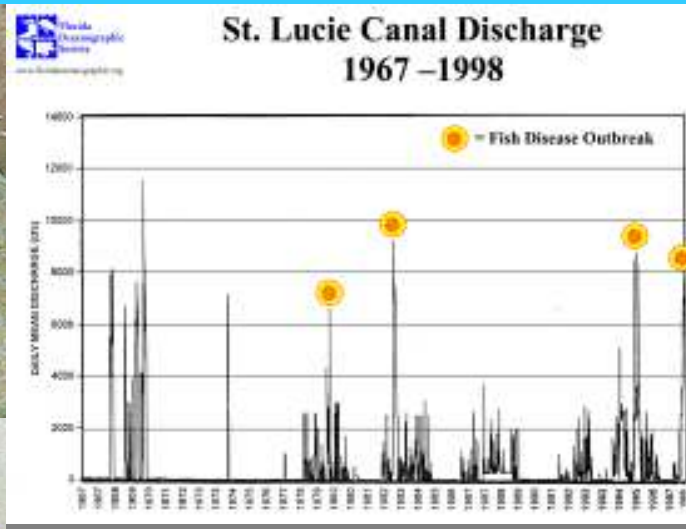
During Discharges

St. Lucie River Estuary Muck Bottom

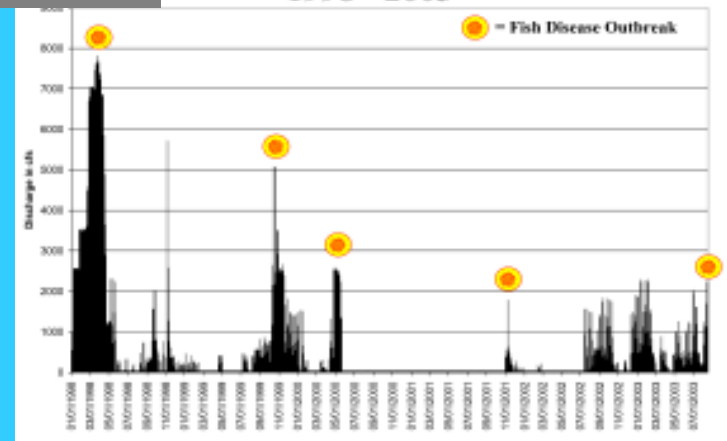


4-8 ft. thick on bottom
7.9 million cubic yards ++

Fish Lesions and Abnormalities



St. Lucie Canal Discharge
1998 - 2003

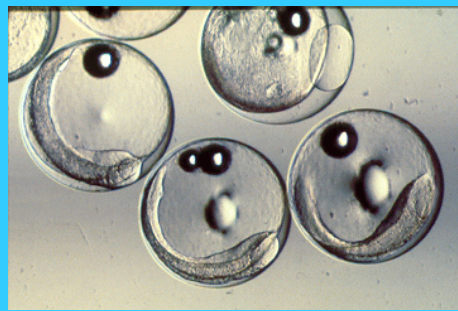
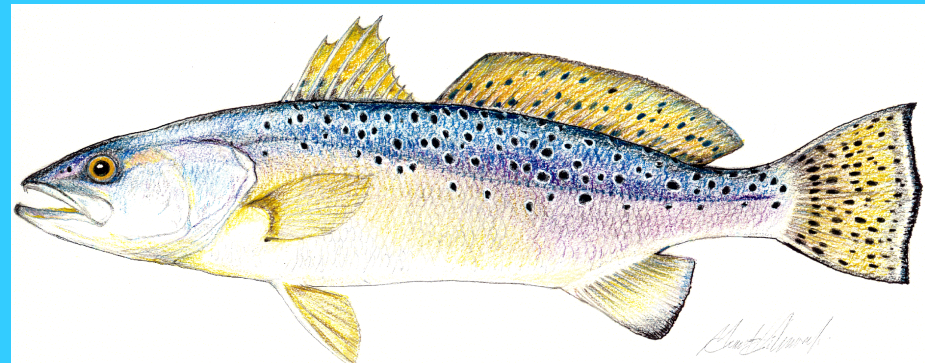


33 Species of Fish
6% of the population

Direct Effects on Fisheries

Economically important Spotted Seatrout

Reproduction is inhibited by low salinity levels in the estuary.

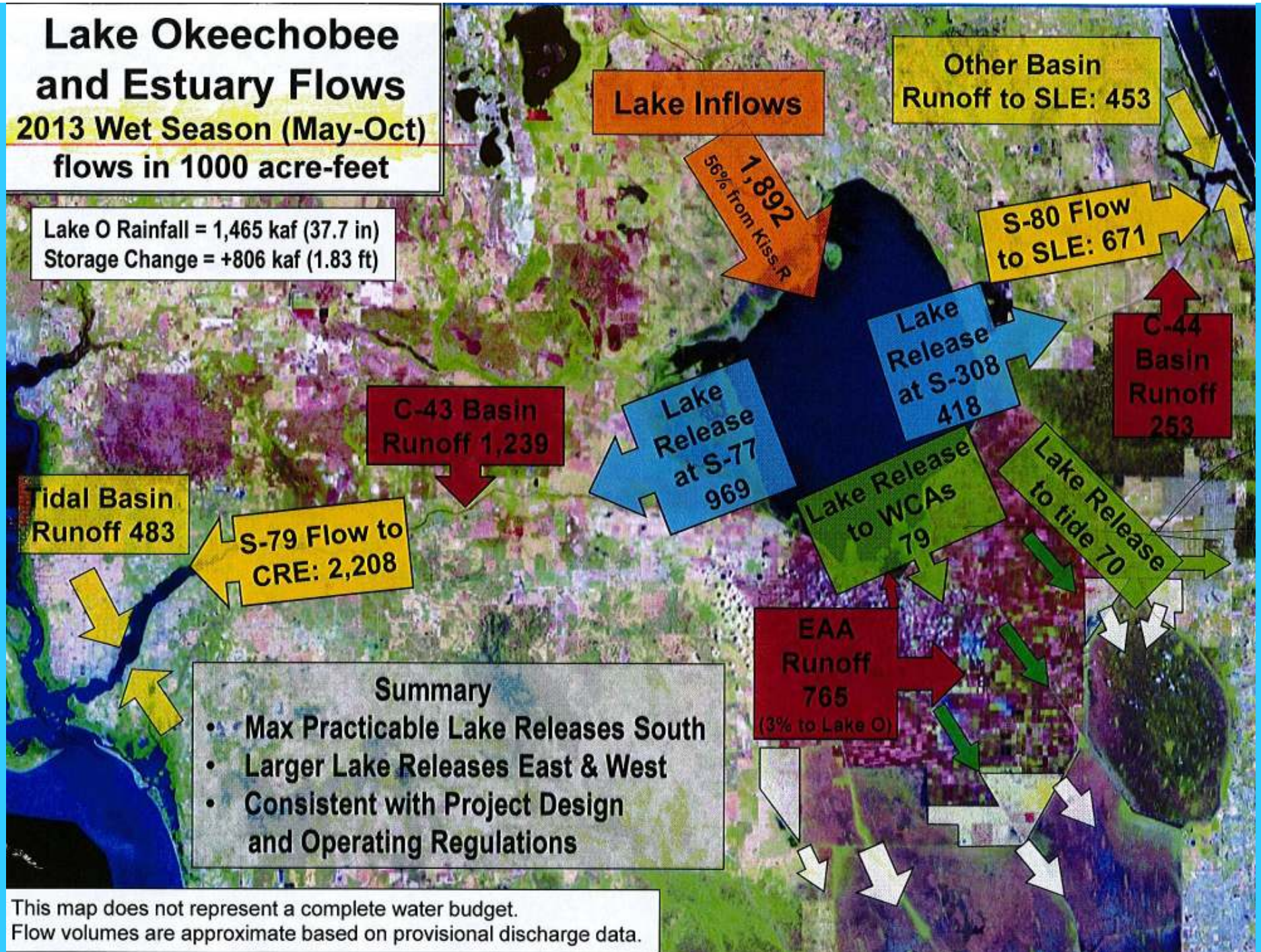


Lake Okeechobee and Estuary Flows

2013 Wet Season (May-Oct)

flows in 1000 acre-feet

Lake O Rainfall = 1,465 kaf (37.7 in)
 Storage Change = +806 kaf (1.83 ft)



Summary

- Max Practicable Lake Releases South
- Larger Lake Releases East & West
- Consistent with Project Design and Operating Regulations

This map does not represent a complete water budget.
 Flow volumes are approximate based on provisional discharge data.



0 0.5 1 2 Miles

North Fork




Middle Estuary

FOS

M.S. Oyster Reef

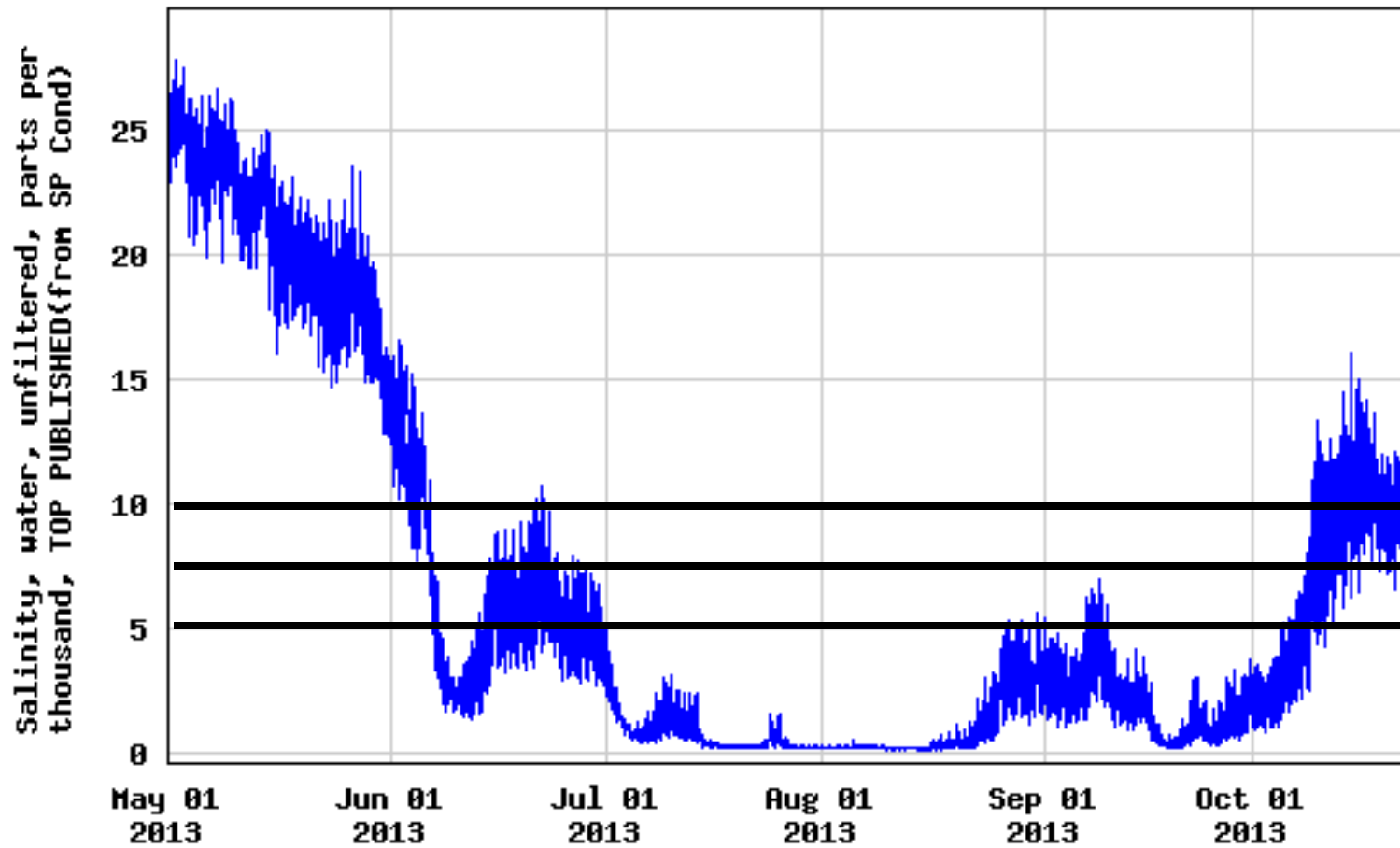
Lower Estuary

South Fork

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



USGS 02277100 ST LUCIE RIVER AT SPEEDY POINT, STUART FL



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

Stress

Harm

Death

140 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 North Fork St. Lucie River and Indian River Lagoon- State Aquatic Preserves



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

St. Lucie Inlet 7-6-13

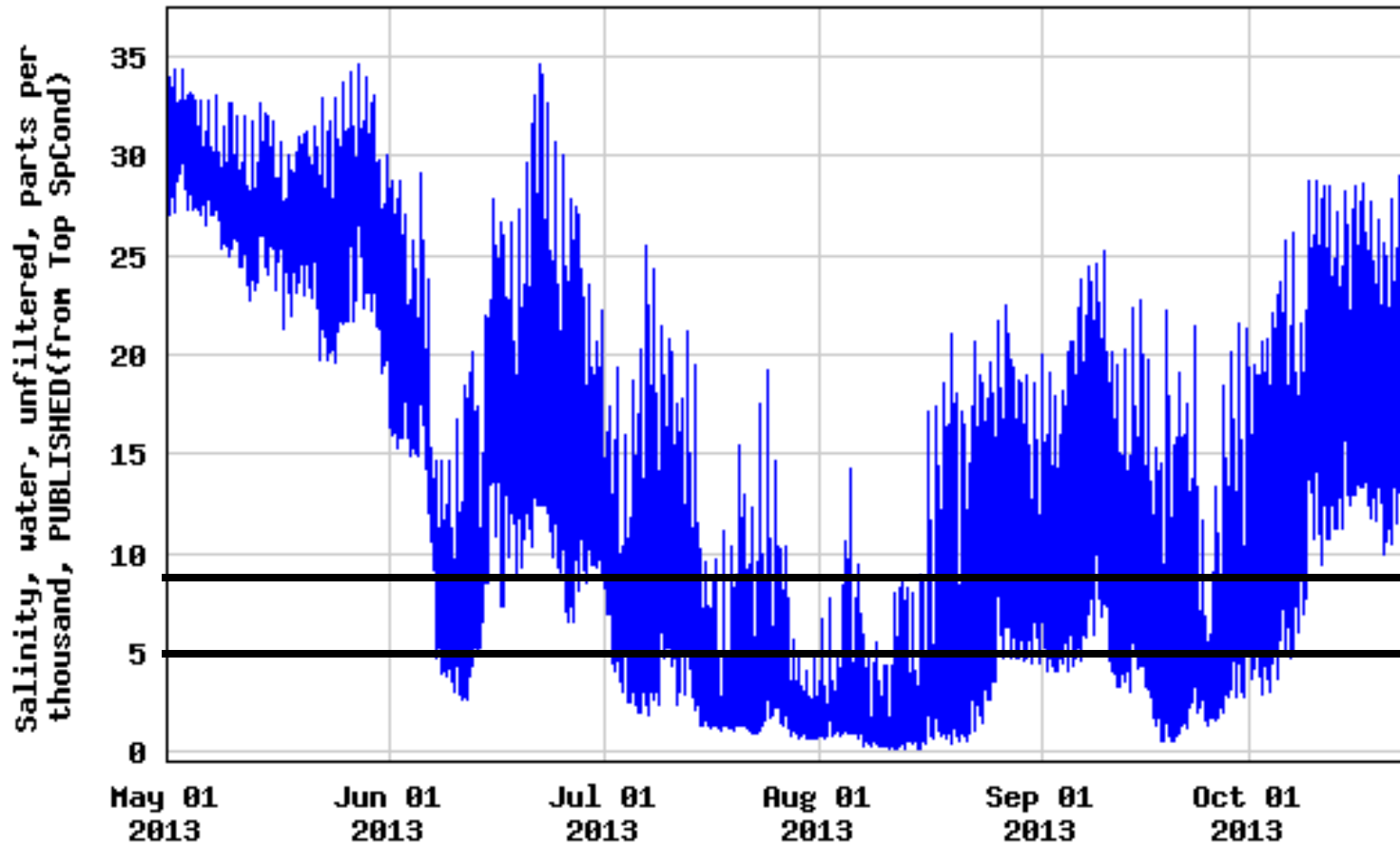
(photos by J. Thurlow-Lippisch)





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

USGS 02277110 ST LUCIE ESTUARY AT A1A (STEELE PT)STUART FL



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

Death

Death

95 Days

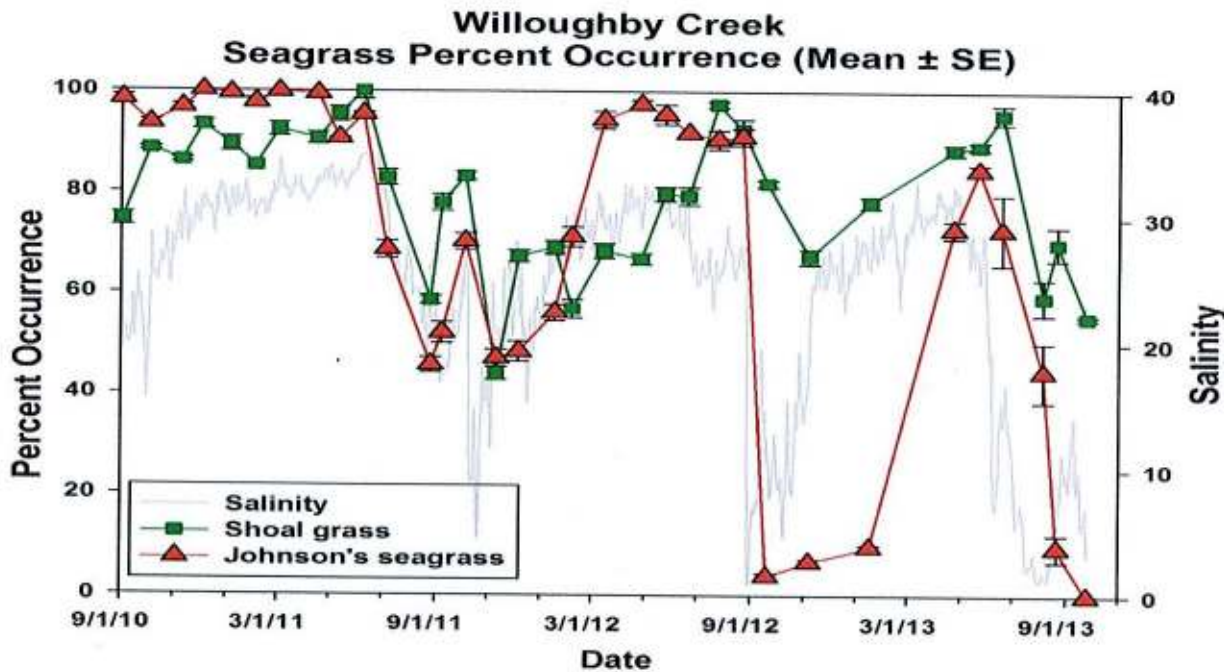
Salinity Tolerance for Seagrass



Death

14 days < 9 ppt

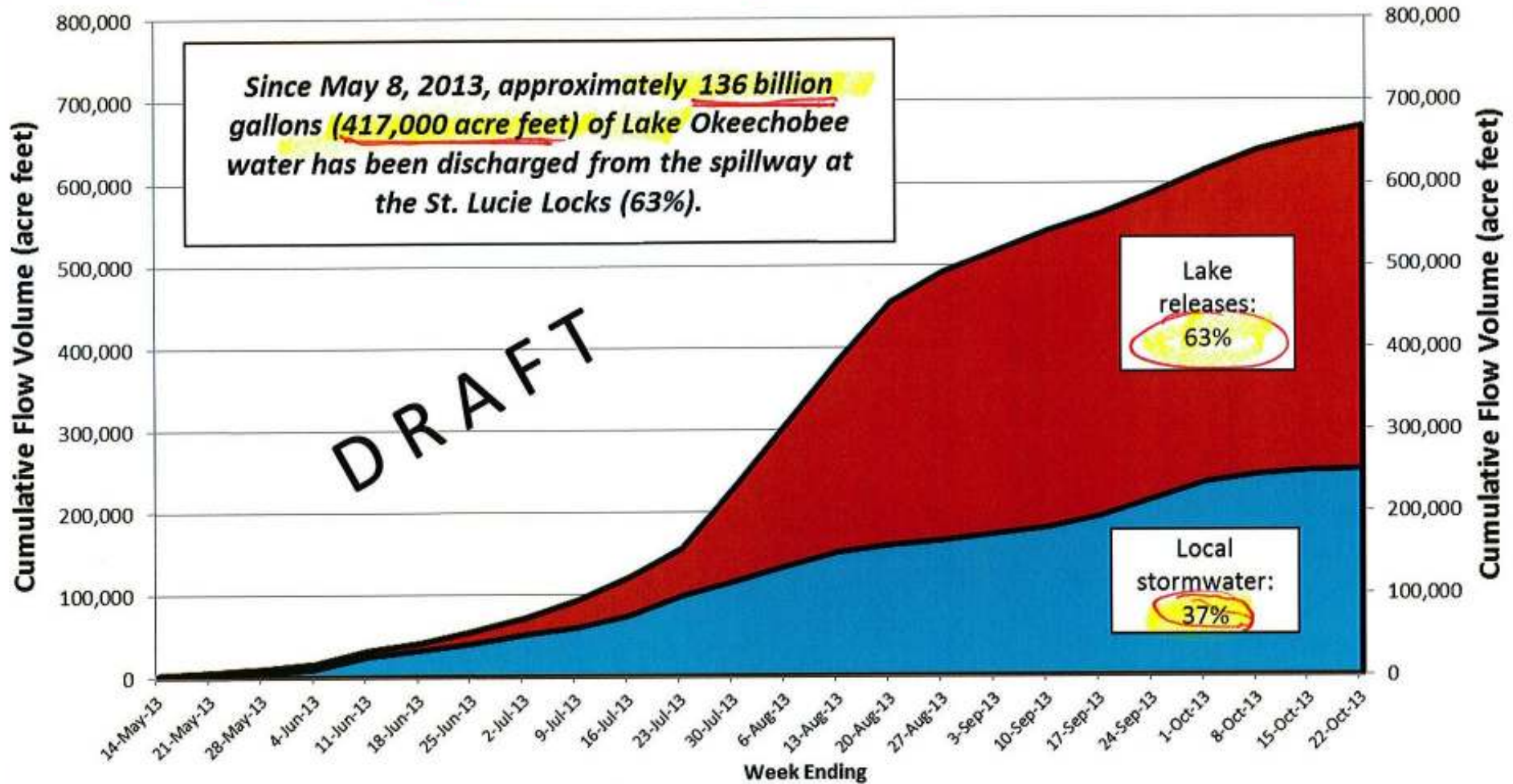
3 days < 5ppt



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

Cumulative flow at the St. Lucie Spillway: May 8 - October 22, 2013

■ Local stormwater ■ Pass through from Lake



1 acre foot = enough water to cover an acre of land with one foot of water. 1 acre foot is equal to 325,872 gallons.

Data source: South Florida Water Management District database : http://www.sfwmd.gov/dbhydroplsql/show_dbkey_info.main_menu

Data are preliminary and subject to revision; flows assumed to continue at last reported values. For S-308, flow was last reported for 10/14/2013 and for S-80, flow was last reported for 10/14/2013.

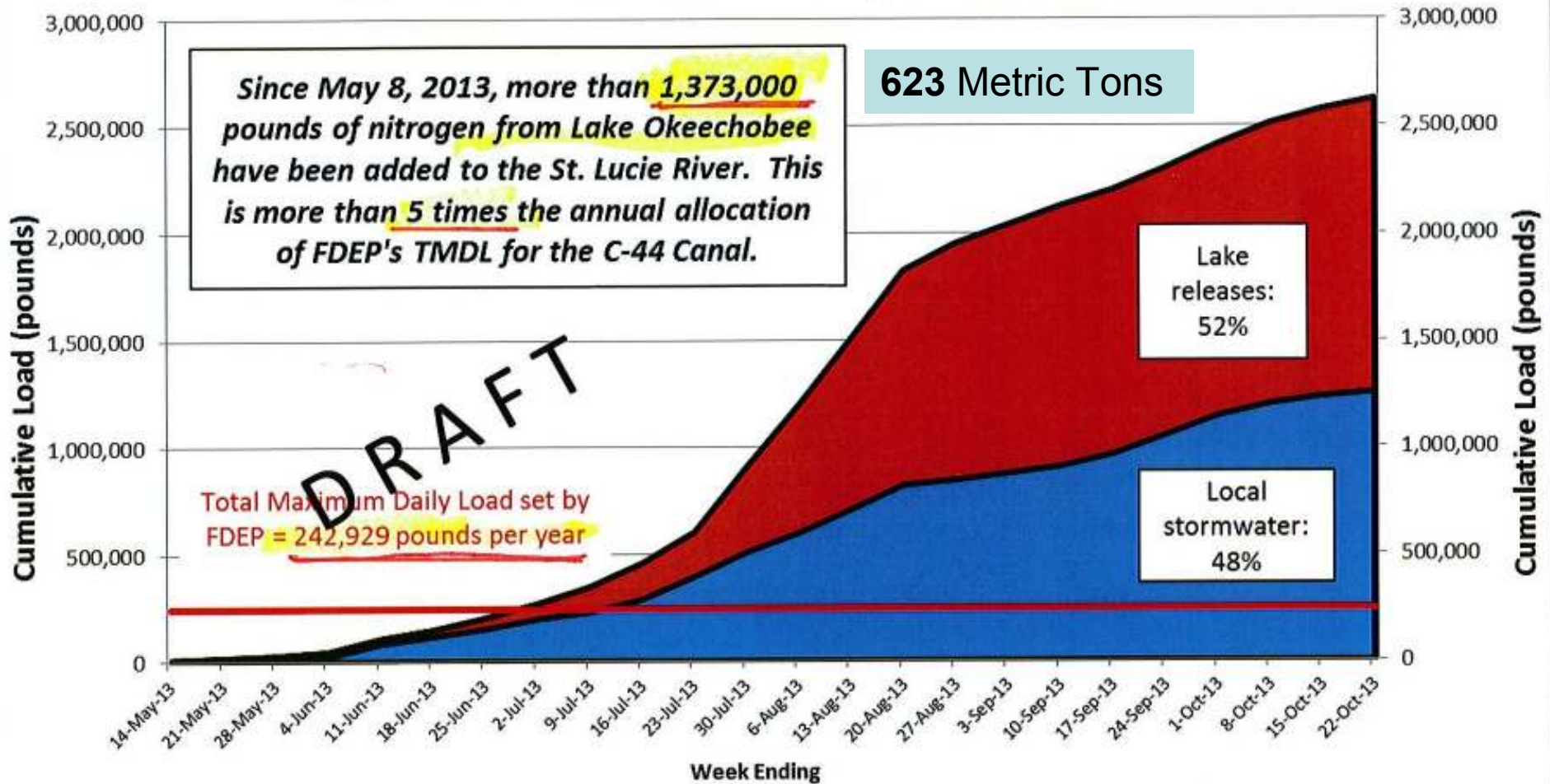
Data analysis-Gary Goforth, Ph.D.



Discharge from the Lake

Nitrogen Loading Through the St. Lucie Spillway: May 8 - October 22, 2013

Local stormwater Pass through from Lake TMDL



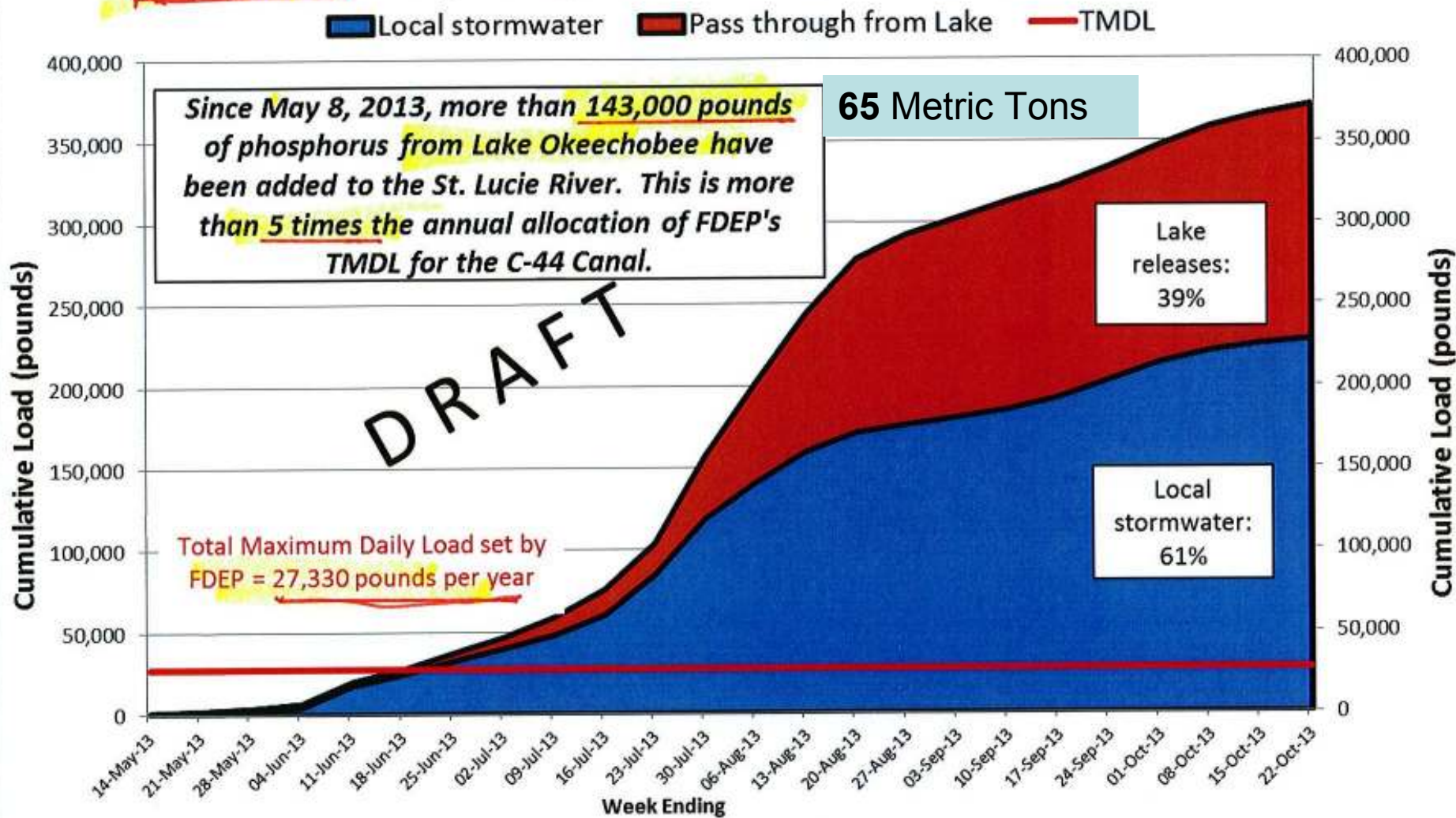
TMDL load is for total C-44 contribution to the River at S-80, and includes local stormwater and Lake discharges
 Data source: South Florida Water Management District database : http://www.sfwmd.gov/dbhydroplsql/show_dbkey_info.main
 Data are preliminary and subject to revision; flows and water quality assumed to continue at last reported values.
 For S-308, flow was last reported for 10/22/2013 and TN was last reported for 09/18/2013. For S-80, flow was last reported for 10/22/2013 and TN was last reported for 09/19/2013.

Data analysis-Gary Goforth, Ph.D.



Nitrogen from the Lake

Phosphorus Loading Through the St. Lucie Spillway: May 8 - October 22, 2013



Data analysis-Gary Goforth, Ph.D.

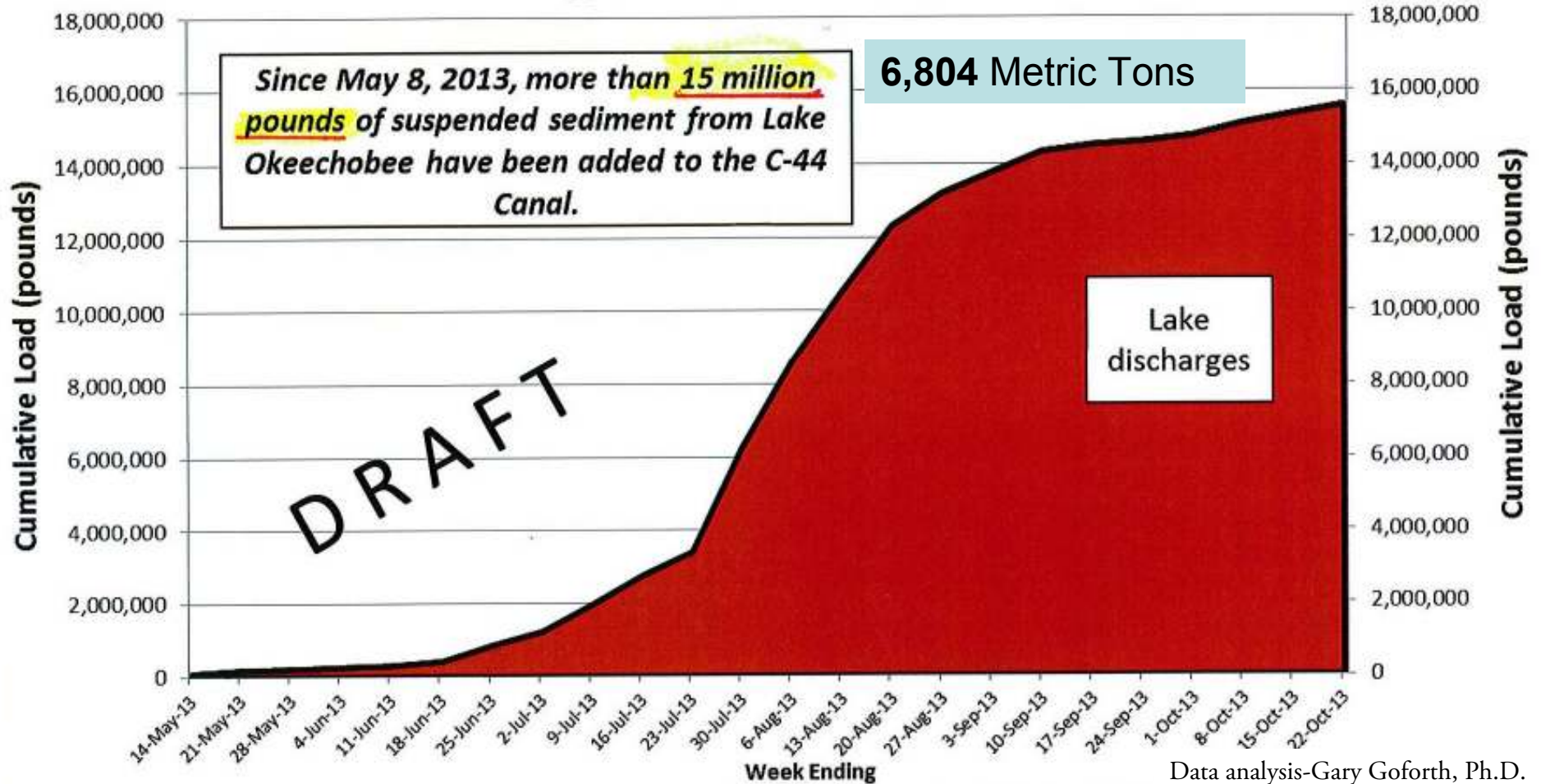
TMDL load is for total C-44 contribution to the River at S-80, and includes local stormwater and Lake discharges
 Data source: South Florida Water Management District database : http://www.sfwmd.gov/dbhydroplsql/show_dbkey_info.main_menu
 Data are preliminary and subject to revision; flows and water quality assumed to continue at last reported values.
 For S-308, flow was last reported for 10/22/2013 and TP was last reported for 09/18/2013. For S-80, flow was last reported for 10/22/2013 and TP was last reported for 09/19/2013.



Phosphorus from the Lake

**Suspended Solids Loading From Lake Okeechobee to the C-44 Canal:
May 8 - October 22, 2013**

■ From Lake to C-44 Canal



Data analysis-Gary Goforth, Ph.D.

Data source: South Florida Water Management District database : http://www.sfwmd.gov/dbhydroplsql/show_dbkey_into.main_menu
Data are preliminary and subject to revision; TSS last reported at S-308 on September 18, 2013 and assumed to continue at that level.



Suspended Solids from the Lake



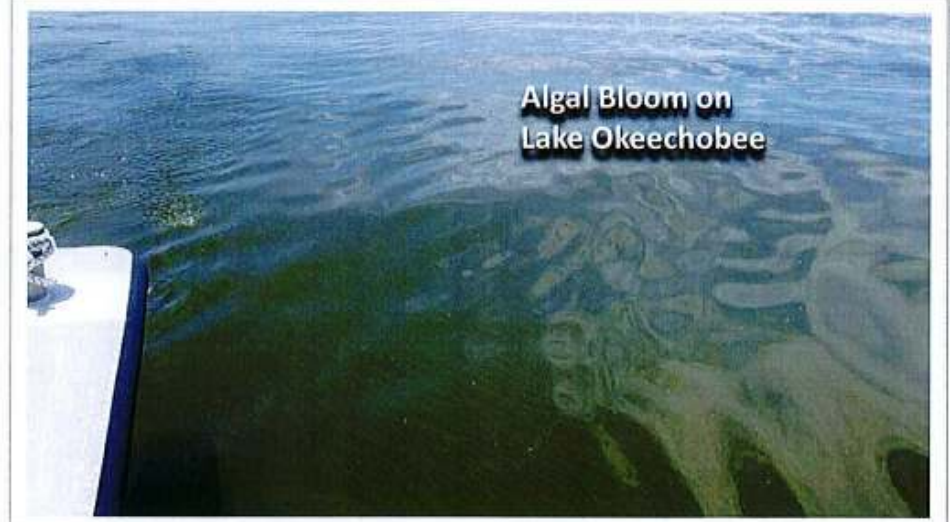
Health Warnings posted in the St. Lucie River Estuary – 2004, 2005, 2006, 2010, 2012 and 2013



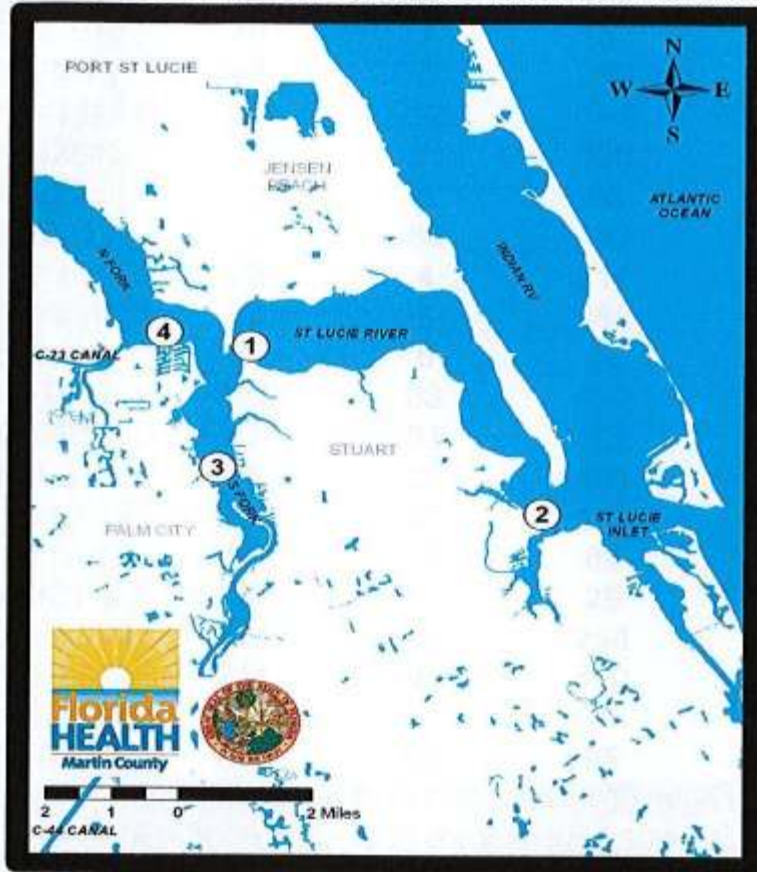
**Green Algae Bloom Observed in St. Lucie River along shoreline in Rio –
Microcystis - Douglas Ashley – 7-13-13**

Lake Okeechobee

Current Conditions



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



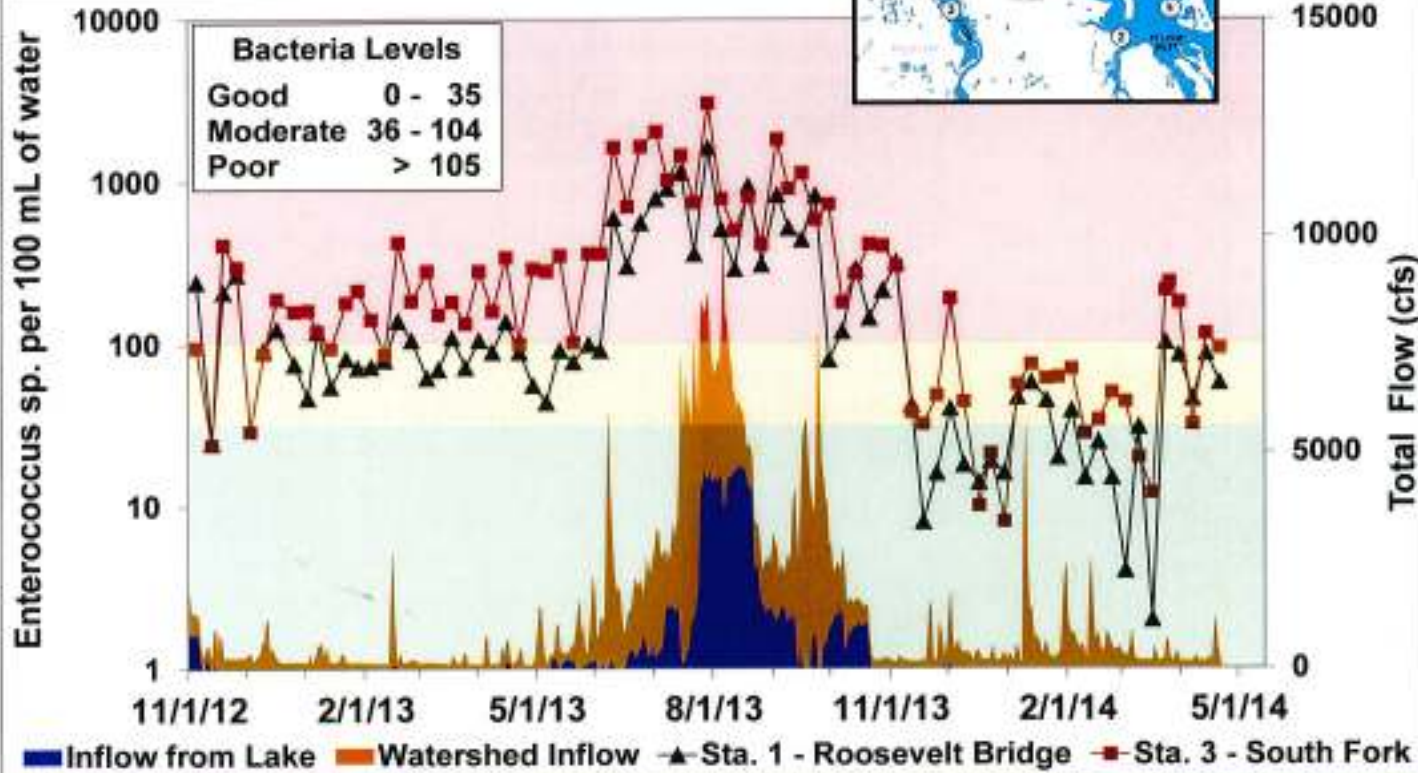
Date	Roosevelt Bridge (1)	Sandsprit Park (2)	Leighton Park (3)	E of Bessey Creek (4)
7/15/2013	1140	354	1440	1480
7/8/2013	910	156	1020	1560
7/2/2013	790	216	2020	1080
6/24/2013	560	102	1640	1400
6/17/2013	302	86	700	590
6/12/2013	Not sampled	134	Not sampled	Not sampled
6/10/2013	600	122	1620	1500



Highest Bacteria Levels Observed
Health Warnings Posted
Avoid Contact with Water

Bacteria Monitoring St. Lucie River

Florida Dept. of Health - Martin County



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



Date	Roosevelt Bridge (1)	Sandpoint Park (2)	Lighthouse Park (3)	Is of Boosay Creek (4)	Stuart Sandbar (5)
5/19/2014	Poor	Good	Poor	Not sampled	Good
5/13/2014	Moderate	Good	Good	Not sampled	Good
5/6/2014	Poor	Good	Poor	Not sampled	Good
4/28/2014	Moderate	Good	Moderate	Not sampled	Good
4/21/2014	Moderate	Good	Poor	Not sampled	Good
4/14/2014	Moderate	Good	Good	Not sampled	Good
4/7/2014	Moderate	Good	Poor	Not sampled	Good
3/31/2014	Not sampled	Not sampled	Poor	Not sampled	Not sampled
3/26/2014	Moderate	Good	Poor	Not sampled	Good
3/24/2014	Good	Good	Good	Not sampled	Good
3/17/2014	Good	Good	Good	Not sampled	Good
3/10/2014	Good	Good	Moderate	Not sampled	Good

Toxic Algae Samples – July 2013



8-03-13 Rally for the River 5,000 at St. Lucie Lock & Dam

8-11-13 Stand on the Sand-6,000 on 3 miles Hutchinson Island beaches

8-20-13 Governor Rick Scott visits St. Lucie Lock & Dam-350 rally-no public address

9-01-13 Sugarland Rally- Clewiston-300 gather

9-28-13 Hands Across the Lagoon Rally – 800 gather



8-08-13 Water Resource Advisory Commission-Indian Riverside Park-20 panel-100s gather

8-15-13 Senator Bill Nelson Meeting-Flagler Center, Stuart-22 panel-100s gather

8-22-13 Florida Select Committee-Senator Joe Negron-9 members-panels-public testimony- Stuart-300 gather

8-29-13 Rivers Coalition-Flagler Center-U.S. Rep. Patrick Murphy-100's gather

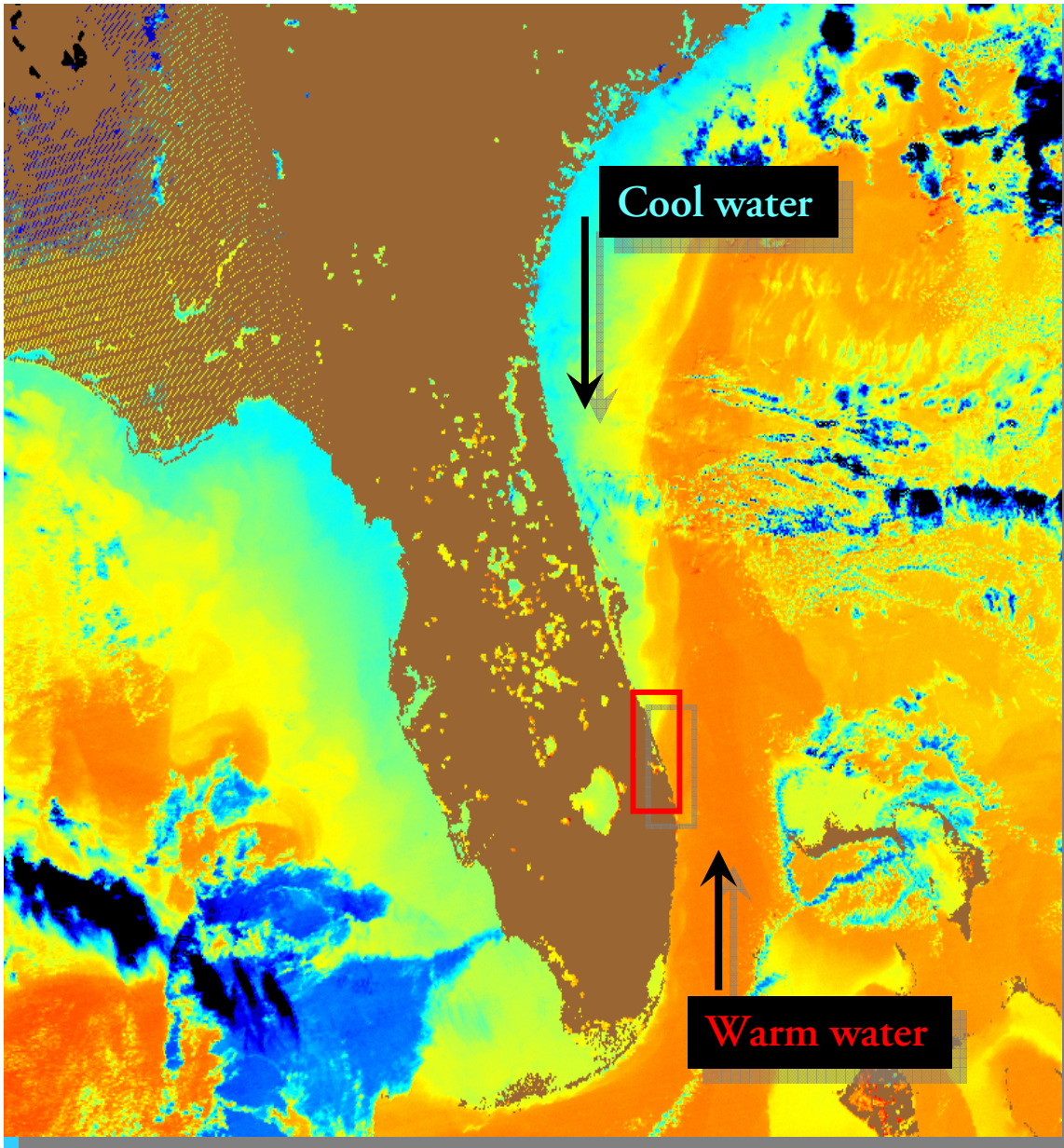
9-5-13 Water Resource Advisory Commission- WPB

9-6-13 9-County Coalition meeting –Okeechobee

9-12-13 SFWMD Mtg and State Delegation Meeting

9-19-13 Central Everglades Planning Project-USACOE

9-24-13 Florida Select Committee-Senator Joe Negron-Tallahassee – Proposed Resource Recovery Plan



Most Biodiverse Ecosystem in North America

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



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. Lucia River Estuary, St. Sebastian River, Turkey Creek, Crane Creek, Moon's Creek, and the inlets of Ponce de Leon Inlet, Port Canaveral Inlet, Sebastian Inlet, Ft. Pierce Inlet, St. Lucia 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	\$634,000,000
(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

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
April 18, 2008



HAZEN AND SAWYER
INCORPORATED
A DIVISION OF
STANTEC INC.



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)***



Now What?

Restoration Plans & Efforts for the Greater Everglades Ecosystem



Kissimmee River

Channalized 1962-1971

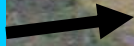
C-38 Canal



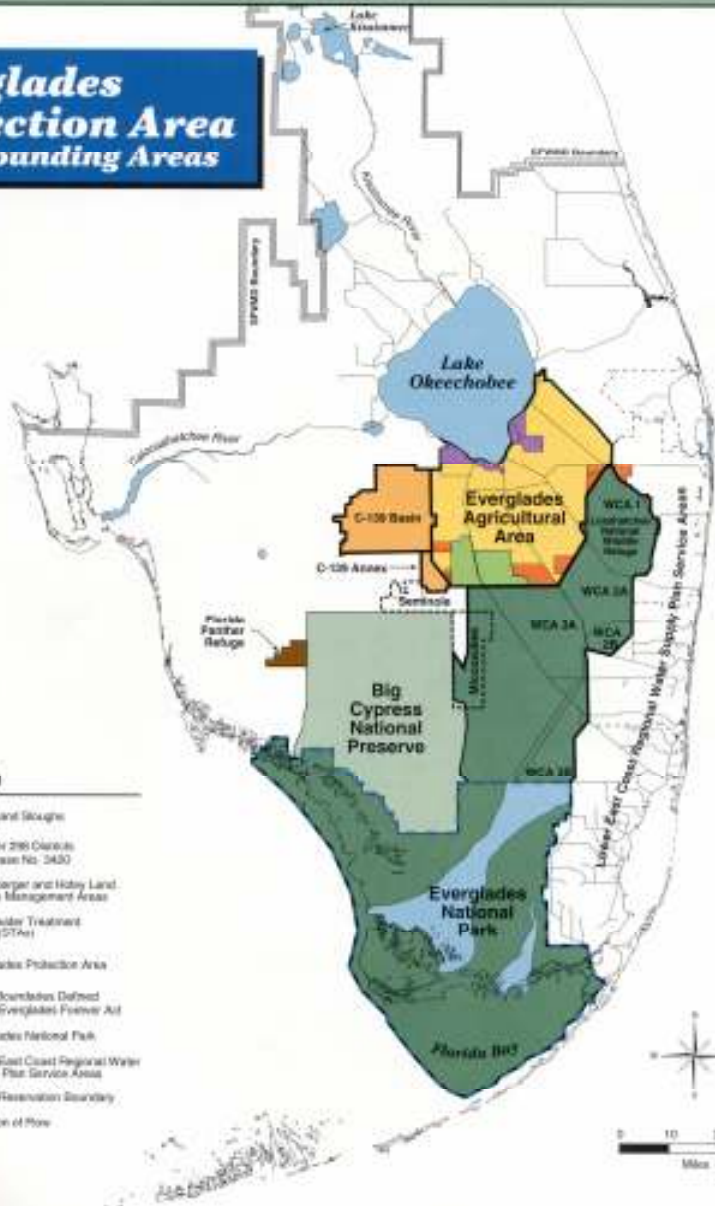
Kissimmee River

Restoration- July 11, 2001

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



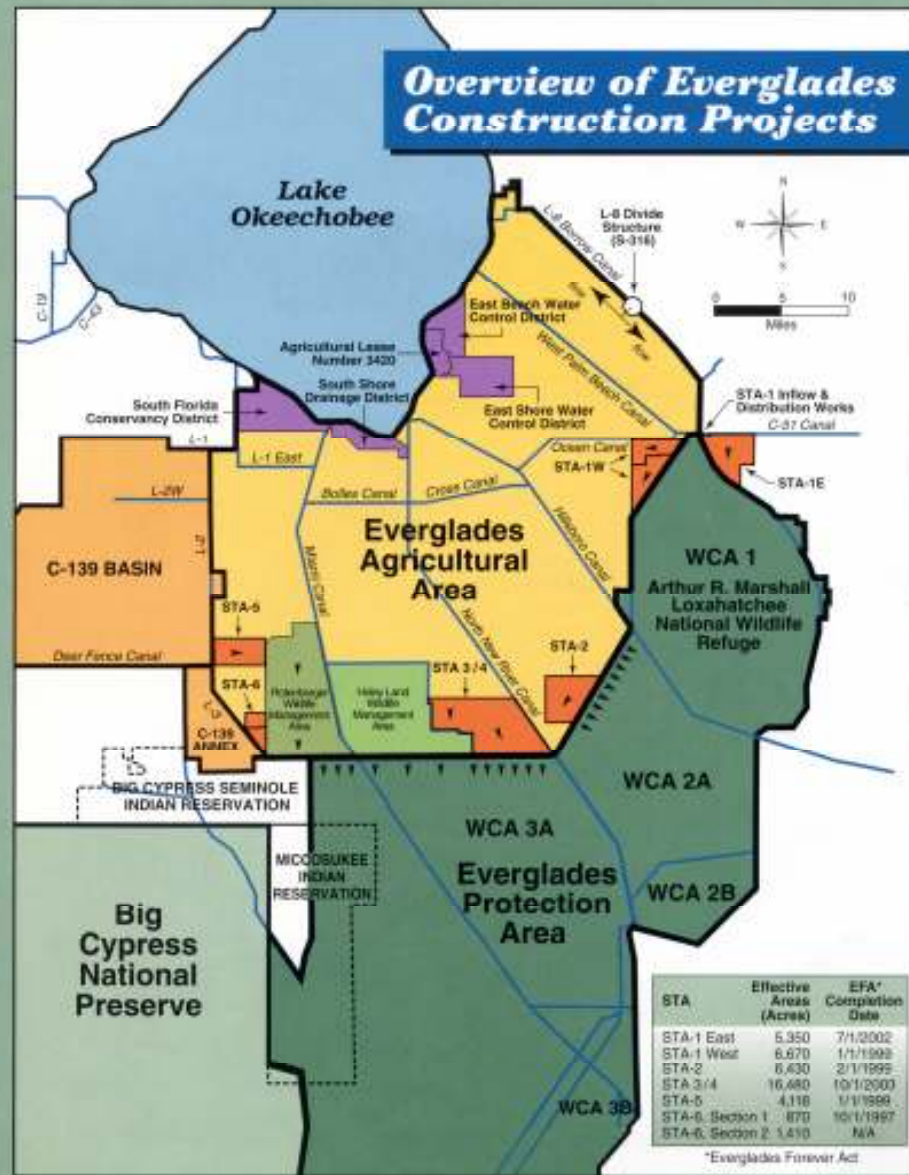
Everglades Protection Area & Surrounding Areas



LEGEND

- Lakes and Sloughs
- Chapter 266 Canals and Lease No. 3420
- Rotenberg and Hilly 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	1/1/1998
STA-2	6,630	2/1/1999
STA 3/4	16,680	10/1/2000
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 \$ 1.2 Billion

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



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

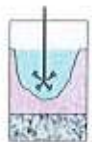
On December 11, 2000, the President signed the Water Resources Development Act (WRDA) of 2000, approving:

Comprehensive Everglades Restoration Plan

A series of environmental and other improvements over 30+ years with an estimated cost of \$7.8 billion (Now \$10-14 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

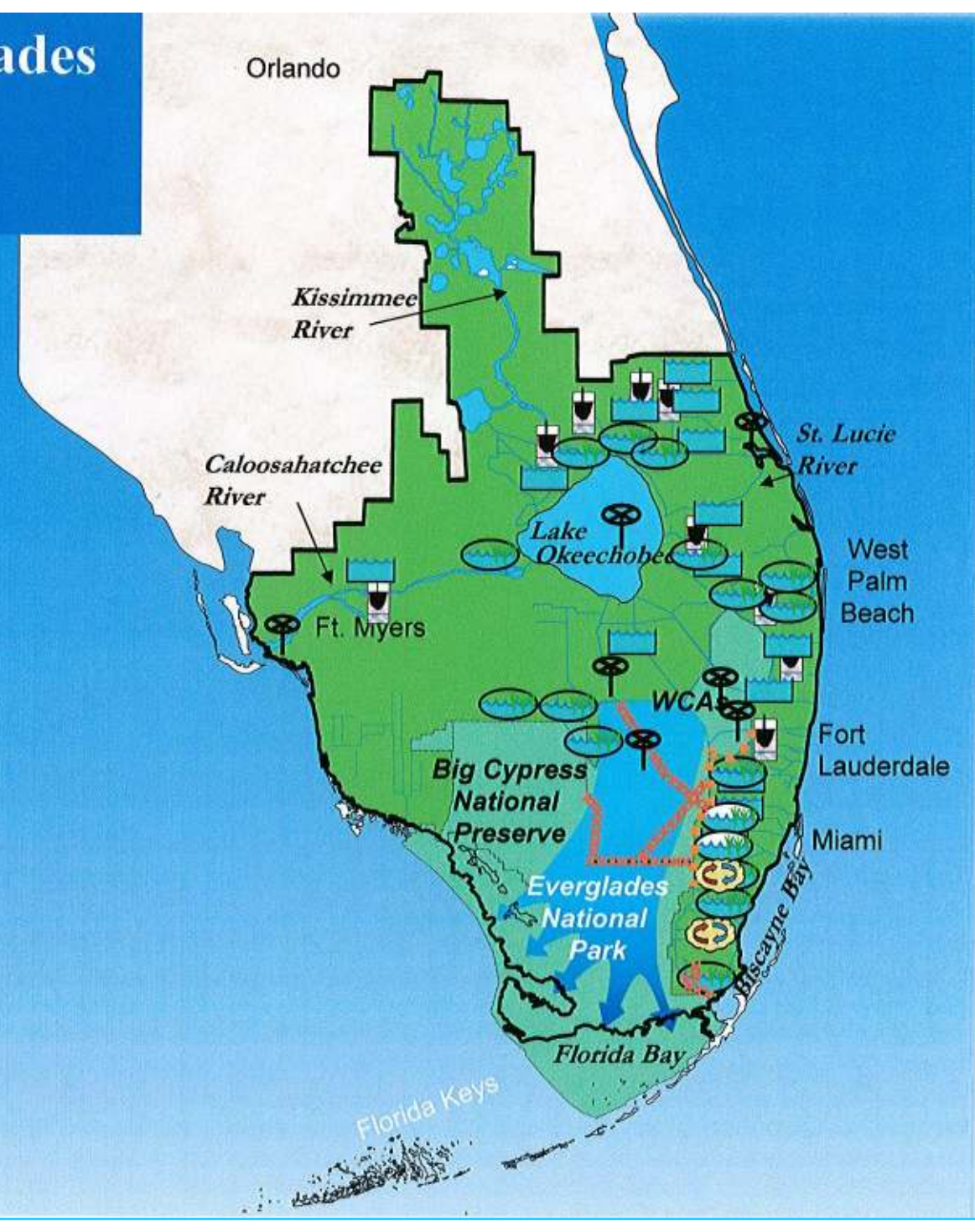


Removing 240 miles of Barriers to Sheetflow

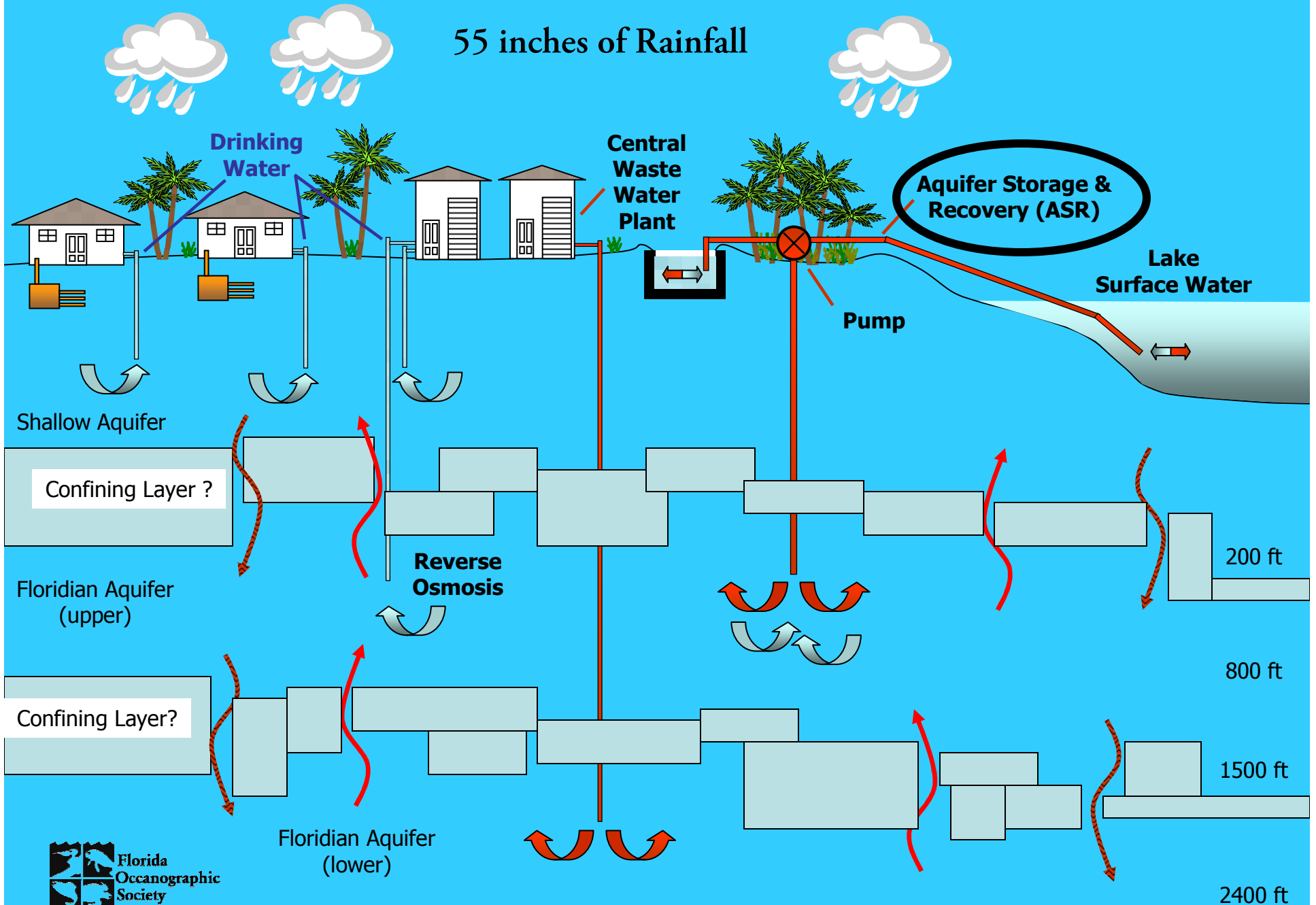


Operational Changes

Florida
Seamless Society



55 inches of Rainfall



South Florida Water Management District –State Efforts

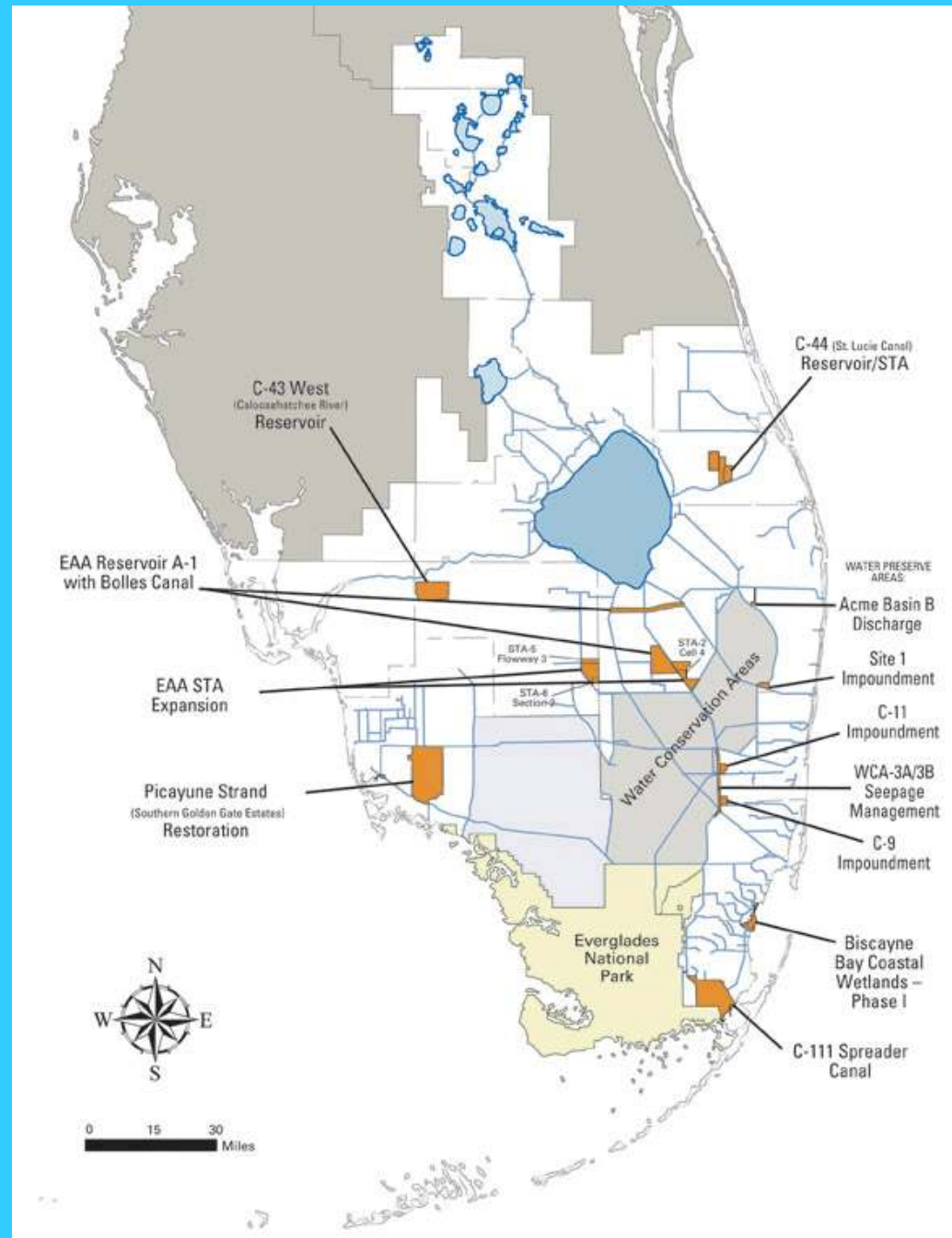
Everglades Restoration

“Acceler8 Projects”

2000-2008

State Investment

\$ 2.1 billion



\$1.75 billion deal aims to protect Everglades

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

By Mike Hickey

WELLINGTON, Fla. — U.S. Sugar Corp. has agreed to sell its 180,000-acre Everglades agricultural area to Florida for \$1.75 billion to help protect the wetlands, the state's largest landowner. The deal, announced Monday, would allow the state to acquire the land and use it for conservation purposes. The deal would also allow the state to acquire the land and use it for conservation purposes.



U.S. Sugar Corp. CEO Robert Baker, left, walks with Florida Gov. Charlie Crist, and South Florida Water Management District Board Vice Chair Michael Baker at a recent conference Tuesday.

The deal would allow the state to acquire the land and use it for conservation purposes. The deal would also allow the state to acquire the land and use it for conservation purposes.



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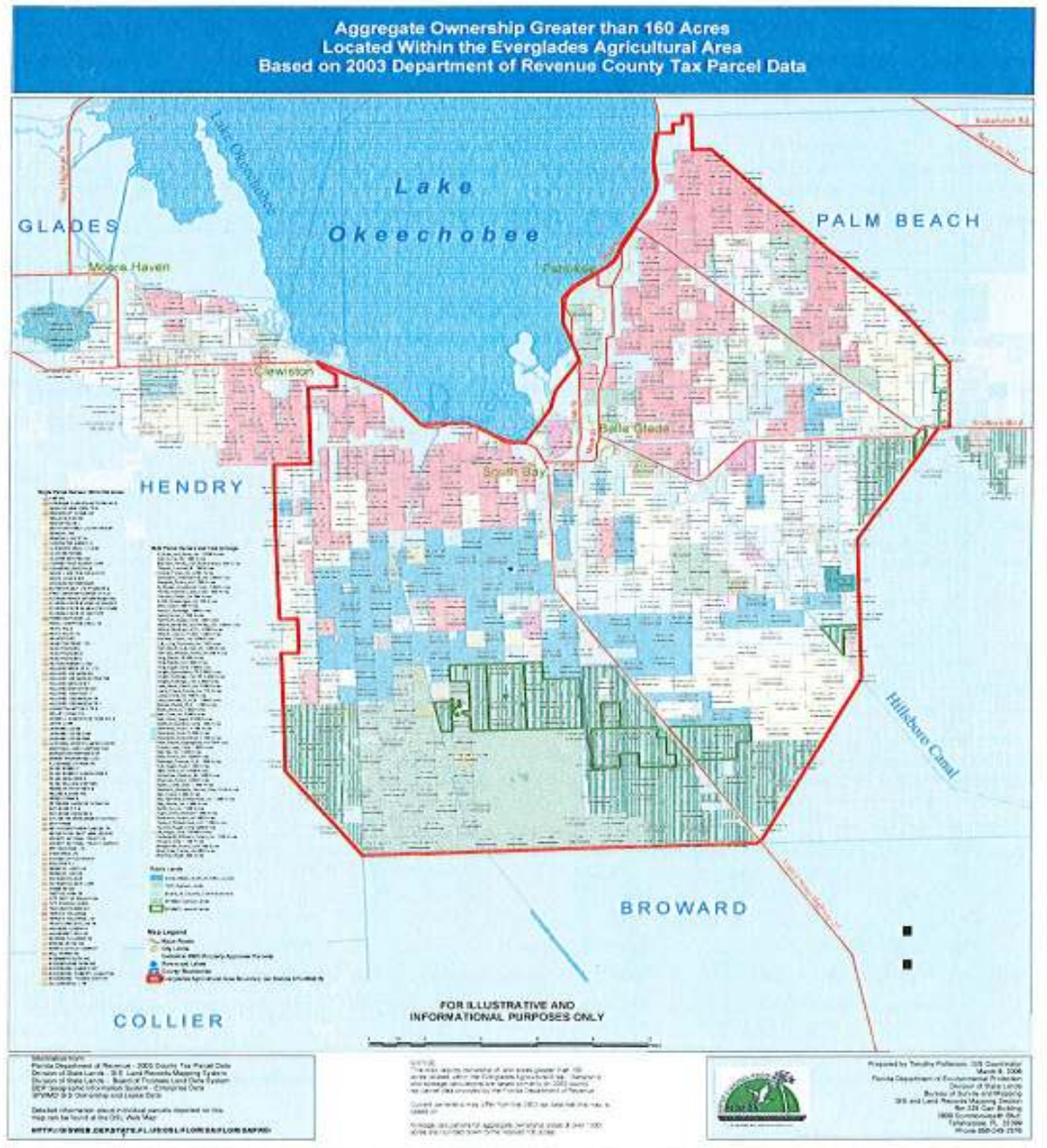
The deal would allow the state to acquire the land and use it for conservation purposes. The deal would also allow the state to acquire the land and use it for conservation purposes.

June 24, 2008

180,000 acres

US Sugar Corp. farmlands

(red color on map)



Reviving the River of Grass



- Home
- About SFWMD
- Governing Board
- Regional Service Centers
- News, Events & Meetings
- Water Conservation
- Procurement & Contracts
- Career Opportunities
- Recreation
- Learning Center
- Technical Data & Docs
- Emergency Management
- Weather
- Water Conditions
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DISTRICT ACQUIRES 26,800 ACRES TO REVIVE THE RIVER OF GRASS

Background

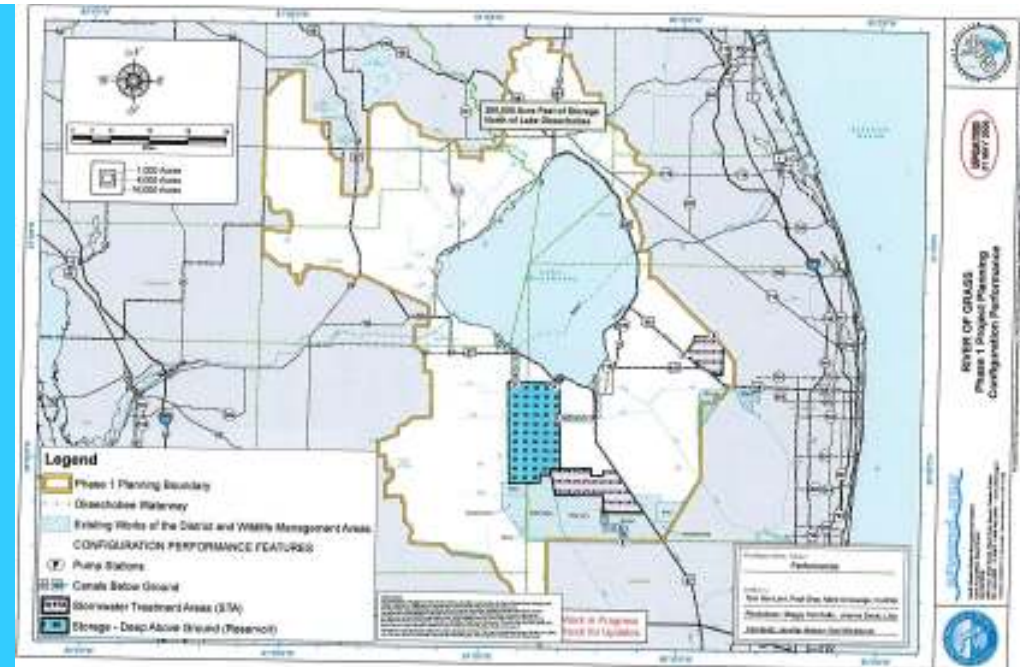
June 2008: Governor Charlie Crist announced that the South Florida Water Management District would begin negotiating an agreement to acquire as much as 167,000 acres of agricultural land owned by the United States Sugar Corporation for Everglades restoration. Acquiring the enormous expanse of real estate 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 \$1.24 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.

- 3X Kissimmee
- 3X Lake Okechobee
- 3X Everglades
- 3X Coastal Areas





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 73,500 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.**

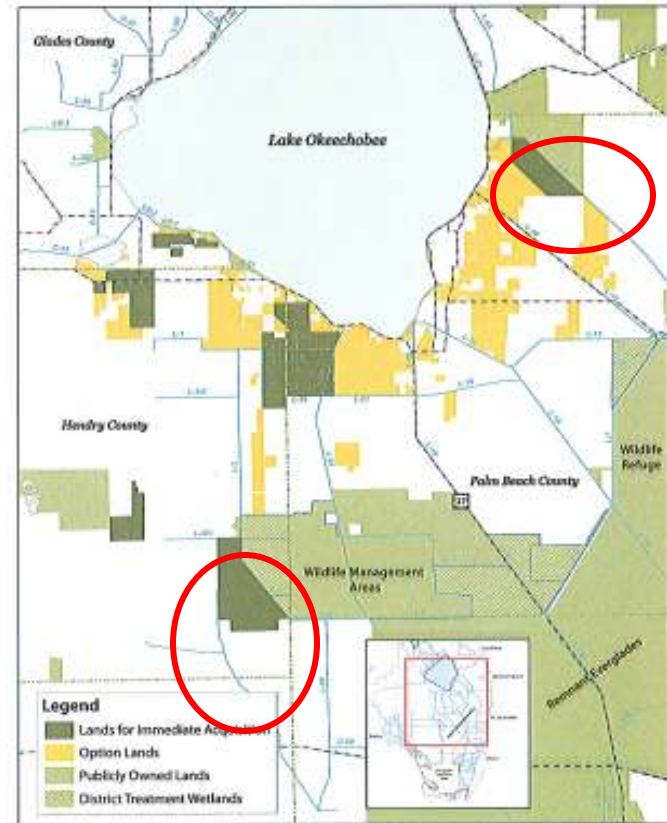
Highlights of the proposed acquisition terms include:

- 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.stwmtd.gov/revolvinggreen



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



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

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"

RESTORING THE HEART OF THE EVERGLADES

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

- Division 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-204 (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-38 of existing agricultural canals with improvements to agricultural canals in WCA-38
- Tamiami Trail western 2.6 mile bridge and L-29 canal max stage of 9.7 ft (future work in 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



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

- Division 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-204 (400 cfs)
- Backfill Miami Canal from S-8 to I-75

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 38
- 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 of 9.7 ft (future work in 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
- G-211 operational refinements use coastal canals to convey seepage

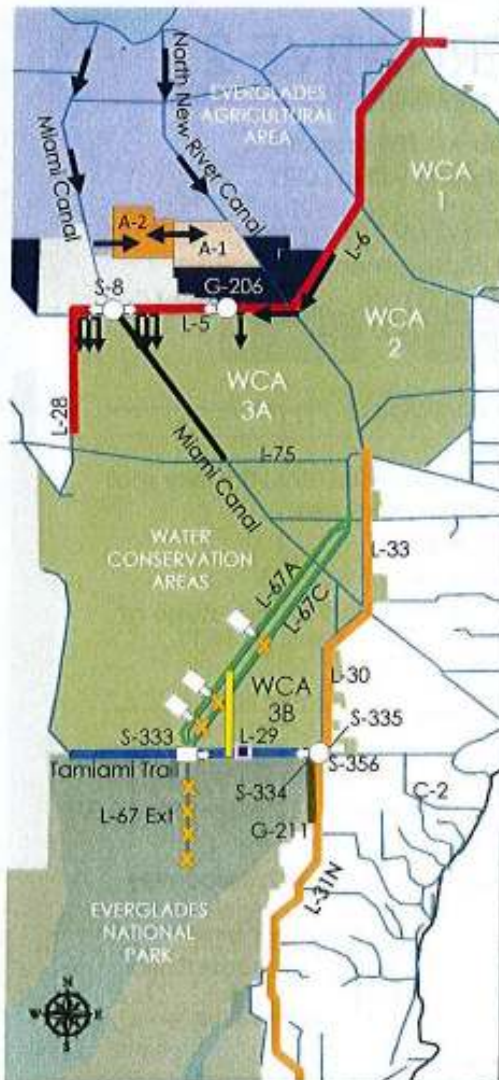


RESTORING THE HEART OF THE EVERGLADES

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

- 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

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- Increase S-333 capacity to 3,000 cfs
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- Degrade entire L-67 extension levee

SEEPAGE MANAGEMENT

- Increase S-356 to 1,000 cfs
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- G-211 operational refinements; use coastal canals to convey seepage



36



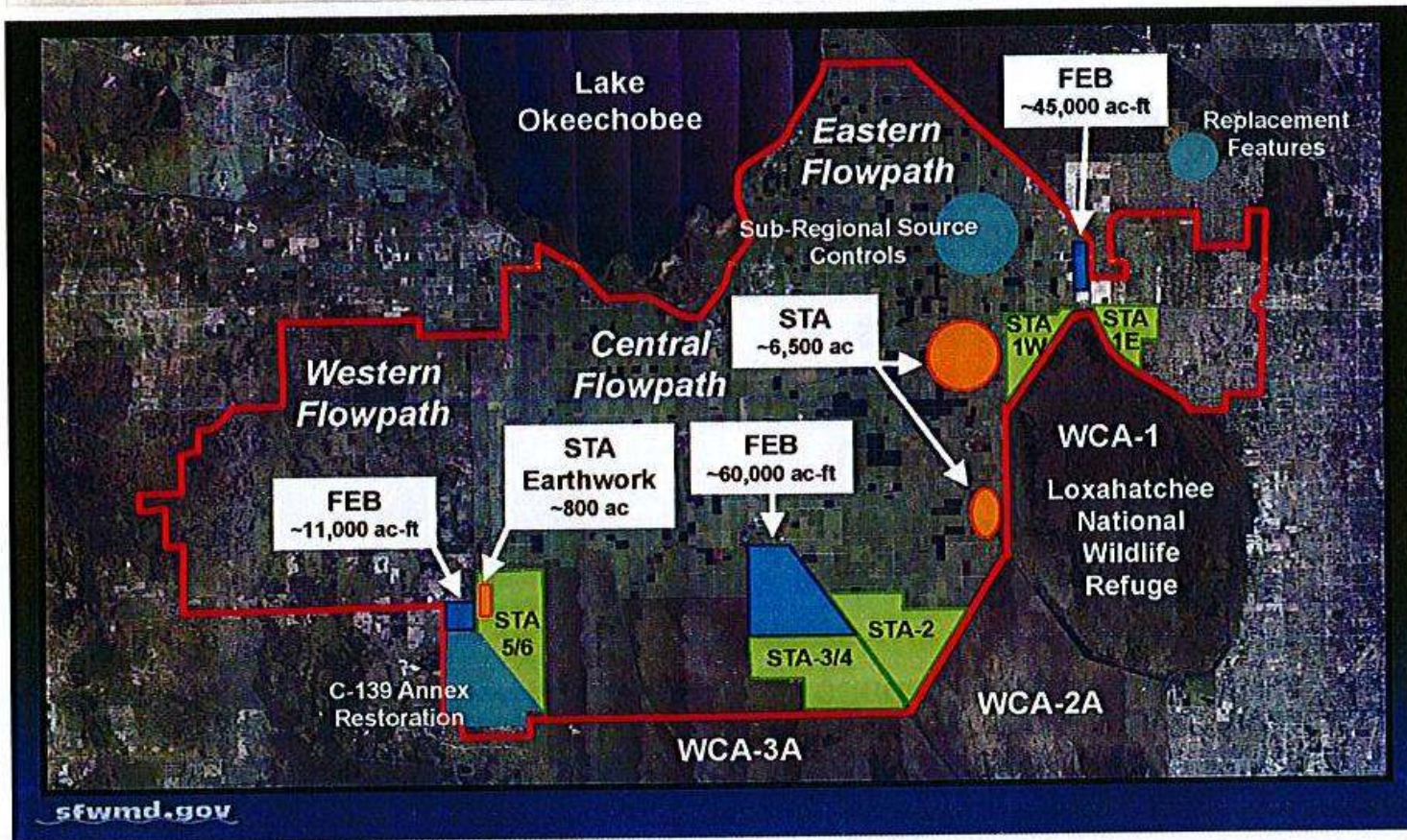
Principals' Meeting October 6, 2011



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 WATERSHED ASSESSMENT

VOLUME B: BASIN PRIORITIES

Prepared for:

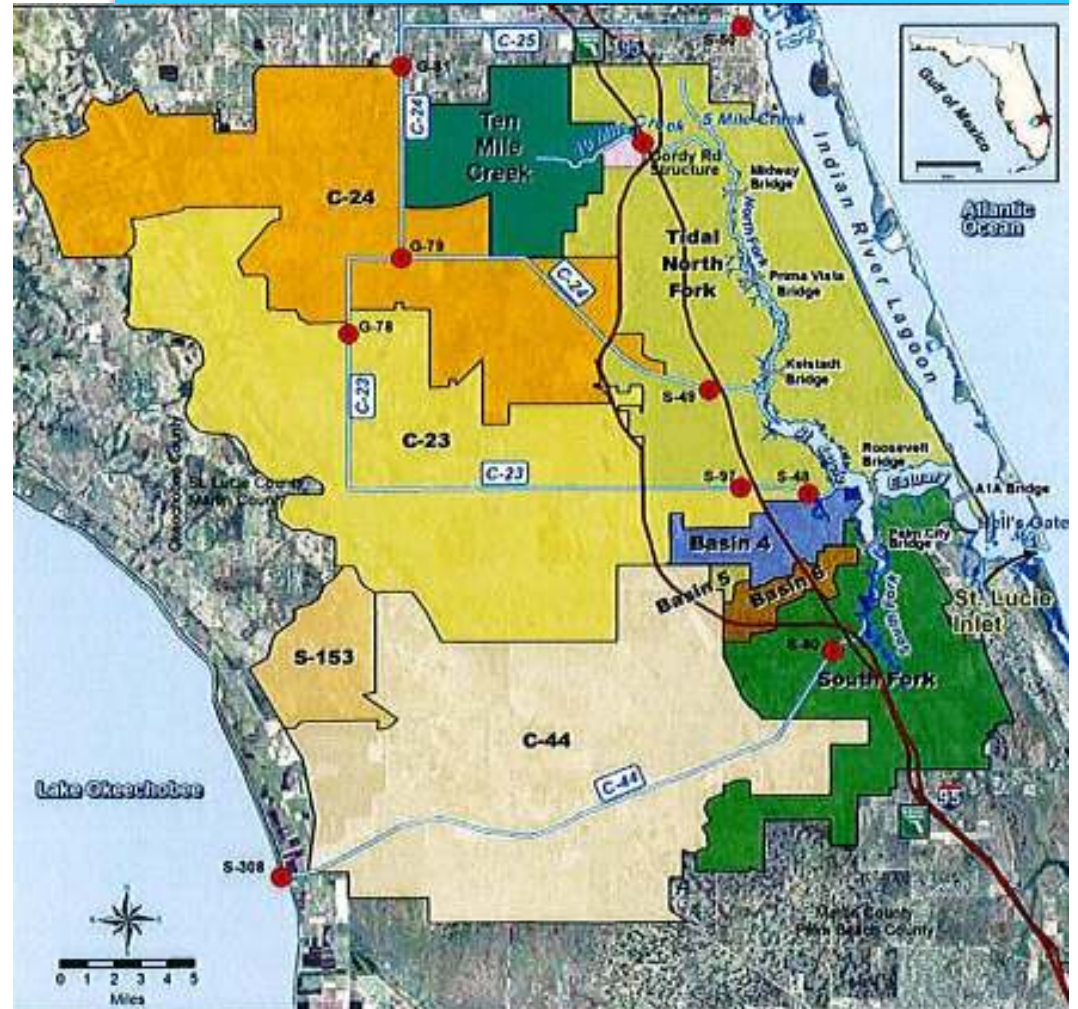
South Florida Water Management District
P.O. Box 24680
3301 Gun Club Road
West Palm Beach, Florida 33416-4680

Prepared by:

Anthony Janicki, David Wade, J. Raymond Pribble, Pam Latham
PBS&J
5300 West Cypress Street
Suite 300
Tampa, Florida 33607-1712

FINAL REPORT

February, 1999



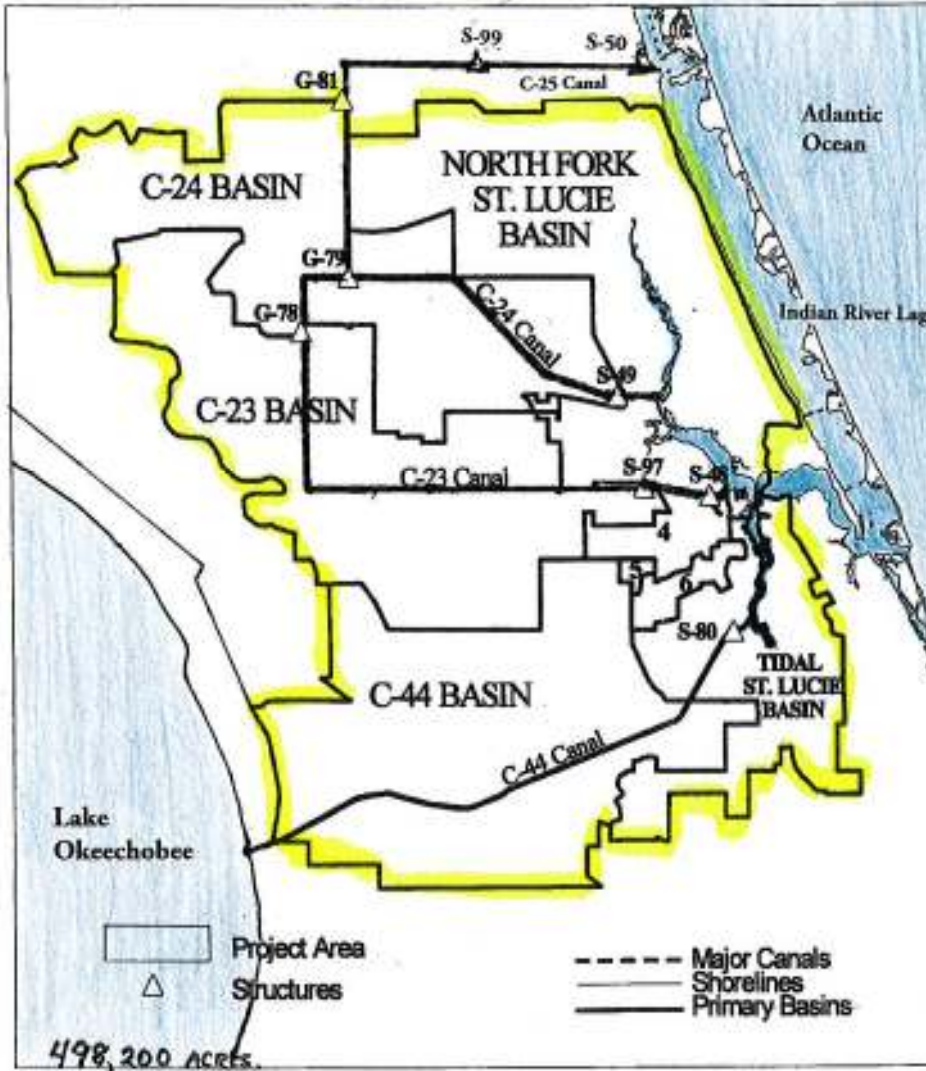
St. Lucie River Watershed

514,646 Acres

Watershed Assessment - February 1999

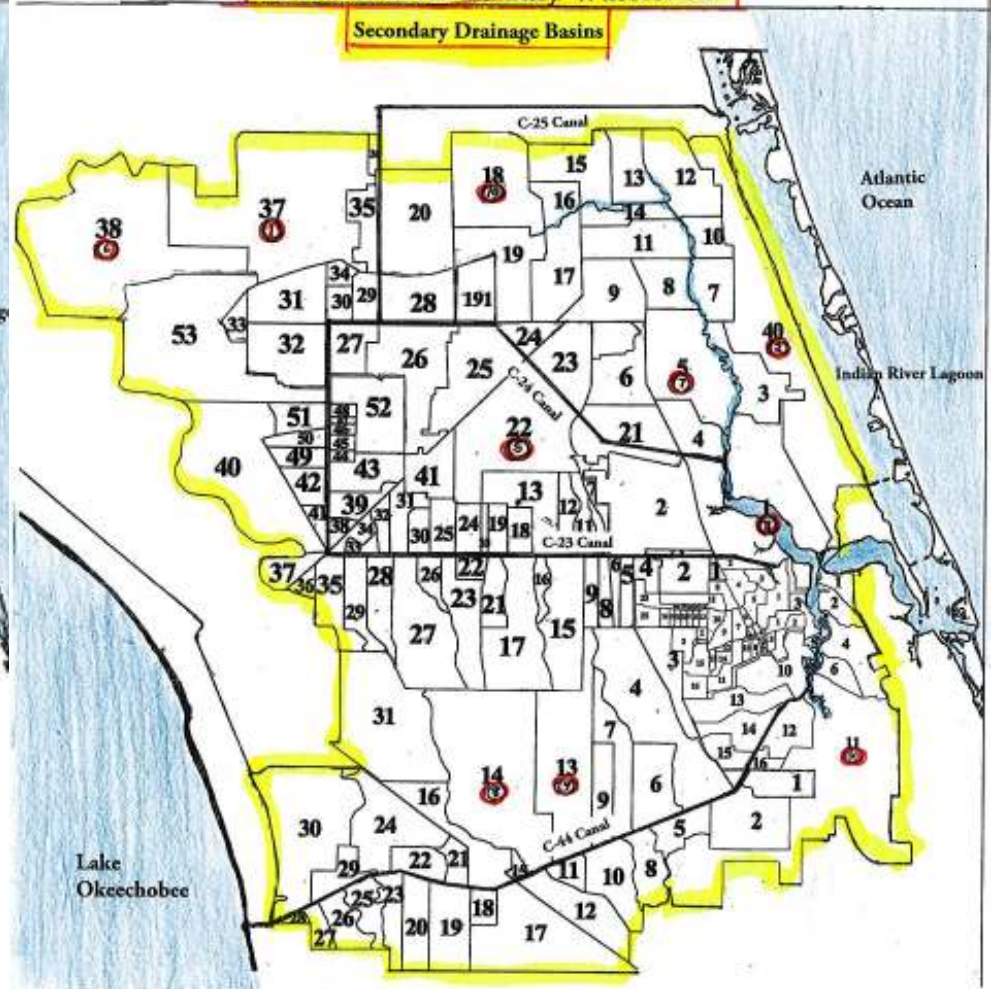
St. Lucie River Estuary Watershed

Primary Drainage Basins



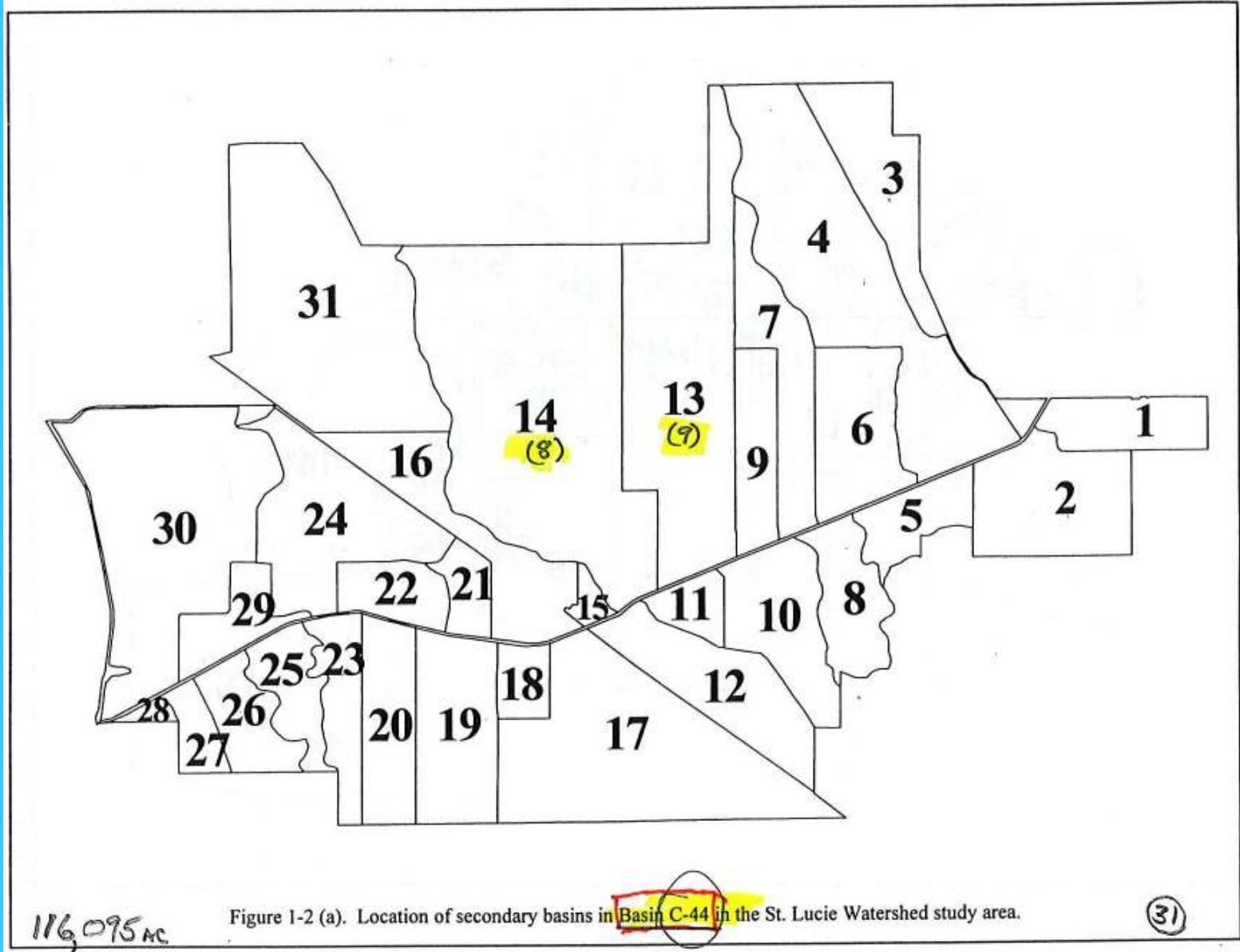
St. Lucie River Estuary Watershed

Secondary Drainage Basins



8 Basins – 186 Secondary Basins

St. Lucie River Estuary Watershed



116,095 ac

Figure 1-2 (a). Location of secondary basins in Basin C-44 in the St. Lucie Watershed study area.

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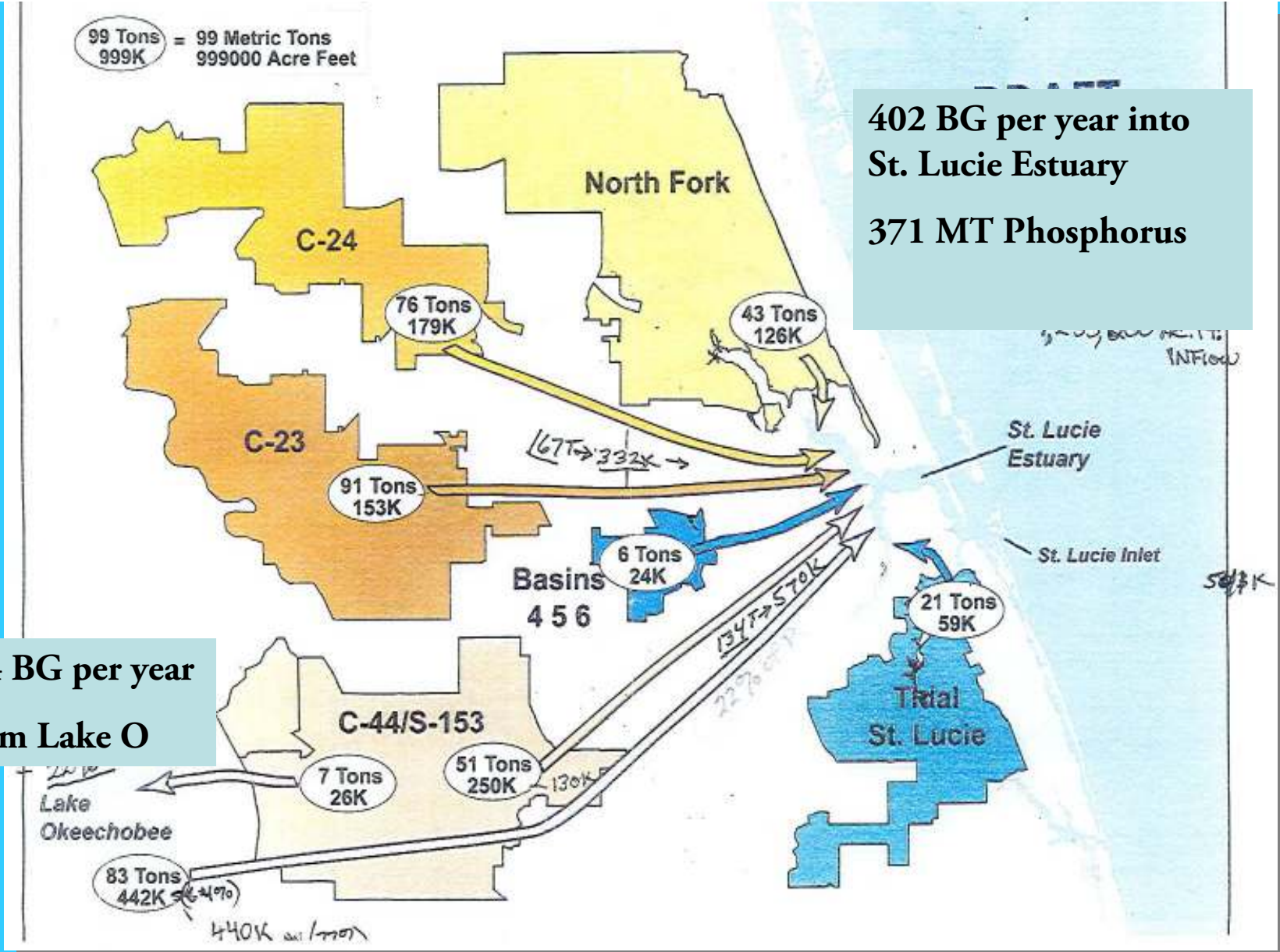
C-44 Basin - 31 Secondary Drainage Basins

25 Pump Stations for Agriculture Irrigation



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

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



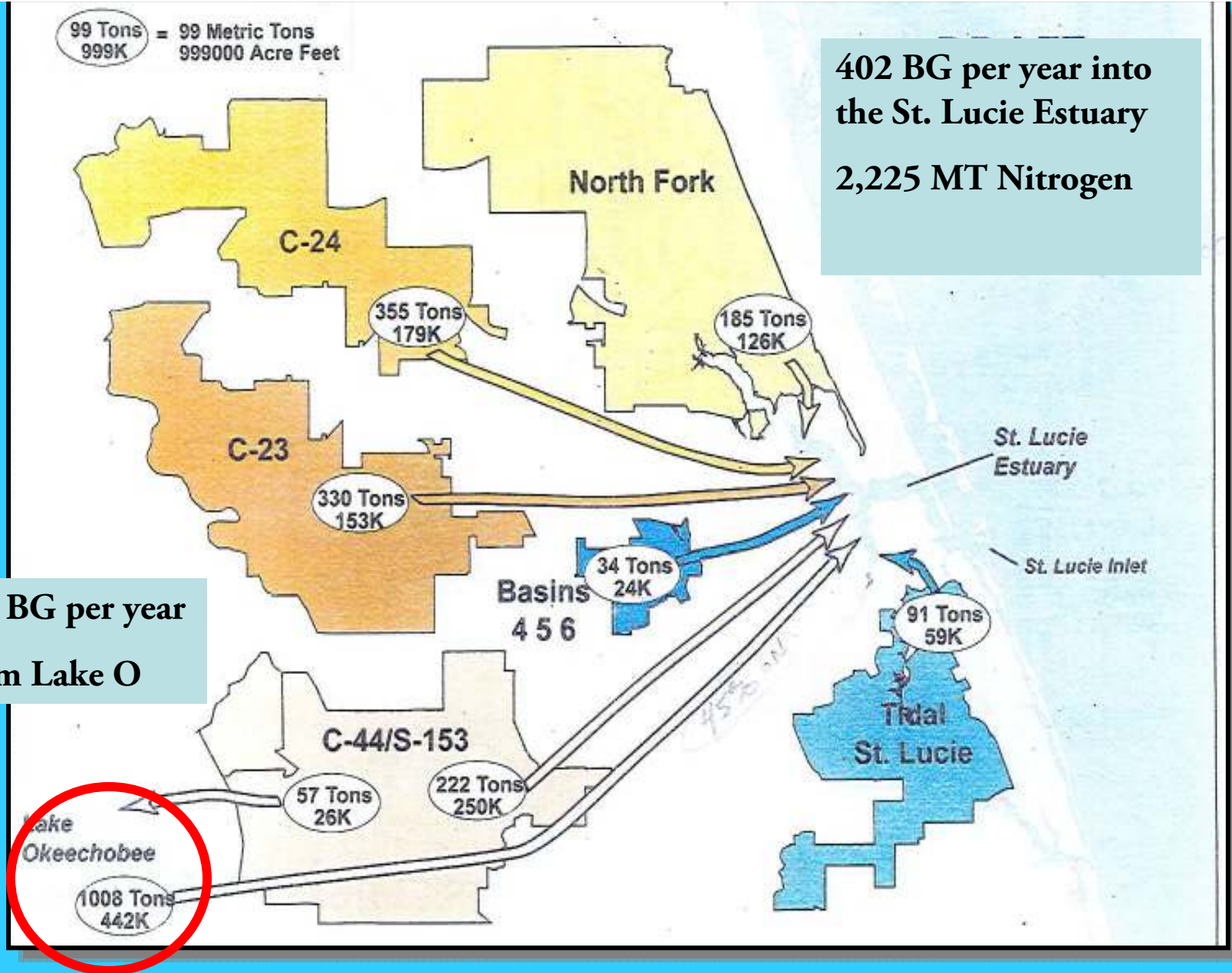
144 BG per year
From Lake O



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

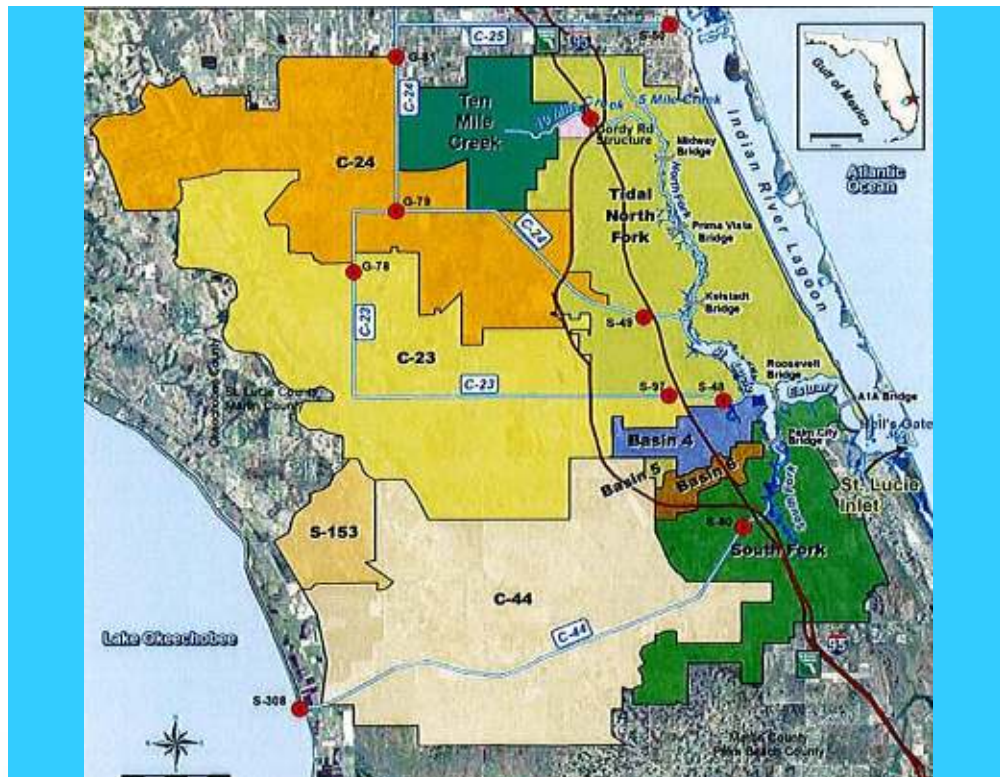
in the

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	884	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	7,630	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	-	1,148	-	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



Nitrogen

TABLE 6: TN STARTING LOADS BY ENTITY

any cell/no data

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)

TMDL – BMAP Implementation June 2013 - Adopted & Enforceable (?)

2013 – 2018 “First Phase” -30% Reduction

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



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)

TMDL – BMAP Implementation June 2013 - Adopted & Enforceable (?)

2013 – 2018 “First Phase” -30% Reduction

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



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 T

in cooperation with
Florida Department of Environ
Division of Environmental Assessm
Bureau of Watershed Re
Tallahassee, Florida 3

April 2013

TABLE 24: AGRICULTURAL TN AND TP LOAD REDUCTION ALLOCATIONS AND ESTIMATED REDUCTIONS IN TN AND TP LOAD IN THE FIRST 5 YEARS

ESTIMATED LOADS	TN (LBS/YR)	TP (LBS/YR)
Agricultural Starting Load	1,563,122.0	390,312.0
Agricultural Required Reduction	812,924.0	307,059.0
Required Reduction for First Phase of BMAP	243,877.2	92,117.7
Estimated Load Reductions via BMPs, 90% Target Enrollment*	197,216.6	40,442.0
Estimated Load Reduction Credit for Land Use Changes*	171,776.4	54,191.1
Total Estimated Reductions	368,993.0	94,663.1
Remaining Load Reductions Needed for First Phase of BMAP	-125,115.8 (credit)	-2,515.4 (credit)

* Note: Load reduction estimates/credits do not include agricultural lands within WCDs.

TMDL – BMAP Implementation

June 2013 - Adopted & Enforceable (?)

2013 – 2018 “First Phase” -30% Reduction

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



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

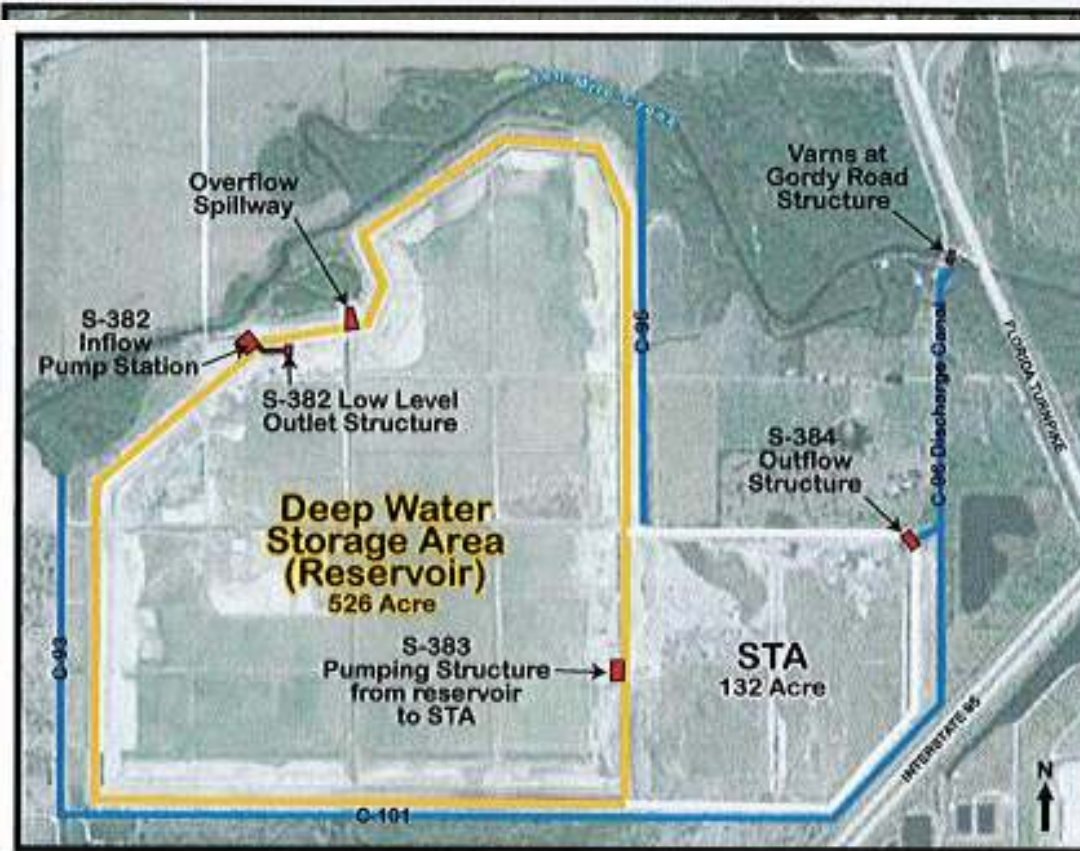
C-25, NORTH FORK AND SOUTH FORK BASIN COMPONENTS

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



**Part of Comprehensive
Everglades Restoration Plan**

TEN MILE CREEK | Water Preserve Area



PROJECT LOCATION

The Ten Mile Creek WPA is located in St. Lucie County near Fort Pierce at the headwaters of the North Fork of the St. Lucie River Aquatic Preserve.



10-Mile Creek Project – State should act NOW to use Project “as is” and attenuate flows into the North Fork

**LAGOON ACTION ASSEMBLY
May 15 - 17, 2014
AGENDA**

May 15, 6:00 pm - 7:00 pm
Inaugural Event & Delegate Introduction
Tad Marshall Lagoon House
2275 State Hwy 9E, Palm Bay, Florida 32909

Press Brief 6:30 - 6:30 PM
Social 6:30 - 7:00 PM
Program 7:00 - 9:00 PM

May 16, 8:00 am - 8:00 pm
Arrival, Refreshments & Sign-in
Florida Institute of Technology
150 W. University Blvd., Melbourne, FL

Check-in (P133 Auditorium Room) 7:30 - 8:30 AM
Presentations & Discussion 8:30 - 12:00 PM
Lunch at Panther Dining Hall 12:15 - 1:15 PM
Sessions (P 133 Auditorium Room) 1:15 - 1:45 PM
Working group session 1 (Small rooms TBD) 2:00 - 3:30 PM
Break 3:30 - 3:45 PM
Working group session 2 (Same small rooms) 3:45 - 5:15 PM
Day wrap-up (P133 Auditorium Room) 5:30 - 6:00 PM

May 17, 8:00 am - 8:00 pm
Working Cooperatively Toward Solutions
Florida Institute of Technology
150 W. University Blvd., Melbourne, FL

Check-in (P133 Auditorium Room) 7:30 - 8:30 AM
Sessions Presentations (P133 Auditorium Room) 8:30 - 9:30 AM
Break to get to group session rooms 9:30 - 9:45 AM
Working group session #1 (Same small rooms) 9:45 - 11:45 AM
Lunch at Panther Dining Hall 12:00 - 1:00 PM
Working group session #2 (Same small rooms) 1:15 - 3:45 AM
Group Discussion - Moving Forward (P133 Auditorium) 4:00 - 5:00 PM



**State Funding - 2014
16 Project Areas - \$230 M**



INDIAN RIVER LAGOON & LAKE OKEECHOBEE BASIN (IRLOB)				
Fiscal Year 2014-15				
PRIORITY PROJECTS	PROJECT DESCRIPTIONS	IRLOB Recs - Long & Short-Term Projects	Conference	Notes
Water Quality Restoration Strategies	Funds will be used for the design and start of the construction for the STA-1 West expansion project in Palm Beach County and is a part of the water quality plan for the Everglades. Recurring funds (\$12m GR & \$20m TF) were appropriated in Ch. 2013-59, LOF, through FY 2023-24.	\$32,000,000	\$32,000,000	✓
Department of Agriculture & Consumer Services (DACS) - Best Management Practices	Funds will be used for agriculture non-point source best management practices in the Lake Okeechobee, St. Lucie River, and Caloosahatchee River watersheds (Northern Estuaries and Protection Area).	\$3,000,000	\$3,000,000	
CERP C-44 Reservoir	Construction of an additional phase of the C-44 Reservoir and STAs that was initiated from the \$20.5m provided in the FY13-14 GAA.	\$40,000,000	\$40,000,000	
CERP Pinyan Strand	Funds for the Pinyan Strand Faka Union (wetlands restoration project) operational testing and monitoring, which includes costs for fuel, electricity, and vegetation management.	\$2,000,000	\$2,000,000	
Disbursed Water Management	Funds for additional storage of water on private lands.	\$3,000,000	\$3,000,000	
C-111 South Dade Project	The C-111 South Dade/Modified Water Deliveries to Everglades National Park projects will remove a major barrier to flowing water south from the Water Conservation Areas into the park.	\$5,000,000	\$5,000,000	
Kissimmee River Restoration	Final phase. Funding would provide land acquisition and construction necessary for backfilling a portion of the Kissimmee River Restoration Project which will provide water storage in the restored floodplain.	\$5,000,000	\$5,000,000	
Caloosahatchee River C-43 Resin Storage Reservoir	Currently pending federal authorization and subsequent appropriation. Project will improve the timing, quantity, and quality of freshwater flows to the river and estuary.	\$15,000,000	\$18,000,000	+ 3M
Indian River Lagoon Sediment Removal (Banana River & Eau Gallie River/Elbow Creek)	Sediment and muck removal for the northern lagoon. Partnership with FIND.	\$20,000,000	\$20,000,000	✓
Lake Worth Lagoon Restoration	Restoration of sea grasses, mangroves, capping of muck, and construction of storm water control projects. Each state dollar is matched at the local level on a minimum 50:50 cost-share basis.	\$2,075,000	\$2,075,000	
Water Quality Monitoring and Research	Water quality monitoring devices to support research in the Caloosahatchee River, and Estuary, St. Lucie River and Indian River Lagoon. \$2 million is provided to Harbor Branch for Land/Ocean Biogeochemical Observatory (LOBO) technology, and \$2 million for the Ocean Research and Conservation Association (ORCA) for Kibry monitoring technology.	\$4,000,000	\$4,000,000	✓
Northern Estuaries Resource Recovery Pilot Program	Reestablish oyster populations and seagrass beds in the St. Lucie and Caloosahatchee Estuaries.	\$1,000,000	\$1,000,000	
Tamiami Trail - DOT Workplan	2nd phase, a 2.6-mile bridge leading to greater and more disbursed water flow south of the bridge into the park. Workplan to include \$90 million over a three-year period.	\$90,000,000	\$90,000,000	Included in DOT Workplan for FY 2014-15
SFWMD Operational Support for Excessive Lake Discharges	The Legislative Budget Commission approved \$2.8 million on September 32, 2013, to provide fuel cost funding to SFWMD in order to maximize critical pump stations to move excess water south to Everglades National Park and tide. The amendment also provided emergency water storage on C-43 site and the C-23/24 reservoir, in addition to removing vegetation and cutting a gap in the old Tamiami trail.	\$2,769,525	\$2,769,585	
Loxahatchee River Preservation Initiative	Plans such as the Northern Palm Beach County Comprehensive Water Management Plan, the Comprehensive Everglades Restoration Plan, and the Loxahatchee River Preservation Initiative are working to address stormwater runoff, habitat restoration and freshwater flow.		\$2,076,718	+
St. Lucie River & Indian River Lagoon Issues Team	St. Lucie River and Indian River Lagoon Issues Team develops federal, state and stakeholder consensus on an action plan that would accelerate progress toward improving water and habitat quality in the St. Lucie River Estuary and Indian River Lagoon.		\$2,076,718	+
Total (*IRLOB Report includes total DOT Annual Workplan)		\$228,864,525	\$231,958,021	



Current Everglades Restoration Projects

Everglades Restoration Projects Non-CERP (Comprehensive Everglades Restoration Plan)

1. Kissimmee River
2. C-111 South Dade
3. C-51/STA-1E
4. Modified Water Deliveries
5. Herbert Hoover Dike Rehab
6. State Restoration Strategies –Water Quality (Florida)
7. Tamiami Trail - Next Steps Bridging (DOI, USACOE, Florida)

1st Generation CERP (Authorized WRDA 2007 - Construction)

1. Site 1 Impoundment
2. IRL-South (C-44 Project, C-23/C-24/C-25 Project)
3. Picayune Strand

2nd Generation CERP (Waiting Authorization-WRRDA 2013)

1. C-43 Reservoir
2. Broward County WPA
3. C-111 Spreader Canal
4. Biscayne Bay Coastal Wetlands

1. Central Everglades Planning Project (CEPP) – CERP (Waiting Authorization-WRRDA 2013)

- Everglades Agriculture Storage Reservoir
- WCA 3 Decompartmentalization & Sheetflow Enhancement
- S-356 Pump Station Modifications
- L-31 Levee Seepage Management
- System-Wide Operational Changes
- Flow to Northwest & Central WCA 3A

Comprehensive Everglades Restoration Plan (CERP)

68 Components

50/50 Cost Share-
Federal/State

(State buys lands needed)



Comprehensive Everglades Restoration Plan

April 1, 1999

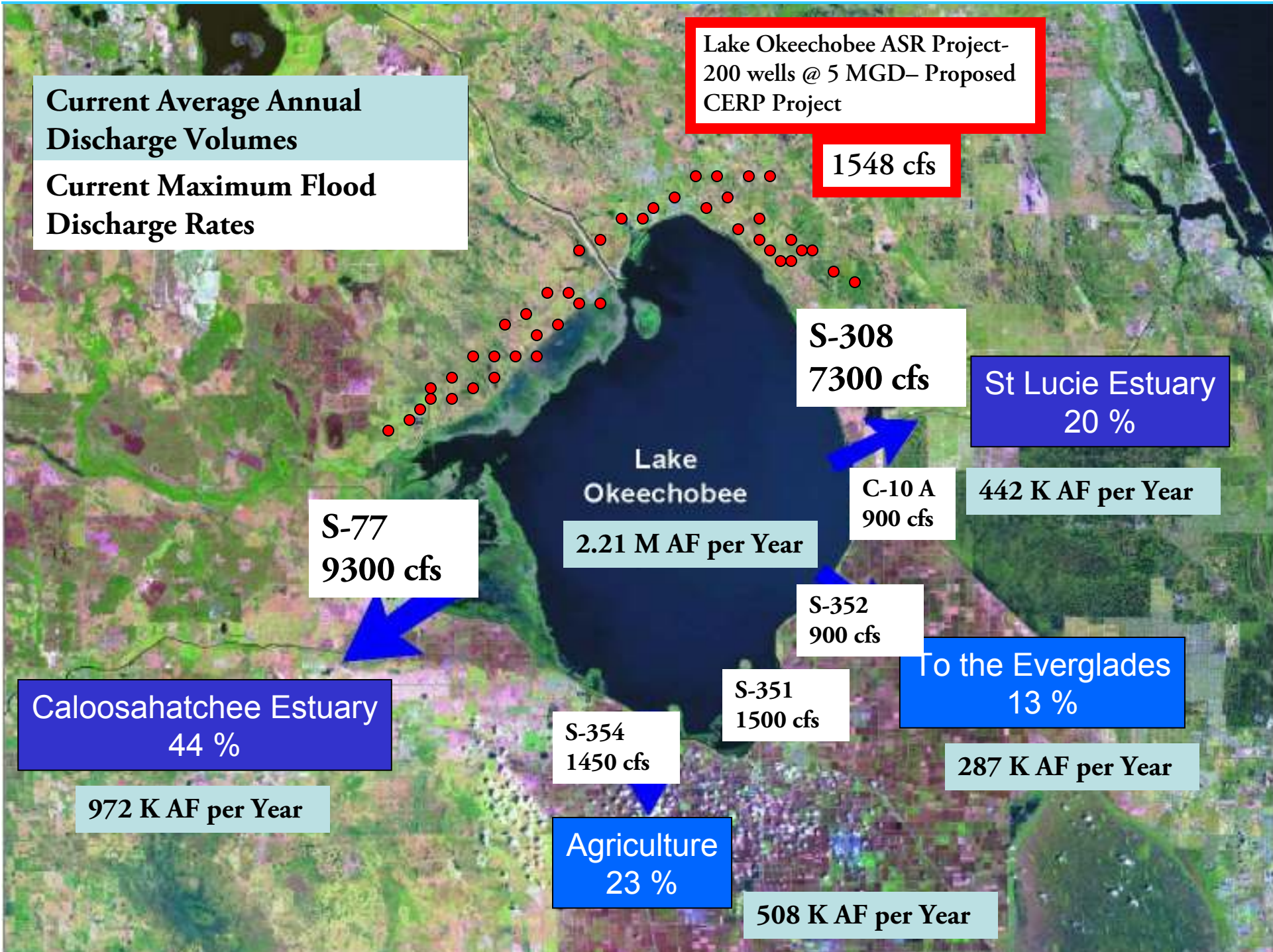
United States Army Corp. of Engineers

TABLES 9-2 & 9-3 Condensed

ESTIMATED FINAL COST FOR CONSTRUCTION FEATURES INCLUDING O&M COST
(\$1,000, October 1999 Price Levels)

CONSTRUCTION FEATURES	Construction*	Real Estate*	Total Initial Cost*	O&M	State Project	Fed. Project
Mississippi River Region						
North of Lake Okechobee Storage Reservoir	\$95,134	183,720	\$278,854	\$1,515,245		
Taylor Creek/Rubin Slough Storage and Treatment Area	\$74,320	\$29,700	\$104,020	\$2,164,114		CRITICAL RPA
Lake Okechobee Watershed Water Quality Treatment Facilities	\$47,800	\$14,448	\$62,248	\$2,630,000		
Lake Okechobee Tributary Sediment Dredging	\$3,890	\$600	\$4,490	\$0		
Lake Istokopga Regulation Schedule	\$50	\$0	\$50	\$0		
Lake Okechobee Aquifer Storage and Recovery	\$1,108,797	\$7,515	\$1,116,312	\$25,000,000		
Caloosahatchee River Region						
C-43 Basin Storage Reservoir and Aquifer Storage and Recovery	\$313,574	\$132,621	\$446,195	\$0,707,589	ACCELERE	
Caloosahatchee Backpumping with Stormwater Treatment	\$69,715	\$13,179	\$82,894	\$0,273,078		
Upper East Coast						
C-44 Basin Storage Reservoir	\$21,388	\$90,675	\$112,063	\$759,953	ACCELERE	GEN1
C-23/C-24/C-25 Northfork and Southfork Storage Reservoirs	\$261,175	\$422,048	\$683,223	\$4,832,774		
Everglades Agricultural Area						
Everglades Agricultural Storage Reservoirs	\$260,112	\$86,536	\$346,648	\$14,459,408		CERP
Big Cypress Region						
Big Cypress/L-28 Interceptor Modifications	\$66,051	\$6,700	\$72,751	\$404,457		
Seminole Tribe Big Cypress Water Conservation Plan- (East & West)	\$69,553	\$5,735	\$75,288	\$775,000		
Water Conservation Area Region						
Flow to Northwest and Central Water Conservation Area 2A	\$20,877	\$0	\$20,877	\$1,702,827		CERP
WCA 3 Decompartimentalization and Sheetflow Enhancement	\$185,408	\$26,279	\$211,687	\$740,111		CERP
Loxahatchee National Wildlife Refuge Internal Canal Structures	\$7,324	\$345	\$7,669	\$42,048		
Microcosmos Water Management Pail	\$22,741	\$1,715	\$24,456	\$540,000		
Lower East Coast Region						
Pan-Mar and J.W. Corbett Wildlife Management Area Hydrospatium Restoration	\$2,500	\$0,000	\$2,500	\$00,000		
Water Preserve Areas I-L-8 Basin	\$262,541	\$21,641	\$284,182	\$2,273,829		
Alma Basin B Discharge	\$11,800	\$0,000	\$11,800	\$594,000	ACCELERE	
Lake Worth Lagoon Restoration	\$2,000	\$300	\$2,300	\$0		
Wesburg Farms Wetland Restoration	\$10,000	\$4,143	\$14,143	\$200,000		
Palm Beach County Wetlands Based Water Reclamation	\$24,800	\$0,800	\$25,600	\$2,500,000		
C-17 Backpumping and Treatment	\$6,624	\$10,307	\$16,931	\$702,435		
C-51 Backpumping and Treatment	\$19,166	\$13,475	\$32,641	\$1,089,892		
C-61 Regional Groundwater Aquifer Storage and Recovery	\$122,291	\$0,845	\$123,136	\$1,466,000		
Palm Beach Only Agricultural Reserve Reservoir and ASR	\$66,440	\$67,667	\$134,107	\$1,016,500		
Protect and Enhance Existing Wetland Systems along						
Loxahatchee National Wildlife Refuge including the Strazulla Tract	\$3,800	\$48,872	\$52,672	\$90,000		
Site 1 Impoundment and Aquifer Storage and Recovery	\$116,792	\$23,587	\$140,379	\$2,052,608	ACCELERE	GEN1
Broward County Secondary Canal System	\$10,978	\$1,500	\$12,478	\$418,617		
Western C-11 Diversion Impoundment and Canal and						
Water Conservation Area 2A and 2B Levee Seepage Management	\$57,620	\$167,846	\$225,466	\$783,432	ACCELERE	CRITICAL RPA
C-6 Stormwater Treatment Area/Impoundment	\$26,207	\$62,898	\$89,105	\$015,743	ACCELERE	
North Lake Bell Storage Area	\$261,122	\$154,858	\$415,980	\$1,241,234		
Diverting Water Conservation Area 2 and 3 flows to Central Lake Bell Storage	\$66,330	\$13,321	\$79,651	\$146,635		
Central Lake Bell Storage Area	\$402,502	\$100,359	\$502,861	\$1,854,519		
Dade-Broward Levee/Pennasco Wetlands	\$10,103	\$8,676	\$18,779	\$195,871		
C-4 Control Structures	\$1,834	\$465	\$2,299	\$30,515		CRITICAL RPA
Bed Drive Recharge Area	\$52,459	\$71,625	\$124,084	\$1,470,869		
L-31N Levee Improvements for Seepage Management and S-365 Structures	\$89,514	\$84,704	\$174,218	\$447,204		CERP
West Miami-Dade County Reuse	\$435,998	\$3,540	\$439,538	\$36,500,000		
Baybaye Bay Coastal Wetlands	\$23,928	\$209,655	\$233,583	\$823,500	ACCELERE	
South Miami-Dade County Reuse	\$269,700	\$3,304	\$273,004	\$47,815,000		
Restoration of Pineland & Hardwood Hammocks in C-111 Basin	\$500	\$0	\$500	\$0		
C-111N Spreader Canal	\$48,268	\$45,766	\$94,034	\$89,586	ACCELERE	
Southeast Florida Region						
Southern Golden Gates Hydrologic Restoration (Piscayuma Strand)	\$15,560	\$0	\$15,560	\$80,000	ACCELERE	GEN1
Southern CERP Project Addition	\$3,434	\$30,106	\$33,540	\$180,000		CRITICAL RPA
Lake Trafford Restoration	\$14,884	\$744	\$15,628	\$0		CRITICAL RPA
Henderson Creek/Belle Meade Restoration	\$3,776	\$1,029	\$4,805	\$41,000		
Lake Park Restoration	\$3,000	\$166	\$3,166	\$62,000		
Florida Keys Region						
Florida Keys Total Restoration	\$1,200	\$51	\$1,251	\$0		
System-wide						
Metastuca Eradication Project and other Exotic Plants	\$5,772	\$0	\$5,772	\$0,000		
Additional Feasibility Studies	\$20,300	\$0	\$20,300	\$0,000		
System-wide Operational Changes-Everglades Rain-Driven Operations						CERP
TOTAL	\$5,595,113	\$2,221,436	\$7,816,549	\$7,868,000		

ACCELERE State funded project begun prior to federal funding assistance
 CRITICAL RPA USACE project created due to immediate environmental needs
 GEN1 Active projects that have been authorized and funded
 CERP Projects that are still awaiting Congressional authorization
 CERP Central Everglades Planning Project



Current Average Annual Discharge Volumes

Current Maximum Flood Discharge Rates

**Lake Okeechobee ASR Project-
200 wells @ 5 MGD- Proposed
CERP Project**

1548 cfs

**S-308
7300 cfs**

**St Lucie Estuary
20 %**

442 K AF per Year

**C-10 A
900 cfs**

2.21 M AF per Year

**S-352
900 cfs**

**To the Everglades
13 %**

287 K AF per Year

**S-351
1500 cfs**

**Caloosahatchee Estuary
44 %**

972 K AF per Year

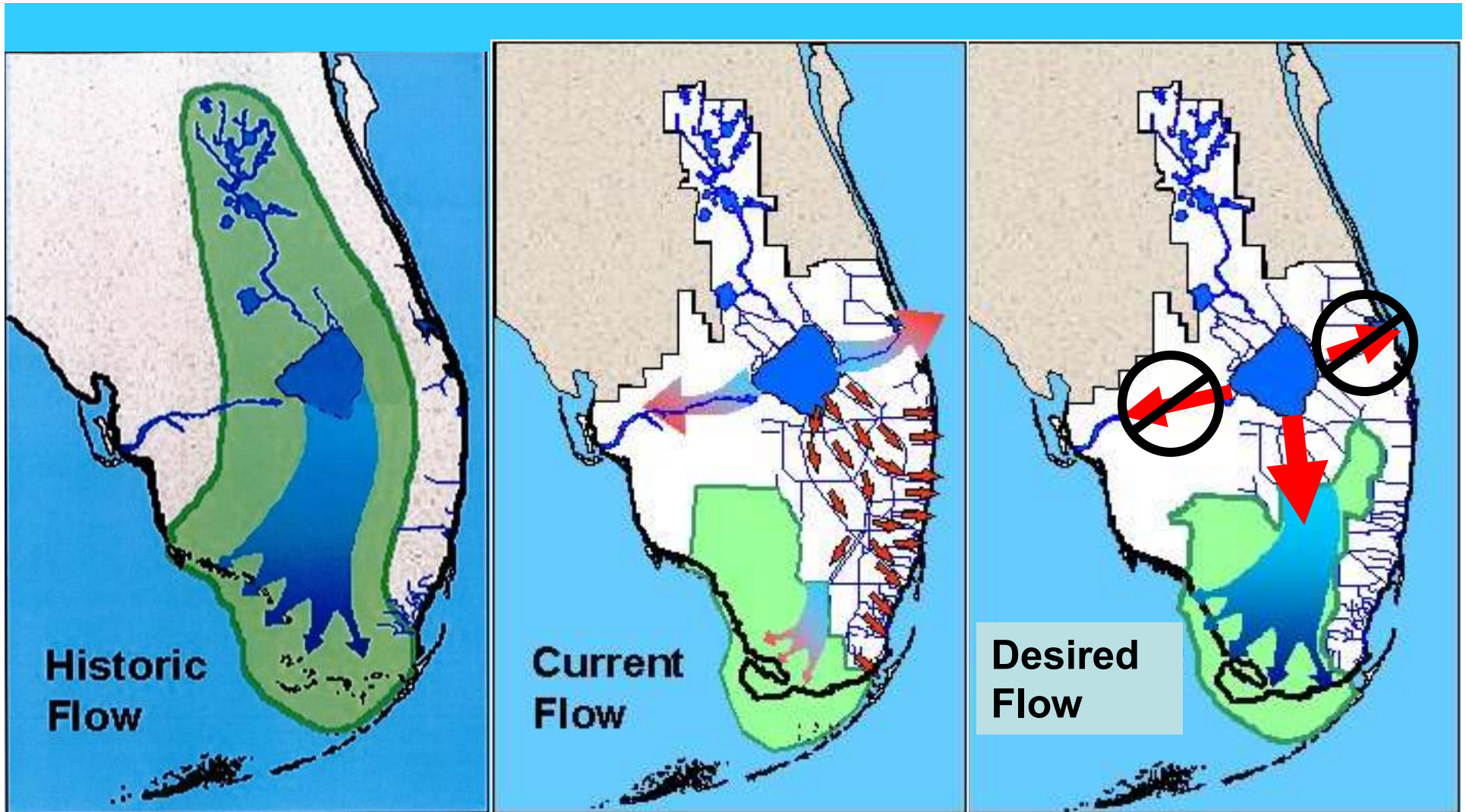
**S-354
1450 cfs**

**Agriculture
23 %**

508 K AF per Year

**S-77
9300 cfs**

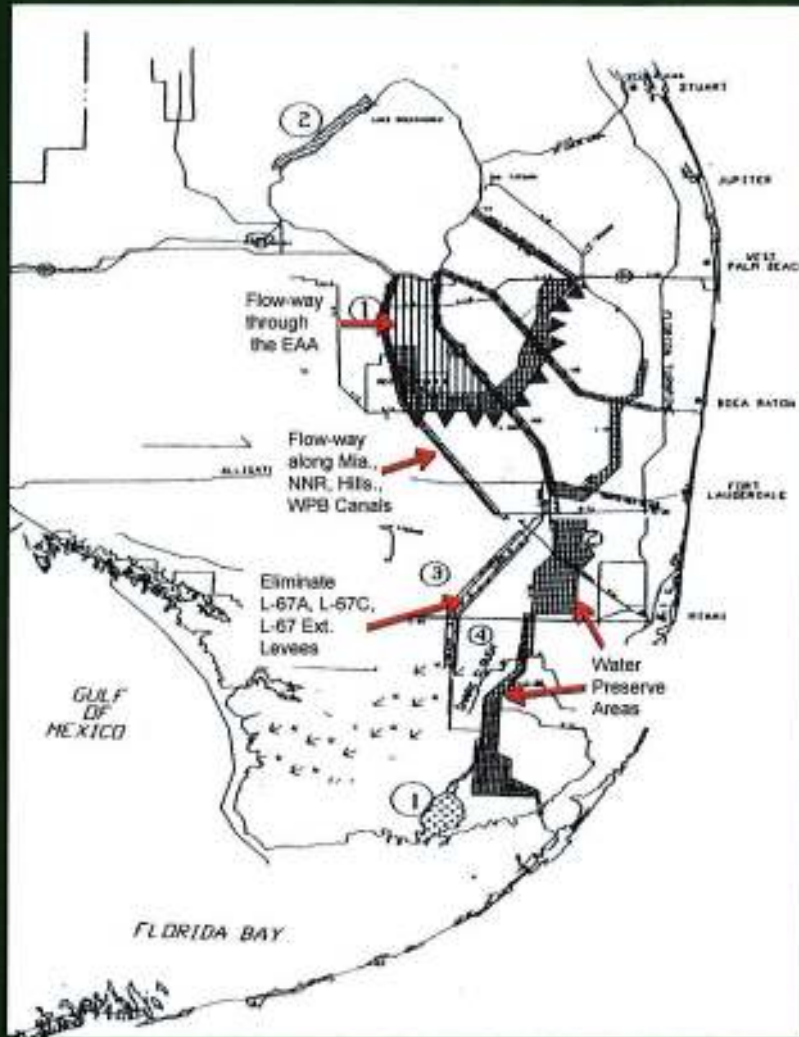
**Lake
Okeechobee**



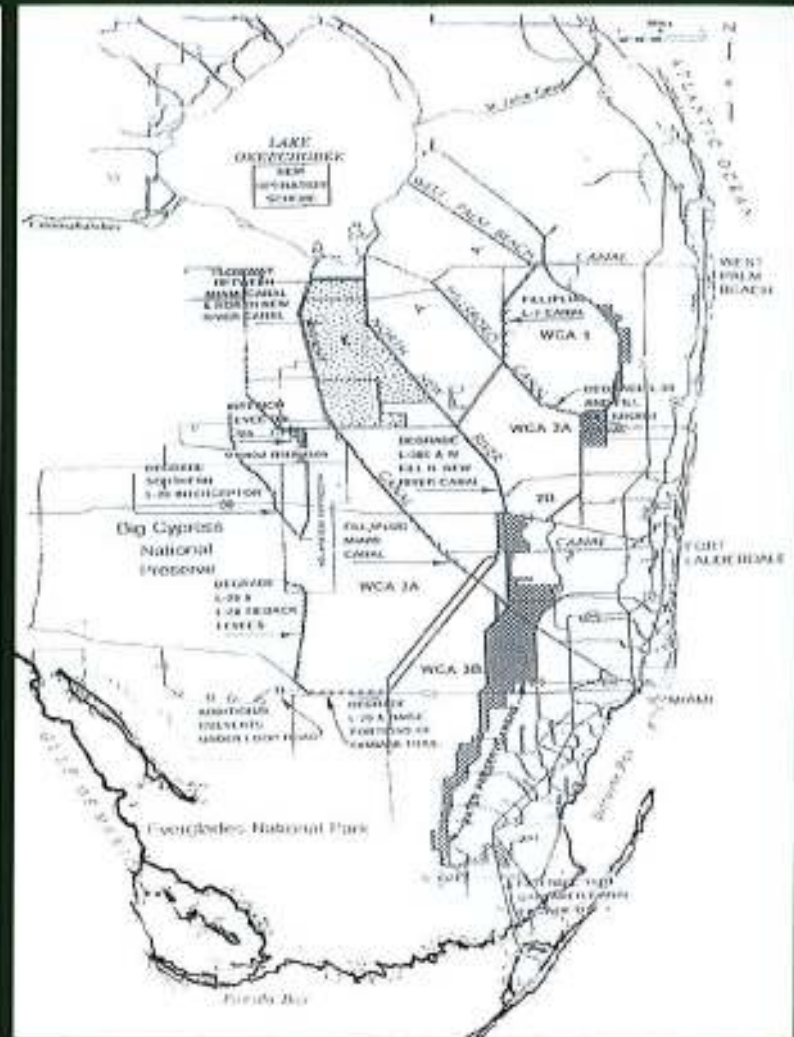
Historic, Current & Desired Flows

Stop destructive discharges to the Northern Estuaries and Move Water South to Restore the River of Grass- Need capacity for Storage, Treatment, Conveyance

Early Conceptual Plans - Everglades Restoration



Science Sub-Group Report, Minimum Plan, 1993.

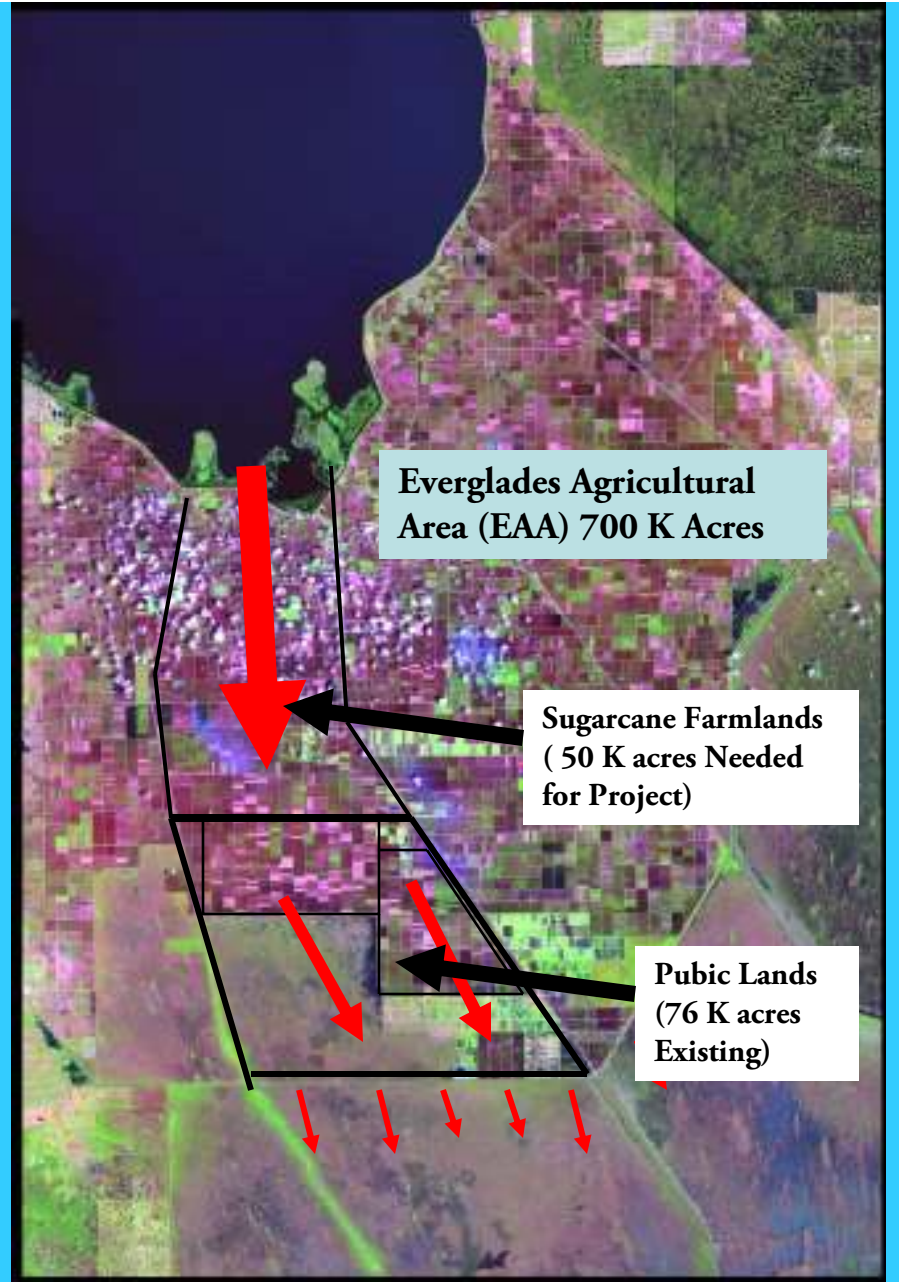


C&SF Restudy Recon. Report, Plan 6, 1994.



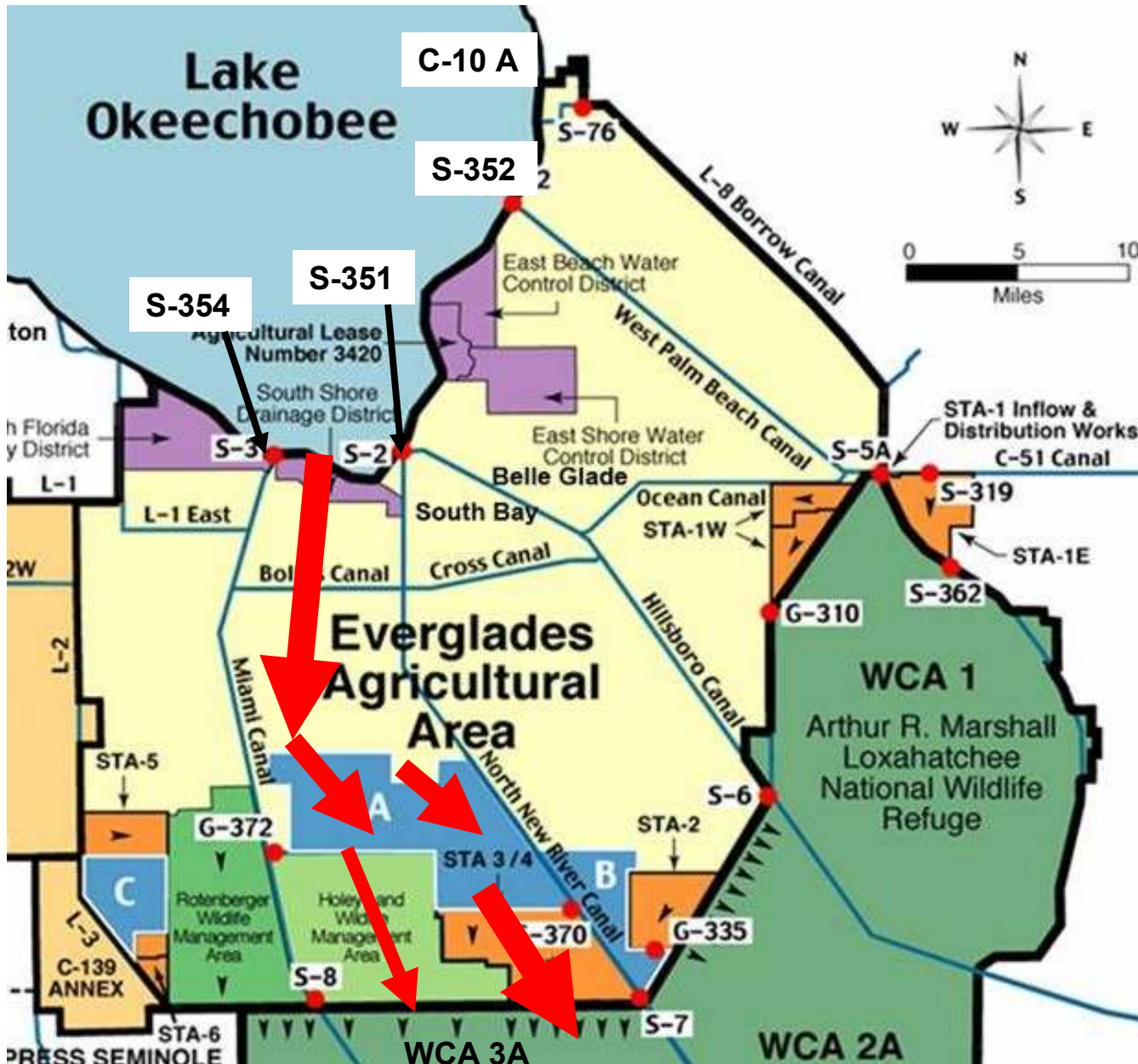
Florida
Oceanographic
Society

Plan 6 – 1993, 1994 - Reconnect Lake Okeechobee to the Everglades- River of Grass- Move Water South



New or Broader Plan 6 Project

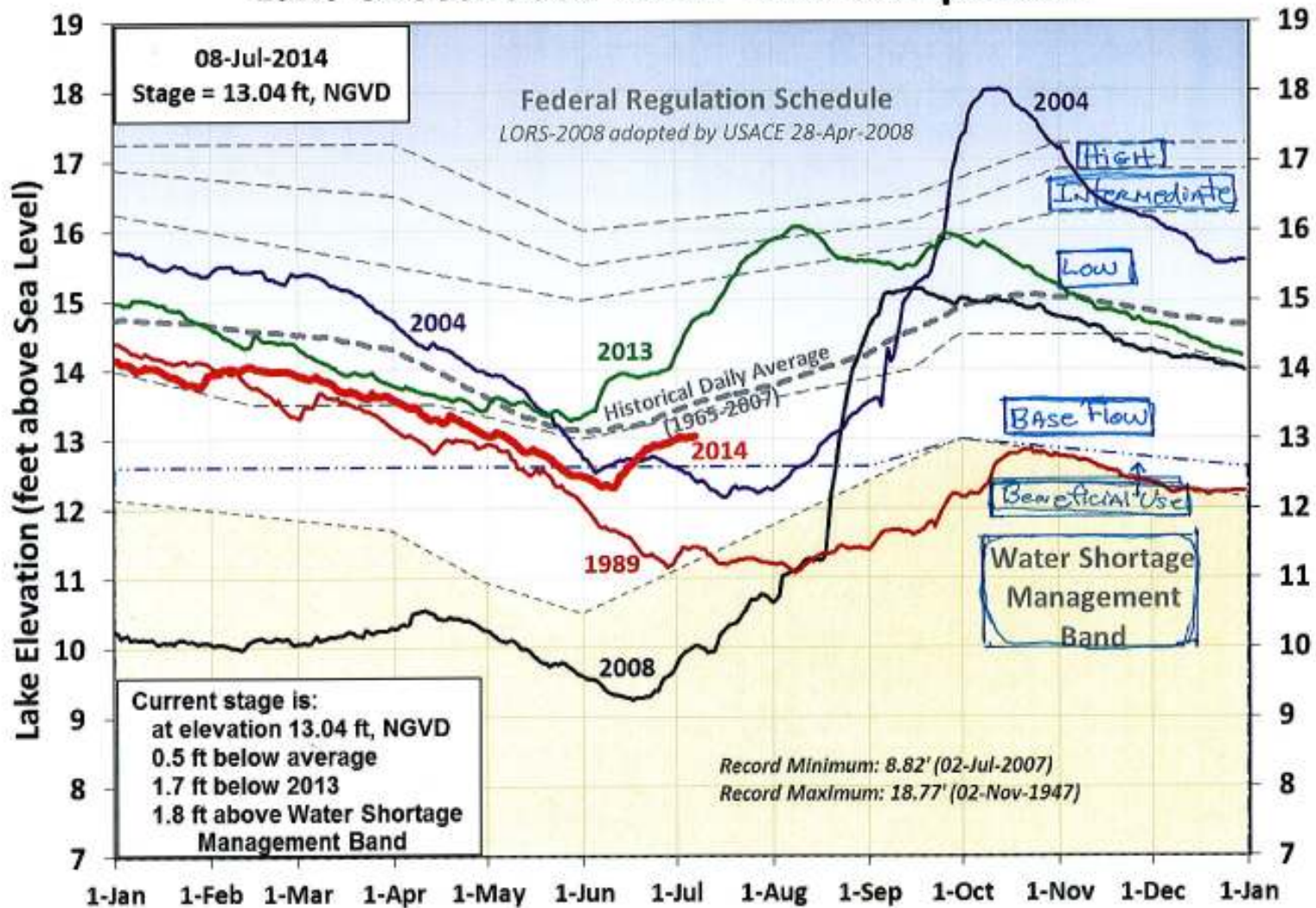
Stop destructive discharges to the Northern Estuaries and Restore the River of Grass



1. Becomes THE primary outflow for water from Lake Okeechobee
2. Stops destructive 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 from the Lake to the Everglades
5. Provides for healthy water levels in Lake Okeechobee
6. Maintains Water Quantity, Quality, Timing and Distribution for Everglades Restoration

New or Broader Plan 6 Project
Stop destructive discharges to the Northern Estuaries and Restore the River of Grass

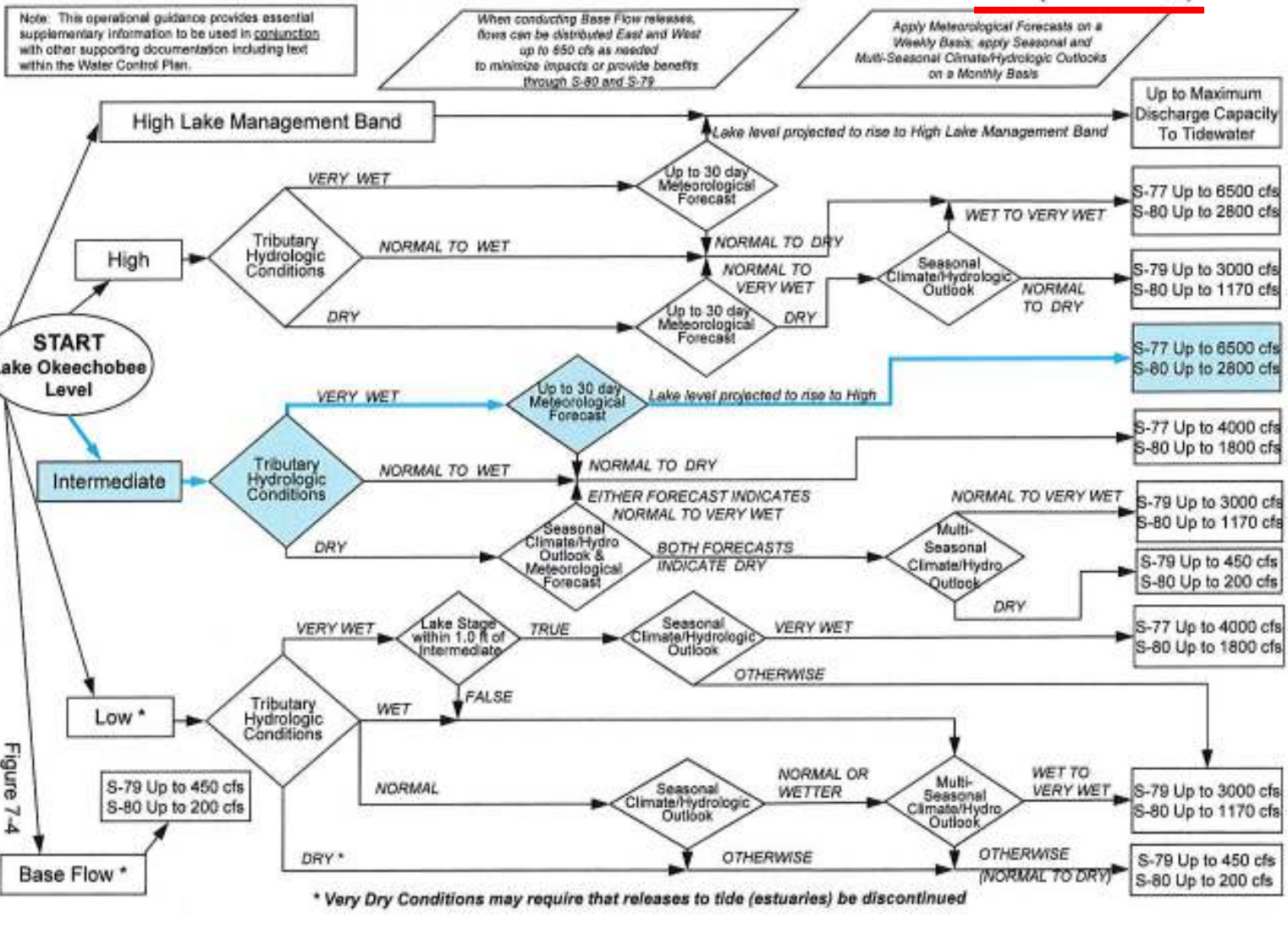
Lake Okeechobee Water Level Comparison



Lake Okeechobee Regulation Schedule – LORS 2008 – USACOE

2008 LORS

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



Lake Okeechobee Regulation Schedule – LORS 2008 – USACOE

2008 LORS

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

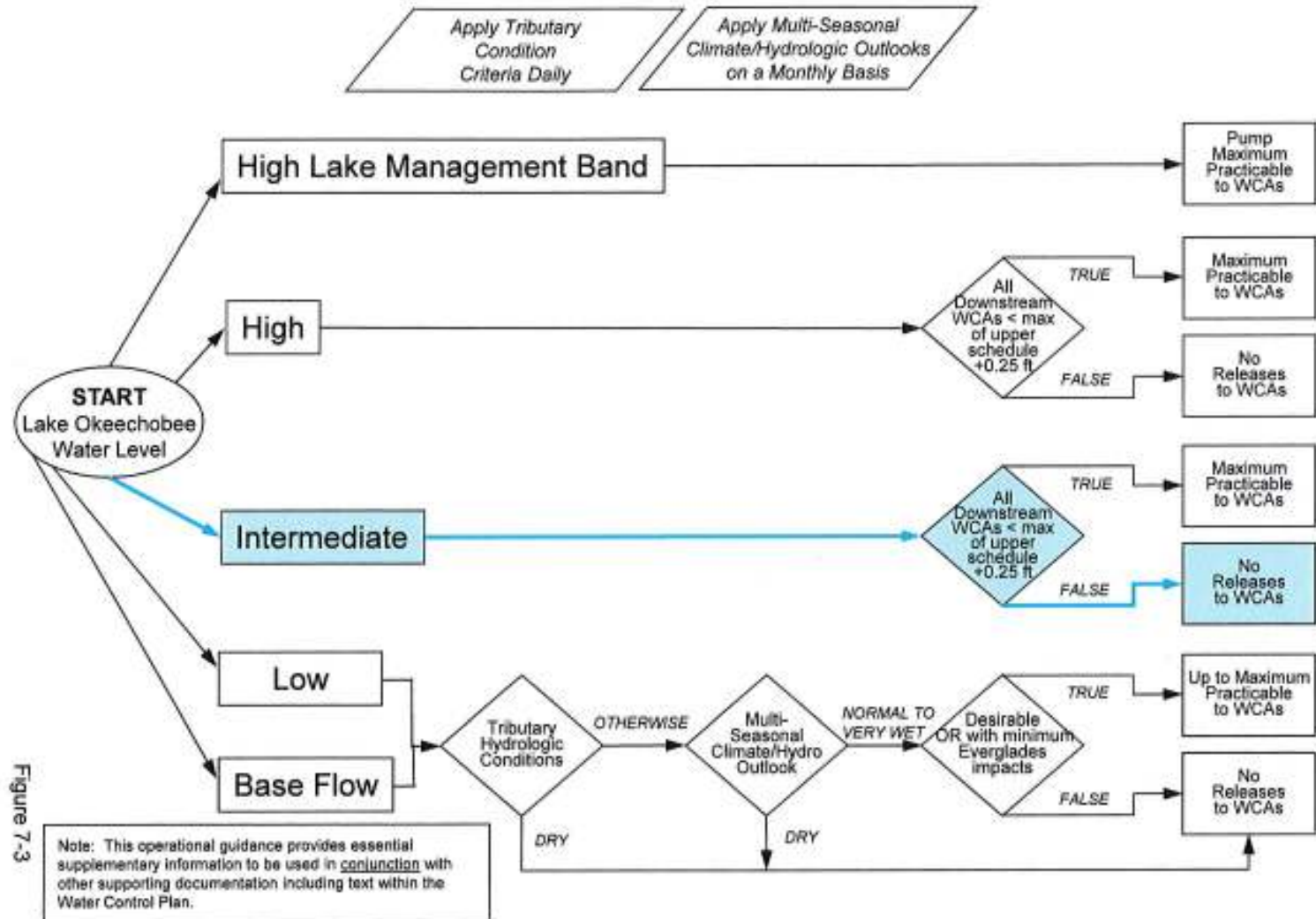
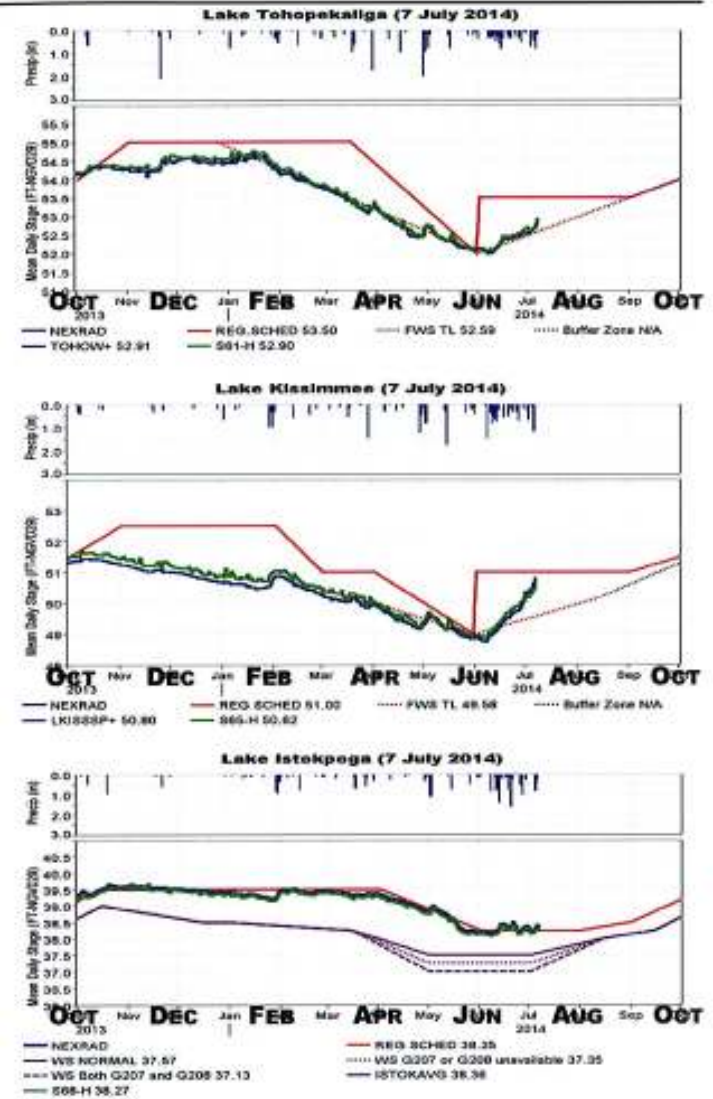
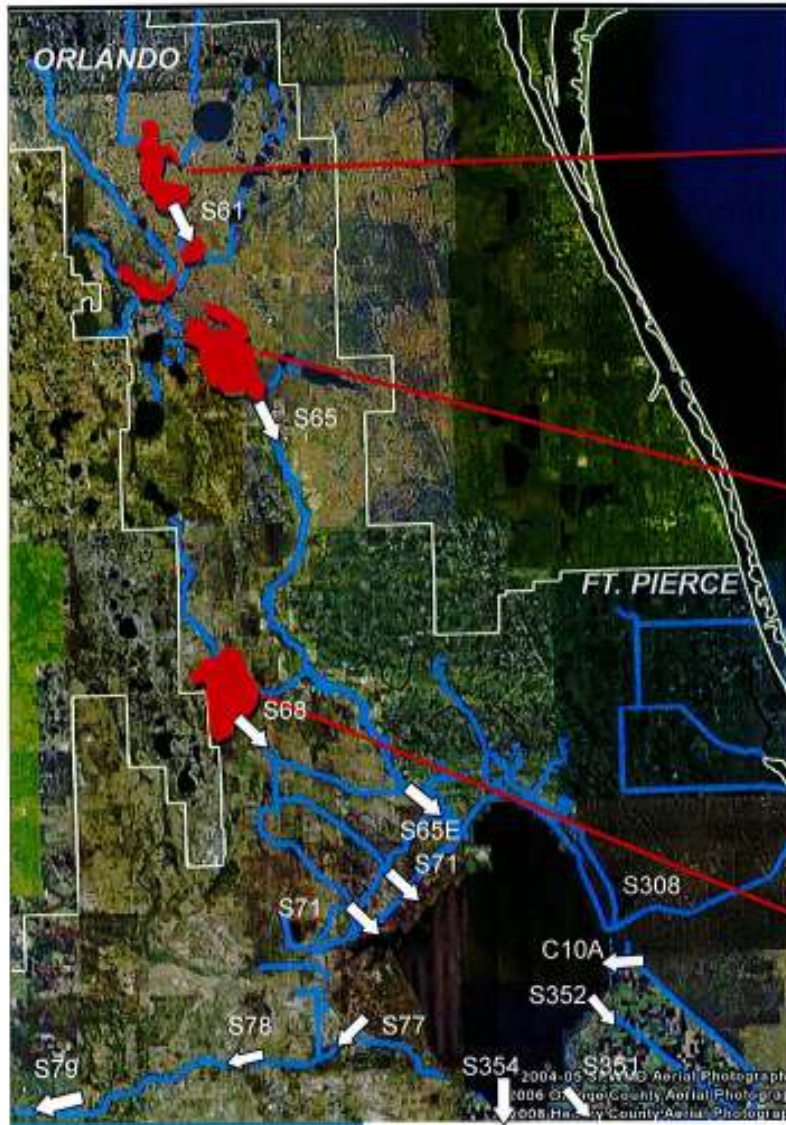
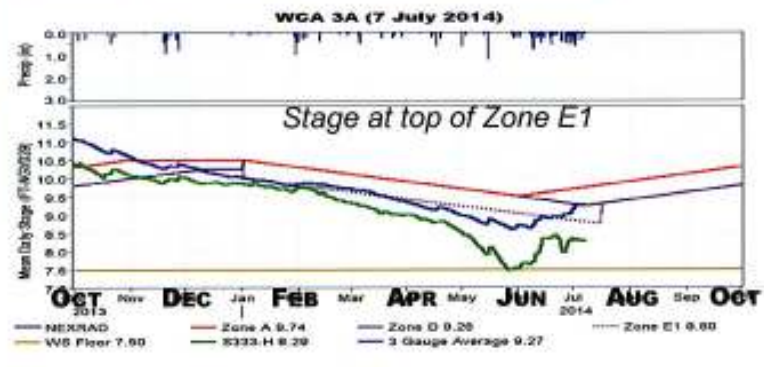
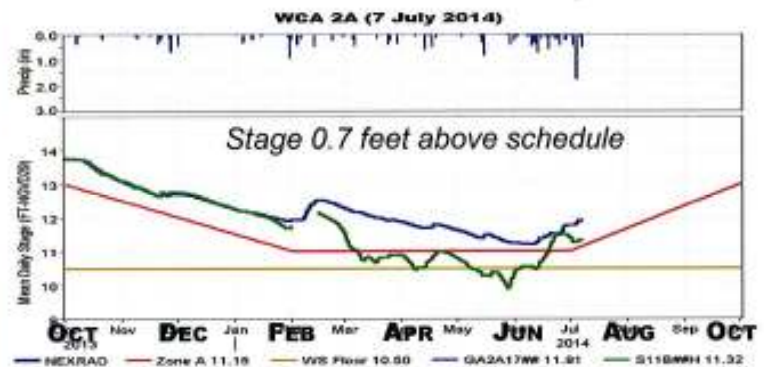
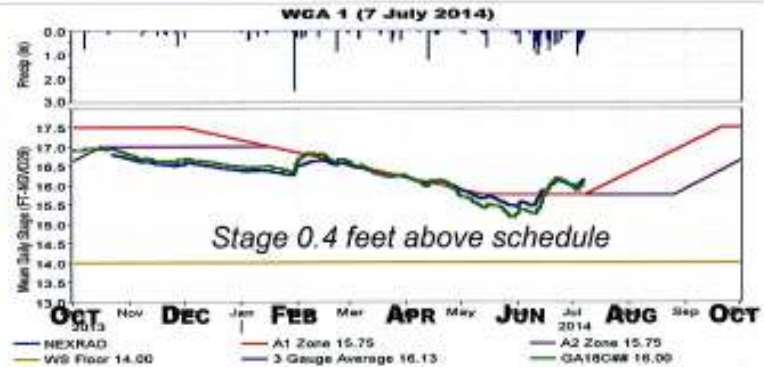


Figure 7-3

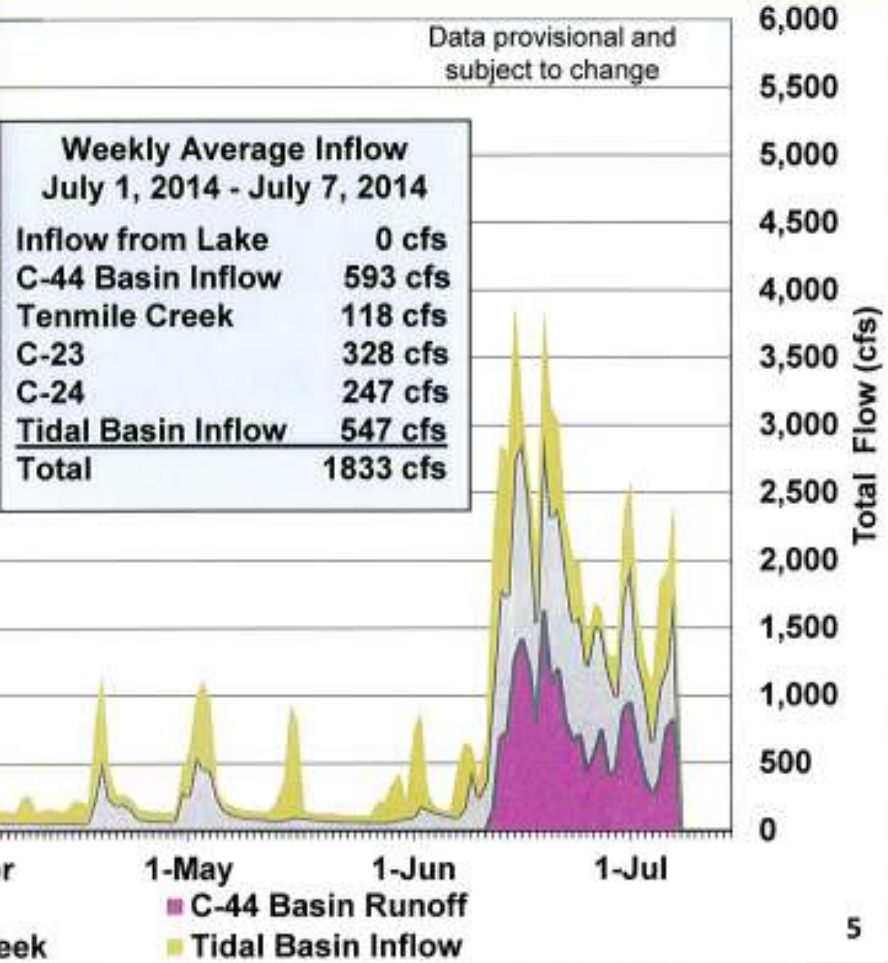
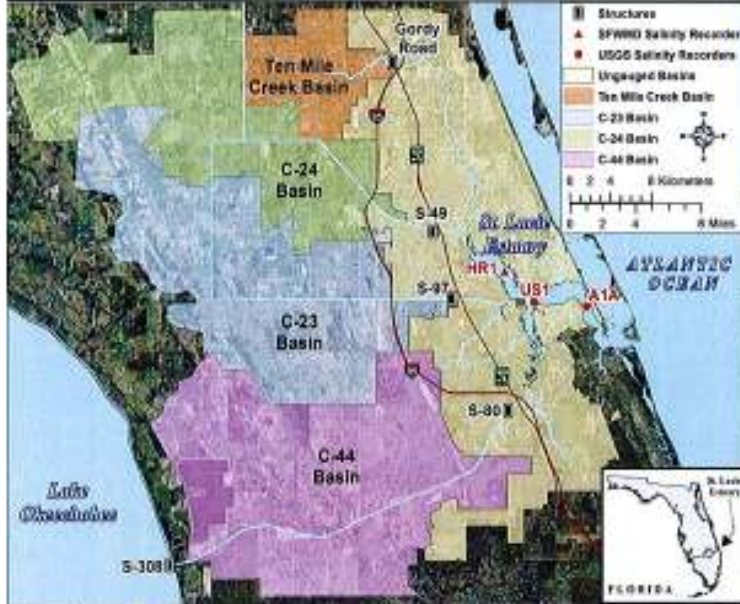


Upper Chain of Lakes & Lake Kissimmee Schedules – USACOE & SFWMD



Water Conservation Areas (WCAs) Schedules – USACOE & SFWMD

St. Lucie Estuary



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.floridaocean.org>
For sample results related to bacteria levels go to: www.marincountyhealth.com and click on the Environmental Health link.

Posted:

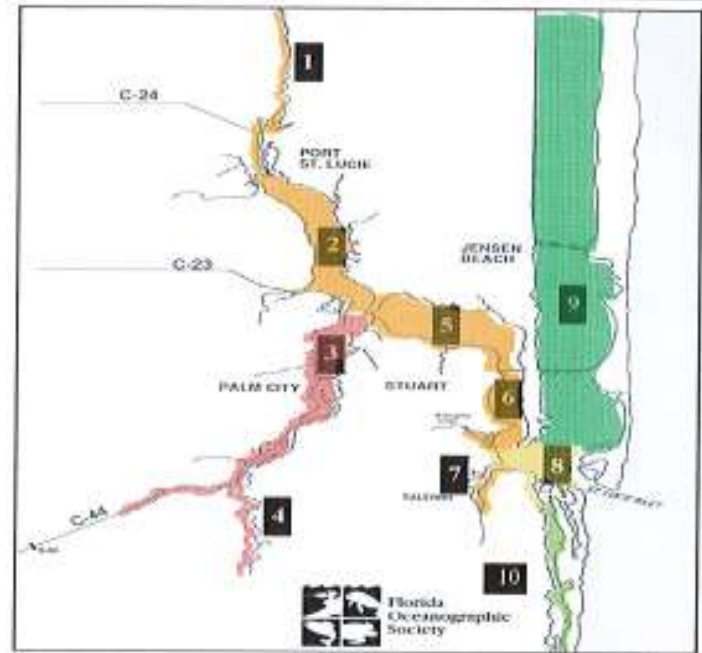
07/17/14

Overall Grade:	66.2%	D	POOR
----------------	--------------	----------	-------------

Zone/ Location	Water Temp. Deg. F	pH	Visibility (Secchi) Meters	Salinity ppt	Dissolved Oxygen mg/L	Location Score	Grade
1. Winding North Fork	84	7.4	0.60 Fair	0.0 Poor	6.0 Good	66%	D Poor
2. North Fork	85	7.9	0.64 Fair	0.3 Poor	5.5 Good	68%	D Poor
3. South Fork	85	7.6	0.43 Poor	0.8 Poor	4.9 Fair	51%	F Destructive
4. Winding South Fork	82	7.1	0.40 Poor	0.0 Poor	2.0 Poor	46%	F Destructive
5. Wide Middle River	86	7.8	0.55 Fair	3.5 Poor	4.2 Fair	61%	D Poor
6. Narrow Middle River	84	8.5	0.60 Fair	10.0 Poor	4.3 Fair	61%	D Poor
7. Manatee Pocket	84	7.9	0.85 Fair	11.5 Poor	3.7 Fair	61%	D Poor
8. Inlet Area	83	8.1	0.75 Fair	25.0 Fair	4.6 Fair	71%	C Satisfactory
9. Indian River Lagoon	86	8.4	VAB NoGrade	30.0 Good	5.1 Good	97%	A Ideal
10. Intracoastal Waterway South	87	7.8	1.15 Good	28.5 Fair	4.0 Fair	81%	B Good



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 871-7882 or the South Florida Water Management District (SFWMD) 223-2800 to ask about the quality of a specific area and report observations of pollution.



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

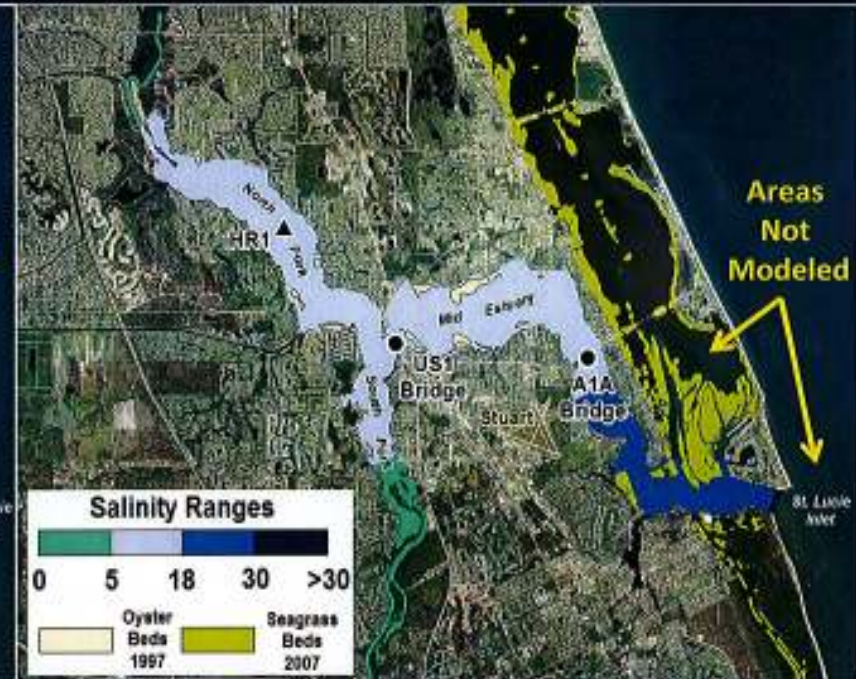
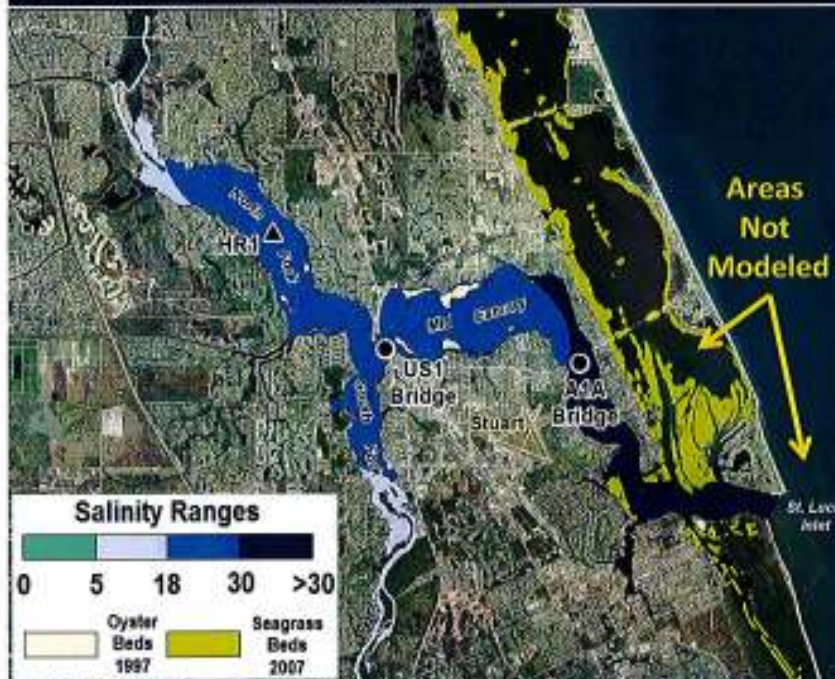
Salinity (Parts per Thousand)				
Zones	Description	Good	Fair	Poor
1 & 4	Winding North & South Forks	2 to 8	1 to 2 or 8 to 15	< 1 or > 15
2 & 3	Inner St. Lucie Estuary (North & South Fork)	15 to 25	10 to 15 or > 25	< 10
5	Wide Middle St. Lucie River	> 20	15 to 20	< 15
6	Narrow Middle St. Lucie River	> 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

St. Lucie Estuary

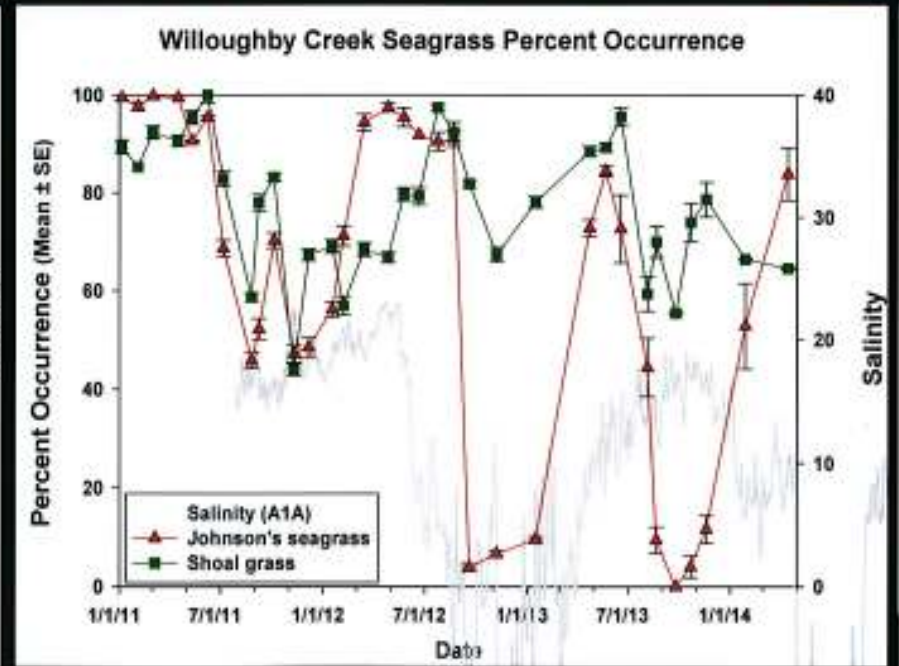
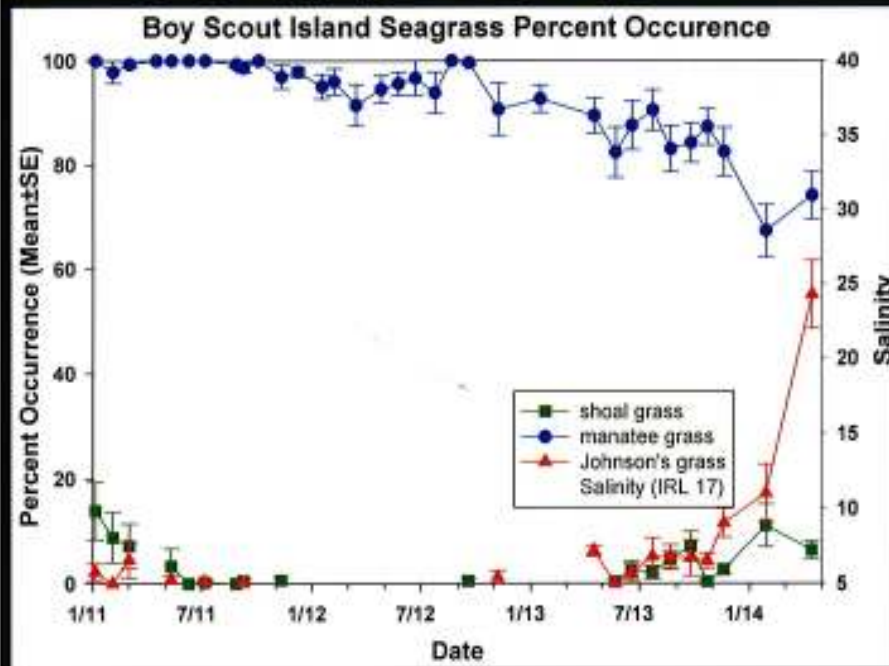
Salinity Conditions

June 8, 2014

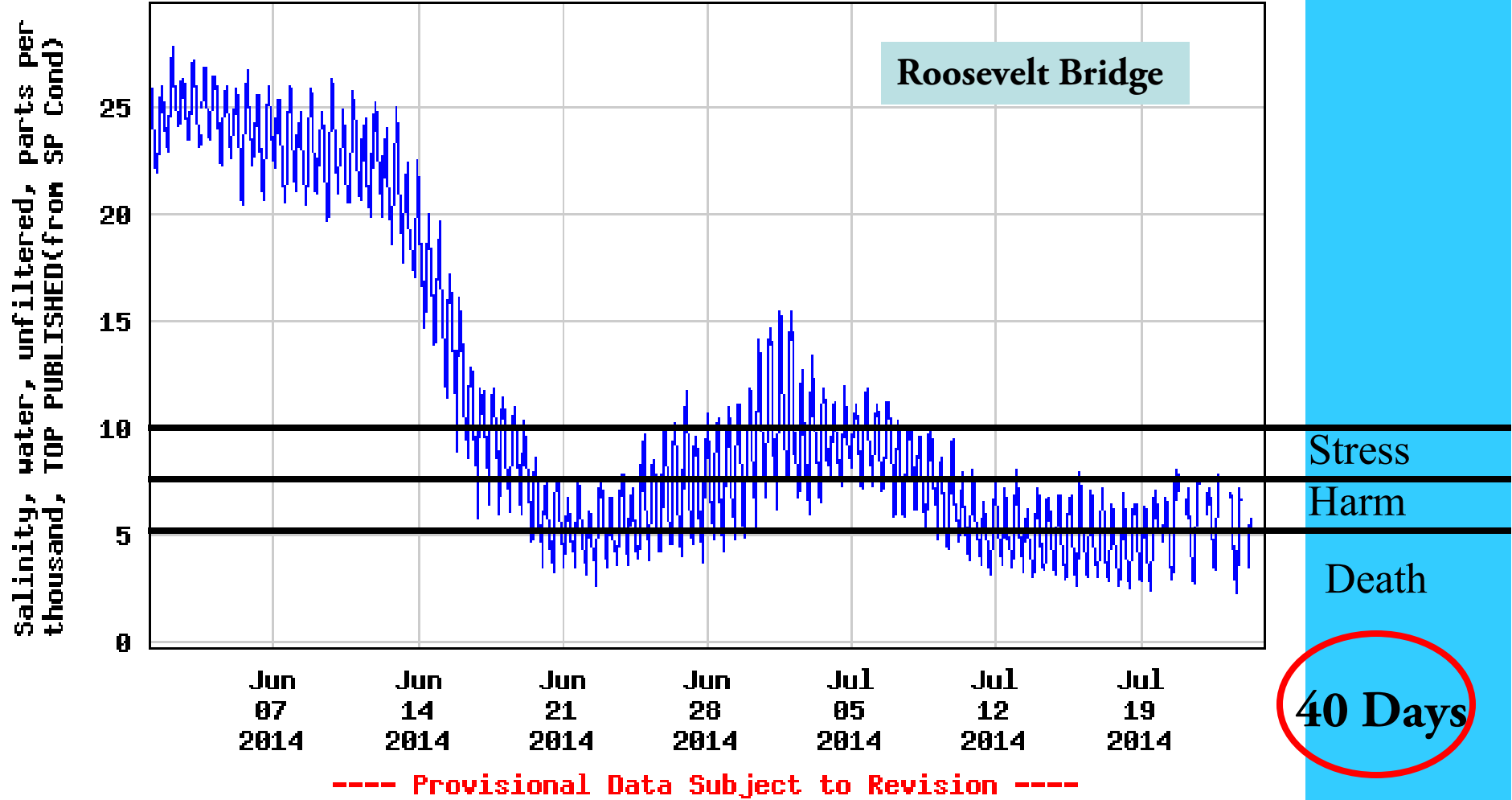
July 7, 2014



St. Lucie Estuary Seagrass



USGS 02277100 ST LUCIE RIVER AT SPEEDY POINT, STUART FL

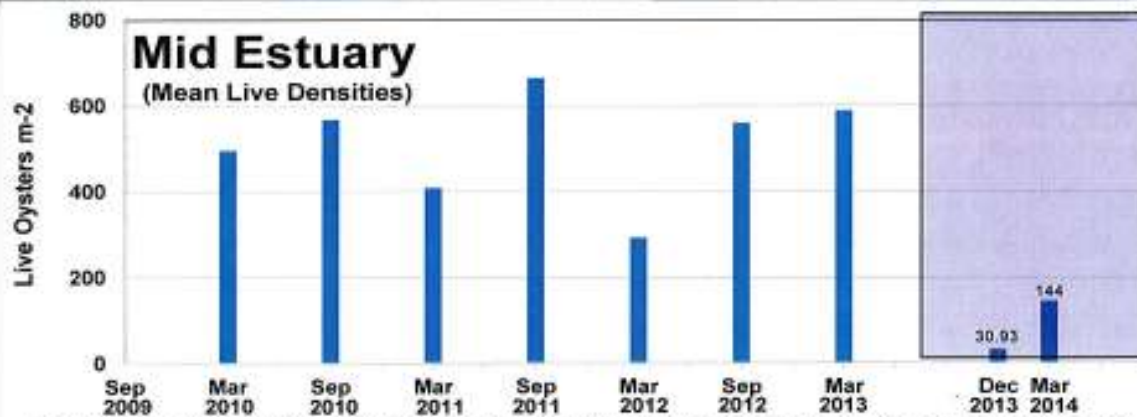


Salinity Tolerance for Oysters

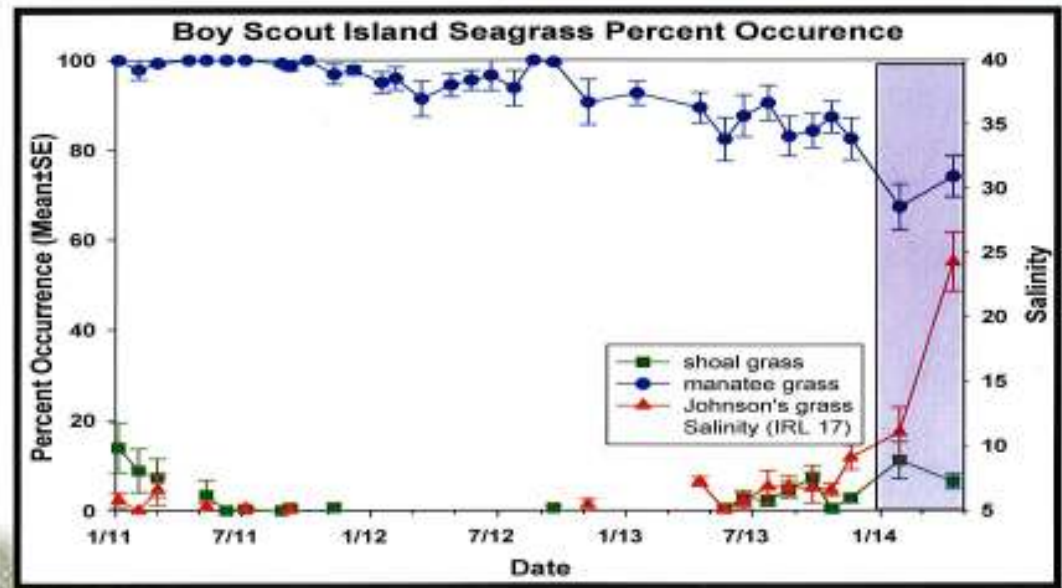


Death
7 Days For Spat & Juveniles
14 – 28 Days For Adults

St. Lucie Estuary – Oyster and Seagrass Recovery



* Density counts were collected in Dec. 2013 due to unsafe water conditions (high bacterial warnings) from May - Nov. 2013.



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.

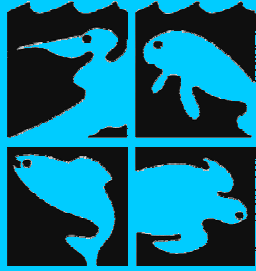
4 - Enforce treating water pollution at the source of the problem, not downstream.



Our Mission:

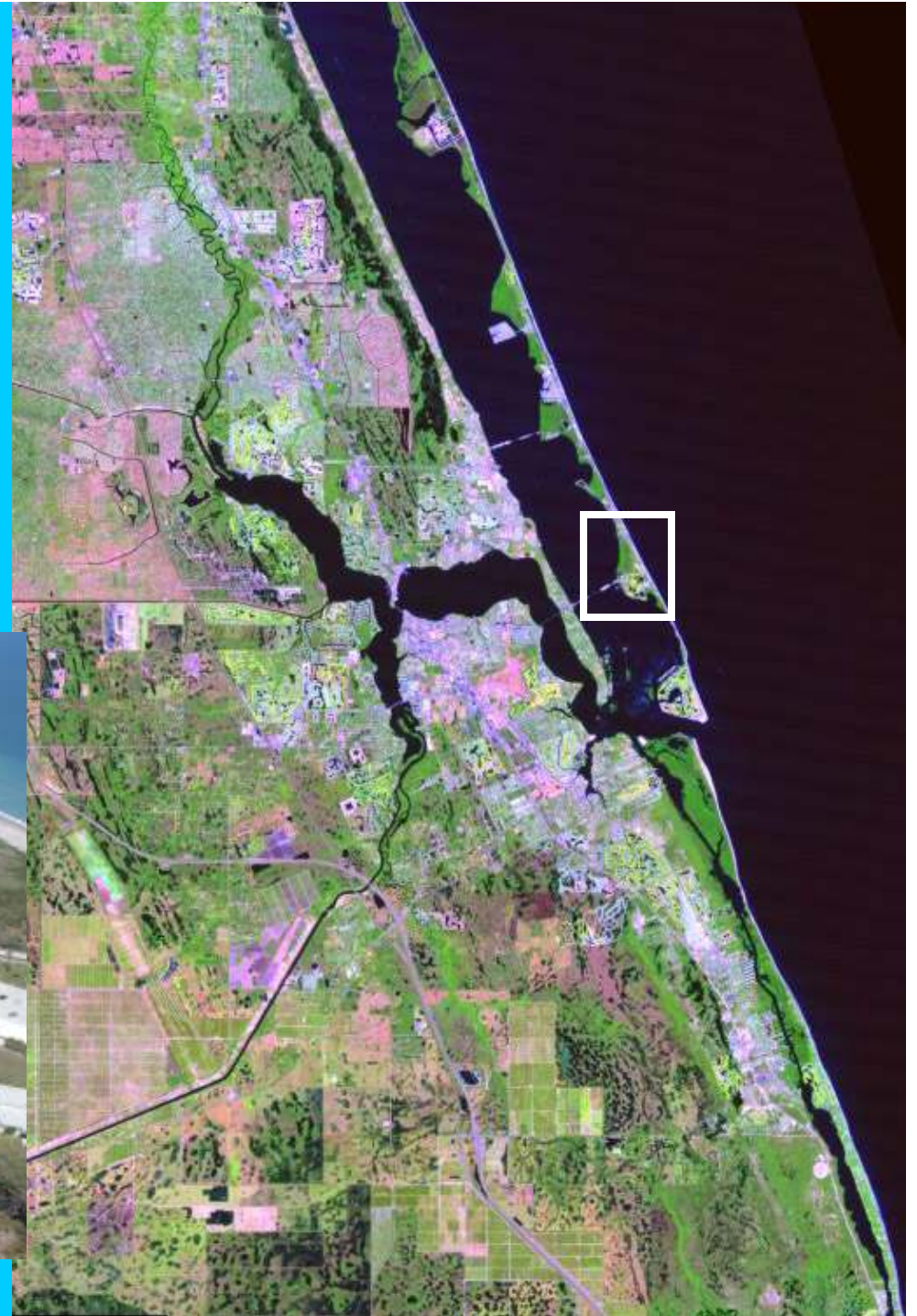
To inspire environmental stewardship of Florida's coastal ecosystems through education and research.

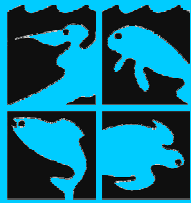




**Florida
Oceanographic
Coastal Center**

**Florida Oceanographic Coastal Center
located on Hutchinson Island in
Stuart, Florida.**





**Florida
Oceanographic
Coastal Center**

Education & Programs

*Hands-on learning for
children and adults*

- *Ray Feeding Programs*
- *Sea Turtle Programs*
- *Game Fish Lagoon Feeding Programs*
- *Guided Nature Trail Walks*



Research & Conservation

- *Water Quality Monitoring*
- *Oyster Reef Restoration*
- *Native Plant Restoration*
- *St. Lucie Estuary/Indian River Lagoon
& Everglades Conservation Efforts*



www.Floridaocean.org

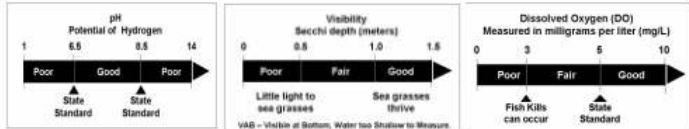
St. Lucie River Estuary Water Quality Outlook

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>

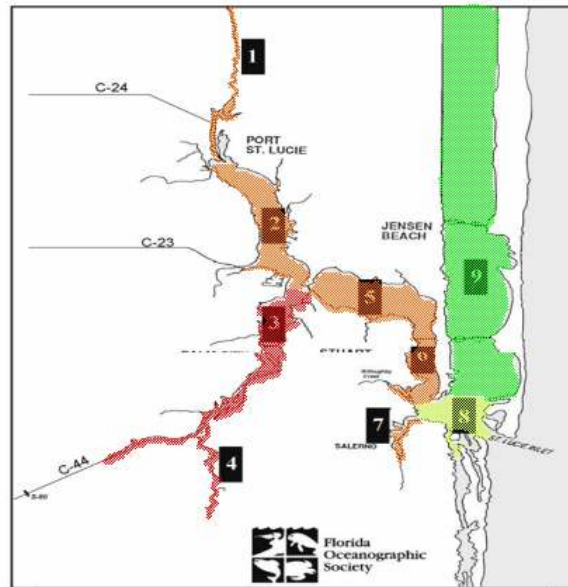
Posted: **06/17/10**

Overall Grade:	67.9%	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	87	7.7	0.70 Fair	0.0 Poor	4.8 Fair	61%	D Poor
2. North Fork	88	7.7	0.79 Fair	0.0 Poor	4.5 Fair	61%	D Poor
3. South Fork	89	8.0	0.35 Poor	0.7 Poor	6.4 Good	56%	F Destructive
4. Winding South Fork	85	7.3	0.55 Fair	0.0 Poor	2.0 Poor	56%	F Destructive
5. Wide Middle River	89	8.0	0.60 Fair	2.0 Poor	5.8 Good	66%	D Poor
6. Narrow Middle River	86	8.3	0.95 Fair	13.0 Poor	6.9 Good	66%	D Poor
7. Manatee Pocket	90	8.1	0.90 Fair	18.0 Poor	7.1 Good	66%	D Poor
8. Inlet Area	86	8.4	1.15 Good	27.5 Fair	4.9 Fair	81%	B Good
9. IRL	88	8.5	1.45 Good	30.0 Good	6.8 Good	97%	A Ideal



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.



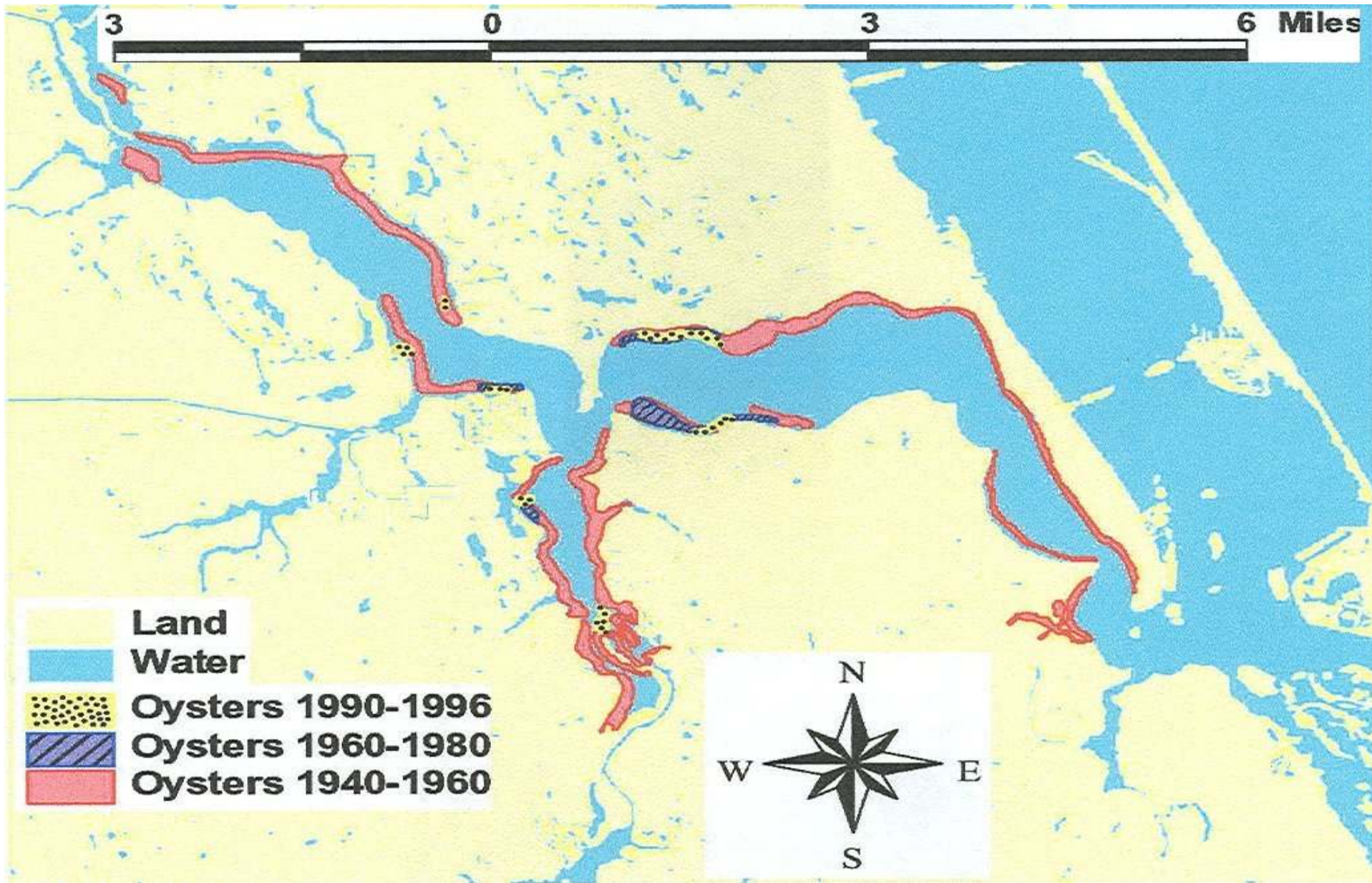
Grading				
A	B	C	D	F
90-100	80-89	70-79	60-69	0-59
IDEAL	GOOD	SATISFACTORY	POOR	DESTRUCTIVE

Salinity (Parts per Thousand)				
Zones	Description	Good	Fair	Poor
1 & 4	Winding North & South Forks	2 to 8	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		
6	Narrow Middle St. Lucie River	> 25		
7	Manatee Pocket	> 27.5		
8 & 9	Inlet and Indian River Lagoon (to Jensen Beach Causeway)	>30		

Water Quality Monitoring preformed weekly by volunteers throughout Martin County.

Results published weekly in The Stuart News.





St. Lucie River Estuary Oyster Reef Habitat Loss
 1940s – 470 acres 1996 – 260 acres 2003 – 116 acres

Oyster Gardening Habitat Restoration Program – Started 2005



Oyster Reef Restoration



Oyster Shells collected from local restaurants are bagged and deployed to designated reef restoration sites by staff and volunteers. New oyster growth is monitored by staff

*1 adult oyster can filter **50 gallons per day**, and oyster reefs provide shoreline stabilization and habitat to **over 300 estuarine species***



In partnership with
Martin County Oyster
Reef Restoration Project







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Welcome to Florida Oceanographic Society



Join our mission to *inspire environmental stewardship of Florida's coastal ecosystems through education and research.*



Welcome to Florida Oceanographic Society. With more than 8,500 miles of tidal shorelines, 2.1 million acres of estuaries and 30% of the state's land cover consisting of wetlands, Florida's relationship to water is vital to the prosperity of our state.

Since 1964, Florida Oceanographic Society has worked to protect our coastal ecosystems through education and research. I invite you to get involved today - [VISIT THE COASTAL CENTER](#), [BECOME A MEMBER](#), and [VOLUNTEER](#). Together let's inspire environmental stewardship for generations to come.

FEATURED EVENTS



SAVE THE DATE
February 23, 2013
6-10:00 p.m.

TICKETS:
\$175 members
\$225 non-members



Birding 101 at Florida Oceanographic

January 9, 16, 23 & 30
4 Full-Day Classes
2 Excursions, Presentations & Labs Per Day
Transportation Included
Very Limited Enrollment
\$170 Members
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For Registration & Details
Call Ellie Van Os
(772)225-0505 ext. 113

WHAT'S GOING ON?



Learn More at www.FloridaOcean.org

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