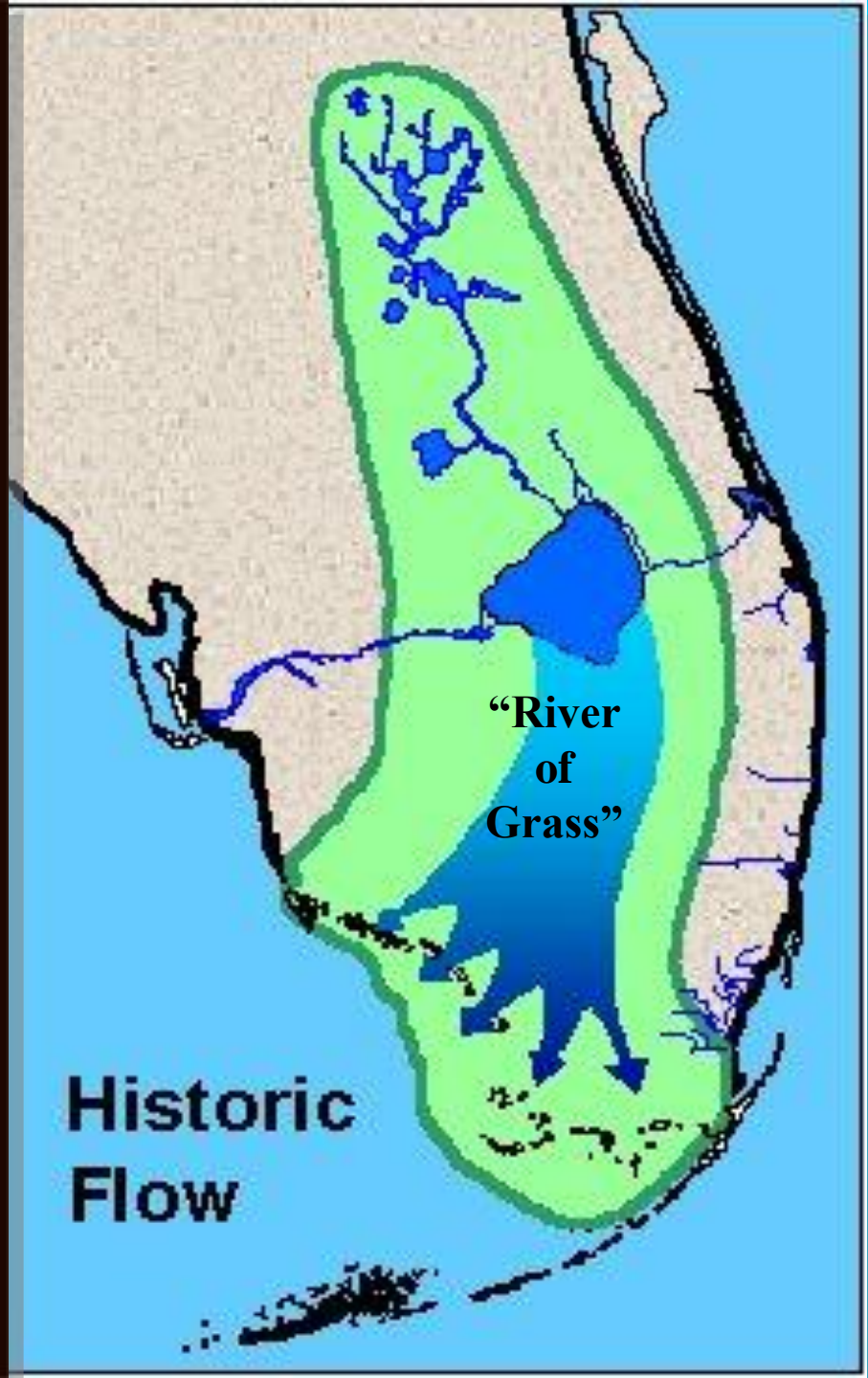


The Everglades and the St. Lucie River: Flows & Current Issues

Rivers Coalition
April 25, 2013





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

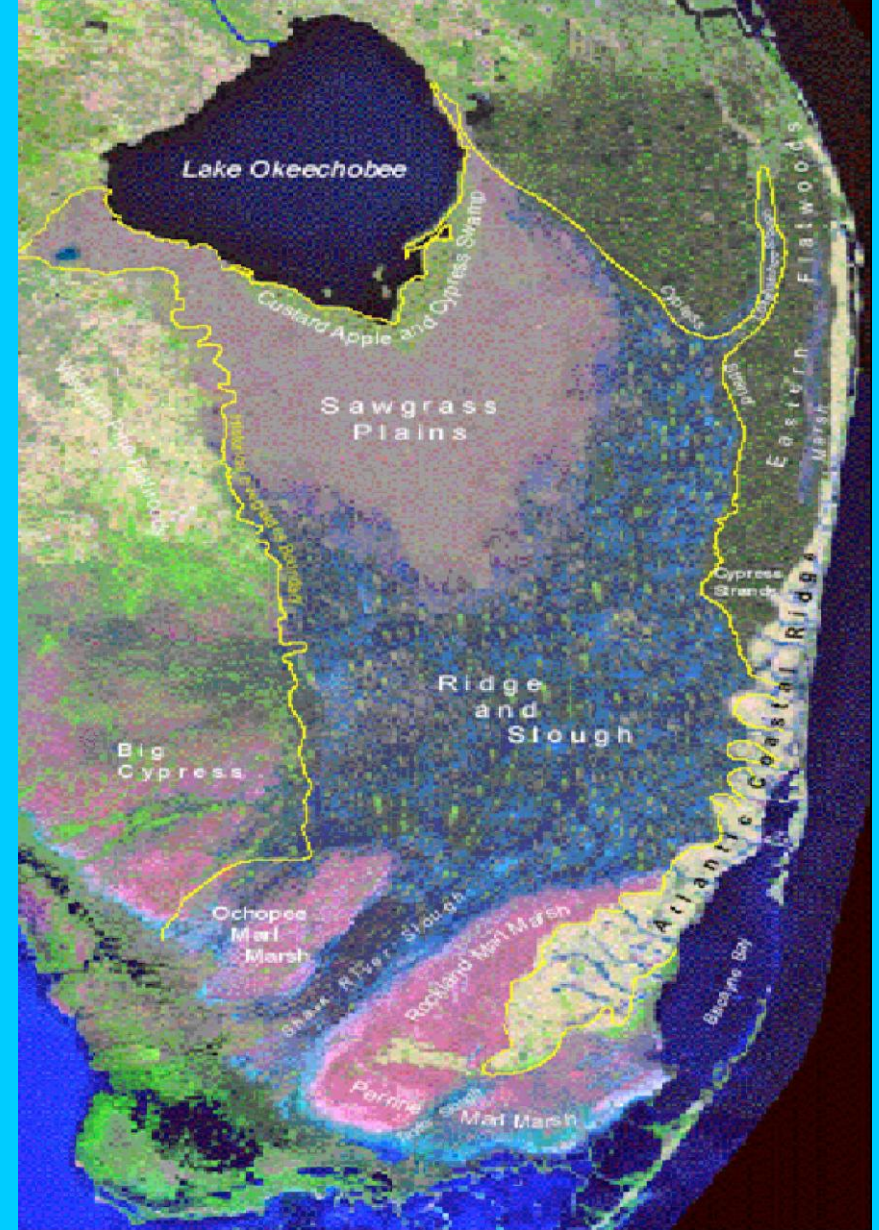
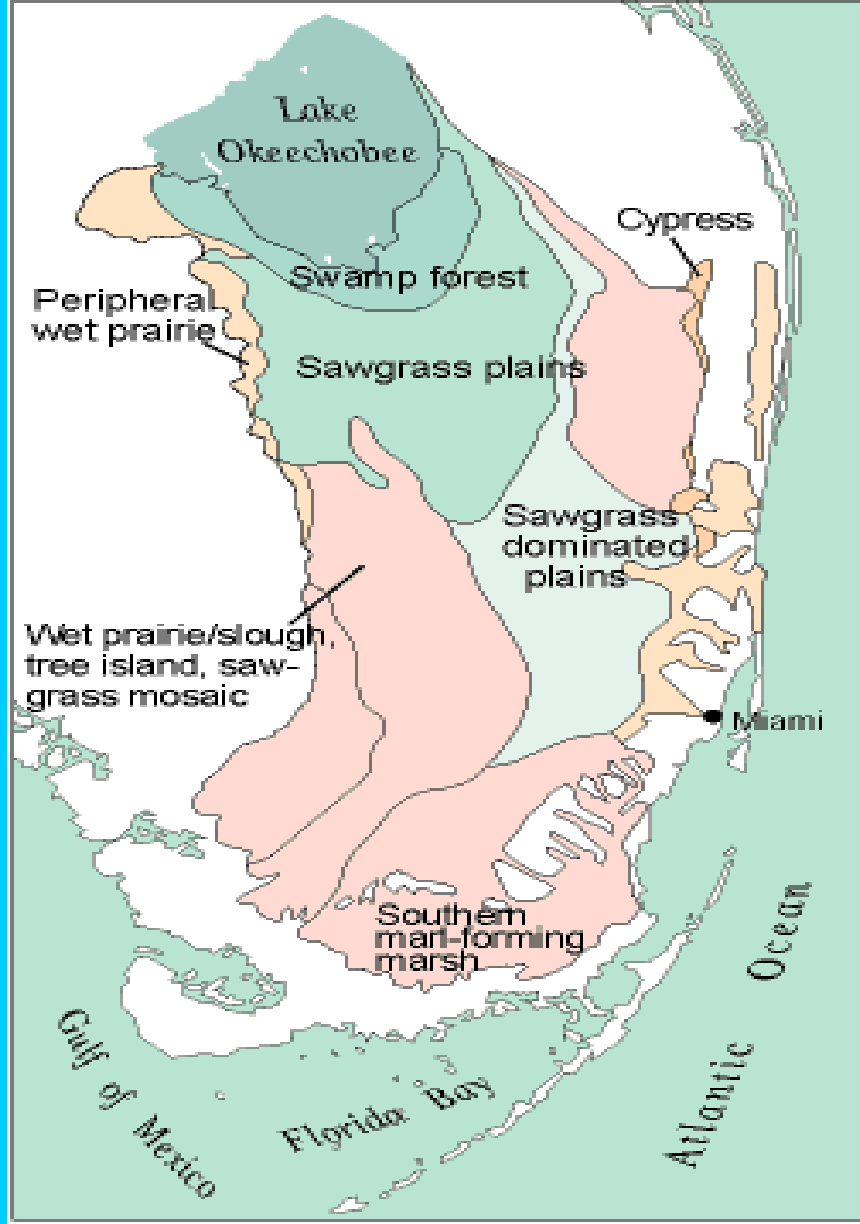
Lake Kissimmee flows south into the
Kissimmee River – 105-mile Oxbow
River with 2-mile-wide floodplain

Water takes 6-8 Months to reach Lake
Okeechobee

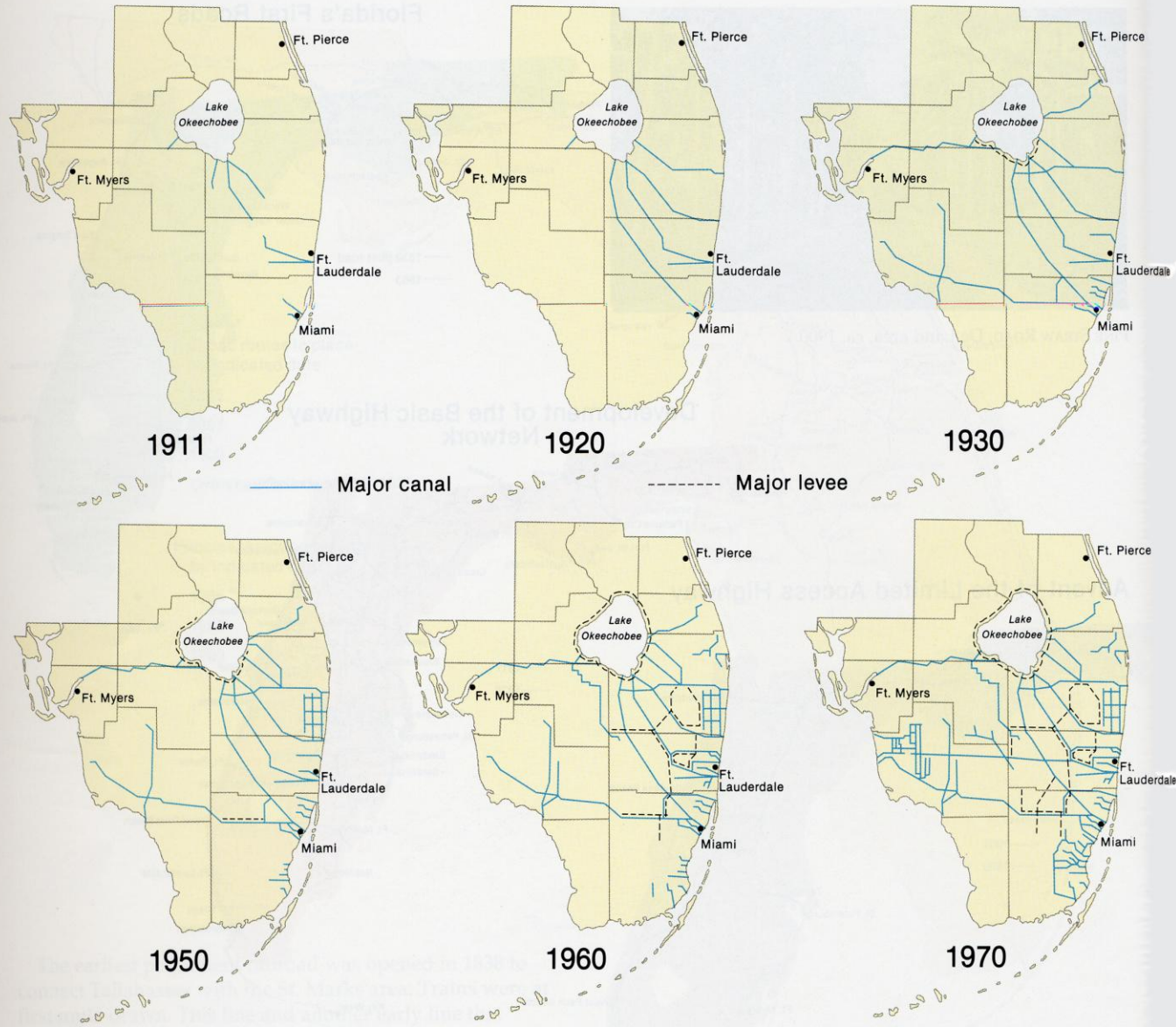
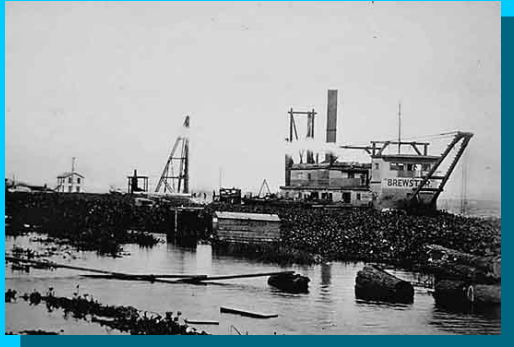
Lake Okeechobee flows south through “River
of Grass”, 60-mile-wide shallow (1 ft deep)
river flowing at 1 mile in 4 days.

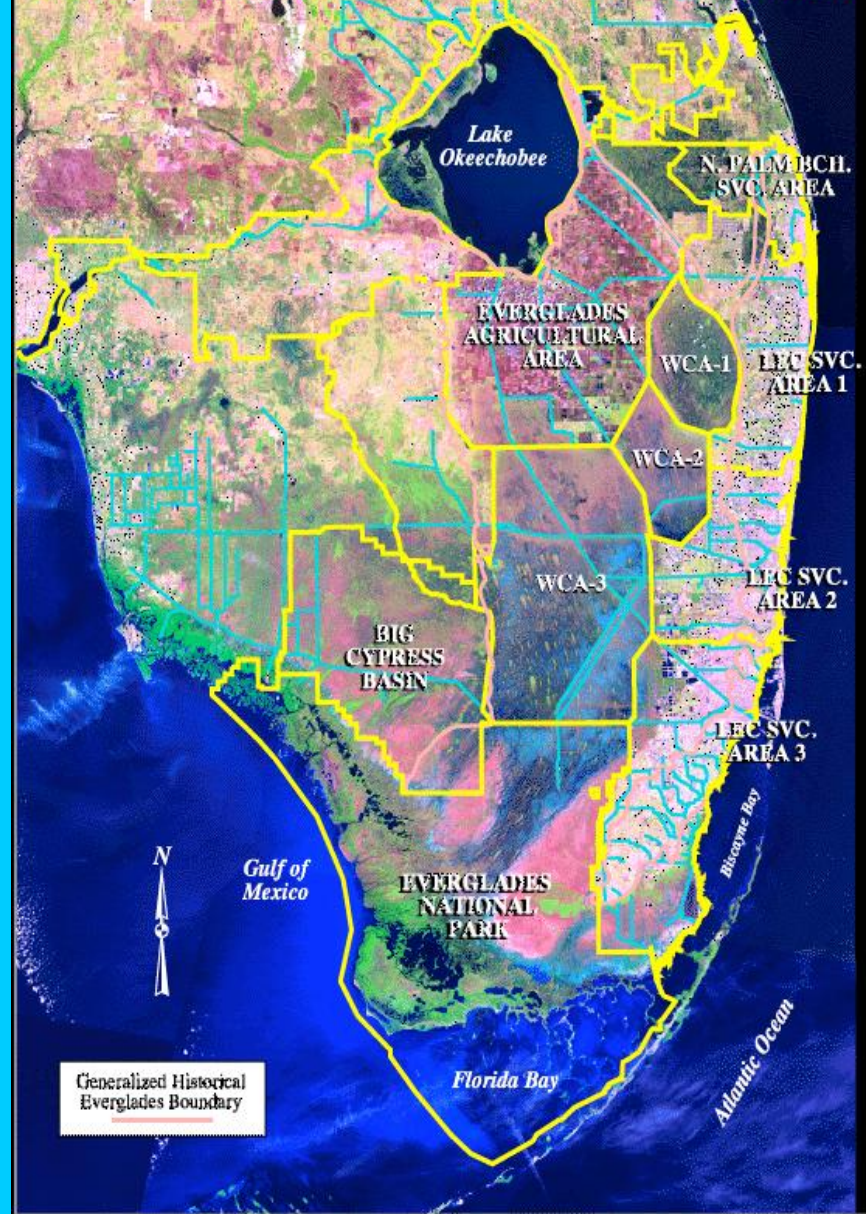
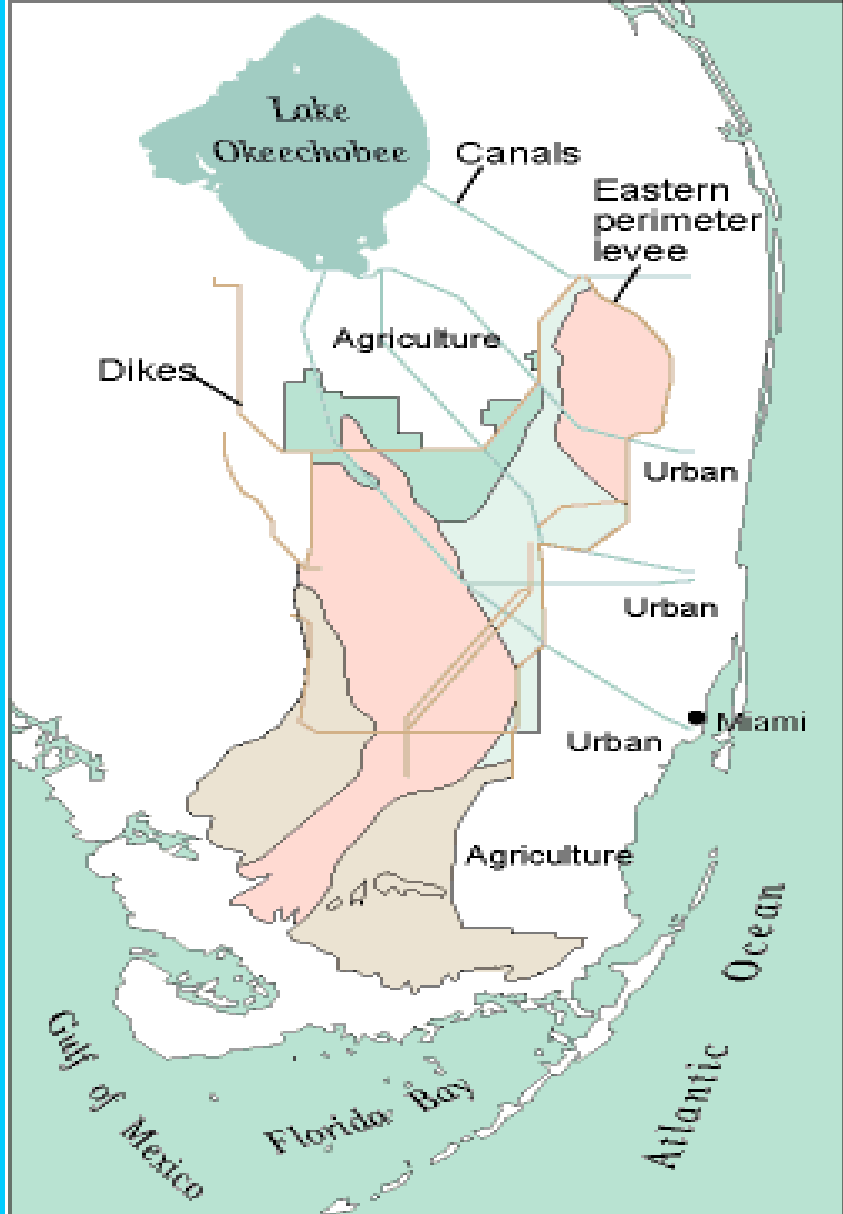
Water takes 16 Months to reach Florida
Bay

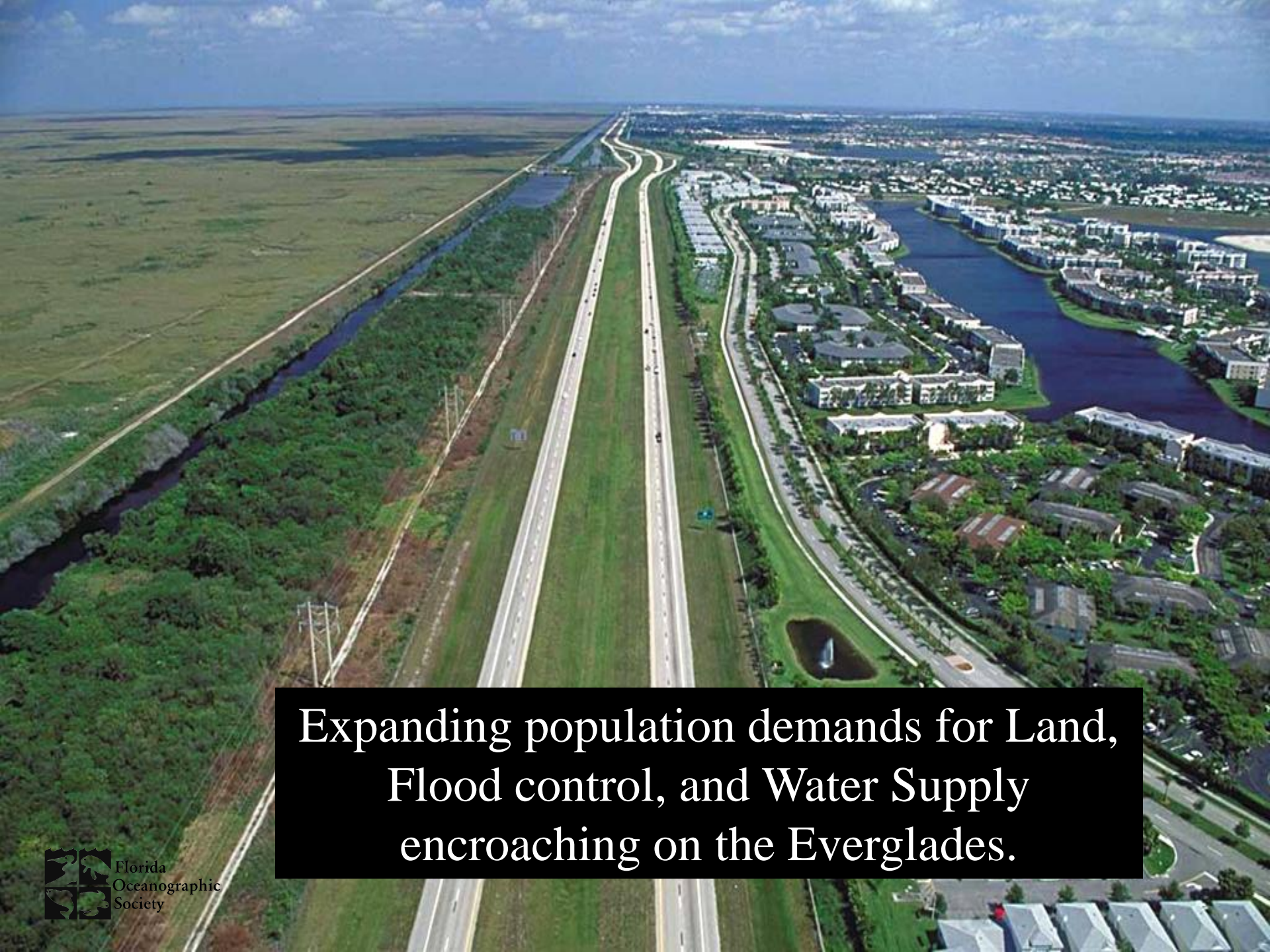




Expansion of the Canal and Levee System







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

Hurricanes in 1926 & 1928

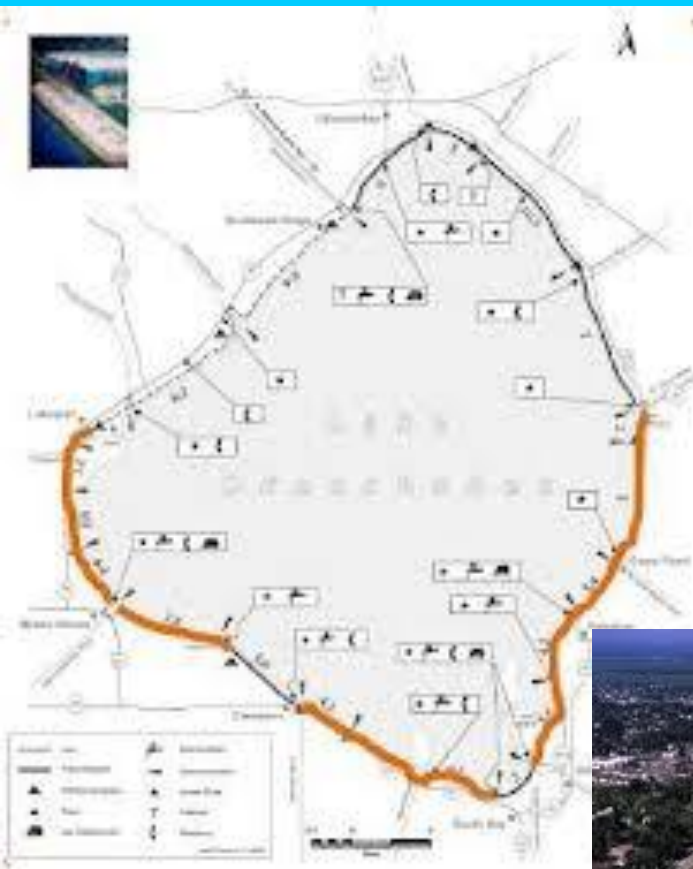
1926 AND 1928
DEVASTATING HURRICANES
... LOSS OF 2,500 LIVES

HOOVER DIKE AUTHORIZED 1930

... COMPLETED 1937

The poster features a central illustration of a long dike extending from a town on the left towards the ocean on the right. The text is arranged around this central image, with the top section in a blue banner and the bottom section in a jagged orange border.

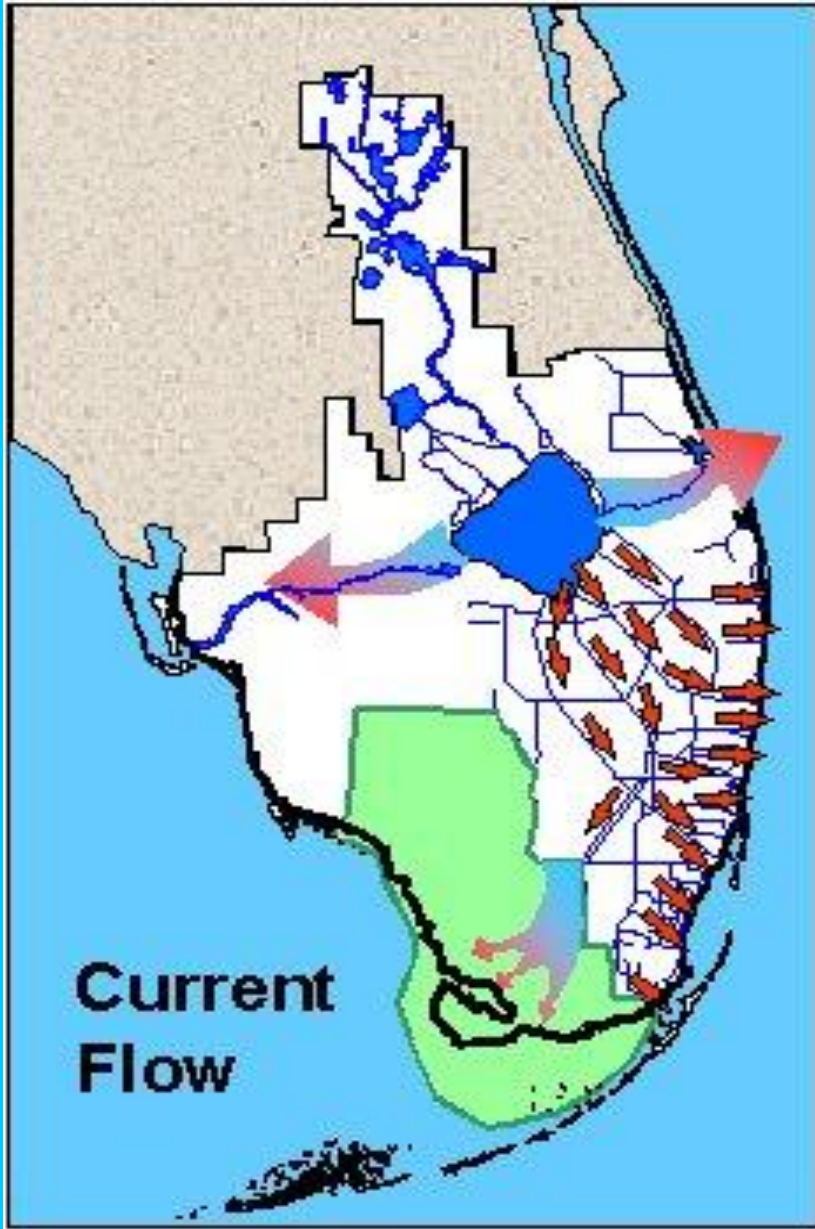




Dam Lake Okeechobee- Stop the flow to the River of Grass (Killed the River of Grass)



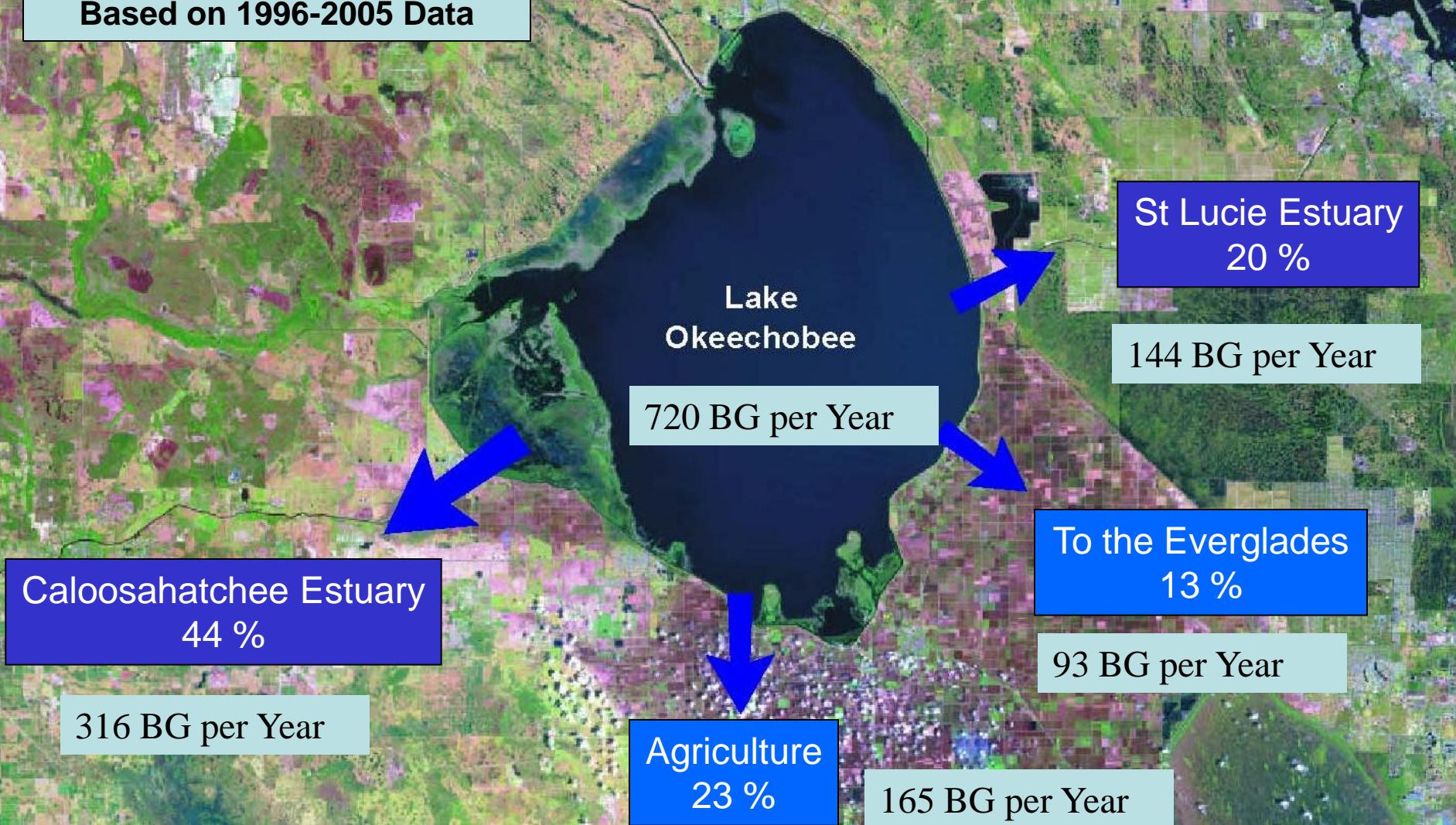
Killed the Kissimmee River- 1962-1970 Dug C-38 Canal up 105 mile oxbows-drained floodplain



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

Where the Water Goes

Based on 1996-2005 Data



Lake Okeechobee

720 BG per Year

St Lucie Estuary
20 %

144 BG per Year

To the Everglades
13 %

93 BG per Year

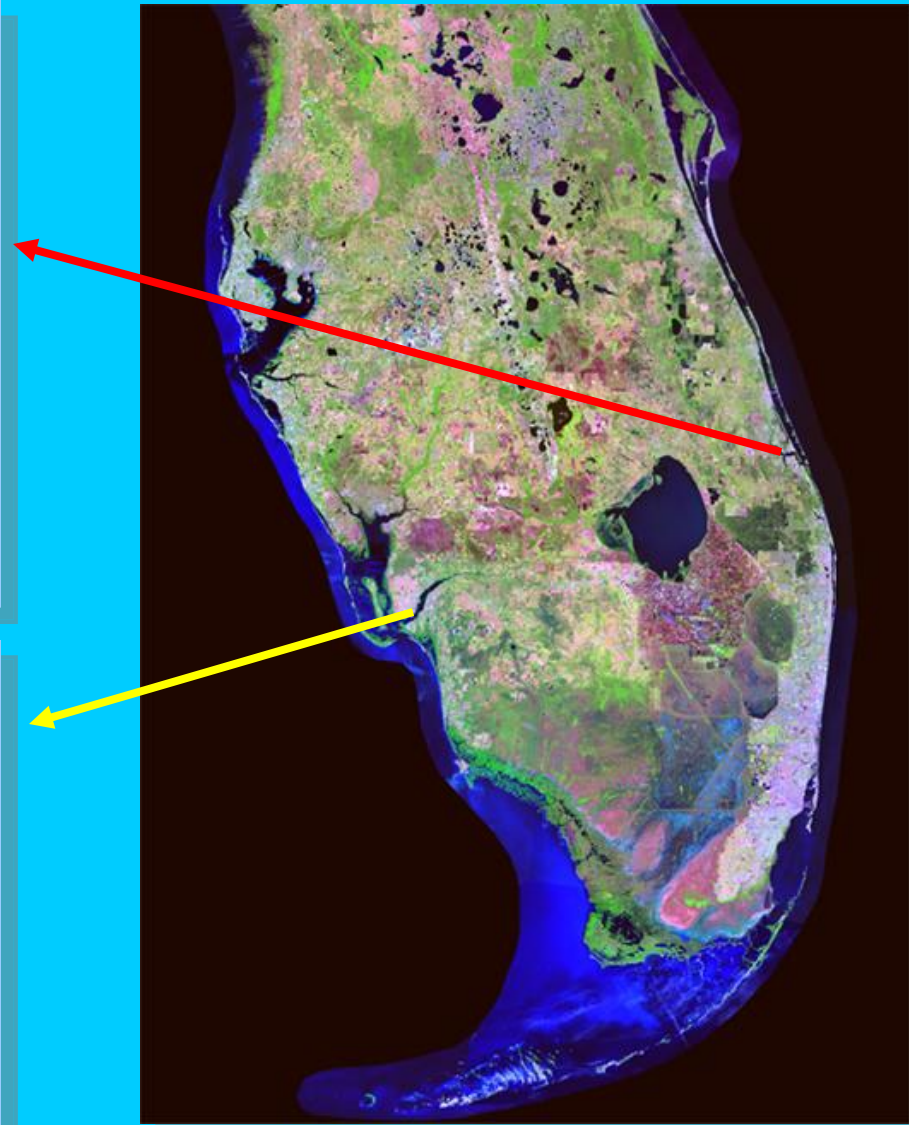
Caloosahatchee Estuary
44 %

316 BG per Year

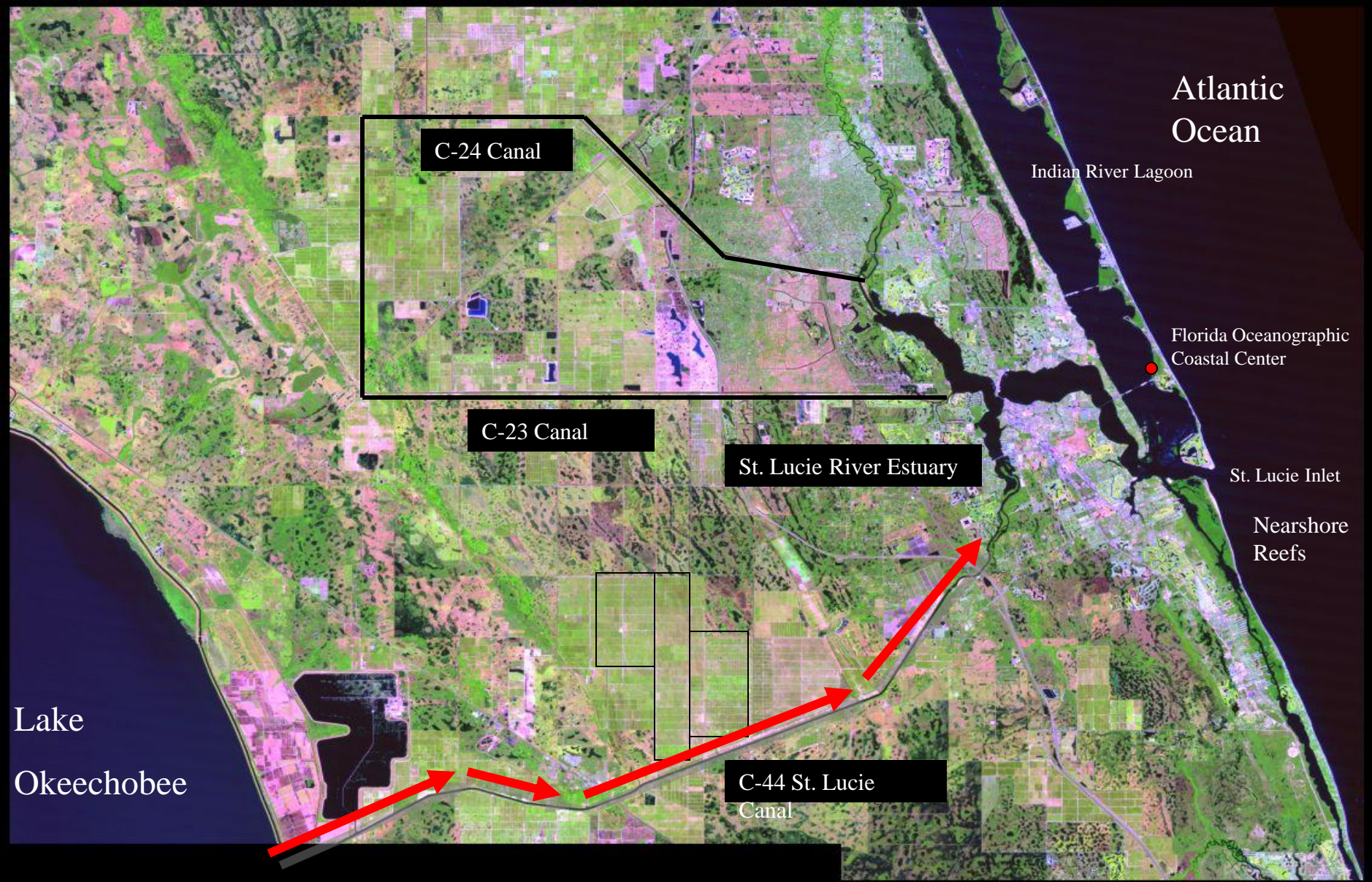
Agriculture
23 %

165 BG per Year

South Florida Coastal Estuaries



Killing the Coastal Rivers



Atlantic Ocean

Indian River Lagoon

Florida Oceanographic Coastal Center

St. Lucie Inlet

Nearshore Reefs

C-24 Canal

C-23 Canal

St. Lucie River Estuary

C-44 St. Lucie Canal

Lake Okeechobee



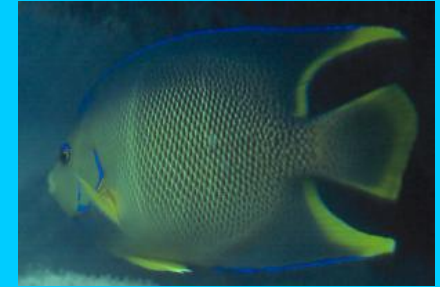
Discharges from Lake Okeechobee to the St. Lucie River Estuary and Indian River Lagoon

St.

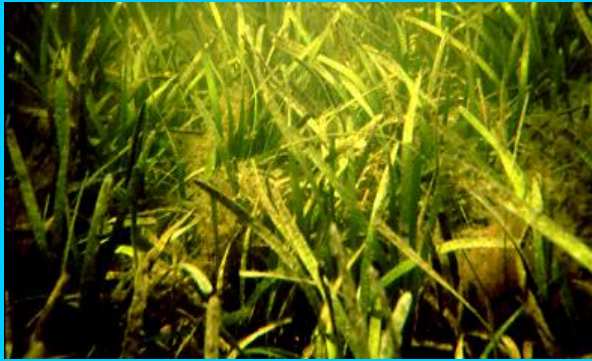


Discharges from Lake Okeechobee and St. Lucie Canal to the Estuary. Up to 4.6 Billion Gallons per Day!

Loss of Fisheries & Coastal Habitat



Seagrass Beds



Oyster Reefs



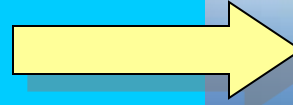
Mangroves

Coral Reefs



Indian River Lagoon Seagrass Beds

Before Discharges

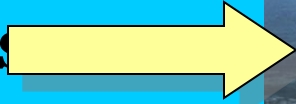


During Discharges



St. Lucie Inlet Nearshore Reefs

Before Discharges



Sediment Plume 6-8 miles offshore



During Discharges

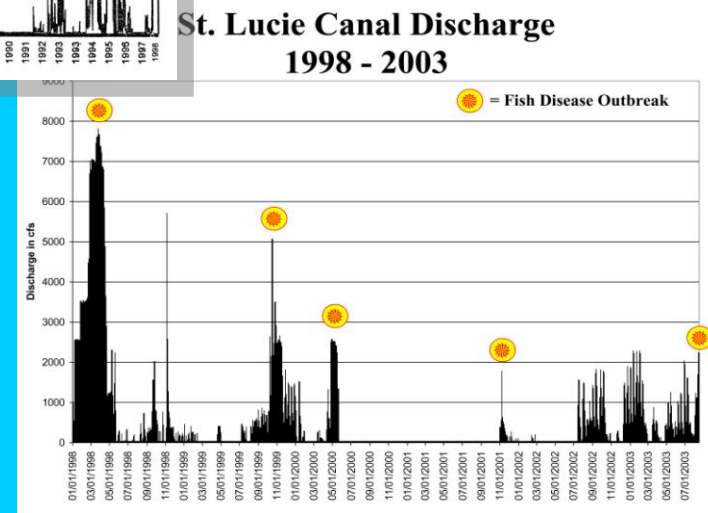
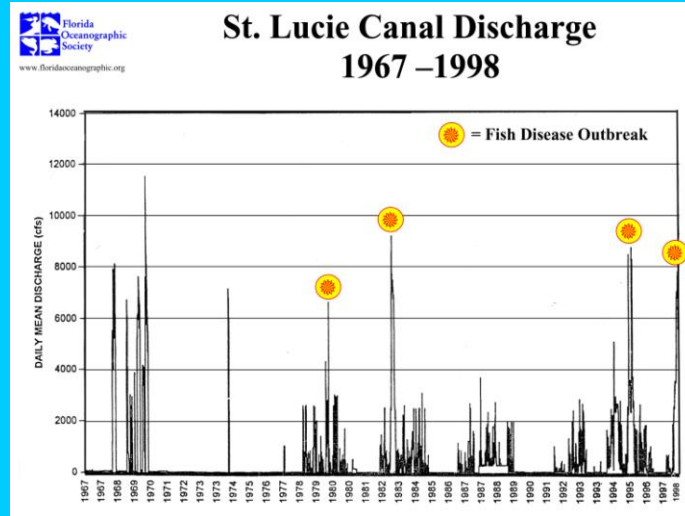
St. Lucie River Estuary Muck Bottom



4-8 ft. thick on bottom

7.9 million cubic yards ++

Fish Lesions and Abnormalities



33 Species of Fish
6% of the population



0 0.5 1 2 Miles



Florida Oceanographic Coastal Center

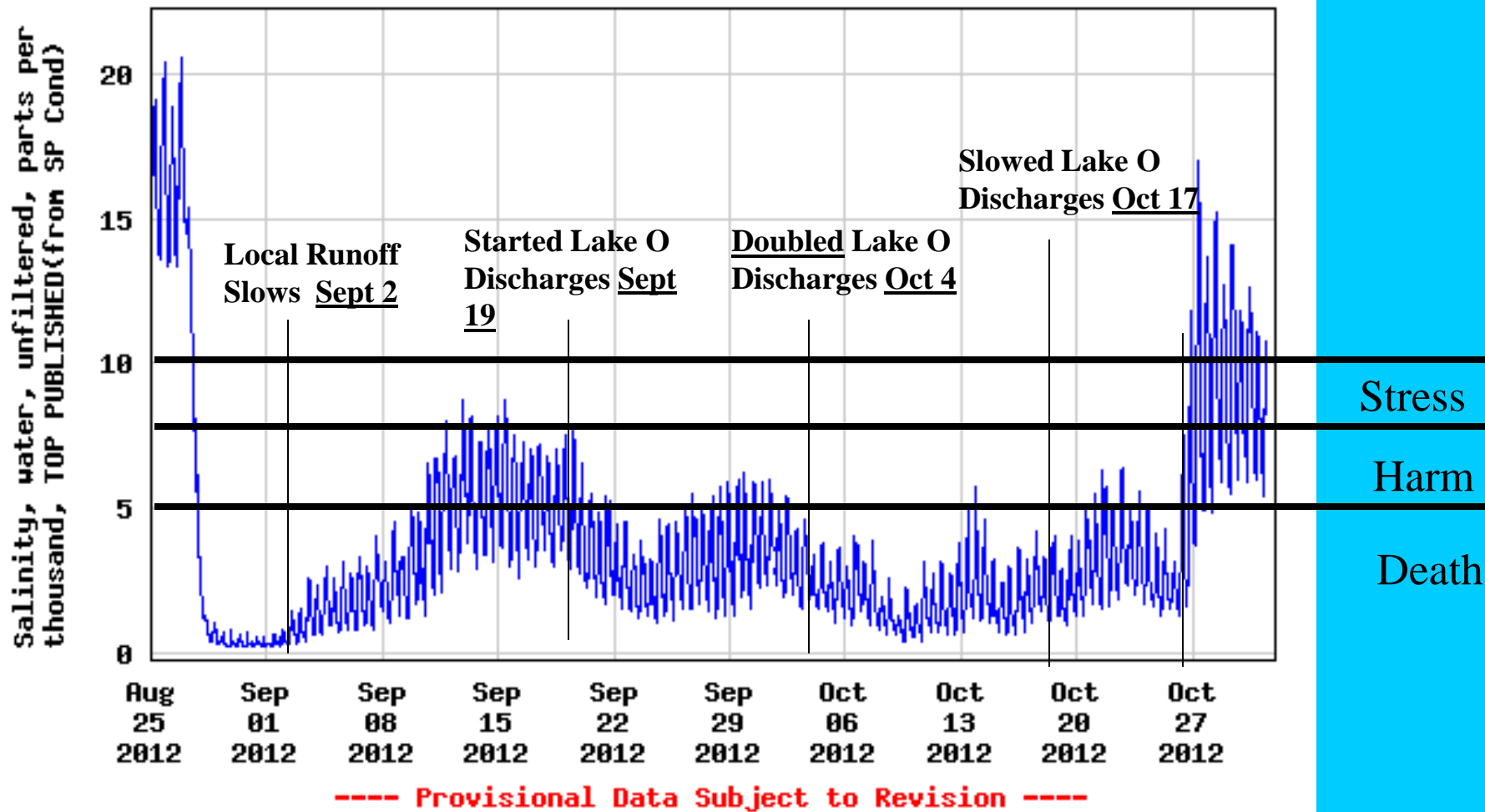


Martin Co./NOAA Reefs



Historic Oyster Reefs





Death

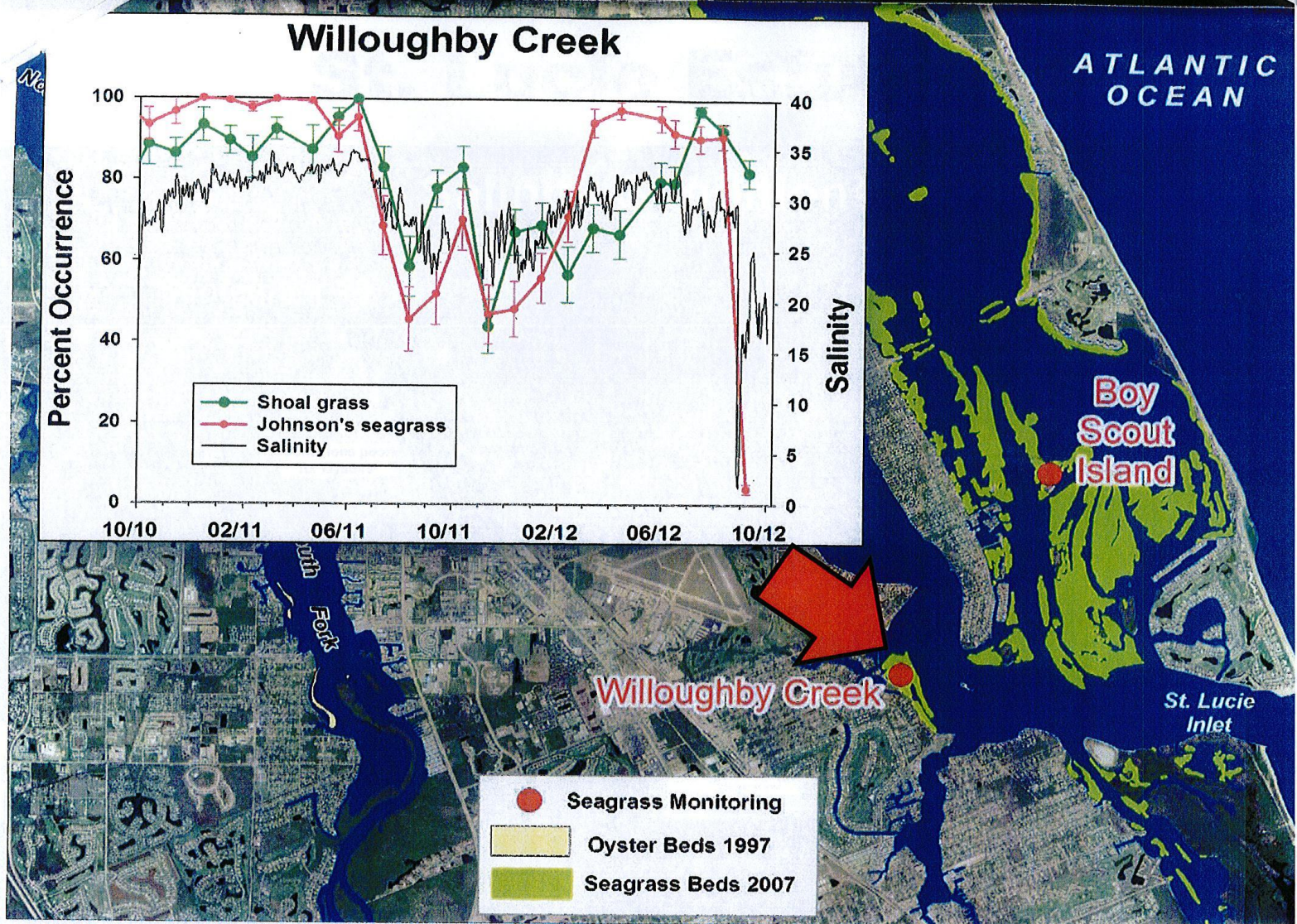
7 Days-Spat & Juveniles

14 – 28 Days – Adults

(Aug 26 – Oct 31 66 Days)

Salinity Tolerance for Oysters

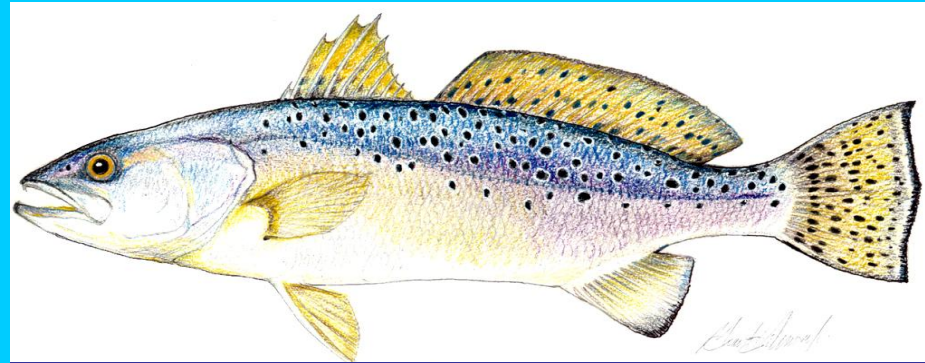




Direct Effects on Fisheries

Economically important Spotted Seatrout

Reproduction is inhibited by low salinity levels in the estuary.



WARNING

HIGH BACTERIA AND BLUE-GREEN ALGAE LEVELS
WARNING. AVOID CONTACT WITH WATER IN THE ST. LUCIE RIVER

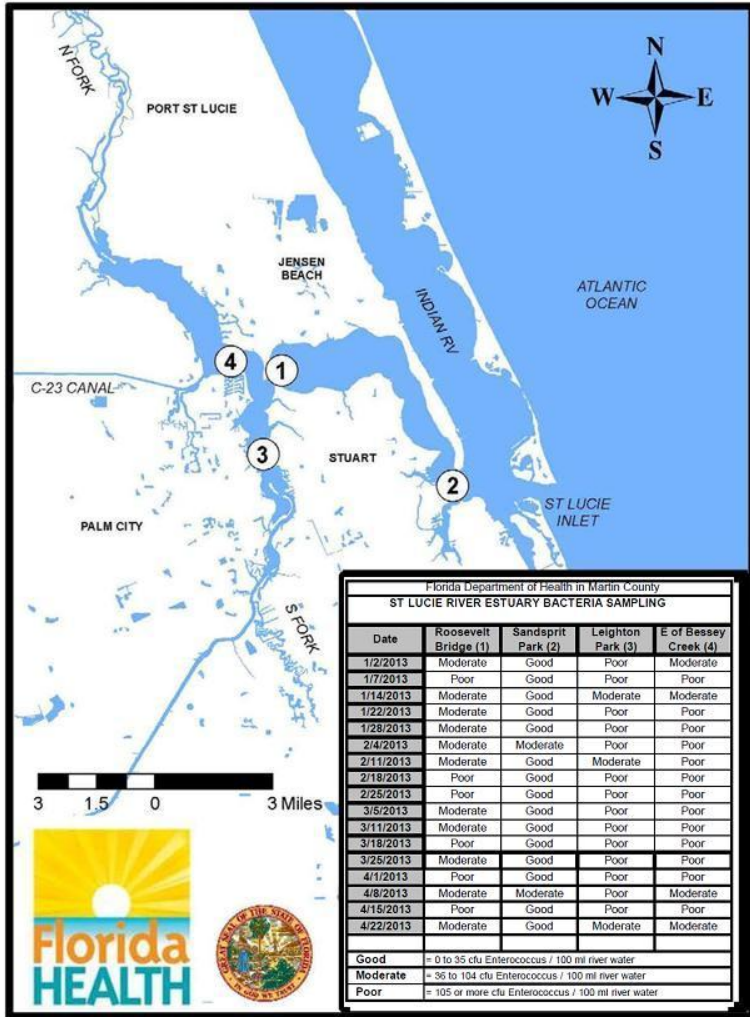


MARTIN CO. HEALTH DEPT. 221-4030

Office phone:

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

MARTIN COUNTY HEALTH DEPARTMENT
ST LUCIE ESTUARY BACTERIA MONITORING



 **ADVISORY**

HIGH BACTERIA LEVELS
AVOID CONTACT WITH WATER
IN THE AREA OF THE ROOSEVELT BRIDGE



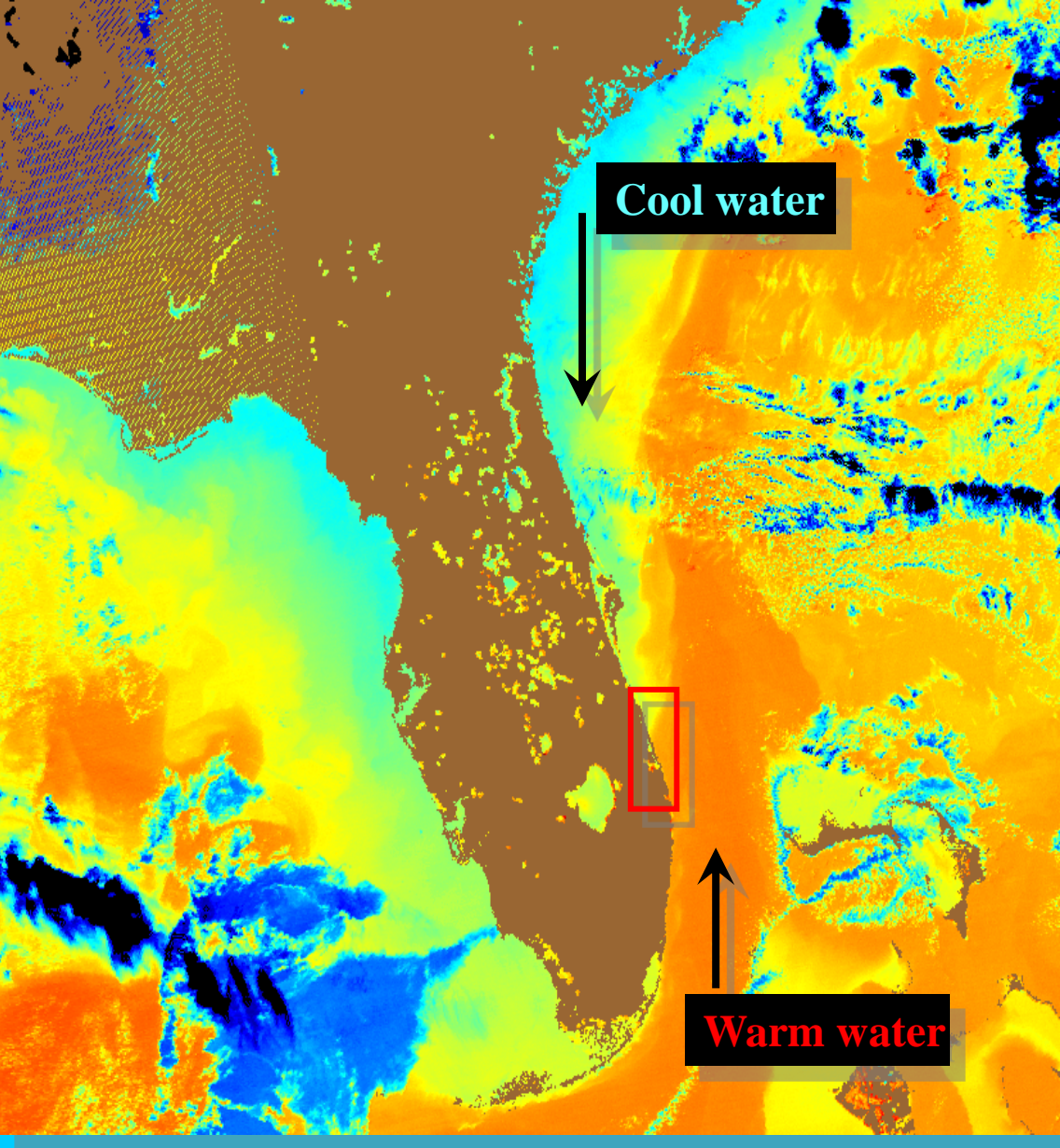
MARTIN CO. HEALTH DEPT. 221-4090



Martin County Health Department Warnings

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\IR2_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)***



Now What?

Restoration Plans & Efforts for the Greater Everglades Ecosystem



Kissimmee River

Channalized 1962-1971

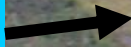
C-38 Canal



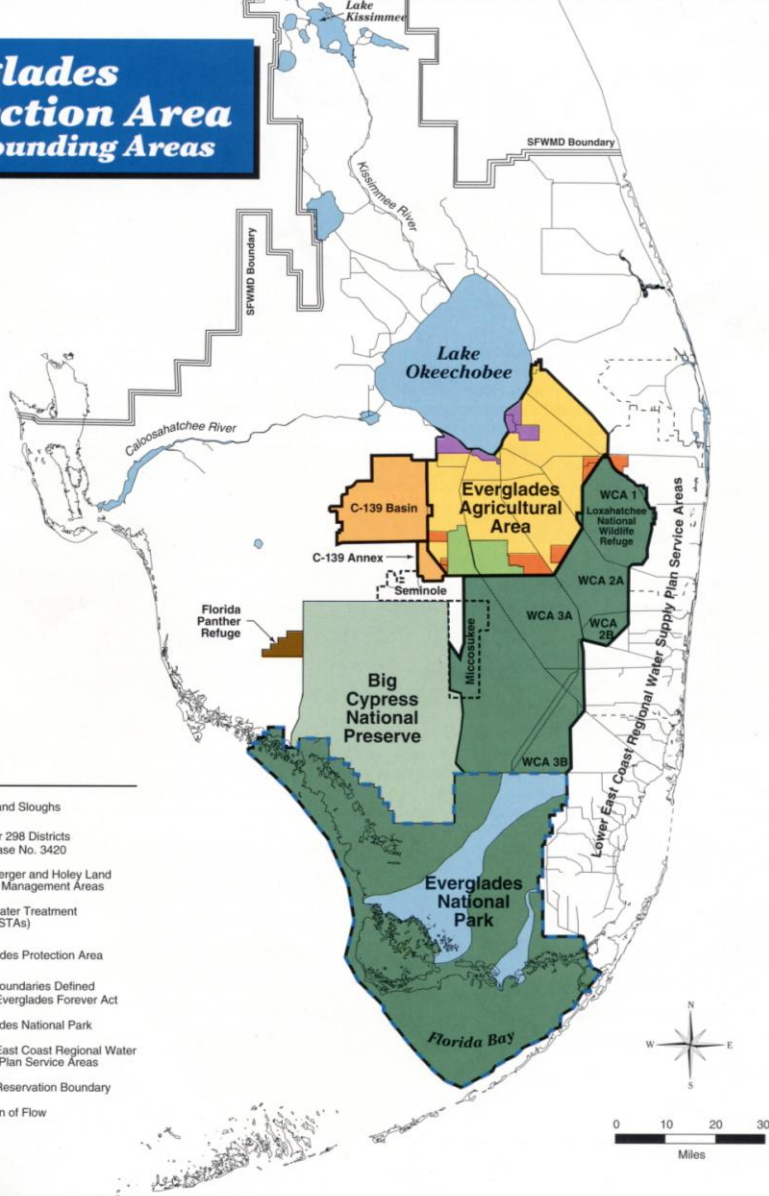
Kissimmee River

Restoration- July 11, 2001

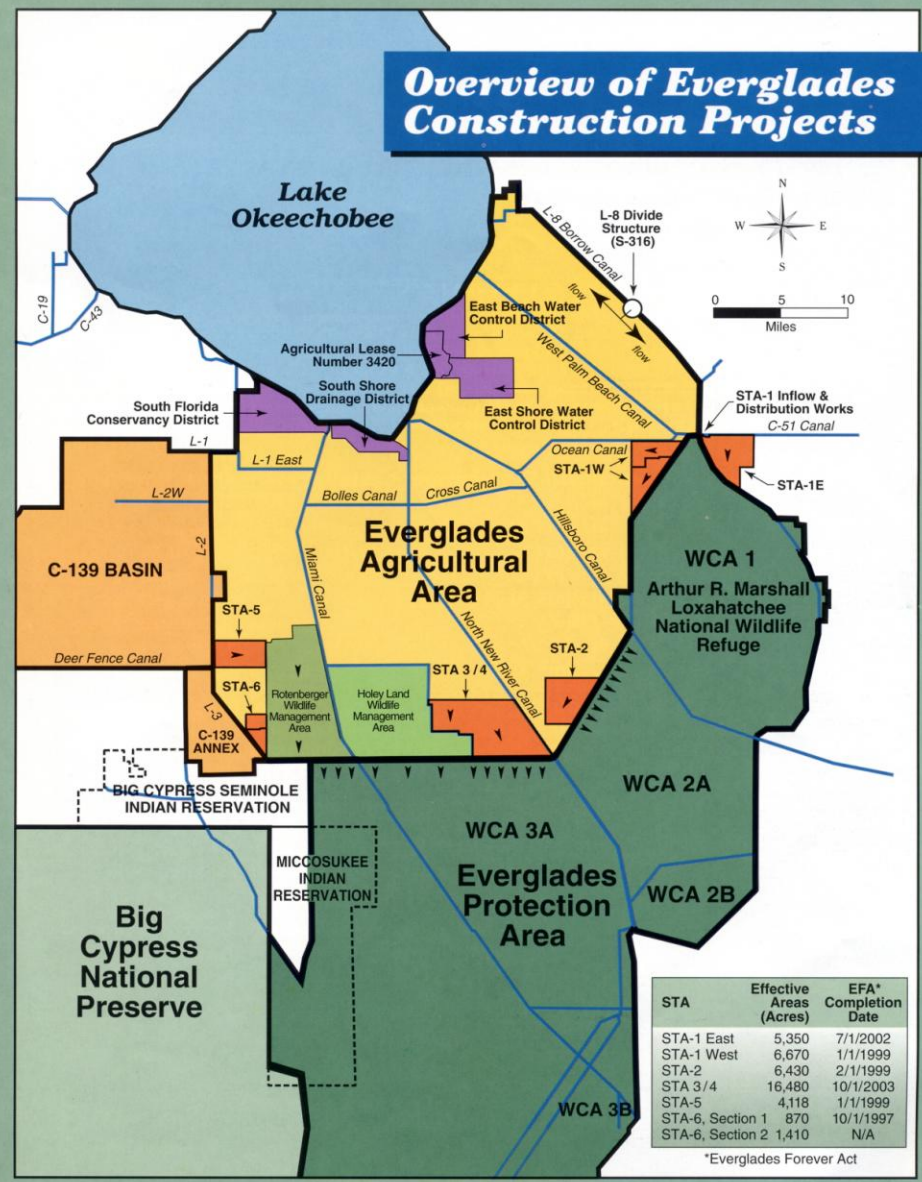
C-38 Canal
(filled in)



Everglades Protection Area & Surrounding Areas



Overview of Everglades Construction Projects



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)*

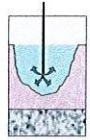
On December 11, 2000, the President signed the Water Resources Development Act (WRDA) of 2000, approving:

Comprehensive Everglades Restoration Plan

A series of environmental and other improvements over 30+ years with an estimated cost of ~~\$7.8 billion~~ (**\$ 11.5 billion**)

Comprehensive Everglades Restoration Plan

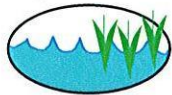
68 Components



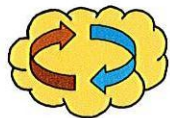
Aquifer Storage & Recovery – 330 Wells



Surface Water Storage Reservoir – 170,000 acres



Stormwater Treatment Areas (STAs) – 36,000 acres



Reuse Wastewater at 2 Regional Plants



Seepage Management

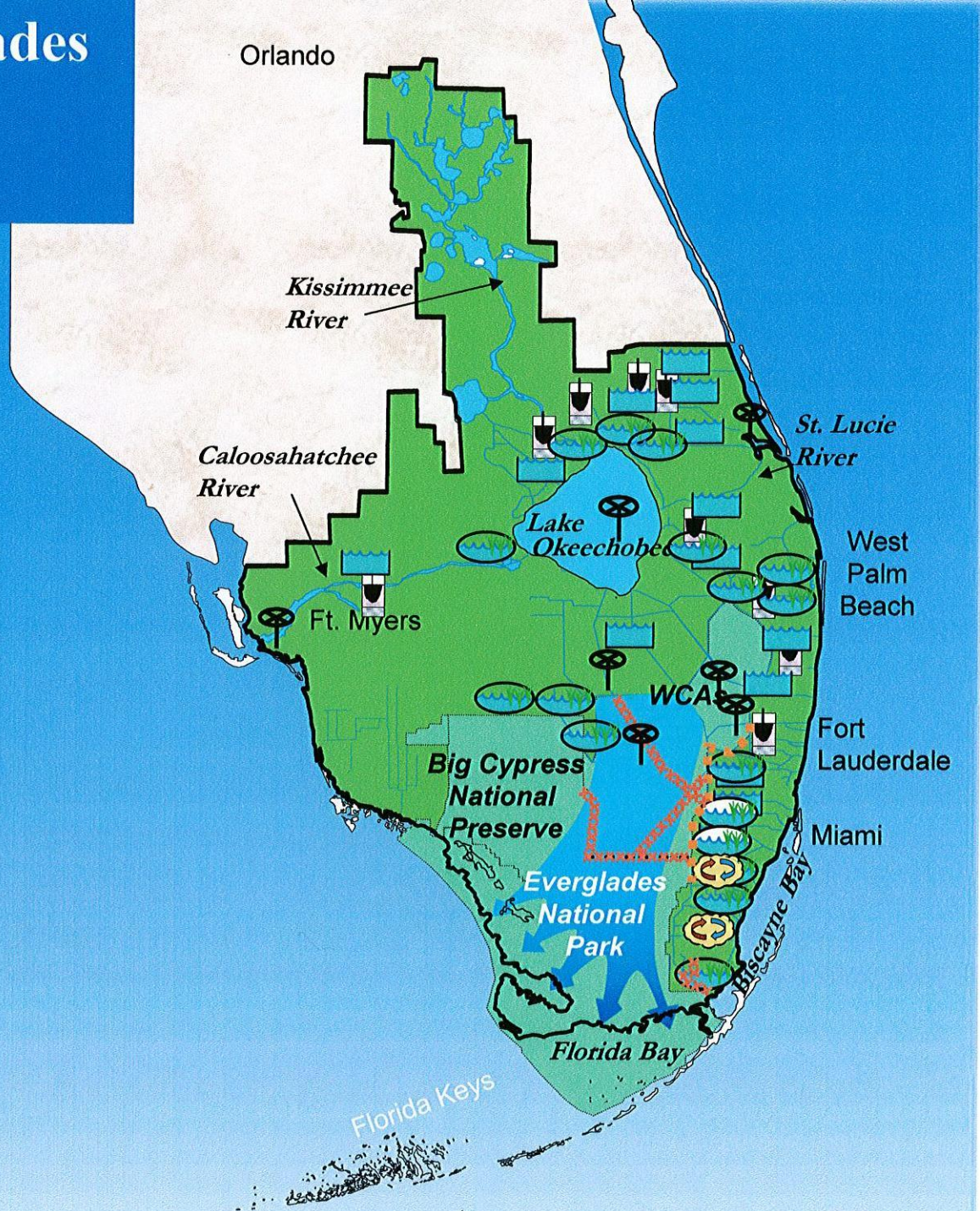


Removing 240 miles of Barriers to Sheetflow

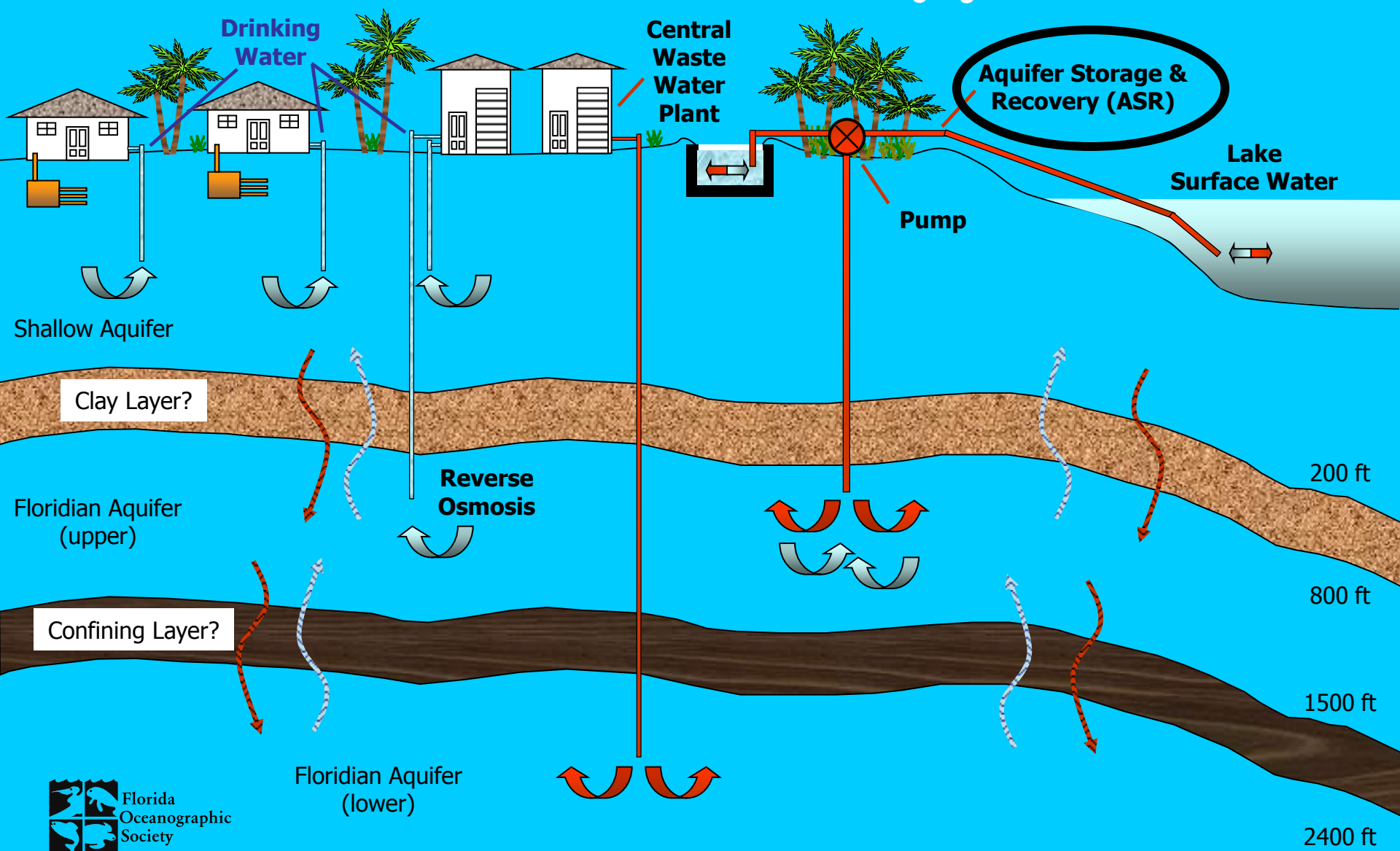


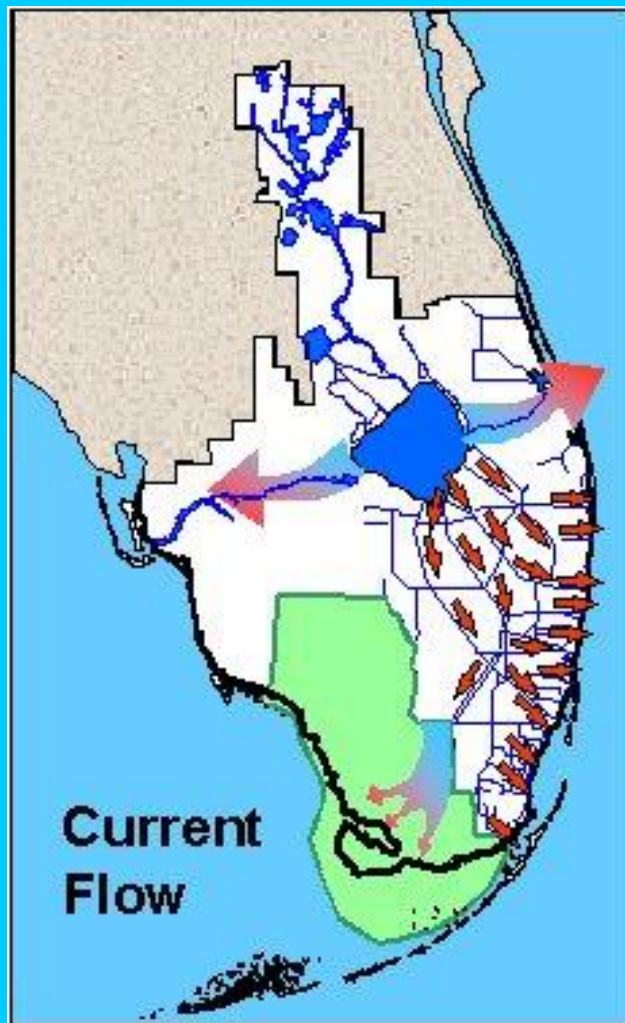
Operational Changes

Florida
Seepage
Society



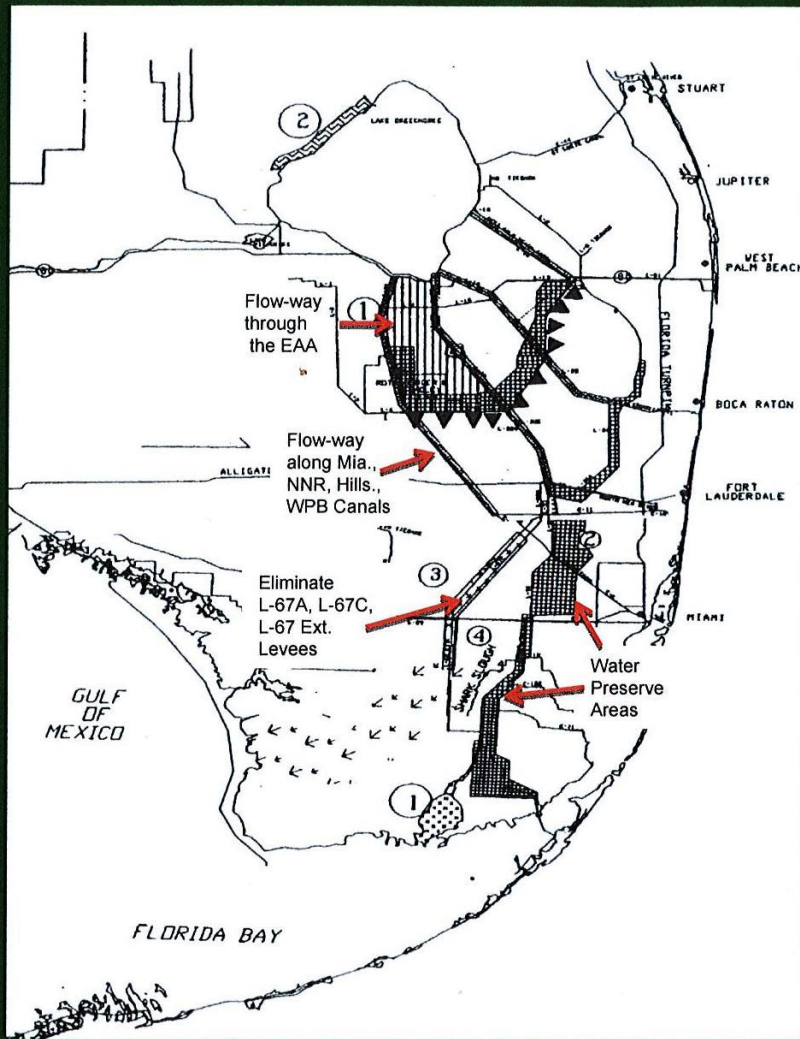
55 inches of Rainfall



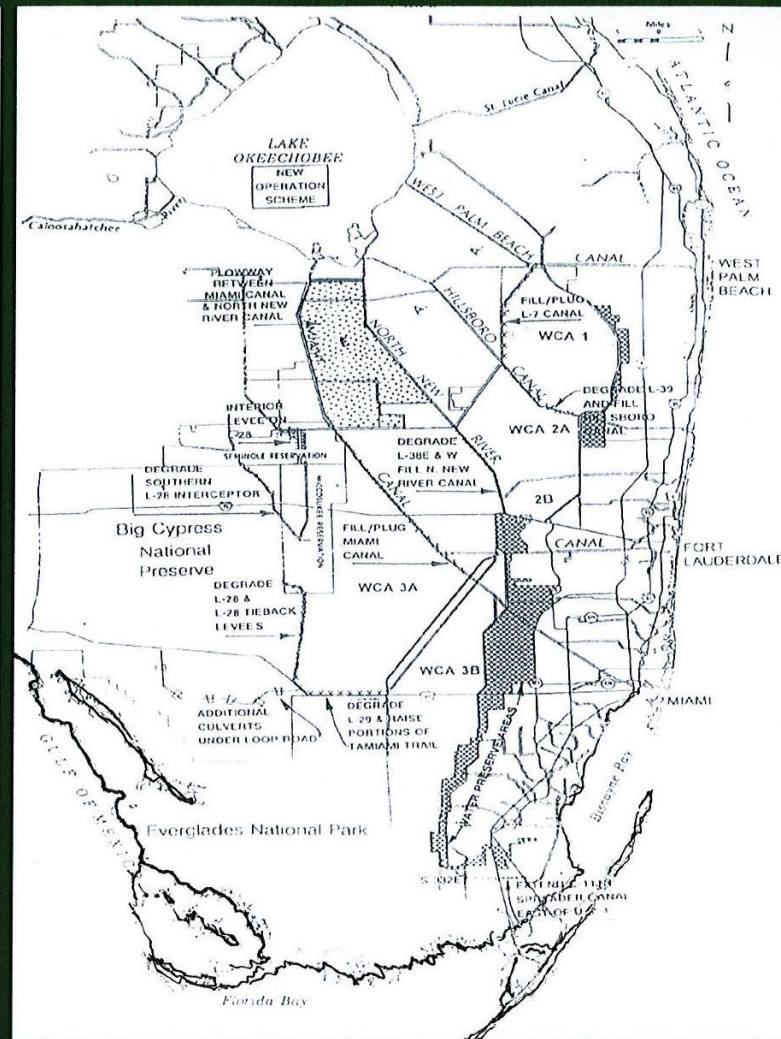


Historic, Current & Planned Flow for the Comprehensive Everglades Restoration Plan

Early Conceptual Plans - Everglades Restoration



Science Sub-Group Report, Minimum Plan, 1993.

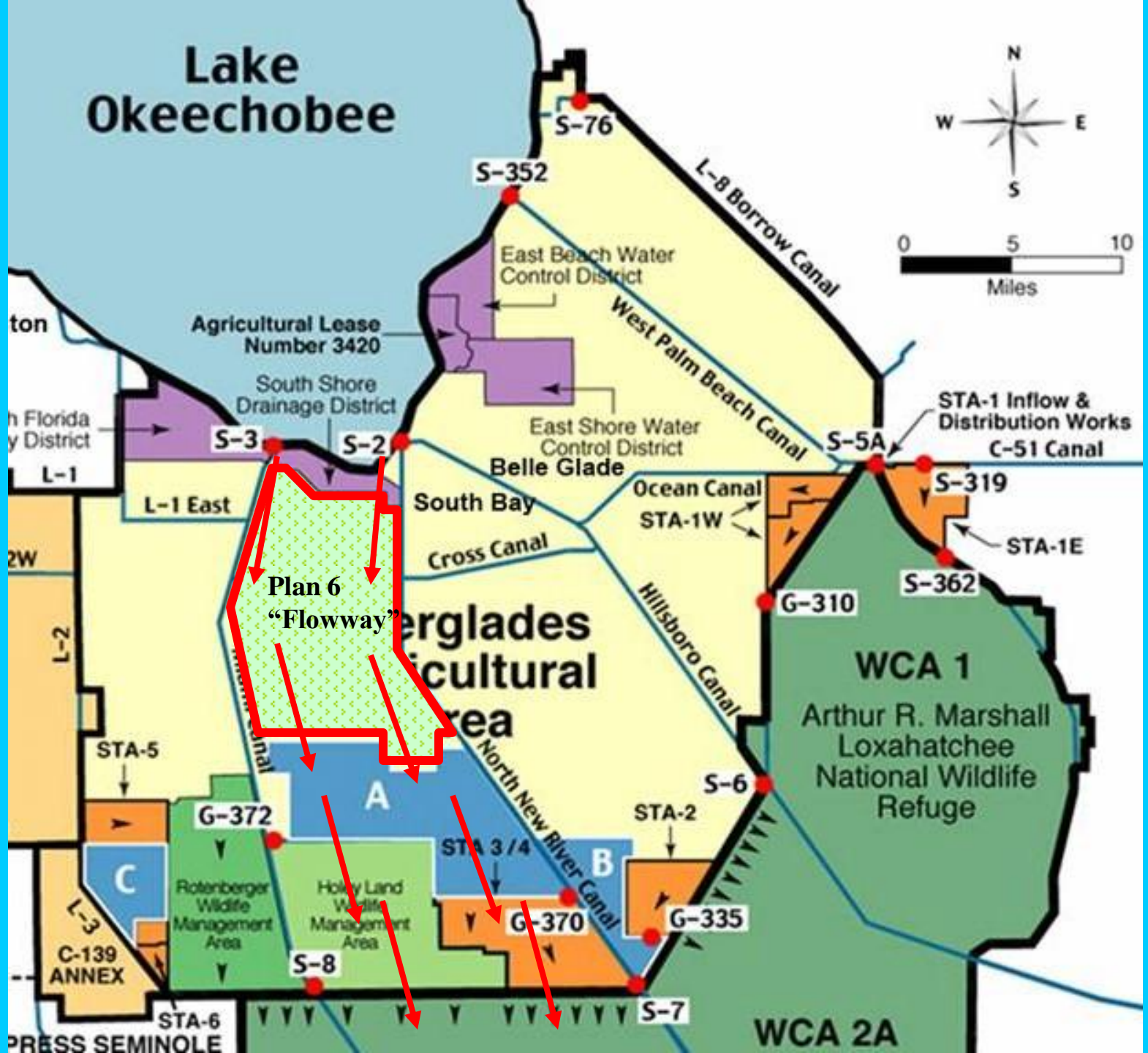


C&SF Restudy Recon. Report, Plan 6, 1994.



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

Lake Okeechobee



\$1.75 billion deal aims to protect Everglades

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

BRIAN SKOLOFF
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.

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 Buker called the deal "monumental" but also was saddened to see the demise of his company, which



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

employs 1,700 people.

"We built a company that right now is the pillar of the agriculture community in Florida," Buker 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.



The nearly 300 square miles of land that U.S. Sugar owns would be used to help restore a more natural flow to the Everglades, which is threatened by agriculture and residential development.

Buker acknowledged that the sugar industry's presence in the Everglades has led to years of "partial fixes" 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.

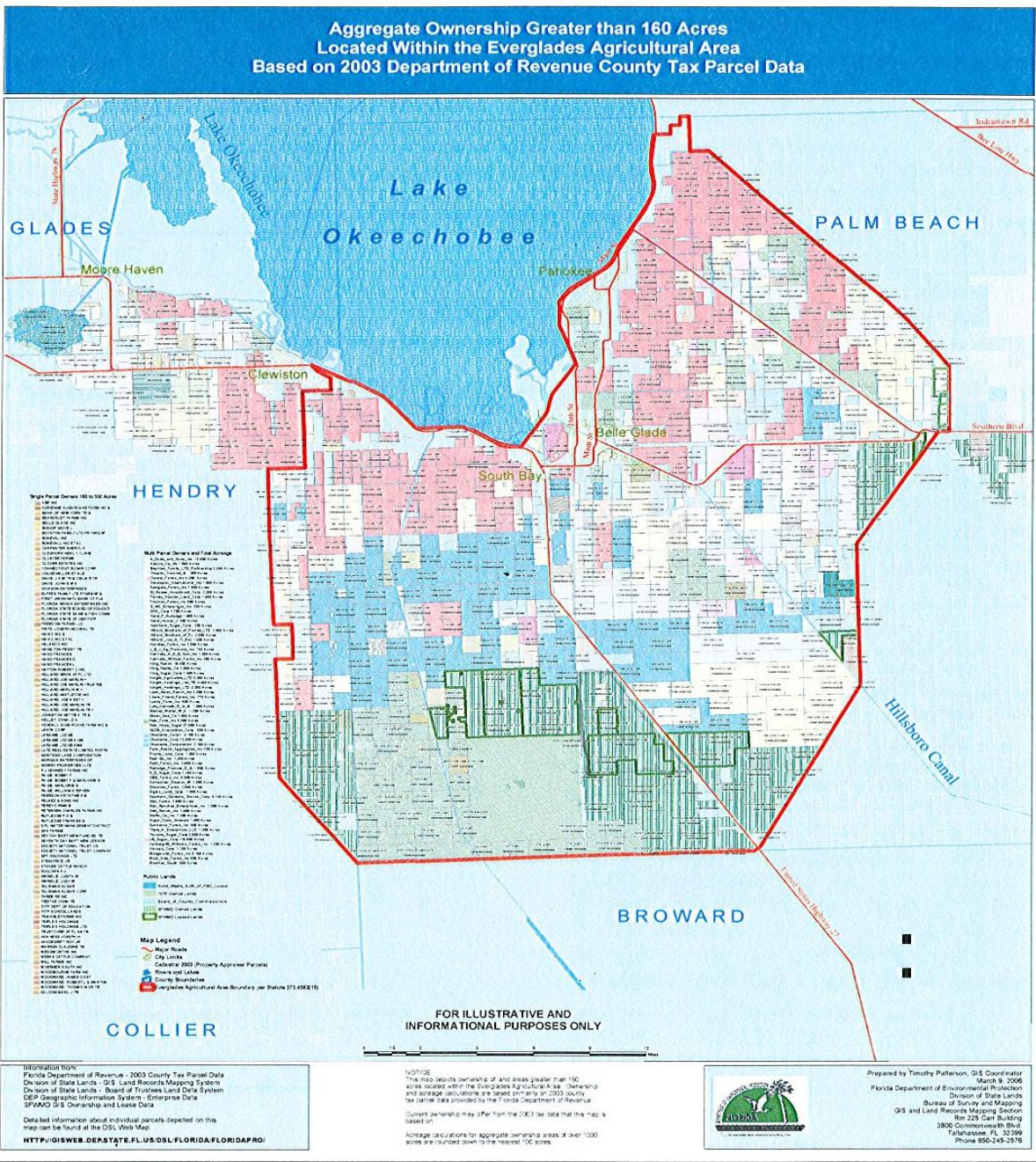
"In the old days, you didn't just beat your opponent, you also ate them," Guest said. "Today, we're eating U.S. Sugar."

June 24, 2008

187,000 acres

US Sugar Corp. farmlands

(red color on map)

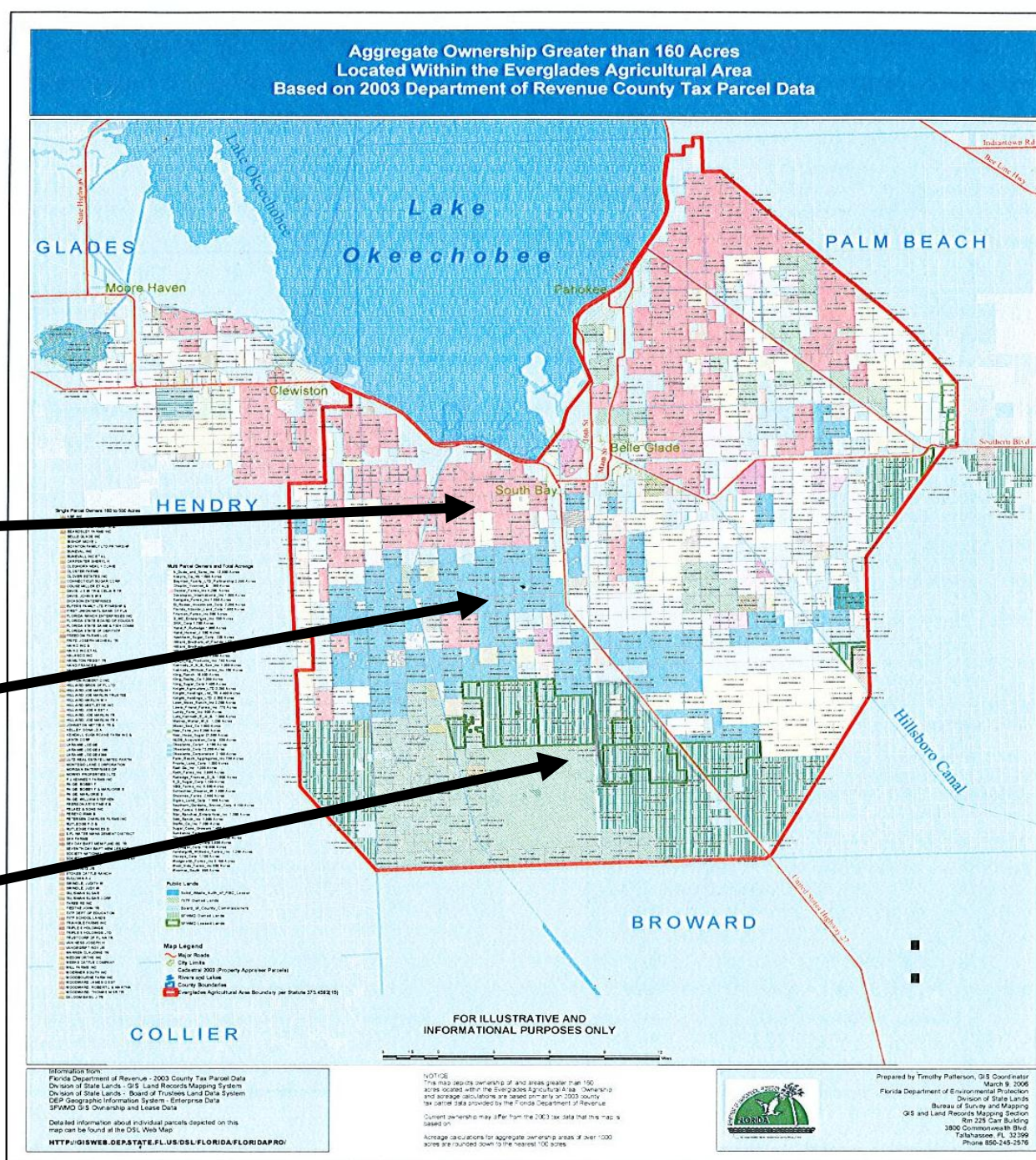


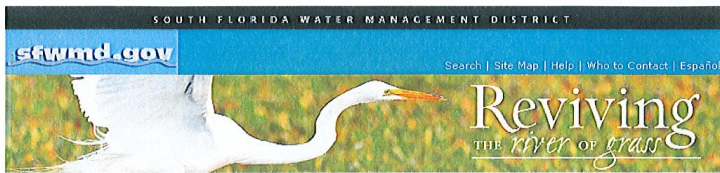
187,000 acres
US Sugar Corp.
farmlands
(red color on map)

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.**

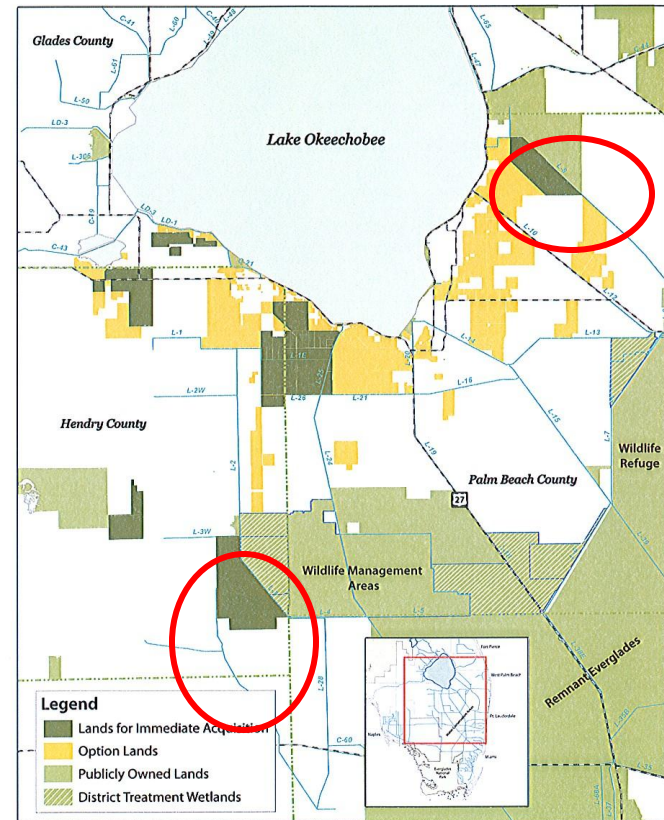
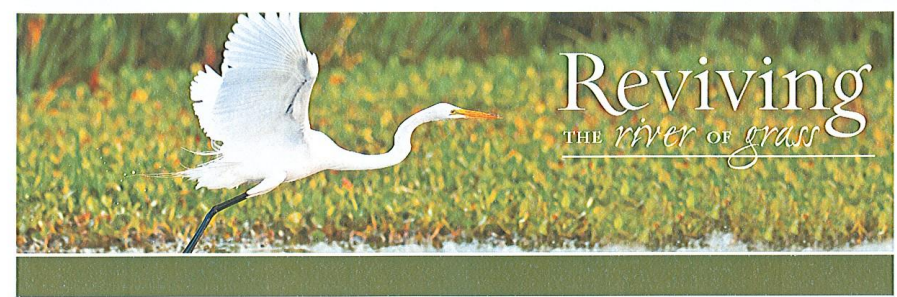
Highlights of the proposed acquisition terms include:

- 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.

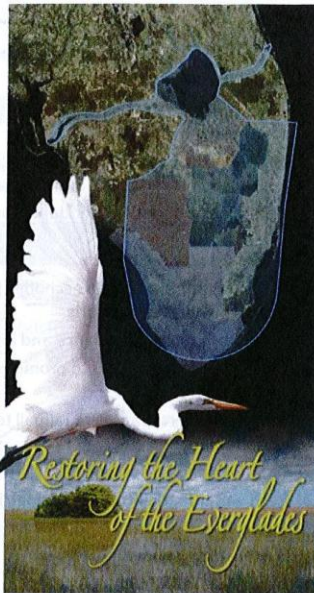
www.sfwmd.gov/riverofgrass



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

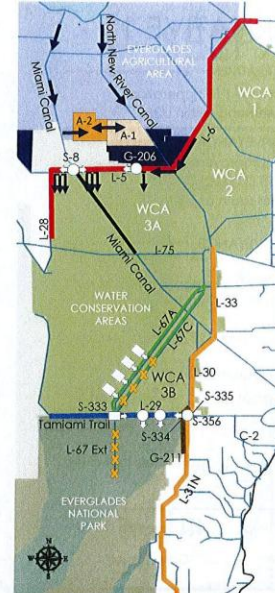
Central Everglades Planning Project (CEPP)

Proposed Final Array of Alternatives

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

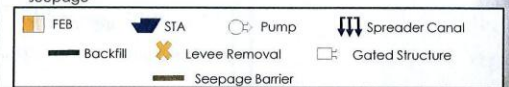
December 7, 2012

•CENTRAL EVERGLADES



PROPOSED ALTERNATIVE 3

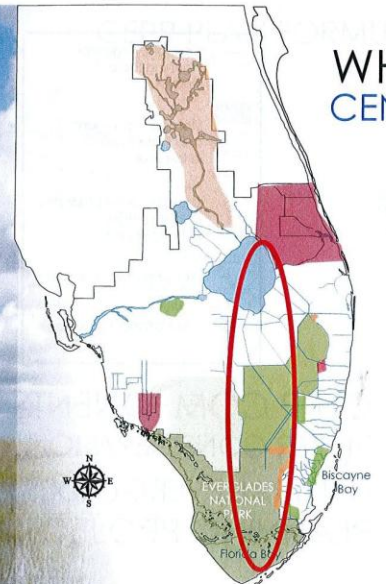
- STORAGE AND TREATMENT**
 - Construct A-2 FEB and integrate with A-1 FEB operations
 - Lake Okeechobee operation refinements within LORS
- DISTRIBUTION/CONVEYANCE**
 - Diversion of L-6 flows and L-5 canal improvements
 - Spreader canal: ~3 miles west of S-8 (3,000 cfs), ~3 miles east of S-8 (800 cfs) 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



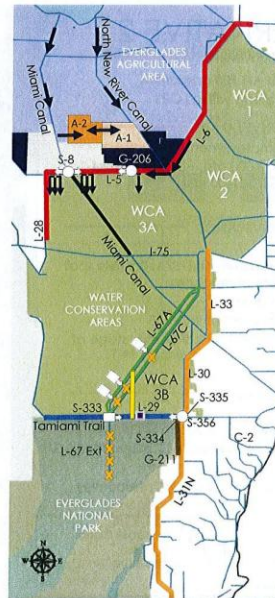
RESTORING THE HEART OF THE EVERGLADES CENTRAL EVERGLADES

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"

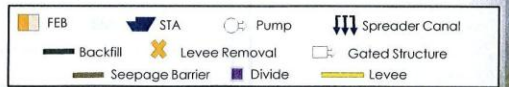


RESTORING THE HEART OF THE EVERGLADES CENTRAL EVERGLADES



PROPOSED ALTERNATIVE 4

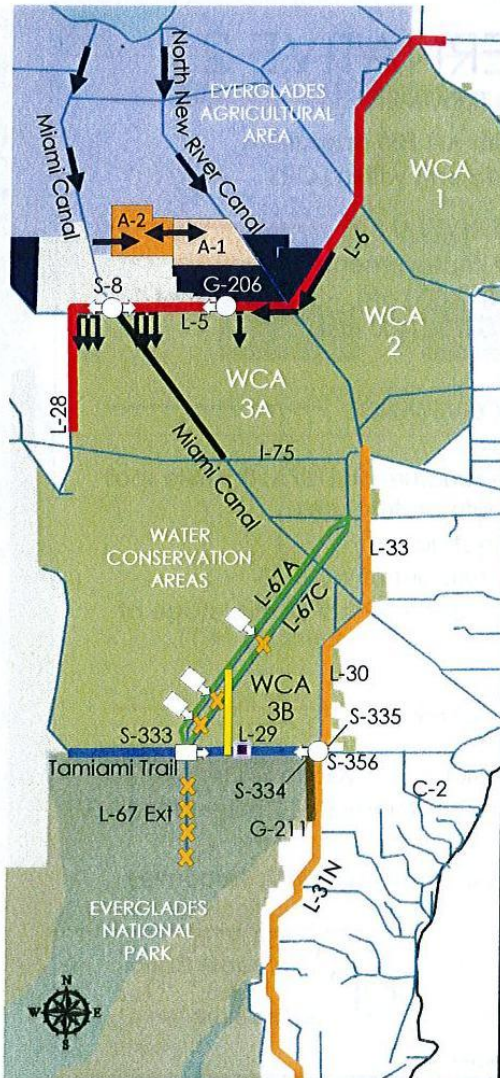
- STORAGE AND TREATMENT**
 - Construct A-2 FEB and integrate with A-1 FEB operations
 - Lake Okeechobee operation refinements within LORS
- DISTRIBUTION/CONVEYANCE**
 - Diversion of L-6 flows and L-5 canal improvements
 - Spreader canal: ~3 miles west of S-8 (3,000 cfs), ~3 miles east of S-8 (800 cfs) 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
 - 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**
 - 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

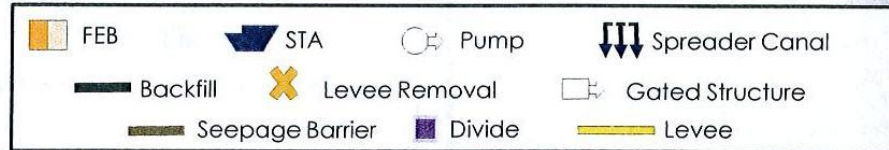
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SEEPAGE MANAGEMENT

- 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



Fertilizer Pollution in the Everglades Agricultural Area

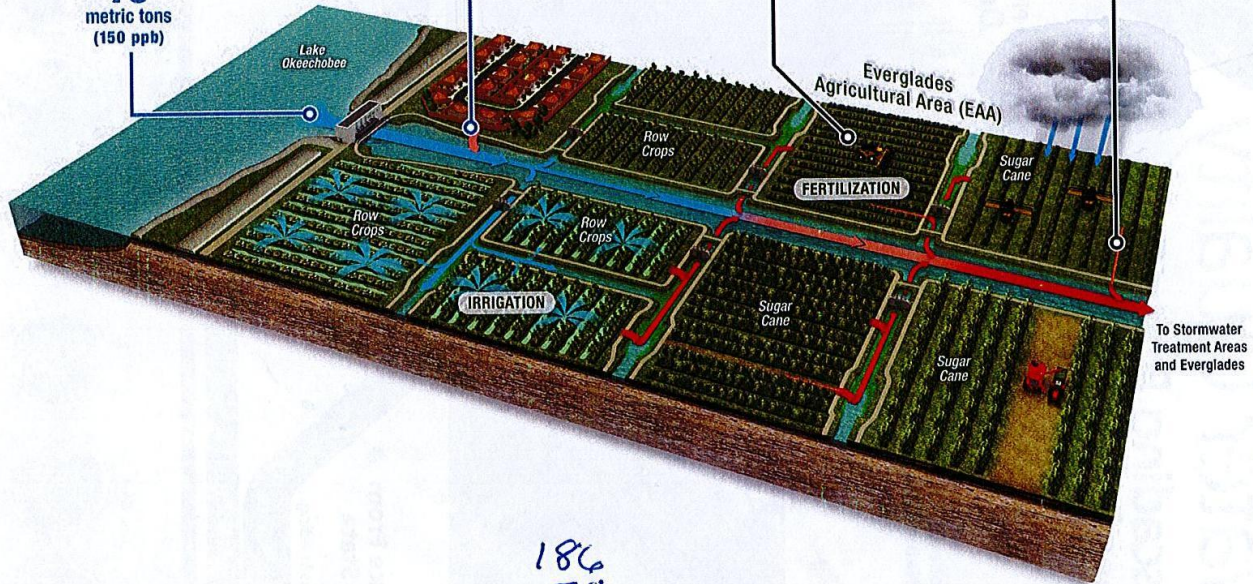
*(Aq) 506K AF (?) x 187 = 95 MT
(Aq + 2V) 792 K mt. (?) x 187 = 149 MT*

IRRIGATION WATER FROM LAKE OKEECHOBEE
78
metric tons
(150 ppb)

URBAN RUNOFF
17
metric tons

FERTILIZER APPLICATION
2,640
metric tons

POLLUTED RUNOFF FROM FARMS
186
metric tons
(140 ppb)



NOTE: All numbers are yearly averages.
Source of data: South Florida Water Management District Database and Reports.

From Lake O

Cal.	SLE	
968K AF	442K AF	1.4M AF/yr.
181M P	83M P	264M P
2,207MTN	1,008MTN	3,215MTN

POLLUTION COMES FROM EAA

*186
78
108 MT Net Export @ 140 ppb.
What About Nitrogen?*

*District
Av. Cost per Pounds
\$ 3-20 per pound
(SFWMD 3-7-12)*



Pollution from EAA to the STAs

COST OF EAA WQ TREATMENT

Everglades Forever Act (1994)
Existing 6 – Stormwater Treatment
Areas (STAs) Cost \$ 1.2 Billion

New WQ Mandated Projects (2013 –
2026) 2 – Flow Equalization Basins
(FEB) Cost \$ 890 Million

\$ 220 Million SFWMD Reserves

\$ 292 Million New Ad Valorem

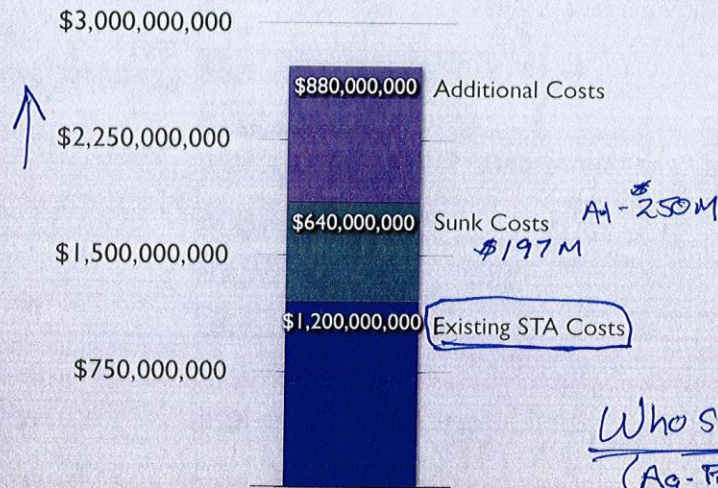
\$ 379 Million State Appropriation

Agricultural Privilege Tax is \$ 25
per Acre = \$ 11 Million per Year
Over 13 Years = \$ 143 Million

(NOT ENOUGH)

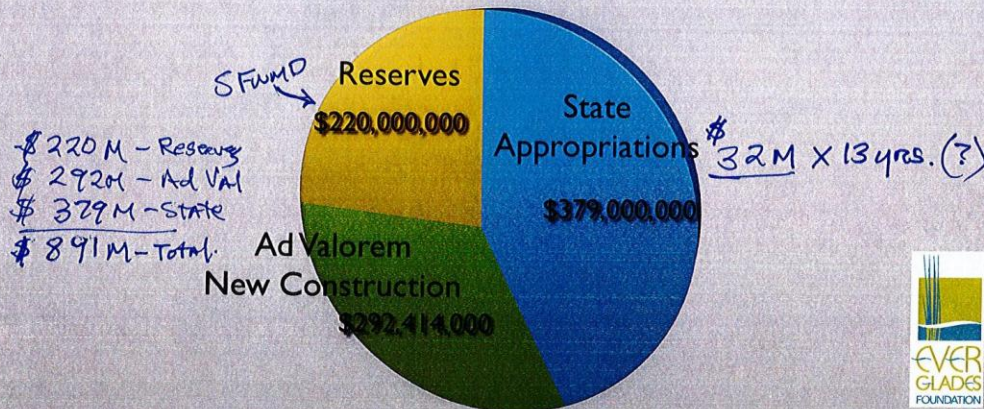
\$ 1.2 B on STAs

Total Costs for STAs in EAA



Who should Pay?
(Ag - Priv. Tx. \$25/acre)
\$11M/acre
\$1.2B of \$890M

Sources of Revenue for New Projects "Key Projects"



Indian River Lagoon-South Plan

12,000 acres above ground Storage Reservoirs

9,000 acres STA manmade wetlands

90,000 acres Natural Area Storage

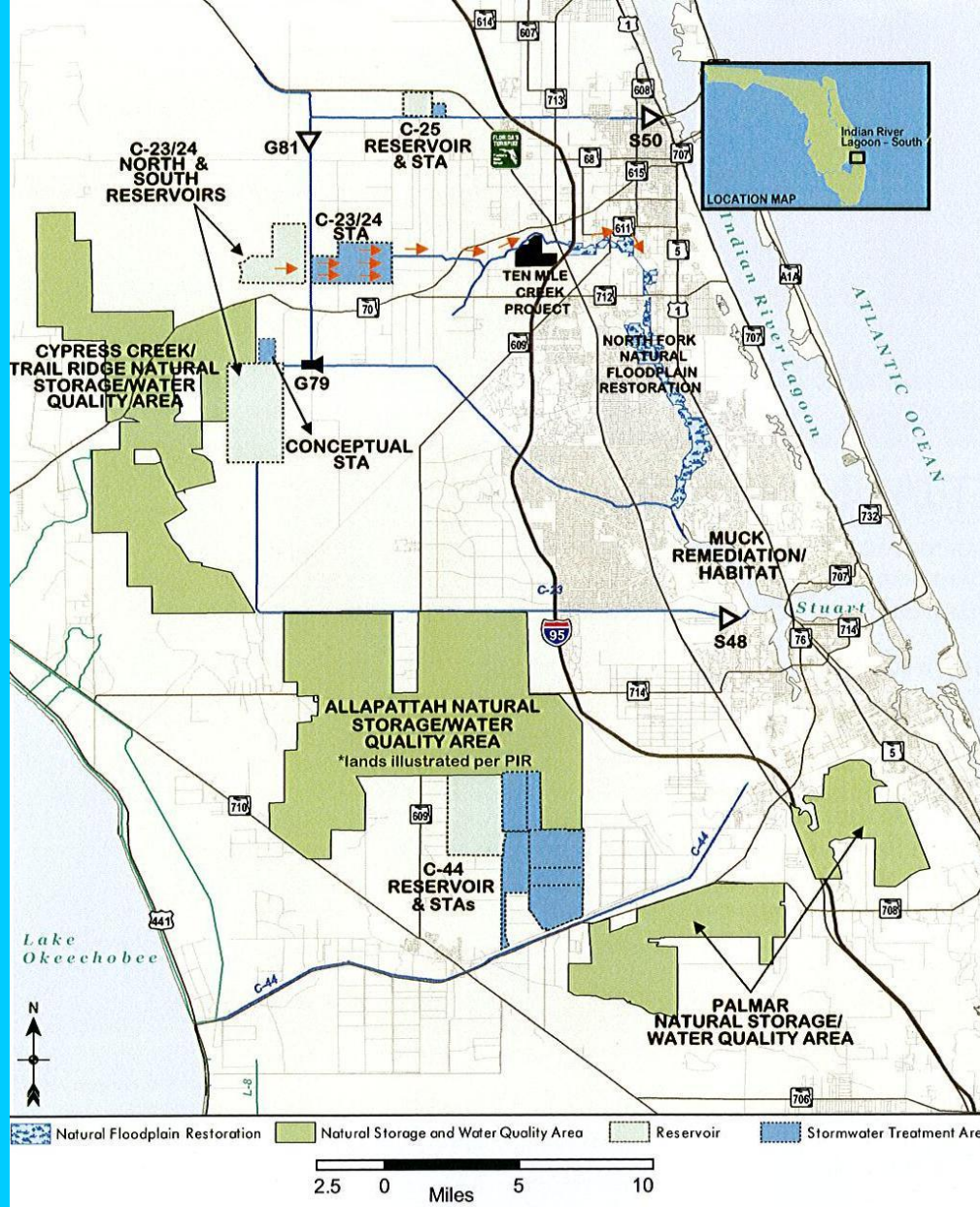
2,650 acres benthic habitat created- 922 acres submerge aquatic habitat restored

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

ST. LUCIE WATERSHED ASSESSMENT

VOLUME B: BASIN PRIORITIES

Prepared for:

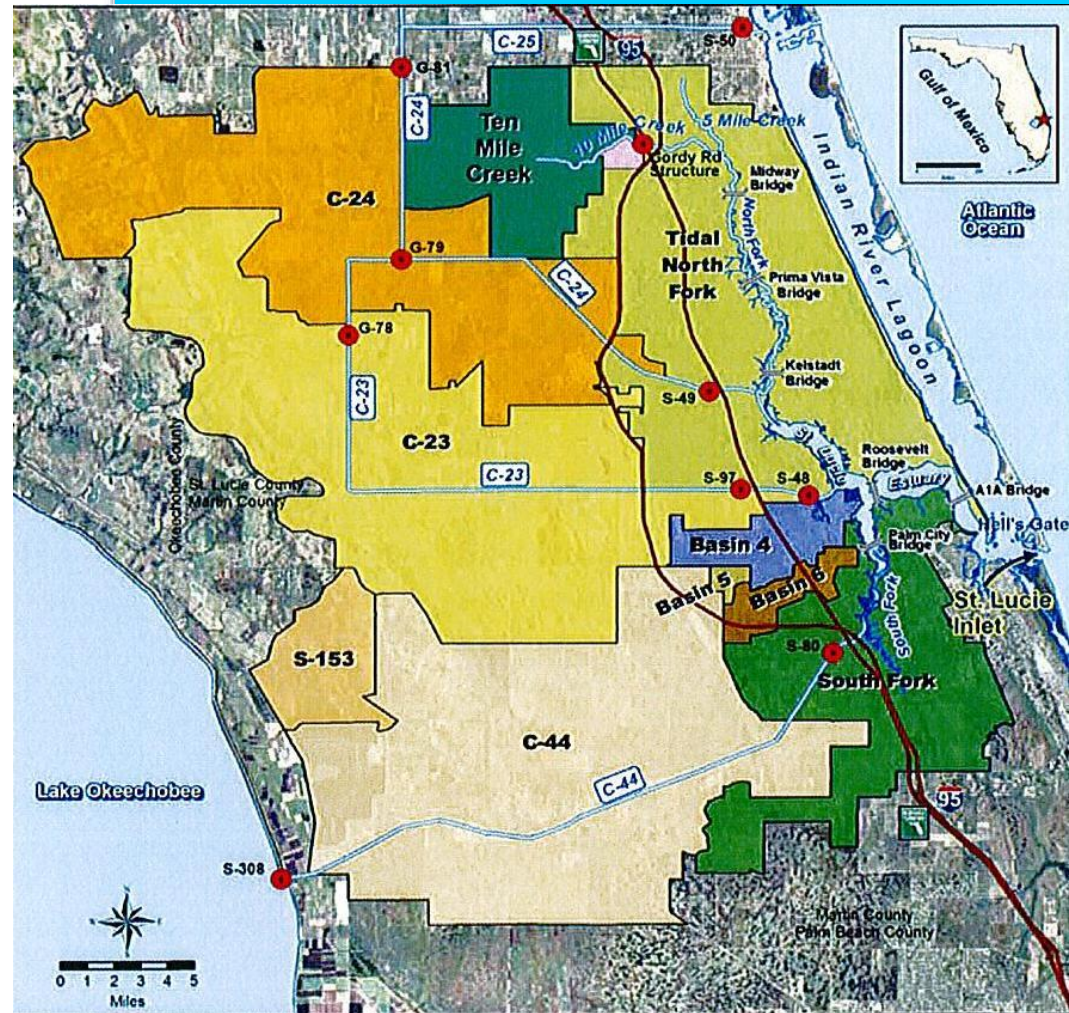
South Florida Water Management District
P.O. Box 24680
3301 Gun Club Road
West Palm Beach, Florida 33416-4680

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

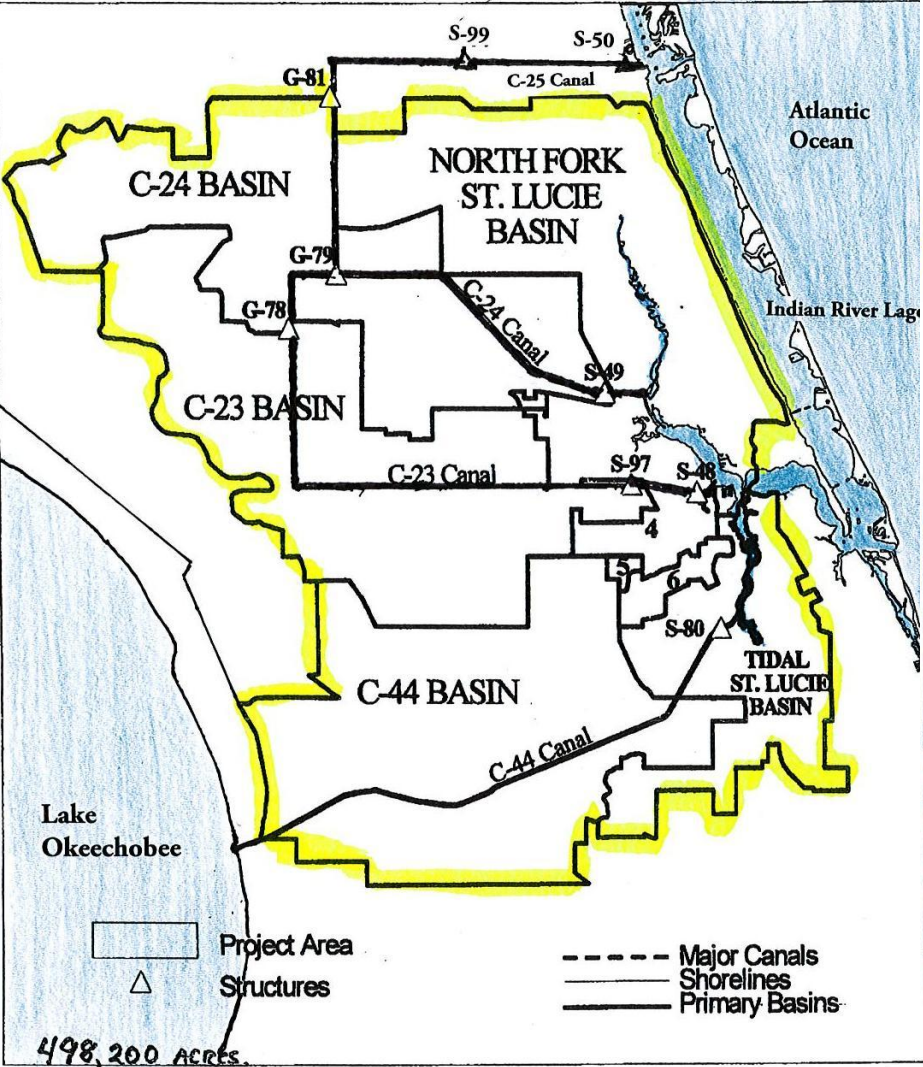


St. Lucie River Watershed
514,646 Acres

Watershed Assessment - February 1999

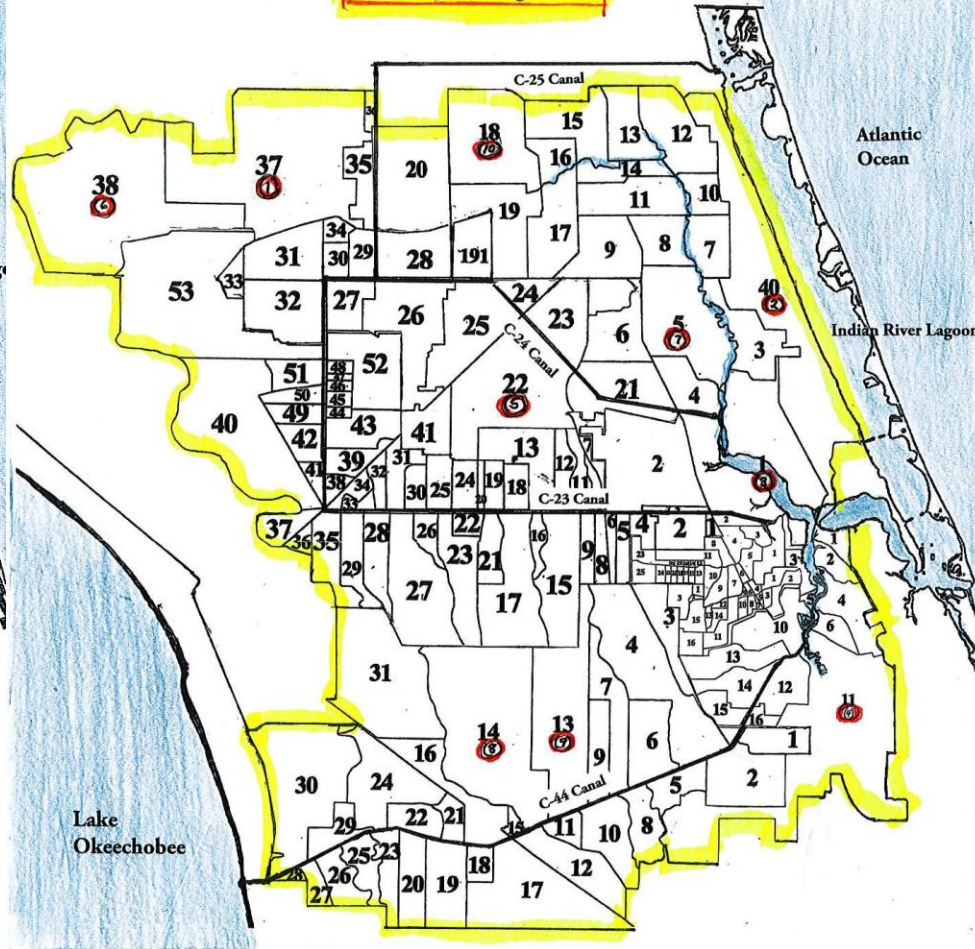
St. Lucie River Estuary Watershed

Primary Drainage Basins



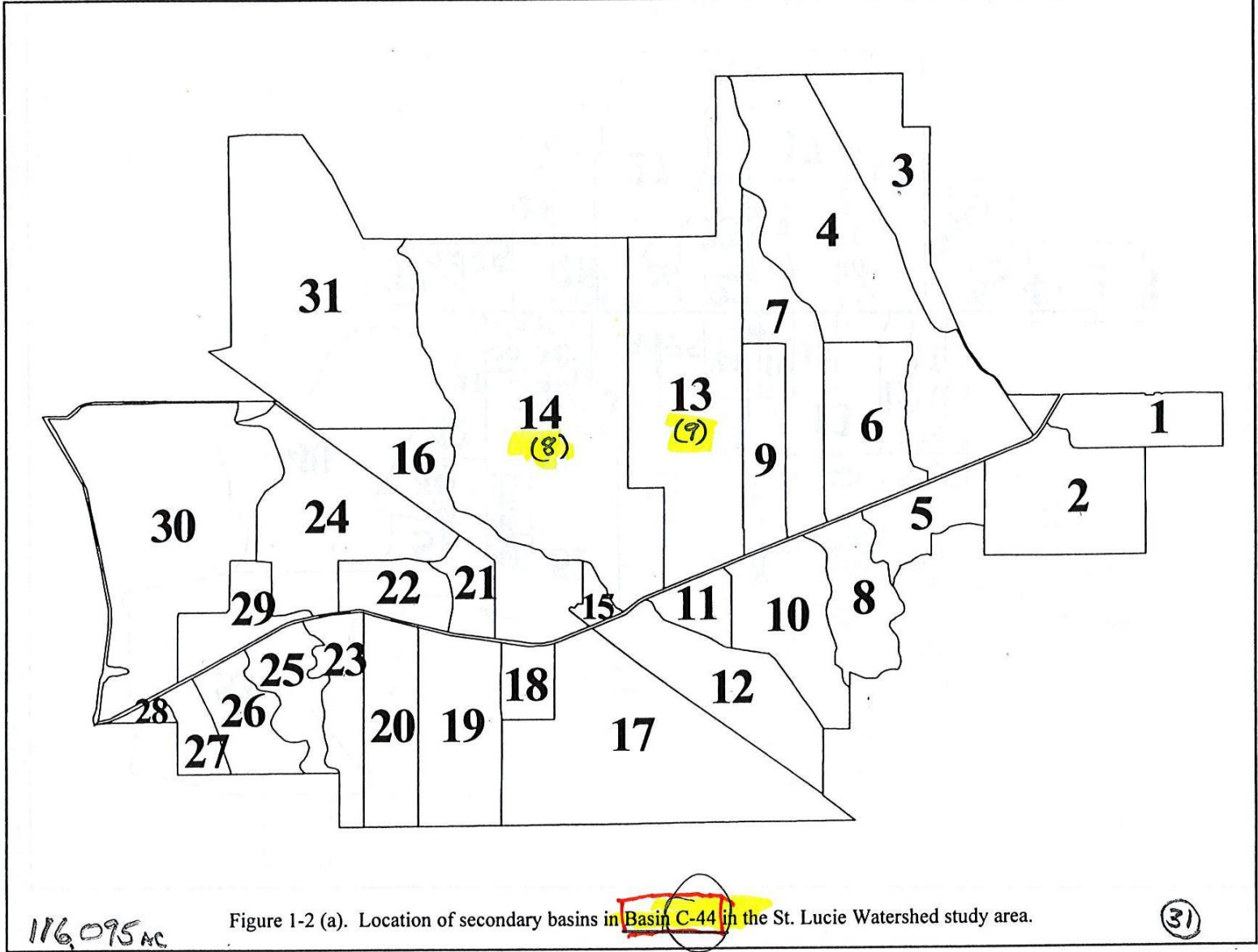
St. Lucie River Estuary Watershed

Secondary Drainage Basins



8 Basins – 186 Secondary Basins

St. Lucie River Estuary Watershed



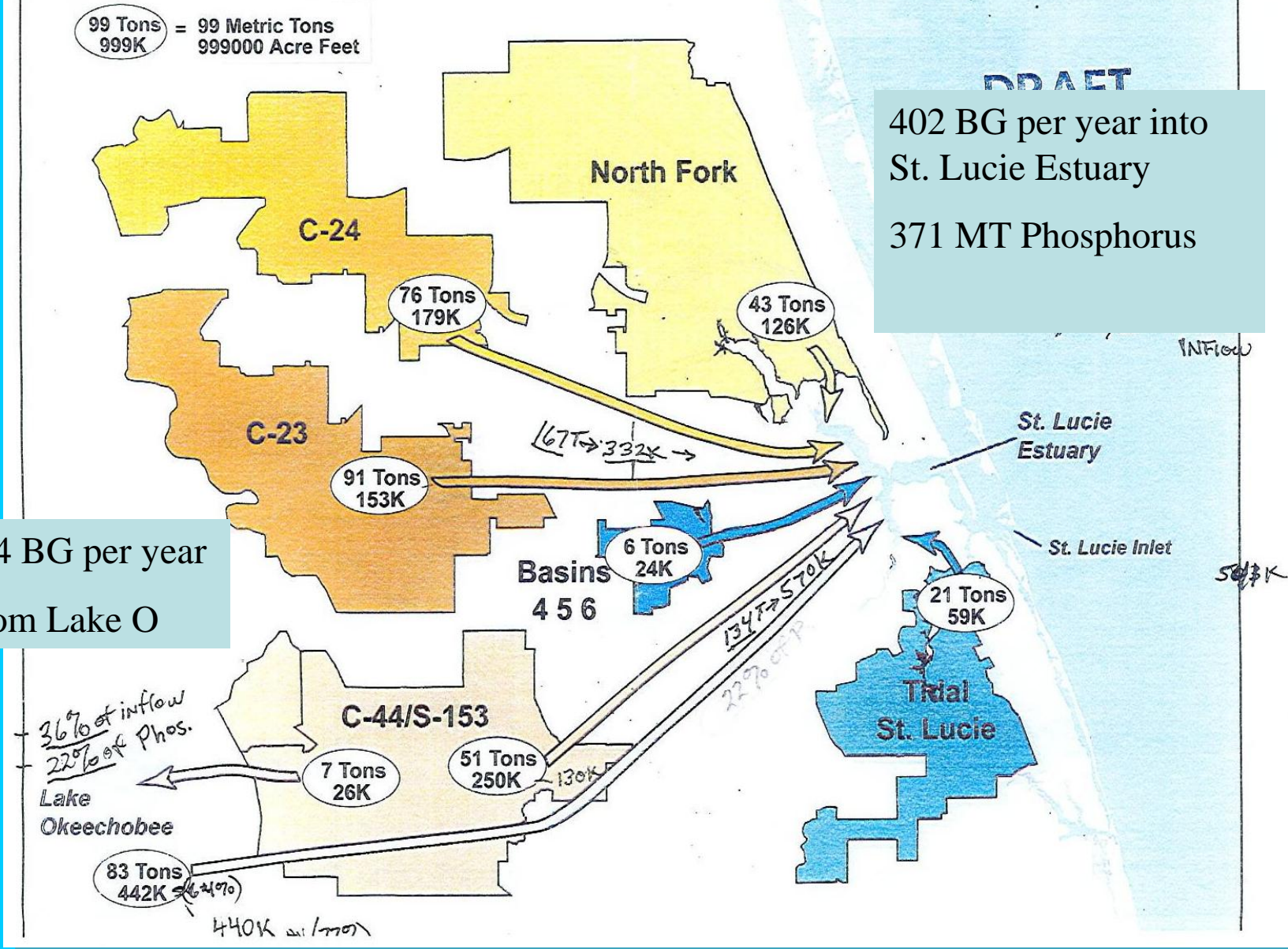
C-44 Basin - 31 Secondary Drainage Basins

25 Pump Stations for Agriculture Irrigation

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

DDA ET
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

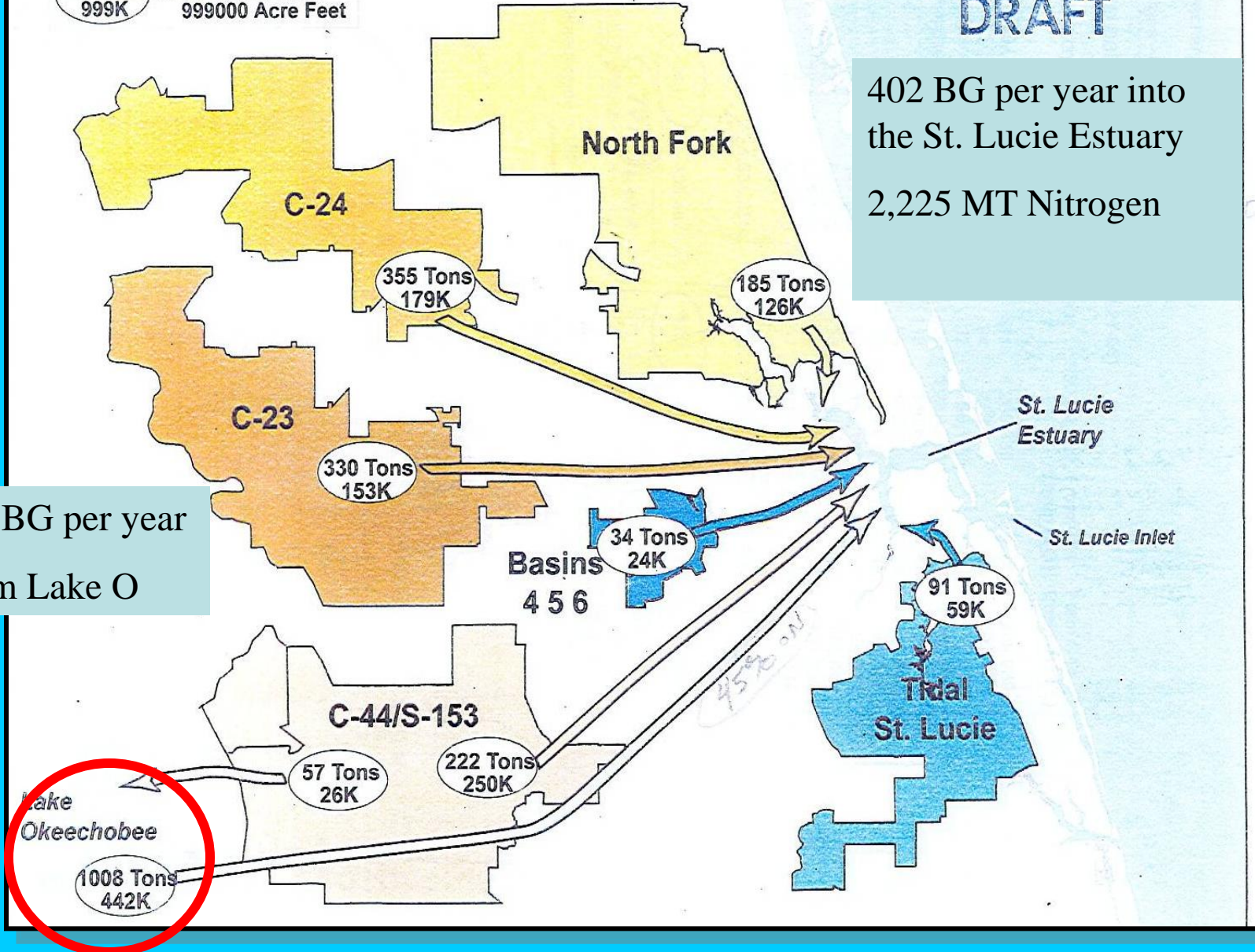
Period of Record 1995-2005 SFWMD

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

DRAFT

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

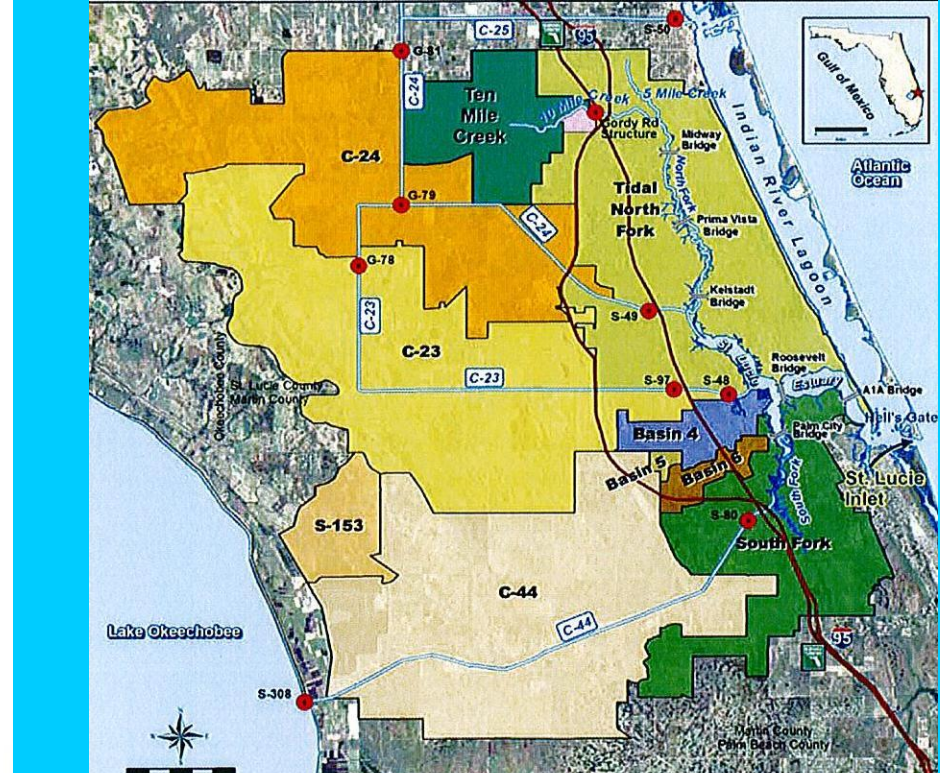
in the

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

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

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

TABLE 7: TP STARTING LOADS BY ENTITY

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

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 Environr
Division of Environmental Assessme
Bureau of Watershed Res
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

ST. LUCIE WATERSHED ASSESSMENT

VOLUME B: BASIN PRIORITIES

Prepared for:

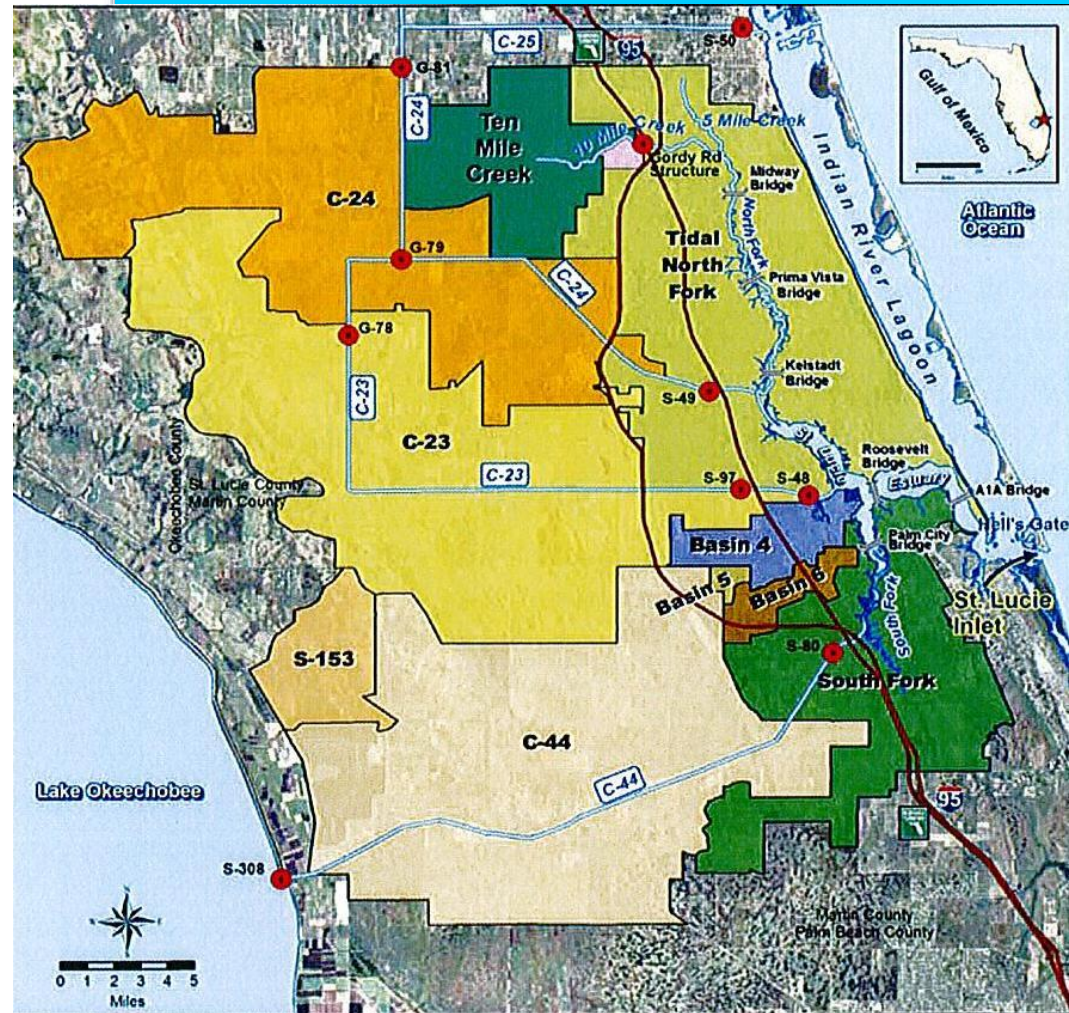
South Florida Water Management District
P.O. Box 24680
3301 Gun Club Road
West Palm Beach, Florida 33416-4680

Prepared by:

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

FINAL REPORT

February, 1999

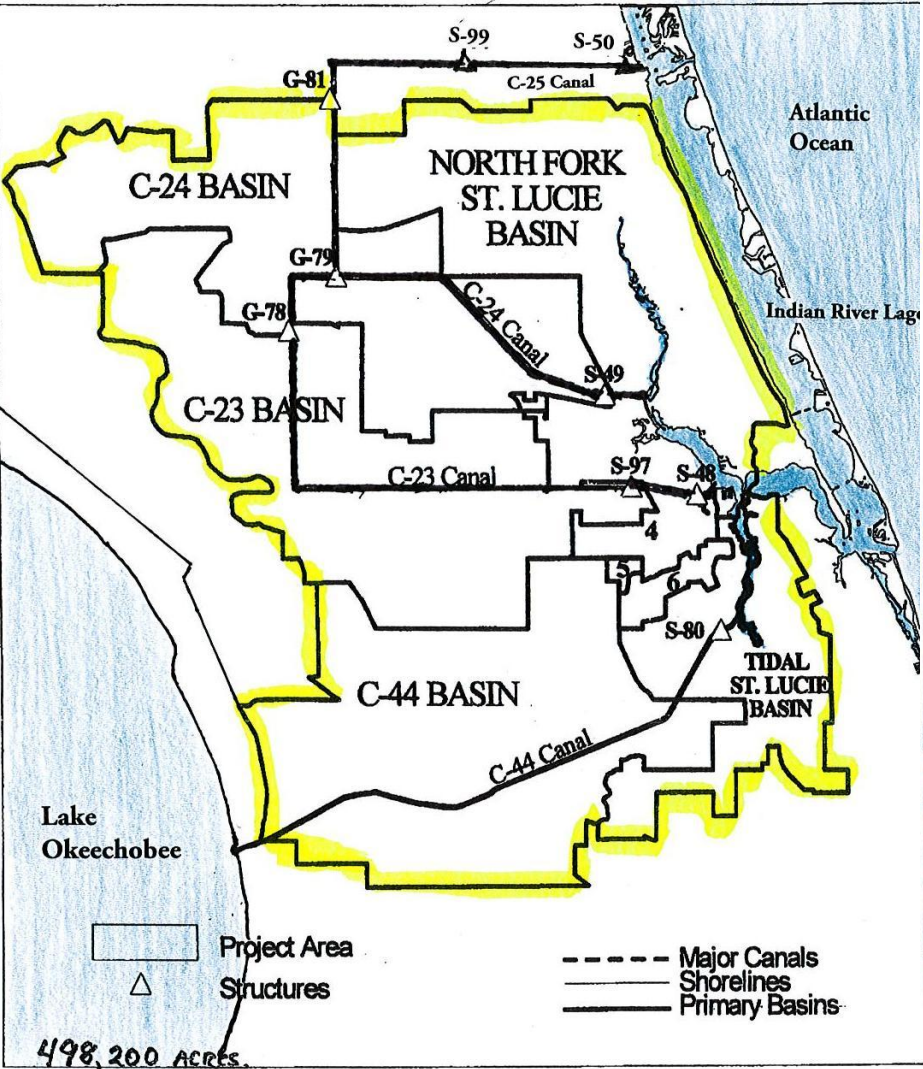


**St. Lucie River Watershed
514,646 Acres**

Watershed Assessment - February 1999

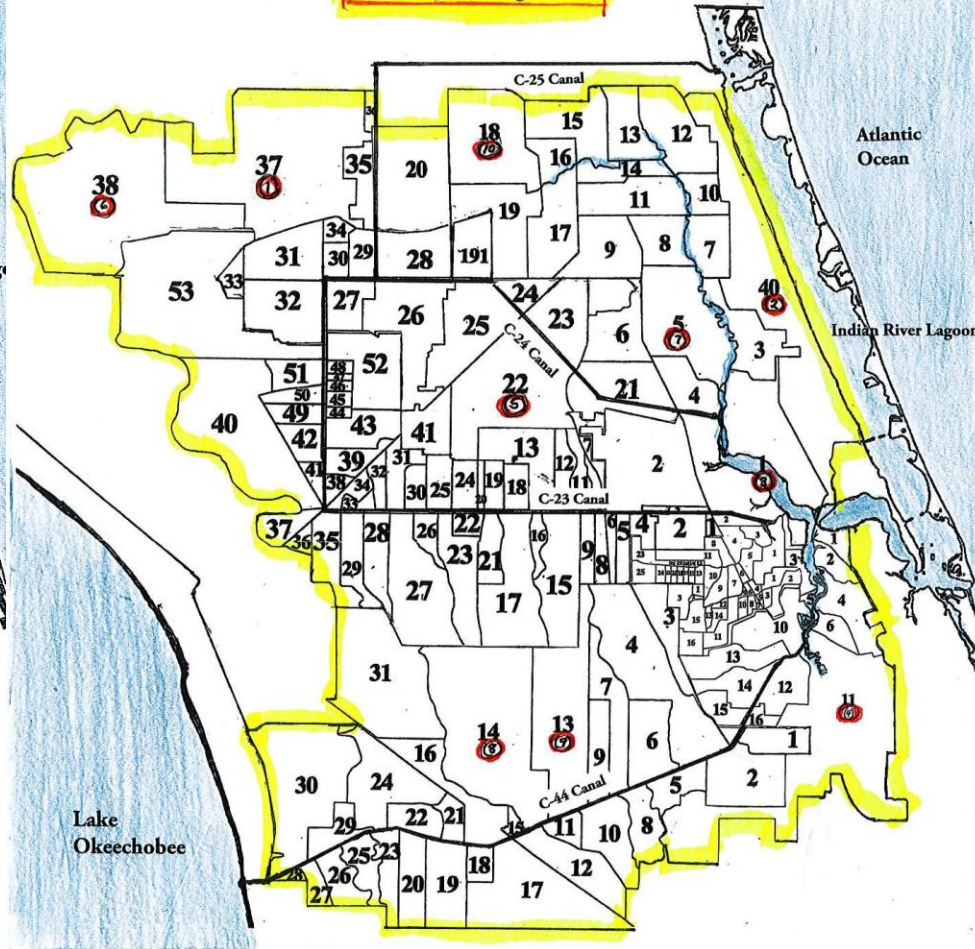
St. Lucie River Estuary Watershed

Primary Drainage Basins



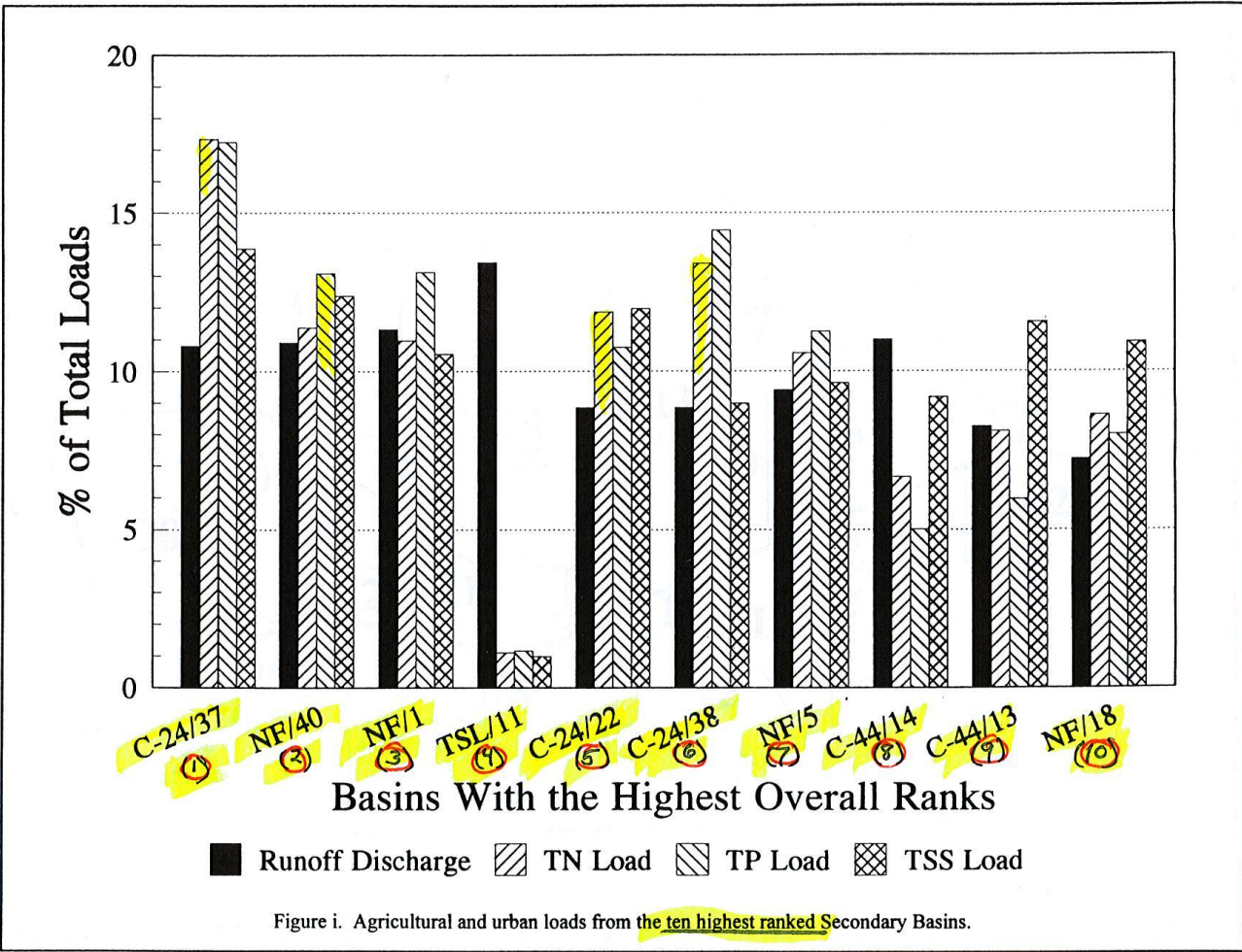
St. Lucie River Estuary Watershed

Secondary Drainage Basins



8 Basins – 186 Secondary Basins

St. Lucie River Estuary Watershed



x

Greater Everglades Ecosystem Restoration

1 - Reconnect the “River of Grass” between Lake Okeechobee and the Everglades.

2- Restore the Kissimmee River valley and flood plain.

3 - Manage Lake Okeechobee between 12.5 ft and 15.5 ft.

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



Advocacy of Florida
Oceanographic Society
since March 2001



Current Everglades & Related Issues

1- Secure Everglades restoration funding in State Budget- \$70 million -Florida Legislature & Governor

2 - Implement EPA and Florida Numeric Nutrient Criteria in state water quality standards - Florida Legislature & Governor

3 –Move forward with USACOE & USDOJ Central Everglades Planning Project-”MOVE WATER SOUTH” (start)- U.S. Congress & President

4 – Secure Appropriation of USDOJ 5.5 mile bridge Tamiami Trail Project- Authorized \$349 M- U.S. Congress & President

5 – Secure continuing Appropriation of USACOE for C-44 Project- Indian River Lagoon-South Plan- U.S. Congress & President

6 – STOP ALL DISCHARGES INTO the St. Lucie Estuary FROM C-44, C-23 and C-24 Canals



April 2013



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- BUSINESS SUPPORTERS
- EDUCATION
- RESEARCH
- ENVIRONMENT
- WEATHER
- EVENTS
- NEWS
- PHOTO GALLERY
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- LOGIN
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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



Florida Oceanographic Society

January 4 Full-Day
2 Executive & Labs
Transportation
Very Limited
\$170 Member
\$200 Non-Member
For Registration Call
(772) 225-0505

WHAT'S NEW

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fos > get involved > contact your legislators

Contact Your Legislators

Contact Your Legislators

U.S. Congress

U.S. House of Representatives - (435)
http://www.house.gov/house/MemberWWW_by_State.shtml

U.S. Senators - (100)

http://www.senate.gov/general/contact_information/senators_cfm.cfm

State of Florida Legislature

State of Florida Senators - (40)

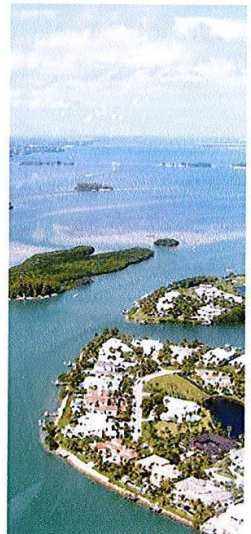
<http://www.flsenate.gov/Legislators/index.cfm?Mode=Member%20Pages&Submenu=1&Tab=legislators&CFID=26112135&CFTOKEN=33260436>

State of Florida House of Representatives - (120)

<http://www.myfloridahouse.gov/Sections/Representatives/representatives.aspx>

Florida Governor

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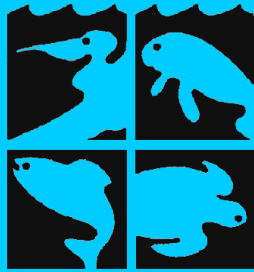
What about our Future?



Our Mission:

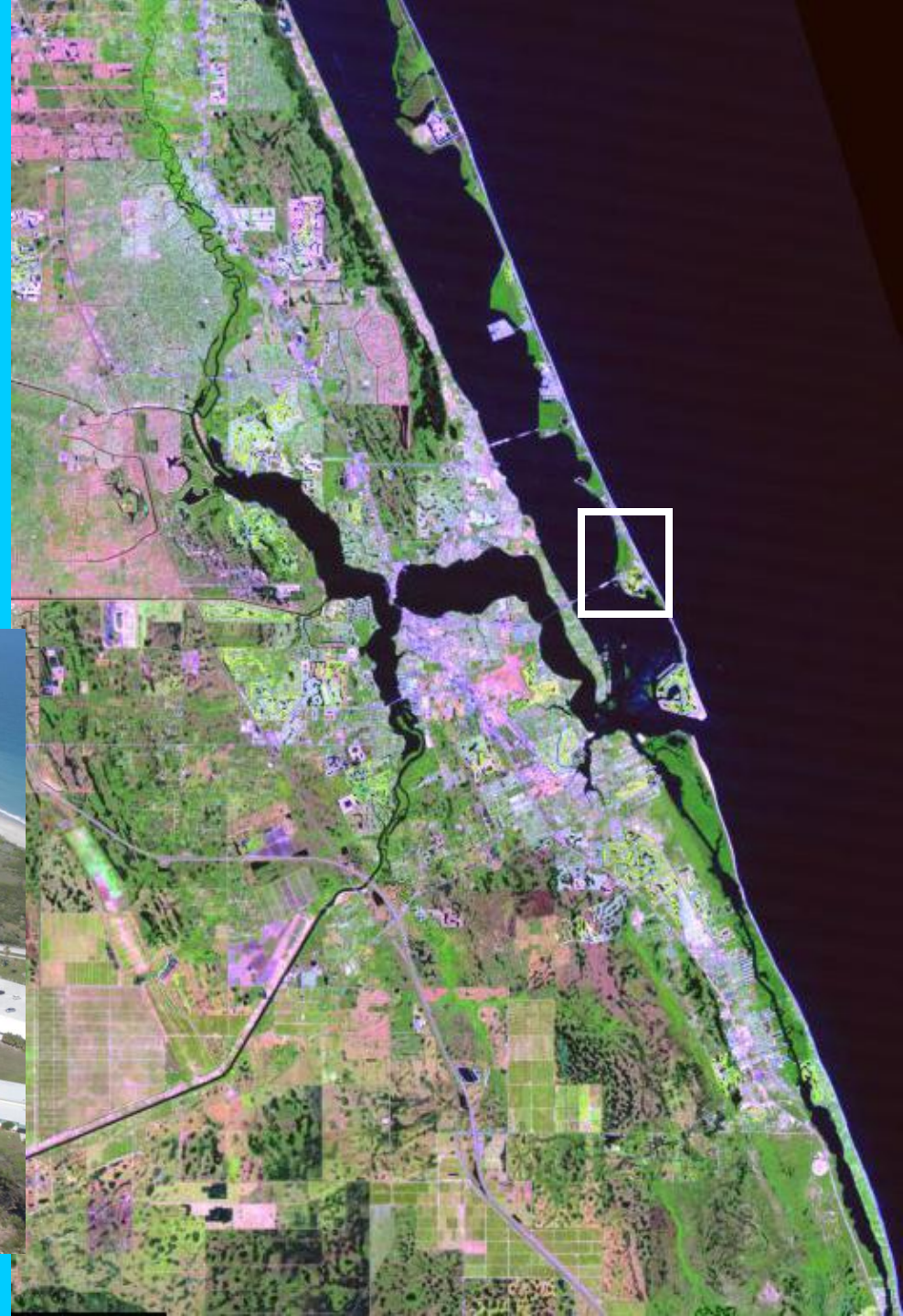
*To inspire
environmental
stewardship of
Florida's coastal
ecosystems through
education and
research.*





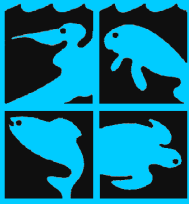
Florida Oceanographic Coastal Center

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





750,000 gallon Game Fish Lagoon



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

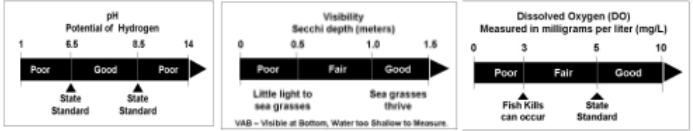
This information is provided by the Florida Oceanographic Society with support of the Marine Resources Council. It is collected by the Citizen Volunteer Water Quality Monitoring Network. For complete data go to our website at:

<http://www.floridaoceanographic.org/water.htm>

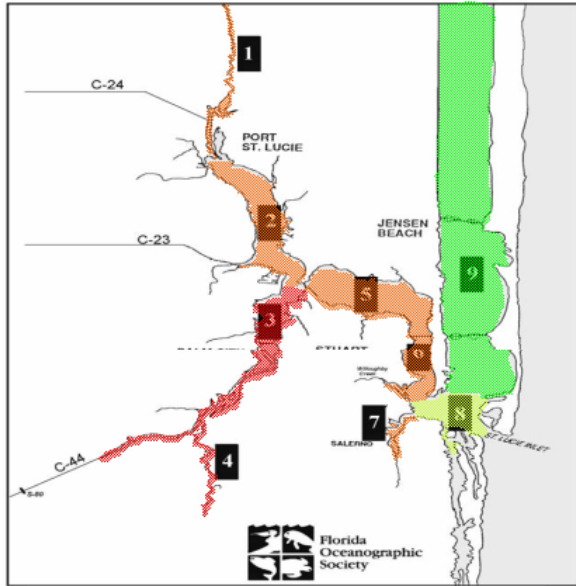
Posted: **06/17/10**

Overall Grade: **67.9%** **D+** **POOR**

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



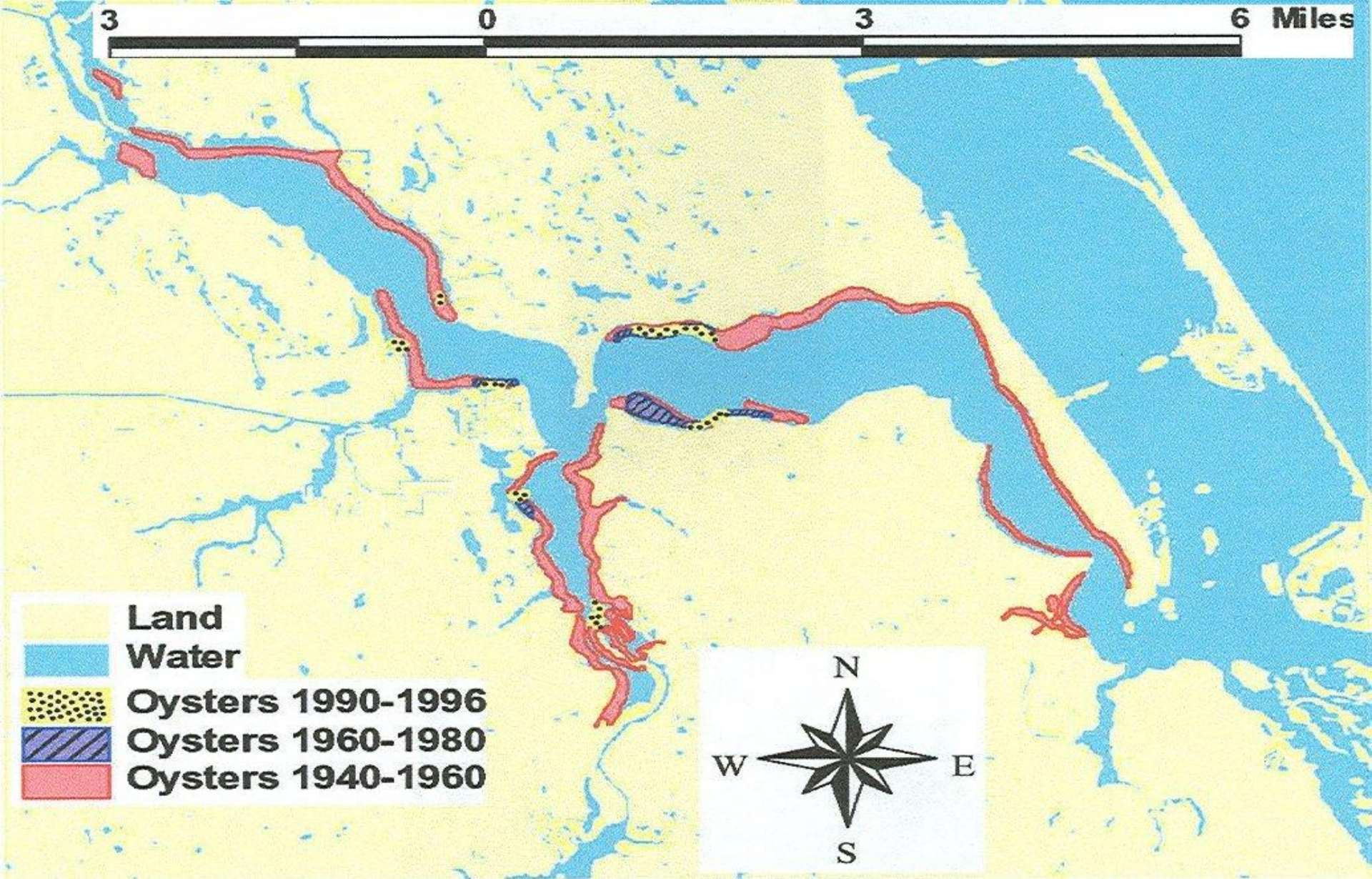
Grading				
A	B	C	D	F
90-100	80-89	70-79	60-69	0-59
IDEAL	GOOD	SATISFACTORY	POOR	DESTRUCTIVE

Salinity (Parts per Thousand)				
Zones	Description	Good	Fair	Poor
1 & 4	Winding North & South Forks	2 to 8	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		
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.

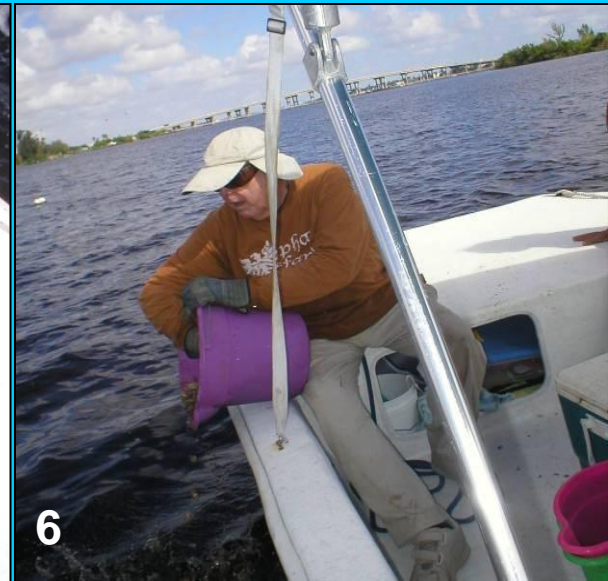
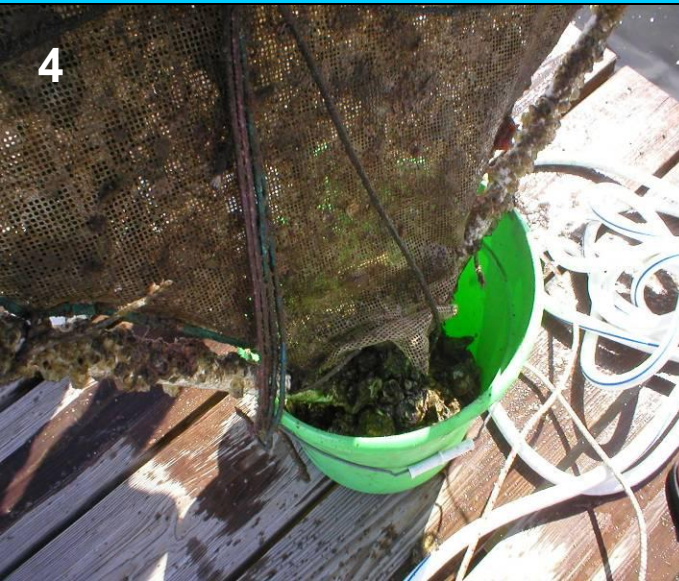




St. Lucie River Estuary Oyster Reef

1940s **Habitat** 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**



N

0 0.5 1 2 Miles

FOS 

North Fork

Middle Estuary

U.S. Oyster Reef

Lower Estuary

South Fork



Florida Oceanographic Coastal Center



Martin Co./NOAA Reefs

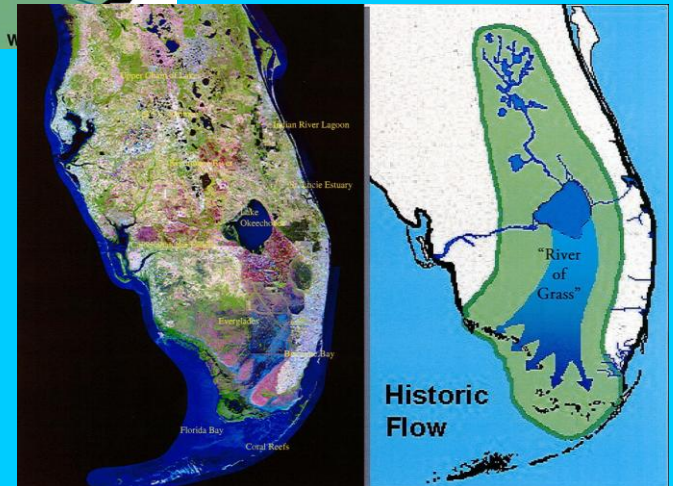
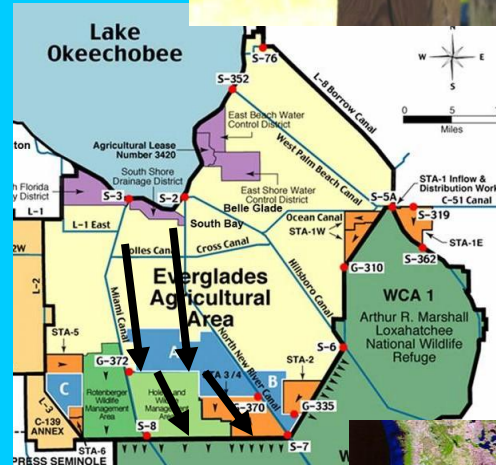


Historic Oyster Reefs



Mark Perry Executive Director Conservation Advocacy

- Member of the Everglades Coalition
- Member of the State Water Resource Advisory Commission
- Member of the Rivers Coalition
- Testified to U.S. Senate Committee and in Federal Courts as to value of the Everglades and Florida's coastal ecosystems





Florida Oceanographic Society

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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
6-10:30 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
\$200 Non-Members

For Registration & Details
Call Ellie Van Os
(772)225-0505 ext. 113

WHAT'S GOING ON?



Learn More at www.floridaocean.org



Florida
Oceanographic
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Join us in Supporting
Florida Oceanographic Society