

St. Lucie Estuary and Indian River Lagoon Update

Rivers Coalition

May 29, 2014

Mark Perry, Executive Director
Florida Oceanographic Society

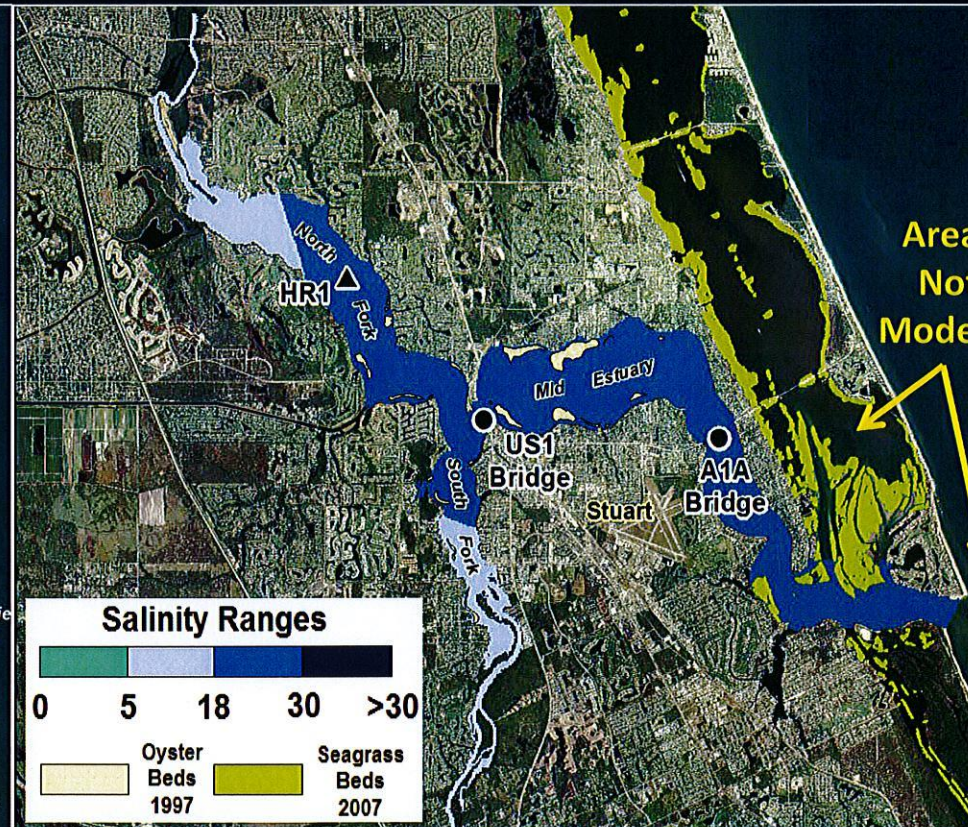
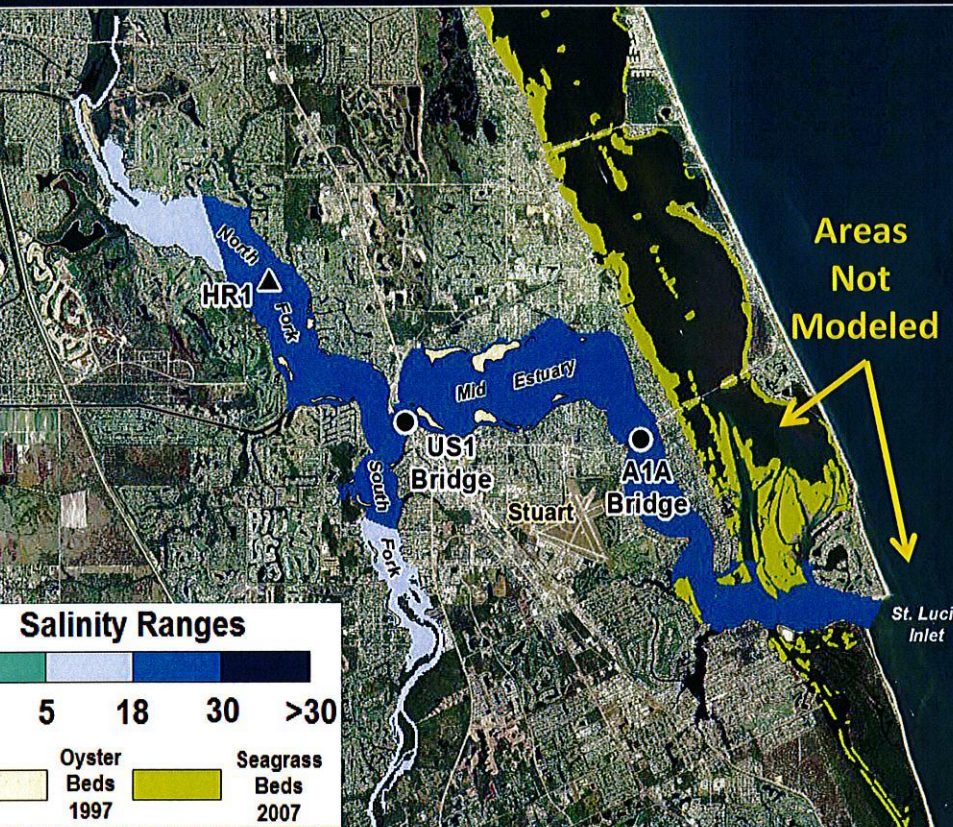


St. Lucie Estuary

Salinity Conditions

April 7, 2014

May 5, 2014



St. Lucie River Estuary Water Quality Outlook

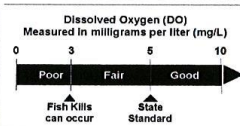
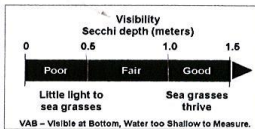
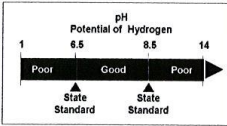
This information is provided by the Florida Oceanographic Society with support of the Marine Resources Council. It is collected by the Citizen Volunteer Water Quality Monitoring Network. For complete data go to our website at: <http://www.floridaocean.org>
For sample results related to bacteria levels go to: www.martincountyhealth.com and click on the Environmental Health link.

Posted:

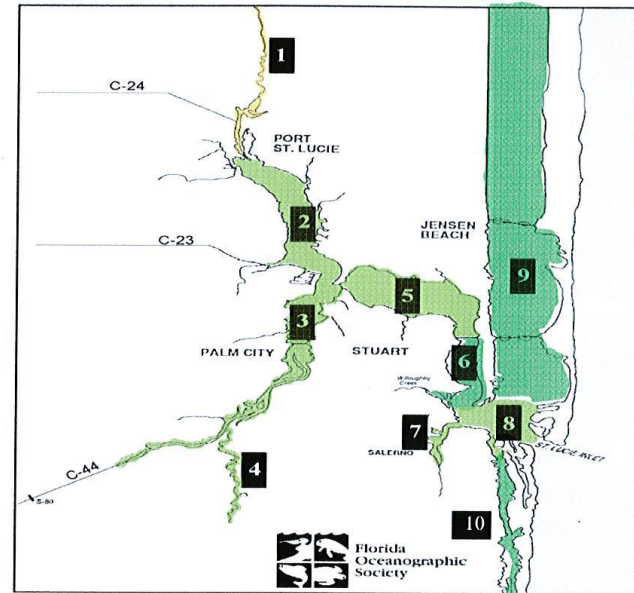
05/22/14

Overall Grade:	87.6%	B+	GOOD
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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	77	7.8	0.70 Fair	1.0 Fair	6.2 Good	76%	C Satisfactory
2. North Fork	80	8.1	1.13 Good	14.7 Fair	6.3 Good	87%	B Good
3. South Fork	78	7.9	0.80 Fair	18.3 Good	5.4 Good	87%	B Good
4. Winding South Fork	79	8.0	0.90 Fair	6.0 Good	4.7 Fair	81%	B Good
5. Wide Middle River	75	8.2	0.90 Fair	25.0 Good	5.8 Good	87%	B Good
6. Narrow Middle River	77	7.9	2.50 Good	30.0 Good	6.2 Good	97%	A Ideal
7. Manatee Pocket	81	8.0	1.33 Good	25.0 Fair	4.9 Fair	81%	B Good
8. Inlet Area	80	8.2	0.80 Fair	33.0 Good	5.7 Good	87%	B Good
9. Indian River Lagoon	81	8.4	VAB NoGrade	38.0 Good	8.6 Good	97%	A Ideal
10. Intracoastal Waterway South	80	7.9	1.07 Good	34.7 Good	6.2 Good	97%	A Ideal



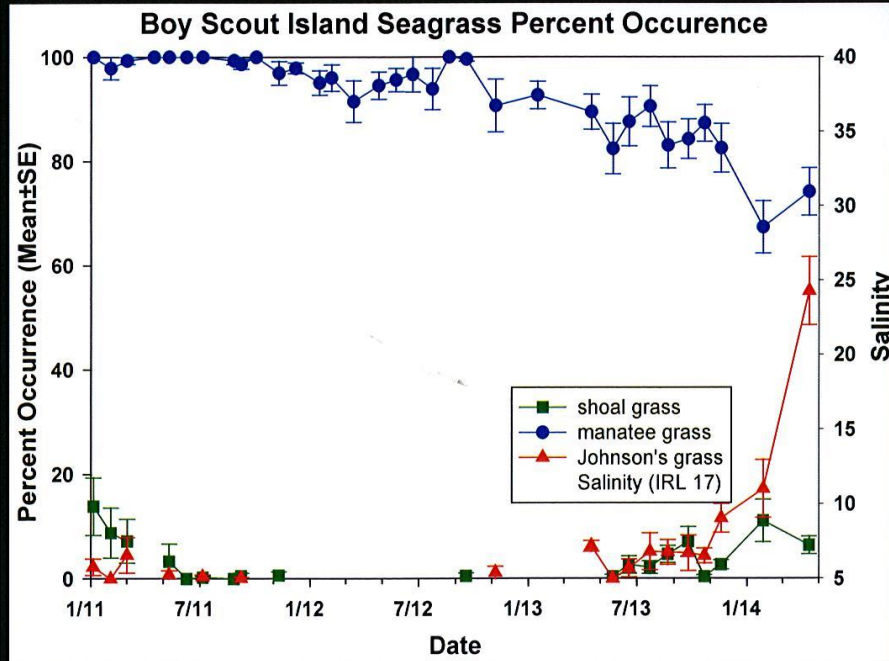
Comment: The data above may indicate areas of concern in the St. Lucie Estuary. Citizens should call the Florida Department of Environmental Protection (DEP) at 871-7662 or the South Florida Water Management District (SFWMD) 223-2600 to ask about the quality of a specific area and report observations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



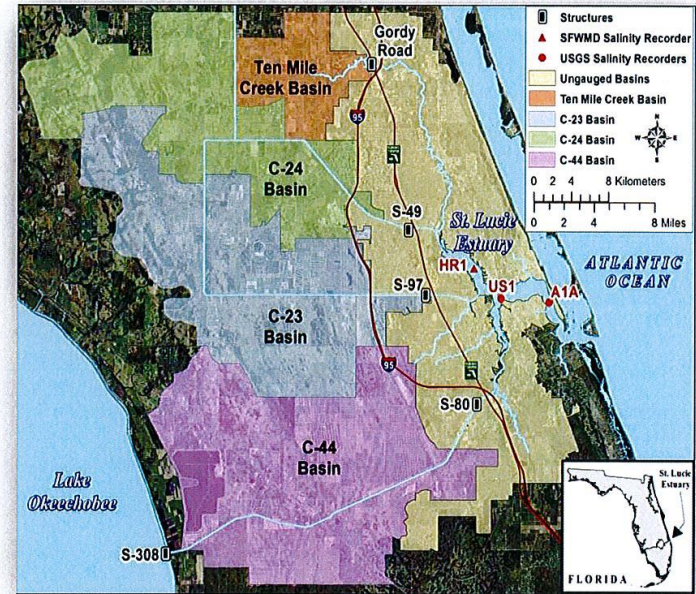
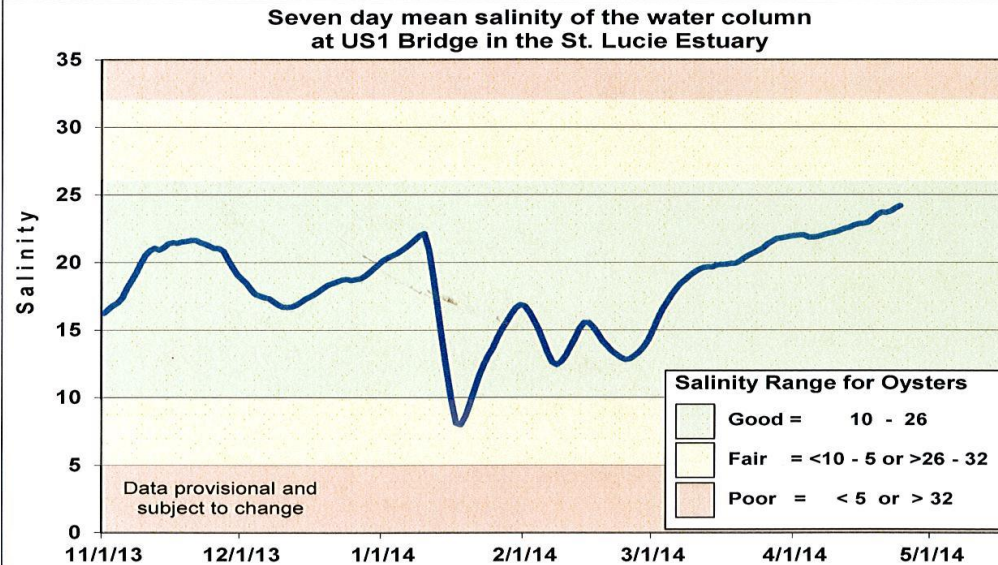
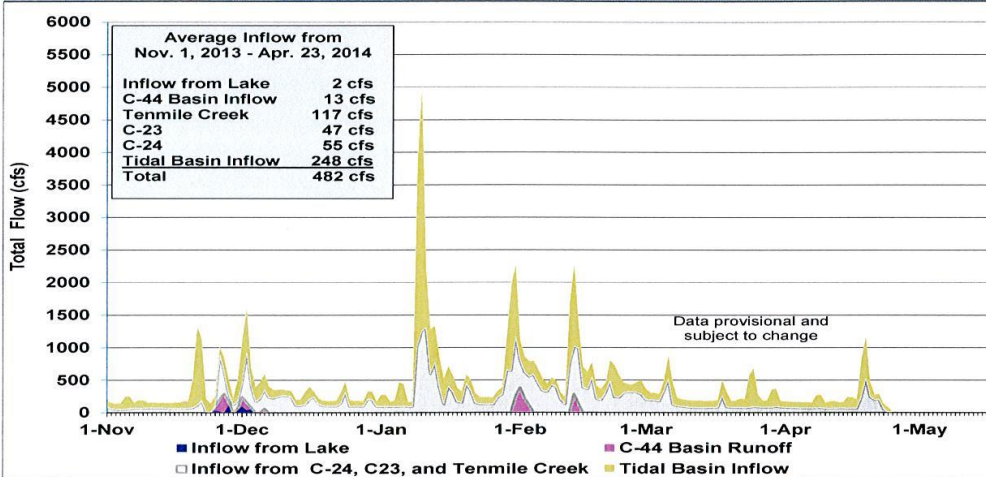
Grading				
A	B	C	D	F
90-100	80-89	70-79	60-69	0-59
IDEAL	GOOD	SATISFACTORY	POOR	DESTRUCTIVE

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

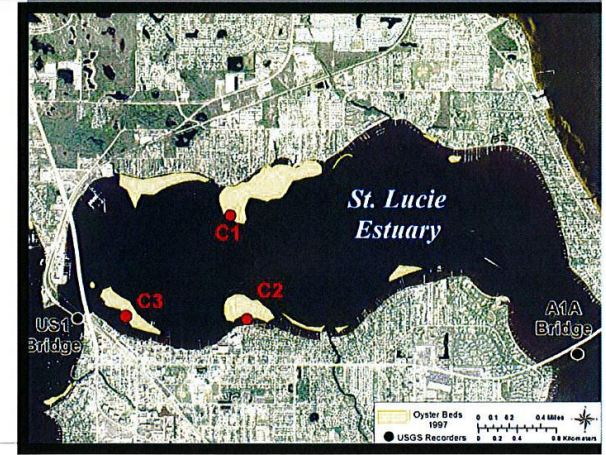
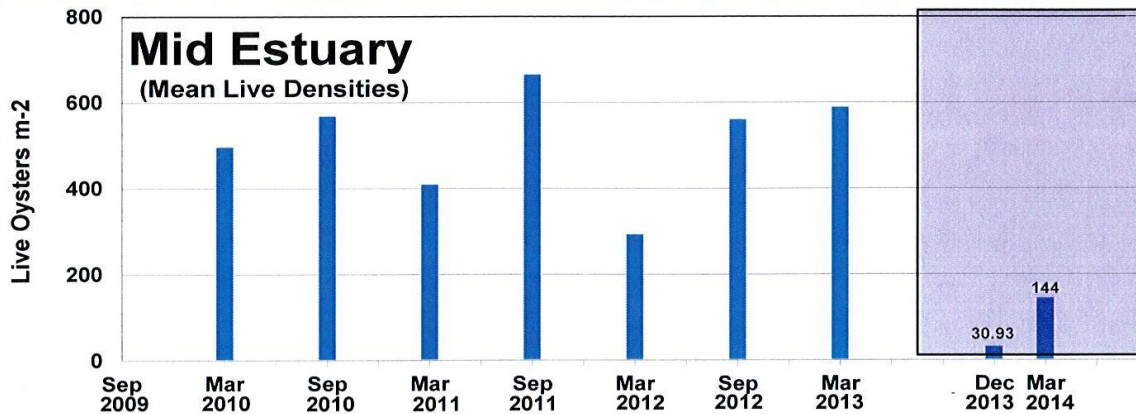
St. Lucie Estuary Seagrass



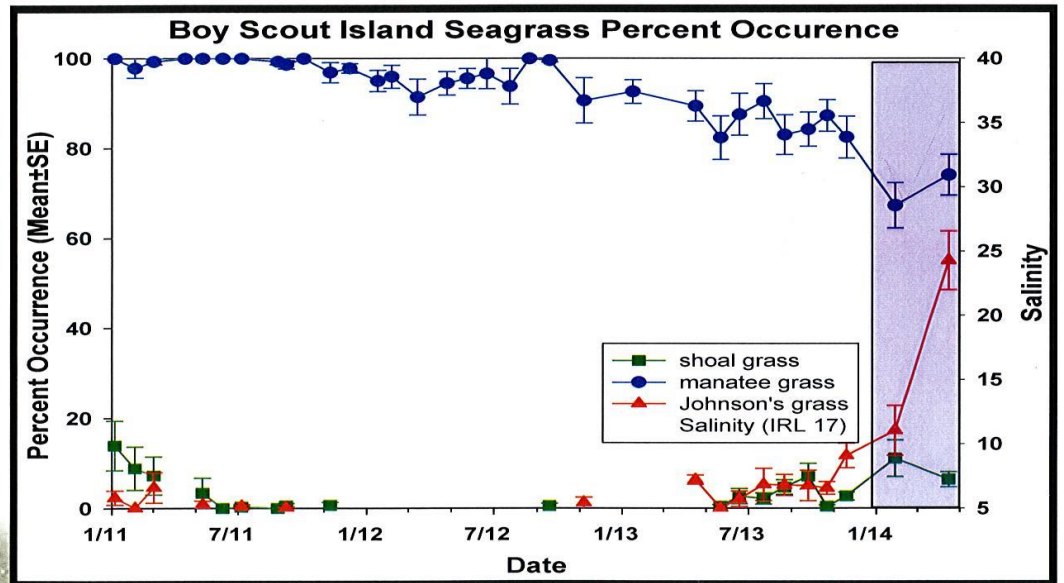
St. Lucie Estuary- Freshwater Inflow and Salinity Conditions



St. Lucie Estuary – Oyster and Seagrass Recovery

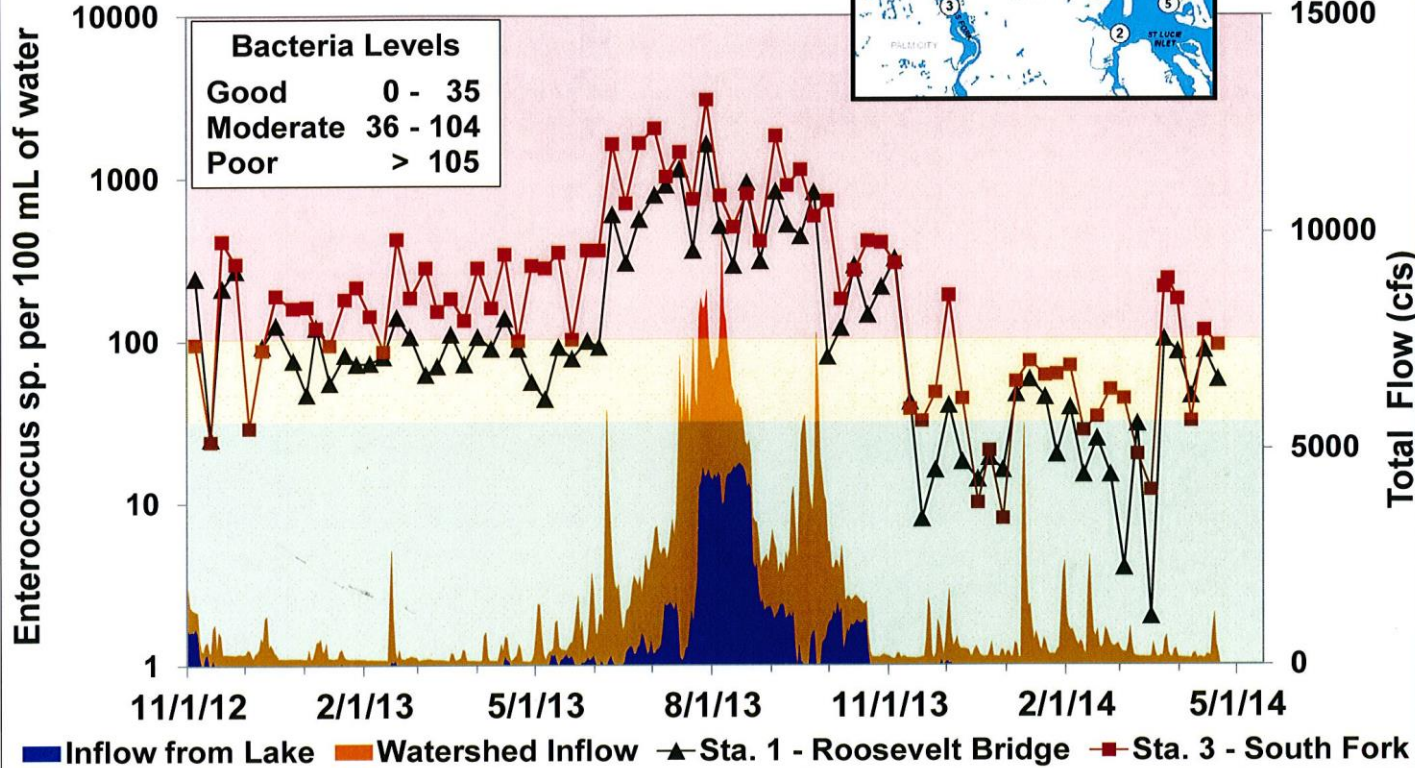
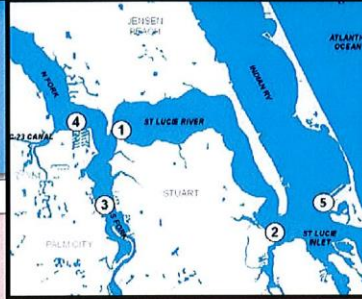


* Density counts were collected in Dec. 2013 due to unsafe water conditions (high bacterial warnings) from May - Nov. 2013.

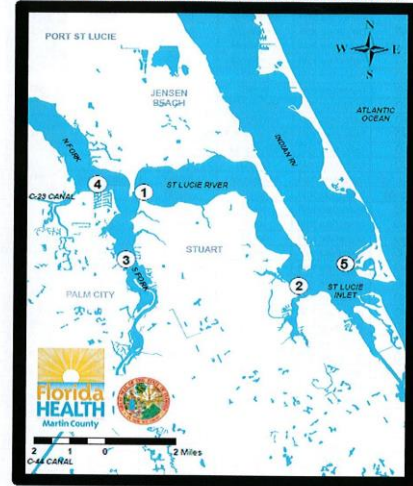


Bacteria Monitoring St. Lucie River

Florida Dept. of Health - Martin County



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



Date	Roosevelt Bridge (1)	Sandspruit Park (2)	Leighton Park (3)	E of Bessey 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



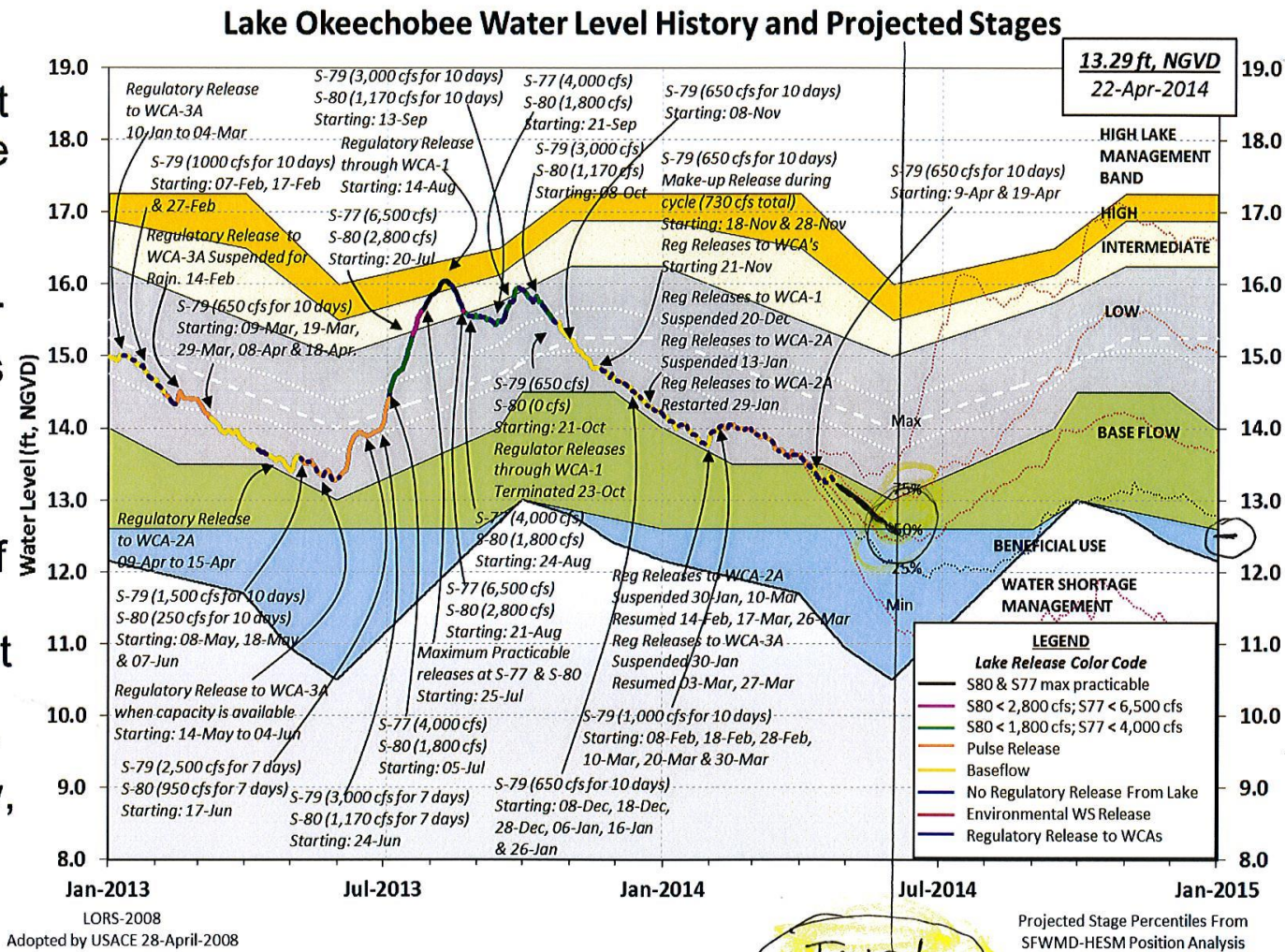
Gracilaria and Lyngbya and
Seagrass -IRL-
Mike Conner-5-28-14



Lyngbya – Blue Green Algae-
Cyanobacteria - IRL-
Gary Ferguson-5-27-14

Lake Okeechobee – Next Six Months

- Water levels for next 6 months highly dependent on severity of the dry season and date of onset of the rainy season.
- Currently Lake is trending below the minimum probability line suggesting that if current conditions persist the Lake will remain within, or fall slightly below, the preferred stage envelope

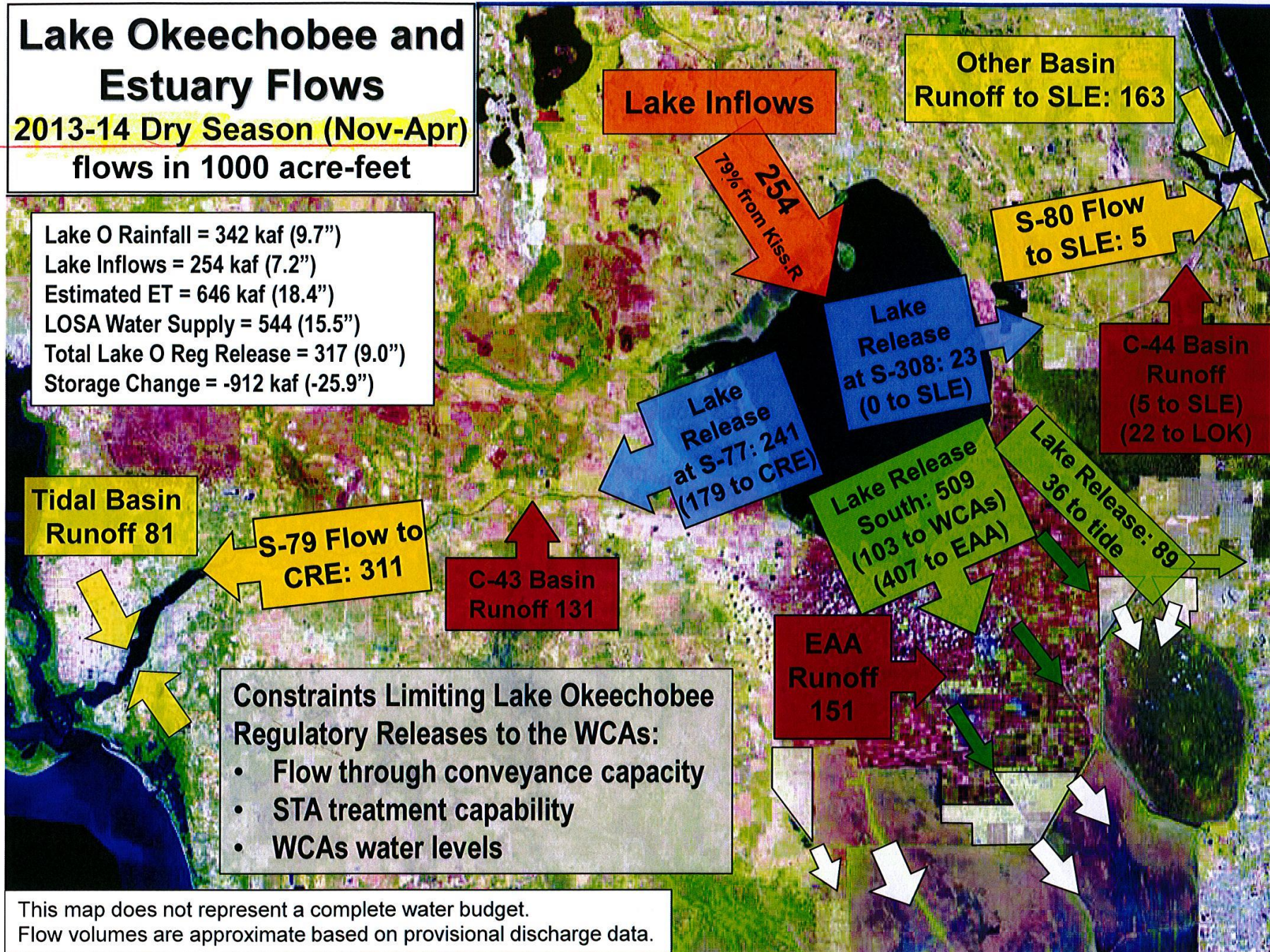


Lake Okeechobee and Estuary Flows

2013-14 Dry Season (Nov-Apr)

flows in 1000 acre-feet

Lake O Rainfall = 342 kaf (9.7")
 Lake Inflows = 254 kaf (7.2")
 Estimated ET = 646 kaf (18.4")
 LOSA Water Supply = 544 (15.5")
 Total Lake O Reg Release = 317 (9.0")
 Storage Change = -912 kaf (-25.9")



Constraints Limiting Lake Okeechobee Regulatory Releases to the WCAs:

- Flow through conveyance capacity
- STA treatment capability
- WCAs water levels

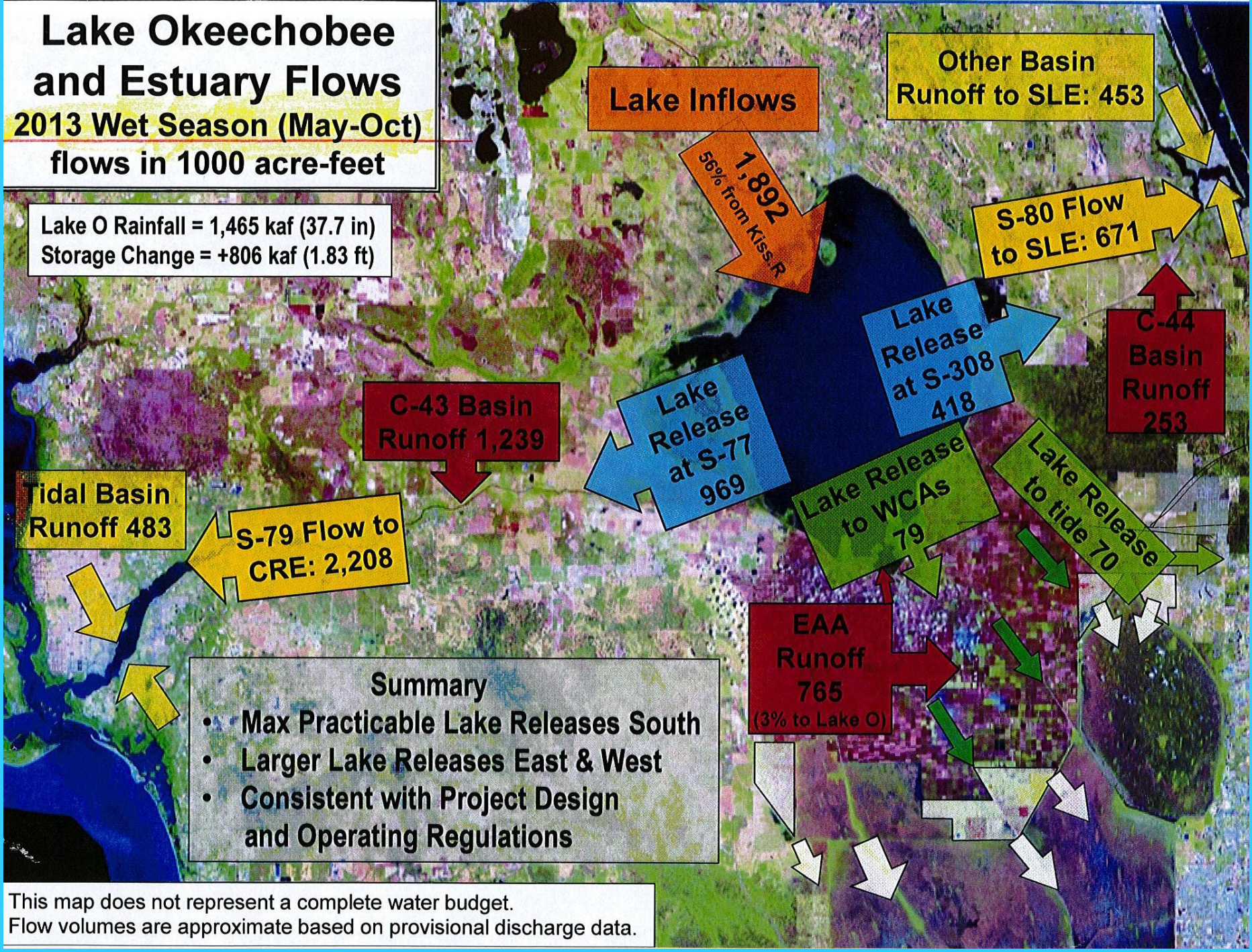
This map does not represent a complete water budget.
 Flow volumes are approximate based on provisional discharge data.

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.

LAGOON ACTION ASSEMBLY
May 15 - 17, 2014
AGENDA

May 15, 6:00 pm - 9:00 pm
Inaugural Event & Delegate Introductions
 Ted Moorhead Lagoon House
 3275 Dixie Hwy NE, Palm Bay, Florida 32905

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

May 16, 8:00 am - 6:00 pm
Issues, Pollutants & Sources
 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
Sources (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 - 5:00 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
Solutions 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 (IRLLOB)				
Fiscal Year 2014-15				
PRIORITY PROJECTS	PROJECT DESCRIPTIONS	IRLLOB 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 Picayune Strand	Funds for the Picayune 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 Basin 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 Kilroy 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 12, 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 (*IRLLOB Report includes total DOT Annual Workplan)		\$224,844,525	\$231,998,021	

Indian River Lagoon-South Plan

12,000 acres above ground Storage Reservoirs

9,000 acres STA manmade wetlands

90,000 acres Natural Area Storage

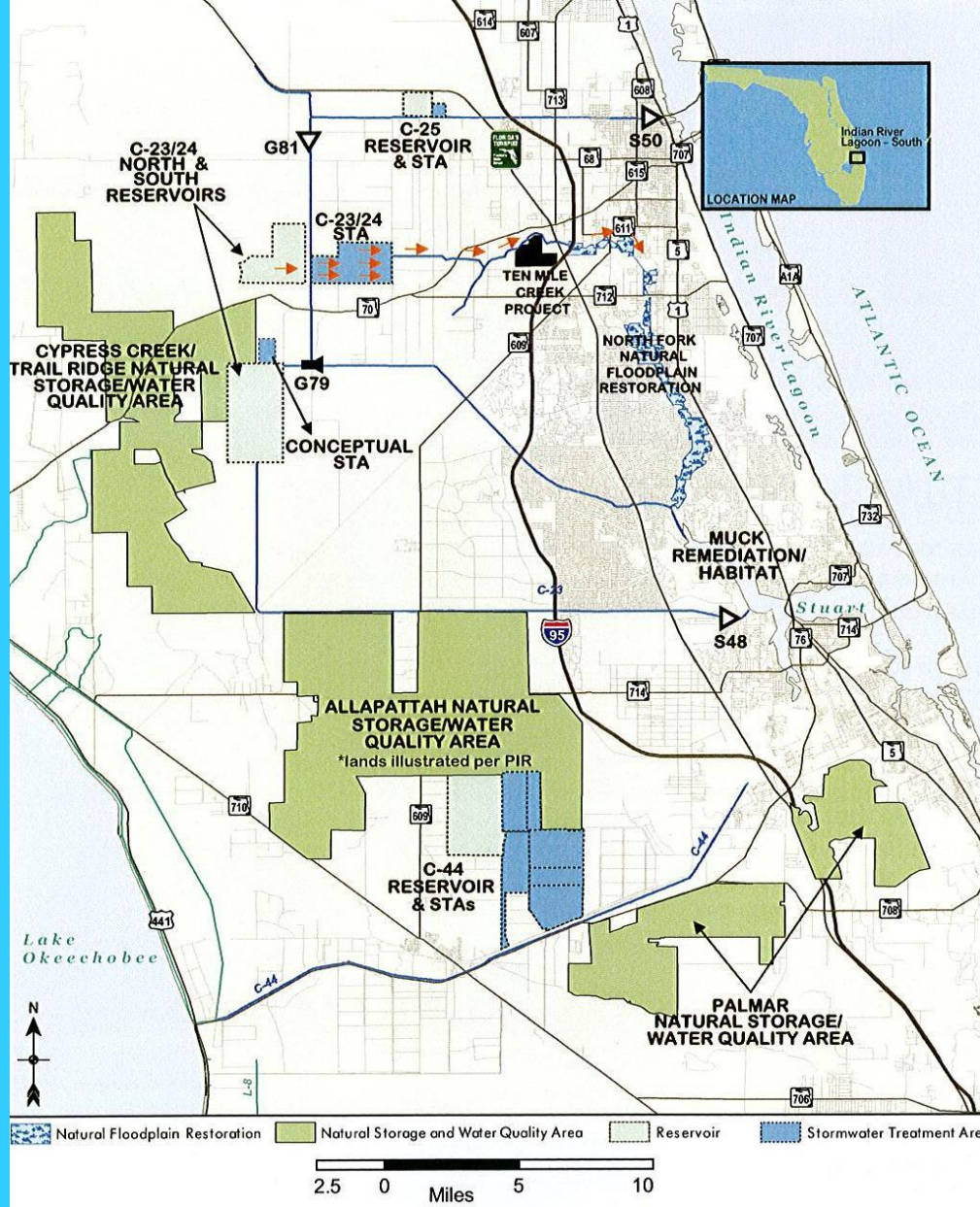
2,650 acres benthic habitat created- 922 acres submerge aquatic habitat restored

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

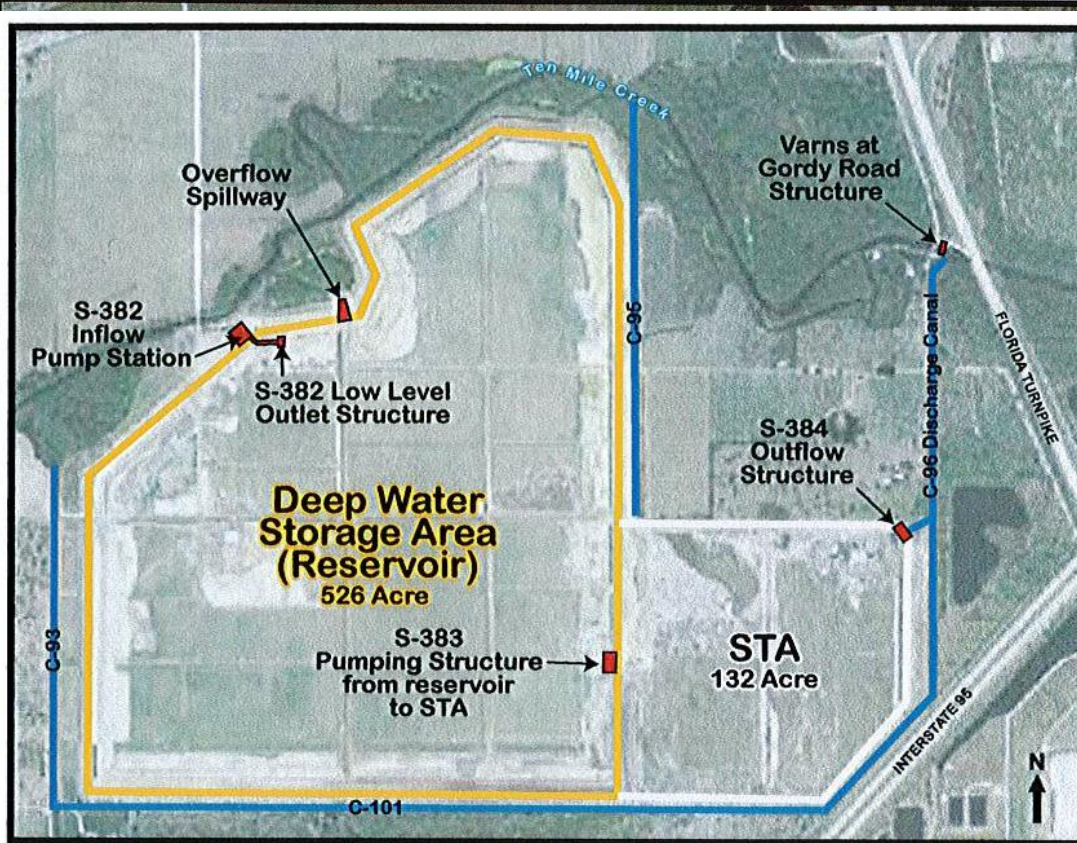
- C-23/24 – North and South Reservoirs
- C-23/24 – Stormwater Treatment Area
- Allapattah, Cypress Creek and Trail Ridge Complex – Natural Storage and Water Quality Area

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



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 to use as is and attenuate flows into the North Fork



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 2014)

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-WRDA)

- 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 INITIAL 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	Corp. Project
Kissimmee River Region						
North of Lake Okeechobee Storage Reservoir	\$95,134	189,720	\$284,854	\$1,515,245		
Taylor Creek/Nubbin Slough Storage and Treatment Area	\$74,326	\$29,700	\$104,026	\$2,164,114		CRITICAL RPA
Lake Okeechobee Watershed Water Quality Treatment Facilities	\$47,800	\$14,448	\$62,248	\$2,620,000		
Lake Okeechobee Tributary Sediment Dredging	\$3,800	\$900	\$4,700	\$0		
Lake Istokpoga Regulation Schedule	\$50	\$0	\$50	\$0		
Lake Okeechobee 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	\$6,707,889	ACCELER8	Gen2
Caloosahatchee Backpumping with Stormwater Treatment	\$69,715	\$13,179	\$82,894	\$2,273,076		
Upper East Coast						
C-44 Basin Storage Reservoir	\$21,888	\$90,675	\$112,563	\$759,953	ACCELER8	Gen1
C-23/C-24/C-25/Northfork and Southfork Storage Reservoirs	\$281,175	\$429,048	\$710,223	\$4,832,774		
Everglades Agricultural Area						
Everglades Agricultural Storage Reservoirs	\$350,112	\$86,536	\$436,648	\$14,458,409		CEPP
Big Cypress Region						
Big Cypress/L-28 Interceptor Modifications	\$36,051	\$6,700	\$42,751	\$404,457		
Seminole Tribe Big Cypress Water Conservation Plan- (East & West)	\$69,553	\$5,735	\$75,288	\$775,000		
Water Conservation Areas Region						
Flow to Northwest and Central Water Conservation Area 3A	\$30,877	\$0	\$30,877	\$1,102,327		CEPP
WCA 3 Decomartmentalization and Sheetflow Enhancement	\$185,408	\$26,279	\$211,687	\$740,111		CEPP
Loxahatchee National Wildlife Refuge Internal Canal Structures	\$7,324	\$345	\$7,669	\$42,045		
Miccosukee Water Management Plan	\$22,741	\$1,718	\$24,459	\$540,000		
Lower East Coast Region						
Pal-Mar and J.W. Corbett Wildlife Management Area Hydropattern Restoration	\$2,500	\$8,000	\$10,500	\$90,000		
Water Preserve Areas / L-8 Basin	\$383,541	\$31,641	\$415,182	\$2,273,929		
Acme Basin B Discharge	\$11,600	\$8,500	\$20,100	\$594,000	ACCELER8	
Lake Worth Lagoon Restoration	\$2,000	\$300	\$2,300	\$0		
Winsburg Farms Wetland Restoration	\$10,000	\$4,140	\$14,140	\$200,000		
Palm Beach County Wetlands Based Water Reclamation	\$24,900	\$2,800	\$27,700	\$2,500,000		
C-17 Backpumping and Treatment	\$9,824	\$10,367	\$20,191	\$752,435		
C-51 Backpumping and Treatment	\$19,156	\$13,475	\$32,631	\$1,089,682		
C-51 Regional Groundwater Aquifer Storage and Recovery	\$122,391	\$9,945	\$132,336	\$1,496,000		
Palm Beach Cnty Agricultural Reserve Reservoir and ASR	\$66,442	\$57,657	\$124,099	\$1,019,500		
Protect and Enhance Existing Wetland Systems along Loxahatchee National Wildlife Refuge including the Strazzulla Tract	\$3,800	\$48,972	\$52,772	\$90,000		
Site 1 Impoundment and Aquifer Storage and Recovery	\$116,792	\$23,587	\$140,379	\$2,052,608	ACCELER8	Gen1
Broward County Secondary Canal System	\$10,978	\$1,920	\$12,898	\$418,017		Gen2
Western C-11 Diversion Impoundment and Canal and Water Conservation Areas 3A and 3B Levee Seepage Management	\$57,526	\$167,646	\$225,172	\$783,432	ACCELER8	CRITICAL RPA
C-9 Stormwater Treatment Area/Impoundment	\$26,207	\$62,939	\$89,146	\$615,743	ACCELER8	
North Lake Belt Storage Area	\$381,193	\$154,868	\$536,061	\$1,241,234		
Diverting Water Conservation Area 2 and 3 flows to Central Lake Belt Storage	\$66,336	\$13,321	\$79,657	\$146,635		
Central Lake Belt Storage Area	\$402,502	\$100,359	\$502,861	\$1,964,519		
Dade-Broward Levee/Pennsuco Wetlands	\$10,103	\$8,676	\$18,779	\$105,871		
C-4 Control Structures	\$1,834	\$495	\$2,329	\$30,015		CRITICAL RPA
Bird Drive Recharge Area	\$52,459	\$71,625	\$124,084	\$1,470,869		
L-31N Levee Improvements for Seepage Management and S-356 Structures	\$89,514	\$94,704	\$184,218	\$4,647,234		CEPP
West Miami-Dade County Reuse	\$435,998	\$3,540	\$439,538	\$36,500,000		
Biscayne Bay Coastal Wetlands	\$93,928	\$205,655	\$299,583	\$923,300	ACCELER8	Gen2
South Miami-Dade County Reuse	\$359,700	\$3,324	\$363,024	\$4,815,000		
Restoration of Pineland & Hardwood Hammocks in C-111 Basin	\$600	\$0	\$600	\$0		
C-111N Spreader Canal	\$48,268	\$45,766	\$94,034	\$59,586	ACCELER8	Gen2
Southwest Florida Region						
Southern Golden Gates Hydrologic Restoration (Picyunne Strand)	\$15,550	\$0	\$15,550	\$93,000	ACCELER8	Gen1
Southern CREW Project Addition	\$3,434	\$30,104	\$33,538	\$160,000		CRITICAL RPA
Lake Trafford Restoration	\$14,664	\$744	\$15,408	\$0		CRITICAL RPA
Henderson Creek/Belle Meade Restoration	\$3,776	\$1,029	\$4,805	\$41,000		
Lake Park Restoration	\$5,000	\$166	\$5,166	\$62,000		
Florida Bay and Keys						
Florida Keys Tidal Restoration	\$1,200	\$51	\$1,251	\$0		
System-wide						
Melaleuca Eradication Project and other Exotic Plants	\$5,772	\$0	\$5,772	\$5,000		
Additional Feasibility Studies	\$20,300	\$0	\$20,300	\$0		
System-wide Operational Changes-Everglades Rain-Driven Operations						CEPP
TOTAL	\$5,598,113	\$2,221,435	\$7,819,548	\$7,800,000		

- ACCELER8 State funded project begun prior to federal funding assistance
- CRITICAL RPA USACOE project created due to immediate environmental needs
- GEN1 Active projects that have been authorized and funded
- GEN2 Projects that are still awaiting Congressional authorization
- CEPP 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 %**

**Lake
Okeechobee
2.21 M AF per Year**

**C-10 A
900 cfs**

442 K AF per Year

**S-77
9300 cfs**

**S-352
900 cfs**

**To the Everglades
13 %**

**Caloosahatchee Estuary
44 %**

**S-351
1500 cfs**

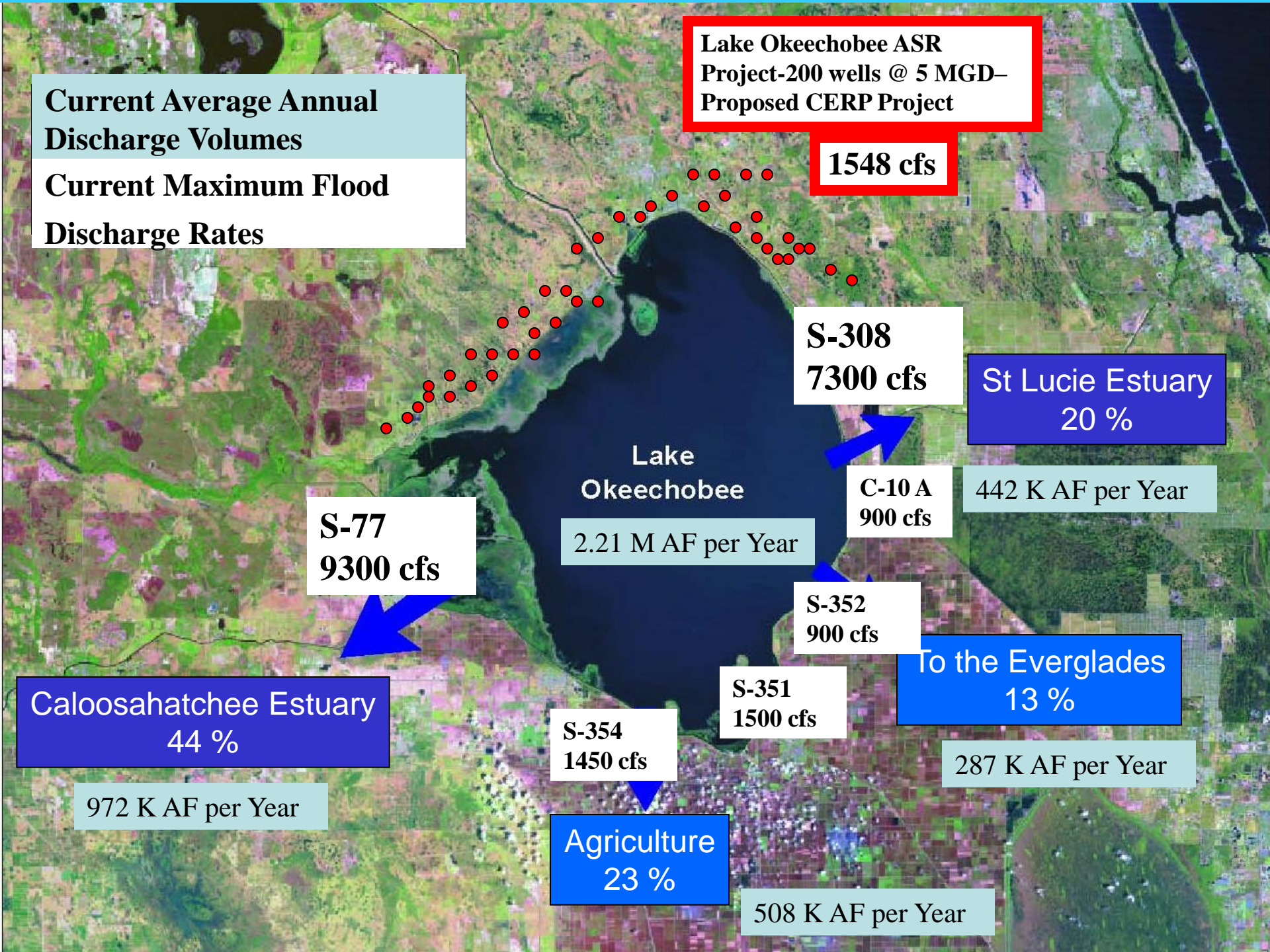
287 K AF per Year

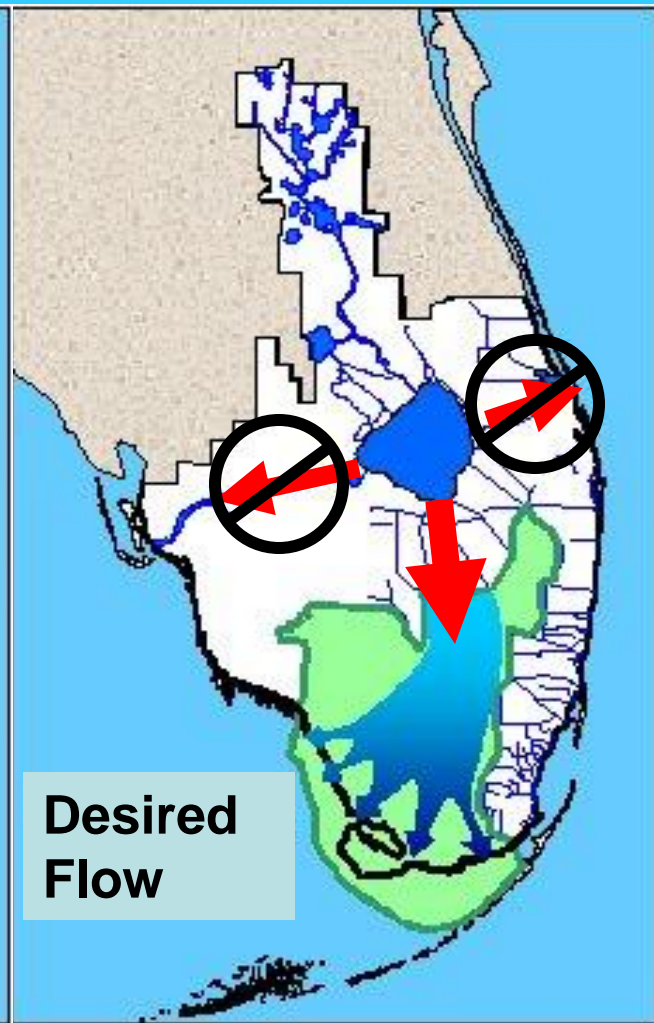
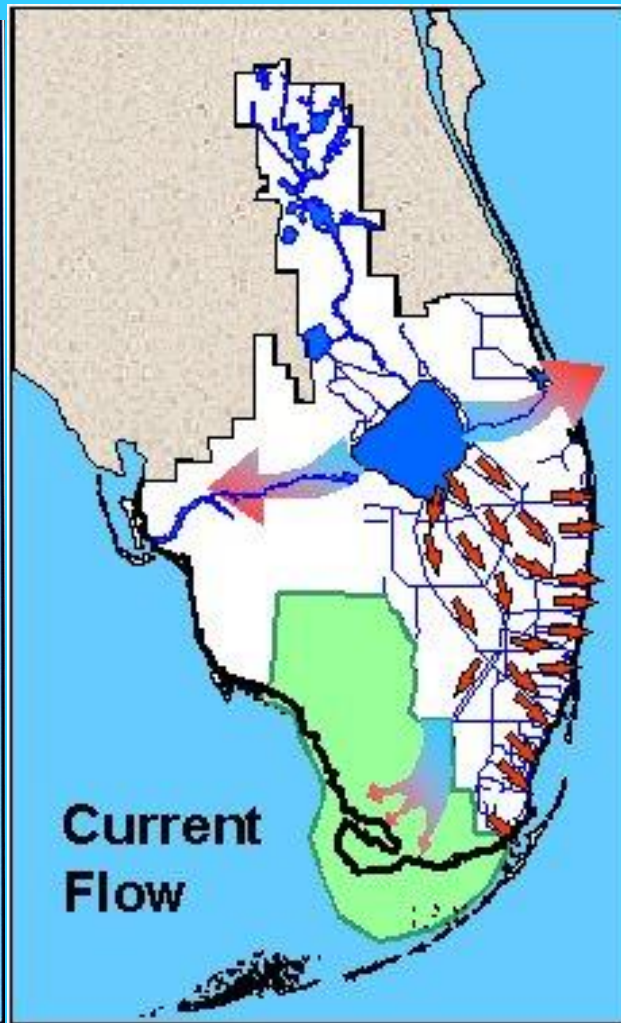
972 K AF per Year

**S-354
1450 cfs**

**Agriculture
23 %**

508 K AF per Year





Historic, Current & Desired Flows

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



Florida
Oceanographic
Society

