

A G E N D A

Caloosahatchee River Watershed Protection Plan Working Team Meeting Wednesday, February 20, 2008 1:30 – 4:45 p.m.

SFWMD Lower West Coast Service Center
2301 McGregor Boulevard
Fort Myers, FL
First Floor Conference Room

Cisco MeetingPlace 6700 || Local 561-682-6700 || Toll Free 866-433-6299 || Meeting ID 6323

1:30	Introduction and Opening Remarks	Janet Starnes
1:45	Management Measures – Review Revisions	Janet Starnes
3:00	Table of Contents	Janet Starnes
3:15	Performance Measures	Clyde Dabbs
3:30	Water Quality Status Nutrient Concentrations in Caloosahatchee Basin	Tim Lieberman Darren Rumbold
4:15	Public Comment	All
4:30	Closing Remarks/Next Meeting	Janet Starnes

Meeting Summary

Northern Everglades

Caloosahatchee River Watershed Protection Plan

Working Team Meeting

February 20, 2008

The Working Team for the Caloosahatchee River Watershed Protection Plan met on Wednesday, February 20, 2008, at 1:30 p.m. at the South Florida Water Management District's Lower West Coast Service Center in Fort Myers, Florida. A copy of the sign-in sheet is attached to this document, and a summary of the presentations and discussions follows.

Attendee	Organization	Attendee	Organization
Janet Starnes	SFWMD	Tim Liebermann	SFWMD
Pinar Balci	SFWMD	Patrick Martin	SFWMD
Jim Beever	SWFRPC	Sally McPherson	SFWMD
Craig Bartoshuk	A. Duda and Sons	John Morgan	SFWMD
Catherine Corbett	CHNEP	Judith Northdurft	SFWMD
Matt Bokor	Youngquist Brothers	Jennifer Nelson	FDEP
John Cassani	Lee Co. Hyacinth CD	Kevin O'Donnell	FDEP
Miao-Li Chang	SFWMD	Tony Pellicer	Lee County
Clyde Dabbs	SFWMD	Peter Quasius	Audubon
Bob Chamberlain	SFWMD	Darren Rumbold	FGCU
Roger Copp	ECWCD and Lehigh Acres	Steve Sentes	SFWMD
Keith Kibbey	Lee County	Noel Marton	FDACS
Connie Jarvis	City of Cape Coral	Geordie Smith	Lee Co. Health Dept.
Pat Fricano	FDEP	Dan Rutledge	USDA
Kurt Harclerode	Lee County	Rae Ann Wessel	SCCF
Rob Loflin	City of Sanibel	Brad Vance	ECT
Katie Higgs	FDEP	Kevin O'Donnell	FDEP
Bob Howard	Agnoli, Barber & Brundage, Inc.	Karen Bickford	FDEP
Scott Legg	SFWMD	Bill Walden	ECWCD
Lloyd Horvath	EXTRIX-WRS		

1. Introduction and Opening Remarks

The Project Manager Janet Starnes extended a warm welcome to the participants and introductions were performed around the room.

2. Management Measures – Review Revisions

Janet summarized that at the last meeting, the team reviewed the proposed Management Measures, consolidating, editing and asking for additional information to complete the submittal outline. Following that, Janet and Scott examined and sorted, taking into consideration the input from the Working Team.

There are 14 management measures included in Alternative 1. In addition Alternative 1 included those Lake Okeechobee Phase II Plan management measures that are related to BMPs or regulatory type activities. Alternative 1 is the common elements alternative which means the management measures included in Alternative 1 will also be included in every subsequent alternative. Alternative 1 was handed out to the Team as a part of the Management Measures Summary Sheet.

In addition the sheet has all of the considered management measures and notes such as “combined,” “duplicate,” “not enough information” etc. which identifies the current status of the management measure.

Janet stressed the importance of keeping the management measure sheets up-to-date. Jim Beever submitted several supplemental management measures that will be reviewed and added to the list. .

The current list of management measures will be posted on the Northern Everglades website and updated on a regular basis.

3. Table of Contents

Janet distributed the draft Watershed Protection Plan outline. The Caloosahatchee and St. Lucie River Watershed Protection Plans will follow the same format and outline.

4. Performance Measures

Clyde Dabbs explained the three hydrologic performance measures which will be used for the hydrologic modeling. The performance measures are:

- Number of times the Caloosahatchee Estuary high discharge criteria exceeded mean monthly flows >2,800 cfs and mean monthly flows >4,500 cfs
- Number of times salinity criteria not met for the Caloosahatchee Estuary – mean monthly flows <450 cfs and mean monthly flows >2,800 cfs
- Total flow index

5. Water Quality

Tim Liebermann reviewed the plan boundary for the Caloosahatchee River Watershed Protection Plan. The goal is to have the boundary similar to that of the Southwest Florida Feasibility Study and the Florida Department of Environmental Protection (FDEP) Department’s Total Maximum Daily Load boundary. The S-4 Basin is within the Plan boundary however Nicodemus Slough and the S-236 Basin will not be included. Nicodemus Slough is included in the Lake Okeechobee Phase II Plan and the S-236 Basin flows south.

Tim reviewed the land use maps that will be used for the water quality spreadsheet (as well as the hydrologic modeling). The water quality spreadsheet model is driven by land use. There was considerable discussion concerning the aggregation of some of the land use types.

FDEP requested that any changes to the boundary or any subunits of land uses be coordinated closely.

Darren Rumbold presented a comparison of water quality nutrient concentrations. He compared the water quality data from four entities – SFWMD, FDEP, Lee County and the City of Cape Coral. The data that was used was the last five years. The goal of the comparison was to identify “nutrient concentration hotspots” within the Caloosahatchee Basin. Darren emphasized that the comparison was on concentrations not loads. To determine the loads need to know the flow and flow is not typically measured at the monitoring sites. See Handout.

6. Public Comment

None

7. Closing Remarks / Next Meeting

The next meeting is scheduled for March 19, 2008 at 1:30 p.m. at the Lower West Coast Service Center. We look forward to seeing you then, if not sooner. We extend our thanks to the team members, their respective agencies and the interested and affected citizens who attend these meetings for helping to advance this planning effort.

MM#	Project Feature/ Activity Alt 1	Level	Notes
CRE10	Water Quality Treatment Area - Constructed Wetland/STA (@Boma property) - <i>SWFFS WQ – W28</i>	3	Janet to add detail. Moved to level 3
CRE 12	Christmas Canal Stormwater Treatment Area	3	Clyde will provide update
CRE 18	Harns Marsh Improvements, Phase I Construction - ECWCD	1	is this baseline? Is it under construction?
CRE 19	Harns Marsh Improvements, Phase II Final Design - ECWCD	2	
CRE 20	Yellowtail Structure Construction - ECWCD	2	Combine with CRE 39
CRE 30	Aquifer Benefit and Storage for Orange River Basin (ABSORB) - ECWCD	2	
CRE 44	Spanish Creek Four Corners Environmental Restoration	3	Include CRE 42 & 43. Phase 1-3
CRE 45	Billy Creel Filter Marsh Phase I & II	2	Combine CRE 45, 46, 47
CRE 48	Manuel's Branch Silt Reduction Structure	2	
CRE 49	Manuel's Branch East and West Weirs	2	
CRE 53	Caloosahatchee Creeks Preserve Hydrological Restoration	2	update from Stormwater
CRE 57	Powell Creek Algal Turf Scrubber	3	
CRE 59	N Ft Myers Surface Water Restoration Project	1	
CRE 64	Yellow Fever Creek/Gator Slough Transfer Facility (#208509)	1	Add CRE 67

Potential MM

CRE 1	Recyclable Water Containment Areas (RWCA) in the Freshwater Caloosahatchee Southeast sub-basin	4	combine with CRE 93
CRE 2	Centralized Recycled Water Containment Area in the S-4 Basin	5	include CRE 115
CRE 3	Lake Hicpochee	5	
CRE 5	Water Quality Treatment Area - Constructed Wetland/STA – Lake Hicpochee vicinity (C-19 canal) @ Duda property Northwest of L. Hicpochee - <i>SWFFS WQ – W47</i>	3	
CRE 6	Lake Hicpochee restoration - <i>SWFFS WQ – W50-52</i>	4	
CRE 7	Hicpochee Restoration -STAs and Filter Marsh	4	
CRE 8	Lake Hicpochee storage/flowway/ treatment feature	3	
CRE11	Water Quality Treatment Area - Constructed Wetland/STA - Caloosahatchee Ecoscape - <i>SWFFS WQ – W38(1)</i>	4	
CRE 13	Water Quality Treatment Area - Constructed Wetland/STA @ C-43 West Basin Storage Reservoir - <i>SWFFS WQ – W38(2)</i>	4	
CRE 14	Filter Marsh (STA) for C-43 Reservoir	5	
CRE 16	Water Quality Treatment Area - @ Hunt Club - <i>SWFFS WQ - W38 (3)</i>	4	renamed - deleted Constructed Wetland/STA
CRE 21	Hendry County Storage	4	renumber with Suffix A-D

CRE 22	Hendry Extension Canal Widening (Construction) - ECWCD	2	renumber Phase 1 as 22A and Phase 2 as 22B - adding
CRE 29	" New" Hickey Creek - Lehigh Acres Stormwater Retrofits - SWFFS WQ -	3	Combine with Hickey Creek projects
CRE 32	Orange River Algal Turf Scrubber	5	WQ feature - include CRE 117
CRE 34	Caloosahatchee Tidal Creeks - Mouth of Orange River	4	use this as start for Generic Creek Outfall MM
CRE 35	Lehigh Acres Centralized Wastewater Treatment and Re-use (Orange River sub-basin Tidal Caloosahatchee) SWFFS WQ -w44 Dog Canal - Hendry Canal Connection (Final Design and Construction)	4	see Hickey Creek CRE 28
CRE 36		3	expand how it would benefit or tie together with other MM
CRE 55	Powell Creek Filter Marsh (Project #8584)	1	more details
CRE 58	Kickapoo Creek Stormwater System Analysis	3	
CRE 62	Popash Creek Preserve (Project #8593)	1	greater clarification needed. Use as base for CRE 34 - G
CRE 66	Gator Sough Phase 1 (Project #3060)	1	
CRE 69	Cape Coral Stormwater Improvements	2	more info -
CRE 70	Cape Coral Spreader Canals Restoration - SWFFS WQ - W100 North Cape Coral - Water Control Treatment Area- - - SWFFS WQ	3	include CRE 68 & CRE 76
CRE 75	W97	4	get more info and combine with other MM
CRE 77	Cape Coral - Canal Stormwater Recovery and Treatment by ASR	1	Good idea - get more info
CRE 78	Cape Coral Canal Weir System SWFFS WQ - W101	4	include CRE 79
CRE 80	Cape Coral Utility Expansion program	1	more information - include suffix's for Phases - map - data
CRE 81	Florida Yards and Neighbors - Cape Coral	1	Rolled into Urban Benefits MM
CRE 82	Financial incentives to small governments to eliminate small wastewater treatment plants	3	list specific plants with suffix - A-? Can we have a generic work with DEP and extend to Hendry and Glades County
CRE 87	Marine Sanitation Initiative (Project #2904)	1	
CRE 88	Sewer System infiltration/Inflow Improvements	2	
CRE 89	Bayous Collection System Evaluation	3	LWCSC project need more details
CRE 90	Sanibel Centralized Sanitary Sewer Expansion	1	
CRE 93	RWCA's Agricultural Suite (SWFFS WQ- W30,33,36,42,54,57,60,63, new freshwater Okeechobee,82,86,91,108)	4	break down by sub-basins and add Suffix A-? Fold into C
CRE 94	HWCA's (Harvestable Water Containment area) Ag Suite	4	
CRE 95	Modified Water Retention Ag Suite	4	
CRE 95A	Tailwater Recovery	4	give new number - now CRE 122
CRE 114	Urban Suite (SWFFS WQ - W66,71,77,85,90,98	4	Same as CRE-LO 13
CRE 118	North Fort Myers Surface Water Restoration Powell Creek - #8533	2	see CRE 57
CRE 121	City of LaBelle Stormwater Quality Improvements	3	

Deleted or Combined MM

CRE 4	lake Hicpochee Restoration -STAs and Filter Marsh Concept	2	5	combine with CRE 08
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CRE 5/30/2008

Recyclable Water Containment Areas (RWCA) in the Freshwater		
CRE-9	Caloosahatchee Southeast sub-basin	4 duplicate
CRE-15	Filter Marsh (STA) for C-43 Reservoir	Duplicate
CRE-17	East Lee County Aquifer Recharge Program (Proj 8515 - FY 1995-1996)	1 out
CRE-23	Carlos Waterway Conveyance for WQ in C-43	4 could become part of CRE 13 as WQTA next to C-43.
CRE-24	Bedman Creek Corridor Restoration	4 combine as part of generic BMP for creeks/outfalls
CRE-25	Hickey Creek Cypress Swamp	4
CRE-26	Hickey Creek Cypress Swamp	Duplicate out
CRE-27	Hickey Creek Headwater Restoration	4 combine as part of CRE 34 -Generic BMP for creeks/outf
CRE-28	Lehigh Acres Centralized Wastewater Treatment and Re-use (Hickey Creek Sub-basin Freshwater Caloosahatchee) SWFFS WQ -w44	3 Combine with CRE 35 and add suffix A-?
CRE-31	Expansion of Harn's March - Orange River sub-basin - SWFFS WQ - W65	4 Combine with CRE 37
CRE-33	Orange River Outfall (403134)	1 Carter property outfall- water needs to go through Hickey
CRE-37	West Marsh Property (Final Design and & Construction)	3 combine with CRE 18
CRE-38	Jacks Branch Stream Restoration	4 combine as part of CRE 34 -Generic BMP for creeks/outf
CRE-39	Yellowtail Structure Retrofit Construction - ECWCD	2 Combine with CRE 20
CRE-40	Stroud Creek Improvements (Project #8530)	1 combine as part of CRE 34 -Generic BMP for creeks/outf
CRE-41	Stroud Creek Restoration (Project #8585)	1 combine as part of CRE 34 -Generic BMP for creeks/outf
CRE-42	Water Quality Treatment Are - Constructed Wetland/STA - "Four Corners" area SWFFS WQ - W62	4 Combine with CRE 44
CRE-43	Spanish Creek Restoration (Project #8538)	1 Combine with CRE 44
CRE-46	Billy Creek Filter Marsh, Phase 1	1
CRE-47	Ford Filter Canal	2
CRE-50	Alameda Canal (Project #0761)	1 combine as part of CRE 34 -Generic BMP for creeks/outf
CRE-51	Poling Lane Drainage (Project #8556)	1 combine as part of CRE 34 -Generic BMP for creeks/outf
CRE-52	Daughtrey's Creek Improvements (Project # 8524)	1 combine as part of CRE 34 -Generic BMP for creeks/outf
CRE-54	Bayshore Creek Improvements (Project #8520)	1 combine as part of CRE 34 -Generic BMP for creeks/outf
CRE-56	Powell Creek Clean & Snag Program (Project #3042)	1 LWCS project need more details
CRE-60	Popash Creek Culvert Replacement (Project # 8508)	1
CRE-61	Popash Creek Culvert Replacement (Project # 8508)	Duplicate
CRE-63	Popash Creek Preserve (Project #8593)	Duplicate
CRE-65	Yellow Fever Creek (E. Branch) Structure Replacements (Project #8510)	1 combine as part of CRE 34 -Generic BMP for creeks/outf
CRE-67	Yellow Fever Creek and Gator Sough Interconnect - Lee County	1 Combined with CRE 64
CRE-68	Spreader Canal Restoration - Cape Coral	3 Combine with CRE 70
CRE-71	Cohn Branch Channel Improvements (Project #8522)	1 combine as part of CRE 34 -Generic BMP for creeks/outf
CRE-72	Chapel branch Improvements (Project #8521)	1 combine as part of CRE 34 -Generic BMP for creeks/outf
CRE-73	March Point Improvements (Project #8526)	1 combine as part of CRE 34 -Generic BMP for creeks/outf
CRE-74	Hancock Bridge parkway Flood Control (Project #8504)	1 combine as part of CRE 34 -Generic BMP for creeks/outf

CRE-76	Spreader Canal Restoration - Cape Coral	1	combined into CRE 70
CRE-79	Weirs Systems in Canals in Cape Coral	1	Combined with CRE 78
CRE-83	Caloosahatchee Tributary Maintenance (project # 8581)	1	combine as part of CRE 34 -Generic BMP for creeks/outf
CRE-84	Caloosahatchee SII for TMDL compliance (Project #8588)	1	planning project - does not meet objectives
CRE-85	Surface Water Management Plan (project #200983)	1	planning project - does not meet objectives
CRE-86	Neighborhood Improvement Program (project #8514)	1	combine as part of CRE 34 -Generic BMP for creeks/outf
CRE-94	Sewer System Expansion, Phase IV	1	does not meet objective
CRE-92	Ft Myers Beach Stormwater Management Study	2	planning project - does not meet objectives
CRE-96	Billy Creek Restoration	5	CRE 45
CRE-97	Caloosahatchee Creeks Preserve Hydrological Restoration	5	combine as part of CRE 34 -Generic BMP for creeks/outf
CRE-98	Caloosahatchee Oxbows	5	
CRE-99	City Golf Course Filter Marsh	5	CRE 48 & 49
CRE-100	Ding Darling Impoundments	5	does not meet objective
CRE-101	Hancock Creek Riverine Corridor	5	combine as part of CRE 34 -Generic BMP for creeks/outf
CRE-102	Manatee island Complex	5	does not meet objective
CRE-103	Manuel's Branch	5	CRE 48 & 49
CRE-104	Matlacha Buffer	5	combine as part of CRE 34 -Generic BMP for creeks/outf
CRE-105	Orange River	5	CRE 33
CRE-106	Pine Island Buffer	5	does not meet objective
CRE-107	Prairie Pine Preserves/ Caloosahatchee Headwaters	5	does not meet objective
CRE-108	Punta Russa	5	does not meet objective
CRE-109	Sanibel Wetland Complex	5	does not meet objective
CRE-110	Sound Island Network	5	does not meet objective
CRE-111	Tidal Caloosahatchee Buffer	5	insufficient information
CRE-112	Yellow Fever Creek Headwaters	5	CRE 67
CRE-113	Yucca Pens	5	insufficient information
	Recyclable Water Containment Areas (RWCA) in the S-4 sub-basin		
CRE-115	(Freshwater Caloosahatchee Okeechobee)		Combine with CRE 02
	Riparian Buffers (SWFFS WQ -		
CRE-116	31,64,37,40,45,49,55,58,61,64,67,75,78,83,88,93,96,99	4	include in base for CRE 34 Generic BMP for creeks/outfa
	Water Quality Treatment Area - Algal Turf Scrubber Facility - Orange		
CRE-117	River sub-basin (Bob's Triangle Marsh)	4	Include in CRE 32
CRE-119	Kickapoo Creek Stormwater System Improvements	1	see CRE 58
CRE-120	Public Education Program for Fertilizer & Landscape BMP	3	include under CRE LO 02

CRWPP

LO-CRE MM

February 20, 2008

CRE-LO 01-02-49
Northern Everglades- Potential Management Measure

Project Feature/Activity: Agricultural BMPs

Level: 1

General Description/Background: Since 2002, considerable effort has been expended on the implementation of agricultural BMPs and water-quality improvement projects to immediately reduce the discharge of P from the watershed to the lake. Agricultural Nutrient Management Plans (AgNMPs) for the 22 active dairies in the watershed were completed in 2002, covering more than 31,000 acres (12,545 ha). Detailed planning, engineering, and design for implementing the stormwater component of the AgNMPs, at four of the dairies, will be completed by June 2007. Implementation of all of the dairy AgNMPs is expected to be completed by FY 2015.

Completed conservation plans now cover approximately 474,200 acres (191,902 ha) in the watershed, and BMPs are in various stages of implementation. The majority of this acreage lies within the four priority basins. Plans are being developed for an additional approximately 600,000 acres (242,811 ha) of agricultural operations. These figures reveal that more than half of the agricultural acreage in the entire watershed is currently under voluntary FDACS programs to plan and implement practices to control offsite movement of P. At the current rate of participation, FDACS is on schedule to complete BMP-based plans for the remainder of the agricultural acreage in the watershed by July 2010, and fully implement BMPs by 2015, as required by the Lake Okeechobee Protection Plan.

Purpose: Improve water quality by reducing transport of nutrients (primarily phosphorus) via runoff and leaching into regional system from agricultural and non-agricultural land uses

Location/Size/Capacity: Primarily within Lake Okeechobee watershed; expanding into estuary watersheds

Initiative Status:

Agricultural- underway; need update from FDACS

Urban- underway; need update from FDEP

Estimate of Water Quality Benefits

- Minimum: 72 mt/yr
- Maximum: 72 mt/yr
- Most Likely: 72 mt/yr
- Level of Certainty: Conceptual
- Assumptions: Water quality benefits will be rolled up into a single “urban” category

Estimate of Water Quantity Benefits

- Minimum: Unknown
- Maximum: Unknown
- Most Likely: Unknown
- Level of Certainty: Unknown
- Assumptions: NA

Screening Criteria

- Proof of Concept: 1
- Other Impacts: 0

Contact: Rich Budell; FDACS; 850-488-6249.

Northern Everglades- Potential Management Measure

Project Feature/Activity: Urban Turf Fertilizer Rule (LOER)

Level: 1

General Description/Background: FDACS has prepared draft rule language regulating the content of phosphorus and nitrogen in urban turf fertilizers. The rule will apply statewide and uses FDACS fertilizer labeling authority to regulate the distribution and sale of fertilizer products for urban turf. Rule requires fertilizer bags to have clearer labeling and warning statement regarding overuse/transport into waterways. Most, if not all, fertilizers will have to be rebagged with larger application area, otherwise they will have to reformulate. Use directions on label must be consistent with the application rates identified below.

- Total Phosphorus
 - No more than 0.25 lb total phosphorus per application
 - No more than 0.5 lb total phosphorus per year
 - **Note:** I have requested and FDACS is working on providing an estimate of percent phosphorus reduction which would result from these app rates (similar to that provided for nitrogen below).
- Nitrogen
 - No more than 0.7 lbs soluble nitrogen per application
 - 2-6 lbs nitrogen applied per year (depending on turf type and location)
 - **Note:** There has been much debate about the nitrogen application rate. Some research supports levels as low as 0.5 lbs per application. FDACS noticed a draft rule with 0.5 lbs per application; however their ability to defend that position is questionable. FDEP is funding ongoing IFAS research which should provide definitive answers to this question. In the meantime, FDACS is considering moving forward with the rule with 0.7 lbs per application limit. This would result in approximately a 25 percent reduction of nitrogen throughout the State. FDACS proposes revisiting this limit and potentially revising the rule once the FDEP-funded IFAS research has concluded.

Purpose: Improve water quality by reducing phosphorus and nitrogen runoff and leaching resulting from application of fertilizers to urban turf.

Location/Size/Capacity: Statewide within urban settings.

Initiative Status: Several rule workshops have already been conducted. Will be noticing revised rule language and proceeding with rulemaking. Anticipate rule adoption in summer/fall 2007.

Cost: Not applicable

Documentation: For more information, please see draft Rule Language, PowerPoint presentations, and meeting summaries

Estimate of Water Quality Benefits

- Minimum: Urban Rollup
- Maximum: Urban Rollup
- Most Likely: Urban Rollup

- Level of Certainty: Conceptual
- Assumptions: Water quality benefits will be rolled up into a single “urban” category

Estimate of Water Quantity Benefits

- Minimum: NA
- Maximum: NA
- Most Likely: NA
- Level of Certainty: Final
- Assumptions: NA

Screening Criteria

- Proof of Concept: NA
- Other Impacts: NA

Contact: Rich Budell; FDACS; 850-488-6249

Northern Everglades Potential Management Measures

Project Feature/Activity: Land Application of Residuals

Level: 1

General Description/Background: Subsection 373.4595(3)(c)6. of the LOPA a. requires an affirmative demonstration that domestic wastewater residuals will not add to phosphorus loadings in Lake Okeechobee or its tributaries prior to authorization of disposal. LOPA further specifies that the demonstration will be based on achieving a net balance between phosphorus imports & exports on the permitted application site.

Purpose: Quantify TP reduction benefits resulting from implementation of LOPA requirement for residual applications.

Location/Size/Capacity: Basin wide

Initiative Status: Not initiated

Cost: To be determined (TBD)

Estimate of Water Quality Benefits

- Minimum: Urban Rollup
- Maximum: Urban Rollup
- Most Likely: Urban Rollup
- Level of Certainty: Conceptual
- Assumptions: NA

Estimate of Water Quantity Benefits

- Minimum: NA
- Maximum: NA
- Most Likely: NA
- Level of Certainty: Final
- Assumptions: NA

Screening Criteria

- Proof of Concept: NA
- Other Impacts: NA

Contact: Maurice Barker; FDEP; 850-245-8614

Northern Everglades Potential Management Measures

Project Feature/Activity: Florida Yards & Neighborhoods

Level: 1

General Description/Background: The Florida Yards & Neighborhoods program is an excellent example of a nonstructural program that is helping to minimize the use of pesticides, fertilizers, and irrigation water by educating citizens and builders about proper landscape design. This promotes “right plant-right place” and minimizes the amount of fertilizer, pesticide, and irrigation needed for a successful landscape. FDEP has an ongoing monitoring program to determine the effectiveness of this program in reducing nutrient loads.

Purpose: Reduce the use of nutrients and pesticides, and irrigation, thereby reducing nutrient loading and reducing water use.

Location/Size/Capacity: Statewide

Initiative Status: On-going

Cost: TBD

Documentation: For more information, please see

Estimate of Water Quality Benefits

- Minimum: Urban Rollup
- Maximum: Urban Rollup
- Most Likely: Urban Rollup
- Level of Certainty: Conceptual
- Assumptions: Projected benefits will roll up under urban category

Estimate of Water Quantity Benefits

- Minimum: Unknown
- Maximum: Unknown
- Most Likely: Unknown
- Level of Certainty: Unknown
- Assumptions: NA

Screening Criteria

- Proof of Concept: NA
- Other Impacts: NA

Contact: Michael Scheinkman, FDEP Environmental Specialist - Clean Lakes program, lake management. Florida Yards and Neighborhoods. Phone 850-267-2075
Eric Livingston, FDEP, on monitoring project for FYN

Northern Everglades Potential Management Measures

Project Feature/Activity: NPDES Stormwater Program

Level: 1

General Description/Background: In 1987, the Federal Clean Water Act was amended requiring the U.S. Environmental Protection Agency (EPA) to develop rules to implement the federal National Pollutant Discharge Elimination System (NPDES) stormwater permitting program. Phase I, promulgated in 1990, addresses the following sources:

"Large" and "medium" **municipal separate storm sewer** systems (MS4s) located in incorporated places and counties with populations of 100,000 or more, and eleven categories of **industrial activity**, one of which is large **construction activity** that disturbs 5 or more acres of land.

Phase II, promulgated in 1999, addresses additional sources, including MS4s not regulated under Phase I, and small construction activity disturbing between 1 and 5 acres.

In October 2000, EPA authorized the Florida Department of Environmental Protection (DEP) to implement the NPDES stormwater permitting program in the State of Florida (in all areas except Indian Country lands). FDEP's authority to administer the NPDES program is set forth in [Section 403.0885, Florida Statutes \(F.S.\)](#).

Important note: The NPDES stormwater permitting program is separate from the State's stormwater/environmental resource permitting programs (found under [Part IV, Chapter 373, F.S.](#) (593KB) and [Chapter 62-25, F.A.C.](#) and local stormwater/water quality programs, which have their own regulations and permitting requirements.

Purpose: To reduce stormwater pollutant loads discharged to surface waters, especially from existing land uses and drainage systems. This is especially true for the master drainage systems owned and operated by cities, counties, FDOT, and Chapter 298 water control districts. Also can help to reduce stormwater pollutant loads from existing industrial sites and from new construction sites.

Location/Size/Capacity: Basin wide

Initiative Status: Being implemented by FDEP

Cost: TBD

Documentation: For more information, please see:
<http://www.dep.state.fl.us/water/stormwater/npdes/index.htm>

Estimate of Water Quality Benefits

- Minimum: Urban Rollup
- Maximum: Urban Rollup
- Most Likely: Urban Rollup
- Level of Certainty: Conceptual
- Assumptions: Projected benefits will roll up under urban category

Estimate of Water Quantity Benefits

- Minimum: Unknown
- Maximum: Unknown
- Most Likely: Unknown
- Level of Certainty: Conceptual
- Assumptions: Depends if infiltration BMPs or stormwater reuse is done; Projected benefits will roll up under urban category

Screening Criteria

- Proof of Concept: NA
- Other Impacts: NA

Contact: Steven Kelly, Program Administration, NPDES Stormwater Section, Tallahassee, 850-245-7518

Northern Everglades – Potential Management Measure

Project Feature/Activity: Coastal and Estuarine Land Conservation Program

Level: 1

General Description/Background: The Coastal and Estuarine Land Conservation Program (CELCP) was established in 2002. The Federal Office of Ocean and Coastal Resource Management (OCRM) will administer the program which provides up to \$3 million dollars for each eligible project. CELCP federal funds will be provided for eligible activities related to state planning, program administration and project acquisition. Any project approved through the program must provide non-federal matching dollars.

Purpose: Protecting important coastal and estuarine areas that have significant conservation, recreation, ecological, historical, or aesthetic values, or that are threatened by conversion from their natural or recreational state to other uses” (CELCP Final Guidelines, 2003).

Location/size/capacity: Statewide

Initiative Status: On-going

Cost: \$3 million dollars for each eligible project.

Documentation: For more information, please see: <http://coastalmanagement.noaa.gov/land/welcome.html>

Estimate of Water Quality Benefits

- Minimum: Unknown
- Maximum: Unknown
- Most Likely: Unknown
- Level of Certainty: Unknown
- Assumptions: NA

Estimate of Water Quantity Benefits

- Minimum: Incidental
- Maximum: Incidental
- Most Likely: Incidental
- Level of Certainty: Unknown
- Assumptions: NA

Screening Criteria

- Proof of Concept: NA
- Other Impacts: NA

Contact: W. Kennedy; FDEP; 561-681-6706

Northern Everglades – Potential Management Measure

Project Feature/Activity: Alternative Water Storage (LOER) – Brighton Reservoir

Level: 2

General Description/Background: The 2005 Lake Okeechobee Estuary and Recovery (LOER) action plan was developed to help restore the ecological health of Lake Okeechobee and adjoining estuaries, through a series of fast-track water quality improvement projects and several other far-reaching and innovative components. Among these additional components is an initiative to identify options for storage and/or disposal of excess surface water to aid in reducing lake levels and high discharge volumes to the estuaries. Assessments of available public and tribal lands for storage of excess surface water have been completed for the watershed, with assessments continuously ongoing for private lands. Eight water storage/disposal projects have been completed including Lykes Basinger Grove, Phase II Indiantown Citrus Growers Association. Additional water storage projects are under way (i.e. Avon Park Air Force Range, Kissimmee Prairie Preserve State Park, etc.), with investigations and designs continuing for additional water storage projects with a goal of 450,000 ac-ft.

Purpose: To assess, plan, design, and construct water storage/disposal projects on public, private, and tribal lands.

Location/Size/Capacity: Brighton Reservoir

Initiative Status: Planning and design of a 500 acre excess stormwater storage and treatment area in the S71 Basin and Indian Prairie region of the Northern Everglades watershed. This project will provide additional water storage in the basin as well as phosphorus treatment.

Cost: Approximately \$450,000 design, estimated \$5,000,000 for construction.

Documentation:

Estimate of Water Quality Benefits

- Minimum: TBD
- Maximum: TBD
- Most Likely: 1.5 mt/yr
- Level of Certainty: 30 percent design
- Assumptions: Not determined

Estimate of Water Quantity Benefits

- Minimum: 500 ac-ft
- Maximum: 2,000 ac-ft
- Most Likely: 1,300 ac-ft
- Level of Certainty: Conceptual
- Assumptions: Not determined

Screening Criteria:

- Proof of Concept: 1
- Other Impacts: 1

Contact: Benita Whalen; SFWMD; 863-462-5260

Northern Everglades – Potential Management Measure

Project Feature/Activity: Alternative Water Storage (LOER) – Barron Water Control District (BWCD)

Level: 1

General Description/Background: The 2005 Lake Okeechobee Estuary and Recovery (LOER) action plan was developed to help restore the ecological health of Lake Okeechobee and adjoining estuaries, through a series of fast-track water quality improvement projects and several other far-reaching and innovative components. Among these additional components is an initiative to identify options for storage and/or disposal of excess surface water to aid in reducing lake levels and high discharge volumes to the estuaries. Assessments of available public and tribal lands for storage of excess surface water have been completed for the watershed, with assessments continuously ongoing for private lands. Eight water storage/disposal projects have been completed including Lykes Basinger Grove, Phase II Indiantown Citrus Growers Association. Additional water storage projects are under way (i.e. Avon Park Air Force Range, Kissimmee Prairie Preserve State Park, etc.), with investigations and designs continuing for additional water storage projects with a goal of 450,000 ac-ft.

Purpose: To assess, plan, design, and construct water storage/disposal projects on public, private, and tribal lands.

Location/Size/Capacity: BWCD is constructing a water storage project within its system which includes the construction of two weirs in an existing canal to retain more water within the BWCD canal system. Excess water in the Caloosahatchee River due to Lake Okeechobee regulatory regional releases will be pumped into BWCD for disposal when conditions support additional capacity. Retention within the existing ditch system and detention areas will result in water quality improvements and enable reuse by individual growers, thereby promoting water conservation and reducing the volume of discharge to the Caloosahatchee River.

Initiative Status: 5,000 ac-ft of water storage on 6,129 acres of project area

Cost: Total \$400,000 (District contributed \$200,000 and BWCD contributed \$200,000).

Estimate of Water Quality Benefits

- Minimum: Unknown
- Maximum: Unknown
- Most Likely: Unknown
- Level of Certainty: Unknown
- Assumptions: Not determined

Estimate of Water Quantity Benefits

- Minimum: 5,000 ac-ft
- Maximum: 5,000 ac-ft
- Most Likely: 5,000 ac-ft
- Level of Certainty: Final
- Assumptions: Not determined

Screening Criteria:

- Proof of Concept: 1
- Other Impacts: 1

Contact: Benita Whalen; SFWMD; 863-462-5260

Northern Everglades – Potential Management Measure

Project Feature/Activity: Alternative Water Storage (LOER) – Central County Water Control District Reservoir

Level: 3

General Description/Background: The 2005 Lake Okeechobee Estuary and Recovery (LOER) action plan was developed to help restore the ecological health of Lake Okeechobee and adjoining estuaries, through a series of fast-track water quality improvement projects and several other far-reaching and innovative components. Among these additional components is an initiative to identify options for storage and/or disposal of excess surface water to aid in reducing lake levels and high discharge volumes to the estuaries. Assessments of available public and tribal lands for storage of excess surface water have been completed for the watershed, with assessments continuously ongoing for private lands. Eight water storage/disposal projects have been completed including Lykes Basinger Grove, Phase II Indiantown Citrus Growers Association. Additional water storage projects are under way (i.e. Avon Park Air Force Range, Kissimmee Prairie Preserve State Park, etc.), with investigations and designs continuing for additional water storage projects with a goal of 450,000 ac-ft.

Purpose: To assess, plan, design, and construct water storage/disposal projects on public, private, and tribal lands.

Location/Size/Capacity: Construct and operate the CCWCD reservoir under a cooperative agreement between the South Florida Water Management District and CCWCD to provide both flood protection and excess water storage in the Caloosahatchee Basin. Currently there are conveyance facilities in place which hydraulically connect the CCWCD reservoir to the Caloosahatchee River.

Cost: Community Budget Issue Request by CCWCD for \$500,000 in 2008 and \$1,500,000 in 2009-2010.

Estimate of Water Quality Benefits

- Minimum: TBD
- Maximum: TBD
- Most Likely: TBD
- Level of Certainty: Conceptual
- Assumptions: TBD

Estimate of Water Quantity Benefits

- Minimum: TBD
- Maximum: TBD
- Most Likely: 4,800 ac-ft
- Level of Certainty: Conceptual
- Assumptions: System can be reevaluated and redesigned to handle additional storage.

Screening Criteria:

- Proof of Concept: 1
- Other Impacts: 1

Contact: Benita Whalen; SFWMD; 863-462-5260

Northern Everglades – Potential Management Measure

Project: Caloosahatchee River Watershed Works of the District Rule Regulatory Phosphorus Source Control Program

Description: To develop a phosphorus source control program for the Caloosahatchee River Watershed by amending Chapter 40E-61, F.A.C. Chapter 40E-61, F.A.C. the Lake Okeechobee Works of the District rule, which was developed in 1989 as a result of the Lake Okeechobee Surface Water Improvement and Management plan, limits the amount of phosphorus that can be discharged from parcels. Ongoing activities include revising Chapter 40E-61 to reflect the requirements of the Northern Everglades Protection Act and to expand the rule boundary to include the Caloosahatchee River Watershed as defined by the Northern Everglades Protection Act. A program for verifying and optimizing permitted BMPs will also be developed.

Purpose: To implement a phosphorus source control program utilizing best management practices for the Caloosahatchee River Watershed complementary to the Coordinating Agencies collective efforts.

Location/Size/Capacity: The location is the Caloosahatchee River Watershed as defined by the Northern Everglades Protection Act.

Initiative Status: The Governing Board has authorized staff to initiate rule amendments to Chapter 40E-61 to reflect recent changes in the legislation. Staff will need to obtain authorization to expand the program to the Caloosahatchee River Watershed. Rule amendments will incorporate permitting, monitoring and BMP implementation verification program.

Cost: FY08 \$891,986 (LOK program) Ad Valorem

Please add your additional information below and return with the original document:

Estimate of Water Quality Benefits:

- Minimum – TBD
- Maximum- TBD
- Most Likely- TBD
- Level of Certainty- conceptual/final/unknown - unknown
- Assumptions leading to benefit estimate- n/a (Based on experience in other predominately agricultural areas with phosphorus limited BMP programs, we might expect to accomplish a 25% load reduction when comparing pre and post BMP periods. Less reduction would be anticipated for urban areas.)

Estimate of Water Quantity Benefits:

- Minimum – Unknown
- Maximum- Unknown
- Most Likely- Some changes may result from implementation of water management BMPs, but not quantifiable at this time.
- Level of Certainty- conceptual/final/unknown - unknown
- Assumptions leading to benefit estimate- n/a

Project Feature/Activity: Lake Okeechobee Works of the District Regulatory Phosphorus Source Control Program

Level: 2

Keep in mind that these predicted percentages are what can be expected from *each* property implementing BMPs within an individual basin, which is impossible, from a resource perspective, to track at that level thus the reason for looking at land use area proportions. These estimates could be considered as the planning basis for quantifying the input load for other downstream water quality projects in the treatment train. New development will have to be looked at separately as added future benefit that is unpredictable assuming the ERP rule is adopted. These benefits will roll up under the urban category.

Estimate of Water Quantity Benefits

- Minimum: Unknown
- Maximum: Unknown
- Most Likely: Unknown
- Level of Certainty: Final
- Assumptions: NA

Screening Criteria

- Proof of Concept: 0
- Other Impacts: 0

Contact: Steffany Gornak; SFWMD; 561-682-6600

Northern Everglades – Potential Management Measure

Project Feature/Activity: Lake Okeechobee and Estuary Watershed Basin Rule (LOER)

Level: 3

General Description/Background: This management measure originated as a component of the Lake Okeechobee and Estuary Recovery (LOER) plan. The component was titled Environmental Resource Permit (ERP) Revisions. The intent is to develop specific supplemental permit criteria for new permitted projects to demonstrate that they will not cause or contribute to the impairment of the targeted water bodies by discharging lower phosphorus loads and runoff volume on an average annual basis.

Purpose: The purpose of this measure is to reduce phosphorus loads and total runoff volume from new development that discharge ultimately to Lake Okeechobee or the Caloosahatchee or St. Lucie estuaries.

Location/size/capacity: The basin rule would cover the Lake Okeechobee Watershed and the Caloosahatchee and St. Lucie Estuary Watersheds

Initiative Status: The District initiated the rule development process on February 8, 2006. Several workshops have been conducted to solicit input from stakeholders in the subject basins. The District is in the process of developing technical criteria and draft rule language necessary to conduct additional workshops. The original goal for requesting rule adoption from the Governing Board is December 2007.

Cost: TBD

Documentation: For more information, follow: <https://my.sfwmd.gov/portal/page> and choose the Lake Okeechobee and Estuary Watersheds Basin Rule PowerPoint.

Estimate of Water Quality Benefits

- Minimum: Unknown
- Maximum: Unknown
- Most Likely: Unknown
- Level of Certainty: Unknown
- Assumptions: Projected benefits will roll up under urban category

Estimate of Water Quantity Benefits

- Minimum: Unknown
- Maximum: Unknown
- Most Likely: Unknown
- Level of Certainty: Unknown
- Assumptions: NA

Screening Criteria

- Proof of Concept: 0
- Other Impacts: 0

Contact: Damon Meiers; SFWMD; 561-682-6876

Northern Everglades – Potential Management Measure

Project Feature/Activity: Lake Hicpochee

Level: 4

General Description/Background: The Lake Hicpochee Project is located on approximately 7500 acres which is currently in private ownership. This project comprises a reservoir and stormwater treatment area along the C-19 and C-43 Canals, degradation of berms, and exotic removal and control. This project could potentially create 55,090 ac-ft of above ground storage.

Purpose: The project objectives are to restore the ecological functioning of Lake Hicpochee. Some of the benefits that would be achieved are use of less water during the dry season due to altered operation of water levels which might involve higher water levels during the wet season and lower wet season and lower water levels during the dry season that currently occurs. Slowly drawing down the pool during the dry season would provide more water for the estuary during that time of year. Additional benefits include improved areas for potential recreation and public use, improvement of an already diverse area of wildlife, and improvement of lake fisheries.

Location/Size/Capacity: The project is located in Glades County, directly west of Lake Hicpochee on the west side of C-19 north of the Lake and along the Caloosahatchee River on the south side, west of the Lake. The project components include a reservoir and STA, degradation of berms, exotic plant removal, stormwater treatment areas, canals, embankments, structures, roads, and the temporary reconfiguration of TIWCD canals:

Initiative Status:

- Advance planning phase and associated field work TBD
- PIR/BODR TBD
- Preliminary Plans and specifications TBD
- Intermediate Design for the PS and Reservoir TBD
- Intermediate Design for the STA TBD
- Pre-final Design TBD

Cost: Not yet determined

Documentation: For more information, please see Evergladesplan.org, C-43 Basin Storage Reservoir Project

Estimate of Water Quality Benefits

- Minimum: Unknown
- Maximum: Unknown
- Most Likely: Unknown
- Level of Certainty: Unknown
- Assumptions: It is assumed that there will be some level of water quality treatment by simply holding water for a period of time before releasing in to the river. Level of treatment is unknown at this time.

Estimate of Water Quantity Benefits

- Minimum: 21,490 ac-ft of above ground storage (2,880 acres)
- Maximum: 55,090 ac-ft of above ground storage (7,500 acres)
- Most Likely: 21,490 ac-ft

- Level of Certainty: Conceptual
- Assumptions: Acquisition of approximately 7500 acres immediately adjacent to Lake Hicpochee.

Screening Criteria

- Proof of Concept: 0
- Other Impacts: 1

Contact: Janet Starnes; SFWMD; 239-338-2929 *7735

Northern Everglades – Potential Management Measure

Project Feature/Activity: C-43 Distributed Reservoirs

Level: 4

General Description/Background: The Caloosahatchee Water Management Plan and preliminary work on the Caloosahatchee.

Purpose: The project objectives are to capture excess run-off within the West Lake Okeechobee Watershed which will then be operated to achieve both environmental flows to the Caloosahatchee Estuary and agricultural demands in the West Lake Okeechobee Watershed (Lake Okeechobee Service Area [LOSA]).

Location/Size/Capacity: The reservoirs are located in Hendry and Glades counties. Between Lake Okeechobee and S-78 (Ortona Lock and Dam). The project components include up to 4 reservoirs with a total storage capacity of 85,410 ac-ft.

- Reservoir (up to
 - Acreage
 - Water Depth
 - Storage volume 85,410 ac-ft (total all reservoirs)
 - Embankment length
 - Pump Station

Initiative Status:

- | | |
|--|-----|
| • Advance planning phase and associated field work | TBD |
| • BODR | TBD |
| • Preliminary Plans and specifications | TBD |
| • Intermediate Design for the PS and Reservoir | TBD |
| • Intermediate Design for the STA | TBD |
| • Pre-final Design | TBD |

Cost: TBD

Estimate of Water Quality Benefits

- Minimum: TBD
- Maximum: TBD
- Most Likely: TBD
- Level of Certainty: Unknown
- Assumptions: TBD

Estimate of Water Quantity Benefits

- Minimum: TBD
- Maximum: TBD
- Most Likely: TBD
- Level of Certainty: Conceptual
- Assumptions: TBD

Screening Criteria

- Proof of Concept: NA
- Other Impacts: NA

Contact: Janet Starnes; SFWMD; 239-338-2929 *7735

Northern Everglades- Potential Management Measure

Project Feature/Activity: Compartmentalization of Lake Okeechobee

Level: 5

General description/Background:

Purpose: The idea is to partition the lake into one or two eastern storage compartments that maximize water storage and isolate poor inflow water quality, while managing the western littoral zone for maximum environmental benefits. Considering the magnitude of the high discharge problem, the current and growing land costs, and the rising economic impacts from damaging discharges to the estuaries, this idea may be the most cost-effective way of achieving massive storage capacity.

Location/size/capacity: Located inside the Herbert Hoover Dike and within the mud zone of Lake Okeechobee. Size to be determined but could exceed 2-3 million ac-ft depending on footprint and maximum depth. Cost/benefit analysis necessary to identify the most cost-effective geometry.

Initiative status: Conceptual. Initial hydrologic modeling was done as part of the 1999 Central and Southern Florida Project Comprehensive Review Study. Further feasibility-level analysis needed to quantify benefits, adverse impacts, and costs.

Cost : TBD; probably several billion dollars. Minimal real estate costs.

Documentation: Conceptual idea documented in two reports:

1. An Assessment of Water Resource Management in the Central and Southern Florida Flood Control District. A report prepared for the USACE by Atlantis Scientific in 1973.
2. Central and Southern Florida Project Comprehensive Review Study, Final Integrated Feasibility Report and Programmatic Environmental Impact Statement. USACE and SFWMD. April, 1999.

Estimate of Water Quality Benefits

- Minimum: Reduced sediment re-suspension impacts to Littoral Zone
- Maximum: Decreased P-load to Littoral Zone and estuaries.
- Most Likely: Better management of water levels in the Littoral Zone (promotes better plant growth and stability, light penetration, and reduces high water impacts). Eliminates environmental damage from high Lake O discharges.
- Level of Certainty: Promising. Has been modeled to estimate water quantity benefits to estuaries, Lake O littoral zone, and water supply. No water quality analysis yet.
- Assumptions: Wet years will continue and require more storage capacity to reduce damage to estuaries and the Lake ecosystem, and to reduce risk of failure of the HH Dike.

Estimate of Water Quantity Benefits

- Minimum: Amount of benefits depends on magnitude of storage capacity constructed. Benefits Lake littoral zone, estuary ecology, flood protection for Herbert Hoover Dike, and water supply.
- Maximum: Amount of benefits depends on magnitude of storage capacity constructed. Could eliminate Lake O high discharge impacts to the Estuaries and provide optimal water level management for the Lake O littoral zone.
- Most Likely: Significant reduction in Lake O high discharges to the Estuaries, better management of water levels in the Lake O littoral zone, improved water supply capability for the region, including environmental water supplies for the Everglades and Estuaries.

- Level of Certainty: High. The construction technology exists and similar efforts have been done. For example, in the early 1930's the Netherlands built the 20-mile long Afluitskijk, an earthen dam which separated a salt water inlet of the North Sea and turned it into the fresh water lake of the IJsselmeer
- Assumptions: Wet years will continue and require more storage capacity to reduce damage to estuaries and the Lake ecosystem, and to reduce risk of failure of the Herbert Hoover Dike.

Screening Criteria

- Proof of Concept: Screening-level hydrologic modeling shows the in-lake storage concept performs similar to the north-of-the-lake storage.
- Other Impacts: Need to be evaluated through feasibility-level analysis. Lake circulation pattern changes need to be analyzed.

Contact: Cal Neidrauer, P.E., Chief Engineer, Operations Department, SFWMD.

Northern Everglades- Potential Management Measure

Project Feature/Activity: Wastewater & Stormwater Master Plans

Level: 4

General Description/Background: Initiative to work with entities (e.g. Cities and Counties) in the Lake Okeechobee basin responsible for wastewater & stormwater programs. Work with those entities to review existing wastewater & stormwater Master Plans to identify planned or possible projects that will provide additional phosphorus reductions that could be implemented in the service area.

Purpose: Implement urban stormwater retrofitting projects or wastewater projects to achieve additional phosphorus reductions and water storage.

Location: Basinwide

Initiative Status: Not initiated

Cost: TBD

Estimate of Water Quality Benefits

- Minimum: Urban Rollup
- Maximum: Urban Rollup
- Most Likely: Urban Rollup
- Level of Certainty: Unknown
- Assumptions: Projected benefits will roll up under urban category

Estimate of Water Quantity Benefits

- Minimum: Unknown
- Maximum: Unknown
- Most Likely: Unknown
- Level of Certainty: Unknown
- Assumptions: Projected benefits will roll up under urban category

Screening Criteria

- Proof of Concept:
- Other Impacts:

Contact: Frank Nearhoof; FDEP

Northern Everglades- Potential Management Measure

Project Feature/Activity: Unified Statewide Stormwater Rule

Level: 4

General Description/Background: Florida’s stormwater treatment rules are technology-based and rely upon BMP design criteria that are presumed to achieve a specified level of stormwater treatment. The rule’s original performance standard was “secondary treatment”, or 80 percent average annual load reduction of Total Suspended Solids (TSS). However, the minimum level of treatment in Chapter 62-40, F.A.C., is “80 percent average annual load reduction of pollutants that cause or contribute to violations of water quality standards”. Nutrients are the biggest source of water body impairment throughout the state and the Governor has directed FDEP to increase the level of stormwater nutrient treatment. Accordingly, FDEP and SFWMD staff are working on a statewide stormwater treatment rule that will be based on a performance standard of post-development nutrient loading does not exceed pre-development nutrient loading.

Purpose: To increase the level of nutrient treatment of stormwater from new development and thereby reduce the discharge of nutrients and excess stormwater volume.

Location: Basinwide

Initiative Status: Beginning July 07, Rule in effect January 09

Cost: TBD

Estimate of Water Quality Benefits

- Minimum: Unknown
- Maximum: Unknown
- Most Likely: Unknown
- Level of Certainty: Conceptual
- Assumptions: Rule will be adopted

Estimate of Water Quantity Benefits

- Minimum: Unknown
- Maximum: Unknown
- Most Likely: Unknown
- Level of Certainty: Conceptual
- Assumptions: Depends on how much infiltration and reuse is done

Screening Criteria

- Proof of Concept:
- Other Impacts:

Contact: Eric Livingston, FDEP, Tallahassee, 850/245-8430

Northern Everglades- Potential Management Measure

Project Feature/Activity: Comprehensive Planning – Land Development Regulations (LDR)

Level: 3

Description: Initiative to work with entities (e.g. Cities and Counties) in the Lake Okeechobee basin responsible for comprehensive planning and land development approvals. Work with those entities to review current comprehensive plans and associated land development regulations to assure that they promote low impact design and proper stormwater treatment.

Purpose: Implement low impact design measures in Okeechobee basin to achieve addition phosphorus reductions and water storage.

Location: Basin wide

Initiative Status: Not initiated

Cost: TBD

Estimate of Water Quality Benefits

- Minimum: Unknown
- Maximum: Unknown
- Most Likely: Unknown
- Level of Certainty: Unknown
- Assumptions: Assume LDRs are changed to promote LID

Estimate of Water Quantity Benefits

- Minimum: Unknown
- Maximum: Unknown
- Most Likely: Unknown
- Level of Certainty: Unknown
- Assumptions: Assume LDRs are changed to promote LID

Screening Criteria

- Proof of Concept:
- Other Impacts:

Contact: Eric Livingston; FDEP; 850/245-8430

Northern Everglades– Potential Management Measure

Project Feature/Activity: Local Initiatives

Level: 1

General Description/Background: The Northern Everglades Initiative directs the District and the Florida Department of Environmental Protection to plan, assess, and implement local initiatives, including efforts with local governments, to reduce phosphorus loads to Lake Okeechobee and provide additional water storage opportunities on the watershed. Currently these projects are either in the planning and assessment or implementation stages of development. There is a planned Okeechobee County road connection between Highway 70 and 78; roadside stormwater conveyance potential expansion to include S-154 basin runoff and routing to expanded Lemkin Creek project.

Planning and Assessment Projects:

- **Okeechobee City/County Stormwater Master Plan Update** – Assess, plan, and update a stormwater master plan to address short term and long term quality and quantity issues dealing with urban stormwater runoff. Plan will identify projects to be implemented. (Will Salters, x3029)
- **Okeechobee County East-West Stormwater Conveyance** – Plan, acquire and implement a stormwater conveyance system with retention and treatment components from east to west through the City of Okeechobee and Okeechobee County. Following water quality treatment and storage, the water will be conveyed into the District’s Lemkin Creek urban water storage and treatment facility before making its way into the Rim Canal and Lake Okeechobee. (Will Salters, x3029)
- **Moore Haven/Glades County Water and Stormwater Master Plan** – Assess, plan and develop a water supply and update a stormwater master plan to address short term and long term quality and quantity issues dealing with water supply and urban stormwater runoff. (Missie Barletto, x3006)
- **Okeechobee Utility Authority Water and Wastewater Master Plan** – Assess, plan, and develop a water and wastewater master plan for the Okeechobee Utility Authority service area with emphasis on prioritizing expansion of the wastewater gravity system (replacing septic systems) into high phosphorus source areas and alternative sources for drinking water supply. (Gary Ritter, x3017)
- **Highlands County Arbuckle Creek and Southern Lake Istokpoga Watershed Assessments** – Assess the stormwater management and floodplain restoration potential in the Southern Lake Istokpoga area to improve water quality and flood protection for homes, businesses, agriculture, and CR 621. Potential projects and a preliminary cost versus benefit analysis of proposed alternatives will also be developed. Additionally, an assessment will be conducted of the Arbuckle Creek area north of Lake Istokpoga for potential floodplain and wetland restoration projects. This assessment will provide an analysis of water quality and quantity improvements that can be attained through these projects and the potential flood protection benefits for downstream communities. A cost versus benefit analysis and discussion on potential land acquisition issues and recreational opportunities on project lands will also be included in this assessment. (Angela Hendrichsen-Sandoval, x 3008)
- **PL566** – Assess the possibilities, through modeling and evaluation, of maximizing water detention and nutrient (total phosphorous – TP) reduction in Taylor Creek through the rehabilitation of one or all of the three PL-566 structures in the main channel of Taylor Creek. The assessment will include a conceptual level cost versus relative benefit analysis for the integration with the current LOFT water storage and treatment reservoir in the process of being designed along Taylor Creek. (Gary Ritter, x3017)

Implementation Projects:

- **Taylor Creek Canals Sediment Removal** – Removal of sediment and vegetation from canals tributary to Taylor Creek in the Treasure Island and Taylor Creek Isles residential areas. The implementation of this project has resulted in the removal of residual phosphorus in the sediment and vegetation of these canals. (Gary Ritter, x3017)
- **Okeechobee City Sediment Trap Installation** – Installed two (2) sediment traps within the city of Okeechobee at specific locations identified by the city’s Comprehensive Stormwater Master Plan as good candidates for the removal of phosphorus-laden particulates and other constituents in runoff that otherwise would contribute to the load entering Lake Okeechobee.
- **Nubbin Slough East Flow Diversion** – Restoring the east main tributary flow conveyance to Nubbin Slough and, consequently, into the Nubbin Slough Stormwater Treatment Area (STA) for treatment; and to reduce flooding in adjacent residential areas. West main tributary flow restoration is identified in Okeechobee Stormwater Master Plan as future project.

Purpose: The purpose of these projects is to undertake local initiatives, including project work with local governments to assess, plan, design, and construct facilities to capture, store and treat stormwater runoff prior to entering Lake Okeechobee and subsequently being released to the estuaries.

Location/size/capacity:

Implementation Projects:

Okeechobee City and County – S133 Basin, Taylor Creek/Nubbin Slough Region

Initiative status:

- Taylor Creek Canals Sediment Removal – Level 1
- Okeechobee City Sediment Trap Installation – Level 1
- Nubbin Slough East Flow Diversion – Level 1

Cost:

- Taylor Creek Canals Sediment Removal – \$950,000 State, \$60,000 County. Total \$1,010,000.
- Okeechobee City Sediment Trap Installation - \$150,000 District; \$10,000 FDEP; \$15,000 City of Okeechobee. Total \$175,000.
- Nubbin Slough East Flow Diversion - \$370,889 District; \$37,089 Okeechobee County. Total \$407,978.

Estimate of Water Quality Benefits

- Taylor Creek Sediment Removal – 1 mt/yr, Conceptual
- Okeechobee City Sediment Trap Installation – Unknown, Unknown
- Nubbin Slough East Flow Diversion - Unknown, Unknown

Estimate of Water Quantity Benefits

- Taylor Creek Sediment Removal – Incidental, Unknown
- Okeechobee City Sediment Trap Installation – NA, Final
- Nubbin Slough East Flow Diversion – Incidental, Unknown

Screening Criteria

- Proof of Concept: 1
- Other Impacts: 1

Contact: Benita Whalen; SFWMD; 863-462-5260

Northern Everglades – Potential Management Measure

Project Feature/Activity: Clewiston STA

Level: 4

General Description/Background: The State of Florida (TIITF) currently owns a parcel of land along the southwestern boundary of Lake Okeechobee in Clewiston (see attached site map Parcel HH200-004). This land in both Hendry and Glades Counties is approximately 766 acres in size and is bordered by Lake Okeechobee on the north side and Canals C-21 and C-20 on the south side. The land is currently in a natural state although it is reportedly impacted by invasive plant species. The potential exists for this land to be used as a natural treatment area for water that is currently discharged to Lake Okeechobee.

Purpose: The purpose of this potential Management Measure is to convert existing State owned land into a Stormwater Treatment Area to treat storm water from the S4 Basin and surrounding area that is currently sent to either Lake Okeechobee (via Culvert 2, S-310 lock Structure and/or S4 Pump Station) or the Caloosahatchee River (via S-235).

Location/Size/Capacity: The land area is approximately 766 acres of which approximately 700 – 750 acres could be used as “treatment area” with the remaining area used for levees and other infrastructure. The current estimated average load is 6.87 mt/yr from the S-4 Basin. It is assumed that a percentage of this water could be routed through the proposed STA.

Initiative Status: Conceptual

Cost: To Be Determined – Note: Other efforts (public and private) in the immediate area could potentially provide funding for all or portions of this proposal. The two main efforts include the S-169 Relocation Study – General Reevaluation Report by the U.S. Army Corps of Engineers and a development proposal by a private developer in Clewiston.

Documentation: Lake Okeechobee Protection Plan Evaluation Report – February 23, 2007

Estimate of Water Quality Benefits

- Minimum: 0 mt/yr
- Maximum: 6.87 mt/yr
- Most Likely: 2.5 mt/yr
- Level of Certainty: Conceptual
- Assumptions: Flow rate = 40 cfs; Inflow P Concentration = 200 ppb; STA size = 750 acres; Outflow P Concentration = 130 ppb

Estimate of Water Quantity Benefits

- Minimum: 1,013 ac-ft
- Maximum: 1,013 ac-ft
- Most Likely: 1,013 ac-ft
- Level of Certainty: Conceptual
- Assumptions: STA storage volume based on 90 percent of footprint acreage X 1.5 ft standard operating depth

Screening Criteria

- Proof of Concept: 1

- Other Impacts: 1

Contact: Mike Voich, SFWMD, 681-2563 *3720

Northern Everglades- Potential Management Measure

Project Feature/Activity: Deep Well Injection

Level: 5

General description/Background: Construction of deep, high-capacity injection wells for water disposal. Wells would be constructed in “clusters” along canal right-of-ways.

Purpose: Disposal of water at selected locations in the watershed.

Location/size/capacity: C-43 at Berry Groves

Initiative status: Conceptual

Cost: TBD

Estimate of Water Quality Benefits

- Minimum: NA (Completely eliminates water (and nutrients) from the system)
- Maximum: NA
- Most Likely: NA
- Level of Certainty: Conceptual
- Assumptions: NA

Estimate of Water Quantity Benefits

- Minimum: NA (Completely eliminates water (and nutrients) from the system)
- Maximum: NA
- Most Likely: NA
- Level of Certainty: NA
- Assumptions: Conceptual

Screening Criteria

- Proof of Concept: 1
- Other Impacts: 0

Contact: : Bob Verrastro; SFWMD; 561-682-6139

Northern Everglades – Potential Management Measure

Project Feature/Activity: Florida Ranchlands Environmental Services Project (FRESP) – 4 Existing Pilots

Level: 1

General Description/Background: Launched in October 2005, the Florida Ranchlands Environmental Services Project (FRESP) will design a program in which ranchers in the Northern Everglades' sell environmental services of water retention, phosphorus load reduction and wetland habitat expansion to agencies of the state and other willing buyers.

These ranches can bring services on line quickly as compared to other options and will complement public investment in regional water storage and water treatment facilities. The sale of the services will be additional income for ranchers who face low profit margins and will provide an incentive against selling land for more intensive agriculture and urban development—land uses that will further aggravate water flow, pollution, and habitat problems.

FRESP is being implemented through collaboration between World Wildlife Fund (WWF), 8 participating ranchers, USDA's Natural Resources Conservation Service and state agencies – the Florida Department of Agriculture and Consumer Services, the South Florida Water Management District, and the Florida Department of Environmental Protection. Technical support is being provided by scientists from the MacArthur Agro-Ecology Research Center and the University of Florida. Funding from Federal, state and private sources exceeds \$5 mil for Phase One – pilot project implementation and program design.

Key Accomplishments

Developed procedures to compare different protocols for documenting environmental services from ranchlands. FRESP will field test different methods of using monitoring and modeling of hydrology, water and soil chemistry, and vegetation change to document the level of environmental services provided by ranch water management projects.

Completed the design, permitting and construction of water management projects on 4 ranches; additional water management projects will be implemented by four additional ranchers. Projects include rehydrating drained wetlands, water table management, and pumping water from a nearby canal through existing ranch wetlands and flowing back into the canal. Based on available information the 8 water management projects occupy some 8,500 acres not including drainage acres. A planning level estimate of the static water retention capacity of the eight projects is 8,260 ac-ft of water for a single storm event with the average ac-ft of storage per acre being 0.98 ft.

LEVEL 1 (Implemented or to be Implemented)

Four Ranchlands Environmental Services Pilot Projects (FRESPP) have been constructed with Alderman-Deloney Ranch (43 ac-ft of on-site water storage and treatment, 0.078 mt/yr, C-25), Williamson Cattle Company (150 ac-ft of on-site water storage, 0.09 mt/yr, S-191), Buck Island Ranch (967 ac-ft of on-site water storage and treatment, 0.37 mt/yr, C-41), and Lykes Bros., Inc. (5,000 ac-ft of regional water storage and treatment, 0.2 mt/yrC-40). Total \$1,000,000 (District contributed \$500,000 through Highlands Soil & Water Conservation District, FDACS \$500,000 through Okeechobee Soil & Water Conservation District). \$1,000,000 Conservation Innovation Grant is funding the monitoring and pay-for-performance program development.

Four additional Rancher Agreements for implementation of FRESPP have been developed with C. M. Payne & Son, Inc. (932 ac-ft of on-site water storage, Fisheating Creek) - total of \$298,489; Lightsey Cattle Company (135 ac-ft of on-site water storage, Fisheating Creek) - total of \$137,280; Syfrett Ranch West (140 ac-ft of regional water storage, C-41A) - total of \$183,500; and Rafter T Ranch (1,145 ac-ft of on-site water storage, Arbuckle Creek) - total of \$609,151. The District provided State Community Budget Issue Request (CBIR) funding which was specifically appropriated by the State through the CBIR process for additional pilot projects implementing water management alternatives to store and treat runoff on private lands.

Developing the design of a pay for services program. Essential program design questions—such as how to assure a dedicated, multiyear funding source to meet contract payment obligations; how to establish what prices that will be paid for services and how to integrate a new pay-for-services program with other state and federal programs will be addressed and answered through the deliberations of the collaboration team, in cooperation with multiple stakeholders and with state agency officials.

Watershed Static Water Retention Potential

Planning level estimates generated by the existing pilot projects were used to derive conservative estimates of potential static storage – maximum capacity to hold water from a single storm event. If FRESPP contracts covered only 15 percent of improved pasture acreage in the Northern Everglades, using the average ac-ft/acre estimate of the 8 existing FRESPP sites of 0.98, the potential storage estimate is 118,000 ac-ft of water (800,500 X 15 percent = 120,000 acres X 0.98 ac-ft / ac). If 15 percent of the unimproved pasture acreage is included the potential storage is 151,800 ac-ft (1,029,500 X 15 percent = 154,400 acres X 0.98 ac-ft / ac). Because these estimates are for a single storm event, they are conservative estimates of annual on-ranch water retention.

Location/Size/Capacity:

	Improved Pasture in LOPP Watershed	Acre-Ft Static Storage on Improved Pasture (0.98 ac- ft/ac)	Improved and Unimproved Pasture	Acre Ft Static Storage on Improved & Unimproved Pasture (0.98 ac-ft/ac)
Total Acres	800,464		1,029,509	
Assumptions re percent Acres in FRESPP for Different Land Use Combinations				
10%	80,046	78,706	102,951	101,226
15%	120,070	118,058	154,426	151,840
20%	160,093	157,411	205,902	202,453

Initiative Status: Developed procedures to compare different protocols for documenting environmental services from ranchlands. FRESPP will field test different methods of using monitoring and modeling of hydrology, water and soil chemistry, and vegetation change to document the level of environmental services provided by ranch water management projects.

Completed the design, permitting and construction of water management projects on 4 ranches; additional water management projects will be implemented by four additional ranchers. Projects include rehydrating drained wetlands, water table management, and pumping water from a nearby canal through existing ranch wetlands and flowing back into the canal. Based on available information the 8 water management projects occupy some 8,500 acres not including drainage acres. A planning level estimate of the static water retention

capacity of the eight projects is 8,260 ac-ft of water for a single storm event with the average ac-ft of storage per acre being 0.98 ft.

Developing the design of a pay for services program. Essential program design questions—such as how to assure a dedicated, multiyear funding source to meet contract payment obligations; how to establish what prices that will be paid for services and how to integrate a new pay-for-services program with other state and federal programs will be addressed and answered through the deliberations of the collaboration team, in cooperation with multiple stakeholders and with state agency officials.

Estimate of Water Quantity Benefits

- Minimum: TBD
- Maximum: TBD
- Most Likely: TBD
- Level of Certainty: conceptual/final/unknown
- Assumptions: Planning level estimates generated by the existing pilot projects were used to derive conservative estimates of potential static storage – maximum capacity to hold water from a single storm event. If FRESP contracts covered only 15 percent of improved pasture acreage in the Northern Everglades, using the average ac-ft/acre estimate of the 8 existing FRESP sites of 0.98, the potential storage estimate is 118,000 ac-ft of water ($800,500 \times 15 \text{ percent} = 120,000 \text{ acres} \times 0.98 \text{ ac-ft / ac}$). If 15 percent of the unimproved pasture acreage is included the potential storage is 151,800 ac-ft ($1,029,500 \times 15 \text{ percent} = 154,400 \text{ acres} \times 0.98 \text{ ac-ft / ac}$). Because these estimates are for a single storm event, they are conservative estimates of annual on-ranch water retention.

Contact: Benita Whalen; SFWMD; 863-462-5260

CRWPP

DRAFT ALT 1

CRE MM

Northern Everglades – Potential Management Measure

Project: Water Quality Treatment Area - Constructed Wetland – Water quality treatment (@Boma property) - SWFFS WQ – W28

Description: This project consists of a constructed wetland designed for optimal nitrogen removal from water diverted to the facility from the Caloosahatchee River and/or the Freshwater Caloosahatchee SouthEast sub-basin. The downstream estuary is generally limited by nitrogen, and therefore the treatment feature will be designed for optimal nitrogen removal. The assumption has been made that a feature targeting nitrogen removal will also successfully reduce concentrations of both phosphorus and suspended solids.

Purpose: The purpose of this project is to reduce nutrient concentrations within the Caloosahatchee River and nutrient pollutant loading to the downstream estuary. This feature, in conjunction with others within the basin, are designed to have the cumulative effect of reducing nutrient concentrations and loads significantly enough to meet water quality targets within the Caloosahatchee Estuary.

Note: This project is one of many developed by the SWFFS WQ sub-team to address the nutrient enrichment issues of the Caloosahatchee Basin. The strategy of this effort was to formulate both structural and non-structural features that, once implemented, will collectively lead to restoration through pollutant load reductions (primarily nutrients). The cumulative effect of these pollutant reductions are to achieve water quality targets set forth by the SWFFS WQ sub-team (based either on an ecological resource, historical conditions, or reference conditions).

Location/Size/Capacity:

- Sub-basin: Freshwater Caloosahatchee SouthEast
- Location: Boma Property (see BAT ID SLG04 – Long Hammock Slough)
- Size and Capacity: The facility will be sized in order to achieve maximum concentration and load reductions of nitrogen, under the constraints of property size, and other applicable constraints.

Initiative Status: Conceptual

Cost: TBD

Documentation: Southwest Florida Feasibility Study (SWFFS) Water Quality Sub-team: Water Quality Plan Formulation Document (work in progress)

Estimate of Water Quality Benefits:

- Nutrient load reduction to Caloosahatchee River and Estuary. The specific water quality benefits will be dependent upon the size of the feature, the effectiveness of the design and operation for removal of nitrogen (as well as other constituents), and on the concentration of pollutants in the inflow water to the feature (Caloosahatchee River and/or sub-basin runoff)
- Level of Certainty- Conceptual

- Assumptions leading to benefit estimate- Constructed wetlands have been shown to be effective phosphorus removal features. Applying methods/technologies to target nitrogen is assumed to be able to increase N removal efficiencies. This sub-basin has been determined to be an appropriate place for a water quality treatment feature due to its location within the basin.

Estimate of Water Quantity Benefits:

- Water quantity benefits may be achieved through the water storage capabilities of the feature (reducing peak flows or providing flows to downstream estuary depending upon season/conditions). Any potential water quantity benefits should be considered incidental because the feature's main purpose is water quality treatment and should be operated as such.
- Level of Certainty- Conceptual
- Assumptions leading to benefit estimate- It is assumed that the Caloosahatchee River and/or sub-basin sources will be able to adequately supply this feature with the water necessary for effective operation. It should be noted that during times of drought, competing water uses may have an impact on the operation of this feature and/or the water use of this feature may impact other water uses (e.g. MFL at S-79)

Level of Certainty: (select one)

Level 4- implementation certainty unknown; conceptual idea; may have rough order of magnitude cost and/or general basin location

Northern Everglades – Potential Management Measure

Project: Christmas Canal Water Quality Feature

Description: The SFWMD partnered with Hendry County to develop and implement a surface water master plan. The Christmas Canal basin, an area south of the LaBelle airport, east of SR 29, west of Canal 1 and north of Sears Road has experienced periodic flooding. The Airport Sears MSBU master plan identified the C43 west reservoir as a potential solution to the Christmas Canal basin flooding problem. Various alternatives were investigated and recently the District determined that it would not be possible for the reservoir to accept runoff from the Christmas Canal area at this time. This SOW modifies the existing agreement to authorize the evaluation of alternative solutions.

Purpose: The primary objective of this study is to identify a conveyance route to convey the runoff from the Christmas Canal basin of Hendry County and treatment site that could be utilized for the runoff.

Location/Size/Capacity: The consultant will coordinate design criteria (flow volumes for 5 year, 25 year, and 100 year storm events, and load reduction or treatment volume) with SFWMD and Hendry County Staff to meet all permit requirements. The Consultant will utilize the design criteria to first determine the volume of type of treatment Best Management Practice (BMP) that will be utilized, and second determine the proper size required to meet the criteria.

Initiative Status: *Preliminary Design*

Cost: \$10,000,000 - \$100,000,000

Estimate of Water Quality Benefits: --

- **Minimum –**
- **Maximum-**
- **Most Likely-**
- **Level of Certainty-** *conceptual*
- **Assumptions leading to benefit estimate-** Modeled values for flow and assume 20% reduction due to settling in the basin

Estimate of Water Quantity Benefits:

- **Minimum –** *15,000 ac/ft*
- **Maximum-** *37,000 ac/ft*
- **Most Likely-** *20,000 ac/ft*
- **Level of Certainty-** *conceptual*
- **Assumptions leading to benefit estimate-** *(Calculated using modeled flow rates and assumed BMP efficiency)*

Northern Everglades – Potential Management Measure

Project: *Harns Marsh Improvements, Phase I Construction - East County Water Control District*

Description: *Lehigh Acres is located within the service area of the East County Water Control District. East County Water Control District (ECWCD) was created on May 5, 1958. It encompasses over 63,000 acres of land and approximately 311 miles of canals. ECWCD is a political sub-division of the State of Florida and is funded through the collection of an acreage tax. ECWCD is requesting a state appropriation in the form of a member project. The Harns Marsh Restoration project is a result of a comprehensive hydrologic study of the area to identify problems and solutions. Harns Marsh is a 578-acre-flood detention facility within ECWCD boundaries.*

An analysis of the hydrology and hydraulics for the entire District was conducted to provide both the policy and decision makers with the necessary information to properly dedicate resources toward those critical water management facilities that have the greatest impact for the least cost.

The following problems and solutions were identified:

- *The control weir at the South Marsh will be rebuilt to accept flows at a lower elevation.*
- *The existing marsh inlet structures will be equipped with automated staff and rainfall gauges and drawdown gates.*
- *The drawdown gates will only be opened when large storms such as hurricanes are expected and will release water to provide additional flood protection. Normally, these gates will be closed to provide maximum dry season storage.*

Purpose: *Lowering the intake point for the South Marsh will expand the storage by 230 acres. This will provide a potential to store 1,450 acre-feet of water. Construction of a control weir at the outlet of Harns Marsh into the Orange River which will raise water levels in Harns Marsh; restrict flows from Harns Marsh; and lower peak flow discharge into the Orange River at least 20 percent for the 25- year-design storm.*

The control weirs in Able Canal which discharge into Harns Marsh will be repaired, modified, or replaced to allow flexible operation to provide maximum flood storage in the marsh. Separate wet and dry season control elevations will be maintained by ECWCD. A pump may also be added to lift water to the cypress head during dry periods. Higher water levels year round, due to these improvements, will provide the best management practices for the Marsh. Design and permitting is well under way for the first phase, which will include the replacement of the outlet structures (S-HM-2) and (S-HM-3) along with the addition of a controllable gate structure next to the existing inlet to the South Marsh structure (S-HM-1). The ECWCD is also working with the Lee County Parks and Recreation Department to allow limited, responsible civic groups access to enjoy the Marsh for recreational purposes.

Location/Size/Capacity: *Harns Marsh is located in Sections 10, 14, & 15, within Township 44S, Range 26E, Lee County, Florida. It is entirely within the boundaries of East County Water Control District located south of State Route 80 and east of Buckingham Road.*

Harns Marsh is a 578 acre flood detention facility. Lowering the intake point for the South Marsh will expand the storage by 230 acres. This will provide a potential to store 1,450 acre feet of water.

Initiative Status: *Modeling has been completed, preliminary design and planning has been completed and final design / permitting for phase 1 has been started and should be completed in early 2008. Final design / permitting for Phase 2 should be started in early 2008. Construction will follow contingent on availability of state legislative funding to match East County Water Control District funds.*

Cost: Total Estimated Project Cost for Phase I Construction: \$1,750,000.00

Requested Funding: \$875,000.00

Documentation:

Estimate of Water Quality Benefits:

- Minimum
- Maximum
- Most Likely
- Level of Certainty – conceptual/final/unknown
- Assumptions leading to benefit estimate-(e.g. for features- sub-watershed; period of record; inflow concentration/load; did you assume bmps were implemented or not) (e.g. for activities – location/sub-watershed where activity will apply; what does % reduction apply to which land uses, only new development, etc.)

The anticipated benefits to the Caloosahatchee River include:

- *Flood attenuation*
- *Water quality improvements*
- *Enhancement of existing wetlands*
- *Reduction of sediment and nutrient loading to the estuary*
- *Provide aquifer recharge*
- *Protect public health and safety*
- *Provide recreational opportunities*
- *Provide native wildlife habitat*
- *Provide native plant habitat free of exotic and invasive plants*

Estimate of Water Quantity Benefits:

- Minimum
- Maximum
- Most Likely
- Level of Certainty – conceptual/final/unknown
- Assumptions leading to benefit estimate- (e.g., sub-watershed; period of record; flow/volume; operational assumptions)

Level of Certainty: (select one)

- **Level 1-** already constructed/implemented or construction/implementation imminent
- **Level 2-** construction/implementation likely; detailed design/activity development ongoing; location well defined

This project is certainly at Level 2 and approaching Level 1.

Northern Everglades – Potential Management Measure

Project: *Harns Marsh Improvements, Phase II, Final Design - East County Water Control District*

Description: *Lehigh Acres is located within the service area of the East County Water Control District. East County Water Control District (ECWCD) was created on May 5, 1958. It encompasses over 63,000 acres of land and approximately 311 miles of canals. ECWCD is a political sub-division of the State of Florida and is funded through the collection of an acreage tax.*

ECWCD is requesting a state appropriation in the form of a member project. The Harns Marsh Restoration project is a result of a comprehensive hydrologic study of the area to identify problems and solutions. Harns Marsh is a 578- acre flood detention facility within ECWCD boundaries.

An analysis of the hydrology and hydraulics for the entire District was conducted to provide both the policy and decision makers with the necessary information to properly dedicate resources toward those critical water management facilities that have the greatest impact for the least cost.

The following problems and solutions were identified:

- *The control weir at the South Marsh will be rebuilt to accept flows at a lower elevation.*
- *The existing marsh inlet structures will be equipped with automated staff and rainfall gauges and drawdown gates.*
- *The drawdown gates will only be opened when large storms such as hurricanes are expected and will release water to provide additional flood protection. Normally, these gates will be closed to provide maximum dry season storage.*

Purpose: *Lowering the intake point for the South Marsh will expand the storage by 230 acres. This will provide a potential to store 1,450 acre- feet of water. Construction of a control weir at the outlet of Harns Marsh into the Orange River which will raise water levels in Harns Marsh; restrict flows from Harns Marsh; and lower peak flow discharge into the Orange River at least 20 percent for the 25-year-design storm.*

The control weirs in Able Canal which discharge into Harns Marsh will be repaired, modified, or replaced to allow flexible operation to provide maximum flood storage in the Marsh. Separate wet and dry season control elevations will be maintained by ECWCD. A pump may also be added to lift water to the cypress head during dry periods. Higher water levels year round due to these improvements will provide the best management practices for the Marsh. Design and permitting is well under way for the first phase construction which will include the replacement of the outlet structures (S-HM-2) and (S-HM-3) along with the addition of a controllable gate structure next to the existing inlet to the south marsh structure (S-HM-1).

The second phase planning and preliminary design has been completed with the final design and permitting (this project) will follow in early 2008. The second phase will include the replacement of structure (S-OR-1) and (S-OR-1SE). The ECWCD is also working with the Lee County Parks and Recreation Department to allow limited, responsible civic groups access to enjoy the Marsh for recreational purposes.

Location/Size/Capacity: *Harns Marsh is located in Sections 10, 14, & 15, within Township 44S, Range 26E, Lee County, Florida. It is entirely within the boundaries of ECWCD located south of State Route 80 and east of Buckingham Road.*

Harns Marsh is a 578-acre-flood detention facility. Lowering the intake point for the south Marsh will expand the storage by 230 acres. This will provide a potential to store 1,450 acre feet of water.

Initiative Status: *Modeling has been completed, preliminary design and planning has been completed and final design / permitting for Phase 1 has been started and should be completed in early 2008. Final design / permitting for Phase 2 should be started in early 2008. Construction will follow contingent on availability of funding to match ECWCD funds.*

Cost: *Total Estimated Project Cost for Phase II, Final Design: \$227,820.00
Requested Funding: \$113,910.00*

Documentation: *See attached copy of design contract and scope of engineering services.*

Estimate of Water Quality Benefits:

- Minimum
- Maximum
- Most Likely
- Level of Certainty – conceptual/final/unknown
- Assumptions leading to benefit estimate-(e.g. for features- sub-watershed; period of record; inflow concentration/load; did you assume bmps were implemented or not) (e.g. for activities – location/sub-watershed where activity will apply; what does percent reduction apply to which land uses, only new development, etc.)

The anticipated benefits to the Caloosahatchee River include:

- *Flood attenuation*
- *Water quality improvements*
- *Enhancement of existing wetlands*
- *Reduction of sediment and nutrient loading to the estuary*
- *Provide aquifer recharge*
- *Protect public health and safety*
- *Provide recreational opportunities*
- *Provide native wildlife habitat*
- *Provide native plant habitat free of exotic and invasive plants*

Estimate of Water Quantity Benefits:

- Minimum
- Maximum
- Most Likely
- Level of Certainty – conceptual/final/unknown

- Assumptions leading to benefit estimate- (e.g., sub-watershed; period of record; flow/volume; operational assumptions)

Level of Certainty: (select one)

- **Level 2-** construction/implementation likely; detailed design/activity development ongoing; location well defined
- **Level 3-** implementation certainty unknown; conceptual level of design/activity development complete; location defined

This project is certainly at Level 3 and approaching Level 2

Northern Everglades – Potential Management Measure

Project: *Yellowtail Structure Construction - East County Water Control District*

Description: *Lehigh Acres is located within the service area of the East County Water Control District. East County Water Control District (ECWCD) was created on May 5, 1958. It encompasses over 63,000 acres of land and approximately 311 miles of canals. ECWCD is a political sub-division of the State of Florida and is funded through the collection of an acreage tax.*

The Yellowtail Structure will replace an old, failing broad- crest weir with a new sheet- pile weir with operable gates that will allow for better control of canal water, for water quality, and water recharge purposes. The proposed structure will have top-down gates that will enable the District to have more control (within the established permit levels) of releasing or containing water as needed.

Purpose: *The existing 30-year-old structure leaks which allows the entire basin to drain during extended dry periods. This leaking structure also does not allow for adequate removal of sediment/nutrients from storm water runoff and it does not allow for groundwater recharge—which is becoming a serious problem within the District.*

Location/Size/Capacity: *The Yellowtail Structure is located in Section 31, within Township 44S, Range 27E, Lee County, Florida. It is within the boundaries of ECWCD and it is located south of Lee Boulevard, west of Homestead Road and just east of Anita Ave.*

Initiative Status: *Modeling has been completed, preliminary design and planning has been completed and final design / permitting should be completed in early 2008. Construction will follow contingent on availability of funding to match East County Water Control District funds.*

Cost: *Total Estimated Construction Cost: \$500,000.00
Requested Funding: \$250,000.00*

Documentation:

Estimate of Water Quality Benefits:

- Minimum
- Maximum
- Most Likely
- Level of Certainty – conceptual/final/unknown
- Assumptions leading to benefit estimate-(e.g. for features- sub-watershed; period of record; inflow concentration/load; did you assume BMPs were implemented or not) (e.g. for activities – location/sub-watershed where activity will apply; what does % reduction apply to which land uses, only new development, etc.)

The anticipated benefits to the Caloosahatchee River include:

- *Flood attenuation*

- *Water quality improvements*
- *Enhancement of existing wetlands*
- *Reduction of sediment and nutrient loading to the estuary*
- *Provide aquifer recharge*
- *Protect public health and safety*

Estimate of Water Quantity Benefits:

- Minimum
- Maximum
- Most Likely
- Level of Certainty – conceptual/final/unknown
- Assumptions leading to benefit estimate- (e.g., sub-watershed; period of record; flow/volume; operational assumptions)

Level of Certainty: (select one)

- **Level 1-** already constructed/implemented or construction/implementation imminent
- **Level 2-** construction/implementation likely; detailed design/activity development ongoing; location well defined
- **Level 3-** implementation certainty unknown; conceptual level of design/activity development complete; location defined
- **Level 4-** implementation certainty unknown; conceptual idea; may have rough order of magnitude cost and/or general basin location
- **Level 5-** implementation certainty unknown; conceptual idea with limited information

This project is certainly at Level 3 and approaching Level 2.

Northern Everglades – Potential Management Measure

Project: *Aquifer Benefit and Storage for Orange River Basin (A.B.S.O.R.B.)
- East County Water Control District*

Description: *The East County Water Control District. East County Water Control District (ECWCD) is a Florida Statutes 298 Special District created in 1958 to build, operate, and maintain drainage facilities in eastern Lee County and western Hendry County. The boundaries of the ECWCD are essentially the same as that of unincorporated Lehigh Acres with the addition of three square miles of adjacent land in Hendry County. The District encompasses over 63,000 acres of land and approximately 311 miles of primary and secondary freshwater canals with numerous culverts, water control structures and bridges.*

The ECWCD has three natural and one man-made outfall(s) that convey storm water runoff to the C-43 Canal (Caloosahatchee River). The three natural outfalls, the Orange River, Hickeys Creek, and Bedman Creek are meandering water bodies that begin at various locations along East County Water Control District's boundaries and flow into the C-43 Canal. The development of the ECWCD canal system modified the historic flow patterns of surface water that feed these natural outfalls. Prior to the ECWCD, surface water entered the natural outfalls via overland sheet flow and natural tributaries. The construction of the ECWCD canal network reduced the storage capacity of the ECWCD headwaters area and changed the volume and intensity of storm water entering the Orange River, Hickeys Creek, and Bedman Creek.

The ECWCD system was designed when excess surface water was considered the “common enemy”, and the intent was to significantly reduce water table levels so Lehigh Acres could be developed. No significant sized parcels of land were set aside for water detention or impoundment to reduce the surface water flow impacts on the three natural outfalls from the ECWCD. Given the current deficiency of available surface water storage areas within the ECWCD system, additional route(s) of storm water discharge from the ECWCD along with basin interconnections and additional storage within the system are needed to reduce the impacts to the three natural outfalls. In addition to these objectives, it will also be beneficial to restore the historic headwaters area and re-establish historical flow patterns where possible.

The recently completed work under the ongoing Lehigh Headwaters Initiative Study is recommending that ECWCD proceed with increasing the amount of storage volume available for storm events, provide for additional water quality treatment in the canals and increase groundwater recharge in the SW Lehigh Acres area. The proposed A.B.S.O.R.B. project will help to address all three of these needs in the southwest Lehigh Acres area as well as to lessen the impact on the environment and the surrounding communities affected by the Caloosahatchee Watershed.

Purpose: *The purpose of this project is to continue the restoration goals and watershed improvement projects that were started under the Caloosahatchee Watershed Initiative during the last few years. This project will be the final design phase for Alternative #3 that was recommended in the preliminary design report.*

Location/Size/Capacity: *The A.B.S.O.R.B. project is located in the southwest portion of Lehigh Acres, Lee County, Florida. It is referred to as drainage basin #7 and #10 located within Township(s) 44S and 45S and Range(s) 25E and 26E of the East County Water Control District. Both basins combined include approximately 18.6 square miles and are generally located south of Buckingham Road, and east of State Route 82 and west of Yellowtail Canal.*

Initiative Status: *Modeling has been completed, preliminary design and planning has been completed and final design / permitting could start in early 2008 contingent on availability of funding to match East County Water Control District funds.*

Cost: *Total Estimated Final Design Cost: \$150,000.00
Requested Funding: \$75,000.00*

Documentation: *See attached copy of the preliminary Design Report.*

Estimate of Water Quality Benefits:

- Minimum
- Maximum
- Most Likely
- Level of Certainty – conceptual/final/unknown
- Assumptions leading to benefit estimate-(e.g. for features- sub-watershed; period of record; inflow concentration/load; did you assume bmps were implemented or not) (e.g. for activities – location/sub-watershed where activity will apply; what does % reduction apply to which land uses, only new development, etc.)

The anticipated benefits to the Caloosahatchee River include:

- *Flood attenuation*
- *Water quality improvements*
- *Enhancement of existing wetlands*
- *Reduction of sediment and nutrient loading to the estuary*
- *Provide aquifer recharge*
- *Protect public health and safety*

Estimate of Water Quantity Benefits:

- Minimum
- Maximum
- Most Likely
- Level of Certainty – conceptual/final/unknown
- Assumptions leading to benefit estimate- (e.g., sub-watershed; period of record; flow/volume; operational assumptions)

Level of Certainty: (select one)

- **Level 1-** already constructed/implemented or construction/implementation imminent

- **Level 2-** construction/implementation likely; detailed design/activity development ongoing; location well defined
- **Level 3-** implementation certainty unknown; conceptual level of design/activity development complete; location defined
- **Level 4-** implementation certainty unknown; conceptual idea; may have rough order of magnitude cost and/or general basin location
- **Level 5-** implementation certainty unknown; conceptual idea with limited information

This project is at Level 3 and ready to proceed to Level 2 with the necessary funding in place.

Northern Everglades – Potential Management Measure

Project: Four Corners Regional Environmental Restoration This project includes restoration of all or a portion of the current County Line Drainage District orange grove. Four conceptual restoration scenarios were developed in 2007. Historic aerial photographs and pre-development topography were used to map historic wetlands and flow ways, and to establish the sub-watershed boundaries of Cypress Creek, Spanish Creek, and Millers Gulley. The goal of the restoration is to provide is to provide benefits in water storage capacity, wetland restoration, and water quality improvements for the Four Corners region and the Caloosahatchee River. The restoration will restore historic flow patterns and provide additional storage and water quality benefits. The recent public acquisition of the Babcock Ranch offers additional opportunity for cooperative hydrologic restoration.

Description: Flow way Restoration Water Quality Improvement Attenuation This project consists of a constructed wetland designed for optimal nitrogen removal from water diverted to the facility from the Caloosahatchee and surrounding areas. The discharge water may be re-routed to Spanish Creek for hydrologic restoration. The downstream estuary is generally limited by nitrogen, and therefore the treatment feature will be designed for optimal nitrogen removal. The assumption has been made that a feature targeting nitrogen removal will also successfully reduce concentrations of both phosphorus and suspended solids

Purpose: The purpose of this project is to reduce nutrient concentrations within the Caloosahatchee River and nutrient pollutant loading to the downstream estuary. This feature, in conjunction with others within the basin, are designed to have the cumulative effect of reducing nutrient concentrations and loads significantly enough to meet water quality targets within the Caloosahatchee Estuary. Improve water quality. Restore flow ways, aquifer recharge.

Location/Size/Capacity: 400 – 4,000 acres in Lee County near the intersection of Hendry, Glades, Charlotte and Lee Counties

Initiative Status: *Preliminary Design*

Cost: \$10,000,000 - \$100,000,000

Estimate of Water Quality Benefits: -- The proposed restoration alternatives offer the opportunity for between 1,000 to 15,000 acre feet of storage. Potential water quality benefits include removing the land from citrus production and water quality treatment of the water flowing through the restored areas and construction of a treatment train system consisting of a series of deep ponds connected by shallow overland flow way areas. Estimates of treatment efficiencies provided range from 10-30%. The contributing drainage area as estimated by the SCS is (County Line canal 1.55 Sq. Mi., Miller Gulley 1.81 esq., Spanish Creek 11.82 esq.) 15.18 sq. mi.. This has the potential to provide removal of 0.5 tons.

- **Minimum** – 0.5 tons
- **Maximum**- 7.5 tons
- **Most Likely**- 1 ton
- **Level of Certainty**- *conceptual*

Estimate of Water Quantity Benefits

- **Minimum** – *1,000 ac/ft*
- **Maximum**- *15,000 ac/ft*
- **Most Likely**- *1,000 ac/ft*
- **Level of Certainty**- *conceptual*

Assumptions leading to benefit estimate- *(Historical based on similar projects)*

Contact: Clyde Dabbs, SFWMD 239-338-2929 x 7759

Northern Everglades – Potential Management Measure

Project: Billy Creek Filter Marsh Phase I & II

Description: The completed project Phase I & II will include the construction of a 56-acre filter marsh facility on an undeveloped parcel adjacent to Billy Creek. The project will install a water control structure within Billy Creek to divert flows into the filter marsh facility providing additional attenuation of stormwater flows within the channel itself. The filter marsh facility itself will consist of an 8 acre open water lake, 13 acre wetland marsh, and incorporate/restore an existing 12 acre cypress hammock.

Purpose: The lake will provide for removal of the suspended solids and sediments. The wetland marshes and cypress hammock will provide for the removal of nutrients such as nitrogen, phosphorus, and heavy metals.

Location/Size/Capacity: Billy Creek/ City of Fort Myers/Tidal Caloosahatchee

Initiative Status: Listed in FY 09 Caloosahatchee Partners for Restoration (CPR) project is ready to begin

- | | |
|--|-----|
| • Advance planning phase and associated field work | TBD |
| • Preliminary Plans and Specification (30% complete) | TBD |
| • Intermediate Design (60% complete) | TBD |
| • Pre-final Design (90% complete) | TBD |
| • Final Design | TBD |
| • Permit submittals | TBD |

Cost: Total Cost\$5 million – City of Fort Myers request SFWMD contribute \$1 million

Documentation: see CPR FY09 report

Estimate of Water Quality Benefits:

- Minimum –
- Maximum-
- Most Likely-
- Level of Certainty- conceptual/final/unknown
- Assumptions leading to benefit estimate-

Estimate of Water Quantity Benefits:

- Minimum –
- Maximum-
- Most Likely-
- Level of Certainty- conceptual/final/unknown
- Assumptions leading to benefit estimate- (e.g., sub-watershed; period of record; flow/volume; operational assumptions)

Level of Certainty: (select one) Level 2-

Contact: Steve Sentes – SFWMD Stormwater Division 239-338-2929 x7754

Northern Everglades – Potential Management Measure

Project: Ford Filter Canal

Description: The project proposes to create a water quality filter marsh to improve the overall quality of stormwater discharging into Billy Creek.

Purpose: The filter marsh will work collectively with a number of other individual treatment areas along Billy Creek and its tributaries. Funds will be used for the design and permitting of the facility.

Location/Size/Capacity: Billy Creek – City of Fort Myers

Initiative Status:

- Advance planning phase and associated field work
- Preliminary Plans and Specification (30% complete)
- Intermediate Design (60% complete)
- Pre-final Design (90% complete)
- Final Design
- Permit submittals

Cost: \$30,000 for design and permitting

Documentation:

Estimate of Water Quality Benefits:

- Minimum –
- Maximum-
- Most Likely-
- Level of Certainty- conceptual/final/unknown
- Assumptions leading to benefit estimate- (e.g. for features- sub-watershed; period of record; inflow concentration/load; did you assume bmps were implemented or not) (e.g. for activities- location/sub-watershed where activity will apply; what does % reduction apply to-which land uses, only new development, etc.)

Estimate of Water Quantity Benefits:

- Minimum –
- Maximum-
- Most Likely-
- Level of Certainty- conceptual/final/unknown
- Assumptions leading to benefit estimate- (e.g., sub-watershed; period of record; flow/volume; operational assumptions)

Level of Certainty: (select one)

Level 2- construction/implementation likely; detailed design/activity development ongoing;
location well defined

Northern Everglades – Potential Management Measure

Project: Manuel's Branch Silt Reduction Structure

Description: The project proposes to install siltation structures within the existing walled outfall section located immediately upstream of the Caloosahatchee river.

Purpose: The facility will reduce siltation associated with stream bank scour, erosion, and degradation via reduced stream/outfall velocities within the immediate upstream reach of the waterway. Funds will be used for the design and permitting of the structures.

Location/Size/Capacity: City of Fort Myers

Initiative Status:

- Advance planning phase and associated field work
- Preliminary Plans and Specification (30% complete)
- Intermediate Design (60% complete)
- Pre-final Design (90% complete)
- Final Design
- Permit submittals

Cost: \$15,000.00 for design and permitting

Documentation:

Estimate of Water Quality Benefits:

- Minimum –
- Maximum-
- Most Likely-
- Level of Certainty- conceptual/final/unknown
- Assumptions leading to benefit estimate- (e.g. for features- sub-watershed; period of record; inflow concentration/load; did you assume bmps were implemented or not) (e.g. for activities- location/sub-watershed where activity will apply; what does % reduction apply to-which land uses, only new development, etc.)

Estimate of Water Quantity Benefits:

- Minimum –
- Maximum-
- Most Likely-
- Level of Certainty- conceptual/final/unknown
- Assumptions leading to benefit estimate- (e.g., sub-watershed; period of record; flow/volume; operational assumptions)

Level of Certainty: (select one)

Level 2- construction/implementation likely; detailed design/activity development ongoing; location well defined

Northern Everglades – Potential Management Measure

Project: Manuel's Branch East and West Weirs

Description: The project involves the installation of two weir/water control structures within existing canal sections.

Purpose: The purpose of the weir structures is to create a linear storage feature within the upstream reach of the existing canal to attenuate flows downstream and reduce peaking effects of past urbanization and storm sewer practices.

Location/Size/Capacity:

Initiative Status:

- Advance planning phase and associated field work
- Preliminary Plans and Specification (30% complete)
- Intermediate Design (60% complete)
- Pre-final Design (90% complete)
- Final Design
- Permit submittals

Cost: \$240,000 - Funds will be used for the design, permitting and construction of the structures.

Documentation:

Estimate of Water Quality Benefits:

- Minimum –
- Maximum-
- Most Likely-
- Level of Certainty- conceptual/final/unknown
- Assumptions leading to benefit estimate- (e.g. for features- sub-watershed; period of record; inflow concentration/load; did you assume bmps were implemented or not) (e.g. for activities- location/sub-watershed where activity will apply; what does % reduction apply to-which land uses, only new development, etc.)

Estimate of Water Quantity Benefits:

- Minimum –
- Maximum-
- Most Likely-
- Level of Certainty- conceptual/final/unknown
- Assumptions leading to benefit estimate- (e.g., sub-watershed; period of record; flow/volume; operational assumptions)

Level of Certainty: (select one)

Level 1- already constructed/implemented or construction/implementation imminent

Level 2- construction/implementation likely; detailed design/activity development ongoing;
location well defined

Northern Everglades – Potential Management Measure

Project: Caloosahatchee Creeks Preserve Hydrological Restoration

Description: Lee County has hired a biologist/engineer to design and permit a hydrological restoration project on Caloosahatchee Creeks Preserve, a Conservation 20/20 preserve in Lee County. Planned hydrological restoration projects include plugging the ditches that currently occur on the property and providing culverts to flow under existing berms. One large ditch channels water north-south directly into the Caloosahatchee River and one east-west ditch channels water into a canal (Stroud Creek) and then into the Caloosahatchee River. The ditch plugs will slow the water and allow onsite wetlands to be rehydrated and filter the water before it enters the Caloosahatchee River.

Purpose: The purpose of the project is to reduce the amount of channelized water that enters the Caloosahatchee River and to rehydrate the wetlands on Caloosahatchee Creeks Preserve.

Location/Size/Capacity: The project will take place in management units 108-1 and 108-2 (211.2 acres) of a 1,325 acre Caloosahatchee Creeks Preserve on the northern shore of the Caloosahatchee River. The capacity has not yet been determined. Tom Odum, the consultant, expects to submit a permit application to the South Florida Water Management District in December 2007.

Initiative Status:

- Advance planning phase and associated field work
- Preliminary Plans and Specification (30% complete)
- Intermediate Design (60% complete) : Plans are underway and should be submitted to the South Florida Water Management District in December 2007.
- Pre-final Design (90% complete)
- Final Design
- Permit submittals

Cost: The construction cost is estimated to be \$500,000. At this point, Lee County has secured \$350,000 from the Florida Department of Environmental Protection for the construction of the project. We are requesting the balance of the project (\$150,000) to be funded by the South Florida Water Management District.

Documentation: Please see the attached documentation from the Florida Department of Environmental Protection.

Estimate of Water Quality Benefits:

- Minimum –
- Maximum-
- Most Likely-
- Level of Certainty- conceptual/final/unknown
- Assumptions leading to benefit estimate- (e.g. for features- sub-watershed; period of record; inflow concentration/load; did you assume bmps were implemented or not) (e.g. for activities-

location/sub-watershed where activity will apply; what does % reduction apply to-which land uses, only new development, etc.)

- Quantitative water quality benefits are not available at this time, but will be available in December once the engineering design has been completed.

Estimate of Water Quantity Benefits:

- Minimum –
- Maximum-
- Most Likely-
- Level of Certainty- conceptual/final/unknown
- Assumptions leading to benefit estimate- (e.g., sub-watershed; period of record; flow/volume; operational assumptions)
- Quantitative water quantity benefits are not available at this time, but will be available in December once the engineering design has been completed.

Level of Certainty: Level 2- construction/implementation likely; detailed design/activity development ongoing; location well defined

Northern Everglades – Potential Management Measure

Project: Caloosahatchee River Basin Algal Turf Scrubber (Formerly Powell Creek Algal Turf Scrubber, the project name was changed in Contract Amendment 4600000978-A1)

Description: The project proposes to install and operate for one year a mobile unit of the Algal Turf Scrubber system. This project also contains funding for a large scale permanent installation of an Algal Turf Scrubber based on the results of the pilot project.

Purpose: The Algal Turf Scrubber is an alternative technology designed to optimize and create flow conditions that maximize the nutrient uptake at rates higher than constructed wetland systems. Installation of the product is estimated to remove of 200 - 1000 pounds of phosphorous and 500 - 8000 pounds of nitrogen for every acre of process area. Based upon the results of this pilot project, a large scale installation of the Algal Turf Scrubber system might be pursued.

Location/Size/Capacity: Adjacent to Powell Creek bypass and approximately 1500 feet north of the Caloosahatchee river. Treatment area is about 10,000 square feet.

Initiative Status:

- Advance planning phase and associated field work
- Preliminary Plans and Specification (30% complete)
- Intermediate Design (60% complete)
- Pre-final Design (90% complete)
- Final Design
- Permit submittals

Cost: \$427,000 (Ad Valorem funding) The contract for this project (4600000978-A1) was amended to increase funding in the amount of \$1,205,000 (Ad Valorem) for the design and construction of the permanent Algal Turf Scrubber.

Documentation:

Estimate of Water Quality Benefits:

- Minimum – 20% less than most likely
- Maximum- 20% more than most likely
- Most Likely- 125 pounds of N, 50 pounds of P, and 5,000 pounds of TSS annually.
- Level of Certainty- conceptual/final/unknown
- Assumptions leading to benefit estimate- (e.g. for features- sub-watershed; period of record; inflow concentration/load; did you assume bmps were implemented or not) (e.g. for activities- location/sub-watershed where activity will apply; what does % reduction apply to-which land uses, only new development, etc.)

Estimate of Water Quantity Benefits:

- Minimum – 0
- Maximum- 20% more than most likely

- Most Likely- 2 cubic feet per second
- Level of Certainty- conceptual/final/unknown
- Assumptions leading to benefit estimate- (e.g., sub-watershed; period of record; flow/volume; operational assumptions)

Level of Certainty: (select one)

Level 3- implementation certainty unknown; conceptual level of design/activity development complete; location defined

Level 4- implementation certainty unknown; conceptual idea; may have rough order of magnitude cost and/or general basin location.

Northern Everglades – Potential Management Measure

Project: North Ft. Myers Surface Water Restoration Project

Description: This project proposes to construct and operate a surface water management system to serve a 2,400 acre project area. The project involves channel improvements, construction of diversion weirs and the planting of shallow water emergent aquatic plants to facilitate longer time for nutrient uptake.

Purpose: Construction of the weirs will capture sediment and slow velocities. This project was previously funded by the District.

Location/Size/Capacity: Off of Powell Creek on a 20/20 owned land located approximately 2miles from the Caloosahatchee River. Water quality treatment area is about 11 acres.

Initiative Status:

- Advance planning phase and associated field work
- Preliminary Plans and Specification (30% complete)
- Intermediate Design (60% complete)
- Pre-final Design (90% complete)
- Final Design- Construction Plans are 100% Complete (Construction will commence pending prequalification of contractors & receipt of qualified bids)
- Permit submittals – all required permits are in place

Cost: \$300,000 (Ad Valorem Funding)

Documentation:

Estimate of Water Quality Benefits:

- Minimum – 20% less than most likely
- Maximum- 20% more than most likely
- Most Likely- 247 pounds of P, 1528 pounds of N and 73,702 pounds of TSS annually
- Level of Certainty- conceptual/final/unknown
- Assumptions leading to benefit estimate- (e.g. for features- sub-watershed; period of record; inflow concentration/load; did you assume bmps were implemented or not) (e.g. for activities- location/sub-watershed where activity will apply; what does % reduction apply to-which land uses, only new development, etc.)

Estimate of Water Quantity Benefits:

- Minimum – 20% less than most likely
- Maximum- 20% less than most likely
- Most Likely- 100 ac-ft per month
- Level of Certainty- conceptual/final/unknown
- Assumptions leading to benefit estimate- (e.g., sub-watershed; period of record; flow/volume; operational assumptions)

Level of Certainty: (select one)

Level 1- already constructed/implemented or construction/implementation imminent

Level 2- construction/implementation likely; detailed design/activity development ongoing;
location well defined.

Northern Everglades – Potential Management Measure

Project Feature: Yellow Fever Creek/Gator Slough Transfer Facility (#208509, FY 2005-2007)

Level: 1

General Description/Background: Construct an operable interconnect facility between the Gator Slough Canal and Yellow Fever Creek in North Fort Myers/Northeast Cape Coral. The project would transfer surface waters during periods of high flows from Gator Slough canal system located just north of Del Prado Blvd (S22-T43-R24) to the Yellow Fever Creek near Littleton Rd through a control facility. The project will utilize existing rights of way.

Purpose: This project will improve the area's overall water quality by reducing and balancing the fresh water peak inflows to Matlacha Pass and Charlotte Harbor. By transferring these excess surface water flows to the Caloosahatchee, the overall system will mimic the historical flow patterns and hydrologic distribution.

Location/Size/Capacity: Yellow Fever Creek (S22-T43-R24)

Initiative Status: Ongoing

Cost: \$600,000.

Documentation: Lee County Natural Resources CIP Budget Guide

Estimate of Water Quality Benefit: unknown

Minimum:

Maximum:

Most Likely:

Level of Certainty:

Assumptions:

Estimate of Water Quantity Benefit: NA

Minimum:

Maximum:

Most Likely:

Level of Certainty:

Assumptions: This project will improve the area's overall water quality by reducing and balancing the fresh water peak inflows to Matlacha Pass and Charlotte Harbor.

Screening Criteria:

Proof of Concept: FDEP Permit for project.

Other Impacts:

Contact: Roland Ottolini – 239-533-8127

ATTACHMENT A
Caloosahatchee River Watershed Protection Plan Outline
DRAFT

(Note: This Outline is a working DRAFT document that may be further revised by the District in cooperation with the Working Team. The District Project Manager reserves the right to adjust the Work Breakdown Structure and Payment and Delivery Schedule as needed to account for revisions made to this outline.)

1.0 Executive Summary

2.0 Introduction

- 2.1 Legislation (SB392) and Mandated Plans
- 2.2 Purpose and Scope
- 2.3 Study Area

3.0 Planning Process

- 3.1 Previous studies and ongoing projects
- 3.2 Problems and Opportunities
- 3.3 Plan Objectives
- 3.4 Planning Constraints
- 3.5 Performance Measures

4.0 Interagency Coordination and Public Involvement

- 4.1 Interagency Coordination
- 4.2 Public and Stakeholder Involvement

5.0 Total Maximum Daily Loads

- 5.1 Development of TMDLs for watershed
- 5.2 Basin Management Action Plan Coordination
- 5.3 Recommendations

6.0 Watershed Construction Project

- 6.1 Summary of Management Measures
- 6.2 Water Quantity Analysis Method
- 6.3 Water Quality Analysis Method
- 6.4 Formulation of Alternatives
- 6.5 Alternative Plan Evaluation and Comparison
- 6.6 Planned Projects and Actions
 - 6.6.1 Summary

- 6.6.2 Plan Features
- 6.6.3 Real Estate
- 6.6.4 Operations & Maintenance
- 6.6.5 Monitoring
- 6.6.6 Permitting
- 6.6.7 Implementation
- 6.6.8 Preliminary Cost Estimates
- 6.6.9 Funding Opportunities

7.0 Watershed Pollutant Control Program

- 7.1 Non-point source Best Management Practices
- 7.2 Private Lands Grant Programs
- 7.3 Disposal of domestic wastewater residual and septage
- 7.4 Land Application of Animal Manure

8.0 Watershed Research and Water Quality Monitoring Program

- 8.1 Introduction
 - 8.1.1 Description of Enabling Legislation
 - 8.1.2 Document Structure
- 8.2 Goals and Objectives of Monitoring and Research
- 8.3 The River and Its Watershed: Status, Trends and Targets in Hydrology, Water Quality and Aquatic Habitat
 - 8.3.1 Delineation of Study Area
 - 8.3.2 Watershed Hydrology and Loading
 - 8.3.3 River/Estuary Salinity, Water Quality and the Related Aquatic Habitats
 - 8.3.4 Salinity Envelopes and Freshwater Inflow Targets
 - 8.3.5 Influence of Lake Okeechobee and Watershed Discharge on Freshwater Inflow to Estuaries
- 8.4 Monitoring on a Regional Scale
 - 8.4.1 Definition of Regional Scale Monitoring
 - 8.4.2 Nutrient Loading and Water Quality Monitoring Program
 - 8.4.3 Freshwater Inflows Monitoring Program
 - 8.4.4 Aquatic Habitat Monitoring Program
 - 8.4.5 Power Analysis
- 8.5 Monitoring on the Project Scale
 - 8.5.1 Definition of Project Level Monitoring
 - 8.5.2 Projects Considered in the Plan (*these are examples at this point*)
 - 8.5.3 Monitoring for Load Reduction- removal efficiency, permit requirements
- 8.6 Research for Adaptive Management
 - 8.6.1 Purpose of Research
 - 8.6.2 Status of Current Research Related to Water Quality
 - 8.6.3 Status of Current Assessment Tools

8.7 Recommendations

8.7.1 Recommendations

8.7.2 Plan Implementation

9.0 Recommended Projects and Actions

9.1 Watershed Construction Project

9.2 Watershed Pollutant Control Program

9.3 Watershed Research and Water Quality Monitoring Program

9.4 Plan Refinement and Revision

DRAFT - CRWPP Hydrologic Performance Measures

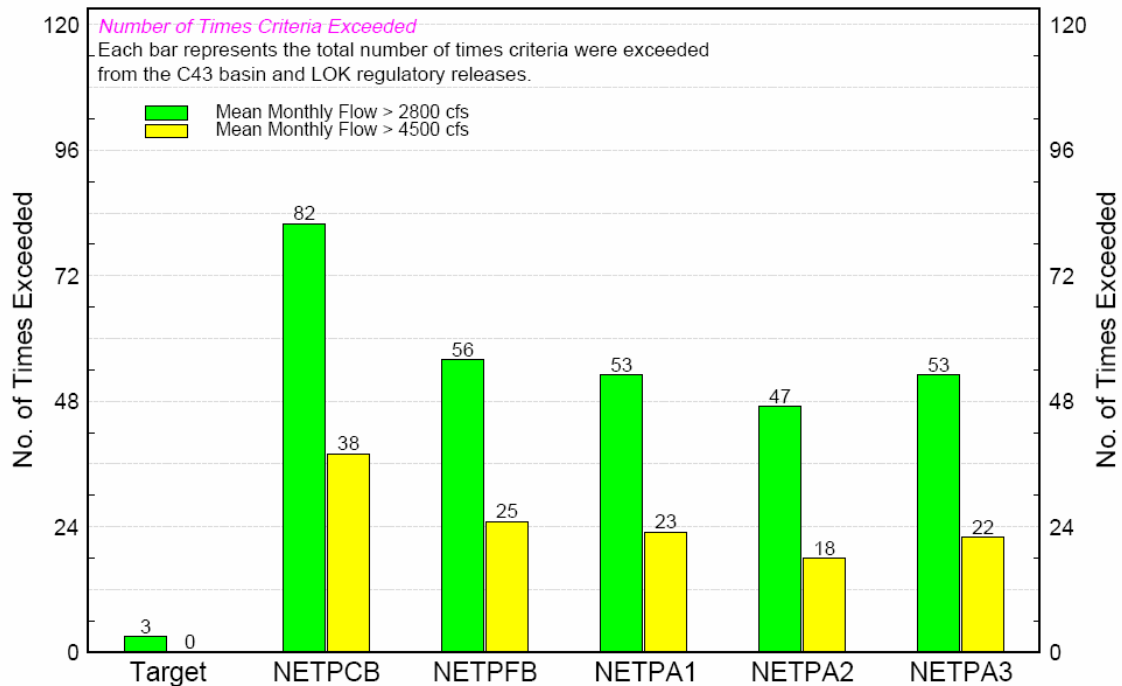
Performance Measure: Number of Times Caloosahatchee Estuary High Discharge Criteria Exceeded – Mean Monthly Flows >2,800 cfs and Mean Monthly Flows > 4,500 cfs

Description – The Lake Okeechobee WSE Regulation Schedule is applied to regulate(flood control) discharges to the Caloosahatchee River, and subsequently to the Caloosahatchee Estuary, when lake stages are high. The Caloosahatchee River has primary capacity for local inflows and is only utilized for CRE discharges when there is secondary capacity available. The number of times that the Caloosahatchee Estuary high discharge criterion is exceeded must be limited to prevent destructive impacts on the estuary.

Target – No more than 3 events with mean monthly flows at S-79 greater than 2,800 cfs and no events with mean monthly flows greater than 4,500 cfs.

Evaluation Method - The Northern Everglades Regional Simulation Model (NERSM) will be employed for all evaluations. The evaluation will be based on the period of record from 1970 through 2005. The number of average monthly S-79 flows between 2,800 cfs and 4,500 cfs will be tallied for each alternative.

Number of Times Caloosahatchee Estuary High Discharge Criteria Exceeded
(mean monthly flows > 2800 & 4500 cfs from 1970 - 2005)



For Planning Purposes Only
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DRAFT - CRWPP Hydrologic Performance Measures

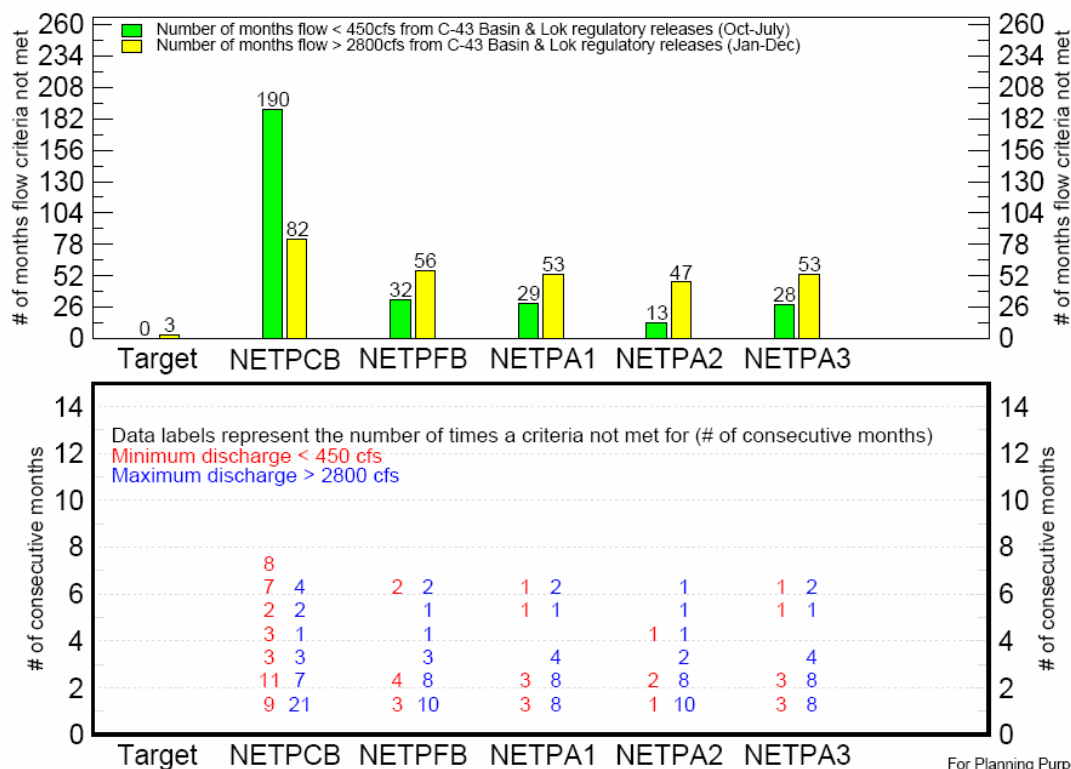
Performance Measure: Number of Times Salinity Criteria Not Met for the Caloosahatchee Estuary – Mean Monthly Flows < 450 cfs and Mean Monthly Flows > 2,800 cfs

Description – A healthy, naturally-diverse and well-balanced estuarine ecosystem can exist only if the salinity regimes are controlled within the desirable range. Lake Okeechobee discharges have a significant impact on how well desirable salinity regimes are maintained in the Caloosahatchee Estuary.

Target – Maintain mean monthly flows at S-79 between 450 cfs and 2,800 cfs with no more than 3 events with mean monthly flows greater than 2,800 cfs.

Evaluation Method - The Northern Everglades Regional Simulation Model (NERSM) will be employed for all evaluations. The evaluation will be based on the period of record from 1970 through 2005. The number of mean monthly flows outside of the desirable range from 450 cfs to 2,800 cfs will be tallied for each alternative.

Number of Times Salinity Envelope Criteria NOT Met for the Caloosahatchee Estuary (mean monthly flows 1970 - 2005)



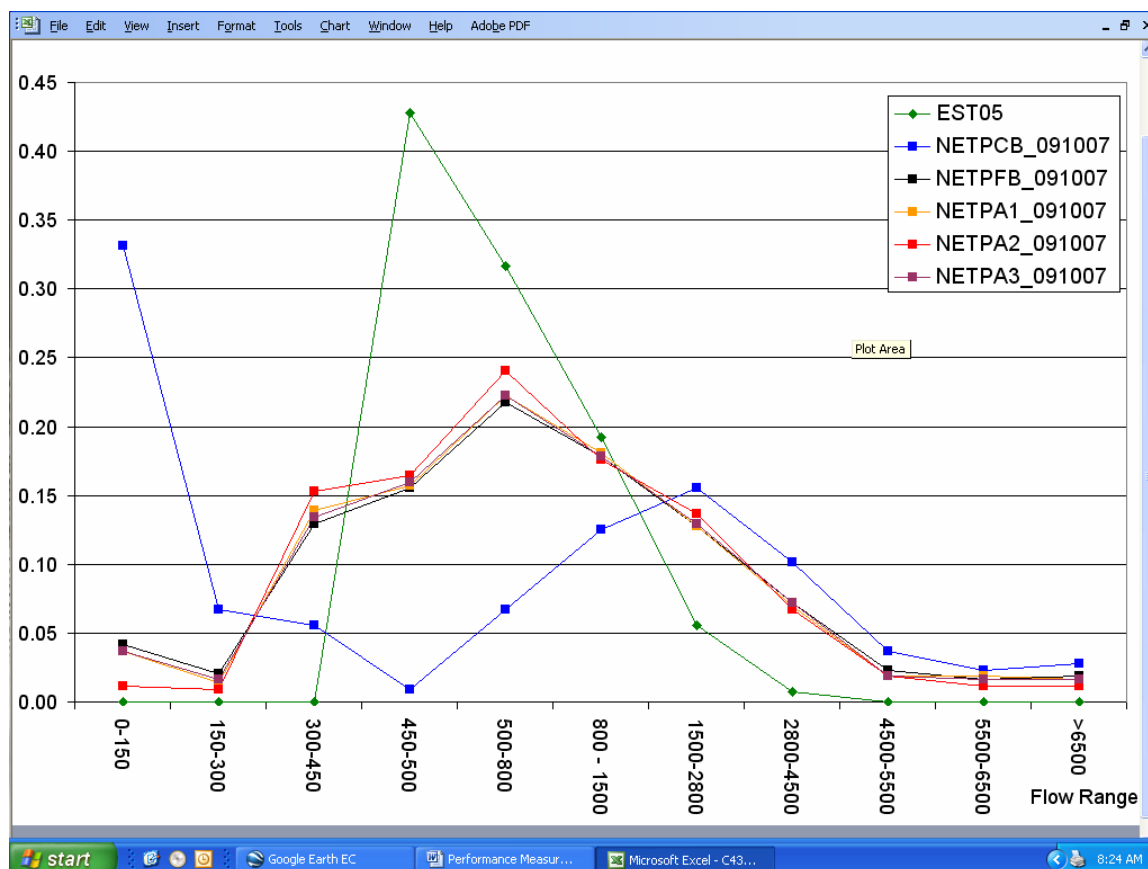
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DRAFT - CRWPP Hydrologic Performance Measures

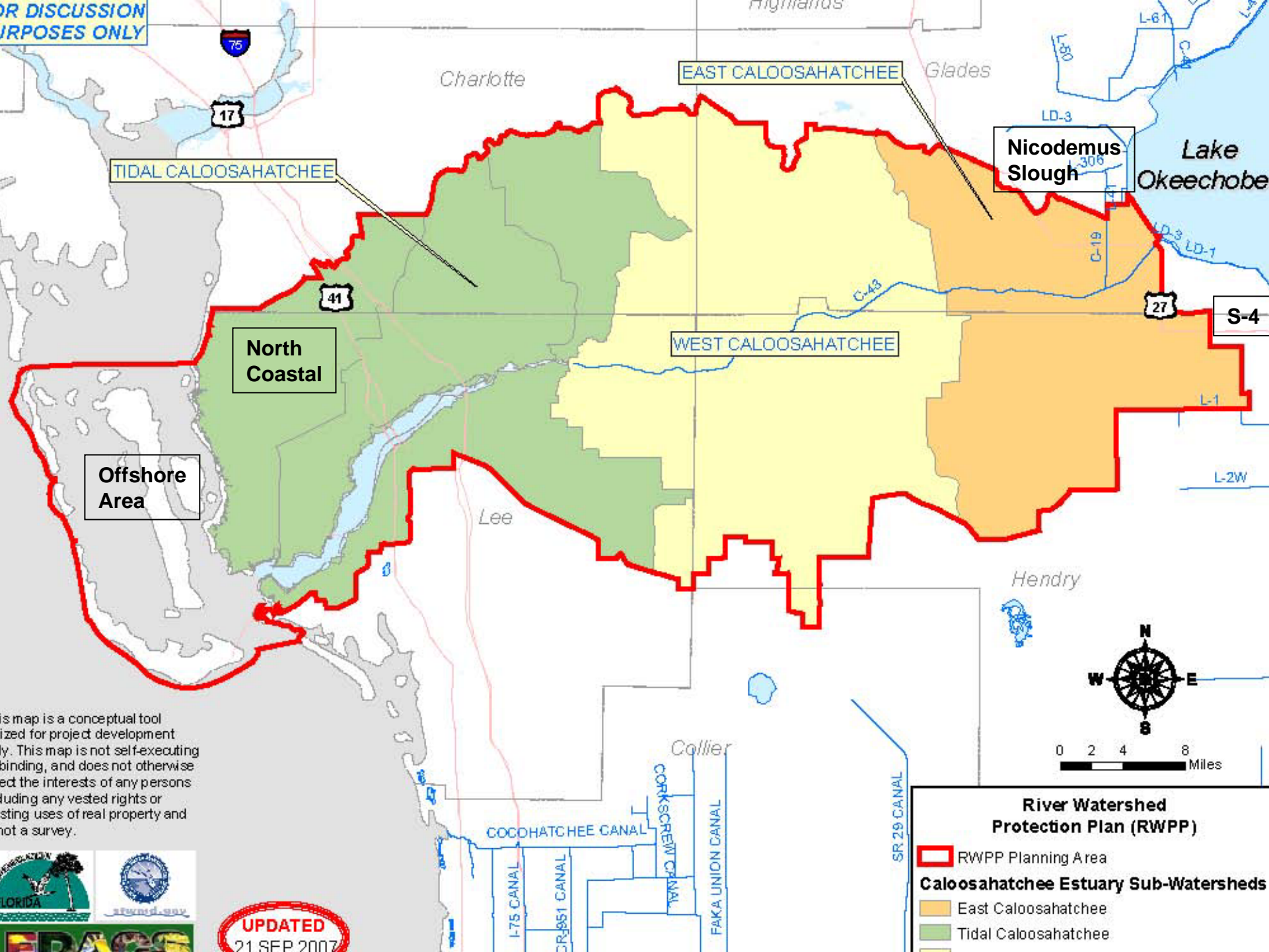
Performance Measure: Total Flow Index

Description – Compares Alternative flow distribution to desired flow distribution

Evaluation Method – The Northern Everglades Regional Simulation Model (NERSM) will be employed for all evaluations. The evaluation will be based on the period of record from 1970 through 2005.



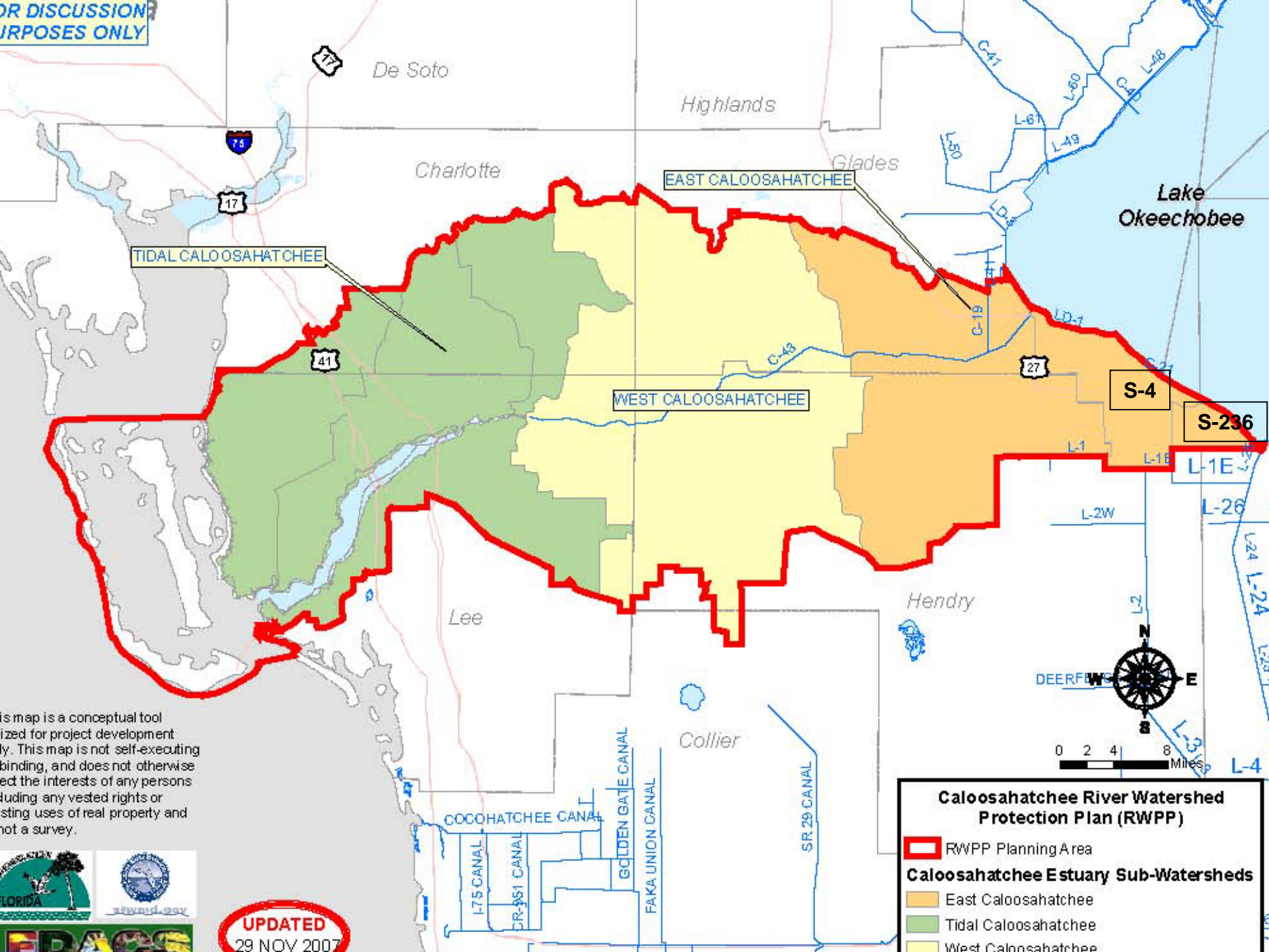
For Planning purposes only.



This map is a conceptual tool
designed for project development
only. This map is not self-executing
binding, and does not otherwise
reflect the interests of any persons
including any vested rights or
existing uses of real property and
is not a survey.



UPDATED
21 SEP 2007



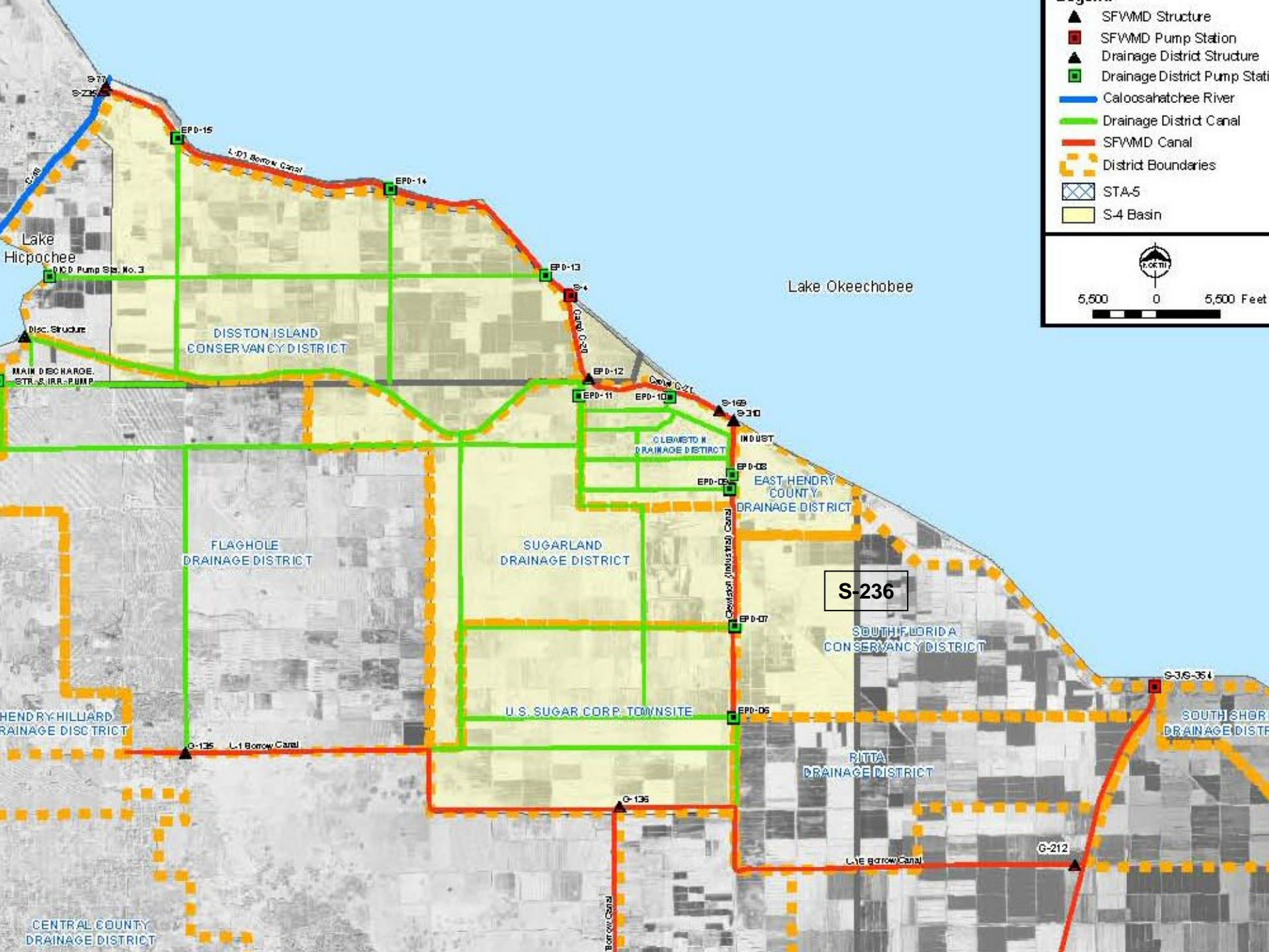
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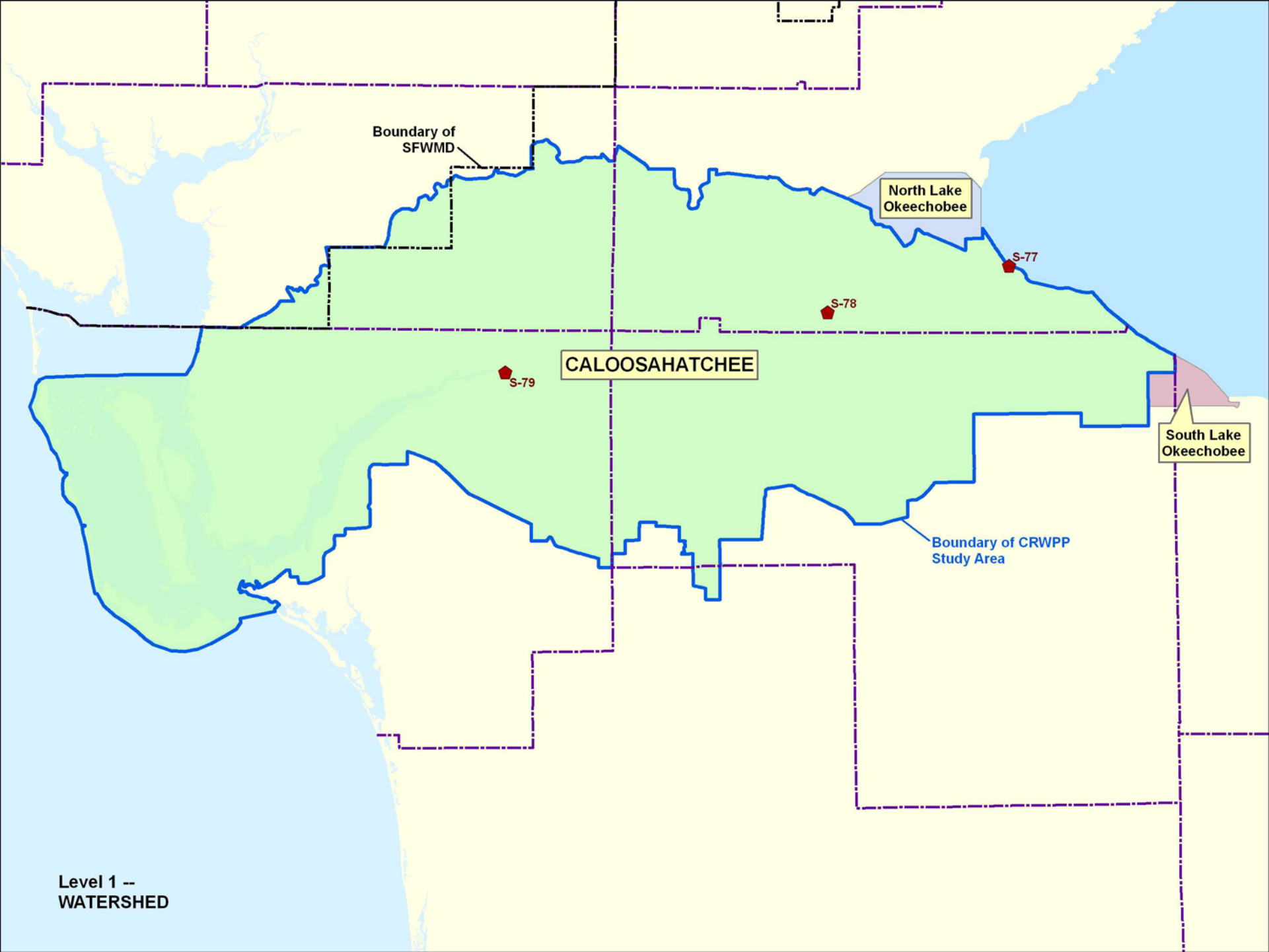


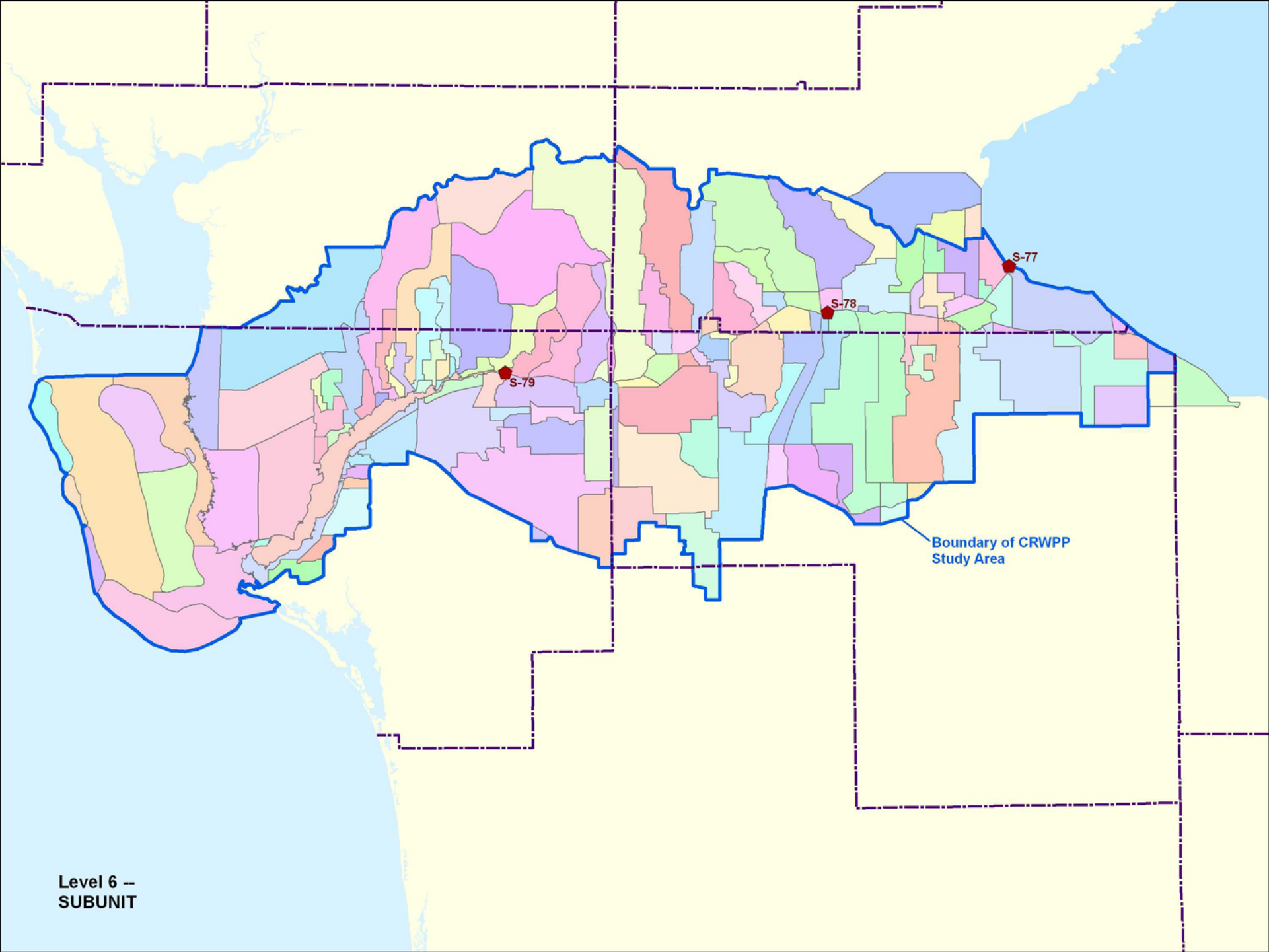
UPDATED
29 NOV 2007

Caloosahatchee River Watershed Protection Plan (RWPP)

- RWPP Planning Area
- Caloosahatchee Estuary Sub-Watersheds**
 - East Caloosahatchee
 - Tidal Caloosahatchee
 - West Caloosahatchee

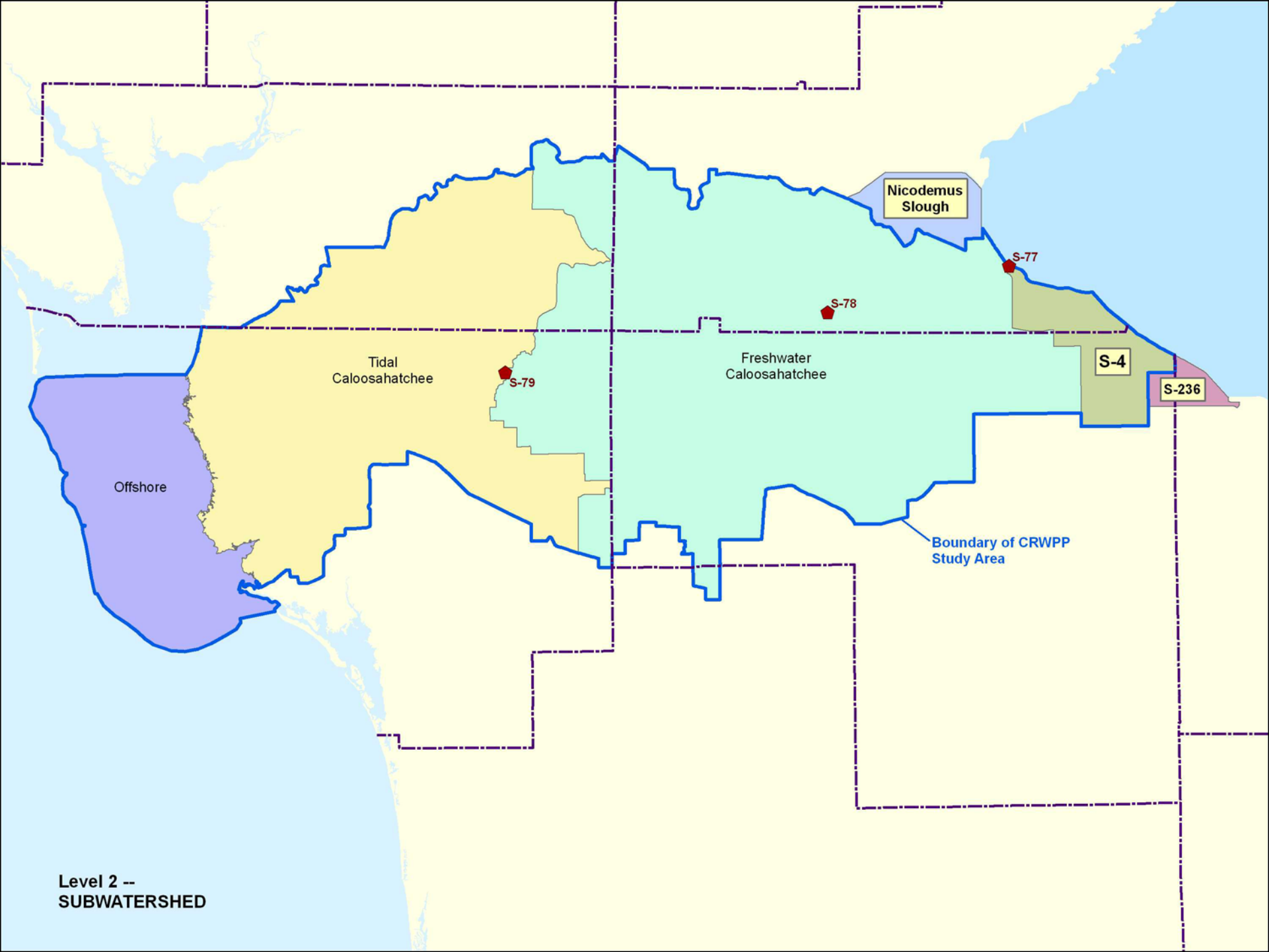




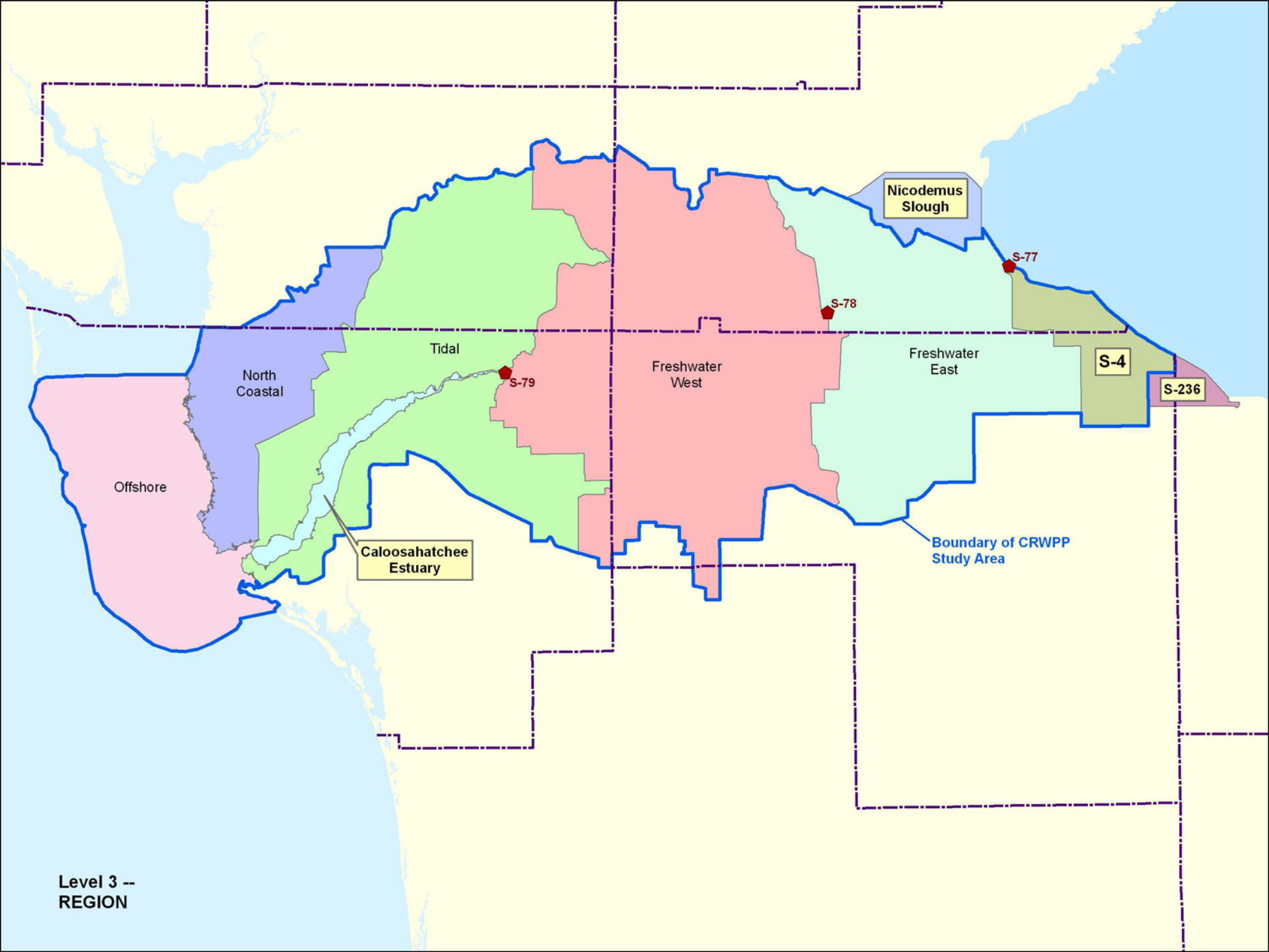


Level 6 --
SUBUNIT

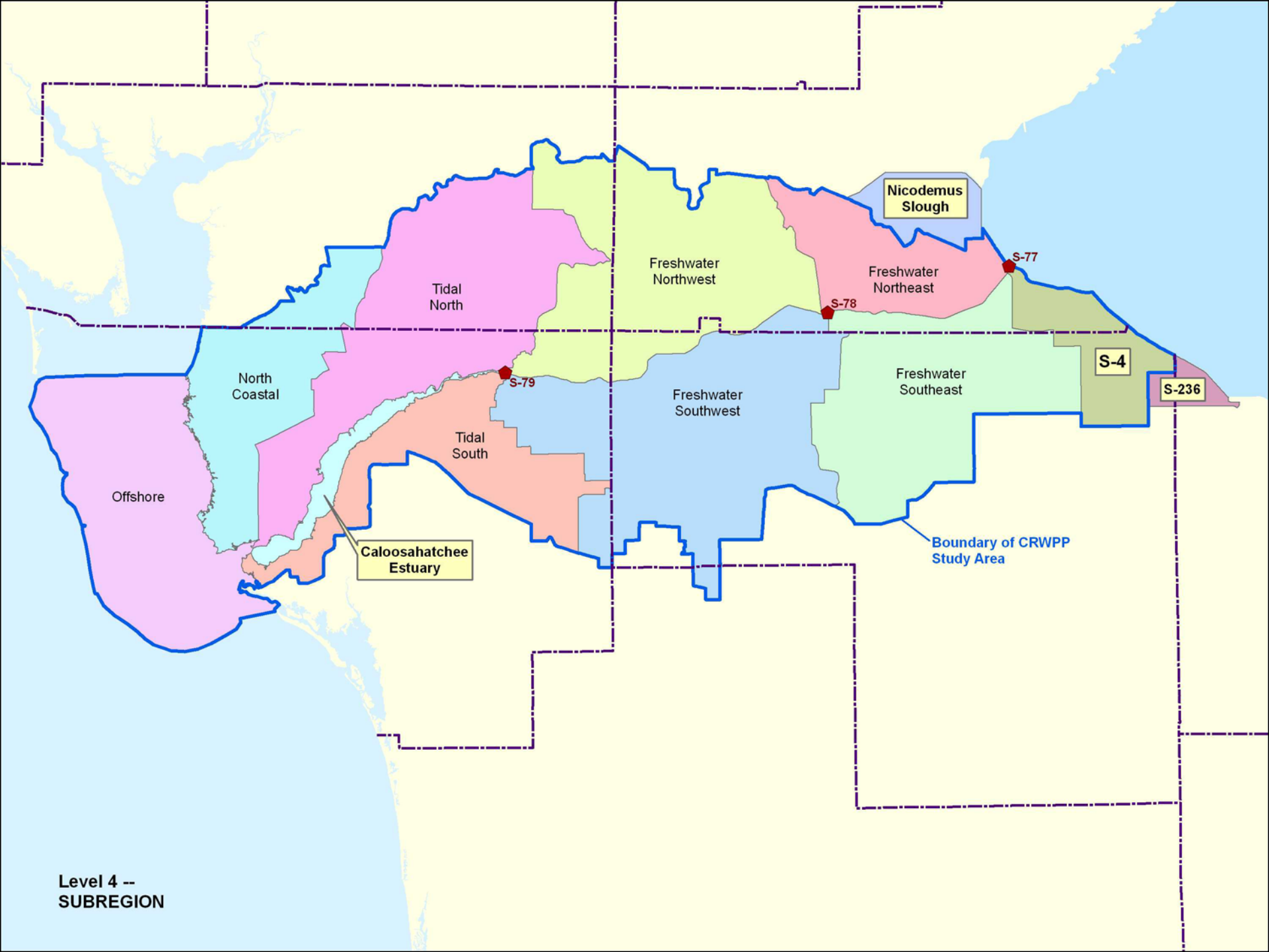
Boundary of CRWPP
Study Area

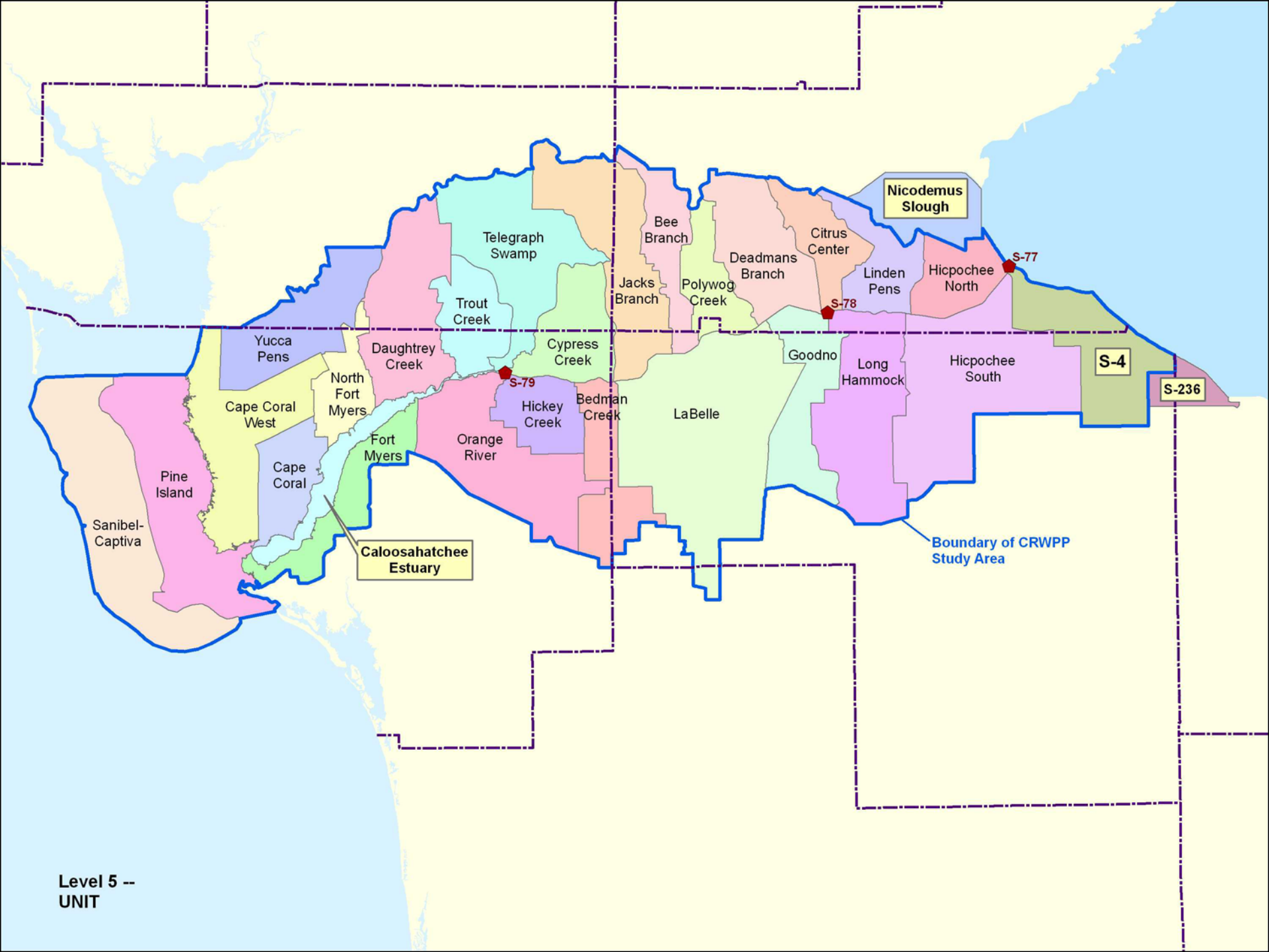


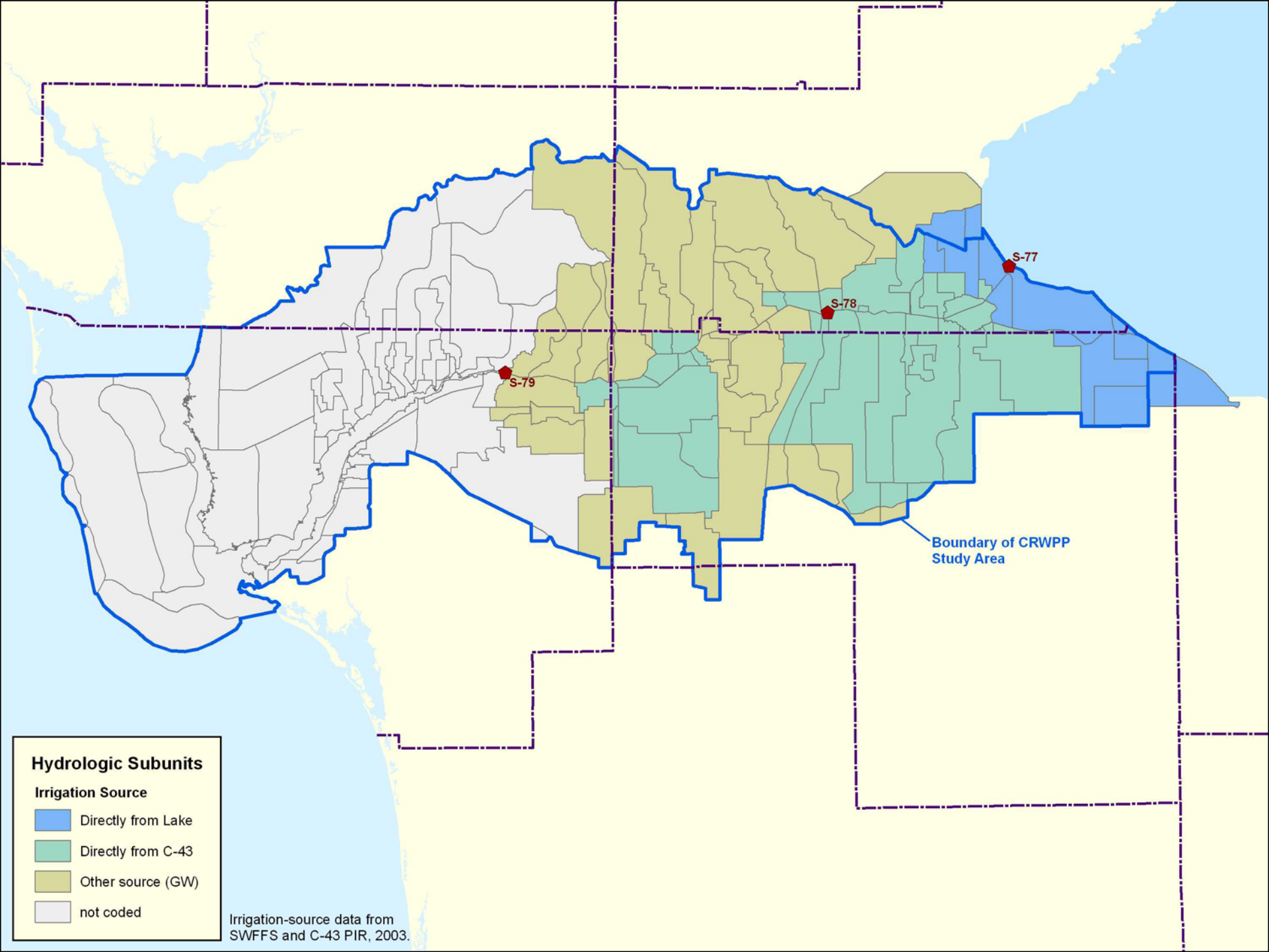
Level 2 --
SUBWATERSHED



Level 3 --
REGION







Identification of Nutrient Concentration Hotspots

Why assess concentration rather than load?

- Load = concentration x flow
- Historically flow is not routinely measured at tributaries where WQ grabs are collected

General Approach

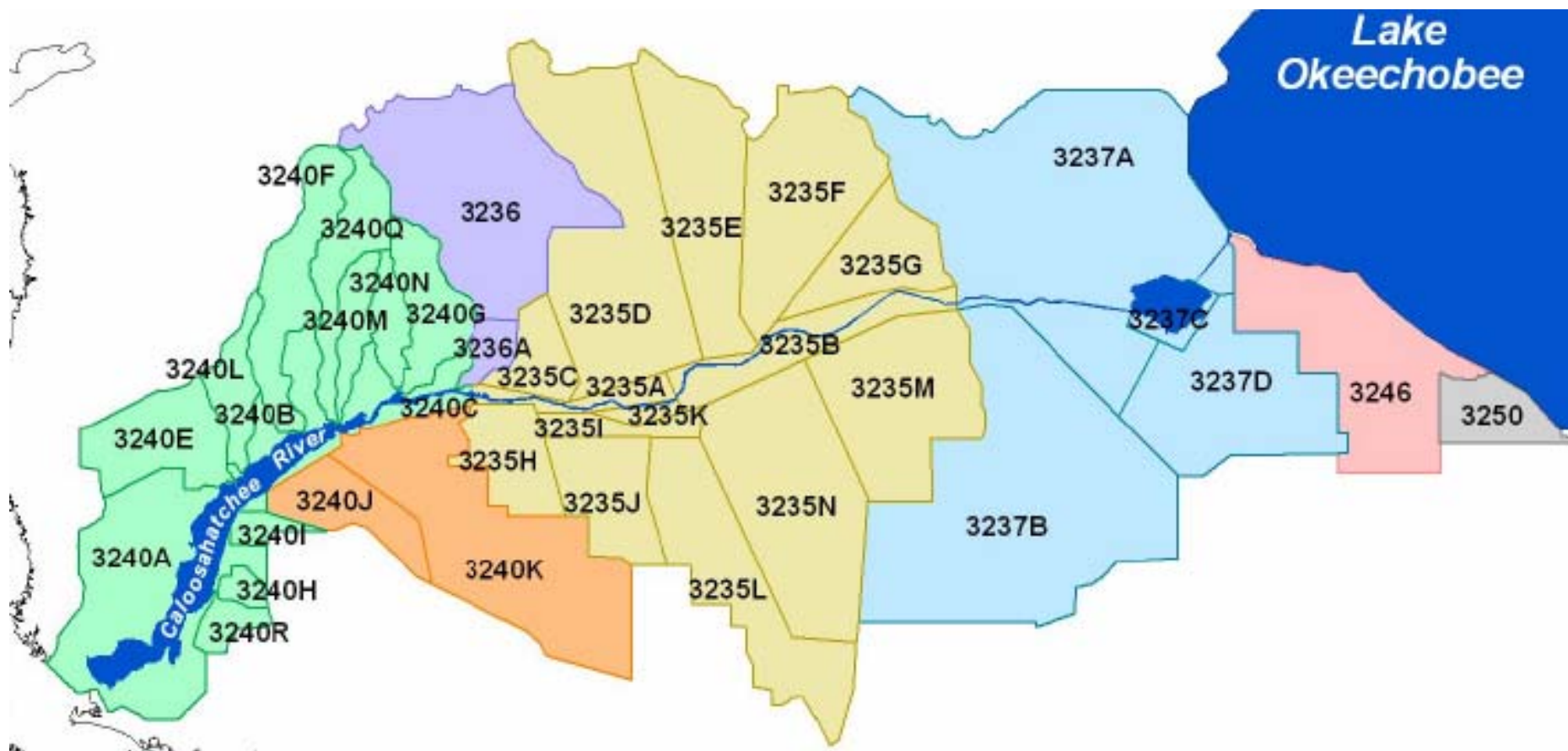
- I. Rank based on median concentration
 - reflects general condition (may be biased by timing of sample collections?)
- II. Rank based on frequency of samples exceeding the 75th percentile concentration of TN / TP
 - captures upper-tail of distribution (more indicative of periods of runoff?)

General Approach

- I. Rank based on median concentration
 1. Compile TN /TP data for individual stations (5 yr POR) within Caloosahatchee Basin collected by SFWMD, FDEP, Lee County and Cape Coral – calculate median and rank
 2. Use FDEP dataset compiled for IWR runs; query Caloosahatchee Basin for TN / TP data (7 yr POR) – rank WBIDs rather than individual stations

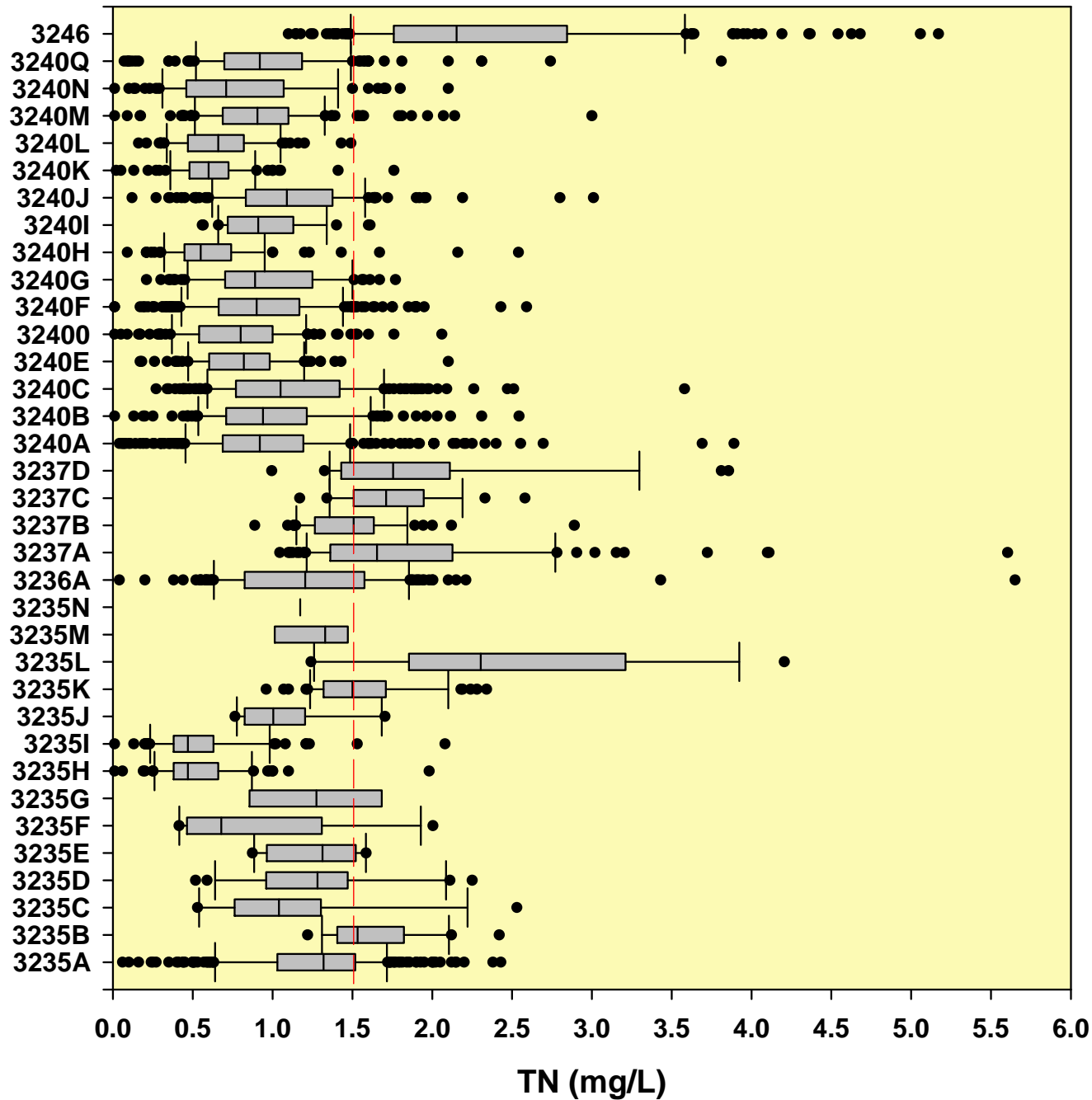
Top 30 out of
234 stations
(excluding in-
river stations)

TN STATION	median	count	rank
US 27 Canal(1.3 mile north of Nine Mile canal)	3.12	12	1
BEE BRANCH SITE 4	2.01	8	2
FLAGHOLE D D STA 4	1.91	5	3
LAKE HICPOCHEE (LH1)	1.81	10	4
833 canal	1.81	5	5
CYPRESS BRANCH SR78 EAST OF SR29	1.81	5	6
TOWNSEND C SR 80 BR E LEE-HENDRY	1.79	8	7
Whidden Corner canal	1.76	5	8
9 MI CANAL 4.5 MI S MOOREHAVEN	1.72	11	9
CR-00.2T	1.69	31	10
C19 Canal at Lake Hicpochee	1.66	9	11
LAKE HICPOCHEE (LH2)	1.65	10	12
LAKE HICPOCHEE (LH3)	1.63	10	13
DEEPGR90	1.62	71	14
NINE MILE CANAL SITE 2 WBID 3237D	1.61	5	15
CR-04.8T	1.59	31	16
BWCD C-3(aka Long Hammock canal)	1.53	16	17
LONG HAMMOCK CREEK SITE 1 WBID 3237B	1.45	5	18
Whidden/833 combined	1.43	11	19
UNNAMED CR SR 80 BR 1.9 M SW LAB	1.43	5	20
BEE BRANCH SITE 3	1.42	8	21
LONG HAMMOCK CREEK AT STATE ROAD 80	1.42	5	22
Robert's canal(aka Banana Branch) *	1.42	6	23
FAST CK SR 80 BR	1.40	5	24
FAST CK SR 80A BR	1.38	8	25
BILLGR60	1.35	64	26
LONG HAMMOCK CREEK SITE 2 WBID 3237B	1.32	5	27
C43TC-1	1.32	5	28
CYPRESSGR	1.31	27	29
BEE BRANCH SITE 2	1.30	12	30



TN

WBID



WBID		Median TN	n	Rank
3235L	TOWNSEND CANAL	2.30	44	1
3246	EAST CALOOSAHATCHEE	2.15	404	2
3237D	NINEMILE CANAL	1.76	41	3
3237C	LAKE HICPOCHEE	1.71	87	4
3237A	EAST CALOOSAHATCHEE	1.65	101	5
3235B	WEST CALOOSAHATCHEE	1.53	51	6
3237B	LONG HAMMOCK CREEK	1.51	68	7
3235K	TOWNSEND CANAL	1.50	63	8
3235M	GOODNO CANAL	1.33	13	9
3235A	WEST CALOOSAHATCHEE	1.32	353	10
3235E	BEE BRANCH	1.31	41	11
3235D	JACKS BRANCH	1.28	26	12
3235G	CYPRESS BRANCH	1.28	18	13
3236A	TELEGRAPH CREEK	1.21	169	14
3235N	ROBERTS CANAL	1.17	2	15
3240J	BILLY CREEK	1.09	246	16
3240C	TIDAL CALOOSAHATCHEE	1.05	363	17
3235C	CYPRESS CREEK	1.04	22	18
3235J	DOG CANAL	1.00	38	19
3240B	TIDAL CALOOSAHATCHEE	0.94	242	20
3240A	TIDAL CALOOSAHATCHEE	0.92	744	21
3240Q	POPASH CREEK	0.92	280	21
3240I	MANUEL BRANCH	0.91	47	23
3240M	STROUD CREEK	0.91	171	24
3240F	DAUGHTREY CREEK	0.90	317	25
3240G	TROUT CREEK	0.89	88	26
3240E	YELLOW FEVER CREEK	0.82	93	27
32400	HANCOCK CREEK	0.80	153	28
3240N	OWL CREEK	0.71	94	29
3235F	POLLYWOG CREEK	0.68	18	30
3240L	GILCHREST DRAIN--POWEL	0.66	147	31
3240K	ORANGE RIVER	0.60	172	32
3240H	WHISKY CREEK (WYOUA CREEK)	0.55	172	33
3235H	HICKEY CREEK	0.47	83	34
3235I	BEDMAN CREEK	0.47	84	34

Top 30 out of
239 stations
(excluding in-
river stations)

TP Station	Median	n	rank
POLLYWOG CREEK @ NOBLES RD	0.900	7	1
Pollywog creek at SR 78 near L	0.650	7	2
CFMBILLY4	0.320	32	3
BILLGR20	0.249	66	4
BILLGR60	0.248	64	5
CFMBILLY1	0.230	31	6
TOWNSEND C SR 80 BR E LEE-HEND	0.220	8	7
16-18GR	0.186	68	8
CFMBILLY6	0.175	30	9
28-5GR	0.166	56	10
26-GR20	0.165	66	11
18-6GR	0.156	71	12
CFMMANUEL	0.155	30	13
16-3GR	0.150	69	14
CFMBILLY3	0.150	31	14
FAST CK SR 80 BR	0.150	5	14
Robert's canal(aka Banana Bran	0.150	6	14
TOWNSEND CANAL DRAINAGE SITE 2	0.150	8	14
FAST CK SR 80A BR	0.145	10	19
CR-04_8T	0.143	32	20
23-5GR	0.140	71	21
833 canal	0.140	5	21
CFMBROADWAY	0.140	31	21
DEEPGR90	0.140	71	21
Fort Simmon"s branch	0.140	9	21
YFC-CI	0.140	70	21
CRASRDIS	0.135	8	27
DEEPGR50	0.131	76	28
CYPRESS BRANCH SR78 EAST OF SR	0.130	5	29
C43TC-2	0.128	5	30

TP

WBID

3246
3240Q
3240N
3240M
3240L
3240K
3240J
3240I
3240H
3240G
3240F
3240O
3240E
3240C
3240B
3240A
3237D
3237C
3237B
3237A
3236A
3235M
3235L
3235K
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3235B
3235A

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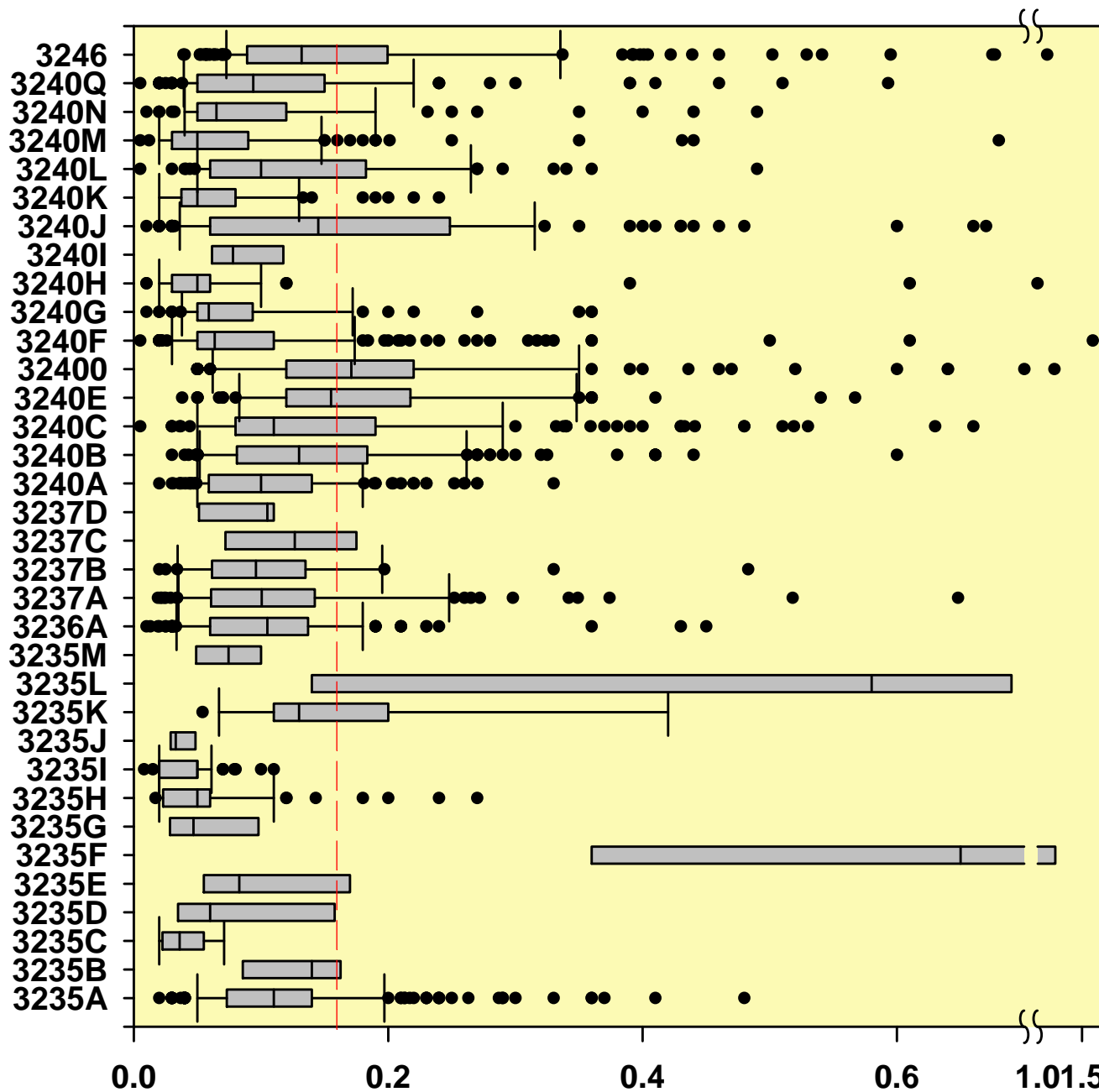
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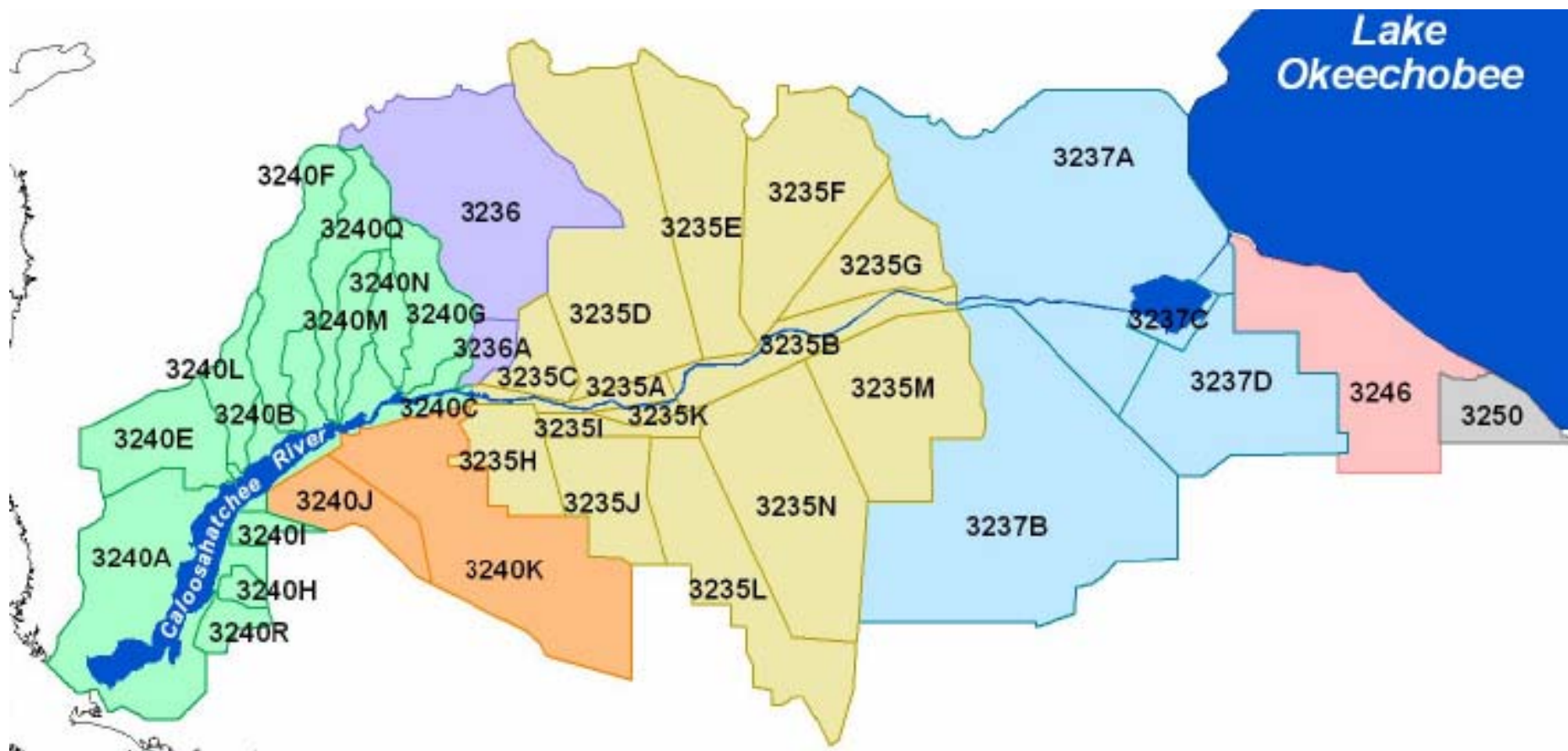
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1.0 1.5

TP (mg/L)

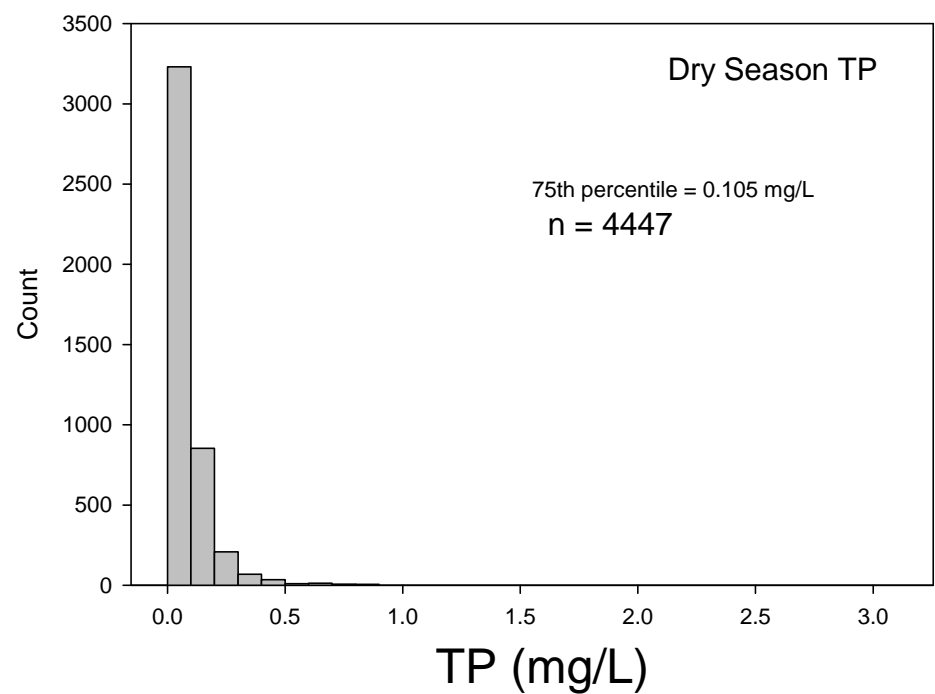
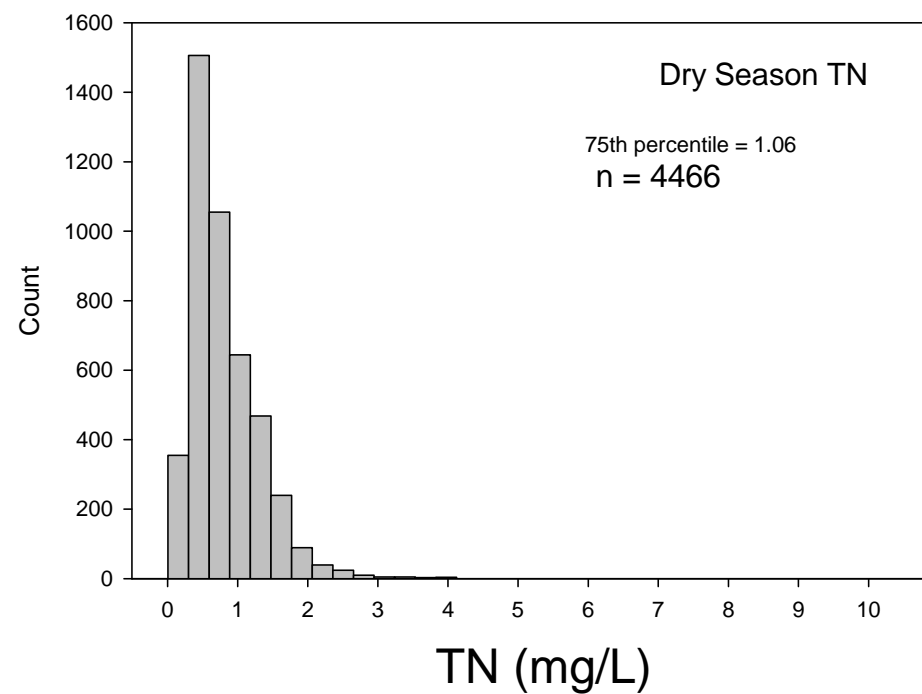
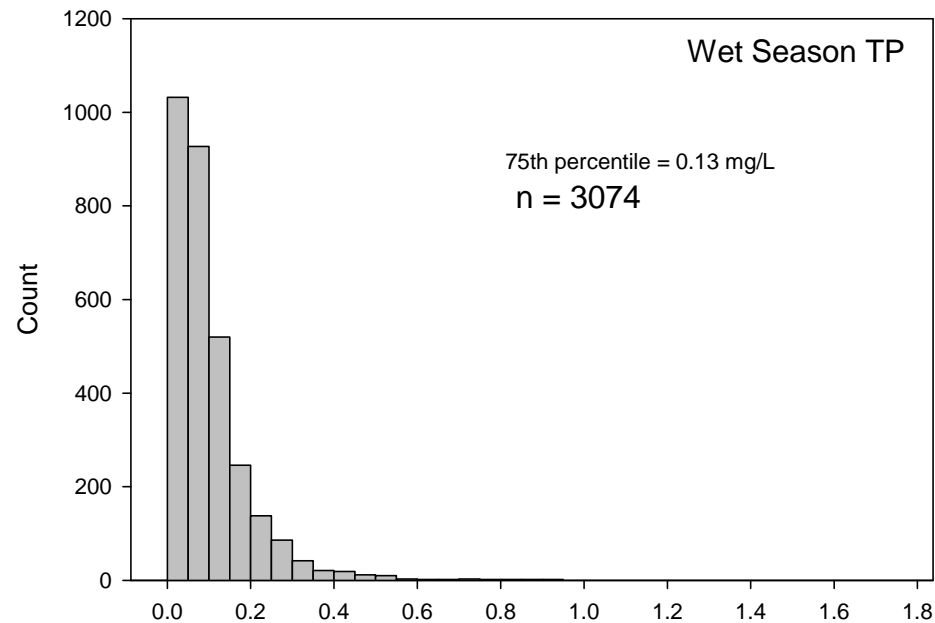
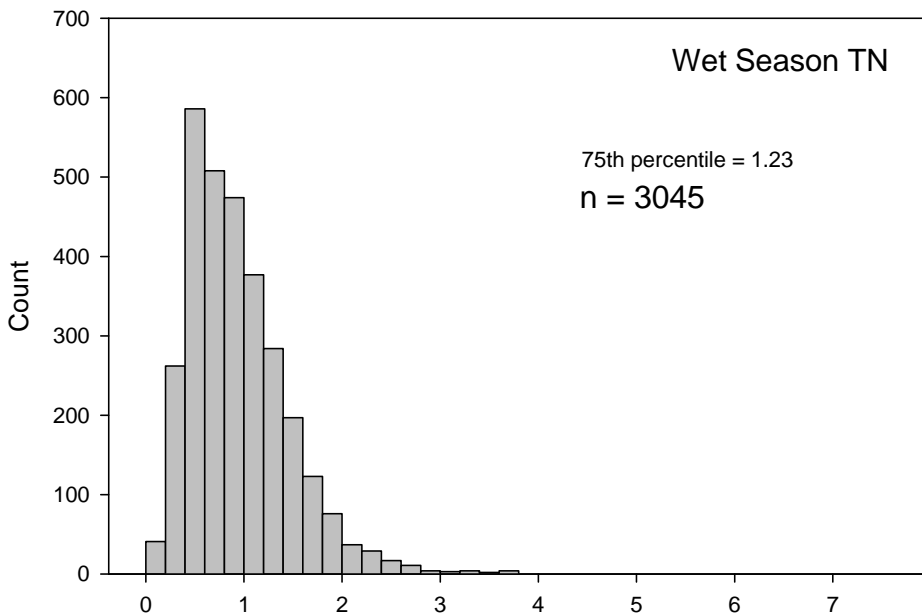


WBID		Median TP	n	Rank
3235F	POLLYWOG CREEK	0.650	14	1
3235L	TOWNSEND CANAL	0.580	24	2
32400	HANCOCK CREEK	0.171	154	3
3240E	YELLOW FEVER CREEK	0.155	85	4
3240J	BILLY CREEK	0.145	229	5
3235B	WEST CALOOSAHATCHEE	0.140	11	6
3246	EAST CALOOSAHATCHEE	0.132	406	7
3235K	TOWNSEND CANAL	0.130	27	8
3240B	TIDAL CALOOSAHATCHEE	0.130	228	8
3237C	LAKE HICPOCHEE	0.127	22	10
3235A	WEST CALOOSAHATCHEE	0.110	291	11
3240C	TIDAL CALOOSAHATCHEE	0.110	336	11
3236A	TELEGRAPH CREEK	0.105	153	13
3237D	NINEMILE CANAL	0.105	6	13
3237A	EAST CALOOSAHATCHEE	0.101	101	15
3240A	TIDAL CALOOSAHATCHEE	0.100	562	16
3240L	GILCHREST DRAIN--POWEL	0.100	134	16
3237B	LONG HAMMOCK CREEK	0.096	47	18
3240Q	POPASH CREEK	0.094	257	19
3235E	BEE BRANCH	0.083	24	20
3240I	MANUEL BRANCH	0.078	6	21
3235M	GOODNO CANAL	0.075	12	22
3240N	OWL CREEK	0.065	79	23
3240F	DAUGHTREY CREEK	0.064	280	24
3235D	JACKS BRANCH	0.060	7	25
3240G	TROUT CREEK	0.059	77	26
3235H	HICKEY CREEK	0.050	79	27
3235I	BEDMAN CREEK	0.050	79	27
3240H	WHISKY CREEK (WYOUA CREEK)	0.050	152	27
3240K	ORANGE RIVER	0.050	151	27
3240M	STROUD CREEK	0.050	155	27
3235G	CYPRESS BRANCH	0.047	17	32
3235C	CYPRESS CREEK	0.036	20	33
3235J	DOG CANAL	0.033	20	34



General Approach

- II. Rank based on frequency of samples exceeding the 75th percentile concentration of TN / TP
 - 1. Compile TN /TP data for individual stations (5 yr POR) within Caloosahatchee Basin collected by SFWMD, FDEP, Lee County and Cape Coral
 - Many stations sampled only infrequently
 - 134 stations for TN and 132 for TP exceed 75th% at least 1x
 - how to make comparisons?
 - # of samples > 75th or Percent of samples collected > 75th



Top 30 Ranked Stations (n>4)

TN STATION	Dry n	Dry n> 75th	Dry %>75th	Dry rank	Dry rank%	Wet n	Wet n> 75th	Wet %>75th	Wet rank	Wet rank%	Average rank
CR-00.2T	19	19	100%	9	1	12	12	100%	11	1	5.5
CR-04.8T	19	19	100%	9	1	12	12	100%	11	1	5.5
S79 *	19	19	100%	9	1	11	11	100%	13	1	6
BWCD C-3(aka Long Hammock canal)	8	8	100%	25	1	8	8	100%	20	1	11.75
Caloosahatchee River .25 mi west of Alva	5	5	100%	38	1	8	8	100%	20	1	15
US 27 Canal(1.3 mile north of Nine Mile canal)	5	5	100%	38	1	7	7	100%	24	1	16
9 MI CANAL 4.5 MI S MOOREHAVEN	5	5	100%	38	1	6	6	100%	30	1	17.5
S77 *	119	118	99%	2	56	87	75	86%	2	56	29
Caloosahatchee River east of Olga WTP	5	5	100%	38	1	8	7	88%	24	55	29.5
CES01 *	148	132	89%	1	59	122	89	73%	1	63	31
DEEPGR90	40	36	90%	4	58	31	26	84%	4	59	31.25
CES03 *	65	44	68%	3	66	48	41	85%	3	57	32.25
S78 *	27	24	89%	7	60	11	10	91%	16	54	34.25
DEEPGR50	43	33	77%	5	62	33	21	64%	6	66	34.75
BILLGR60	37	23	62%	8	72	27	23	85%	5	58	35.75
CES04 *	33	19	58%	9	73	22	17	77%	7	61	37.5
26-GR20	37	25	68%	6	67	29	13	45%	9	77	39.75
TOWNSEND C SR 80 BR E LEE-HENDRY	5	5	100%	38	1	3	2	67%	60	64	40.75
Fort Simmon"s branch	5	5	100%	38	1	4	2	50%	60	69	42
CYPRESSGR	14	10	71%	20	65	13	7	54%	24	68	44.25
BILLGR20	39	16	41%	14	87	27	11	41%	13	80	48.5
20A-19GR	34	14	41%	16	86	25	9	36%	18	82	50.5
20-29GR	43	12	28%	19	99	30	13	43%	9	78	51.25
DEEPGR10	43	18	42%	13	85	33	8	24%	20	90	52
TOWNSEND CANAL DRAINAGE SITE 2- WBID 3235K	5	5	100%	38	1	3	1	33%	87	83	52.25
21-7GR	35	14	40%	16	88	24	7	29%	24	86	53.5
CES06 *	31	5	16%	38	113	22	14	64%	8	66	56.25
23-27GR	40	14	35%	16	92	28	6	21%	30	96	58.5
25-GR20	40	6	15%	31	114	26	11	42%	13	79	59.25
CFMBILLY4	19	10	53%	20	76	13	3	23%	51	92	59.75

Top 30 Ranked Stations (n>4)

TN STATION NOT IN RIVER	Dry n	Dry n> 75th	Dry %>75th	Dry rank	Dry rank%	Wet n	Wet n> 75th	Wet %>75th	Wet rank	Wet rank%	Average rank
CR-00.2T	19	19	100%	9	1	12	12	100%	11	1	5.5
CR-04.8T	19	19	100%	9	1	12	12	100%	11	1	5.5
BWCD C-3(aka Long Hammock canal)	8	8	100%	25	1	8	8	100%	20	1	11.75
US 27 Canal(1.3 mile north of Nine Mile canal)	5	5	100%	38	1	7	7	100%	24	1	16
9 MI CANAL 4.5 MI S MOOREHAVEN	5	5	100%	38	1	6	6	100%	30	1	17.5
DEEPGR90	40	36	90%	4	58	31	26	84%	4	59	31.25
DEEPGR50	43	33	77%	5	62	33	21	64%	6	66	34.75
BILLGR60	37	23	62%	8	72	27	23	85%	5	58	35.75
26-GR20	37	25	68%	6	67	29	13	45%	9	77	39.75
TOWNSEND C SR 80 BR E LEE-HENDRY	5	5	100%	38	1	3	2	67%	60	64	40.75
Fort Simmon"s branch	5	5	100%	38	1	4	2	50%	60	69	42
CYPRESSGR	14	10	71%	20	65	13	7	54%	24	68	44.25
BILLGR20	39	16	41%	14	87	27	11	41%	13	80	48.5
20A-19GR	34	14	41%	16	86	25	9	36%	18	82	50.5
20-29GR	43	12	28%	19	99	30	13	43%	9	78	51.25
DEEPGR10	43	18	42%	13	85	33	8	24%	20	90	52
TOWNSEND CANAL DRAINAGE SITE 2- WBID 3235K	5	5	100%	38	1	3	1	33%	87	83	52.25
21-7GR	35	14	40%	16	88	24	7	29%	24	86	53.5
23-27GR	40	14	35%	16	92	28	6	21%	30	96	58.5
25-GR20	40	6	15%	31	114	26	11	42%	13	79	59.25
CFMBILLY4	19	10	53%	20	76	13	3	23%	51	92	59.75
20A-11GR	32	6	19%	31	111	24	8	33%	20	83	61.25
27-6GR	40	6	15%	31	114	27	9	33%	18	83	61.5
23-5GR	43	10	23%	20	105	28	6	21%	30	96	62.75
CFMBILLY3	18	8	44%	25	84	13	3	23%	51	92	63
22-18GR	31	8	26%	25	100	29	6	21%	30	98	63.25
Pollywog creek at SR 78 near LaBelle	5	2	40%	104	88	2	2	100%	60	1	63.25
27O-GR20	41	5	12%	38	123	27	10	37%	16	81	64.5
24-19GR	40	10	25%	20	101	27	5	19%	41	99	65.25
CFMBILLY1	18	6	33%	31	93	13	3	23%	51	92	66.75

Top 30 Ranked Stations (n>4)

TP STATION	Dry n	Dry n> 75th	Dry %>75th	Dry rank	Dry rank%	Wet n	Wet n> 75th	Wet %>75th	Wet rank	Wet rank%	Average rank
CFMBILLY4	19	19	100%	14	1	13	13	100%	15	1	7.75
CFMBILLY6	17	16	94%	17	26	13	13	100%	15	1	14.75
CFMBILLY1	18	18	100%	15	1	13	12	92%	18	28	15.5
BILLGR60	37	35	95%	5	25	27	23	85%	4	31	16.25
16-18GR	40	36	90%	3	27	28	22	79%	6	34	17.5
CFMMANUEL	17	17	100%	16	1	13	10	77%	23	36	19
18-6GR	42	36	86%	3	30	29	22	76%	6	38	19.25
BILLGR20	39	34	87%	6	29	27	21	78%	8	35	19.5
16-3GR	41	30	73%	9	38	28	25	89%	3	29	19.75
CFMBILLY3	18	15	83%	19	31	13	11	85%	21	32	25.75
YFC-CI	41	29	71%	10	41	29	20	69%	9	44	26
26-GR20	37	26	70%	11	42	29	20	69%	9	44	26.5
28-5GR	30	15	50%	19	53	26	23	88%	4	30	26.5
DEEPGR50	43	31	72%	8	40	33	19	58%	12	50	27.5
TOWNSEND C SR 80 BR E LEE-HENDRY	5	5	100%	49	1	3	3	100%	60	1	27.75
DEEPGR90	40	25	63%	12	46	31	19	61%	12	47	29.25
CES01 *	82	49	60%	2	49	66	28	42%	2	67	30
CR-04.8T	20	14	70%	24	43	12	10	83%	23	33	30.75
23-5GR	43	32	74%	7	37	28	13	46%	15	65	31
CFMBROADWAY	18	13	72%	27	39	13	10	77%	23	36	31.25
POLLYWOG CREEK @ NOBLES RD	5	5	100%	49	1	2	2	100%	74	1	31.25
S77 *	118	52	44%	1	65	89	35	39%	1	72	34.75
CES03 *	35	15	43%	19	66	26	14	54%	14	52	37.75
S79 *	19	11	58%	31	50	11	8	73%	29	42	38
20A-11GR	32	15	47%	19	64	24	12	50%	18	53	38.5
DEEPGR10	43	13	30%	27	84	33	20	61%	9	48	42
TOWNSEND CANAL DRAINAGE SITE 2- WBID 3235K	5	3	60%	70	47	3	3	100%	60	1	44.5
CES04 *	33	14	42%	24	67	22	10	45%	23	66	45
350	32	8	25%	38	87	17	12	71%	18	43	46.5
242	32	13	41%	27	68	17	8	47%	29	64	47

Top 30 Ranked Stations (n>4)

TP STATION NOT IN RIVER	Dry n	Dry n> 75th	Dry %>75th	Dry rank	Dry rank%	Wet n	Wet n> 75th	Wet %>75th	Wet rank	Wet rank%	Average rank
CFMBILLY4	19	19	100%	14	1	13	13	100%	15	1	7.75
CFMBILLY6	17	16	94%	17	26	13	13	100%	15	1	14.75
CFMBILLY1	18	18	100%	15	1	13	12	92%	18	28	15.5
BILLGR60	37	35	95%	5	25	27	23	85%	4	31	16.25
16-18GR	40	36	90%	3	27	28	22	79%	6	34	17.5
CFMMANUEL	17	17	100%	16	1	13	10	77%	23	36	19
18-6GR	42	36	86%	3	30	29	22	76%	6	38	19.25
BILLGR20	39	34	87%	6	29	27	21	78%	8	35	19.5
16-3GR	41	30	73%	9	38	28	25	89%	3	29	19.75
CFMBILLY3	18	15	83%	19	31	13	11	85%	21	32	25.75
YFC-CI	41	29	71%	10	41	29	20	69%	9	44	26
26-GR20	37	26	70%	11	42	29	20	69%	9	44	26.5
28-5GR	30	15	50%	19	53	26	23	88%	4	30	26.5
DEEPGR50	43	31	72%	8	40	33	19	58%	12	50	27.5
TOWNSEND C SR 80 BR E LEE-HENDRY	5	5	100%	49	1	3	3	100%	60	1	27.75
DEEPGR90	40	25	63%	12	46	31	19	61%	12	47	29.25
CR-04.8T	20	14	70%	24	43	12	10	83%	23	33	30.75
23-5GR	43	32	74%	7	37	28	13	46%	15	65	31
CFMBROADWAY	18	13	72%	27	39	13	10	77%	23	36	31.25
POLLYWOG CREEK @ NOBLES RD	5	5	100%	49	1	2	2	100%	74	1	31.25
20A-11GR	32	15	47%	19	64	24	12	50%	18	53	38.5
DEEPGR10	43	13	30%	27	84	33	20	61%	9	48	42
TOWNSEND CANAL DRAINAGE SITE 2- WBID 3235K	5	3	60%	70	47	3	3	100%	60	1	44.5
350 *	32	8	25%	38	87	17	12	71%	18	43	46.5
242 *	32	13	41%	27	68	17	8	47%	29	64	47
22-7GR	33	16	48%	17	62	27	8	30%	29	89	49.25
Pollywog creek at SR 78 near LaBelle	5	5	100%	49	1	2	1	50%	104	53	51.75
POWLGR51	14	8	57%	38	51	20	6	30%	38	87	53.5
Fort Simmon"s branch	5	3	60%	70	47	4	3	75%	60	39	54
POWLGR20	40	21	53%	13	52	28	5	18%	47	104	54

General Approach

- II. Rank based on frequency of samples exceeding the 75th percentile concentration of TN / TP
 - 1. Compile TN /TP data for individual stations (5 yr POR) within Caloosahatchee Basin collected by SFWMD, FDEP, Lee County and Cape Coral
 - Many stations sampled only infrequently
 - 134 stations for TN and 132 for TP exceed 75th% at least 1x
 - how to make comparisons?
 - # of samples > 75th or Percent of samples collected > 75th
 - **Aggregate stations in space**

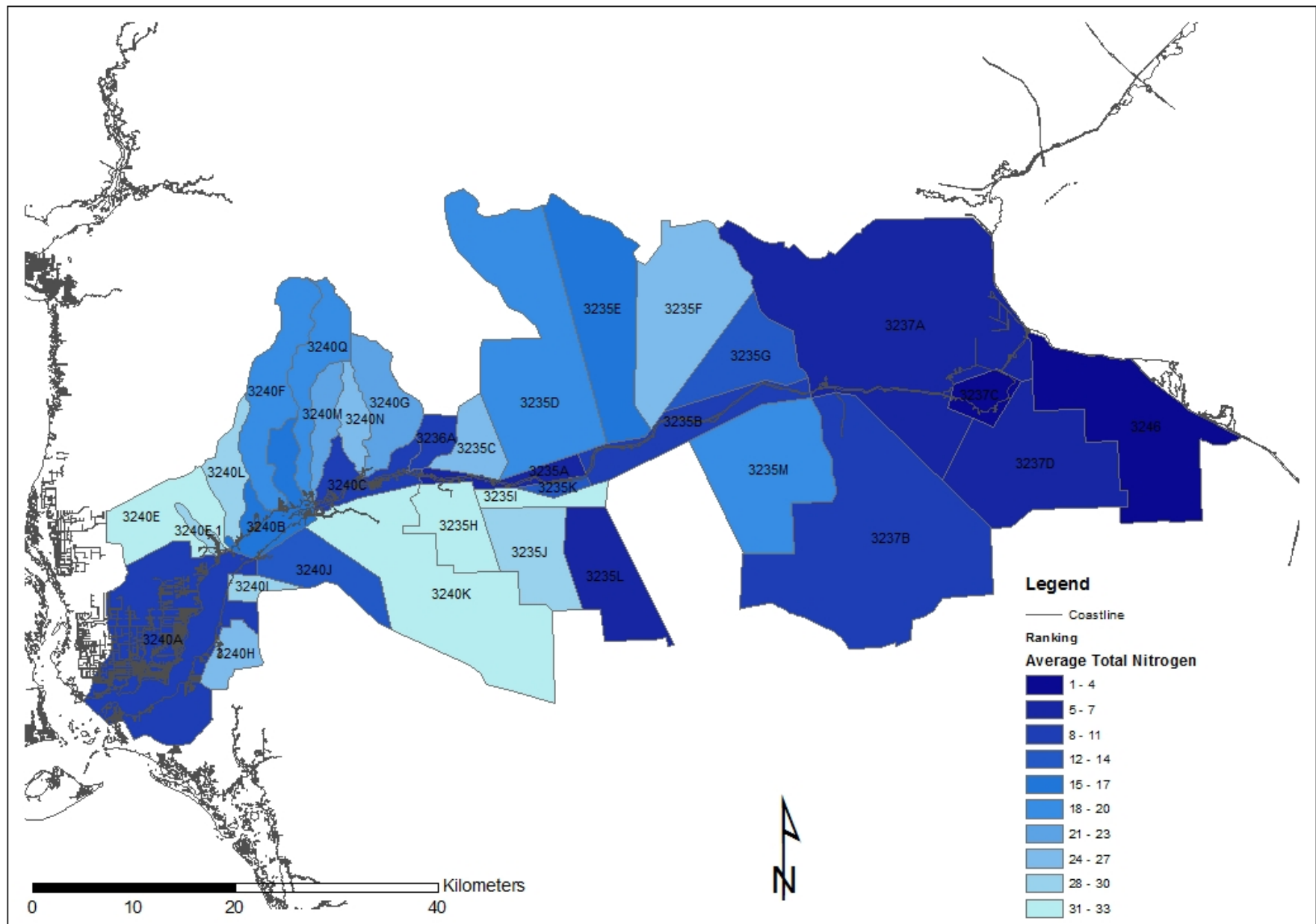
General Approach

- II. Rank based on frequency of samples exceeding the 75th percentile concentration of TN / TP
 1. Compile TN /TP data for individual stations (5 yr POR) within Caloosahatchee Basin collected by SFWMD, FDEP, Lee County and Cape Coral
 2. Use FDEP dataset compiled for IWR runs; query Caloosahatchee Basin for TN / TP data (7 yr POR) – rank WBIDs rather than individual stations

WBID	n Dry Season	Dry Exceed 75th	Dry% >75th	Dry Season rank	Dry Season rank%	n Wet Season	Wet Exceed 75th	Wet%> 75	Wet Season rank	Wet Season rank%	Average Rank
3246	208	186	89%	1	1	196	168	86%	1	2	1
3237C	50	42	84%	4	3	37	30	81%	5	5	4
3237A	63	39	62%	6	6	38	26	68%	6	6	6
3237D	22	19	86%	11	2	19	16	84%	10	3	7
3235A	206	82	40%	2	12	147	40	27%	3	12	7
3235L	27	21	78%	10	4	17	14	82%	11	4	7
3235B	27	16	59%	12	7	24	16	67%	9	7	9
3237B	45	28	62%	9	5	23	10	43%	14	8	9
3240A	432	76	18%	3	18	312	62	20%	2	17	10
3236A	102	38	37%	7	13	67	18	27%	8	13	10
3240C	216	42	19%	5	17	147	31	21%	4	15	10
3235G	14	8	57%	18	8	4	4	100%	19	1	12
3235K	34	15	44%	14	10	29	11	38%	13	9	12
3240J	136	35	26%	8	16	110	23	21%	7	16	12
3235E	23	11	48%	17	9	18	5	28%	18	11	14
3240B	145	15	10%	15	21	97	13	13%	12	20	17
3235D	14	6	43%	19	11	12	2	17%	22	18	18
3240F	194	16	8%	13	23	123	8	7%	15	22	18
3235M	10	3	30%	25	14	3	1	33%	26	10	19
3240Q	173	15	9%	16	22	107	7	7%	16	21	19
3240G	53	6	11%	20	20	35	2	6%	24	24	22
3240M	102	4	4%	23	26	69	4	6%	20	23	23
3235F	14	1	7%	31	24	4	1	25%	25	14	24
3240H	102	4	4%	22	25	70	3	4%	21	26	24
3240N	55	2	4%	30	29	39	6	15%	17	19	24
3235C	15	4	27%	21	15	7	0	0%	30	30	24
3240E1	95	3	3%	26	31	58	2	3%	23	27	27
3235J	26	3	12%	24	19	12	0	0%	33	33	27
3240I	26	1	4%	34	28	21	1	5%	28	25	29
3240L	85	3	4%	27	30	62	1	2%	29	29	29
3235I	51	2	4%	28	27	33	0	0%	32	32	30
3240E	56	1	2%	33	34	37	1	3%	27	28	31
3235H	50	1	2%	32	32	33	0	0%	31	31	32
3240K	101	2	2%	29	33	71	0	0%	34	34	33
3235N	2	0	0%	35	35	2	0	0%	35	35	35

TN

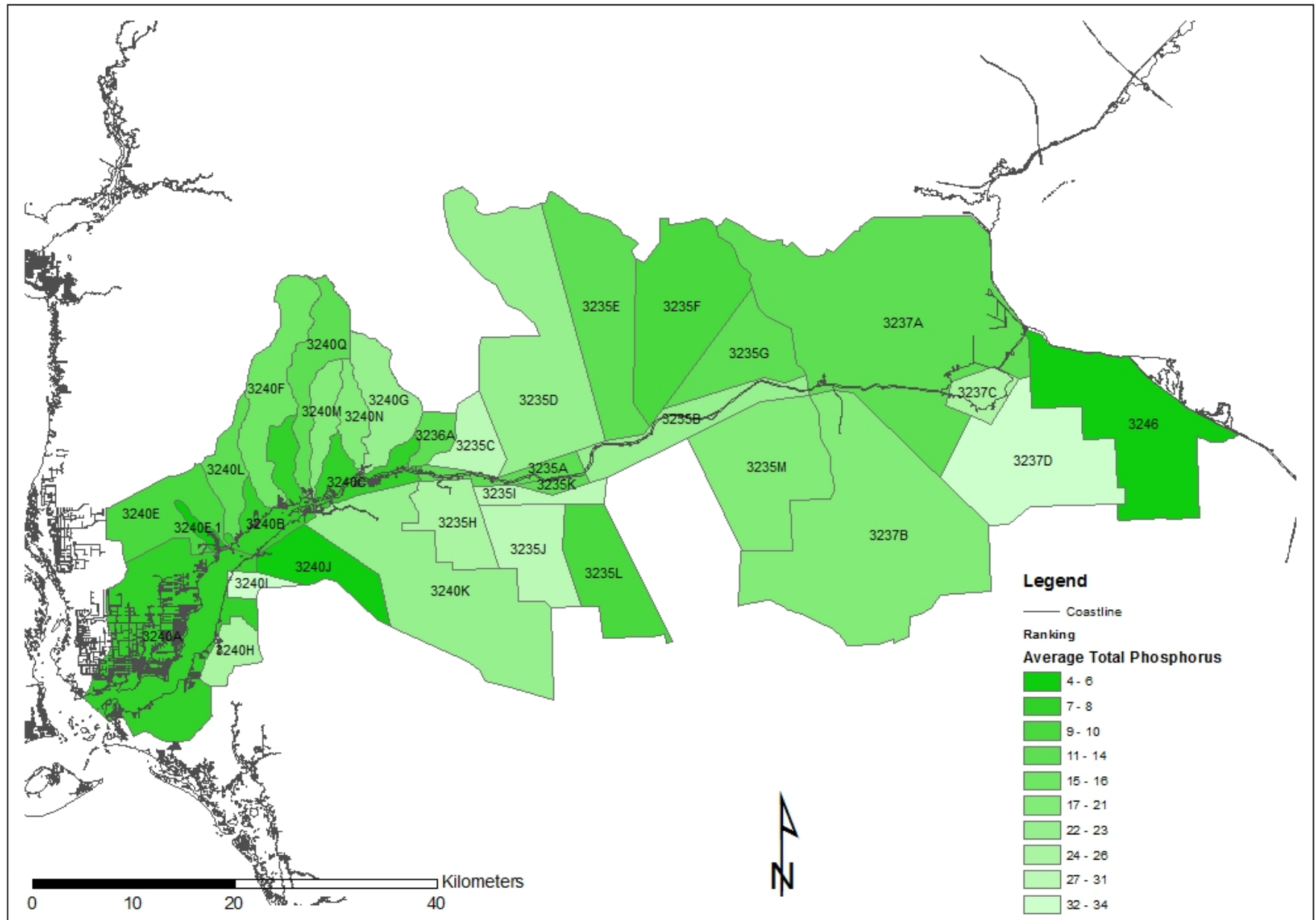
Caloosahatchee River WBID Ranking



WBID	n Dry Season	Dry Exceed 75th	Dry%>7 5th	Dry Season rank	Dry Season rank%	n Wet Season	Wet Exceed 75th	Wet%> 75th	Wet Season rank	Wet Season rank%	Average Rank
3240J	121	88	73%	1	2	108	44	41%	4	8	4
3240E1	95	63	66%	4	4	59	25	42%	7	7	6
3246	209	71	34%	3	11	197	74	38%	1	9	6
3240C	193	56	29%	5	14	143	61	43%	3	6	7
3240A	316	76	24%	2	15	246	73	30%	2	13	8
3240B	134	51	38%	6	10	94	31	33%	5	12	8
3235L	17	12	71%	14	3	7	5	71%	17	2	9
3235F	10	10	100%	16	1	4	3	75%	21	1	10
3240E	50	33	66%	8	5	35	9	26%	12	16	10
3235E	13	5	38%	19	7	11	5	45%	15	5	12
3240L	77	32	42%	9	6	57	8	14%	13	22	13
3240Q	155	46	30%	7	13	102	16	16%	9	21	13
3235A	172	27	16%	10	19	119	30	25%	6	17	13
3237A	63	13	21%	13	17	38	10	26%	11	14	14
3235K	13	5	38%	21	9	14	5	36%	16	10	14
3236A	91	13	14%	12	21	62	16	26%	8	15	14
3235G	13	5	38%	20	8	4	2	50%	25	4	14
3240F	166	25	15%	11	20	114	15	13%	10	24	16
3240N	46	3	7%	24	24	33	8	24%	14	18	20
3235M	9	2	22%	25	16	3	1	33%	29	11	20
3240M	90	12	13%	15	22	65	5	8%	18	26	20
3237B	35	7	20%	18	18	12	2	17%	26	20	21
3235D	4	0	0%	30	30	3	2	67%	24	3	22
3235B	3	1	33%	27	12	8	1	13%	27	25	23
3240G	47	3	6%	23	26	30	4	13%	19	23	23
3240K	83	8	10%	17	23	68	3	4%	23	28	23
3240H	86	2	2%	26	28	66	4	6%	20	27	25
3235H	47	3	6%	22	25	32	1	3%	28	29	26
3237C	8	0	0%	32	32	14	3	21%	22	19	26
3235C	14	0	0%	29	29	6	0	0%	30	30	30
3235J	16	1	6%	28	27	4	0	0%	32	32	30
3235I	47	0	0%	31	31	32	0	0%	31	31	31
3237D	4	0	0%	33	33	2	0	0%	33	33	33
3240I	2	0	0%	34	34	4	0	0%	34	34	34

TP

Caloosahatchee River WBID Ranking



Take home message

- Lots of sources of TN and TP
- Sources differ for TN and TP

Where do we go from here?

- This is concentration not load
- Next step is to compare these nutrient concentration hotspots with modeled flow to qualitatively estimate loads