

AGENDA
St. Lucie River Watershed Protection Plan
Working Team Meeting #6

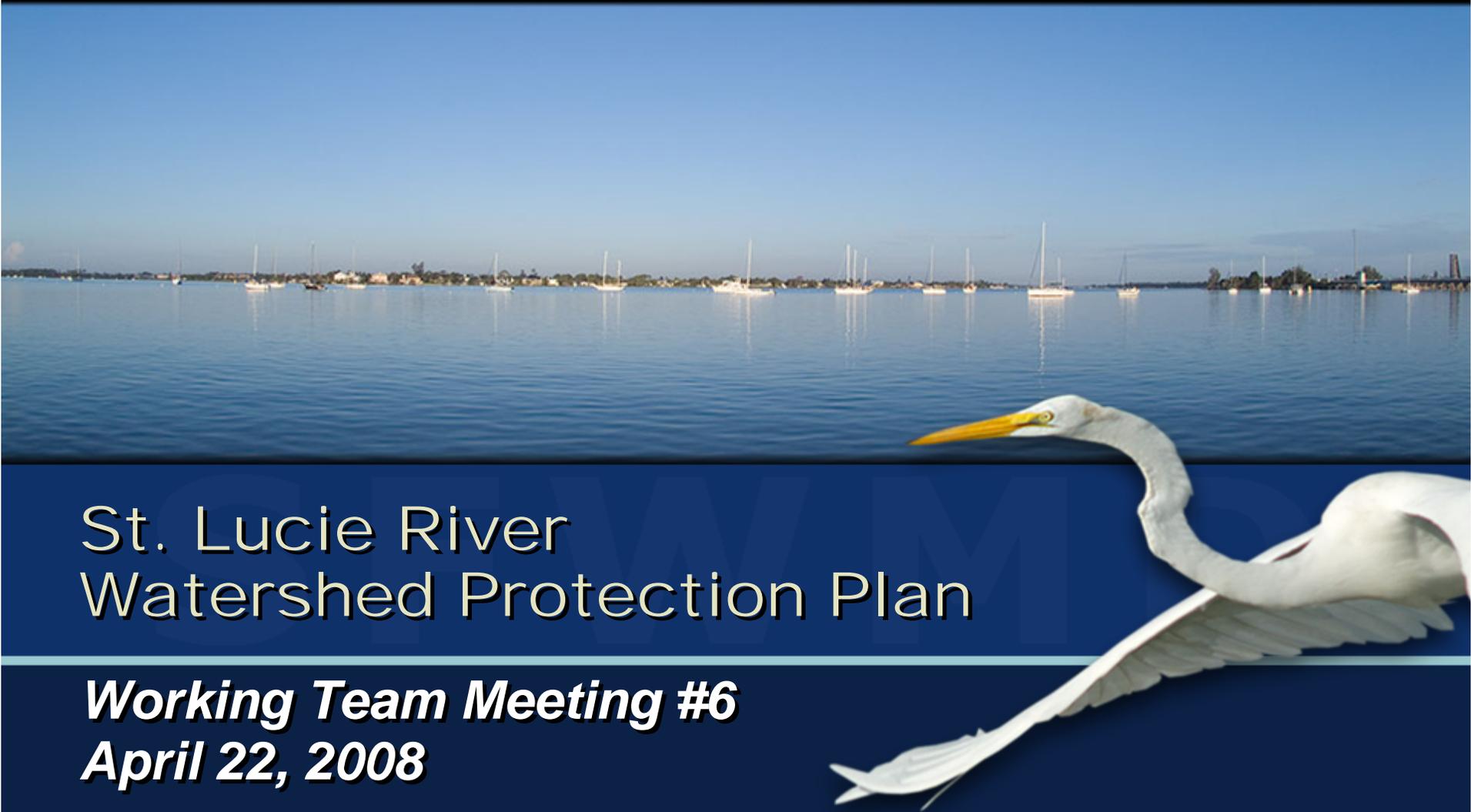
Tuesday, April 22, 2008
1330 - 1630

SFWMD Martin/St. Lucie Service Center
780 Southeast Indian Street
Stuart, FL 34997
(772) 223-2600

Conference Call Information:
561-640-6220

1. Introduction and Opening Remarks
2. Coordinating Agencies Update
3. Project Status and Schedule
4. FINAL DRAFT Management Measures
5. Regional Simulation Model
 - a. Base Conditions
 - b. Status of Alternative 1
 - c. Development of Alternative 2
6. Water Quality Spreadsheet Analysis Update
7. Public Comment Period*
8. Closing Remarks and Action Items (Next Meeting – Tuesday, May 27, 2008)

* As time permits, brief Public Comment Periods will also be held after major discussion items in the agenda

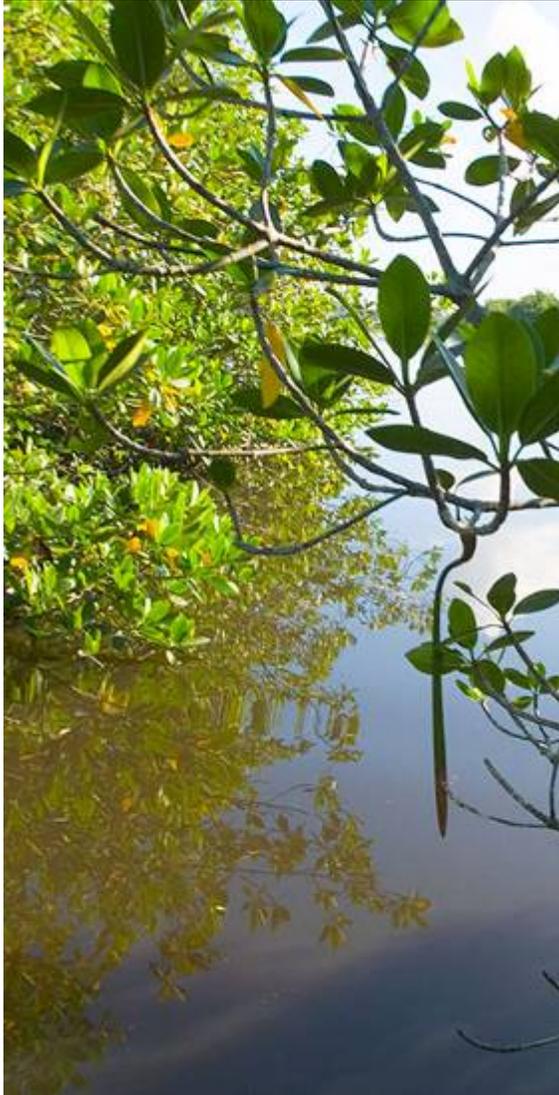


St. Lucie River
Watershed Protection Plan

Working Team Meeting #6
April 22, 2008



Schedule



- **Formulation and Evaluation of Alternatives through May/June 2008**
- **DRAFT Plan for Public review in October 2008**
- **Final Plan to Governing Board in December 2008**
- **Submit Plan to Legislature on January 1, 2009**



Project Alternatives Formulation and Evaluation

Alternative 1

Alternative 2

Alternative 3

Alternative 4

Others?

3/25

4/22

5/27

6/24

April 1

May 1

June 1

July 1



Interim Products

- **Management Measure Sheets**
- **Regional Simulation Model (RSM):**
 - **Base Run Results for “Integrated Model”**
 - **Results of Alternative 1**
 - **Alternative 2 Descriptions**
- **Water Quality Spreadsheet**
 - **Updated BMP information**
 - **Alternative 1**





Questions

**St. Lucie River Watershed Protection Plan
DRAFT Management Measures
4/21/2008**

MM#	Sub-Watershed	Project Feature/Activity	Level	Alternative
LO 1	SLE Watershed	Agricultural BMPs - Owner Implemented	1	1
LO 2	SLE Watershed	Agricultural BMPs - Funded Cost Share	1	1
LO 3	SLE Watershed	Urban Turf Fertilizer Rule (LOER)	1	1
LO 4	SLE Watershed	Land Application of Residuals	1	1
LO 5	SLE Watershed	Florida Yards and Neighborhoods	1	1
LO 7	SLE Watershed	ERP Regulatory Program	1	1
LO 8	SLE Watershed	NPDES Stormwater Program	1	1
LO 9		Coastal and Estuarine Land Conservation Program	1	1
LO 12		Alternative Water Storage (AWS) - Lake Okeechobee and Estuary Recovery	-	1
LO 12f		AWS - Indiantown Citrus Growers Association	1	1
LO 12j		AWS - Dupuis	4	1
LO 12m		AWS - Waste Management St. Lucie Site	4	1
LO 12q		AWS - Caulkins	4	1
LO 14	C-44	CERP - IRL South: C-44 Reservoir/STA	B	0
LO 15	SLE Watershed	St. Lucie River Watershed Works of the District Rule Regulatory Phosphorus Source Control Program	2	1
LO 21	SLE Watershed	LO and Estuary Watershed Basin Rule (LOER)	3	1
LO 38		C-44 Littoral	4	
LO 49	SLE Watershed	Agricultural BMPs - Cost Share Future Funding	1	1
LO 50	SLE Watershed	Agricultural BMPs - Additional Agricultural BMPs	1	1
LO 63	SLE Watershed	Wastewater and Stormwater Master Plans	4	1
LO 64	SLE Watershed	Unified Statewide Stormwater Rule	4	1
LO 65		L-65 Culvert to L-8 Tieback	4	
LO 66	N/A	L-8 Reservoir Phase I	B	0
LO 68	SLE Watershed	Comprehensive Planning-Land Development Regulations	3	1
LO 87		Florida Ranchlands Environmental Services Projects (FRESP)	-	1
LO 87a_1		Alderman-Deloney Ranch (C-25 basin)	1	1
LO 87c		Florida Ranchlands Environmental Services Project- full implementation	5	1
LO 91		Farm and Ranchland Protection Program Partnership	4	
LO 101	N/A	ECP Diversions	B	0
LO 102	N/A	EAA Reservoir	B	0
SLE 02		White City Canal D	1	1
SLE 03		White City Drainage Improvements (Citrus/Saeger)	1	1
SLE 04		White City Drainage Improvements (canals B, C, E, F, G)	2	
SLE 06		Indian River Estates/Savannas Ecosystem Management Project	1	1
SLE 07		Platt's Creek Wetland Restoration	2	
SLE 08		Indian River Drive Stormwater Outfall Retrofits	2	
SLE 09		Natural Lands in CERP IRL-South Project	-	1
SLE 09a	C-44, South Fork	CERP - IRL South: PalMar Complex - Natural Storage and Water Quality Area	1	1
SLE 09b	C-23	CERP - IRL South: Allapattah Complex - Natural Storage and Water Quality Area	1	1
SLE 09c	C-23	CERP - IRL South: Cypress Creek/Trail Ridge Complex - Natural Storage and Water Quality Area	2	1
SLE 10		St. Lucie Watershed Natural Area Registry Program	3	
SLE 11		Creation of suitable oyster substrate in the St. Lucie Estuary	2	
SLE 11a		Queens Cove	2	
SLE 11b		North Causeway Island	2	
SLE 11c		Savannah Road	2	
SLE 11d		Citrus Avenue	3	
SLE 11e		Thumb Point	2	
SLE 11f		Spoil Island	2	
SLE 11g		Vero Shores (South)	2	
SLE 11h		Jaycee Park	1	
SLE 11i		Various sites identified in IRL-South PIR (Artificial Habitat Creation)		
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SLE 18		Additional Reservoir Storage and Treatment Areas	-	
SLE 18a	C-44	Reservoir and/or Stormwater Treatment Area along the south side of the C-44 Canal	5	
SLE 19		Conversion of existing canals into "linear wetland treatment areas"	4	
SLE 22		North River Shores Vacuum Sewer System	1	1
SLE 24	C-23, C-24, North Fork	CERP - IRL South: C-23/24 Reservoir/STA	1	1
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SLE 28		Tropical Farms Roebuck Creek Stormwater Quality Retrofit	1	1
SLE 29		Old Palm City Phase III Stormwater Quality Retrofit	1	1
SLE 30		Manatee Pocket Dredging Project	1	1
SLE 31		Stormwater Baffle Box Retrofit - City of Stuart		
SLE 32		Danforth Creek Stormwater Quality Retrofit	3	
SLE 33		North St. Lucie River Water Control District Stormwater Retrofit; Structures 81-1-2 and 85-1-2		
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SLE 39a	C-44	ASR at C-44 Reservoir (IRL-S)	4	
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SLE 40	C-23, C-44	CERP - IRL South: Southern Diversion C-23 to C-44 interconnect	1	1
SLE 41		Martin County Baffle Boxes	4	
SLE 42		Jensen Beach Retrofit	1	1
SLE 43a		Leilani Hts/ Warner Creek Retrofit - Phase 1	1	1
SLE 43b		Leilani Hts/ Warner Creek Retrofit - Phase 2	3	
SLE 43c		Leilani Hts/ Warner Creek Retrofit - Phase 3	4	
SLE 44		Manatee Creek Water Quality Retrofit; PhII & PhIII; New Monrovia, Dixie Park	1	1
SLE 45	North Fork	10 Mile Creek - Reservoir and STA	B	0
SLE 46	SLE Watershed	Small Acreage Manure Management	3	
SLE 47		Deep Well Injection	4	
SLE 47a	C-44	Deep Well Injection- C-44 St. Lucie Canal (LO 96)	4	
SLE 48		Danforth Creek Muck Removal Dredging project	2	
SLE 49		Warner Creek Muck Removal Dredging Project	2	
SLE 50		Hidden River Muck Removal Dredging Project	2	

Levels:

B - Base condition; Project included in base model runs

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



SOUTH FLORIDA
WATER MANAGEMENT DISTRICT

Overview of Hydrologic Modeling For St. Lucie River Watershed Protection Plan

(presented by Lehar Brion, HESM, SFWMD)

4/22/08

- **Presentation Outline**
 - **Initial Model Run Assumptions**
 - **Performance Measures**
 - **Performance Indicators**
 - **Initial Modeling Results:**
 - **LOWCP P2TP Current Base**
 - **Draft SLRWPP Base Run**

4/22/08

■ Initial Model Run Assumptions

- The link-node version of the Regional Simulation Model (RSM) is the regional tool used to evaluate alternatives for St. Lucie River Watershed Protection Plan (SLRWPP)
- NERSM = specific implementation of RSM covering the northern extent of the District down to Lake Okeechobee
- Current Base:
 - Represents conditions as they exist in the Northern Everglades Watershed in 2005.
 - Assumes no projects as defined by the Comprehensive Everglades Restoration Plan (CERP).
 - Period of record: 1970 to 2005.
 - Lake Okeechobee flood control releases to estuary and Water Conservation Areas are based on the existing WSE regulation schedule.
 - Same as LOWCP P2TP current base scenario.

4/22/08

- **Initial Model Run Assumptions**
 - **SLRWPP Base Run:**
 - **Represents conditions likely to exist in Northern Everglades Watershed after implementation of Acceler8, Lower & Upper Kissimmee water resources projects such as:**
 - C-44 reservoir and STA
 - C-43 reservoir
 - EAA Phase A-1 Reservoir
 - Kissimmee River Restoration Project and the Kissimmee River Headwaters Revitalization Project
 - Other projects south of Lake Okeechobee such as authorized MODWATERS and C-111 projects

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■ Initial Model Run Assumptions

- **SLRWPP Base Run (con't):**
 - **Represents future base conditions plus implementation of projects described in the Lake Okeechobee Watershed Construction Project Phase II Technical Plan**
 - C-44 reservoir & STA operating with 50.25 kaf of effective storage; 9,700 acres; 1,060/1,060 cfs inflow/outflow capacity
 - C-43 reservoir used solely to meet EST05 targets in the Caloosahatchee estuary as in the C43 reservoir Phase I PIR
 - **Based on the LOWCP P2TP ALT4 with refinements in the simulation of the St. Lucie River watershed**
 - Additional level of detail in conceptualizing the St. Lucie River sub-watershed into component basins
 - Fewer boundary conditions driving the model, e.g. backflows from C-44 basin are now simulated relative to water level fluctuations in Lake Okeechobee

4/22/08

■ Initial Model Run Assumptions

- **SLRWPP Base Run (con't):**

- **Based on the LOWCP P2TP ALT4 with refinements in the simulation of the St. Lucie River watershed**
 - **Addition of Ten-mile Creek Reservoir and STA:**
 - » Reservoir/STA footprints: 524 /132 Acres
 - » Reservoir/STA operating depths: 13 / 2 ft
 - **Update of C-44 reservoir and STA**
 - » Reservoir/STA footprints: 3,400 / 6,300 Acres
 - » Reservoir/STA operating depths: 12 / 1.5 ft
 - **Lake Okeechobee is not used in making environmental deliveries to the St. Lucie Estuary.**

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■ Performance Measures

- An objective of the St. Lucie River Watershed Protection Plan is to reduce frequency and duration of harmful freshwater releases into the St. Lucie Estuary.
 - **Number of Times St. Lucie Estuary High Discharge Criteria Exceeded (mean monthly flows > 2800 & 3000 cfs from 1970 – 2005)**
 - Goal is to reduce the frequency of damaging discharges
 - > 2,000 cfs causes stress to the ecosystem and > 3,000 cfs causes severe damage
 - Targets of no more than twenty-one (21) occurrences between 2,000 and 3,000 cfs and six (6) occurrences over 3,000 cfs are used.
 - **Number of Times Salinity Envelope Criteria NOT met for the St. Lucie Estuary**
 - Goal is to have salinity concentrations that are conducive to estuary ecologic health by maintaining combined local inflows and Lake Okeechobee discharges. Specifically, “the goal is to avoid mean monthly flows less than 350 cfs and 14-day rolling average discharges from exceeding 2,000 cfs.”

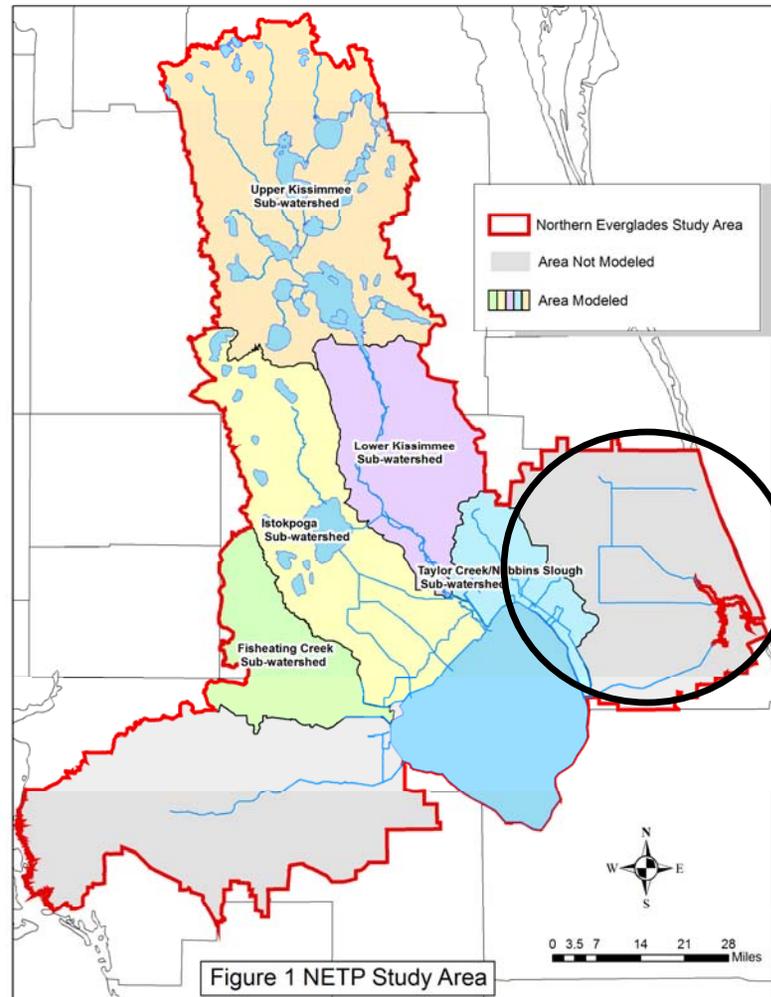
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■ Performance Indicators

- **Maintain other water-related needs for the other parts of the system; provides a way to evaluate water supply impacts of different alternatives.**
 - **Lake Okeechobee performance measures as used in LOWCP P2TP**
 - **Mean annual EAA/LOSA supplementation irrigation (4-in-1)**
 - **LOSA demand cutback volumes for 7 water years in the simulation period with the largest cutbacks**

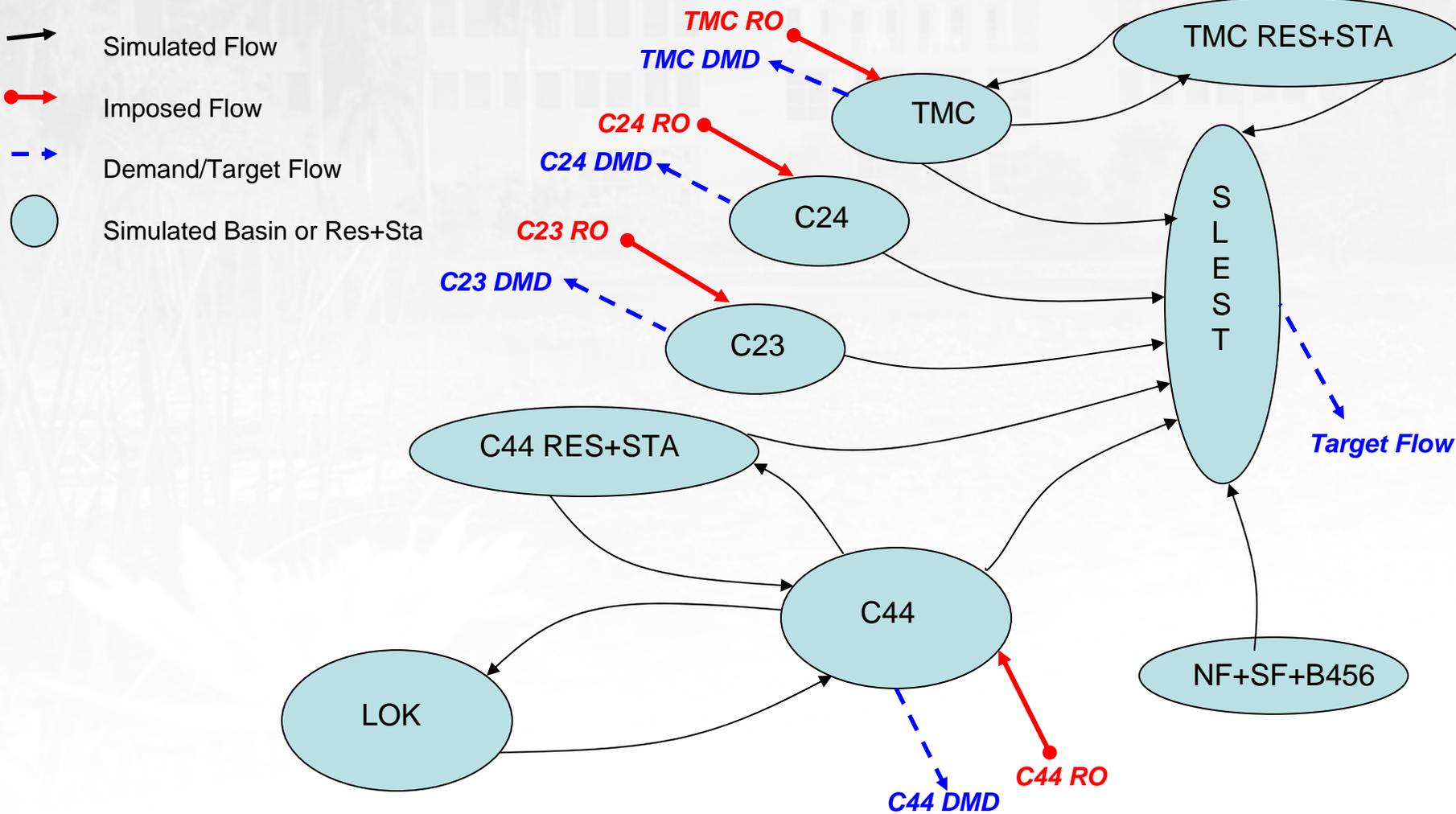
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- **Modeling Domain**



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Node-Link Representation of the St. Lucie Sub-watershed in the NERSM for Draft SLRWPP Base



■ Initial Modeling Results

- Comparison of LOWCP P2TP Current Base Scenario **{CBASE}** and Draft SLRWPP Base Run **{RWPPB}** using performance measures and indicators
- Alternative scenarios will be compared against **CBASE** and **RWPPB** incrementally as they become available

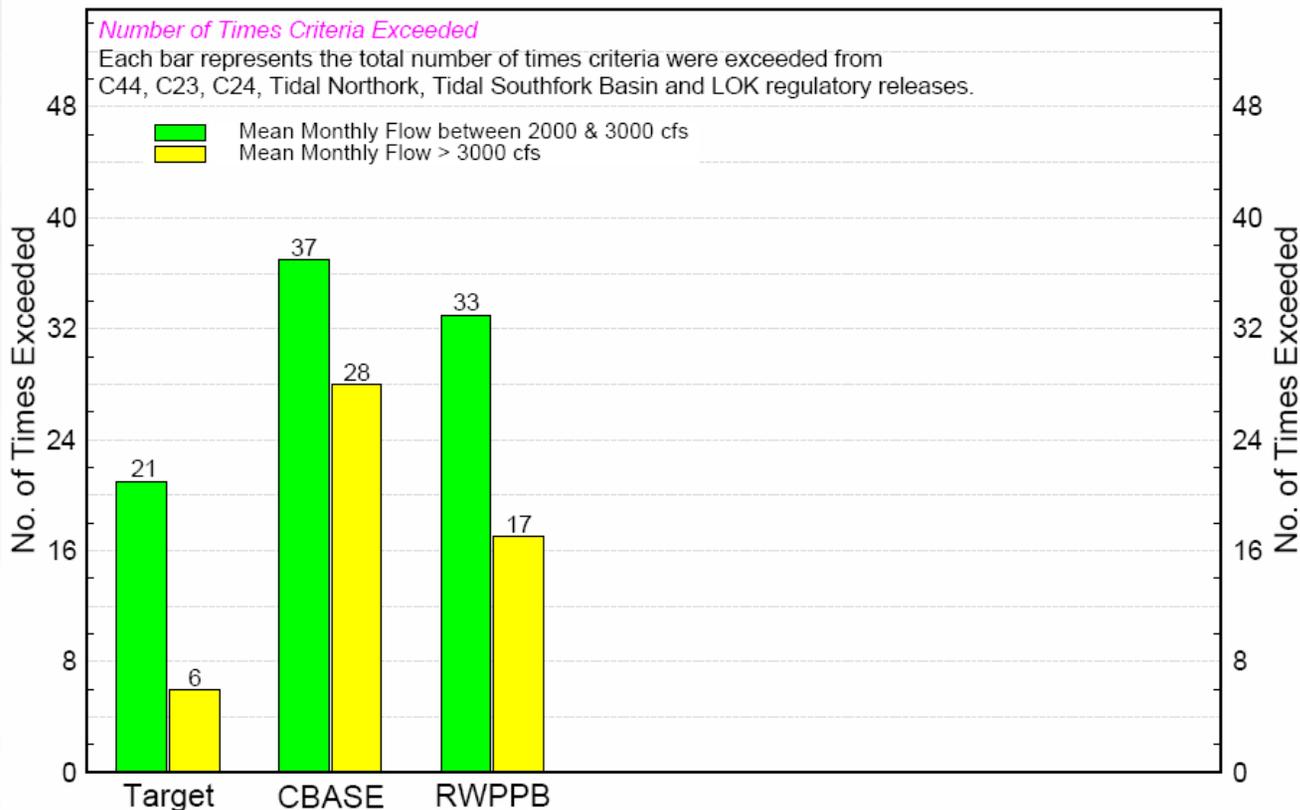
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- **Recap: Scenario Comparison Using Performance Measures and Indicators**
 - **goal is to re-establish salinity regimes suitable for the maintenance of healthy, naturally-diverse and well-balanced estuarine ecosystems while meeting the other water related needs of the region including water supply.**
 - **Number of times SLE Estuary High Q Criteria Exceeded**
 - **Number of times salinity envelope criteria NOT met for SLE estuary**
 - **Water year (Oct-Sep) LOSA demand cutback volumes (7-worst years)**
 - **Mean Annual EAA/LOSA supplemental Irrigation: demands and demands-not-met (4-in-1 WS indicator)**

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Number of Times St. Lucie High Discharge Criteria Exceeded (mean monthly flows > 2000 cfs from 1970 - 2005)

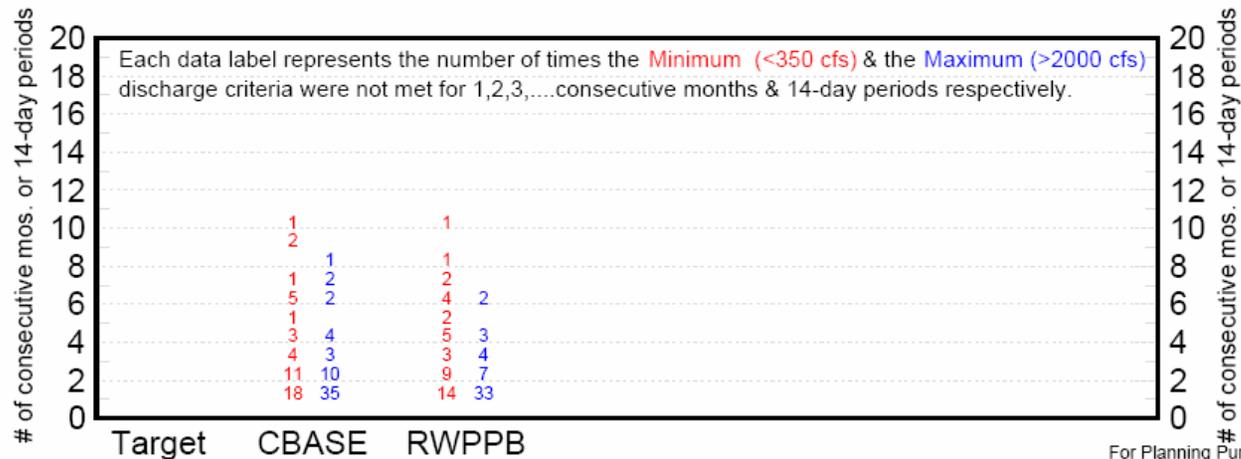
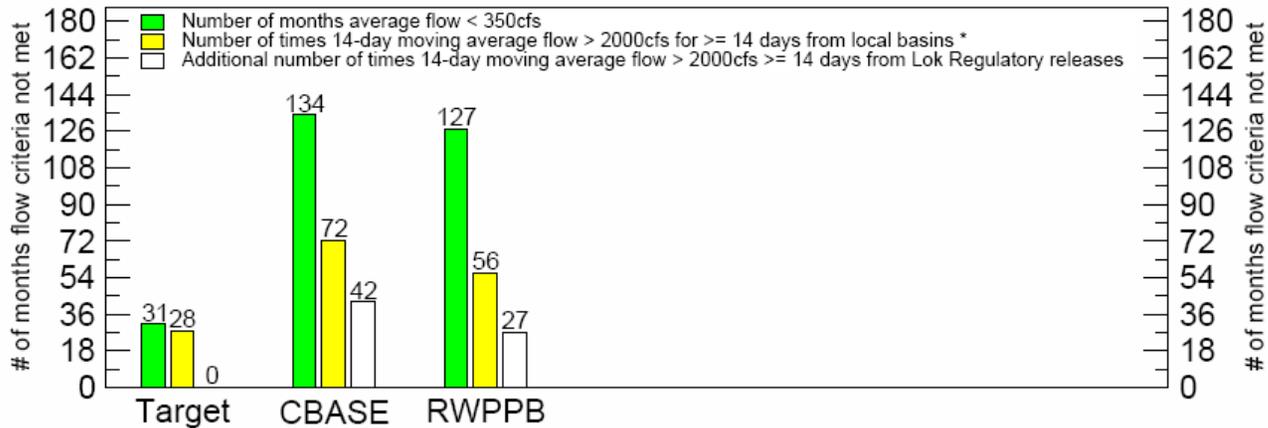


Note: A favorable maximum monthly flow was developed for the estuary (2000 cfs) that will theoretically provide suitable salinity conditions which promote the development of important benthic communities (eg. oysters & shoalgrass). Mean monthly flows above 3000 cfs result in freshwater conditions throughout the entire estuary causing severe impacts to estuarine biota.

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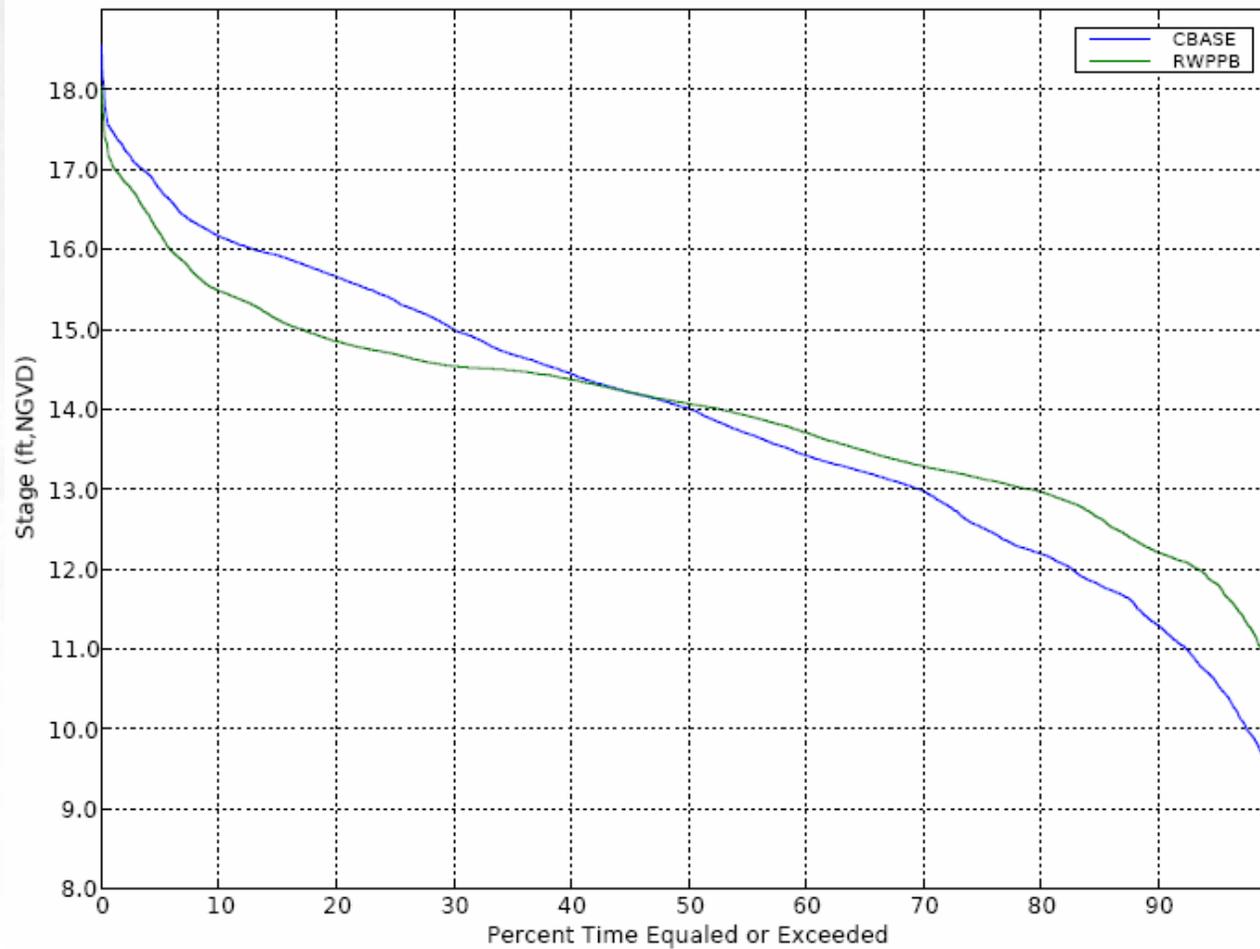
Number of Times Salinity Envelope Criteria NOT Met for the St. Lucie Estuary (mean monthly flows 1970 - 2005)



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Stage Duration Curve for Lake Okeechobee



4/22/08

- **Future Modeling Using NERSM**
 - **Refinement of Draft SLRWPP Base Run**
 - **Integration with improvements in the Caloosahatchee River Watershed Protection Plan (CRWPP) modeling efforts and use of Lake Okeechobee & CRWPP-specific performance measures**
 - **Alternative formulation, simulation and evaluation**

4/22/08

- **Website:**
www.sfwmd.gov/northerneverglades
- **Questions?**

**St. Lucie River Watershed Protection Plan
DRAFT ALTERNATIVE 1
4/21/2008**

MM#	Sub-Watershed	Project Feature/Activity	Level	Alternative
LO 101	N/A	ECP Diversions	B	0
LO 102	N/A	EAA Reservoir	B	0
LO 14	C-44	CERP - IRL South: C-44 Reservoir/STA	B	0
LO 66	N/A	L-8 Reservoir Phase I	B	0
SLE 45	North Fork	10 Mile Creek - Reservoir and STA	B	0
LO 1	SLE Watershed	Agricultural BMPs - Owner Implemented	1	1
LO 12		Alternative Water Storage (AWS) - Lake Okeechobee and Estuary Recovery	-	1
LO 12f		AWS - Indiantown Citrus Growers Association	1	1
LO 12j		AWS - Dupuis	4	1
LO 12m		AWS - Waste Management St. Lucie Site	4	1
LO 12q		AWS - Caulkins	4	1
LO 15	SLE Watershed	St. Lucie River Watershed Works of the District Rule Regulatory Phosphorus Source Control Program	2	1
LO 2	SLE Watershed	Agricultural BMPs - Funded Cost Share	1	1
LO 21	SLE Watershed	LO and Estuary Watershed Basin Rule (LOER)	3	1
LO 3	SLE Watershed	Urban Turf Fertilizer Rule (LOER)	1	1
LO 4	SLE Watershed	Land Application of Residuals	1	1
LO 49	SLE Watershed	Agricultural BMPs - Cost Share Future Funding	1	1
LO 5	SLE Watershed	Florida Yards and Neighborhoods	1	1
LO 50	SLE Watershed	Agricultural BMPs - Additional Agricultural BMPs	1	1
LO 63	SLE Watershed	Wastewater and Stormwater Master Plans	4	1
LO 64	SLE Watershed	Unified Statewide Stormwater Rule	4	1
LO 68	SLE Watershed	Comprehensive Planning-Land Development Regulations	3	1
LO 7	SLE Watershed	ERP Regulatory Program	1	1
LO 8	SLE Watershed	NPDES Stormwater Program	1	1
LO 87		Florida Ranchlands Environmental Services Projects (FRESP)	-	1
LO 87a_1		Alderman-Deloney Ranch (C-25 basin)	1	1
LO 87c		Florida Ranchlands Environmental Services Project- full implementation	5	1
LO 9		Coastal and Estuarine Land Conservation Program	1	1
SLE 02		White City Canal D	1	1
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SLE 06		Indian River Estates/Savannas Ecosystem Management Project	1	1
SLE 09		Natural Lands in CERP IRL-South Project	-	1
SLE 09a	C-44, South Fork	CERP - IRL South: PalMar Complex - Natural Storage and Water Quality Area	1	1
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SLE 40	C-23, C-44	CERP - IRL South: Southern Diversion C-23 to C-44 interconnect	1	1
SLE 41		Martin County Baffle Boxes	4	
SLE 42		Jensen Beach Retrofit	1	1
SLE 43a		Leilani Hts/ Warner Creek Retrofit - Phase 1	1	1
SLE 43b		Leilani Hts/ Warner Creek Retrofit - Phase 2	3	
SLE 43c		Leilani Hts/ Warner Creek Retrofit - Phase 3	4	
SLE 44		Manatee Creek Water Quality Retrofit; PhII & PhIII; New Monrovia, Dixie Park	1	1
SLE 45	North Fork	10 Mile Creek - Reservoir and STA	B	0
SLE 46	SLE Watershed	Small Acreage Manure Management	3	
SLE 47		Deep Well Injection	4	
SLE 47a	C-44	Deep Well Injection- C-44 St. Lucie Canal (LO 96)	4	
SLE 48		Danforth Creek Muck Removal Dredging project	2	
SLE 49		Warner Creek Muck Removal Dredging Project	2	
SLE 50		Hidden River Muck Removal Dredging Project	2	

Levels:

B - Base condition; Project included in base model runs

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

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

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- 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

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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 Measure

Project Feature/Activity: ERP Regulatory Program

Level: 1

General Description/Background: The Environmental Resource Permit (ERP) program regulates activities involving the alteration of surface water flows. This includes activities in uplands that alter stormwater runoff, as well as dredging and filling in wetlands and other surface waters. ERP applications are processed by either the Department or the water management districts, in accordance with the division of responsibilities specified in operation agreements between the Department and the water management districts.

Purpose: The purpose of this measure is to ensure that activities do not degrade water quality, impact flood protection or adversely impact the function of wetland systems.

Location/Size/Capacity: SFWMD jurisdiction

Initiative Status: Existing Program Activity

Cost: N/A

Estimate of Water Quality Benefits

- Minimum: Urban Rollup
- Maximum: Urban Rollup
- Most Likely: Urban Rollup
- Level of Certainty: Conceptual
- Assumptions: No increase in phosphorus loads resulting from new development; Applies to new development only; Conversion of intense agricultural uses (dairies, row crops, improved pasture, sod, citrus) with little or no water quality treatment to urban uses with modern surface water management systems with treatment; Projected benefits will roll up under the urban category

Estimate of Water Quantity Benefits

- Minimum: Unknown
- Maximum: Unknown
- Most Likely: Unknown
- Level of Certainty: Conceptual
- Assumptions: Applies to new development only; Conversion of intense agricultural uses (dairies, row crops, improved pasture, sod, citrus) with little or no stormwater storage to urban uses with modern surface water management systems with storage; Projected benefits will roll up under urban category

Screening Criteria

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- Proof of Concept: NA
- Other Impacts: NA

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

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

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- Other Impacts: NA

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

Northern Everglades – Potential Management Measure

Project Feature/Activity: Alternative Water Storage (LOER) – Indiantown Citrus Growers Association

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: Indiantown Citrus Growers Association (ICGA) – Phase 1 of the project consisted of the rehabilitation and relocation of pump stations. The association will utilize their irrigation pumps at the St. Lucie Canal to draw regulatory regional lake releases into their site for disposal which will reduce freshwater volumes to the estuary. Phase 2 of the project will include widening ditches in the ICGA ditch system. The detention of stormwater within the existing ditch system will result in water quality improvements thereby promoting water conservation and reducing the volume of surface water discharge to the St. Lucie Canal and Estuary.

Initiative Status: 3,550 ac-ft of water storage on 1,775 acres of project area.

Cost: Total \$831,531 (District contributed \$220,758; ICGA contributed \$322,965; and FDACS contributed \$287,808).

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

- Minimum: 3,550 ac-ft

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- Maximum: 3,550 ac-ft
- Most Likely: 3,550 ac-ft
- Level of Certainty: Final
- Assumptions: NA

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) – Dupuis

Level: 4

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: Design, engineer, and implement additional 1 foot of storage in the Dupuis marsh before on-site stormwater enters the L-8 Canal. This project could potentially store 2,500 ac-ft of water.

Cost: Cost for design and implementation is approximately \$1.76 million.

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: 0 ac-ft
- Maximum: 2,5000 ac-ft
- Most Likely: 1,250 ac-ft
- Level of Certainty: Conceptual
- Assumptions: NA

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) – Waste Management St. Lucie Site

Level: 4

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: Enter into a partnership arrangement to modify borrow areas into minor above ground impoundment(s). Preliminary hydrologic investigation is in process. Details are being developed.

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) – Caulkins

Level: 4

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: Rehabilitation and relocation of internal pump stations. During regulatory releases to the St. Lucie Estuary irrigation facilities will be utilized to draw excess stormwater into the 3,400 acre project site. The detention of stormwater within the existing ditch system will result in water quality improvements thereby promoting water conservation and reducing the volume of surface water discharge from the site.

Cost: TBD The cost of this project is approximately \$300,000 with a 50/50 match.

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: TBD
- Level of Certainty: Conceptual
- Assumptions: TBD

Screening Criteria:

- Proof of Concept: 1
- Other Impacts: 1

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

Northern Everglades- Potential Management Measure

Project Feature/Activity: CERP – IRL South: C-44 Reservoir / STA

Level: 1 (This feature is part of the future base RSM simulation)

General Description/Background: The C44 Reservoir/ STA Project is located on approximately 12,000 acres of land owned by SFWMD. This project comprises three components (Reservoir, West STA, and East STA) identified in the Indian River Lagoon south (IRL-S) Project Implementation (PIR).

Purpose: The project objectives, as defined in the PIR, are to capture local runoff from the C44 Basin, treat some or all of it via sedimentation and natural transformation of nutrients, and return it to the C-44 Canal when there is a need. The components are designed for flow attenuation to the St. Lucie Estuary, water quality benefits from reduced loading of nutrients, pesticides, herbicides, and other pollutants contained in runoff presently discharged to the estuary, and water supply benefits. Additional future benefits include the ability to remove the increased phosphorous load in the C-23 diverted water.

Location/Size/Capacity: The project is located in Martin County, directly north of the C-44 Canal (St. Lucie Canal), halfway between Lake Okeechobee and the Atlantic Ocean. The project components include a reservoir, a pump station, stormwater treatment areas, canals, embankments, structures, roads, and the temporary reconfiguration of TIWCD canals:

- Reservoir
 - Acreage 3,400 acres
 - Water Depth ~ 15 ft
 - Storage volume 50,600 to 55,000 ac-ft
 - Embankment length 48,600 linear ft
- Pump Station
 - Capacity 1,100 cfs
- TIWCD Irrigation Pump Station
 - 85,000 gallons per minute (gpm)
- STA
 - Acreage 6,300 acres
 - Intake/Discharge Canals 20,000 linear ft
 - Perimeter Canals 92,500 linear ft
 - Conveyance/Control Structures 19
 - Storage Volume: 8,505 ac-ft (based on 90 percent footprint area available for storage and 1.5 ft standard operating depth)

Initiative Status: Final plans and specs submitted June 29, 2007

Cost: Pre-final Design Opinion of Probable Construction Cost is \$339.8 million

Documentation: For more information, please see Formal BODR and Final Design Report and calculations.

Estimate of Water Quality Benefits

- Minimum: 4 mt/yr
- Maximum: 4 mt/yr
- Most Likely: 4 mt/yr
- Level of Certainty: Conceptual
- Assumptions: This is the load reaching Lake Okeechobee. Period of Record for Modeling is 1968-2000.

Estimate of Water Quantity Benefits

- Minimum: Reservoir (55,000 ac-ft); STA (8,505 ac-ft)
- Maximum: Reservoir (55,000 ac-ft); STA (8,505 ac-ft)
- Most Likely: Reservoir (55,000 ac-ft); STA (8,505 ac-ft)
- Level of Certainty: Conceptual
- Assumptions: STA storage volume based on 90 percent footprint area X 1.5 ft standard operating depth

Screening Criteria

- Proof of Concept: 1
- Other Impacts: 1

Contact: Sue Ray; SFWMD; 561-242-5520 *4019

Northern Everglades – Potential Management Measure

Project Feature/Activity: St. Lucie River Watershed Works of the District Rule Regulatory Phosphorus Source Control Program

Level: 2

General Description/Background: To develop a phosphorus source control program for the St. Lucie 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 St. Lucie 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 St. Lucie River Watershed complementary to the Coordinating Agencies collective efforts.

Location/Size/Capacity: The location is the St. Lucie 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 St. Lucie River Watershed. Rule amendments will incorporate permitting, monitoring and BMP implementation verification program.

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

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

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- 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

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

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- Proof of Concept: 0
- Other Impacts: 0

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

Northern Everglades – Potential Management Measure

Project Feature/Activity: C-44 Littoral

Level: 4

General Description/Background: The creation of a littoral zone of native vegetation to “treat” for water entering the C-44 via the S308 can benefit Lake Okeechobee and the St Lucie Estuary. The project will maintain boat navigation through the lake.

Purpose: The C-43 canal receives a significantly larger volume of water the C44. However the loads entering the C44 are higher than the C43 because the C43 water passes through the Lakes natural littoral zone before leaving Lake Okeechobee. The manmade littoral zone for the C44 will uptake nutrients, remove particulate and provide wildlife benefits.

Location/size/capacity: Inside and parallel to the Herbert Hoover Dike from the S308 structure to the North (see photo)

Initiative Status: Idea.

Cost: TBD

Estimate of Water Quality Benefits

- Minimum: Unknown
- Maximum: Unknown
- Most Likely: Unknown
- Level of Certainty: Unknown
- 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: 0
- Other Impacts: 0

Contact: Chad Kennedy; FDEP; 561-681-6706

Northern Everglades – Potential Management Measure

Project Feature/Activity: Agricultural BMPs - Additional Agricultural BMPs (Urban Rollup)

Level: 1

General Description/Background: This is an advanced level of BMPs with chemical treatment, plus retention/detention pond to treat discharge from higher P loading land uses.

Purpose: To treat water and reduce phosphorus loads at source

Location/Size/Capacity: All basins north of Lake Okeechobee

Initiative Status: Starting implementation in 2010

Cost: 143.6 million capital and 86.1 O&M cost from 2010 to 2015

Documentation: For more information, please see Table 6 from 2007 LOPP Update.

Estimate of Water Quality Benefits

- Minimum: 36 mt/yr
- Maximum: 36 mt/yr
- Most Likely: 36 mt/yr
- Level of Certainty: Conceptual
- Assumptions: It was calculated based on phosphorus concentrations after implementing typical cost-share BMPs. It was applied to citrus, dairy, row crop, ornamentals, and sod

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: Joyce Zhang; SFWMD; 561- 682-6341

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: L-65 Culvert to L-8 Tieback

Level: 4

General Description/Background: Install a high volume (1000+/- cfs) inverted culvert under the C-44 Canal from the L-65 Canal to the L-8 Tieback Canal to facilitate the movement of low nutrient water from Stormwater Treatment Areas north of Lake Okeechobee to the L-8 Reservoir.

Purpose: To route STA-treated water from the Taylor Creek/Nubbin Slough area to the L-8 Reservoir via a new connection between the L-65 and L-8 Canals. The isolated connection prevents treated water from coming in contact with un-treated C-44 Canal water.

Location/Size/Capacity: Isolated connection of up to 1,000 cfs.

Initiative Status: Conceptual

Cost: TBD

Estimate of Water Quality Benefits

- Minimum: 0 mt/yr
- Maximum: 38.4 mt/yr
- Most Likely: 3.84 mt/yr
- Level of Certainty: Conceptual
- Assumptions: Assume all proposed improvements within the Taylor Creek/Nubbin Slough area are completed to provide 38.4 mt/yr of remaining P load. Assume that L-8 system could only take approximately 10 percent of average annual discharge of 187,583 ac-ft. This provides approximately 18,758 ac-ft of water and 3.84 mt/yr of P diverted from Lake Okeechobee

Estimate of Water Quantity Benefits

- Minimum: 0 ac-ft
- Maximum: 187,583 ac-ft
- Most Likely: 18,758 ac-ft (diverted from Lake Okeechobee)
- Level of Certainty: Conceptual
- Assumptions: An evaluation of the L-8 Basin system would need to be performed to determine the amount of water that could be brought into this system.

Contact: South Florida Water Management District

Northern Everglades – Potential Management Measure

Project Feature/Activity: L-8 Reservoir Phase I

Level: 1 (This feature is part of the future base RSM simulation)

General Description/Background: The C-51 and Southern L-8 Reservoir (L-8 Reservoir) is part of CERP North Palm Beach County – Part 1 and is located at the northwest corner of the intersection of the L-8 and C-51 Canals in Palm Beach County. The L-8 Reservoir is designed to store water in-ground in a converted mining site that has natural geologic properties that are beneficial to reduce groundwater seepage.

Purpose: The main purpose of the reservoir is to capture excess water from the L-8 Basin that would otherwise be lost to tide and use this to provide restorative water flows and levels in the Grassy Waters Preserve, Loxahatchee Slough and Northwest Fork of the Loxahatchee River. In addition, by providing storage in the L-8 Basin, this reservoir will allow us to improve management of stages in the L-8 Canal. By reducing the amount of time that the L-8 Canal is at elevated, undesirable stages, the amount of water that flows to Lake Okeechobee from the L-8 Basin through Culvert C-10A (by gravity) may be reduced.

Location/Size/Capacity: The site is located at the former Palm Beach Aggregates site on State Road 80 approximately 20 miles west of I-95. The SFWMD has purchased approximately 45,000 ac-ft of storage that is currently under construction.

Cost: \$4,500 - \$5,000/ac-ft

Documentation: L-8 Reservoir Testing Project Final Report, May 2005; L-8 Reservoir Pilot Water Storage Project, July 2003; L-8 Reservoir Consent Final Judgments, Dec 2002 and Dec 2003.

Estimate of Water Quality Benefits

- Minimum: TBD
- Maximum: TBD
- Most Likely: TBD
- Level of Certainty: Conceptual
- Assumptions: Full implementation of CERP North Palm Beach County – Part 1

Estimate of Water Quantity Benefits

- Minimum: 44,500 ac-ft
- Maximum: 48,000 ac-ft
- Most Likely: 44,500 ac-ft
- Level of Certainty: Final (storage area complete September 2007)
- Assumptions: Full implementation of CERP North Palm Beach County – Part 1 by 2015

Screening Criteria

- Proof of Concept: 1
- Other Impacts: 1

Contact: Michael Voich; SFWMD; 561-681-2563 *3720

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: 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.

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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/yr C-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 ($800,500 \times 15 \text{ percent} = 120,000 \text{ acres} \times 0.98 \text{ ac-ft / ac}$). 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.

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 FRESP 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. 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.

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 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

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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.

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

Northern Everglades – Potential Management Measure

Project Feature/Activity: Farm and Ranchland Protection Program Partnership

Level: 4

General Description/Background: The Farm and Ranchland Protection Program (FRPP) is a voluntary USDA Natural Resources Conservation Service (NRCS) program that helps farmers and ranchers keep their land in agriculture. The program provides matching funds to State, Tribal or local governments and non-governmental organizations to purchase conservation easements. The proposal is that the NRCS, The Nature Conservancy (TNC), local agricultural landowners, and the District enter into an agreement to each contribute \$5 million dollars toward a long-term partnership.

Purpose: The partnership would acquire easements on private lands to remain in agriculture and provide water quality and storage benefits in support of the Northern Everglades initiative.

Location/Size/Capacity: Northern Everglades watershed; Over fifteen large landowners are interested in participating in this partnership. Over 3000 acres of property in 42 states are currently under the FRPP.

Initiative Status: FRPP is an established program and landowners are waiting to participate.

Cost: The proposal is that the NRCS, The Nature Conservancy (TNC), local agricultural landowners, and the District enter into a agreement to each contribute \$5 million dollars toward a long-term partnership. The partnership would bring federal, state, not-for-profit, and private funding together.

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

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

Screening Criteria

DRAFT – 4/21/2008

- Proof of Concept: NA
- Other Impacts: NA

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

Northern Everglades- Potential Management Measure

Project Feature/Activity: ECP Diversions

Level: 1

General description/Background: The "Everglades Program Implementation: Program Management Plan" describes the projects that comprise the major elements of the Everglades Program restoration. Of these projects, Everglades Construction Project-10 (the "Diversion Project") is the plan for specified Chapter 298 Districts and Lease Number 3420 (Closter Farms) to divert discharges away from the Lake Okeechobee (Lake), south to the EAA, by modifying their surface water management system.

Purpose: To minimize water quality impacts to the Lake by diverting discharges away from the Lake, south to STAs via Everglades Agricultural Area (EAA).

Location/size/capacity: Four diversion discharge pump stations and associated tributary areas located south and southeast of the Lake.

Initiative status: Construction of all stations was complete as of June 2005.

Cost : \$ 22.8 Million

Estimate of Water Quality Benefits

- Minimum: 80 percent of historical long-term average TP load diverted to STAs
- Maximum: 100 percent of historical long-term average TP load diverted to STAs
- Most Likely: 80 – 100 percent of historical long-term average TP load diverted to STAs
- Level of Certainty: Final
- Assumptions: Period of record, discharge volume and concentration

Estimate of Water Quantity Benefits

- Minimum: 80 percent of historical long-term average flow diverted to STAs
- Maximum: 100 percent of historical long-term average flow diverted to STAs
- Most Likely: 80 – 100 percent of historical long-term average flow diverted to STAs
- Level of Certainty: Final
- Assumptions: Period of record, discharge volume and concentration (load)

• **Screening Criteria**

- Proof of Concept: NA
- Other Impacts: NA

Northern Everglades- Potential Management Measure

Project Feature/Activity: EAA Reservoir

Level: 1

General description/Background: This Acceler8 project is a component of the larger Everglades Agricultural Area (EAA) Reservoir Project and is designed to provide significant additional water storage in the southern region of the Everglades Agricultural Area. The project is an above-ground reservoir for water storage, with a capacity of 190,000 ac-ft, or 62 billion gallons, at a maximum depth of 12.5 ft. The reservoir will be constructed on a 16,700-acre parcel of land situated north of Stormwater Treatment Area 3/4 and between the Miami and North New River canals.

Purpose:

- Capture, move and store regulatory releases from Lake Okeechobee, reducing the number and volume of harmful discharges to coastal estuaries
- Reduce water levels in Lake Okeechobee when needed, benefiting the lake's environmental health and recovery
- Capture, move and store agricultural stormwater runoff, reducing the need for emergency flood control backpumping into Lake Okeechobee
- Provide additional water to meet Everglades water demands, lessening water supply dependency on Lake Okeechobee
- Improve operational flexibility to move water within the EAA, including flow equalization and optimization of Stormwater Treatment Area performance to further reduce phosphorus inflows to the Everglades
- Improve flood protection for lands adjacent to the Bolles canal
- Provide public access and recreational opportunities

Location/size/capacity: Southern region of the Everglades Agricultural Area. An above-ground reservoir for water storage, with a capacity of 190,000 ac-ft, or 62 billion gallons, at a maximum depth of 12.5 ft. The reservoir will be constructed on a 16,700-acre parcel of land situated north of Stormwater Treatment Area 3/4 and between the Miami and North New River canals.

Initiative status: Under construction

Estimate of Water Quality Benefits

- Minimum: 11 metric tons
- Maximum: 11 metric tons
- Most Likely: 11 metric tons
- Level of Certainty: Final
- Assumptions: N/A

Estimate of Water Quantity Benefits

- Minimum: 190,000 ac-ft
- Maximum: 190,000 ac-ft
- Most Likely: 190,000 ac-ft
- Level of Certainty: Final
- Assumptions: NA

Contact: John Mitnick, SFWMD, 561-686-8800

Northern Everglades- Potential Management Measure

Project Feature/Activity: White City Canal D

Level: 1

General Description/Background: Existing canal is currently running through a pasture. The canal could be relocated and retrofit to include a control structure.

Purpose: To improve water quality of storm water flows to the North Fork the St. Lucie River (NFSLR) by modifying canal stages and reducing the potential for pollutant run-off from pasture.

Location/Size/Capacity: The project is located in St. Lucie County adjacent to the NFSLR within a 50 acre basin.

Initiative Status: Approved and on-going by St. Lucie County

Cost: \$400,000

Documentation: Master Plan, CERP, SWIM, TMDL efforts

Estimate of Water Quality Benefits

- Minimum:
- Maximum:
- Most Likely: (Reductions) ~10% coliform; 20% - 40% nutrients and solids
- Level of Certainty:
- Assumptions:

Estimate of Water Quantity Benefits

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

Contact: Jason Bessey, Stormwater Program, St. Lucie County Public Works, 772-462-1668

Northern Everglades- Potential Management Measure

Project Feature/Activity: White City Drainage Improvements (Citrus/Saeger)

Level: 1

General Description/Background: Construction of 4 acre storm water detention pond with associated outfall structure

Purpose: Capture, store and treat run-off and provide controlled release to the St. Lucie River

Location/Size/Capacity: The project is in St. Lucie County at the intersection of Citrus and Saeger. The project would utilize a portion of a 50 acre basin.

Initiative Status: Approved and on-going by St. Lucie County

Cost: \$300,000

Documentation: Master Plan, CERP, SWIM, TMDL efforts

Estimate of Water Quality Benefits

- Minimum:
- Maximum:
- Most Likely: (Reductions) 30% - 50% Nutrients and Solids
- Level of Certainty:
- Assumptions:

Estimate of Water Quantity Benefits

- Minimum:
- Maximum:
- Most Likely: Capture first 1” of run-off (~22 acre-ft)
- Level of Certainty:
- Assumptions:

Contact: Jason Bessey, Stormwater Program, St. Lucie County Public Works, 772-462-1668

Northern Everglades- Potential Management Measure

Project Feature/Activity: White City Drainage Improvements (canals B, C, E, F, G)

Level: 2

General Description/Background: Improve/retrofit various direct discharges to St. Lucie River from basin

Purpose: Capture, store and treat stormwater run-off using modern storm systems and Best Management Practices

Location/Size/Capacity: Various locations within the 50 acre basin

Initiative Status: approved and pending authorization; will most likely result in multiple small retrofits in area

Cost: \$3 Million

Documentation: Master Plan, CERP, SWIM, TMDL efforts

Estimate of Water Quality Benefits

- Minimum:
- Maximum:
- Most Likely: (Reductions) 30% - 50% nutrients and solids
- Level of Certainty:
- Assumptions:

Estimate of Water Quantity Benefits

- Minimum:
- Maximum:
- Most Likely: tbd
- Level of Certainty:
- Assumptions:

Contact: Jason Bessey, Stormwater Program, St. Lucie County Public Works, 772-462-1668

Northern Everglades- Potential Management Measure

Project Feature/Activity: Indian River Estates/Savannas Ecosystem Management Project

Level: 1

General Description/Background: Construction of a pump station, infrastructure and water detention cells to manage and treat run-off from a 1200 acre residential basin

Purpose: To improve flood control and treat stormwater that currently discharges directly to the Indian River Lagoon and North Fork of the St. Lucie River

Location/Size/Capacity: The project is a 1200 acre basin in St. Lucie County adjacent to the Savannahs Preserve and Indian River Lagoon

Initiative Status: approved and on-going by St. Lucie County

Cost: \$8 Million

Documentation: Master Plan, CERP, SWIM, TMDL efforts

Estimate of Water Quality Benefits

- Minimum:
- Maximum:
- Most Likely: (Reductions) 100 % gross solids; 90% solids/coliforms; 50% TN (Alum enhancement proposed)
- Level of Certainty:
- Assumptions:

Estimate of Water Quantity Benefits

- Minimum:
- Maximum:
- Most Likely: 32 acre-feet of storage
- Level of Certainty:
- Assumptions:

Contact: Jason Bessey, Stormwater Program, St. Lucie County Public Works, 772-462-1668

Northern Everglades- Potential Management Measure

Project Feature/Activity: Platt’s Creek Wetland Restoration

Level: 2

General Description/Background: Convert and restore a citrus operation to floodplain forest, marsh and flatwoods. Also create depression marshes/wetlands for “polishng” of run-off

Purpose: To restore and preserve the native habitat along the shoreline of the North Fork of the St. Lucie River

Location/Size/Capacity: The project is in St. Lucie County located north of Platt’s Creek tributary and east of the river

Initiative Status: Approved and in design by St. Lucie County

Cost: \$3 Million

Documentation: Master Plan, CERP, SWIM, TMDL efforts

Estimate of Water Quality Benefits

- Minimum:
- Maximum:
- Most Likely: (Reductions) ~20% nutrients
- Level of Certainty:
- Assumptions:

Estimate of Water Quantity Benefits

- Minimum:
- Maximum:
- Most Likely: attenuate run-off through system
- Level of Certainty:
- Assumptions:

Contact: Jason Bessey, Stormwater Program, St. Lucie County Public Works, 772-462-1668

Northern Everglades- Potential Management Measure

Project Feature/Activity: Indian River Drive Stormwater Outfall Retrofits

Level: 1

General Description/Background: Currently over 150 outfalls discharge directly to the Indian River Lagoon from the surrounding Indian River Drive residential area. The existing system could be retrofitted with modern baffle boxes to improve control of gross solids and sediments

Purpose: Improve water quality of run-off to Indian River Lagoon by reducing solids and sediments with modern baffle boxes

Location/Size/Capacity: The project is located on Indian River Drive in St. Lucie County

Initiative Status: Approved and on-going by St. Lucie County (multiple small retrofit projects each year)

Cost: \$4.5 Million

Documentation: Master Plan, CERP, SWIM, TMDL efforts

Estimate of Water Quality Benefits

- Minimum:
- Maximum:
- Most Likely: (Reductions) 90% gross solids; 20% - 30% nutrients
- Level of Certainty:
- Assumptions:

Estimate of Water Quantity Benefits

- Minimum: N/A
- Maximum: N/A
- Most Likely: N/A
- Level of Certainty: N/A
- Assumptions: N/A

Contact: Jason Bessey, Stormwater Program, St. Lucie County Public Works, 772-462-1668

Northern Everglades- Potential Management Measure

Project: Natural Lands in IRL-S CERP Project:
a. PalMar Area
b. Allapattah Area
c. Cypress Creek/Trail Ridge Area

Level: see specific project

Description: The recommended plan includes a component called natural storage areas. These are currently drained pasture lands that will be hydrologically restored to provide a variety of project benefits. The purposes of the natural areas have been identified for use as alternative storage, rehydration, and habitat restoration. This land currently consists primarily of native and improved pasture. Some of the existing land is classified as wetlands, and the remainder of the land is classified as a type of upland. The natural areas have been broken down into three components. These include: Palmar Area, Allapattah Area, and Cypress Creek/Trail Ridge Area.

Purpose: By restoring the natural hydropattern in these areas, large volumes of water that now rapidly drain off these lands can be retained in wetlands. The natural areas will provide approximately 30,000 acre-feet of freshwater storage for the project through this onsite retention of stormwater. Onsite retention in these areas will also reduce phosphorus and nitrogen loads to the estuaries while providing increased spatial extent of natural wetlands and upland habitat for wildlife. Finally, onsite retention will recharge the superficial aquifer.

Location/Size/Capacity: 92,000 acres in Martin, St. Lucie, and Okeechobee Counties

Initiative Status: Approximately 30,000 acres have been protected through mitigation programs, conservation easements, and acquisition. There are 62,000 acres remaining to be protected through this project.

Cost: TBD. We note that land values reflected in the current real estate market may provide an opportunity for protection now before property values escalate.

Documentation: For more information, please see the IRL-S PIR. Additional assessment of this project has been vetted through public agencies in the South Florida Ecosystem Restoration Task Force's Natural Lands Report provided to Congress in 2006.

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

Contact: South Florida Water Management District

Northern Everglades- Potential Management Measure

Project Feature/Activity: CERP - IRL South: PalMar Complex - Natural Storage and Water Quality Area

Level: 1

General Description/Background: Approximately 17,143 acres of pastureland in the C-44 basin has been identified for use as alternative storage, nutrient removal, rehydration and habitat restoration. This land currently consists primarily of improved pasture with degraded wetlands. The location of this land is south and east of C-44. Establishing this land as a natural storage and treatment area is consistent with the ecological enhancement goal for the Comprehensive Everglades Restoration Plan (CERP) by increasing the spatial extent of functional natural areas, improving habitat and functional quality, and improving native plant and animal species abundance and diversity. This land also provides a “low tech” solution to water storage and water quality improvement needs in the basin, and its size and location will add to the greenway concept by providing close proximity to other public lands such as Jonathan Dickenson State Park, Atlantic Ridge, Corbett Wildlife Management Area, Dupuis Reserve and Palmar. Greenways are critical to reestablishing diverse wildlife populations of some keystone and threatened and endangered species.

The natural storage and water quality treatment areas have been disturbed to varying degrees by previous or current land uses. Specifically, swales, ditches, and canals have been constructed to drain some areas and irrigate others. In order to restore a more natural hydrology on these sites, swales and ditches will need to be filled and/or culverts will need to be plugged. In this preliminary design, the drainage features will all be filled. Filling provides the most conservative construction cost estimate. During detailed design, additional topographical and drainage feature data will be collected to determine where simply plugging culverts would provide an effective means of hydro-pattern restoration. A comprehensive land management plan will be developed for each of the natural areas. The plan will include the control or eradication of exotic and nuisance plant species within the project feature, appropriate fire management, and appropriate cattle management to include either the complete removal of cattle or a minimal stocking density of cattle.

This water storage and treatment function provided by this project is consistent with the Corps policy regarding eligibility for Federal cost sharing of water quality features necessary for the restoration of the greater Everglades ecosystem (modifying the final use of runoff to meet ecosystem restoration targets). The treatment function provided by the natural storage area is intrinsic to the water storage function (i.e., a passive result); no special features were incorporated into the feasibility-level design to enhance water quality treatment functions. However, the reduction of nutrient loads to the estuary associated with storing watershed runoff is an important additional benefit provided by the natural storage and treatment areas and is consistent with the ecosystem restoration objectives for the St. Lucie Estuary and Indian River Lagoon.

Purpose: By restoring the natural hydro-pattern in this area, large volumes of water that now rapidly drain off these lands can be retained in wetlands. The natural areas will provide freshwater storage for

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the project through this onsite retention of stormwater. Onsite retention in these areas will also reduce phosphorus and nitrogen loads to the estuaries while providing increased spatial extent of natural wetlands and upland habitat for wildlife. Finally, onsite retention will recharge the superficial aquifer.

Location/Size/Capacity: 17,143 acres

Initiative Status: Indian River Lagoon – Project Implementation Report and Environmental Impact Statement (February 2004) was authorized by the U.S. Congress as described in the Water Resource Development Act of 2007

Cost: \$107,761,857 (IRL-S PIR/EIS, Feb. 2004)

Documentation: Indian River Lagoon – Project Implementation Report and Environmental Impact Statement (February 2004)

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

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

Contact: SFWMD

Northern Everglades- Potential Management Measure

Project Feature/Activity: CERP - IRL South: Allapattah Complex - Natural Storage and Water Quality Area

Level: 1

General Description/Background: The Allapattah Complex - Natural Storage and Treatment Area, is located in Martin County and includes approximately 42,348 acres of land in the C-23 basin. This land has been identified for use as alternative storage, rehydration, habitat restoration, and to provide incidental water quality treatment. This land currently consists primarily of improved pasture, degraded wetlands and some impacted native upland habitat. The large size, location along the C-23 canal and contiguous nature of these parcels make it the most important alternative storage area. The Allapattah Ranch, which encompasses 22,000 of the 42,348 acres, has been extensively drained for cattle grazing and other farming practices over the years. These drained hydric soils provide an excellent opportunity for restoration. By rehydrating these lands in a very cost effective manner, large volumes of water, which currently drain off the property during the rainy season, will be attenuated on-site. The western portion of the ranch also contains the last remaining large tract of forested wetlands in Martin County. The two parcels directly to the east of the ranch contain some of the largest remaining pine flatwood wet prairie habitat in the basin. These remaining forested areas will provide for habitat diversity until more forested communities can be reestablished on the ranch.

The natural storage and water quality treatment areas have been disturbed to varying degrees by previous or current land uses. Specifically, swales, ditches, and canals have been constructed to drain some areas and irrigate others. In order to restore a more natural hydrology on these sites, swales and ditches will need to be filled and/or culverts will need to be plugged. In the preliminary design, the drainage features will all be filled. Filling provides the most conservative construction cost estimate. During detailed design, additional topographical and drainage feature data will be collected to determine where simply plugging culverts would provide an effective means of hydropattern restoration.

A comprehensive land management plan will be developed for each of the natural areas. The plan will include the control or eradication of exotic and nuisance plant species within the project feature, appropriate fire management, and appropriate cattle management to include either the complete removal of cattle or a minimal stocking density of cattle.

This water storage and treatment function provided by this project is consistent with the Corps policy regarding eligibility for Federal cost sharing of water quality features necessary for the restoration of the greater Everglades ecosystem (modifying the final use of runoff to meet ecosystem restoration targets). The treatment function provided by the natural storage area is intrinsic to the water storage function (i.e., a passive result); no special features were incorporated into the feasibility-level design to enhance water quality treatment functions. However, the reduction of nutrient loads to the estuary associated with storing watershed runoff is an important additional benefit provided by the natural storage and treatment areas and is consistent with the ecosystem restoration objectives for the St. Lucie Estuary and Indian River Lagoon.

Purpose: By restoring the natural hydro-pattern in this area, large volumes of water that now rapidly drain off these lands can be retained in wetlands. The natural areas will provide freshwater storage for the project through this onsite retention of stormwater. Onsite retention in these areas will also reduce phosphorus and nitrogen loads to the estuaries while providing increased spatial extent of natural wetlands and upland habitat for wildlife. Finally, onsite retention will recharge the superficial aquifer.

Location/Size/Capacity: 42,348 acres

Initiative Status: Indian River Lagoon – Project Implementation Report and Environmental Impact Statement (February 2004) was authorized by the U.S. Congress as described in the Water Resource Development Act of 2007

Cost: \$179,542,351 (IRL-S PIR/EIS, Feb. 2004)

Documentation: Indian River Lagoon – Project Implementation Report and Environmental Impact Statement (February 2004)

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

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

Contact: SFWMD

Northern Everglades- Potential Management Measure

Project Feature/Activity: CERP - IRL South: Cypress Creek/Trail Ridge Complex - Natural Storage and Water Quality Area

Level: 2

General Description/Background: The Cypress Creek Complex - Natural Storage and Treatment Area, is located in St. Lucie and Okeechobee Counties and includes 32,639 acres of primarily pastureland, along with some of the last remaining large tracts of forested wetland habitat in St. Lucie County. This land has been identified for use as alternative storage, rehydration, habitat restoration, and water quality improvements. The parcels consist primarily of the V-2 Ranch, lands around Cypress Creek and remnants of Bluefield Ranch. This area is one of the most important and highly valued properties included in the study for natural storage, water quality improvement and habitat restoration. However, a portion of the ranch has been impacted through many years of agricultural use. These properties contain an excellent mixture of both drained pasturelands and areas of lightly impacted upland and wetlands. By rehydrating these drained pastures, large volumes of water will be attenuated on-site during the rainy season, providing a low cost alternative to reservoir storage. The less impacted areas will help the overall reestablishment of native plant and animal species, including some listed as threatened and endangered.

The natural storage and water quality treatment areas have been disturbed to varying degrees by previous or current land uses. Specifically, swales, ditches, and canals have been constructed to drain some areas and irrigate others. In order to restore a more natural hydrology on these sites, swales and ditches will need to be filled and/or culverts will need to be plugged. In this preliminary design, the drainage features will all be filled. Filling provides the most conservative construction cost estimate. During detailed design, additional topographical and drainage feature data will be collected to determine where simply plugging culverts would provide an effective means of hydropattern restoration.

A comprehensive land management plan will be developed for each of the natural areas. The plan will include the control or eradication of exotic and nuisance plant species within the project feature, appropriate fire management, and appropriate cattle management to include either the complete removal of cattle or a minimal stocking density of cattle.

This water storage and treatment function provided by this project is consistent with the Corps policy regarding eligibility for Federal cost sharing of water quality features necessary for the restoration of the greater Everglades ecosystem (modifying the final use of runoff to meet ecosystem restoration targets). The treatment function provided by the natural storage area is intrinsic to the water storage function (i.e., a passive result); no special features were incorporated into the feasibility-level design to enhance water quality treatment functions. However, the reduction of nutrient loads to the estuary associated with storing watershed runoff is an important additional benefit provided by the natural storage and treatment areas and is consistent with the ecosystem restoration objectives for the St. Lucie Estuary and Indian River Lagoon.

Purpose: By restoring the natural hydro-pattern in this area, large volumes of water that now rapidly drain off these lands can be retained in wetlands. The natural areas will provide freshwater storage for the project through this onsite retention of stormwater. Onsite retention in these areas will also reduce phosphorus and nitrogen loads to the estuaries while providing increased spatial extent of natural wetlands and upland habitat for wildlife. Finally, onsite retention will recharge the superficial aquifer.

Location/Size/Capacity: 32,639 acres

Initiative Status: Indian River Lagoon – Project Implementation Report and Environmental Impact Statement (February 2004) was authorized by the U.S. Congress as described in the Water Resource Development Act of 2007

Cost: \$180,971,792 (IRL-S PIR/EIS, Feb. 2004)

Documentation: Indian River Lagoon – Project Implementation Report and Environmental Impact Statement (February 2004)

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

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

Contact: SFWMD

Northern Everglades- Potential Management Measure

Project: St. Lucie Watershed Natural Area Registry Program

Level: 3

Description: A natural area registry program is a voluntary program designed to provide support for protecting the watershed’s natural lands. The voluntary cooperation of a landowner to protect the natural elements, features, and characteristics of their own property is the basis for natural area registry programs. Through a “handshake” agreement the landowner agrees to conserve his or her land to the best of their abilities. In return, they can receive a survey of the plants, animals, and natural features on the property and be provided information on stewardship practices.

Purpose: The purpose of the natural areas registry is to protect and conserve natural lands within the St. Lucie watershed; educate landowners about the natural resource values and the value in protecting them; establish and maintain a relationship with landowners to assure that communication channels are kept open for sharing information about land values, land availability, conservation options, landowner appreciation, etc.

Location/Size/Capacity: Natural lands within the St. Lucie River watershed.

Initiative Status:

Cost: TBD. There would be only program cost as this is not a construction project or a land acquisition project.

This program could also be coordinated with the FWC Florida Landowner Incentive Program (LIP) which works with private landowners to educate and encourage land management activities that will maintain or enhance habitat conditions that benefit the needs of listed species. This is a 50% cost share program. Management practices could include hydrology enhancement projects, mechanical & chemical vegetation treatments, native vegetation restoration and prescribed fire.

A possible federal funding source is the NRCS Wildlife Habitat Incentives Program. This is a voluntary program that provides technical and financial assistance to landowners and others to develop upland, wetland, riparian and aquatic habitat. The focus in Florida is to enhance or restore native vegetative communities and to conserve declining or imperiled species. While funding for this program is unavailable in the present budget, it is an option for future years of the St. Lucie Watershed Protection Plan.

Documentation: The Nature Conservancy is a partner in similar programs in other states and can provide additional information. This is a non-binding, voluntary program.

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

Contact: The Nature Conservancy

Northern Everglades- Potential Management Measure

Project Feature/Activity: Creation of suitable oyster substrate in the St. Lucie Estuary at the following locations:

- a. Queens Cove – Level 2
- b. North Causeway Island – Level 2
- c. Savannah Road – Level 2
- d. Citrus Avenue – Level 3
- e. Thumb Point – Level 2
- f. Spoil Island “18-B” – Level 2
- g. Vero Shores (South) – Level 2
- h. Jaycee Park – Level 1 (see attached map)
- i. Various sites identified in IRL-South PIR (Artificial Habitat Creation)

Level: various – see above for each level at location

General Description/Background: Build upon existing efforts to create suitable oyster substrate in the St. Lucie Estuary using natural or made-made conditions (i.e. “oyster balls”, limestone rocks, relict shell bags, etc.) placed under docks or on open slopes. (NOTE: previous efforts have indicated that a total of 180 acres of artificial habitat should be created in the SLE via this means: 135 acres of oyster shell hash and 45 acres of prefabricated reef balls). Martin County has constructed 1 small demonstration project (2004-2005) and a subsequent ½ acre project in 2006. Monitoring of the ½ acre site indicates the current filtering capacity to be 25M gallon/day.

Purpose: Established oyster reefs provide many ecological benefits including improvement of water quality. Oysters are a vital species in achieving restoration of the St. Lucie Estuary. They are a key indicator of the health of the system and are also very effective bio-filters of fine sediments and nutrients in the water column. Creating additional oyster habitat area is essential because it aids in the restoration process by providing a location for oyster larvae to settle thus increasing the population filtering base. In addition, the St Lucie could use some substrate to help jumpstart the oyster recruitment process. Currently, there are very few acres of oyster reefs remaining.

Location/Size/Capacity: Ultimately, many sites in the middle estuary could be created. Each site could be approximately 20 acres in area and could include 15 acres of shell hash and 5 acres of prefabricated 2-foot diameter concrete reef balls.

Two sites (1/2 acre each) within the middle estuary of the St. Lucie River have been designated for oyster reef restoration. These sites will be located on the north and south shores of the river and east of the Roosevelt Bridge. Approximately 140 patch reefs total will be constructed, 70 patch reefs per the two sites. The patch reefs will be separated by approximately 30 ft. (10 m). Patches will be of approximate equal size (area = 316 ft² (30 m²), volume = 6 ft³ (0.6 m³) each) and will be 6-in (15.24 cm) thick. Each site will be approximately 0.5 acres in area totaling 1 acre of patch reef habitat. In habitats

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with sufficient depth these patch reefs may include the addition of prefabricated 2-foot diameter concrete reef balls.

Initiative Status: 4 existing projects by Martin County, future projects possible pending funding. A JCP permit will be required. Permit turn around for these projects is typically 3-4 months based on permitting for the 2 prior projects. Although this management measure was included in the Final PIR for IRL-South, it was not included in the Chief of Engineer’s Report or WRDA 2007. This is a critical measure to ensure habitat restoration. Substrate is a limiting factor in the SLE and is declining each year.

Cost: Total project cost:	\$270,000
St. Lucie Estuary Protection Plan funding request	\$180,000

Documentation: CERP Indian River Lagoon – South PIR; Martin County Artificial and Oyster Reef Monitoring in the St. Lucie River and Indian River Lagoon, Florida – September, 2007

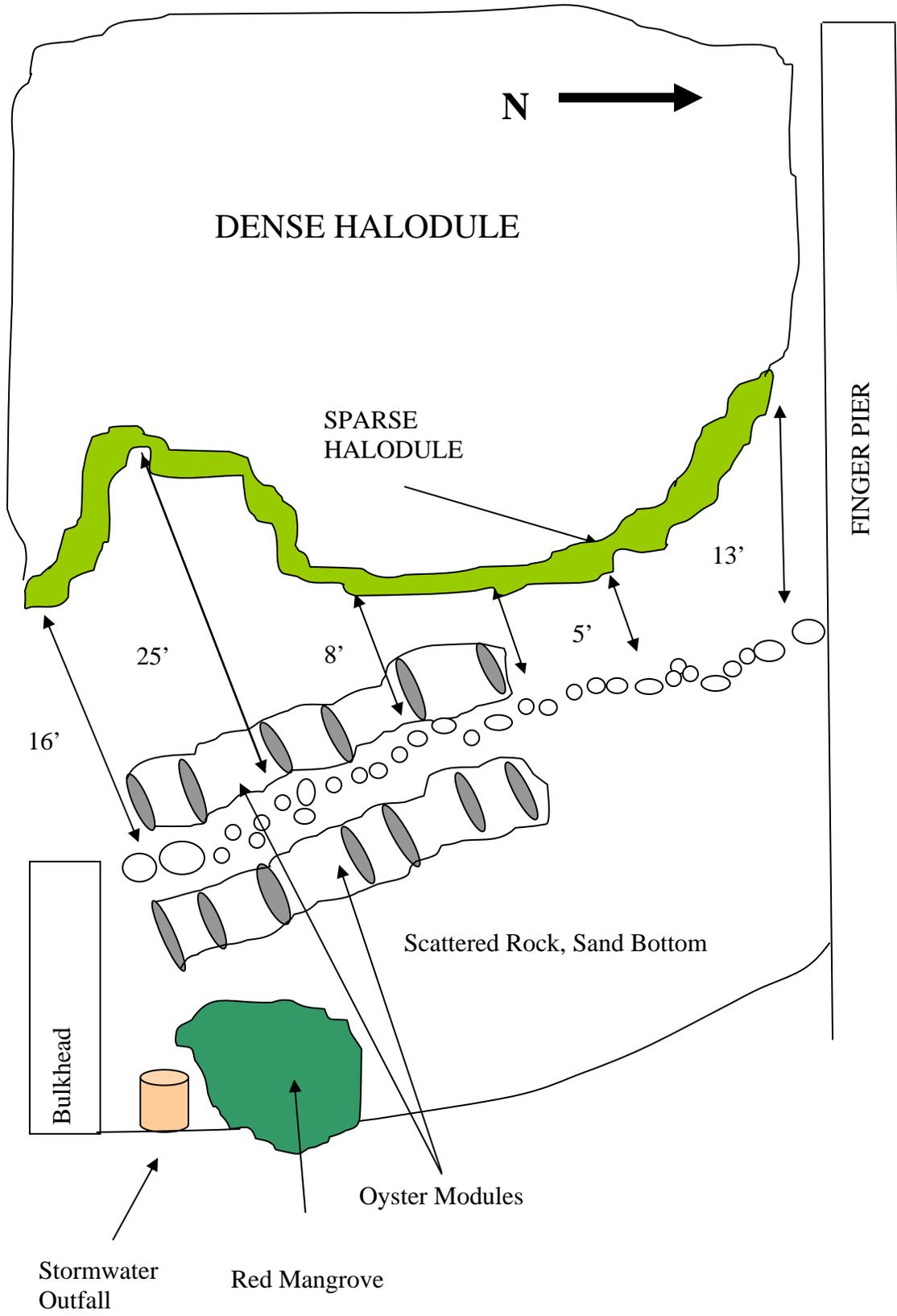
Estimate of Water Quality Benefits

- Minimum: At 1 year growth, filter 50M gal/day
- Maximum: At 1 year growth, filter 100 M gal/day
- Most Likely: 75M gal/day
- Level of Certainty: based on performance of existing projects in Middle Estuary
- Assumptions: Natural salinity conditions are maintained, however monitoring of sites established at times of high release rates (2004 & 2005) have shown excellent natural recruitment on constructed substrate. Good resilience of oyster population overall in the Middle Estuary has been demonstrated.

Estimate of Water Quantity Benefits

- Minimum: N/A
- Maximum: N/A
- Most Likely: N/A
- Level of Certainty: N/A
- Assumptions: N/A

Contact: Kathy Fitzpatrick, P.E., Martin County, 772-288-5429



JAYCEE PARK OYSTER REEF RESTORATION - FALL 2006

Northern Everglades- Potential Management Measure

Project Feature/Activity: Develop an On-site Sewage Treatment and Disposal System (OSTDS) inspection and pump-out program within designated areas of concern

Level: 4

General Description/Background: EPA recommends an inspection and pump-out every 3-5 years for an OSTDS. Most older urban areas within the St. Lucie River watershed both have a septic system and are located in close proximity to impaired waters. These areas of concern are also in low lying or flood prone developments which further necessitates periodic OSTDS maintenance. An incentive program could help residents identify damaged or non-functioning septic systems by providing financial assistance and technical expertise. Valuable data could be obtained by this program and area waters would benefit from increased maintenance and repair.

Purpose: To reduce the amount of water quality problems related to damaged or non-functioning septic systems

Location/Size/Capacity: Martin and St. Lucie Counties (specific locations to be determined), areas of concern will be delineated using existing WQ data and prioritized. There are approx. 70,000 OSTDS in the basin. Assuming 15% are in areas of concern, there would be 10,500 systems eligible for the program.

Initiative Status: conceptual

Cost: (Initial estimate) \$2.5M for 10,500 systems over 5 years

Documentation: Department of Health data, Wekiva River area study

Estimate of Water Quality Benefits: source reduction of 2.3M gallons of untreated septage entering the ground. Assuming: 15% participation, 15% of those found failing, 40 gal./person/day for a year.

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

Estimate of Water Quantity Benefits: N/A

- Minimum:
- Maximum:
- Most Likely:
- Level of Certainty:

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- Assumptions:

Contact: St. Lucie and Martin County Health Departments

Northern Everglades- Potential Management Measure

Project Feature/Activity: Improved management of sludge disposal in St. Lucie County through the use of an innovative technology (Plasma-Arc)

Level: 1

General Description/Background: The current disposal practices of land applying Biosolids will be phased out in favor of the Plasma Arc Gasification process to be utilized at the St. Lucie County Solid Waste Baling & Recycling facility.

Purpose: To remove a major pollution source of bacteria and nutrients to area waters by providing an alternative disposal method.

Location/Size/Capacity: St. Lucie County ,FL 1500 Tons/day initial, then expanded to 3000 Tons/day.

Initiative Status:

Cost: \$0.00 (project is privately funded)

Documentation: FDEP Residuals Annual Summary Report, 2004; Dr. Lou Circeo, "Engineering & Environmental Applications of Plasma Arc Technology"

Estimate of Water Quality Benefits:

- Minimum: 22 Tons Nitrogen, 17 Tons Phosphorus Removed annually.
- Maximum: The source removal and ultimate immobilization of well over 1000 Tons Nitrogen and 700 Tons Phosphorus per year.
- Most Likely:
- Level of Certainty:
- Assumptions:

Estimate of Water Quantity Benefits: N/A

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

Contact: Jason Bessey, Stormwater Program, St. Lucie County Public Works, 772-462-1668

Northern Everglades- Potential Management Measure

Project Feature/Activity: Additional Reservoirs and/or Stormwater Treatment Areas to capture and treat any remaining undesired releases from Lake Okeechobee and/or the local watershed to the St. Lucie River and Estuary not addressed by the proposed improvements north of the lake.

Level: various for each option/opportunity

General Description/Background: The proposed projects in the Lake Okeechobee Protection Plan and the CERP Indian River Lagoon Project Implementation Report will provide significant reduction in the amount of undesirable discharges from the lake and/or local watershed to the estuary. Any remaining undesirable discharges could be addressed through the construction of additional reservoirs and/or stormwater treatment areas to capture and treat these remaining lake discharges.

Purpose: To provide storage and treatment of water that is discharged from the lake and/or the local watershed to the estuary at undesirable times and amounts.

Location/Size/Capacity: tbd

Initiative Status: conceptual

Cost: tbd

Documentation:

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

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

Contact: South Florida Water Management District

Northern Everglades- Potential Management Measure

Project Feature/Activity: Reservoir and/or Stormwater Treatment Area along the south side of the C-44 Canal to capture and treat any remaining undesired releases from Lake Okeechobee to the St. Lucie River and Estuary not addressed by the proposed improvements north of the lake.

Level: 5

General Description/Background: The proposed projects in the Lake Okeechobee Protection Plan will provide significant reduction in the amount of undesirable discharges from the lake to the estuary. Any remaining undesirable discharges could be addressed through the construction of a reservoir and/or stormwater treatment area to capture and treat these remaining lake discharges.

Purpose: To provide storage and treatment of water that is discharged from the lake to the estuary at undesirable times and amounts.

Location/Size/Capacity: tbd

Initiative Status: conceptual

Cost: tbd

Documentation:

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

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

Contact: South Florida Water Management District

Northern Everglades- Potential Management Measure

Project Feature/Activity: Conversion of existing canals into “linear wetland treatment areas” (i.e. similar to St. James Canals)

Level: 4

General Description/Background:

Purpose:

Location/Size/Capacity:

Initiative Status:

Cost:

Documentation:

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

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

Contact:

Northern Everglades- Potential Management Measure

Project Feature/Activity: North River Shores Vacuum Sewer System

Level: 1

General Description/Background: Vacuum assisted gravity sewer collection system to provide service to approximately 750 single and multi family residential units.

Purpose: Septic Tank Elimination

Location/Size/Capacity: Along the banks of the east side of the North Fork of the St. Lucie River, North of the Roosevelt Bridge, West of U.S. 1 and South of Britt Road. To service approximately 750 single and multi-family residential units, presently disposing of approximately 190,000 gallons per day of waste through septic tanks.

Initiative Status:

Cost: approximately \$10,000,000 (estimate as of 1/15/07) 2-year project

Documentation: 60% construction drawings and St. Lucie River Septic Tank/Water Quality Study from the Harbor Branch Oceanographic Institution.

Estimate of Water Quality Benefits

- Minimum:
- Maximum:
- Most Likely: Eliminate nutrient loading from septic tanks @ 3.5 lbs TN per month and .89 lbs TP per month per septic tank as per FDEP study.
- Level of Certainty: 90% - State law requires residential connection to sewer system within 365 days of its availability.
- Assumptions:

Estimate of Water Quantity Benefits

- Minimum:
- Maximum:
- Most Likely: Increased wastewater flow @ 190,000 gpd from homes to be converted to reuse
- Level of Certainty: 90% - State law requires residential connection to sewer system within 365 days of its availability.
- Assumptions:

Contact: Additional information regarding loading is available in the Harbor Branch Oceanographic Institute June 2006 report

Northern Everglades- Potential Management Measure

Project Feature/Activity: CERP - IRL South: C-23/24 Reservoir/STA

Level: 1

General Description/Background: This project consists of three components described as follows:

C-23/24 North Reservoir: This feature is located in St. Lucie County on the west side of C-24 between control structures G-81 and G-79 and includes a 4,399-acre aboveground reservoir with a maximum depth of 12-feet. The total storage capacity of the reservoir is approximately 48,500 acre-feet. The purpose of this component is to capture local runoff from the C-23 and C-24 Basins. The pump station will be designed to provide up to 900-cfs removal rate from C-24 canal. This water can then be routed to the C-23/24 STA or returned to C-23 or C-24 when there is a need to reclaim storage capacity or meet a water supply demand. The component is designed for stormwater attenuation to the estuary to control salinity and to provide an additional source of agricultural water supply. This component is also expected to provide incidental water quality benefits by reducing loads of nutrients, pesticides, and other pollutants.

This component also can be operated to contribute flow to the diversion canal. It allows stormwater originating in the C-23 and C-24 basins to be directed into the C-23/C-24 STA to be treated and then discharged from the STA into Ten Mile Creek. Ten Mile Creek forms the headwaters of the Northfork of the SLR. Thus, stormwater presently discharged from C-23 and C-24 directly into the SLR at points considered most harmful can be redirected to the headwaters of the St. Lucie River producing a more desirable salinity gradient within the river and estuary.

C-23/24 South Reservoir: This feature is located in St. Lucie County north and west of C-23 between control structures G-78 and G-79 and includes a 4,155-acre aboveground reservoir with a maximum depth of 12-feet. The total storage capacity of the reservoir is approximately 43,400 acre-feet. This component functions very much like the C-23/24 North reservoir. A sag culvert or inverted siphon crossing under State Highway 70 will connect the two reservoirs. In fact, if it were not for Highway 70, these two reservoirs would be one. The pump station will be designed to remove up to 900 cfs from the C-23 canal. The intake and discharge points on the reservoir have been separated to prevent short-circuiting, which would negatively impact incidental water quality performance. Approximately 10,560 feet of Canal C-23 will be re-routed around the reservoir levee as part of the seepage canal system. The abandoned section of the canal will be left in place as an approach to the drawdown structure S-413 and as a fish refuge area.

C-23/24 Stormwater Treatment Area: This feature is located in St. Lucie County and includes a 2,568-acre Stormwater Treatment Area with a maximum depth of 4 feet and a normal operating depth of 2 feet. It is designed to remove 80% of the phosphorus from stormwater entering the C-23/24 reservoirs. The STA is located east of C-24 between control structures G-81 and G-79.

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This facility will be a multi-cell STA covering approximately four square miles. The primary discharge from the STA will be into the header canal of the North SLR Water Control District. A 250-cfs pump station will transfer water from the C-23/24 North Reservoir into the STA. It is expected that the STA will be operated to discharge primarily into the header canal and then directed toward Ten Mile Creek. Other discharge options include C-25 and C-24. Approximately one mile of Sneed Road (State Road 613) will be abandoned.

This component of the recommended plan includes water quality features considered essential to Everglades restoration. This feature will be operated to reuse C-23/C-24 basin water to meet water quantity and nutrient targets for the SLE. These components capture water currently discharged to tide and store it to meet water quantity, quality, timing, and distribution targets for this portion of the Everglades ecosystem.

Purpose: The purpose of this project is to improve the quality, quantity, timing and distribution of water discharge to the St. Lucie River and Estuary from the local watershed.

Location/Size/Capacity: Storage – 91,900 acre-feet (total for both reservoirs); STA – 2568 acre-feet

Initiative Status: Indian River Lagoon – Project Implementation Report and Environmental Impact Statement (February 2004) was authorized by the U.S. Congress as described in the Water Resource Development Act of 2007

Cost: \$332,145,375 (IRL-S PIR/EIS, Feb. 2004)

Documentation: Indian River Lagoon – Project Implementation Report and Environmental Impact Statement (February 2004)

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

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

Contact: SFWMD

Northern Everglades- Potential Management Measure

Project Feature/Activity: CERP - IRL South: Northfork Natural Floodplain Restoration

Level: 2

General Description/Background: The North Fork lands are extremely important in linking the estuary to the watershed. Preservation will provide such water quality and environmental benefits as removing nutrients, maintaining valuable wading bird habitat, and serving as a nursery for many of the recreationally and commercially important fish species that spend certain life stages in this area. This feature includes acquisition and preservation of approximately 3,100 acres of floodplain and adjacent lands, which will receive an additional 64,500 acre-feet of flow via the northern diversion efforts. (Although it was assumed North Fork lands would be acquired in fee, during the PED phase other lesser estates will be given consideration, including a Conservation Easement, Flowage Easement, channel improvement easement, temporary construction easement or some combination of these estates.)

Purpose: Preserving lands within the North Fork corridor provides significant environmental improvement in the health of this portion of the river by preventing such degradation as increased stormwater runoff, increased turbidity, and increased influence of exotic plants and animals from the surrounding areas that are under significant development pressure.

Location/Size/Capacity: 3,100 acres of floodplain and adjacent lands

Initiative Status: Indian River Lagoon – Project Implementation Report and Environmental Impact Statement (February 2004) was authorized by the U.S. Congress as described in the Water Resource Development Act of 2007

Cost: \$13,016,700 (IRL-S PIR/EIS, Feb. 2004)

Documentation: Indian River Lagoon – Project Implementation Report and Environmental Impact Statement (February 2004)

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

- Minimum:
- Maximum:

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- Most Likely:
- Level of Certainty:
- Assumptions:

Contact: SFWMD

Northern Everglades- Potential Management Measure

Project Feature/Activity: CERP - IRL South: Muck Remediation

Level: 3

General Description/Background: Muck remediation involves the removal of accumulated muck within the SLE from areas that are effectively “dead zones.” Muck accumulation has covered substrate that once supported a healthy SAV and oyster community. Removal of this sediment would greatly improve estuarine conditions by exposing this substrate making it suitable for colonization by target species. Removing the muck would also improve water quality conditions for target species by improving the clarity of the water and reducing sunlight attenuation, especially critical for re-colonization and growth of SAV.

It is strongly believed that Lake Okeechobee is not a significant source of sediments delivered to the SLE and IRL. Lake Okeechobee, due to its size, behaves as a very large settling basin. Total suspended solids measured at the C-44 discharge point out of the Lake are normally in the 8-12 mg/l range, which is quite low. Therefore, there are few solids in the water to be delivered to the SLE and IRL. The soils in the C-44 canal are overwhelmingly fine sands and do not contribute significantly to muck in the SLE and IRL. Deposits left by high flow events from Lake Okeechobee consist almost entirely of fine sands. Analysis of the muck sediments and the soils of the watershed confirm that the principal source of the muck is erosion from the watershed. Improved land and watershed management practices are certain to result in reduced delivery of sediments to the SLE and IRL. The construction of reservoirs and STAs will further reduce muck forming sediments in the SLE and IRL.

Muck remediation can occur at several locations and offers the same benefits from alternative to alternative without regard to the configuration of the balance of the components included in that alternative. This component provides specific benefits to the SLE and the target species of the study but cannot be simulated through the use of models used for evaluation of the multipurpose alternative plans. This component is critical for restoring the estuary to a sustainable condition.

The four areas targeted in this study for remediation correspond closely with those identified in Haurert (1988) as “hot spots”. Two areas are located in the North Fork, one in the South Fork, and one in the Mid-Estuary. Muck is accumulating in the study area at a rate 2.5 times faster than historically in the SLE. The excessive muck deposits cover a vast expanse of the SLR and SLE. This study chose to address only those 4 “hot spot” areas identified in Haurert (1988) that includes the majority of estuary muck.

Removal of SLE muck sediments has been identified as a component that may bring about an immediate, and potentially dramatic, improvement in water quality, as well as improvements in habitat quality and extent. A Corps survey conducted in 2000 with transects 500 feet apart in the SLE estimated removal of 5.5 million cubic yards of muck. Recent re-evaluation of the muck feature in 2003 has further refined the estimate to 7.9 million cubic yards of muck removal from the North and South Forks and Middle St. Lucie Estuary.

Excavation of deep cuts in the deepest layers of muck is the preferred method for removal and will provide sequestering potential for muck suspended by any cause such as wind, high currents, or boat traffic. Pilot cuts dredged to 13 feet in fine muck sediments in the South Fork of the SLR in 2002 and 2003 demonstrated the ability of the excavations to act as sediment traps, filling with muck accumulations within one year. The excavated cuts have the potential to collect fluid muck under appropriate hydraulic conditions, pulling muck from nearby shallower areas, as well as to trap muck moving along with currents. Realizing the importance of clearing muck from the shallower zones of the SLR and SLE that serve as habitat for oysters and SAV, final muck removal methods, locations, and accumulation rates will be determined with more detailed water quality and sediment transport modeling during the Pre-Construction Engineering and Design phase. The act of dredging itself is not likely to be a significant cause of re-suspension due to the vacuuming action of the dredge. Most disturbed material will be pulled into the suction flow of the dredge and removed from the SLR and SLE water column. The recommended disposal method is via a permanent upland spoil disposal site. The site is located just south of C-23 and just west of the Florida Turnpike in Martin County. It has been under intense agricultural use for many years as a sod farm. The recommended location is central to the major muck deposit locations and enables supernatant return via gravity to below the salinity control structure in C-23, a distance of approximately 2 miles east of the site. The disposal site is one square mile in area (640 acres). It would be bounded by an earthen levee approximately 18 feet high and dredged sediments would be pumped into the confined space and allowed to desiccate and consolidate in place. As consolidation occurs, space may be made available to future dredging disposal.

Purpose: Muck remediation involves the removal of accumulated muck within the SLE from areas that are effectively “dead zones.” Muck accumulation has covered substrate that once supported a healthy SAV and oyster community. Removal of this sediment would greatly improve estuarine conditions by exposing this substrate making it suitable for colonization by target species. Removing the muck would also improve water quality conditions for target species by improving the clarity of the water and reducing sunlight attenuation, especially critical for re-colonization and growth of SAV.

Location/Size/Capacity: The four areas targeted in this study for remediation correspond closely with those identified in Haunert (1988) as “hot spots”. Two areas are located in the North Fork, one in the South Fork, and one in the Mid-Estuary.

Initiative Status: Indian River Lagoon – Project Implementation Report and Environmental Impact Statement (February 2004) was authorized by the U.S. Congress as described in the Water Resource Development Act of 2007

Cost: \$92,028,000 (IRL-S PIR/EIS, Feb. 2004)

Documentation: Indian River Lagoon – Project Implementation Report and Environmental Impact Statement (February 2004)

Estimate of Water Quality Benefits

- Minimum:
- Maximum:
- Most Likely:

- Level of Certainty:
- Assumptions:

Estimate of Water Quantity Benefits

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

Contact: SFWMD

Northern Everglades- Potential Management Measure

Project Feature/Activity: Tropical Farms / Roebuck Creek Stormwater Quality Retrofit

Level: 1

General Description/Background: The project is designed to capture the first inch of runoff from 540-acres and convey the runoff to a proposed Lake / Stormwater Treatment Area (STA) that will provide 39 acre-feet of stormwater attenuation and water quality treatment. The project consists of the installation of approximately 8,500 linear feet of stormpipe ranging from 18” to 48” diameter and the construction of a 1.5-acre lake and a 21 acre lake / STA system.

Purpose: To provide 39.2 acre-feet of water quality treatment and stormwater attenuation to 540 acres of Roebuck Creek.

Location/Size/Capacity: The Roebuck Creek basin is located in east, central Martin County, Florida more specifically, in Sections 1, 12 & 13 of Township 39 South, Range 40 East and Sections 5-8 and 18 of Township 39 South, Range 41 East. The total basin size is 1,915 acres. A 1.5 acre lake and a 21.1 acre Lake / STA system is proposed to provide 39.2 acre feet of attenuation and water quality treatment.

Initiative Status: Approved and on-going by Martin County

Cost: Total Project Cost is estimated to be over \$4.0 million, of which Martin County is requesting a total of \$600,000 from the State & SFWMD. Martin County will provide \$300,000 in match.

Documentation: Tropical Farms Stormwater Quality Retrofit Study, Capital Improvement Plan, TMDL efforts

Estimate of Water Quality Benefits

- Minimum:
- Maximum:
- Most Likely: Reduce TSS 70-85% (10,852 kg/yr); TP 60-70% (90kg/yr); TN 35-45% (603 kg/yr)
- Level of Certainty:
- Assumptions:

Estimate of Water Quantity Benefits

- Minimum:
- Maximum:
- Most Likely: Providing additional 39.2 acre-feet of storage within basin
- Level of Certainty:
- Assumptions:

Contact: Gary Roderick, Chief Office of Water Quality, Martin County

DRAFT – 4/21/2008

Additional Project Information: TROPICAL FARMS / ROEBUCK CREEK

Payment and Delivery Schedule:

<u>Task</u>	<u>Deliverable</u>	<u>Schedule</u>	<u>Payment</u>
Construction	Pay Requests / Engineer's Certification	Sep '08 to Apr '09	\$600,000

How much project work has already occurred?

Design is 70% complete.

Permitting is on-going, it is anticipated that a permit will be issued in March 2008.

Only four (4) easements are necessary and acquisition has started and is on-going.

How much funding has already been obtained and from what sources?

<u>Year</u>	<u>Source</u>	<u>Grant Amount</u>	<u>Martin County Match</u>
FY06	SLRIT	\$ 512,000	\$ 512,000
FY07	SLRIT	\$ 400,500	\$ 400,500
FY08	SLRIT	\$ 500,000	\$ 500,000
FY07-08	TMDL	\$1,412,500	\$1,412,500

Breakdown of Martin County matching funds?

See above.

For the multi year projects, would Martin County need all funding in Year 1 or could it be spread over the project life?

Majority of any 5/5/5 funding would be for construction. The majority of funding would be needed in the first year of the grant.

How much work of the multi year project would be completed in Year 1?

If a 5/5/5 grant is obtained, the majority of funding would be for construction. Construction of this project is scheduled to begin in Sep - Oct 2008 and continue for 6-8 months. So the majority of funding would be needed in Year 1 of the 5/5/5 grant.

Where would the remaining funding for future years come from?

Other grants, County ad valorem taxes

Northern Everglades- Potential Management Measure

Project Feature/Activity: Old Palm City Phase III Stormwater Quality Retrofit

Level: 1

General Description/Background: Phase 3 of the Old Palm City Retrofit project is to construct two (2) Stormwater Treatment Areas that will serve 106 acres of residential land that was first platted in the 1920's. The project proposes an East STA and West STA.

Purpose: To provide a total of 8.5 ac-feet of water quality treatment and stormwater attenuation to a total of 106 acre basin of residential lands developed prior to today's standards.

Location/Size/Capacity: This project is located in Palm City, Florida more specifically in Sections 17 & 20, Township 38 South, Range 41 East. The project consists of an East and West STA which are 4.8 acres and 6.9 acres in aerial extent, respectively. The East STA has 1.89 acre-feet of storage and the West STA has 6.64 acre-feet of storage.

Initiative Status: Approved and on-going by Martin County

Cost: Total Project Cost is estimated at \$3.9 million, of which Martin County is requesting a total of \$1.2 million from the State & SFWMD. Martin County will provide \$600k in match.

Documentation: Old Palm City Phase 3 Engineering Design Report, CIP, TMDL efforts

Estimate of Water Quality Benefits

- Minimum:
- Maximum:
- Most Likely: Capture and treat 1"+ over the 87 acre west basin and 1.2" over the 19 acre east basin
- Level of Certainty:
- Assumptions:

Estimate of Water Quantity Benefits

- Minimum:
- Maximum:
- Most Likely: Providing additional 8.5 ac-ft of storage within basin
- Level of Certainty:
- Assumptions:

Contact: Gary Roderick, Chief Office of Water Quality, Martin County

Additional Project Information: OLD PALM CITY PHASE 3

Payment and Delivery Schedule:

<u>Task</u>	<u>Deliverable</u>	<u>Schedule</u>	<u>Payment</u>
Land Acquisition	Deeds and Easements	Mar '08 to Sep '08	\$1,200,000

How much project work has already occurred?

Design is 85% complete, awaiting land acquisition to finalize.
Permitting is 95% complete, awaiting land acquisition to finalize.

How much funding has already been obtained and from what sources?

<u>Year</u>	<u>Source</u>	<u>Grant Amount</u>	<u>Martin County Match</u>
FY06	SLRIT	\$ 411,800	\$ 411,800
FY07	SLRIT	\$ 400,000	\$ 400,000
FY08	SLRIT	\$ 244,500	\$ 244,500
Phase 1	HMGP	\$ 198,274	\$ 64,050
Phase 2*	HMGP	\$1,311,251	\$ 439,125

- Phase 2 HMGP Grant is still pending.

Breakdown of Martin County matching funds?

See above.

For the multi year projects, would Martin County need all funding in Year 1 or could it be spread over the project life?

Any 5/5/5 funding would be allocated to land acquisition. Land acquisition is scheduled for March through September 2008. The funding is needed in the first year of the grant.

How much work of the multi year project would be completed in Year 1?

Since the 5/5/5 grant would be allocated to land acquisition, and the acquisition is scheduled for Year 1 of the grant then all the work is scheduled in Year 1.

Where would the remaining funding for future years come from?

Other grants, (SLRIT and FEMA HMGP), County ad valorem taxes

Northern Everglades- Potential Management Measure

Project Feature/Activity: Manatee Pocket Dredging Project

Level: 1

General Description/Background:

Shoaling and sedimentation in Manatee Pocket has been an ongoing process, accelerated during extreme storm events and fueled by upstream construction a development. Martin County has completed three separate storm water retrofit projects designed to remove the muck sediment from water entering Manatee Pocket. The total cost of these three projects exceeded \$10M. Grant funds from the St. Lucie River Issues Team contributed to each of the projects. The Manatee Pocket Dredging Project will be the capstone of these projects by removing a large volume (approximately 250,000 cubic yards) of the previously deposited muck sediments. The sediments are to be hydraulically dredged from a 100 ft wide X 10 ft. deep channel along the axis of Manatee Pocket and includes a loop access channel and detrital trap area. Additionally, material will be removed from the four main water bodies that drain to the Manatee Pocket: Crooked Creek entrance, Salerno Creek, Manatee Creek and Chapman Creek. Finally muck will be removed in selected locations to uncover clean sandy substrate, creating areas likely to recruit benthic flora and fauna. Dredged material will be pumped directly to a dikes containment area at Martin County's Witham Field, where the sediment will be allowed to dry prior to moving to a final destination.

A series of public meetings have been conducted to educate and receive input from waterfront property owners. Sediment and water quality testing, bathymetric surveys and environmental assessments have been completed. State and federal regulatory agencies have issued the required permits for the project. Baseline environmental surveys will be conducted prior to project initiation and periodically subsequent to project completion to allow scientific analysis of project impacts.

Purpose:

The environmental need for this project was stated in the Manatee Pocket Dredging Feasibility Study (Applied Technology Management, Inc., November 2005). That concluded Manatee Pocket "exhibited a generally degraded habitat with silt (muck) conditions predominating over the majority of the pocket.... Dredging represents the only practical engineering approach to address the current conditions within the pocket, both in terms of habitat quality and vessel navigation. Removal of significant volumes of fine (muck) sediments has the potential to expose bottom sediments more suitable to seagrass colonization. The net result of this action would be an improved marine habitat within the pocket."

Muck sediments are easily suspended in storm conditions and may move from Manatee Pocket into the St. Lucie River. Reducing the source of the sediments within the Pocket will result in a positive impact on the River. A monitoring program will allow quantification of project effects, and provide important data for future de-mucking projects.

An increased channel depth, coupled with the installation of channel markers will provide increased safety for Manatees, and also reduce muck suspension boat propellers. Signage will also be installed to educate boaters on manatee safety and seagrass protection.

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Manatee Pocket/Port Salerno has been designated as a Working Waterfront by the State of Florida. The creation of a dedicated navigation channel through the waterway will create improved navigation and provide a much needed economic stimulus for the area.

Location/Size/Capacity:

Manatee Pocket is located in Martin County, near confluence of the St. Lucie River and the Indian River Lagoon. The project will remove approximately 250,000 cubic yards of muck sediments over 47 acres within Manatee Pocket and its tributaries.

Initiative Status:

Permits are in hand, final design/bid documents are under development.

Cost:

Initial estimates place this project at: \$12M

Northern Everglades funding request: \$4M

Documentation: Manatee Pocket Feasibility Study, ATM 2006; Conceptual design, Tetra Tech EC, 2007; 2007 and 2008 SLRIT applications (funded 2007, ranked #1 for 2008); Pre project baseline studies and post project monitoring will allow reports to quantify impact of the project.

Estimate of Water Quality Benefits

- Minimum:
- Maximum:
- Most Likely: Estimates of water quality benefits have not been quantified but his project will lead to improved water quality by:
 1. Restoring up to 5 acres of seagrass habitat by removing accumulated muck to expose suitable substrate at a depth conducive to seagrass growth;
 2. Removing up to 230,000 cubic yards of muck, some of which contains elevated levels of metals and organics;
 3. Creating three (3) sediment traps at the main tributaries to isolate future deposited sediment.The quantity of muck and associated metals and organics will be reported upon project completion.
- Level of Certainty: High
- Assumptions:

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

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

Contact: Kathy Fitzpatrick, Coastal Engineer, Martin County

Northern Everglades- Potential Management Measure

Project Feature/Activity: Stormwater Baffle Box Retrofit - City of Stuart

Level:

General Description/Background:

Purpose:

Location/Size/Capacity:

Initiative Status:

Cost:

Documentation:

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

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

Contact: City of Stuart

Northern Everglades- Potential Management Measure

Project Feature/Activity: Danforth Creek Stormwater Quality Retrofit

Level: 3

General Description/Background: This portion of Palm City was platted and developed prior to today's standards for water quality treatment and storm attenuation. Danforth Creek has been identified by Martin County and SFWMD as one of the highest nutrient pollutant creeks in Martin County. This project is to provide some additional water quality treatment and attenuation for a 50 acre residential basin that currently has no treatment.

Purpose: The purpose of this project is to provide approximately 4 acre-feet of additional treatment and storage for a 50 acre untreated residential development area.

Location/Size/Capacity: This project is located in Palm City, Florida more specifically in part Sections 18 & 19, Township 38 South, Range 41 East and Sections 13 & 24, Township 38 South, Range 40 East. The project includes the construction of a 3.5 – 6.0 acre lake / Stormwater Treatment Area and the installation of 5 second generation baffle boxes.

Initiative Status: Approved and on-going by Martin County

Cost: Total Project cost is estimated to be over \$4.0 million, of which Martin County is requesting a total of \$1.0 million for the State & SFWMD. Martin County will provide \$500,000 in match.

Documentation: Capital Improvement Plan scheduled to start in FY08, TMDL efforts

Estimate of Water Quality Benefits

- Minimum:
- Maximum:
- Most Likely: (Reduction) ~10% coliforms, 70-80% TSS, 60-70% TP, 20-35% TN
- Level of Certainty:
- Assumptions:

Estimate of Water Quantity Benefits

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

Contact: Gary Roderick, Chief Office of Water Quality, Martin County

Additional Project Information: DANFORTH CREEK

Payment and Delivery Schedule:

<u>Task</u>	<u>Deliverable</u>	<u>Schedule</u>	<u>Payment</u>
Construction	Pay Requests / Engineer's Certification	Jun '09 to Jan '10	\$1,000,000

How much project work has already occurred?

Preliminary conceptual designs and feasibility studies have been addressed.

How much funding has already been obtained and from what sources?

<u>Year</u>	<u>Source</u>	<u>Grant Amount</u>	<u>Martin County Match</u>
FY07	SLRIT	\$ 1,000,000	\$ 1,000,000
FY08	SLRIT	\$ 1,000,000	\$ 1,000,000

Breakdown of Martin County matching funds?

See above.

For the multi year projects, would Martin County need all funding in Year 1 or could it be spread over the project life?

Funding could be spread out over subsequent years

How much work of the multi year project would be completed in Year 1?

Design and permitting.

Where would the remaining funding for future years come from?

Other grants, County ad valorem taxes

Northern Everglades- Potential Management Measure

Project Feature/Activity: North St. Lucie River Water Control District Stormwater Retrofit; Structures 81-1-2 and 85-1-2

Level:

General Description/Background:

Purpose:

Location/Size/Capacity:

Initiative Status:

Cost:

Documentation:

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

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

Contact: North St. Lucie River Water Control District

Northern Everglades- Potential Management Measure

Project Feature/Activity: Indiantown Citrus Growers Water Conservation Project, Phase II

Level:

General Description/Background:

Purpose:

Location/Size/Capacity:

Initiative Status:

Cost:

Documentation:

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

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

Contact: Treasure Coast RC&D Council

Northern Everglades- Potential Management Measure

Project Feature/Activity: All American Boulevard Ditch Retrofit

Level: 3

General Description/Background: This portion of Old Palm City was first platted and developed in the 1920's before today's standards. The homes are serviced with individual septic systems that leach into the All American ditch and the All American Ditch drains uncontrolled into the South Fork of the St. Lucie River.

Purpose: The purpose of the project is to re-grade the All American ditch and pipe the flows to an approximately 12.5 acre Lake / Stormwater Treatment Area for water quality treatment and provide some attenuation.

Location/Size/Capacity: This project is located in Palm City, Florida more specifically in Sections 20, Township 38 South, Range 41 East and Hanson Grant.

Initiative Status: Approved and on-going by Martin County

Cost: Total project cost is estimated to be \$2.3 million, of which Martin County is requesting a total of \$1.0 million from the State and SFWMD. Martin County will provide \$500,000 in match.

Documentation: Capital Improvement Plan scheduled to begin in FY09, and TMDL efforts

Estimate of Water Quality Benefits

- Minimum:
- Maximum:
- Most Likely: (Reduction) ~10% coliforms, 70-80% TSS, 60-70% TP, 20-35% TN
- Level of Certainty:
- Assumptions:

Estimate of Water Quantity Benefits

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

Contact: Gary Roderick, Chief Office of Water Quality, Martin County

Additional Project Information: ALL AMERICAN DITCH

Payment and Delivery Schedule for proposed 5/5/5 funding:

<u>Task</u>	<u>Deliverable</u>	<u>Schedule</u>	<u>Payment</u>
Design & Permitting	Permit	Nov '08 to Jun '09	\$127,500
Construction	Pay Requests & Engineer's Certification	Aug '09 to Jan '10	\$872,500

How much project work has already occurred?

Preliminary conceptual designs and feasibility studies have been addressed.

How much funding has already been obtained and from what sources?

<u>Year</u>	<u>Source</u>	<u>Grant Amount</u>	<u>Martin County Match</u>
FY08	SLRIT	\$ 650,000	\$ 0

Breakdown of Martin County matching funds?

See above.

For the multi year projects, would Martin County need all funding in Year 1 or could it be spread over the project life?

The 5/5/5 funding would be allocated for design/permitting and construction. Funding for design / permitting would be needed in Year 1 and funding for construction could be spread out over subsequent years.

How much work of the multi year project would be completed in Year 1?

Design / permitting would be completed in Year 1.

Where would the remaining funding for future years come from?

Other grants, and County ad valorem taxes

Northern Everglades- Potential Management Measure

Project Feature/Activity: Everglades Comprehensive Plan Amendment

Level: 2

General Description/Background: The Florida Department of Community Affairs (DCA) is leading an effort to ensure that county comprehensive plans include environmental protection for the Everglades. An amendment has been drafted, and is currently being revised, which states that for the areas within the jurisdiction of the South Florida Water Management District each comprehensive plan shall include goals, objectives and policies that ensure protection of the land, water, and biological resources necessary for the long-term viability of the Florida Everglades. The goals, objectives and policies to protect the Florida Everglades shall be adopted into comprehensive plans within one year of the effective date of this law.

Purpose: This amendment will require comprehensive plans to include: a conservation element for the conservation, use, and protection of natural resources in the area, including air, water, water recharge areas, wetlands, waterwells, estuarine marshes, soils, beaches, shores, flood plains, rivers, bays, lakes, harbors, forests, fisheries and wildlife, marine habitat, minerals, and other natural and environmental resources.

Location/Size/Capacity: Areas within the jurisdiction of the South Florida Water Management District

Initiative Status: DCA is currently working within the legislative process to draft/revise this amendment.

Cost: N/A

Documentation:

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

- Minimum:
- Maximum:
- Most Likely:
- Level of Certainty:

- Assumptions:

Contact: The Nature Conservancy

Northern Everglades- Potential Management Measure

Project Feature/Activity: Living Shoreline Initiative

Level: 3

General Description/Background: The primary goal of the Living Shoreline Initiative is to provide landowners and contractors with “softer” and more natural alternatives to shoreline hardening. In addition to providing erosion control, living shorelines help filter stormwater runoff, and provide important habitat for plants and animals.

This is a partnership effort that could be modeled after the Living Shoreline Initiative established by the Florida Panhandle Coastal Program. In the Panhandle program, partners include: Apalachicola Riverkeeper, Choctawhatchee Basin Alliance, Florida Department of Environmental Protection (Ecosystem Restoration Section, and Office of Coastal and Aquatic Managed Areas), Florida Fish and Wildlife Conservation Commission, National Oceanic and Atmospheric Administration, PBS&J, Pensacola Gulf Coast Keepers, Sea Grant Extension, University of Florida, University of West Florida, U.S. Fish and Wildlife Service, and West Florida Regional Planning Council.

Purpose: To protect shorelines from erosion using natural habitat elements, such as native vegetation and oyster shells, rather than armoring. Living shorelines create nursery and foraging habitat, enhance natural processes and improve water quality.

Location/Size/Capacity: TBD

Initiative Status: A coordinated effort to implement this program within the St. Lucie Estuary is not yet underway

Cost: TBD

Documentation: “A Living Shoreline Initiative for the Florida Panhandle: Taking a Softer Approach,” Melody Ray Culp, USFWS, National Wetlands Newsletter, vol. 29, no. 6, Copyright 2007.

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

- Minimum:

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- Maximum:
- Most Likely:
- Level of Certainty:
- Assumptions:

Screening Criteria

- Proof of Concept:
- Other Impacts:

Contact: Andrea Povinelli, The Nature Conservancy, 561-744-6668

Northern Everglades- Potential Management Measure

Project Feature/Activity: Urban Best Management Practices Program (An Extension of the Florida Yards and Neighborhoods Program)

Level: 1 (Existing Program within the St. Lucie Watershed)

General Description/Background: The Florida Yards and Neighborhoods Program is an environmental education program designed to improve the water quality of the Indian River Lagoon and the St. Lucie Estuary (SLE) by reducing non point sources of pollution from properties throughout the watershed. The program is a key component of the Urban Best Management Practices (BMP) initiative and an excellent complement to the Agricultural BMP Program.

Purpose: This program is designed to reduce pollution flowing into the river from urban landscapes. The homeowner is the only group that has no regulations regarding the use and application of nutrients and pesticides. Consequently, materials may be applied by them indiscriminately. The goal of the FYN Program is to provide collaborative educational programming about environmental landscape management (ELM), integrated pest management (IPM), soil and water conservation and sustainable development that will address non point source pollution at a primary source: residential yards and commercial landscapes in the rapidly expanding suburban areas of the watershed that impact water quality through inappropriate maintenance. This is one of the fastest growing metropolitan areas in the U.S. which indicates that a continuous educational program must be in operation in order to inform and train home gardeners, youth, and landscape professionals in the correct use of pesticides, the selection and placement of plant materials, fertilization, and proper irrigation methods. By reducing the amount of possible pollutants used in landscapes, the FYN program will greatly enhance water quality in the Indian River Lagoon and the St. Lucie Estuary.

Location/Size/Capacity: Martin County, St. Lucie County, Port St. Lucie and the City of Stuart

Initiative Status: The Florida Yards and Neighborhoods program has been active and successful in Martin County, St Lucie County and the city of Stuart for the last nine years

Cost: \$98,000 per year

Documentation: Quarterly reports presented to funding agencies in addition to a multiagency/multi stakeholder advisory board.

Estimate of Water Quality Benefits

- **Minimum:** reduction in nutrients, metals, pesticides and herbicides from urban landscapes reaching the St. Lucie Estuary.
- **Maximum:** help in reaching the soon to be adopted TMDL's for the SLE
- **Most Likely:** net benefit to the SLE with proven cost savings to the homeowner

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- **Level of Certainty:** reductions based on level of acceptance and implementation within the watershed
- **Assumptions:** requires other initiatives to also be implemented: state-wide fertilizer rule, mandatory training for landscape professionals, environmental, education and outreach, etc.

Estimate of Water Quantity Benefits

- **Minimum:** reduction in the amount of water leaving the property
- **Maximum:** total on-site retention
- **Most Likely:** enhanced retention with aquifer recharge but not total on-site retention
- **Level of Certainty:** moderate for reducing water quantity
- **Assumptions:** continues research from IFAS and Cooperative Extension on improvements to program

Contact: Fred Burkey IFAS Extension, Martin and St Lucie County

Northern Everglades- Potential Management Measure

Project Feature/Activity: Aquifer Storage & Recovery

Level: 4

General Description/Background:

Purpose:

Location/Size/Capacity:

Initiative Status:

Cost:

Documentation:

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

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

Contact:

Northern Everglades- Potential Management Measure

Project Feature/Activity: Aquifer Storage & Recovery – C-44 Reservoir (IRL South)

Level: 4

General Description/Background:

Purpose:

Location/Size/Capacity:

Initiative Status:

Cost:

Documentation:

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

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

Contact:

Northern Everglades- Potential Management Measure

Project Feature/Activity: Aquifer Storage & Recovery – C-23/24 Reservoir (IRL South)

Level: 4

General Description/Background:

Purpose:

Location/Size/Capacity:

Initiative Status:

Cost:

Documentation:

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

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

Contact:

Northern Everglades- Potential Management Measure

Project Feature/Activity: CERP – IRL South: Southern Diversion C-23 to C-44 interconnect

Level: 1

General Description/Background: An important component of the IRL South Plan. It greatly expands the flexibility of where to direct excess flows from the C-23 canal system which scientists tell us is the most damaging point of entry for freshwater into the St. Lucie Estuary.

Purpose: The canal would direct excess water from the C-23, C-24, C-25 canal system through the C-44 STA and into the St. Lucie Canal (C-44) where it could be diverted to Lake Okeechobee anytime the Lake was below 14.5’MSL, used to meet local irrigation demands, or sent to tide at a point less damaging than the C-23.

Location/Size/Capacity: The proposed canal would link the C-23 canal at a point two miles west of the S48 fix crested weir (the coastal structure) run south along the east side of Allapattah and link up into the northeastern corner of the proposed C-44 STA. Under current operational rules, 53,000 acre-feet of water could be harvested annually from the C-23, undergo water quality enhancements in the STA and then be discharged to the C-44. The PIR estimates that, in an average year 31,000 acre-feet could be gravity discharged to Lake Okeechobee via S-308 and 22,000 acre-feet could be sent to tide through the S-80 structure. Discharges handled in this manner are very close to achieving the Natural System Model, or pre-drainage, distribution of stormwater flows at C-23.

Initiative Status: The land has been purchased as part of the Allapattah and C-44 acquisitions. Design and permitting have not yet begun.

Cost:

Documentation: IRL SOUTH CERP PIR

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

- Minimum:
- Maximum:

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- Most Likely:
- Level of Certainty:
- Assumptions:

Contact:

Northern Everglades- Potential Management Measure

Project Feature/Activity: Martin County Baffle Boxes

Level: 4

General Description/Background: Currently Martin County has identified and prioritized nearly 30 locations for potential baffle box installations. The County has secured grants to install eight baffle boxes along Indian River Drive in Jensen Beach that discharge directly into the Indian River. With Northern Everglades funding the remaining baffle boxes can be installed.

Purpose: To provide sediment and debris traps to discharges directly into either the Indian River or St Lucie Rivers within Martin County.

Location/Size/Capacity: This project is located through out Martin County. The County has identified and prioritized nearly 30 locations for potential baffle box installations at locations that discharge within one-half mile of either the Indian River or the St Lucie Rivers.

Initiative Status: Approved and on-going by Martin County

Cost: Total Project Cost is estimated to be approximately \$2.5 million, of which Martin County is requesting a total of \$500k from the State & SFWMD. Martin County will provide \$250k in match.

Documentation: Martin County CIP, and TMDL efforts

Estimate of Water Quality Benefits

- Minimum:
- Maximum:
- Most Likely: Provide sediment and debris traps on various sized basins
- Level of Certainty:
- Assumptions:

Estimate of Water Quantity Benefits

- Minimum:
- Maximum:
- Most Likely: None
- Level of Certainty:
- Assumptions:

Contact: Gary Roderick, Chief Office of Water Quality, Martin County

Additional Project Information: Martin County Baffle Boxes

Payment and Delivery Schedule:

<u>Task</u>	<u>Deliverable</u>	<u>Schedule</u>	<u>Payment</u>
Construction	Payment Requests / Engineer's Certification	FY09 – FY10	\$500,000

How much project work has already occurred?

Planning is 75% complete
No design or permitting has been done.

How much funding has already been obtained and from what sources?

<u>Year</u>	<u>Source</u>	<u>Grant Amount</u>	<u>Martin County Match</u>
FY08	SLRIT	\$ 187,000	\$ 187,000
FY08	FL Forever	\$ 394,000	\$ 394,000

Breakdown of Martin County matching funds?

See above.

For the multi year projects, would Martin County need all funding in Year 1 or could it be spread over the project life?

Any 5/5/5 funding would be allocated to construction. The funding could be spread out over multiple years.

How much work of the multi year project would be completed in Year 1?

Not known at this time.

Where would the remaining funding for future years come from?

Other grants, County ad valorem taxes

Northern Everglades- Potential Management Measure

Project Feature/Activity: Jensen Beach Retrofit

Level: 1

General Description/Background: This project proposes to provide detention and/or retention for stormwater runoff in vaults and/or in exfiltration for an older developed area in downtown Jensen Beach, FL

Purpose: Development within this 20+ acre basin is primarily commercial. All of the development occurred before required water quality treatment. and the area discharges directly to the Indian River Lagoon without water quality treatment. Retention and detention are commonly used stormwater BMP's to remove pollutants from stormwater runoff including; particulates, metals, and some nutrients. This project proposes to utilize vaults and or exfiltration beneath a parking lot, at the bottom of the hill, directly adjacent to the outfall and lagoon to remove pollutants from untreated runoff.

Location/Size/Capacity: This Jensen Beach basin is steeply sloped towards the river and drains approximately 20 acres. The basin is located; east of Skyline Drive, south of Ricou Terrace, west of the Indian River and north of an E-W line approximately 250 ft south of Jensen Beach Blvd. The basin is 95 % impervious consisting of roadway, parking, and retail commercial properties, and office buildings. The only remaining area to provide treatment is in the SE corner of the intersection of Indian River Drive and Jensen Beach Blvd. and is approximately 16000 sf. Utilization of detention vaults alone are capable of providing .24 ins of detention for the treated area while 2500 lf of exfiltration could provide as much as 1.5 ins of detention or the amount required to provide treatment to today's standards based on an assumed absorption capacity for the soils.

Initiative Status: This project is currently in the Martin County CIP , negotiations are complete for engineering design, and discussions have begun for acquisition of rights to construct the facility beneath the existing parking lot.

Cost: Construction of vaults and plumbing are estimated in 2008 dollars as \$2.25 M assuming that r/w is donated. Cost for exfiltration is estimated at \$850K based on assumption of donated r/w and absorption capacity.

Documentation: Martin County Capital Improvement Plan

Estimate of Water Quality Benefits

- Minimum: 50%-70% TSS reduction, 60%-70% TP reduction, 20%-35% TN reduction
- Most Likely: 80%-95% TSS reduction, 60%-70% TP reduction, 20%-35% TN reduction
- Maximum: 70%-80% TSS reduction, 60%-70% TP reduction, 20%-35% TN reduction
- Level of Certainty: 90% certain that pollutant removals will be between the minimum & maximum.

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- Assumptions: Maximum - Due to dry season retention of runoff due to percolation and evapotranspiration from open water and vegetated STA area 100% of removal is expected for some portion of the year. Most Likely – Presumptive regulatory standard based on NURP studies will perform as expected. Minimum - Presumptive regulatory standards do not work

Estimate of Water Quantity Benefits

- Minimum: Adopted LOS for flood protection is not achieved, retention/detention results in all runoff discharged to tide
- Most Likely: Adopted SFWMD LOS for flood protection is achieved, retention/detention results in percolation of 50% of runoff to groundwater which would otherwise have discharged to tide
- Maximum: Adopted County LOS for flood protection is achieved, retention/detention results in percolation of 80% of runoff to groundwater which would otherwise have discharged to tide
- Level of Certainty: 90% certain that LOS and water storage will be between minimums and maximums
- Assumptions: Maximum- Discharge rates from existing contributing areas are less than and percolation to groundwater is greater than expected; Most Likely - under normal rainfall conditions the system will perform as designed; Minimum - Antecedent conditions to events allowed no pre event storage to reduce LOS and groundwater tables are elevated in wet years such that percolation does not occur.

Contact: Mr. Gary Roderick – Water Quality Chief, Office of Water Quality

Northern Everglades- Potential Management Measure

Project Feature/Activity: Leilani Hts/ Warner Creek Retrofit

Level: 1 (Ph 1)
 3 (Ph 2)
 4 (Ph 3)

General Description/Background: *Phase I-* constructs 2400 lf exfiltration with inlet sediment traps within Leilani Hts. to provide 6.3 ac-ft of retention to treat runoff from 112 ac. contributing sub-basin which currently discharges directly to the St Lucie River, improvements to hydraulic capacity at Pinelake Boulevard to reduce structure and roadway flooding, sediment removal from 2000 ft of Warner Creek upstream of existing weir to provide sediment storage, construction of 2800lf exfiltration with inlet sediment traps within Jensen Highlands to provide 6.7 ac-ft of retention for the 160 ac contributing sub-basin which currently discharges directly to the St Lucie River.

Phase II – Acquires 1.8 acres of a parcel adjacent to Warner Creek directly downstream of Leilani Hts. and construct a 2 ac-ft dry detention area to treat runoff from Leilani Hts. not served by exfiltration.

Phase III – Acquires 28 acres of land adjacent to Warner Creek, directly upstream of the FEC RR and tidal influence and constructs a 43 ac-ft STA marsh to provide treatment for runoff to the St. Lucie not currently receiving treatment from areas not treated today and not served by Phases 1 & 2, enables proposed flood reduction improvements upstream by providing attenuation to flows before discharge to the St. Lucie River.

Purpose: The purpose of this 3 Phase project is to provide treatment to today’s standards for runoff from existing sub-standard development, to resolve conveyance capacity within the system to reduce flooding, to provide attenuation of increased flows resulting from internal conveyance improvements and to recharge groundwater with runoff which currently flows directly to the St. Lucie Estuary.

Location/Size/Capacity: The Warner Creek Basin is approximately 5100 acres in size and is bounded by Walton Rd in Port St. Lucie to the north, the Atlantic coastal Ridge to the east and Pineapple Plantation/ Jensen Beach Golf and Country Club to the west. Development in the basin which ranges from the undeveloped Savannas State Preserve to highway, commercial, and residential development such as Leilani Hts. and mobile homes which receive no stormwater runoff treatment. Approximately 704 acres of the basin are deficient in water quality treatment and to bring the basin up to today’s treatment standards are required an estimated additional 59 ac-ft of storage. Some of the older areas adjacent to the creek have also suffered structure and roadway flooding which compromises access to hundreds of residential units.

Initiative Status: This project is currently in the Martin County CIP. Martin County has dedicated \$1.6M in advalorem taxes toward the project, the SLRIT has awarded \$1.53M in grants, and EPA Sec 319 has awarded \$0.56 M in grants toward the project. Hydrologic & hydraulic studies are complete and design of Phase 1 work is complete. Construction of Phase 1 improvements imminent as permitting of

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most of this work can be handled under FAC 40E-400.215 (No Notice General Permit). Phases 2 & 3 require land acquisition and has only begun as of January 2008.

Cost: Based on Engineer's preliminary estimate of costs and staff estimate of land costs in 2008 dollars the overall project is estimated to cost as follows: Phase I- \$3.96M, Phase II- \$1M, Phase III- \$7.0M. Grant requests are as follows : Phase I- \$2.66 M, Phase II -\$0.55M, Phase III -\$5.1M

Documentation: Martin County Capital Improvement Plan, "Leilani Hts. / Warner Creek Basin Stormwater Quality Retrofit, Stormwater Management Study, January 2008"

Estimate of Water Quality Benefits

- Minimum: 50% TSS reduction, 60% TP reduction, 20% TN reduction
- Most Likely: 70% TSS reduction, 71 % TP reduction, 70%-35% TN reduction
- Maximum: 80% TSS reduction, 800 % TP reduction, 35% TN reduction
- Level of Certainty: 90% certain that pollutant removals will be between the minimum & maximum.
- Assumptions: Maximum - Due to dry season retention of runoff due to percolation by exfiltration and evapotranspiration from open water and vegetated STA area 100% of removal is expected for some portion of the year. Most Likely – Presumptive regulatory standard based on NURP studies will perform as expected. Minimum - Presumptive regulatory standards do not work

Estimate of Water Quantity Benefits

- Minimum: Adopted LOS for flood protection is not achieved, retention/detention results in all runoff discharged to tide
- Most Likely: Adopted SFWMD LOS for flood protection is achieved, retention/detention results in percolation of 50% of runoff to groundwater which would otherwise have discharged to tide
- Maximum: Adopted County LOS for flood protection is achieved, retention/detention results in percolation of 80% of runoff to groundwater which would otherwise have discharged to tide
- Level of Certainty: 90% certain that LOS and water storage will be between minimums and maximums
- Assumptions: Maximum- Discharge rates from existing contributing areas are less than and percolation to groundwater is greater than expected; Most Likely - under normal rainfall conditions the system will perform as designed; Minimum - Antecedent conditions to events allowed no pre event storage to reduce LOS and groundwater tables are elevated in wet years such that percolation does not occur.

Contact: Mr. Gary Roderick – Water Quality Chief, Office of Water Quality

Northern Everglades- Potential Management Measure

Project Feature/Activity: Manatee Creek Water Quality Retrofit; PhII & PhIII; New Monrovia, Dixie Park

Level: 1

General Description/Background: This project proposes to provide wet detention and STA marsh nutrient removal at the confluence of 2 sub-basins of the Manatee Creek prior to discharge to the Manatee Pocket.

Purpose: Development within this sub-basin consists of; residential, commercial, industrial, and highway.. Much of the development occurred before required water quality treatment. area and discharges to the Manatee Pocket of the Indian River Lagoon without water quality treatment. Wet and dry detention are commonly used stormwater BMP's to remove pollutants from stormwater runoff including; particulates, metals, and some nutrients. This project proposes to utilize these BMP's to remove pollutants from untreated runoff in the basin.

Location/Size/Capacity: The Manatee Creek drains is approximately 833 acres. The basin is located; south of Cove Road, north of the Mariner Sands subdivision, west of Dixie Highway (CR A1A), and extends one-half mile west of US Highway 1. Phase 1 of the Manatee Creek Retrofit is complete and constructed 10 acre ft of storage and STA marsh filtration. Phases II and III of the project will provide an additional 15.3 ac-ft of water quality treatment in wet detention and STA marsh filtration.

Initiative Status: The Manatee Creek is as an Impaired water on the State 303d list. Martin County has completed Phase I and has acquired much of the land required for PH II & III through purchase of parcels, dedication of the decommissioned Dixie Park WWTP and use of road right of way. The project has been designed, permits have been issued, is listed in the Martin County CIP, and is funded by; advalorem taxes, SRF loan, FDEP TMDL grant, & SLRIT (SFWMD) grants.

Cost: PI – \$2.8M (Complete), PII - \$2.5M , PIII – \$3.4M

Documentation: Martin County Capital Improvement Plan

Estimate of Water Quality Benefits

- Minimum: 50%-70% TSS reduction, 60%-70% TP reduction, 20%-35% TN reduction
- Most Likely: 80%-95% TSS reduction, 60%-70% TP reduction, 20%-35% TN reduction
- Maximum: 70%-80% TSS reduction, 60%-70% TP reduction, 20%-35% TN reduction
- Level of Certainty: 90% certain that pollutant removals will be between the minimum & maximum.
- Assumptions: Maximum - Due to dry season retention of runoff due to percolation and evapotranspiration from open water and vegetated STA area 100% of removal is expected for some portion of the year. Most Likely – Presumptive regulatory standard based on NURP studies will perform as expected. Minimum - Presumptive regulatory standards do not work

Estimate of Water Quantity Benefits

- Minimum: Adopted LOS for flood protection is not achieved, retention/detention results in all runoff discharged to tide

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- **Most Likely:** Adopted SFWMD LOS for flood protection is achieved, retention/detention results in percolation of 50% of runoff to groundwater which would otherwise have discharged to tide
- **Maximum:** Adopted County LOS for flood protection is achieved, retention/detention results in percolation of 80% of runoff to groundwater which would otherwise have discharged to tide
- **Level of Certainty:** 90% certain that LOS and water storage will be between minimums and maximums
- **Assumptions:** Maximum- Discharge rates from existing contributing areas are less than and percolation to groundwater is greater than expected; Most Likely - under normal rainfall conditions the system will perform as designed; Minimum - Antecedent conditions to events allowed no pre event storage to reduce LOS and groundwater tables are elevated in wet years such that percolation does not occur.

Contact: Mr. Gary Roderick – Water Quality Chief, Office of Water Quality

Northern Everglades- Potential Management Measure

Project Feature/Activity: 10 Mile Creek – Reservoir and Stormwater Treatment Area

Level: 1

General Description/Background: Project includes all required planning and design activities, land acquisition, operational and best management practice plans for the successful design, construction, and operation of an above-ground reservoir with a pump station for filling the reservoir from Ten Mile Creek and a gated water-level control structure for the release of water back to the creek. The foot-print of the reservoir is anticipated to be approximately 550 acres in size with the remaining acreage being utilized as a polishing cell and a natural preserve area. Based upon existing topography, stored water depths average ten feet. Total storage capacity will be approximately 5,000 acre-feet. The height of the reservoir levee will range from about 12 to 15 feet above surrounding natural ground. Side slopes for the levees will be about 1 vertical to 4 horizontal.

The intent of the Ten Mile Creek Water Preserve Area project is to attenuate summer stormwater flows into the North Fork of the St. Lucie River, which originate in the Ten Mile Creek basin by capturing and storing the passing stormwater. The sedimentation of suspended solids that occurs in the storage reservoir will reduce sediment loads delivered to the estuary. In addition, it is the intention that the captured stormwater be passed through a polishing cell for additional water quality treatment before being released into the North Fork of the St. Lucie River. Stored water can be released in the drier winter months to augment current insufficient flows.

Stabilizing the salinity concentration will greatly enhance the SLE's ability to support seagrasses, oysters, and nursery grounds for marine fish. Commercial and recreational fishing are very important activities in this region and will be benefited by an improved estuary. The West Indian Manatee, an endangered species, is dependent on seagrasses as a primary food source. This project, coupled with ongoing Water Quality improvement projects, will help to reduce future decline of seagrasses in the area.

The project is expected to provide relief to the SLE from damaging freshwater discharges. Implementation of this project would greatly enhance the ability to maintain appropriate salinities in the North Fork Aquatic Preserve and offset the damaging effects of Lake Okeechobee flood releases until other components of the Comprehensive Plans for the C&SF Project can be implemented. Stormwater runoff collected in project flood control canals C-23, C24, C44 and regulatory releases from Lake Okeechobee cause dramatic changes in salinity within the SLE. Maintenance of groundwater levels by project control structures also prevents adequate dry season baseflows from reaching the estuary during the dry season.

Current evaluations of alternative Comprehensive Plans for the C&SF Project indicate that, in addition to a much needed change in Lake Okeechobee operations, storage facilities within the SLE watershed are needed to maintain desirable salinities. The proposed project lies within a basin that contributes the second largest volume of stormwater amongst the estuary's five tributary basins. In addition, the project

is ideally situated at the headwaters of the North Fork of the St. Lucie River Aquatic Preserve. The Preserve is one of the last remaining freshwater/estuarine wilderness areas in this region of Florida and supports a wide variety of fish and wildlife.

The Indian River Lagoon Surface Water Improvement and Management Plan (SWIM Plan) determined that the major pollutant to the IRL and SLE is stormwater. The salinity concentration is drastically reduced in the rainy summer months by massive and rapid stormwater inflows. In the dry winter months, this same efficient drainage system limits normal base flow because it has substantially lowered groundwater tables in the region. Lowered base flow causes the salinity concentration to rise above the desirable level. In addition to salinity disturbances, stormwater discharges also carry undesirable concentrations of sediments and nutrients that are washed from urban and agricultural lands. This project meets all applicability criteria for critical restoration projects. Restoration benefits will include cleaning stormwater runoff entering Ten Mile Creek, as well as creating a more natural salinity range in the SLE. These hydrologic changes will create conditions favoring seagrass (shoal grass), oysters, and juvenile recreational/ commercial fish (red drum, croaker, snook, etc.) nursery grounds in the SLE and IRL. The project is consistent with the Governor's Commission Conceptual Plan and will be initiated before September 1999. The local sponsor will be the South Florida Water Management District. Lastly, the project is not an authorized feature of the C&SF Project.

Purpose: The purpose of this water preserve area (WPA) is the seasonal or temporary storage of stormwater from the Ten Mile Creek Basin. Ten Mile Creek is the largest subbasin delivering water to the North Fork of the St. Lucie River Estuary (SLE) which has been established as an Outstanding Florida Water (OFW). The SLE discharges into the Indian River Lagoon (IRL) which is also an OFW. The IRL is the most biologically diverse estuary in North America. The entire lagoon is endangered from increased runoff from watershed drainage enhancements. Excess stormwater due to drainage improvements is causing radical fluctuations of the salinity concentration in the SLE. Adverse salinity concentrations are eliminating viable habitat in the SLE suitable for oysters, seagrasses, and marine fish spawning. Storage of excess stormwater will allow its measured release, and hence, a more natural salinity regime. Sediment and nutrient uptake processes that will occur in the WPA will reduce pollution loads delivered to the estuary. The reduction in sediment delivery is expected to improve the long-term water quality outlook in the estuary and thus enhance and restore habitat for a wide variety of fish and wildlife.

There is no known alternative to a water preserve area for storage of water in this basin. Water cannot be feasibly routed to Lake Okeechobee or to more southerly receiving bodies such as the Water Conservation Areas. The addition of Aquifer Storage Recovery (ASR) to increase storage potential may be a consideration as part of the next phase of design, but will not be included in the scope of this project.

Location/Size/Capacity: The proposed site is southwest of Ft. Pierce, in St. Lucie County. It is situated just south of Ten Mile Creek and is the most easterly location for a Water Preserve Area in this Basin. It is located immediately west of the crossing of Florida's Turnpike and Interstate-95 and south of Highway 70 (Okeechobee Road) and north of Midway Road. The site is currently in two ownerships and consists of 1559 acres. Ten Mile Creek runs west to east across the northern portion of the site. The low level salinity control structure for Ten Mile Creek is less than one-half mile east of the proposed water preserve area site.

Initiative Status: Initial Construction Complete – modifications/improvements currently under development and review

Cost: \$30,808, 500 (USACE Letter Report – April 1998)

Documentation: Section 528 Of The 1996 Water Resources Development Act

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

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

Contact: SFWMD/USACE

Northern Everglades- Potential Management Measure

Project Feature/Activity: Small Acreage Manure Management

Level: 3

General Description/Background: Danforth Creek and Bessey Creek watershed basins located in western Martin County are home to a large community of small acreage horse owners and a few larger scale facilities. An average 1,000-pound horse produces 9 tons of manure a year (50 pounds per day) containing high levels of nutrients. Add to that an additional cubic foot of bedding material and you get 730 cubic feet/year of waste from one horse. How the manure is stored and treated has a substantial impact on the environment. This project involves creating a central collection and/or composting facility for manure waste from the community.

Purpose: Reduce the amount of nutrients released into the regional system from landowner storage of manure on the banks of the creeks in these watersheds by providing a centrally located and properly managed facility for the collection and/or composting of manure waste.

Location/Size/Capacity: Watershed size?

Initiative Status: Conceptual. The FDEP and Martin County and other local agencies are working together to develop a plan for the collection and/or composting of manure waste within the watershed

Cost: TBD

Documentation:

<http://www.mcstoppp.org/acrobat/Horse%20Manure%20Mangement.PDF>

<http://www.ext.colostate.edu/PUBS/LIVESTK/01219.html>

<http://panutrientmgmt.cas.psu.edu/pdf/G97.pdf>

<http://extension.unh.edu/Pubs/AgPubs/aahr1050.pdf>

<http://www.clemson.edu/psapublishing/Pages/ADVS/LL53.pdf>

Estimate of Water Quality Benefits

- Minimum: Average nutrient content of horse manure – N/ton = 12 to 19 lbs; P₂O₅/ton = 5 to 14 lbs x 9 tons/horse x 800 horses (approximately)
- Maximum:
- Most Likely:
- Level of Certainty: Conceptual
- Assumptions:

Estimate of Water Quantity Benefits

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

Contact: Dianne Hughes, FDEP

Northern Everglades- Potential Management Measure

Project Feature/Activity: Deep Well Injection at the following selected locations in watershed:

- a. C44 St. Lucie Canal (same as LO 96)

Level: 5

General description/Background: Construction of deep, high-capacity injection wells for water disposal. Wells would be constructed in “clusters” along C-44 canal right-of-way.

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

Location/size/capacity: C-44 at St. Lucie

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: Danforth Creek Muck Removal Dredging project

Level: 2

General Description/Background: Over the years this site has been used for storm water runoff and drainage. As a result, the Creek has experienced an influx of silty organic material. The accumulated sediments have created shoals and are now also restricting water flow and access to the creek. The shoals extend well into the St. Lucie River. This project would remove a large percentage of these accumulated sediments.

Purpose: Removal of muck sediments from Danforth Creek. Left unaddressed, these sediments will continue to move into the St. Lucie River. Additionally the quality of water entering the St. Lucie River from Danforth Creek will be improved.

Location/Size/Capacity: Removal of approximately 20,000 cy of accumulated sediments over an area of 142,000 sq. ft.

Initiative Status: A feasibility report has been completed and initial contacts have been made with the permitting agencies. It is similar to other projects conducted by the County. The project will move forward when funding becomes available.

Cost: \$6,000,000

Documentation: Danforth Creek Feasibility Report, July 24, 2007 by Applied Technology and Management.

Estimate of Water Quality Benefits

- Minimum:
- Maximum:
- Most Likely: Improved water quality of water leaving Warner Creek and entering the St. Lucie River.
- Level of Certainty: High
- Assumptions:

Estimate of Water Quantity Benefits

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

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Contact: Kathy Fitzpatrick
Martin County BOCC
2401 SE Monterey, Stuart FL
772 288 5429

Northern Everglades- Potential Management Measure

Project Feature/Activity: Warner Creek Muck Removal Dredging Project

Level: 2

General Description/Background: Over the years this site has been used for storm water runoff and drainage. As a result, the Creek has experienced an influx of silty organic material. The accumulated sediments have creates shoals and are now also restricting water flow and access to the creek. The shoals extend into the St. Lucie River and have restricted 60% of the entrance. This project would remove a large percentage of these accumulated sediments.

Purpose: Removal of muck sediments from Warner Creek. Left unaddressed, these sediments will continue to move into the St. Lucie River. Additionally the quality of water entering the St. Lucie River from Warner Creek will be improved.

Location/Size/Capacity: This project would be conducted in and near Warner Creek. Approximately 16,000 cy of material would be removed in this project.

Initiative Status: A feasibility report has been completed and initial contacts have been made with the permitting agencies. It is similar to other projects conducted by the County. The project will move forward when funding becomes available.

Cost: \$850,000

Documentation: Warner Creek Dredging Feasibility Report, March 20, 2006 by Applied Technology and Management.

Estimate of Water Quality Benefits

- Minimum:
- Maximum:
- Most Likely: Improved water quality of water leaving Warner Creek and entering the St. Lucie River.
- Level of Certainty: High
- Assumptions:

Estimate of Water Quantity Benefits

- Minimum:
- Maximum:
- Most Likely:
- Level of Certainty:

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- Assumptions:

Contact: Kathy Fitzpatrick
Martin County BOCC
2401 SE Monterey, Stuart FL
772 288 5429

Northern Everglades- Potential Management Measure

Project Feature/Activity: Hidden River Muck Removal Dredging Project

Level: 2

General Description/Background: Over the years this site has been used for storm water runoff and drainage. As a result, the River has experienced an influx of silty organic material and sand. The accumulated sediments have creates shoals and are now also restricting water flow and access to the River. The shoals extend into Bessey Creek which connects directly to the St. Lucie River. This project would remove a large percentage of these accumulated sediments.

Purpose: Removal of muck sediments from Hidden River. Left unaddressed, these sediments will continue to move into Bessey Creek and ultimately the St. Lucie River. Additionally the quality of water entering the St. Lucie River from Hidden River will be improved.

Location/Size/Capacity: This project would be conducted in and near Hidden River. The project volume has not yet been estimated.

Initiative Status: A feasibility report has been completed and initial contacts have been made with the permitting agencies. It is similar to other projects conducted by the County. The project will move forward when funding becomes available.

Cost: Unknown at this time

Documentation: Hidden River Dredging Assessment Report, March 3, 2008 by Applied Technology and Management.

Estimate of Water Quality Benefits

- Minimum:
- Maximum:
- Most Likely: Improved water quality of water leaving Hidden River and entering the St. Lucie River.
- Level of Certainty: High
- Assumptions:

Estimate of Water Quantity Benefits

- Minimum:
- Maximum:
- Most Likely:
- Level of Certainty:

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- Assumptions:

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Northern Everglades- Potential Management Measure

Project Feature/Activity:

Level:

General Description/Background:

Purpose:

Location/Size/Capacity:

Initiative Status:

Cost:

Documentation:

Estimate of Water Quality Benefits

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

Estimate of Water Quantity Benefits

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

Contact: