A G E N D A

Caloosahatchee River Watershed Protection Plan
Working Team Meeting
Friday, June 27, 2008
10:00 – 2:00 p.m.

SFWMD Lower West Coast Service Center
2301 McGregor Boulevard
Fort Myers, FL
First Floor Conference Room
(Plan is to provide menus so that lunch can be brought in, please bring cash to pay for your lunch)

Cisco MeetingPlace 6700 || Local 561-682-6700 || Toll Free 866-433-6299 || Meeting ID
Hope is to VTC with FDEP, FDACS

10:00	Introduction and Opening Remarks	Janet Starnes
10:15	Management Measures Alternative 1 - Complete Alternative 2 – Complete Alternative 3 – Draft	Janet Starnes
10:30	Water Quality Alternative 1 (Revised) Alternative 2 Preliminary Alternative 3 Preliminary	Tim Liebermann
11:30	Hydrologic Modeling Status of Hydrologic Modeling Alternative 1	Lehar Brion
12:30	Public Comment	All
1:00	Schedule	Janet Starnes
1:15	Closing Remarks/Next Meeting	Janet Starnes
	Next Meeting is July 16th Interim Products	

June 25, 2008

Meeting Summary

Northern Everglades
Caloosahatchee River Watershed Protection Plan
Working Team Meeting
June 27, 2008

The Working Team for the Caloosahatchee River Watershed Protection Plan met on Friday, June 27, 2008, at 10:00 a.m. at the South Florida Water Management District's Lower West Coast Service Center in Fort Myers, Florida. A copy of the sign-in sheet is attached to this document, and a summary of the presentations and discussions follow.

Attendee	Organization	Attendee	Organization
Janet Starnes	SFWMD	Srikanth Gajula	CES Consultants
Pinar Balci	SFWMD	Ed Hanlon	UFL SWFREC IFAS
Tara Bamber	JJG	Kurt Harclerode	Lee County
Karen Bickford	Lee County	Joy Hazell	Lee County
Lehar Brion	SFWMD	Jennifer Hecker	Conservancy of SW FL
Kevin Carter	SFWMD	Bob Howard	Agnoli, Barber & Brundage, Inc.
John Cassani	Lee Co. Hyacinth CD	Molly Meadows	SFWMD
Bob Chamberlain	SFWMD	John Morgan	SFWMD (phone)
Jose Compress	CES Consultants	Temperince Morgan	SFWMD
Michael Cook	ECWCD	Jennifer Nelson	FDEP
Clyde Dabbs	SFWMD	Judith Northdurft	SFWMD
Wayne Daltry	Lee County	Roland Ottolini	Lee County
Mick Denham	City of Sanibel	Bob Pascale	PURRE
Liz Donley	SWFRPC	Tony Pellicer	Lee County
James Evans	City of Sanibel	Peter Quasius	Audubon
Randy Ferguson	JJG	Darren Rumbold	FGCU

1. Introduction and Opening Remarks

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

2. Management Measures

Janet updated on the status of the management measures. The Draft list for Alternatives 1, 2 and 3 were handed out. Alternative 1 and 2 are now complete. Alternative 3 is still a draft and the District is requesting comments from the Working Team, preferably by email to Janet by July 3rd. Once Alternative 3 is complete, the formulation of Alternative 4 will begin.

A question was raised at this point about the C-43 West Reservoir, given an article in paper (viability, funding, downsizing?). Neither Janet nor Temperince had any comments as they had not seen the article.

3. Water Quality (presentation attached)

Janet Starnes filled in for Tim Liebermann and presented the update on the water quality modeling results. The revised water quality results for Alternative 1 were discussed and included the total phosphorus (P) and total nitrogen (N) reductions as a result of the Alternative 1 regional and local projects. The preliminary water quality results for Alternative 2 and 3 were also summarized. Janet noted that the load reductions for the management measures were based on input from the authors of the management measures, or from efficiencies noted in the Southwest Florida Feasibility Study efforts as well as from the "Nutrient Loading Rates, Reduction Factors and Implementation Costs Associated with BMPs and Technologies" which was prepared by Wetland Solutions, Inc. for the District.

In the Alternative 2 summary, Janet noted that the estimated storage goal for the Caloosahatchee Basin is 250K acre-feet. In the Alternative 3 discussion, it was noted specifically that Alternative 3 reductions were independent of Alternative 2.

Janet indicated the opportunity of scheduling a separate meeting if anyone wanted to discuss the water quality results in more detail. The next steps include finalizing hydrologic and water quality modeling for Alternative 2 and 3, formulating Alternative 4, complete modeling for Alternative 4, and drafting the preferred plan.

Questions/Comments

Q: What is the process of selecting Alternative. 4?
A: Alternative 4 will be a combination of Alternative 2 and Alternative 3. Alternative 4 will be drafted by the District after reviewing the hydrologic performance and nutrient reduction performance of Alternative 2 and 3.

Q: What is the target for the load reductions?
A: The target would normally be the Total Maximum Daily Load (TMDL). Since the Caloosahatchee River Basin does not have a TMDL available at this time, the District is trying to maximize the water quality reductions to no more than estimated background levels.

Q: Is the current level of reduction significant?
A: The load reductions are approaching one-third of the load, which is seen as significant. It was noted that these load reductions do not currently include the Lake Okeechobee reductions. They are expected to be something in the range of a 40% reduction is expected when all projects are considered.

Q: Where can the new fertilizer rules, sewage treatment and septic tank issues be found?
A: The BMP and Fertilizer rule can be found in Alternative. 1. The sewage issues are discussed in Alternative 3 and the septic issues are found in Alternative 1.

Q: Why are the St. Lucie River results better than the Caloosahatchee?
A: The Indian River Lagoon South Plan resolved storage problems for the St. Lucie Basin already. They have also had a lot of local projects in place for longer periods of time including monitoring and data collection.

4. Hydrologic Modeling (presentation attached)

Janet pointed out that the timing of the recent presentation of the Alternative 1 hydrologic modeling results to the Lake Okeechobee Water Resources Advisory Committee was unavoidable and that the intent was to present these results to the Caloosahatchee Working Team first. She indicated that they expected to present Alternative 2 and 3 results at the next (July) Working Team meeting.

Lehar Brion presented an update on hydrologic modeling for the CRWPP." He went over the model setup and assumptions. He reviewed the performance measures and indicators specific to CRWPP. He showed charts and diagrams of the modeling results comparing the Lake Okeechobee Watershed Construction Plan base run (CBASE), River Watershed Protection Plan base run and Alternative 1 (ALT1) models. The model addressed the needs of both the Caloosahatchee River and St. Lucie River Basin; therefore it was called the River Watershed Protection Plan base model (RWPPB).

Questions/Comments

Q: Why don't the Alternative 1 model results show much change on Slide 15?
A: Alternative 1 is based on the Lake Okeechobee Construction Plan, so Alternative 1 is not expected to show significant improvements. More significant improvement is expected as a result of Alternative 2.

5. Public Comment

None

6. Schedule

The schedule was discussed during the Water Quality Presentation. Alternative 2 hydrology results should be available for the next Working Team meeting. An interim meeting may need to be held between July and August to review the

Alternative 3 hydrology results. Alternative 4 should be formulated by mid-August and presented at the August Working Team meeting.

The plan sections as well as the Research and Water Quality Monitoring Plan chapters should be rolling out in the next couple of weeks for review. The Working Team will be given two weeks to review each section and chapter. As we get closer to the end, the review time may be shortened. Please make Janet aware if you have a problem reviewing the documents in the allotted time.

7. Closing Remarks/Next Meeting

The next meeting is scheduled for July 16, 2008 at 1:30 p.m. at the Lower West Coast Service Center. Interim meetings may be scheduled as needed to present the water quality and hydrologic modeling results.

Sign In Sheet

Caloosahatchee River Watershed Protection Plan Working Team Meeting

SFWMD LWC Service Center
June 27, 2008
10:00 a.m. to 2:00 p.m.

Name	Signature/Via Phone	Agency
Abtew, Wossenu		SFWMD
Bailey, Nathaniel		FDEP
Balci, Pinar		SFWMD
Bamber, Tara		Jordan, Jones & Goulding
Bartolone, Frank		SFWMD
Bartoshuk, Craig		A Duda & Sons
Beever, Jim		SWFRPC
Beever, Lisa		SWFRPC/Charlotte Harbor NEP
Bengtsson, Terrance		SFWMD
Bennett, Susan		SFWMD
Bickford, Karen		Lee County
Bierman, Victor		Limno Tech
Bokor, Matt		Youngquist Brothers, Inc.
Bologna, Lizabeth		SFWMD
Boyle, Michael		City of Labelle
Brion, Lehar		SFWMD
Budell, Richard		DACS
Calder, Fred		FDEP
Capece, John		Southern Datastream
Cassani, John		Lee Co Hyacinth CD
Chamberlain, Robert		SFWMD
Chang, Miao-Li		SFWMD
Conner, Jenny		The Nature Conservancy
Cook, Michael		ECWCD
Copp, Roger		ECWCD and Lehigh Acres
Cornell, Brad		Audubon
Cressman, Kim		City of Cape Coral
Dabbs, Clyde		SFWMD
Dabral, Sandeep		SFWMD

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Caloosahatchee River Watershed Protection Plan Working Team Meeting

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June 27, 2008
10:00 a.m. to 2:00 p.m.

Name	Signature	Agency
Daltry, Marti		Sierra Club & Riverwatch
Daltry, Wayne		Lee County
Dantzler, Rick		Frost, O'Toole & Saunders
Dauray, Charles		SFWMD
Denger, Tim		SFWMD
Denham, Mick		City of Sanibel
Doering, Peter		SFWMD
Donley, Liz		SWFRPC /CHNEP
Edenfield, Ron		ECT
Elliott, Rebecca		SFWMD
Evans, James		City of Sanibel
Everham, Edwin		FGCU
Feken, Stacey		FDEP
Ferguson, Randy		Jordan, Jones & Goulding
Flood, Phil		SFWMD
Fricano, Pat		FDEP
Gerry, Lawrence		SFWMD
Gihring, Jennifer		FDEP
Goblisch, Bud		Jordan, Jones & Goulding
Grigsby, Melanie		City of Fort Myers
Hamel, Ron		Gulf Citrus Growers
Hammond, Bill		Gulf Citrus
Hanlon, Ed		UFL SWFREC IFAS
Harclerode, Kurt		Lee County
Hazell, Joy		Lee County
Heatherington, Ken		SWFRPC
Hecker, Jennifer	Amber Crooks on behalf of	Conservancy of SW FL
Higgs, Katie		FDEP
Howard, Bob		Agnoli, Barber & Brundage, Inc.

Sign In Sheet

Caloosahatchee River Watershed Protection Plan Working Team Meeting

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June 27, 2008
10:00 a.m. to 2:00 p.m.

Name	Signature	Agency
Hughes, Eric		USEPA
Iricanin, Nenad		SFWMD
Irizarry-Oritz, Michelle		SFWMD
Jarvis, Connie		City of Cape Coral
Kazemi, Saeed		City of Fort Myers
Kelly, Alison		SFWMD
Kennedy, Sally		SFWMD
Kibbey, Keith		Lee County
Lamb, Steve		MacVicar, Federico & Lamb
Laskis, Kristina		FDEP
Legg, Scott		SFWMD
Lewis, Beth		SFWMD
Liebermann, Tim		SFWMD
Lindblad, Erick		SCCF
Lindsay, David		ECWCD
Loflin, Rob		City of Sanibel
Love, Jim		Lee County/Health Dept
Love, Kim		Tetra Tech
MacLaughlin, Doug		SFWMD
MacVicar, Tom		MacVicar Federico & Lamb
Marks, Ernie		FDEP
Marlowe, Beth		USACE
Martin, Patrick		SFWMD
Marton, Noel		SWFWMD
Mazourek, Joyce		FWS
McCarthy, Linda		Lykes Brothers, Inc.
McCullers, Ed		Youngquist Brothers, Inc.
McPherson, Peggy		Everglades Foundation
McPherson, Sally		SFWMD

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Name	Signature/Via Phone	Agency
Meiers, Damon		SFWMD
Mitnik, John		SFWMD
Morgan, John		SFWMD
Morgan, Temperince		SFWMD
Murphy, Jerry		Town of Fort Myers Beach
Nearhoof, Frank		FDEP
Neidrauer, Cal		SFWMD
Nelson, Jennifer		FDEP
Nothdurft, Judith		SFWMD
O'Donnell, Kevin		FDEP
Olson, Cathy		Lee County
Ottolini, Roland		Lee County
Parker, Shane		Hendry County
Pascale, Bob		PURE
Pellicer, Tony		Lee County
Quasius, Peter		Audubon
Ramirez, Armando		SFWMD
Ramsey, Agnes		SFWMD
Romeis, Gordon		FDEP
Rumbold, Darren		FGCU
Rutledge, Dan		USDA
Sanchez, Judy		US Sugar
Sanders, Susan		SFWMD
Sculley, Séan		SFWMD
Sentes, Steven		SFWMD
Sheng, Yan		Jordan, Jones & Goulding
Shukla, Sonjay		UFL SWFREC IFAS
Smith, Geordie		Lee County/Health Dept
Spencer, Niki		SFWMD

Sign In Sheet

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SFWMD LWC Service Center
June 27, 2008
10:00 a.m. to 2:00 p.m.

Name	Signature/Via Phone	Agency
Spratt, Jim		FL Nurserymen Growers
Starnes, Janet		SFWMD
Teasley, Debra		SFWMD
Teets, Tom		SFWMD
Thomas, Daryl		USFWS
Tritaik, Paul		FWS/NWR
Vacarr, Palma		SFWMD
Vanzee, Randy		SFWMD
Verrastro, Bob		SFWMD
Voich, Michael		SFWMD
Volety, Aswani		FGCU
Wade, Pam		SFWMD
Wessel, Rae Ann		Sanibel-Captiva Conservation Foundation
Willams, Beth		SFWMD
Young, Linda		Clean Water Network of FL
Srikanth Gajula		& CES
Joe Compres		CES & JJG
Kevin Carter		SFWMD
Molly Meagher		SFWMD

Caloosahatchee River Watershed Protection Plan

Draft Alternative 1 and 2

MM#	Sub-Watershed	Management Measures	Level	Alternative
		Baseline		
	FSW	C-43 Reservoir	B	0
		Alternative 1		
CRE10	FSE	C-43 Water Quality Treatment Demonstration Project (BOMA Property)	4	1
CRE 18	TS	Harns Marsh Improvements Phase I & II	1	1
CRE 19	TS	Harns Marsh Improvements, Phase II Final Design - ECWCD	2	1
CRE 20	TS	Yellowtail Structure Construction - ECWCD	2	1
CRE 21	FSW	Hendry County Storage	3	1
CRE 22	FSW	Hendry Extension Canal Widening (Construction) - ECWCD	2	1
CRE 30	TS	Aquifer Benefit and Storage for Orange River Basin (ABSORB) - ECWCD	2	1
CRE 44	FNW	Spanish Creek Four Corners Environmental Restoration	2	1
CRE 45	TS	Billy Creek Filter Marsh Phase I & II	1	1
CRE 48	TS	Manuel's Branch Silt Reduction Structure	2	1
CRE 49	TS	Manuel's Branch East & West Weirs	2	1
CRE 53	TN	Caloosahatchee Creeks Preserve Hydrological Restoration	2	1
CRE 57	TN	Powell Creek Algal Turf Scrubber	2	1
CRE 59	TN	N Ft Myers Surface Water Restoration	1	1
CRE 64	TN	Yellowfever Creek / Gator Slough Transfer Facility	1	1
CRE 121	FSW	City of LaBelle Stormwater Master Plan Implementation	2	1
		Alt 1 MM adopted from LO Plan		
CRE-LO 01,02, 49	All	Agricultural BMP's	1	1
CRE-LO 03	All	Urban Turf Fertilizer Rule (LOER)	1	1
CRE-LO 04	All	Land Application of Residuals	1	1
CRE-LO 05	All	Florida Yards and Neighborhoods	1	1
CRE-LO 08	All	NPDES Stormwater Program	1	1
CRE-LO 09	TS, EST, NC, NS	Coastal and Estuarine Land Conservation Program	1	1
CRE-LO 12g	FSW	Alternative Water Storage (LOER) - Barron Water Control District (BWCD)	1	1
CRE-LO 15	All	Caloosahatchee River Watershed Works of the District Rule Regulatory Phosphorus Source Control Program	2	1
CRE-LO 21	All	Lake Okeechobee And Estuary Watershed Basin Rule (LOER)	3	1
CRE-LO 41	FSE, FNE	C-43 Distributed Reservoirs	4	1
CRE-LO 63	All	Wastewater & Stormwater Master Plans	4	1
CRE-LO 64	All	Unified Statewide Stormwater Rule	4	1
CRE-LO 68	All	Comprehensive Planning - Land Development Regulation (LDR)	3	1
CRE-LO 87c	All	Florida Ranchlands Environmental Services Project (FRESP)	1	1
CRE-LO 92	S-4	Clewiston STA	4	1
		Alternative 2		
CRE 01	All	Recyclable Water Containment Areas (RWCA) in the Freshwater Caloosahatchee Southeast sub-basin	4	2
CRE 02	S-4	Centralized Recycled Water Containemnt Area in S-4 Basin	5	2
CRE 77	TN, NC	Cape Coral - Canal Stormwater Recovery and Treatment by ASW	1	2
CRE 122	TS	Rehydrate Lee County Well Fields (south of Hwy 82)	3	2
CRE 128	FSE	East Caloosahatchee Storage	4	2
		Alternative 2 MM adopted from LO Plan		
CRE-LO 40	FNE	Lake Hicpochee	4	2

Yellow = Alt 1 Common Elements (in all subsequent alternatives)
Blue = Alt 2 Water Storage

Abbreviations

Management Measures (MM) Numbering System

CRE - MM submitted and adopted for the CRWPP
CRE-LO - MM adopted from Lake Okeechobee Plan
MM - numbers were originally assigned from east to west. MM's added after the initial meeting were numbered sequentially.

Caloosahatchee River Watershed Protection Plan

Draft Alternative 1 and 2

Sub-Watersheds

S-4 - S-4 sub-basin
FNE - Caloosahatchee River Freshwater Northeast of S-78
FSE - Caloosahatchee River Freshwater Southeast of S-78
FNW - Caloosahatchee River Freshwater Northwest of S-78
FSW - Caloosahatchee River Freshwater Southwest of S-78
TN - Caloosahatchee River - Tidal North of River
TS - Tidal Caloosahatchee South of River
EST - Caloosahatchee Estuary
NC - North Coastal
NS - Nearshore

Levels

Base- Included in base condition
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
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Caloosahatchee River Watershed Protection Plan

Draft Alternative 1 and 3

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CRE-LO 04	All	Land Application of Residuals	1	1
CRE-LO 05	All	Florida Yards and Neighborhoods	1	1
CRE-LO 08	All	NPDES Stormwater Program	1	1
CRE-LO 09	TS, EST, NC, NS	Coastal and Estuarine Land Conservation Program	1	1
CRE-LO 12g	FSW	Alternative Water Storage (LOER) - Barron Water Control District (BWCD)	1	1
CRE-LO 15	All	Caloosahatchee River Watershed Works of the District Rule Regulatory Phosphorus Source Control Program	2	1
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CRE-LO 64	All	Unified Statewide Stormwater Rule	4	1
CRE-LO 68	All	Comprehensive Planning - Land Development Regulation (LDR)	3	1
CRE-LO 87c	All	Florida Ranchlands Environmental Services Project (FRESP)	1	1
CRE-LO 92	S-4	Clewiston STA	4	1
		Alternative 3		
CRE 04	FNE	Lake Hicpochee Restoration (Caloosa Lakes)	5	3
CRE 11	FSW	Water Quality Treatment Area - Caloosahatchee Ecoscape	4	3
CRE 13	FSW	Water Quality Treatment Area - West Caloosahatchee	3	3
CRE 29	FSW	Lehigh Acres Wastewater Treatment & Stormwater Retrofit	3	3
CRE 69	TN, NC	Cape Coral Wastewater Treatment & Stormwater Retrofit	2	3
CRE 123	TS	North Ten Mile Canal Stormwater Treatment System	2	3
CRE 124	TS	Carrell Canal (FMCC) Water Quality Improvements	2	3
CRE 125	TS	Shoemaker-Zapato Canal Stormwater Treatment	2	3
CRE 129	All	Caloosahatchee Creeks Water Quality Treatment	4	3

Yellow = Alt 1 Common Elements (in all subsequent alternatives)
Green = Alt 3 Water Quality

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Caloosahatchee River Watershed Protection Plan

Draft Alternative 1 and 3

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FSW - Caloosahatchee River Freshwater Southwest of S-78
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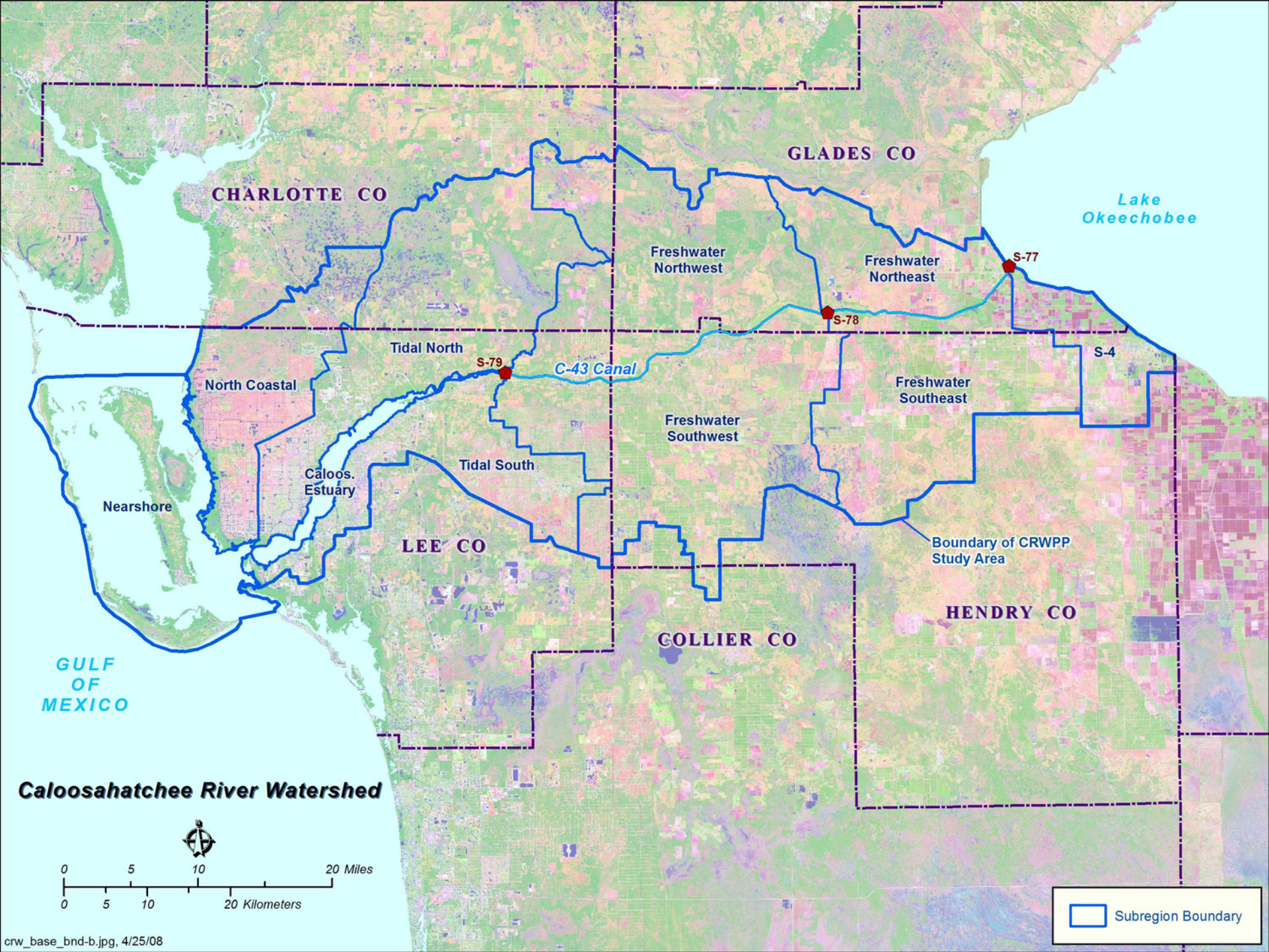
SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Caloosahatchee River Watershed Protection Plan

Working Team Meeting
June 27, 2008

sfwmd.gov


GLADES CO
CHARLOTTE CO
Lake Okeechobee
Freshwater Northwest
Freshwater Northeast
S-77
S-78
Tidal North
S-79
C-43 Canal
S-4
North Coastal
Freshwater Southeast
Freshwater Southwest
Caloos. Estuary
Tidal South
Nearshore
LEE CO
Boundary of CRWPP Study Area
HENDRY CO
COLLIER CO
GULF OF MEXICO
Caloosahatchee River Watershed
0 5 10 20 Miles
0 5 10 20 Kilometers
Subregion Boundary
crw_base_bnd-b.jpg, 4/25/08

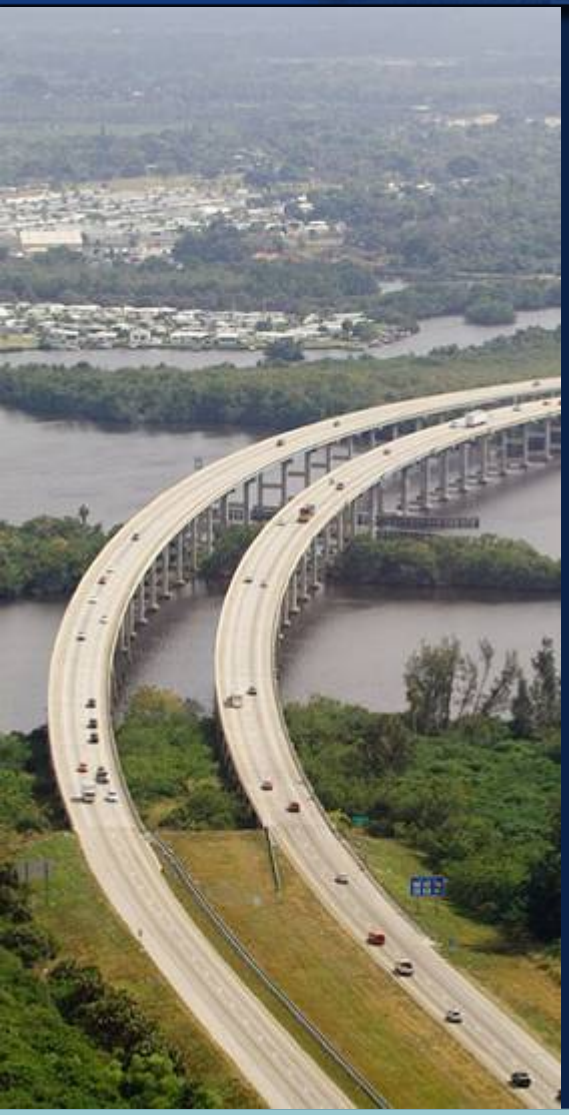
Presentation Topics

- Revised WQ Results for Alt 1
- Draft Alternative 2
- Preliminary WQ Results for Alt 2
- Draft Alternative 3
- Preliminary WQ Results for Alt 3
- Next Steps
- Proposed Schedule

Alternative 1 Summary

- Common Elements (current, ongoing, and planned projects)
- Source Control Measures:
  - Agricultural and Urban Best Management Practices
  - Statewide Stormwater Rule
  - Source Control Regulatory Program
  - Land Application of Residuals
  - Florida Yards and Neighborhoods

Alternative 1 Summary



- **Regional Projects:**
  - **C-43 Distributed Reservoirs**
  - **Spanish Creek 4 Corners Preserve**
- **Local Projects:**
  - **Stormwater Retrofits**
  - **Hydrologic Restoration**

Revised WQ Results Alternative 1- Total Phosphorus

Current Load from Watershed	326.1 mt/yr
Load Reduction for Base Condition	6.8 mt/yr
Load Reduction for Alternative 1	76.8 mt/yr
Remaining TP Load from Watershed	242.5 mt/yr

mt = metric ton = 1000 kg

Revised WQ Results Alternative 1- Total Phosphorus

Load Reduction for Source Control	56.3 mt/yr
Load Reduction for Local Projects	13.5 mt/yr
Load Reduction for Regional Projects	14.5 mt/yr
Total Load Reduction for Alternative 1 *	76.8 mt/yr

Remaining TP Concentration	122 ppb
Remaining TP Load	242.5 mt/yr

*Total reduction may be less than sum because of load reduction adjustment.

Revised WQ Results Alternative 1- Total Nitrogen

Current Load from Watershed	2,899.7 mt/yr
Load Reduction for Base Condition	48.3 mt/yr
Load Reduction for Alternative 1	667.6 mt/yr
Remaining TN Load from Watershed	2,183.8 mt/yr

Revised WQ Results Alternative 1- Total Nitrogen

Load Reduction for Source Control	513.0 mt/yr
Load Reduction for Local Projects	68.8 mt/yr
Load Reduction for Regional Projects	85.8 mt/yr
Total Load Reduction for Alternative 1	667.6 mt/yr

Remaining TN Concentration	1.10 ppm
Remaining TN Load	2,183.8 mt/yr

Revised WQ Results for Alternative 1

MM Number	Management Measure (MM) Name	SubWatershed	Level	Scope	Load Reduction	
					Total Nitrogen (Mton/yr)	Total Phosphorus (Mton/yr)
CRE-LO 12g	Alternative Water Storage (LOER) -- Barron WCD	Freshwater Southwest	1	Local	0.00	0.00
CRE-LO 41	C-43 Distributed Reservoirs	Freshwater Southeast	4	Regional	28.35	4.25
CRE-LO 92	Clewiston STA	S-4	4	Regional	0.00	0.00
CRE 10	C-43 WQ Treatment and Demonstration Project	Freshwater Southeast	3	Regional	47.85	9.21
CRE 18	Harnes Marsh Improvements, Phase I	Tidal South	1	Local	1.52	0.24
CRE 19	Harnes Marsh Improvements, Phase II	Tidal South	2	Local	0.61	0.09
CRE 20	Yellowtail Structure Construction	Tidal South	2	Local	0.32	0.03
CRE 21	Hendry County Storage	Freshwater Southwest	4	Local	2.72	0.68
CRE 22	Hendry Extension Canal Widening	Freshwater Southwest	2	Local	0.00	0.00
CRE 30	Aquifer Benefit and Storage for Orange River Basin (ABSORB)	Tidal South	2	Local	3.72	0.37
CRE 44	Spanish Creek/Four Corners Environmental Restoration	Freshwater Northwest	3	Regional	9.58	1.08
CRE 45	Billy Creek Filter Marsh and Ford Canal Filter Marsh	Tidal South	2	Local	2.05	0.51
CRE 48	Manuel's Branch Silt Reduction Structure	Tidal South	2	Local	0.14	0.11
CRE 49	Manuel's Branch East and West Weirs	Tidal South	2	Local	0.42	0.16
CRE 53	Caloosahatchee Creeks Preserve Hydrologic Restoration	Tidal North	2	Local	21.77	5.44
CRE 57	Powell Creek Algal Turf Scrubber	Tidal North	3	Local	0.06	0.02
CRE 59	N. Ft. Myers Surface Water Restoration, Powell Creek	Tidal North	1	Local	0.68	0.06
CRE 64	Yellow Fever Creek/Gator Slough Transfer Facility	North Coastal	1	Local	1.26	0.15
CRE 121	City of LaBelle Stormwater Quality Improvements	Freshwater Southwest	3	Local	34.78	5.80

Alternative 2 Summary

- Focus on water storage
- Reservoirs
- Well field rehydration
- Stormwater recovery and ASR
- Recyclable water containment areas

Preliminary WQ Results
Alternative 2 – Total Phosphorous

Current Load from Watershed	326.1 mt/yr
Load Reduction from Alternative 1	83.6 mt/yr
Load Reduction from Additional Alternative 2 Management Measures	15.1 mt/yr
Total Load Reduction from Alternative 2	98.7 mt/yr
Remaining TP Load from Watershed	227.4 mt/yr

Preliminary WQ Results
Alternative 2 – Total Phosphorous

Load Reduction for Alternative 1	83.6 mt/yr
Load Reduction for Alternative 2 Local Projects	1.0 mt/yr
Load Reduction for Alternative 2 Regional Projects	25.9 mt/yr
Total Load Reduction for Alternative 2 *	98.7 mt/yr

Remaining TP Concentration	116 ppb
Remaining TP Load	227.4 mt/yr

*Total reduction may be less than sum because of load reduction adjustment.

Preliminary WQ Results
Alternative 2 – Total Nitrogen

Current Load from Watershed	2,899.7 mt/yr
Load Reduction from Alternative 1	715.9 mt/yr
Load Reduction from Additional Alternative 2 Management Measures	116.2 mt/yr
Total Load Reduction from Alternative 2	832.1 mt/yr
Remaining TN Load from Watershed	2,067.6 mt/yr

Preliminary WQ Results
Alternative 2 – Total Nitrogen

Load Reduction for Alternative 1	715.9 mt/yr
Load Reduction for Alternative 2 Local Projects	5.4 mt/yr
Load Reduction for Alternative 2 Regional Projects	143.9 mt/yr
Total Load Reduction for Alternative 2 *	832.1 mt/yr

Remaining TN Concentration	1.05 ppm
Remaining TN Load	2,067.6 mt/yr

*Total reduction may be less than sum because of load reduction adjustment.

Preliminary WQ Results for Alternative 2

					Load Reduction	
MM Number	Management Measure (MM) Name	SubWatershed	Level	Scope	Total Nitrogen (Mton/yr)	Total Phosphorus (Mton/yr)
CRE-LO 40	Lake Hicpochee	Freshwater Northeast	4	Regional	26.91	3.83
CRE 01	Recyclable Water Containment Areas (RWCA)	Multiple *	1	Regional	67.48	14.34
CRE 02	Recyclable Water Containment Areas (RWCA) -- S-4 Basin	S-4	1	Regional	11.85	2.41
CRE 77	Cape Coral Canal Stormwater Recovery and ASR	Tidal North	1	Local	4.13	0.82
CRE 122	Rehydrate Lee County Well Fields	Tidal South	3	Local	1.27	0.23
CRE 128	East Caloosahatchee Storage	Freshwater Southeast	4	Regional	37.64	5.29

*** CRE 01 can be distributed in several subwatersheds on agricultural lands. The actual locations may vary from year to year as part of a 5-year rotation.**

Alternative 3 Summary

Focus on water quality improvement - phosphorus and nitrogen

- Regional
  - Lake Hicpochee Restoration
  - Caloosahatchee Ecoscape Water Quality Treatment Area
  - West Caloosahatchee Water Quality Treatment Area
- Local
  - Wastewater conversion and stormwater retrofits
  - Urban stormwater treatment areas

Preliminary WQ Results
Alternative 3 – Total Phosphorous

Current Load from Watershed	326.1 mt/yr
Load Reduction from Alternative 1	83.6 mt/yr
Load Reduction from Additional Alternative 3 Management Measures	29.4 mt/yr
Total Load Reduction from Alternative 3	113.0 mt/yr
Remaining TP Load from Watershed	213.1 mt/yr

Preliminary WQ Results
Alternative 3 – Total Phosphorous

Load Reduction for Alternative 1	83.6 mt/yr
Load Reduction for Alternative 3 Local Projects	19.7 mt/yr
Load Reduction for Alternative 3 Regional Projects	50.6 mt/yr
Total Load Reduction for Alternative 3 *	113.0 mt/yr

Remaining TP Concentration	108 ppb
Remaining TP Load	213.1 mt/yr

*Total reduction may be less than sum because of load reduction adjustment.

Preliminary WQ Results
Alternative 3 – Total Nitrogen

Current Load from Watershed	2,899.7 mt/yr
Load Reduction from Alternative 1	715.9 mt/yr
Load Reduction from Additional Alternative 3 Management Measures	246.9 mt/yr
Total Load Reduction from Alternative 3	962.8 mt/yr
Remaining TN Load from Watershed	1,936.9 mt/yr

Preliminary WQ Results
Alternative 3 – Total Nitrogen

Load Reduction for Alternative 1	715.9 mt/yr
Load Reduction for Alternative 3 Local Projects	97.2 mt/yr
Load Reduction for Alternative 3 Regional Projects	209.0 mt/yr
Total Load Reduction for Alternative 3 *	962.8 mt/yr

Remaining TN Concentration	0.98 ppm
Remaining TN Load	1,936.9 mt/yr

*Total reduction may be less than sum because of load reduction adjustment.

Preliminary WQ Results for Alternative 3

MM Number	Management Measure (MM) Name	SubWatershed	Level	Scope	Load Reduction	
					Total Nitrogen (Mton/yr)	Total Phosphorus (Mton/yr)
CRE 04	Lake Hicpochee Restoration (Caloosa Lakes)	Freshwater Northeast	5	Regional	100.43	24.69
CRE 11	Caloosahatchee Ecoscape Water Quality Treatment Area	Freshwater Southwest	4	Regional	50.05	11.98
CRE 13	West Caloosahatchee Water Quality Treatment Area	Freshwater Southwest	4	Regional	58.49	13.94
CRE 29	Lehigh Acres Wastewater Treatment and Stormwater Retrofit	Tidal South	3	Local	68.45	13.69
CRE 69	Cape Coral Wastewater Treatment and Stormwater Retrofit	Multiple *	2	Local	26.98	5.40
CRE 123	North Ten Mile Canal Stormwater Treatment System	Tidal South	1	Local	0.82	0.33
CRE 124	Carrell Canal (FMCC) Water Quality Improvments	Tidal South	1	Local	0.42	0.13
CRE 125	Shoemaker-Zapato Canal Stormwater Treatment	Tidal South	1	Local	0.54	0.14
CRE 129	Caloosahatchee Creeks	Tidal North	4	Local	0.00	0.00

*** CRE 69 is primarily in the North Coastal subwatershed, but also includes some areas in the Tidal North subwatershed.**

Next Steps

- Complete hydrologic modeling of Alternatives 2 and 3
- Finalize water quality results of Alternatives 2 and 3
- Formulate Alternative 4 based on results of Alternatives 1, 2, and 3
- Complete water quality analysis and hydrologic modeling of Alternative 4
- Identify preferred plan and complete drafting of document

Questions

https://my.sfwmd.gov/northerneverglades

Update on Hydrologic Modeling For Caloosahatchee River Watershed Protection Plan

(by Larry Brion, HESM, SFWMD)

6/27/08

Presentation Outline

- General Model Description and Assumptions
- Model Run Assumptions
- Performance Measures & Indicators
- Other Performance Measures & Indicators
- Modeling Results:
  - LOWCP P2TP Current Base
  - RWPP (Future) Base Run
  - RWPP Alternative 1
- Future Modeling

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General Model Description and Assumptions

- **Regional Simulation Model (RSM) = regional hydrologic simulation tool used to conduct a water budget analysis of the watersheds within the Northern Everglades area**
- **Northern Everglades Regional Simulation Model (NERSM) = specific implementation of node-link version RSM covering the northern extent of the District down to Lake Okeechobee and the Caloosahatchee and St. Lucie River Watersheds**
  - **Model domain:**
    - **Lake Okeechobee Watershed (Upper Kissimmee, Lower Kissimmee, Lake Istokpoga, Fisheating Creek, and Taylor Creek/Nubbin Slough)**
    - **Caloosahatchee Watershed (East and West Caloosahatchee)**
    - **St. Lucie Watershed (C-44, C-24, C-23, Ten Mile Creek, North Fork/South Fork/Basins 4,5, and 6)**
  - **Period of simulation: 1970-2005**
  - **Daily time step**
  - **Lake Okeechobee Regulation Schedule: WSE**

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- **Modeling Domain (LOWCP P2TP)**

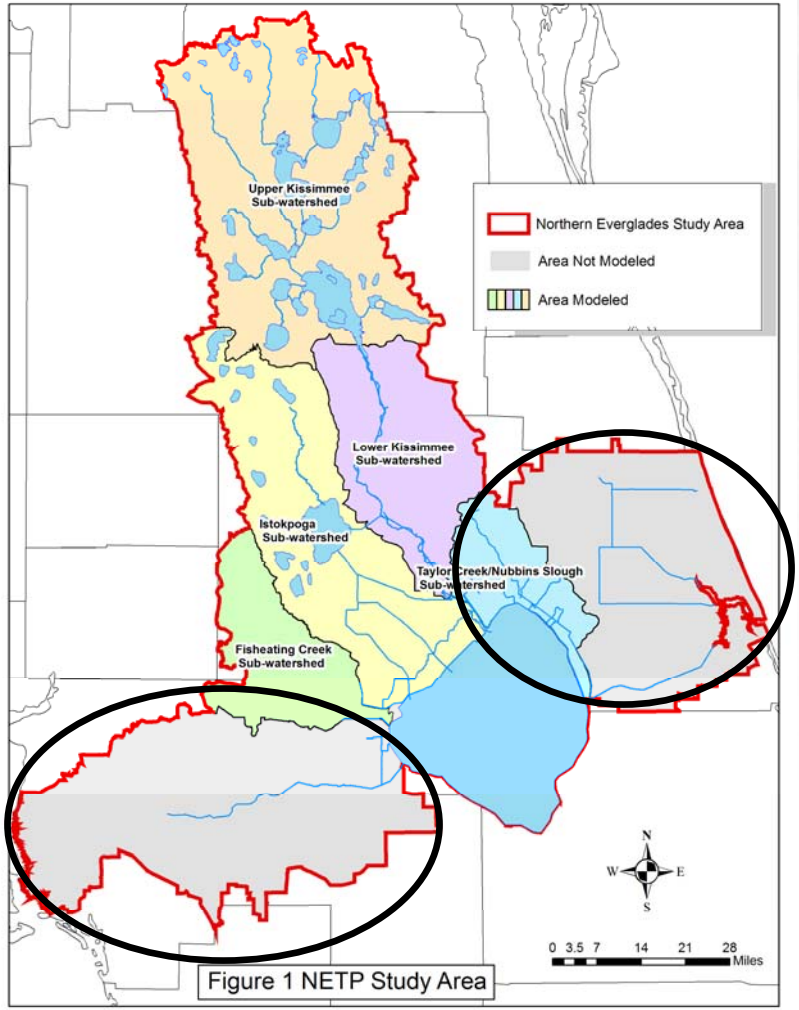

Figure 1 NETP Study Area

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Model Run Assumptions for Current Base

- **Current Base Condition:**
  - **Represents conditions as they exist in the Northern Everglades Watershed in 2005.**
  - **Assumes no projects as defined by the Comprehensive Everglades Restoration Plan (CERP).**
  - **Lake Okeechobee flood control releases to estuary and Water Conservation Areas are based on the existing WSE regulation schedule.**
  - **Same as in the current base scenario established for the Lake Okeechobee Watershed Construction Project Phase II Technical Plan (LOWCP P2TP)**

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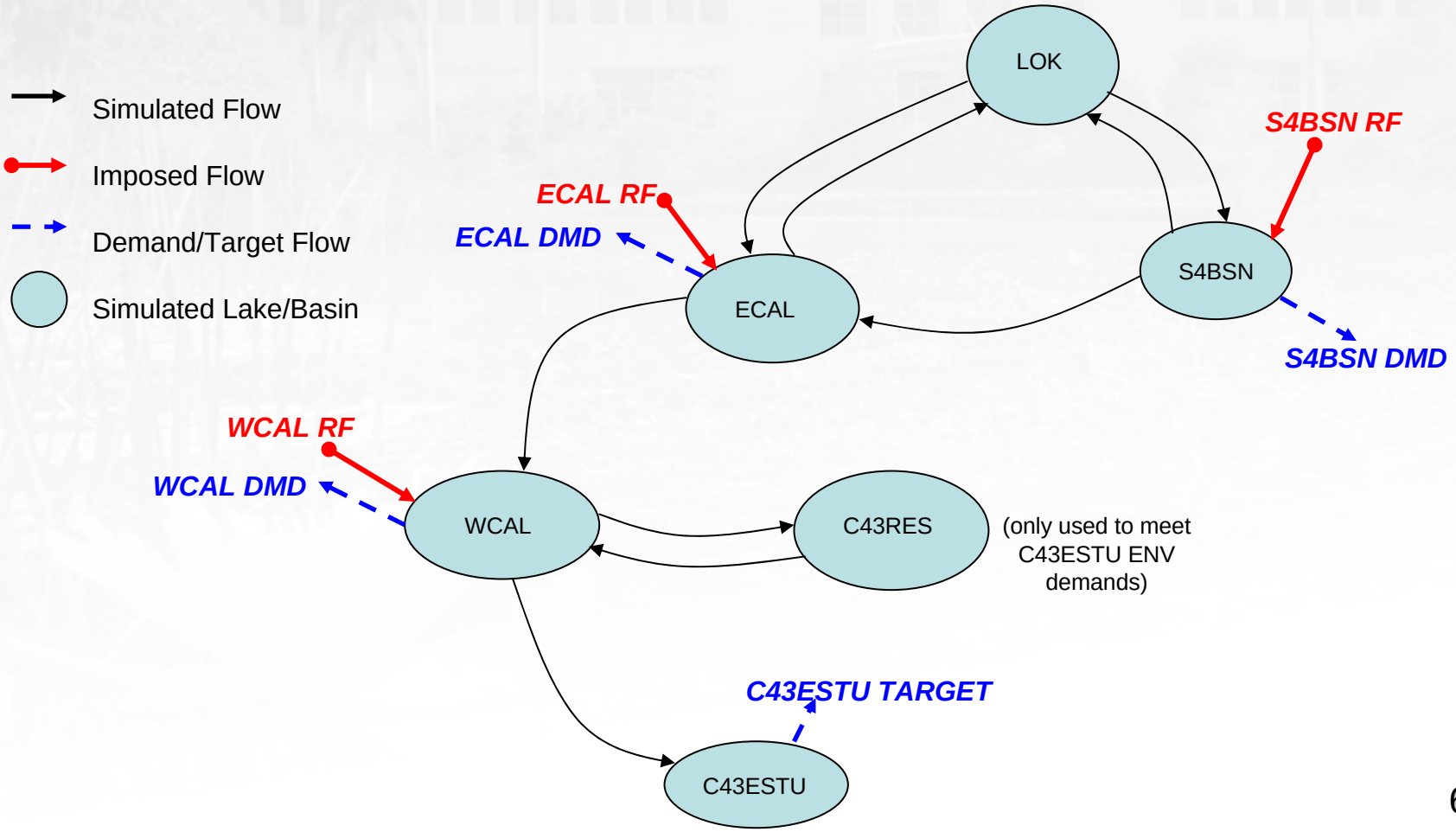
Model Run Assumptions for RWPP Base

- **RWPP (Future) Base Condition (circa 2015):**
  - **Full Kissimmee River Restoration including Kissimmee River Headwaters Revitalization project**
  - **All Acceler8 projects are in place**
  - **Authorized MODWATERs and C-111 projects**
  - **Northern Everglades LOWCP P2TP preferred alternative with**
    - **Additional level of detail in conceptualizing the Caloosahatchee and St. Lucie River Watersheds**
    - **Fewer boundary conditions to drive the model, e.g. backflows are now simulated relative to water level fluctuations in Lake Okeechobee**
    - **Additional performance indicator (Target Flow Index) to aid in alternative evaluation process**

Node-Link Representation of the Caloosahatchee Sub-watershed in the NERSM for CRWPP Base



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Model Run Assumptions for RWPP ALT1

- **RWPP Alternative 1:**
  - **RWPP base conditions plus Alt1 management measures:**
  - **For SLRWPP:**
    - **Indian River Lagoon-South Recommended Plan Components**
    - **Local Stormwater Improvement Projects**
  - **For CRWPP:**
    - **C-43 Distributed reservoirs**
      - **Total footprint: 6,600 Acres**
      - **Reservoir operating depth: 7.5 Ft**
    - **Flow pass-through management measures:**
      - **C-43 Water Quality Project (BOMA) in East Caloosahatchee: 1,335 Acres with ~4.5 ft operating depth**
      - **STA in S-4 Basin (Clewiston): 766 Acres with ~1.5 ft operating depth**

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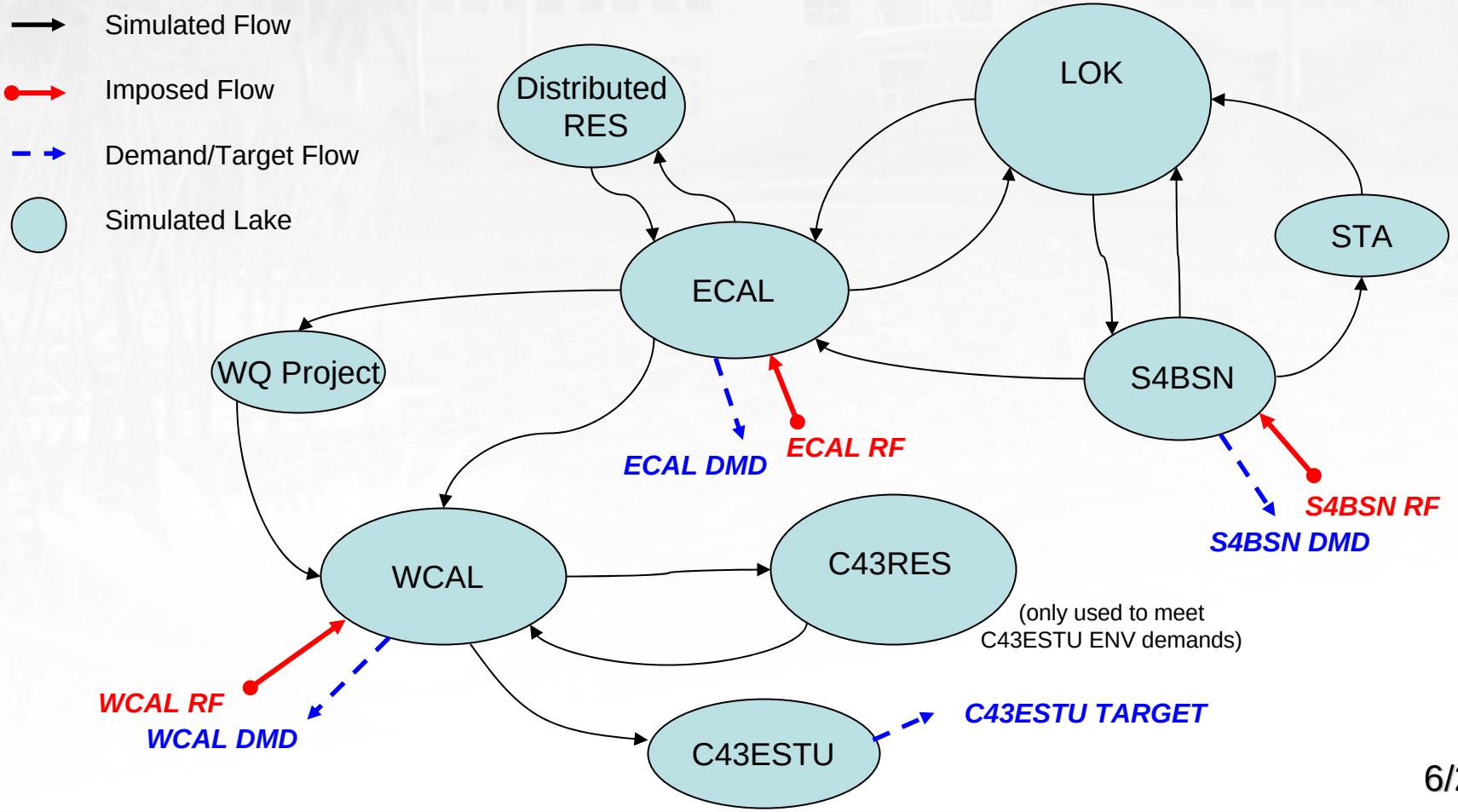
Node-Link Representation of the Caloosahatchee Sub-watershed in the NERSM for CRWPP Alternative 1



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Performance Measures & Indicators

- **Performance Measures for CRWPP**
  - **An objective of the Caloosahatchee River Watershed Protection Plan is to reduce frequency and duration of harmful freshwater releases into the Caloosahatchee Estuary at the S-79 structure.**
    - **Number of Times Caloosahatchee Estuary High Discharge Criteria Exceeded (mean monthly flows > 2800 & 4500 cfs from 1970 – 2005)**
      - **Goal is to reduce the occurrence of high discharges to a frequency that approximate natural conditions.**
      - **Specific metric is to have up to three occurrences of mean monthly flows exceeding 2800 cfs (causes stress to the ecosystem); and avoid mean monthly flows in excess of 4500 cfs (causes severe damage).**
    - **Number of Times Salinity Envelope Criteria NOT met for the Caloosahatchee Estuary**
      - **Goal is to maintain salinity concentrations that are conducive to estuary ecology**
      - **Specific metric is to avoid mean monthly flows less than 450 cfs from October to July and up to three occurrences of mean monthly flows greater than 2,8000 cfs**

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Performance Measures & Indicators

- **Performance Measures for CRWPP (con't)**
  - **Another objective is to establish a salinity range favorable to juvenile marine fish, shellfish, oysters and submerged aquatic vegetation.**
    - **Target Flow Index (TFI)**
      - **A desired flow distribution (based on the EST05 flow time series) was established to achieve above goal.**
      - **TFI wasofrmulated in order to measure deviation from the desired flow distribution. A value of zero signifies a perfect match to EST05. Progressively more negative index values are associated with flows deviating (either above or below) from the target.**

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Other Performance Measures & Indicators

- **Maintain other water-related needs for the other parts of the system; provides a way to evaluate impacts of different alternatives in areas outside the Caloosahatchee River Watershed.**
  - **For St. Lucie River Watershed:**
    - **Number of Times St. Lucie Estuary High Discharge Criteria Exceeded (mean monthly flows > 2800 & 3000 cfs from 1970 – 2005)**
    - **Number of Times Salinity Envelope Criteria NOT met for the St. Lucie Estuary**
  - **For Lake Okeechobee:**
    - **Extreme High (17 ft NGVD) and Low Stages (10 ft NGVD)**
    - **Stage Envelope (Score Below & Above)**
    - **Minimum Flow and Level**
    - **Stage Duration Curve**
  - **For Lake Okeechobee Service Area (LOSA):**
    - **Mean annual EAA/LOSA supplementation irrigation (4-in-1)**
    - **Demand cutback volumes for 7 water years in the simulation period with the largest cutbacks**

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Modeling Results

- Comparison of LOWCP P2TP Current Base Scenario {CBASE}, RWPP Base Run {RWPPB} and RWPP Alternative1 {ALT1} using performance measures and indicators
- Additional alternative scenarios will be compared against CBASE and RWPPB incrementally as they become available

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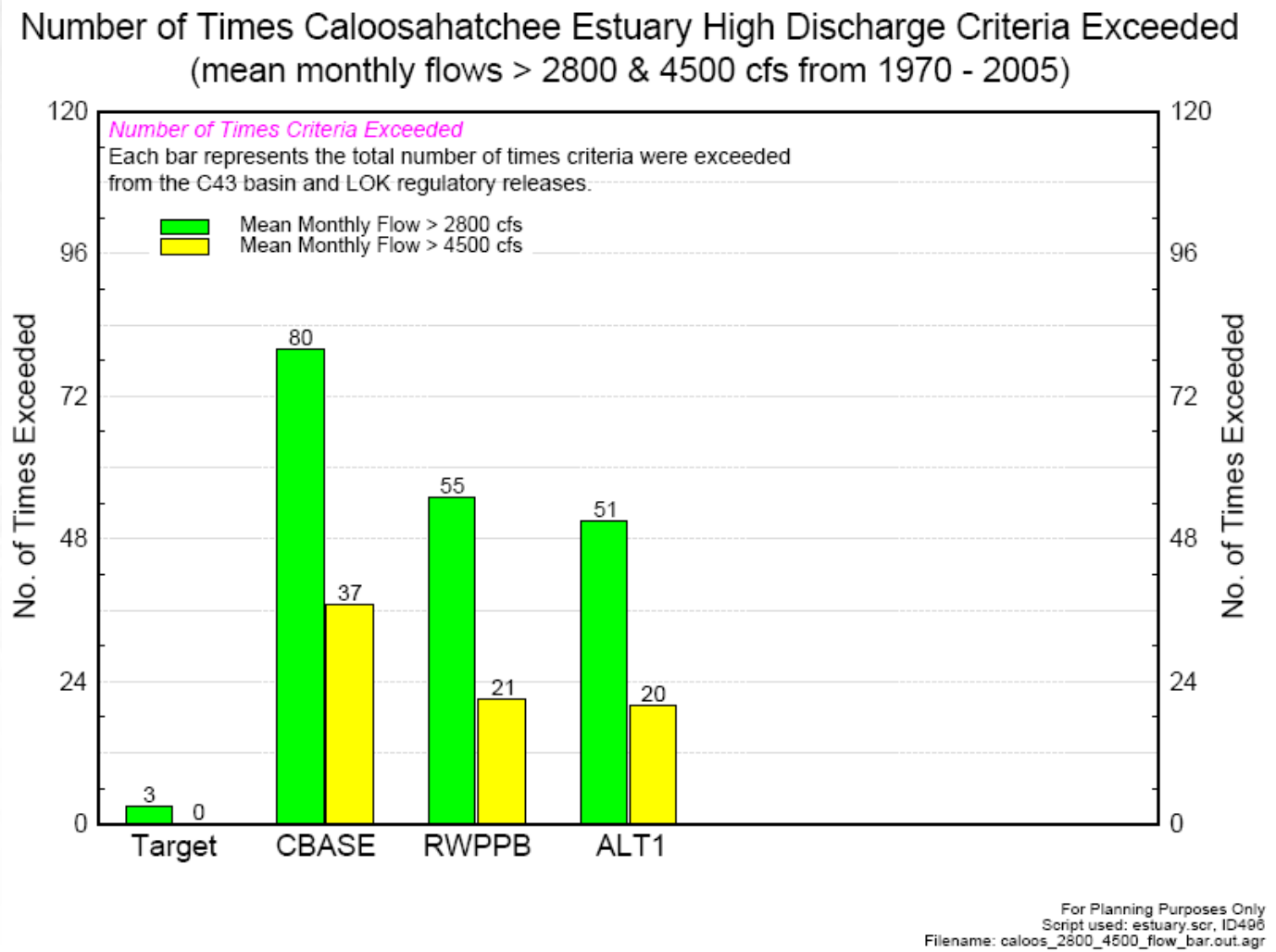
Estuary-Specific Performance Measures



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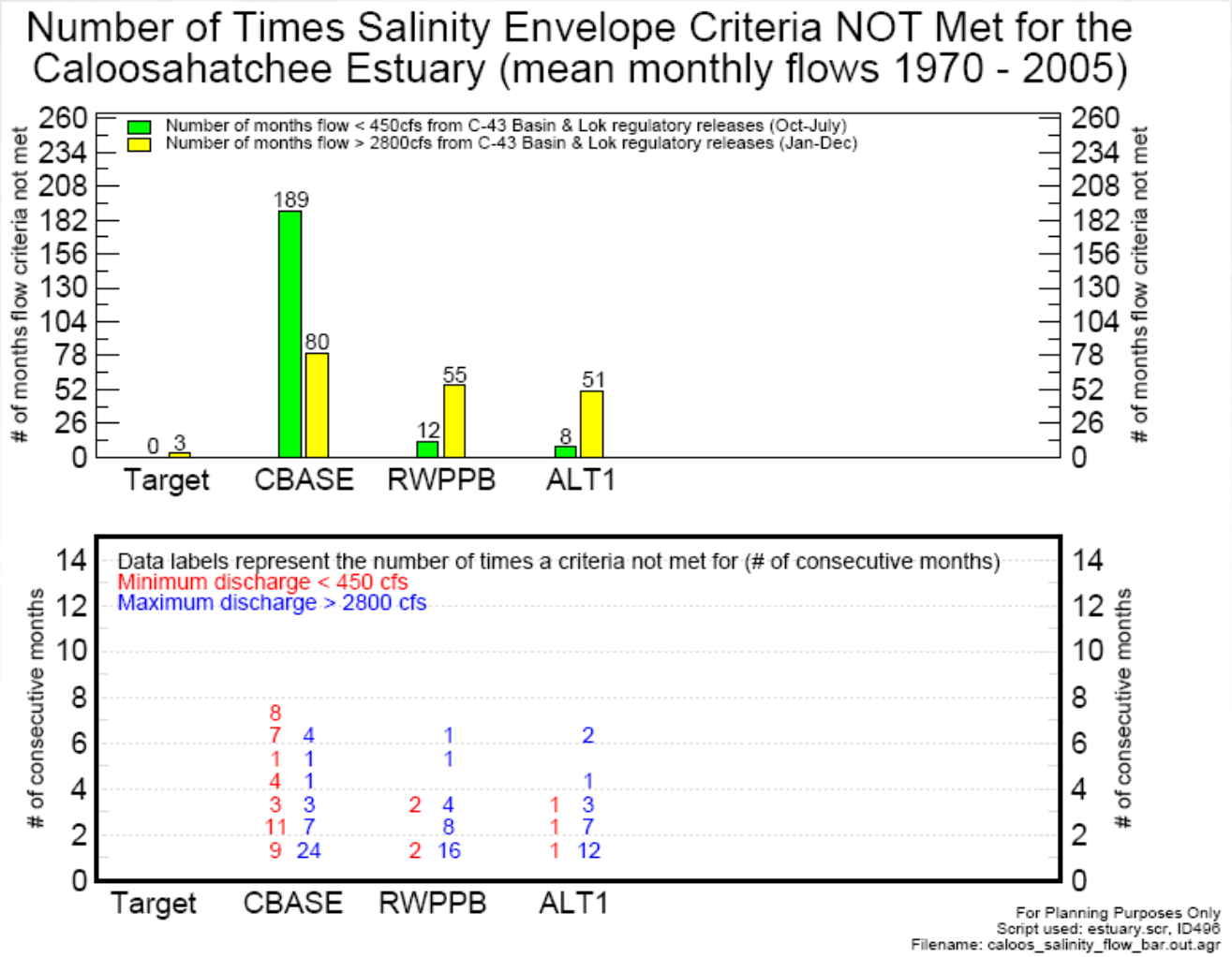
Estuary-Specific Performance Measures



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Estuary-Specific Performance Measures

- **Breakdown of Flows to Estuary By Source (Number of months out of 432 total months of simulation for 1970-2005 period of record)**

	CBASE	RWPPB	ALT1
Basin > 2800 cfs	48	33	**26**
LOK > 2800 cfs	21	9	**10**
Basin + LOK > 2800 cfs	11	13	**15**
Total > 2800 cfs	**80**	**55**	**51**

	CBASE	RWPPB	ALT1
Basin > 4500 cfs	10	7	**6**
LOK > 4500 cfs	5	2	**2**
Basin + LOK > 4500 cfs	22	12	**12**
Total > 4500 cfs	**37**	**21**	**20**

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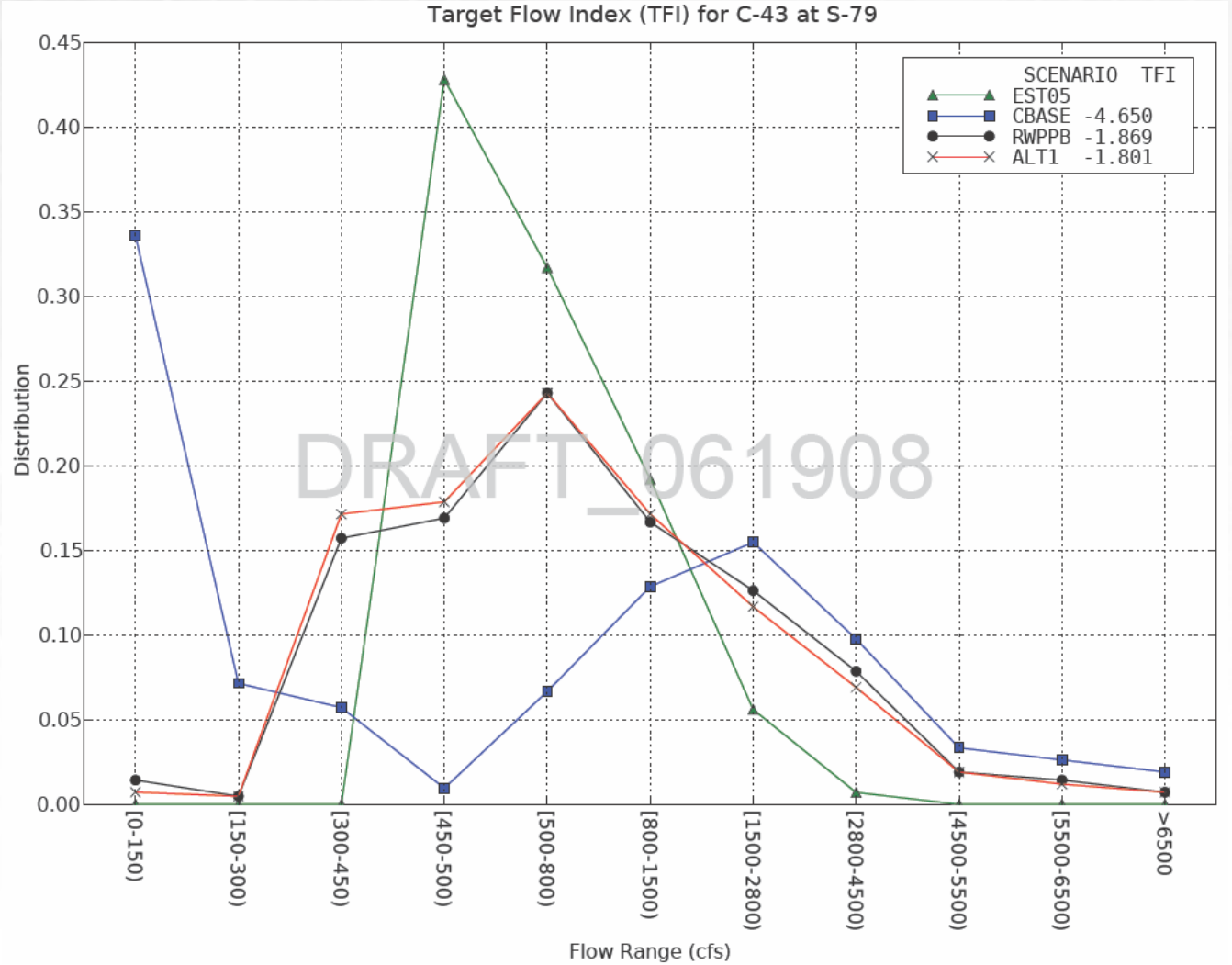
Estuary-Specific Performance Measures



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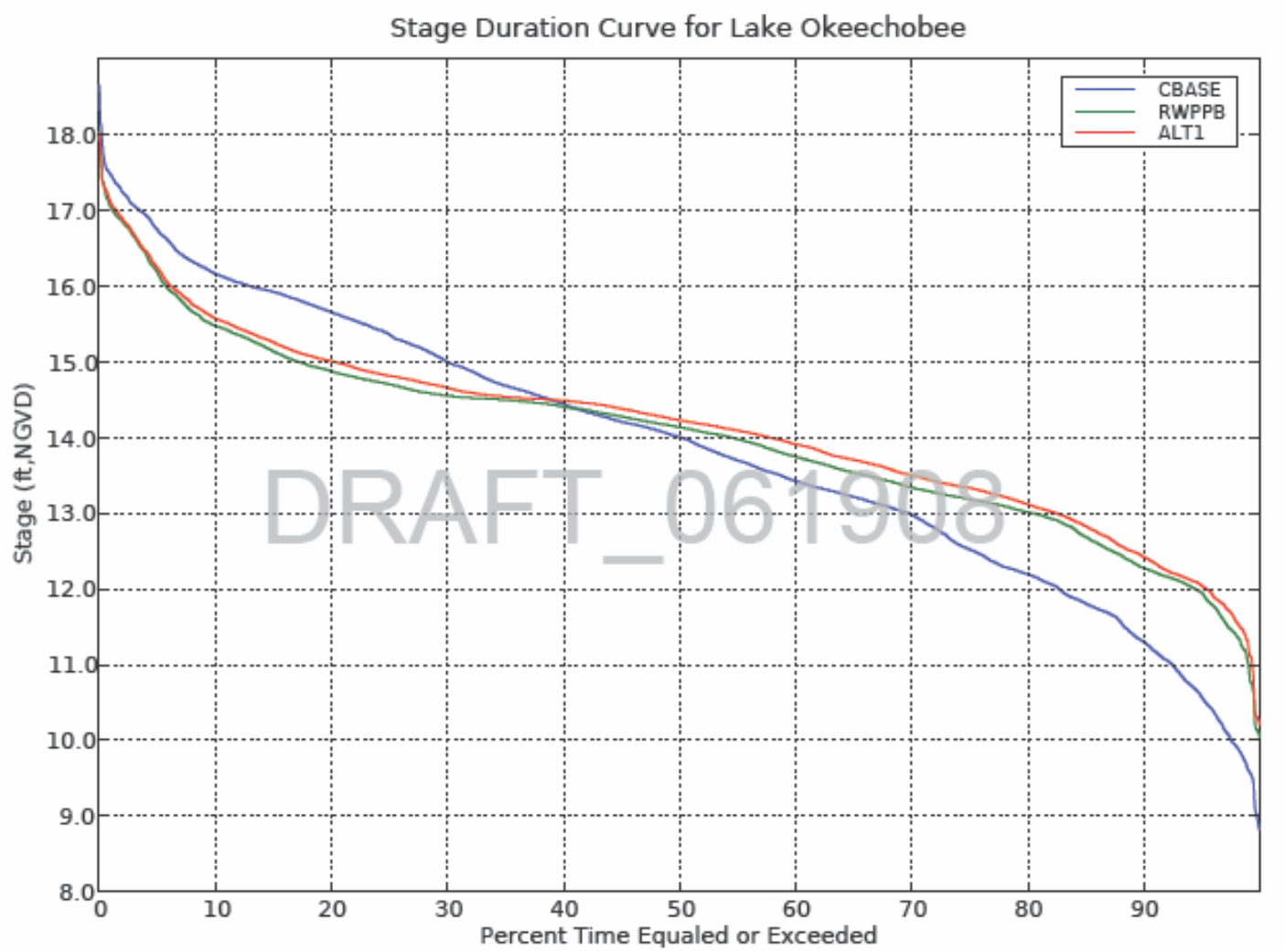
Lake Okeechobee Performance Indicator



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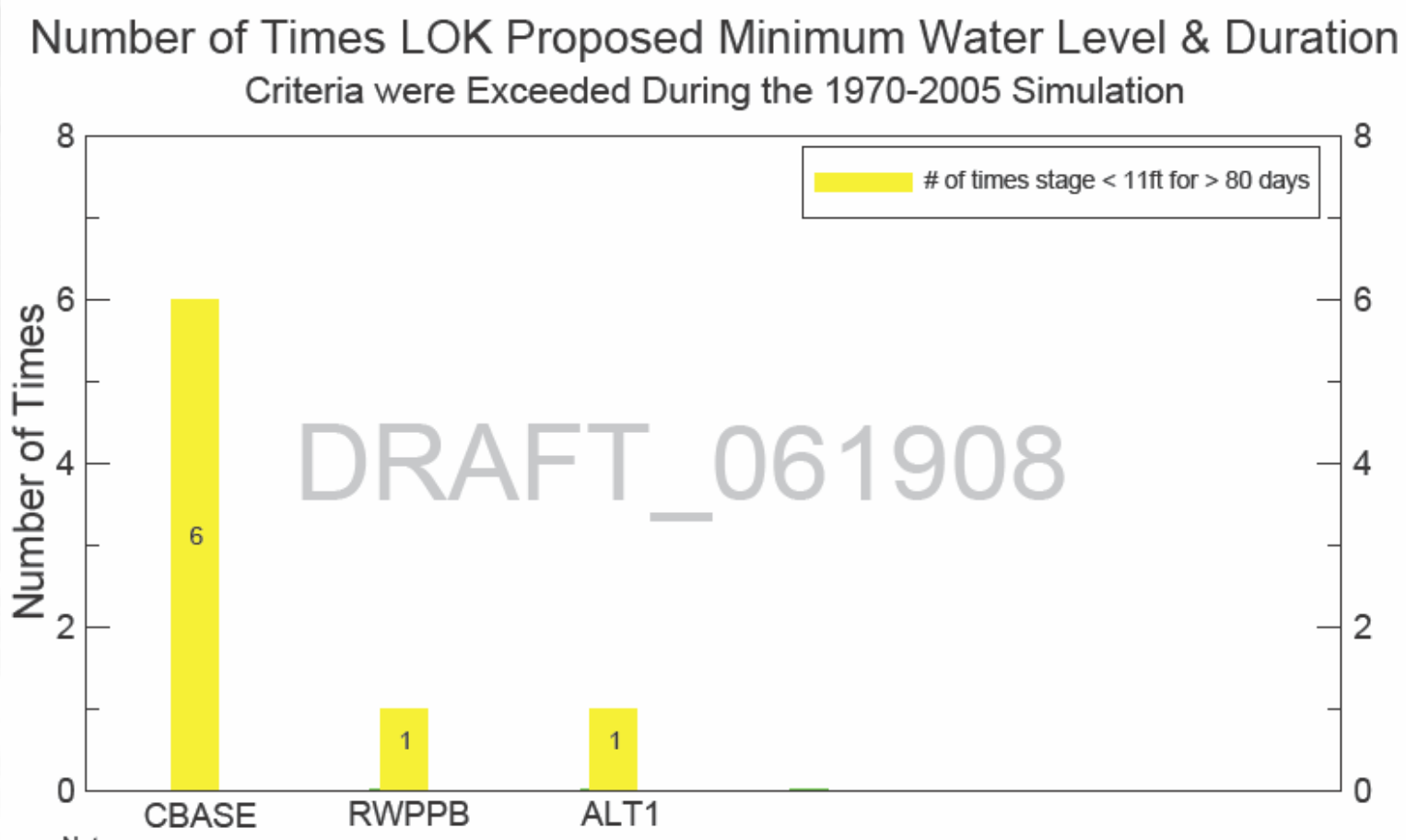
Lake Okeechobee Performance Indicator



Note:

Target: Minimum Level, duration and Return Frequency - Water levels in Lake Okeechobee should not fall below 11ft NGVD for greater than 80 days more often than once every six years (Target derived from 1952-1995 historical stage data for Lake Okeechobee).

For Planning Purposes Only

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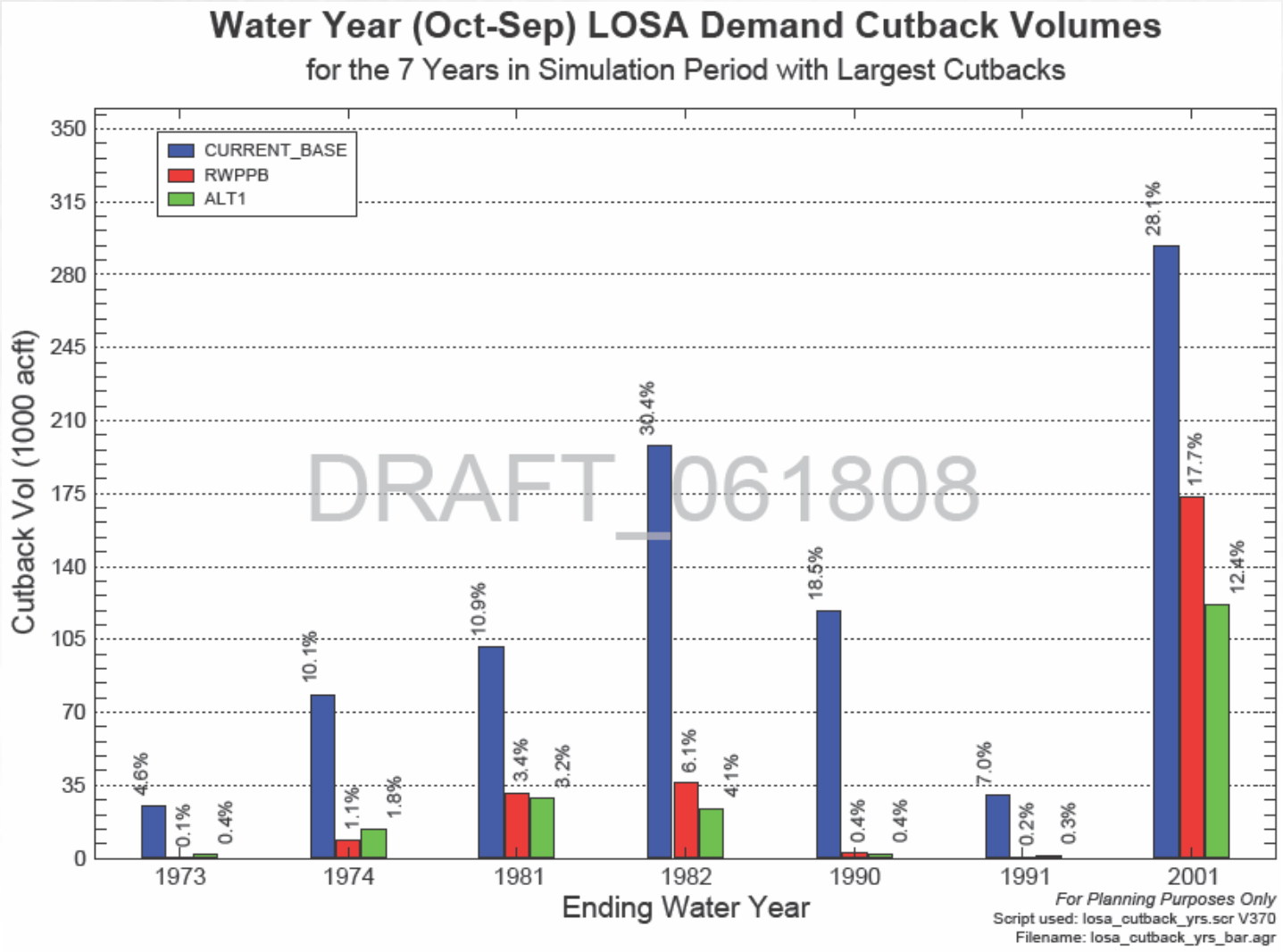
LOSA Performance Indicator



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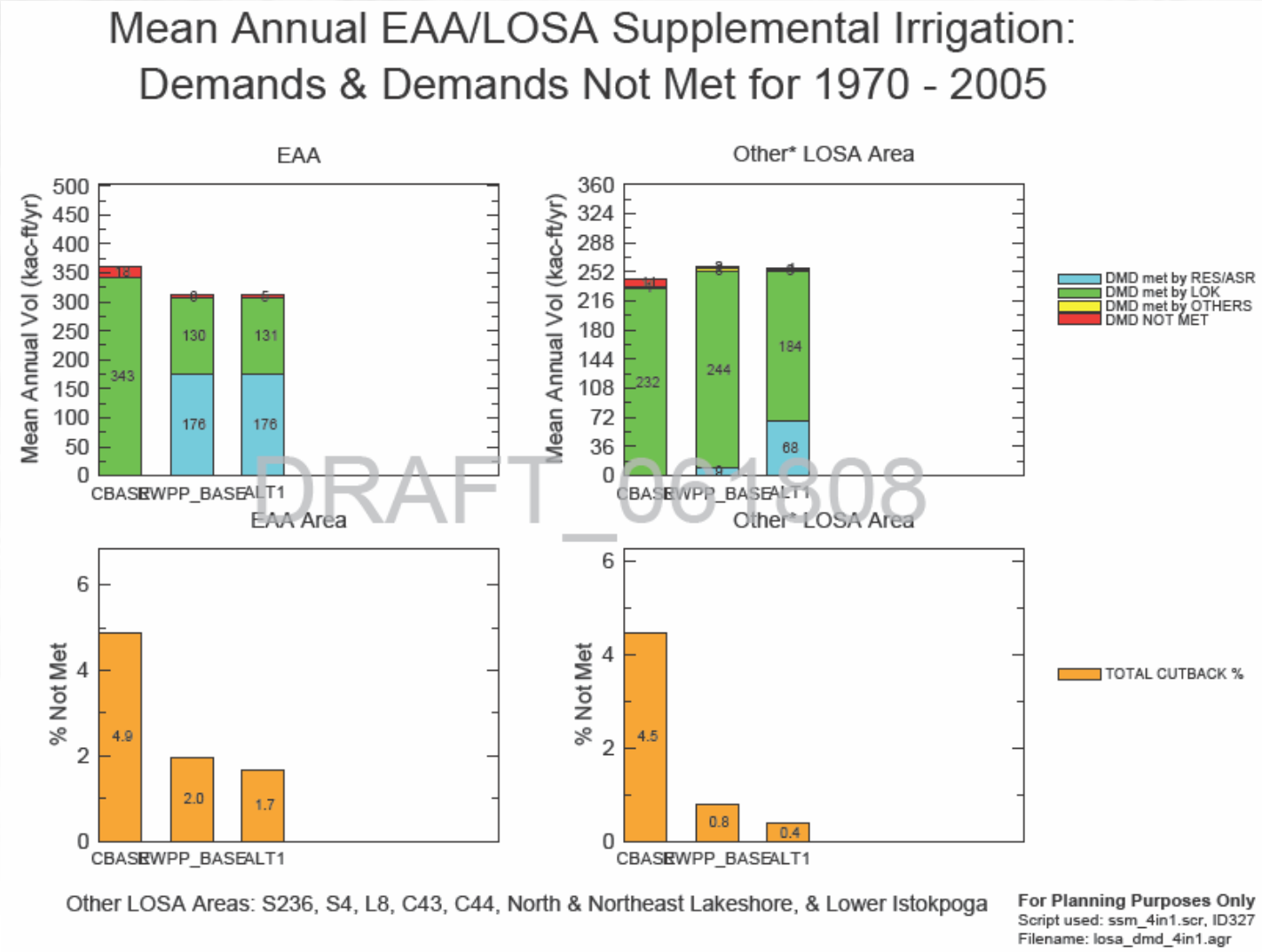
LOSA Performance Indicator



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Future Modeling

- **What's next?**
  - **Incorporation of CRWPP-specific Alternative 2 management measures**
  - **Integration with Alternative 2 management measures for the St. Lucie River Watershed Protection Plan (SLRWPP)**
  - **Continued alternative formulation, simulation and evaluation**

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

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