

Sunrise over  
Lake Okeechobee near  
the City of Okeechobee

# Lake Okeechobee System Operating Manual



Jennifer Reynolds  
Division Director  
South Florida Water Management District  
Governing Board Meeting  
July 15, 2021

# LOSOM Planning Process

- 10 Public Scoping Meetings in February & March 2019
- 6 Public Webinars on Lake Okeechobee Water Management in May & June 2019
- 2 Public Workshops in September 2019
- 20 Project Delivery Team Meetings and Workshops along with numerous Sub-Team Meetings to-date



# LOSOM Schedule to Preferred Alternative

- Started in July 2020
- Preliminary identification of the preferred alternative on July 19, 2021
- Identify preferred lake schedule alternative by August 4, 2021
- Iteration 3 modeling and optimization of preferred lake schedule
- Identification of operational criteria and guidance by October 14, 2021

Development of Conceptual Plans  
(July 2020 – Oct 2020)

Evaluation of Conceptual Plans  
(Nov 2020 – Jan 2021)

Iteration 1: Initial Array of Lake  
Schedules (Jan 2021 – May 2021)

Iteration 2: Balanced Array of Lake  
Schedules (May 2021 – July 2021)

★Select Preferred Alternative by Aug 4, 2021

We Are  
Here

Iteration 3: Optimization of Preferred  
Schedule (Aug 2021 – Oct 2021)



# OBJECTIVES



- Manage risk to public health and safety, life and property
- Continue to meet authorized purposes for navigation, recreation and flood control
- Improve water supply performance
- Enhance ecology in Lake Okeechobee, northern estuaries and across the south Florida system.



# Governing Board Policy Statement (April 2021)

The South Florida Water Management District (District) works to safeguard and restore South Florida's water resources and ecosystems, protect our communities from flooding, and meet the region's water needs while connecting with the public and stakeholders. LOSOM allows us to capitalize on recent infrastructure improvements including rehabilitation of the Herbert Hoover Dike and CERP features. The District views balancing the differing interests across the system, including flexibility to adapt to current situations to achieve that balance, as integral to the success of the LOSOM process. Those interests include: equitably delivering water supply to society and the environment for beneficial uses during the dry season; increasing the tolerance for temporary/short term higher lake stages during the wet season in order to avoid harmful estuary discharges; and maintaining the other congressionally authorized purposes of flood control, navigation, and recreation.

# Governor DeSantis Statement

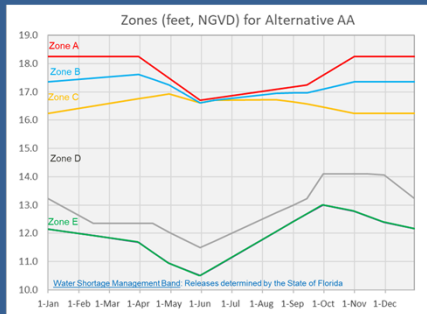
- On May 17, 2021 in a letter to Mr. Pinkham, the Acting Assistant Secretary of the Army for Civil Works, Governor DeSantis conveyed the following policy statement regarding LOSOM:

*LOSOM must promote environmentally-beneficial releases that support lower lake levels during the dry season, and enhanced operational flexibility for managers to hold water in the lake during the wet season, to prevent harmful discharges into the estuaries and send more water south to benefit the environment and our communities.*

## Iteration 2

# Honor Different Perspectives On Balancing The Congressionally Authorized Project Purposes And The Stated Goal And Objectives Of LOSOM

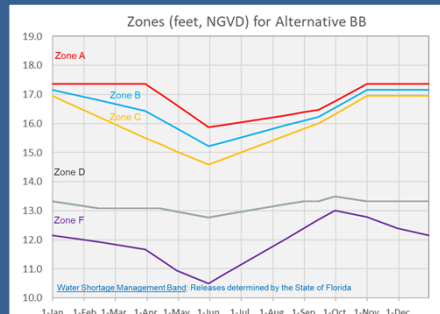
### Alternative AA



Explores upper and lower lake stages to increase interim storage in the lake to:

- Enhance ecology of St. Lucie Estuary by reducing Lake Okeechobee releases through S-308,
- Improve water supply,
- Enhance Everglades ecology by providing more freshwater south, and
- Enhance Caloosahatchee ecology by providing low and optimal flows.

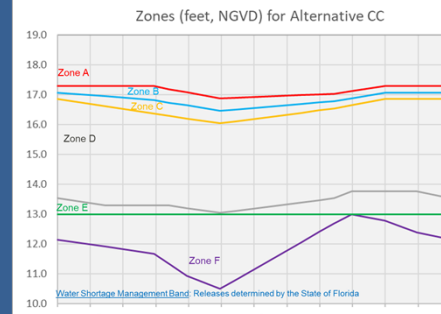
### Alternative BB



Improves water supply performance to pre-LORS08 as a priority objective and:

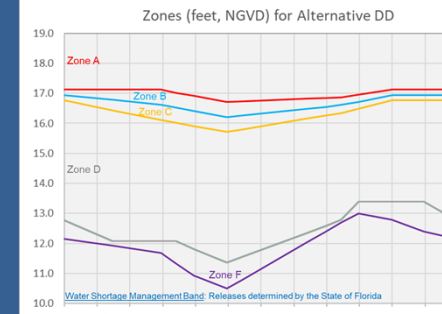
- Reduce algal bloom risk
- Increase low and optimal flows to Caloosahatchee Estuary
- Reduce lake releases to St. Lucie Estuary
- Enhancing Everglades ecology by providing more freshwater south.

### Alternative CC



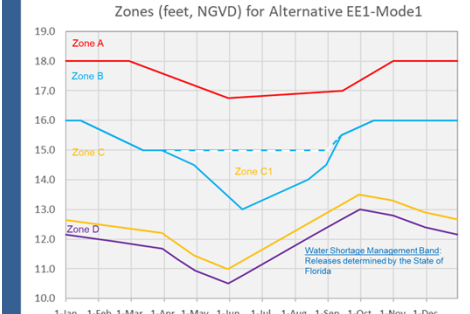
- Enhancing Caloosahatchee ecology by providing low and optimal flows and reducing extreme high flows >6500 cfs
- Enhancing ecology of St Lucie Estuary by reducing Lake O releases
- Enhancing Everglades ecology by providing more freshwater south
- Improving water supply performance as compared to the No Action condition

### Alternative DD



Honors the perspective on balance that each of the LOSOM objectives should be incrementally improved over LORS08 performance

### Alternative EE1 & EE2



Lake Okeechobee stage target (equation based). Incorporates memory and flexibility by asking key questions at key times to define operational mode:

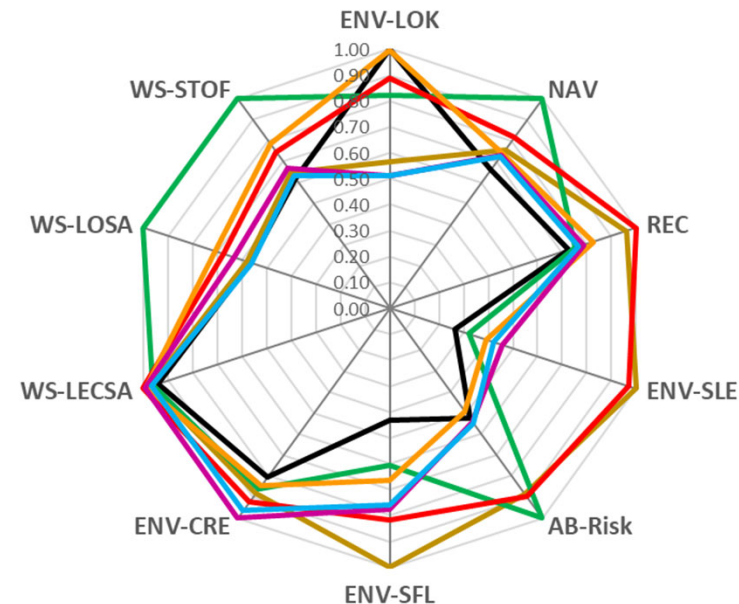
- Mode 1-Normal
- Mode 2- Conservation
- Mode 3-Recovery



	Metric	ECBr	NA25	AA	BB	CC	DD	EE1	EE2
L O K	Lake O - % above stage envelope	34	36	42	50	40	35	42	41
	Lake O - % within stage envelope	26	26	21	23	23	29	21	22
	Lake O - % below stage envelope	40	39	37	27	36	37	38	38
	Lake O - Upper penalty - all years	13193	13954	23756	25235	20585	14897	23087	20617
	Lake O - Lower penalty - all years	18448	17447	16015	10300	15114	14454	16484	16680
	Lake O - Upper penalty May-Sep	6590	6952	11610	12773	9901	7420	10214	9303
	Lake O - Lower penalty May-Sep	5781	5406	5088	2915	4460	4237	5145	5326
	Lake O - Upper penalty Recovery years	10226	11184	19854	20609	17138	11493	16918	16684
	Lake O - Lower penalty Recovery years	4070	5626	5082	3444	5376	5490	6442	6624
	Lake O - % of Time above 17'	0.29	0.24	2.81	1.12	1.03	0.47	3.31	3.49
C R E	Caloos - Optimal flow - # of 14 day periods 750-2100 cfs	468	593	600	654	714	605	741	703
	Caloos - Damaging LOK flow - # of 14 d periods ≥2600	205	186	237	119	156	207	151	166
	Caloos - High LOK flow - # of 14 d periods ≥2100 <2600cfs	190	183	184	110	289	113	75	71
	Caloos - Low flow - # of 14 day periods < 750 cfs	663	556	485	554	377	526	383	418
	Caloos - # of 14 day periods <457	555	76	56	69	69	63	85	86
	Caloos # of 14 d periods ≥2600 <4500 cfs	347	280	336	237	271	316	299	307
	Caloos # of 14 d periods ≥4500 <6500 cfs	117	101	117	87	86	118	85	87
	Caloos # of 14 d periods ≥6500 cfs	66	58	50	61	57	57	29	30
	Caloos - MFL exceedance	38	10	8	9	10	10	12	12
	Mean annual flood control releases from LO to Caloos. (S-77 Regulatory flows, k-ac-ft/year)	515	528	577	409	578	517	465	495
LWL	Mean annual flood control releases from LO to L8 (C-10A Regulatory flows, k-ac-ft/year)	59	59	7.04	24.21	3.39	24.66	16.53	19.15
S L U E	St. Lucie - Optimal flow - # of 14 day periods 150-1400 cfs	827	864	926	857	929	861	832	835
	St. Lucie - High LOK flow - # of 14 day periods 1400-1700 cfs	162	148	23	83	13	137	52	119
	St. Lucie - Damaging LOK flow - # of 14 day periods ≥1700 cfs	160	142	20	118	17	135	113	109
	St. Lucie - # of 14 d periods < 150 cfs	109	105	166	149	169	156	163	159
	St. Lucie - # of 14 d periods ≥1700 <4000 cfs	519	515	434	479	430	507	496	497
	St. Lucie - # of 14 d periods ≥4000 cfs	179	161	140	185	148	158	174	166
	Mean annual flood control releases from LO to St. Lucie (S-308 Regulatory flows, k-ac-ft/yr)	231	187	49	226	72	144	187	166
E V G	South - average annual Kac-ft/yr	59.78	60.45	241.22	138.57	194.3	151.38	184.72	181.66
	South - Wet (Jun-Oct)	12.67	13.08	92.05	66.81	77.44	65.83	78.22	82.22
	South - early dry (Nov-Feb)	35.19	35.83	78.00	36.69	65.17	44.23	54.25	47.37
	South - late dry (Mar-May)	11.92	11.54	71.17	35.07	51.69	41.32	51.92	52.01
W S U P P L Y	LOSA Worst Drought Events Avg % of demand not met	32%	31%	29%	18%	27%	26%	28%	29%
	LOSA Duration - Months of cutback	59	60	64	31	55	52	60	64
	LOSA Freq - Years >20 Kac-ft cutback	13	13	14	8	13	12	13	14
	LOSA Years >100 Kac-ft cutback	8	8	9	5	7	8	8	8
	Total shortage months in non drought years	29	28	29	17	23	27	31	29
	# of Months with cutbacks not during or after drought year	21	19	20	10	14	18	22	20
	# of Months with cutbacks after drought year	8	9	9	7	9	9	9	9
	EAA % of Dmd not Met	10	10	10	5	9	8	9	10
	Other LOSA % of Dmd Not Met	6	5	5	3	5	4	5	5
	Brighton % of Dmd not Met	4.4	4.1	4.0	2.3	3.5	3.3	3.9	4.0
	Big Cypress % of Dmd Not Met	2.6	2.5	2.5	1.7	2.2	2.2	2.4	2.5
	WS Deliveries to LEC at Lake O outflow structures	59.3	60.5	57.8	61.2	59.3	59.9	58.1	58.3
	WS Deliveries to LEC (EAA/WCA and WCA/LEC boundaries)	188.7	166.4	179.6	177.0	180.6	176.0	178.1	178.0
	LECSA 1-3 Avg Duration	159	151	134	104	140	136	142	148
	LECSA 1-3 Avg Frequency	22	20	18	14	19	18	19	20
	LECSA 1-3 Avg Severity	171	163	145	116	151	148	154	159
Y	No. of times Bisc Aq MFL Criteria Not Met (11 structures)	10	9	8	8	8	8	8	8
	Avg Percent of Time Stage Below Bisc Aq MFL Criteria	27%	27%	28%	28%	28%	28%	28%	28%

## DRAFT MCDA Performance Comparison Iteration 2 Alternatives

— NA25 — AA — BB — CC — DD — EE1 — EE2

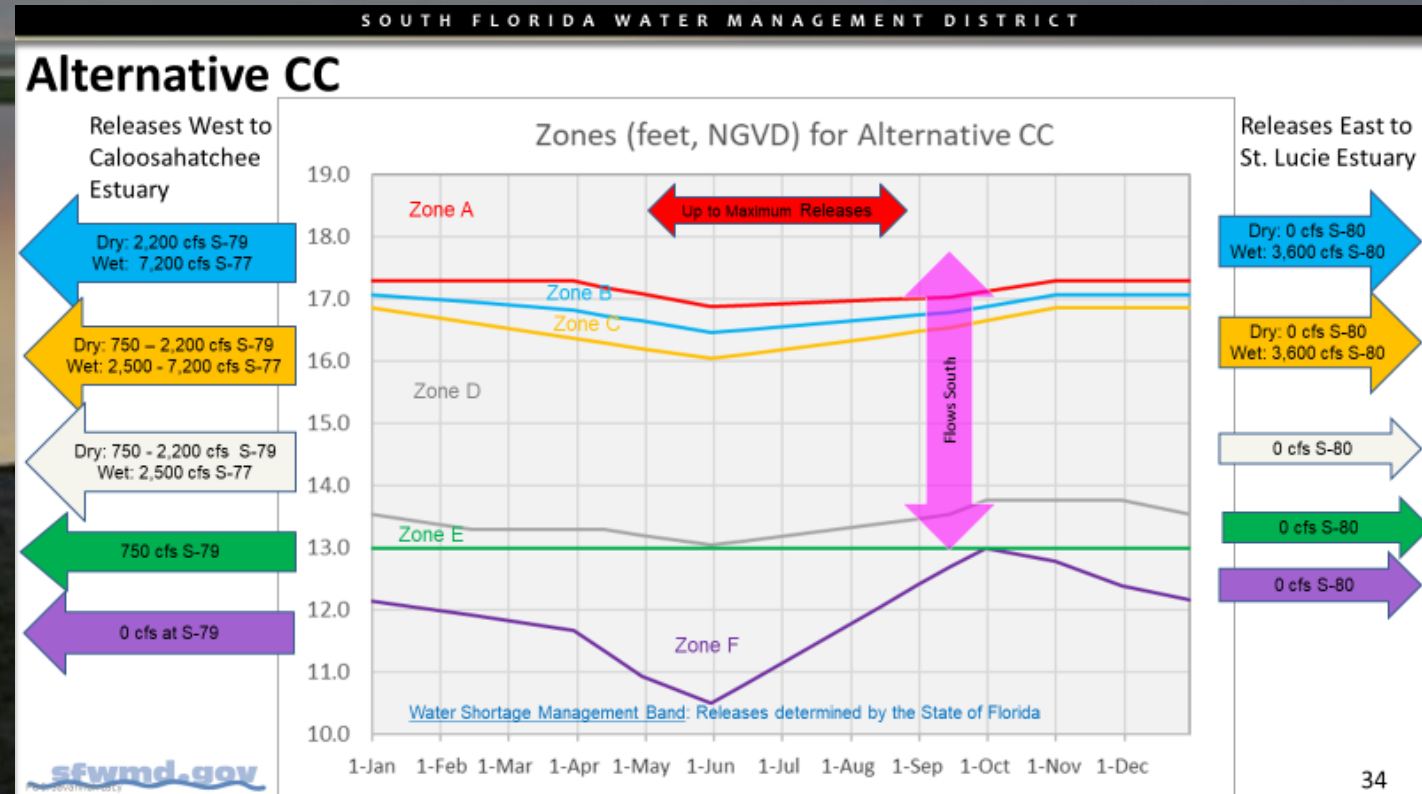


- **ENV-LOK:** Lake Okeechobee Ecology
- **NAV:** Navigation
- **REC:** Recreation
- **ENV-SLE:** St. Lucie Estuary Ecology
- **AB-Risk:** Northern Estuaries Algal Bloom Risk
- **ENV-SFL:** South Florida Ecology
- **ENV-CRE:** Caloosahatchee Estuary Ecology
- **WS-LECSA:** Water Supply Lower East Coast Service Area
- **WS-LOSA:** Water Supply Lake Okeechobee Service Area
- **WS-STOF:** Water Supply Seminole Tribe of Florida



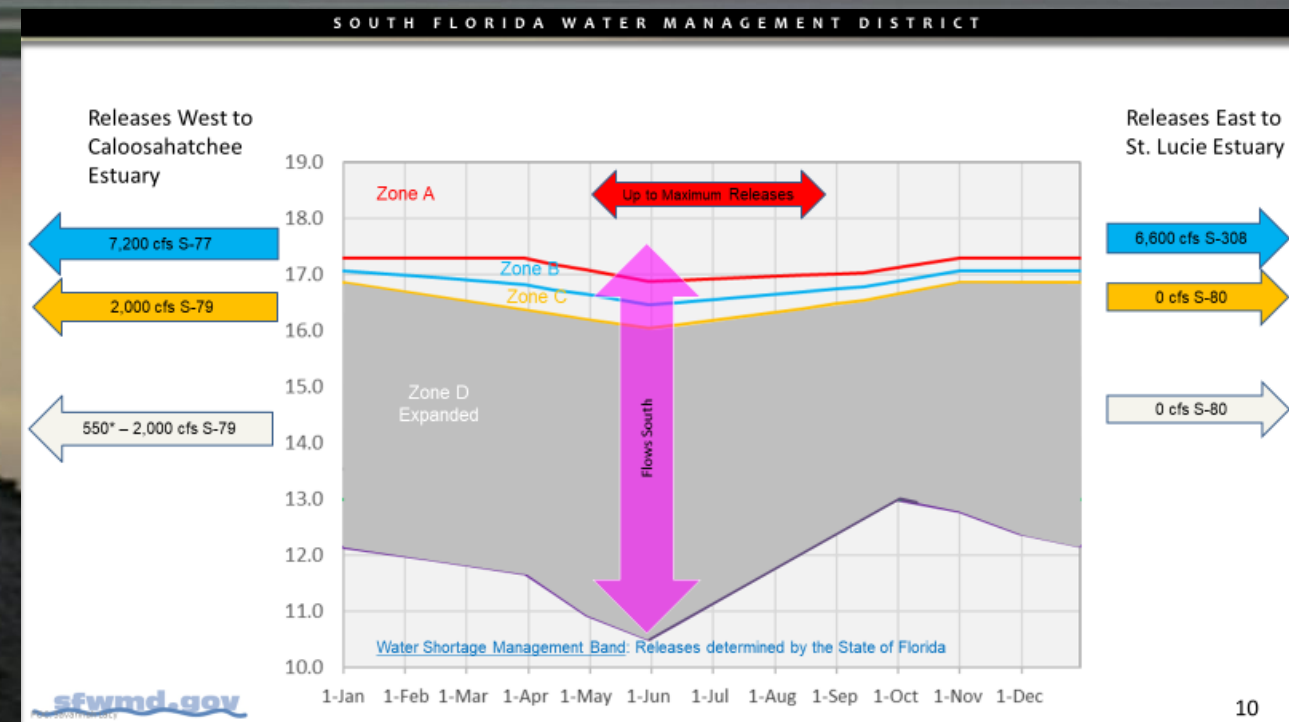
# District Efforts Since Workshop

- Tested different policies prior to optimization of LOSOM alternative schedules
- Explored different approaches to implement the Governing Board's policy statement and tradeoffs discussed at the June 29<sup>th</sup> LOSOM Workshop
- SR3.5 -- example run incorporating policy direction and tradeoffs



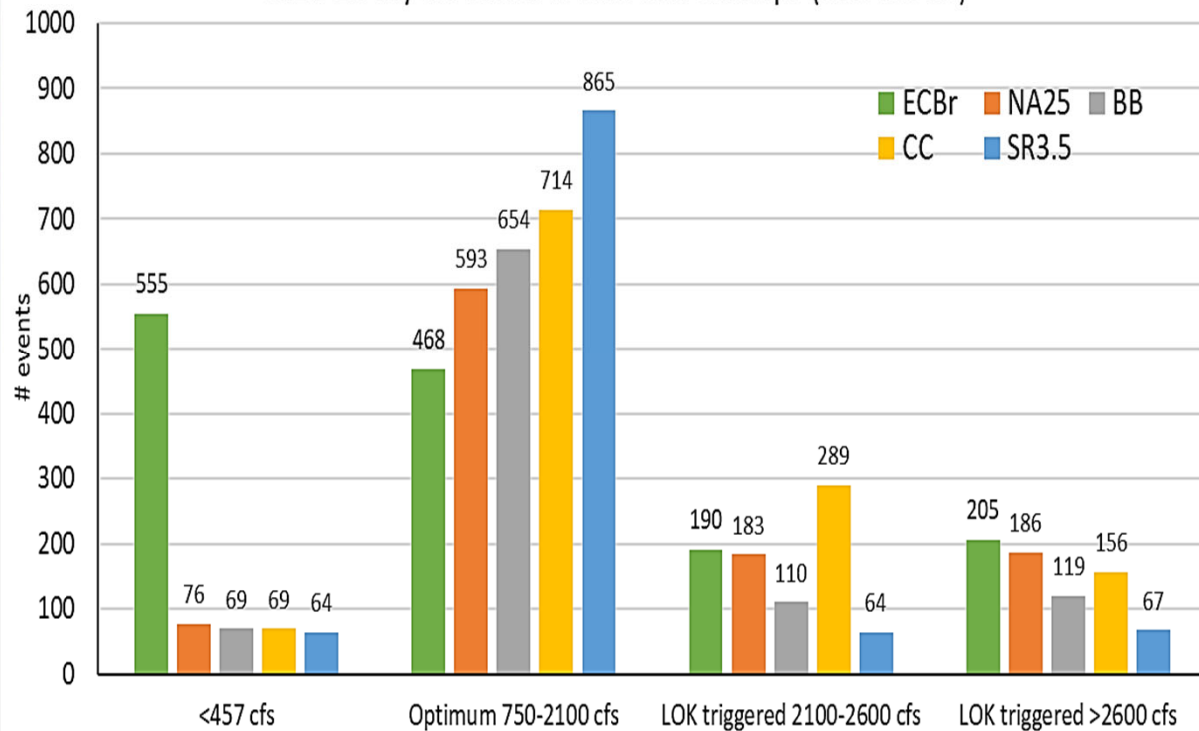
# District Modeling Efforts Since Workshop

- Improve optimal flows to Caloosahatchee and align discharge decisions
- Allow beneficial flow south and west until Lake reaches Lake Okeechobee Water Shortage Management Band
- Turn off flows to St. Lucie and minimize flows to Caloosahatchee in June, July, August
- Raise S-308 backflow line to allow water back into Lake from the C-44 basin (14.5 ft all year)
- Experiment with 1-day vs. 10-day pulses
- Test lake operations to maximize use of available storage

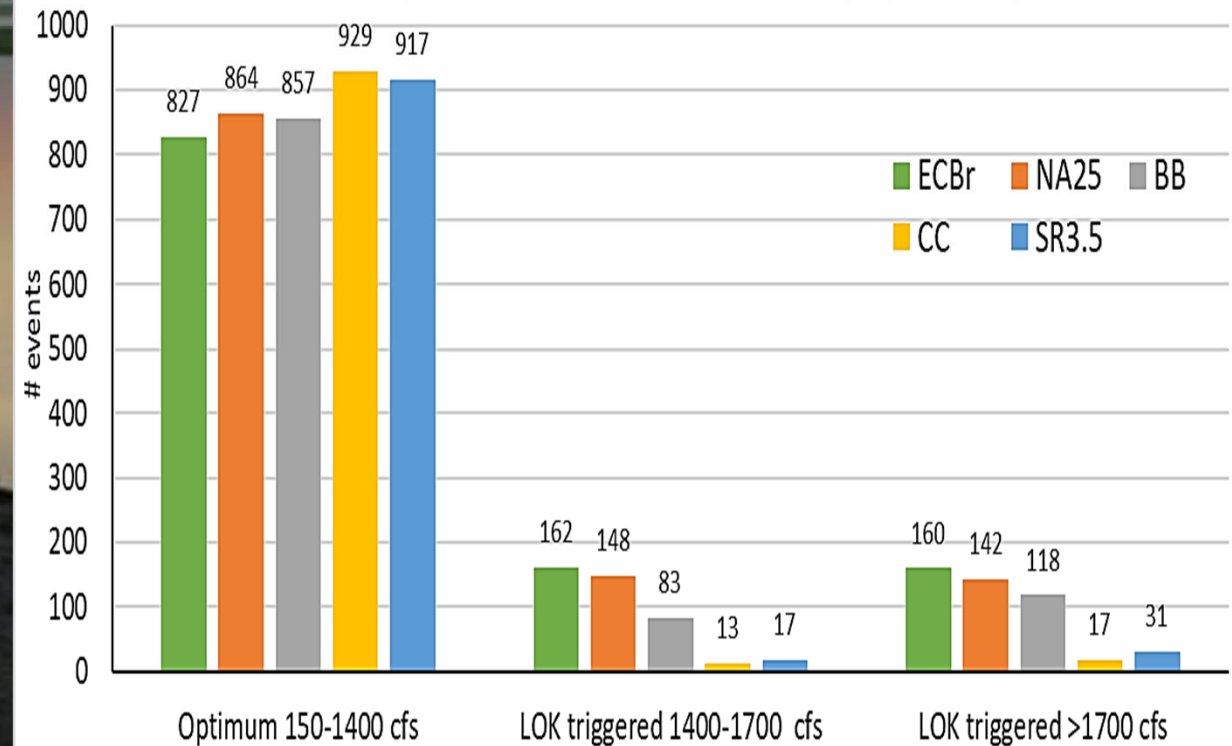


# Caloosahatchee & St. Lucie

CRE # 14-day ma events in each flow envelope (flow at S-79)

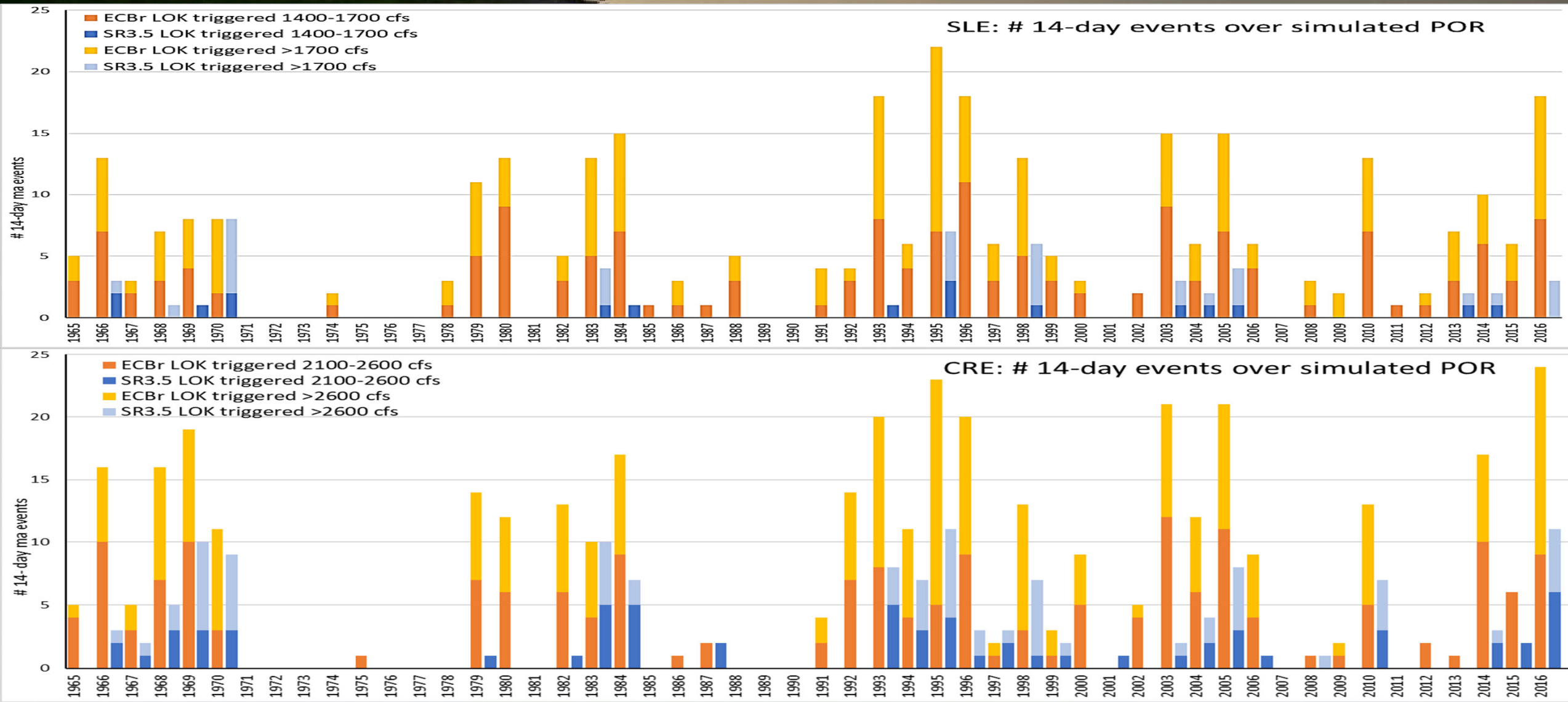


SLE # 14-day ma events within each flow envelope (total flow)

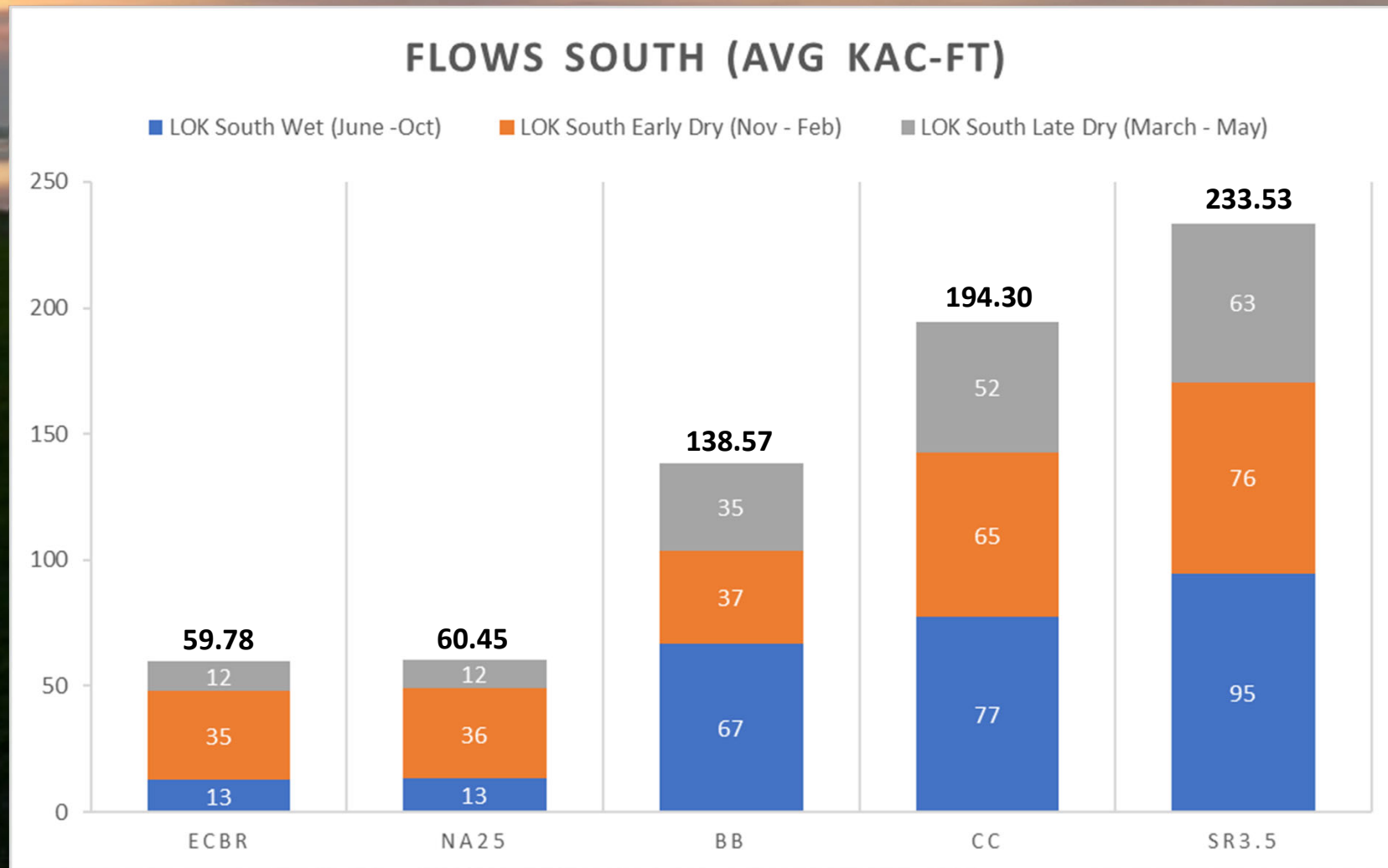




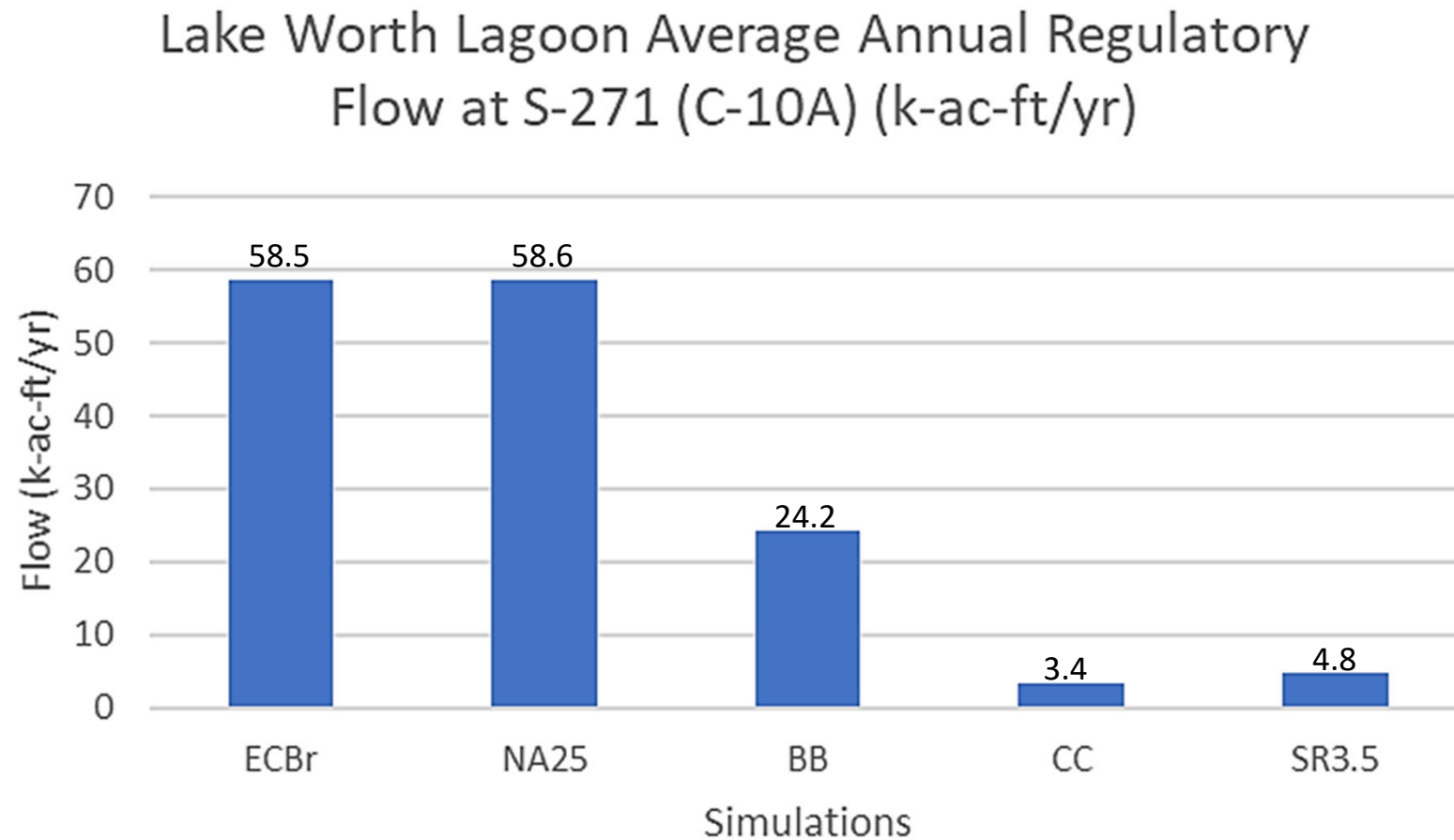
# Number of 2-Week Stress and Damaging Discharge Events Triggered by Lake Okeechobee Regulatory Releases



# Flows South



# Lake Worth Lagoon

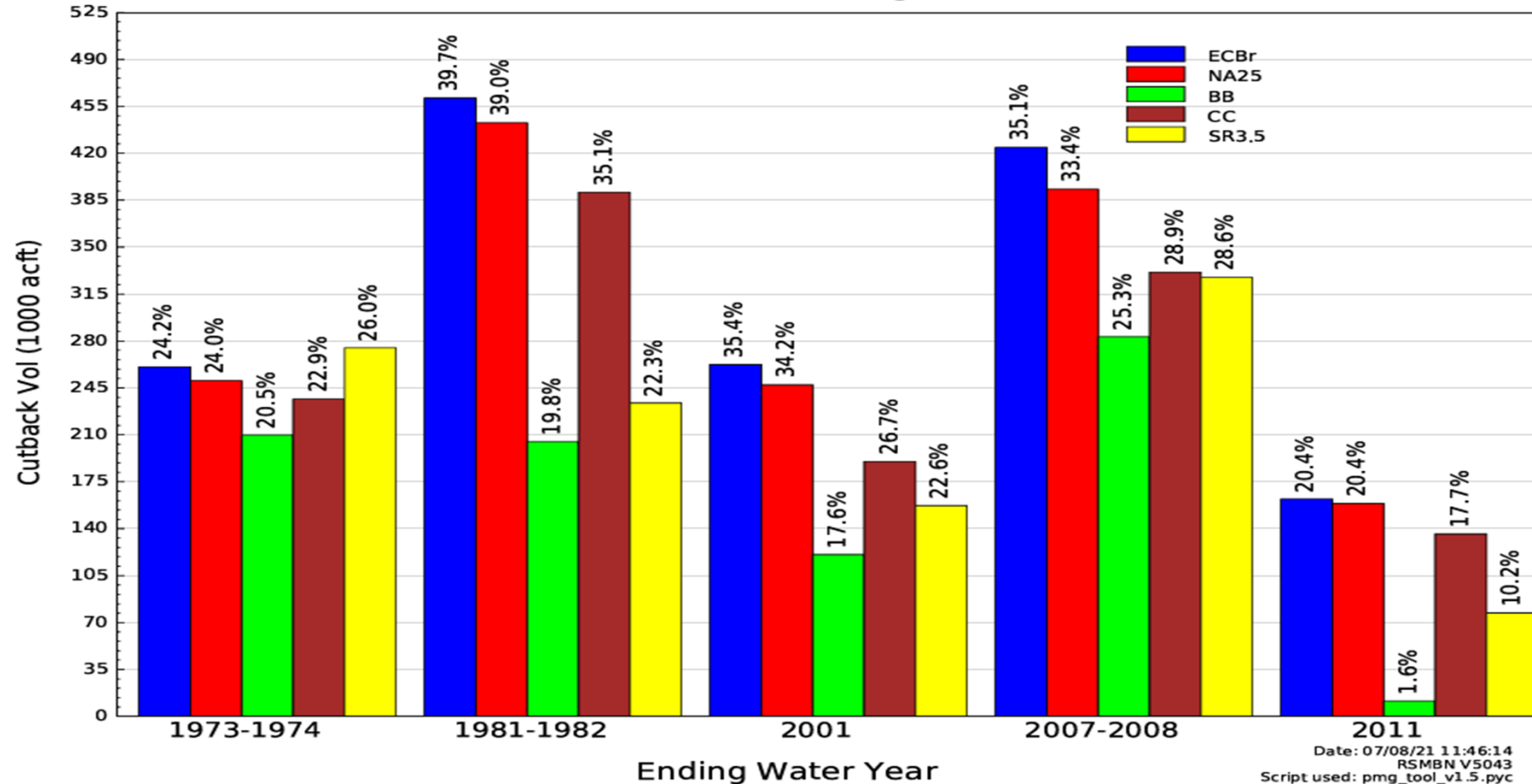




# Water Supply

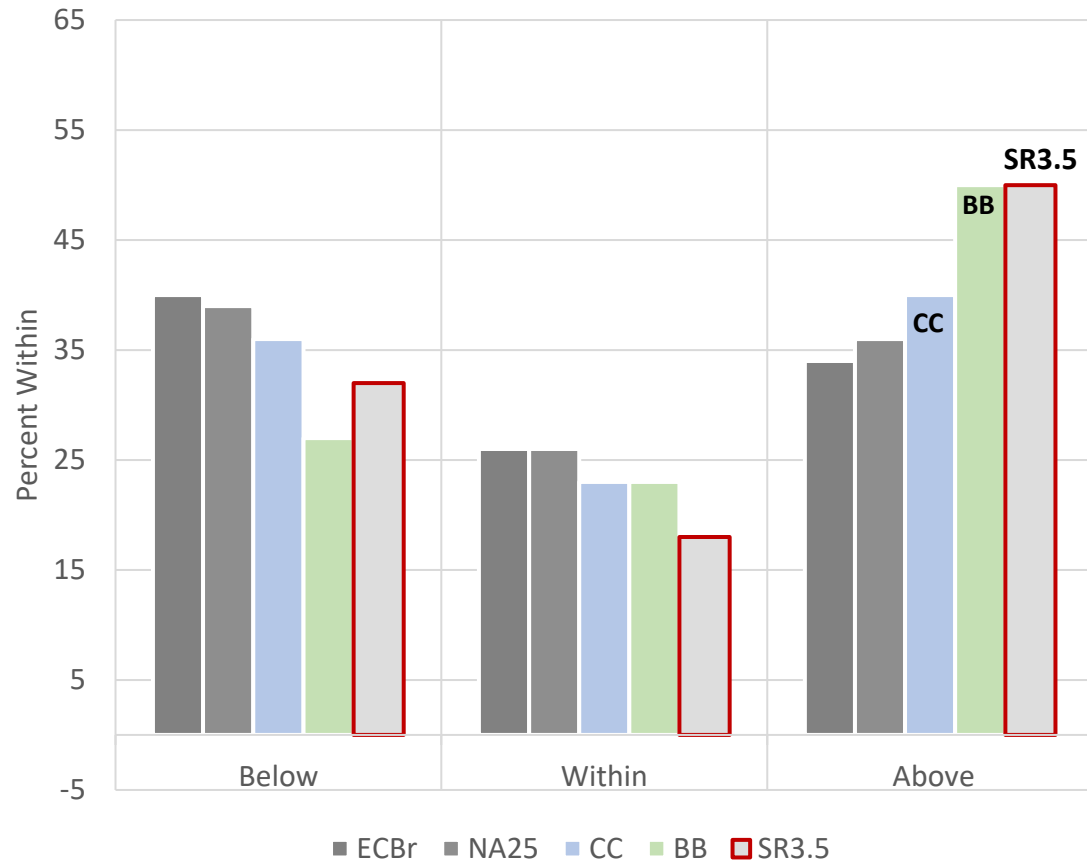
## Water Year (Oct-Sep) LOSA Demand Cutback Volumes

Simulation Periods with Largest Cutbacks



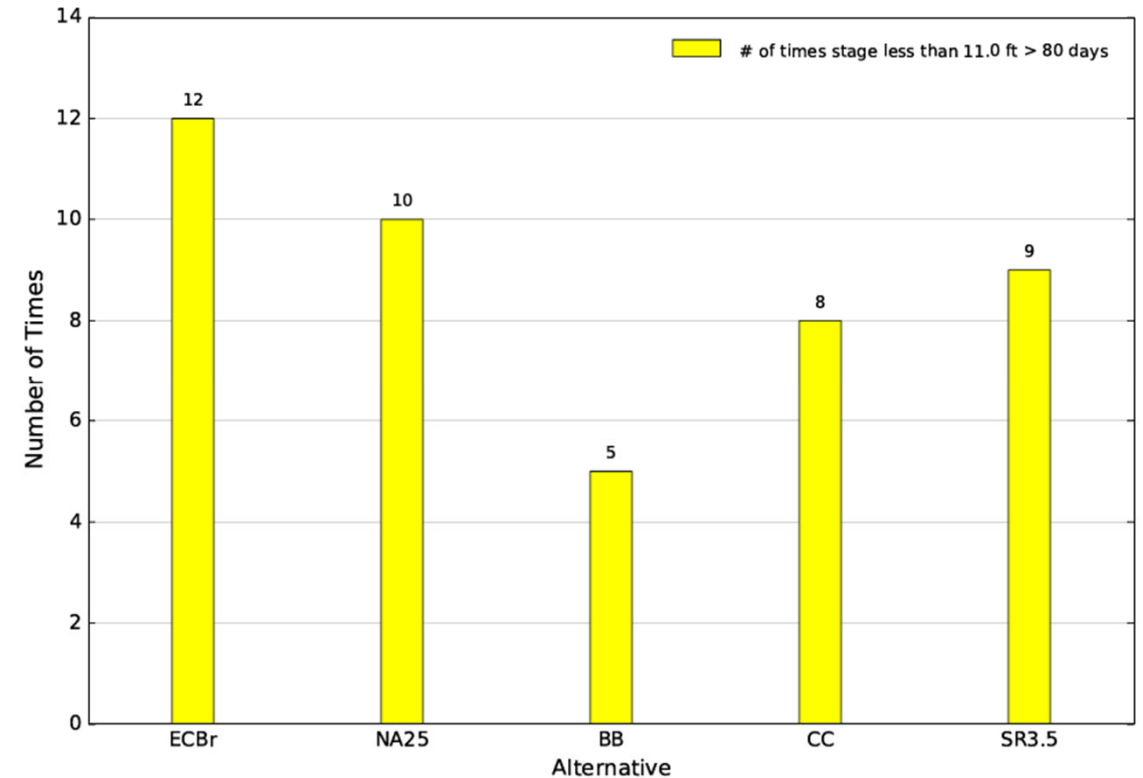
# Lake Okeechobee Stages Relative to Ecological Envelope

Percent Below, Within, and Above Envelope



Number of Times LOK Proposed Minimum Water Level and Duration

Criteria Exceeded During the 1965-2016 Simulation



Note: Target: Minimum Level, Duration and Return Frequency - Water levels in Lake Okeechobee should not fall below 11.0 ft NGVD for greater than 80 days for a checking window more often than once every six years (Target derived from 1952-1995 historical stage data for Lake Okeechobee).

RSMBN P.O.S. 1965-2016

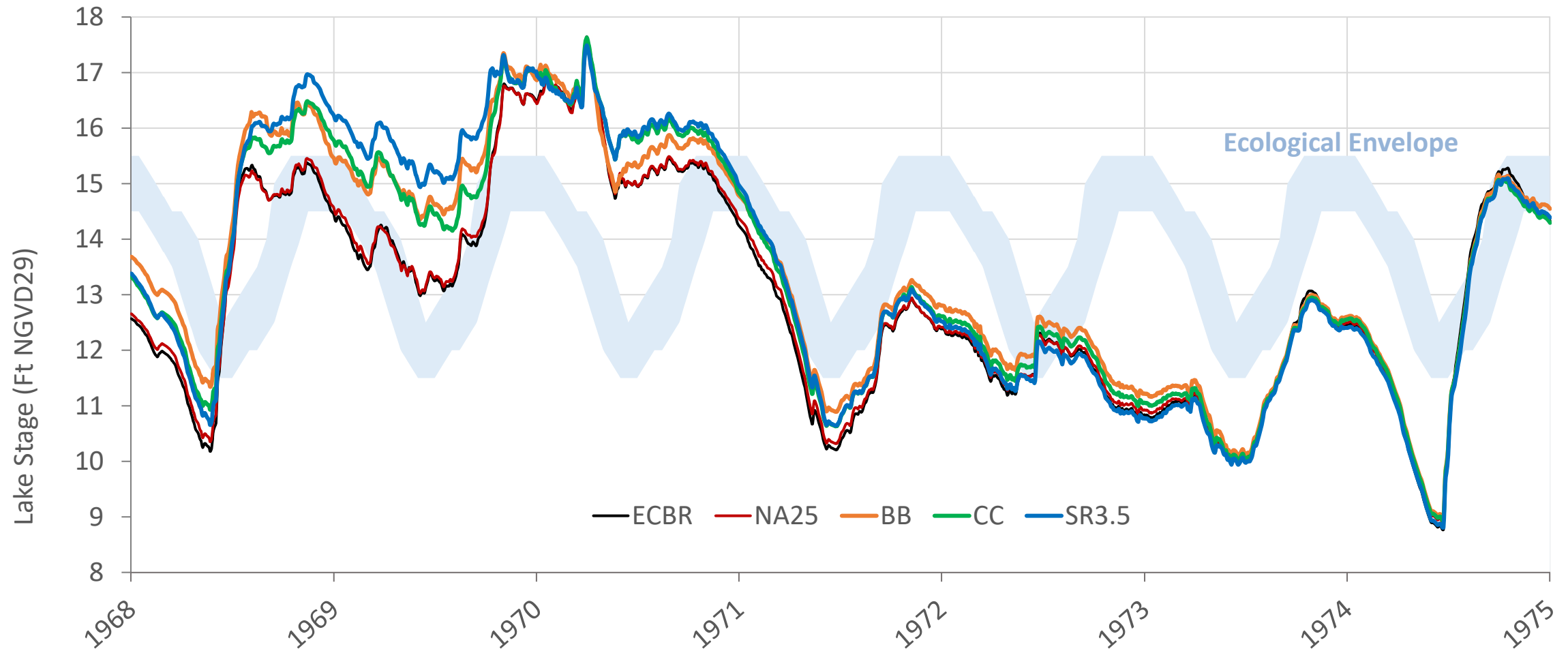
Date: 07/08/21 11:45:30

RSMBN V5043

Script used: pmg\_tool v1.5.pyc

Filename: pmg\_rsmbrn\_ECBR\_NA25\_BB\_CC\_SR3.5.xml

# Lake Okeechobee Modeled Stages 1968-1974





# Conservation & Recovery



Lake Stage 17.2 ft  
Indian Prairie Lake Okeechobee October 2017



Lake Stage 10.1 ft  
Indian Prairie Lake Okeechobee February 2008

# **Implementation Policy Considerations**

## **Building Upon CC (1 of 2)**

- **Minimize harmful Lake flows to the Caloosahatchee, St. Lucie, and Lake Worth Lagoon.**
- **Promote environmentally-beneficial flows south to the Everglades and west to the Caloosahatchee until Lake Okeechobee reaches the Water Shortage Management Band.**
- **Turn off flows to the St. Lucie and minimize flows to the Caloosahatchee in June, July, and August to minimize algae discharge.**
- **At any time when considering regulatory releases through the S-79, S-80, and S-155A, include the ability to not discharge water when harmful algae blooms are present.**
- **Defer to SFWMD managers to decide the delivery rate to the Everglades for permit compliance responsibilities and health of the STAs.**



# Implementation Policy Considerations

## Building Upon CC (2 of 2)

- Provide for Lake Okeechobee recovery operations if lake has experienced high and damaging lake levels for more than one year in a row.
- Provide for water conservation measures when lake levels are forecasted to enter a dry period, which would lead to entering into the water shortage management band.

***Remember: Expeditiously building CERP should remain a top priority to gain even greater benefits for the environment and society.***

Jaycee Park on  
north shore of  
Lake Okeechobee

# Board Direction

