Lake Okeechobee System Operating Manual

Sanibel-Captiva Conservation Foundation

Conservancy of Southwest Florida

August 31, 2021

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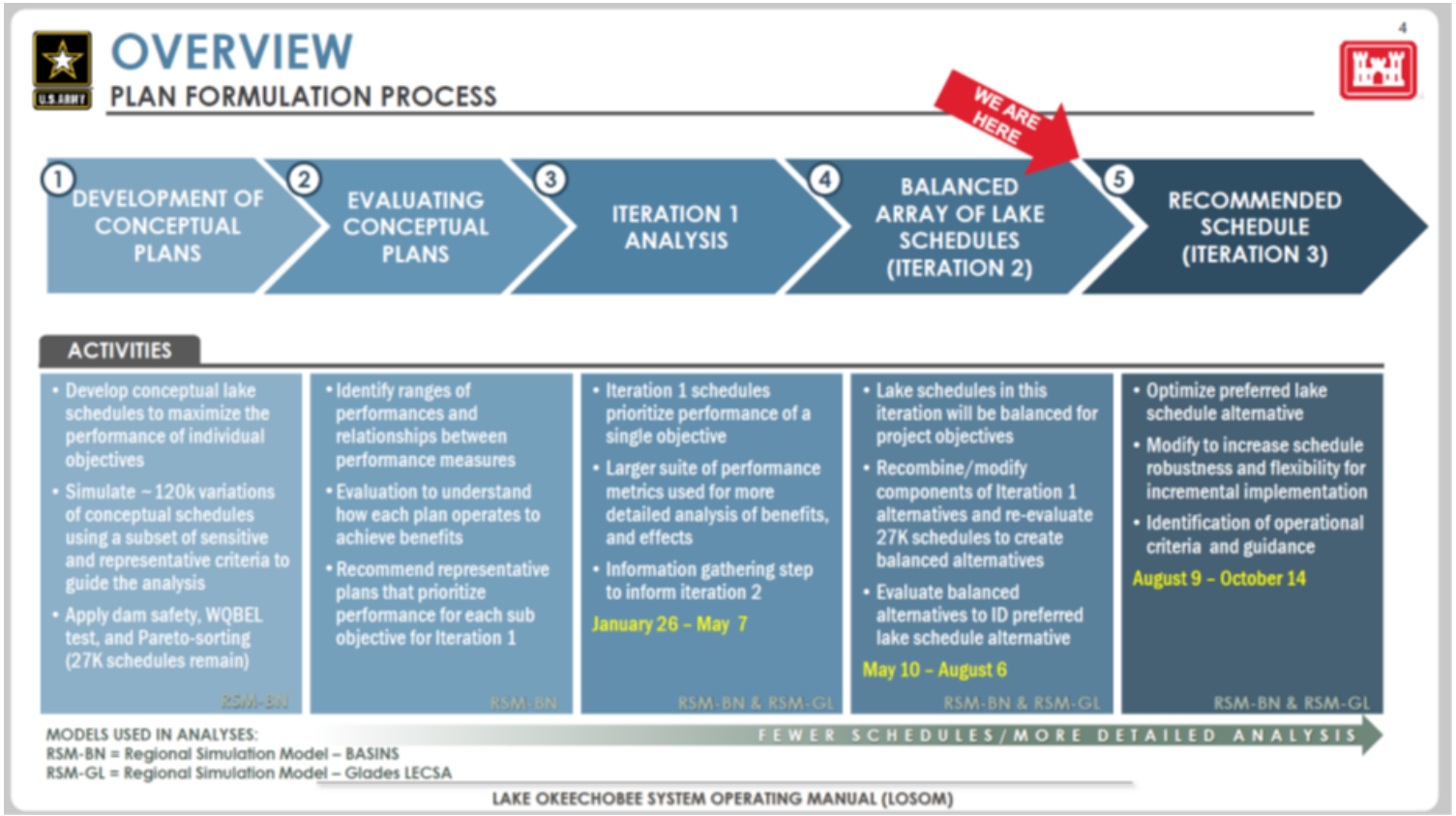
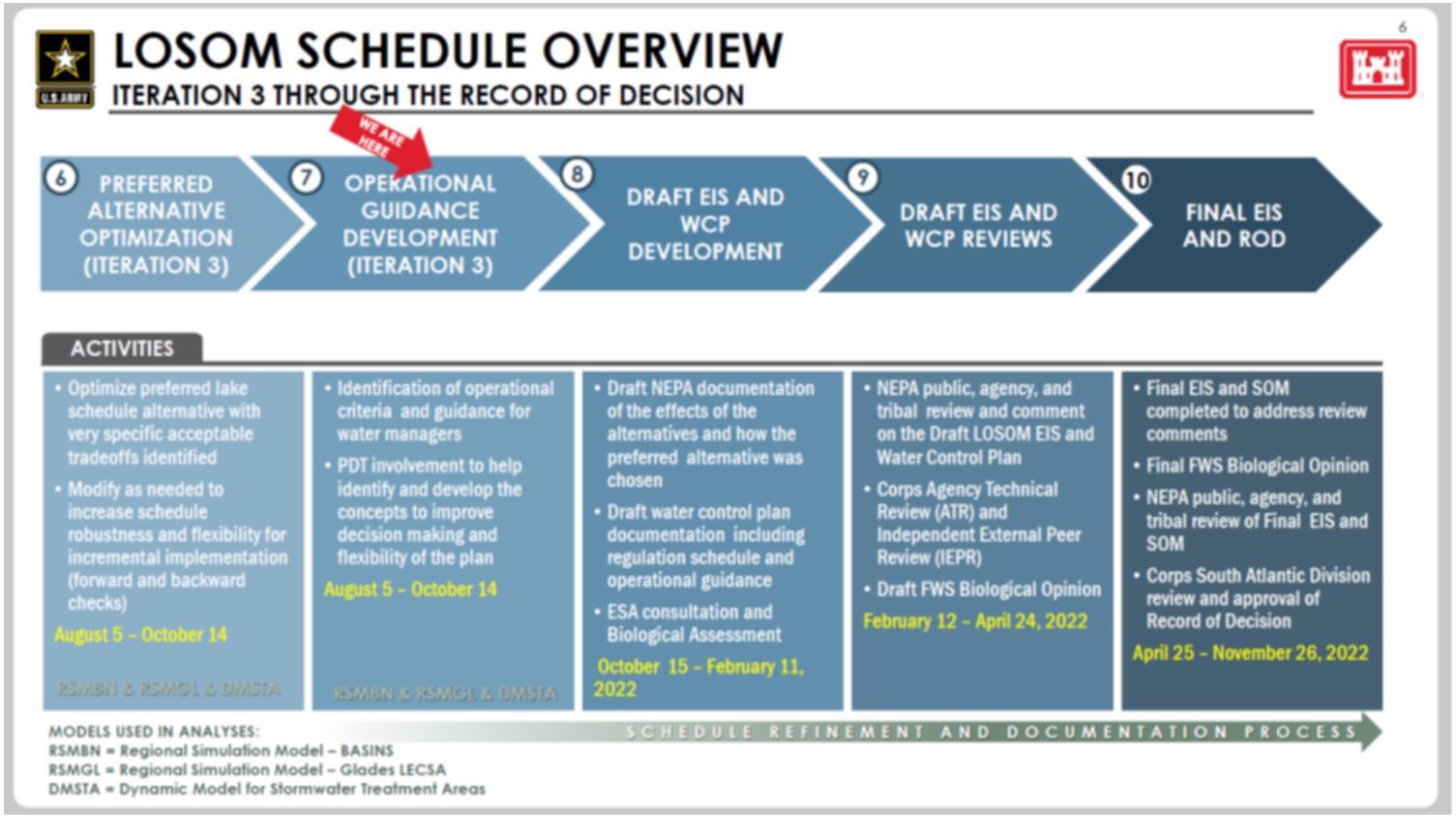
LOSOM Process and Timeline

- LOSOM process started with Scoping Meetings - Feb 2019
- LOSOM Public Workshops – Sept 2019



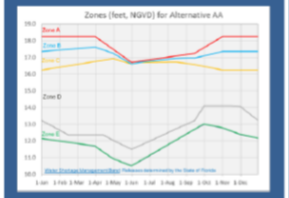
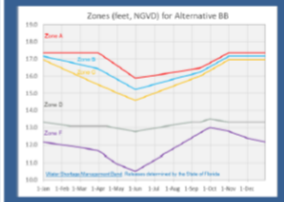
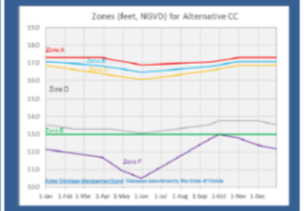
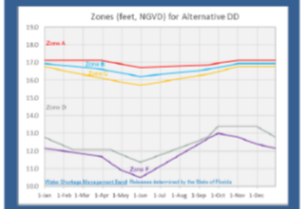
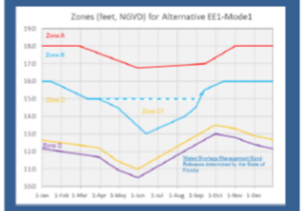
From USACE PDT 09 Aug 2021 meeting presentation

LOSOM Process and Timeline



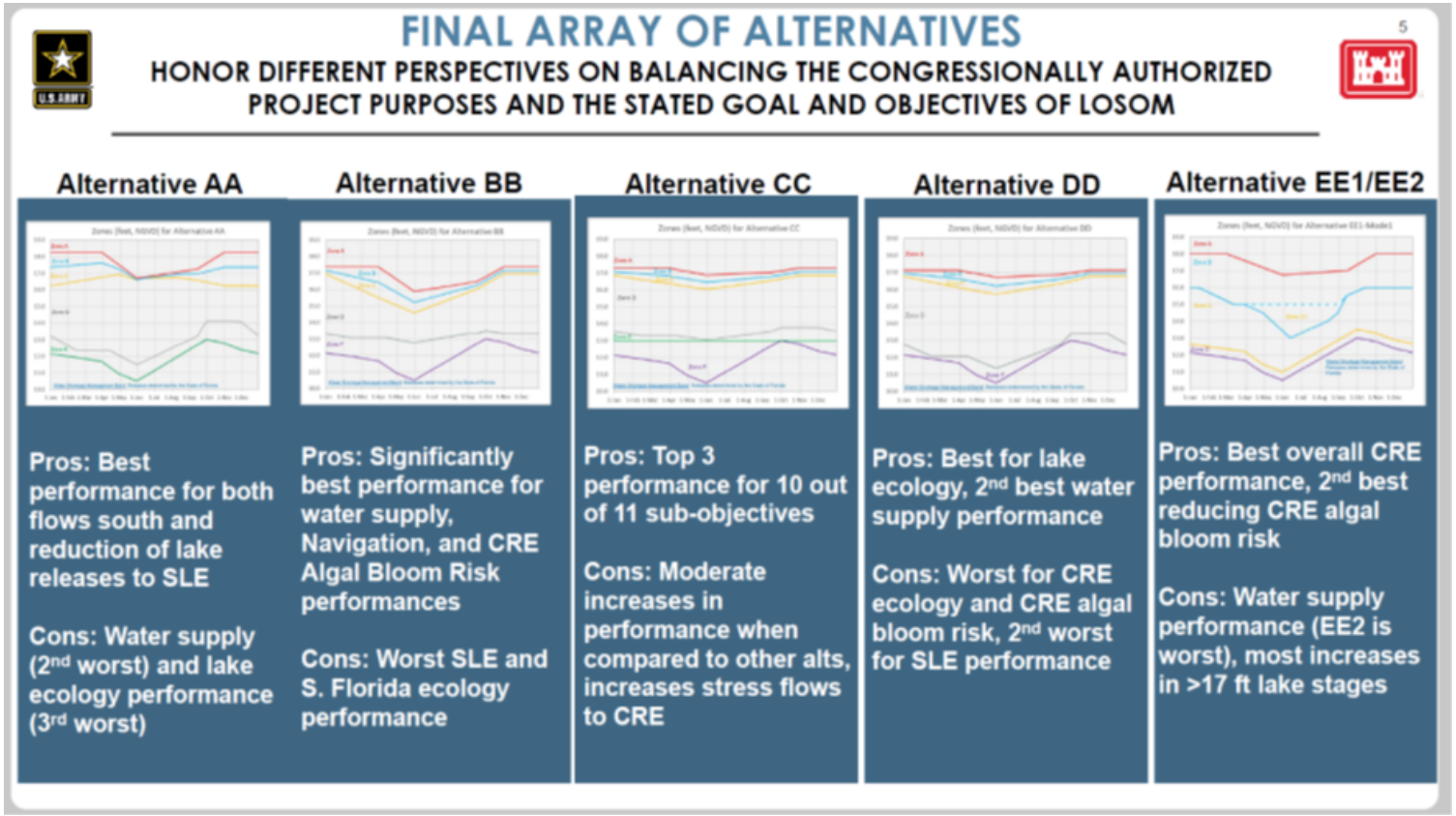
From USACE PDT 25 Aug 2021 meeting presentation

Iteration 2 - Model Alternative

Alternative AA	Alternative BB	Alternative CC	Alternative DD	Alternative EE1 & EE2
				
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.	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.	• 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	Honors the perspective on balance that each of the LOSOM objectives should be incrementally improved over LORS08 performance	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
Favors St Lucie & Flows south with benefits to Water Supply	Favors Recreation & Water Supply	Favors St Lucie & (to some degree) Caloosahatchee	Similar to LORS08 Favors Lake	New water management concept – operational flexibility

From SFWMD 08 July 2021 Governing Board meeting presentation

Iteration 2 - Model Alternative



From USACE PDT 19 July 2021 meeting presentation

Baslines

Future Without (FWO) - NA25

- Lake Schedule - LORS08
- Flows South - COP + A-2 STA
- HHD Rehab Complete
- KRR Complete
- C44 & C43 Reservoirs - Operational
- C23/C24 STA - Complete
- CEPP South - Removal of Old TT + CEPP structures
- WCA3A Regulation Schedule - COP

Existing Condition - ECBr

- Lake Schedule - LORS08
- Flows South - 60k ac-ft (average annual flow to central flowpath)
- Partial HHD Rehab
- KRR as of 2019 (**not** complete)
- C44 & C43 Reservoirs - **Not** Operational
- C23/C24 STA - **Not** Operational
- CEPP South - **Not** Operational
- WCA3A Regulation Schedule - ERTP & L29 Constraint

Average annual regulatory flows (QFC flow tag; CRE: S77; SLE: S308) and stress and damaging events based on RECOVER salinity envelope 14-day event counts for Caloosatchee and St Lucie estuaries.

		Summarized Data					Percent Different from FWO				
Estuary	Alt	Regulatory Flows (kacft/yr)	Stress Events From LOK [3]	Stress Events From Basin [3]	Damaging Events From LOK [4]	Damaging Events From Basin [4]	Regulatory Flows (kacft/yr)	Stress Events From LOK [3]	Stress Events From Basin [3]	Damaging Events From LOK [4]	Damaging Events From Basin [4]
CRE [1]	NA25 [2]	528	183	118	186	173					
	ECBr	515	190	153	205	225	**-2.5**	**3.8**	**29.7**	**10.2**	**30.1**
	CC	578	289	89	156	174	**9.5**	**57.9**	**-24.6**	**-16.1**	**0.6**
SLE [1]	NA25 [2]	187	148	210	142	428					
	ECBr	231	162	186	160	432	**23.0**	**9.5**	**-11.4**	**12.7**	**0.9**
	CC	72	13	308	17	469	**-61.7**	**-91.2**	**46.7**	**-88.0**	**9.6**

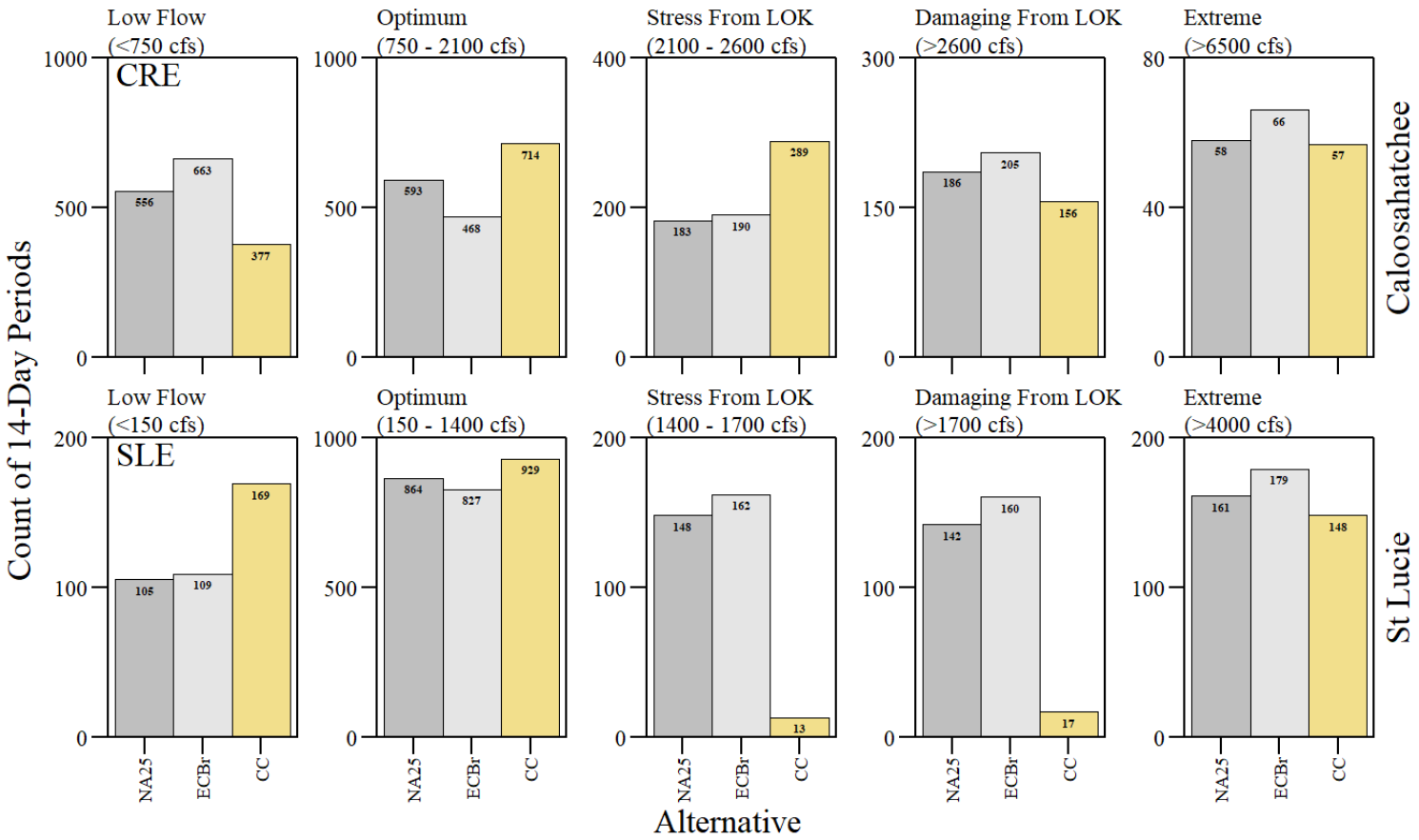
[1] CRE: Caloosahatchee Estuary; SLE: St Lucie Estuary; [2] NA25 = Future without project (FWO)

[3] **Stressful Flows:** CRE: ≥ 2100 cfs & < 2600 cfs; SLE: ≥ 1400 cfs & < 1700 cfs

[4] **Damaging Flows:** CRE: > 2600 cfs; SLE:> 1700 cfs

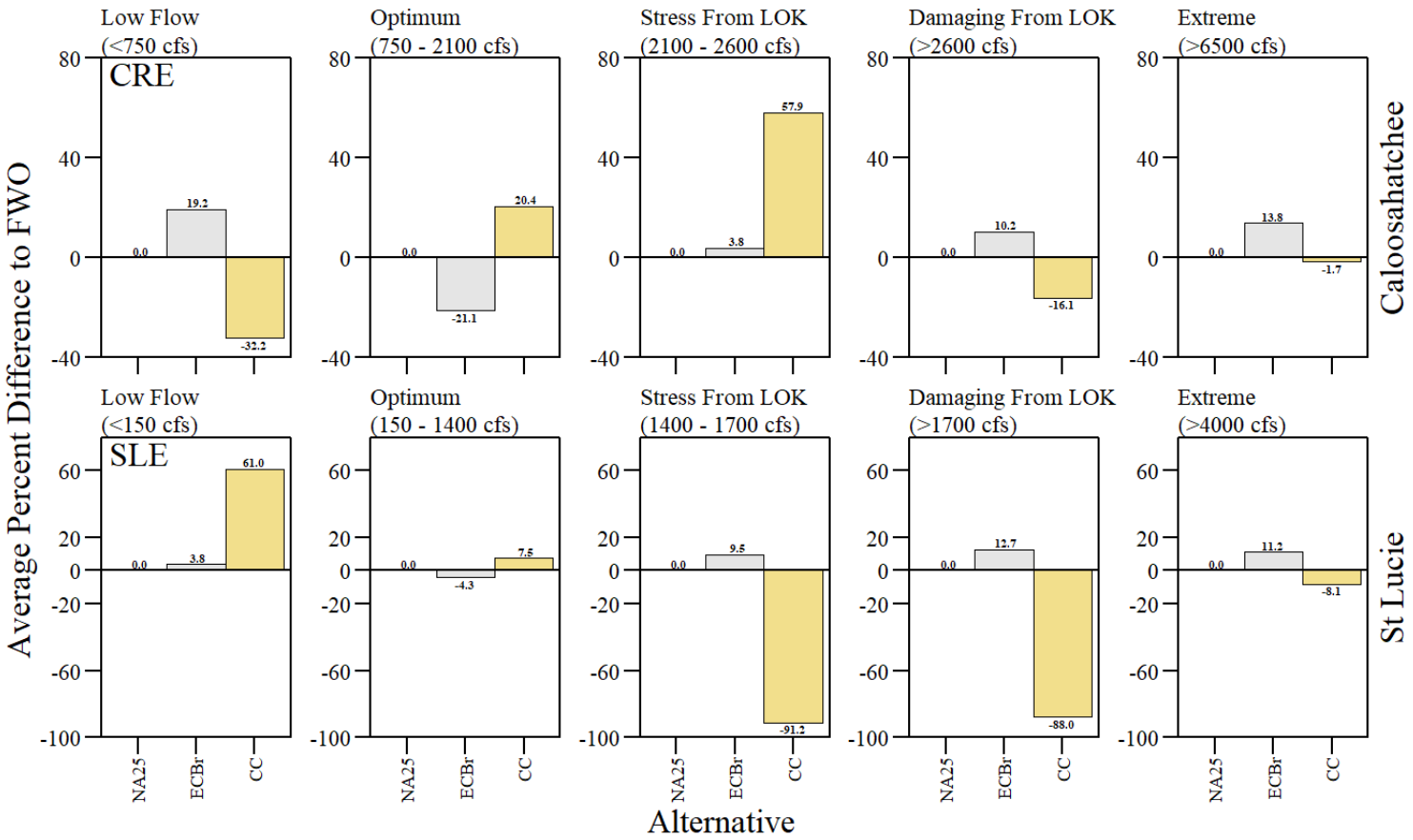
Data Source: USACE and SFWMD Interagency Modeling Center

RECOVER Metric



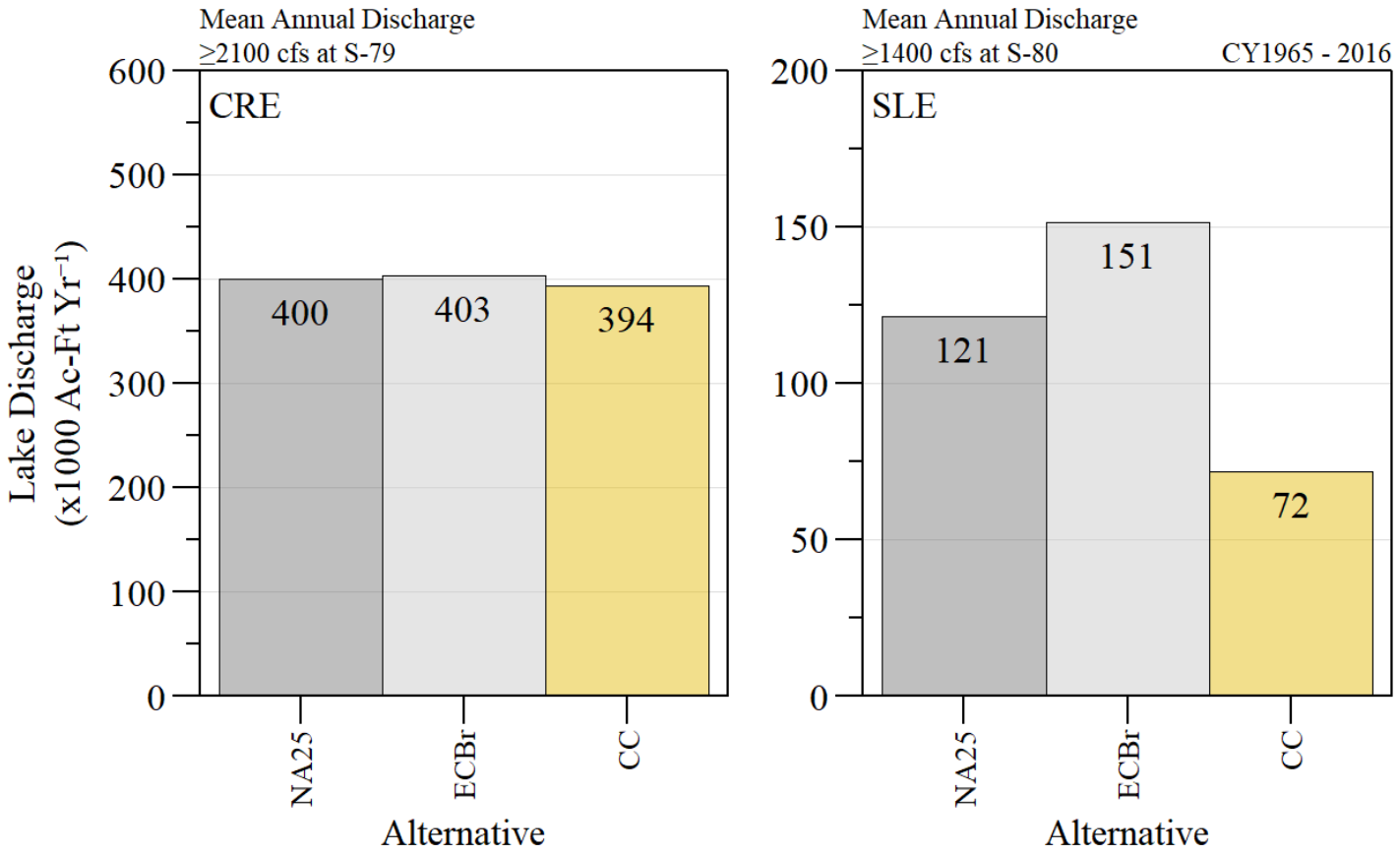
RECOVER salinity envelope evaluation during the simulation period of record for Caloosahatchee (top) and St Lucie (bottom) estuaries.

RECOVER Metric



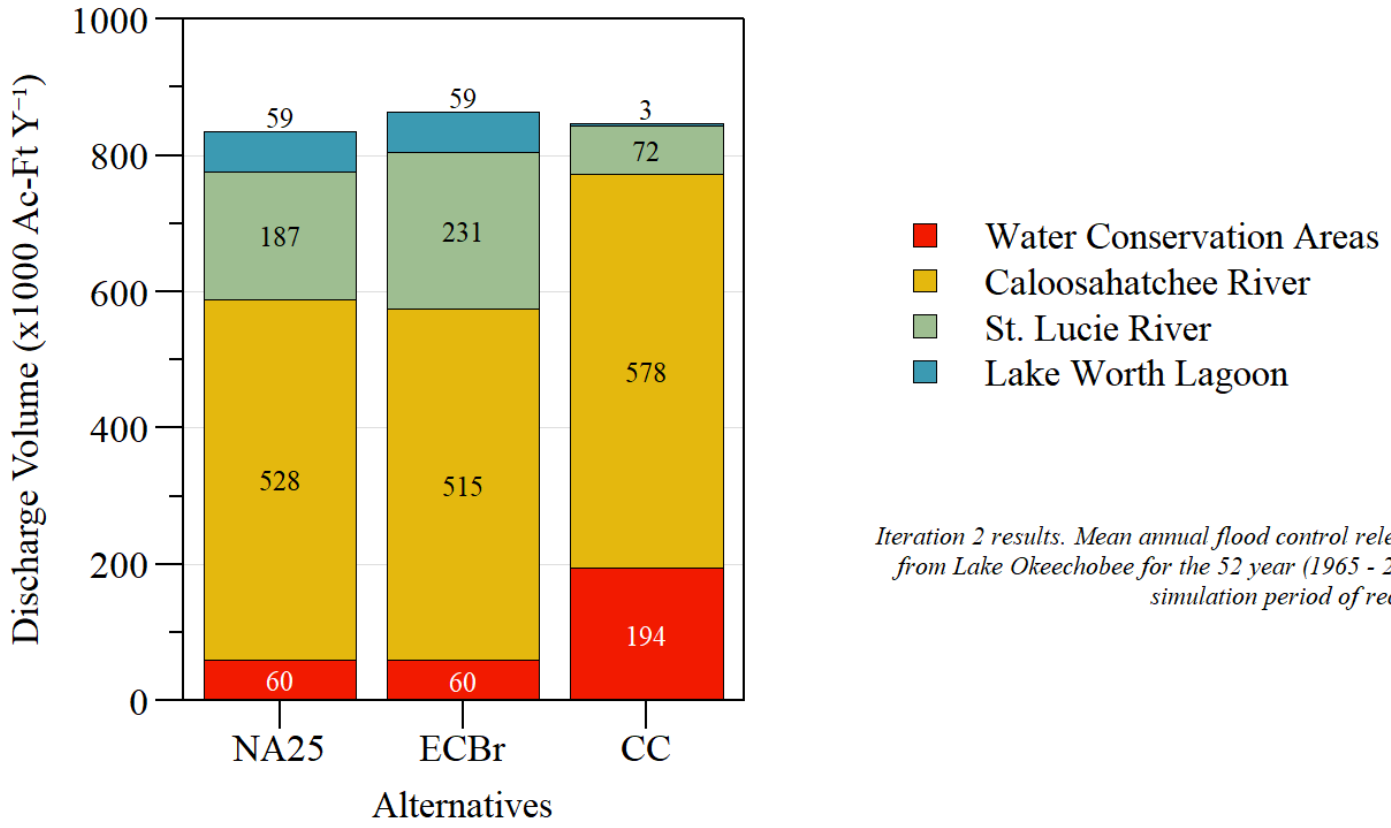
RECOVER salinity envelope evaluation relative to FWO (NA25) during the simulation period of record for Caloosahatchee (top) and St Lucie (bottom) estuaries.

Lake Discharges



Average annual lake discharge volume over the simulation period of record when stress and damaging discharge at S79 and S80, respectively.

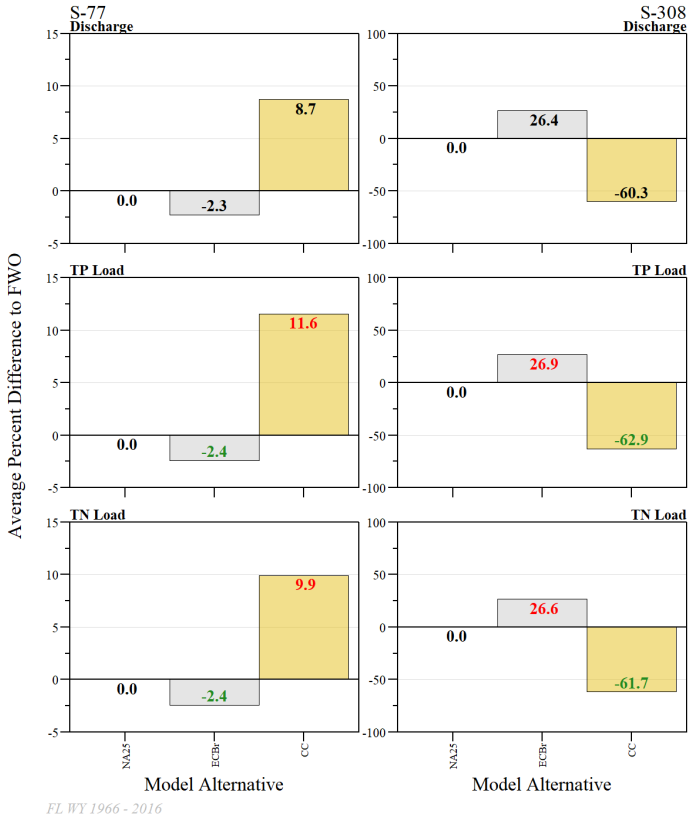
Flood control discharges



Iteration 2 results. Mean annual flood control releases from Lake Okeechobee for the 52 year (1965 - 2016) simulation period of record.

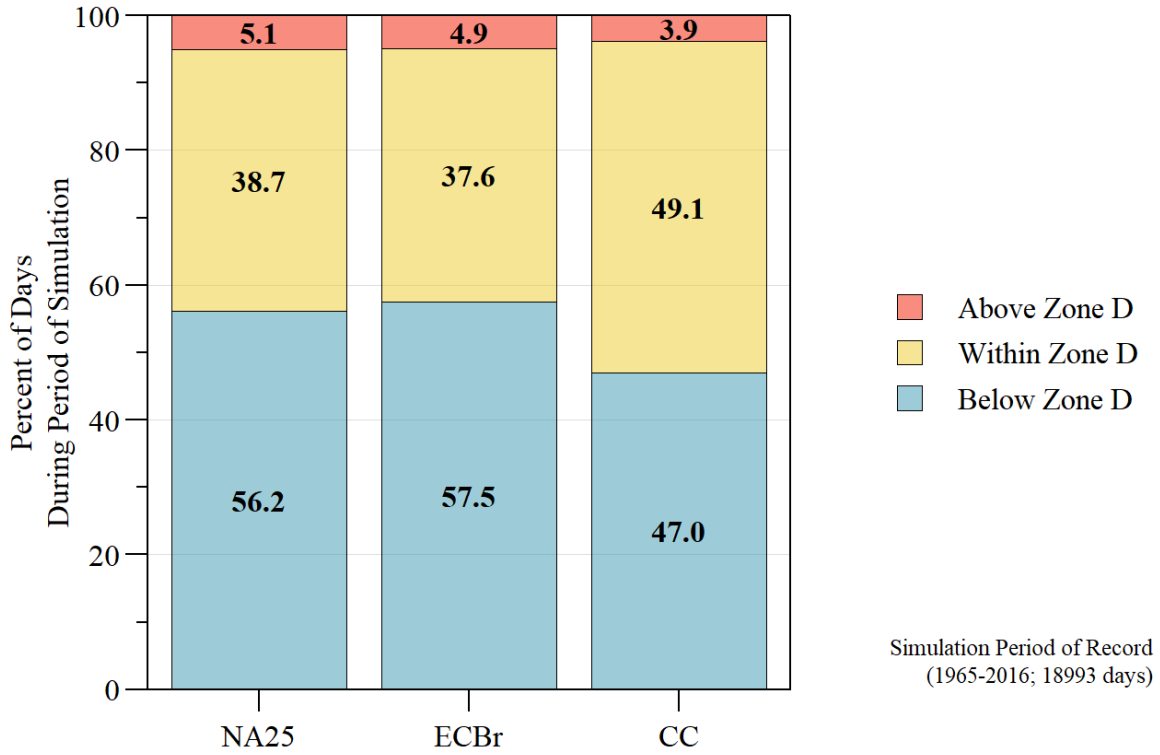
Average annual flood control discharges from Lake Okeechobee to Water Conservation Areas and Northern Estuaries over the simulation period of record.

Load



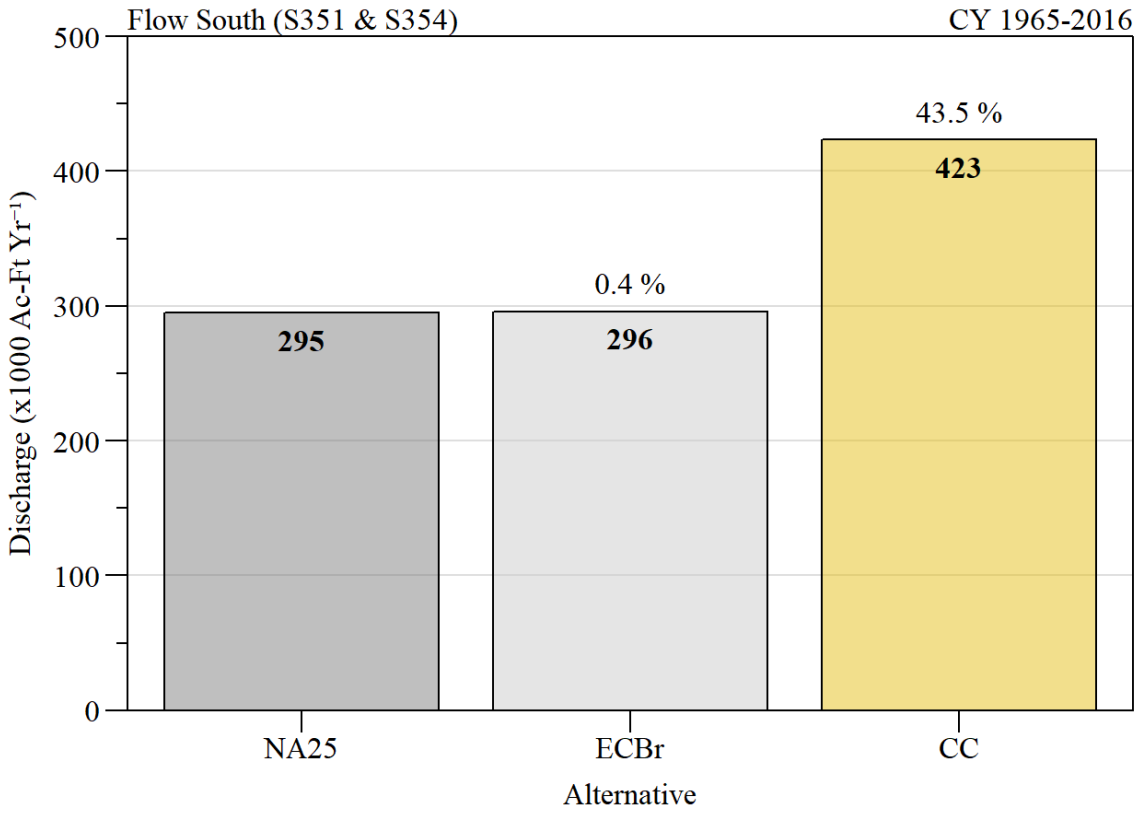
Average percent difference from FWO (NA25) for discharge and estimated nutrient loads over the May 1965 - April 2016 (FL WY 1966 - 2016) period of simulation.

Lake Okeechobee Regulation Schedule



Percent of time above, within, and below Zone D of the regulation schedule.

Flows South



Average annual discharge volume for NA25 (Future Without), ECBR (Existing Condition) and CC (selected alternative) during the simulated period of record.

Back Flow/Pump

Average annual load and average percent change relative to FWO (NA25) over the simulation period or record between May 1965 and April 2016 for back flow/pumping from S77, S308 and EAA (S2, S3 and S4) to Lake Okeechobee.

		Average Annual[1]				% Change Compare to FWO		
Area	Alt[1]	Percent Total Inflow Water Budget[1]	Discharge (kAcf-Ft WY^{-1})[1]	TP Load (kg WY^{-1})	TN Load (kg WY^{-1})	Discharge	TP Load	TN Load
S77	NA25	1.8%	34.0	5957	70334	---	---	---
	ECBr	1.8%	35.2	6370	74002	3.7	6.9	5.2
	CC	1.6%	31.5	5839	66730	-7.3	-2.0	-5.1
S308	NA25	2.1%	38.8	9894	84024	---	---	---
	ECBr	2.4%	45.9	11421	96162	18.2	15.4	14.4
	CC	2.4%	45.6	11882	101066	17.5	20.1	20.3
EAA	NA25	2.5%	47.3	13790	169512	---	---	---
	ECBr	2.7%	52.8	14516	187490	11.7	5.3	10.6
	CC	3.4%	64.4	15760	228985	36.2	14.3	35.1

[1]Simulation period of record between Florida Water Year 1966 - 2016 (May 1965 - April 2016)

Extra Information

Daily count of low, optimum, stress and damaging flow events for Caloosatchee and St Lucie estuaries.

		Summarized Data						Percent Different from FWO					
Estuary	Alt	Low Events	Optimum Events	Stress Events From LOK	Stress Events From Basin	Damaging Events From LOK	Damaging Events From Basin	Low Events	Optimum Events	Stress Events From LOK	Stress Events From Basin	Damaging Events From LOK	Damaging Events From Basin
CRE [1]	NA25 [2]	7743	6344	261	488	1988	2169	---	---	---	---	---	---
	ECBr	9354	3769	246	706	2015	2903	20.8	-40.6	-5.7	44.7	1.4	33.8
	CC	5058	8420	450	519	2199	2347	-34.7	32.7	72.4	6.4	10.6	8.2
SLE [1]	NA25 [2]	1943	10112	388	593	1444	4513	---	---	---	---	---	---
	ECBr	2045	9725	405	516	1567	4735	5.2	-3.8	4.4	-13.0	8.5	4.9
	CC	3110	10433	0	759	201	4490	60.1	3.2	-100.0	28.0	-86.1	-0.5

[1] CRE: Caloosahatchee Estuary; SLE: St Lucie Estuary; [2] NA25 = Future without project (FWO)

Low Flows CRE: < 750 cfs; SLE: < 150 cfs

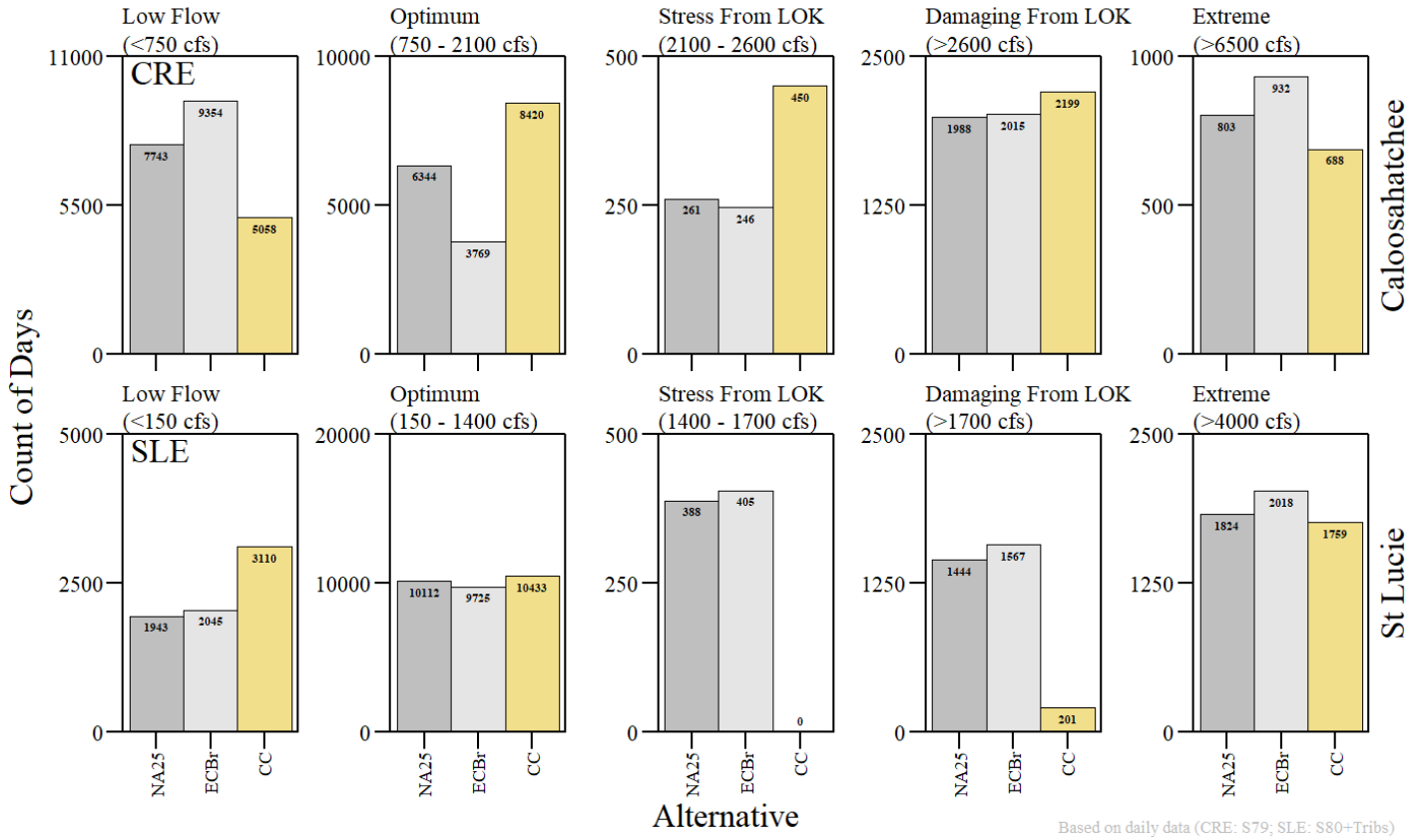
Optimum Flows CRE: ≥ 750 cfs & < 2100 cfs; SLE: ≥ 150 cfs & < 1400 cfs cfs

Stressful Flows CRE: ≥ 2100 cfs & < 2600 cfs; SLE: ≥ 1400 cfs & < 1700 cfs

Damaging Flows CRE: > 2600 cfs; SLE:> 1700 cfs

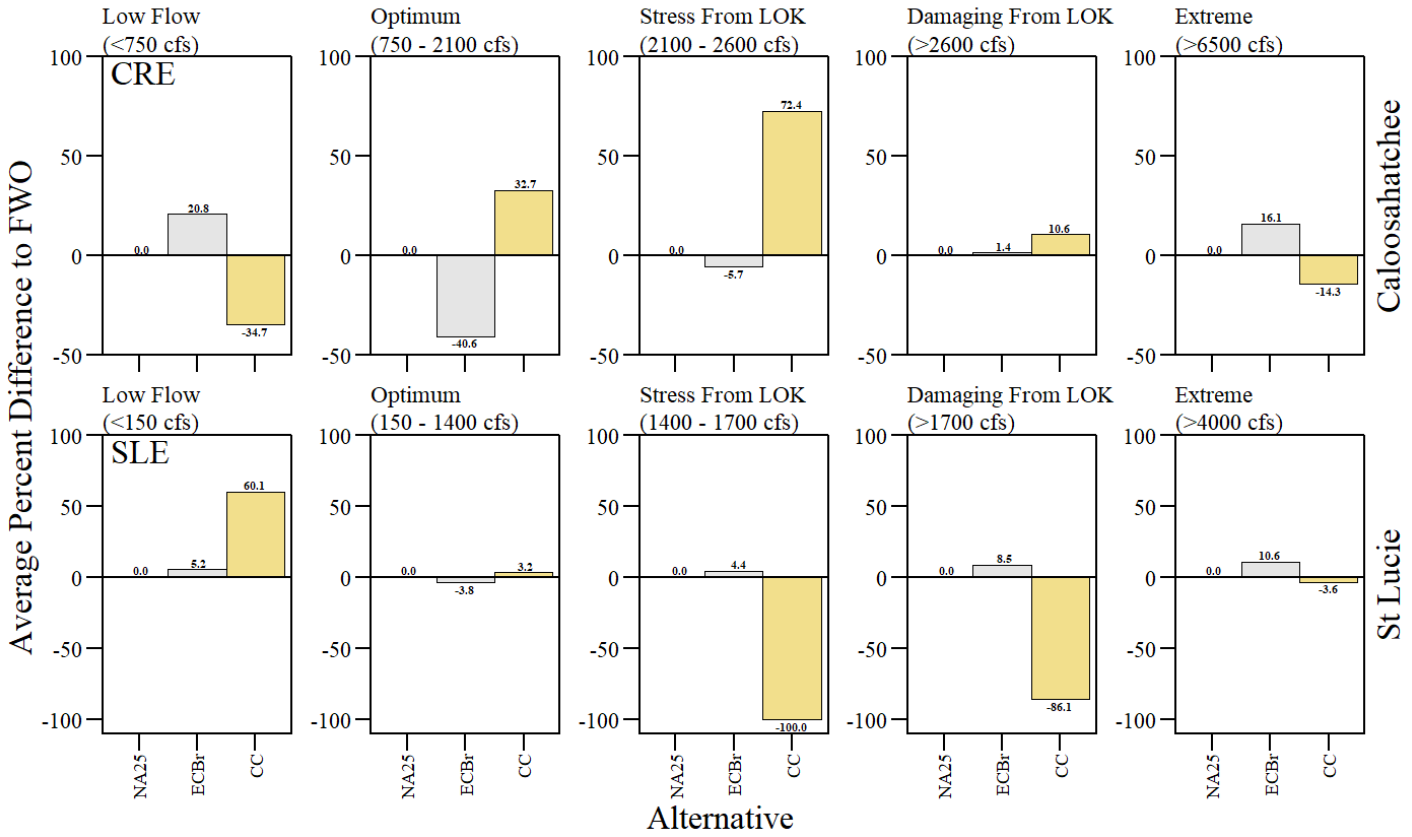
Data Source: USACE and SFWMD Interagency Modeling Center

Daily Metric



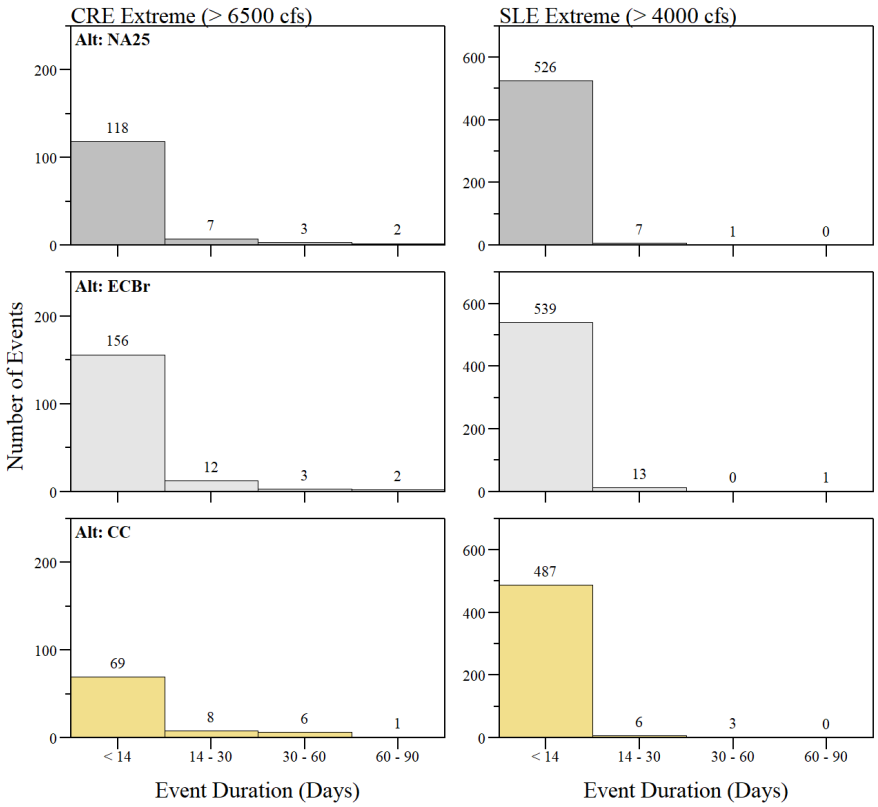
Daily salinity envelope evaluation during the simulation period of record for Caloosahatchee (top) and St Lucie (bottom) estuaries. Low, Optimum and Extreme events are from all sources.

Daily Metric



Daily salinity envelope evaluation relative to FWO (NA25) during the simulation period of record for Caloosahatchee (top) and St Lucie (bottom) estuaries. Low, Optimum and Extreme events are from all sources.

Daily Metric - Extreme Events



Number and duration of events where daily discharge for CRE and SLE fall within the extreme (CRE: >6500 cfs; SLE: >4000 cfs).

Monthly count of low, optimum, stress and damaging flow events for Caloosatchee and St Lucie estuaries based on monthly mean discharge data.

		Summarized Data						Percent Different from FWO					
Estuary	Alt	Low Events	Optimum Events	Stress Events From LOK	Stress Events From Basin	Damaging Events From LOK	Damaging Events From Basin	Low Events	Optimum Events	Stress Events From LOK	Stress Events From Basin	Damaging Events From LOK	Damaging Events From Basin
CRE [1]	NA25 [2]	212	225	37	19	70	61	---	---	---	---	---	---
	ECBr	253	153	33	25	76	84	19.3	-32.0	-10.8	31.6	8.6	37.7
	CC	149	243	96	15	54	67	-29.7	8.0	159.5	-21.1	-22.9	9.8
SLE [1]	NA25 [2]	23	314	31	35	46	175	---	---	---	---	---	---
	ECBr	23	308	30	26	47	190	0.0	-1.9	-3.2	-25.7	2.2	8.6
	CC	30	363	0	47	8	176	30.4	15.6	-100.0	34.3	-82.6	0.6

[1] CRE: Caloosahatchee Estuary; SLE: St Lucie Estuary; [2] NA25 = Future without project (FWO)

Low Flows CRE: < 750 cfs; SLE: < 150 cfs

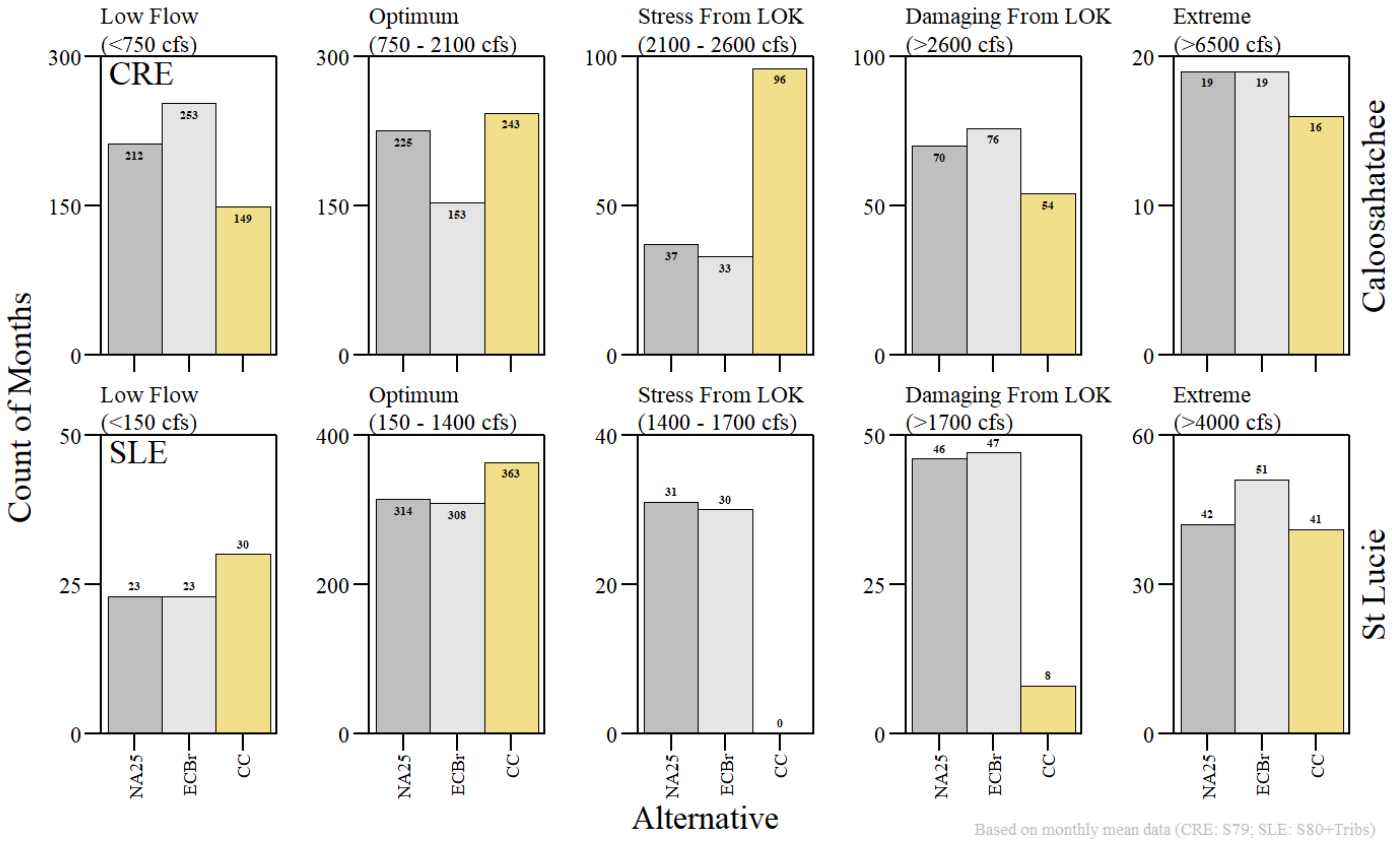
Optimum Flows CRE: ≥ 750 cfs & < 2100 cfs; SLE: ≥ 150 cfs & < 1400 cfs cfs

Stressful Flows CRE: ≥ 2100 cfs & < 2600 cfs; SLE: ≥ 1400 cfs & < 1700 cfs

Damaging Flows CRE: > 2600 cfs; SLE:> 1700 cfs

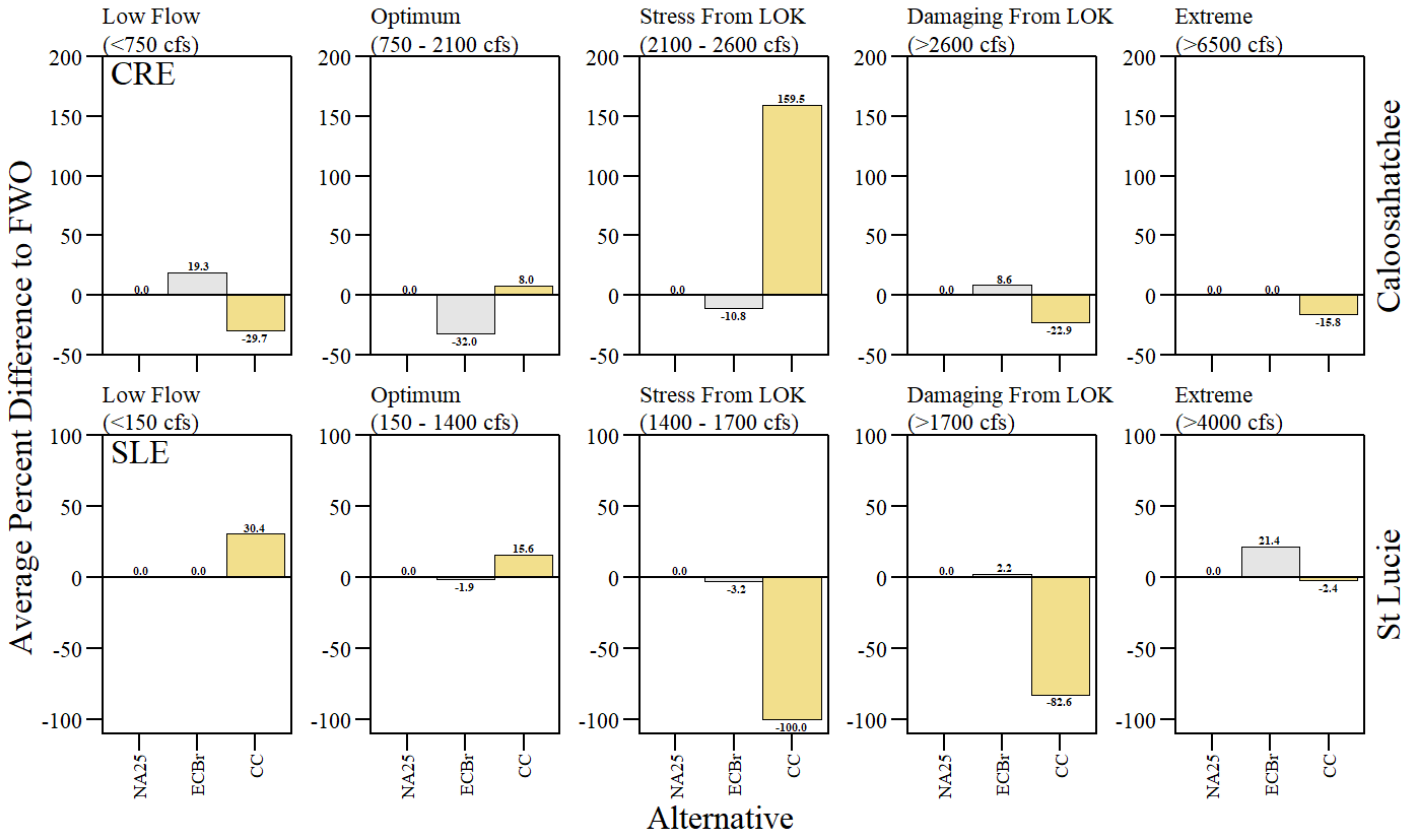
Data Source: USACE and SFWMD Interagency Modeling Center

Monthly Metric



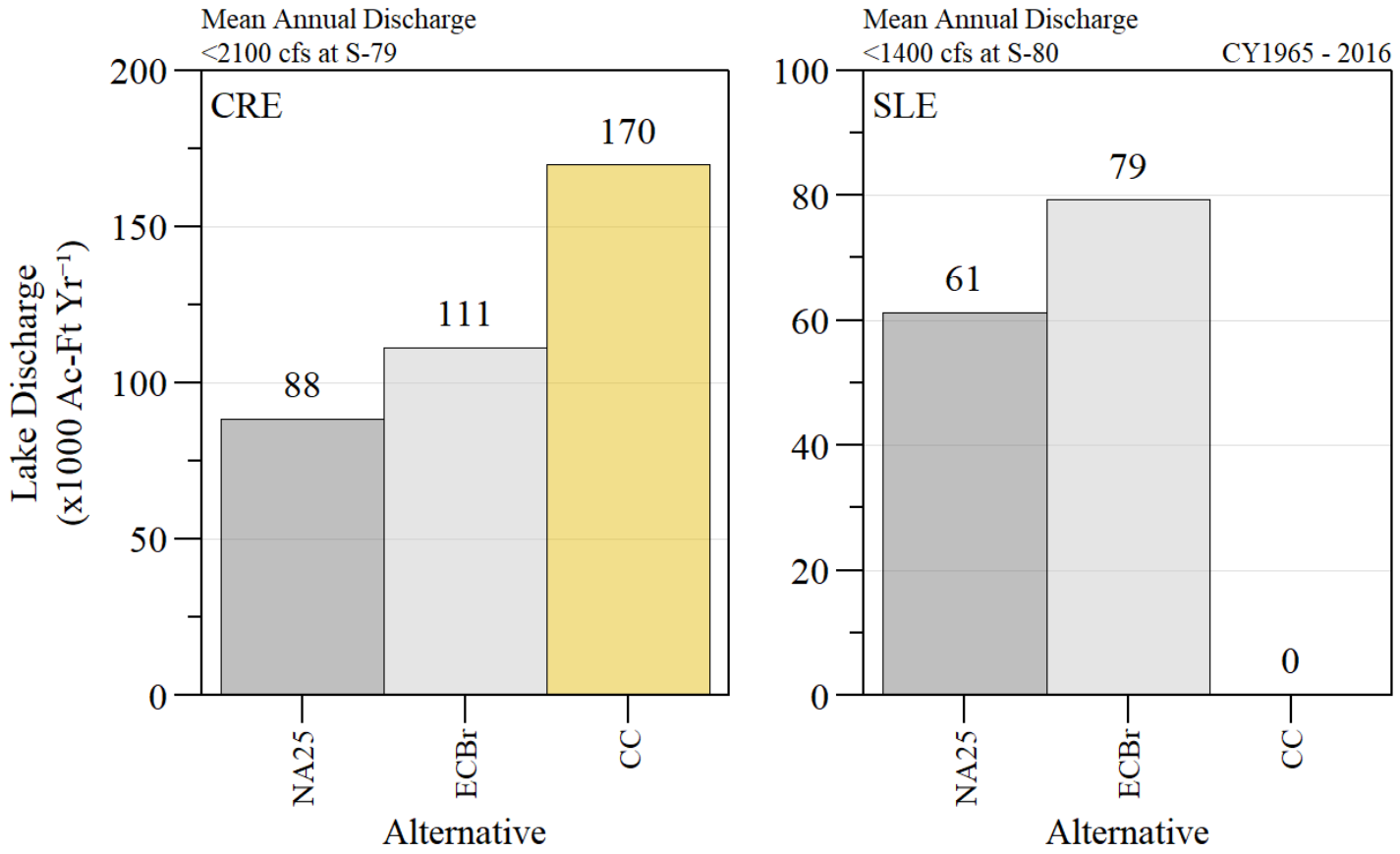
Monthly salinity envelope evaluation during the simulation period of record for Caloosahatchee (top) and St Lucie (bottom) estuaries. Low, Optimum and Extreme events are from all sources.

Monthly Metric



Monthly salinity envelope evaluation relative to FWO (NA25) during the simulation period of record for Caloosahatchee (top) and St Lucie (bottom) estuaries. Low, Optimum and Extreme events are from all sources.

Lake Discharges



Average annual lake discharge volume over the simulation period of record when low and optimum discharge at S79 and S80, respectively.