Lake Okeechobee System Operating Manual

POST Iteration 2 Modeling Evaluation

Sanibel-Captiva Conservation Foundation

Conservancy of Southwest Florida

DRAFT - August 23, 2021

Paul Julian PhD
pjulian@sccf.org

Use cursor keys for navigation, press "O" for a slide Overview

Download PDF Version

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**
	OPT [2]	487	65	144	72	187	**-7.8**	**-64.5**	**22.0**	**-61.3**	**8.1**
SLE	NA25	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**
	OPT	109	23	288	28	467	**-41.8**	**-84.5**	**37.1**	**-80.3**	**9.1**

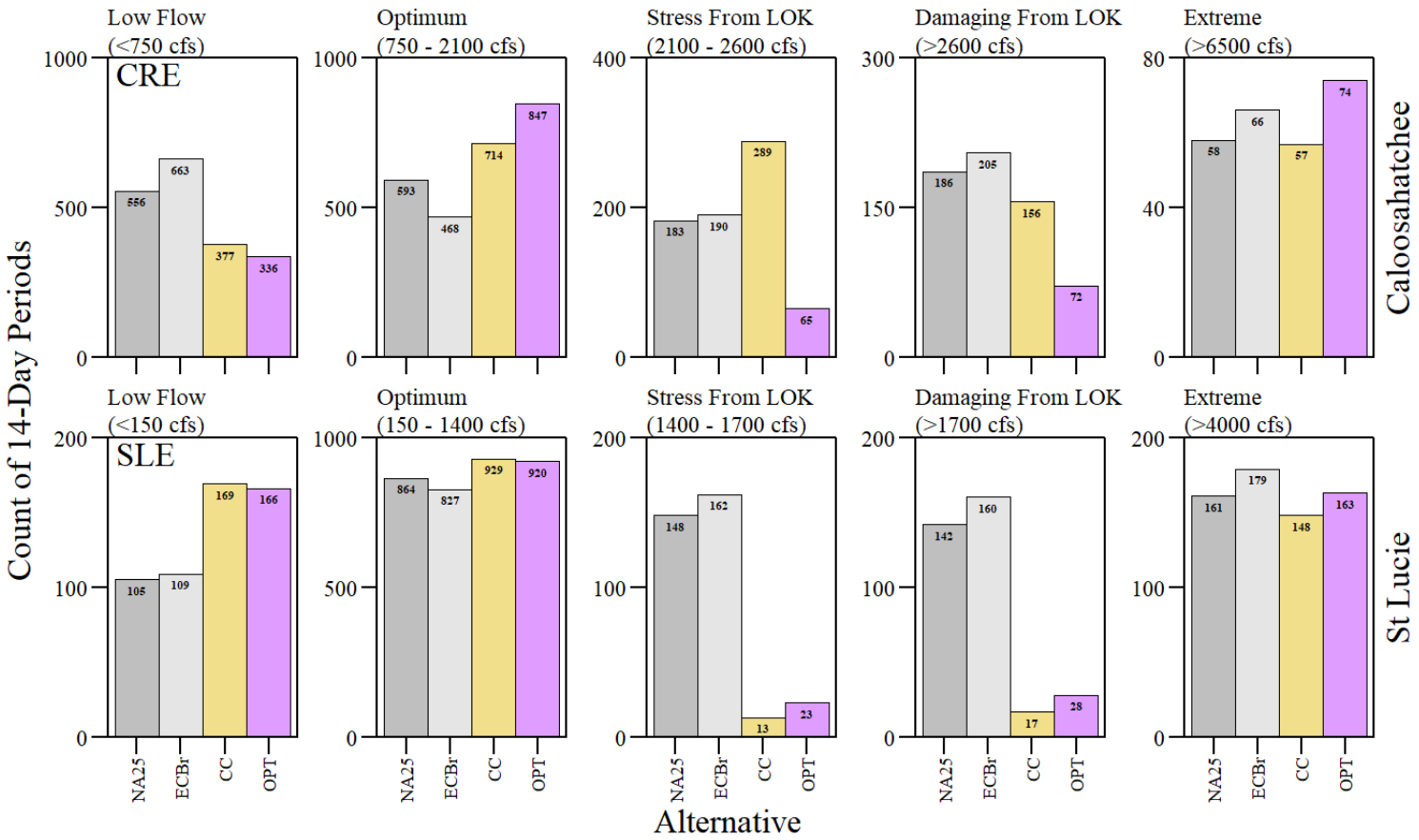
[1] CRE: Caloosahatchee Estuary; SLE: St Lucie Estuary; [2] NA25 = Future without project (FWO)

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

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

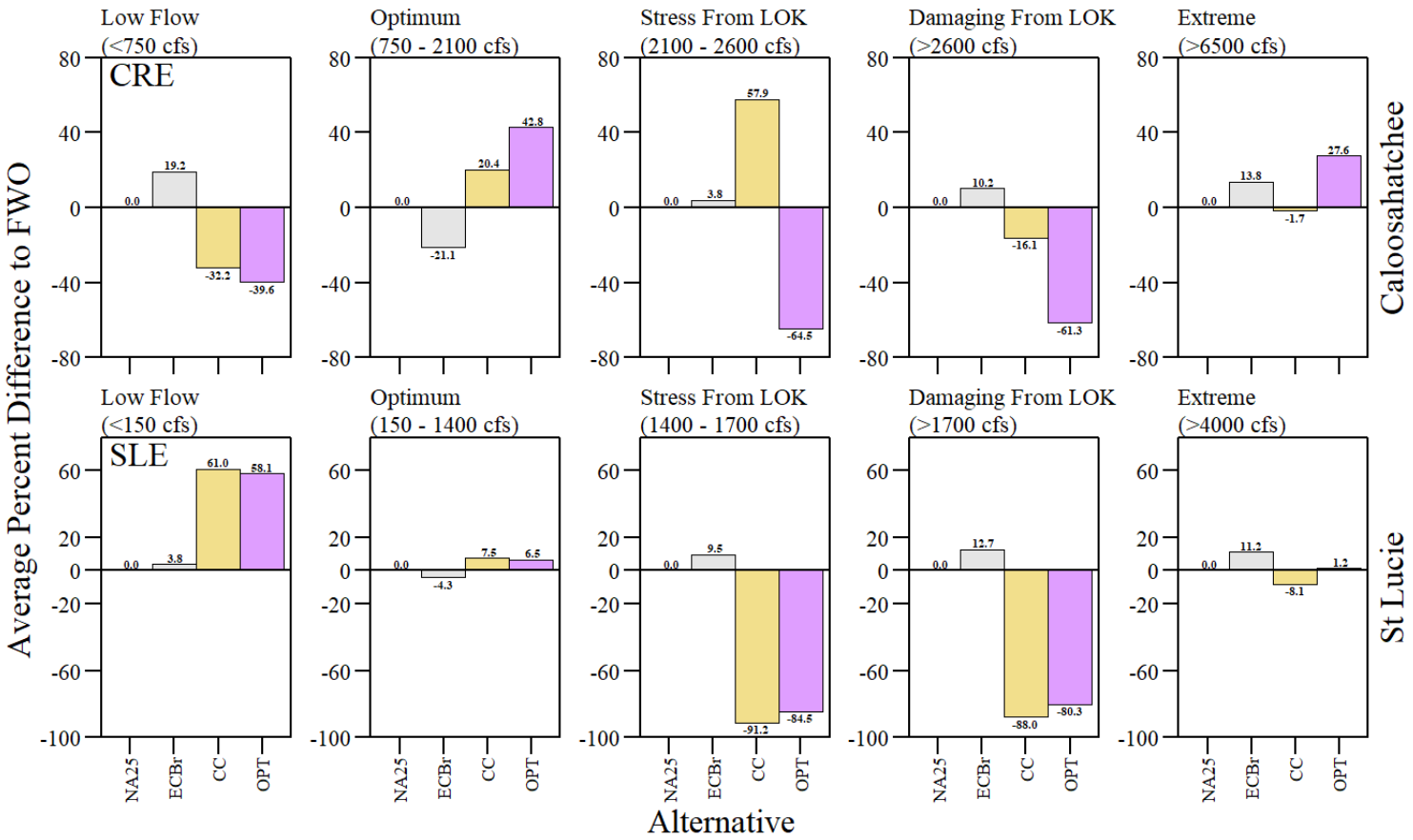
Data Source: USACE and SFWMD Interagency Modeling Center. ***OPT Alternative*** provided by Everglades Foundation

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.

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
	OPT [2]	4558	10993	101	642	407	2292	-41.1	73.3	-61.3	31.6	-79.5	5.7
SLE	NA25	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
	OPT	3039	10374	0	716	360	4504	56.4	2.6	-100.0	20.7	-75.1	-0.2

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

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

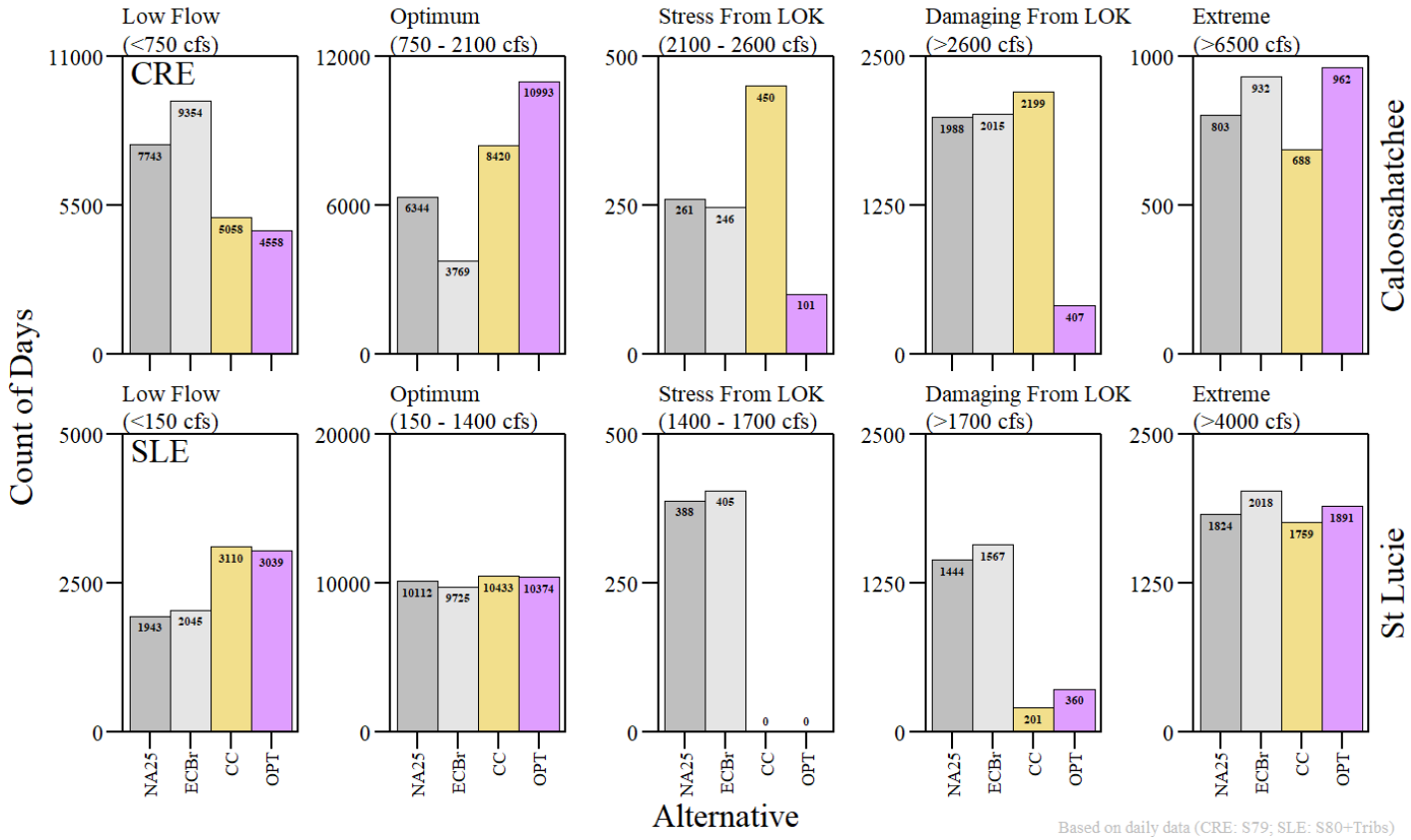
Optimum Flows CRE: ≥ 750 cfs & < 2100 cfs; SLE: ≥ 150 cfs & < 1400 cfs cfs

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

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

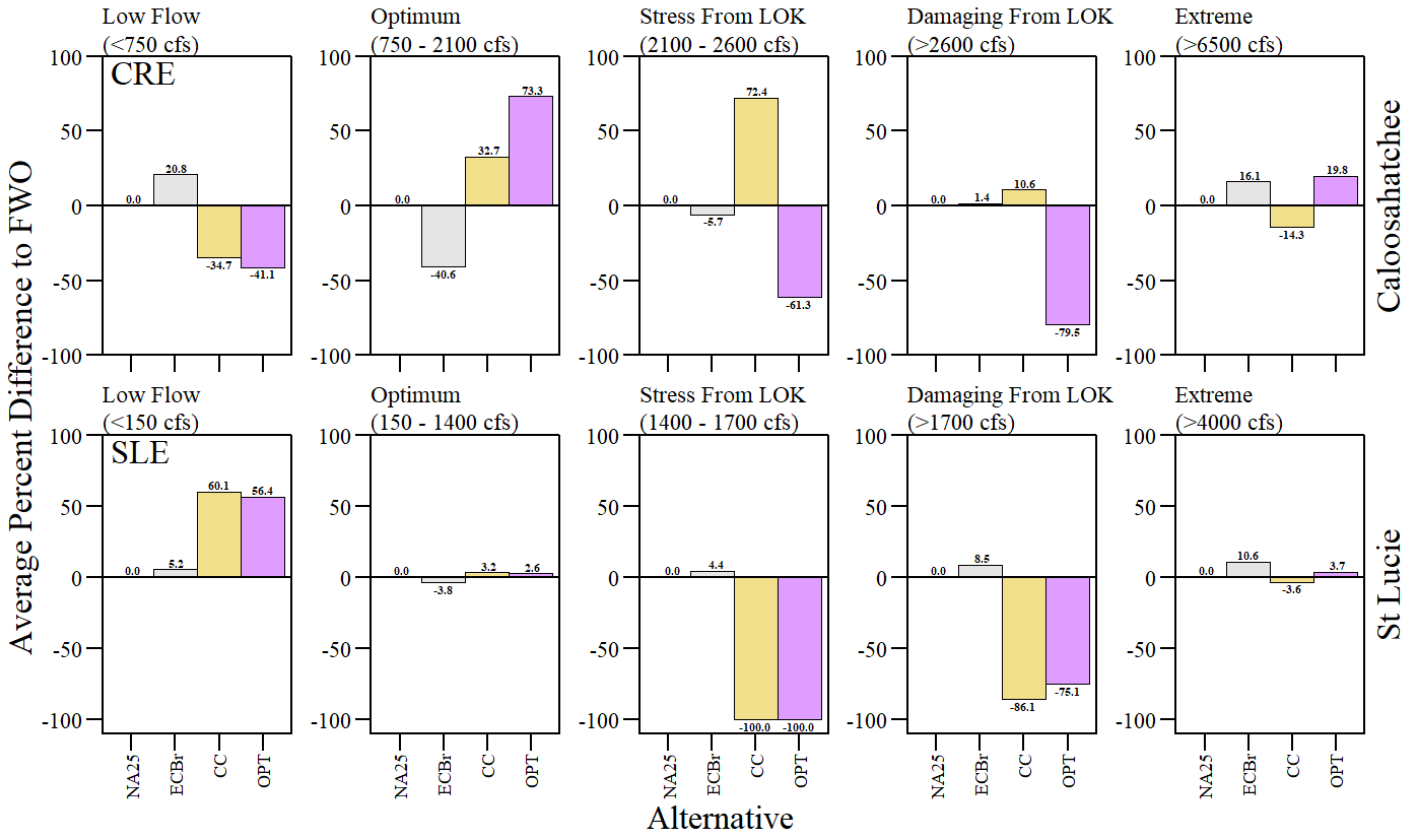
Data Source: USACE and SFWMD Interagency Modeling Center. ***OPT Alternative*** provided by Everglades Foundation

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.

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
	OPT [2]	137	353	17	24	27	66	-35.4	56.9	-54.1	26.3	-61.4	8.2
SLE	NA25	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
	OPT	29	359	1	45	13	177	26.1	14.3	-96.8	28.6	-71.7	1.1

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

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

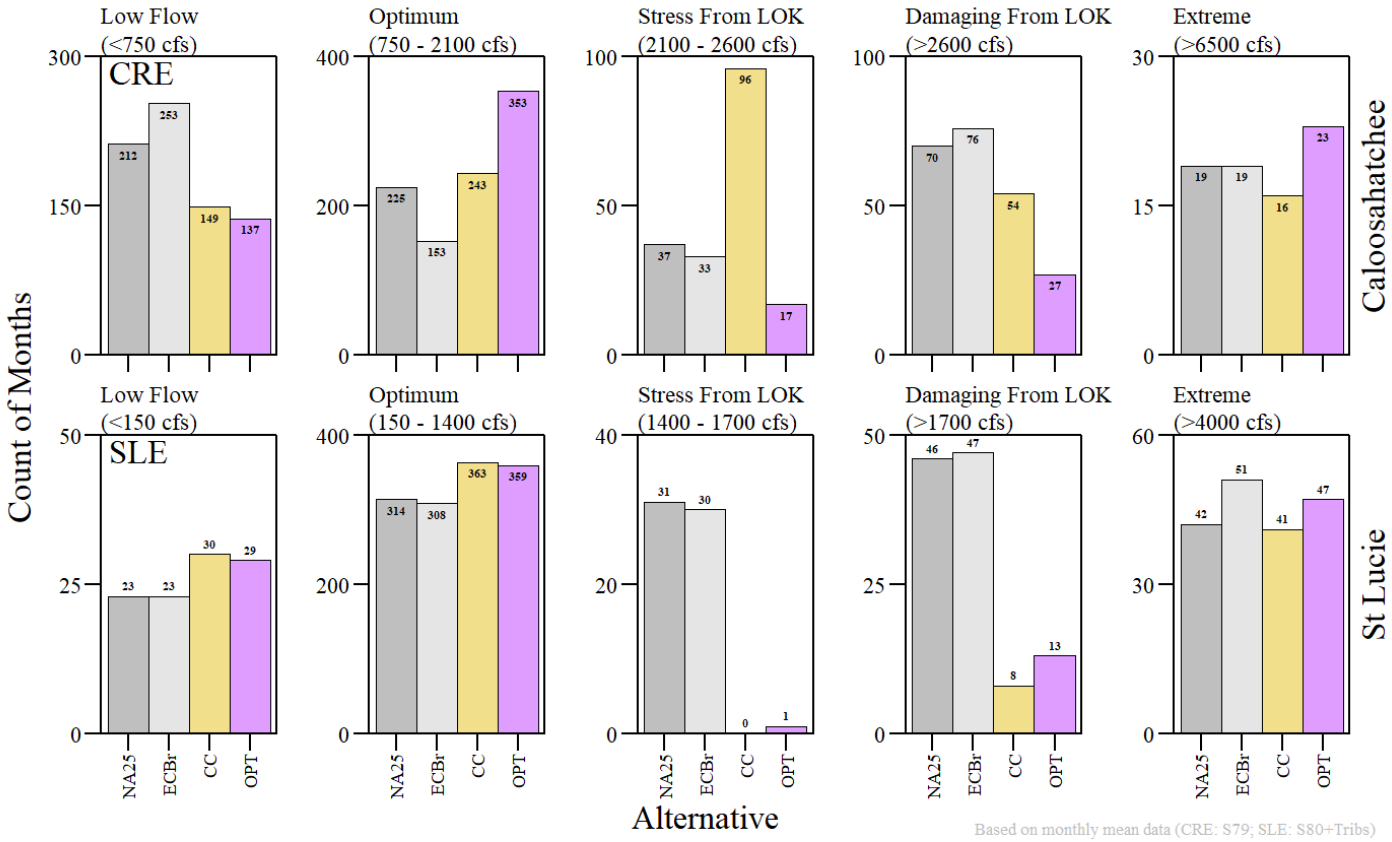
Optimum Flows CRE: ≥ 750 cfs & < 2100 cfs; SLE: ≥ 150 cfs & < 1400 cfs cfs

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

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

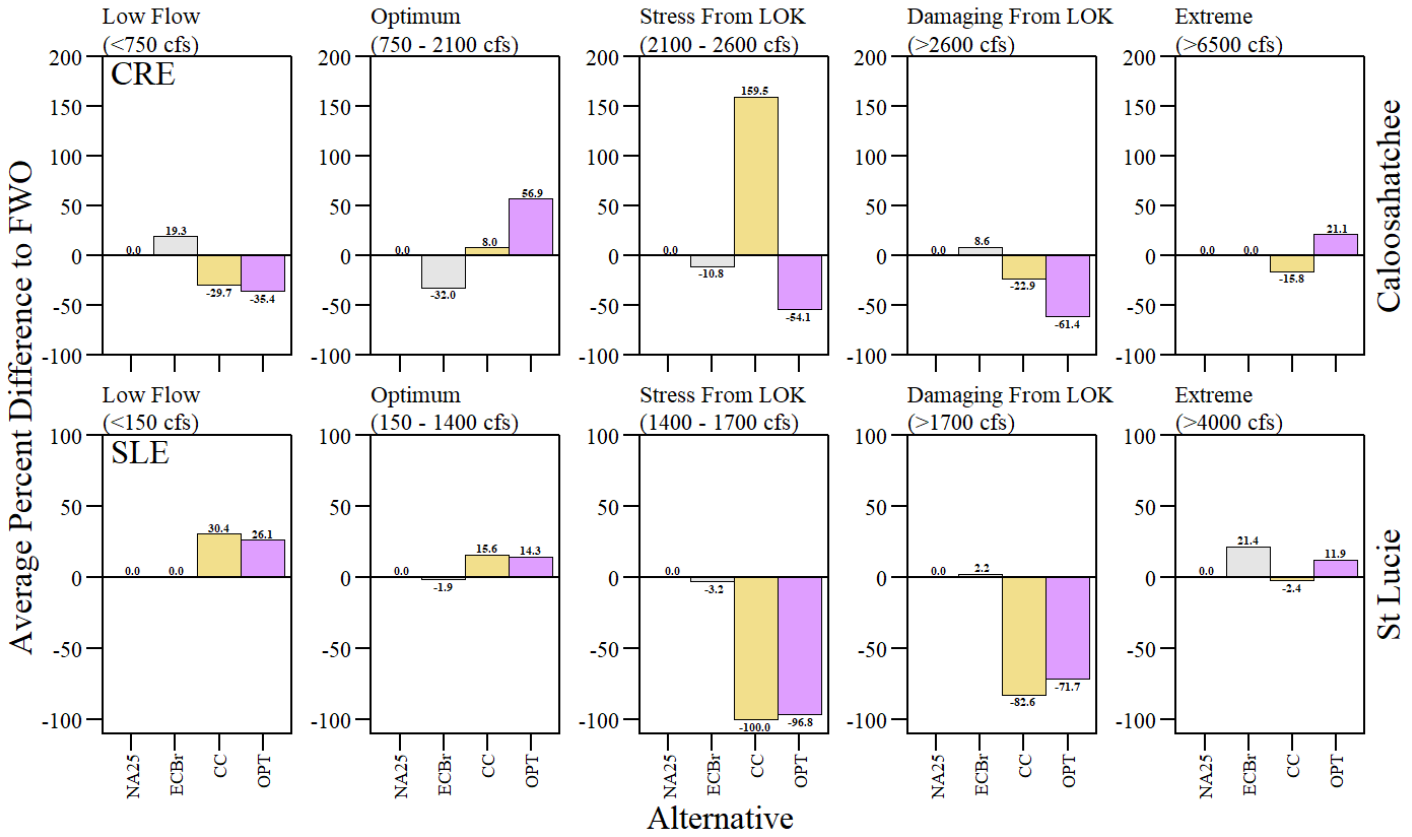
Data Source: USACE and SFWMD Interagency Modeling Center. ***OPT Alternative*** provided by Everglades Foundation

Monthly Metric



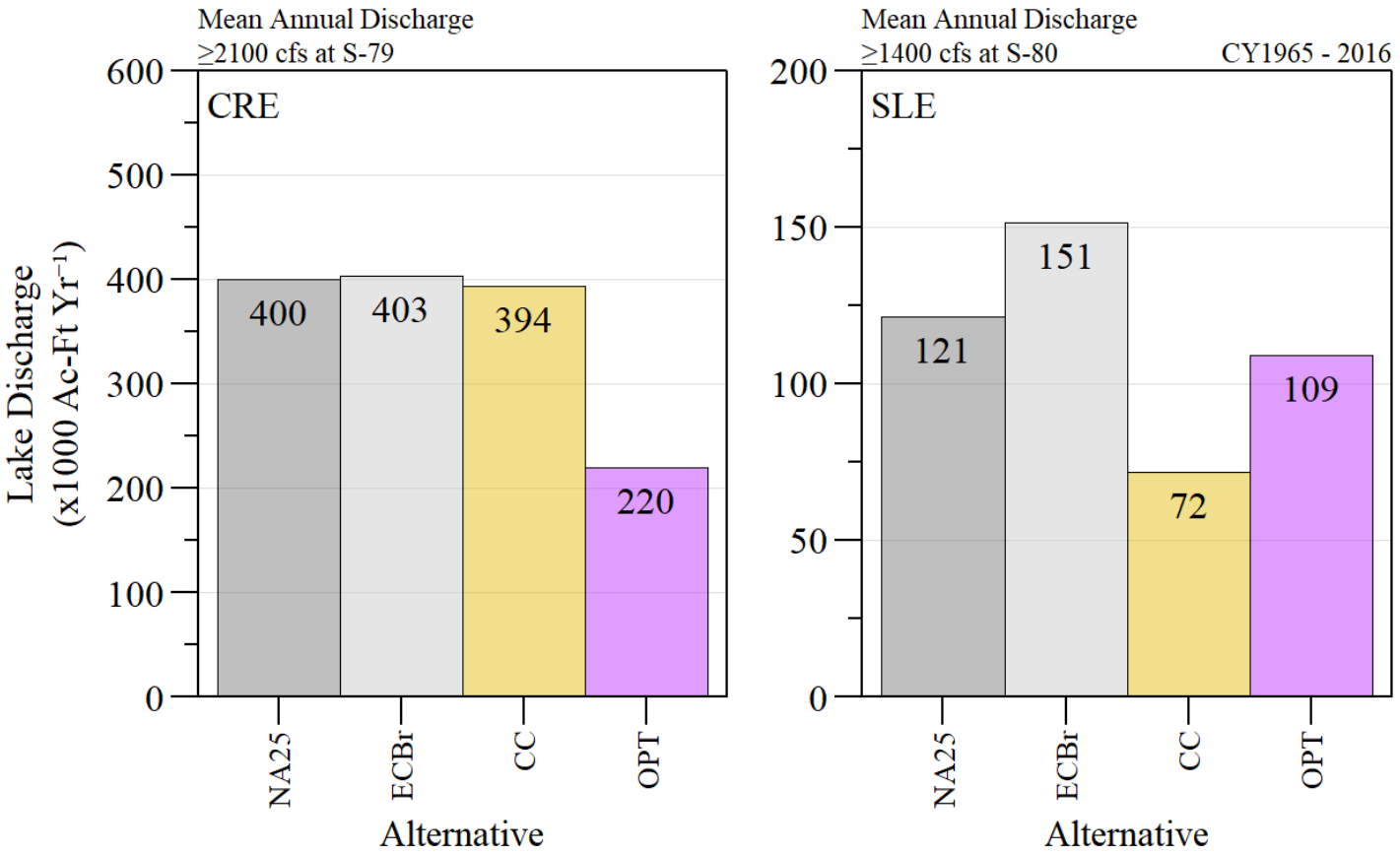
Monthly salinity envelope evaluation during the simulation period of record for Caloosahatchee (top) and St Lucie (bottom) estuaries. Low, Optimum and Extreme events are from all sources.

Monthly Metric



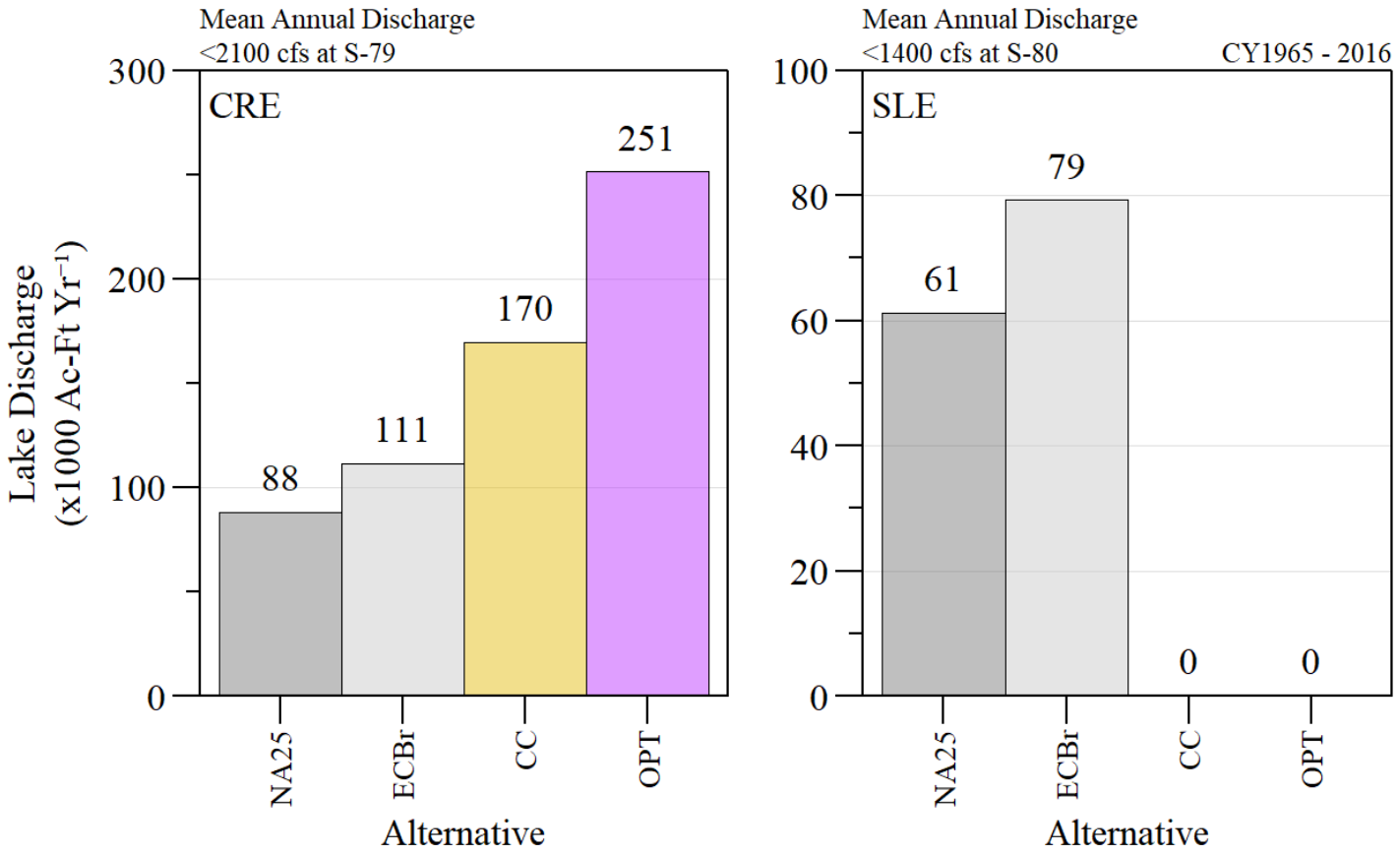
Monthly salinity envelope evaluation relative to FWO (NA25) during the simulation period of record for Caloosahatchee (top) and St Lucie (bottom) estuaries. Low, Optimum and Extreme events are from all sources.

Lake Discharges



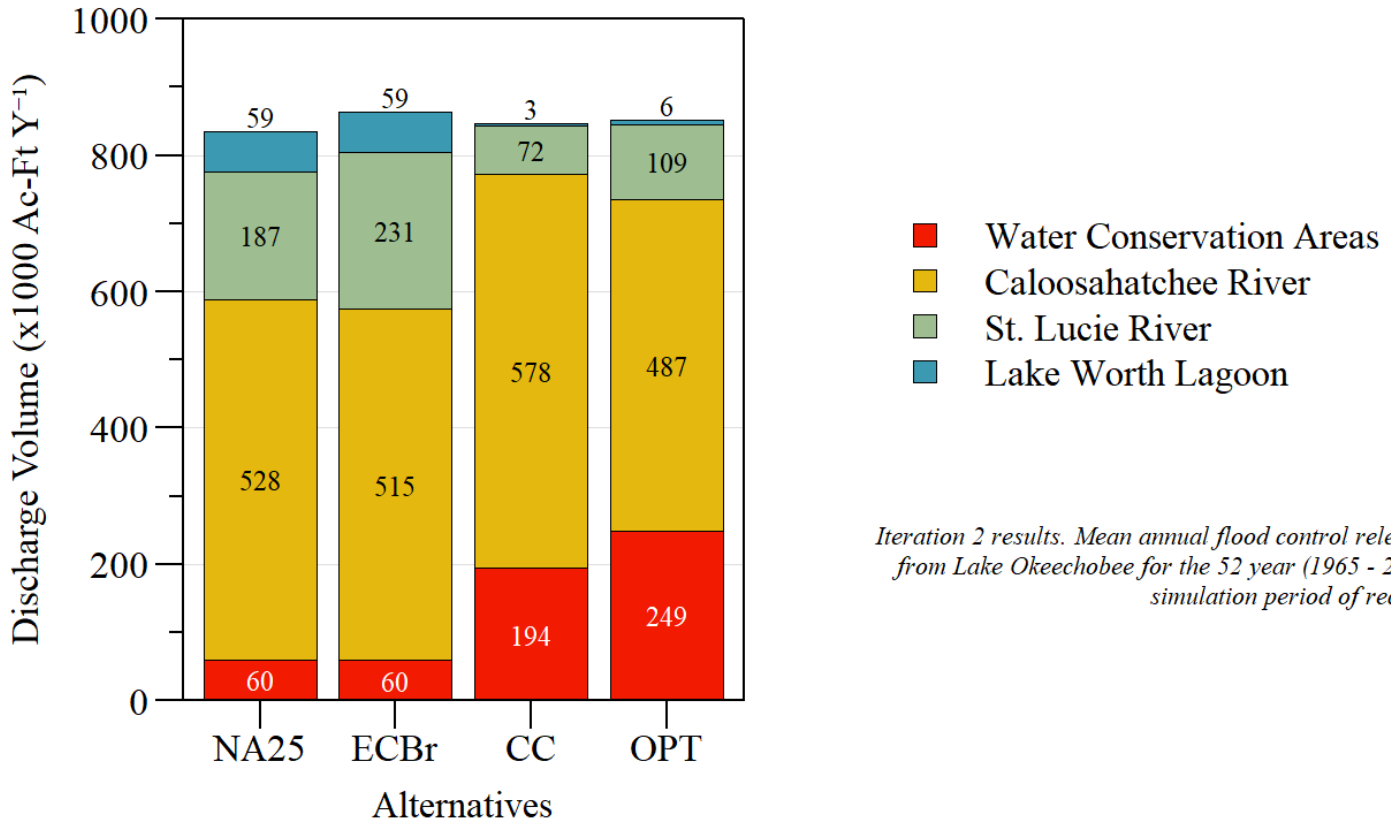
Average annual lake discharge volume over the simulation period of record when stress and damaging discharge at S79 and S80, respectively.

Lake Discharges



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

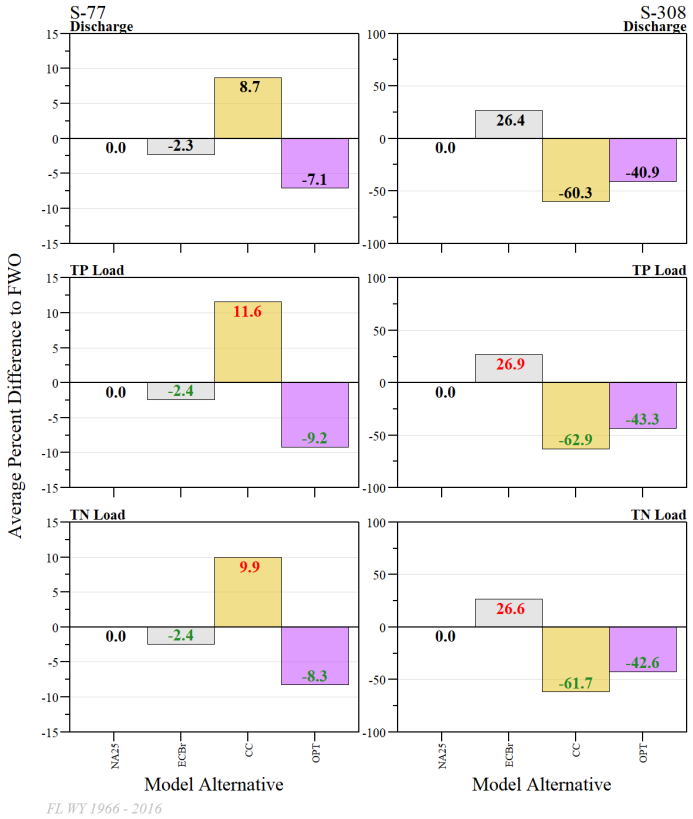
Flood control discharges



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.

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
	OPT	1.7%	33.3	6142	70661	-1.8	3.1	0.5
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
	OPT	2.3%	43.4	11315	95784	11.9	14.4	14.0
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
	OPT	3.8%	73.9	16916	265371	56.3	22.7	56.5

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