Lake Okeechobee System Operating Manual

Iteration 2 Modeling Evaluation

Sanibel-Captiva Conservation Foundation

Conservancy of Southwest Florida

DRAFT - August 10, 2021

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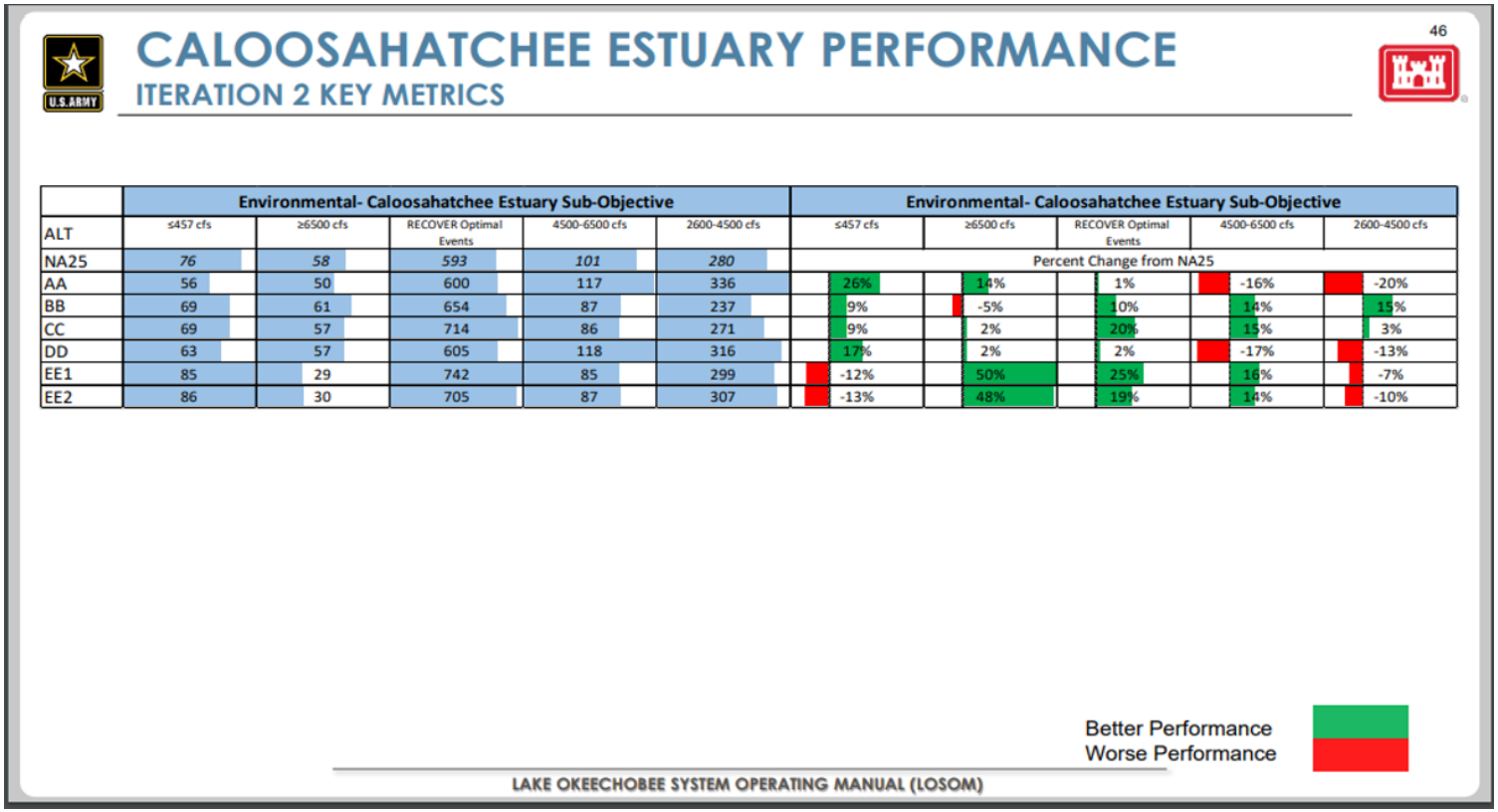


from 17 June 2021 PDT Meeting Presentation

Caloosahatchee Estuary

S77 and S79 average total discharge comparison between alternatives with percent change relative to FWO and ECB across the entire simulation period of record (Jan 1965 - Dec 2016).

	Average Total Annual Discharge (x1000 Ac-Ft Yr^{-1})		% Change Compared to FWO [1]	
Alternative	S77	S79	S77 [1]	S79 [1]
NA25	584.7	1293.9	0.0	0.0
ECBr	571.2	1298.8	-2.3	0.4
AA	633.3	1342.1	8.3	3.7
BB	467.2	1188.1	-20.1	-8.2
CC	635.3	1347.4	8.7	4.1
DD	574.3	1286.1	-1.8	-0.6
EE1	521.8	1229.6	-10.8	-5.0
EE2	552.1	1258.9	-5.6	-2.7
SR3.5	529.7	1242.0	-9.4	-4.0

[1] FWO = NA25

RECOVER Salinity Envelope

Percent difference relative to FWO for the Caloosahatchee River Estuary. Count of 14-day period within each respective flow category for each alternative across the simulation period of record. Estimates consistent with RECOVER methodology using 14-day moving average discharge values for S79.

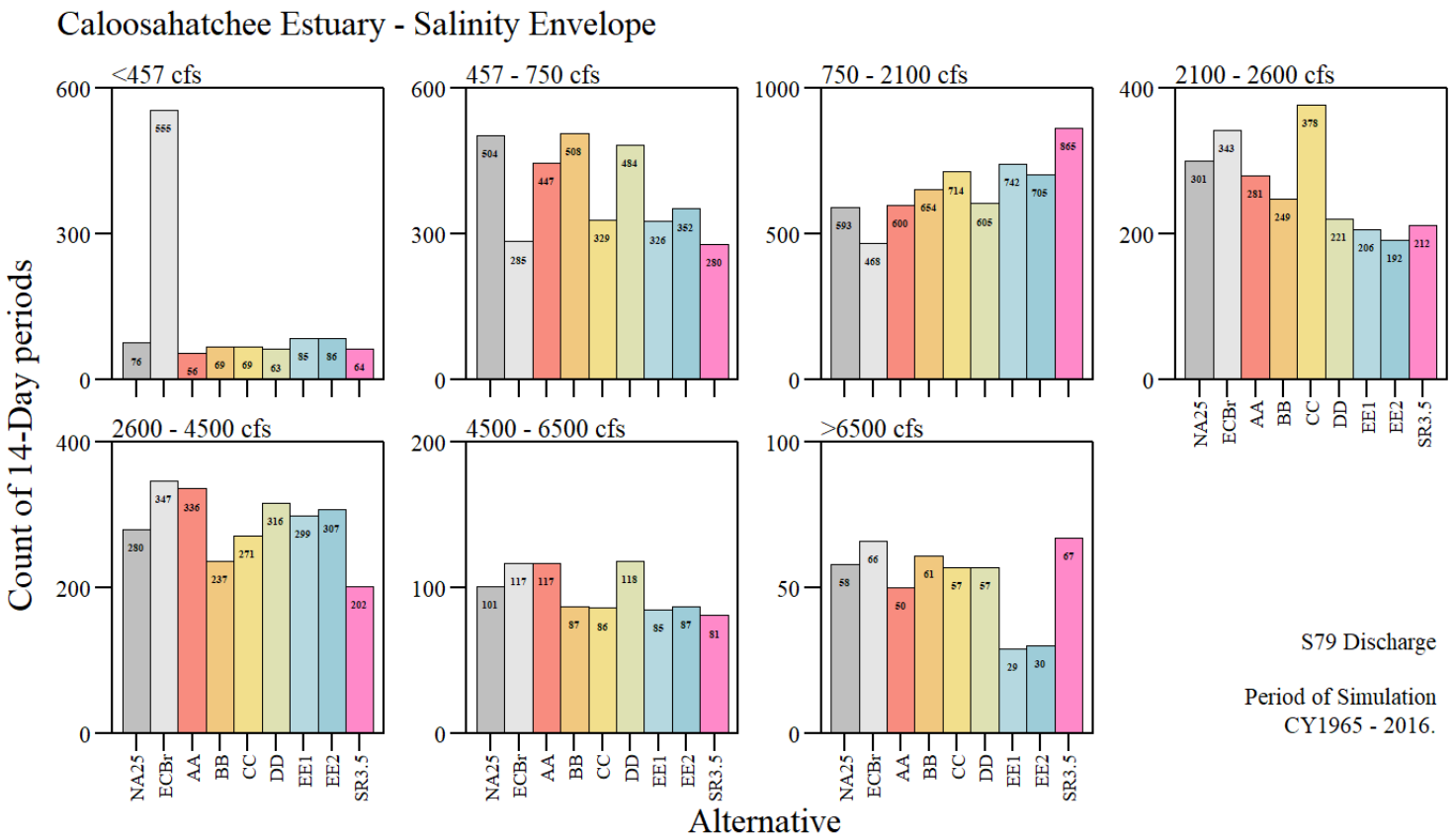
Alternative	<457 cfs	457 - 750 cfs	750 - 2100 cfs (Optimum)	2100 - 2600 cfs (Stress)	> 2600 cfs (Damaging)	2600 - 4500 cfs	4500 - 6500 cfs	>6500 cfs
NA25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ECBr	630.3	-43.5	-21.1	14.0	19.8	23.9	15.8	13.8
AA	-26.3	-11.3	1.2	-6.6	16.2	20.0	15.8	-13.8
BB	-9.2	0.8	10.3	-17.3	-15.3	-15.4	-13.9	5.2
CC	-9.2	-34.7	20.4	25.6	-8.1	-3.2	-14.9	-1.7
DD	-17.1	-4.0	2.0	-26.6	7.2	12.9	16.8	-1.7
EE1	11.8	-35.3	25.1	-31.6	-6.1	6.8	-15.8	-50.0
EE2	13.2	-30.2	18.9	-36.2	-0.8	9.6	-13.9	-48.3
SR3.5	-15.8	-44.4	45.9	-29.6	-28.4	-27.9	-19.8	15.5

RECOVER Salinity Envelope

Percent difference relative to FWO for the Caloosahatchee River Estuary. Count of 14-day period within each respective flow category for each alternative across the simulation period of record. Estimates consistent with RECOVER methodology using 14-day moving average discharge values for S79.

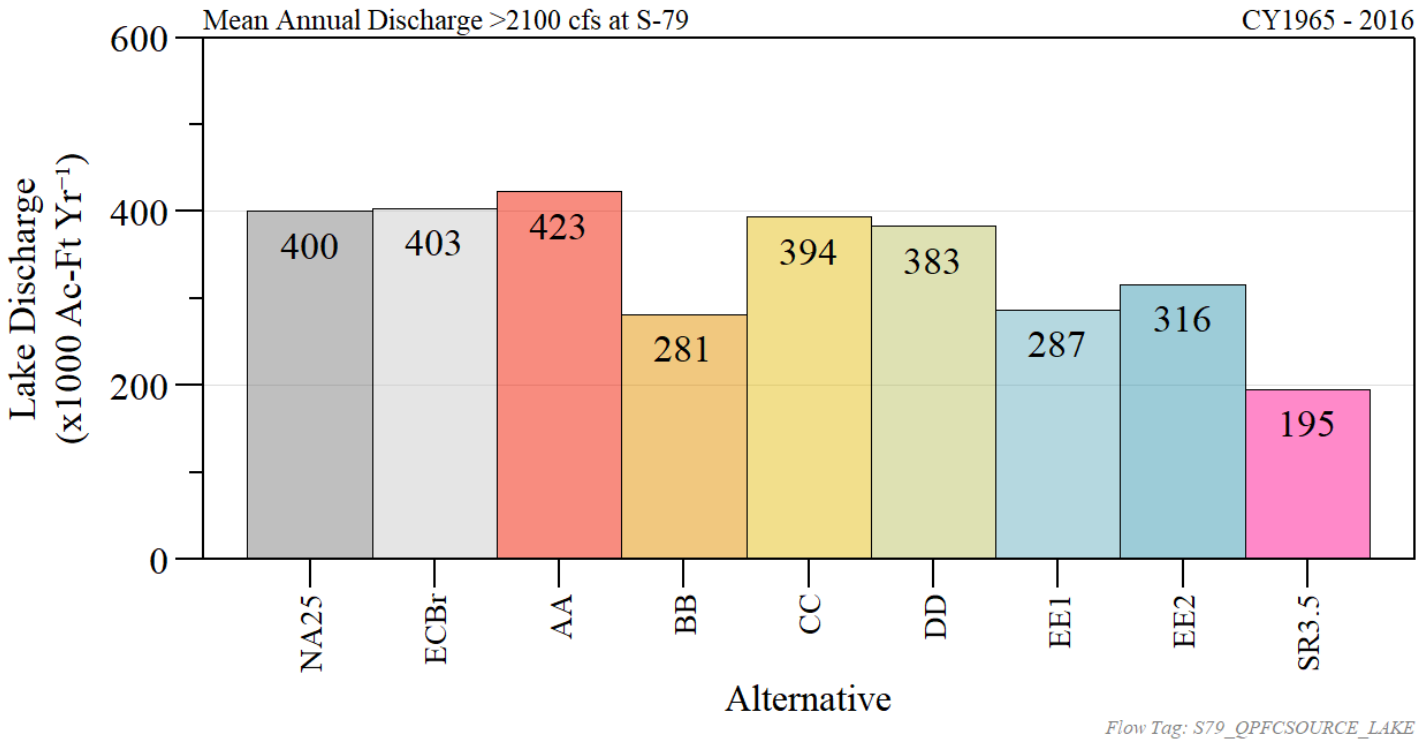
	2100 - 2600 cfs (Stress)		> 2600 cfs (Damaging)	
Alternative	Lake Regulatory	Basin	Lake Regulatory	Basin
NA25	0.0	0.0	0.0	0.0
ECBr	3.8	29.7	10.2	30.1
AA	0.5	-17.8	27.4	4.0
BB	-39.9	17.8	-36.0	6.9
CC	57.9	-24.6	-16.1	0.6
DD	-38.3	-8.5	11.3	2.9
EE1	-59.0	11.0	-18.8	7.5
EE2	-61.2	2.5	-11.3	10.4
SR3.5	-65.0	25.4	-64.0	9.8

RECOVER Salinity Envelope

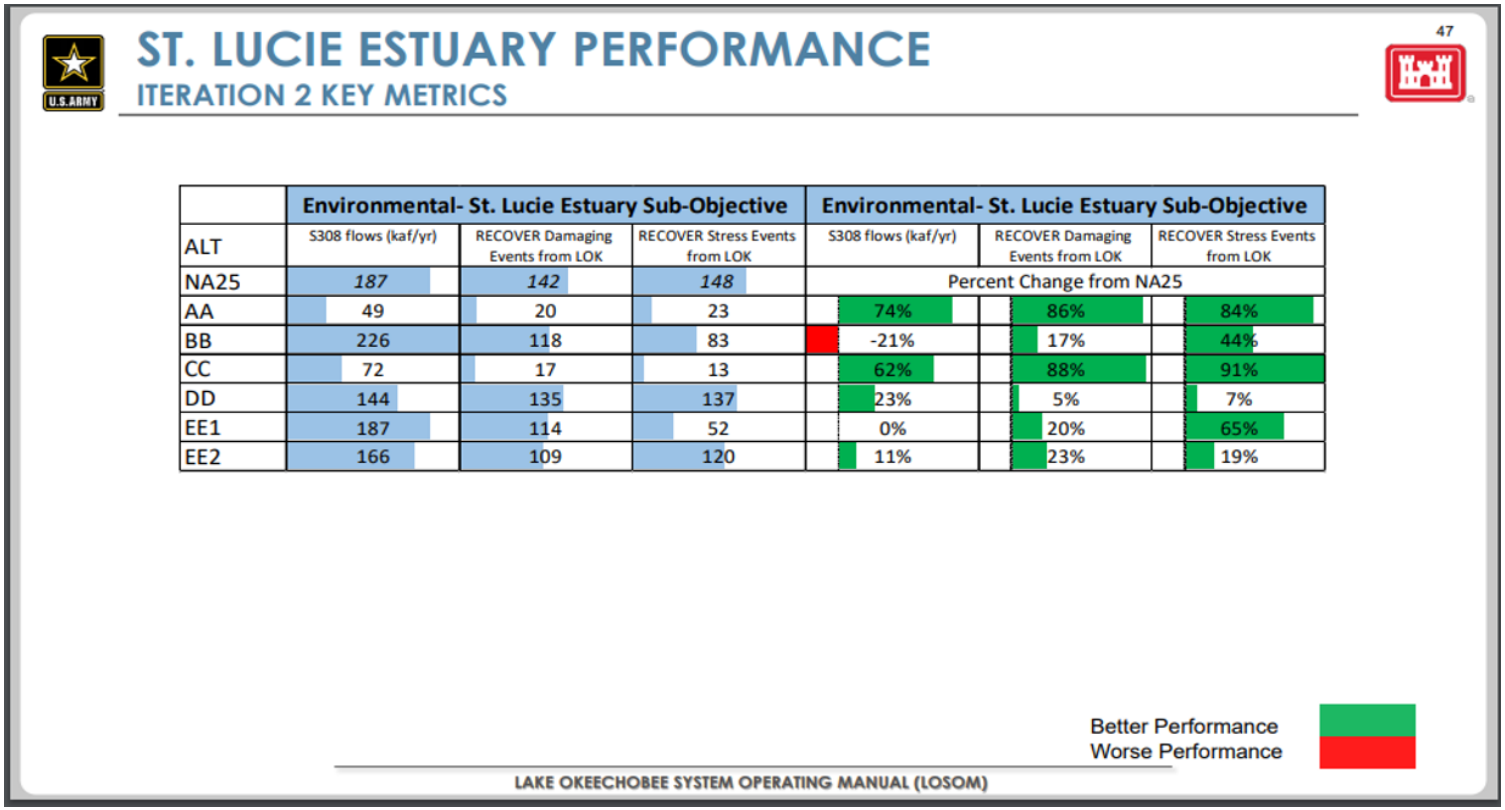


Count of 14-day period within each respective flow category for each alternative across the simulation period of record. Estimates consistent with RECOVER methodology using 14-day moving average discharge values for S79.

Damaging Lake Discharges



Mean annual lake discharge volume when S79 flows are greater than 2100 cfs.



	Environmental- St. Lucie Estuary Sub-Objective			Environmental- St. Lucie Estuary Sub-Objective		
ALT	S308 flows (kaf/yr)	RECOVER Damaging Events from LOK	RECOVER Stress Events from LOK	S308 flows (kaf/yr)	RECOVER Damaging Events from LOK	RECOVER Stress Events from LOK
NA25	*187*	*142*	*148*	Percent Change from NA25		
AA	49	20	23	74%	86%	84%
BB	226	118	83	-21%	17%	44%
CC	72	17	13	62%	88%	91%
DD	144	135	137	23%	5%	7%
EE1	187	114	52	0%	20%	65%
EE2	166	109	120	11%	23%	19%

from 17 June 2021 PDT Meeting Presentation

St Lucie Estuary

S308, S80 and S308 backflow (return to Lake) average total discharge comparison between alternatives with percent change relative to FWO and ECB across the entire simulation period of record (Jan 1965 - Dec 2016).

	Average Total Annual Discharge (x1000 Ac-Ft Yr^{-1})			% Change Compared to FWO [1]		
Alternative	S80	S308	S308 Backflow	S80 [1]	S308 [1]	S308 Backflow [1]
NA25	276.5	195.0	38.1	0.0	0.0	0.0
ECBr	334.5	246.3	45.0	21.0	26.3	18.2
AA	130.3	56.3	45.5	-52.9	-71.1	19.6
BB	316.9	234.1	36.3	14.6	20.0	-4.6
CC	153.4	79.3	45.3	-44.5	-59.3	19.1
DD	230.0	152.0	41.4	-16.8	-22.1	8.7
EE1	269.2	194.8	45.1	-2.6	-0.1	18.6
EE2	248.7	173.8	44.7	-10.0	-10.9	17.4
SR3.5	216.3	151.3	54.4	-21.8	-22.4	43.0

[1] FWO = NA25

RECOVER Salinity Envelope

Percent difference relative to FWO for the St Lucie River Estuary. Count of 14-day period within each respective flow category for each alternative across the simulation period of record. Estimates consistent with RECOVER methodology using 14-day moving average discharge values for S80 and Tributaries.

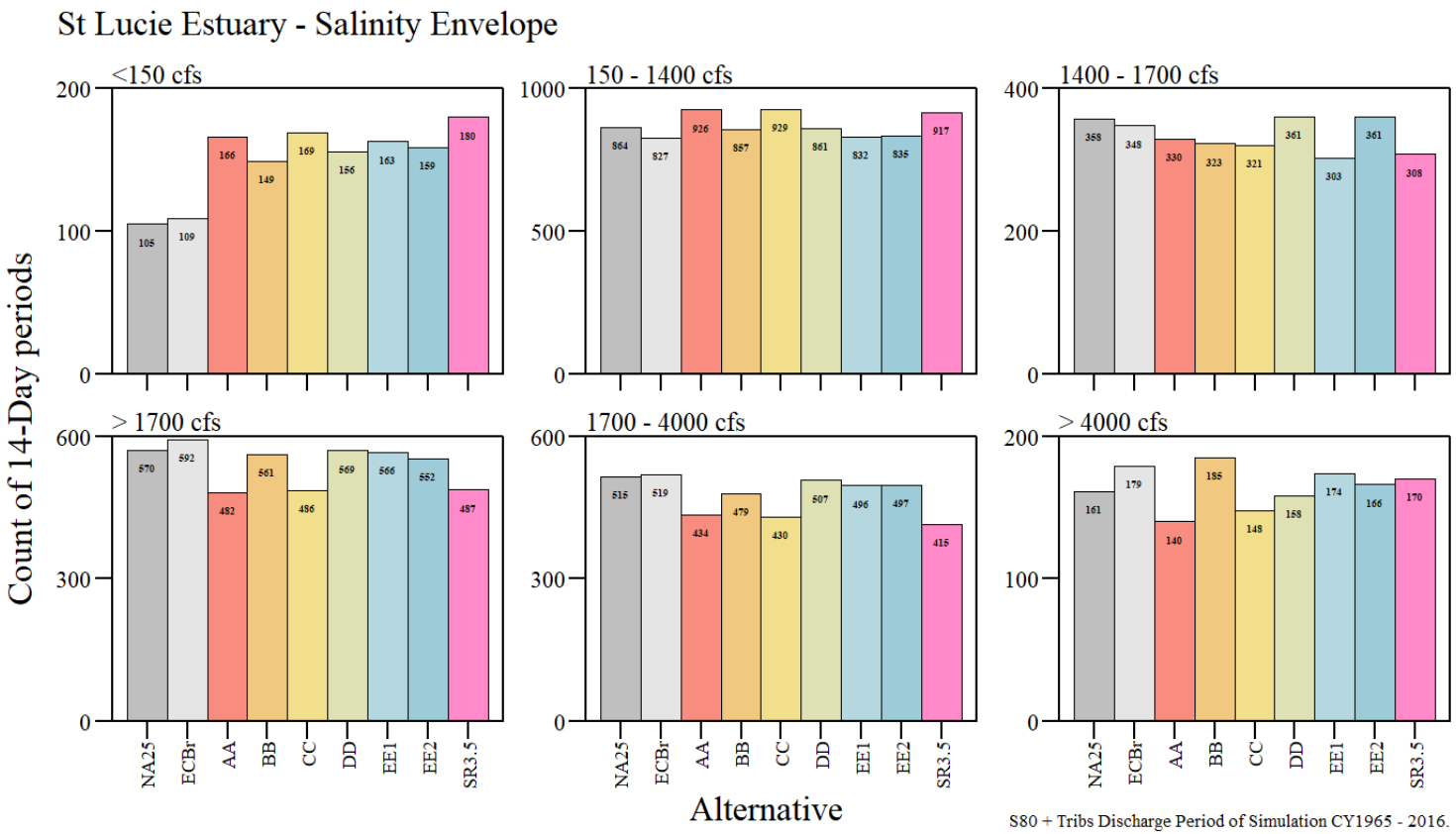
Alternative	< 150 cfs	150 - 1400 cfs (Optimum)	1400 - 1700 cfs (Stress)	> 1700 cfs (Damaging)	1700 - 4000 cfs	> 4000 cfs
NA25	0.0	0.0	0.0	0.0	0.0	0.0
ECBr	3.8	-4.3	-2.8	3.9	0.8	11.2
AA	58.1	7.2	-7.8	-15.4	-15.7	-13.0
BB	41.9	-0.8	-9.8	-1.6	-7.0	14.9
CC	61.0	7.5	-10.3	-14.7	-16.5	-8.1
DD	48.6	-0.3	0.8	-0.2	-1.6	-1.9
EE1	55.2	-3.7	-15.4	-0.7	-3.7	8.1
EE2	51.4	-3.4	0.8	-3.2	-3.5	3.1
SR3.5	71.4	6.1	-14.0	-14.6	-19.4	5.6

RECOVER Salinity Envelope

Percent difference relative to FWO for the St Lucie River Estuary. Count of 14-day period within each respective flow category for each alternative across the simulation period of record. Estimates consistent with RECOVER methodology using 14-day moving average discharge values for S80 and Tributaries.

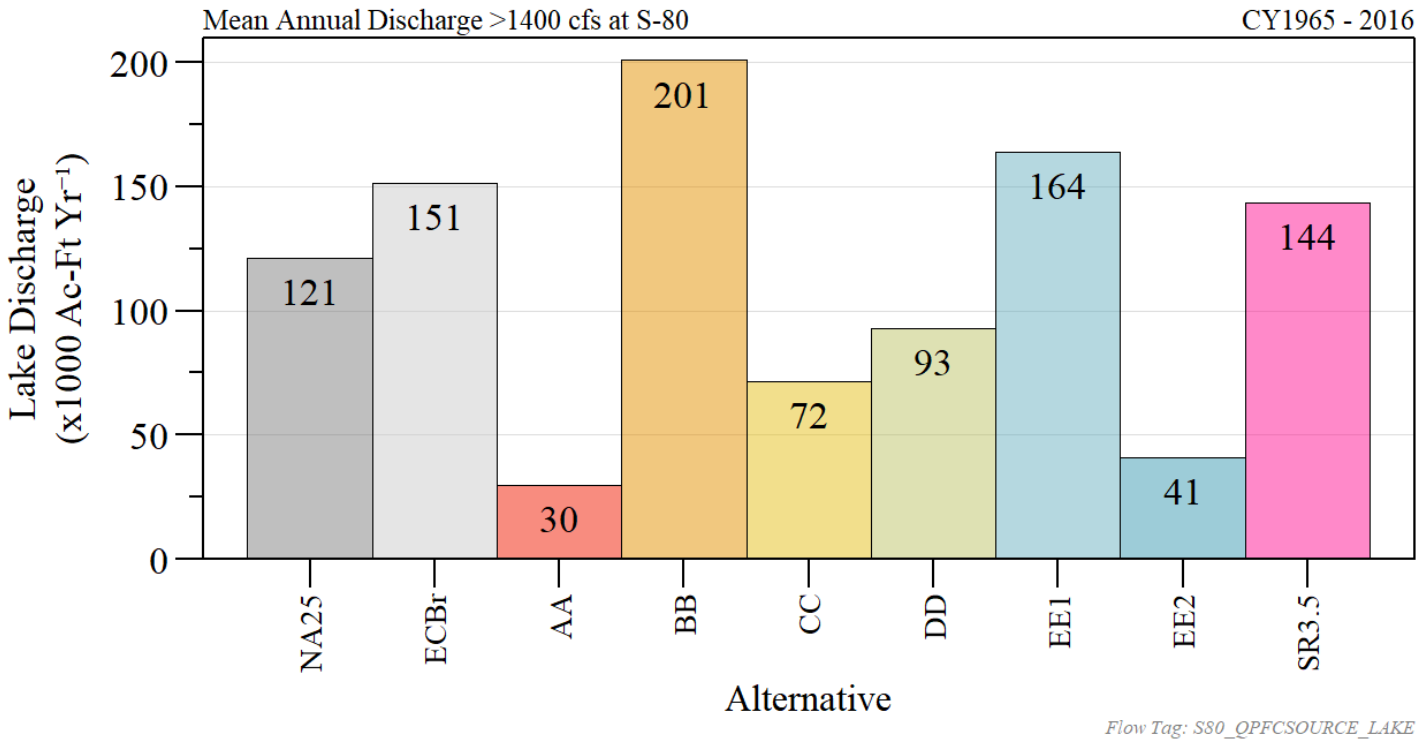
	1400 - 1700 cfs (Stress)		> 1700 cfs (Damaging)	
Alternative	Lake Regulatory	Basin	Lake Regulatory	Basin
NA25	0.0	0.0	0.0	0.0
ECBr	9.5	-11.4	12.7	0.9
AA	-84.5	46.2	-85.9	7.9
BB	-43.9	14.3	-16.9	3.5
CC	-91.2	46.7	-88.0	9.6
DD	-7.4	6.7	-4.9	1.4
EE1	-64.9	19.5	-19.7	5.6
EE2	-18.9	14.8	-23.2	3.5
SR3.5	-88.5	38.6	-78.2	6.5

RECOVER Salinity Envelope



Count of 14-day period within each respective flow category for each alternative across the simulation period of record. Estimates consistent with RECOVER methodology using 14-day moving average discharge values for S80 and Tributaries.

Damaging Lake Discharges



Mean annual lake discharge volume when S80 flows are greater than 1400 cfs.

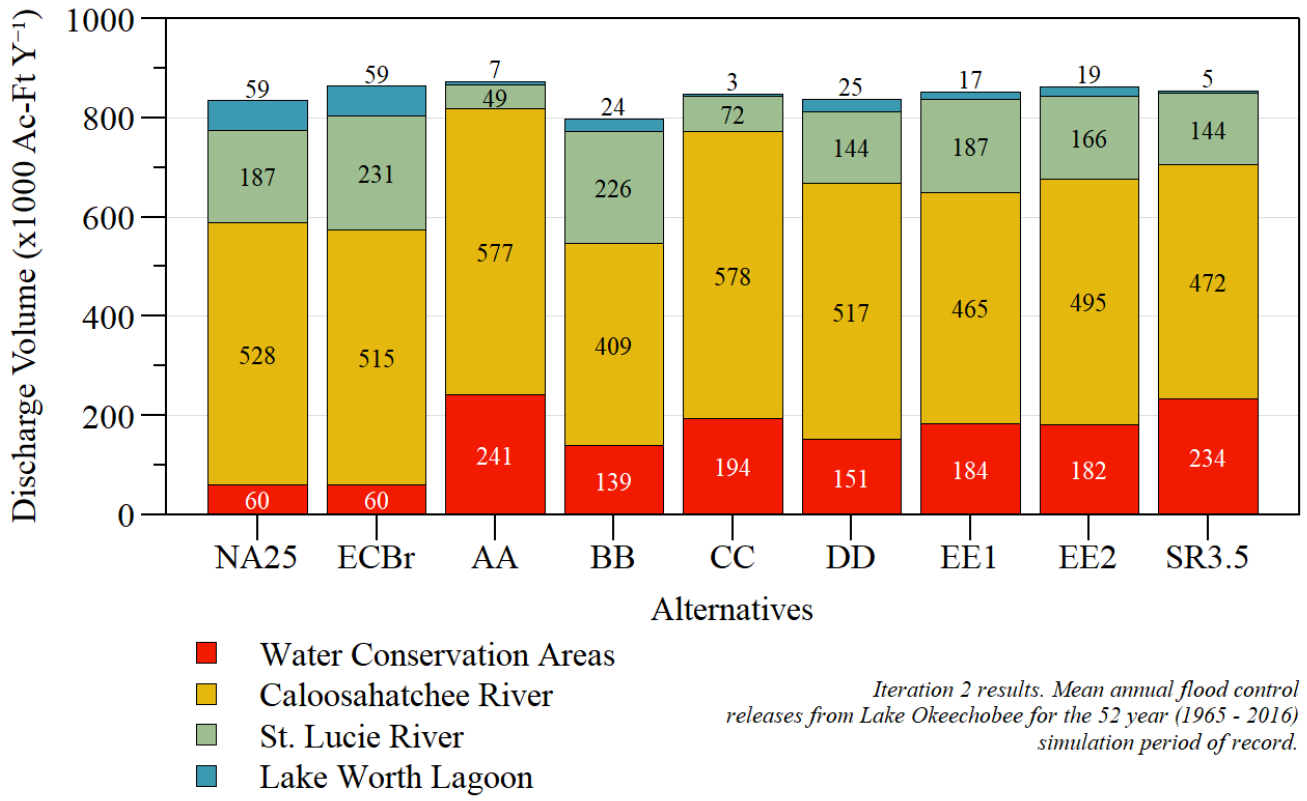
Flow South

S351 and S354 (Flow South) and S2, S3, and S4 (backflow to Lake) average total discharge comparison between alternatives with percent change relative to FWO and ECB across the entire simulation period of record (Jan 1965 - Dec 2016).

	Average Total Annual Discharge (x1000 Ac-Ft Yr^{-1})		% Change Compared to FWO [1]	
Alternative	∑ S351, S354	∑ S2, S3, S4	∑ S351, S354 [1]	∑ S2, S3, S4 [1]
NA25	294.9	46.5	0.0	0.0
ECBr	296.0	52.0	0.4	11.8
AA	466.0	81.7	58.0	75.6
BB	375.6	60.4	27.3	29.8
CC	423.2	64.1	43.5	37.8
DD	383.8	63.2	30.1	35.8
EE1	413.7	64.6	40.3	38.7
EE2	410.1	66.7	39.0	43.4
SR3.5	462.3	72.4	56.7	55.5

[1] FWO = NA25

Flood Control



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