Lake Okeechobee System Operating Manual

Iteration 2 Modeling Evaluation
(with SFWMD Sensitivity Run)

Sanibel-Captiva Conservation Foundation

Conservancy of Southwest Florida

DRAFT - July 14, 2021
(Updated: July 26, 2021)

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

Iteration 2 - Model runs

Alternative	Description
ECBr [1]	LOSOM Existing Condition Baseline 2019
NA25 [2]	LOSOM No Action 2025 (FWO)
AA	ESLE Framework. Enhances SLE ecology.
BB	SPLC Framework. Improve water supply to pre-LORS08
CC	Pareto Plan D Framework. Enhances CRE ecology and improves water supply
DD	Pareto Plan A Framework. Incremental improvement over LORS.
EE1	Stage Target Operation Framework. Improve water supply performance by reducing flows south.
EE2	Stage Target Operations Framework. Reduce flows to SLE by reducing Zone B release rate.
SR3.5	SFWMD Sensitivity Run for CC (NOT an offical alternative)

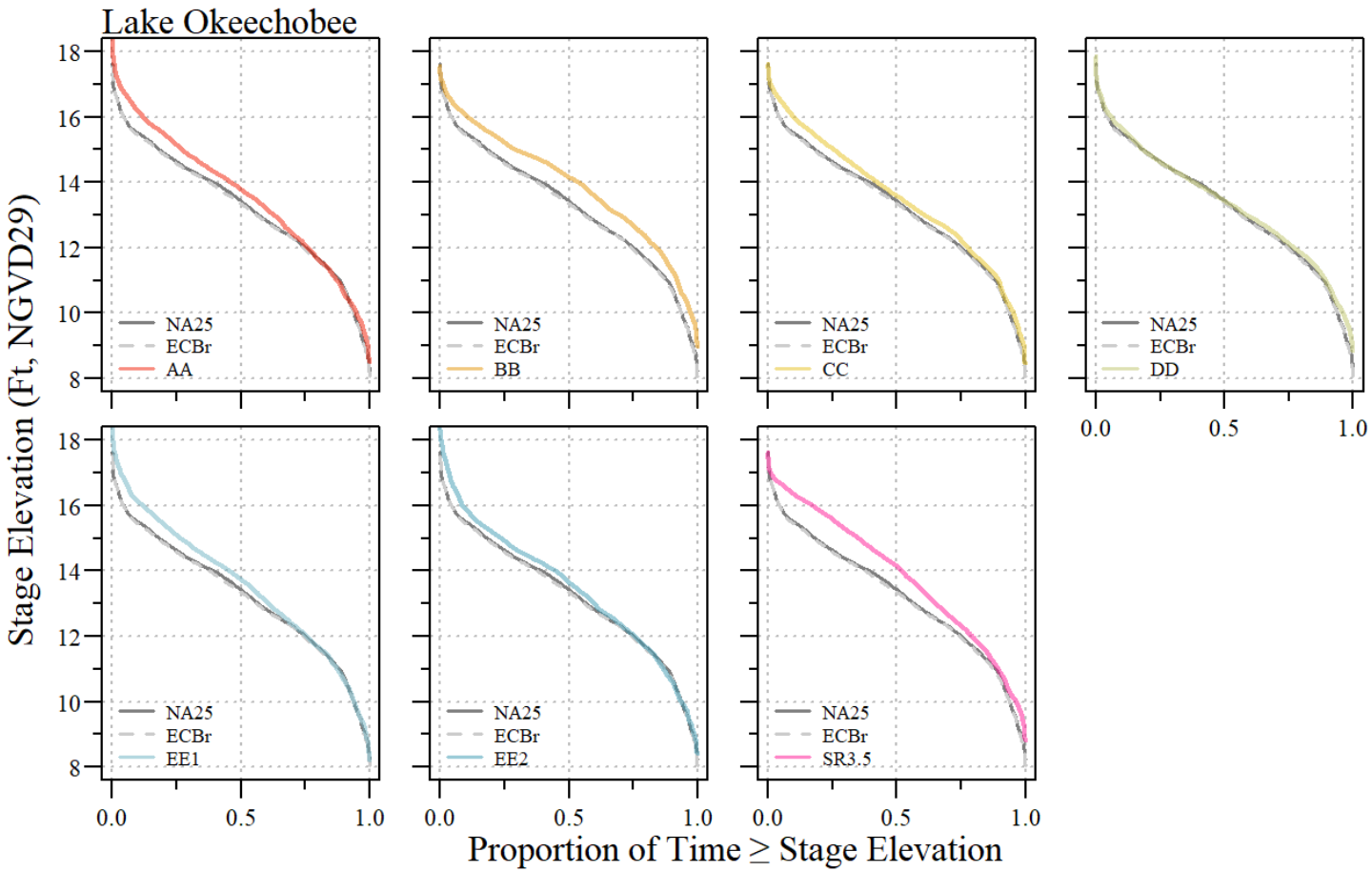
[1] Existing Conditions Baseline 2019, revised (replaces LSMECB)

[2] No action Condition 2025 (replaces LSM25B)

SR3.5

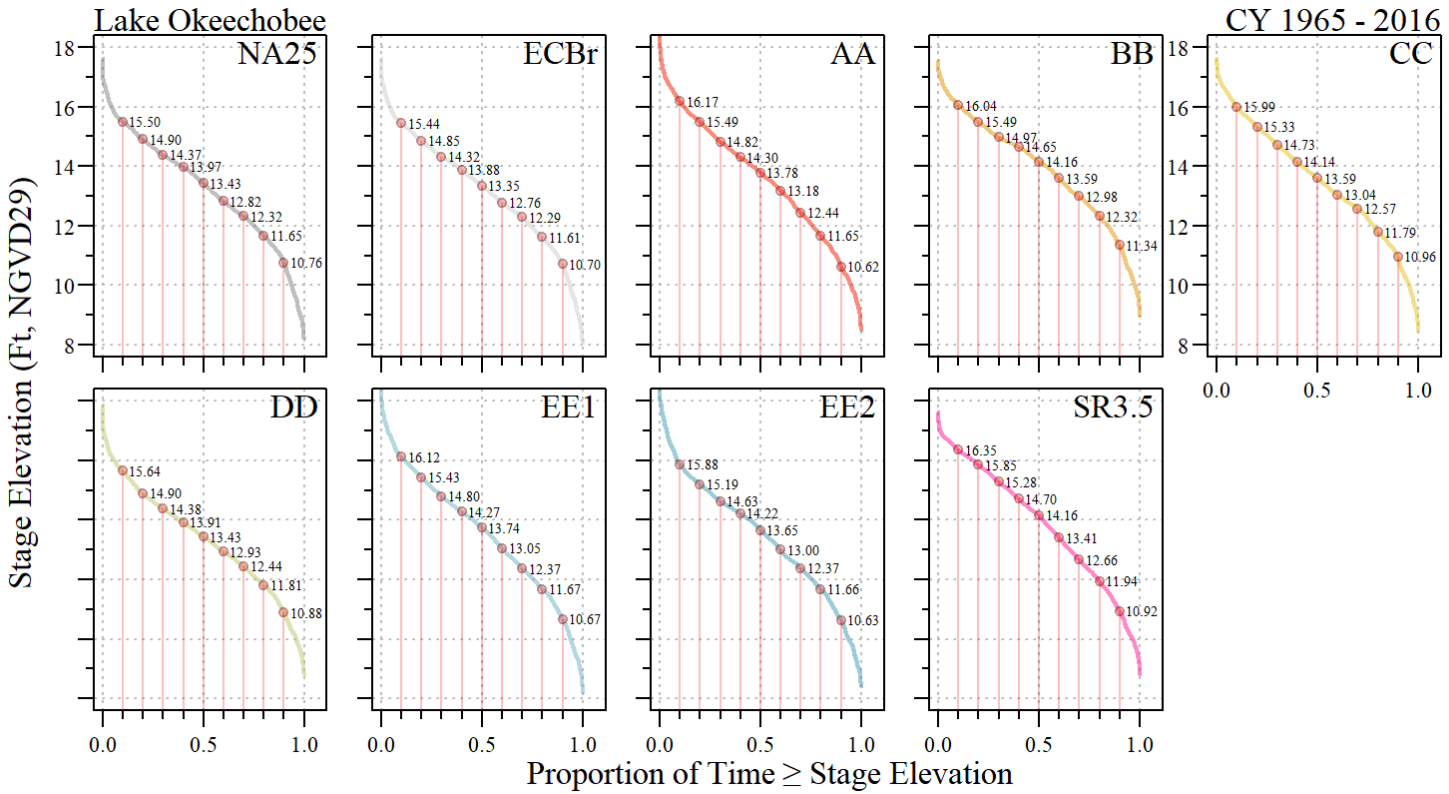
- Built from alternative CC
- SFWMD sensitivity run which serves as an example run incorporating policy direction (as informed by the Governing Board) and trade-offs between the different systems
- Presented at the July 15th 2021 Governing Board

Lake Stage Duration Curves



Lake Okeechobee stage duration curves comparing FWO and ECB relative to each alternative during the simulation period of record (CY1965 - 2016).

Lake Stage Duration Curves



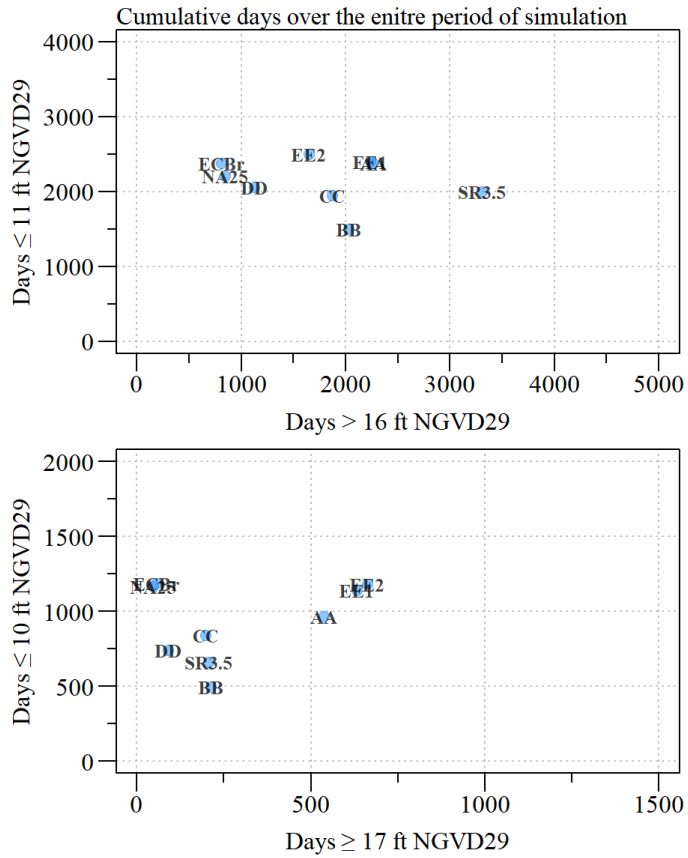
Lake Okeechobee stage duration curves for all alternatives including SR3.5 with stage values identified along the curve during the simulation period of record (CY1965 - 2016).

Lake Stage Duration Curves

Stage values for each segment of the stage duration curve for each alternative including SR3.5 during the simulation period of record (CY1965 - 2016).

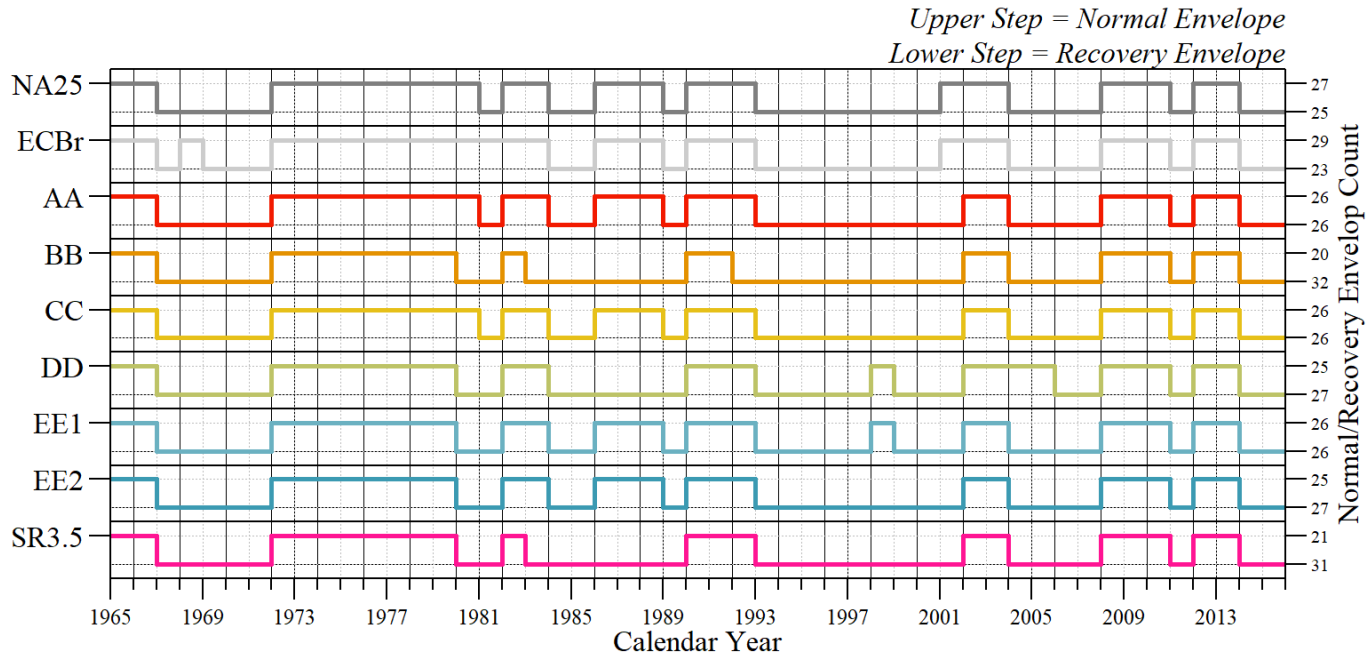
Alt	10% Pt	20% Pt	30% Pt	40% Pt	50% Pt	60% Pt	70% Pt	80% Pt	90% Pt
NA25	15.50	14.90	14.37	13.97	13.43	12.82	12.32	11.65	10.76
ECBr	15.44	14.85	14.32	13.88	13.35	12.76	12.29	11.61	10.70
AA	16.17	15.49	14.82	14.30	13.78	13.18	12.44	11.65	10.62
BB	16.04	15.49	14.97	14.65	14.16	13.59	12.98	12.32	11.34
CC	15.99	15.33	14.73	14.14	13.59	13.04	12.57	11.79	10.96
DD	15.64	14.90	14.38	13.91	13.43	12.93	12.44	11.81	10.88
EE1	16.12	15.43	14.80	14.27	13.74	13.05	12.37	11.67	10.67
EE2	15.88	15.19	14.63	14.22	13.65	13.00	12.37	11.66	10.63
SR3.5	16.35	15.85	15.28	14.70	14.16	13.41	12.66	11.94	10.92

High/Low Stages



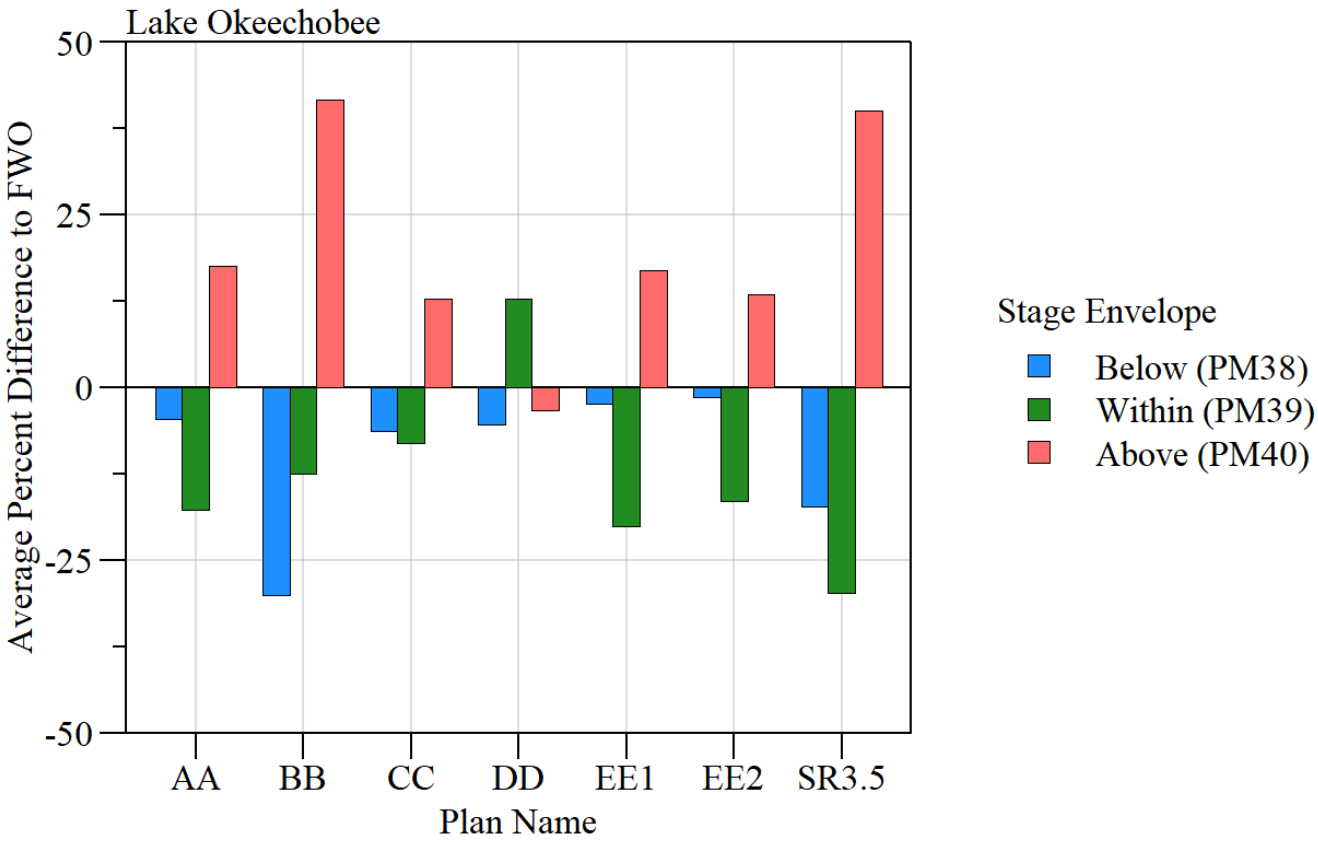
Total number of days during the simulation period where (Top) stage elevations were ≤ 11 or > 16 Ft NGVD29 and (Bottom) ≤ 10 or ≥ 17 Ft NGVD29.

Normal/Recovery Envelope



Lake Okeechobee ecological stage envelope across alternatives and period of simulation. Upper step signifies the year during which the normal stage envelope applies and the lower is the recovery envelope. Counts of each evelope are identified on the secondary y-axis (right).

Normal/Recovery Envelope



Percent average difference relative to FWO of the percent of time below, within and above the ecological stage envelope across alternatives including SR3.5 during the period of simulation.

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

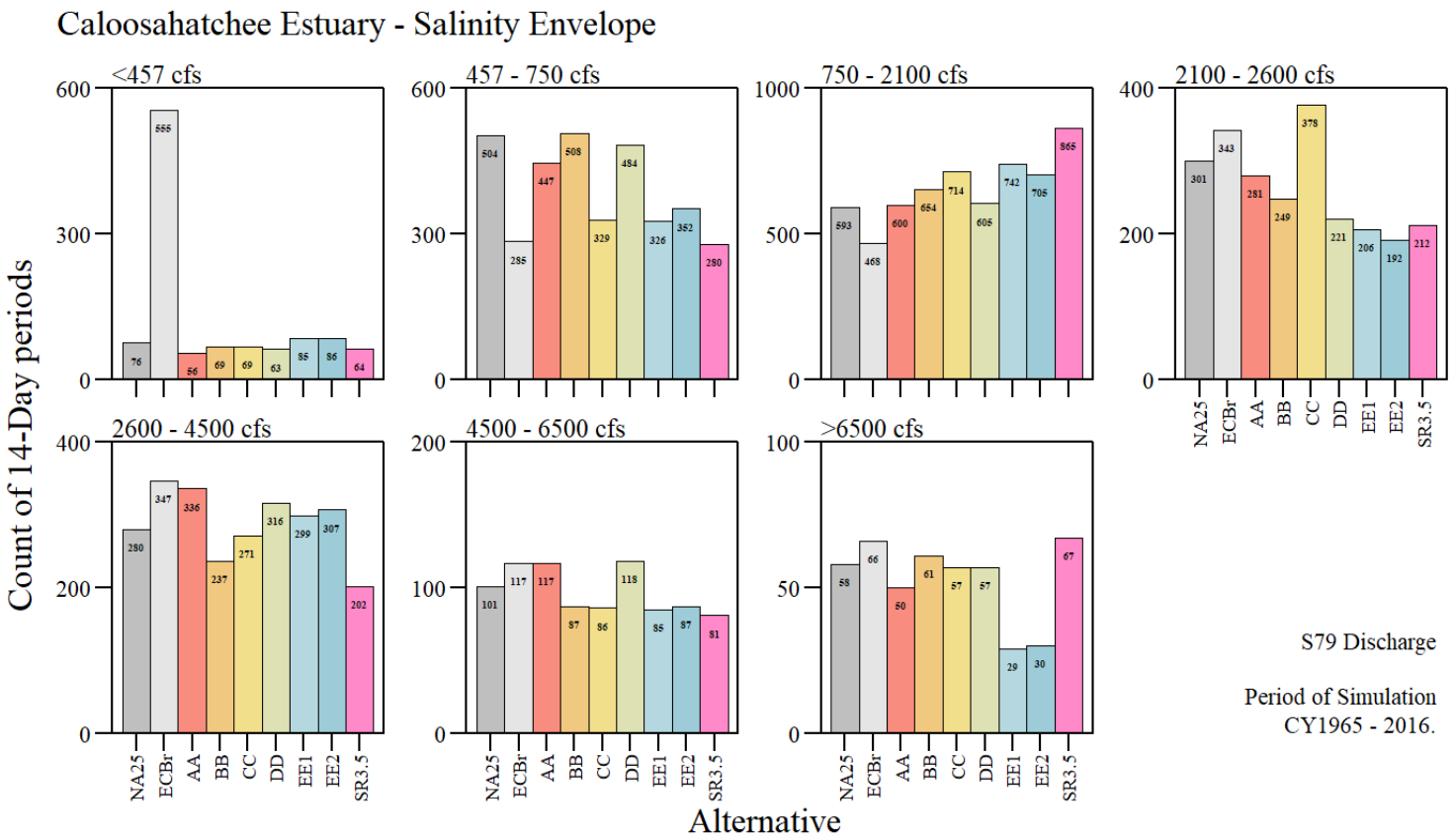
[1] FWO = NA25

Caloosahatchee Estuary

S77 and S79 total discharge volume for the 52 year simulation period (Jan 1965 - Dec 2016) for each alternative.

	Total Discharge (x1000 Ac-Ft)	
Alternative	S77	S79
NA25	30,402.49	67,280.74
ECBr	29,704.66	67,537.25
AA	32,933.91	69,791.61
BB	24,296.17	61,780.24
CC	33,035.20	70,062.62
DD	29,864.39	66,877.83
EE1	27,133.82	63,940.76
EE2	28,707.46	65,462.67
SR3.5	27,543.08	64,582.75

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.

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.

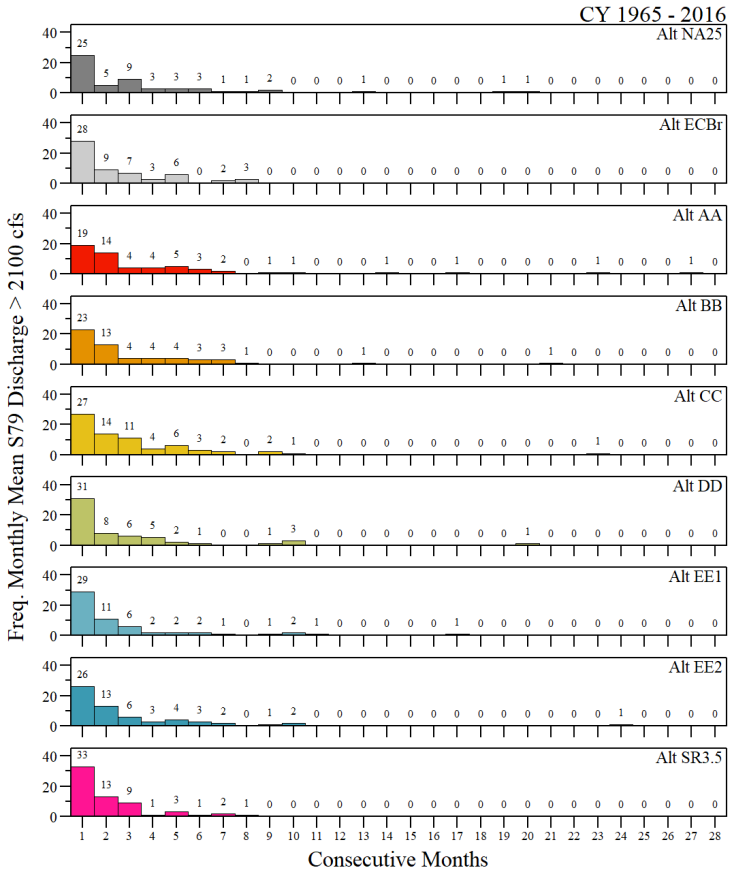
Alternative	<457 cfs	457 - 750 cfs	750 - 2100 cfs (Optimum)	2100 - 2600 cfs (Stress)	> 2600 cfs (Damaging)	2600 - 4500 cfs	4500 - 6500 cfs	>6500 cfs
NA25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ECBr	630.3	-43.5	-21.1	14.0	19.8	23.9	15.8	13.8
AA	-26.3	-11.3	1.2	-6.6	16.2	20.0	15.8	-13.8
BB	-9.2	0.8	10.3	-17.3	-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.

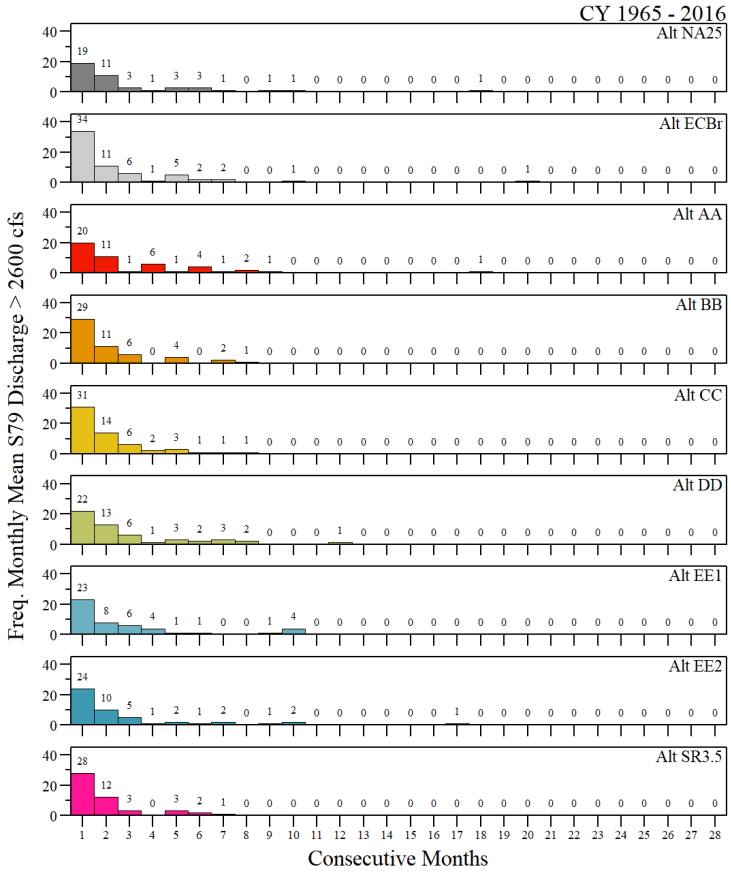
	2100 - 2600 cfs (High)		> 2600 cfs (Damaging)	
Alternative	Lake Regulatory	Basin	Lake Regulatory	Basin
NA25	0.0	0.0	0.0	0.0
ECBr	3.8	29.7	10.2	30.1
AA	0.5	-17.8	27.4	4.0
BB	-39.9	17.8	-36.0	6.9
CC	57.9	-24.6	-16.1	0.6
DD	-38.3	-8.5	11.3	2.9
EE1	-59.0	11.0	-18.8	7.5
EE2	-61.2	2.5	-11.3	10.4
SR3.5	-65.0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

Monthly Mean Discharge



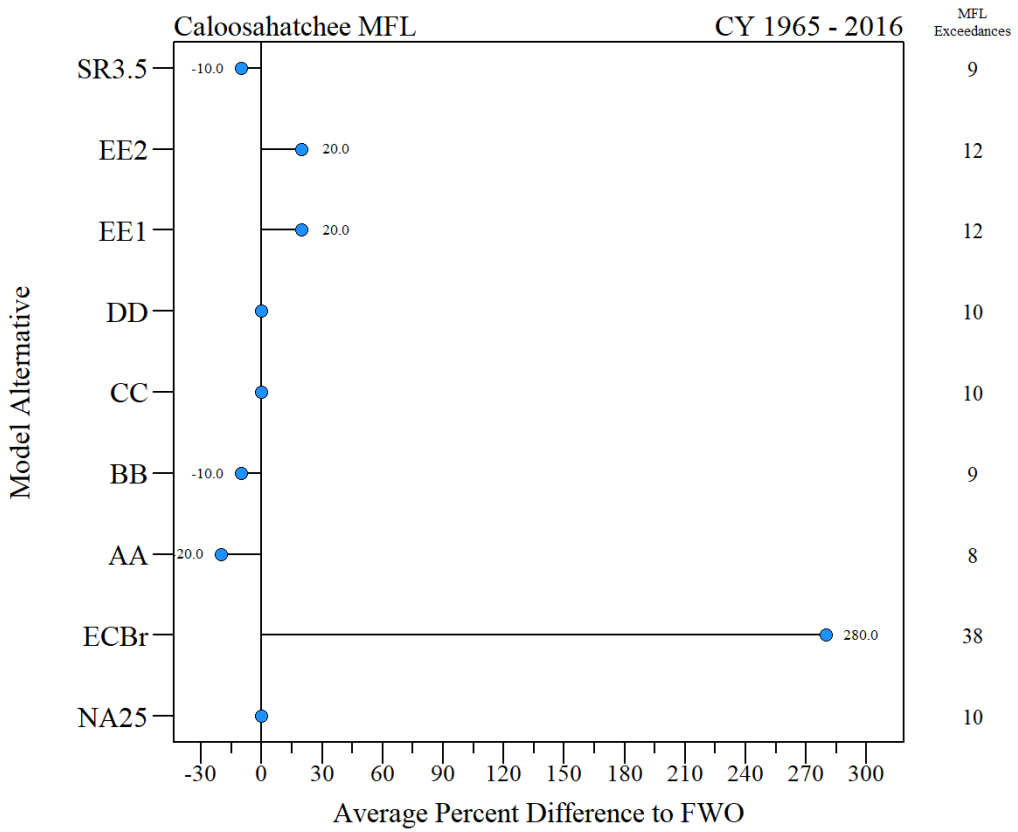
Frequency of consecutive months of monthly mean S79 discharges greater than 2100 cfs for each alternative across the simulation period of record (CY 1965 - 2016).

Monthly Mean Discharge



Frequency of consecutive months of monthly mean S79 discharges greater than 2600 cfs for each alternative across the simulation period of record (CY 1965 - 2016).

Caloosahatchee MFL



Percent average difference relative to FWO of MFL exceedances for the Caloosahatchee River estuary across alternatives including SR3.5 during the period of simulation.

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

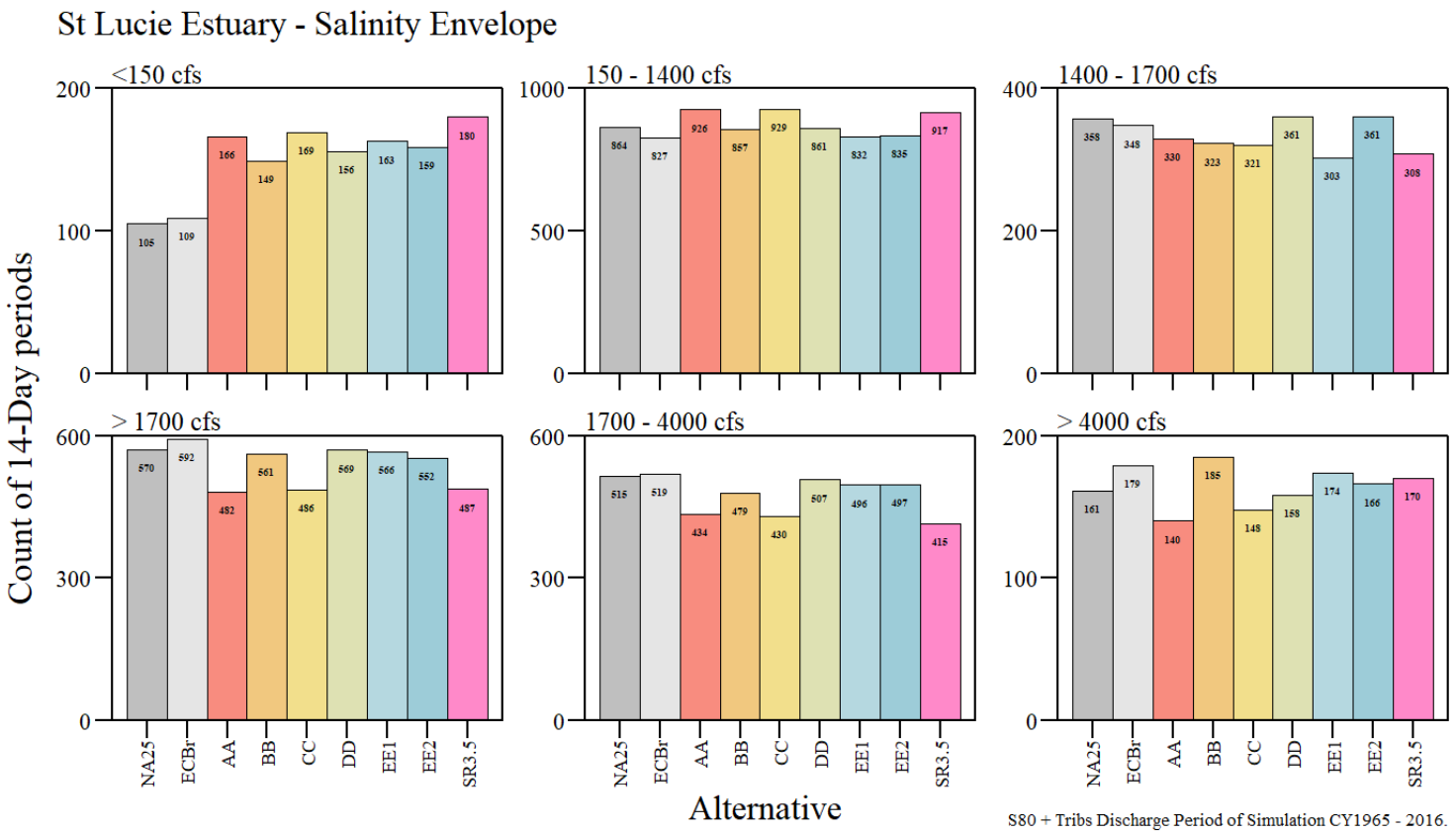
[1] FWO = NA25

St Lucie Estuary

S308, S80 and S308 backflow (return to Lake) total discharge volume for the 52 year simulation period (Jan 1965 - Dec 2016) for each alternative.

	Total Discharge (x1000 Ac-Ft)		
Alternative	S80	S308	S308 Backflow
NA25	14,376.736	10,139.770	1,979.257
ECBr	17,395.150	12,806.565	2,339.480
AA	6,775.453	2,925.595	2,367.484
BB	16,477.730	12,171.089	1,888.303
CC	7,978.168	4,124.103	2,357.296
DD	11,960.700	7,903.481	2,150.896
EE1	13,999.453	10,131.840	2,346.470
EE2	12,932.328	9,039.271	2,323.471
SR3.5	11,247.518	7,870.025	2,829.621

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.

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 (High)		> 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

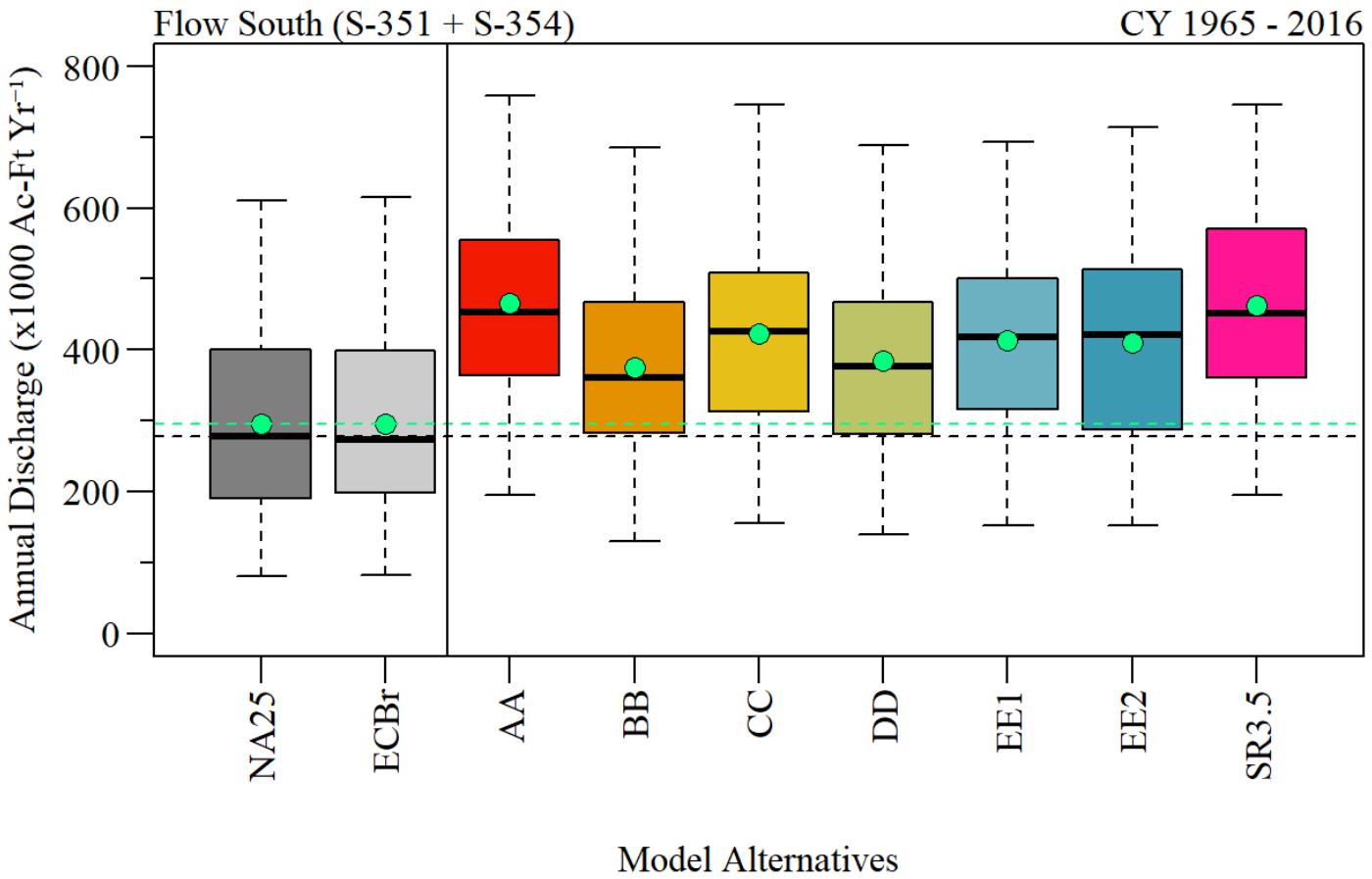
Flow South

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

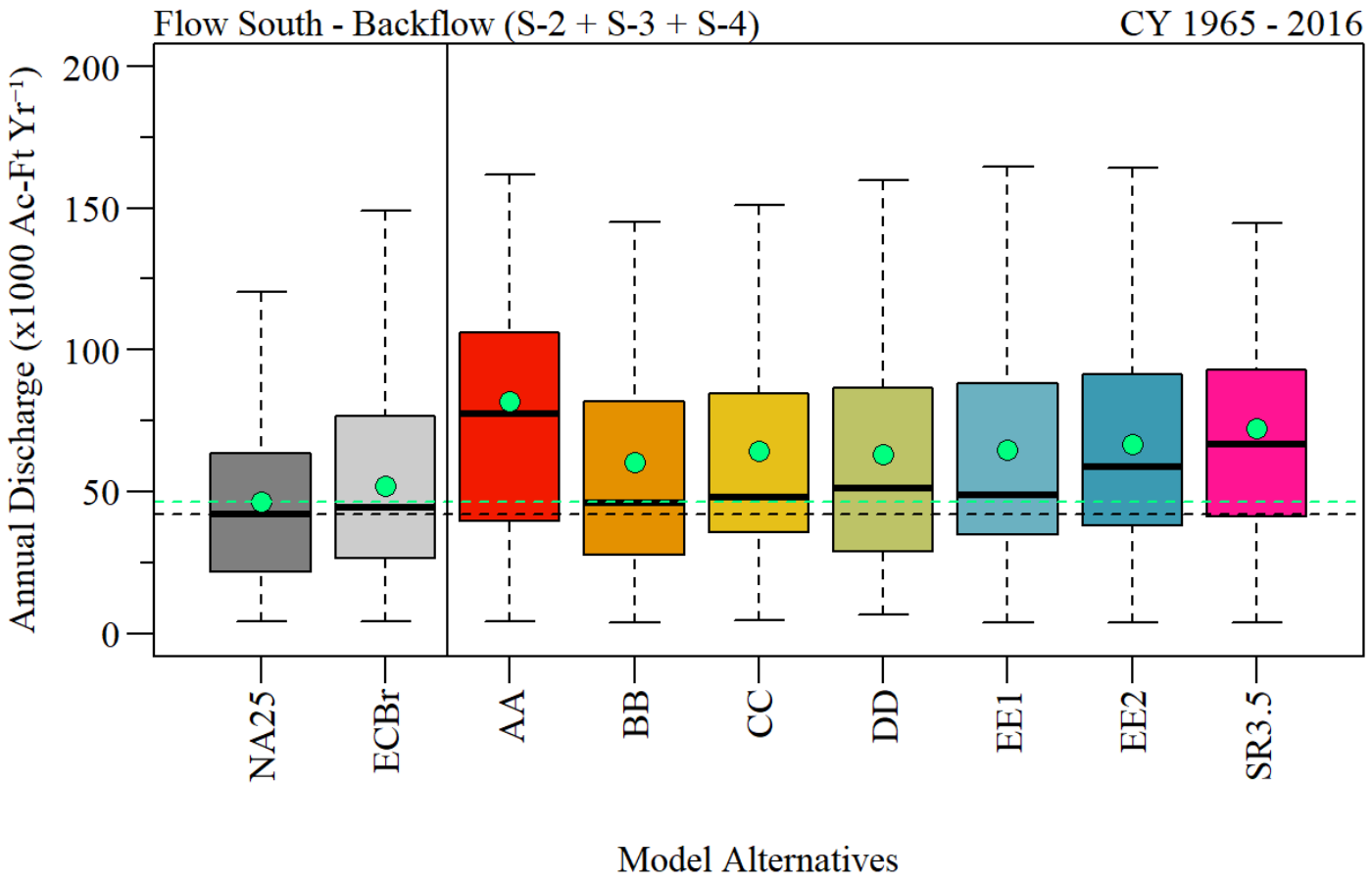
[1] FWO = NA25

Flow South



Boxplots of annual (calendar year) discharge for flows south (S351 and S354) for each alterntive across the simulation period of record including SR3.5.

Flow South - Backflow



Boxplots of annual (calendar year) discharge for S2, S3 and S4 (backflow to Lake) for each alterntive across the simulation period of record including SR3.5.