

RECOVER EAASR Regional Evaluation Addendum

RECOVER is providing this addendum to the previous regional evaluation of the EAASR project based on new information provided in the updated draft PIR. This addendum is a review of the updated modeling. RECOVER highlighted areas where performance has changed from the previous model analysis. The current analysis is based on the Next Added Increment –S5A model run. In this run the two EAA storage reservoirs are modeled as four cells. The reservoirs are each 15,360 acres divided into two cells (5120 and 10240 acres for each reservoir). Each of the reservoirs has a free flow connection between the two cells. The two reservoirs are also connected (via EAR3T1 and EAR4T2). The previous NAI alternatives reviewed by RECOVER included total reservoir acreage ranging from 26,500 to 62,000 acres and depths ranging from 14 to 6 feet for a total storage capacity of 360,000 acre-ft.

Lake Okeechobee:

LO Stages:

Extreme high stages above 17 ft are reduced under the NAI-S5A alternative compared to the 2050B3, 2050B2 and 2000B2 conditions (4 vs. 8 vs. 9 vs. 7 events, respectively). Although not to the same extent, stages above 15 ft for greater than 365 days were also reduced (1 vs. 2 events for NAI-S5A and 2050B3, respectively). Low stages below 11 ft perform slightly poorer under the NAI-S5A alternative than under the 2050B3 condition. There was no effect on stages below 12 ft for greater than 365 days.

*Recover did not use the stage envelope calculator (LO10) because the post processing results were not available. LO1 through LO4 encompass the stage targets established for the stage envelope PM.

EAA Backpumping to LO:

Average annual backpumping to the Lake is reduced even further in the NAI-S5A run compared to the previous analysis (8.94 vs. 18-25 vs. 40.43 thousand acre-ft/yr in the NAI-S5A, previous NAI and 2050B2 runs, respectively).

STA Bypass:

Reduction in STA 2 bypass was seen for both the 2050B3 condition and the NAI-S5A alternative. Bypasses were reduced from 2225 to 900-1200 to 0 acre-ft/yr under 2050B2, the previous NAI alternatives, and both the NAI-S5A and 2050B3 runs, respectively. STA 3 bypass was approximately 5600 acre-ft/yr for NAI-S5A alternative.

Northern Estuaries:

Caloosahatchee Estuary:

Caloosahatchee regulatory flows increased from the previous NAI run low of 183,000 to 250,000 acre-ft/year (average annual) in the NAI-S5A alternative. Although the S5A run performs poorer than the previous NAI run, both are still improvements over the 2050B3 condition (356,650 acre-ft/yr).

The NAI-S5A, similar to the previous NAI alternatives, performs poorly for the Caloosahatchee stage envelope dry season flows. The S5A alternative plan showed increased number of months with flows less than 300 cfs compared to the 2000B2, 2050B2 and 2050B3 conditions. This increase would negatively affect the salinity conditions within the estuary. Alternatively, extreme high flows (with LO regulatory) were much lower under S5A vs. 2050B3 (28 vs 42 months, respectively).

St Lucie Estuary:

Regulatory flows to the SL decline considerably under the NAI-S5A alternative compared to 2050B3 (average annual from 119,000 to 78,000 acre-ft/yr). This is also a decline from the 2000B3 condition (average annual = 129,000 acre-ft/yr)

High flows to the estuary improve slightly under to NAI-S5A alternative compared to the 2050B3. For low flows (<350 cfs), the NAI-S5A alternative performs slightly worse than the 2050B3 and 2000B3 conditions.

Lake Worth Lagoon:

The NAI-S5A alternative performs poorer than the 2050B3 condition for low flow events but the S5A alternative is an improvement for high flow events.

Greater Everglades:

The number of dry events in Shark River Slough is benefited under the NAI-S5A alternative compared to the 2050B3. In particular, in IR 132 the number of dry events declines from 22 to 14 events with only a small increase in duration.

For GE-2 no change is seen in the number and duration of events in WCA1. In WCA2, indicator region 113 is the only IR that considerable difference in % POR differs between the 2050B3 and the NAI alternative (86 vs 82 %). Although an increase over the without project condition is seen in number of events, the duration and % POR both fall short of the targets. Overall, little change in % POR inundated occurred in WCA3 North. In WCA 3A south inundation generally declines providing a % POR closer to NSM targets (as compared to the 2050B3 condition). Inundation duration and % POR (beneficially) increase in ENP under the NAI-S5A alternative compared to the 2050B3 condition.

Inundation duration and % POR increased in Marl (East Perrine and Ochopee) and Rocky Glade communities. This increase under the NAI-S5A alternative moves further away from established short hydroperiod targets.

For GE-3 (extreme highs and lows), little change was observed for WCA2 North. In IR 112, WCA2B North, extreme lows increased in the NAI-S5A alternative compared to the 2050B3 condition (from 5 to 11 events and from 1 to 2 % POR). In WCA2B South there was a small increase in duration of extreme low events and the % POR, but a large, beneficial decrease in the duration and % POR of high stages. WCA3A North had an increase in the number and % POR of high events under the NAI-S5A alternative compared to the 2050B3 condition. For IR 118 in WCA3A there were slightly fewer events but high events were of increased duration under the NAI-S5A alternative. This moves further away from the target compared to the 2050B3 condition. In IR 119, there were fewer extreme high events with shorter duration leading to a large drop in the % POR (56 to 46%) thereby benefiting the system. Under the NAI-S5A alternative, WCA3B generally increased in the % POR of harmful high events. No change was noted for the number and duration of high events in the Marl Prairies or Rocky Glades indicator regions.

The timing and distribution of GE inputs should be optimized using adaptive management principles. Current modeling indicates that the timing and distribution of flows could potentially negatively impact the system.

Water Supply and Flood Damage Protection:

LOSA:

The number of years with water restrictions declines under the NAI-S5A (4 years) alternative compared to the 2050B3 (12 years), 2000B3 (10 years), and the previous NAI (10-11 years) alternatives. Similar to the original regional evaluation, the duration and severity of some of the drought years are also reduced from the FWO.

LECSA:

A slight improvement in water restrictions occurred in LECSA areas 1 and 3 under the NAI-S5A alternative compared to the 2000B3 and 2050B3 conditions. This is an improvement for areas 1 and 3 over the original NAI alternatives. A minor increase in water restrictions occurred in LECSA area 2 (Table 15).

Conclusions:

The updated model results indicate that the EAASR project is consistent with and will benefit system wide objectives. Updated modeling indicated minor changes in performance from the previous round of modeling. RECOVER highlighted key differences in the text above. The recommendations provided in RECOVER's original

regional evaluation are still relevant. The bulleted list below highlights difference in performance between the current NAI (S5A) alternative and the previous model runs.

- LO high stages were reduced, further benefiting LO littoral vegetation and associated water quality (Table 1).
- Further reductions in both LO backpumping and STA2 bypasses were observed. STA3 bypasses were approximately 5600 acre-ft/yr (Tables 2 & 3).
- Caloosahatchee regulatory flows increased significantly from the previous model runs potentially negatively impacting estuarine performance. Low flows to the estuary performed poorly while extreme high flows were attenuated compared to the 2050B3.
- Similar to the previous round of modeling, the NAI alternative reduces high flows to the St Lucie Estuary. Low flows on the other hand perform slightly worse than the without project condition.
- GE patterns are not consistent across all PMs and IRs, but increased flow into ENP is observed under the NAI-S5A alternative. Increased inundation duration and % POR occurred in SRS IRs. East Perrine and Ochopee Marl prairies and E and W Rocky Glades IRs also show increased inundation duration and % POR inundated compared to the without project condition. Increased duration may negatively impact short hydroperiod marl and rocky glade communities. It appears that the timing, depth and distribution of water would likely benefit by using alternate triggers based on adaptive management principles and field observations.
- Transect and structure flows indicate additional water passing south into Everglades National Park over the base condition potentially benefiting Shark River Slough and Taylor Slough
- LOSA water restrictions are benefited under the NAI-S5A alternative compared to the previous analysis
- LECSA water restrictions are benefited in areas 1 and 3, but perform worse for area 2 compared to the original evaluation.

Attachment A: Tabular Comparison of EAA Storage Reservoir SFWMM Runs

LO 1-4 summary		
Stage above 17 ft	2050B3	8
	NAI-S5A	4
Stage above 15 ft	2050B3	2
	NAI-S5A	1
Stage below 11 ft	2050B3	11
	NAI-S5A	13
Stage below 12 ft	2050B3	2
	NAI-S5A	2

EAA backpumping to LO (1000 acre/ft)		
2050B3	40.43	
NAI-S5A	8.94	

STA 2 Bypasses		
2050B3	0	
NAI-S5A	0	

STA 3 Bypasses (acre-ft/year)		
2050B3		
NAI-S5A	5600	

Caloosahatchee Regulatory Flows from LO		
2050B3	356.65	kac/ft
NAI-S5A	249.88	kac/ft

Caloosahatchee salinity envelope			
	Target	2050B3	NAI-S5A
<300 cfs	70	146	164
>2800 cfs	26	41	41
>2800 cfs (LO reg)	0	42	28

SL Regulatory from LO		
2050B3	118.95	kac/ft
NAI-S5A	77.21	kac/ft

SLE salinity envelope			
	Target	2050B3	NAI-S5A
<350 cfs	207	129	135
>2000 cfs	28	69	65
>2000 cfs (LO release)	0	48	28

SLE high discharge			
	Target	2050B3	NAI-S5A
flow between 2000-3000	22	44	40
flow > 3000 cfs	14	26	18

LWL salinity envelope		
	2050B3	NAI-S5A
0 cfs	17	22
> 500 cfs	102	88

GE1- Dry Events in Shark River Slough					
IR		4.62	2050B3	NAI-S5A	2000B3
129	#	2	15	13	
129	duration	10	18	17	
130	#	4	15	11	
130	duration	23	16	16	
131	#	7	17	13	
131	duration	18	16	16	
132	#	9	22	14	
132	duration	14	14	15	

Regulatory to the WCAs from LO		
2050B3	105.06	kac/ft
NAI-S5A	147.72	kac/ft

Water Supply to LEC from LO		
2050B3	37.17	kac/ft
NAI-S5A	58.12	kac/ft

LOSA water restrictions	Target	2050B3	NAI-S5A	2000B3
# of years	3	12	4	10

LECSA water restrictions	Target	2050B3	NAI-S5A	2000B3
area 1	3	7	5	7
area 2	3	27	28	23
area 3	3	6	4	6

Structure Flows	2050B3	NAI-S5A
S12A	49.4	104.2
S12B	95.1	135.6
S12C	120.8	155
S12D	152.1	191.2
S332B	27.3	29.8
S332C	34.9	37.9
S332D	128.7	148.4

1000s of acre-ft