

**STA & Reservoir Performance Measures for the Everglades Restudy
Workbook for Ranking Alternatives**

prepared for

U.S. Army Corps of Engineers & U.S. Department of the Interior

by

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Methodology: Weighted ranking scheme described in Eric Bush e-mail to Restudy water quality group, May 13, 1998.

Preliminary Scores (Scale 1-10, higher score means better performance):

	<u>50Base</u>	<u>ALT-A</u>	<u>ALT-B</u>	<u>ALT-C</u>	<u>ALT-D</u>	<u>A-D13R</u>
BMP Performance = 25% (ECP Design)						
Concentration Criteria	5.8	8.3	7.1	4.8	3.3	5.6
Load Criteria	5.0	8.6	5.6	5.3	5.0	7.2
Hydrologic Criteria	3.8	5.0	6.7	6.7	7.1	6.3
SA/EFA Criteria	4.7	7.7	8.0	4.7	4.3	5.7
Combined	5.0	7.7	6.8	5.2	4.6	6.2
BMP Performance = 51% (1995-1997)						
Concentration Criteria	6.5	8.1	6.3	4.4	3.5	6.0
Load Criteria	7.2	8.1	5.3	5.0	4.4	5.3
Hydrologic Criteria	3.8	5.0	6.7	6.7	7.1	6.3
SA/EFA Criteria	5.0	7.7	7.7	4.7	4.3	5.7
Combined	5.9	7.5	6.4	5.0	4.6	5.8

<u>Sheet</u>	<u>Description</u>	<u>BMP Performance</u>
Values1	Performance Indicator Values for Each Alternative	25% (ECP Design)
Rankings1	PI Rankings & Scores	25% (ECP Design)
Values2	Performance Indicator Values for Each Alternative	51% (1995-1997)
Rankings2	PI Rankings & Scores	51% (1995-1997)
Definitions	PM Descriptions & Weights	

Note: Results shown are for illustrative purposes only.
Weighting factors to be selected by consensus & entered in 'Definitions' sheet

Input Values:
Tolerance **1%** PI values within X% of best value are equivalent & all ranked highest.
Highest Score **10** Used to rescale weighted mean ranks

Workbook: RANKS.XLS

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STA & Reservoir Performance Measures

Numerical Values

BMP Performance:

25% (ECP Design)

<u>No</u>	<u>Performance Indicator</u>	<u>Units</u>	<u>Pd</u>	<u>95Base</u>	<u>50Base</u>	<u>ALT-A</u>	<u>ALT-B</u>	<u>ALT-C</u>	<u>ALT-D</u>	<u>A-D13R</u>	<u>Target</u>
Concentration Criteria											
1	WCA Inflow Concentration	ppb	65-95	156	62	56	57	57	58	57	<50
2	WCA Inflow Conc., Excl. STA-5	ppb	65-95	142	60	52	54	54	54	54	<50
3	Refuge Inflow Concentration	ppb	65-95	154	50	52	52	52	55	54	<50
4	STA-1E Outflow Conc	ppb	65-95		43	46	46	46	45	45	<50
5	STA-1W Outflow Conc	ppb	65-95		55	57	57	57	62	62	<50
6	STA-2 Outflow Conc	ppb	65-95		76	63	65	66	67	63	<50
7	STA-34 Outflow Conc	ppb	65-95		55	45	48	48	48	48	<50
8	STA-5 Outflow Conc	ppb	65-95		98	99	99	99	99	99	<50
9	STA-6 Outflow Conc	ppb	65-95		61	61	61	61	60	60	<50
Load Criteria											
10	WCA Total Load	mt/yr	65-95	253.0	104.5	98.3	104.7	102.4	104.7	102.2	Min
11	Refuge Total Load	mt/yr	65-95	106.5	19.8	21.6	21.6	21.7	23.4	23.3	Min
12	Total Load Reduction	mt/yr	65-95	0.0	164.3	168.9	169.1	166.5	168.1	168.7	Max
13	Total Load with C > 50 ppb	mt/yr	65-95	251.0	95.7	53.6	56.5	57.4	59.8	56.4	Min
14	STA ByPass Load	mt/yr	65-95	249.2	4.3	4.9	7.1	7.1	7.1	7.1	Min
15	LEC P Load	mt/yr	65-95	3.5	11.3	7.5	8.6	8.2	6.2	7.0	Min
Hydrologic Criteria											
16	Freq. Depth < 6 inches	%	65-95		2.6%	1.2%	1.1%	1.0%	1.1%	1.1%	Min
17	Freq. Depth > 4 ft	%	65-95		0.4%	0.4%	0.6%	0.8%	0.8%	0.7%	Min
18	WCA Inflow Volume	kac-ft/yr	65-95	1314	1373	1434	1493	1443	1460	1441	Max
19	Refuge Inflow Volume	kac-ft/yr	65-95	559	324	338	337	338	347	347	Max
Everglades Forever Act & Settlement Agreement Criteria											
20	WCA Inflow Concentration	ppb	79-88	151	55	48	50	51	51	50	<50 (EFA)
21	WCA Inflow Conc., Excl. STA-5	ppb	79-88		56	46	49	49	49	48	<50 (SA)
22	Refuge Inflow Concentration	ppb	79-88	154	47	49	49	49	51	51	<50 (SA, EFA)
23	STA ByPass Load	mt/yr	79-88	217.4	4.7	4.1	6.3	6.4	6.4	6.4	= 0 (SA, EFA)
24	WCA Inflow Vol Increase	%	79-88	7%	12%	14%	23%	19%	20%	19%	>=28% (EFA)

STA & Reservoir Performance Measures

Ranks: 5=High, 1=Low

BMP Performance: 25% (ECP Design)

No	Performance Indicator	Weight*	Pd	50Base	ALT-A	ALT-B	ALT-C	ALT-D	A-D13R	Range %
Concentration Criteria										
1	WCA Inflow Concentration	1	65-95	1	6	5	3	2	4	11%
2	WCA Inflow Conc., Excl. STA-5	1	65-95	1	6	5	3	2	4	14%
3	Refuge Inflow Concentration	1	65-95	6	4	5	3	1	2	9%
4	STA-1E Outflow Conc	1	65-95	6	3	1	1	4	5	9%
5	STA-1W Outflow Conc	1	65-95	6	4	5	3	1	2	13%
6	STA-2 Outflow Conc	1	65-95	1	6	4	3	2	6	19%
7	STA-34 Outflow Conc	1	65-95	1	6	5	4	3	2	20%
8	STA-5 Outflow Conc	1	65-95	6	5	4	3	1	2	1%
9	STA-6 Outflow Conc	0	65-95	6	3	2	1	6	6	2%
	Weighted Mean Score (1-10)			5.8	8.3	7.1	4.8	3.3	5.6	
Load Criteria										
10	WCA Total Load	1	65-95	3	6	1	4	2	5	6%
11	Refuge Total Load	1	65-95	6	4	5	3	1	2	16%
12	Total Load Reduction	1	65-95	1	6	6	2	6	6	3%
13	Total Load with C > 50 ppb	1	65-95	1	6	4	3	2	5	67%
14	STA ByPass Load	1	65-95	6	5	2	4	1	3	45%
15	LEC P Load	1	65-95	1	4	2	3	6	5	63%
	Weighted Mean Score (1-10)			5.0	8.6	5.6	5.3	5.0	7.2	
Hydrologic Criteria										
16	Freq. Depth < 6 inches	1	65-95	1	2	4	6	5	3	120%
17	Freq. Depth > 4 ft	1	65-95	6	5	4	2	1	3	77%
18	WCA Inflow Volume	1	65-95	1	2	6	4	5	3	8%
19	Refuge Inflow Volume	1	65-95	1	3	2	4	6	6	7%
	Weighted Mean Score (1-10)			3.8	5.0	6.7	6.7	7.1	6.3	
Everglades Forever Act & Settlement Agreement Criteria										
20	WCA Inflow Concentration	1	79-88	1	6	5	3	2	4	14%
21	WCA Inflow Conc., Excl. STA-5	1	79-88	1	6	4	2	3	5	19%
22	Refuge Inflow Concentration	1	79-88	6	3	5	4	2	1	7%
23	STA ByPass Load	1	79-88	5	6	4	2	1	3	40%
24	WCA Inflow Vol Increase	1	79-88	1	2	6	3	5	4	62%
	Weighted Mean Score (1-10)			4.7	7.7	8.0	4.7	4.3	5.7	
	Combined Weighted Mean Score (1-10)			5.0	7.7	6.8	5.2	4.6	6.2	

Range % = (Max - Min) / Average; low values indicate small differences among alternatives 7/16/98

* Assigned Weights are for demonstration purposes only; these need to be determined by group consensus.

Enter alternative weights in column C of 'Definitions' table. Weight can be any value >=0.

STA & Reservoir Performance Measures

Numerical Values

BMP Performance:

51% (1995-1997)

<u>No</u>	<u>Performance Indicator</u>	<u>Units</u>	<u>Pd</u>	<u>95Base</u>	<u>50Base</u>	<u>ALT-A</u>	<u>ALT-B</u>	<u>ALT-C</u>	<u>ALT-D</u>	<u>A-D13R</u>	<u>Target</u>
Concentration Criteria											
1	WCA Inflow Concentration	ppb	65-95	114	46	45	46	46	47	46	<50
2	WCA Inflow Conc., Excl. STA-5	ppb	65-95	99	45	42	43	43	43	43	<50
3	Refuge Inflow Concentration	ppb	65-95	115	44	46	46	46	48	48	<50
4	STA-1E Outflow Conc	ppb	65-95		42	46	46	46	45	45	<50
5	STA-1W Outflow Conc	ppb	65-95		43	45	45	45	49	49	<50
6	STA-2 Outflow Conc	ppb	65-95		49	42	44	45	45	41	<50
7	STA-34 Outflow Conc	ppb	65-95		39	36	38	38	38	38	<50
8	STA-5 Outflow Conc	ppb	65-95		89	90	90	90	90	90	<50
9	STA-6 Outflow Conc	ppb	65-95		33	34	34	34	33	33	<50
Load Criteria											
10	WCA Total Load	mt/yr	65-95	184.9	78.7	79.7	85.0	82.8	84.5	82.7	Min
11	Refuge Total Load	mt/yr	65-95	79.1	17.5	19.1	19.1	19.2	20.4	20.4	Min
12	Total Load Reduction	mt/yr	65-95	0.0	125.1	131.6	132.4	129.4	130.6	130.5	Max
13	Total Load with C > 50 ppb	mt/yr	65-95	183.0	16.7	20.2	21.5	21.5	21.6	21.5	Min
14	STA ByPass Load	mt/yr	65-95	181.1	2.7	2.9	4.2	4.2	4.2	4.2	Min
15	LEC P Load	mt/yr	65-95	3.5	11.2	7.3	8.5	8.1	6.1	6.8	Min
Hydrologic Criteria											
16	Freq. Depth < 6 inches	%	65-95		2.6%	1.2%	1.1%	1.0%	1.1%	1.1%	Min
17	Freq. Depth > 4 ft	%	65-95		0.4%	0.4%	0.6%	0.8%	0.8%	0.7%	Min
18	WCA Inflow Volume	kac-ft/yr	65-95	1314	1373	1434	1493	1443	1460	1441	Max
19	Refuge Inflow Volume	kac-ft/yr	65-95	559	324	338	337	338	347	347	Max
Everglades Forever Act & Settlement Agreement Criteria											
20	WCA Inflow Concentration	ppb	79-88	112	42	40	41	42	42	42	<50 (EFA)
21	WCA Inflow Conc., Excl. STA-5	ppb	79-88	99	42	38	40	41	40	40	<50 (SA)
22	Refuge Inflow Concentration	ppb	79-88	115	42	44	44	44	45	45	<50 (SA, EFA)
23	STA ByPass Load	mt/yr	79-88	159.5	2.8	2.4	3.7	3.7	3.8	3.7	= 0 (SA, EFA)
24	WCA Inflow Vol Increase	%	79-88	7%	12%	14%	23%	19%	20%	19%	>=28% (EFA)

STA & Reservoir Performance Measures

Ranks: 5=High, 1=Low

BMP Performance: 51% (1995-1997)

<u>No</u>	<u>Performance Indicator</u>	<u>Weight*</u>	<u>Pd</u>	<u>50Base</u>	<u>ALT-A</u>	<u>ALT-B</u>	<u>ALT-C</u>	<u>ALT-D</u>	<u>A-D13R</u>	<u>Range %</u>
Concentration Criteria										
1	WCA Inflow Concentration	1	65-95	4	6	5	2	1	3	4%
6-July-9	WCA Inflow Conc., Excl. STA-5	1	65-95	1	6	4	2	3	5	8%
3	Refuge Inflow Concentration	1	65-95	6	4	5	3	1	2	8%
4	STA-1E Outflow Conc	1	65-95	6	3	1	1	4	5	9%
5	STA-1W Outflow Conc	1	65-95	6	4	5	3	1	2	12%
6	STA-2 Outflow Conc	1	65-95	1	5	4	3	2	6	17%
7	STA-34 Outflow Conc	1	65-95	1	6	2	5	4	3	8%
8	STA-5 Outflow Conc	1	65-95	6	5	4	2	1	3	2%
9	STA-6 Outflow Conc	0	65-95	6	2	3	1	6	6	2%
	Weighted Mean Score (1-10)			6.5	8.1	6.3	4.4	3.5	6.0	
Load Criteria										
10	WCA Total Load	1	65-95	6	5	1	3	2	4	8%
11	Refuge Total Load	1	65-95	6	4	5	3	1	2	15%
12	Total Load Reduction	1	65-95	1	6	6	2	4	3	6%
13	Total Load with C > 50 ppb	1	65-95	6	5	4	3	1	2	24%
14	STA ByPass Load	1	65-95	6	5	1	4	2	3	41%
15	LEC P Load	1	65-95	1	4	2	3	6	5	64%
	Weighted Mean Score (1-10)			7.2	8.1	5.3	5.0	4.4	5.3	
Hydrologic Criteria										
16	Freq. Depth < 6 inches	1	65-95	1	2	4	6	5	3	120%
17	Freq. Depth > 4 ft	1	65-95	6	5	4	2	1	3	77%
18	WCA Inflow Volume	1	65-95	1	2	6	4	5	3	8%
19	Refuge Inflow Volume	1	65-95	1	3	2	4	6	6	7%
	Weighted Mean Score (1-10)			3.8	5.0	6.7	6.7	7.1	6.3	
Everglades Forever Act & Settlement Agreement Criteria										
20	WCA Inflow Concentration	1	79-88	2	6	5	3	1	4	5%
21	WCA Inflow Conc., Excl. STA-5	1	79-88	1	6	3	2	4	5	11%
22	Refuge Inflow Concentration	1	79-88	6	3	5	4	2	1	5%
23	STA ByPass Load	1	79-88	5	6	4	2	1	3	40%
24	WCA Inflow Vol Increase	1	79-88	1	2	6	3	5	4	62%
	Weighted Mean Score (1-10)			5.0	7.7	7.7	4.7	4.3	5.7	
	Combined Weighted Mean Score (1-10)			5.9	7.5	6.4	5.0	4.6	5.8	

Range % = (Max - Min) / Average; low values indicate small differences among alternatives

7/16/98

* Assigned Weights are for demonstration purposes only; these need to be determined by group consensus.

Enter alternative weights in column C of 'Definitions' table. Weight can be any value >=0.

STA & Reservoir Performance Measures - Definitions

<u>No</u>	<u>Performance Indicator</u>	<u>Sign</u>	<u>Weight</u>	<u>Description</u>
Concentration Criteria				
1	WCA Inflow Concentration	-1	1	average inflow concentration to WCA's*
2	WCA Inflow Conc., Excl. STA-5	-1	1	same as 1, excluding STA-5; basins considered in Settlement Agreement*
3	Refuge Inflow Concentration	-1	1	average inflow concentration to Refuge *
4	STA-1E Outflow Conc	-1	1	average outflow concentration from STA-1E, including bypasses
5	STA-1W Outflow Conc	-1	1	average outflow concentration from STA-1W, including bypasses
6	STA-2 Outflow Conc	-1	1	average outflow concentration from STA-2, including bypasses
7	STA-34 Outflow Conc	-1	1	average outflow concentration from STA-34, including bypasses
8	STA-5 Outflow Conc	-1	1	average outflow concentration from STA-5, including bypasses
9	STA-6 Outflow Conc	-1	0	average outflow concentration from STA-6, including bypasses
Load Criteria				
10	WCA Total Load	-1	1	total load to WCA's *
11	Refuge Total Load	-1	1	total load to Loxahatchee National Wildlife Refuge *
12	Total Load Reduction	1	1	total load reduction (outflow - inflow) accomplished by STA's & Reservoirs
13	Total Load with C > 50 ppb	-1	1	total load with concentration > 50 ppb *
14	STA ByPass Load	-1	1	total bypass load for all STA's *
15	LEC P Load	-1	1	load in urban-water supply deliveries through WCA's, bypassing treatment
Hydrologic Criteria				
16	Freq. Depth < 6 inches	-1	1	frequency of depths < 6 inches, area-weighted mean across all STA's
17	Freq. Depth > 4 ft	-1	1	frequency of depths > 4 feet, area-weighted mean across all STA's
18	WCA Inflow Volume	1	1	total inflow volume to WCA's *
19	Refuge Inflow Volume	1	1	total inflow volume to Refuge *
Everglades Forever Act & Settlement Agreement Criteria				
20	WCA Inflow Concentration	-1	1	average inflow conc. To WCA's, 1979-1988 base period*
21	WCA Inflow Conc., Excl. STA-5	-1	1	average inflow conc. To WCA's, excluding STA-5, 1979-1988 base period*
22	Refuge Inflow Concentration	-1	1	average inflow conc to Refuge, 1979-1988 base period *
23	STA ByPass Load	-1	1	total bypass load for all STA's, 1979-1988 base period*
24	WCA Inflow Vol Increase	1	1	percent increase in total WCA inflow volume, relative to 1979-1988 base pd*

* excluding urban water-supply deliveries

Signs: +1 higher values are preferred, -1 lower values are preferred

Weights are used to calculate weighted-mean rankings within each category; enter values >=0