

# Appendix 5B-3: Emergent and Submerged Aquatic Vegetation Coverage in the STAs

Yaoyang Yan, Michael Chimney,  
Delia Ivanoff and Hongjun Chen

The Everglades Stormwater Treatment Area (STA) vegetation mapping program has several objectives: (1) documentation of areal coverage of emergent aquatic vegetation (EAV), submerged aquatic vegetation (SAV), and open-water areas based on aerial images; (2) mapping dominant vegetation types on an as-needed basis; (3) monitoring changes in vegetation density in problematic cells; and (4) assessing hydraulic condition as influenced by presence or absence of vegetation. Ground truthing via helicopter flights supplements the aerial imagery. Future goals include being able to relate coverage and density to STA performance, estimate P storage in biomass, and determine hydraulic effects of vegetation resistance.

The 2012 digital imagery was collected on April 12 and 25, 2012 utilizing a Vexcel UltraCamX large format digital camera mounted in a Cessna 208 Grand Caravan aircraft flying at an approximate altitude of 13,500 feet above ground level. Raw images were processed using Microsoft Vexcel UltraMap 1.0. Stereo imagery was captured with 60 percent overlap between adjacent frames and 40 percent overlap between adjacent flight lines. Vegetation cover maps for STA 1 East, 1 West, 2, 3/4, 5, and 6 were produced using unsupervised classification of the color infrared bands of this imagery. Image processing software (ERDAS Imagine 2010) was also used to reclassify, filter, and aggregate the initial classification. Expert knowledge and ground truthing of vegetation composition were employed to conduct final edits, calculate acreage, and output results cartographically using Geographic Information System (GIS) software.

Among the limitations of STA aerial imagery are (1) photographic overflights are limited to once a year only during the dry season, and (2) the inability to discriminate between areas covered with SAV versus open-water areas. Since acquiring aerial imagery requires clear weather with a cloudless sky, flights oftentimes occur during periods when the water levels in the STAs are receding (i.e., the dry season). Wetland vegetation coverage can change quickly depending on hydrologic conditions. For example, some areas covered with SAV and open-water areas may be rapidly covered with EAV when the water level recedes and conditions become conducive to EAV growth and expansion. For the STA maps and data summaries presented in this appendix, coverage is distinguished among areas covered with EAV, areas covered with open-water or SAV (Water/SAV), and bare areas (Bare Area). Bare Area includes areas of dry soil and dead grasses (often times less than 1 percent; largest was in STA-1E Cell 2, with 15 percent of area) during the time of the aerial flight.

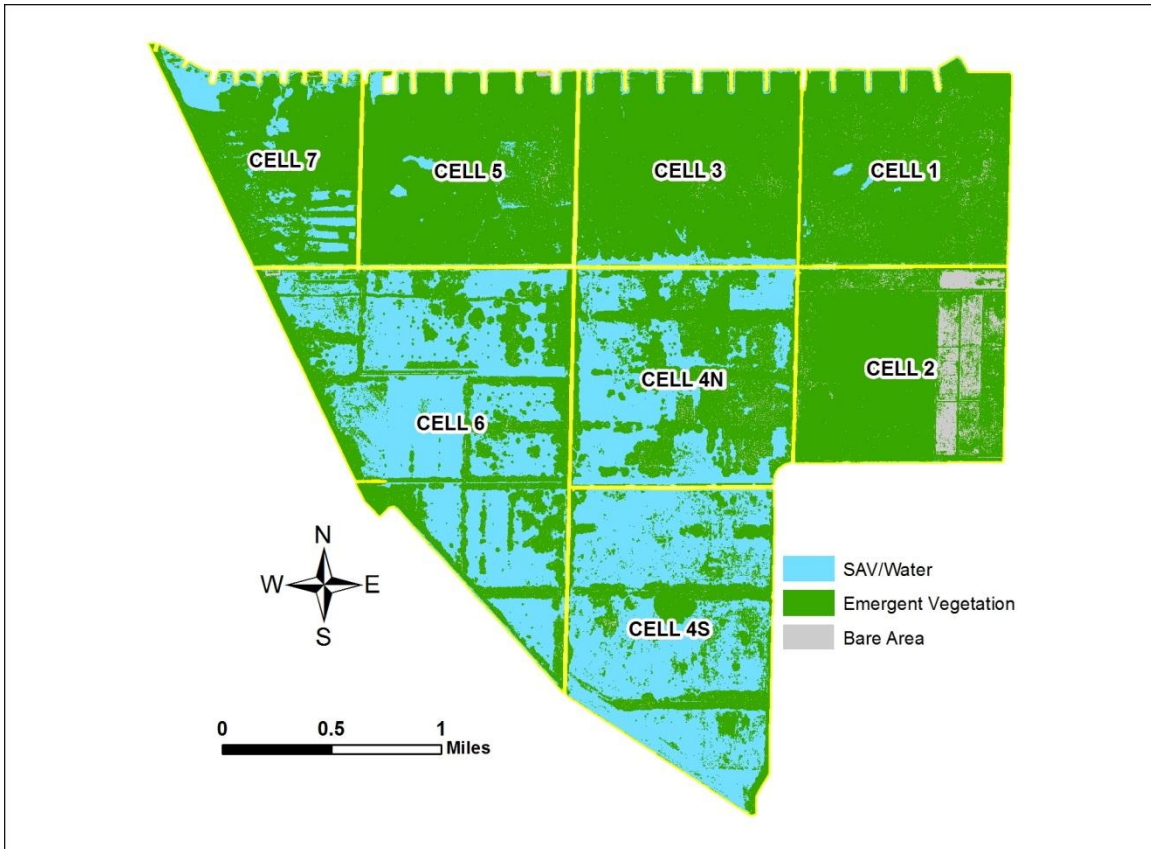
For consistency with previous reports, vegetation data is not discussed for Cells 5-8 of STA- 2, the PSTA Project cell in STA-3/4, and Cells 5-4A, 5-4B, 5-5A, 5-5B, and 6-4 of STA-5/6 in this report.

---

## STORMWATER TREATMENT AREA 1 EAST

---

Cell	Coverage Type	Estimated Coverage (acre)	% Coverage	Cell Area (acre)
Cell 1	Water/SAV	21.08	3.90	540.69
	EAV	510.47	94.41	
	Bare Area	9.14	1.69	
Cell 2	Water/SAV	7.56	1.40	540.48
	EAV	452.12	83.65	
	Bare Area	80.80	14.95	
Cell 3	Water/SAV	66.28	11.58	572.17
	EAV	503.30	87.96	
	Bare Area	2.59	0.45	
Cell 4N	Water/SAV	346.94	54.65	634.82
	EAV	278.85	43.93	
	Bare Area	9.03	1.42	
Cell 4S	Water/SAV	595.21	81.35	731.64
	EAV	133.34	18.23	
	Bare Area	3.09	0.42	
Cell 5	Water/SAV	112.08	20.66	542.40
	EAV	427.31	78.78	
	Bare Area	3.01	0.55	
Cell 6	Water/SAV	704.82	68.23	1033.04
	EAV	320.03	30.98	
	Bare Area	8.19	0.79	
Cell 7	Water/SAV	134.48	33.81	397.78
	EAV	261.62	65.77	
	Bare Area	1.68	0.42	

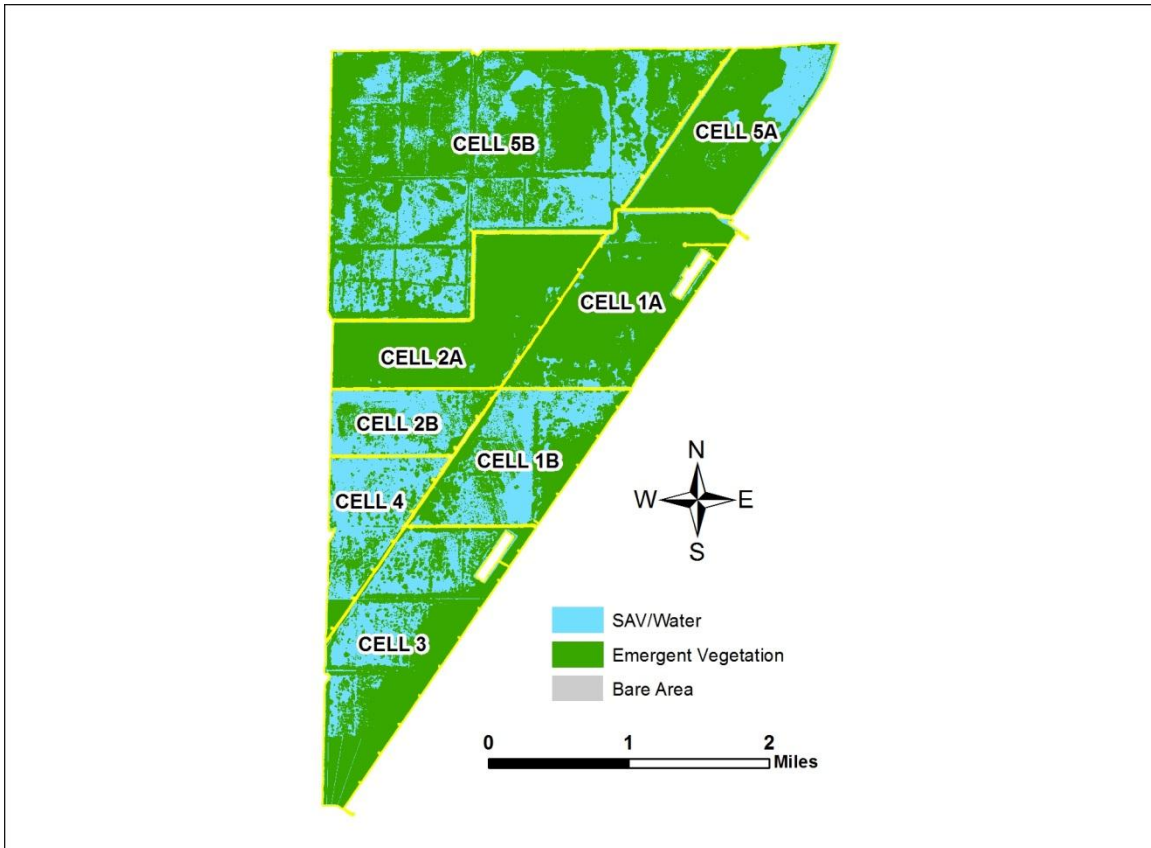


---

## STORMWATER TREATMENT AREA 1 WEST

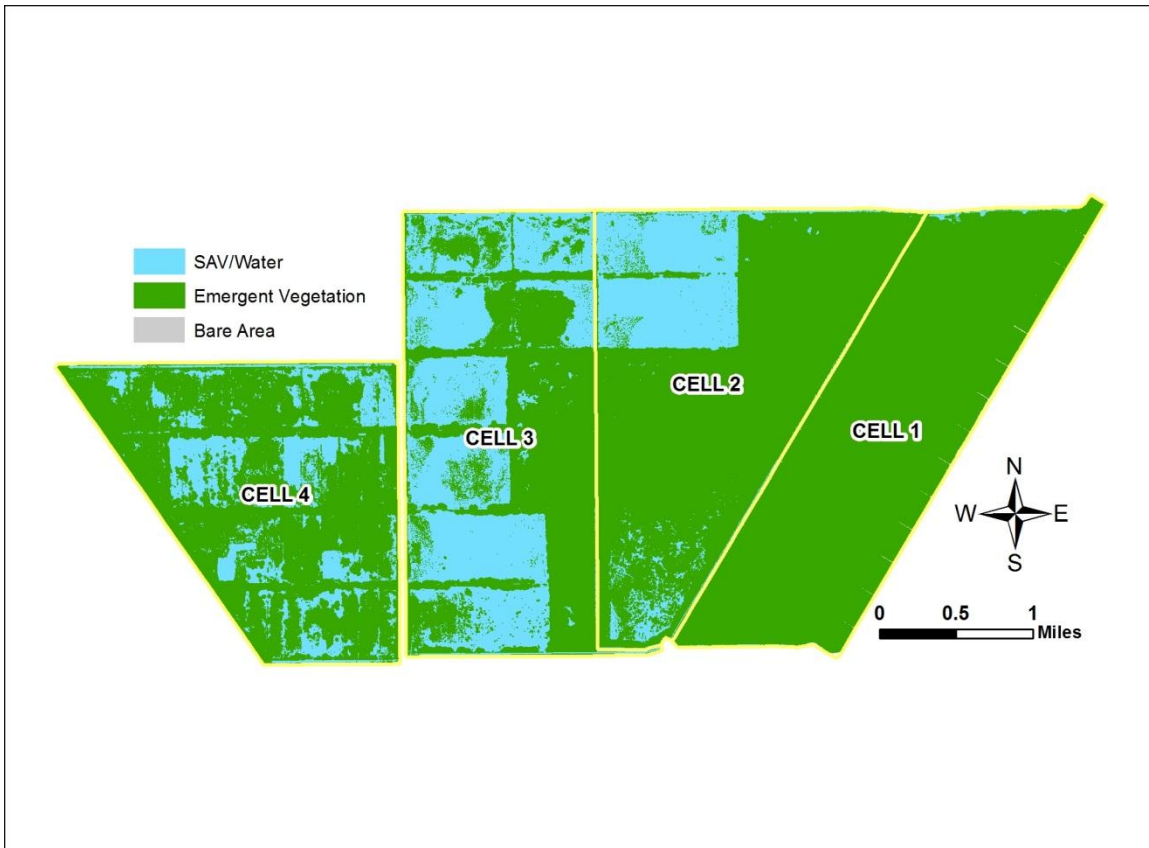
---

Cell	Coverage Type	Estimated Coverage (acre)	% Coverage	Cell Area (acre)
Cell 1A	Water/SAV	150.22	21.05	713.51
	EAV	540.56	75.76	
	Bare Area	22.72	3.18	
Cell 1B	Water/SAV	440.23	76.26	577.25
	EAV	121.62	21.07	
	Bare Area	15.39	2.67	
Cell 2A	Water/SAV	185.88	26.50	701.47
	EAV	492.91	70.27	
	Bare Area	22.67	3.23	
Cell 2B	Water/SAV	285.22	92.26	309.14
	EAV	22.46	7.27	
	Bare Area	1.45	0.47	
Cell 3	Water/SAV	558.79	63.44	880.82
	EAV	307.91	34.96	
	Bare Area	14.11	1.60	
Cell 4	Water/SAV	325.42	90.71	358.74
	EAV	30.75	8.57	
	Bare Area	2.57	0.72	
Cell 5A	Water/SAV	209.74	34.82	602.43
	EAV	388.80	64.54	
	Bare Area	3.88	0.64	
Cell 5B	Water/SAV	1772.10	73.79	2401.63
	EAV	611.96	25.48	
	Bare Area	17.44	0.73	



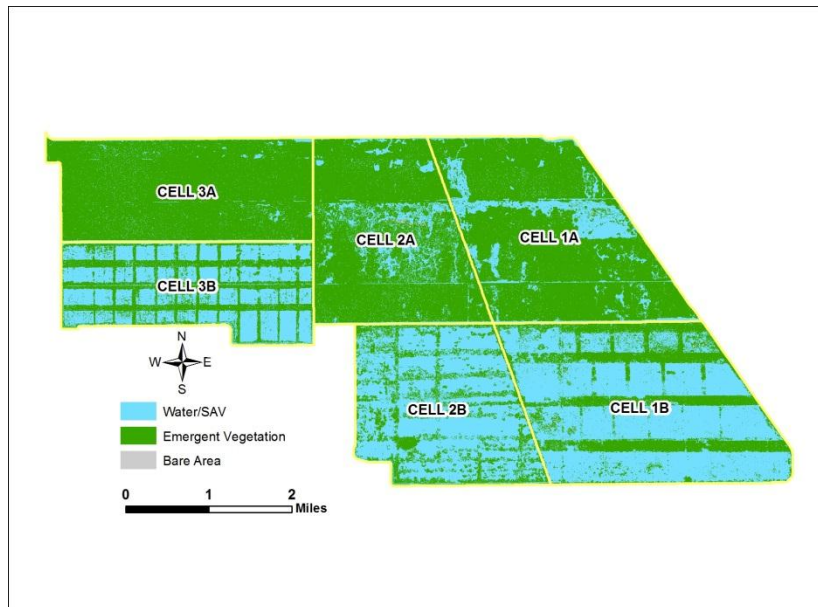
## STORMWATER TREATMENT AREA 2

Cell	Coverage Type	Estimated Coverage (acre)	% Coverage	Cell Area (acre)
Cell 1	Water/SAV	165.53	8.1	2032.52
	EAV	1846.56	90.9	
	Bare Area	20.43	1.0	
Cell 2	Water/SAV	881.37	37.1	2373.21
	EAV	1479.18	62.3	
	Bare Area	12.66	0.5	
Cell 3	Water/SAV	1591.35	69.3	2296.32
	EAV	692.22	30.1	
	Bare Area	12.75	0.6	
Cell 4	Water/SAV	1056.71	54.4	1942.03
	EAV	843.65	43.4	
	Bare Area	41.67	2.1	



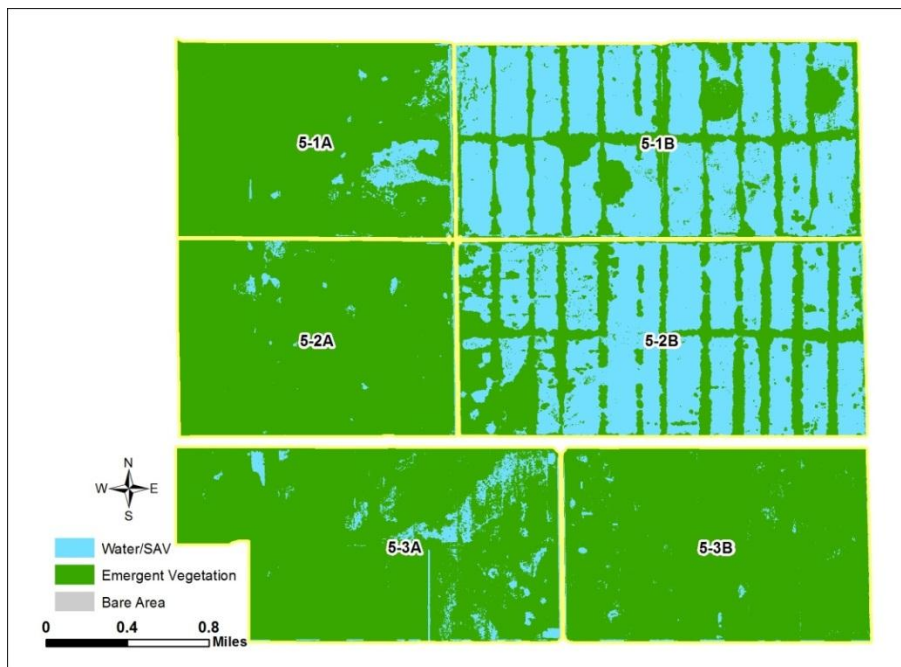
## STORMWATER TREATMENT AREA 3/4

Cell	Coverage Type	Estimated Coverage (acre)	% Coverage	Cell Area (acre)
Cell 1A	Water/SAV	550.32	18.23	3019.60
	EAV	2454.08	81.27	
	Bare Area	15.20	0.50	
Cell 1B	Water/SAV	2382.17	68.93	3456.10
	EAV	1062.26	30.74	
	Bare Area	11.68	0.34	
Cell 2A	Water/SAV	422.13	16.85	2505.55
	EAV	2071.58	82.68	
	Bare Area	11.84	0.47	
Cell 2B	Water/SAV	1727.55	72.09	2396.45
	EAV	658.91	27.50	
	Bare Area	9.99	0.42	
Cell 3A	Water/SAV	138.82	5.75	2415.15
	EAV	2274.28	94.17	
	Bare Area	2.04	0.08	
Cell 3B	Water/SAV	1293.69	62.00	2086.69
	EAV	791.14	37.91	
	Bare Area	1.86	0.09	



## STORMWATER TREATMENT AREA 5

Cell	Coverage Type	Estimated Coverage (acre)	% Coverage	Cell Area (acre)
Cell 5-1A	Water/SAV	93.14	11.09	840.21
	EAV	746.61	88.86	
	Bare Area	0.42	0.05	
Cell 5-1B	Water/SAV	913.92	74.71	1223.24
	EAV	307.89	25.17	
	Bare Area	1.21	0.10	
Cell 5-2A	Water/SAV	50.05	5.93	844.70
	EAV	794.40	94.05	
	Bare Area	0.25	0.03	
Cell 5-2B	Water/SAV	823.36	66.77	1233.08
	EAV	409.14	33.18	
	Bare Area	0.57	0.05	
Cell 5-3A	Water/SAV	172.15	16.44	1047.04
	EAV	874.67	83.54	
	Bare Area	0.22	0.02	
Cell 5-3B	Water/SAV	109.94	11.95	920.25
	EAV	809.03	87.91	
	Bare Area	1.27	0.14	





## STORMWATER TREATMENT AREA 6

Cell	Coverage Type	Estimated Coverage (acre)	% Coverage	Cell Area (acre)
Cell 6-2	Water/SAV	191.89	14.10	1361.38
	EAV	1168.31	85.82	
	Bare Area	1.17	0.09	
Cell 6-3	Water/SAV	10.91	4.51	241.88
	EAV	230.76	95.40	
	Bare Area	0.20	0.08	
Cell 6-5	Water/SAV	7.90	1.27	621.15
	EAV	612.79	98.65	
	Bare Area	0.46	0.07	

