Appendix 5B-2: Summary of STA Black-Necked Stilts and Other Protected Birds during the 2013 Nesting Season

Brian Garrett

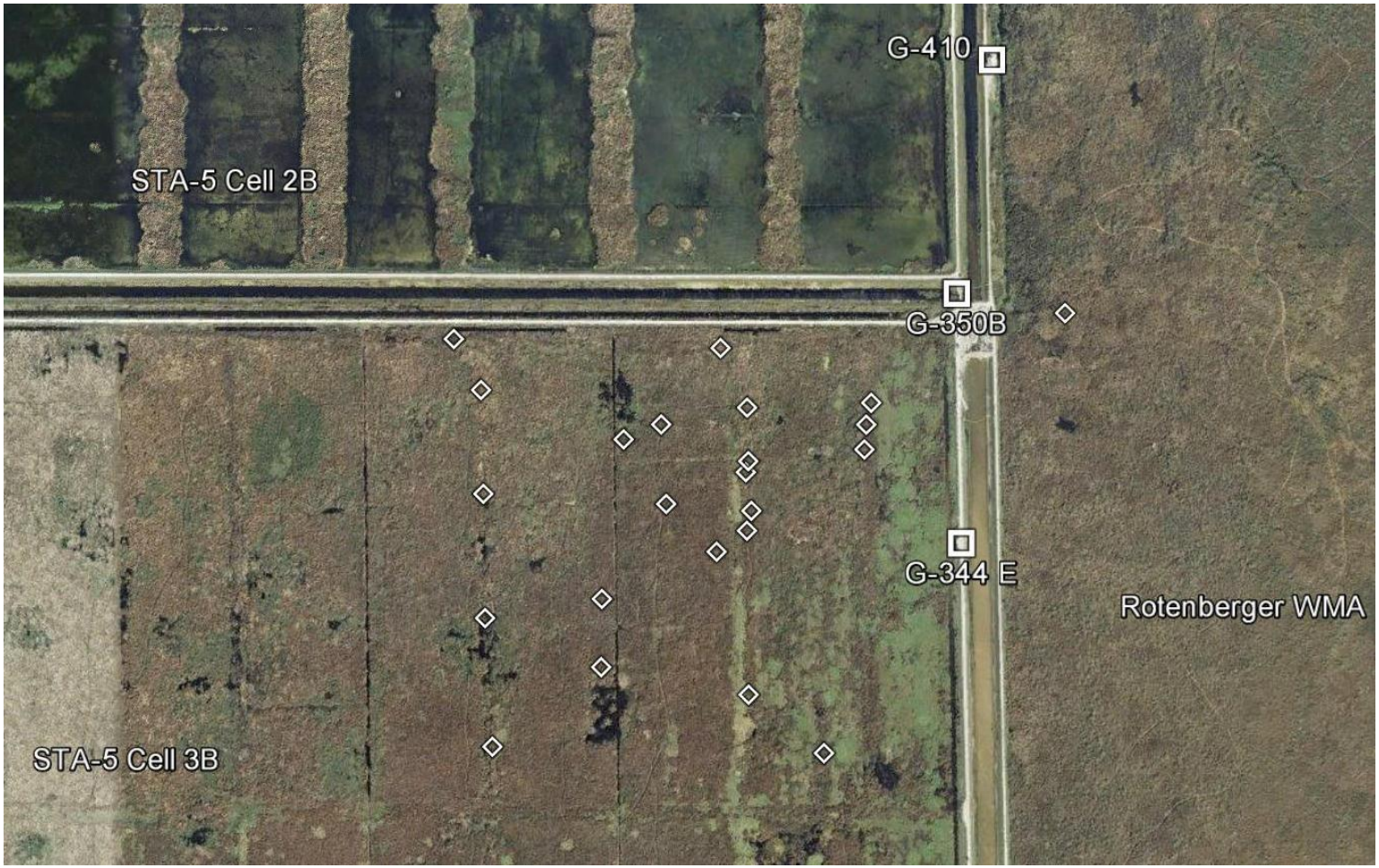
The South Florida Water Management District (SFWMD or District), in cooperation with the United States Fish and Wildlife Service (USFWS), finalized an Avian Protection Plan (APP) in 2008 for the Everglades Stormwater Treatment Areas (STAs) and their expansions, which focused on black-necked stilts (*Himantopus mexicanus*) and Florida burrowing owls (*Athene cunicularia floridana*). These two species are afforded protected status under the Migratory Bird Treaty Act of 1918. Additional protected status has been given to the burrowing owl, as they are also listed as a species of special concern in the state of Florida. Black-necked stilts and Florida burrowing owls are used as sentinel species for the APP. This means that by addressing these two species, then impacts to other protected migratory bird species should also be minimized within the Everglades STAs. The APP characterizes the risks to ground-nesting migratory bird species from STA construction, operation, start-up, drought conditions, routine maintenance, and enhancement activities, and outlines actions intended to minimize harmful impacts to migratory birds and their nests due to these activities. This plan is unconventional in that it has been developed to help manage the operation of constructed treatment wetlands, i.e., the STAs, which already provide important habitat, nesting, and foraging benefits to migratory birds as compared to the previous agricultural land use (Gawlik and Beck, 2010). The APP and the protective measures outlined in the plan were implemented between April and July 2013. The APP survey results from calendar year 2013 are presented in this appendix.

Everglade snail kites (*Rostrhamus sociabilis*) were observed nesting within STA-5 Cell 1A and Cell 2A in April 2010 (Kitchens 2010 data). This was the first documented nesting of this federally and state-listed endangered avian species in any of the STAs operated by the District. Since that time, the University of Florida (UF) Snail Kite Lab has conducted snail kite nesting surveys in the STAs during this species' nesting season. When snail kite nests are observed, the UF Snail Kite Lab examines the nests and report their findings to the District and USFWS. To date, there have been 76 snail kite nesting attempts observed within the Everglades STAs.

During the 2013 calendar year, the UF Snail Kite Lab conducted snail kite nesting surveys within the Everglades STAs between mid-January and early November 2013. There were 45 snail kite nests that were established in STA-1E Cell 4N and STA-5 Cell 3B (23 nests in STA-1E Cell 4N and 22 nests in STA-5/6 Cell 3B) (**Figures 1** and **2**, respectively). There was an additional nest observed from eastern levee of STA-5/6 in a palm tree in the Rotenberger Wildlife Management Area. The snail kites associated with the Rotenberger nest primarily foraged for apple snails in STA-5/6. There were no reports of STA operations impacting the success of any Everglade snail kite nests during calendar year 2013. A summary of the Everglades snail kite nesting activities for the 2013 snail kite nesting season, based on surveys conducted by UF is summarized in this document.

Figure 1. Locations of the 20 Everglade snail kite nests in STA-1E Cell 4N from January 22 to November 7, 2013. [Note: Diamonds represent snail kite nests and squares represent water control structures.]

Figure 2. The locations of the 22 Everglade snail kite nests in STA-5/6 Cell 3B from May 8 to August 2, 2013 and the location of the single Everglade snail kite nests in the Rotenberger Wildlife Management Area (within 500 feet of STA-5/6) from February 25 to April 17, 2013. [Note: Diamonds represent snail kite nests and squares represent water control structures.]



BURROWING OWLS

No burrowing owl nests were observed within the confines of any of the Everglades STAs during the 2013 calendar year surveys.

BLACK-NECKED STILTS

Standardized surveys were conducted according to the APP. Close coordination among scientists, water operators, field stations, and USFWS biologists was maintained throughout the black-necked stilt nesting season. Operational procedures related to water flow and levee and canal maintenance were implemented accordingly to reduce impacts to ground-nesting birds within the STAs. Although the abundance of stilt chicks was not measured, several dozen black-necked stilt chicks were observed foraging near adult birds in several STAs during May, June, and July 2013.

Consistent with the APP, black-necked stilts were the focus of the surveys, as they are considered to be an abundant and conservative indicator species for ground-nesting birds in the STAs. Additionally, black-necked stilts nest directly on the ground, often close to the water's edge, or they construct nests that emerge about three to five inches above shallow water. Nest sites are vulnerable to increases in water levels, particularly more than other ground-nesting species that select sites farther upslope or in standing vegetation.

During the 2013 nesting season, 96 black-necked stilt nests were observed (**Table 1**). This was the second lowest number of stilt nests observed during a nesting season in the STAs since the APP has been implemented. There were four hydrologic events that occurred in most STA cells, which likely explain the low number of stilt nests observed during 2013: (1) prior to the start of the stilt nesting season, water managers were able to keep many STA cells hydrated by managing available water sources, (2) the rainy season began in mid-May, when the number of stilt nests is usually peaking; (3) June started with the remnants of Tropical Storm Andrea bringing excessive amounts of rain, and (4) a rainier than normal June. Together, these events kept many of these cells inundated to a level in which few black-neck stilts were able find shallow water or exposed ground to establish nests within the STAs. Once the rainy season began, the District was able to manage water levels and, to the greatest extent possible, minimize the flooding of locations where nests were present.

Table 1. Summary of black-necked stilts nesting in the STAs from 2006 to 2013.

Year	STA-1E	STA-1W	STA-2	STA-3/4	STA-5/6	Total Nests
2006	186	49	0	5	122	362
2007	102	236	74	55	147	614
2008	69	26	16	7	73	191
2009	102	360	237	69	105	873
2010	150	19	29	15	14	227
2011	42	105	39	142	11	339
2012	9	5	0	4	15	33
2013	22	13	12	4	45	96

Sources: Pietro et al. (2007, 2008, 2009, 2010), Germain & Pietro 2011, Ivanoff et al. (2012, 2013)

Black-necked stilt nest surveys of treatment cells were performed from the levees (levee surveys) by experienced and trained District staff. Levee surveys represent a resourceful way to observe a large area and obtain useful information regarding the relative number of nests within a treatment cell. Three different types of levee surveys were implemented based on the type of information needed to make operational decisions:

1. Monthly – This survey type was performed once a month from the beginning of the breeding season. All treatment cells were surveyed to provide baseline nesting information and the basis for operational decisions throughout the season.
2. Supplementary – This survey type was performed on an 'as needed basis' depending on nesting and water conditions. This type of survey was performed during periods between monthly surveys. Selected treatment cells were surveyed to provide information needed to make operational decisions.
3. Spot-check – This survey type was performed on an as-needed basis, depending on nesting and water conditions. Inspections were done on specific nest locations previously recorded; the numbers of nests in cells not surveyed are assumed to remain as previously observed.

Levee surveys were conducted using binoculars [16 x 50 millimeter (mm)] or a spotting scope (20-60 x 80 mm). A hand-held global positioning system (GPS) unit provided latitude and longitude of the observer location on the levee where nests were detected inside a treatment cell. Distance from the observer to the nest(s) was measured with a rangefinder (6 X 216.0°). Information including coordinates of observer, number and distance of nests, observations, and observer initials were recorded in the field using a Microsoft Access® database. After each survey was completed, data were sent to District staff via e-mail for analysis and reporting. Reports were standardized for all STAs and used to inform District staff of the location of black-necked stilt nests and number of nests by flow-way and treatment cell. Reports regarding black-necked stilt nest activity and locations, and the resulting activity restrictions within the STAs, were distributed by e-mail to both District and USFWS staff.

MODIFICATION OF OPERATIONAL PROCEDURES AND LEVEE AND CANAL MAINTENANCE

Adjustments to operational and mechanical procedures were developed in accordance with the APP to reduce impacts to ground-nesting birds within the STAs. Flow was prioritized in areas that did not have nests. Mowing and grading schedules at affected areas, as part of levee and canal maintenance, were adjusted to occur outside of the black-necked stilt nesting season at locations where nesting was observed. Additionally, bean-bag markers were used to mark nests that could potentially be impacted by vehicle traffic.

While the mowing schedule within the STAs was modified based mostly on the black-necked stilts' nesting season, it also includes other protected ground-nesting migratory bird species including killdeer (*Charadruis vociferous)*, common nighthawks (*Chordeiles minor*), and least terns (*Sternula antillarum*). Several dozen protected ground-nesting birds were observed nesting on STA levee roads and staging areas between April and July 2013. Black-necked stilts, killdeers, common nighthawks, and least terns have similar incubation periods ranging between 18 to 25 days (Robinson et al., 1999; Jackson and Jackson, 2000; Thompson et al., 1997; Poulin et al., 1996). While black-necked stilts and killdeer have normally completed their nesting activities in the Everglades STAs by early July, common nighthawks and least terns can nest into mid-August. Modifications to operations and maintenance within the STAs during Water Year 2013 (WY2013) (May 1, 2012–April 30, 2013) are shown in **Table 2.**

Table 2. Modified operational and levee and canal maintenance activities implemented during WY2013 due to migratory bird nesting.

STA	Type of Action	Date Implemented	Impact Reduction of Ground Nesters Description of Action
All	Operational	Throughout Breeding Season	Utilized flow-ways that were not impacted with black-necked stilt nests to reduce phosphorus in stormwater runoff.
All	Maintenance	Throughout Breeding Season	Modified mowing and grading schedule to reduce impacts to ground nesters and young on levee roads and embankments.

WY13 Operational Changes to Individual STAs Due to Nesting					
STA	**Cell**	**Affected Time Period**	**# of Nests**	**Species**	**Impacts to Operations**
1E	5	May 1 to June 11, 2012	9	Black-necked Stilt	No water was directed into Cell 5 during this period.
1E	4N	January 22 to April 30, 2013	7	Everglade Snail Kite	Stages in Cell 4N were operated between 17.4 feet and 15.1 feet between Jan. 22 and Feb. 11. Stages in Cell 4N were operated between 16.6 feet and 15.1 feet between Feb. 11 and Mar. 7. Stages in Cell 4N were operated between 15.9 feet and 15.1 feet between Mar. 7 and Apr. 4. Stages in Cell 4N were operated between 16.4 feet and 15.1 feet between Apr. 4 and Apr 30.
1W	2B	May 15 to May 23, 2012	5	Black-necked Stilt	Guidance was given to keep stages under 11.35 feet in this cell during this period. Large amounts of rainfall between May 15 and May 23 directly into Cell 2B elevated the water stage above the nests.
3/4	PSTA	May 14 to June 29, 2012	4	Black-necked Stilt	Guidance was given to keep stages under 10.67 feet in this cell during this period.
3/4	PSTA	April 22 to April 30, 2013	1	Black-necked Stilt	Guidance was given to keep stages under 10.5 feet in this cell during this period.
5/6	1B	April 29 to April 30, 2013	6	Black-necked Stilt	Guidance was given to keep stages under 12.5 feet in this cell during this period.
5/6	2B	April 29 to April 30, 2013	2	Black-necked Stilt	Guidance was given to keep stages under 12.5 feet in this cell during this period.
5/6	3B	April 29 to April 30, 2013	1	Black-necked Stilt	Guidance was given to keep stages under 13.3 feet in this cell during this period.
5/6	5B	April 29 to April 30, 2013	1	Black-necked Stilt	Guidance was given to keep stages under 13.6 feet in this cell during this period; however, this cell was not in operation.

Table 2. Continued.

WY13 Maintenance Changes to Individual STAs Due to Nesting				
Location	**Affected Time Period**	**# of Nests**	**Species**	**Impacts to Operations**
STA-1E at the rock stockpiles on the eastern north levee	May 1 to June 9, 2012	~10-20	Least Tern	Tern nesting became wide spread and activities near the stockpiles ceased. These rock stockpiles are used to repair washouts on STA levee roads.
STA-1E Southern Portion of Cell 4N and the Northern Portion of Cell 4S	January 22 to June 30, 2013	7	Everglade Snail Kite	Access was restricted in an approximate 300 acre area in the southern half of Cell 4N and vegetation treatments were limited in the approximate 300 acre northern half of Cell 4S since this was the area snail kites were primarily foraging.
STA-1E at the rock stockpiles on the eastern north levee	April 17 to April 30, 2013	~10-20	Least Tern	Attempts were made to make some of the rock stockpiles available. Eventually, tern nesting became wide spread and activities near the stockpiles ceased. These rock stockpiles are used to repair washouts on STA levee roads.
STA-1W Levee between Cells 2B and 4	May 15, 2012 to mid-June, 2012	1	Black-necked Stilt	One ground nest was marked with bean bags and reported to District staff. Mowers avoided area until nesting was completed in mid-June 2012.
STA-2 One on the East Levee and One on the West Levee of Cell 3	May 9, 2012 to mid-June, 2012	2	Killdeer	Both ground nests were marked with bean bags and reported to District staff. Mowers avoided area until nesting was completed in mid-June 2012.
STA-2 former Compartment B construction site (west side of STA)	June 1 to July 9, 2012	~5-10	Least Tern	Tern nesting became wide spread and activities near the stockpiles ceased. These rock stockpiles are used to repair washouts on STA levee roads.
STA-2 Levee near the G-445 structure	April 19 to April 30, 2013	1	Killdeer	One ground nest was marked with bean bags and reported to District staff. Mowers avoided area until nesting was completed in mid-May 2013.
STA-3/4 East side of Cell 1B	June 7 to early-July, 2012	1	Killdeer	One ground nest was marked with bean bags and reported to District staff. Mowers avoided area until nesting was completed in early-July 2012.
STA-3/4 Levee on west side of the PSTA cells	April 22 to April 30, 2013	1	Killdeer	One ground nest was marked with bean bags and reported to District staff. Mowers avoided area until nesting was completed in late-May 2013.
STA-5/6 less than 500 feet outside the STA in the Rotenberger WMA next to the G-410	February 25 to April 17, 2013	1	Everglade Snail Kite	District employees and contractors were informed about the snail kite nest and all maintenance projects in the area were performed with consideration that the protective buffer around the nest fell within the boundaries of STA-5/6.

SURVEY RESULTS FROM THE 2013 BLACK-NECKED STILT NESTING SEASON

The 2013 nesting season surveys began in mid-April, with the earliest stilt nests observed on April 22 in STA-3/4. Because few nests were observed during the April monthly surveys, the May monthly surveys were moved to the middle of the month and were implemented between May 10 and 24. June monthly surveys were performed between June 3 and 25. Supplementary surveys were performed for all of STA-1W in May as well as STA-1E Cell 2 and STA-5 Cells 1B, 2B, 3B, and 4B in early July. In May, two spot check surveys were performed within STA-1E Cell 5 to observe whether nesting was complete in this cell. In July, three spot checks were performed in STA-1E Cell 2 to observe if nesting was completed in this cell. A spot check was performed in STA-1W Cells 2B and 4 after the remnants of Tropical Storm Andrea moved through South Florida in June. No stilt nests appeared to survive the increase in water stage in these cells even though the District added no water to the cells. A spot check was performed in STA-3/4 Cells 2A and 3B on May 21. The nesting season was determined to be complete on July 24 when a spot check survey in STA-1E Cell 2 observed no active stilt nests. This is the latest date in which an APP nesting surveys has been necessary.

Overall, there were 96 black-necked stilt nests observed via levee surveys during the 2013 breeding season (**Table 1**), with the highest number of nests observed in STA-5/6 (45 nests), followed by STA-1E (22 nests; **Table 1**). APP survey by survey results are presented in **Table 3**.

EVERGLADE SNAIL KITES

In January 2013, the UF Snail Kite Lab personnel confirmed reports of snail kite nests within STA-1E Cell 4N (Kitchens 2013 data). From January 22 to November 7, there were 23 snail kite nests were confirmed to exist within STA-1E Cell 4N (Kitchens 2013 data; **Figure 1**). There was a single snail kite nest established at the top of a cabbage palm tree in the northwest corner of the Rotenberger Wildlife Management Area, within 500 feet of STA-5/6 (**Figure 2**). Observed from the eastern levee of STA-5/6, this nest was first reported in February 25, confirmed by UF in early March, and determined to have been successful on April 17. District contractors reported the presence of a snail kite nest in STA-5/6 Cell 3B in early May, which was confirmed by UF field staff on May 8. From May 8 to October 14, there were 22 snail kite nests observed in STA-5 Cell 3B (Kitchens 2013 data; **Figure 3**). Although previous nesting activity has occurred in STA-3/4, there were no nests established in this STA during 2013 (Kitchens 2013 data). Construction and maintenance activities performed near all the above-mentioned snail kite nests were done with consideration for the nests (**Table 2**). The stages at which STA-1E Cell 4N and STA-5/6 Cell 3B were operated changed multiple times during the nesting season in order to minimize potential impacts to snail kites nests (**Tables 4** and **5**). The USFWS was consulted on construction, maintenance, and operational activities that might impact snail kite nesting success.

Table 3. Black-necked stilt nesting season levee surveys for each STA (April–July 2013).

STA-1E										
		Black-necked Stilt Nests Inside Treatment Cell as Observed from the Levee								
Flow-way	Cell	Monthly 4/23/13	Monthly 5/10/13	Spot Check 5/21/13	Spot Check 5/29/13	Monthly 6/3/13	Supple-mentary 7/5/13	Spot Check 7/10/13	Spot Check 7/17/13	Spot Check 7/24/13
Eastern	1	0	0	NS	NS	0	NS	NS	NS	NS
	2	0	0	NS	0	0	21	10	3	0
Central	3	0	0	NS	NS	0	NS	NS	NS	NS
	4N	0	0	NS	NS	0	NS	NS	NS	NS
	4S	0	0	NS	NS	0	NS	NS	NS	NS
Western	5	0	1	1	0	0	NS	NS	NS	NS
	6	0	0	NS	NS	0	NS	NS	NS	NS
	7	0	0	NS	NS	0	NS	NS	NS	NS
Distribution Cells	Eastern	0	0	NS	NS	0	NS	NS	NS	NS
	Western	0	0	NS	NS	0	NS	NS	NS	NS
Totals		**0**	**1**	**1**	**0**	**0**	**21**	**10**	**3**	**0**

NS – Not Surveyed

STA-1W						
		Black-necked Stilt Nests Inside Treatment Cell as Observed from the Levee				
Flow-way	Cell	Monthly 4/25/13	Monthly 5/10/13	Supple-mentary 5/31/13	Spot Check 6/17/13	Monthly 6/25/13
Eastern	1A	0	0	NS	NS	0
	1B	0	0	NS	NS	0
	3	0	0	NS	NS	0
Western	2A	0	0	NS	NS	0
	2B	0	2	2	0	0
	4	0	2	7	0	0
Northern	5A	0	0	NS	NS	0
	5B	0	0	NS	NS	0
Totals		**0**	**4**	**9**	**0**	**0**

NS – Not Surveyed

Table 3. Continued.

STA-2				
	Black-necked Stilt Nests Inside Treatment Cell as Observed from the Levee			
Cell	Monthly 4/19/13	Monthly 5/14/13	Monthly 5/15/13	Monthly 6/10/13
1	0	NS	0	0
2	0	NS	0	0
3	0	NS	7	0
4	0	0	NS	0
5	0	4	NS	0
6	0	1	NS	0
7	0	0	NS	0
8	0	0	NS	0
Totals	**0**	**5**	**7**	**0**

NS – Not Surveyed

STA-3/4					
		Black-necked Stilt Nests Inside Treatment Cell as Observed from the Levee			
Flow-way	Cell	Monthly 4/22/13	Monthly 5/16/13	Spot Check 5/21/12	Monthly 6/7/12
Eastern	1A	0	0	NS	0
	1B	0	0	NS	0
Central	2A	0	2	2	0
	2B	0	0	NS	0
PSTA	USAV	0	0	NS	0
	LSAV	0	0	NS	0
	PSTA	1	0	NS	0
Western	3A	0	0	NS	0
	3B	0	1	0	0
Totals		**1**	**3**	**2**	**0**

NS – Not Surveyed

Table 3. Continued.

STA-5/6								
		Black-necked Stilt Nests Inside Treatment Cell as Observed from the Levee						
Flow-way	Cell	Monthly 4/29/13	Monthly 4/30/13	Monthly 5/22/13	Monthly 5/21/13	Monthly 6/12/13	Monthly 6/14/13	Supple-mentary 7/3/13
Flow-way 1	1A	0	NS	0	NS	NS	0	NS
	1B	6	NS	3	NS	NS	0	0
Flow-way 2	2A	0	NS	0	NS	NS	0	NS
	2B	2	NS	5	NS	NS	0	0
Flow-way 3	3A	0	NS	0	NS	NS	0	NS
	3B	1	NS	10	NS	NS	2	0
Flow-way 4	4A	NS	0	NS	3	NS	0	NS
	4B	NS	0	NS	10	NS	2	0
Flow-way 5	5A*	NS	0	NS	0	NS	0	NS
	5B*	NS	1	NS	0	NS	0	NS
Flow-way 6	4	NS	0	NS	0	0	NS	NS
	Section 2	NS	0	NS	0	0	NS	NS
Flow-way 7	5	NS	0	NS	0	0	NS	NS
Flow-way 8	3	NS	0	NS	0	0	NS	NS
Totals		**9**	**1**	**18**	**13**	**0**	**4**	**0**

NS- Not Surveyed * = Cell Offline during APP Survey Period

Table 4. Changes in the operational stages for STA-1E Cell 4N due to the presence of nesting Everglade snail kites between January 22 and November 7, 2013.

Date	STA-1E Cell 4N (Avg Ground Elevation = 14.1 ft)		
	Max Stage (ft)	Maintain Stage (ft)	Min Stage (ft)
Jan-22	-	15.5*	-
Jan-23	17.4	15.4*	15.1*
Feb-11	16.6	15.4*	15.1*
Mar-7	15.9	15.4*	15.1*
Apr-4	16.4	15.4*	15.1*
Jun-28	16.7	15.4*	15.1*
Aug-5	16.4	15.4*	15.1*
Sep-25	16.7	15.4*	15.1*
Oct-23	No Stage Guidance		
Nov-7	No More Snail Kite Nesting		

* = as long as water is available

Table 5. Changes in the operational stages for STA-5 Cell 3B due to the presence of nesting Everglade snail kites between May 9 and August 5, 2013.

Date	STA-5/6 Cell 3B (Avg Ground Elevation = 12.4 ft)		
	Max Stage (ft)	Maintain Stage (ft)	Min Stage (ft)
May-9	13.6†	13.6*	13.4*
Jul-3	14.4	13.7*	13.4*
Sep-25	14.7	13.7*	13.4*
Oct-2	No Stage Guidance		
Oct-14	No More Snail Kite Nesting		

* = as long as water is available † = max stage caused by nesting black-necked stilts

LITERATURE CITED

Gawlik, D.E. and T. Beck, 2010. Assessment of the Environmental Lift of Stormwater Treatment Areas on South Florida Avifauna: Phase II Long-term Study Deliverable 4. Submitted to the South Florida Water Management District, West Palm Beach, FL.

Jackson, B.J.S. and J.A. Jackson. 2000. Killdeer (*Charadrius vociferus*). In: *The Birds of North America, No. 517* (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Kitchens, W. 2010. Data received from the University of Florida snail kite survey crew from April 12, 2010 to October 23, 2010.

Kitchens, W. 2013. Data received from the Unversity of Florida snail kite survey crew from January 22, 2012 to July 31, 2013.

Poulin, R.G., S.D. Grindal and R.M. Brigham. 1996. Common Nighthawk (*Chordeiles minor*). In: *The Birds of North America, No. 213* (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Robinson, J.A., J.M. Reed, J.P. Skorupa and L.W. Oring. 1999. Black-necked Stilt (*Himantopus mexicanus*). In: *The Birds of North America, No. 449* (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Thompson, B.C., J.A. Jackson, J. Burger, L.A. Hill, E.M. Kirsch and J.L. Atwood. 1997. Least Tern (*Sterna antillarum*). In: *The Birds of North America, No. 290* (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.