

Appendix 5B-3: Summary of Stormwater Treatment Area Black-necked Stilts and Other Protected Birds during the 2016 Nesting Season

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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), which focused on black-necked stilts (*Himantopus mexicanus*) and Florida burrowing owls (*Athene cunicularia floridana*) (Pandion Systems 2008). 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, negative 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 potential disturbances. The APP 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). While the APP does not authorize take or absolve SFWMD from liability, the APP "...acknowledges the District's need to operate the STAs for water quality protection and flood control purposes at times that may result in incidental bird take." This was the eleventh year the black-necked stilt nesting surveys have been conducted using the methods outlined in the APP. The surveys and protective measures outlined in the APP were implemented between April and July 2016. The APP survey results from Calendar Year 2016 (CY2016) are presented in this appendix.

Everglade snail kites (*Rostrhamus sociabilis*) were observed nesting within STA-5 Cells 1A and 2A in April 2010 (Kitchens 2010). 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 reports their findings to the District and USFWS. From 2010 to 2015, there were 282 snail kite nesting attempts reported to the District that were observed within the Everglades STAs.

At the time this document was prepared, the 2016 Everglade snail kite nesting season was not yet complete in STA-5/6. During CY2016, the UF Snail Kite Lab conducted snail kite nesting surveys within the Everglades STAs between mid-January and early-August. Everglade snail kite nesting activities for the 2016 nesting season in the STAs, based on surveys conducted by UF, are summarized in this appendix.

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BURROWING OWLS

39 No burrowing owl nests were observed within the confines of any of the Everglades STAs during the
40 CY2016 surveys.

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BLACK-NECKED STILTS

42 Standardized surveys of black-necked stilts were conducted in accordance with the APP. Coordination
43 among scientists, water managers, field crews, and USFWS biologists was maintained throughout the
44 black-necked stilt nesting season. Operational procedures related to water flow and levee and canal
45 maintenance were implemented accordingly to reduce impacts to ground-nesting birds within the STAs.
46 Although the abundance of stilt chicks was not measured, several dozen black-necked stilt chicks were
47 observed foraging near adult birds in several STAs during May, June, and July 2016.

48 Black-necked stilts are considered indicator species for other ground-nesting birds in the STAs. Black-
49 necked stilts nest directly on the ground, often close to the water's edge, or they construct nests that emerge
50 about three to five inches above shallow water. Nest sites are vulnerable to increases in water levels, more
51 than other ground-nesting species that select sites farther upslope or in standing vegetation.

52 During the 2016 nesting season, 279 black-necked stilt nests were observed within the STA cells
53 (**Table 1**). This number of nests was below the previous ten-year average (306 nests per year); however, it
54 was higher than the average observed over the past five years (159 nests per year). There were several
55 hydrologic events that occurred in the Everglades STAs, which likely contributed to the number of stilt
56 nests observed during 2016: (1) prior to the start of the stilt nesting season, water managers were able to
57 keep most STA cells hydrated by managing available water sources; (2) stages were somewhat lowered in
58 Cell 1A of STA-1 West (STA-1W), Cell 5 of STA-1 East (STA-1E), and Cell 1A of STA-3/4 in order for
59 newly planted vegetation to become established in these cells; (3) the rainy season began around its typical
60 time; and (4) there was a large multiday rain event in mid-May that increased stages by as much as 6 inches
61 in some STA cells without any other inputs from upstream sources, which likely resulted in a large number
62 of nests being inundated. Within other Everglades STA cells, water levels were such that few black-neck
63 stilts were likely able to find shallow water or exposed ground to establish nests within the STAs. In addition
64 to these hydrologic conditions, the coverage of emergent plants in many cells has increased as the STA
65 marshes have matured. STA managers have also continued to plant large areas of the marsh with emergent
66 vegetation to limit short circuits through the STAs and to help keep submerged aquatic vegetation from
67 moving large distances during strong wind events. Increased emergent vegetation coverage and the lack of
68 shallow open water areas that are the preferred nesting locations for black-necked stilts and other ground-
69 nesting migratory birds have resulted in less overall available nesting habitat over the past five years.

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Table 1. Summary of black-necked stilts nesting in the STAs from 2006 to 2016.^a

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	23	13	12	4	45	97
2014	0	16	32	1	73	122
2015	4	95	36	0	69	204
2016	40	132	58	1	46	279

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a. Sources: Pietro et al. (2010), Germain and Pietro (2011), Ivanoff et al. (2012, 2013), and Chimney (2014, 2015), and Pietro (2016).

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

- 77 • **Monthly** – This survey type was performed once per month from the beginning of the
78 nesting season. All treatment cells were surveyed to provide baseline nesting information
79 and the basis for operational decisions throughout the season.
- 80 • **Supplementary** – This survey type was performed on an as needed basis depending on
81 nesting and water conditions. This type of survey was performed during periods between
82 monthly surveys. Selected treatment cells were surveyed to provide additional information
83 to assist with STA operational decisions.
- 84 • **Spot-check** – This survey type was performed on an as-needed basis, depending on nesting
85 and water conditions. Inspections were conducted on previously recorded nest locations
86 and also provided additional information to assist with STA operational decisions.

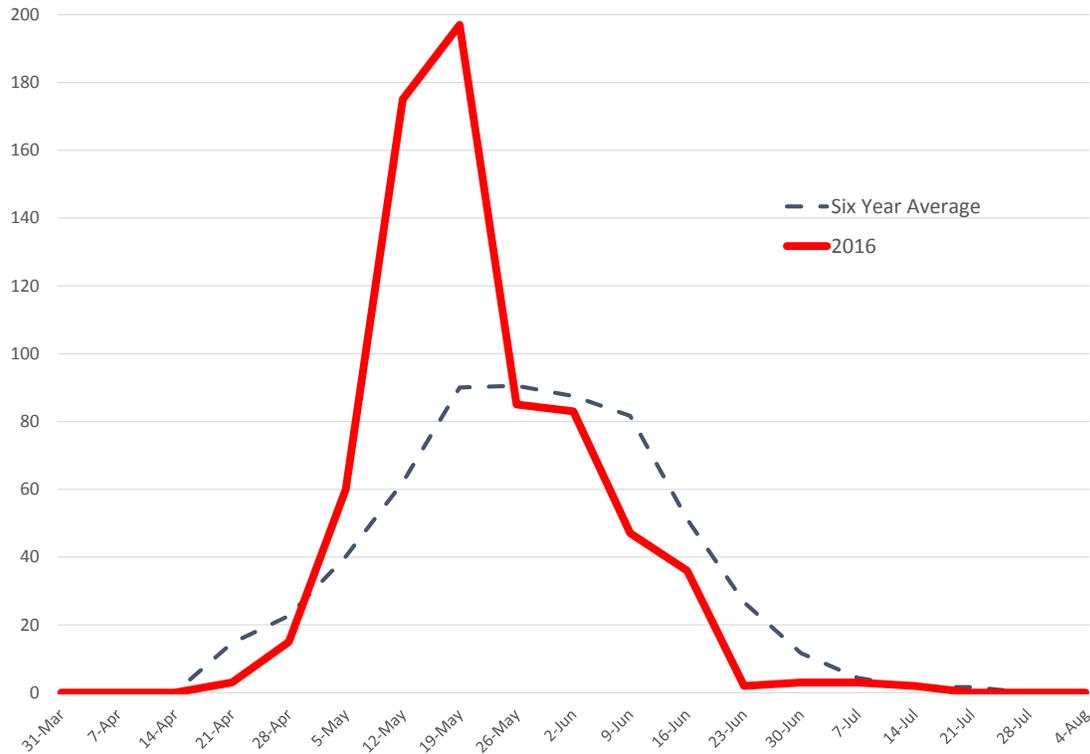
87 Levee surveys were conducted using binoculars (16 x 50 millimeters) or a spotting scope (20–60 x 80
88 millimeters). A hand-held global positioning system unit provided latitude and longitude of the observer
89 location on the levee where nests were detected inside a treatment cell. Distance from the observer to the
90 nest(s) was measured with a rangefinder. Information including coordinates of observer, number and
91 distance of nests, observations, and observer initials were recorded in the field on survey sheets. After each
92 survey was completed, summarized data were analyzed and incorporated into reports. Reports were
93 standardized for all STAs and used to inform District staff of the location of black-necked stilt nests and
94 number of nests in each STA cell. Reports regarding black-necked stilt nest activity and locations and the
95 resulting recommended mortality reduction measures were distributed by e-mail to both District and
96 USFWS staff.

97 SURVEY RESULTS FROM THE 2016 98 BLACK-NECKED STILT NESTING SEASON

99 The CY2016 nesting season surveys began in late April 2016, with the earliest black-necked stilt nest
100 observed on April 20 in STA-2. Because few stilt nests are observed during the April monthly survey, the
101 May monthly surveys are conducted during the middle of the month. The May monthly surveys were
102 implemented between May 4 and 17. The June monthly survey was performed between June 1 and 14. Four
103 supplementary surveys were performed in STA-1W during June and then three spot checks of known nests
104 in Cell 5B were performed during July after rain events to see if nests were still active. One supplementary
105 survey was conducted during both May and June in Cells 3, 5, 6, and 8 of STA-2 to check on the status of
106 nests; the June survey found that all nesting was complete. A spot check of a single nest in STA-3/4 was
107 conducted in May to check the status of the nest and newly hatched chicks were observed. Two spot check
108 surveys were conducted in STA-5/6 Cell 5-5B in late June to check the status of one last nest in this STA.
109 The nesting season was determined to be complete on July 18 when a spot check survey in STA-1W Cell 5B
110 observed no active stilt nests.

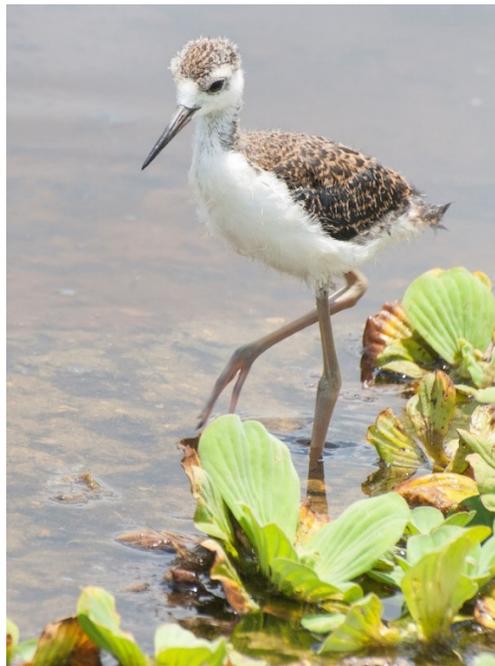
111 Overall, 279 black-necked stilt nests were observed via levee surveys during the 2016 nesting season
112 (**Table 1**), with the highest number of nests observed in STA-1W (132 nests), followed by STA-2
113 (58 nests). This nesting season was on track to have more nests than prior stilt nesting seasons in the STAs
114 until the large rain event occurred in mid-May (**Figure 1**). All surveys from 2010 to 2016 were conducted
115 by the same individuals, so the annual nest counts are comparable. Several dozen precocial black-necked
116 stilt chicks (**Figure 2**) were observed in the STAs where stilt nests had been observed.

**Number of Everglades STA Stilt Nests During the Nesting Season
(2016 Data vs Six Year Average)**



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Figure 1. Total number of black-necked stilt nests each week during the 2016 nesting season versus (vs) the average number of nests during the 2010–2015 nesting seasons.



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Figure 2. A precocial black-necked stilt chick in STA-5/6 Cell 5-5A (photo by SFWMD, June 2016).

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EVERGLADE SNAIL KITES

124 UF Snail Kite Lab personnel confirmed reports of Everglade snail kite nests within STA-5/6 during
 125 their March surveys of STA-1E and STA-5/6. From March 5 to August 4 (Note: the snail kite nesting season
 126 was not complete at the time this report was written), there were 18 snail kite nests confirmed within
 127 STA-1E Cells 1 (Fletcher 2016; **Figure 3**). These snail kite nests were found in two different cells in STA-
 128 1E including Cell 1 (5 nests) and Cell 4N (13 nests). From March 18 to June 14, there was one snail kite
 129 nest observed in STA-2 Cell 6 (Fletcher 2016; **Figure 4**). This was the first snail kite nest observed in
 130 STA-2 since surveys began in 2010. From March 5 to August 4, there were 41 snail kite nests observed in
 131 STA-5/6 (Fletcher 2016; **Figure 5**). These snail kite nests were found in three separate cells in STA-5/6
 132 including Cell 5-3B (8 nests), Cell 5-5A (17 nests), and Cell 5-5B (15 nests). Although snail kite nesting
 133 has occurred in STA-3/4 previously, there were no nests established in this STA during 2016 (Fletcher
 134 2016). No snail kite nests have ever been observed in STA-1W. Construction, operations, and maintenance
 135 activities near all of the snail kite nests were performed in ways to avoid disturbing the nests. The
 136 operational guidance in STA cells with snail kite nests were adjusted multiple times during WY2016 to
 137 minimize potential impacts to nests and chicks.



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Figure 3. Locations of the 18 Everglade snail kite nests in STA-1E Cells 1 and 4N from March 5 to August 2, 2016. [Note: Diamonds represent nest locations and some nests were so close the diamonds are indistinguishable.]



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Figure 4. Locations of the single Everglade snail kite nest in STA-2 Cell 6 from March 18 to June 1, 2016. [Note: The diamond represents the snail kite nest.]



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 146 **Figure 4.** Locations of the 31 Everglade snail kite nests in STA-5/6 Cells 5-3B, 5-5A and 5-5B from
 147 March 5 to August 4, 2016. [Note: Diamonds represent snail kite nests and some nests were so close
 148 the diamonds are indistinguishable.]

149 Snail kites have been confirmed nesting in the Everglade STAs since 2010. Since that time, there have
 150 been 341 snail kite nests observed within the Everglades STAs that UF has reported to the District with
 151 41 percent of known nests successfully fledging one or more chicks during this period (**Table 2**).

152 **Table 2.** Annual snail kite nesting numbers and success rate within the STAs. Success rate is
 153 measured by a nest fledging one or more chicks.

	2010	2011	2012	2013	2014	2015	2016 ^a	Seven Year Totals
Nesting Attempts	29	1	1	45	113	93	59	341
Successful Nests	7	0	1	22	40	48	22	140
Failed/Incomplete Nests	18	1	0	18	54	34	28	153
Unknown Final Status	4	0	0	5	19	11	4	43
Percent Successful	24%	0%	100%	49%	35%	52%	37%	41%

154 a. Snail kite nesting season was not complete at this time this report was written.

MODIFICATION OF OPERATIONAL PROCEDURES AND LEVEE, CANAL, AND STRUCTURE MAINTENANCE

Adjustments to STA operations and maintenance procedures were made in accordance with the APP to reduce impacts to ground-nesting birds within the STAs. Where possible, flow was routed to areas that did not have nests. Schedules for grass mowing and road grading for levee and canal maintenance were adjusted at locations where nesting was observed to times outside of the black-necked stilt nesting season. Additionally, bean-bag markers were placed along roadways to mark nests that could potentially be impacted by vehicle traffic.

While grass mowing schedules within the STAs were modified based on the black-necked stilts' nesting season, these changes also benefited other protected ground-nesting migratory bird species including killdeer (*Charadrius vociferous*), common nighthawks (*Chordeiles minor*), and least terns (*Sterna antillarum*). Several dozen protected ground-nesting birds were observed nesting on STA levee roads and staging areas between March and July 2016. Modifications to operations and maintenance within the STAs during Water Year 2016 (WY2016) (May 1, 2015–April 30, 2016) are shown in **Table 3**. Access to individual STA levees and structures was modified as necessary to protect ground-nesting birds and to keep activities to a minimum within the USFWS recommended 500-foot buffer zones around snail kite nests (**Table 4**).

Table 3. Modified STA operations and maintenance activities implemented during WY2016 due to nesting Everglade snail kites and black-necked stilts.

STA	Cell	Affected Time Period	# of Nests	Species	Adjustment to Operations
1E	1	May 1 to August 31, 2015	5	Everglade Snail Kite	Guidance was issued to attempt to keep stages in Cell 1 above 17.9 feet between May 1 and June 26. Guidance was issued to operate stages in Cell 1 between 21.2 feet and 17.9 feet between June 26 and July 8. Guidance was issued to operate stages in Cell 1 between 20.2 feet and 17.9 feet between July 8 and August 25. Limited access to Cell 1 for all operations and maintenance (O&M) activities from May 1 to August 31.
1E	4N	May 1 to July 8, 2015	11	Everglade Snail Kite	Guidance was issued to operate stages in Cell 4N between 16.3 feet and 15.1 feet between May 1 and May 15. Guidance was issued to operate stages in Cell 4N between 16.1 feet and 15.1 feet between May 15 and June 2. Guidance was issued to operate stages in Cell 4N between 16.2 feet and 15.1 feet between June 2 and June 19. Guidance was issued to operate stages in Cell 4N between 15.7 feet and 15.1 feet between June 19 and June 26. Guidance was issued to operate stages in Cell 4N between 16.7 feet and 15.1 feet between June 26 and July 8. Limited access to Cells 4N and 4S for all O&M activities from May 1 to July 8.
1E	4N	March 7 to April 30, 2016	5	Everglade Snail Kite	Guidance was issued to operate stages in Cell 4N between 17.1 feet and 15.1 feet between March 7 and March 28. Guidance was issued to operate stages in Cell 4N between 17.4 feet and 15.1 feet between March 28 and April 30. Limited access to Cell 4N for all O&M activities from March 7 to April 30.
1E	5	May 1 to June 3, 2015	4	Black-necked Stilt	Guidance was issued to keep stages under 14.3 feet in this cell during this period.
1W	1A	May 1 to June 29, 2015	83	Black-necked Stilt	Guidance was issued to keep stages under 10.8 feet in this cell during this period.
1W	2A	May 20 to June 29, 2015	4	Black-necked Stilt	Guidance was issued to keep stages under 10.4 feet in this cell during this period.

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Table 3. Continued.

STA	Cell	Affected Time Period	# of Nests	Species	Adjustment to Operations
1W	5B	June 9 to July 10, 2015	8	Black-necked Stilt	Guidance was issued to keep stages under 10.3 feet in this cell during this period.
1W	1A	April 29 to April 30, 2016	17	Black-necked Stilt	Guidance was issued to keep ages under 11.9 feet in this cell during this period.
1W	2B	April 29 to April 30, 2016	1	Black-necked Stilt	Guidance was issued to keep stages under 10.9 feet in this cell during this period.
1W	3	April 29 to April 30, 2016	4	Black-necked Stilt	Guidance was issued to keep stages under 11.4 feet in this cell during this period.
1W	5B	April 29 to April 30, 2016	3	Black-necked Stilt	Guidance was issued to keep stages under 10.0 feet in this cell during this period.
2	6	March 28 to April 30, 2016	1	Everglade Snail Kite	Guidance was issued to operate stages in Cell 4N between 12.8 feet and 9.8 feet between March 28 and April 30. Limited access to Cell 6 for all O&M activities from March 28 to April 30.
2	5	May 1 to June 22, 2015	24	Black-necked Stilt	Guidance was issued to keep stages under 10.6 feet in this cell during this period.
2	6	May 1 to June 10, 2015	12	Black-necked Stilt	Guidance was issued to keep stages under 10.7 feet in this cell during this period.
2	5	April 20 to April 30, 2016	2	Black-necked Stilt	Guidance was issued to keep stages under 10.5 feet in this cell during this period.
2	6	April 21 to April 30, 2016	1	Black-necked Stilt	Stage guidance followed for Everglade snail kite nest in Cell 6 takes priority over black-necked stilt nest.
5/6	5-3B	May 1 to August 7, 2015	17	Everglade Snail Kite	Guidance was issued to operate stages in Cell 5-3B between 14.5 feet and 13.4 feet between May 1 and May 11. Guidance was issued to operate stages in Cell 5-3B between 13.6 feet and 13.4 feet between May 11 and June 1. Guidance was issued to operate stages in Cell 5-3B between 14.3 feet and 13.4 feet between June 1 and August 4. Limited access to Cell 5-3B for all O&M activities from May 1 to August 7.
5/6	5-5A	May 1 to July 8, 2015	4	Everglade Snail Kite	Guidance was issued to operate stages in Cell 5-5B between 15.3 feet and 13.6 feet between May 1 and July 8. Limited access to Cell 5-5A for all O&M activities from May 1 to July 8.
5/6	5-5B	May 1 to August 7, 2015	46	Everglade Snail Kite	Guidance was issued to operate stages in Cell 5-5B between 14.0 feet and 13.0 feet between May 1 and May 11. Guidance was issued to operate stages in Cell 5-5B between 13.4 feet and 13.0 feet between May 11 and June 1. Guidance was issued to operate stages in Cell 5-5B between 13.5 feet and 13.0 feet between June 1 and June 19. Guidance was issued to operate stages in Cell 5-5B between 14.5 feet and 13.0 feet between June 19 and August 4. Limited access to Cell 5-5B for all O&M activities from May 1 to August 7.
5/6	5-3B	March 5 to April 30, 2016	3	Everglade Snail Kite	Guidance was issued to operate stages in Cell 5-3B between 14.9 feet and 13.4 feet between March 5 and March 28. Guidance was issued to operate stages in Cell 5-3B between 13.9 feet and 13.4 feet between March 28 and April 20. Guidance was issued to operate stages in Cell 5-3B between 14.3 feet and 13.4 feet between April 20 and April 30. Limited access to Cell 5-3B for all O&M activities from March 5 to April 30.
5/6	5-5A	March 28 to April 30, 2016	7	Everglade Snail Kite	Guidance was issued to operate stages in Cell 5-5A between 14.4 feet and 13.0 feet between March 28 and April 20. Guidance was issued to attempt to keep stages in Cell 5-5A above 13.0 feet between April 20 and April 30. Limited access to Cell 5-5A for all O&M activities from March 28 to April 30.

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Table 3. Continued.

STA	Cell	Affected Time Period	# of Nests	Species	Adjustment to Operations
5/6	5-5B	March 28 to April 30, 2016	15	Everglade Snail Kite	Guidance was issued to operate stages in Cell 5-5B between 15.4 feet and 13.0 feet between March 28 and April 20. Guidance was issued to operate stages in Cell 5-5B between 15.1 feet and 13.0 feet between April 20 and April 30. Limited access to Cell 5-5B for all O&M activities from April 20 to April 30.
5/6	5-3B	May 1 to June 26, 2015	17	Black-necked Stilt	Stage guidance followed for Everglade snail kite nest in Cell 5-3B takes priority over black-necked stilt nest.
5/6	5-4A	May 1 to June 29, 2015	18	Black-necked Stilt	Guidance was issued to keep stages under 13.5 feet in this cell during this period.
5/6	5-4B	May 26 to June 17, 2015	1	Black-necked Stilt	Guidance was issued to keep stages under 13.2 feet in this cell during this period.
5/6	5-5A	May 1 to June 19, 2015	7	Black-necked Stilt	Stage guidance followed for Everglade snail kite nest in Cell 5-5A takes priority over black-necked stilt nest.
5/6	5-5B	May 1 to June 29, 2015	26	Black-necked Stilt	Stage guidance followed for Everglade snail kite nest in Cell 5-5B takes priority over black-necked stilt nest.
5/6	5-3B	April 27 to April 30, 2016	4	Black-necked Stilt	Stage guidance followed for Everglade snail kite nest in Cell 5-3B takes priority over black-necked stilt nest.
5/6	5-5A	April 27 to April 30, 2016	1	Black-necked Stilt	Stage guidance followed for Everglade snail kite nest in Cell 5-5A takes priority over black-necked stilt nest.
5/6	5-5B	April 27 to April 30, 2016	7	Black-necked Stilt	Stage guidance followed for Everglade snail kite nest in Cell 5-5B takes priority over black-necked stilt nest.

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Table 4. Modified STA access to levees and structures implemented during WY2016 due to migratory bird nesting.

Location	Affected Time Period	# of Nests	Species	Adjustment to Operations
Southern levee of STA-1E Cell 4N	May 1 to June 1, 2015	3	Everglade Snail Kite	Southern levee of Cell 4N closed to non-essential traffic during this time period.
Eastern levee of STA-1E Cell 4N	May 1 to July 8, 2015	2	Everglade Snail Kite	Eastern levee of Cell 4N closed to all traffic during this time period.
Northern levee of STA-5/6 Cell 5-3B	May 1 to June 1, 2015	2	Everglade Snail Kite	Northern levee of Cell 5-3B closed to all traffic during this time period.
Northern levee of STA-5/6 Cell 5-5B	May 1 to August 4, 2015	1	Everglade Snail Kite	Northern levee of Cell 5-5B closed to all traffic during this time period.

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