
SOUTH FLORIDA WADING BIRD REPORT

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Dale E. Gawlik, Editor

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Summary

Water conditions during the 1997 nesting season were dryer than in recent years and most regions reported a “strong drydown” as the dry-season progressed. However, in late March and early April water level reversals occurred in Everglades National Park (ENP) and the Water Conservation Areas (WCAs).

The estimated number of wading bird nests in south Florida (south of Lake Okeechobee) this year was approximately 12,850. This number is down about 26% from the estimated 17,282 nests in 1996. Both of these estimates include all wading bird species reported in all regions and therefore may be higher than other published estimates that only include the traditional “core” species.

Areas with the most severe decrease (about 50%) were ENP and Florida Bay (Big Cypress National Preserve reported only 20 Little Blue Heron nests this year but systematic surveys were not conducted). Numbers of nesting wading birds in the southwest coast increased slightly from last year. Numbers in WCA 2 and 3 were down about 10% from 1996 whereas numbers in Loxahatchee National Wildlife Refuge (LNWR) were down about 25%. Preliminary data from aerial wading bird distribution surveys (includes non-nesting birds) and

data from the southwest coast suggest that the total numbers of birds using the system were similar in 1996 and 1997. The decline in numbers of nesting birds in 1997 may therefore represent an increase in the proportion of non-breeding birds rather than a change in actual population size.

The only species that showed a system-wide increase from 1996 was the White Ibis. This species increased from an estimated 2101 nesting pairs in 1996 to 3591 nesting pairs in 1997. However, numbers are still only about equal to the 10-year average for that species. Three species showed increased nesting over 1996 in one region and decreased nesting in others. Numbers of nesting Tricolored Herons and Snowy Egrets increased in LNWR but declined in other areas. Cattle Egrets increased in WCA 2 & 3 but decreased in other regions. All other species showed system-wide decreases from 1996.

Nest abandonment by Wood Storks, Snowy Egrets, and Tricolored Herons was reported in southwest WCA-3A and northern ENP. Other areas were not monitored as closely so it was not possible to document the extent of nest abandonment. The parasite *Eustrongyldes ignotus* was found in one colony in WCA-3A that experienced widespread abandonment. A special section by Steinkamp in this report, documents the progression of abandonment by Wood Storks at the Tamiami West colony.

From the perspective of ecosystem restoration, the Great Egret was the only species that met numerical nesting targets proposed by the Science Subgroup to the South Florida Ecosystem Restoration Task Force. White Ibis showed some improvement in the timing of colony initiation only.

This report marks continued progress toward the management of south Florida as an ecosystem rather than individual political units. Because the synthesis of regional wading bird nesting patterns may well be one of the best measures of ecosystem health, we are obligated to improve it when we can. The reliability of our knowledge is hampered by inconsistencies in survey methods and effort. These problems emerge anytime a system-wide synthesis is attempted. Ogden provides a more thorough discussion of these points later in the report. If wading birds are to continue to play a critical role in the management of south Florida's ecosystem, then all people and agencies involved must continue to improve the reliability of our knowledge and share their understanding of this remarkable place.

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Regional Nesting Reports

WATER CONSERVATION AREAS 2 AND 3

Nesting was monitored throughout the study period by monthly systematic aerial surveys (February through June), through opportunistic visits to colonies, and through systematic ground surveys by airboat, which began in late April and continued through June. The aerial surveys covered all of WCA 3A, 3B, 2A and 2B. The ground surveys covered all of WCA 3A and

3B. Our reports are complete for WCA 3A, but still lack ground counts in WCA 2A and 2B.

Within WCA 3, the 1997 nesting season began in a promising fashion. Drying rates seemed fast, and wading birds were found in numerous dense feeding groups in northern and northwestern WCA 3 by late January. Nesting began in late January and early February for Great Egrets, which is slightly early by comparison with other years from the past ten. In addition, Wood Storks

Summary of numbers of wading bird nests in WCA 3 and 2 in the central Everglades during 1997. All large colonies are listed, and smaller colonies are summarized. Data from Peter Frederick, University of Florida.

Name	Latitude	Longitude	GE	WI	WS	SE	TCH	LBH	BCNH	GBH	ANH	RS	GI	CE	Total
	dec. deg.	dec. deg.													
Alley North	26.18917	80.52583	700	2,000		150	100	20	30	2	25	15			3,042
Hidden/L-28	25.79883	80.84300	80			130	375				30				615
Tamiami West	25.75862	80.54593	200	100	90		25							150	565
Big Melaleuca	26.04667	80.62500	250							1	10				261
Mud Canal	25.79707	80.49072	80	50										120	250
new	26.01633	80.45783	120												120
Cypress City	26.12550	80.54083	120												120
3B mud canal E	25.79767	80.53833	90						5						95
L-67	25.95550	80.56533	83							2	5				90
new	25.90600	80.60900	61												61
new	26.14167	80.62000	59												59
new	26.14000	80.59667	58												58
Jwnew	26.14250	80.74533	55												55
crossover	25.94000	80.83167	50												50
new	26.34200	80.43933	50												50
Tamiami East	25.75862	80.50843	43												43
new	26.16267	80.34667	40												40
new	26.12383	80.73200	37												37
3B Deer island	25.81667	80.60283	30	5											35
new	26.10617	80.49667	35												35
new	26.14000	80.61167	33												33
JW1	26.08450	80.71917	30												30
Lumpy	25.95400	80.65300	28							1					29
new	26.11450	80.65833	25												25
JW2	26.12183	80.73233	25												25
new	25.95667	80.47833	24												24
new	25.97133	80.70000	24												24
new	26.14233	80.37900	20												20
new	26.16500	80.43333	18												18
Colonies of less than 20 pairs			140	0	5	0	129	27	3	116	248	0	0	0	523
Total, WCA 2 & 3			2,608	2,155	95	280	629	47	38	122	318	15	0	270	6,432

began nesting by late February in the Tamiami West colony.

However, a series of water-level reversals in late March and early April was associated with a reduction in Great Egret nests at several colonies. The Hidden colony, for instance, showed a 50% reduction in nests between March and April surveys; the Crossover colony showed a 100% reduction (complete abandonment); Tamiami West was reduced by over half; and Big Melaleuca showed a 15% reduction. The pattern of reduction suggests those birds on the western side of WCA 3 (probably foraging in Big Cypress) were affected much more than those further east and north. At the Hidden colony, we were monitoring nesting intensively (see below), and we documented the abandonment of nearly all Snowy Egrets and over 50% of the Tricolored Herons during late April and early May. This abandonment may have been induced by, and was at least accompanied by, high rates of parasitism by the nematode *Eustrongylides ignotus* in the chicks of both species.

Wood Storks had essentially no nesting success at the Tamiami West colony. These birds were studied intensively by both Shannon Bouton (University of Florida) and Melanie Steinkamp (U.S. Fish and Wildlife Service). They reported that by late May, nesting at Tamiami West had collapsed almost completely, and the few young that had been produced appeared to have been abandoned.

Overall, we found 5,934 nests of wading birds in WCA 3 during the 1997 spring season (Table p. 2; not including Cattle Egrets, Anhingas, or Cormorants). For reference, this total figure is 10% less than comparable surveys done in 1996 over the same area. In a larger context, the 1997 nesting numbers are about 3% higher than the 1993 - 1996 average for WCA 3, and about 11% more than the 1986 - 1989 average. The former average represents a uniformly very wet period, and the latter represents average to slightly wet conditions. By comparison with the most recent year of excellent nesting, 1992, the 1997 figure is 75% lower.

The total numbers of nesting pairs during the past four very wet years have fluctuated relatively little, between 5,184, and 6,199. This may be due to relatively stable, deep-water conditions in the central Everglades. White Ibis nesting during this period has increased rather steadily from zero (1993) to 100 (1994), 1013 (1996) and 2,155 (1997). During the past several years we have also seen nesting beginning in March and early April, a clear change from the late May and June nestings of the late 1980s and early 1990s. Great Egrets have slowly increased in nesting numbers during the same period, though the 1996 and 1997 figures suggest a plateau. Perhaps the most dramatic change in 1997 has been in numbers of Great Blue Herons (122 pairs), which were down 50% from 1996, and down over 65% from the 1993 - 1996 average. The cause of this decrease is not known. Tricolored Herons also were down by 10% in comparison to 1996, and 16% in comparison to the 1993 - 1996 average, respectively. This may have to do

with under-counting both of these dark colored species. We relied heavily on ground counts, which were initiated in late April and May. Thus, we may only have measured post-abandonment nests and may have therefore under-represented the total number of nests initiated.

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EVERGLADES NATIONAL PARK

Park biologists flew from fixed-wing aircraft four colony surveys during the 1997 nesting season. No nesting birds were observed on the first two surveys, one each in mid-January and early February. Surveys were of traditional colonies as well as new colonies discovered during Systematic Reconnaissance Flights. There were approximately 1367 active wading bird nests counted on the mainland during the 1997 surveys (Table p. 4). This is probably a conservative estimate because of the difficulty in counting the small dark-colored herons. Nevertheless this year's estimate is roughly half of what was counted during 1996. Estimates for 1994 and 1995 were similarly low and collectively are among the lowest in the Park's history. Great Egrets, Wood Storks, Snowy Egrets, and Cattle Egrets were lower this year than the last two. Only White Ibis showed an increase (albeit a slight one) over 1996.

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Everglades National Park Wading Bird Colony Surveys 1997

Colony Name and Location	Date	GE	WI	WS	SE	RS	BCNH	BP	CE	Comments
Upper Taylor Slough SW corner of L31W & Main Park Rd	24-Mar-97									Not active
	7-May-97									Not active
Madeira Ditches 25° 19.39 / 80° 38.74	24-Mar-97									Not active
	7-May-97								180-200	
Madeira 25° 13.10 / 80° 39.64	24-Mar-97									Not active
	7-May-97									Not active
Cuthbert Lake 25° 12.56 / 80° 46.50	24-Mar-97	5								Only 5 of 12 GE incubating
	7-May-97	6	1 ^a							
Frank Key 25° 06.17 / 80° 54.39	24-Mar-97	25	20		30			150		
	7-May-97	30	220+					110		
Paurotis Pond 25° 16.89 / 80° 48.18	24-Mar-97	5		20-30	25 ^a	10 ^a				
	7-May-97	12-15		11						Many abandoned WS nests
East River Rookery 25° 16.08 / 80° 52.03	24-Mar-97	5								GE eggs visible
	7-May-97									Not active
Lane River Rookery 25° 18.02 / 80° 53.18	24-Mar-97									Not active
	7-May-97									Not active
Rogers River Bay 25° 33.40 / 81° 04.19	24-Mar-97	75		15						
	7-May-97									5 GE roosting – no nests
N. of 10 Mile Corner 25° 40.67 / 80° 49.29	24-Mar-97									Not active
	7-May-97									Not active
Preserve Pond Apple 25° 40.51 / 80° 55.87	24-Mar-97	35								10 WI nearby in trees
	7-May-97									Not active
East Slough 25° 36.32 / 80° 50.24	24-Mar-97	1								
	7-May-97									Not active
West of Obsv. Tower 25° 39.48 / 80° 47.96	24-Mar-97									Not active
	7-May-97									Not active
Pond Apple Hammock 25° 44.20 / 80° 44.10	24-Mar-97									2 GE – no nests
	7-May-97									Not active
Tamiami West 25° 45.47 / 80° 32.69	24-Mar-97	30		180-200						WI in area- no nests
	7-May-97	120	100	10-20				50		
Tamiami East 25° 45.48 / 80° 30.47	24-Mar-97	35-40								
	7-May-97	25-30								
NE Grossman (b) 25° 41.10 / 80° 34.50	24-Mar-97	35								
	7-May-97									Not active
NE Grossman (a) 25° 38.81 / 80° 36.55	24-Mar-97									Not active
	7-May-97									Not active
Grossman Ridge 25° 37.68 / 80° 38.74	24-Mar-97	30								
	7-May-97									Not active
"A-1997" 25° 42.63 / 80° 35.65	7-May-97	5-10							75-100	
Total^b		402	340+	245	30	0	0	150	350	

^a Indicates roosting birds

^b Represents maximum counts

FLORIDA BAY

The aerial census (helicopter) of large water bird activity in Florida Bay continued for another complete year with the help of the Miami Station of the U.S. Coast Guard. We now have two full years and three months of aerial observations of nesting activity over all of Florida Bay. Our monthly aerial censuses began in April 1995, and recording and analysis of data are completed through March, 1997. Preliminary data on nesting are presented for April through August of 1997. Seven wading bird species, two large diving bird species, and two raptor species were observed nesting in Florida Bay from April, 1996, through March, 1997. These were the Great White Heron, Great Blue Heron, Great Egret, Snowy Egret, Roseate Spoonbill, White Ibis, Tricolored Heron, Double-crested Cormorant, Brown Pelican, Bald Eagle, and Osprey.

In both observation years, maximum nesting activity for most species occurred in the winter or early spring. July, August, September, and October were the months of lowest nesting activity. Some nests of Great White Herons were observed in all but two months, June and August, of the first year and continuously thereafter. Intensive nesting by Brown Pelican extended from November to May. White Ibis started nesting

later in the winter than the other species and continued well into spring of the first year. In the second year, nesting activity by White Ibis was not observed until May.

We have only a few observations of Snowy Egrets nesting in Florida Bay. Great Egret nesting was sizeable the first year (maximum of 195 nests in March, 1996), but minimal the second year. We saw considerably fewer Snowy Egrets and somewhat fewer Great Egrets at feeding sites the second year. Although we have a few observations of nesting by Tricolored Herons and Roseate Spoonbills, we were not able to see their nests well from the air. Therefore, our records do not provide a complete picture of nesting activity in Florida Bay by these birds. Note: nesting data for July and August are incomplete, referring only to main nesting aggregations.

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Number of nests observed in Florida Bay, by month.

Year	Month	GW	GB	GE	RE	TC	SE	WI	RS	CO	BP	BE	OS
1995	Apr	1	4	0	0	0	0	0	0	0	0	22	15
1995	May	17	0	27	0	0	0	40	0	45	10	31	93
1995	Jun	0	0	0	0	0	0	0	0	0	0	14	10
1995	Jul	1	0	0	2	50	0	0	0	6	0	25	77
1995	Aug	0	0	0	0	0	0	0	0	0	0	33	87
1995	Sep	2	0	0	0	0	0	0	0	0	0	26	102
1995	Oct	14	0	0	0	0	0	0	0	0	0	40	174
1995	Nov	120	4	0	0	0	0	0	45	0	75	38	124
1995	Dec	189	6	10	0	0	0	0	12	0	50	33	150
1996	Jan	257	33	130	0	0	0	0	18	0	225	21	120
1996	Feb	188	20	165	1	0	0	0	9	75	365	26	116
1996	Mar	152	24	195	0	1	0	101	21	50	350	32	126
1996	Apr	104	6	84	0	10	10	275	0	0	251	3	26
1996	May	71	15	163	0	29	0	200	0	10	168	1	6
1996	Jun	14	3	20	0	0	0	150	0	25	40		
1996	Jul	17	0	3	0	0	5	0	0	50	0	2	0
1996	Aug	4	1	0	0	0	0	0	0	0	0	0	0
1996	Sep	35	0	0	0	0	0	0	0	20	0	0	0
1996	Oct	81	5	0	0	0	0	0	0	0	0	2	4
1996	Nov	90	6	0	0	0	0	0	20	0	77	0	3
1996	Dec	131	21	0	0	0	0	0	40	50	100	0	23
1997	Jan	200	20	0	0	20	0	0	24	75	235	4	29
1997	Feb	153	15	0	0	0	0	0	0	50	275	3	27
1997	Mar	133	48	75	0	0	0	0	0	55	420	7	31
1997	Apr	80	3	30	0	0	0	0	0	110	270	8	0
1997	May	30	1	0	0	0	1	75	0	50	40	0	0
1997	Jun	9	0	0	0	50	0	100	0	0	0	0	0
1997	Jul			75		50	75	50					
1997	Aug			50		50				51			

BIG CYPRESS NATIONAL PRESERVE

There was a rapid drydown this year accompanied by very little wading bird nesting. Although there was no formal wading bird survey, known areas of previous wading bird use were checked while on panther flights. On June 27, approximately 20 Little Blue Heron nests were found with young nearly fledged.

The low numbers of wading birds this year contrasts with last year's 1250 Wood Storks scattered over 45 sites. At least half the sites had nests. It may be that last year's Wood Stork nesting was the result of two years of record high water followed by a normal drydown. If the south Florida restoration initiative results in longer hydroperiods in Big Cypress, there may be more frequent Wood Stork nesting.

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HOLEY LAND AND ROTENBURGER WILDLIFE MANAGEMENT AREAS

The Rotenberger and Holey Land Wildlife Management Areas were basically dry through late April and no wading bird nests were found this year. Although we do not perform specific nesting surveys, I feel that any large nesting colonies would have been seen in our monthly fixed-wing wading bird foraging surveys, April deer recruitment and vegetation surveys (helicopter), or the June fixed-wing deer population survey.

Until hydropattern restoration occurs in Rotenberger, it is unlikely that there will be much wading bird nesting because it is normally dry until the rainy season. Holey Land usually has some surface water throughout the year, especially in several hundred acres of sloughs in the northeastern corner. However, nesting substrate is lacking. I would be very interested in talking with anyone who has used artificial wading bird nest structures, which may be appropriate for this area.

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SOUTHWEST COAST

The inland dry-down was very severe this year. In April, Corkscrew Swamp Sanctuary recorded the third lowest water levels for the period in thirty years. Along the coast, we had very strong winds in April that blew out some nests at Marco and Chockoloskee Bay, and appeared to cause unusual mortality among birds migrating in from the gulf (including waders). Numbers of active nests are shown parenthetically after each species below.

Great Egret (58): Night roost censuses throughout the period indicated that these birds were in the area in typical numbers. Nesting at Marco started at about the usual time; but there were no where near the average number of nests; numbers of nests were down 64% from the 15-year mean.

Snowy Egret (130): In the area in usual numbers. Nesting activity started two weeks early but time of egg laying was about average. Numbers of nests were down 60% from the 15-year mean and there did not appear to be as many chicks in the colony as I expected.

Little Blue Heron (5): Numbers were a little low at the night roost but nothing unusual. Nesting numbers were very low; 94% below the 15-year mean.

Tricolored Heron (307): In the area in usual numbers. Nesting 46% lower than the 15-year mean but up considerably from 1996.

Cattle Egret (457): Numbers night-roosting down 57% from 12-year mean. As with Snowy Egrets, they started nesting activity early but their time of egg-laying was normal. Numbers nesting were similar to long-term average but up from 1996.

White Ibis (26): Numbers of adults (8836) at the night roost were the highest ever recorded in June (62% above the 12 year mean). Traditionally, White Ibis nested inland and not on the coast in Southwest Florida. Two years ago they started nesting in the Marco colony and this year there were about 26 nests. The adults arrived early this year, suggesting they may not have had a productive year elsewhere.

It appears that there are an average number of waders in the area and nesting is similar to last year. However, nesting is down approximately 50% from the long-term average.

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A.R.M. LOXAHATCHEE NATIONAL WILDLIFE REFUGE

This year's wading bird nesting effort was similar to last year's. In 1997, a total of 32 hours of airboat survey effort were conducted from May 1 through May 29. Helicopter observations of colonies inaccessible by airboat took place on May 12 and June 10 for approximately two hours. Nest estimates for each species were derived by either counting actual nests at each colony or by counting the number of flushed, tending adults. Only one survey effort was undertaken early in the nesting period this year due to staffing shortages. Therefore, these are conservative survey estimates, as some species may have started nesting after the initial count.

We again documented more colonies occurring north of 26°31.00'N than in 1993, 1994, 1995 and 1996. Another new colony (26°36.97'N, 80°20.10'W) was located near the most northern interior colony, and three colonies were found in the central interior of the refuge. Forty Glossy Ibises were observed perched in a mixed colony at 26°33.68'N, 80°14.99'W; one was observed carrying nesting material. We will continue to monitor this colony for possible Glossy Ibis nesting.

Most wading bird nesting colonies visited in 1997 were located in the same vicinity as those from the previous years.

Wading bird nest estimates surveyed at A.R.M. Loxahatchee National Wildlife Refuge by species, 1992-97.

SPECIES	1992	1993	1994	1995	1996	1997	MEAN
Little Blue Heron	938	673	1333	1153	1372	1311	1130
Tricolored Heron	520	173	103	343	197	254	265
Great Blue Heron	87	73	73	82	118	95	88
Great Egret	239	328	396	610	837	516	488
Snowy Egret	97	4	21	59	28	73	47
Cattle Egret	1408	728	1051	729	2403	1028	1225
White Ibis	2761	218	1849	2249	800	1095	1495
USW*	0	378	0	0	0	0	63
TOTAL NESTS	6050	2575	4826	5225	5755	4372	5116
TOTAL NESTS w/o Cattle Egrets	4642	1847	3775	4496	3352	3344	3891

* USW = Unknown small wading birds.

The colony near the headquarters boat ramp grew from 180 Cattle Egret nests in 1996 to 200 in 1997, from two Tricolored Heron nests to 57, and from one Little Blue Heron nest to 100; 20 Snowy Egrets were observed there for the first time.

Survey estimates show four species of birds had decreased nesting activity in 1997. Little Blue Heron nest estimates decreased by 4% from 1996, but appear to be holding steady over the last 4 years. Great Blue Heron nest estimates in 1997 were higher than all six years except for 1996, which was 19% higher. Great Egret nest estimates decreased by 15% from 1995 and 38% from 1996. However, the number of 1997 Great Egret observations was greater than 1992, 1993 and 1994 surveys. Cattle Egrets declined 57% from 1996, but have fluctuated greatly over the years. The Cattle Egret nesting colony located just south of the S5A pump station is thought to have decreased in size in 1997 (300 nests) from 1996 (900 nests) survey. However, this colony will continue to be monitored by helicopter in 1997, as it increased in size from between May and July 1996. Two large colonies of Cattle Egrets including the 1996 colony at 26°22.99'N, 80°14.41'W were not found by airboat or helicopter survey this year.

Survey estimates show three species of nesting birds increased nesting activity from 1996 to 1997. Tricolored heron nesting has fluctuated greatly over the 6-year period; 1997 showed a 29% increase in Tricolored Herons from 1996. Snowy Egrets showed a general increase over the 5-year trend with a 160% increase from 1996 to 1997. White Ibis numbers increased in 1997 by 37% from 1996 and are expected to increase slightly more as these birds were just starting nesting activity during the dates of the initial survey. However, even with a projected increase in nesting activity, the nesting estimate will be below the 1995 figures.

MEETINGS OF INTEREST:

Florida Ornithological Society: 3 – 5 Oct 1997,
St. Pete Beach, Florida.

Colonial Waterbird Society: 29 Oct – 2 Nov
1997, Lafayette, Louisiana.

North American Ornithological Conference: 6 -
12 April 1998, St. Louis, Missouri.

Colonial Waterbird Society: October 1998,
Miami, Florida.



Spring storm events were typical and brought occasional torrential rains and winds. June had above average rainfall. The heat index was often above 100°F during May and June. These typical climatic conditions were not likely to have significantly impacted nesting success.

The observed trend of colony establishment in more widespread locations, especially in the northern half of the refuge, is attributed to the continued implementation of the new water regulation schedule for A.R.M. Loxahatchee NWR. Subjective information about the likelihood of success was derived from references to spring water levels and climatic conditions in the refuge interior.

The actual water level in the refuge interior stayed below the highest zone of the regulation schedule from the end of December 1996, through January and February and into the beginning of March 1997. However, the low water level conditions provided concentrated forage fish availability for smaller wading birds and wood storks. However in mid-May, the water levels began to rise sharply. Higher water levels probably reduced foraging efficiency of hunting parents and fledgling wading birds as forage fish are less concentrated and therefore less available. The rising water levels also may have prevented future nesting attempts by those birds losing clutches or late nesters.

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KISSIMMEE RIVER BASIN

For the purposes of this report, the Kissimmee Basin includes the Kissimmee River, Lake Kissimmee, Lake Istokpoga, and the northern portion of Lake Okeechobee.

Nesting effort was moderate in the Kissimmee River Basin during the 1997 breeding season. Although several historical colonies were not active this year, a few new colonies were established. At this time, no intensive monitoring has been conducted in wading bird colonies on the Kissimmee River and its associated lakes. However, beginning next year, the South Florida Water Management District will implement a more extensive survey program for the Kissimmee River Basin as a part of baseline data collection in preparation for the Kissimmee River Restoration Program.

Bird Island and Rabbit Island on Lake Kissimmee both supported wading bird colonies this year. Cattle Egrets and Anhingas were the most abundant species, however, both islands had a few scattered Snowy Egrets, Tricolored Herons, Little Blue Herons, Great Egrets, Glossy Ibis, and White Ibis. The south end of the Bird Island colony was heavily predated at the end of May at a stage when many nests still contained eggs. One of two colonies on the Audubon Kissimmee River sanctuary was active with about 200 pairs of Cattle Egrets. A new colony was initiated late in the season on the south end of the Avon Park Bombing Range in Pool B of the Kissimmee River. Approximately 500 pair of Cattle Egrets and several Little Blue Herons were observed on nests at this colony during the last week of June. The fate of the colony is unknown at this time but will be monitored through the remainder of the summer. Lake Istokpoga had some nesting activity; the Bumblebee Island colony contained 19 Great Egret nests and two Great Blue Heron nests. Neither the Eagle Island nor King's Bar colony on Lake Okeechobee was active this year. Lake levels were very low this spring, changing the characteristics of the colony sites, which may have been responsible for the lack of nesting at those locations.

I acknowledge the help of Julie Hovis and Nancy Douglas, Florida Game & Freshwater Fish Commission, Central Region.

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SYSTEMATIC RECONNAISSANCE FLIGHTS

Editor's note: Because the SRF's measure the distribution and abundance of wading birds, this section may appear to represent a departure from the theme of nesting. However, when SRF population estimates are combined with nesting surveys, it is possible to calculate the proportion of the population that breeds each year.

Wading Bird Surveys of the Water Conservation Areas, Holey Land, and Everglades Nutrient Removal Project were flown with a fixed winged aircraft from January to June 1997 by Dave Nelson and Craig Theriot of the USAE Waterways Experiment Station.

Wet conditions were observed throughout most of the 6 month survey in 1997 similar to conditions observed in 1996. The range of water levels varied little during each month of the six-month survey season. However, during May Loxahatchee National Wildlife Refuge (WCA 1) had slightly lower water levels. The lower water levels created shallow pools that probably concentrated forage species since numerous wading birds were observed around these pools. While we are in the process of compiling the numbers for 1997, wading birds numbers appeared to be similar to 1996 but slightly lower.

Great Blue Herons, Little Blue Herons, Glossy Ibises, and White Ibises appeared to be slightly lower in abundance in 1997 than in 1996. Great Egrets and Wood Storks appeared to be similar in abundance from 1996 to 1997. White Ibises were more dispersed and not observed as often in large flocks in 1997 as they were in 1996.

We used high resolution digital video linked with GPS position to record each transect. The resolution of the video has a high enough quality to distinguish vegetation types and to identify wading birds that are white in color. The darker colored wading birds are difficult to observe on the video. We currently have about 40 hours of archived video for 1996 and 1997 surveys.

We designed a new data sheet for the 1997 that allows for more rapid data entry and reduces data entry error. This data sheet is being used to develop real time computerized data entry linked to GPS positions that we plan to implement in 1998.

The final report for the 1996 survey is currently available and data and tables for the 1997 survey will be available by August 1997 from USAE Waterways Experiment Station.

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Special Topics

TAMIAMI WEST COLONY

Wood stork nesting at the Tamiami West colony was monitored from April 10 - June 12, using ground and aerial surveys. Monitoring was completed as a condition of the construction protocol developed to prevent adverse effects on nesting Wood Storks at the Tamiami West colony. There was concern that blasting activities as part of levee modification at the S-355B site, which is within 0.4 miles of the Tamiami West colony, may be detrimental to nesting Wood Storks and other wading birds. To reduce the risk of adverse effects on Wood Storks, it was decided to delay blasting until all Wood Stork nestlings in the colony were at least six weeks of age. To determine when the colony reached this status, weekly aerial and ground surveys were conducted.

On April 2, 1997, an aerial survey documented 135 nesting pairs of Wood Storks in the Tamiami West colony. Of the observed nests, approximately 70% contained eggs, 20% had young, and 10% were on nest platforms.

On April 10, both ground and aerial surveys were completed for the colony. During the ground survey, 29 nests were marked for future monitoring and nest characteristics recorded. Of these nests, 69% contained eggs, 24% contained nestlings, and 7% contained eggs and nestlings. The colony showed signs of substantial stress; attentiveness by adults was weak and few adults showed strong attachment to their nests. The aerial survey revealed that the number of active stork nests had decreased to approximately 65% (45-50 nests) of those observed during the April 2, 1997, survey.

On April 17, 1997, ground and aerial surveys revealed an additional 36% decline (29-32 nests) in the number of active Wood Stork nests. Of the 29 nests marked the previous week and re-visited, 11 nests had failed. Of 17 re-visited nests, nine supported nestlings, five had eggs, and two supported both nestlings and eggs. The aerial survey documented that 29-32 active Wood Stork nests remained in the colony.

On April 29 and 30, ground and aerial surveys were conducted, respectively, and supported the previous trend of a failing colony. The number of active Wood Stork nests had declined to 23, an additional decline of approximately 20%. Twelve of the marked nests were re-visited during the ground survey and all contained nestlings ranging in age from one to four weeks.

As a result of the decline in the number of active nests, the aerial surveys were discontinued. However, ground surveys were continued. On May 8, the number of active Wood Stork nests continued to decline, with 12 active

nests located. Nestlings were weak, lethargic, and showed signs of food stress.

On May 17, nine nests were re-visited. Nestlings, again, were lethargic, weak, and emaciated, and some showed signs of abandonment. Adult attentiveness was weak or non-existent. Nestlings in nests that failed between May 8 and May 17 were all less than four weeks of age.

On June 12, a final ground survey of the colony was performed. Of the initial 29 nests marked, four fledged young. Three nests fledged one young and one nest fledged two young.

It is unlikely that any of the 1997 fledglings will survive to independence. On June 27, colony observations showed no sign of Wood Storks. It is probable that those fledglings observed on June 12 perished.

Water Levels

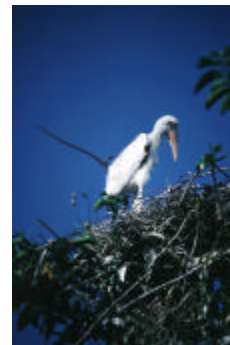
South Florida experienced heavy rainfall during May and early June. While data are not yet available for gages closest to the colony, biologists monitoring the colony experienced increasing water levels in May and June. Additionally, data from gage G-3273 reveal an increase in mean water levels (feet) from 4.84 in April, to 5.69 in May, to 6.30 during the first nine days of June. Maximum water levels measured at G-3273 during the months of April, May and early June were 6.22, 6.18, and 6.99 respectively. These data suggest rising water levels within the surrounding foraging grounds in the southern Everglades.

Timing

It is not unusual for South Florida to experience heavy rains in May and June. Although the failure of Wood Storks to produce young in the Tamiami West colony was, most likely, a result of the inability of the adults to forage effectively due to rising water levels, the direct cause was the late initiation of nesting. Wood Storks will rarely have much success in producing viable young in years when they must wait until March or April to begin nesting. Foraging conditions deteriorate as wet season rains increase water levels within the foraging grounds.

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STATUS OF WADING BIRD RECOVERY -1997

The Science Subgroup to the South Florida Ecosystem Restoration Task Force has prepared a preliminary set of recommendations for success measures for the south Florida ecosystem restoration program (Science subgroup, 1997). Included in these recommendations are targets for the recovery of nesting wading birds in the Everglades basin (WCAs & ENP; Ogden et al. 1997). The wading bird success measures are for three nesting parameters: the number of nesting birds, the timing of nesting, and the location of colonies, for five characteristic species in mainland Everglades colonies (Great Egret, Snowy Egret, Tricolored Heron, White Ibis and Wood Stork). For each of these three parameters, and for each species, the most recent, annual pattern of nesting is compared against a base condition derived from nesting patterns during the years 1986-1995. In order to smooth the affects of survey error, as well as the large interannual variation in nesting effort, three-year running averages are used for making comparisons of numbers of nesting birds. The first annual evaluation of nesting wading birds using these three parameters was reported in Gawlik and Ogden (1996). The following evaluation, one year following the first, is derived from 1997 nesting information contained elsewhere in this document (see Bass and Oberhofer, Frederick and Battaglia, Bailey and Jewell).

Numbers of Nesting Birds

In 1997, the combined nesting effort for the Loxahatchee National Wildlife Refuge, Water Conservation Areas 2 and 3, and mainland Everglades National Park (including Frank Key), was 3,390 nesting pairs of Great Egrets, 383 pairs of Snowy Egrets, 883 pairs of Tricolored Herons, 3,470 pairs of White Ibis, and 175 pairs of Wood Storks. The following table lists the highest and lowest values among the three year running averages calculated for nesting pairs during the base years (1986-1995), the three year running average for the two most recent periods (1994-1996; 1995-1997), and the proposed target range for three year running averages for nesting pairs (Ogden et al. 1997), for the five species (Snowy & Tricolored combined).

Species	Base high/low	1994-1996	1995-1997	Target
Great Egret	1,163/3,843	4,043	4,302	4,000
Snowy/ Tricolored	903/2,939	1,508	1,488	10k-20k
White Ibis	2,107/8,020	2,172	2,850	10k-25k
Wood Stork	130/294	343	283	1.5k-2.5k

Timing of Nesting

The two species that have shown the greatest change in the timing of the initiation of nesting have been White Ibis and Wood Storks (Ogden 1994, Ogden et al. 1997). During the base period, ibis initiated nesting, on average, about 1.5 months later than during an earlier, historic period; storks on average about 2 months later. "Late" nesting has been

associated with reduced numbers of nesting birds and reduced nesting success. During 1997, ibis initiated nesting in "...March and early April,..." and storks initiated nesting in late February and early March (this report: Frederick and Battaglia, Steinkamp). The timing of ibis nesting in 1997 represented an improvement over the May-June initiations during the drier years, late 1980s-early 1990s. Storks, in 1997, showed no improvement in timing, compared to the base period.

Location of Colonies

The restoration target for wading bird colony locations in the mainland Everglades is for the percentage of birds nesting in the area of the traditional ecotone colony sites to increase above the 26 percent mean (for the five target species) which nested there during the base period (range, 6-58%). Although not suggested in Ogden et al. (1997), a goal would be to reestablish the large colonies in the subregion of the mangrove-marsh ecotone. The proportion nesting at the southern Everglades ecotone in 1997 was 2 percent (11% in 1996)!

Conclusions

Great Egrets again met the numerical target set by Ogden et al. (1997). The remaining four species showed no improvement in numbers of nesting birds compared to the base condition. White Ibis showed improvement in the timing of colony initiation during the recent, relatively wet years, compared to the drier year during the late 1980s and early 1990s. Wood Storks showed no improvement in the timing of nesting, which goes a long way towards explaining why most stork nests at the Tamiami Trail West colony failed in 1997. The percentage of the total number of nesting birds (for the five species) nesting in the traditional ecotone subregion continues to decline. The two percent nesting effort in 1997 may be the lowest ever! The shift of nesting birds out of mainland Everglades National Park has been at a dramatic pace. As recently as 1983, 1984, and 1986, more birds nested in the mainland Park than in WCAs 2 and 3 (Ogden 1991).

Ogden et al. (1997) proposed a simple scoring process for reporting annual progress towards meeting five recovery goals for wading birds in south Florida. Information on three of these restoration targets (numbers in the Everglades system, timing, location) are included in this 1997 evaluation, and so it is possible to use this scoring process to produce a 0.0 to 3.0 score for 1997. By this method, the 1997 score is 1.0 (improvement in numbers for Great Egret and White Ibis, but not for Snowy/Tricolored or storks = 0.5; improvement in timing for ibis, but not storks = 0.5; no improvement in the percentage of birds nesting in the ecotone subregion).

The value of the annual wading bird colony surveys in south Florida has been substantially weakened by two problems. Firstly, the current surveys do not follow a

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standard survey protocol. In 1997, colonies were surveyed from the air, monthly by fixed-wing aircraft for WCAs 2 and 3 (February through June), twice by helicopter for Loxahatchee (May 12 and June 10), and four times by fixed-wing aircraft for mainland Everglades National Park (January, February, March 24 and May 7). Systematic ground surveys by airboat were conducted between late April and June in WCA-3, and throughout May in Loxahatchee. No ground checks were conducted for WCA-2 or Everglades National Park (except TTW; see Steinkamp). An obvious result from the uneven pattern of ground surveys; an impressively high 1,311 pairs of Little Blue Herons were found nesting in Loxahatchee, and 629 pairs of Tricolored Herons in WCA-3, while neither species was detected nesting in mainland Everglades National Park. Similarly, the new monthly aerial surveys in Florida Bay (this report: Browder et al.) are producing useful numbers of nesting pairs for conspicuous species (for example, Great White Herons), but appear to be missing most nests of species that are inconspicuous from the air (for example, Reddish Egret & Roseate Spoonbill).

Secondly, systematic colony surveys are still lacking for key subregions and times. The missing subregions include the entire Big Cypress, Fakahatchee, Okaloacoochee Slough, and Corkscrew basins, and most of the Gulf coastal islands between Lostman's River and Marco Island. The missing time frame is the wet season, June/July through September/October. Historically (including 1970s-1980s), significant numbers of several species (for example, Great Egrets, Little Blue Herons, White Ibis) nested in south Florida during the wet season in some years (Bancroft et al. 1988, Kushlan & White 1977, Ogden 1994).

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