

Supplemental Information for the Tricolored Heron

Biological Status Review Report



The following pages contain peer reviews received from selected peer reviewers, comments received during the public comment period, and the draft report that was reviewed before the final report was completed

March 31, 2011

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Peer review #1 Dr. Larry Bryan

From: Larry Bryan

To: Imperiled

Subject: RE: Deadline reminder for peer reviews of BSR reports

Date: Wednesday, January 05, 2011 1:22:41 PM

Review: Tricolored Heron Listing as State Threatened in Florida

I have completed my review of the Draft Biological Status Review for the Tricolored Heron (*Egretta tricolor*) produced by the 3-member review group (Rodgers, Cook & Frederick). In my opinion, acknowledging the difficulty of surveying for this species given its cryptic coloration and nesting habits (e.g.; understory), I thought the review group utilized the best available data in evaluating the status of this species and correctly classified it as State Threatened, given the criteria provided. I also thought the assumptions made by the group where needed within the Tables were accurate (e.g; assuming the lack of immigration from other states). This species is considered a high priority species in both GA and SC due to population declines and its sensitivity to habitat loss/change and thus these nearby populations would not be appropriate as sources. Acknowledgement of the potential impacts of sea level rise/climate change (Table 1...three generations...) was also important and appropriate.

Larry Bryan, University of Georgia's Savannah River Ecology Laboratory

Peer review #2 from Michael Cheek

From: Cheek, Michael

To: Imperiled

Cc: Rodgers, James

Date: Thursday, January 06, 2011 2:47:14 PM

Attachments: TRHE and LBHE status review comments Cheek.docx

Please find my attached comments regarding the species status reviews for both tricolored heron and little blue heron. I had initially only received the tricolored heron for review, but then in a second e-mail I received little blue heron as well, but they appeared very similar so I reviewed them both.

Please let me know if you have any questions.

Mike

Michael Cheek

Staff Environmental Scientist

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Restoration Sciences Department

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Overall, both species (LBHE and TRHE) status reviews appear to have defensible logic and solid reasoning for their respective proposed listing recommendations.

Although data from the Kissimmee Division of the South Florida Water Management District is not suitable for statewide trend analysis of either species, the authors may want to consider the following abundance data from the Kissimmee River floodplain in central Florida to assist in estimating statewide numbers. Data collected from aerial surveys along the Kissimmee River show that small dark herons (LBHE and TRHE combined, excluding juv. little blue herons) averaged approximately 1.66 (± 0.19 SE) birds/km² within the *restored* area (55 km² total) from 2001-2008 (SMDH densities were 1.12 (± 0.19 SE) in the control area prior to restoration during the baseline period (1996-1998)).

If you extrapolate the restored value out to wetland habitat statewide (approximately 1/3 of 90,000 km², or 29,997 km²) it is a rather large number, around 49,750 birds statewide. Roughly estimating that TRHE are at least 2x the population size of LBHE based on nesting numbers and spp. proportions in foraging flocks in south Florida, that would equal roughly 33,000 TRHE and 16,500 LBHE, assuming they were equally distributed throughout the state, which we know they are not.

It is unclear in the Area Occupied (AOO) under the Status Review sections at the bottom of both reviews where the 16,000 km² (25,000 km² for LBHE) area of occupied habitat came from for TRHE, is this supposed to be 1/3 of total state area of 95,000 km² *minus* the western panhandle and north central counties? May need to clarify.

Tricolored heron Status Review Comments

- Authors may want to include citations for assumptions under Status Review Notes.
- Tricolored heron longevity record from Bird Banding Lab is 17 years 8 months, *not* 14 years. The max age appears OK so may not need to recalculate generation time and resulting time period of evaluation?

Letters and emails received during the solicitation of information from the public period of September 17, 2010 through November 1, 2010

Email from Neil Langenberg

Florida's Imperiled Species – Biological Status Review

Department of Environmental Protection
Coastal and Aquatic Managed Areas
Charlotte Harbor Aquatic Preserves
Punta Gorda, Florida 33955

October 14, 2010

Please find attached rookery monitoring data for the Biological Status Review regarding Florida's imperiled species requested by the Florida Fish and Wildlife Conservation Commission. Data was collected from rookery islands in 2008, 2009 and 2010 by staff from Charlotte Harbor Aquatic Preserves (CHAP) and J.N. "Ding" Darling National Wildlife Refuge (USFWS). The study area is located in southwest Florida, within Lee County, more specifically, the lower Charlotte Harbor area including Pine Island Sound Aquatic Preserve, Matlacha Pass Aquatic Preserve, and portions of J.N. Ding Darling NWR complex. Colonial bird nesting activities were documented by direct counts of active nests via boat during the breeding season. Counts reflect the maximum number or peak estimates of adults with nest by species. Data listed is only for the following imperiled species; Tricolored heron (TRHE), Little blue heron (LBHE), Snowy egret (SNEG), Reddish egret (REEG), White ibis (WHIB), and the Brown pelican (BRPE).

Neil Langenberg
Environmental Specialist
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Charlotte Harbor Aquatic Preserves
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Table 1. Colonial nesting bird survey peak estimates for Pine Island Sound AP, Matlacha Pass AP and J.N "Ding" Darling NWR complex between February and August 2010.

COLONY (ISLAND)	Lat	Long	TRHE	LBHE	SNEG	REEG	WHIB	BRPE
Bodiford Key	26.4977	-82.1125	0	0	0	1	0	18
Broken Isl. N	26.6768	-82.1940	1	0	3	0	0	62
Fish Hut Island	26.5467	-82.1245	0	0	0	0	0	5
Givney Key	26.5144	-82.0552	2	0	1	0	14	1
Hemp Key	26.6004	-82.1525	8	1	2	1	0	72
Lower Bird Island	26.5125	-82.0330	0	0	2	0	0	37
N. of York Island	26.4945	-82.1043	2	0	2	0	0	8
N. E. of York Island	26.4939	-82.1021	2	0	0	0	0	0
NW of Mason Island	26.5545	-82.1252	0	0	0	0	0	2
N. W. of Pumpkin Key	26.5660	-82.1279	0	0	0	0	0	1
Skimmer Island	26.5101	-82.0250	7	0	33	2	0	72
SW of Mason Island	26.5534	-82.1249	0	0	0	0	0	1
S. W. of Pumpkin Key	26.5642	-82.1276	0	0	0	0	0	1
Tarpon Bay Keys	26.4573	-82.0745	5	0	9	0	0	34
Useppa Oyster Bar	26.6522	-82.2144	9	1	1	3	0	100
TOTAL			36	2	53	7	14	414

Table 2. Colonial nesting bird survey peak estimates for Pine Island Sound AP, Matlacha Pass AP and J.N "Ding" Darling NWR complex between March and July 2009.

COLONY (ISLAND)	Lat	Long	TRHE	LBHE	SNEG	REEG	WHIB	BRPE
Bodiford Key	26.4977	-82.1125	0	0	0	0	0	6
Broken Isl. E	26.6782	-82.1920	0	0	0	0	0	1
Broken Isl. N	26.6768	-82.1940	1	0	1	1	0	10
BrokenIsl. S	26.6741	-82.1944	2	0	1	0	0	60
Givney Key	26.5144	-82.0552	0	0	0	0	108	2
Hemp Key	26.6004	-82.1525	5	0	0	0	0	56
Lumpkin Island	26.6015	-82.0526	2	1	1	0	0	1
N. of York Island	26.4945	-82.1043	3	0	3	1	1	0
Skimmer Island	26.5101	-82.0250	0	1	0	1	0	44
Tarpon Bay Keys	26.4573	-82.0745	7	5	8	5	0	40
Useppa Oyster Bar	26.6522	-82.2144	1	0	0	0	0	0
TOTAL			21	7	14	8	109	220

Table 3. Colonial nesting bird survey peak estimates for Pine Island Sound AP, Matlacha Pass AP and J.N "Ding" Darling NWR complex between March and July 2008.

COLONY (ISLAND)	Lat	Long	TRHE	LBHE	SNEG	REEG	WHIB	BRPE
Broken Isl.E	26.6782	-82.192	0	0	0	1	0	30
Broken Isl. N	26.6768	-82.1940	1	1	2	0	4	16
Broken Isl. S	26.6741	-82.1944	0	2	1	2	0	92
Crescent Island	26.5978	-82.0637	0	0	0	0	0	7
Givney Key	26.5144	-82.0552	6	4	4	0	201	9
Hemp Key	26.6004	-82.1525	14	3	2	4	0	153
Lower Bird Island	26.5125	-82.0330	0	0	0	0	0	37
Lumpkin Island	26.6015	-82.0526	15	10	5	1	0	0
Skimmer Island	26.5101	-82.0250	2	1	2	0	0	35
Tarpon Bay Keys	26.4573	-82.0745	8	14	13	3	10	32
TOTAL			46	35	29	11	215	411

Email from Kurt Snyder

From: Kurt Snyder

To: Imperiled

Subject: Florida Imperiled Species - Living in Port Orange Florida

Date: Tuesday, October 19, 2010 2:04:37 PM

Hello,

I read in the FWC Newsletter about the Biological Status Review being made concerning Florida Imperiled Species.

I live in the Cypress Head Golf Course Community in Port Orange, Florida. We have six different species included on the Imperiled Species List that are full time residents here, and one other bird on the list that occasionally has been spotted here.

I am not sure if this is the kind of information you are looking for, but if so, let me know and I can provide you with further details.

Here is a list of the 6 species we have at Cypress Head year round:

Florida Sandhill Crane (a dozen or more adult birds, and at least four that were born this spring)

Little Blue Heron (a dozen or more adult birds)

Osprey (two or three adult pairs)

Snowy Egret (5-10 adult birds)

Tricolored Heron (5-10 adult birds)

White Ibis (at least three dozen adult birds and many immature birds born this spring)

Also, for the last three years we have observed one or two Roseate Spoonbills that have stopped for a day or so.

If this information is what you are looking for, I would be happy to provide additional details.

Best regards,

Kurt Snyder

Email from Diane Erdely

From: Diane Erdely

To: Imperiled

Subject: Imperiled species

Date: Tuesday, October 05, 2010 10:19:24 AM

Hello Gentlemen:

My name is Diane Erdely. I live in the community of Solivita, zip code 34759. We straddle the Polk/Osceola County lines. The community, which will consist of about 600 homes when completed, was built with lots of conservation area, and many retention ponds, some of large size. We also have two golf courses. We are within a few miles of the Nature Conservancy's Disney Wilderness preserve. We see some of the imperiled species here on a regular basis.

Florida Sandhill Crane

Very common here. There are at least five breeding pairs in our development. One pair who has had chicks in the past was not successful this year. Several pair successfully raised 2 chicks this year, and one pair raised 1 chick. Have also seen a pair along Marigold Avenue (Marigold and Pleasant Hill Rd.), and several pair on Pleasant Hill Road between here and Kissimmee. I am sure you have the information on the FSC's in The DWP, as we have helped with the survey there.

Limpkin

Often seen around the lakes here. Breed on the property. Several broods have been seen in the development and just outside. At one point this summer, there was a flock of 10 wandering around the area.

Little Blue Heron

Very common around the lakes in this development. There is a little blue rookery by a small natural pond within the development. They have been very successful for several years, raising easily 20 chicks at a time..standing room only.

Osprey

Seen daily flying over the lakes. Don't know the location of a nest.

Snowy Egret

Common. Seen almost daily around the lakes.

Tricolor Heron

Seen occasionally around the lakes.

White Ibis

Common. Seen daily in small flocks, including immature.

Email from Mark Rachal

From: RACHAL, Mark

To: Imperiled

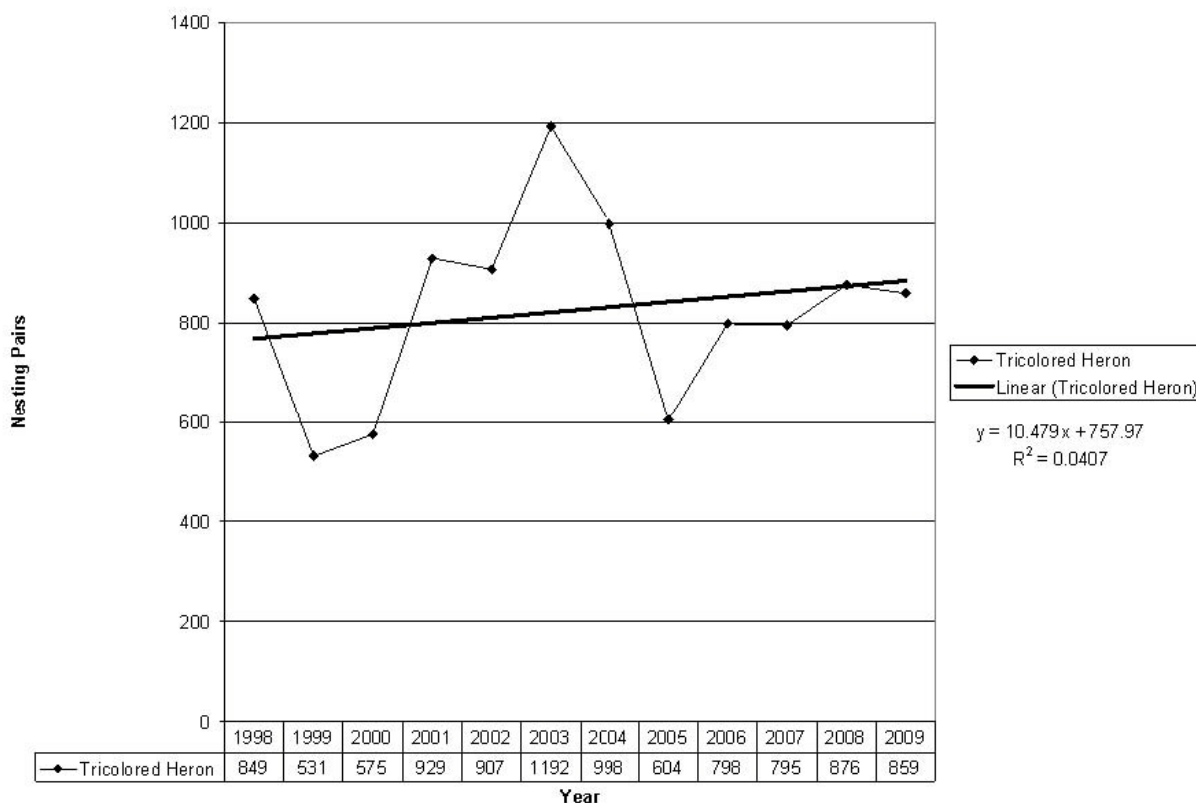
Cc: HODGSON, Ann

Subject: Tricolored Heron trends

Date: Tuesday, November 02, 2010 11:06:13 AM

We estimated the number of birds at the Ozona Spoil East, Dunedin Sand Key West, Don Cesar and Citrus Park colonies in 2009 by taking an average of the 2008 and 2010 nesting data for each site.

There is a high count in 2003 of 1192 nesting pairs and a general decrease in the number of birds going forward. Preliminary results from the 2010 surveys show a much lower total number of nesting pairs.



Ann B. Hodgson, PhD
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Mark Rachal

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Email from Ann Hodgson

From: HODGSON, Ann

To: Imperiled

Cc: WRAITHMELL, Julie

Subject: Status of colonial waterbird populations in the Tampa Bay area from 1984-2009

Date: Friday, October 29, 2010 5:20:28 PM

Attachments: Hodgson-twenty_five_years-06-21-10.pdf

Attached is our recent report:

TWENTY-FIVE YEARS AFTER BASIS: AN UPDATE ON THE CURRENT STATUS AND RECENT TRENDS OF COLONIAL WATERBIRD POPULATIONS IN TAMPA BAY

Ann B. Hodgson, Audubon of Florida, Florida Coastal Islands Sanctuaries, 410 S. Ware Boulevard, Suite 702, Tampa, Florida 33619, ahodgson@audubon.org

Ann F. Paul, Audubon of Florida, Florida Coastal Islands Sanctuaries, 410 S. Ware Boulevard, Suite 702, Tampa, Florida 33619, apaul@audubon.org

Representatives of 4 orders dominate the avifauna of Tampa Bay: pelecaniformes (pelicans, cormorants, anhingas); ciconiiformes (herons, ibis, spoonbills, storks); anseriformes (waterfowl); and charadriiformes (shorebirds, gulls, and terns). The first bay-wide assessment of colonial waterbird populations was presented at BASIS by Paul and Woolfenden (1985). Twelve of the 22 colonies they reported have been abandoned since due to various causes of habitat loss or disturbance and c. 59,000 pairs (mostly Laughing Gulls) nested on 5 colonies that no longer support very large populations. After 1985, 50 new colonies became active, including 15 inland colonies, of which 16 were abandoned later. Using annual breeding bird surveys, we provide recent trends in the populations of 30 bird species breeding in Tampa Bay, 13 of which receive enhanced conservation protection through their listing by federal or state agencies. The Tampa Bay breeding population totals 30,000-58,000 nesting pairs, averaging 39,000 annually. The 2009 nesting population (all species) was 58,500 at 44 colonies. Up to 50% of the total colonial waterbird nesting occurs in Hillsborough Bay; the remainder is distributed at colony sites around Tampa Bay. Human disturbance has become the most significant cause of nesting failure annually, accompanied by anthropogenically-induced predator population increases and urban development affecting the number and ecological integrity of estuarine and palustrine wetland foraging sites. We provide a suite of habitat and population management recommendations that should be implemented to conserve the bay's avifauna. Please cite the information as:

Hodgson, A. and A. Paul. 2010. Twenty-Five Years after Basis I: An Update on the Current Status and Recent Trends in Bird Colonial Waterbird Populations of Tampa Bay, in: Cooper, S.T. (ed.). 2010. Proceedings, Tampa Bay Area Scientific Information Symposium, BASIS 5: 20-23 October 2009. St. Petersburg, FL. 538 pp.

Please call if you have further questions.
best, Ann

Ann B. Hodgson, Ph. D., P.W. S.
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TWENTY-FIVE YEARS AFTER BASIS: AN UPDATE ON THE CURRENT STATUS AND RECENT TRENDS OF COLONIAL WATERBIRD POPULATIONS IN TAMPA BAY

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Ann F. Paul, Audubon of Florida, Florida Coastal Islands Sanctuaries, 410 S. Ware Boulevard, Suite 702, Tampa, Florida 33619, apaul@audubon.org

ABSTRACT

Representatives of 4 orders dominate the avifauna of Tampa Bay: pelecaniformes (pelicans, cormorants, anhingas); ciconiiformes (herons, ibis, spoonbills, storks); anseriformes (waterfowl); and charadriiformes (shorebirds, gulls, and terns). The first bay-wide assessment of colonial waterbird populations was presented at BASIS by Paul and Woolfenden (1985). Twelve of the 22 colonies they reported have been abandoned since due to various causes of habitat loss or disturbance and c. 59,000 pairs (mostly Laughing Gulls) nested on 5 colonies that no longer support very large populations. After 1985, 50 new colonies became active, including 15 inland colonies, of which 16 were abandoned later. Using annual breeding bird surveys, we provide recent trends in the populations of 30 bird species breeding in Tampa Bay, 13 of which receive enhanced conservation protection through their listing by federal or state agencies. The Tampa Bay breeding population totals 30,000-58,000 nesting pairs, averaging 39,000 annually. The 2009 nesting population (all species) was 58,500 at 44 colonies. Up to 50% of the total colonial waterbird nesting occurs in Hillsborough Bay; the remainder is distributed at colony sites around Tampa Bay. The Cockroach Bay-Terra Ceia Bay, Hillsborough Bay, Johns Pass, and Lower Tampa Bay Important Bird Areas are listed by Audubon of Florida among its 100 Important Bird Areas in Florida. Lower Tampa Bay and Hillsborough Bay were designated by Birdlife International and the National Audubon Society, Inc. in 2003 and 2009, respectively, as "Important Bird Area of Global Significance". Human disturbance has become the most significant cause of nesting failure annually, accompanied by anthropogenically-induced predator population increases and urban development affecting the number and ecological integrity of estuarine and palustrine wetland foraging sites. We provide a suite of habitat and population management recommendations that should be implemented to conserve the bay's avifauna. Hodgson and Paul

INTRODUCTION

The species richness of colonial waterbirds that nest in the Tampa Bay estuarine system is unique, as many birds of temperate North America breed here, as well as some typically "tropical" birds (Reddish Egrets, Roseate Spoonbills) that do not nest further north, and some species that nest only in low numbers anywhere in Florida (Caspian, Royal, Sandwich, and Gull-billed terns) (Howell 1932, Paul and Woolfenden 1985, Paul and Schnapf 1997, Paul and Paul 2005, Hodgson, Paul and Rachal 2006).

Within Tampa Bay, colonial waterbirds (pelecaniformes [pelicans, cormorants, anhingas]; ciconiiformes [herons, ibis, spoonbills, storks]; and charadriiformes [shorebirds, gulls, and terns]) nest preferably on small islands that are off-shore, separated by open water and deep channels with tidal currents that discourage predatory mammals from swimming to them, and

have no resident mammalian predators. Large numbers of birds of many species may breed at a single site. Generally, sites occupied by larids are sparsely vegetated sand or shell beaches or dredged spoil material, while peleciform and ciconiiform birds nest where shrubs or trees are available (Schreiber and Schreiber 1978). Thirteen species are currently listed by the state and federal wildlife management agencies to receive elevated regulatory protection. Several other species that nest in the watershed, although not formally listed, are very rare (Willet, Wilson's Plover, Gull-billed, Caspian, Royal, and Sandwich terns) and warrant comparable protection. The importance of Tampa Bay's bird community has been widely recognized by national and international authorities. The Cockroach Bay-Terra Ceia Bay, Hillsborough Bay, Johns Pass, and Lower Tampa Bay Important Bird Areas (IBAs) are listed by Audubon of Florida among its 100 Important Bird Areas in Florida, and BirdLife International and the National Audubon Society recognized Lower Tampa Bay and Hillsborough Bay as globally-significant IBAs in 2003 and 2009, respectively.

In this paper, we briefly summarize the current status and population trends of 30 species of birds nesting in the Tampa Bay system, mostly colonial but also some territorial nesters that often select sites within a mixed species colony, review current management programs to protect them, and provide conservation recommendations to maintain stable populations in the future.

METHODS

We (Florida Coastal Islands Sanctuaries [FCIS]) surveyed colonial waterbird colonies and territorial shorebirds from 1985 to 2009 in Tampa Bay, using direct nest counts or flight line counts, and counting nesting pairs and productivity (chicks/nest) when possible (Buckley and Buckley 1976; King 1978; Erwin and Ogden 1980, Portnoy 1980; Erwin 1981, Paul et al. 2004). Laughing Gulls were censused using a circular plot technique and extrapolating nesting density among areas of similar nesting density (Patton and Hanners 1984). We added colony locations to the survey schedule as they were discovered. We also included 15 bird colonies that occur on the bay's periphery at inland locations within the Tampa Bay Estuary Program's watershed boundaries in Hillsborough, Pasco, and Polk counties, but not colonies outside the watershed in Clearwater Harbor and St. Josephs Sound, although they contribute to the regional population (Agency on Bay Management 1995). Numbers of colonies surveyed varied inter-annually contingent on colony activity, personnel, weather, and other constraints. English and scientific names follow the Check-list of North American Birds 7th edition (American Ornithologists' Union 1998) and 50th Supplement (Chesser et al. 2009).

RESULTS

In Tampa Bay, 58,424 nesting pairs of colonial birds (all species), 42.7% of which were Laughing Gulls, bred at 44 colonies in 2009 (Table 1). The 10 year (2000-2009) mean number of nesting pairs (all species) was 44,141 (SD 10,946.57), and the mean number of active colonies was 32 (SD 6.88) (Table 2).

Of the 71 colonies mapped in the Tampa Bay watershed, 22 were discussed in BASIS, of which 12 (54.5%) were abandoned ("winked out") later for various reasons (altered habitats [e.g., urban development, plant succession], predators, human disturbance) since 1985, including 5 colonies that supported most of the gull population (Figs. 1, 2, 3). In the past 25 years we located and surveyed 50 new sites undescribed in 1985; however, 16 colonies (32.0%) subsequently collapsed and were abandoned. Cumulatively, the inland colonies supported 10.0% of the regional population. Of the initial 22 colonies, all but six were islands (Paul and

Woolfenden 1985). Five were small colonies of Yellow-crowned Night-Herons or Great Blue Herons nesting high in tall oak trees or slash pines near the bay, and the last site was the shore of the Howard Frankland Causeway, where the Florida Department of Transportation planted the roadside in the early 1990s to discourage Black Skimmers from nesting and causing traffic hazards. All recently-active colonies were islands, except the Mobbly powerlines, scattered oystercatcher territories in Apollo Beach, and the Cockroach Bay borrow pit.

In 1985, the Alafia Bank Bird Sanctuary, Washburn Sanctuary, and Tarpon Key National Wildlife Refuge were the three largest mixed colonies of pelecaniforms, herons and ibis in the region. In 2009, pelicans nested at only four sites, Washburn Sanctuary had very few pairs since 2004, and Tarpon Key was abandoned in 2005, so that the three largest colonies with similar species composition were Egmont Key National Wildlife Refuge and State Park (33,700 pairs, of which 300 were pelicans and >25,000 were larids), the Richard T. Paul Alafia Bank Bird Sanctuary (10,500 pairs, only 150 pairs of pelicans), and Alligator Lake (745 pairs), which had no pelicans.

Table 1. Colony characteristics and management status of colonial waterbird colonies in Tampa Bay, Florida, USA, in 2009.

Colony Number	Name	Bay Segment	Taxa	Species (n)	Pairs (n)	Abandoned after 1984	New since 1984	Ownership / Management	Protected status	Regional population (%)	Active within last 5 yrs?	Latitude	Longitude
25	Dogleg Key	BCB	P, Ci	12	296	X		FDEP-AP / FCIS	Y	0.51	Y	27.8021	-82.7618
26	Johns Pass, Little Bird Key	BCB	Ci	1	2			Suncoast Seabird Sanctuary	Y	0.00	Y	27.7932	-82.7777
27	Johns Pass, Middle Bird Island	BCB	Ci	2	5			FDEP-AP	Y	0.01	Y	27.7913	-82.7739
28	Johns Pass, Eleanor Island	BCB	Ci			X		City of Treasure Island	Y	0.00	Y	27.7878	-82.7738
29	South Pasadena Marker 34	BCB	L			X	X	City of Pasadena		0.00	N	27.7431	-82.7299
30	Sunset Beach	BCB	L			X	X	City of Treasure Island	N	0.00	N	27.7391	-82.7565
31	Don CeSar Colony	BCB	P, Ci	6	50		X	Private	N	0.09	Y	27.7059	-82.7352
32	Bayway Spoil	BCB	L			X		Developed	N	0.00	N	27.7094	-82.6995
33	Indian Key NWR	BCB	Ci			X	X	USFWS NWR	Y	0.00	Y	27.7011	-82.6909
34	Little Bird Key NWR	BCB	Ci	5	16		X	USFWS NWR	Y	0.03	Y	27.6852	-82.7169
35	Cow and Calf Islands	BCB	P, Ci	2	9		X	FDEP-AP		0.02	Y	27.6856	-82.6916
36	Darling Key	BCB	P, Ci	3	17		X	FDEP-AP		0.03	Y	27.6765	-82.6813
37	Jackass Key NWR	BCB	P, Ci	4	30		X	USFWS NWR	Y	0.05	Y	27.6693	-82.7177
38	Tarpon Key NWR	BCB	P, Ci			X		USFWS NWR	Y	0.00	N	27.6666	-82.6932
39	Whale Island NWR	BCB	P, Ci			X	X	USFWS NWR	Y	0.00	N	27.6626	-82.6930
40	Shell Key County Preserve	BCB	Ch					Florida / Pinellas County	Y	0.00	Y	27.6645	-82.7445
41	Mule Key NWR	BCB	P, Ci			X	X	USFWS NWR	Y	0.00	Y	27.6619	-82.7178
42	Listen Key NWR	BCB	P, Ci			X	X	USFWS NWR	Y	0.00	N	27.6596	-82.7179
43	Sister Key	BCB	P, Ci			X	X	Florida / Pinellas County		0.00	N	27.6503	-82.7312
44	Ft. DeSoto Park	LTB	L, Ch			X	X	Pinellas County	Y	0.00	N	27.6488	-82.7433
45	Egmont Key NWR/State Park	LTB	P, Ci, Ch	10	36,521		X	USFWS NWR / Florida State Parks	Y	62.51	Y	27.5894	-82.7614

Populations of Colonial Waterbirds

Colony Number	Name	Bay Segment	Taxa	Species (n)	Pairs (n)	Abandoned after 1984	New since 1984	Ownership / Management	Protected status	Regional population (%)	Active within last 5 yrs?	Latitude	Longitude
46	Little Bayou Bird Island	MTB	P, Ci	10	140		X	FDEP-AP / FCIS	Y	0.24	Y	27.7196	-82.6312
47	Coffeepot Bayou Bird Island	MTB	P, Ci	14	612		X	Private	Y	1.05	Y	27.7916	-82.6241
48	Gandy Radio Tower	OTB				X	X	Unknown	N	0.00	N	27.8772	-82.5902
49	Howard Frankland	OTB	L			X		FDOT	N	0.00	N	27.9046	-82.6335
50	Cooper's Point	OTB				X		Pinellas County / City of Clearwater	N	0.00	N	27.9730	-82.6891
51	Alligator Lake	OTB	P, Ci	12	745			City of Safety Harbor / Pinellas County	Y	1.27	Y	27.9813	-82.6990
52	Philippe Park	OTB	Ci			X		Pinellas County	N	0.00	N	28.0053	-82.6778
53	Mobbly Bay Powerlines	OTB	P	1	19		X	Progress Energy	N	0.03	Y	28.0038	-82.6677
54	Courtney Campbell Causeway	OTB	L			X	X	FDOT	N	0.00	N	27.9736	-82.5958
55	Wilson Property/Grand Hyatt	OTB	Ci			X		Private	N	0.00	N	27.9654	-82.5514
56	Sunset Park	OTB				X		City of Tampa	N	0.00	N	27.9374	-82.5201
57	Westshore	OTB				X		City of Tampa	N	0.00	N	27.9002	-82.5361
58	McKay Bay	HB				X	X	City of Tampa / TPA	Y	0.00	N	27.9371	-82.4143
59	Hooker's Point	HB				X	X	TPA	Y	0.00	N	27.9076	-82.4338
60	Tampa Port Authority Spoil Island 2D	HB	Ch	9	2,152			TPA / FCIS	Y	3.68	Y	27.8805	-82.4313
61	Fantasy Island	HB	Ch	1	1			TPA / FCIS	Y	0.00	Y	27.8683	-82.4253
62	Spoil Area C	HB	L, Ch			X	X	Mosaic	Y	0.00	N	27.8571	-82.4003
63	Richard T. Paul Alafia Bank Bird Sanctuary	HB	P, Ci, Ch	16	6,234			Mosaic / FCIS	Y	10.67	Y	27.8483	-82.4106
64	Tampa Port Authority Spoil Island 3D	HB	Ch	2	23			TPA / FCIS	Y	0.04	Y	27.8331	-82.4352

Colony Number	Name	Bay Segment	Taxa	Species (n)	Pairs (n)	Abandoned after 1984	New since 1984	Ownership / Management	Protected status	Regional population (%)	Active within last 5 yrs?	Latitude	Longitude
65	Port Redwing	HB	L, Ch			X	X	TPA	Y	0.00	N	27.8132	-82.3951
66	Fishhook Spoil Island	HB	Ch	2	13			TPA / TECO	Y	0.02	Y	27.8024	-82.4152
67	Apollo Beach Oystercatchers	HB	Ch	2	15		X	Private	N	0.03	Y	27.7733	-82.4318
68	Mouth of Little Manatee River	MR	P, Ci			X		FDEP Cockroach Bay Aquatic Preserve	N	0.00	N	27.7160	-82.4823
69	Cockroach Bay Preserve	MTB	Ch	1	30		X	ELAPP	Y	0.05	Y	27.6955	-82.5079
70	Hole in the Wall, Cockroach Bay Preserve 1	MTB	Ci				X	ELAPP	Y	0.02	Y	27.6811	-82.5183
71	Hole in the Wall, Cockroach Bay Preserve 2	MTB	Ci	1	20		X	ELAPP	Y	0.02	Y	27.6799	-82.5198
72	Hole in the Wall, Cockroach Bay Preserve 3	MTB	Ci				X	ELAPP	Y	0.02	Y	27.6764	-82.5169
73	Piney Point	MTB	P, Ci	14	2,795		X	SWFWMD	Y	4.78	Y	27.6505	-82.5462
74	Manbirtee Key	MTB	Ci, Ch	4	24			MCPA / FCIS	Y	0.04	Y	27.6359	-82.5740
75	Two Brothers Island	LTB	Ci			X		Private	N	0.00	N	27.5935	-82.5847
76	Skyway Bridge Least Tern colony	LTB	L			X	X	FDOT	N	0.00	N	27.5808	-82.6090
77	Miguel Bay Colony	LTB	P, Ci				X	FDEP-AP / FCIS	Y	0.00	Y	27.5708	-82.5995
78	Passage Key	LTB	P, Ci, L, Ch			X		USFWS NWR	Y	0.00	Y	27.5545	-82.7404
79	Nina Washburn Sanctuary	TCB	P, Ci	7	52			FCIS	Y	0.09	Y	27.5527	-82.5999
80	Washburn Junior/Terra Ceia Bay Little Bird Key	TCB	P, Ci	14	407		X	FDEP Terra Ceia Aquatic Preserve / FCIS	Y	0.70	Y	27.5285	-82.6015
81	Dot Dash Dit Colony	MR	P, Ci	13	2,360			Private / Florida / FCIS	Y	4.04	Y	27.4993	-82.5243
82	Heath Yellow-crowned Night-Heron Colony	HC	Ci	1	5		X	Private	N	0.01	Y	27.8772	-82.3129
83	Office/Fernan Bird Colony	HC	P, Ci	8	74		X	Private	Y	0.13	Y	27.9448	-82.3417

Populations of Colonial Waterbirds

Colony Number	Name	Bay Segment	Taxa	Species (n)	Pairs (n)	Abandoned after 1984	New since 1984	Ownership / Management	Protected status	Regional population (%)	Active within last 5 yrs?	Latitude	Longitude
84	Robles Park	HC	Ci	4	31	X		City of Tampa	Y	0.05	Y	27.9740	-82.4550
85	Corporex Colony	HC	P, Ci	7	94	X		Private	N	0.16	Y	27.9786	-82.3857
86	East Lake Island	HC	P, Ci	5	14	X		Florida Audubon Society	Y	0.02	Y	27.9922	-82.3784
87	Temple Crest/Orange Lake/Wargo Bird Colony	HC	P, Ci	8	51	X		City of Tampa / TPA	N	0.09	Y	28.0193	-82.4174
88	River Cove Yellow-crowned Night-Heron colony	HC	Ci				X	Hillsborough County	N	0.02	Y	28.0192	-82.4486
89	Citrus Park Bird Colony	HC	P, Ci	9	486	X		Private	N	0.83	Y	28.0699	-82.5834
90	Heron Point	PaC	P, Ci	7	57	X		Private	N	0.10	Y	28.2157	-82.4349
91	Saddlebrook	PaC	P, Ci	3	48	X		Private	Y	0.08	Y	28.2277	-82.3297
92	Cypress Creek Preserve	HC	P, Ci	11	3,294	X		ELAPP	Y	5.64	Y	28.1629	-82.3975
93	Cross Creek Colony	HC	P, Ci	2	8	X		Private	N	0.01	Y	28.1424	-82.3520
94	Medard County Park	HC	P, Ci	10	477	X		Hillsborough County	Y	0.82	Y	27.9218	-82.1630
95	Alafia River Corridor Preserve	HC	P, Ci	5	46	X		ELAPP	Y	0.08	Y	27.8756	-82.1053
96	Wood Lake/Somerset Lake	PoC	P, Ci	14	1,151	X		City of Lakeland / Private	Y	1.97	Y	28.0036	-81.9311
	Totals				58,424	27	48			100.00			

Taxa: P-pelecaniformes, Ci-ciconiiformes, Ch-charadriiformes, L-larids.

Values are number of species, nesting pairs, and % of 2009 regional nesting population.

Abbreviations: ELAPP – Environmental Lands Acquisition & Protection Program, FDEP-AP - Florida Department of Environmental Protection Aquatic Preserves, FDOT – Florida Department of Transportation, MCPA – Manatee County Port Authority, TPA – Tampa Port Authority, USFWS NWR - U. S. Fish & Wildlife Service National Wildlife Refuge.



Figure 1. Bird colonies in the Tampa Bay, Florida, USA, ecosystem from 1984-2009 (colonies 1-24 are excluded because they are not in the Tampa Bay watershed).



Figure 2. Bird colonies in Boca Ciega Bay, Florida, USA, from 1984-2009.



Figure 3. Bird colonies in Terra Ceia Bay, Florida, USA, from 1984-2009.

Table 2. Nesting pairs (no./species) of 30 colonial waterbirds and shorebirds and assessment of recent population trends in Tampa Bay, Florida, USA, from 2000-2009.

Species	Mean	SD	Population trend
Brown Pelican	1,024	326.15	45 is the major nesting site since 2004 when 79 and 38 collapsed; widespread also at several smaller colonies, declining
Double-crested Cormorant	455	68.48	Widely distributed at 7 sites; shifted from 79 and 38 when they collapsed; stable
Anhinga	334	93.11	Widely distributed at 7 sites; stable
Least Bittern	2	1.69	Uncommon – nesting at 4 or more freshwater sites with large cattail stands; under-surveyed
Great Blue Heron	217	61.80	Widely distributed at 10 heronries, and various misc. sites; stable
Great Egret	740	148.15	Nesting at 18 sites, >100 prs at 63, 81, 25, 47, and I-25 (Clearwater Harbor) in that order; stable
Snowy Egret	923	193.63	c. 75% decline since 1970s (Ogden 1978); stable last 10 yrs; 73 increased to 300 prs
Little Blue Heron	315	88.92	Nesting at 73, 63, and 94, and other sites; declined since 1950s with freshwater wetland loss; stable last 10 yrs
Tricolored Heron	788	178.87	Widespread at all mixed heronries; c. 60% of the population at 3 colonies: 73, 63 and 51; stable
Reddish Egret	57	21.19	Nesting at 6 sites: 63 largest group; 51 – only known freshwater site; c. 16% of state popn in Tampa Bay
Cattle Egret	4,146	2,836.85	Abundant at 63, 73, 51, 92, and 81; increasing since 1980s.
Green Heron	29	12.01	Nesting at 11 sites, notably 73, and other solitary locations; stable
Black-crowned Night-Heron	112	52.27	Nesting at the major heronries, notably 73, and inland sites; stable
Yellow-crowned Night-Heron	73	39.58	Nesting in mixed heronries; other small groups in tall coastal trees in residential areas; declining since 1980s; recent decline more rapid
White Ibis	9,180	3,464.63	Most common endemic wading bird; dependent on El Niño cycles and prey concentrated as freshwater wetlands draw down; most nesting at 63 and 73
Glossy Ibis	285	102.58	Nesting only at 63, 73, and 92; formerly approx. 50% were at 79; require shallow freshwater wetlands; stable to declining
Roseate Spoonbill	329	111.26	Exponential increase at 63 since 1975; radiated to 11 sites in the past 5 yrs; popn not stabilized
Wood Stork	212	116.93	Nesting only at 81, plus inland colonies 92, 93, 86, 95, and 89
Snowy Plover	0.4	1.26	Rarely nesting at 44, 40, 45 and usually unsuccessful due to disturbance
Wilson's Plover	25	20.68	Spottily distributed in salterns and suitable bare habitat; 74 recently important; stable; prob. under-surveyed
American Oystercatcher	91	13.58	C. 72 prs in Hillsborough Bay on spoil island shorelines (60, 63, 64, 66); the rest at widespread sites; stable, approx. 21% of state popn nests in Tampa Bay
Black-necked Stilt	32	31.35	Nesting sporadically at 60, 64, 69 around drying algae mats; rare
Willet	34	14.43	Rare and inconspicuously distributed in salt marshes and dune vegetation; under-surveyed
Laughing Gull	19,698	8,741.13	Nesting only at 60, 64 and 45; approx. 50% decline since early 1980s; Tampa Bay hosts c. 20% of entire southeast U. S. popn
Gull-billed Tern	8	5.69	A few pairs annually, often with Black Skimmers, nearly annually at 60 or 64

Species	Mean	SD	Population trend
Caspian Tern	83	10.57	Most nesting at 60, 64; formerly 63; Hillsborough Bay colony is the state's largest
Royal Tern	3,618	1,857.76	Nesting formerly at 63 and 78; now at 45 and Hillsborough Bay 60 or 64; increasing since 1990s
Sandwich Tern	811	341.14	All at 45 in 2009; formerly Hillsborough Bay (60, 64, or 63); poss. increasing
Least Tern	116	91.38	Most natural habitat lost; recently c. 80% are rooftop nesters; declining; most nesting on beaches unsuccessful due to human disturbance
Black Skimmer	406	192.24	In the last five years, skimmers nested at 60, 64, 45, 78, 40, and 29; stable, but in some years, zero nesting success

Values are mean and standard deviation of nesting pairs; see Table 1 for colony identification numbers.

DISCUSSION

Species richness (30 species) of the regional colonial waterbird population did not change in Tampa Bay from 1985 to 2009, with every endemic species and introduced Cattle Egrets represented. This community remains the largest and most significant colonial waterbird population in Florida outside of the Everglades. The Laughing Gull population has diminished by around 50% since the 1980s and is now concentrated in Hillsborough Bay and Egmont Key. These populations have persisted despite significant and continuing alteration of shoreline habitats, bay bottom, and freshwater wetlands, although recent population declines in Brown Pelicans, Laughing Gulls, Least Terns, and Snowy Plovers suggest that, as elsewhere in Florida, progressive urbanization threatens to further reduce the ecological integrity of the Tampa Bay ecosystem. Roseate Spoonbills and Reddish Egrets, extirpated as nesting species from Tampa Bay until the mid-1970s, have increased significantly, while widely expanding their distribution among suitable habitats in the bay, and Wood Stork, and Royal and Sandwich tern populations have increased slightly. The other pelecaniformes, ciconiiformes, charadriiformes and larids have remained relatively stable. The inland colonies are particularly important for small herons and Wood Storks.

Five additional species are found uniquely in coastal habitats: Clapper Rails, Mangrove Cuckoos, Gray Kingbirds, Black-whiskered Vireos, and Prairie Warblers. Clapper Rails occur in low and high marsh and require expansive areas of continuous cover, areas which are diminishing as the shoreline has been developed. Black-whiskered Vireos have virtually disappeared from Tampa Bay since c. 1991. Mangrove Cuckoos were found annually in mangroves in Boca Ciega Bay, Weedon Island, and Terra Ceia Bay in some years, but are infrequent now. Prairie Warblers are more widely distributed along Tampa Bay mangrove shorelines. Although Gray Kingbirds may also nest in uplands beyond the mangroves, all five species are primarily coastal birds whose populations have decreased in recent years. The four estuarine passerines are susceptible to nest parasitism by increasing populations of Brown-headed Cowbirds.

Paul and Woolfenden (1985) identified a number of biotic and abiotic stressors that influence bird abundance in Tampa Bay. In the decades leading up to the 1980s, coastal habitat loss dominated. In the 1990s, with the large increase in registered watercraft, the most significant issues to have emerged are anthropogenic disturbances from the increasing numbers of recreational boaters and beachgoers that: "...present a vast potential for annual disturbance of breeding birds", as predicted by Paul and Schnapf (1997:94), continued dredge and fill activities that have had both beneficial and negative effects for colonial waterbirds and beach-nesting species, continued loss of palustrine wetlands (particularly short hydroperiod and ephemeral "prairie ponds"), the trend toward reducing the spatial distribution of palustrine wetlands by condensing them into stormwater ponds and mitigation banks from the natural patterns that birds cue to throughout the landscape, and extremely high populations of meso-carnivores (raccoons, to a lesser extent opossums and, potentially, coyotes and invasive exotic herptiles).

Management Initiatives

Through site-specific management initiatives by FCIS at Audubon-owned and leased sanctuaries, Audubon's Project ColonyWatch, which engages volunteers to observe and protect colonies in cooperation with site managers, and a continuous effort to expand colony management partnerships among agencies and private landowners, most of the now active colonies have been posted, are managed during the year to control predators and remove entangling fishing line during the Tampa Bay Watch and Audubon Monofilament Cleanup, are regularly surveyed to establish colony species composition and productivity, and are intermittently patrolled. However, with the dramatic increase in public recreation on the water, this program is insufficient to fully protect most colonies. In the past five years we have also implemented a series of inter-agency workshops for law enforcement marine units about the biology, habitat requirements, and laws protecting colonial waterbirds.

Management Recommendations

Environmental education – In collaboration with land managers and management partners, continue to produce and distribute to the public boaters guides describing the bay's natural resources and protected areas, and present informational talks about the bay's avifauna.

Colony management - Continue current management activities, and establish and enforce spatial buffers around colonies to prevent site disturbance. Increase enforcement of wildlife protection laws.

Habitat management - Manage existing sites to provide required habitats; the spoil islands in the Hillsborough Bay Important Bird Area support some of the largest colonies of pelicans, herons, ibis, gulls, and oystercatchers in the state. Many nesting colony sites have been abandoned and fewer new sites will be available in the future given the development density. Currently functioning sites must be carefully protected.

Habitat restoration – Continue to acquire land and restore coastal ecosystems to replace the large areas of coastal mangroves, salterns, intertidal mudflats, and freshwater wetlands that have been lost; restore tidal creeks and re-establish altered coastal drainage patterns.

Wetland protection - The loss of both coastal estuarine and inland palustrine wetlands by drainage or alteration has been a dominant cause of population declines of colonial birds regionally and statewide. Locally, habitat fragmentation, seasonal wetland draw downs, and consolidation of freshwater wetlands decreases wetland functioning in the landscape, and

reduces forage availability, which particularly affects successful nesting of White Ibis, small herons, and Wood Storks.

Sea level rise – Participate in the dialogue about climate change and potential effects of sea level rise; include in future conservation planning initiatives acquisition of lands and sites that will not be affected by increasing water levels.

Maintaining the vibrant, diverse colonial waterbird population in Tampa Bay in the future will be more challenging than during the past three decades since BASIS, and much more difficult than in the decades preceding widespread coastal development. Despite 25 years of intensive public outreach and environmental education activities by Audubon and others, sedulous volunteers in Audubon's Project ColonyWatch and in the Florida Shorebird Alliance providing colony guardianship, and expanded coordination between non-governmental, local, county, state, and federal wildlife protection programs, human disturbance is an incessant threat to the persistence of local bird colonies. More protective regulations, more enforcement, and heightened public cooperation will all be needed to protect the spectacular, charismatic bird populations of Tampa Bay.

ACKNOWLEDGMENTS

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From: HODGSON, Ann
To: Imperiled
Cc: WRAITHMELL, Julie; Rodgers, James
Subject: RE: BRPE trend data
Date: Tuesday, November 02, 2010 1:24:07 PM
Attachments: Audubon Tampa Bay colony descriptions and map.doc

The data presented below were acquired at colonial waterbird colonies throughout the Tampa Bay region (Pinellas, Hillsborough, Manatee, Sarasota, and Polk counties) during annual colonial waterbird nesting surveys conducted by Audubon of Florida's Florida Coastal Islands Sanctuaries in cooperation with land management partners, as shown on the attached table and map.

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Table 1. Colony characteristics and management status of colonial waterbird colonies in Tampa Bay, Florida, USA, in 2009.

Colony Number	Name	Bay Segment	Taxa	Species (n)	Pairs (n)	Abandoned after 1984	New since 1984	Ownership / Management	Protected status	Regional population (%)	Active within last 5 yrs?	Latitude	Longitude
25	Dogleg Key	BCB	P, Ci	12	296	X		FDEP-AP / FCIS	Y	0.51	Y	27.8021	-82.7618
26	Johns Pass, Little Bird Key	BCB	Ci	1	2			Suncoast Seabird Sanctuary	Y	0.00	Y	27.7932	-82.7777
27	Johns Pass, Middle Bird Island	BCB	Ci	2	5			FDEP-AP	Y	0.01	Y	27.7913	-82.7739
28	Johns Pass, Eleanor Island	BCB	Ci			X		City of Treasure Island	Y	0.00	Y	27.7878	-82.7738
29	South Pasadena Marker 34	BCB	L			X	X	City of Pasadena		0.00	N	27.7431	-82.7299
30	Sunset Beach	BCB	L			X	X	City of Treasure Island	N	0.00	N	27.7391	-82.7565
31	Don CeSar Colony	BCB	P, Ci	6	50		X	Private	N	0.09	Y	27.7059	-82.7352
32	Bayway Spoil	BCB	L			X		Developed	N	0.00	N	27.7094	-82.6995
33	Indian Key NWR	BCB	Ci			X	X	USFWS NWR	Y	0.00	Y	27.7011	-82.6909
34	Little Bird Key NWR	BCB	Ci	5	16		X	USFWS NWR	Y	0.03	Y	27.6852	-82.7169
35	Cow and Calf Islands	BCB	P, Ci	2	9		X	FDEP-AP		0.02	Y	27.6856	-82.6916
36	Darling Key	BCB	P, Ci	3	17		X	FDEP-AP		0.03	Y	27.6765	-82.6813
37	Jackass Key NWR	BCB	P, Ci	4	30		X	USFWS NWR	Y	0.05	Y	27.6693	-82.7177
38	Tarpon Key NWR	BCB	P, Ci			X		USFWS NWR	Y	0.00	N	27.6666	-82.6932
39	Whale Island NWR	BCB	P, Ci			X	X	USFWS NWR	Y	0.00	N	27.6626	-82.6930
40	Shell Key County Preserve	BCB	Ch					Florida / Pinellas County	Y	0.00	Y	27.6645	-82.7445
41	Mule Key NWR	BCB	P, Ci			X	X	USFWS NWR	Y	0.00	Y	27.6619	-82.7178
42	Listen Key NWR	BCB	P, Ci			X	X	USFWS NWR	Y	0.00	N	27.6596	-82.7179
43	Sister Key	BCB	P, Ci			X	X	Florida / Pinellas County		0.00	N	27.6503	-82.7312
44	Ft. DeSoto Park	LTB	L, Ch			X	X	Pinellas County	Y	0.00	N	27.6488	-82.7433

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Colony Number	Name	Bay Segment	Taxa	Species (n)	Pairs (n)	Abandoned after 1984	New since 1984	Ownership / Management	Protected status	Regional population (%)	Active within last 5 yrs?	Latitude	Longitude
45	Egmont Key NWR/State Park	LTB	P, Ci, Ch	10	36,521		X	USFWS NWR / Florida State Parks	Y	62.51	Y	27.5894	-82.7614
46	Little Bayou Bird Island	MTB	P, Ci	10	140		X	FDEP-AP / FCIS	Y	0.24	Y	27.7196	-82.6312
47	Coffeepot Bayou Bird Island	MTB	P, Ci	14	612		X	Private	Y	1.05	Y	27.7916	-82.6241
48	Gandy Radio Tower	OTB				X	X	Unknown	N	0.00	N	27.8772	-82.5902
49	Howard Frankland	OTB	L			X		FDOT	N	0.00	N	27.9046	-82.6335
50	Cooper's Point	OTB				X		Pinellas County / City of Clearwater	N	0.00	N	27.9730	-82.6891
51	Alligator Lake	OTB	P, Ci	12	745			City of Safety Harbor / Pinellas County	Y	1.27	Y	27.9813	-82.6990
52	Philippe Park	OTB	Ci			X		Pinellas County	N	0.00	N	28.0053	-82.6778
53	Mobbly Bay Powerlines	OTB	P	1	19		X	Progress Energy	N	0.03	Y	28.0038	-82.6677
54	Courtney Campbell Causeway	OTB	L			X	X	FDOT	N	0.00	N	27.9736	-82.5958
55	Wilson Property/Grand Hyatt	OTB	Ci			X		Private	N	0.00	N	27.9654	-82.5514
56	Sunset Park	OTB				X		City of Tampa	N	0.00	N	27.9374	-82.5201
57	Westshore	OTB				X		City of Tampa	N	0.00	N	27.9002	-82.5361
58	McKay Bay	HB				X	X	City of Tampa / TPA	Y	0.00	N	27.9371	-82.4143
59	Hooker's Point	HB				X	X	TPA	Y	0.00	N	27.9076	-82.4338
60	Tampa Port Authority Spoil Island 2D	HB	Ch	9	2,152			TPA / FCIS	Y	3.68	Y	27.8805	-82.4313
61	Fantasy Island	HB	Ch	1	1			TPA / FCIS	Y	0.00	Y	27.8683	-82.4253
62	Spoil Area C	HB	L, Ch			X	X	Mosaic	Y	0.00	N	27.8571	-82.4003

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Colony Number	Name	Bay Segment	Taxa	Species (n)	Pairs (n)	Abandoned after 1984	New since 1984	Ownership / Management	Protected status	Regional population (%)	Active within last 5 yrs?	Latitude	Longitude
63	Richard T. Paul Alafia Bank Bird Sanctuary	HB	P, Ci, Ch	16	6,234			Mosaic / FCIS	Y	10.67	Y	27.8483	-82.4106
64	Tampa Port Authority Spoil Island 3D	HB	Ch	2	23			TPA / FCIS	Y	0.04	Y	27.8331	-82.4352
65	Port Redwing	HB	L, Ch			X	X	TPA	Y	0.00	N	27.8132	-82.3951
66	Fishhook Spoil Island	HB	Ch	2	13			TPA / TECO	Y	0.02	Y	27.8024	-82.4152
67	Apollo Beach Oystercatchers	HB	Ch	2	15		X	Private	N	0.03	Y	27.7733	-82.4318
68	Mouth of Little Manatee River	MR	P, Ci			X		FDEP Cockroach Bay Aquatic Preserve	N	0.00	N	27.7160	-82.4823
69	Cockroach Bay Preserve	MTB	Ch	1	30		X	ELAPP	Y	0.05	Y	27.6955	-82.5079
70	Hole in the Wall, Cockroach Bay Preserve 1	MTB	Ci				X	ELAPP	Y	0.02	Y	27.6811	-82.5183
71	Hole in the Wall, Cockroach Bay Preserve 2	MTB	Ci	1	20		X	ELAPP	Y	0.02	Y	27.6799	-82.5198
72	Hole in the Wall, Cockroach Bay Preserve 3	MTB	Ci				X	ELAPP	Y	0.02	Y	27.6764	-82.5169
73	Piney Point	MTB	P, Ci	14	2,795		X	SWFWMD	Y	4.78	Y	27.6505	-82.5462
74	Manbirtee Key	MTB	Ci, Ch	4	24			MCPA / FCIS	Y	0.04	Y	27.6359	-82.5740
75	Two Brothers Island	LTB	Ci			X		Private	N	0.00	N	27.5935	-82.5847
76	Skyway Bridge Least Tern colony	LTB	L			X	X	FDOT	N	0.00	N	27.5808	-82.6090
77	Miguel Bay Colony	LTB	P, Ci				X	FDEP-AP / FCIS	Y	0.00	Y	27.5708	-82.5995
78	Passage Key	LTB	P, Ci, L, Ch			X		USFWS NWR	Y	0.00	Y	27.5545	-82.7404
79	Nina Washburn Sanctuary	TCB	P, Ci	7	52			FCIS	Y	0.09	Y	27.5527	-82.5999
80	Washburn Junior/Terra Ceia	TCB	P, Ci	14	407		X	FDEP Terra Ceia Aquatic	Y	0.70	Y	27.5285	-82.6015

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Colony Number	Name	Bay Segment	Taxa	Species (n)	Pairs (n)	Abandoned after 1984	New since 1984	Ownership / Management	Protected status	Regional population (%)	Active within last 5 yrs?	Latitude	Longitude
	Bay Little Bird Key							Preserve / FCIS					
81	Dot Dash Dit Colony	MR	P, Ci	13	2,360			Private / Florida / FCIS	Y	4.04	Y	27.4993	-82.5243
82	Heath Yellow-crowned Night-Heron Colony	HC	Ci	1	5	X		Private	N	0.01	Y	27.8772	-82.3129
83	Office/Ferman Bird Colony	HC	P, Ci	8	74	X		Private	Y	0.13	Y	27.9448	-82.3417
84	Robles Park	HC	Ci	4	31	X		City of Tampa	Y	0.05	Y	27.9740	-82.4550
85	Corporex Colony	HC	P, Ci	7	94	X		Private	N	0.16	Y	27.9786	-82.3857
86	East Lake Island	HC	P, Ci	5	14	X		Florida Audubon Society	Y	0.02	Y	27.9922	-82.3784
87	Temple Crest/Orange Lake/Wargo Bird Colony	HC	P, Ci	8	51	X		City of Tampa / TPA	N	0.09	Y	28.0193	-82.4174
88	River Cove Yellow-crowned Night-Heron colony	HC	Ci				X	Hillsborough County	N	0.02	Y	28.0192	-82.4486
89	Citrus Park Bird Colony	HC	P, Ci	9	486	X		Private	N	0.83	Y	28.0699	-82.5834
90	Heron Point	PaC	P, Ci	7	57	X		Private	N	0.10	Y	28.2157	-82.4349
91	Saddlebrook	PaC	P, Ci	3	48	X		Private	Y	0.08	Y	28.2277	-82.3297
92	Cypress Creek Preserve	HC	P, Ci	11	3,294	X		ELAPP	Y	5.64	Y	28.1629	-82.3975
93	Cross Creek Colony	HC	P, Ci	2	8	X		Private	N	0.01	Y	28.1424	-82.3520
94	Medard County Park	HC	P, Ci	10	477	X		Hillsborough County	Y	0.82	Y	27.9218	-82.1630
95	Alafia River Corridor Preserve	HC	P, Ci	5	46	X		ELAPP	Y	0.08	Y	27.8756	-82.1053
96	Wood Lake/Somerset Lake	PoC	P, Ci	14	1,151		X	City of Lakeland / Private	Y	1.97	Y	28.0036	-81.9311
	Totals				58,424	27	48			100.00			

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Copy of the Tricolored heron BSR draft report that was sent out for peer review

Biological Status Review for the Tricolored Heron (*Egretta tricolor*)

EXECUTIVE SUMMARY

The Florida Fish and Wildlife Conservation Commission (FWC) directed staff to evaluate all species listed as Threatened or Species of Special Concern as of September 1, 2010. Public information on the status of the tricolored heron was sought from September 17, 2010 to November 1, 2010. A three member biological review group met on November 3 – 4, 2010. Group members were James A. Rodgers (FWC lead), Mark I. Cook (South Florida Water Management District), and Peter Frederick (University of Florida). In accordance with rule 68A-27.0012 F.A.C., the Tricolored Heron Biological Review Group was charged with evaluating the biological status of the tricolored heron using criteria included in definitions in 68A-27.001(3) F.A.C., and following the protocols in the *Guidelines for Application of the IUCN Red List Criteria at Regional Levels Version 3.0 (2003)* and *Guidelines for Using the IUCN Red List Categories and Criteria Version 8.1 (2010)*. Please visit http://myfwc.com/WILDLIFEHABITATS/imperiledSpp_listingprocess.htm to view the listing process rule and the criteria found in the definitions.

The Biological Review Group concluded from the biological assessment that the tricolored heron met the listing population size criteria A2, A3, and A4. Based on the literature review, information received from the public, and the biological review findings, FWC staff recommends listing the tricolored heron as state threatened.

This work was supported by a Conserve Wildlife Tag grant from the Wildlife Foundation of Florida.

BIOLOGICAL INFORMATION

Taxonomic Classification – Previously referred to as the Louisiana heron, tricolored herons (*Egretta tricolor*) are members of the Family Ardeidae, which include other herons, egrets, and bitterns (Frederick 1997). Three subspecies are generally recognized: *E. t. tricolor* (South America, Trinidad and Tobago), *E. t. occidentalis* (southwest USA and northwest Mexico), and *E. t. ruficollis* (eastern USA, Mexico, Central America). Previously, the species was placed in the monotypic genus *Hydranassa*.

Geographic Range and Distribution – The breeding range for the tricolored heron in the U.S. extends along the Atlantic and Gulf of Mexico coasts, into the southeastern coastal plain and throughout the Caribbean (Frederick 1997). Breeding also occurs along both coasts of Mexico and the coastal areas of South America. The species occurs throughout most of Florida in both freshwater and estuarine habitats (Runde 1991, Kale et al. 1992, Rodgers et al. 1996, Mikuska et al. 1998, Rodgers et al. 1999, Florida Fish and Wildlife Conservation Commission 2003).

Life History References – Rodgers et al. 1996, Frederick 1997, Smith 1997, Strong et al. 1997, Gawlik 2002, Dugger et al. 2005, Hoyer et al. 2005, Gawlik and Crozier 2007, IUCN 2010, Lantz et al. 2010.

BIOLOGICAL STATUS ASSESSMENT

Threats – Tricolored heron populations suffered huge losses during the plume trade of the late 1800s and early 1900s (Rodgers et al. 1996, Frederick 1997, Kushlan 2002, Hunter 2006). Current threats to the species are not well understood, but coastal development, recreational disturbance at foraging and breeding sites, environmental degradation, human disturbance, and increased pressure from predators are primary concerns (Kushlan et al. 2002, Stolen 2003, Rodgers and Schwikert 2003). Like other wading birds that depend on fragile estuaries and wetlands for foraging and breeding, tricolored herons are at risk of exposure to persistent contaminants such as heavy metals and pesticides (Rodgers 1997, Spalding et al. 1997). Other potential threats to tricolored heron populations are alterations to the hydrology of foraging areas, reduced prey abundance, and oil spill impacts to critical breeding, foraging and roosting sites. The North American Waterbird Conservation Plan ranks the tricolored heron in the “High Concern” category for conservation status (Kushlan et al. 2002).

Statewide Population Assessment – Once considered one of the most common herons in the state, Runde (1991) determined that the tricolored heron population experienced a decrease from 35,000 individuals in the late 1970s to 16,000 birds in the late 1980s. Unfortunately, aerial surveys of wading bird populations have been shown to include error rates that raise questions about their validity and usefulness in determining trends, particularly for small, dark-plumaged species that nest beneath the nesting canopy as do tricolored herons (Rodgers et al. 2005, Frederick et al. 2006, Conroy et al. 2008, Green et al. 2008). Annual surveys of colonial waterbirds in the Everglades region and elsewhere in Florida and the range of the species indicate that nesting numbers for wading birds can be highly variable from season to season (Ogden 1994, Gawlik 1999, Frederick and Ogden 2001, Cook and Kobza 2009). About 1,144 pairs of tricolored herons nested in the three Water Conservation Areas and mainland Everglades National Park in 2009 (Cook and Kobza, 2009). This compares to 1,723 nesting pairs in the area during the 1999 nesting season and an estimated 10,000–15,000 pairs in the 1930s (Ogden 1994, Gawlik 1999).

Biological Status Review—The review group concluded the tricolored heron met the population size reduction criteria A2, A3, and A4. See Table 1 for details.

Regional Application—The review group concluded there was no change in the recommendation for the tricolored heron. See Table 2 for details.

LISTING RECOMMENDATION

Staff recommends listing the tricolored heron as a Threatened species because the species met criteria for listing as described in 68A-27.001(3) F.A.C.

SUMMARY OF THE INDEPENDENT REVIEW

To be added later.

DRAFT

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Table 1. Biological status review information findings for the tricolored heron in Florida.

Biological Status Review Information Findings		Species/taxon:	Tricolored Heron		
		Date:	11/04/10		
		Assessors:	Rodgers, Cook, Frederick		
		Generation length:	12 years		
Criterion/Listing Measure	Data/Information	Data Type*	Criterion Met?	References	
*Data Types - observed (O), estimated (E), inferred (I), suspected (S), or projected (P). Criterion met - yes (Y) or no (N).					
(A) Population Size Reduction, ANY of					
(a)1. An observed, estimated, inferred or suspected population size reduction of at least 50% over the last 10 years or 3 generations, whichever is longer, where the causes of the reduction are clearly reversible and understood and ceased ¹	Since 1974, numbers have fluctuated. Numbers appear to show a slow decline from 1974 via BBS routes. In southern estuarine regions of the ENP there has been a decline. In Tampa Bay a slight increase. Everglades total numbers maybe 2,500-3,000 nests (=5,000-6,000 individuals).	O	N	Unpublished databases of the SFWMD, ENP, NAS, P. Frederick/Everglades, FWC 1999 statewide survey, BBS trend analysis.	
(a)2. An observed, estimated, inferred or suspected population size reduction of at least 30% over the last 10 years or 3 generations, whichever is longer, where the reduction or its causes may not have ceased or may not be understood or may not be reversible ¹	FWC 1999 survey indicated a tendency of smaller colonies in last 3 decades. Analysis of ENP/Everglades data indicates decrease of 1.4%/year and a possibility of nearly 50% reduction in 3 generations time period.	E	Y	Unpublished databases of the SFWMD, ENP, NAS, P. Frederick/Everglades, FWC 1999 statewide survey, BBS trend analysis. BNA account. FWC 1978-79 and 1989-90 databases.	
(a)3. A population size reduction of at least 30% projected or suspected to be met within the next 10 years or 3 generations, whichever is longer (up to a maximum of 100 years) ¹	2010 to 2046 time period: expect continued slow decline referred to in A2 above. In addition, two major threats are sea level rise (=reduction in freshwater marsh habitat along coasts) and reduced freshwater discharge into coastal estuaries that will reduce primary estuarine foraging habitat. Less rainfall will have impacts on freshwater habitats throughout Florida and discharge to estuarine habitats, both of which will increase salinity and probably result in reduced quality of foraging sites.	I	Y		
(a)4. An observed, estimated, inferred, projected or suspected population size reduction of at least 30% over any 10 year or 3 generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased or may not be understood or may not be reversible. ¹	FWC 1999 survey indicates a tendency of smaller colonies in last 3 decades. Analysis of BBS data indicates a decrease of 1.4%/year and a possibility of 50% reduction in 3 generations.	I	Y	Unpublished databases of the SFWMD, ENP, NAS, P. Frederick/Everglades, FWC 1999 statewide survey, BBS trend analysis.	

¹ based on (and specifying) any of the following: (a) direct observation; (b) an index of abundance appropriate to the taxon; (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat; (d) actual or potential levels of exploitation; (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.				
(B) Geographic Range, EITHER				
(b)1. Extent of occurrence < 20,000 km ² (7,722 mi ²) OR	Probably >45,000 miles ² .	O	N	See EOO on notes tab.
(b)2. Area of occupancy < 2,000 km ² (772 mi ²)	Probably >10,000 miles ² .	O	N	See AOO on notes tab.
AND at least 2 of the following:				
a. Severely fragmented or exist in ≤ 10 locations				
b. Continuing decline, observed, inferred or projected in any of the following: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent, and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals				
c. Extreme fluctuations in any of the following: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals				
(C) Population Size and Trend				
Population size estimate to number fewer than 10,000 mature individuals AND EITHER	There are probably at least 10,000 individuals in Florida but may not be much more.	I	N	Unpublished databases of the SFWMD, ENP, NAS, P. Frederick/Everglades, FWC 1999 statewide survey, BBS trend analysis.
(c)1. An estimated continuing decline of at least 10% in 10 years or 3 generations, whichever is longer (up to a maximum of 100 years in the future) OR				
(c)2. A continuing decline, observed, projected, or inferred in numbers of mature individuals AND at least one of the following:				
a. Population structure in the form of EITHER				
(i) No subpopulation estimated to contain more than 1000 mature individuals; OR				
(ii) All mature individuals are in one subpopulation				
b. Extreme fluctuations in number of mature individuals				
(D) Population Very Small or Restricted,				

EITHER				
(d)1. Population estimated to number fewer than 1,000 mature individuals; OR	Minimum colony numbers and relative sizes indicate at least 10,000 individuals.	E	N	Unpublished databases of the SFWMD, ENP, NAS, P. Frederick/Everglades, FWC 1999 statewide survey, BBS trend analysis.
(d)2. Population with a very restricted area of occupancy (typically less than 20 km ² [8 mi ²]) or number of locations (typically 5 or fewer) such that it is prone to the effects of human activities or stochastic events within a short time period in an uncertain future	See B criterion.	E	N	Unpublished databases of the SFWMD, ENP, NAS, P. Frederick/Everglades, FWC 1999 statewide survey, BBS trend analysis.
(E) Quantitative Analyses				
e1. Showing the probability of extinction in the wild is at least 10% within 100 years	Not available for species on statewide basis. BBS and ENP/Everglades trend analysis indicate a downward trend.		N	Unpublished databases of the SFWMD, ENP, NAS, P. Frederick/Everglades, FWC 1999 statewide survey, BBS trend analysis.

Initial Finding (Meets at least one of the criteria OR Does not meet any of the criteria)	Reason (which criteria are met)
Meets at least one of the criterion.	A2, A3, A4
Is species/taxon endemic to Florida? (Y/N)	N
If Yes, your initial finding is your final finding. Copy the initial finding and reason to the final finding space below. If No, complete the regional assessment sheet and copy the final finding from that sheet to the space below.	
Final Finding (Meets at least one of the criteria OR Does not meet any of the criteria)	Reason (which criteria are met)
Meets at least one criterion.	A2, A3, A4

Table 2. Biological status review information for the regional assessment for the tricolored heron.

1	Biological Status Review Information Regional Assessment	<u>Species/taxon:</u>	Tricolored Heron
2		<u>Date:</u>	11/4/10
3		<u>Assessors:</u>	Rodgers, Cook, Frederick
4			
5			
6			
7			
8	Initial finding	Supporting Information	
9			
10	2a. Is the species/taxon a non-breeding visitor? (Y/N/DK). If 2a is YES, go to line 18. If 2a is NO or DO NOT KNOW, go to line 11.	No, breeding species in Florida.	
11	2b. Does the Florida population experience any significant immigration of propagules capable of reproducing in Florida? (Y/N/DK). If 2b is YES, go to line 12. If 2b is NO or DO NOT KNOW, go to line 17.	No. Though little information is available for parameters regarding movement into Florida, we suspect it occurs or can occur albeit at some low rate. We also suspect that any rescue effect of the Florida population from outside state regions is not adequate to offset the decrease currently occurring in some areas of Florida (see criterion A2) as indicated by the steady decline in the total Florida population. We also infer that the out of state populations may not be adequate to reverse the current decline.	
12	2c. Is the immigration expected to decrease? (Y/N/DK). If 2c is YES or DO NOT KNOW, go to line 13. If 2c is NO go to line 16.		
13	2d. Is the Florida population a sink? (Y/N/DK). If 2d is YES, go to line 14. If 2d is NO or DO NOT KNOW, go to line 15.		
14	If 2d is YES - Upgrade from initial finding (more imperiled)		
15	If 2d is NO or DO NOT KNOW - No change from initial finding		
16	If 2c is NO or DO NOT KNOW - Downgrade from initial finding (less imperiled)		
17	If 2b is NO or DO NOT KNOW - No change from initial finding	No change.	
18	2e. Are the conditions outside Florida deteriorating? (Y/N/DK). If 2e is YES or DO NOT KNOW, go to line 24. If 2e is NO go to line 19.		
19	2f. Are the conditions within Florida deteriorating? (Y/N/DK). If 2f is YES or DO NOT KNOW, go to line 23. If 2f is NO, go to line 20.		
20	2g. Can the breeding population rescue the Florida population should it decline? (Y/N/DK). If 2g is YES, go to line 21. If 2g is NO or DO NOT KNOW, go to line 22.		
21	If 2g is YES - Downgrade from initial finding (less imperiled)		
22	If 2g is NO or DO NOT KNOW - No change from initial finding		
23	If 2f is YES or DO NOT KNOW - No change from initial finding		
24	If 2e is YES or DO NOT KNOW - No change from initial finding		

25		
26	Final finding	No change.

Status Review - In its review of the status of the tricolored heron, the Biological Review Group made the following assumptions and conclusions:

- Generation time: Most birds breed at 2 years of age. Maximum known age of a recovered banded bird was 14 years. Maximum age probably is about 25 years of age. Calculation of generation time was based on the mid-point of onset of breeding to maximum age at death: $(22-2)/2=10$ year, with generation time as $10+2=12$ years of age. Therefore, the time period for evaluation of change/trend analysis is $3 \times 12=36$ years or begins at 1974.
- Extent of occurrence (EOO): This is mostly the entire state of Florida (total about 94,000 km² or 59,000 miles²) except for the western panhandle and extreme north-central region of state (i.e., Columbia, Clay, and Union counties and adjacent regions) where few colonies are known or located. In summary, the EOO is larger than the 20,000 km² delineation.
- Area of occupancy (AOO): Using the general premise that area of wetland typically makes up about 1/3 the total land area, the AOO is at least 16,000 km² or 10,000 miles².
- Quality and status of wading bird survey data: Tricolored herons are dark-plumaged species that tend to nest under the tree canopy making them difficult to detect during aerial surveys using fixed wing aircraft, which is the primary method to survey wading birds over a large area such as the entire state. Rodgers et al (2005) found the probability of detecting any of the dark-plumaged day herons within a colony was <50%. Only ground counts (typical of surveys in the Everglades and Florida Bay) will result in accurate nest counts. Breeding Bird Survey (BBS) surveys may not accurately detect wading birds if the routes do not occur in wetlands to sufficiently detect these species. These shortcomings may result in undercount of actual species presence.

APPENDIX 1. Biographies of the members of the Tricolored Heron Biological Review Group.

Mark I. Cook has a M.S. in Ecology from the University of Durham, UK and Ph.D. in Ecology from Glasgow University, UK. He is a senior environmental scientist with the South Florida Water Management District. His expertise is in the behavioral ecology, conservation biology, habitat quality and reproductive success, and restoration ecology related to wading bird foraging and reproductive performance especially applied to hydrologic management and restoration issues in the Everglades. He has published numerous papers on the food ecology of wading birds.

Peter C. Frederick received a Ph.D. in Zoology from the University of North Carolina. He is Research Professor at the University of Florida. His expertise is in the areas of wetland ecology, ecotoxicology, and avian ecology of wading birds, especially with the wood stork, great egret, and white ibis and the everglades. He has published numerous papers on waterbird ecology, pesticide contamination, population biology, and habitat requirements of wading birds in Florida.

John C. Ogden received a B.S. degree in Zoology from the University of Tennessee. He has held positions as research ecologist with the Everglades National Park and National Audubon Society, environmental scientist with the South Florida Water Management District working on the everglades restoration, and most recently as research director with Audubon of Florida. His expertise is in the ecology of wading birds, especially the wood stork, and has served on the USFWS recovery teams for the wood stork, California condor, and American crocodile. He serves on numerous advisory committees and has published over 100 technical papers.

James A. Rodgers received a M.S. from Louisiana State University and a Ph.D. from the University of South Florida. Since joining the FWC in 1980, he has worked on snail kites, double-crested cormorants, several species of wading birds including little blue herons and wood storks, development of buffer distances for waterbirds, pesticide contamination, and population genetics of birds. He was elected a Fellow of the American Ornithologist Union in 2009 and has published numerous papers on the breeding and nesting ecology of waterbirds.

APPENDIX 2. Summary of letters and emails received during the solicitation of information from the public period of September 17, 2010 through November 1, 2010.

Most information received by FWC staff was anecdotal and consisted of general observations of presence or absence. Information from Ann Hodgson (Tampa Bay Sanctuaries, NAS) for the status of the species in the Tampa Bay region was used in the review of the species by the BSR panel on November 3-4, 2010.

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APPENDIX 3. Information and comments received from independent reviewers.

To be added later.

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