Supplemental Information for the Least Tern

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 from Chuck Hunter

From: Chuck_Hunter@fws.gov
To: Imperiled
Subject: Re: Deadline reminder for peer reviews of BSR reports (Least Tern and Black
Date: Sunday, 01/08/2011 01:59:58 PM..

Elsa et al:

I have reviewed both Status Reports and found them complete and factual information accurate. I have nothing to suggest adding to these reports. Thank you for the opportunity to review these important documents.

Chuck

Peer review #2 from Julie Wraithmell

From: WRAITHMELL, Julie
To: Imperiled
Subject: peer reviews for LETE and BLSK
Date: Tuesday, January 11, 2011 2:46:30 PM
Attachments: Wraithmell BSR review LETE.pdf
Wraithmell BSR review BLSK.pdf

Please confirm receipt of the attached peer reviews for the BSRs for least tern and black skimmer?

Thank you for this opportunity.

Julie
. . . . . .
Julie Brashears Wraithmell
Director of Wildlife Conservation
Audubon of Florida
308 N. Monroe St.
Tallahassee, FL 32301

Audubon of Florida
11 January 2011
To: Florida Fish and Wildlife Conservation Commission, Imperiled Species Review Team
From: Julie Wraithmell, Director of Wildlife Conservation, Audubon of Florida
Re: Peer Review of Biological Status Review for Black Skimmer

Thank you for the opportunity to peer review this important status review for Black Skimmer in Florida. After carefully reviewing the committee's materials and assessment, I concur with their conclusion that the Black Skimmer warrants continued listing as Threatened under Florida law.

Per your request for comments in two specific areas:

(1) completeness and accuracy of the biological information and data analyses in the BSR
(a) Threats: It would be important under threats to also include roadkill as an historical and ongoing threat to these birds. During the 2010 season, at least two skimmer fledges were killed by vehicles at Gulf Islands National Seashore. These birds were in colonies that occur on either side of a paved road. In past years, other roadside colonies in this region have resulted in roadkill mortality as well. These threats are ongoing and significant. Predators, at least in the Panhandle, should also include feral hogs.
(b) Data completeness: It is unfortunate that there is not more formal data for the Panhandle. However, I support the committee's assumptions, as addressed below.

(2) reasonableness and justifiability of assumptions, interpretations of data, and conclusions
(a) Panhandle data: While the Panhandle may not provide the same degree of information, I think the committee's assumption that the Panhandle is not substantially more successful than the rest of the state is an accurate one. Rough data consolidated from Panhandle land managers in 2010 suggests that beach nesting in the Panhandle was poor this year, with many colonies failing and poor fledging rates. This region in particular has the issues of beach driving and roadkill on adjacent roads to contend with.
(b) Assumptions about declining availability of habitat: Because recreational disturbance is such an overwhelming influence on these birds' success, it is important to clearly recognize the diminishing availability of beach nesting habitat as a result of human disturbance related to recreation. Two sources to consider: the steadily increasing visitation numbers for Florida State Parks (many of which are historical nesting sites for these birds) as well as the steady increase in vessel registrations in Florida. Both of these factors may be viewed as a proxy for the level of recreational pressure on these places.
(c) Uncertain future of funding for management actions: Audubon believes in partnerships as the future of wildlife management, and in few cases is this more apparent than the management of beach-dependent birds. Protective measures for these species are often initiated by the FWC but would not be possible without the collaboration of other state and local government land managers, as well as dedicated Audubon volunteers. Given the economic challenges faced by all of these sectors, it seems appropriate that the BSR should recognize how dependent the current productivity of these birds is on intense management, as well as how vulnerable that continued management is to reductions in funding.

Thank you for this opportunity to contribute to the evaluation of this species. Please share my appreciation with the BSR committee for their exhaustive review of the data available to them and their diligence in adhering to this complex listing process.

Peer review #3 from Marianne Korosy

From: Marianne Korosy
To: Imperiled
Cc: Brush, Janell
Subject: Re: Least tern Draft BSR Report
Date: Wednesday, January 05, 2011 10:48:25 PM
Attachments: LETE BSR_review_Korosy.doc

Dr. Haubold,

Thank you for the opportunity to provide an independent review of the BRG's findings for Least Tern. The attached MS Word document contains my review comments. Please do not hesitate to contact me if additional input is needed or with questions pertaining to my comments.

Marianne Korosy

Independent review of Biological Species Group draft report on Least Tern

As requested via email dated 11/17/2010 from Dr. Elsa Haubold, Florida Fish and Wildlife Conservation Commission (FFWCC), I completed an independent review of the draft Biological Species Review (BSR) report and all the of the correspondence and literature posted to the FFWCC Sharepoint website for Least Tern. I also performed an independent, computer-based search of the published scientific literature through the University of Central Florida's library system and located no relevant, published information that the Biological Review Group (BRG) did not include in their assessment.

The following comments are offered for consideration.

(1) Based on my independent literature search, the BRG members considered all relevant data sources, published reports, and published scientific literature related to nesting habitat, distribution, predation, and sources of threats/disturbance. Data used by the BRG for calculations and for evaluation against listing criteria were obtained primarily from publications and competent data sources for Florida subpopulations. Because Least Terns breeding along the Atlantic and Gulf coasts are a different subspecies than the federally endangered Interior Least Tern and the federally endangered California Least Tern it is appropriate to utilize only population trend data from the eastern nominate subspecies to evaluate Least Tern for listing in Florida.

(2) Regarding criterion/listing measure [A] Population size reduction, I agree with the BRG's conclusion on (a)1. - (a)4. Published scientific literature identifies multiple causes of observed population declines. Interactions among those causes are not well understood; however the causes of decline have not ceased. I concur with the BRG's projections of population decline based on published data. Although the species is migratory, no available data records emigration

of individuals from other North American subspecies into the Florida breeding population that could offset in-state population declines.

(3) Calculations for extent of occurrence in [B] Geographic range, (b)1. and (b) 2. were performed accurately based on published data for occupied rooftops and ground colonies and current but unpublished data in the FFWCC database. The number of ground colonies has declined dramatically and remaining ground colonies on beaches and construction sites have high nest failure rates. I concur with the BRG's calculations of projected declines in the number of gravel rooftops available for Least Tern breeding colonies due to introduction of lightweight, reflective materials with lower installation and maintenance costs than the gravel rooftops.

(4) Regarding [C] Population size and trend, (c)1. and (c)2., data used to compile the estimated number of rooftop nesting Least Tern is consistent with published sources. Ground colonies are difficult to census statewide because the terns occupy ephemerally suitable nesting sites (e.g. rock and sand mines, phosphate mines, and construction sites) from year to year in addition to coastal beach substrate. Given the BRG's stated estimate of rooftop-nesting individuals, the total population in Florida with ground colonies included may exceed the listing threshold of 10,000.

(5) For [D] Population very small or restricted, I concur with the BRG's conclusions that data do not support a total Florida population under 1,000 mature individuals or that the total Florida population is restricted to breeding in an area less than 20 km^2.

(6) For [E] Quantitative analyses, I concur with the BRG's use of Florida population data on adult survival and fledging success to conduct a population viability analysis. A probability of extinction within 100 years without intervention is consistent with published data on population declines and low juvenile fledging success at most ground and rooftop colonies.

Based on my review of the published literature and reports considered by the BRG and my independent review of the published literature, I concur with the findings of the Biological Species Review group that Least Tern meets criteria in Chapter 68A, FAC, for listing as a threatened species.

Marianne G. Korosy
PhD Candidate, Conservation Biology, UCF/Orlando
2021 Oak View Lane
Palm Harbor, FL 34683

Peer review #4 from Monique Borboen

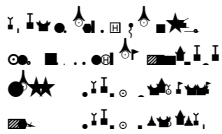
From: BORBOEN-ABRAMS, Monique
To: Imperiled
Subject: LETE BSR review
Date: Tuesday, January 11, 2011 4:47:12 PM
Attachments: BSR LETE Review. Monique Borboen..doc

Attached are my comments for the Least Tern BSR.
Thank you for making me part of this process,

Sincerely,

Monique Borboen
NE FL Policy Associate
Audubon of Florida
9601 Oceanshore Blvd
St. Augustine, FL 32080

Audubon **of florida**



January 11, 2011

To: Florida Fish and Wildlife Conservation Commission -Imperiled Species Review Team

Thank you for giving me the opportunity to review the Biological Status Report for the Least Tern. I find that the Biological Review Panel properly followed IUCN guidelines in analyzing the data and I see their conclusion as appropriate. The data presented meet more than one of the IUCN criteria and justifies the recommendation to retain the Least Tern as a Threatened species in the state in accordance to our listing process.

The biological information presented is, in my opinion, complete and offers a representative picture of the status of Least Tern in Florida at this time. The Review Panel had impressive data from the Southwest region and extensive data for rooftops to work from. The analysis of this data is thorough, and the panel justifies well its assumption that the data is representative of the status of species in the state. The quantitative analyses are prudent, for example using the highest adult survival rate recorded. I find that the data presented justifies the conclusion of the panel.

In the analysis of Criterion B (Geographic Range), would the extent of occurrence be different if only natural nesting sites had been considered? I would have liked to see beach, rooftop and phosphate mines colonies mentioned separately to account for the dependence of Least Tern on

man-made sites. Note that this wouldn't change the conclusion of the panel, but might help show the paucity of suitable natural sites, a concern for the future.

In conclusion, the Panel should be commended for its thorough work gathering data and biological information, and analyzing it. Its recommendation of keeping Least Tern as Threatened is reasonable and well justified.

Sincerely,

Monique Borboen, Northeast Florida Policy Associate, Audubon of Florida

Peer review #5 from Patty Kelly

From: Patricia_Kelly@fws.gov
To: Imperiled
Cc: Brush, Janell; Gruver, Brad
Subject: Re: Least tern Draft BSR Report
Date: Friday, February 04, 2011 5:27:45 PM

Review of Least Tern Biological Status Review:

I have read the "Biological Status Report for the Least Tern (Sternula antillarum)" and concur with the conclusion of the Biological Review Panel that the least tern warrants listing as a threatened species in Florida. The information used in the biological status report, is the best available to my knowledge and is summarized objectively and accurately with great conciseness.

A few specific comments or points to consider to improve clarity and justification of the conclusion are as follows:

Population Status and Trend:
Area and Extend of Occurrence: Consider redoing with just beach nesting locations unless you intend to achieve conservation of the species with the use of rooftops. Our general support of "recovery or conservation" is by protecting species habitat in the wild or within its native habitat or ecosystem and rooftops would not necessarily meet that description.

It's not clear if you used Zambrano and Warraich (2010) draft for some of the Florida comparisons of rooftops in the discussion at top of page 2. Seems most appropriate to use this most recent information.

The reference to the "global population", does that only include all three subspecies or are there others? Trying to put in perspective the 65,000-70,000 individuals and how that compares to S.a. antillarum versus Florida portion.

Consider adding a table that shows the different population numbers where comparisons might be useful to put into perspective the current population levels in Florida relative to declines in the entire subspecies. The data as presented makes it hard to make comparisons but I suspect this is due to the limited estimates of population status for comparison.

<u>Geographic Range and Distribution:</u>
You mention "the species has a very large range"-- is this the "global population" mentioned in the above section? or are there others? Is it more appropriate for this section to focus on just the nominate subspecies? .. If so, than consider moving the last sentence in the Taxonomic Classification section to this section. ["The nominate

subspecies S.A. antillarum breeds along the Atl., GOM, and Caribbean coasts]

Biological Status Assessment:
Threats-- Not clear when summarizing this section and citing the references, if it just refers to the nominate subspecies? Its okay to use general threats, but providing clarification is useful.

Statewide Population Assessment:
Per the tables that support the findings: I think greater emphasis on the ground nesting populations is appropriate as a more acceptable approach for conservation than our current reliance on the rooftop populations. Consider trying to use existing information such as mining the Florida Beach-nesting bird report (2005-2008) or even more recent data within the beach nesting database to apply the population size reduction comparisons in Section A to ground nesting numbers.
Same comment for table (B) Geographic Range. Emphasis on ground nesting, possibly mention rooftop and how that changes results but Conservation goal should be for ground nesting only.

Thanks for the opportunity to comment. I apologize for the late response. Patty.

Patty Kelly
Wildlife Biologist
US Fish and Wildlife Service
1601 Balboa Avenue
Panama City, FL 32405

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

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.
Gulf Coast Ecosystem Science Coordinator
Audubon of Florida
Florida Coastal Islands Sanctuaries Program
410 Ware Blvd., STE 702
Tampa, FL 33619

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

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 pelecaniform 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

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/Ferman Bird Colony	HC	P, Ci	8	74		X	Private	Y	0.13	Y	27.9448	-82.3417

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.

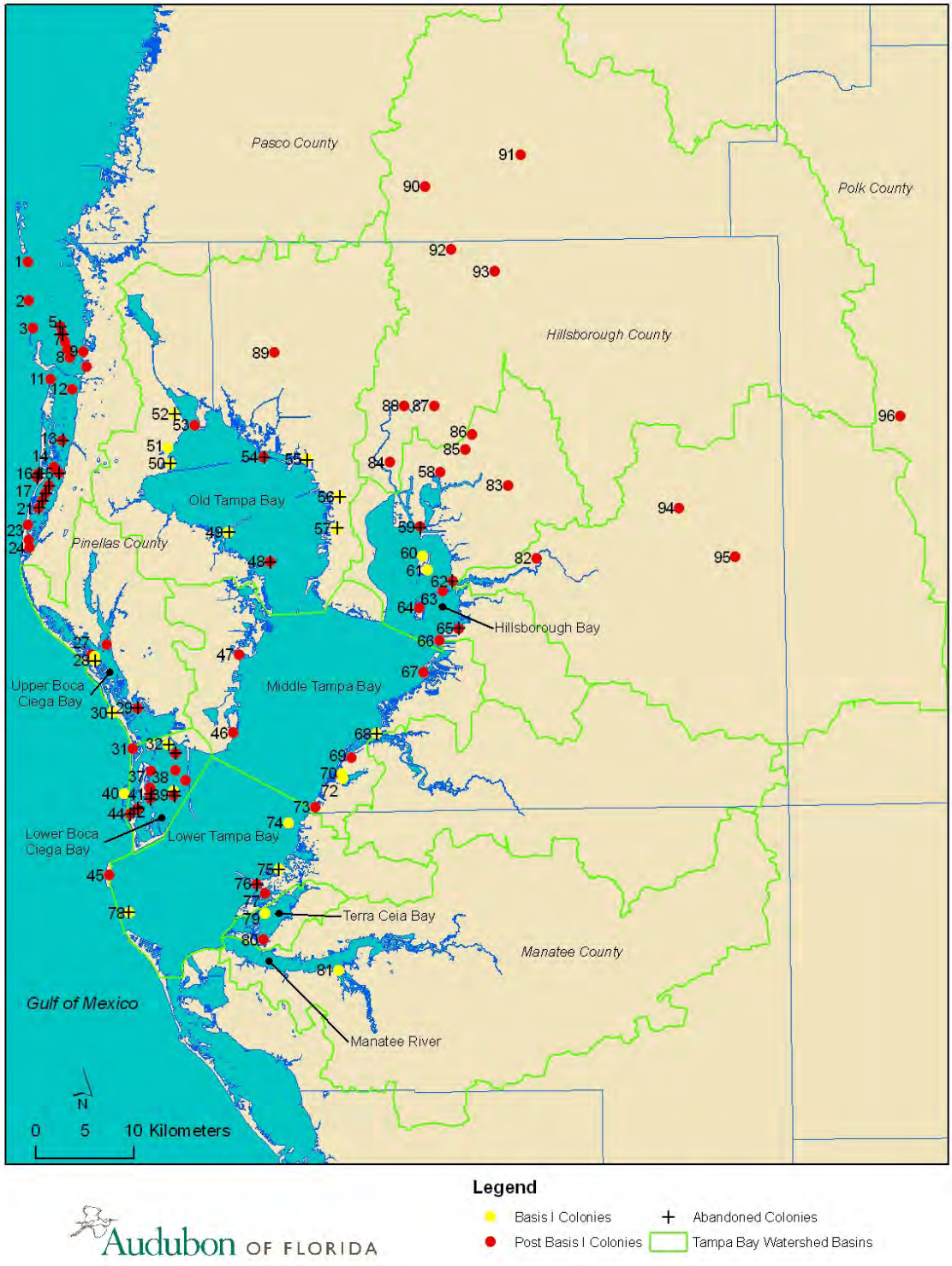


Figure 1. Bird colonies in the Tampa Bay, Florida, USA, ecosystem from 1984-2009 (colonies 1-24 are excluded because they are not in the Tampa Bay watershed).

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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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.

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	-82.699

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*
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	-82.744

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*
41	Mule Key NWR	BCB	P, Ci			X	X	USFWS NWR	Y	0.00	Y	27.6615	-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
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	-82.590

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*
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	1 2	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	-82.520

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*
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	-82.435

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	MTB	Ci				X	ELAPP	Y	0.02	Y	27.6764	-82.516

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*
	Preserve 3												9
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	TCB	P, Ci	14	407		X	FDEP Terra Ceia Aquatic Preserve /	Y	0.70	Y	27.5285	-82.601

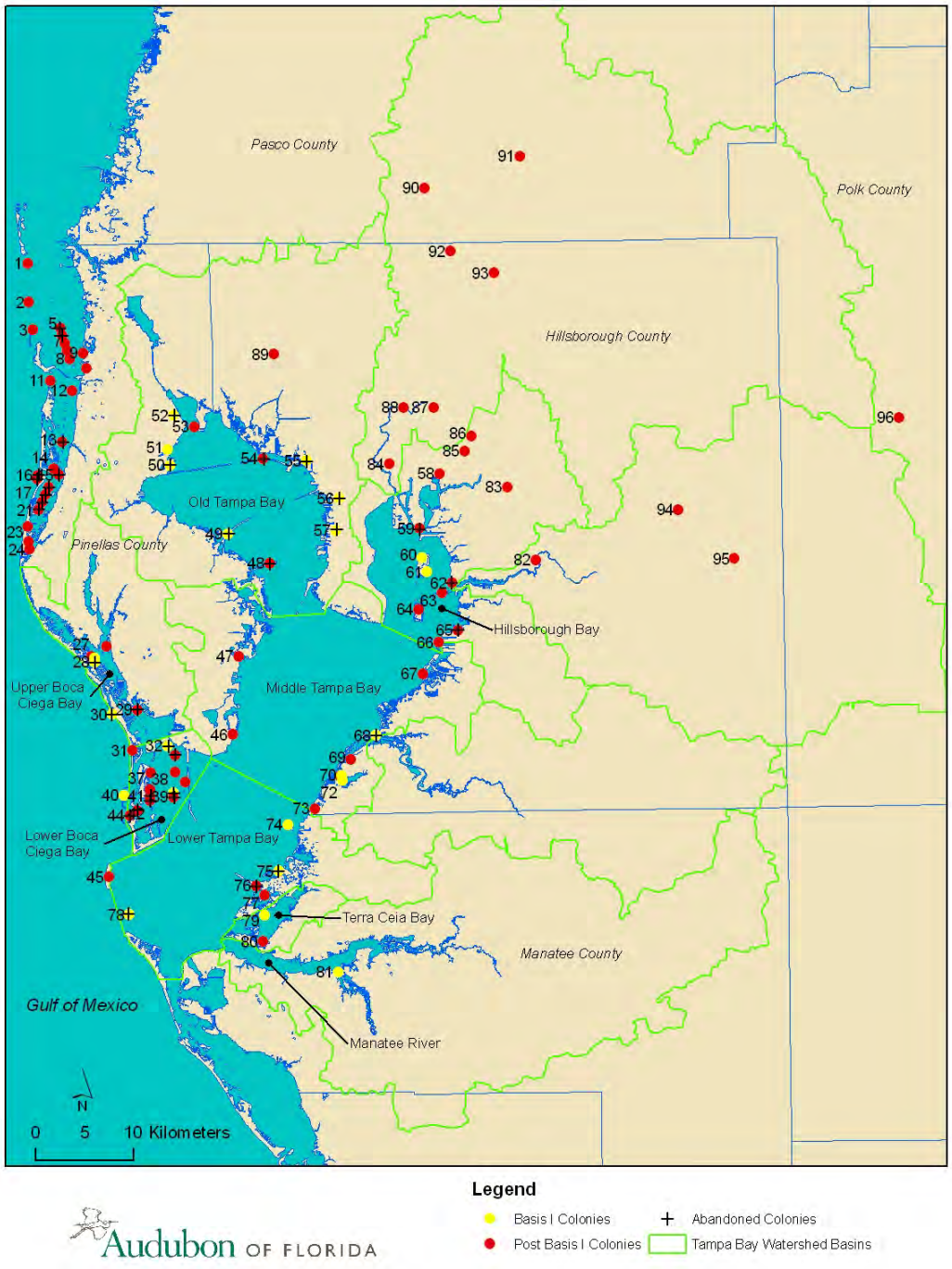
Colony Number	*Name*	Bay Segment	Taxa	Species *(n)*	Pairs *(n)*	Abandoned after 1984 New since 1984	Ownership / Management	Protected status	Regional *population* (%)	Active within last 5 yrs?	*Latitude*	*Longitude*
	Key						FCIS					5
81	Dot Dash Dit Colony	MR	P, Ci	13	2,360		Private / Florida / FCIS	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	HC	Ci			X	Hillsborough County	N	0.02	Y	28.0192	-82.448

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*
	colony											6
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	-81.931

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.

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*
													1
	Totals				58,424	2	4			100.00			

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.



Copy of the Least Tern BSR draft report that was sent out for peer review

Biological Status Review
For the Least Tern
(*Sternula antillarum)*

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 least tern was sought from September 17 to November 1, 2010. The three-member biological review group met on November 3 - 4, 2010. Group members were Janell M. Brush (FWC lead), Elizabeth A. Forys (Professor of Environmental Science and Biology at Eckerd College), and Gary L. Sprandel (Geoprocessing Specialist, Kentucky Department of Fish and Wildlife Resources). In accordance with rule 68A-27.0012 Florida Administrative Code (F.A.C.), the Biological Review Group (BRG) was charged with evaluating the biological status of the least tern using criteria included in definitions in 68A-27.001(3) and following the protocols in the *Guidelines for Application of the IUCN Red List Criteria at Regional Levels (Version 3.0)* and *Guidelines for Using the IUCN Red List Categories and Criteria (Version 8.1)*. Please visit http://www.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 least tern met criteria for listing and recommend retaining the species on the FWC list of threatened species.

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

BIOLOGICAL INFORMATION

Life History References – BirdLife International 2010; Butcher et al. 2007; FFWCC 2003; Rodgers et al. 1996; Thompson et al. 1997; Thompson et al. 1992.

Taxonomic Classification – Least terns (*Sternula antillarum*, formerly *Sterna antillarum*) are the smallest members of the Sternidae family. Terns belong to the suborder Lari, along with gulls, skimmers, and skuas. There are currently three recognized subspecies of least tern that breed in North America, although this classification scheme has been disputed (Whittier et al. 2006; Thompson et al. 1992). The nominate subspecies *S. a. antillarum* breeds along the Atlantic , Gulf of Mexico, and Caribbean coasts, *S. a. athalassos* breeds in the interior U.S., and *S. a. brownii* breeds on the Pacific coast of North America.

Population Status and Trend - The global population for the least tern is estimated at 65,000 – 70,000 individuals (BirdLife International 2010). In the early 1980s, the population of the subspecies *S. a. antillarum* was estimated at 21,300 pairs along the east coast of the U.S., but

survey methods were not comprehensive and did not include a significant rooftop-nesting segment of the population (Clapp et al. 1983; Fisk 1978). Historically, the breeding range for least terns in Florida has included all coastlines and some interior locations. Gore et al. (2007) estimated the Florida population of breeding least terns at 12,562 pairs, based on surveys from 1998 – 2000. The species is entirely limited to rooftop colonies in some regions (Gore et al. 2007; Zambrano et al. 1997). Rooftops are currently estimated to support over 80% of the breeding population, which represents a significant shift from the late 1970s when it was estimated that only 21% of the state's least terns nested on rooftops (Fisk 1978).

Geographic Range and Distribution – The species has a very large range, breeding along sandy coasts and inland rivers of the U.S. and Mexico, and the northern coasts of Central and South America (BirdLife International 2010). Least terns are a migratory species, wintering in Central and South America and moving north to breeding grounds during the summer months.

Quantitative Analyses – A population viability analysis has not been conducted for the Florida least tern population.

BIOLOGICAL STATUS ASSESSMENT

Threats – Habitat loss during the past decades has been extremely high for beach-nesting species such as the least tern. The American Bird Conservancy (2007) lists development, recreation, pollution, global warming, coastal engineering projects and invasive species as threats to coastal habitats. Least terns have been categorized as a "red" species of highest conservation concern by the National Audubon Society's Watchlist due to the number of threats the species faces throughout its range and declining population trends (Butcher et al. 2007). The Southeast U.S. Regional Waterbird Conservation Plan lists chronic recreational disturbances, elevated predator numbers, declining populations, and continued movement away from natural nesting habitats as concerns for the species (Hunter et al. 2006).

Human-induced negative impacts to roosting and breeding least terns on their natural beach habitats include recreational activity, shoreline hardening, mechanical raking, oiling of adults or breeding areas following spills, response to oil spill events, and increased presence of domestic animals (Defeo et al. 2009). Predation of eggs and chicks by hawks, crows, gulls, herons, raccoons and coyotes can be severe for some colonies (Brunton 1999; Erwin et al. 2001; Forys et al. 2005; O'Connell and Beck 2003). Additional emerging threats which are poorly understood but have generated concern are invasive species such as fire ants and carnivorous lizards (Hooper-Bui et al. 2004). Colonies on beaches are also vulnerable to tidal overwash during extreme weather or tides.

Gravel rooftop nesting has benefited least terns in response to degraded beach habitats, but rooftop colonies are also subject to a wide range of threats. Chicks often fall and perish from rooftops without appropriate ledge barriers when there is no one to monitor and re-roof them. Flooding and washout of nests and chicks has been observed during intense rainfall events. Most rooftop breeding locations are on privately owned buildings and the retail and other business operations do not view the flocks of birds, and their droppings, favorably. Colonies may be disturbed by rooftop work or other machinery maintenance. Most rooftops lack adequate shelter for chicks from the sun and/or predators, and catastrophic events such as building fires can and have occurred. The future of rooftop nesting itself is precarious as buildings convert aging gravel rooftops to newer, modified plastic surfaces (DeVries and Forys 2004).

Statewide Population Assessment – Findings from the BRG are included in Biological Status Review Information Tables.

LISTING RECOMMENDATION

Staff recommends that the least tern be listed as a Threatened species because the species met criteria for listing as described in 68A-27.001(3) F.A.C. The recommendation is based on estimated population declines due to low reproductive success, decrease in available nesting rooftops, increased predation, vulnerability to stochastic events and high probability of extinction within the next 100 years.

SUMMARY OF THE INDEPENDENT REVIEW

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Biological Status Review Information
Findings

Species/taxon: Least Tern /*Sternula antillarum*
Date: 11/4/2010
Assessors: Janell Brush, Gary Sprandel, Elizabeth Forys

Generation length: 9.63 (Massey et al. 1992)

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]	No data to support this conclusion as causes of decline are not well understood.	None.	NO	Gore et al. 2007; Zambrano and Warraich 2010
(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]	We calculated a 70% decline in number of nesting individuals on rooftops based on Gore et al. 2007 (estimated # pairs on rooftops) and Zambrano and Warraich 2010 (observed # pairs on rooftops). Rooftops represent nesting substrate for 80% of the breeding population according to Gore et al. 2007. A 23% decline in the number of occupied rooftops over a 10 year period (Zambrano 2010). Research has found that gravel rooftops are being phased out (DeVries and Forys 2004) and 27% of suitable gravel rooftops during Gore's research were lost by 2010 (Zambrano and Warraich 2010).	Observed/ Estimated	YES – c	DeVries and Forys 2004; Gore et al. 2007; Zambrano and Warraich 2010
(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]	b: Documented population decline over previous 10 years, causes not well understood but expected to continue. c: see above (A2). e: Competition and predation with increased populations of gulls and crows is a concern. Increased populations of Cooper's hawks.	Estimated/ Suspected/ Projected	YES - bce	DeVries and Forys 2004; Forys et al. 2005; Burney 2009; Unpublished Data: E. Forys, M. Borboen, FWC, A. Hodgson;
(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]	Average ground colony productivity from 2002 - 2010 in southwest Florida 0.10 fledges/pair (SD ±0.06) indicates future population decline. Observed rooftop productivity in 2003 was 0.23 fledges/pair in Pinellas County for 36 occupied rooftops. In 2008, only one chick fledged from rooftops (total pairs = 562; 0.002 fledges/pair). We project a population reduction of at least 30% over the next 3 generations.	Observed/ Projected	YES - b	Forys 2010

[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	Data do not support an extent of occurrence below 20,000 sq. km. due to interior nesting colonies.	Observed	NO	Burney 2009
(b)2. Area of occupancy < 2,000 km^2 (772 mi^2)	143 rooftop colonies + 76 ground colonies in 2010 = 217 total colonies recorded colony sites. 217 x 4 sq km = 868 sq km conservatively estimated from current available data. 868 sq km is an overestimate because no overlap of squares were considered in the estimate.	Estimated	YES	Carreker 1985; FWC Unpublished Data; Zambrano and Warraich 2010
AND at least 2 of the following:				
a. Severely fragmented or exist in ≤ 10 locations	Colonies are dispersed throughout the state and estimated to be greater than 10 locations.		NO	Burney 2009
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	We calculated a 70% decline in number of nesting individuals on rooftops based on Gore et al. 2007 (estimated # pairs on rooftops) and Zambrano 2010 (observed # pairs on rooftops). Rooftops represent nesting substrate for 80% of the breeding population according to Gore et al. 2007. A 23% decline in the number of occupied rooftops over a 10 year period (Zambrano and Warraich 2010). Research has found that gravel rooftops are being phased out (DeVries and Forys 2004) and 27% of suitable gravel rooftops during Gore's research were lost by 2010 (Zambrano and Warraich 2010).	Observed/ Estimated	YES - iii, iv, v	DeVries and Forys 2004; Gore et al. 2007; Zambrano and Warraich 2010
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	Data do not indicate extreme fluctuations	Estimated	NO	Gore et al. 2007; Zambrano and Warraich 2010
(C) Population Size and Trend				
Population size estimate to number fewer than 10,000 mature individuals AND EITHER	Estimated to be 6,278 breeding adults on rooftops, but uncertainty regarding breeding adults at ground colonies.	Estimated	NO	Forys 2010; Zambrano and Warraich 2010
(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	Data do not support		NO	See Above
(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	Data do not support		NO	See Above
(E) Quantitative Analyses				
e1. Showing the probability of extinction in the wild is at least 10% within 100 years	Created Vortex model using BNA survival rates and current productivity rates (southwest = 0.10 fledges/pair; northeast = 0.16 fledges/pair) from several regions shows 100% chance of extinction in 100 years if productivity rates continue. Panhandle productivity is unknown, but believed to be at a rate lower than what is required to compensate for low productivity in other regions.	Inferred	YES	Forys 2010; Zambrano and Warraich 2010; Thompson et al. 1997; Unpublished data, M. Borboen

Initial Finding (Meets at least one of the criteria OR Does not meet any of the criteria)	Reason (which criteria are met)
Yes, meets more than one criterion	A2c; A3b, c, e; A4b; E1
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)
Species meets the criteria	A2c; A3b, c, e; A4b; E1

1	Biological Status Review Information Regional Assessment	Species/taxon: Least Tern /Sternula antillarum
2		Date: 11/4/10
3		Assessors: Janell Brush, Gary Sprandel, Beth Forys
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
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/DO NOT KNOW (banding data do not indicate immigration, no new colonies or growth of colonies to indicate immigration)
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

Appendix 1. Brief biographies of the members of the Biological Review Group for the least tern.

Janell M. Brush received her M.S. in Wildlife Ecology and Conservation from the University of Florida. Janell has managed avian research projects in Florida for over 10 years and joined the FWC in 2006. She is the project leader for two State Wildlife Grant funded coastal waterbird projects in Florida. Janell has experience working on research projects involving many different species of shorebirds and seabirds.

Elizabeth A. Forys received a M.S. in Environmental Science/Ecology from the University of Virginia and a Ph.D. in Wildlife Ecology and Conservation from the University of Florida. She is currently a professor at Eckerd College in St. Petersburg, Florida. She has over 30 publications on endangered species theory and management and 8 specifically on shorebirds and seabirds including American oystercatchers, black skimmer, least terns, and snowy plovers in Florida. For the past 10 years Beth has helped coordinate a project that monitors, maps, and protects beach and roof-top nesting birds throughout west-central Florida.

Gary L. Sprandel has a B.S. degree in Computer Science from Colorado State University with coursework in wildlife biology. He has worked as a geoprocessor for the Kentucky Department of Fish and Wildlife Resources since 2005 on a variety of projects including the State Wildlife Action Plan, public hunting area mapping, survey databases, habitat mapping, and species distribution mapping. From 1992-2005 Gary worked for the FWC as a database manager on many projects including data collection and analysis for wintering shorebird surveys, support of breeding shorebird and seabird surveys, and species and site ranking databases. Gary has over a dozen published papers on Florida's bird life.

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.

Email from Ann Hodgson, Gulf Coast Ecosystem Science Coordinator, Audubon of Florida, Florida Coastal Islands Sanctuaries, (ahodgson@audubon.org), 410 S. Ware Boulevard, Suite 702, Tampa, Florida 33619) dated October 29, 2010. Dr. Hodgson provided a copy of the following report:

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.

The average number of Least Tern nesting pairs in the Tampa Bay Region from 2000-2009 was 116 (SD 24.62-207.68). A downward trend was reported with most natural habitat lost and 80% of nesting occurring on rooftops. 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. Progressive urbanization threatens to further reduce the ecological integrity of the Tampa Bay ecosystem. More protective regulations, more enforcement, and heightened public cooperation will all be needed to protect the spectacular, charismatic bird populations of Tampa Bay.

Appendix 3: Information and Comments Received from Independent Reviewers