Supplemental Information for the Roseate Spoonbill

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 William E. Davis

I found the methodology, data, analysis, and interpretation to be appropriate. The historical aspects were thoroughly researched and the literature cited was extensive and appropriate. The biological information and accuracy appears complete. Despite the apparent gradual increase in population numbers since 1965, I find the argument for listing the Roseate Spoonbill under D2 criteria persuasive.

I have made several editorial suggestions using Track Changes, posed several questions relating to missing words or lack of clarity in the text, and pointed out several inconsistencies between the in-text citations and the Literature Cited.

William E. Davis, Jr. 12/14/2010

Biological Status Review
for the Roseate Spoonbill
(*Platalea ajaja*)

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 roseate spoonbill was sought from September 17, 2010 to November 1, 2010. The three member biological review group met on November 3 – 4, 2010. Group members were James A. Rodgers (FWC lead), Mark Cook (South Florida Water Management District), and Peter Frederick (University of Florida). In accordance with rule 68A-27.0012 F.A.C, the Roseate Spoonbill Biological Review Group was charged with evaluating the biological status of the roseate spoonbill 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 (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 Roseate Spoonbill met the population very small or restricted criteria D2 for listing. Based on the literature review, information received from the public, and the biological review findings, FWC staff recommends listing the roseate spoonbill as state threatened.

Comment [WED1]: Don't you need to be consistent in capitalizing common names of birds? You capitalize Roseate Spoonbill in some places, not in others.

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

BIOLOGICAL INFORMATION

Taxonomic Classification – Roseate Sspoonbills (*Platalea ajaja*) are members of the Family Threskiornithidae, which include other spoonbill species and ibises. The roseate spoonbill was previously in the monotypic genus *Ajaia*.

Geographic Range and Distribution – The Rroseate Sspoonbill is the only spoonbill species that inhabits the western hemisphere. The species is a resident breeder in South America, generally east of the Andes, and coastal areas of Central America, the Caribbean, and the Gulf of Mexico (Dumas 2000). Mangrove islands and occasionally dredge-spoil islands are the preferred nesting habitat for the species. In Florida, the largest breeding populations are in Florida Bay, with additional breeding sites in Tampa Bay on the Gulf coast and Brevard County on the Atlantic coast (Powell et al. 1989, Kale et al. 1992, Ogden 1994, Rodgers et al. 1996, Rodgers et al. 1999, Dugger et al. 2005, Cook and Kobza 2009). The global population is estimated at approximately 150,000–200,000 individuals, with >30,000 individuals in North America and an estimated 5,500 breeding pairs in the U.S. (Kushlan et al. 2002, Hunter et al. 2006, IUCN 2009).

Life History References – Bjork and Powell 1994, Rodgers et al. 1996, Dumas 2000, Hoyer et al. 2005, Lorenz 2000, Lorenz et al. 2002, Lorenz et al. 2008, IUCN 2009, Lantz et al. 2010.

BIOLOGICAL STATUS ASSESSMENT

Threats – Rroseate Sspoonbill populations were reduced to only 15 pairs towards the end of the plume trade era through the early 1900s, but numbers expanded following legal protections and enforcement of conservation areas (Runde et al. 1991, Rodgers et al. 1996, Dumas 2000). Current threats to the species are not well understood, but degradation or loss of habitat due to coastal development, hydrologic alterations to wetlands, and reductions to important prey sources are of primary concern (Davis et al. 2005, Lorenz 1999, Lorenz et al. 2002). Like other wading birds that depend on fragile estuaries and wetlands for foraging and breeding, Rroseate Sspoonbills are at risk of exposure to persistent contaminants such as heavy metals and pesticides (Beyer et al. 1997, Spalding et al. 1997). Oil spill impacts to critical breeding and foraging sites, recreational disturbance at foraging and breeding sites, adverse weather during key breeding periods, human disturbance at nesting colonies, and increased pressure from predators are also concerns (Dumas 2000; Rodgers and Schwikert 2004, Stolen 2003). The North American Waterbird Conservation Plan ranks the Rroseate Sspoonbill in the "Moderate Concern" category for conservation status (Kushlan et al. 2002).

Comment [WED3]: This reference is Rogers and Schwikert 2003 in the Literature Cited.

Statewide Population Assessment – Ground surveys by FWC and Audubon Society biologists determined that the Rroseate Sspoonbill population was between 550-750 pairs in Tampa Bay and Florida Bay during the late 1980s (Runde 1991) but less than 500 pairs during the 2000s (Lorenz et al. 2002, Lorenz et al. 2008). This was in comparison to an estimated 2,500 individuals in the late 1970s (Powell et al. 1989). Unfortunately, aerial surveys of wading bird populations have been shown to include error margins that raise questions about their validity and usefulness in determining trends (Rodgers et al. 2005, Conroy et al. 2008, Green et al. 2008). Additionally, annual surveys of breeding pairs of colonial waterbirds in the Everglades region have indicated that nesting numbers for wading birds can be highly variable from season to season. In 1995-1996, the breeding population was estimated to be 1,000–1,100 pairs statewide

(R.T. Paul, unpublished data). For the 2009 season, 316 Rroseate Sspoonbill nests were documented in Florida Bay, which was below the mean number of about 543 nests recorded each year since the 1984-1985 breeding season (Cook and Kobza 2009). Islands at the mouth of the Alafia River in Tampa Bay are also historically important sites for breeding colonies of Rroseate Sspoonbill. In 2004, 370 pairs nested at this location (Audubon of Florida, unpublished data).

Status Review - In our review of the status of the Rroseate Sspoonbill, the Biological Review Group made the following assumptions and conclusions:

- Generation time: Average of first breeders is about 3.5 years (J. Lorenz, NAS, unpublished data) and maximum breeding age is 19 years of age based on banded/mark-resighting data from south Florida. Modeled maximum age is estimated to be about 32 years of age but modeled average longevity is only about 25 years. We decided the mid-point between 3.5 and 25 years of age is about 15 years. Thus our time period for evaluation is 3x15 years=45 years or a beginning year of 1965.
- Extent of Occurrence (EOO): spoonbills are observed as a nesting/foraging species in both freshwater and estuarine wetlands regions mostly south of the I-4 corridor, which is roughly calculated as 37,500 miles^2 or 59,900 km^2.
- Area of Occurrence (AOO): Maximum AOO equates to the wetlands used for foraging, which makes up on averages about 1/3 of the area of the actual land boundary in Florida, and is estimated to be a minimum of 20,000 km^2 or 12,500 miles^2.

Biological Status Review—The review group concluded the Rroseate Sspoonbill met the population very small or restricted criteria D2. See Table 1 for details.

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

LISTING RECOMMENDATION

Staff recommends that the Roseate Spoonbill be listed as a Threatened species because it met criteria for listing as described in 68A-27.001(3) F.A.C.

SUMMARY OF THE INDEPENDENT REVIEW

To be added later.

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Comment [WED4]: I can't find this reference cited in the text

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Table 1. Biological status review information findings for the Rroseate Sspoonbill in Florida.

Biological Status Review Information Findings		
	Species/taxon:	**Roseate Spoonbill**
	Date:	11/03/10
	Assessors:	Rodgers, Frederick, Cook
	Generation length:	15 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]	Large declines in population occurred prior to 1965. Since 1965, number of nests/individuals has been stable to slight increase in numbers.	O	N	National Park Service (Everglades NP) and National Audubon Society (Tavernier and Tampa Bay Sanctuary) unpublished database.
(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]	Large declines in population occurred prior to 1965. Since 1965, number of nests/individuals has been stable to slight increase in numbers.	O	N	National Park Service (Everglades NP) and National Audubon Society (Tavernier and Tampa Bay Sanctuary) unpublished database.
(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]	All breeding sites on either public (both federal and state) or conservation (NAS) protected lands, including most nesting sites in mangrove and foraging sites in freshwater habitats, in public management. If sea-level rise occurs 45 years in the future, the species may benefit by increased foraging habitat created, especially in south Florida. Less rainfall may or may not impact foraging habitat but it is suspected to result in less prey availability only at freshwater habitats.	I	N	FWC/SFWMD/NAS/ENP databases and atlas information.
(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]	Florida population in 1965 estimated 358 nests (736 individuals) statewide (nesting only occurred in and near vicinity of Florida Bay); however, the estimated current population is about 900 nests (pairs) or minimum of 1800 mature individuals in Florida as the south Florida population has slightly increased and the Tampa Bay colonies have increased since 1977 from 0 to circa 400+ nests.	O	N	National Park Service (Everglades NP) and National Audubon Society (Tavernier and Tampa Bay Sanctuary) unpublished database.
[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.				

Comment [WED5]: Do you need an "are" here?

(B) Geographic Range, EITHER				
(b)1. Extent of occurrence < 20,000 km^2 (7,722 mi^2) OR	Estimated as 59,900 km^2.	O	N	See notes for EOO.
(b)2. Area of occupancy < 2,000 km^2 (772 mi^2)	Estimated as 20,000 km^2.	O	N	See notes for AOO.
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	Florida population in 1965 estimated 358 nests (736 individuals) statewide (nesting only occurred in and near vicinity of Florida Bay); however, the estimated current population is about 900 nests (pairs) or minimum of 1800 mature individuals in Florida as the south Florida population has slightly increased and the Tampa Bay colonies have increased since 1977 from 0 to circa 400+ nests.	O	Y	National Park Service (Everglades NP) and National Audubon Society (Tavernier and Tampa Bay Sanctuary) unpublished database.
(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	Data analysis shows a clear trend of a slow increase in population size and range during the last 45 years. Largest colony in Florida today is circa 400 nests.	O	N	National Park Service (Everglades NP) and National Audubon Society (Jerry Lorenz, in Tavernier and Tampa Bay Sanctuary) unpublished database.
(c)2. A continuing decline, observed, projected, or inferred in numbers of mature individuals AND at least one of the following:	Population in Florida is slowly increasing.	O	N	
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	Estimated to be a minimum of 1,800 mature individuals. See line 23 above.	O	N	
(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	Despite relatively large AOO and AOE values given in line 16 above, the actual nesting locations is very restricted and possibly only 4-5 locations (made up of multiple small, closely-spaced colonies of various sizes) but most of the Florida population is only within 3 locations. Oil spill in Tampa Bay could impact a major portion of the Florida population.	O	Y	National Park Service (Everglades NP) and National Audubon Society (Tavernier and Tampa Bay Sanctuary) unpublished database.
(E) Quantitative Analyses				
e1. Showing the probability of extinction in the wild is at least 10% within 100 years	No analysis has been done but number of individuals appears to be increasing slowly.	E	N	

Comment [WED6]: What line 23 above?

Comment [WED7]: What line 16 above?

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 criterion.	D2
Is species/taxon endemic to Florida? (Y/N)	No

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)
No change from initial finding.	D2

Table 2. Biological status review information for the regional assessment for the Roseate Spoonbill.

1	Species/taxon:	Roseate Spoonbill
2	Biological Status Review Information Date:	11/3/10
3	Regional Assessment Assessors:	Rodgers, Frederick, Cook
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 there is evidence from banded birds the species may occasionally come into the state, the number of immigrants (especially from Cuba, Texas) is estimated to be insignificant to augment the breeding population in Florida.
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 from initial finding.
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 from initial finding.

Peer review #2 from Jim Kushlan

From: Jim Kushlan
To: Imperiled
Subject: Roseate Spoonbill
Date: Tuesday, November 23, 2010 11:00:48 PM

As requested, I have reviewed the Biological Status Review for the Roseate Spoonbill. Information on the taxonomy and distribution are correct. Within the Biological Status Assessment, a list of threats are noted, but neither the plausibility of occurrence of each of these threats nor their geographic scale is evaluated. The Statewide Population Assessment is well done.

Due recognition is given to the high degree of uncertainty of estimates made from airplanes and the history of ground counts of nests is used to provide relatively reliable data on population size and trends. The Review Group's assessment of both current population size and trend seem very reasonable. Importantly, the Geographic Range evaluation for both Extent of Occurrence (EO) and Area of Occupancy (AO) are sound. The Review Group concludes that the species should be listed as Threatened under the Population Very Small or Restricted criteria (D). The population is estimated to exceed 1000 mature individuals and neither EO or AO support this conclusion. So the remaining justification is that of a restricted number of locations (D2). D2 is a tricky criteria (RedList Guidelines 4.11), as it is not the number of nesting sites that is evaluatable but how these sites collect into locations that are imperiled by a common plausible and serious threat or in total by other more specific threats. All this needs to be clearly articulated in the assessment. Of the threats noted in the Biological Status Assessment section, most do not threaten all nesting sites uniformly. Storms and oil spills are the widest ranging threats, but even these would not affect all nesting sites, perhaps not even in one area of the state. It very likely that the Assessment's conclusion and listing recommendation are sound, however the present assessment text is inexact in its support of that conclusion. The Review should evaluate the geographic extent, plausibility, and potential effect of various threats. What are the critical common threats to all or a large proportion of sites, how plausible are the common threats (have oil spills ever affected the populations?), how serious are the common threats (have oil spills had a long term adverse impact on the species or a similar species?), how many sites occur, how are sites dispersed along the state, how should sites be grouped into locations with respect to common plausible serious threats and other threats? And exactly how many 'locations' is that? Based on that analysis, the Data/Information tabulated to support the decision should state exactly how many locations the assessors consider to be occupied by the entire Florida population as defined with respect to what common plausible serious threat or other specific threats. If the exact answer is five or less, the D2 criteria holds.

Jim Kushlan

Peer review #3 from

From: Coultermc@aol.com
To: Imperiled
Cc: Rodgers, James
Subject: Re: Roseate spoonbill Draft BSR Report
Date: Monday, January 17, 2011 5:14:14 PM
Attachments: 110117_Roseate Spoonbill Final Draft BSR 11.doc

To Whom It May Concern:

Enclosed are my comments. I apologize that these are a few days late. I had an accident about ten days ago and am still recovering, but taking time. I hope these comments are appropriate.

If you wish more. please let me know.

Best wishes,

Malcolm
****
Co-Chair
Specialist Group on Storks, Ibises and Spoonbills
PO Box 480
Chocorua, New Hampshire 03817-0480

Roseate Spoonbill Final Draft BSR 11-17-10.docx
Comments
Malcolm C. Coulter: coultermc@aol.com

I am unfamiliar with this effort. I glean from the documents sent me that this is to update the official status of species previously listed as species of concern so that appropriate conservation attention can be given to those that are indeed threatened.

I am a little confused. I can guess but don't know the context of this effort and what it is intended to achieve. It was unclear what you wished me to comment on or the format for offering these. So, I hope my notes are appropriate and helpful.

Furthermore, you have chosen to use the IUCN guidelines to determine the status. This is an excellent choice because within the IUCN Species Survival Commission, there is an emphasis to separate the conservation politics from the science of status listing to ensure impartiality.

However, you should be aware that birds are a little different from other species in the listing is largely done by BirdLife International which works with Ramsar that contracts with

Wetlands International every few years to evaluate the populations of waterbirds throughout the world. This effort is improving but at present may include the Florida Roseate Spoonbill population as a rough estimate, probably based on information from researchers and others on Florida.

I am familiar with the IUCN guidelines. They are complex to be thorough and also straight forward. In evaluating the draft, I found everything to be in order. It was well-done and thorough. Also, James Rodgers and Peter Frederick are colleagues and I know their work to be thorough and exemplary.

I hope this will be helpful. If you need more, please let me know.

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

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

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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:

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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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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); pass. 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

We thank the many agencies and landowners that allowed access to their lands in the bay: Chassahowitzka National Wildlife Refuge Complex/Pinellas National Wildlife Refuges, Egmont Key and Passage Key National Wildlife Refuges; Florida Department of Environmental Protection Pinellas Aquatic Preserve and Terra Ceia Aquatic Preserve; Florida Parks Department, Hillsborough County; Manatee County and Manatee County Port Authority; Mosaic; Pinellas County; Cities of Clearwater, Lakeland, Pasadena, Safety Harbor, Tampa; and Treasure Island; Southwest Florida Water Management District; Tampa Port Authority; Tampa Electric Company, and many private landowners. This research was supported in part by the National Fish and Wildlife Foundation Pinellas County Environmental Fund, the U. S. Fish & Wildlife Service Coastal Program, the Tampa Port Authority, Mosaic, and many corporate and private donors. Laura Flynn, Lewis Environmental Services, Inc., prepared the figures.

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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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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	-82.6995
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	LTB	P, Ci, Ch	10	36,521		X	USFWS NWR / Florida	Y	62.51	Y	27.5894	-82.7614

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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*
	Park							State Parks					
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

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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

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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*
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
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			


Pasco County
Polk County
Hillsborough County
Pinellas County
Old Tampa Bay
Middle Tampa Bay
Lower Tampa Bay
Upper Boca Ciega Bay
Lower Boca Ciega Bay
Hillsborough Bay
Terra Ceia Bay
Manatee County
Manatee River
Gulf of Mexico
N
0 5 10 Kilometers
Audubon OF FLORIDA
Legend
Basis I Colonies
Post Basis I Colonies
Abandoned Colonies
Tampa Bay Watershed Basins

Email from Dana Hartley

From: Dana_Hartley@fws.gov
To: Imperiled; Rodgers, James
Cc: Paula_Halupa@fws.gov; Marilyn_Knight@fws.gov; Andrew_Caron@fws.gov
Subject: Roseate spoonbill
Date: Tuesday, November 02, 2010 4:26:47 PM

Dear Mr. Rogers (and whoever is checking the "Imperiled" email):

Marilyn Knight of my staff reviewed our records and discovered a lot of information (~40mb) on roseate spoonbills that does not appear to be on the FWC's sharepoint site. Given the size and the lateness of the day I am sending these via the following FTP site.
http://www.fws.gov/filedownloads/ftp_verobeach/SPECIES_DATA/Roseate%20spoonbill/
Please let me know when you have completed transfer of the files and we will remove them from the FTP site.

Thanks very much and feel free to contact me with any questions.

Dana

Dana Hartley
Endangered Species Supervisor
U.S. Fish & Wildlife Service
South Florida Ecological Services Office
1339 20th Street
Vero Beach, FL 32960

Email from Susan Anstead

From: susan anstead
To: Imperiled
Subject: Roseate spoonbills (Platalea ajaja)
Date: Wednesday, October 20, 2010 9:10:12 AM

To whom it may concern,

My husband and I recently bought a house just off Amelia Island, in northern Florida, on the end of a peninsula, on a marsh. We are only able to stay in our home one week a month as my husband is working in St. Louis until the end of the year. But when we are there we spend much of our time on the front balcony watching the birds, of which there are many!!! One thing we absolutely love about the area are all the birds. This summer we noticed hundreds and hundreds of Roseate spoonbills (Platalea ajaja) flying over our house. My mother visited us and counted many flocks of 50 or more all flying in the same direction perhaps to bed down for the evening after a day of foraging in the marsh. I asked a local tour guide last weekend, if the birds may have migrated south already as we had not seen any in days. She said perhaps they had but that the conservation department says they don't come up that far north. I started a little Internet investigation and noticed on your website that they are considered an "imperiled species". That surprised me, of course, having seen so many over the summer. I did actually see 4 Roseate spoonbills fly over our house, day before yesterday. So they have not all migrated yet. I don't know what sort of information you are looking for from non-professional observers but I thought this may important. If not I apologize for wasting your time. I hope this helps.

Thanks!

Susan Anstead

Copy of the Roseate spoonbill BSR draft report that was sent out for peer review

Biological Status Review
for the Roseate Spoonbill
(*Platalea ajaja)*

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 roseate spoonbill was sought from September 17, 2010 to November 1, 2010. The three member biological review group met on November 3 – 4, 2010. Group members were James A. Rodgers (FWC lead), Mark Cook (South Florida Water Management District), and Peter Frederick (University of Florida). In accordance with rule 68A-27.0012 F.A.C, the Roseate Spoonbill Biological Review Group was charged with evaluating the biological status of the roseate spoonbill 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 (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 roseate spoonbill met the population very small or restricted criteria D2 for listing. Based on the literature review, information received from the public, and the biological review findings, FWC staff recommends listing the roseate spoonbill as state threatened.

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BIOLOGICAL INFORMATION

Taxonomic Classification – Roseate spoonbills (*Platalea ajaja*) are members of the Family Threskiornithidae, which include other spoonbill species and ibises. The roseate spoonbill was previously in the monotypic genus *Ajaia*.

Geographic Range and Distribution – The roseate spoonbill is the only spoonbill species that inhabits the western hemisphere. The species is a resident breeder in South America, generally east of the Andes, and coastal areas of Central America, the Caribbean, and the Gulf of Mexico (Dumas 2000). Mangrove islands and occasionally dredge-spoil islands are the preferred nesting habitat for the species. In Florida, the largest breeding populations are in Florida Bay, with additional breeding sites in Tampa Bay on the Gulf coast and Brevard County on the Atlantic coast (Powell et al. 1989, Kale et al. 1992, Ogden 1994, Rodgers et al. 1996, Rodgers et al. 1999, Dugger et al. 2005, Cook and Kobza 2009). The global population is estimated at approximately 150,000–200,000 individuals, with >30,000 individuals in North America and an estimated 5,500 breeding pairs in the U.S. (Kushlan et al. 2002, Hunter et al. 2006, IUCN 2009).

Life History References – Bjork and Powell 1994, Rodgers et al. 1996, Dumas 2000, Hoyer et al. 2005, Lorenz 2000, Lorenz et al. 2002, Lorenz et al. 2008, IUCN 2009, Lantz et al. 2010.

BIOLOGICAL STATUS ASSESSMENT

Threats – Roseate spoonbill populations were reduced to only 15 pairs towards the end of the plume trade era through the early 1900s, but numbers expanded following legal protections and enforcement of conservation areas (Runde et al. 1991, Rodgers et al. 1996, Dumas 2000). Current threats to the species are not well understood, but degradation or loss of habitat due to coastal development, hydrologic alterations to wetlands, and reductions to important prey sources are of primary concern (Davis et al. 2005, Lorenz 1999, Lorenz et al. 2002). Like other wading birds that depend on fragile estuaries and wetlands for foraging and breeding, roseate spoonbills are at risk of exposure to persistent contaminants such as heavy metals and pesticides (Beyer et al. 1997, Spalding et al. 1997). Oil spill impacts to critical breeding and foraging sites, recreational disturbance at foraging and breeding sites, adverse weather during key breeding periods, human disturbance at nesting colonies, and increased pressure from predators are also concerns (Dumas 2000; Rodgers and Schwikert 2004, Stolen 2003). The North American Waterbird Conservation Plan ranks the roseate spoonbill in the "Moderate Concern" category for conservation status (Kushlan et al. 2002).

Statewide Population Assessment – Ground surveys by FWC and Audubon Society biologists determined that the roseate spoonbill population was between 550-750 pairs in Tampa Bay and Florida Bay during the late 1980s (Runde 1991) but less than 500 pairs during the 2000s (Lorenz et al. 2002, Lorenz et al. 2008). This was in comparison to an estimated 2,500 individuals in the late 1970s (Powell et al. 1989). Unfortunately, aerial surveys of wading bird populations have been shown to include error margins that raise questions about their validity and usefulness in determining trends (Rodgers et al. 2005, Conroy et al. 2008, Green et al. 2008). Additionally, annual surveys of breeding pairs of colonial waterbirds in the Everglades region have indicated that nesting numbers for wading birds can be highly variable from season to season. In 1995-1996, the breeding population was estimated to be 1,000–1,100 pairs statewide (R.T. Paul, unpublished data). For the 2009 season, 316 roseate spoonbill nests were documented in Florida Bay, which was below the mean number of about 543 nests recorded each year since the 1984-1985 breeding season (Cook and Kobza 2009). Islands at the mouth of the Alafia River in Tampa Bay are also historically important sites for breeding colonies of roseate spoonbills. In 2004, 370 pairs nested at this location (Audubon of Florida, unpublished data).

Status Review - In our review of the status of the roseate spoonbill, the Biological Review Group made the following assumptions and conclusions:

- Generation time: Average of first breeders is about 3.5 years (J. Lorenz, NAS, unpublished data) and maximum breeding age is 19 years of age based on banded/mark-resighting data from south Florida. Modeled maximum age is estimated to be about 32 years of age but modeled average longevity is only about 25 years. We decided the mid-point between 3.5 and 25 years of age is about 15 years. Thus our time period for evaluation is 3x15 years=45 years or a beginning year of 1965.

- Extent of Occurrence (EOO): spoonbills are observed as a nesting/foraging species in both freshwater and estuarine wetlands regions mostly south of the I-4 corridor, which is roughly calculated as 37,500 miles^2 or 59,900 km^2.
- Area of Occurrence (AOO): Maximum AOO equates to the wetlands used for foraging, which makes up on averages about 1/3 of the area of the actual land boundary in Florida, and is estimated to be a minimum of 20,000 km^2 or 12,500 miles^2.

Biological Status Review—The review group concluded the roseate spoonbill met the population very small or restricted criteria D2. See Table 1 for details.

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

LISTING RECOMMENDATION

Staff recommends that the roseate spoonbill be listed as a Threatened species because it met criteria for listing as described in 68A-27.001(3) F.A.C.

SUMMARY OF THE INDEPENDENT REVIEW

To be added later.

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Table 1. Biological status review information findings for the roseate spoonbill in Florida.

Biological Status Review Information Findings	Species/taxon:	**Roseate Spoonbill**
	Date:	11/03/10
	Assessors:	Rodgers, Frederick, Cook
	Generation length:	15 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]	Large declines in population occurred prior to 1965. Since 1965, number of nests/individuals has been stable to slight increase in numbers.	O	N	National Park Service (Everglades NP) and National Audubon Society (Tavernier and Tampa Bay Sanctuary) unpublished database.
(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]	Large declines in population occurred prior to 1965. Since 1965, number of nests/individuals has been stable to slight increase in numbers.	O	N	National Park Service (Everglades NP) and National Audubon Society (Tavernier and Tampa Bay Sanctuary) unpublished database.
(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]	All breeding sites on either public (both federal and state) or conservation (NAS) protected lands, including most nesting sites in mangrove and foraging sites in freshwater habitats, in public management. If sea-level rise occurs 45 years in the future, the species may benefit by increased foraging habitat created, especially in south Florida. Less rainfall may or may not impact foraging habitat but it is suspected to result in less prey availability only at freshwater habitats.	I	N	FWC/SFWMD/NAS/ENP databases and atlas information.
(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]	Florida population in 1965 estimated 358 nests (736 individuals) statewide (nesting only occurred in and near vicinity of Florida Bay); however, the estimated current population is about 900 nests (pairs) or minimum of 1800 mature individuals in Florida as the south Florida population has slightly increased and the Tampa Bay colonies have increased since 1977 from 0 to circa 400+ nests.	O	N	National Park Service (Everglades NP) and National Audubon Society (Tavernier and Tampa Bay Sanctuary) unpublished database.

[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	Estimated as 59,900 km^2.	O	N	See notes for EOO.
(b)2. Area of occupancy < 2,000 km^2 (772 mi^2)	Estimated as 20,000 km^2.	O	N	See notes for AOO.
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	Florida population in 1965 estimated 358 nests (736 individuals) statewide (nesting only occurred in and near vicinity of Florida Bay); however, the estimated current population is about 900 nests (pairs) or minimum of 1800 mature individuals in Florida as the south Florida population has slightly increased and the Tampa Bay colonies have increased since 1977 from 0 to circa 400+ nests.	O	Y	National Park Service (Everglades NP) and National Audubon Society (Tavernier and Tampa Bay Sanctuary) unpublished database.
(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	Data analysis shows a clear trend of a slow increase in population size and range during the last 45 years. Largest colony in Florida today is circa 400 nests.	O	N	National Park Service (Everglades NP) and National Audubon Society (Jerry Lorenz, in Tavernier and Tampa Bay Sanctuary) unpublished database.
(c)2. A continuing decline, observed, projected, or inferred in numbers of mature individuals AND at least one of the following:	Population in Florida is slowly increasing.	O	N	
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	Estimated to be a minimum of 1,800 mature individuals. See line 23 above.	O	N	
(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	Despite relatively large AOO and AOE values given in line 16 above, the actual nesting locations is very restricted and possibly only 4-5 locations (made up of multiple small, closely-spaced colonies of various sizes) but most of the Florida population is only within 3 locations. Oil spill in Tampa Bay could impact a major portion of the Florida population.	O	Y	National Park Service (Everglades NP) and National Audubon Society (Tavernier and Tampa Bay Sanctuary) unpublished database.
(E) Quantitative Analyses				
e1. Showing the probability of extinction in the wild is at least 10% within 100 years	No analysis has been done but number of individuals appears to be increasing slowly.	E	N	

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 criterion.	D2
Is species/taxon endemic to Florida? (Y/N)	No
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)
No change from initial finding.	D2

Table 2. Biological status review information for the regional assessment for the roseate spoonbill.

1	Biological Status Review Information Regional Assessment	Species/taxon: Roseate Spoonbill
2		Date: 11/3/10
3		Assessors: Rodgers, Frederick, Cook
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 there is evidence from banded birds the species may occasionally come into the state, the number of immigrants (especially from Cuba, Texas) is estimated to be insignificant to augment the breeding population in Florida.
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 from initial finding.
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 from initial finding.

APPENDIX 1. **Biographies of the members of the Roseate Spoonbill 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.

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. He has published numerous papers on the food ecology of wading birds.

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.

APPENDIX 3. Information and comments received from independent reviewers.

To be added later.