Snowy Egret Biological Status Review Report

March 31, 2011

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
620 South Meridian Street
Tallahassee, Florida 32399-1600

Biological Status Review Report
for the
Snowy Egret
(*Egretta thula*)
March 31, 2011

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 November 8, 2010 that had not undergone a status review in the past decade. Public information on the status of the snowy egret was sought from September 17, 2010 to November 1, 2010. The three member Biological Review Group (BRG) met on November 3 - 4, 2010. Group members were James A. Rodgers (FWC lead), Peter C. Frederick (University of Florida), and Mike Cook (South Florida Water Management District) (Appendix 1). In accordance with rule 68A-27.0012, Florida Administrative Code (F.A.C.), the Snowy Egret BRG was charged with evaluating the biological status of the snowy egret using criteria included in definitions in 68A-27.001, F.A.C., and following the protocols in the *Guidelines for Application of the IUCN Red List Criteria at Regional Levels Version 3.0 (2003)* and *Guidelines for Using the IUCN Red List Categories and Criteria Version 8.1 (2010)*. Please visit http://myfwc.com/wildlifehabitats/imperiled/listing-action-petitions/ to view the listing process rule and the criteria found in the definitions.

In late 2010, staff developed the initial draft of this report which included BRG findings and a preliminary listing recommendation from staff. The draft was sent out for peer review and the reviewers' input has been incorporated to create this final report. The draft report, peer reviews, and information received from the public are available as supplemental materials at http://myfwc.com/wildlifehabitats/imperiled/biological-status/.

The BRG concluded from the biological assessment that the snowy egret does not meet any of the listing criteria. Based on the literature review, information received from the public, and the BRG findings, FWC staff recommends the snowy egret not be listed as a Threatened species and that it be removed from the Species of Special Concern list.

This work was supported by a Conserve Wildlife Tag grant from the Wildlife Foundation of Florida. FWC staff gratefully acknowledges the assistance of the biological review group members and peer reviewers. Staff also would like to thank Michelle VanDeventer who served as a data compiler on the species and assisted with writing an early draft of this report, and Caly Murphy and Pam Lister who assisted with logistic support and editing of the final report.

BIOLOGICAL INFORMATION

Taxonomic Classification – Snowy egrets (*Egretta thula*) are members of the Family Ardeidae, which include other egrets, herons, and bitterns. Some authorities recognize two subspecies, the nominate *E. t. thula* and *E. t. brewsteri* (Parson and Master 2000). The breeding range of the former is eastern North America, south through Central America, and all of South

America. The latter subspecies breeds in western North America and Baja California (Parsons and Master, 2000). Previously, the species was placed in the monotypic genus *Leucophoyx*.

Geographic Range and Distribution – Snowy egrets are found throughout the western hemisphere (Parson and Master 2000). The breeding range of the species extends along the coastlines and interior freshwater wetlands of the U.S. south to South America, with some breeding suspected as far north as Nova Scotia on the Atlantic coast (Parsons and Master 2000). Snowy egrets occur throughout Florida but become rarer in the western panhandle region (Runde 1991, Kale et al. 1992, Gawlik 1999, Rodgers et al. 1999, Frederick and Ogden 2001, Florida Fish and Wildlife Conservation Commission 2003, Drugger et al. 2005, Cook and Kobza 2009). The population estimate for snowy egrets is >143,000 individuals in North America (Kushlan et al. 2002, IUCN 2010).

Life History References – Ryder 1978, Rodgers et al. 1996, Smith 1997, Parsons and Master 2000, Frederick and Ogden 2001, Gawlik 2002, Hoyer et al. 2005, Master et al. 2005.

BIOLOGICAL STATUS ASSESSMENT

Threats – Snowy egret populations suffered huge losses during the plume trade of the late 1800s and early 1900s, but populations rebounded following hunting and trade regulations (Rodgers et al. 1996, Parson and Master 2000, Kushlan et al. 2002, Hunter et al. 2006). Current threats to the species are not well understood, but coastal development, recreational disturbance at foraging and breeding sites, environmental degradation, human disturbance, and increased pressure from predators are primary concerns (Rodgers et al. 1996, Kushlan et al. 2002, Stolen 2003). Similar to other wading birds that depend on fragile estuaries and wetlands for foraging and breeding, snowy egrets are at risk of exposure to persistent contaminants such as heavy metals and pesticides (Rodgers 1997, Spalding et al. 1997). Snowy egrets compete for nesting sites with growing numbers of cattle egrets, which can be aggressively territorial at colony sites, but the relationship to productivity is not well understood (Parsons and Master, 2000). Other potential threats to snowy egret populations are alterations to the hydrology of foraging areas, and oil spill impacts to critical breeding, foraging and roosting sites.

Population Assessment – Florida is home to both wintering snowy egrets and resident, breeding individuals (Mikuska et al. 1998, Rodgers et al. 1996). The number of breeding snowy egrets in the state rebounded following protection measures and hunting prohibitions enacted in the early 1900s. However, Runde (1991) noted a decrease in the snowy egret population in Florida from >51,000 individuals in the late 1970s to <14,000 in the late 1980s. 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, Frederick et al. 2006, Conroy et al. 2008, Green et al. 2008). Annual surveys of breeding pairs of snowy egrets in the Everglades region have indicated that nesting numbers for wading birds can by highly variable from season to season (Frederick and Ogden 2001). Nearly 2,830 pairs of snowy egrets nested in the three Water Conservation Areas and Everglades National Park in 2009 compared to a 3-year running average of 4,400 pairs for the 2005–2007 seasons (Cook and Kobza 2009).

Biological Status Review for the Snowy Egret – The BRG concluded the snowy egret does not meet any listing criteria. See Table 1 for details.

Regional Application – The review group concluded there was no change in the recommendation for the snowy egret. See Table 2 for details.

LISTING RECOMMENDATION

Staff recommends the snowy egret not be listed as a Threatened species and that it be removed from the Species of Special Concern list.

SUMMARY OF THE INDEPENDENT REVIEW

This report was sent to 3 potential independent reviewers. Comments were received from 2 reviewers. The full text of peer reviews is available at MyFWC.com.

Jaime A. Collazo, North Carolina State University: Collazo recommended the FWC should monitor the status of the species in future years, especially in regards to climate change issues in Florida. In summary, he supported the findings of the BSR panel and stated "…I concur with the assessment and recommendation by the panel of experts reviewing the status of the species…Evidence NO longer justifies keeping the Snowy Egret as a State Threatened Species…I congratulate you and your staff on a well drafted documented."

Dale Gawlik, Florida Atlantic University: Gawlik provided a short discussion on the difficulty of assessing wetland loss and lack of determining the quality of habitat used by the species in Florida. However, he did support the findings of the BSR panel and stated "…I think that given the constraints of the criteria for evaluation, your recommendation to delist the snowy egret was justified."

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Table 1. Biological status review information findings for the snowy egret in Florida.

Biological Status Review Information Findings				
	Species/taxon:	Snowy Egret		
	Date:	11/04/10		
	Assessors:	Rodgers, Cook, Frederick		
	Generation length:	12 years		
Criterion/Listing Measure	**Data/Information**	**Data Type***	**Sub-Criterion Met?**	**References**
*Data Types - observed (O), estimated (E), inferred (I), suspected (S), or projected (P). Sub-Criterion met - yes (Y) or no (N).				
(A) Population Size Reduction, ANY of				
(a)1. An observed, estimated, inferred or suspected population size reduction of at least 50% over the last 10 years or 3 generations, whichever is longer, where the causes of the reduction are clearly reversible and understood and ceased[1]	Since 1974, numbers have fluctuated. Numbers range from 1,500 nests (3,000 individuals) in early 1990s to about 3,000 nests (6,000 individuals) during the 2000s in ENP/Everglades. Probably a minimum of 20,000 individuals in Florida.	E	N	Unpublished databases of the SFWMD, ENP, NAS, P. Frederick/Everglades, FWC 1999 statewide survey, BBS trend analysis.
(a)2. An observed, estimated, inferred or suspected population size reduction of at least 30% over the last 10 years or 3 generations, whichever is longer, where the reduction or its causes may not have ceased or may not be understood or may not be reversible[1]	1988-89 surveys suggest decreases from previous survey in 1970s but was categorical survey and the decline probably has occurred but not as much as 30%.	E	N	Unpublished databases of the SFWMD, ENP, NAS, P. Frederick/Everglades, FWC 1999 statewide survey, BBS trend analysis.
(a)3. A population size reduction of at least 30% projected or suspected to be met within the next 10 years or 3 generations, whichever is longer (up to a maximum of 100 years) [1]	2010 to 2046 time period: two major possible threats to the species are sea level rise (=reduction in freshwater marsh habitat along coasts) and reduced freshwater discharge into coastal estuaries that will reduce primary estuarine foraging habitat. Less rainfall will have impacts on freshwater habitats through Florida and discharge to estuarine habitats, both which will increase salinity and probably result in reduced quality of foraging sites. The degree of impact of these variables probably will negative but the amount is difficult to predict at this time.	I	N	No modeling or sources to support these threats or suspicions. While sea level rise may reduce the available freshwater foraging habitat the percent change on the species can't be determined at this time.
(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]	See A3 above.	I	N	Unpublished databases of the SFWMD, ENP, NAS, P. Frederick/Everglades, FWC 1999 statewide survey, BBS trend analysis.

[1] based on (and specifying) any of the following: (a) direct observation; (b) an index of abundance appropriate to the taxon; (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat; (d) actual or potential levels of exploitation; (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

(B) Geographic Range, EITHER				
(b)1. Extent of occurrence < 20,000 km^2 (7,722 mi^2) OR	Probably >45,000 $miles^2$.	S	N	See EOO on notes tab.
(b)2. Area of occupancy < 2,000 km^2 (772 mi^2)	Probably >10,000 $miles^2$.	S	N	See AOO on notes tab.
AND at least 2 of the following:				
a. Severely fragmented or exist in ≤ 10 locations				
b. Continuing decline, observed, inferred or projected in any of the following: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent, and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals				
c. Extreme fluctuations in any of the following: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals				
(C) Population Size and Trend				
Population size estimate to number fewer than 10,000 mature individuals AND EITHER	Probably a minimum of 20,000 individuals in Florida.	E	N	Unpublished databases of the SFWMD, ENP, NAS, P. Frederick/Everglades, FWC 1999 statewide survey, BBS trend analysis.
(c)1. An estimated continuing decline of at least 10% in 10 years or 3 generations, whichever is longer (up to a maximum of 100 years in the future) OR				
(c)2. A continuing decline, observed, projected, or inferred in numbers of mature individuals AND at least one of the following:				
a. Population structure in the form of EITHER				
(i) No subpopulation estimated to contain more than 1000 mature individuals; OR				
(ii) All mature individuals are in one subpopulation				
b. Extreme fluctuations in number of mature individuals				
(D) Population Very Small or Restricted, EITHER				

(d)1. Population estimated to number fewer than 1,000 mature individuals; OR	Probably a minimum of 20,000 individuals in Florida.	E	N	Unpublished databases of the SFWMD, ENP, NAS, P. Frederick/Everglades, FWC 1999 statewide survey, BBS trend analysis.
(d)2. Population with a very restricted area of occupancy (typically less than 20 km^2 [8 mi^2]) or number of locations (typically 5 or fewer) such that it is prone to the effects of human activities or stochastic events within a short time period in an uncertain future	See A1, B1, and B2 above.	E	N	Unpublished databases of the SFWMD, ENP, NAS, P. Frederick/Everglades, FWC 1999 statewide survey, BBS trend analysis.
(E) Quantitative Analyses				
e1. Showing the probability of extinction in the wild is at least 10% within 100 years	Not available.		N	

Initial Finding (Meets at least one of the criteria OR Does not meet any of the criteria)	Reason (which criteria/sub-criteria are met)
Does not meet any criteria.	
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/sub-criteria are met)
Does not meet any criteria.	

Table 2. Biological status review information for the regional assessment for the snowy egret.

1	Biological Status Review Information Regional Assessment	Species/taxon: Snowy Egret
2		Date: 11/4/10
3		Assessors: Rodgers, Cook, Frederick
4		
5		
6		
7		
8	Initial finding	Supporting Information
9		
10	2a. Is the species/taxon a non-breeding visitor? (Y/N/DK). If 2a is YES, go to line 18. If 2a is NO or DO NOT KNOW, go to line 11.	No, breeds 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.	Do not know.
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	

Additional Notes - In our review of the snowy egret's status, the Biological Review Group made the following assumptions and conclusions:

- Generation time: Most birds breed at 2 years of age. Maximum known age of a recovered banded bird was about 23 years. Maximum age probably is about 25 years of age. Calculation of generation time based on the mid-point of breeding to maximum age at death: 22-2=20/2=10 years with generation time estimated as 10+2=12 years of age. Therefore, time period for evaluation of change/trend analysis is 3x12=36 years or begin the time period at 1974.
- Extent of occurrence (EOO): The species mostly occurs throughout the entire state of Florida (total about 140,513 km^2 or 54,252 $miles^2$) except for western panhandle and extreme NC region of state (i.e., Columbia, Clay, and Union counties and adjacent regions) where few colonies are known or located. In summary, the EOO is larger than the 20,000 km^2 delineation.
- Area of occupancy (AOO): Using the general premise that area of wetland typically makes up about 1/3 the total land area, the AOO is at least 46,838 km^2 or 18,084 $miles^2$.
- Quality and status of wading bird survey data: While a white-plumaged species, snowy egrets tend to nest under the tree canopy making them difficult to detect during aerial surveys using fixed wing aircraft (Rodgers et al. 2005, Frederick et al. 2006, Conroy et al. 2008), which is the primary method to survey wading birds over a large area such as the entire state. There also is the potential to not to be able to distinguish snowy egrets from other white-plumaged nesting associates when both species nest in the same colony. Rodgers et al (2006) found the probability of detecting any of the intermediate-sized day herons within a colony was <50%. Only ground counts (typical of surveys in the Everglades and Florida Bay) will result in accurate nest counts. Breeding Bird Survey (BBS) surveys may not accurately detect wading birds if the routes do not occur in wetlands to sufficiently detect these species. These short comings may result in undercount of actual species presence.

APPENDIX 1. Brief biographies of the Snowy egret Biological Review Group members.

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 foraging 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 egrets, 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.

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 in Florida. Information from Ann Hodgson (Tampa Bay Sanctuaries, NAS) on 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.