Reddish 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 Reddish Egret
(*Egretta rufescens*)
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 reddish egret was sought from September 17, 2010 to November 1, 2010. A three member Biological Review Group met on November 3-4, 2010. Group members were James A. Rodgers (FWC lead), Peter C. Frederick (University of Florida), Jerry Lorenz (National Audubon Society), Mark Cook (South Florida Water Management District), and John C. Ogden (Audubon of Florida) (Appendix 1). In accordance with rule 68A-27.0012, Florida Administrative Code (F.A.C.), the Reddish Egret BRG was charged with evaluating the biological status of the reddish 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 reddish egret met the "population size and trend" and "population very small or restricted" criteria for listing. Based on the literature review, information received from the public, and the BRG findings, FWC staff recommends listing the reddish egret as a Threatened species.

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 – Reddish egrets (*Egretta rufescens*) are members of the Family Ardeidae, along with other egrets, herons and bitterns. The species has two distinct color morphs: white and dark. The more common dark morph and name sake is characterized by a reddish head and neck and a gray body, whereas the less common white morph has an entirely white plumage. Both forms have pinkish bills with black tips, and blue to grayish-black legs.

Some authorities recognize two subspecies: the nominate *E. r. rufescens* on the east coast of North America and in the Caribbean, and *E. r. dickeyi* along the Pacific coast of the southern U.S. and Mexico (Lowther and Paul 2002). Previously, the species was placed in the monotypic genus *Dichromonassa*.

Geographic Range and Distribution – Reddish egrets occur along the coastlines of Florida, Alabama, Louisiana, Mississippi, and Texas (Rodgers et al. 1996, Lowther and Paul 2002, Green 2006, Hodgson and Paul in review). They are found on the eastern coast of Mexico, and the Baja Peninsula on the Pacific coast. Their range extends through the Caribbean islands, Cuba, Belize, and the Bahamas, and south along Central America to northern Colombia and Venezuela. The species is generally resident at breeding locations and not considered migratory as are other species of wading birds (Rodgers et al. 1996, Mikuska et al. 1998).

Life History References – Rodgers et al. 1996, Toland 1999, Lowther and Paul 2002, Florida Fish and Wildlife Conservation Commission 2003, IUCN 2009.

BIOLOGICAL STATUS ASSESSMENT

Threats – Reddish egret populations suffered huge losses during the plume trade of the late 1800s and early 1900s and are still considered one of the rarest heron species (Kale et al. 1992, Rodgers et al. 1996, Lowther and Paul 2002). Current threats to reddish egrets are not well understood, but coastal development, recreational disturbance at foraging and breeding sites, environmental degradation, loss of genetic diversity and interchange, and increased pressure from predators are of primary concern (Powell et al. 1989, Lowther and Paul 2002, Hunter et al. 2006, American Bird Conservancy 2007, Bates et al. 2009). The reddish egret was one of fourteen species identified as regional priority species in need of Critical Recovery or Immediate Management in the 2006 Southeast U.S. Waterbird Conservation Plan (Hunter et al. 2006). The species is listed as Near Threatened on the IUCN Red List of Threatened Species, and labeled as "red," or species of greatest conservation concern, on Audubon's Watchlist due to its moderately small population and suspected population declines (Butcher et al. 2007, IUCN 2009).

Population Assessment – Reddish egret populations gradually increased through the 20th century as a result of protection measures and hunting prohibitions. However, current population estimates are still estimated at only 10% of the pre-plume hunting population size (Lowther and Paul 2002). While the non-breeding range of the species extends along both the Atlantic and Gulf of Mexico coasts of the state, breeding sites are located along the southern half of the state into Florida Bay and the Lower Keys (Paul et al. 1975, Paul et al. 1979, Rodgers and Schwikert 1986, Toland 1991, Toland 1999). The species initiated breeding in South Carolina in 2005 (Ferguson et al. 2005). Estimates for the Florida population of reddish egrets were 350-400 pairs in the early 1990s (Lowther and Paul 2002). Because most birds have dark plumage, white birds can be mistaken for other white herons, and they tend to nest under the canopy of trees, it is difficult to survey for reddish egrets during statewide aerial surveys (Rodgers et al. 2005, Conroy et al. 2008, Hodgson and Paul 2010).

Biological Status Review for the reddish egret – The review group concluded the reddish egret met the population size and trend criteria C1, C2 and population very small or restricted

criteria D1, D2. See Table 1 for details.

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

LISTING RECOMMENDATION

Staff recommends listing the reddish egret as a Threatened species.

SUMMARY OF THE INDEPENDENT REVIEW

Comments were received from 3 reviewers. The full text of peer reviews is available at MyFWC.com.

Elizabeth Bates, Caesar Kleberg Wildlife Research Institute, Texas A&M University: Bates agreed with the findings of the BSR panel and stated "…I conclude that the review committee has done a thorough job collecting the available literature on the biology of reddish egrets and has applied this information in a conservative manner when making inferences and assumptions…The conclusion that the reddish egret met population size and trend criteria C1 and C2 and population very small and restricted criteria D1 and D2 is reasonable given the consistently low population size and the declines and the distribution of nesting colonies…I agree with the conclusion that the reddish egret be listed as a Threatened species."

M. Clay Green, Texas State University: Green commented on the decrease in number of reddish egret nests at the Florida Coastal Sanctuaries in Tampa Bay during 2004-2009, which the BSR panel had considered in the evaluation process. Green agreed with both the rest of the information contained within the BSR and findings of the BSR panel and stated "…I concur with the findings that criteria C1, C2, D1, D2 are met for Reddish Egrets in Florida. Based on the met criteria, the FWC staff recommendation of Reddish Egret as "state threatened" is justified."

Ann B. Hodgson, Resource Designs, Inc.: Hodgson provided an updated literature citation for her information on the status of the species in Florida and a minor correction on the population size in the BSR. She agreed with the findings of the BSR panel and stated "I generally concur with (1) the completeness and accuracy of the biological information and data analyses in the BSR, and the (2) reasonableness and justifiability of the assumptions, interpretations, and conclusions…I concur with the recommendation to list Reddish Egret in Florida as a threatened species."

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

Biological Status Review Information Findings		
	Species/taxon:	Reddish Egret
	Date:	11/04/10
	Assessors:	Rodgers, Ogden, Lorenz, Cook, Frederick
	Generation length:	15 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]	While the species experienced population decreases prior to 1965, there is no evidence of population decrease during the 1965-2010 period. Rather, the species exhibited a slow increase in numbers up to 2000s. Although pre-2000 populations may have been about 250-300 pairs, recent surveys indicate circa 300-400 pairs (600-800 individuals) in statewide population. Some indication of a relatively slow, steady decline in Keys and Florida Bay during the 2000s.	O	N	Paul et al. 1975, 1979; Hodgson and Paul 2010, Lowther and Paul 2002, Green 2006.
(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]	See A1 above.	O	N	Paul et al. 1975, 1979; Hodgson and Paul 2010, Lowther and Paul 2002.
(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]	No evidence species will decrease in the next 45 years unless major alteration in coastal/Florida habitat quality and impacts due to human disturbance.	O	N	Paul et al. 1975, 1979; Hodgson and Paul 2010, Lowther and Paul 2002.
(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]	Tampa Bay and Indian River Lagoon populations stable but Keys/Florida Bay populations are slowly decreasing due to unknown reasons. Sea level rise probably will not cause significant decrease of foraging habitat (=limiting factor for distribution of species since nesting habitat is not limited) and mangroves might increase in area by moving inland unless movement is constrained by existing development.	O	N	Paul et al. 1975, 1979; Hodgson and Paul 2010, Lowther and Paul 2002.
[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	About 5,600 km^2.	O	Y	See EOO on notes tab.
(b)2. Area of occupancy < 2,000 km^2 (772 mi^2)	Probably <2,000 km^2.	O	Y	See AOO on notes tab.
AND at least 2 of the following:				

a. Severely fragmented or exist in ≤ 10 locations	Numerous individual colonies (circa 50+) with small number of nests (mostly <25 nests) at each colony but there only appears to be 5 natural clusters (=locations) of colonies: Tampa Bay, Indian River Lagoon, North Florida Bay, Lower Keys, and a continuous area along the SW coast.	O	Y	Paul et al. 1975, 1979; Hodgson and Paul 2010, Lowther and Paul 2002.
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	No evidence of any of these variables.	O	N	Paul et al. 1975, 1979; Hodgson and Paul 2010, Lowther and Paul 2002.
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	No evidence.	O	N	Paul et al. 1975, 1979; Hodgson and Paul 2010, Lowther and Paul 2002.
(C) Population Size and Trend				
Population size estimate to number fewer than 10,000 mature individuals AND EITHER	Current population is circa 300-400 pairs (600-800 individuals). However, 2007-08 surveys in Florida Bay found only about 56 nests, a decrease from the 1990s.	O	Y	Paul et al. 1975, 1979; Hodgson and Paul 2010, Lowther and Paul 2002, Lorenz pers comm.
(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	Florida Bay population has decreased from the 1990s because of unknown reasons. Based on total population of 600-800 individuals, a 10% decrease in the future would only be a decrease of about 60-80 individuals. It is reasonably likely this percent decrease could be met in Florida Bay alone.	E/I	Y	Paul et al. 1975, 1979; Hodgson and Paul 2010, Lowther and Paul 2002.
(c)2. A continuing decline, observed, projected, or inferred in numbers of mature individuals AND at least one of the following:	A decline has occurred in Florida Bay.		Y	Paul et al. 1975, 1979; Hodgson and Paul 2010, Lowther and Paul 2002.
a. Population structure in the form of EITHER	Total population is only about 600-800 individuals.		Y	Paul et al. 1975, 1979; Hodgson and Paul 2010, Lowther and Paul 2002.
(i) No subpopulation estimated to contain more than 1000 mature individuals; OR				
(ii) All mature individuals are in one subpopulation	East coast, west coast, and Florida Bay birds considered as one population.		Y	Paul et al. 1975, 1979; Hodgson and Paul 2010, Lowther and Paul 2002.
b. Extreme fluctuations in number of mature individuals	No evidence.		N	Paul et al. 1975, 1979; Hodgson and Paul 2010, Lowther and Paul 2002.
(D) Population Very Small or Restricted, EITHER				
(d)1. Population estimated to number fewer than 1,000 mature individuals; OR	Total population is only about 600-800 individuals.		Y	Paul et al. 1975, 1979; Hodgson and Paul 2010, Lowther and Paul 2002.
(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 B2.a for identification of 5 clusters or locations.		Y	Paul et al. 1975, 1979; Hodgson and Paul 2010, Lowther and Paul 2002.

(E) Quantitative Analyses				
e1. Showing the probability of extinction in the wild is at least 10% within 100 years	None completed to date.		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)
Meet at least one criteria	C1, C2, D1, 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 /sub-criteria are met)
Meets at least one criteria above	C1, C2, D1, D2

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

1	Biological Status Review Information Regional Assessment	Species/taxon: Reddish Egret
2		Date: 11/4/10
3		Assessors: Rodgers, Ogden, Lorenz, 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, resident breeding species.
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. It is not clear what would be significant movement by the species into Florida and what numbers were suspected/inferred to have moved into the state from Cuba/Bahamas in order to rescue the Florida population. At most, movement into Florida would be a slow process during the 3 generation time period and it may require >2055 to have an impact on Florida population. Movement from Texas is an unknown entity. In conclusion, it is uncertain if there would be enough immigrants within 45 years to prevent extirpation of the species 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 in 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 in initial finding.

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

- Generation time: Most birds breed at 3-4 years of age. Maximum known age of a recovered banded bird was 12 years (Lorenz, pers. obs.) but maximum longevity probably is about 25 years. Calculation of generation time is based on the mid-point of onset of breeding to maximum age at death: (25-4)=21/2=11 years; thus generation time is 11+4=15 years of age. Therefore, the time period for evaluation of change/trend analysis is 3x15=45 years or beginning of the period at 1965.
- Extent of Occurrence (EOO): The species most frequently occurs along coastal areas from Titusville south through the Keys and north to Tampa Bay region, an area of about 2,400 km^2 of mangrove/estuarine habitat. At most there is twice amount of shallow water foraging habitat as mangrove habitat, which is the limiting factor for the distribution of the species. Thus, the EOO is a maximum of about 4,800 km^2.
- Area of Occupancy (AOO): This is less than EOO as the species is not evenly distributed along the coasts and in Florida Bay; thus, habitat actually available, used, or suitable (e.g., large areas of coastline are either developed or not available due to human recreation) for foraging, etc., is probably <2,000 km^2.

APPENDIX 1. Brief biographies of the Reddish 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 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.

Jerome J. Lorenz received a M.S. in Zoology from Miami University and a Ph.D. in Marine Biology and Fisheries from the University of Miami. Since 1989 Jerry has been a staff scientist for the Audubon Society and has been primary investigator of the National Audubon Society's Florida Bay Estuarine Research Project since 1992. This project focuses on the impact of water management in the southern Everglades on the coastal ecosystems of Florida Bay. In 2005, he became the state research director for Audubon of Florida. He serves as a member on numerous advisory committees and has published numerous papers.

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

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

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

Most information received by FWC staff was anecdotal and consisted of general observations of presence or absence of the species within Florida. Information from Ann Hodgson (Florida Coastal Islands Sanctuaries, National Audubon Society) 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.