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# POPULATION INCREASE, NESTING PHENOLOGY, NESTING SUCCESS AND PRODUCTIVITY OF REDDISH EGRETS IN INDIAN RIVER COUNTY, FLORIDA

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The Florida population of the Reddish Egret (*Egretta rufescens*) has been gradually expanding its breeding range from Florida Bay northward to its former breeding limit (Bancroft 1971, Paul 1982, Paul 1986, Rodgers and Schwikert 1986, Toland 1991). Approximately two-thirds of Florida's Reddish Egret population occurs in Florida Bay and the Keys, where the species is widely distributed (Paul 1996). Nesting is more localized and less common along the peninsular coastlines (Paul 1996). The best documented range expansion along Florida's Atlantic Coast occurred in Brevard County (Haulover Island in Merritt Island National Wildlife Refuge) and Indian River County (Riomar Island, Pelican Island National Wildlife Refuge, Oslo Island) (Maxwell and Kale 1974, Paul et al. 1979, Paul 1982, Rodgers and Schwikert 1986, Toland 1991).

During the period from 1984 through 1989, only one Reddish Egret nest was found per year in Indian River County at either Riomar Island in Vero Beach or Pelican Island National Wildlife Refuge (Rodgers and Schwikert 1986, Toland unpubl. data). This note reports an increase in nesting pairs of Reddish Egrets in Indian River County and documents nesting phenology, nesting success, and productivity from 1990 through 1998.

I studied the nesting behavior of Reddish Egrets throughout Indian River County, Florida from 1990 through 1995; and from 1996 through 1998 I monitored Reddish Egrets on Pelican Island National Wildlife Refuge only. From 1990 through 1995, I systematically surveyed a 39-km section of the Indian River Lagoon for Reddish Egrets biweekly by boat from 1 April through 15 August each year. The study area includes 49 spoil islands (created by dredging the Atlantic Intracoastal Waterway) and Pelican Island National Wildlife Refuge. I observed all mixed-species waterbird nesting colonies for Reddish Egrets using 10× binoculars. Nest counts were accomplished by (1) using a boat to drift along an island's perimeter about 20 m from the mangrove fringe, and (2) slowly entering the interior of the colony by foot. Entry was from the unoccupied section of the island during late incubation and early nestling stages so as to minimize disturbance-related nesting failures or premature fledging (Toland 1991). When a Reddish Egret nest was located, I recorded the stage of nesting, nesting substrate, and height of nest above ground. Subsequent visits were made to each nest site to document the fate of each nesting attempt.

During this study Reddish Egrets nested exclusively in mixed-species colonies of waterbirds (Ciconiiformes and Pelicaniformes) on either natural or dredged-material (spoil) islands in the Indian River Lagoon. I located a total of 21 Reddish Egret nests in Indian River County from 1990 through 1995. The number of breeding pairs nesting in the study area increased from two during 1990, to three during 1992 and 1993, to four during 1993 and 1994, to five pairs during 1995. An additional 12 Reddish Egret nests

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were located on Pelican Island from 1996 through 1998 and the number of nesting pairs increased from three to five. All five nests on Pelican Island successfully fledged young in 1998 (2.0 fledglings per pair).

Of the 50 available islands in the study area, 5 (10%) were used for nesting attempts by Reddish Egrets during the eight-year study. The natural island at Pelican Island National Wildlife Refuge was the only site used by Reddish Egrets every year during the study. Reddish Egrets constructed nests 1 to 4 m high in five species of plants including, 22 in prickly pear cactus (*Opuntia stricta*), 4 in white mangrove (*Laguncularia racemosa*), 4 in black mangrove (*Avicenna germinans*), 2 in buttonwood (*Conocarpus erectus*), and 1 in Brazilian pepper (*Schinus terebinthafolius*). Only 2 of 21 (9.5%) Reddish Egret nests were constructed over water; the majority of nests were located in the interior of nesting colonies at distances of from 5 to 25 m from water. All Reddish Egret nests were located among mixed-species herons and egrets and not peripherally distributed or isolated from other species as reported for Florida Bay (Paul 1996).

Mean nesting dates were estimated using a 26-day incubation period and 6.5-week nestling period (Hancock and Kushlan 1984). The mean date of initiation of incubation was April 18, the mean hatching date was May 14, and the mean fledging date was June 27. Reddish Egret clutch size is typically three to four eggs (Paul 1996). Mean clutch size was 3.4 ($n$ = 16, range = 3 to 4) in this study. This contrasted with the overall average of 2.8 eggs (range = 2.3 to 3.0) reported for small colonies in Florida Bay (R. T. Paul unpubl. data). Hatching success for this study was 80% (44 eggs hatched out of 55 eggs laid) and about 75% of the nestlings monitored subsequently fledged. Normal hatching rates range from 65 to 85% of all eggs laid while normal fledging success ranges from 60 to 75% of all hatched eggs (Paul 1996). Paul (unpubl. data) documented hatching success of 86% and fledging success varying from 4 to 62% in Florida Bay. Reddish Egrets in my study successfully fledged at least one young 94% (31 of 33) of the nesting attempts. Mean annual productivity was 2.4 fledglings per nesting pair per year for all nesting attempts. Productivity ranged from 0.1 to 1.8 fledglings per nesting pair in Florida Bay (Paul unpubl. data).

Human recreational activities, including boating, personal watercraft use, picknicking, and fishing, were the most important causes of disturbance to roosting and nesting Reddish Egrets. During this study, all islands used by nesting Reddish Egrets were relatively unattractive or inaccessible to humans due to dense Brazilian peppers, absence of sandy beaches or spits, and/or surrounding oyster reefs. The mixed-species wading bird colony at Pelican Island National Wildlife Refuge is officially protected and monitored by the U.S. Fish and Wildlife Service. However, the wading bird nesting colonies on spoil islands have received no official protection and are potentially vulnerable to disturbance from boaters and personal watercraft operators. Powerboats frequently approached to within 25 m of wading bird colonies while personal watercraft easily encroached to within 10 m of nests, causing numerous flushes of breeding birds. These disturbances can cause direct adverse affects including nest abandonment or premature fledging by nestlings, as well as indirect impacts such as opportunistic nest predation by Fish Crows (*Corvus ossifragus*).

Management recommendations for Reddish Egrets in the Indian River Lagoon should prioritize the control of human recreational activities on or near spoil islands with documented heronries, at least during the nesting period of March through July. County comprehensive plans should include nesting colony protection, emphasizing buffer zones around nest sites (Rodgers and Smith 1995). Recent studies to determine disturbance distances of approaching personal watercraft to nesting wading birds recommend a buffer zone radius of 150 m to adequately protect Reddish Egrets and other colonial nesting waterbirds (Rodgers pers. comm). Continued wading bird surveys are needed to locate additional Reddish Egret nest sites, update wading bird population assessments, and initiate appropriate protective measures throughout the Indian River Lagoon.

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