

GENERAL NOTES

Age of first nesting in the Brown Pelican.—Disagreement exists in the literature as to the age at which Brown Pelicans (*Pelecanus occidentalis*) first breed. Bent (U.S. Natl. Mus., Bull. 121, 1922) and Palmer (Handbook of North American Birds, Vol. 1, 1962) say that breeding first occurs when the birds are about two years old, while others have suggested that this occurs at older ages. As no convincing evidence has been presented for any opinion, the question has remained unanswered (Henny, Bureau of Sport Fisheries and Wildlife, Wildlife Res. Report No. 1, 1972). We can now report from our studies on the Brown Pelican that marked individuals have first nested successfully when they were three years old.

In July 1968 a group of flightless, nestling pelicans was captured in a Florida colony and trucked to Grand Terre, Louisiana. There they were individually color-marked with patagial streamers similar to those described by Knowlton et al. (J. Wildlife Mgmt. 28:169-170, 1964), leg-banded, and released as part of a program to restore this recently extirpated species as a breeder in the "Pelican State." When released, the birds were 9 to 12 weeks old, and the older individuals were beginning to fly. Inventories of the color-marked, free-flying juveniles near the release area showed nearly 100 percent survival during the following months.

In late March 1971, 13 nests containing eggs were found on a low reef at the mouth of the Barataria Bay ship channel. Wing rivets, with remnants of the patagial streamers, and leg bands identified all the nesting birds as those released in the summer of 1968. At that time the nesting birds were almost three years old.

Additional Florida young were shipped to Louisiana in 1969, 1970, and 1971. These also apparently nested for the first time when they were approximately three years old. By 1973 so many banded pelicans with worn-out patagial streamers were present, along with the offspring from the 1971 and 1972 nesting seasons, that precise data on the ages of nesting birds were unattainable.

The nesting 3-year-olds were in an advanced subadult plumage. This is similar to the adult nuptial plumage, but it lacks the bright yellow crown and throat markings, has considerable white markings on the belly, shows a few dark marks on the crown, and has some light-colored markings on the neck (chestnut in full nuptial plumage). A light wash of yellow was first noticeable on the crown and median throat (through field glasses) at the start of the 1972 nesting season, when the older birds were nearly four years old. These markings did not become bright yellow (as they are in Florida nesting colonies) until 1974, when the older individuals were almost six years old.

One of us has visited all of the Brown Pelican colonies in Florida, some of them on several occasions, without finding substantial numbers of birds nesting in subadult plumage. The only exception was in a new colony of about 20 nests at Port St. Joe in 1972. Most of the breeding pelicans there were in subadult plumage similar to that worn by the 3-year-olds in Louisiana in 1968.

We do not consider ours to be the definitive statement on the age of first breeding in Brown Pelicans, nor do we believe that age of first breeding is necessarily a fixed parameter in the species. In some species, the age at first breeding is known to be lower when food is especially abundant and/or when older individuals have been removed from the population (Lack, Ecological Adaptations for Breeding in Birds, Methuen & Co., Ltd., London, 1968). Obviously, in 1968, the birds in our Louisiana colony contained no pelicans older than three years. Also, natural food supplies in the vicinity were such

that at least in the past thousands of pelicans were able to thrive there. In addition, natural food was greatly supplemented by large quantities of non-commercial fishes that were thrown overboard from the numerous trawlers returning to port. Similar circumstances existed at the Port St. Joe, Florida subadult-dominated colony in 1972.

Based on these observations, we believe that the age of first breeding in Brown Pelicans may be lower in new colonies than in established colonies. However, the species is clearly capable of successful breeding at three years of age.

This is in part a contribution of the Federal Aid to Wildlife Restoration Program, Florida Pittman-Robertson Project, W-41. We wish to thank Lawrence J. Blus and R. W. Schreiber for suggestions on the manuscript.—LOVETT E. WILLIAMS, JR., *Wildlife Research Projects Office, Florida Game and Fresh Water Fish Commission, Gainesville, Florida 32601* and TED JOANEN, *Refuge Division, Louisiana Wildlife and Fisheries Commission, Grand Chenier, Louisiana 70643. Accepted 10 May 1974.*

Aerial hunting by Little Blue Herons.—Aerial hunting methods have been described for several species of herons, including the Snowy Egret, *Egretta thula* (Kushlan, 1972); Louisiana Heron, *Hydranassa tricolor* (Kushlan, 1972); Great Egret, *Casmerodius albus* (Rodgers, 1974); Gray Heron, *Ardea cinerea* (Marshall, 1961); Great Blue Heron, *A. herodias* (Hedeon, 1967); and Yellow-crowned Night Heron, *Nyctanassa violacea* (Parmer, 1968). Diving from flight was briefly noted in Little Blue Herons, *Florida caerulea*, by Dickinson (1947) and Jenni (1969), but has not been described in detail.

In the period from late July to September 1972, I observed a total of 162 aerial dives by adult and immature Little Blue Herons during 11 periods of observation at the Welder Wildlife Refuge, San Patricio County, Texas. Such behavior was first noted on 26 July, although I had been studying Little Blue Heron feeding habits since April. Interestingly, the more typical Wade/Walk Slowly method of feeding (Meyerriicks, 1962) was not often observed during this July-to-September period.

Observations were made from a car using a 15-60X spotting scope. The herons dived and caught prey as close as 30 m from me, without indicating awareness of my presence. The sites of observation were at Encino and Pollito Lakes on the refuge. During late summer these lakes become covered with an opaque mat of vegetation, consisting of *Najas guadalupensis*, *Heteranthera dubia*, and green algae. The herons' activities were primarily at the edges of the lakes in areas of floating lotus (*Nelumbo lutea*) and tall, emergent grasses (*Paspalum* spp., *Panicum* spp.).

Aerial hunting behavior was variable in the herons, but typically it began with the bird flying from an elevated perch out over the lake, frequently banking sharply and emitting loud calls. In contrast to normal flight positioning, the neck was partially extended and the legs dangled. Before diving the heron usually hovered like a tern. The dive was performed feet-first, unless the bird was diving from five m or higher. In that case the bird plummeted head-first, righting itself just above the surface to enter the water feet-first. Frequently there was a last-moment directional change before the bird reached the water. As it contacted the water the heron speared its prey with a normal bill-thrust. If the water was too deep for standing, the bird swam on the surface; if the water was very shallow it might run a few steps as it struck. Hunting flights were usually brief and low, one to three meters above the water, though sometimes a dive was made from up to 10 m.