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ASPECTS OF RED-SHOULDERED HAWK NESTING IN
SOUTHERN FLORIDA

John C. Ogden

The small, pale Red-shouldered Hawks (*Buteo lineatus extimus*) of southern Florida are common breeding birds in Everglades National Park, where they maintain a nesting density that may equal or be greater than this species' density in other regions. Between 1966 and 1974 I was able to look at about 30 nests in mainland portions of the Park incidental to other field work. Generally these nests contained clutches of two or three eggs, with two-egg clutches being more frequent. Successful nests fledged between one and three young; nests that fledged two young probably were more numerous than the combined number of nests that fledged one or three young. Food items collected by the adults when feeding nestlings were small rodents, snakes, frogs and large insects. These observations are fairly consistent with the published data on Red-shoulder nesting (Dixon, 1928; Bent, 1937; Stewart, 1949; Craighead and Craighead, 1956).

The high density of resident Red-shoulders in Everglades National Park provides an excellent situation for some much-needed field research on population dynamics in raptors. Although I attempted no such study, I do wish to report three observations which are at variance with the general nesting pattern briefly summarized above. Presumably these three observations will help focus attention toward aspects of raptor population biology deserving more study.

1. Red-shouldered Hawks breed on the keys in Florida Bay much less frequently than on the mainland, presumably because the prey they most frequently take is relatively scarce in the Bay. I cannot remember seeing rodents or rodent signs on the Bay keys, frogs are absent, and only two species of snakes are known from these keys, a water snake (*Natrix fasciata*) and a rattlesnake (*Crotalus adamanteus*). This food shortage may result in reduced nesting success by the Red-shoulders that do nest in the Bay, as occurred with a pair that nested on Frank Key, about two miles south of Flamingo in western Florida Bay. Frank Key is about 1000 by 450 meters, and therefore provides a hunting range not much different

in area from the hunting ranges of Red-shoulder pairs I measured on the mainland (Ogden, 1974). The pair on Frank Key nested for four years (1968-1971) in the same Buttonwood tree (*Conocarpus erecta*) in the interior of the key. On 2 April 1968 the nest contained a single downy young about two weeks old; in 1969 the nest contained two eggs on 25 February, two downy young (one twice the size of the other) on 25 March, and one large, feathered young in late April; in 1970 a single partly-feathered young was in the nest on 7 April; in 1971 one downy young was there on 22 March (partly feathered by early April). It is certain from these observations that no more than one young was fledged each of the four years, a production rate probably about one-half the average for mainland nests. Food remains examined in this nest consisted of a patch of small yellow feathers (Prairie Warbler, *Dendroica discolor*?) in 1968, nine carapace shells of newly-hatched Diamondback Turtles (*Malaclemys terrapin*), a tuft of rodent hair, a single primary from a small bird in 1969, and two carapaces of newly-hatched Diamondback Turtles in 1970. If turtles and small birds truly were the major food for this pair, it is no great surprise that nesting success was relatively poor.

A different nesting attempt by Red-shoulders on nearby Murray Key in 1973 failed; an adult was incubating two eggs on 27 February, but the nest was empty in mid-April.

2. On 21 March 1972 I climbed to a Red-shoulder nest in a Buttonwood tree on the east shore of Middle Fox Lake, Cape Sable. This nest was unusual to my experience in containing four nestlings, and apparently had three adults in attendance. The nestlings were newly hatched, three approximately the same size and one larger; all appeared healthy. An adult hawk flushed from brooding the nestlings, made several close passes at me in the tree, and once struck my head. I believe this behavior to be characteristic of a female bird. Her screams attracted two other adult Red-shoulders that arrived within 60 seconds; both circled low over the nest tree and called frequently. The behavior of these last two birds suggests they were males. At one time, for a 45-second period while I was still in the nest tree, all three adults perched within three feet of each other in an adjacent tree and called frequently. I was unable to make subsequent visits to this nest, so can only guess that the original pair accepted the services of a nest helper. Picozzi and Weir (1974) reported several instances of three adults of the Buzzard (*Buteo buteo*) occupying a single nesting territory, but they did not clearly indicate the number of nests at each site.

3. On 17 February 1974 Maryanne Biggar showed me a nest 15 feet up in a cypress tree (*Taxodium ascendens*) inside a one-acre cypress head located in open 'glades. On this date the nest had an adult Red-

shoulder apparently incubating, although I was informed that the same nest was used in 1973 by a pair of Barred Owls (*Strix varia*). Later that day when we flushed a pair of Barred Owls from a *Cocoplum* thicket (*Chrysobalanus icaco*) in the same cypress head the male Red-shoulder dived upon one of the owls. The owl avoided being chased from the cypress by performing a twisting, circular flight through the trees. On 23 March 1974 the nest was empty and unattended, but both the Red-shoulders and Barred Owls were still present. Again when we flushed the owls from a low thicket, one adult hawk made a brief diving chase of one owl. During April the nest remained empty and both birds remained in this cypress head, but we saw no more chases. I assume that neither the owls nor the Red-shoulders were able to nest successfully because neither pair was able to drive the other from the site. Possibly similar interspecific conflict occurs regularly in the Everglades and Big Cypress regions where these two common species maintain broadly overlapping habitats and food habits.

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FOOD OF THE BARN OWL AT GAINESVILLE, FLORIDA

James Horner, Robert Wallace, and David W. Johnston

Food habits of the Barn Owl (*Tyto alba*) in the United States are generally well known, especially from the analysis of regurgitated pellets collected at roosting and nest sites. In most studies of continental populations, rodents and other small mammals comprise 95% (or more) of prey items; birds are taken less commonly (Wallace, 1948). The percentages usually reflect local abundance of specific prey species. Especially on islands where rats and mice are either scarce or less available, Barn Owls prey heavily upon birds (Howell, 1920; Bonnot, 1928; Johnston, 1972).

Through the kindness of Tom Carr, we were alerted to a Barn Owl roost adjacent to U.S. 441, four miles south of Gainesville, Alachua County, Florida, in the winter of 1972-73. The roost, located in a partially modified mesic hammock with Live Oaks (*Quercus virginiana*) and Cabbage Palm (*Sabal palmetto*), was at the edge of Paynes Prairie. During the daytime, owls were sometimes found spread over an area of at least five acres, but they were usually clumped in a dozen or so trees. Although five or six owls were sometimes heard calling simultaneously at night, no more than two roosting owls were seen at one time. Tom Carr and other residents of the area reported that in the late winter of 1972-73, Barn Owls nested in a hollow, dead tree approximately one-fourth of a mile from the roosting sites. Barred Owls (*Strix varia*) and Great Horned Owls (*Bubo virginianus*) also inhabit this same hammock, the latter species nesting there in March-April 1974. Immediately adjacent to the roosting sites in this hammock are the broad expanses of Paynes Prairie over which Barn Owls were seen flying many times at dusk and after dark.

Despite the widespread breeding distribution of the Barn Owl throughout Florida, little has been published on its specific foods in the state or, more importantly, on its ecological impact upon prey populations. To the best of our knowledge specific foods of feral Barn Owls in Florida are limited to the published accounts of Howell (1932), Wible and Parkes (1955), and Trost and Hutchison (1963). The account by Trost and Hutchison (1963) is the most thorough because these authors identified 865 vertebrate animals in ten pounds of nest debris. In that study, conducted some 12 miles south of our Gainesville site, the owls were feeding chiefly over a "wet habitat", took mostly *Sigmodon hispidus* and *Oryzomys palustris*, and preyed on relatively few birds (3.4% of the prey items).

The 59 pellets that we examined (Table 1) contained relatively few surprises because (1) approximately 88% of the prey items were mammals, (2) the majority of these were rodents, and (3) only nine bird remains were recovered. It is of interest to direct attention to the moderately high

percentage (31%) of *Neofiber alleni* (Round-tailed Muskrat) in the pellets, indicating the impact of Barn Owls on this localized rodent. Birkenholz (1962), in his intensive investigations of *Neofiber* on Paynes Prairie, noted (p. 124) that "Barn Owls also preyed on *Neofiber*," although he located no roosts of the owls. Both Howell (1932) and Schwartz (1952) reported *Neofiber* in pellets of Barn Owls. Interestingly, *Neofiber* was recorded from the Okefinokee Swamp, Georgia, by the recovery of three skulls in Barn Owl pellets (Schantz and Jenkins, 1950). These rodents (average weight of ten specimens equals 264 g) are certainly contrastingly large as compared with smaller prey mammals of Barn Owls, such as the Short-tailed Shrew (*Cryptotis parva*; wt. equals 5 g). Most studies of Barn Owl foods (Wallace, 1948; Trost and Hutchison, 1963; and others) have shown that Barn Owls at a given site prey heavily on one species (70-90%), with lesser amounts of other prey species being consumed. Presumably this is because that particular species is either more abundant locally or the owls can better capture that species. In our Gainesville sample (Table 1) *Neofiber*, *Sigmodon*, and *Oryzomys* occurred in similar percentages as prey items, even though *Neofiber* is by far the heaviest of the three. Although we have no specific figures on local mammal populations on Paynes Prairie at this time of year, we are inclined to believe that these three mammals were all readily accessible to the owls.

As ornithologists, we were not surprised, either, at the bird species taken by the owls--Sora, Long-billed Marsh Wren, American Robin, Red-winged Blackbird, and two unidentified forms (probably small parulids). All these birds would be expected on Paynes Prairie in winter.

In virtually every instance, both *Sigmodon* and *Oryzomys* were represented in individual pellets by both skull and body skeleton. The larger *Neofiber*, however, appeared to require two pellets for a single prey animal; one pellet usually contained either a skull or the bulk of the body skeleton. In fact, in only one instance did we find for *Neofiber* both skull and the majority of the body skeleton in one pellet. According to Wallace (1948), 254 pellets contained from one to 8 prey animals per pellet, with an average of 2.7, meaning, of course, that in Wallace's analyses smaller-sized mammals were being eaten. Our over-all average was 1.5 mammals per pellet.

Although Barn Owls can and do feed to some extent in the daytime or at dusk, they use only the sense of hearing in locating prey in total darkness (Payne, 1971). It is interesting to note in Table 1 those species presumably located by the owls' hearing the prey--perhaps the birds and certainly the katydids. It seems probable to us that the birds were flushed by the owls' flight or simply were moving at dusk. The katydids are of special interest because, according to Dr. Thomas J. Walker, these katydids were of the species *Neoconocephalus triops*, and all were males. At

the time of pellet-collection (Feb.-Mar.) these male katydids were calling, their calls probably attracting the Barn Owls.

For the identification of certain prey items we appreciate the personal assistance of Pierce Brodkorb (birds), Stephen Humphrey (mammals), and Thomas J. Walker (insects). Reference collections of Pierce Brodkorb and the Florida State Museum were most helpful for identification.

Table 1. Food items identified in Barn Owl pellets
from Gainesville, Florida.

	12 Mar.	28 Mar.	25 Dec.	Total	Percent of all prey items ¹	Percent of bio- mass
Number of pellets examined	24	24	11	59		
Contents:						
Mammals					88.2	96.9
<u>Neofiber alleni</u> (264 g) ²	9	11	4	24	31.2	59.3
<u>Sigmodon hispidus</u> (123 g)	8	8	2	18	23.7	20.7
<u>Oryzomys palustris</u> (85 g)	11	3	7	21	27.6	16.7
<u>Cryptotis parva</u> (5 g)	3	1		4	5.3	0.2
Birds					11.8	3.1
<u>Porzana carolina</u> (50 g)	1		1	2	2.6	0.9
<u>Telmatodytes palustris</u> (10 g)	1			1	1.3	0.1
<u>Turdus migratorius</u> (71 g)		2		2	2.6	1.2
<u>Phoeniceus agelaius</u> (42 g)	1		1	2	2.6	0.8
Unidentified (Parulidae?)	1		1	2	2.6	0.1
Invertebrates						
Tettigoniidae (katydids)		5		5		<0.1
Percent mammals	88.5	76.7	86.6			
Percent birds	11.5	6.7	13.4			
Percent invertebrates	0	16.7	0			

¹Less the few, relatively unimportant insect remains.

²Mean body weights: mammals, from Florida State Museum specimens; birds, personal records of DWJ.

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1941 NW 23 Terrace, 2381 NW 18 Place, and Department of Zoology, University of Florida, Gainesville, Florida 32611.

POPULATION ESTIMATE OF BREEDING BIRDS ON A SPOIL ISLAND IN THE INDIAN RIVER, INDIAN RIVER COUNTY, FLORIDA

George R. Maxwell II and Herbert W. Kale II

Spoil islands are formed by the piling of spoil (rock, shell, and sand) along navigable waterways during dredging operations and are common along the length of the Indian River, a tidal bay on Florida's east coast. Breeding bird populations on these islands change rather rapidly corresponding to successional changes in vegetation. Riomar Island (sometimes called Crane Island) is a spoil island located in the city of Vero Beach between the electric power plant on the west bank of the river and a residential development on the barrier island to the east. The river is approximately 0.75-mile wide in this area. The island was created in the 1940's and enlarged in the late 1950's when the Intracoastal Waterway was deepened. Vegetational development has proceeded undisturbed since then. Birds, chiefly herons, ibis, cormorants and anhingas, began to establish nesting sites in the early 1960's and pelicans began nesting there in 1968. In that year less than 50 pairs of pelicans nested and they have increased to the 1973 level of 300 pairs.

At 17th Street in Vero Beach the Florida Department of Transportation intends to construct a highway bridge across the Indian River that will pass within 200 feet of the southern tip of the island. This study should enable future investigators to assess any impact of the bridge on the island's breeding birds.

Methods

The size of the island was determined by scaled aerial photographs confirmed by pacing on the ground.

The vegetational survey was made by counting the vegetation in 20 quadrats (10m x 10m each) chosen at random. All shrubs and trees over 0.33m in height were counted and plants in the herbaceous layer, if present, were categorized as common (covered more than 50% of quad), uncommon (covered less than 50% of quad), or rare (covered less than 5% of quad).

The bird population estimate was made by counting all active nests on 7 and 8 May 1973 of the following species in each of four sections of the heronry (See Figure 1; also Table 3 for scientific names): Brown Pelican, Double-crested Cormorant, Anhinga, Great Egret, Black-crowned Night Heron, and Great Blue Heron. The nests of these species were counted accurately because they can be identified readily by their construction, location, or the presence of adults or young. Unfortunately, this method could not be used satisfactorily with some nests of the Snowy Egret, Cattle Egret, Louisiana Heron, Little Blue Heron, or White Ibis. The nests of these five species, the eggs of all but the ibis, and the newly-

hatched young of the Snowy, Cattle, and Little Blue, are similar and usually cannot be distinguished. An estimate of the number of nests for which species determination was made were counted and the proportion of each species was calculated. Then all the nests in a particular section were counted and proportioned accordingly among the species.

Results and Discussion

Riomar Island is composed of limestone spoil rock, sand, organic debris, and mollusk shells stabilized by vegetation on most of the island. It is 393m long and 167m at its widest point. The area is 28,129 sq. m or 2.81 hectares (7 acres).

Three species of plants dominate the island with importance values (Curtis, J. T., and G. Cottam. 1962. Plant Ecology Workbook. Burgess Publ. Co., Minneapolis. 193 pp.) ranging from 59.5 to 38.9 (Table 1). These are Black Mangrove (*Avicennia nitida*), White Mangrove (*Laguncularia racemosa*), and the feral, exotic Australian Pine (*Casuarina equisetifolia*), in decreasing order of importance. Four other species were less numerous, with importance values ranging from 19.2 to 7.4. These, in order of decreasing importance, were: Florida Privet (*Forestiera proulosa*), Red Mangrove (*Rhizophora mangle*), Button Mangrove (*Conocarpus erecta*), and the feral, exotic Brazilian Pepper (*Schinus terebinthefolius*). The D/d index (observed density/expected density) computed for each species indicates that all the plants were aggregated in their distribution, with the larger values indicating greater aggregation. Only one species, the Brazilian Pepper, was randomly distributed, as indicated by the nearly equal observed and expected density values (See Table 1).

The herbaceous layer consisted of four species found in the following number of quadrats: Marsh Rosemary or Sea Lavender (*Limonium carolinianum*), ten (common), Saltwort or Pickleweed (*Batis maritima*), four (common), Woody Glasswort (*Salicornia perennis*), three (uncommon), and Saltmarsh Heliotrope (*Heliotropium polyphyllum*), one (rare).

Prior to 1973 the breeding bird population was observed seasonally by Kale since 1966. No systematic effort to census the birds was undertaken other than rough estimates during occasional visits to the island to band young birds and to obtain blood samples for other research. In 1971 and 1972 estimated numbers of pairs of each species for the entire season were as follows: Cattle Egret, 2000; Snowy Egret, 1000; White Ibis, 500; Louisiana Heron, 300; Great Egret, 100; Black-crowned Night Heron, 100; Little Blue Heron, 25 in 1971, 70 in 1972.

Except for the increase in Little Blue Herons, the over all impression held by Kale is that a reduction in numbers of the other heron species has occurred since pelicans began nesting in 1968. The figures in Table 2 show a rapid increase in numbers of breeding pairs of Brown Pelicans

between 1968 and 1970. This has stabilized since that year at around 300 nests. The increase in the nesting pelican population on Riomar Island and on several other nesting islands to the north in Brevard County and to the south in St. Lucie County coincides with a marked decrease in the numbers of nesting pelicans on Pelican Island National Wildlife Refuge located in the Indian River 13 miles north of Vero Beach. This decrease is attributed to periodic deterioration of the vegetative substrate of the three-acre island on which the birds nest (S. L. Wineland, pers. comm.). Parenthetically, this fairly regularly occurring phenomenon emphasizes the importance in designating and preserving presently uninhabited mangrove islands that are in the vicinity of known nesting colonies for future nesting sites. The discrepancies in estimated numbers of pelican pairs between our ground estimates and the aerial survey estimates conducted by the Game and Fresh Water Fish Commission (L. E. Williams, pers. comm.) are noteworthy. These seem caused by several factors: the date in the nesting period on which the surveys are made (pelicans breed on Riomar from January through September, with nesting peaks in April-July), visibility of nests from the air, and ability to get within view of each nest from the ground.

The total number of breeding pairs of birds on Riomar Island in early May 1973 was calculated to be 2657 and represented two orders, five families, and 13 species (Table 3). Two species, the Louisiana Heron and Snowy Egret, accounted for 66% of all breeding pairs. The Cattle Egret and Brown Pelican accounted for 24%, and the nine remaining species made up 10% of the total. Although we had previously suspected possible nesting by the Yellow-crowned Night Heron (*Nyctanassa violacea*), in the colony, 1973 was the first year that nests with eggs and young were observed. These were in Australian Pines, 30-40 feet above the ground.

An indication of how the composition of the breeding species changes seasonally was noted on subsequent visits on 7 June and on 18 and 24 July 1973 by Kale. On 7 June Louisiana Herons, Snowy Egrets, and Cattle Egrets were present in equal numbers, approximately 500 birds each, but by mid-July fewer than 100 active nests of Louisiana Herons and 300 of Snowy Egrets existed and now nearly 1000 of Cattle Egrets. Numbers of two other species also increased as the season progressed to an estimated 300 active nests of White Ibis, and 35 nests of Black-crowned Night Herons.

Summary

A vegetational survey and a breeding-bird population estimate were made in May 1973 on Riomar Island, a spoil island in the Indian River, Indian River County, Florida. The dominant plants were Black Mangrove, White Mangrove and Australian Pine. The spatial distribution of these

plants was aggregated.

The breeding populations of some birds, namely Cattle Egret, Little Blue Heron, White Ibis, and Brown Pelican, have been increasing since they initially established nesting sites on the island in the 1960's. Thirteen species made up the 2657 breeding pairs on the island in May 1973. The Louisiana Heron and Snowy Egret accounted for 67% of all the nests. Cattle Egrets and Brown Pelicans comprised 24% of the nests, and 9 other species accounted for the remainder. Later in the season Cattle Egrets and White Ibis became the dominant breeding species.

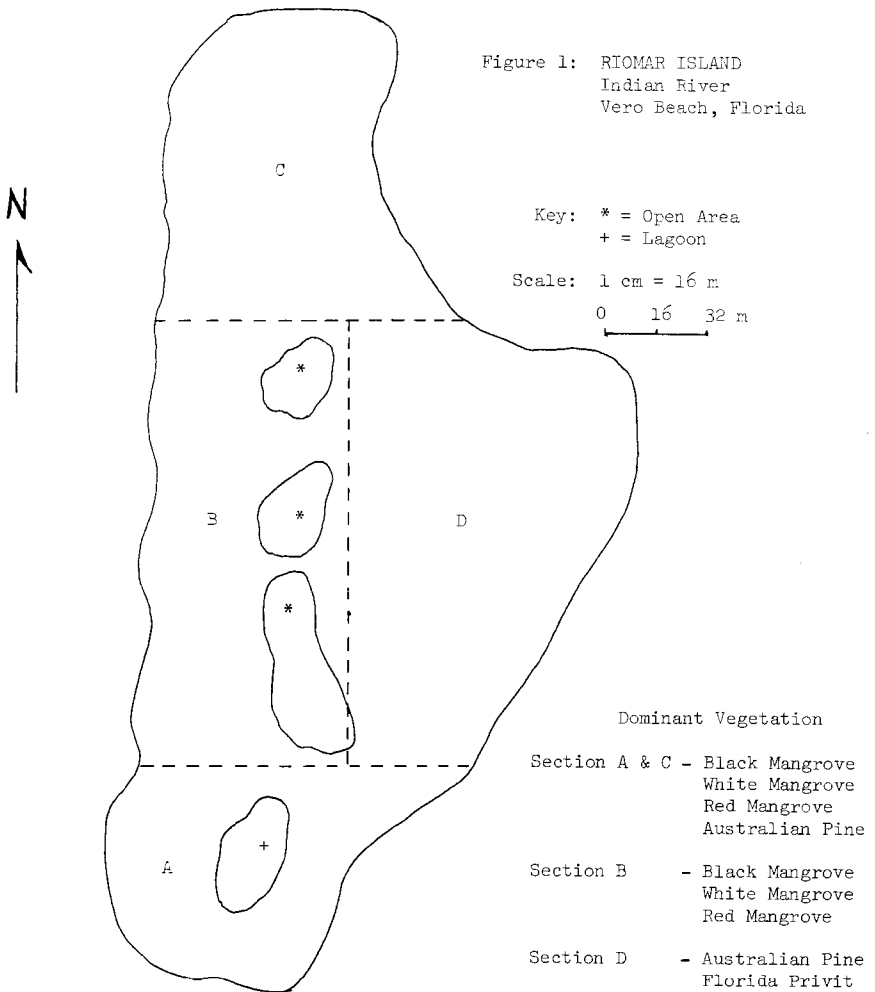


Table 1. Importance values and spatial distribution of plants on Riomar Island, Indian River County, Florida from 20 quadrats of 100 square meters each. (Modified from Curtis and Cottam).

Species	No. Quadrats of Occurrence (Q)	No. of Plants (N)	Frequency ¹ (F)	Observed ² Density (D)	Expected Density (d)	D/d Index	Relative ³ Frequency (RF)	Relative ⁴ Density (RD)	Importance Value (RF+RD)
Black Mangrove	14	389	70%	19.5	1.20	16.3	24.6%	34.9%	59.5
White Mangrove	13	309	65%	15.5	1.05	14.8	22.8%	27.7%	50.5
Australian Pine	12	199	60%	10.0	0.92	10.9	21.1%	17.8%	38.9
Florida Privet	5	117	25%	5.9	0.29	20.3	8.7%	10.5%	19.2
Red Mangrove	5	83	25%	4.2	0.29	14.5	8.7%	7.4%	16.1
Button Mangrove	5	14	25%	0.7	0.29	2.4	8.7%	1.2%	9.9
Brazilian Pepper	3	4	20%	0.2	0.22	0.9	7.0%	0.4%	7.4
Total	57	1115							

Mean number of plants per quadrat (hectare) = 55.8 (5580)

$$\begin{aligned}
 {}^1 F &= \frac{Q}{20} & {}^2 D &= \frac{N}{20} & {}^3 RF &= \frac{Q}{57} & {}^4 RD &= \frac{N}{1115}
 \end{aligned}$$

Table 2. Increase in breeding pairs of Brown Pelican on Riomar Island,
 Indian River County, Florida 1968-1973.

Year	Ground Survey	Aerial Survey ¹
1968 (no nesting prior to 1968)	< 50	80
1969	100	—
1970	300	300
1971	350	450
1972	300	400
1973	295	225

¹ From L. E. Williams and M. Fogarty, Fla. Game & Fresh Water Fish Commission (pers. comm.)

Table 3. Population estimate of breeding pairs of birds on Riomar Island, Indian River County, Florida, during May, 1973.

Species	Sect.* A	Sect.* B	Sect.* C	Sect. D	Total All Sect.	Relative Density %	Breeding Pairs/ Hectare	Breeding Pairs/ Acre
Louisiana Heron (<u>Hydranassa tricolor</u>)	295	476	200	14	985	37.1	351	141
Snowy Egret (<u>Egretta thula</u>)	106	453	219	6	784	29.5	279	112
Cattle Egret (<u>Bubulcus ibis</u>)	77	192	66	2	337	12.7	120	48
Brown Pelican (<u>Pelecanus occidentalis</u>)	55	153	87	0	295	11.1	105	42
Great Egret (<u>Casmerodius albus</u>)	1	64	38	0	103	3.9	37	15
Little Blue Heron (<u>Florida caerulea</u>)	20	11	0	40	71	2.7	25	10
Double-crested Cormorant (<u>Phalacrocorax auritus</u>)	29	0	12	0	41	1.5	15	6
White Ibis (<u>Eudocimus albus</u>)	10	0	15	0	25	0.9	9	4
Black-crowned Night Heron (<u>Nycticorax nycticorax</u>)	1	3	2	0	6	0.2	2	1
Yellow-crowned Night Heron (<u>Nyctanassa violacea</u>)	0	0	0	3	3	0.1	1	<1
Anhinga (<u>Anhinga anhinga</u>)	0	0	3	0	3	0.1	1	<1
Great Blue Heron (<u>Ardea herodias</u>)	0	0	2	0	2	0.1	<1	<1
Green Heron (<u>Butorides virescens</u>)**	0	0	1	1	2	0.1	<1	<1
Totals	594	1352	645	66	2657		945+	380+

* - See Figure 1.

** - Two pairs observed frequently, nests not found.

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FLORIDA ORNITHOLOGICAL SOCIETY

SPRING MEETING

April 25-27, 1975

at

Rodeway Inn
1355 Apalachee Parkway
Tallahassee, Fl. 32301
(904-877-3171)

NOCTURNAL MIGRANTS KILLED AT A CENTRAL FLORIDA TV TOWER, AUTUMN 1972

Walter Kingsley Taylor and Bruce H. Anderson

Bird kills at the WDBO-WFTV TV tower near Bithlo, Orange County, have temporarily ceased since the structure collapsed on June 8, 1973. Prior to its collapse, it had been visited regularly during four consecutive autumn migrations. A report of the nocturnal migrants killed during the first three autumns (1969-1971) and a description of the tower and surrounding area have been published elsewhere (Taylor and Anderson, *Wilson Bull.*, 85: 42-51, 1973). Data obtained from the bird kills during the fourth year of study (1972) are presented herein.

Numbers of Birds Killed

Forty-nine species were represented in the 1347 individuals collected during 36 trips to the facility (Table 1). Common Yellowthroats (*Geothlypis trichas*), Black-throated Blue Warblers (*Dendroica caerulescens*), Ovenbirds (*Seiurus aurocapillus*), and American Redstarts (*Setophaga ruticilla*) made up 72% of the total. Warblers made up 41% of the 49 species and 89% of the 1347 individuals. These data are consistent with those obtained from the first three years.

Birds killed during the four autumn migrations total 9130 individuals of 89 species (Table 2). The smaller number of individuals and fewer species killed in 1972, as compared with each of the other years, is believed to be correlated with fewer severe frontal conditions that reached our area. Species found in 1972 but not found during the 1969-71 kills were: one Yellow Rail (*Coturnicops noveboracensis*), two Ground Doves (*Columbina passerina*), one Common Nighthawk (*Cordeiles minor*), and one Acadian Flycatcher (*Empidonax virescens*). All of these species with the exception of the Acadian Flycatcher are uncommonly reported in kills at tall lighted structures.

We thank the owners of WDBO-WFTV for allowing us to use their facilities. Their cooperation and interest during the past four years have been outstanding.

Department of Biological Sciences, Florida Technological University, Orlando, Florida 32816.

TABLE 1

Seasonal Variation of Migrants Killed
at the WDBO-WFTV TV Tower; Autumn, 1972

Species	August		September		October		November		Totals
	16-31	1-15	16-30	1-15	16-31	1-15	16-30		
Virginia Rail		1						1	
Sora		2		2				4	
Yellow Rail				1				1	
Common Gallinule					1			1	
American Coot						1	1	2	
Ground Dove	1				1			2	
Yellow-billed Cuckoo		1		1				2	
Black-billed Cuckoo				1				1	
Common Nighthawk	1							1	
Yellow-bellied Sapsucker					1			1	
Acadian Flycatcher		1						1	
House Wren				4	1			5	
Long-billed Marsh Wren		2	1	8	1	3		15	
Short-billed Marsh Wren					2			2	
Gray Catbird				17	3			20	
Hermit Thrush							1	1	
Swainson's Thrush					1			1	
Veery		5		2				7	
Ruby-crowned Kinglet					1	4		5	
Solitary Vireo						1		1	
White-eyed Vireo		5		6	1			12	
Red-eyed Vireo	4	3	1	26				34	
Philadelphia Vireo				1				1	
Black-and-White Warbler	3	11		44				58	
Prothonotary Warbler	1							1	
Swainson's Warbler		1		10				11	
Worm-eating Warbler		4						4	
Northern Parula Warbler		4		47	3	1		55	

TABLE 1--Continued

Species	August		September		October		November		Totals
	16-31	1-15	16-30	1-15	16-31	1-15	16-30		
Yellow Warbler	2	1						3	
Magnolia Warbler				1				1	
Cape May Warbler		18	4	5	7			34	
Black-throated Blue Warbler		13		106	4	2		125	
Yellow-rumped Warbler (Myrtle)					2	6	2	10	
Blackburnian Warbler				1				1	
Yellow-throated Warbler	2			1				3	
Blackpoll Warbler						1		1	
Pine Warbler					2			2	
Prairie Warbler	2	5				1		8	
Palm Warbler				12	6	1		19	
Ovenbird	3	105	3	110	3			224	
Northern Waterthrush	1	12		4				17	
Common Yellowthroat		76	3	374	35	1		489	
American Redstart	2	34	2	88	2	1		129	
Unidentified Warbler		1						1	
Bobolink		17		2				19	
Northern Oriole (Baltimore)				1				1	
Indigo Bunting					1			1	
Savannah Sparrow						3		3	
Grasshopper Sparrow					1	1		2	
Swamp Sparrow					1	3		4	
Total Species	11	21	6	26	22	15	3	49	
Total Individuals	22	322	14	875	80	30	4	1347	

TABLE 2
 Numbers of Individuals and Species of Birds Killed
 in Autumn Migration at the WDEO-WFTV TV Tower

Dates	Individuals	Species
Sept. - Dec. 1969	2758	55
July - Dec. 1970	2794	54
Aug. - Dec. 1971	2231	67
Aug. - Nov. 1972	1347	49
Totals	9130	89

FIELD NOTES

Singular Brown Pelican Feeding Behavior

On 8 September 1974 an immature Brown Pelican (*Pelecanus occidentalis*) was observed swimming in a shallow freshwater pond located in Panama City Beach, Florida. The bird appeared to be stalking prey hidden in the flowers of the Water Lily (*Nymphaea odorata*).

Open flowers were cautiously approached by the bird; then, with a lunging stab, they were engulfed by the pelican's pouch and plucked from their stems. The pelican proceeded to shake the flower about in its pouch, make several obvious swallowing motions, and then expel the flower.

Prey identification was never possible, but it was fairly apparent that food of some sort was being secured, although animal food could hardly have been present in large amounts. This process was repeated more than half-a-dozen times in the course of 8 to 10 minutes.

As the pelican soon flew off strongly toward the Gulf and then westward along the coast, it is not likely that its singular feeding behavior should be attributed to sickness or injury. During that day, however, Hurricane Carmen had created considerable turmoil in the Gulf; quite possibly the 3 to 5 foot waves then rolling in discouraged the pelican's characteristic plunge-diving and forced it to adopt a different feeding procedure.

Other recent observations (Dinsmore, *Florida Field Naturalist*, 1974:11) have noted that Brown Pelicans may forage while swimming in salt water. The present record not only indicates that pelicans are adaptable enough to utilize fresh water while feeding, but also demonstrates that food sources other than fish may comprise at least a small part of their diet.—Stephen J. Stedman, 1407 East Sixth Court, Panama City, Florida 32401.

Whip-poor-will Singing in Winter

On 31 December 1973 at dusk near the intersection of the Fellsmere Canal and Lateral Q, Indian River County, Florida, I heard a Whip-poor-will (*Caprimulgus vociferus*) give a series of four or five "whip-poor-wills" from a strip of woods between the far side of the canal and the adjoining pasture.

Nelson, quoted by Tyler in Bent (1940, U.S. Natl. Mus. Bull. 176:179), said that the Whip-poor-will is not in song during the winter in central Florida, but just before it starts northward late in March it sings for a few evenings. Sustained singing after arrival in fall and continuing oc-

asionally as late as mid-November was reported by Robertson and Ogden (1968, Florida region. *Audubon Field Notes*, 22:29). Sprunt (1954, Florida Bird Life, New York, Coward-McCann:259-260) in 17 winters at Okeechobee heard the species only twice, in the same hammock two successive years on 31 January 1949 and 30 January 1950, both warm winters. The temperature was about 83 degrees when I heard the bird sing.--Margaret Coon Bowman, Box 783, Wabasso, Florida 32970.

Foods of the Osprey at Newnans Lake ¹

Newnans Lake in eastern Alachua County, three miles east of Gainesville, has a high Osprey (*Pandion haliaetus*) population. During the spring and summer of 1972, Ospreys were observed with telescopes and field glasses as they fished there, prey species were identified, and size estimates made of prey.

Thirty-four captures were observed. All prey were fish, 25 (73.5%) of which were Gizzard Shad (*Dorosoma cepedianum*) and Threadfin Shad (*D. petenense*). The remaining nine (26.5%) fish were sunfish (*Lepomis* sp.), Black Crappie (*Pomoxis nigromaculatus*), Large-mouth Bass (*Micropterus salmoides*), or were unidentifiable. The average length of captured prey was about 18 cm with a range of 7.5-35 cm. At least eight (23.5%) captures were of dead or dying fish floating near the surface.

Fishery studies (unpublished) by the Florida Game and Fresh Water Fish Commission revealed that shad make up 34.0% of the fish population in the lake. Threadfin Shad comprise 32.3% and Gizzard Shad 1.7%. The average length of Gizzard and Threadfin Shad taken from Newnans Lake in this fishery studies was 13 and 10.3 cm. respectively.

Ospreys were preying on shad of above-average length at a rate greater than their relative abundance would indicate (even after eliminating from the count those shad picked up as dead or dying). A ratio of 1.1 attempts per capture (excluding those of dead or dying fish) suggests that shad are especially vulnerable to being captured by Ospreys. This is even more apparent when this capture ratio for shad is compared with a ratio of four attempts per capture on another area where the primary prey species was sunfish, *Lepomis* sp.--Stephen A. Nesbitt, Florida Game and Fresh Water Fish Commission, 4005 South Main Street, Gainesville, Florida 32601.

¹This is a contribution of a Federal Aid Program, Florida Pittman-Robertson Project W-41, Job VII-A-4.

A *Salmonella typhimurium* Outbreak at a Bird Feeding Station

Unexplained mortality among small passerine birds is frequently reported to the Wildlife Research Projects Office of the Florida Game and Fresh Water Fish Commission. Pesticide poisoning has been suspected in many of these incidents, but chemical analyses have usually failed to reveal pesticide levels sufficient to cause death. Investigation of mortality incidents involving small birds has revealed that at least one infectious disease is an important factor in some die-offs.

A die-off involving birds frequenting a feeding station was reported by Mrs. Howard Pearl at her home near Salt Springs, Marion County, Florida, from 1971 through December, 1973. Species involved were the Blue Jay (*Cyanocitta cristata*), Tufted Titmouse (*Parus bicolor*), Brown Thrasher (*Toxostoma rufum*), House Sparrow (*Passer domesticus*), Red winged Blackbird (*Agelaius phoeniceus*), Common Grackle (*Quiscalus quiscula*), Cardinal (*Cardinalis cardinalis*), Chipping Sparrow (*Spizella passerina*), White-throated Sparrow (*Zonotrichia albicollis*), and Ground Dove (*Columbigallina passerina*). Specimens that could not be examined fresh were frozen for later examination. Heaviest mortality was observed in late winter and early spring. Mrs. Pearl reported that, at times, every bird coming to her feeder appeared to be affected to some degree. Some of the Cardinals, Common Grackles, Red-winged Blackbirds, Chipping Sparrows, and House Sparrows had subcutaneous lesions in the pectoral region similar to pustular lesions previously described for *Salmonella typhimurium* infections in birds (Wobese, G. A. and C. F. Finlayson. 1969. *Salmonella typhimurium* infection in House Sparrows. *Arch. Environ. Health*, 19: 882-884). Cultures taken from birds with lesions and affected birds without lesions were positive for *Salmonella typhimurium*.

As a partial test of our diagnosis that an agent in or on the soil caused the death of these wild birds, we suggested birds be discouraged from frequenting the feeding site in large numbers and that food be elevated and moved to another part of the yard. This was practical only to a limited extent. A collection of individuals of most of the same passerine species that had been infected earlier was made on 10 March 1974. All specimens were devoid of any lesions and otherwise in good condition. Cultures made from them were negative for *Salmonella*. Possibly the decline in incidence of infection was caused by the disease-induced reduction in the population using the feeding station.

Salmonella typhimurium is orally communicable to man and other animals by infected feces or other contaminated sources. Birds feeding on foods scattered on the ground or on elevated platforms that go uncleaned for long periods of time are highly susceptible to salmonellosis. As a

matter of course, those who feed birds regularly should avoid the use of ground feeding stations and occasionally should clean and thoroughly disinfect elevated platforms, particularly if sick or dead birds are observed in the vicinity. If feed is made available on the ground, the site should be changed regularly to reduce the likelihood of contact with infected feces. The Florida Game and Fresh Water Fish Commission, Wildlife Research Projects Office, 4005 South Main Street, Gainesville, Florida 32601 (phone 904-376-6481) should be contacted in the event of any unexplained bird mortality. Fresh specimens should be wrapped in aluminum foil and frozen as soon as possible. More specific instructions will be provided after notification. -Stephen A. Nesbitt, Florida Game and Fresh Water Fish Commission, Wildlife Research Projects, 4005 S. Main Street, Gainesville, Florida 32601; Franklin H. White, Department of Veterinary Science, University of Florida, Gainesville, Florida 32601.

NOTICE: HAWK MIGRATION ASSOCIATION OF NORTH AMERICA

This notice will serve to introduce the Hawk Migration Association of North America, a newly-formed organization which will strive to increase communication between hawk-watchers, to standardize the recording and processing of hawk-migration data, and to expand and improve the coverage of hawk migration in North America.

For the purpose of the Association's work, North America has been divided into nine regions, each with a regional representative/editor. Before each spring and fall migration season, all participating hawk-watch and hawk-banding stations will receive, free, as many copies of the HMANA Report Form as are needed. After each season, hawk-watchers will return completed forms to their regional representatives, who will write a regional report. All of these regional reports, plus a continent-wide summary, will be published twice annually, and will be sent to each member.

The association is vitally interested not only in lookouts that are manned regularly, but also in those that are covered infrequently. This allows the exploring hawk-watcher leeway for searching out new watches which will help to expand the coverage throughout the South. If you are interested in learning more about the Hawk Migration Association please contact Robert S. Kennedy, Southern Regional Representative HMANA, Museum of Zoology, Louisiana State University, Baton Rouge, Louisiana 70803.

Chordeiles minor sennetti in Florida

The first record for Florida of a specimen of *Chordeiles minor sennetti*, a subspecies of the Common Nighthawk, was published by Mengel (*Auk*, 68: 507), who "discovered" the study skin in the collections of the University of Michigan. This specimen had been collected in Clay Springs, Orange County, on 21 April 1896.

Two more specimens of this subspecies were taken in Broward County during the autumn of 1972. The first, a road kill from Ft. Lauderdale, found on 14 October by Roger Martz, fisheries biologist, Florida Game and Fresh Water Fish Commission, is a female now in the University of Miami Reference Collections (UMRC 7283). A second bird (UMRC 7282), sex undetermined, found injured in Pompano Beach on 16 October, died in the custody of Mrs. Madelaine Menser. Identification of both specimens was confirmed at the National Museum of Natural History by John S. Weske.

I examined an additional and apparently unreported specimen of the subspecies in the collections of the American Museum of Natural History (AMNH 476887). This carries a Rothschild Museum label. Originally identified as *C. m. chapmani*—which it patently does not resemble—the identification had been redesignated "*C. m. sennetti?*". No collector is specified for this male bird taken in Hillsborough County, 24 April 1897.

C. m. sennetti breeds in the upper midwestern and northwestern areas of the United States and adjacent portions of Canada (Checklist of North American Birds. 1957. American Ornithologists' Union, Baltimore, Md.). Its Florida status, based on the records cited herein, is therefore that of an unusual spring or fall migrant. I suggest it is possible that occurrence may be less unusual than indicated by the records now at hand. Nighthawks are probably less well scrutinized than most migrants and, being among the more difficult to prepare as study skins, dead birds are no doubt less apt to be retrieved than those of other migrants.

Casualties of Nighthawk migrants should be carefully inspected for information concerning this, as well as other, subspecies of the Common Nighthawk.

I thank the Bird Division of the American Museum of Natural History for the opportunity to examine specimens of *Chordeiles minor*.—Oscar T. Owre, Department of Biology, University of Miami, Coral Gables, Florida 33124.

SUGGESTIONS FOR CONTRIBUTORS

The *Florida Field Naturalist* welcomes articles and short notes containing new information on subjects relevant to the biology of wild species of birds or other vertebrates in or near Florida. Its emphasis is on papers dealing with the biology of birds, to which it will give publication priority over papers on other organisms. All articles, notes, and other materials should be submitted to the Editor: Henry M. Stevenson, Department of Biological Science, Florida State University, Tallahassee, Florida 32306.

All manuscripts should be submitted in triplicate. They should be typewritten, double-spaced, on one side of numbered sheets of standard (8 1/2 x 11 in.), unruled white paper, with margins of at least one inch on all sides.

Titles should be short and descriptive, and the body of the article should state the necessary facts without using unnecessary words. All references should be cited in the body of the text unless there are more than three, in which case each complete entry should be listed at the end under "Literature Cited", and the citation in the body should then indicate author and year of publication (e.g., Bond, 1961). Whenever there are more than two authors, list the first followed by "*et al.*" (e.g., Blair *et al.* 1968). Whenever pertinent, the particular page or pages should also be indicated (Bond, 1961: 44).

The vernacular (common) names of all species mentioned — plants or animals — should be capitalized, and the scientific name should be added in parentheses following the first reference except in the title. The scientific name should be underscored and should follow a widely accepted authority for the group of animals or plants involved (e.g. A.O.U. *Check-list*, 1957, for birds).

Abbreviations should be used sparingly in the body of the text except in parenthetical material: e.g. "Tallahassee (5 mi. SE)." Digits rather than words are recommended for all numbers except one (1). The metric system is preferred for weights and measurements and is acceptable for such measurements as distances. In writing dates, never use a number to refer to a month.

Proofs will be sent to the (senior) author. The Editor must be informed well in advance of any change in address or mechanism for handling proofs; also of necessary changes in the manuscript before proofs are printed. Changes in proof are expensive, so authors must not expect to make major changes at this stage unless they are willing to bear the cost. When proofs reach the author, he should *carefully check against the typescript and promptly return both to the Editor.*

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