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STATUS OF THE FERAL BUDGERIGAR IN FLORIDA

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Although the exotic status of the dominant urban birds in North America, the Rock Dove (*Columba livia*), House Sparrow (*Passer domesticus*), and Starling (*Sturnus vulgaris*), is well known, we tend to be complacent about the establishment of other exotic avian species. This attitude may stem from the fact that these 3 species have become so well established that we have ceased to view them as exotic. Recent reviews of the status of exotic birds in North America (Bull 1973, Hardy 1973, Owre 1973) indicate that present threats of establishment of new exotic species are greatest in southern areas and from members of the parrot family. The mild, and even sub-tropical climates in southern California and Florida and the highly man-altered habitats in these areas provide an ideal setting for feral birds to become established as breeding populations.

The most widespread psittacine in Florida is the Budgerigar (*Melopsittacus undulatus*) which is native to the xeric interior of Australia. Our interest in the distribution and breeding biology of this species was prompted by the discovery that feral populations of this bird wintered as far north as Gainesville in northern Florida and that they nested in natural cavities in dead pines. Budgerigars apparently were not confined to southern Florida; they were reproducing in the wild; and they represented at least a potential threat to native cavity-nesting species. This study describes the breeding range of feral Budgerigars in Florida, habitats they occupy, and their potential for range expansion and competition with native birds.

METHODS

Range and origin.—In November 1977, we sent questionnaires inquiring about the local status of Budgerigars to 130 members of The Wildlife Society, Florida Audubon Society, and to Florida Game and Fresh Water Fish Commission offices throughout the state. In addition, a request for information on Budgerigar sightings was printed in the Florida Ornithological Society newsletter. Our intent was to poll knowledgeable individuals throughout the state and not to sample a statistically valid group of Floridians. Responses to these questionnaires and the newsletter were used to assess current range, breeding locations, and relative abundance of Budgerigars in Florida. Some reports were field-checked by the authors.

Habitat and population censusing.—The New Port Richey-Holiday area on the Gulf coast just north of Tampa was chosen for intensive field work on habitat use. These communities have large breeding populations of Budgerigars and were convenient to reach from Gainesville. Both residential and rural habitats were surveyed, but it soon became

apparent that Budgerigars occurred only in residential areas and that they made heavy use of bird feeders and nest boxes. Thereafter, we concentrated our surveys on different types of residential habitat.

Seven housing developments were selected for census work. These represented the following 4 habitat types: Habitat A, sparse vegetation, many bird feeders and nest boxes; Habitat B, sparse vegetation, few feeders and nest boxes; Habitat C, dense vegetation, many feeders and nest boxes; and Habitat D, dense vegetation, few feeders and nest boxes. In order to compare densities of Budgerigars seasonally and in different habitat types, transects (covered by car) were established in each development. Each transect was 20 m wide (one house lot deep on each side of the street) and included roughly 25% of each development.

Censuses were conducted weekly from May through the first week in December 1978. Each census began 15 min after sunrise and lasted approximately 30 min. Starting and ending points were reversed each week to reduce temporal bias. Densities of Budgerigars within habitats were compared using the non-parametric Kruskal-Wallis test; pairwise comparisons of time periods were made using the Dunn method (Hollander and Wolfe 1973).

RESULTS AND DISCUSSION

Range and origin of feral Budgerigars in Florida.—We received 57 responses to the questionnaires and the newsletter request, representing 46% of Florida's 67 counties and almost all of the counties in peninsular Florida. The responses indicated that Budgerigars were breeding in colonies of 100+ individuals on the Gulf coast roughly from Hudson to Ft. Myers. Transient flocks were reported as far north as Spring Hill, and south to Sanibel Island and Naples. On the Atlantic coast, breeding populations occurred near Ft. Pierce, Port St. Lucie, and Ft. Lauderdale, and transient flocks were common from Miami and West Palm Beach to north of Ft. Pierce (Fig. 1). Flocks of 30+ birds had been seen sporadically in Gainesville (L. Williams pers. comm.). Sightings of 1–3 birds were reported for the Panhandle, areas north of Gainesville, and the Jacksonville vicinity. Budgerigars were apparently absent from the interior of the state, except for reports of small colonies in Winter Park (breeding status unknown), and they apparently did not occur in the Keys. Densest concentrations of breeding Budgerigars appeared to be in New Port Richey, Clearwater, St. Petersburg, Largo, Seminole, Sarasota, Bradenton, Venice, Englewood, and Port St. Lucie.

Because Budgerigars are easily domesticated, possess many color variations, and can be taught to talk, they have become the most popular caged bird world-wide. Budgerigars breed prolifically in captivity, and the pet trade in the United States has been supplied largely by birds reared domestically. Florida is a favored area for commercial parakeet breeding in outdoor enclosures because of its mild climate. In addition, birds are bred as a hobby by many Floridians. Intentional or accidental releases of between 1 and 3000 Budgerigars from these sources were

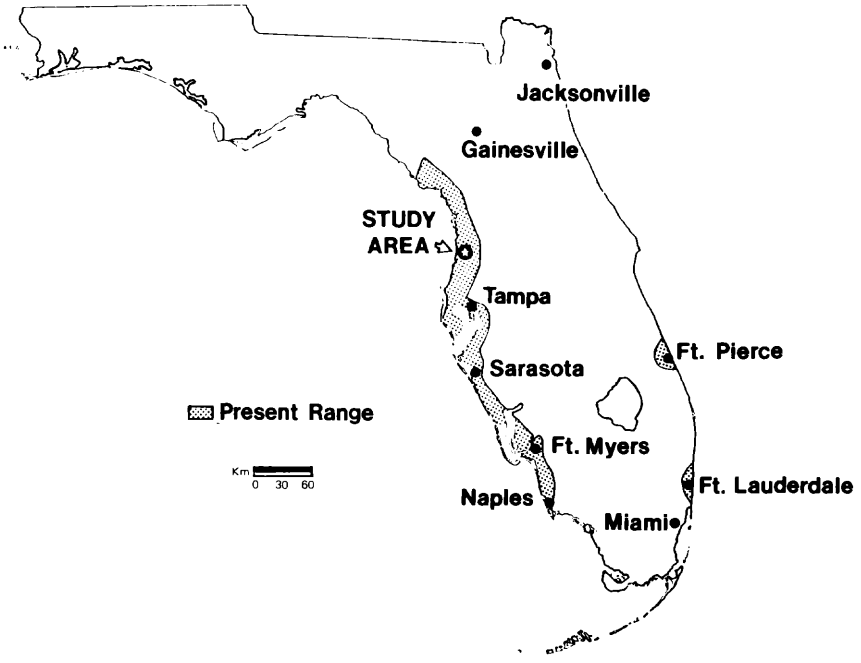

FIGURE 1. Breeding range of Budgerigars in Florida, 1978.

mentioned in the responses received. Another reservoir of released birds has been the multitude of outdoor tourist attractions in the state, such as the Edison Estate in Fort Myers, where flocks were permitted to come and go at will from large aviaries about 25 years ago.

Population densities and habitat selection.—Densities of Budgerigars (birds/ha) on our study area were calculated at 2-month intervals for all 7 transects in the 4 habitat types (Table 1). In those residential areas with many bird feeders and nest boxes (Habitats A and C), numbers of Budgerigars increased steadily from May to October probably because of continual recruitment of fledglings into the population. Greatest densities occurred in November–December in residential areas with sparse vegetation and many feeders and nest boxes (Habitat A). This peak coincided with cessation of breeding for most Budgerigars and, thus, the addition of females into the sampled population (Shapiro 1979). During the breeding season, nesting females spent 40–50 min/h inside nest boxes and were seldom counted.

This peak also occurred at the same time that Budgerigars became much more gregarious, and flocks of several thousand, often mixed with Starlings, American Robins (*Turdus migratorius*), and Mourning Doves (*Zenaida macroura*), began massing on utility wires along a major 4-lane

TABLE 1. Densities of Budgerigars (birds/ha) at 2-month intervals ($\bar{x} \pm SD$) on 7 transects in 4 habitat types, 1978. Habitat types were as follows: A—sparse vegetation, many feeders and nest boxes; B—sparse vegetation, few feeders and nest boxes; C—dense vegetation, many feeders and nest boxes; D—dense vegetation, few feeders and nest boxes. Common superscripts within rows indicate no significant difference ($P > .05$) among densities.

Habitat type	Transects No.	Transects Total area (ha)	May–June	July–Aug.	Sept.–Oct.	Nov.–Dec.	*P*
A	3	52	0.94 ± 0.48^{a}	1.49 ± 0.21^{ab}	2.67 ± 0.70^{bc}	5.51 ± 2.26^{c}	<.01
B	2	14	0.03 ± 0.09	0.06 ± 0.09	0.05 ± 0.11	0.04 ± 0.08	>.05
C	1	9	1.24 ± 0.60^{ab}	1.21 ± 0.44^{ab}	2.43 ± 1.40^{a}	0.53 ± 0.50^{b}	<.01
D	1	38	0.06 ± 0.14	0	0	—	>.05

highway just north of a Habitat A transect. Large post-breeding flocks during winter months were also reported by questionnaire respondents. These large groups may have been composed of local birds and/or transient birds from other areas. Whether some or all of these birds remained in New Port Richey or emigrated out of the area after December is unknown. In Habitat C, fewer birds were counted on the average in November–December than during any other time. We presume that these birds left this development and joined the flocks on the wires along U.S. Route 19.

Most parakeets were in neighborhoods containing the highest densities of nest boxes and bird feeders. The absence of resident Budgerigars in developments that had few feeders and nest boxes (Habitats B and D) (Table 1) implied that nest boxes and bird feeders were prerequisites for the establishment of breeding populations within suburban areas. Our data further suggested that although Budgerigars may prefer open habitats, they were not deterred from nesting in more densely vegetated areas.

Nesting was frequently observed in street lamps throughout the breeding season in Habitats A and C, which indicated that birds chose to remain in areas with established breeding populations, even when available nest boxes were occupied. Presumably, an ample food supply existed to support these additional breeding pairs. In their native Australia, Budgerigars are also cavity nesters. They breed colonially where not limited by suitable nest sites (Ward and Zahavi 1973) and as close as possible to one another even when cavities are vacant over a wide area (Immelman 1968).

Roosts.—Roosting sites were located adjacent to a Habitat A transect and a Habitat C transect. The Habitat A roost was at the edge of the neighborhood within a condominium complex. Rows of condominiums were bisected by brackish-water canals bordered by the largest trees in the development. Other roost trees were located on undeveloped prop-

erties adjacent to the complex. An estimated 6000–8000 Budgerigars roosted within approximately 50 *Eucalyptus,* silk oak (*Grevillea robusta*), and live oak (*Quercus virginiana*) trees along the canals, and frequented some 15 live oaks, longleaf pines (*Pinus palustris*), and slash pines (*P. elliottii*) in the undeveloped area. The same trees were not used every night, but this roost was used consistently from April through December 1978. A visit to the roost in early fall 1980 revealed that it was still occupied.

The Budgerigar has become well established as a permanent resident in many coastal Florida communities. Its present range in the state is largely the result of multiple releases and escapes, but a probable contributing factor to its widespread distribution is the nomadic tendency of this species (Bartholomew and Cade 1963, Forshaw 1969). The large post-breeding aggregations of Budgerigars seen on our study area may have been part of this dispersal mechanism. However, the rate of range expansion in this species may be retarded by a strong tendency to nest at high densities and by abundant nest sites and food near original release sites.

Responses to our questionnaire indicated that Budgerigars can survive the winter in northern Florida, where they may experience 20–35 nights of frost a year. Their presence this far north suggests that Budgerigars may have the physiological potential for range expansion across the Gulf coast to southern Texas and Mexico.

Although we have observed Budgerigars nesting in natural tree cavities and feeding on bahiagrass seeds (*Paspalum* spp.), these appeared to be rare events. The birds on our study area were heavily dependent on local residents for food and nest boxes. The only competition for these resources was with House Sparrows. At this time, Budgerigars do not seem to be competing for nest sites with native cavity-nesters. Nevertheless, in the same way that the nomadic tendencies of this species should be cause for concern about its potential for range expansion, the presence of an aggressive cavity-nesting exotic in such large numbers should be cause for concern about its potential as a competitor for nest sites on native species in this area.

The feral Budgerigar is already too well established as a breeding bird in coastal Florida to make an eradication program practical even if it was deemed desirable. If the Budgerigar remains a suburban bird and heavily dependent on man, its presence will continue to be innocuous. On the other hand, if its populations outstrip resources presently being provided, Budgerigars could revert to a less man-dependent form of behavior and use natural sources of food and nest cavities. Should this happen, the Budgerigar could become established widely across the southern edge of the United States and become a serious competitor with native birds. We strongly recommend that state and federal wildlife agencies closely monitor the status of this species with respect to breeding range and feeding habitat.

SUMMARY

Respondents to a 1977 questionnaire and newsletter request reported a Florida breeding range for feral Budgerigars from Hudson to Ft. Myers and near Ft. Pierce, Port St. Lucie, and Ft. Lauderdale. Intentional and accidental releases from tourist attractions and by amateur and commercial breeders account for the presence of feral Budgerigars in the state.

Habitat and population censusing studies revealed that most parakeets occurred where nest box and bird feeder densities were highest and that, although they may prefer open habitats, Budgerigars did nest in more densely vegetated neighborhoods.

Greatest Budgeriar densities were noted in the November–December censusing interval, probably because post-breeding females and newly-fledged young had joined the censusable population.

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