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POPULATION INCREASE AND RANGE EXPANSION OF BLACK-HOODED PARAKEETS IN FLORIDA

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Abstract.—Native to central South America and imported in vast numbers for the pet trade, Black-hooded Parakeets (*Nandayus nenday*) were first reported outside of captivity in Florida at St. Petersburg during 1969. Between December 2002 and January 2004, they were observed in nine counties on the peninsula, and their population size exceeded 850 individuals. Most parakeets are found along the central Gulf coast, primarily in the St. Petersburg area. Christmas Bird Count data indicate that Black-hooded Parakeets have significantly increased their range and numbers since the 1980-1981 season. Breeding of free-flying individuals presumably accounts for this increase, although formal study is needed. The Black-hooded Parakeet may merit recognition as an established exotic species in Florida.

Black-hooded Parakeets (*Nandayus nenday*) are a monotypic species native from extreme southwestern Brazil and southeastern Bolivia south to central Paraguay and northern Argentina (Forshaw 1977, Kratter et al. 1993, del Hoyo et al. 1997, Juniper and Parr 1998). Beginning in the 1960s, they were captured in vast numbers for the U.S. pet trade—over 200,000 parakeets were imported between 1968 and 1990 (Garrett 1997, Juniper and Parr 1998). Given this degree of importation, accidental escapes and perhaps deliberate releases were inevitable. Black-hooded Parakeets were first noted outside of captivity in Florida at St. Petersburg, Pinellas County during 1969 (Robertson and Woolfenden 1992, D. Goodwin pers. comm.). Since then, they have greatly increased their numbers and range in the state. Here, we use Christmas Bird Count (CBC) and other data to document the status of Black-hooded Parakeets in Florida.

METHODS

We obtained data on parakeet numbers and distribution from Stevenson and Anderson (1994), field observations published in *Florida Field Naturalist*, the online Christmas Bird Count (CBC) database (National Audubon Society 2004), and contacts with numerous individuals (see acknowledgments). To estimate the current statewide population, we compiled all parakeet observations from non-overlapping locations during the 14-month period from 1 December 2002 through 31 January 2004, which allowed us to sample two CBC seasons. We mapped (Fig. 1) other recent observations from Brevard

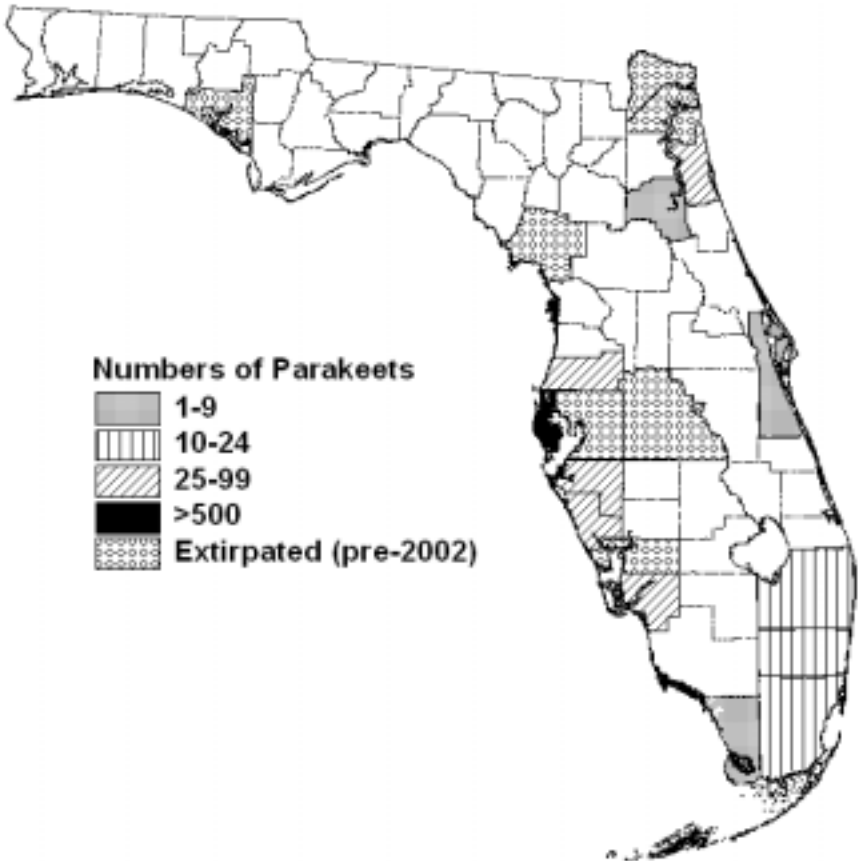


Figure 1. Abundance of Black-hooded Parakeets by Florida counties, from 1 December 2002 through 31 January 2004. Each of the nine counties in which parakeets have been reported during this period is shaded according to the estimated population in each, derived from CBC data and other observations (Table 1). We also mapped recent observations from Brevard, Monroe (Mainline Keys, not the mainland), and Putnam counties; see text for details. Seven other counties (Bay, Charlotte, Duval, Hillsborough, Levy, Nassau, and Polk) in which parakeets formerly occurred are shaded separately.

County (January 2002; C. Thompson, photograph), Monroe County (May 2002; J. Bouton, pers. comm.), and Putnam County (March 2004; Pranty 2004c), but these were not included in Table 1. For each CBC season, we express parakeet abundance as the total number of individuals observed, the number of individuals observed per party-hour, and the percentage of CBC circles that contained parakeets. We used Model I linear regression to quantify the relationship between parakeet numbers and year. Statistical analyses were made with JMP (SAS 1994). For analysis of birds per party-hour, we excluded two North Pinellas CBCs for which the published party-hours are erroneous (i.e., "27.5" hours per party in December 1993, and "31.3" hours per party in December 1997).

RESULTS

Distribution.—Since 1969, Black-hooded Parakeets have been reported from 19 (28%) of Florida's 67 counties (Fig. 1). From December 2002 through January 2004, they were reported from nine counties, all on the peninsula. Many hundreds of parakeets are found along the central Gulf coast, with dozens of individuals along the southern Atlantic coast, moderate numbers around St. Augustine and Fort Myers, small flocks on the Mainline Keys (i.e., those traversed by US-1), and presumed local introductions elsewhere (Fig. 1, Table 1). There are no recent observations from Bay, Charlotte, Duval, Hillsborough, Levy, Nassau, and Polk counties, in which presumed local introductions have been reported (Stevenson and Anderson 1994, National Audubon Society 2004).

Population size.—We account for 882 Black-hooded Parakeets observed in Florida during our 14-month study, with most of these reported on CBCs (Table 1). The St. Petersburg area represents the stronghold of the species, with 500 individuals tallied during December 2003 (Table 1). Fifty or more parakeets recently have been observed also in Manatee, St. Johns, and Sarasota counties (Table 1), and in Broward County (Pranty and Epps 2002). CBC data suggest significant increases in parakeet numbers since the 1980-1981 season, both in total individuals ($r^2 = 0.78$, $p = <0.0001$, $n = 24$; Fig. 2) and individuals per party-hour ($r^2 = 0.80$, $p = <0.0001$, $n = 24$; Fig. 3).

Range expansion.—The first reports of Black-hooded Parakeets on Florida CBCs were from the Lake Wales (Polk County) and Sarasota (Sarasota County) CBC circles during December 1980. By January 2004, they were found in 16% of the state's CBC circles (Fig. 4). CBC data suggest significant range expansion in Florida since the 1980-1981 season ($r^2 = 0.77$, $p = <0.0001$, $n = 24$; Fig. 4). Small numbers of parakeets in new areas, such as the individuals in Brevard and Putnam counties mentioned above, probably derive from local introductions, but the range expansion in the western Tampa Bay region probably is due to increasing populations. For instance, the colonization of southwestern Pasco County, discovered as two parakeets during May 2001 (Pranty 2001c) and numbering at least 32 individuals by No-

Table 1. Highest counts of Black-hooded Parakeets from all non-overlapping locations in Florida, 1 December 2002-31 January 2004. *Listed erroneously as Martin County in Pranty (2004a).

County	Location	Date	Number	Reference
Broward	Davie	23 September 2003	10	file J. Boyd
Broward	Hollywood	3 January 2003	3	C. Nadeau photograph
Broward	Fort Lauderdale CBC circle	21 December 2003	8	National Audubon Society (2004)
Lee	Fort Myers CBC circle	17 December 2002	30	National Audubon Society (2004)
Manatee	Bradenton CBC circle	20 December 2003	60	National Audubon Society (2004)
Miami-Dade	Dade County CBC circle	20 December 2003	1	National Audubon Society (2004)
Miami-Dade	Kendall Area CBC circle	27 December 2003	20	National Audubon Society (2004)
Palm Beach*	Jupiter Inlet Colony	24 November 2003	1	Pranty 2004a
Palm Beach	West Palm Beach CBC circle	3 January 2004	12	National Audubon Society (2004)
Pasco	Holiday	18 November 2003	32	K. Tracey pers. comm.
Pinellas	Fort De Soto Park	February 2004	23	L. Snyder, photograph
Pinellas	Largo	12 April 2003	30	J. Fisher pers. comm.
Pinellas	North Pinellas CBC circle	27 December 2003	37	National Audubon Society (2004)
Pinellas	St. Petersburg CBC circle	20 December 2003	500	National Audubon Society (2004)
St. Johns	St. Augustine CBC circle	14 December 2002	40	National Audubon Society (2004)
St. Johns	Crescent Beach	Fall 2003	10	G. Basili pers. comm.
Sarasota	Sarasota CBC circle	20 December 2003	65	National Audubon Society (2004)
Total			882	

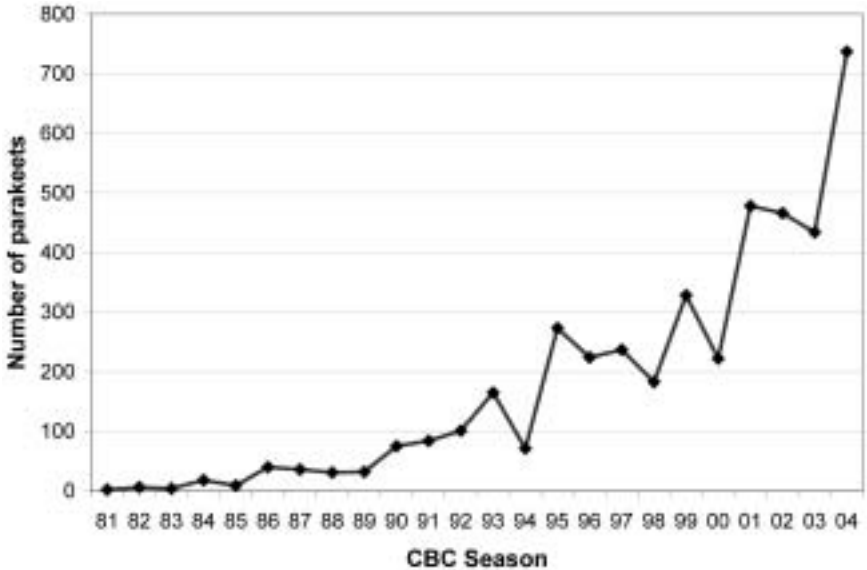


Figure 2. Numbers of Black-hooded Parakeets reported on Christmas Bird Counts in Florida, from the 1980-1981 through 2003-2004 CBC seasons.

vember 2003 (Pranty 2004a, Table 1), presumably was derived from northern Pinellas County. The recently-discovered populations of Black-hooded Parakeets in eastern Broward County (Pranty and Epps 2002) may derive from local introductions and/or expansion from northern Miami-Dade County or southern Palm Beach County. Isolated populations at St. Augustine, Fort Myers, and the Mainline Keys presumably originated from local introductions.

Population persistence.—Black-hooded Parakeets have persisted—and in some cases, have thrived—at most areas into which they became liberated. They have been observed on CBCs in Manatee County nearly annually since December 1983, in Pinellas County annually since December 1985, and in Sarasota County annually since December 1991 (National Audubon Society 2004). CBC data suggest similar persistence at West Palm Beach (Palm Beach County) and St. Augustine (St. Johns County) since the 1990-1991 season (National Audubon Society 2004).

DISCUSSION

Black-hooded Parakeets are common residents of savannas, lowland palm groves, and ranchlands along the Paraguay River in the central South American interior (Forshaw 1977, del Hoyo et al. 1997,

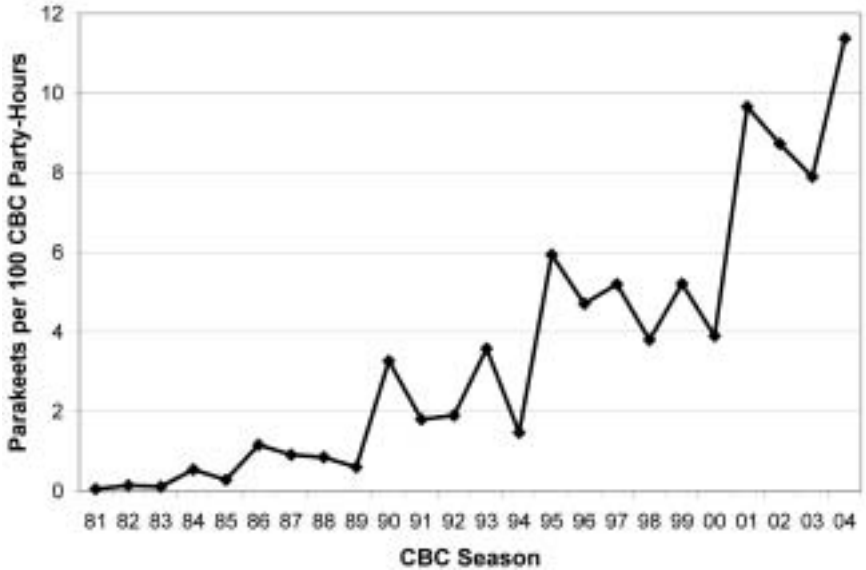


Figure 3. Black-hooded Parakeets reported on Christmas Bird Counts in Florida, from the 1980-1981 through 2003-2004 CBC seasons, graphed by individuals per 100 party-hours (to take advantage of whole numbers of parakeets). Data were not used for two North Pinellas Christmas Bird Counts (December 1993 and December 1997) with incorrect party-hours.

Juniper and Parr 1998). In Florida, they are restricted to urban and suburban areas landscaped with native and exotic vegetation, especially large metropolitan areas along the peninsular coasts (e.g., Fig. 1). A considerable majority of the population (746 of 882 parakeets; 84%) is found along the central Gulf coast, in Pasco, Pinellas, Manatee, and Sarasota counties (Table 1, Fig. 1), where other cavity-nesting psittacids are scarce or absent. Small numbers (<100 pairs) of only two other cavity-nesting psittacids are breeding in the Tampa Bay region: the Budgerigar (*Melopsittacus undulatus*) in Hernando and Pasco counties (Pranty 2001a), and the Blue-crowned Parakeet (*Aratinga acuticaudata*) in Pinellas and Manatee counties (Pranty and Garrett 2003). In contrast, at least 12 other species of cavity-nesting psittacids are breeding presently in small to moderate numbers (>100 pairs) along the southern Atlantic coast in Palm Beach, Broward, and Miami-Dade counties (Pranty and Epps 2002, Pranty and Garrett 2003). Greatly reduced breeding competition with other cavity-nesting psittacids may explain the success of Black-hooded Parakeets along the central Gulf coast, compared to populations in southeastern Florida.

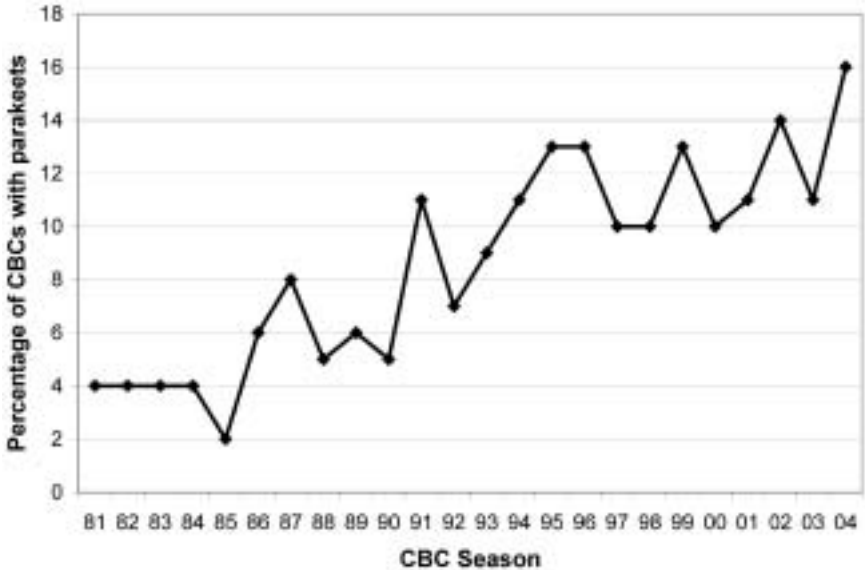


Figure 4. The percentage of Christmas Bird Count circles in Florida that included reports of Black-hooded Parakeets, from the 1980-1981 through 2003-2004 CBC seasons.

Our data indicate that 882 Black-hooded Parakeets were found in Florida between 1 December 2002 and 31 January 2004 (Table 1). This figure may be regarded as a minimum estimate, as we are aware of other recent observations outside our 14-month study period (e.g., Pranty and Epps 2002, Fig. 1). These and other observations known to us suggest that the population of Black-hooded Parakeets in Florida may exceed 1000 individuals presently. During the most recent CBC season (2003-2004), the total number of parakeets observed, the number of parakeets observed per party-hour, and the percentage of CBC circles containing parakeets all reached new levels (Figs. 2-4), inferring that the population increase is continuing.

Although Black-hooded Parakeets occur in aviculture and the pet trade, we consider it extremely unlikely that releases of captive individuals are responsible for the steady and perhaps exponential population increase of the past 20+ years (Figs. 2-4). Indeed, most of this increase has occurred following passage of the Wild Bird Conservation Act of 1992 (United States Fish and Wildlife Service 1992). Implementation of the Act effectively ended the importation of wild-caught psittacids into the United States—and removed the most likely source of frequent releases of parakeets. Furthermore, if escapees were the primary source of Florida's population, then we would expect that para-

keets would be scattered throughout the state's human population centers, rather than being confined largely to four counties along the central Gulf coast. Finally, the increase of Black-hooded Parakeets in the Tampa Bay metropolitan area overlapped the time period when populations of Budgerigars in the same region plummeted from perhaps 20,000 individuals during the late 1970s to 150-200 birds by 2000 (Pranty 2001a). Considering their popularity as pets, we would expect that far greater numbers of Budgerigars would be found at liberty in the region compared to Black-hooded Parakeets, if escapees were responsible for the populations of both species. We believe that the population increase and range expansion of Black-hooded Parakeets in Florida is due largely to their own reproductive efforts rather than from continuing releases of captive individuals. Although a formal study will be required to prove our hypothesis, we know of several recent confirmed or probable nesting observations in Broward, Manatee, Miami-Dade, Palm Beach, Pasco, Pinellas, and St. Johns counties (Pranty and Epps 2002, Pranty unpublished data).

Opinion on the status of the Black-hooded Parakeet in Florida differs among authors. Robertson and Woolfenden (1992) listed the species in their Appendix B of "probably unestablished exotics" but admitted that by 1991 it was "perhaps already established." By 1994, Stevenson and Anderson (1994) considered these parakeets to be "apparently established in Pinellas County," while van Doorn (1997) considered them established in undefined portions of the state by 1997. The American Ornithologists' Union (1998) placed the Black-hooded Parakeet on its appendix of species "with insufficient evidence for placement on the main list," but cited Robertson and Woolfenden (1992) as claiming that the species "may be established" in peninsular Florida. Because the Florida Ornithological Society Records Committee (FOSRC) uses Robertson and Woolfenden (1992) as its base list, the Black-hooded Parakeet presently is considered not established in Florida (Bowman 2000). In the event that the Black-hooded Parakeet is added to the official Florida bird list by the FOSRC, we recommend that populations be considered as being established from western Pasco County south through Pinellas and western Manatee counties to western Sarasota County. At the present time, other populations in Florida may not meet acceptable size or persistence criteria to be considered established.

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