

NATURAL HISTORY OF BLUE-AND-YELLOW MACAWS (*Ara ararauna*) IN MIAMI-DADE COUNTY, FLORIDA

BILL PRANTY¹, DARIA FEINSTEIN², AND KAREN LEE³

¹8515 Village Mill Row, Bayonet Point, Florida 34667-2662

E-mail: billpranty@hotmail.com

²3661 South Miami Avenue, Suite 1005, Miami, Florida 33133

³Coral Gables, Florida 33146

Abstract.—A small breeding population of Blue-and-yellow Macaws (*Ara ararauna*) has been present in east-central Miami-Dade County, Florida since the mid-1980s. This naturalized population originated from escapees from sources such as animal exhibits, quarantine facilities, and private collections. Despite its 25-year persistence, little has been published on this population. Our results indicate that by early 2010, at least 24 macaws occupied 74.1 km² of urbanized habitats. All 15 Blue-and-yellow Macaw nests found since 1986 have been built in snags of exotic palms, primarily Cuban royal palms (*Roystonea regia elata*). We also discuss macaw food items and interactions with conspecifics and other species.

The Blue-and-yellow Macaw (*Ara ararauna*; Fig. 1) is a large, monotypic parrot native from eastern Panama south to Paraguay, southern Brazil, and northern Argentina (Dickinson 2003). Neither Long (1981) nor Lever (1987) listed any Blue-and-yellow Macaws found outside their natural range, but a small population has been present in southeastern Florida since the mid-1980s (Toops and Dilley 1986, Kale et al. 1992, Robertson and Woolfenden 1992, Stevenson and Anderson 1994, Pranty in prep.). Nearly all previously published information on Blue-and-yellow Macaws in Florida is limited to dates and locations of one to a few individuals each. In this paper, we provide information on macaw numbers and range, persistence, breeding substrates and seasonality, food items, and interactions with conspecifics and other species. Gathering natural history information is the necessary first step in understanding how these and other exotic birds interact with their environment and other species.

METHODS

We supplemented our observations of Blue-and-yellow Macaws since 2002 with those of others that have been posted to the Miami Bird Board (TAS 2009) since 2003. All observations were opportunistic. Our study area is located in east-central Miami-Dade County, primarily the cities, towns, or hamlets of Coconut Grove, Coral Gables, Gables



Figure 1. A flock of seven Blue-and-yellow Macaws (of at least nine present) on a feeder stocked with unshelled peanuts at Coral Gables, Miami-Dade County, Florida, 13 February 2009. Photograph by Bill Pranty.

Estates, Green Mar Acres, southern Miami, Palmetto Bay, Pinecrest, and South Miami. The study area includes several small parks, Fairchild Tropical Botanic Garden, the University of Miami campus, and intervening residential areas. Although heavily urbanized, much of the area is densely vegetated with native and exotic trees, palms, and shrubs.

RESULTS AND DISCUSSION

Distribution, population size and persistence, and population source.—Since the 1980s, Blue-and-yellow Macaws have been observed in six counties in Florida and have bred in four of these (Robertson and Woolfenden 1992, Stevenson and Anderson 1994, Pranty in prep.). Outside of Miami-Dade County, three or more macaws were found at Fort Lauderdale, Broward County during the 1980s (Pranty and Epps 2002, B. Neville in litt.) and a few are again present (A. Rosner in litt.); one was observed once in Orange County in 1992 (Stevenson and Anderson 1994); as many as two were in Highlands County in 1995 (Pranty 1995); and solitary pairs bred in Palm Beach County during 1997 (Pranty 1998) and in Monroe County during an unstated year (Robertson and Woolfenden 1992).

The only known breeding population of Blue-and-yellow Macaws in Florida is in east-central Miami-Dade County, where a small number has persisted since 1986 or earlier (cf. Kale 1985). This population originated from escapees from sources such as animal exhibits, quarantine facilities, and private collections. “Probably thousands” of Blue-and-yellow Macaws passed through a single facility at Miami during the 1980s (S. Clubb in litt.). Despite rumors to the contrary, the former Parrot Jungle exhibit at Pincrest was not the source of this naturalized population (S. Clubb in litt.).

The first known observations of non-captive Blue-and-yellow Macaws in our study area were of pairs that bred at South Miami in 1986 (Toops and Dilley 1986) and Coconut Grove for two or more years during the latter 1980s (Neville 1988, Kale et al. 1992, Stevenson and Anderson 1994). We mapped 23 locations where Blue-and-yellow Macaws were observed between January 2003 and July 2009. Twenty-one of these locations are clustered within our study area and create a current range of approximately 74.1 km² (minimum convex polygon), an area 0-8 km wide and 14-17 km long (Fig. 2). The macaws’ range is bounded by A. D. “Doug” Barnes Park to the northwest, David T. Kennedy Park to the northeast, and Bill Sadowski Park to the south. Of the remaining two locations we mapped, one macaw at Homestead in October 2004 was likely a recent escapee, while two macaws 8.5 km from our mapped range at northeast Miami in August 2004 (B. Boeringer in litt.) probably represented a separate pair, but perhaps were birds from our study area that had wandered somewhat.

Even though the Blue-and-yellow Macaw population has persisted for as many as 25 years, its size remains small. We cannot census the population because none of the macaws is known to be banded, and we cannot track the macaws as they travel between foraging and roosting/breeding areas. The largest numbers of macaws seen together since 2002 have been seven at the University of Miami campus and 3 km away at South Miami during 2005 (R. Kelley in litt.), 11 at Palmetto Bay in January 2009 (J. Guthrie in litt.), as many as 17 at KL’s residence in Coral Gables from 2007-2009, and 21 at KL’s residence and 3 simultaneously at DF’s residence on 7 Jan 2010. We believe that these sightings all refer to the same flock of macaws, and that this flock represents the bulk if not the entirety of the population.

Excluding single escapees, the only other non-captive Blue-and-yellow Macaws known in North America were found in San Diego County, California. As many as three macaws were found around Ocean Beach and Point Loma from 1992 to 2004, including one macaw that successfully bred with a Green-winged Macaw (*A. chloroptera*) and produced one young in 1992 (Unitt 2004).

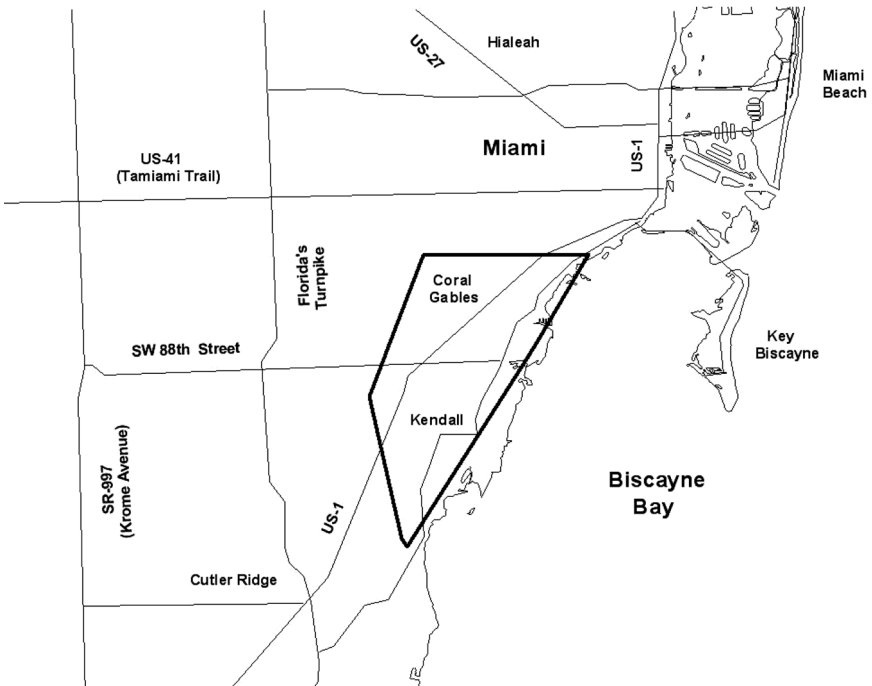


Figure 2. Range of the Blue-and-yellow Macaw population in east-central Miami-Dade County, Florida. The range (minimum convex polygon) of 74.1 km² of urbanized habitats was drawn around 21 mapped locations of from one to 17 macaws observed between January 2003 and July 2009.

Breeding biology.—We have gathered data (Table 1) on 15 Blue-and-yellow Macaw nests built within our study area (apparently no nest has been observed elsewhere in Florida). Except for two nests found during the 1980s (Toops and Dille 1986, Neville 1988, Kale et al. 1992, Stevenson and Anderson 1994), all were active during 2004–2009 (Table 1). All 15 nests were built in palm snags, of either Cuban royal palms (*Roystonea regia elata*; $n = 10$), fan palms (*Borassus* spp.; $n = 2$), or unidentified palms ($n = 3$). Several palms were used as nesting substrates for multiple years, until, in some cases, the palms were toppled by strong winds (e.g., Hurricanes *Katrina* and *Wilma* during 2005) or were cut down for reasons of safety or aesthetics ($n = 3$). Macaws excavated at least two nest cavities, while others appropriated abandoned woodpecker cavities or used natural cavities. The breeding season appears protracted (Table 1), but only one brood seems to be produced. Two cavities were excavated during December, one nest was active in January, two nestlings fledged from one nest ca. February, one nest was active during April, three others were active during May,

Table 1. Blue-and-yellow Macaw nests found outside captivity in east-central Miami-Dade County, 1986-2009 ($n = 15$). The name of Fairchild Tropical Botanic Garden is shortened.

| Location | Date | Evidence | Substrate | Reference |
|---------------------|----------------|--------------------|------------------------------|------------------------------|
| Coconut Grove | Late 1980s | Active nest | Royal palm snag | Kale et al. 1992 |
| Coral Gables | Aug 2004 | Active nest | palm snag | K. Mabb in litt. |
| Coral Gables | 2006 | Active nest | Royal palm snag ¹ | Feinstein pers. obs. |
| Coral Gables | 2006 | Active nest | Royal palm snag ¹ | Feinstein pers. obs. |
| Coral Gables | Jan 2007 | Active nest | Royal palm snag | J. Weber in litt. |
| Fairchild TB Garden | Aug 2004 | Nest; 1 fledgling | palm snag | <i>vide</i> K. Mabb in litt. |
| Fairchild TB Garden | 13 May 2005 | Active nest | Royal palm snag | K. Koslowski in litt. |
| Gables Estates | 2006 | Active nest | Royal palm snag ¹ | Feinstein pers. obs. |
| Gables Estates | 30 Dec 2006 | Excavating | Royal palm snag | Feinstein pers. obs. |
| Gables Estates | 18 May 2008 | Active nest | Royal palm snag | Feinstein pers. obs. |
| Palmetto Bay | ca. 1 Aug 2006 | Nest; 1 fledgling | Fan palm snag ² | S. Guthrie in litt. |
| Palmetto Bay | Dec 2006 | Excavating | Fan palm snag ² | S. Guthrie in litt. |
| Palmetto Bay | 7 Apr 2009 | Active nest | Royal palm snag | R. Torres in litt. |
| South Miami | Early 2005 | Nest; 2 fledglings | palm snag | A. M. Clyatt in litt. |
| South Miami | 1986 | Active nest | Royal palm snag | Toops and Dilley 1986 |

¹Snag cut down.

²Same palm, different pairs of macaws.

one nestling fledged ca. 1 August, and another nest was active in August (Table 1). Brood size, based on the number of fledglings observed, is 1.5 ($n = 4$): three of the nests in Table 1 plus one family of four macaws photographed at Coral Gables during 2000 (*vide* A. McKie, Pranty in prep.). In their native range, Blue-and-yellow Macaws nest in palm snags, breed during winter and spring months, and are single-brooded (Forshaw 1977, Juniper and Parr 1998). Brood size is one or two nestlings, and one captive brood fledged after 13 weeks (Forshaw 1977).

Food items.—Blue-and-yellow Macaws in Miami-Dade County have been observed to feed on seed pods of royal poinciana (*Delonix regia*) and yellow poinciana (*Peltophorum pterocarpum*); fruits of mango (*Mangifera indica*), Chinese fan palm (*Livistona chinensis*), and Cuban royal palm; nuts of tropical almond (*Terminalia catappa*); “milk” from immature coconuts (*Cocos nucifera*); cones of South Florida slash pine (*Pinus elliottii* var. *densa*); and human-supplied foods such as sunflower seeds, unshelled peanuts and walnuts, banana (*Musa* spp.), star fruit (*Averrhoa carambola*), other fruits and vegetables, and cookies. We have observed macaws also perched in, but not necessarily foraging in, black olive (*Bucida buceras*) and banyan (*Ficus benghalensis*) trees. One macaw at Fort Lauderdale, Broward County fed on fruits of sea-grape (*Coccoloba uvifera*) in 1985 (B. Neville in litt.). Blue-and-yellow Macaws in their native range feed on a variety of seeds, fruits, nuts, leaf buds, and other vegetable matter (Forshaw 1977, Juniper and Parr 1998).

Interactions with conspecifics and other species.—Blue-and-yellow Macaws in Florida rarely associate with other parrots. The only three exceptions we know of involved individuals of other macaws: one Scarlet Macaw (*A. macao*) with three Blue-and-yellow Macaws at Fairchild Tropical Botanic Garden in March 2005 (J. Lopez in litt., 2005); perhaps the same Military Macaw (*A. militaris*) that accompanied a Blue-and-yellow Macaw at Coral Gables during the first half of the 2000s (DF pers. obs.) and then observed with six Blue-and-yellow Macaws at Matheson Hammock Park in April 2004 (photograph by J. Boyd); and one escaped Hyacinth Macaw (*Anodorhynchus hyacinthinus*) that joined the flock of Blue-and-yellow Macaws at Fort Lauderdale in recent years (A. Rosner in litt.). Two of the naturalized macaws that visit DF’s captive Blue-and-yellow Macaws, Green-winged Macaws, and captive-bred hybrid macaws have become so tame as to accept unshelled walnuts from the hand.

When foraging or resting, Blue-and-yellow Macaws at Coral Gables post a sentinel to watch for predators (KL pers. obs.), a behavior known in some parrots in their native range (Juniper and Parr 1998) and also observed in Sun Parakeets (*Aratinga solstitialis*) in Pasco County, Florida during 2009 (Pranty and Lovell in review). In our

study area, macaws are wary of raccoons (*Procyon lotor*), domestic dogs (*Canis lupus familiaris*), and domestic cats (*Felis catus*), and most macaws abandon a feeder when gray squirrels (*Sciurus carolinensis*) arrive to feed on peanuts and walnuts. We have observed three interactions with raptors: macaws chased by a *Buteo* that may have been a Red-tailed Hawk (*B. jamaicensis*); one macaw that chased a Merlin (*Falco columbarius*; R. Kelley in litt.); and macaws repeatedly flushed from a feeder by a female Cooper's Hawk (*Accipiter cooperii*) that attacked Rock Pigeons (*Columba livia*) foraging under the feeder. We have heard stories of at least two Blue-and-yellow Macaws in east-central Miami-Dade County that were captured or recaptured by humans.

One of the tame macaws that visits DF's residence, now three years old, displays atypical plumage that suggests a hybrid origin: an orange (rather than green) forehead; rather indistinct black and yellow (rather than bold black) feathered lines across the white facial skin; and a grayish-white (rather than blackish) culmen. This macaw still accompanies a typically-plumaged Blue-and-yellow Macaw, believed to be one of its parents. Based on an examination of our photographs, Susan Clubb (in litt.) believes that this individual may be the offspring of a Blue-and-yellow Macaw and a "Catalina macaw," a hybrid between a Blue-and-yellow Macaw and a Scarlet Macaw. We cannot say whether this potential hybrid pairing occurred in or out of captivity, but a free-flying Scarlet Macaw was observed nearby with other macaws in 2005 (see above). It suffices to say that we have scarcely begun to understand the complexities of parrot identification in Florida caused by inadequate descriptions of juvenile and immature plumages, uncertainty in subspecies of some parrots, potential natural or human-bred hybrid pairings, and potential natural or human-bred color morphs.

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