

SHORT COMMUNICATIONS

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CUBAN RAPTOR-MIGRATION COUNTS IN 2001

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Scientists and conservationists often use migration counts of raptors at traditional bottlenecks and concentration points to document the status of raptor populations and to study their migratory behavior (e.g., Haugh 1986, Bednarz et al. 1990, Bildstein and Zalles 1995, Bildstein 1998). Most migration watch-sites, however, are in the northern Temperate Zone, and relatively few counts have been made in the tropics (Zalles and Bildstein 2000). For example, although islands in the Caribbean basin long have been recognized as important stopover sites and wintering grounds for many North American raptors including Ospreys (*Pandion haliaetus*), Swallow-tailed Kites (*Elanoides forficatus*), Merlins (*Falco columbarius*), and Peregrine Falcons (*Falco peregrinus*), and although many species of migrants remain threatened in the Caribbean Islands, no one has conducted season-long migration counts in the region. Consequently, our understanding of the geography and ecology of raptor migration in the area remains rudimentary, compromising our ability to protect raptors there (Poole and Agler 1987, Hoffman and Darrow 1992, Crouse and Keith 1999, Zalles and Bildstein 2000, Rodríguez et al. 2001). With this in mind, we investigated the possibility of establishing one or more raptor migration watch-sites in Cuba, the largest island in the region. Here we report the results of our first season of effort (2001) at two sites, Carahatas and La Gran Piedra, in central and southeastern Cuba, respectively.

STUDY AREA AND METHODS

We located our counting station at La Gran Piedra based on satellite telemetry tracking data collected by M.

Martell as part of a continental study of Osprey migration and on the observations of F. Rodríguez Santana, which together suggested the likelihood of important movements of Ospreys through eastern Cuba (Martell et al. 2001, Rodríguez et al. 2001). The La Gran Piedra watch-site (20°00'41"N, 75°37'38"W) is situated atop 1234-m La Gran Piedra, in the Sierra Maestra range. La Gran Piedra is 18 km east of Santiago de Cuba city, Santiago de Cuba province, and 9.6 km from the seacoast. Another counting station, Carahatas (22°55'02"N, 80°17'51"W), was used for 4 d. Carahatas is on the Atlantic coast in Matanzas Province, north-central Cuba.

We counted migrants for 18 d at La Gran Piedra between 27 August and 17 October 2001, and for 4 d at Carahatas between 18 and 21 September 2001. Counts at La Gran Piedra, which regularly began at 0800 H, never lasted for more than 7 hr due to afternoon rains. Counts at Carahatas took place from 0700–1400 H, except on 18 September, when the count finished at 1800 H.

We identified all migrating raptors at the count sites using 10× binoculars. Raptors were considered migrants if they appeared on the horizon to the west and flew past the watch-site using powered or soaring flight. Data were collected using the standardized daily report of the HMANA (Hawk Migration Association of North America) translated into Spanish. Wind speed and temperature were recorded using a Kestrel 2000 Pocket Weather Station (Nielsen Kellerman, Chester, PA). We also recorded barometric pressure. A mechanical counter (U.S. Government Tally Counter [Heavy Duty Model]) was used to tally the hourly count for the most numerous migrant, the Osprey, at peak hours.

RESULTS

We counted 1380 raptors belonging to eight species in 95 hr of observation at the two watch-sites (Tables 1 and 2). Counts at La Gran Piedra accounted for 92% of the individuals observed. Ospreys were the most common species observed at both watch-sites, accounting for 89% ($N = 93$) of the migrants at Carahatas and 96% ($N = 1223$) of migrants at La Gran Piedra. Other migrants included Swallow-tailed Kites, Sharp-shinned Hawks (*Accip-*

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Table 1. Mean daily counts, and minimum, maximum, and mean hourly counts of raptors seen at La Gran Piedra watch-site, Santiago de Cuba Province, southeastern Cuba, during 66 hr and 19 min of observation on 18 days (27 August–17 September), in autumn 2001.

SPECIES	MEAN DAILY COUNT	MINIMUM COUNT/hr	MAXIMUM COUNT/hr	MEAN COUNT/hr
Osprey	67.9	0	171	18.4
Swallow-tailed Kite	0.56	0	10	0.15
Sharp-shinned Hawk	0.05	0	1	0.20
Broad-winged Hawk	0.72	0	8	0.02
Merlin	0.39	0	1	0
Peregrine Falcon	0.28	0	2	0.08
Unidentified falcon	0.28	0	2	0.08
Unidentified raptor	0.61	0	2	0.17

iter striatus), Broad-winged Hawks (*Buteo platypterus*), Crested Caracaras (*Caracara cheriway*), American Kestrels (*Falco sparverius*), Merlins, and Peregrine Falcons.

Ospreys passed La Gran Piedra at a rate of 18.4 birds/hr, and Carahatas at a rate of 3.3/hr. Osprey numbers at La Gran Piedra peaked at 1100–1200 H, when more than 40% of all Ospreys were counted, and the flight typically began after 0800 H. No counts occurred during the late afternoon because of precipitation. All raptors observed at this watch-site were flying from west to east, following the region's Sierra Maestra ridges, which parallel the coast of southeastern Cuba. In Carahatas, where the flight began at about 0800 H, most Ospreys passed between 0900 and 1000 H. All raptors seen migrating at this watch-site were flying from northwest to southeast along the coast.

DISCUSSION

Although eight species of migrants were observed, Ospreys made up the overwhelming majority of migrants counted at both watch-sites (Tables 1 and 2). Despite the fact that Ospreys typically are considered to be broad-front migrants (Poole 1989, Poole et al. 2003), our observations suggest a concentrated migration corridor for the species in southeastern Cuba. We are not certain why this is so, although most studies of Osprey migration have

been in northern temperate areas and the species may behave differently in the tropics. The number of Ospreys counted at the La Gran Piedra watch-site in autumn 2001 place it among the "top" five Osprey migration watch-sites in the world (Table 3), confirming earlier suggestions that Cuba is along an important flyway for North American Eastern Seaboard populations of the species (Hoffman and Darrow 1992, Rodríguez et al. 2001).

We observed Ospreys soaring in the thermals and moving east along the Sierra Maestra mountain ridges in flocks with as many as 43 birds, much greater than the flock of 11 at Cape May, New Jersey reported by Dunne et al. (1988). All flocks with Ospreys did not include other species, although one was preceded by a flock of 10 migrating Swallow-tailed Kites (Bildstein et al. 2002). This species has been reported flying with Ospreys at other sites in the Caribbean (Crouse and Keith 1999). Flying in flocks may allow individual Ospreys to locate thermals more efficiently (Kerlinger 1989).

Satellite-telemetry data indicate that southbound Ospreys from North America fly from the Florida Keys to northwestern Cuba, and then along the east-west axis of Cuba before crossing the Windward Passage to Hispaniola (Martell et al. 2001, Rodríguez et al. 2001). The relatively high number of Ospreys seen at La Gran Piedra lead us to conclude that this site is along the main mi-

Table 2. Mean daily counts, and minimum, maximum, and mean hourly counts of raptors seen at the Carahatas watch-site, Matanzas Province, north-central Cuba, during 28 hr and 45 min of observation on four days (18–21 September), in autumn 2001.

SPECIES	MEAN DAILY COUNT	MINIMUM COUNT/hr	MAXIMUM COUNT/hr	MEAN COUNT/hr
Osprey	23.3	0	20	3.23
Sharp-shinned Hawk	0.25	0	1	0.03
Crested Caracara	0.72	0	3	0.10
Merlin	0.25	0	1	0.03
American Kestrel	0.75	0	3	0.24

Table 3. Annual mean, maximum annual count, maximum 1-day count, monitoring period and migration period at the world's four "top" Osprey migration watch-sites (Zalles and Bildstein 2000) compared with that at the La Gran Piedra watch-site, Santiago de Cuba Province, in southeastern Cuba, autumn 2001.

WATCH-SITE	MEAN	MAXIMUM ANNUAL COUNT	MAXIMUM 1-DAY COUNT	MONITORING PERIOD	MIGRATION PERIOD
Lighthouse Point, CT, U.S.A.	1920	4040	—	1980–91	120 days
Cape May Point, NJ, U.S.A.	1540	2940	308	1976–85	150 days
Hilton Head Island, SC, U.S.A.	1150	1560	261	1993–96	63 days
Kiptopeke, VA, U.S.A.	—	5775	1053	1977–96	150 days
La Gran Piedra, Santiago de Cuba, Cuba	—	1223	279	2001	18 days

gration corridor through the region, and may be an important monitoring point for this population. All other species of raptor migrants seen at La Gran Piedra watch-site in autumn 2001 were heading east along the southern slope of the east-west oriented Sierra Maestra range that runs parallel to the coastline of southeastern Cuba.

The Swallow-tailed Kites recorded at La Gran Piedra watch-site represented the first record of this species as a migrant in eastern Cuba (Bildstein et al. 2002). The species has been reported as an uncommon transient, and possibly a rare winter resident in Cuba by Garrido and Kirkconnell (2000). The 13 Broad-winged Hawks counted at La Gran Piedra watch-site also represent the first record of this species as a migrant in eastern Cuba. Crested Caracaras are not reported as migrants in Cuba (Garrido and García 1975, Garrido and Kirkconnell 2000), although Raffaele et al. (1998) reported them as vagrants in Jamaica Bay. We considered the three caracaras observed at the Carahatas coastal watch-site to be vagrants. All three passed the site along the seacoast in directed flight (i.e., west-to-east, straight-line flapping flight), and may have been engaged in short-distance regional movements as reported for this species in the United States (Clark and Wheeler 1987).

Our count results at two sites in Cuba, suggest that exploratory raptor-migration counts on Caribbean Islands can provide important new information regarding the routes and ecology of raptor migration in the region (Bildstein et al. 2002), as well as may provide a basis for developing long-term count efforts. Once established and working in collaboration with North American watch-sites, long-term efforts at such sites can: (1) help monitor populations of species of raptors migrating through the region, (2) study migration ecology and behavior in the tropics and compare it with that in temperate regions, and (3) introduce the regional human populations to the spectacle of raptor migration, thereby improving regional understanding of the connectivity of continental North America's and the Caribbean Island's natural resources and increasing opportunities to achieve conservation (Bildstein and Zalles 1998).

RESUMEN.—Se ofrecen los resultados del primer conteo de aves rapaces migratorias para Cuba y el Caribe insular. Se contaron 1380 rapaces de ocho especies en dos puntos de observación en el centro y sudeste de Cuba. Las Águilas Pescadoras (*Pandion haliaetus*) representaron el 89% y el 96% de las aves contadas en Carahatas y en La Gran Piedra respectivamente. Otras especies observadas durante la migración fueron el Cernícalo (*Falco sparverius*), halconcito (*Falco columbarius*), halcón peregrino (*Falco peregrinus*), caraira (*Caracara plancus cheriway*) y el gavilancito (*Accipiter striatus*), además, se reportan el gavilán bobo (*Buteo platypterus*) y el gavilán cola de tijera (*Elanoides forficatus*) por primera vez migrando en la región oriental de Cuba. Se confirma la importancia de Cuba para la migración de la población norteamericana de águila pescadora (*P. haliaetus*) durante su migración a través del Caribe.

[Traducción de los autores]

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