

THE ORDER FALCONIFORMES IN CUBA: STATUS, DISTRIBUTION, MIGRATION AND CONSERVATION

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INTRODUCTION

Fifteen species of raptors have been reported to Cuba including residents, migrants, transients, vagrants and one endemic species, the Gundlach's Hawk (*Accipiter gundlachii*). As a rule, studies on the biology, ecology, migration as well as conservation and management actions on these species have yet to be carried out. Since the XVI century, the Cuban archipelago has lost its natural forests gradually to nearly 14 % of the total area in 1959 (CIGEA, 2000). Today, Cuba has the 20 % of its territory covered by forests, (CIGEA, op. cit) and one of the main objectives of the Cuban environmental laws is to protect important areas for biodiversity as well as threatened, migratory, commercial and endemic, species. Nevertheless, the absence of raptor population studies, poor implementation of the laws, insufficient environmental education level among Cuban citizens and bad economic situation since the nineties continue to threaten the population of raptors and their habitats. As a result, the endemic Gundlach's Hawk is endangered (Hilton-Taylor, 2000), the resident Hook-billed Kite (*Chondrohierax uncinatus*) is almost extirpated from the archipelago (Garrido and Kirkconnell 2000), and the resident race of the Sharp-shinned Hawk (*Accipiter striatus fringilloides*) is also endangered (Garrido and Kirkconnell 2000). Studies on these species, as well as conservation and management plans based on sound biological data, are required for the preservation of these species and the habitats upon which they depend. I offer an overview of the status, distribution, threats, migration and conservation of Cuba's Falconiformes.

MATERIALS AND METHODS

For the status and distribution of the Falconiformes in Cuba, I reviewed the last published literature available as well as my published and unpublished data. As for migration, I took my own published data on the migration of Ospreys and other raptors as well as unpublished data from two years of operation of La Gran Piedra Raptor Observatory (GPRO), so far the only Cuban raptor observatory where studies on raptor migration are being carried out every year on a regular basis. Threats and conservation of Falconiformes came from published literature as well as interviews with resident farmers in the Sierra Maestra and Nipe-Sagua-Baracoa mountain range in eastern Cuba and my own unpublished observations.

STATUS AND DISTRIBUTION

Cuba is an important stop-over site and wintering ground for some North American Falconiformes (Hoffman and Darrow, 1992). Nine of the 15 species of the Falconiformes reported to the Cuban Archipelago are migratory in some way (Table 1). Other species (5), belong to North American populations established in the archipelago or have become endemic (Gundlach's Hawk) by speciation from the North American Cooper's Hawk (*Accipiter cooperi*) immigrants. The exception is the Hook-billed Kite (*Chondrohierax uncinatus*), claimed to be an endemic (*Chondrohierax wilsonii*) by Garrido and Kirkconnell (2000) which established in the island from Central America immigrants via Peninsula of Yucatan.

Table 1. Status of the Falconiformes reported to Cuba: (b) breeds regularly in Cuba, (wtmp) winter resident and transient migratory populations, (rmp) resident and migratory populations, (t) transient, (wr) winter resident, (e) endemic, (v) vagrant.

Common and scientific name	Status
Osprey (<i>Pandion haliaetus</i>)	B, WTMP
Hook-billed Kite (<i>Chondrohierax uncinatus</i>)	B
Swallow-tailed Kite (<i>Elanoides forficatus</i>)	T
Snail Kite (<i>Rostrhamus sociabilis</i>)	B
Northern Harrier (<i>Circus cyaneus</i>)	WR
Sharp-shinned Hawk (<i>Accipiter striatus</i>)	RMP

Figure 1. Map with the localities cited in the text



Gundlach's Hawk (<i>Accipiter gundlachi</i>)	E
Common Black Hawk (<i>Buteogallus anthracinus</i>)	B
Broad-winged Hawk (<i>Buteo platypterus</i>)	RMP
Red-tailed Hawk (<i>Buteo jamaicensis</i>)	B
Crested Caracara (<i>Caracara cheriway</i>)	B
American Kestrel (<i>Falco sparverius</i>)	RMP
Merlin (<i>Falco columbarius</i>)	WTMP
Peregrine Falcon (<i>Falco peregrinus</i>)	WTMP
Mississippi Kite (<i>Ictinia mississippiensis</i>)	V

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Hook-billed Kite (*Chondrohierax uncinatus*). Is the rarer and most threatened raptor in Cuba. Garrido and Kirkconnell (2000) reported three sightings in the last 30 years, the most recent in Yateras, Guantanamo province, in 1992. The Peregrine Fund has been supporting Cuban biologists since 2002 in an effort to identify the current population of the species with no success so far. Any existing population almost certainly must be located around Yateras, in Sagua-Baracoa mountain range, North eastern Cuba, where the last individuals were seen (Figure 1).

Cuban farmers usually kill any hawk if they consider their poultry to be threatened, regardless whether they prey on chickens or not. As this hawk is considered quite tame, it is fairly an easy prey for local citizens. Loss of primary habitat and indiscriminate collection of mollusks of the genus *Polymita* upon which they prey on, are the major causes for its declination (Raffaele et al. 1998).

Osprey (*Pandion haliaetus*). There are two subspecies of Ospreys in Cuba, *P. h. carolinensis*, winter resident, permanent resident and transient in Cuba, which is the most common and *P. h. ridgwayi*, rarer and reported by Raffaele et al. (1998) for some Cuba's offshore keys and Zapata Swamp. There are no studies on the ecology and abundance of either race in Cuba. Rodriguez et al. (2001) reported hunting as the major threat for the species in Cuba. Winter resident and permanent populations might be increasing lately due to the construction of new dams.

Swallow-tailed Kite (*Elanoides forficatus*). This species has been reported in the two years of Operation of GPRO (southeastern Cuba) which suggests that the species might be wintering in Cuba or other Caribbean island, because this species is unable to cross large bodies of water such as the Caribbean sea (Bildstein et al., 2002).

Snail Kite (*Rosthramus sociabilis*). This is not a common species in the eastern part of Cuba. During the studies of the avifauna of Nipe-Sagua-Baracoa and Sierra Maestra mountain ranges and the wetlands of the eastern part of Cuba (F. Rodriguez unpub. data) there have been not records of this species in the last six years. Snail Kites appear to be restricted to some freshwater ponds where Apple Snails [*Pomacea paludosă*] use to live. Raffaele et al. (1998) reported it as increasing due to the establishment of reservoirs and rice fields. There are not studies on the ecology and abundance of this species in Cuba.

Northern Harrier (*Circus cyaneus*). This species must be more common from Las Tunas to Matanzas province. The extent to which their wintering populations might be threatened by direct persecution or any other causes is unknown. There are no studies on its wintering ecology and abundance.

Sharp-shinned Hawk (*Accipiter striatus*). This is one of the rarer raptors in Cuba. Their resident populations are mainly threatened by fragmentation and loss of habitat (Garrido, 1985; Wiley, 1986) and possibly by direct persecution. There are not studies on the ecology and abundance of the resident race (*A. s. fringilloides*). The migratory race (*A. s. velox*) is more common, especially during autumn migration in the northern Cuban keys. The individuals seen in Santiago de Cuba city and in GPRO probably belong to the migratory race. Misidentification between the resident race and the migratory race can result in overestimation of the resident race's real population size. It is found in forests at middle elevations and occasionally seen in lowland forests (Garrido, 1985).

Gundlach's Hawk (*Accipiter gundlachi*). Although regarded as vulnerable by Garrido and Kirkconnell (2002) it is reported as endangered (C2a) by Hilton-Taylor (2000). The major threats to this species are considered hunting and loss of habitat (Raffaele et al., 1998). This is the raptor that kills most of the poultry to Cuban farmers, thus, the most persecuted and killed by the local Citizens. Interviews with local farmers of the Sierra Maestra and Nipe-Sagua-Baracoa mountain ranges show that hunting Gundlach's Hawk using different traps is a common practice (Rodriguez, unpub. dat), thus, direct persecution together with loss of habitat, are be the principal threats for its conservation which is consistent with Raffaele et al. (1998). It has been found in every province of Cuba (Collar et al, 1992) and Garrido (1985) reported it in forest borders, swamps, wooden coasts and mountains at an elevation below 800 m. This author has seen this species breeding well above that altitude (ca. 1100 m) in La Gran Piedra, southeastern Cuba (F. Rodríguez, unpub. dat).

Black Hawk (*Buteogallus anthracinus*). There are not studies on the ecology and abundance of this hawk that Garrido and Kirconnell (2000) suggested might be considered an endemic species (*B. gundlachii*). It's more common in the central-western part of Cuba. It has never been found in the coast of Santiago de Cuba, Holguín or Guantánamo provinces.

Broad-winged Hawk (*Buteo platypterus*). The resident race (*B. p. cubanensis*) is restricted to some dense and undisturbed semideciduous and pine forests (Garrido and Kirkconnell, 2000). As a migrant, there are not data on its habitat preferences. Wotzkow (1994) reported it as decreasing in many localities, mainly due to the degradation of natural habitats. Wotzkow (unpub data in Wiley, 1985) considered it as widespread in suitable habitat throughout Cuba.

Red-tailed Hawk (*Buteo jamaicensis*). This is a common raptor in Cuba, widely distributed in the main island and also in Key Coco and Sabana-Camaguey archipelago (Garrido and Kirconnell, 2000). There are not studies on this raptor in Cuba. Sometimes this species preys on poultry, thus, it is occasionally hunted by local farmers (F. Rodriguez, unpub. dat) which is the major threat to its populations, although the number being killed appears to be very small to put at risk its populations (F. Rodriguez, unpub. dat.).

Crested Caracara (*Caracara cheriway*). This species is more common in some keys than in the mainland of the Cuban archipelago (Garrido and Kirkconnell, 2000) where it is well distributed. As other species of raptors, there are not studies on its population ecology and abundance.

American Kestrel (*Falco sparverius*). This is the most abundant and widely distributed of Cuban raptors (Wotzkow, 1994). There are not population studies either on the migratory race (*F. s. sparverius*) or the resident race (*F. s. sparverioides*). During the breeding season, taking fledglings to be kept as pets is a common practice in Santiago de Cuba and other cities (F. Rodriguez, unpub. dat). It is primarily seen in open areas, including urban areas, secondary forests and primarily open forests. It is well distributed in the entire Cuban archipelago.

Merlin (*Falco columbarius*). It can be seen in all Cuba, specially during migration. Its habitat includes open areas, coastlines, urban areas and sometimes dense forests (during migration). Threats to this species while in Cuba are unknown.

Peregrine Falcon (*Falco peregrinus*). This species appear to be more common during migration than reported by Garrido and Kirkconnell (2000) to judge by the numbers seen heading south to Cuba from the Florida keys by Hoffman and Darrow (1992). People interested in protecting their race pigeons often kill this falcon. Recent sightings of their display flights and a breeding record in Cuba (Wardman and Aspinall, 1999; Regalado and Cables, 2000) might reflect the expansion of the North American populations after its recovery.

MIGRATION

South America, Central America and the Caribbean rank as the least studied regions in the world regarding raptor migration (Zalles and Bildstein, 2000). The best description of the raptor migration for the Caribbean is that of Hoffman and Darrow (1992) and studies on the migration of satellite telemetered Swallow-tailed Kite (*Elanoides forficatus*) (K. Meyer in Zalles and Bildstein, 2000) and Ospreys and other raptors (Rodriguez et al., 2001 and Rodriguez et al. in press a,b). Hoffman and Darrow (1992) reported migrant Peregrine Falcon (*Falco peregrinus*), Merlin (*Falco columbarius*), Kestrel (*Falco sparverius*), Sharp-shinned Hawk (*Accipiter striatus*), Osprey (*Pandion haliaetus*), departing from peninsular Florida into the Caribbean, particularly Cuba.

In Cuba there are no studies on raptor migration other than the studies on the migration of the Swallow-tailed Kite

(*E. forficatus*) (Bildstein, 2002) and the papers on Osprey migration of Rodriguez et al. (2001), Rodriguez et al (in press, a), and for raptors Rodriguez et al (in press, b) as well as a report on the sightings of Swallow-tailed Kites in Cuba by Milera (1995). Just recently (2001) the GPRO in South-eastern Cuba was open, to track the movements of migrating hawks through the south-eastern part of Cuba.

Studies on the wintering ecology and abundance of the nine species of migratory raptors that regularly occur in Cuba are still to be carried out.

Species Accounts

Osprey (*Pandion haliaetus*). Cuba is an important flyway for North American Ospreys (*P. haliaetus*). Band recoveries, satellite telemetered birds and visual counts (Rodriguez, 2001; Rodriguez et al. in press, b) suggest that almost 90 % of the eastern seaboard population of North American Ospreys pass through Cuba during autumn migration. They mostly reach Cuba in a broad front between Matanzas and Villa Clara provinces, traveling then southeast to eastern Cuba (Rodriguez et al., 2001). Counts made at GPRO and Nipe-Sagua-Baracoa mountain ranges (Rodriguez et al., 2001) showed that these mountain chains, both in the eastern part of Cuba are important corridors that funnel Ospreys movements into the easternmost part of Cuba. This, together with visual counts on the North and South coasts of Cuba (F. Rodriguez, unpub. dat) suggests that Maisi point, the easternmost point of Cuba, appears to be an important congregation point for migrating Ospreys, before crossing the Wind Channel en route to La Hispaniola and South America. Counts at Maisi point might be particularly telling on the numbers of these birds that pass through Cuba during autumn migration.

Osprey wintering ecology is unknown, although the island has been suggested to be an important stopover site and wintering ground for the species (Rodriguez et al. 2001; Poole, 1989).

Swallow-tailed Kite (*Elanoides forficatus*). Although Garrido and Kirkconnell (2000) reported the Swallow-tailed Kite as an uncommon transient in Cuba, satellite telemetered data of this species (Meyer, 1995) suggest that it is a common autumn transient through the western part of Cuba while they flight from peninsular Florida to the Yucatan peninsula. Meyer (K. Meyer, pers. comm.) also suggests that nearly 90 % of the North American population of this species is likely to take this flyway during autumn migration. The fact that Swallow-tailed Kite flying high could be undetected and that there are no researchers studying on a regular basis raptor migration in western Cuba, could explain the lack of regular records for this area. As quoted above, during the counts at GPRO, this species has been observed flying east to easternmost Cuba (Bildstein et al. 2002, F. Rodriguez, unpub dat.). This suggests that every year, at least some part of the population of Swallow-tailed Kite take the eastern flyway to wintering grounds either in eastern Cuba or probably to Jamaica and La Hispaniola, where this bird was reported previously (Raffaele et al. 1998, Crouse and Keith, 1999). It is curious that this bird has been reported migrating together with Ospreys (Rodriguez et al in Press, a, Crouse and Keith, 1999; Bildstein et al. 2002).

Mississippi Kite (*Ictinia mississippiensis*). First record for Cuba and the West Indies made very recently (Burke et al., 2000). This is a rare vagrant in Cuba.

Norther Harrier (*Circus cyaneus*). Never reported at GPRO during the autumn migration, although the species has been seen wintering farther east in Guantanamo province. Two records in mountainous areas, Cuba Peak (1900 m asl) on February of 2000 and Gran Piedra (1200 m asl) on February of 2003 (A. Llanes, pers. comm.) suggest some inland wandering between wintering areas. There are no data on the magnitude of its migration into Cuba, just its arriving (august 15) and departure (April 24) dates (Garrido and Kirckonnell, 2000). It is a common winter resident in open areas such as savannas and marshes (Garrido and Kirckonnell, 2000). The main wintering areas in Cuba comprise from Granma province west to Matanzas where the major part of the

Northern Harrier suitable habitat occurs.

Sharp-shinned Hawk (*Accipiter striatus*). The difficulties associated with censusing accipiters while in their wintering grounds because of their preferences for forests (Fuller and Moser, 1987) and the fact that there are no studies on their wintering ecology, may have influenced Garrido and Kirkconnell (2000) to consider this species rare as winter resident.

Although it has been reported only one migrating individual at GPRO (Rodriguez et al. in Press, b), there are reasons to believe that big numbers of North American Sharp-shinned Hawk arrive every autumn to the North coasts of Cuba. Hoffman and Darrow (1992) reported this species as an abundant migrant in the Florida keys. Caretakers of Empresa Nacional de Flora y Fauna at Carahatas station, in North Central Cuba, describe the arrival to the outer keys of numerous round winged-long tailed little raptors that prey upon exhausted song birds once they arrive from North America. Arriving to Cuba scattered in a broad front and its subsequent dispersal into the Cuban mainland forests, including keys and the difficulties associated with telling apart the migratory race from the resident populations (*A. s. fringilloides*), can keep their migratory abundance unnoted for Cuban ornithologists.

Broad-winged Hawk (*Buteo platypterus*). There is strong evidence that support that this species is not a rare migrant in Cuba as reported by Garrido and Kirkconnell (2000). Hoffman and Darrow (1992) describe the movements of several thousands of Broad-winged Hawks (mostly juveniles) through the Florida keys flying South, presumably to Cuba. During the spring, large flocks ranging between 250 and 500 individuals have been seen soaring in kettles in the Peninsula of Hicacos (North-central Cuba) before departing North to Florida from the Peninsula of Hicacos in Matanzas province (D. Rodriguez and C. Perez, Pers. comm.). During the counts at GPRO, juveniles of this species have been seen migrating east along the Sierra Maestra mountain range to easternmost Cuba (Rodriguez et al. in Press, b, F. Rodriguez, unpub. dat.). This supports that even in eastern Cuba, this species is a common winter resident. The difficulties associated with telling apart the migratory (*B.p.platypterus*) from the nonmigratory race (*B.p.cubanensis*), the lack of studies on their wintering ecology and migratory movements in Cuba, might keep its migratory abundance unknown in Cuba; thus, records made by Cuban ornithologists island-wide during the winter might be from either race.

Crested Caracara (*Caracara cheriway*). Although this species does not migrate from US to Cuba, Rodriguez et al. (in press) have reported internal migration in Cuba. This kind of movements has also been reported for North America (Clark and Wheeler, 2001).

American Kestrel (*Falco sparverius*). Hoffman and Darrow (1992) reported this species as probably an abundant migrant through Florida keys. It seems to be more common in the western than in the eastern part of Cuba (F. Rodriguez, unpubl. data). There are no records of migratory individuals at GPRO, nor studies on its wintering ecology.

Merlin (*Falco columbarius*). This falcon is more common during the autumn migration in Cuba where they occur almost everywhere in the archipelago. Cohn and M. Martell (in Bildstein, 2000) suggested that they apparently island-hope or migrate across a broad front through the greater and lesser Antilles. Often seen in urban habitats during winter.

Peregrine Falcon (*Falco peregrinus*). Hoffman and Darrow (1992) believed that big numbers of this species are expected to be seen in October in some point of Florida keys. Regarding the geographic position of Cuba, halfway between North and South America, its east-to-west long shape, and that this species rarely hesitate to cross large bodies of water (Kerlinger, 1989), it is likely that raptors counts during migration either in the very western or eastern tips of Cuba show some pattern of the Peregrine movements through Cuba and the insular

Caribbean during autumn migration. In the inland GPRO, there have been few records on the migration of this species to allow any conclusion.

CONSERVATION

Cuba has a well developed national protected areas system which comprises 236 different areas which represents that 22% of the territory is protected in some way. Of these protected areas, 75 % belongs to terrestrial ecosystems and the rest to marine ecosystems (CIGEA, op. cit). These protected areas include 14 National Parks, 25 Ecological Reserves and six Biosphere Reserves.

Having in mind the lack of basic information on the distribution, ecology, biology, and migratory patterns of some species of the Cuban fauna of vertebrates, these protected areas have been established following mainly floristic criteria, sometimes protecting natural self-protected undisturbed areas worthy for conservation purposes. Thus, there are good possibilities for improving the coverage of these protected areas by doing basic studies on the distribution and ecology of these species of the fauna that might result even in new proposals for protected areas.

As for the Cuban efforts to protect the environment, the Law #81 of the Environment passed on July 11, 1997, includes in its articles 84, 85, 90 and 116, the conservation of biological resources, as well as endemic, migratory, commercial and endangered species and their genetic heritage. In the other hand, the Law # 200 passed on December 12, 1999, foresees the contraventions regarding collecting, and/or damaging the biodiversity and the legal procedures required to access the biodiversity. Cuba has also signed several international agreements such as CITES and the Agreement of Biological Biodiversity of Rio de Janeiro and the RAMSAR convention.

With this array of protected areas, laws and international agreements, one can think that conservation of biodiversity is completely guaranteed in Cuba. Nevertheless, Cuba, among the Greater Antilles, is the island with more species of birds in the Red List of Threatened Species (Hilton-Taylor, 2000), including the endemic Gundlach's Hawk (*A. gundlachi*). The Cuban law for the protection of the environment is still very vague and does not guarantee the conservation of biodiversity by itself.

In the other hand, the implementation of the existing laws is still poor and when applied, there are still very lenient to discourage the environmental crime.

The major part of the protected areas, although with well established geographical boundaries, lack of the proper signs, guards, budget, financing and management plans which by itself, undermine their conservation mission.

The Cuban difficult economic situation affects the environment where logging by private owners and some state entities without planning and required permits still occur. The hard economic situation has also triggered the hunting of some species either for food or/and for commercial purposes.

Financing for conservation in Cuba is harder to achieve than in its neotropical neighbors. Cuban researchers are not allowed to apply for the US base financing resources for research and conservation, although some US institutions have collaborated with their Cuban counterparts.

Despite its high educational level as compare to the Latin American standard, the Cuban society is still poor educated from the environmental point of view. Trapping songbirds for the pets trade, collecting tree snails for handcraft, killing animals for food, trapping raptors (Ospreys) for using their talons as spurs in cockfightings, illegal logging, charcoal, nomadic agriculture in mountain ranges, cattle ranching,

killing eating and non-eating poultry raptors, among other things, continue to threaten Cuban biodiversity. Together with this, educational programs targeted to overcome the consequences of this insufficient environmental education are still rare.

Having in mind all this, it is not surprising that three species of raptors of the 15 reported to Cuba are threatened directly in some way or another.

All forest Falconiformes are persecuted, blamed to kill poultry and all killed occasionally with no apparent reason other than hunting.

There is a need of population studies on raptors and the dissemination of the environmental laws among Cuban citizens. Specific laws to protect raptors in Cuba, including some compensation to farmers for they hawk-related lost poultry and/or payment some dues for every threatened Falconiformes nesting in their lands, educational campaigns countrywide, upgrading some Cuban ornithologists as raptor biologists and financial support for researchers studying raptors in Cuba should be the starting point for accomplishing raptor conservation in Cuba.

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