Where to watch raptor migration in the Caribbean

Matias A. Juhant

Following our two previous investigations into raptor migration over Middle America and South America, Matias Juhant takes us on a tour across the Caribbean in search of migrant birds of prey. Although this region is more frequently associated with its many endemics (among them several restricted-range raptors, at least two of them on the verge of extinction), as the author reveals, raptors also move through and to the West Indian islands. As in other parts of the Neotropics, our cumulative knowledge of their routes, stopover sites and final destinations are sometimes poorly known, and efforts to better understand them can be substantially advanced by amateur observations.

Cuban Black Hawk *Buteogallus gundlachii*, Cayo Coco, Archipiélago de Sabana-Camagüey, Cuba, March 2008 (William Price / www.pbase.com/tereksandpiper). Cuban Black Hawk is one of four raptors endemic to the Greater Antilles. It is distributed locally across the main island, the Isle of Youth, and on many of the keys off both the north and south coasts.
Raptor migration in the Caribbean was first observed as long ago as the early 16th century by the Spanish historian Gonzalo Fernández de Oviedo y Valdés. He described large-scale movements of raptors in the Greater Antilles (and Middle America): ‘...every yeare there pass from the end of Cuba infinite numbers of divers sorts of birds [raptors], which come from the North of the firme Land, and crosse over the Alacrain Islands [the Alacranes] and Cuba, and flye over the Gulfe Southwards...’. Several centuries later Hoffman & Darrow wrote the first complete overview of raptor migration in the Caribbean and provided an account of 17 species that migrate across the West Indies. Subsequently, Zalles & Bildstein synthesised knowledge of raptor migration in the Neotropics including a short description of raptor migration in the Caribbean, and proposed five potential watchsites for long-term monitoring in the Florida Keys, Cuba and the Archipiélago de Los Roques. Despite these efforts, we still lack long-term or detailed data from raptor watchsites, information on the main wintering areas of the species involved, their bottlenecks, and details of their migration routes across the Caribbean. In this article, I examine the state of our current knowledge of raptor migration in the Caribbean, with an emphasis on Caribbean flyways, water-crossing behaviour and weather conditions, and describe 11 sites to watch raptors on migration throughout the Caribbean Basin, including the Florida Keys, the Greater Antilles and the islands off the northern coast of South America.

Caribbean flyways

The Caribbean migration system is populated by Nearctic–Neotropical migrants and includes species that breed in the North America and overwinter in the Neotropics. Based on satellite-tracking data, banding recoveries, raptor migration counts and sporadic observations, I propose to divide the Caribbean into six raptor migration corridors.
(1) From the Florida Keys through the western Greater Antilles to Middle America.—This corridor involves two over-water crossings totalling 350 km, from Key West to northern Cuba (155 km) and from westernmost Cuba to the Yucatán Peninsula (195 km). Satellite-tracking data reveal that Swallow-tailed Kites *Elanoides forficatus* and Peregrine Falcons *Falco peregrinus* pass through peninsular Florida, cross into Cuba and then move west to the Yucatán into Middle America and onwards towards South America16,17,58 (www.fr.org/SC_PEFA.htm). There are no satellite-tracking data for any Ospreys *Pandion haliaetus* migrating via this corridor, but at Cabo San Antonio (at the westernmost tip of Cuba), 71 Ospreys have been counted presumably en route to Middle America40. Cabo San Antonio represents one of the largest bottlenecks for Swallow-tailed Kites in the Northern Hemisphere, where 2,950 kites were counted between mid July and early October 200740. Tracked kites arrived on the Yucatán Peninsula as early as 19 July and as late as 7 September58. Swallow-tailed Kites have also been observed in eastern Cuba, where as many as 67 have been recorded, while two have even been seen in Haiti5,10. However, the paucity of data for eastern Cuba, Hispaniola, Jamaica and the Cayman Islands suggests that records in these areas involved either vagrants or wintering birds39. Peregrine Falcon migration via this corridor in autumn is linked to tail-winds and updrafts that assist its migration, but during spring the birds must ‘make do’ without such favourable weather conditions and this appears to be the reason why no large movements of Peregrines across the Caribbean occur at this season16,17 (www.fr.org/SC_PEFA.htm). Records of Mississippi Kites *Ictinia mississippiensis* over the Florida Keys and Greater Antilles include a mean 19 kites during ten autumn counts on the Florida Keys48, a single-season count of 272 at Cabo San Antonio, Cuba, between mid July and early October40, a single record of two on 2 October 2002 from the Cayman Islands35, and four records of small groups or single birds during spring between mid March and mid May in Jamaica, elsewhere in Cuba, and on Bermuda8,25,31,55, may indicate that this species uses the corridor in small numbers. Other species, such as Sharp-shinned Hawk *Accipiter striatus*, Broad-winged Hawk *Buteo platypterus*, Swainson’s Hawk *B. swainsoni*, American Kestrel *Falco sparverius* and Merlin *Falco columbarius* might also be using this migration corridor but published data are still rather few and poorly documented1,7,20,40,47.

(2) From the Florida Keys through the eastern Greater Antilles to South America.—This corridor includes total over-water crossings of 905 km; from Key West to northern Cuba (155 km), from eastern Cuba to Hispaniola (150 km), and from Hispaniola to northern South America (600 km). East coast and upper Midwestern Ospreys migrate overland via the length of peninsular Florida, thereafter into north-central Cuba via Matanzas and Villa Clara provinces towards Hispaniola and thereafter cross the Caribbean to northern South America making landfall between Barranquilla (Colombia) and the Lago de Maracaibo (Venezuela)29,30. Data from band recoveries and tracked Ospreys suggest that Cuba and Hispaniola serve as major stopover sites for mainland Ospreys migrating via this corridor29,30,40,45. Peregrine Falcon also uses this corridor in a similar way to Ospreys, but on returning to their breeding areas use the Mesoamerican Land Corridor in spring16.21.

(3) From the Florida Keys through the Greater and Lesser Antilles to South America.—This corridor includes total over-water crossings of 1,160 km. No satellite-tracking data or raptor migration counts are available from this corridor. Tracked Ospreys from North America did not continue island-hopping through Puerto Rico and the smaller islands to the south-east29,30. Smaller falcons, such as American Kestrel and Merlin, may use this corridor en route to Venezuela, but further field research is needed to determine if this is the case.

(4) From the Florida Keys to the West Indies.—This corridor includes total over-water crossings of between 155 and 1,000 km depending on the birds’ wintering grounds in the West Indies. Most raptors that over-winter in the West Indies remain in the Greater Antilles, with the numbers of wintering birds decreasing southward through Lesser Antilles and the islands off the north coast of South America39. Several authors have recorded movements of Turkey Vultures *Cathartes aura* within the keys, peaking between late October and early December11,20,28,34. Doubts existed as to whether this vulture crosses the Straits of Florida to the West Indies, but two vultures marked in Florida have been observed near La Habana (Cuba)36 and Raffaele et al.39 also reported that numbers of Turkey Vultures apparently increase in the Bahamas and Cuba during winter, suggesting that small numbers overwinter in the Greater Antilles. Black Vulture *Coragyps atratus* is considered a vagrant to the West Indies by Raffaele et al.39 and has been recorded from the Bahamas (Bimini), Cuba, Jamaica and Grenada, on the last island probably from a South American population. In the Florida Keys, Black Vultures have been recorded once on migration (two
birds) and have overwintered there. Most records from the Greater Antilles are dated between December and April, which may indicate that small numbers overwinter there; for example, it seems that very small numbers winter around the Zapata Swamp, Cuba (G. M. Kirwan in litt. 2012). Osprey overwinters throughout the West Indies between September and April. Northern Harrier Circus cyaneus overwinters in the Greater Antilles and Bahamas, is a rare migrant to the Lesser Antilles, and occurs in the region between October and April. Most Sharp-shinned Hawks from North America overwinter in the Bahamas between February and April, while small numbers overwinter further south, in the Greater Antilles. Cooper’s Hawks A. cooperii have been observed (but not documented) at Cabo San Antonio between mid August and mid September, while two reported specimens also from Cuba further suggest that some individuals reach the country. Cooper’s Hawk could potentially occur elsewhere throughout the Greater Antilles. Broad-winged (especially) and perhaps Swainson’s Hawks seem to overwinter throughout the West Indies as far south as Trinidad & Tobago, but published data are still rather few and not well documented (Southeastern Caribbean Bird Alert 2001-13/2002-43/2006-3, www.tffnc.org/rarebird.php). Short-tailed Hawks B. brachyurus have been recorded on migration as far south as the Florida Keys and two were seen over Cabo San Antonio in autumn 2007, which indicates that the species might be an occasional winter visitor to Cuba. Red-tailed Hawks B. jamaicensis from North America perhaps reach the West Indies in small numbers given that one ringed in New Jersey was recovered in the Dominican Republic. Merlin overwinters

| Table 1. Raptor species that migrate across the Caribbean. Regular migrants (RM), vagrants (V) and uncertain status (?). Migration pathways: 1from the Florida Keys through the western Greater Antilles to Middle America; 2from the Florida Keys through the eastern Greater Antilles to South America; 3from the Florida Keys through the Greater and Lesser Antilles to South America; 4from the Florida Keys to the West Indies; 5through the Gulf of Mexico to the Yucatán Peninsula; 6transatlantic vagrants, and 7breed in the Caribbean. |

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<th>Greater Antilles</th>
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throughout the West Indies between October and March\textsuperscript{[9,39]}, and Peregrine Falcon between October and April\textsuperscript{[39]}

(5) Through the Gulf of Mexico to the Yucatán Peninsula.—This corridor includes an over-water crossing of 850 km. Upper Midwestern Ospreys migrate south through the Mississippi drainage, cross the Gulf of Mexico directly towards the Yucatán Peninsula and thereafter move through Middle America towards South America\textsuperscript{[29,50]}. On their return north in spring they cross the Gulf of Mexico from the Yucatán and make landfall on the Texas coast\textsuperscript{[50]}. Peregrine Falcons breeding in the boreal forest region and low Arctic cross the Gulf of Mexico on their southbound migration, but rarely cross it on northbound passage\textsuperscript{[16]}

(6) Transatlantic vagrants.—Some migratory raptors have crossed the North Atlantic to the West Indies by natural dispersion, but presumably with assistance from prevailing westerly trade winds or via ship-assisted passage. Black Kite \textit{Milvus migrans}, Western Marsh Harrier \textit{C. aeruginosus} and Eurasian Kestrel \textit{F. tinnunculus} have been recorded as vagrants on several islands in the West Indies\textsuperscript{[23,26,33,36,38]}. In their natural range, all of these species are to some extent long-distance migrants between Europe and Africa\textsuperscript{[14]}

**Water-crossing behaviour and weather conditions**

The Gulf of Mexico and the Caribbean Sea present significant ‘obstacles’ for North American raptors that migrate through this region towards their wintering grounds. Darrow\textsuperscript{[11]} wrote, with an emphasis on soaring raptors, that ‘what happens to the birds once they leave Key West is something of an enigma, many people do not believe they cross the Straits of Florida...’ (p. 38). Today, some data are available to resolve this issue, but we still have much to learn. Crossing these two large bodies of water, rather than following the Gulf coast is a trade-off between risk and total distance. Thermal and slope soaring are difficult to achieve over water, and only direct powered flight is particularly well suited for such travel, especially in tail-winds and cross-winds\textsuperscript{[4]}. Limited information exists concerning how weather conditions affect the migration of raptors when they cross the Gulf of Mexico and Caribbean...
towards their wintering grounds, especially during tropical storms. Between 1871 and 2008, southern Florida was struck by 43 hurricanes at an average of one every three years, with the peak season mid August through most of October, meaning that hurricane peaks clearly coincide with raptor migration. Hurricanes vary greatly in size and in the intensity of their winds, but they can affect bird populations both directly and indirectly. Direct effects involve death from exposure to wind and rain, while indirect effects include destruction of food supplies or nesting, roosting and foraging substrates by high winds. Satellite-tracking data revealed how tropical storms affected the orientation and navigation of an Osprey and two Peregrine Falcons crossing either the Gulf of Mexico or the Caribbean in poor weather conditions. Holroyd & Duxbury tracked two Peregrine Falcons that encountered Hurricane Mitch on their southward migration across the West Indies. The Peregrine tracked by Holroyd & Duxbury attempted to cross the Caribbean twice. During its first attempt, from Haiti to northern Venezuela, the Peregrine had to turn back north to Haiti when just 150 km from Venezuela due to strong winds from the south. On its second attempt, the bird changed its course further west towards Middle America, but apparently perished when it encountered head winds of up to c.160 km/hour. The Peregrine tracked by McGrady et al. flew over Florida following the Keys when it met strong winds. It too then moved further west, perhaps perching on a ship, coming close to the...
Mexican coast and thereafter flew north to the Texas coast. It then continued its migration across the Gulf of Mexico towards Yucatán and further to northern Venezuela for the winter. Stout et al. \(^{50}\) tracked an Osprey during its southbound migration from Louisiana and Texas to the Yucatán in four consecutive years. In the first two years, the Osprey crossed the Gulf of Mexico from Louisiana towards the Yucatán, but in the third year the bird moved 150 km further west perhaps because Hurricane Rita made landfall on the Texas–Louisiana border, and crossed the Gulf further south from the Texas coast. In the final year it followed the coast around the Gulf toward its wintering grounds. Perhaps this Osprey learned that crossing the Gulf of Mexico is risky? Also, Zimmerman\(^{58}\) showed that the mortality rate of young Swallow-tailed Kites was higher for Florida kites, which migrate over water for between 350 km and 770 km, than for Louisiana kites, which migrate over land around the Gulf of Mexico. Study of the over-water migration of raptors and how tropical storms affect their migration through the Gulf of Mexico and the Caribbean remains fertile ground for future research.

**Migration watchsites**

Raptor migration has been observed at 11 watchsites in the Caribbean (Fig. 1). The watchsites can be divided into three areas: Florida Keys, the Bahamas and Greater Antilles, and the Lesser Antilles and the islands off the north coast of South America.

**Florida Keys.**—Two watchsites possess detailed data on raptor migration. Sixteen species have been recorded at these including Turkey Vulture, Osprey, two kites, Northern Harrier, Bald Eagle *Haliaetus leucocephalus*, seven hawks and three falcons. Curry Hammock State Park represents one of the best watchsites in the world to observe large numbers of Peregrine Falcons\(^{28}\). Several authors have reported ‘reverse’ migration moving north along both the west and east coasts of Florida as well as over the Florida Keys, presumably due to birds turning back north to avoid crossing the Straits of Florida\(^{11,20,28,34,46}\).
The Bahamas and Greater Antilles.—No watchsites in the Bahamas. Standard migration data are available for two of the seven watchsites in the Greater Antilles. Fifteen species have been recorded at these seven watchsites including Turkey Vulture, Osprey, two kites, Northern Harrier, six hawks, Crested Caracara *Caracara cheriway* and three falcons. La Gran Piedra in eastern Cuba represents one of the best watchsites in the world to see large numbers of Ospreys. Rodriguez mentioned that a new watchsite had been established in 2006 at Siboney (eastern Cuba) but no data have been published to date.

Lesser Antilles and the islands off the north coast of South America.—Standard migration data are unavailable from anywhere in these areas. Two watchsites are situated on the islands off northern South America. Six species have been recorded at
these two including Osprey, Swallow-tailed Kite, Yellow-headed Caracara \textit{Milvago chimachima}, and three falcons. Flocks of migrating Broad-winged Hawks have been noted, primarily at the north-western and north-eastern ends of Trinidad (Chacachacare Island and Galera Point, respectively) and the south-western and north-eastern ends of Tobago (Crown Point and Little Tobago, respectively). Interestingly, Swainson’s Hawk has been observed at all of these localities except Crown Point. The four points could be considered migration watchsites for raptors and other migrating birds.

(10) Bonaire (12º10’N 68º18’W), former Netherlands Antilles; based on sporadic observations year-round over several years. Six species: Osprey (38 autumn, 19 winter, 16 spring, 14 summer), Swallow-tailed Kite (one, spring), Yellow-headed Caracara (one, winter), American Kestrel (one autumn, two winter, two spring, two summer), Merlin (23 autumn, 19 winter, 13 spring, three summer), and Peregrine Falcon (21 autumn, 15 winter, 11 spring, one summer).35

(11) Archipiélago de Los Roques (11º78’N 66º56’W), Venezuela; based on sporadic observations in 1992–93. Two species have been observed between August and January, namely Osprey and Peregrine Falcon.57

Conservation implications

Europeans first arrived in the West Indies just over 500 years ago triggering extensive environmental changes that have adversely affected the region’s avifauna through massive deforestation, the introduction of predators and competitors, and hunting.53,54 Puerto Rico represents an extreme example of the effects of habitat destruction in the region because the entire island had been cutover by 1912, by which time less than 1% of virgin forest remained.54 Three of the four raptors endemic to the West Indies are Critically Endangered because they have extremely small and fragmented populations that continue to decline. According to BirdLife International the Cuban Kite’s
The Chondrohierax wilsonii population (Critically Endangered) has been estimated at just 50–249 mature individuals (and there are very few recent observations), Ridgway’s Hawk Buteo ridgwayi (Critically Endangered) at 160–240 mature individuals and Gundlach’s Hawk Accipiter gundlachi (Endangered) at 300–400 mature individuals. (Not all authorities recognise the specific distinctness of Cuban Kite, and it might be argued that the species status of Gundlach’s Hawk vis-à-vis Cooper’s Hawk demands revisiting.)

Habitat degradation is an important threat to both resident and migrant species. Good-quality habitat is important for species that overwinter in the West Indies and for those that stopover on islands before crossing the dangerous ecological barriers represented by the Gulf of Mexico and the Caribbean. Further field research is needed to clarify how habitat degradation affects migratory raptors in the Caribbean.

The present paper, together with previous articles by Juhant and Taylor in Neotropical Birding, provides the most current update on where to watch raptor migration throughout Latin America and the Caribbean. Birdwatchers with the inspiration and desire to contribute to our understanding of raptor migration in the Neotropics now hold the key to accelerating the momentum. Raptor biologists will value any contribution, no matter how small, that you can make on this topic.
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