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THE AVIFAUNAL COMPOSITION IN THE RÍO MAYARÍ DELTA, NORTHEASTERN CUBA

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Abstract: We used line transects to survey bird populations in the Río Mayarí Delta, in coastal central Holguín Province, Cuba, in January and August 2004. The species richness and composition of the avifauna were determined in three habitats: open lagoons, lagoons within mangroves, and temporarily flooded plains, with incidental observations made in savanna and agricultural habitats. We recorded 147 species of birds, which represent 39.6% of the Cuban avifauna, including 85 permanent residents, 40 winter residents, 10 summer residents, and 12 transients. Sixty-two of the species are associated with wetlands and represent 75% of the Cuban aquatic avifauna. Among the three habitats, open lagoon had the highest species richness for waterbirds. In relation to the conservation status, seven species are considered at various levels of threat and five are of international concern. Based on the substantial number of species and proportion of birds of concern, the area has been declared an Important Bird Area by BirdLife International, but still lacks government protection.

Key words: avifauna, conservation, Cuba, diversity, Río Mayarí Delta, species richness, threatened, wetland

Resumen: THE AVIFAUNAL COMPOSITION IN THE RÍO MAYARÍ DELTA, NORTHEASTERN CUBA. La investigación se desarrolló en el delta del río Mayarí ubicado en la porción central costera de la provincia de Holguín. Los muestreos se realizaron en los meses de enero y agosto del año 2004, se utilizó el método de transepto. Se determinó la riqueza y composición de la avifauna en tres tipos de hábitats: lagunas en interiores de manglares, lagunas abiertas y planicies temporalmente inundadas también se tuvo en cuenta, para confeccionar la lista de aves de la región, las aves vistas fuera de conteo y la información de otros investigadores. En total se registraron 147 especies de aves, que representan el 39,6% de la avifauna cubana: 85 residentes permanentes, 10 residentes de verano y 52 migratorias neotropicales. En esta área se registraron 62 especies de aves asociadas a los humedales y representan el 75% de las aves de hábitos acuáticos del archipiélago. El hábitat de las lagunas abiertas presentó los mayores valores de riqueza. Con relación al estatus de conservación, siete especies son consideradas en diferentes categorías de amenaza, cinco de ellas globalmente amenazadas. Teniendo en cuenta el alto numero de especies y la proporción de aves de interés, el sitio ha sido declarado como Área de Importancia para la Aves, aunque todavía no tiene protección legal.

Palabras clave: amenazada, avifauna, conservación, Cuba, delta del río Mayarí, diversidad, humedal, riqueza de especies

Résumé : LA COMPOSITION DE L'AVIFAUNE DANS LE DELTA DU RÍO MAYARI, NORD-EST DE CUBA. Nous avons utilisé la méthode des transects linéaires pour étudier les populations d'oiseaux dans le delta du Río Mayarí, dans la région côtière du centre de la province de Holguín, Cuba, en janvier et août 2004. La richesse spécifique et la composition de l'avifaune ont été déterminées dans trois habitats—lagunes ouvertes, lagunes à l'intérieur de mangroves et plaines temporairement inondées—et des observations aléatoires ont été réalisées dans la savane et les milieux agricoles. Nous avons relevé 147 espèces d'oiseaux qui représentent 39,6% de l'avifaune cubaine, dont 85 sédentaires, 40 hivernantes, 10 estivantes, et 12 de passage. Parmi elles, 62 espèces sont associées aux zones humides et représentent 75% de l'avifaune aquatique cubaine. Sur les trois habitats, la lagune ouverte présentait la plus grande richesse en oiseaux d'eau. Sept espèces sont classées dans différents catégories de menace et cinq présentent un état de conservation préoccupant au niveau international. Au regard du nombre important d'espèces et de la proportion d'oiseaux dont l'état de conservation est préoccupant, la zone a été déclarée Zone importante pour la conservation des oiseaux par BirdLife International, mais ne bénéficie pas encore d'une protection gouvernementale.

Mots clés : avifaune, conservation, Cuba, delta du Río Mayarí, diversité, espèces menacées, richesse spécifique, zone humide

The Bahía de Nipe is the largest bay in the Caribbean and one of the largest in the world, with an aquatic surface area of approximately 220 km². The bay is in Holguín Province (20°50′ N, 75°40′ W), northeastern Cuba. The most important rivers that flow into the bay are the Mayarí, Nipe, and Tacajó.

The Río Mayarí provides the main current of the bay and its delta is the most important wetland in the region, which is in the zoogeographical district of Sierra de Nipe–Cristal of eastern Cuba (de la Cruz 1989). The Río Mayarí Delta (hereafter Delta) is in the coastal portion of central Holguín Province, between the towns of Guatemala and Felton. The Delta is bordered to the north and east by the Bahía de Nipe, whereas the mainland limits the Delta on the south and west (Fig. 1). The Delta has a surface of 3,336 ha, of which 484 ha are marine habitats.

No published data exist on the avifauna of the Delta, and there has been only one unpublished inventory, that of Navarro and Reyes. Ornithological studies that have been conducted in the northern coast of Holguín Province have been carried out, mainly, in the sector associated with the zoogeographical region that embraces the western portion, resulting in publications on species observed in the migratory flyway of Gibara (Torres and Solana 1994), the composition and abundance of the birds during the autumn migration in Gibara (Rodríguez *et al*. 1994), and records of Charadriiformes on the northern coast of Oriente, Cuba (Peña *et al*. 2000), among others.

The results reported here are part of fieldwork for the project, "Preparation for the community management of coastal wetlands in northeastern Cuba," conducted by the Center of Investigations and Environmental and Technological Services (CISAT) of Holguín Province and funded by the RAMSAR Convention, with the objective of identifying habitats with important ecological characteristics and representative biodiversity. The objectives of the present research were to determine: the species composition; presence of rare, globally threatened, and other key species; and relative abundance of bird species in three distinct habitats as indicators of the value of the Delta for bird conservation.

STUDY AREA AND METHODS

The Bahía de Nipe exerts a strong marine influence, so that the aquatic habitats are classified as saline, despite the presence of the Río Mayarí. The delta formation at the river's mouth classifies it as an estuary. In our study area, the major habitat diversity occurs along the northern coast of Holguín Province, and includes swamps, rivers, coastal lagoons with shallow bottoms, temporarily flooded plains, tidelands, and lagoons within mangrove for-

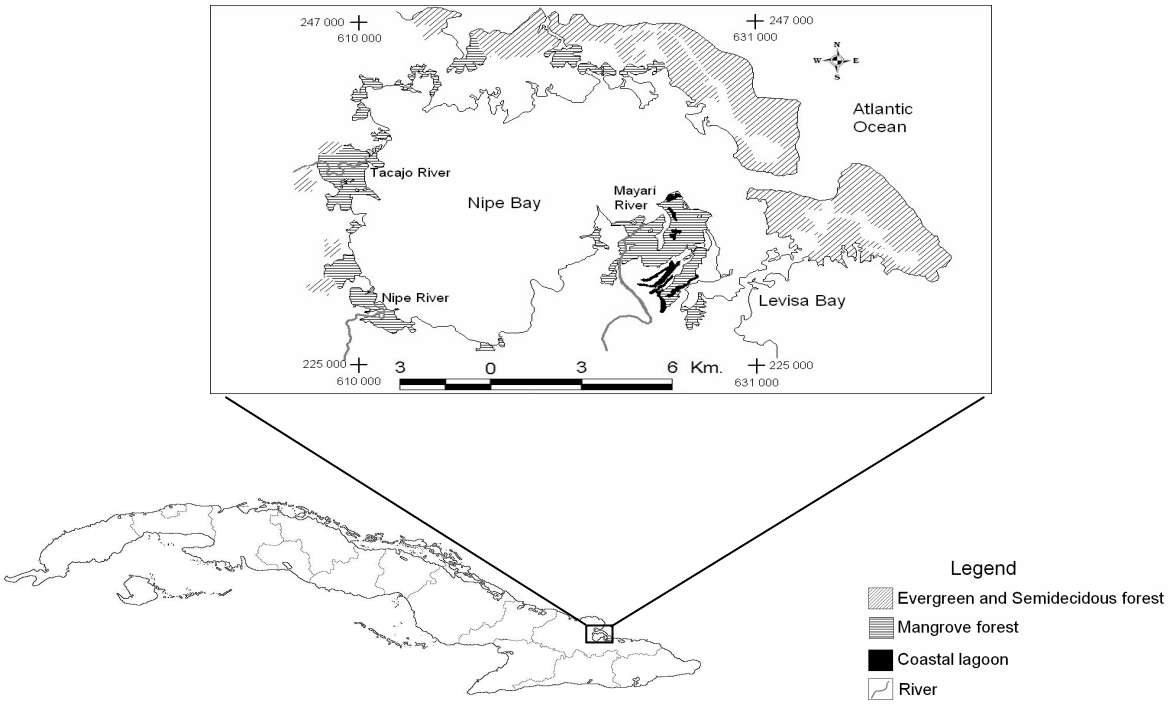

Fig. 1. Map of Cuba, showing location of Mayarí River Delta study area in northeastern Cuba. Enlarged map shows habitat characteristics of study area and surrounding area, and its location in relation to the Nipe Bay.

ests (Fig. 1). More than 50% of the coastal surface is covered with mangroves. Mixed stands of red (*Rhizophora mangle*) and black (*Avicennia germinans*) mangroves prevail at river mouths and surrounding areas and, in some places, include white (*Laguncularia racemosa*) and buttonwood (*Conocarpus erecta*) mangroves. *Avicennia germinans* covers the most extensive areas. The succulent *Batis maritima* (saltwort) occurs in the temporarily flooded plains around mangrove forests. Also in the area are savanna and agricultural habitats. Savannas are adjacent to the interior lagoons and are characterized by several grasses (especially *Cyanthillium cinereum*, *Capraria biflora*, and *Bothriochloa pertusa*) and trees (e.g., *Leucaena leucocephala*, *Zanthoxylon fagara*, and *Bourreria succulenta*). Agricultural areas are distant from our sampling sites and are characterized by agroecosystems and remnants of semideciduous and red mangrove forests.

We sampled bird populations during January and August 2004 in three habitats: temporarily flooded plain (saladares), lagoons in the interiors of mangrove forests, and open lagoons with shallow waters and between fringes of secondary vegetation and mangrove forests. We counted all identified birds observed along both sides of the route using line transects (Blondel 1969), which resulted in a list of species that inhabit sampled areas (in open habitats). We established one transect 1000 m long per habitat and these were traversed at a rate of 100 m in 10 min. We counted birds using the same transects during four days each month from 0700 to 0900. We categorize species residency status following Llanes *et al.* (2002). We classify as bimodal species those that have both resident and non-resident populations that intermix during a period in Cuba. For the purpose of analysis of the species, we consider waterbirds to include the orders Podicipediformes, Pelecaniformes, Ciconiiformes, Phoenicopteriformes, Gruiformes, Charadriiformes, and Anseriformes. Our list of species in the area includes the unpublished data of Navarro and Reyes from 1998, birds incidentally observed in areas adjacent to the three sampled habitats, and additional species observed outside of our sampling periods.

RESULTS AND DISCUSSION

ALL SPECIES

We recorded 147 species of birds (Appendix 1), accounting for 39.6% of the Cuban avifauna (n = 371 species, González Alonso *et al*. 2002). These species represent 17 orders, 42 families, and 102 genera, constituting 81.0%, 66.7%, and 49.8%, respectively, of the total taxa that inhabit the Cuban archipelago. Of the species recorded, 85 (57.8%) were permanent residents (including bimodal species), 40 (27.2%) winter residents, 10 (6.8%) summer residents, and 12 (8.1%) transient species. Obviously a high representation of the Cuban avifauna converges in this area.

Passeriformes, with 48 species (32.7% of species for the locality), was the best-represented order, followed by Charadriiformes (n = 25 species, 17.0%), Ciconiiformes (13, 8.8%), Anseriformes (12, 8.2 %), Falconiformes (10, 6.8%), Gruiformes (6, 4.1%), and Columbiformes (6, 4.1%). All other orders were represented by three or fewer species, with the least-represented orders being Podicipediformes and Phoenicopteriformes, with one species (0.7%) each. Parulidae (with 18 species, 12.2%), Anatidae (12, 8.2%), and Scolopacidae (11, 7.5%) were the families represented by the most species. *Setophaga*, with ten species, was the best-represented genus in the Delta.

WATERBIRDS

A total of 62 species were associated with wetlands in the Delta, and comprised 75% of the waterbird species occurring in the Cuban archipelago. For waterbirds, the habitat of open lagoons with shallow waters had the highest values in species richness for the two sampled periods, and highest value for bird abundance with 2352 individuals / km, due possibly to more food availability owing to that habitat's connection to the sea (Table 1).

For the three sampled habitats, the highest values in species richness among waterbirds were obtained in January, with 20 species in open lagoons, ten species in lagoons inside mangroves, and seven species in the temporarily flooded plains. This January prevalence coincided with winter residence of several species. We obtained lower species richness values during August, the period of summer residence, with ten species recorded in the open lagoons, eight in lagoons within mangroves, and two in temporarily flooded plains.

Bimodal and winter resident categories had a higher number of species in the three sampled habitats than other status categories. In the open lagoons, 11 species of bimodal residents were found in January and eight in August, whereas winter residents comprised six and one species, respectively. Similarly, the bimodal resident category had the highest number of species at lagoons within mangroves in both periods (nine in January, five in Au-

Table 1. Abundance (individuals / km of habitat survey) of waterbirds in three habitats of the Río Mayarí Delta, Cuba, during January and August 2004.

	Open Lagoon		Interior Lagoon		Temporarily Flooded Plain	
Species	January	August	January	August	January	August
Blue-winged Teal (*Anas discors*)	350	–	–	–	–	–
Northern Shoveler (*A. clypeata*)	173	–	–	–	–	–
Double-crested Cormorant (*Phalacrocorax auritus*)	22	15	–	–	–	–
Brown Pelican (*Pelecanus occidentalis*)	70	–	–	–	–	–
Great Blue Heron (*Ardea herodias*)	12	1	2	–	–	–
Great Egret (*A. alba*)	171	4	4	15	2	–
Snowy Egret (*Egretta thula*)	73	–	4	25	–	–
Little Blue Heron (*E. caerulea*)	52	22	19	47	–	–
Tricolored Heron (*E. tricolor*)	40	29	26	67	–	–
Green Heron (*Butorides virescens*)	–	–	3	–	–	–
Black-crowned Night-Heron (*Nycticorax nycticorax*)	–	–	4	4	–	–
Yellow-crowned Night-Heron (*Nyctanassa violacea*)	–	–	1	–	–	–
White Ibis (*Eudocimus albus*)	–	–	20	25	–	–
Wilson's Plover (*Charadrius wilsonia*)	–	3	–	–	–	22
Killdeer (*C. vociferus*)	–	–	–	–	2	9
Black-necked Stilt (*Himantopus mexicanus*)	83	74	82	–	–	–
Spotted Sandpiper (*Actitis macularius*)	2	–	–	–	–	–
Solitary Sandpiper (*Tringa solitaria*)	7	–	–	–	–	–
Greater Yellowlegs (*T. melanoleuca*)	–	–	–	7	8	–
Willet (*T. semipalmata*)	65	50	–	–	–	–
Lesser Yellowlegs (*T. flavipes*)	35	–	–	4	–	–
Ruddy Turnstone (*Arenaria interpres*)	–	–	–	–	1	–
Semipalmated Sandpiper (*Calidris pusilla*)	–	65	–	–	580	–
Western Sandpiper (*C. mauri*)	–	–	–	–	95	–
Least Sandpiper (*C. minutilla*)	1170	–	–	–	620	–
Stilt Sandpiper (*C. himantopus*)	4	–	–	–	–	–
Laughing Gull (*Leucophaeus atricilla*)	10	7	–	–	–	–
Herring Gull (*Larus argentatus*)	5	–	–	–	–	–
Gull-billed Tern (*Gelochelidon nilotica*)	6	–	–	–	–	–
Royal Tern (*Thalasseus maximus*)	2	–	–	–	–	–
Totals	2352	270	165	194	1308	31

gust). The winter resident category was the most important group for species richness in the temporarily flooded plains during January.

These observations reveal the importance of winter migration on species richness in Cuban ecosystems, as shown by differences between our two sampled periods. Our results regarding migratory periods are similar to those obtained by others working among different ecosystems of Cuba, where species richness values are higher during winter residence period compared to summer residence period (Wallace *et al*. 1996, Rodríguez 2000).

The highest abundance values for aquatic bird communities were observed in the open lagoons and temporarily flooded plains during January, with 2352 individuals / km and 1308 individuals / km, respectively (Table 1). Within open lagoons, the most important species were Least Sandpiper (1170 individuals / km), Blue-winged Teal (350 / km), Northern Shoveler (173 / km), Great Egret (171 / km), and Black-necked Stilt (83 / km). For the temporarily flooded plains, Least Sandpiper was also the most abundant species, with 620 individuals / km, followed by Semipalmated Sandpiper (580 / km) and Western Sandpiper (95 / km). These results were influenced in January by the influx of winter residents and migration of bimodal residents.

Lagoons inside mangroves had the highest abundance value during the summer, with 194 individuals / km (Table 1). Tricolored Heron (67 individu-

als / km), Little Blue Heron (47 / km), and White Ibis (25 / km) contributed the highest numbers of individuals in this habitat. This outcome may be an effect of breeding activities, because mangrove stands constitute the best refuge in the Delta for reproduction of colonial heron and ibis populations.

Further evidence of the importance of the Delta to Cuba's avifauna consists of our observations of substantial numbers of several waterbird species, including colonial species, with American Flamingo (*Phoenicopterus ruber*), West Indian Whistling-Duck (*Dendrocygna arborea*), Black Skimmer (*Rynchops niger*), Brown Pelican, White Ibis, Black-bellied Plover (*Pluvialis squatarola*), Wilson's Plover, and Semipalmated Plover (*C. semipalmatus*).

SPECIES OF SPECIAL CONCERN

It is important to note the presence in the Delta of nine (42.9%) species and two (28.6%) genera endemic to Cuba. In relation to the conservation status, seven species present are considered in various threat categories, including one endangered, one vulnerable, and three near threatened species internationally (BirdLife International 2008a), and one endangered and four vulnerable at the national level (González Alonso *et al*. 2012). The value of the Delta is also demonstrated by the high numbers of biome-restricted (n = 21, 43.8% of all species identified in Cuba) and range-restricted (2; 18.2%) species (Appendix 1; BirdLife International 2008b). Below we present extended notes on six species of special concern or interest.

West Indian Whistling-Duck.—This species occurs in the Bahamas, and the Greater and Lesser Antilles. Whistling-duck populations have diminished throughout its range, with the largest populations surviving in Cuba (Raffaele *et al*. 1998, Garrido and Kirkconnell 2000). This species was not observed during our sampling periods, but they have been seen occasionally by local residents in mangroves and lagoons, always in small groups composed of 10–20 individuals. Navarro and Reyes (unpubl.) observed a small population of 30 individuals perching in the mangroves near the mouth of the Río Mayarí in 1998.

Gundlach's Hawk (*Accipiter gundlachi*).—Although this endemic hawk occurs through mainland Cuba and in Cayo Coco in the Archipiélago de Sabana-Camagüey, it is nowhere common, and is considered rare and local (Garrido and García Montaña 1975, Garrido and Kirkconnell 2000). In the Delta, Gundlach's Hawk is a local nesting species, occurring particularly in the areas surrounding the mixed stands of red and black mangrove on both sides of the Río Mayarí.

Northern Bobwhite (*Colinus virginianus cubanensis*).—This endemic subspecies inhabits savannas, pastures, and some cultivated lands of Cuba and the Isla de la Juventud (Garrido and Kirkconnell 2000). We recorded bobwhite only during the January sampling period, when small groups of 10–15 individuals were sighted in the pastures surrounding the southern part of the open lagoons and temporarily flooded plain. The bobwhite is not common in this locality, and populations probably nest in more appropriate habitats farther north of the study area (Jaime Arteaga pers. comm.).

White-crowned Pigeon (*Patagioenas leucocephala*).—This pigeon is found in large numbers in parts of Cuba, mainly where and when fruits are abundant (Garrido and Kirkconnell 2000). Its preferred habitats are semideciduous and mangrove forests. Although White-crowned Pigeons were seen in the mangrove forests of the Delta during both winter and summer sampling, the species was more frequent in the summer when it was found nesting in the area. We consider the pigeon a common local summer resident in the Delta.

Painted Bunting (*Passerina ciris*).—Formerly common in winter migration (Garrido and García Montaña 1975), this bunting has declined dramatically in Cuba, becoming a rare winter resident, possibly because of the widespread indiscriminate capture for the local pet trade (Garrido and Kirkconnell 2000; pers. obs.). We recorded one individual during the winter period, in a patch of secondary forest near the open lagoons. The bunting seems to be a rare casual visitor for this locality, because winter populations on the northern coast of Holguín Province occur farther west along the coastal portion of Gibara Municipality, which has a distinct environment.

Among the species we recorded from the Delta, Oriente Warbler (*Teretistris fornsi*) has a remarkably restricted habitat. This warbler is not common in the area, but small flocks of 5–7 individuals were observed in open and bushy tracts of secondary forests.

CONCLUSIONS

Because of the importance of the Delta to Cuba's avifauna, we proposed the area for an Important Bird Area (IBA) in 2004. To support this proposal, we cited the high proportion of endemic species and genera that occurred in the Delta, as well as the several species considered of international and national

conservation concern. Further, the high numbers of biome-restricted and range-restricted species served to justify special recognition and status of the Delta. Subsequently, BirdLife International (2008b) designated the area as the Delta del Mayarí Important Bird Area, and the region has been proposed as a protected area. We urge the government conservation organizations to accelerate the process to establish official protected status for the Delta to ensure the conservation of the habitat and important bird populations. Further, we strongly encourage additional systematic sampling, to include all seasons, to improve our knowledge of species richness and the numbers of permanent and summer residents, as well as Neotropical migrants.

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LITERATURE CITED

BIRDLIFE INTERNATIONAL. 2008a. Threatened birds of the world 2008. BirdLife International, Cambridge, UK.

BIRDLIFE INTERNATIONAL. 2008b. Important Bird Areas in the Caribbean: key sites for conservation. BirdLife International, Cambridge, UK. (BirdLife Conservation Series no. 15).

BLONDEL, J. 1969. Methodes de denombrament des population d'oiseaux. Problemes d`ecologie. L'echatillonage des peuplements animaeux terrestres. Masson et Cie, Paris.

DE LA CRUZ, J. 1989. Regionalización zoogeográfica. *In* Nuevo Atlas Nacional de Cuba. Sección XI: Fauna. Editorial Instituto Geodesia y Cartografía e Instituto de Geografía, Habana, Cuba.

GARRIDO, O. H., AND F. GARCÍA MONTAÑA. 1975. Catálogo de las aves de Cuba. Editorial Academia de Ciencias de Cuba, La Habana, Cuba.

GARRIDO, O. H., AND A. KIRKCONNELL. 2000. Field guide to the birds of Cuba. Cornell University Press, Ithaca, NY.

GONZÁLEZ ALONSO, H. (ed.). 2002. Aves de Cuba. Instituto de Ecología y Sistemática, La Habana, Cuba.

GONZÁLEZ ALONSO, H., L. RODRÍGUEZ SCHETTINO, A. RODRÍGUEZ, C. A. MANCINA, AND I. RAMOS GARCÍA (eds.). 2012. Libro rojo de los vertebrados de Cuba. Editorial Academia, La Habana, Cuba.

LLANES, A., H. GONZÁLEZ, B. SÁNCHEZ, AND E. PÉREZ. 2002. Lista de las aves registradas para Cuba. Pp. 147–155 *in* Aves de Cuba (H. González Alonso, ed.). Instituto de Ecología y Sistemática, La Habana, Cuba.

PEÑA, C., A. FERNÁNDEZ, E. REYES, AND N. NAVARRO. 2000. Nueva localidad para *Sterna nilotica* (Laridae) en Cuba. Pitirre 13:18.

RAFFAELE, H., J. WILEY, O. GARRIDO, A. KEITH, AND J. RAFFAELE. 1998. A guide to the birds of the West Indies. Princeton University Press, Princeton, NJ.

RODRÍGUEZ, D. 2000. Composición y estructura de las comunidades de aves en tres formaciones vegetales de Cayo Coco, Archipiélago de Sabana-Camagüey, Cuba. Tesis en opción al grado científico de doctor en ciencias biológicas. Universidad de La Habana, La Habana, Cuba.

RODRÍGUEZ, D., B. SÁNCHEZ, A. TORRES, AND A. RAMS. 1994. Composición y abundancia de las aves durante la migración otoñal en Gibara, Cuba. Avicennia 1:101–109.

TORRES, A., AND E. SOLANA. 1994. Listado de las aves observadas en el corredor migratorio de Gibara, provincia Holguín, Cuba. Garciana 22:1–4.

WALLACE, G. E., H. GONZÁLEZ, M. C. MCNICHOLL, D. RODRÍGUEZ, R. OVIEDO, A. LLANES, B. SÁNCHEZ, AND E. A. H. WALLACE. 1996. Winter surveys of forest-dwelling Neotropical migrant and resident birds in three regions of Cuba. Condor 98:745–768.

APPENDIX 1

Species, status, and habitats of birds observed in the Río Mayarí Delta, Cuba, during January and August 2004. Sequence of codes for each species: Status, Habitat (Threat Category). Status: PR = permanent resident; BR = bimodal resident; WR = winter resident; T = transient; SR = summer resident. Habitat: OL = open lagoons; LIM = lagoons within mangroves; M = mangroves; TFP = temporarily flooded plains; C = coast; SV = secondary vegetation; SAV = savanna; AA = agricultural areas. Status and threat category: E = Endemic species; ENI = Endangered at international level; VUI = Vulnerable at international level; NTI = Near Threatened at international level (BirdLife International 2008a); ENN = Endangered at the national level; VUN = Vulnerable at national level; NTN = Near Threatened at national level (González Alonso *et al.* 2012); BIR = biome-restricted bird, RR = restricted range-species (BirdLife International 2008b).

West Indian Whistling-Duck (*Dendrocygna arborea*) PR, LIM (VUI, VUN, BIR); Fulvous Whistling-Duck (*D. bicolor*) PR, LIM-OL; Wood Duck

(*Aix sponsa*) PR, LIM-OL; American Wigeon (*Anas americana*) WR, OL; Mallard (*A. platyrhynchos*) WR-T, OL; Blue-winged Teal (*A. discors*) WR, LIM-OL; Northern Shoveler (*A. clypeata*) WR, OL; White-cheeked Pintail (*A. bahamensis*) PR, OL; Northern Pintail (*A. acuta*) WR-T, OL; Green-winged Teal (*A. crecca*) WR, LIM; Ring-necked Duck (*Aythya collaris*) WR, OL; Masked Duck (*Nomonyx dominicus*) PR, OL (VUN); Ruddy Duck (*Oxyura jamaicensis*) BR, OL; Helmeted Guineafowl (*Numida meleagris*) PR, SAV; Northern Bobwhite (*Colinus virginianus*) PR, SAV (NTI); Least Grebe (*Tachybaptus dominicus*) PR, LIM; Pied-billed Grebe (*Podilymbus podiceps*) PR,LIM; American Flamingo (*Phoenicopterus ruber*) BR, LA; Magnificent Frigatebird (*Fregata magnificens*) BR, C; Neotropic Cormorant (*Phalacrocorax brasilianus*) BR, OL; Double-crested Cormorant (*P. auritus*) BR, OL; Anhinga (*Anhinga anhinga*) BR, LIM-C-OL; Brown Pelican (*Pelecanus occidentalis*) BR, OL; Least Bittern (*Ixobrychus exilis*) BR, LIM-OL; Great Blue Heron (*Ardea herodias*) BR, LIM-OL; Great Egret (*A. alba*), BR, LIM-OL-TFP; Snowy Egret (*Egretta thula*) BR, LIM-OL; Little Blue Heron (*E. caerulea*) BR, LIM-OL-TFP; Tricolored Heron (*E. tricolor*) BR, LIM-OL; Reddish Egret (*E. rufescens*) BR, OL; Cattle Egret (*Bubulcus ibis*) BR, LIM-OL; Green Heron (*Butorides virescens*) BR, LIM-OL; Black-crowned Night-Heron (*Nycticorax nycticorax*) BR, LIM-OL; Yellow-crowned Night-Heron (*Nyctanassa violacea*) BR, LIM-OL; White Ibis (*Eudocimus albus*) PR, LIM; Turkey Vulture (*Cathartes aura*) PR, TFP-OL; Osprey (*Pandion haliaetus*) BR, TFP-OL; Snail Kite (*Rostrhamus sociabilis*) PR, OL; Northern Harrier (*Circus cyaneus*) WR, TFP; Sharp-shinned Hawk (*Accipiter striatus*) BR, LIM; Gundlach's Hawk (*A. gundlachi*) PR, SV (E, ENI, ENN, BIR); Red-tailed Hawk (*Buteo jamaicensis*) PR, SV; Crested Caracara (*Caracara cheriway*) PR, SV; American Kestrel (*Falco sparverius*) BR, SV; Merlin (*F. columbarius*) WR, SV; Peregrine Falcon (*F. peregrinus*) WR-T, OL-SV; Clapper Rail (*Rallus longirostris*) PR, OL; King Rail (*Rallus elegans*) BR, OL; Purple Gallinule (*Porphyrio martinica*) BR, LIM-OL; Common Gallinule (*Gallinula galeata*) BR, OL; American Coot (*Fulica americana*) BR, OL; Limpkin (*Aramus guarauna*) PR, LIM-OL; Wilson's Plover (*Charadrius wilsonia*) SR-WR, TFP; Killdeer (*C. vociferus*) BR, TFP-OL; Black-necked Stilt (*Himantopus mexicanus*) BR-T, LIM-OL; Northern Jacana (*Jacana spinosa*) PR, OL; Spotted Sandpiper (*Actitis macularius*) PR-T, LIM-OL; Solitary Sandpiper (*Tringa solitaria*) WR, OL; Greater Yellowlegs (*T. melanoleuca*) WR-T, LIM-OL; Willet (*T. semipalmata*) PR-T, OL; Lesser Yellowlegs (*T. flavipes*) WR-T, LIM-OL; Ruddy Turnstone (*Arenaria interpres*) WR-T, OL; Semipalmated Sandpiper (*Calidris pusilla*) WR-T, TFP; Western Sandpiper (*C. mauri*) T-WR, OL; Least Sandpiper (*C. minutilla*) WR-T, TFP-OL; Stilt Sandpiper (*C. himantopus*) T, OL; Wilson's Snipe (*Gallinago delicata*) WR, OL; Laughing Gull (*Leucophaeus atricilla*) BR-T, OL; Herring Gull (*Larus argentatus*) WR-T, OL; Bridled Tern (*Onychoprion anaethetus*) SR, OL; Least Tern (*Sternula antillarum*) SR-T, OL-TFP; Gull-billed Tern (*Gelochelidon nilotica*) T-WR, OL; Common Tern (*Sterna hirundo*) T-SR, OL; Royal Tern (*Thalasseus maximus*) BR-T, OL; Sandwich Tern (*T. sandvicensis*) SR-T-PR, OL; Scaly-naped Pigeon (*Patagioenas squamosa*) PR, SV; White-crowned Pigeon (*P. leucocephala*) BR-T, M (NTI, VUN); White-winged Dove (*Zenaida asiatica*) PR, LIM; Zenaida Dove (*Z. aurita*) PR, SV; Mourning Dove (*Z. macroura*) BR, SV; Common Ground-Dove (*Columbina passerina*) PR, SV; Yellow-billed Cuckoo (*Coccyzus americanus*) SR-T, LIM; Mangrove Cuckoo (*C. minor*) PR, LIM; Great Lizard-Cuckoo (*C. merlini*) PR, LIM-SV (BIR); Smooth-billed Ani (*Crotophaga ani*) PR, SV; Barn Owl (*Tyto alba*) PR-WR, SV; Cuban Pygmy-Owl (*Glaucidium siju*) PR, SV (E, BIR); Short-eared Owl (*Asio flammeus*) PR, SAV; Common Nighthawk (*Chordeiles minor*) T, TFP; Antillean Nighthawk (*C. gundlachii*) SR, TFP (E, BIR); Greater Antillean Nightjar (*Caprimulgus cubanensis*) SR, SV; White-collared Swift (*Streptoprocne zonaris*) PR, TFP; Antillean Palm-Swift (*Tachornis phoenicobia*) PR, SV (BIR); Cuban Emerald (*Chlorostilbon ricordii*) PR, SV (BIR); Cuban Tody (*Todus multicolor*) PR, SV (E, BIR); Belted Kingfisher (*Megaceryle alcyon*) WR, OL; West Indian Woodpecker (*Melanerpes superciliaris*) PR, SV (BIR); Yellow-bellied Sapsucker (*Sphyrapicus varius*) WR-T; SV; Cuban Green Woodpecker (*Xiphidiopicus percussus*) PR, SV-LIM (E, BIR); Cuban Pewee (*Contopus caribaeus*) PR, SV (BIR); La Sagra's Flycatcher (*Myiarchus sagrae*) PR, SV (BIR); Gray Kingbird (*Tyrannus dominicensis*) SR-T, SV; Loggerhead Kingbird (*T. caudifasciatus*) PR, SV (BIR); Cuban Vireo (*Vireo gundlachii*) PR, VS (E, RR, BIR); Black-whiskered Vireo (*V. altiloquus*) SR-T, LIM-SV; Cuban Martin (*Progne cryptoleuca*) SR, TFP (BIR); Tree Swallow (*Tachycineta bicolor*) WR, TFP-LIM; Northern Rough-winged Swallow (*Stelgidopteryx serripennis*) T-

WR, TFP-LIM; Barn Swallow (*Hirundo rustica*) T, TFP; Blue-gray Gnatcatcher (*Polioptila caerulea*) WR, SV; Red-legged Thrush (*Turdus plumbeus*) PR, SV; Gray Catbird (*Dumetella carolinensis*) WR-T, SV; Northern Mockingbird (*Mimus polyglottos*) WR, SV; Ovenbird (*Seiurus aurocapilla*) WR-T, SV; Worm-eating Warbler (*Helmitheros vermivorum*) WR-T, SV; Louisiana Waterthrush (*Parkesia motacilla*) WR-T, OL; Northern Waterthrush (*P. noveboracensis*) WR-T, LIM; Black-and-white Warbler (*Mniotilta varia*) WR-T, SV-LIM; Common Yellowthroat (*Geothlypis trichas*) WR-T, LIM-SV; American Redstart (*Setophaga ruticilla*) WR-T, SV; Cape May Warbler (*S. tigrina*) WR-T, SV-LIM; Northern Parula (*S. americana*) WR-T, SV; Blackburnian Warbler (*S. fusca*) T, SV; Yellow Warbler (*S. petechia*) WR-T, LIM; Black-throated Blue Warbler (*S. caerulescens*) WR-T, SV; Palm Warbler (*S. palmarum*) WR-T, SV-LIM; Yellow-rumped Warbler (*S. coronata*) WR-T, LIM; Yellow-throated Warbler (*S. dominica*) WR-T, SV; Prairie Warbler (*S. discolor*) WR-T, SV; Black-throated Green Warbler (*S. virens*) WR-T, SV; Oriente Warbler (*Teretistris fornsi*) PR, SV (E, BIR, RR); Western Spindalis (*Spindalis zena*) PR, SV (BIR); Red-legged Honeycreeper (*Cyanerpes cyaneus*) PR, SV; Cuban Bullfinch (*Melopyrrha nigra*) PR, SV (NTN); Cuban Grassquit (*Tiaris canora*) PR, SV (E); Yellow-faced Grassquit (*T. olivaceus*) PR, SV; Grasshopper Sparrow (*Ammodramus savannarum*) T-WR, SAV; Blue Grosbeak (*Passerina caerulea*) T-WR, SV; Indigo Bunting (*P. cyanea*) T -WR, SV; Painted Bunting T-WR, SV (NTI, VUN); Tawny-shouldered Blackbird (*Agelaius humeralis*) PR, SV (BIR); Eastern Meadowlark (*Sturnella magna*) PR, SAV; Cuban Blackbird (*Dives atroviolaceus*) PR, SV (E, BIR); Greater Antillean Grackle (*Quiscalus niger*) PR, SV (BIR); Shiny Cowbird (*Molothrus bonariensis*) PR, SV; Cuban Oriole (*Icterus melanopsis*) PR, SV (E, BIR); House Sparrow (*Passer domesticus*) PR, AA