

# STATUS, ABUNDANCE, AND DISTRIBUTION OF BIRDS OF MARICAO STATE FOREST, PUERTO RICO

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**Abstract.**—We report 73 birds species in 26 families, including 31 new records, based on observations made during visits to Maricao State Forest from 1978 to 2000. The best-represented family was the Parulidae, with 19 species, including some rare migratory species in Puerto Rico, such as Swainson's (*Limnothlypis swainsonii*) and Kentucky Warblers (*Oporornis formosus*). The species total in Maricao corresponded closely with the number of species in other montane forests in Puerto Rico. Maricao State Forest seems to be marginal habitat for the endemic and endangered Puerto Rican Nightjar (*Caprimulgus noctitherus*) and Puerto Rican Broad-winged Hawk (*Buteo platypterus brunescens*), but is prime habitat for the endangered Puerto Rican Sharp-shinned Hawk (*Accipiter striatus venator*) and the endemic Puerto Rican Vireo (*Vireo latimeri*). Populations of the resident Adelaide's Warbler (*Dendroica adelaidae*) and Elfin Woods Warbler (*D. angelae*) occur in sympatry only in Maricao State Forest.

**Resumen.**—ESTADO, ABUNDANCIA Y DISTRIBUCIÓN DE LAS AVES DEL BOSQUE DE MARICAO, PUERTO RICO. Reportamos 73 especies de aves, incluyendo 31 nuevos registros, basados en observaciones hechas durante visitas al Bosque Estatal de Maricao de 1978 a 2000. La familia mejor representada fue la Parulidae, con 19 especies, incluyendo algunas especies migratorias raras en Puerto Rico como la Reinita de Swainson (*Limnothlypis swainsonii*) y la Reinita de Kentucky (*Oporornis formosus*). El número total de especies en el Bosque Estatal de Maricao es similar al informado para otros bosques montanos en Puerto Rico. El Bosque Estatal de Maricao aparenta ser hábitat marginal para el Guabairo Pequeño de Puerto Rico (*Caprimulgus noctitherus*) y el Guaragua de Bosque (*Buteo platypterus brunescens*), ambas formas endémicas y en peligro de extinción, pero es hábitat primario para el Halcón de Sierra (*Accipiter striatus venator*), en peligro de extinción, y para el endémico Bien-te-veo (*Vireo latimeri*). Poblaciones residentes de la Reinita Mariposera (*Dendroica adelaidae*) y la Reinita del Bosque Enano (*D. angelae*) coexisten en simpatria únicamente en el Bosque Estatal de Maricao.

**Key words:** abundance, biodiversity, bird populations, Puerto Rico, status

## INTRODUCTION

LITTLE IS KNOWN ABOUT the avian species richness of Maricao State Forest, the second largest forest reserve in Puerto Rico. An inventory and species list of the avifauna is important for developing management plans, implementing conservation measures, as well as serving as baseline information for developing research projects at the community level. Furthermore, a species list can be used to compare richness among different forests in the island and with other regions.

In this report we present an updated account of the avifauna present in Maricao State Forest compiled from visits made during two decades. The present study is the only comprehensive effort to update the list of species in the Forest since Raffaele (1975). We also classify species according to their relative abundance, and comment on their status and distribution.

## STUDY AREA AND METHODS

Maricao State Forest comprises 4150 ha in the municipalities of Mayagüez, San Germán, Sabana

Grande, and Maricao, in the westernmost part of the Cordillera Central. Elevations range from 150 to 875 m above sea level. Annual rainfall and temperature average 2326 mm and 21.7°C, respectively (Silander *et al.* 1986).

Over 85% of the soils in Maricao State Forest are derived from ultramafic rocks. These rocks represent 1% of the total area of Puerto Rico, limited in distribution to the southwestern part of the island (Figueroa Colón 1992). Even with high levels of rainfall, the soils are dry because of their fast drainage and high permeability. Soils derived from ultramafic rocks are characterized by high contents of iron, chromium, nickel, and cobalt; low calcium/magnesium ratio; and low contents of clay (Figueroa Colón 1992). High levels of plant endemism are promoted by these nutritional imbalances and high levels of phytotoxics, such as nickel and magnesium (Silander *et al.* 1986; Figueroa Colón 1992).

Three life zones are found in Maricao Forest. The subtropical moist forest comprises 32.9% of the Forest, the subtropical wet forest 65.2%, and the lower montane wet forest 1.9% (Ewel and Whitmore 1973; Colón *et al.* 1976). The vegetation can be classified

into five associations: dry slope forest, slope forest, mixed hardwood, exposed ridge woodland, and *Podocarpus* mixed hardwood (Colón *et al.* 1976). The moist life zone is found at elevations up to approximately 600 m on the southern slopes of the Forest. The woody vegetation in the moist life zone is characterized by narrow crowns, slender stems, and an average canopy height of 6–9 m. The most common trees are *Bursera simaruba*, *Homalium racemosum*, *Plumeria obtusa*, *Clusia rosea*, *Eugenia confusa*, *Pimenta racemosa*, and *Dipholis cubensis*. In areas of high humidity with moderate slopes and deep soils (e.g., along the narrow drainage basins), a more mesic vegetation grows. This vegetation resembles that which grows in the wetter life zones.

The wet life zone receives 2000–4000 mm of rainfall per year and in Maricao State Forest occurs at approximately 550–750 m elevation. The Forest in the wet life zone has a poorly developed emergent tree layer (Colón *et al.* 1976), and the canopy height ranges from 12 to 20 m. Dominant trees include: *Buchenavia capitata*, *Zanthoxylum martinicense*, *Turpinia paniculata*, *Pithecellobium arboreum*, and *Coccoloba pubescens*. Parts of this forest were previously cleared and reforested in the 1920s and 1930s (Colón *et al.* 1976).

The lower montane wet life zone occurs from 700 to 900 m elevation and receives approximately 2550 mm of precipitation yearly. Two forest types dominate this zone. A dwarf spinescent vegetation dominates the narrow ridges and peaks exposed to strong winds and along the steep slopes with shallow serpentine soils. The trees range from 2 to 5 m in height and 5 to 20 cm in diameter at breast height (dbh). The principal species are *Dipholis cubensis*, *Guettarda pungens*, *G. scabra*, *Randia aculeata*, *Ilex riedlaei*, *Coccoloba pirifolia*, and *Comocladia glabra* (Colón *et al.* 1976). Where the slopes are not steep and the ridges are wide, more soil and humus accumulate to produce a more mesic habitat. Here the leaves are sclerophyllous but large, and the trees larger (5–10 m in height and 10–40 cm in dbh) than on the narrow ridges, peaks, and steep slopes with shallow soils. The principal trees are *Clusia grisebachiana*, *Coccoloba sintenisi*, *Eugenia confusa*, and *Tabebuia schumanniana*. A different forest type grows on deep serpentine soils of the moderate slopes that characterize the wide upper ridges at elevations of 800–850 m (Colón *et al.* 1976). There the forest type forms a more or less continuous canopy at 15–20 m. Epiphytic growth is not abundant, however vines are common. Dominant tree species are: *Micropholis chrysophylloides*, *Matayba dominguen-sis*, *Podocarpus coriacea*, *Sloanea amygdalina*,

*Buchenavia capitata*, *Ocotea acuneata*, and *Magnolia portorricensis*. The palm, *Prestoea montana*, and the tree ferns, *Cyathea arborea* and *C. aquiline*, are common in the understory.

The headwaters of various important rivers are found in Maricao State Forest. Five rivers originate in the southern slopes of the Forest and three to the north, including the río Maricao (Colón *et al.* 1976). The pools of a fish hatchery are filled with the water of the río Maricao.

*Species list.*—We compiled a bird species list from observations made during approximately 1500 visits to Maricao State Forest from 1978 to 2000. Delannoy repeatedly visited Maricao from 1978 to 1995, whereas Tossas visited from 1998 to 2001. Most visits were associated with ornithological research we have conducted over the years. The list includes all bird species we observed, as well as those reported by Raffaele (1975). We used field guides (Biaggi 1970, Raffaele 1989, Raffaele *et al.* 1998) to identify the birds observed with binoculars or trapped in mist nets.

The frequency in which birds were encountered during our visits was used as a measure of their relative abundance. Accordingly, species were categorized as *very common*, if observed five or more times in a single visit; *common*, if at least one individual was observed in more than half of the visits; *uncommon*, if observed in less than half the visits; and *rare*, if two or fewer individuals were observed per year. *Accidentals* or *vagrants* were those species that occurred in Maricao State Forest only once every decade or greater. We also categorized birds according to their status. *Resident* species, either permanent or seasonal, are those known to breed in Maricao State-Forest, *non-breeding residents* do not breed in the Forest, but do breed elsewhere on the island, and *Neotropical migrants* are birds that breed in the Nearctic and spend several months in the Forest. A *naturalized* bird is an introduced species thriving in the wild.

We include information on the distribution of each species in the Forest. The species list follows the taxonomic classification and nomenclature of the American Ornithologists' Union (1998). Endemic species appear in bold.

## RESULTS

### Ardeidae

Snowy Egret (*Egretta thula*).—Common non-breeding resident observed feeding in creeks, fish hatchery ponds, and margins of the río Maricao.

Little Blue Heron (*Egretta caerulea*).—Common non-breeding resident observed feeding along the margins of the río Maricao and ponds in the fish hatchery.

Cattle Egret (*Bubulcus ibis*).—Common non-breeding resident observed feeding from the margins of the fish hatchery ponds and the río Maricao.

Green Heron (*Butorides virescens*).—Common resident observed feeding along the margins of the fish hatchery ponds and the río Maricao.

#### Cathartidae

Turkey Vulture (*Cathartes aura*).—Very common non-breeding resident observed flying over the Forest canopy from low to high elevations, mainly above the drier southern slopes. Turkey Vultures commute back and forth from the southwest to the Añasco valley in western Puerto Rico, crossing over the Maricao State Forest. The vultures take advantage of the strong slope and thermal updrafts in the Forest that create a corridor. They stop to feed in Maricao when carrion is available.

#### Accipitridae

Sharp-shinned Hawk (*Accipiter striatus venator*).—Locally common resident in dense mesic forest and maría (*Calophyllum brasiliense*) plantations from middle to high elevations. Maricao holds one of five known breeding populations. Other populations are in Toro Negro, Carite, Luquillo, and Guilarte Forests. Only 130 individuals remain of this endangered subspecies endemic to Puerto Rico (Delannoy 1997).

Broad-winged Hawk (*Buteo platypterus brunnescens*).—Accidental in the Forest. Not observed by the authors, but reported by Raffaele (1975). It is an endangered subspecies with extant populations in Luquillo, Carite, and Río Abajo Forests, totaling 125 individuals (Delannoy 1997).

Red-tailed Hawk (*Buteo jamaicensis*).—Common resident widespread throughout the Forest, observed at all elevations and habitats.

#### Falconidae

American Kestrel (*Falco sparverius*).—Uncommon resident found in disturbed habitats (e.g., vacation center) and forest edges at all elevations.

Merlin (*Falco columbarius*).—Accidental migrant in the Forest. One individual observed hunting in the edge of a mesic forest at 700 m elevation on 28 October 2000 by AGT.

#### Columbidae

Scaly-naped Pigeon (*Columba squamosa*).—Very

common resident observed in dense forest at all elevations. The species becomes uncommon in the months following the breeding season. It forms monospecific flocks in July and presumably migrates to lowland forests during fall and winter. This flocking behavior was reported by Rivera-Milán (1992) in wet and moist zones throughout the island.

White-crowned Pigeon (*Columba leucocephala*).—Accidental non-breeding resident in the Forest. Not observed by us, but reported by Raffaele (1975).

White-winged Dove (*Zenaida asiatica*).—Uncommon non-breeding resident observed in forest edges and disturbed habitats. Three individuals were seen by AGT, from February to April 1999, at 650 m elevation in the Forest interior in an area heavily affected by Hurricane Georges (1998). The species is common in disturbed habitats around Maricao State Forest.

Zenaida Dove (*Zenaida aurita*).—Uncommon resident in winter, spring, and summer; found in dry slope forest, plantation forest, and *Podocarpus*-mixed hardwood forest at different elevations.

Common Ground-Dove (*Columbina passerina*).—Uncommon resident found at middle and low elevations in the dry southern slopes.

Key West Quail-Dove (*Geotrygon chrysis*).—A rare breeding resident at lower elevations in the dry southeastern slopes. Locally common near Cerro Avispa (450–500 m elevation) in the western slopes. However, AGT captured two adults in mist nets at 750 m elevation on 2 April 1999, and found a pair building a nest at 770 m on 1 June 2000. The nest was depredated.

Ruddy Quail-Dove (*Geotrygon montana*).—Very common resident in dense forests at all elevations before Hurricane Georges, but uncommon thereafter. The species seems to be highly affected by canopy loss from hurricane winds, as reported after Hurricane Hugo (1989) in the Luquillo Experimental Forest, in eastern Puerto Rico (Wunderle 1995).

#### Cuculidae

Mangrove Cuckoo (*Coccyzus minor*).—Rare resident, found mainly at middle and low elevations near forest edges, in disturbed habitats, and dry forests of the southern slopes.

**Puerto Rican Lizard-Cuckoo (*Saurothera vieloti*).**—Common resident, more frequently heard than seen. Widespread throughout the Forest.

## Strigidae

**Puerto Rican Screech-Owl (*Otus nudipes*).**—A common resident, widespread throughout the Forest.

Short-eared Owl (*Asio flammeus portoricensis*).—Rare resident, one individual was observed on 1 August 1982 by CAD at 770 m in dense brush dominated by fern mats in the dry southeastern slopes.

## Caprimulgidae

**Puerto Rican Nightjar (*Caprimulgus noctitherus*).**—Vagrant, one individual was observed and photographed on 10 January 1988 by CAD in a maría plantation, 300 m north of the west fork of the río Maricao, at 600 m above sea level. Possibly it was a stray bird from the nearby population in Susúa State Forest.

## Apodidae

Black Swift (*Cypseloides niger*).—Seasonal resident, common in spring and summer at high elevations. The breeding status in the Forest is unknown. Observed in groups of four to six individuals, feeding with swallows.

## Trochilidae

Antillean Mango (*Anthracothonax dominicus*).—Rare resident species, observed at low elevations in the south- and east-facing slopes.

**Green Mango (*Anthracothonax viridis*).**—Common breeding resident widespread throughout the Forest.

**Puerto Rican Emerald (*Chlorostilbon maugaeus*).**—Common breeding resident widespread throughout the Forest.

## Todidae

**Puerto Rican Tody (*Todus mexicanus*).**—Very common breeding resident found in forested habitats at all elevations.

## Alcedinidae

Belted Kingfisher (*Ceryle alcyon*).—Common Neotropical migrant, observed mainly in the pools of the fish hatchery and along the río Maricao.

## Picidae

**Puerto Rican Woodpecker (*Melanerpes portoricensis*).**—Very common resident present at all elevations and habitats. Commonly seen and heard in groups of up to six individuals.

Yellow-bellied Sapsucker (*Sphyrapicus varius*).—Accidental Neotropical migrant in the Forest. An adult male was observed on 19 February 2001 at 880 m elevation (José A. Colón López, pers.

comm.).

## Tyrannidae

Lesser Antillean Pewee (*Contopus latirostris*).—Common breeding resident found at all elevations, mainly in the understory of dense woodland.

**Puerto Rican Flycatcher (*Myiarchus antillarum*).**—Rare resident found mainly in disturbed areas and forest edges at all elevations. Common in shade coffee plantations around the Maricao State Forest.

Gray Kingbird (*Tyrannus dominicensis*).—Common breeding resident found in open and disturbed woodlands at all elevations.

Loggerhead Kingbird (*Tyrannus caudifasciatus*).—Rare resident found mainly in secondary forests, disturbed woodland, and edges at all elevations.

## Vireonidae

**Puerto Rican Vireo (*Vireo latimeri*).**—Very common breeding resident widespread throughout the Forest.

Black-whiskered Vireo (*Vireo altiloquus*).—Very common resident widespread throughout the Forest. Breeds in Maricao State Forest but presumably migrates to northern South America from September to February (Raffaele *et al.* 1998).

## Hirundinidae

Caribbean Martin (*Progne dominicensis*).—Common non-breeding resident observed flying over the Forest canopy during spring and summer. Possibly migrates to South America in the winter months (Raffaele *et al.* 1998).

Cave Swallow (*Petrochelidon fulva*).—Common non-breeding resident observed in groups of five or more flying over the Forest canopy at all elevations.

## Turdidae

Red-legged Thrush (*Turdus plumbeus*).—Very common resident found at all elevations and habitats in the Forest.

## Mimidae

Pearly-eyed Thrasher (*Margarops fuscatus*).—Uncommon resident found mainly in disturbed woods, forest edges, and forest stands along rivers from low to high elevations.

## Sturnidae

Hill Myna (*Gracula religiosa*).—Accidental exotic in the Forest. CAD observed one individual from March to May 1993 near the Department of Natural and Environmental Resources headquarters at an elevation of 770 m.

## Parulidae

Northern Parula (*Parula americana*).—Common Neotropical migrant widespread in the Forest from fall until early spring.

Magnolia Warbler (*Dendroica magnolia*).—Rare Neotropical migrant observed in dense forest. CAD observed one adult male 10 April 1981 at 650 m elevation.

Cape May Warbler (*Dendroica tigrina*).—Common Neotropical migrant observed in a wide range of habitats and elevations from fall to spring.

Black-throated Blue Warbler (*Dendroica caerulescens*).—Common Neotropical migrant widespread in the Forest from fall until early spring.

Yellow-rumped Warbler (*Dendroica coronata*).—Rare Neotropical migrant observed in dense forest and edges. CAD observed a pair of adults on 7, 13, and 25 February 1981 at 800 m elevation.

Black-throated Green Warbler (*Dendroica virens*).—Accidental Neotropical migrant observed in dense forest. Two adult males observed by CAD from 5 January until 7 April 1981 at 875 m elevation. AGT observed an adult male on 1 April 1999 at 700 m.

Yellow-throated Warbler (*Dendroica dominica*).—Accidental Neotropical migrant in the Forest. Observed by AGT on 11 and 26 November 2000 at 650 m elevation, in pine (*Pinus caribaea*) and eucalyptus (*Eucalyptus robusta*) plantations, respectively.

Adelaide's Warbler (*Dendroica adelaidae*).—Common resident found in shrub vegetation at all elevations.

Prairie Warbler (*Dendroica discolor*).—Rare Neotropical migrant observed in dense forest from fall to spring.

Blackpoll Warbler (*Dendroica striata*).—Uncommon Neotropical migrant, observed mainly in dense forest at high elevations during its southward migration.

**Elfin Woods Warbler (*Dendroica angelae*).**—Common resident found mainly in the *Podocarpus*-mixed hardwood association from 700–900 m, but also can be observed in dense forest at lower elevations.

Black-and-white Warbler (*Mniotilta varia*).—Common Neotropical migrant widespread throughout the Forest from fall until early spring.

American Redstart (*Setophaga ruticilla*).—Common Neotropical migrant widespread throughout the Forest from fall to early spring.

Swainson's Warbler (*Limnothlypis swainsonii*).—Accidental Neotropical migrant in the Forest. One record: CAD trapped and banded an adult on 16 January 1992 in dense forest at 770 m elevation.

Ovenbird (*Seiurus aurocapillus*).—Common Neotropical migrant frequently observed near the ground in dense forest over a wide range of elevations from fall to spring.

Northern Waterthrush (*Seiurus noveboracensis*).—Neotropical migratory wood warbler not observed by the authors, but reported by Raffaele (1975).

Louisiana Waterthrush (*Seiurus motacilla*).—Common Neotropical migrant observed along creeks and the río Maricao from fall until early spring.

Kentucky Warbler (*Oporornis formosus*).—Accidental Neotropical migrant in the Forest. One record: an adult male trapped and banded by CAD on 9 March 1992 in dense forest at 770 m elevation.

Hooded Warbler (*Wilsonia citrina*).—Accidental Neotropical migrant observed in dense woodland. One adult male trapped and banded by AGT on 22 March 1999 in dense forest at 700 m elevation.

## Coerebidae

Bananaquit (*Coereba flaveola*).—Very common resident found at all elevations and habitats.

## Thraupidae

**Puerto Rican Tanager (*Nesospingus speculiferus*).**—Very common resident widespread throughout the Forest.

Scarlet Tanager (*Piranga olivacea*).—Accidental Neotropical migrant in the Forest. One record: an adult female trapped and banded by AGT in dense forest at 700 m elevation on 25 October 1998, probably passing through in its southward migratory route.

**Puerto Rican Spindalis (*Spindalis portoricensis*).**—Very common resident widespread throughout the Forest.

Antillean Euphonia (*Euphonia musica*).—Common resident observed at different elevations and habitats. The species became uncommon in the Forest after Hurricane Georges (Tossas, pers. obs.).

## Emberizidae

Yellow-faced Grassquit (*Tiaris olivacea*).—Uncommon resident observed mainly in openings and forest edge over a wide range of elevations.

Black-faced Grassquit (*Tiaris bicolor*).—Very common resident in openings, disturbed areas, and for-

est edge over a wide range of elevations.

**Puerto Rican Bullfinch (*Loxigilla portoricensis*).**—Very common resident widespread throughout the Forest.

#### Cardinalidae

Rose-breasted Grosbeak (*Pheucticus ludovicianus*).—Accidental Neotropical migrant in the Forest. CAD observed two adults, male and female, on 4 March 2001 at 750 m elevation.

#### Icteridae

Shiny Cowbird (*Molothrus bonariensis*).—Uncommon resident. Observed in disturbed habitats, along edges, and forest fragments from low to high elevations.

Greater Antillean Oriole (*Icterus dominicensis*).—Uncommon resident found in a variety of habitats at all elevations. We have seen Shiny Cowbird females entering oriole nests in disturbed habitats in the Forest.

#### Estrildidae

Indian Silverbill (*Lonchura malabarica*).—Naturalized species in Puerto Rico, rarely observed in Maricao State Forest. CAD observed a flock of 14 on 11 January 1986 at 650 m in the dry south-facing slopes.

Tricolored Munia (*Lonchura malacca*).—Naturalized species in Puerto Rico, rarely observed in Maricao State Forest. On 8 September 1985, CAD observed a flock of 15 in a forest edge at 650 m in the dry south-facing slopes.

### DISCUSSION

In this work we report 73 bird species in 26 families for Maricao State Forest, including 13 species and two subspecies endemic to Puerto Rico. This number increases the size of the previous list (Raffaele 1975) by 31 species. More species, however, might be added with further effort, particularly from censuses or mist-netting when Neotropical migrants are present or passing through. Other published bird lists for montane forests in Puerto Rico closely correspond to our species total. Miranda-Castro *et al.* (2000) reported 72 species in Los Tres Picachos State Forest, and Wiley and Bauer (1985) reported 66 in Luquillo Forest.

The largest taxonomic group in the Forest is represented by wood warblers (Parulidae), with 19 species. Two species in this bird family are residents in Maricao State Forest, the Elfin Woods and Adelaide's warblers. Both are common in the Forest but segregate ecologically, selecting habitats that differ

in vertical structure. Adelaide's Warbler prefers shorter shrub vegetation, whereas Elfin Woods Warbler prefers taller and dense forest (Cruz and Delannoy 1984). These congeners occur in sympatry over a wide elevational gradient in Maricao State Forest. This is the only reported habitat in Puerto Rico where the two species coexist (Cruz and Delannoy 1984).

Wood warblers are also the most represented group in other montane forests in Puerto Rico. Miranda-Castro *et al.* (2000) reported 13 species, including the resident Adelaide's Warbler in Los Tres Picachos State Forest. Wiley and Bauer (1985) reported 18 species in Luquillo Forest, including the resident Elfin Woods Warbler. Among the migratory wood warblers found in Maricao, several are rare in Puerto Rico. These include the Kentucky, Swainson's, Yellow-throated, and Black-throated Green warblers. The presence of these rare warbler species, along with Scarlet Tanager, can be related to the vast extension of this forest reserve, and high quality and diversity of habitats available. Moreover, shade coffee plantations around Maricao State Forest act as buffer zones and further increase the amount of forest cover.

Leopold (1963) and Raffaele (1975) reported the Broad-winged Hawk in Maricao State Forest. However, we have not seen any in this forest or adjacent habitats in 20 years. We conclude that this bird is not a regular member of the Forest avifauna. Its status better fits the category of a vagrant species. Similarly, Raffaele (1975) reported White-crowned Pigeons in Maricao State Forest, and Wiley (1979) sighted an unreported number in March 1975 while conducting monthly and bimonthly censuses in 1974 and 1975. However, we did not see or hear this species in Maricao during our study period. We suggest the White-crowned Pigeon should be considered a vagrant in Maricao.

Maricao State Forest may be at the upper limit of the endemic and endangered Puerto Rican Nightjar's range. Vilella and Zwank (1993) reported two nightjars in an eucalyptus plantation in the eastern boundary of the Forest. Nightjar abundance tapered off considerably to extremely low levels from a transitional zone between dry coastal and dry limestone forest south of Susúa and Maricao State Forests (Vilella and Zwank 1993). The Puerto Rican Nightjar sighting we report is from a plantation near the northern boundary of the Forest.

The sightings of the naturalized exotic Indian Silverbill and Tricolored Munia in Maricao State Forest seem to be the movement of flocks from low-

lands into the interior mountains during the non-breeding period. Delannoy (pers. obs.) has seen flocks of Tricolored Munias in farmlands close to the foothills of the Luquillo Forest at elevations of 700 m during the fall and winter months. Also, Wiley and Bauer (1985) reported the Bronze Mannikin (*Lonchura cucullata*) from the Luquillo Forest as an uncommon resident in edges and interface of pastures, croplands, and fallow lands. Miranda-Castro *et al.* (2000) reported naturalized exotic Orange-cheeked Waxbill (*Estrilda melpoda*) and Bronze Mannikin to be common in Los Tres Picachos State Forest at elevations of 550 m. In addition, they reported the Pin-tailed Whydah (*Vidua macroura*) as uncommon, but present, at an elevation of 690 m.

Maricao State Forest provides important habitat for the endangered and endemic Puerto Rican Sharp-shinned Hawk. This subspecies, whose population is estimated at 130 individuals, is one of the most endangered on the island (Delannoy 1997). The Maricao subpopulation, with 56 individuals, is the largest in Puerto Rico. Other endemic birds common in the Forest, such as the Elfín Woods Warbler, Puerto Rican Tanager, and Puerto Rican Vireo, have disjunct or relatively small populations elsewhere on the island (Raffaele 1989). Therefore, the conservation of the habitat in Maricao State Forest, and the surrounding buffer lands, will guarantee the subsistence of a high species diversity, particularly of endangered, endemics, and rare birds.

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