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**Steven Latta, Christopher Rimmer, Allan Keith, James Wiley,
Herbert Raffaele, Kent McFarland & Eladio Fernandez:
Birds of the Dominican Republic and Haiti**

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INTRODUCTION

Our goal in writing *Birds of the Dominican Republic and Haiti* is to fill a large void in the bird-watching, conservation, and environmental education needs of Hispaniola. There has never been a comprehensive field guide devoted to the birds of Hispaniola, and the only existing guide, by Annabelle Dod, is almost 30 years old, covers only 226 species, and is illustrated with black-and-white line drawings. Here we describe and illustrate all 306 species known to have occurred on the island. But our intention is to provide more than just a means of identifying bird species; our guide also provides information on the biology and ecology of the birds, with the hope that we can help inspire a new generation of birdwatchers, ornithologists, and conservationists. With this guide in hand, we hope that more Dominicans and Haitians will become as fascinated as we are by the diversity of the island's avifauna.

Our guide is based on *A Guide to the Birds of the West Indies* by Herb Raffaele and others, and it incorporates detailed information on the status and range of species from the annotated checklist *The Birds of Hispaniola: Haiti and the Dominican Republic* by Allan Keith and coauthors. Our guide features expanded species accounts, and it provides new information from our personal research on the biology and ecology of Hispaniolan avifauna. Thanks to the generosity of the publisher and artists of the West Indies guide, we have been able to use many of the fine plates from that guide in this work. We also include more than 105 new images of Hispaniolan species painted by Canadian artist Barry Kent MacKay, as well as new, detailed range maps of unsurpassed accuracy and precision prepared by Kent McFarland.

We are confident that by dramatically expanding possibilities for the appreciation of birds in the Dominican Republic and Haiti, this guide will promote conservation of migratory and resident birds, and build support for environmental measures to conserve and protect their habitats. The guide is certain to be used in the many educational, outreach, and training activities by environmental organizations such as the Sociedad Ornitológica de la Hispaniola and the Société Audubon Haiti. We sincerely hope that it will increase public awareness throughout Hispaniola and internationally for the unique birds of the island, and underscore the need to protect these special species and their habitats for the enjoyment of future generations.

MAP OF HISPANIOLA

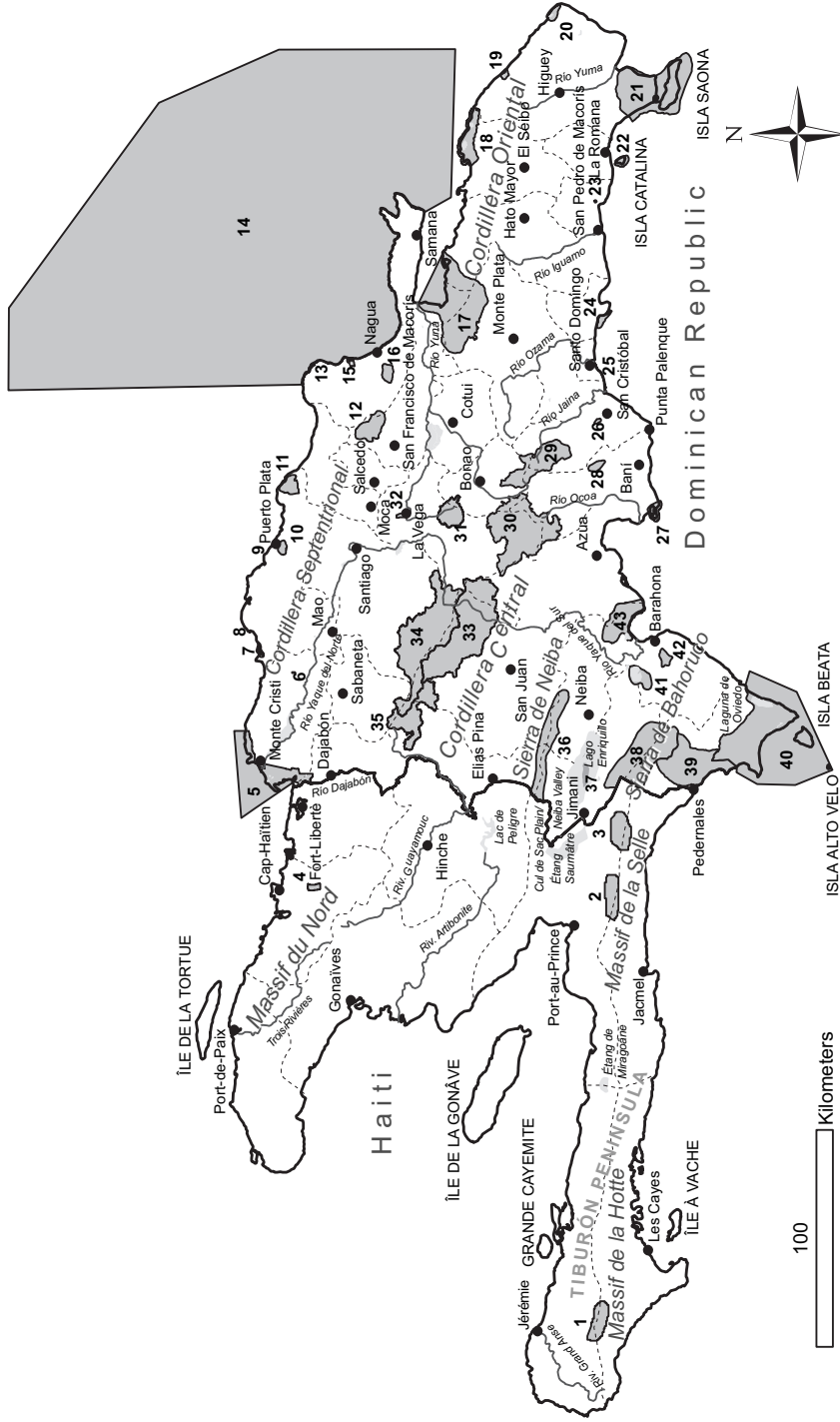


Figure 1. Map of the Dominican Republic and Haiti showing principal cities, physical features, and major protected areas.

- 1 Macaya Biosphere Reserve
- 2 La Visite National Park
- 3 Forêt des Pins
- 4 National Historic Park of the Citadelle, Sans Souci, and the Ramiers
- 5 Monte Cristi National Park and Cayos Siete Hermanos
- 6 Villa Elisa Scientific Reserve
- 7 Estero Hondo
- 8 La Isabela National Park
- 9 Litoral Norte de Puerto Plata National Park
- 10 Isabel de Torres Natural Monument
- 11 El Choco
- 12 Loma Quita Espuela Scientific Reserve
- 13 Cabo Francés Viejo National Park
- 14 Banco de la Plata (Santuario de Mamíferos Marinos)
- 15 La Gran Laguna Wildlife Refuge
- 16 Miguel Canela Lázaro (Loma Guaconejo) Scientific Reserve
- 17 Los Haitises National Park
- 18 Lagunas Redonda y Limón Natural Reserve
- 19 Albufera de Maimón Natural Monument
- 20 Laguna Bávaro Wildlife Refuge
- 21 Del Este National Park
- 22 Isla Catalina Natural Monument
- 23 Cueva de las Maravillas Anthropological Reserve
- 24 Submarino La Caleta National Park
- 25 Litoral Sur de Santo Domingo National Park
- 26 Cuevas de Borbón (del Pomier) Anthropological Reserve
- 27 Bahía de las Calderas Natural Monument
- 28 Erik Leonard Eckman (Loma La Barbacoa) Scientific Reserve
- 29 Eugenio Jesús Marciano (Loma La Humeadora) National Park
- 30 Juan B. Pérez Rancier (Valle Nuevo) National Park
- 31 Ebano Verde Scientific Reserve
- 32 La Vega Vieja National Park
- 33 José del Carmen Ramírez National Park
- 34 Armando Bermúdez National Park
- 35 Nalga de Maco National Park
- 36 Sierra de Neiba National Park
- 37 Isla Cabritos National Park
- 38 Sierra de Bahoruco National Park
- 39 Acetillar-Cabo Rojo Panoramic Way
- 40 Jaragua National Park
- 41 Laguna de Rincón (Cabra) Wildlife Refuge
- 42 Padre Miguel D. Fuertes (Bahoruco Oriental) Biological Reserve
- 43 Sierra de Martín García National Park

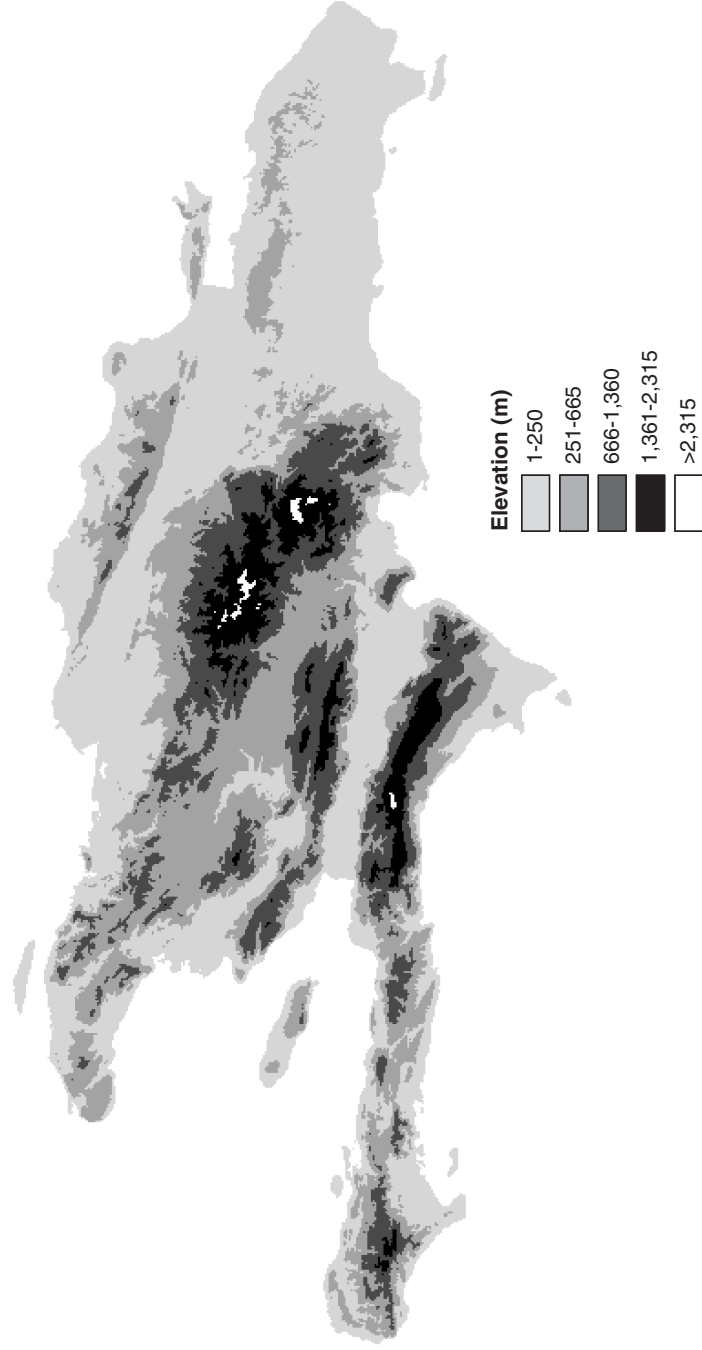


Figure 2. Elevational map of the Dominican Republic and Haiti.

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Names. In the species accounts, scientific and English names, and the sequence of species, are those of the *Check-list of North American Birds*, seventh edition (American Ornithologists' Union [AOU] 1998) and its supplements (AOU 2000, 2002, 2003, 2004). Most subspecies names are those given in Dickinson 2003 or Keith et al. 2003. We have introduced two changes to common names; changed the sequence of species in two cases; and recognize three previously proposed splits in species, resulting in three more endemic species for Hispaniola. We recognize the changes proposed by Lovette and Bermingham 2001 and Klein et al. 2004 suggesting that the genera *Microligea* and *Xenoligea* are not wood-warblers but are closely aligned with the tanager genus *Phaenicophilus*. As such we have renamed the Green-tailed Warbler (also known as the Green-tailed Ground-Warbler) as the Green-tailed Ground-Tanager, and we have renamed the White-winged Warbler as the Hispaniolan Highland-Tanager. Both we now place in the Thraupidae. We also recognize proposed splits of three species. We split the Hispaniolan Nightjar from the Cuban Nightjar (both were formerly united as the Greater Antillean Nightjar), based on distinct vocalizations and other characteristics as noted by Hardy et al. (1988), Garrido and Reynard (1993), and the AOU (1998). We follow Garrido et al. (1997) and Raffaele et al. (1998) in recognizing the Hispaniolan Palm Crow as an endemic species, distinct from the Cuban Palm Crow, and we follow Garrido et al. (in press) in distinguishing the Hispaniolan Oriole from others in the Greater Antillean Oriole assemblage. Immediately following the name at the head of each species account, we note the status of each species (see "Status" below) and highlight endemic species and those considered threatened or endangered.

Description. We provide size measurements for all species, including length (from bill tip to tail tip) and mass. Where size varies between sexes, or for example with the presence of tail plumes, more than one measurement is provided. The mass presented here for each species is an average and is taken from Dunning 1993 or the authors' own data. Descriptions of all commonly encountered plumages focus on key characteristics allowing field identification. In general, the most commonly encountered plumages are described first. For example, non-breeding visitors are described in their non-breeding plumage first; breeding residents are described in their breeding plumage first. Other plumages, including juvenal and immature, are subsequently described.

Age terminology of avian plumages can be confusing, as birders use several different systems. In this book we distinguish primarily between immatures and adults when plumages of the two differ markedly. We further discriminate between juveniles and immatures for those species that have a distinct juvenal plumage (the first true, nondowny plumage) that is likely to be seen by birders on Hispaniola. Many species retain their juvenal plumage for only a short period after leaving the nest and are seldom encountered by birders in this plumage; we do not describe these short-lived plumages. Other species (e.g., grebes, shorebirds, gulls, terns, and some passerines) retain their juvenal plumage for several months before molting into a subsequent plumage, which may or may not be distinguishable from the definitive adult plumage. We recognize those prolonged juvenal plumages in the species accounts. For those species that retain a juvenal plumage during their entire first year (e.g., some herons and hawks), we simply use the term "immature." We also use "immature" to describe the distinct plumages of many first-year birds (e.g., many passerines) between their juvenal and adult plumages. Thus, for simplicity, we recognize three typical age plumages in this book: juvenal, immature, and adult.

Similar species. Here we highlight differences among the species being described and any others occurring on Hispaniola with which it might be confused.

Voice. The calls, songs, and notes as known on Hispaniola are described. In the case of winter visitors that rarely sing or otherwise vocalize while on the island, their songs and calls are also described but are noted as rare.

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Hispaniola. Here we describe where on Hispaniola the species is likely to be encountered. This includes major habitats occupied by the species, range of elevations where it has been found, and specific locales. For species with 10 or fewer reports, all sightings are listed. For more commonly occurring species, distributions are generalized based on habitat and elevational range. For species that visit Hispaniola seasonally, we give general dates of arrival and departure. We also list all of the larger outlying islands where the species has been found. Distributions of all but the rarest or most locally distributed species are illustrated in range maps that depict where on Hispaniola the species might be expected in appropriate habitat.

Status. We distinguish among breeding residents, breeding visitors, non-breeding visitors, vagrants, and passage migrants as follows. We also note if species are endemic or introduced to the island.

Breeding resident: A species known to breed on Hispaniola and that remains on the island year-round.

Breeding visitor: A species known to breed on Hispaniola but that generally migrates off-island during the non-breeding period.

Non-breeding visitor: A species that breeds elsewhere but resides on Hispaniola during the non-breeding season, generally from September to April.

Vagrant: A species known to have occurred on Hispaniola fewer than five times or likely to occur less frequently than once every five years.

Passage migrant: A species that migrates through Hispaniola on a seasonal basis but does not generally reside on the island for extended periods of time. Sometimes referred to as “transient”; also includes wanderers that may move throughout the West Indies or beyond at irregular intervals.

Endemic: A species confined to Hispaniola and associated islands and found nowhere else in the world.

Introduced: A species that is not native to Hispaniola, but that occurs as a population of escaped or intentionally released birds.

In some cases a species may be represented by more than a single distinct population. For example, a breeding resident population may be joined in the non-breeding season by a migratory population from the north. In such cases, both populations are described, with the more common situation listed first.

For each species we characterize population status as abundant, common, uncommon, or rare on Hispaniola. All abundance categories refer to a birdwatcher’s chance of observing the species in its preferred habitat:

Abundant: Species is invariably encountered without much effort in large numbers.

Common: Species is invariably encountered singly or in small numbers.

Uncommon: Species is occasionally encountered but not to be expected each trip.

Rare: Species has 10 or fewer records and is not likely to occur more than once or twice a year.

We also describe species’ population trends where possible, drawing particular attention to species thought to be declining in abundance, and noting likely factors associated with that decline. Species that are threatened with extinction are listed as threatened, endangered, or critically endangered. Determination of such status is based on a variety of published accounts, including BirdLife International 2000, Keith et al. 2003, Latta and Lorenzo 2000, and the authors’ personal experience. Finally, we address taxonomic questions when appropriate, such as alternative treatment of species and the presence of endemic subspecies on the island.

Comments. In this section we may comment on the biology and ecology of the species. This is intended to provide the reader with a better appreciation for the species, and may help in identification. Comments may include, for example, information on foraging, social behavior, or courtship. Because little is known about the ecology of many Hispaniolan species, many of these comments incorporate the authors’ own data.

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Nesting. This is a brief description of the nest, nest site, number of eggs laid, egg color, and breeding season for those species that breed on Hispaniola. Nesting data are not provided if the species is not known to have bred on the island. Nesting biology of many Hispaniolan birds is not well known, although recent studies by Latta and Rimmer have begun to contribute the first quantifiable data for a variety of species. Some of these data are summarized for the first time in these species accounts.

Range. We summarize the worldwide range of each species, including, for migratory species, the breeding and wintering grounds. We also draw particular attention to a species' occurrence in other portions of the West Indies. Abbreviations used here include: n. (northern), s. (southern), e. (eastern), w. (western), ne. (northeastern), nw. (northwestern), se. (southeastern), sw. (southwestern), c. (central), nc. (north-central), sc. (south-central), ec. (east-central), and wc. (west-central).

Local names. We provide local names in the Dominican Republic and Haiti for each species when possible. In many cases a variety of local names are used, and we list these in approximate order of popularity of use; in some cases, no local names are known.

TOPOGRAPHY AND HABITATS OF HISPANIOLA

Topographic Features

Hispaniola is a diverse island with many habitats and a rich assemblage of bird species, in part a result of its complex geologic history. Although its geologic history is not well understood, Hispaniola is thought to have formed by the merging of at least three land blocks, with two of these formerly attached to what are now Cuba and Puerto Rico. These three blocks probably came together about nine million years ago, but change continued to take place even then. Global cycles of glacial and interglacial periods caused rising and lowering of sea levels, and the alternation of dry and moist environments, resulting in drastic environmental changes and repeated isolation of higher elevation sites by the rising seas. Cyclic climatic changes contributed to the repeated separation of Hispaniola into two "paleo-islands" by a marine canal along the current Neiba Valley and Cul de Sac Plain during much of the Pliocene and portions of the Pleistocene. These two paleo-islands are generally referred to as the North Island and the South Island of Hispaniola. In addition, the South Island was likely divided in pre-Pleistocene times by an intermittent sea passage across the peninsula at the Jacmel-Fauché depression. This would have effectively separated the Massif de la Hotte to the west from the Massif de la Selle and Sierra de Bahoruco to the east.

Cyclic climatic changes in the Pleistocene are likely to have contributed significantly to speciation and extinction events. Unique flora and fauna are thought to have existed on the two paleo-islands, as evidenced by the several pairs of bird species that are today found on the north and south paleo-islands. For example, the Eastern Chat-Tanager is found in the Cordillera Central and the Sierra de Neiba, whereas the Western Chat-Tanager is found in the Sierra de Bahoruco and the southern peninsula of Haiti. Similar processes may have contributed to the speciation of the Gray-crowned and Black-crowned palm-tanagers, the two today species, and two subspecies of La Selle Thrush.

Cyclic climatic changes also had great impacts on the island's vegetation. It is clear that vegetation types such as conifers, now confined to higher elevations, occurred much lower during the cooler, drier periods, when glaciation occurred on Hispaniola down to the level of 1,800 m. It was also during such periods that sea levels were significantly lower, allowing the appearance of a broad expanse of savanna and thorn scrub habitat in the Hispaniolan lowlands. During these periods of cold and aridity, the wet slopes of the Massif de la Hotte in particular are thought to have served as a refugium for plants and animals adapted to mesic environments. The mountain range's geography with respect to winds and weather fronts positioned it to receive naturally high levels of rainfall. Today the Massif de la Hotte displays extraordinary levels of endemism in orchids, other plants, and amphibians.

Geographically, Hispaniola is the second largest island in the Caribbean, covering 77,842 km². The island is longer (650 km) than it is wide (260 km), and it is split politically between the larger Dominican Republic (48,442 km²) and the smaller Haiti (29,400 km²). The island is dominated by a series of roughly parallel mountain ranges and valleys that are aligned east to west. These ranges change names between Haiti and the Dominican Republic but essentially bridge both countries. The southern paleo-island features, from west to east, the Massif de la Hotte-Massif de la Selle-Sierra de Bahoruco range. High points in this range include Pic Macaya (2,347 m) in the Massif de la Hotte, Pic la Selle (2,574 m), and Loma de Toro (2,367 m) in the Sierra de Bahoruco. North of the Neiba Valley and the Cul de Sac Plain, on the northern paleo-island, lies the second major east-west range of mountains. These are the Montagnes de Trou-d'Eau in Haiti and the Sierra de Neiba in the Dominican Republic. At its summit, Monte Neiba reaches 2,279 m. Somewhat isolated to the east of the Sierra de Neiba, and southwest of Azua, is the Sierra de Martín García. Farther north, the Plateau Central and the Valle de San Juan separate this range from the next east-west range, the Cordillera Central, which extends into Haiti as the Massif du Nord. This is the largest mountain range on the island, and it includes Pico Duarte, at 3,098 m the highest elevation in the Caribbean. North of the Cibao Valley lies the Cordillera Septentrional, which runs from Monte Cristi to

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Samaná Bay and rises to 1,250 m. Two additional, minor ranges include the Cordillera Oriental, southeast of Samaná Bay, and the Montagnes du Nord-Ouest in the northwestern peninsula of Haiti.

Hispaniola has several lakes and lagoons, many of which lie along the current Neiba Valley and Cul de Sac Plain. These include the hypersaline Lago Enriquillo (which can vary from 180 to 265 km²) in the western Dominican Republic and, to its east, the largest freshwater lake on the island, Laguna de Rincón (30 km²) at Cabral; and in Haiti, the slightly brackish Étang Saumâtre (113 km²) and marshy freshwater Trou Caïman (7 km²). Other large water bodies include Laguna de Oviedo (25 km²) in the southeast of the Barahona Peninsula, Laguna Redonda (7 km²) and Laguna Limón (5.1 km²) on the northeastern coast, and Étang de Miragoâne, consisting of two freshwater lakes (combined 8 km²) and adjacent marshes on the northern coast of the Tiburón Peninsula.

There are several significant river systems on the island, including the Río Yaque del Norte, Río Yaque del Sur, Río Ozama, and Río Dajabón in the Dominican Republic, and in Haiti the Guayamouc, Les Trois Rivières, and Artibonite. At 400 km, the Artibonite is the longest river in the Caribbean.

Bisected by mountain ranges and rivers, and dotted with lakes and lagoons, Hispaniola contains a diversity of habitats. Most of the mountains are steep and rugged, and frequently cut by deep gorges or valleys. Mountain valleys tend to be cool and moist, supporting either pine or broadleaf forests, but lower elevations are dominated by dry forest and thorn scrub habitats. There are extensive areas of limestone karst in the southern paleo-island, including the Tiburón Peninsula, Barahona Peninsula, Sierra de Bahoruco, and Sierra de Neiba. In addition, much of the eastern Dominican Republic is limestone karst. Along the northern coast, limestone karst forms tower formations in Los Haitises National Park, on the Samaná Peninsula, and along the Cordillera Septentrional. Sand dunes are found in more than 20 coastal locations, and those near Baní on the southern coast are the largest in the Caribbean.

Ten offshore islands contribute to Hispaniola's avifauna. These islands tend to be relatively low, small, and dry but are often of high importance to birds. Many are crucial nesting sites for seabirds and other species, and some are home to endemic subspecies of land birds. Associated with the southern paleo-island are Isla Beata (47 km², 100 m elevation); Isla Alto Velo (1 km², 152 m elevation); Île Grande Cayemite and Île Petite Cayemite, with the larger being 45 km² and 152 m in elevation; and Île à Vache (52 km², 30 m elevation). Associated with the northern paleo-island are Isla Saona (111 km², 35 m elevation); Isla Catalina (18 km²); the Cayos Siete Hermanos which are seven small, low, and sandy islands; Île de la Tortue (180 km², 325 m elevation); and Île de la Gonâve (658 km², 755 m elevation). Navassa Island (5 km², 77 m elevation), a U.S. possession 55 km due west of the westernmost point of Haiti, is included in this guide because of its zoogeographic association with Hispaniola.

Major Habitats

For the purposes of this guide, nine major habitats are identified based on Tolentino and Peña 1998 and Keith et al. 2003.

Mangroves. This habitat type is found at coastal sites around river mouths and lagoons where the soil is flooded most or all of the year, and also inland along the margins of both freshwater and saline lakes where the soil may only be flooded seasonally. In some places the mangrove forest reaches heights of 20 m and a density covering 70 to 85 percent of the ground surface. Dominant species are buttonwood mangrove (*Conocarpus erectus*), red mangrove (*Rhizophora mangle*), white mangrove (*Laguncularia racemosa*), and black mangrove (*Avicennia germinans*). In the Dominican Republic, mangroves cover less than 1% of the land area; in Haiti, mangroves cover about 0.5% of the land area.

Freshwater swamps. This is an uncommon lowland habitat type on Hispaniola, usually occurring below 20 m elevation. It is sometimes forested, primarily with swamp bloodwood

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(*Pterocarpus officinalis*), or may occur in the form of marshlands characterized by dense growth of cattail (*Typha domingensis*). Some of the marshlands in this category may have significant moisture for only part of each year. On Hispaniola, freshwater swamps cover less than 0.5% of the land area.

Grasslands. This habitat type includes natural savannas at all elevations. They are mostly in the lowlands but are also found in several intermountain valleys. On Hispaniola, grasslands cover less than 1% of the land area.

Agricultural lands. Included here are all lands cleared for agriculture, whether for large-scale farming enterprises such as sugarcane plantations and truck gardens or for subsistence agriculture, even at relatively high elevations in the foothills and mountains in many parts of the island, especially Haiti. Land cleared for pasture is also included here. In the Dominican Republic, agricultural lands and pastures cover about 55% of the land area; in Haiti, about 42% of the land is under cultivation, and another 19% is considered pasture.

Shrublands. This habitat type is typically dry and results from the recent removal of forest cover or because environmental or geological substratum conditions limit plant growth. It is now a widespread habitat type in both countries from sea level to, at least locally, 500 m. Depending on the elevation and original forest type, typical shrub species may include mahogany (*Swietenia mahagoni*), botoncillo (*Ternstroemia peduncularis*), mastic (*Sideroxylon cubensis*), waltheria (*Waltheria indica*), escobón (*Eugenia maleolens*), logwood (*Haematoxylon campechianum*), cordia (*Cordia globosa*), and sensitive plant (*Mimosa pudica*). Especially typical of thorny shrublands are *Jacquinia berterii*, capertree (*Capparis ferruginea*), damiana (*Turnera diffusa*), and another sensitive plant species (*Mimosa azuensis*). In the Dominican Republic, shrublands cover about 6% of the land area; in Haiti, where the forest cover has been removed from more than 95% of the land area and 60% of the land is mountainous, shrublands and low dense vegetation cover about 35% of the land area.

Dry scrub. This forest type now consists primarily of secondary growth of semideciduous trees growing at 40 to 500 m elevation in areas receiving 50 to 100 cm of annual rainfall. The canopy is largely open at a typical height of 10 m. Most of these forests are disturbed because of cutting by humans. This vegetation type is widespread in the lowlands of both the Dominican Republic and Haiti. Indicator species are gumbo limbo (*Bursera simaruba*), acacia (*Acacia sckeroxyla*), boxwood (*Phyllostylon brasiliensis*), tamarindo (*Acacia macracantha*), and white leadtree (*Leucaena leucocephala*). In the Dominican Republic, dry scrub covers about 8% of the land area; in Haiti, dry scrub is reduced to shrubland.

Dry forest. Typically found at elevations of 400 to 900 m on the coastal plain and in the foothills of mountains, this habitat type is often bordered by dry scrub at its lower edge and broadleaf forest at its upper edge. It occurs in areas with a distinct annual arid period and rainfall in the range of 100 to 180 cm. It is a common natural forest type over much of lower elevation Dominican Republic and Haiti but has been widely cut, especially in Haiti. In its undisturbed form it has a canopy density of 60% or greater; the canopy typically ranges from 3 to 10 m in height, less often to 20 m in wetter situations. Indicator species in drier areas are leadwood (*Krugiodendron ferreum*), mahogany (*Swietenia mahagoni*), seagrape (*Coccoloba diversifolia*), gumbo limbo (*Bursera simaruba*), lignumvitae (*Guaiacum sanctum*), poison tree (*Metopium brownei*), and crabwood (*Ateramnus lucidus*). Moisture habitats usually contain oxborn bucida (*Bucida buceras*), pond-apple (*Annona glabra*), and mara (*Calophyllum calabra*). In the Dominican Republic, dry forest covers about 8% of the land area; in Haiti, most dry forest has been converted to shrubland.

Broadleaf evergreen forest. Humid evergreen forest or rainforest is typically found below 500 m but locally up to elevations of 1,500 m. It is found in all Dominican Republic mountain ranges and very locally in Haiti, though extensive stands are now quite scarce. Typical canopy height is up to 25 m, and canopy density is 60% or greater. This forest type receives

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annual precipitation of 200 cm or more. Many humid evergreen forests are also mixed with pine or with shade coffee. Indicator species include wild mamee (*Clusia rosea*), myrtle laurelcherry (*Prunus myrtifolia*), lancewood (*Oxandra laurifolia*), manac palm (*Calyptronoma plumeriana*), tree-fern (*Cyathea arborea*), butterbough (*Exothea paniculata*), miconia (*Miconia dodecandra*), and coi (*Mora abbottii*).

At higher elevations up to 2,300 m, this habitat type is known as montane broadleaf forest or cloud forest. These humid forests are found in parts of the Cordillera Central, Cordillera Septentrional, Sierra de Neiba, and Sierra de Bahoruco; remnant stands in Haiti are found primarily in the Massif de la Hotte and Massif de la Selle. Canopy density is 80% or greater, and indicator canopy species include wind tree (*Didymopanax tremulus*), parrot-tree (*Brunellia comocladifolia*), bitter tree (*Garrya fadyenii*), tachvela (*Podocarpus aristulatus*), palms (*Coccothrinax* spp.), green ebony (*Magnolia pallescens* and *M. hamori*), rose-apple (*Clusia clusioides*), sierra palm (*Prestoea montana*), bone-tree (*Haenianthus salicifolius*), trumpet-tree (*Cecropia schreberiana*), swamp cyrilla (*Cyrilla racemiiflora*), florida trema (*Trema micrantha*), tabebuia (*Tabebuia berterii*), and laurel (*Ocotea* sp). In the Dominican Republic, broadleaf evergreen forest covers about 13% of the land area; in Haiti broadleaf evergreen forests have probably been reduced to less than 1% of the land area.

Pine forest. Pine forest habitats include both pure pine stands and pine mixed with some broadleaf species. Pine forests can also be either closed pine forest, with a canopy density of 60% or greater, or open pine forest, with a canopy density between 40 and 60%. Virtually all closed pine habitat remaining in Hispaniola is in the Sierra de Bahoruco or above 2,000 m in the Cordillera Central of the Dominican Republic. Examples of open pine habitat are found in parts of the Cordillera Central, Sierra de Bahoruco, and Sierra de Neiba; small stands occur in the Macaya Biosphere Reserve and La Visite National Park, Haiti. Indicator species include Hispaniolan pine (*Pinus occidentalis*) in the canopy, and in the understory bitter tree (*Garrya fadyenii*), *Eupatorium illitium*, holly (*Ilex tuerckheimii*), and species of the genera *Fuchsia*, *Ambrosia*, and *Senecio*. In the Dominican Republic, pine forest covers about 6% of the land area; in Haiti the pine forests have been reduced to less than 1.5% of the land area.

ENDEMIC SPECIES AND SUBSPECIES

We recognize a total of 31 species endemic to Hispaniola and associated satellite islands and 50 endemic subspecies. Here we list those species and subspecies and provide general ranges of the subspecies. Subspecies are those identified by Dickinson 2003 and Keith et al. 2003. Although we recognize that the subspecies concept is sometimes controversial, it does provide an initial measure of geographic variation within a species, and serves as a preliminary reference for identifying genetic diversity and the uniqueness of populations which may be useful in conservation planning.

ENDEMIC SPECIES OF HISPANIOLA

Ridgway's Hawk (<i>Buteo ridgwayi</i>)	Flat-billed Vireo (<i>Vireo nanus</i>)
White-fronted Quail-Dove (<i>Geotrygon leucometopia</i>)	Hispaniolan Palm Crow (<i>Corvus palmarum</i>)
Hispaniolan Parakeet (<i>Aratinga chloroptera</i>)	White-necked Crow (<i>Corvus leucognaphalus</i>)
Hispaniolan Parrot (<i>Amazona ventralis</i>)	La Selle Thrush (<i>Turdus swalesi</i>)
Hispaniolan Lizard-Cuckoo (<i>Saurothera longirostris</i>)	Palmchat (<i>Dulus dominicus</i>)
Bay-breasted Cuckoo (<i>Hyetornis ruficularis</i>)	Green-tailed Ground-Tanager (<i>Microligea palustris</i>)
Ashy-faced Owl (<i>Tyto glaucops</i>)	Hispaniolan Highland-Tanager (<i>Xenoligea montana</i>)
Least Pauraque (<i>Siphonorhis brewsteri</i>)	Black-crowned Palm-Tanager (<i>Phaenicophilus palmarum</i>)
Hispaniolan Nightjar (<i>Caprimulgus eckmani</i>)	Gray-crowned Palm-Tanager (<i>Phaenicophilus poliocephalus</i>)
Hispaniolan Emerald (<i>Chlorostilbon swainsonii</i>)	Western Chat-Tanager (<i>Calyptophilus tertius</i>)
Hispaniolan Trogon (<i>Priotelus roseigaster</i>)	Eastern Chat-Tanager (<i>Calyptophilus frugivorus</i>)
Broad-billed Tody (<i>Todus subulatus</i>)	Hispaniolan Spindalis (<i>Spindalis dominicensis</i>)
Narrow-billed Tody (<i>Todus angustirostris</i>)	Hispaniolan Oriole (<i>Icterus dominicensis</i>)
Antillean Piculet (<i>Nesocittes micromegas</i>)	Hispaniolan Crossbill (<i>Loxia megaplaga</i>)
Hispaniolan Woodpecker (<i>Melanerpes striatus</i>)	Antillean Siskin (<i>Carduelis dominicensis</i>)
Hispaniolan Pewee (<i>Contopus hispaniolensis</i>)	

ENDEMIC SUBSPECIES OF HISPANIOLA AND ASSOCIATED ISLANDS

Sharp-shinned Hawk (<i>Accipiter striatus striatus</i>)	Hispaniola
American Kestrel (<i>Falco sparverius dominicensis</i>)	Hispaniola, associated islands
Double-striped Thick-knee (<i>Burhinus bistriatus dominicensis</i>)	Hispaniola
Common Ground-Dove (<i>Columbina passerina navassae</i>)	Navassa Island
Hispaniolan Lizard-Cuckoo (<i>Saurothera longirostris longirostris</i>)	Hispaniola, Isla Saona
Hispaniolan Lizard-Cuckoo (<i>Saurothera longirostris petersi</i>)	Île de la Gonâve
Burrowing Owl (<i>Athene cunicularia troglodytes</i>)	Hispaniola, Île de la Gonâve, Isla Beata
Stygian Owl (<i>Asio stygius noctipetens</i>)	Hispaniola, Île de la Gonâve

ENDEMIC SPECIES AND SUBSPECIES

Short-eared Owl (<i>Asio flammeus domingensis</i>)	Hispaniola
Northern Potoo (<i>Nyctibius jamaicensis abbotti</i>)	Hispaniola, Île de la Gonâve
Antillean Mango (<i>Anthracothonax dominicus dominicus</i>)	Hispaniola, associated islands
Vervain Hummingbird (<i>Mellisuga minima vieilloti</i>)	Hispaniola, associated islands
Antillean Piculet (<i>Nesocittes micromegas micromegas</i>)	Hispaniola
Antillean Piculet (<i>Nesocittes micromegas abbotti</i>)	Île de la Gonâve
Greater Antillean Elaenia (<i>Elaenia fallax cherriei</i>)	Hispaniola
Hispaniolan Pewee (<i>Contopus hispaniolensis hispaniolensis</i>)	Hispaniola
Hispaniolan Pewee (<i>Contopus hispaniolensis tacitus</i>)	Île de la Gonâve
Stolid Flycatcher (<i>Myiarchus stolidus dominicensis</i>)	Hispaniola, associated islands
Loggerhead Kingbird (<i>Tyrannus caudifasciatus gabbiï</i>)	Hispaniola
Thick-billed Vireo (<i>Vireo crassirostris tortugae</i>)	Île de la Tortue
Golden Swallow (<i>Tachycineta euchrysea sclateri</i>)	Hispaniola
Cave Swallow (<i>Petrochelidon fulva fulva</i>)	Hispaniola, associated islands
Rufous-throated Solitaire (<i>Myadestes genibarbis montanus</i>)	Hispaniola
La Selle Thrush (<i>Turdus swalesi swalesi</i>)	Southern Hispaniola
La Selle Thrush (<i>Turdus swalesi dodae</i>)	Northern Hispaniola
Palmchat (<i>Dulus dominicus dominicus</i>)	Hispaniola, Isla Saona
Palmchat (<i>Dulus dominicus oviedo</i>)	Île de la Gonâve
Yellow Warbler (<i>Dendroica petechia chlora</i>)	Cayos Siete Hermanos
Yellow Warbler (<i>Dendroica petechia solaris</i>)	Île de la Gonâve, Petite Gonâve
Yellow Warbler (<i>Dendroica petechia albicollis</i>)	Hispaniola, associated islands
Pine Warbler (<i>Dendroica pinus chrysoleuca</i>)	Hispaniola
Bananaquit (<i>Coereba flaveola bananivora</i>)	Hispaniola, associated islands
Bananaquit (<i>Coereba flaveola nectarea</i>)	Île de la Tortue
Green-tailed Ground-Tanager (<i>Microligea palustris palustris</i>)	Hispaniola
Green-tailed Ground-Tanager (<i>Microligea palustris vasta</i>)	Southwestern Hispan- iola, Isla Beata
Gray-crowned Palm-Tanager (<i>Phaenicophilus poliocephalus poliocephalus</i>)	Hispaniola, Grand Cayemite
Gray-crowned Palm-Tanager (<i>Phaenicophilus poliocephalus coryi</i>)	Île de la Gonâve
Gray-crowned Palm-Tanager (<i>Phaenicophilus poliocephalus tetraopes</i>)	Île à Vache
Western Chat-Tanager (<i>Calyptophilus tertius tertius</i>)	Massif de la Hotte
Western Chat-Tanager (<i>Calyptophilus tertius selleanus</i>)	Massif de la Selle, Sierra de Bahoruco
Eastern Chat-Tanager (<i>Calyptophilus frugivorus frugivorus</i>)	Cordillera Central
Eastern Chat-Tanager (<i>Calyptophilus frugivorus neibeï</i>)	Sierra de Neiba
Eastern Chat-Tanager (<i>Calyptophilus frugivorus abbotti</i>)	Île de la Gonâve
Greater Antillean Bullfinch (<i>Loxigilla violacea affinis</i>)	Hispaniola, associated islands
Greater Antillean Bullfinch (<i>Loxigilla violacea maurella</i>)	Île de la Tortue
Grasshopper Sparrow (<i>Ammodramus savannarum intricatus</i>)	Hispaniola
Rufous-collared Sparrow (<i>Zonotrichia capensis antillarum</i>)	Hispaniola
Tawny-shouldered Blackbird (<i>Agelaius humeralis humeralis</i>)	Hispaniola
Greater Antillean Grackle (<i>Quiscalus niger niger</i>)	Hispaniola, associated islands
Antillean Euphonia (<i>Euphonia musica musica</i>)	Hispaniola, Île de la Gonâve

AVIAN CONSERVATION ON HISPANIOLA

Conservation Issues

Hispaniola's contribution to global biodiversity has earned the island the highest ranking of biological importance in a worldwide assessment of bird-protection priorities (Stattersfield et al. 1998). Whereas habitats of Hispaniola are vital to the survival of many endemic and migrant bird species, a variety of commonly confronted environmental issues threaten the sustainability of bird populations in both the Dominican Republic and Haiti. In many ways, the conservation issues faced in the Dominican Republic and Haiti are identical, except that Haiti faces a much more extreme situation, owing to its severe economic, social, and political problems, many of which have been compounded by poor conservation efforts in the past. Bird conservation in Haiti must still be considered embryonic (Paryski et al. 1989, Keith et al. 2003), although recent momentum provides grounds for optimism (e.g., Rimmer et al. 2004).

By all accounts, the loss and degradation of habitats are the principal problems facing birds on Hispaniola. In the Dominican Republic recent estimates place forest loss at greater than 90% in the last 20 years (Food and Agricultural Organization 1991, Ottenwalder 2000), and most currently forested areas are fragmented and under continuing heavy pressure. A series of more than 60 laws protects forests and watersheds, including a 1967 order to close all existing sawmills and a ban on the cutting of all trees. The primary issue has been lack of enforcement. The principal government agencies responsible for forest administration and management, the General Directorate of Forests and the Directorate of National Parks, are underfunded and understaffed, and transportation of employees out of their offices and into the field where abuses occur has always been difficult. Reforestation programs have been proposed and executed from time to time by both government agencies and private sector organizations, but program implementation and enforcement of regulations have been hampered by small budgets and insufficiently trained personnel.

In Haiti, the landscape is already almost entirely deforested (Paryski et al. 1989, Ottenwalder 2000, Rimmer et al. 2005). Some see little chance under present conditions for recovery of environmental damage already done (Grupo Jaragua 1994). The Division of Natural Resources within the Ministry of Agriculture is responsible for protection and regulation of all forests and for reforestation efforts. However, the country's high population density, poverty, and political instability, compounded by small budgets, absence of trained staff, lack of clear policies, and shifting government priorities, have prevented any sustained conservation efforts. National parks in Haiti are few and essentially unprotected. There are agents responsible for the parks, and basic offices exist in the parks, but personnel seem to be present only intermittently and access is entirely uncontrolled.

Many Hispaniolan habitats are severely affected by deforestation and other human pressures. The 1998 National Planning Workshop for Avian Conservation in the Dominican Republic concluded that cloud forest and moist broadleaf forests were the most threatened habitats in the country (Latta and Lorenzo 2000), but every major native habitat has been adversely affected by human influences. Because population growth has been highest on the coasts and in the lowlands, these areas are the most heavily affected, with lowland forests, beaches, coastal swamps and lagoons, and mangroves all suffering from multiple threats. A corollary to outright destruction of habitat by people is the problem of human-introduced exotic predators, including dogs, cats, pigs, and mongoose, all of which have had enormous impacts on a variety of bird species, especially those nesting low to the ground.

The conditions of rivers and watersheds across Hispaniola are also poor, and declining as the result of heavy silting from erosion and, in some areas, severe water pollution. Erosion results from deforestation in the mountains, seriously affecting the lower portions of watersheds, as well as estuaries, coastal regions, and coral reefs. Pollution results primarily from the lack of adequate sanitation systems and from contamination by agricultural chemicals and industrial wastes.

CONSERVATION ISSUES

A second major problem, alluded to above, is the lack of enforcement of environmental laws. Associated with this is the lack of funding, personnel, and vehicles and the inability of enforcement officers, managers, and researchers from government agencies to get into the field on a regular basis. Adequate law enforcement could not only better control illegal cutting and slash-and-burn agriculture but could restrict hunting and the cage-bird trade. Hunting of most species is illegal in the Dominican Republic, and rifles and shotguns are relatively scarce, but the use of slingshots, snares, and baiting is rampant. Collection of birds for the cage-bird trade has long been the most serious threat to parrots and parakeets, but many other species have also been found in captivity, including Greater Flamingos, Little Blue Heron, Hispaniolan Palm and White-necked crows, Hispaniolan Lizard-Cuckoo, Greater Antillean Bullfinch, and Village Weaver.

A third major area of avian conservation concerns involves the general lack of an established environmental education program, especially in schools, and the lack of a national environmental ethic. These two issues were identified as priority action items at the National Planning Workshop for Avian Conservation in the Dominican Republic (Latta and Lorenzo 2000). But it is also here that the conservation community may have exerted its greatest influence in recent years. Community-based non-governmental organizations (NGOs) that focus on avian issues have a strong presence in the island's conservation community, especially in the Dominican Republic. Groups such as the Sociedad Ornitológica de la Hispaniola, Fundación Moscoso Puello, Grupo Jaragua, Observadores de Aves Annabelle Dod, Grupo Ecológica Tinglar, and Societé Audubon Haiti have been active in a wide variety of environmental education efforts, especially in communities that border protected areas. These groups have worked diligently to foster an entirely new perspective on the importance of natural resource protection as part of the island's national patrimony.

National Protected Areas in the Dominican Republic

In response to the environmental crisis, the Dominican government has created 70 protected areas covering more than 13,000 km². Approximately 8,000 km², or more than 16% of the country, is designated as protected terrestrial ecosystems. The Directorate of National Parks (DNP) recognizes 11 categories of management: national parks (22), panoramic ways (10), natural monuments (9), wildlife refuges (7), ecological corridors (6), scientific reserves (5), biological reserves (4), recreation areas (3), anthropological reserves (2), natural reserves (1), and special ecological reserves (1). Management plans have been written for 10 national parks, of which only 6 have found some level of implementation; 24 protected areas have designated personnel (Ottenwalder 2000). In addition, a number of personnel from NGOs are assigned to national parks under comanagement agreements between those organizations and the DNP. Examples include the management of Valle Nuevo by Fundación Moscoso Puello and of certain activities within Jaragua National Park by Grupo Jaragua. Attempts in 2004–2005 by the President and the legislature to eviscerate the national park system through the sell-off of protected lands for tourism and development activities underscore the fragility of the parks in the Dominican Republic, and the on-going need for building an environmental ethic that sanctifies parks as the national treasures that they are. Major protected areas in the Dominican Republic include the following.

Monte Cristi National Park. On the extreme northwestern coast of the country, Monte Cristi National Park covers 561 km², including the small offshore islands of the Cayos Siete Hermanos. Offering protection primarily for its diverse and abundant coral reefs, the park also protects important estuarine habitats, lagoons, and mangroves, as well as dunes, beaches, and coastal scrub forest.

Armando Bermúdez and José del Carmen Ramírez National Parks. These twin parks of the Cordillera Central comprise 766 km² and 764 km², respectively. Armando Bermúdez includes Pico Duarte (3,098 m), the highest point in the Caribbean, and both parks contain extensive tracts of pine forest, savanna, and montane humid broadleaf forest. Twelve of the country's most important rivers flow through or have their origin in these parks.

CONSERVATION ISSUES

Juan B. Pérez Rancier National Park. Formerly the Valle Nuevo Scientific Reserve, and still commonly referred to as Valle Nuevo, Juan B. Pérez Rancier National Park is a 657-km² protected area in the heart of the Hispaniolan pine forest region. This region contains some of the best representations of pine, montane broadleaf, and cloud forests on Hispaniola.

Los Haitises National Park. Situated on Samaná Bay, and at 1,375 km² one of the Dominican Republic's largest parks, Los Haitises includes densely vegetated, moist broadleaf forest on limestone karst, secondary forest, and extensive mangroves.

Del Este National Park. Located in the extreme southeastern corner of the island, Del Este National Park covers 430 km² of coastal habitats and extensive woodlands and includes Isla Saona (110 km²). Principal habitats in the park include lagoons and mangroves as well as coastal scrub forest.

Sierra de Neiba National Park. This 407-km² park is characterized by montane broadleaf forest, but much of the landscape has been heavily disturbed, such that secondary forest in varying stages of regrowth, and open pastures, are common. Pine forest is extremely reduced in the Sierra de Neiba, and nearly all forest below 1,600 m has been cut for agriculture and timber.

Laguna de Cabral Wildlife Refuge. Located at the eastern end of the Neiba Valley, the refuge (240 km²) includes the largest (30 km²) pool of freshwater on the island. Also referred to as Laguna de Rincón at Cabral, the lagoon still serves local communities as an important source for commercial fishing, and it provides critical habitat for many resident breeding, as well as migratory, bird species.

Sierra de Bahoruco National Park. This 800-km² park, and the adjoining 427-km² **Aceitillar–Cabo Rojo Panoramic Way**, are in extreme southwestern Dominican Republic and protect an important center of Hispaniolan endemism. Studies conducted in four major habitat types across an elevational gradient (Latta et al. 2003) have also documented the Bahoruco's importance to North American migrants.

Jaragua National Park. This is one of the Dominican Republic's largest protected areas, covering 1,374 km². The park includes scrub forest and dry forest, as well as the large lagoon at Oviedo and surrounding mangroves. Jaragua National Park also includes Isla Beata (47 km²) and Isla Alto Velo (1.5 km²), which lie 6 and 27 km, respectively, southwest of the Barahona Peninsula. Both islands are dominated by scrub forest and dry forest, which are interrupted in places by bare rock, beaches, lagoons, and mangroves.

National Protected Areas in Haiti

In Haiti there are only three national parks.

National Historic Park of the Citadelle, Sans Souci, and the Ramiers. Situated 18 km south of Cap Haïtien in the western Massif du Nord, this small, 2.5-km² park lies at 500 to 875 m elevation. The area immediately adjacent to the Citadelle is degraded by coffee, cocoa, and other agricultural crops, but the ridge of Bonnet-a-l'Evêque and the Ramiers area includes limestone pinnacles and ridges and contains xerophytic broadleaf forests, as well as moist broadleaf forests at upper elevations. Steep and rocky terrain has discouraged disturbance of the habitat.

Macaya Biosphere Reserve. In the Massif de la Hotte, 195 km southwest of Port-au-Prince, this 55-km² reserve rises from 950 to 2,347 m in elevation and includes the forested ridges and deep ravines of Morne Macaya and Morne Formon, and the moderately high Plain of Formon, which includes extensive areas of exposed karst. Five major rivers originate in the park:

ORNITHOLOGICAL HISTORY OF HISPANIOLA

The earliest written records of Hispaniola's avifauna date from Christopher Columbus's expeditions to the island between 1492 and 1504. These and subsequent explorations of Hispaniola during the following two centuries, however, provided little more than general narrative accounts and incidental natural history observations. France's occupation of Haiti in the early 1700s spawned advances in bird study and led to a number of published works, many of them based on specimen collections which were subsequently lost or destroyed. The first ornithological explorations of eastern Hispaniola were conducted by a French entomologist, Auguste Sallé, who published in 1857 a thorough account of his collections, which included 61 species.

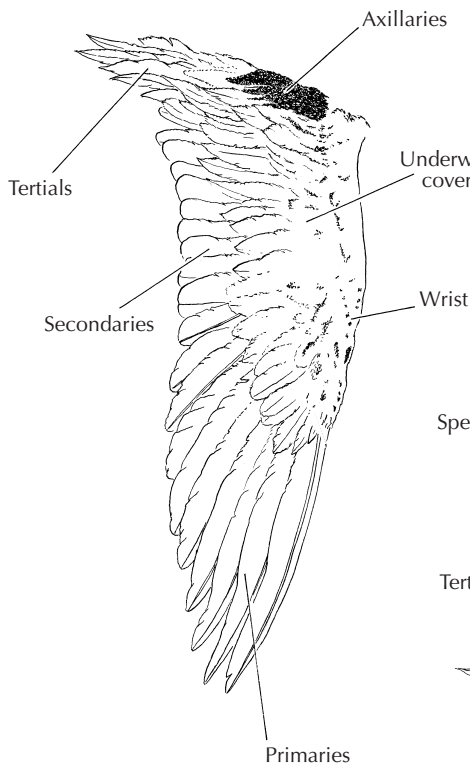
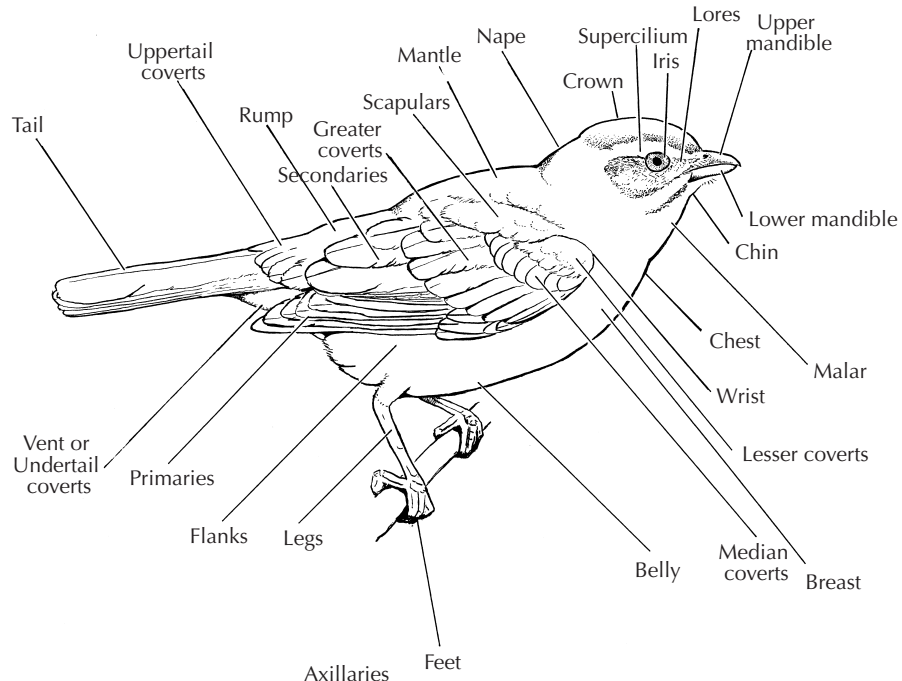
Systematic documentation of Hispaniola's avifauna began with collecting expeditions by the U.S. ornithologist Charles Cory, who visited both Haiti and the Dominican Republic from 1881 to 1883 and published an important reference work, *The Birds of Haiti and San Domingo*, in 1885. Several follow-up collecting trips through 1896, under Cory's direction, amassed several thousand bird specimens, most of which are housed in U.S. museums. From 1916 to 1923, William Abbott collected widely over the island, securing additional large series of museum specimens and gaining new insights into the birds of Hispaniola's mountainous regions and satellite islands. An intensive period of field exploration occurred from 1917 to 1934 and culminated in the landmark 1931 volume *Birds of Haiti and the Dominican Republic*, by Alexander Wetmore and Bradshaw Swales. This important reference synthesized the authors' extensive data on distribution, relative abundance, systematics, and natural history, based on their field observations, specimen collections, and examination of fossilized bone deposits. Parallel work by James Bond in the 1920s, early 1930s, and 1941 added valuable information and was incorporated into his classic publication *Birds of the West Indies*, which was first published in 1936 and updated with later editions.

Few ornithological studies were conducted during the post-U.S. occupation of Haiti from the late 1920s through the 1970s, or during the Dominican Republic's 30-year Trujillo dictatorship, which ended in 1961. The arrival of Donald and Annabelle "Tudy" Dod to the Dominican Republic in 1964 launched a new era in Hispaniolan field ornithology. Tudy Dod worked tirelessly to study birds, popularize them, and promote their conservation. Her illustrated 1978 book *Aves de la República Dominicana* was the first ornithological account of general interest to Dominicans. Dod's efforts helped usher in a wave of intensive field studies in the Dominican Republic during the 1960s and 1970s, primarily on specific species or groups of resident birds. Principle investigators included David B. Wingate (studying Black-capped Petrels), Wesley E. Lanyon (studying *Myiarchus* flycatchers), Angela Kay Kepler (studying todies), R. K. Selander (studying Hispaniolan Woodpeckers), and James W. Wiley (studying various species). These studies were followed in the 1980s and 1990s by a diversity of projects targeting wintering and transient bird communities which were conducted by Wayne Arendt, John Terborgh, John Faaborg, Joseph Wunderle, Jr., Chris Rimmer, and Steven Latta. This work has in turn spawned studies in nearly all major habitat types of the island by Latta and Rimmer. Ornithological field surveys in Haiti have not kept pace, mainly because of the political constraints of working in the country, but extensive fieldwork by Charles Woods, José Ottenwalder, and Florence Sergile in the 1970s and 1980s provided a noteworthy exception. Follow-up surveys by Chris Rimmer and colleagues were carried out during the winters of 2004 and 2005.

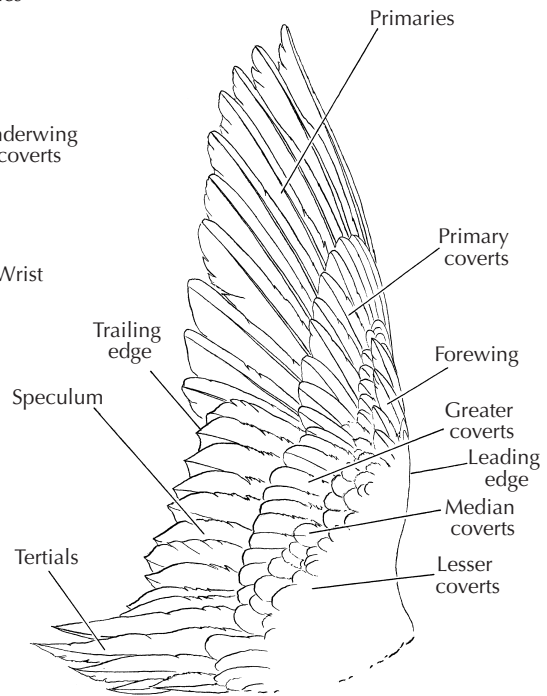
Figure 3. The basic parts of a passerine bird as illustrated by the Hispaniolan Spindalis.
Figure 4. The basic parts of a wing as illustrated by the underwing of the Black-bellied Plover. The basic parts of the waterfowl wing as illustrated by the Blue-winged Teal.

DESCRIPTIVE PARTS OF A BIRD

Body Topography



Underwing Topography



Upperwing Topography