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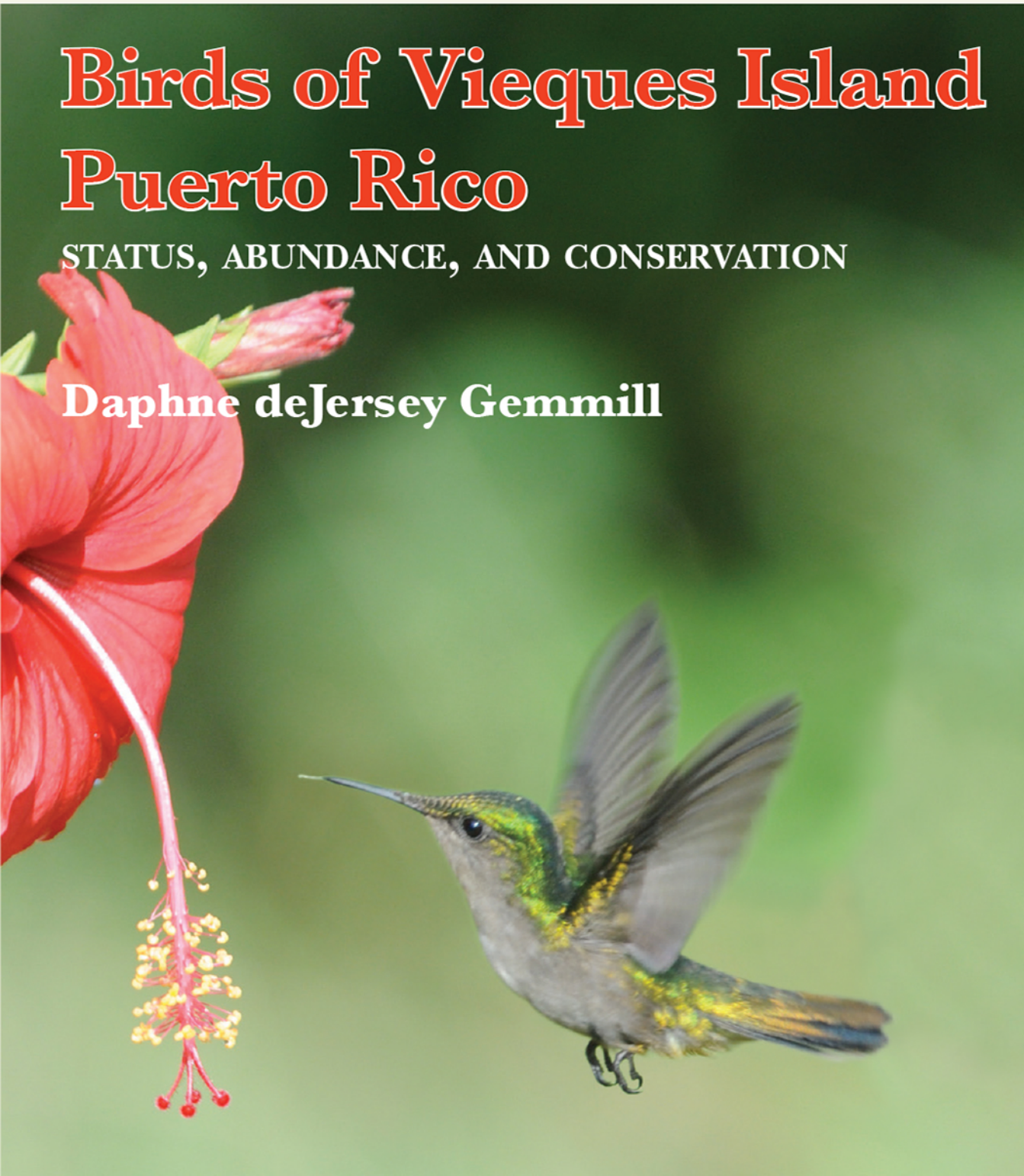
Daphne deJersey Gemmill



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Front cover: Antillean Crested Hummingbird
(Orthorhyncus cristatus), El Pilón (Gemmill 2009)

Frontispiece: Loggerhead Kingbird
(Tyrannus caudifasciatus), El Pilón (Gemmill 2006)

This work honors my parents,
Vivienne Warry Gemmill and Chalmers L. Gemmill,
who instilled in me a love of the outdoors
and curiosity about our environment,
and
Donald Messersmith,
my ornithology professor, who introduced me to birds.

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Vieques Birds

BIRDS OF VIEQUES ISLAND, PUERTO RICO: STATUS, ABUNDANCE, AND CONSERVATION

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ABSTRACT—The following study describes the 174 documented wild bird species on Vieques Island, Puerto Rico—the birds' status, abundance, habitat preference, and their conservation threats. It summarizes the geography, geology, climate, plant communities, avian habitats, and the island's political, cultural, and ornithological histories. A discussion of the paleornithological record is followed by a discussion of zoogeography, breeding birds, migrants, introduced species, and conservation. Pertinent information related to status, abundance, breeding records, arrival and departure dates, museum specimen locations, banding records, and conservation status is then provided in Species Accounts. These accounts cover 174 documented species, 21 species that lack sufficient documentation, and an escaped caged bird erroneously noted as a wild bird.

A rich ornithological history, beginning with reports published in 1705, provides data on the status and abundance of Vieques Island birds. From 1899 to 1975, ornithologists and naturalists collected 422 museum specimens and published their observations in more than sixty periodicals, ranging alphabetically from *The Auk* to the *Wilson Journal of Ornithology*. The author began annual bird surveys in 1983 of Vieques's key habitats. In mid-2002, the U.S. Fish and Wildlife Service initiated a bird-banding program, and the Sociedad Ornitológica Puertorriqueña began conducting Christmas Bird Counts. The combined data of thirty years of scientific study has clarified the status of many of the island's species, added new birds to the island list, confirmed breeding status, and highlighted the importance of an intact and permanent mangrove habitat. As of December 2012, the author found 76 species to be abundant to uncommon, and 98 species rare to extremely rare.

Keywords.—Vieques, Puerto Rico, status, abundance, conservation, birds, avian, museum specimens, banding records, ornithology.

Fig. 3 (facing page). Elizabeth Langhorne and Staci Notine surveying Laguna Boca Quebrada for wading birds. (Gemmill 2006)

PÁJAROS DE LA ISLA DE VIEQUES, PUERTO RICO: STATUS, ABUNDANCIA, Y CONSERVACIÓN

RESUMEN—El siguiente estudio describe las 174 especies documentadas de aves silvestres en la isla de Vieques, Puerto Rico - el estado de las aves, la abundancia, la preferencia de hábitat, y las amenazas a su conservación. En él se resume la geografía, la geología, el clima, las comunidades vegetales, hábitats de aves, y las historias política, cultural y ornitológica de la isla. A una discusión sobre el registro paleornithologico sigue una discusión de zoogeografía, de la reproduccion de aves, de aves migrantes, de las especies introducidas y del estado de conservacion. La información pertinente relativa a la situacion de las aves, a su abundancia, a los registros de cría, a fechas de llegada y salida, a la ubicacion de especímenes de museo, a registros de anillamiento, y estado de conservación se proporciona luego en Cuentas de Especies. Estas Cuentas cubren 174 especies documentadas, 21 especies que con insuficiente documentación, y un pájaro enjaulado que escapo, que ha sido erróneamente señalado como salvaje o silvestre.

Una rica historia ornitológica, a partir de informes publicados en 1705, proporciona datos sobre el estatus y la abundancia de aves en la Isla de Vieques. De 1899 a 1975, ornitólogos y naturalistas recogieron 422 especímenes de museo y publicaron sus observaciones en más de sesenta publicaciones periódicas, que van alfabéticamente desde *The Auk* (el alca) hasta al *Wilson Journal of Ornithology*. El autor comenzó encuestas anuales de los hábitats de aves clave de Vieques en el año 1983. A mediados de 2002, el Servicio de Pesca y Vida Silvestre de EE.UU. inició un programa de anillamiento, y la Sociedad Ornitológica Puertorriqueña realizó Conteos Navideños de aves. Los datos combinados de treinta años de estudio científico han aclarado la situación de muchas de las especies de la isla, añadido aves nuevas a la lista de la isla, confirmado el estado de reproducción, y destacado la importancia de un hábitat de manglares intactos y permanente. A diciembre de 2012, el autor encontró 76 especies clasificadas entre abundantes y poco comúnes, y 98 especies raras o extremadamente raras.

Palabras clave.—Vieques, Puerto Rico, de estatus, abundancia, conservación, pájaros, aviar, especímenes de museo, registros de anillamiento, ornitología.

OISEAUX DE L'ILE DE VIEQUES, PUERTO RICO: STATUT, L'ABONDANCE ET CONSERVATION

RÉSUMÉ—La présente étude décrit les 174 espèces d'oiseaux sauvages documentés sur l'île de Vieques, Puerto Rico – le statut des oiseaux, leur nombre, leurs préférences quant'a l'habitat, et les menaces a leur conservation. Elle résume la géographie, la géologie, le climat, les communautés végétales, les habitats des oiseaux, et les histoires politique, culturelle, et paleo-ornithologique de l'île. Une discussion de l'histoire paleornithologique est suivie d'une discussion de zoogeographie, des oiseaux nicheurs, des migrants, des espèces introduites, et leur statut de conservation. L'étude propose aussi dans les Comptages d'Espèces, des informations pertinentes relatives à l'état, l'abondance, les dossiers d'élevage, les dates d'arrivées et de départs, les emplacements des musée de spécimens, les dossiers de baguage, et l'état de conservation. Ces Comptages couvrent les 174 espèces répertoriées, 21 espèces qui n'ont pas suffisamment de documentation, et un oiseau échappé d'une cage et indiqué par erreur comme un oiseau sauvage.

Une histoire ornithologique riche, à commencer par les rapports publiés en 1705, fournit des données sur l'état et l'abondance des oiseaux de l'île de Vieques. De 1899 à 1975, des ornithologues et naturalistes ont recueilli 422 spécimens de musée et ont publié leurs observations dans plus de soixante périodiques, allant, en ordre alphabétique de *The Auk* au *Wilson Journal of Ornithology*. L'auteur a commencé des enquêtes annuelles des habitats clés d'oiseaux de Vieques en 1983. À la mi- 2002, le Fish and Wildlife Service des États-Unis a lancé un programme de baguage, et la Sociedad Ornitológica Puertorriqueña mené un Comptage des oiseaux a Noël. Les données combinées de trente ans d' étude scientifique ont clarifié le statut de nombreuses espèces de l'île, a ajouté de nouveaux oiseaux à la liste de ceux de l'île, ont confirmé le statut de reproduction, et a souligné l'importance habitative d'une mangrove intacte et permanente. En Décembre 2012, l'auteur a trouvé 76 espèces entre abondantes et rares, et 98 espèces entre rares et très rares.

Mots-clés.—Vieques, Puerto Rico, statut, abondance, conservation, oiseaux, aviaire, spécimens de musée, baguage, ornithologie.

Introduction

Vieques Island is located about 13 km (8 mi) east of the main island of Puerto Rico, and a portion of the island is designated as a National Wildlife Refuge (Figs. 4 and 5). Vieques is a municipality, or township, of Puerto Rico and is governed by a mayor and represented by two district senators. The cultural and political history of Vieques has influenced its birdlife.

There is archaeological evidence of inhabitants on the island as early as 3000 to 2000 BCE. Arawak-speaking people arrived about 1680 BCE. The Arawakans were ancient indigenous people from South America who migrated to Central America and the Greater Antilles in the Caribbean. The Taínos, distant relatives of the Arawakans, arrived from other islands, and by 1000 CE the Taíno culture flourished. In 1493, Christopher Columbus claimed Puerto Rico and its offshore islands for Spain. Within a hundred years, the Taíno culture was extinct from European infectious disease (primarily smallpox), warfare, and enslavement (Langhorne 1987).

Spain governed the affairs of Puerto Rico and its offshore islands for

Fig. 4 (facing page). The northern coastline of the eastern end is part of the Vieques National Wildlife Refuge. (Eastern End, Vieques, Gemmill 2009)

Fig. 5 (above). View of Vieques from Punta Este. (Vieques, Wikipedia 2013)

more than four hundred years. For much of that time, Vieques, once known as Crab Island by Europeans or Bieque (small island) by the Taínos, was ignored by the Spanish, and the inhabitants survived by farming, fishing, and smuggling. The French, Dutch, Danes, and British, however, coveted the island for its timber. European countries made several attempts to take possession of the island. In 1811 the governor of Puerto Rico initiated steps to secure and permanently settle Vieques. In 1832, Teófilo José Jaime María Le Guillou, a French immigrant to Puerto Rico, was appointed Governor of Vieques under Spanish rule. He established Isabel Segunda, named for Isabel II, queen of Spain, the "town of Vieques." The new governor also established large sugarcane plantations.

Following the Spanish-American War in 1898 and under the Treaty of Paris, Spain ceded Puerto Rico to the U.S. During the next fifty-four years, Puerto Ricans gained American citizenship and partial self-government. In 1952 Puerto Rico became an autonomous part of the U.S. called the Commonwealth of Puerto Rico—the status it retains today.

By the beginning of the twentieth century, sugarcane was the island's economic driving force (fig. 6). At its peak in 1922, four processing plants were active on the island (USFWS 2007). As the export market withered, sugarcane cultivation was replaced by the cattle industry (USFWS 2007). In 1978, 8,000 head of cattle roamed Vieques, which had only 7,000 inhabitants (Sorrie, field notes 1978). The timber, sugarcane, and cattle industries transformed the landscape from original forest to agricultural fields and grassy pastures.

By 2000 ecotourism replaced agriculture as Vieques's principal economic activity. Today's population (9,000) lives in the middle third of the island, clustered around Isabel Segunda, the administrative center on the north coast, and Esperanza on the south coast.

The growth of ecotourism is tied to the U.S. Navy, a major landowner on Vieques for almost fifty years. In 1941, the Navy purchased and relocated residents from about two-thirds of Vieques to extend the Roosevelt Roads Naval Station on the main island to Vieques. The Navy acquired the eastern and western thirds of Vieques for ammunition storage and training with limited civilian access. By the late 1970s, the Navy came under public scrutiny because of environmental impacts (fig. 7) associated with naval use of the island for waste disposal and military training

Fig. 6. Sugarcane plantations were established under Spanish rule in the nineteenth century. Very few traces of this once-dominant industry remain today. (Sugarcane Pier with Loaders, Esperanza, Sorrie 1971)

Fig. 7. The U.S. Navy used the eastern end of the island, which included a 900-acre Live Impact Area, for training exercises and target practice. (Live Impact Area, Gemmill 1997)

exercises. A Navy environmental impact statement was released in 1979 followed by a signed agreement in 1983 whereby the Navy would take steps to protect marine and other wildlife. This action led to the establishment of conservation zones and the fencing off of cattle from the mangroves.

Today these large tracts of undeveloped land with their pristine beaches and clear offshore waters are a haven for wildlife, especially birds of conservation concern, and are the basis for the thriving ecotourism business. By prohibiting shoreline and beach development, the Navy preserved natural habitats that have all but disappeared on the main island and throughout much of the Caribbean.

Due to public pressure, the Navy left Vieques in 2001 and transferred 12.5 km^2 (3,100 ac) on the western side to the U.S. Department of Interior for a National Wildlife Refuge, 17.0 km^2 (4,200 ac) to the municipality, and 3.2 km^2 (791 ac) to the Puerto Rican Conservation Trust (USFWS 2007). In 2003, the eastern Navy lands were transferred to the Department of Interior, creating the largest land-based wildlife refuge in the Caribbean (USFWS 2003).

Ornithological History

Vieques has a rich ornithological history, spanning more than 250 years, beginning with observations of eighteenth-century European naturalists on exploration voyages. Europeans sought to exploit the area's natural resources, establish permanent settlements, and spread Christianity. Collectors, ornithologists, biologists, naturalists, and conservationists followed. The first published record was in 1722; the most recent journal publication specifically on the birds of Vieques was in 1975.

In 1705, Jean-Baptiste Labat (1663–1738), a French Dominican missionary and naturalist, visited L'Isle à Crábes and was the first observer to record Vieques birdlife. His observations appeared in print in 1722 in his *Nouveau voyage au isles de l'Amérique, contenant l'histoire naturelle de ce pays, l'origine, les moeurs, la réligion, & le gouvernement des habitants anciens & modernes* [New voyage to the islands of America, containing the natural history of the country, the origin, customs, religion, and the government of the old and new inhabitants]. He described the bountiful marine and terres-

trial life on L'Isle à Crábes, mentioned the rivers of the island, and noted that his hunters found parrots in abundance.

Hans West (1758–1811), a Danish botanist and teacher from St. Croix, visited Vieques in 1794, which he called Krabbenneyland. He commented on the noisy cries of green parrots at daybreak coming from the highest trees in his 1794 *Beyträge zur Beschreibung von St. Croix Bebst einer Kurzen ueberssicht der benach barten inseln St. Thomas, St. Jean, Tortola, Spanishtown, und Krabbenneyland* [Report on the Description of St. Croix with a Short Overview of the Nearby Islands St. Thomas, St. John, Tortola, Spanishtown, and Crabland].

After West's visit, sixty-five years passed before another reference to the Vieques birdlife appeared in print. Alfred Newton noted in several *Ibis* articles that Apotheker Riise of St. Thomas sent a collector (about 1858) to Vieques who returned with a Puerto Rican Woodpecker *(Melanerpes portoricensis),* a Puerto Rican Lizard-Cuckoo *(Coccyzus vieilloti) (*fig. 8), and a Shiny Cowbird *(Molothrus bonariensis)* (Newton 1859b, 1860). The woodpecker and cuckoo specimens are in the British Museum of Natural

Fig. 8. A collector for ornithologist Apotheker Riise sent the first and only specimen of a Puerto Rican Lizard-Cuckoo from Vieques in 1859. This specimen resides in the Tring bird collection of the British Natural History Museum. (©Natural History Museum, London)

Fig. 9. Alexander Wetmore visited Vieques in 1912 and published his field observations in *The Auk*. (Wetmore, Culebra Island, Smithsonian Institution Archives, image no. 02953, photographer unknown 1912) http://siarchives.si.edu/

History. The Shiny Cowbird specimen is missing—neither the British Museum of Natural History nor the University of Copenhagen Museum of Zoology (ZMUC) has this specimen. In 1873 and 1875, a German who lived most of his life in Cuba, Juan Gundlach (1810–1896), conducted the first extensive Puerto Rican ornithological studies and amassed collections of skins (Gundlach 1874, 1878a, 1878b). Surprisingly, his travels did not include Vieques. During a voyage (6–8 Feb 1899) on the U.S. Fish Commission steamer *Fish Hawk,* J.D. Milligan and A.B. Baker collected birds on Vieques. Their collection is in the Smithsonian Institution National Museum of Natural History in Washington, D.C.

Stationed with the U.S. Army in Puerto Rico, Beecher S. Bowdish (1872–1963) was the first ornithologist to visit the island. The sole purpose of his visit from 5 Nov 1899 to 10 Feb 1900 was to study the island's birdlife and collect specimens. He published his findings, "Some Winter Birds of the Island of Vieques," in

The Oologist in 1900. Most of his specimens are in the collection of the American Museum of Natural History in New York City.

Following on Bowdish's heels, Charles Wallace Richmond (1868–1932), Associate Curator of Birds, National Museum of Natural History and an expert on ornithological bibliography, nomenclature, and systemics, and Leonhard Stejneger (1851–1943), the Curator of Reptiles, visited Vieques 22–28 Mar 1900 (Stone 1933). They acquired sixty bird specimens for the museum but did not publish their observations.

Fig. 10. Stuart T. Danforth was an ornithologist who researched and collected Vieques birds in 1935. (Danforth, *USGS Newsletter*, 1939 or 1940, photographer and date unknown)

Twelve years later the ornithologist and avian paleontologist Alexander Wetmore (1886–1978) explored the island from 16 Mar to 5 Apr 1912, and again 22–23 Apr (fig. 9). He landed on the western end of the island in the vicinity of Laguna Kiani and walked to the main town of Isabel Segunda. Wetmore visited the island as part of his field research under the auspices of the U.S. Department of Agriculture's Bureau of Biological Survey and the Government of Puerto Rico's Insular Board of Agriculture. He summarized his extensive field observations during his visit in "The Birds of Vieques Island, Porto Rico" published in *The Auk* (Wetmore 1916a). His specimens are in the National Museum of Natural History. He had a long association with the museum and the Smithsonian, of which he was Secretary from 1945 to 1952 (Mayr 1979).

Stuart T. Danforth (1900–1938), originally from Massachusetts, was an author, professor of biology at the College of Agriculture at Mayagüez, and the eminent Puerto Rican ornithologist in his day (Allen 1939; Wolcott 1939) (fig. 10). Virgilio Biaggi (1913–2007), his student and assistant, later became professor of biology at the University of Puerto Rico, Mayagüez and author of *Las Aves de Puerto Rico* published in 1970 and revised in 1974, 1983, and 1997. The two spent 21–31 Dec 1935 studying

the birds on Vieques. They added new birds to the island's bird list and amassed a large number of specimens, most of which are housed at the National Museum of Natural History. Danforth published "Ornithological Investigations in Vieques Island, Puerto Rico, during December 1935" in the *Journal of Agriculture of the University of Puerto Rico* (Danforth 1937).

After Danforth, the collecting of specimens waned. During the peak of the bird-collecting era from 1850 to 1940, Baker, Milligan, Bowdish, Richmond, Wetmore, Danforth, and Biaggi collected 352 specimens, including 8 nests and egg samples. Several naturalists before them and several ornithologists after them collected 52 additional birds. The published literature references 18 additional specimens that have not been located. The total of 422 collected specimens represents 55 species. Of the 422 specimens, 341 (representing 44 species) reside in the Bird Division of the National Museum of Natural History. Other museums with Vieques bird specimens are American Museum of Natural History (63); British Museum of Natural History (2); Carnegie Museum of Natural History (1); Louisiana State University Museum of Natural Science (3); Museum of Comparative Zoology, Harvard University (3); and University Museum of Zoology, Cambridge (1). The New York State Museum has the 8 nest or egg sets collected by Bowdish. The Species Accounts in this publication provide detailed information on the collected specimens, museum locations, and collection numbers for 404 specimens, and notations for 18 specimens referenced in the literature but not located.

Forty years lapsed before the next paper on Vieques's avifauna was published by Bruce A. Sorrie (1944–): "Observations on the Birds of Vieques Island, Puerto Rico" (Sorrie 1975). A photographer, ornithologist, and botanist, Sorrie was stationed at Roosevelt Roads Navy Facility in the early 1970s. The Navy assigned him to conduct bird surveys on Vieques. After his return to civilian life, the Navy hired him as a consultant to perform additional surveys from 1978 to 1981 and subsequently published his results. Sorrie was the last person to publish an extensive account of Vieques birdlife.

Between 1981 and 2013, various researchers conducted bird surveys on waterfowl or on specific species, such as Caribbean Brown Pelican *(Pelecanus occidentalis),* White-crowned Pigeon *(Patagioenas leucocephala),* White-cheeked Pintail *(Anas bahamensis),* and introduced granivorous birds that

included references to Vieques: David Belitsky (1978a, 1978b), Jaime Callazo (Callazo and Agardy 1982; Callazo and Klass 1985; Collazo 1986; Collazo et al. 1998; Collazo 2000a; Collazo and Bonilla-Martinez 2001), Joan Duffield (Duffield and Cardona 1978), Felix Iñgo (1968a, 1968b), Herbert Raffaele (1974, 1975, 1978, 1981, 1989b; Raffaele et al. 1973; Raffaele and Duffield 1979; Raffaele and Kepler 1992), Frank Rivera-Milán (1990, 1992, 1993, 1995a, 1995b, 1995c, 2001; Rivera-Milán and Bonilla Martínez 2007), and Ralph and Elizabeth Ann Schreiber (Schreiber R et al. 1981; Schreiber EA 1999, 2000a, 2000b, 2000c).

The Navy undertook a biological assessment of the Eastern Maneuver Area and Live Impact Area in 2001 that included a section on birds of conservation concern. Recently, the Vieques National Wildlife Refuge of the U.S. Fish and Wildlife Service (USFWS) began a bird-banding program, and the Sociedad Ornitológica Puertorriqueña (SOPI) occasionally undertakes Christmas Bird Counts and other surveys. This additional field work has clarified the status of many of the island's species, added new birds to the island list, confirmed breeding status, and contributed to poorly understood Caribbean migration patterns.

Since 1983, the author has conducted annual avian abundance surveys along specified routes (Appendix 3). Data have been gathered from each month of the year and from each of the key avian habitats. The author has visited the island more frequently since retiring from the National Oceanic and Atmospheric Administration (NOAA) in 2000. She has submitted her sightings to the Vieques Conservation and Historical Trust, the Vieques National Wildlife Refuge, and eBird. The highlights are published in *North American Birds*. The author produced two bird checklists (1989, 2008) for the Trust. This special issue is the first publication specifically on Vieques birdlife in thirty-nine years.

In addition to the naturalists and ornithologists mentioned previously, ninety other individuals have contributed observations. Over 14,000 records from 1705 to 2012 built the database of avian knowledge that is summarized in the Species Accounts. Through the end of 2012, 174 species are documented for the island. SOPI, which maintains the official Puerto Rican bird list, is reviewing one species, Chimney Swift *(Chaetura pelagica),* which will likely be added to the island list. Twenty additional species lack sufficient documentation to confirm their presence on the is-

land. An escaped caged bird, Hill Myna *(Gracula religiosa),* is included in the Species Accounts to preclude references to this bird as occurring in the wild on the island. The total of reported species at the end of 2012 stands at 196.

Research and Methods

Status, abundance, and habitat use of Vieques birds are based on original work by the author. Species information is based on the author's annual bird surveys from 1983 to 2012 using the Christmas Bird Count (CBC) and eBird protocols for recording birds seen and heard. The author also reviewed the literature, museum collections, and banding records.

Literature references to Vieques's birdlife are extensive. Beginning in 1705, 414 citations provide more than three hundred years of observations. Primary literature sources for field data are Bowdish (1900, 1902a 1902b, 1903), Wetmore (1916a, 1916b, 1917, 1927), Danforth (1935), and Sorrie (1975, 1978, 1981). Several Navy biological assessments include field data (1979, 1980a, 1980b, 1980c, 1986, 2001a, 2001b, 2006). Some references do not indicate the number of individual birds seen. In such instances, the sighting has been attributed the conservative estimate of one individual.

In addition to the literature review, the author surveyed museum bird collections for Vieques specimens. The results of the author's survey are summarized in the ornithological history section in a discussion of the bird-collecting era (p. 8).

Banding efforts are more recent. Between 1980 and 2006, researchers banded approximately one thousand birds. Jaime Collazo banded Caribbean Brown Pelicans on Cayo Conejo in 1980 (fig. 11). Gilbert Bonilla banded pigeons and doves in 1991. Stephen Earsom banded birds in 2001 and 2002. Peter Marra and others banded birds during a study of West Nile Virus in West Indian birds in 2003. The Vieques National Wildlife Refuge staff initiated a small demonstration program from 2004 to 2006 with the objective of developing an ongoing banding program in the future. These data are accessible from the U. S. Bird Banding Laboratory.

The literature, museum collections, and banding data together with

Fig. 11. Approximately a thousand birds were banded on Vieques between 1980 and 2006. (Jaime Collazo Banding Brown Pelicans, Bob Adamcik 1983)

field data yielded about 14,000 data points in a FileMaker Pro® database. The author maintains this database for the Vieques National Wildlife Refuge and has submitted the data to eBird.

TAXONOMY AND NAMES

The taxonomic species order, Latin names and common English names are in accordance with the Fifty-fourth Supplement to the American Or-

nithological Union's *Check-list of North American Birds* (AOU 2013). Subspecies information in the Species Accounts is from *The Howard and Moore Complete Checklist of the Birds of the World* (Dickinson et al. 2013 and 2014). The Puerto Rican names are in accordance with the Sociedad Ornitológica Puertorriqueña (SOPI) *Catálogo de las Aves de Puerto Rico* (Colón 2011) and are considered the most widely used names for a given species.

The common English, Latin, and Puerto Rican bird names are used in the Species Accounts. In the text, the Latin and common English names are used when a species is first mentioned and then the common English name is used thereafter.

Unless otherwise noted, the source for plant names in Latin, English, and Puerto Rican Spanish is the Smithsonian National Museum of Natural History online *Catalog of Seed Plants of the West Indies* (http://botany.si.edu/antilles/WestIndies); the U.S. Department of Agriculture (USDA) Plant Database is a secondary source. The English name is the one in common use in the Caribbean.

DEFINITIONS AND ASSUMPTIONS

Category labels and definitions used to describe Vieques birdlife are derived from definitions for seasonal status, abundance, and habitat preference of birds used by *North American Birds* and various authors (Arendt 1992; Raffaele 1989; Raffaele et al. 1998; Sorrie 1978; White A 1998; and White G et al. 2007).

SEASONS

Following the seasonal protocol of *North American Birds* (Norton 1980), the months of each season correspond to migration and breeding cycles. Fall (F) encompasses southbound migration (August to November). Winter (W) is when Nearctic-Neotropical migrants have arrived and remain on their wintering grounds (December to February). Spring (Sp) is the time of northward migration (March to May). Summer (S) is the peak of the Northern Hemisphere breeding season when most winter visitors to Vieques are absent and on their breeding grounds and many resident birds are breeding (June and July).

STATUS

Eight categories describe the status of Vieques birds: breeding resident, possible breeder, nonbreeding resident, former breeder, passage migrant, winter visitor, summer visitor, and vagrant. The definitions for each of these categories and abbreviations used in the tables and figures follow:

Breeding resident (BR): species present year-round.

Possible breeder (PB): year-round resident for which breeding is assumed but not verified.

Nonbreeding resident (NB): found throughout the year but is not known to breed on the island.

Former breeder (FB): species no longer present on Vieques.

Passage migrant (PM): stops on Vieques during fall or spring migration and spends the winter further south. On a rare occasion, one or two individuals linger into the winter months.

Winter visitor (WV): arrives in the fall, winters on Vieques, and departs in the spring. A few species may linger through the summer, but they are still considered winter visitors.

Summer visitor (SV): arrives in the spring, spends the summer on the island, and departs in late summer or early fall. Some summer visitors breed on the island.

Vagrant (V): species recorded fewer than 15 times since 1865 including birds that are out of their normal range as well as rare visitors (RV) that could be expected to appear on Vieques but do so infrequently.

Question Mark (?): Documentation is insufficient for a first island record; therefore, the species' presence cannot be verified and is not included on the Vieques list.

ABUNDANCE

The frequency with which birds are encountered during surveys is an indicator of their relative abundance. The key word is *indicator.* The number

of surveys, time in the field, and the habits of a bird influence its abundance status. For example, secretive birds may be underreported, and hence, designated as less common than they may actually be.

Birds are assigned to six abundance categories based on the number of birds seen during a given survey in multiple or appropriate habitats. Four of the categories are objective, whereas two—*uncommon* and *fairly common*—are subjective. The categories are applied island-wide, so a fairly common bird in a restricted habitat might be rare relative to Vieques in its entirety. For example, Key West Quail-Dove *(Geotrygon chrysia)* is listed as rare, since its range is limited to three small areas of dry limestone palmetto forests on the south coast where it is common. The six categories follow:

Abundant (A): 5 or more individuals likely to be seen daily in multiple habitats.

Common (C): 1 to 4 individuals likely seen daily in multiple habitats.

Fairly Common (FC): a species in appropriate habitat that is present and may not be seen or heard on every survey.

Uncommon (UC): a species in appropriate habitat limited to few individuals and may not be present every year.

Rare (R): a species with between 6 to 15 total records.

Extremely Rare (ER): a species with 5 or fewer total records.

HABITAT

For simplicity, Vieques's vegetation was categorized into six broad types. They are as follows:

Forests (FO): primary and secondary dry and wet forests, and mangrove, lowland, gallery, and upland forests.

Mangrove lagoons (ML): fringed, closed, and ephemeral lagoons as well as their open water and surrounding mud flats and salt pans.

Scrub (SC): thorn, beach, and evergreen scrub.

Shoreline (SH): cliffs and beaches including offshore islands and islets.

Streams and ponds (SP): freshwater bodies including ephemeral wetlands.

Inhabited areas (IA): areas with a human footprint such as towns, pastures, fields, roads, and buildings.

CONSERVATION STATUS

Conservation status of island birds is based on multiple sources that include Raffaele (1977), Philibosian and Yntema (1977), and federal, state, and nongovernmental organizations regulations and watchlists. Previous papers focused exclusively on birds protected under federal and state regulations. The author expanded the number of Vieques birds of conservation concern by adding resident and migrant birds appearing on watchlists. Designations of the probability of extinction in risk order are Endangered (EN), Threatened (TH), Near-Threatened (NT), Vulnerable (V), Extremely High (EH), High (HI), Moderate (M), National Concern (Yellow), and Global Concern (Red).

SYMBOL, ACRONYMS, AND ABBREVIATIONS

Upon a term's first-time use, its acronym is given in parentheses. The acronym is used thereafter. A reference for these frequently used terms is given in Symbol, Acronyms, and Abbreviations (pp. 225–226).

The Island

Location

Vieques supports a variety of birdlife not only because of its habitats and climate, but also to its geographical location between North and South America and Greater and Lesser Antilles (fig. 13). It is approximately 13 km (8 mi) southeast of the main island of Puerto Rico and 35 km (22 mi) southwest of St. Thomas, U.S. Virgin Islands (fig. 13). Under the jurisdiction of the Commonwealth of Puerto Rico, Vieques is the smallest and easternmost island of the Greater Antilles. It is Puerto Rico's largest offshore island: an elongated 137 km2 (34,000 ac), 35 km (22 mi) long and 7 km (5 mi) wide with a north-south axis from 18°09´ to 18°05´ and an east to west axis from -65°16´ to -65°34´ (Bauer et al. 2008, U.S. Geological Survey Vieques Map 7.5 Minute Series 1951, Photograph revised 1982).

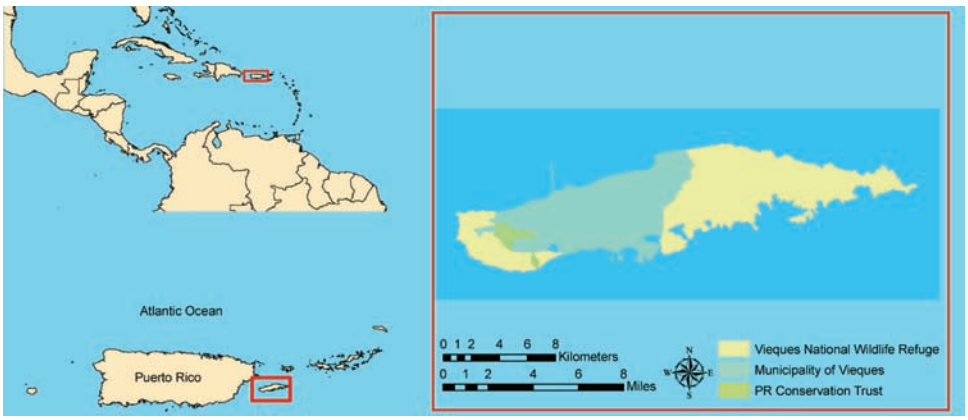


Fig. 12 (facing page). The American Kestrel is a common breeding resident. A Vieques specimen collected by A.B. Baker in 1899 is the type specimen for the Puerto Rican subspecies. (American Kestrel, Eastern End, Gemmill 2011)

Fig. 13 (above). Vieques is part of the Commonwealth of Puerto Rico and located about 13 km (8 mi) east of the mainland. (USFWS 2007)

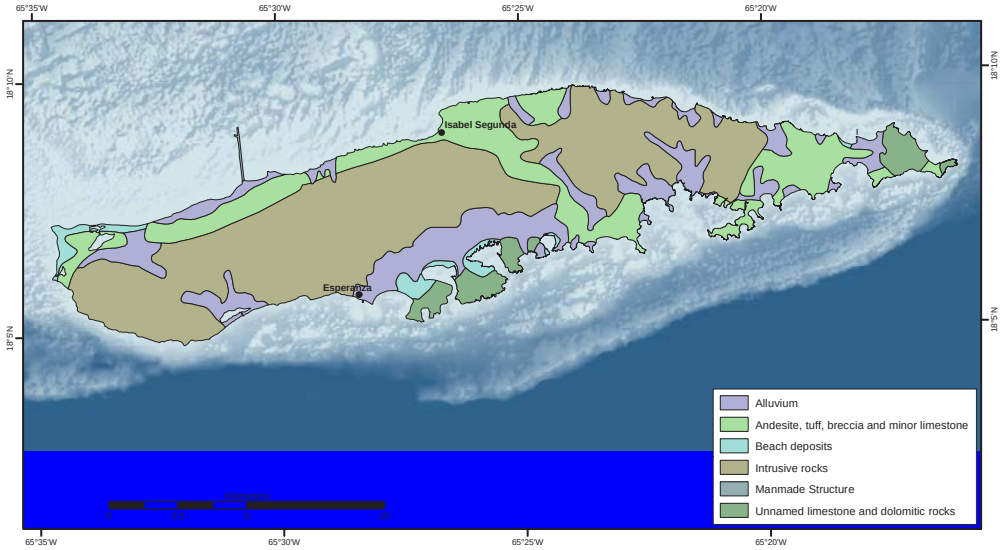


Fig. 14. Vieques has six geological structures. (Bauer et al. 2008, NOAA National Centers for Coastal Ocean Science)

Geology

The island consists of volcanic rock (primarily granite) and sedimentary rock (e.g., limestone and sandstone), overlain by alluvial deposits of gravel, sand, silt, and clay (fig. 14). The island's western end is swamp and marsh deposits from Laguna Kiani to Punta Boca Quebrada. The upland area of Monte (Mt.) Pirata is plutonic rocks underlain with granite. The island's eastern end consists of sedimentary rock with shallow clay soils. Patches of limestone are found in the northern, southern, and eastern coastal areas (USFWS 2007).

Geography

Two striking geographical features are (1) healthy mangrove lagoons, thirty-three in total, varying from freshwater to highly saline, from landlocked to tidal and (2) the moist subtropical forest of Mt. Pirata, the highest point on the island at 330 m (987 ft) (fig. 15). Otherwise the terrain

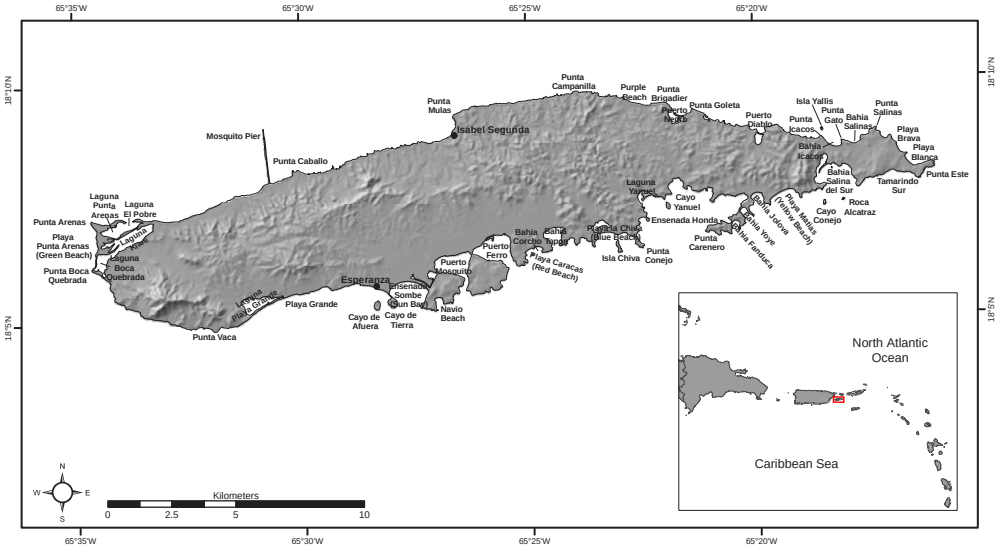


Fig. 15. The island's topography consists of hills (cerros), coastal bays, and mangrove lagoons. (Bauer et al. 2008, NOAA National Centers for Coastal Ocean Science)

is a series of cerros, or hills, no taller than 183 m (600 ft), running from east to west along the spine of the island from Cerro Indio in the east to Cerro El Buey in the west (USFWS 2007).

Climate and Weather

The Vieques climate is tropical-marine with an average temperature of 26° C (79° F), registering a modest fluctuation of 3 to 4°F between winter (February) and summer (August). The easterly trade winds are the greatest influence on the island's climate and that of the West Indies. These steady winds bring moisture from the Atlantic and produce rainfall on the islands. The average annual precipitation is approximately 114 cm (45 in), which is similar to the amount of rainfall in Atlanta, Georgia. While rain may occur in any month, half of the yearly total falls in August through November, the height of hurricane season. The heaviest rain is in September. On 15 Sep 2004, Hurricane Jeanne produced a record 24-hour total of 60 cm (23.75 in). March is the driest month with an average precipitation of less

than 5 cm (2 in). Due to the topography, the western part of the island receives a higher amount of annual rainfall (about 127 cm or 50 in) than the eastern section (about 63.5 cm or 25 in) annually (US Navy 1979; USFWS 2007). Eighteenth-century naturalists reported perennial streams on the island (Labat 1722; West 1794). Today, streambeds contain water during and shortly after rainfalls.

Plant Communities and Avian Habitats

Plant communities form the basis for habitats that support different birds. These communities can be categorized by life zones and vegetation cover (fig. 16). Six avian habitats are based on these plant communities.

Vieques has two vegetation life zones (Holdridge 1947). One of the earth's most threatened life zones, the subtropical moist forests, covers 21 percent of the land area (fig. 17) (Ewel and Whitmore 1973; US Navy 1979; Norris 20014; USFWS 2007). The subtropical moist forest is the life zone of the western portion of the island, which has more rain and deep, well-drained soil. Except for the steep slopes of Mt. Pirata, this zone was

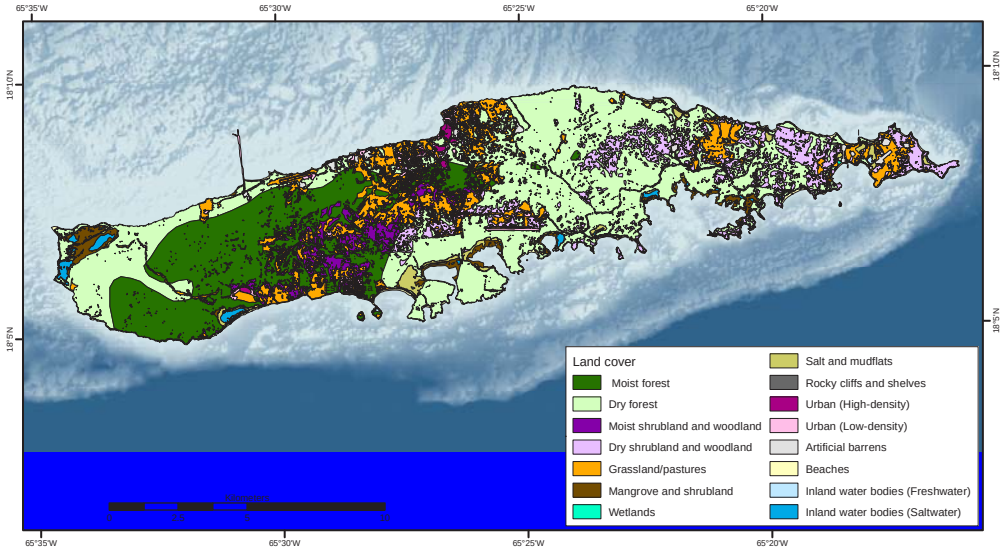


Fig. 16. Fifteen land cover types have been identified on Vieques. For this study, several of these land covers have been combined to form six vegetative land covers. (Bauer et al. 2008; NOAA National Centers for Coastal Ocean Science)

Fig. 17. The subtropical moist forest life zone covers 21 percent of the western portion of the island. Palm and deciduous trees form a canopy 15 m (50 ft) tall. (Subtropical Forest of Mt. Pirata, Gemmill 2002)

deforested in nineteenth-century colonial and early twentieth-century post-colonial times. Today, deciduous trees sprouting epiphytes (air plants) form a canopy more than 15 m (50 ft) high. The Puerto Rican royal palm *(Roystonea borinquena),* endemic to Puerto Rico (including Vieques), is found in this moist zone (Ewel and Whitmore 1973).

The drier, clay-based eastern end of the island is dominated by subtropical dry forest that covers approximately 40 percent of the land (fig. 18) (US Navy 1979; USFWS 2007). Plants in the Burseraceae (e.g., turpentine or gumbo-limbo tree), Cactaceae (e.g., cactus), and Fabaceae (e.g., mesquite, tamarind, acacia) families are common (Ewel and Whitmore 1973). The remaining is scrubland, woodland, pastures, urban, mangroves, wetlands, salt flats, rocky cliffs, beaches, freshwater, and saltwater (Ewel and Whitmore 1973; US Navy 1979; USFWS 2007).

Six vegetation land covers exist in the two life zones. *The International Classification of Ecological Communities Systems* definitions are beach, coastal

Fig. 18. The island's subtropical dry forest life zone covers about 40 percent of the land and is dominated by moderate-sized trees and shrubs in the Burseraceae, Cactaceae, and Fabaceae plant families. (Subtropical Dry Forest, Eastern End, Gemmill 2006)

strand forest, mangrove, dry forest scrub, evergreen-deciduous mixed forest, and grasslands (USFWS 2007). The first four categories are found within the subtropical dry forest zone. The evergreen-deciduous mixed forest is the vegetation cover of the subtropical moist zone. Grasslands are found in both zones. A description of these Vieques plant communities follows and their relationship to avian habitats is addressed in the next chapter.

BEACH

Saltwater, salt spray, and sea winds affect beach-community vegetation (fig. 19). This land-cover type begins on sandy beaches and rocky shorelines and extends inland a short distance. Most of the native species in this zone are grasses, such as *Sporobolus virginicus* (seashore rush-grass, matojo de burro), *Paspalum vaginatum* (seashore paspalum, no Puerto Rican name found), *Spartina patens* (saltmeadow cordgrass, yerba de sal), *Ipomoea pes-*

Fig. 19. Varieties of grasses, succulents, and shrubs are found on beaches and rocky shorelines. Playa Grande beach is an excellent example of this beach habitat. (Playa Grande, Gemmill 2007)

Fig. 20. Dry coastal strand forests are found along narrow, rocky coastlines behind beaches and mangroves. These areas are dominated by silvertop palmetto palms, a variety of evergreens, and deciduous trees. (Puerto Ferro Dry Coastal Strand Forest, Gemmill 2008)

caprae (bay hops, bejuco de playa), and *Canavalia maritima* (beach-bean, no Puerto Rican name found). Succulents such as *Cakile lanceolata* (coastal searocket, mostacilla del mar), and the native *Euphobia serpens* (matted sandmat, Sanguinaria) are common. Shrubs are also found such as *Scaevola plumieri* (inkberry, borbón), *Suriana maritima* (bay cedar, guitarán), *Coccoloba uvifera* (sea grape, uva de playa). Succulent plants, *Ipomoea pes-caprae* and *Canavalia maritima,* dominate the sandy beaches.

COASTAL STRAND FOREST

Having been left undisturbed by humans, diverse dry evergreen and deciduous woodlands thrive in the dry environment of narrow rocky coastal areas. *Thrinax morrisii* (silvertop palmetto, a fan palm; palma de escoba) is the identifying plant of this community. The common native xerophytic shrubs are *Colubrina arborescens* (snakewood, abejuelo), *Erithalis fruticosa* (candlewood, jayabico), *Crossopetalum rhacoma* (poison cherry, coral), *Suriana maritima* (bay cedar, guitarán), *Oplonia spinosa* (prickly bush, espinosa), and occasionally dense stands of *Bromelia pinguin* (penguin, penguin). Common low-growing native trees are *Coccoloba diversifolia* (pigeon plum, cucubano), *Coccoloba uvifera* (sea grape, uva de playa), *Cassine xylocarpa* (marble tree, guayarote), *Byrsonima lucida* (locust-berry, aceituna), *Bucida buceras* (black olive, ucar), *Bursera simaruba* (gumbo limbo, almácigo), *Tabebuia heterophylla* (white cedar, roble blanco), *Pisonia subcordata* (loblolly, loblolly), *Krugiodendron ferreum* (black ironwood, bariaco), *Bourreria succulenta* (USDA Plants Database: bodywood, no Puerto Rican name found), *Gymnanthes lucida* (crabwood, yaití), and the toxic West Indies endemic *Rauvolfia nitida* (milk bush, cachimbo). Several flowering plants are in the genus Eugenia. The limestone outcroppings of the Puerto Ferro, Puerto Mosquito, and Cerro Playuela peninsulas are excellent hosts of this vegetative cover (fig. 20).

MANGROVE

Trees and shrubs of the mangrove family Rhizophoraceae are found in saline coastal habitats and grow in both moist and dry zones. Vieques has four mangrove species:

1. *Rhizophora mangle* (red mangrove, mangle zapatero) typically lines the shores of the bays, lagoons, and channels.

2. *Avicennia germinans* (black mangrove, mangle negro) occurs on higher ground and is the dominant species of the island, occurring as dense stands in drier sites and as islets in shallow, open water (Fram 1972; Wiley 1979).
3. *Laguncularia racemosa* (white mangrove, mangle bobo) occurs further inland.
4. *Conocarpus erectus* (button mangrove, mangle botón) is in the interior.

The most extensive mangrove forests are the Kiani Wetland Complex, Puerto Mosquito/Laguna Sombe, Puerto Ferro, and Ensenada Honda (fig. 21).

Fig. 21. Four types of saltwater-tolerant mangrove trees and shrubs are found on Vieques, located in both moist and dry areas along the tidal coastline. (Puerto Mosquito Mangroves, Gemmill 2012)

Sandy salt flats often extend behind the tidal mangrove areas (fig. 22). Common herbaceous plants of the salt flats are *Batis maritima* (saltwort, barilla), *Sesuvium portulacastrum* (sea purslane, verdolaga rosada), *Heliotropium curassavicum* (seaside heliotrope, cotorrera de playa), *Lantana involucrata* (wild sage, santa maría), *Ipomoea pes-caprae* (bay hops, bejuco de playa), *Sporobolus virginicus* (seashore rush-grass, matojo de burro), and other grasses and sedges. Common woody vegetation includes the natives *Randia aculeata* (ink-berry, cabai nacte), *Pictetia aculeata* (fustic, tachuelo), *Cocccoloba uvifera* (sea grape, uva de playa), *Bucida buceras* (black olive, ucar), and *Tabebuia heterophylla* (white cedar, roble blanco).

Fig. 22. Sandy salt flats are located inland behind the mangroves. Saltwater-tolerant grasses, sedges, shrubs, and trees grow in these areas. (Puerto Ferro Salt Flat, Gemmill 2013)

Fig. 23. Dry forest scrub dominates the drier eastern portion of the island. It is a less desirable avian habitat, and birds that frequent these areas also forage in other plant communities. (Eastern End, Rainy Season, Gemmill 2008)

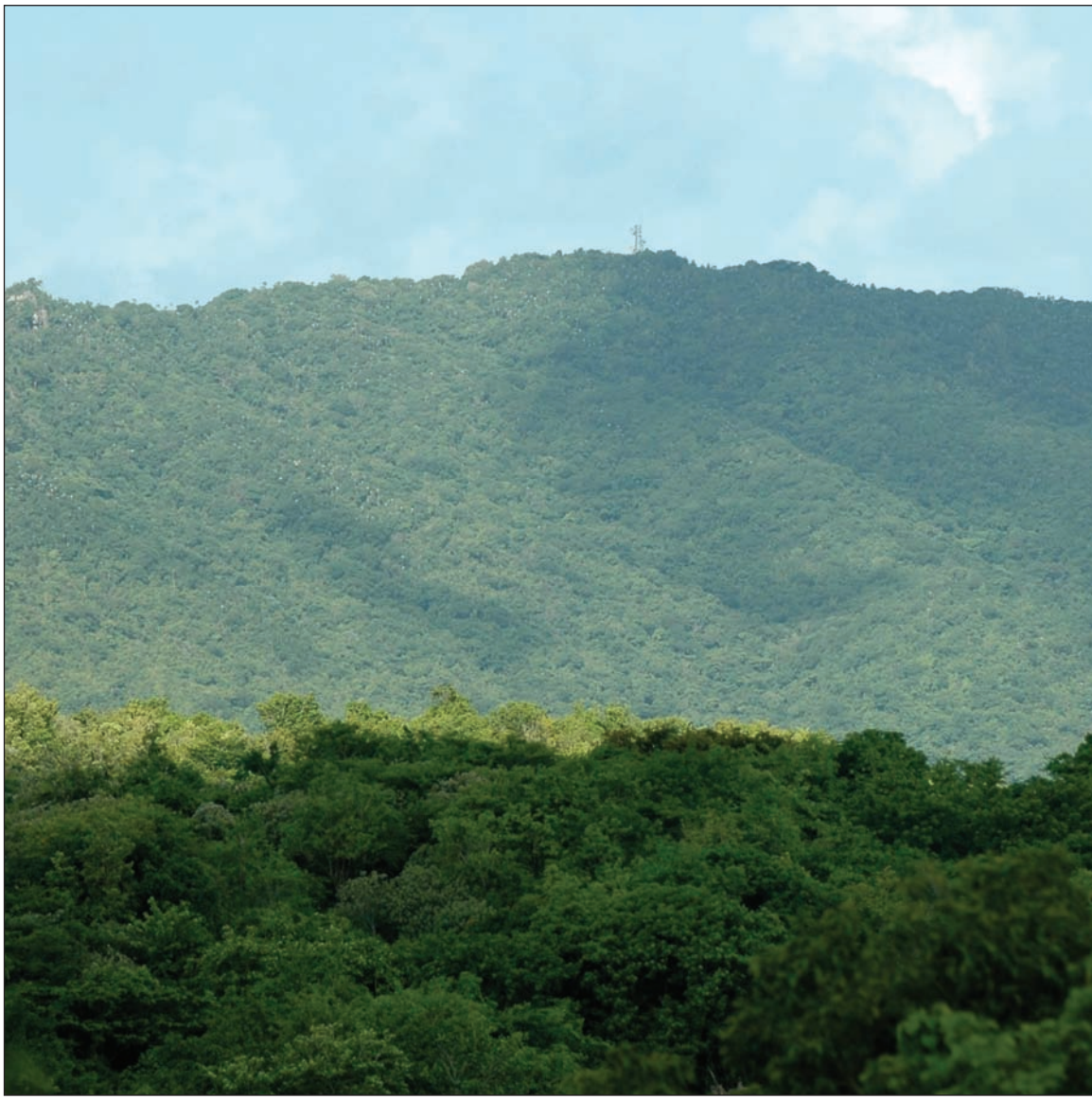
DRY FOREST SCRUB

Semi-deciduous forest scrub is found throughout the West Indies (Terborgh 1973). On Vieques, as on other islands, the original vegetative cover has been greatly modified due to grazing and agriculture. Today, dense, dry, spiny woodland and shrub community dominate the drier sections of the island (fig. 23). Remnant stands of the original vegetative cover occur on the undisturbed hilltops and ridges where *Thrinax morrisii* (thatch palm, palma de escoba) is dominant. In the lowlands the secondary growth mesquite savanna and lowland drought-deciduous scrubland have many introduced species. Native plants of the mesquite savanna are the common acacia of the island, *Prosopis juliflora* (mesquite, mesquite); *Leucaena leucocephala* (wild tamarind, acacia); and *Ziziphus mauritiana* (Indian kujube, juyube). Several native Acacia species are *Acacia macracantha* (long-spined acacia, tamarindo silvestre) and *Acacia farnesiana* (casha,

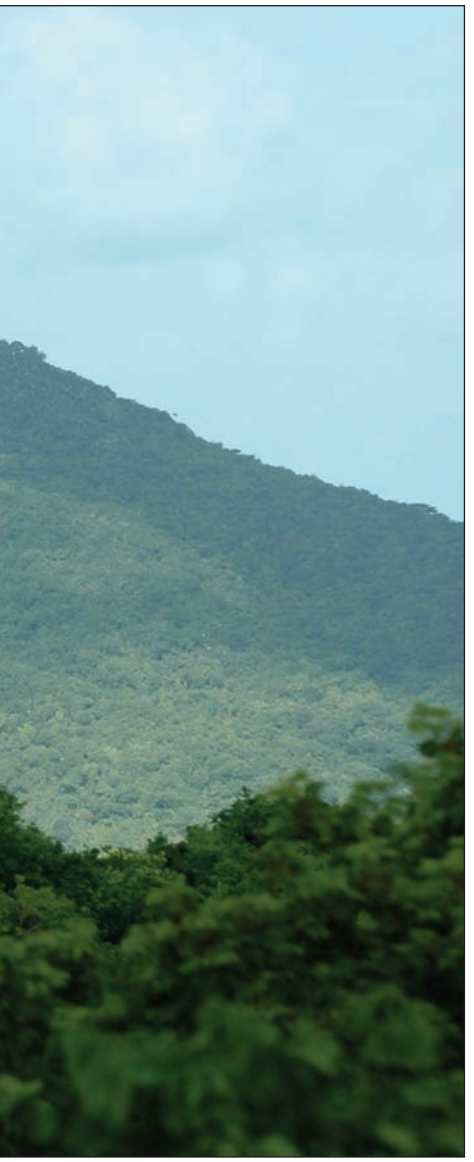
aroma). Other native species are *Pithecellobium unguis-cati* (cat's claw, escambrón colorado), various croton and lantana species, *Randia aculeata* (ink-berry, cabai nacte), and *Bucida buceras* (black olive, ucar). In 1978 as well as today, the best intact black olive, or ucar, forests, are near Laguna La Plata and Laguna Yanuel. Trees can be 50 ft in height (Woodbury, pers. com. 1978). The grasses are primarily the exotic *Panicum maximum* (Guinea grass, gramalote), native *Chloris barbata* (Mexican blue grass, horquetilla morada), and exotic *Dichanthium annulatum* (railroad-track grass, pajón). The dominant woody species are the exotic *Achyranthes aspera* (man-better-man, rabo de gato), and natives *Parkinsonia aculeata* (Jerusalem thorn, flor de mayo) and *Capparis flexuosa* (caper tree, limber caper). A unique native dry cactus-scrub forest is associated with the steep slopes of the hills on the eastern end where humans and cattle did not venture (Sorrie 1979). The native cactus is *Pilosocereus royenii* (Royen's tree cactus, Sebucán).

EVERGREEN-DECIDUOUS MIXED FOREST

Mature remnants of Vieques's evergreen hardwood forest are found on upper slopes, ravines, and interior highlands stretching from Mt. Pirata and Cerro El Buey in the west down the central spine of the island ending



in the east at Quebrada Marunguey (fig. 24). These highlands receive a moderate amount of rain (an average of 50 in), placing them in the subtropical moist forest life zone. Mixed lowland forest and gallery forest are found only as remnants in moist lowland areas along the north central coastal slope, usually along streambeds. Upland mixed broadleaf forest is restricted to the western half on higher hills (Sorrie 1979). Roadside vegetation is disturbed and conducive to weedy species, such as the exotic *Leucaena leucocephala* (wild tamarind, acacia), native *Cordia polycephala* (black sage, basora prieta), and native West Indies endemic *Mimosa ceratonia* (climbing mimosa, zarza).



Two of the most conspicuous upper-story plant species in this forest are the *Coccothrinax alta* (silver fan palm, palma de abanico), which is endemic to Puerto Rico and the Virgin Islands; and the *Bursera simaruba* (gumbo limbo, almácigo). The tallest trees are found in these areas. The slender and tall fan palm *(Coccothrinax barbadensis)* is the most conspicuous palm observed above the canopy on Mt. Pirata (Oscar Diaz, pers. com., 2012). Common native tree species within the forest are *Savia sessiliflora* (amansa guapo in the USDA Plants Database), *Krugiodendron ferreum* (black ironwood, bariaco), *Chrysophyllum argenteum* (wild star apple, caimito verde), and *Ceiba pentandra* (silk cotton tree, ceiba). The West Indies endemic *Lonchocarpus domingensis* (lancepod, geno-geno) is among the largest.

This habitat is rich in endemic plants. The Puerto Rican endemic *Goetzea elegans* (beautiful goetzea, manzanilla) is a rare plant and legally protected. Two other endemic Puerto Rican

Fig. 24. Evergreen-deciduous forest is found in the subtropical moist forest life zone. (Mt. Pirata Evergreen-Deciduous Forest, Gemmill 2006)

Fig. 25. Many birds species, including birds of conservation concern, are attracted to grassland and its multitude of seed plants. (Ensenada Sombe Grasslands, Gemmill 2010)

species are *Myrciaria myrtifolia* (ridgetop quavaberry in USDA Plants Database) and *Acalypha berteroana* (little Puerto Rico copperleaf). Puerto Rico and the Virgin Islands endemic species are *Malpighia fucata* (black twist, palo bronco in the USDA Plants Database), and *Cordia ricksecker*i (San Bartolomé in English and Spanish in the USDA Plants Database).

GRASSLAND

From 1940 to 1980, the thriving cattle industry kept much of the island in grasslands through fire and grazing. In the 1990s, when the cattle were removed and fires suppressed, grasslands reverted to dry forest and scrub with early successional tree species, such as the exotics *Leucaena leucocephala* (wild tamarind, acacia) and *Albizia lebbeck* (siris tree or woman's

tongue, acacia amarilla). Several grasslands still exist in areas recently subjected to fire or maintained by mowing, such as the areas around Camp Garcia or Ensenada Sombe (fig. 25). These areas are dominated by short bunch grasses that are composed of exotics, such as *Dichanthium annulatum* (railroad-track grass, pajón), *Cenchrus ciliaris* (buffelgrass, yerba de salinas), *Bothriochloa pertusa* (hurricane grass, heracán), and *Eleusine indica* (goose grass, grama de caballo). A common native grass is *Sporobulus indicus* (smut grass, burrillo). *Panicu maximum* (Guinea grass, gramalote) is a very common tall grass.

Avian Habitats

The author identified six categories of avian habitat that incorporate the six ecological plant communities described earlier in the chapter. In this section, the six avian habitats in declining order by size are outlined. The descriptions, compiled from several publications (Woodbury 1972; US Navy 1979; USFWS 2007), include avian relationships to plant communities, specific locations, and their importance for certain bird species.

FORESTS (63 PERCENT)

The author combined the coastal stand, mixed evergreen-deciduous, and mangrove forests into one bird habitat called forests. This combination reflects the fact that many birds, such as the White-crowned Pigeon and endemic Adelaide's Warbler *(Setophaga adelaidae),* use more than one forest community. This forest habitat is comprised of three types: (1) moist gallery forests of the western portion of the island (e.g., Mt. Pirata forest) (21 percent), (2) drier upland forests (e.g., Puerto Ferro peninsula, restricted to the tops of the larger hills), and lowland forest generally found adjacent to the inland boundaries of mangrove forests on the south coast (e.g., Ensenada Honda) (40 percent), and (3) mangrove forests (e.g., Boca Quebrada, Kiani Wetland complex, Playa Grande, Laguna Sombe, Puerto Mosquito, and Puerto Ferro) (2 percent). A unique black olive or ucar *(Bucida buceras)* forest surrounds Laguna Yanuel.

Mangrove forests are one of the most threatened habitats in the world (Norris 2004). From the 1940s to the 2000s, Vieques's mangrove forest declined by approximately 133 km^2 (329 ac). In the late 1980s, the

Navy began protecting the remaining mangrove forests (USFWS 2007). As a result, Vieques's rate of loss is less than on the main island or other Caribbean islands (Bauer 2008). Today Vieques's mangrove habitat is relatively stable and comprises 6 percent of the total Puerto Rican mangrove acreage (Lewis 1979, 1985; Bauer et al. 2008). By contrast, Puerto Rico has lost 85 percent of its mangrove cover (Fram 1972; Bauer et al. 2008).

Sixty-five bird species use these forest habitats. Twenty-one forest-dependent species are of conservation concern. The mangrove forest is prime habitat for many winter visitors and certain breeding species (Lewis et al. 1981a). Three species of quail-dove and several species of warblers are restricted to forest habitat, primarily the moist forest of Mt. Pirata.

SCRUB (17 PERCENT)

Scrub combines dry forest scrubland and beach scrub with its coco palms of the northwest and west coasts; evergreen scrub on the limestone cliffs (e.g., Puerto Ferro and Mosquito); the Microphyllous thorn scrub of the dry forest scrubland, which is the dominant vegetation type on the eastern portion of Vieques; mixed low scrub that covers the eastern ridges and hillsides; and mixed thorn scrub on the western portion (e.g., Kiani, Boca Quebrada).

Scrub is a less desirable avian habitat. The fifty-four species that frequent it supplement their foraging in other habitats (Marra et al. 1998; Marra and Holmes 2001). It attracts the fewest birds of conservation concern with a total of five species of which four are breeding residents that have adapted to this habitat over time. Baltimore Oriole *(Icterus galbula),* an extremely rare winter visitor, prefers the coco palms of the beach scrub habitat when it visits the island.

INHABITED AREAS (15 PERCENT)

Grassland plant communities form the basis for a wider bird habitat: inhabited areas that combine grasslands and pastures; commercial, recreational, and residential areas; barren areas, such as the Live Impact Area; and road verges. The two towns on the island, Isabel Segunda and Esperanza, together with the airport, former Navy headquarters, Mosquito Pier, and Camp Garcia comprise the main inhabited areas (fig. 26).

Sixty-eight species of birds can be found in this habitat. Eight out of

Fig. 26. Esperanza and Isabel Segunda are the two towns on the island. The towns attract introduced species because of seed plants. (Isabel Segunda, Gemmill 2008)

the nine introduced species on the island prefer the urban environment with its many seed plants. Grassy areas, puddles, and poorly drained built-up areas are refugia for shorebirds. For example, during and after severe fall weather, large numbers of migrating shorebirds can be found resting and feeding on the mowed grass lawns of Ensenada Sombe if their preferred mud flats are submerged. Thirty-two percent of the birds that frequent inhabited areas are birds of conservation concern.

MANGROVE LAGOONS (3 PERCENT)

Mangrove lagoons encompass the sandy salt flats of the mangrove plant community plus mud flats, open water, and mangrove islets. The largest mangrove communities are located along the south-central coast (fig. 27).

Fig. 27. Mangroves cover about 3 percent of the island with the largest areas on the south-central coast. Many waterbirds are found in these areas. (Puerto Mosquito, Gemmill 1983)

Ensenada Honda is the largest at approximately 0.81 km^2 (200 ac), followed by Puerto Ferro with 0.38 km^2 (93 ac), and Puerto Mosquito with 0.25 km^2 (60 ac). The Kiani Wetlands on the west end of the island encompasses approximately 0.72 km^2 (177 ac).

Seventy-three species, of which a majority are waterbirds, use the mangrove lagoons for a combination of feeding, resting, roosting, or nesting. Fifty-six percent of the birds that depend on this habitat are of conservation concern.

SHORELINE (2 PERCENT)

Shoreline habitat covers the beach plant community plus sandy beaches, rocky outcroppings, limestone cliffs, offshore islets, and coastal waters.

Thirty-two bird species favor the shoreline with waterbirds being the principal users. Seven species use this habitat exclusively. With the scarcity of undeveloped shoreline on Puerto Rico and other Caribbean Islands, Vieques's pristine shoreline attracts many birds of conservation concern. This habitat has the greatest number of birds that are covered under the

Fig. 28. The most important shoreline area for breeding birds is Cayo Conejo, which once harbored the largest Brown Pelican breeding colony in Puerto Rico. (Cayo Conejo, Gemmill 2008)

U.S. Endangered Species Act (ESA). The most important shoreline area for breeding birds is Cayo Conejo, which once harbored the largest Brown Pelican breeding colony in Puerto Rico (fig. 28).

STREAMS AND PONDS (0.1 PERCENT)

The habitat choice of some birds is more dependent on freshwater than terrestial plant community. For this reason, an avian habitat titled streams and ponds was added to cover freshwater sources and surrounding vegetation. A freshwater pond at kilometer marker 4.7 on Highway 997 is the only permanent freshwater habitat on the island. Puddles, submerged low-lying areas, and seasonal streams create temporary freshwater habitats during and after the rainy season.

The few freshwater sources attract sixty-one species, of which twenty-five species are of conservation concern. Two extremely rare bird species for the island, Solitary Sandpiper *(Tringa solitaria)* and Louisiana Waterthrush *(Parkesia motacilla),* prefer this habitat.

Vieques Birds

What do we know about Vieques birds? Information to date has accumulated from various sources. An archaeological excavation provides information on the early birdlife of the island. Work by James Bond illuminates origins of Vieques birds, which molecular biology is refining. Surveys conducted between 1899 and 2012 shed light on the status of breeding birds, birds that visit the island, and introduced species. This special issue of this journal integrates these sources to present Vieques birdlife today and its conservation challenges.

Paleornithology

Little is known of the earliest avian inhabitants on Vieques. Wetmore, a paleontologist, did not explore the island's fossil record during his 1912 visit. Yvonne M. Narganes Storde did her master's thesis (University of Georgia) on vertebrate remains from two middens associated with pre-Columbian aboriginal sites at Sorcé. Her study contains the only paleornithological record for the island (Narganes 1982). The middens date to 35–65 CE. Birds were second to fish in biomass remains. Her analyses of bones housed at El Centro de Investigaciones Arqueológicas, University of Puerto Rico, identified nineteen avian genera: pelicans, boobies, frigatebirds, herons, bitterns, egrets, flamingos, ducks, falcons, rails, gallinules, coots, gulls, terns, pigeons, doves, parrots, crows, and thrushes. Pigeons comprise the largest group. Specific species included American Flamingo *(Phoenicopterus ruber),* Magnificent Frigatebird *(Fregata magnificens),* Great Egret *(Ardea alba),* Black-crowned Night-Heron *(Nycticorax nycticorax),* and White-winged Dove *(Zenaida asiatica).* The latter is likely an error. The present-day ornithological record indicates that White-winged Dove is a recent Greater Antillean colonizer reaching Vieques in 1971 (Sorrie 1975).

Fig. 29 (facing page). Bridled Quail-Dove arrived from the Lesser Antilles and was first reported in 1972. (Bridled Quail-Dove, Mt. Pirata, Gemmill 2006)

Zoogeography

The origins of many birds now resident on Vieques reflect the island's position between North and South America and Greater and Lesser Antilles. Until the 1960s, zoogeographers studying the distribution of plants and animals considered the West Indies avifauna as part of the Neotropics.

In 1963, James Bond published the first of three papers arguing that Caribbean avifauna derived from Central America and tropical North America rather than from South America (Bond 1963, 1966, 1978). He suggested that thrashers, mockingbirds, vireos, and wood warblers from tropical North America colonized the West Indies, along with herons, ibises, storks, gulls, plovers, doves, nighthawks, and woodpeckers from North America (Bond 1966). Fewer South American families have spread northward through the Lesser Antilles because the smaller islands of the northern Lesser Antilles may form a barrier for dispersal (Bond 1966). Parrots (Psittacidae), hummingbirds (Trochilidae), tyrant flycatchers (Tyrannidae), and honeycreepers exemplify successful colonists from the south. Unsuccessful South American colonists and families poorly represented in the West Indies include becards (genus *Pachyramphus*), trogons (Trogonidae), antbirds (Thamnophilidae), and ovenbirds (Furnariidae).

Based on preliminary studies, molecular biologists are questioning some of Bond's conclusions as to the origins of certain species. They believe, for example, that the Bananaquit *(Coereba flaveola)* and Amazonia parrots may have originated in the Caribbean rather than South America, and Grasshopper Sparrow may have South American origins rather than North America. Research is underway to confirm these initial findings (Seutin et al. 1994; Burns et al. 2002, 2003; Russello and Amanto 2004; Ricklefs and Bermingham 2008; Klicka 2014; Ricklefs, pers. com. 2014).

Until these initial findings are confirmed, the origins of Vieques resident birds are consistent with Bond's theory and are predominately of northern derivation (Table 1). Of thirty-four breeding and former breeding native landbirds, four originated from Central America and sixteen from North America versus ten from South America. Four of the thirty-four are of uncertain origin. With the exception of the White-cheeked Pintail, the resident waterbirds are derived from North America. The breeding raptors of Vieques, American Kestrel *(Falco sparverius)* and Red-tailed Hawk *(Buteo jamaicensis),* arrived from North America (Bond 1966).

Table 1. Author's Tabulation of Vieques Resident Landbirds (based on Bond 1966)			
	English Name	**Puerto Rican Name**	**Origins**
SOUTH AMERICAN			
1	Bridled Quail-Dove	Paloma Perdez de Martinica	South America
2	Mangrove Cuckoo	Pájaro Bobo Menor	South America
3	Smooth-billed Ani	Garrapatero	South America
4	Antillean Mango	Zumbador Dorado	South America
5	Green-throated Carib	Zumbador Pechiazul	South America
6	Antillean Crested Hummingbird	Zumbadorcito Crestado	South America
7	Puerto Rican Parrot	Cotorra Puertorriqueña	South America
8	Caribbean Elaenia	Juí Blanco	South America
9	Bananaquit	Reinita Común	South America
10	Shiny Cowbird	Tordo Lustroso	South America
CENTRAL AMERICAN			
1	Puerto Rican Flycatcher	Juí	Central America
2	Gray Kingbird	Pitirre	Central America
3	Loggerhead Kingbird	Clérigo	Central America
4	Greater Antillean Grackle	Mozambique	Central America
NORTH AMERICAN			
1	Scaly-naped Pigeon	Paloma Turca	North America
2	White-crowned Pigeon	Paloma Cabeciblanca	North America
3	White-winged Dove	Tórtola Aliblanca	North America
4	Zenaida Dove	Tórtola Cardosantera	North America
5	Mourning Dove	Tórtola Rabilarga	North America
6	Key West Quail-Dove	Paloma Perdiz Áurea	North America
7	Short-eared Owl	Múcaro Real	North America
8	Antillean Nighthawk	Querequequé	North America
9	Puerto Rican Woodpecker	Carpintero de Puerto Rico	North America
10	Black-whiskered Vireo	Julián Chiví	North America
11	Caribbean Martin	Golondrina de Iglesias	North America
12	Pearly-eyed Thrasher	Zorzal Pardo	North America
13	Northern Mockingbird	Ruiseñor	North America
14	Yellow Warbler	Canario de Mangle	North America
15	Adelaide's Warbler	Reinita Mariposera	North America
16	Grasshopper Sparrow	Gorrión Chicharra	North America
UNCERTAIN			
1	Common Ground-Dove	Rolita	Uncertain
2	Ruddy Quail-Dove	Paloma Perdiz Rojiza	Uncertain
3	Yellow-faced Grassquit	Gorrión Barba Amarilla	Uncertain
4	Black-faced Grassquit	Gorrión Negro	Uncertain

The arrival histories of five Vieques birds serve to illustrate the diversity of species' colonization routes from North, Central, and South America. In order of arrival date, the five species are Green-throated Carib *(Eulampis holosericeus)* (1912), Shiny Cowbird (1966) Mourning Dove *(Zenaida macroura)* (1967), White-winged Dove (1971), and Bridled Quail-Dove *(Geotrygon mystacea)* (1972) (Fig 29, p. 38). The Mourning Dove and White-winged Dove arrived from North or Central America via the Greater Antilles. The others arrived from South America via the Lesser Antilles or from the southern islands of the Lesser Antilles.

Starting with the Lesser Antilles route, the currently fairly common Green-throated Carib (fig. 30) arrived on Vieques from the Lesser Antilles in the early 1900s (Wetmore 1916b, 1917) and may have displaced the endemic Antillean Mango *(Anthracothorax dominicus)* (Wetmore 1916a, 1916b, 1927; Sorrie 1975; Raffaele 1989a, 1998). At the time of the Carib's arrival, the Antillean Mango of similar size was the most abundant hummingbird on the island (Wetmore 1927). Danforth (1937) did not observe the mango during his visit in 1935, and by 1957 the mango was considered rare on Vieques (Robertson Jr. 1962). On Christmas Day 1994, Geoffrey LeBaron, the director of the National Audubon Society CBC, recorded an Antillean Mango, the first such observation since 1912 (Norton 1995a).

The Shiny Cowbird's arrival date in the Greater Antilles is debatable. A specimen collected on Vieques about 1858 (Newton 1860) is of questionable origin. Because the bird was not reported again on Vieques for more than a hundred years, Cory (1892), Wetmore (1916a), Bond (1978), and Raffaele (1989) considered it a stray or an escaped cage bird. The species spread north through the Lesser Antilles during the 1900s, reaching eastern Puerto Rico in 1955, Hispaniola by 1976, and Jamaica in 1993 (Cruz et al. 1989). The arrival date for this species on Vieques is the 1950s or 1960s (Rolle 1961; Bond 1967), with the first confirmed sighting in 1971 (Sorrie 1975). Given the lack of suitable grassland habitat, the Shiny Cowbird is found in low numbers on Vieques.

During the twentieth century, the Bridled Quail-Dove, a restricted range species found primarily in the Lesser Antilles, spread northward through the Lesser Antilles. Notwithstanding a record of a vagrant collected on Culebra by A.B. Baker in February 1899 (USNM# 169028), it probably reached Puerto Rico sometime in the 1970s. Cory (1887) re-

Fig. 30. There are two species of hummingbirds on Vieques. An example of a species' colonization is the arrival from the Lesser Antilles of the Green-throated Carib. It is believed that the Green-throated Carib displaced the Antillean Mango, the most abundant hummingbird when Wetmore visited the island in 1912. (Green-throated Carib, El Pilón, Gemmill 2009)

ported that this species was confined to Guadeloupe, Santa Lucia, and Grand Terre. Wetmore (1916b) and Danforth (1936) noted that the bird was very rare in Puerto Rico. Bond (1940) listed this species as confined to the Lesser Antilles where it was rare. By 1950, he added Culebra and the Virgin Islands to its range. As of 1956, the Culebra specimen was still the only record from Puerto Rico (Bond 1956). As late as 1974, Biaggi questioned its presence in the region and did not include it in his 1983 revision of *Las Aves de Puerto Rico.* Raffaele was the first to report this species on Vieques. He saw and heard two individuals on Mt. Pirata on 23 Jun 1972 (Raffaele 1978; Sorrie 1975, 1978). In his 1997 edition, Biaggi mentions that this quail-dove had recently been reported from Vieques and Fajardo on the main island.

Moving east through the Greater Antilles and then south, the White-winged Dove was first recorded in Puerto Rico in 1943 (Bond 1987). In his 1945 *Check-list of the Birds of the West Indies,* Bond listed this species as

accidental in Puerto Rico. The first record for Vieques was on 8 Mar 1971 (Sorrie 1975). The dove reached St. John, Virgin Islands, in May 1982 (Norton 1982b) and has expanded its population southward since then (Norton et al. 2003). The first record for the Lesser Antilles was in 1992 in Saba. The dove had reached as far south as Dominica by 2005 (Larsen and Levesque 2008).

The Mourning Dove was unknown from Puerto Rico until 1935, after which it became more common in the southwest (Raffaele 1989a). Vieques's first record is in 1967 by Luis Santaella (Bond 1967). Today it is a rare bird on Vieques; apparently, it reached a barrier in its range expansion. A review of the 1990–2007 National Audubon Society CBC for Puerto Rico and the Virgin Islands reveals that Mourning Doves are abundant in southwest Puerto Rico around Cabo Rojo, uncommon in the east around Fajardo, and extremely rare in the Virgin Islands. One theory of why this species has never become established on Vieques is niche competition with Zenaida Doves *(Zenaida aurita)* (US Navy 1979).

Fig. 31. White-cheeked Pintail is a resident of Vieques with two breeding seasons (spring and fall). This pintail is seen on lagoons throughout the island. (White-cheeked Pintail, Eastern End, Gemmill 2006)

One of these arrival histories—Green-throated Carib—may also illustrate a hypothesis about displacement patterns on small Caribbean islands. Studies by Lack (1973), Kodric-Brown et al. (1984), and Brown and Bowers (1985) show that small Caribbean islands typically support two species of hummingbirds, one small and one large, due to limited flora diversity that results in competition of similarly-sized species for the same food source. Lack (1973) believed that human disturbance on Vieques may have changed the ecological conditions creating a more favorable environment for the Green-throated Carib in competition with the Antillean Mango. Terborgh (1973) also theorized along those lines. They suggest that the successful range expansion of the carib is due to its preference for disturbed habitats where long-established hummingbirds, such as Antillean Mango, are naturally uncommon. These theories could explain the change in abundance of the Antillean Mango from common in 1912 to extremely rare today while the Green-throated Carib was not reported on Vieques in 1900 and is fairly common today.

Breeding Birds

Out of the sixty-four year-round Vieques residents, fifty-one are confirmed breeders, nine are possible breeders, and four are resident nonbreeders. Out of nine summer visitors, four are confirmed breeders, and one is a possible breeder. Thus, Vieques has a total of fifty-five confirmed breeders with an additional ten possible breeding species.

The categories of breeding birds are landbirds, waterbirds, and seabirds. The largest category of breeding birds is landbirds. This predominance is due to undisturbed forest and scrub habitats that provide ideal nesting sites. The protected mangrove lagoons and mud flats create excellent breeding habitat for waterbirds (ducks, egrets, shorebirds, coots, moorhen, and rails), the second largest category (fig. 31). The island has few rocky cliffs, offshore islands, or suitable soil for the third category, seabirds. What habitat is

available for seabirds is used by three species of conservation concern: Least Tern *(Sternula antillarum),* Roseate Tern *(Sterna dougallii),* and Brown Pelican.

The seasonal pattern in breeding activity is not known but probably similar to the main island and other Caribbean islands where the peak breeding season is March, April, and May (Raffaele 1989a). On Vieques, this period coincides with the end of the dry season and the beginning of the short rainy season bringing an abundance of blossoms and insects to feed young. One or two species, such as the White-cheeked Pintail, have a brief second breeding period at the beginning of the dry season in November and December when water levels are suitable for breeding. Some species breed as early as January and as late as September. A few, such as the Bananaquit, Black-faced Grassquit *(Tiaris bicolor),* and Yellow-faced Grassquit *(Tiaris olivaceus),* breed throughout the year.

Ten species have shown significant status changes since 1900. Six species no longer breed on the island and are now either absent or visitors. Four species have had significant population changes.

The six former breeders are Northern Bobwhite *(Colinus viginianus),* American Flamingo, Brown-throated Parakeet *(Aratinga pertinax),* Puerto Rican Parrot *(Amazona vittata),* Antillean Mango, and Antillean Euphonia *(Euphonia musica).* The bobwhite (Raffaele 1978) and euphonia (Wetmore 1916a, 1927; Danforth 1936; Bond 1940; Sorrie 1975) were unsuccessful released birds. The flamingo and parrots slowly disappeared as settlers destroyed their habitats. The Brown-throated Parakeet, a northern South American species introduced to the Virgin Islands, resided on the eastern tip of Vieques for a short time in the 1970s but has not been reported since 1976 (Raffaele 1989; Raffaele et al. 1998; Wiley 1993). The then-common Antillean Mango was probably displaced by the more aggressive Green-throated Carib when it arrived on the island in the early 1900s (Wetmore 1916a, 1916b, 1927; Sorrie 1975; Raffaele 1989a; Raffaele et al. 1998).

Major population changes have occurred to the breeding Brown Pelican, endemic Adelaide's Warbler, and two introduced species, Nutmeg Mannikin *(Lonchura punctulata)* and Bronze Mannikin *(Lonchura cucullata).*

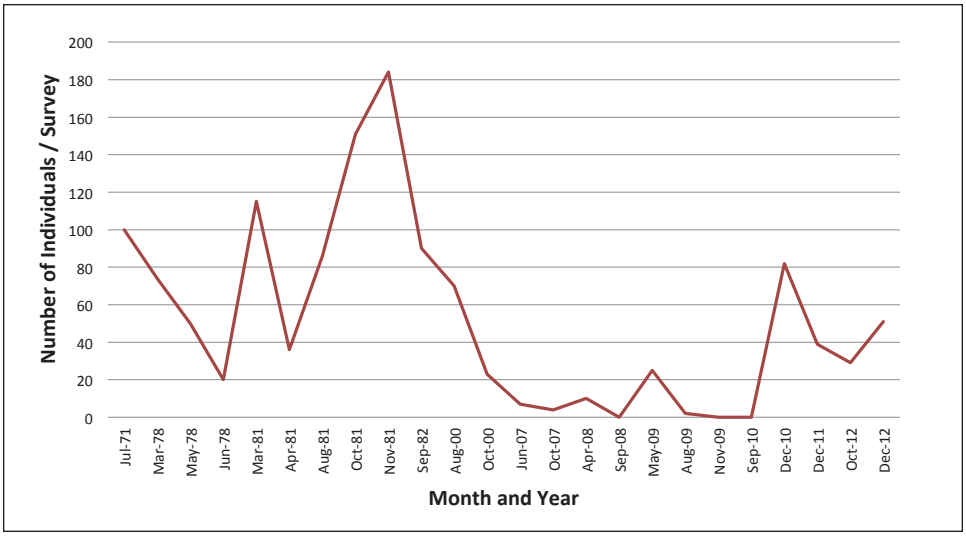


Fig. 32. Brown Pelican Population Trends: Cayo Conejo, Vieques (1971–2012). In 1981, the largest year-round breeding colony for Puerto Rican Brown Pelicans was on Cayo Conejo. Numbers fluctuated significantly between 1971 and 2012.

THE CARIBBEAN BROWN PELICAN

The most studied breeding species on Vieques is the Caribbean Brown Pelican, a subspecies of the former federally endangered Brown Pelican (Collazo and Agardy 1982; Collazo and Klass 1985; Collazo 1986; Collazo et al. 1998, Collazo 2000; Collazo and Bonilla-Martínez 2000; Geo-Marine 2001b, 2006a; Schreiber EA 1999; Schreiber R et al. 1981). The Cayo Conejo rookery, one of three Puerto Rican breeding colonies, was the largest and only colony in 1971 (Collazo and Klass 1985). In 1981, it was still the largest colony in Puerto Rico, with ninety-two nests (Collazo 1985). This colony remained stable between 1971 and 1999, and pelicans nested year-round (Schreiber, EA 1999). In 1999, the island supported more than 50 percent of Puerto Rico's Brown Pelicans and 7 percent of the West Indian population (Schreiber, EA 1999). Between 2000 and 2010 adult pelicans declined and did not breed in some years. From 2010 to 2012 adults and juveniles have increased (Gemmill, field notes 2010, 2011, 2012) (fig. 32). The impact of human disturbance on this colony is discussed in Conservation Impacts (pp. 75–76).

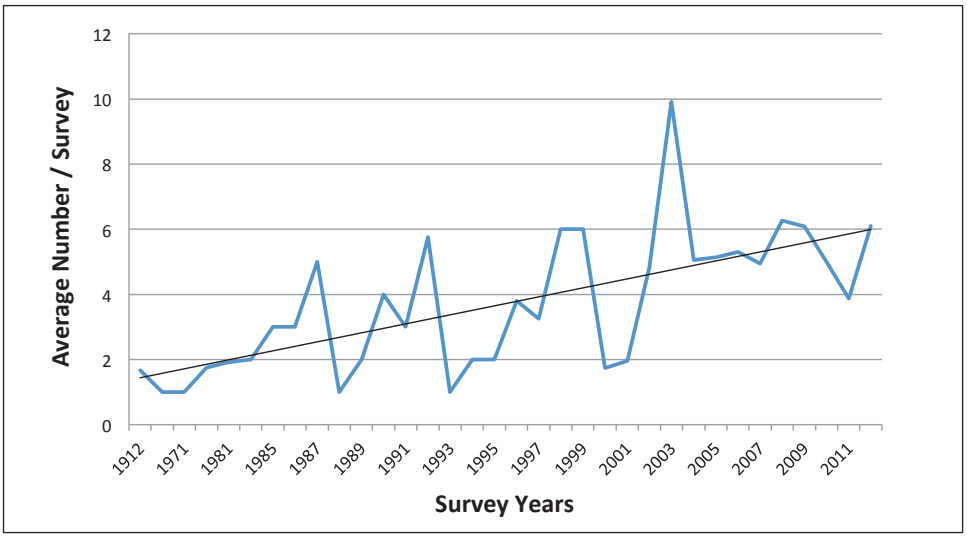


Fig. 33. Adelaide's Warbler Population trends (1912–2012). The Adelaide's Warbler has expanded its range on Vieques, and its population steadily increased between 1912 and 2012.

ADELAIDE'S WARBLER

Until 1989, Adelaide's Warblers were restricted to the dry limestone forest of Puerto Ferro (Wetmore 1916a, 1916b; Danforth 1936, 1937; Sorrie 1975). This limited range was probably due to the replacement of their preferred habitat of dry coastal scrubland and thickets with sugarcane fields, and later, pastures (Sorrie 1975). Between 1989 and 2012, this species expanded its range across the island, appearing in all habitats, even the moist forests of Mt. Pirata where thirty-three were counted on 13 Sep 2008 (Gemmill, field notes 2008). On 12 Apr 2003 a six-hour morning bird survey on the western end of the island produced sixty-five Adelaide's Warblers (Salguero, field notes 2003). The 2005 CBC totaled 433 Adelaide's Warbler island-wide, explaining the peak in the above graph (Norton et al. 2005). This population growth since 1989 may be attributed to the transition in land-use practices from pasture and agriculture to secondary forests and scrub. As of 2012, the population appears to be stabilizing (fig. 33).

Fig. 34. The Bronze Mannikin was introduced to Vieques in 1970. With the arrival of the Nutmeg Mannikin to the island in 1988, the Bronze Mannikin population began to decrease. (Nutmeg Mannikin, El Pilón, Gemmill 2007)

NUTMEG AND BRONZE MANNIKINS

Over the years, two introduced mannikins, Nutmeg (fig. 34) and Bronze, have had opposite population trends. Bronze Mannikins arrived on Vieques in 1970 followed by Nutmeg Mannikins in 1988 (Sorrie 1975; Norton 1988). Nutmeg Mannikin populations have increased while Bronze Mannikin numbers have deceased. Perhaps Nutmeg Mannikins compete with Bronze Mannikins for the same food source, or habitat changes favor one species over the other. These opposing population trends on Vieques (fig. 35) are reflected in Caribbean CBCs. The CBC

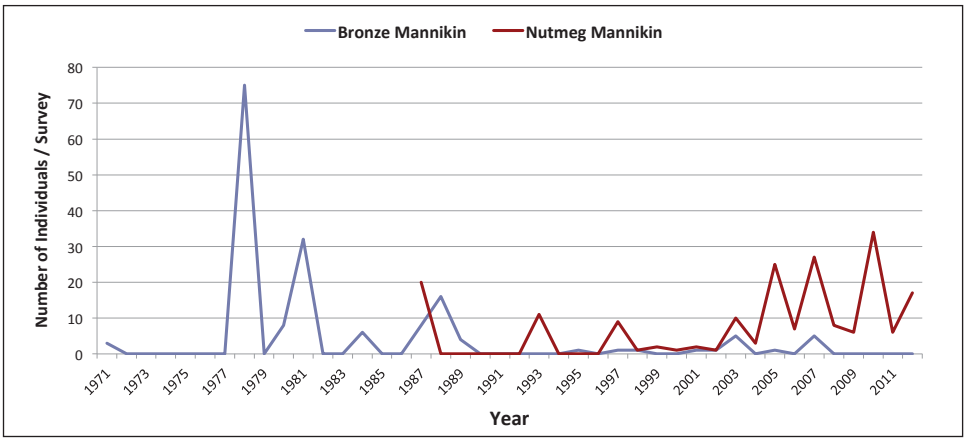


Fig. 35. Mannikin Abundance (1971–2012). Bronze and Nutmeg Mannikins were introduced to Vieques in 1970 and 1988, respectively. The opposing trends of the two species are also reflected in Caribbean CBC data.

data show that Bronze Mannikins declined 39 percent between 1997 and 2007, while Nutmeg Mannikins increased more than 200 percent.

Visitors

Visitors are divided into three categories: (1) passage migrants that stop to feed and rest on their fall and spring migrations; (2) winter and summer visitors, with the preponderance being winter visitors; and (3) vagrants. Given its geographic location at the northeastern corner of the Caribbean basin and its protected habitats, Vieques is an important stopover for these visitors. The island is one of the last landmasses before the barriers of the Atlantic Ocean to the east or the drier Lesser Antillean islands and the expanses of the Caribbean Sea to the south.

Species that visit the island (60 percent) outnumber the permanent residents. Twenty-five percent of the documented birds are winter or summer visitors, 10 percent are passage migrants, and 25 percent are vagrants (fig. 36). The status of each species is included in the Species Accounts.

Little is known about the routes that migrants take from their North American breeding grounds to wintering grounds in the West Indies or points further south. Vieques observations contribute to mapping these routes and identifying critical stopover sites.

PASSAGE MIGRANTS

Passage migrants include warblers, shorebirds, swallows, and one cuckoo. Ten warbler species pass through the West Indies during fall and spring migration. Their route apparently takes them through the western Greater Antilles where the majority of warblers arrive in September (Bond 1957; Gochfeld 1979). Two species, Blackpoll and Magnolia Warblers *(Setophaga magnolia)* pass through Vieques. Blackpoll *(Setophaga striata)* Warblers stop over in October and November on their way to South America (Nisbet 1970; Baird 1999). A few southbound Magnolia Warblers arrive in late November and return north via Vieques in March and April.

During fall, some shorebirds and passerines may depart from the East Coast between the mid-Atlantic states and maritime Canada. They fly nonstop to South America unless they encounter unfavorable weather conditions that force them to stop on islands in the West Indies. The spring migratory route for species wintering in South America apparently is west of Vieques, although a few individuals may retrace their fall route.

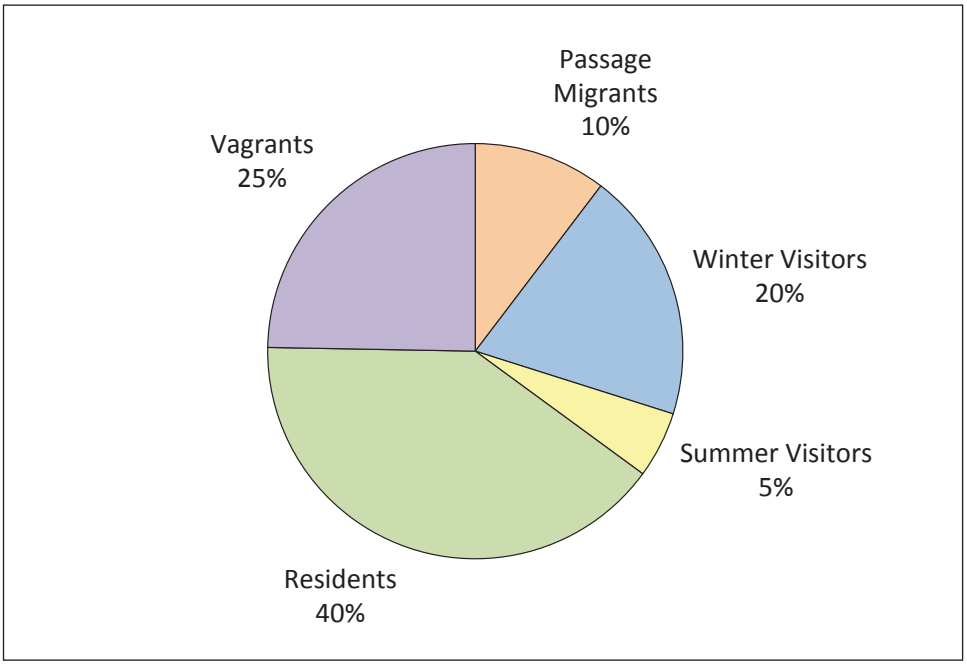


Fig. 36. Distribution of Residents and Visitors. Passage migrants, seasonal visitors, and vagrants account for 60 percent of the species found on Vieques.

Shorebirds comprise half of the seventeen passage migrants recorded on the island. The other half includes swallows, warblers, and Yellow-billed Cuckoo *(Coccyzus americanus).*

Sixteen passage migrants have been recorded in the fall and thirteen species in the spring. Four species—American Golden Plover *(Pluvialis dominica),* Sanderling *(Calidris alba),* Cliff Swallow *(Petrochelidon pyrrhonota),* and Blackpoll Warbler—are fall migrants, and one species—Common Yellowthroat *(Geothlypis trichas)*—is a spring migrant. Four species—Stilt

Fig. 37. Half of passage migrants are shorebirds, with the majority recorded in the fall. They also comprise the second largest group of winter visitors. Semipalmated Sandpiper, a winter visitor, is among the most abundant shorebirds with a record high count of over a thousand on 15 Oct 2007. (Semipalmated Sandpiper, Ensenada Sombe, Gemmill 2008)

(Calidris himantopus) and Pectoral Sandpipers *(Calidris melanotos),* and Cave and Barn Swallows *(Hirundo rustica)*—are more common in the fall than spring, and three—Western Sandpiper *(Calidris mauri),* Yellow-billed Cuckoo *(Coccyzus americanus),* and Prothonotary Warbler *(Protonotaria citrea)*—are more common in the spring. Stilt Sandpipers, while the most common of the spring passage migrants, are less numerous than in the fall. In the spring, swallow numbers are greatly reduced from their fall highs.

The island may be a critical resting and feeding area for passage migrants, especially when migrants encounter turbulent weather during fall passage. In early September 2008, for example, several tropical depressions passed north of Puerto Rico accompanied by southerly winds. After this inclement weather, high concentrations of migratory and wintering shorebirds actively fed on the recently mowed grass at Ensenada Sombe. The Semipalmated Sandpiper *(Calidris pusilla)* was the most abundant shorebird with a two-week total of more than 1,000 (fig. 37).

Swallows are also affected by unusual weather systems. On 7 Sep 2008, blustery winds and rainsqualls followed early-morning heavy rains. From 07:15 to 11:15, an estimated 1,000 Barn Swallows left land at Cayo de Tierra heading south. From 5–15 Sep 2008, approximately 2,000 Barn Swallows passed through Vieques (Gemmill in Norton et al. 2009a). During this period, 500 Cave Swallows *(Pertrochelidon fulva)* passed through the island with peaks of 175 on 13 Sep and 14 Sep.

Spring observations and banding data indicate that the island may be an important staging area for warblers on their northward journey. They use the island as a land bridge, flying across it from east to west before heading north across open water (Wetmore 1916b; Gemmill, field notes 1990).

WINTER VISITORS

The majority of the thirty-four winter visitors are warblers, followed by shorebirds, waterbirds, raptors, and other landbirds. A summary of their abundance and presence on the island follows.

Wintering warblers arrive in low numbers in early September. Among the first to arrive are Prairie Warbler *(Setophaga discolor),* Black-and-white Warbler *(Mniotilta varia),* American Redstart (*Setophaga ruticilla;* fig. 38),

and Northern Waterthrush *(Parkesia noveboracensis)* (Gemmill, field notes 1983–2012). Yellow-rumped Warbler *(Setophaga coronata)* is the last to arrive, which, according to Bond (1957), has not been reported in the West Indies prior to October. These visitors' departures peak in mid-March and cease by the end of April.

Thirteen out of the fifteen warbler species that winter in the West Indies are winter visitors to Vieques (Gochfeld 1979). The most common wintering warbler is Northern Parula *(Setophaga americana),* followed closely by Northern Waterthrush and then in declining order: Prairie Warbler, American Redstart , Black-and-white Warbler Ovenbird *(Seiurus aurocapilla),* Yellow-rumped Warbler, Cape May Warbler *(Setophaga tigrina),* Palm Warbler *(Setophaga palmarum),* Hooded Warbler *(Setophaga citrina),* Black-throated Blue Warbler *(Setophaga caerulescens),* Worm-eating Warbler *(Helmitheros vermivorum),* and Louisiana Waterthrush.

Sixteen shorebirds regularly spend winter in the West Indies (Raffaele et al. 1998). Vieques is a winter home for ten of these species. The most common winter visitors are Semipalmated and Least Sandpipers *(Calidris minutilla)* with daily maxima of 600 per species and Lesser Yellowlegs *(Tringa flavipes)* with a daily maximum of 260. The least common is Wilson's Snipe *(Gallinago delicata)* with one every few years, although that low number may reflect its solitary and secretive nature. Shorebirds begin arriving in small numbers in early August, and by mid-September, flock size increases. They depart in early March with some remaining through May. A few will spend the summer on the island. Numbers vary in any given year depending on water levels in the lagoons.

Wintering waterbirds include grebes, ducks, and flamingos. Heron and egret species that are winter visitors augment the resident populations from August to April. The three species of wintering ducks are Blue-winged Teal *(Anas discors),* Northern Shoveler *(Anas clypeata),* and Lesser Scaup *(Aythya affinis)*—although Lesser Scaup has not been reported since 1935. American Flamingos were breeding residents on the island until the 1940s. Now they are an extremely rare winter visitor (Norton 1985a, 1987; Norton and White 2001).

Four raptor species winter in the West Indies (Raffaele 1989). The three winter visitors to Vieques are Osprey *(Pandion haliaetus),* Merlin *(Falco columbarius),* and Peregrine Falcon *(Falco peregrinus).* These species

Fig. 38. Thirteen species of warblers winter on the island. American Redstart, a common winter visitor, is most often seen in forests from Puerto Ferro in the east to Mt. Pirata in the west. (American Redstart, Puerto Ferro, Gemmill 2008)

arrive in October and depart by the end of April. Osprey sightings outnumber Merlin and Peregrine sightings combined. Rounding out the winter visitors are several landbirds—Belted Kingfisher *(Megaceryle alcyon),* which is present most winters, Chuck-will's-widow *(Antrostomus carolinensis),* Yellow-throated Vireo *(Vireo flavifrons),* and exceedingly rare Baltimore Oriole.

Fig. 39. The Least Tern, a summer visitor and a species of conservation concern, breeds on the Playa Grande and Sombe lagoon salt flats. (Least Tern, Laguna Sombe, Gemmill 2006)

SUMMER VISITORS

Nine species, of which six are seabirds, arrive for the summer months (fig. 39). Four species—Roseate and Least Terns, Antillean Nighthawk *(Chordeiles gundlachii),* and Caribbean Martin *(Progne dominicensis)*—are known breeders. Black-whiskered Vireo *(Vireo altiloquus)* is a possible breeder. Four species—Laughing Gull *(Leucophaeus atricilla),* Sandwich Tern *(Thalasseus sandvicensis),* Bridled Tern *(Onychoprion anaethetus),* and Sooty Tern *(Onychoprion fuscatus)*—are nonbreeders that have dispersed from nearby breeding colonies. They arrive in May and depart by September. Caribbean Martins have been recorded every month of the year.

Black-bellied Plover *(Pluvialis squatarola),* Semipalmated Plover *(Charadrius semipalmatus),* Greater and Lesser Yellowlegs, Spotted Sandpiper *(Actitis macularius),* Semipalmated Sandpiper, and Short-billed Dowitcher *(Limnodromus griseus)* are winter visitors that are present in small numbers in June and July. These summer visitors could be very early southbound migrants, or they could be nonbreeders who never made the trip north, because many were recorded in nonbreeding plumage.

VAGRANTS

Given the island's location at an avian crossroads and its excellent vegetative cover, it is not surprising that the number of vagrants (sixty-one) is relatively high (fig. 40). Forty percent are waterbirds, shorebirds, and seabirds while 60 percent are landbirds. Vagrants are birds observed one to fifteen times. They are subdivided into two categories—rare visitors (thirty-four) and true vagrants (twenty-seven).

The thirty-four rare visitors are not a surprise because they are present or occur regularly in the eastern Antilles. For example, fifteen birds that are found on the main island, such as Gull-billed Tern *(Gelochelidon nilotica)* that frequents the San Juan Harbor and American Coot *(Fulica americana)* that is a fairly common winter visitor, have been sighted on Vieques. The other rare visitors from the main island are Masked Duck *(Nomonyx dominicus),* Least Grebe *(Tachybaptus dominicus),* Broad-winged Hawk *(Buteo platypterus),* Sora *(Porzana carolina),* Herring Gull *(Larus argentatus),* Caspian Tern *(Hydroprogne caspia),* Antillean Mango, Puerto Rican Emerald *(Chlorostilbon maugaeus),* Yellow-bellied Sapsucker *(Sphyrapicus varius),* Red-legged Thrush *(Turdus plumbeus),* Yellow-shouldered Blackbird *(Agelaius xanthomus),* Orange Bishop *(Euplectes franciscanus),* and Pin-

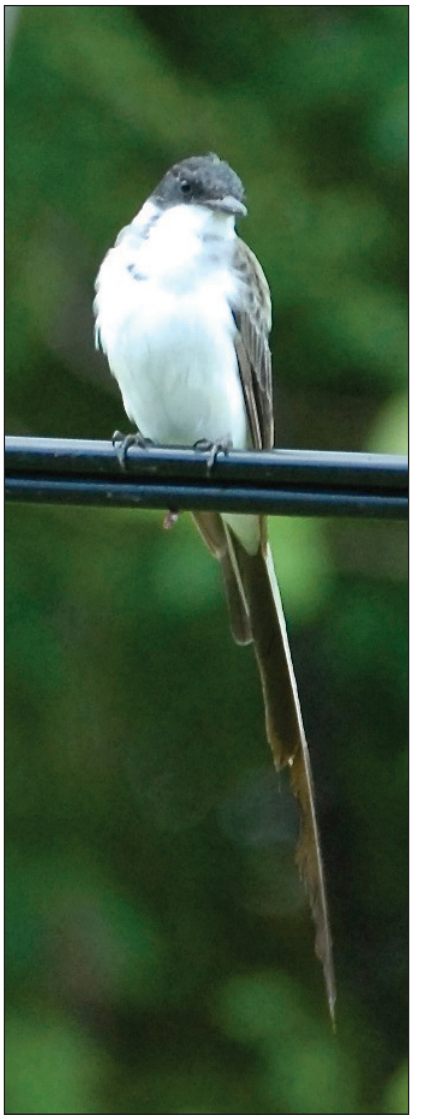


Fig. 40. This flycatcher, a vagrant from the south, is the first record for Vieques and Puerto Rico, and the first record east of Jamaica and Cuba. (Fork-tailed Flycatcher, Near Former Navy Headquarters, Gemmill 2006)

tailed Whydah *(Vidua macroura).* American Flamingo, Sooty and Bridled Terns, and Brown-throated Parakeet have colonies on other islands near Vieques. Six rare visitors are passage migrants: American Golden Plover, Piping Plover *(Charadrius melodus),* Solitary Sandpiper, Sanderling, and Bank and Cliff Swallows. Rare visitors in the winter are Northern Shoveler, Lesser Scaup, Wilson's Snipe, and Bicknell's Thrush *(Catharus bicknelli),* which has a major wintering ground in Hispaniola. The other rare visitors are five Nearctic-Neotropical migrants: Yellow-throated Vireo; Worm-eating, Magnolia, and Black-throated Blue Warblers; and Baltimore Oriole.

True vagrants are birds that have been recorded once since 1899 and are outside of their normal range. Examples of northern vagrants are Canada Goose *(Branta canadensis),* Swallow-tailed Kite *(Elanoides forficatus),* Northern Harrier *(Circus cyaneus),* Kentucky Warbler *(Geothlypis formosa)* and Mourning Warbler *(Geothlypis philadelphia)* (Bond 1957). Two vagrants from the south are White-collared Swift *(Streptoprocne zonaris)* and Fork-tailed Flycatcher *(Tyrannus savana).*

Fig. 41. Most of the species introduced to the island arrived in the last fifty years. The first Vieques report of House Sparrow, introduced into the Americas from Europe by the Victorians, was 22 Dec 1994. (House Sparrow, Isabel Segunda, Gemmill 2008)

Introduced Species

Vieques has few introduced birds. This is due to the lack of caged birds and predation by rats and mongooses. Species can be introduced by release on the island or dispersal from the main island or the Virgin Islands where they had been released. There are ten introduced species. Northern Bobwhite *(Colinus virginianus)* and Antillean Euphonia were released on Vieques but never became established. Seven species from Africa, Asia, and Europe were introduced by dispersal from the main island. Three of the seven, Orange Bishop, Bronze Mannikin, and Pin-tailed Whydah are native to Africa. Nutmeg Mannikin came from Southeast Asia. European Starling *(Sturnus vulgaris),* Rock Pigeon *(Columba livia),* and House Sparrow *(Passer domesticus)* came from Europe (fig. 41). The South American Brown-throated Parakeet was introduced to the Virgin Islands and made its way to Vieques for a short time. Four species, Rock Pigeon, House Sparrow, and Bronze and Nutmeg Mannikins, became established breeders. The others are extremely rare.

Undocumented Reports

Twenty species are not sufficiently documented to be a first record and some would be rare records for Puerto Rico and even for the West Indies. The Sociedad Ornitológica Puertorriqueña (SOPI) is reviewing one additional record that probably will be accepted. Details regarding the sighting and reasons for not including the species on the Vieques list are in the Species Accounts and are indicated by a question mark (?).

Fourteen species are listed in the appendices of government reports of raw data tables for bird surveys with no supporting evidence (Duffield and Cardona 1978; Lewis et al. 1981b; NOAA ESI-PR67 online Vieques Environmental Sensitivity Index Map 2000; Geo-Marine 2001b, 2006b). These undocumented birds are Ring-necked Duck *(Aythya collaris),* Purple Gallinule *(Porphyrio martinicus),* American Avocet *(Recurvirostra americana),* Dunlin *(Calidris alpina),* Red Phalarope *(Phalaropus fulicarius),* Ring-billed Gull *(Larus delawarensis),* Brown Noddy *(Anous stolidus),* Common Tern *(Sterna hirundo),* Arctic Tern *(Sterna paradisaea),* Green Mango *(Anthracothorax viridis),* Puerto Rican Tody *(Todus mexicanus),* Puerto Rican Vireo

(Vireo latimeri), White-breasted Thrasher *(Ramphocinclus brachyurus),* and Puerto Rican Bullfinch *(Loxigilla portoricensis).* Six additional species are undocumented: Audubon Shearwater *(Puffinus lherminieri),* a Puerto Rican Screech-Owl subspecies *(Megascops nudipes newtoni),* Purple-throated Carib *(Eulampis jugularis),* Eastern-Wood Pewee *(Contopus virens),* Gray-cheeked Thrush *(Catharus minimus),* and Puerto Rican Oriole *(Icterus portoricensis),* known at the time as Black-cowled Oriole. SOPI is reviewing a record for Chimney Swift.

Birds of Conservation Concern

Over the years, the number of Vieques birds of conservation concern has increased due to reasons discussed under Conservation Challenges. In 1978, twenty-four species were considered rare or endangered in Puerto Rico and the Virgin Islands (Raffaele 1973; Philibosian and Yntema 1977; Sorrie 1978). In 2010, at least one organization, and in many instances several, identified seventy-seven Vieques species to be of conservation concern. By the end of 2012, 108 species were ranked from critically endangered to possible concern. For those species facing the possibility of extinction in the near-term, conservation status for individual species is provided in the Species Accounts and Appendix 1.

How are these determinations made? Ornithological organizations routinely identify birds of conservation concern and communicate their conclusions via watchlists. Watchlists categorize birds based on their extinction risk, ranging from critically endangered to low risk (fig. 42). These lists are based on a review of the ornithological literature, population surveys, CBCs, and other relevant data sources to determine the conservation status of birds on regional, national, and global scales. The key criteria are rapid population decline, small or restricted population, unique taxonomic status (endemism), and conservation threats. The American Bird Conservancy's 2012 list is the most up-to-date. It includes a separate listing for Puerto Rico and ranks subspecies for the first time (American Bird Conservancy 2012).

Eleven watchlists are relevant to Vieques's birdlife and form the basis for an island-specific watchlist that can guide natural resources managers and policy makers in their decisions regarding research, species and habi-

tat protection, funding, and public education (Appendix 1). Federal or commonwealth governments generate the first three lists. Public-private partnerships and nongovernmental organizations issue the other eight watchlists.

In the United States, species listed as endangered or threatened pursuant to the federal Endangered Species Act of 1973 (ESA), as amended by the 2010 ESA, are considered the species at greatest risk of extinction. The ESA listings are based on three categories: Endangered (EN), Threatened (TH), and Candidate for Listing (CL). An ESA designation carries

Fig. 42. The Caribbean Brown Pelican is on the Vieques Watchlist because the Puerto Rico Department of Natural and Environmental Resources considers the subspecies endangered in Puerto Rico. The USFWS lists the subspecies of conservation concern, and the American Bird Conservancy lists it as vulnerable. (Caribbean Brown Pelican, Playa Grande, Gemmill 2011)

the highest level of protection and investment in recovery plans. Four Vieques birds are listed: Broad-winged Hawk, Piping Plover, Roseate Tern, and Yellow-shouldered Blackbird. Roseate Tern is a summer visitor and breeder. The other three are rare visitors.

Species listed pursuant to the 2004 Commonwealth of Puerto Rico's Regulation for the Management of Vulnerable and Endangered Species (Regulation no. 6766) are those facing grave threats in Puerto Rico. In addition to the four ESA protected species, thirteen other species found on Vieques meet the regulation's criteria. Their categories are Critically Endangered (CE), Endangered (EN), and Vulnerable (VU).

Birds that are not covered under the ESA but are facing conservation threats that could make them eligible in the near future are ranked by the USFWS at the national and regional levels as species of conservation concern. Lists are published periodically in Birds of Conservation Concern *(http://www.fws.gov/migratorybirds/NewReportsPublications/Special Topics/BCC2008 /BCC2008.pdf)*. The last update was in 2008. The USFWS's list adds an additional nineteen Vieques species to those covered by the federal and commonwealth laws, plus eighteen winter visitors that are USFWS birds of conservation concern in the fifty states (U.S.).

Public-private partnerships and nongovernment organizations list an additional fifty-four species or subspecies observed on Vieques that may meet the ESA criteria in the future. The organization, the year its list was published, its threat designations, and URLs follow:

2012—American Bird Conservancy (ABC) List of the Birds of the United States with Conservation Rankings. At Risk (AR), Vulnerable (VU), and Potential Concern (PC): *http://www.abcbirds.org/abcprograms/science/conservationchecklist/index.html.*

2012—Birdlife International and the International Union for the Conservation of Nature Red List (BI/IUCN). Critically Endangered (CE), Vulnerable (VU), and Near Threatened (NT): *http://www.birdlife.org/action/science/species/global_species_programme/red_list.html.*

2007—National Audubon Society and American Bird Conservancy Watchlist (NAS/ABC)). Red List for globally threatened birds and Yellow List for threatened birds in the U.S.: *http://birds.audubon.org/2007-audubon-watchlist* (Butcher et al. 2007).

2006—North America Waterbird Conservation Plan (NAWCP): Marshbirds. Extremely High Concern (EH), High Concern (HI), Moderate Concern (MO): *http://www.waterbirdconservation.org/pdfs/status_assessment/FinalStatusandDistributionMarshbirdsTable.pdf.*

2004—Partners in Flight (PIF) U.S. Watchlist, Puerto Rico and the Virgin Islands Watchlist, and Stewardship List: *http://www.pwrc.usgs.gov/pif/WatchListNeeds/default.htm.*

2004—U.S Shorebird Conservation Plan Council U.S. Shorebird Conservation Plan (USSCP). Extremely High (EH), High (HI), and Moderate (MO).

2002—North American Waterbird Conservation Plan: Waterbirds (NAWCP). Same criteria as Marshbirds (see NAWCP 2006 above): *http://www.waterbirdconservation.org.*

2000—The Society for the Conservation and Study of Caribbean Birds West Indian Seabird Conservation Action Plan (WISCAP). Critically Endangered (CE), Endangered (EN), Vulnerable (VU), Near Threatened (NT) (Schreiber BA 2000a).

A summary of the conservation status of the 108 species by species, public or private organization, and level of concern is provided in Appendix 1: Vieques Watchlist. The list also includes a column for birds protected under the Migratory Bird Treaty Act of 2006 (MBTA).

Species are included on the Vieques list if at least one organization rates the species, or subspecies, moderately to critically endangered for Puerto Rico or North America. Species of conservation concern in North America are included because conservation plans for their migratory stopover sites and wintering grounds are important for the long-term health of their populations (Berger 2000).

Conservation Challenges

Sixty-two percent of Vieques bird species are of conservation concern. Due to the land tenure in the last hundred years, Vieques has not suffered conservation threats to the extent experienced on the main island, such as burgeoning human population, the draining of freshwater wetlands,

and the destruction of mud flats, mangrove swamps, and other coastal avian habitats (King et al. 1976). This relative undevelopment is due largely to the Navy's controlling access to two-thirds of the island from 1942 to 2003. In 2003, the Navy conveyed its land to the U.S. Department of Interior for a national wildlife refuge, to the Puerto Rico Trust for a protected natural resource area, and the built-up areas to the local government. Much work remains to be done to ensure Vieques maintains its favorable environment as an avian crossroads.

The main threat to Vieques birdlife is human disturbance, both direct (disturbance of nesting and feeding habitats, and hunting) and indirect (introduced predators, invasive species, and environmental pollution). While there is a long history of direct human impacts, most indirect threats are recent. The newest threat is climate change.

Over the years, conservation threats to Vieques's birdlife changed with land-use patterns. Increased public awareness, more effective laws, better enforcement, and establishment of conservation areas have helped to mitigate past threats. These tools can also mitigate future threats.

DIRECT IMPACTS

Prior to 2000, the major conservation threats to Vieques birdlife were deforestation (for agricultural use and livestock grazing) and military uses that resulted in loss of vegetative cover and the altering of mangrove lagoon hydrology (King et al. 1976; Sorrie 1978; Wiley 1985b, 1985c; Arendt 1992; Schreiber EA 2000c; USFWS 2007). Hunting also impacted many birds (King et al. 1976; Raffaele et al. 1973; Raffaele 1978; Sorrie 1981; Wiley 1985b). Egg collecting and firewood gathering were relatively minor conservation threats (Sorrie 1978). Today, recreational use—boating or beach activity, cabana use, camping, biking, dog walking, or horseback riding—has a negative effect, primarily on nesting birds.

DEFORESTATION

The major habitat alteration that negatively affects birdlife is deforestation. The first Europeans on Vieques cut down trees for timber. In the late nineteenth century, deforestation in Puerto Rico and Vieques accelerated as forests were cleared for settlements and agriculture, especially sugarcane (fig. 43). By the beginning of the twentieth century, very little

original forest remained, and even those forests, such as on Mt. Pirata, were intensively disturbed (Bowdish 1900; Wetmore 1927).

Forest loss negatively impacts forest-dependent species. Endemic cavity nesters, such as the Puerto Rican Parrot (Wiley 1985a), Puerto Rican Screech-Owl (Wiley 1985a), Puerto Rican Flycatcher (Seaman 1957), and Puerto Rican Woodpecker, lost their nest trees. The Puerto Rican Parrot may have been the first species to be extirpated from the island, probably by the middle of the nineteenth century. It lost its nesting trees and was captured for food or for pets. The Puerto Rican Screech-Owl, a subspecies unique to Culebra, the Virgin Islands, and possibly Vieques either never lived on Vieques or was gone by the end of the nineteenth century due to conversion of forest to sugarcane fields. The early ornithologists visiting the island in the beginning of the twentieth century never saw a parrot or an owl (Bowdish 1900; Wetmore 1927; Danforth 1937). The Puerto Rican Flycatcher nearly joined the ranks of extinct birds due to hurricane destruction of trees, while the Puerto Rican Woodpecker held on by adapting its nest-site preference from trees to palms and eventually to wooden telephone and electrical poles (Raffaele 1989a; US Navy 1979).

Several range-restricted birds of heavily forested areas, including the Ruddy and Bridled Quail-Doves, became scarce. In 1935, Danforth con-

Fig. 43. In the late nineteenth century Vieques forests were cut for timber and replaced by sugarcane fields. The loss of forests resulted in the permanent or temporary disappearance of forest-dependent species such as the Puerto Rican Parrot, Flycatcher, and Woodpecker. (Vieques Sugarcane Field in 1912, Smithsonian Institution Archives, Image #02954, Wetmore, 1912) http://siarchives.si.edu/

Fig. 44. After World War II, the sugarcane-based economy gave way to livestock grazing. Pastures dominated the landscape favoring grassland birds, a marked contrast to today's landscape. (View North from El Pilón, Gemmill 1983)

Fig. 45. Today secondary forest and scrub dominate the former pasture lands. The increase in forested landscape may account for the increase in Adelaide's Warbler. (Same View North from El Pilón Twenty-five Years Later, Gemmill 2008)

sidered Ruddy Quail-Dove *(Geotrygon montana)* rare on Vieques, and Bridled Quail-Dove may not have arrived until the secondary forests had begun to reclaim agricultural and grazing lands (Danforth 1936, Bond 1940, 1956; Biaggi 1997). The only report from Vieques of the Puerto Rican Lizard-Cuckoo, a bird that prefers forested areas, is from 1858, before the wholesale clearing of forests for sugarcane (Newton 1859b).

As the original forests gave way to agricultural lands, birds that could thrive in the new landscape displaced species that favored an undisturbed habitat. The Antillean Mango, for example, was a common hummingbird at the beginning of the twentieth century when Wetmore visited (Wetmore 1916). The Green-throated Carib, once confined to the Lesser Antilles, replaced the Antillean Mango by 1935 when Danforth found the carib common (Danforth 1937). Another species that prefers disturbed landscapes where seeds are plentiful is the Shiny Cowbird. It moved north through the Lesser Antilles as agriculture and ranching spread, arriving in Vieques in the 1950s or 1960s (Rolle 1961; Bond 1967). This cowbird parasitizes the nests of many species: particularly vulnerable are Yellow Warbler *(Setophaga petechia)* and Black-whiskered Vireo.

Over the last twenty years, tourism has replaced agricultural and ranching as the island's main economic activity. Secondary forests have reclaimed most pasture land (Figs. 44 and 45). As a result, Puerto Rican Woodpeckers and other forest-dwelling species are more numerous, and Shiny Cowbirds have declined. The change in vegetative cover may also explain the population explosion of the Puerto Rican endemic Adelaide's Warbler in the mid-1990s.

MILITARY ACTIVITIES

The second landscape alteration came during and after World War II when U.S. military forces, which had purchased two-thirds of the island's acreage from eight landowners (Sorrie, field notes 1971), began draining and filling wetlands, building roads, and conducting training exercises. Draining wetlands and building roads affected the hydrologic patterns that determine the mangrove community structure and function. Due to runoff, these practices also led to erosion and sedimentation of mangrove wetlands. Wetland habitat was lost as vegetation shifted to upland type (USFWS 2007).

The mangrove lagoon Laguna Boca Quebrada suffered from military activities. The Navy built a road between the lagoon and the ocean, effectively blocking the lagoon's primary outlet to the sea. The Navy also dumped wastes in the lagoon. Aerial photographs taken in April 1970 and February 1971 show a healthy mangrove forest encircling Laguna Boca Quebrada. By 1978, however, acres of mangroves were dead, leaving leafless snags (Sorrie 1978; fig. 46). After efforts to restore tidal flows began the mangroves began to recolonize in 2000. Sorrie (1981) estimated that between 1936 and 1978, Vieques lost about 1.33 km^2 (329 ac) of mangrove due to military activities. Thirty-six mangrove sites totaling 3.64 km^2 (900 ac) remain, the same acreage as when Sorrie did his mangrove study (Sorrie 1981).

Fig. 46. During the Navy's tenure, mangrove lagoons were impacted by dumped wastes and the building of new roads that impeded water flow. By 1978, many lagoons had dead and dying mangrove trees. (Boca Quebrada Mangrove Dieback, Sorrie 1978)

Loss of mangrove lagoons, wetlands, and associated forests and mud flat impacted waterbirds and shorebirds. Some waterbird species ceased to breed on the island, some waterbirds and shorebirds lost nest sites, and migrating shorebirds lost feeding and roosting sites. The critically endangered West Indian Whistling-Duck *(Dendocygna arborea)* had frequented Laguna Boca Quebrada prior to human interference with its hydrology in the early 1970s (Sorrie 1978). Sorrie did not find whistling-ducks in an extensive survey in 1978 (Sorrie 1978). In fact, these ducks were not reported again until 2005 after the mangroves at Boca Quebrada had begun to recover (fig. 47). Other species that were adversely impacted were:

- Least Terns and Wilson's Plovers *(Charadrius wilsonia)* that nest on mangrove lagoon mud flats.

Fig. 47. Several attempts to restore the natural water flow to Boca Quebrada have improved conditions so that by 2000 mangroves were recolonizing the lagoon and restoring critical wildlife habitat. Mangrove lagoon-forest complex is one of Puerto Rico's most endangered ecosystems and attractive to bird species of conservation concern. (Boca Quebrada Mangrove Recovery, Gemmill 2012)

- Semipalmated, Western, Least, and Stilt Sandpipers, and other migrant or wintering shorebirds that feed in the shallow waters.
- White-crowned Pigeons that nest in the mangroves.

The mangrove lagoon-forest complex constitutes an important habitat for wildlife and may be Puerto Rico's most endangered ecosystem (USFWS 2007). The close proximity of water, mud flats, and mangrove forest brings together a high proportion of the bird species of conservation concern.

Today, Lagunas Boca Quebrada, Bahía de la Chiva, Puerto Diablo, and Monte Largo are important shorebird and waterbird areas that have artificially restricted flow (USFWS 2007). Past attempts to improve water flow include a bridged placed over the openings of the lagoons at Bahía de la Chiva and Kiani by 1983. The USFWS refuge has built culverts to improve water flow at the Kiani wetlands complex and has attempted to remove barriers to water flow at Boca Quebrada. Past attempts by the Navy to restore the hydrological connection at Laguna Boca Quebrada as well as the most recent attempt in 2008 by the USFWS have been unsuccessful. Other lagoons, such as Puerto Diablo and Monte Largo, have roadways blocking their hydrological connections to the ocean. Restoring tidal fluctuations and flushing to impounded areas will improve the health of many of them (USFWS 2007).

Road building by the refuge and municipality continue to have negative impacts. Since 2007, several roads have been built too close to the edge of mangrove forests leading to sedimentation and opportunities for human disturbance. Other roads are too wide destroying native vegetation and impacting birds of conservation concern. Road widening in the unique dry limestone forest near Puerto Ferro is one example (Figs. 48 and 49).

The Navy's target practice had both positive and negative impacts. Training exercises with live ordnance destroyed a small area on the eastern end of the island approximately 1.8km^2 (44 ac). In the live or active artillery area, seabirds were unable to nest, and birds were possibly exposed to ordnance pollution. However, in restricted areas, birds were protected from human disturbances (fig. 50, p. 72). The eastern end of the island became a refuge for the vulnerable Caribbean Coot (*Fulica carib-*

Fig. 48. The Puerto Ferro road had minimal environmental impact before its replacement in 2008. (Puerto Ferro Old Road, Gemmill 1998)

Fig. 49. The Puerto Ferro replacement road in 2008 destroyed native habitat for flora and fauna of conservation concern. The large shoulder areas are now covered by nonnative thorn scrub. (Puerto Ferro Replacement Road, Gemmill 2008)

Fig. 50. Although the Navy left Vieques in 2001, reminders remain of its former involvement, such as unexploded ordnance. Restricted areas have become wildlife refuges. (Sign Restricting Entry to Eastern End, Gemmill 2009)

aea), Ruddy Duck *(Oxyura jamaicensis),* and White-cheeked Pintail. A Brown Pelican breeding colony, the largest in Puerto Rico at one time, flourished. Recreational activities, however, may have had a negative impact on this colony (see p. 75 for more details).

OVERGRAZING

In 1978, a major conservation issue for the island was livestock overgrazing (fig. 51). Under lease arrangements that provided the Navy $.50 per head, 8,000 cattle grazed on 5.67 km^2 (1,400 ac) outnumbering the island's 7,700 inhabitants (Whitmore 1972; Raffaele 1978; Sorrie, field notes 1978). Cattle, and to a lesser extent horses and goats, roamed freely, over the remainder of the island, resulting in overgrazing and the loss of native plants. The native woody vegetation changed to monotonous thorn scrub *(Acacia, Prosopis).* This change threatened the unique composition of the dry forests on the eastern and south coasts of the island as well as the subtropical moist forest of the western hills and Mt. Pirata, especially a fan-palm forest on the upper south slopes of the mountain. Grazing both reduced the natural forest undergrowth and replacement seedlings and

Fig. 51. Cattle dominated the landscape in the 1960s. Overgrazing led to the loss of native plants, forest undergrowth, and bird habitat. In the 1970s, the Navy took steps to reduce free-ranging cattle. (Cattle, El Pilón, Gemmill 1986)

allowed the invasion of two exceedingly noxious plants—one a thorny, woody scrub-vine and the other a twining, stinging nettle-like vine (Sorrie 1978). As late as 1978, Sorrie observed cattle grazing on Cerro El Buey and Mt. Pirata with a heavy loss of undergrowth. He noted that the Cayo de Afuera goats had been removed (Sorrie 1978).

Additional problems associated with free-ranging livestock are soil compaction and deliberately-set fires. Cattle compact the ground around the forests where they nibble on emerging shoots and trees (Lewis et al. 1981a). As a result, mangrove forests are not able to regenerate or spread, and in some cases they even recede. Cattle owners set fire to grassy and scrubby areas to encourage the new growth favored by livestock. The two most severe ecological threats to the continuation of the dry forests are wildfires and grazing cattle (USFWS 2007). Fires cause ground-nesting and scrub-nesting birds to abandon their nests and decrease quality habitat for wood warblers and other winter visitors. The newly disturbed habitat is not favored by native species (USFWS 2007).

In the 1970s, the Navy began reducing the number of grazing animals on military lands and fencing off sensitive areas around mangrove lagoons.

Fig. 52. Cayo Conejo was a successful pelican breeding colony during the Navy's tenure because it was in a restricted area protected from recreational activities. (Cayo Conejo During the Navy's Management, Sorrie 1978)

Fig. 53. The Cayo Conejo area has had an increase in boating, fishing, and other recreational activities under post-Navy administration. The increase in these recreational activities has coincided with a precipitous decline in breeding pelicans. (Bahía Icacos, Gemmill 2008)

While cattle were technically restricted from military lands, in practice gates were frequently left open (Sorrie, field notes 1978). This policy led to wetland improvement between 1978 and 1985 (Sorrie 1978; Lewis 1985). By the 1980s cattle grazing also declined due to market factors (Sorrie 1978). The US Navy's 1996 Land Use Management Plan called for removal of free-ranging livestock on its Vieques land (USFWS 2007). Today cattle and goats are no longer a conservation threat. Horses, while fewer than in the past, are still a problem, especially on the eastern end.

One unintended consequence of the policy change is that grasslands are becoming scrub and forest communities. This change is detrimental to grassland birds, such as Short-eared Owl *(Asio flammeus)* and Grasshopper Sparrow *(Ammodramus savannarum)* that are birds of conservation concern (Pérez-Rivera et al. 1977).

RECREATIONAL ACTIVITIES

Boating, camping, riding horseback, biking, and fishing, and related infrastructure, such as beach cabanas, are recreational activities that, if not restricted at specific times and areas, can affect the success rate of breeding birds and migrant survival. The species most affected by human presence in these cases are pelicans, ducks, shorebirds, terns, and quail-doves (Anderson 1988; Klein et al. 1999; Carney and Sydeman 1999).

The most studied of these species is the former federally endangered Caribbean Brown Pelican. On Vieques, its primary breeding location is Cayo Conejo (fig. 52). Until 2003 Cayo Conejo was in a Navy restricted area. Monitoring showed the pelicans took little notice of military activities and many young fledged (Sorrie 1978; Schreiber R et al. 1981; Schreiber EA 1999; Geo-Marine 2001a, 2006a). During the 1970s, the Cayo Conejo colony was the largest of the three breeding colonies in Puerto Rico. Numbers fluctuated between 200 and 250 (Collazo and Klass 1985). By 1981, the colony represented 7 percent of the West Indian Brown Pelican population (Collazo and Klass 1985; Schreiber, EA 1999). The colony remained stable until 2000. From 1999 to 2003, anti-Navy protestors camped on a near-by beach, and boat traffic increased exponentially (fig. 53). In 2003, the Navy land was transferred to the USFWS, and Cayo Conejo was transferred to the Commonwealth of Puerto Rico Department of Natural and Environmental Resources. Pelican surveys

recommenced in 2007. Surveys from 2007 to 2009 indicate that the colony was a shadow of its former self (Gemmill, Diaz, Barandiaran field notes 2007–2009; Gemmill in Norton et al. 2008a, 2008b, 2008c, 2009a). By 2010, boating activity decreased to occasional recreational boaters and to people fishing. As a result, from 2010 to 2012, pelican numbers including young increased indicating a possible recovery may be underway.

Increased human activity was the most likely cause of abandonment of the Cayo Conejo colony. A similar decline occurred at several colonies in Puerto Rico and the U.S. (Anderson 1988; Klein et al. 1999; Carney and Sydeman 1999). Nesting pelicans are very susceptible to human disturbance, even to boat traffic within 200 meters (Schreiber R et al. 1981; Anderson 1988). In a 1999 study for the Navy, Elizabeth Ann Schreiber, a seabird expert, stated: "Cayo Conejo has survived as a nesting site primarily because the area is closed. Since the island is easily accessible, if it were in an unprotected area, I believe the birds would no longer be nesting here" (Schreiber EA 1999).

A serious future threat is a proposed Navy cleanup of Cayo Conejo, which includes stripping the vegetation down to the soil (Barandiaran, pers. com. 2013). This human impact would cause the pelicans to abandon their nesting colony. Years would go by before the vegetation grew to the height preferred by nesting pelicans.

The federally threatened Roseate Tern nests on Roca Alcatraz near Cayo Conejo. Recreational boating activities may have disrupted their breeding (Saliva 2000). Picnickers and fishermen's use of Isla Yallis, just north of Punta Icacos on the eastern end, discourages terns and oystercatchers from nesting on this island.

In addition to boating and fishing, other recreational activities that may be detrimental to birds are hiking, bicycling, horseback riding, jogging, and walking dogs, especially on mangrove lagoon salt and mud flats. Two birds of conservation concern, Wilson's Plover and Least Tern, make well-camouflaged nests on mud flats and beaches. Riders, bikers, and hikers who cross these areas can easily destroy the nests, injure the chicks, force the adults to abandon the nests, and stress the birds (fig. 54). These recreational activities can affect shorebirds, both migrants and winter visitors, which use beaches and mud flats to roost and feed (Klein et al. 1999; Carney and Sydeman 1999). These stopover sites are becoming scarce in

other parts of the Caribbean, making these habitats on Vieques increasingly critical.

Large grassy areas serve as alternate stopover sites when the mud flats are flooded. Large grassy areas at Ensenada Sombe, the airport, and former Navy headquarters are crucial for migrating shorebirds forced to land due to weather. In September 2008, the author counted eleven species of shorebirds, many birds of conservation concern, resting and feeding on the lawns of Ensenada Sombe after a night of heavy rains. Hikers, joggers, dog walkers, and lawn mowers caused the birds to fly off and return several times. Forcing shorebirds to fly burns fat reserves they need to reach their wintering or breeding grounds.

Hiking and biking trails, whether on Mt. Pirata, the dry limestone forest of Puerto Ferro, Playa Grande, or Boca Quebrada should be planned carefully to avoid disruption of breeding or wintering birds. Hiking trails open undisturbed areas to human disturbance, causing birds to abandon previously used areas. Trails also result in forest fragmentation, allowing predators and exotic species access to areas previously not occupied by them. Trails, unless constantly maintained, can lead to soil compaction and erosion similar to the environmental impact caused by livestock.

Fig. 54. A bird of conservation concern, Wilson's Plover, lays well-camouflaged eggs in small indentations on mud flats. If riders, bikers, and hikers have access to these mud flats during breeding season, they may inadvertently destroy the nests and eggs. (Wilson Plover Nest, Laguna Yanuel, Gemmill 2006)

Recreational use of salt flats, lagoons, and the waters around nesting islets should be carefully planned and restricted during critical periods of use by birds of conservation concern.

HUNTING

Hunting has been a conservation issue since the nineteenth century when plume hunters

killed herons and egrets and sold the feathers for hats and pillows (Wetmore 1916b). On Vieques, locals shot birds, including Red-tailed Hawks, for food (Wetmore 1912). In the 1970s, cock fighters paid hunters $25 per Red-tailed Hawk claw to use as a spur on their fighting cocks (Sorrie, field notes 1971). In the 1980s, the hunting of pigeons, doves, and ducks also resulted in the decline of these species (Raffaele 1978; Sorrie 1981).

Lack of conservation education, regulation, and enforcement led to unsustainable hunting practices. In 1978, for example, hunters could shoot a total of eight White-crowned and Scaly-naped Pigeons *(Patagioenas squamosa)*. White-crowned Pigeons declined because opening day of hunting season coincided with the pigeon's March to July breeding season (Raffaele et al. 1973). In 1974, the Department of Natural and Environmental Resources rescheduled the opening of hunting season to August. In 1975, the DNR approved a moratorium on the taking of White-crowned Pigeon but failed to act in time for that year's hunting (Raffaele 1978). As late as 1985, the White-crowned Pigeon was still one of the sixteen legally hunted species in Puerto Rico. Another eight game birds found on Vieques were Blue-winged Teal *(Anus discors)*, Common Gallinule *(Gallinula galaeta),* American and Caribbean Coots, Wilson's Snipe, Zenaida Dove, White-winged Dove, and Mourning Dove (Wiley 1985a). Today hunting is restricted to Scaly-naped Pigeon, and Zenaida, White-winged, and Mourning Doves on municipal lands. Duck hunting is not allowed.

INDIRECT IMPACTS

Human activity can disturb bird species indirectly as well as directly. Introduced predators, invasive plants, and pollution can affect habitat quality and avian health and wellbeing.

INTRODUCED PREDATORS

The introduction of exotic species—Black and Norway Rats *(Rattus rattus* and *norvegicus)*, Small Indian or Asian Mongoose *(Herpestes auropunctatus),* cats, and dogs—wreak havoc on nesting birds through predation and competition for resources (Wiley 1985). Introduced predators devastate native wildlife, and small islands like Vieques are particularly vulnerable.

Rats arrived with European settlers (fig. 55). In 1872, sugarcane plan-

tation owners introduced the Asian Mongoose to control the rapidly expanding rat population. This mongoose was introduced to Puerto Rico in 1877 (Horst et al. 2001). Bowdish (1902a) is the first to mention the mongoose on Vieques (fig. 56). The mongoose diet includes birds, as well as their young and eggs. The USFWS has initiated mongoose control programs at sea turtle nesting beaches because the mongooses eat turtle eggs and hatchlings.

A more recent arrival (in the 1980s) is the Green, or Common, Iguana *(Iguana iguana)*. This iguana is native to Central and South America. Its range extends into Mexico and the Caribbean. It was first noted in a heron rookery in La Chata in 1985; from there it has spread as far west as the former Navy headquarters. The adults are herbivores, but the young are known to eat young birds.

Feral cats and dogs occur throughout the island, primarily in inhabited areas. The local animal shelter is working diligently to control and reduce feral animals.

Figs. 55 and 56. Rats (upper photo) arrived on European ships. Mongooses (lower photo) were introduced to Vieques prior to 1900 in the mistaken belief that they would control the sugarcane rats. Instead they had a negative effect on island birdlife as they are opportunistic feeders, eating birds, their eggs, and chicks. (Rat, Mt. Pirata, Gemmill 2006; Mongoose, Boca Quebrada, Gemmill 2006)

INVASIVE SPECIES

The major habitat threat today is invasive plant species (fig. 57). Invasives are nonnative species or exotics that adversely affect a native habitat. For example, invasive vines on Mt. Pirata are displacing the native vegetation, and various acacia species have replaced native vegetation on the highly disturbed eastern end of the island. On the eastern side of the refuge, USFWS is experimenting with removing exotic plants and reintroducing

Fig. 57. Invasive plant species are taking over native vegetation on parts of the island. Removal of invasive plants is a major undertaking. (Invasive Vines, Playa Grande, Gemmill 2013)

native species. Removing exotic species is labor-intensive, but if future generations are to find native flora and fauna, efforts must be made to reduce invasive species across the island.

CLIMATE CHANGE

Many scientific experts in fields related to anthropogenic climate change state that climate change is impacting natural systems and habitats (IPCC 2007). Some scientific studies indicate that human-induced climate change may lead to reduced summer precipitation in the Caribbean, to increased hurricane activity and intensity, and to sea level rise (Soloman et al. 2007; USCCSP 2008; Webster et al. 2005).

To aid conservation planning for protecting birds in a warmer world, the U.S. Committee of the North American Bird Conservation Initiative (NABCI) prepared *The State of the Birds 2010: Report on Climate Change.* How will climate change affect Vieques and its birds? The report states:

- Average annual temperatures in the Caribbean have increased by more than 1°F since 1900 and are expected to increase 4°F this century, leading to less summer rain and less moist forest coverage.
- Hurricanes are expected to increase in number and intensity.
- Sea level rise will push the mangrove forests inland or cause them to die.
- Forty-nine percent of U.S. Caribbean island birds have medium or higher vulnerability to climate change.

Climate change will affect the amount and timing of rainfall, and, therefore, salinity and water levels in mangrove lagoons. Today Vieques has a dry and a wet season, with the dry season beginning in December and lasting through April. May, June, and July are transition months. The wet season is from August to November, coinciding with hurricane season. March is the driest month and September the wettest.

The wet and dry seasons are intertwined with a bird's survival. During the rainy season, fruiting trees, flower nectar, and insect abundance correlates with successful breeding and survival for residents and visitors (Faaborg 1982; Marra et l.1998; Staicer 1996). Drought affects the timing of breeding (Raffaele 1975; Sorrie 1981). Strong hurricanes such as Class

Figs. 58 and 59. Climate change may increase the number and intensity of hurricanes, which will negatively impact plants and wildlife. In 1989, a class IV Hurricane Hugo passed directly over Vieques stripping the trees of leaves. Punta Arenas on the western side is shown before (upper photo) and six months after (lower photo). (Punta Arenas Before and After Hurricane Hugo, Gemmill 1988 and 1990)

IV Hugo, 1990, strip trees of leaves, flowers, and fruit, and destroy nesting (Wiley 1993) (Figs. 58, 59, 60, and 61) Finding food after a hurricane is perhaps the biggest challenge (Askins and Ewert 1991; Wade 1991; Wauer and Wunderle 1992; Rivera-Milán 1995; Wunderle 1995, 2001; Tossas 2001). For example, waterbirds suffered when storm-induced saltwater intrusion killed their prey.

Specific examples of Hugo's impact on Vieques birds follow:

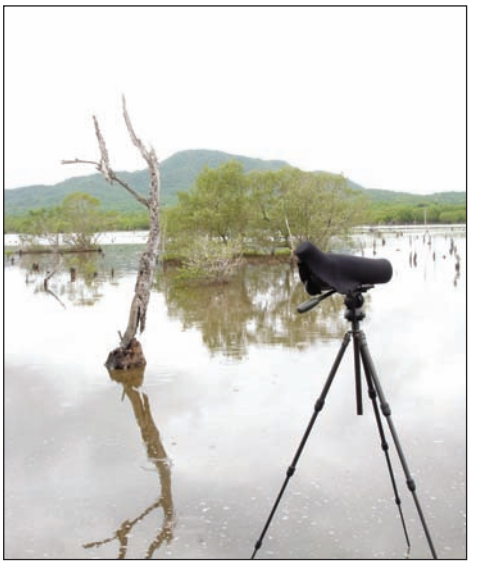
- Scaly-naped Pigeons did not nest on Vieques in May or June 1990, their peak nesting season; did not recover for two years after Hugo; and large flocks dispersed from Vieques and Culebra to the main island, most likely in search of food and cover (Rivera-Milán 1995a).
- Puerto Rican Woodpeckers lost nesting cavities and were forced to roost outside in the inclement weather. Whether the wood-

Figs. 60 and 61. The Taíno ceiba tree (known as kapok tree) is a landmark on the western end (left photo). The winds of Hurricane Hugo stripped its leaves (right photo). In the aftermath of Hugo, birds had difficulties finding food and protected nesting sites. (Kapok Tree Before and After Hurricane Hugo, Gemmill 1983 and 1990)

pecker population died or was forced to move to the main island to find standing trees for nest holes, this species disappeared from the island until April 1992, and did not fully recover until 1997 (Norton 1990, 1995b, 1998, and Norton et al. 2002).

- Antillean Crested Hummingbird and Green-throated Carib essentially disappeared from the island and did not return to pre-Hugo levels until 1997 (Norton 1998). The Antillean Crested Hummingbird was not observed during surveys in 1991 and 1993. Single birds were reported in 1992, 1994, and 1995. The Green-throated Carib fared better, as it was reported each year after the hurricane, although only single birds in 1990, 1991, and 1992. By the end of 1993, a recovery was underway, with eight individuals reported (Gemmill, field notes 1991–1995).

Precipitation may be a factor affecting avian biodiversity on Vieques (Sorrie 1981; Faaborg and Arendt 1989; Haney et al. 1991; Tanner and



Figs. 62 and 63. Lagoons attract different birds according to the water levels. Shortly before the rainy season, lagoons are dry (left photo, June). During the rainy season, water levels increase (right photo, September). Herons and egrets prefer more water, while shorebirds need lower levels and mud flats. (Boca Quebrada Before and After Rainy Season, Gemmill 2006 and 2008)

Kapos 1991; Dugger et al. 2004). Pigeon and dove movements, for example, are driven by precipitation patterns that affect fruiting trees. Columbids move between the islands to find these fruiting trees (Wiley 1976, 1991). Waterbirds and shorebirds also respond to precipitation in Puerto Rico and the Virgin Islands by moving among lagoons or islands seeking favorable water levels (Belitsky 1978b; Sorrie 1981; Faaborg and Arendt 1989; Collazo and Bonilla-Martínez 2001; Rivera-Milán and Bonilla-Martínez 2007) (Figs. 62, 63, 64, 65). A regional conservation strategy is needed to ensure that mangrove lagoons and forests with fruiting trees are protected on Vieques, Culebra, the main island, and Virgin Islands in light of this intra- and inter-island movement. For game species, plans also need to reflect this intra-island movement. Hunting season timing and bag limits should be set on a year-to-year basis to reflect differences among species in breeding activity and population fluctuations due to weather variations (Wiley 1991; Rivera-Milán 1995a).

Figs. 64 and 65. Laguna Sombe on the south-central shore, is one of the island's most important shorebird and waterfowl lagoons. Early in the rainy season it can be bone dry (left photo, August). During the rainy season, the lagoon is filled with water (right photo, October). (Laguna Sombe Before and During Rainy Season, Gemmill 2009 and 2007)

Conservation Governance

Federal and commonwealth laws, regulations, and administrative orders protect the birds on Vieques and their habitat (Ortiz 1989). Species and habitat management are under the purview of USFWS, the Commonwealth of Puerto Rico, the Conservation Trust of Puerto Rico (CTPR), and the Municipality of Vieques. Four nongovernmental organizations—the Vieques Conservation and Historical Trust (VCHT), the Sociedad Ornitológica Puertorriqueña, Inc. (SOPI), Comité Pro Desarrollo y Rescate de Vieques, and TICATOVE—work with the public sector agencies to support implementation of the laws, regulations, and plans.

FEDERAL AND COMMONWEALTH LAWS AND REGULATIONS

Four federal bird conservation laws apply to Vieques.

1. The earliest law is the Migratory Bird Treaty Act of 1918 (MBTA), as amended, which implements various treaties and conventions among the U.S. and Canada, Japan, Mexico, and Russia for the protection of migratory birds. Under the act, taking, killing, or possessing migratory birds is unlawful. All species (with the exception of introduced species) are protected. The list of migratory bird species protected by the MBTA appears in Title 50, section 10.13, of the Code of Federal Regulations (50 CFR 10.13).
2. The most important law for the protection and recovery of threatened or endangered species is the U.S. Endangered Species Act (ESA) of 1973. The ESA is in Sections 1531 through 1544 of Chapter 35 of Title 16 of the U.S. Code (USC) Annotated (ESA,16 USC 1531–1544, 87 Stat. 884), as amended. Federal funding is provided by two additional acts.
3. The Fish and Wildlife Conservation Act of 1980 (FWCA, 16 USC 2901–2911; 94 Stat. 1322), as amended, provides funding for states and territories for conservation plans and programs for non-game fish and wildlife. The FWCA requires the Secretary of the Department of Interior to identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the En-

dangered Species Act. In 2001, President Clinton issued Executive Order 13186—Responsibilities of federal agencies to protect migratory birds—to improve the executive branch's migratory bird management. One of the actions calls for a periodic report identifying nongame birds that are "Species of Concern."

4. The Neotropical Migratory Bird Conservation Act of 2000 (NMBCA, PL 106–247, 20 Jul 2000, 113 Stat. 593), reauthorized in 2006, provides for a matching-grant program to fund projects that promote the conservation of migratory birds in the U.S., Canada, Latin America, and the Caribbean.

The Puerto Rican law to protect, conserve, and enhance both native and migratory wildlife species is Nueva Ley de Vida Silvestre de Puerto Rico [New Wildlife Law of Puerto Rico] (Act 241, 15 Aug 1999), as amended. Its associated regulations (2004) are Reglamento para regir la Conservación y el Manejo de la Vida Silvestre las Especies Exóticas y la Caza en El Estado Libre Asociado de Puerto Rico—Reglamento 6765 [Regulation Governing the Conservation and Management of Exotic Species Wildlife and Game in the Commonwealth of Puerto Rico—Regulation 6765] and the Reglamento para Regir el Manejo de las Especies Vulnerables y en Peligro de Extinción en el Estado Libre Asociado de Puerto Rico. Reglamento 6766 [Regulation for the Management of Vulnerable and Endangered Species—Regulation 6766].

NATURAL RESOURCE STEWARDS

Eight government and nongovernment agencies and organizations play a role in protecting the natural resources of Vieques.

- Commonwealth of Puerto Rico's Department of Natural and Environmental Resources oversees the Commonwealth of Puerto Rico's natural resources from birds to coral reefs. On Vieques, it manages Laguna Sombe, one of the most critical shorebird and waterfowl lagoons on the island; Puerto Mosquito, an environmentally sensitive bioluminescence bay; and seabird nesting islands of Cayo Conejo, Cayo de Tierra, and Cayo de Afuera. Separately, the Compañia de Parques Nacionales de Puerto Rico [Puerto Rico National Parks Company] manages the concessions

and beaches at Ensenada Sombe adjacent to the lagoon.

- The USFWS strives to conserve, protect, and enhance fish, wildlife, and plants, and their habitats. It implements and manages the ESA and MBTA and develops and maintains a list of U.S. birds of conservation concern. The Department of Interior designated the lands it received from the Navy as the USFWS Vieques National Wildlife Refuge. The refuge comprises numerous biologically rich mangrove lagoons, the ecologically rich Mt. Pirata moist forest, and important dry limestone forests on the south coast around Puerto Ferro. The most important mangrove areas for birds within the refuge are Playa Grande, Kiani Wetlands Complex, Puerto Mosquito, Puerto Ferro, Bahía Tapón, and Puerto Diablo.
- Vieques Municipality took over responsibility from the Navy for developed land with barracks and bunkers. The municipality manages its land so it does not impact the surrounding biologically sensitive lands, such as Mosquito Pier seagrass beds, the Playa Grande lagoon complex, and neighboring moist forests.
- Conservation Trust of Puerto Rico (CTPR) or Fideicomiso de Conservación de Puerto Rico was created by the U.S. Congress in 1968. CTPR owns and manages many environmental-sensitive properties in Puerto Rico. On Vieques, it owns and manages the moist forest area around Cerro El Buey adjacent to Mt. Pirata.
- Puerto Rican Ornithological Society or Sociedad Ornitológica Puertorriqueña Inc. (SOPI) was established in 1995. It is dedicated to the study, conservation, and appreciation of birds in Puerto Rico. Its members conduct surveys, CBCs, and other activities to conserve Puerto Rico's birds and biodiversity of the main island and of Vieques. It maintains the official list of Puerto Rican birds.
- TICATOVE is a Friends of the Refuge group formed in 2007. The group's name combines the Spanish words for three sea turtles: Tinglar (leatherback sea turtle) *(Dermochelys coriacea),* Carey (hawksbill sea turtle) *(Eretmochelys imbricata),* and Tortuga Verde (green sea turtle) *(Chelonia mydas),* species that nest on Vieques. It provides environmental education, scientific

research, and technical assistance to the refuge. The group's focus on sea turtles has expanded to include coastal forest restoration, reptile and amphibian monitoring, and bats.

- Vieques Conservation and Historical Trust (VCHT) or Fideicomiso de Conservación e Historia de Vieques was founded in 1984. Its mission is to foster, protect, and conserve the environmental, archaeological, and cultural resources of Vieques. A primary goal is to preserve and study the bioluminescent bays found on the island. Its members conduct bird surveys, walks, and educational programs for local schools and the general public.
- Committee for the Rescue and Development of Vieques or Comité Pro Rescate y Desarrollo de Vieques, founded in 1993, is dedicated to ending the military presence on Vieques and to promoting sustainable development.

One of today's challenges is the coordination among multiple federal and commonwealth authorities to protect habitat and wildlife. Protection of the pelican colony on Cayo Conejo is a good example. The island is under the jurisdiction of the Commonwealth. The Navy is responsible for the cleanup of military ordnance. The USFWS has responsibility for the recovery of the Brown Pelican. NOAA is responsible for the coastal zone.

Research Recommendations

Research is needed on Vieques for long-term data to answer critical questions regarding avian life history and habitat quality for the island's residents and migrants. Since 1900, data gathering on Vieques has been limited to single-observer efforts. Resource managers should initiate as soon as possible a variety of data-gathering projects to answer fundamental questions (Nuñez-Garcia 1999). The results should be shared with large-scale monitoring programs and made available to researchers through peer-reviewed publications and the web. Some research questions under the categories of significance, trends, and specific species follow:

SIGNIFICANCE

- To understand the relationships between birds, weather, and climate, how can reliable island-weather data be obtained? Since

the Navy left, it is difficult to obtain consistent weather data.
- What are the relationships between island bird species and precipitation?
- What is the quality of the habitat in terms of food availability and protected roosting sites for migrants and winter visitors?
- How important is Vieques for wintering shorebirds and Nearctic-Neotropical migrants?
- Why do some lagoons attract waterbirds and shorebirds and others do not?
- Why do shorebirds prefer the grassy area at Ensenada Sombe as a refuge during storms while the Navy headquarters and the airport are rarely used?
- Are Vieques birds' life cycles affected by environmental contaminants?

TRENDS
- What are the avian population trends on the island, especially for resident species of conservation concern?
- What are the return rates of migrant species, as this is an indicator of habitat quality?
- What is the winter survival rate and physical condition of passage migrants and winter visitors?

SPECIFIC SPECIES
- Which seabirds are nesting on Vieques, and where and what is the impact of human disturbance?
- Does the Puerto Rican Screech-Owl still reside in the hills east of Camp Garcia?
- What are the best management practices for grassland birds?
- What are the life histories of the three Puerto Rico endemic birds on Vieques: Puerto Rican Woodpecker, Puerto Rican Flycatcher, and Adelaide's Warbler?
- What is the taxonomy of certain island birds, such as Caribbean Elaenia, *(Elaenia martinica),* Gray Kingbird *(Tyrannus dominicensis),* Loggerhead Kingbird *(Tyrannus caudifasciatus),* Key West Quail-Dove, Bridled Quail-Dove, and Bananaquit?

Species Accounts

The following list of Vieques's birds includes 196 species, of which twenty species are not sufficiently documented for a first record, one species is an escaped caged bird, and one species is pending before the SOPI Rare Birds Committee. The listing provides the following information for each species:

- Scientific, English, and Puerto Rican idiomatic names for birds and plants accepted as of June 2014 (for source documents see pp. 11–12).
- Status, seasonal abundance, and habitat preference (for acronyms see pp. 12–15; e.g., ER/V/ML represents extremely rare vagrant of mangrove lagoons).
- Vieques records including date of first record, breeding confirmation, winter visitors' arrival and departure dates, and noteworthy observations.
- Conservation status as designated by various government agencies and non-profit organizations (for acronyms see pp. 61–63). The designations are listed in chronological order starting with the most recent.
- Museum specimens, their locations, and tag numbers.
- Number banded. Detailed information is available from the U.S. Bird Banding Laboratory.
- Photographic documentation, if available.

A summary of the Species Accounts for documented species is provided in Table 2 at the end of this section (pp. 210–212).

Records come from observers' field notes, personal communications, banding, and eBird. Observers' names are listed on p. 92 together with

the observers' initials used in the Species Accounts. Records that have been published are noted by author's last name, followed by publication year, and preceded by the observer's initials if different from the author's. Photographers are given credit with each illustration. The observers (in alphabetical order by last name) follow:

IA	Isha Alexander
MA	Matthew Anderson
ABB	A B. Baker
MB	Mike Barandiaran
DWB	David W. Belitsky
EB	Erick Bermudez
VB	V. Biaggi
TB	Tomás Blanco
BB	Bob Bowden
BSB	B. S. Bowdish
NB	Ned Brinkley
GB	Gisella Burgos
SC	Sarah Campbell
KC	Kirk Capra
MC	Marcos Caraballo
JCa	Julio Cardona
JAC	Joy Avis Chapper
JCo	J. Colón
SAC	Sergio A. Colón
FC	Frank Corrado
LC	Liz Courtney
DC	Dennis Currier
STD	Stuart T. Danforth
LD	Linnette Diaz
OD	Oscar Diaz
D&PD	Dale and Priscilla Doucette
JD	Joan Duffield
SE	Stephen Earsom
MFP	Manuel Figueroa-Pagan
SF	Sean Furniss
DDG	Daphne deJ. Gemmill
VG	Vivienne Gemmill
NTG	N. T. Giovanni
JG	Jaime González
NG	Nancy Green
KG	Karin Grosz
SH	Steve Hairfield
DH	Doris Hall
KH	Karsten Harries
IH	Isaac Hernández
WH	Willie Hernández
AH	AMP Horruitiner
SH	Siddihia & Stanley Hutchinson
JJ	Joseph Jehl
CK	Cameron Kepler
PK	Patrick Kline
BL	Betty Langhorne
EL	Elizabeth Langhorne
GL	Geoffrey LeBaron
ML	Maria Lugo
PMa	Peter Marra
JM	John Martin
HM	Heidi Martinez
WM	Winston Martinez
RM	Ray McNamara
CM	Carmen Mendez
JM	Javier Mercado
DHM	Donald H. Messersmith
JDM	J. D. Milligan
LM	Leopoldo Miranda
PM	Pablo Miranda
AMol	Alexis Molinaris
RM	Robert Moore
ALM	Alcides L. Morales
WM	William Mueller
SN	Staci Notine
JN	Julian Notine
JPO	José P. Olivo
JO	José Ortúzar
AP	Ana Pazos

MP	Mike Powers
WP	Wendy Price
R&PP	Rich and Peggy Puffer
HAR	Herbert A. Raffaele
RR	Ross Rassmussen
WR	W. Reagan
GR	George R. Rickley
JR	José Rincón
RLR	Ramón L. Rivera
FRM	Frank Rivera-Milán
AR	Ana Robles
PR	P. Román
FR	Francheska Ruiz
JAS	José A. Salguero
LS	Luis Santaella
JGS	Jason G. Santos
EAS	Elizabeth Ann Schreiber
RS	Ralph Schreiber
JJS	Joseph J. Schwagerl
BAS	Bruce A. Sorrie
JS	Jason Sturner
KV	Kathy Veit
PV	Papo Vives
AW	Alexander Wetmore
EHW	Ernest H. Williams
LBW	Lucy Bunkley Williams
SZW	Sandy Z. Wilson

Non-Passerines

ANATIDAE

1. DENDROCYGNA ARBOREA

West Indian Whistling-Duck (Chiriría Caribeña) ER/PB/ML

Extremely rare, possible breeder. Wetmore (1916a) received reports that this duck occurred at times on the larger lagoons. First confirmed report at Laguna Boca Quebrada, 18 Jun 1970 (Sorrie 1975). Other sightings were seven birds feeding at Laguna Kiani, 15 Jan 2005 (ML, AM, JR); and two birds near Cerro Indio, 12 Jun 2010 (MB). The 2000 Puerto Rican population estimate was a hundred individuals and little is known about intra-island movements for this species (Collar et al. 1992; Satterfield and Capper 2000).

Conservation Status: Potential Concern (ABC), Vulnerable (BI/IUCN), US and PR/VI Conservation Concern (USFWS), Critically Endangered (DNER), and Protected (MBTA).

2. BRANTA CANADENSIS

Canada Goose (Ganso Canadiense) ER/V/ML

Vagrant. Four present on a lagoon in Dec 1981 (JG in Perez-Rivera 1987). Vieques is the eastern limit for this species in the West Indies (Norton, pers. com. 2012).

Conservation Status: Protected (MBTA).

3. ANAS AMERICANA
American Wigeon (Pato Cabeciblanco) ER/V/SP
Vagrant. Only record is a female on the freshwater pond off Route 997 at marker 4.7 km, 12 Oct 2002 (SAC, JAS, LM, PM, RLR in Salguero 2002).

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

4. ANAS DISCORS (Fig. 66)
Blue-winged Teal (Pato Zarcel) FC-ER/WV/ML-SP
Fairly common winter visitor with peak numbers in December and February; extremely rare in summer (DDG). First record 24 Dec 1935 (Danforth 1937). Winter visitor average count is two to twenty with an occasional flock of sixty to a hundred. Largest flock was two hundred at Laguna Sombe, 27 Dec 1992 (DDG, NG). More recently, 12 Feb 2012, eighty teal were on Laguna El Gato (EB and FR). Earliest arrival is 21 Sep (EB, FR), and latest departure, 1 Jun (BAS). Favorite lagoons are Sombe, Playa Grande, and Navio.

Conservation Status: Protected (MBTA).

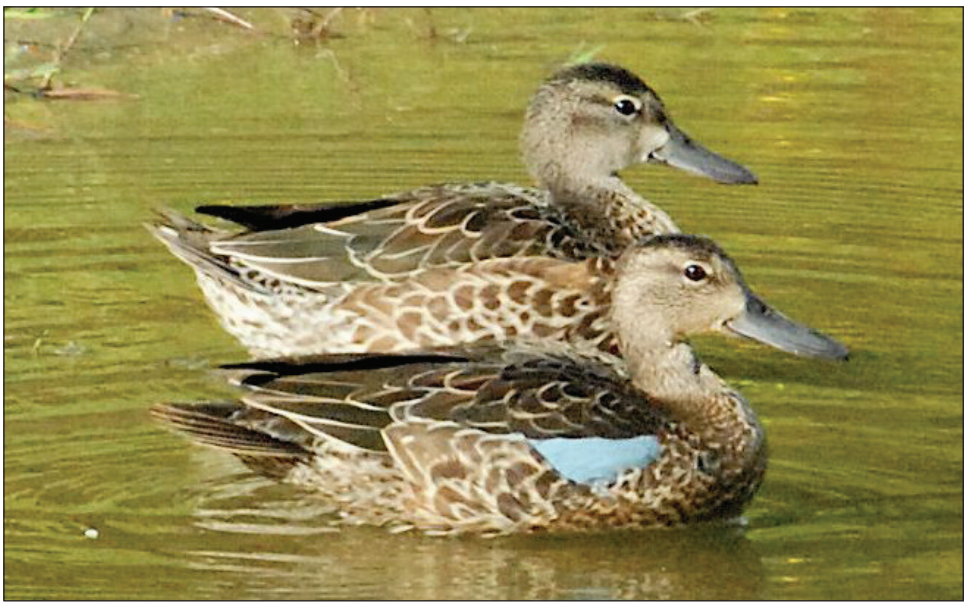


Fig. 66. Male and Female Blue-winged Teals (Gemmill 2007)

5. ANAS CLYPEATA

Northern Shoveler (Pato Cuchareta) R/WV/ML

A rare winter visitor; extremely rare in fall and spring; no summer reports. Tomás Blanco (1969) collected a male on Vieques but gave no date or location. Second record was from Laguna Playa Grande, 13 Feb 1983 (DDG). A high count of thirty-seven was on Laguna Playa Grande, 18 Mar 2012 (EB, FR). Earliest arrival date, 1 Nov (EB), and latest departure date, 4 Apr (EB, FR).

Conservation Status: Protected (MBTA).

Museum Specimen: Tomás Blanco's specimen, location unknown.

6. ANAS BAHAMENSIS BAHAMENSIS (Fig. 67)

White-cheeked Pintail (Pato Quijada Colorada) FC/BR/ML-SP

Fairly common resident. First record Bahía Tapón, 20 Jul 1971 (BAS, CK in Sorrie 1975). A nest with two eggs found by Sorrie at Bahía Salina del Sur, 17 May 1978, was the first breeding record. In 1966, Culebra and Vieques harbored the entire Puerto Rican population of this species (Iñigo 1968a). By 1975, a small population at a marsh at Roosevelt Roads was discovered (Raffaele 1975). In 2000, the Puerto Rican estimate was 1,021 (Collazo and Bonilla-Martínez 2001). The Vieques lagoons have significant numbers due to the quality of the habitat, reduced human disturbance, and restrictions on hunting. The largest single flocks were 206 on Laguna Playa Grande, 26 Dec 2012 (EB, FR), and 150 on Laguna Sombe, 23 Dec 1992 (DDG, NG). Monthly high total is 883 based on 22 Dec observations between 1983 and 2012. Two months had counts in the 400s, one in the 300s, six in the 200s, and two in the 100s. The lagoons in the restricted eastern end along with

Fig. 67. White-cheeked Pintail Duckling (Sorrie 1978)

Playa Grande, Puerto Ferro, and Laguna Sombe are the preferred feeding and resting areas.

Conservation Status: PR/VI Conservation Concern (USFWS), Vulnerable (DNER), and Protected (MBTA).

Banded: One color marked ASY-M pintail with modified patagial streamers #X3 and US band #815-29046. This bird was marked at Airport Pond on the main island; one month later it was sighted in Culebra; ten days later in Vieques at Laguna Monte Largo; and eighteen days later back in Culebra (Belitsky 1978b).

7. AYTHYA COLLARIS

Ring-necked Duck (Pato del Medio) ?/SP

Unconfirmed. A table accompanying the 2000 NOAA Vieques Environmental Sensitivity Maps 67 and 68 lists this species in high concentrations on brackish and saltwater lagoons. Accuracy of the information is in question and not sufficient for a first Vieques record because the record is not consistent with the species' preferred freshwater habitat, the high numbers are excessive for an uncommon bird in Puerto Rico, and there is a lack of documentation.

8. AYTHYA AFFINIS

Lesser Scaup (Pato Pachiblanco Menor) ER/WV/ML

Extremely rare winter visitor. Wetmore (1916a) noted a report of this species as present. Only one record of 300 scaup on Playa Grande, 25 Dec 1935 (Danforth 1937). At the time it was considered the most common migratory duck in Puerto Rico (Danforth 1931). Its population decline since the 1930s may account for the lack of subsequent records.

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

9. MERGUS SERRATOR

Red-breasted Merganser (Mergansa Piquilarga) ER/V/ML

Vagrant. One record, 6 Dec 1981, for Vieques and Puerto Rico as of 2012 (SF in Norton 1982a; Norton, pers. com. 2014).

Conservation Status: Protected (MBTA).

10. NOMONYX DOMINICUS

Masked Duck (Pato Dominico) ER/V/ML

Rare visitor. In 1987 or 1988, Julio Cardona and Manuel Rivera of the DNER observed and photographed a Masked Duck on Laguna Playa Grande for the only confirmed record (Ventosa, pers. com. 2010). A table accompanying the 2000 NOAA Vieques Environmental Sensitivity Maps 67 and 68 lists this species in high concentrations on Vieques's lagoons. Accuracy of the information is questionable given the absence of this endangered species' preferred habitat of freshwater areas with sufficient aquatic vegetation, and the lack of supporting documentation.

Conservation Status: Potential Concern (ABC), PR/VI Conservation Concern (USFWS), Endangered (DNER), and Protected (MBTA).

11. OXYURA JAMAICENSIS JAMAICENSIS

Ruddy Duck (Pato Chorizo) R-ER/BR/ML

Extremely rare winter and summer breeding resident; rare in spring; no fall reports. First record is the eastern end of the island, 12 Mar 1978 (Belitsky 1978b). Largest flock size reported is thirty individuals at Laguna El Gato, 11 Feb 2012 (EB, FR). Nests were found at Laguna Matias, 19 May 1978, and Monte Largo, 20 May 1978 (BAS).

Conservation Status: PR/VI Conservation Concern (USFWS), Vulnerable (DNER), and Protected (MBTA).

ODONTOPHORIDAE

12. COLINUS VIRGINIANUS

Northern Bobwhite (Codorniz) ER/FB/SC

Introduced; extremely rare. First unsuccessful introduction attempt for this game species was mid-to-late 1800s (Bowdish 1902a). Lever (1987) assumed that these birds were *Colinus virginianus cubanensis.* The second attempt was by the Division of Fish and Wildlife, Department of Agriculture of Puerto Rico, when they released 800 bobwhites from Georgia, *Colinus virginianus virginianus,* on 1 Jul 1971: 200 east of Mosquito Pier and south of the old road; 200 south of the old civilian airport; 200 on Mt. Pirata; and 200 in Quebrada

Hueca, east of Isabel Segunda (Raffaele 1978; Sorrie 1975). The only reported sight record was 2 Jul 1971 (Sorrie 1975). A recent unconfirmed sight record was Quebrada Urbano, 2000 (KC). These birds probably succumbed to mongoose and rat predation.

Conservation Status: Potential Concern (ABC).

PODICIPEDIDAE

13. TACHYBAPTUS DOMINICUS DOMINICUS (Fig. 68)

Least Grebe (Tigua) **ER/WV-PB/ML-SP**

Extremely rare fall, winter, and spring visitor. First record 11 Nov 2001 at the freshwater pond at Route 997 kilometer marker 4.7 (DDG), as are six out of the seven records. Other record is 13 Oct 2007 on Laguna Puerto Diablo (DDG). Most records are pairs during breeding season indicating possible breeding.

Conservation Status: Vulnerable for this Greater Antilles subspecies (ABC), Data deficient (DNER), High Concern (NAWCP), and Protected (MBTA).

Fig. 68. Least Grebe (Gemmill 2007)

14. PODILYMBUS PODICEPS ANTILLARUM (Fig. 69)
Pied-billed Grebe (Zaramago) R/BR/ML-SP

Fig. 69. Adult and Immature Pied-billed Grebes (Gemmill 2009)

Rare resident. Wetmore (1916a) received reports of this species on Laguna Playa Grande in March 1912. First confirmed record is 25 Dec 1935 at Laguna Playa Grande, (Danforth 1935, 1937). There are three subsequent records at this lagoon with a high count of ten individuals, 1 Apr 1971 (BAS). Other sightings, usually a pair, are from the freshwater pond at Route 997 kilometer marker 4.7 with eleven records from 1999 to 2012 (LD, DDG, JM, JO), lagoons on the eastern end with eleven records from 1971 to 2012 (MB, JC, JD, DDG, MFP, BAS), and the Kiani Wetland complex with a few reports (Sorrie 1975; Raffaele 1978). On 15 Aug 2009, a pair were seen feeding a chick to confirm breeding (DDG in Norton et al. 2010b). A record high number is fifty, including some immatures, on Laguna Monte Largo, 20 May 1978 (Sorrie 1981).

Conservation Status: Vulnerable for this Greater Antilles subspecies (ABC), High Concern (NAWCP), and Protected (MBTA).

PHOENICOPTERIDAE

15. PHOENICOPTERUS RUBER (Fig. 70, p. 100)
American Flamingo (Flamenco) ER/WV-FB/ML-SP

Extremely rare winter visitor from fall to spring. Fossils indicate a pre-European presence (Narganes 1982). Hans West was the first to report flamingos on Vieques (West 1794). This species probably was breeding at the time because several lagoons offer excellent habitat.

Fig. 70. American Flamingo (Gemmill 1987)

It was extirpated due to hunting, egg collecting, and human disturbance. The last resident bird was killed in 1940 (Rolle 1961). The most recent sighting is near Blue Beach, October 2000, when seven birds stayed until the end of Jan 2001 (Norton and White 2001).

Conservation Status:
PR/VI Conservation Concern (USFWS) and Protected (MBTA).

Museum Specimens:
Antonio Mellado collected a specimen, 24 Nov 1940, reported to be in the Museo del Departamento de Biología del Colegio de Agricultura y Artes Mecánicas de Mayagüez (Biaggi 1970). Its current location is not known. Fossil remains are housed at El Centro de Investigaciones Arqueológicas, University of Puerto Rico.

PROCELLARIIDAE

16. PUFFINUS LHERMINIERI LHERMINIERI

Audubon's Shearwater (Pampero de Audubon) ?/SH

Unconfirmed. Halewyn and Norton (1984) mentioned that this species was a possible breeder. Sorrie, however, stated that breeding

was unlikely due to the limestone substrate that was unsuitable for burrows in the ground (US Navy 1980a). A report of this species in 2012 was submitted to eBird, which considered it invalid due to imprecise location and lack of documentation (eBird 2012).

Conservation Status: Vulnerable (ABC), PR/VI Conservation Concern (USFWS), and Protected (MBTA).

PHAETHONTIDAE

17. PHAETHON LEPTURUS CATESBYI
White-tailed Tropicbird (Chirre Coliblanco) R-ER/BR/SH

Resident. Extremely rare in winter; rare breeder in spring and summer; no fall reports. First record is Laguna Punta Gato, 19 May 1978 (BAS). First breeding record is Cayo Conejo, 1 Jun 1978 (BAS). Nesting was later observed on Cayo Conejo, Punta Este, Puerto Ferro peninsula (Johnson 1988; Schreiber EA 1999; BAS), and Cayo de Afuera (MB, OD, DDG). It may be underreported due to lack of offshore surveys. In 2000, the estimated number of breeding pairs on Puerto Rico was two to three hundred (Walsh-McGehee 2000).

Conservation Status: The Caribbean subspecies is considered At Risk (ABC), PR/VI Conservation Concern (USFWS), Vulnerable (WISCAP), High Concern (NAWCP), and Protected (MBTA).

18. PHAETHON AETHEREUS MESONAUTA (Fig. 71)
Red-billed Tropicbird (Chirre Piquirrojo) R-ER/PB/SH

Rare in spring; extremely rare in summer, fall, and winter; possible breeder (Johnson 1988; Walsh-McGehee 2000). First record is a bird searching for a nest site on Cayo de

Fig. 71. Red-billed Tropicbird (Sorrie 1971)

Afuero, 31 Mar 1971 (Sorrie 1975). The majority of sightings are around Cayo de Tierra and Cayo de Afuera (DDG, JD, JCa, JAS). Three pairs were seen regularly going and coming from the south cliffs on Punta Este, 27 May 2012, indicating possible nesting activity (MB). This species, like the White-tailed Tropicbird, is probably underreported due to lack of offshore surveys.

Conservation Status: The Caribbean subspecies is considered at risk (ABC), PR/VI Conservation Concern (USFWS), High (NAWCP), Vulnerable (WISCAP), and Protected (MBTA).

FREGATIDAE

19. FREGATA MAGNIFICENS (Fig. 72)

Magnificent Frigatebird (Tijereta) **FC/NB/SH-ML-SP-IA**

A fairly common, nonbreeding resident. First reported by Bowdish (1900), 16 Dec 1899, and listed as occurring by Danforth (1935). Fossil remains indicate an earlier presence (Narganes 1982).

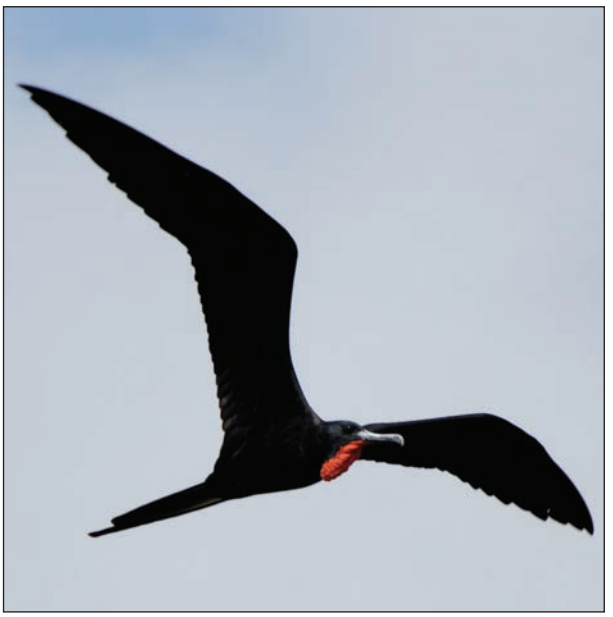


Fig. 72. Male Magnificent Frigatebird (Gemmill 2008)

Conservation Status: Vulnerable (ABC), PR/VI Conservation Concern (USFWS), Red (NAS/ABC), High Concern (NAWCP), Near Threatened (WISCAP), and Protected (MBTA).

Museum Specimen: AMNH# 178517; fossil remains at El Centro de Investigaciones Arqueológicas, University of Puerto Rico.

Fig. 73. Brown Booby (Gemmill 2008)

SULIDAE

20. SULA LEUCOGASTER LEUCOGASTER (Fig. 73)

Brown Booby (Boba Parda) FC-UC-R/NB/SH

Fairly common nonbreeding resident from December to May; uncommon in fall; rare in summer. Wetmore (1916a) received reports in 1912 that this species was an occasional visitor. Danforth (1935) lists it as occurring on Vieques. First sight record was Cayo de Afuera, 29 Mar 1971 (BAS). Frequently seen off Cayo de Tierra.

Conservation Status: Vulnerable (ABC), PR/VI Conservation concern (USFWS), High Concern (NAWCP), and Protected (MBTA).

Banded: US #130743152 recovered from a dead Brown Booby found on Playa Matias, March 2010. It was banded as an adult female on Kalkun Cay off St. Thomas, U.S. Virgin Islands, 23 Mar 2006.

PHALACROCORACIDAE

21. PHALACROCORAX AURITUS

Double-crested Cormorant (Cormorán Crestado) ER/V/ML

Vagrant. The record is 15 Jan 1989 (DDG in Norton 1989). Also one undocumented report (Lewis et al. 1981b).

Conservation Status: Protected (MBTA).

PELECANIDAE

22. PELECANUS ERYTHRORHYNCHOS
American White Pelican (Pelícano Blanco) ER/V/SH

Vagrant. This species was observed at an infrequently visited mangrove lagoon located within the Naval Reserve, 12 Feb 1986 (KG, BB in Norton 1986). The observers' description included all salient features except the prominent black primaries. Norton (1986) comments that this occurrence was not the first for Puerto Rico and Virgin Islands, and it occurred during an influx of this species.

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

23. PELECANUS OCCIDENTALIS OCCIDENTALIS (Fig. 74)
Brown Pelican (Pelícano Pardo) C/BR/SH-ML

Common resident. Reported abundant on 23 Dec 1899 (Bowdish 1900). Cameron B. Kepler discovered nesting pelicans on Cayo Conejo in a Navy-restricted area, 20 Jul 1971 (Sorrie 1975). In 1972, Cayo Conejo was the only breeding colony of Brown Pelicans on Vieques and the main island (Raffaele 1978). In the 1970s, numbers

Fig. 74. Brown Pelicans on Cayo Conejo (Sorrie 1978)

fluctuated between 200 and 250 (Collazo and Klass 1985). Birds nested year round (Schreiber EA 1999). In 1981, it was the largest in Puerto Rico (Collazo and Klass 1985). By 1999, the island supported more than 50 percent of the Puerto Rican population and 7 percent of the West Indian population (Schreiber EA 1999). In the 2000s, pelicans abandoned the colony for a few years after the Navy turned over the land to the USFWS. Recent surveys indicate that pelicans are returning (EB, MB, DDG, FR). North American migrants augment the resident population from November to February (Raffaele 1989a). Punta Vaca, Laguna Playa Grande, Kiani mangroves, and pilings to the west of Mosquito Pier are important roosting sites.

Conservation Status: The Caribbean subspecies is considered Vulnerable (ABC), Delisted (ESA), Endangered (DNER), Moderate (NAWCP), Endangered (WISCAP), and Protected (MBTA).

Banded: 62. A fledgling banded on Cayo Conejo (F11) was seen on Culebra and then sighted at Humacao three days later (Collazo and Klass 1985).

Museum Specimen: AMNH# 178511.

ARDEIDAE

24. IXOBRYCHUS EXILIS EXILIS (Fig. 75) Least Bittern (Martinetito) R-ER/BR/ML

Resident. Rare in spring and summer; extremely rare in winter; no fall reports. First record is Boca Quebrada, 21 Jul 1971 (Sorrie 1975). Breeding documented in March and April 2003 (DDG, RM in Norton et al. 2003). It may be more common than the data indicates given its secretive nature.

Conservation Status: Potential Concern (ABC), PR/VI

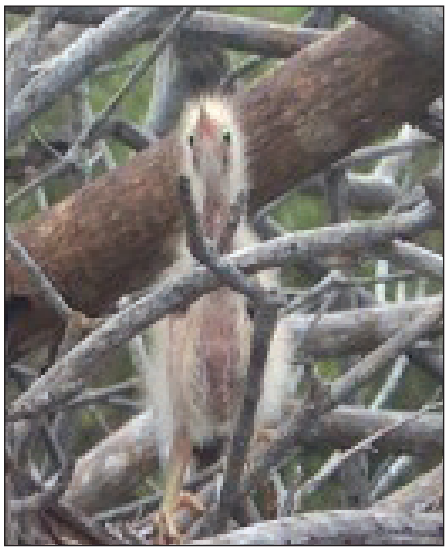


Fig. 75. Least Bittern Chick (Ray McNamara 2003)

Conservation Concern (USFWS),and High Concern (NAWCP), and Protected (MBTA).

25. ARDEA HERODIAS HERODIAS (Fig. 76)
Great Blue Heron (Garzón Cenizo) FC-UC-ER/PB-WV/ML-SP

Fairly common in winter and spring when North American migrants join residents; uncommon in fall; extremely rare in summer. The first confirmed record is 24 Dec 1935 (Danforth 1937). José Bartón reported this bird's presence to Wetmore in March 1912 (Wetmore 1916a). This species may breed on Vieques. Immature birds were reported on Cayo Jalovita, 17 May 1978 (BAS), and Boca Quebrada, 28 Apr 2008 (DDG in Norton et al. 2008c), and subadult birds were reported on Boca Quebrada, 13 Jun 1981 (Sorrie 1981). Record high count is fifteen Great Blue Herons in the lagoons on the west side of Puerto Mosquito, 23 Feb 1996 (DDG, FC).

Conservation Status: Protected (MBTA).

Fig. 76. Great Blue Heron (Gemmill 2001)

26. ARDEA ALBA EGRETTA (Fig. 77)
Great Egret (Garza Real)
C-FC-R/PB-WV/ML-SP

Common in winter and spring due to wintering birds from North America; rare in the summer; fairly common in early fall. Fossils indicate that this species was present prior to European exploration (Narganes 1982). In 1912, Wetmore found this egret uncommon, which he attributed to plume hunting (Wetmore 1916b).

Danforth (1935) listed it as occurring. In 1971, Sorrie found them rare to uncommon and suspected that resident birds were breeding (Sorrie 1975). To date, breeding is not documented. A record high number for one survey period was sixty-two on Laguna Sombe, 13 Feb 2002 (DDG, SZW).

Conservation Status: Protected (MBTA).

Museum Specimens: El Centro de Investigaciones Arqueológicas, University of Puerto Rico.

Fig. 77. Great Egret (Gemmill 2001)

27. EGRETTA THULA (Fig. 78) Snowy Egret (Garza Blanca) C-UC-R/BR-WV/ML-SP

Common in winter and spring when North American migrants join resident birds; uncommon in fall and rare in summer. First record is 25 Mar 1912 of a Snowy Egret in full breeding plumage (Wetmore 1916a). In 1912, Wetmore found it common despite the fact that it was hunted for its plumes and its habitat diminished (Wetmore

Fig. 78. Snowy Egret (Gemmill 2007)

1927). Danforth (1935) listed this species as occurring. Sorrie found them uncommon but regular on the larger lagoons. He had a high count of seventy-five individuals feeding on a fish kill at Laguna El Pobre, 24 Apr 1981 (Sorrie 1981). He also reported young on 21 May 1978 (BAS). This species was observed nesting at La Chata rookery, 3 Mar 2000 (DDG) and 1 Jun 2000 (SH).

Conservation Status: High Concern (NAWCP) and Protected (MBTA).

28. EGRETTA CAERULEA (Fig. 79)

Little Blue Heron (Garza Azul) **C-UC/BR-WV/ML**

Common in fall, winter, and spring; uncommon in summer. First record is 14 Nov 1899 (Bowdish 1900), who found it common but not as abundant as Green Heron *(Butorides virescens)* (Bowdish 1900). Wetmore reported that it was the most common island heron in March 1912. Danforth (1935) listed it as occurring. Wetmore observed many white juvenile and calico first-year birds (Wetmore 1916a), as did others (FC, DDG, NG, BL; Sorrie 1981). Sorrie's nesting record at the Bahía Tapón rookery, 12 Jun 1981, was the first West Indies breeding record (Sorrie 1981).

Fig. 79. Little Blue Heron (Gemmill 2009)

Conservation Status: Vulnerable (ABC), US Conservation Concern (USFWS), High Concern (NAWCP), and Protected (MBTA).

Museum Specimens: AMNH# 178530; USNM# 232647, 353528.

29. EGRETTA TRICOLOR RUFICOLLIS (Fig. 80)
Tricolored Heron (Garza Pechiblanca) C-FC-UC/BR-WV/ML-SP
Resident. Common in winter and spring; uncommon in summer; fairly common in fall. First record is Christmas Day 1935 (Danforth 1937). By the 1980s, it was common on mangrove lagoons. Sorrie observed more than eleven young in nests at Playa Grande, 28 May 1978, and adults on nests at Bahía Tapón, 12 Jun 1981, and Playa Grande, 13 Jun 1981. A high count for a single survey was twenty-five on Playa Grande, 13 Jun 1981 (Sorrie 1981). In the late 1800s, this heron was found only along Puerto Rico's southwest coast (Wetmore 1916b).

Conservation Status: Potential Concern (ABC), High Concern (NAWCP), and Protected (MBTA).

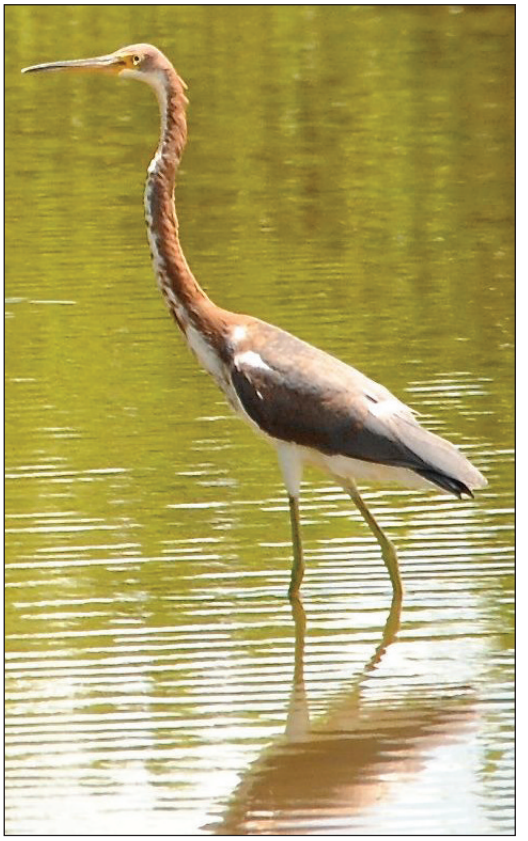


Fig. 80. Tricolored Heron (Gemmill 2009)

30. EGRETTA RUFESCENS RUFESCENS
Reddish Egret (Garza Rojiza) ER/V/ML
Vagrant. Only record was Laguna Sombe, 24 Dec 1994 (DDG, NG in Norton 1995b).

Conservation Status: At Risk (ABC), US Conservation Concern (USFWS), Red (NAS/ABC), Moderate (NAWCP), and Protected (MBTA).

31. BUBULCUS IBIS IBIS (Fig. 81)
Cattle Egret (Garza Ganadera) FC/BR/IA-ML-SC-SP

Fairly common resident. Approximate arrival date of this African species on Vieques is the mid-1950s shortly after it had arrived in Puerto Rico and the Virgin Islands (Bond 1987; Lever 1987; Arendt 1988; Raffaele 1989a). The first confirmed sighting was Boca Quebrada, 18 Jun 1970 (Sorrie 1975). Two years later, Bond (1977) confirmed it had reached Vieques. First breeding was recorded at a roost in the Kiani wetlands complex, 6 Jun 1972 (Raffaele 1978). A record number of 1,315 Cattle Egrets were counted at the Bahía Tapón heron rookery, 30 May 1978 (BAS). During the 1970s and 1980s, the primary use of the land as agriculture or cattle grazing was ideal for Cattle Egrets. This egret declined in the 1990s as grazing was abandoned and as the land reverted to secondary scrub and scrub forest. On 8 Jun 2007, a heron rookery at La Chata had approximately 200 Cattle Egrets (DDG, KH, EL, SN) while on 2 Sep 2010 they numbered approximately a hundred (DDG, WM, SN, JGS).

Fig. 81. Cattle Egret in Breeding Plumage (Gemmill 2006)

Conservation Status: Protected (MBTA).

Museum Specimen: Skeleton Specimen: USNM# 554894.

32. BUTORIDES VIRESCENS VIRESCENS (Fig. 82)
Green Heron
(Martinete)
FC/BR/ML-SP-IA

Fig. 82. Green Heron (Gemmill 2006)

Fairly common resident. In 1899/1900 Green Heron was abundant (Bowdish 1900). In 1912, Wetmore (1916a, 1927) found this heron to be a common breeding bird and a game species. In 1935, however, Danforth found this species scarce (1935, 1937). In 1971, Sorrie (1975) found it common.

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

Museum Specimens: AMNH# 791558; USNM# 171582, 232083, 232084, 232085.

33. NYCTICORAX NYCTICORAX HOACTLI
Black-crowned Night-Heron (Yaboa Real) R-ER/PB/ML-SP

Rare resident in spring; extremely rare in the rest of year. Fossil remains indicate an early presence (Narganes 1982). The first record for Puerto Rico's smaller offshore islands was the sighting on 25 Dec 1935 of fifty adults at Laguna Playa Grande (Danforth 1937). Sorrie (1975) considered the bird very rare. Breeding has not been confirmed. Immature birds reported in May (BAS), October (DDG, MB), and November (DDG). Most observations from Laguna Playa Grande with a scattering of reports from the Kiani Wetland Complex, Lagunas La Plata, Sombe, and Puerto Mosquito, and pond at Route 997 kilometer marker 4.7

Fig. 83. Yellow-crowned Night-Heron (Gemmill 2006)

Conservation Status: Potential Concern (ABC), Moderate (NAWCP), and Protected (MBTA).

Museum Specimen: El Centro de Investigaciones Arqueológicas, University of Puerto Rico.

34. NYCTANASSA VIOLACEA BANCROFTI (Fig. 83)

Yellow-crowned Night-Heron (Yaboa Común) UC-R/BR/ML-SP

Uncommon resident from spring to fall; rare in winter. First record is 20 Mar 1912 at a dry swamp near Manuel Qui, known today as the Puerto Ferro peninsula (Wetmore 1916a). Danforth (1935) listed the species as occurring. Breeding documented on Cayo de Afuera, 31 Mar 1971 (Sorrie 1975). Nests and immature birds have been observed at La Chata rookery (DDG, SH, SN, JGS, WM,) and Laguna Playa Grande (DDG, FR, WM).

Conservation Status: Potential Concern (ABC), Moderate (NAWCP), and Protected (MBTA).

Museum Specimen: USNM# 232646.

PANDIONIDAE

35. PANDION HALIAETUS CAROLINENSIS

Osprey (Aguila Pescadora) FC-UC-ER/WV/ML-FO-SH-IA

Fairly common winter visitor from fall to spring; extremely rare in summer. First record is 31 Dec 1899 (Bowdish 1900). Wetmore (1916a) considered it a rare winter visitor in 1912. By the 1970s, the Osprey was an uncommon winter visitor. Earliest arrival is 6 Sep (DDG) and latest departure is 21 Jun (DDG, IA, PK). Most sightings are during migration (February to March and October to November).

Conservation Status: Protected (MBTA).

Museum Specimen: USNM# 177969.

ACCIPITRIDAE

36. ELANOIDES FORFICATUS

Swallow-tailed Kite (Elanio Tijerta) ER/V/IA

Vagrant. In April 2010 while floating in his swimming pool on El Pilón, George Rickley noticed an unusual black-and-white bird overhead, which he later identified as a Swallow-tailed Kite, a first record (GW in Norton et al. 2010c). The bird was part of a huge influx of Swallow-tailed Kites throughout the Caribbean from February to April 2010. The Bahamas had ten times their normal sightings with a total of sixty-eight reports of about forty-two individuals. Additional sightings came in from Cuba (five), Turks and Caicos (one), and Bermuda (eighteen) (Norton et al. 2010c; White, pers. com. 2010). An estimated sixty-one migrated through the region that spring. For comparison, an average of 3.5 Swallow-tailed Kites were reported in spring over the previous ten years, with a high count of eleven in 2003.

Conservation Status: Vulnerable (ABC), US Conservation Concern (USFWS), Yellow (NAS/ABC), US WatchList (PIF), and Protected (MBTA).

37. CIRCUS CYANEUS HUDSONIUS

Northern Harrier (Gavilán de Ciénaga) ER/V/ML

Vagrant. While kayaking in the mangrove channels of Puerto Mosquito, Gemmill and Mueller flushed a Northern Harrier on 7 Apr 2003 (Salguero et al. 2003).

Conservation Status: Potential Concern (ABC), US Conservation Concern (USFWS), and Protected (MBTA).

38. BUTEO PLATYPTERUS BRUNNESCENS
Broad-winged Hawk (Guaraguao de Bosque) ER/V/FO

Extremely rare visitor. First sighting was an immature bird over Mt. Pirata, 16 Oct 2004 (DDG, MB, OD, WM in Norton et al. 2005b). Two subsequent sightings were an adult over Mt. Pirata, 7 Feb 2005 (OD in Norton et al. 2005) and an immature over El Pilón, 7 Oct 2007 (DDG). This subspecies is endemic to Puerto Rico where it is an uncommon and extremely local resident confined to El Yunque and around Río Abajo State Forest. It was common in the nineteenth century but had become rare by 1912 when Wetmore was conducting his surveys (Wiley 1986). The population on Puerto Rico has remained stable for nearly a century at approximately 125 birds (Delannoy 1997).

Conservation Status: This Puerto Rican subspecies is considered At Risk (ABC), Endangered (ESA), PR/VI Conservation Concern (USFWS), Critically Endangered (PRDNER), and Protected (MBTA).

39. BUTEO JAMAICENSIS JAMAICENSIS (Fig. 84)
Red-tailed Hawk
(Guaraguao Colirrajo)
FC/BR/FO-ML-IA

Fairly common resident. First record is 26 Jan 1900 (Bowdish 1900). Wetmore received reports of young in a nest, 10 Mar 1912. He estimated that ten to twelve birds resided on Vieques where this species was considered a pest and shot (Wetmore 1916a). Some islanders ate young birds (Wetmore 1916b). Sorrie (1975) recorded breeding activity on Mt. Pirata in March 1971. In a

Fig. 84. Red-tailed Hawk (Gemmill 2007)

draft report to the US Navy in 1979, Sorrie noted that this species, probably fewer than ten pairs, bred on other hills such as Cerro El Buey, Martineau, and Matias (Sorrie, unpublished report 1979).

Conservation Status: This Caribbean subspecies is considered At Risk (ABC) and Protected (MBTA).

Museum Specimen: USNM# 277924.

RALLIDAE

40. LATERALLUS JAMAICENSIS JAMAICENSIS
Black Rail (Gallito Negro) ER/PB/ML

Extremely rare resident. Only record is the shallow lagoon connecting Puerto Mosquito to Laguna Sombe, 10 Oct 2007 (DDG). A small downy black chick, approximately twenty feet from the adult bird, was swimming among the mangrove roots. Breeding could not be confirmed because moorhens and coots have similar black chicks making identification difficult.

Conservation Status: At Risk (ABC), Near Threatened (BI/IUCN), US and PR/VI Conservation Concern (USFWS), Red (NAS/ABC), Highest Concern (NAWCP), and Protected, (MBTA).

41. RALLUS LONGIROSTRIS CARIBAEUS (Fig. 85)
Clapper Rail (Pollo de Mangle) FC/BR/ML

Fairly common resident. In 1912, Wetmore (1927) saw tracks in the mud. Peters (1934) listed it as occurring. Danforth (1937) observed the rail at Punta Arenas in December 1935. Sorrie (1975) found them abundant. Highest single survey total was fifteen at Laguna Sombe, 1972 (Raffaele 1978). Breeding was confirmed when an adult was observed building a nest at Kiani Wetlands, 27 Apr 1995 (DDG), a pair was observed mating on 12 Feb 2002 (DDG, SZW), and an adult and two chicks were present at Playa Grande, 20 May 2012 (FR, EB).

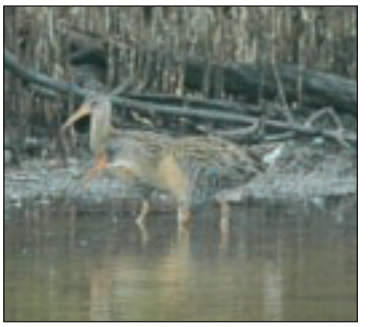


Fig. 85. Clapper Rail (Gemmill 1988)

Conservation Status: Vulnerable (ABC), Moderate (NAWCP), Yellow (NAS/ABC), and Protected (MBTA).

42. PORZANA CAROLINA

Sora (Gallito Sora) **ER/V/ML**

Extremely rare winter visitor. Biaggi collected a specimen on 25 Dec 1935, for the first record (Danforth 1937). Sorrie (1981) heard two calling in a freshwater marsh near Playa Grande, 15 Feb 1981. Gemmill and B. Langhorne saw one in the Kiani Wetlands, 30 Jan 1984. On 5 Dec 2011, Francheska Ruiz and Erick Bermudez observed a Sora at an ephemeral wetland on the road to Caracas Beach, formerly known as Red Beach.

Conservation Status: Potential Concern (ABC), High Concern (NAWCP), and Protected (MBTA).

Museum Specimen: USNM# 353761.

43. PORPHYRIO MARTINICUS

Purple Gallinule (Gallareta Azul) **?/ML**

Unconfirmed. Duffield and Cardona (1978) listed this species from Bahía Salina del Sur, 31 May 1978, in an appendix to their report without documentation.

Conservation Status: Potential Concern (ABC), High Concern (NAWCP), and Protected (MBTA).

44. GALLINULA GALEATA CERCERIS

Common Gallinule (Gallareta Común) **FC/BR/ML**

Fairly common breeding resident. In 1912, Wetmore (1916a) received reports from hunters that this species was present on the lagoons when water levels were high. Danforth (1935, 1937) found them common during December 1935. Sorrie (1975, 1981) found them common in the 1970s. On 20 May 1978, he saw fifty birds including young on Laguna Monte Largo for the first breeding documentation (Sorrie 1981). Since 1978, adults with young have been seen on various lagoons throughout the island (DDG). The record high count was eighty on Laguna El Gato, 25 Feb 2012 (EB, FR).

Conservation Status: This Caribbean subspecies is considered Vulnerable (ABC), Moderate Concern (NAWCP), and Protected (MBTA).

45. FULICA AMERICANA AMERICANA (Fig. 86)
American Coot (Gallinazo Americano) ER/V/SP

Extremely rare fall and winter visitor. First record is Playa Grande, 15 Feb 1981 (Sorrie 1981). Another winter record is 6 Feb 2005 from the freshwater pond at Route 997 kilometer marker 4.7 (DDG, WM in Norton et al. 2005). A fall record at this same pond was 23 Nov 2006 (DDG).

Conservation Status: Potential Concern (ABC), PR/VI Conservation Concern (USFWS), and Protected (MBTA).

46. FULICA CARIBAEA (Fig. 87) Caribbean Coot (Gallinazo Caribeño) R-ER/PB/ML

Rare in winter, spring, and summer; extremely rare in fall. First record is Playa Grande, 21 Dec 1935 (Danforth 1937). Sorrie observed pairs on Laguna Matias, El Gato, and Anones, 19 May 1978, indicating possible breeding although he did not find a nest (US Navy 1979). Record high count was 15 on Laguna Puerto Diablo, 7 Jun 2007 (DDG, MB in Norton et al. 2008a). All the sightings in the last thirty years with four exceptions have been from the lagoons in the restricted area of the far eastern end of the island.

Fig. 86. American Coot (Gemmill 2006)

Fig. 87. Caribbean Coot (Gemmill 2006)

Conservation Status: Vulnerable (ABC), Near Threatened (BI/IUCN), Vulnerable (PRDNER), US and PR/VI Conservation Concern (USFWS), Highest Concern (NAWCP), and Protected (MBTA).

RECURVIROSTRIDAE

47. HIMANTOPUS MEXICANUS (Fig. 88)

Black-necked Stilt (Viuda) **C-A/BR/ML**

Abundant resident in summer and fall; common in other seasons. Wetmore (1916a) received a third-hand report for Playa Grande, 24 Mar 1900. Wetmore (1927) did not see this species nor did Danforth (1937). Bond (1945) considered it a summer resident. First sight record was Kiani Wetlands, 9 Mar 1971 (Sorrie 1975). Sorrie (1975) reported it common to abundant (US Navy 1979). He found a nest with adults doing territorial displays at Laguna Playa Blanca, 18 May 1978; a juvenile on Laguna Yanuel, 22 May 1978; and downy chicks on a lagoon north of Bahía de la Chiva, 23 May 1978, to confirm breeding (Sorrie 1981). Other confirmed nesting lagoons are Playa Grande, Boca Quebrada, and Sombe (DDG). Laguna Sombe and Playa Grande attract the largest flocks. Record high survey count is more than 500 on Laguna Sombe (south side), 29 Aug 1997 (DDG), and more than 450 on Laguna Playa Grande, 8 Dec 2011 (EB, FR).

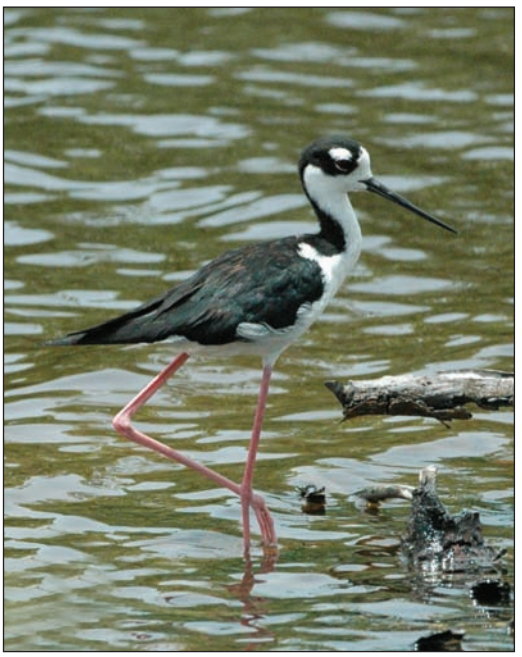


Fig. 88. Black-necked Stilt (Gemmill 2006)

Conservation Status: Potential Concern (ABC), Moderate Priority (USSCP), and Protected (MBTA).

48. RECURVIROSTRA AMERICANA
American Avocet (Avoceta) ?/ML
Unconfirmed. Three birds in the Eastern Maneuver Area, 1 Jul 2001, are listed in an appendix of raw data (Geo-Marine 2001b, 2006b). This species remains unconfirmed due to insufficient documentation for a first island record of a species accidental in the West Indies.

Conservation Status: Vulnerable (ABC), Moderate Priority (USSCP), and Protected (MBTA).

HAEMATOPODIDAE

49. HAEMATOPUS PALLIATUS PALLIATUS (Fig. 89)
American Oystercatcher (Ostrero) UC-R-ER/BR/SH
Uncommon resident in spring; rare in summer; extremely rare in fall and winter. In 1912, the oystercatcher was known only from Culebra (Wetmore 1916b). First Vieques record is Cayo de Afuera, 31 Mar 1971 (Sorrie 1975). From April to July during the breeding season, it is seen in pairs. On 18 May 1978, Sorrie found a nest with eggshell fragments on Cayo Conejo, which confirmed breeding (US Navy 1979). Low numbers of reported oystercatchers may be due to the scarcity of its preferred rocky coastal habitat.

Conservation Status: Vulnerable (ABC), US and PR/VI Conservation Concern (USFWS), High Priority (USSCP), Protected (MBTA), and Species Conservation Plan (WHSRN).

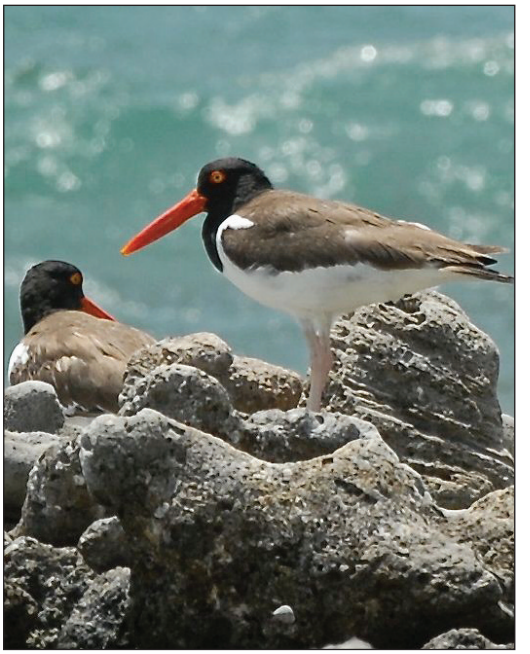


Fig. 89. American Oystercatcher (Gemmill 2006)

CHARADRIIDAE

50. PLUVIALIS SQUATAROLA CYNOSURAE (Fig. 90)
Black-bellied Plover (Playero Cabezón) C-FC-UC/WV/ML

Common winter visitor in winter and spring; fairly common in fall; uncommon in summer. First record is Kiani Wetlands, 9 Mar 1971 (Sorrie 1975). Sorrie (1975) found it an uncommon winter visitor. A record high count during a survey period is thirty-two individuals on Playa Grande, 29 Feb 2004 (DDG, WM).

Conservation Status: Potential Concern (ABC), Moderate Concern (USSCP), and Protected (MBTA).

51. PLUVIALIS DOMINICA
American Golden Plover (Playero Dorado) ER/PM/IA

Extremely rare fall passage migrant. First record is the grass verge at the airport, 30 Aug 1997 (DDG in Norton et al. 1998). The second record is the grassy area at Ensenada Sombe, 5 Sep 2008 (DDG in Norton et al. 2009a).

Conservation Status: Vulnerable (ABC), US Conservation Concern (USFWS), Yellow (NAS/ABC), High Concern (USSCP),

Fig. 90. Black-bellied Plover (Gemmill 2009))

Protected (MBTA), and Species Conservation Plan (WHSRN).

52. CHARADRIUS WILSONIA WILSONIA (Fig. 91)
Wilson's Plover (Playero Marítimo) C/BR/ML

Common resident throughout year. First record is a specimen collected 5 Nov 1899 (Bowdish 1900, 1902a; Wetmore 1927). Wetmore did not see the plover in 1912 although he considered it a rare resident (Wetmore 1916a, 1916b). Danforth (1935) listed it as occurring. Sorrie (1975) found it common to abundant (US Navy 1979). He documented breeding at Laguna Puerto Diablo, 20 May 1978 (Sorrie 1981). Record high count for a single survey is seventy-five from the salt flats of Puerto Mosquito, spring 1972 (Raffaele 1978). A recent high count was forty at Laguna Puerto Diablo, 7 Apr 2012 (EB, FR).

Conservation Status: Vulnerable (ABC), US and PR/VI Conservation Concern (USFWS), Yellow (NAS/ABC), High Priority (USSCP), Protected (MBTA), and Species Conservation Plan (WHSRN).

Museum Specimens: AMNH# 178535; USNM# 171584, 171585, 171586.

Fig. 91. Wilson's Plover (Gemmill 2009)

53. CHARADRIUS SEMIPALMATUS (Fig. 92)
Semipalmated Plover (Chorlito Acollarado)
FC-ER/WV/ML-SH-SP-IA

Fairly common winter visitor in fall, winter, and spring; extremely rare in summer. Wetmore recorded this plover on the north coast 30 Mar 1912, which he considered a rare migrant (Wetmore 1916a, 1916b, 1927). Danforth (1935) listed it as occurring. Sorrie found this species locally common (Sorrie 1975). A few individuals are found in summer, and large flocks are recorded in January and February. Record high count for a single survey was seventy-five on Playa Grande, 29 Feb 2004 (DDG, WM).

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

54. CHARADRIUS MELODUS
Piping Plover (Chorlito Melódico) **ER/PM/IA-SH**

Extremely rare passage migrant in fall and spring. First record is La Chata Beach, 18 Mar 1992 (DDG, RM). A flock of nine birds was in the airport's grass verge, 30 Aug 1997 (DDG). An undocumented re-

Fig. 92. Semipalmated Plover (Gemmill 2008)

port of ten birds in the Eastern Maneuver Area, 1 Jul 2001, and thirty-eight birds, 2 Jul 2001, are unconfirmed records due to lack of documentation of a rare passage migrant in large numbers at an unlikely time of year (Geo-Marine 2001b, 2006b).

Conservation Status: At Risk (ABC), Near Threatened (BI/IUCN), Threatened (ESA), Red (NAS/ABC), Critically Endangered (DNER), Extremely High Priority (USSCP), and Protected (MBTA).

55. CHARADRIUS VOCIFERUS (Fig. 93)
Killdeer (Chorlito Sabanero) FC/BR-WV/IA-ML-SP

Fairly common resident. First record is Martinez, 16 Mar 1912 (Wetmore 1916a, 1927). On 23 Mar 1912, Wetmore documented breeding of the Greater Antilles subspecies, *Charadrius vociferous ternominatus,* when he collected a female specimen with an egg (Wetmore 1916a, 1916b, 1927). Peters (1934) listed it as occurring. Biaggi collected a female specimen at Puerto Negro, 28 Dec 1935, for the first North American migratory record *Charadrius vociferus vociferus* (Danforth 1937). At the time, the subspecies was recorded from the Isle of Pines,

Fig. 93. Killdeer (Gemmill 2006)

Hispaniola, Vieques, and the Virgin Islands (Bond 1945). By 1970, the North American race had been documented for eastern Puerto Rico (Biaggi 1970). Sorrie found Killdeer common to abundant (US Navy 1979). Record high count was twenty-five in the grassy area east of the entrance to Ensenada Sombe, 9 Oct 2007 (DDG). It is losing its preferred habitat (pasture land) and is no longer abundant.

Conservation Status: North American subspecies is of Potential Concern while the Greater Antillean subspecies is Vulnerable (ABC), Moderate Priority (USSCP), and Protected (MBTA).

Museum Specimens: USNM# 232320, 232321, 353859, 353866.

SCOLOPACIDAE

56. ACTITIS MACULARIUS (Fig. 94)
Spotted Sandpiper (Playero Coleador) C-UC/WV/ML

Common winter visitor in fall, winter, and spring; uncommon in summer. First record is 4 Dec 1899 (Bowdish 1900). Bowdish reported it as common, as did Wetmore in 1912 (1916a), Sorrie in 1971 (1975), and subsequent observers.

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

Banded: 1.

Museum Specimen: AMNH# 178536.

Fig. 94. Spotted Sandpiper (Gemmill 2006)

57. TRINGA SOLITARIA SOLITARIA (Fig. 95)
Solitary Sandpiper (Playero Solitario) ER/WV/SP

Extremely rare winter visitor in fall, winter, and spring; not reported in summer. First

record is 4 Mar 1988 (DHM in Norton 1988). On 6 Apr 1988, this species was seen at the quebrada near the Navy headquarters (DDG, NG) where possibly the same individual was seen in two subsequent years, 18 Jan 1989 (DDG) and 8 Mar 1990 (DDG, VG in Norton 1990). Earliest arrival is 16 Aug (DDG in Norton et al. 2010b) and latest departure is 6 Apr (DDG, NG). Raw data in two biological assessments (Geo-Marine 2001b, 2006b) showed total of forty Solitary Sandpipers with a daily high of seventeen at lagoons on the eastern end in July 2001 and September 2000. These data are questionable because of the date and numbers. In addition, no Spotted Sandpipers were reported, a common species present in summer and fall, which is easily confused with Solitary Sandpiper.

Conservation Status: Potential Concern (ABC), US Conservation Concern (USFWS), High Priority (USSCP), and Protected (MBTA).

Fig. 95. Solitary Sandpiper (Gemmill 2004)

58. TRINGA MELANOLEUCA (Fig. 96)
Greater Yellowlegs (Playero Guineílla Mayor) C-UC/WV/ML
Common winter visitor in fall, winter, and spring; uncommon in summer. In recent years, it has been more common than Lesser Yellowlegs. First record is Kiani Wetlands, 9 Mar 1971 (Sorrie 1975). Sorrie considered it common (US Navy 1979). Record single survey high count is more than 1,000 individuals on the mud flats at Laguna Playa Grande, 8 Dec 2011 (EB, FR).

Conservation Status: Potential Concern (ABC), Moderate Priority (USSCP), and Protected (MBTA).

Fig. 96. Greater Yellowlegs (Gemmill 2008)

59. TRINGA SEMIPALMATA (Fig. 97) Willet (Playero Aliblanco) R-ER/PM/ML-SP-IA
Rare passage migrant during fall, late winter, and spring; extremely rare in summer; no

Fig. 97. Willet (Gemmill 2009)

records from May, November, or December. The first of twenty-six records is Playa Grande, 1 Apr 1971 (Sorrie 1975). Eighteen are from lagoons on the island's western end (DDG, EB, DM, FR).

Conservation Status: Vulnerable (ABC), Moderate Priority. (USSCP), and Protected (MBTA).

60. TRINGA FLAVIPES (Fig. 98)

Lesser Yellowlegs (Playero Guineílla Menor) C-R/WV/ML

Common winter visitor in fall, winter, and spring; rare in summer. This species was first reported by Richmond, 25 Mar 1900 (Wetmore 1916a, 1916b, 1927). Danforth (1937) found the species common. Sorrie found it a common winter visitor (Sorrie 1975; US Navy 1979). High counts occur in late fall and winter: 625 on Laguna Playa Grande, 2 Nov 2011, and 782, 30 Nov 2011 (EB, FR), and 250 on Laguna Sombe, 23 Jan 1997 (DDG). Small flocks of twenty or more arrive as early as 2 Jul and depart 31 Mar.

Conservation Status: Vulnerable (ABC), US Conservation Concern (USFWS), Moderate Priority (USSCP), Protected (MBTA), and Species Conservation Plan (WHSRN).

Museum Specimen: USNM# 353964.

Fig. 98. Lesser Yellowlegs (Gemmill 2007)

61. NUMENIUS PHAEOPUS HUDSONICUS (Fig. 99)
Whimbrel (Playero Picocorvo) R-ER/M/ML

Rare migrant in spring; extremely rare in summer, fall, and winter. First documented sighting is four birds at the Kiani Wetlands, 3 Mar 1985 (DDG, BL in Norton 1985b). At least twenty were at this location earlier that year (DH in Norton 1985b). Twelve of fourteen records are from lagoons on the western end, possibly due to its proximity to Roosevelt Roads wetlands on the main island where it is fairly common. Earliest arrival is 13 Jul of two individuals in breeding plumage (DDG in Norton et al. 2007) and latest departure is 17 Mar (DDG in Norton et al. 2006).

Fig. 99. Whimbrel (Gemmill 2006)

Conservation Status: Vulnerable (ABC), US Conservation Concern (USFWS), High Priority (USSCP), Protected (MBTA), and Species Conservation Plan (WHSRN).

62. LIMOSA HAEMASTICA (Fig. 100) Hudsonian Godwit (Barga Aliblanca) ER/V/ML

Vagrant. Sole record was Bahía de la Chiva lagoon outlet, 22 Sep 1978 (BAS).

Conservation Status: Vulnerable (ABC), US Conservation Concern (USFWS), Yellow (NAS/ABC), High Priority (USSCP), and Protected (MBTA).

Fig. 100. Hudsonian Godwit (Sorrie 1978)

63. ARENARIA INTERPRES MORINELLA (Fig. 101)
Ruddy Turnstone (Playero Turco) FC-UC/NB-WV/ML-SH
Fairly common nonbreeding resident and winter visitor in fall, winter, and spring; uncommon in summer. First record Kiani Wetlands Complex, 9 Mar 1971 (Sorrie 1975). Sorrie found it common (Sorrie 1975; US Navy 1979). Record high count of forty at Laguna Monte Largo, 14 Feb 1981 (Sorrie 1981).

Conservation Status: Potential Concern (ABC), High Priority (USSCP), and Protected (MBTA).

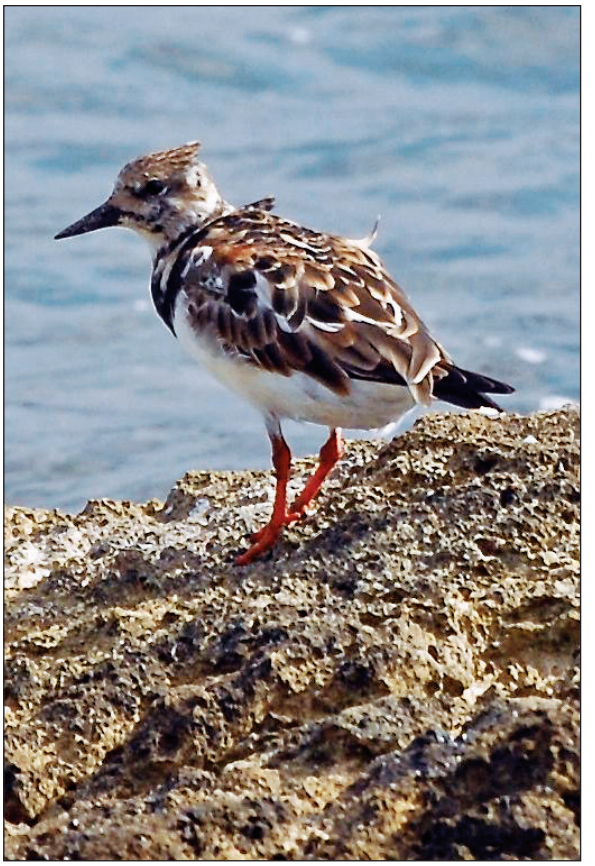


Fig. 101. Ruddy Turnstone (Gemmill 2008)

64. CALIDRIS HIMANTOPUS (Fig. 102, p. 130)
Stilt Sandpiper (Playero Patilargo) C-ER/PM/ML-SP-IA
Common passage migrant during fall, winter, and spring; extremely rare in summer. First record is 1 Apr 1971, Playa Grande (Sorrie 1975). Sorrie (1975) listed it as a rare migrant reflecting the time of year in which he conducted his surveys. Earliest arrival is 1 Aug on an eastern end lagoon (Geo-Marine 2001b, 2006b). Abundance highly variable within seasons ranging from absent to abundant. During fall migration, it is

Fig. 102. Stilt Sandpiper (Gemmill 2008)

rare in August, common in September, abundant in October with flocks of up to about 450 birds at Laguna Sombe, and extremely rare in November with one record of 7 birds (DDG). In winter, it is absent in December and January before becoming abundant in February when flocks of 100 to 300 occur (DDG). In the spring, it is common in March and April with flocks ranging from 90 to 300 and not reported in May (DDG). Latest departure date is Kiani Wetlands, 27 Apr (DDG). It is extremely rare in summer, with 1 record of 30 individuals from Laguna Sombe salt flats, 11 Jun 2007 (DDG, SN in Norton et al. 2008a). Large flocks prefer Lagunas Playa Grande and Sombe. Few surveys have been conducted of lagoons in the restricted area on the eastern end, but one survey of Laguna Monte Largo, 14 Feb 1981, found 135 Stilt Sandpipers. These lagoons may harbor large flocks when they have water (Sorrie 1981).

Conservation Status: Vulnerable (ABC), PR/VI Conservation Concern (USFWS), Yellow (NAS/ABC), Moderate Priority (USSCP), and Protected (MBTA).

Fig. 103. Sanderling (Gemmill 2008)

65. CALIDRIS ALBA RUBIDA (Fig. 103)
Sanderling (Playero Arenero) ER/PM/ML

Extremely rare passage migrant in late summer, fall, and winter; no spring reports. First of five records is eight birds at Ensenada Sombe, 1 Nov 1997 (MP). A single bird was seen on the island's eastern end, 11 Jan 2001 (Geo-Marine 2001b, 2006b), and another on Laguna Sombe salt flats, 14 Jul 2006 (DDG). A pair showing breeding plumage was feeding on the beach at Sombe, 7 Sep 2008 (DDG in Norton et al. 2009a).

Conservation Status: Vulnerable (ABC), Yellow (NAS/ABC), High Priority (USSCP), Protected (MBTA), and Species Conservation Plan (WHSRN).

66. CALIDRIS ALPINA HUDSONIA
Dunlin (Playero Espaldicolorado) ?/ML

Unconfirmed. An undocumented reference to this species appears in Table 10 of a report on mangrove forests submitted to the Navy, but it is not mentioned in the report's Appendix I that summarizes

bird surveys for the report (Lewis et al. 1981b).

Conservation Status: Potential Concern (ABC), US Conservation Concern (USFWS), Moderate Priority (USSCP), Protected (MBTA), and Species Conservation Plan (WHSRN).

67. CALIDRIS MINUTILLA (Fig. 104)

Least Sandpiper (Playerito Menudillo) FC-ER/WV/ML-SH-SP-IA

Common winter visitor; fairly common in spring; extremely rare in summer; uncommon in fall. First record is Laguna Playa Grande, 1 Apr 1971 (Sorrie 1975). Earliest arrival is 15 Aug (EB, FR), and latest spring date is 28 Apr (DDG). No records for May and June and one record for July of an adult in breeding plumage (DDG in Norton et al. 2007a). The record high fall count was approximately 600 birds at Laguna Playa Grande, 9 Sep 2011 (EB, FR). Record high spring count was more than 350 birds on the mud flats of Playa Grande, 5 Apr 2003 (DDG, WM). If lagoon water levels are favorable in fall, winter, and spring, flocks of 1 to 600 birds may feed and rest at Lagunas Sombe, Playa Grande, or Boca Quebrada (DDG, NG, EB, FR).

Conservation Status: Potential Concern (ABC), Moderate Priority (USSCP), and Protected (MBTA).

Fig. 104. Least Sandpiper (Gemmill 2007)

68. CALIDRIS FUSCICOLLIS (Fig. 105)
White-rumped Sandpiper (Playero de Rabadilla Blanca) ER/V/ML
Vagrant. The record is Bahía de la Chiva, 22 Sep 1978 (BAS, JJ, RS EAS; Sorrie, unpublished report 1979).

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

Fig. 105. White-rumped Sandpiper (Sorrie 1978)

69. CALIDRIS MELANOTOS (Fig. 106)
Pectoral Sandpiper (Playero Pectoral) R-ER/PM/IA
Rare passage migrant during fall; extremely rare in spring; no winter or summer reports. First record is Camp Garcia's sewer pond, 22 Sep 1978 (BAS, JJ, EAS, RS). Earliest fall arrival date is 30 Aug with a departure date of 15 Oct (DDG). The one spring record is a single bird, 14 Mar 1988 (DHM in Norton 1988). Record high number is fifteen birds on the grassy verge at the airport, 30 Aug 1997 (DDG).

Conservation Status: Vulnerable (ABC), Moderate Priority (USSCP), and Protected (MBTA).

Fig. 106. Pectoral Sandpiper (Gemmill 2007)

70. CALIDRIS PUSILLA (Fig. 107)
Semipalmated Sandpiper (Playerito Gracioso)

A-R/WV/ML-SH-SP-IA

Abundant in fall, winter, and spring; rare in summer. First record is Laguna Playa Grande, 1 Apr 1971 (Sorrie 1975). Earliest arrival is 22 Aug (DDG) and latest departure is 13 Jun (Sorrie 1981). The record high is more than 1,000 Semipalmated Sandpipers on Laguna Sombe, 15 Oct 2007 (DDG in Norton et al. 2008b). Earliest arrival date of a large flock is more than 600 on Laguna Sombe salt flats, 29 Aug 2010 (DDG, WM, JGS in Norton et al. 2011), and latest departure date is more than 182 from Laguna Puerto Diablo, 26 Apr 2008 (DDG, MB in Norton et al. 2008c). The few summer records are flocks ranging from sixteen to seventy-one (DDG in Norton et al. 2007; Raffaele 1978; Sorrie 1981; Geo-Marine 2001b, 2006b). Flocks prefer Lagunas Playa Grande and Sombe.

Conservation Status: Vulnerable (ABC), Near-threatened (BI/IUCN), Yellow (NAS/ABC), US and PR/VI Conservation

Fig. 107. Semipalmated Sandpiper (Gemmill 2007)

Concern (USFWS), Moderate Priority (USSCP), Protected (MBTA), and Species Conservation Plan (WHSRN).

71. CALIDRIS MAURI (Fig. 108)

Western Sandpiper (Playero Occidental) R-ER/PM/ML-SH-IA

Rare passage migrant in spring and fall; extremely rare in winter and summer. The first record is Bahía de la Chiva lagoon outlet, 22 Sep 1978 (Sorrie 1979). Record high count was sixty-six, many in breeding plumage, from Laguna Monte Largo, 22 Apr 1981 (Sorrie 1981). Earliest spring arrival is 22 Feb 2004 (DDG, WM) with a departure of 22 Apr 2008 (BAS). Earliest fall arrival is 14 Jul although this bird could be a nonbreeder that lingered over the summer. Latest fall departure is 9 Oct (DDG). It may be underreported as it associates with Semipalmated Sandpipers and could be overlooked in large flocks.

Conservation Status: Vulnerable (ABC), High Priority (USSCP), Yellow (NAS/ABC), Protected (MBTA), and Species Conservation Plan (WHSRN).

Fig. 108. Western Sandpiper (Gemmill 2007)

Fig. 109. Short-billed Dowitchers (Gemmill 2012)

72. LIMNODROMUS GRISEUS GRISEUS (Fig. 109)
Short-billed Dowitcher (Agujeta Piquicorta) FC-UC-R/WV/ML
Fairly common winter visitor in winter and spring; uncommon in fall; rare in summer. First record is Laguna Playa Grande, 1 Apr 1971 (Sorrie 1975). Sorrie considered this species common (US Navy 1979). Flock numbers are the largest in winter. Record high number is 100 birds at Laguna Sombe, 17 Feb 2001 (DDG). Earliest arrival is 15 Aug, and latest departure is 26 Apr (DDG). Large flocks have lingered as late as 17 Jun when 47 birds in nonbreeding plumage were actively feeding on the mud flats of Playa Grande (DDG).

Conservation Status: Vulnerable (ABC), US Conservation Concern (USFWS), High Priority (USSCP), and Protected (MBTA).

Fig. 110. Wilson's Snipe (Gemmill 2007)

73. GALLINAGO DELICATA (Fig. 110)
Wilson's Snipe (Becasina) **ER/WV/SP-IA**
Extremely rare winter visitor from October to March. First record is a small marsh southwest of Mosquito Pier, 15 Feb 1981 (Sorrie 1981).
Conservation Status: Potential Concern (ABC), Moderate Priority (USSCP), and Protected (MBTA).

74. PHALAROPUS FULICARIUS
Red Phalarope (Falaropo Rojo) **?/ML**
Unconfirmed. Red Phalarope was reported in a Live Impact Area lagoon, 24 May 2001, in a Navy biological study raw-data appendix (Geo-Marine 2001b, 2006b). The record is questionable: this species is a Caribbean rarity in spring and unlikely at this inland location.
Conservation Status: Potential Concern (ABC), Moderate Priority (USSCP), and Protected (MBTA).

Fig. 111. Laughing Gull (Gemmill 2006)

LARIDAE

75. LEUCOPHAEUS ATRICILLA ATRICILLA (Fig. 111)
Laughing Gull (Gaviota Gallega) FC-UC-R/SV/SH-IA-ML
Fairly common summer visitor in summer and early fall; rare in spring; no winter reports. First record is Isabel Segunda, 22 Apr 1912 (Wetmore 1916a, 1927). Earliest arrival is 6 Apr (DDG, WM). Latest departure is 9 Sep (DDG, SN). Usually seen singly or in pairs, with the exception of a flock of twenty-one birds hovering around Mosquito Pier, 13 Jul 2006 (DDG).

Conservation Status: Protected (MBTA).

76. LARUS DELAWARENSIS
Ring-billed Gull (Gaviota Piquianillada) ?/ML
Unconfirmed. An undocumented reference to this species appears in Table 10 of a report on mangrove forests submitted to the Navy,

but it is not mentioned in the report's Appendix I that summarizes bird surveys for the report (Lewis et al. 1981b). This inconsistency and no documentation raise questions about the accuracy of this record.

Conservation Status: Protected (MBTA).

77. LARUS ARGENTATUS SMITHSONIANUS
Herring Gull (Gaviota Argéntea) ER/V/SH

Rare visitor. Ned Brinkley and Steve Hairfield reported a first-winter gull from Green Beach, 31 Jan 2005, for the first record and a second-winter gull at Isabel Segunda, 2 Feb 2005, for the second record (Norton et al. 2005).

Conservation Status: Protected (MBTA).

78. ANOUS STOLIDUS STOLIDUS
Brown Noddy (Cervera Parda) ?/S

Unconfirmed. A single bird over a lagoon in the Eastern Maneuver Area, 21 May 2001, is listed in a raw data appendix of a Navy biological assessment (Geo-Marine 2001b, 2006b). Documentation is insufficient, however, to establish a first record.

Conservation Status: Protected (MBTA).

79. ONYCHOPRION FUSCATUS FUSCATUS
Sooty Tern (Charrán Obscura) ER/SV/SH-ML

Extremely rare summer visitor. A single confirmed record is Punta Este, 18 May 1978 (Sorrie, unpublished report 1979; Navy 1979). A Sooty Tern may have been hovering in a distant flock of Bridled Terns over Boca Quebrada, 13 Jul 2006, but the distance prohibited positive identification (DDG in Norton et al. 2007).

Conservation Status: Potential Concern (ABC), Moderate Concern (NAWCP), and Protected (MBTA).

80. ONYCHOPRION ANAETHETUS MELANOPTERUS
Bridled Tern (Charrán Monja) ER/SV/SH

Extremely rare summer visitor in spring and summer; no fall or winter reports. A possible breeder (Johnson 1988). First record is Punta Negra, 24 May 1978 (Sorrie, unpublished report 1979; US Navy 1979). The tern was inspecting nesting sites. Other records are Boca

Quebrada, 13 Jul 2006 (DDG); off Punta Este, 9 Jun 2007 (DDG, OD, MB); and off the western end, 15 Jul 2012 (JM).

Conservation Status: Vulnerable (ABC), Yellow (NAS/ABC), High Concern (NAWCP), and Protected (MBTA).

81. STERNULA ANTILLARUM ANTILLARUM (Fig. 112)
Least Tern (Charrancito) UC-FC-R-ER/SV-BR/ML-SH

Fairly common summer visitor that breeds on the island; rare in fall; extremely rare in winter; uncommon in spring. First record is Bahía Tapón, 20 Jul 1971 (BAS, CK in Sorrie 1975). Record high count of sixty-three birds on Laguna Playa Grande salt flats, 2 Aug 2012 (FR, EB). Earliest arrival date is 8 Apr and latest departure is 5 Sep (DDG). Vieques is one of four known nesting sites in Puerto Rico (Johnson 1988; Lee 1991; Jackson 2000). Sorrie documented breeding on Laguna Sombe salt flats, 27 May 1978, where he found seventeen terns with eight nests (most with eggs) and witnessed breeding behavior consisting of fish presentation (Sorrie 1978, 1981; US Navy 1979). Another major breeding site is Laguna Playa Grande's western mud flat (DDG, SN, EB, FR). High count of fifty-three Least Terns with eight on nests were observed 14 Jun 2012; two weeks later on 27 Jun, forty-two birds were counted of which twenty-five appeared to be nesting (EB, FR). Bahía de la Chiva may be a nesting area as four Least Terns exhibited courtship displays, and a female carried food on 12 Jun 1981 (BAS). Suitable habitat for Least Terns also exists in the former Live Impact

Fig. 112. Least Tern (Gemmill 2006)

Area, where three nesting pairs were seen at Laguna Anones, 15 May 2005 (Geo-Marine 2005) and eighteen were observed on 8 Dec 2012 for the only winter record (FR, EB).

Conservation Status: Vulnerable (ABC), US Conservation Concern (USFWS), Red (NAS/ABC), Data deficient (PRDNER), High Concern (NAWCP), Vulnerable (WISCAP), and Protected (MBTA). Currently this subspecies is not considered federally threatened but would be listed as threatened under Puerto Rico law if sufficient information on its status was available.

Fig. 113. Gull-billed Tern (Gemmill 2008)

82. GELOCHELIDON NILOTICA ARANEA (Fig. 113)
Gull-billed Tern (Charrán Piquicorto) **ER/V/SH**

Rare visitor. One record of a single bird is Ensenada Sombe, 5 Sep 2008 (DDG in Norton et al. 2009a).

Conservation Status: Vulnerable (ABC), Yellow (NAS/ABC), US Conservation Concern (USFWS), High Concern (NAWCP), Critically Endangered (WISCAP), and Protected (MBTA).

83. HYDROPROGNE CASPIA
Caspian Tern (Charrán Caspio) **ER/V/SH**

Rare visitor. The record is 12 Feb 1986 (KG, BB in Norton 1986).

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

84. STERNA DOUGALLII DOUGALLII
Roseate Tern (Palometa) **FC-R-ER/SV-BR/SH-ML**
Fairly common summer visitor that breeds on the island (Johnson 1988); extremely rare in fall; no winter reports; rare in spring. First record is also first nesting record: four pairs with nests and eggs on Cayo Conejo, 18 May 1978 (Sorrie, unpublished report 1979; US Navy 1979, 1986, 2001a, 2006). Ten to twenty pairs and three nests with eggs were on Punta Este, 5 Jul 2001 (OD, WM; Geo-Marine 2001b, 2006b). Four pairs were observed nesting on Roca Alcatraz, 9 Jun 2007 (DDG, OD, MB in Norton et al. 2008a). Earliest observation is 22 Apr and latest is 12 Sep (BAS, MFP). Breeding occurs on the eastern half of the island where human presence is limited.
Conservation Status: Vulnerable (ABC), Threatened (ESA), Yellow (NAS/ABC), Vulnerable (PRDNER), High Concern (NAWCP), and Protected (MBTA).

85. STERNA HIRUNDO HIRUNDO
Common Tern (Charrán Común) **?/SH**
Unconfirmed due to lack of documentation. While a common visitor to the main island and reported at least once in all seasons on Vieques, there is no documented first record. Six reports from the island's restricted eastern end (one on 26 May 1978 and five from early July 2001) were listed in an appendix for assessments by PRDNER (Duffield and Cardona 1978) and the Navy (Geo-Marine 2001b, 2006b). Two sightings (MP) on 31 Oct and 1 Nov 1997 are on eBird.
Conservation Status: Potential Concern (ABC), US Conservation Concern (USFWS), and Protected (MBTA).

86. STERNA PARADISAEA
Arctic Tern (Charrán Ártico) **?/SH**
Unconfirmed. One sighting at the Eastern Maneuver Area, 12 Sep 2000, is listed in a Navy biological assessment appendix (Geo-Marine 2001b, 2006b). Documentation is required because Arctic Tern is accidental in Puerto Rico's far offshore waters, and it is easily confused with Roseate Tern that breeds on Vieques's eastern end.
Conservation Status: Potential Concern (ABC) and Protected (MBTA).

Fig. 114. Forster's Tern (John Martin 2011)

87. STERNA FOSTERI (Fig. 114)
Forster's Tern (Charrán de Forster) ER/V/SH
Rare visitor. Sole record (JM) is a bird photographed on rocks west of Mosquito Pier with a group of ten Royal Terns *(Thalasseus maximus),* 6 Feb 2011 (eBird 2012).
Conservation Status: Potential Concern (ABC) and Protected (MBTA).

88. THALASSEUS MAXIMUS MAXIMUS (Fig. 115, p. 144)
Royal Tern (Charrán Real) C/NB/SH-ML
Common nonbreeder in all seasons. First record is March 1912 (Wetmore 1916a, 1927). Flocks from six to twenty-one birds are seen from October through January. In other months, one to three terns are seen along the shore or over lagoons. A record high count is twenty-six terns roosting on Bahía Playa Blanca, 18 May 1978 (Sorrie 1979). A few Royal Terns breed in Puerto Rico, but no breeding records exist for Vieques (Vincente 1979). On 15 Aug 2009, a juvenile bird and a nonbreeding plumage adult sat on a rock off Esperanza. This juvenile could indicate breeding on Vieques (DDG), but more likely it came from another location.

Conservation Status: Potential Concern (ABC), Moderate (NAWCP), Endangered (WISCAP), and Protected (MBTA).

Fig. 115. Royal Tern (Gemmill 2008)

89. THALASSEUS SANDVICENSIS (Fig. 116) Sandwich Tern (Charrán Piquiagudo) R-ER/SV/ML-SH

Rare summer visitor in summer and fall; extremely rare in spring; no winter reports. First record is Laguna Anones, 19 May 1978 (BAS, WR in Sorrie, unpublished report 1979). Earliest arrival is 14 Mar (DHM) and latest departure is 7 Sep (DDG). A high count of twenty-six terns is recorded from Mosquito Pier, 1 Jun 1978 (US Navy 1979).

Conservation Status: Potential Concern (ABC), Vulnerable (WISCAP), and Protected MBTA).

Fig. 116. Sandwich Tern (Gemmill 2008)

COLUMBIDAE

90. COLUMBA LIVIA

Rock Pigeon (Paloma Doméstica) C/BR/IA

Common breeding resident restricted to urban areas, principally Isabel Segunda. Ornithologists pay scant attention to feral Rock Pigeons, so the first known record is February 1981 (Sorrie 1981).

91. PATAGIOENAS SQUAMOSA (Fig. 117)

Scaly-naped Pigeon (Paloma Turca) FC/BR/FO-IA-SC

Fairly common resident. First record is 1 Jan 1900 (Bowdish 1900). In 1912, Wetmore found this once-common bird only common where forest remained. He called for a closed hunting season from February to October to allow it to recover (Wetmore 1916b). In his Life Histories, Bent comments that many in Puerto Rico believed it to be a migrant, a belief promoted by hunters who desired an open season during the entire year (Bent 1932b). Danforth (1935) listed this species as occurring. By the 1970s, hunting pressures and habitat destruction had decimated the population. Sorrie found this pigeon to be uncommon, limited primarily to the western gallery forests (US Navy 1979). Today, it is fairly common because hunting is prohibited on the Vieques National Wildlife Refuge and forests are regenerating. In 1992, during a columbid nest survey, thirty-three nests were counted (Rivera-Milán 2001). A record number of pigeons (twenty-five) were counted on Mt. Pirata during the 2005 Christmas Bird Count (SC, PV, WH, MC).

Conservation Status: Protected (MBTA).

Museum Specimens: AMNH# 178577; USNM# 171587; location of two specimens unknown.

Fig. 117. Scaly-naped Pigeon (Gemmill 2009)

92. PATAGIOENAS LEUCOCEPHALA (Fig. 118)
White-crowned Pigeon (Paloma Cabeciblanca) C-FC/BR/ML-SC

Common resident in summer when young fledge; fairly common in fall, winter, and spring. First record is Puerto Ferro, 25 Mar 1912 (Wetmore 1916a, 1927). First nest records are from the Kiani Wetlands complex, 6 Jun 1972 (Raffaele 1978). Bent mentions in his Life Histories that the pigeon's range includes Vieques (Bent 1932a). Wiley and Sorrie found it in "fair numbers" in 1974 (Wiley 1976) and 1975 (Sorrie 1975). In 1976, the first year in which hunting this species was prohibited, its Vieques population was about 200 pairs (King et al. 1976; Reeves 1977; Wiley 1977, 1979). The White-crowned Pigeon population on the western end of Vieques was probably the most protected population in Puerto Rico (Raffaele and Duffield 1979). Vieques and Culebra are important strongholds for this species (Raffaele 1977). One reason is intact mangrove forests, which provide the pigeon its exclusive nesting habitat. A second reason is it is no longer hunted.

Fig. 118. White-crowned Pigeon (Gemmill 2006)

Conservation Status: At Risk (ABC), Near Threatened (BI/IUCN), US and PR/VI Conservation Concern (USFWS), Red (NAS/ ABC), Data Deficient (PRDNER), Watchlist (PIF), and Protected (MBTA).

Banded: 6. Four chicks banded in St. Croix, Virgin Islands, between 1950 and 1960 were recovered at later dates in Vieques (Norton and Seaman 1985).

Museum Specimen: USNM# 232269.

93. ZENAIDA ASIATICA ASIATICA (Fig. 119)
White-winged Dove (Tórtola Aliblanca) A-C/BR/FO-IA-ML-SC-SP
Abundant resident in summer and early fall during the breeding season; common during spring, late fall, and winter. Once considered accidental in Puerto Rico (Bond 1945, 1987), it has expanded its range eastward. First Vieques record is 8 Mar 1971 from a small tidal lagoon west of the Mosquito Pier (Sorrie 1975). Sorrie found this dove to be uncommon but regular in thorn scrub (Sorrie 1975). Thereafter its population grew rapidly to today's abundance. A nest near Boca Quebrada, 21 Apr 1981, and two nests with young at Laguna Yanuel, 25 Apr 1981 established breeding (Sorrie 1981). Record high count is over 400 birds recorded from the island's western end, 2 Sep 2010 (DDG, WM, JGS). Fossil remains at El Centro de Investigaciones Arqueológicas, University of Puerto Rico were identified as this species (Narganes 1982). This finding may be in error given the recent arrival of this species on Vieques. Zenaida Dove would be more likely.

Conservation Status: Protected (MBTA).

Fig. 119. White-winged Dove (Gemmill 2008)

Fig. 120. Zenaida Dove (Gemmill 2011)

94. ZENAIDA AURITA ZENAIDA (Fig. 120)
Zenaida Dove (Tórtola Cardosantera) C/BR/IA-FO-SC-ML-SP
Common resident all year. First record is Isabel Segunda, 8 Feb 1899 (ABB). In 1912, Wetmore found this resident species to be very common in dense growth of the dry, heavily forested hills and brushy pastures (Wetmore 1916a). Danforth (1935) listed this species as occurring. A nest with two white eggs, 1 Mar 1971, on the island's western end; a nest with two three-quarter-grown fledglings at Bahía de la Chiva, 23 May 1978; and a nest with two eggs at Boca Quebrada, 13 Jun 1981, established breeding (BAS). In fall and winter, the birds are usually seen alone or in pairs. After early spring breeding season, flocks ranging from five to twenty-five birds may be seen (DDG, BAS; Duffield 1978; Raffaele 1978; Sorrie 1981).

Conservation Status: Protected (MBTA).

Banded: 5

Museum Specimens: USNM# 169026, 232276, 232281, 232282, 354163; AMNH# 178573, 178574, 178575, 178576.

95. ZENAIDA MACROURA MACROURA
Mourning Dove (Tórtola Rabilarga) R/BR/IA-SC
Rare resident all year. Although Morning Doves reached the main

island of Puerto Rico in 1935 (Bond 1987) and the extreme northeast coast by 1963 (Schwartz and Klinikowski 1963), the first record for Vieques did not occur until 1967 (LS in Bond 1967). Much earlier, Bowdish (1900, 1902) had reported this bird on 30 Dec 1899 and collected a specimen (AMNH# 178575). However, Wetmore (1916a, 1916b) noted that Bowdish erred in reporting this species, which was actually a Zenaida Dove. Bowdish's specimen is logged into the American Museum of Natural History as Zenaida Dove. Sorrie found the birds nesting at Camp Garcia, 20 Jul 1971, to confirm breeding (Sorrie 1975). By 1972, Raffaele reported that this dove was very common (Raffaele 1978), although by 1979 Sorrie considered the doves to be rare breeders. Competition from Zenaida Doves might explain the meager population (US Navy 1979).

Conservation Status: Protected (MBTA).

Museum Specimen: AMNH# 178575.

96. COLUMBINA PASSERINA PORTORICENSIS (Fig. 121)
Common Ground-Dove (Rolita) A/BR/FO-IA-SC-SP

Abundant resident. Bowdish found this dove to be abundant in late 1899 and early 1900 (Bowdish 1900). Wetmore also described this dove as abundant and collected an egg specimen, 30 Mar 1912, to

Fig. 121. Common Ground-Dove (Gemmill 2009)

establish breeding (Wetmore 1916a). Danforth (1935) listed this species as occurring. Sorrie found them common in thorn scrub and pastures (Sorrie 1975). Although abundant today, the Puerto Rican subspecies has been recently designated at risk of extinction by the American Bird Conservancy due to its restricted range (American Bird Conservancy 2012).

Conservation Status: At Risk (ABC) and Protected (MBTA).

Banded: 150

Museum Specimens: USNM# 232291, 232292, 232293, 232294, 232295, 232296, 232297, 232298, 354254, 354255, 556085, B33036

97. GEOTRYGON CHRYSIA (Fig. 122)

Key West Quail-Dove (Paloma Perdiz Áurea) R/BR/FO

Rare resident in spring and summer; extremely rare in fall and winter. These designations are a reflection of the difficulty in hearing or seeing the birds. From 1895 to 1963 this species expanded its range eastward to Puerto Rico (Ridgway 1916; Wetmore 1927; Bent 1932d; Danforth 1936; Peters 1937; Bond 1940, 1950, 1956; McCandless 1958; Leopold 1963). First record for Puerto Rico is Mayagüez, 20

Fig. 122. Key West Quail-Dove (Gemmill 2008)

Jan 1924 (Danforth 1931). By 1963, it was considered a rare Puerto Rican resident (Leopold 1963). First Vieques record is Puerto Ferro, 21 Jul 1971 (Sorrie 1975). It may have been on Vieques since the beginning of the twentieth century. José Bartôn told Wetmore in 1912 that quail-doves were fairly common in brushy, dry habitat of eastern Vieques (Wetmore 1916a). Apparently, Wetmore assumed that the quail-doves were Ruddy Quail-Doves because Key West Quail-Doves have not been reported from Puerto Rico. If habitat preference is a guide, in all likelihood, Bartôn's quail-doves were Key West Quail-Doves (Raffaele 1978). Pérez-Rivera (1979) does not mention the presence of this quail-dove on Vieques in his life history of this species in Puerto Rico. Since 1979, the majority of confirmed records are from the evergreen scrub and palmetto forest behind the limestone cliffs of the peninsula between Puerto Ferro and Puerto Mosquito and just to the west of Puerto Mosquito. Within the south shore's very restricted and rare palmetto forest habitat, it is fairly common with as many as five heard just after dawn on the west side of Puerto Mosquito (DDG). A few reports of heard birds from Mt. Pirata have not been confirmed by sight, photograph, or banding (SAC, JAS, eBird 2012; CBC 2005). One sight record outside its usual range is in dry forest just west of Esperanza, 11 May 2011 (JS, eBird 2012).

Conservation Status: Vulnerable (ABC), PR/VI Conservation Concern (USFWS), Data Deficient (PRDNER), and Protected (MBTA).

98. GEOTRYGON MYSTACEA (Fig. 123, p. 152)
Bridled Quail-Dove (Paloma Perdez de Martinica) R/BR/FO

Rare resident because it is restricted to the higher elevation moist fan palm forests of Mt. Pirata, where it is fairly common, and neighboring Cerro El Buey. This species spread northward through the Lesser Antilles reaching Puerto Rico in the 1970s. In 1916, it was confined to St. Croix with one record from Culebra (Riley 1903; Ridgway 1916). First Vieques record was Mt. Pirata, 23 Jun 1972 (Raffaele 1978; Sorrie 1975, 1979; Pérez-Rivera 1979). Bond (1984) noted that it had ranged as far west as Vieques. During a survey of Cerro El Buey and Mt. Pirata, 28 May 1978, Sorrie heard at least twenty-four (BAS). On Mt. Pirata, 4 Jun 1978, he flushed a female off a nest with two eggs to

Fig. 123. Bridled Quail-Dove (Gemmill 2006)

establish breeding (Sorrie, unpublished report 1979). Oscar Diaz banded a female with a brood patch at the base of Mt. Pirata, 19 Jul 2006.

Conservation Status: Vulnerable (ABC), PR/VI Conservation Concern (USFWS), Data deficient (PRDNER), Watchlist PR/VI (PIF), and Protected (MBTA). PIF lists the Bridled Quail-Dove as representing the highest territorial priority species in need of conservation measures.

Banded: 1.

99. GEOTRYGON MONTANA MONTANA (Fig. 124)
Ruddy Quail-Dove (Paloma Perdiz Rojiza) ER/BR/FO

Extremely rare resident, with the first record and specimen (AMNH# 178566) collected 30 Dec 1899 by Bowdish (1902a). Wetmore (1916a) did not see any. Ridgway (1916) does not include Vieques as a known location in Puerto Rico. In his Life Histories, Bent stated that this quail-dove was found on Vieques (Bent 1932d). Danforth (1937) found this bird rare in 1935. A second specimen was a dead bird in the El Pilón area, 13 Oct 2004 (WP). An immature bird was

Fig. 124. Recently Banded Ruddy Quail-Dove (Gemmill 2006)

caught and banded at the foot of Mt. Pirata, 18 Jul 2006, to confirm breeding (OD in Norton et al. 2007). The raw data for a 2001 Navy biological assessment show numerous reports of Ruddy Quail-Dove for the restricted, dry scrub eastern end with as many as ten at one location and a total of nineteen in one month (Geo-Marine 2001b). These records are unconfirmed due to lack of documentation for a rare bird not in its preferred habitat. Its call and appearance can be confused with Zenaida Dove, common in dry scrub habitat. From 1899 to the present, only twenty birds were reported with the most on a single day of four. All reports are from its preferred habitat on the western end of heavily forested hills and mountains. Given the extent of the area in which it has been reported—Mt. Pirata's lower slopes, Cerro El Buey, El Pilón, west of Mosquito Pier, and the cross-island highway— this secretive species, usually heard and not seen, may be more common than the thirteen reports indicate.

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

Banded: 1.

Museum Specimen: AMNH# 178566.

Fig. 125. Mangrove Cuckoo (Gemmill 2008)

CUCULIDAE

100. COCCYZUS AMERICANUS AMERICANUS

Yellow-billed Cuckoo (Pájaro Bobo Piquiamarillo) R-ER/PM/FO

Rare passage migrant in spring; extremely rare in summer and fall; no winter reports. Richard Thomas collected a specimen at Santa Maria, 3 Sep 1964, for the first record (Schwartz and Klinikowski 1965). Sorrie found this species to be rare and believed that competition with Mangrove Cuckoo *(Coccyzus minor)* limited the number of Yellow-billed Cuckoos (US Navy 1979). The last report of this species was from Ensenada Sombe, 5 Jun 2004 (JAS).

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

Museum Specimen: LSUMZ# 142158.

101. COCCYZUS MINOR (Fig. 125)
Mangrove Cuckoo
(Pájaro Bobo Menor)
C/BR/FO-IA-ML-SC

Common resident throughout the year. In 1899 and 1900, Bowdish noted several birds for the first records (Bowdish 1900). Wetmore (1916b) and Danforth (1937) found this species a common resident. Peters (1940) listed it as occurring on Vieques. Sorrie classified this species as fairly common (Sorrie 1975). The 2005 Christmas Count produced seventy-four Mangrove Cuckoos. Two birds with brood patches banded near Boca Quebrada, 9 Mar 2004, confirmed breeding.

Conservation Status: Vulnerable (ABC), US Conservation Concern (USFWS), Yellow (NAS/ABC), Watchlist PR/VI (PIF), and Protected (MBTA).

Banded: 9.

Museum Specimens: USNM# 171592, 232129, 232130, 232131, 354381, 354382.

102. COCCYZUS VIELLOTI (Fig. 126)
Puerto Rican Lizard-Cuckoo
(Pájaro Bobo Mayor) ER/V/FO

Rare visitor. Around 1858, a collector employed by Apotheker Riise of the Virgin Islands collected a specimen, which was later lent to Alfred and Edward Newton for examination (Newton 1859b). Alfred Newton was a

Fig. 126. Puerto Rican Lizard-Cuckoo Specimen (©Natural History Museum London)

professor of zoology and comparative anatomy at the University of Cambridge 1866–1907. His brother, Sir Edward Newton, was in the Colonial Service in Mauritius 1859–1877 and later governor and colonial secretary of Jamaica 1877–1883. This skin is in the British Museum of Natural History and is the sole record outside of the main island. Appendices to a Navy (Geo-Marine 2001a) and DNER (Duffield and Cardona 1978) biological assessments reported Puerto Rican Lizard-Cuckoos from the sparsely, vegetated, dry eastern end. These records are unconfirmed due to lack of appropriate documentation for an extremely rare bird away from its preferred forest habitat.

Conservation Status: Vulnerable (ABC), Stewardship List PR/VI (PIF), and Protected (MBTA).

Museum Specimen: BMNH# 1889.9.27.43.

103. CROTOPHAGA ANI (Fig. 127)
Smooth-billed Ani
(Garrapatero)
FC/BR/IA-FO-SC-ML-SP

Fairly common resident. J.D. Milligan collected a specimen, 6 Feb 1899, for the first record (Wetmore 1927). Bowdish (1900)

Fig. 127. Smooth-billed Ani (Gemmill 2006)

found anis abundant in January 1900. Wetmore (1916a) found them fairly common in 1912, and Sorrie found them common in the 1970s (US Navy, 1979). An ani on a nest, 12 Mar 1998, and a pair nesting in the heron rookery at La Chata, 1 Jun 2000, confirmed breeding (DDG, NG, SH). A record high count is seventy-eight from the 2005 CBC.

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

Museum Specimens: USNM# 168955, 232108, 232109, 232110, 232111, 232112, 354457, 354458; AMNH# 178585, 178586, 178587, 178589, 178590, 178591.

STRIGIDAE

104. MEGASCOPS NUDIPES NEWTONI

Puerto Rican Screech-Owl (Múcaro Cumún) ?/FO

Unconfirmed. Maynard's 1898 *Catalog of the Birds of the West Indies* describes the range of Puerto Rican Screech-Owl from Puerto Rico to St. Thomas. The subspecies *newtoni* was named in 1860 from skins collected on St. Croix and was endemic to the larger Virgin Islands where it is now considered extinct (Dickinson and Ramsen Jr. 2013). At the beginning of the twentieth century, this subspecies was reported to Wetmore and Danforth as resident in wooded hills just west of Punta Salinas, Vieques. No authenticated sight record, however, exists. Bond (1956) questioned whether the subspecies *newtoni* actually occurred in the hills west of Punta Salinas. If Puerto Rican Screech-Owl did exist on Vieques, it probably disappeared when the original forests with nesting sites were replaced with sugarcane and agricultural fields and pasture for cattle (Wiley 1985b). During the last thirty years, surveys on Vieques and the Virgin Islands using recordings of Puerto Rican Screech-Owl elicited no response. No sight records have been reported in the last hundred years (DDG; Belitsky 1978a; Moreno 1998). By the mid-1930s Danforth (1935) reported *newtoni* extinct. Raffaele (1977) considered it possibly extinct. Moreno (1998) declared it extinct.

Conservation Status: Vulnerable (ABC), Stewardship List PR/VI (PIF), and Protected (MBTA).

105. ASIO FLAMMEUS PORTORICENSIS

Short-eared Owl (Múcaro Real) **ER/BR/IA**

Extremely rare resident. Prior to the first confirmed record on 30 Aug 1997 (DDG, SN in Norton 1998), local residents reported this bird's presence. From 2005 to the present, a pair has frequented Camp Garcia (GB, EB, SAC, MB). In 2012, a pair was seen in the bunker area (MB) and a single owl in the El Pilón cattle pastures (JN).

Conservation Status: Vulnerable (ABC), US Conservation Concern (USFWS), Yellow (NAS/ABC), Watchlist (PIF), and Protected (MBTA).

CAPRIMULGIDAE

106. CHORDEILES GUNDLACHII (Fig. 128)

Antillean Nighthawk (Querequequé) **R-ER/SV-BR/IA-SC**

Rare breeding summer visitor in late spring and summer; extremely rare in fall and winter. First record is Camp Garcia, 20 Jul 1975 (Sorrie 1975). Earliest arrival is 21 Apr (DDG, BL) and latest departure is 20 Aug (DDG). Courtship flight displays were observed at Camp

Fig. 128. Antillean Nighthawk (Gemmill 2006)

Garcia, 21 Apr 1981 (Sorrie 1981) and at Puerto Ferro, 27 Apr 2008 (DDG). This nighthawk (Fig. 128) nests on the former USFWS office roof in Isabel Segunda. Eight nests with eggs were found on the Camp Garcia runway, 7 May 2007 (MB, OD).

Conservation Status: Potential Concern (ABC), Yellow (NAS/ABC), Watchlist (PIF), and Protected (MBTA).

107. ANTROSTOMUS CAROLINENSIS

Chuck-will's-widow (Guabairo de la Carolina) R-ER/WV/FO-IA

Rare winter visitor; extremely rare in spring and fall; no summer reports. Bowdish collected a specimen, 15 Dec 1899, for the first record. Interestingly, he found this species only on Vieques and not the main island or other satellite islands (Bowdish 1902a). Sorrie found this bird to be rare in winter (Sorrie 1975). Earliest arrival is 14 Oct (DDG, WM) and latest departure is 20 Feb (DDG).

Conservation Status: Potential Concern (ABC), US Conservation Concern (USFWS), and Protected (MBTA).

Museum Specimens: AMNH# 178616; USNM# 354532; one unknown location.

APODIDAE

108. STREPTOPROCNE ZONARIS

White-collared Swift (Vencejo Acollarado) ER/V/FO

Vagrant. First record for Vieques and Puerto Rico is Mt. Pirata, 21 Jul 1971. Sorrie and Kepler had excellent views of this swift for ten minutes (Sorrie 1975; Raffaele 1989a). Bond (1984) noted that this swift would be the migratory *Streptoprocne zonaris albicincta.*

Conservation Status: Protected (MBTA).

109. CHAETURA PELAGICA

Chimney Swift (Vencejo de Chimenea) ?/SH

Pending. On 5 Oct 2009 Alcides Morales was the sole observer of a Chimney Swift over the Ensenada Sombe campground that he reported to eBird. This observation would be a first record for Vieques as well as Puerto Rico. SOPI's 2011 revised *Catálogo de Las Aves de Puerto Rico,* the official list of Puerto Rican birds, does not include this species. This record is under review. When SOPI accepts this

record, Chimney Swift will be added to its Vieques list.

Conservation Status: Potential Concern (ABC), Near-threatened (BI/IUCN), and Protected (MBTA).

TROCHILIDAE

110. ANTHRACOTHORAX DOMINICUS AURULENTUS

Antillean Mango (Zumbador Dorado) ER/FB-V/IA-FO

Extremely rare former breeder. In March 1912, Wetmore found Antillean Mango the most abundant hummingbird. At that time the young were fully grown (Wetmore 1916b). Danforth did not observe the mango during his visit in 1935. Peters (1945) and Bond (1945) listed it. Bond was still listing this species on Vieques in 1956. By 1957, this species was rare (Robertson 1962). An explanation for this change in status is the arrival of the Green-throated Carib (see the following page). The only record of Antillean Mango since 1912 was by Geoffrey LeBaron, CBC director at the National Audubon Society, on Christmas day 1994 (Norton 1995a). LeBaron noted that the Green-throated Carib was virtually absent at the time, perhaps the result of Hurricane Hugo, or a prolonged drought, and that dry coastal habitat favored the Antillean Mango (Norton 1995a).

Conservation Status: Vulnerable (ABC), PR/VI Conservation Concern (USFWS), Watchlist PR/VI (PIF), and Protected (MBTA)

Museum Specimens: USNM# 231773, 231774, 231775, 231776, 231777.

111. ANTHRACOTHORAX VIRIDIS

Green Mango (Zumbador Verde) ?/SC

Unconfirmed. Two undocumented reports are from Puerto Diablo in the Eastern Maneuver Area, 25 May 2001 (Geo-Marine 2001b), and the Hix Island House, 29 Oct 2011 (RP, eBird 2012). This Puerto Rican endemic is common in the central and western mountains, and uncommon in the Luquillo Mountains in the east. Documentation is needed.

Conservation Status: Vulnerable (ABC), Stewardship List PR/VI (PIF), and Protected (MBTA).

112. EULAMPIS JUGULARIS

Purple-throated Carib (Colibrí Caribeño Gorgimorado) ?/IA

Unconfirmed. Liz Courtney reported this species from her garden in Isabel Segunda during August 2005. She took its picture with an Instamatic camera, but the image was so poor that the hummingbird could not be identified as to species. On El Pilón, 16 Aug 2009, Gemmill had a brief glimpse of what initially appeared to be a Green-throated Carib. As it flew by, she noticed a purplish-red throat but did not notice bill or wing color (DDG in Norton et al. 2010b). Neither sighting is sufficiently documented for a first record of a Lesser Antillean species that prefers mountain forests and banana plantations, is occasionally found at sea level, and is a vagrant as far north as the Virgin Islands (Raffaele et al. 1998).

Conservation Status: Protected (MBTA).

113. EULAMPIS HOLOSERICEUS HOLOSERICEUS (Fig. 129)

Green-throated Carib (Zumbador Pechiazul) FC/BR/IA-SC-SP-FO

A fairly common resident, Green-throated Carib reached Vieques and Puerto Rico from the Lesser Antilles in the first years of the twentieth century. Edward Newton (1859a) found the carib common on St. Croix. A few years later Cory (1886b) listed this bird as confined to the Lesser Antilles. Boucard (1893–1894) added St. Thomas to its range. Maynard (1898) listed it as restricted to the Lesser Antilles. Bowdish,

Fig. 129. Green-throated Carib (Gemmill 2006)

Baker, and Richmond did not report this species in 1899 and 1900, yet Wetmore in 1912 found the carib common on Vieques but not Puerto Rico proper (Wetmore 1916b, 1917). Danforth (1937) found the carib on the main island's eastern end not as common as on Vieques and Culebra. Peters (1945) listed it as occurring. On 23 Mar 1912, Wetmore confirmed breeding when he found females feeding young in Isabel Segunda (Wetmore 1916a, 1927). Sorrie found a nest with two eggs on Cayo de Afuera, 31 Mar 1971 (Sorrie 1975) and another nest on Mt. Pirata, 24 Apr 1981 (BAS). One theory as to the successful range expansion is that the carib prefers disturbed habitats where the longer-established Greater Antillean hummingbirds are naturally uncommon (Terborgh 1973).

Conservation Status: Vulnerable (ABC) and Protected (MBTA).

Banded: 2.

Museum Specimens: USNM# 231795, 231797, 231798, 231799, 231800, 231801, 354693. USNM# 231796 exchanged on 20 Mar 1936 with C.F. Underwood, location unknown.

114. CHLOROSTILBON MAUGEUS

Puerto Rican Emerald (Zumbadorcito de Puerto Rico) ER/V/SC

Rare visitor. On 1 Aug 2003, Stephen Earsom banded a Puerto Rican Emerald near the base of Mt. Pirata for a first documented record (BBL Report 2009). Two Puerto Rican Emeralds from Laguna Bahía Icacos and Bahía Fanduca, 1 Aug 2000, were listed in the raw data appendix to the 2001 Navy Biological Assessment (Geo-Marine 2001b). These sightings lack sufficient documentation for first and second records. In addition, the sightings were far from the bird's regular mountain forest habitat. The emerald is similar in size and appearance to the common Antillean Crested Hummingbird. A report of four Puerto Rican Emeralds, 5 Apr 2007, to eBird (2012) is considered invalid due to species misidentification.

Conservation Status: Vulnerable (ABC), Stewardship List PR/VI (PIF), and Protected (MBTA).

Banded: 1.

115. ORTHORHYNCUS CRISTATUS EXILIS (Fig. 130)
Antillean Crested Hummingbird (Zumbadorcito Crestado)
C/BR/IA-FO-SC-SP

Common resident. First confirmed record was Isabel Segunda, 18 Mar 1912 (Wetmore 1916a, 1927). By 1886, this Lesser Antillean species, known at the time as Green-crested Hummer, had expanded its range to Puerto Rico, Dominica, and Montserrat from St. Thomas, St. Croix, Nevis, and Martinique (Cory 1886b; Maynard 1898). While Cory and Maynard did not specify a location on Puerto Rico in which the Green-crested Hummingbird had been reported, it might have been Vieques because Wetmore questioned the occurrence of this hummingbird on the main island (Wetmore 1927) as did Bond as late as 1950. Peters (1945) listed it as occurring on Vieques. In 1912, Wetmore found this hummingbird to be fairly common (Wetmore 1916a, 1927). Perhaps the explanation why Bowdish and Richmond did not see this hummingbird was that it was extremely rare in 1899 and 1900. By 1936, Danforth (1937) found it to be abundant on Vieques and Culebra. Sorrie found it to be common (US Navy 1979). The first confirmed breeding record was a female on a nest on El Pilón, 4 Mar 1985 (DDG, BL).

Fig. 130. Antillean Crested Hummingbird (Gemmill 2008)

Conservation Status: Vulnerable (ABC) and Protected (MBTA).
Banded: 2.
Museum Specimens: USNM# 231765, 231767, 231768, 231769, 231770, 231771, 354597, 354598, 556086. USNM# 231764 exchanged on 20 Jan 1967 to Rio de Janeiro and is no longer in their collection—location unknown. USNM# 231766 exchanged on November 1925 to Carnegie Museum where its catalog number is CM# 100884.

TODIDAE

116. TODUS MEXICANUS

Puerto Rican Tody (San Pedrito) **?/SC**

Unconfirmed. Four Puerto Rican Todies from Laguna Caño Cruz and Punta Salinas, 20 Dec 2000; Laguna Anones, 13 Feb 2001; and Puerto Diablo, 14 Feb 2001, were listed in the raw data appendix to the 2001 Navy Biological Assessment (Geo-Marine 2001b). These sightings were in dry scrub habitat, which differ greatly from its normal damp, dense forest habitats on the main island. The sightings lack sufficient documentation for a first record

Conservation Status: At Risk (ABC), Stewardship List PR/VI (PIF), and Protected (MBTA).

ALCEDINIDAE

117. MEGACERYLE ALCYON

Belted Kingfisher (Martin Pescador Norteño) **FC/WV/ML-SP-SH**

Fairly common winter visitor from fall to spring; no summer reports. First record is 10 Dec 1899 (Bowdish 1900; Wetmore 1927). Earliest arrival is 3 Sep and latest departure is 28 Apr (DDG). Wetmore (1916a), Danforth (1937), and Sorrie (1975) found this bird to be an uncommon winter visitor.

Conservation Status: Potential Concern (ABC) and Protected (MBTA).
Museum Specimens: AMNH# 178614; USNM# 232319.

PICIDAE

118. MELANERPES PORTORICENSIS (Fig. 131)

Puerto Rican Woodpecker (Carpintero de Puerto Rico)

FC/BR/IA-FO-SC

Fairly common resident. First record is about 1858. A collector employed by Apothecary Riise of the Virgin Islands collected a specimen lent to the Newtons (see Puerto Rican Lizard-Cuckoo for a brief biography). This specimen is in the British Museum of Natural History (Newton 1859b). Bowdish (1900) found this species fairly common in 1899 and 1900. Wetmore (1916b) found it common wherever large trees flourished. On 25 Mar 1912, he saw one feeding well-grown young to confirm breeding. Danforth (1937) found it fairly common in the hills with brushy woods in the eastern half of the island. Sorrie found it uncommon to rare with limited habitat due to the low number of trees suitable for nesting cavities (Bond 1977; US Navy 1979). Both field guides (Raffaele 1989; Raffaele et al. 1998) list the woodpecker as rare on Vieques. With the change from agricultural fields and pastures in the 1960s and 1970s to secondary growth forests at the turn of the century, this woodpecker is now fairly common due to improved nesting habitat, which includes the wood poles for electric wires. Cement poles are replacing the

Fig. 131. Puerto Rican Woodpecker (Gemmill 1985)

wooden poles, and this change may negatively impact future population numbers. After Hurricane Hugo decimated the island's trees in fall 1989, this woodpecker was extremely rare for four years. By 1997, it was fairly common (DDG). By 2000, the Puerto Rican Woodpecker had made an excellent recovery, with sightings of eight pairs and twenty individuals during a one-week survey (DDG in Norton et al. 2002). As of 2012, this Greater Antillean species had reached its eastern-most limit (Robertson 1962; Norton, pers. com. 2012).

Conservation Status: Vulnerable (ABC), Stewardship List PR/VI (PIF), and Protected (MBTA).

Banded: 3.

Museum Specimens: BMNH# 1889.2.26.223; USNM# 171737, 171738, which were initially logged into the American Museum of Natural History's collection as AMNH# 178596 and 178597, respectively; USNM# 171650, 231833, 231834, 231835, 231836, 231837, 3231838, 354823, 354824, 354825.

119. SPHYRAPICUS VARIUS

Yellow-bellied Sapsucker (Capintero Pechiamarillo) ER/V/FO

Extremely rare winter and spring vagrant; no summer and fall reports. Sorrie, who observed sapsuckers at Roosevelt Roads Naval Station, found a pattern of recently made holes ringing a tree, which is characteristic of this species, in four locations in three different years: Kiani Wetlands, 3 Mar 1971; Laguna Yanuel, 26 May 1978; Playa Grande, 28 May 1978; and an unknown location, 15 Feb 1981.

Conservation Status: Protected (MBTA).

FALCONIDAE

120. FALCO SPARVERIUS CARIBAEARUM (Fig. 132)

American Kestrel (Falcón Común) FC/BR/IA-FO-ML-SP-SH

Common resident. A.B. Baker collected a specimen on 8 Feb 1899, which was the first specimen for this subspecies and the first record for Vieques (Specimen tag USNM# 169029). At the turn of the century, Bowdish (1900) found this species uncommon. In 1912, Wetmore (1927) found them common. By 1935, Danforth (1937) noted they were "rather scarce." In the 1970s, Raffaele (1978) could only

Fig. 132. American Kestrel (Gemmill 2006)

find one pair, and Sorrie did not find any in 1971 (Sorrie 1975). In subsequent visits, Sorrie found the kestrel in five to six locations east of Camp Garcia and none in the western part of the island where suitable habitat existed. He postulated that because it uses woodpecker holes for nesting and the Puerto Rican Woodpecker is rare west of Camp Garcia, so is the kestrel (Sorrie 1979). Today, woodpeckers are flourishing, and secondary forests provide plentiful nesting sites. A female sitting next to an immature bird and a second female feeding a recently fledged bird, 30 Aug 1997, confirmed breeding (DDG). Winter visitors from North America augment the local resident populations, *Falco s. caribaearum,* from October to April.

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

Museum Specimens: USNM# 169029, 232132, 232133, 232134, 232135, 232136, 232137, 393696; AMNH# 791561, 791562; one Bowdish specimen not located; A.B. Baker's specimen (USNM# 169029), 8 Feb 1899, is the type specimen for the Puerto Rican subspecies (Riley 1904).

121. FALCO COLUMBARIUS COLUMBARIUS

Merlin (Falcón Migratorio) R/WV/ML-FO-SC-SP

Rare winter visitor from fall to spring; no summer reports. First record is Cayo de Afuera, 4 Mar 1985 (Sorrie 1975). Earliest arrival is 9 Oct (DDG) and latest departure is 12 Apr (JAS).

Conservation Status: Protected (MBTA).

Banded: 2.

122. FALCO PEREGRINUS TUNDRIUS

Peregrine Falcon (Falcón Peregrino) UC-R-ER/WV/ML-FO-SH

Uncommon winter visitor; extremely rare in spring; rare in fall; no June and July reports. First record is Mosquito Pier, 24 Dec 1977 (Belitsky 1978a). Only single bird sightings with the exception of two males and a female hunting shorebirds on Laguna Playa Grande, 17 Oct 2004 (DDG, MB). Earliest arrival is 16 Oct (DDG, MB, OD, WM) and latest departure is 4 Apr (DDG, NG).

Conservation Status: Potential Concern (ABC), Delisted (ESA), US Conservation Concern (USFWS), Critically Endangered (DNER), and Protected (MBTA).

PSITTACIDAE

123. ARATINGA PERTINAX

Brown-throated Parakeet (Periquito gargantimoreno) ER/FB/SC

Extremely rare former breeder. Wiley (1993) saw seven birds at Laguna Yanuel 22 Apr 1975, but the population was not present a year later (Wiley 1993b). These birds most likely arrived from St. Thomas, Virgin Islands, where the Curaçao subspecies *(Aratinga pertinax pertinax)* was introduced in the 1800s and is fairly common today. Early reports of this species are hearsay. Gundlach (1878b) heard of parakeets although the specific species was unknown. Wetmore did not confirm reports that this species occurred occasionally during the rainy season of June, July, and August (Wetmore 1916a). Sorrie did not find them nor did Wiley in 1974 (Wiley 1993)

124. AMAZONA VITTATA

Puerto Rican Parrot (Cotorra Puertorriqueña) ER/FB/FO

Extremely rare. Probably breeding resident until the late nineteenth-century tree-cover loss (Wiley 1985b; Wilson et al. 1994). French naturalist Jean B. Labat (1663–1738) wrote in his journal that his hunters found parrots in abundance on the island (Labat 1772). Danish botanist Hans West (1758–1811) commented in 1794 on the noisy cries of green parrots at daybreak from the highest trees (West 1794). Jean Gundlach (1810–1896), German ornithologist and collector living in Cuba in the mid-nineteenth century, received reports of parrots

on Vieques, which he notated with a question mark as the Cuban Parakeet, Periquito *(Aratinga euops)* (Gundlach 1878a). Wetmore discusses Vieques parrots under Culebra Island Parrot *(Amazona vittata gracilipes),* last reported in 1899 when A.B. Baker collected three on Culebra (Wetmore 1927). Wetmore received reports that these parrots were summer visitors. They appeared in the rainy season during June, July, and August in the heavy forest on the south side where they fed on fruit. Señor José Bartón told Wetmore they were game birds, "making a highly desirable dish for the table" (Wetmore 1916a). Twentieth-century ornithologists Bowdish, Baker, Richmond, Wetmore, and Danforth did not see or hear parrots on Vieques, and none were recorded in over a hundred years.

Conservation Status: At risk (ABC), Critical (BI/IUCN), Endangered (ESA), Critically Endangered (DNER), and PR/VI Watchlist (PIF).

PASSERINES

TYRANNIDAE

125. ELAENIA MARTINICA RIISII (Fig. 133, p. 170)

Caribbean Elaenia (Juí Blanco) **C/BR/FO-SC-SP**

Common resident; abundant in the dry scrub forests of the island's eastern end. First record is Puerto Ferro, 25 Mar 1912 (Wetmore 1916a, 1916b). The elaenia arrived from the Lesser Antilles around 1900 to Vieques and much later to Puerto Rico (Peters 1926; Traylor 1979). In 1886, Cory (1886a) found this bird confined to the Lesser Antilles as Maynard did twelve years later (Maynard 1898). Bowdish, Baker, and Richmond did not report seeing the elaenia during their visits in 1899 and 1900. Wetmore did see it in 1912. Danforth (1937) found this species very common. Sorrie (1975) found the elaenia abundant in thorn scrub and lowland second growth forests. During the 2004–2005 CBC, a record high count of fifty individuals was recorded at Caracas Beach, formerly known as Red Beach, 15 Jan 2005 (MA, HM). The observation of an adult feeding young, 22 Jan 1989 (DDG, BL), and the banding of several females with brood

patches from 2004 to 2006 (OD) confirm breeding.

Conservation Status: Vulnerable (ABC) and Protected (MBTA).

Banded: 62.

Museum Specimens: USNM# 232229, 232230, 232231, 232232, 232233, 355001, 355002, 355003, 355004, 355005, 355006, 355007.

Fig. 133. Caribbean Elaenia (Gemmill 2006)

126. CONTOPUS VIRENS
Eastern Wood-Pewee
(Pibí Oriental) ?/FO

Unconfirmed. This species was reported to eBird from the western end, 26 Mar 2000, with no documentation. It is a vagrant in the eastern Caribbean where spring records are extremely rare. Sufficient documentation is essential. It would have been a first record for Vieques and Puerto Rico.

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

127. MYIARCHUS ANTILLARUM
Puerto Rican Flycatcher (Juí) **FC-R/BR/FO-SC-SP**

Fairly common resident in fall to spring; rare in the summer. During his visit in 1899–1900, Bowdish found the flycatcher not as abundant as Gray Kingbird *(Tyrannus dominicensis)* or Loggerhead Kingbird *(Tyrannus caudifasciatus)* (Bowdish 1900). He did not give a date. Wetmore (1916a) found it a common resident evenly distributed throughout the island although nowhere abundant. He saw a mated

pair in Isabel Segunda on 18 Mar 1912 (Wetmore 1916a). Danforth did not positively identify this bird in 1935. According to a local hunter, it was common before the hurricane of 1928 but had practically disappeared (Danforth 1937). Bond (1956) reported that it was considered rare in 1956. Sorrie (1975) did not find it during his first visit to the island in 1971. He did see one on Cerro Caracas, 23 May 1978, for the first report since 1912 (Sorrie, unpublished report 1979), and then it was reported every year until 2010. No sightings were reported in 2011 and 2012.

Conservation Status: Vulnerable (ABC), PR/VI Conservation Concern (USFWS), Stewardship List PR/VI (PIF), and Protected (MBTA).

Banded: 2.

Museum Specimens: USNM# 171599, 232213, 232214, 232215, 232216, 232217, 232218, 232219, 554895.

128. TYRANNUS DOMINICENSIS DOMINICENSIS (Fig. 134) Gray Kingbird (Pitirre) A/BR/FO-IA-SC-ML-SP

Abundant resident all year. First record is 6 Feb 1899 (JDM). Bowdish found it the most common bird on the island (Bowdish 1900). Wetmore (1916a) and Danforth (1936) called it common, whereas Sorrie (1975) found it abundant.

Conservation Status: Protected (MBTA).

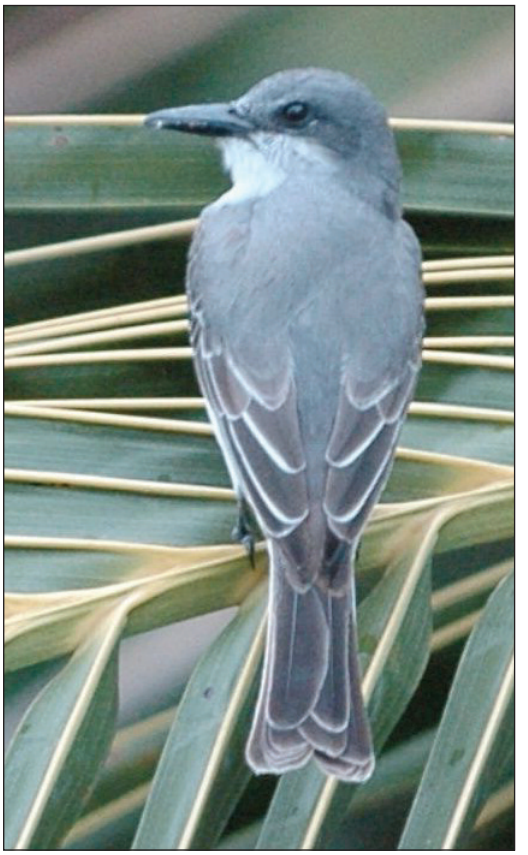


Fig. 134. Gray Kingbird (Gemmill 2006)

Banded: 13.
Museum Specimens: USNM# 168962, 168963, 168965, 169047, 232191, 232192, 232193, 232195, 232196, 232197, 354851, 354852, 354853; AMNH# 178619, 178620, 178622, 178623,178624, 178625.

129. TYRANNUS CAUDIFASCIATUS TAYLORI (Fig. 135)
Loggerhead Kingbird (Clérigo) FC/BR/FO-IA-SP

Fairly common resident in forested areas. Bowdish (1900) noted this species for a first record but gave no date. This kingbird was less common than the Gray Kingbird (Bowdish 1900). Wetmore (1916a, 1927) and Danforth (1936) concurred with Bowdish. Sorrie (1975) found the Loggerhead Kingbird uncommon. On 28 Mar 1912, Wetmore observed a mated pair (Wetmore 1916a, 1927). A recent paper proposes species status for this endemic Puerto Rican subspecies (Garrido et al. 2009).

Fig. 135. Loggerhead Kingbird (Gemmill 2006)

Conservation Status: Vulnerable (ABC), PR/VI Conservation Concern (USFWS), and Protected (MBTA).
Banded: 11
Museum Specimens: USNM# 171593,171594,171595, 232156, 232171, 232172, 232173, 232174, 232175, 354929, 354930, 354931.

130. TYRANNUS SAVANA (Fig. 136)
Fork-tailed Flycatcher (Bobito de Cola Ahorquillada) ER/V/IA
Vagrant. First Puerto Rican and Vieques record is just west of the former Navy headquarters, 8 Jun 2007 (DDG, EL, SN in Norton et al. 2008a). This immature bird in almost adult plumage is the first record east of Jamaica and Cuba, and one of the few records for the West Indies reported in *North American Birds.*

Conservation Status:
Protected (MBTA).

Fig. 136. Fork-tailed Flycatcher (Gemmill 2006)

VIREONIDAE

131. VIREO GRISEUS GRISEUS
White-eyed Vireo (Vireo Ojiblanco) ER/V/FO
Vagrant. The record was Cayo Verdiales (Puerto Ferro Peninsula), 15 Feb 1981 (Sorrie 1981).

Conservation Status:
Potential Concern (ABC) and Protected (MBTA).

132. VIREO LATIMERI
Puerto Rican Vireo (Bien-te-veo) ?/SC
Unconfirmed. A Puerto Rican Vireo was listed from Laguna Icacos, 24 May 2001 in the raw data appendix to the 2001 Navy Biological Assessment (Geo-Marine 2001b). Documentation is required because this Puerto Rican bird has not been found away from western

Puerto Rico. The Management Plan for the Western Vieques Conservation Areas incorrectly lists Puerto Rico Vireo as occurring on the island (Silva et al. 2002).

Conservation Status: Vulnerable (ABC), Critically Endangered (PRDNER), US and PR/VI Conservation Concern (USFWS), Watchlist PR/VI (PIF), and Protected (MBTA).

133. VIREO FLAVIFRONS (Fig. 137)

Yellow-throated Vireo (Vireo Gargantiamarillo) R/WV/FO-SC

Rare fall and winter visitor; with no spring or summer reports. This vireo was unknown in the West Indies prior to 1975. The first Vieques record is Playa Caracas, formerly Red Beach, 8 Dec 1984 (EHW, LBW in Williams 1985). The other five records are from Mt. Pirata in Feb 2004, Jan 2005 (two records), Nov 2006, and Nov 2009 (DDG, SC, WM, DDG in Norton et al. 2005).

Fig. 137. Yellow-throated Vireo (Gemmill 2009)

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

134. VIREO OLIVACEUS OLIVACEUS
Red-eyed Vireo (Vireo Ojirrojo) ER/V/FO

Vagrant. The first confirmed record is Mt. Pirata, 2 Sep 2010 (DDG, WM in Norton et al. 2011). It may have been seen earlier at the same location. During the 2005 CBC, a Red-eyed Vireo was reported from Mt. Pirata, 15 Jan 2005 (SAC, WH in Norton et al. 2005) and 16 Jan 2005 (SC, IH WH in Salguero and Colón 2005). This record may be incorrect because Segio Colón does not report this sighting on his eBird checklist for 16 Jan and says he did not observe it for the previous day either (eBird 2012; pers. com. 2013). To date no one has claimed this record.

Conservation Status: Protected (MBTA).

135. VIREO ALTILOQUUS ALTILOQUUS
Black-whiskered Vireo (Julián Chiví) UC-R-ER/SV-PB/FO-SC

Uncommon summer visitor in spring and summer; rare in fall; extremely rare in winter. Bowdish (1900) described the first record without giving a date or location. Wetmore (1916a, 1927) found it fairly common with a higher density on the south coast. Sorrie (1975) found this vireo common in summer, which no longer seems to be the case.

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

Museum Specimens: USNM# 231896, 231897, 231898, 231899.

HIRUNDINIDAE

136. PROGNE DOMINICENSIS (Fig. 138, p. 176)
Caribbean Martin (Golondrina de Iglesias)
FC-R/SV-BR/FO-IA-SH-SP

Fairly common summer visitor in spring and summer; rare in fall and winter. Reported in every month of the year. First record is 10 Feb 1900 (Bowdish 1900). Wetmore (1916a) saw these martins in Isabel Segunda. First reported breeding on the island is in 1960 (Mayr 1960). The first breeding record is an immature martin at Laguna

Punta Gato, 19 May 1978 (BAS). Several pairs were seen inspecting nest holes in the limestone cliffs of Puerto Ferro, 15 Jul 2006 (DDG), and several were on nests in the cliffs on the island's eastern end, 9 Jun 2007 (DDG, OD, MB). Record high count is thirty martins at Esperanza, 9 Jan 1987, after a storm (DDG).

Conservation Status: Vulnerable (ABC) and Protected (MBTA).

Fig. 138. Caribbean Martin (Gemmill 2006)

137. RIPARIA RIPARIA RIPARIA (Fig. 139)
Bank Swallow
(Golondrina Parda)
ER/PM/IA-SH

Extremely rare passage migrant in fall, winter, and spring; no summer reports. The first of six records was the former Navy headquarters quebrada, 15 Mar 1992 (DDG, RM) The three fall records occurred in the first two weeks of September (DDG).

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

138. PETROCHELIDON PYRRHONOTA
Cliff Swallow (Golondrina de Peñasco) ER/PM/IA-ML-SH-SP

Extremely rare passage migrant in fall and winter; no spring and summer reports. First of six records was seven birds flying over the airport, 22 Sep 1978 (BAS, JJ, RS, EAS). A flock of twenty was reported 30 Aug 1997 for the earliest arrival date and the record high

Fig. 139. Bank Swallow with Barn Swallows (Gemmill 2008)

count (DDG in Norton 1998). Latest observation was 9 Feb 2002 (DDG, SZW). The other three records are from early September.

Conservation Status: Protected (MBTA).

139. PETROCHELIDON FULVA (Fig. 140, p. 178)

Cave Swallow (Golondrina de Cuevas) FC-R/PM/FO-IA-ML-SP

Fairly common passage migrant in early fall; rare in winter, spring, and summer. First record is Kiani Wetlands, 9 Mar 1971 (Sorrie 1975). Sorrie believed that the swallow was probably the resident subspecies, *Petrochelidon fulva puertoricensis* because that subspecies nested inside a barge at nearby Roosevelt Roads Naval Station, Puerto Rico. This barge made infrequent trips to service the facility on Vieques. Sorrie

suspected that some birds followed the barge to Vieques Island (Sorrie 1975). Most recent sightings of large flocks, indicates the possibility of migratory subspecies (DDG in Norton et al. 2009a). About 175 Cave Swallows, for example, perched on power wires at Ensenada Sombe, 13 Sep 2008 (DDG).

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

Fig. 140. Cave Swallow (Gemmill 2008)

140. HIRUNDO RUSTICA ERYTHROGASTER (Fig. 141) Barn Swallow (Golondrina Horquillada) C-R/PM/FO-IA-ML-SC-SH-SP

Common passage migrant during fall; rare in winter and spring; no summer reports. First confirmed record is Puerto Diablo, 27 Dec 1935 (Danforth 1937). In fall and winter, large congregations may appear for a day. On 7 Sep 2008, more than 1,000 Barn Swallows departed

Fig. 141. Barn Swallow (Gemmill 2008)

the island at Cayo de Tierra, heading south (DDG in Norton et al. 2009a). Based on observations during the first two weeks of September in 2009 and 2010, 50–350 Barn Swallows were present on any given day (DDG). On 22 Aug 2009 and 4 Sep 2010, up to 350 Barn Swallows departed Punta Este heading in an easterly direction towards St. Croix, U.S. Virgin Islands. On Christmas Day 1994, more than 200 Barn Swallows were on the telephone wires to the former Navy headquarters and feeding low over the newly mowed grass (DDG, NG). Earliest arrival is 18 Aug (DDG) and latest departure is 23 May (BAS).

Conservation Status: Protected (MBTA).

TURDIDAE

141. CATHARUS MINIMUS

Gray-cheeked Thrush (Zorzalito Carigris) ?/V/FO

Unconfirmed. One report was Mt. Pirata, 15 Jan 2005 (SAC, PV, WH, MC in Norton et al. 2005). Sergio Colón (SAC) reported it as either Gray-cheeked or Bicknell's (Salguero and Colón 2005; eBird 2012). Oscar Diaz reported it as Bicknell's Thrush (pers. com. 2014). According to Chris Rimmer, an expert on winter ranges of Gray-cheeked and Bicknell's Thrushes, any thrush seen on that date would likely be a Bicknell's Thrush (pers. com. 2010).

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

142. CATHARUS BICKNELLI

Bicknell's Thrush (Zorzalito de Bicknell) ER/V/FO

Rare visitor. First record is Mt. Pirata, 27 Dec 2004 (JCo, AH, PR in Colón and Salguero 2006). The second record from the same location is 8 Jan 2006 (OD, SAC in Colón and Salguero 2006). The second bird was seen and heard and responded to a tape of its call. A third probable sighting is during the Mt. Pirata 2005 CBC, 15 Jan 2005 (OD, SC, PV, WH, MC in Norton et al. 2005). (See Gray-cheeked Thrush account (141 above) for discussion of this January sighting).

Conservation Status: At Risk (ABC), Vulnerable (BI/IUCN), US Conservation Concern (USFWS), Red (NAS/ABC), Watchlist (PIF), and Protected (MBTA).

143. TURDUS PLUMBEUS ARDOSIACEUS

Red-legged Thrush (Zorzal Patirrojo) ER/V/IA

Rare visitor. Extremely rare from fall to spring; no summer reports. First record is La Casa Francisco, 14 Mar 1988 (DHM), the second at Laguna Icacos, 14 Sep 2000 (Geo-Marine 2001b), and the third from Caracas Beach, formerly Red Beach, 15 Jan 2005 (MA, HM in Norton et al. 2005b). This subspecies may be designated as a full species (American Bird Conservancy 2012).

Conservation Status: Vulnerable (ABC) and Protected (MBTA).

MIMIDAE

144. DUMETELLA CAROLINENSIS

Gray Catbird (Maullador Gris) ER/V/FO-IA

Vagrant. One confirmed record is Puerto Ferro, 25 Nov 2006 (DDG, WM). An earlier flyby in front of a car on El Pilón, 22 Mar 2006, was probably a Gray Catbird (WM).

Conservation Status: Protected (MBTA).

145. RAMPHOCINCLUS BRACHYURUS

White-breasted Thrasher (No Spanish name.)
(Cuitlacoche Pechiblanco or Azotador Pechiblanco?) ?/M

Unconfirmed. An undocumented reference to this species appears in Table 10 of a report on mangrove forests submitted to the Navy, but it is not mentioned in the report's Appendix I that summarizes bird surveys for the report (Lewis et al. 1981b). This species is endemic to Martinique and St. Lucia, where it is critically endangered with possibly less than 150 pairs. Given its restricted range and a small population, there is insufficient documentation for acceptance of this report.

Conservation Status: Endangered (BI/IUCN).

Fig. 142. Pearly-eyed Thrasher (Gemmill 2008)

146. MARGAROPS FUSCATUS FUSCATUS (Fig. 142)
Pearly-eyed Thrasher (Zorzal Pardo) C/BR/FO-IA-SC-SP
Common resident. First record is 28 Jan 1900 (Bowdish 1900). Bowdish, Wetmore, Danforth, and Sorrie found the thrasher to be common (Bowdish 1900; Wetmore 1916a, 1927; Danforth 1936, 1937; Sorrie 1975).

Conservation Status: Protected (MBTA).

Banded: 4.

Museum Specimens: AMNH# 178664; USNM# 171729, 232029, 232031, 232032, 232033, 232034, 232035, 232036, 232037, 232038, 232039, 232040, 232041, 355335, 355336, 355337. USNM# 232030 exchanged to Agricultural Station, Puerto Rico though present location is not known. Location of one collected by Bowdish is unknown.

147. MIMUS POLYGLOTTOS ORPHEUS (Fig. 143)
Northern Mockingbird (Ruiseñor)
C/BR/FO-IA-SC-SP

Common resident. First record is 6 Feb 1899 (JDM). Bowdish found mockingbirds uncommon when he arrived in November and common when he left in February (Bowdish 1900). Wetmore described them as common residents (Wetmore 1916a, 1927) and documented breeding on 3 Apr 1912 when he observed a week-old chick (Wetmore 1916b). Sorrie recorded it as a common resident (Sorrie 1975).

Fig. 143. Northern Mockingbird (Gemmill 2006)

Conservation Status: Protected (MBTA).
Banded: 1.
Museum Specimens: USNM# 169008, 171728, 232076, 232077, 232078, 232079, 232080, 232081, 232082, 355304, 355305, 355306; AMNH# 178665; one specimen location unknown.

STURNIDAE

148. STURNUS VULGARIS VULGARIS
European Starling (Estornino Pinto) **ER/V/IA**

Vagrant. The record is a singing male at Camp Garcia, 21 Apr 1981 (Sorrie 1981). This European subspecies *(Sturnus vulgaris vulgaris)* was introduced to North America from where it spread to the Bahamas, Cuba, Jamaica, and Puerto Rico. The first record for Puerto Rico was 1973, and the Virgin Islands' record was 1982 (Raffaele et al. 1998; Sorrie 1981).

149. GRACULA RELIGIOSA

Hill Myna (Maina de Colinas) **?/V/IA**

The record is Playa Grande area, 1972 (Raffaele 1978). Raffaele noted that this bird was probably an escaped caged bird. It is included here to preclude references to this species as occurring on Vieques.

PARULIDAE

150. SEIURUS AUROCAPILLA AUROCAPILLA (Fig. 144)

Ovenbird (Pizpita Dorada) **UC-R/WV/FO-IA-SC**

Uncommon winter visitor; rare in spring and fall; no summer records. First record is 16 Jan 1900 (Bowdish 1900, 1903; Wetmore 1927). Bowdish (1903) found it to be somewhat common. Wetmore thought the Ovenbird was more common during migration (1916a, 1927). Danforth (1935) listed this species as occurring. Sorrie (1975) found it very rare. The 2005 CBC produced seven sightings, while a week of banding during March 2004 netted four (OD). Earliest fall record is 12 Oct (DDG), and latest spring record is 25 Apr (Sorrie 1981).

Fig. 144. Ovenbird (Gemmill 2009)

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

Banded: 8.

151. HELMITHEROS VERMIVORUM

Worm-eating Warbler (Reinita Gusanera) ER/PM/FO

Extremely rare fall to spring passage migrant; no summer reports. First record and latest spring record is Mt. Pirata, 30 Mar 1971 (Sorrie 1975). Earliest fall record is 14 Oct (DDG, WM).

Conservation Status: Potential Concern (ABC), US Conservation Concern (USFWS), Watchlist (PIF), and Protected (MBTA).

Banded: 2.

152. PARKESIA MOTACILLA

Louisiana Waterthrush (Pizpita de Río) ER/WV/SP

Extremely rare winter visitor in winter and spring; no summer or fall reports. The first report for Vieques and Puerto Rico was 7 Feb 1899 (ABB; Wetmore 1916a). The last report for a century was 27 Mar 1912 (Wetmore 1916a). On 8 Jan 2006, a Louisiana Waterthrush was observed in a flowing freshwater quebrada near the former Navy headquarters (OD, SAC). The previous year a possible sighting was Mt. Pirata, 16 Jan 2005 (SAC, IH, WH, eBird 2012). Interestingly, in the early 1900s, Baker, Bowdish and Wetmore reported Louisiana Waterthrush, which is associated with freshwater streams, but not Northern Waterthrush, which is common to abundant today and is associated with mangroves. A possible explanation for the disappearance of one waterthrush and the appearance of another is a change in preferred habitat. According to early naturalist journals, the island had many freshwater streams and the forest swept down to the shore, an ecosystem that favored Louisiana Waterthrush (Labat 1722; West 1794). The permanent, freshwater streams disappeared with the introduction of sugarcane and the clearing of the forests for agriculture and pasture. Today, only one or two small permanent streams still flow. Under the Navy tenure, the mangrove lagoons were protected and flourished creating ideal conditions for Northern Waterthrush.

Conservation Status: Potential Concern (ABC), US and PR/VI Conservation Concern (USFWS), and Protected (MBTA).

Museum Specimens: AMNH# 178690; USNM# 169092, 170747; one specimen location unknown.

153. PARKESIA NOVEBORACENSIS (Fig. 145)

Northern Waterthrush (Pizpita de Mangle) C/WV/FO-ML-SC-SP

Common winter visitor in late fall, winter, and early spring; no reports from May through August. It is associated with mangrove lagoons and forests. First record is Punta Arenas, 24 Dec 1935 (VB in Danforth 1937). Earliest fall record is 5 Sep (DDG) and latest spring record is 24 Apr (Sorrie 1975). Based on banding data, the Northern Waterthrush can be abundant at times. For example, on the island's western end, 73 Northern Waterthrushes were banded on 21 Feb 2002 (SE) and 111 Northern Waterthrushes were banded from 5 Mar to 11 Mar 2004 (OD).

Conservation Status: Potential Concern (ABC), PR/VI Conservation Concern (USFWS), and Protected (MBTA).

Banded: 303.

Museum Specimens: USNM# 355891 355892.

Fig. 145. Northern Waterthrush (Gemmill 2007)

154. MNIOTILTA VARIA
(Fig. 146)
Black-and-white Warbler
(Reinita Trepadora)
FC/WV/FO-SC

Fairly common winter visitor in fall, winter, and spring; no summer reports. First island record is 17 Jan 1900 (Bowdish 1900). Danforth (1935) listed this species as occurring. Earliest fall record is 6 Sep (DDG) and latest spring record is 22 Apr (BAS). Sorrie considered this warbler an uncommon winter visitor (Sorrie 1975). This species is most often seen in the forests surrounding the mangrove lagoons from Puerto Ferro on the east to Boca Quebrada on the west.

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

Banded: 10.

Museum Specimens: AMNH# 791644, 791645, and one unknown location.

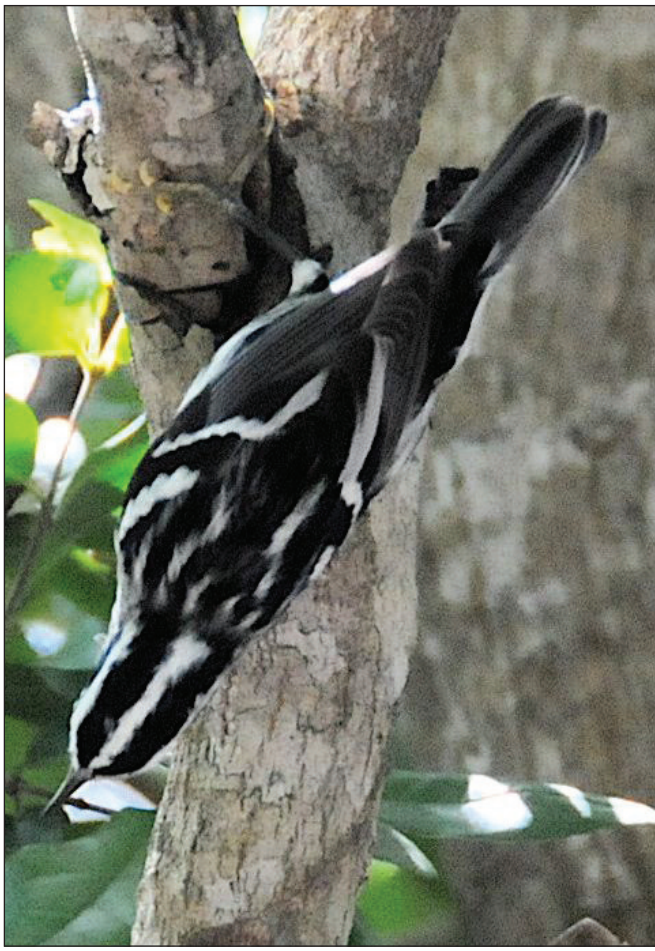


Fig. 146. Black-and-white Warbler (Gemmill 2009)

155. PROTONOTARIA CITREA
Prothonotary Warbler (Reinita Protonotaria) UC-R-ER/PM/FO

Uncommon passage migrant in spring; extremely rare in fall; rare in winter; no summer reports. First record is Bahía Tapón, 31 Jan 1984 (DDG). Earliest fall record is 1 Nov (DDG), and latest spring record is 30 Mar (Geo-Marine 2001b). It prefers mangrove forest

habitat, from which it rarely strays (Raffaele 1989). Due to the bird's inaccessible habitat, it probably is more common than current observations indicate. In 2003 and 2004, mist nets were placed near Boca Quebrada, and thirteen were banded, 10–22 Feb 2003 (SE); thirteen during three days in March 2003 (PMa); and twenty-one during 6–11 Mar 2004, (OD). Six individuals were caught in two hours on 10 Mar 2004, with a total of ten for the day. Prior to the banding, only five records of single individuals existed: two in winter, two in spring, and one in fall.

Conservation Status: Vulnerable (ABC), US Concern (USFWS), Yellow (NAS/ABC), Watchlist (PIF), and Protected (MBTA).

Banded: 46.

156. OREOTHLYPIS PEREGRINA

Tennessee Warbler (Reinita de Tennessee) ER/V/FO

Vagrant. First record for Vieques and Puerto Rico is Laguna Monte Largo, 22 Apr 1981 (Sorrie 1981). No subsequent sightings.

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

157. OPORORNIS AGILIS

Connecticut Warbler (Reinita de Connecticut) ER/V/FO

Vagrant. The record is from the dry limestone forest and mangrove interface on the east side of Puerto Mosquito, 18 Mar 2006 (DDG, DH in Norton et al. 2006). Reports of this species in Puerto Rico have been increasing in recent years.

Conservation Status: Vulnerable (ABC) and Protected (MBTA).

158. GEOTHLYPIS PHILADELPHIA

Mourning Warbler (Reinita Enlutada) ER/V/SC

Vagrant. First record is Ensenada Honda, 29 Dec 1935 (Danforth 1936, 1937; Bond 1940, 1945, 1950; Sorrie 1975). A second bird may have been seen at the same location seventy-five years later. On 21 Oct 2009, Gemmill had brief looks at a bird she believed was a Mourning Warbler but was unable to make definitive identification.

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

159. GEOTHLYPIS FORMOSA

Kentucky Warbler (Reinita de Kentucky) ER/V/FO

Vagrant. The record was from a forest thicket in the middle of the western end of the island on a cross-island road, 13 Oct 2007 (DDG in Norton et al. 2008b).

Conservation Status: Vulnerable (ABC), US Conservation Concern (USFWS), Yellow (NAS/ABC), Watchlist (PIF), and Protected (MBTA).

160. GEOTHLYPIS TRICHAS TRICHAS

Common Yellowthroat (Reinita Picatierra) R-ER/PM/FO-SC

Extremely rare passage migrant in fall and winter; rare in spring; no summer reports. First and latest spring record was Playa Grande, 1 Apr 1971 (Sorrie 1975). Earliest arrival record is 13 Oct (JAS, eBird 2012). One bird was banded near Kiani, 6 Mar 2003, and was recaptured in 2004 in the same location.

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

Banded: 6.

Fig. 147. Hooded Warbler (Gemmill 2009)

161. SETOPHAGA CITRINA (Fig. 147)

Hooded Warbler (Reinita Encapuchada) R-ER/WV/FO

Rare winter visitor; extremely rare in spring and fall; no summer reports. First record from the western end, 31 Dec 1962 (NTG in Bond 1968; Sorrie 1975). Earliest fall record 14 Oct (DDG, WM) and latest spring record 11 Mar (OD). May be more common than records indicate because 50 percent of records are from banding. Five birds were banded in early March 2004, doubling the sightings of this warbler.

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

Banded: 8.

162. SETOPHAGA RUTICILLA (Fig. 148)

American Redstart (Candelita) C-FC/WV/FO-SC

Common winter visitor during early spring and late fall migration; fairly common in winter; no summer reports. First record is 30 Nov 1899 (Bowdish 1900, 1903; Wetmore 1916a, 1927). Its abundance has not changed over time because Wetmore (1916a) found this

Fig. 148. American Redstart (Gemmill 2008)

species to be fairly common, especially during migration, and Sorrie (1975) found them common. The redstart is most often seen in forests from Puerto Ferro in the east to Mt. Pirata in the west. Earliest fall record is 2 Sep (DDG, WM). Latest spring record is 27 Apr (DDG in Norton et al. 2008c).

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

Banded: 41.

Museum Specimens: AMNH# 1786684 and 791660; USNM# 355845.

163. SETOPHAGA TIGRINA
Cape May Warbler (Reinita Tigre) UC-R-ER/WV/FO-IA-SC-SP

Rare winter visitor; uncommon in spring; extremely rare in fall; no summer reports. First record and latest spring departure 4 Apr 1912, Isabel Segunda, (Wetmore 1916a, 1916b, 1927). Earliest arrival 1 Nov (DDG).

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

Banded: 4.

164. SETOPHAGA AMERICANA (Fig. 149)
Northern Parula (Reinita Pechidorada) C/WV/FO-IA-ML-SC-SP

Common winter visitor in late fall through early spring; no summer reports. First record is 17 Jan 1900

Fig. 149. Northern Parula (Gemmill 2006)

(Bowdish specimen tag). As early as 1900, observers found Northern Parula to be common to abundant (Bowdish 1900, 1903; Wetmore 1916a, 1927; Danforth 1935, 1936; and Sorrie 1975). In spring and fall, one can see as many as twenty individuals during a morning survey (DDG). Earliest arrival is 12 Oct (DDG), and latest departure is 13 Apr (JAS).

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

Banded: 71.

Museum Specimens: AMNH# 178723, 178724, 178725, 178726, 178727, 178728; USNM# 171680, 231541, 232723, 232724, 232725, 231542, 231543, 231544, 355822, 355823, 355824, 355825, 355826, 355827. Danforth collected two males and a female that have not been located.

165. SETOPHAGA MAGNOLIA

Magnolia Warbler (Reinita Manchada) ER/PM/FO-SC

Extremely rare passage migrant in fall, winter, and spring; no summer records. First island record and fourth Puerto Rican record was Cerro El Buey, 10 Mar 1971 (Sorrie 1975), one of five fall and spring migration records (DDG, BAS). Four winter records were from January (DDG, MA, HM, SAC, OD).

Conservation Status: Protected (MBTA).

166. SETOPHAGA FUSCA

Blackburnian Warbler (Reinita de Fuego) ER/V/SC

Vagrant. First island record and fourth Puerto Rican record is Laguna Anones, 10 Jan 2001 (Geo-Marine 2001b). Ross Rasmussen and Manuel Figueroa-Pagan documented this sighting of a very rare passage migrant outside of migration dates and away from its preferred conifer habitat in an unpublished paper in 2001.

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

167. SETOPHAGA PETECHIA BARTHOLEMICA (Fig. 150, p. 192)

Yellow Warbler (Canario de Mangle) C/BR/FO-ML-SC-SP

Common resident. First record is a specimen collected, 25 Mar 1900 (Wetmore 1927). Wetmore found them to be a common resident

Fig. 150. Yellow Warbler (Gemmill 2006)

(Wetmore 1916a, 1916b, 1927). Surprisingly, Bowdish (1900) did not list this species. C.W. Richmond, on the other hand, collected several specimens during his visit in March 1900 (specimen tags). Danforth (1935) listed this species as occurring. Sorrie (1975) found this species abundant in all habitats. A Yellow Warbler carrying nesting material, 19 Mar 1992 (DDG, RM); a banded female with a brood patch, 12 Aug 2005 (OD); and an adult feeding a young bird, 19 Aug 2009 (DDG) confirmed breeding. The record high count was forty-two individuals at Laguna Sombe, June 1972 (Raffaele 1978). This resident subspecies on Puerto Rico and the Virgin Islands, known as Golden Warbler, is a mangrove specialist (Peters 1927, Bond 1930).

Conservation Status: Vulnerable (ABC), PR/VI Conservation Concern (USFWS), and Protected (MBTA).

Banded: 42.

Museum Specimens: USNM# 171683, 171684 ,171685, 171686, 171687, 171688, 171690, 171705, 171706, 171707, 231608, 231609, 231610, 231611, 231612, 231613, 231614, 355667, 355668. USNM# 171689 was exchanged with the Museum of Comparative Zoology, Harvard University (MCZ# 111931).

168. SETOPHAGA STRIATA
Blackpoll Warbler (Reinita Rayada) UC/PM/FO-SC
Uncommon in fall; no reports during other seasons. First record is Boca Quebrada, 29 Oct 1999 (DDG). Earliest arrival is 10 Oct (ALM, eBird 2012) and latest departure is 17 Nov (Geo-Marine 2001b).
Conservation Status: Potential Concern (ABC) and Protected (MBTA).

169. SETOPHAGA CAERULESCENS
Black-throated Blue Warbler (Reinita Azul) ER/WV/FO
Extremely rare winter visitor in fall, winter, and spring; no summer reports. First record is 27 Mar 1912 (Wetmore 1916a, 1916b, 1927). Of the six sightings, two are on Mt. Pirata during the CBC period in 2005 have not been confirmed. Earliest arrival date is 13 Oct (DDG in Norton et al. 2008b). Latest departure is 30 Mar (Sorrie 1975).
Conservation Status: Potential Concern (ABC) PR/VI Conservation Concern (USFWS), and Protected (MBTA).

170. SETOPHAGA PALMARUM (Fig. 151)
Palm Warbler
(Reinita Palmera)
R-ER/WV/FO-SC
Rare winter visitor in winter and spring; extremely rare in early summer and late fall. First record is Kiani Wetlands, 9 Mar 1971 (Sorrie 1975). Sorrie considered it rare (US Navy 1979). Earliest arrival is 5 Nov (DDG). The latest departure is 3 Jun

Fig. 151. Palm Warbler (Western Race) (Gemmill 2009)

(Sorrie 1975). Two reports of the western race of Palm Warbler are of note. One was banded near Laguna Kiani, 21 Feb 2002 (BBL Report 2009) and one was observed at Puerto Ferro, 5 Nov 2009 (DDG in Norton et al. 2010c)

Conservation Status: Protected (MBTA).

Banded: 1 Western Palm Warbler.

171. SETOPHAGA PINUS

Pine Warbler (Renita de Pinos) ER/V/SC

Vagrant. First record is Laguna Kiani, 15 Mar 1998 (DDG, NG), and a second is from the same location, 5 Feb 2005 (DDG, WM in Norton et al. 2005).

Conservation Status: Protected (MBTA).

172. SETOPHAGA CORONATA CORONATA

Yellow-rumped Warbler (Reinita Coronada) UC/WV/FO-IA-SC

Uncommon winter visitor from fall to spring; no summer reports. First record is 22 Jan 1900 (Bowdish 1900, 1903; Wetmore 1916a, 1927). Wetmore (1916a) found them uncommon in 1912. Danforth (1935) listed this species as occurring. Sorrie described this warbler as an uncommon winter visitor. Vieques is the eastern edge of its wintering range (Bond 1956). Most sightings are single birds with the exception of a flock of ten seen at Bahía Tapón, 11 Mar 1990 (DDG, VG). Earliest arrival is 1 Nov (DDG) and latest spring departure is 6 Apr (DDG, NG). Danforth observed that this species in Puerto Rico arrived late in the winter and was the first of the Nearctic-Neotropical migrants to leave in the spring (Danforth 1931).

Conservation Status: Protected (MBTA).

Banded: 2.

Museum Specimens: AMNH# 791651, 178707, 178708; USNM# 355753.

173. SETOPHAGA DOMINICA

Yellow-throated Warbler (Reinita Gargantiamarilla) ER/V/FO

Vagrant. Extremely rare with two records. First record is 25 Jan 1997 (DDG) followed a year later by a sighting at Boca Quebrada, 15 Mar 1998 (DDG, NG).

Conservation Status: Protected (MBTA).

Fig. 152. Prairie Warbler (Gemmill 2009)

174. SETOPHAGA DISCOLOR (Fig. 152)

Prairie Warbler (Reinita Galana) C/WV/FO-SC

Common winter visitor in late fall, winter, and early spring; no summer reports. Bowdish (1900) found this species abundant and was the first to report it on 18 Jan 1900. Wetmore (1916a, 1916b) found Prairie Warblers to be common winter visitors, although more common during migration. Danforth (1937) and Sorrie (1975) also found them common. The record high count of 120 Prairie Warblers is from a week of banding near Laguna Kiani, 5–11 Mar 2004 (PM, OD, SAC). Earliest arrival record is 25 Aug (DDG) and latest departure record is 23 May (Geo-Marine 2001b).

Conservation Status: Vulnerable (ABC), US Conservation Con-

cern (USFWS), Yellow (NAS/ABC), Watchlist (PIF), and Protected (MBTA).

Banded: 233.

Museum Specimens: AMNH# 178697, 178698, 178699, 178700, 178701, 178702, 178703, 791650; USNM# 231607, 232704, 355741, 355742; MCZ# 178701.

175. SETOPHAGA ADELAIDAE (Fig. 153)

Adelaide's Warbler (Reinita Mariposera) C/BR/FO-IA-SC-SP

Common resident. First island record and first record outside the main island is Puerto Ferro, 20 Mar 1912 (Wetmore 1916a). Wetmore and Danforth found it to be fairly common (Wetmore 1916b; Danforth 1935, 1936, 1937). In 1971, Sorrie found it limited to the Puerto Ferro dry limestone forest (Sorrie 1975; Bond 1977). This restricted range may have been due to destruction of their preferred habitat of dry coastal scrub and thickets (Sorrie 1975). The warbler remained confined to this habitat until Hurricane Hugo in 1989, after which it expanded its range across the island, appearing in all habitats, even the moist forests of Mt. Pirata where thirty-three were counted on 13 Sep 2008 (DDG). It is now verging on being classified as abundant. On 12 Apr 2003, a six-hour morning bird survey on the island's western end produced sixty-five Adelaide's Warblers (JAS). The 2005 CBC totaled 433 Adelaide's Warblers island-wide (Norton et al. 2005). This population increase may be due to the transition in land-use practices from agriculture to secondary forests and scrub. Breeding was confirmed at Caracas Beach, formerly Red Beach, 8 Mar 1990;

Fig. 153. Adelaide's Warbler (Gemmill 2007)

Bahía Tapón, 11 Mar 1990, where adults fed young; and Mt. Pirata, 19 Jul 2006, when an after-hatch-year (AHY) female with a brood patch was banded (DDG, VG, OD).

Conservation Status: Vulnerable (ABC), PR/VI Conservation Concern (USFWS), Watchlist PR/VI (PIF), and Protected (MBTA).

Banded: 34.

Museum Specimens: USNM# 231586, 231587, 231588, 231589, 231590, 355802, 355803.

176. CARDELLINA CANADENSIS

Canada Warbler (Reinita de Canadá) ER/V/FO

Vagrant. The record for this rare migrant, which occasionally passes through the Caribbean in September and October, is Mt. Pirata, 13 Oct 2002 (JAS in Salguero 2002).

Conservation Status: Vulnerable (ABC), US Conservation Concern (USFWS), Yellow (NAS/ABC), Watchlist (PIF), and Protected (MBTA).

INCERTAE SEDIS

177. COEREBA FLAVEOLA SANCTIHOMAE (Fig. 154)

Bananaquit (Reinita Común) A/BR/FO-IA-ML-SC-SP

Abundant resident. First record is a Bananaquit collected on 6 Feb 1899 (JDM). The first confirmed breeding record is an adult feeding young at Kiani Wetlands, 21 Dec 1992 (DDG, NG). Breeding activity has been observed in all months except May and June with a peak in

Fig. 154. Bananaquit (Gemmill 2010)

March. The Virgin Island subspecies, *Coereba flaveola sanctihomae,* is the common resident bird on Vieques (Dickinson and Christidis 2014; Lowe 1912; American Bird Conservancy 2012).

Conservation Status: Vulnerable (ABC) and Protected (MBTA).

Banded: 125.

Museum Specimens: AMNH# 178732, 178733, 178734, 178735; USNM# 168989, 171712, 171713, 171714, 171715, 171716, 171718, 231958, 231959, 231960, 231961, 231962, 231963, 231964, 231965, 231966, 231967, 231968, 231969, 231970, 231971, 231972, 231973, 231974, 231975, 231976, 231977, 232760, 232761, 355557, 355558, 355559, 355560, 556087, 505785; NYSM# 10490, 10491, 10492, 10493. USNM# 171717 exchanged with the Museum of Comparative Zoology, Harvard University (MCZ# 111930).

EMBERIZIDAE

178. TIARIS OLIVACEUS BRYANTI (Fig. 155)

Yellow-faced Grassquit (Gorrión Barba Amarilla)

UC/BR/IA-SC-SP

Uncommon resident. Vieques is the eastern limit of this Greater Antillean grassquit's range. Bowdish collected a female with eggs for the first island and breeding records, 30 Jan 1900 (Bowdish 1903). He found it not as abundant as the Black-faced Grassquit. This remains true today. Wetmore (1916b) found the Yellow-faced Grassquit common but rare on Culebra. Danforth (1935) listed this

Fig. 155. Yellow-faced Grassquit (Gemmill 2006)

species as occurring. Sorrie found it rare due to its restriction to pastures (US Navy 1979), where it can be fairly common. Sorrie found fifty-three individuals in a grassy pasture near Esperanza, 1 Jun 1978, for a record high count. The change in abundance from common to uncommon may be due to changes in land use since 1912 from pastures, which this species favors, to second-growth scrub, forests, and housing.

Conservation Status: Vulnerable (ABC) and Protected (MBTA).

Banded: 2.

Museum Specimens: AMNH# 178815, 178816, 178817; USNM# 169073, 171625, 231726, 231727, 231728, 231729, 232740, 232741, 356329, 356330, 356331, 356332, 556093, 556094, 556095, 556096, 556102, 556103, 556104, 556106.

179. TIARIS BICOLOR OMISSUS (Fig. 156)

Black-faced Grassquit (Gorrión Negro) C/BR/IA-SC-SP

Common resident. First record is 7 Feb 1899 (ABB). Breeding was confirmed the same year when Bowdish (1900, 1902b) collected several nests, a few with eggs, in November. He reported these birds as very common (Bowdish 1900). Danforth (1935) listed this species as occurring. Sorrie (1975) found it abundant, favoring heavily grazed pastures. Because of habitat loss since the 1970s it is no longer abundant. The record high number for a single survey is sixty-three along the mowed verge of Mt. Pirata, 9 Jan 1987 (DDG).

Conservation Status: Vulnerable (ABC) and Protected (MBTA).

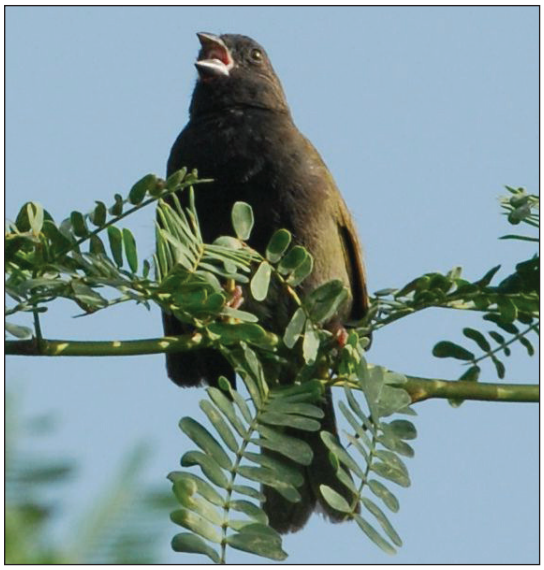


Fig. 156. Black-faced Grassquit (Gemmill 2006)

Banded: 60.

Museum Specimens: AMNH# 178807, 178808, 1788099; USNM# 169074, 169075, 169079, 171626, 171627, 171628, 171629, 171630,171631, 171632, 171633, 171634, 171635, 171636, 171637, 231745, 231746, 231747, 231748, 231749, 231750, 231751, 231752, 356373, 356374, 554896, 556122, 556127, 556130, 556131; NYSM# 10494, 10495,10496, 10497.

180. LOXIGILLA PORTORICENSIS

Puerto Rican Bullfinch (Comeñame) ?/ML

Unconfirmed. An undocumented reference to this species appears in Table 10 of a report on mangrove forests submitted to the Navy, but it is not mentioned in the report's Appendix I, which summarizes bird surveys for the report (Lewis et al. 1981b). This main island endemic species prefers woodlands and heavy forests and is absent from the extreme eastern tip of the main island. Its occurrence in mangrove forest to the east of the main island is insufficiently documented for a first record.

Conservation Status: Vulnerable (ABC) and Protected (MBTA).

181. AMMODRAMUS SAVANNARUM BORINQUENSIS

Grasshopper Sparrow (Gorrión Chicharra) ER/BR/IA

Extremely rare resident in winter, spring, and summer; no fall reports. First record is Puerto Ferro, 30 Dec 1935 (Danforth 1937). On 18 Jun 1970, Sorrie (1975) found an active nest just east of the Camp Garcia barracks for the first breeding record. Several subsequent sightings in 1989, 1990, and 1992 were from the grassy open areas between the camp and runway (DDG, VG, RM). Record high count is twenty-three in a pasture near Esperanza, 30 May 1978 (Sorrie, unpublished report 1979). Last reported sighting was in 1992 (DDG, RM). Its preferred grasslands of the 1950s to 1970s have given way to thorn scrub, secondary forest, and second homes. As a localized and rare subspecies it may be overlooked.

Conservation Status: At Risk (ABC), US and PR/VI Conservation Concern (USFWS), Data Deficient (PRDNER), PR/VI Conservation Concern (PIF), and Protected (MBTA).

Fig. 157. Rose-breasted Grosbeak (Gemmill 2006)

CARDINALIDAE

182. PHEUCTICUS LUDOVICIANUS (Fig. 157)

Rose-breasted Grosbeak (Picogrueso Pechirrosado) ER/V/FO

Vagrant. First confirmed record, two males, is Mt. Pirata, 3 Mar 2006 (DDG, WM in Norton 2006). A possible female Rose-breasted Grosbeak was reported from the same location on 16 Jan 2005 (SAC, eBird 2012).

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

183. PASSERINA CYANEA

Indigo Bunting (Gorrión Azul) ER/V/IA

Rare visitor. Extremely rare in winter and spring; no summer and fall reports. The first record is the bunker area at the foot of Mt. Pirata, 13 Jan 2005 (OD in Norton et al. 2005). Two days later during the 2004–2005 Christmas Count, four individuals were recorded

from two locations, Puerto Mosquito and Puerto Ferro (JM. LD, JO, AMol, MB). Two additional sightings are La Llave, 26 Feb 2010 (R&PP) and Mt. Carmelo garden, 15 and 16 Mar 2012 (D&PD, DC).

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

ICTERIDAE

184. DOLICHONYX ORYZIVORUS

Bobolink (Chambergo) ER/V/SC

Vagrant. First record is a specimen collected in 1871 by August von Pelzeln, an Austrian ornithologist (Cory 1892). An undocumented record is Puerto Ferro, 15 Jan 2005, a time of year when this species should be wintering south of the Amazon (MB, AM, CBC 2004–2005; Salguero and Colón 2005).

Conservation Status: Vulnerable (ABC) and Protected (MBTA).

Museum Specimens: Wetmore (1916b) states that "Pelzeln (1871, p. 199 footnote) says that a specimen from the Paris Museum is marked Puerto Rico. Gundalch says that it was taken on Vieques Island where previously recorded by Cory (1892, p. 110)." Today the Paris Museum does not have this specimen.

185. AGELAIUS XANTHOMUS XANTHOMUS

Yellow-shouldered Blackbird (Tordo Puertorriqueño) ER/V/FO

Rare visitor. Two reports of this rare endemic species are from Laguna Yanuel on the eastern end where the habitat is similar to the bird's habitat at the former Roosevelt Roads Naval Station. James W. Wiley reported the first record of this species, 30 Apr 1974, and Julio Cardona noted the second record, 11 Mar 1978 (Belitsky 1978a).

Conservation Status: At Risk (ABC), Endangered (BI/IUCN), Endangered (ESA), Endangered (PRDNER), Watchlist PR/VI (PIF), and Protected (MBTA).

186. QUISCALUS NIGER BRACHYPTERUS (Fig. 158)

Greater Antillean Grackle (Mozambique) A/BR/FO-IA-ML-SC-SP

Abundant resident. Bowdish (1900) found this grackle to be common. In 1912, Wetmore (1916a) found it uncommon and local in distribution. In 1935, Danforth (1936, 1937) found this species to

be scarce except during the time of the sugarcane harvest. This species was still considered rare thirty-three years later (Leopold 1963). That designation changed when Biaggi (1970) listed this species as abundant. Sorrie (1975) found the grackle common, especially in pastures and settled areas. The record high count is ninety birds at Bahía Tapón, 7 Jan 1987 (DDG, JAC). The first nests that confirm breeding were reported from Laguna Yanuel, 6 Jun 1972 (Raffaele 1978). Vieques is at the eastern limit of its range (Peters 1921; Norton, pers. com. 2014)

Conservation Status: Vulnerable (ABC) and Protected (MBTA).

Banded: 18.

Museum Specimens: USNM# 171664, 171665, 171666, 171667 171668, 171669, 171670, 1716671, 171672, 171673, 231678, 231679, 231680, 231681, 231682, 231683, 356005, 356006, 356007; LSUMZ# 146761, 146762; UMZC# 27/Ict/21/e/10.

Fig. 158. Greater Antillean Grackle (Gemmill 2006)

187. MOLOTHRUS BONARIENSIS MINIMUS (Fig. 159)
Shiny Cowbird (Tordo Lustroso) UC-R/BR/IA-SC-SP
Uncommon resident in spring, summer, and fall; rare in winter. First record is on the western end, 8 Mar 1971 (BAS). The first record for the West Indies is a specimen collected on Vieques around 1858 (Newton 1860). Cory (1892), Wetmore (1916a), Bond (1976, 1977, 1978), and Raffaele (1989a) considered this bird a stray or escaped cage bird because this bird was not reported again for over a hundred years. The accepted arrival date is somewhere in the 1950s or 1960s (Rolle 1961; Bond 1967). This cowbird reached the main island in 1955 (Grayce 1957; Post and Wiley 1977; Bond 1987). Shiny Cowbirds have never been very common even in the 1970s when pastures dominated the landscape. Most of the sightings are one to three birds. A record high count is twenty-five birds at Laguna Sombe, 26 Dec 1992 (DDG, NG).

Fig. 159. Shiny Cowbird (Gemmill 2006)

Conservation Status: Protected (MBTA).
Banded: 1.
Museum Specimen: Location of the 1858 specimen is unknown.

188. MOLOTHRUS ATER ATER
Brown-headed Cowbird (Vaquero De Cabeza Café) ER/V/SC
Vagrant. One from Laguna Icacos, 30 Mar 2001, was listed in the raw data appendix to the 2001 Navy Biological Assessment (Geo-Marine 2001b). Ross Rasmussen and Manuel Figueroa-Pagan wrote an unpublished paper documenting the sighting.
Conservation Status: Protected (MBTA).

189. ICTERUS PORTORICENSIS

Puerto Rican Oriole (Calandria) ?/FO

Unconfirmed. This species, known at the time as Black-cowled Oriole *(Icterus prosthemelas),* was reported to Bowdish during his visit as occurring on Vieques (Bowdish 1900, 1903). During his 1912 visit, Wetmore was unable to find anyone who knew about the bird, so he questioned the earlier report (Wetmore 1916a). Sorrie (1975) concluded that the Bowdish report was in error.

Conservation Status: At Risk (ABC), PR/VI Conservation Concern (USFWS), Data Deficient (PRDNER), Watchlist PR/VI (PIF), and Protected (MBTA).

190. ICTERUS GALBULA

Baltimore Oriole (Bolsero de Baltimore) ER/WV/SC

Extremely rare winter visitor in winter and spring; no summer and fall reports. First record is near the first bridge in the Kiani Wetlands, 6 Mar 1985 (DDG, BL, DH in Norton 1985). It is also the fifth record for Puerto Rico (Raffaele 1989a). Baltimore Orioles were reported from several other locations in the eastern Caribbean that year (Norton 1985). Two subsequent records are from the same grove of palm trees: 23 Dec 1993 (DDG, NG) and 22 Dec 1994 (DDG, NG in Norton 1995b). The last record is from the cross-island road along the boundary of the former Navy lands on the island's western end, 9 Feb 2005 (DDG, WM in Norton et al. 2005).

Conservation Status: Potential Concern (ABC) and Protected (MBTA).

FRINGILLIDAE

191. EUPHONIA MUSICA SCLATERI

Antillean Euphonia (Jilguero) ER/FB/IA

Extremely rare former breeder. According to Wetmore, in fall 1910, Mr. Reed, a Presbyterian minister in Isabel Segunda, attempted to introduce the Puerto Rican subspecies of Antillean Euphonia. He purchased forty birds in Ponce that remained around his house for

some time but then disappeared (Wetmore 1916a, 1927; Danforth 1936; Sorrie 1975).

Conservation Status: Vulnerable (ABC) and Protected (MBTA).

PASSERIDAE

192. PASSER DOMESTICUS (Fig. 160)

House Sparrow (Gorrión Doméstico) **FC/BR/IA**

Fairly common introduced species, now resident. The first report of the House Sparrow on Puerto Rico is at Playa de Ponce, 14 Mar 1972 (Raffaele and Kepler 1992) from which it spread throughout the main island. First record for Vieques is the Morales grocery store parking lot, 22 Dec 1994 (DDG, NG in Norton 1995b). That same year, House Sparrows appeared for the first time in the Virgin Islands. One hypothesis is that a ship left San Juan for the Virgin Islands and sparrows hopped off along the way (Norton et al. 1995b). By 2004 the sparrow had spread to other urban areas: Esperanza, Camp Garcia, the ferry terminal, and airport (DDG). They are rarely seen outside these areas (DDG). Typically, House Sparrows struggle to survive in the tropics (Raffaele 1989b).

Fig. 160. House Sparrow (Gemmill 2008)

PLOCEIDAE

193. EUPLECTES FRANCISCANUS

Orange Bishop (Obispo Anaranjado) **ER/V/SC**

Rare visitor. Vieques has five records for this African species introduced on the main island in the 1960s: Boca Quebrada, 27 Dec 1997 (EL, KH), old Navy headquarters, 2 Feb 2002 (JJS), road to Puerto Ferro, 10 Feb 2005 (DDG, WM), and Vieques Wildlife Refuge, 29 Aug 2012 (JPO, eBird 2012).

ESTRIIDIDAE

194. LONCHURA CUCULLATA (Fig. 161)

Bronze Mannikin (Diablito) **R-ER/PB/IA**

Rare resident in winter and spring; extremely rare in summer and fall. This African species probably arrived in Puerto Rico on a slave ship during the colonial period. First record for Vieques is Navy headquarters, 6 Jul 1970 (Sorrie 1975). Sorrie (1975) found this bird to be locally common in a few pastures on the island's western end. In 1978, he found them throughout 60 percent of the island and in large flocks. He had a record high count of sixty on 1 Jun 1978 in a grassy field north of Esperanza (BAS). He concluded that this species was a recent arrival to Vieques and was spreading (correspondence with Dr. Richard Banks dated 8

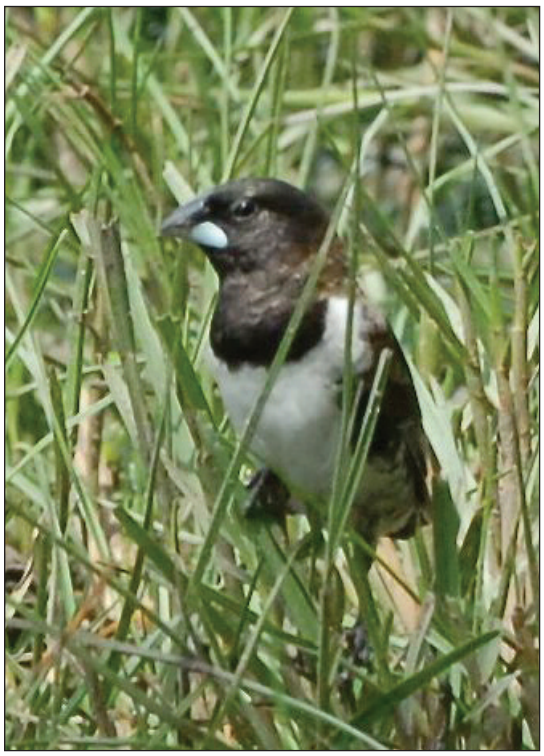


Fig. 161. Bronze Mannikin (Gemmill 2007)

Fig. 162. Nutmeg Mannikin (Gemmill 2006)

Jul 1978). The population has declined since then. The current status may be the result of a decline in grassy areas, its preferred habitat. It may also have been displaced by Nutmeg Mannikin, which arrived in 1988, and whose numbers have increased while the Bronze Mannikins have decreased.

Museum Specimens: USNM# 556172, 556174, 556193, 556194, 556195, 556176, 556177, 556183, 556198.

195. LONCHURA PUNCTULATA (Fig. 162)
Nutmeg Mannikin (Gorrión Canela) R/BR/IA

Rare resident throughout the year. This introduced Southeast Asia species arrived in Puerto Rico in the 1960s (Raffaele 1989a). The first Vieques record is 14 Mar 1988 (DHM in Norton 1988), the second is 24 Dec 1993 (DDG). The next report was in 1997, and since then this mannikin has been seen every year in increasing numbers (DDG). First confirmed breeding record is a mannikin building a nest on El Pilón, 12 Jul 2006 (DDG). Record high count is fifty birds bathing in a parking lot puddle, 5 Sep 2008 (DDG).

Fig. 163. Pin-tailed Whydah (Gemmill 2008)

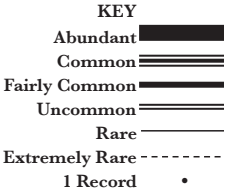
VIDUIDAE

196. VIDUA MACROURA (Fig. 163)

Pin-tailed Whydah (Vidua Colicinta) **ER/V/IA**

Rare visitor. This African species was introduced in Puerto Rico in the 1960s (Raffaele and Kepler 1992). The first record for Vieques is Ensenada Sombe, 7 Apr 1988, of four basic plumage birds (DDG, NG in Norton 1988). Most recent report is seven basic plumage birds at the quebrada near the former Navy headquarters, 25 Apr 2008 (DDG). First breeding record is a pair nesting in a palm just west of the airport entrance ramp, 22 Jun 2001 (JJS).

Table 2.
Vieques Bird List:
Abundance Based on Likelihood of Observance



#	Common English Name	Puerto Rican Name	Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	West Indian Whistling-Duck	Chiriría Caribeña	PB												
2	Canada Goose	Ganso Canadiense	V												•
3	American Wigeon	Pato Cabeciblanco	V										•		
4	Blue-winged Teal	Pato Zarcel	WV												
5	Northern Shoveler	Pato Cuchareta	WV												
6	White-cheeked Pintail	Pato Quijada Colorada	BR												
7	Lesser Scaup	Pato Pachiblanco Menor	WV												
8	Red-breasted Merganser	Mergansa Piquilarga	V												•
9	Masked Duck	Pato Dominico	V												•
10	Ruddy Duck	Pato Chorizo	BR												
11	Northern Bobwhite (Extirpated)	Codorniz	FB												
12	Least Grebe	Tigua	WV												
13	Pied-billed Grebe	Zaramago	BR												
14	American Flamingo	Flamenco	WV-FB												
15	White-tailed Tropicbird	Chirre	BR												
16	Red-billed Tropicbird	Chirre Piquirrojo	PB												
17	Magnificent Frigatebird	Tijereta	NB												
18	Brown Booby	Boba Parda	NB												
19	Double-crested Cormorant	Cormorán Crestado	V	•											
20	American White Pelican	Pelícano Blanco	V		•										
21	Brown Pelican	Pelícano Pardo	BR												
22	Least Bittern	Martinetito	BR												
23	Great Blue Heron	Garzón Cenizo	PB												
24	Great Egret	Garza Real	PB												
25	Snowy Egret	Garza Blanca	BR												
26	Little Blue Heron	Garza Azul	BR												
27	Tricolored Heron	Garza Pechiblanca	BR												
28	Reddish Egret	Garza Rojiza	V												
29	Cattle Egret	Garza Ganadera	BR												
30	Green Heron	Martinete	BR												
31	Black-crowned Night-Heron	Yaboa Real	PB												
32	Yellow-crowned Night-Heron	Yaboa Común	BR												
33	Osprey	Águila Pescadora	WV												
34	Swallow-tailed Kite	Elaino Tijereta	V				•								
35	Northern Harrier	Gavilán de Ciénaga	V				•								
36	Broad-winged Hawk	Guaraguao de Bosque	V												
37	Red-tailed Hawk	Guaraguao Colirrajo	BR												
38	Black Rail	Gallito Negro	PB										•		
39	Clapper Rail	Polo de Mangle	BR												
40	Sora	Gallito Sora	V												
41	Common Gallinule	Gallareta Común	BR												
42	American Coot	Gallinazo Americano	V												
43	Caribbean Coot	Gallinazo Caribeño	PB												
44	Black-necked Stilt	Viuda	BR												
45	American Oystercatcher	Ostrero	BR												
46	Black-bellied Plover	Playero Cabezón	WV												
47	American Golden Plover	Playero Dorado	M												
48	Wilson's Plover	Playero Marítimo	BR												

#	Common English Name	Puerto Rican Name	Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
49	**Semipalmated Plover**	Chorlito Acollarado	WV												
50	**Piping Plover**	Chorlito Melódico	M												
51	**Killdeer**	Chorlito Sabanero	BR												
52	**Spotted Sandpiper**	Playero Coleador	WV												
53	**Solitary Sandpiper**	Playero Solitario	WV												
54	**Greater Yellowlegs**	Playero Guineílla Mayor	WV												
55	**Willet**	Playero Aliblanco	M												
56	**Lesser Yellowlegs**	Playero Guineílla Memor	WV												
57	**Whimbrel**	Playero Picocorvo	M												
58	**Hudsonian Godwit**	Barga Aliblanca	V												
59	**Ruddy Turnstone**	Playero Turco	NB												
60	**Stilt Sandpiper**	Playero Patilargo	M												
61	**Sanderling**	Playero Arenero	M												
62	**Least Sandpiper**	Playerito Menudillo	WV												
63	**White-rumped Sandpiper**	Playero de Rabadilla Blanca	V												
64	**Pectoral Sandpiper**	Playero Pectoral	M												
65	**Semipalmated Sandpiper**	Playerito Gracioso	WV												
66	**Western Sandpiper**	Playero Occidental	M												
67	**Short-billed Dowitcher**	Agujeta Piquicorta	WV												
68	**Wilson's Snipe**	Becasina	WV												
69	**Laughing Gull**	Gaviota Gallega	SV												
70	**Herring Gull**	Gaviota Argéntea	V												
71	**Sooty Tern**	Charrán Obscura	SV												
72	**Bridled Tern**	Charrán Monja	SV												
73	**Least Tern**	Charrancito	SV-BR												
74	**Gull-billed Tern**	Charrán Piquicorto	V												
75	**Caspian Tern**	Charrán Caspio	V												
76	**Roseate Tern**	Palometa	SV-BR												
77	**Foster's Tern**	Charrán de Forster	V												
78	**Royal Tern**	Charrán Real	NB												
79	**Sandwich Tern**	Charrán Piquiagudo	SV												
80	**Rock Pigeon**	Paloma Doméstica	BR												
81	**Scaly-naped Pigeon**	Paloma Turca	BR												
82	**White-crowned Pigeon**	Paloma Cabeciblanca	BR												
83	**White-winged Dove**	Tórtola Aliblanca	BR												
84	**Zenaida Dove**	Tórtola Cardosantera	BR												
85	**Mourning Dove**	Tórtola Rabilarga	BR												
86	**Common Ground Dove**	Rolita	BR												
87	**Key West Quail-Dove**	Paloma Perdiz Áurea	BR												
88	**Bridled Quail-Dove**	Paloma Perdez de Martinica	BR												
89	**Ruddy Quail-Dove**	Paloma Perdiz Rojiza	BR												
90	**Yellow-billed Cuckoo**	Pájaro Bobo Piquiamarillo	M												
91	**Mangrove Cuckoo**	Pájaro Bobo Menor	BR												
92	**Puerto Rican Lizard-Cuckoo**	Pájaro Bobo Mayor	V												
93	**Smooth-billed Ani**	Garrapatero	BR												
94	**Short-eared Owl**	Múcaro Real	BR												
95	**Antillean Nighthawk**	Querequequé	SV-BR												
96	**Chuck-will's-widow**	Guabairo de la Carolina	WV												
97	**White-collared Swift**	Vencejo Acollarado	V												
98	**Antillean Mango**	Zumbador Dorado	FB-V												
99	**Green-throated Carib**	Zumbador Pechiazul	BR												
101	**Puerto Rican Emerald**	Zumbadorcito de Puerto Rico	V												
100	**Antillean Crested Hummingbird**	Zumbadorcito Crestado	BR												
102	**Belted Kingfisher**	Martin Pescador Norteño	WV												
103	**Puerto Rican Woodpecker**	Carpintero de Puerto Rico	BR												
104	**Yellow-bellied Sapsucker**	Capintero Pechiamarillo	V												
105	**American Kestrel**	Falcón Común	BR												
106	**Merlin**	Falcón Migratorio	WV												
107	**Peregrine Falcon**	Falcón Peregrino	WV												
108	**Brown-throated Parakeet (Extirpated)**	Periquito gargantimoreno	FB												
109	**Puerto Rican Parrot (Extirpated)**	Cotorra Puertorriqueña	FB												
110	**Caribbean Elaenia**	Juí Blanco	BR												
111	**Puerto Rican Flycatcher**	Juí	BR												

#	Common English Name	Puerto Rican Name	Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
112	**Gray Kingbird**	Pitirre	BR												
113	**Loggerhead Kingbird**	Clérigo	BR												
114	**Fork-tailed Flycatcher**	Bobito de Cola Ahorquillada	V												
115	**White-eyed Vireo**	Vireo Ojiblanco	V												
116	**Yellow-throated Vireo**	Vireo Gargantiamarillo	WV												
117	**Red-eyed Vireo**	Vireo Ojirrojo	V												
118	**Black-whiskered Vireo**	Julián Chiví	SV-PB												
119	**Caribbean Martin**	Golondrina de Iglesias	SV-BR												
120	**Bank Swallow**	Golondrina Parda	M												
121	**Cliff Swallow**	Golondrina de Peñasco	M												
122	**Cave Swallow**	Golondrina de Cuevas	M												
123	**Barn Swallow**	Golondrina Horquillada	M												
124	**Bicknell's Thrush**	Zorzalito de Bicknell	V												
125	**Red-legged Thrush**	Zorzal Patirrojo	V												
126	**Gray Catbird**	Maullador Gris	V												
128	**Pearly-eyed Thrasher**	Zorzal Pardo	BR												
127	**Northern Mockingbird**	Ruiseñor	BR												
129	**European Starling**	Estornino Pinto	V												
130	**Ovenbird**	Pizpita Dorada	WV												
131	**Worm-eating Warbler**	Reinita Gusanera	M												
132	**Louisiana Waterthrush**	Pizpita de Río	WV												
133	**Northern Waterthrush**	Pizpita de Mangle	WV												
134	**Black-and-white Warbler**	Reinita Trepadora	WV												
135	**Prothonotary Warbler**	Reinita Protonotaria	M												
136	**Tennessee Warbler**	Reinita de Tennessee	V												
137	**Connecticut Warbler**	Reinita de Connecticut	V												
138	**Mourning Warbler**	Reinita Enlutada	V												
139	**Kentucky Warbler**	Reinita de Kentucky	V												
140	**Common Yellowthroat**	Reinita Picatierra	M												
141	**Hooded Warbler**	Reinita Encapuchada	WV												
142	**American Redstart**	Candelita	WV												
143	**Cape May Warbler**	Reinita Tigre	WV												
144	**Northern Parula**	Reinita Pechidorada	WV												
145	**Magnolia Warbler**	Reinita Manchada	M												
146	**Blackburnian Warbler**	Reinita de Fuego	V												
147	**Yellow Warbler**	Canario de Mangle	BR												
148	**Blackpoll Warbler**	Reinita Rayada	M												
149	**Black-throated Blue Warbler**	Reinita Azul	WV												
150	**Palm Warbler**	Reinita Palmera	WV												
151	**Pine Warbler**	Renita de Pinos	V												
152	**Yellow-rumped Warbler**	Reinita Coronada	WV												
153	**Yellow-throated Warbler**	Reinita Gargantiamarilla	V												
154	**Prairie Warbler**	Reinita Galana	WV												
155	**Adelaide's Warbler**	Reinita Mariposera	BR												
156	**Canada Warbler**	Reinita de Canadá	V												
157	**Bananaquit**	Reinita Común	BR												
158	**Yellow-faced Grassquit**	Gorrión Barba Amarilla	BR												
159	**Black-faced Grassquit**	Gorrión Negro	BR												
160	**Grasshopper Sparrow**	Gorrión Chicharra	PB												
161	**Rose-breasted Grosbeak**	Picogrueso Pechirrosado	V												
162	**Indigo Bunting**	Gorrión azul	V												
163	**Bobolink**	Chambergo	V												
164	**Yellow-shouldered Blackbird**	Mariquita	V												
165	**Greater Antillean Grackle**	Mozambique	BR												
166	**Shiny Cowbird**	Tordo Lustroso	BR												
167	**Brown-headed Cowbird**	Vaquero De Cabeza Café	V												
168	**Baltimore Oriole**	Bolsero de Baltimore	WV												
169	**Antillean Euphonia (Extirpated)**	Jilguero	FB												
170	**House Sparrow**	Gorrión Doméstico	BR												
171	**Orange Bishop**	Obispo Anaranjado	V												
172	**Bronze Mannikin**	Diablito	PB												
173	**Nutmeg Mannikin**	Gorrión Canela	BR												
174	**Pin-tailed Whydah**	Viuda Colicinta	V												

Appendix 1
Vieques Watchlist

Watchlists focus on birds facing extinction according to specific criteria from least concern to threatened or endangered. Ten government and non-government organizations have created watchlists to guide wildlife managers in setting priorities for birds of conservation concern. The conservation status for each species based on these watchlists is given in the Species Accounts. This appendix compiles conservation rankings for island species with the excpetion of vagrants.

The 105 species on this watchlist have at least one organization rate the species, or subspecies, moderately to critically endangered for Puerto Rico or North America. North American species of conservation concern are included because conservation plans for their migratory stopover sites and wintering grounds impact the long-term health of their populations. Endangered or threatened Vieques species are highlighted in red.

KEY			
Status	**Abundance**	**Conservation Designation: Red Indicates Most Threatened**	
BR Breeding Resident	**A** Abundant	**AR** At Risk	**PC** Potential Concern
PB Possible Breeder	**C** Common	**CE** Critically Endangered	**PR/VI** Puerto Rico/Vieques Is.
NB Non-breeder	**FC** Fairly Common	**DD** Data Deficient	
FB Former Breeder	**UC** Uncommon	**DE** Delisted	**Red** Global Concern
PM Passage Migrant	**R** Rare	**EH** Extremely High	**ST** Stewardship
WV Winter Visitor	**ER** Extremely Rare	**EN** Endangered	**TH** Threatened
SV Summer Visitor		**HI** High	**US** United States
V Rare Visitor		**MO** Moderate	**VU** Vulnerable
		NT Near Threatened	**Yellow** National Concern

ORGANIZATIONS			
MBTA	Migratory Bird Treaty Act	**USSCP**	US Shorebird Conservation Plan
ESA	US Endangered Species Act	**NAWCP**	North American Waterbird Conservation Plan
DNER	Puerto Rico Department of Natural and Environmental Resources	**WISCAP**	West Indies Seabird Conservation Action Plan
USFWS	US Fish and Wildlife Service	**NAS/ABC**	National Audubon Society/American Bird Conservancy
PIF	Partners in Flight	**BI/IUNCN**	Birdlife International/International Union for the Conservation of Nature

#	English Name	Puerto Rican Name	Status	MBTA	ESA	DNER	USFWS	PIF	USSCP	NAWCP	WISCAP	ABC	NAS/ABC	BI/IUNCN
1	West Indian Whistling-Duck	Chiriría Caribeña	PB/ER	✓		CE	US, PR/VI					PC		VU
2	White-cheeked Pintail	Pato Quijada Colorada	BR/FC	✓		VU	PR/VI							
3	Masked Duck	Pato Dominico	V/ER	✓		EN	PR/VI					PC		
4	Ruddy Duck	Pato Chorizo	BR/R	✓		VU	PR/VI							
5	Least Grebe	Tigua	WV/ER	✓		DD				HI		VU		
6	Pied-billed Grebe	Zaramago	BR/R	✓						HI		VU		
7	American Flamingo	Flamenco	WV/ER	✓			PR/VI							
8	White-tailed Tropicbird	Chirre	BR/R	✓			PR/VI			HI	VU	AR		
9	Red-billed Tropicbird	Chirre Piquirrojo	PB/ER	✓			PR/VI				VU	AR		
10	Magnificent Frigatebird	Tijereta	NB/FC	✓			PR/VI			HI	NT		Red	
11	Brown Booby	Boba Parda	NB/FC	✓			PR/VI			HI		VU		
12	Brown Pelican	Peficano Pardo	BR/C	✓	DE	EN	PR/VI				EN	VU		
13	Least Bittern	Martinetito	BR/FC	✓			PR/VI			HI		PC		
14	Snowy Egret	Garza Blanca	BR/C	✓						HI				
15	Little Blue Heron	Garza Azul	BR/C	✓			US			HI		VU		
16	Tricolored Heron	Garza Pechiblanca	BR/C	✓						HI		PC		
17	Green Heron	Martinete	FC/BR	✓								PC		
18	Black-crowned Night-Heron	Yaboa Real	R/PB	✓						MO		PC		
19	Yellow-crowned Night-Heron	Yaboa Común	PB/R	✓						MO		PC		
20	Swallow-tailed Kite	Elanio Tijereta	V/ER	✓				US				VU	Yellow	
21	Broad-winged Hawk	Guaraguao de Bosque	V/ER	✓	EN	CE	PR/VI					AR		
22	Red-tailed Hawk	Guaraguao Colirrajo	BR/FC	✓								AR		

#	English Name	Puerto Rican Name	Status	MBTA	ESA	DNER	USFWS	PIF	USSCP	NAWCP	WISCAP	ABC	NAS/ABC	BI/IUNCN
23	Black Rail	Gallito Negro	PB/ER	✓			US, PR/VI			HI		AR	Red	NT
24	Clapper Rail	Polo de Mangle	BR/FC	✓								VU	Yellow	
25	Sora	Gallito Sora	V/ER	✓						HI		PC		
26	Common Gallinule	Gallareta Común	BR/FC	✓						MO		VU		
27	American Coot	Gallinazo Americano	V/ER	✓			PR/VI					PC		
28	Caribbean Coot	Gallinazo Caribeño	PB/R	✓		VU	US, PR/VI			HI		VU		NT
29	Black-necked Stilt	Viuda	BR/A	✓					MO			PC		
30	American Oystercatcher	Ostrero	BR/UC	✓			US, PR/VI		HI			VU		
31	Black-bellied Plover	Playero Cabezón	WV/C	✓					MO			PC		
32	American Golden Plover	Playero Dorado	PM/ER	✓			US			HI		VU	Yellow	
33	Wilson's Plover	Playero Marítimo	BR/C	✓			US, PR/VI			HI		VU	Yellow	
34	Semipalmated Plover	Chorlito Acollarado	FC/WV	✓								PC		
35	Piping Plover	Chorlito Melódico	PM/ER	✓	TH	CE				EH		AR	Red	NT
36	Killdeer	Chorlito Sabanero	BR/C	✓					MO			VU		
37	Spotted Sandpiper	Playero Coleador	WV/C	✓								PC		
38	Solitary Sandpiper	Playero Solitario	WV/ER	✓			US		HI			PC		
39	Greater Yellowlegs	Playero Guinéilla Mayor	WV/C	✓					MO			PC		
40	Willet	Playero Aliblanco	PM/R	✓					MO			VU		
41	Lesser Yellowlegs	Playero Guinéilla Memor	WV/C	✓			US		MO			VU		
42	Whimbrel	Playero Picocorvo	PM/R	✓			US		HI			VU		
43	Ruddy Turnstone	Playero Turco	NB/FC	✓					HI			PC		
44	Stilt Sandpiper	Playero Patilargo	PM/C	✓			US, PR/VI		MO			VU	Yellow	

#	English Name	Puerto Rican Name	Status	MBTA	ESA	DNER	USFWS	PIF	USSCP	NAWCP	WISCAP	ABC	NAS/ABC	BI/IUNCN
45	Sanderling	Playero Arenero	PM/ER	✓					HI			VU	Yellow	
46	Least Sandpiper	Playerito Menudillo	WV/FC	✓					MO			PC		
47	Pectoral Sandpiper	Playero Pectoral	PM/R	✓					MO			VU		
48	Semipalmated Sandpiper	Playerito Gracioso	WV/A	✓			US, PR/VI		MO			VU	Yellow	NT
49	Western Sandpiper	Playero Occidental	PM/R	✓					HI			VU	Yellow	
50	Short-billed Dowitcher	Agujeta Piquicorta	WV/FC	✓			US		HI			VU		
51	Wilson's Snipe	Becasina	WV/ER	✓					MO			PC		
52	Sooty Tern	Charrán Obscura	SV/ER	✓						MO		PC		
53	Bridled Tern	Charrán Monja	SV/ER	✓						HI		VU	Yellow	
54	Least Tern	Charrancito	BR/FC	✓		DD	US			HI	VU	VU	Red	
55	Gull-billed Tern	Charrán Piquicorto	V/ER	✓			US			HI	CE	VU	Yellow	
56	Roseate Tern	Palometa	BR/FC	✓	TH	VU				HI		VU	Yellow	
57	Royal Tern	Charrán Real	NB/C	✓							EN	PC		
58	Sandwich Tern	Charrán Piquiagudo	SV/R	✓							VU	PC		
59	White-crowned Pigeon	Paloma Cabeciblanca	BR/C	✓		DD	US, PR/VI	US, PR/VI				AR	Red	NT
60	Key West Quail-Dove	Paloma Perdiz Aurea	BR/R	✓		DD	PR/VI					VU		
61	Bridled Quail-Dove	Paloma Perdez de Martinica	BR/R	✓		DD	PR/VI	PR/VI				VU		
62	Ruddy Quail-Dove	Paloma Perdiz Rojiza	BR/ER	✓								PC		
63	Yellow-billed Cuckoo	Pájaro Bobo Piquiamarillo	PM/R	✓								PC		
64	Mangrove Cuckoo	Pájaro Bobo Menor	BR/C	✓			US	US, PR/VI				VU	Yellow	
65	Short-eared Owl	Múcaro Real	BR/ER	✓			US	US				VU	Yellow	
66	Antillean Nighthawk	Querequequé	BR/R	✓				US, PR/VI				PC	Yellow	

#	English Name	Puerto Rican Name	Status	MBTA	ESA	DNER	USFWS	PIF	USSCP	NAWCP	WISCAP	ABC	NAS/ABC	BI/IUNCN
67	Chuck-will's-widow	Guabairo de la Carolina	WV/R	✓			US					PC		
68	Antillean Mango	Zumbador Dorado	V/ER	✓			PR/VI	PR/VI				VU		
69	Green-throated Carib	Zumbador Pechiazul	BR/FC	✓								VU		
70	Puerto Rican Emerald	Zumbadorcito de Puerto Rico	V/ER	✓				ST/PR				VU		
71	Antillean Crested Hummingbird	Zumbadorcito Crestado	BR/C	✓								PC		
72	Belted Kingfisher	Martin Pescador Norteño	WV/FC	✓								PC		
73	Puerto Rican Woodpecker	Carpintero de Puerto Rico	BR/FC	✓				ST/PR				VU		
74	American Kestrel	Falcón Común	BR/FC	✓								PC		
75	Peregrine Falcon	Falcón Peregrino	WV/R	✓	DE	CE	US					PC		
76	Caribbean Elaenia	Juí Blanco	BR/C	✓								VU		
77	Puerto Rican Flycatcher	Juí	BR/FC	✓			PR/VI	ST/PR				VU		
78	Loggerhead Kingbird	Clérigo	BR/FC	✓			PR/VI					VU		
79	Yellow-throated Vireo	Vireo Gargantiamarillo	WV/R	✓								PC		
80	Black-whiskered Vireo	Julián Chiví	PB/UC	✓								PC		
81	Caribbean Martin	Golondrina de Iglesias	SV/FC	✓								VU		
82	Bank Swallow	Golondrina Parda	PM/ER	✓								PC		
83	Cave Swallow	Golondrina de Cuevas	PM/FC	✓								PC		
84	Bicknell's Thrush	Zorzalito de Bicknell	V/ER	✓			US	US				AR	Red	VU
85	Ovenbird	Pizpita Dorada	WV/UC	✓								PC		
86	Worm-eating Warbler	Reinita Gusanera	PM/ER	✓			US	US				PC		
87	Northern Waterthrush	Pizpita de Mangle	WV/C	✓			PR/VI					PC		
88	Back-and-white Warbler	Reinita Trepadora	WV/FC	✓								PC		

#	English Name	Puerto Rican Name	Status	MBTA	ESA	DNER	USFWS	PIF	USSCP	NAWCP	WISCAP	ABC	NAS/ABC	BI/IUNCN
89	Prothonotary Warbler	Reinita Protonotaria	PM/UC	✓			US	US				VU	Yellow	
90	Common Yellowthroat	Reinita Picatierra	PM/R	✓								PC		
91	Hooded Warbler	Reinita Encapuchada	WV/R	✓								PC		
92	American Redstart	Candelita	WV/C	✓								PC		
93	Cape May Warbler	Reinita Tigre	WV/UC	✓								PC		
94	Northern Parula	Reinita Pechidorada	WV/C	✓								PC		
95	Yellow Warbler	Canario de Mangle	BR/C	✓			PR/VI					VU		
96	Blackpoll Warbler	Reinita Rayada	PM/UC	✓								PC		
97	Black-throated Blue Warbler	Reinita Azul	WV/ER	✓			PR/VI					PC		
98	Prairie Warbler	Reinita Galana	WV/C	✓			US	US, PR/VI				VU	Yellow	
99	Adelaide's Warbler	Reinita Mariposera	BR/C	✓			PR/VI	PR/VI				VU		
100	Bananaquit	Reinita Común	BR/A									VU		
101	Yellow-faced Grassquit	Gorrión Barba Amarilla	BR/UC	✓								VU		
102	Black-faced Grassquit	Gorrión Negro	BR/C	✓								VU		
103	Grasshopper Sparrow	Gorrión Chicharra	PB/ER	✓		DD	US, PR/VI					AR		
104	Yellow-shouldered Blackbird	Mariquita	V/ER	✓	EN	EN		PR/VI				AR		EN
105	Greater Antillean Grackle	Mozambique	BR/A									VU		

Appendix 2
Gazetteer

This geographical index shows latitude and longitude for the locations highlighted in this book.

Location	Latitude	Longitude	Location	Latitude	Longitude
Airport	18°07′53″N	65°29′15″W	Laguna Algodones	18°09′21″N	65°22′25″W
Bahía de la Chiva	18°06′34″N	65°23′15″W	Laguna Anones	18°08′22″N	65°17′50″W
Bahía Salina del Sur	18°08′00″N	65°18′15″W	Laguna Boca Quebrada	18°06′20″N	65°34′25″W
Bahía Tapón	18°06′48″N	65°24′15″W			
Camp Garcia	18°07′12″N	65°24′59″W	Laguna Gato	18°08′17″N	65°18′02″W
Cayo de Afuera	18°05′20″N	65°28′49″W	Laguna Icacos	18°08′17″N	65°18′28″W
Cayo Conejo	18°07′20″N	65°18′29″W	Laguna Monte Largo	18°09′15″N	65°25′51″W
Cayo de Tierra	18°05′23″N	65°28′02″W	Laguna Navio	18°05′30″N	65°26′53″W
Cerro El Buey	18°06′27″N	65°32′26″W	Laguna Playa Blanco	18°06′20″N	65°34′25″W
El Pilón	18°06′43″N	65°30′02″W	Laguna Playa Grande	18°05′25″N	65°30′59″W
Ensenada Honda	18°07′20″N	65°21′15″W	Laguna Puerto Diablo	18°08′44″N	65°19′58″W
Ensenada Sombe	18°05′44″N	65°27′41″W	Laguna Sombe	18°05′52″N	65°27′16″W
Espreranza	18°05′43″N	65°28′30″W	Laguna Yanuel	18°07′36″N	65°22′21″W
Isabel Segunda	18°08′53″N	65°26′35″W	Live Impact Area (LIA)	18°08′22″N	65°18′18″W
Isla Yallis	18°08′53″N	65°18′33″W	Mosquito Pier	18°08′09″N	65°30′45″W
Kiani Wetlands Complex			Monte Pirata	18°05′36″N	65°33′05″W
Laguna Arenas	18°06′56″N	65°34′13″W	Navy Headquarters	18°07′16″N	65°31′32″W
Laguna El Pobre	18°07′07″N	65°33′38″W	Puerto Ferro	18°06′9″N	65°25′40″W
Laguna Kiani	18°07′00″N	65°33′42″W	Puerto Mosquito	18°06′15″N	65°26′45″W
La Chata	18°09′28″N	65°25′53″W	Punte Este	18°07′60″N	65°16′19″W

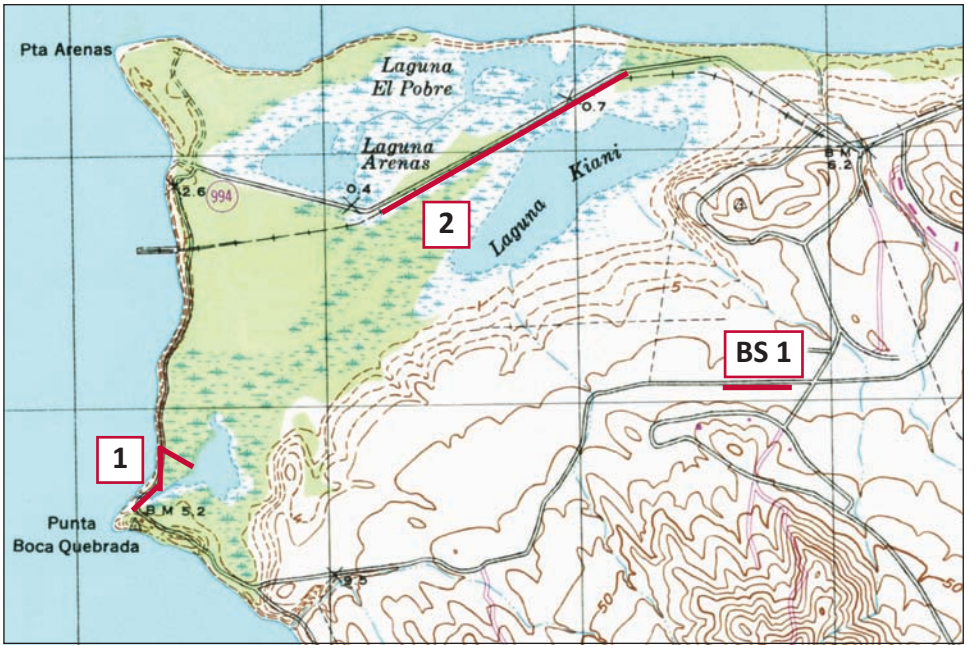
Fig. 164. Survey areas of Laguna Sombe, the enclosed body of water on the upper left; Laguna Navio, the small pond just to the right of the middle semicircular beach; and Puerto Mosquito, the large body of water to the right of Laguna Sombe. See the following Appendix 3 for specific locations of the survey routes. (Gemmill 1997)

Appendix 3

Primary Survey Areas and Routes 1983 to 2012

ANNUAL SURVEY ROUTES 1 AND 2, AND BANDING STATION (BS) 1

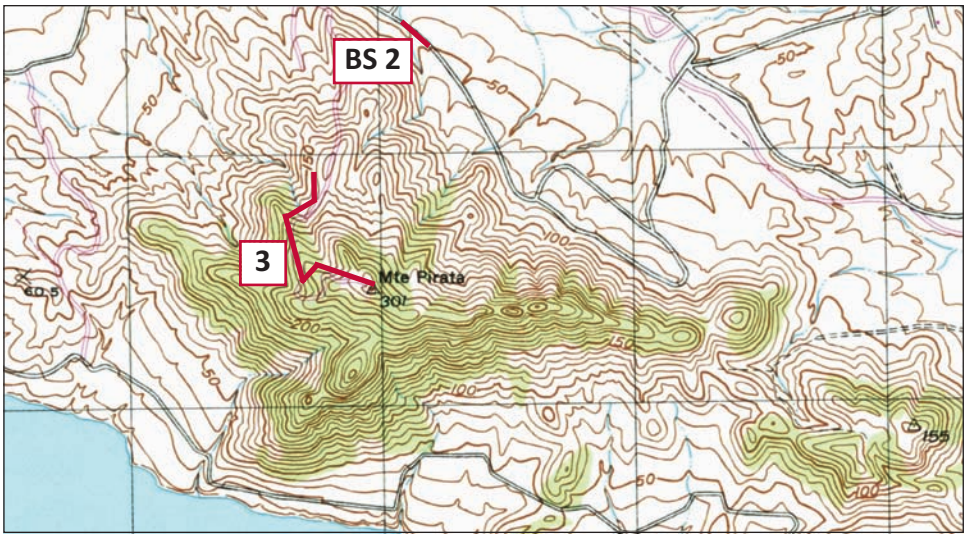
Boca Quebrada (1) and Kiani Wetlands Complex (2)



Maps in Appendix 3 are sections of the Historical Topographical Map, Isla de Vieques, Puerto Rico, 1951. Photo revised 1982, Scale 1:30,000, U.S. Geological Survey.

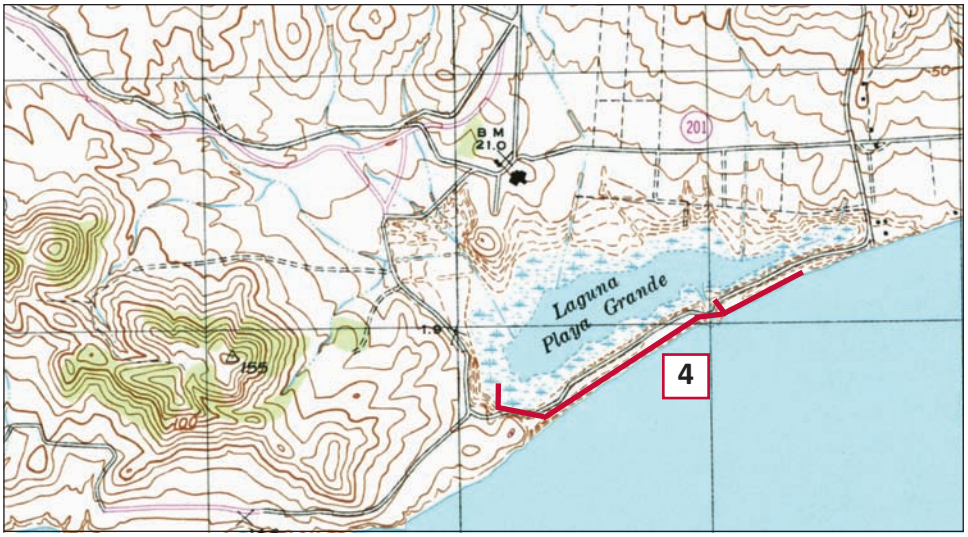
ANNUAL SURVEY ROUTE 3 AND BANDING STATION (BS) 2

Monte Pirata (3)



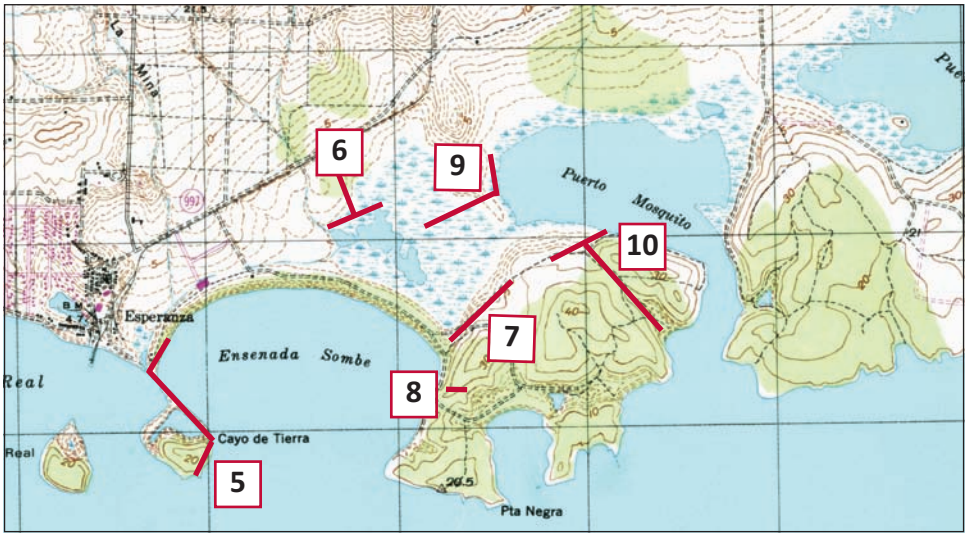
ANNUAL SURVEY ROUTE 4

Laguna Playa Grande (4)



SURVEY ROUTES 5, 6, 7, 8, 9, AND 10

Cayo de Tierra (5), Laguna Sombe—Northside (6), Laguna Sombe—Southside (7), Laguna Navio (8), Puerto Mosquito, Kayak Put-in (9), Puerto Mosquito Electric Boat Put-in (10)



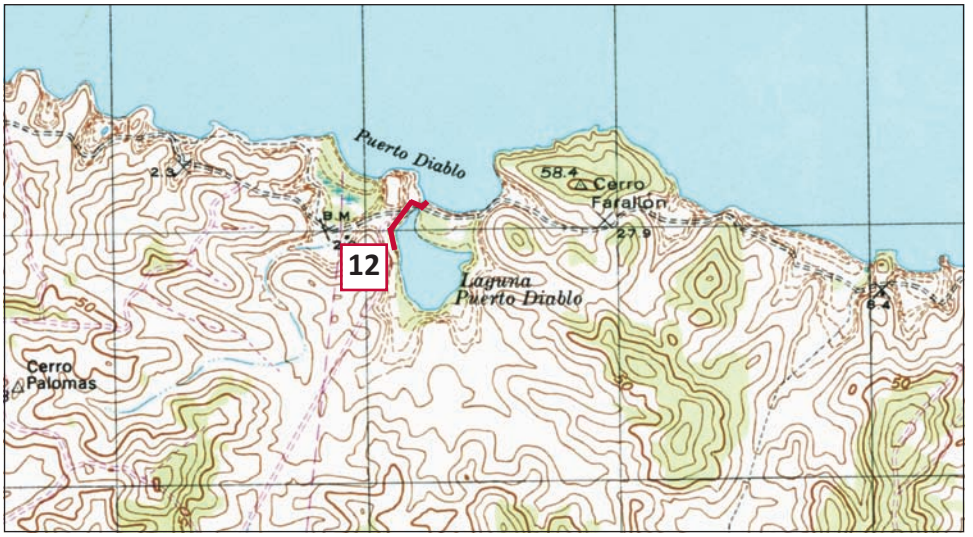
ANNUAL SURVEY ROUTE 11

Puerto Ferro (11)

PERIODIC SURVEY ROUTE 12

Laguna Puerto Diablo (12)

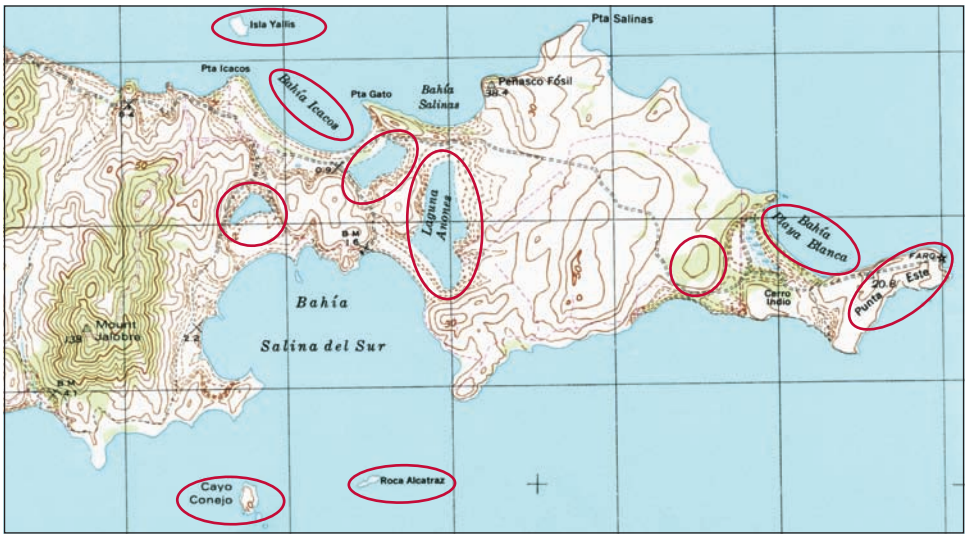
Part of an Official USFWS Bird Count (Restricted Area: Access by Permit)



PERIODIC SURVEY ON EASTERN END

Lagoons, Beaches, and Islets

Part of an Official USFWS Bird Count (Restricted Area: Access by Permit)



Symbol, Acronyms, and Abbreviations

SYMBOL

?	Unconfirmed due to insufficient documentation for a first record

ACRONYMS AND ABBREVIATIONS

A	Abundant when referring to species presence
ABC	American Bird Conservancy
AMNH	American Museum of Natural History
ANSP	Academy of Natural Sciences, Philadelphia, Pennsylvania
AOU	American Ornithologists Union
ASY	After second year for bird's age, a bird banding term
BBL	U.S. Geological Survey Patuxent Wildlife Research Center Bird Banding Laboratory, Laurel, Maryland
BI	Birdlife International
BMNH	British Museum of Natural History
BOU	British Ornithologists' Union
BR	Breeding Resident
C	Common when referring to species presence
BC	BirdsCaribbean was formerly known as the Society for the Conservation and Study of Caribbean Birds and previously Society for Caribbean Ornithology
CBC	Christmas Bird Count run by the National Audubon Society
CE	Critically Endangered
CM	Carnegie Museum of Natural History
CTPR	Conservation Trust of Puerto Rico
DOI	U.S. Department of Interior
DNER	Department of Natural and Environmental Resources of Puerto Rico, the English equivalent for the Puerto Rican DNRA
DRNA	Departamento de Recursos Naturales y Ambientales de Puerto Rico (Department of Natural Resources and Environment of Puerto Rico)
EH	Extremely high threat of extinction
EN	Endangered
ER	Exceedingly Rare when referring to species presence
ESA	Federal Endangered Species Act
FC	Fairly Common when referring to species presence
FB	Former Breeder
FO	Forest Habitat
HI	High threat of extinction
IA	Inhabited Area habitat
IBA	Important Bird Area
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for the Conservation of Nature
LSU	Museum of Natural Science, Louisiana State University, Baton Rouge, Louisiana
M	Migratory

MBTA	Migratory Bird Treaty Act
MCZ	Museum of Comparative Zoology, Harvard University
ML	Mangrove Lagoon habitat
MNHN	Museé National D'Histoire Naturelle, Paris
MO	Moderate threat of extinction
NAS	National Audubon Society
NABCI	North American Bird Conservation Initiative
NAWCP	North American Waterbird Conservation Plan
NB	Non-breeder
NC	National Concern for threat of extinction
NMNH	Smithsonian National Museum of Natural History, Washington, D.C.
NOAA	National Oceanic and Atmospheric Administration
NT	Near Threatened
NYSM	New York State Museum
PIF	Partners in Flight
PB	Possible Breeder
PM	Passage Migrant
PRR	Puerto Rican Regulation No. 6766, Regulation for the Management of Vulnerable and Endangered Species
PR/VI	Puerto Rico/Virgin Islands
R	Rare when referring to species presence
ROTHR	Relocatable Over-the-Horizon Radar
RV	Rare Visitor, a vagrant that might be expected to appear
S	Summer
SC	Scrub habitat
SCSCB	Society for the Conservation and Study of Caribbean Birds now BirdsCaribbean
SH	Shoreline Habitat
SP	Stream and Pond habitat
Sp	Spring
SOPI	Sociedad Ornitológica Puertorriqueña, Inc. (Puerto Rican Ornithological Society)
SV	Summer Visitor
TH	Threatened
TICATOVE	TinglarCareyTortugaVerde, Spanish for Leatherback Sea Turtle, Hawksbill Sea Turtle, and Green Sea Turtle, a Refuge friends group.
UC	Uncommon when referring to species presence
UMZC	University Museum of Zoology, Cambridge, U.K.
USCCSP	U.S. Climate Change Science Program
USFWS	U.S. Fish and Wildlife Service, Department of the Interior
USGS	U.S. Geological Survey
USNM	U.S. National Museum, original name of the Smithsonian Institution, used today to denote specimen's museum.
USSCP	U.S. Shorebird Conservation Plan
V	Vagrants includes rare visitors as well as birds not expected to appear
VCHT	Vieques Conservation and Historical Trust
VU	Vulnerable
W	Winter
WISCAP	West Indian Seabird Conservation Action Plan
WV	Winter Visitor

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I wish the person who started me down this thirty-year path could be with us today to see her vision realized of an in-depth review of the island's birdlife. Elizabeth Langhorne, known as Betty, was a Virginian who spent half the year on Vieques and was a Viequense at heart. In the early 1980s, she was concerned that someday the Navy might depart, and her beautiful paradise possibly destroyed by uncontrolled development. She and several other individuals founded the Vieques Conservation and Historical Trust to protect the environment and history of the island and to provide environmental education for the islanders. In 1983, she asked me to conduct an annual bird survey, knowing that fact trumped hearsay in the planning process.

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Scientific, Common Puerto Rican, and Common English Bird Names

Fig. 165 (facing page). Staci Notine looks for seabirds on the North Shore of Vieques. (Gemmill 2006)

COMUNES PUERTORRIQUEÑOS PÁJARO NOMBRES [INDEX OF COMMON PUERTO RICAN BIRD NAMES]

COMMON ENGLISH BIRD NAMES

Over the last three decades, Daphne Gemmill, the author, has conducted bird surveys, led bird walks, and given lectures for the Vieques Conservation and Historical Trust. In 1983, her first survey was initiated when a founder of the Trust asked Gemmill to explore the island's birdlife in an effort to learn more about the bird species supported by Vieques habitat. These annual surveys form the basis for this book and have contributed to an avian database on which the Trust and the Vieques National Wildlife Refuge can base their conservation recommendations. Gemmill worked in the environmental field, retiring from the National Oceanic and Atmospheric Administration. She has served as a trustee on numerous birding association boards. Among her previous publications are *Bird Finding in Forty National Forests and Grasslands* and a special issue of American Birding Association's magazine on bird photography. She lives in Washington, DC.