

© 2009 BirdLife International
Juan de Dios Martínez Mera N35-76 y Av. Portugal
Casilla 17-17-717
Quito, Ecuador.
Tel: +593 2 2277059
Fax: +593 2 2469838

americas@birdlife.org
www.birdlife.org

BirdLife International is a UK-registered charity No. 1042125
ISBN: 978-9942-9959-0-2

Recommended citation: DEVENISH, C., DÍAZ FERNÁNDEZ, D. F., CLAY, R. P., DAVIDSON, I. & YÉPEZ ZABALA, I. Eds. (2009) *Important Bird Areas Americas - Priority sites for biodiversity conservation*. Quito, Ecuador: BirdLife International (BirdLife Conservation Series No. 16).

To cite this chapter: ANADÓN-IRIZARRY, V., CORVEN, J., MÉNDEZ-GALLARDO, V., SALGUERO-FARÍA, J. A. & SCHWAGERL, J. (2009) Puerto Rico and US Unincorporated Territories. Pp 317 – 328 in C. Devenish, D. F. Díaz Fernández, R. P. Clay, I. Davidson & I. Yépez Zabala Eds. *Important Bird Areas Americas - Priority sites for biodiversity conservation*. Quito, Ecuador: BirdLife International (BirdLife Conservation Series No. 16).

The purpose of the information contained in this book is to support conservation initiatives in the Americas, for which it may be reproduced. Using this information for commercial purposes is not permitted. If part or all of this information is used or included in any other publication, BirdLife International must be cited as copyright holder. Those who provided illustrations or photographs in this book have copyright over them and these are not permitted to be reproduced separately to the texts accompanying them.

The presentation of material in this book and the geographical designations employed do not imply the expression of any opinion whatsoever on the part of BirdLife International concerning the legal status of any country, territory or area, or concerning the delimitation of its frontiers or boundaries. Membership of BirdLife International does not imply any opinion or position with respect to sovereignty issues on the part of BirdLife International Partner organizations.

Graphic design: Alejandro Miranda Baldares (alejoanime@yahoo.com)
Translations: Christian Devenish, Ítala Yépez Zabala & Amiro Pérez-Leroux
Maps: David F. Díaz Fernández, Ítala Yépez Zabala & Christian Devenish
Edition of Spanish language country chapters: Ítala Yépez Zabala, Carlos Huertas Sánchez & David F. Díaz Fernández
Graphic design volunteer (Spanish language country chapters): Adriana Valencia Tapia
Printed in Ecuador by Poligráfica C.A.

This publication and all country/territory chapters in their native languages are available for download at www.birdlife.org/

Important Bird Areas AMERICAS

PUERTO RICO AND US UNINCORPORATED TERRITORIES

Verónica Anadón-Irizarry, Jim Corven, Verónica Méndez-Gallardo,
José A. Salguero-Farías & Joseph Schwagerl



Puerto Rican Nightjar (*Caprimulgus noctitherus*) is Critically Endangered and its remaining population is estimated at 1500–2000 individuals. However, it is now the focus of conservation actions by SOPI and other institutions. Photo: Michael J. Morel; www.rarebirdyearbook.com



Territory facts at a glance

No. of territories:	3
Total area:	9,228 km ²
Total population:	4,050,259
Number of IBAs:	30
Total IBA area:	351,494 ha
IBA coverage of land area:	16%
Globally threatened birds:	5
Globally threatened birds in IBAs:	5
Country endemics:	16

General introduction

The United States territories in the Americas (as covered by the definition in this directory - see Introduction) consist of the commonwealth of Puerto Rico and the unincorporated territories of Navassa Island and the US Virgin Islands¹.

Table 1. Summary information for Puerto Rico and US Unincorporated Territories

Territory	Area (km ²)	Population	Capital	Altitude (m)	No of IBAs	Total IBA area (ha)	Percentage of total land area
Puerto Rico	8,870	3,944,259	San Juan	0–1,338	20	197,176	16%
US Virgin Islands	353	106,000	Charlotte Amalie	0–477	9	6,218	10%
Navassa	5	0	n/a	0–76	1	148,100	100%

Puerto Rico is the smallest and most easterly of the Greater Antilles lying 114 km east of the Dominican Republic and just 60 km west of the US Virgin Islands. It is a Commonwealth and territory of the USA. Puerto Rico is a small archipelago of islands and cays such as Vieques, Culebra, Mona, Monito, Desecheo, Caja de Muertos amongst others. Nearly 85% of the country lies below 500 m and less than 1% is above 1000 m, the highest point being Cerro Punta, at 1338 m above sea level.

With c.3.9 million people (429 people/km²) Puerto Rico has one of the highest population densities in the Caribbean. Puerto Rico's population remained relatively constant from 16th to 18th century, after which it increased exponentially. This increase peaked in the second half of 20th century when population growth reached a rate of 72%, to the detriment of the island's natural resources.

To the east of Puerto Rico lie the US Virgin Islands (USVI), an organized, unincorporated United States territory at the eastern end of the Greater Antillean chain of islands. The US Virgin Islands comprise three major islands and more than 50 offshore cays. As an archipelago, the Virgin Islands are politically divided between USVI (the south-western group of islands) and the British Virgin Islands (which stretch out to the north-east). However, St Croix (the largest of the three main islands at 217 km²) lies about 65 km to the south of the rest of the Virgin Islands and c.100 km south-east of mainland Puerto Rico.



Navassa Island (UM001) lighthouse, built in 1917.
Photo: Jean Wiener

¹ For details of Hawaii and how this is covered by the directory, see Box 1 in the United States chapter.



Great Pond IBA (VI009) on St Croix, US Virgin Islands.
Photo: Lisa D. Yntema



Mona Island IBA (PR001), off the coast of western Puerto Rico—important for its seabirds and Endangered Yellow-shouldered Blackbird (*Agelaius xanthomus*) population.
Photo: Enrique A. Silva Rodriguez

Navassa Island lies between Jamaica and Haiti, 53 km west of the latter country. Navassa is an unorganized, unincorporated territory of the USA. It is grouped politically with other islands claimed under the Guano Islands Act of 1856 as one of the United States Minor Outlying Islands and is the only island of this group in the Caribbean. Navassa rises abruptly from deep water with cliffs reaching heights of 20 m or more. There are no beaches, ports or harbors on Navassa and access (from offshore anchorages) is extremely hazardous. The highest point on the island is Dunning Hill, at 76 m. Haitian fishermen and researchers camp, albeit infrequently, on the island which is otherwise uninhabited and closed to the public. The Republic of Haiti laid claim to sovereignty over Navassa in 1804, and they disputed the U.S. annexation of the island in 1857. The island has remained in the Haitian constitution since 1856.

Puerto Rico and the unincorporated territories have tropical to subtropical climates, Puerto Rico, with a larger altitudinal range, receives more rainfall than the other two territories. The mountainous region of the island acts as a barrier to the moisture-rich trade winds which unload most of their humidity in the form of rain on the windward side of the mountains. Thus, the north and east is relatively wet (averaging 1550 mm per year), whereas the south is fairly dry (910 mm annually). The west receives the remainder of the moisture from the trade winds and the humidity-soaked winds from the south. The windward side of the Luquillo Mountains may receive more than 5000 mm of rain annually. In the US Virgin Islands, average annual rainfall is 750 mm in coastal areas and up to 1400 mm at higher elevations. Highest rainfall in all territories is in the second half of the year, generally associated with tropical low pressure systems which form or pass through the region.

Puerto Rico's geographical location and geological history has had a profound influence on the rich diversity of its flora and fauna. It can be divided into three geomorphologic regions of the central mountainous interior, karst, and coastal plains. With regard to vegetation, forests in Puerto Rico are considered to be subtropical and are classified into 10 types depending on a combination of temperature, elevation and substrate. Puerto Rico's flora includes c.3130 species with nearly 9% (240 spp.) endemism. Naturalized exotic species make up a high percentage of for-

est species, and represent an important component of the "new" forested landscape of Puerto Rico. In addition to forested areas, Puerto Rico also has diverse wetlands, including forested wetlands, such as mangroves, *Pterocarpus officinalis* and *Ammonia glabra* freshwater swamps, brackish and freshwater herbaceous wetlands and hypersaline saltflats. Major wetland areas include Caño Tiburones, Laguna Tortuguero, Laguna Cartagena, San Juan and Jobos bays estuaries and Cabo Rojo saltflats.

In contrast, vegetation on USVI is primarily dry forest, including closed-canopy forest, woodland and shrubland. Subtropical moist forest (with a continuous canopy and an abundant herbaceous understorey) is found in the uplands (where annual rainfall is above 1200 mm), along drainage ghaunts or streams and in some coastal basin areas (accounting for c.10–15% of the land area). USVI also supports grasslands, a variety of wetlands, and a full range of coastal zone habitats. However, all have been subject to human disturbance or development as well as natural effects of tropical storms and virtually no primary forest exists on the islands. Wetland habitats include salt ponds, salt flats, mangrove wetlands, mixed swamp, and freshwater ponds (all of which are man-made for livestock or landscaping). Despite their extremely high value to both humans and wildlife, many of the natural wetlands have been destroyed or lost to development.

Navassa's primary vegetation cover is evergreen woodland/forest comprising four main tree species, namely short-leaf fig (*Ficus citrifolia*), pigeon plum (*Coccoloba diversifolia*), mastic (*Sideroxylon foetidissimum*) and poisonwood (*Metopium brownei*). The island's upper plateau around Dunning Hill supports small, scattered areas of grassland which seem to be maintained by frequent fires. A second major habitat is the fan palm (*Thrinax morrisii*) forest that occurs in pure stands in the lower north-western part of the island although the species is also scattered throughout the upper plateau and ridges. There is also a palm (*Pseudophoenix sargentii* var. *navassana*) represented by only one (relatively healthy) individual which is located on the ridge to the east of the lighthouse. Snow cactus (*Mamillaria nivosa*) plants are scattered across the limestone surface of the island.



The Endangered Yellow-shouldered Blackbird (*Agelaius xanthomus*) is endemic to Puerto Rico and has a population of just 1250 individuals.
Photo: Alfredo D. Colón



Brown Pelicans (*Pelecanus occidentalis*) are listed under the Federal Endangered Species Act. Photo: Carol Cramer-Burke/St Croix Environmental Association

Historically, Navassa has supported a herpetofauna thought to consist of eight endemic reptiles, of which *Cyclura onchiopsis*, *Leiocephalus eremitus*, *Tropidophilus bucculentus* and *Typhlops sulcatus* are presumably extinct as a result of habitat alteration during the guano-mining, human exploitation or depredation by introduced mammalian predators. The four extant species are abundant.



El Yunque IBA (PR016) in the Sierra de Luquillo, home to many restricted-range species including the threatened Puerto Rican Amazon (*Amazona vittata*) and Elfin-woods Warbler (*Dendroica angelae*). Photo: SOPI

Navassa is critically important for its marine environment, including pristine coral reef ecosystems, which sustains foraging habitat for one of the largest colonies of Red-footed Booby (*Sula sula*) in the Caribbean. More than 300 marine species have been identified by biologists, including three new fish species.

Conservation and protected area system



Both Puerto Rico and the US unincorporated territories have legally protected areas for biodiversity conservation, varying in size from the whole of Navassa to 6.8% of Puerto Rico's land area. Approximately 60,800 ha of the commonwealth have been designated by the government as conservation areas, but only 31,055 ha (less than 3.5%) have been acquired. The remainder are still in private or public ownership and thus threatened by development. Various state and federal agencies, as well as private institutions, manage these protected areas: the Department of Natural and Environmental Resources (DNER) is responsible for more than 90% of the total; and the United States Fish and Wildlife Service (USFWS), United States Forest Service (USFS) and Conservation Trust of Puerto Rico (CTPR) manages the rest.

Numerous protected areas exist in the US Virgin Islands, provided by both territorial and federal governments, and private organizations including The Nature Conservancy, Island Resources Foundation and St Croix Environmental Association. All federally owned cays are protected within the Virgin Islands National Park, Hassel Island National Monument, Buck Island National Monument, or as National Wildlife Refuges. The territorial government has designated Flat Cay, Little Flat Cay, Saba Island, and Turtledove Cay as wildlife reserves. More recently, legislation has been drafted that would result in all 33 cays owned by the territorial government being designated as wildlife sanctuaries.

Navassa National Wildlife Refuge was established in 1999 by Department of the Interior, after being described as a unique preserve of Caribbean biodiversity by a scientific expedition in 1998. It is administered as part of the Caribbean Islands National Wildlife Refuge Complex, with headquarters in Boquerón, Puerto Rico. The refuge includes the island of Navassa and marine habitats up to 22 km from the island.

Local and federal environmental legislation are in force in the commonwealth and territories. As US territories, islands have to abide by federal laws such as the Endangered Species Act (1972), Migratory Bird Treaty Act (1918) and the Clean Water Act (1972). However, although these laws and regulations can be very strict they are rarely enforced properly due to lack of resources and government bureaucracy. Local and federal laws also provide for private entities to set aside part of their land as conservation easements. The Conservation Trust of Puerto Rico has been working with this provision, encouraging and providing guidance to landowners willing to take advantage of the tax benefits associated with the conservation easements.

Puerto Rico has numerous local laws and regulations to protect the island's precious natural resources. Among the most important are the New Wildlife Law (1999) and its associated regulations: Regulation for Management of Vulnerable and Endangered Species (2004) and Regulation for the Management of Wildlife, Exotic Species and Hunting in the Commonwealth of Puerto Rico (2004). Also, the DNER has been responsible for protecting the coastal littoral zone (areas under tidal influence) since its creation in 1972.

Principal local legislation for the protection of wildlife in USVI is the Virgin Islands Indigenous and Endangered Species Act (1990). A modification of this legislation, currently being proposed, will list USVI species considered under various categories of threat and are included in the "Comprehensive Wildlife Conservation Strategy".

On both Puerto Rico and USVI, many governmental and non-governmental organizations work towards biodiversity conservation. Citizen science initiatives, such as eBird, in collaboration with the Cornell Lab of Ornithology, and the Christmas Bird Counts sponsored by National Audubon Society, have also been implemented.

On Puerto Rico, several federal and local agencies fund and coordinate research projects, many of which are geared toward avian studies². Locally, the DNER monitors a number of bird species, implements recovery plans, and manages several initiatives such as the Puerto Rico Critical Wildlife Areas, the Atlantic Coast Joint Venture through the Puerto Rico Waterfowl Focus Areas, the Puerto Rico Gap Analysis Project (PRGAP), and the Fisheries and Wildlife Management Plan. At present the DNER is working on the first "Programmatic Safe Harbor Agreement" with the USFWS for the conservation of Plain Pigeon (*Patagioenas inornata*). The USFWS conducts surveys of national wildlife refuges throughout the Commonwealth where management usually centers on avian resources. At El Yunque, the USFS is involved in managing and studying the resident Puerto Rican Amazon (*Amazona vittata*) population (until recently, the only wild extant population) in coordination with the USFWS and the DNER.

"For many years, universities have been an important source of avian scientific research in Puerto Rico."

²For more information on projects see the separate Puerto Rico chapter in BirdLife International 2008.



Southgate Pond (VI008) in St Croix, important for a range of congregatory waterbirds. Photo: Lisa D. Yntema

For many years, universities have been an important source of avian scientific research in Puerto Rico. The University of Puerto Rico's campuses at Rio Piedras, Mayagüez, Humacao and Cayey have contributed to knowledge of local avifauna for over 30 years, with programs on species such as Plain Pigeon, Yellow-shouldered Blackbird (*Agelaius xanthomus*), Broad-winged Hawk (*Buteo platypterus brunnescens*), Sharp-shinned Hawk (*Accipiter striatus venator*) and Elfin-woods Warbler (*Dendroica angelae*).

The national NGO and BirdLife partner in Puerto Rico, Sociedad Ornitológica Puertorriqueña, Inc., (Puerto Rican Ornithological Society-SOPI) has been coordinating bird-focused conservation efforts, including education, research, land stewardship, and the identification of the island's IBAs. Other SOPI projects include the Puerto Rico Shorebird Monitoring Network (Programa Red Limícola; Box 2) and Puerto Rico Breeding Bird Atlas (jointly coordinated with the Puerto Rico Gap Analysis Project).

The Division of Fish and Wildlife (DFW) in USVI is the key public agency for research and monitoring of birds and habitats. They have directed or collaborated in extensive studies on all the islands that have documented the status of seabirds and, to a lesser extent other species. Working with US Dept. of Agriculture, DFW has undertaken eradications of rats and goats from important seabird breeding colonies on DFW-managed cays. They are also looking at exotic plant management with the National Park Service (NPS), and collaborate with other organizations to implement their work. The NPS is responsible for all land and marine areas within the St John Park which it monitors regularly and within which

“Half the wild population of Puerto Rican Amazon (*Amazona vittata*) were wiped out by Hurricane Hugo in 1989.”

it has completed numerous biological inventories. The University of the Virgin Islands (UVI) has provided local logistics for a number of offshore projects, plus GIS and data management expertise, and technical advice.

The main threats to biodiversity across the territories include habitat loss, introduction of exotic species, fishing, illegal hunting and natural events. Habitat loss caused by urbanization and a growing human population has particularly affected Puerto Rico and USVI, with lands cleared for housing, industry, roads and agriculture. Introduction of non-native species (including domestic animals turning feral) is a problem on all three territories, exacerbated by laws and regulations not being enforced. Hurricanes have also taken their toll on native fauna, with nearly half the wild population of Puerto Rican Amazon (*Amazona vittata*) wiped out by Hurricane Hugo in 1989. On Navassa, more specific human impacts have particularly affected biodiversity, namely, the former guano-mining and lighthouse maintenance operations, impacting both the vegetation and marine environment.

Lack of environmental education is also of particular concern on Puerto



Haitian fishermen at anchor in Lulu Bay, Navassa (UM001). Photo: Jean Wiener

Rico, in that inhabitants are, for the most part, unaware of their local flora and fauna. The lack of proper environmental education limits the capacity of environmentalists and land managers to conserve the natural resources of the island.

Conservation needs on Puerto Rico and USVI include land protection, education, biological information, enforcement and planning. Even though several laws exist to protect natural resources, land acquisition is the most effective way to protect important areas for birds and other wildlife. A major

conservation need is the development of a strong educational program for land managers and their staff, environmental law enforcement personnel, lawmakers and the general public. Conservation needs on Navassa are different and managing the protected area has been very difficult. In 2004, a conservation plan was jointly developed with many stakeholders to strategize ways to address several issues, including fishing. A dialogue with the Haitian conservation community has been established as a necessary first step and needs to be developed to ensure the conservation of the tremendous fish and wildlife resources of Navassa Island National Wildlife Refuge.

Ornithological importance



More than half the bird species recorded on Puerto Rico and the US unincorporated territories in the Caribbean occur as wintering Neotropical migrants, transients or vagrants. In Puerto Rico, of the 354 recorded bird species, about 133 are known to breed; in USVI, 60 breeding species are known of a total of 210 (Table 2). Many exotic species have also become established, especially in Puerto Rico, where 45 have been reported and more than 35 are either well-established or have small breeding populations.

A total of 27 species are restricted to the Puerto Rico and Virgin Islands Endemic Bird Area (EBA 029). However, two are considered extinct within this EBA: the White-necked Crow (*Corvus leucognaphalus*) and the Hispaniolan Parakeet (*Aratinga chloroptera*). Nevertheless, Hispaniolan Parakeet has recently been considered as an introduced species on Puerto Rico (albeit a different subspecies), as individuals have been seen in various parts of the island. Of the 25 remaining species in the EBA, 24 occur on Puerto Rico and seven in the USVI, including the Lesser Antillean Bullfinch (*Loxigilla noctis*), not present on Puerto Rico. A number of restricted-range species have been extirpated from USVI including Puerto Rican Screech-owl (*Megascops nudipes*; last recorded in the 1930s) and Antillean Mango (*Anthracothorax dominicus*; last recorded during the 1960s), probably reflecting the loss of primary forest throughout the islands.

The geographical position of Puerto Rico and the US Virgin Islands integrates a Greater Antillean and Lesser Antillean avifauna like no other islands in the region. A number of the restricted-range species are shared with neighboring islands such as Antillean Mango and Antillean Euphonia (*Euphonia musica*) also present in the Hispaniola EBA (028), and Lesser

“Two Puerto Rican Critically Endangered endemics could be heading for extinction: Puerto Rican Amazon and Puerto Rican Nightjar.”

Antillean Bullfinch and Lesser Antillean Pewee (*Contopus latirostris*), present in the Lesser Antilles EBA (030). No restricted-range birds are known to breed on Navassa, however, the Vulnerable White-necked Crow (*Corvus leucognaphalus*), a restricted-range bird from the Hispaniola EBA, was seen during expeditions in 1998 and 2003.

A total of 16 breeding species are confined to Puerto Rico, primarily to natural forest and woodlands, one of which—*Nesospingus*—represents a monotypic endemic genus. Navassa has a subspecies of Common Ground-dove (*Columbina passerina navassae*) which is endemic to the island.

Ten globally threatened species have been recorded from Puerto Rico and the US unincorporated territories (Table 2), however, only five occur regularly: two Critically Endangered (Box 1), one Endangered and two Vulnerable (a further two Vulnerable species are extinct on the island). The two Critically Endangered endemics could also be heading for extinction, Puerto Rican Amazon (*Amazona vittata*) and Puerto Rican Nightjar (*Caprimulgus noctitherus*). The wild population of Puerto Rican Amazon is estimated at c.26–30 individuals in El Yunque National Forest (IBA PR016) and 25–27 in the Rio Abajo State Forest (IBA PR003). The Puerto Rican Nightjar population is estimated to be 1500–2000 individuals, confined to the drier forests of south-western Puerto Rico. Four Near Threatened species have also been recorded, although only three trigger IBA criteria, including viable populations of Caribbean Coot (*Fulica caribaea*) and White-crowned Pigeon (*Patagioenas leucocephala*) on USVI. Hundreds of the latter species breed on Navassa.

Table 2. Numbers of bird species (including threatened and endemic species) in Puerto Rico and US Unincorporated Territories³

Commonwealth /Territory	No of species	CR	EN	VU	NT	Endemics
Puerto Rico	354	2	1+(1)	2+(3)	4+(4)	16
US Virgin Islands	210	-	-	(1)	2+(1)	-
Navassa	58	-	-	(1)	1	-
Total nos. of species	-	2	1+(1)	2+(4)	4+(4)	16

Waterbirds are an important component of the local avifauna representing more than 35% of the species recorded for Puerto Rico, with 45 and 15 breeding species on Puerto Rico and the USVI, respectively. However, the seabird populations on USVI, mainly on offshore cays, are threatened by predation from introduced rats (*Rattus* spp.), trampling by goats, human disturbance and illegal eggging. Indirectly, they are also being impacted by the depletion of fish stocks (from over fishing), bird entanglements in fishing lines, invasive plant species, and habitat loss. Navassa is notable for its breeding populations of Red-footed Booby (*Sula sula*) and Magnificent Frigatebird (*Fregata magnificens*). Studies of Red-footed Booby nestling mortality suggest a number of causal factors including adult defense of the nest, chicks being left unattended or human disturbance. Carcasses of Red-footed Booby, eaten clean by humans have been found under several trees and at a campsite at Lulu Bay, Navassa.



Puerto Rico's national bird, Puerto Rican Woodpecker (*Melanerpes portoricensis*) is endemic to the island. Photo: Alfredo D. Colón

³Numbers in brackets refer to vagrant species or those whose regular presence in the territory has not been confirmed.

IBA overview



A total of 30 IBAs covering 351,494 ha have been designated in Puerto Rico and the US unincorporated territories in the Caribbean (Table 1, 3, Figure 1, 2), of which, 20% have no form of legal protection. Nine IBAs enjoy full protection throughout their whole area. More than half (17) of the sites have been selected wholly or in part for species of global conservation concern and all five globally threatened species occurring in sufficient numbers to trigger IBA criteria are represented within sites (Table 3). Of the Near Threatened species recorded for the islands, only three occur in sufficient numbers to trigger IBA criteria. Twenty-five sites have been confirmed under criterion A2 corresponding to one Endemic Bird Area, with a total of 25 restricted-range species. This represents all restricted-range species present on the islands (see Ornithological Importance). Eight IBAs have been triggered by A4 criteria for nine waterbirds or seabirds. There are five sites for A4i, two for A4ii and three for A4iii.

The IBA program in **Puerto Rico** is an initiative of the Sociedad Ornitológica Puertorriqueña, Inc. The program started in 2002 with visits (led

by SOPI volunteers) to “potential” IBAs to document the presence of key bird species. A committee was established to evaluate the field survey and site information, and in June 2006 a national IBA workshop, in which state and federal personnel and NGO members participated, was held. Participants had the opportunity to review the information, discuss proposals and revise the criteria of the selected areas. The initial list of 26 proposed IBAs was consolidated to 18 selected sites. An additional two IBAs were proposed and have been included in the final inventory of 20 IBAs which embrace protected areas and privately owned lands. These 20 IBAs represent a critical network covering the full diversity of habitats for Puerto Rico’s avifauna.

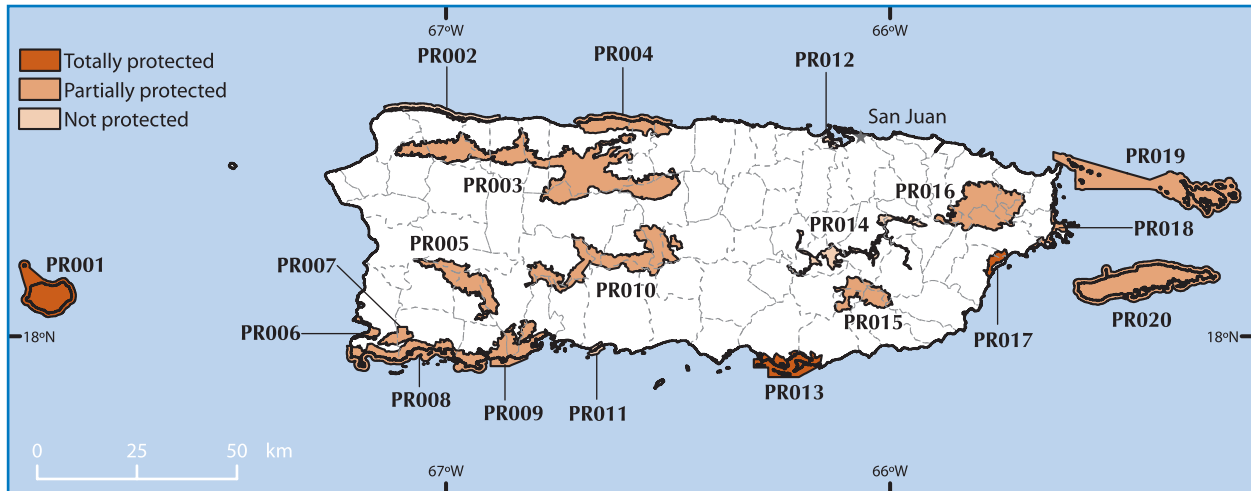
Of the **US Virgin Islands** IBAs, only St John IBA (VI007) embraces populations of all the restricted-range species, Bridled Quail-dove (*Geotrygon mystacea*) and Puerto Rican Flycatcher (*Myiarchus antillarum*) not being found in any other IBA in the islands. The globally threatened species are only found in criteria-triggering populations in

Table 3. Important Bird Areas in Puerto Rico and US Unincorporated Territories

IBA code	IBA name	Adm unit	Area (ha)	A1				A2	A3	A4		
				CR	EN	VU	NT			A4i	A4ii	A4iii
Puerto Rico												
PR001	Mona y Monito	Mayagüez	10,761	1								
PR002	Acantilados del Noroeste	Aguadilla, Camuy, Isabela, Quebradillas	4,147					X				
PR003	Karso del Norte	Arecibo, Barceloneta, Camuy, Ciales, Guaynabo, Hatillo, Isabela, Manatí, Moca, Quebradillas, Utuado	37,893	1				X				
PR004	Caño Tiburones	Arecibo, Barceloneta, Manatí	8,517			1		X		X		
PR005	Maricao y Susúa	Maricao, Sabana Grande, San Germán, Yauco	8,555	1		1		X				
PR006	Guaniquilla y Boquerón	Cabo Rojo	1,152			1		X				
PR007	Sierra Bermeja y Laguna Cartagena	Cabo Rojo, Lajas	1,979	1	1	1		X				
PR008	Suroeste	Cabo Rojo, Lajas	13,600	1	1			X		X		X
PR009	Karso del Sur	Guayanilla, Guánica, Peñuelas, Ponce, Yauco	8,162	1				X		X		
PR010	Cordillera Central	Adjuntas, Ciales, Guayanilla, Jayuya, Juana Diaz, Orocovis, Peñuelas, Ponce, Utuado, Yauco	18,250					X				
PR011	Salinas de Punta Cucharas	Ponce	661					X				
PR012	Ciénaga Las Cucharillas	Cataño	395			1		X				
PR013	Bahía de Jobos	Guayama, Salinas	6,917		1			X				X
PR014	Este Central	Aguas Buenas, Caguas, Cidra, Comerio, Gurabo, Juncos, San Lorenzo	5,166				1	X				
PR015	Carite	Caguas, Cayey, Guayama, Patillas, San Lorenzo, Yabucoa	6,000				1	X				
PR016	El Yunque	Canóvanas, Ceiba, Fajardo, Juncos, Las Piedras, Luquillo, Naguabo, Rio Grande	15,306	1		1		X				
PR017	Humacao	Humacao, Naguabo	1,378			1		X				
PR018	Ceiba y Naguabo	Ceiba, Naguabo	1,987					X				
PR019	Culebra	Culebra, Fajardo	23,704							X		X
PR020	Vieques	Vieques	22,646					X				
US Virgin Islands												
VI001	North-west Cays	St Thomas	1,185									X
VI002	Perseverance Bay Lagoons	St Thomas	175					X				
VI003	John Brewer’s Bay	St Thomas	270					X				
VI004	Saba Island and Cays	St Thomas	505							X		
VI005	Magens Bay	St Thomas	570					X				
VI006	Mangrove Lagoon	St Thomas	225					X				
VI007	St John	St John	2,978					X				
VI008	Southgate and Green Cay	St Croix	245				1	X				
VI009	Great Pond	St Croix	65				1	X				
Navassa												
UM001	Navassa	Navassa	148,100				1					X

For information on trigger species at each IBA, see individual site accounts at BirdLife’s Data Zone: www.birdlife.org/datazone/sites/

Figure 1. Location of Important Bird Areas in Puerto Rico



one IBA each—namely Southgate and Green Cay IBA (VI008) for Caribbean Coot (*Fulica caribaea*), and Great Pond IBA (VI009) for White-crowned Pigeon (*Patagioenas leucocephala*). With further information (e.g. concerning the numbers of breeding White-crowned Pigeon on Ruth Island, St Croix) additional IBAs for these species may be identified. Two of the IBAs have been identified on the basis of their globally significant seabird and waterbird populations.

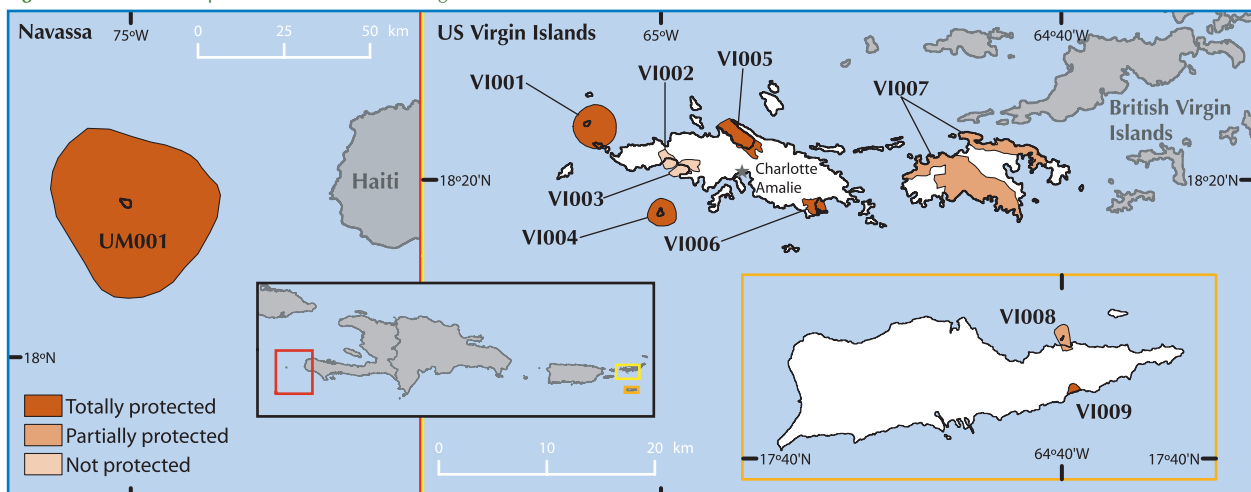
Navassa IBA (UM001) covers 148,100 ha of critical terrestrial and marine habitats that are legally protected as a national wildlife refuge.

However, remoteness from USFWS administration in Puerto Rico and disputed sovereignty by Haiti have made enforcement of regulations and conservation management impractical. As a result, foreign nationals enter the refuge and harvest protected natural resources. Illegal commercial and subsistence fishing and hunting activities (impacting the breeding seabirds) have been documented during recent expeditions. In spite of these infringements and other threats, the significant populations of Red-footed Booby (*Sula sula*) and Magnificent Frigatebird (*Fregata magnificens*) are thought to be have remained stable since the island became a refuge in 1999.



Young White-crowned Pigeons—significant numbers breed at Great Pond IBA, but the territory’s population is unknown. Photo: Claudia C. Lombard/USFWS

Figure 2. Location of Important Bird Areas in US Virgin Islands and Navassa



Opportunities



Some priority actions are outlined below to improve the conservation of birds and their habitats on Puerto Rico and the US unincorporated territories in the Caribbean.

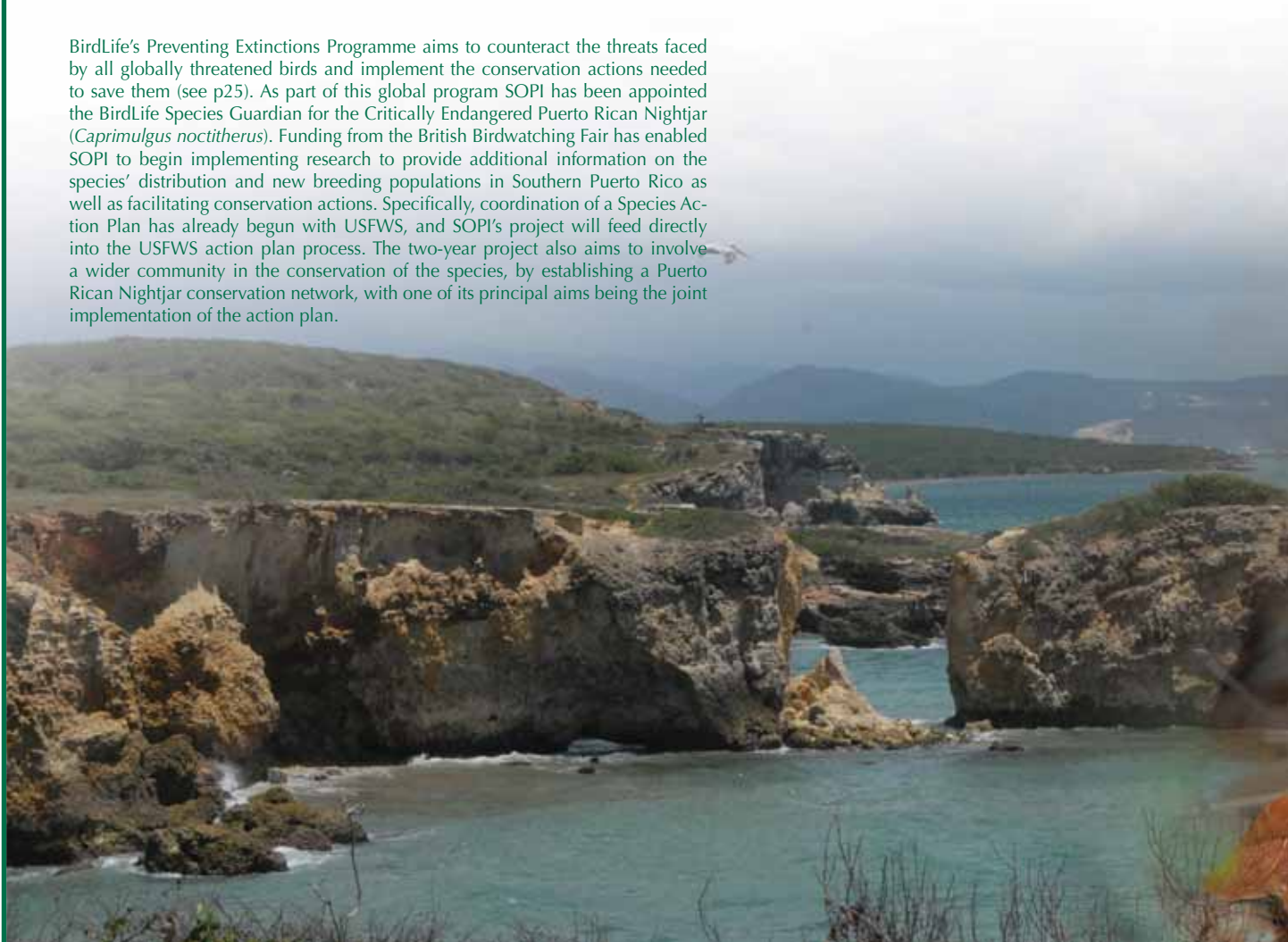
- Expand Site Support Group initiative to USVI, in the same way that SOPI is continuing to implement conservation actions at IBAs through the provision of assistance to IBA Site Support Groups on Puerto Rico.
- Control and monitor alien invasive species, for example, the DFW has eradicated rats from five cays on USVI and continues to monitor for their presence.
- Increased enforcement of existing legislation appears to be necessary on USVI if the populations of birds at the seven protected IBAs (that make the sites internationally important) are to thrive.
- Establishing and continuing with existing bird monitoring programs is essential for guiding conservation actions and determining the true impact of various threats across the territories. On Puerto Rico, SOPI is monitoring IBAs through the Shorebird Monitoring Network, Christmas Bird Counts and data collected by eBird (a public, online database for bird records), as well as through collaboration with state and federal agencies. Existing monitoring

programs for seabirds and some other species on USVI could usefully be expanded to fill population status data gaps for key species (and any additional birds on the USVI Endangered species list) at IBAs. The Division of Fish and Wildlife (DFW) and USFWS have initiated a collaborative project to assess the status of Least Tern (*Sterna antillarum*) populations on St Croix and produce management recommendations. A Least Tern nesting colony in the national park on St John is also monitored and protected by the park staff. Survey work is also required to establish population numbers for known large concentrations of seabirds, for example at Magens Bay (VI005). Such work may lead to more sites qualifying as IBAs under A4 criteria. On Navassa, more extensive research to better estimate the Red-footed Booby (*Sula sula*) and Magnificent Frigatebird (*Fregata magnificens*) colonies and establish a baseline against which to monitor the populations has been scheduled for the next biological expedition to the island.

- The results from the shorebird, threatened bird and seabird monitoring undertaken by all actors across the territories should be used to inform the annual assessment of state, pressure and response variables at each IBA in order to provide an objective status assessment and highlight management interventions that might be required to maintain these internationally important biodiversity sites.

Species Guardian for Puerto Rican Nightjar to establish conservation network to protect the species

BirdLife's Preventing Extinctions Programme aims to counteract the threats faced by all globally threatened birds and implement the conservation actions needed to save them (see p25). As part of this global program SOPI has been appointed the BirdLife Species Guardian for the Critically Endangered Puerto Rican Nightjar (*Caprimulgus noctitherus*). Funding from the British Birdwatching Fair has enabled SOPI to begin implementing research to provide additional information on the species' distribution and new breeding populations in Southern Puerto Rico as well as facilitating conservation actions. Specifically, coordination of a Species Action Plan has already begun with USFWS, and SOPI's project will feed directly into the USFWS action plan process. The two-year project also aims to involve a wider community in the conservation of the species, by establishing a Puerto Rican Nightjar conservation network, with one of its principal aims being the joint implementation of the action plan.



Punta Ventanas in Karso del Sur (PR009): effective conservation of this important Puerto Rican Nightjar area is threatened by a wind energy project.
Photo: F. González

Further information



National IBA directory

Méndez, V. (2009) Áreas Importantes para la Conservación de las Aves en Puerto Rico. San Juan, Puerto Rico: Sociedad Ornitológica Puertorriqueña, Inc.

Contact information

Verónica Anadón-Irizarry (Veronica.Anadon@birdlife.org)

BirdLife International

www.birdlife.org/regional/caribbean/

Jim Corven (calidris1@earthlink.net)

Bristol Community College

777 Elsbree St., Fall River, MA 02720, USA

<http://ebird.org/content/usvi/>

Verónica Méndez-Gallardo (sopi_aia@yahoo.com)

José A. Salguero-Farías (dricterus@yahoo.com)

Sociedad Ornitológica Puertorriqueña, Inc.

PO Box 195166

Joseph Schwagerl (joseph_schwagerl@fws.gov)

U.S. Fish And Wildlife Service

Post Office Box 510

Boqueron, Puerto Rico 00622-0510

www.fws.gov/southeast/

Acknowledgements



The authors would like to thank the following people and institutions for contributing to this chapter: Sergio Colón, Carol Cramer-Burke (St Croix Environmental Association), John Curnutt (USDA Forest Service Eastern Region), Javier Mercado, Joel Mercado, Douglas McNair (Sapphos Environmental, Inc.), Judy Pierce (DPNR, Division of Fish and Wildlife), Jorge Saliva, Susan Silander, Claudia Lombard (US Fish and Wildlife Service), Adrianne Tossas, Jean W. Wiener (Fondation pour la Protection de la Biodiversité Marine), Lisa Yntema, DNER, USFWS, USFS, USDA, CTPR personnel and SOPI's past and present Board, members and volunteers.

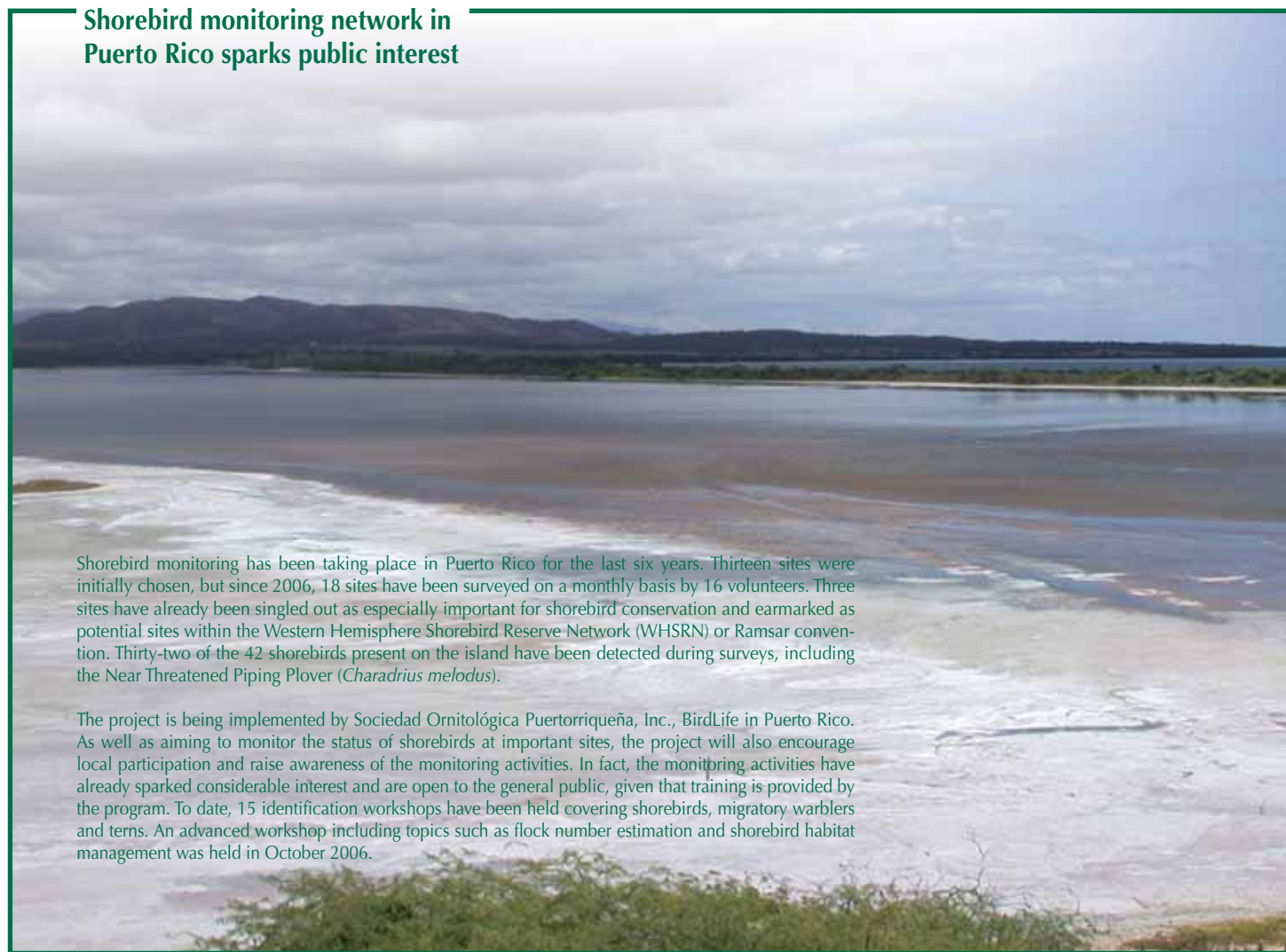


Box 1



Puerto Rican Nightjar
(*Caprimulgus noctitherus*)
Photo: Michael J. Morel

Shorebird monitoring network in Puerto Rico sparks public interest



Shorebird monitoring has been taking place in Puerto Rico for the last six years. Thirteen sites were initially chosen, but since 2006, 18 sites have been surveyed on a monthly basis by 16 volunteers. Three sites have already been singled out as especially important for shorebird conservation and earmarked as potential sites within the Western Hemisphere Shorebird Reserve Network (WHSRN) or Ramsar convention. Thirty-two of the 42 shorebirds present on the island have been detected during surveys, including the Near Threatened Piping Plover (*Charadrius melodus*).

The project is being implemented by Sociedad Ornitológica Puertorriqueña, Inc., BirdLife in Puerto Rico. As well as aiming to monitor the status of shorebirds at important sites, the project will also encourage local participation and raise awareness of the monitoring activities. In fact, the monitoring activities have already sparked considerable interest and are open to the general public, given that training is provided by the program. To date, 15 identification workshops have been held covering shorebirds, migratory warblers and terns. An advanced workshop including topics such as flock number estimation and shorebird habitat management was held in October 2006.

Surroeste IBA (PR008), embraces the Cabo Rojo Salt Flats National Wildlife Refuge, and is one of three sites identified as especially important for shorebirds. Photos F. González

References

- AUKEMA, J. E., CARLO, T. A., TOSSAS, A. G. & ANADÓN-IRIZARRY, V. (2006) A call to protect Sierra Bermeja for future generations. San Juan, Puerto Rico: Sociedad Ornitológica Puertorriqueña, Inc.
- BIRDLIFE INTERNATIONAL (2008) *Important Bird Areas in the Caribbean: key sites for conservation*. Cambridge, UK: BirdLife International. (BirdLife Conservation Series No. 15)
- BONILLA, G., VÁZQUEZ, M. & PÉREZ, E. (1992) Estatus, estimado poblacional y distribución de cuatro aves acuáticas nativas en Puerto Rico. Pp.135–148 in E. L. Cardona, ed. *XVIII Simposio de los Recursos Naturales*. Puerta de Tierra, Puerto Rico: Departamento de Recursos Naturales y Ambientales.
- BOULON, R. H. & GRIFFIN, D. M. (1999) *Shoreline guide to the U.S. Virgin Islands*. St Thomas, USVI: Dept. Planning and Natural Resources, Div. Fish and Wildlife.
- COLÓN, S. (2004) *Aves de la zona del Caño Tiburones y Bosque de Cambalache*. San Juan, Puerto Rico: Sociedad Ornitológica Puertorriqueña, Inc. (Unpublished data).
- COLLAZO, J., HARRINGTON, B., GEAR, J. & COLÓN, J. (1995) Abundance and distribution of shorebirds at the Cabo Rojo Salt Flats, Puerto Rico. *J. Field Orn.* 66: 424–438.
- DAMMANN, A. E. & NELLIS, D. W. (1992) *A natural history atlas to the cays of the U.S. Virgin Islands*. Sarasota, FL, USA: Pineapple Press, Inc.
- DIAZ, R. & PÉREZ, R. (1989) *Assessment of the West Indian Whistling Duck Dendrocygna arborea in eastern Puerto Rico*. San Juan, Puerto Rico: Department of Natural and Environmental Resources. (Unpublished report).
- GARCÍA, M., CRUZ, J., VENTOSA, E. & LÓPEZ, R. (2005) *Puerto Rico comprehensive wildlife conservation strategy*. San Juan, Puerto Rico: Department of Natural and Environmental Resources.
- GIBNEY, E., THOMAS, T., O'REILLY, R. & DEVINE, B. (2000) *USVI vegetation community classification system*. St Thomas, USVI: University of the Virgin Islands Conservation Data Center [available at: <http://cdc.uvi.edu/reaweb/vegbody.html>].
- ISLAND RESOURCES FOUNDATION (1993) Southgate Pond/Chenay Bay, Area of Particular Concern and Area of Preservation and Restoration: a comprehensive analytical study. St Thomas, USVI: Dept. Planning and Natural Resources. (Unpublished report).
- JOGLAR, R. L. Eds. (2005) *Biodiversidad de Puerto Rico: vertebrados terrestres y ecosistemas*. San Juan, Puerto Rico: Editorial del Instituto de Cultura Puertorriqueña.
- LOMBARD, C. D. (2006) *Navassa Island National Wildlife Refuge Bird Observations*. Boquerón, Puerto Rico: United States Fish and Wildlife Service. (Unpublished report).
- LÓPEZ, T. & VILLANUEVA, N. (2006) *Atlas ambiental de Puerto Rico*. San Juan, Puerto Rico: La Editorial Universidad de Puerto Rico.
- MCLAUGHLIN, M. Ed. (1976) *Shoreline and marine associations of the Virgin Islands*. St Thomas, USVI: Island Resources Foundation (DCCA Environmental Fact Sheet 4).
- MCNAIR, D. B. (2006) Historical breeding distribution and abundance of the White-crowned Pigeon (*Patagioenas leucocephala*) on St. Croix, US Virgin Islands. *J. Carib. Orn.* 19: 1–7.
- MCNAIR, D. B. (2006) Review of the status of American (*Fulica americana*) and Caribbean Coot (*Fulica caribaea*) in the United States Virgin Islands. *North American Birds* 59: 680–686.
- MCNAIR, D. B. & LOMBARD, C. D. (2004) Population estimates, habitat associations, and management of *Ameiva polops* (Cope) at Green Cay, U.S. Virgin Islands. *Carib. J. Sci.* 40: 353–361.
- MCNAIR, D. B. & SLADEN, F. W. (2007) Historical and current status of the Cattle Egret in the U.S. Virgin Islands, and management considerations. *J. Carib. Orn.* 20: 7–16.
- MCNAIR, D. B., YNTEMA, L. D. & CRAMER-BURKE, C. (2006) Use of waterbird abundance for saline wetland site prioritization on St Croix, U.S. Virgin Islands. *Carib. J. Sci.* 42: 220–230.
- MCNAIR, D. B., YNTEMA, L. D., CRAMER-BURKE, C. & FROMER, S. L. (2006) Recent breeding records and status review of the Ruddy Duck (*Oxyura jamaicensis*) on St Croix, U.S. Virgin Islands. *J. Carib. Orn.* 19: 91–96.
- MCNAIR, D. B., YNTEMA, L. D., LOMBARD, C. D., CRAMER-BURKE, C. & SLADEN, F. W. (2005) Records of rare and uncommon birds from recent surveys on St



Piping Plover (*Charadrius melodus*)
Photo: Gabriel Lugo

- Croix, United States Virgin Islands. *North American Birds* 59: 539–551.
- PIERCE, J. J. (1996) *Survey of cove nesting avifauna in the U. S. Virgin Islands*. St Thomas, USVI: Div. Fish and Wildlife, Dept. Planning and Natural Resources (Final report for the Pittman-Robertson Wildlife Restoration Aid Grant W5-11, Study 2).
- MILLER, M. W. (2003). *Status of reef resources of Navassa Island*. Unpublished U.S. Department of Commerce – National Oceanic and Atmospheric Administration Technical Memorandum (NMFS-SEFSC-501)
- MILLER, M. W., MCCLELLAN, D. B., WIENER, J. W. & STOFFLE, B. (2007) Apparent rapid fisheries escalation at a remote Caribbean island. *Env. Conserv.* 34:92–94
- MIRANDA, L., PUENTE, A. & VEGA, S. (2000) First list of the vertebrates of Los Tres Picachos State Forest, Puerto Rico, with data on relative abundance and altitudinal distribution. *Carib. J. Sci.* 36: 117–126.
- MORALES, A. (2002) *Lista de aves observadas en los Acanalados de Guajacata, Quebradillas, Puerto Rico*. San Juan: Sociedad Ornitológica Puertorriqueña, Inc. (Unpublished report).
- PIERCE, J. J. (2009) United States Virgin Islands. In Bradley P. E. and Norton, R. L. eds. *Breeding seabirds of the Caribbean*. Gainesville, Florida: Univ. Florida Press.
- PLATENBERG, R. J., HAYES, F. E., MCNAIR, D. B. & PIERCE, J. J. (2005) *Comprehensive wildlife conservation strategy for the U.S. Virgin Islands*. St Thomas, USVI: Div. Fish and Wildlife, Dept. Planning and Natural Resources.
- POWELL, R. (1999) Herpetology of Navassa Island, West Indies. *Carib. J. Sci.* 35: 1–13
- RAFFAELE, H. A. (1989) *A guide to the birds of Puerto Rico and the Virgin Islands* (Revised edition). Princeton, New Jersey: Princeton University Press.
- RAFFAELE, H., WILEY J., GARRIDO, O., KEITH, A. & RAFFAELE, J. (1998) *A guide to the birds of the West Indies*. Princeton, New Jersey: Princeton University Press.
- RIVERA, M. (1997) *Puerto Rican Broad-winged Hawk and Puerto Rican Sharp-shinned Hawk* *Buteo platypterus brunescens* and *Accipiter striatus venator* *Recovery Plan*. Cabo Rojo, Puerto Rico: US Fish and Wildlife Service (Boquerón Field Office).
- SCHREIBER, E. A. & LEE, D. S. Eds. (2000) *Status and conservation of West Indian Seabirds*. Ruston, USA: Society of Caribbean Ornithology (Spec. Publ. 1).
- SILANDER, S., SCHWAGERL, J., CERVENY, K. & GUDE, A. (2006) *Navassa Island National Wildlife Refuge coordinated management strategy*. Washington, D.C., USA. (Unpublished White Paper submitted to the Department of the Interior).
- SLADEN, F. W. (1992) Abundance and distribution of waterbirds in two types of wetland on St. Croix, U.S. Virgin Islands. *Ornitología Caribeña* 3: 35–42.
- SOPI (2008) *Puerto Rico breeding bird atlas*. San Juan, Puerto Rico: Sociedad Ornitológica Puertorriqueña, Inc. (Unpublished report).
- SORRIÉ, B. A. (1975) Observations on the birds of Vieques Island, Puerto Rico. *Carib. J. Science* 15: 89–103.
- THE NATURE CONSERVANCY (2005) *A survey of the plants, birds, reptiles and amphibians at the Magen's Bay Preserve, St Thomas, U.S. Virgin Islands*. St Thomas, USVI: Div. Fish and Wildlife, Dept. Planning and Natural Resources.
- US FISH AND WILDLIFE SERVICE (2006) *Environmental Assessment: reintroduction of the Puerto Rican Parrot to Rio Abajo Commonwealth Forest, Puerto Rico*. Río Grande, Puerto Rico: US Fish and Wildlife Service (Río Grande Field Office).
- US FISH AND WILDLIFE SERVICE (2007) *Refugio Nacional de Vida Silvestre de Vieques: plan abarcador de conservación y declaración de impacto ambiental*. Vieques, Puerto Rico: US Fish and Wildlife Service.
- VENTOSA, E., CAMACHO, M., CHABERT, J., SUSTACHE, J. & DÁVILA, D. (2005) *Puerto Rico waterfowl focus areas*. San Juan, Puerto Rico: Department of Natural and Environmental Resources.
- VILELLA, F. J. & ZWANK, P. J. (1993) Geographic distribution and abundance of the Puerto Rican Nightjar. *J. Field Orn.* 64: 233–238.
- WAIDE, R. B. (1995) *Status and conservation of the Elf-woods Warbler Dendroica angelae in the Luquillo Experimental Forest*. (Unpublished final report submitted to the US Fish and Wildlife Service).
- WIENER, J. W. (2005) *Oral history and contemporary assessment of Navassa island fishermen*. Port-au-Prince, Haiti: Fondation pour la Protection de la Biodiversité Marine, (Unpublished report).
- WUNDERLE, J. M., WAIDE, R. B. & FERNÁNDEZ, J. (1988) Seasonal abundance of shorebirds in the Jobos Bay estuary in southern Puerto Rico. *J. Field Orn.* 60: 329–339.
- YEARMAN, K. (1998) Navassa Island – a look at hell. *Bull. Illinois Geogr. Soc.* 40.