An Inventory of Breeding Seabirds of the Caribbean

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The Islands of Venezuela

DIANA ESCLASANS, MIGUEL LENTINO, ALEJANDRO LUY, AND CARLOS BOSQUE

The Venezuelan coastline is approximately 3,964 km long. Off the coastline, from the Gulf of Venezuela in the west to the Gulf of Paria in the east, extends a series of islands that are all Venezuelan territory except for Aruba, Curaçao, and Bonaire. The islands of Margarita, Coche, and Cubagua make up the State of Nueva Esparta, and the rest make up the Federal Dependencies, a group of approximately 311 islands, cays, and small barren islets with an estimated area of 316 km^2 (maps 48, 49, 50). These islands host important colonies of seabirds and 14 endemic subspecies of landbirds.

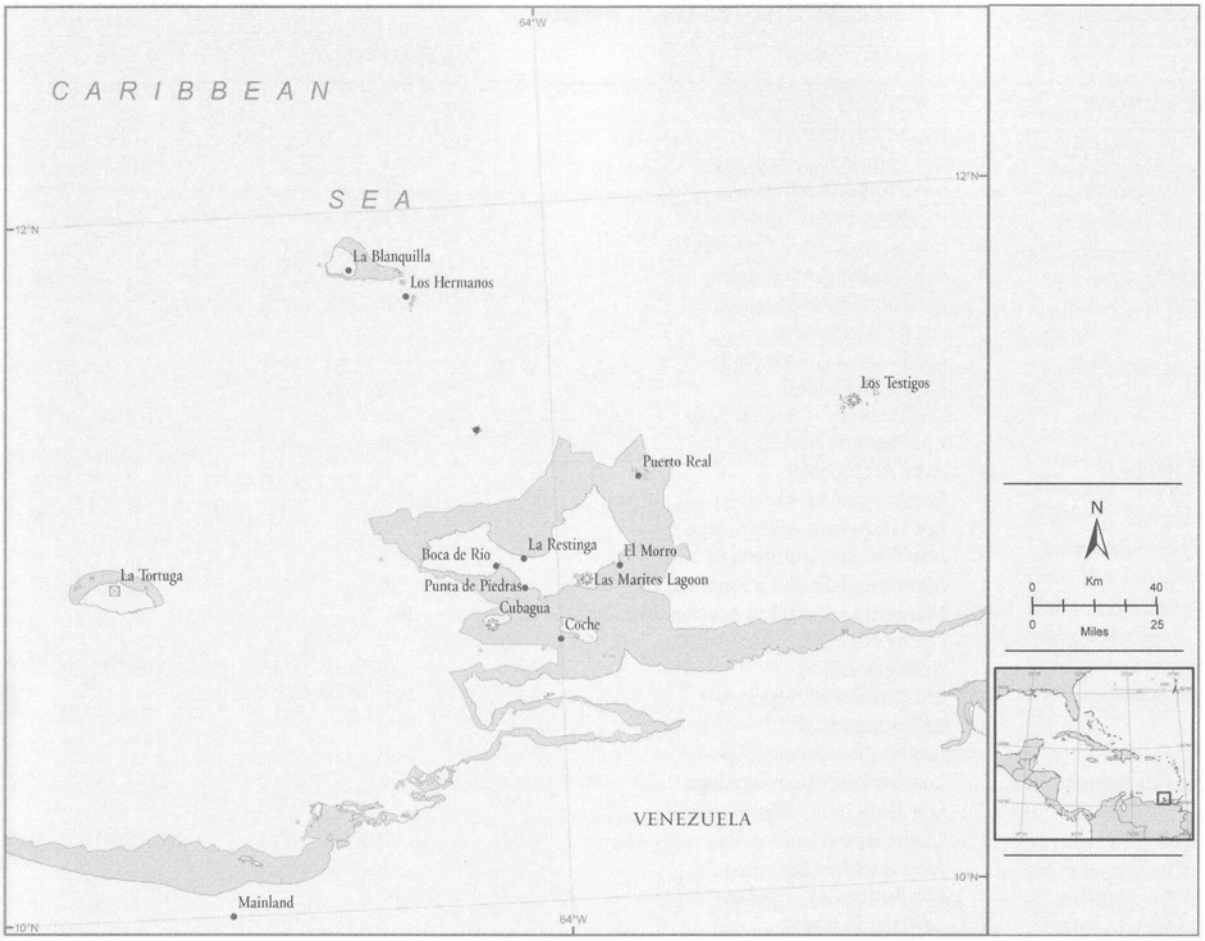
Study of the birds of Venezuelan islands began in the early twentieth century (Ferry 1908; Cory 1909; Lowe 1911a). Initial investigations consisted mostly of inventories of species, but authors occasionally added comments on the activity of colonies seabirds. The most important bird inventories were made during the 1940s and 1950s, and until now they have been the main source of information on bird diversity of the islands (Fernández 1945; Phelps Jr. 1945, 1948; Phelps and Phelps Jr. 1950, 1957, 1959a, 1959b; Ginés and Yépez 1956, 1960; Yépez 1963a, 1963b, 1964a, 1964b). In later years fewer studies on island birds have been conducted, particularly on the most remote islands; nonetheless, a few described aspects of the biology of some marine species (LeCroy 1976) and made reliable estimates of colony sizes in some islands, such as Isla Aves (Lazell 1967; Gremone and Gómez 1983) and Los Roques Archipelago (Guzmán and Schreiber 1987; Luy 1997; Bosque et al. 2001; Esclasans 2003).

The only counts of breeding seabirds since 1996 were from Los Roques and Aves Island (table 25.1); a list of all known breeding species is given in table 25.2. Subsequent information refers only to the string of islands that lie parallel to the mainland coast: Margarita, Coche, Cubagua, La Orchila, La Tortuga, La Blanquilla, and Aves, and the archipelagos Los Monjes, Las Aves, Los Roques, Los Hermanos, Los Frailes, and Los Testigos. Table 25.3 shows the location of these islands and their most important habitat types. The richest islands or groups of islands in terms of number of breeding seabirds are Los Roques Archipelago (15 species), Las Aves Archipelago (11 species), La Orchila Archipelago (8 species), and Los Hermanos Archipelago (7 species; table 25.2). Detailed studies on these islands are few, and for some locations we can report only the presence (or absence) of species. For three localities we provide nest counts (breeding pairs): Marites Lagoon, Los Roques Archipelago, and Las Aves (table 25.2).

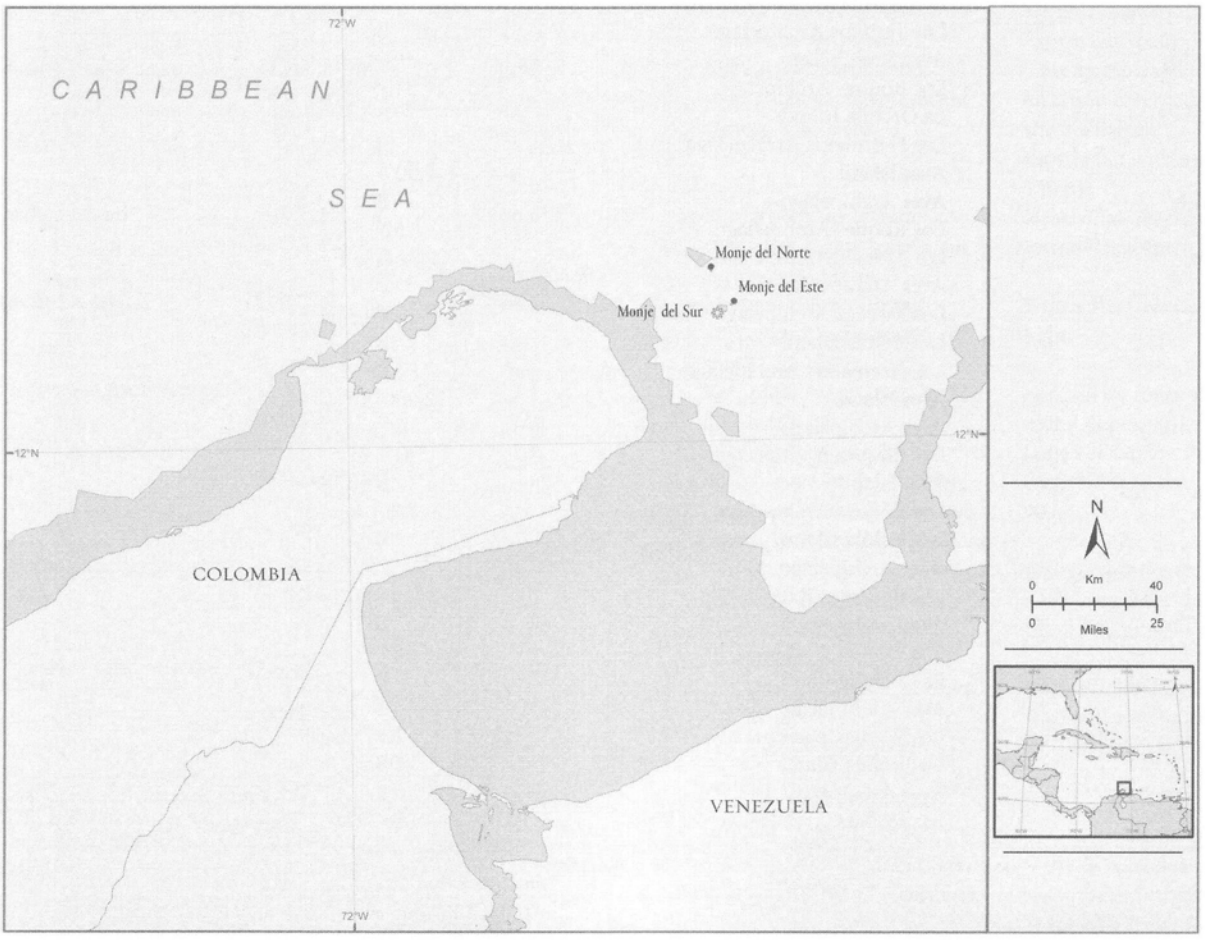
The most important finding in this chapter are that one of the largest Caribbean breeding populations of Masked Booby was found on Los Monjes Archipelago in 1996 (Ricardo Muñoz Tebar pers. comm.), and the largest colony of Brown Noddy remains on Las Aves (Rodrigo Lazo, pers. comm.). Significant numbers of Black Noddy (the largest colony in the Caribbean) breed in Los Roques Archipelago. In addition, we point out that populations of several species of seabirds are seemingly in decline. Our review shows that current knowledge of

Table 25.1. Counts of seabird pairs breeding on Los Roques Archipelago, 2001–2002 (the only post-1996 counts in Venezuela)

Species	Number of pairs
Brown Booby	474
Red-footed Booby	1,113
Brown Pelican	491
Laughing Gull	544
Brown Noddy	313
Black Noddy	52
Sooty Tern	5
Bridled Tern	418
Least Tern	205
Common Tern	104
Royal Tern	25
Cayenne Tern	75



Map 49. La Blanquilla, Los Testigos, Los Hermanos, Coche, Cubagua, and La Tortuga, Venezuela.



Map 50. Los Monjes, Venezuela.

Table 25.2. Counts of seabird pairs breeding in the Venezuelan islands and archipelagos

Species	Location	Number of Pairs
Audubon's Shearwater	Los Roques Archipelago	B[a]
	La Orchila Island	B
	Los Hermanos Archipelago	B
Red-billed Tropicbird	Los Monjes Archipelago	B
	Los Roques Archipelago	B
	Los Hermanos Archipelago	B
Masked Booby	Los Monjes Archipelago	200[d]
Brown Booby	Los Monjes Archipelago	200[d]
	Aves Archipelago	B
	Los Roques Archipelago	474[f]
	La Orchila Island	B
	Los Hermanos Archipelago	B
	Los Testigos Archipelago	B
Red-footed Booby	Aves Archipelago	B
	Los Roques Archipelago	1,113[f]
	Los Hermanos Archipelago	B
	Los Testigos Archipelago	B
Brown Pelican	Margarita Island, La Restinga Lagoon	B
	Margarita Island, Las Marites Lagoon	291[c]
	Coche Island	B
	Cubagua Island	B
	Los Roques Archipelago	491[f]
	La Tortuga Island	B
	Los Frailes Archipelago	B
Magnificent Frigatebird	Los Hermanos Archipelago	B
	Los Testigos Archipelago	B
Laughing Gull	Coche Island	B
	Aves Archipelago	B
	Los Roques Archipelago	544[f]
	La Orchila Island	B
	Los Hermanos Archipelago	B
	Los Testigos Archipelago	B
Brown Noddy	Aves Archipelago	B
	Los Roques Archipelago	313[f]
	La Orchila Island	B
	Los Hermanos Archipelago	B
	Aves Island	5,000[g]
Black Noddy	Aves Archipelago	B
	Los Roques Archipelago	52[f]
Sooty Tern	Los Monjes Archipelago	B
	Aves Archipelago	B
	Los Roques Archipelago	5[e]
	La Orchila Island	B
	Los Hermanos Archipelago	B
	Aves Island	12,000[g]
Bridled Tern	Aves Archipelago	B
	Los Roques Archipelago	418[f]
	Aves Island	B
Least Tern	Los Roques Archipelago	205[f]
	La Orchila Island	B
Roseate Tern	Aves Archipelago	B
	Los Roques Archipelago	E[b]
Common Tern	Aves Archipelago	B
	Los Roques Archipelago	104[f]
	La Orchila Island	B
Royal Tern	Aves Archipelago	B
	Los Roques Archipelago	25[e]
	La Orchila Island	B
Cayenne Tern	Aves Archipelago	B
	Los Roques Archipelago	75[e]

a. Breeds in unknown numbers, no recent counts.

b. Breed historically, extirpated; no recent data.

c. Guzmán and Schreiber (1987).

d. Ricardo Muñoz Tebar, pers. comm. (data from 1996).

e. Bosque et al (2001).

f. Esclasans (2003).

g. Rodrigo Lazo (2007, unpublished data).

Table 25.3. Location, area, topography, and habitat types of Venezuelan islands and archipelagos

Island or archipelago	Location	Area (km^2)	No. islands or keys	Habitat/vegetation types	Physiognomy and Topography
Margarita Island	10°51' 11°10' N 63°46' 64°24' W	933.80	1	Semiarid thorn scrub, mesophytic vegetation.	Formed by two large hilly portions joined by narrow sandy isthmus.
Coche Island	10°44' 10°49' N 63°53' 64°00' W	43.09	1	Xerophytic and halophylous vegetation. Cacti (*Opuntia* sp., *Melocactus* sp.), dominant.	Has a smooth relief, slanting from north to south, Elevations below 50m.
Cubagua Island	10°47' 10°51' N 64°08' 64°14' W	22.44	1	Xerophytic and halophylous vegetation. Cacti (*Opuntia* sp., *Melocactus* sp.).	Smooth relief shaped by rounded hills, not higher than six meters.
Los Monjes Archipelago	12°22' 12°21' N 70°55' 70°53' W	0.2	5	Rocky shores, grasses.	Formed by three groups of islands, Northern Monjes (6 islands), Southern Monjes (2 islands) and Eastern Monjes (1 island). Monje Grande, in the Southern Monjes, 600 m long, 350 m wide, and 70 m highest elevation.
Las Aves Archipelago	12° N 12° N 67°25' 67°40' W	3.4	8	*Batis maritime* dominant along beaches. Dunes covered by herbaceous veg. Large mangrove stands, *Rhizophora mangle* and *Avicennia germinans.*	Formed by two growing atolls of islets and coral reefs.
Los Roques Archipelago	11°44' 11°58' N 66°32' 66°52' W	40.6	58	Mangroves, herbaceous "prairies," halophylous vegetation along shorelines, thorn scrub, rocky cliffs, storm terraces, sea grass bottoms (*Thalassia testudinum*).	Mostly sandy keys of coralline origin and a large number of sandbanks, all together in an oval shape around a shallow lagoon (1–10 m deep). Largest island, Gran Roque, to the north, has rocky cliffs.
La Orchila Island	11°47' 11°49' N 66°6' 66°13' W	40	7	Mangroves, xerophytic vegetation, cacti, spinescent shrubs, and herbs.	This archipelago includes sandy keys and emerged coral reefs to the northwest. La Orchila Island is mostly flat with a single elevation of 150 m.
La Tortuga Island	10°57' N 65°19' W	156.6	18	Mangroves, xerophytic vegetation, cacti, spinescent shrubs, and herbs.	Nearly flat, reaches 40 m high toward the center.
La Blanquilla Island	11°50' N 64°35' W	64.5	1	Mangroves, xerophytic vegetation, cacti, spinescent shrubs, and herbs.	Nearly flat, reaches less than 40 m high.
Los Hermanos Archipelago	11°45' N 64°25' W	2.1	7	Xerophytic vegetation, cacti dominant.	Formed by seven islets having steep rocky slopes, no sandy beaches.
Los Frailes Archipelago	11°11' 11°14' N 63°42' 63°46' W	1.9	8	Xerophytic veg., cacti dominant: *Cereus veriabilis*, *Opuntia wentiana*, *Melocatus caesius,* and *Cenchrus echinatus.*	Largest island is Puerto Real, 2.2 km long and 0.75 km^2; highest elevation 90 m.
Los Testigos Archipelago	11°20' 11°25' N 63°02' 63°09' W	6.5	15	Xerophytic vegetation, shrubs and mid-size trees present, e.g., *Hippomane mancinella*. No mangroves.	Testigo Grande, largest island, about 5 km long. Maximum elevation about 150 m.
Aves Island	15°40' N 63°36' W	0.035	1	Halophylous litoral "prairies," e.g., *Sesuvium portulacastrum* and *Portulaca aleracea*	Low and flat; formed by calcareous sand and coral conglomerates laid on the rocky platform.

Venezuelan seabirds is very poor, and that only at Los Roques Archipelago and Aves Island have recent counts of breeding pairs been conducted (Bosque et al. 2001; Esclasans 2003; Rodrigo Lazo, pers. comm.).

Description of the Islands

Most of the islands lie between 150 and 200 km to the north of the mainland, forming a more or less parallel rosary along the coastline; the exception is Aves Island, about 500 km north (table 25.3). These islands originated in the early Cretaceous and consist of surfacing igneous-metamorphic rocks. On some of them the rocky plinth is covered by substantial calcareous deposits that form extensive coralline archipelagos, such as at Los Roques and Las Aves. The islands are quite arid, annual precipitation generally averaging less than 100 mm, and their average yearly ambient temperature is above 28°C. Evaporation is high, and humid northeast trade winds sweep the islands continuously. These conditions shape the predominant vegetation types of the islands: mangroves, thorny scrub, halophytic savannas, and patches of xerophytic scrub (Fontana 1993).

These islands and cays host a diverse avifauna of some 123 species, 70 aquatic and 53 terrestrial. Of the 32 species of seabirds known for Venezuela, 17 have breeding colonies in the islands (table 25.2). Six are resident (Red-billed Tropicbird, Masked Booby, Brown Booby, Red-footed Booby, Brown Pelican, and Magnificent Frigatebird); three are migratory (Audubon's Shearwater, Brown Noddy, and Black Noddy); and eight have resident and migratory populations (Laughing Gull and Sooty, Bridled, Least, Roseate, Common, Royal and Cayenne terns).

Methods of Surveying the Colonies

In this review, we report estimates of breeding pairs and colony sizes from information in the literature or from our field studies, where indicated. In general the method employed on a majority of the islands was a direct count of each colony. Bosque et al. (2001) and Esclasans (2003) used a combination of census methods to count the number of breeding pairs on Los Roques Archipelago (map 48). On smaller cays, the total number of birds or pairs was counted, while on larger islands subsamples were taken along predetermined transect and the total number of nests or pairs was estimated by considering the area where the main breeding colony occurred on a given island.

Counts of Bridled Terns were made by the flush-counting method (Burger and Lawrence 2000), to provide a rough indication of the numbers of breeding pairs. The ratio was determined depending on the area of the rocky section, the preferred site for nesting. Red-footed Booby on Los Bobos Cays was sampled from boats along the coastline when breeding in mangrove swamps.

Margarita, Coche, and Cubagua Islands

The islands of Margarita, Coche, and Cubagua are located north of Araya Peninsula (Sucre State), off the eastern coast of the country and making up the State of Nueva Esparta. Table 25.2 shows reports of breeding colonies in Coche, Cubagua, and two localities on Margarita Island: La Restinga and Las Marites Lagoon.

Overall, 15 species of seabirds are known from Margarita Island, and Coche and Cubagua host eight and seven species respectively (Yépez 1963a, 1964a; Bisbal 2001). Of these, only two species breed: Brown Pelican and Laughing Gull. The current knowledge of sizes of the colonies is sparse. Brown Pelican were reported to be very common (Yépez 1963b), but it was not until 1983 that population estimates were made. Guzmán and Schreiber (1987) reported 291 nests in Las Marites Lagoon (table 25.2) and estimated a population of about 743 individuals in the islands, while Bisbal (2001) observed 800 individuals of Brown Pelican resting in Punta Arena, Cubagua. Therefore, there are not sufficient data to indicate if the population of Brown Pelican has diminished or increased in these islands.

Los Monjes Archipelago

Los Monjes Archipelago is a set of small barren islets located to the northwest of the Gulf of Venezuela, near the western limit of the country. All the islands have meager vegetation, grasses and lichens being dominant (Williams 1980).

Four species breed on this archipelago (Red-billed Tropicbird, Masked Booby, Brown Booby, and Sooty Tern). The Masked Booby population numbered approximately 500 individuals or an estimated 200 pairs in 1996, making it the largest colony in Venezuela; the estimate for Brown Booby was 200 pairs; there are no post-2000 counts (Ricardo Muñoz Tebar, pers. comm.; table 25.2). Red-billed Tropicbird and Sooty Tern also bred, but the size of the colonies was not estimated (Ricardo Muñoz Tebar, pers. comm.). Between 1995 and 1998 the southern islets of Los Monjes were linked by

a man-made isthmus with the purpose of constructing a port and a military base. It seems probable that this construction has had a negative effect on the population of Masked Boobies, but no study has yet been done. The position of the Los Monjes Archipelago likely makes these islands essential in the migratory route of many bird species, but again no assessment has been made.

Las Aves Archipelago

Two reef complexes known as Las Aves Windward (three islands) and Las Aves Leeward (five islands) make up the Las Aves Archipelago. The islands are located about 160 km north of the mainland (map 48). Vegetation of the islands is halophytic-xerophytic (Williams 1980).

Eleven species breed in these islands, two sulids and eight larids (table 25.2). The initial observations were made in 1958 and 1959. In 1958 between 1,800 and 2,000 individuals of Brown Booby were recorded on Bubí Cay, in the northern sector of Las Aves Windward (Werf et al. 1958). In 1959 a flock of 300 to 400 individuals of Red-footed Booby was recorded on Tesoro Island, located on the western part of Las Aves Windward; additionally, 200 nests were noted in a patch of black mangrove (*Avicennia germinans*) on the same island (Ginés and Yépez 1960). Van Halewyn and Norton (1984) in their review of the status of Caribbean birds estimated the population of Brown Booby at 1,000 birds and that of Red-footed Booby at 1,200 individuals. The latter figures suggest that populations of Brown Booby have declined while those of Red-footed Booby have increased since the 1950s, but there are no recent reports to support this indication of an increase.

Los Roques Archipelago

Los Roques encompass most of the typical coastal ecosystems of Caribbean shorelines, including sandy beaches, shallow lagoons, brine ponds, grass prairies, mangroves, storm terraces, and rocky cliffs (map 48). Most of the knowledge of birds inhabiting cays and islands of Los Roques is due to the studies and explorations made by the Phelpses (1950, 1959b). Several later workers have studied some of these islands and their species composition (Lentino et al. 1994; Lentino and Rodner 2003), in some cases estimating population sizes (LeCroy 1976; Guzmán and Schreiber 1987; Luy 1997; Bosque et al. 2001).

Twenty-two species of seabirds have been reported on the archipelago, of which 15 species breed, including Red-billed Tropicbird (for which there are no counts), with breeding unconfirmed for Roseate Tern. Bosque et al. (2001) and Esclasans (2003) made recent counts of breeding pairs for 11 species of seabirds that breed in the archipelago (tables 25.1, 25.2). Those counts represent minimum numbers of breeding pairs present in the archipelago, because we were unable to count all the colonies on larger islands and unable to visit the southern cays (Gresqui, Sal, and Maria Uespen cays).

Populations of Brown Pelican, Bridled Tern, and Least Tern seem to have diminished in the last decade, since more recent estimates of their populations (Luy 1997; Bosque et al. 2001) are substantially lower than those reported by van Halewyn and Norton (1984). The latter authors estimated for Los Roques a population of 2,000 Brown Pelican. In 1992, 310 nests of this species were noted on Los Canquises, and their total population on Los Roques was estimated at 923 birds (Luy 1997), with at least 491 pairs in 2002 (Esclasans 2003), seemingly a declining trend for this species.

Phelps and Phelps Jr. (1959b) pointed out the presence of several individuals of Masked Booby and reported nesting on two islands, Gran Roque and Selesquí. Van Halewyn and Norton (1984) indicated that this species was scarce on Los Roques, and reported no more than 15 individuals there. Luy in September of 1992 registered a nest of this booby on Selesquí, and Bosque et al. (2001) reported just one Masked Booby on Selesquí; there was no evidence of breeding on this island or in any other of the islands of the archipelago (Esclasans 2003). Masked Boobies have always been rare on Los Roques, but the nearly total lack of recent reports suggests that they are now disappearing.

In contrast, numbers of Brown Booby, Laughing Gull, Royal Tern, and Common Tern seem to have increased, when comparing recent figures to those of van Halewyn and Norton (1984). The Brown Booby colony has increased to 474 pairs. Recent estimates of Laughing Gull were of at least 1,200 individuals (544 pairs) (table 25.1), substantially higher than the earlier estimate of 100 individuals (Halewyn and Norton 1984). Red-footed Booby (1,113 pairs) and Brown Noddy (313 pairs) have maintained large breeding colonies on Los Roques (table 25.1), likely comparable in numbers to those initially observed by Phelps and Phelps Jr. in the 1950s.

The Black Noddy is considered a rare species throughout the Caribbean, its total population for the whole region being estimated at 10–100 pairs (Chardine et al. 2000b). Luy in 1992 observed several tens of this species on Los Roques but did not record any nests. Esclasans (2003) counted 52 breeding pairs on Los Roques

(table 25.1), where the species commonly nests in small colonies within stands of black mangrove on several islands.

It is important to emphasize that our counts show legally protected cays hosting the largest breeding colonies, such as Brown Pelican, Brown Booby, and Red-Footed Booby (resident species) on Los Canquises cay and the archipelago's largest colony of Red-Footed Booby on Los Bobos cay. Both of these sites are within the restricted use zones (Integral Protection Zones) of a national park.

Roseate Terns were reported nesting on four islands in the archipelago by Phelps and Phelps Jr. (1959b), but neither Bosque et al. (2001) nor Esclasans (2003) found any nests of this species.

La Orchila Archipelago

This small archipelago consists of La Orchila Island and a group of sandy cays and emergent coralline reefs. Phelps and Phelps Jr. (1959a) reported 11 species of seabirds for La Orchila, and Lentino et al. (1994) added two species to the list, Yellow-billed Tern and Cayenne Tern, bringing the total number of species to 13.

Eight species are known to breed: Audubon's Shearwater, Brown Booby, Laughing Gull, Brown Noddy, Sooty Tern, Least Tern, Common Tern, and Royal Tern (table 25.2), although there are no recent population data. Nonetheless, Meyer de Schauensee and Phelps Jr. (1978) noted that the populations of Sooty Tern had diminished considerably by the time of their publication.

La Tortuga Island

La Tortuga is the second largest Venezuelan island after Margarita. Seven species of seabirds have been recorded, but only Brown Pelican were ever reported breeding in a large colony (Cory 1909). Later studies have not recorded any breeding colonies (Fernández 1945; Phelps Jr. 1945; Guzmán and Schreiber 1987).

La Blanquilla Island

Vegetation on this island includes columnar cacti at higher elevations, the salt-loving grass known as turtleweed (*Batis maritima*), and mangrove stands dominated by the same species as those of Los Roques and La Orchila. Phelps Jr. (1948) listed three species of seabirds: Brown Pelican, Brown Booby, and Magnificent Frigatebird. Lentino et al. (1994) added six more species: Audubon's Shearwater, Red-billed Tropicbird, Masked Booby, Brown Booby, Laughing Gull, and Royal Tern—bringing the total observed to nine species. There is no information about breeding colonies on this island.

Los Hermanos Archipelago

Los Hermanos is located north of Margarita Island. Seven species are known to breed (table 25.2): Audubon's Shearwater, Red-billed Tropicbird, Brown Booby, Red-footed Booby, Magnificent Frigatebird, Brown Noddy, and Sooty Tern (Phelps Jr. 1948). There are no data on colony sizes.

Los Frailes Archipelago

Los Frailes is formed by seven small islands, five small barren islets, and numerous cays positioned in two parallel rows about 2 km apart and scattered in an area not greater than 14 km^2. Knowledge on the birds of Los Frailes is mostly due to observations by Phelps Jr. (1945), who listed four species of seabirds: Brown Pelican, Brown Booby, Magnificent Frigatebird, and Laughing Gull. Yépez (1963b) indicated the existence of a breeding colony of Brown Pelican (table 25.2), but there is no recent information on the breeding status of these species.

Los Testigos Archipelago

Rainfall on Los Testigos (approx. 400 mm per year) is considerably higher than on the rest of the islands, and its vegetation is more lush (Williams 1980). Five species of seabirds have been recorded at Los Testigos, three of them breeding: Red-footed Booby, Brown Booby, and Magnificent Frigatebird (table 25.2). There are no data on their current colony sizes.

Aves Island

Isla Las Aves is the island farthest from the Venezuelan mainland, located some 500 km north of Margarita. Its climate is rigorous, and frequent hurricanes limit the development of vegetation. Two prostrate species, *Sesuvium portulacastrum* and *Portulaca oleracea,* are prominent (Gremone and Gómez 1983).

Three species of seabirds breed on Las Aves: Bridled Tern, Sooty Tern, and Brown Noddy. The Sooty Tern colony, estimated by Zuloaga (1955) at 500,000 individuals, occurred with a smaller number of Brown Noddy. Lazell (1967) recorded three species of terns nesting, and estimated 4,000–5,000 nests of Sooty Tern;

about 1,000 nests of Bridled Tern; and 10,000–12,000 nests of Brown Noddy (table 25.2). In 1982, 250,000 individuals of Sooty Tern and 60,000 individuals of Brown Noddy were recorded by Gremone and Gómez (1983). Rodrigo Lazo (2007, unpublished data) estimated 5,509 breeding pairs of Brown Noddy and 12,182 pairs of Sooty Tern, the largest colony in Venezuela. Although the population of Sooty Tern has declined in recent years, Aves Island continues to be one of the most important sites in the Caribbean for this species. To date, it remains an important nesting site for Sooty Tern and Brown Noddy although the number of breeding pairs can be highly variable from year to year due to the passage of hurricanes. Large numbers of green turtles (*Chelonia mydas*) also lay their eggs there, and the island was declared a wildlife refuge in 1972.

Threats

In general, marine birds inhabiting Venezuelan islands have been well protected due to their remoteness or through law enforcement, and their nesting habitats have been relatively safe, but there are disturbance and egg collecting issues. We have no information about predation by feral cats, rats, snakes, or invasive species.

Human Disturbance and Habitat Loss

Human intervention has become more extensive on Los Roques Archipelago, Margarita, Coche, and Tortuga islands, where tourist activity has increased considerably during the last decade. The remoteness of Los Roques and the protection of certain cays (e.g., Los Canquises and Los Bobos) have safeguarded the breeding colonies for more than 40 years.

In contrast, the colonies of Least Tern and Laughing Gull are at risk on cays that have no legal protection, such as Los Noronquises, due to disturbances in the breeding colonies. We consider investigations of the impact of tourism on breeding sites and populations of seabirds at these islands to warrant a high research priority. Likewise, the potential impact of the construction of a fishing port in Los Monjes has yet to be evaluated. The need to perform accurate and regular population surveys on Venezuelan islands to determine seabird population trends is urgent.

Egg Taking

Egg taking is an important threat, particularly impacting colonies that nest in the ground. This threat has been documented in past surveys in the Los Roques Archipelago and in our 2001 and 2002 surveys (Bosque et al. 2001; Esclasans 2003), when we noted egg taking for Least Tern, Common Tern, and Laughing Gull in Los Noronquises cays, areas that have important colonies for these species but with recreational zone classification, where use is not restricted.

Conservation

Efforts are geared toward enhancing the security of existing protected areas and promoting additional monitoring of colonies and public awareness about the needs of seabirds.

Protected Areas

Several of the Venezuelan islands are protected under different legislative regimens. Las Aves was declared a wildlife refuge in 1972. Los Roques Archipelago became a national park in 1972 and a Ramsar site in 1996. On Margarita Island there are two protected areas: Las Marites Lagoon, declared a natural monument in 1974, and La Restinga Lagoon, a national park since 1974.

We consider that protected islands have contributed significantly to the preservation of seabirds; for example, on Los Roques Archipelago, the largest colonies of resident species are located on islands with restricted use zones (Integral Protection Zones; Bosque et al. 2001; Esclasans 2003).

Need for Monitoring and Surveys

We urgently need to conduct surveys to provide up-to-date data because the bulk of information was collected prior to the 1980s. We have recent information only for the Los Roques Archipelago, with its important seabird colonies, particularly of Brown Pelican and Black Noddy—considered critically endangered and endangered, respectively (Schreiber 2000a). The Venezuelan islands host major seabird breeding colonies and represent important areas for the conservation of seabirds in the Caribbean. New census data are essential for estimating overall Caribbean seabird populations.

For resident species, we also need information on patterns of local movements between islands and the mainland. Apparently several species that are common on the islands, as well as along or just off the mainland coast, form large breeding colonies only on the islands. Examples include terns, sulids, and Magnificent Frigatebird. It was discovered, for example, that Cayenne Tern individuals inhabiting the Orinoco Delta, in extreme eastern Venezuela, had fledged from the colony of San Nicholas, Aruba (Lentino 2004).

Third, there is an urgent need to recognize precise

patterns of species population trends and hold periodic censuses for both resident and migratory species in the Venezuelan islands. Some of what appear to be tendencies toward population decline—or increase—of the resident species discussed may be due, at least partially, to periodic local movements. For instance, numbers of Laughing Gulls on Los Roques increase sharply from May to July during breeding but are negligible during the earlier part of the year. Similarly, Brown Pelican numbers reach a maximum around November and a minimum near February.

Public Education and Awareness

Fundación Científica Los Roques (FCLR) is conducting an education project with the students of the school on Gran Roque Cay, Los Roques. The objective of this project is to create awareness of the need for conservation of the birds of the archipelago, and plans are to create an ecological brigade for monitoring and conservation of the natural resources in the archipelago (Bladimir Rodriguez, pers. comm.). Our collaboration with the project consists of providing courses on identification and surveys and explaining the importance of participation by the local population in the conservation of the seabird colonies.

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