

SEARCHES FOR SEABIRD BREEDING COLONIES IN THE LESSER ANTILLES

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Abstract.—Information is presented which updates current seabird breeding colony locations in the Lesser Antilles. No evidence of breeding was found for Black-capped Petrels (*Pterodroma hasitata*) in Dominica. Audubon's Shearwater (*Puffinus lherminieri*) was found nesting on the St. Martin islet of Tintamarre. Incubating Red-billed Tropicbirds (*Phaethon aethereus*) were recorded in Anguilla and St. Martin. White-tailed Tropicbird (*Phaethon lepturus*) nesting was confirmed in St. Martin. An important and possibly recently established Caribbean Brown Pelican (*Pelecanus occidentalis occidentalis*) breeding colony in St. Martin is described. Our investigations have resulted in significant findings regarding Caribbean seabird conservation. More surveys, however, are necessary in the region to identify seabird breeding locations and evaluate the sustainability of known populations.

Key words: *Anguilla, Audubon's Shearwater, Black-capped Petrel, Brown Pelican, Dominica, Lesser Antilles, Pelecanus occidentalis occidentalis, Puffinus lherminieri, Phaethon aethereus, Phaethon lepturus, Pterodroma hasitata, Red-billed Tropicbird, status, St. Martin, White-tailed Tropicbird*

Resumen.—INFORME CORRIENTE SOBRE COLONIAS DE CRIANZA DE AVES MARINAS EN LAS ANTILLAS MENORES. Se presenta información que actualiza las ubicaciones de las colonias de crianza. No se encontro ninguna evidencia de crianza de *Pterodroma hasitata* en Dominica. Se encontro que *Puffinus lherminieri* tiene nidos en un cayo de St. Martin. La incubacion de *Phaethon aethereus* fue documentada en Anguilla y St. Martin. Se confirmo que *Phaethon lepturus* tiene nidos en St. Martin. Descripción de una colonia de tamaño significativo de *Pelecanus occidentalis*. Estas investigaciones dieron resultados significantes sobre la conservación de las aves marinas del Caribe. Sin embargo, mas estudios de la region son nesarios para identificar los sitios de los criaderos de las aves marinas y para evaluar el mantenimiento de las poblaciones conocidas.

Key words: *Anguilla, Antillas Menores, Dominica, estatus, Pampero de Audubon, Pampero de las Brujas, Pelicano, Pelecanus occidentalis occidentalis, Phaethon aethereus, Phaethon lepturus, Pterodroma hasitata, Puffinus lherminieri, Rabijunco, Rabijunco de Pico Rojo, St. Martin*

INTRODUCTION

MANY ISLANDS OF THE LESSER ANTILLES have not been thoroughly surveyed for breeding seabirds. For successful conservation planning in the region, seabird population status, timing of breeding, and critical habitat must be determined. The goal of our research during the winters of 2001 and 2002 was to identify Lesser Antillean breeding areas for seabirds which were previously unknown or unconfirmed. Identification of breeding colonies is the first step in the process of protecting or restoring these populations and habitats. To meet that goal, we conducted searches for seabird breeding colonies in Anguilla, St. Martin, Saba, and Dominica (Fig. 1). In addition, we took note of potential threats that may limit breeding success.

SPECIES ACCOUNTS

Black-capped Petrel.—The Black-capped Petrel (*Pterodroma hasitata*) breeds only in the Caribbean (Lee 2000) and is listed as Critically Endangered (Schreiber 2000). This species nests in burrows in steep mountainous terrain, returning to land at night, and only during the breeding season. The only known extant breeding colonies are in the mountains of Hispaniola. The Black-capped Petrel has historically nested in Dominica and, as recently as the 1980s, was observed flying over southern Dominica at Petit Coulibri near Morne Verte (Evans and James 1997). Surveys conducted this century for the petrel on Morne Diablotin and coastal mountains of southeastern Dominica, including our own during two days in January 2002, have resulted in no conclusive evidence of

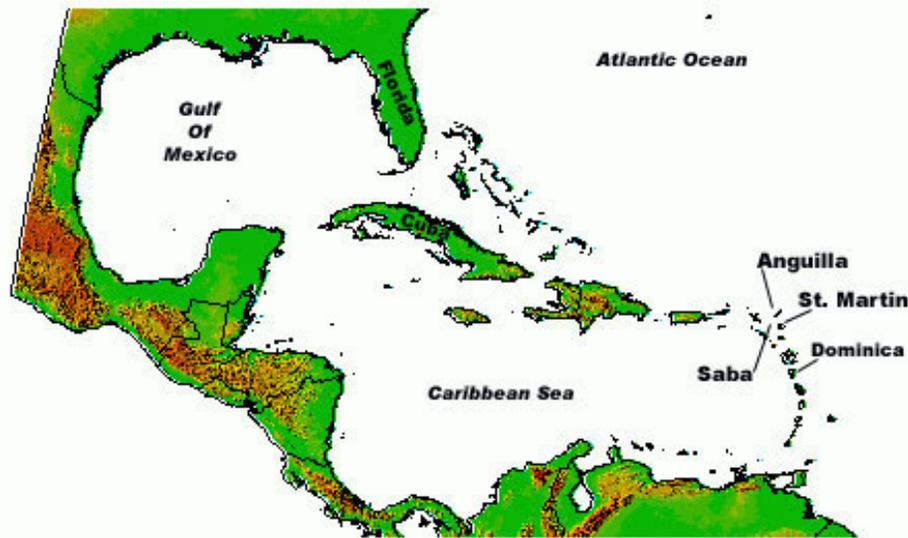


Fig. 1. Islands covered during seabird surveys, 2001-2002 (United Nations Environment Program).

breeding (Evans and James 1997; Brown and Collier 2001).

Southeastern Dominica's mountains are thickly vegetated with forest. We conducted searches for petrels at Morne Fou, part of the Petit Coulibri Estate. Morne Fou rises almost vertically from the ocean to approximately 1000 m. Three methods of detection were used in searches for petrels during our two-day search: The first method used was "call-playback" attraction in which a loop tape of Black-capped Petrel calls, obtained from George Reynard, was played at night in a suspected breeding area. This method has been used successfully to attract other nocturnal burrowing seabird species (Warham 1990). The tape was played at full volume on a portable stereo player from one hour after sunset until midnight. On the night of 29 January 2001 a loop tape of the call of the petrel was played from 19:30 to 00:00 h. The call was played for 90 min at each of the three sites on Morne Fous, allowing all directions to be covered by the sound. No petrels were seen.

The second method used was "call-playback" to determine burrow occupancy. A hand-held mini-cassette recorder was used to play petrel calls at the mouth of burrows. Petrel chicks or incubating adults will often respond to the call from within the burrow (James and Robertson 1985). On 30 January 2001 a daytime survey was made of the area below Morne Fous on the southeastern facing side called "des Sav" (15°12.57' N, 061°20.5' W). Because of the large number of animals, such as land crabs which

create burrows in the area, many holes were present. Using a hand-held tape player, the call was played at the mouth of 31 burrows. No petrels were found.

The third method used a burrow camera to determine occupancy. The camera was on the end of a 3-m flexible tube, used to guide the lens through burrows. Infrared lights illuminated the burrows and contents were viewed through a hand-held monitor (Dyer and Aldworth 1998). On 30 January at des Sav, seven burrows were checked visually using the camera. No petrels were found.

Time of year should not have been a factor because petrels are most often found breeding from November to May. However, breeding colonies have been found in Hispaniola year-round (Woods 1987). It is also possible that the stereo player did not amplify the sound enough to attract petrels, although an unidentified owl hovered overhead at one point.

We played the recording for the groundskeeper at Petit Coulibri Estate, approximately 100 m below Morne Fous, and he reported that he had not heard the call of the Black-capped Petrel in the area during the 40 years he had worked, lived, and hunted there. A fisherman in the area, however, reported that he had heard the call while fishing at night below Morne Fous. Two other individuals, upon seeing drawings of the bird, reported that the bird is seen in the mountains of the Grand Bay area.

These local sightings are encouraging and the Black-capped Petrel may yet be found in Dominica

Table 1. Surveys for Audubon's Shearwater on Saba, Lesser Antilles, 2001–2002.

Location	Year	Date	Time	Results
The Landfill	2001	5 Feb	17:30–21:30	None observed
Sulpher Mine	2001	6 Feb	05:30–07:00	One seen flying
Sulpher Mine canyon	2002	20 Feb	Diurnal	One adult on egg
Sulpher Mine canyon	2002	20 Feb	21:00–22:30	None observed
Sulpher Mine	2002	20 Feb	22:45–23:30	None observed
Eastern & northern sides of Great Hill	2002	21 Feb	Diurnal	None observed
Southern & eastern sides of Booby Hill	2002	21 Feb	Diurnal	None observed
The Bottom	2002	21 Feb	20:00–21:00	None observed
The Landfill	2002	22 Feb	21:15–22:15	None observed
Hilltop above The Landfill	2002	22 Feb	Diurnal	None observed

because many areas remain unsurveyed. This species is of critical concern and more studies are needed. Because of repeated acts and threats of violence from residents, however, our search was severely restricted and eventually forced to end.

Audubon's Shearwater.—There are an estimated 3000–5000 pairs of Audubon's Shearwaters (*Puffinus lherminieri*) nesting in the Caribbean (Lee 2000) and they are listed as Near Threatened (Schreiber 2000). However, their population and breeding status is difficult to determine because of a lack of research on the species. Chicks and eggs are susceptible to predation by introduced predators such as cats and rats, which may be causing a decline in the population (Wingate *in* Palmer 1962). Because Audubon's Shearwaters nest in burrows and usually are active at the colonies only at night, they are difficult to locate. Our surveys during the winters of 2001 and 2002 revealed only one individual on Isle Tintamarre and two on Saba.

Isle Tintamarre (18°7.5' N, 62°59.17' W) is an islet 3 km from St. Martin. It rises gradually from a beach and scrub vegetation area to cliffs about 30 m high. Breeding of Audubon's Shearwater was previously suspected at this site but unconfirmed (Voous 1983).

Call-playback, flashlights, and a burrow camera were used to determine burrow occupancy. Searches were conducted on 16 February and 11 March 2002, and covered approximately 100 burrows. One Audubon's Shearwater was found on an egg on 16 February.

Saba is a steep, mountainous island with a range of habitats, from cloud forest to dry scrub. Audubon's Shearwater is known to nest on the island (M. Walsh-McGehee, pers. comm.). We listened for shearwater calls in appropriate habitat for six nights.

During the day, we inspected approximately 100 burrows at each of four sites using a flashlight (Table 1).

On 20 February 2002, one Audubon's Shearwater was found on an egg in a canyon wall near Sulpher Mine. One shearwater was seen flying into Sulpher Mine at 06:00 h on 6 February 2001. No other evidence of nesting, such as feathers or dead chicks, was found. No calls were heard during night observations.

Time of year may have been a factor affecting the amount of breeding activity during our surveys. Audubon's Shearwater nests have been found previously on Saba during December and January, but were absent during another survey in March (Voous 1955a). Local residents said that in recent years the shearwaters were seen landing on the roads in the town of The Bottom. Residents said they had not seen the birds in "some months," but could not remember the time of year when they are usually seen. More observations are needed to describe attendance periods on the island and appropriately design survey efforts.

Threats to nesting shearwaters are numerous. Many rats (*Rattus rattus*) were noted in the boulder-covered hillsides above The Bottom and are likely present on Isle Tintamarre as well. It is unknown whether rats are reducing local populations through predation on eggs and nestlings. Goats are ubiquitous on Saba and Isle Tintamarre and may crush burrows. Further studies are needed to determine conservation needs for Audubon's Shearwater on Saba and Isle Tintamarre.

Red-billed Tropicbird.—Red-billed Tropicbirds (*Phaethon aethereus*) are classified as Vulnerable in the West Indies with up to 2500 breeding pairs estimated for the region (Schreiber 2000). They breed

from Puerto Rico south to Trinidad (Walsh-McGehee 2000). Our surveys during March 2001 confirmed a suspected breeding site on Anguilla (18°15' N, 63°10' W). Surveys during February and March 2002 confirmed nesting on Isle Tintamarre and identified two potential nest sites on St. Martin.

We surveyed Windward Point, Anguilla on 4 March 2001. Although used for sand mining, this is an otherwise undeveloped rocky point of land accessible by dirt road. This was a suspected breeding area for the species, which nests in other locations on or near Anguilla (Karim Hodge, pers. comm.). We found a Red-billed Tropicbird on an egg at Windward Point, Anguilla and estimated the presence of seven potential nests based on the number of adults flying around the area, available crevices, and site use as evidenced by molted feathers. A more accurate count of breeding pairs at this and other locations is needed.

Isle Tintamarre was surveyed weekly from the French dump (18°6.43' N, 63°1.12' W) on St. Martin from January to March 2001 and January to March 2002, using an 83 mm 50x scope. Habitat is clay and sandstone boulders and cliffs. In 2001, 30–50 Red-billed Tropicbirds were seen during most weekly surveys. In 2002, the highest count was 14 individuals.

In 2002, boat access was possible and two ground surveys were conducted (16 February and 11 March) on Isle Tintamarre. We checked all crevices encountered and used a flashlight when necessary to determine the contents of a site. Nesting was confirmed when 40 occupied sites were recorded on 16 February. A site was defined as occupied if a tropicbird adult, chick, or egg was in a crevice. However, it should be noted that the presence of an adult does not necessarily indicate nesting.

During the second census on 11 March, 24 of the previously occupied sites were checked. In addition, three adults and three chicks were banded using metal numbered bands. Of the 24 sites checked on both visits, 62.5% (n = 15) had chicks or adults on eggs on 16 February. By 11 March that number had dropped to 20.8% (n = 5). Of the eight nests that had eggs on the first visit, seven had disappeared by the second visit. This high loss may be due to predation, possibly by rats. In addition, the remains of two tropicbird chicks (piles of downy feathers and some flight feathers) were found outside crevices and appear to be the result of predation by a Peregrine Falcon (*Falco peregrinus*), which was seen during both surveys.

Molly B'Day is a rocky islet off St. Martin, near

Pelikan Rock. It was observed during weekly surveys from January to March 2001 and January to March 2002 from Point Blanche using a spotting scope. Two Red-billed Tropicbirds were seen going into a crevice on the northern side of Molly B'Day twice during 2001 and nine times during 2002. We were unable to access the island to confirm breeding.

Precipice des Oiseaux is part of mainland St. Martin, near Bay Rouge. It was surveyed from an observation point (18°4.17' N, 63°8.7' W) six times during February and March 2001 and February and March 2002. Eight Red-billed Tropicbirds were seen calling, displaying courtship behavior, and disappearing into crevices on 22 February 2001. Two were seen on 10 March 2001. None was seen in the area in 2002. Access to Precipice des Oiseaux is the limiting factor in determining the nesting population. Obtaining access to these sites through cooperation with landowners is needed.

Data on Red-billed Tropicbirds in St. Martin are scarce. Preliminary surveys indicate a potentially significant predation problem on Isle Tintamarre. Small mammal surveys are necessary to determine the size of the population and the extent of depredation on tropicbird eggs and chicks. More frequent and standardized tropicbird nest surveys would provide a larger sample size and clearer picture of the issue of predation.

White-tailed Tropicbird.—White-tailed Tropicbirds (*Phaethon lepturus*) are classified as Vulnerable in the West Indies (Schreiber 2000). Up to 3500 breeding pairs are estimated for the West Indies, with only about 500 estimated for the Lesser Antilles. They range from the Bahamas south to Grenada (Walsh-McGehee 2000). During January to March 2001 and January to March 2002, the Cupecoy area of St. Martin was observed 5–7 days per week for flying White-tailed Tropicbirds. Ground surveys confirmed nesting at Cupecoy and identified another potential nest site on St. Martin.

The Cupecoy study area is between Cupecoy beach and Mullet Bay in St. Martin. Sea cliffs in the area are limestone and exposed reef, 5–10 m in height. The surrounding area is a mix of resorts, a golf course, and scrub marine terrace. Using a spotting scope, we made observations from a high point in the town of Maho. The last known avian survey of the area took place in 1975 when six pairs of White-tailed Tropicbirds were found (Hoogerworf 1977). Historically, however, this species has been recorded in a larger area, including Maho Bay (Voous 1983).

Our first observation of pairs entering crevices at Cupecoy cliffs was on 14 March 2002. In 2001 and

2002, the highest number of individuals seen flying in the area was nine; all were displaying courtship behavior and many went into crevices at Cupecoy, some in pairs.

Two surveys for nests were conducted by rappelling to the cliffs below Cupecoy Beach Club resort (18°2.26' N, 63°7.25' W) and using a flashlight to inspect potential crevices. Crevices were checked on 15 February 2001, but no nests were found. During the next survey, on 13 March, an adult was found sitting on an egg. The nest was in the cliffs 2 m below the eastern part of Cupecoy Beach Club. By inspecting the cliffs, we determined 18 potential nesting crevices are present in the Cupecoy area.

White-tailed Tropicbirds were seen disappearing near the caves at nearby Maho Reef in February and March 2001 and 2002, but no breeding activity was confirmed despite searches in the area.

Precipice des Oiseaux was surveyed by boat using 10x40 binoculars on 3 and 23 February 2002. Eight White-tailed Tropicbirds were observed in courtship flight at Precipice des Oiseaux on 3 February 2002. On 23 February, one tropicbird was seen in a crevice, but the species could not be determined from the boat.

The White-tailed Tropicbird population in the Cupecoy study area has most likely been affected by exotic species, development, and human activity. The occupied nests at Cupecoy and Precipice des Oiseaux are on steep cliffs not easily accessible to predators. Maho Reef, however, is at a low angle and crevices are easily reached, which may account for the lack of occupancy.

Brown Pelican.—The Caribbean Brown Pelican (*Pelecanus occidentalis occidentalis*) is classified as Endangered in foreign territories by the United States Fish and Wildlife Service (U.S. Federal Register 1970) and listed as Endangered in the West Indies by the Society for the Conservation and Study of Caribbean Birds (Schreiber 2000). An estimated 1500 pairs nest within the Greater and Lesser Antilles (Collazo *et al.* 2000). With such a small breeding population, the protection of individual nesting areas is critical to the health of the subspecies.

Two pelican colonies on St. Martin were surveyed weekly from 5 February to 14 March 2001 and 2 January to 12 March 2002. Fort Amsterdam (18°1.10' N, 63°3.37' W), a previously unreported breeding site, was used by approximately 48 breeding pairs during 2001, but no evidence of breeding was seen in 2002. Pelikan Rock (18°0.54' N, 63°1.57' W) is a smaller islet colony and had active nests both years.

Fort Amsterdam, a registered and protected historical site, is on a point of land on St. Martin. Vegetation is characterized by thorny scrub, composed mainly of *Acacia macracantha* and *A. tortuosa*, reaching over 2 m in height. The presence of nesting pelicans at Pelikan Rock is noted in the literature, but no mention of the Fort Amsterdam colony has been found (Danforth 1930; Voous 1954, 1955a, 1955b, 1983; Voous and Koelers 1967; Pinchon 1976; Hoogerworf 1977; Halewyn and Norton 1984; Rojer 1997; Raffaele *et al.* 1998; Collazo *et al.* 2000). The only exception is a note by David Johnston from the same year as our sighting (Norton and White 2001). The size of the Fort Amsterdam colony would seem to make it more obvious than the smaller and more distant Pelikan Rock colony. The area may have been overlooked in the past or possibly it was recently colonized.

The colony was on the western side of the point, below the fort. A smaller group of about 10 pelicans was visible nesting on the eastern side of Fort Amsterdam, but we did not follow this colony. Weekly population counts for the western side colony were conducted from the Belair Hotel (18°1.10' N, 63°3.37' W), a distance of approximately 0.5 km, using an 83 mm 50x scope. Because age classes were difficult to distinguish from this distance, all birds capable of flight, or post-fledge individuals, were counted. However, the thick vegetation obstructed views of nests, which were not counted.

An index plot, approximately 200 m from the farthest nest, was used to gain a more accurate representation of the composition of the colony. The index plot allowed us to survey approximately two-thirds of the colony. Counts were made from the first point of land past the Divi Resort, on the western side of Fort Amsterdam (18°0.56' N, 63°3.37' W) using a spotting scope. The following were counted: number of immature birds, number of adults, number of nest territories, and number of chicks.

To determine the number of nests in the index plot and generate a breeding correction factor, a "nest-territory" classification was used. The brush often obscured a complete view of a nest, which is a pile of dry vegetation. It was considered an active nest or territory if one of the following parameters applied: 1) a chick was in the nest or just outside it; 2) an adult was in incubation posture on the nest; or 3) if the nest was not visible above the brush, two adults had to be next to each other, indicating a pair (only applied to brushy areas). A nest was not classified as active if a juvenile, meaning a bird capable of flight, was on or near the nest.

During 2001, the mean number of post-fledge birds in the Divi Point index plot was 136 and the mean number of nest territories was 39, producing a breeding correction factor of 0.287. Therefore, with a total mean count of 166 post-fledge birds from -Belair, we estimated the mean breeding population at Fort Amsterdam during our study to be 48 breeding pairs.

In 2001, the average number of chicks recorded from the index plot was 36. Although all phases of breeding, from incubation to fully-feathered chicks, were visible on all visits, some were more predominant than others. On February 21, most chicks seen were downy to partly-feathered. By our final visit, on March 14, it was becoming difficult to discern fully feathered chicks from recently fledged individuals. Even during the final observations in March, however, adults were still in incubation posture.

From January to March 2002, no nesting was observed at Fort Amsterdam and non-breeding roosting activity was minimal. This lack of nesting activity may indicate that the site is used only during more productive years or during periods in which no surveys were conducted. Colony fidelity and synchrony of breeding is not known for this area. There appears to have been no change in the level of human disturbance from 2001 to 2002. A major disturbance event may have occurred in our absence, however, causing the pelicans to abandon the site.

Human disturbance is an issue at this urban location. A resort lies approximately 500 m away. The Fort ruins are approximately 10 m from the nearest nest, but the thorny vegetation restricts visitors from accessing the nesting area. The surrounding waters are used heavily by watercraft, including jet skis, dive boats, and parasail boats. The bay on the eastern side of the point is a major cruise ship port. In 2001, disturbance was noted only when a watercraft passed quickly or loudly. Over 40 pelicans flushed when a jet ski went by the colony at c. 400 m out. However, a dive boat, only 10 m off the colony did not flush any pelicans because it was going slow enough so it did not produce a wake.

Pollution may also be a concern. Little Bay Pond, where we observed pelicans feeding daily, experiences periodic fish die-offs, most likely due to the dumping of sewage. Pelicans regularly forage in surrounding bays, one of which is a major port, but these waters have not been tested for pollutants.

The Fort Amsterdam breeding colony is significant not only in size but also in location. It is one of the largest known breeding colonies of the Caribbean Brown Pelican in the Lesser Antilles (based on com-

parisons with Collazo *et al.* 2000). Annual surveys will aid in understanding factors affecting use of the site by pelicans.

Pelikan Rock, also known as Guana Key, is a small, inaccessible rock islet approximately 1 km off Point Blanche, St. Martin. It lies within a marine park and is protected. Nests were on a grassy slope on the upper portion of Pelikan Rock. We surveyed the site from Point Blanche, c. 1 km away, using an 83 mm 50x spotting scope.

In 2001, Pelikan Rock had a high count of 40 post-fledge pelicans. Of the 19 nests recorded, one contained two chicks. In 2002, a maximum of 10 nests and 3 chicks were seen. The high count of post-fledge pelicans was 24.

It appears Pelikan Rock may be a more stable nesting site than Fort Amsterdam, perhaps because of its remote location and low levels of human disturbance. Future surveys may reveal the limiting factors affecting both of these sites.

CONCLUSIONS

Much remains to be learned about seabird breeding in the Lesser Antilles. There is a need to investigate breeding success and causes of nesting failure while determining threats to known seabird colonies. In addition, a complete survey of islands and surrounding islets is necessary to accurately assess population levels and identify previously unknown breeding sites. Information regarding seabird nesting locations, timing of breeding, and conservation issues should be made available to the proper local governmental and non-governmental agencies.

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