

## THE AVIFAUNA OF MUSTIQUE ISLAND (ST VINCENT AND THE GRENADINES)

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**Abstract:** This study reviews published records from Mustique (St Vincent and the Grenadines) and compares historical records with new data on species status and abundance from 1997–2010. An assessment of habitat use by bird species highlights the importance of the mangrove habitat. The avifauna of Mustique includes 109 species. Of these, 16 are seabirds, at least 11 of which breed locally. There are 31 locally-breeding resident species, of which 21 breed on the island. Nearctic breeding species include 20 regular winter residents, 13 occasional winter residents, and 19 transients. There are two species which visit to breed locally, and eight vagrants. The small population and habitat preferences of the Grenada Flycatcher (*Myiarchus nugator*) suggest a vulnerability to further development in the region. The first national record of Flamingo (*Phoenicopterus ruber* or *P. roseus*) and the first Mustique record of Scaly-breasted Thrasher (*Allenia fusca*) are documented. Full documentation of records recently published in a book is provided for: the first national records of White-cheeked Pintail (*Anas bahamensis*), Ring-necked Duck (*Aythya collaris*), Little Egret (*Egretta garzetta*), Glossy Ibis (*Plegadis falcinellus*), and Palm Warbler (*Dendroica palmarum*); the first Grenadine records of Northern Pintail (*Anas acuta*), Ring-billed Gull (*Larus delawarensis*), Caribbean Elaenia (*Elaenia martinica*), Blackpoll Warbler (*Dendroica striata*), and House Sparrow (*Passer domesticus*); a further five new, and several probably new island records. The breeding of the Masked Booby (*Sula dactylatra*) in the Grenadines is reconfirmed. New data indicates that breeding is not strictly seasonal for some landbirds and seabirds.

**Key words:** avifauna, birds, Caribbean, mangrove habitats, Mustique Island, St Vincent and the Grenadines

**Resumen:** LA AVIFAUNA DE LA ISLA MUSTIQUE (ST VINCENTE Y LAS GRANADINAS). Este estudio resume registros publicados de Mustique (St Vincente y las Granadinas) y compara registros históricos con nuevos datos sobre el estado y abundancia de las especies desde 1997–2010. Una evaluación del uso del hábitat por las aves destaca la importancia del hábitat del manglar. La avifauna de Mustique incluye 109 especies, de estas 16 son aves marinas y al menos 11 de ellas se reproducen en la localidad. Hay 31 especies residentes que se reproducen localmente, de las cuales 21 crían en la isla. Dentro de las migratorias neárticas 20 especies son residentes invernales, 13 residentes ocasionales y 19 transeúntes. Además hay dos especies que visitan la isla para criar y ocho son accidentales. La pequeña población y preferencias de hábitat del *Myiarchus nugator* sugiere su vulnerabilidad al posterior desarrollo de la región. Se documentan el primer registro nacional del *Phoenicopterus ruber* o *P. roseus* así como el de *Allenia fusca*. Toda la información de los registros recientemente publicados en un libro es aportada por: los primeros registros nacionales del *Anas bahamensis*, *Aythya collaris*, *Egretta garzetta*, *Plegadis falcinellus*, y *Dendroica palmarum*; el primer registro para Granadina del *Anas acuta*, *Larus delawarensis*, *Elaenia martinica*, *Dendroica striata*, y *Passer domesticus*. Se reconfirma la reproducción del *Sula dactylatra*. Nuevos datos indican que la reproducción no es estrictamente estacional para algunas aves terrestres y marinas.

**Key words:** aves, avifauna, Caribe, hábitat de manglar, Isla Mustique, St Vicente y las Granadinas

**Résumé :** L'AVIFAUNE DE L'ILE MOUSTIQUE (SAINT-VINCENT-ET-LES-GRENADINES). Cette étude passe en revue les données publiées sur l'avifaune de l'île Moustique (Saint-Vincent-et-les-Grenadines). Elle compare les données historiques et récentes concernant le statut et l'abondance des espèces entre 1997 et 2010. Une évaluation des habitats des oiseaux met en avant l'importance de la mangrove. L'avifaune de Moustique comprend 109 espèces. Parmi elles, 16 sont des oiseaux marins dont au moins 11 nichent localement. Il y a 31 espèces nicheuses et localement résidentes dont 21 nichent sur l'île. Les migrateurs néarctiques sont représentés par 20 espèces hivernantes régulières, 13 hivernantes occasionnelles et 19 espèces de passage, deux espèces migratrices nicheuses localement et huit erratiques. La petite taille de la population du Tyran bavard (*Myiarchus nugator*) et ses préférences en termes d'habitat suggère l'incertitude de son expansion dans la région. La première donnée nationale de Flamant rose (*Phoenicopterus ruber* ou *P. roseus*) et la première donnée sur Moustique du Moqueur grivotte (*Allenia fusca*) sont présentées. Des informations complètes sont fournies pour des données récemment publiées : la première observation dans le pays du Canard des Bahamas (*Anas bahamensis*), du Fuligule à bec cerclé (*Aythya collaris*), de l'Aigrette garzette (*Egretta garzetta*), de l'Ibis falcinelle (*Plegadis falcinellus*) et de la Paruline à couronne rousse (*Dendroica palmarum*) ; la première observation dans les Grenadines du Canard pilet (*Anas acuta*), du Goéland à bec cerclé (*Larus delawarensis*), de l'Éléonie siffleuse (*Elaenia martinica*), de la Paruline rayée (*Dendroica striata*), et du Moineau domestique (*Passer domesticus*); ainsi que quelques espèces probablement nouvelles pour l'île. La

nidification du Fou masqué (*Sula dactylatra*) dans les Grenadines est à nouveau confirmée. De nouvelles données indiquent que la nidification de certains oiseaux terrestres et marins ne présente pas de saisonnalité stricte.

*Mots clés* : avifaune, oiseaux, Caraïbes, Ile Moustique, mangrove, Saint-Vincent-et-les-Grenadines

Mustique is a private island in the Grenada bank located 28 km south of St Vincent (Fig. 1). It is 4 km long from north to south, and 2.4 km wide from east to west, with an area of 565 ha. It is of volcanic origin and is hilly with some flat lowland areas. The main habitat in the hills is secondary woodland, formerly in cotton and sugarcane production, interspersed by gardens attached to luxury villas. Lowland areas include more residencies with gardens, ornamental 'parkland', playing fields, grazed grassland, and three mangrove swamps: the Lagoon (6.9 ha), the Bird Sanctuary (5.9 ha), and Macaroni (0.8 ha) (Fig. 2). Coastal high ground is generally cactus scrub vegetation. Coasts include both sandy and rocky shores and an exposed reef. Additionally there are a few small man-made freshwater ponds, recently created brackish 'scrapes' (the palm grove ponds north of the Bird Sanctuary), a vestigial mangrove pond (Point Lookout pond), and a natural seasonal brackish pond (Rutland pond). Mustique and its surrounding waters, to a distance of 1 km offshore, were declared a conservation area on 1 January 1990 following the Mustique Conservation Act 1989.

In this paper we review the avifauna of Mustique and present new data on the status of birds based on extensive observations during 12 winter visits by Paice from 1997–2010 and by Speirs from March 2007 to April 2009.

#### ORNITHOLOGICAL HISTORY

Father Plumier made three expeditions to the West Indies between 1689 and 1696, including visits to St Vincent and the Grenadines. Although primarily a botanist and illustrator of botany, Plumier also made sketches of the fauna he encountered including the birds. A collection of ornithological plates by Plumier, titled 'The Ornithographia Americana', is held in the central library of the Museum National d'Histoire Naturelle in Paris (Bourlière 1949). Nearly two centuries later, Slater (1871) stated that 'nothing is known' of the special ornithology of Grenada and the Grenadines. The first substantial study on the birds of the Grenadines was by Wells (1902a, b) on the birds of Carriacou. Austin Clark (1905) surveyed the birds of the Grenadines while living in the southern Lesser Antilles from 3 August 1903 until 22 September 1904, during

which time he made several visits to the Grenadines including a visit to Mustique from 9–11 December 1903. Gerald Thayer visited the Grenadines from April to December 1924, including visits to Mustique on 2 April, 2 June, 2 and 8 September, and from 14 October to 4 November 1924. In 1925 he visited the Grenadines in early April, May, most of June to 1 July, September, October, and November. Visits to Mustique include 7 May, 1 and 9 June, 11–13 September, and 15–17 November 1925, based on the American Museum of Natural History collection dates. The leading authority on West Indian birds, James Bond, made two expeditions to St Vincent and the Grenadines in 1927 and 1929–1930. Dates from the collections of the Academy of Natural Sciences of Philadelphia include 21 April to 4 May 1927, 19–24 March 1929 near Grenada, 14–23 June 1929, and 6 January 1930 in St Vincent and the Grenadines. It is unclear how much time was spent by Bond on Mustique during these trips, especially as he did little collecting (J. Wiley pers. comm.). Father Raymund Devas arrived in Grenada in 1922 and published several books on the avifauna of Grenada, St Vincent and the Grenadines (Devas 1941, 1943, 1954, 1970). In his capacity as a priest, Devas travelled extensively in the area; however, he does not mention Mustique specifically and may not have visited the island. Bond continued to document records for the region in his 'Check-list of birds of the West Indies' (Bond 1950) and subsequent supplements up until the 1980s. More recently, Ralph Widrig visited Mustique from 8–17 January 1990 (Norton 1990) and Stephen Eccles visited on 14 January 2002 (Norton 2002). Katharine Lowrie, Megan Friesen, and David Lowrie conducted a seabird breeding survey of all the coasts and islands of St Vincent and the Grenadines from 9 May to 1 June 2009 (Lowrie *et al.* unpubl. report).

#### METHODS

Mustique is small enough to be explored on foot. On each visit by Paice (see Table 1) much of the island was covered both on foot and by vehicle. Detailed notes were taken on the date, time, locality, and number of each species seen, as well as of unusual behaviour. Descriptions of the appearance and vocalizations of unfamiliar birds were made. The notes were compiled to provide the following data



Fig. 1. Map of Mustique and nearby islands within St Vincent and the Grenadines.

for each species: (1) The highest count seen on one occasion (e.g., a flock seen together, or the number seen on one visit to a particular site) per annual visit. (2) The total number of sightings of one or more birds per annual visit. (3) All records were summed according to named habitats, to provide a guide to habitat use. For some habitats (e.g., wetlands), individual sites have been treated separately to allow comparison.

## RESULTS

### SPECIES ACCOUNTS

The following accounts include only published or confirmed records of the birds seen on or around Mustique. Accounts of species thought to be extirpated are included in brackets. Many of the older records are anecdotal and are either quoted or written closely following the original wording. These

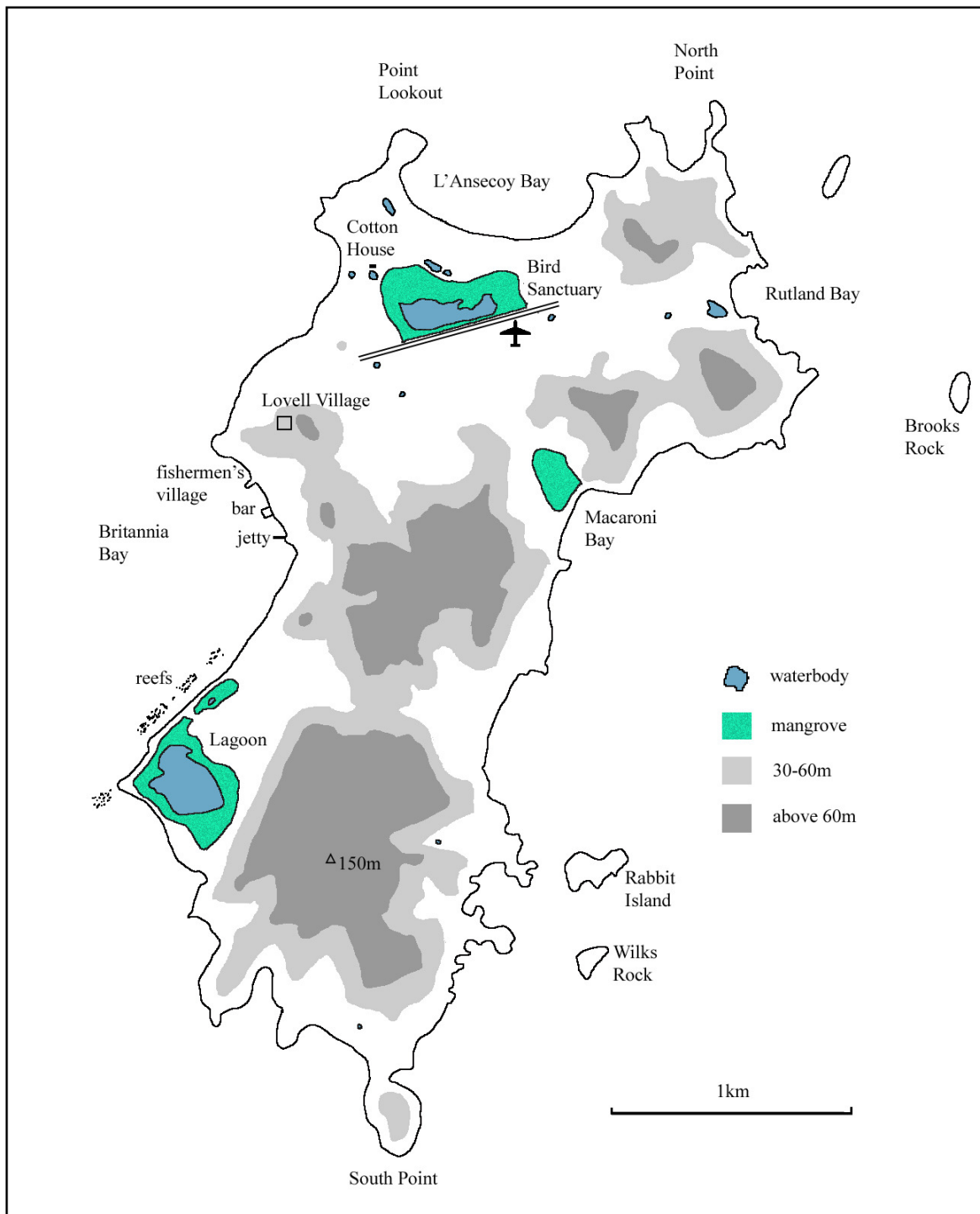


Fig. 2. Map of Mustique with named landmarks showing mangrove and other wetland habitats.

Table 1. Dates of winter visits by Paice.

Year	Arrival	Departure	Duration
1997	27 January	14 February	18 days
1998	27 January	12 February	16 days
2001	23 January	8 February	16 days
2002	22 January	7 February	16 days
2003	21 January	6 February	16 days
2004	27 January	12 February	16 days
2005	18 January	3 February	16 days
2006	17 January	2 February	16 days
2007	23 January	8 February	16 days
2008	22 January	7 February	16 days
2009	20 January	5 February	16 days
2010	26 January	11 February	16 days

are included to credit these authors, to provide a comparison to recent records, and to show that later authors (e.g., Bond) may (justifiably) have made generalisations based on the original records. In consequence of the last scenario, there are several recent records that are possibly or probably new records. References from Clark (1905) of breeding refer to birds breeding in all suitable localities in the Grenadines, unless otherwise specified. In references to Bond (1950), the following definitions apply: ‘common—apt to be observed frequently during a day’s watch in suitable territory; fairly common—a few should be seen; rare—few if any would be found after several days searching’. Bond’s (1950) comments on status are included where they differ from Clark’s (1905) comments, where they differ from the current findings, or where it is unclear whether they are generalisations or comprehensive accounts. In the text from Paice, evidence of breeding and the use of habitats are described (the latter in descending order of frequency), and data on abundance is summarised. Full details are included for new national records (marked \*\*\*), for new Grenadine records (\*\*), for new island records (\*), and for records of species seen only occasionally. Full details are also provided for new dates of breeding, or probable breeding. Additional details and photographic records of nearly every species seen can be found in Paice and Speirs (2009). Observations from the following observers are initialled: Stephen Eccles (SE), Michael Paice (MP), Robert Speirs (RS), and Ralph Widrig (RW). Nomenclature follows the American Ornithologists’ Union online checklist (2008).



Fig. 3. White-cheeked Pintail (*Anas bahamensis*; right) with a Blue-winged Teal (*Anas discors*; left) at Rutland Bay pond, 29 October 2007. Photo by R. Speirs.

Black-bellied Whistling Duck (*Dendrocygna autumnalis*). Recorded in Mustique on 6 February (year not stated; Bond 1950). An adult was seen and photographed at the Cotton House outer pond at 0837 on 19 August 2008, and was last seen on 20 August 2008 (RS).

American Wigeon (*Anas americana*). One was shot in Grenada (Bond 1951). RW noted four in Mustique from 8–17 January 1990 (Norton 1990).

Blue-winged Teal (*Anas discors*). Common (Clark 1905). Usually seen only in the Bird Sanctuary, where 30 were seen in 1997, and 24 in 1998. Since then numbers have fallen, ranging from two to 13 each visit. A flock was also seen at the small freshwater pond near Rutland Bay in 1998, and another at Pt Lookout pond in 2007 (MP). From mid October a few frequent Rutland pond and the palm grove ponds (RS).

\*\*\*White-cheeked Pintail (*Anas bahamensis*). One was seen and photographed with a Blue-winged Teal at 1000 and again at 1500 at Rutland pond on 29 October 2007 (RS; Fig. 3).

\*\*Northern Pintail (*Anas acuta*). The second national record was of a drake on the Bird Sanctuary lagoon at 1400 on 25 January and at 1720 on 27 January 2006. A female was seen briefly at 1740 alongside a male Ring-necked Duck (*Aythya collaris*) in the Bird Sanctuary on 26 January 2009 (MP). Both were seen there at 1700 the next day (MP and RS; photograph by RS in Paice and Speirs 2009:201).

Green-winged Teal (*Anas crecca*). Rare winter visitor in West Indies, with records from the Grenadines (Bond 1950). A female was at Rutland pond at 0700 on 27 November 2008, and at 0747 on 28 November 2008. It was there daily, and once at the Bird Sanctuary, until 5 December 2008 (RS).

\*\*\*Ring-necked Duck (*Aythya collaris*). One



Fig. 4. Ring-necked Duck (*Aythya collaris*; left) and American Coot (*Fulica americana*; right) at Rutland pond, 7 November 2008. Photo by R. Speirs.

female was observed from 1700–1720 on 31 January 2003 on the Bird Sanctuary lagoon, and again from 0800–1730 on 3 February 2003. On 7 November 2008 a male (probably a first-year) accompanied an American Coot (*Fulica americana*) at Rutland pond at 0804, flew to the palm grove ponds, and returned to Rutland pond by 0820 (Fig. 4). Subsequent sightings included 8 and 20 November at Rutland, and 27 November 2008 at the Bird Sanctuary (RS), and on 26 and 27 January 2009 (in adult plumage) at the Bird Sanctuary (MP and RS).

[Crested Bobwhite (*Colinus cristatus*)]. Introduced to Mustique in 1885 (Ogilvie-Grant 1902, Clark 1905). Bond (1950) included it among those introduced species which had not ‘thriven to any extent on any of the islands’ and its presence had not been subsequently verified on Mustique. There are no recent records, so it is probably extirpated.

Pied-billed Grebe (*Podilymbus podiceps*). Uncommon resident on Grenada, breeding on Carriacou and Isle Ronde (Clark 1905). Common in suitable localities throughout the Antilles (Bond 1950). Now thought to be a rare non-breeding resident in the southern Lesser Antilles from October to March, with the possible exception of Barbados where it may breed (Raffaele *et al.* 1998). One was seen on 25 and 27 January 2006 on the Bird Sanctuary lagoon. An immature was on Pt Lookout pond from 27–31 January and 5–7 February 2007 (MP). One was also seen on 24 July 2007 in the same location (RS). On 6 February 2008 a courting pair was at the Bird Sanctuary (MP). One was seen at Pt Lookout pond in March, May, June (three times), and on 27 and 31 August 2008 (RS). One was at the Bird Sanctuary on 28 January and 4 February 2009.

And one was seen at the Lagoon on 31 January 2010 (MP).

\*\*\*American Flamingo (*Phoenicopterus ruber*). A juvenile flamingo was first noticed feeding on flooded grassland between the airstrip and the Bird Sanctuary at 1500 on 6 December 2010 by Alistair Alexander, the manager of Mustique Airport (Dianne Wilson pers. comm.). At 1615 on the same day it was photographed at the same place (Figs. 5–6). From 6–9 December 2010 it was seen on the grassland by the Cotton House and also at a field south of the airstrip, near the equestrian centre (Dianne Wilson *et al.* pers. comm.). It appeared unconcerned by human presence. The photographs indicate that it is in its first year. The bill shows little black or blackish suggesting *P. roseus* of the Afrotropics; however, when seen from the front, blackish appears to extend up to, or almost up to, the corner of the culmen on the upper mandible (Fig. 6); this and the already pinkish plumage suggest *P. ruber*. *P. roseus* could have arrived in the Americas as a consequence of a weather event, perhaps hurricane Tomas, but as yet there have been no records of *P. roseus* in the New World.

Red-billed Tropicbird (*Phaethon aethereus*). Large numbers breed on Battowia and Baliceaux (Clark 1905). It is locally common particularly among smaller islands (Bond 1950). Two or three were seen on 14 January 2002 off Port Elizabeth, Bequia, en route to Mustique (SE; Norton *et al.* 2002). Recently recorded breeding on several islands of the Grenadines (Frost *et al.* 2009). Up to 25 are regularly seen by the Pillories, and near small islets off northern Mustique; a few can also be seen off Petit Mustique island, southwest of Mustique. This species has been seen flying to cliffs to presumed nest sites at the Pillories on 27 January 2006, 23 January 2007, and during subsequent visits (MP).

Magnificent Frigatebird (*Fregata magnificens*). Breeds in the Grenadines (e.g., Battowia; Clark 1905), but no recent evidence of breeding (Frost *et al.* 2009). Seen daily at sea along the coast, especially in Britannia Bay where about four birds are usually present, and up to 17 have been seen soaring in thermals over high ground (often north of Rutland Bay). A male with an inflated breeding pouch was seen on 23 January 2007 in Britannia Bay, considered unusual at that time of year (R. Hoflund pers. comm., MP).

\*Masked Booby (*Sula dactylatra*). Breeds sparingly on Kick-‘em Jenny and probably also Battowia (Clark 1905). ‘Colonies thriving in the Grena-





Fig. 5. Juvenile flamingo (*Phoenicopterus ruber* or *P. roseus*) by airstrip, 6 December 2010. Photo by Dianne Wilson.



Fig. 6. Juvenile flamingo showing dark front of upper mandible. By airstrip, 6 December 2010. Photo by Dianne Wilson.

dines' at Battowia Bullet, All-awash Islet, and Kick-em Jenny' (Bond 1950). No breeding colonies found in 2004 (Frost *et al.* 2009). On 3 February 1998, one was seen on the ground and two in flight at Brooks Rock. Subsequent sightings at the same locality include: several possible sightings on 31 January 2001; two pairs and a single on the ground and another in flight on 6 February 2002; one pair and three separate singles on the ground on 28 January 2003; two pairs on the ground on 25 January 2005; three pairs and seven singles on the ground plus one in flight on 21 January 2006, suggesting 10 nest sites; eight birds plus a possible juvenile on the ground at seven separate sites, and others in flight on 28 January 2007 (Fig. 7); five pairs and three singles on 4 February 2008; 11 on 31 January 2009; and six singles, three pairs (nine sites) and two fully grown chicks on 4 February 2010. Brooks Rock was not surveyed in 2004 or at other times of the year by MP, but Masked Boobies were there in early November 2007 (RS). Lowrie *et al.* (unpubl. report) found three chicks (first confirmed breeding record) in separate nests on Brooks Rock in May 2009, and found no other breeding colonies of this species in St Vincent and the Grenadines.

Brown Booby (*Sula leucogaster*). Abundant on Battowia and Kick-em Jenny (Clark 1905). Common, nesting on numerous small islands or cays (Bond 1950, Frost *et al.* 2009). Five to ten

(occasionally up to 40) are seen along the coast daily. Usually seen in Britannia and L'Ansecoy Bays, and at Montezuma Shoal due west of Mustique (see Fig. 1). It breeds on Brooks Rock alongside Masked Boobies with up to 20 seen there. A half-grown chick was seen on Brooks Rock on 28 January 2007. Five chicks in separate nests were found on Brooks Rock in May 2009 (Lowrie *et al.* unpubl. report).

Red-footed Booby (*Sula sula*). Breeds on Battowia and birds head for it every evening (Clark 1905). Much less common than Brown Booby (Bond 1950). Breeds on several of the Grenadine Islands (Frost *et al.* 2009). About 50 immatures and dark-morph adults were seen between Bequia and Mustique on 14 January 2002 (SE; Norton *et al.* 2002). A few seen daily at sea, sometimes up to 30. Often seen at Montezuma Shoal or, closer to shore, to the east of Brooks Rock and South Point. Many were perched on trees or flying around All Awash Island (suggesting breeding) to the NE of Mustique on 23 January 2007. Many adults and some chicks were noted at Battowia Island on 4 February 2003 (MP). At Battowia on 18 February 2007, D. Wilson and M. de Silva (pers. comm.) photographed both white- and dark-morph adults at nests with eggs and chicks.

Brown Pelican (*Pelecanus occidentalis*). Common throughout the Grenadines, especially in the



Fig. 7. Masked Booby (*Sula dactylatra*) colony at Brooks Rock, 28 January 2007. Photo by M. R. Paice.

Pillories, mainly in winter; doesn't appear to breed (Clark 1905, Frost *et al.* 2009). Occurs in the Antilles and nests in southern Cuba (Bond 1950). Seen along the coast on nearly every visit, occasionally fishing off the headland at Lovell and by Gellicieux Bay, and roosting on small islets amongst the Pillories and formerly at Brooks Rock when there was a small tree. Up to four seen together (MP). Also noted in August and November in 2007. An individual fishing off the beach to the west of the Cotton House on 10 July 2008, was the first sighting in almost 6 mo. By 5 September 2008, a dozen or more were present (RS).

Great Blue Heron (*Ardea herodias*). Not uncommon in Southern Lesser Antilles (Clark 1905), where it is a winter resident (Bond 1950). Mostly seen in the two larger mangrove swamps, at the palm grove ponds, and at Rutland pond. In 2007 two were seen regularly at Cotton House Pond. None were seen in 1997 or 2001, otherwise one or two have been seen, and since 2006 at least two were present on each visit (MP). Also seen on 30 October 2007, and every month until 13 June in 2008 (RS).

Great Egret (*Ardea alba*). Probably nests in very small numbers in the Lesser Antilles, recorded in Mustique (Bond 1950). Less shy than the previous species, it is usually seen at the two larger man-

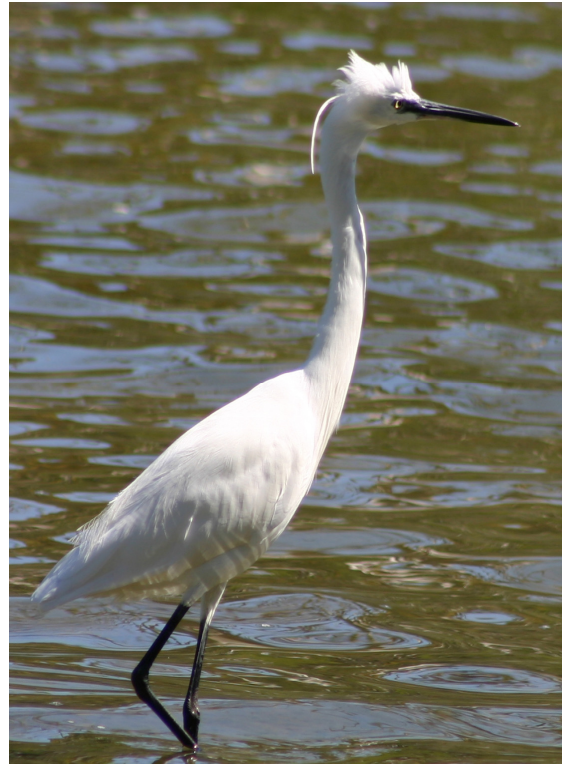


Fig. 8. Little Egret (*Egretta garzetta*) at the Lagoon, 24 January 2007. Photo by M. R. Paice.

grove swamps, at the palm grove ponds, and at both Cotton House ponds. Not always present. One was seen in 2001, 2003, and 2004, three in 2006, two in 2007 and 2008, one in 2009, and two in 2010 (MP). One was seen on 8 November 2007. In 2008, noted in May, June, and on 19 October (when four were present), and in November (RS).

\*\*\*Little Egret (*Egretta garzetta*). First seen at the Lagoon at 1000 and at 1050 on 24 January 2007 when a single bird with a long head plume, bluish lores, black bill and legs, and yellow feet was photographed (Fig. 8). From 1620–1635 a second bird was seen at the Cotton House Pond. This bird had no head plumes, paler bluish-grey lores, a blackish bill (lower mandible appeared partly grey), black legs, and greenish-yellow feet. The plumed individual was seen again on 27 January 2007 in a tree roost at the Bird Sanctuary, and on 1 and 6 February 2007 at the Lagoon (MP). One was seen regularly from 31 August to 28 October 2007, usually at the palm grove ponds. On 5 December 2007 two were seen at the same ponds. In 2008 two were seen on 9 April, and ones and twos were seen in June, July,





Fig. 9. Tricolored Heron (*Egretta tricolor*) at the palm grove ponds, 1 November 2007. Photo by R. Speirs.

August, and November (RS). On 2 February 2010 four were at the Bird sanctuary with other egrets (MP).

\*\*\*Western Reef-Heron (*Egretta gularis*). The first record was of a dark-morph immature seen on 1 February 2004 at Lagoon Bay West, documented in Paice (2006). Possibly the same individual was seen at Mustique on 24 June 2004 by George Barlow (Norton *et al.* 2005a).

Snowy Egret (*Egretta thula*). Casual in the Grenadines (Clark 1905). One actively feeding bird was seen at 1700 on 31 January, and at 1730 and 1745 on 3 February 2003 on the Bird Sanctuary lagoon (MP). Two were at the Cotton House outer pond at 0915 on 19 June 2008, and were seen again at the same place and at Pt Lookout pond on 23 June. One was at south Britannia Bay on 27 August 2008, and one was at Rutland pond on 18 October 2008. One in breeding condition was at the Lagoon on 26 and 28 March 2009 (RS). On 2 February 2010 four were at the Bird Sanctuary with other egrets (MP).

Little Blue Heron (*Egretta caerulea*). Common throughout the region, breeding in the Grenadines (Clark 1905). Birds of all age groups have been seen in mangroves, along shores, on reefs, and at ponds throughout the year. Up to eight seen daily (MP).

\*Tricolored Heron (*Egretta tricolor*). Graham White saw one from a boat in between Bequia and Tobago Cays during 5–9 August 1999 (White 2002). An immature bird was photographed at the palm grove ponds on the morning of 1 November 2007 (Fig. 9). An adult was seen along the Britannia Bay coast on 13 June 2008, and on 19 June 2008 it was seen by the Lagoon. Presumably the same bird was at Pt Lookout pond with a Little Egret on 22 June 2008, and alone on 17 August 2008 at the same pond (RS). At the Bird Sanctuary one, sometimes two, were seen from 2–10 February 2010 (MP).

Cattle Egret (*Bubulcus ibis*). Increasingly widespread in the West Indies, now known from many of the Windward Islands including the Grenadines (Pinchon 1961, Schwartz and Klinikowski 1963). Usually seen at the Bird Sanctuary (roosting), on grassland near the airstrip, associating with horses (*Equus ferus*) and goats (*Capra aegagrus*), and at Cotton House Pond. Occasionally small flocks fly to and from the island. Up to seven have been present every visit except in 2003 (MP). Fifteen were seen in November 2007 (RS).

Green Heron (*Butorides virescens*). A breeding resident found throughout the region (Clark 1905). Seen daily in mangroves, beside all ponds, and along the coast. A bird was on a nest in the Bird Sanctuary on 19 January 2006. It is the most abundant heron species on the island, though it is difficult to assess numbers as it is widespread, solitary, and often remains hidden. Up to four have been seen in the Bird Sanctuary. Present throughout the year.

Black-crowned Night-Heron (*Nycticorax nycticorax*). Has been seen on Carriacou (Clark 1905). Rather rare in the West Indies and very rare and local as a breeding bird. Occurs in St Vincent and the Grenadines (Bond 1950). Both adults and immature birds have been observed at the Bird Sanctuary and Pt Lookout pond. An immature was present at the Cotton House Pond in 2005. In years up to 2006 one to three were the highest counts in the Bird sanctuary (none were seen in 1997 and 2001), but counts there from 2006 have been: four (2006), three in 2007, four in 2008 and 2009, and six in 2010 (MP). An adult and an immature were seen several times from 30 August to 21 October 2007. In 2008 an immature was seen on 24 May, an adult on 29 October, and an adult and an immature on 5 November, all at the Cotton House Pond (RS).

Yellow-crowned Night-Heron (*Nyctanassa violacea*). Abundant in the region (Clark 1905), and



Fig. 10. Glossy Ibis (*Plegadis falcinellus*) at Cotton House pond, 22 January 2005. Photo by M. R. Paice.

breeds virtually throughout the West Indies (Bond 1950). It occurs in all mangrove swamps and along the coast throughout the year. Seen on every visit with highest counts in the Bird Sanctuary of three in 1998, six in 2001 (estimated), and one or two in other years (MP).

\*\*\*Glossy Ibis (*Plegadis falcinellus*). The first record was of an adult in winter plumage seen at 1515 on 22 January 2005 by Cotton House pond (Fig. 10). It was feeding amongst flooded grass and then perched in a tree. It was reported as having been present for a week or more. It was seen again at the same place at 1700 on 24 January, and at 1130 on 28 January 2005.

Osprey (*Pandion haliaetus*). Regularly arriving in August (Clark 1905). It is an uncommon to fairly common winter resident along coasts throughout the West Indies (Bond 1950). Seen annually, hunting over the two lagoons or perched on the surrounding mangroves. It can also be seen flying to and from neighbouring islands and islets. Up to a dozen sightings per visit, with two birds seen at the same time in 2004, 2007, and 2009, and three together in 2006 (MP). Recorded in every month (RS).

Broad-winged Hawk (*Buteo platypterus*). Found on St Vincent with Grenadines records from Bequia, where it has bred, and a casual occurrence on Mustique (Clark 1905). No subsequent records.

Merlin (*Falco columbarius*). Recorded on Carriacou (Clark 1905). Found throughout the West Indies, from September to May 2, not as rare as *F. peregrinus* (Bond 1950). RW noted one during his 8–17 January 1990 visit (Norton 1990). One was seen hunting Carib Grackles (*Quiscalus lugubris*) opposite Rabbit Island; another was carrying a bat

near the airport; and one hunted over the Bird Sanctuary. One, sometimes two different birds have been seen, one to four times on each trip, except in 2008 when there were no sightings (MP). Later in 2008 singles were seen at the Lagoon on 14 April, at Rutland on 27 and 30 October, near L'Ansecroy on 1 November, chasing a Belted Kingfisher (*Megasceryle alcyon*) at the Bird sanctuary on 5 November, and later that day at Rutland (RS).

Peregrine Falcon (*Falco peregrinus*). A rare winter visitor found throughout the region (Clark 1905). RW noted one on Mustique during 8–17 January 1990 (Norton 1990). Both immatures and adults have been seen, often along the coast and at Rutland Bay. One to four sightings were made per visit in: 2002 (adult and an immature), 2003, 2005, 2006, and 2008; none were seen on the other visits (MP). One was seen in flight at Rutland on c. 14–15 and 27 November 2008 (RS).

Sora (*Porzana carolina*). Recorded on Mustique (Clark 1905). A common winter resident in the region from 13 October to 24 April (Bond 1950). One was spotted at Buttercup pond (east of the airport) at 1700 on 31 January 2004 (MP). An immature was at the Cotton House pond in November 2007 (RS).

Purple Gallinule (*Porphyrio martinica*). Common in Grenada and the Grenadines where there are swamps, recorded as breeding (Clark 1905). Very rare in the Lesser Antilles except on some of the Grenadines and Grenada (Bond 1950). R. Hoflund (pers. comm.) saw an adult by the Cotton House Pond in the 1990s. An immature was seen at 0830 on 27 January 2003 in a bush by Buttercup pond (MP). A probable adult was glimpsed beside the pond near Pt Lookout on 17 August 2008 (RS).

Common Moorhen (*Gallinula chloropus*). Abundant at pond by Mr Charles Wallace's house (probably what is now the Cotton House Pond) on Mustique, breeding in the Grenadines (Clark 1905). It breeds in the Bird Sanctuary where one to five are seen each visit. Often seen at the Cotton House and Pt Lookout ponds. Present all year, with up to ten in 1998 (MP) and 15 at the Cotton House Pond in June 2008 (RS).

\*\*American Coot (*Fulica americana*). An adult was seen early in the morning on 4 November 2008 at Rutland pond. It was seen several times that month at the same place and at the Bird Sanctuary, often accompanying a Ring-necked Duck (Fig. 4). Several sightings on 2 December 2008 and from 15–31 January 2009, all in the Bird Sanctuary, were probably of the same bird. One on 9 March 2009 in the Bird Sanctuary may have been of either *Fulica*

species (RS).

Caribbean Coot (*Fulica caribaea*). Common at Mustique, etc., breeding in the Grenadines (Clark 1905). All questionable records from Lesser Antilles probably *caribaea*. Locally common, occurs in the Grenadines. It apparently interbreeds readily with *F. americana* (Bond 1950). In the Bird Sanctuary, 15 immatures and adults were present in 1997, one in 2001, four in 2002, and one in 2003 and 2006 (MP). One was seen on 31 July and two on 10 August 2008 in the Bird Sanctuary. An immature *Fulica* species was seen at the Lagoon on 18 March 2009 (RS).

Black-bellied Plover (*Pluvialis squatarola*). Probably visits southern Lesser Antilles (Clark 1905). Fairly common as both a transient and winter resident in the West Indies. Recorded throughout the year, mostly in autumn and spring (Bond 1950). Up to five have been seen most years on mudflats at the Lagoon. Some were also at the Bird Sanctuary in 1997, and ten were there in 1998 (water levels were lower). A flock of 17 roosted on the reef by the Lagoon in 2002 (MP). Has occurred as early as 15 August and as late as 15 April, both in 2008 (RS).

American Golden Plover (*Pluvialis dominica*). Common in the Grenadines becoming fewer every year (Clark 1905). In the region from 26 July to 4 November and from 16 February to April (Bond 1950). Two were seen on grassland by Rutland Bay at c. 0800 on 4 September 2007, and at least one was there daily until 18 October 2007. Sightings in 2008 include: one by the airstrip on 24 August; three at south Britannia Bay on 5 September; one by the Cotton House on 10 November; one with Black-bellied Plovers at south Britannia Bay on 17 and 22 November; and one at Rutland on 26 and 27 November (RS).

Collared Plover (*Charadrius collaris*). Very rare perhaps merely casual in the Lesser Antilles, recorded on Mustique (Bond 1950). No subsequent records.

Wilson's Plover (*Charadrius wilsonia*). Found nesting on Mustique in a colony of about six pairs by Thayer (Bond 1950). A photograph was recently taken of this species on the intertidal zone near the Lagoon (no date), and eggs were found on Union Island (De Silva pers. comm. in 2006). Singles were seen on mud flats at the Lagoon on 20 May 2007, on 1 and 22 May 2008, and on 30 March 2009 (RS). The species may still breed on Mustique.

Semipalmated Plover (*Charadrius semipalmatus*). Common in the southern Lesser Antilles, from the end of August until November (Clark 1905). A fair-

ly common winter resident in the West Indies, but most numerous as an autumn transient (Bond 1950). Most days, small groups of two to eight occur around the Lagoon or along the coastal reefs to the west, with 22 at the Lagoon in 2009 (MP). In autumn it frequents Rutland pond and the flooded palm grove ponds. Numbers increased around 12 January 2008. Recorded as early as 6 August and as late as 22 May, both in 2008 (RS).

Killdeer (*Charadrius vociferus*). Rare migrant to Carriacou and Grenada (Wells 1902a, Clark 1905). Recorded in the Grenadines (Bond 1950). At 1230 on 20 November one was seen on the lawn by the Cotton House, where it lingered the next 2 days (RS).

American Oystercatcher (*Haematopus palliatus*). Evidently breeds in the Grenadines (Tobago Cays) (Bond 1950). The species was very likely present over 300 yr ago, as drawings and notes by Plumier (in 1689–1696) made from observations in the Grenadines are almost certainly of American Oystercatchers (Bourlière 1949). Seen on every visit. For details of sightings up to 2006 see Hayes *et al.* (2006). Numerous sightings were made in 2007 and in subsequent visits, on rocky headlands and reefs (MP). One was also seen on 5 September at Britannia Bay (RS). The sightings of consorting pairs and perched birds on suitable nesting islets lends support to the suggestion by Hayes *et al.* (2006) that the species may breed locally. However, the lack of records from RS in spring and summer casts doubt on this.

Spotted Sandpiper (*Actitis macularius*). Abundant, many remaining all year (Clark 1905). Usually solitary, it has been seen in all mangrove swamps, often by the ponds north of the Bird Sanctuary, and sometimes along sandy coasts. In 2004 a flock of 14 roosted in the Bird Sanctuary, perhaps prior to migration. Seen almost daily with up to eight in the two larger swamps (MP). Seen as late as 23 May 2008, and a bird seen on 18 July 2008 may have been an early arrival (RS).

Solitary Sandpiper (*Tringa solitaria*). Common in the Grenadines from July to December (Clark 1905). Fairly common transient but casual as winter resident in the West Indies (Bond 1950). In 2008, one foraged in a ditch south of the airstrip on 21 and 25 August, four were on the flooded airstrip grassland on 14 September, and one was at the Lagoon on 12, 13, and 18 December (RS).

Greater Yellowlegs (*Tringa melanoleuca*). Common in the southern Lesser Antilles during migration, can arrive as early as May but mainly seen

from September and October to mid November (Clark 1905). Less common in West Indies as transient and winter resident than the Lesser Yellowlegs (*T. flavipes*) though not rare in the region. Recorded throughout the year, most abundant in autumn and spring (Bond 1950), but according to Raffaele *et al.* (1998) more abundant in autumn. Up to five occurred each visit around the Lagoon. In 1997 and 1998, several were at the Bird Sanctuary, and ten were seen there with other waders in 2010 (MP). Seen at Rutland and palm grove ponds in autumn. The earliest autumn date was 6 August and the latest spring date was 24 May, both in 2008 (RS).

Willet (*Tringa semipalmata*). A regular uncommon visitor (Clark 1905). Recorded on Mustique by Thayer. Recorded in the region from 24 October to 15 November (Bond 1950). RW noted two during his 8–17 January 1990 visit (Norton 1990). Singles of the western race *inornatus* were by the palm grove ponds on 31 October 2007 and on 18 July 2008, and one of the nominate eastern race was at Britannia Bay on 9 and 10 September 2008 (RS). Another western Willet was seen several times at the Bird Sanctuary from 2–9 February 2010 (MP).

Lesser Yellowlegs (*Tringa flavipes*). Arriving mid July on the Grenadines, a few may be found in swamps throughout the year (Clark 1905). Common transient and winter resident in the West Indies, most numerous in autumn and spring (Bond 1950). Not seen on four visits; from one to three were seen on other visits except: in 1997, when four were seen; 1998, fifteen; and 2010, nine, all at the Bird Sanctuary. It has also been spotted at the Lagoon. In most years this species is less abundant as a winter resident than the Greater Yellowlegs (MP). Up to fifteen were seen at Rutland pond in September and October, and at the palm grove ponds in late October 2007. The earliest record is 18 July and the latest on 9 April, both in 2008. It outnumbers the Greater Yellowlegs in autumn (RS).

\*Upland Sandpiper (*Bartramia longicauda*). Small numbers arrive in Grenada and Carriacou in September and October (Wells 1902a; Clark 1905). Rare on migration; recorded in the Grenadines (Bond 1950). One inhabited grassland at the approach to Rutland Bay from 13–15 September 2007 (RS, photo in Paice and Speirs 2009:102).

Whimbrel (*Numenius phaeopus*). Rather uncommon though regular, arriving early August (Clark 1905). A rare transient in the West Indies, recorded in the Grenadines (Bond 1950). ‘The Whimbrel has lately become a local winter resident in the Lesser Antilles apparently as a result of tourist hotels built

near ponds or lagoons where no shooting is allowed’, many were observed on Mustique in early March 1974 by C. G. Chaplin (Bond 1977). RW noted twelve during his 8–17 January 1990 visit (Norton 1990). Individuals or loose groups are found in all mangrove swamps, and often feed in grassland by the palm grove ponds. The highest count was of eight at the Bird Sanctuary in 1998, and total numbers on Mustique on each visit were probably between six and twelve birds (MP). Recorded in every month (RS).

Ruddy Turnstone (*Arenaria interpres*). Common on all islands on migration, sometimes as many as thirty or forty (Clark 1905). A fairly common transient and winter resident throughout the West Indies (Bond 1950). During the middle of the day flocks of 30–60 roost in coastal trees by the Lagoon. In the evening, smaller flocks may gather to roost on low branches in the Bird Sanctuary. Groups forage at the water’s edge along sandy beaches in Britannia and L’Ansecoy Bays, and beside the ponds. Some join other waders in the mangrove swamps. Observation of ringed birds by RS suggests that the different groups are discrete units, suggesting a total island population of 40–80 (MP). Recorded in every month. A hundred were by the fishermen’s village on 13 December 2008 (RS).

Sanderling (*Calidris alba*). Never abundant (Clark 1905). A fairly common transient and winter resident in the West Indies throughout the year but mainly September to May (Bond 1950). RW noted two during his 8–17 January 1990 visit (Norton 1990). One or two have been observed feeding along the water’s edge on sandy beaches, often with turnstones, during 2003–2005 (MP), and in late August 2007 and 2008. A high count of six were at Pasture Bay on 2 September 2008 (RS).

Semipalmated Sandpiper (*Calidris pusilla*). ‘Everywhere abundant in these islands’ (Clark 1905). A common fall transient in the West Indies, recorded throughout the year but much less in spring, a few winter (Bond 1950). Up to six at a time were seen regularly from 21 August to 18 October 2007 at Rutland pond. From 15 August 2008 many were present in the Lagoon area and later were numerous elsewhere along the coasts and on flooded grassland, until mid October by which time most waders had left. Not seen the rest of the year (RS).

Western Sandpiper (*Calidris mauri*). Probably a not rare transient and a rare winter resident in the West Indies, recorded in Mustique (Bond 1950). A lone individual with a long bill suggestive of a fe-

male was at the Lagoon from 16 March until 8 April 2009 (RS).

Least Sandpiper (*Calidris minutilla*). Occurs on all islands from mid July to the end of October (Clark 1905). A common transient and fairly common winter resident (Bond 1950). RW noted ten during his 8–17 January 1990 visit (Norton 1990). SE saw six on the mudflats around the lagoon on 14 January 2002 (Norton *et al.* 2002). Found almost exclusively on mudflats around the Lagoon. Small flocks of four or less, nine in 2007, and seven in 2009, probably represent the total population present. Not seen in 1998 and 2008 (MP). Ten were seen on 18 December 2007. In 2008 the earliest was on 18 July at the flooded palm grove ponds and the latest was on 1 May (RS).

White-rumped Sandpiper (*Calidris fuscicollis*). Arrives in July and remains until November, flies with *C. pusilla* and *C. minutilla* (Clark 1905). A fairly common fall but rare spring transient, recorded in Mustique (Bond 1950). A juvenile was seen alongside a Killdeer on grass by the Cotton House on 21 and 22 November 2007. In 2008 one foraged by the Cotton House pond on 6 and 7 September; on 16 October there were twenty-three amongst a flock of 150 waders on the flooded paddock south of the airstrip, and two others by the Cotton House; on 22 October there were seven at the paddock; and on 12 and 13 November one was at Rutland pond (RS).

Baird's Sandpiper (*Calidris bairdii*). There is one questionable sight record from Mustique on 8 September in the 1920s by Thayer (J. Wiley pers. comm., Raffaele *et al.* 1998).

Pectoral Sandpiper (*Calidris melanotos*). Abundant in the Grenadines, it arrives in July and August and increases from October to November (Clark 1905). A common fall transient and a rather rare spring transient (Bond 1950). Two were at Rutland pond on 18 August and another two turned up at the Cotton House pond on 21 October 2007. In 2008 one was at Rutland small pond on 24 and 29 May. The first autumn 2008 sighting was one at Pasture Bay on 3 September, followed by six on flooded grassland in a flock of 50 waders; several on 14 October; and 25 (among 150 waders) on the paddock, and two by the Cotton House on 16 October. The latest 2008 sightings were one by the Cotton House pond on 31 October, and one on the coast on 10 November (RS).

Stilt Sandpiper (*Calidris himantopus*). Visits during migration, not very common (Clark 1905). A fairly common fall transient in the West Indies, but rare in spring, July to December, and April (Bond

1950). RW noted eight during his 8–17 January 1990 visit (Norton 1990). On 11 February 1998 a flock of eight fed voraciously in the shallow lagoon of the Bird Sanctuary (MP). On 4 December 2007, three were at the Lagoon mudflats (RS). And one was at the Bird Sanctuary on 6 and 9 February 2010 (MP).

Buff-breasted Sandpiper (*Tryngites subruficollis*). A very rare transient in the West Indies recorded in Mustique in October (Bond 1950). No subsequent records.

Short-billed Dowitcher (*Limnodromus griseus*). A rare visitor (Clark 1905), recorded in Mustique (Bond 1950). SE saw two on the Lagoon mudflats on 14 January 2002 (Norton *et al.* 2002). One stayed at Rutland pond from 23 August until 19 September 2007. Sightings in 2008 at the Lagoon, on flooded grass by the airstrip, along coasts, and by the Cotton House pond were made: one on 23 May (the only spring record), one on 25 July, two on 6, 16, and 24 August, one on 1 September, two on 3 September, and one on 5, and 10 September (RS).

Wilson's Snipe (*Gallinago delicata*). An uncommon migrant (Clark 1905). A common transient and winter resident locally in the West Indies, most numerous in the Greater Antilles (Bond 1950). RW noted one during his 8–17 January 1990 stay (Norton 1990). Two or three possible snipe were seen from a distance feeding on wet grassland by the airstrip in January 1997 (MP). In 2007, two were at the Cotton House pond on 21 and 22 October, one was at Rutland Pond on 10 November, and another was on grass by the Cotton House on 20 November. Three were at the Cotton House Pond on 16 October 2008 (RS), and one was seen there on 1, 2, and 6 February 2010 (MP).

Laughing Gull (*Leucophaeus atricilla*). Common everywhere in the Grenadines, nesting on small islets (Clark 1905). It is rarely seen, except locally during winter months (Bond 1950). In 2004 found nesting only on Petit Canouan and Battowia (Frost *et al.* 2009). On Mustique these gulls arrive together in mid March when mating occurs. They are thought to breed on the Pillories. Then they leave en masse on about August 20 (D. Wilson pers. comm.). On four visits, single individuals (both basic and alternate plumage) stayed around the boats at north Britannia Bay (MP). From April to July a hundred or more may gather near the jetty; on 7 September 2008 there were still about twelve gulls on the island but most had left the previous week (RS).

\*\*Ring-billed Gull (*Larus delawarensis*). At 1615



on 1 February 2006, an adult flew over the Bird Sanctuary. Presumably the same individual was seen the next day at 1400, flying north past the Bird Sanctuary from grassland by the airstrip (no photo; MP).

Brown Noddy (*Anous stolidus*). Common among Grenadines, nesting near Carriacou and on Western Key off Bequia (Clark 1905). Nests in St Vincent and the Grenadines, common locally. Present from late March to October 16 (Bond 1950). Found breeding on several of the Grenadine Islands in 2004 (Frost *et al.* 2009). The first 2008 sighting was of two off south Britannia Bay on 5 July; on 6 August about eight landed on the side of Rabbit Island, where they may have been nesting; and on 18 August a flock of 90 fished close to the shore of south Britannia Bay. The last sighting of 2008 was of a few near Wilks Rock on 31 August (RS). Breeding was found locally at the Pillories (210 individuals), and in small numbers at Rabbit Island, Brooks Rock, and Wilks Rock in May 2009 (Lowrie *et al.* unpubl. report).

Sooty Tern (*Onychoprion fuscatus*). Small flocks occur between Bequia and Canouan, and it is abundant in the southern Grenadines, where it breeds (Clark 1905). Found breeding on several Grenadine islands in 2004 (Frost *et al.* 2009). Several were encountered on a boat trip between Mustique and Tobago Cays, including one within 3 km of Mustique on 5 August 2007. One was observed off south Britannia Bay on 4 July 2008. Two perched on rocks on the bay to the south west of the Cotton House on 17 July 2008 (RS). Lowrie *et al.* (unpubl. report) found a few breeding on the smaller Pillories in May 2009.

Bridled Tern (*Onychoprion anaethetus*). Common in southern Grenadines, with abundant nesting on Lee Rocks and Rose Rock. Singles and pairs are frequent in the northern Grenadines (Clark 1905). Recorded in the Grenadines from March to October (Bond 1950). Found nesting on All Awash, the Pillories, and possibly Battowia in 2004 (Frost *et al.* 2009). In May 2009 breeding was found on the Pillories with c. 95 individuals, on Rabbit Island with c. 30, and a few on Wilks Rock (Lowrie *et al.* unpubl. report).

Gull-billed Tern (*Gelochelidon nilotica*). Recorded at Mustique on 8 September 1924 (G. H. Thayer unpubl. report at the American Museum of Natural History; J. Wiley pers. comm.) and recorded in the region as a whole from 5 May to 22 October (Bond 1950).

Roseate Tern (*Sterna dougallii*). Fairly common

in the Grenadines, breeding near Carriacou (Clark 1905). It winters from the West Indies to Brazil (Bond 1950). Found nesting on several Grenadine islands in 2004 (Frost *et al.* 2009). Photographs taken on 18 May 2007 at Rutland Bay show two Roseate Terns in alternate plumage (RS). In 2008 there were sightings of single birds off the coast by the Lagoon on 19 and 20 June, and 11 July. On 12 July one was with a Sandwich Tern at the bay adjacent to the Cotton House. On 15 August there were eight to ten, including a juvenile, at south Britannia Bay; the adults had moulted their tail streamers and had mostly lost the red on the bill. The last 2008 sighting was on 3 September (RS). A likely breeding colony with 75 birds in north Mustique in May 2009 was the largest colony found in the country (Lowrie *et al.* unpubl. report).

Common Tern (*Sterna hirundo*). In 2008 up to five were seen from 12 July, mostly at Pasture Bay, including three or more amongst other terns from 29 August until 2 September. One in basic plumage was seen on 25 October 2008 at L'Ansecoy Bay (RS).

Royal Tern (*Thalasseus maximus*). Found sparingly throughout the Grenadines where it also breeds (Clark 1905). Occurs at all seasons in the Antilles (Bond 1950). No evidence of breeding in 2004 (Frost *et al.* 2009). SE saw 40 off Britannia Bay on 14 January 2002 (Norton *et al.* 2002). Up to 42 have roosted during the day on reefs off south Britannia Bay. They regularly fish along this stretch of shore and at L'Ansecoy Bay, and also often fish or perch on buoys at north Britannia Bay. In 2001 and 2002, flocks of terns (150 and 50 respectively), probably including this species, congregated near Montezuma Shoal (MP). Royal Terns leave to breed in March and are seen again at the end of August (RS).

Sandwich Tern (*Thalasseus sandvicensis*). Recorded in the Grenadines (Tobago Cays; Bond 1950). Frost *et al.* (2009) reported 'flightless chicks' in late August 2004, but neglected to report the locality. SE saw seven amongst Royal Terns off Britannia Bay on 14 January 2002 (Norton *et al.* 2002). On half the visits Sandwich Terns roosted alongside Royal Terns on the reefs along the west coast, usually in smaller numbers (but in 2001 there were 34 Sandwich to 15 Royal Terns). Large groups of terns seen in 2001 and 2002 at sea (see previous species) may have included this species (MP). Two were seen off Rutland Bay on 18 September 2007. A flock of 150 or so Sandwich Terns with a few Royal Terns perched on a moored boat in the bay near the



Fig. 11. Yellow-billed Cuckoo (*Coccyzus americanus*) at Rutland Bay, 17 November 2007. Photo by R. Speirs.

Cotton House in mid December 2007, and another large flock appeared there on 12 February 2008. On 2 September 2008 one “Cayenne” Tern of the South American race *eurygnatha* was on the sand alongside 20 typical Sandwich and 20 Royal Terns at Pasture Bay (RS).

Scaly-naped Pigeon (*Patagioenas squamosa*). Common on all the Grenadines including at low elevations; abundant at Church Rock between Battowia and Baliceaux, nesting mostly on smaller keys from May to August (Clark 1905). Common locally (Bond 1950). It is scarce in winter, encountered in ones and twos, five times or less per visit, in taller trees in the mangroves. But during the 2005 visit there were eighteen sightings, with groups of up to five in trees and bushes near Rutland Bay (MP). Forty were in that vicinity in October 2007. In 2008 many were on the island from 11 June, with many flying to Rabbit Island; by 5 July there were hundreds all over the island, including several flying between Mustique and other islands (e.g., Bequia). There were still many flying between Mustique and Rabbit Island on 6 August 2008 (RS; erroneously dated 2007 in Paice and Speirs 2009). Rabbit Island seems to be a favoured breeding site for this and other pigeon species.

Zenaida Dove (*Zenaida aurita*). Abundant in the Grenadines, especially numerous on Battowia, Bal-

liceaux, and Mustique. Breeds in the Grenadines (Clark 1905). Frequents mangroves, often foraging in shaded leaf litter, and also inhabits trees by freshwater ponds. Widespread in undisturbed habitat. Although only a few are seen together, with maxima of two to seven per visit, they probably outnumber the Eared Dove (*Z. auriculata*) on the island because their habitat is more extensive (MP).

Eared Dove (*Zenaida auriculata*). Locally common in the Grenadines including Mustique (Bond 1950). A recent colonist (Raffaele *et al.* 1998), hence no mention of the species by Clark (1905) for the northern Grenadines. In contrast to the previous species, Eared Dove occurs mainly in parkland, gardens, and around the goat pens to the north of the Lagoon. Seen daily, groups of 20–40 roost together in one tree (MP).

Common Ground-Dove (*Columbina passerina*). An abundant breeding bird in the Grenadines (Clark 1905). Found in pairs and small groups of up to seven, in open sandy or grassy areas (including those in gardens and parkland), cactus scrub, and on edges of mangroves and other woodland. It is not as conspicuous as the previous two species and is perhaps seen less, nevertheless it is probably the most numerous columbid on the island because of its general habitat use and small size. Nesting was recorded on 31 January 2003 (MP).

Yellow-billed Cuckoo (*Coccyzus americanus*). Wells (1902b) saw a pair on Carriacou in 1896 (no date), and he saw the species annually from then on during October and November. A transient in the southern Lesser Antilles, recorded in the Grenadines (Bond 1950). At 1500 on 17 November 2007, one was photographed in cactus scrub near Rutland Bay (Fig. 11). In 2008, the first was on the paddock south of the airstrip on 16 October; one was on the road north-east of the airstrip, two were on the grass by the Cotton House, and seven were near the paddock on 3 November; about 100 were in the grassy areas between the Cotton House, Rutland Bay, and the paddock from 5–8 November; two or three were seen daily until 20 November; and the last was seen at the paddock on 12 December (RS).

Mangrove Cuckoo (*Coccyzus minor*). A common breeding bird on the Grenadines (Clark 1905). Fairly common, even occurring on many of the smaller islands (Bond 1950). Occurs in mangroves or xeric woodland throughout the island. An adult was feeding a large caterpillar to a fledgling on 4 February 2001 at the Macaroni mangrove edge. Usually seen only once or twice per visit (MP).

Smooth-billed Ani (*Crotophaga ani*). Occurs on



Fig. 12. Caribbean Elaenia (*Elaenia martinica*) at the Lagoon, 9 February 2009. Photo by R. Speirs.

some of the Grenadines including Mustique, otherwise it is absent. Breeding has been recorded in the Grenadines (Clark 1905). Common on most of the islands in the Lesser Antilles (Bond 1950). Groups of four to eight (probably the total populations) have been seen in grassland and parkland around the airstrip, in cactus scrub and grassland near Rutland Bay, and also by the goat enclosures to the north of the Lagoon (all lowland areas). Adults with recently fledged young inhabited the area approaching Rutland Bay on 25 January 2005. None appeared to be on the island during the 2004, 2006, and 2010 visits (MP).

Green-throated Carib (*Eulampis holosericeus*). Local in the Grenadines; seen in Bequia, on Canouan, also on Union and Carriacou. Recorded as breeding in the Grenadines (Clark 1905). Found virtually throughout the Lesser Antilles, but unknown south of Saline Island in the Grenadines (Bond 1950). One was seen repeatedly during 17–22 December 2007 in mangroves on the east side of the Lagoon. In 2008, at least two were seen in a garden in hills southwest of Rutland Bay during 26–30 October; two were by the Cotton House Pond on 20 November; two were in the garden on 20 and 22 November and five or six on 27 November; and the last was in the garden on 11 December (RS).

Antillean Crested Hummingbird (*Orthorhyncus*

*cristatus*). Common breeding resident found on all the Grenadines (Clark 1905). Occurs in all habitats throughout the island, and has even been seen flying across the sea to Rabbit Island, perhaps explaining its successful colonisation of island groups. Though less obvious, it may at times outnumber the Bananaquit on Mustique. A nest with a nestling was observed on 26 January 2001, and a nest with newly fledged young was seen on 31 January 2007.

Belted Kingfisher (*Megaceryle alcyon*). Common near the sea from late summer to spring in all islands, a few remain all year (Clark 1905). Singles were observed on six of the visits, a pair was present in 2007, and a male and a female (separately) in 2010 (MP). Single birds were also noted on: 21 October, and during December in 2007; and one in March, one of each sex on 9 April, and the first autumn bird on 16 October in 2008 (RS). It is generally found by the two mangrove lagoons, but has also been seen along the western coast, and at the Cotton House and Pt Lookout ponds.

**\*\*Caribbean Elaenia (*Elaenia martinica*).** Clark (1905) reported that he shot both *Elaenia* species from the same tree on Mustique. Recorded as breeding in the Grenadines (Clark 1905). Of doubtful occurrence on the Grenadines. Said to have occurred on Mustique by Clark in 1903, but absent from the Grenadines 20 years later (Thayer) and of late not found on these islands [by Bond and Danforth] (Bond 1950). There have been some possible sightings around the Lagoon, the most convincing was that of a pair which were seen and heard calling from trees in the north-west corner of the Lagoon nature trail on 10 February 2004 (MP). On the morning of 9 February 2009 a pair were seen and heard at the same place, and one was photographed (RS; Fig. 12). At 0920 on 27 January 2010 one was seen on a fruiting fig tree by a house on a hill overlooking Britannia Bay. At 1100 on 4 February 2010 a pair were at the fig tree at the same time as a pair of Yellow-bellied Elaenia (*E. flavogaster*; MP).

Yellow-bellied Elaenia (*Elaenia flavogaster*). Common in the Grenadines. Breeding has been recorded on Bequia and Mustique (Clark 1905). Often seen in pairs. Up to four have been encountered two or three times per visit, in parkland and gardens, usually in the evening (MP).

Grenada Flycatcher (*Myiarchus nugator*). Rather uncommon on St Vincent, usually common on the Grenadines, and common on Grenada. Recorded as breeding in the Grenadines (Clark 1905). It is common even on the Grenadines (Bond 1950). Up to





Fig. 13. Scaly-breasted Thrasher (*Allenia fusca*) above Britannia Bay, 27 January 2010. Photo by M. R. Paice.

five, but typically two to four, were seen and heard around the Lagoon each visit. It was also seen at the other mangrove swamps, and on wooded hillsides. A family group was seen and heard in a wooded ravine opposite Rabbit Island on 30 January 2002, and a recently fledged bird was seen in the Lagoon mangroves on 4 February 2002 (MP).

Gray Kingbird (*Tyrannus dominicensis*). Abundant breeding resident in the Grenadines (Clark 1905). By far the most abundant flycatcher, up to six seen daily in all open places including over ponds and lagoons, in cactus scrub, and amongst palms. A pair was observed mating in flight (MP).

Black-whiskered Vireo (*Vireo altiloquus*). Fairly common and recorded as breeding on the Grenadines (Clark 1905). It is common in the Lesser Antilles (Bond 1950). Of eight sightings, seven were initially noticed on being heard. It is likely that the species is overlooked when silent. One was seen in 1997, a consorting pair in 1998, and one in 2007 in shaded woodland to the east of the Lagoon. Singing individuals were also found more than once at the Macaroni mangroves, and in a garden by woodland on a hill overlooking Britannia Bay in 2008. At the Lagoon a pair were seen in 2010 (MP), one in December 2007, and adults feeding young on c. 25 May 2008 (RS).

Caribbean Martin (*Progne dominicensis*). Breeds in the Grenadines at the church at Canouan and at various places on Carriacou, also seen on Mayreau, Petit Martinique, and Union Island (Clark 1905). Breeds virtually throughout the Lesser Antilles and migrates in September or early October to some unknown region, a few remain according to Devas. Locally common in summer but very rare or absent in late autumn and early winter (Bond 1950). Only seen by MP in 1997, when a small group hunted over grassland by the airstrip and settled on the runway on 5 February 1997. Ten or more were at the Rutland Bay approach in May and August 2007. In 2008, two were seen flying over Rutland on 24 May, several were seen from a boat on 11 June as they flew into caves on an island off Bequia (where they probably breed), and six to nine were often seen during July and August, with ten seen near L'Ansecoy Bay on 30 August, the last 2008 sighting (RS).

Barn Swallow (*Hirundo rustica*). Common in all islands from August until March, seen on Mustique (Clark 1905). A common transient in the West Indies, a few winter in the Lesser Antilles (Bond 1950). Six present in 1997 and five in 2001 over grassland near the airstrip (MP). Three flew over the dried-up Rutland pond on 26 August, 11 flew over the airstrip on 30 August, and another 10 were seen around the airstrip on 16 November 2008 (RS).

Bare-eyed Thrush (*Turdus nudigenis*). Occurs on the northern end of Bequia, on Canouan, on Union, on Petit Martinique, on Carriacou, and on Isle Ronde, 'but is nowhere common on these islands'. Recorded as breeding in the Grenadines (Clark 1905). Not numerous but widespread in the Grenadines (Bond 1950). Consorting pairs were seen north of the Bird Sanctuary in 2002 and at Macaroni mangroves in 2005 and 2007. Singing birds were at the Lagoon in 2006 and south of the airstrip in 2007 during late January and early February, suggesting that breeding was imminent. Up to four were detected on every visit except 1997 and 2003, and with increasing frequency (up to eight times per visit) since 2005. Six were feeding on a fruiting fig tree in a garden above Britannia Bay in 2010 (MP).

Tropical Mockingbird (*Mimus gilvus*). Breeding resident on all the Grenadines, where it is the commonest bird (Clark 1905). Known to be parasitised by *Molothrus* on Grenada (Bond 1951). Ubiquitous, especially in cactus scrub where most other species are absent, often heard singing. Up to ten at a time seen daily. Probably as numerous as the Carib Grackle (*Quiscalus lugubris*).



Fig. 14. Palm Warbler (*Dendroica palmarum*) by the Cotton House pond, 24 May 2008. Photo by R. Speirs.

\*Scaly-breasted Thrasher (*Allenia fusca*). After the hurricane of 1898 which devastated St Vincent, this species was found on Union Island and Carriacou where it was still present in 1902 (Wells 1902b); subsequently, after searching these islands thoroughly, Clark (1905) concluded that it had died out. There have been no Grenadine records since then. From 0930–1330 on 27 January 2010 two were feeding on a fig tree in fruit (probably *Ficus citrifolia*) on a hill overlooking Britannia Bay (Fig. 13). They were seen again the following day, when they repeatedly flew the same direction into woodland as if caching food or feeding young. Two or perhaps three were seen repeatedly up to 9 February 2010 (MP).

Northern Parula (*Parula americana*). Found in the West Indies from 4 August to 7 May (Bond 1950). One was seen by RW during his 8–17 January 1990 visit (Norton 1990).

\*Yellow Warbler (*Dendroica petechia*). Found on Carriacou, Union, and commonly on Prune, where it breeds (Clark 1905), and probably casual on Mayero, but unknown from the remainder of the Grenadines, and confined to mangrove swamps (Bond 1950). Recorded on St Vincent from 10 October to 24 March (Bond 1965). Four were seen at the Lagoon mangroves at 1730 on 10 February 1998. A single bird was noted at the Macaroni mangroves at 1245 on 29 January 2005, and again at 1345 on 31 January 2005 (MP). On 23 and 24 October 2008 a female was photographed at Rutland Bay approach (photo by RS in Paice and Speirs 2009: 168).

\*\*\*Palm Warbler (*Dendroica palmarum*). An individual of the nominate western race was photographed on the ground beside the Cotton House pond at 1010 on 24 May 2008 and subsequently

seen until 28 May (RS; Fig. 14).

\*\*Blackpoll Warbler (*Dendroica striata*). Migrates through the West Indies from 24 September to 26 November, and from 1 April to 24 May (Bond 1950). Recorded from Grenada by Plowden-Wardlaw as late as 9 December (Bond 1951). In 2007, one was seen at Rutland Bay at 0900 on 25 October; on 27 October many bushes and trees had three or four birds, with possibly hundreds on the island (photos by RS in Paice and Speirs 2009:171–172), but most appeared to have departed by 29 October with lingering solitary individuals noted at Rutland Bay paddock on 4 and 5 November, south of the airstrip on 5 November, and by the Cotton House on 8 November (RS).

Black-and-white Warbler (*Mniotilta varia*). A common winter resident in the West Indies, except on the Lesser Antilles (Bond 1950). Seen by RW during his 8–17 January 1990 visit (Norton 1990).

American Redstart (*Setophaga ruticilla*). Winters throughout the West Indies (Bond 1950). Seen by RW between 8 and 17 January 1990 (Norton 1990).

Prothonotary Warbler (*Protonotaria citrea*). A very rare transient in the West Indies from 14 September to 6 October, and from 28 February to early April, but not mentioned from the Lesser Antilles (Bond 1950). Subsequent midwinter records from the months of November, January, and February indicate that some birds overwinter (Schwartz and Klinikowski 1963). Seen by RW during his 8–17 January 1990 visit (Norton 1990). On the afternoon of 13 February 1997, a male was spotted in mangroves at the Bird Sanctuary. A pair was seen east of the Lagoon on 2 and 11 February 1998. Subsequent records include single birds at: the Bird Sanctuary on 28 January 2005 (male) and 25 January 2006 (MP); at the Lagoon mangroves on 8 (male) and 28 December 2007; at the Bird Sanctuary on 27 November 2008; and at the Lagoon on 18 December 2008 (RS).

Northern Waterthrush (*Parkesia noveboracensis*). Occurs regularly on the Grenadines, wherever there are mangrove swamps (Clark 1905). Found virtually throughout the West Indies, all year but chiefly from September to April (Bond 1950). Seen by RW during his 8–17 January 1990 visit (Norton 1990). Recorded every visit in all mangrove swamps with probably one to three pairs in each of the three swamps. One was seen by Pt Lookout pond in 2007 (MP).

Bananaquit (*Coereba flaveola*). Abundant breeding resident on the Grenadines (Clark 1905). Found wherever there are trees, particularly in mangroves,



gardens, and amongst palms. Probably the most common bird.

Black-faced Grassquit (*Tiaris bicolor*). Abundant breeding resident in all these islands, with the exception of some of the smaller Grenadines (notably Prune; Clark 1905). Often in pairs, sometimes in groups of up to eight, on grassland, including lawns, and in open areas in or near mangroves. Usually seen most days but much less common than the Bananaquit.

Grassland Yellow-Finch (*Sicalis luteola*). Introduced from northern South America to Barbados where it is now common. Recorded on Mustique by Thayer (Bond 1950), but no subsequent records.

Summer Tanager (*Piranga rubra*). A specimen was collected in Mustique on 31 May 1890 by D. W. Smith and deposited in the British Museum (Bond 1957). Two tanagers were seen and photographed by James Archibald and Sylvia Howard on a hill overlooking Britannia Bay during several days in February and March 2000 (R. Touche pers. comm.). Photographs by J. Archibald seem to be of either two Summer Tanagers or both a Summer Tanager and a Scarlet Tanager (*P. olivacea*).

Scarlet Tanager (*Piranga olivacea*). A rare transient in the West Indies during September to October, and from March to 19 May. It has been recorded on Mustique (Bond 1950). The only other Grenadines record was of a male in breeding plumage seen by Earle Kirby on Bequia in April 1963 (Bond 1965). See Summer Tanager account above for a possible 2000 sighting.

\*Bobolink (*Dolichonyx oryzivorus*). An annual but uncommon visitor. It has been shot on Grenada by Wells (Clark 1905). Solely a spring and autumn transient in the West Indies, locally abundant in April and late September and October (Bond 1950). At about 0900 on 25 October 2007, four Bobolinks were photographed amongst scrubland at Rutland Bay (photo by RS in Paice and Speirs 2009:182), but could not be relocated the following day. A single bird was seen in long grass by Rutland small pond on 29 and 30 October, and on 5 November 2008 (RS).

Carib Grackle (*Quiscalus lugubris*). Breeding resident abundant on all the Grenadines, flying about from one to another. The largest roost in the Grenadines is in the town of Ashton, Union Island, which harbours many hundreds (Clark 1905). The local race is common in Grenada and the Grenadines (Bond 1950). An opportunistic species often found in groups of up to ten around people, snatch-

ing scraps from dining tables and regularly visiting moored yachts. Often seen in gardens, mangroves, and associating with goats. The main roost is in trees on Rabbit Island. Counts of birds flying to the roost, which probably comprise most of the island's population, include 500 in 2002, 670 in 2004, 850 in 2006, 540 in 2007, and 765 in 2008.

Shiny Cowbird (*Molothrus bonariensis*). 'It is now common on Carriacou and has spread to the neighbouring islands, being found on Union, Petit Martinique, Mayreau, the Tobago Keys, and Canouan' (Clark 1905). Found on St Vincent, the Grenadines, and Grenada. It is a comparatively recent arrival in the Lesser Antilles, where it was first recorded on Carriacou in June 1899 according to Wells (1902a) (Bond 1950). First recorded for Bequia on 28 January 1962 by Bond (1962). Flocks of up to 20 forage on grass, near goats, and at the plant nursery. Noted up to eight times per visit, but not seen during four visits. Several have been seen amongst Carib Grackles flying to the Rabbit Island roost, suggesting that the grackle may be a host species for this brood parasite on Mustique.

\*\*House Sparrow (*Passer domesticus*). First recorded for St Vincent and the Grenadines at Kingstown, St Vincent, in 2005 by Alvaro Jaramillo (Norton *et al.* 2006). Ten female or juvenile plumage birds were seen on grass between the Cotton House and the beach at c. 1400 on 22 June 2008 (photo by RS in Paice and Speirs 2009:188). They probably arrived with a boat, perhaps from Kingstown, St Vincent.

#### SPECIES NOT ACCEPTED

Muscovy Duck (*Cairina moschata*), Rock Pigeon (*Columba livia*) (both recorded by MP), and Mallard (*Anas platyrhynchos*) (Clark 1905) probably represent escaped domestic birds.

The following seabird species have been recorded in the Grenadines but are not stated to have been reported from Mustique: Audubon's Shearwater (*Puffinus lherminieri*) (Clark 1905), White-tailed Tropicbird (*Phaethon lepturus*), and Black-headed Gull (*Chroicocephalus ridibundus*) (Bond 1950).

According to Clark (1905), the Common Night-hawk (*Chordeiles minor*) 'probably occurs'.

Culzac-Wilson (2008:298) listed the following unsubstantiated species on Mustique: Lesser Antillean Swift (*Chaetura martinica*), Lesser Antillean Tanager (*Tangara cucullata*), and Lesser Antillean Bullfinch (*Loxigilla noctis*).

## DISCUSSION

## AVIFAUNAL COMPOSITION

Of the 109 species recorded on and around Mustique, 16 are seabirds of which 11 breed locally. Of the 93 landbird species, 31 are locally-breeding residents, of which at least 21 breed on the island (Caribbean Elaenia and Scaly-breasted Thrasher may also breed). The resident avifauna is augmented by a further 52 Nearctic species which mainly arrive in autumn, including 20 species which regularly over-winter in small numbers, 13 occasional winter residents, and 19 recorded solely as transients (chiefly in autumn). The numbers of the overwintering species typically peak during south-bound migration in autumn and to a lesser extent during northbound migration in spring. With the exception of some non-breeding individuals, the Nearctic breeders are absent in spring and early summer, mid-May to mid-July (Bond 1985). Caribbean Martin and Wilson's Plover visit to breed locally in spring and summer (the latter may still breed on Mustique), and are usually absent at other times of the year.

## HABITAT USE

A description of the habitats on Mustique and an analysis of habitat use data from the winter visits 1997–2007 are given in Paice and Speirs (2009), where we emphasize the importance of mangrove swamps to birds and plea for their continued protection.

In autumn the Rutland Bay pond area is important for transient grassland and wetland species of waders, ducks, and some passerines, many of which are very rare. In 2007 the seasonal pond at Rutland was dry until the storms Dean and Felix (the biggest storm on Mustique), when waders began arriving. The ponds amongst the palm grove north of the Bird Sanctuary also hosted several waders at the end of October (RS).

The Antillean Crested Hummingbird was ubiquitous in terrestrial habitats, seen feeding on nectar in cactus scrub and even flying to offshore Rabbit Island. These generalist traits may explain its ability to colonise and maintain viable populations on Caribbean islands where it is endemic. The Tropical Mockingbird was also found in most terrestrial habitats, especially cactus scrub where other species were scarce. The Grenada Flycatcher is described as favouring open areas around settlements and lowland scrub, especially near palms (Raffaele *et al.* 1998), but we found it almost exclusively in man-

groves around the Lagoon wetland to the west of Mustique, and also in hillside woodland away from human habitation. Pairs of Caribbean Elaenia were also seen in these areas. In regions where both Caribbean Elaenia and Yellow-bellied Elaenia (a more recent colonist from South America) occur, the former is largely limited to woodland areas (Crowell 1968). The Grenada Flycatcher is similarly limited at least during the winter, when Gray Kingbirds are numerous in more open habitats and with Yellow-bellied Elaenias favouring anthropogenic 'parkland' habitats. The small numbers present, perhaps only half a dozen pairs, suggest that this regional endemic to St Vincent, the Grenadines, and Grenada might be vulnerable to further modification of habitats due to development. In 1971, when the Grenada Flycatcher was considered to be a race of the Rusty-tailed Flycatcher (*M. tyrannulus*), it was found to occur only sparsely on St Vincent (Lack *et al.* 1973), and on Grenada it was regular in lowland woodland scrub and cultivation but sparser in higher wooded cultivation and rainforest (Lack and Lack 1973). Wege and Anadón-Irrizarry (2005) include the Grenada Flycatcher among the species needing a status review (MP).

## ABUNDANCE

Bird populations change seasonally with a dramatic influx of largely transient waders in the autumn, and in spring and summer with the presence of Laughing Gulls. The immigration of large numbers of Scaly-naped Pigeon and other pigeon species in summer 2008 appears to be triggered by suitable breeding conditions.

Some winter visitors were consistently present in very low numbers, notably: Least Sandpiper, Semipalmated Plover, Greater Yellowlegs, and Northern Waterthrush. Other species regularly present in low numbers were American Oystercatcher, Grenada Flycatcher, Mangrove Cuckoo, and Yellow-bellied Elaenia.

Some species appear to be increasing in abundance. Black-bellied Plover seem to be more abundant than a century ago (Clark 1905) and relatively recent colonists Cattle Egret and Shiny Cowbird have become well established since the 1960s. Devas (1970 appendix) commented on the absence of the Peregrine Falcon, and the rarity of the Merlin and Osprey in the Grenadines, Grenada, and St Vincent; however, their populations now appear to have recovered. Whimbrel have apparently become overwintering birds since the 1970s (Bond 1977) and may be more abundant.

Scaly-naped Pigeon numbers have increased since 1997, with particularly high numbers in 2005. This change may simply be due to local migration between islands, which is characteristic for this species (Raffaele *et al.* 1998), and has been observed at sea (White 2002). The ban on hunting on Mustique, which was designated as a conservation area in 1990, may have benefited the species. The particularly high numbers in 2005 may have resulted from an influx of birds displaced from Grenada after Hurricane Ivan on 7 September 2004, which severely affected woodland habitats (Norton *et al.* 2005b). Numbers have risen since 2005 for Black-crowned Night-Heron, Great Egret, and following the first sighting in 2007 for Little Egret. In 2010 these were augmented by Snowy Egrets and Tricolored Herons.

Other species appear to be declining in abundance. Brown Pelican, Purple Gallinule, Caribbean Coot, and American Golden Plover appear to be less numerous than during Clark's (1905) era, and Masked Booby and Wilson's Plover have probably also declined since Bond's (1950) time.

During winter visits Caribbean Martin and Barn Swallow were seen in 1997 and the latter also in 2001, but were absent thereafter. Caribbean Coot were numerous in 1997, but subsequently only a few have been seen intermittently. Caribbean Coot are thought to have declined considerably in the West Indies due to hunting, habitat degradation, and predation by introduced species. Blue-winged Teal have also suffered a steep decline since the 1950s and 1960s (Raffaele *et al.* 1998), and in this study were most numerous in the first 2 yr (1997 and 1998).

Changes in abundance on a local scale may be affected by chance, weather, predation, etc., either locally or elsewhere (Wiens 1989).

#### BREEDING

Mustique has little seasonal temperature variation but it does have a wet and a dry season; the wet season is usually from June to November and the driest months are February and March. No local (Grenadines) data is available for the timing of breeding by landbirds. For the eastern Caribbean, Evans (1990) states 'many bird species (for example hummingbirds, bananaquits, ...and grassquits) may breed several times through the year. The rest for the most part breed during the middle of the dry season, particularly from February to May'.

The Masked Booby, considered a vagrant in St Vincent and the Grenadines (Raffaele *et al.* 1998), was thought to no longer to breed in the Grenadines,

but careful observation of Brooks Rock since 1998 suggested breeding, and combined with Lowrie *et al.*'s unpublished 2009 report, confirm that a small breeding population remains in this area, as suggested by Bond (1985). On Brooks Rock this species nests on the flat top of the islet, which may be necessary for the birds to take off and may explain its vulnerability to egg collectors (Evans 1990). Brown Boobies also nest on less accessible cliff ledges and may therefore be less vulnerable. Red-billed Tropicbirds were seen flying into the cliffs on the Pillories indicating that breeding occurs there as well as on Ballowia.

The islets and rocks around Mustique were found by Lowrie *et al.* (unpubl. report) to hold small breeding groups of seven seabird species, and if the Pillories are included, an eighth species, the Sooty Tern.

Rabbit Island was a breeding site for large numbers of Scaly-naped Pigeon, other pigeon species, and for grackles. Sightings of probable egrets, juvenile and adult Little Blue Herons, Yellow-crowned Night-Herons (flying to island), and a Cattle Egret (flying from island) in June and July 2008 (RS) may indicate breeding on Rabbit island, warranting further investigation.

Courtship behaviour by Pied-billed Grebes in February 2008 and the presence of one in March, May, and June 2008 suggests attempted breeding. According to Culzac-Wilson (2008) the Caribbean Coot is 'a common breeder in the Bird Sanctuary', but our observations suggest breeding is only occasional. Two adults with two grey immatures were seen in the Bird Sanctuary on 3 February 1997, suggesting they may have bred on the island. The absence of Brown Pelicans from February to July in 2008 (RS), and the lack of breeding evidence anywhere in the country during May 2009 (Lowrie *et al.* unpubl. report), does not support the view that pelicans breed on or around Mustique (Culzac-Wilson 2008), although some may breed in the region. The four Little Egrets, four Snowy Egrets, and two Tricolored Herons in 2010 could potentially form a breeding colony.

Breeding evidence observed during the winter visits suggest new or unusual dates (cf. Evans 1990, Raffaele *et al.* 1998) for Green Heron, Scaly-naped Pigeon, Mangrove Cuckoo, Grenada Flycatcher, Bare-eyed Robin, and Black-whiskered Vireo. And for seabirds, new or unusual breeding dates are suggested for all three booby species and Magnificent Frigatebird (cf. Evans 1990, Raffaele *et al.* 1998).

## CONSERVATION

The St Vincent and the Grenadines Wildlife Protection Act of 1987 affords partial protection to all pigeon species, 'quail', duck, and all shorebirds, with a closed season for hunting pigeons from 1 March to 30 September, and full protection to nearly all other bird species, with the anomalous exception of grebes and ibises (perhaps the former was thought to be a kind of duck, and the latter was not recorded). Protected wildlife reserves close to Mustique are Battowia, All Awash, Savan Islands, and the northern end of Bequia.

The Mustique Conservation Act of 1989 designated the entire island, including its marine environment, as a conservation area. This has extended protection by making it illegal to kill or take the eggs of any living creature without permission. The Mustique Company, which runs the island, has limited future building to a number of zoned lots, whilst setting aside large tracts of land that will not be developed. Recognising its responsibility, the Mustique Company has commissioned a number of ecological and environmental studies of the island and its surrounding waters, notably the 'Mustique Environmental Inventory' by J. Overing and G. Cambers in 1995, and 'Update on Environmental Management in Mustique' by the same authors in 2004 (both unpublished). It has produced pamphlets to inform visitors and encourage an appreciation of the flora and fauna of the island. The sole bird study was a short survey from 22–24 January 1999 by Avian Eyes, a voluntary bird conservation group based on St Vincent. The formation of the Mustique Environmental Committee in 2004 has further boosted nature conservation. The Committee promoted the idea of a detailed study and the production of a natural history book (de Silva and Wilson 2006), made possible by the Mustique Company. A book on the birds of the island (Paice and Speirs 2009) has also been published thanks to an anonymous donor and the Mustique Company.

The main threats to the birds of Mustique are from the loss or deterioration of marine and terrestrial habitats (notably mangrove swamp). Marine issues include: over fishing and damage to coral reefs and sea grass beds (affecting fish) by irresponsible boat anchorage, discharge of oil or other pollutants from boats, nutrient run-off from land, and global warming. On land, the replacement of natural and semi-natural habitats by buildings, gardens, or 'parkland' through development is a major issue, which includes the pressure of expanding waste disposal sites and the threat of airport enlargement

on a mangrove swamp. Other serious threats include the degradation of habitats and invertebrate communities through the use of fertilisers, detergents, and pesticides, and the introduction of some alien species. Alien species which may be problematic include rats (*Rattus* sp.), mice (*Mus musculus*), domestic cats (*Felis catus*), Cane Toad (*Bufo marinus*; Paice 2005), Rock Pigeon (*Columba livia*), and plant species such as the Common Snake-plant (*Sansevieria hyacinthoides*) and the Mexican Creeper (*Antigonon leptopus*) (de Silva and Wilson 2006). Although the hunting of birds has been stopped on Mustique, the collection of Booby eggs for food may still occur in the region and must be actively discouraged without drawing attention to the small Masked Booby colony on Brooks Rock.

## CONCLUSION

Mustique's avifaunal diversity is enhanced by its largely intact mangrove swamps and offshore islets, justifying its 'important bird area' status bestowed by BirdLife International (Culzac-Wilson 2008). The outlook for habitat protection on Mustique may be positive; however, the long-term bird diversity of the island is dependent on habitat protection throughout the Grenadines. Local natural history appreciation and expertise should be fostered in the region through funded educational projects, the incentive of possible employment in nature conservation and eco-tourism, and support for voluntary conservation bodies (notably Avian Eyes). Much remains to be learnt about the birds of the Grenadines.

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