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Photo: Hannah Madden

New bird records for the island of St. Eustatius, Dutch Caribbean, with notes on other significant sightings

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Abstract The avifauna of the Dutch Caribbean island of St. Eustatius has been little studied. We document 22 new bird species for the island and update the status of several important species based on our recent observations. The documented avifauna of the island amounts to 75 published species records. We conclude by pointing out several positive developments in the avifauna and ascribe these to the combined effects of reduced hunting, the legal establishment of protected park areas, and a growing environmental awareness among the island's inhabitants.

Keywords avifauna, Dutch Caribbean, Netherlands Antilles, St. Eustatius

Resumen Nuevos registros de especies de aves para la isla de San Eustaquio, Antillas Holandesas, con notas de otros avistamientos significativos—La avifauna de la isla San Eustaquio de las Antillas Holandesas ha sido poco estudiada. Basados en nuestras recientes observaciones documentamos 22 nuevas especies de aves para la isla y actualizamos el estado de muchas especies importantes. La avifauna documentada de la isla asciende a 75 registros publicados. Concluimos destacando que hay muchos avances positivos para la avifauna y que se pueden atribuir a los efectos combinados de la reducción de la caza, el establecimiento legal de áreas protegidas y el creciente interés medio ambiental entre los habitantes de la isla.

Palabras clave Antillas Holandesas, avifauna, San Eustaquio

Résumé Nouvelles espèces pour l'île de Saint-Eustache, Antilles néerlandaises, et autres observations importantes—L'avifaune de l'île caribéenne de Saint-Eustache dans les Antilles néerlandaises a été peu étudiée jusqu'à présent. Nous mentionnons ici vingt-deux nouvelles espèces pour l'île, et actualisons le statut de plusieurs espèces importantes, sur la base de nos observations récentes. L'avifaune de l'île compte 75 espèces faisant l'objet de mentions publiées. Nous concluons en soulignant plusieurs évolutions positives pour l'avifaune pouvant être attribuées aux effets combinés de la pression de chasse réduite, de la désignation de zones protégées et de la prise de conscience croissante des habitants de l'île vis-à-vis de l'environnement.

Mots clés Antilles néerlandaises, avifaune, Saint-Eustache

Of the three windward Dutch Caribbean islands—St. Martin, Saba, and St. Eustatius—the avifauna of St. Martin has been most studied (Brown and Collier 2006, Brown 2008, Brown 2012, Howard and Brown 2013) whereas that of St. Eustatius has been the least studied. So while for St. Martin and Saba, 164 and 87 bird species have been documented, respectively, for St. Eustatius only 53 species can be listed based on available sources (Voous 1983, Rojer 1997, Brown *et al.* 2009).

The island of St. Eustatius (17°30'N, 62°58'W) is located in the northeastern Lesser Antilles between the islands of Saba and St.

Kitts. Its surface area is 21 km² and its highest point is the 600 m high Quill, a dormant stratovolcano (Roobol and Smith 2004). Average annual rainfall is about 950 mm yr⁻¹ and almost 50% falls between August and November (Freitas *et al.* 2014). Rainfall at elevations higher than 400 m is likely 1.5–2 times higher than at lower altitudes (Freitas *et al.* 2014). The island lies in the zone of the northeasterly trade winds and experiences hurricane force winds about once every 5 yrs (Freitas *et al.* 2014). All areas of the island remain heavily affected by roaming livestock and a number of invasive plant species, of which the Mexican creeper vine (*Antigonon leptopus*) is one of the worst (Burg *et al.* 2012, Berkowitz 2014, Debrot *et al.* 2015).

The most extensive avifaunal surveys conducted for St. Eustatius date from the mid-1950s to mid-1970s (Voous 1955, Voous and Koelers 1967, Hoogerwerf 1977) and only sparing recent observations have been made (e.g., Collier and Brown 2003, Haseth *et al.* 2015). Here, we list records of 22 new species for the island

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and discuss the status of a few notable species.

Methods

This paper is based predominantly on opportunistic observations and photographs by the authors and nine other contributing birders (all named in the text). Observations of the Scaly-naped Pigeon (*Patagioenas squamosa*), Bridled Quail-Dove (*Geotrygon mystacea*), and other dove species were primarily collected by HM during bi-annual terrestrial bird surveys in 2009–2013 and 2015. Mist netting trials conducted by Steven Latta and Robert Ricklefs in March 2015 yielded one new species record (Indigo Bunting [*Passerina cyanea*]). HM, RH, and SP have been resident nature managers on St. Eustatius for 5 yrs or more (earliest since 2006), while SW spent 2.5 months on a birding internship from mid-November 2014 to early February 2015. All significant sightings by SW have been submitted to the eBird.org online database (eBird 2015). The observations contributed by the other four authors are based on two or more short visits to the island since 2012 in the line of other work. Most records are from 2012 or later with the exception of one record, previously unreported, from October 1989 (Northern Waterthrush [*Parkesia noveboracensis*]). Records made until May 2015 are included in this paper. Except as noted, all records and available supporting images have been uploaded to the Observado birding website for St. Eustatius (Observation.org 2015b). Dr. Herbert Raffaele confirmed, based on the supporting images, all records for which the identification was uncertain.

Results and Discussion

New Species Records

Blue-winged Teal *Anas discors*.—On 17 November and 8 December 2012, SP saw a single male Blue-winged Teal in a brackish pond at Venus Bay in Boven National Park. Both sightings likely concern the same animal. This species has not been recorded before for either St. Eustatius or Saba, whereas it has commonly been recorded between October and April for St. Martin (Voous 1983). On St. Martin, several species of ducks are common and even breeding due to the presence of wetland habitat (Brown and Collier 2004). Habitat for waterfowl on Saba and St. Eustatius is extremely limited and both these sightings were at the only natural freshwater or brackish habitat available on these islands. On 31 October 2013, AD also saw a male Blue-winged Teal flying towards St. Kitts from Zeelandia, St. Eustatius.

Great Blue Heron *Ardea herodias*.—A single adult bird was photographed by RH on 21 October 2012 at the Agricultural Station in Oranjestad. It has also been observed by HM at various locations, including private residences with ponds, at lower elevations across the island between 2012 and 2015. SW found it to be common and widespread while birding from mid-November 2014 to early February 2015. The species is also common on St. Martin (Brown 2008, 2009).

Great Egret *Ardea alba*.—This species was first photographed on St. Eustatius on 9 October 2009 by RH at Zeelandia. In March 2013, it was a regular visitor to the back yard of HM in Oranjestad where it was seen hunting for reptiles and insects and was photographed on 22 March 2013. It was also observed on 6 November 2011 by Michiel Boeken, 12 November 2011 by Stef Strik, 23 April 2012 by HV, and 26 Apr 2012 by Michiel Boeken in

Oranjestad, and is now common year-round on St. Eustatius (RH and SW pers. obs.). Its presence on St. Eustatius is not surprising as Brown (2008, 2009) also reported it as common on nearby St. Martin.

Common Gallinule *Gallinula galeata*.—On 3 February 2015, SW saw a single Common Gallinule at the wooded northern end of the Oranje Bay beach. The species was listed for both St. Martin and Saba by Voous (1983), but not for St. Eustatius. Today, it is a common species in fresh and brackish pond habitat on St. Martin (Brown and Collier 2008).

Caribbean Coot *Fulica caribaea*.—A solitary Caribbean Coot was photographed in Gallows Bay on 6 December 2013 by Thomas Foxley. According to Raffaele *et al.* (2003), the species is a rare resident in the Virgin Islands and a rare wanderer in the Lesser Antilles. This species has increased in the last decades and St. Martin presently has a resident breeding population (Brown and Collier 2008, Nijman *et al.* 2008).

Black-necked Stilt *Himantopus mexicanus*.—The species is seen regularly on St. Eustatius at ephemeral ponds at Zeelandia and Concordia (RH pers. obs.) and was photographed at Concordia on 22 June 2012 by Jessica Berkel. It is a common shorebird throughout the Caribbean (Raffaele *et al.* 2003), but has not been documented for St. Eustatius before. While Raffaele *et al.* (2003) indicated this species to be less common in the northern Lesser Antilles south to Guadeloupe, and according to Voous (1983), it was rather scarce and local in St. Martin, today it is common and abundant year-round in ponds on St. Martin (e.g., Brown and Collier 2008).

American Oystercatcher *Haematopus palliatus*.—Two birds were photographed by Jessica Berkel on Zeelandia Beach on 25 October 2010. Since then, HV saw two birds together in the Boven area on 26 April 2012, HM saw a single bird on 17 October 2014, and Frank van Spelde documented one on 27 May 2015. SW recorded numerous additional records while birding from mid-November 2014 to early February 2015. Raffaele *et al.* (2003) indicated that the species is rather rare and local in the northern Lesser Antilles. On St. Martin, it has been previously recorded as a probable breeding species (Voous 1983).

Black-bellied Plover *Pluvialis squatarola*.—At the end of 2010, RH photographed a single bird in non-breeding plumage at Zeelandia, and on 1 December 2013, JS and RH photographed a single bird in non-breeding plumage on the beach at Lynch. The species is a common fall and winter resident throughout the West Indies, August–May (Raffaele *et al.* 2003), and is commonly reported from St. Martin (Brown 2008).

Semipalmated Plover *Charadrius semipalmatus*.—A single bird in non-breeding plumage was photographed by RH in a grazed meadow on the east side of the island at Concordia on 9 October 2009. Additional photographs of a flock of about 20 birds were taken on 1 December 2013 in English Quarter by RH and JS. The species is a common resident throughout the West Indies in August–May but with a peak in September and October (Raffaele *et al.* 2003). The species has long been documented for St. Martin (Voous 1983) where it is common in pond habitats (Brown and Collier 2008).

Whimbrel *Numenius phaeopus*.—One bird was noted in Oranjestad on 12 September 2013 by a local resident who alerted HM. The bird was obviously exhausted and malnourished,

since it made no attempt to fly away when picked up. It was left to recuperate on a shady section of beach at Oranje Bay. A few hours later, the bird was gone. On 1 November 2013, a solitary Whimbrel was also seen at Zeelandia Beach in an abandoned swimming pool (S. Bouwma pers. comm.). For the windward Dutch islands, this species has so far only been formally reported for St. Martin where it now is often seen as a winter visitor (e.g., Brown and Collier 2007, 2008). Nearly all Whimbrels in the West Indies belong to the American subspecies Hudsonian Whimbrel (*N. p. hudsonicus*), although a few Eurasian Whimbrels (*N. p. phaeopus*) have also been documented including one individual on St. Martin that was observed from 14 April 2004 until 28 January 2005 in Gallis Bay (Brown and Collier 2007). However, it was not possible to identify either St. Eustatius record to subspecies.

Least Sandpiper *Calidris minutilla*.—Four birds were photographed by Stef Strik at Zeelandia Bay on 30 August 2012, and a number of birds were observed by HM in late September and early October 2013 for about a week on Oranje Bay Road, Oranjestad. The species identification was confirmed by visiting birder Mark Yokoyama (pers. comm.). An additional solitary bird was seen and photographed on Zeelandia Beach on 8 January 2013 by HM. The species is found almost year-round on St. Martin where it regularly occurs in mixed flocks with other shorebirds (Brown and Collier 2008).

Pectoral Sandpiper *Calidris melanotos*.—This species was photographed by SG on Zeelandia Beach on 10 December 2012. The Pectoral Sandpiper is an uncommon migrant in the West Indies, August–November (Raffaele *et al.* 2003), and in the past has been reported occasionally for St. Martin (Voous 1983).

Wilson's Snipe *Gallinago delicata*.—A solitary Wilson's Snipe was seen in a puddle on the road to Whitewall on the morning of 23 November 2014 by SW. This species is rare throughout the Lesser Antilles except Barbados, and occurs primarily October through April (Raffaele *et al.* 2003).

White-crowned Pigeon *Patagioenas leucocephala*.—Until recently, this IUCN "Near Threatened" listed species (BirdLife International 2015) had only been recorded for St. Martin as an irregular visitor (Voous 1983) and its occurrence on St. Eustatius was unknown. On 27 April 2012, HV photographed this species on the slope of the Quill. On 26 January 2015, SW saw a single bird at the Quill crater, and on 2 February 2015, one bird at Boven at the other side of the island. The species is known to move extensively between Caribbean islands (Voous 1983, EOL 2015). In St. Croix, nesting has been documented in mangrove stands and littoral woodlands (McNair 2008). Nesting has not been documented for St. Eustatius, but for nearby St. Croix, McNair (2008) found this species to be in healthy breeding status and suggested down-listing from "Endangered" to "Threatened" status in the U.S. Virgin Islands. Its recent confirmation for St. Eustatius may reflect some recovery of this heavily hunted species in the Lesser Antilles.

Peregrine Falcon *Falco peregrinus*.—This species is documented for St. Eustatius based on several recent observations: SG, RH, and Meike Scheidat at Zeelandia Bay, 7 December 2012; Ronald Pieters, exact site and date unrecorded, December 2013; and Berry van Hoorn, HM, and SW in the areas of Gilboa, Pilot Hill, and Oranje Bay on at least 20 occasions from November

2014 to February 2015. In the West Indies, it is an uncommon to rare winter resident, primarily from October to April (Raffaele *et al.* 2003).

Northern Waterthrush *Parkesia noveboracensis*.—A single bird was recorded by Hans van Berkel at Gallows Bay on 2 October 1989. Raffaele *et al.* (2003) reported it to be a relatively common non-breeding resident, September–April, throughout the West Indies. This is a regular species in the mangroves of St. Martin (Brown 2008).

Blackpoll Warbler *Setophaga striata*.—On 4 November 2013, AD observed a solitary Blackpoll Warbler in semi-evergreen woodland on the north slope of the Quill. The bird had faint side stripes which clearly distinguished it from the Bay-breasted Warbler (*S. castanea*) which is very rare in the Lesser Antilles (Raffaele *et al.* 2003). In the three windward Dutch islands, the species has already been recorded for St. Martin (Voous 1983) and recent photo-documented records for Saba are also available (Observation.org 2015a). An earlier January record for the Blackpoll Warbler from St. Eustatius was considered to be erroneous (James Bond, in Voous 1983).

Rose-breasted Grosbeak *Pheucticus ludovicianus*.—On 30 November 2014, SW saw a single adult female Rose-breasted Grosbeak feeding in the canopy near the top of the Quill until it was chased away shortly after by a territorial Caribbean Elaenia (*Elaenia martinica*). It is listed as a vagrant among larger Lesser Antillean islands (Raffaele *et al.* 2003).

Blue Grosbeak *Passerina caerulea*.—On 5 April 2012 on the west slope of the Quill at the Hensen residence, AD and RH photographed a male Blue Grosbeak at nightfall. The bird flew back and forth to nearby perches, singing and flicking its tail nervously. Based on the robustly-sized beak, head shape, and overall color, it could be identified as a Blue Grosbeak. The brown wing bars were indicative of an immature bird.

Indigo Bunting *Passerina cyanea*.—On 18 March 2015, a single specimen was captured in a mist net during avian research and photographed by HM at the Botanical Garden. The bird's plumage of brown overall with traces of blue indicated that it was a non-breeding male (Raffaele *et al.* 2003). This species is a common non-breeding resident from October to early May in the Bahamas and Cuba, but generally rare in Puerto Rico and further eastwards (Raffaele *et al.* 2003). However, Voous (1983) reported this species to be a regular winter visitor to Saba.

Shiny Cowbird *Molothrus bonariensis*.—On 1 May 2014, RH saw and photographed two pairs of this species foraging in open grasslands at Concordia. This nest-parasitic species has been expanding rapidly throughout the Caribbean and is a common resident on many islands today (Raffaele *et al.* 2003).

House Sparrow *Passer domesticus*.—The House Sparrow was first noted for St. Eustatius by Michiel Boeken during visits in the last weeks of April 2011 and 2012 and today is a regular inhabitant of Oranjestad (RH pers. obs.). The sparrow has also been introduced in St. Martin and Saba (Buurt and Debrot 2012) where it is common in the urban environment. The species has spread rapidly throughout the Caribbean (Raffaele *et al.* 2003) and was first documented in the Lesser Antilles in 1999 (Levesque and Clergeau 2002). MacGregor-Fors *et al.* (2010) have shown what negative impact this species can have on Neotropical bird faunas.

Noteworthy Observations and Developments

Feral chicken *Gallus gallus*.—This introduced species of farm poultry is likely to have been present on the island since early colonial times, but today the species is widely distributed across the island where it reproduces in a feral state, even in uninhabited areas. Highest population densities are found in Oranjestad and the lush slopes and crater of the Quill (Debrot *et al.* 2015). In the northern hills of St. Eustatius, feral chickens are especially found in moist and verdant gullies. The species has been widely introduced to tropical islands where it possibly has important impacts on the native flora and fauna (Engbring 1983) as it preys on seeds, seedlings, endemic invertebrates, and small reptiles (Collias and Collias 1967, Arshad *et al.* 2000). The feral chicken is currently not hunted on St. Eustatius, but it should still be relatively easy to control the species in the two national park areas with directed hunting and trapping.

Red-tailed Hawk *Buteo jamaicensis*.—In 1996, Rojer (1997) was unable to confirm any recent sightings for this species, but it was recorded by Collier and Brown (2003). Today, the species is seen regularly, especially in and around the Quill and in the northern hills. It was photographed above the Quill on 25 April 2012 by HV and in December 2012 by SG. No nesting or nesting attempts can be confirmed. Total population size is not likely to be more than 2–3 animals and movement between St. Eustatius and nearby islands is likely (Voous 1983).

Scaly-naped Pigeon *Patagioenas squamosa*.—This species was reported by Voous (1983) to be a scarce and wary breeding bird for the windward Dutch islands, and on St. Eustatius practically limited to the Quill. Today, the species is found to be common or even numerous in and around the Quill, and in recent years it has been observed in the northern hills during bi-annual bird surveys. There have also been many observations of this species during bi-annual bird surveys conducted by the St. Eustatius National Parks (STENAPA) between 2009 and 2013 at the Quill crater rim, Venus Bay, Quill trail, Gilboa Hill, and along the road to the Botanical Garden (STENAPA unpubl. data). It is less abundant in the northern hills than in and around the Quill.

Eurasian Collared-Dove *Streptopelia decaocto*.—This species was first recorded for St. Eustatius by Collier and Brown (2003) and since 2011 was recorded 27 times during STENAPA's bi-annual bird surveys (STENAPA unpubl. data). HM saw flocks in Oranjestad in January and June 2012 and 2013, and often sees the species in town outside of bird surveys. Its presence on St. Eustatius is not surprising as Brown (2009) reported it as common on nearby St. Martin and it is known to be spreading widely throughout the West Indies (Raffaele *et al.* 2003).

Bridled Quail-Dove *Geotrygon mystacea*.—Throughout its range this species is largely limited to lush wooded areas where it feeds on the forest floor and flies exclusively at low levels under vegetation cover (Chiple 1991). It is most common on several of the Virgin Islands, where its numbers have increased since the beginning of the 20th century (Boal 2011). Elsewhere, including Puerto Rico, it remains rare and threatened (Boal 2011). However, a relatively recent first record has been documented for St. Martin (Brown and Newman 2007).

Today, this species can be reliably seen on hikes into the crater of the Quill. It is also commonly seen on the upper outer slopes of the Quill (STENAPA unpubl. data). Voous (1983) listed it as

rare on St. Eustatius, but our observations suggest that the species may be less rare today than formerly was the case. It may be that reduced hunting and the gradual recovery of some of the vegetation of the island is allowing the species to recover. In contrast for Saba, Brown *et al.* (2009) indicated that the species had declined dramatically in recent years presumably as a result of hurricane impacts and predation. Not only are introduced predator densities (cats [*Felis catus*] and rats [*Rattus* sp.]) very high on Saba (Debrot *et al.* 2014), but in contrast to the Quill, the Mt. Scenery volcano of Saba lacks a deep protective crater.

White-winged Dove *Zenaida asiatica*.—This migratory species was not listed for any of the windward Dutch islands by Voous (1983), but has since established itself on all three. Up to a decade ago, the species was reported as spreading eastwards through the Antilles but still rare in the nearby Virgin Islands (Raffaele *et al.* 2003). It was first reported for St. Eustatius by Collier and Brown (2003), but has since become common and widespread. It is now a resident species of the island and has been numerous observed during bird surveys in 2012 and 2013. A nest containing a juvenile was also photographed by HM in Oranjestad on 24 June 2012, which confirms that it is breeding on the island.

Scaly-breasted Thrasher *Allenia fusca*.—This species is relatively common on most islands throughout its range, but has generally been considered rare on St. Eustatius (Raffaele *et al.* 2003). Rojer (1997) did not record this species during a week of fieldwork in August 1996. At the time of the compilations by Voous (1983) and Rojer (1997), the most recent sightings had been made in 1927. However, a recent sighting for the species was recorded by Collier and Brown (2003). Since then, it has been regularly recorded, particularly in and around the Quill where the species was seen in small flocks of up to six birds and often in association with the Pearly-eyed Thrasher (*Margarops fuscatus*; HM and SW pers. obs., STENAPA unpubl. data). At present, it appears to be a relatively common resident of this area, occurring on the main Quill trail, inside the crater, along the road to the Botanical Garden, and the sheltered gut leading to Bergje in the Northern Hills. It seems to be well-established on the island.

Brown Trembler *Cinlocerthia ruficauda*.—Voous (1983) listed this species as extremely rare on St. Eustatius; its occurrence and listing as a breeding bird being solely based on one specimen collected prior to 1880 and calls heard in 1952. Raffaele *et al.* (2003) did not list St. Eustatius as part of its current range. Throughout its range, it is largely limited to lush rainforest vegetation and is nowhere very common (Evans 1990). During a period of 7 yrs as ranger on the island, HM has seen this secretive but easy to distinguish species (based on trembling behavior) twice. In 2006, she observed it once at the Botanical Garden, and thereafter on the southwestern outer slope of the Quill on 6 June 2013. The significance of these records is not known. The animals may represent birds blown over from neighboring islands during recent hurricanes or could indicate that the species has always been present on St. Eustatius, but in very small numbers. Additional directed surveys (November 2014 to February 2015) by SW failed to produce any further confirmation for this species, and we therefore currently regard it only as a rare vagrant from neighboring islands.

Scarlet Tanager *Piranga olivacea*.—This species is a trans-

Gulf migrant with an eastern flyway passing over the Caribbean through Cuba and down to northern South America (Mowbray 1999). It rarely reaches as far east as Puerto Rico and is quite rare in the northern Lesser Antilles (Raffaele *et al.* 2003). For instance, extensive mist netting on St. Martin in several habitats from 2002 to 2008 only yielded one capture for this species versus hundreds of other Neotropical migrants captured (Brown 2008). It has so far only been recorded once before on St. Eustatius, in May 1977 (Voous 1983). One male in full breeding plumage was photographed by RH on 23 April 2014 on the west slope of the Quill at the Hensen residence, thus providing a second spring record for this rarely seen species.

Conclusions

Together with the 22 new species records presented here, 2 recent additions by Collier and Brown (2003) as discussed above (Eurasian Collared-Dove and White-winged Dove), and the 51 species listed by Voous (1983), the total known avifauna of St. Eustatius presently amounts to 75 species, of which all except 1 are currently listed online in the Observado database for St. Eustatius (Observation.org 2015b). The taxonomic status of this latter species remains uncertain. The Sandwich Tern, *Sterna sandvicensis*, as listed by Voous (1983) may actually involve one or more subspecies of *Thalasseus sandvicensis* that today are sometimes considered distinct species. Based on Voous' (1983) information for St. Eustatius, most birds had black bills and would probably correspond to the migratory Cabot's Tern (*T. s. acufavidus*) from North America. However, Cayenne Tern (*T. s. eurygnathus*) from the southern Caribbean or even the nominate Sandwich Tern (*T. s. sandvicensis*) cannot be ruled out.

Shorebirds, waterfowl, and migratory passerines are the most under-represented groups on St. Eustatius compared to islands in the vicinity. The apparent paucity of waterfowl is likely due to the shortage of suitable habitat: freshwater habitat is practically non-existent and coastal wetlands are absent. Even though suitable habitat for shorebirds is quite limited, the paucity of records for this group as well as for passerine migrants is likely primarily due to the lack of birding effort. The scarcity of warbler records on St. Eustatius also illustrate this. The Blackpoll Warbler is the most numerous warbler migrating through the islands, but it has only recently been documented on St. Eustatius. Many other warblers that regularly migrate through the islands should also be likely to stop over on St. Eustatius. For instance, during two days in March 2003, Collier and Brown (2003) documented Black-and-white Warbler (*Mniotilta varia*), American Redstart (*Setophaga ruticilla*), Northern Parula (*S. americana*), and Prairie Warbler (*S. discolor*) near the top of the Quill. HM further recorded a Prairie Warbler on 7 February 2011 and caught a Northern Parula in a mist netting trial on 20 March 2015. None of these are new species records but do suggest that in due time, more warblers will be documented for St. Eustatius. Further birding efforts and reporting to stata.observation.org are highly recommended.

Birds are a highly mobile element of the island fauna. Therefore, it is not surprising that based on available birding efforts and studies, large developments and trends can be seen in the avifauna of the Caribbean region (e.g., Raffaele *et al.* 2003) or its sub-regions (e.g., Prins *et al.* 2009) on a decadal timescale. More important than simply documenting new species records, our

observations may be especially interesting in that they suggest several recent avifaunal developments for the island.

Encouraging developments appear to include the likely partial recovery of the Red-tailed Hawk population, and likely increases in the numbers of Scaly-naped Pigeon and Bridled Quail-Dove. Additionally, the Scaly-breasted Thrasher, which was formerly very rare, seems to now be well-established, and the regionally endangered White-crowned Pigeon is present and may eventually become established or re-established. Two rare sight records for the Brown Trembler even give reason for hope for the eventual establishment or re-establishment of this long-time rare species. We suggest these developments may especially be due to an evident decline in hunting pressure, a growing environmental awareness among the island's inhabitants, and the recent legal establishment of protected park areas. The island now has two terrestrial park areas, internationally recognized as Important Bird Areas (IBAs; Brown *et al.* 2009, Geelhoed *et al.* 2013) and corresponding to 26% of the land area of the island (MacRae and Esteban 2009). Furthermore, quantitative vegetation studies indicate partial recovery of essential woodland cover (Freitas *et al.* 2014).

In contrast, some potentially negative developments for the avifauna of St. Eustatius include the establishment and spread of invasive species, such as the House Sparrow, the nest-parasitic Shiny Cowbird, and the ubiquitous feral chicken. There may also be unforeseen future impacts of the recent invasion and establishment of the Eurasian Collared-Dove and the White-winged Dove. A further danger that must be considered is the potential continued deterioration of natural vegetation due to urban development, invasive plants, and climate change (Debrot and Bugter 2010, Freitas *et al.* 2014). The latter aspect is particularly worrisome as the most diverse, moist montane habitats are also the most vulnerable to climate change (Debrot and Bugter 2010). Their ongoing loss (e.g., Freitas *et al.* 2014) or degradation due to disturbance and livestock overgrazing (Debrot *et al.* 2015) may disproportionately impact the small and vulnerable montane forest bird populations.

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