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Status of the Red-billed Tropicbird (*Phaethon aethereus*) on and around the islands of Aruba, Curaçao, and Bonaire

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Photo: Michiel Oversteegen

Status of the Red-billed Tropicbird (*Phaethon aethereus*) on and around the islands of Aruba, Curaçao, and Bonaire

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Abstract Red-billed Tropicbirds have historically been considered rare visitors to the waters around the islands of Aruba, Curaçao, and Bonaire in the southern Caribbean. However, in recent years there has been an increase in documented records. We summarize all known Red-billed Tropicbird records for the region and review broader regional population and movement data to place this increase in records in context. We recommend continued careful documentation of Red-billed Tropicbird records on and around the islands of Aruba, Curaçao, and Bonaire and the implementation of a standardized monitoring program across the Caribbean range for the species to better understand the species' population status, trends, and breeding and at-sea distribution.

Keywords Aruba, Bonaire, Curaçao, Dutch Caribbean, *Phaethon aethereus*, Red-billed Tropicbird

Resumen Estado de *Phaethon aethereus* en las islas de Aruba, Curazao y Bonaire y sus alrededores • Históricamente, *Phaethon aethereus* ha sido considerada como una visitante rara en las aguas que rodean las islas de Aruba, Curazao y Bonaire, en el sur del Caribe; sin embargo, en los últimos años ha habido un aumento en el número de observaciones documentadas. Resumimos todos los registros conocidos de esta especie para la región e hicimos una revisión de los datos poblacionales regionales más amplios y de los de movimiento, para así ubicar en contexto dicho incremento. Recomendamos continuar con la documentación minuciosa de los registros de presencia de *P. aethereus* en las islas de Aruba, Curazao y Bonaire, así como de sus alrededores, e implementar un programa de monitoreo estandarizado en toda el área de distribución de la especie en el Caribe, con el fin de comprender mejor el estado y las tendencias poblacionales, su reproducción y distribución en el mar.

Palabras clave Aruba, Bonaire, Caribe neerlandés, Curazao, *Phaethon aethereus*

Résumé Statut du Phaéton à bec rouge (*Phaethon aethereus*) sur les îles d'Aruba, de Curaçao, et de Bonaire, ainsi qu'aux alentours • Le Phaéton à bec rouge a toujours été considéré comme un visiteur rare autour des îles d'Aruba, de Curaçao et de Bonaire dans le sud de la Caraïbe. Cependant, ces dernières années, le nombre d'observations documentées a augmenté. Nous faisons la synthèse de toutes les mentions connues de Phaéton à bec rouge dans la région et examinons des données régionales plus larges sur la population et les déplacements afin de replacer cette augmentation dans son contexte. Nous recommandons la poursuite d'une documentation minutieuse des mentions de Phaéton à bec rouge sur les îles d'Aruba, de Curaçao et de Bonaire, ainsi qu'aux alentours, et la mise en œuvre d'un programme de suivi normalisé dans l'ensemble de l'aire de répartition de l'espèce dans la Caraïbe, afin de mieux comprendre l'état et les tendances de sa population, ainsi que sa reproduction et sa répartition en mer.

Mots clés Aruba, Bonaire, Caraïbes néerlandaises, Curaçao, *Phaethon aethereus*, Phaéton à bec rouge

Two of the three species of tropicbirds in the world breed within the Caribbean Basin (Harrison 1983, 1987, Raffaele *et al.* 1998, Orta *et al.* 2020). The White-tailed Tropicbird (*Phaethon lepturus*) occupies the northernmost part of the western Atlantic breeding distribution. It is known to breed from Bermuda and the Bahamas south through the Greater Antilles and in the Lesser

Antilles south to St. Vincent (Walsh-McGehee 2000, Bradley and Norton 2009, Lowrie *et al.* 2010). The Red-billed Tropicbird (*Phaethon aethereus*), the other species found in the Caribbean, breeds from Puerto Rico and the Virgin Islands south through the Lesser Antilles to Grenada, on Tobago, and at least occasionally on some Venezuelan islands west to the Los Monjes archipelago, approximately 80 km west of Aruba (Lee and Walsh-McGehee 2000, Bradley and Norton 2009, Esclasans *et al.* 2009, Lowrie *et al.* 2010). This review aims to document the status and distribution of the Red-billed Tropicbird in the southern Caribbean, particularly around the islands of Aruba, Curaçao, and Bonaire,

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consolidating observations from the last eight decades.

The breeding status of the Red-billed Tropicbird on the Venezuelan islands is poorly documented. The species has been noted as having bred on islands of the Los Monjes archipelago, the Los Roques archipelago (150 km east of Bonaire), and the Los Hermanos archipelago (400 km east of Bonaire) (Esclasans *et al.* 2009). Sanz and Oviol (2010) mention Red-billed Tropicbirds breeding in the Los Frailes archipelago (immediately east of Isla Margarita, 500 km east of Bonaire). The species has also been recorded nesting in Mochima National Park, at or close to the continental coast halfway between the cities of Barcelona and Cumaná (450 km east of Bonaire; Marín *et al.* 2000). In a recent review of the ecology of Los Roques and Las Aves (Debrot *et al.* 2019), only a single record of a Red-billed Tropicbird was noted (a lone bird observed by R. van Halewijn in deep waters off of Aves de Barlovento on 20 November 1972), with no mention of the species breeding on any of the islets. On Los Roques, Bosque *et al.* (2015) found an egg and a chick in April 2001. However, for these Venezuelan locations, there is no published information on the number of breeding birds, how breeding was documented (incubating birds, nestlings, recently fledged young, etc.), on what islets birds were breeding within each archipelago, what types of nest sites were being used (e.g., cliffs, ground), and whether sites are used for breeding annually or only occasionally. The species has not been documented breeding on any Colombian islands in the Caribbean (Hilty and Brown 1986, Avendaño *et al.* 2017). While it does breed along the northeastern Caribbean coast of Panama, it does not breed elsewhere along the Caribbean coasts of Central America or Mexico (Howell and Webb 1995, Angehr and Dean 2010, Kushlan *et al.* 2017).

Previously, the largest breeding concentrations of Red-billed Tropicbirds in the Caribbean were reported from Saba, Tobago, and in the US Virgin Islands (Walsh-McGehee 2000). However, more recent publications of estimated seabird breeding numbers in the Lesser Antilles (Lowrie *et al.* 2010, Boeken 2016, Coffey and Collier 2020, Madden 2020) reported significantly higher numbers of Red-billed Tropicbirds on Grenada, Guadeloupe, Saba, St. Vincent, and St. Eustatius than were reported for these same islands in Walsh-McGehee (2000). Based on these most recent publications, it appears that the closest large breeding populations (with hundreds of pairs each) to Aruba, Curaçao, and Bonaire are those on Grenada (700 km east of Bonaire), St. Vincent (750 km east of Bonaire), and Tobago (800 km east of Bonaire).

Tropicbirds have historically received minimal research focus and much remains unknown about their biology, distribution, and movements, especially in the Caribbean. Nonetheless, some relevant research has been done on both regionally occurring species. Studies of the breeding ecology and local foraging movements of White-tailed Tropicbirds were carried out on Puerto Rico in the 1980s (Schaffner 1988, 1991, Pennycuik *et al.* 1990). Among the results of this work was the finding that adult birds maximized the amount of food that they carried back to nestlings to apparently minimize the number of return trips to the nesting island in order to spend more time pursuing their patchily distributed pelagic prey (Lee and Walsh-McGee 2020). These studies also highlighted the negative effect of introduced

mammalian predators on nest success at colony sites on Puerto Rico (Schaffner 1991). More recently, broad-scale migratory tracking studies of White-tailed Tropicbirds that nest in Bermuda revealed that many of the birds spent October and November at sea along the southern Grand Banks off of Nova Scotia and Newfoundland, Canada, more than 1,000 km from their breeding islands (Mejías *et al.* 2017).

A tracking study of Red-billed Tropicbirds breeding on St. Eustatius has been initiated, and preliminary results from one track showed movements over 2,000 km northeastward into the Atlantic Ocean (Atlantic Seabirds 2021). Observational data also indicate that Red-billed Tropicbirds can stray widely away from their breeding colonies with records north into New England, Atlantic Canada, and the British Isles (Orta *et al.* 2020). Moreover, individual Red-billed Tropicbirds have summered (June through October) multiple years in two New England locations: one spent three summers near Martha's Vineyard between 1986–1988 (Arvidson 1986, Veit and Petersen 1993) and one has summered annually (May–August) at Seal Island National Wildlife Refuge on the coast of Maine since 2005 until at least 2020 (Vickery *et al.* 2020).

In the waters of the southern Caribbean, in and around the islands of Aruba, Curaçao, and Bonaire, Red-billed Tropicbirds have historically been quite rare (Wells and Childs Wells 2017). Voous (1983) described only six records for the islands despite considerable work by him and others to document the birds of the region, including extensive offshore seabird surveys by van Halewijn (1972, 1985). The first Red-billed Tropicbird record for this island region was in 1939, when one landed on a boat near Curaçao (Table 1; Voous 1983). Two more records occurred on or near Curaçao in the 1960s and another in the 1970s. Two sightings of the species were documented well offshore from Bonaire (considered the first for that island) in the 1970s (Voous 1983). A dead adult was found on Bonaire in 1986 and a juvenile was collected there in 1991 (Prins *et al.* 2009). One was seen at sea near Klein Curaçao (a small island about 10 km southeast from the main island of Curaçao) on 29 January 1992 (Prins *et al.* 2009). Cumulatively, we found documentation for nine occurrences of Red-billed Tropicbirds in or around Curaçao and Bonaire over the 70 years between 1939–2009 (Table 1; Wells and Childs Wells 2017), rather than ten as suggested in Luksenburg and Sangster (2013).

Neither Voous (1983) nor Prins *et al.* (2009) noted a single record on or near Aruba. However, in 2010, Luksenburg and Sangster (2013) began actively surveying for pelagic species from sport fishing boats off the coast of Aruba. During boat trips in June 2010 and April and June 2011, they found and photographed individual Red-billed Tropicbirds four times (assumed to be four separate individuals) at distances ranging 1–22 km from Aruba (Luksenburg and Sangster 2013).

Since 2013, there have been at least six more photographic records and one adequately documented sight record of the Red-billed Tropicbird from on or near the islands of Aruba, Curaçao, and Bonaire, bringing the number of cumulative records to 20 (Table 1); two other sight records in the eBird database without photographic documentation or extensive written descriptions, though perhaps correct, have not been included here. An adult was photographed at sea off of Aruba

Table 1. The 20 documented records of single Red-billed Tropicbirds in and near the islands of Aruba, Bonaire, and Curaçao since 1939 in chronological order from most recent to oldest. Not included are the 25 tropicbird sightings (presumed to all be Red-billed Tropicbird) made during aerial transect surveys well offshore (≥ 30 km) from the islands in November 2013 (Geelhoed *et al.* 2014). eBird checklist IDs (beginning with "S") and associated photo archive accession numbers in the Macaulay Library at the Cornell Lab of Ornithology (starting with "ML") are provided.

| Date | Location | Age | Status |
|-----------------|--|---------------|---|
| 2 August 2021 | Natural Pool Trail, Aruba | Immature | Found dead (S92833155; ML359313171 and ML359313201). Observation by D. Spelt |
| 14 April 2021 | Off northern tip of Aruba | Not specified | Sighting of bird following charter fishing boat (S85567138). Observation by D. Odell |
| 2 February 2021 | Klein Curaçao | Immature | Found dead (S80357211; ML303902601). Observation by HdV and RW |
| 28 January 2021 | East coast of Bonaire | Immature | Found injured, brought to bird rehabilitation facility but later died (S80107659; ML302566771). Observation by EA |
| Late March 2018 | Cruise ship several hours from Aruba | Adult | Found injured, brought to bird rehabilitation facility but later died (S58045605; ML167540751, ML167540711, ML167537621, and ML167537611). Observation by MO and SO |
| 14 June 2017 | Washington-Slagbaai NP, Bonaire | Immature | Found injured, brought to EA at bird rehabilitation facility but later died (S37588826; ML61071201). Observation by P. Bertol. |
| 20 October 2014 | 60 km north-northwest of Aruba | Adult | Photographed in flight from ship (Mlodinow and Norton 2017) |
| 25 June 2011 | 8.0 km from southwest coast of Aruba | Not specified | Observed and photographed from small charter fishing boat (Luksenburg and Sangster 2013) |
| 3 June 2011 | 1.0 km from northern tip of Aruba | Not specified | Observed and photographed from small charter fishing boat (Luksenburg and Sangster 2013) |
| 20 April 2011 | 22.6 km from northeast coast of Aruba | Not specified | Observed and photographed from small charter fishing boat (Luksenburg and Sangster 2013) |
| 18 June 2010 | 8.7 km from southwest coast of Aruba | Not specified | Observed and photographed from small charter fishing boat (Luksenburg and Sangster 2013) |
| 29 January 1992 | Near Klein Curaçao | Not specified | Observed at sea near Klein Curaçao (Prins <i>et al.</i> 2009) |
| 20 July 1991 | Southeast coast of Bonaire | Immature | Collected and photographed with specimen in Zoological Museum Amsterdam (Prins <i>et al.</i> 2009) |
| 14 May 1986 | Sorobon/Lac, Bonaire | Adult | Dead bird found and photographed (Prins <i>et al.</i> 2009) |
| December 1978 | Flying past Watamula, Curaçao | Not specified | Observed from shoreline (Voous 1983) |
| 12 May 1977 | 22 km southwest of south cape of Bonaire | Not specified | Observed from ship (Voous 1983) |
| 25 May 1970 | 37 km northwest of Malmok, Bonaire | Not specified | Observed from ship by van Halewijn (Voous 1983) |
| 30 October 1968 | North coast of Curaçao | Not specified | Oiled bird found and collected with specimen in Zoological Museum Amsterdam (Voous 1983) |
| 4 February 1966 | In harbor of Curaçao | Not specified | Caught on board a ship (Prins <i>et al.</i> 2009, Voous 1983) |
| 7 February 1939 | Near Curaçao | Not specified | One alighted on board a ship near Curaçao (Voous 1983) |

on 20 October 2014 (Mlodinow and Norton 2017). An apparently sick immature bird was recovered and photographed in Washington-Slagbaai National Park on Bonaire on 14 June 2017 (eBird 2022). It was taken to a bird rehabilitation center but did not survive (EA pers. obs.). An adult bird with an injured wing that landed on a cruise ship was brought to a bird rehabilitator (Dr. Gorgoza) on Aruba upon arrival in late March 2018. It was rehabilitated and released off of Governor's Beach, Aruba, on 25 April 2018, but it was unable to fly and was recovered by SO and MO (eBird 2022) and brought back to the rehabilitator. Despite much care, the bird never recovered and died seven months later. The exact location of the cruise ship when the tropicbird landed on it is unknown, but it was said to have been hours from Aruba. We include it here for thoroughness, although we recognize that it is likely that the bird was outside of the territorial waters of Aruba when it landed on the ship. An apparently sick, non-flying immature bird was found along the east coast of Bonaire on 28 January 2021 and brought to a bird rehabilitation center where it was photographed (eBird 2022). The bird succumbed on 29 January 2021 (EA pers. obs.). A dead immature bird was found and photographed on Klein Curaçao on 2 February 2021 (eBird 2022). A bird was sighted following a charter fishing boat off the northern tip of Aruba on 14 April 2021 (eBird 2022). A dead immature bird was found and photographed along the coastline near the Natural Pool Trail on Aruba on 2 August 2021 (eBird 2022). Necropsies were not performed on any of the dead birds.

The monthly distribution of these 20 records is as follows: January (2), February (3), March (1), April (2), May (3), June (4), July (1), August (1), September (0), October (2), November (0), and December (1). Eleven of the 20 records were of apparently healthy birds at sea and the remaining nine of sick, injured, or dead birds. Of the eight records that indicate the age of the bird, five were noted as immature or juveniles and three as adults. The most striking trend related to Red-billed Tropicbird records in the region is the apparent increase in records in recent years. In the 70-yr period between 1939–2009 there were nine records, resulting in a rate of documentation of the species of 1.3 birds every decade. In contrast, there have been 11 new records since 2010, nearly 10 times the historical rate.

In addition to these 20 records, some other recent records add further insight into the status of the species in the southern Caribbean region. An airplane-based transect survey of marine birds and mammals was carried out on 7–10 November 2013 across the offshore waters of the Exclusive Economic Zone of Aruba, Curaçao, and Bonaire (Geelhoed et al. 2014). The observers tallied at least 25 tropicbirds during the surveys. Of the individuals that they could definitively identify to species level (a reported 64%), all were Red-billed Tropicbirds (Geelhoed et al. 2014). Because of the novelty of this survey method, which allows a vast area to be surveyed in a short time, and the fact that all tropicbird sightings reported in the survey were more than 30 km (some more than 100 km) from any of the three islands, it is somewhat difficult to place these sightings in context compared to sightings from boats and land-based observers. In any case, the survey clearly indicates that in waters 30 km or more from Aruba, Curaçao, and Bonaire, Red-billed Tropicbirds occurred regularly during the November 2013 survey period and likely commonly forage in these offshore waters.

The number of observers skilled in bird identification has greatly increased on Aruba, Curaçao, and Bonaire, and the conduits for archiving sightings of rare birds via the internet (e.g., eBird, Observado, and iNaturalist) are also much more user-friendly and accessible. Both factors could presumably account for this increase in records of Red-billed Tropicbirds near Aruba, Curaçao, and Bonaire. It is equally plausible that there has been a true increase in the numbers of the species occurring in this region. The evidence for any obvious change (including an increase) in the numbers of Red-billed Tropicbirds or the number of colonies in the Caribbean is unclear (Walsh-McGehee 2000, Boeken 2018, Madden 2020) because no regular, standardized surveys for the species have been implemented across the Caribbean breeding range of the species. Many seabird species are known to exhibit great flexibility in their distribution and to travel long distances tracking prey populations, which are themselves impacted by large-scale weather patterns and climate change (Shealer 2001). It will be useful to continue carefully documenting records of Red-billed Tropicbird sightings, whether alive, injured, or dead; the latter should include necropsies to better understand what factors may be contributing to mortality. Sightings with photographs are especially useful, particularly those that show the patterns on the extended upperwings, tail, and back and sides of the head and bill, as they can be used to document the age of the birds and to differentiate them from the White-tailed Tropicbird (Lee et al. 1981, Howell et al. 2014). Such observations will improve our understanding of the species' distribution in the region, allowing us to assess distributional changes and population trends and better inform potential management actions and marine and coastal management plans.

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Title Page Illustration

Adult Red-billed Tropicbird (*Phaethon aethereus*) at Governor's Beach, Oranjestad, Aruba on 25 April, 2018. This bird had been found with an injured wing on a cruise ship that arrived in Aruba in March 2018 when the bird was taken to a bird rehabilitator. It was released on 25 April 2018 at Governor's Beach but the bird did not fly and was eventually retrieved and brought back into captivity where it died seven months later. Photographer: Michiel Oversteegen.

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