

A taxonomic and conservation re-appraisal of all the birds on the island of Nias

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Abstract. Nias is the largest of a chain of islands off the west coast of Sumatra. Historically, it received extensive attention from ornithologists, leading to the description of numerous endemic subspecies of birds. However, serious attention ceased before the end of World War II, and there has been an almost complete lack of modern-day work. At the same time, Nias now has the most degraded and fragmented natural environment of all the larger West Sumatran islands. Here, we report the results of recently renewed fieldwork coupled with an exhaustive perusal of the island's ornithological literature, and present a fresh taxonomic and conservation appraisal of the Nias avifauna. We furnish detailed information on all 165 bird species known from the island to date, including five newly recorded species, and recommend that seven species be removed from Nias's list. We flag a number of taxa, foremost the local Red-backed Dwarf Kingfisher *Ceyx [rufidorsa] captus* and Brown Wood Owl *Strix [leptogrammica] niasensis*, whose taxonomic distinctness may have been overlooked or underestimated in past accounts, while equally providing information to help synonymise numerous dubiously endemic taxa. We discovered the largest surviving population of the globally Critically Endangered Silvery Woodpigeon *Columba argentina* on Nias and its offshore islands. Based on the results of this study, we point to the possible local extinction of a number of species on Nias, including endemic subspecies, that can largely be attributed to wholesale loss of original forest cover on the island, and recommend comprehensive conservation efforts to ensure the survival of the remaining avifauna.

Key words. Sumatra, Indonesia, avifauna, Southeast Asia, Barusan

INTRODUCTION

The Greater Sunda Islands are an archipelago of land masses on the Sunda continental shelf, predominantly embedded within the west of Indonesia. Comprising three of the world's largest islands, Borneo, Sumatra, and Java (Fig. 1 inset), the Greater Sundas have been regularly connected to the Asian mainland during the last few cyclical Quaternary periods of global cooling, forming one big sub-continent known as 'Sundaland' (Bintanja et al., 2005; Wurster et al., 2010). Far less characteristic of Sundaland is a chain of islands off the west coast of Sumatra, historically—and more recently again—known as the Barusan Islands. This West Sumatran island chain comprises a mixture of shelf islands at times in the past connected to the Sundaland sub-continent and deep sea, 'oceanic' islands with no history of connection

to the mainland (Fig. 1 main figure). These West Sumatran islands and their biogeography historically received much ornithological attention, with numerous publications from the late 1800s to the mid-1900s (see accounts later), after which avian biologists' interest in them waned and, to date, has never fully recovered.

Measuring 5,120 km², Nias is the largest of the Barusan (or West Sumatran) islands. With its hills rising to over 800 m, it is also the tallest island, and has therefore received the greatest historic attention. In his detailed biogeographic account of these islands, Ripley (1944) demonstrated that Nias has the highest avian species count as well as family diversity among any of the Barusan members. What has remained surprising, however, is the lack of avian species-level endemism on Nias. While Nias is mostly separated from Sumatra by deep sea, a continuous shelf ridge does connect its northern tip with Tuangku Island in the Banyak Island group further north (Fig. 1), which—in turn—is well connected to the Sumatran mainland by a shallow shelf. This complicated topography means that Nias should have become connected with Sumatra at least occasionally during the last few Quaternary glacial periods, allowing for exchange of modern bird populations. At the same time, other Barusan islands, such as the Mentawai group, with an even wider shelf ridge connecting them to Sumatra, host multiple endemic bird species (e.g., Eaton et al., 2016; del Hoyo et al., 2019). Lack of avian species-level endemism

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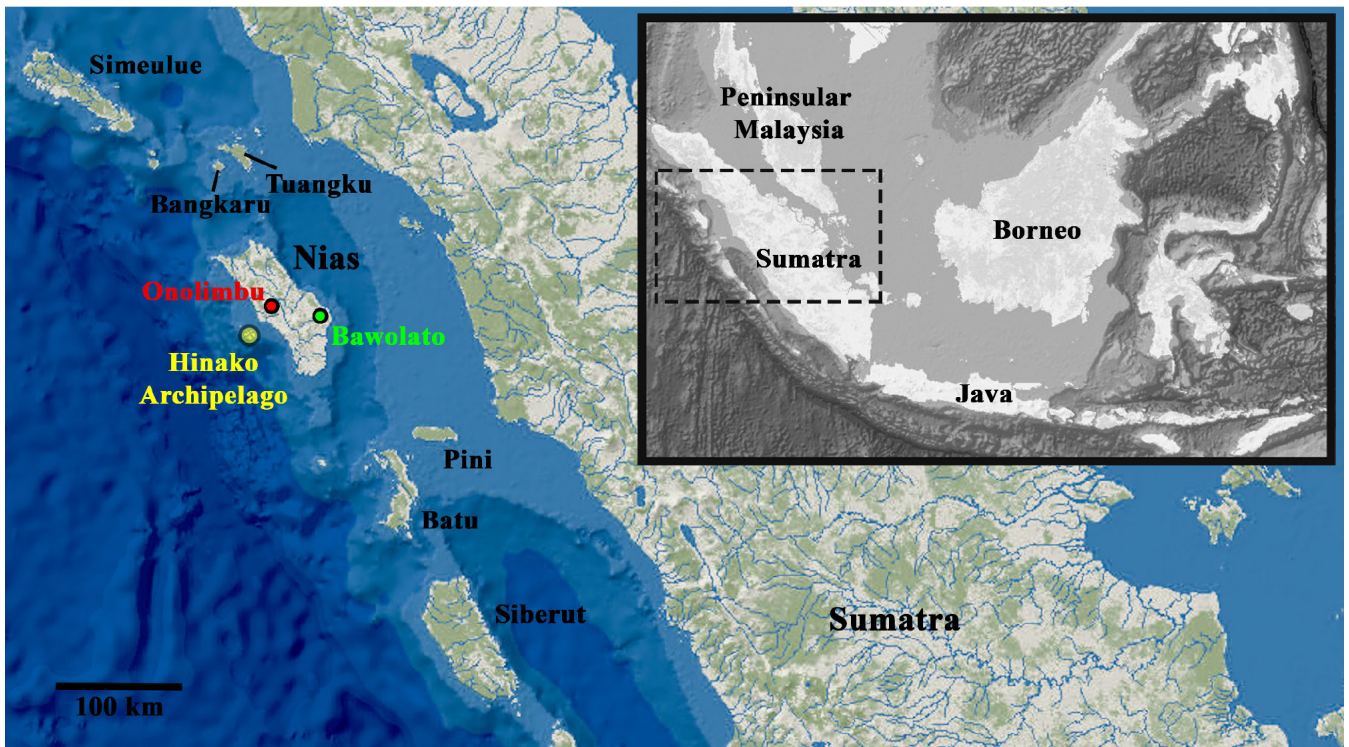


Fig. 1. Map of the location of the West Sumatran islands; the inset depicts location of Sumatra within Southeast Asia. The lightest blue hue represents a present-day water depth of <120 m, indicating areas exposed as land during the most recent cyclical sea level fluctuations of the Quaternary. Note that Nias may have briefly been connected to Sumatra via a narrow ridge to the north during those periods when sea level was at its lowest. The localities of field sites where mist-netting was conducted, including Pulau Asu and Pulau Bawa of the Hinako Archipelago, are labelled on the map.

on Nias notwithstanding, the island is known to host the highest amount of subspecific avian endemism among any Barusan members, consistent with the availability of submontane elevations and its larger land area, both of which are crucial in maintaining species diversity (e.g., Kalmar & Currie, 2006; Gwee et al., 2017; Rheindt et al., 2020).

The purpose of this contribution is to shed light on the state of the birds of Nias as assessed during a recent blood sample collecting expedition to the island from 8 to 16 March 2019. This field experience allows for three types of advances regarding Nias's avifauna: (1) Given the confusion surrounding the taxonomic distinctness of many of Nias's avian subspecies, we bring to bear modern information based on handling, measuring, and photographing these birds during mist-netting; (2) we present new avian records for the island and assess the whole island's bird list; and (3) we provide an update on the degraded state of the island's natural habitats, with assessments of the conservation status of many of its avian inhabitants.

History of ornithological exploration of Nias. There are numerous accounts about the colonial-era ornithologists who explored Nias, but a short summary is given here. Baron H.C.B. von Rosenberg was the first foreign ornithologist visiting (but not collecting on) Nias, in 1854. Results from this visit were published by Nieuwenhuisen & von Rosenberg (1863), and re-published in more detail but in a slightly different composition by von Rosenberg (1878). Given the large overlap of these two accounts, we henceforth solely

cite von Rosenberg (1878) when referring to results of this author's 1854 visit to Nias. The first actual bird collections were made by Signor Elio Modigliani during four to five months in 1886. His findings were published by Salvadori (1887), including the first descriptions of endemic Nias taxa. The next ornithological visitor, M.J. Claine, collected Nias birds in 1891. An account of Claine's collection was presented only a year later by Oustalet (1892), who admitted that relatively few new records were made beyond those by Salvadori (1887) and von Rosenberg (1878). A missionary by the name of W. Thomas carried out additional minor bird collections around that time, later reported on by European museum taxonomists. However, the next big bout of progress in our understanding of Nias birds was propelled from 1895 to 1896 by an indefatigable young collector, J.Z. Kannegieter, whose avian exploits were made public by Büttikofer (1896), again including the description of significant new taxonomic endemism.

The golden peak of Nias ornithological exploration was marked by Dr. W.L. Abbott's series of voyages around the West Sumatran archipelago from 1901 through 1905. Abbott collected over 1,300 skins across all islands and visited Nias twice during this time. While there has never been a comprehensive write-up of all of Abbott's collections, Dr. Harry C. Oberholser wrote multiple papers in which he described new endemic taxa on the basis of Abbott's collections, most famously his 1912 treatise (published as Oberholser, 1913) entitled "Descriptions of One Hundred and Four New Species and Subspecies of Birds from the Barusan

Islands and Sumatra". Following Abbott's collections, there were only two smaller colonial-era collecting efforts on Nias, one in 1937 but unpublished by Barbara Lawrence, and another in June 1939 by Sidney Dillon Ripley, later published by Meyer de Schauensee & Ripley (1940) and by Ripley (1944).

Following World War II, we are aware of extremely limited ornithological exploration of Nias. Since the 1970s, there have perhaps been fewer than five serious efforts by ornithologists to document observations from the island, most of these described in greater detail by Dymond (1994) and more recently by Svensson & Yong (2016). Given a lack of perceived avian species-level endemism and the degraded state of the habitat on Nias (see below), most recent ornithologists have concentrated on the multiple other Barusan islands that offer richer endemic rewards in their eyes.

Conservation situation on Nias. Being the largest and tallest member of the Barusan group, Nias also happens to be the island with the longest history of dense human settlement (van Oven et al., 2011). The contrast with the more sparsely populated and densely forested Siberut, the second-largest Barusan island, could not be more pronounced. Nias has a strong local culture, centred on a unifying local language (Bahasa Nias) with more or less mutually intelligible dialects, as well as influential Christian church denominations. Both the interior hilly highlands and the coastal lowlands are interspersed with a dense network of villages embedded within a matrix of home gardens, paddies and—in by far the greatest proportion—rubber plantations across a spectrum of intensive to extensive use. Based on detailed exploration of satellite imagery and ground-truthing during our fieldwork, we do not believe that Nias hosts any more natural hill or sub-montane forest, all of which has now been converted to rubber, even along the steeper slopes, with implications for the survival of multiple hill taxa. In the lowlands, the vast majority of habitat has also been converted, although two degraded patches of swamp forest survive at the far eastern and far northern tip of the island, respectively (see field sites below). Many of the birds originally found on the island must now be considered locally extinct, including a number of endemic subspecies (see species accounts).

MATERIAL AND METHODS

Fieldwork. Our fieldwork on Nias from 8 to 16 March 2019, carried out under the Indonesian government agency RISTEK's research permit number 313/SIP/FRP/E5/Dit. KI/X/2018, comprised opportunistic bird observation and sound recording, as well as mist-netting with biometric measurements, photography, and blood-sampling of captured individuals. We did not collect entire skins. While we endorse judicious scientific whole-specimen collection in most parts of the world (Remsen, 1995), we strongly oppose the notion that routine scientific avian whole-skin collections are justified in the surroundings of Sumatra, Kalimantan, and Java in this decade or the next, given the presently unfolding Asian

Songbird Crisis and the vast pressure on local birdlife by hundreds of thousands—quite possibly millions—of illegal trappers and poachers (e.g., Eaton et al., 2015; Lee et al., 2016; Bušina et al., 2018; Rentschlar et al., 2018).

We worked at multiple field sites:

- (1) Bawolato: This site is one of the last remaining patches of unconverted, although heavily disturbed, lowland secondary woodland on Nias, the other one being on the far northern tip of the island which we did not visit. The Bawolato patch of secondary woodland is located on the far eastern tip, inside Nias Regency (kabupaten Nias). The reason this area remains less densely populated is probably because it is low-lying, partly flooded swamp forest and hence less suitable for agricultural use. Even here on the far eastern tip of the island, however, humans have made inroads, and all habitat within walking distance of our village base was heavily disturbed. Because of the dense, secondary undergrowth of this degraded woodland and its flooded status, the least disturbed parts of this habitat remain all but inaccessible to mist-netting efforts. For a cumulative two days (spread over four calendar days), we were based in the house of the 'kepala desa' (head) of a village hosting a military division around 1.040°N, 97.887°E. From here, we used a muddy local trail to gain access to a matrix of overgrown rubber plantations and tiny remnant woodlots to carry out mist-netting. In the below accounts, we refer to this site as Bawolato (the municipality = kecamatan that it lies in).
- (2) Gunung Sitoli: On one morning, two of us (first and second authors) had the opportunity to visit home gardens with a small secondary forest patch just outside Gunung Sitoli (the island's capital) on a track to an antenna. The approximate location is 1.265°N, 97.631°E.
- (3) Hills of Nias Selatan: We spent a whole day exploring and ground-truthing the highest parts of the island reaching to over 800 m elevation in the far northern part of South Nias Regency (kabupaten Nias Selatan). The whole area, including the very highest point of the island, is covered by a dense network of ridgetop villages. The poor state of the habitat, which has been completely converted into rubber gardens, discouraged us from investing more time. In the end, the bad condition of the road only allowed us to penetrate as far as a village at 700 m elevation centred around 0.928°N, 97.682°E. However, we had clear visibility from here all the way to the highest ridge that reaches 800 m, confirming that no good habitat remains in the higher hills of Nias Selatan.
- (4) Onolimbu: To cover the lower hilly elevations of Nias, we based ourselves for two-and-a-half days in what appears to be the only area widely recommended for visitation by non-locals on the western side of the island: kecamatan Onolimbu in West Nias Regency (kabupaten Nias Barat) at 120 m elevation, centred around 1.001°N, 97.494°E. This location allowed us to carry out mist-netting work along newly built muddy tracks—as yet invisible on

Google Earth's satellite maps—that appear to be the foundation of a new settlement. The general habitat was a matrix of more or less overgrown rubber plantations interspersed with thick secondary forest gullies along streams.

- (5) Pulau [= Island] Asu and Pulau Bawa: These islands are roughly 10–15 km off Nias's west coast in the Hinako Archipelago, consisting of small, mostly coconut plantation islands. We worked on two of them, staying based on the northernmost Pulau Asu and mist-netting in a matrix of overgrown coconut plantations and what appeared to be remnant primary forest fragments. After our work on Pulau Asu, we visited Pulau Bawa, the largest, southernmost island of the Hinako group, apparently with the greatest human population, although without recommended infrastructure for non-locals. On Pulau Bawa, we worked along a maze of small tracks on the way to the lake in the island's interior, where we performed a morning's mist-netting in the forest patch surrounding the lake.

Biometric and bioacoustic work. For some of the bird taxa, we provide morphometric comparisons of individuals mist-netted by us with our measurements of historic specimens deposited at the Lee Kong Chian Natural History Museum (LKCNHM) in Singapore (see Supplementary Material for the list of specimens examined) and measurements of specimens taken by Ripley (1944). All measurements listed are in millimetres (mm) unless otherwise stated.

Given that museum specimens are likely to contract in size from rigor mortis, we omit morphometric measurements such as full body length and tarsus length which may not be comparable between live mist-netted birds and museum specimens. Furthermore, we note the inevitable presence of discrepancies between measurements conducted by different people. Thus we avoided, where possible, comparisons of bill lengths, which are notoriously variable across different measurers, although we did resort to them with caution in a few exceptional cases. Our biometric measurements are generally based on wing length, which is a conservative measurement of the length of a wing from carpal to the tip of the longest primary of a bird. We also carried out bioacoustic comparisons for several taxa with recordings obtained by us in the field and recordings from other recordists shared on the Xeno-Canto bird sound library (Xeno-canto Foundation, 2019).

RESULTS

Re-appraisal of all Nias bird species. The following is a reassessment of the taxonomic and conservation status of all of Nias's known birds. We indicate the possibility of an upgrade to species status for a taxon by placing its species name (= second name) in square brackets, like so: *Spilornis [cheela] asturinus*. We identify a taxon as possibly elevated to species status based on plumage, morphometric comparisons, and/or vocalisations. Our species sequence

and nomenclature generally follow Eaton et al. (2016). In the following, we list all 165 species currently known from Nias, including five newly added by us, followed by seven species recommended for removal from Nias's list.

Distinct or possibly distinct bird taxa endemic to Nias and surrounding Barusan islands. The following list includes all taxa possibly endemic to Nias based on previous descriptions and/or our recent field observations. We include a number of species here that have widely been treated as valid by modern accounts despite our judgment that they should be synonymised.

1. Green Imperial Pigeon *Ducula aenea consobrina*: First recorded on Nias by von Rosenberg (1878). Salvadori (1887) described the Nias population as a new species, *consobrina*, on the basis of the following morphological distinctions from Sumatran *polia*: (1) sharp separation of grey neck and green back; (2) lack of pink hue on head; (3) lack of white feathering around the bill base; (4) darker chestnut vent; and (5) smaller size. Later, Büttikofer (1896) presented specimen material calling the third-listed trait into question. Büttikofer (1896), who otherwise fully agreed with Salvadori's (1887) description of *consobrina*, went on to describe yet another new species of Green Imperial Pigeon from Nias, *Carpophaga vandepolli*, which was later exposed as a misdiagnosis of a *consobrina* individual based on a discoloured specimen (Junge, 1935). Other endemic island taxa subsequently described by Oberholser (1913) from neighbouring West Sumatran islands on the basis of slight size and colour differences, such as *babiensis* from Babi, *mista* from Simeulue, and *vicina* from Mentawai, greatly resemble *consobrina* and were synonymised with it by Ripley (1944), who showed that all fell within the range of variation of Nias *consobrina*. We endorse Ripley's (1944) taxonomic recommendation to consider *consobrina* a widespread subspecies of *Ducula aenea* from Mentawai to Simeulue. Puzzlingly, we did not see *consobrina* during our Nias fieldwork, despite finding similarly-sized pigeon species (including a *Ducula* congener) that are usually locally outnumbered by Green Imperial Pigeons elsewhere. Our observations suggest that *consobrina* may be seriously threatened on Nias. However, neighbouring populations on other West Sumatran islands (e.g., Babi, Simeulue), here subsumed under *consobrina*, can still readily be detected during short bouts of fieldwork where they occur (pers. obs.).
2. Barusan Cuckoodove *Macropygia modiglianii modiglianii*: First recorded for Nias by von Rosenberg (1878). Salvadori (1887) described the Nias population as a new species, *modiglianii*, merely on the basis of its size being larger than *M. emiliana*, but Ng et al. (2016) corroborated species level status of the Barusan Cuckoodove *M. modiglianii* (which also includes two island subspecies from other West Sumatran islands) based on bioacoustic data. The nominate subspecies of Barusan Cuckoodove from Nias may now be

threatened. Within >1 week of fieldwork, we only had one good perched view, few fly-overs, and several acoustic records at Bawolato. This conspicuous bird was unknown to at least one experienced informant in the west at Onolimbu, where the species may be absent.

3. Thick-billed Green Pigeon *Treron curvirostra pegus*: First mentioned for Nias by Oustalet (1892). Oberholser (1913) described the Nias population as an endemic subspecies, *Treron curvirostra pega* (likely assuming that *Treron* was feminine), because of its larger size and paler underparts than nominate *curvirostra* from Sumatra and Borneo. This subspecies designation—endorsed herein—has generally stood unchallenged (Ripley, 1944; Eaton et al., 2016), although some modern sources prefer to synonymise it with nominate *curvirostra* (del Hoyo et al., 2019). The species is now difficult to find on Nias, as exemplified by only two sightings in >1 week of fieldwork: one male seen well perched at Bawolato showing all the bare-part traits of this species, and one male at Gunung Sitoli only glimpsed perched, with a diagnostic maroon back, but bare parts not seen. Following Eaton et al.'s (2016) taxonomic division of plain-faced populations from Enggano and Mentawai as Barusan Green Pigeon *T. hypothapsinus*, the Nias taxon *pegus* continues to merit attribution to the Thick-billed Green Pigeon *T. curvirostra*, with its bare eye ring and red bill base.
4. Cinnamon-headed Green Pigeon *Treron fulvicollis melopogenys*: First mentioned for Nias by Salvadori (1887). Oberholser (1913) described Nias birds as an endemic subspecies, *melopogenys*, based on their reportedly smaller size and the female's chin centre being more clearly yellow. Ripley (1944) reluctantly retained this subspecies treatment based on sparse specimen material, conceding that variation in the species is large and the Nias population is perhaps indistinct. Modern accounts (e.g., Eaton et al., 2016; del Hoyo et al., 2019) have generally followed Ripley's (1944) continued subspecies recognition of *melopogenys* and added populations from Mentawai to it, as do we. We did not record Cinnamon-headed Green Pigeons, despite searching for them in seemingly suitable disturbed flooded forest remnants at Bawolato. While this taxon may survive in the disturbed remnant flooded forest and woodland patches of Bawolato (far eastern Nias) and a similar area in far northern Nias, heavy levels of degradation of these areas may have led to its severe endangerment.
5. Uniform Swiftlet *Aerodramus vanikorensis aerophilus*: We here follow Eaton et al. (2016), who merged Mossy-nest Swiftlet *Ae. salangana* from Sundaland with the senior Uniform Swiftlet *Ae. vanikorensis* from Australasia because of a lack of differences in nest morphology, biometry, and plumage as well as insignificant mitochondrial DNA differentiation (Rheindt et al., 2014). Going even further, morphology-based identification of Edible-nest Swiftlet *Ae. fuciphagus* from Mossy-nest *Ae. salangana* (= Uniform Swiftlet *Ae. vanikorensis*) has long been challenging, and in the absence of great mitochondrial differences (Rheindt et al., 2014), the two are nowadays generally told apart solely by their nest architecture and base colouration of contour feathers (Medway, 1966). At a time when a distinction between Edible- and Mossy-nest Swiftlets was not generally made, Oberholser (1912) described a poorly differentiated population from Nias as an endemic subspecies, *aerophilus*, on account of its darker black (less brownish) upperparts and greyer (less brownish) underparts when compared to Edible-nest Swiftlets *Ae. fuciphagus vestitus* from Sumatra and Borneo. Ripley (1944) synonymised the name *aerophilus* with *vestitus* as he could see no defining differences, but the name has continued to be used in modern accounts for all populations from the West Sumatran islands, not as a subspecies of Edible-nest but of Mossy-nest Swiftlet *Ae. salangana* (here subsumed under *Ae. vanikorensis*)—see e.g., Eaton et al. (2016) and del Hoyo et al. (2019). Pending more taxonomic work aided by genomics, and pending a verification of the colouration of contour feather bases on the type specimen of *aerophilus*, we retain the latter as a subspecies of a newly constituted *Ae. vanikorensis*. During our fieldwork on Nias, we observed at least 100 unidentified *Aerodramus* swiftlets near Gunung Sitoli, ~40 around Bawolato, and ~10 near Onolimbu. The majority of good sightings referred to individuals that were all dark with no apparent paler rump (especially in Gunung Sitoli), consistent with average plumage trends pointing to Black-nest *Ae. maximus* or Uniform (= Mossy-nest) Swiftlets, although occasional pale-rumped individuals more typical of Edible-nest Swiftlets were also seen. The three species are challenging to impossible to identify in flight. In our own field experience from handling and observing Black-nest and Edible-nest Swiftlets at nest locations in Singapore, we have not been able to confirm any reliable indicator of species identity other than nest type and biometric characters that are impossible to ascertain on free-flying birds.
6. Plume-toed Swiftlet *Collocalia affinis vanderbilti*: First recorded on Nias by von Rosenberg (1878). We follow DNA evidence by Rheindt et al. (2017) in separating Plume-toed Swiftlet (as here circumscribed) from the more easterly Glossy Swiftlet *Collocalia esculenta*. Nias hosts an endemic subspecies of Plume-toed Swiftlet, *vanderbilti*, whose mantle gloss is characterised as being blue rather than green or greenish-blue (Meyer de Schauensee & Ripley, 1940). The species was encountered at all field sites on Nias; our conservative counts of sightings are ~5 near Gunung Sitoli, ~20 in the hills of Nias Selatan, ~8 around Bawolato, and ~10 near Onolimbu.
7. Grey-rumped Treeswift *Hemiprocne longipennis perlonga*: To the best of our knowledge, the species

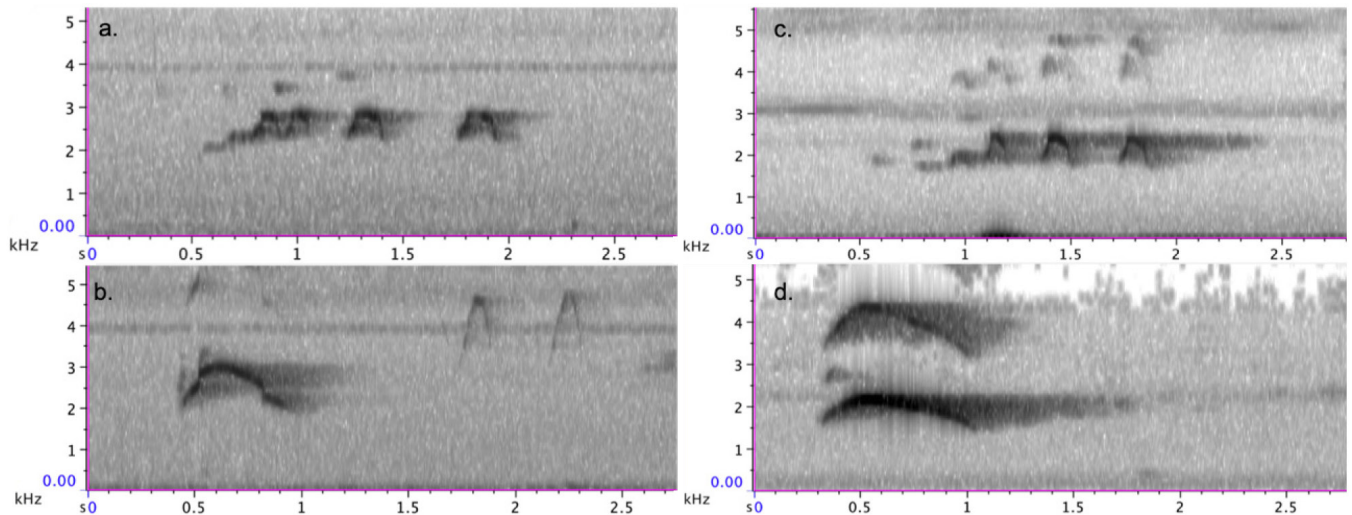


Fig. 2. Sonograms of typical calls of the Crested Serpent Eagle *Spilornis cheela*. a, b, four-note and single-note calls, respectively, of *asturinus* from Onolimbu (Xeno-Canto accession: XC482238, XC482239; recordist: Frank E. Rheindt); c, four-note call of *malayensis* from Sungai Menyala Forest Reserve, Malaysia (Xeno-Canto accession: XC89521; recordist: Frank Lambert); d, single-note call of *malayensis* from Petaling, Selangor, Malaysia (Xeno-Canto accession: XC447920; recordist: Ding Li Yong).

was first mentioned for Nias by Oberholser (1913), who described local populations as an endemic race *ocyptera* merely on the basis of being larger and paler on the underparts than *longipennis* from Sumatra. Ripley (1944) eloquently demonstrated that populations across all West Sumatran islands are in fact larger than Sumatran *longipennis* and should be united under the senior name *perlonga*, which becomes a pan-Barusan subspecies. We recorded the species on multiple occasions, observing five in the hills of Nias Selatan, at least 10 around Bawolato, and seven around Onolimbu.

8. Crested Serpent Eagle *Spilornis [cheela] asturinus*: Meyer (1884) described a puzzling new species of serpent eagle, *Spilornis asturinus*, on the basis of a dwarf-sized specimen of unknown provenance in the Dresden Museum. For many years, the Nias population was given alternative monikers before Meise (1939) realised that Meyer's (1884) senior name *asturinus* refers to the Nias population. In modern times, the taxon *asturinus* has been widely considered one of the most distinct endemic birds on Nias because of its pronounced dwarfism and pale colouration, and is variably placed at the species or subspecies level (Ferguson-Lees & Christie, 2001; Eaton et al., 2016; del Hoyo et al., 2019). During >1 week, we only saw one adult, at Onolimbu, loudly vocalising, sound-recorded (Fig. 2a, b; Xeno-Canto accession: XC482238, XC482239), and perching for good views; as well as one adult flying overhead and calling at Bawolato. We hope our sound material will contribute to future bioacoustic inquiry. Taxonomic work on West Sumatran islands' serpent eagles is urgent to guide possible conservation priorities.
9. Crested Goshawk *Accipiter trivirgatus niasensis*: First recorded on Nias by von Rosenberg (1878). Mayr (1949) described subspecies *niasensis* on the basis of Nias individuals' smaller size and darker overall

colouration, and this taxonomic arrangement has generally been maintained (e.g., Eaton et al., 2016). We did not find this subspecies, but it is likely to survive undetected because of its secretive lifestyle and general tolerance of agricultural habitat and human settlements.

10. Wallace's Hawk-eagle *Nisaetus nanus stresemanni*: This species was first mentioned for Nias as Blyth's Hawk-eagle *N. alboniger* by Salvadori (1887) and later by Büttikofer (1896) and Ripley (1944). Blyth's Hawk-eagle is an upland species of unlikely occurrence on Nias. Amadon's (1953) analysis of hawk-eagle variation later showed that Nias is likely only inhabited by Wallace's Hawk-eagle *N. nanus*, a lowland denizen for which he described *stresemanni* as an endemic Nias subspecies on the basis of an almost fully white rather than strongly buffy juvenile plumage in his two existing specimens. These specimens are worth reinvestigation to rule out potential confusion with Changeable Hawk-eagle *N. limnaeetus*, a species with a white juvenile plumage known from other West Sumatran islands. In the meantime, we agree with Amadon (1953) that Nias was probably never inhabited by any hawk-eagle other than *N. nanus*. We did not record Wallace's Hawk-eagle during our fieldwork and fear that it may have gone extinct. Most of the lowlands of Nias have been converted into human settlements and rubber plantation, and only two areas of disturbed secondary forest larger than 1,000 ha survive, in the very north and east, respectively. Our fieldwork in one of them (Bawolato in the far east) over four calendar days did not provide evidence of this species, but showed that the habitat is more degraded than expected from satellite imagery.
11. Brown Wood Owl *Strix [leptogrammica] niasensis*: Eaton et al. (2016) proposed a split of the Brown Wood Owl complex into *S. leptogrammica* from Borneo and Java versus *S. indraneae* from the remainder of the



Fig. 3. Brown Wood Owl *Strix [leptogrammica] niasensis* at Bawolato, with distinct rufous breast band. Photograph by Chyi Yin Gwee.

range (Sumatra to Himalayas) based on consistent differences in colouration in the facial disc as well as main vocalisations. While *S. leptogrammica (sensu stricto)* from Borneo and Java is characterised by a one-hoot vocalisation, the familiar call of *S. indraneae* in the remainder of the range is a rapid and bubbly succession of low-pitched hoots. The calls on Sumatra are little known, but the one recording available to us (Macaulay Sound Library: ML175550) is of a single hoot, indicating that Eaton et al.'s (2016) division might have been drawn along erroneous lines and that Sumatran *myrtha* may require inclusion with *S. leptogrammica (sensu stricto)*. The island of Nias is home to an endemic taxon of Brown Wood Owl, *niasensis*, reportedly most similar to *S. l. leptogrammica* from Borneo in colouration (e.g., Hartert, 1898) but described as a new species by Salvadori (1887) on the basis of its smaller size, narrower upperparts barring, and chestnut-brown crown. Our measurements of LKCNHM specimens of *vaga* from North Borneo (male: wing 318, tail 168; females: wing 310 & 317, tail 158 & 161) and *maingayi* from Peninsular Malaysia (males: wing 343 & 337, tail 181 & 203; female: wing 345, tail 223), together with Ripley's (1944) measurements of *niasensis* (male: wing 273, tail 151.5; female: wing 280.5, tail 156.5) and *nyctiphasma* from Bangkaru (see Fig. 1) (male: wing 299.5, tail 154; female: wing 307, tail 167) support Salvadori's (1887) diagnosis of *niasensis* as the smallest in size, but also point to a biometric dichotomy between larger Asian mainland populations of Brown Wood Owl (e.g., *maingayi* from Peninsular Malaysia) versus smaller insular ones (e.g., *niasensis*, *vaga* [Borneo], *nyctiphasma* [Bangkaru]) in possible support of Eaton et al.'s (2016) taxonomic division into two species, albeit along modified lines. Taxon *niasensis* has been unknown in life for a long time, but has been described by more recent authors

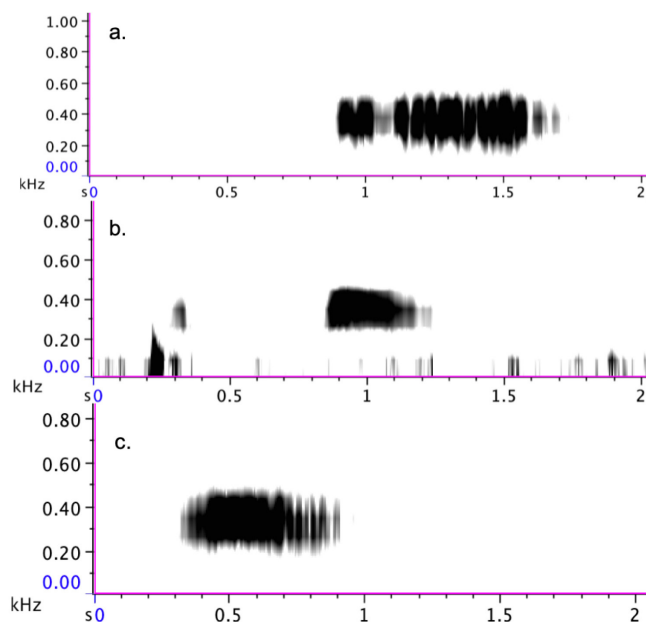


Fig. 4. Sonograms of typical male calls of members of the Brown Wood Owl complex. a, *Strix indraneae maingayi* from Fraser's Hill, Pahang, Malaysia ("hu-huhu-hu"; Xeno-Canto accession: XC142617; recordist: Marc Anderson); b, *Strix [leptogrammica] niasensis* from Bawolato ("hu, huuuu"; Xeno-Canto accession: XC482240; recordist: Frank E. Rheindt); c, *Strix leptogrammica vaga* from Lower Kinabatangan River, Sabah, Borneo ("huuuu"; Xeno-Canto accession: XC360090; recordist: Peter Boesman).

as additionally distinct on account of its more chestnut breast band than other members of the complex (e.g., Eaton et al., 2016; del Hoyo et al., 2019). During our fieldwork, we spot-lit and photographed one individual at Bawolato that was perched on a branch for almost a minute (Fig. 3), with the silhouette of a second individual also flying in. At this site, we probably heard a total of eight individuals, and its hoot was also heard briefly during one pre-dawn session near Onolimbu. Consistent with previous information, the spot-lit bird appeared rather small for a Brown Wood Owl and showed a bright rufous breast band. Presumed males gave a low-pitched two-note hoot that sounded like a single hoot unless heard very closely; presumed females gave a higher-pitched "cow", which—on only one occasion—was rendered multi-syllabically. We obtained sound recordings of both calls (Fig. 4; Xeno-Canto accession: XC482240, XC482241). The vocalisations of this subspecies are extremely different from the multi-syllabic, bubbly male call of the mainland Asian populations ascribed to *S. indraneae* by Eaton et al. (2016), more closely resembling the mono-syllabic call of *S. leptogrammica (sensu stricto)* from Borneo and Java. However, Javan and Bornean populations importantly differ in exhibiting a single hoot which lacks the short introductory note of *niasensis* that is only audible at close distance (Fig. 4). More research is obviously needed to resolve the taxonomy of this confusing species complex. In the meantime, we flag *niasensis* as quite possibly a candidate for endemic species status.



Fig. 5. Buff-necked Woodpecker *Meiglyptes tukki infuscatus* at Onolimbu; male (left) and female (right). Photographs by Chyi Yin Gwee.



Fig. 6. Male Rufous Piculet *Sasia abnormis magnirostris* caught at Onolimbu. Photographs by Chyi Yin Gwee.

12. Buffy Fish Owl *Bubo ketupu buettikoferi*: First mentioned for Nias by Salvadori (1887). Büttikofer (1896) described Nias's population as a new species, *Ketupa minor*, on the basis of its smaller dimensions than across the rest of the range, but his name is preoccupied by *Bubo minor* Schlegel, 1862, which prompted Chasen (1935) to assign a replacement name, *Bubo ketupu buettikoferi*. While we did not encounter this subspecies during our fieldwork, some informants, especially at Bawolato, described recent captures of large, brownish owls with yellow eyes, attesting to its continued existence. Despite being a large predator, the Buffy Fish Owl's dietary focus on fish allows it to persist in habitats with a highly disturbed terrestrial component. This ecological specificity has probably contributed to the survival of this large predator on Nias.
13. Orange-breasted Trogon *Harpactes oreskios nias*: First mentioned for Nias by Salvadori (1887). Discarding the diagnostic traits outlined in the original description (Meyer de Schauensee & Ripley, 1940), Ripley (1944) characterised the endemic subspecies *nias* on the basis of its darker crown and larger bill than subspecies *uniformis* from Sumatra. This endemic race's distribution likely resembles all other Greater Sunda subspecies in being restricted to hilly terrain above 500 m. During our visit to the highest elevations on Nias, in the hills of Nias Selatan that rise to slightly above 800 m, we did not find any remnant forest habitat as the entire landscape, which is visible from great distances, has been converted into rubber plantations without an undergrowth. Habitat conversion in Nias's highlands seems to have allowed for less overgrown plots than in Nias's lowlands, where old and overgrown plantations appear to be more widespread. Based on our visual impressions of the highest elevations on Nias and our inspection of satellite maps, we doubt that this endemic form survives, but would be delighted to be proven wrong.
14. Blue-eared Barbet *Psilopogon australis gigantorhina*: First mentioned for Nias by Salvadori (1887), the local population was described as subspecies *gigantorhina* on the basis of its larger bill than *duvaucelii* from Sumatra (Oberholser, 1913). We saw one responsive individual in degraded forest at Bawolato, where many more individuals were heard; the species was heard also at a forest patch near Gunung Sitoli, but it was not vocally detected in rubber plantations on the western half of the island during our visit.
15. Crimson-winged Woodpecker *Picus puniceus soligae*: First recorded on Nias by von Rosenberg (1878). The widely recognised endemic subspecies of Nias, *soligae*, was described on the basis of reduced yellow on the crest (Meyer de Schauensee & Ripley, 1940). We did not record this subspecies during our fieldwork. This forest-interior specialist may have declined—or even become extinct—on Nias given that all the lowland forest we found looked seriously degraded, with only few older trees remaining.
16. Banded Yellownape *Chrysophlegma miniaceum niasense*: First mentioned for Nias by Salvadori (1887). Büttikofer (1896) described Nias birds as an endemic species, *Chrysophlegma niasense*, to be distinguished from Sumatran *malaccense* by the longer, more lively reddish crest, more intensely yellow back and rump, and a more vividly reddish pattern on the mantle. Modern sources have unanimously demoted this population to subspecies level, a treatment with which we concur. We observed this subspecies multiple times around Bawolato in degraded forest, with approximately eight individuals over ~3 days. Our observations were of adults with extremely conspicuous green back triangles, perhaps referring to Büttikofer's (1896) yellower back diagnosis. However, despite minor plumage differences, these woodpeckers sounded and behaved exactly like their counterparts on Sumatra and Peninsular Malaysia.
17. Buff-necked Woodpecker *Meiglyptes tukki infuscatus*: Salvadori (1887) was extremely impressed by the endemic Nias population, which he described as a new species, *infuscatus*, differing from Sumatran



Fig. 7. Red-backed Dwarf Kingfisher *Ceyx rufidorsa*. a–c, an individual of the Nias endemic *Ceyx [rufidorsa] captus* caught at Bawolato; d, nominate subspecies *Ceyx rufidorsa rufidorsa* caught on neighbouring Tuangku Island. Photographs by Chyi Yin Gwee (a–c) and Elize Ying Xin Ng (d).

populations of Buff-necked Woodpecker *M. tukki* on the basis of a browner overall plumage, a nearly black head, narrower and browner body barring, and a buff-brown rather than yellowish neck patch. However, subsequent authors with larger specimen series, e.g., Hartert (1898), pointed out that Salvadori's (1887) type of *infuscatu*s may have been an aberrant individual, and generally demoted *infuscatu*s to subspecies level. Oberholser (1924), with a signature lack of attention to detail, described this taxon again under a junior synonym *hylodromus*. We found this woodpecker a number of times near Onolimbu, with three seen and two caught and processed. This species occurs in surprisingly degraded habitat on the West Sumatran islands (including on Tuangku Island, pers. obs.). Our photos reveal that the Nias endemic subspecies closely resembles the nominate subspecies *M. t. tukki* in its similar shade of brown plumage (Fig. 5), brown head, and yellowish neck patch, thus supporting most modern authors in retaining *infuscatu*s as a subspecies of *M. tukki*.

18. Rufous Piculet *Sasia abnormis magnirostris*: First mentioned for Nias by Salvadori (1887). Hartert (1901) described the Nias population as an endemic subspecies, *magnirostris*, based on its larger beak. This subspecies continues to be widely recognised. We recorded this

subspecies sporadically, with one seen near Gunung Sitoli, one male caught and processed in Onolimbu (Fig. 6), and four near Bawolato. It seems to survive well in overgrown rubber plantations. The male individual caught measured 52 for wings, which falls near the range of 52.5 to 53 that Ripley (1944) measured, and 15.9 for culmen, which is slightly longer than the male individuals of *magnirostris* measured by Ripley (14 & 14.5; 1944), thus supporting the diagnosis of *magnirostris* as having a longer bill in comparison to individuals from Peninsular Malaysia (12–13.5).

19. Red-backed Dwarf Kingfisher *Ceyx [rufidorsa] captus*: The Oriental Dwarf Kingfisher *Ceyx erithacus* complex exhibits confusing plumage polymorphism, with different proportions of bluish versus purplish iridescent colouration on the back and wings. Lim et al. (2010) demonstrated, however, that all the “black-backed” populations breeding in the drier monsoon zones of South and Southeast Asia comprise one compact mitochondrial DNA cluster, whereas red-backed populations from Sundaland (including those with blue wings, such as *motleyi* from Sabah) comprise another. This evidence has provided justification for an alternative taxonomic treatment—followed here and by Eaton et al. (2016)—in which Sundaic populations are separated as Red-backed Dwarf Kingfishers *Ceyx*

rufidorsa. The Nias population was first characterised in great morphological detail by Salvadori (1887). Ripley (1941), one of the first followers of a Red-backed (*C. rufidorsa*) versus Black-backed (*C. erithacus*) taxonomic arrangement, then described the Nias population as an endemic subspecies (*captus*) but confusingly assigned it to Black-backed *Ceyx erithacus* along with the very similar subspecies *motleyi* from Sabah, even though both *motleyi* and *captus* are surrounded by Red-backed (*C. rufidorsa*) breeding populations. Ripley (1941) characterised *captus* as slightly longer-billed and larger in size, with a smaller forehead spot than *motleyi*. Lim et al.'s (2010) genetic data have linked Sabah's red-backed *motleyi* with Red-backed Dwarf Kingfishers *C. rufidorsa* despite their blue wings creating a superficial resemblance with Black-backed *C. erithacus*. Nias's morphologically distinct *captus*, on the other hand, has remained unknown in life for many decades, and was even erroneously synonymised with *C. erithacus* by recent authorities (del Hoyo et al., 2019). After hearing dwarf kingfishers and glimpsing them both in flight and briefly perched several times at Onolimbu and Bawolato, we caught three individuals at Bawolato, all with blue wings and a pale purple-violaceous back resembling the Sabah taxon *motleyi* (Fig. 7a–c). Confirming Ripley's (1941) data, some of our unrelated fieldwork on multiple nearby islands, such as Tuangku and Bangkaru in the adjacent Banyak Archipelago and Simeulue further north, has provided us with close handling and study experience of populations there that are all-purple on the wings and back, and seemingly identical to nominate *rufidorsa* from Sumatra (Fig. 7d). The taxon *captus* on Nias appears to be a population with an unusually distinctive plumage as compared to neighbouring landmasses, calling for future research into gene flow dynamics. Luckily, it seems to survive well in Nias's degraded landscapes.

20. Stork-billed Kingfisher *Pelargopsis capensis sodalis*: First mentioned for Nias by Salvadori (1887). Oberholser (1909) described birds from Nias and Batu as subspecies *nesoeca* on the basis of brighter, more bluish back, wings, and tail, as well as a paler crown. However, Ripley (1944) found that these colour traits only apply to half of all Nias specimens and can vary with seasonal wear, recommending the synonymisation of *nesoeca* with *sodalis* from Tuangku Island in the Banyak Archipelago. The latter thereby becomes a more widespread Barusan taxon, a treatment we follow here. We only detected a single individual in our fieldwork, along a mangrove bay at Pulau Bawa, but we likely overlooked it elsewhere.
21. Red-breasted Parakeet *Psittacula alexandri perionca*: First recorded on Nias by von Rosenberg (1878). Oberholser (1913) described the Nias population as an endemic subspecies, *perionca*, calling it similar to the neighbouring island subspecies *major* from Babi but smaller. Both *major* and *perionca* are set apart from *cala* (from Simeulue) and *fasciata* (from mainland Southeast Asia) by their lighter, less bluish abdomen. Subspecies *perionca* continues to be widely recognised (e.g., Eaton et al., 2016; del Hoyo et al., 2019). We did not encounter this form during our fieldwork, and our enquiries with informants left us with the impression that this parakeet must be extremely threatened by now, as people profess to encounter them only in the remotest countryside. Luckily, the very similar subspecies *major* from neighbouring Babi can readily be encountered even on short trips to that island (pers. obs.).
22. Roving Cuckooshrike *Coracina sumatrensis kannegieteri*: We follow Eaton et al.'s (2016) taxonomic arrangement that separates Sundaic populations of the Bar-bellied Cuckooshrike *Coracina striata* complex into an independent species, Roving Cuckooshrike *C. sumatrensis*, partly based on genetic data by Jönsson et al. (2010) showing that the *C. striata* complex comprises multiple species. Büttikofer (1896), the first person to mention this bird for Nias, described the island's population as an endemic species "*Artamides kannegieteri*" based on larger wing and bill measurements, although the biometric comparison hinged on only one female Nias bird. In a re-analysis of *kannegieteri* widely ignored by modern accounts, Hartert (1898) emphatically commended Büttikofer's (1896) judgement by adding a generally paler male plumage colouration to the diagnosis of *kannegieteri* as compared to *sumatrensis* from Sumatra, especially on wings and lores. Modern sources have generally recognised *kannegieteri* at the subspecific level, doubtless justified on the basis of the great dispersal capabilities of this cuckooshrike (Jönsson et al., 2010), which prevents an accumulation of genetic differences required for speciation. We failed to encounter Roving Cuckooshrikes on Nias despite having seen and heard them on multiple other West Sumatran islands and being attuned to their calls and habits. Given the degraded state of habitat the species tolerates on other West Sumatran islands, we assume *kannegieteri* continues to exist on Nias.
23. Black-naped Oriole *Oriolus chinensis mundus*: First recorded on Nias by von Rosenberg (1878). Richmond (1903) initially described *Oriolus mundus* from Simeulue as a new species on the basis of its lack of a wing speculum and its clear rich yellow (as opposed to sordid or greenish) back and mantle. Later taxonomists quickly included the Nias population in it and demoted the form to subspecies status based on its similarity to other regional populations apparently not considered by Richmond (1903). Morphological distinctions among all West Sumatran island populations are confusing and perhaps subtle, calling the validity of some island taxa into question. We saw and sound-recorded two to three individuals on Pulau Asu (Xeno-Canto accession: XC482237), where their vocal impression was quite different, almost *Gracula*-like, as compared

to the familiar Singaporean vocalisation of *maculatus*. A total of three were seen on Pulau Bawa, where their vocalisations appeared to cover a greater range, including familiar motifs. It is possible that the Asu birds were imitating a now-extinct hill myna population. Surprisingly, the species was not encountered with certainty on the main island of Nias, although very distant calls at Bawolato may have pertained to this species.

24. Blyth's Paradise Flycatcher *Terpsiphone affinis insularis*: We follow Fabre et al.'s (2012) genetic evidence in regarding Southeast Asian breeding populations of *Terpsiphone* as a species, *T. affinis*, different from Indian and northeast Asian ones. Nias hosts an impressive endemic taxon, *insularis*, described as a new species by Salvadori (1887) because it exclusively exhibits brown-phase males with grey (not black) crowns and throats lacking any iridescence. We saw one male near Gunung Sitoli, and caught and processed one male and one female (Fig. 8) near Onolimbu, where the taxon survives in overgrown rubber plantations. We found this taxon to be among the top five most distinct endemic Nias bird taxa on the basis of colouration.

25. Scaly-crowned Babbler *Malacopteron cinereum niasense*: First mentioned for Nias by Salvadori (1887). Riley (1937) described the Nias population as a new subspecies, *niasense*, perceiving it to be larger-bodied, greater-billed, and darker. This is the only babbler species recorded from Nias, reflecting this group's poor dispersal capabilities (Cros et al., 2020). We targeted this species with great effort, and eventually detected it at Bawolato in the least disturbed parts of a plot of degraded woodland, where the bird was heard and sound-recorded strictly during the dawn chorus, and one was eventually seen, then mist-netted and processed. Its strongly hooked bill was apparent during handling, which may represent character displacement in the absence of the similar but stronger-billed Rufous-crowned Babbler *M. magnum* (Fig. 9) (Brown & Wilson, 1956). The wing length for this Nias individual (sex unknown) measured 82, while the wing length for three males, one female, and one unsexed *niasense* specimen measured by Ripley (1944) are as follows: 80, 80.5, 81.5, 73, and 77.5. The wing measurements of these *niasense* individuals suggest that our individual was a male, and indicate that *niasense* is consistently longer-winged than nominate *M. c. cinereum*, for which we have LKCNHM wing measurements from Peninsular Malaysia (male: 69; female: 69), Natuna Island (male: 75; female: 72), peninsular Thailand (male: 72; female: 67), Riau Islands (male: 66; female: 63), and North Borneo (male: 73; female: 76), as well as *M. c. rufifrons* from Java (male: 77; female: 75). The vocalisation of *niasense* sound-recorded by us invariably consisted of 4–5 ascending notes, similar to the 3–5 ascending notes typical for elsewhere in Sundaland (Xeno-Canto



Fig. 8. Blyth's Paradise Flycatcher *Terpsiphone affinis insularis* from Onolimbu; male (left; photo taken after dark) and female (right). This taxon lacks a glossy crest and has completely dull-grey underparts. Males and females were sexed by tail length; retrices of males are more than twice as long as the females. Photographs by Chyi Yin Gwee.

accession: XC482235, XC482236). Given its greater, more strongly hooked bill and greater wing length, subspecies status for *niasense* should be retained. We consider this subspecies of a precarious conservation status.

26. Black-headed Bulbul *Microtarsus atriceps atriceps*: First mentioned for Nias by Salvadori (1887). Oberholser (1913) described two subspecies from the West Sumatran islands, darker and stouter-billed *hyperemnus* from Simeulue and *chrysophorus* from Pagi with a more golden rump and abdomen. Ripley (1944) attributed Nias birds to *chrysophorus*, but felt that Oberholser's (1913) plumage traits fall within the range of variation of nominate *atriceps*. As corroborated by our specimen inspection (Fig. 10), the "golden rump" feature is not specific to the Pagi population, but may instead be an age-dependent morphological character which is also observed across the Sundaic region. Ripley (1944) also disagreed with Oberholser's (1913) diagnosis of *hyperemnus* as "darker" but conceded its stouter beak and maintained the subspecies. Meanwhile, most modern sources have surprisingly merged all West Sumatran island populations into *hyperemnus* (e.g., Eaton et al., 2016; del Hoyo et al., 2019). In our fieldwork we frequently encountered this species, seeing five near Gunung Sitoli; three in the hills of Nias Selatan; at least 10 around Bawolato; and at least 20 near Onolimbu, three of which were caught and processed. The local population, which was also sound-recorded (Xeno-Canto accession: XC482234), uttered an oft-heard chippy vocalisation similar to populations in mainland Southeast Asia and made a short-tailed appearance in the field. We did not observe consistent differences in rump colour among LKCNHM specimens from the Sumatran mainland, the Mentawai islands (Sipora and Siberut), and the individuals we caught on Nias (Fig. 10), consistent with Ripley's (1944) synonymisation of *chrysophorus* under nominate *atriceps*. To assess potential biometric differences



Fig. 9. Scaly-crowned Babbler *Malacopteron cinereum niasense* from Bawolato (left) and nominate subspecies *M. cinereum* from Johor, Malaysia (right). Photographs by Chyi Yin Gwee (left) and Keita Sin (right).



Fig. 10. Plumage comparisons among Black-headed Bulbuls *Microtarsus atriceps* with specimens from LKCNHM and two individuals caught at Onolimbu. Photographs by Chyi Yin Gwee.

among populations from the West Sumatran islands and from elsewhere in Sundaland, we performed wing and tail measurements on the individuals we caught on Nias as well as a range of LKCNHM specimens. Wings of our three unsexed Nias individuals (74–78) are only slightly shorter than the wing of the type specimen of *chrysophorus* from South Pagi (79.5; Ripley, 1944), two mainland Sumatran LKCNHM specimens (a male and a female; both 80), and a combined series of specimens (78–84) measured by Ripley (1944) and by us during unrelated fieldwork on Simeulue. On the other hand, these Nias individuals overlap in wing length with LKCNHM specimens from Sipora / Siberut (72–75)

and Java (78), and are comparable to peninsular Thai-Malay specimens (76–82) as shown by Wells et al. (2007). In summary, wing length across the region varies and is likely clinal. Tail lengths of our three unsexed Nias samples (67–69) again overlapped with measurements of the same mixed (see above) Simeulue series (68–75) as well as with a large series from the Thai-Malay Peninsula (63–68.5; Wells et al., 2007), and only slightly exceeded those of the type of *chrysophorus* from South Pagi (66; Ripley, 1944) and other Mentawai individuals (62–67) as well as Sumatran individuals (56–66). On the other hand, the Nias birds' (and other Barusan individuals') tail length was distinctly shorter



Fig. 11. Olive-winged Bulbul *Pycnonotus [plumosus] porphyreus* with distinct eye colour. The individual on the left was caught at Onolimbu and the individual on the right was caught on Pulau Asu. Photographs by Chyi Yin Gwee.

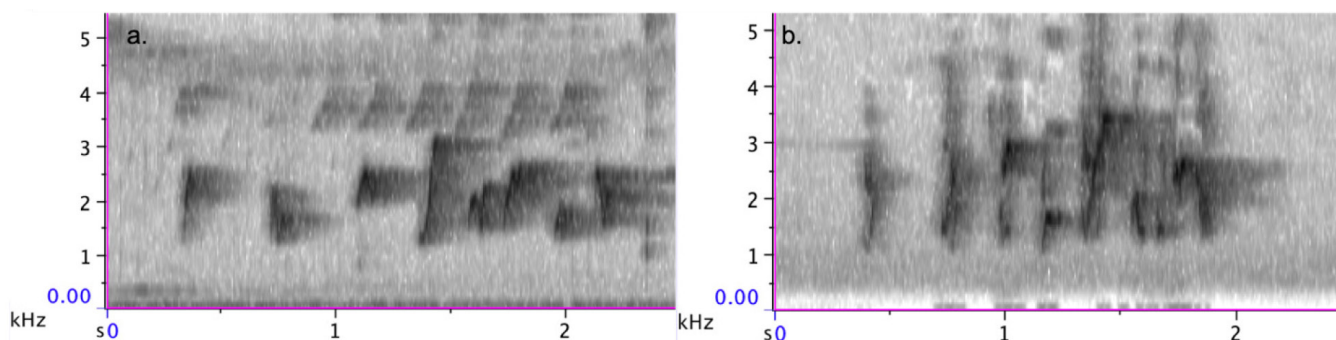


Fig. 12. Sonograms of typical vocalisations of Olive-winged Bulbul *Pycnonotus plumosus*. a, *porphyreus* from Bawolato (Xeno-Canto accession: XC482233; recordist: Frank E. Rheindt); b, *plumosus* from Singapore (Xeno-Canto accession: XC175831; recordist: Lars Buckx).

than that of a single LKCNHM specimen measured from West Java (75). We provisionally follow Ripley's (1944) synonymisation of *chrysophorus* with *atriceps*, merging most Barusan populations (except Simeulue) with Sumatra. On the other hand, a future taxonomic revision of this complex may yet uncover that West Sumatran island populations are divergent in some respect. Such future work should take into account genomic, morphological and vocal data.

27. Olive-winged Bulbul *Pycnonotus [plumosus] porphyreus*: First mentioned for Nias by Salvadori (1887). Oberholser (1913) described subspecies *porphyreus* from North Pagi because it struck him as “darker, especially on the upperparts”, and this name was then applied widely by Ripley (1944) across West Sumatran populations including the mainland and islands such as Nias. Ripley (1944) did characterise the eye colour of his specimens as pale (e.g., bright ochre, yellow), which is unusual for a species that is typically known for dark-red to reddish-black eyes (Eaton et al., 2016). In our field experience here on Nias and during unrelated fieldwork on other West Sumatran islands, *porphyreus* is deeply distinct, looking unlike the well-familiar populations in Singapore and elsewhere in Sundaland, of which we have handled

dozens of individuals over the years (e.g., Tang et al., 2016). Apart from its much paler eyes (with eye colour being important in bulbul species delimitation; see Garg et al., 2016), it has an unusual contrast between an olive back and a grey, scaly crown (Fig. 11). It is sturdier, more aggressive in the hand than Red-eyed and Cream-vented Bulbuls, and appears quite short-tailed in the field. Our unpublished preliminary genomic data point to deep differentiation that would justify species level, but pending the publication of that material, we here retain it as a subspecies. We encountered, caught, processed, and sound-recorded (Fig. 12; Xeno-Canto accession: XC482233) this taxon numerous times: specifically, we saw eight near Gunung Sitoli; at least 10 around Bawolato, where one additional individual was caught and processed; seven near Onolimbu, four of which were caught and processed; at least 10 on Pulau Asu, two of which were caught and processed; and six on Pulau Bawa. The wing and bill lengths of these Nias individuals ranged from 79 to 86, and from 16 to 22, respectively. The average wing and bill lengths of over 100 Singapore *P. p. plumosus* individuals caught by us over the years are 83 and 20, respectively, indicating a lack of pronounced morphometric distinctions in these two otherwise so different populations.



Fig. 13. Plumage comparisons of Yellow-bellied Prinia *Prinia flaviventris* with specimens from the LKCNHM and an individual caught at Onolimbu. The Nias endemic subspecies *halistona* shows buff-tinged underparts akin to the Bornean endemic subspecies *latrunculus*, and distinct from the obvious yellow-bellied underparts of *rafflesi* from Peninsular Malaysia, the Sumatran mainland, and Java. Photographs by Chyi Yin Gwee.

28. Yellow-bellied Prinia *Prinia flaviventris halistona*: First mentioned for Nias with certainty by Salvadori (1887). Oberholser (1913) described Nias birds as a new subspecies, *halistona*, of Hill Prinia *P. superciliaris* (i.e., *Burnesia dysancrita* in the taxonomic usage of the day). However, Ripley (1944) pointed out the obvious error in this action, and re-assigned *halistona* to Yellow-bellied Prinia *P. flaviventris*, in which it has been widely recognised as a subspecies to the present day. Ripley (1944) likened Nias birds to the population from Borneo (nowadays *latrunculus*) in that they lack the yellow flanks and belly of *rafflesi* from Sumatra but show a slight buff tinge on the breast, and because they are greyer (less olive) on the upperparts. Ripley's

(1944) only purported difference between *halistona* (Nias) and *latrunculus* (Borneo) is the larger size of Nias birds. We encountered this taxon multiple times across Nias, including seven seen around Bawolato and one seen at Onolimbu, where another one was additionally caught and processed (Fig. 13). At other sites across Nias, we heard it repeatedly without seeking visual confirmation. All individuals encountered indeed showed very pale underparts with a buff tinge most similar to Bornean *latrunculus* (Fig. 13), corroborating *P. f. halistona* as yet another odd Nias endemic that appears to be linked to Bornean rather than Sumatran taxa through morphological affinity. Comparisons of wing measurements among our Nias individual (50; sex

unknown), Ripley's (1944) Nias individuals (males: 48 & 51.5; females: 46 & 47), Ripley's (1944) Bornean specimens (males: 45 & 46; female: 41; unknown: 44.5 & 47.5), and our LKCNHM specimens (Borneo male: 48, female: 44; Sumatra male: 44, female: 42; peninsular Malaysia male: 50, female: 48) are consistent with the diagnosis of Nias *halistona* as slightly larger than Bornean *latrunculus* and distinctly larger than adjacent Sumatran populations of *rafflesi*. Although peninsular Malaysian and Sumatran *rafflesi* populations seem to differ in wing length based on our specimens, these differences almost disappear with Wells et al.'s (2007) larger specimen series, emphasising the need for a sufficient sample size in morphometric diagnoses.

29. Barusan Shama *Copsychus melanurus melanurus*: Salvadori (1887) described the Nias population as a new species under the name *Cittacincla melanura* on the basis of its all-black tail. Ripley (1944) added much detail to its diagnosis by pointing out the darker red underparts of *melanurus* and its less pronounced sexual dimorphism in comparison with White-rumped Shamas *C. malabaricus tricolor* from Sumatra. After Barusan Shamas *C. melanurus* had widely been absorbed as a subspecies of White-rumped Shamas *C. malabaricus* in modern days (e.g., del Hoyo et al., 2019), a field guide by Eaton et al. (2016) reverted to Salvadori's (1887) species-level arrangement. The Barusan Shama is now an extremely endangered species that has gone extinct on most islands of former occurrence (Rheindt et al., 2019). We widely encountered the nominate form on Nias in roadside cages and in Gunung Sitoli's pet shops during our fieldwork, but we were unable to see or hear this species in the wild. One informant who owned a captive shama told us that he had caught it within the previous two weeks in remote parts of the island, raising hopes of its continued survival, although any remnant populations must be unviable at this stage and are likely to be wiped out soon by unrelenting poaching pressure. The survival of this subspecies, and perhaps of the entire Barusan species, now rests firmly in the hands of conservation breeders. Other black-tailed Barusan island populations (not counting white-tailed populations from the shelf island groups of Batu and Banyak) were not known in Salvadori's (1887) days, but were described to science later primarily by Oberholser (1913), e.g., *hypolizus* from Simeulue (smaller with lighter rufous abdomen) and *opisthochrus* from Lasia and Babi (size as *melanurus*, but abdomen even paler rufous than *hypolizus*). Populations from Mentawai are widely subsumed under the nominate form from Nias, which is a treatment we follow here. Ripley (1944) was unimpressed by Oberholser's (1913) descriptions, discarding tail length as a valid trait because of its variability and synonymising the latter's subspecies into *C. melanurus*. Our experience with captive populations is in conflict with Ripley's (1944) assessment. One breeder on Simeulue whom we have visited during unrelated fieldwork on multiple occasions is in possession of prized males from Nias (*melanurus*), Babi (*opisthochrus*), and Simeulue (*hypolizus*), which—when seen side-by-side in their cages—display instantly recognisable differentiation in abdomen colour and tail length. Breeders with experience in these Barusan Shamas can infer island provenance by looking at these traits. Most of this subspecific variation probably only persists in cages at this point, but is well worth preserving in dedicated conservation breeding efforts. We therefore argue in favour of continued recognition of Oberholser's (1913) subspecies names for shamas.
30. Oriental Magpie Robin *Copsychus saularis nesiarchus*: First mentioned for Nias by Salvadori (1887). Based on smaller size and more white on the third and fourth rectrices than the Sumatran race *musicus*, Oberholser (1923) described the Nias population as an endemic subspecies, *nesiarchus*, a taxonomic arrangement that has been maintained by Ripley (1944) and up until the modern day (e.g., Eaton et al., 2016). Subspecies *zacnecus* from Simeulue, described by Oberholser (1913) much earlier, seems to be most similar to *nesiarchus* but has more buff on the flanks and vent (Ripley, 1944). The species is widely targeted by poachers on Nias, and was frequently found in cages along the roadside and in Gunung Sitoli's pet shops. Even so, we still recorded the species in the wild, including a sighting of two to three near Onolimbu; eight on Pulau Asu (two of which were caught and processed); and one on Pulau Bawa; while additionally hearing individuals at all these sites and at Bawolato. While birds in the wild generally seemed to conform with *nesiarchus* (Fig. 14), some captive individuals at local houses (especially on Pulau Asu) did show conspicuous buff flanks, which may have been age-related. We doubt that these individuals would have related to imported *zacnecus* escapees from Simeulue, as there are few cultural or transportation links between Simeulue and Nias. More attention should be paid in the future to plumage variation of this species across the West Sumatran archipelago.
31. Asian Glossy Starling *Aplonis panayensis altirostris*: First recorded on Nias by von Rosenberg (1878). Salvadori (1887) described the Nias population as a distinct species, *Calornis altirostris*, on the basis of its more "saturated" plumage, greater size, and much wider beak than *strigata* from adjacent Sumatra. Populations on Simeulue and Babi, described based on variations in dimensions and gloss as *rhadinorhamphus* (Oberholser, 1913) and *nesodramus* (Oberholser, 1926), respectively, are often now merged with *altirostris* (e.g., Eaton et al., 2016). This merger goes back to Ripley's (1944) assessment that Oberholser's (1913, 1926) purported differences were not diagnostic, although we do note that our recent work on Babi (unpublished) has shown this island's population to be cream-eyed rather than red-eyed in adults, arguing for a reinstatement of the name *nesodramus* for Babi's population, which may warrant a taxonomic reassessment. We found the



Fig. 14. Oriental Magpie Robin *Copsychus saularis nesiarchus* caught in the wild on Pulau Asu. Photographs by Chyi Yin Gwee.

species to be widespread across Nias, seeing at least 30 around Bawolato; at least 40 on Pulau Asu; and at least 10 on Pulau Bawa. Especially the birds we observed on Pulau Asu were much larger-beaked than is typical for elsewhere in Sundaland, and generally uttered much louder, more forceful and strident vocalisations (XenoCanto accession: XC482232), confirming at least the distinct subspecies status of *altirostris*. Large beak size seems to be a general trait of small-island subspecies in the Asian Glossy Starling (e.g., Eaton et al., 2016), calling for a comprehensive taxonomic review of this species complex.

32. Nias Hill Myna *Gracula [religiosa] robusta*: First recorded on Nias by von Rosenberg (1878). Salvadori (1887) described the Nias population as an endemic new species, *robusta*, because it differs from adjacent populations from Sumatra and Java (*religiosa*) on the basis of (1) its larger size, (2) stouter beak, (3) differences in the arrangement of bare skin between the wattles, (4) the white wing patch being twice to three times the size of that of *religiosa*, and (5) the presence of a unique white spot in the secondaries. Although long ignored, this species-level treatment has recently been re-adopted (del Hoyo et al., 2019). Richmond (1903) presented specimen evidence to extend the range of *robusta* to include populations on Babi and Tuangku islands further north. Oberholser (1913) went further in describing Tuangku birds as an endemic race, *ophellochlora*, based on perceived smaller size and greener head-sides. However, Ripley (1944) exposed these differences as being within the range of variation of *robusta*, confirming the distribution of the Nias Hill Myna *G. robusta* to extend to the Banyak Archipelago. This taxon attracts record prices in the bird trade and was long thought to have been driven to extinction in the wild on Nias (Dymond, 1994), until a small

number of individuals was rediscovered in 2015 by Czech and Indonesian biologists (T. Ouhel and S. Bruslund, pers. comm.). Nothing is known about the fate of this surviving population on Nias now in 2019, but it may well be extinct with continuing trapping pressure. Unsurprisingly, we did not find any wild Nias Hill Mynas during our fieldwork on the island, but saw an unexpected number of individuals (perhaps ~25 in total) in roadside cages and pet shops in Gunung Sitoli, all of which were conclusively identified as *robusta*.

33. Greater Green Leafbird *Chloropsis sonnerati parvirostris*: First mentioned for Nias by Salvadori (1887). The Nias population of this species was described as an endemic subspecies, *parvirostris*, by Hartert (1898) on the basis of its smaller bill dimensions. Hartert (1898) compared his Nias material against good series from elsewhere in Sundaland, and Ripley (1944)—who was otherwise critical of indistinct subspecies from Nias—maintained *parvirostris* on the basis of the single male available to him. Although recent sources (e.g., Eaton et al., 2016; del Hoyo et al., 2019) have synonymised the Nias subspecies, current evidence based on morphometric comparison is in support of its recognition. This species is now threatened across Indonesia because it has become a recent target species for cagebird trappers (Eaton et al., 2015). During our fieldwork at Bawolato, we briefly glimpsed one male leafbird feeding in the tree canopy whose visual impression was neither that of a particularly large nor small leafbird, and which seemed to have no hooked bill. As the Greater Green Leafbird is the only leafbird species recorded on Nias, this may well have been a record of this species. The general impression of the bill would be consistent with the diagnosis of *parvirostris* as having small bill dimensions. However, we are reluctant to claim this



Fig. 15. Plumage comparison of Little Spiderhunter *Arachnothera longirostra* among LKCNHM specimens from Sumatra, Siberut, and Sipora, as well as individuals caught during our Nias fieldwork. Two individuals from Nias are depicted, one from Onolimbu (leftmost and rightmost in the Nias panel), and the other from Bawolato (centre in the Nias panel). Photographs by Chyi Yin Gwee.

sighting as certain, because the bird in question may well have constituted a new island record of Lesser Green Leafbird *C. cyanopogon*.

34. Little Spiderhunter *Arachnothera longirostra cinereicollis*: First mentioned for Nias by Salvadori (1887). Nias's population was separated as an endemic subspecies *niasensis* from Sumatran *cinereicollis* on the basis of its longer wings, longer bill, and paler yellow underparts (van Oort, 1910). With large specimen series available to him, Ripley (1944) considered bill length extremely variable across the species and called attention to seasonal variation in the paleness of underparts, thereby synonymising this subspecies and additional ones from other West Sumatran islands. Nevertheless, and perhaps surprisingly, many modern treatments continue to recognise *niasensis* (e.g., Eaton et al., 2016; del Hoyo et al., 2019). Little Spiderhunters continue to be easy to encounter on Nias: we saw four around Bawolato; three near Gunung Sitoli; six near Onolimbu; and one en route in Nias Barat. We caught and processed a total of five individuals across the island. Our plumage inspection did not show distinct differences between Sumatran mainland, Mentawai, and Nias individuals (Fig. 15). Wing measurements of our five unsexed Nias individuals ranged from 60 to 72 while the two *niasensis* specimens available to Ripley (1944) measured 69 (male) and 68.5 (female). This range overlaps with wing lengths of a number of island series presented by Ripley (1944): Tuangku and Bangkaru Island (female: 62.5; males: 68.5 & 70), Siberut and Sipora Island (males: 66.5–70; females: 60–62.5), Batu Islands (males: 60.5 & 64), and Sumatra (male: 65; female: 65). Additional wing measurements of LKCNHM specimens from Sipora and Siberut equally fall within this range (males: 66, 68 & 71; female: 60). Following Ripley's (1944) demonstration of the inappropriateness of bill length and underpart

colouration as taxonomic traits in Little Spiderhunters, our wing length comparisons support a synonymisation of *niasensis* with Sumatran *cinereicollis*. Future taxonomic inquiries should incorporate genomic data to assess potential differentiation in West Sumatran populations of Little Spiderhunter.

35. Scarlet-backed Flowerpecker *Dicaeum cruentatum niasense*: Early ornithological accounts from Nias struggled with the identity of this species. Oustalet (1892) listed typical-looking individuals under *Dicaeum cruentatum* and a number of aberrant individuals, now known to belong to an unusual morph, as “var. *pryeri*”. Büttikofer (1896) compounded the situation by adding *D. sumatranum* to this list, regarded as a full species at the time. Hartert (1898) called him out on this mistake, clarifying that only one form (i.e., *sumatranum*) can occur on the island. At last, the Nias population was separated from *sumatranum* on Sumatra as an endemic subspecies, *niasense*, by Meyer de Schauensee & Ripley (1940) on the basis of its purplish-blue rather than greenish-blue wing coverts, its darker grey underparts, and its stouter bill, although Cheke et al. (2001) called the distinctness of this form into question. Regardless of its taxonomic status, the Nias population has only been detected sporadically and is perhaps only reliably found along the coast. We saw one male near Gunung Sitoli and one pair on Pulau Asu, with a likely sighting of one female on Pulau Bawa that was too brief for confirmation.
36. Orange-bellied Flowerpecker *Dicaeum trigonostigma antioproctum*: First recorded on Nias by von Rosenberg (1878). Oberholser (1913) described Nias's population as an endemic subspecies, *lyprum*, on the basis of darker slate upperparts. With a much larger specimen series, Ripley (1944) dismissed *lyprum* and other island subspecies described by Oberholser as variants, but

merged them all into one West Sumatran island taxon *antioproctum*, originally described from Simeulue by Oberholser (1913), based on its larger size than Sumatra's nominate subspecies and its females being brighter-rumped and brighter-bellied. This species is one of the most dominant members of Nias's rural soundscape; it was heard widely, with at least 10 seen near Gunung Sitoli, around Bawolato, and near Onolimbu each; and doubtless also seen at other places but not committed to memory.

Bird taxa described as endemic to Nias but likely indistinct. The following list includes taxa originally described as distinct subspecies endemic to Nias, but synonymised or considered indistinct by most modern accounts, as corroborated by our data.

37. Pink-necked Green Pigeon *Treron vernans vernans*: First recorded on Nias by von Rosenberg (1878). Oberholser (1913) described the population on Nias as an endemic subspecies, *Dendrophassa vernans mesochloa*, based on larger size, less olive (more greenish) male upperparts, and lighter female overall colouration, but we follow Ripley (1944), who recommended synonymising this subspecies with nominate *vernans* due to overlapping measurements and plumage characters. This is the only green pigeon (genus *Treron*) still straightforward to detect on Nias and adapted to agricultural landscape. We saw at least 10 in the hills of Nias Selatan; ~40 around Bawolato; ~15 around Onolimbu; ~25 on Pulau Asu; and ~25 on Pulau Bawa.
38. Plaintive Cuckoo *Cacomantis merulinus threnodes*: First recorded on Nias by von Rosenberg (1878) under the puzzling name "*Cuculus flavipes*", doubtless in reference to this species. Oberholser (1913) described a Nias-endemic subspecies *subpallidus* on the basis of a male that struck him as smaller and paler on the head and underparts, but Ripley (1944) examined additional specimens from Nias and attributed the aberrant type of *subpallidus* to individual variation. We follow Ripley (1944) and most modern accounts in assigning Nias birds to *threnodes* from the main Sundaic landmasses. This bird was seemingly ubiquitous by sound during our fieldwork on the entire island, and was often heard en route from the moving vehicle. We saw one in the hills of Nias Selatan; one at Bawolato; and one at Onolimbu.
39. White-breasted Waterhen *Amaurornis phoenicurus phoenicurus*: First mentioned for Nias by Salvadori (1887). Oberholser (1913) described a female from Nias as a new subspecies, *cleptea*, but subsequent authors have disagreed with him about the distinctness of the type specimen. For instance, Ripley (1944) synonymised the Nias taxon with *javanicus*, which has generally been synonymised with nominate *phoenicurus* in modern accounts (e.g., del Hoyo et al., 2019). In

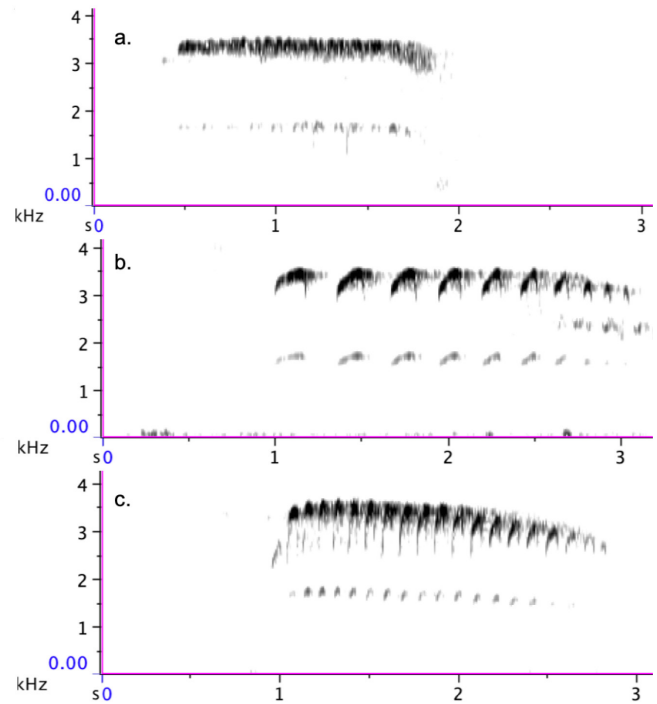


Fig. 16. Sonograms of the typical accelerating call of Rufous Woodpecker *Micropternus brachyurus*. a, *badius* from Pantii Forest Reserve, Johor, Malaysia (Xeno-Canto accession: XC189942; recordist: Ding Li Yong); b, *badius* from Bawolato (Xeno-Canto accession: XC482231; recordist: Frank E. Rheindt); c, *brachyurus* from Gunung Halimun, West Java (Xeno-Canto accession: XC204141; recordist: Mike Nelson).

the Hinako Archipelago, we saw three on Pulau Bawa and heard the species on Pulau Asu.

40. Rufous Woodpecker *Micropternus brachyurus badius*: First recorded on Nias by Büttikofer (1896). Oberholser (1913) described Nias birds as an endemic race *celaenephis* based on size and darker overall colouration. Ripley (1944) showed that Oberholser's (1913) size diagnosis was mistaken, but provided more detail on what he believed are darker overall barring and spotting on Nias birds. Nevertheless, more modern sources, which we follow here cautiously, generally do not recognise *celaenephis* (e.g., Eaton et al., 2016; del Hoyo et al., 2019). We sound-recorded one (Fig. 16; Xeno-Canto accession: XC482231) and saw it well at Bawolato. Our comparison of its primary accelerating call with examples from peninsular Malaysia and Java indicates a large degree of vocal variability within the species, necessitating further bioacoustic inquiry (Fig. 16).
41. Buff-rumped Woodpecker *Meiglyptes tristis grammithorax*: First mentioned for Nias by Salvadori (1887). Oberholser (1913) described Nias's population as an endemic race *microterus* based on smaller body size, but Ripley (1944) demonstrated the difference to be insignificant. We only saw one individual, briefly but conclusively at Bawolato in degraded forest, confirming its continued existence on Nias.



Fig 17. Collared Kingfisher *Todiramphus chloris laubmannianus* from Pulau Asu. Photographs by Chyi Yin Gwee.

42. White-bellied Woodpecker *Dryocopus javensis javensis*: First reported for Nias by Oustalet (1892). Richmond (1912) described Nias birds as an endemic race *buettikoferi*, said to differ from nominate *javensis* by the lack of blackish bars on the thighs (Ripley, 1944). Although Ripley (1944) maintained this subspecies, subsequent authors have not considered it distinct (e.g., Eaton et al., 2016; del Hoyo et al., 2019) based on the obviously minor extent of purported differences. Ripley (1944) mooted its impending extinction on Nias even in the mid-20th century based on forest loss. We did not record this species, and given the highly degraded state of remnant lowland woodland patches on Nias, we fear that the local population of this large woodpecker may have become extirpated.
43. Collared Kingfisher *Todiramphus chloris laubmannianus*: First recorded on Nias by von Rosenberg (1878). Oberholser (1920) described an endemic subspecies from Nias as *amphirytus*, larger and duller than *laubmannianus* from Sumatra, yet smaller and brighter than *chloropterus* from Simeulue. Ripley (1944) characterised Oberholser's (1920) treatment as "...a form of microdissection that escapes me...", pointing to the clinality of these traits to support synonymisation of both *amphirytus* and *chloropterus* under *laubmannianus*. The name *amphirytus* has generally not been used as valid in modern works, but *chloropterus* continues to be applied to West Sumatran island populations including Nias (e.g., Eaton et al., 2016; del Hoyo et al., 2019). While we reserve judgement on *chloropterus* from Simeulue, where we have seen unusual plumage types in unrelated fieldwork, we do favour a more conservative course complying with Ripley's (1944) synonymisation of *amphirytus* from Nias, based on the lack of distinct morphological differences between Nias and Sumatran mainland individuals. We mainly found this subspecies in coastal settings, observing one on the coast near Onolimbu; at least 10 on Pulau Asu (several of which were caught and processed); and six on Pulau Bawa.
44. Blue-eared Kingfisher *Alcedo meninting meninting*: First recorded on Nias by Büttikofer (1896). Oberholser (1913) described an endemic subspecies *subviridis* from Nias on the basis of a smaller male with greener upperparts, but Ripley (1944) showed that three additional Nias specimens do not coincide with these aberrations, leading to a synonymisation of *subviridis*. We did not record this species, probably because we did not invest much time near streams, but it is expected to survive on Nias.
45. Blue-crowned Hanging-Parrot *Loriculus galgulus galgulus*: First recorded on Nias by von Rosenberg (1878). Oberholser (1913) described the Nias population as an endemic subspecies, *lamprochlorus*, because of a smaller, paler male and a more yellowish-tinged female. However, Ripley (1944) demonstrated that the material from Nias falls within the range-wide variation of nominate *L. g. galgulus*. We saw five near Gunung Sitoli and a cumulative five near Bawolato, demonstrating that the species remains widespread on Nias.
46. Blue-winged Pitta *Pitta moluccensis*: Oberholser (1913) first reported this species for Nias, but—with poor judgement—decided to describe a new subspecies, *lepta*, from here on the basis of minor size differences. Given the extreme unlikelihood of anything but a migrant status on Nias, such a course of action is unjustified, and Ripley (1944) showed that the type of *lepta* falls within the range of variation for the species. We failed to record this migrant.

47. Pied Triller *Lalage nigra striga*: First mentioned for Nias with certainty by Salvadori (1887). Subspecies *empheris*, described for Nias by Oberholser (1913) based on a bird with a paler rump, was found to be indistinct (Ripley, 1944). We saw a total of seven around Bawolato.
48. Greater Racket-tailed Drongo *Dicrurus paradiseus platurus*: First recorded on Nias by von Rosenberg (1878). Oberholser (1913) described the Nias population as *adelphus*, calling it larger, and Ripley (1944) agreed but pointed out that Oberholser's (1913) feather shape characters are non-diagnostic. Even so, the name is not widely used in modern accounts (e.g., Eaton et al., 2016; del Hoyo et al., 2019), and we consider it unlikely to be taxonomically valid based on our experience with size variability in this species elsewhere. We only saw three at Bawolato, where this species was also heard during the earliest dawn chorus in the dark.
49. Black-naped Monarch *Hypothymis azurea prophata*: To the best of our knowledge, this species was first mentioned for Nias by Salvadori (1887). Oberholser (1911) described Nias birds as an endemic subspecies, *amelis*, likening them to *leucophila* from Mentawai but with a shorter wing, darker and more purplish-blue male body, and more greyish abdomen, extensively washed with blue. Ripley (1944) discarded these differences as individual variation matched by specimens from the Sumatran race *prophata*. Consequently, the Nias population has not been considered taxonomically distinct in more modern accounts. The species has survived well in Nias's degraded woodland and plantations; we saw two near Gunung Sitoli; four around Bawolato, where one was additionally caught and processed; at least five near Onolimbu; at least five on Pulau Asu, several of which were caught and processed; and five on Pulau Bawa, where one was caught and processed. At least the population on Pulau Asu gave a *Locustella*-like trilling call exclusive to small West Sumatran island populations (unpublished data). Our photos show that the individual from the main island of Nias (Onolimbu) appears to be less vibrant blue in plumage and has a less distinct black neck ring in comparison to the individuals caught on the Hinako Islands (Fig. 18), demonstrating definitive phenotypic variation even among closely adjacent islands, which may be individual variation or seasonal. Further research is needed to ascertain population structure and gene flow among island forms.
50. Common Iora *Aegithina tiphia horizopectera*: First mentioned for Nias by Salvadori (1887) with certainty, although previous mentions by von Rosenberg (1878) under antiquated names (e.g., "*Sylvia flavigastra*") probably referred to this species. Oberholser (1913) described the subspecies *horizopectera* based on a Nias male, calling it smaller, with darker upperparts, more olive flanks, and a less yellowish forehead than in the Sumatran mainland population. However, Meyer



Fig. 18. Black-naped Monarch *Hypothymis azurea prophata*. Individuals from Onolimbu (top), Pulau Asu (middle), and Pulau Bawa (bottom). Photographs by Chyi Yin Gwee.

de Schauensee & Ripley (1940) and Ripley (1944) considered *horizopectera* within the range of variation of birds from Sumatra to the Malay Peninsula, and adopted this name for that entire region because of its seniority. We saw four near Gunung Sitoli; seven around Bawolato; and one near Onolimbu. Additionally, we heard the species more often at all fieldwork sites and elsewhere.

51. Grey-headed Canary-Flycatcher *Culicicapa ceylonensis antioxantha*: First mentioned for Nias by Salvadori (1887). Oberholser's (1913) description of Nias birds as an endemic subspecies, *pellonota*, based on their larger size and darker back, was discarded by

Ripley (1944) as individual variation. Meanwhile, many modern accounts have treated most populations from southern Southeast Asia under the subspecies *antioxantha* (e.g., Eaton et al., 2016), as do we. We saw one near Gunung Sitoli, and heard this bird at Bawolato as well as Onolimbu. It seems to survive in degraded woodland.

52. Pacific Swallow *Hirundo tahitica javanica*: First recorded on Nias by von Rosenberg (1878). Oberholser (1926) described the subspecific name *hypolampira* on the basis of an adult female from Nias, characterising the taxon as larger and paler on the abdomen. Ripley (1944) debunked this subspecies, contesting the veracity of the described traits, and it has subsequently not been considered valid. We found the Pacific Swallow to be widespread on Nias, e.g., four in the hills of Nias Selatan; 13 around Bawolato; seven around Onolimbu; six on Pulau Asu; and five on Pulau Bawa.
53. Spectacled Bulbul *Pycnonotus erythrophthalmos erythrophthalmos*: Oberholser (1913) was likely the first to mention this species for Nias with certainty, describing the local population as an endemic subspecies, *pammicrus*, based purely on its “smaller” size, but without providing measurements. True to form, Ripley (1944) debunked this taxonomic supposition by demonstrating that *pammicrus* falls within the range of variation with the nominate subspecies. We did not record this species, despite being well attuned to its distinctive call and spending much time at fruiting trees. We assume this species may have been less well able to adapt to Nias's habitat loss and degradation than ecologically similar species, such as Cream-vented and Red-eyed Bulbuls.
54. Ashy Tailorbird *Orthotomus ruficeps ruficeps*: First mentioned for Nias by Salvadori (1887). The Nias population was afforded endemic subspecies status as *baeus* (Oberholser, 1913) on the basis of being smaller than adjacent *cineraceus* from Sumatra, but Ripley (1944) conclusively demonstrated that measurements and the colouration of Nias birds lie within the species's range of variation, recommending synonymisation of this name. We found it across the island, e.g., seeing five in the hills of Nias Selatan; at least 15 around Bawolato; and five near Onolimbu. It was also heard and probably seen but not committed to memory elsewhere. Our wing measurements of the three Ashy Tailorbirds that we caught on Nias ranged from 47 to 50, which overlaps with measurements of Ripley's (1944) Nias specimens (48.5–49) as well as his measurements of individuals from the Malay Peninsula, Bangka and Billiton (= Belitung) (48.5–50.5), corroborating Ripley's (1944) recommendation for synonymisation of *baeus*.
55. Yellow-breasted Flowerpecker *Prionochilus maculatus maculatus*: First reported for Nias by Büttikofer (1896). The endemic race *opistatus* was described for Nias by Oberholser (1913), who characterised the island's birds as darker and smaller than the Sumatran mainland population, but Ripley (1944) was unable to confirm these differences, synonymising the name with Sumatra's nominate subspecies. We found it in degraded woodland near Bawolato, where six were seen and an additional five caught and processed.
56. Brown-throated Sunbird *Anthreptes malacensis malacensis*: First recorded on Nias by von Rosenberg (1878). Oberholser (1913) described Nias birds as *pollostus* based on smaller size and darker overall female colouration than the Sumatran mainland population, but Ripley (1944) conclusively debunked these claims with larger series of specimens, leading to the synonymisation of *pollostus* with the nominate subspecies. This is perhaps the most numerous arboreal bird on Nias, uttering one of the most ubiquitous sounds on the island. We saw it often, although at most places no notes were taken.
57. Ruby-cheeked Sunbird *Chalcoparia singalensis panopsia*: First mentioned for Nias by Salvadori (1887). Birds from the Banyak Archipelago were described by Oberholser (1913) as *panopsia* based on the female's brighter yellowish abdomen and paler, more greenish upperparts. Ripley (1944) suggested that Sumatran *sumatrana*, a junior name, may need to be merged with *panopsia* based on colour similarities, rendering *panopsia* a wide-ranging taxon that includes the Nias population, although subspecies *sumatrana* continues to be recognised in some modern works (Cheke & Mann, 2020). The species was restricted to the best habitat patches during our fieldwork, often with fruiting trees, with one seen near Gunung Sitoli; one near Onolimbu; and five around Bawolato.
58. Van Hasselt's Sunbird *Leptocoma brasiliana brasiliana*: First recorded on Nias by von Rosenberg (1878). Oberholser (1913) separated the population on Nias from nominate *brasiliana* as *oenopa* on the basis of a larger bill, darker male abdomen, and a darker, duller female. Ripley (1944) dismissed these differences as individual variation, although conceding that Nias birds may have a tendency towards a larger size. Consequently, this name has been widely synonymised with the nominate subspecies. We saw seven around Bawolato; five near Onolimbu; three on Pulau Asu; and two on Pulau Bawa.
59. Crimson Sunbird *Aethopyga siparaja siparaja*: First recorded on Nias by von Rosenberg (1878), who mentioned two species, *Nectarinia siparaja* and *Nectarinia eximia*, the second of which actually refers to the Javan highland endemic White-flanked Sunbird *Aethopyga eximia* and must have been given in error (as also argued by Hartert, 1898). Hartert (1898) described the Crimson Sunbird subspecies *niasensis* from Nias based on darker underparts and a stouter bill than the Sumatran mainland population. When trying to make

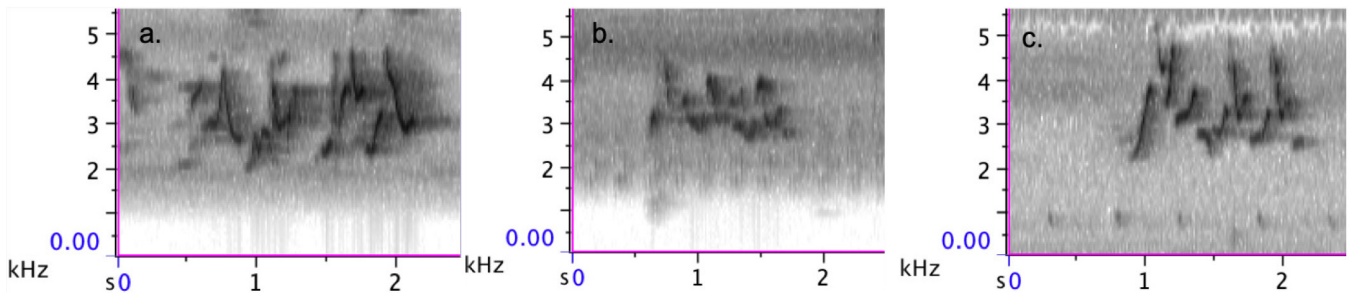


Fig. 19. Sonograms of typical vocalisations of Puff-backed Bulbuls *Microtarsus eutilotus* from a, Besitang, North Sumatra (Xeno-Canto accession: XC396948; recordist: Sander Lagerveld); b, Bawolato (Xeno-Canto accession: XC497914; recordist: Frank E. Rheindt); c, Danum Valley, Sabah, Borneo (Xeno-Canto accession: XC292829; recordist: Mike Nelson).

sense of the descriptions of six different Crimson Sunbird subspecies from the West Sumatran islands by Hartert (1898) and other authors, Ripley (1944) expressed exasperation at the lack of rigour, deploring that Hartert's (1898) *niasensis* rested on examination of but one individual. Although Hartert's (1898) wording makes it clear that his diagnosis was certainly based on more than one, Ripley (1944) was convincing in his characterisation of Nias birds as fitting within the range of variation of nominate *siparaja* from Sumatra. We found Crimson Sunbirds to be widespread on Nias, seeing two near Gunung Sitoli; five in the hills of Nias Selatan; five around Bawolato; four near Onolimbu; and four on Pulau Bawa.

60. Yellow-eared Spiderhunter *Arachnothera chrysogenys chrysogenys*: First mentioned for Nias by Hartert (1898). Oberholser (1913) described the island's population as an endemic subspecies, *pleoxantha*, on the basis of its darker overall plumage than the Sumatran mainland population. Ripley (1944) dismissed this assertion as individual variation, synonymising the name with the nominate subspecies. We did not find this species on Nias; its requirements for larger areas of unbroken canopy may have led to its serious endangerment on the island.

New records for Nias.

61. Zebra Dove *Geopelia striata*: Our sightings constitute a new island record of an introduced species, or the recent natural arrival of a human commensal. We saw three outside the capital Gunung Sitoli, where more were heard.
62. Spotted Dove *Streptopelia chinensis tigrina*: Our sightings constitute a new island record of what may well be an introduced species. We saw four around Bawolato; four on Pulau Asu (claimed by locals to be recently introduced here); and likely also encountered them in Gunung Sitoli (where written records of this species were not kept).
63. Violet Cuckoo *Chrysococcyx xanthorhynchus xanthorhynchus*: Our Nias record of this species is the first island record. We saw and heard one calling fly-by at Bawolato, with its characteristic two-note series

that is well known to us from Malaysia, Singapore, and elsewhere in Indonesia.

64. Sunda Yellow-vented Bulbul *Pycnonotus analis*: Our fieldwork produced the first records of this species for the island of Nias. We saw two outside the capital Gunung Sitoli, which likely referred to recent introductions.
65. Puff-backed Bulbul *Microtarsus eutilotus*: The distinct vocalisations of this species were sound-recorded (Fig. 19; Xeno-Canto accession: XC497914) at Bawolato, but the bird was not seen despite serious effort. This constitutes a surprising new record of a lowland forest species on Nias. Close knowledge of its vocalisations is key to detecting this inconspicuous canopy bird, which is likely the reason why there are no historic records.

Other species confirmed for Nias's list. This list includes all other bird taxa, including migrants, recorded on the island. Our visit fell within the migratory season, providing us with an opportunity to record migratory species.

66. Great-billed Heron *Ardea sumatrana*: First reported for Nias by Hartert (1898) under the name "*Ardea goliath*". We did not record this species in our fieldwork, probably because we did not frequent much suitable coastline habitat, but its continued existence is likely. If this species is no longer a breeding bird, it is extremely likely to continue to visit the island on the occasion of inter-island dispersal events.
67. Purple Heron *Ardea purpurea*: First recorded on Nias by von Rosenberg (1878). We observed three in the greater rice paddy surroundings near Onolimbu and three on Pulau Bawa.
68. Great Egret *Ardea alba*: First found on Nias by Dymond (1994); not found by us.
69. Intermediate Egret *Ardea intermedia*: First recorded on Nias by von Rosenberg (1878); one seen on Pulau Bawa by us.
70. Little Egret *Egretta garzetta (nigripes?)*: First recorded on Nias by von Rosenberg (1878), but not recorded

- by us. Future surveys should aim at establishing the subspecies provenance on Nias. The island is close to the natural range of *nigripes*, but breeding colonies of the nominate subspecies *garzetta* have been recorded on the northern half of Sumatra (Iqbal et al., 2012).
71. Eastern Reef Egret *Egretta sacra*: First mentioned for Nias by Salvadori (1887). We observed 13 individuals on Pulau Asu, all dark-morph except for one white individual. We also found one dark-morph individual on Pulau Bawa. Ripley's (1944) ratio of dark-morph versus white-morph specimens across all West Sumatran islands was 19 versus 13, corroborating that dark-morph individuals outnumber the white morph on Nias.
 72. Mangrove Heron *Butorides striata spodiogaster*: First recorded on Nias by von Rosenberg (1878). On the basis of museum material, Ripley (1944) argued that populations on the West Sumatran islands should be subsumed under subspecies *spodiogaster* from the Andamans and Nicobars, which we follow here. We observed one in mangroves on Pulau Bawa (Hinako Archipelago).
 73. Black-crowned Night-Heron *Nycticorax nycticorax*: First reported for Nias by von Rosenberg (1878); not found by us.
 74. Yellow Bittern *Ixobrychus sinensis*: First mentioned for Nias by Salvadori (1887); not found by us.
 75. Black Bittern *Ixobrychus flavicollis*: First recorded on Nias by von Rosenberg (1878); not found by us.
 76. Little Cormorant *Microcarbo niger*: First recorded on Nias by von Rosenberg (1878). There have been no subsequent records, and the species may well be absent from the island now. On the Sumatran mainland, there have been few records of Little Cormorant, though breeding sites were found recently in the provinces of South Sumatra and North Sumatra (Iqbal et al., 2013).
 77. Brahminy Kite *Haliastur indus intermedius*: First recorded on Nias by von Rosenberg (1878). Hartert (1898) explicitly attributed Nias birds to the more westerly continental subspecies *indus*, but subsequent sources have uniformly regarded the Nias population as part of *intermedius*, the only widely recognised Sundaic subspecies. We saw a singleton in rice paddies near Onolimbu, as well as three on Pulau Asu.
 78. White-bellied Fish Eagle *Ichthyophaga leucogaster*: First recorded on Nias by Chasen (1935). We observed one nesting on an antenna outside Gunung Sitoli, as well as one to two on Pulau Asu.
 79. Chinese Goshawk *Accipiter soloensis*: Apparently recorded on Nias since before 1970 (Holmes, 1994). We had one possible record of an unconfirmed brief fly-by. Given its status as a migrant, it is likely to continue to occur on Nias on passage and perhaps in the winter.
 80. Japanese Sparrowhawk *Accipiter gularis*: Büttikofer (1896) reported on the collection of a single female *Accipiter virgatus*, by today's taxonomy Besra, a species which has never been found on Nias again. Besra is primarily a montane forest resident on Sumatra, although it is also recorded as an occasional migrant from the mainland of Asia (Eaton et al., 2016). Its occurrence on Nias must be considered surprising. Ripley (1944) attributes Büttikofer's (1896) record to the Japanese Sparrowhawk *Ac. gularis*, which was often subsumed as a Besra subspecies under the taxonomic fashion of the day, and we agree that Büttikofer's (1896) record is much more likely to pertain to this widespread migratory species. We did not record this species, but given its status as a migrant, it is likely to continue to occur on Nias on passage and perhaps in the winter.
 81. Asian Shikra *Accipiter badius*: Büttikofer (1896) reported on the collection of a single adult female under the then-conventional name *Astur poliopsis*. This species has never been found on Nias again, and—if it was identified correctly—may be a non-annual migrant, though breeding records of Asian Shikra have recently been confirmed in Banda Aceh in Aceh province (Nurza et al., 2009).
 82. Black Eagle *Ictinaetus malaiensis*: Only ever recorded on Nias once by von Rosenberg (1878). The species is likely now extinct on Nias, if von Rosenberg did not misidentify it.
 83. Eurasian Kestrel *Falco tinnunculus*: Recorded on Nias by Büttikofer (1896) on the basis of a November record, but never found again. This may have been a vagrant to the island.
 84. Peregrine Falcon *Falco peregrinus calidus*: Probably first reported for Nias by Ripley (1944); this migrant was not recorded by us.
 85. Wandering Whistling Duck *Dendrocygna arcuata*: First recorded on Nias by von Rosenberg (1878). Ripley (1944) states that Büttikofer (1896) refers to *D. javanica* on Nias, calling *D. arcuata* an erroneous addition to the Nias list. However, the presence of *D. arcuata* on Nias has now been confirmed by Dymond (1994). We did not record this species.
 86. Lesser Whistling Duck *Dendrocygna javanica*: The confusion regarding scientific names of this species and *D. arcuata* in the 19th century notwithstanding, it is likely that Büttikofer (1896) was the first to list a valid record of this species for Nias. It was not found by us.

87. Red-legged Crake *Rallina fasciata*: First reported for Nias by Hartert (1898). This shy species is known as a good island coloniser and tolerates fairly degraded aquatic vegetation and even overgrown rubber plantation, so is likely to survive on Nias. We did not detect it probably because of its secretive nature and vocalisations being nocturnal.
88. Purple Swamphen *Porphyrio porphyrio*: First recorded on Nias by von Rosenberg (1878); not found by us.
89. Pacific Golden Plover *Pluvialis fulva*: A migrant first recorded on Nias by von Rosenberg (1878); not found by us.
90. Little Ringed Plover *Charadrius dubius curonicus*: The first record for Nias likely refers to von Rosenberg (1878), who erroneously used the name *Charadrius hiaticula*. This migrant was not found by us.
91. Malaysian Plover *Charadrius peronii*: First reported for Nias by Ripley (1944). Not found by us.
97. Lesser Sandplover *Charadrius mongolus*: A migrant first found by Dymond (1994); not found by us.
93. Greater Sandplover *Charadrius leschenaultii*: A migrant first mentioned for Nias by Salvadori (1887); not found by us.
94. Whimbrel *Numenius phaeopus*: A migrant first reported for Nias by Hartert (1898); species not found by us.
95. Eurasian Curlew *Numenius arquata*: A migrant first reported for Nias by Hartert (1898); not found by us.
96. Bar-tailed Godwit *Limosa lapponica*: A migrant first reported for Nias by Ripley (1944); not found by us.
97. Common Redshank *Tringa totanus*: A migrant first recorded on Nias by von Rosenberg (1878); not found by us.
98. Common Greenshank *Tringa nebularia*: A migrant first reported for Nias by Ripley (1944); not found by us.
99. Terek Sandpiper *Xenus cinereus*: A migrant first found by Dymond (1994); not found by us.
100. Common Sandpiper *Actitis hypoleucos*: A ubiquitous migrant first mentioned for Nias by Salvadori (1887); we found one on Pulau Bawa.
101. Ruddy Turnstone *Arenaria interpres*: A migrant first reported for Nias by Hartert (1898); not found by us.
102. Pintail Snipe *Gallinago stenura*: A migrant first reported for Nias with certainty by Büttikofer (1896); not found by us.
103. Rufous-necked Stint *Calidris ruficollis*: A migrant first reported for Nias by Ripley (1944); not found by us.
104. Curlew Sandpiper *Calidris ferruginea*: A migrant first reported for Nias by Ripley (1944); not found by us.
105. Beach Thick-knee *Esacus magnirostris*: First reported for Nias by Hartert (1898); not found by us, but it should survive due to presence of suitable nesting habitat.
106. Oriental Pratincole *Glareola maldivarum*: First recorded on Nias by von Rosenberg (1878); not found by us.
107. Great Crested Tern *Thalasseus bergii*: First recorded on Nias by von Rosenberg (1878); not seen by us, but probably continues to be regular around Nias waters.
108. Black-naped Tern *Sterna sumatrana*: First recorded on Nias by von Rosenberg (1878); not seen by us, but probably continues to be regular around Nias waters.
109. Whiskered Tern *Chlidonias hybrida*: First recorded on Nias by von Rosenberg (1878); not seen by us, but probably continues to be a regular migrant around Nias waters.
110. Brown Noddy *Anous stolidus*: First recorded on Nias by von Rosenberg (1878); not seen by us, but probably continues to be regular around Nias waters.
111. Large Green Pigeon *Treron capellei*: First found by Dymond (1994). We did not find this species and fear that it may well have gone extinct on the island over only two decades. In 2019, only two areas of disturbed secondary forest larger than ~1,000 ha survive in the very north and east of Nias, respectively. Our fieldwork in one of them (Bawolato in the far east) over four calendar days did not provide evidence of this species, but showed that the habitat is more degraded than expected from satellite imagery.
112. Little Green Pigeon *Treron olax*: Von Rosenberg (1878) recorded this species on all the larger islands of the West Sumatran island chain, but there were no specimens or subsequent sightings until Dymond (1994) reconfirmed the species for Nias. We did not find it, and if it survives, it must be extremely localised.
113. Jambu Fruit Dove *Ptilinopus jambu*: First reported for Nias by Hartert (1898). This species has declined and become elusive range-wide, was not found by us on Nias, and may have gone extinct on the island, though long-range sporadic visits may be possible.
114. Mountain Imperial Pigeon *Ducula badia*: First recorded on Nias by von Rosenberg (1878), but without specimens or subsequent sightings until Dymond (1994) reconfirmed the species for Nias. It was not recorded by us. This montane species is an erratic visitor to



Fig. 20. Silvery Woodpigeon *Columba argentina*. Individual on the left from Onolimbu, individual on the right from Pulau Asu. Photographs by Chyi Yin Gwee.

lowlands and probably only visits Nias irregularly during eruptions.

115. Pied Imperial Pigeon *Ducula bicolor*: First recorded on Nias by von Rosenberg (1878). We found this species relatively sparsely, and only on the Hinako Archipelago, with ~10 on Pulau Asu and one on Pulau Bawa.

116. Silvery Woodpigeon *Columba argentina*: This Critically Endangered pigeon (BirdLife International, 2016) had remained undiscovered on Nias until Svensson & Yong (2016) documented a captive individual in a western Nias village that was claimed by the owner to have been caught in surrounding secondary vegetation. Records in the wild had thus far eluded ornithologists, but during our fieldwork on Nias we encountered this species at two sites: (1) At Onolimbu, we sighted over half a dozen morning flocks of large black-and-white pigeons flying over on three different days, in total amounting to over 50 individuals, with a decidedly greyish rather than yellow cast. Their suspected identity as Silvery Woodpigeons (because of their inland location) was confirmed by one small group of four (perhaps five) individuals perching in an open tree near the main road through Onolimbu behind a small church at around 1000 hours, allowing us to observe them in the scope for ~2–3 min and take photos immediately before the church congregation streamed out at the end of their service and flushed the pigeons. Our photos show the bicoloured bill and red eye with a dark periorbital disc (Fig. 20). (2) On Pulau Asu, we observed two individuals on one morning in a fruiting tree next to our bird processing station in an overgrown coconut grove next to a small woodlot. The birds were initially feeding, but then settled down and perched out in the open at ~60 m distance, allowing for detailed scope views and

photos. Our observation lasted from ~0920–1040 hours. The photos show great detail, including the pinkish rather than black legs incorrectly depicted in most books (e.g., Eaton et al., 2016). Our records indicate that Nias's secondary lowland habitats dominated by overgrown rubber plantations appear suitable for this species, and Nias may host the world's healthiest population of this pigeon. The lack of historic records of this species on Nias despite extensive collecting in the early 1900s may indicate that Nias has become more suitable for this supertramp with the extinction and endangerment of original frugivorous doves (see Green Imperial Pigeon, Large Green Pigeon, etc.), although this hypothesis requires solid confirmation (Diamond, 1974). We consider it unlikely that the birds seen on Nias are merely erratic visitors from unknown breeding locations elsewhere, mainly because other suitable islands (e.g., Babi, Bangkaru, Siberut, etc.) have by now been well surveyed and do not seem to harbour the potential for populations of hundreds of birds that can visit Nias seasonally.

117. Emerald Dove *Chalcophaps indica*: First mentioned for Nias by Salvadori (1887). We saw one flying by and caught, DNA-sampled, and released one more at Onolimbu. We also heard this species near Gunung Sitoli, at Bawolato, and on Pulau Bawa.

118. Nicobar Pigeon *Caloenas nicobarica*: First recorded on Nias by von Rosenberg (1878); not recorded by us. This species is now widely hunted out from its original range and its continued existence on Nias must be in doubt.

119. Indian Cuckoo *Cuculus micropterus*: Apparently recorded on Nias since before 1970 (Holmes, 1994).

- Not found by us, this shy migrant probably continues to frequent the island regularly.
120. Drongo Cuckoo *Surniculus lugubris*: First reported for Nias by Büttikofer (1896). Not found by us, despite listening for its signature vocalisations; perhaps seasonally silent or non-breeding migratory, as suggested by Ripley (1944).
121. Asian Koel *Eudynamys scolopaceus*: First mentioned for Nias by Salvadori (1887). We found this species on the Hinako Archipelago multiple times, with ~5 seen on Pulau Asu, one seen on Pulau Bawa, and more heard on both islands. Hinako's birds are most likely attributable to the local subspecies *malayanus* instead of migrants from the north, but we lack evidence.
122. Greater Coucal *Centropus sinensis*: First recorded on Nias by von Rosenberg (1878). We saw two adults near Bawolato, and frequently heard the species here and elsewhere. It appears to be widespread.
123. Oriental Bay Owl *Phodilus badius*: First recorded on Nias by Büttikofer (1896). We tracked down, spot-lit, observed, sound-recorded, and photographed one vocal bird at Onolimbu in overgrown rubber plantations adjacent to a secondary woodland gully, confirming its continued presence on Nias.
124. Malaysian Eared Nightjar *Lyncornis temminckii*: First reported for Nias by Hartert (1898). We saw a total of ~4 in high flight vocalising at dawn around Bawolato.
125. Edible-nest Swiftlet *Aerodramus fuciphagus*: For early taxonomic disagreements about the attribution of Nias populations to either Edible-nest or Mossy-nest (*Ae. salangana*) = Uniform Swiftlets *Ae. vanikorensis*, refer to the Uniform Swiftlet account (see above). The current occurrence of Edible-nest Swiftlet on Nias is confirmed by the presence of a number of house farms in coastal settlements in which enclosures below house roofs are re-modelled to serve as breeding localities for Edible-nest Swiftlets for commercial nest harvesting. We visited one such house farm in a coastal village slightly south of the island's airport and were allowed to sample a number of shed feathers. We do not attribute these populations to the geographically most adjacent subspecies *vestitus* as much remains to be learned about the subspecific affinity of house-farm swiftlets (Cranbrook et al., 2013).
126. Black-nest Swiftlet *Aerodramus maximus lowi*: First reported for Nias by Ripley (1944). It should have remained a widespread breeder on Nias because house roofs may serve as nesting sites. For our sightings, see Uniform Swiftlet account above.
127. Whiskered Treeswift *Hemiprocne comata*: First reported for Nias by Büttikofer (1896) on the basis of a single male. Subsequent records have been sparse. We did not record this species and it may have declined or become extinct.
128. Common Kingfisher *Alcedo atthis bengalensis*: This winter migrant was first recorded on Nias by Büttikofer (1896). We may have glimpsed one at a mangrove bay on Pulau Bawa, but the brief views of a red ear patch and the poor light conditions did not allow us to conclusively rule out a juvenile Blue-eared Kingfisher *Alcedo meninting*. At any rate, this migrant is expected to continue to frequent the island.
129. Ruddy Kingfisher *Halcyon coromanda minor*: First recorded on Nias by von Rosenberg (1878). Records on Nias have been identified as the Sundaic breeding subspecies (*minor*) (Ripley, 1944). We did not detect this shy species, likely overlooking it.
130. Blue-throated Bee-eater *Merops viridis*: First recorded on Nias by von Rosenberg (1878). Unidentified *Merops* bee-eaters during our fieldwork in the distance at Bawolato probably referred to this species.
131. Blue-tailed Bee-eater *Merops philippinus*: Büttikofer (1896) reported on two adult males from Gunung Sitoli, but the species does not seem to have been listed subsequently for Nias. We assume it may be an occasional migrant.
132. Common Dollarbird *Eurystomus orientalis orientalis*: First recorded on Nias by von Rosenberg (1878). Ripley (1944) identified a male specimen from Nias as a migrant *E. o. deignani* (which is nowadays usually synonymised with nominate *orientalis*). We observed one to two on Pulau Asu, noting that they were very purple-throated, but were unable to identify them to subspecies level.
133. Asian Pied Hornbill *Anthracoceros albirostris*: First recorded on Nias by von Rosenberg (1878). We did not record this species, but its continued existence was reported to us by local informants at least from the surroundings of Bawolato.
134. Sunda Pygmy Woodpecker *Picoides moluccensis*: Ripley (1944) listed *Dryobates hardwickii* for Nias, an antiquated name that refers to the brown-headed species group of pygmy woodpeckers regionally represented by the Sunda Pygmy Woodpecker. The sole male inspected by Ripley (1944) had a considerably larger bill size than other populations, but Ripley (1944) refrained from conclusions based on low sample size. We are not aware of subsequent records, and wonder whether this specimen could have had a mislabelled locality. Nevertheless, we are reluctant to recommend it for removal from the Nias list at this point.
135. Green Broadbill *Calypdomena viridis*: First mentioned for Nias by Salvadori (1887), but probably no longer found in the 20th century (Ripley, 1944). We did

- not record this species, despite being attuned to its vocalisation. Given the degraded state of Nias's remnant lowland forest, the bird may have become seriously endangered or extinct on the island.
136. Hooded Pitta *Pitta sordida cucullata*: First reported for Nias by Büttikofer (1896). We failed to record this migrant.
137. Barn Swallow *Hirundo rustica*: Recorded on Nias at least since Ripley (1944). We only saw ~3 singletons of this migrant at Bawolato.
138. Forest Wagtail *Dendronanthus indicus*: First reported for Nias by Büttikofer (1896); we found only one at Bawolato.
139. Eastern Yellow Wagtail *Motacilla tschutschensis tschutschensis*: Ripley (1944) listed the supercilied subspecies *simillima* (now widely synonymised with the nominate) as occurring on Nias as a migrant. We did not find it.
140. Grey Wagtail *Motacilla cinerea*: First reported for Nias by Büttikofer (1896). We did not find this migrant.
141. Paddyfield Pipit *Anthus rufulus*: First recorded on Nias by von Rosenberg (1878). We strangely did not find this species, although it should occur due to the availability of suitable agricultural habitat.
142. Fiery Minivet *Pericrocotus igneus*: Only mentioned for Nias by Büttikofer (1896). We did not find this species, which may have declined for a lack of tall emergent trees in Nias's remnant lowland forest patches. Obviously, it does not seem to have adapted to the rubber plantations on Nias.
143. Black-winged Flycatcher-Shrike *Hemipus hirundinaceus*: Only recorded on Nias by von Rosenberg (1878). We did not find this species, which may have declined or become extinct on Nias for a lack of tall emergent trees in the island's remnant lowland forest patches. Obviously, it does not seem to have adapted to the rubber plantations on Nias.
144. Straw-headed Bulbul *Pycnonotus zeylanicus*: First recorded on Nias by von Rosenberg (1878), but extremely likely to be extirpated on the island now, as it has become locally and regionally extinct over wide swathes of Indonesia because of rampant trapping (Eaton et al., 2015). We did not find this species either in the wild, or in the bird shops of Gunung Sitoli.
145. Cream-vented Bulbul *Pycnonotus simplex simplex*: First mentioned for Nias by Salvadori (1887). We found this species both in degraded remnant forest and, perhaps surprisingly, in rubber plantations, seeing two near Gunung Sitoli; one around Bawolato; and nine near Onolimbu, some of which were caught and processed. All Cream-vented Bulbuls sighted had white eyes and differed distinctly from Olive-winged Bulbuls by their lack of pale cheek streaking.
146. Asian Red-eyed Bulbul *Pycnonotus brunneus brunneus*: To the best of our knowledge, first mentioned for Nias with certainty by Ripley (1944). We found this species both in degraded remnant forest and, perhaps surprisingly, in rubber plantations, seeing two near Gunung Sitoli; four around Bawolato; five in the hills of Nias Selatan; and ~9 near Onolimbu, some of which were caught and processed.
147. Asian Fairy Bluebird *Irena puella crinigera*: First mentioned for Nias by Salvadori (1887). We did not record this species during our fieldwork. Its absence was consistent with the scarcity or absence of other larger frugivores of the high canopy, and may be a reflection of the extremely degraded state of remnant lowland forest patches on Nias.
148. Tiger Shrike *Lanius tigrinus*: This migrant was first reported for Nias by Büttikofer (1896). We scoped one fairly immature-looking bird at Onolimbu and observed it over ~15 min. The immature plumage state was surprising to us, given that a mid-March observation date would suggest that most birds should be at least in their second calendar-year breeding plumage, although little is known about the appearance of second calendar-year plumages in this species.
149. Brown Shrike *Lanius cristatus*: First found on Nias by Dymond (1994). We had a brief sighting of an individual in poor light near Gunung Sitoli that may have been a grey-crowned *lucionensis*, but because of the substandard quality of the sighting, we do not firmly claim this taxon here.
150. Malayan Forktail *Enicurus frontalis*: This species was only mentioned for Nias by Salvadori (1887). It is often known as the White-crowned Forktail *E. leschenaulti*, but we follow Moyle et al.'s (2005) genetic results arguing for a division between the lowland Sundaic populations and those on Java, montane Borneo, and elsewhere. We did not detect this species on Nias, and the general state of degradation especially along streams may suggest that it could have declined or become extinct on the island by now.
151. Stejneger's Stonechat *Saxicola stejnegeri*: This migrant species, formerly included within a larger Old World wastebasket species, Common Stonechat *S. torquatus*, was recorded on Nias only once as a vagrant by Dymond (1993).
152. Siberian Thrush *Zoothera sibirica*: This migrant was first reported on Nias by Büttikofer (1896); we did not find it, but it likely persists as a migrant.

153. Oriental Reed Warbler *Acrocephalus orientalis*: This migrant species was recorded on Nias for the first time by Dymond (1994); we did not detect it.
154. Zitting Cisticola *Cisticola juncidis*: To the best of our knowledge, this species may have been first mentioned for Nias by Ripley (1944). We saw one and heard more in paddy lowlands of Bawolato.
155. Arctic Warbler *Phylloscopus borealis*: This migrant was first reported for Nias by Büttikofer (1896). We likely saw 1+1 at Bawolato, but they were silent and skittish, not affording good views, which is why we do not claim their identification as certain. The species likely continues to visit Nias as a migrant.
156. Amur Paradise Flycatcher *Terpsiphone incei*: Büttikofer (1896) delivered a convincing description of a Nias specimen of this species, indicating that it occasionally reaches Nias as a migrant. It has been overlooked by most subsequent accounts of Nias birds; we did not detect it.
157. Mangrove Whistler *Pachycephala cinerea*: First mentioned for Nias by Salvadori (1887). On the main island of Nias, one briefly came in to a fruiting tree at Onolimbu, where another one was caught and processed, but its distinctive vocalisation was not heard once. However, it was one of the most noticeable forest denizens by sound on the Hinako Archipelago, where ~8 were seen on Pulau Asu, several of which were caught and processed; and ~4 were seen on Pulau Bawa, where one was caught and processed.
158. Plain Sunbird *Anthreptes simplex*: First mentioned for Nias by Salvadori (1887), although Ripley (1944) claimed earlier records by von Rosenberg (1878). Dymond (1994) argued that these records required verification, thereby removing the species from Nias's list. However, Ripley (1944) had referenced specimens by four independent collectors. We saw the species on several occasions, although it was always tough to view for long in the high canopy. After multiple probable sightings, 1+2 were conclusively identified in disturbed woodland at Bawolato, seen by two observers with previous experience of the species (first and second authors), with clear views of its unique bill morphology and its brighter olive upperparts and greyer underparts. These sightings constitute further confirmation of this species's occurrence on Nias.
159. Copper-throated Sunbird *Leptocoma calcostetha*: This species was first mentioned for Nias by Hartert (1898). We only recorded one, a male in mangroves on Pulau Bawa.
160. Ornate Sunbird (= Olive-backed Sunbird) *Cinnyris ornatus*: This form was previously merged under the species Olive-backed Sunbird *C. jugularis*, but we follow the genetic data in Lohman et al. (2010) in separating a Sundaic group of subspecies from populations in the Philippines, Wallacea, and Papua as *C. ornatus*. The species was first detected on Nias by Dymond (1994). It is one of the most widespread species of disturbed habitat on Sumatra and other bigger Sundaic landmasses, so its late discovery on Nias is puzzling and may have followed deforestation. In our fieldwork spanning >1 week, we did not record this bird, and assume that it must be an irregular or localised breeder or visitor to the island, perhaps because of competitive exclusion by other sunbirds.
161. Scaly-breasted Munia *Lonchura punctulata*: First mentioned for Nias by Salvadori (1887). We found this species in open cultivated areas around Bawolato, where we saw at least 10 individuals.
162. White-headed Munia *Lonchura maja*: First recorded on Nias by von Rosenberg (1878). We found this species in open cultivated areas, with sightings of at least 100 near Gunung Sitoli; at least 30 around Bawolato; and two near Onolimbu.
163. Eurasian Tree Sparrow *Passer montanus*: Recorded on Nias for the first time by Dymond (1994) at a time when it must have been freshly introduced or arrived naturally. Now, the species is widespread in the countryside. We saw ~40 around Bawolato; ~20 near Gunung Sitoli; ~20 near Onolimbu and surroundings; and even ~10 on Pulau Asu.
164. Baya Weaver *Ploceus philippinus*: First mentioned for Nias by Salvadori (1887), but not found by us in the field or in cages. Habitat degradation should have favoured its expansion across the island.
165. Slender-billed Crow *Corvus enca compiler*: First mentioned for Nias by Salvadori (1887), although von Rosenberg (1878) probably referred to this species by mention of "*Corvus validus*". We did not record this species, which is a forest specialist on Sumatra and may therefore have declined on Nias by now.

Species recommended for removal from the Nias list.

166. (Javan Pond Heron *Ardeola speciosa* / Chinese Pond Heron *Ardeola bacchus*: First recorded on Nias by von Rosenberg (1878) under the antiquated name *Ardea leucoptera*, but probably not safely identified to species level, and therefore recommended for deletion from the Nias list.)
167. (Oriental Cuckoo *Cuculus saturatus*: First recorded on Nias by Büttikofer (1896). Not found by us, this shy migrant probably continues to frequent the island regularly. Under Eaton et al.'s (2016) taxonomy, it is questionable whether the local records refer to Himalayan Cuckoo *C. saturatus* or to the northern breeding Oriental Cuckoo *C. optatus*.)

168. (Savannah Nightjar *Caprimulgus affinis*: Recorded on Nias by von Rosenberg (1878), but perhaps in error? We are not aware of subsequent records of this species, which is easily detectable because of its distinct crepuscular call and should have expanded with habitat degradation. Given that von Rosenberg (1878) only observed and did not collect, he may have mistaken Malaysian Eared Nightjars for this species. We recommend its deletion from Nias's list based on the puzzling absence of further records.)
169. (Malay Blue-banded Kingfisher *Alcedo peninsulae*: Reported for Nias by von Rosenberg (1878), but not by subsequent visitors. We agree with Büttikofer (1896) that this may have been a misidentification relating to Blue-eared Kingfisher *A. meninting*. If this species ever existed on Nias, its continued existence must be in doubt as it prefers undisturbed large streams, which can no longer be found on the island.)
170. (Freckle-breasted Woodpecker *Dendrocopos analis*: This species is mentioned by von Rosenberg (1878), but not by any subsequent visitor. With the next confirmed breeding population on Java, its occurrence on Nias would be biogeographically odd, even though 1–2 records have been produced from areas in southernmost and easternmost Sumatra, away from Nias. For now, we assume it was mentioned for Nias by mistake or misidentified.)
171. (White-rumped Shama *Copsychus malabaricus tricolor*: Oustalet (1892), who reported on the collections by one M. J. Claine on Nias from the year 1891, described in great detail the subtle plumage variation across 17 individuals of Barusan Shama *C. melanurus* endemic to the island, but added a separate account for the White-rumped Shama *C. malabaricus tricolor*, describing [French translation ours] "...one specimen which completely agrees with the typical form in the colouration of its outer tail feathers, which are mostly white as in specimens from Malacca...". Given Oustalet's (1892) extensive examination of tail plumage variation in Barusan Shammas, we believe his account of one good White-rumped Shama museum specimen in the Nias series is credible, despite Hartert's (1898) doubts. However, in light of its allopatric replacement on Nias by the Barusan Shama *C. melanurus*, we believe that the White-rumped Shama specimen should be a mix-up or mislabelling in the collection or in the field, as Claine additionally spent time on the Sumatran mainland and may have added a specimen from there to his Nias series in error.)
172. (Large-billed Crow *Corvus macrorhynchos*: Büttikofer (1896) presented a detailed reassessment of Sundaic crow taxonomy, which was in disarray at the time, assigning a sole adult male from Nias to Slender-billed Crow *Corvus enca* (*C. tenuirostris* of the day). However, in his rediagnosis of *C. macrorhynchos*, he

accidentally listed Nias as part of its range, despite not presenting specimen evidence as he did for all other Nias birds in his account. At the end of his manuscript, he provided a list of all Nias species known to him that excluded the Large-billed Crow, which is further evidence that its previous listing was in error. Dymond (1994) independently opined that historical records of Large-billed Crow from Nias may have been based on misidentification, although we rather attribute those claims to misinterpretations of the written record.)

DISCUSSION

We have produced an inventory of 165 bird species recorded from the island of Nias. This inventory includes five new species records for the island from our fieldwork in March 2019, three of which are human commensals that are likely to have been introduced or arrived naturally in recent times, whereas two are shy denizens of the forest canopy that were encountered based on our bioacoustic knowledge and may therefore have eluded previous researchers. In this inventory, we remove seven species previously claimed for Nias because identification is in doubt. Four of these seven removed species were claimed by von Rosenberg (1878) based on sightings at a time when identification knowledge was much less advanced, but have never been re-sighted. The other three species were removed based on probable errors, mislabelling, and taxonomic discrepancies.

Nias is characterised by the highest avian subspecies-level endemism among all the West Sumatran islands. Following the taxonomic treatment advocated here, we recognise 23 avian subspecies endemic to Nias (Table 1). In this work, we have brought to bear new bioacoustic and morphological data from our fieldwork in March 2019 on the taxonomy of Nias's birds, lending support for synonymisations of multiple taxa previously assumed to be endemic to Nias. On the other hand, our work also highlights the distinctness of other Nias-endemic taxa that may need to be upgraded to species level in future taxonomic analyses, especially Crested/Nias Serpent Eagle (*Spilornis [cheela] asturinus*), Brown/Nias Wood Owl (*Strix [leptogrammica] niasensis*), Red-backed/Nias Dwarf Kingfisher (*Ceyx [rufidorsa] captus*), and Blyth's Paradise Flycatcher (*Terpsiphone affinis insularis*) (Table 1). Apart from the subspecies endemic to the island, Nias is also inhabited by 11 subspecies endemic to the larger West Sumatran (= Barusan) island chain, three of which are distinct enough to be upgraded to species level at least by some taxonomists (Table 1).

Given its catastrophic level of habitat destruction, Nias has undergone a fair share of local extinction. Owing to a lack of modern ornithological exploration on the island, we are reluctant to quantify the number of species that may have gone extinct on Nias, although our species accounts provide some information on which species we believe no longer exist on Nias. Three species must be highlighted because of the outsized role that Nias may play in their global survival:

Table 1. List of all taxa occurring on Nias that are either endemic to the island or additionally occur on at least one other major West Sumatran (= Barusan) island while being endemic to the Barusan island chain. **Bold** print indicates species-level endemism to the Barusan island chain, or—in the case of some Nias endemics—distinct subspecies that may be upgraded to species level with increased taxonomic knowledge. The distinct Olive-winged/Barusan Bulbul (*Pycnonotus [plumosus] porphyreus*) is given in bold despite also having been reported from the adjacent Sumatran coast.

Nias endemics	Taxa endemic to the West Sumatran islands (= Barusan endemics)
Barusan Cuckoodove – <i>Macropygia modiglianii modiglianii</i>	Green Imperial Pigeon – <i>Ducula aenea consobrina</i>
Thick-billed Green Pigeon – <i>Treron curvirostra pegus</i>	Cinnamon-headed Green Pigeon – <i>Treron fulvicollis melopogenys</i>
Plume-toed Swiftlet – <i>Collocalia affinis vanderbilti</i>	Uniform Swiftlet – <i>Aerodramus vanikorensis aerophilus</i>
Crested/Nias Serpent Eagle – <i>Spilornis [cheela] asturinus</i>	Grey-rumped Treeswift – <i>Hemiprocne longipennis perlonga</i>
Crested Goshawk – <i>Accipiter trivirgatus niasensis</i>	Stork-billed Kingfisher – <i>Pelargopsis capensis sodalis</i>
Wallace’s Hawk Eagle – <i>Nisaetus nanus stresemanni</i>	Black-naped Oriole – <i>Oriolus chinensis mundus</i>
Brown/Nias Wood Owl – <i>Strix [leptogrammica] niasensis</i>	Olive-winged/Barusan Bulbul – <i>Pycnonotus [plumosus] porphyreus</i>
Buffy Fish Owl – <i>Bubo ketupu buettikoferi</i>	Barusan Shama – <i>Copsychus melanurus melanurus</i>
Orange-breasted Trogon – <i>Harpactes oreskios nias</i>	Asian Glossy Starling – <i>Aplonis panayensis altirostris</i>
Blue-eared Barbet – <i>Psilopogon australis gigantorhina</i>	Nias Hill Myna – <i>Gracula [religiosa] robusta</i>
Crimson-winged Woodpecker – <i>Picus puniceus soligae</i>	Orange-bellied Flowerpecker – <i>Dicaeum trigonostigma antioproctum</i>
Banded Yellownape – <i>Chrysophlegma miniaceum niasense</i>	
Buff-necked Woodpecker – <i>Meiglyptes tukki infuscatus</i>	
Rufous Piculet – <i>Sasia abnormis magnirostris</i>	
Red-backed/Nias Dwarf Kingfisher – <i>Ceyx [rufidorsa] captus</i>	
Red-breasted Parakeet – <i>Psittacula alexandri perionca</i>	
Roving Cuckooshrike – <i>Coracina sumatrensis kannegieteri</i>	
Blyth’s Paradise Flycatcher – <i>Terpsiphone affinis insularis</i>	
Scaly-crowned Babbler – <i>Malacopteron cinereum niasense</i>	
Yellow-bellied Prinia – <i>Prinia flaviventris halistona</i>	
Oriental Magpie Robin – <i>Copsychus saularis nesiarchus</i>	
Greater Green Leafbird – <i>Chloropsis sonnerati parvirostris</i>	
Scarlet-backed Flowerpecker – <i>Dicaeum cruentatum niasense</i>	

(1) The Critically Endangered Silvery Woodpigeon *Columba argentina* was only known from Nias in the form of a single captive individual (Svensson & Yong, 2016). It has otherwise only been recorded in the 21st century in single digits from Simeulue, Siberut, Babi, and perhaps Bangkaru. Our sightings of flocks, perhaps amounting to approximately 50 individuals in total, in the western half of Nias as well as on Pulau Asu are supported by photographic material and bear testimony of the largest existing population of this species on Earth. Urgent fieldwork is required to further assess the status of these birds on Nias and devise conservation strategies.

(2) The Critically Endangered Nias Hill Myna *Gracula [religiosa] robusta* may no longer survive in the wild on Nias after the last sightings of an isolated pair in 2015.

It is not strictly endemic to Nias, and other populations have meanwhile been found at undisclosed locations elsewhere.

(3) The Barusan Shama *Copsychus melanurus* is currently not treated at the species level by IUCN authorities and therefore has no official threat status. However, a recent range-wide inventory found only one surviving individual on Siberut island (Rheindt et al., 2019), foreshadowing its imminent extinction in the wild. Nias is home to the nominate subspecies of this Barusan island endemic, but our field research remained inconclusive regarding this species’s survival here in the wild. It is common in captivity on Nias, and its future will probably depend on ex-situ conservation breeding now.

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SUPPLEMENTARY MATERIAL

Supplementary Table 1. List of museum specimens measured for biometric comparison. All specimens are deposited in the Lee Kong Chian Museum of Natural History (Singapore).

Genus	Species	Catalogue no.	Sex	Locality	Wing (mm)	Tail (mm)
<i>Strix</i>	<i>leptogrammica</i>	ZRC3.8793	F	North Borneo	310	158
<i>Strix</i>	<i>leptogrammica</i>	ZRC3.8792	M	North Borneo	318	168
<i>Strix</i>	<i>leptogrammica</i>	ZRC3.8791	F	North Borneo	317	161
<i>Strix</i>	<i>leptogrammica</i>	ZRC3.8790	M	Selangor, Malaysia	343	181
<i>Strix</i>	<i>leptogrammica</i>	ZRC3.8788	M	Selangor, Malaysia	337	203
<i>Strix</i>	<i>leptogrammica</i>	ZRC3.8786	F	Kuala Pahang, Malaysia	345	223
<i>Malacopteron</i>	<i>cinereum</i>	ZRC3.20519	F	Selangor, Malaysia	69	68
<i>Malacopteron</i>	<i>cinereum</i>	ZRC3.20516	M	Selangor, Malaysia	69	53
<i>Malacopteron</i>	<i>cinereum</i>	ZRC3.20569	F	Natuna Island	72	55
<i>Malacopteron</i>	<i>cinereum</i>	ZRC3.20563	M	Natuna Island	75	57
<i>Malacopteron</i>	<i>cinereum</i>	ZRC3.20590	M	Thailand	72	63
<i>Malacopteron</i>	<i>cinereum</i>	ZRC3.20595	F	Thailand	67	54
<i>Malacopteron</i>	<i>cinereum</i>	ZRC3.20587	F	Bintang, Riau	63	52
<i>Malacopteron</i>	<i>cinereum</i>	ZRC3.20574	M	Bintang, Riau	66	54
<i>Malacopteron</i>	<i>cinereum</i>	ZRC3.20545	M	North Borneo	73	60
<i>Malacopteron</i>	<i>cinereum</i>	ZRC3.20524	F	North Borneo	76	58
<i>Malacopteron</i>	<i>cinereum</i>	ZRC3.20607	F	West Java	75	62
<i>Malacopteron</i>	<i>cinereum</i>	ZRC3.20606	M	West Java	77	61
<i>Microtarsus</i>	<i>atriceps</i>	ZRC3.16058	F	Palembang, Sumatra	80	56
<i>Microtarsus</i>	<i>atriceps</i>	ZRC3.16043	M	Sumatra	80	66
<i>Microtarsus</i>	<i>atriceps</i>	ZRC3.16055	F	Sipora, Sumatra	75	62
<i>Microtarsus</i>	<i>atriceps</i>	ZRC3.16056	M	Sipora, Sumatra	73	62
<i>Microtarsus</i>	<i>atriceps</i>	ZRC3.16051	M	Siberut, Sumatra	72	64
<i>Microtarsus</i>	<i>atriceps</i>	ZRC3.16053	F	Siberut, Sumatra	73	67
<i>Microtarsus</i>	<i>atriceps</i>	ZRC3.15987	M	Tapli, Pakchan, Thailand	82	77
<i>Microtarsus</i>	<i>atriceps</i>	ZRC3.16034	F	Selangor, Malaysia	71	78
<i>Microtarsus</i>	<i>atriceps</i>	ZRC3.16003	M	Telok Poh, Malaysia	83	73
<i>Microtarsus</i>	<i>atriceps</i>	ZRC3.15984	M	West Java	78	75
<i>Pycnonotus</i>	<i>plumosus</i>	ZRC3.17369	M	Siberut, Sumatra	87	72
<i>Pycnonotus</i>	<i>plumosus</i>	ZRC3.17372	F	Siberut, Sumatra	75	63
<i>Pycnonotus</i>	<i>plumosus</i>	ZRC3.17379	F	Sipora, Sumatra	84	68
<i>Pycnonotus</i>	<i>plumosus</i>	ZRC3.17376	M	Sipora, Sumatra	80	65
<i>Pycnonotus</i>	<i>plumosus</i>	ZRC3.17296	M	Selangor, Malaysia	85	67
<i>Pycnonotus</i>	<i>plumosus</i>	ZRC3.17291	F	Malaysia	82	73
<i>Pycnonotus</i>	<i>plumosus</i>	ZRC3.17281	M	Thailand	87	68
<i>Pycnonotus</i>	<i>plumosus</i>	ZRC3.17262	F	Thailand	83	68
<i>Prinia</i>	<i>flaviventris</i>	ZRC3.24517	M	Johor Bahru, Malaysia	50	60
<i>Prinia</i>	<i>flaviventris</i>	ZRC3.24520	F	Singapore	48	53
<i>Prinia</i>	<i>flaviventris</i>	ZRC3.24526	M	Sumatra	44	51
<i>Prinia</i>	<i>flaviventris</i>	ZRC3.24524	F	Galang, Sumatra	42	45
<i>Prinia</i>	<i>flaviventris</i>	ZRC3.24508	F	Mt Kinabalu, N. Borneo	44	55
<i>Prinia</i>	<i>flaviventris</i>	ZRC3.24497	M	N. Borneo	48	54
<i>Arachnothera</i>	<i>longirostra</i>	ZRC3.32455	M	Padang, Sumatra	65	40
<i>Arachnothera</i>	<i>longirostra</i>	ZRC3.32442	F	Padang, Sumatra	65	42
<i>Arachnothera</i>	<i>longirostra</i>	ZRC3.32441	M	Siberut, Sumatra	66	41
<i>Arachnothera</i>	<i>longirostra</i>	ZRC3.32446	F	Siberut, Sumatra	60	40
<i>Arachnothera</i>	<i>longirostra</i>	ZRC3.32445	M	Sipora, Sumatra	68	44
<i>Arachnothera</i>	<i>longirostra</i>	ZRC3.32448	M	Sipora, Sumatra	71	43