



Historical distribution data of New Zealand endemic families Callaeidae and Notiomystidae (Aves, Passeriformes)

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Abstract

Callaeidae (wattlebirds) and Notiomystidae (stitchbirds) are New Zealand-endemic sister-taxa; while widespread before human settlement, they subsequently became critically endangered or extinct. Aside from presently managed populations, information about them is scarce and actual specimens even scarcer. Herein, we provide a snapshot of these families' historical distribution during the critical periods of European settlement and expansion in New Zealand (19th and early-20th centuries), exploring new data and insights resulting from this approach. We include an extensive catalogue of worldwide museum specimens to facilitate future research. We report the last known record/specimen of huia *Heteralocha acutirostris* (Gould, 1837) and late 19th century specimens of North Island saddleback *Philesturnus rufusater* (Lesson, 1828) from Cuvier Island that confirm its occurrence there. We failed to find specimens of North Island saddleback and stitchbird *Notiomystis cincta* (du Bus de Gisignies, 1839) (with one and two exceptions, respectively) from named locations on the mainland.

Keywords

Extinct species, *Heteralocha acutirostris*, huia, museum specimens, natural history collections, stitchbird, wattlebirds.

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Introduction

Natural history collections are physical repositories of the history of our planet, from rocks and minerals to animals and plants. Museum specimens are invaluable records for researchers, especially when a large series can be used to study historical changes in phenotype, distribution and, increasingly, genotype. However, even in the present information age, it is difficult for researchers to access information stored in museum collections. Moreover, museum collections are not equal, as institutions tend to prioritise their own geographical province

and groups that are being actively worked on by curators and other researchers. Finally, specimens of a given type or group might be so rare that museums will hold only a very few of them.

Some animal groups are particularly difficult to find in museums, even if they belong to groups that are otherwise prominent in collections such as birds. Typically, these are species that are particularly rare in the wild, present a very restricted distribution (oftentimes in barely accessible places), or became extinct or nearly so due to human action. Two such groups are the Callaeidae (wattlebirds) and their monotypic sister-family

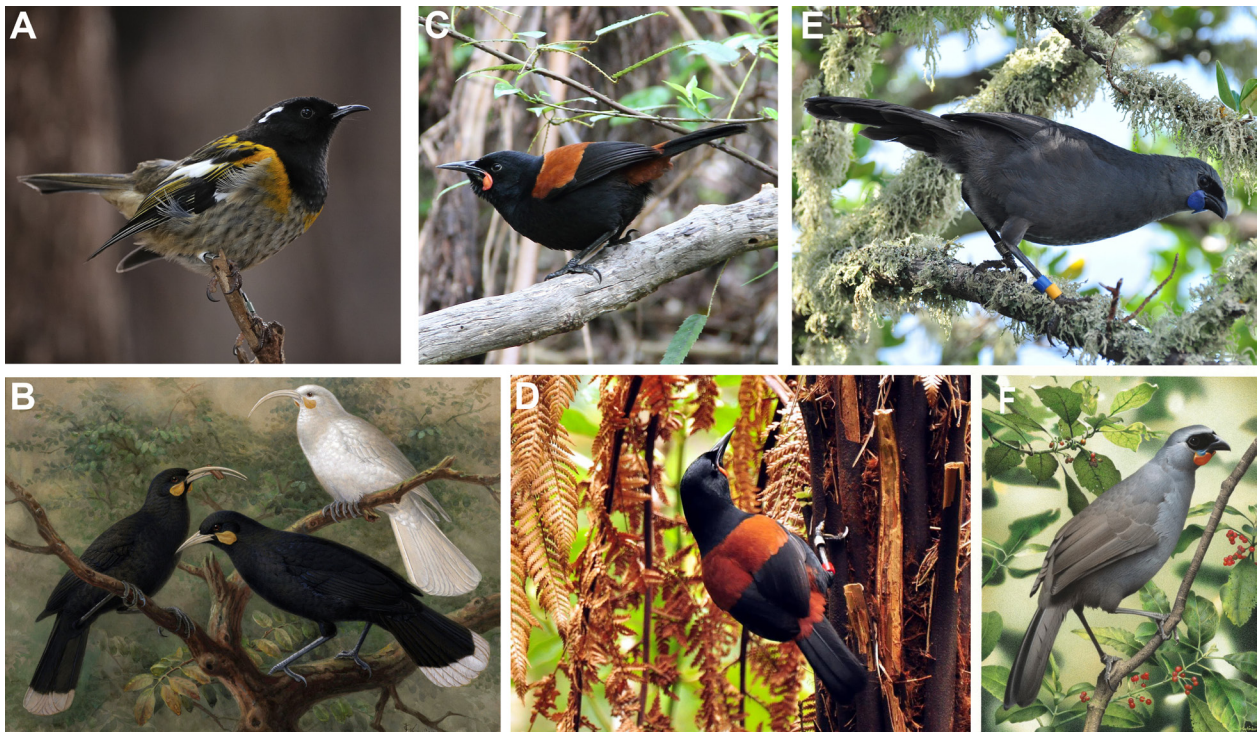


Figure 1. Photographs of the extant species and illustrations of the extinct ones studied herein. Photographs used with author's permission. **A.** Stitchbird, adult male, photo by Tony Whitehead (April 2008, Tiritiri Matangi Island), © Tony Whitehead. **B.** Huia, adult male and females (including a leucistic form), watercolour (MNZ 1993-0029-6) by Johannes G. Keulemans (ca. 1900, London), public domain. **C.** North Island saddleback, adult, photo by Rob Lynch (October 2013, Zealandia Ecosanctuary), © Rob Lynch. **D.** South Island saddleback, adult, photo by Cheryl Marriner (October 2009, Ulva Island), © Cheryl Marriner. **E.** North Island kokako, adult, photo by Cheryl Marriner (April 2010, Tiritiri Matangi Island), © Cheryl Marriner. **F.** South Island kokako, watercolour (MNZ 2006-0010-1/10) by Paul Martinson (2003, Masterton) from the series *Extinct Birds of New Zealand*, © Te Papa CC BY-NC-ND 4.0.

Notiomystidae (stitchbirds).

These two families are endemic to New Zealand, containing six species in total (Fig. 1). While these species were widespread before human settlement (Miskelly 2013), they have now become threatened or worse: most undergo extensive management, one is likely extinct and another is long extinct (Table 1). Populations of the species under management have been translocated to mammal-free islands and some inland sanctuaries (Miskelly and Powlesland 2013; Parker 2013b). Despite their ongoing recovery, their present distribution is still largely

restricted to these last-resort refuges (Miskelly 2013).

As part of an ongoing research involving these two families and other New Zealand land birds, we contacted all the major museums in New Zealand and worldwide (and several other institutions with smaller collections as well) that could harbour specimens. Unfortunately, specimens are scarcer than one would have liked, but this only makes the information they contain even more crucial. Herein, we used those museum specimens to provide a snapshot of the historical distribution of Callaeidae and Notiomystidae species during the critical

Table 1. Species of Callaeidae and Notiomystidae, with notes on their conservation status according to the IUCN Red List (IUCN 2017) and the New Zealand Threat Classification System (Townsend et al. 2008; Miskelly 2013), year the species were given legal protection (Miskelly 2014), original and present distribution (Miskelly 2013), and whether translocations occurred (Miskelly and Powlesland 2013). Abbreviations: NI, North Island; NZ, New Zealand.

Species	Conservation status		Protection	Translocation	Present distribution
	IUCN	NZ			
Callaeidae					
<i>Callaeas wilsoni</i>	Near threatened	Recovering	1896	Yes	Scattered forests on northern NI, plus a few nearby islands
<i>Callaeas cinerea</i>	Critically endangered	Data deficient	1896	No	Likely extinct
<i>Heteralocha acutirostris</i>	Extinct	Extinct	1892	No	Extinct
<i>Philesturnus rufusater</i>	Near threatened	Recovering	1896	Yes	Small islands and sanctuaries
<i>Philesturnus carunculatus</i>	Near threatened	Recovering	1896	Yes	Small islands and sanctuaries
Notiomystidae					
<i>Notiomystis cincta</i>	Vulnerable	Nationally vulnerable	1896	Yes	Small islands and sanctuaries

periods of European settlement and expansion in New Zealand during the 19th and early 20th centuries. We also seize the opportunity to provide a full catalogue of specimens in museums worldwide to facilitate future research on these species.

Methods

We located circa 40 natural history collections worldwide (museums and universities) that hold specimens of the families Callaeidae and Notiomystidae (see below for full list). Other collections contacted (over 60 additional institutions worldwide, of all sizes) did not have material of these taxa. Herein, we used the information recorded from these specimens to provide a glimpse in the past distribution of the six species that compose these families.

To achieve that, we considered only the historical specimens with reasonably specific locality data and year of collection. Approximated year of collection, estimated based on collector or donor, were also taken into account, as so few of these specimens remain. The full list of specimens used is given below in the Appendix; that section also includes the specimens lacking precise data, as this information might be helpful to future researchers conducting other types of studies (e.g., morphological, molecular).

Distribution data from the literature were also taken into account when specific localities (rather than whole regions) are mentioned, as this information tends to become lost in recent publications. We conducted a thorough search of scientific literature using physical and/or digital copies of publications, as available. Grey literature and unpublished material, such as field notes and diaries, were disregarded unless their status have already been assessed by other researchers (e.g., Medway 1968; Lavers 1978; Gill 2014).

As none of the historical museum specimens and literature data contain coordinates, we estimated this as best as possible to create the distribution maps presented below. Maps were created using QGIS (QGIS Development Team 2019). A full list of estimated coordinates is given in the Appendix.

We report the species' natural distribution until they became extinct on the mainland and started to be translocated to and from island sanctuaries. The exception is the North Island kokako, which never became extinct on the mainland; for this species, we present its distribution until 1950. The more recent distribution from 1950 onwards is not addressed here, as by that time the Ornithological Society of New Zealand started gathering data and publishing atlases of current bird distribution in the country (e.g., Bull et al. 1985; Robertson et al. 2007).

Collections. AMNH = American Museum of Natural History (New York, USA); ANSP = Academy of Natural Sciences of Drexel University (Philadelphia, USA); AWMM = Auckland War Memorial Museum (Auckland, New Zealand); BPBM = Bernice Pauahi Bishop Museum

(Honolulu, USA); CM = Canterbury Museum (Christchurch, New Zealand); CMNH = Carnegie Museum of Natural History (Pittsburgh, USA); FLMNH = Florida Museum of Natural History (Gainesville, USA); FMNH = Field Museum of Natural History (Chicago, USA); LUOMUS = Luonnontieteellinen museo (Helsinki, Finland); MCZ = Museum of Comparative Zoology, Harvard University (Cambridge, USA); MHNB = Muséum d'histoire naturelle de Bordeaux (Bordeaux, France); MHNG = Muséum d'histoire naturelle de Genève (Geneva, Switzerland); MNCN = Museo Nacional de Ciencias Naturales (Madrid, Spain); MNHN = Muséum national d'Histoire naturelle (Paris, France); MNZ = Museum of New Zealand Te Papa Tongarewa (Wellington, New Zealand); MPW = Muzeum Przyrodnicze we Wrocławiu (Wrocław, Poland); MVZ = Museum of Vertebrate Zoology (Berkeley, USA); MZUB = Museo di Zoologia dell'Università di Bologna (Bologna, Italy); NHMD = Statens Naturhistoriske Museum (Copenhagen, Denmark); NHMUK = Natural History Museum (London/Tring, UK); NHMW = Naturhistorisches Museum Wien (Vienna, Austria); NMBA = Naturhistorisches Museum Basel (Basel, Switzerland); NML = National Museums Liverpool (Liverpool, UK); NMS = National Museums Scotland (Edinburgh, UK); NMW = Amgueddfa Cymru, National Museum Wales (Cardiff, UK); NRS = Naturhistoriska riksmuseet (Stockholm, Sweden); OMNZ = Otago Museum (Dunedin, New Zealand); RBINS = Royal Belgian Institute of Natural Sciences (Brussels, Belgium); RMNH = Naturalis Biodiversity Center (former Rijksmuseum van Natuurlijke Historie; Leiden, The Netherlands); SAM = South Australian Museum (Adelaide, Australia); SMAG = Southland Museum and Art Gallery (Invercargill, New Zealand); SMF = Senckenberg Forschungsinstitut und Naturmuseum (Frankfurt am Main, Germany); USNM = Smithsonian National Museum of Natural History (Washington, DC, USA); YIO = Yamashina Institute for Ornithology (Chiba, Japan); WMAH = Waikato Museum (Hamilton, New Zealand); YPM = Peabody Museum of Natural History, Yale University (New Haven, USA); ZMA = Naturalis Biodiversity Center (former Zoologisch Museum Amsterdam; Leiden, The Netherlands); ZMB = Museum für Naturkunde, Leibniz Institute for Evolution and Biodiversity Science (Berlin, Germany); ZMH = Zoologische Museum Hamburg, Centrum für Naturkunde (Hamburg, Germany); ZSM = Zoologische Staatssammlung München (Munich, Germany).

Results

Below is presented the historical distribution of each of the six species of Callaeidae and Notiomystidae, in the form of a list of occurrences presented in chronological order. Each occurrence represents the date of collection (for actual specimens) or the date of sighting (for literature data). This approach was chosen, instead of the typical arrangement by localities, to give a clearer

picture of the historical distribution. The list of occurrences is accompanied by a map (arranged by genus; Figs 2–5) and, when pertinent, additional remarks. A brief overview of each species' current distribution is also provided.

Identification. Identification of Callaeidae and Notiomystidae is very straightforward, with little room for confusion, and easily done through photographs (Fig. 1). Some previously unidentified specimens could be identified based on simple morphological features (Miskelly 2013) observed on specimens (collections within New Zealand) or photographs (other collections), or based on geographical provenance, as each of New Zealand's main islands have their own species of *Philesturnus* and *Callaeas*. The two species of *Philesturnus* can be distinguished by the thin gold band on the frontal edge of the saddle (Fig. 1C, D; Parker, 2013a), while the two *Callaeas* spp. can in theory be distinguished by the colour of the wattles (Innes 2019), which might not be preserved on museum specimens. The identification of other problematic specimens (e.g., juveniles, eggs), was not possible; they are presented as undetermined in the Appendix and were not used for compiling the species' distribution.

North Island kokako, *Callaeas wilsoni* (Bonaparte, 1850) (Fig. 2)

Material examined. See Appendix.

Occurrence (museum specimens). 1800: south Wairoa. 1842: "River Kianga" (likely Hokianga River). 1871, 1873: Wellington. 1883: Rimutaka Ranges, Waitakere Ranges. 1889: Wairoa. 1890: Wairarapa, Wairoa Range. 1891: Auckland, Wairarapa. 1892: Tararua Range, Wairarapa. 1898: Kaitara Range. 1899: Wellington province. 1902: Taranaki province. 1905: Whanganui. 1909: Pipiriki. 1910: Papakura-Hunua. 1912: Kokakonui Stream (Whanganui River). 1913: Horopito. 1923: Kawhia. 1927: Wadestown (Wellington).

Occurrence (literature data): Pre-1835: Waihou ["Thames"] River (Oliver 1930). Ca. 1840: Hokianga River (type locality sensu Oliver 1930, 1955). 1846: Whanganui National Park (Medway 1968). 1847, 1849: Coromandel (Lavers 1978). 1850: Tangihua Range (Lavers, 1978). 1854: Lower Hutt/Upper Hutt, Wellington (Lavers 1978). 1858: Auckland (type locality of *C. olivascens* Pelzeln, 1867) (Pelzeln 1887; Lavers 1978). 1862: Otaki (Lavers 1978); 1868: Great Barrier Island (Oliver 1955; Lavers 1978). 1870: Auckland (Lavers 1978). 1872: Wellington (Lavers 1978). Pre-1873: Auckland, Kaipara, Kaitara Ranges, Upper Manawatu River, Maungatautari, Taupo, between Wairoa and Whangarei Rivers (Buller 1873). 1873: Wairarapa, Wellington (Lavers 1978). Pre-1877: Mangorewa Forest (between Tauranga and Rotorua) (Buller 1877b). 1877: Rimutaka Range, Rotorua/Rotorua Lakes (Lavers 1978). 1878: Titirangi (Lavers 1978). 1879: Tangihua Forest (Reischek 1886). 1880: Lake Rotokare (Medway 1968);

Maungataroto, Tokatea Range (Reischek 1886; Lorenz-Liburnau 1902). 1881: Lake Rotokare (Medway 1968); Rimutaka Range, Wellington (Lavers 1978). Pre-1882: Tauranga, Tutira, Wairoa (Lavers 1978). 1882: Great Barrier Island, Mount Pirongia, Ngunguru, Waitakere Ranges (Reischek 1886; Lorenz-Liburnau 1902); Kaitara Ranges, Pirongia Range, Tangahua Range, Wairarapa, Wairoa, Whangarei (Lavers 1978). 1883: Ngamatapouri (Medway 1968); Pati Tapu Bush, Wairarapa (Buller 1888). 1884: Ngamatapouri, Rawhitiroa, Waitotara Forest (Medway 1968); Greytown, Martinborough (Lavers 1978). 1885: Lake Rotokohu, Waitotara Forest (Medway 1968); Waitakere Ranges (Reischek 1886). 1886: Napier (Lavers 1978). 1887: Hunua Range (Lavers 1978). Pre-1888: Hawke's Bay, Piercy Island, Poroporo Ranges, Rimutaka Ranges, Wairarapa, Wellington (Buller 1888). 1888: Maungatautari, Motukokako Island, Rotorua/Rotorua Lakes, Wairoa, Waitakere Ranges, Wellington, Whangarei (Lavers 1978). 1890: Lower Hutt/Upper Hutt, Wainuiomata, Wairarapa (Lavers 1978). 1891: Auckland, Wairarapa (Lavers 1978). 1892: Great Barrier Island, Tararua Range, Wairarapa, Wellington, Whangarei (Buller 1892; Lavers 1978). 1895: Kaitara Ranges (Lavers 1978). 1898: Kaitara Ranges, Okaihau, Puhī Puhī Scenic Reserve (Lavers 1978). 1899: Wellington (Lavers 1978). Pre-1900: Waverly (Lavers 1978). 1900s: Lower Hutt/Upper Hutt (Lavers 1978). 1900: Bay of Islands (Oliver 1955); Rangitumau (Lavers 1978). 1901: Wellington (Lavers 1978). 1905: Rimutaka Range, Tararua Range, Waikato (Lavers 1978). 1906: Maungahaumia Range, Whataututu (M'Lean 1912). 1907: Maungahaumia Range (M'Lean 1912); Egmont National Park, Raglan, Tararua Range, Tikorangi (Lavers 1978). 1908: Tararua Range (Oliver 1955); Te Urewera, Whanganui (Lavers 1978). 1909: Opotiki, Pipiriki, Te Urewera, Waioeka (Lavers 1978). 1910s: Papakura (Lavers 1978). 1910: Kopuapounamu River (Lavers 1978). 1912: Hunua Range (Lavers 1978). 1916: Pukekohe (Lavers 1978). 1917: Mauku (Lavers 1978). 1918: Onewhero, Raetihi (Lavers 1978). 1920: Makomako, Otangiwai (Lavers 1978). 1921: Rotorua/Rotorua Lakes (Lavers 1978). 1923: Kawhia (Lavers 1978). 1924: Te Urewera (Lavers 1978). 1926: Huntly, Kawhia, Rotorua/Rotorua Lakes, Wairarapa, Wellington, Whangarei (Lavers 1978). 1928: Mamaku (Lavers 1978). 1931: Te Kuiti, Waikino (Lavers 1978). 1932: Hunua Range, Rotorua/Rotorua Lakes, Waitakere Ranges (Lavers 1978). 1933: Pirongia Range (Lavers 1978). 1934: Mamaku, Potaka, Rimutaka Range, Rotorua/Rotorua Lakes (Lavers 1978). 1935: Kopuapounamu River (Lavers 1978). 1937: Hunua Range, Rotorua/Rotorua Lakes (Lavers 1978). 1939: Mamaku, Rotorua/Rotorua Lakes (Lavers 1978). 1940: Mamaku, Ohura, Rotorua/Rotorua Lakes, Russell (Lavers 1978). 1941: Waihi (Lavers 1978). 1942: Clevedon, Te Whaiti (Lavers 1978). 1943: Clevedon, Hunua Range, Mangatangi, Rotorua/Rotorua Lakes (Lavers 1978). 1944: Clevedon, Patumahoe, Pipiriki, Pureora Forest, Rotorua/Rotorua Lakes, Tauranga (Lavers 1978). 1945: Great Barrier

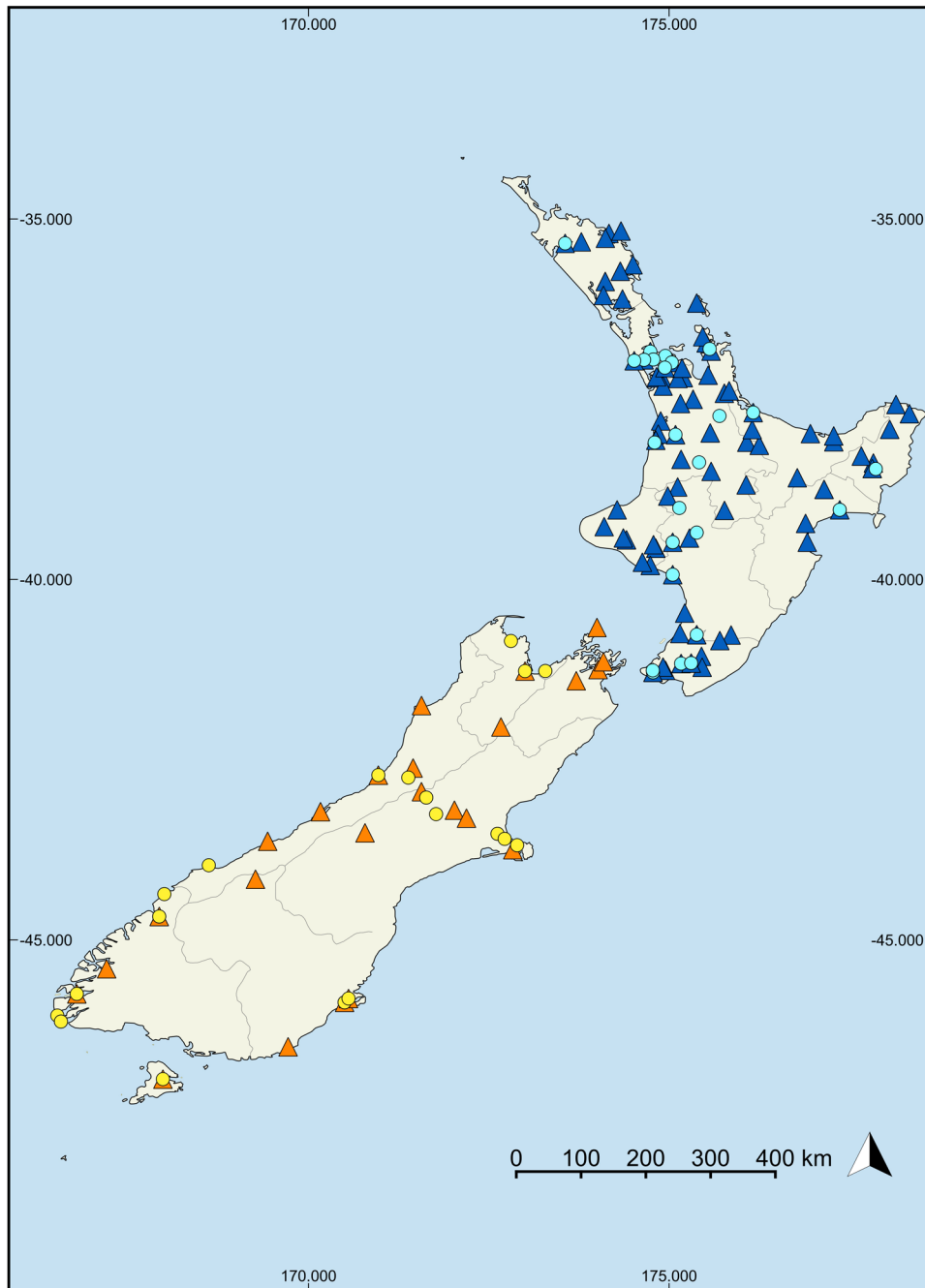


Figure 2. Historical distribution of North and South Island kokako in New Zealand until 1950, based on museum specimens (circles) and literature data (triangles). Blue markers represent the North Island species and orange/yellow markers represent the South Island one.

Island, Opotiki, Pirongia Range (Lavers 1978). 1946: Mangatawhiri, Rotorua/Rotorua Lakes (Lavers 1978). 1947: Great Barrier Island, Mount Hikurangi (Lavers 1978). 1948: Hunua Range, Mount Pihanga, Tauranga (Lavers 1978). 1949: Colville, Great Barrier Island, Hunua Range, Pirongia Range, Rotorua/Rotorua Lakes, Tararua Range, Tangahuaia Range (Lavers 1978).

Present distribution. Natural populations include only in a few forested areas in the northern part of the North Island, from Te Urewera northwards (Innes 2019). Successful translocations occurred to Kapiti Island, Little Barrier Island, and Tiritiri Matangi Island, as well as several mainland areas: Boundary Stream Mainland Island Reserve, Mount Bruce Scenic Reserve, Ngapukeriki,

Otanewainuku Forest, Puketi Forest, Sanctuary Mountain Maungatautari, Waitakere Ranges Regional Park, Whirinaki Te Pua-a-Tāne Conservation Park (Innes 2019).

Remarks. North Island kokako were widespread in the North Island, but suffered a rapid decline in the first half of the 20th century due to habitat loss and introduced mammalian predators (Norman 2018). Even though they are now restricted to the northern portion of the North Island, they are arguably the Callaeidae species in “best shape” today, which is reflected by the greater amount of records in the literature.

The North Island kokako is the best-recorded species herein, but still shows a meaningful gap in its distribution (Fig. 2) that include the Ruahine Range. This ought

to be a real signal rather than collection (or observation) biases since other species were collected or reported from that area (e.g., Fig. 3). This gap was noted by Lavers (1978), who gathered data on reports of this species.

South Island kokako, *Callaeas cinerea* (Gmelin, 1788) (Figs 2, 6)

Material examined. See Appendix.

Occurrence (museum specimens). 1827: Tasman Bay. 1849: Port Cooper (Lyttelton). 1872: Bealey. 1875: Castle Hill Peak. 1875: Cook Strait(?). 1884: Dusky Sound. 1886: Mount Cargill. 1887: Blue River (Jackson Bay), Chalky Sound. 1888, 1889: Milford Sound. 1891: Otago. 1892: Nelson province, Otago province. 1897: Dunedin. 1899: Nelson province, Takaka. 1901: Dusky Sound. 1902: Preservation Inlet. Uncertain date: Bealey, Christchurch, Dunedin, Hokitika, Milford Sound, Pigeon Bay (Banks Peninsula), Preservation Inlet, Stewart Island, West Coast.

Occurrence (literature data). 1769–1770: Marlborough Sounds (Norman 2018). 1773: Queen Charlotte Sound (type locality), Dusky Sound (Norman 2018). Early 1800s: Banks Peninsula (Hutton and Drummond 1909). 1827: Tasman Bay (Quoy and Gaimard 1830). 1839: Ship Cove (Queen Charlotte Sound) (Dieffenbach 1843). 1869: Havelock River (Potts 1873); Mount Franklyn (Spenser Ranges) (Buller 1873). Ca. 1870: Waimakariri River spring (Finsch 1870). 1873: Milford Sound (Potts 1873). Pre-1873: Catlin River, Dunedin, Hokitika, Mount Cargill, Oxford Ranges (Buller 1873). Pre-1874: Paringa River (Oliver 1930). 1877: Arthur's Pass (Reischek 1885); Chalky Sound (Lorenz-Liburnau 1902). Pre-1878: Okarito (Hamilton 1878). 1878: Mount Alexander (Reischek 1885). 1884: Dusky Sound, Milford Sound, West Coast (Reischek 1885). 1887: Blue River (Lorenz-Liburnau 1902); Chalky Sound (Reischek 1887). 1887–1888: Lake Brunner (Smith 1888). Pre-1888: Milford Sound (Buller 1888). Pre-1892: Westport (Buller 1892). 1892: Stephens Island (Brown 2000). Pre-1895: Mount Riley (Handly 1895). 1901: Dusky Sound (Ogilvie-Grant 1905). 1911: Stewart Island (Rakeahua River and Pater-son Inlet) (McLean 1911). 1946: western Southland (Turbott 1967). Uncertain date: Stewart Island (Oliver 1930).

Present distribution. Uncertain, possibly extinct.

Remarks. This species was considered rare already in the late 19th century and its ground-foraging habits and low nesting sites made them particularly vulnerable to introduced mammals, whose numbers irrupted during mast years in the beech forest (Clout and Hay 1981; Szabo 2017). The last accepted sighting dates from 1967, from Mount Aspiring National Park (Clout and Hay 1981).

South Island kokako were declared extinct by New Zealand's Department of Conservation in 2007, but its status was changed to Data Deficient after a reported sighting from Reefton, even though unconfirmed by

photographic evidence (Milne and Stocker 2014; Szabo 2017; Norman 2018). Nevertheless, many New Zealanders believe the species survives and the search for the South Island kokako still goes on (Tennyson and Martinson 2007).

Huia, *Heteralocha acutirostris* (Gould, 1837) (Figs 3, 7)

Material examined. See Appendix.

Occurrence (museum specimens). 1870: Kaimanawa Ranges. 1877: Wainuiomata, Wellington. 1878: Tararua Range. 1880: Akatarawa. 1881: Rimutaka Hill, Wellington. 1883: Wellington. 1885: Mangaroa Hill (Upper Hutt). 1886: Manawatu River. 1890: Pahiatua (Puketoi Range), Remutaka Range. 1891: Ngarara Ranges, Wairarapa. 1892: Makuri Ranges, Makuri River, Puketoi Range, Waikanae, Wairarapa, Wellington. 1898: Rimutaka Hill, Wellington. 1899: Makara. 1906: Saddle Hill (Manawatu Gorge). Uncertain date: Hawke's Bay, Makuri Range, Manawatu, Manawatu River, Peep-o-Day Road, Hinau (Rangitikei), Rimutaka Range, Wairarapa, Wellington.

Occurrence (literature data). Pre-1835: mountains of Taranaki and farther south on North Island (Yate 1835). 1836: Wainuiomata Hills (type locality) (Buller 1870). 1840: Hawke's Bay to Wellington (Dieffenbach 1843); Wainuiomata Hills (Oliver 1955); Wellington (Dieffenbach 1843). 1855: Wainuiomata Hills (Buller 1870). 1863: forest between Manawatu Gorge and Akitio (Buller 1888; Szabo 2013). 1864: Rimutaka Range (Buller 1870). Pre-1865: Tararua Range, Ruahine Range, Wairarapa Valley (Buller 1865). 1867: Ruahine Range (Buller 1870). Pre-1870: Rimutaka Range, Ruahine Range, Tararua Range, Wairarapa Valley (Buller 1870). 1870: Wellington (Busk 1870). 1872–1873: Wairarapa valley (Buller 1873; Bartle and Tennyson 2009). 1873: Akitio (Potts 1873). 1875: Wainuiomata (Norman 2018). 1877: Wainuiomata (Buller 1878, 1888). Pre-1879: Akitio (Kirk 1879). 1881: Manawatu River (Potts 1884). 1882: Mataroa, Tira-raukawa (Medway 1968). 1883: Tiriraukawa (Medway 1968). 1883: Pati Tapu Bush (Buller 1888). 1885: Wairarapa (Buller 1888). Pre-1888: Turakirai (SW Wairarapa Lake) (Buller 1888). 1890s: Taihape-Moawhango (Phillips 1963; Medway 1968). Pre-1892: Hutt Valley, Pahiatua (Buller 1892). 1892: Makuri Range, Ngarara Range, Puketoi Range (Bartle and Tennyson 2009). 1905: Mount Holdsworth (Tararua Range; uncertain, see below) (Galbreath 2017). Uncertain date: Hutt Valley (Stidolph 1922); Kaimanawa Range, Turakirae Head (Oliver 1930).

Present distribution. Extinct.

Remarks. Based on Holocene fossils, huia were distributed through the whole of the North Island, but declined rapidly in range after human settlement (Tennyson and Martinson 2007; Gill et al. 2010).

By the time of European settlement, the species' range was restricted to the eastern and southern mountain ranges of North Island and its adjacent forests (Turbott

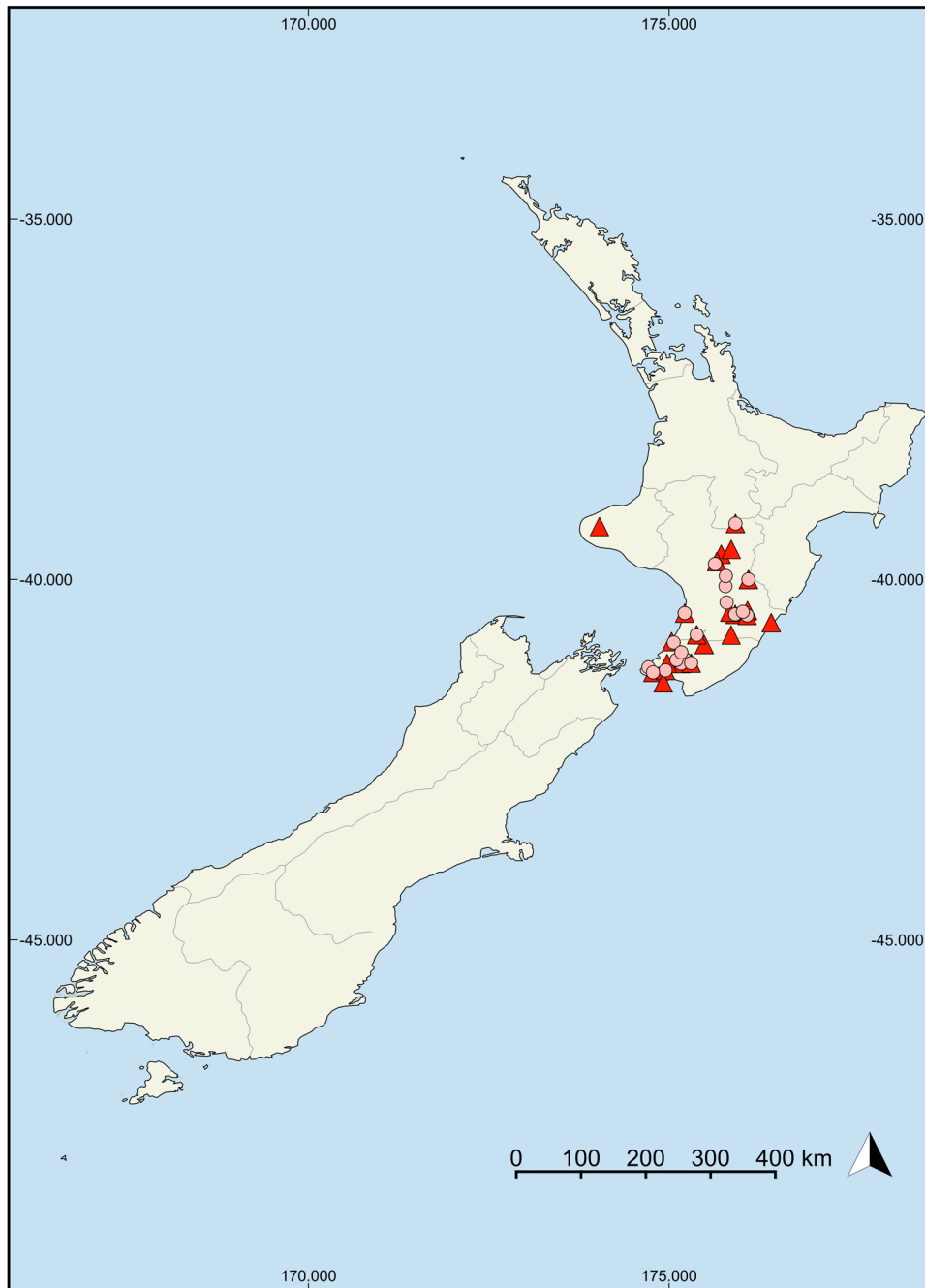


Figure 3. Historical distribution of huia in New Zealand until its extinction, based on museum specimens (circles) and literature data (triangles).

1967; Gill et al. 2010; Szabo 2013). The species' decline was recognised in 1890 and some protections were put in place in 1892, although these were poorly enforced (Tennyson and Martinson 2007; Szabo 2013; Miskelly 2014; Norman 2018). Pressure from humans and other introduced mammalian predators, alongside habitat destruction, are the probable causes that drove the species to extinction (Tennyson and Martinson 2007). Singularly among the birds treated here, the huia were hunted for their tail feathers, which were tapu signifiers of rank for Māori rangatira (chiefs), and fashion accessories for Europeans (Norman 2018).

Literature typically dates the last accepted sighting from December 1907 (Myers 1923), which likely stems

from Mount Holdsworth (Galbreath 2017). However, this record has been recently considered unreliable and a more likely (although still unconfirmed) date is 1905 (Galbreath 2017). However, one museum specimen (Fig. 7; MNZ OR.030203, W. "Bill" Wilson col.) was collected near Saddle Hill (north side of Manawatu Gorge) in 1906 (± 1 year). This specimen more certainly represents the last known record of the huia.

It is possible that a few huia persisted longer, as there were reported sightings from Tararua Range in the early 1920s (Tennyson and Martinson 2007; Galbreath 2017), and less credible reports (from Lower Hutt, Wairarapa and Bay of Plenty) from the 1920s to the 1960s (Phillips 1963; Norman 2018).

Reports from the northern South Island (e.g., Picton, Nelson, and Golden Bay) have been treated as either dubious or as rare cases of vagrant birds (Buller 1888; Phillips 1963). Only two museum specimens have the locality noted as “South Island”: NHMUK 1949.64.214 and ZMA.AVES.3162 (G.M. Mathews col.). Another huia specimen from the same collector as the latter specimen (ZMA.AVES.3163) has only “New Zealand” as locality.

North Island saddleback, *Philesturnus rufusater* (Lesson, 1828) (Fig. 4)

Material examined. See Appendix.

Occurrence (museum specimens). 1880: Hen/Taranga Island. 1886: Cuvier Island. 1903, 1909: Hen/Taranga Island. 1924: Hen and Chicken Islands. 1925, 1933, 1937, 1949: Hen/Taranga Island. Uncertain date: Bay of Islands.

Occurrence (literature data). 1769: Poverty Bay (Colenso 1877). 1769–1770: Northland (Norman 2018). 1772, 1824, 1835: Bay of Islands (type locality) (Oliver 1930). 1852: Wairoa River (Kaipara) (Buller 1873). 1855: Wellington (Buller 1906; Bartle and Tennyson 2009). Ca. 1850–1860: New Plymouth (Smith 1910). 1859–1864: Kaipara (Smith 1910). 1862: Little Barrier Island (Layard 1863; Buller 1873; Oliver 1955). 1867: Great Barrier Island, Little Barrier Island (Hutton 1868; Buller 1873). 1868: Little Barrier Island (Bartle and Tennyson 2009). Pre-1870: Great Barrier Island, Little Barrier Island (Finsch 1870). Pre-1873: Hauraki Gulf, Hunua Ranges, Kaitaia, Maungatepere Bush near Whangarei, Ruahine Range, Waikato Heads to Raglan, Wellington, Tararua Range (Buller 1873, 1877b). Pre-1877: East Cape to Gisborne (Buller 1877b). 1878: Cuvier Island [error], Kaitaia (Oliver 1955). 1880: Hen/Taranga Island, Little Barrier Island (Reischek 1886; Buller 1888; Norman 2018). 1882: Great Barrier Island, Little Barrier Island, Rangitoto Range (Reischek 1886); Hen/Taranga Island (Buller 1888; Lorenz-Liburnau 1902). 1883: Hen/Taranga Island (Reischek 1886). 1884: Hen/Taranga Island (Buller 1888). 1886: Cuvier Island (Gill 2014). Pre-1888: Hen/Taranga Island, Great Barrier Island, Little Barrier Island (Buller 1888). Pre-1892: Hauraki Gulf (Buller 1892). Uncertain date: Hutt Valley (Stidolph 1922).

Present distribution. Hen/Taranga Island. Translocated populations exist on several islands off the North Island and on some mainland sanctuaries: Bushy Park Sanctuary, Cape Sanctuary, Karori Wildlife Sanctuary (Zealandia Ecosanctuary), Sanctuary Mountain Maungatautari, and Tawharanui Regional Park (Parker 2013a).

Remarks. Both saddleback species were common at the time of European settlement, but declined rapidly due to introduced mammalian predators and by the late 19th century were already considered rare (Buller 1888; Hooson

and Jamieson 2003). The North Island saddleback was virtually extinct on the mainland by the 1890s, surviving only as a single population on Hen/Taranga Island (Hooson and Jamieson 2003). After careful management beginning in the last third of the 20th century and several successful translocations, the species is now recovering (Miskelly and Powlesland 2013; Parker 2013a).

There is a surprising dearth of specimens of the North Island saddleback in collections worldwide (Fig. 4). The only specimen from a named location on the mainland that we located was the type specimen from the Bay of Islands (NHMUK 1842.12.16.49). Bartle and Tennyson (2009) studied Buller’s collection and argued that as the North Island saddleback was not recognised as a separate species from the South Island bird, there was little to gain in collecting it.

One interesting locality that came to our attention is Cuvier Island. Even though the North Island saddleback has been successfully translocated to that island in 1968 (Miskelly and Powlesland 2013), its natural occurrence there in the 19th century is not widely reported in the literature. Only Oliver (1955) mentioned it, with the date of occurrence being 1878. His original notes are housed in the archives of the MNZ (register number MNZ MU000233/033/0001) and indicate that he either saw or acquired information of specimens in the AMNH and AWMM collections. We examined these specimens (see the Appendix) and they were all collected by Charles Francis Adams, including a further specimen in the FMNH collection. Adams was an American taxidermist (Gill 2004; Beolens et al. 2014) who worked for the AWMM from 1885 to 1887 and visited Cuvier Island on November 1886 (Gill 2014). Adams’ diary (register number AWMM MS-2017-3: pp. 70–71) includes: “The Bell Birds and Saddle-backs were singing their evening songs”; “Also for the first time saw the Saddle Backs, now becoming so rare”; “The trouble in shooting them was in getting far enough away”. This last entry reveals that Adams attempted to collect saddlebacks. The Cuvier Island specimens from the AWMM were mentioned by Gill (2004), however, they were not included in previous accounts of the distribution of the North Island saddleback. We here reaffirm the presence of the North Island saddleback on Cuvier Island during the 19th century, and correct the date published by Oliver (1955).

South Island saddleback, *Philesturnus carunculatus* (Gmelin, 1789) (Fig. 4)

Material examined. See Appendix.

Occurrence (museum specimens). 1800: Nelson province. 1827: Tasman Bay. 1873: Taipo. 1875: Taipo River. 1877: Okarito. 1878: Taipo, Taramakau. 1882: Martins Bay. 1886: Lammerlaw Mountain (Otago). 1888: Big Bay. 1890: Otago province. 1892: Nelson, Otago province, Stephens Island, West Coast. 1894: Pelorus Sound. 1895: Karamea. 1896: Preservation Inlet. 1897: Nelson province, Otago province. 1898: Milford Sound, Nelson

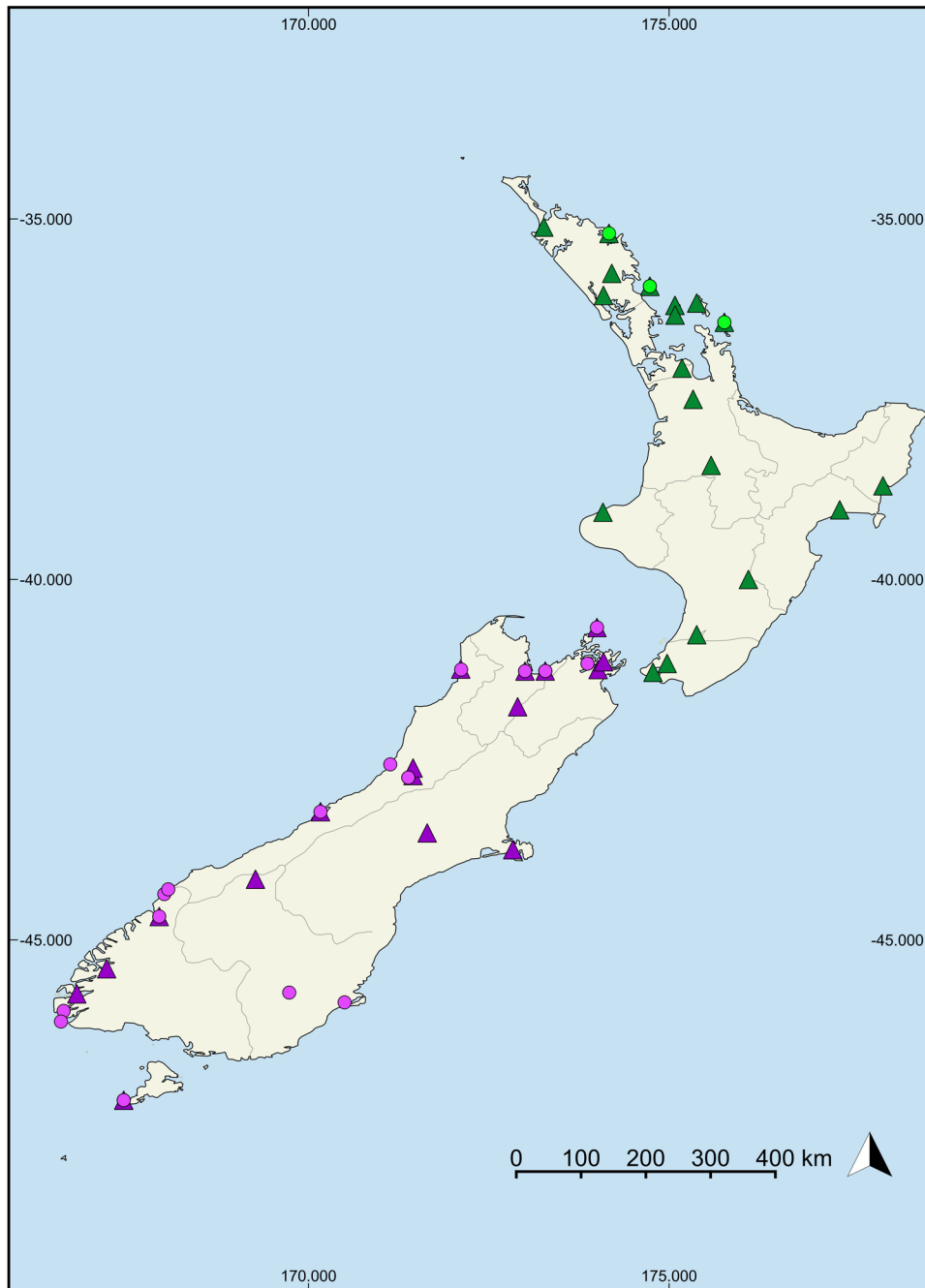


Figure 4. Historical distribution of North and South Island saddlebacks in New Zealand until 1950, based on museum specimens (circles) and literature data (triangles). Green markers represent the North Island species and purple markers represent the South Island one.

province. 1904, 1905: Nelson province. 1921: Taipo. 1931: Big South Cape Island, Pukeweka Island, Solomon Island (off Stewart Island). 1938: Big South Cape Island, Pukeweka Island. 1939: Big South Cape Island.

Occurrence (literature data). 1769–1770: Marlborough Sounds (Norman 2018). 1773: Queen Charlotte Sound (type locality). 1827: Tasman Bay, Nelson (Quoy and Gaimard 1830). 1859: Banks Peninsula (Buller 1888). Pre-1865: Banks Peninsula (type locality of *Creadion cinereus* Buller, 1865) (Buller 1865; Mathews and Iredale 1913). 1877: Greenstone Hill, Lake Brunner, Mount Alexander, Teremakau River (Reischek 1886; Lorenz-Liburnau 1902); West Coast (Norman 2018). Pre-1878: Okarito (Hamilton 1878). 1878: Mount Alexander

(Reischek 1886). 1879: Mount Algidus (Rakaia Gorge) (Reischek 1886). 1884: Dusky Sound, Milford Sound (Reischek 1886; Lorenz-Liburnau 1902). 1887: Blue River, Chalky Sound (Reischek 1887; Lorenz-Liburnau 1902); Lake Brunner (Smith 1888). Pre-1892: Stephens Island (Buller 1892). Pre-1895: Karamea Saddle (Buller 1895); Tophouse (Handly 1895). Pre-1909: Lake Brunner (Hutton and Drummond 1909). 1931: islands SW of Stewart Island (Stead 1937). Uncertain date: Solomon Island (Oliver 1930).

Present distribution. South Island saddlebacks became extinct in their last natural stronghold following colonisation of the three ‘South Cape’ islands by ship rats *Rattus rattus* (Linnaeus, 1758) in the early 1960s (Bell et

al. 2016). They were rescued through translocations to nearby Big Island and Kaimohu Island, with subsequent translocations to more than 20 further islands (Miskelly and Powlesland 2013).

Remarks. Around 1905 this species was nearly extinct, with surviving populations on Big South Cape Island (Taukihepa), Pukeweka Island, and Solomon Island (Rerewhakaupoko) (Hooson and Jamieson 2003). During their rescue from rat predation, the species went through a low of just 36 individuals in the 1960s (Hooson and Jamieson 2003), but now number in their thousands (Masuda and Jamieson 2013; Miskelly and Powlesland 2013). They were reintroduced to Big South Cape Island and Solomon Island in 2011–2012, and have since naturally recolonised Pukeweka Island (Miskelly and Powlesland 2013; Miskelly et al. 2017), restoring them to their pre-1960 range.

Stitchbird, *Notiomystis cincta* (du Bus de Gisignies, 1839) (Fig. 5)

Material examined. See Appendix.

Occurrence (museum specimens). 1842: Hokianga River (presumably). 1875: Wellington. 1882: Little Barrier Island. 1883: Hauraki Gulf, Little Barrier Island. 1885: Little Barrier Island. 1886, 1888: Hauraki Gulf, Little Barrier Island. 1892, 1893, 1894, 1909: Little Barrier Island.

Occurrence (literature data). 1835: Bay of Islands (Oliver 1955; Watola 2009). 1867: Great Barrier Island, Little Barrier Island (Hutton 1868; Buller 1873). Pre-1870: Hutt Valley, Wellington (Buller 1877a; Higgins et al. 2001); Ngaio Gorge (Stidolph 1922). Ca. 1870: Kaiwharawhara Stream (Buller 1873). 1871: Waimarama near Paparewa (Buller 1873). Ca. 1873: Port Waikato, Raglan (Buller 1873). 1874: Eketahuna (Buller 1888). 1876: Tarawera (midway between Napier and Taupo) (Buller 1888). Pre-1877: Lake Whangape, Port Waikato, Raglan (Buller 1877a). 1882, 1883: Little Barrier Island (Angehr 1984; Lorenz-Liburnau 1902; Drummond 1907; Hutton and Drummond 1909). 1883: Tararua Range (Buller 1888; Turbott 1967). 1885, 1886, 1892, 1895, 1897, 1907, 1919, 1946: Little Barrier Island (Angehr 1984; Lorenz-Liburnau 1902; Drummond 1907; Hutton and Drummond 1909). Uncertain date: Te Urewera (Oliver 1930).

Present distribution. Little Barrier Island. Successful translocations (but not self-sustaining populations; Castro 2016): Bushy Park Sanctuary, Kapiti Island, Karori Wildlife Sanctuary (Zealandia Ecosanctuary), Sanctuary Mountain Maungatautari, Tiritiri Matangi Island.

Remarks. Genetic studies have suggested that stitchbirds belongs to a family of its own, which is the sister group of the family Callaeidae, having split from it circa 34 Ma (Ewen et al. 2006; Driskell et al. 2007).

Stitchbirds, also known as hihi, were reportedly distributed throughout the North Island during the Holocene

(based on subfossil and midden remains), including Little and Great Barrier Islands, until the 1840s (Heather and Robertson 2005; Gill et al. 2010). Although modern sources also mention Kapiti Island (e.g., Higgins et al. 2001; Norman 2018), this report was never confirmed and has actually been treated as doubtful (Buller 1888; Turbott 1967).

The first reported sighting of the species is from 1835, from the Bay of Islands (Castro 2016). Stitchbirds remained common in middle (lower Waikato region) to southern North Island until the 1870s (Gill et al. 2010); after a rapid decline, they had vanished from the mainland in 1885 (Heather and Robertson 2005). Likely in consequence to this, there is a scarcity of specimens of stitchbird from localities on the mainland: just two specimens have indication of precise localities there (Fig. 5).

The last confirmed sighting on the mainland is from the Tararua Range in February 1883 (Angehr 1984; Castro 2016). The species survived only as a relictual population on Little Barrier Island until the 1980s (Heather and Robertson 2005), when translocation programs started (Miskelly and Powlesland 2013; Castro 2016). These programs achieved some success and the conservation status of the stitchbird improved in 2013, from “nationally endangered” to “nationally vulnerable” (Castro 2016).

Discussion

We located and collated collection data from museum specimens worldwide and combined these with literature records to produce a more precise historical distribution for the endemic New Zealand families Callaeidae and Notiomystidae. Literature records, especially the more recent ones, are often too broad and generic to be of use in works where more precision is required (but see Lavers 1978 for an exception). Compilation works in modern literature usually mention presumed distribution ranges such as entire regions (e.g., “Northland”) or, more typically, half of the country (e.g., “North Island”), which is not necessarily true. Several of these reports are often accompanied by nostalgia-infused statements of how abundant the species was in its heyday. Sometimes, these whole-island historical ranges were apparently extrapolated from a record in the northern part and one in the southern, meaning that an assumption was made that the species could be found everywhere in between. Once again, this is very unlikely the case and it can be misleading. For instance, even the best-recorded species herein, the North Island kokako (Fig. 2), shows a meaningful gap in its distribution that is likely a real signal rather than collection (or observation) bias. Areas on the South Island without reports or specimens could be attributed to collection bias, as they include localities that are difficult to explore on and around the Southern Alps mountain range.

The results gathered from museum collections are, in most cases, quite well aligned with reported sightings. These two streams of data are complementary, of course,

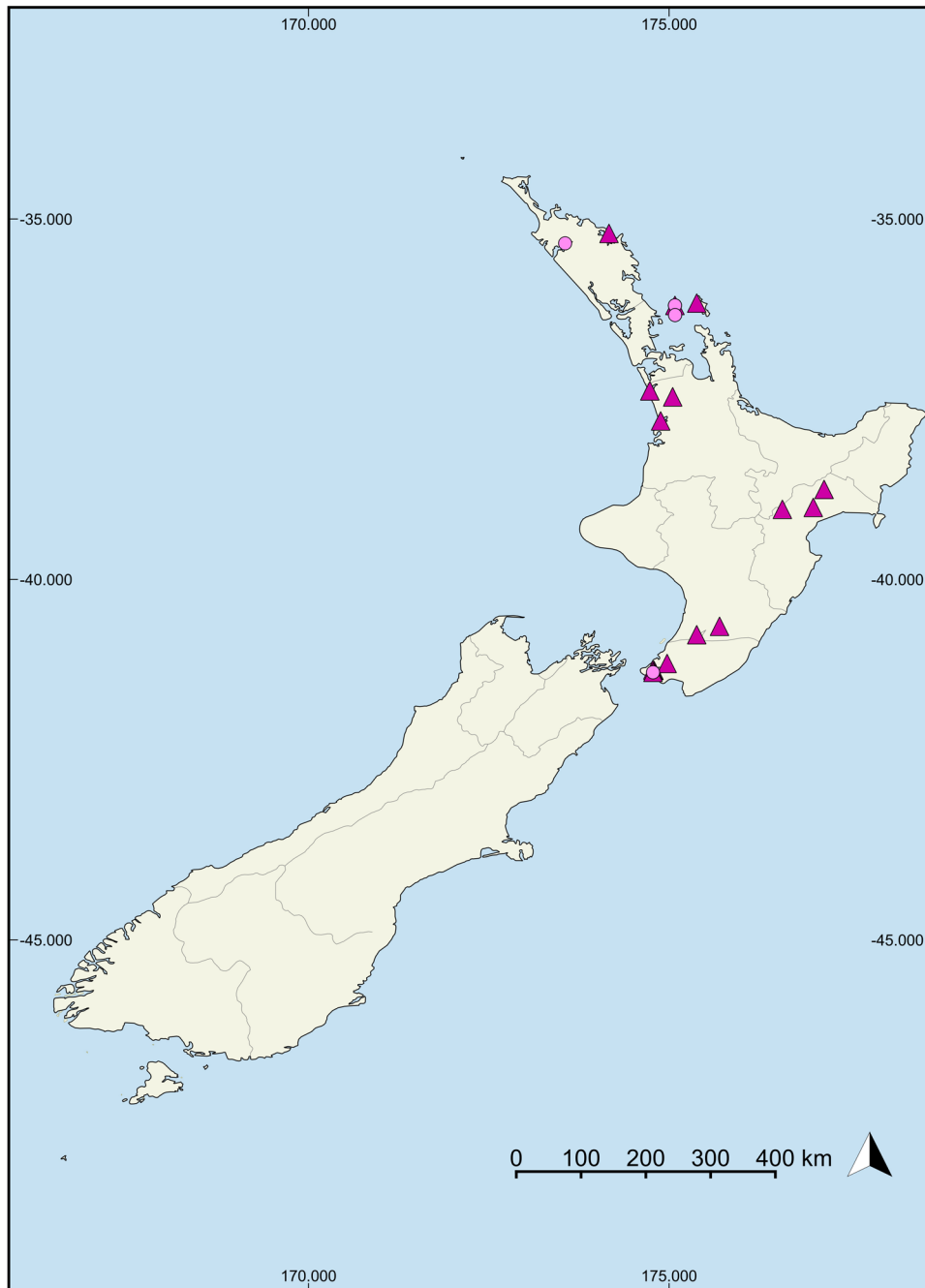


Figure 5. Historical distribution of stitchbird in New Zealand until 1910, based on museum specimens (circles) and literature data (triangles).

as shown by the cases of the North Island saddleback and stitchbird (Figs 4, 5), where few specimens were collected before they became extinct on the mainland. Even so, vouchered specimens are much more reliable, as they represent primary data that can be re-examined (Schilthuizen et al. 2015; Turney et al. 2015).

Species' occurrence data is important in many research fields, including systematics, biogeography, ecology, and global change biology. The power of museum collections, however, surprisingly remains largely untapped for study areas beyond systematics; they are just now being recognised for the possibilities they hold for long-term studies (e.g., Meineke et al. 2018; Schmitt et al. 2018). As always, accurate data garnered from real specimens are crucial to this venture. Understanding

species' original distribution in historic times is key to dispel misleading generalizations and thus to better plan conservation and management strategies; in addition, it should allow better-informed distribution models for re-introduction programs to be built upon. Therefore, we hope our work will serve to inform future research and conservation regarding these species.

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Figure 6. Example of a South Island kokako specimen (MNZ OR.014300). Despite their importance, most specimens, like this one, lack provenance data. © Te Papa CC BY-NC-ND 4.0.



Figure 7. Last known specimen and record of the huia, from 1906 (MNZ OR.030203), Manawatu Gorge. © Te Papa CC BY-NC-ND 4.0.

Scotfield, Phil Skewes, and Natasha Bonham-Carter (CM); Steve Rogers and Chase Mendenhall (CMNH); Thomas A. Webber (FLMNH); Martti Hildén (LUOMUS); Jeremiah Trimble (MCZ); Matthieu Landreau (MHNH); Alice Cibois (MHNG); Josefina Rodriguez (MNCN); Jérôme Fuchs and Patrick Boussès (MNH); Jan Lontkowski (MPW); Rauri Bowie and Carla Cicero (MVZ); Marco Passamonti (MZUB); Jan Kristensen, Peter Hosner and Jon Fjeldså (NHMD); Mark Adams (NHMUK); Hans-Martin Berg (NHMW); Dieter Tietze (NMBA); Tony Parker (NML); Bob McGowan and Zena Timmons (NMS); Jennifer Gallichan (NMW); Ulf Johansson (NRS); Emma Burns, Kane Fleury and On Lee Lau (OMNZ); Olivier Pauwels (RBINS); Pepijn Kamminga (RMNH); Maya Penck (SAM); Kimberley Stephenson (SMAG); Gerald Mayr (SMF); Rodney Cook (WMAH); Kristof Zyskowski (YPM); Sylke Frahnert (ZMB); Alexander Haas and Cordula Bracker (ZMH); and Markus Unsöld (ZSM). We are likewise grateful to Jennifer Twist (MNZ) for helping to retrieve the original notes of W.R.B. Oliver; to Elizabeth Lorimer (AWMM) for helping procuring the diary of C.F. Adams; to Jean-Claude Stahl (MNZ) for the photograph of the huia; to the photographers who kindly granted us permission to use their photos in this work; and to Gisele Dantas and Sahas Barve for the helpful comments and suggestions. We are equally thankful to all other museum staff we bothered while looking for specimens. BMT was supported by a Rubicon fellowship of the Netherlands Organization for Scientific Research (NWO; Rubicon #019.181EN.005).

Authors' Contributions

RBS compiled the list of specimens; BMT prepared the maps; CMM and RBS re-identified problematic specimens; all authors shared in writing the text.

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Appendix

Catalogue of museum specimens

Below are listed all the specimens of Callaeidae and Notiomystidae we were able to find in institutional collections (museums and universities) worldwide. For the discussion on the main text, only those specimens with known locality and date of collection were considered. However, the list below includes all the other specimens, as this information might be useful for other researchers; it also comprises captive birds and specimens from translocated populations, indicated respectively by [C] or [T] after the locality data. We do not, however, list fossil specimens, as deep-past distributions are out of the scope of this article. Likewise, we do not list sub-fossil specimens or archaeological material, due to the uncertainty (or lack of data) regarding their precise provenance and/or age.

The list is arranged systematically and each species entry is organised by the kind of the specimen, that is: mounts, skins, skeletons and skeletal parts, wings/tails, feathers, fluid-preserved specimens, tissue samples, eggs, and nests. Within each of these categories, the specimens are listed alphabetically by the acronym of their institutions (see list of abbreviations below) and then numerically by catalogue number. For each specimen, we only included the most important data (when available): sex, age, collection year, and locality (the mention of “New Zealand” on the locality entry was omitted). For brevity and simplicity, we excluded other less-relevant data (e.g., name of collector, donor, old register numbers). Most specimens lack data or have questionable data and some remain unidentified to species level. We could not visit all the collections housing specimens to try to resolve at least a portion of these matters, so for now they will remain with incomplete/inconclusive data.

Analysed specimens stem from the following collections: AWMM, CM, MNZ. Photographs of specimens were obtained from the following collections: BPBM, CMNH, FLMNH, LUOMUS, MCZ, MHNH, MHNG, MNCN, MPW, NHMD, NHMUK, NHMW, NMBA, NML, NMS, NMW, NRS, OMNZ, RBINS, SAM, SMAG, WMAH. The remaining data was gathered from collection databases (online or upon request), but there is no reason to suspect their identification is erroneous.

As neither the older specimens studied herein nor the literature data contain coordinates, we had to estimate the coordinates as best as possible using Google Earth (Google LLC). The coordinates are given in the end of this Appendix, in decimal degrees (DD), arranged by species and localities. Localities are given in alphabetical order for easiness of use.

Abbreviations: [C] = captive bird; m = male; f = female; juv = juvenile; spm = specimen(s); [T] = bird from a translocated population.

North Island Kokako, *Callaeas wilsoni* (Bonaparte, 1850)

Eggs. MNZ OR.025219 (25/Nov/1996, Bay of Plenty, Rotoehu Forest); MNZ OR.025220 (26/Dec/1996, Mapara State Forest near Taumarunui); MNZ OR.025221 (12/Dec/1996, Mapara State Forest near Taumarunui); MNZ OR.025222 (10/Feb/1997, Mapara State Forest near Taumarunui); MNZ OR.025223 (29/Jan/1997, Mapara State Forest near Taumarunui); MNZ OR.025224 (28/Dec/1996, Mapara State Forest near Taumarunui); MNZ OR.025225 (21/Jan/1997, Mapara State Forest near Taumarunui); MNZ OR.025226 (16/Dec/1996, Bay of Plenty, Rotoehu Forest); MNZ OR.025227 (6/Dec/1996, Bay of Plenty, Rotoehu Forest); MNZ OR.025228 (5/Dec/1996, Bay of Plenty, Rotoehu Forest); MNZ OR.025438 (23/Dec/1997, Mapara Wildlife Management Reserve); MNZ OR.025439 (22/Nov/1997, Hunua Ranges); MNZ OR.025440 (27/Dec/1997, Mapara State Forest near Taumarunui); MNZ OR.025441 (17/Jan/1998, Mapara Wildlife Management Reserve); MNZ OR.025833 (17/Dec/1998, Kapiti Island [T]); MNZ OR.025835 (17/Dec/1998, Kapiti Island [T]); MNZ OR.025836 (7/Jan/1999, Kapiti Island [T]); MNZ OR.025837 (17/Dec/1998, Kapiti Island [T]); MNZ OR.026632 (20/Dec/1999, Kapiti Island [T]); MNZ OR.026633 (20/Dec/1999, Kapiti Island [T]); MNZ OR.026634 (Mount Bruce Wildlife Reserve [C]); MNZ OR.026735 (31/Dec/1996, Mapara State Forest near Taumarunui).

Feathers. AWMM LB11812 (28/Mar/2004, Little Barrier Island [T]); AWMM LB12955 (30/Aug/2003, Northland); AWMM LB13672 (ca. 2006, Tiritiri Matangi Island [T]); AWMM LB14729 (m, 24/Jun/2008).

Fluid. AWMM LB1979 (m, 02/Dec/1982, Mamaku Ranges, Mamaku Plateau); AWMM LB12949 (juv, 27/Feb/2005); MNZ OR.010275 (15/Jun/1962, Bay of Plenty, Te Puke, Te Matai Road); MNZ OR.023359 (f, 4/Dec/1979, Pureora Forest); MNZ OR.024651 (3/Jan/1992, Mapara Wildlife Management Reserve); MNZ OR.025294/b (f, 4/Jan/1996, Rotoehu Forest); MNZ OR.025832/b (f, 22/Jan/1998, Hunua Ranges); MNZ OR.025833/a (17/Dec/1998, Kapiti Island [T]); MNZ OR.025834 (4/Feb/1999, Kapiti Island, Maraetakaroro [T]); MNZ OR.026733 (17/Dec/1996, Hunua Ranges); MNZ OR.026734 (17/Dec/1997, Hunua Ranges); MNZ OR.026736 (27/Dec/1998, Mapara State Forest near Taumarunui); MNZ OR.026737 (11/Sep/1996, near Tauranga); MNZ OR.027880 (28/Dec/1996, Mapara State Forest near Taumarunui); MNZ OR.027881 (29/Jan/1997, Mapara State Forest near Taumarunui); MNZ OR.027882 (26/Dec/1997, Mapara Wildlife Management Reserve); MNZ OR.027883 (18/Jan/1997, Mapara Wildlife Management Reserve).

Mount. AWMM LB238 (pre-1950, Auckland, Cockle Bay); AWMM LB4212 (pre-1934, Bay of Plenty);

AWMM LB4213 (f, 03/Jul/1953, Ngaruawahia); AWMM LB4214 (m, pre-1936, Waitakere Ranges); AWMM LB4215 (pre-1936); AWMM LB8515 (pre-1913); AWMM LB8522 (pre-1982); AWMM LB8523 (07/Jul/1968m, Mount Pirongia); AWMM LB8524 (m, pre-1879, Tauranga); AWMM LB8535 (m, 26/Nov/1889, Clevedon, Wairoa Range); AWMM LB8542 (m, pre-1913, upper Waipa Valley); AWMM LB8543 (f, 04/Jan/1890, Clevedon, Wairoa Range); AWMM LB8821 (pre-1912, South Auckland district); AWMM LB8822 (pre-1912, South Auckland district); AWMM LB8823 (pre-1912, South Auckland district); AWMM LB12797 (pre-1958); AWMM LB12798 (pre-1958); AWMM LB14742 (29/Aug/1953, Tutamoe Range); CM AV2731 (m, Sep/1912, Whanganui River, Kokakonui Stream); CM AV2732 (Sep/1912, Whanganui River, Kokakonui Stream); MHNB 2008.4283; MHNG 632.014 (Napier); MNZ OR.000163; MNZ OR.000164 (m); MNZ OR.000167 (f, 30/Jun/1883, Rimutaka Ranges); MNZ OR.000176 (Wairarapa); MNZ OR.001918 [deaccessioned] (m, 6/Dec/1927, Wellington, Wadestown); MNZ OR.009354 (f, 18/Nov/1923, Kawhia); MNZ OR.009684 (m, 18/Nov/1923, Kawhia); MNZ OR.010833; MNZ OR.010843; MNZ OR.010862; MNZ OR.010863; MNZ OR.010881; MNZ OR.010902; MNZ OR.014042 (m); MNZ OR.014257; MNZ OR.014301; MNZ OR.018894; MNZ OR.022072 (f, 19/Sep/1979, Mapara Wildlife Management Reserve); MNZ OR.022292 (m, 21/Sep/1979, Te Kuiti, Kopaki); MNZ OR.025254 (m, 25/Sep/1996, Waimana Valley, Tawai Ridge); MNZ OR.025294 (f, 4/Jan/1996, Rotoehu Forest); NRS 537931 (1905, Whanganui); NRS 537932 (1905, Whanganui); OMNZ AV683; OMNZ AV5741; RMNH.AVES.90491 (syntype, m, pre-1850); RMNH.AVES.90492 (syntype, f, pre-1850); RMNH.AVES.163017 (m, juv, Wellington province); SMAG E78.229.

Nest. CM AV36810 (17/Dec/1991, Lake Rotoehu); CM AV19234 (1962); MNZ OR.025286 (19/Dec/1994, Mapara Wildlife Management Reserve); MNZ OR.028012 (6/Feb/1992, Mapara Wildlife Management Reserve); MNZ OR.028015 (26/Nov/1994, Mapara Wildlife Management Reserve).

Skeleton. AWMM LB726 (m, 15/Apr/1983, Rotoehu); AWMM LB13672 (ca. 2006, Tiritiri Matangi Island [T]); AWMM LB14729 (m, 24/Jun/2008, Auckland Zoological Park [C]); CM AV5227 (m); MNZ OR.008637 (m, Jul/1883, Waitakere Ranges); MNZ OR.011050; MNZ OR.022072/a (f, 19/Sep/1979, Mapara Wildlife Management Reserve); MNZ OR.022762 (m, 21/Sep/1979, Te Kuiti, Kopaki); MNZ OR.023028 (1979, Mapara State Forest near Taumarunui); MNZ OR.023162/a (f, Nov/1983, Waitomo, Rangitoto Range); MNZ OR.025254/a (m, 25/Sep/1996, Waimana Valley, Tawai Ridge); MNZ OR.025294/a (f, 4/Jan/1996, Rotoehu Forest); MNZ OR.025829/a (m, 11/Sep/1996, Otanewainuku Forest); MNZ OR.025830/a (f, 30/Jan/1997, Rotoehu Forest); MNZ OR.025831/a (m, 20/Oct/1994, Rotoehu Forest);

MNZ OR.025832/a (f, 22/Jan/1998, Hunua Ranges); MNZ OR.025838 (22/Dec/1994, Kapiti Island [T]); MNZ OR.025839/a (22/Aug/1997, Mount Bruce Wildlife Reserve [C]); MNZ OR.025840 (f, Jan/1997, Mapara State Forest near Taumarunui); MNZ OR.027630 (Urewera National Park, Waimana River); MNZ OR.027636 (Urewera National Park, Ikawhenua Range); MNZ OR.027950/a (m, 25/Sep/2005, Te Kuiti Forest); MNZ OR.027979 (18/Jan/1997, Mapara Wildlife Management Reserve, southwest of Te Kuiti).

Skin. AMNH 454364 (f, 1890, Wairarapa); AMNH 673807; AMNH 673808 (Auckland); AMNH 673809 (f, 1890, Wairarapa); AMNH 673810 (m); AMNH 673811; AMNH 673812; AMNH 673813; AMNH 673814 (f); AMNH 673815; AMNH 673816; AMNH 673817; AMNH 673818; AMNH 673819; AMNH 673820; AMNH 673821; AMNH 673822; AMNH 673823; AMNH 673824; AWMM LB726 (m, 15/Apr/1983, Rotoehu); AWMM LB1979 (m, 02/Dec/1982, Mamaku Plateau); AWMM LB4519 (pre-1982); AWMM LB4520 (m, 16/Apr/1878, Titirangi); AWMM LB4521 (f, 30/Apr/1878, Titirangi); AWMM LB4522 (m, May/1933, Mount Pirongia); AWMM LB4523; AWMM LB4524 (pre-1939); AWMM LB4525 (pre-1982); AWMM LB4526 (pre-1935); AWMM LB4527 (m, 07/Apr/1968, Pureora Forest); AWMM LB4528 (f, Oct/1969, Kopaki); AWMM LB4529 (ca. 1910, Papakura-Hunua area); AWMM LB4532 (f, 27/Jun/1899, Walton near Waharoa); BPBM 7160.01 (4/Jan/1890, Wairoa Range); BPBM 7161.01 (juv, 22/Jan/1890, Wairoa Range); ANSP 16029 (f); ANSP 16030 (f); ANSP 54775 (f, 26/Mar/1908); CMNH P24781 (m, 1891, Auckland province, Auckland); CM AV386 (m, 17/Oct/1909, Pipiriki); CM AV387 (m, Sep/1913, Horopito); CM AV388 (m, 16/Oct/1909, Pipiriki); CM AV389 (f, Sep/1913, Horopito); CM AV390; CM AV391 (f, 17/Oct/1909, Pipiriki); CM AV392 (f, 17/Oct/1909, Pipiriki); CM AV393 (f, 16/Oct/1909, Pipiriki); CM AV394 (f); CM AV395; CM AV396; CM AV397; CM AV398; CM AV399; CM AV400; CM AV401 (f); CM AV1123 (f, 1891, Wairarapa); CM AV1122 (m, 1892, Wairarapa); CM AV1124 (m, 19/Dec/1889, Wairoa); CM AV1125 (f, Hunua); CM AV2737; CM AV4373; CM unnumbered; CMNH P24780 (f, 1892, Tararua Range); FMNH 88273; MCZ 39976 (m); MCZ 39977 (m, King Country); MCZ 194970 (Whanganui); MNHN-ZO-MO-1999-943 (m, pre-1895); MNHN-ZO-MO-1999-944 (f, pre-1895); MNHN-ZO-MO-1999-945 (m, pre-1895); MNHN-ZO-MO-1999-946 (f, pre-1895); MNHN-ZO-MO-1999-947 (pre-1895); MNZ OR.005048 (m, Aug/1899, Wellington province); MNZ OR.005049 (f, Aug/1899, Wellington province); MNZ OR.005050; MNZ OR.005051; MNZ OR.005052; MNZ OR.005053 (m, Mar/1902, Taranaki province); MNZ OR.005054 (f, 1906); MNZ OR.005055 (f, 1904); MNZ OR.005056 (f, 1904); MNZ OR.005057 (m, 1905); MNZ OR.005058 (m, 1905); MNZ OR.005059 (m); MNZ OR.005060 (m, 1905); MNZ OR.005061 (f, 1905); MNZ OR.005062; MNZ OR.005063; MNZ

OR.005064; MNZ OR.005065; MNZ OR.005066; MNZ OR.005067; MNZ OR.010408 (ca. 1880); MNZ OR.011049 ([C]); MNZ OR.011051 ([C]); MNZ OR.011070 ([C]); MNZ OR.017650 (ca. 1910, Auckland, Papakura-Hunua); MNZ OR.017651 (pre-1922); MNZ OR.018622 (m, juv, 16/Feb/1971, Mount Bruce Wildlife Reserve); MNZ OR.021807 (Auckland, Hunua Gorge); MNZ OR.023162 (f, juv, Nov/1983, Waitomo, Rangitoto Range); MNZ OR.025306; MNZ OR.025829 (m, 11/Sep/1996, Otanewainuku Forest); MNZ OR.025832 (f, juv, 22/Jan/1998, Hunua Ranges); MNZ OR.025839 (juv, 22/Aug/1997, Mount Bruce Wildlife Reserve [C]); MNZ OR.028469 (pre-1937); NHMUK IRN 6765691 (1842, “River Kianga”, likely Hokianga River); NML D2685 (pre-1851); NML T3224 (Jun/1873, Wellington); NML T3225 (pre-1896); NMS.Z 1906.144.173; OMNZ AV684; OMNZ AV688 (Apr/1880, Castle Rock); OMNZ AV689 (Apr/1880, Castle Rock); RMNH.AVES.142758 (m, pre-1898, Kaitara Range); RMNH.AVES.142759 (f, pre-1898, Kaitara Range); RMNH.AVES.142760; SAM B.11566 (1905); SMF 17420 (f, Feb/1882); USNM 124651 (m, 19th century, south Wairoa); USNM 124652 (f, 19th century, south Wairoa); USNM 146975 (f, 1882); USNM 170332; USNM 370479 (1882); USNM 370480 (1882); SMAG E78.227 (Wairoa); SMAG E78.230; SMAG E78.231; SMAG E78.232; ZMB 25400 (Sep/1871, Wellington province, Wellington).

Tail. MNZ OR.027950/1 (m, 25/Sep/2005, Waikato, Te Kuiti Forest).

Wing. MNZ OR.025830 (f, 30/Jan/1997, Bay of Plenty, Rotoehu Forest); MNZ OR.025831 (m, 20/Oct/1994, Bay of Plenty, Rotoehu Forest); MNZ OR.027950 (m, 25/Sep/2005, Waikato, Te Kuiti Forest).

South Island Kokako, *Callaeas cinerea* (Gmelin, 1788)

Eggs. MNZ OR.007626 (Hokitika).

Feathers. OMNZ AV10183 (Stewart Island); OMNZ AV10212.

Mount. AWMM LB4210 (f, pre-1936, Fiordland, Martins Bay); AWMM LB4211 (f, pre-1936, Fiordland, Martins Bay); AWMM LB8554 (m); AWMM LB8555 (m); CM AV2735 (m, Bealey); CM AV1116; CM AV2733 (Otago); CM AV2736 (f, Bealey); MNCN 19984; MNHN-ZO-MO-1843-79 (1840–1843); MNHN-ZO-MO-1875-206 (m, pre-1876); MNHN-ZO-MO-1875-207 (f, pre-1876); MNHN-ZO-MO-1876-220 (m, 1875); MNHN-ZO-MO-1876-221 (f, 1875); MNHN-ZO-2018-556 (1837–1839); MNHN-ZO-2018-557 (m, Jan/1827, Tasman Bay); MNZ OR.000171; MNZ OR.000174; MNZ OR.000175; MNZ OR.009683 (Dunedin); MNZ OR.010842; MNZ OR.014041; MNZ OR.014300; MNZ OR.021445; OMNZ AV685; OMNZ AV734; OMNZ AV737; OMNZ AV736; OMNZ AV738; OMNZ AV741; OMNZ AV742; OMNZ AV3565; OMNZ AV5742; OMNZ AV5743; SMAG E78.233; USNM 66277 (m, Oct/1872, Bealey).

Nest. CM AV2738 (Jan/1873, Milford Sound); MNZ OR.029158 (Jan/1873, Milford Sound, Freshwater Basin).

Skeleton. CM AV5115 (18/Nov/1899, Takaka); AV5245; MCZ 341347; MNZ OR.015082; MNZ OR.015083; MNZ OR.015084; MNZ OR.015085; MNZ OR.015092.

Skin. AMNH 673786 (f, Aug/1874, Canterbury); AMNH 673787 (1875, Castle Hill Peak); AMNH 673788 (m, Feb/1875, Cook Strait?); AMNH 673789 (Canterbury); AMNH 673790 (Dunedin); AMNH 673791 (m, West Coast); AMNH 673792 (f, West Coast); AMNH 673793 (West Coast); AMNH 673794; AMNH 673795; AMNH 673796; AMNH 673797 (m, Pigeon Bay); AMNH 673798 (m); AMNH 673799; AMNH 673800 (m); AMNH 673801 (f); AMNH 673802; AMNH 673803; AMNH 673804; AMNH 673805; AMNH 673806; ANSP 16026 (f); ANSP 16027 (f); ANSP 16028 (f); ANSP 54774 (f, 26/Mar/1908); AWMM LB4530 (m); AWMM LB4531 (f); AWMM LB4533 (m); AWMM LB4534 (f); AWMM LB4535 (f, 1875, Westland, Taipo); AWMM LB5826; AWMM LB4536 (pre-1938, Stephens Island?); CM AV402 (Milford Sound); CM AV403 (Milford Sound); CM AV404 (30/Jun/1902, Preservation Inlet); CM AV405; CM AV1111 (m, 10/Jul/1911); CM AV1112; CM AV1113; CM AV1114; CM AV1115 (m, 1892, Nelson province); CM AV1117 (f, 1891, Otago); CM AV1118 (30/Jun/1902, Preservation Inlet); CM AV1119; CM AV1120 (1896); CM AV1121; CM AV2246; CM AV2247; CMNH P24779 (m, 1892, Otago province); CMNH P24778 (f, 1892, Nelson province); FLMNH UF36423 (pre-1930); MCZ 11855 (Christchurch); MCZ 11856 (Christchurch); MCZ 11857 (Christchurch); MCZ 28843; MCZ 39978 (m, Milford Sound); MCZ 39979 (f, West Coast); MCZ 75885; MCZ 97218 (West Coast); MCZ 97219 (West Coast); MCZ 341347; MNHN-ZO-MO-1933-852 (m, Oct/1872, Bealey); MNHN-ZO-MO-1999-948 (m, pre-1895); MNZ OR.000168 (f, Jan/1888, Milford Sound); MNZ OR.000169 (m, Stewart Island); MNZ OR.000170; MNZ OR.000172; MNZ OR.000173; MNZ OR.001461 (m, 1906); MNZ OR.001462 (1905); MNZ OR.001463 (1905); MNZ OR.005068 (m, Jun/1899, Nelson province); MNZ OR.005069 (f, pre-1871); MNZ OR.005070; MNZ OR.005071; MNZ OR.005072; MNZ OR.005073; MNZ OR.005074; MNZ OR.021806; MNZ OR.028470; NHMUK 1849.12.12.25 (04/May/1849, Lyttelton [Port Cooper]); NHMUK 1849.12.12.26 (juv, Banks Peninsula, Pigeon Bay); NHMUK 1849.12.12.27 (04/May/1849, Lyttelton [Port Cooper]); NHMUK 1875.7.2.1 (juv); NHMUK 1875.7.2.2; NHMUK 1875.7.2.3; NHMUK 1897.12.6.27 (m, Otago); NHMUK 1897.12.6.28 (f, Otago); NHMUK 1903.7.17.1 (m, Jun/1901, Dusky Sound); NHMUK 1926.12.22.29; NHMUK 1926.12.22.31; NHMUK 1927.12.18.167 (f, Jan/1889, Milford Sound); NHMUK 1927.12.18.4 (f, 1884, Dusky Sound); NHMUK 1927.6.14.4; NHMUK 1949.6.4.202 (m, Aug/1887); NHMUK 1955.6.N.4.9; NHMUK 1958.3.27; NHMUK 1988.21.19; NHMUK 1988.21.20; NHMW 11.533 (f, Jan/1887, Chalky Sound);

NHMW 52.691 (f, Aug/1887, Jackson Bay, Blue River); NMBA 350 (m, pre-1869); NML T17369 (pre-1896); NML T17370 (pre-1896); NMS.Z unnumbered; NMS.Z 1960.23.1; NMS.Z 1992.101.1 (m, Mar/1886, Otago, Mount Cargill); NRS 554879 (1847); SAM B.12346 (f); OMNZ AV686 (pre-1915, Dunedin); OMNZ AV687 (pre-1915, Dunedin); SAM B.12347; SAM B.12351; SMF 17421 (f, ad); SMAG E78.228; SMAG E78.234 (f, Preservation Inlet); SMF 17422 (m, ad); USNM 60523 (1882); USNM 146976 (1882); USNM 168792 (1882); USNM 168793 (1882); USNM 370478 (1882); ZMA.AVES.6594; ZMA.AVES.6595 (m); ZMB 44101 (15/Jan/1897, Dunedin); ZMB 44102 (m, Aug/1874); ZMH 58.3893 (m, pre-1958).

Kokako indet., *Callaeas* sp.

Note. The specimens below lack locality data, so the species could not be precisely determined. Moreover, because the colour of the wattle fades in museum specimens, it is not possible to diagnose the two species of *Callaeas* based on photographs alone.

Egg. NHMUK IRN 3925990.

Fluid. MNZ OR.028751; NHMUK 1940.12.8.109 (1894); NHMUK IRN 3929663; NHMUK IRN 3929666; NHMUK IRN 3929669.

Mount. BPBM 1892; MPW unnumbered; NML 1994.71.1431; RMNH.AVES.253762 (f); RMNH.AVES.253763 (m); RMNH.AVES.253764 (m, juv); SMAG E78.226.

Skeleton. MNZ OR.001378; MNZ OR.001393; MNZ OR.001509; MNZ OR.015081; RMNH.AVES.255466; RMNH.AVES.256401.

Skin. LUOMUS KS.UL1154 (m, pre-1875); MPW unnumbered (pre-1893); MZUB 341; MZUB 207229; NHMD unnumbered (m, pre-1870); NHMUK 1927.6.14.3; NHMUK IRN 3930020 (1894); NHMUK IRN 4241678; NML D2667 (pre-1851); NML D2668 (pre-1851); NML D2684a (pre-1851); NML D4048 (pre-1851); NML D4048a (m, pre-1851); NRS 533806 (pre-1820); RBINS 3193; RBINS 3193B; RBINS 3193C (m, ad); RBINS 3193D (f, ad); RBINS 3193E; RBINS 66592 (m); RMNH.AVES.253760 (m); SMF 17417 (m, 1840); SMF 17418 (m, 1880).

Huia, *Heteralocha acutirostris* (Gould, 1837)

Beaks. CM AV37493 (2 spm, m & f).

Eggs. MNZ OR.007640 (11/Oct/1877, Wainuiomata).

Feathers. AWMM LB14708; CM AV12572 (ca. 1870, Kaimanawa Range); OMNZ AV10395.

Fluid. NHMUK 1940.12.8.107 (m, 1894); NHMUK 1940.12.8.108 (f, 1894); NHMUK IRN 3929651 (f); NHMUK IRN 3929654 (m); NHMUK IRN 3929657 (m); NHMUK IRN 3929660 (f).

Mount. AWMM LB4198 (f, pre-1887, Wairarapa, Seventy Mile Bush); AWMM LB4199 (m, pre-1887, Wairarapa, Seventy Mile Bush); AWMM LB4200 (m); AWMM LB8516 (m); AWMM LB8536 (f); AWMM LB8537 (m); AWMM LB9212 (m); AWMM LB9213 (f); AWMM LB9214 (m, pre-1882, Wellington Province); AWMM LB9216 (m); AWMM LB9215 (m); AWMM LB9217 (f); AWMM LB9218; AWMM LB9219 (f); AWMM LB10964 (f); BPBM 2794; BPBM 145821; BPBM 145822; BPBM 145824; CM AV1083 (f); CM AV1084 (f); CM AV1085 (m); CM AV1086 (m); CM AV1087 (m); CM AV1088 (f); CM AV1089; CM AV1109 (f); CM AV1110 (m); CM AV2726 (m); CM AV3342 (m); CM AV3343 (f); CM AV21283 (m); CM AV36838 (f); MHNG 617.003 (m); MHNG 617.004 (f); MNHN-ZO-MO-1876-223 (m, pre-1877); MNHN-ZO-MO-1876-225 (f, pre-1877); MNHN-ZO-MO-1876-227 (f, pre-1877, Wellington, Wellington); MNHN-ZO-MO-1876-228 (f, pre-1877); MNHN-ZO-unnumbered (2 spm); MNZ OR.000064 (m); MNZ OR.000096 (f); MNZ OR.000152 (f); MNZ OR.000153 (m); MNZ OR.000177 (f, 1911); MNZ OR.000193 (m); MNZ OR.000695 (f); MNZ OR.000696 (f); MNZ OR.001327 (m); MNZ OR.001328 (f); MNZ OR.005509 (m); MNZ OR.005510 (m); MNZ OR.005512 (f); MNZ OR.005514 (m); MNZ OR.005515 (f); MNZ OR.005517 (f); MNZ OR.005518 (m); MNZ OR.005519 (f); MNZ OR.005520 (f); MNZ OR.005521 (f); MNZ OR.005522 (m); MNZ OR.005523 (m); MNZ OR.005525 (m?); MNZ OR.005526 (f); MNZ OR.005527 (m); MNZ OR.005529 (f); MNZ OR.005533 (m); MNZ OR.005534 (f); MNZ OR.008514 (m); MNZ OR.008561 (f); MNZ OR.010868 (f); MNZ OR.010900 (f); MNZ OR.011054 (f); MNZ OR.011056 (f, 1899, Wellington, Makara); MNZ OR.011059; MNZ OR.011061 (f); MNZ OR.015791 (m); MNZ OR.022790 (f, 1882); MNZ OR.025277 (m); MNZ OR.025278 (f); MNZ OR.026535 (f); MNZ OR.026811 (m); MNZ OR.026812 (f); MNZ OR.030203 (f, 1906, Manawatu Gorge, Saddle Hill); NHMUK 1945.58.10; NMW Z.1969.140.010 (m); NMW Z.1969.140.011 (f); NRS 523080 (1890); NRS 523081 (1890); RBINS 6987 (m); OMNZ AV722 (m); OMNZ AV731 (f); OMNZ AV732 (m); OMNZ AV733 (f); OMNZ AV5739 (m); OMNZ AV5740 (f); RBINS 6987B (f); RBINS 6987C (f); RBINS 6987D (m); RMNH.AVES.110080 (m); RMNH.AVES.110081 (f); RMNH.AVES.110101 (m); RMNH.AVES.110102 (f); SMAG 33 (m, pre-1912); SMAG 34 (f, pre-1912); SMAG 35 (m, juv, pre-1912); USNM 109185 (m, Manawatu); USNM 109186 (f, upper Manawatu River); WMAH 1961/27/6 (1 m + 2 f); ZMB 26167 (m, 17/Jul/1881, Wellington province, Wellington); ZMH 84.147 (m), ZMH 84.148 (f).

Nest. CM AV2743 (18/Nov/1883, Wellington province, Wellington).

Skeleton. CM AV1070 (f); CM AV5223/O1072.4 (f); CM AV5226 (m); CM AV7184; CM AV21283 (m); MCZ 340350; MNZ OR.011064/a (f, 1880, Wellington, Akatarawa); MNZ OR.000192 (f); MNZ OR.000691; MNZ

OR.000692 (m); MNZ OR.001377; MNZ OR.001508; MNZOR.001517 (f, 1890, Pahiatua, Puketoi Range); MNZ OR.005513 (f); MNZ OR.005528 (f); MNZ OR.005531 (f); MNZ OR.005532 (m); MNZ OR.011057 (m); MNZ OR.011058 (m); MNZ OR.011653 (m); MNZ OR.011654 (f); MNZ OR.015087 (m); MNZ OR.015088 (f); MNZ OR.015089 (m); MNZ OR.015090; MNZ OR.015091 (f); MNZ OR.019803 (m, Rangitikei, Hinau); MNZ OR.019804 (m, Rangitikei, Hinau); MNZ OR.019805 (f, Rangitikei, Hinau); MNZ OR.019806 (Rangitikei, Hinau); MNZ OR.023686 (f); MNZ OR.023928 (f, 1890, Remutaka Range); MNZ OR.026462 (f); M N Z OR.026463; MNZ OR.026464; MNZ OR.026465 (f); NHMUK IRN 1881.1.17.91 (m); NHMUK IRN 3931238 (f); NHMUK IRN 4063831 (f); NHMUK IRN 8058745 (f); NHMUK IRN 8058746; NHMUK IRN 8058747; USNM 346388.

Skin. AMNH 203038 (m); AMNH 203039 (f); AMNH 295315 (f, Peep-o-Day Road); AMNH 295316 (m, Peep-o-Day Road); AMNH 669772 (m, 1982, Wellington); AMNH 669773 (m, Makuri Ranges); AMNH 669774 (m, Makuri Ranges); AMNH 669775 (m, Makuri Ranges); AMNH 669776 (m, Makuri Ranges); AMNH 669777 (m, Makuri Ranges); AMNH 669778 (f, Makuri Ranges); AMNH 669779 (f, Makuri Ranges); AMNH 669780 (f, Makuri Ranges); AMNH 669781 (f, Makuri Ranges); AMNH 669782; AMNH 669783; AMNH 669784; AMNH 669785; AMNH 669786; AMNH 669787; AMNH 669788; AMNH 669789 (f); ANSP 16021 (m); ANSP 16022 (f); ANSP 16023 (f); ANSP 16024 (m); AWMM LB393 (m); AWMM LB394 (f); AWMM LB4564 (m); AWMM LB4565 (m); AWMM LB4566 (f, Wellington Province); AWMM LB4567 (m, Ruahine Range); AWMM LB4568 (f, Ruahine Range); AWMM LB4576 (f); AWMM LB4577 (m); AWMM LB4569 (m); AWMM LB4570 (f); AWMM LB4571 (m); AWMM LB4572 (m); AWMM LB4573 (f); AWMM LB4574 (f); AWMM LB4575 (f); CM AV355 (m); CM AV356 (f); CM AV357 (f); CM AV773 (m, Hawke's Bay); CM AV1069 (m); CM AV1077 (f, 1892, Wairarapa); CM AV1076 (f, 1891, Wairarapa); CM AV1082 (m, juv?, 1892, Wairarapa); CM AV1079 (m, 1891, eastern Wairarapa, Ngarara Ranges); CM AV1080 (f, 29/Nov/1892, Puketoi Range); CM AV1078 (m, 1892, Makuri Ranges); CM AV1081 (f); CM AV1126 (m); CM AV2244 (f); CM AV2245 (m); CM AV2283 (m); CM AV2285 (m); CM AV2727 (f); CM AV2728 (f); CM AV2729 (m); CM AV2730 (m); CM AV2744 (m, Wellington province, Wellington); CM AV2745 (m, 1885, Upper Hutt, Mangaroa Hill); CM AV2746 (f, 1885, Upper Hutt, Mangaroa Hill); CM AV2747 (f, juv, 1885, Upper Hutt, Mangaroa Hill); CM AV10691 (m); CM AV10692 (f); CM AV21282 (f); CM unnumbered (2 spm); CMNH P24773 (m, 1892, Puketoi Range); CMNH P24772 (f, 28/Nov/1892, Puketoi Range); CMNH P24775 (m, Feb/1892, near Waikanae); CMNH P24776 (f, 1892, Puketoi Range, Makuri River); CMNH P24777 (f, juv, 1892, Puketoi Range, Makuri

River); FMNH 3701 (f); FMNH 215100 (m); FMNH 215101 (m); FMNH 310193 (f); LUOMUS KS.UL2095 (pre-1879); MCZ 36320 (m); MCZ 36321; MCZ 39974; MCZ 39975 (f); MCZ 88773; MCZ 88774; MCZ 156589 (m); MNHN-ZO-MO-1999-951 (m, pre-1895); MNHN-ZO-MO-1999-952 (f, pre-1895); MNHN-ZO-MO-1999-953 (m, pre-1895); MNHN-ZO-MO-1999-954 (m, pre-1895); MNHN-ZO-MO-1999-955 (f, pre-1895); MNZ OR.000094 (m); MNZ OR.000095; MNZ OR.000097 (m); MNZ OR.000098 (f); MNZ OR.000181 (f); MNZ OR.000185 (m); MNZ OR.000189 (f, Nov/1898, Wellington Province); MNZ OR.001518 (m, 1890, Pahiatua, Puketoi Range); MNZ OR.005047 (m, Aug/1901); MNZ OR.005516 (f); MNZ OR.005524 (m); MNZ OR.005530 (f); MNZ OR.011053 (m); MNZ OR.011055 (m); MNZ OR.011062 (m, 1880, Wellington, Akatarawa); MNZ OR.011063 (m, 1899, Wellington, Makara); MNZ OR.011064 (f, 1880, Wellington, Akatarawa); MNZ OR.025303; MNZ OR.025304; MNZ OR.025305; MVZ 108562 (f); MVZ 108563 (m); NHMD 294762 (m, pre-1875); NHMD 294763 (f, pre-1875); NHMUK 1847.1.8.23; NHMUK 1875.7.2.10 (f, Rimutaka Range); NHMUK 1875.7.2.11 (m, Rimutaka Range); NHMUK 1875.7.2.12 (f, Rimutaka Range); NHMUK 1875.7.2.13 (f, Rimutaka Range); NHMUK 1875.7.2.14 (f, Rimutaka Range); NHMUK 1875.7.2.81 (m, Rimutaka Range); NHMUK 1875.7.2.9 (m, Rimutaka Range); NHMUK 1897.6.1.394 (f); NHMUK 1897.6.1.395 (f); NHMUK 1926.10.10.1 (m, 1978); NHMUK 1926.10.10.2 (Sep/1878, Tararua Range); NHMUK 1939.12.9.14 (m, Makuri Range); NHMUK 1939.12.9.15a (f); NHMUK 1945.58.11 (m); NHMUK 1949.64.214 (m, South Island); NHMUK 1949.64.215 (m); NHMUK 1949.64.216 (m); NHMUK 1949.64.217 (f); NHMUK 1953.33.14 (f); NHMUK 1953.33.15 (f); NHMUK 1953.33.16 (m); NHMUK 1955.6.N.4.10 (m, 24/Aug/1895); NHMUK IRN 3930002 (f); NHMUK IRN 3930005 (m); NHMUK IRN 3930014 (f); NHMUK IRN 3930023 (m, 1894); NHMUK IRN 3930017 (m); NHMW 11.538 (m, Oct/1886, Manawatu River); NHMW 11.539 (m, Feb/1886, Manawatu River); NHMW 11.540 (m, juv, Oct/1886, Manawatu River); NHMW 11.541 (m, Oct/1886, Manawatu River); NHMW 11.542 (f, Oct/1886, Manawatu River); NHMW 11.543 (f, juv, Oct/1886, Manawatu River); NHMW 11.564 (f, Oct/1886, Manawatu River); NHMW 11.565 (m, Oct/1886, Manawatu River); NHMW 45.745 (m, 20/Jul/1881, Rimutaka Hill); NHMW 45.746 (f, 17/Jul/1881, Rimutaka Hill); NMBA 445 (f, pre-1884); NMS.Z unnumbered (m); NMS.Z unnumbered (f); NMS.Z 1869.6.26a (f); NMS.Z 1869.6.26b (m); NMS.Z 1877.11.1.1 (m, 1874); NMS.Z 1877.11.1.2 (f); NMS.Z 1960.23.2 (f, 1874); NMS.Z 1960.23.3 (m); NMW Z.1979.053.3283 (m, Dec/1893); NMW Z.1979.053.3284 (f, Dec/1893); NRS 572048 (f, 1868); RMNH.AVES.110107 (f); RMNH.AVES.110108 (m, Dec/1898, Rimutaka Hill); RMNH.AVES.110109 (f, Dec/1898, Rimutaka Hill); SAM B.9710 (f); SAM B. 9711 (f); SAM B.11034 (m); SAM B.12360 (m); SAM B.12361 (m); SAM B.12362 (f); SAM B.12363

(f); SMF 17429 (m, ad); SMF 17430 (f, ad); SMF 17431 (m, 1892); SMF 17432 (f, 1892); SMF 17433 (m, ad); SMF 17434 (f, ad); USNM 60521 (f, 19th century); USNM 60522 (m, 19th century); USNM 146977 (f, 19th century); USNM 146978 (f, 19th century); USNM 170331 (f, 19th century); USNM 192727 (m, 1882); USNM 192728 (f, 1882); USNM 192729 (f, 19th century); USNM 273915 (m, 19th century); USNM 273916 (f, 19th century); YPM 14729 (f); YPM 14730 (m); ZMA.AVES.4 (f); ZMA.AVES.5 (f); ZMA.AVES.3162 (f, South Island); ZMA.AVES.3163 (m); ZMA.AVES.3413 (f); ZMB 26168 (f, 05/Aug/1881, Wellington province, Wellington); ZSM unnumbered (2 spm).

North Island Saddleback, *Philesturnus rufusater* (Lesson, 1828)

Eggs. CM AV5055 (Hen/Taranga Island); CM AV5056 (Hen/Taranga Island); CM AV5057 (25/Nov/1933, Hen/Taranga Island); CM AV5058 (Little Barrier Island); CM AV5059 (Nov/1909, Hen/Taranga Island); CM AV5060 (Nov/1909, Hen/Taranga Island); MNZ OR.012018 (Oct/1965, Mount Bruce Wildlife Reserve [C]); MNZ OR.012929 (Nov/1967, Mount Bruce Wildlife Reserve [C]); MNZ OR.016034 (29/Nov/1970, Mount Bruce Wildlife Reserve [C]); MNZ OR.027168 (27/Dec/2002, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.027169 (16/Oct/2002, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.027170 (27/Dec/2002, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.027700 (4/Feb/2004, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.027701 (24/Dec/2003, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.027702 (4/Dec/2002, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.027703 (23/Dec/2003, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.027704 (24/Feb/2004, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.027705 (22/Dec/2003, Zealandia/Karori Wildlife Sanctuary [T]).

Feathers. AWMM LB13324 (f, juv, 31/Jul/2002, Tiritiri Matangi Island [T]); AWMM LB14699 (m, 20/May/2007, Tiritiri Matangi Island, Hauraki Gulf [T]); MNZ OR.029231/a (5/Nov/2008, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.029378/a (f, 16/Mar/2004, Zealandia/Karori Wildlife Sanctuary [T]).

Fluid. AWMM LB1500 (juv, 05/Jan/1987, Cuvier Island [T]); AWMM LB1503 (18/Jan/1987, Cuvier Island [T]); AWMM LB1504 (19/Jan/1987, Cuvier Island [T]); AWMM LB1505 (m, 06/Mar/1987, Cuvier Island [T]); AWMM LB1506 (f, 06/Mar/1987, Cuvier Island [T]); AWMM LB1507 (juv, 29/Jan/1987, Cuvier Island [T]); AWMM LB1508 (18/Jan/1987, Cuvier Island [T]); AWMM LB1509 (18/Jan/1987, Cuvier Island [T]); AWMM LB1984 (m, 20/Dec/1982, Kapiti Island [T]); AWMM LB1985 (f, 20/Dec/1982, Kapiti Island [T]); AWMM LB2187 (f, 16/May/1984, Kapiti Island [T]); AWMM LB9845 (14/Aug/2000, Tiritiri Matangi Island [T]); MNZ OR.009855 (4/Jun/1949, Hen/Taranga Island);

MNZ OR.010188 (m, 12/Jan/1964, Hen/Taranga Island); MNZ OR.010189 (m, 12/Jan/1964, Hen/Taranga Island); MNZ OR.010273/a (f, 6/Feb/1964, Hen/Taranga Island); MNZ OR.012291 (Dec/1965, Mount Bruce Wildlife Reserve [C]); MNZ OR.013250 (m, 16/Jan/1968, Hen/Taranga Island); MNZ OR.027885 (25/Feb/2003, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.029168 (24/Oct/2008, Zealandia/Karori Wildlife Sanctuary [T]).

Mount. AWMM LB153 (f, 25/Sep/1987, Mercury Islands, Stanley Island [T]); AWMM LB1350 (f, 25/Feb/1985, Cuvier Island [T]); AWMM LB4203 (m, 03/Oct/1908, Hen/Taranga Island); AWMM LB4204 (pre-1929); AWMM LB8525 (f, pre- 1881, Hen/Taranga Island); AWMM LB8544 (m, pre-1887, Hen/Taranga Island); AWMM LB8551 (f, pre-1890, Hen/Taranga Island); AWMM LB8610 (m, 07/Aug/1996, Tiritiri Matangi Island [T]); AWMM LB11808 (14/Sep/1999, Tiritiri Matangi Island [T]); CM AV2751 (m, Dec/1924); MNZ OR.005044; MNZ OR.005045; MNZ OR.010307 (m, 12/Jan/1964, Hen/Taranga Island); MNZ OR.014045; MNZ OR.014296; MNZ OR.014297 ([C]); MNZ OR.022287 (m, Mount Bruce Wildlife Reserve [C]); OMNZ AV724.

Skeleton. AMNH 27326 (m, 23/Nov/1997, Tiritiri Matangi Island [T]); AWMM LB153 (f, 25/Sep/1987, Mercury Islands, Stanley Island [T]); AWMM LB1350 (f, 25/Feb/1985, Cuvier Island [T]); AWMM LB14699 (m, 20/May/2007, Tiritiri Matangi Island, Hauraki Gulf [T]); AWMM LB14975 (f, 30/Aug/2007, Tiritiri Matangi Island [T]); CM unnumbered (Aug/1997, [T]); MNZ OR.012528 (19/Nov/1965, Mount Bruce Wildlife Reserve [C]); MNZ OR.012529 (17/Dec/1965, Mount Bruce Wildlife Reserve [C]); MNZ OR.014975 (m, 1968, Mount Bruce Wildlife Reserve [C]); MNZ OR.021501 (22/Apr/1976, Mount Bruce Wildlife Reserve [C]); MNZ OR.023910 (f, 26/Sep/1988, Mount Bruce Wildlife Reserve [C]); MNZ OR.024422 (f, 2/Aug/1990, Stanley Island [T]); MNZ OR.026752 (31/Mar/2000, Cuvier Island [T]); MNZ OR.027138 (2000, Cuvier Island [T]); MNZ OR.027415 (m, 15/Jun/2002, Tiritiri Matangi Island, Hauraki Gulf [T]); MNZ OR.027642 (2/Aug/2002, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.027645 (16/Sep/2002, Wellington, Makara Peak [T]); MNZ OR.027945/a (28/Jun/2003, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.028164/a (f, 1/Sep/2002, outside Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.028217/a (13/Jan/2004, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.028426/a (m, 1/Sep/2004, Hawke's Bay, Boundary Stream [T]); MNZ OR.028596 (f, Bay of Plenty, probably Motuhora Island [T]); MNZ OR.029230 (Dec/2007, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.029231 (5/Nov/2008, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.029232 (m, 26/Apr/2008, Wellington, Karori, Turbine Track [T]); MNZ OR.029234 (m, outside Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.029235 (m?, 14/Dec/2006, outside Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.029378 (f, 16/Mar/2004, Zealandia/Karori Wildlife

Sanctuary [T]); MNZ OR.029451/a (m, 17/May/2011, Zealandia/Karori Wildlife Sanctuary [T]); USNM 18288 (Hen/Taranga Island); USNM 18289 (Hen/Taranga Island).

Skin. AMNH 8520 (m, ad); AMNH 413990 (m, 14/Nov/1886, Cuvier Island); AMNH 413991 (m, 15/Nov/1886, Cuvier Island); AMNH 413992 (m, 13/Nov/1886, Cuvier Island); AMNH 413993 (f, 15/Nov/1886, Cuvier Island); AMNH 413994 (f, 15/Nov/1886, Cuvier Island); AMNH 413995 (f, 15/Nov/1886, Cuvier Island); AMNH 669751 (m?, likely 1880's); AMNH 669752 (likely 1880's); AMNH 669753; AWMM LB1420 (f, juv, 21/Sep/1987, Mercury Islands, Stanley Island [T]); AWMM LB1554 (m, 09/Sep/1989, Tiritiri Matangi Island, Bush Two [T]); AWMM LB1984 (m, 20/Dec/1982, Kapiti Island [T]); AWMM LB2187 (f, 16/May/1984, Kapiti Island [T]); AWMM LB2193 (f, juv, 21/Feb/1984, Cuvier Island [T]); AWMM LB4537 (f, Nov/1886, Cuvier Island); AWMM LB4538 (m, Nov/1886, Cuvier Island); AWMM LB4539 (m, Nov/1886, Cuvier Island); AWMM LB4540 (pre-1929); AWMM LB4541 (pre-1929); AWMM LB4542 (pre-1935, Hen/Taranga Island); AWMM LB4543 (pre-1935, Hen/Taranga Island); AWMM LB4544 (pre-1935, Hen/Taranga Island); AWMM LB4545 (m, Jan/1937, Hen/Taranga Island); AWMM LB4546 (f, Jan/1937, Hen/Taranga Island); AWMM LB4548 (pre-1981, Hen/Taranga Island); AWMM LB4549 (f, Jan/1937, Hen/Taranga Island); AWMM LB7011 (m, 15/Oct/1993, Tiritiri Matangi Island [T]); AWMM LB7084 (10/Feb/1994, Tiritiri Matangi Island [T]); AWMM LB9166 (10/Dec/1997, Tiritiri Matangi Island [T]); AWMM LB10375 (m, 20/Oct/1996, Tiritiri Matangi Island [T]); AWMM LB10936 (m, 11/Nov/2000, Tiritiri Matangi Island [T]); AWMM LB11073 (08/Jul/1995, Tiritiri Matangi Island, Big Wattle Valley [T]); AWMM LB11766 (14/Sep/1998, Tiritiri Matangi Island, near Hobbs Beach [T]); AWMM LB11767 (23/Oct/1999, Tiritiri Matangi Island [T]); AWMM LB12040 (m, 06/Oct/1999, Tiritiri Matangi Island [T]); AWMM LB12146 (m, 27/Aug/1995, Tiritiri Matangi Island, Kawerau Track [T]); AWMM LB12343 (04/Apr/1999, Tiritiri Matangi Island [T]); AWMM LB12353 (29/Dec/1998, Tiritiri Matangi Island [T]); AWMM LB12812 (14/Mar/2002, Tiritiri Matangi Island [T]); AWMM LB13766 (f, 05/Nov/2007, Tiritiri Matangi Island [T]); AWMM LB14687 (f, 02/Oct/2008, Tiritiri Matangi Island [T]); AWMM LB14688 (m, 18/Sep/2008, Tiritiri Matangi Island [T]); CM AV303 (Sep/1903, Hen/Taranga Island); CM AV304 (m, Nov/1909, Hen/Taranga Island); CM AV305 (m, Nov/1909, Hen/Taranga Island); CM AV307 (m, Nov/1909, Hen/Taranga Island); CM AV306 (m, 19/Sep/1903, Hen/Taranga Island); CM AV308 (m, Nov/1909, Hen/Taranga Island); CM AV310 (m, 26/Sep/1903, Hen/Taranga Island); CM AV311 (f, Nov/1909, Hen/Taranga Island); CM AV312 (m, Nov/1909, Hen/Taranga Island); CM AV314 (f, 15/Sep/1903, Hen/Taranga Island); CM AV316 (f, 17/Sep/1903, Hen/Taranga

Island); CM AV319 (m, Nov/1909, Hen/Taranga Island); CM AV320 (f, Nov/1909, Hen/Taranga Island); CM AV321 (f, Nov/1909, Hen/Taranga Island); CM AV322 (f, Nov/1909, Hen/Taranga Island); CM AV323 (m, Nov/1909, Hen/Taranga Island); CM AV325 (f, juv, Hen/Taranga Island); CM AV334 (m, 10/Sep/1903, Hen/Taranga Island); CM AV1097 (f, Dec/1924, Hen and Chicken Islands); CM AV1098 (m, Dec/1924, Hen and Chicken Islands); FMNH 67213 (m, 13/Nov/1886, Cuvier Island); MCZ 25745; MNHN-ZO-MO-1999-949 (f, 1880, Hen/Taranga Island); MNZ OR.001654 (f, 28/Oct/1925, Hen/Taranga Island); MNZ OR.005031; MNZ OR.005032; MNZ OR.005033; MNZ OR.005046 (f); MNZ OR.010190 (m, 12/Jan/1964, Hen/Taranga Island); MNZ OR.010273 (f, 6/Feb/1964, Hen/Taranga Island); MNZ OR.011445 (juv, 23/Jan/1964, Hen/Taranga Island); MNZ OR.011658 (1886); MNZ OR.012161 (m, juv, 2/Apr/1966, Mount Bruce Wildlife Reserve [C]); MNZ OR.012228 (m, 2/Apr/1966, Mount Bruce Wildlife Reserve [C]); MNZ OR.012581 (m, 10/Apr/1967, Mount Bruce Wildlife Reserve [C]); MNZ OR.013249 (m, 20/Jan/1968, Hen/Taranga Island); MNZ OR.015225 (f, 26/Apr/1969, Mount Bruce Wildlife Reserve [C]); MNZ OR.017012 (f, 30/May/1971, Cuvier Island [T]); MNZ OR.018616 (f, Mount Bruce Wildlife Reserve [C]); MNZ OR.018617 (f, 8/Jan/1972, Mount Bruce Wildlife Reserve [C]); MNZ OR.018618 (f, 29/Jun/1971, Mount Bruce Wildlife Reserve [C]); MNZ OR.018619 (f, juv, 14/Mar/1970, Mount Bruce Wildlife Reserve [C]); MNZ OR.018620 (f, 8/Jan/1972, Mount Bruce Wildlife Reserve [C]); MNZ OR.021773 (f, Jan/1937, Hen/Taranga Island); MNZ OR.027443 (juv, 5/Jan/2003, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.028217 (juv, 13/Jan/2004, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.028427 (m, 10/Sep/2004, Hawke's Bay, Boundary Stream [T]); MNZ OR.029425 (m, 31/May/2011, Zealandia/Karori Wildlife Sanctuary [T]); NHMUK 1842.12.16.49 (type, pre-1842, Bay of Islands).

Tail. MNZ OR.027945/1 (28/Jun/2003, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.028426/1 (m, 1/Sep/2004, Hawke's Bay, Boundary Stream [T]).

Tissue. AMNH 11059 (m, 23/Nov/1997, Tiritiri Matangi Island [T]); MNZ OR.029451/b (m, 17/May/2011, outside Zealandia/Karori Wildlife Sanctuary [T]).

Wing. AWMM LB10837 (04/Jul/1999, Tiritiri Matangi Island [T]); AWMM LB14975 (f, 30/Aug/2007, Tiritiri Matangi Island [T]); MNZ OR.027945 (28/Jun/2003, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.028164 (f, 1/Sep/2002, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.028426 (m, 1/Sep/2004, Hawke's Bay, Boundary Stream [T]); MNZ OR.029451 (m, 17/May/2011, Zealandia/Karori Wildlife Sanctuary [T]).

South Island Saddleback, *Philesturnus carunculatus* (Gmelin, 1789)

Eggs. CM AV3820 (14/Nov/1931, Pukeweka Island);

CM AV4117 (23/Nov/1931, Solomon Island); CM AV4118 (4/Dec/1931, Big South Cape Island); CM AV4119 (24/Nov/1931, Solomon Island); CM AV4120 (Nov–Dec/1931; Solomon Island & Big South Cape Island); CM AV5061 (22/Nov/1931, Solomon Island); CM AV5062 (8/Dec/1931, Solomon Island); CM AV5063 (22/Nov/1931, Solomon Island); CM AV5064 (Nov–Dec/1931; Solomon Island); CM AV5065 (22/Nov/1931, Big South Cape Island); CM AV10837 (22/Nov/1931, Solomon Island); MNZ OR.007617 (22/Nov/1931, Solomon Island); MNZ OR.007618 (1/Dec/1931, Solomon Island); MNZ OR.007619; MNZ OR.007620; MNZ OR.007621; MNZ OR.015308 (8/Mar/1969, Big Island [T]); MNZ OR.015638 (20/Jul/1970, Big Island [T]); MNZ OR.016693 (Oct/1971, Southland, Gorge Road [C]).

Fluid. CM AV4641 (21/Jun/1938, Big South Cape Island); MNZ OR.009852 (Jan/1955, Big South Cape Island); MNZ OR.009853 (Jan/1955, Big South Cape Island); MNZ OR.019196 (11/Apr/1976, Womens Island [T]); MNZ OR.022240 (24/Mar/1980, Maud Island [T]); MNZ OR.023365 (31/May/1978, Kaimohu Island [T]); MNZ OR.023366 (31/May/1978, Kaimohu Island [T]); MNZ OR.023367 (31/May/1978, Kaimohu Island [T]); MNZ OR.023368 (31/May/1978, Kaimohu Island [T]); MNZ OR.023369 (31/May/1978, Kaimohu Island [T]); OMNZ AV8528 (04/Dec/1941); OMNZ AV10565 (23/Jan/1976, Big Island [T]); OMNZ AV10566 (Jan/1976, Big Island [T]); OMNZ AV10567 (1976).

Mount. AWMM LB4201 (pre-1935); AWMM LB4202 (pre-1935); AWMM LB4205 (m, Fiordland, Chalky Inlet); AWMM LB4206 (f, Fiordland, Chalky Inlet); AWMM LB8552 (pre-1936); AWMM LB8553; AWMM LB8550 (f, juv, pre-1963); CM AV2614 (f, juv); CM AV2615 (f, juv, Jun/1888, Big Bay); CM AV2723 (f, West Coast); CM AV2750 (juv, Jun/1888, Big Bay); MNHN-ZO-MO-1876-216 (m, 1875); MNHN-ZO-MO-1876-217 (f, juv, 1875); MNHN-ZO-MO-1876-218 (f, juv, 1875); MNHN-ZO-2010-474 (f, 1827, Tasman Bay); MNHN-ZO-2010-475 (m, 1827, Tasman Bay); MNHN-ZO-2017-464 (f, juv, 1840–1843); MNHN-ZO-2017-465 (f, juv, 1840–1843); MNHN-ZO-2017-466 (f, juv, 1840–1843); MNHN-ZO-2018-558 (m, 1840–1843); MNHN-ZO-2018-559 (juv, Jan/1827); MNZ OR.000194; MNZ OR.001276; MNZ OR.011074; MNZ OR.011659; MNZ OR.012321 (Big South Cape Island); MNZ OR.014046; MNZ OR.014047 (m); MNZ OR.014048 (f); MPW unnumbered (f); OMNZ AV723; OMNZ AV725; OMNZ AV735; OMNZ AV2175; OMNZ AV5724; OMNZ AV5725 (May/1874, Dunedin); OMNZ AV5726; OMNZ AV11502; RMNH.AVES.165101 (m); RMNH.AVES.165103 (m); RMNH.AVES.165125 (m, pre-1876); RMNH.AVES.165130 (f, juv, pre-1876); SMAG 0000.5223; SMAG E78.267; USNM 109146 (Nelson province).

Nest. CM AV2706 (Westland).

Skeleton. CM AV5239 (Pelorus ecological district); CM AV6534; MNZ OR.001381 (19/Aug/1877, Okarito);

MNZ OR.001382; MNZ OR.001395 (Okarito); MNZ OR.008638 (1953, Big South Cape Island); MNZ OR.008698/a (f, 23/May/1956, Big South Cape Island); MNZ OR.012260 (1953, Big South Cape Island); MNZ OR.015079 (May/1953, Big South Cape Island); MNZ OR.021472 (f, Southland); MNZ OR.022106 (m, Southland); MNZ OR.022108 (20/Jul/1980, Maud Island [T]); MNZ OR.022109 (f, Southland); MNZ OR.022110 (m, Southland); MNZ OR.022111 (m, Southland); MNZ OR.022293 (m, Southland); MNZ OR.022671 (24/May/1982, Maud Island [T]); MNZ OR.023128 (m, Aug/1984, Kundy Island [T]); MNZ OR.023129 (Aug/1984, Kundy Island [T]); MNZ OR.027075 (28/Feb/1972, Big Island [T]); MNZ OR.028532 skeleton (m, 2004, Titi Islands [T]); MNZ OR.029914/a (m, 20/Mar/2012, Kundy Island [T]); MNZ OR.029915/a (20/Mar/2012, Kundy Island [T]); MNZ OR.029916/a (f, 20/Mar/2012, Kundy Island [T]); MNZ OR.029917/a (20/Mar/2012, Kundy Island [T]).

Skin. AMNH 669741 (m, Jan/1894, Pelorus Sound); AMNH 669742 (m, Jan/1894, Pelorus Sound); AMNH 669743 (f, Jan/1894, Pelorus Sound); AMNH 669744 (f, Jan/1894, Pelorus Sound); AMNH 669745 (m); AMNH 669746 (Otago); AMNH 669747 (m?, Banks Peninsula); AMNH 669748 (f?, Banks Peninsula); AMNH 669749 (m?, south Taipo [River?]); AMNH 669750 (f, south Taipo [River?]); AMNH 669757 (juv); AMNH 669760 (m, juv); AMNH 669761 (f, juv); AMNH 669762 (f, juv); AMNH 669764 (juv); AMNH 669765 (juv); AMNH 669766 (juv); AMNH 669767 (juv); AMNH 669768 (juv); AMNH 669769 (juv); AMNH 669771 (juv); AWMM LB4552 (pre-1907); AWMM LB4553 (pre-1936); AWMM LB4554 (f, 1875); AWMM LB4555 (f); AWMM LB4556 (m); AWMM LB4557 (f); AWMM LB4558 (f); AWMM LB4559 (m); AWMM LB4560 (m); AWMM LB4561 (m); AWMM LB4562 (f); AWMM LB4563; BPBM 1894 (May/1897, Otago); CM AV309 (West Coast); CM AV313 (m, Nov/1932, Solomon Island); CM AV315 (f, 30/Nov/1932, Solomon Island); CM AV317 (West Coast); CM AV318 (juv); CM AV324 (M, 30/Nov/1932, Solomon Island); CM AV326 (juv); CM AV327 (juv); CM AV328 (juv); CM AV330 (juv); CM AV332 (juv); CM AV329 (juv, Dec/1932, Solomon Island); CM AV331 (juv, Dec/1932, Solomon Island); CM AV1103; CM AV1096 (juv, Moana, Lake Brunner); CM AV1099 (m, juv, 1892, Nelson province, Nelson); CM AV1100 (f, juv, 1898, Milford Sound); CM AV1072 (m, 1892, Otago); CM AV1073 (m, Banks Peninsula); CM AV1075; CM AV1101 (juv, 1892, Nelson province, Nelson); CM AV1071 (f, 1892, Otago); CM AV1074 (m, 1892, West Coast); CM AV1102 (juv, Nov/1932, Solomon Island); CM AV2243 (m, 1921?, Taipo); CM AV2748 (m); CM AV2749 (f); CM AV2721 (juv, Akaroa); CM AV2722 (m, juv, West Coast); CM AV2612 (m, juv); CM AV2613 (f, juv); CM AV4641 (21/Jun/1938, Big South Cape Island); CM AV15868; CM AV15869; CMNH P24761 (f, 1891, Otago); CMNH

P24762 (f, 1892, Otago); CMNH P24763 (m, Feb/1896, Southland, Preservation Inlet); CMNH P24764 (juv, 1892, Stephens Island); CMNH P24765 (f, 1892, Stephens Island); CMNH P24766 (f, juv); CMNH P24767 (f, juv, 1892, Otago); CMNH P24768 (m, juv, 1892, Canterbury); CMNH P24770 (f, juv, 1892, Nelson province); CMNH P24771 (m, juv, 1895, Karamea); CMNH P24760 (m); MCZ 11854 (Christchurch); MCZ 97217 (West Coast); MCZ 171893 (f, 1982, Canterbury); MNHN-ZO-MO-1946-71 (pre-1947); MNHN-ZO-MO-1999-950 (pre-1895); MNZ OR.000201 (m, Mar/1905, Nelson province); MNZ OR.000202 (Mar/1904, Nelson province); MNZ OR.000203 (m, Apr/1905, Nelson province); MNZ OR.000204 (m, Apr/1905, Nelson province); MNZ OR.001653 (m, Mar/1904, Nelson province); MNZ OR.001655; MNZ OR.001656 (f, Aug/1898, Nelson province); MNZ OR.001948 (1890, Otago); MNZ OR.002464 (m?); MNZ OR.002465 (Stephens Island); MNZ OR.005034 (m, Aug/1898, Nelson province); MNZ OR.005035 (f, Aug/1898, Nelson province); MNZ OR.005036 (m, Mar/1904, Nelson province); MNZ OR.005037 (m, Jun/1897, Nelson province); MNZ OR.005038 (f, Jun/1897, Nelson province); MNZ OR.005040; MNZ OR.005041; MNZ OR.005042; MNZ OR.005043; MNZ OR.008698 (f, 23/May/1956, Big South Cape Island); MNZ OR.012227 (m, 13/Jun/1965, Big South Cape Island); MNZ OR.015809 (m, 30/Jul/1970, Big Island [T]); MNZ OR.015810 (m, 30/Jul/1970, Big Island [T]); MNZ OR.015811 (f, 30/Jul/1970, Big Island [T]); MNZ OR.016677 (28/Feb/1972, Big Island [T]); MNZ OR.016678 (f, 13/Jun/1938, Puke-weka Island); MNZ OR.016679 (Dec/1931, Solomon Island); MNZ OR.016680 (m, 16/Feb/1939, Big South Cape Island); MNZ OR.018124; MNZ OR.023029 (m, Aug/1984, Kundy Island [T]); MNZ OR.023030 (m, Aug/1984, Kundy Island [T]); MNZ OR.023031 (m, Aug/1984, Kundy Island [T]); MNZ OR.023377 (m, Aug/1984, Kundy Island [T]); MNZ OR.023408 (m, Aug/1984, Kundy Island [T]); MNZ OR.023413 (m, Aug/1984, Kundy Island [T]); MNZ OR.025478 (m, 26/Jun/1965, Big South Cape Island); MNZ OR.025479 (f, 1/Jul/1965, Big South Cape Island, Murderer's Bay Point); MNZ OR.025480 (m, 28/Jun/1965, Big South Cape Island); MNZ OR.025481 (f, 27/Jun/1965, Big South Cape Island); MNZ OR.028051 (10/Sep/2003, Breaksea Island [T]); MNZ OR.029914 (m, 20/Mar/2012, Kundy Island [T]); MNZ OR.029915 (20/Mar/2012, Kundy Island [T]); MNZ OR.029916 (f, 20/Mar/2012, Kundy Island [T]); MPW unnumbered (m, pre-1893); NHMUK 1886.10.1.7299 (f, juv, Sep/1873, Taipo); NHMUK 1926.10.10.44 (m, May/1878, Taipo); NHMUK unnumbered (m, juv, Sep/1873, Taipo); NMBA 22835 (m, 1875, Taipo River); NMS.Z 1992.101.2 (m, Mar/1886, Otago, Lammerlaw Mountain); OMNZ AV677 (pre-1896, Otago); OMNZ AV678 (pre-1896, Otago); OMNZ AV679 (pre-1896, Otago); SAM B.11568; SMAG 0000.7944; SMF 17423; SMF 17424 (f, Nov/1882); SMF 17425; SMF 17426 (f, juv); SMF 17428 (m, juv); USNM 109188 (19th

century, Nelson province); USNM 352638 (Martins Bay); ZMB 44103 (f, juv, Jan/1878, West Coast, Taramakau).

Tissue. MNZ OR.029914/b (m, 20/Mar/2012, Kundy Island [T]); MNZ OR.029915/b (20/Mar/2012, Kundy Island [T]); MNZ OR.029916/b (f, 20/Mar/2012, Kundy Island [T]); MNZ OR.029917/b (20/Mar/2012, Kundy Island [T]).

Wing. MNZ OR.029914/1 (m, 20/Mar/2012, Kundy Island [T]); MNZ OR.029915/1 (20/Mar/2012, Kundy Island [T]); MNZ OR.029916/1 (f, 20/Mar/2012, Kundy Island [T]); MNZ OR.029917 (20/Mar/2012, Kundy Island [T]).

Saddleback indet., *Philesturnus* sp.

Note. The specimens below lack locality data, so the species could not be precisely determined. Moreover, the minute morphological differences (relative wattle size and bill width, and a pale yellowish band on the front edge of the saddle) are not preserved properly in museum specimens and/or do not translate well to photographic records of such specimens.

Eggs. CM AV3413.

Mount. CPBM 1893; BPBM 145823; MPW unnumbered; NRS 537741 (f, 1858); RMNH.AVES.165104 (f); RMNH.AVES.165124 (m, juv); RMNH.AVES.165132 (m, juv); SMAG 2004.940.59.

Nest. CM AV3412; NHMUK 193.357; NHMUK IRN 2901695.

Skeleton. CM AV5238; CM AV6532.

Skin. AMNH 669754; AMNH 669755; AMNH 669756; AMNH 669758 (m); AMNH 669759 (m); AMNH 669763; AMNH 669770; ANSP 16031; ANSP 16033; ANSP 16034 (m); ANSP 16035 (m); ANSP 16036 (m); ANSP 16037 (m); ANSP 70175; MCZ 39980; FMNH 88274; MCZ 39981; MCZ 39982; MCZ 172264; MHNG 763.069 (f?, juv); NHMUK 1842.9.7.55; NHMUK 1852.1.17.79 (m); NHMUK 1852.1.17.80 (f?); NHMUK 1897.12.6.13; NHMUK 1897.12.6.14 (juv); NHMUK 1903.12.10.23 (m, pre-1903, Chatham Islands [likely error]); NHMUK 1926.12.22.38; NHMUK 1926.12.22.39 (juv); NHMUK 1941.5.3.1; NMBA 446 (m, pre-1878); NMS.Z 1889.88.2 (m); NRS unnumbered; NRS unnumbered (f, ad); NRS 553755 (m, 1853); RBINS 923 (m, ad); RBINS 923B (f); RBINS 923C (f); RBINS 923D (f, juv); RBINS 2350D; SMF 17427 (m, juv, 1880); YPM 36965; ZMA.AVES.6061; ZMH 62.916 (m, pre-1944).

Stitchbird, *Notiomystis cincta* (du Bus de Gisignies, 1839)

Eggs. AWMM LB906 (Feb/1920, Little Barrier Island); AWMM LB1462 (Feb/1984, Little Barrier Island, Tirikakawa Stream); AWMM LB2133 (04/Jan/1985, Little Barrier Island); AWMM LB6682 (Feb/1984, Little Barrier Island, Shag Track); AWMM LB6683 (Feb/1984, Little

Barrier Island, Tirikakawa Valley); AWMM LB8669 (10/Dec/1997, Kapiti Island [T]); AWMM LB10987 (Nov/2002, Tiritiri Matangi Island [T]); AWMM LB10988 (Nov/2002, Tiritiri Matangi Island [T]); AWMM LB11023 (30/Nov/2002, Tiritiri Matangi Island [T]); AWMM LB11086 (Dec/2002, Tiritiri Matangi Island [T]); AWMM LB11088 (15/Jan/2003, Tiritiri Matangi Island [T]); AWMM LB11089 (10/Jan/2003, Tiritiri Matangi Island [T]); AWMM LB11090 (17/Jan/2003, Tiritiri Matangi Island [T]); MNZ OR.016032 (13/Dec/1970, Mount Bruce Wildlife Reserve [C]).

Feathers. AWMM LB10357 (07/Sep/1995); AWMM LB10748 (m, pre-Jun/1999, Tiritiri Matangi Island [T]).

Fluid. AMNH 11199; AWMM LB2163 (male, 16/Apr/1983, Little Barrier Island); AWMM LB727 (m, 21/Jun/1982, Little Barrier Island); AWMM LB1916 (m, 1981, Little Barrier Island); AWMM LB2181 (juv, 03/Dec/1984, Little Barrier Island); AWMM LB3618 (f, 07/Dec/1991, Little Barrier Island); AWMM LB11037 (juv, 06/Dec/2002, Tiritiri Matangi Island [T]); AWMM LB11038 (juv, 01/Dec/2002, Tiritiri Matangi Island [T]); AWMM LB11039 (juv, 04/Dec/2002, Tiritiri Matangi Island [T]); AWMM LB11040 (juv, 22/Nov/2002, Tiritiri Matangi Island [T]); AWMM LB11041 (juv, 08/Dec/2002, Tiritiri Matangi Island [T]); AWMM LB11042 (juv, 08/Dec/2002, Tiritiri Matangi Island [T]); AWMM LB11043 (juv, 08/Dec/2002, Tiritiri Matangi Island [T]); AWMM LB11045 (embryo, ca. Oct/2002, Tiritiri Matangi Island [T]); AWMM LB11046 (embryo, 03/Dec/2002, Tiritiri Matangi Island [T]); AWMM LB11047 (embryo, 30/Nov/2002, Tiritiri Matangi Island [T]); AWMM LB11048 (embryo, 30/Nov/2002, Tiritiri Matangi Island [T]); AWMM LB11044 (juv, 16/Jan/2003, Tiritiri Matangi Island [T]); AWMM LB11068 (juv, 18/Jan/2003, Tiritiri Matangi Island [T]); AWMM LB11069 (juv, 18/Jan/2003, Tiritiri Matangi Island [T]); AWMM LB11070 (juv, 20/Dec/2002, Tiritiri Matangi Island [T]); MNZ OR.029959 (9/Jan/2006, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.024004/a (f, 18/Mar/1989, Mount Bruce Wildlife Reserve [C]); MNZ OR.024355/b (m, 25/Oct/1989, Mount Bruce Wildlife Reserve [C]); MNZ OR.026576/a (m, 3/Aug/1996; Lake Rotorua, Mokoia Island [T]); MNZ OR.027792 (17/Oct/2005, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.027793 (27/Oct/2005, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.027794 (15/Jan/2006, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.027795 (8/Feb/2006, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.027796 (24/Feb/2006, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.027797 (7/Feb/2006, Zealandia/Karori Wildlife Sanctuary [T]).

Mount. AWMM LB8545 (f, pre-1884, Little Barrier Island); AWMM LB8546 (m, 1883, Little Barrier Island); AWMM LB8547 (m, juv, pre-1884, Little Barrier Island); AWMM LB8548 (Dec/1975, Little Barrier Island); AWMM LB8549 (m, 24/Dec/1964, Little Barrier Island,

Waipawa Stream); AWMM LB8849 (m, pre-1982); AWMM LB8850 (m, pre-1982); AWMM LB8851 (f, pre-1982); AWMM LB8906 (m, 07/Sep/1995); AWMM LB9754 (f, 19/Feb/1996, Little Barrier Island); BPBM 145825; BPBM 145826; CM AV2720 (m); CM AV2644 (f); MNHN-ZO-2012-561 (m, 1837–1839); MNHN-ZO-MO-1847-252 (m, pre-1848); MNZ OR.000316 (m); MNZ OR.005024 (m); MNZ OR.005025 (m, [C]); MNZ OR.014052 (f); MNZ OR.014053 (m); MNZ OR.025017 (m, Kapiti Island [T]); MNZ OR.029233 (m, Dec/2010, Mount Bruce Wildlife Reserve [C]); NMS.Z 1869.6.31; RBINS 6994 (m); NRS 523083 (1848); OMNZ AV3313; OMNZ AV5727 (Little Barrier Island); OMNZ AV5729 (May/1874); OMNZ AV5728 (Little Barrier Island); RBINS 6994B (m); SMAG unnumbered (m); SMAG 0000.5370 (m).

Nest. AWMM LB1999 (04/Apr/1986, Little Barrier Island, Tirikakawa Valley); MNZ OR.026473 (1997, Kapiti Island [T]); MNZ OR.027811 (20/oct/2005, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.027812 (30/Jan/2006, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.028977 (16/Jan/2008, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.028978 (29/Oct/2008, Zealandia/Karori Wildlife Sanctuary [T]).

Skeleton. AWMM LB140 (1973, Little Barrier Island); AWMM LB316 (m, Apr/1885, Little Barrier Island); AWMM LB727 (m, 21/Jun/1982, Little Barrier Island); AWMM LB7556 (m, 28/Aug/1995, Little Barrier Island); AWMM LB10357 (07/Sep/1995); AWMM LB10601 (07/Sep/1995, Little Barrier Island); AWMM LB10748 (m, pre-Jun/1999, Tiritiri Matangi Island [T]); AWMM LB11114 (juv, 09/Jan/2003, Tiritiri Matangi Island [T]); AWMM LB12099 (f, juv, Dec/2002, Tiritiri Matangi Island [T]); AWMM LB12500 (Feb/2005, Tiritiri Matangi Island [T]); AWMM LB12952 (f, 18/May/2005, Tiritiri Matangi Island [T]); AWMM LB13467 (f, juv, 09/Jul/2007, Waitakere Ranges, The Cascades [T]); AWMM LB13617 (juv, 08/Mar/2007, Tiritiri Matangi Island [T]); AWMM LB14732 (m, 22/Nov/2012, Tiritiri Matangi Island [T]); AWMM LB14731 (f, 17/Nov/2012, Tiritiri Matangi Island [T]); AWMM LB14733 (pre-2008, Tiritiri Matangi Island [T]); AWMM LB14736 (m, 22/Nov/2012, Tiritiri Matangi Island [T]); AWMM LB14750 (m, 12/Nov/2011); AWMM LB14798 (m, 02/Dec/2012, Tiritiri Matangi Island [T]); AWMM LB14815 (m, 24/Dec/2009, Tiritiri Matangi Island [T]); CM AV5249; MNZ OR.014295 (m); MNZ OR.023482/a (m, 4/Apr/1985, Little Barrier Island); MNZ OR.023824/a (f, 26/Apr/1988, Mount Bruce Wildlife Reserve [C]); MNZ OR.023825/a (m, 26/Apr/1988, Mount Bruce Wildlife Reserve [C]); MNZ OR.024004 (f, 18/Mar/1989, Mount Bruce Wildlife Reserve [C]); MNZ OR.024355/a (m, 25/Oct/1989, Mount Bruce Wildlife Reserve [C]); MNZ OR.024437 (f, 29/May/1991, Mount Bruce Wildlife Reserve [C]); MNZ OR.025003/a (f, 13/Nov/1992, Kapiti Island [T]); MNZ OR.025017/a (m, Kapiti Island [T]); MNZ OR.025112 (f, 13/Dec/1993, Mount Bruce Wildlife

Reserve [C]); MNZ OR.026873 (1991, Little Barrier Island?); MNZ OR.027986/a (f, 14/Jun/2006, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.028218/a (f, 12/Oct/2006, Kapiti Island [T]); MNZ OR.028219/a (m, 3/Oct/2006, Mount Bruce Wildlife Reserve [C]); MNZ OR.028486 (m, 17/Feb/2006, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.028609 (f, 27/Apr/2007, Mount Bruce Wildlife Reserve [C]); MNZ OR.028626 (m, 9/Sep/2002, Kapiti Island [T]); MNZ OR.028841/a (m, 23/Apr/2007, Mount Bruce Wildlife Reserve [C]); MNZ OR.028937 (m, 16/Apr/2007, Mount Bruce Wildlife Reserve [C]); MNZ OR.029453/a (m, 17/Dec/2009, Mount Bruce Wildlife Reserve [C]).

Skin. AMNH 8054; AMNH 203020 (m); AMNH 203021 (m); AMNH 203022 (f); AMNH 203023 (f); AMNH 203024 (f); AMNH 203025 (f); AMNH 203026 (f); AMNH 697350 (m, 1885, Little Barrier Island); AMNH 697351 (m, juv, 1885, Little Barrier Island); AMNH 697352 (m, 1885, Little Barrier Island); AMNH 697353 (m, 1885, Little Barrier Island); AMNH 697354 (m, juv, 1885, Little Barrier Island); AMNH 697355 (m, juv, 1885, Little Barrier Island); AMNH 697356 (m, 1885, Little Barrier Island); AMNH 697357 1885, (m, Little Barrier Island); AMNH 697358 (m, 1885, Little Barrier Island); AMNH 697359 (m, 1886, Little Barrier Island); AMNH 697360 (m, Little Barrier Island); AMNH 697361 (f, 1885, Little Barrier Island); AMNH 697362 (Little Barrier Island); AMNH 697363 (Little Barrier Island); AMNH 697364 (Little Barrier Island); AMNH 697365 (Little Barrier Island); AMNH 697366 (Little Barrier Island); AMNH 697367 (Little Barrier Island); AMNH 697368 (Little Barrier Island); AMNH 697369 (Little Barrier Island); AMNH 697370 (Little Barrier Island); AMNH 697371 (Little Barrier Island); AMNH SKIN 697372; AMNH SKIN 697373; AMNH SKIN 697374; ANSP 18379; ANSP 18380 (m); ANSP 18381 (m); ANSP 18382 (f); AWMM LB727 (m, 21/Jun/1982, Little Barrier Island); AWMM LB1916 (m, 1981, Little Barrier Island); AWMM LB2019 (m, pre-1982); AWMM LB2020 (f, pre-1982); AWMM LB2181 (juv, 03/Dec/1984, Little Barrier Island); AWMM LB3618 (f, 07/Dec/1991, Little Barrier Island); AWMM LB4420 (m, pre-1890, Little Barrier Island); AWMM LB4421 (m, juv, pre-1890, Little Barrier Island); AWMM LB4422 (m, May/1925); AWMM LB4423 (m, ca. 1883, Little Barrier Island); AWMM LB7086 (m, 21/Aug/1991, Little Barrier Island); AWMM LB7087 (m, 19/Aug/1991, Little Barrier Island); AWMM LB8858 (m, 28/Aug/1995, Little Barrier Island); AWMM LB10985 (Nov/2002, Tiritiri Matangi Island [T]); AWMM LB10986 (Feb/2002, Tiritiri Matangi Island [T]); AWMM LB12257 (m, juv, 16/Apr/2004, Tiritiri Matangi Island [T]); AWMM LB12316 (m, 30/Nov/2004, Little Barrier Island); AWMM LB13314 (09/Oct/2006, Tiritiri Matangi Island [T]); CM AV1107 (m, juv, 1886, Little Barrier Island); CM AV1106 (m, 1882, Little Barrier Island); CM AV1105 (m, Dec/1883, Little Barrier Island); AV346 (m, Little Barrier Island);

AV347 (m, Little Barrier Island); AV348 (m); AV349 (m); AV350 (m); AV351 (m); AV352 (m); AV353 (f); AV354 (f); AV1104 (m); AV2258 (f); AV2259 (m); AV2643 (m); AV2642 (f); CMNH P24716 (m, juv, 1886, Little Barrier Island); CMNH P24717 (m, 1888, Little Barrier Island); CMNH P24715 (f, 1886, Little Barrier Island); CMNH P24714 (f, Dec/1883, Little Barrier Island); MCZ 76199 (holotype of *Meliphaga (Ptilotis) auritus* Lafresnaye, 1839); MNHN-ZO-MO-1847-253 (f, 1847); MNHN-ZO-MO-1893-485 (m, pre-1894, Little Barrier Island); MNHN-ZO-MO-2000-1275 (m, pre-1895); MNHN-ZO-2018-545 (f, pre-1846); MCZ 84334; MCZ 84335; MCZ 141493 (m); MCZ 141494 (f); MNZ OR.000317 (f); MNZ OR.000318 (m); MNZ OR.005021 (m, Little Barrier Island); MNZ OR.005022 (m, Little Barrier Island); MNZ OR.005023 (f, Little Barrier Island); MNZ OR.005026 (m); MNZ OR.015803 (m, 7/Nov/1970, Little Barrier Island); MNZ OR.018602 (f, 19/Aug/1971, Little Barrier Island); MNZ OR.022286 (m, juv, 20/Dec/1980, Mount Bruce Wildlife Reserve [C]); MNZ OR.022381 (m, Mount Bruce Wildlife Reserve [C]); MNZ OR.023482 (m, juv, 4/Apr/1985, Little Barrier Island); MNZ OR.024295 (m, 19/Dec/1990, Mount Bruce Wildlife Reserve [C]); MNZ OR.024355 (m, 25/Oct/1989, Mount Bruce Wildlife Reserve [C]); MNZ OR.025003 (f, 13/Nov/1992, Kapiti Island [T]); MNZ OR.026576 (m, 3/Aug/1996, Lake Rotorua, Mokoia Island [T]); MNZ OR.026577 (m, juv, 30/Jul/1991, Mount Bruce Wildlife Reserve [C]); MNZ OR.026578 (f, 4/Sep/1991, Mount Bruce Wildlife Reserve [C]); MNZ OR.028218 (f, juv, 12/Oct/2006, Kapiti Island [T]); MNZ OR.028219 (m, juv, 3/Oct/2006, Mount Bruce Wildlife Reserve [C]); MNZ OR.028423 (m, 19/Jan/2006, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.028424 (f, 17/Feb/2006, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.028775 (f, juv, 17/Mar/2008, Mount Bruce Wildlife Reserve [C]); MNZ OR.028776 (m, 24/Feb/2008, Mount Bruce Wildlife Reserve [C]); MNZ OR.029163 (f, juv, 16/Jan/2009, Mount Bruce Wildlife Reserve [C]); MNZ OR.029164 (f, 14/Jan/2009, Mount Bruce Wildlife Reserve [C]); MNZ OR.029432 (f, 30/Jan/2011, Tiritiri Matangi [T]); MNZ OR.029433 (m, 10/Jan/2011, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.029434 (m, juv, 7/Apr/2011, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.029604 (m, juv, 24/Jul/2008, Mount Bruce Wildlife Reserve [C]); MNZ OR.029606 (m, juv, 14/Mar/2009, Mount Bruce Wildlife Reserve [C]); MNZ OR.029929 (m, 15/Sep/2012, Zealandia/Karori Wildlife Sanctuary [T]); NHMD unnumbered (30/Jul/1870); NHMD unnumbered (20/Sep/1848); NHMUK 1842.11.6.1; NHMUK 1842.5.17.10 (f, 1842, presumably Hokianga River); NHMUK 1842.9.29.3; NHMUK 1852.1.17.87; NHMUK 1852.1.17.88; NHMUK 1886.6.24.343; NHMUK 1886.6.24.344; NHMUK 1907.3.23.1; NHMUK 1927.12.18.7; NHMUK 1927.12.18.8; NHMUK 1927.12.18.9; NHMUK 1949.64.207; NHMUK 1949.64.208; NHMUK 1949.64.209; NHMUK 1949.64.210; NHMUK 1949.64.211; NHMUK 1949.64.212; NHMUK 1987.24.369; NHMW

12.450 (m, Dec/1883, Little Barrier Island); NHMW 12.451 (m, Dec/1883, Little Barrier Island); NHMW 12.452 (f, Dec/1883, Little Barrier Island); NHMW 12.453 (m, juv, Dec/1883, Little Barrier Island); NHMW 12.454 (m, juv, Dec/1883, Little Barrier Island); NHMW 12.455 (m, Dec/1883, Little Barrier Island); NHMW 12.456 (m, juv, Dec/1883, Little Barrier Island); NHMW 12.457 (m, juv, Dec/1883, Little Barrier Island); NHMW 12.458 (f, Dec/1883, Little Barrier Island); NHMW 12.459 (f, Dec/1883, Little Barrier Island); NHMW 12.460 (f, juv, Dec/1883, Little Barrier Island); NHMW 50.721 (f, Dec/1883, Little Barrier Island); NHMW 50.722 (m, juv, Dec/1883, Little Barrier Island); NMBA 4002 (m, pre-1909, Little Barrier Island); NML T1392 (f, 1850); NML T13132 (m, pre-1896); NML 1980.114 (m, ad); NML 1980.115 (f, ad); NMS.Z 1906.144.123 (m, Little Barrier Island); NMS.Z 1906.144.124 (f, Little Barrier Island); NMW Z.1979.053.2442 (f); RMNH.AVES.134385 (m); RMNH.AVES.134386 (m); RMNH.AVES.134387 (f); RMNH.AVES.134388 (m, pre-1875, Wellington, Wellington); RMNH.AVES.134389 (m, pre-1875, Wellington, Wellington); SAM B.9706; USNM 172402 (m, 1892, likely Little Barrier Island); USNM 172403 (1885, Little Barrier Island); USNM 174651 (Little Barrier Island); USNM 265016 (f, juv, early 1900's); YIO 50366 (m); YIO 50367 (f); YPM 11517 (f); ZMB 477 (m, Dec/1883, Little Barrier Island); ZMB 31042 (f, Jun/1893, Little Barrier Island).

Tail. MNZ OR.023824/1 (f, 26/Apr/1988, Mount Bruce Wildlife Reserve [C]); MNZ OR.023825/1 (m, 26/Apr/1988, Mount Bruce Wildlife Reserve [C]); MNZ OR.023836/1 (m, 24/Apr/1988, Mount Bruce Wildlife Reserve [C]); MNZ OR.023837/1 (24/Apr/1988, Mount Bruce Wildlife Reserve [C]); MNZ OR.028841/1 (m, 23/Apr/2007, Mount Bruce Wildlife Reserve [C]).

Tissue. MNZ OR.029453/b (m, 17/Dec/2009, Mount Bruce Wildlife Reserve [C]).

Wing. AWMM LB10748 (m, pre-Jun/1999, Tiritiri Matangi Island [T]); AWMM LB7086 (m, 21/Aug/1991, Little Barrier Island [T]); AWMM LB7087 (m, 19/Aug/1991, Little Barrier Island); AWMM LB12952 (f, 18/May/2005, Tiritiri Matangi Island [T]); MNZ OR.023824 (f, 26/Apr/1988, Mount Bruce Wildlife Reserve [C]); MNZ OR.023825 (m, 26/Apr/1988, Mount Bruce Wildlife Reserve [C]); MNZ OR.023836 (m, 24/Apr/1988, Mount Bruce Wildlife Reserve [C]); MNZ OR.023837 (24/Apr/1988, Mount Bruce Wildlife Reserve [C]); MNZ OR.024295/1 (m, 19/Dec/1990, Mount Bruce Wildlife Reserve [C]); MNZ OR.027986 (f, 14/Jun/2006, Zealandia/Karori Wildlife Sanctuary [T]); MNZ OR.028841 (m, 23/Apr/2007, Mount Bruce Wildlife Reserve [C]); MNZ OR.029453 (m, 17/Dec/2009, Mount Bruce Wildlife Reserve [C]).

List of estimated coordinates

North Island Kokako. Auckland: -36.8405; 174.7400. Bay of Islands: -35.2000; 174.1666. Clevedon:

-36.9908; 175.0377. Colville: -36.6333; 175.4666. Coromandel: -36.8333; 175.5833. Egmont National Park: -39.2666; 174.1000. Great Barrier Island: -36.1666; 175.3833. Greytown: -41.0666; 175.4500. Hokianga River: -35.3376; 173.5583. Huntly: -37.5583; 175.1583. Hunua Range: -37.0700; 175.1800. Kaipara: -36.0600; 174.0900. Kaitara Ranges: -38.4599; 177.8179. Kawhia: -38.0683; 174.8157. Kopuapouamu River: -37.7000; 178.3333. Lake Rotokare: -39.4500; 174.4100. Lake Rotokohu: -39.5173; 174.7838. Lower Hutt: -41.2166; 174.9166. Makomako: -37.9833; 174.8500. Mamaku: -38.0952; 176.0786. Mangatangi: -37.2019; 175.1978. Mangatawhiri: -37.2131; 175.1228. Mangorewa Forest: -37.9192; 176.1525. Martinborough: -41.2188; 175.4591. Mauku: -37.2052; 174.8205. Maungahaumia Range: -38.2878; 177.6665. Maungataroto: -36.1097; 174.3541. Maungatautari: -37.9668; 175.5706. Motukokako Island: -35.1666; 174.3333. Mount Hikurangi: -37.9170; 178.0600. Mount Pihanga: -39.0413; 175.7686. Mount Pirongia: -37.9910; 175.0892. Napier: -39.4833; 176.9166. Ngamatapouri: -39.5666; 174.8166. Ngunguru: -35.6344; 174.5000. Ohura: -38.8430; 174.9819. Okaihau: -35.3166; 173.7833. Onewhero: -37.3166; 174.9166. Opotiki: -38.0083; 177.2833. Otaki: -40.7500; 175.1500. Otangiwai: -38.7165; 175.1191. Papakura: -37.0625; 174.9419. Pati Tapu Bush: -40.7704; 175.8602. Patumahoe: -37.1881; 174.8277. Piercy Island: -35.1666; 174.3333. Pipiriki: -39.48333; 175.0500. Pirongia Range: -37.9910; 175.0892. Poroporo Ranges: -37.9760; 176.9599. Potaka: -37.5722; 178.1471. Pukekohe: -37.2000; 174.9000. Pureora Forest: -38.5000; 175.5833. Raetihi: -39.4250; 175.2833. Raglan: -37.8000; 174.8833. Rangitumau: -40.8478; 175.7041. Rawhitiroa: -39.4238; 174.3658. Rimutaka Range: -41.1666; 175.1666. Rotorua/Rotorua Lakes: -38.1377; 176.2513. Russell: -35.2666; 174.1166. Tangahua Range: -35.8666; 174.1147. Tararua Range: -40.7666; 175.3833. Taupo: -38.6875; 176.0694. Taurangi: -37.6833; 176.1666. Te Kuiti: -38.3333; 175.1666. Te Urewera: -38.7500; 177.1500. Te Whaiti: -38.5881; 176.7781. Tikorangi: -39.0338; 174.2797. Titirangi: -36.9544; 174.6530. Tokatea Range: -36.7196; 175.5143. Tutira: -39.2220; 176.8930. Upper Manawatu River: -40.4666; 175.2166. Waihi: -37.3833; 175.8333. Waihou ["Thames"] River: -37.1680; 175.5416. Waikato: -37.5000; 175.3333. Waikino: -37.4166; 175.7666. Wainuiomata: -41.2613; 174.9508. Waioeka: -38.0895; 177.2844. Wairarapa: -41.1606; 175.3063. Wairoa: -39.0333; 177.3666. Waitakere Ranges: -36.9666; 174.5166. Waitotara Forest: -39.8054; 174.7396. Waverly: -39.7611; 174.6300. Wellington: -41.2888; 174.7772. Whanganui: -39.9333; 175.0500. Whangarei: -35.7250; 174.3236. Whatatutu: -38.3833; 177.8333.

South Island Kokako. Arthur's Pass: -42.9453; 171.5656. Banks Peninsula: -43.7500; 172.8330. Blue River: -44.1600; 169.2644. Catlin River: -46.4833; 169.7166. Chalky Sound: -45.4000; 167.2000. Dunedin: -45.8666; 170.5000; Dusky Sound: -45.7492; 166.7866. Havelock

River: -43.5166; 170.7833. Hokitika: -42.7155; 170.9680. Lake Brunner: -42.6166; 171.4500. Marlborough Sounds: -41.1416; 174.0894. Milford Sound: -44.6750; 167.9294. Mount Alexander: -36.9969; 144.3050. Mount Cargill: -45.8131; 170.5548. Mount Franklyn: -42.0471; 172.6683. Mount Riley: -41.4058; 173.7128. Okarito: -43.2227; 170.1659. Oxford Ranges: -43.3127; 172.1905. Paringa River: -43.6333; 169.4333. Queen Charlotte Sound [type locality]: -41.2500; 174.0158. Ship Cove -41.2500; 174.0158. Stephens Island: -40.6666; 174.0000. Stewart Island: -46.9320; 167.9804. Tasman Bay: -41.2717; 173.0023. Waimakariri River spring: -43.2016; 172.0235. Westport: -41.7500; 171.5666.

Huia. Akitio: -40.6000; 176.4166. Forest between Manawatu Gorge and Akitio: -40.4319; 176.0888. Hutt Valley: -41.1657; 174.9730. Kaimanawa Range: -39.2230; 175.9210. Makuri Range: -40.4833; 175.9166. Manawatu River: -40.4666; 175.2166. Mataroa: -39.6494; 175.7226. Mount Holdsworth: -40.9028; 175.4876. Ngarara Range: -40.8624; 175.0353. Pahiatua: -40.4533; 175.8408. Pati Tapu Bush: -40.7704; 175.8602. Puketoi Range: -40.4983; 176.0829. Rimutaka Range: -41.1666; 175.1666. Ruahine Range: -40.0000; 176.1000. Taihape-Moawhango: -39.5811; 175.8618. Taranaki mountains: -39.2643; 174.0345. Tararua Range: -40.7666; 175.3833. Tiriraukawa: -39.7523; 175.6615. Turakira: -41.4339; 174.9181. Turakirae Head: -41.4339; 174.9181. Wainuiomata: -41.2613; 174.9508. Wainuiomata Hills: -41.2613; 174.9508. Wairarapa: -41.1606; 175.3063. Wairarapa Valley: -41.1606; 175.3063. Wellington: -41.2888; 174.7772.

North Island Saddleback. Bay of Islands: -35.2000; 174.1666. Cuvier Island: -36.4333; 175.7666. Great Barrier Island: -36.1666; 175.3833. Hauraki Gulf: -36.3333; 175.0833. Hen/Taranga Island: -35.9333; 174.7333. Hunua Ranges: -37.0700; 175.1800. Hutt Valley:

-41.1657; 174.9730. Kaipara: -36.0600; 174.0900. Kaitaia: -35.1125; 173.2627. Little Barrier Island: -36.1991; 175.0814. Maungatepere Bush: -35.7541; 174.2054. New Plymouth: -39.0666; 174.0833. Poverty Bay: -38.7000; 177.9666. Rangitoto Range: -38.4166; 175.5833. Ruahine Range: -40.0000; 176.1000. Tararua Range: -40.7666; 175.3833. Waikato Heads: -37.5000; 175.3333. Wairoa River: -39.0333; 177.3666. Wellington: -41.2888; 174.7772.

South Island Saddleback. Banks Peninsula: -43.7500; 172.8330. Blue River: -44.1600; 169.2644. Chalky Sound: -45.4000; 167.2000. Dusky Sound: -45.7492; 166.7866. Greenstone Hill: -26.1180; 28.1560. Islands SW of Stewart Island: -47.2244; 167.4369. Karamea Saddle: -41.2434; 172.1113. Lake Brunner: -42.6166; 171.4500. Marlborough Sounds: -41.1416; 174.0894. Milford Sound: -44.6750; 167.9294. Mount Alexander: -36.9969; 144.3050. Mount Algidus (Rakaia Gorge): -43.5174; 171.6458. Nelson: -41.2707; 173.2825. Okarito: -43.2227; 170.1659. Queen Charlotte Sound: -41.2500; 174.0158. Solomon Island: -47.2244; 167.4369. Stephens Island: -40.6666; 174.0000. Tasman Bay: -41.2717; 173.0023. Teremakau River: -42.7213; 171.4494. Top-house: -41.7666; 172.9000.

Stitchbird. Bay of Islands: -35.2000; 174.1666. Eketahuna: -40.6500; 175.7000. Great Barrier Island: -36.1666; 175.3833. Hutt Valley: -41.1657; 174.9730. Kaiwharawhara Stream: -41.2617; 174.7910. Lake Whangape: -37.4666; 175.0500. Little Barrier Island: -36.1991; 175.0814. Ngaio Gorge: -41.2568; 174.7750. Port Waikato: -37.3833; 174.7333. Raglan: -37.8000; 174.8833. Tararua Range: -40.7666; 175.3833. Tarawera: -39.0265; 176.5714. Te Urewera: -38.7500; 177.1500. Waimarama: -39.0000; 177.0000. Wellington: -41.2888; 174.7772.