

Introduction

KEITH WOODLEY

Pukorokoro Miranda Shorebird Centre, 283 East Coast Road, RD 3 Pokeno 2473

It is over 20 years since the publication of the *Notornis* special issue, *Wader Studies in New Zealand* (Robertson 1999). Dedicated to R.B. Sibson and B.D. Heather, it contained a broad range of papers on many aspects of wader studies, including distribution and numbers, seasonal movements, and general ecology. Data it presented on population numbers and trends have been widely cited since then. The keynote paper for this special issue, 'Distribution and numbers of waders in New Zealand, 2005–2019' (Riegen & Sagar 2020) provides a long overdue update on our wader populations. In analysing and reporting on substantial data, it stands as a tribute to the countless hours spent by hundreds of Birds New Zealand members and other volunteers who have participated in the national wader censuses. As do the results presented here of a special census of the *baueri* bar-tailed godwit population in New Zealand and eastern Australia.

The New Zealand Checklist (Gill *et al.* 2010), records 70 taxa of Charadriiformes, excluding skuas, gulls, and terns. Since publication two more have been added – buff-breasted sandpiper (*Tryngites subruficollis*) (2014) and Cox's sandpiper (*Calidris paramelanotos*) (2017). Of these 72, 45 are considered vagrants – primarily Arctic breeding species that occur regularly in small numbers or straggle to this country periodically. This leaves 25, of which five are classified as non-resident natives. Under the New Zealand Threat Classification system

(Robertson *et al.* 2017), these five – ruddy turnstone (*Arenaria interpres*), Pacific golden plover (*Pluvialis fulva*), sharp-tailed sandpiper (*Calidris acuminata*), red-necked stint (*Calidris ruficollis*), and Asiatic whimbrel (*Numenius phaeopus*) – are classified as Secure Overseas. Of the remaining 20, all but two (96%) are classified as threatened (Table 1).

Table 1. Number of New Zealand native wader species classified as threatened.

Status	Number of species
Nationally Critical	4
Nationally Endangered	1
Nationally Vulnerable	5
At Risk: Declining	2
At Risk: Recovering	2
Naturally Uncommon	4
Total	18

Population data for all but seven of these taxa, i.e. Chatham Island oystercatcher (*Haematopus chathamensis*), New Zealand shore plover (*Thinornis noveseelandiae*), Auckland Island banded dotterel (*Charadrius bicinctus exilis*), Antipodes Island snipe (*Coenocorypha aucklandica meinertzhagenae*), Snares Island snipe (*Coenocorypha huegeli*), Campbell Island snipe (*Coenocorypha aucklandica perseverance*), and

Chatham Island snipe (*Coenocorypha pusilla*), are documented here (Riegen & Sagar 2020). With the exception of shore plover, where some birds have been translocated to islands close to mainland New Zealand, these taxa are confined to off shore islands and are excluded from the Birds New Zealand/OSNZ count scheme which covers only mainland New Zealand and Rakiura/Stewart Island.

The latest counts show that the numbers of most species have declined since the 1983–1994 surveys. Declines are particularly evident in the Northern Hemisphere migrants with the numbers of some species down by 50% or more. Some endemic New Zealand species are also showing marked declines. Following a steady increase since the mid-20th century, South Island pied oystercatchers (*Haematopus finschi*) are now declining by 5% per year (Riegen & Sagar 2020).

A migrant species of particular concern is ruddy turnstone, the third most numerous Arctic-breeding species to occur in New Zealand, but about which we know little (Melville *et al.* 2020). It is currently classified as Non-resident Native: Migrant. While the 2019 summer figure of 2,468 is considerably higher than the previous three years when counts averaged 1,654 birds, there has still been a 61% decline between the two survey periods (1983–1994 and 2005–2019) (Riegen & Sagar 2020). Conklin *et al.* (2014) considered the population using the EAAF to be declining at a rate to justify upgrading the threat ranking of this taxon.

Several species featured in this issue depend on riverbed habitats in the eastern and central South Island for breeding. Such areas are subject to negative pressure from a range of factors, including loss and degradation of habitat, flooding, and predation. Walker & Monks (2020) report on national changes in habitat occupancy by wader species and show decreases in endemic inland breeding species within their South Island breeding ranges. Studies of wrybill productivity in the Tasman and Tekapo rivers reported here, are instructive as to the complexity of factors at work in those environments. While predator trapping was beneficial in one river it was less so in another. Factors governing the distribution and changing densities of mammalian predators in braided river systems is limited and requires further research. Also documented here is the importance of coastal wetlands as flood refugia for species such as wrybill (Crossland & Crutchley 2020).

A particularly welcome contribution here concerns the status of banded dotterel (*Charadrius bicinctus*) (O'Donnell & Monks 2020). It occurs throughout New Zealand, breeding in a range of habitats, both coastal and inland, and dispersing widely after breeding, including to Australia. Unlike

many waders that can be counted at high tide roost sites, banded dotterels are less dependent on tidal environments so assessing population trends for this taxon is problematic. Estimates in the 1980s put the population at 50,000, although Robertson *et al.* (2017) revised the population estimate to somewhere between 5,000 and 20,000 mature individuals. Analysing counts on their braided river breeding grounds throughout the country from 1962 to 2017, and using nationwide winter count data from 1984 to 2018 as an independent measure to compare trends, O'Donnell & Monks (2020) estimate the population at around 20,000, a decline of over 50% since the 1980s.

Against this trend of overall declining populations, is the status of northern New Zealand dotterel. Dowding (2020), confirms both a marked population increase and range expansion for this taxon, allowing its status to change from At Risk Declining to Recovering. It is the clear outcome of management by agencies, community groups and volunteers. However, the taxon remains conservation dependent and without continuing management, the population would once again decline.

The New Zealand wader counts have made, and continue to make, important contributions to the monitoring of flyway populations (Studds *et al.* 2017) and conservation threat assessments, both nationally (Robertson *et al.* 2017) and internationally (BirdLife International 2020).

New Zealand is a Contracting Party to the *Convention on Wetlands of International Importance especially as Waterfowl Habitat*, commonly known as the *Convention on Wetlands* or the Ramsar Convention. The convention includes two criteria based on waterbird numbers for the identification of wetlands of international importance:

Criterion 5: A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.

Criterion 6: A wetland should be considered internationally important if it regularly supports 1% of the individuals of a population of one species or subspecies of a waterbird.

Taking the data provided by Riegen & Sagar (2020) and the flyway population estimates of Wetlands International (2020) there are at least 12 sites in New Zealand that meet the Criterion 6 population threshold and are of international importance for Arctic-breeding waders (Table 2). They include two existing Ramsar sites, Firth of Thames, and Farewell Spit. A further 22 major sites were identified as internationally important for endemic waders by Dowding & Moore (2006).

Table 2. Sites that support 1% or more of the East Asian-Australasian Flyway population and thus are of international importance under the Ramsar Convention on Wetlands.

a) Sites where >1,100 red knots were counted, on average, during summer 2005–2019.

Site	No. counts	Mean	% of Population est.
Summer			
Manukau Harbour	15	9,580	8.70
Farewell Spit	15	8,184	7.44
Kaipara Harbour	15	6,908	6.28
Firth of Thames	15	3,257	2.96

b) Sites where >290 (1%) ruddy turnstones were counted, on average, during summer 2005–2019.

Site	No. counts	Mean	% of Population est.
Summer			
Farewell Spit	15	333	1.11

c) Sites where >1,300 (1%) *baueri* bar-tailed godwits were counted, on average, during summer or winter 2005–2019.

Site	No. counts	Mean	% of Population est.
Summer			
Manukau Harbour	15	13,452	10.76
Farewell Spit	15	12,922	10.34
Kaipara Harbour	15	9,591	7.67
Firth of Thames	15	6,425	5.14
Tauranga Harbour	14	6,360	5.09
Tasman Bay	15	4,007	3.21
Rangaunu Harbour	9	2,996	2.40
Whāngarei Harbour	14	2,738	2.19
Kawhia Harbour	15	2,535	2.03
Ohiwa Harbour	13	2,385	1.91
Golden Bay	15	2,227	1.78
Parengarenga Harbour	11	2,123	1.70

Currently New Zealand has seven Ramsar sites, five of which are internationally important for at least one species of wader. It is unlikely that the New Zealand government will progress nomination of all remaining candidate sites in the foreseeable future as there are other priorities (Denyer & Robertson 2016); however, the fact that these sites are of international importance needs to be recognised by local government in their regional policy statements that are required under Section 6 (c) of the Resource Management Act. Furthermore, there is great scope for Birds New Zealand wader count data to support conservation management at local government level in the identification of regionally important sites (McArthur & Lawson 2013; Schuckard & Melville 2013).

New Zealand policy makers are faced with significant challenges: global climate change, including sea level rise, coastal development, rural land use changes, water quality, and spread of invasive species and predator control being just some of them. Data presented in this issue will play a major role in informing environmental and conservation decisions and setting research and management priorities.

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