

Conservation status of New Zealand birds, 2008

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Abstract An appraisal of the conservation status of the post-1800 New Zealand avifauna is presented. The list comprises 428 taxa in the following categories: 'Extinct' 20, 'Threatened' 77 (comprising 24 'Nationally Critical', 15 'Nationally Endangered', 38 'Nationally Vulnerable'), 'At Risk' 93 (comprising 18 'Declining', 10 'Recovering', 17 'Relict', 48 'Naturally Uncommon'), 'Not Threatened' (native and resident) 36, 'Coloniser' 8, 'Migrant' 27, 'Vagrant' 130, and 'Introduced and Naturalised' 36. One species was assessed as 'Data Deficient'. The list uses the New Zealand Threat Classification System, which provides greater resolution of naturally uncommon taxa typical of insular environments than the IUCN threat ranking system. New Zealand taxa are here ranked at subspecies level, and in some cases population level, when populations are judged to be potentially taxonomically distinct on the basis of genetic data or morphological observations. In contrast, IUCN and BirdLife International bird threat rankings are assigned only at species level. This paper represents the first time that the entire modern New Zealand avifauna has been assessed from a conservation perspective. A brief analysis of patterns of extinction, threat, and rarity exhibited by the taxa listed is presented.

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Keywords threatened birds; endangered birds; uncommon birds; extinct birds; conservation status; threat classification; New Zealand

INTRODUCTION

Several classification systems for categorising the risk of extinction for New Zealand species exist (e.g. IUCN 2001; Molloy *et al.* 2002). The most recent threat classification assessments of New Zealand birds were conducted in 2002 and

2005 (Hitchmough 2002; Hitchmough *et al.* 2007) using the then newly developed New Zealand Threat Classification System (Molloy *et al.* 2002). The classification system was reviewed in 2007, resulting in several new threat categories, and redefinition of some existing categories (Townsend *et al.* 2008). This refined system is a uniquely New Zealand-based conservation status assessment tool (cf. IUCN 2001), which has been used to assess the

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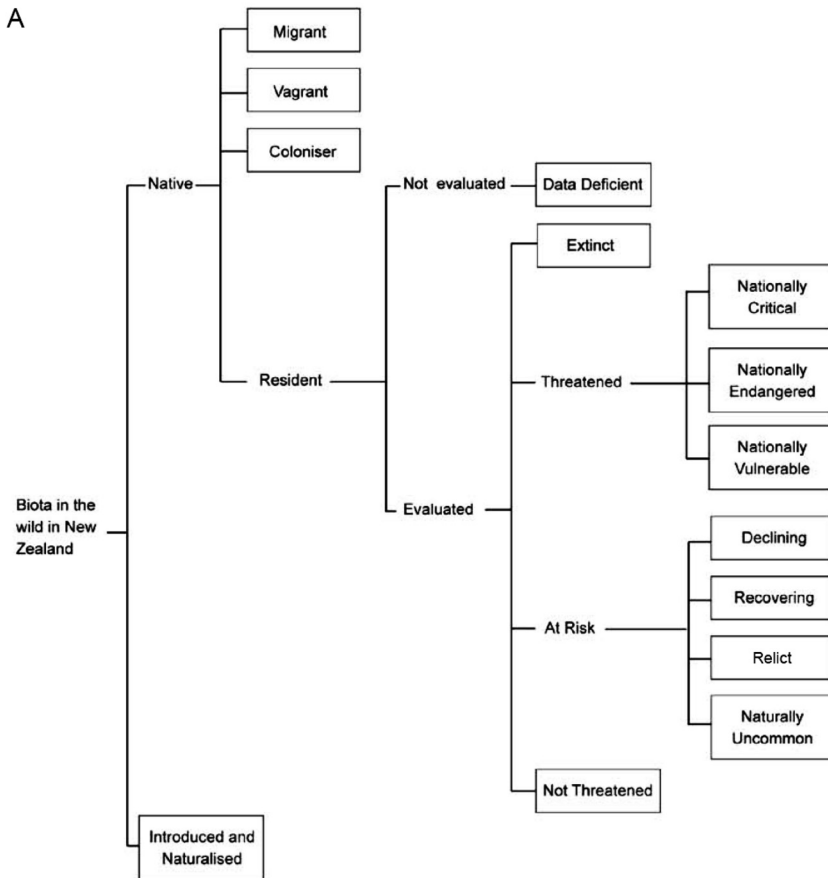


Fig. 1 New Zealand threat classification system (after Townsend *et al.* 2008).

conservation status of vascular plants and birds. In the coming three years it will be applied to the bats, marine mammals, frogs, reptiles, freshwater and marine fish, freshwater, marine, and terrestrial invertebrates, bryophytes, macro-algae, and fungi which are indigenous to New Zealand (Hitchmough *et al.* 2007; Townsend *et al.* 2008).

As part of the implementation of the revised New Zealand threat classification system by the Department of Conservation, we undertook a comprehensive re-evaluation of the threat status of New Zealand birds during January-June 2008. This paper reports the results of this assessment.

This new list updates and supersedes all previous New Zealand bird threat classification listings for New Zealand (Williams & Given 1981; Molloy & Davis 1992, 1994; Hitchmough 2002; Hitchmough *et al.* 2007) and remains valid from the date of publication until the next list is published.

METHODS

All bird taxa recorded from the New Zealand Exclusive Economic Zone since 1800 are listed, with

the exception of species that have been introduced to New Zealand but failed to establish (and therefore had few or no records reported in Robertson *et al.* 2007). The following list is for bird taxa (species, subspecies, and those entities as yet without formal taxonomic rank) believed to be indigenous to New Zealand, plus taxa that have been introduced and are believed to persist as breeding species. Included are migrant birds, vagrant birds, recent colonists, and indigenous birds that also occur naturally overseas (e.g., in Australia), where they may or may not be considered threatened. For non-endemic taxa the listing we provide is based on the status of the New Zealand population only. The global conservation status for each New Zealand bird species that does not breed here (or also breeds elsewhere) is also listed, based on threat rankings assigned by BirdLife International (IUCN 2006). This was only possible at species level, because BirdLife International does not currently assess threat rankings for subspecies (BirdLife International 2004).

Data for re-evaluation of the conservation status of New Zealand birds included that used for the previous listing (Hitchmough *et al.* 2007), and the

Table 1 Primary criteria for ‘Threatened’, ‘At Risk’ and ‘Not Threatened’ taxa. Note that population changes are calculated over 10 years or 3 generations, whichever is longer. Where more than 1 option is available in a cell, the key distinction is whether the current population level is considered natural, or results from human impacts. NU_{RR} (Naturally Uncommon, Range Restricted) is triggered when the breeding range is < 100,000 ha. Other abbreviations are given in Methods and caption for Table 2. From Townsend *et al.* (2008), which provides further explanation.

TOTAL POPULATION TREND*	TOTAL NUMBER OF MATURE INDIVIDUALS				
	< 250	250–1000	1000–5000	5000–20 000	20 000– > 100 000
> 10% increase		NV/ NU	NU/ Rec	NU/ Rec	NT/ NU _{RR} / Rel
Stable (± 10%)		NE/ NU	NV/ NU	NU/ Rel	
10–30% decline		NE			Dec
30–50% decline				NV	
50–70% decline	NC		NE		
> 70% decline					

* Predicted and ongoing due to existing threats.

Atlas of bird distribution in New Zealand 1999-2004 (Robertson *et al.* 2007), supplemented by public submissions and expert opinion. Submissions were solicited from the New Zealand ornithological community through the New Zealand Department of Conservation website (<http://www.doc.govt.nz/>), *Southern Bird* newsletter, and the Birding-NZ website (<http://groups.yahoo.com/group/BIRDING-NZ/>), and these were collated and reviewed by the authors in May-June 2008.

The placement of taxa in risk categories was based on the criteria outlined by Townsend *et al.* (2008), submissions, panel knowledge, and referral to recent publications (especially Robertson *et al.* 2007). In situations of doubt, provisional assessments of taxa were referred to relevant specialists for their advice. Interim rankings were made available to attendees at the Ornithological Society of New Zealand’s 2008 Annual General Meeting for comment.

The threat categories used (Appendix) are those defined in Townsend *et al.* (2008) (Fig. 1, Table 1), namely:

1. *Extinct*
2. *Threatened* (including Nationally Critical [NC], Nationally Endangered [NE], and Nationally Vulnerable [NV])

3. *At Risk* (including Declining [Dec], Recovering [Rec], Relict [Rel], and Naturally Uncommon [NU])
4. *Not Threatened* [NT]
5. *Non-resident Native* (including Coloniser [Col], Migrant, and Vagrant)
6. *Introduced and Naturalised* (self-sustaining populations exist in the wild)
7. *Data Deficient*

Several of these categories were not used by Molloy *et al.* (2002), namely ‘Declining’, ‘Recovering’, ‘Relict’, and ‘Naturally Uncommon’. Townsend *et al.* (2008) made minor changes to other categories, mainly to ensure that all possible combinations of population status and trend were covered by the classification system. Note also that the ‘At Risk’ categories (‘Declining’, ‘Recovering’, ‘Relict’, ‘Naturally Uncommon’) are no longer grouped under the super-category ‘Threatened’.

These categories were preferred by Townsend *et al.* (2008) over the current IUCN (2001) categories because they reflect more accurately the nature of insular rarity that occurs in New Zealand (cf. de Lange & Norton 1998). However, as indicated by Molloy *et al.* (2002), the New Zealand Threat Classification System does not preclude use of IUCN Threat Categories. Information used for the

Table 2 Patterns of extinction, threat and rarity among indigenous New Zealand breeding bird taxa summarised by family. Column abbreviations: Col, Coloniser; Dec, Declining; NC, Nationally Critical; NE, Nationally Endangered; NT, Not Threatened; NU, Naturally Uncommon; NV, Nationally Vulnerable; Rec, Recovering; Rel, Relict. Row abbreviations: Ch, Chatham Is; K, Kermadec Is; M, mainland (North I., South I. and Stewart Island); NI, North I.; offshore, offshore islands; SI, South I.; St, Stewart I. and its offshore islands; Sthn M, southern mainland (southern South I. and Stewart I. and their offshore islands; Sub, subantarctic island or islands.

Family	Total	Extinct		Threatened			At Risk						
		pre 1800	post 1800	NC	NE	NV	Dec	Rec	Rel	NU	NT	Col	
Emeidae	8	8	-	-	-	-	-	-	-	-	-	-	-
Dinornithidae	2	2	-	-	-	-	-	-	-	-	-	-	-
Apterygidae	8	-	-	2	-	5	-	1	-	-	-	-	-
Phasianidae	1	-	1	-	-	-	-	-	-	-	-	-	-
Anatidae	20	8	1	3	-	2	-	1	-	-	-	5	-
Podicipedidae	3	-	-	-	-	2	-	-	-	-	-	-	1
Spheniscidae	11	2	-	1	-	3	2	-	-	3	-	-	-
Diomedidae	14	-	-	1	-	2	2	-	-	7	-	-	2
Procellariidae	38	2	-	2	-	2	5	2	11	9	4	1	1
Hydrobatidae	5	-	-	1	1	-	-	-	2	-	1	-	-
Phaethontidae	1	-	-	-	1	-	-	-	-	-	-	-	-
Sulidae	2	-	-	-	1	-	-	-	-	-	1	-	-
Phalacrocoracidae	13	-	-	1	3	3	-	-	-	4	2	-	-
Ardeidae	6	-	1	1	1	1	-	-	-	-	1	1	1
Threskiornithidae	1	-	-	-	-	-	-	-	-	1	-	-	-
Accipitridae	3	2	-	-	-	-	-	-	-	-	1	-	-
Falconidae	3	-	-	-	1	2	-	-	-	-	-	-	-
Aptornithidae	2	2	-	-	-	-	-	-	-	-	-	-	-
Rallidae	19	6	2	1	-	2	1	-	3	2	1	1	1
Scolopacidae	8	1	2	1	-	1	-	-	-	3	-	-	-
Haematopodidae	3	-	-	1	-	-	1	1	-	-	-	-	-
Recurvirostridae	2	-	-	1	-	-	1	-	-	-	-	-	-
Charadriidae	8	-	-	2	-	3	-	-	-	1	1	1	1
Stercorariidae	1	-	-	-	-	-	-	-	-	1	-	-	-
Laridae	3	-	-	-	1	1	-	-	-	-	1	-	-
Sternidae	11	-	-	2	1	2	1	1	-	3	-	1	1
Columbidae	2	-	-	1	-	-	-	-	-	-	1	-	-
Psittacidae	13	1	-	2	2	1	-	1	1	4	1	-	-
Cuculidae	2	-	-	-	-	-	-	-	-	1	1	-	-
Strigidae	3	-	2	-	-	-	-	-	-	-	1	-	-
Aegothelidae	1	1	-	-	-	-	-	-	-	-	-	-	-
Alcedinidae	1	-	-	-	-	-	-	-	-	-	1	-	-
Acanthisittidae	10	3	4	-	-	1	2	-	-	-	-	-	-
Acanthizidae	2	-	-	-	-	1	-	-	-	-	1	-	-
Meliphagidae	6	-	1	-	1	-	-	-	-	2	2	-	-

Table 2 Continued.

Petroicidae	9	-	-	1	1	1	-	-	-	2	4	-
Pachycephalidae	3	-	-	-	-	1	-	-	-	-	2	-
Rhipiduridae	3	-	-	-	-	-	-	-	-	1	2	-
Corvidae	3	3	-	-	-	-	-	-	-	-	-	-
Turnagridae	3	-	3	-	-	-	-	-	-	-	-	-
Callaeidae	5	-	2	-	-	1	-	2	-	-	-	-
Notiomystidae	1	-	-	-	1	-	-	-	-	-	-	-
Hirundinidae	1	-	-	-	-	-	-	-	-	-	1	-
Zosteropidae	1	-	-	-	-	-	-	-	-	-	1	-
Sylviidae	6	-	1	-	-	1	2	-	-	2	-	-
Motacillidae	4	-	-	-	-	-	1	1	-	2	-	-
Total	275	41	20	24	15	38	18	10	17	48	36	8
		61		77			93					

New Zealand listings presented here, and held by the Department of Conservation, is available to those wishing to undertake an independent IUCN threat assessment.

The 4 main parameters used to assign threat ranking were total population size, population trend, geographical range, and whether the taxon has been directly or indirectly affected by humans (Townsend *et al.* 2008). Ongoing or predicted population trends were assessed over 10 years or 3 generations, whichever was longer. For taxa that had not been studied in sufficient demographic detail, we defined 1 generation to be twice the minimum age of 1st breeding by females.

Townsend *et al.* (2008) defined 'Vagrant' as "Taxa that are found unexpectedly in New Zealand and whose presence in this region is naturally transitory, or migratory species with fewer than 15 individuals known or presumed to visit per year". We have refined this further by defining 'Vagrant A' as taxa with at least 10 independent records since 1950, and 'Vagrant B' as taxa with fewer than 10 records since 1950 (including zero for those recorded only pre-1950).

A brief analysis for indigenous breeding taxa is also presented, assessing the relationships between phylogeny, endemism, broad habitat preferences, and biogeography on patterns of extinction, threat, and rarity. This required expanding the 'Extinct' category to include 41 taxa that became extinct between AD1000 and 1800, i.e. human-induced extinctions that occurred before European contact. These comparisons have mainly been made at higher threat ranking levels ('Extinct', 'Threatened', 'At Risk', and 'Not Threatened'), but further summary details are presented in Tables 2-5, and codes used for individual taxa are available from the senior author.

Patterns of extinction, threat and rarity in relation to phylogeny were assessed by grouping taxa by their taxonomic families. The relationship between extinction, threat and rarity and endemism was investigated by considering whether each breeding taxon belonged to a New Zealand endemic family, genus, species or subspecies, or was considered undifferentiated from breeding populations beyond the New Zealand region.

For the habitat analysis, taxa were grouped according to whether their non-breeding distributions were predominantly on land, freshwater, coastal or oceanic. Groupings used for the biogeographical analysis were: Mainland (North I, South I & Stewart I); North I, South I, Stewart I and offshore islands; northern offshore islands (those around the North I, including Three Kings Is); southern offshore islands (those around the South I); Kermadec Is; Chatham Is; single subantarctic islands (any one of Antipodes, Auckland, Bounty, Campbell and Snares Is groups); and multiple subantarctic islands. These were regressively grouped to show taxa originally occupying large land areas and with extensive New Zealand breeding distributions, through to those with the most restricted distributions.

Scientific names for all taxa are given in Appendix 1, and follow the taxonomy intended for the revised New Zealand checklist (Checklist Committee unpubl.).

RESULTS AND DISCUSSION

This paper is based on a conservation assessment of the entire recent New Zealand avifauna. Of the 428 taxa, we ranked 20 (4.7%) 'Extinct', 77 (18.0%) 'Threatened' (comprising 24 'Nationally Critical', 15 'Nationally Endangered', and 38 'Nationally Vulnerable'), and 93 (21.7%) 'At Risk' (comprising

Table 3 Patterns of extinction, threat and rarity among indigenous New Zealand breeding bird taxa in relation to levels of endemism. Taxa were grouped depending on whether they belonged to an endemic family, an endemic genus, an endemic species, were an endemic subspecies of a species that also breeds beyond the New Zealand region, or were considered indistinguishable from populations breeding elsewhere. Abbreviations given in Methods and caption for Table 2. Subtotals for status within each taxonomic level are given in parentheses.

	Total	Extinct		Threatened			At Risk				NT	Col
		pre 1800	post 1800	NC	NE	NV	Dec	Rec	Rel	NU		
Family	39	15	9	2	1	7	2	3	-	-	-	-
		(24)			(10)			(5)				
Genus	46	9	7	3	3	7	2	-	-	8	7	-
		(16)			(13)			(10)				
Species	95	17	4	11	7	17	4	3	5	19	8	-
		(21)			(35)			(31)				
Subspecies	36	-	-	4		4	3	3	5	10	7	-
		-			(8)			(21)				
Widespread	59	-	-	4	4	3	7	1	7	11	14	8
		-			(11)			(26)				
Total	275	41	20	24	15	38	18	10	17	48	36	8
		61		77			93					

18 'Declining', 10 'Recovering', 17 'Relict', and 48 'Naturally Uncommon'). Of the remaining taxa, 36 (8.4%) were assessed as 'Not Threatened' (native and resident), 8 (1.9%) 'Coloniser', 27 (6.3%) 'Migrant', 130 (30.4%) 'Vagrant', and 36 (8.4%) 'Introduced and Naturalised' (Appendix 1). One species (New Zealand storm petrel) was assessed as Data Deficient. If pre-European human-induced extinctions are included, the number of extinct taxa increases to 61 (12.5% of total 489 taxa, or 22.8% of 267 resident indigenous breeding taxa).

Threat classifications have changed for many taxa since 2005 (Hitchmough *et al.* 2007), but these were largely due to changes in the threat classification system (Townsend *et al.* 2008), including creation of the new categories 'Recovering' and 'Relict', and new definitions for 'Declining' and 'Naturally Uncommon'. A key change in the criteria was removal of the trend criterion "There has been a decline of [$\geq 60\%$ or $30-60\%$] in the total population or habitat area in the last 100 years" used by Molloy *et al.* (2002) for 'Nationally Endangered' and 'Nationally Vulnerable' respectively. The removal of reference to historic declines (other than for 'Relict' taxa) meant that many formerly widespread taxa that now have stable or increasing populations moved to lower threat classifications.

Many New Zealand seabirds have stable or increasing populations of many thousands or even millions of pairs, but triggered the spatial requirements for 'Naturally Uncommon (Range Restricted)' due to them having breeding ranges of less than 100,000 ha. We chose to designate 6 such taxa as 'Not Threatened' because they bred at 2 or more widely separated sites or island groups: subantarctic diving petrel, black-winged petrel, grey-faced petrel, white-headed petrel, black-bellied storm-petrel, and Australasian gannet.

Other abundant and/or increasing seabirds were assessed as 'Relict' if there was evidence that their original breeding range had decreased by more than 90 per cent following introduction of predatory mammals: wedge-tailed shearwater, fluttering shearwater, Kermadec little shearwater, northern diving petrel, southern diving petrel, fairy prion, broad-billed prion, Cook's petrel, mottled petrel, white-naped petrel, Kermadec petrel, grey-backed storm petrel, and New Zealand white-faced storm petrel. For some of these species, evidence of their former breeding range was based on bone deposits dated before human arrival in New Zealand (Worthy & Holdaway 2002).

We consider 32 taxa to have changed their threat classification due to actual changes in

Table 4 Patterns of extinction, threat and rarity among indigenous New Zealand breeding bird taxa summarised by major habitat groupings. Abbreviations given in Methods and caption for Table 2. Subtotals for status within each habitat grouping are given in parentheses.

	Total	Extinct		Threatened			At Risk				NT	Col
		pre 1800	post 1800	NC	NE	NV	Dec	Rec	Rel	NU		
Land	129	29	18	8	6	17	6	5	2	18	20	-
		(47)		(31)			(31)					
Freshwater	37	8	2	4	2	4	1	1	2	3	7	3
		(10)		(10)			(7)					
Coastal	32	-	-	6	4	10	2	2	-	4	3	1
		-		(20)			(8)					
Oceanic	77	4	-	6	3	7	9	2	13	23	6	4
		(4)		(16)			(47)					
Total	275	41	20	24	15	38	18	10	17	48	36	8
		61		77			93					

population size or trend since they were last assessed in 2005. Of these, 19 taxa have improved their status (brown teal, little spotted kiwi, North Island kokako, Kermadec parakeet, New Zealand pigeon, yellowhead, North Island kaka, sooty tern, Stewart Island robin, South Island saddleback, North Island saddleback, southern crested grebe, Chatham petrel, Cook's petrel, mottled petrel, Pycroft's petrel, North Island little shearwater, Antarctic tern, and Chatham Island mollymawk), and 13 taxa have deteriorated in status (grey duck, New Zealand pipit, banded dotterel, Gibson's wandering albatross, eastern rockhopper penguin, New Zealand pied oystercatcher, pied stilt, black-billed gull, red-billed gull, white-chinned petrel, Pitt Island shag, grey-headed mollymawk, and white-capped mollymawk).

The main causes for improvements in conservation status were eradication of rats and cats from offshore and outlying islands (e.g. for birds breeding on the Kermadec Islands, Campbell Island, and muttonbird islands off Stewart Island), and successful threatened species management (especially translocations to predator-free sites, or those with low predator densities due to sustained pest control: e.g. for brown teal, South Island saddleback, North Island saddleback and yellowhead). The Chatham petrel has responded well both to management of competition for burrows from broad-billed prions, and translocation to a new breeding site on Pitt Island. For several species (e.g. brown teal, North Island kokako, yellowhead, and North Island kaka) population increases at managed sites are now believed to be offsetting

ongoing declines at unmanaged sites, resulting in a stable or increasing total population.

The main causes for deterioration in conservation status were thought to be changes in land-use, particularly conversion of sheep farming to dairy farming (New Zealand pied oystercatcher, pied stilt, banded dotterel, black-billed gull and New Zealand pipit); changes in oceanic productivity, possibly linked with global warming (eastern rockhopper penguin, grey-headed mollymawk, red-billed gull); fisheries by-catch (Gibson's wandering albatross, white-capped mollymawk, white-chinned petrel); and predation (banded dotterel, black-billed gull). For some species (e.g. black-billed gull and Gibson's wandering albatross) a combination of factors is likely.

Nationally Critical taxa

All 21 taxa assessed as 'Nationally Critical' in 2005 remain in that category, with the addition of grey duck, eastern rockhopper penguin and grey-headed mollymawk, all of which have large populations, but are believed to have declined or be declining at more than 70% per 3 generations. While the decline of the grey duck has apparently accelerated recently, decline rates for 'Nationally Critical' were previously measured over 10 years (Molloy *et al.* 2002) cf. the option of assessing declines over 3 generations (Townsend *et al.* 2008), meaning that the long-lived penguin and albatross now meet the amended trend criterion.

Many 'Nationally Critical' taxa are responding well to conservation management, and some were close to triggering the criteria for 'Nationally

Table 5 Patterns of extinction, threat and rarity among indigenous New Zealand breeding bird taxa in relation to their original geographic distribution. Abbreviations given in Methods and caption for Table 2.

	Total	Extinct		Threatened			At Risk					
		pre 1800	post 1800	NC	NE	NV	Dec	Rec	Rel	NU	NT	Col
M, Ch, Sub, K	1	-	-	1	-	-	-	-	-	-	-	-
M, Ch, Sub	8	-	1	-	-	1	1	-	3	-	2	-
M, Ch, K	4	-	-	-	-	-	-	-	1	-	3	-
M, Ch	18	1	1	1	-	2	1	1	1	3	7	-
M, Sub, K	1	-	-	-	-	-	-	-	-	-	1	-
M, Sub, K	4	-	-	-	-	-	-	-	2	-	2	-
M, K	3	-	-	-	-	-	-	-	-	1	2	-
M & offshore	14	-	1	1	-	2	2	1	1	2	4	-
NI, SI & offshore	11	1	1	1	2	2	-	1	1	1	1	-
NI, SI	21	8	-	3	1	4	1	-	-	-	1	3
SI, St & offshore	17	1	3	2	1	3	2	1	-	-	4	-
Sthn M, Ch, Sub	5	-	-	1	-	-	-	-	2	2	-	-
Sthn M, Sub	5	1	-	-	1	1	-	1	-	1	-	-
NI or SI & offshore	27	3	2	-	1	8	5	1	1	-	6	-
NI or SI	35	17	5	3	1	3	1	-	1	3	-	1
St & offshore	6	-	1	-	-	4	-	-	-	1	-	-
Ch, sub	4	-	-	-	-	1	-	-	-	3	-	-
Ch	33	9	4	4	5	3	-	-	-	7	-	1
Multiple Sub	13	-	-	1	-	1	3	1	-	3	3	1
Single Sub	24	-	-	4	-	3	1	-	-	15	-	1
K	14	-	-	2	3	-	-	1	4	3	-	1
Offshore	7	-	1	-	-	-	1	2	-	3	-	-

Vulnerable' (> 250 mature individuals, population increasing at > 10% over 10 years or 3 generations, e.g. Chatham Island oystercatcher, New Zealand shore plover).

Patterns of extinction, threat, and rarity

A total of 46 families of birds are (or were) represented in the indigenous New Zealand breeding avifauna (Table 2). Of these, 6 are extinct in New Zealand (Emeidae, Dinornithidae, Aptornithidae, Turnagridae, Aegothelidae and Corvidae), of which the first 4 (2 moa, adzebills and piopio) were endemic and are therefore globally extinct. Fourteen families have (or had) 8 or more breeding taxa; of these, 1 family is extinct (Emeidae), and 4 others have suffered >40% extinctions of taxa (Acanthisittidae, Anatidae, Rallidae and Scolopacidae). Seven of these large families now have a third or more of

their taxa classified as Threatened (Apterygidae, Charadriidae, Phalacrocoraciidae, Sternidae, Spheniscidae, Psitticidae and Petroicidae), and 6 have a third or more of their taxa classified as 'At Risk' (Procellariidae, Diomedidae, Spheniscidae, Psitticidae, Sternidae and Scolopacidae). The only large family with a high proportion of 'Not Threatened' taxa is Petroicidae, with 44% of 9 taxa.

There was a clear correlation between levels of endemism and extinction and threat (Table 3): 62% of 39 taxa endemic at family level were extinct, and another 26% were threatened (87% total). Comparable figures for the 46 taxa in endemic genera were 35% extinct and 28% threatened (63% total). Of the 95 taxa in endemic species, 22% were extinct and 37% were threatened (59% total). None of the 36 endemic subspecies (of more widespread species) has become extinct since human arrival in New Zealand, nor have

any of the 59 taxa with breeding distributions shared with other countries. However, 22% of the endemic subspecies are threatened, as are 19% of taxa shared with other countries.

Land birds were most likely to have become extinct (36%), followed by freshwater birds (27%) and oceanic birds (5%). However, no coastal taxa are known to have become extinct (Table 4). By contrast, 63% of the 32 coastal taxa are ranked as threatened, along with 27% of freshwater birds, 24% of land birds, and 21% of oceanic birds.

The strongest geographical patterns among New Zealand bird extinctions were that taxa confined to one of the 2 main islands were the most likely to have become extinct (63% of 35 taxa), followed by taxa confined to the Chatham Islands (39% of 33 taxa) and taxa confined to both the main islands (38% of 21 taxa) (Table 5). Among geographical groupings with 8 or more taxa, currently threatened taxa were most likely to occur on both main islands and offshore islands (46% of 11 taxa), on both main islands (38% of 21 taxa), on the Chatham Is (36% of 33 taxa), on the Kermadec Is (36% of 14 taxa), on the South I. and Stewart I. and offshore islands (35% of 17 taxa), and either the North I. or South I. and offshore islands (33% of 27 taxa). Not surprisingly, there was a high proportion of 'At Risk' taxa among those confined to single island groups or to offshore islands, as such taxa triggered one of the criteria for 'Naturally Uncommon', of having a breeding range of <100,000 ha.

Ironically and tragically, the single bird species that formerly occupied the main islands, offshore islands, Kermadec Is, Chatham Is and multiple subantarctic island groups is the described taxon declining most rapidly towards extinction in New Zealand. The extremely broad geographical range of the New Zealand subspecies of the grey duck has not spared it from competition and genetic introgression from the introduced mallard. Without immediate and innovative management, probably on the Chatham Islands, pure-bred grey ducks are likely to be extinct in the New Zealand region within a decade (Rhymer *et al.* 2004; Williams & Basse 2006).

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Appendix 1 Threat rankings for New Zealand birds

Taxa are grouped by threat category, then alphabetically by scientific name. The Criteria column provides each taxon a code for population size and trend justifying placement in that threat category (see Townsend *et al.* 2008 for more detail). Full definitions for Qualifiers are also in Townsend *et al.* (2008), but the abbreviations are: CD, Conservation Dependent; De, Designated; DP, Data Poor; EF, Extreme Fluctuations; IE, Island Endemic; Inc, Increasing; OL, One Location; PD, Partial Decline; RF, Recruitment Failure; RR, Range Restricted; SO, Secure Overseas; Sp, Sparse; St, Stable; TO, Threatened Overseas. For non-endemic taxa identified as 'Threatened Overseas', we provide the IUCN threat ranking (IUCN 2006): EN, Endangered; LC, Least Concern (at species level, where the subspecies is threatened); VU, Vulnerable. Explanations of IUCN codes are in IUCN (2001, 2006). Those species assessed as Near Threatened (NT) by IUCN are also identified

Criteria for New Zealand threat rankings

Nationally Critical: A, <250 mature individuals (natural or unnatural); C, any population size, >70% population decline over 10 years or 3 generations, whichever is longer.

Nationally Endangered: A (1/1), 250-1000 mature individuals (natural or unnatural), 10-50% population decline; B (1/1), 250-1000 mature individuals (unnatural), stable; C (1/1), 1000-5000 mature individuals, 50-70% population decline.

Nationally Vulnerable: A (1/1), 250-1000 mature individuals (unnatural), population increase >10%; B (1/1), 1000-5000 mature individuals (unnatural), stable; C (1/1), 1000-5000 mature individuals, 10-50% population decline; D (1/1), 5000-20,000 mature individuals, 30-70% population decline; E (1/1), 20,000-100,000 mature individuals, 50-70% population decline

Declining: A (1/1), 5000-20,000 mature individuals, 10-30% population decline; B (1/1), 20,000-100,000 mature individuals, 10-50% population decline; C (1/1), >100,000 mature individuals, 10-70% population decline.

Recovering: A, 1000-5000 mature individuals, population increase >10%; B, 5000-20,000 mature individuals, population increase >10%.

Relict: A, 5000-20,000 mature individuals, stable; B, >20,000 mature individuals, stable or increasing. All Relict taxa occupy <10% of their original range.

A. Extinct (= extirpated since AD 1800)

Scientific name	Common name	Family	Criteria	Qualifier	IUCN threat ranking
<i>Anthornis melanocephala</i>	Chatham Island bellbird	Meliphagidae			
<i>Bowdleria rufescens</i>	Chatham Island fernbird	Sylviidae			
<i>Cabalus modestus</i>	Chatham rail	Rallidae			
<i>Callaeas cinerea</i>	South Island kokako	Callaeidae		De	
<i>Coenocorypha barrierensis</i>	North Island snipe	Scolopacidae			
<i>Coenocorypha iredalei</i>	Stewart Island snipe	Scolopacidae			
<i>Coturnix novaezelandiae</i>	New Zealand quail	Phasianidae			
<i>Gallirallus dieffenbachii</i>	Dieffenbach's rail	Rallidae			
<i>Heteralocha acutirostris</i>	Huia	Callaeidae			
<i>Ixobrychus novaezelandiae</i>	New Zealand little bittern	Ardeidae			
<i>Mergus australis</i>	New Zealand merganser	Anatidae			
<i>Sceloglaux albigifacies albigifacies</i>	South Island laughing owl	Strigidae			
<i>Sceloglaux albigifacies rufifacies</i>	North Island laughing owl	Strigidae			
<i>Traversia lyalli</i>	Lyall's wren	Acanthisittidae			
<i>Turnagra capensis capensis</i>	South Island piopio	Turnagridae			
<i>Turnagra capensis minor</i>	Stephens Island piopio	Turnagridae			
<i>Turnagra tanagra</i>	North Island piopio	Turnagridae			
<i>Xenicus longipes longipes</i>	South Island bush wren	Acanthisittidae			
<i>Xenicus longipes stokesi</i>	North Island bush wren	Acanthisittidae			
<i>Xenicus longipes variabilis</i>	Stead's bush wren	Acanthisittidae			

B. Threatened**B.1. Nationally Critical**

Scientific name	Common name	Family	Criteria	Qualifier	IUCN threat ranking
<i>Anas chlorotis</i> "South Island"	South Island brown teal	Anatidae	A		
<i>Anas nesiotis</i>	Campbell Island teal	Anatidae	A	IE Inc OL	
<i>Anas superciliosa superciliosa</i>	Grey duck	Anatidae	C		
<i>Apteryx australis</i> "Haast"	Haast tokoeka	Apterygidae	A	De RF	
<i>Apteryx rovi</i>	Rowi, Okarito brown kiwi	Apterygidae	A	CD Inc OL	
<i>Ardea modesta</i>	White heron	Ardeidae	A	OL SO St	
<i>Charadrius obscurus obscurus</i>	Southern New Zealand dotterel	Charadriidae	A	CD OL St	

<i>Coenocorypha aucklandica</i> "Campbell"	Campbell Island snipe	Scolopacidae	A	IE Inc OL	
<i>Cyanoramphus malherbi</i>	Orange-fronted parakeet	Psittacidae	A	CD EF Inc RR	
<i>Eudyptes filholi</i>	Eastern rockhopper penguin	Spheniscidae	C	TO	VU A2bce+3bce (3 taxa)
<i>Gygis alba royana</i>	White tern	Sternidae	A	OL SO	
<i>Haematopus chathamensis</i>	Chatham Island oystercatcher	Haematopodidae	A	CD IE RR St	
<i>Hemiphaga chathamensis</i>	Chatham Island pigeon, parea	Columbidae	A	CD IE OL	
<i>Himantopus novaeseelandiae</i>	Black stilt	Recurvirostridae	A	CD RR	
<i>Leucocarbo ranfurlyi</i>	Bounty Island shag	Phalacrocoracidae	A	IE OL	
<i>Pelagodroma albiclunus</i>	Kermadec white-faced storm petrel	Hydrobatidae	A	IE OL	
<i>Pelecanoides georgicus</i> "Codfish Island"	Codfish Island South Georgian diving petrel	Procellariidae	A	IE OL	
<i>Petroica traversi</i>	Black robin	Petroicidae	A	IE RR	
<i>Porphyrio hochstetteri</i>	Takahe	Rallidae	A	CD RR	
<i>Pterodroma magentae</i>	Chatham Island taiko	Procellariidae	A	CD IE Inc OL	
<i>Sternula nereis davisae</i>	New Zealand fairy tern	Sternidae	A	CD RR	
<i>Strigops habroptilus</i>	Kakapo	Psittacidae	A	CD Inc RR	
<i>Thalassarche chrysoloma</i>	Grey-headed mollymawk	Diomedidae	C	DP OL TO	VU A4bd
<i>Thinornis novaeseelandiae</i>	New Zealand shore plover	Charadriidae	A	CD Inc RR Sp	

B.2. Nationally Endangered

Scientific name	Common name	Family	Criteria	Qualifier	IUCN threat ranking
<i>Botaurus poiciloptilus</i>	Bittern	Ardeidae	B (1/1)	Sp TO	EN B2ab(iii,iv,v)
<i>Chlidonias albostrigatus</i>	Black-fronted tern	Sternidae	C (1/1)	DP	
<i>Cyanoramphus forbesi</i>	Forbes' parakeet	Psittacidae	B (1/1)	IE OL	
<i>Falco novaeseelandiae</i> "southern"	Southern falcon	Falconidae	B (1/1)	DP	
<i>Fregetta grallaria grallaria</i>	White-bellied storm petrel	Hydrobatidae	B (1/1)	DP SO	
<i>Larus bulleri</i>	Black-billed gull	Laridae	E	De	
<i>Leucocarbo carunculatus</i>	King shag	Phalacrocoracidae	B (1/1)		
<i>Leucocarbo onslowi</i>	Chatham Island shag	Phalacrocoracidae	B (1/1)	DP IE RR	
<i>Nestor meridionalis meridionalis</i>	South Island kaka	Psittacidae	C (1/1)	CD PD RF	
<i>Notiomystis cincta</i>	Stitchbird	Notiomystidae	C	CD De RR	
<i>Petroica macrocephala chathamensis</i>	Chatham Island tomtit	Petroicidae	B (1/1)	IE RR St	
<i>Phaethon rubricauda</i>	Red-tailed tropicbird	Phaethontidae	B (1/1)	RR SO St	
<i>Prosthemadera novaeseelandiae chathamensis</i>	Chatham Island tui	Meliphagidae	B (1/1)	IE RR St	
<i>Stictocarbo featherstoni</i>	Pitt Island shag	Phalacrocoracidae	A (1/1)	IE RR	
<i>Sula dactylatra fullageri</i>	Masked (blue-faced) booby	Sulidae	B (1/1)	RR St TO	SO (at species level)

B.3. Nationally Vulnerable

Scientific name	Common name	Family	Criteria	Qualifier	IUCN threat ranking
<i>Anarhynchus frontalis</i>	Wrybill	Charadriidae	C (1/1)	RR	
<i>Anas aucklandica</i>	Auckland Island teal	Anatidae	B (1/1)	IE RR St	
<i>Apteryx australis</i>	Southern Fiordland tokoeka	Apterygidae	C (1/1)	CD Inc OL RF	
<i>Apteryx australis</i> (Northern Fiordland)	Northern Fiordland tokoeka	Apterygidae	D (1/1)	CD RF	
<i>Apteryx australis lawryi</i>	Stewart Island tokoeka	Apterygidae	D (1/1)	RF	
<i>Apteryx haastii</i>	Great spotted kiwi	Apterygidae	D	De OL RF	
<i>Apteryx mantelli</i>	North Island brown kiwi	Apterygidae	D (1/1)	CD PD RF	
<i>Bowdleria punctata stewartiana</i>	Stewart Island fernbird	Sylviidae	B (1/1)	DP RR	
<i>Callaeas wilsoni</i>	North Island kokako	Callaeidae	B (1/1)	CD Inc Sp	

<i>Charadrius bicinctus bicinctus</i>	Banded dotterel	Charadriidae	D (1/1)	RR	
<i>Charadrius obscurus aquilonius</i>	Northern New Zealand dotterel	Charadriidae	B (1/1)	CD	
<i>Coenocorypha pusilla</i>	Chatham Island snipe	Scolopacidae	B (1/1)	IE RR St	
<i>Diomedea antipodensis gibsoni</i>	Gibson's albatross	Diomedeidae	D (1/1)	IE RR	
<i>Egretta sacra sacra</i>	Reef heron	Ardeidae	B (1/1)	SO St	
<i>Eudyptes pachyrhynchus</i>	Fiordland crested penguin	Spheniscidae	C (1/1)	Sp	
<i>Eudyptula minor albosignata</i>	White-flipped blue penguin	Spheniscidae	B	De RR	
<i>Falco novaeseelandiae sensu stricto</i>	Bush falcon	Falconidae	B (1/1)	DP St	
<i>Falco novaeseelandiae "eastern"</i>	Eastern falcon	Falconidae	B (1/1)	DP St	
<i>Gallirallus australis greyi</i>	North Island weka	Rallidae	B (1/1)	CD EF RR Sp	
<i>Gallirallus australis scotti</i>	Stewart Island weka	Rallidae	B (1/1)	DP	
<i>Gerygone albofrontata</i>	Chatham Island warbler	Acanthizidae	B (1/1)	IE RR St	
<i>Hydroprogne caspia</i>	Caspian tern	Sternidae	B (1/1)	SO	
<i>Hymenolaimus malachorhynchus</i>	Blue duck, whio	Anatidae	C (1/1)	CD Sp	
<i>Larus novaehollandiae scopulinus</i>	Red-billed gull	Laridae	E (1/1)		
<i>Leucocarbo chalconotus</i>	Stewart Island shag	Phalacrocoracidae	B (1/1)		
<i>Leucocarbo colensoi</i>	Auckland Island shag	Phalacrocoracidae	B (1/1)	IE RR St	
<i>Megadyptes antipodes</i>	Yellow-eyed penguin	Spheniscidae	B (1/1)	EF	
<i>Mohoua ochrocephala</i>	Yellowhead	Pachycephalidae	C (1/1)	CD	
<i>Nestor meridionalis septentrionalis</i>	North Island kaka	Psittacidae	C (1/1)	CD PD RF	
<i>Petroica australis rakiura</i>	Stewart Island robin	Petroicidae	B (1/1)	IE RR	
<i>Phalacrocorax varius varius</i>	Pied shag	Phalacrocoracidae	C (1/1)		
<i>Podiceps cristatus australis</i>	Southern crested grebe	Podicipedidae	A (1/1)	Inc SO	
<i>Poliiocephalus rufopectus</i>	New Zealand dabchick	Podicipedidae	B (1/1)		
<i>Procellaria parkinsoni</i>	Black petrel	Procellariidae	B (1/1)	RR	
<i>Pterodroma axillaris</i>	Chatham petrel	Procellariidae	A (1/1)	CD IE Inc OL	
<i>Sterna striata aucklandornia</i>	Southern white-fronted tern	Sternidae	B (1/1)	DP RR	
<i>Thalassarche salvini</i>	Salvin's mollymawk	Diomedeidae	D (1/1)	DP RR TO	VU D2
<i>Xenicus gilviventris</i>	Rock wren	Acanthisittidae	C (1/1)	DP	

C. Data deficient

Scientific name	Common name	Family	Criteria	Qualifier	IUCN threat ranking
<i>Oceanites maorianus</i>	New Zealand storm petrel	Hydrobatidae		DP	

D. At Risk

D.1. Declining

Scientific name	Common name	Family	Criteria	Qualifier	IUCN threat ranking
<i>Acanthisitta chloris chloris</i>	South Island rifleman	Acanthisittidae	C (1/1)		
<i>Acanthisitta chloris granti</i>	North Island rifleman	Acanthisittidae	B (1/1)		
<i>Anthus novaeseelandiae novaeseelandiae</i>	New Zealand pipit	Motacillidae	C (1/1)		
<i>Bowdleria punctata punctata</i>	South Island fernbird	Sylviidae	B (1/1)		
<i>Bowdleria punctata vealeae</i>	North Island fernbird	Sylviidae	B (1/1)	RR St	
<i>Eudyptula minor iredalei</i>	Northern blue penguin	Spheniscidae	A (1/1)	DP EF	
<i>Eudyptula minor minor</i>	Southern blue penguin	Spheniscidae	A (1/1)	DP	
<i>Gallirallus australis australis</i>	Western weka	Rallidae	A (1/1)	DP EF	
<i>Haematopus finschi</i>	New Zealand pied oystercatcher	Haematopodidae	B (1/1)		
<i>Himantopus himantopus leucocephalus</i>	Pied stilt	Recurvirostridae	B (1/1)	SO	
<i>Phoebastria palpebrata</i>	Light-mantled sooty albatross	Diomedeidae	B (1/1)	DP RR SO	NT

<i>Procellaria aequinoctialis</i>	White-chinned petrel	Procellariidae	C (1/1)	RR TO	VU A4bcde
<i>Procellaria cinerea</i>	Grey petrel	Procellariidae	B (1/1)	SO	NT
<i>Puffinus carneipes</i>	Flesh-footed shearwater	Procellariidae	B (1/1)	RR TO	LC (but recent decline)
<i>Puffinus griseus</i>	Sooty shearwater	Procellariidae	C (1/1)	SO	NT
<i>Puffinus huttoni</i>	Hutton's shearwater	Procellariidae	C (1/1)	OL	
<i>Sterna striata striata</i>	White-fronted tern	Sternidae	B (1/1)	DP	
<i>Thalassarche cauta steadi</i>	New Zealand white-capped mollymawk	Diomedidae	C (1/1)	DP RR	

D.2. Recovering

Scientific name	Common name	Family	Criteria	Qualifier	IUCN threat ranking
<i>Anas chlorotis</i> "North Island"	Brown teal	Anatidae	A	CD RR	
<i>Anthus novaeseelandiae aucklandicus</i>	Auckland Island pipit	Motacillidae	B	Inc RR	
<i>Apteryx owenii</i>	Little spotted kiwi	Apterygidae	A	CD Inc RR	
<i>Cyanoramphus novaeseelandiae cyanurus</i>	Kermadec parakeet	Psittacidae	A	EF IE Inc RR	
<i>Haematopus unicolor</i>	Variable oystercatcher	Haematopodidae	A		
<i>Philesturnus carunculatus</i>	South Island saddleback	Callaeidae	A	Inc RR	
<i>Philesturnus rufusater</i>	North Island saddleback	Callaeidae	B	Inc RR	
<i>Pterodroma pycrofti</i>	Pycroft's petrel	Procellariidae	B	Inc RR	
<i>Puffinus assimilis haurakiensis</i>	North Island little shearwater	Procellariidae	B	Inc RR	
<i>Sterna vittata bethunei</i>	Antarctic tern	Sternidae	A	RR SO	

D.3. Relict

Scientific name	Common name	Family	Criteria	Qualifier	IUCN threat ranking
<i>Cyanoramphus novaeseelandiae novaeseelandiae</i>	Red-crowned parakeet	Psittacidae	B		
<i>Gallirallus australis hectori</i>	Buff weka	Rallidae	A		
<i>Garrodia nereis</i>	Grey-backed storm petrel	Hydrobatidae	B	RR SO	
<i>Pachyptila turtur</i>	Fairy prion	Procellariidae	B	RR SO	
<i>Pachyptila vittata</i>	Broad-billed prion	Procellariidae	B	RR SO	
<i>Pelagodroma marina maoriana</i>	New Zealand white-faced storm petrel	Hydrobatidae	B	RR	
<i>Pelecanoides urinatrix chathamensis</i>	Southern diving petrel	Procellariidae	B	RR	
<i>Pelecanoides urinatrix urinatrix</i>	Northern diving petrel	Procellariidae	B	Inc RR SO	
<i>Porzana pusilla affinis</i>	Marsh crake	Rallidae	A	DP SO	
<i>Porzana tabuensis plumbea</i>	Spotless crake	Rallidae	A	SO	
<i>Pterodroma cervicalis</i>	White-naped petrel	Procellariidae	B	OL	
<i>Pterodroma cookii</i>	Cook's petrel	Procellariidae	B	Inc RR	
<i>Pterodroma inexpectata</i>	Mottled petrel	Procellariidae	B	Inc RR	
<i>Pterodroma neglecta</i>	Kermadec petrel	Procellariidae	A	SO	
<i>Puffinus assimilis kermadecensis</i>	Kermadec little shearwater	Procellariidae	B	IE RR	
<i>Puffinus gavia</i>	Fluttering shearwater	Procellariidae	B	RR	
<i>Puffinus pacificus</i>	Wedge-tailed shearwater	Procellariidae	B	RR SO	

D.4. Naturally Uncommon

Scientific name	Common name	Family	Criteria	Qualifier	IUCN threat ranking
<i>Anous tenuirostris minutus</i>	White-capped noddy	Sternidae		RR SO	
<i>Anthornis melanura obscura</i>	Three Kings bellbird	Meliphagidae		IE OL St	
<i>Anthornis melanura oneho</i>	Poor Knights bellbird	Meliphagidae		IE OL St	
<i>Anthus novaeseelandiae chathamensis</i>	Chathams pipit	Motacillidae		IE RR St	
<i>Anthus novaeseelandiae steindachneri</i>	Antipodes Island pipit	Motacillidae		IE RR St	

<i>Bowdleria punctata caudata</i>	Snares fernbird	Sylviidae	IE OL St		
<i>Bowdleria punctata wilsoni</i>	Codfish Island fernbird	Sylviidae	IE RR		
<i>Catharacta antarctica lombergi</i>	Brown skua	Stercorariidae	SO Sp		
<i>Charadrius bicinctus exilis</i>	Auckland Island banded dotterel	Charadriidae	DP IE RR		
<i>Coenocorypha aucklandica aucklandica</i>	Auckland Island snipe	Scolopacidae	IE RR St		
<i>Coenocorypha aucklandica meinerzhagenae</i>	Antipodes Island snipe	Scolopacidae	IE RR St		
<i>Coenocorypha huegeli</i>	Snares Island snipe	Scolopacidae	IE RR St		
<i>Cyanoramphus hochstetteri</i>	Reischek's parakeet	Psittacidae	IE RR St		
<i>Cyanoramphus novaezelandiae chathamensis</i>	Chatham Island red-crowned parakeet	Psittacidae	IE RR St		
<i>Cyanoramphus unicolor</i>	Antipodes Island parakeet	Psittacidae	IE RR St		
<i>Daption capense australe</i>	Snares Cape pigeon	Procellariidae	RR		
<i>Diomedea antipodensis antipodensis</i>	Antipodean albatross	Diomedeidae	IE RR		
<i>Diomedea epomophora epomophora</i>	Southern royal albatross	Diomedeidae	RR		
<i>Diomedea epomophora sanfordi</i>	Northern royal albatross	Diomedeidae	RR		
<i>Dryolimnas muelleri</i>	Auckland Island rail	Rallidae	IE RR St		
<i>Eudynamys taitensis</i>	Long-tailed cuckoo	Cuculidae	DP		
<i>Eudyptes robustus</i>	Snares crested penguin	Spheniscidae	IE OL		
<i>Eudyptes sclateri</i>	Erect-crested penguin	Spheniscidae	RR		
<i>Eudyptula minor chathamensis</i>	Chatham Island blue penguin	Spheniscidae	IE RR		
<i>Gallirallus philippensis assimilis</i>	Banded rail	Rallidae	DP		
<i>Leucocarbo campbelli</i>	Campbell Island shag	Phalacrocoracidae	DP IE OL		
<i>Macronectes halli</i>	Northern giant petrel	Procellariidae	RR SO		NT
<i>Nestor notabilis</i>	Kea	Psittacidae			
<i>Onychoprion fuscata kermadeci</i>	New Zealand sooty tern	Sternidae	DP RR SO		
<i>Pachyptila crassirostris crassirostris</i>	Fulmar prion	Procellariidae	RR St		
<i>Pachyptila crassirostris flemingi</i>	Lesser fulmar prion	Procellariidae	OL SO St		
<i>Pachyptila crassirostris pyramidalis</i>	Chatham fulmar prion	Procellariidae	IE RR		
<i>Pachyptila desolata</i>	Antarctic prion	Procellariidae	RR SO		
<i>Petroica macrocephala damnefaerdi</i>	Black tomtit	Petroicidae	IE OL St		
<i>Petroica macrocephala marrineri</i>	Auckland Island tomtit	Petroicidae	IE RR		
<i>Phalacrocorax carbo novaezelandiae</i>	Black shag	Phalacrocoracidae	SO Sp		
<i>Phalacrocorax melanoleucos brevirostris</i>	Little shag	Phalacrocoracidae	Inc		
<i>Phalacrocorax sulcirostris</i>	Little black shag	Phalacrocoracidae	RR SO		
<i>Platalea regia</i>	Royal spoonbill	Threskiornithidae	Inc RR SO Sp		
<i>Procellaria westlandica</i>	Westland petrel	Procellariidae	OL St		
<i>Procelsterna cerulea albivittata</i>	Grey ternlet	Sternidae	RR SO		
<i>Puffinus bulleri</i>	Buller's shearwater	Procellariidae	OL St		
<i>Puffinus elegans</i>	Subantarctic little shearwater	Procellariidae	RR SO		
<i>Rhipidura fuliginosa penita</i>	Chatham Island fantail	Rhipiduridae	EF IE RR		
<i>Thalassarche bulleri bulleri</i>	Southern Buller's mollymawk	Diomedeidae	RR		
<i>Thalassarche bulleri platei</i>	Northern Buller's mollymawk	Diomedeidae	RR		
<i>Thalassarche eremita</i>	Chatham Island mollymawk	Diomedeidae	IE OL		
<i>Thalassarche impavida</i>	Campbell Island mollymawk	Diomedeidae	IE OL		

E. Not Threatened

Scientific name	Common name	Family	Criteria	Qualifier	IUCN threat ranking
<i>Anas gracilis</i>	Grey teal	Anatidae		Inc SO	
<i>Anas rhynchotis variegata</i>	New Zealand shoveler	Anatidae			

<i>Anthornis melanura melanura</i>	Bellbird	Meliphagidae		
<i>Ardea novaehollandiae</i>	White-faced heron	Ardeidae	SO	
<i>Aythya novaeseelandiae</i>	New Zealand scaup	Anatidae	Inc	
<i>Chrysococcyx lucidus lucidus</i>	Shining cuckoo	Cuculidae	DP	
<i>Circus approximans</i>	Swamp harrier	Accipitridae	SO	
<i>Cyanoramphus auriceps</i>	Yellow-crowned parakeet	Psittacidae	EF	
<i>Cygnus atratus</i>	Black swan	Anatidae	SO	
<i>Fregetta tropica</i>	Black-bellied storm petrel	Hydrobatidae	De RR SO	
<i>Gerygone igata</i>	Grey warbler	Acanthizidae		
<i>Hemiphaga novaeseelandiae</i>	New Zealand pigeon, kereru	Columbidae	CD Inc	
<i>Hirundo tahitica neoxena</i>	Welcome swallow	Hirundinidae	Inc SO	
<i>Larus dominicanus dominicanus</i>	Southern black-backed gull	Laridae	SO	
<i>Mohoua albicilla</i>	Whitehead	Pachycephalidae		
<i>Mohoua novaeseelandiae</i>	Brown creeper	Pachycephalidae		
<i>Morus serrator</i>	Australasian gannet	Sulidae	De Inc SO	
<i>Ninox novaeseelandiae novaeseelandiae</i>	Morepork	Strigidae		
<i>Pelecanoides urinatrix exsul</i>	Subantarctic diving petrel	Procellariidae	De RR SO	
<i>Petroica australis australis</i>	South Island robin	Petroicidae		
<i>Petroica longipes</i>	North Island robin	Petroicidae	St	
<i>Petroica macrocephala macrocephala</i>	Yellow-breasted tomtit	Petroicidae		
<i>Petroica macrocephala toitoi</i>	Pied tomtit	Petroicidae		
<i>Porphyrio melanotus</i>	Pukeko	Rallidae	Inc SO	
<i>Prosthemadera novaeseelandiae novaeseelandiae</i>	Tui	Meliphagidae	OL St	
<i>Pterodroma lessonii</i>	White-headed petrel	Procellariidae	De RR SO	
<i>Pterodroma macroptera gouldi</i>	Grey-faced petrel	Procellariidae	De Inc RR	
<i>Pterodroma nigripennis</i>	Black-winged petrel	Procellariidae	De Inc RR SO	
<i>Rhipidura fuliginosa fuliginosa</i>	South Island fantail	Rhipiduridae		
<i>Rhipidura fuliginosa placabilis</i>	North Island fantail	Rhipiduridae		
<i>Stictocorbo punctatus punctatus</i>	Spotted shag	Phalacrocoracidae		
<i>Stictocorbo punctatus steadi</i>	Blue shag	Phalacrocoracidae		
<i>Tadorna variegata</i>	Paradise shelduck	Anatidae		
<i>Todiramphus sanctus vagans</i>	Sacred kingfisher	Alcedinidae		
<i>Vanellus miles novaehollandiae</i>	Spur-winged plover	Charadriidae	SO	
<i>Zosterops lateralis lateralis</i>	Silvereye	Zosteropidae	SO	

F. Coloniser

Scientific name	Common name	Family	Criteria	Qualifier	IUCN threat ranking
<i>Anous stolidus pileatus</i>	Common noddy	Sternidae		OL SO	
<i>Charadrius melanops</i>	Black-fronted dotterel	Charadriidae		SO Sp	
<i>Fulica atra</i>	Australian coot	Rallidae		Inc SO	
<i>Nycticorax caledonicus</i>	Nankeen night heron	Ardeidae		OL SO	
<i>Pterodroma mollis</i>	Soft-plumaged petrel	Procellariidae		Inc OL SO	
<i>Tachybaptus novaehollandiae</i>	Australasian little grebe	Podicipedidae		SO	
<i>Thalassarche carteri</i>	Eastern yellow-nosed mollymawk	Diomedidae		TO	EN A4bde
<i>Thalassarche melanophrys</i>	Black-browed mollymawk	Diomedidae		TO	EN A4bd

G. Migrant

Scientific name	Common name	Family	Criteria	Qualifier	IUCN threat ranking
<i>Arenaria interpres</i>	Turnstone	Scolopacidae		SO	
<i>Bubulcus ibis coromandus</i>	Cattle egret	Ardeidae		SO	

<i>Calidris acuminata</i>	Sharp-tailed sandpiper	Scolopacidae	SO	
<i>Calidris canutus rogersi</i>	Knot	Scolopacidae	SO	
<i>Calidris ferruginea</i>	Curlew sandpiper	Scolopacidae	SO	
<i>Calidris ruficollis</i>	Red-necked stint	Scolopacidae	SO	
<i>Catharacta maccormicki</i>	South Polar skua	Stercorariidae	SO	
<i>Chlidonias leucopterus</i>	White-winged black tern	Sternidae	SO	
<i>Daption capense capense</i>	Cape pigeon	Procellariidae	SO	
<i>Diomedea exulans</i>	Snowy albatross	Diomedeidae	TO	VU A4bd (several taxa)
<i>Fulmarus glacialisoides</i>	Antarctic fulmar	Procellariidae	SO	
<i>Halobaena caerulea</i>	Blue petrel	Procellariidae	SO	
<i>Limosa lapponica baueri</i>	Eastern bar-tailed godwit	Scolopacidae	SO	
<i>Lugensa brevirostris</i>	Kerguelen petrel	Procellariidae	SO	
<i>Macronectes giganteus</i>	Southern giant petrel	Procellariidae	SO	NT
<i>Numenius madagascariensis</i>	Far-eastern curlew	Scolopacidae	SO	
<i>Numenius phaeopus variegatus</i>	Asiatic whimbrel	Scolopacidae	SO	
<i>Oceanites oceanicus</i>	Wilson's storm petrel	Hydrobatidae	SO	
<i>Pachyptila belcheri</i>	Narrow-billed prion	Procellariidae	SO	
<i>Pachyptila salvini</i>	Salvin's prion	Procellariidae	SO	
<i>Pluvialis fulva</i>	Pacific golden plover	Charadriidae	SO	
<i>Puffinus tenuirostris</i>	Short-tailed shearwater	Procellariidae	SO	
<i>Stercorarius longicaudus</i>	Long-tailed skua	Stercorariidae	SO	
<i>Stercorarius parasiticus</i>	Arctic skua	Stercorariidae	SO	
<i>Stercorarius pomarinus</i>	Pomarine skua	Stercorariidae	SO	
<i>Sterna paradisaea</i>	Arctic tern	Sternidae	SO	
<i>Sternula albifrons sinensis</i>	Little tern	Sternidae	SO	

H. Vagrant

H.1. Vagrant A

Scientific name	Common name	Family	Criteria	Qualifier	IUCN threat ranking
<i>Anas castanea</i>	Chestnut teal	Anatidae		SO	
<i>Aptenodytes patagonicus</i>	King penguin	Spheniscidae		SO	
<i>Apus pacificus pacificus</i>	Fork-tailed swift	Apodidae		SO	
<i>Ardea intermedia</i>	Intermediate egret	Ardeidae		SO	
<i>Calidris alba</i>	Sanderling	Scolopacidae		SO	
<i>Calidris melanotos</i>	Pectoral sandpiper	Scolopacidae		SO	
<i>Calidris tenuirostris</i>	Great knot	Scolopacidae		SO	
<i>Charadrius leschenaultii</i>	Large sand dotterel	Charadriidae		SO	
<i>Charadrius mongolus</i>	Mongolian dotterel	Charadriidae		SO	
<i>Charadrius ruficapillus</i>	Red-capped dotterel	Charadriidae		SO	
<i>Charadrius veredus</i>	Oriental dotterel	Charadriidae		SO	
<i>Cuculus optatus</i>	Oriental cuckoo	Cuculidae		SO	
<i>Egretta garzetta</i>	Little egret	Ardeidae		SO	
<i>Eudyptes chrysolophus schlegeli</i>	Royal penguin	Spheniscidae		TO	VU D2
<i>Eurystomus orientalis pacificus</i>	Dollarbird	Coraciidae		SO	
<i>Falco cenchroides</i>	Nankeen kestrel	Falconidae		SO	
<i>Fregeta ariel</i>	Lesser frigatebird	Fregatidae		SO	
<i>Gallinago hardwickii</i>	Japanese snipe	Scolopacidae		SO	
<i>Gelochelidon nilotica macrotarsa</i>	Gull-billed tern	Sternidae		SO	
<i>Glareola maldivarum</i>	Oriental pratincole	Glareolidae		SO	
<i>Hirundapus caudacutus caudacutus</i>	White-throated needletail	Apodidae		SO	
<i>Hirundo ariel</i>	Fairy martin	Hirundinidae		SO	

<i>Hylochelidon nigricans</i>	Tree martin	Hirundinidae	SO	
<i>Limicola falcinellus</i>	Broad-billed sandpiper	Scolopacidae	SO	
<i>Limosa haemastica</i>	Hudsonian godwit	Scolopacidae	SO	
<i>Limosa limosa melanuroides</i>	Asiatic black-tailed godwit	Scolopacidae	SO	
<i>Numenius minutus</i>	Little whimbrel	Scolopacidae	SO	
<i>Numenius phaeopus hudsonicus</i>	American whimbrel	Scolopacidae	SO	
<i>Phaeton lepturus dorotheae</i>	White-tailed tropicbird	Phaethontidae	SO	
<i>Phalaropus lobatus</i>	Red-necked phalarope	Scolopacidae	SO	
<i>Plegadis falcinellus</i>	Glossy ibis	Threskiornithidae	SO	
<i>Pluvialis squatarola</i>	Grey plover	Charadriidae	SO	
<i>Poliiocephalus poliocephalus</i>	Hoary-headed grebe	Podicipedidae	SO	
<i>Pterodroma (leucoptera) caledonica</i>	New Caledonian petrel	Procellariidae	TO	VU B2ab(v); D2 (2 taxa)
<i>Pygoscelis papua</i>	Gentoo penguin	Spheniscidae	SO	NT
<i>Sterna hirundo longipennis</i>	Common tern	Sternidae	SO	
<i>Sula leucogaster</i>	Brown booby	Sulidae	SO	
<i>Tadorna tadornoides</i>	Chestnut-breasted shelduck	Anatidae	SO	
<i>Thalassoica antarctica</i>	Antarctic petrel	Procellariidae	SO	
<i>Threskiornis molucca</i>	Australian white ibis	Threskiornithidae	SO	
<i>Tringa brevipes</i>	Siberian tattler	Scolopacidae	SO	
<i>Tringa flavipes</i>	Lesser yellowlegs	Scolopacidae	SO	
<i>Tringa hypoleucos</i>	Common sandpiper	Scolopacidae	SO	
<i>Tringa incana</i>	Wandering tattler	Scolopacidae	SO	
<i>Tringa nebularia</i>	Greenshank	Scolopacidae	SO	
<i>Tringa stagnatilis</i>	Marsh sandpiper	Scolopacidae	SO	
<i>Tringa terek</i>	Terek sandpiper	Scolopacidae	SO	

H.2. Vagrant B

Scientific name	Common name	Family	Criteria	Qualifier	IUCN threat ranking
<i>Acrocephalus australis</i>	Australian reed warbler	Sylviidae		SO	
<i>Anas acuta</i>	Northern pintail	Anatidae		SO	
<i>Anas clypeata</i>	Northern shoveler	Anatidae		SO	
<i>Anhinga melanogaster novaeollandiae</i>	Australian darter	Anhingidae		SO	
<i>Anthochaera carunculata</i>	Red wattlebird	Meliphagidae		SO	
<i>Aptenodytes forsteri</i>	Emperor penguin	Spheniscidae		SO	
<i>Ardea pacifica</i>	White-necked heron	Ardeidae		SO	
<i>Artamus personatus</i>	Masked Woodswallow	Artamidae		SO	
<i>Artamus superciliosus</i>	White-browed Woodswallow	Artamidae		SO	
<i>Aythya australis</i>	Australian white-eyed duck	Anatidae		SO	
<i>Bartramia longicauda</i>	Upland sandpiper	Scolopacidae		SO	
<i>Bulweria bulwerii</i>	Bulwer's petrel	Procellariidae		SO	
<i>Cacomantis flabelliformis</i>	Fan-tailed cuckoo	Cuculidae		SO	
<i>Calidris alpina</i>	Dunlin	Scolopacidae		SO	
<i>Calidris bairdii</i>	Baird's sandpiper	Scolopacidae		SO	
<i>Calidris fuscicollis</i>	White-rumped sandpiper	Scolopacidae		SO	
<i>Calidris himantopus</i>	Stilt sandpiper	Scolopacidae		SO	
<i>Calidris mauri</i>	Western sandpiper	Scolopacidae		SO	
<i>Calidris minuta</i>	Little stint	Scolopacidae		SO	
<i>Calidris subminuta</i>	Long-toed stint	Scolopacidae		SO	
<i>Calonectris diomedea borealis</i>	Cory's shearwater	Procellariidae		SO	
<i>Calonectris leucomelas</i>	Streaked shearwater	Procellariidae		SO	

<i>Charadrius semipalmatus</i>	Semi-palmated plover	Charadriidae	SO	
<i>Chenonetta jubata</i>	Australian wood duck	Anatidae	SO	
<i>Chlidonias hybrida javanicus</i>	Whiskered tern	Sternidae	SO	
<i>Coracina novaehollandiae</i>	Black-faced cuckoo-shrike	Campephagidae	SO	
<i>Cuculus pallidus</i>	Pallid cuckoo	Cuculidae	SO	
<i>Cymochorea leucorhoa leucorhoa</i>	Leach's storm petrel	Hydrobatidae	SO	
<i>Dendrocygna eytoni</i>	Grass whistling duck	Anatidae	SO	
<i>Erythrogonys cinctus</i>	Red-kneed dotterel	Charadriidae	SO	
<i>Eudyptes chrysocome</i>	Western rockhopper penguin	Spheniscidae	TO	VU A2bce+3bce (3 taxa)
<i>Eudyptes chrysolophus chrysolophus</i>	Macaroni penguin	Spheniscidae	TO	VU A2bc+3bc
<i>Eudyptes moseleyi</i>	Moseley's rockhopper penguin	Spheniscidae	TO	VU A2bce+3bce (3 taxa)
<i>Falco subniger</i>	Black falcon	Falconidae	SO	
<i>Fregeta minor</i>	Great frigatebird	Fregatidae	SO	
<i>Gallinula tenebrosa</i>	Dusky moorhen	Rallidae	SO	
<i>Gallinula ventralis</i>	Black-tailed native-hen	Rallidae	SO	
<i>Ixobrychus minutus dubius</i>	Little bittern	Ardeidae	SO	
<i>Lalage tricolor</i>	White-winged triller	Campephagidae	SO	
<i>Leucophaeus pipixcan</i>	Franklin's gull	Laridae	SO	
<i>Limnodromus semipalmatus</i>	Asiatic dowitcher	Scolopacidae	SO	NT
<i>Malacorhynchus membranaceus</i>	Pink-eared duck	Anatidae	SO	
<i>Milvus migrans affinis</i>	Black kite	Accipitridae	SO	
<i>Monarcha melanopsis</i>	Black-faced monarch	Dicruridae	SO	
<i>Morus capensis</i>	Cape gannet	Sulidae	SO	
<i>Myiagra cyanoleuca</i>	Satin flycatcher	Dicruridae	SO	
<i>Numenius tahitiensis</i>	Bristle-thighed curlew	Scolopacidae	TO	VU C2a(ii)
<i>Onychoprion anaethetus anaethetus</i>	Bridled tern	Sternidae	SO	
<i>Onychoprion lunatus</i>	Grey-backed tern	Sternidae	SO	
<i>Pelagodroma marina dulciae</i>	Australian white-faced storm petrel	Hydrobatidae	SO	
<i>Pelecanus conspicillatus conspicillatus</i>	Australian pelican	Pelecanidae	SO	
<i>Phalacrocorax melanoleucos melanoleucos</i>	Little pied cormorant	Phalacrocoracidae	SO	
<i>Phalaropus fulicarius</i>	Grey phalarope	Scolopacidae	SO	
<i>Phalaropus tricolor</i>	Wilson's phalarope	Scolopacidae	SO	
<i>Philomachus pugnax</i>	Ruff	Scolopacidae	SO	
<i>Phoebastria immutabilis</i>	Laysan albatross	Diomedidae	TO	VU A4bd
<i>Phoebastria nigripes</i>	Black-footed albatross	Diomedidae	TO	EN A3bd
<i>Phoebastria fusca</i>	Sooty albatross	Diomedidae	TO	EN A4bd
<i>Platalea flavipes</i>	Yellow-billed spoonbill	Threskiornithidae	SO	
<i>Pluvialis dominica</i>	American golden plover	Charadriidae	SO	
<i>Pseudobulweria rostrata rostrata</i>	Tahiti petrel	Procellariidae	SO	NT
<i>Pterodroma alba</i>	Phoenix petrel	Procellariidae	TO	EN A3bce+4bce
<i>Pterodroma externa</i>	Juan Fernandez petrel	Procellariidae	TO	VU D2
<i>Pterodroma longirostris</i>	Stejneger's petrel	Procellariidae	TO	VU D2
<i>Pterodroma solandri</i>	Providence petrel	Procellariidae	TO	VU D2
<i>Puffinus assimilis assimilis</i>	Norfolk Island little shearwater	Procellariidae	SO	
<i>Puffinus creatopus</i>	Pink-footed shearwater	Procellariidae	SO	
<i>Puffinus gravis</i>	Great shearwater	Procellariidae	SO	
<i>Puffinus nativitatis</i>	Christmas shearwater	Procellariidae	SO	
<i>Puffinus newelli</i>	Newell's shearwater	Procellariidae	TO	EN A2bce+3bce+ 4bce
<i>Puffinus pacificus chlororhynchus</i>	Wedge-tailed shearwater	Procellariidae	SO	

<i>Puffinus puffinus</i>	Manx shearwater	Procellariidae	SO	
<i>Pygoscelis adeliae</i>	Adelie penguin	Spheniscidae	SO	
<i>Pygoscelis antarctica</i>	Chinstrap penguin	Spheniscidae	SO	
<i>Recurvirostra novaehollandiae</i>	Red-necked avocet	Recurvirostridae	SO	
<i>Rhiphidura leucophrys</i>	Willie wagtail	Rhipiduridae	SO	
<i>Rostratula australis</i>	Australian painted snipe	Rostratulidae	SO	
<i>Scythrops novaehollandiae</i>	Channel-billed cuckoo	Cuculidae	SO	
<i>Spheniscus magellanicus</i>	Magellanic penguin	Spheniscidae	SO	NT
<i>Thalassarche cauta cauta</i>	Tasmanian mollymawk	Diomedidae	SO	NT
<i>Thalassarche chlororhynchos</i>	Atlantic yellow-nosed mollymawk	Diomedidae	TO	EN A4bd; B2ab(v)
<i>Thalasseus bergii cristatus</i>	Crested tern	Sternidae	SO	
<i>Tyto alba deliculata</i>	Barn owl	Tytonidae	SO	

I. Introduced and Naturalised

Scientific name	Common name	Family	Criteria	Qualifier	IUCN threat ranking
<i>Acridotheres tristis</i>	Common myna	Sturnidae		SO	
<i>Alauda arvensis</i>	Eurasian skylark	Alaudidae		SO	
<i>Alectoris chukar</i>	Chukar	Phasianidae		SO Sp	
<i>Anas platyrhynchos</i>	Mallard	Anatidae		SO	
<i>Anser anser</i>	Feral (greylag) goose	Anatidae		SO	
<i>Athene noctua</i>	Little owl	Strigidae		SO	
<i>Branta canadensis</i>	Canada goose	Anatidae		SO	
<i>Cacatua galerita</i>	Sulphur-crested cockatoo	Cacatuidae		SO Sp	
<i>Callipepla californica</i>	California quail	Phasianidae		SO	
<i>Carduelis carduelis</i>	European goldfinch	Fringillidae		SO	
<i>Carduelis chloris</i>	European greenfinch	Fringillidae		SO	
<i>Carduelis flammea</i>	Common redpoll	Fringillidae		SO	
<i>Cereopsis novaehollandiae</i>	Cape Barren goose	Anatidae		SO Sp	
<i>Columba livia</i>	Rock pigeon	Columbidae		SO	
<i>Corvus frugilegus</i>	Rook	Corvidae		SO	
<i>Coturnix ypsilophora australis</i>	Brown quail	Phasianidae		SO	
<i>Cygnus olor</i>	Mute swan	Anatidae		SO Sp	
<i>Dacelo novaeguineae</i>	Laughing kookaburra	Alcedinidae		SO RR	
<i>Emberiza cirlus</i>	Cirl bunting	Emberizidae		SO Sp	
<i>Emberiza citrinella</i>	Yellowhammer	Emberizidae		SO	
<i>Eolophus roseicapillus</i>	Galah	Cacatuidae		SO RR	
<i>Fringilla coelebs</i>	Chaffinch	Fringillidae		SO	
<i>Gymnorhina tibicen</i>	Australian magpie	Artamidae		SO	
<i>Meleagris gallopavo</i>	Wild turkey	Phasianidae		SO	
<i>Numida meleagris</i>	Helmeted guineafowl	Phasianidae		SO Sp	
<i>Passer domesticus</i>	House sparrow	Passeridae		SO	
<i>Pavo cristatus</i>	Indian peafowl	Phasianidae		SO	
<i>Phasianus colchicus</i>	Common pheasant	Phasianidae		SO	
<i>Platycercus elegans</i>	Crimson rosella	Psittacidae		SO RR	
<i>Platycercus eximius</i>	Eastern rosella	Psittacidae		SO	
<i>Prunella modularis</i>	Dunnock	Prunellidae		SO	
<i>Streptopelia chinensis</i>	Spotted dove	Columbidae		SO	
<i>Streptopelia roseogrisea</i>	African collared-dove	Columbidae		SO Sp	
<i>Sturnus vulgaris</i>	Common starling	Sturnidae		SO	
<i>Turdus merula</i>	Eurasian blackbird	Muscicapidae		SO	
<i>Turdus philomelos</i>	Song thrush	Muscicapidae		SO	