



NEW ZEALAND THREAT CLASSIFICATION SERIES 1

Summary of changes to the conservation status of taxa in the 2008–11 New Zealand Threat Classification System listing cycle

Rod Hitchmough

Cover: Tusked weta (*Motuweta isolata*), Middle Island, Mercury Islands, 1993. Photo: Brett Robertson.

New Zealand Threat Classification Series is a scientific monograph series presenting publications related to the New Zealand Threat Classification System (NZTCS). Most will be lists of the NZTCS status of members of a plant, fungal or animal group (e.g. algae, birds, spiders). There are currently 23 groups, each assessed once every 3 years. After each 3-year cycle, there will be a report analysing and summarising trends across all groups for that listing cycle. From time to time the manual that defines the categories, criteria and process for the NZTCS will be reviewed. Publications in this series are considered part of the formal international scientific literature.

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Rod Hitchmough

Science and Capability Group, Department of Conservation, PO Box 10420, Wellington 6143,
New Zealand
Email: rhitchmough@doc.govt.nz

Abstract

The conservation status of most groups of New Zealand plants, animals and fungi was reassessed using the revised 2008 New Zealand Threat Classification System over the period 2008–11. The results were published in 21 papers in peer-reviewed science journals. This report presents a statistical summary and a brief analysis of important changes across taxonomic groups. Coverage was more extensive than in previous lists, including wider species coverage for most groups and a comprehensive listing of the status of lichens for the first time. Overall, 799 taxa were listed as Threatened, 2741 as At Risk and 3940 as Data Deficient. Twelve Threatened taxa had genuinely improved in status as a result of successful species management, while 59 had genuinely worsened in status. The listed status of many more taxa changed for better or worse as a result of improvements in our knowledge of them, changes in the interpretation of information about them, or changes to the categories and criteria as a result of revisions to the manual.

Keywords: New Zealand Threat Classification System, conservation status

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1. Introduction and Methods

The New Zealand Threat Classification System (NZTCS; Molloy et al. 2002) is a national system that was first developed in 2002 by a group containing representatives from the Department of Conservation (DOC), universities, conservation non-government organisations (NGOs) and fisheries science. Its implementation is led and funded by DOC. The NZTCS was introduced to provide a national system similar to the IUCN Redlist, but with finer-scale discrimination of the status of a biota that includes many naturally range-restricted island and montane local endemics. Thus, the system is complementary to the global view provided by the IUCN Redlist. Lists of the threat status of taxa from a broad range of groups were developed in 2001–2002 (Hitchmough 2002) and 2004–2005 (Hitchmough et al. 2007). However, some issues with the categories and criteria were identified during the preparation of these lists, which led to these being reviewed and a revised system manual being issued in 2008 (Townsend et al. 2008).

The conservation status of most groups of New Zealand plants, animals and fungi was reassessed using the revised NZTCS manual (Townsend et al. 2008) over the period 2008–11. The results were published in 21 papers in peer-reviewed science journals (Table 1)¹. The listings for algae, freshwater invertebrates, landsnails in the genus *Powelliphanta* and marine fish were not reassessed during this cycle, however. Instead, for these groups, statistics from the 2005 list (Hitchmough et al. 2007) were directly transferred to the most equivalent category in the revised manual (Townsend et al. 2008).

For the better-known groups (bats, marine mammals, birds, reptiles, frogs, freshwater fish, vascular plants, Nematoda, Araneae (spiders), Orthoptera (wētā, grasshoppers, etc.), Phthiraptera (bird lice), and acanthodrilid and megascolicid earthworms), the status of all known taxa was assessed. For the remaining groups, only taxa that had been nominated as being of conservation concern at some time were reassessed.

In the papers in Table 1, taxa were listed at the lowest recognised taxonomic level. Thus, if a subspecies is recognised, the listings were for the subspecies rather than for the species as a whole. For taxa that are also found outside New Zealand, the listing described the status of the New Zealand sector of the population only. Taxonomically indeterminate entities (i.e. taxa that have been identified by expert panels as likely to be undescribed species or subspecies, but which do not yet have names or formal descriptions) are included in the statistics summarised here. The most urgent priority for these is confirmation of their taxonomic distinctiveness, and formal description and naming; however, they were listed by conservation status to ensure that they do not experience a serious increase in risk of extinction while awaiting formal description.

¹ For details of the methods and results, refer to the manual and published papers.

Table 1. Papers in which revised 2008–11 listings were published, by taxonomic group. Groups are listed alphabetically by collective common name.

TAXONOMIC GROUP	REFERENCE
Algae	Not reviewed
Bats	O'Donnell, C.F.J.; Christie, J.E.; Hitchmough, R.A.; Lloyd, B.; Parsons, S. 2010: The conservation status of New Zealand bats, 2009. <i>New Zealand Journal of Zoology</i> 37: 297–311.
Beetles	Leschen, R.A.B.; Marris, J.W.M.; Emberson, R.M.; Nunn, J.; Hitchmough, R.A.; Stringer, I.A.N. 2012: The conservation status of New Zealand Coleoptera. <i>New Zealand Entomologist</i> 35: 91–98.
Birds	Miskelly, C.M.; Dowding, J.E.; Elliot, G.P.; Hitchmough, R.A.; Powlesland, R.G.; Robertson, H.A.; Sagar, P.M.; Scofield, R.P.; Taylor, G.A. 2008: Conservation status of New Zealand birds. <i>Notornis</i> 55: 117–135.
Bryophytes	Glenny, D.; Fife, A.J.; Brownsey, P.J.; Renner, M.A.M.; Braggins, J.E.; Beever, J.E.; Hitchmough, R. 2011: Threatened and uncommon bryophytes of New Zealand (2010 revision). <i>New Zealand Journal of Botany</i> 49: 305–327.
Bugs	Stringer, I.A.N.; Hitchmough, R.A.; Larivière, M-C.; Eyles, A.C.; Teulon, D.A.J.; Dale, P.J.; Henderson, R.C. 2012: The conservation status of New Zealand Hemiptera. <i>New Zealand Entomologist</i> 35: 110–115.
Flies	Andrew, I.G.; Macfarlane, R.P.; Johns, P.M.; Hitchmough, R.A.; Stringer, I.A.N. 2012: The conservation status of New Zealand Diptera. <i>New Zealand Entomologist</i> 35: 99–102.
Freshwater fish	Allibone, R.; David, B.; Hitchmough, R.; Jellyman, D.; Ling, N.; Ravenscroft, P.; Waters, J. 2010: Conservation status of New Zealand freshwater fish, 2009. <i>New Zealand Journal of Marine and Freshwater Research</i> 44: 271–287.
Freshwater invertebrates	Not reviewed
Frogs	Newman, D.G.; Bell, B.D.; Bishop, P.J.; Burns, R.; Haigh, A.; Hitchmough, R.A.; Tocher, M. 2010: Conservation status of New Zealand frogs, 2009. <i>New Zealand Journal of Zoology</i> 37: 121–130.
Fungi	Awaiting publication by Landcare Research
Hymenopterans	Ward, D.F.; Early, J.W.; Schnitzler, F-R.; Hitchmough, R.A.; Stringer, I.A.N. 2012: The conservation status of New Zealand Hymenoptera. <i>New Zealand Entomologist</i> 35: 116–119.
Landsnails	Mahfeld, K.; Brook, F.J.; Roscoe, D.J.; Hitchmough, R.A.; Stringer, I.A.N. 2012: The conservation status of New Zealand terrestrial Gastropoda excluding <i>Powelliphanta</i> . <i>New Zealand Entomologist</i> 35: 103–109.
Lepidopterans	Stringer, I.A.N.; Hitchmough, R.A.; Dugdale, J.S.; Edwards, E.; Hoare, R.J.B.; Patrick, B.H. 2012: The conservation status of New Zealand Lepidoptera. <i>New Zealand Entomologist</i> 35: 120–127.
Lichens	de Lange, P.J.; Galloway, D.J.; Blanchon, D.J.; Knight, A.; Rolfe, J.R.; Crowcroft, G.M.; Hitchmough, R. 2012: Conservation status of New Zealand lichens. <i>New Zealand Journal of Botany</i> 50: 303–363.
Marine fish	Not reviewed
Marine invertebrates	Freeman, D.J.; Marshall, B.A.; Ah Yong, S.T.; Wing, S.R.; Hitchmough, R.A. 2010: The conservation status of New Zealand marine invertebrates, 2009. <i>New Zealand Journal of Marine and Freshwater Research</i> 44: 129–148.
Marine mammals	Baker, C.S.; Chilvers, B.L.; Constantine, R.; DuFresne, S.; Mattlin, R.H.; van Helden, A.; Hitchmough, R. 2010: Conservation status of New Zealand marine mammals (suborders Cetacea and Pinnipedia), 2009. <i>New Zealand Journal of Marine and Freshwater Research</i> 44: 101–115.
Nematodes	Yeates, G.W.; Zhao, Z.Q.; Hitchmough, R.A.; Stringer, I.A.N. 2012: The conservation status of New Zealand Nematoda. <i>New Zealand Entomologist</i> 35: 128–130.
Orthopterans	Trewick, S.A.; Morris, S.J.; Johns, P.M.; Hitchmough, R.A.; Stringer, I.A.N. 2012: The conservation status of New Zealand Orthoptera. <i>New Zealand Entomologist</i> 35: 131–136.
Reptiles	Hitchmough, R.A.; Hoare, J.M.; Jamieson, H.; Newman, D.; Tocher, M.D.; Anderson, P.J.; Lettink, M.; Whitaker, A.H. 2010: Conservation status of New Zealand reptiles, 2009. <i>New Zealand Journal of Zoology</i> 37: 203–224.
Small and poorly known invertebrate groups, including earthworms and bird lice	Buckley, T.R.; Palma, R.L.; Johns, P.M.; Gleeson, D.M.; Heath, A.C.G.; Hitchmough, R.A.; Stringer, I.A.N. 2012: The conservation status of small or less well known groups of New Zealand terrestrial invertebrates. <i>New Zealand Entomologist</i> 35: 137–143.
Spiders	Sirvid, P.J.; Vink, C.J.; Wakelin, M.D.; Fitzgerald, B.M.; Hitchmough, R.A.; Stringer, I.A.N. 2012: The conservation status of New Zealand Araneae. <i>New Zealand Entomologist</i> 35: 85–90.
Terrestrial invertebrates introduction	Stringer, I.A.N.; Hitchmough, R.A.; 2012: Assessing the conservation status of New Zealand's native terrestrial invertebrates. <i>New Zealand Entomologist</i> 35: 77–84.
Vascular plants	de Lange, P.J.; Norton, D.A.; Courtney, S.P.; Heenan, P.B.; Barkla, J.W.; Cameron, E.K.; Hitchmough, R.; Townsend, A.J. 2009: Threatened and uncommon plants of New Zealand (2008 revision). <i>New Zealand Journal of Botany</i> 47: 61–96.

2. Changes in status since the previous listing

Of the 12223 taxa assessed, 799 were listed as Threatened and 2741 as At Risk (Table 2), making a total of 3540, which is an increase from the 2788 taxa listed in 2005 (Hitchmough et al. 2007). Although the detailed definitions of and criteria for inclusion in individual categories changed somewhat in the revised manual (Townsend et al. 2008), the overall coverage of the Threatened categories *sensu* Molloy et al. (2002) and the Threatened plus At Risk categories *sensu* Townsend et al. (2008) is the same, making the grand totals comparable. Breakdowns into individual categories for the two periods are provided in Table 3. However, it should be noted that these subtotals are only roughly equivalent because the details of criteria for the categories have been adjusted even when the category names remain unchanged. Thus, the former Serious Decline category has been largely subsumed within the Nationally Vulnerable category; the former Gradual Decline category is roughly equivalent to the new Declining category; the former Range Restricted and Sparse categories have collectively become the Relict and Naturally Uncommon categories; and the Recovering category is new. A further 3940 taxa were listed as Data Deficient; i.e. probably threatened but with too little information available to list them in a particular category.

Taxonomic coverage was also wider in the 2008–11 cycle than in previous listings, with greater species coverage for many groups and a comprehensive listing of the status of lichens for the first time. This contributed greatly to the increased numbers of taxa listed as Threatened or At Risk.

Twelve taxa genuinely improved in status as a result of successful species management and 59 genuinely worsened in status (Table 4). The listed status of many more taxa changed for better or worse as a result of improvements in our knowledge of them, changes in the interpretation of information about them, or changes to the categories and criteria resulting from publication of the revised manual rather than through any real change in their risk of extinction.

Table 2. Statistical summary of listings across all taxonomic groups in the 2008–11 listing cycle. Algae, freshwater invertebrates and marine fish were not reassessed during this cycle; therefore, the figures for these groups have been taken from the 2005 list (Hitchmough et al. 2007).

STATUS	ALGAE	BATS	BEEPLES	BIRDS	BRYOPHYTES	FLIES	FRESHWATER FISH	FRESHWATER INVERTEBRATES	FROGS	FUNGI
Nationally Critical	1	1	35	24	31	0	4	11	1	62
Nationally Endangered	0	1	7	15	10	0	3	2	0	20
Nationally Vulnerable	0	2	3	38	4	1	7	1	2	6
Total Threatened	1	4	45	77	45	1	14	14	3	88
Declining	0	1	6	18	1	1	13	3	1	10
Recovering	0	0	0	10	0	0	0	0	0	0
Relict	0	0	18	17	2	0	1	0	0	0
Naturally Uncommon	37	0	243	48	122	144	6	97	0	12
Total At Risk	37	1	267	93	125	145	20	100	1	22
Total Threatened and At Risk	38	5	312	170	170	146	34	114	4	110
Data Deficient	23	1	52	1	131	90	0	27	1	1481*
Extinct (since 1000)	0	0	4	20	0	0	1	0	3	0
Migrant	0	0	0	27	0	0	0	0	0	0
Vagrant	0	1	0	130	6	0	0	0	0	0
Coloniser	0	0	0	8	2	0	3	0	0	0
Not Threatened	0	0	73	36	45	624†	17	2	0	14
Introduced and Naturalised‡	0	0	1	36	3	0	20	0	3	0
Total assessed	61	7	442	428	357	860	75	143	11	1605

* The Data Deficient fungi were not reassessed during this cycle—1445 taxa remain as listed in Hitchmough (2002), but an additional 36 taxa have been added to this category.

† For Diptera (flies), 623 species that had not previously been listed were assessed as Not Threatened, but these were not included in the published list; only one previously listed species now reassessed as Not Threatened was included in the published paper.

‡ In many groups, Introduced and Naturalised taxa are present in New Zealand but have not yet been fully catalogued in the NZTCS.

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STATUS	BUGS (HEMIPTERANS)	HYMENOPTERANS	LEPIDOPTERANS	LICHENS	MARINE FISH	MARINE INVERTEBRATES	MARINE MAMMALS	MINOR INVERTEBRATE GROUPS
Nationally Critical	9	2	13	4	0	10	5	13
Nationally Endangered	0	0	9	4	0	2	3	0
Nationally Vulnerable	0	0	27	3	0	21	0	14
Total Threatened	9	2	49	11	0	33	8	27
Declining	0	2	16	4	2	8	0	2
Recovering	0	0	0	0	0	0	0	4
Relict	1	0	19	0	0	0	0	1
Naturally Uncommon	48	18	34	173	52	243	0	43
Total At Risk	49	20	69	177	54	251	0	50
Total Threatened and At Risk	58	22	118	188	54	284	8	77
Data Deficient	67	47	56	975	37	12	13	110
Extinct (since 1000)	0	0	0	0	0	0	0	3
Migrant	0	0	0	0	10	0	6	0
Vagrant	0	1	0	0	4	0	20	0
Coloniser	0	0	0	0	0	0	0	0
Not Threatened	24	1	13	636	113	11	9	50
Introduced and Naturalised*	0	1	0	0	0	0	0	2
Total assessed	149	72	187	1799	218	307	56	242

* In many groups, Introduced and Naturalised taxa are present in New Zealand but have not yet been fully catalogued in the NZTCS.

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STATUS	NEMATODES	ORTHOPTERANS	REPTILES	SNAILS	POWELLIPHANTA	SPIDERS	VASCULAR PLANTS	TOTAL
Nationally Critical	3	1	6	28	8	3	142	417
Nationally Endangered	0	2	3	11	28	1	54	175
Nationally Vulnerable	1	3	8	8	11	0	47	207
Total Threatened	4	6	17	47	47	4	243	799
Declining	2	1	27	5	9	1	87	220
Recovering	1	2	3	0	0	0	8	28
Relict	0	6	11	50	0	7	21	154
Naturally Uncommon	0	31	10	204	12	147	615	2339
Total At Risk	3	40	51	259	21	155	731	2741
Total Threatened and At Risk	7	46	68	306	68	159	974	3540
Data Deficient	51	19	8	138	1	538	61	3940
Extinct (since 1000)	0	0	2	0	0	0	7	40
Migrant	0	0	2	0	0	0	0	45
Vagrant	10	0	5	0	0	1	12	190
Coloniser	0	0	0	0	0	0	14	27
Not Threatened	509	94	23	14	0	401	1482	4191
Introduced and Naturalised*	136	8	1	0	0	39	0	250
Total assessed	713	167	109	458	69	1138	2550	12223

* In many groups, Introduced and Naturalised taxa are present in New Zealand but have not yet been fully catalogued in the NZTCS.

Table 3. Comparison of summary statistics between the 2005 (Hitchmough et al. 2007) and 2008–11 listing cycles. Note: The 2005 categories (Molloy et al. 2002) are not directly comparable with the 2008 categories (Townsend et al. 2008), but have been aligned with their closest equivalent.

STATUS	TOTAL 2005	TOTAL 2008–11
Nationally Critical	383	417
Nationally Endangered	232	175
Nationally Vulnerable	53+55*	207
Total Threatened 2008–11		799
Declining	202	220
Recovering	–	28
Relict	–	154
Naturally Uncommon	349+1514†	2339
Total At Risk 2008–11		2741
Total Threatened and At Risk	2788	3540
Data Deficient	3031	3940
Extinct (since 1000)	33‡	40

* 53 taxa listed as Nationally Vulnerable plus 55 listed as in Serious Decline according to the categories of Molloy et al. (2002); both former categories are now mostly included in Nationally Vulnerable *sensu* Townsend et al. (2008).

† 349 taxa listed as Sparse and 1514 as Range Restricted according to the categories of Molloy et al. (2002); most of these will have moved to Naturally Uncommon, with some of the Range Restricted taxa moving to Relict *sensu* Townsend et al. (2008).

‡ Only extinctions since 1800 were listed in 2005.

Table 4. Threatened taxa that genuinely improved or deteriorated in status between the 2005 (Hitchmough et al. 2007) and 2008–11 listing exercises. Taxa are listed by major taxonomic group, then alphabetically by scientific name.

SCIENTIFIC NAME	COMMON NAME	2005 STATUS	2008–11 STATUS	COMMENTS
Species with truly improved status (12)				
Bats				
<i>Mystacina tuberculata aoupourica</i>	Northern lesser short-tailed bat	Nationally Endangered	Nationally Vulnerable	Population recovery following pest eradication on Hauturu/Little Barrier Island has outweighed extinction or near extinction on Northland mainland.
Birds				
<i>Anas chlorotis</i>	Brown teal	Nationally Endangered	Recovering	Successful translocations and good response to improved pest control.
<i>Callaeas wilsoni</i>	North Island kōkako	Nationally Endangered	Nationally Vulnerable	Unmanaged populations now functionally extinct; managed populations increasing or stable.
<i>Hymenolaimus malachorhynchus</i>	Blue duck, whio	Nationally Endangered	Nationally Vulnerable	Management of predators now being undertaken successfully at several sites; still declining at other sites.
<i>Mohoua ochrocephala</i>	Yellowhead	Nationally Endangered	Nationally Vulnerable	Status improved because of establishment of substantial island populations and protection by Operation Ark. Possibly more than 5000 adults, which would move species into Declining, or Relict if population is no longer declining overall.
<i>Nestor meridionalis septentrionalis</i>	North Island kākā	Nationally Endangered	Nationally Vulnerable	Effective population 4000 birds (2000 pairs). Similar situation to South Island kākā, with sex bias in unmanaged mainland populations (e.g. Waihaha—3 males : 1 female) and similarly threatened. However, a larger proportion of the population is secure and less male-biased on Kapiti Island, Great Barrier Island (Aotea Island) and Hauturu/Little Barrier Island, so there is a lower predicted decline of c. 30% over the next 30 years.
<i>Petroica australis rakiura</i>	Stewart Island robin	Nationally Endangered	Nationally Vulnerable	Now confined to wet valleys on main Stewart Island/Rakiura. Established and abundant on Ulva and Putauhina Islands.
<i>Philesturnus carunculatus</i>	South Island saddleback	Nationally Endangered	Recovering	Ongoing successful island translocations.
<i>Pterodroma axillaris</i>	Chatham petrel	Nationally Endangered	Nationally Vulnerable	Recovering as a result of management. Five fledged from Pitt Island (Rangiauria) in 2008.
Wētā				
<i>Deinacrida heteracantha</i>	Little Barrier giant wētā	Nationally Endangered	Relict	Success of kiore (<i>Rattus exulans</i>) eradication not confirmed at time of listing, but the population has recovered dramatically since this control operation; decline had continued after the eradication of cats (<i>Felis catus</i>).
<i>Deinacrida mahoenui</i>	Mahoenui giant wētā	Nationally Endangered	Recovering	
<i>Motuweta isolata</i>	Mercury Islands tusked wētā	Nationally Critical	Recovering	

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SCIENTIFIC NAME	COMMON NAME	2005 STATUS	2008–11 STATUS	COMMENTS
Species with truly worsened status (59)				
Bats				
<i>Chalinolobus tuberculatus</i> “South Island”	South Island long-tailed bat	Nationally Endangered	Nationally Critical	High decline rate on South Island mainland due to predation.
Birds				
<i>Anas superciliosa superciliosa</i>	Grey duck	Nationally Endangered	Nationally Critical	Most records in NZ Bird Atlas (Robertson et al. 2007) will be hybrids. Even morphologically ‘pure’ grey ducks have substantial introgression revealed by genetic analyses. Genetic evidence supports distinctiveness of subspecies.
<i>Apteryx australis</i>	Southern Fiordland tokoeka	Gradual Decline	Nationally Vulnerable	Population c. 5000 adults. Present on Resolution Island. Decline rate guessed to be lower than great spotted kiwi because of wetter habitat.
<i>Apteryx haastii</i>	Great spotted kiwi	Gradual Decline	Nationally Vulnerable	Generation time based on mean life expectancy of adults (estimated as 27 years), so decline assessed over 27 x 3 years = 81 years. Worst measured decline rate (2.5% p.a. over 81 years = 87%, from call counts at 21 listening sites nation-wide), puts species into Nationally Critical category. However, alternative data from a banded population study with mapped territories and using 2 x age at first breeding as the generation time estimate suggest lower decline rate (0.6% p.a. over three generations = 24 years = 13%).
<i>Charadrius bicinctus bicinctus</i>	Banded dotterel	Gradual Decline	Nationally Vulnerable	Winter counts in New Zealand estuaries declined from c. 11000 to c. 6000 in the last 20 years. Coastal breeding range has contracted. There may be >20000 individuals, but population data are not reliable.
<i>Diomedea antipodensis gibsonii</i>	Gibson’s wandering albatross	Range Restricted	Nationally Vulnerable	Approximately 8000 breeding pairs. Substantial decline during 1960s and 1970s, followed by slight recovery. Decline of c. 25% over last 4 years. If this decline continues, species will move into Nationally Critical category.
<i>Eudyptes filholi</i>	Eastern rockhopper penguin	Nationally Endangered	Nationally Critical	Now given full species status. <i>Eudyptes chrysocome</i> s.l. is listed as VU A2bce+3bce by the IUCN (ver 3.1; 2001). Decline continuing at 84% per three generations and colonies fragmenting on Campbell Island/Motu Ihupuku. Evidence of similar declines in Antipodes Islands colonies.
<i>Larus bulleri</i>	Black-billed gull	Serious Decline	Nationally Endangered	In 2008, c. 90000 adult individuals (Rachel McClellan, Wildland Consultants), predicted 50–70% decline over the next 10 years in Southland. Serious concern about rate of decline—approaching trigger for Nationally Critical ranking. Listed as EN A2bce+3bce by the IUCN (ver 3.1; 2001). Designated as Nationally Endangered because it appears to be much more seriously threatened than other Nationally Vulnerable species.
<i>Larus novaehollandiae scopulinus</i>	Red-billed gull	Gradual Decline	Nationally Vulnerable	Kaikoura Peninsula breeding population reduced by 51% between 1983 and 2003 to 7000-8000 (Mills 2008) which is equivalent to 68% over 32 years (= three generations). Mokohinau population crashed. Data from other populations inadequate. Therefore, total population estimate is required.

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SCIENTIFIC NAME	COMMON NAME	2005 STATUS	2008–11 STATUS	COMMENTS
Birds continued				
<i>Phalacrocorax varius varius</i>	Pied shag	Not Threatened	Nationally Vulnerable	Possibly fewer than 2000 pairs. Previous persecution may have contributed to large decline over past 100 years, but populations may have now stabilised. NZ Bird Atlas (Robertson et al. 2007) shows moderately stable distribution despite colonisation of Wellington area in past two decades.
<i>Stictocarbo featherstoni</i>	Pitt Island shag	Nationally Vulnerable	Nationally Endangered	Mortality in crayfish pots.
<i>Thalassarche chrysostoma</i>	Grey-headed mollymawk	Nationally Endangered	Nationally Critical	1990s population 6000–9000 pairs p.a. Declining at 2.8–3.7% p.a. in mid-1990s, and 87% decline since 1940s based on photo counts of Campbell Island/Motu Ihupuku colony. Listed as VU A4bd by the IUCN (ver 3.1; 2001). Decline probably due to global warming plus bycatch. No data since mid-1990s.
Bryophytes				
<i>Petalophyllum australe</i>	Liverwort	Nationally Endangered	Nationally Critical	Fits Nationally Critical criterion A(3) in area of occupancy, but also seriously declining (primary habitat = mineralised lowland wetland edges); last seen 1988.
<i>Seligeria diminuta</i>	Moss	Nationally Endangered	Nationally Critical	Among the most rarely collected moss species in New Zealand. Found in sheltered crevices of limestone in Canterbury (Castle Hill, Cave Stream, Mt Alford). Possibly threatened by rock climbers. The single modern and confirmed collection from the Castle Hill area was collected at 'Castle Rock' by J.K. Bartlett on 26 August 1980 (CHR 266206).
Freshwater fish				
<i>Galaxias anomalus</i>	Central Otago roundhead galaxias	Gradual Decline	Nationally Vulnerable	Down to 17 subpopulations (some lost, some no longer regarded as distinct subpopulations). Populations experience extreme fluctuations in numbers in response to drought and floods. Water quality and extraction issues are expected to impact the species in the future. A few populations are vulnerable to trout invasion.
<i>Galaxias eldoni</i>	Eldon's galaxias	Nationally Vulnerable	Nationally Endangered	A total of 18 populations now known, six of which were recently lost; only two populations are secure. Generation time c. 15 years; therefore decline is assessed over 45 years.
<i>Galaxias macronasus</i>	Bignose galaxias	Gradual Decline	Nationally Vulnerable	A total of 17 subpopulations. Type locality plowed under. Outcomes of Waitaki River consents hearings may affect status.
<i>Galaxias prognathus</i>	Upland longjaw galaxias	Gradual Decline	Nationally Vulnerable	Found in Rakaia and Rangitata Rivers only. Hurunui River and upper Maruia/Buller River populations gone.
<i>Galaxias pullus</i>	Dusky galaxias	Gradual Decline	Nationally Endangered	Populations listed as vulnerable in last listing have all gone. Only four strong populations are left (in Te Papanui Conservation area).

Continued on next page

Table 4 continued from previous page

SCIENTIFIC NAME	COMMON NAME	2005 STATUS	2008–11 STATUS	COMMENTS
Freshwater fish continued				
<i>Galaxias</i> “Teviot”	Teviot flathead galaxias	Nationally Vulnerable	Nationally Critical	May be an introgressed mitochondrial lineage within a <i>G. gollumoides</i> population—but <i>G.</i> “Teviot” could also be a distinct entity with some introgressed <i>G. gollumoides</i> mt-DNA, so listed as a precaution. A total of six populations are now known, two of which are from single specimens. Only one decent population—above a dam. Threatened by ploughing of catchments and conversion to forestry.
<i>Galaxias</i> sp. D.	Clutha flathead galaxias	Gradual Decline	Nationally Vulnerable	Three genetic groups—lower, central and upper Clutha River—all only found in small tributaries. A total of 58 populations. Increase in kōaro (<i>Galaxias brevipinnis</i>) resulting from the formation of Lake Dunstan is having a negative impact. Other impacts include drought, loss of habitat to development, and barrier failures and liberations that are allowing trout into some habitats.
<i>Neochanna burrowsius</i>	Canterbury mudfish, kōwaro	Nationally Endangered	Nationally Critical	Major declines documented, with likely loss of all peripheral populations. However, large size of Waianiwaniwa population, which appears at less risk, is believed to be keeping total decline rate under 70% threshold. Serious range contraction.
Landsnails				
<i>Rhytida greenwoodi webbi</i>		Nationally Vulnerable	Nationally Critical	Huge decline in numbers.
<i>Succinea archeyi</i>		Serious Decline	Nationally Endangered	Impacted by habitat loss and degradation of coastal sand dunes, and predation by mammals.
Charopidae sp. 30 (NMNZ M.078966)		Range Restricted	Nationally Critical	Habitat deterioration continues in the small urban reserve where the species occurs.
<i>Liarea</i> (NMNZ M.158257)		Data Deficient	Nationally Vulnerable	Now threatened by Argentine ants (<i>Linepithema humile</i>) that have become established at the western end of Bream Head
<i>Paryphanta wattii</i>		Gradual decline	Nationally Vulnerable	Unuwahao population in serious decline; two larger populations apparently stable. Endemic to northern Aupouri Peninsula.
Marine mammals				
<i>Phocartos hookeri</i>	New Zealand sealion	Range Restricted	Nationally Critical	Over 3000 mature breeding individuals. Cause of decline unknown, but fishery-related mortality may aggravate the situation. 50% drop in pup production over last 11 years. This extrapolates to well over 70% per three generation threshold for Nationally Critical criterion C.
Vascular plants				
<i>Brachyglottis huntii</i>	Rautini	Nationally Vulnerable	Nationally Critical	
<i>Carmichaelia carmichaeliae</i>	Pink broom	Nationally Vulnerable	Nationally Critical	

Continued on next page

Table 4 continued from previous page

SCIENTIFIC NAME	COMMON NAME	2005 STATUS	2008–11 STATUS	COMMENTS
Vascular plants continued				
<i>Carmichaelia curta</i>		Nationally Endangered	Nationally Critical	
<i>Clianthus maximus</i>	Ngutu kākā, kākā beak	Nationally Endangered	Nationally Critical	
<i>Crassula multicaulis</i>		Sparse	Nationally Critical	
<i>Deyeuxia lacustis</i>		Range Restricted	Nationally Critical	
<i>Dichelachne lautumia</i>		Range Restricted	Nationally Critical	
<i>Gentianella calcis</i> subsp. <i>calcis</i>	Awahokomo gentian	Range Restricted	Nationally Critical	
<i>Hebe adamsii</i>	Adam's koromiko	Range Restricted	Nationally Critical	
<i>Hebe barkeri</i>	Barker's koromiko	Range Restricted	Nationally Critical	
<i>Hebe rigidula</i> var. <i>sulcata</i>		Range Restricted	Nationally Critical	
<i>Hibiscus richardsonii</i>	Native hibiscus	Nationally Endangered	Nationally Critical	
<i>Hypericum minutiflorum</i>	Native St John's wort	Serious Decline	Nationally Critical	
<i>Leptinella rotundata</i>	Button daisy	Nationally Vulnerable	Nationally Endangered	
<i>Myosotis colensoi</i>	Colenso's forget-me-not	Nationally Endangered	Nationally Critical	
<i>Myosotis laeta</i>	Red Hill's forget-me-not	Range Restricted	Nationally Critical	
<i>Myosurus minimus</i> subsp. <i>novae-zelandiae</i>	Mousetail	Nationally Endangered	Nationally Critical	
<i>Olearia pachyphylla</i>		Nationally Endangered	Nationally Critical	
<i>Ourisia modesta</i>		Serious Decline	Nationally Critical	
<i>Pachycladon stellata</i>		Serious Decline	Nationally Critical	
<i>Phylloglossum drummondii</i>		Nationally Endangered	Nationally Critical	
<i>Poa aucklandica</i> subsp. <i>rakiura</i>		Range Restricted	Nationally Critical	
<i>Pseudognaphalium ephemerum</i> *	Tarn cudweed	Sparse	Nationally Critical	
<i>Ranunculus viridis</i>	Tin Range buttercup	Range Restricted	Nationally Critical	
<i>Scutellaria novae-zelandiae</i>	New Zealand skull cap	Nationally Vulnerable	Nationally Endangered	
<i>Senecio kermadecensis</i>	Kermadec fireweed	Range Restricted	Nationally Critical	

* Listed by de Lange et al (2009) as *Graphalium luteoalbum* var. *compactum*.

Table 4 continued from previous page

SCIENTIFIC NAME	COMMON NAME	2005 STATUS	2008-11 STATUS	COMMENTS
Vascular plants continued				
<i>Senecio lautus</i> subsp. <i>esperensis</i>	L'Esperance Rock groundsel	Range Restricted	Nationally Critical	
<i>Senecio scaberulus</i>		Nationally Endangered	Nationally Critical	
<i>Simplicia buchananii</i>	Simplicia	Range Restricted	Nationally Critical	
<i>Simplicia laxa</i>	Simplicia	Nationally Endangered	Nationally Critical	
Wētā				
<i>Hemideina thoracica</i> 2n=23,24	Karikari tree wētā	Gradual Decline	Nationally Vulnerable	Found only within a small area of coastal habitat on the Karikari Peninsula. Habitat being reduced by land development.

3. Extinction

No taxa were found to have become extinct since the previous listing cycle, but some which are believed to have been extinct for many decades or even centuries were added to the list of Extinct taxa. In the 2008–11 listings, extinctions since humans first arrived in New Zealand 900–1000 years ago were listed, rather than only those since 1800 (although this extension to the list was omitted in error for the birds).

Because there needs to be a very high degree of certainty to list a taxon as Extinct according to the definition given in the NZTCS (as in the IUCN system), all but the best known and most closely monitored taxa will have been extinct for many years before being listed as such. Thus, at least 70 New Zealand taxa have not been seen for more than 20 years, but are still listed as Data Deficient or Nationally Critical (Data Poor), despite having been comprehensively searched for to the point that they are known to be either extremely rare or extinct.

Extinct taxa and changes between the three listing cycles to date are itemised in Appendix 1.

4. Acknowledgements

The NZTCS listing process would be impossible without the generous and mostly unpaid contributions of time and expertise by all members of the expert panels (authors of listing papers—see Table 1). In particular, the panel chairs (first authors of the papers) made a huge contribution to writing up the results, as well as helping to organise and run the meetings, and contributing their own knowledge and expertise.

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Appendix 1

Lists of extinct taxa and explanatory notes on changes to these lists between the three listing cycles to date

A1.1 2002 and 2005 listings

The 2002 and 2005 listing processes were based on the guidelines published in Molloy et al. (2002).

Table A1.1. Taxa listed as Extinct in 2002 (28 taxa; extinctions since 1800).

SCIENTIFIC NAME	COMMON NAME	TAXONOMIC GROUP
<i>Anthornis melanocephala</i>	Chatham Island bellbird	Bird
<i>Bowdleria rufescens</i>	Chatham Island fernbird	Bird
<i>Cabalus modestus</i>	Chatham rail	Bird
<i>Coenocorypha aucklandica barrierensis</i>	Little Barrier Island snipe	Bird
<i>Coenocorypha aucklandica iredalei</i>	Stewart Island snipe	Bird
<i>Coturnix novaezelandiae</i>	New Zealand quail	Bird
<i>Gallirallus dieffenbachii</i>	Dieffenbach's rail	Bird
<i>Heteralocha acutirostris</i>	Huia	Bird
<i>Ixobrychus novaezelandiae</i>	New Zealand little bittern	Bird
<i>Mergus australis</i>	Auckland Island merganser	Bird
<i>Oceanites maorianus</i>	New Zealand storm petrel	Bird
<i>Sceloglaux albifacies</i>	Laughing owl	Bird
<i>Traversia lyalli</i>	Stephens Island wren	Bird
<i>Turnagra capensis</i>	South Island piopio	Bird
<i>Turnagra tanagra</i>	North Island piopio	Bird
<i>Xenicus longipes</i>	Bush wren	Bird
<i>Prototroctes oxyrhynchus</i>	Grayling	Freshwater fish
<i>Hoplodactylus delcourti</i>	Kawekaweau	Reptile
<i>Leioproctus</i> sp2 "Christchurch"	Native bee, manuscript name "tautahi"	Terrestrial invertebrate
<i>Placostylus ambagiosus</i> "Herangi Hill"	Flax snail	Terrestrial invertebrate
<i>Thotmus halli</i> Broun, 1911	Weevil	Terrestrial invertebrate
<i>Zelandiscus worthyi</i>	Snail	Terrestrial invertebrate
<i>Lepidium obtusatum</i> Kirk		Vascular plant
<i>Logania depressa</i> Hook.f.		Vascular plant
<i>Myosotis traversii</i> var. <i>cinerascens</i> (Petrie) L.B.Moore		Vascular plant
<i>Pseudognaphalium</i> (a) (CHR 365358; Zoo)		Vascular plant
<i>Stellaria elatinoides</i> Hook.f.		Vascular plant
<i>Trilepidea adamsii</i> (Cheeseman) Tiegh.		Vascular plant

Table A1.2. Taxa listed as extinct in 2005 (33 taxa; extinctions since 1800).

SCIENTIFIC NAME	COMMON NAME	TAXONOMIC GROUP
<i>Anthornis melanoccephala</i>	Chatham Island bellbird	Bird
<i>Bowdleria rufescens</i>	Chatham Island fernbird	Bird
<i>Cabalus modestus</i>	Chatham rail	Bird
<i>Callaeas cinerea cinerea</i>	South Island kōkako	Bird
<i>Coenocorypha aucklandica barrierensis</i>	Little Barrier Island snipe	Bird
<i>Coenocorypha aucklandica iredalei</i>	Stewart Island snipe	Bird
<i>Coturnix novaezelandiae</i>	New Zealand quail	Bird
<i>Gallirallus dieffenbachii</i>	Dieffenbach's rail	Bird
<i>Heteralocha acutirostris</i>	Huia	Bird
<i>Ixobrychus novaezelandiae</i>	New Zealand little bittern	Bird
<i>Mergus australis</i>	Auckland Island merganser	Bird
<i>Sceloglaux albifacies</i>	Laughing owl	Bird
<i>Traversia lyalli</i>	Stephens Island wren	Bird
<i>Turnagra capensis</i>	South Island piopio	Bird
<i>Turnagra tanagra</i>	North Island piopio	Bird
<i>Xenicus longipes</i>	Bush wren	Bird
<i>Prototroctes oxyrhynchus</i>	Grayling	Freshwater fish
<i>Hoplodactylus delcourti</i>	Kawekaweau	Reptile
"Elletia" "aucklandensis" (NMNZ M. 127901)	Snail	Terrestrial invertebrate
<i>Leioproctus</i> "otautahi"	Native bee, manuscript name "tautahi"	Terrestrial invertebrate
<i>Mecodema costellum</i> "spelles"	Ground beetle	Terrestrial invertebrate
<i>Mecodema punctellum</i> Broun, 1921	Ground beetle	Terrestrial invertebrate
<i>Megacolabus sculpturatus</i> Broun, 1893	Akaroa weevil	Terrestrial invertebrate
<i>Placostylus (Maoristylus) ambagiosus</i> "Herangi Hill"	Flax snail	Terrestrial invertebrate
<i>Placostylus (Maoristylus) ambagiosus</i> "Kohuronaki"	Flax snail (pupuharakeke)	Terrestrial invertebrate
<i>Thotmus halli</i> Broun, 1911	Weevil	Terrestrial invertebrate
<i>Zelandiscus elevata</i> (Climo, 1978)	Snail	Terrestrial invertebrate
<i>Lepidium obtusatum</i> Kirk		Vascular plant
<i>Logania depressa</i> Hook.f.		Vascular plant
<i>Myosotis traversii</i> var. <i>cinerascens</i> (Petrie) L.B.Moore (WELT 2585)		Vascular plant
<i>Pseudognaphalium</i> (a) (CHR 365358; Zoo)		Vascular plant
<i>Stellaria elatinoides</i> Hook.f.		Vascular plant
<i>Trilepidea adamsii</i> (Cheeseman) Tiegh.		Vascular plant

Changes between 2002 and 2005

Deletions:

New Zealand storm petrel (*Oceanites maorianus*)—moved from Extinct to Data Deficient category following sightings in the Hauraki Gulf.

Snail *Zelandiscus worthyi*—moved to Data Deficient category; no new information, but decision made that necessary level of certainty for listing as Extinct not reached.

Additions:

South Island kōkako (*Callaeas cinerea cinerea*)—moved from Data Deficient to Extinct following absence of confirmed sightings since the 1960s.

Other additions were all terrestrial invertebrates, which represent historical extinctions that were missed from the previous list rather than new extinctions:

“Ellettia” “aucklandensis” (NMNZ M.127901)

Mecodema costellum “spelles”

Mecodema punctellum Broun, 1921

Megacolabus sculpturatus Broun, 1893

Placostylus (Maoristylus) ambagiosus “Kohuronaki”

Zelandiscus elevata (Climo, 1978)

Note:

The Canterbury knobbled weevil (*Hadramphus tuberculatus*) had not been seen since 1922 and had previously been listed as Extinct by the IUCN (as *Karocolens tuberculatus*); however, it had not been listed as Extinct under the New Zealand Threat Classification System, as the expert panel in 2002 felt that the necessary level of certainty for listing it as Extinct had not been reached. It was later rediscovered at Burke’s Pass in 2005.

A1.2 2008–11 listings

In 2008, the New Zealand Threat Classification System guidelines (Molloy et al. 2002) were reviewed and revised, resulting in the publication of a new manual (Townsend et al. 2008). The only change that affected the listing of Extinct species was that the lists were extended to include extinctions since first human settlement 900–1000 years ago, rather than only those since 1800.

Table A1.3. Taxa listed as Extinct in 2008–11 (40 taxa; extinctions since 1000).

Note: Pre-European extinctions were missed in error from the 2008 bird list.

SCIENTIFIC NAME	COMMON NAME	TAXONOMIC GROUP
<i>Anthornis melanocephala</i>	Chatham Island bellbird	Bird
<i>Bowdleria rufescens</i>	Chatham Island fernbird	Bird
<i>Cabalus modestus</i>	Chatham rail	Bird
<i>Callaeas cinerea</i>	South Island kōkako	Bird
<i>Coenocorypha barrierensis</i>	North Island snipe	Bird
<i>Coenocorypha iredalei</i>	Stewart Island snipe	Bird
<i>Coturnix novaezelandiae</i>	New Zealand quail	Bird
<i>Gallirallus dieffenbachii</i>	Dieffenbach’s rail	Bird
<i>Heteralocha acutirostris</i>	Huia	Bird
<i>Ixobrychus novaezelandiae</i>	New Zealand little bittern	Bird
<i>Mergus australis</i>	Auckland Island merganser	Bird
<i>Sceloglaux albifacies albifacies</i>	South Island laughing owl	Bird
<i>Sceloglaux albifacies rufifacies</i>	North Island laughing owl	Bird
<i>Traversia lyalli</i>	Lyall’s wren	Bird
<i>Turnagra capensis capensis</i>	South Island piopio	Bird
<i>Turnagra capensis minor</i>	Stephens Island piopio	Bird
<i>Turnagra tanagra</i>	North Island piopio	Bird
<i>Xenicus longipes longipes</i>	South Island bush wren	Bird
<i>Xenicus longipes stokesi</i>	North Island bush wren	Bird
<i>Xenicus longipes variabilis</i>	Stead’s bush wren	Bird
<i>Prototroctes oxyrhynchus</i>	Grayling	Freshwater fish
<i>Leiopelma auroreensis</i>	Frog	Frog

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Table A1.3 continued from previous page

SCIENTIFIC NAME	COMMON NAME	TAXONOMIC GROUP
<i>Leiopelma markhami</i>	Frog	Frog
<i>Leiopelma waitomoensis</i>	Frog	Frog
<i>Hoplodactylus delcourti</i>	Kawekaweau	Reptile
<i>Oligosoma northlandi</i>	Northland skink	Reptile
<i>Mecodema costellum</i> “spelles” (NZACMcostel01)	Beetle	Terrestrial invertebrate
<i>Mecodema punctellum</i>	Beetle	Terrestrial invertebrate
<i>Thotmus halli</i>	Beetle	Terrestrial invertebrate
<i>Waitomophylax worthyi</i>	Beetle	Terrestrial invertebrate
<i>Philopterooides xenicus</i>	Bird louse	Terrestrial invertebrate
<i>Rallicola (Apterocola) pilgrimi</i>	Bird louse	Terrestrial invertebrate
<i>Rallicola (Huiacola) extinctus</i>	Bird louse	Terrestrial invertebrate
<i>Chenopodium pusillum</i>		Vascular plant
<i>Lepidium obtusatum</i>		Vascular plant
<i>Logania depressa</i>		Vascular plant
<i>Myosotis laingii</i>		Vascular plant
<i>Myosotis traversii</i> var. <i>cinerascens</i>		Vascular plant
<i>Stellaria elatinoides</i>		Vascular plant
<i>Trilepidea adamsii</i>		Vascular plant

Changes between 2005 and 2011

Deletions:

Snail “*Ellettia*” “aucklandensis” (NMNZ M.127901), now called *Charopidae* sp. 104 (NMNZ M.127901)—new live collection; no longer considered Extinct.

Native bee, manuscript name “tautahi” (*Leioproctus* “otautahi”)—described in error as an endemic species but now recognised as an accidental introduction or vagrant from Australia that did not establish a resident population.

Akaroa weevil (*Megacolabus sculpturatus* Broun, 1893)—moved to Data Deficient category; no new information, but decision made that necessary level of certainty for listing as Extinct not reached.

Flax snail *Placostylus (Maoristylus) ambagiosus* “Herangi Hill”—subspecies no longer recognised as distinct.

Flax snail *Placostylus (Maoristylus) ambagiosus* “Kohuronaki” (pupuharakeke)—subspecies no longer recognised as distinct.

Snail *Zelandiscus elevata* (Climo, 1978)—moved to Data Deficient category; no new information, but decision made that necessary level of certainty for listing as Extinct not reached.

Pseudognaphalium (a) (CHR 365358; Zoo)—no longer recognised as a distinct taxon.

Additions:

Some bird subspecies were listed individually, where they had previously been listed collectively at the species level; however, their status did not change.

Northland skink (*Oligosoma northlandi*)—pre-European extinction added because of revisions to the criteria in the manual.

Three *Leiopelma* frog species—pre-European extinctions added because of revisions to the criteria in the manual.

Beetle *Waitomophylax worthyi*—pre-European extinction added because of revisions to the criteria in the manual.

Bird louse *Philopteroides xenicus*—new addition to list; previously overlooked. Only found on extinct South Island bush wren *Xenicus longipes longipes*; lice collected from old skins held in German museums.

Bird louse *Rallicola (Huiacola) extinctus*—new addition to list; previously overlooked. Only found on extinct huia.

Bird louse *Rallicola (Aptericola) pilgrimi*—host-specific louse of little spotted kiwi (*Apteryx owenii*); previously listed with same status as host, but now known to have gone extinct when host died out on the mainland several decades ago; not present on surviving island populations of host.

Chenopodium pusillum—formerly Data Deficient. Note, however, that taxonomic distinction from *C. pumilio* is in serious doubt (listed as taxonomically indeterminate).

Myosotis laingii—formerly Data Deficient; last seen 1912.