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Conservation status of Orthoptera (wētā, crickets and grasshoppers) in Aotearoa New Zealand, 2022

Steve Trewick, Danilo Hegg, Mary Morgan-Richards, Tara Murray, Corinne Watts,
Peter Johns and Pascale Michel



Department of
Conservation
Te Papa Atawhai



**Te Kāwanatanga
o Aotearoa**
New Zealand Government

Caption: Jacinda's wētā (*Hemiandrus jacinda*), At Risk – Naturally Uncommon. Photo: © Steve Trewick

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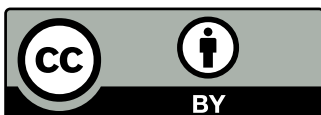
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Conservation status of Orthoptera (wētā, crickets and grasshoppers) in Aotearoa New Zealand, 2022

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Abstract

The conservation status of all 162 known taxa of Orthoptera (wētā, crickets and grasshoppers) in Aotearoa New Zealand was reassessed using the New Zealand Threat Classification System (NZTCS). A list of these taxa is presented, along with a statistical summary and brief notes on the most important changes since the previous assessment. This list replaces all previous NZTCS lists for Orthoptera. In total, 18 taxa (11.1%) were assessed as being Threatened, 27 (16.7%) as At Risk, 95 (58.6%) as Not Threatened, and 5 (3.1%) as Introduced and Naturalised. A further 17 taxa (10.5%) were assessed as Data Deficient (i.e. insufficient information is available to assess their conservation status). Only 20 (12%) of the 162 documented Orthoptera taxa in Aotearoa New Zealand have not been formally described and named; however, we are aware of numerous additional entities. Also, several genera of Rhaphidophoridae, such as *Neonetus* and *Macropathus*, include species that are currently under investigation.

Keywords: Acrididae, Anostomatidae, Gryllacrididae, Gryllidae, Gryllotalpidae, Mogoplistidae, Rhaphidophoridae, Tettigoniidae, Trigonidiidae

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1. Background

The New Zealand Threat Classification System (NZTCS) was developed in 2002 to complement the International Union for Conservation of Nature (IUCN) Red List system. Categories and criteria were defined to reflect Aotearoa New Zealand's unique environments and to account for the country's relatively small size and diversity of ecosystems, as well as the large number of taxa with naturally restricted ranges and/or small population sizes (Molloy et al. 2002). The conservation status of Orthoptera in Aotearoa New Zealand was first assessed using the NZTCS in 2002, when 62 taxa were listed (Hitchmough 2002), and soon after in 2005, with 69 taxa listed (Hitchmough et al. 2007).

The NZTCS methodology was refined in 2007 to ensure that all possible combinations of status and trend were covered within the different categories. The resulting manual (Townsend et al. 2008) was used to re-assess the conservation status of Orthoptera in 2010 (Trewick et al. 2012), 2014 (Trewick et al. 2016) and 2022 (this report). Some minor changes to the categories, criteria and qualifiers proposed by Rolfe et al. (2021) and Michel (2021) were incorporated into this latest assessment, as follows:

- The status At Risk – Recovering A for taxa with increasing populations that have 1000–5000 mature individuals or occupy less than 100 ha has been moved into the Threatened category and renamed Threatened – Nationally Increasing, with no change to the criteria. This was done to address the fact that when the growth of a population assessed as Recovering A stabilised, the taxon moved to the category Threatened – Nationally Vulnerable, despite there being no deterioration in the taxon's population. The term Nationally Increasing does not imply that the population is increasing consistently across its entire geographical range but rather that the total population of the taxon in Aotearoa New Zealand is predicted to increase at > 10% in three generations.
- The qualifier Climate Impact (CI) has been added to reflect newly recognised pressures from changing environments and to acknowledge taxa that are or will be adversely affected by long-term climate trends and/or extreme events.
- The qualifier Conservation Research Needed (CR) has been added to indicate the need for research to better understand the cause of decline and/or a solution for recovery.
- The qualifier Data Poor (DP) has been split into three new qualifiers that identify the knowledge gaps that result in their use: Data Poor Recognition (DPR) to indicate the difficulty in identifying the taxon in the field, Data Poor Size (DPS) to indicate a lack of data on population size and Data Poor Trend (DPT) to indicate a lack of data on population trend.
- The qualifier Population Fragmentation (PF) has been added, covering some taxa that previously triggered the qualifier Sparse, to indicate that gene flow between sub-populations is hampered as a direct or indirect result of human activity.

NZTCS assessments are reviewed approximately every 5 years by a panel of experts from the New Zealand Department of Conservation Te Papa Atawhai (DOC) and external organisations. The assessment panel brings together experts in the fields of taxonomy, conservation biology and ecology who have deep knowledge on a specific taxonomic group and/or are recognised by their peers as active experts in the field, as well as people with a good technical knowledge of the NZTCS process to ensure consistent approaches across the various assessment panels. For this assessment, the expert panel consisted of six members plus one administration/support staff, and all but one of the panel members were employees of organisations external to DOC.

A call for information was advertised through the New Zealand Entomological Society, DOC's 'Have your say' process (www.doc.govt.nz/conservation-status-weta-grasshoppers), the NZTCS website and expert networks. This engagement process was initiated 3 months prior to the assessment meeting with the aim of collating data from local and regional monitoring programmes before the expert panel met. No information was submitted to the expert panel for this assessment.

In making their assessments, experts consider the previously published assessment as the starting point for the new assessment and evaluate any new information available, both published and unpublished. Taxa are assessed according to the reported population size and trend since the last assessment (usually the past 5 years) and predicted future changes over the next 10 years or three generations, whichever is the longest. Orthoptera have a short generation time (c. 2–3 years), so the 10-year threshold was used for this assessment. Taxa are assigned to the Data Deficient category when insufficient data are available to assess their conservation status, or are given the qualifier Data Poor Size or Data Poor Trend when assessments are made but with low confidence due to limited data being available.

Assessment criteria and categories are interpreted in the context of scientific evidence (e.g. population monitoring) and expert understanding of the ecology of each taxon/order (e.g. natural population fluctuations), and the manual requires that a precautionary approach is applied where a taxon is on the border of two possible threat categories, resulting in the higher threat category being chosen. Notes from the expert panel meeting and rationale for the reclassification of taxa have been summarised in the present report. Full details can be found online on the assessment page for each taxon on the NZTCS website (<https://nztcs.org.nz/reports/1111>).

2. Summary

This report presents the conservation status of all 162 known taxa of Orthoptera (wētā, crickets and grasshoppers) in Aotearoa New Zealand. It is the latest update in a regular series of re-assessments (Hitchmough 2002; Hitchmough et al. 2007; Trewick et al. 2012, 2016).

In 2014, Trewick et al. (2016) assessed the conservation status of 175 Orthoptera taxa in Aotearoa New Zealand using the criteria specified in the NZTCS manual (Townsend et al. 2008). Here, we report a new assessment of 162 taxa, 24 of which have been assessed for the first time.

2.1 Additional taxa

Twenty-four taxa were assessed for the first time in 2022 (Table 1).

Eighteen of these are new species that were first described in recent papers (Taylor-Smith et al. 2016; Fitness et al. 2018; Hegg et al. 2019, 2022; Trewick et al. 2020; Trewick 2021). They include two species of Anostomatidae (genus *Hemiandrus*) and 16 species of Rhabdophoridae.

One native species of Gryllidae, *Gryllopsis maoria* (de Saussure, 1877), was accidentally omitted from previous assessments. This small, dark cricket has rarely been recorded and is listed as Data Deficient here.

Two exotic Orthoptera are recent arrivals in the country. The Australian katydid *Austrosalomona falcata* (Redtenbacher, 1891) was first detected in Aotearoa New Zealand in 2007 (MAF Biosecurity New Zealand 2007) and is now established in Northland (Green 2012). The cosmopolitan tropical house cricket *Grylloides sigillatus* (Walker, 1869) is occasionally intercepted at the border, and while an infestation detected in Tauranga in 2020 is thought to have been eradicated (Bleach 2020), more recent observations in Auckland suggest the species is still at large (see <https://inaturalist.nz/observations/109177874>).

The remaining three additions are taxonomically unresolved. The ground wētā *Hemiandrus* (CMNZ 2005.56.717) “*madisylvestris*” (Anostomatidae) is an undescribed endemic species (Johns 2001) that inhabits forest in South Westland and was recognised as valid by the panel. The scaly cricket *Ornebius* “*kermadecensis*” and a ground cricket *Pteronemobius* sp. (Gryllidae) (see Messenger 1991) are also taxonomically unresolved but certainly occur within Aotearoa New Zealand. It is not currently known whether these taxa are native or were introduced, so it is possible that they are undescribed or represent species described from elsewhere in the Pacific region.

2.2 Removed taxa

Thirty-seven taxa listed in the previous assessment (Trewick et al. 2016) have not been included in the 2022 list (Table 2).

Eleven of these taxa are now considered to be conspecific with other taxa assessed here. Sixteen undescribed taxa had previously been listed tentatively on the basis of a preliminary report (Johns 2001) but their tag names have now been rejected as not representing any known described or undescribed species.

Two exotic species of Gryllidae previously listed as introduced to Aotearoa New Zealand have been removed from this assessment after review of the evidence for their presence. A single record of *Ornebius novarae* (Saussure, 1877) in Rotorua by a University of Iowa scientific expedition (Caudell 1927) is considered suspect, as the basis of the identification was poor, there is no known voucher specimen and no representatives of this taxon have subsequently been found although other small crickets have been recorded. Likewise, the only record

of *Bobilla bivittata* (Walker, 1869) in Aotearoa New Zealand was by Hudson (1973), who overlooked the descriptions of the native species *Bobilla nigrova* and *B. bigelowi* provided in Swan (1972).

The Acrididae *Siga*us “black”, *Siga*us “blue”, *Siga*us “green”, *Siga*us “red” and *Siga*us “yellow” have been replaced with *Siga*us *australis* (Hutton, 1898) “central arid”, as no details or voucher materials have been forthcoming to justify retention of the population tag names. It is recognised that colour-polymorphic *Siga*us *australis* exist throughout the arid zones of Central Otago and Canterbury, and while their density and level of gene flow are not known, this habitat is under extreme threat from climate change (Koot et al. 2022) and other types of anthropogenic modification (MfE & Stats NZ 2021).

Table 1. Orthoptera taxa assessed for the first time in this report.

ASSESSMENT NAME AND AUTHORITY	COMMON NAME	FAMILY
Taxonomically determinate		
<i>Austrosalomona falcata</i> (Redtenbacher, 1891)	olive-green coastal katydid	Tettigoniidae
<i>Grylloides sigillatus</i> (Walker, 1869)	tropical house cricket	Gryllidae
<i>Gryllopsis maoria</i> (de Saussure, 1877)	cricket	Gryllidae
<i>Hemiandrus luna</i> Taylor-Smith, Trewick & Morgan-Richards, 2016	ground wētā	Anostostomatidae
<i>Hemiandrus nox</i> Taylor-Smith, Trewick & Morgan-Richards, 2016	ground wētā	Anostostomatidae
<i>Miotopus richardsae</i> Fitness, Morgan-Richards, Hegg & Trewick, 2018	cave wētā	Rhaphidophoridae
<i>Pharmacus cochleatus fiordensis</i> Hegg, Morgan-Richards & Trewick, 2022	alpine cave wētā	Rhaphidophoridae
<i>Pharmacus cochleatus naucleus</i> Hegg, Morgan-Richards & Trewick, 2022	alpine cave wētā	Rhaphidophoridae
<i>Pharmacus cochleatus rawhiti</i> Hegg, Morgan-Richards & Trewick, 2022	alpine cave wētā	Rhaphidophoridae
<i>Pharmacus concinnus</i> Hegg, Morgan-Richards & Trewick, 2022	alpine cave wētā	Rhaphidophoridae
<i>Pharmacus cristatus</i> Hegg, Morgan-Richards & Trewick, 2022	alpine cave wētā	Rhaphidophoridae
<i>Pharmacus notabilis</i> Hegg, Morgan-Richards & Trewick, 2022	alpine cave wētā	Rhaphidophoridae
<i>Pharmacus perfidus</i> Hegg, Morgan-Richards & Trewick, 2022	alpine cave wētā	Rhaphidophoridae
<i>Pharmacus senex</i> Hegg, Morgan-Richards & Trewick, 2022	alpine cave wētā	Rhaphidophoridae
<i>Pharmacus vallestris</i> Hegg, Morgan-Richards & Trewick, 2022	alpine cave wētā	Rhaphidophoridae
<i>Pleiopectron auratum</i> Hegg, Morgan-Richards & Trewick, 2019	cave wētā	Rhaphidophoridae
<i>Pleiopectron caudatum</i> Hegg, Morgan-Richards & Trewick, 2019	cave wētā	Rhaphidophoridae
<i>Pleiopectron crystallae</i> Hegg, Morgan-Richards & Trewick, 2019	cave wētā	Rhaphidophoridae
<i>Pleiopectron flavicorne</i> Hegg, Morgan-Richards & Trewick, 2019	cave wētā	Rhaphidophoridae
<i>Pleiopectron rodmorrisi</i> Hegg, Morgan-Richards & Trewick, 2019	cave wētā	Rhaphidophoridae
<i>Pleiopectron triquetrum</i> Hegg, Morgan-Richards & Trewick, 2019	cave wētā	Rhaphidophoridae
Taxonomically unresolved		
<i>Hemiandrus</i> (CMNZ 2005.56.717) “madisylvestris”	ground wētā	Anostostomatidae
<i>Ornebius</i> (AMNZ86469) “kermadecensis”	scaly cricket	Mogoplistidae
<i>Pteronemobius</i> sp. [truncatus / tarrios]	cricket	Trigonidiidae

Table 2. Orthoptera taxa that were assessed by Trewick et al. (2016) but not included in the 2022 assessment.

ASSESSMENT NAME AND AUTHORITY	COMMON NAME	FAMILY	REASON FOR DELETION
Taxonomically determinate			
<i>Bobilla bivittata</i> (Walker, 1869)	ground cricket	Trigonidiidae	Dubious evidence of species ever existing in Aotearoa New Zealand
<i>Ornebius novarae</i> (Saussure, 1877)	scaly cricket	Mogoplistidae	Dubious evidence of species ever existing in Aotearoa New Zealand
<i>Pachyrhamma altum</i> (Walker, 1869)	cave wētā	Rhaphidophoridae	Conspecific with <i>Pachyrhamma edwardsii</i> (Scudder, 1869)
<i>Pharmacus chapmanae</i> Richards, 1972	cave wētā	Rhaphidophoridae	Conspecific with <i>Pharmacus cochleatus</i> (Karny, 1935)
<i>Pharmacus dumbletoni</i> Richards, 1972	cave wētā	Rhaphidophoridae	Conspecific with <i>Pharmacus montanus</i> Pictet & de Saussure, 1893
<i>Pleioplectron diversum</i> Hutton, 1897	cave wētā	Rhaphidophoridae	Conspecific with <i>Miotopus diversus</i> (Hutton, 1896)
Taxonomically unresolved			
<i>Brachaspis</i> “Hunter Hills”	Hunter Hills grasshopper	Acrididae	Conspecific with <i>Brachaspis nivalis</i> (Hutton, 1897)
Gryllidae <i>incertae sedis</i> sp. A	cricket	Gryllidae	No known voucher material or justification
<i>Hemiandrus</i> “Cape Campbell”	ground wētā	Anostomatidae	Conspecific with <i>Hemiandrus bilobatus</i> Ander, 1938
<i>Hemiandrus</i> “Longwood Range”	ground wētā	Anostomatidae	No known voucher material or justification
<i>Hemiandrus</i> “Mt George”	ground wētā	Anostomatidae	No known voucher material or justification
<i>Hemiandrus</i> “Pureora 1”	ground wētā	Anostomatidae	No known voucher material or justification
<i>Hemiandrus</i> “Pureora 2”	ground wētā	Anostomatidae	No known voucher material or justification
<i>Hemiandrus</i> “Redhills”	ground wētā	Anostomatidae	No known voucher material or justification
<i>Hemiandrus</i> “Richmond”	ground wētā	Anostomatidae	No known voucher material or justification
<i>Hemiandrus</i> “small lake”	ground wētā	Anostomatidae	No known voucher material or justification
<i>Hemiandrus</i> “Staveley”	ground wētā	Anostomatidae	No known voucher material or justification
<i>Hemiandrus</i> “Tapuae-O-Uenuku”	ground wētā	Anostomatidae	No known voucher material or justification
<i>Isoplectron</i> n. spp. (3)	cave wētā	Rhaphidophoridae	No known voucher material or justification
<i>Macropathus</i> sp. A	cave wētā	Rhaphidophoridae	No known voucher material or justification
<i>Macropathus</i> sp. B	cave wētā	Rhaphidophoridae	No known voucher material or justification
<i>Neonetus</i> n. spp. (9)	cave wētā	Rhaphidophoridae	No known voucher material or justification
<i>Pachyrhamma</i> n. spp. (> 11)	cave wētā	Rhaphidophoridae	No known voucher material or justification
<i>Petrotettix</i> sp. A	cave wētā	Rhaphidophoridae	No known voucher material or justification
<i>Pharmacus?</i> n. spp. (3)	cave wētā	Rhaphidophoridae	No known voucher material or justification
<i>Phaulacridium</i> n. spp. (3)	short-horned grasshopper	Acrididae	No known voucher material or justification
Rhaphidophoridae <i>incertae sedis</i> sp. A	cave wētā	Rhaphidophoridae	No known voucher material or justification
Rhaphidophoridae <i>incertae sedis</i> sp. B	cave wētā	Rhaphidophoridae	No known voucher material or justification
Rhaphidophoridae <i>incertae sedis</i> sp. C	cave wētā	Rhaphidophoridae	No known voucher material or justification
Rhaphidophoridae <i>incertae sedis</i> sp. D	cave wētā	Rhaphidophoridae	No known voucher material or justification
<i>Sigaus</i> “black”	alpine grasshopper	Acrididae	Conspecific with <i>Sigaus australis</i> (Hutton, 1898) “central arid”
<i>Sigaus</i> “green”	alpine grasshopper	Acrididae	Conspecific with <i>Sigaus australis</i> (Hutton, 1898) “central arid”
<i>Sigaus</i> “red”	alpine grasshopper	Acrididae	Conspecific with <i>Sigaus australis</i> (Hutton, 1898) “central arid”
<i>Sigaus</i> “Remarkables”	alpine grasshopper	Acrididae	Conspecific with <i>Sigaus australis</i> (Hutton, 1898)
<i>Sigaus</i> “yellow”	alpine grasshopper	Acrididae	Conspecific with <i>Sigaus australis</i> (Hutton, 1898) “central arid”
<i>Talitropsis</i> n. sp.	cave wētā	Rhaphidophoridae	
<i>Weta</i> sp. A	cave wētā	Rhaphidophoridae	

2.3 Changed taxon names

Sixteen taxa have changed name since the previous assessment (Table 3).

As noted in section 2.2 above, the taxon *Sigauss australis* (Hutton, 1898) “central arid” (Acrididae) has been introduced to accommodate short-horn grasshoppers, including *Sigauss* “blue”, that are found in and around the arid zones of Central Canterbury and Otago. *Brachaspsis* “lowland” has been replaced with *Brachaspsis nivalis* “lowland”, as current evidence demonstrates a taxonomic affinity (Trewick & Morris 2008). It is possible that the smaller size of “lowland” populations is an adaptation to local (usually braided riverbed) conditions. If this is the case, this taxon would have similar status to *Brachaspsis robustus* Bigelow, 1967, which is an ecologically distinct lineage of southern *B. nivalis* (Trewick 2001).

Six tag-named *Hemiandrus* ground wētā (Anostostomatidae) have now been formally described. Four of these (*H. “Kapiti”*, *H. “Horomaka”*, *H. “vicinus”* and *H. “Onokis”*) belong to a radiation of short ovipositor species that include *H. bilobatus*, which was recently found to forage on Marlborough grapevines (Trewick et al. 2020). *Hemiandrus jacinda* (formerly *H. “elegans”*) is a large and brightly coloured species found rarely in North Island native forest (Trewick 2021). The tag name *Hemiandrus “Otekauri”* is a synonym of the formally described species *H. brucei*, which is part of the long ovipositor *H. maculifrons* complex (Taylor-Smith et al. 2016).

Lepidogryllus lepidus (Walker, 1869) has been recognised as a junior synonym of *L. parvulus* (Walker, 1869), a cricket accidentally introduced to Aotearoa New Zealand that has been recorded in Auckland and Northland.

Genus- and species-level corrections and updates have also been made among the Rhaphidophoridae. A recent revision of *Pleioplectron* resulted in seven new species and synonymy of the genus *Weta* (Hegg et al. 2019). Similarly, revision of *Pharmacus* (Hegg et al. 2022) established new species and significant subspecies that are endemic to alpine habitats in

Table 3. Name changes affecting Orthoptera taxa in Aotearoa New Zealand between the publication of Trewick et al. (2016) and this report.

NAME AND AUTHORITY IN TREWICK ET AL. (2016)	NAME AND AUTHORITY IN THIS REPORT [†]	FAMILY
Taxonomically determinate		
<i>Hemiandrus “Otekauri”</i>	<i>Hemiandrus brucei</i> Taylor-Smith, Morgan-Richards & Trewick, 2016	Anostostomatidae
<i>Hemiandrus “Horomaka”</i>	<i>Hemiandrus celaeno</i> Trewick, Taylor-Smith & Morgan-Richards, 2020	Anostostomatidae
<i>Hemiandrus “elegans”</i>	<i>Hemiandrus jacinda</i> Trewick, 2021	Anostostomatidae
<i>Hemiandrus “Kapiti”</i>	<i>Hemiandrus merope</i> Trewick, Taylor-Smith & Morgan-Richards, 2020	Anostostomatidae
<i>Hemiandrus “vicinus”</i>	<i>Hemiandrus sterope</i> Trewick, Taylor-Smith & Morgan-Richards, 2020	Anostostomatidae
<i>Hemiandrus “Onokis”</i>	<i>Hemiandrus taygete</i> Trewick, Taylor-Smith, & Morgan-Richards, 2020	Anostostomatidae
<i>Lepidogryllus lepidus</i> * (Walker, 1869)	<i>Lepidogryllus parvulus</i> (Walker, 1869)	Gryllidae
<i>Pharmacus brewsterensis</i> Richards, 1972	<i>Notoplectron brewsterense</i> (Richards, 1972)	Rhaphidophoridae
<i>Turbottoplectron cavernae</i> (Hutton, 1897)	<i>Pachyrhamma cavernae</i> (Hutton, 1900)	Rhaphidophoridae
<i>Turbottoplectron unicolor</i> Salmon, 1948	<i>Pachyrhamma unicolor</i> (Salmon, 1948)	Rhaphidophoridae
<i>Isoplectron cochleatum</i> Karny, 1935	<i>Pharmacus cochleatus cochleatus</i> (Karny, 1935)	Rhaphidophoridae
<i>Pleioplectron</i> n. spp. (3)	<i>Pleioplectron gubernator</i> Hegg, Morgan-Richards & Trewick, 2019	Rhaphidophoridae
<i>Weta thomsoni</i> Chopard, 1923	<i>Pleioplectron thomsoni</i> (Chopard, 1923)	Rhaphidophoridae
<i>Weta chopardi</i> Karny, 1937	<i>Talitropsis chopardi</i> (Karny, 1937)	Rhaphidophoridae
Taxonomically unresolved		
<i>Brachaspsis</i> “lowland”	<i>Brachaspsis nivalis</i> (Hutton, 1897) “lowland”	Acrididae
<i>Sigauss</i> “blue”	<i>Sigauss australis</i> (Hutton, 1898) “central arid”	Acrididae

* This species was incorrectly listed as *Lepidocogryllus lepidus* in Trewick et al. (2014).

the South Island of Aotearoa New Zealand. In doing so, *Pharmacus brewsterensis* Richards, 1972 was revised to *Notoplectron brewsterense* (Richards, 1972) based on genetic and morphological evidence, while *Isoplectron cochleatum* Karny, 1935 was recognised as belonging to the genus *Pharmacus* and renamed *Pharmacus cochleatus cochleatus* (Karny, 1935).

Suppressing the genus *Turbottoplectron* Salmon, 1948 has led to the recognition of *Pachyrhamma cavernae* (Hutton, 1900) and *Pachyrhamma unicolor* (Salmon, 1948).

2.4 Trends

The conservation status of 38 taxa has changed since the previous assessment in 2014 (Trewick et al. 2016), with 5 having improved, 19 having worsened and the remaining 14 having neutral changes (12 taxa moved into or out of Data Deficient and 2 taxa moved from Introduced and Naturalised to Not Threatened) (see Tables 4–6). Twelve (32%) of these changes were identified as actual changes in population levels or trends, with the remainder being driven by improved knowledge, occasionally from the re-interpretation of existing data or a change in the criteria used in the assessment (e.g. from number of individuals to area of occupancy) (Table 6).

Most notable are the population declines of *Deinacrida* giant wētā species, which reflect ongoing attrition by exotic pests. In all cases the species most affected exist in small habitat patches. Short-horn grasshoppers (Acrididae) that continue to decline are, at present, those in low-elevation habitats that are subject to rapid habitat modification from agricultural intensification, weed invasion and introduced mammalian pests including cats, stoats, hedgehogs and rats.

We note, however, that high-elevation Orthoptera that currently have relatively natural population ranges, and presumably abundances, are in very real danger of decline during the next 50 years due to uncontrolled anthropogenic climate change. The situation for alpine Acrididae has recently been modelled in detailed with very concerning results (Koot et al. 2022).

Table 4. Comparison of the status of Orthoptera taxa in Aotearoa New Zealand assessed in 2002 (Hitchmough 2002), 2005 (Hitchmough et al. 2007), 2010 (Trewick et al. 2012), 2014 (Trewick et al. 2016) and 2022 (this report).

CONSERVATION STATUS	2002	2005	2010	2014	2022
Data Deficient	17	17	19	30	17
Threatened – Nationally Critical	3	3	1	2	3
Threatened – Nationally Endangered	5	6	2	2	5
Threatened – Nationally Vulnerable	0	0	3	4	8
Threatened – Nationally Increasing*	0	0	2	2	2
At Risk – Declining	3	3	1	1	5
At Risk – Relict	0	0	6	6	2
At Risk – Naturally Uncommon	34	38	31	32	20
Not Threatened	0	2	94	87	95
Introduced and Naturalised	0	0	8	9	5
Total	62	69	167	175	162

* The status At Risk – Recovering A defined in Townsend et al. (2008) and used in 2010 and 2014 has been renamed Threatened – Nationally Increasing in this assessment following Michel (2021).

Table 5. Summary of status changes of Orthoptera taxa between 2014 (rows, Trewick et al. 2016) and 2022 (columns, this report). Numbers on the diagonal (shaded black) represent those taxa that have not changed status between 2014 and 2022, numbers to the right of the diagonal (shaded green) represent taxa with an improved status (e.g. one taxon has moved from Threatened – Nationally Critical in 2014 to Threatened – Nationally Vulnerable in 2022), numbers to the left of the diagonal (shaded pink) represent taxa with a poorer status, and numbers without shading represent taxa that either have moved into or out of Data Deficient, are Non-resident Native or Introduced and Naturalised, have been newly added, or were removed from this assessment.

		CONSERVATION STATUS 2022												
		Total	DD	NC	NE	NV	NI	Dec	Rel	NU	NT	IN	NA*	TI†
		199‡	17	3	5	8	2	5	2	20	95	5	26	11
CONSERVATION STATUS 2014	THREATENED	Data Deficient (DD)	30	5							4		17	4
		Nationally Critical (NC)	2			1	1							
		Nationally Endangered (NE)	2			1								1
		Nationally Vulnerable (NV)	4				3							1
		Nationally Increasing (NI)	2§			1		1						
	AT RISK	Declining (Dec)	1				1							
		Relict (Rel)	6			1	2	1	1	1				
		Naturally Uncommon (NU)	32	4	2	1	1		1	1	18	3		1
		Not Threatened (NT)	87	2		1			3		2	68	7	4
		Introduced and Naturalised (IN)	9	2								2	3	2
		New listing	24	4								18	2	

* NA = not assessed.

† TI = taxonomically indistinct.

‡ The total in this table includes the 37 taxa that were not assessed or were deemed taxonomically indistinct in 2022.

§ The status At Risk – Recovering A defined in Townsend et al. (2008) and used in 2014 has been renamed Threatened – Nationally Increasing in this assessment following Michel (2021).

Table 6. Summary of changes to the number of Orthoptera taxa assigned to each conservation status between 2014 (Trewick et al. 2016) and 2022 (this report).

TYPE OF CHANGE, REASON, CONSERVATION STATUS	NO. TAXONOMICALLY DETERMINATE TAXA
BETTER	5
More knowledge	5
Threatened – Nationally Endangered	1
Threatened – Nationally Vulnerable	1
Not Threatened	3
WORSE	19
Actual decline	7
Threatened – Nationally Critical	1
Threatened – Nationally Vulnerable	2
At Risk – Declining	4
More knowledge	3
At Risk – Relict	1
At Risk – Naturally Uncommon	2
Reinterpretation of data	9
Threatened – Nationally Critical	2
Threatened – Nationally Endangered	3
Threatened – Nationally Vulnerable	2
Threatened – Nationally Increasing*	1
At Risk – Declining	1
NEUTRAL	14
Greater uncertainty	8
Data Deficient	8
More knowledge	4
Not Threatened	4
Reinterpretation of data	2
Not Threatened	2
NO CHANGE	100
Data Deficient	5
Threatened – Nationally Endangered	1
Threatened – Nationally Vulnerable	3
Threatened – Nationally Increasing*	1
At Risk – Relict	1
At Risk – Naturally Uncommon	18
Not Threatened	68
Introduced and Naturalised	3
NEW LISTING	24
Data Deficient	4
Not Threatened	18
Introduced and Naturalised	2
TOTAL	162

* Threatened – Nationally Increasing is a new name and category that replaces At Risk – Recovering A (Michel 2021).

2.4.1 Improved status

The Tekapo ground wētā (*Hemiandrus* “furoviarius”) and the Homer grasshopper (*Sigaus homerensis*) have moved out of the highest threat status, Threatened – Nationally Critical, into Threatened – Nationally Endangered and Threatened – Nationally Vulnerable, respectively, since the previous assessment due to increased knowledge about their populations. In addition, the cave wētā *Notoplectron brewsterense* and the ground wētā *Hemiandrus nitaweta* have moved from At Risk – Naturally Uncommon to Not Threatened.

2.4.2 Worsened status

Eleven taxa have moved into one of the Threatened categories. These include 10 taxa that have moved from one of the At Risk categories and one taxon that has moved from the Not Threatened category.

The most noticeable changes are for three taxa that have moved into Threatened – Nationally Critical:

- *Deinacrida mahoenui*, the Mahoenui giant wētā, which was previously assessed as At Risk – Recovering A, is currently known from four populations – the original natural population at Mahoenui Giant Wētā Scientific Reserve and three translocated populations. The translocated population at Sanctuary Mountain Maungatautari is still in the establishment phase; the translocated population at Warrenheip Reserve is established and stable, but this 16-ha fenced sanctuary on private land has intermittent rodent incursions and so cannot be considered secure; and the translocated population on Mahurangi Island is also established but appears to be declining, and DOC’s Mahoenui Giant Wētā Technical Advisory Group has concerns regarding the level of predation seen at this site, which is within swimming distance of predatory mammals and so is also not secure. The natural population at the Mahoenui Giant Wētā Scientific Reserve appeared to be stable during the first 7 years of DOC monitoring, which began in 2004. However, occupancy has declined significantly from c. 50% to c. 2% in the 10 years since 2012 (Stilborn 2019). During this time the gorse (*Ulex europaeus*) canopy has opened and is succeeding to native vegetation, which provides less protection to the wētā from mammalian predators. Rodent control began in 2019, and traps were established for mustelids, hedgehogs and feral cats in 2020. DOC and the Otorohanga Kiwi House, with support from local iwi, have recently initiated a captive rearing programme for this species.
- *Deinacrida tibiospina*, the Mt Arthur giant wētā, which was previously assessed as At Risk – Naturally Uncommon, is confined to tussocklands and herbfields in the subalpine regions of Kahurangi National Park. The species’ geographical range is decreasing rapidly and its population is declining due to mammalian predators (Hegg 2021).
- *Deinacrida talpa*, the Paparoa wētā (or giant mole wētā), which was previously assessed as At Risk – Naturally Uncommon, is confined to dry carpet grass slopes in the Paparoa Range at elevations of 1150–1350 m above sea level. All evidence points to this being a small, relict population that is rapidly declining. Colonies of *D. talpa* that were discovered in the 1990s and in 2000 were probably remnants of a species that was formerly widespread in the subalpine regions of the Paparoa Range but have subsequently been confined to the most unproductive habitat at the upper end of the species’ natural range (Hegg 2021).

Additionally, *Deinacrida pluvialis*, the Southern Alps giant wētā, has moved from Not Threatened to Threatened – Nationally Endangered, with a recent survey suggesting an overall decline of c. 70% and possible extinction at a site in the Matukituki Basin.

2.4.3 Data Deficient

Seventeen taxa are currently considered Data Deficient (see section 3.1, Table 7). *Teleogryllus commodus* (Walker, 1869), the black field cricket, was added to this list in 2022 because existing scientific literature gives conflicting interpretations on whether it is native to Aotearoa New Zealand or has been introduced from Australia. Consequently, while the species is common and widespread in this country, we have to list it as Data Deficient because we do not have enough information to decide whether it should be assessed as Not Threatened or Introduced and Naturalised.

The katydid *Salomona solida* was previously assessed as Introduced and Naturalised but is now considered Data Deficient. This species is believed to be native to the Kermadec Islands and an observation of it was made from the Kermadec Islands in November 2021 (<https://inaturalist.nz/observations/100823368>; *Salomona solida* (Walker, 1869)), supporting its continued existence.

3. Conservation status of all known Orthoptera in Aotearoa New Zealand

3.1 Assessments

Taxa were assessed according to the criteria of Townsend et al. (2008) and have been grouped in Table 7 by conservation status and then alphabetically by scientific name. For non-endemic species that are threatened internationally, the IUCN category is listed alongside the NZTCS listing. Data Deficient appears at the top of the list. Categories are then ordered by degree of loss, with Threatened at the top and Not Threatened at the bottom, above Introduced and Naturalised.

Brief descriptions of the NZTCS categories and criteria for assessments are provided in section 3.2. See Townsend et al. (2008), Michel (2021) and Rolfe et al. (2021) for details.

The full data for the assessments listed in Table 7 can be viewed and downloaded at <https://nztcs.org.nz/reports/1111>.

Table 7. Conservation status of all known Orthoptera in Aotearoa New Zealand.

Qualifiers are abbreviated as follow: CD = Conservation Dependent, De = Designated, DPR = Data Poor Recognition, DPS = Data Poor Size, DPT = Data Poor Trend, IE = Island Endemic, OL = One Location, PF = Population Fragmentation, RR = Range Restricted, S?O = Secure? Overseas, SO = Secure Overseas, Sp = Sparse. Further details about each of these can be found at <https://nzctcs.org.nz>.

NAME AND AUTHORITY	COMMON NAME	FAMILY	CRITERIA	QUALIFIERS	STATUS CHANGE
DATA DEFICIENT (17)					
Taxonomically determinate (12)					
<i>Gryllopsis maoria</i> (de Saussure, 1877)	cricket	Gryllidae			New listing
<i>Hemiandrus lanceolatus</i> (Walker, 1869)	ground wētā	Anostomatidae			No change
<i>Neonetus huttoni</i> Chopard, 1923	cave wētā	Rhaphidophoridae			Neutral
<i>Pachyrhamma giganteum</i> Richards, 1962	Poor Knights cave wētā	Rhaphidophoridae		CD, IE, RR	Neutral
<i>Pachyrhamma unicolor</i> (Salmon, 1948)	cave wētā	Rhaphidophoridae		IE, RR	Neutral
<i>Paraneonetus multispinus</i> Salmon, 1948	cave wētā	Rhaphidophoridae		IE, RR	Neutral
<i>Pharmacus vallesstris</i> Hegg, Morgan-Richards & Trewick, 2022	alpine cave wētā	Rhaphidophoridae		OL	New listing
<i>Salomona solida</i> (Walker, 1869)	katydid	Tettigoniidae		S?O	Neutral
<i>Sigaia takaha</i> Morris, 2003	alpine grasshopper	Acridae			No change
<i>Talitropsis irregularis</i> Hutton, 1897	cave wētā	Rhaphidophoridae			Neutral
<i>Teleogryllus commodus</i> (Walker, 1869)	black field cricket	Gryllidae		De, SO	Neutral
<i>Trimescaptor aotea</i> Tindale, 1928	mole cricket	Gryllotalpidae		Sp, RR	Neutral
Taxonomically unresolved (5)					
<i>Hemiandrus</i> "Rocklands"	ground wētā	Anostomatidae			No change
<i>Hemiandrus</i> sp. nr. <i>focalis</i>	ground wētā	Anostomatidae			No change
<i>Ornebius</i> (AMNZ86469) "kermadecensis"	scaly cricket	Mogoplistidae			New listing
<i>Pteronemobius</i> sp. nr. <i>truncatus</i> / <i>tairios</i>	ground cricket	Trigoniidae			New listing
Rhaphidophoridae <i>incertae sedis</i> aff. <i>Talitropsis</i> sp. A "Poor Knights"	cave wētā	Rhaphidophoridae		IE, OL	No change
THREATENED (18)					
NATIONALLY CRITICAL (3)					
Taxonomically determinate (3)					
<i>Deinacrida mahoenui</i> Gibbs, 1999	Mahoenui giant wētā	Anostomatidae	C	CD, RR	Worse
<i>Deinacrida talpa</i> Gibbs, 1999	Paparoa giant wētā	Anostomatidae	B(1)	DPS, RR	Worse
<i>Deinacrida tibiospina</i> (Salmon, 1950)	Mt Arthur wētā	Anostomatidae	B(1)	RR, Sp	Worse

Continued on next page

Table 7 continued

NAME AND AUTHORITY	COMMON NAME	FAMILY	CRITERIA	QUALIFIERS	STATUS CHANGE
NATIONALLY ENDANGERED (5)					
Taxonomically determinate (4)					
<i>Brachaspis robustus</i> Bigelow, 1967	robust grasshopper	Acrididae	A(1)	Sp, Ci, RR	No change
<i>Deinacrida carnata</i> Salmon, 1950	Herekōpare wētā	Anostostomatidae	B(1)	CD, DPS, DPT, PF, RR	Worse
<i>Deinacrida elegans</i> Gibbs, 1999	mountain bluff wētā	Anostostomatidae	A(1)	Sp, DPS, DPT, PF	Worse
<i>Deinacrida pluvialis</i> Gibbs, 1999	Southern Alps giant wētā	Anostostomatidae	C(2)	DPS, DPT, PF	Worse
Taxonomically unresolved (1)					
<i>Hemiandrus</i> "turovianus"	Tekapo ground wētā	Anostostomatidae	C(1)	RR, Sp	Better
NATIONALLY VULNERABLE (8)					
Taxonomically determinate (5)					
<i>Deinacrida parva</i> Buller, 1895 (IUCN: Data Deficient, v2.3, 1996)	Kaikōura giant wētā	Anostostomatidae	C(1)	DPS, DPT	Worse
<i>Deinacrida rugosa</i> Buller, 1871 (IUCN: Vulnerable D2, v2.3, 1996)	Cook Strait giant wētā	Anostostomatidae	B(1)	CD, RR	Worse
<i>Sigaüs childi</i> Jamieson, 1999	Otago arid grasshopper	Acrididae	D(3)	Sp, DPS, DPT, RR	Worse
<i>Sigaüs homerensis</i> Morris, 2003	Homer grasshopper	Acrididae	B(3)	Sp, DPR, DPS, RR	Better
<i>Sigaüs minutus</i> Bigelow, 1967	minute grasshopper	Acrididae	E(2)		No change
Taxonomically unresolved (3)					
<i>Hemiandrus</i> (CMNZ 2000.121.21115) "Cromwell"	ground wētā	Anostostomatidae		DPS, DPT, RR	No change
<i>Hemideina thoracica</i> (White, 1842) "2n=23,24"	Karikari tree wētā	Anostostomatidae	C(3)	DPS, DPT	No change
<i>Sigaüs australis</i> (Hutton, 1898) "central arid"	central arid alpine grasshopper	Acrididae		DPR, RR	No change
NATIONALLY INCREASING (2)					
Taxonomically determinate (2)					
<i>Deinacrida heteracantha</i> White, 1842 (IUCN: Vulnerable D2, v2.3, 1996)	Little Barrier giant wētā	Anostostomatidae		CD, RR	Worse
<i>Motuweta isolata</i> Johns, 1997	Mercury Island tusked wētā	Anostostomatidae		CD	No change
AT RISK (27)					
DECLINING (5)					
Taxonomically determinate (4)					
<i>Anisoura nicobarica</i> Ander, 1938	Northland tusked wētā	Anostostomatidae		Sp, DPS, DPT, PF	Worse
<i>Pachyrhamma delii</i> (Richards, 1954)	cave wētā	Rhaphidophoridae	C(2)	Sp, DPS, DPT, PF	Worse

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Table 7 continued

NAME AND AUTHORITY	COMMON NAME	FAMILY	CRITERIA	QUALIFIERS	STATUS CHANGE
<i>Phaulacridium otageense</i> Westerman & Ritchie, 1984	short-horned grasshopper	Acrididae	C(2)	Sp	Worse
<i>Sigaus campestris</i> (Hutton, 1898)	short-horned grasshopper	Acrididae	C(2)	Sp, DPS, DPT	Worse
Taxonomically unresolved (1)					
<i>Brachaspis nivalis</i> (Hutton, 1897) "lowland"	snow grasshopper	Acrididae	B(2)	Sp, DPR, RR	Worse
RELICT (2)					
Taxonomically determinate (2)					
<i>Hemiandrus superbus</i> Jewell, 2007	ground wētā	Anostomatidae	B	Sp, DPS, DPT, OL	Worse
<i>Hemideina trewicki</i> Morgan-Richards, 1995	Hawke's Bay tree wētā	Anostomatidae		Sp	No change
NATURALLY UNCOMMON (20)					
Taxonomically determinate (16)					
<i>Deinacrida fallai</i> Salmon, 1950 (IUCN: Vulnerable D2, v2.3, 1996)	Poor Knights giant wētā	Anostomatidae		CD, DPS, DPT, IE, RR	No change
<i>Dendroplectron aucklandense</i> Richards, 1964	Auckland Island cave wētā	Rhaphidophoridae		IE, RR	No change
<i>Hemiandrus celeeno</i> Trewick, Taylor-Smith & Morgan-Richards, 2020	ground wētā	Anostomatidae		RR	No change
<i>Hemiandrus jacinda</i> Trewick, 2021	Jacinda's wētā	Anostomatidae		Sp, DPS, DPT, PF	No change
<i>Hemiandrus merope</i> Trewick, Taylor-Smith & Morgan-Richards, 2020	Kapiti ground wētā	Anostomatidae		IE, OL	No change
<i>Hemiandrus subantarcticus</i> (Salmon, 1950)	ground wētā	Anostomatidae		CD, IE, RR	No change
<i>Hemideina ricta</i> Hutton, 1896	Banks Peninsula tree wētā	Anostomatidae		RR	No change
<i>Insulanoplectron spinosum</i> Richards, 1970	Snares Island wētā	Rhaphidophoridae		CD, IE, RR	No change
<i>Ischyroplectron isolatum</i> (Hutton, 1895)	Bounty Island cave wētā	Rhaphidophoridae		CD, IE, OL	No change
<i>Motuweta riparia</i> Gibbs, 2002	Raukūmara tusked wētā	Anostomatidae		DPS, DPT, RR	No change
<i>Notoplectron campbellense</i> Richards, 1964	Campbell Island cave wētā	Rhaphidophoridae		CD, IE, RR	No change
<i>Novoplectron serratum</i> Hutton, 1904	cave wētā	Rhaphidophoridae		IE, RR	No change
<i>Pallidoplectron peniculosum</i> Richards, 1960	cave wētā	Rhaphidophoridae		OL	Worse
<i>Pallidoplectron subterraneum</i> Richards, 1965	cave wētā	Rhaphidophoridae		DPS, DPT, PF, RR	Worse
<i>Talitropsis crassicuris</i> Hutton, 1897	cave wētā	Rhaphidophoridae		IE	No change
<i>Talitropsis megatibia</i> Trewick, 1999	cave wētā	Rhaphidophoridae		IE, RR	No change
Taxonomically unresolved (4)					
<i>Hemiandrus</i> (CMNZ 2000.121.21093) "Hapuku"	ground wētā	Anostomatidae		RR	No change
<i>Hemiandrus</i> (CMNZ 2000.121.21908) "Nokomal"	ground wētā	Anostomatidae		RR	No change

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Table 7 continued

NAME AND AUTHORITY	COMMON NAME	FAMILY	CRITERIA	QUALIFIERS	STATUS CHANGE
<i>Hemiandrus</i> "Porters Pass"	ground wētā	Anostomatidae			No change
<i>Hemideina thoracica</i> (White, 1842) "2n=11,12"	Cuvier Island tree wētā	Anostomatidae		RR	No change
NOT THREATENED (95)					
Taxonomically determinate (90)					
<i>Alpinacris crassicauda</i> Bigelow, 1967	short-horned grasshopper	Acrididae			No change
<i>Alpinacris tumidicauda</i> Bigelow, 1967	short-horned grasshopper	Acrididae			No change
<i>Bobilla bigelowi</i> (Swan, 1972)	small field cricket	Trigonidiidae			No change
<i>Bobilla nigrova</i> (Swan, 1972)	field cricket	Trigonidiidae			No change
<i>Brachaspis collinus</i> (Hutton, 1897)	short-horned grasshopper	Acrididae			No change
<i>Brachaspis nivalis</i> (Hutton, 1897)	snow grasshopper	Acrididae			No change
<i>Caedicia simplex</i> (Walker, 1869)	garden katydid	Tettigoniidae			No change
<i>Conocephalus albescens</i> (Walker, 1869)	field katydid	Tettigoniidae			Neutral
<i>Conocephalus bilineatus</i> (Erichson, 1842)	field katydid	Tettigoniidae			Neutral
<i>Conocephalus semivittatus</i> (Walker, 1869)	field katydid	Tettigoniidae			No change
<i>Deinacrida connectens</i> (Ander, 1939)	scree wētā	Anostomatidae		DPT	No change
<i>Hemiandrus bilobatus</i> Ander, 1938	two-lobed ground wētā	Anostomatidae			No change
<i>Hemiandrus brucei</i> Taylor-Smith, Trewick & Morgan-Richards, 2016	Bruce's ground wētā	Anostomatidae			Better
<i>Hemiandrus electra</i> Taylor-Smith, Morgan-Richards & Trewick, 2013	shining amber ground wētā	Anostomatidae			No change
<i>Hemiandrus fiordensis</i> (Salmon, 1950)	ground wētā	Anostomatidae			No change
<i>Hemiandrus focalis</i> (Hutton, 1897)	ground wētā	Anostomatidae			No change
<i>Hemiandrus luna</i> Taylor-Smith, Trewick & Morgan-Richards, 2016	ground wētā	Anostomatidae			New listing
<i>Hemiandrus maculifrons</i> (Walker, 1869)	ground wētā	Anostomatidae			No change
<i>Hemiandrus maia</i> Taylor-Smith, Morgan-Richards & Trewick, 2013	ground wētā	Anostomatidae			No change
<i>Hemiandrus nitaweta</i> Jewell, 2007	ground wētā	Anostomatidae		OL	Better
<i>Hemiandrus nox</i> Taylor-Smith, Trewick & Morgan-Richards, 2016	ground wētā	Anostomatidae			New listing
<i>Hemiandrus pallitarsis</i> (Walker, 1869)	ground wētā	Anostomatidae			No change
<i>Hemiandrus sterope</i> Trewick, Taylor-Smith & Morgan-Richards, 2020	ground wētā	Anostomatidae			No change
<i>Hemiandrus taygete</i> Trewick, Taylor-Smith, Morgan-Richards, 2020	ground wētā	Anostomatidae			No change
<i>Hemideina broughi</i> (Buller, 1896)	West Coast bush wētā	Anostomatidae		DPS, DPT	No change
<i>Hemideina crassidens</i> (Blanchard, 1851)	Wellington tree wētā	Anostomatidae			No change

Continued on next page

Table 7 continued

NAME AND AUTHORITY	COMMON NAME	FAMILY	CRITERIA	QUALIFIERS	STATUS CHANGE
<i>Hemideina femorata</i> Hutton, 1898	Canterbury tree wētā	Anostomatidae			No change
<i>Hemideina maori</i> (Pictet & Saussure, 1891)	mountain stone wētā	Anostomatidae			No change
<i>Hemideina thoracica</i> (White, 1842)	Auckland tree wētā	Anostomatidae			No change
<i>Isoplectron aciculatum</i> Karny, 1937	cave wētā	Rhaphidophoridae			No change
<i>Isoplectron armatum</i> Hutton, 1897	cave wētā	Rhaphidophoridae			No change
<i>Isoplectron calcaratum</i> Hutton, 1897	cave wētā	Rhaphidophoridae			No change
<i>Locusta migratoria</i> (Linnaeus, 1758)	migratory locust	Acridae	SO		No change
<i>Macropathus filifer</i> Walker, 1869	cave wētā	Rhaphidophoridae			No change
<i>Macropathus huttoni</i> Kirby, 1906	cave wētā	Rhaphidophoridae			Neutral
<i>Maotoweta virescens</i> Johns & Cook, 2014	green moss wētā	Rhaphidophoridae			Neutral
<i>Metioche maorica</i> (Walker, 1869) (UCN: Least Concern, v3.1, 2018)	ground cricket	Trigonidiidae			No change
<i>Miotopus diversus</i> (Hutton, 1896)	cave wētā	Rhaphidophoridae			Neutral
<i>Miotopus richardiae</i> Fitness, Morgan-Richards, Hegg & Treweek, 2018	Aola Richards' cave wētā	Rhaphidophoridae			New listing
<i>Neonetus pilosus</i> (Hutton, 1904)	cave wētā	Rhaphidophoridae			No change
<i>Neonetus variegatus</i> Brunner von Wattenwyl, 1888	cave wētā	Rhaphidophoridae			No change
<i>Notoplectron brewsterense</i> (Richards, 1972)	cave wētā	Rhaphidophoridae			Better
<i>Pachyrhamma acanthocerum</i> (Milligan, 1926)	Auckland cave wētā	Rhaphidophoridae			No change
<i>Pachyrhamma cavernae</i> (Hutton, 1900)	cave wētā	Rhaphidophoridae			No change
<i>Pachyrhamma edwardsii</i> (Scudder, 1869)	Edwards' cave wētā	Rhaphidophoridae			No change
<i>Pachyrhamma fuscum</i> (Richards, 1959)	cave wētā	Rhaphidophoridae			No change
<i>Pachyrhamma longicaudum</i> (Richards, 1959)	cave wētā	Rhaphidophoridae		DPS, DPT	No change
<i>Pachyrhamma longipes</i> (Colenso, 1887)	cave wētā	Rhaphidophoridae			No change
<i>Pachyrhamma ngongotahaense</i> Richards, 1961	cave wētā	Rhaphidophoridae			No change
<i>Pachyrhamma spinosum</i> Richards, 1961	cave wētā	Rhaphidophoridae			No change
<i>Pachyrhamma tuari</i> Richards, 1961	cave wētā	Rhaphidophoridae			No change
<i>Pachyrhamma uncatum</i> (Richards, 1959)	gold mine cave wētā	Rhaphidophoridae			No change
<i>Pachyrhamma waipuae</i> (Richards, 1960)	cave wētā	Rhaphidophoridae			No change
<i>Pachyrhamma waitomoense</i> (Richards, 1958)	Waitomo cave wētā	Rhaphidophoridae			No change
<i>Pallidoplectron turneri</i> Richards, 1958	cave wētā	Rhaphidophoridae			No change
<i>Papirides dugdali</i> Bigelow, 1967	Dugdale's grasshopper	Acridae			No change
<i>Papirides nitidus</i> Hutton, 1898	short-horned grasshopper	Acridae			No change

Continued on next page

Table 7 continued

NAME AND AUTHORITY	COMMON NAME	FAMILY	CRITERIA	QUALIFIERS	STATUS CHANGE
<i>Petrotettix cupoleaensis</i> Richards, 1972	cave wētā	Rhaphidophoridae			No change
<i>Petrotettix nigripes</i> Richards, 1972	cave wētā	Rhaphidophoridae			No change
<i>Petrotettix serratus</i> Richards, 1972	cave wētā	Rhaphidophoridae			No change
<i>Petrotettix spinosus</i> Richards, 1972	cave wētā	Rhaphidophoridae			No change
<i>Pharmacus cochleatus cochleatus</i> (Karny, 1935)	alpine cave wētā	Rhaphidophoridae			No change
<i>Pharmacus cochleatus fiordensis</i> Hegg, Morgan-Richards & Trewick, 2022	black tumbling cave wētā	Rhaphidophoridae			New listing
<i>Pharmacus cochleatus naucleus</i> Hegg, Morgan-Richards & Trewick, 2022	alpine cave wētā	Rhaphidophoridae		CI, RR	New listing
<i>Pharmacus cochleatus rawhiti</i> Hegg, Morgan-Richards & Trewick, 2022	alpine cave wētā	Rhaphidophoridae		RR	New listing
<i>Pharmacus concinnus</i> Hegg, Morgan-Richards & Trewick, 2022	elegant sorcerer alpine cave wētā	Rhaphidophoridae			New listing
<i>Pharmacus cristatus</i> Hegg, Morgan-Richards & Trewick, 2022	tufted sorcerer alpine cave wētā	Rhaphidophoridae			New listing
<i>Pharmacus montanus</i> Pictet & de Saussure, 1893	Mt Cook flea	Rhaphidophoridae			No change
<i>Pharmacus notabilis</i> Hegg, Morgan-Richards & Trewick, 2022	Remarkables alpine cave wētā	Rhaphidophoridae		RR	New listing
<i>Pharmacus perfidus</i> Hegg, Morgan-Richards & Trewick, 2022	Takitimu sorcerer alpine cave wētā	Rhaphidophoridae		CI, RR	New listing
<i>Pharmacus senex</i> Hegg, Morgan-Richards & Trewick, 2022	old sorcerer alpine cave wētā	Rhaphidophoridae		CI, RR	New listing
<i>Phaulacridium marginale</i> (Walker, 1870)	short-horned grasshopper	Acrididae			No change
<i>Pleiopteron auratum</i> Hegg, Morgan-Richards & Trewick, 2019	gold-haired cave wētā	Rhaphidophoridae			New listing
<i>Pleiopteron caudatum</i> Hegg, Morgan-Richards & Trewick, 2019	cave wētā	Rhaphidophoridae			New listing
<i>Pleiopteron crystallae</i> Hegg, Morgan-Richards & Trewick, 2019	cave wētā	Rhaphidophoridae			New listing
<i>Pleiopteron flavicorne</i> Hegg, Morgan-Richards & Trewick, 2019	cave wētā	Rhaphidophoridae			New listing
<i>Pleiopteron gubernator</i> Hegg, Morgan-Richards & Trewick, 2019	cave wētā	Rhaphidophoridae			No change
<i>Pleiopteron hudsoni</i> Hutton, 1896	Hudson's cave wētā	Rhaphidophoridae			No change
<i>Pleiopteron rodmorrisi</i> Hegg, Morgan-Richards & Trewick, 2019	Rod Morris' cave wētā	Rhaphidophoridae			New listing
<i>Pleiopteron simplex</i> Hutton, 1896	cave wētā	Rhaphidophoridae			No change
<i>Pleiopteron thomsoni</i> (Chopard, 1923)	Thomson's cave wētā	Rhaphidophoridae			No change
<i>Pleiopteron triquetrum</i> Hegg, Morgan-Richards & Trewick, 2019	cave wētā	Rhaphidophoridae			New listing
<i>Setascutum ohauense</i> Richards, 1972	cave wētā	Rhaphidophoridae			No change
<i>Setascutum pallidum</i> Richards, 1972	cave wētā	Rhaphidophoridae			No change
<i>Sigaus australis</i> (Hutton, 1898)	southern alpine grasshopper	Acrididae			No change
<i>Sigaus piliferus</i> Hutton, 1898	North Island alpine grasshopper	Acrididae		Sp	No change
<i>Sigaus villosus</i> (Salmon, 1950)	hairy mountain top grasshopper	Acrididae		Sp	No change
<i>Talitropsis choparai</i> (Karny, 1937)	cave wētā	Rhaphidophoridae			Neutral

Continued on next page

Table 7 continued

NAME AND AUTHORITY	COMMON NAME	FAMILY	CRITERIA	QUALIFIERS	STATUS CHANGE
<i>Talitropsis poduroides</i> (Walker, 1871)	cave wētā	Rhaphidophoridae			No change
<i>Talitropsis sedilloti</i> Bolívar, 1883	cave wētā	Rhaphidophoridae			No change
Taxonomically unresolved (5)					
<i>Hemiandrus</i> (CMA 2005.56.712) "disparalis"	ground wētā	Anostomatidae			No change
<i>Hemiandrus</i> (CMA 2005.56.804) "saxatilis"	ground wētā	Anostomatidae			No change
<i>Hemiandrus</i> (CMA 2005.56.840) "Timaru"	ground wētā	Anostomatidae			No change
<i>Hemiandrus</i> (CMNZ 2000.121.21086) "Waimakariri"	ground wētā	Anostomatidae			No change
<i>Hemiandrus</i> (CMNZ 2005.56.717) "madisylvestris"	ground wētā	Anostomatidae			New listing
INTRODUCED AND NATURALISED (5)					
Taxonomically determinate (4)					
<i>Austrosalomona faicata</i> (Redtenbacher, 1891)	olive-green coastal katydid	Tettigoniidae		SO	New listing
<i>Gryllodes sigillatus</i> (Walker, 1869)	tropical house cricket	Gryllidae		SO	New listing
<i>Lepidogryllus parvulus</i> (Walker, 1869)	fast-chirping field cricket	Gryllidae		SO	No change
<i>Ornebius aperta</i> Otte & Alexander, 1983	scaly cricket	Mogoplistidae		SO	No change
Taxonomically unresolved (1)					
<i>Pterapotrechus</i> sp.	raspy cricket	Gryllacrididae		SO	No change

3.2 NZTCS categories, criteria and qualifiers

Full details of the criteria and qualifiers included in Table 7 can be found in Rolfe et al. (2021) or at https://nztcs.org.nz/content/NZTCS_QUALIFIERS.

Summary definitions for the categories are presented below.

Data Deficient

Taxa that cannot be assessed due to a lack of current information about their distribution and abundance. It is hoped that listing such taxa will stimulate research to find out the true category (for a fuller definition, see Townsend et al. 2008).

Threatened

Taxa that meet the criteria specified by Townsend et al. (2008) for the categories Nationally Critical, Nationally Endangered and Nationally Vulnerable.

NATIONALLY CRITICAL

A – very small population (natural or unnatural)

- A(1) < 250 mature individuals
- A(2) ≤ 2 sub-populations, ≤ 200 mature individuals in the larger sub-population
- A(3) Total area of occupancy ≤ 1 ha (0.01 km²)

B – small population with a high ongoing or forecast decline of 50–70%

- B(1) 250–1000 mature individuals
- B(2) ≤ 5 sub-populations, ≤ 300 mature individuals in the largest sub-population
- B(3) Total area of occupancy ≤ 10 ha (0.1 km²)

C – population (irrespective of size or number of sub-populations) with a very high ongoing or forecast decline of > 70%

- C Predicted decline > 70%

NATIONALLY ENDANGERED

A – small population that has a low to high ongoing or forecast decline of 10–50%

- A(1) 250–1000 mature individuals
- A(2) ≤ 5 sub-populations, ≤ 300 mature individuals in the largest sub-population
- A(3) Total area of occupancy ≤ 10 ha (0.1 km²)

B – small, stable population (unnatural)

- B(1) 250–1000 mature individuals
- B(2) ≤ 5 sub-populations, ≤ 300 mature individuals in the largest sub-population
- B(3) Total area of occupancy ≤ 10 ha (0.1 km²)

C – moderate population and high ongoing or forecast decline of 50–70%

- C(1) 1000–5000 mature individuals
- C(2) ≤ 15 sub-populations, ≤ 500 mature individuals in the largest sub-population
- C(3) Total area of occupancy ≤ 100 ha (1 km²)

NATIONALLY VULNERABLE

A – small population (unnatural), increasing > 10%

- A(1) 250–1000 mature individuals
- A(2) ≤ 5 sub-populations, ≤ 300 mature individuals in the largest sub-population
- A(3) Total area of occupancy ≤ 10 ha (0.1 km²)

B – moderate population (unnatural), stable ± 10%

- B(1) 1000–5000 mature individuals
- B(2) ≤ 15 sub-populations, ≤ 500 mature individuals in the largest sub-population
- B(3) Total area of occupancy ≤ 100 ha (1 km²)

C – moderate population and population trend that has a low to high ongoing or forecast decline of 10–50%

- C(1) 1000–5000 mature individuals
- C(2) ≤ 15 sub-populations, ≤ 500 mature individuals in the largest sub-population
- C(3) Total area of occupancy ≤ 100 ha (1 km²)

D – moderate to large population and moderate to high ongoing or forecast decline of 30–70%

- D(1) 5000–20 000 mature individuals
- D(2) ≤ 15 sub-populations, ≤ 1000 mature individuals in the largest sub-population
- D(3) Total area of occupancy ≤ 1000 ha (10 km²)

E – large population and high ongoing or forecast decline of 50–70%

- E(1) 20 000–100 000 mature individuals
- E(2) Total area of occupancy ≤ 10 000 ha (100 km²)

NATIONALLY INCREASING

This is a new name and category for At Risk – Recovering A of Townsend et al. (2008).

Taxa that have undergone a documented decline within the last 1000 years to a population size of 1000–5000 mature individuals or a total area of occupancy of ≤ 100 ha (1 km²) and now have an ongoing or predicted increase of > 10% in the total population or area of occupancy, taken over the longer of the next 10 years or three generations.

Taxa that are increasing but have a population size of < 1000 mature individuals (or a total area of occupancy of < 10 ha) are listed in one of the other Threatened categories, depending on their population size (for more details, see Townsend et al. (2008)).

At Risk

DECLINING

A – moderate to large population and low ongoing or forecast decline of 10–30%

- A(1) 5000–20 000 mature individuals
- A(2) Total area of occupancy ≤ 1000 ha (10 km²)

B – large population and low to moderate ongoing or forecast decline of 10–50%

- B(1) 20 000–100 000 mature individuals
- B(2) Total area of occupancy ≤ 10 000 ha (100 km²)

C – very large population and low to high ongoing or forecast decline of 10–70%

- C(1) > 100 000 mature individuals
- C(2) Total area of occupancy > 10 000 ha (100 km²)

RELICT

Taxa that have undergone a documented decline within the last 1000 years and now occupy < 10% of their former range and meet one of the following criteria:

A 5000–20 000 mature individuals; population stable ($\pm 10\%$)

B > 20 000 mature individuals; population stable or increasing at > 10%

The range of a relictual taxon takes into account the area currently occupied as a ratio of its former extent. Relict can also include taxa that exist as reintroduced and self-sustaining populations within or outside their former known range (for more details, see Townsend et al. (2008)).

NATURALLY UNCOMMON

Taxa whose distributions are confined to a specific geographical area or which occur within naturally small and widely scattered populations, where these distributions are not the result of human disturbance.

Not Threatened

Resident native taxa that have large, stable populations.

Introduced and Naturalised

Taxa that have become naturalised in the wild after being deliberately or accidentally introduced into Aotearoa New Zealand by human agency.

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