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Conservation status of New Zealand reptiles, 2021

Rod Hitchmough, Ben Barr, Carey Knox, Marieke Lettink, Joanne M. Monks, Geoff B. Patterson, James T. Reardon, Dylan van Winkel, Jeremy Rolfe and Pascale Michel



Department of
Conservation
Te Papa Atawhai

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Addendum: draft assessment of *Oligosoma lineoocellatum*

February 2024

The expert panel has reconvened to re-assess the conservation status of *Oligosoma lineoocellatum* (Canterbury spotted skink). Mitochondrial DNA sequences and re-assessment of morphology showed that the group of populations from the Ashburton Lakes basin and surrounding ranges, previously regarded as *O. lineoocellatum*, were misidentified.

Those animals are *O. prasinum* or an undescribed sister taxon. This has reduced the total population of *O. lineoocellatum* substantially, and removed what were believed to be the most secure populations.

Age at maturity is assumed to be 4 years for this large-bodied skink species, natural generation time is estimated at 10 years, and decline assessment period at 30 years. All intensively monitored populations showed well-documented decline rates easily exceeding 70% over three generations. These rates apply to the entire eastern portion of the range (Christchurch, Banks Peninsula, and Kaitorete Spit), and many of the populations are already functionally extinct. The exception is a currently thriving population within a small predator exclusion fence on Banks Peninsula. The fence is subject to damage caused by earth movement and its future is not certain, putting this population at risk of declining at a similar rate to others. Small populations found on tiny near-shore islands off Banks Peninsula are not secure because the islets are too small to sustain large lizard populations and are well within swimming range of the mainland for stoats and rats. Populations in the foothills to the west of the Canterbury Plains are more poorly known and lack monitoring, and some may remain undiscovered. They are subject to the same pressures as those in the east and are likely to experience similar declining trends.

Oligosoma lineoocellatum was reassessed as Threatened – Nationally Critical based on Criterion C: “the population has an ongoing trend or predicted decline of > 70% in the total population due to existing threats taken over the next 10 years or three generations, whichever is longer.”

NAME AND AUTHORITY	COMMON NAME	FAMILY	CRITERIA	QUALIFIER	STATUS CHANGE
THREATENED – NATIONALLY CRITICAL					
<i>Oligosoma lineoocellatum</i> (Duméril & Duméril 1851)	Canterbury spotted skink	Scincidae	C	CD, CI, DPS, PD, Sp	Worse

Qualifier abbreviations: CD = Conservation Dependent, CI = Climate Impact, DPS = Data Poor Size, PD = Partial Decline, Sp = Biologically Sparse

Note added in press: Just before this report was published, DNA sequence results became available which indicated that the Cupola gecko *Mokopirirakau* “Cupola” was not genetically distinct from the forest gecko *Mokopirirakau granulatus*. It should therefore be regarded as Taxonomically Indistinct.

Cover: *Mokopirirakau galaxias* (hura te ao gecko), Oteake Conservation Park, Threatened – Nationally Endangered. Photo: Carey Knox.

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 providing NZTCS status of members of a plant or animal group (e.g. algae, birds, spiders). There are currently 23 groups, each assessed once every 5 years. 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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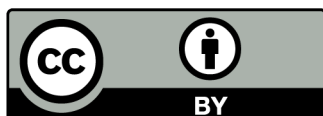
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Conservation status of New Zealand reptiles, 2021

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Abstract

The conservation status of all known (135) New Zealand reptile taxa 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. This list replaces all previous NZTCS lists for reptiles. Of the taxa assessed, 49 (36.3%) taxa are classified here as being Threatened, 67 (49.6%) are At Risk, 5 (3.7%) are Not Threatened, 8 (5.9%) are Non-resident Native, and 1 (0.7%) is Introduced and Naturalised. Additionally, 4 taxa (3%) are Data Deficient because insufficient information is available to assess their conservation status and 1 (0.7%) is extinct. The Data Deficient list is likely to include some of the most threatened species in New Zealand. Of the 135 known New Zealand reptile taxa, 54 (40%) have not been formally described and named.

Keywords: New Zealand Threat Classification System, NZTCS, conservation status, gecko, skink, tuatara, turtle, sea snake, Diplodactylidae, Scincidae, Sphenodontidae, Cheloniidae, Dermochelyidae, Hydrophiidae, Laticaudidae

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1. Background

The New Zealand Threat Classification System (NZTCS) was established in 2002 to complement the IUCN Red List System. Categories and criteria were defined to reflect New Zealand's unique environments, accounting for the country's relatively small size and diversity of ecosystems, and the large number of taxa with naturally restricted ranges and/or small population sizes (Molloy et al. 2002). The System's methodology was refined in 2007 following a rigorous review by a team of experts, to ensure that all possible combinations of status and trend were covered within the different categories. The resulting manual (Townsend et al. 2008) is the most recently updated methodology currently in use to assess all known taxa present within the New Zealand Exclusive Economic Zone, not including the Ross Dependency in Antarctica.

1.1 Assessment process

NZTCS taxa specific assessments are reviewed every 5 years by a panel of experts. The assessment panel chair brings together experts in the field of taxonomy and ecology who are actively researching on a specific group of taxa and are recognised by their peers as experts in their field. 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). An information-gathering process complements the knowledge provided by members of the expert panel and is open to all persons wishing to provide expert scientific information to assist the review of the assessment. A questionnaire is provided as part of this process to facilitate the gathering of scientific evidence by targeting the type of data needed for assessing threat status (for example, from local surveys and monitoring). In making their assessments, experts consider the previously published assessment as the starting point for the new assessment and evaluate any new information that is provided during the consultation period. Taxa are assessed according to the reported population size and trend since the last assessment and predicted future changes over the next 10 years or 3 generations, whichever is the longest. Taxa are assigned to the 'Data Deficient' category when insufficient data are available to assess conservation status, or to the qualifier 'Data Poor' when assessments are made but with low confidence due to limited data being available.

1.2 This assessment

For this assessment, the expert panel consisted of eight members, plus two administration/support staff; three panel members were employees of the New Zealand Department of Conservation (DOC) and five of external organisations. A call for submissions was advertised through the New Zealand Herpetological Society, the DOC Have-your-say process, 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. A total of three submissions were received from private consultants, providing additional data on 10 taxa. The expert panel met on 2-6 November 2020. Notes from this meeting and rationale for the reclassification of taxa have been summarised in the present report. Full text can be found online, on the assessment page of each taxon on the NZTCS website (<https://nztns.org.nz/reports/1083>).

In 2019, the following additions were made to categories, criteria and qualifiers as defined in the NZTCS manual (Townsend et al. 2008, Rolfe et al. 2021):

- The status 'Recovering A' was moved from the category 'At Risk' to the category 'Threatened' and renamed 'Nationally Increasing'. This was done because when the population of a taxon assessed as 'Recovering A' stabilises, the taxon moves from the

category 'At Risk' to the category 'Threatened', despite there being no deterioration in the taxon's population. The term 'Nationally' is used to be consistent with the nomenclature of other conservation statuses in the category 'Threatened'. The term 'Increasing' does not require that the population of a taxon in this category is increasing consistently across its entire geographical range.

- The qualifier 'Climate Impact (CI)' was added to reflect new pressures from changing environment and acknowledge taxa that are or will be adversely affected by long-term climate trend and/or extreme events (Rolfe et al. 2021). Adverse effects of climate change may be direct (e.g. extreme weather) or indirect (e.g. change in predator pressure following seed masting events).
- The qualifier 'Conservation Research needed (CR)' indicates a need for research to better understand the cause of decline and/or solution for recovery.
- The qualifier 'Data Poor (DP)' was replaced by three qualifiers - 'Data Poor Recognition (DPR)', 'Data Poor Size (DPS)' and 'Data Poor Trend (DPT)' - to indicate whether the low confidence in the assessment is due to difficulty in determining the identity of the taxon in the field and/or in the laboratory, because of a lack of data on population size or because of a lack of data on population trend.
- The qualifier 'Population Fragmentation (PF)' indicates that gene flow between sub-populations is hampered as a direct or indirect result of human activity.
- The qualifier 'Possibly extinct (PE)' indicates that a taxon has not been observed for more than 50 years and may be extinct but there has been insufficient search effort to formally declare it extinct.

These additions to the methodology aim to better inform conservation management for prioritisation purposes and future research.

2. Summary

This report presents the conservation status of all known New Zealand native lizard (gecko and skink) and tuatara taxa, as well as migrant, vagrant and introduced species including marine turtles and sea snakes. It is the latest update in a regular series of re-assessments (Hitchmough 2002; Hitchmough et al. 2007, 2010, 2013, 2016). In 2015, Hitchmough et al. (2016) assessed the conservation status of 117 New Zealand reptile taxa using the criteria specified in the New Zealand Threat Classification System (NZTCS) manual (Townsend et al. 2008). Here we report on a new assessment of 135 reptile taxa which includes 18 taxa being assessed for the first time.

2.1 Changes to the list of taxa

The list of reptiles assessed includes one tuatara species, 76 endemic skink species (genus *Oligosoma*), 48 endemic gecko species (genera *Hoplodactylus*, *Woodworthia*, *Tukutuku*, *Toropuku*, *Mokopirirakau*, *Dactylocnemis* and *Naultinus*), 5 marine turtle species, 4 sea snake and sea krait species, and 1 introduced skink. In this context, the term 'species' is used loosely to include undescribed entities which still require formal taxonomic research to confirm their validity and provide them with a formal name. These species carry the tag 'Taxonomically Unresolved'. Occasionally, described species whose validity is in question also carry this tag.

The addition of 18 taxa (Table 1) and changes to the names of 14 taxa (Table 2) mostly reflect the results of ongoing phylogenetic research that is revealing a greater amount of diversity amongst skink and gecko species than was previously recognised. For example, *Hoplodactylus duvaucelii*

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

NAME AND AUTHORITY	COMMON NAME	FAMILY	NOTES
<i>Hoplodactylus duvaucelii</i> "southern" Dumeril & Bibron, 1836	southern Duvaucel's gecko	Diplodactylidae	New split from <i>H. duvaucelii</i>
<i>Mokopirirakau galaxias</i> Knox et al., 2021	hura te ao gecko	Diplodactylidae	New discovery
<i>Oligosoma</i> "rockhopper"	rockhopper skink	Scincidae	New discovery
<i>Oligosoma</i> aff. <i>chloronoton</i> "eastern Otago"	Otago green skink	Scincidae	New split from <i>O. chloronoton</i>
<i>Oligosoma</i> aff. <i>chloronoton</i> "Stewart Island"	Stewart Island green skink	Scincidae	New split from <i>O. chloronoton</i>
<i>Oligosoma</i> aff. <i>inconspicuum</i> "Big Bay"	Big Bay skink	Scincidae	New split from <i>O. inconspicuum</i>
<i>Oligosoma</i> aff. <i>inconspicuum</i> "herbfield"	herbfield skink	Scincidae	New split from <i>O. inconspicuum</i>
<i>Oligosoma</i> aff. <i>inconspicuum</i> "Humboldt"	Humboldt skink	Scincidae	New split from <i>O. inconspicuum</i>
<i>Oligosoma</i> aff. <i>inconspicuum</i> "mahogany"	mahogany skink	Scincidae	New split from <i>O. inconspicuum</i>
<i>Oligosoma</i> aff. <i>inconspicuum</i> "pallid"	pallid skink	Scincidae	New split from <i>O. inconspicuum</i>
<i>Oligosoma</i> aff. <i>waimatense</i> "alpine rock"	alpine rock skink	Scincidae	New discovery
<i>Oligosoma</i> aff. <i>waimatense</i> "Marlborough"	Marlborough scree skink	Scincidae	New split from <i>O. waimatense</i>
<i>Oligosoma auroaraense</i> Melzer et al., 2019	Hawke's Bay skink	Scincidae	New split from <i>O. infrapunctatum</i>
<i>Oligosoma infrapunctatum</i> Boulenger, 1887	speckled skink	Scincidae	Re-examination of type specimen
<i>Oligosoma kahurangi</i> Patterson & Hitchmough, 2021	Kahurangi skink	Scincidae	New discovery
<i>Woodworthia</i> "Raggedy"	Raggedy Range gecko	Diplodactylidae	New split from <i>W. "Otago/Southernland large"</i>
<i>Woodworthia</i> "Southern Alps northern"	northern Southern Alps gecko	Diplodactylidae	New split from <i>W. "Southern Alps"</i>
<i>Woodworthia</i> "south-western"	south-western large gecko	Diplodactylidae	New split from <i>W. "Otago-Southernland large"</i>

Table 2. Name changes affecting New Zealand reptile taxa between the publication of Hitchmough et al. (2016) and this document.

NAME AND AUTHORITY IN HITCHMOUGH ET AL. 2016	NAME AND AUTHORITY IN THIS REPORT	COMMON NAME	FAMILY
<i>Hoplodactylus duvaucelii</i> (Dumeril & Bibron, 1836)	<i>Hoplodactylus duvaucelii</i> "northern" Dumeril & Bibron, 1836	northern Duvaucel's gecko	Diplodactylidae
<i>Nautinus</i> "North Cape"	<i>Nautinus flavirictus</i> Hitchmough et al., 2021	Aupouri gecko	Diplodactylidae
<i>Oligosoma</i> aff. <i>inconspicuum</i> "Okuru"	<i>Oligosoma</i> "Okuru"	Okuru skink	Scincidae
<i>Oligosoma</i> aff. <i>infrapunctatum</i> "Alborn"	<i>Oligosoma albornense</i> Meizer et al., 2019	Alborn Skink	Scincidae
<i>Oligosoma</i> sp. "Homer Tunnel"	<i>Oligosoma awakopaka</i> Jewell, 2017	awakopaka skink	Scincidae
<i>Oligosoma</i> aff. <i>lineoocellatum</i> "South Marlborough"	<i>Oligosoma elium</i> Meizer et al., 2017	south Marlborough spotted skink	Scincidae
<i>Oligosoma</i> aff. <i>longipes</i> "Rangitata"	<i>Oligosoma hoparatea</i> Whitaker et al., 2018	white-bellied skink	Scincidae
<i>Oligosoma lineoocellatum</i> (Dumeril & Dumeril, 1851)	<i>Oligosoma kokowai</i> Meizer et al., 2017	northern spotted skink	Scincidae
<i>Oligosoma</i> aff. <i>lineoocellatum</i> "Central Canterbury"	<i>Oligosoma lineoocellatum</i> (Dumeril & Duméril 1851)	Canterbury spotted skink	Scincidae
<i>Oligosoma infrapunctatum</i> (Boulenger, 1887)	<i>Oligosoma newmani</i> Wells & Wellington, 1985	Newman's speckled skink	Scincidae
<i>Oligosoma</i> aff. <i>lineoocellatum</i> "Mackenzie Basin"	<i>Oligosoma prasinum</i> Meizer et al., 2017	Mackenzie skink	Scincidae
<i>Oligosoma</i> aff. <i>infrapunctatum</i> "crenulate"	<i>Oligosoma robinsoni</i> Wells & Wellington, 1985	crenulate skink	Scincidae
<i>Oligosoma</i> aff. <i>infrapunctatum</i> "Chesterfield"	<i>Oligosoma salmo</i> Meizer et al., 2019	Kapiti skink	Scincidae
<i>Toropuku</i> "Coromandel"	<i>Toropuku inexpectatus</i> Hitchmough et al., 2020	northern striped gecko	Diplodactylidae

is now recognised as comprising two distinct clades that probably merit species-level distinction. In this report, they are tag-named *H. duvaucelii* “northern” and *H. duvaucelii* “southern”. Previous assessments of *H. duvaucelii* have been arbitrarily assigned to *H. duvaucelii* “northern” (which has the larger population) and *H. duvaucelii* “southern” has been added to the list. It is recognised that this and future assessments of *H. duvaucelii* “northern” represent a narrower taxonomic concept and, therefore, a smaller total population than was previously assessed.

Ongoing research has indicated that subclades within *Woodworthia* “Otago-Southland large” (large heavy-bodied populations from south of the Kawarau/Clutha Rivers and Old Man Range and in eastern Fiordland, and small-bodied populations from the northern Raggedy Range and areas to the north and east) and *W.* “Southern Alps” (populations from the Arthurs Pass area northwards) are likely to merit recognition as species in their own right, as they diverge at a genetic distance similar to that among species in related genera, are morphologically diagnosable, and meet their sister taxa at abrupt boundaries without evidence of extensive genetic exchange. Therefore, three additional *Woodworthia* taxa were added (Table 1).

The Coromandel striped gecko was formally described as *Toropuku inexpectatus* by Hitchmough et al. (2020). A formal description of the unnamed gecko, *Naultinus* “North Cape”, was published shortly before this report went to press (see Hitchmough et al. 2021). It is now *Naultinus flavivinctus* Hitchmough et al. 2021. The Lonely Lake skink has also very recently been formally described as *Oligosoma kahurangi* Patterson & Hitchmough, 2021. Most recently, the hura te ao (southern black-eyed) gecko has been described as *Mokopirirakau galaxias* by Knox et al. (2021).

One taxon that was reported on in Hitchmough et al. (2016) – the extinct *Hoplodactylus delcourti* – has been removed from the list of New Zealand geckos because evidence to support its inclusion as a New Zealand taxon is lacking. *Hoplodactylus delcourti* is based on a single very large gecko specimen (snout-to-vent length (SVL) of 370 mm) of unknown provenance in the Marseilles Museum in France. The specimen resembled *Hoplodactylus* and was, therefore, presumed to be of New Zealand origin. The specimen was also thought to support accounts by Māori and early European settlers of very large lizards (kawekaweau) in New Zealand. However, there is growing evidence that all large geckos in pre-human New Zealand were *H. duvaucelii* sensu lato and that *H. delcourti* is most likely not from this country but of New Caledonian origin (Worthy 2016).

The addition of speckled skink, *Oligosoma infrapunctatum*, as a ‘new’ taxon warrants explanation. The name *O. infrapunctatum* has historically been applied to populations from the northern and western South Island and Cook Strait Islands, but re-examination of the type specimen of *O. infrapunctatum* has revealed that it is a different taxon of unknown provenance. Therefore, populations that were previously referred to as *O. infrapunctatum* have been formally renamed *O. newmani* (Newman’s speckled skink; Melzer et al. 2019) and a ‘new’ listing has been made for *O. infrapunctatum*. As part of the same taxonomic revision, *Oligosoma auroraense*, from Hawkes Bay, was recognised as a new species (Melzer et al. 2019).

Oligosoma pachysomaticum, a species described in the 1970s and then quickly included within *O. oliveri*, was recently resurrected as a species in its own right (Jewell 2019). Although acceptance of the validity of this move has been very mixed, we listed the species here (in line with the required precautionary approach of the NZTCS, which aims to avoid the species becoming extinct as a result of taxonomic error, so includes all possible species in the list), tagged ‘Taxonomically Unresolved’ to reflect this uncertainty.

An informal proposal for recognition of seven entities within what is currently *Oligosoma inconspicuum* has been circulated in the New Zealand herpetological community. For some of the entities, support appears extremely strong, including them having been found in sympatry. For others there is little information and much more work is required. However, following the precautionary approach outlined above, all are listed here as separate entities. One of them (the Oteake skink, *O.* “North Otago”) was already listed by Hitchmough et al. (2016), as was *O. inconspicuum* itself.

Work is underway on formalising a four-way split within the *Oligosoma chloronoton* species complex. The most genetically divergent subclade has previously been listed separately as the Lakes skink, *O. aff. chloronoton* “Western Otago” (Hitchmough et al. 2016). Eastern Otago and Stewart Island entities are given their own listings here, leaving *O. chloronoton* confined to mainland Southland and some Foveaux Strait islands. This narrower circumscription, along with observations of severe decline, has led to it now being regarded as much more severely threatened than it previously was.

Four of the new listings are completely new discoveries since the last assessment in 2015: two skinks and a gecko from north Otago and a skink from the alpine zone of Kahurangi National Park. One of the skinks from Otago is related to *O. waimatense*, but has now been found in sympatry with it. This has resulted in a re-assessment of the likely significance of the divergence between the northern and southern clades of *O. waimatense*, and the listing of the Marlborough populations as a separate taxonomically unresolved entity.

2.2 Trends

Of the 135 taxa assessed in this report, 49 are Threatened, 67 are At Risk and five are Not Threatened (Table 3). New information on four taxa previously assessed as Data Deficient was sufficient to determine their conservation status in this assessment (Section 3.1, Table 6). *Oligosoma aff. infrapunctatum* “Hokitika” (Hokitika skink) and *Oligosoma awakopaka* (awakopaka skink) are assessed as Threatened – Nationally Critical, *Mokopirirakau* “Okarito” (broad-cheeked gecko) as Threatened – Nationally Vulnerable, and *Oligosoma aff. inconspicuum* “North Otago” (Oteake skink) as Threatened – Nationally Vulnerable.

Table 3. Comparison of the number of species of New Zealand reptile taxa assessed in each status category in 2015 (Hitchmough et al. 2016) and 2021 (this document).

CATEGORY	2015	2021
Extinct	2	1
Data Deficient	7	4
Threatened – Nationally Critical	8	10
Threatened – Nationally Endangered	8	16
Threatened – Nationally Vulnerable	21	22
Threatened – Nationally Increasing ¹	0	1
At Risk – Declining	27	49
At Risk – Recovering	4 ²	3
At Risk – Relict	11	8
At Risk – Naturally Uncommon	10	7
Not Threatened	10	5
Non-resident Native – Migrant	2	2
Non-resident Native – Vagrant	6	6
Introduced and Naturalised	1	1
Grand Total	117	135

¹ Threatened – Nationally Increasing is a new name and category for what was previously named At Risk – Recovering A.

² This figure represents the number of At Risk – Recovering B taxa from Hitchmough et al. (2016).

The population trend in each category in Hitchmough et al. (2016) and this assessment are summarised and compared in Figure 1. In this assessment, populations of c. 70% of taxa (89 of 125) are expected to decrease over their next three generations compared with 46% (49 of 106) in the assessment of Hitchmough et al. (2016). Populations of fewer taxa are also expected to remain stable over three generations, 21% (26 of 125) in 2021, compared with 42% (45 of 106) in 2015. In this assessment, populations of six taxa are expected to increase over three generations whereas populations of five taxa were expected to increase in the assessment of Hitchmough et al. (2016).

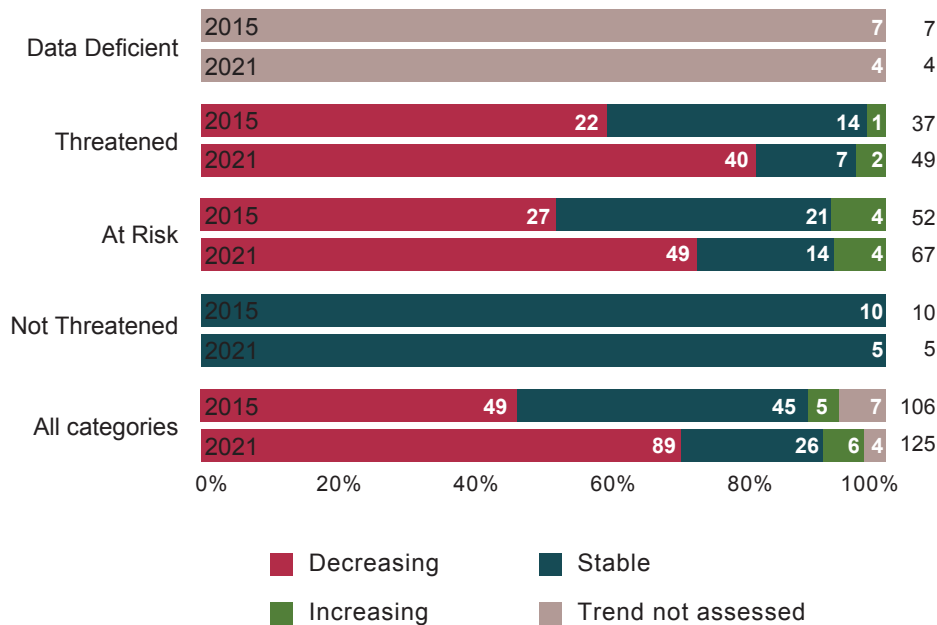


Figure 1. Statistical comparison of the population trend of New Zealand reptile taxa assessed in 2015 (Hitchmough et al. 2016) and in 2021 (this document). For example, in the 2015 assessment, 22 Threatened taxa had a declining trend, 14 were stable and 1 was increasing. In the 2021 assessment, 40 Threatened taxa had a declining trend, 7 were stable and 2 were increasing. 'All categories' does not include species assessed as Extinct, Migrant, Vagrant or Introduced and Naturalised.

Mokopirirakau nebulosus (cloudy gecko) was assessed by Hitchmough et al. (2016) as having an increasing population, but in this report, it is assessed as having an overall roughly stable population, so is moved from At Risk - Recovering to At Risk - Relict. The balance of population size and trend between small islands with dense, presumably stable populations, and much larger islands with extremely sparse, presumably declining populations (Stewart Island), and sparse but presumably slowly recovering populations (e.g. Whenua Hou/Codfish Island) is very difficult to assess to estimate an overall population trend. More than 20 years after pest eradication, the species is still seldom seen on Whenua Hou and does not appear to be recovering rapidly. The assumption that this subpopulation would be recovering well underlay the previous assessment of this species as Recovering.

The conservation status of 22 taxa has changed between the 2015 assessment (Hitchmough et al. 2016) and this one, because of more knowledge about the state of populations (13 taxa) and reinterpretation of the data used for previous assessments (9 taxa) (Tables 4 and 5).

Of the 20 taxa for which the conservation status has worsened, 11 were assessed as experiencing an actual decline. Large population declines have been observed in parts of the range of *Oligosoma chloronoton* (green skink), and one subpopulation has become extinct. *O. chloronoton* is a large skink found mostly in lowland areas and it is highly susceptible to invasive predators. Its conservation status has, therefore, changed from At Risk - Declining to Threatened - Nationally Critical. A narrowed circumscription also contributed to this changed status.

Table 4. Summary of changes to the number of taxa in each conservation status between 2015 (Hitchmough et al. 2016) and 2021 (this report). A 'neutral' change is any movement into or out of Data Deficient.

TYPE OF CHANGE, REASON, CONSERVATION STATUS	TAXA
BETTER	9
More knowledge	8
Threatened – Nationally Endangered	2
Threatened – Nationally Vulnerable	1
At Risk – Declining	4
At Risk – Naturally Uncommon	1
Reinterpretation of data	1
Not Threatened	1
WORSE	20
Actual decline	11
Threatened – Nationally Critical	2
Threatened – Nationally Endangered	2
Threatened – Nationally Vulnerable	1
At Risk – Declining	6
More knowledge	1
Threatened – Nationally Endangered	1
Reinterpretation of data	8
Threatened – Nationally Endangered	1
Threatened – Nationally Vulnerable	1
At Risk – Declining	5
At Risk – Relict	1
NO CHANGE	84
Extinct	1
Data Deficient	3
Threatened – Nationally Critical	5
Threatened – Nationally Endangered	7
Threatened – Nationally Vulnerable	13
At Risk – Declining	26
At Risk – Recovering	3
At Risk – Relict	7
At Risk – Naturally Uncommon	6
Not Threatened	4
Non-resident Native – Migrant	2
Non-resident Native – Vagrant	6
Introduced and Naturalised	1
NEUTRAL	4
More knowledge	4
Threatened – Nationally Critical	2
Threatened – Nationally Vulnerable	2
NEW LISTING	18
Data Deficient	1
Threatened – Nationally Critical	1
Threatened – Nationally Endangered	3
Threatened – Nationally Vulnerable	4
Threatened – Nationally Increasing ¹	1
At Risk – Declining	8
Total	135

¹ Threatened – Nationally Increasing is a new name and category for what was previously named At Risk – Recovering A.

The status of *Oligosoma elium* (south Marlborough spotted skink) and *Naultinus rudis* (rough gecko) changed from Threatened – Nationally Vulnerable to Threatened – Nationally Endangered. Populations of *O. elium* have decreased due to habitat modification and loss following the 2016 Kaikōura earthquake in its coastal range, as well as increased weed and potential invasive predator pressure in its island range. *Naultinus rudis* was the least surveyed *Naultinus* species until recently, and although significant new populations have been found, its global population is facing numerous threats including habitat modification, inferred predation and competition from vespulid wasps (observations suggest invasive *Vespula* wasps are a serious threat to lizards, particularly but not only in honeydew beech forests; research is urgently required), vegetation clearance, fire, conversion to forestry and impacts of earthquakes.

Oligosoma stenotis (small-eared skink), limited to high altitude herbfields and fractured rock slabs on Stewart Island, was previously thought to have a stable population, benefitting from the conservation management (pest control) for southern New Zealand dotterel (*Charadrius obscurus obscurus*), but recent opportunistic observations suggest that significant decline has occurred. The status of *O. stenotis* has changed from At Risk – Nationally Uncommon to Threatened – Nationally Vulnerable.

The status of *Oligosoma robinsoni* (crenulate skink) has changed from At Risk – Relict to At Risk – Declining because its population is inferred to be in ongoing decline in mainland parts of its range where mammalian predators are prevalent, and rodents have invaded Mokoia Island, a former pest-free stronghold.

Six previously Not Threatened taxa are now assessed as At Risk – Declining. They are the geckos *Woodworthia* “Southern Alps” (Southern Alps gecko), *Woodworthia* “southern mini” (short-toed gecko), *Woodworthia* “Marlborough mini” (minimac gecko) and *Woodworthia* “pygmy” (pygmy gecko) and the skinks *Oligosoma notosaurus* (southern skink) and *Oligosoma aeneum* (copper skink). These changes result from observations of noticeable decline and/or habitat loss at sites which have been visited over long periods, and for some species from inferences based on observed declines in ecologically similar, closely related species plus knowledge of the impacts of invasive predator irruptions on the ecosystem in general. An understanding that invasive predator impacts are likely to increase in the future under the influence of climate change, particularly at high altitude sites, also influenced these decisions. Some At Risk – Declining species remain extremely abundant; membership of this category is driven by population trend, not size. Decline is measured over three generations or 10 years, whichever is longer. The generation time is the average age of mothers of the next generation, so in long-lived, slow reproducing species the overall assessment period is often 40 years or more. Very small but ongoing annual declines can then accumulate over these long assessment periods to trigger listing in this category.

Of the 18 newly listed taxa, one is Threatened – Nationally Critical, three are Threatened – Nationally Endangered, four are Threatened – Nationally Vulnerable, one is Threatened – Nationally Increasing, and eight are At Risk – Declining.

The four newly discovered taxa (i.e. discovered within the last 5 years) obviously have had little opportunity for further work to determine their true distributions, and additional undiscovered subpopulations are possible. However, the very fact that they have never been seen before indicates that they are genuinely rare, highly cryptic and/or occupying largely inaccessible or poorly known environments. Using the precautionary principle, they are listed on the basis of current knowledge of their distributions and numbers, but with low confidence indicated by Data Poor qualifiers.

Oligosoma infrapunctatum (speckled skink) is known only from the single type specimen, and its collection locality is unknown. This lack of locality information makes assessing its conservation status impossible, so it is assessed here as Data Deficient (Table 5). Since it has not been knowingly seen for well over a century it also carries the qualifier Possibly Extinct.

Table 5. Summary of status changes of reptile taxa between 2015 (data in rows, Hitchmough et al. 2016 and 2021 (data in columns, this report). Numbers to the right of the diagonal (shaded in pale grey) indicate improved status (e.g. one taxon has moved from At Risk – Relict in 2015 to Not Threatened in 2021), numbers to the left of the diagonal (shaded in mid grey) indicate poorer status, numbers on the diagonal (shaded dark grey) have not changed, and numbers without shading are either taxa that have moved into or out of Data Deficient, taxa added to this assessment, or taxa that have not been assessed (NA) because they are now known not to occur in New Zealand.

		Conservation status 2021															
		Total 135	DD 4	Ext 1	NC 10	NE 16	NV 22	NI ¹ 1	Dec 49	Rec 3	Rel 8	NU 7	NT 5	Mig 2	Vag 6	IN 1	NA ² 1
Conservation status 2015	Data Deficient (DD)	7	3		2		2										
	Extinct (Ext)	2		1													1
	Threatened – Nationally Critical (NC)	8			5	2	1										
	Threatened – Nationally Endangered (NE)	8				7			1								
	Threatened – Nationally Vulnerable (NV)	21			1	4	13		3								
	Threatened – Nationally Increasing (NI)	0						0									
	At Risk – Declining (Dec)	27							26								
	At Risk – Recovering (Rec)	4			1					3	1						
	At Risk – Relict (Rel)	11 ³					1		2		7	1	1				
	At Risk – Naturally Uncommon (NU)	10					1		3			6					
	Not Threatened (NT)	10							6				4				
	Non-resident Native – Migrant (Mig)	2												2			
	Non-resident Native – Vagrant (Vag)	6													6		
	Introduced and Naturalised (IN)	1															1
	Not listed	18	1		1	3	4	1	8								

¹ Threatened – Nationally Increasing is a new name and category for what was previously named At Risk – Recovering A.

² NA = Not Assessed. This applies to the extinct *Hoplodactylus delcourti*, which is now understood to have never occurred in New Zealand. This species was therefore not counted in the total number of species being assessed in 2021.

³ A total of 11 species were listed as ‘Relict’ in Hitchmough et al. 2016. Of these one species *Hoplodactylus duvaucelii* was split into two clades (“southern” and “northern”) for the purpose of the 2021 assessment. This row, however, sums up to 12 species previously assessed as “Relict”; this is because *Oligosoma pachysomaticum* was not assessed in 2015. It was last assessed in 2005 and then in this report.

3. Conservation status of New Zealand reptiles

Taxa are assessed according to the criteria of Townsend et al. (2008), grouped by conservation status, then alphabetically by scientific name. For non-endemic species that are threatened internationally, the IUCN category is listed alongside the NZTCS listing. Categories are ordered by degree of loss, with Extinct at the top of the list and Not Threatened at the bottom, above Introduced and Naturalised. The Data Deficient list is inserted between Extinct and Threatened. Although the true status of Data Deficient taxa will span the entire range of available categories, taxa are in that list mainly because they are very seldom seen, so most are likely to end up being considered threatened and some may already be extinct. The Data Deficient list is likely to include many of the most threatened species in New Zealand, as search for many of these species has repeatedly failed to resight them.

Brief descriptions of the NZTCS categories and criteria are provided in section 2.2. See Townsend et al. (2008) for full definitions of categories, criteria and qualifiers, and explanation of the assessment process (<https://www.doc.govt.nz/globalassets/documents/science-and-technical/sap244.pdf>).

3.1 Assessments

The conservation status of 135 New Zealand reptile taxa is presented in Table 6. The full data for the taxa listed in this table can be viewed and downloaded at <https://nztcs.org.nz/reports/1083>.

Table 6. Conservation status of New Zealand reptiles.

NAME AND AUTHORITY	COMMON NAME	FAMILY	CRITERIA	QUALIFIERS	STATUS CHANGE
EXTINCT (1)					
<i>Taxonomically Determinate (1)</i>					
<i>Oligosoma northlandi</i> (Worthy, 1991)	Northland skink	Scincidae			No change
DATA DEFICIENT (4)					
<i>Taxonomically Determinate (1)</i>					
<i>Oligosoma infrapunctatum</i> Boulenger, 1887	speckled skink	Scincidae	PE		New listing
<i>Taxonomically Unresolved (3)</i>					
<i>Mokopirirakau</i> "Cupola"	Cupola gecko	Diplodactylidae			No change
<i>Oligosoma</i> "Okuru"	Okuru skink	Scincidae	PE		No change
<i>Oligosoma</i> aff. <i>infrapunctatum</i> "Westport"	Westport skink	Scincidae			No change
THREATENED (49)					
NATIONALLY CRITICAL (10)					
<i>Taxonomically Determinate (6)</i>					
<i>Oligosoma albomense</i> Melzer et al., 2019	Albom Skink	Scincidae	A(1)	OL	No change
<i>Oligosoma awakopaka</i> Jewell, 2017	awakopaka skink	Scincidae	A(1)	CI, DPS, DPT, OL	Neutral
<i>Oligosoma chloronoton</i> (Hardy, 1977)	green skink	Scincidae	C	CD, PD	Worse
<i>Oligosoma hoparātea</i> Whitaker et al., 2018	white-bellied skink	Scincidae	A(1)	RR, Sp	No change
<i>Oligosoma kahurangi</i> Patterson & Hitchmough 2021	Kahurangi skink	Scincidae	A(3)	CI, CR, DPS, DPT	New listing
<i>Oligosoma salmo</i> Melzer et al., 2019	Kapitiia skink	Scincidae	A(1)	CI, CD, OL	No change
<i>Taxonomically Unresolved (4)</i>					
<i>Oligosoma</i> "Whirinaki"	Whirinaki skink	Scincidae	A(3)	CI, CD, CR, OL	No change
<i>Oligosoma</i> aff. <i>infrapunctatum</i> "cobble"	cobble skink	Scincidae	A(1)	CI, CD, CR, DPS, DPT, EW	No change
<i>Oligosoma</i> aff. <i>infrapunctatum</i> "Hokitika"	Hokitika skink	Scincidae	A(1)	CI, DPR, DPS, DPT	Neutral
<i>Oligosoma</i> aff. <i>infrapunctatum</i> "Southern North Island"	Kupe skink	Scincidae	B(2)	CI, CD, CR, DPT, PD, PF	Worse
NATIONALLY ENDANGERED (16)					
<i>Taxonomically Determinate (14)</i>					
<i>Nautilinus rudis</i> (Fischer, 1882)	rough gecko	Diplodactylidae	C(2)	CI, CR, Sp	Worse
<i>Mokopirirakau galaxias</i> Knox et al., 2021	hura te ao gecko	Diplodactylidae	A(3)	CI, DPS, DPT	New listing
<i>Oligosoma auroraense</i> Melzer et al., 2019	Hawke's Bay skink	Scincidae	B(3)	CI, CD, OL, PD	New listing
<i>Oligosoma burganae</i> Chapple et al., 2011	Burgan skink	Scincidae	C(1)	CI, DPT, RR, Sp	Better
<i>Oligosoma elium</i> Melzer et al., 2017	south Marlborough spotted skink	Scincidae	C(1)	CI, CD, Sp DPS, DPT, PD	Worse
<i>Oligosoma grande</i> (Gray, 1845)	grand skink	Scincidae	B(1)	CI, CD, PD, RR	No change
<i>Oligosoma judgei</i> Patterson & Bell, 2009	Barrier skink	Scincidae	A(2)	CI, DPT, RR, Sp	No change

Continued on next page

Table 6 continued

NAME AND AUTHORITY	COMMON NAME	FAMILY	CRITERIA	QUALIFIERS	STATUS CHANGE
<i>Oligosoma levidensum</i> (Chapple et al., 2008)	slight skink	Scincidae	C(3)	CI, CR, DPS, DPT, PF, RR	Worse
<i>Oligosoma otagensense</i> (McCann, 1955)	Otago skink	Scincidae	B(1)	CD, RR	No change
<i>Oligosoma pikitanga</i> Bell & Patterson, 2008	Sinbad skink	Scincidae	A(1)	CI, DPS, DPT, OL	No change
<i>Oligosoma taumakae</i> Chapple & Patterson, 2007	Taumaka skink	Scincidae	B(1)	CD, RR	No change
<i>Oligosoma tekakahu</i> Chapple et al., 2011	Te Kakahu skink	Scincidae	B(3)	CI, CD	Better
<i>Oligosoma whitakeri</i> (Hardy, 1977)	Whitaker's skink	Scincidae	A(3)	CI, CD, DPT, RR	No change
<i>Tukutuku rakiurae</i> (Thomas, 1981)	Hartequin gecko	Diplodactylidae	C(1)	CI, DPS, DPT, RR	Worse
Taxonomically Unresolved (2)					
<i>Mokopirirakau</i> "Open Bay Islands"	Open Bay Islands gecko	Diplodactylidae	A(1)	CD, DPS, DPT, OL	No change
<i>Oligosoma</i> aff. <i>waimatense</i> "Marlborough"	Marlborough scree skink	Scincidae	C(2)	CI, DPS, DPT, PF, Sp	New listing
NATIONALLY VULNERABLE (22)					
Taxonomically Determinate (14)					
<i>Mokopirirakau cryptozoicus</i> (Jewell & Leschen, 2004)	Takitimu gecko	Diplodactylidae	C(2)	CI, DPS, DPT, Sp	No change
<i>Mokopirirakau kahutarae</i> (Whitaker, 1985)	black-eyed gecko	Diplodactylidae	C(2)	CI, DPS, DPT, RR, Sp	No change
<i>Naultinus stellatus</i> Hutton, 1872	starred gecko	Diplodactylidae	E(1)	CI, CR, DPS, Sp	No change
<i>Naultinus tuberculatus</i> (McCann, 1955)	West Coast green gecko	Diplodactylidae	C(2)	CI, DPS, DPT, Sp	No change
<i>Oligosoma acrinasum</i> (Hardy, 1977)	Fiordland skink	Scincidae	B(3)	CI, CD, RR	Worse
<i>Oligosoma homalonotum</i> (Boulenger, 1906)	chevron skink	Scincidae	C(1)	CI, CD, CR, DPT, RR	No change
<i>Oligosoma lineocellatum</i> (Duméril & Duméril 1851)	Canterbury spotted skink	Scincidae	D(1)	Sp, CI, DPS, DPT	No change
<i>Oligosoma longipes</i> Patterson, 1997	long-toed skink	Scincidae	C(2)	CI, DPR, DPS, DPT, RR, Sp	No change
<i>Oligosoma microlepis</i> (Patterson & Daugherty, 1990)	small-scaled skink	Scincidae	C(2)	PF, RR, Sp	No change
<i>Oligosoma prasinum</i> Melzer et al., 2017	Mackenzie skink	Scincidae	C(2)	CI, DPT, PF, RR	No change
<i>Oligosoma stenotis</i> (Patterson & Daugherty, 1994)	small-eared skink	Scincidae	D(3)	CI, DPS, DPT, RR, Sp	Worse
<i>Oligosoma waimatense</i> (McCann, 1955)	scree skink	Scincidae	D(1)	CI, Sp	No change
<i>Toropuku inexpectatus</i> Hitchmough et al., 2020	northern striped gecko	Diplodactylidae	C(2)	DPS, DPT, Sp	No change
<i>Toropuku stephensi</i> (Robb, 1980)	southern striped gecko	Diplodactylidae	B(1)	CD, DPS, RR	No change
Taxonomically Unresolved (8)					
<i>Mokopirirakau</i> "Okarito"	broad-cheeked gecko	Diplodactylidae	C(2)	DPR, DPS, DPT	Neutral
<i>Oligosoma</i> aff. <i>chloronoton</i> "Stewart Island"	Stewart Island green skink	Scincidae	C(3)	CI, CD, DPS, DPT, PD	New listing
<i>Oligosoma</i> aff. <i>chloronoton</i> "West Otago"	Lakes skink	Scincidae	C(2)	CI, DPS, DPT, PF, Sp	No change
<i>Oligosoma</i> aff. <i>inconspicuum</i> "Big Bay"	Big Bay skink	Scincidae	D(3)	DPS, DPT, RR	New listing
<i>Oligosoma</i> aff. <i>inconspicuum</i> "North Otago"	Oteake skink	Scincidae	C(3)	CI, DPT, OL	Neutral
<i>Oligosoma</i> aff. <i>waimatense</i> "alpine rock"	alpine rock skink	Scincidae	D(3)	CI, DPT, RR	New listing

Continued on next page

Table 6 continued

NAME AND AUTHORITY	COMMON NAME	FAMILY	CRITERIA	QUALIFIERS	STATUS CHANGE
<i>Woodworthia</i> "Raggedy"	Raggedy Range gecko	Diplodactylidae	C(3)	CI, DPT, RR	New listing
<i>Woodworthia</i> aff. <i>maculata</i> "Muriwai"	Muriwai gecko	Diplodactylidae	C(1)	CI, CR, DPS, DPT, RR	Better
NATIONALLY INCREASING (1)					
Taxonomically Unresolved (1)					
<i>Hoplodactylus duvaucelii</i> "southern" Dumeril & Bibron, 1836	southern Duvaucel's gecko	Diplodactylidae		CD, RR	New listing
AT RISK (67)					
DECLINING (49)					
Taxonomically Determinate (19)					
<i>Mokopirirakau granulatus</i> (Gray, 1845)	forest gecko	Diplodactylidae	C(2)	CI, CR, DPT, PD, PF	No change
<i>Naultinus elegans</i> Gray, 1842	elegant gecko	Diplodactylidae	C(2)	CI, CR, DPT, PD, PF	No change
<i>Naultinus flavivinctus</i> Hitchmough et al., 2021	Aupouri gecko	Diplodactylidae	C(2)	CI, CR, DPT, OL, PF	No change
<i>Naultinus gemmeus</i> (McCann, 1955)	jewelled gecko	Diplodactylidae	C(2)	CI, PD, PF	No change
<i>Naultinus grayii</i> Bell, 1843	Northland green gecko	Diplodactylidae	C(2)	CI, CR, DPS, DPT, PF	No change
<i>Naultinus manukanus</i> (McCann, 1955)	Marlborough green gecko	Diplodactylidae	B(2)	CD, CR, DPS, DPT, PD, PF	No change
<i>Naultinus punctatus</i> Gray, 1843	barking gecko	Diplodactylidae	C(2)	CI, DPT, PF	No change
<i>Oligosoma aeneum</i> (Girard, 1857)	copper skink	Scincidae	C(1)		Worse
<i>Oligosoma inconspicuum</i> (Patterson & Daugherty, 1990)	cryptic skink	Scincidae	C(2)	CI	No change
<i>Oligosoma newmani</i> Wells & Wellington, 1985	Newman's speckled skink	Scincidae	C(2)	CI, CD, PD, Sp	No change
<i>Oligosoma notosaurus</i> (Patterson & Daugherty, 1990)	southern skink	Scincidae	C(1)	CD, DPT, RR	Worse
<i>Oligosoma ornatum</i> (Gray, 1843)	ornate skink	Scincidae	C(2)	CD	No change
<i>Oligosoma repens</i> Chapple et al., 2011	Eyres skink	Scincidae	C(2)	DPR, DPT, RR, Sp	Better
<i>Oligosoma robinsoni</i> Wells & Wellington, 1985	crenulate skink	Scincidae	B(2)	CD, DPS, DPT, PD, PF	Worse
<i>Oligosoma smithi</i> (Gray, 1845)	shore skink	Scincidae	C(2)	CI, CD, DPT, PD	Worse
<i>Oligosoma striatum</i> (Buller, 1871)	striped skink	Scincidae	C(2)	CD, DPS, DPT, Sp	No change
<i>Oligosoma toka</i> Chapple et al., 2011	Nevis skink	Scincidae	C(2)	CI, DPT, RR	Better
<i>Oligosoma zelandicum</i> (Gray, 1843)	glossy brown skink	Scincidae	C(2)	CD, PD	No change
<i>Woodworthia chrysoiretica</i> (Robb, 1980)	goldstripe gecko	Diplodactylidae	C(2)	CD, DPS, DPT, PD, PF	Worse
Taxonomically Unresolved (30)					
<i>Dactylocnemis</i> "Matapia Island"	Matapia gecko	Diplodactylidae	C(2)	CI, CD, DPT, PD, PF, RR	No change
<i>Dactylocnemis</i> "North Cape"	Te Paiki gecko	Diplodactylidae	C(2)	CI, DPR, DPS, DPT, PD, PF, RR	No change
<i>Mokopirirakau</i> "Cascades"	cascade gecko	Diplodactylidae	C(2)	CI, DPT	No change
<i>Mokopirirakau</i> "Roys Peak"	orange-spotted gecko	Diplodactylidae	A(2)	CI, DPT, RR, Sp	Better
<i>Mokopirirakau</i> "southern forest"	Tautuku gecko	Diplodactylidae	C(2)	CI, DPT	Better

Continued on next page

Table 6 continued

NAME AND AUTHORITY	COMMON NAME	FAMILY	CRITERIA	QUALIFIERS	STATUS CHANGE
<i>Mokopirirakau</i> "southern North Island"	ngahere gecko	Diplodactylidae	C(2)	DP, DPR, PD	No change
<i>Oligosoma</i> "rockhopper"	rockhopper skink	Scincidae	B(2)	CI, DPS, DPT, RR	New listing
<i>Oligosoma</i> aff. <i>chloronotus</i> "eastern Otago"	Otago green skink	Scincidae	B(2)	CI, CD, DPS, DPT	New listing
<i>Oligosoma</i> aff. <i>inconspicuum</i> "herbfield"	herbfield skink	Scincidae	B(2)	CD, DPT, PF, RR	New listing
<i>Oligosoma</i> aff. <i>inconspicuum</i> "Humboldt"	Humboldt skink	Scincidae	B(2)	CI, DPS, DPT	New listing
<i>Oligosoma</i> aff. <i>inconspicuum</i> "mahogany"	mahogany skink	Scincidae	B(2)	CI, DPS, DPT, RR	New listing
<i>Oligosoma</i> aff. <i>inconspicuum</i> "pallid"	pallid skink	Scincidae	B(2)	CI, DPS, DPT, RR	New listing
<i>Oligosoma</i> aff. <i>longipes</i> "southern"	roamtimati skink	Scincidae	C(2)	DPR, DPT, RR, Sp	No change
<i>Oligosoma</i> aff. <i>smithi</i> "Three Kings, Te Pahi, Western Northland"	Tatahi skink	Scincidae	C(2)	CI, CD, PD, RR	No change
<i>Oligosoma</i> aff. <i>polychroma</i> Clade 2	Waiharakeke grass skink	Scincidae	B(2)	CD, DPR, PD, RR	No change
<i>Oligosoma</i> aff. <i>polychroma</i> Clade 3	south Marlborough grass skink	Scincidae	C(2)	DPR, DPS, DPT	No change
<i>Oligosoma</i> aff. <i>polychroma</i> Clade 4	Canterbury grass skink	Scincidae	C(2)	DPR	No change
<i>Oligosoma</i> aff. <i>polychroma</i> Clade 5	southern grass skink	Scincidae	C(2)	DPT	No change
<i>Woodworthia</i> cf. <i>brunnea</i> Cope, 1869	Waitaha gecko	Diplodactylidae	C(1)	PD	No change
<i>Woodworthia</i> "Central Otago"	schist gecko	Diplodactylidae	C(2)	CI, PD	No change
<i>Woodworthia</i> "Cromwell"	Kawarau gecko	Diplodactylidae	C(2)	CI, DPT	No change
<i>Woodworthia</i> "Kaikoura"	Kaikoura gecko	Diplodactylidae	A(1)	CI, DPR, DPS, DPT, RR, Sp	Worse
<i>Woodworthia</i> "Marlborough mini"	minimac gecko	Diplodactylidae	C(1)	DPT	Worse
<i>Woodworthia</i> "Mount Arthur"	Kahurangi gecko	Diplodactylidae	A(2)	CI, CR, DPR, DPT, RR, Sp	Worse
<i>Woodworthia</i> "Otago/Southern large"	korero gecko	Diplodactylidae	C(1)	PD	No change
<i>Woodworthia</i> "pygmy"	pygmy gecko	Diplodactylidae	C(1)	DPT	Worse
<i>Woodworthia</i> "south-western large"	south-western large gecko	Diplodactylidae	C(2)	CI, DPT, PD	New listing
<i>Woodworthia</i> "Southern Alps"	Southern Alps gecko	Diplodactylidae	C(1)		Worse
<i>Woodworthia</i> "southern mini"	short-toed gecko	Diplodactylidae	B(2)	CI, DPT	Worse
<i>Woodworthia</i> "Southern Alps northern"	northern Southern Alps gecko	Diplodactylidae	C(2)	CI	New listing
RECOVERING (3)					
Taxonomically Determinate (3)					
<i>Oligosoma alani</i> (Robb, 1970)	robust skink	Scincidae		CI, CD, RR	No change
<i>Oligosoma macgregori</i> (Robb, 1975)	McGregor's skink	Scincidae		CD, RR	No change
<i>Oligosoma townsi</i> (Chapple, Patterson, Gleeson, Daugherty, Fitchie, 2008)	Hauraki skink	Scincidae		CD, DPS, PD, RR	No change

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Table 6 continued

NAME AND AUTHORITY	COMMON NAME	FAMILY	CRITERIA	QUALIFIERS	STATUS CHANGE
RELICT (8)					
<i>Taxonomically Determinate (6)</i>					
<i>Mokopirirakau nebulosus</i> (McCann, 1955)	cloudy gecko	Diplodactylidae	B	CD, DPS, DPT, PD, RR	Worse
<i>Oligosoma kokowai</i> Meizer et al., 2017	northern spotted skink	Scincidae	A	CD, PD, Sp	No change
<i>Oligosoma moco</i> (Duméril & Bibron, 1939)	moko skink	Scincidae	B	CD, PD	No change
<i>Oligosoma nigriplantare</i> (Peters, 1873)	Chathams skink	Scincidae	A	CD, IE, PD, RR	No change
<i>Oligosoma suteri</i> (Boulenger, 1906)	egg-laying skink	Scincidae	B	CI, CD, PD, RR	No change
<i>Sphenodon punctatus</i> (Gray, 1842)	tuatara	Sphenodontidae	B	CI, CD, RR	No change
<i>Taxonomically Unresolved (2)</i>					
<i>Oligosoma pachysomaticum</i> (Robb, 1975)	southern marbled skink	Scincidae	A	CD	No change
<i>Hoplodactylus duvaucelii</i> "northern" Dumeril & Bibron, 1836	northern Duvaucel's gecko	Diplodactylidae	B	CD	No change
NATURALLY UNCOMMON (7)					
<i>Taxonomically Determinate (4)</i>					
<i>Oligosoma fallai</i> (McCann, 1955)	Falla's skink	Scincidae		CD, IE, RR	No change
<i>Oligosoma hardyi</i> (Chapple, Patterson, Bell & Daugherty, 2008)	Hardy's skink	Scincidae		CD, IE, OL	No change
<i>Oligosoma oliveri</i> (McCann, 1955)	marbled skink	Scincidae		CD, IE, OL	Better
<i>Oligosoma roimata</i> Patterson, Hitchmough & Chapple, 2013	Aorangi skink	Scincidae		CD, IE, OL	No change
<i>Taxonomically Unresolved (3)</i>					
<i>Dactylocnemis</i> "Mokohinau"	Mokohinau gecko	Diplodactylidae		CD, IE, RR	No change
<i>Dactylocnemis</i> "Poor Knights"	Poor Knights gecko	Diplodactylidae		CD, IE, RR	No change
<i>Dactylocnemis</i> "Three Kings"	Three Kings gecko	Diplodactylidae		CD, IE, RR	No change
NOT THREATENED (5)					
<i>Taxonomically Determinate (5)</i>					
<i>Dactylocnemis pacificus</i> (Gray, 1842)	Pacific gecko	Diplodactylidae		CD, DPR, PD	Better
<i>Hydrophis platurus</i> Linnaeus, 1766	yellow-bellied sea snake	Elapidae		DPT, DPS, SO	No change
<i>Oligosoma maccami</i> (Patterson & Daugherty, 1990)	McCann's skink	Scincidae			No change
<i>Oligosoma polychroma</i> (Patterson & Daugherty, 1990)	northern grass skink	Scincidae		CD	No change
<i>Woodworthia maculata</i> (Gray, 1845)	Raukawa gecko	Diplodactylidae		CD, PD	No change
NON-RESIDENT NATIVE (8)					
MIGRANT (2)					
<i>Taxonomically Determinate (2)</i>					
<i>Chelonia mydas</i> (Linnaeus, 1758) (IUCN: Endangered A2bd, ver 3.1, 2004)	green turtle	Cheloniidae		TO	No change

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Table 6 continued

NAME AND AUTHORITY	COMMON NAME	FAMILY	CRITERIA	QUALIFIERS	STATUS CHANGE
<i>Derموchelys coriacea</i> (Vandelli, 1761) (IUCN: Vulnerable A2bd, ver 3.1, 2013)	leatherback turtle	Derموchelyidae		TO	No change
VAGRANT (6)					
Taxonomically Determinate (6)					
<i>Caretta caretta</i> Linnaeus, 1758 (IUCN: Vulnerable A2bd, ver 3.1, 2015)	loggerhead turtle	Cheloniidae		DPS, DPT, TO	No change
<i>Eretموchelys imbricata</i> (Linnaeus, 1766) (IUCN: Critically Endangered A2bd, ver 3.1, 2008)	hawksbill turtle	Cheloniidae		DPS, DPT, TO	No change
<i>Laticauda colubrina</i> (Schneider, 1799)	yellow-lipped sea krait	Laticaudidae		DPS, DPT, SO	No change
<i>Laticauda laticaudata</i> Linnaeus 1758	brown lipped sea krait	Laticaudidae		DPS, DPT, SO	No change
<i>Laticauda saintgironsi</i> Cogger & Heatwole, 2005	Saint-Giron's sea krait	Laticaudidae		DPS, DPT, SO	No change
<i>Lepidochelys olivacea</i> (Eschscholtz, 1829) (IUCN: Vulnerable A2bd, ver 3.1, 2008)	olive ridley turtle	Cheloniidae		DPS, DPT, TO	No change
INTRODUCED AND NATURALISED (1)					
Taxonomically Determinate (1)					
<i>Lampropholis delicata</i> (De Vis, 1888)	plague skink	Scincidae			No change

3.2 NZTCS categories, criteria and qualifiers

See https://nzctcs.org.nz/content/NZTCS_QUALIFIERS, for details of criteria and qualifiers, which are abbreviated as follows:

CD	Conservation Dependent
CI	Climate Impact
CR	Conservation Research needed
De	Designated
DPR	Data Poor Recognition
DPS	Data Poor Size
DPT	Data Poor Trend
EF	Extreme Fluctuations
EW	Extinct in the Wild
IE	Island Endemic
Inc	Increasing
OL	One Location
PD	Partial Decline
PF	Population Fragmentation
PE	Possibly extinct
RF	Recruitment Failure
RR	Range Restricted
SO	Secure Overseas
Sp	Sparse
St	Stable
TO	Threatened Overseas

Extinct

Taxa for which there is no reasonable doubt – following repeated surveys in known or expected habitats at appropriate times (diurnal, seasonal and annual) and throughout the taxon’s historic range – that the last individual has died.

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

Criteria for Nationally Critical:

A – very small population (natural or unnatural)

A(1) <250 mature individuals

A(2) ≤2 subpopulations, ≤200 mature individuals in the larger subpopulation

A(3) Total area of occupancy ≤1 ha (0.01 km²)

B – small population (natural or unnatural) with a high ongoing or predicted decline

B(1) 250–1000 mature individuals, predicted decline 50–70%

B(2) ≤5 subpopulations, ≤300 mature individuals in the largest subpopulation, predicted decline 50–70%

B(3) Total area of occupancy ≤10 ha (0.1 km²), predicted decline 50–70%

C – population (irrespective of size or number of subpopulations) with a very high ongoing or predicted decline (>70%)

C Predicted decline >70%

Nationally Endangered

Criteria for Nationally Endangered:

A – small population (natural or unnatural) that has a low to high ongoing or predicted decline

A(1) 250-1000 mature individuals, predicted decline 10-50%

A(2) ≤5 subpopulations, ≤300 mature individuals in the largest subpopulation, predicted decline 10-50%

A(3) Total area of occupancy ≤10 ha (0.1 km²), predicted decline 10-50%

B – small stable population (unnatural)

B(1) 250-1000 mature individuals, stable population

B(2) ≤5 subpopulations, ≤300 mature individuals in the largest subpopulation, stable population

B(3) Total area of occupancy ≤10 ha (0.1 km²), stable population

C – moderate population and high ongoing or predicted decline

C(1) 1000-5000 mature individuals, predicted decline 50-70%

C(2) ≤15 subpopulations, ≤500 mature individuals in the largest subpopulation, predicted decline 50-70%

C(3) Total area of occupancy ≤100 ha (1 km²), predicted decline 50-70%

Nationally Vulnerable

Criteria for Nationally Vulnerable:

A – small, increasing population (unnatural)

A(1) 250-1000 mature individuals, predicted increase >10%

A(2) ≤5 subpopulations, ≤300 mature individuals in the largest subpopulation, predicted increase >10%

A(3) Total area of occupancy ≤10 ha (0.1 km²), predicted increase >10%

B – moderate, stable population (unnatural)

B(1) 1000-5000 mature individuals, stable population

B(2) ≤15 subpopulations, ≤500 mature individuals in the largest subpopulation, stable population

B(3) Total area of occupancy ≤100 ha (1 km²), stable population

C – moderate population, with population trend that is declining

C(1) 1000-5000 mature individuals, predicted decline 10-50%

C(2) ≤15 subpopulations, ≤500 mature individuals in the largest subpopulation, predicted decline 10-50%

C(3) Total area of occupancy ≤100 ha (1 km²), predicted decline 10-50%

D – moderate to large population and moderate to high ongoing or predicted decline

D(1) 5000-20000 mature individuals, predicted decline 30-70%

D(2) ≤15 subpopulations, ≤1000 mature individuals in the largest subpopulation, predicted decline 30-70%

D(3) Total area of occupancy ≤1000 ha (10 km²), predicted decline 30-70%

E – large population and high ongoing or predicted decline

E(1) 20000-100000 mature individuals, predicted decline 50-70%

E(2) Total area of occupancy ≤10000 ha (100 km²), predicted decline 50-70%

Nationally Increasing

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

Criteria for Nationally Increasing:

Taxa that have undergone a documented decline within the last 1000 years to a population size of 1000–5000 mature individuals or total area of occupancy ≤ 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 next 10 years or three generations, whichever is longer.

Taxa that are increasing but have a population size of <1000 mature individuals (or 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

Taxa that meet the criteria specified by Townsend et al. (2008) for Declining, Recovering, Relict and Naturally Uncommon.

Declining

Criteria for Declining:

A – moderate to large population and low ongoing or predicted decline

A(1) 5000–20000 mature individuals, predicted decline 10–30%

A(2) Total area of occupancy ≤ 1000 ha (10 km²), predicted decline 10–30%

B – large population and low to moderate ongoing or predicted decline

B(1) 20000–100000 mature individuals, predicted decline 10–50%

B(2) Total area of occupancy ≤ 10000 ha (100 km²), predicted decline 10–50%

C – very large population and low to high ongoing or predicted decline

C(1) >100000 mature individuals, predicted decline 10–70%

C(2) Total area of occupancy >10000 ha (100 km²), predicted decline 10–70%

Recovering

Taxa that have undergone a documented decline within the last 1000 years to a population size of 5000–20000 mature individuals or total area of occupancy ≤ 1000 ha (10 km²), and now have an ongoing or predicted increase of >10% in the total population or area of occupancy, taken over the next 10 years or three generations, whichever is longer.

Taxa that are increasing but have a population size of <5000 mature individuals (or total area of occupancy of <100 ha) are listed in one of the Threatened categories, depending on their population size (for more details see the description of Nationally Increasing, above and Townsend et al. (2008)).

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 5000–20000 mature individuals; population stable ($\pm 10\%$)

B >20000 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 distribution is confined to a specific geographical area or which occur within naturally small and widely scattered populations, where this distribution is not the result of human disturbance.

Non-resident Native

Taxa whose natural presence in New Zealand is either discontinuous (Migrant) or sporadic or temporary (Vagrant) or which have succeeded in recently (since 1950) establishing a resident breeding population (Coloniser).

Migrant

Taxa that predictably and cyclically visit New Zealand as part of their normal life cycle (a minimum of 15 individuals known or presumed to visit per annum) but do not breed here.

Vagrant

Taxa whose occurrences, though natural, are sporadic and typically transitory, or migrants with fewer than 15 individuals visiting New Zealand per annum.

Coloniser

Taxa that otherwise trigger Threatened categories because of small population size but have arrived in New Zealand without direct or indirect help from humans and have been successfully reproducing in the wild only since 1950.

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 New Zealand by human agency.

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