



NEW ZEALAND THREAT CLASSIFICATION SERIES 10

Conservation status of New Zealand earthworms, 2014

Thomas R. Buckley, Stéphane Boyer, Scott Bartlam, Rod Hitchmough, Jeremy Rolfe and Ian Stringer

Cover: *Megascolides equestris*, Aorangi Island, Poor Knights Islands. Photo: David Seldon.

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 3 years. After each three-year cycle there will be a report analysing and summarising trends across all groups for that listing cycle. From time to time the manual that defines the categories, criteria and process for the NZTCS will be reviewed. Publications in this series are considered part of the formal international scientific literature.

This report is available from the departmental website in pdf form. Titles are listed in our catalogue on the website, refer www.doc.govt.nz under *Publications*, then *Science & technical*.

© Copyright May 2015, New Zealand Department of Conservation

ISSN 2324-1713 (web PDF)

ISBN 978-0-478-15038-4 (web PDF)

This report was prepared for publication by the Publishing Team; editing and layout by Lynette Clelland. Publication was approved by the Deputy Director-General, Science and Capability, Department of Conservation, Wellington, New Zealand.

Published by Publishing Team, Department of Conservation, PO Box 10420, The Terrace, Wellington 6143, New Zealand.

In the interest of forest conservation, we support paperless electronic publishing.

CONTENTS

Abstract	1
<hr/>	
1. Summary	2
<hr/>	
2. Conservation status of New Zealand earthworms	3
<hr/>	
2.1 Taxonomically determinate	4
Extinct (0)	4
Data Deficient (99)	4
Threatened (0)	6
At Risk (32)	6
Declining (1)	6
Recovering (0)	7
Relict (0)	7
Naturally Uncommon (31)	7
Non-resident Native (0)	8
Not Threatened (40)	8
Introduced and Naturalised (2)	9
2.2 Taxonomically indeterminate	10
Data Deficient (6)	10
3. Acknowledgements	10
<hr/>	
4. References	10
<hr/>	

Conservation status of New Zealand earthworms, 2014

Thomas R. Buckley¹, Stéphane Boyer², Scott Bartlam³, Rod Hitchmough⁴,
Jeremy Rolfe⁴ and Ian Stringer⁴

¹ Landcare Research New Zealand Ltd, Private Bag 92170, Auckland 1142, New Zealand.
buckleyt@landcareresearch.co.nz

² Department of Natural Sciences, Faculty of Social and Health Sciences, Unitec Institute of
Technology, Auckland, New Zealand.

³ Landcare Research New Zealand Ltd, Private Bag 3127, Waikato Mail Centre, Hamilton,
New Zealand.

⁴ Department of Conservation, PO Box 10420, Wellington 6143, New Zealand.

Abstract

The conservation status of all known New Zealand Megascolecoid earthworm taxa (179 taxa) was assessed using the New Zealand Threat Classification System (NZTCS). A full list is presented, along with a statistical summary and brief notes on the most important changes. 105 taxa are ranked Data Deficient, 1 Declining, 31 Naturally Uncommon, 40 Not Threatened and 2 Introduced and Naturalised. This list replaces all previous NZTCS lists for earthworms.

Keywords: New Zealand Threat Classification System, NZTCS, conservation status, Acanthodrilidae, Megascolecidae

© Copyright May 2015, Department of Conservation. This paper may be cited as:

Buckley, T.R.; Boyer, S.; Bartlam, S.; Hitchmough, R.; Rolfe, J.; Stringer, I. 2015: Conservation status of New Zealand earthworms, 2014. *New Zealand Threat Classification Series 10*. Department of Conservation, Wellington. 10 p.

1. Summary

New Zealand Megascolecidae were last assessed in 2010 and included all taxa then described (Macfarlane et al. 2010; Buckley et al. 2012). Since then six endemic megascolecid earthworms have been described, comprising three each of Acanthodrilidae and Megascolecidae. Five of the newly described species are ranked as Data Deficient and one (*Deinodrilus gorgon* Boyer, Blackmore & Wratten 2011) as Declining (Table 1). Following its description in 2011 from a specimen from Happy Valley (Upper Waimangaroa Valley, Buller), *Deinodrilus gorgon* was recorded on the Stockton Plateau, the Denniston Plateau and the Barrytown flats near Punakaiki (Boyer 2013). Despite a potentially large distribution area on the West Coast, the best-documented section of its natural habitat is threatened by on-going and future mining activities on the Stockton and Denniston Plateaus. These activities are likely to cause a decline of the best-known population. The population recorded at Punakaiki is only present in a small and isolated pocket of remnant native vegetation, but there are large areas of unsurveyed potential habitat.

Exotic (Introduced and Naturalised) taxa have not been included in the assessment, but two species previously incorrectly considered to be native are included in the list.

Table 1. Names added to the NZTCS list of New Zealand Megascolecidae and Acanthodrilidae earthworms in this document that were not in the previous assessment (Buckley et al. 2012).

NAME AND AUTHORITY	FAMILY
<i>Aporodrilus aotea</i> Blakemore, 2011	Megascolecidae
<i>Aporodrilus ponga</i> Blakemore, 2011	Megascolecidae
<i>Deinodrilus gorgon</i> Boyer, Blakemore & Wratten 2011	Acanthodrilidae
<i>Maoridrilus felix</i> Boyer, Blakemore & Wratten 2011	Acanthodrilidae
<i>Notoscolex repanga</i> Blakemore, 2011	Megascolecidae
<i>Octochaetus kenleei</i> Boyer, Blakemore & Wratten 2011	Acanthodrilidae

Overall, 58.7% of the taxa are ranked as Data Deficient, 17.9% as At Risk and 22.3% as Not Threatened (Table 2). Of the 171 taxa assessed in 2010 (Buckley et al. 2012), the threat rankings of only two taxa have been changed: *Maoridrilus plumbeus* (Beddard, 1895) is now Naturally Uncommon whereas it was previously Data Deficient and *Maoridrilus transalpinus* Lee, 1959 is now Not Threatened whereas it was previously Data Deficient (Table 3). The change in status for *M. plumbeus* followed a reinterpretation of the data which indicates that this species is stable and restricted to its known range in western Waikato. Recent surveys and historic records have indicated that *M. transalpinus* is widespread (Manapouri, Mahinapua, Banks Peninsula, Lincoln, Taipo Valley, Jacks Pass and Arthur's Pass) and it has now been ranked as Not Threatened.

Table 2. Statistical summary of the status of New Zealand Megascolecidae and Acanthodrilidae earthworm species assessed in 2010 (Buckley et al. 2012) and 2014 (this document).

CATEGORY	BUCKLEY ET AL. 2012	BUCKLEY ET AL. 2015
Data Deficient	102	105
At Risk—Declining	0	1
At Risk—Naturally Uncommon	30	31
Not Threatened	39	40
Introduced and Naturalised	2	2
Total	173	179

Table 3. Statistical summary of status changes of earthworms between 2012 (Buckley et al. 2012) and 2014 (this document).

CONSERVATION STATUS 2014	CONSERVATION STATUS 2012	DETERMINATE	INDETERMINATE	TOTAL
DATA DEFICIENT		99	6	105
	Data Deficient	94	6	100
	Not in previous list	5	0	5
AT RISK		32	0	32
Declining		1	0	1
	Not in previous list	1	0	1
Naturally Uncommon		31	0	31
	Data deficient	1	0	1
	Naturally Uncommon	30	0	30
NOT THREATENED		40	0	40
	Data deficient	1	0	1
	Not Threatened	39	0	39
INTRODUCED AND NATURALISED		2	0	2
	Introduced and naturalised	2	0	2
TOTAL		173	6	179

2. Conservation status of New Zealand earthworms

The revised threat ranking for New Zealand earthworms is provided in this section and replaces all previous NZTCS lists for New Zealand earthworms.

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.

See Townsend et al. (2008) for details of criteria and qualifiers, which are abbreviated as follows:

CD	Conservation Dependent
De	Designated
DP	Data Poor
EF	Extreme Fluctuations
EW	Extinct in the Wild
IE	Island Endemic
Inc	Increasing
OL	One Location
PD	Partial Decline
RF	Recruitment Failure
RR	Range Restricted
SO	Secure Overseas
Sp	Sparse
St	Stable
TO	Threatened Overseas

2.1 Taxonomically determinate

Extinct (0)

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.

No taxonomically determinate earthworm taxa are listed in this category, although numerous undescribed species exist (Buckley & Bartlam 2010; Boyer et al. 2011; Buckley et al. 2011; Boyer 2013).

Data Deficient (99)

Taxa that are suspected to be threatened, or in some instances, possibly extinct but are not definitely known to belong to any particular category 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 or threat (for a fuller definition see Townsend et al. 2008).

NAME	FAMILY	QUALIFIERS
<i>Decachaetus minor</i> Lee, 1959	Acanthodrilidae	OL
<i>Decachaetus violaceus</i> Lee, 1959	Acanthodrilidae	OL
<i>Deinodrilus agilis</i> Lee, 1952	Acanthodrilidae	OL
<i>Deinodrilus benhami</i> Beddard, 1889	Acanthodrilidae	OL
<i>Deinodrilus lateralis</i> Lee, 1959	Acanthodrilidae	RR
<i>Deinodrilus montanus</i> Lee, 1952	Acanthodrilidae	
<i>Deinodrilus parvus</i> Lee, 1952	Acanthodrilidae	
<i>Deinodrilus suteri</i> Benham, 1906	Acanthodrilidae	RR
<i>Diporochaeta aquatica</i> Benham, 1903	Megascolecidae	
<i>Diporochaeta caswelli</i> Lee, 1959	Megascolecidae	OL
<i>Diporochaeta intermedia</i> Beddard, 1888	Megascolecidae	
<i>Eodrilus annectens</i> (Beddard, 1889)	Acanthodrilidae	OL
<i>Eodrilus micros</i> Lee, 1959	Acanthodrilidae	OL
<i>Eodrilus montanus</i> Lee, 1959	Acanthodrilidae	RR
<i>Eodrilus pallidus</i> Lee, 1959	Acanthodrilidae	OL
<i>Eodrilus parvus</i> Lee, 1959	Acanthodrilidae	OL
<i>Eodrilus rossi</i> Lee, 1959	Acanthodrilidae	OL
<i>Eudinodriloides forsteri</i> Lee, 1959	Acanthodrilidae	
<i>Hoplochaetina pallida</i> Lee, 1952	Acanthodrilidae	
<i>Hoplochaetina polycystis</i> Lee, 1952	Acanthodrilidae	RR
<i>Hoplochaetina robusta</i> Lee, 1952	Acanthodrilidae	OL
<i>Hoplochaetina rossii</i> (Benham, 1903)	Acanthodrilidae	
<i>Hoplochaetina rubra</i> Lee, 1959	Acanthodrilidae	RR
<i>Hoplochaetina spirilla</i> Lee, 1959	Acanthodrilidae	
<i>Hoplochaetina subtilis</i> Lee, 1959	Acanthodrilidae	
<i>Leucodrilus fuscus</i> Lee, 1952	Acanthodrilidae	OL
<i>Leucodrilus robustus</i> Lee, 1959	Acanthodrilidae	RR
<i>Maoridrilus alpinus</i> Lee, 1959	Acanthodrilidae	OL
<i>Maoridrilus fuscus</i> Lee, 1959	Acanthodrilidae	OL
<i>Maoridrilus gravus</i> Lee, 1959	Acanthodrilidae	RR
<i>Maoridrilus megacystis</i> Benham, 1919	Acanthodrilidae	
<i>Maoridrilus michaelsoni</i> Ude, 1905	Acanthodrilidae	

Continued on next page

Data Deficient continued

NAME	FAMILY	QUALIFIERS
<i>Maoridrilus minor</i> Lee, 1959	Acanthodrilidae	OL
<i>Maoridrilus modestus</i> Michaelsen, 1910	Acanthodrilidae	
<i>Maoridrilus montanus</i> Lee, 1959	Acanthodrilidae	
<i>Maoridrilus nelsoni</i> Lee, 1959	Acanthodrilidae	
<i>Maoridrilus pallidus</i> Lee, 1959	Acanthodrilidae	
<i>Maoridrilus purus</i> Ude, 1905	Acanthodrilidae	
<i>Maoridrilus rubicundus</i> Lee, 1959	Acanthodrilidae	OL
<i>Maoridrilus smithi</i> (Beddard, 1892)	Acanthodrilidae	
<i>Maoridrilus suteri</i> Michaelsen, 1922	Acanthodrilidae	OL
<i>Maoridrilus ultimus</i> Lee, 1959	Acanthodrilidae	
<i>Megascolex animae</i> Lee, 1959	Megascolecidae	OL
<i>Megascolides albus</i> Lee, 1952	Megascolecidae	OL
<i>Megascolides esculentus</i> (Benham, 1904)	Megascolecidae	OL
<i>Megascolides fuscus</i> Lee, 1952	Megascolecidae	RR
<i>Megascolides huttoni</i> (Benham, 1904)	Megascolecidae	OL
<i>Megascolides kirki</i> (Benham, 1904)	Megascolecidae	
<i>Megascolides mortenseni</i> (Michaelsen, 1923)	Megascolecidae	OL
<i>Megascolides napiensis</i> Benham, 1941	Megascolecidae	OL
<i>Megascolides neglectus</i> Cognetti de Martiis, 1909	Megascolecidae	
<i>Megascolides parvus</i> Lee, 1952	Megascolecidae	
<i>Megascolides raglani</i> Lee, 1952	Megascolecidae	
<i>Megascolides reptans</i> (Ude, 1905)	Megascolecidae	
<i>Megascolides sapidus</i> Benham, 1904	Megascolecidae	OL
<i>Megascolides unipapillatus</i> (Ude, 1905)	Megascolecidae	OL
<i>Megascolides urewerae</i> Benham, 1904	Megascolecidae	
<i>Megascolides viridis</i> Lee, 1952	Megascolecidae	
<i>Microscolex campbellianus</i> (Benham, 1905)	Acanthodrilidae	
<i>Microscolex phosphoreus</i> (Dugès, 1837)	Acanthodrilidae	OL
<i>Neochaeta salmoni</i> Lee, 1959	Acanthodrilidae	OL
<i>Neodrilus campestris</i> (Hutton, 1877)	Acanthodrilidae	
<i>Neodrilus polycystis</i> Lee, 1959	Acanthodrilidae	
<i>Notoscolex hakeaphilus</i> Benham, 1949	Megascolecidae	
<i>Octochaetus antarcticus</i> (Beddard, 1889)	Acanthodrilidae	OL
<i>Octochaetus pelorus</i> Lee, 1959	Acanthodrilidae	
<i>Octochaetus ravus</i> Lee, 1959	Acanthodrilidae	OL
<i>Octochaetus sylvestris</i> Lee, 1952	Acanthodrilidae	
<i>Octochaetus tricystis</i> Lee, 1952	Acanthodrilidae	
<i>Perieodrilus lateralis</i> (Benham, 1903)	Acanthodrilidae	RR
<i>Perieodrilus montanus</i> (Benham, 1903)	Acanthodrilidae	RR
<i>Perionyx egmonti</i> Lee, 1952	Megascolecidae	
<i>Plagiochaeta lineata</i> (Hutton, 1877)	Acanthodrilidae	
<i>Plagiochaeta stewartensis</i> Michaelsen, 1923	Acanthodrilidae	
<i>Plutellus parvus</i> Lee, 1959	Megascolecidae	RR
<i>Pontodrilus lacustris</i> (Benham, 1903)	Megascolecidae	OL
<i>Rhododrilus agathis</i> Lee, 1959	Acanthodrilidae	RR
<i>Rhododrilus aquaticus</i> Lee, 1959	Acanthodrilidae	OL
<i>Rhododrilus attenuatus</i> Lee, 1952	Acanthodrilidae	
<i>Rhododrilus besti</i> Benham, 1904	Acanthodrilidae	
<i>Rhododrilus disparatus</i> Lee, 1952	Acanthodrilidae	
<i>Rhododrilus dobsoni</i> Lee, 1959	Acanthodrilidae	OL
<i>Rhododrilus edulis</i> Benham, 1904	Acanthodrilidae	

Continued on next page

NAME	FAMILY	QUALIFIERS
<i>Rhododrilus intermedius</i> Lee, 1952	Acanthodrilidae	
<i>Rhododrilus microgaster</i> Lee, 1959	Acanthodrilidae	OL
<i>Rhododrilus minutus</i> Beddard, 1889	Acanthodrilidae	RR
<i>Rhododrilus papaensis</i> Lee, 1952	Acanthodrilidae	
<i>Rhododrilus parvus</i> Benham, 1906	Acanthodrilidae	IE, OL
<i>Rhododrilus rosae</i> Lee, 1959	Acanthodrilidae	
<i>Rhododrilus sexpapillatus</i> Dyne, 1980	Acanthodrilidae	OL
<i>Rhododrilus sutherlandi</i> Lee, 1952	Acanthodrilidae	
<i>Spenceriella argillae</i> Lee, 1959	Megascolecidae	OL
<i>Spenceriella pallida</i> Lee, 1959	Megascolecidae	OL
<i>Sylovodrilus gravus</i> Lee, 1959	Acanthodrilidae	
<i>Maoridrilus felix</i> Boyer, Blakemore & Wratten 2014	Acanthodrilidae	OL
<i>Octochaetus kenleei</i> Boyer, Blakemore & Wratten 2014	Acanthodrilidae	OL
<i>Aporodrilus aotea</i> Blakemore, 2011	Megascolecidae	
<i>Aporodrilus ponga</i> Blakemore, 2011	Megascolecidae	
<i>Notoscolex repanga</i> Blakemore, 2011	Megascolecidae	

Threatened (0)

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

No taxonomically determinate earthworm taxa are listed in this category.

At Risk (32)

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

Declining (1)

Taxa that do not qualify as 'Threatened' because they are buffered by large population size and/or a slower rate of decline than the trigger points.

Criteria for Declining:

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

A(1/1) 5000–20 000 mature individuals, predicted decline 10–30%

A(2/1) Total area of occupancy \leq 1000 ha (10 km²), predicted decline 10–30%

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

B(1/1) 20 000–100 000 mature individuals, predicted decline 10–50%

B(2/1) Total area of occupancy \leq 10 000 ha (100 km²), predicted decline 10–50%

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

C(1/1) > 100 000 mature individuals, predicted decline 10–70%

C(2/1) Total area of occupancy > 10 000 ha (100 km²), predicted decline 10–70%

NAME AND AUTHORITY	FAMILY	CRITERIA	QUALIFIERS
<i>Deinodrilus gorgon</i> Boyer, Blakemore & Wratten 2011	Acanthodrilidae	A(2/1)	PD

Recovering (o)

Taxa that have undergone a documented decline within the last 1000 years 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. Note that such 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 Threatened categories, depending on their population size (for more details see Townsend et al. (2008)).

Criteria for Recovering:

- A 1000–5000 mature individuals or total area of occupancy ≤ 100 ha (1 km²), and predicted increase >10%
- B 5000–20000 mature individuals or total area of occupancy ≤ 1000 ha (10 km²), and predicted increase >10%

No taxonomically determinate earthworm taxa are listed in this category.

Relict (o)

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:

Criteria for Relict:

- 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)).

No taxonomically determinate earthworm taxa are listed in this category.

Naturally Uncommon (31)

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.

NAME AND AUTHORITY	FAMILY	QUALIFIERS
<i>Acanthodrilus kermadecensis</i> Lee, 1953	Acanthodrilidae	CD, IE, OL
<i>Diporochaeta brachysoma</i> Benham, 1909	Megascolecidae	IE, RR
<i>Diporochaeta chathamensis</i> Benham, 1901	Megascolecidae	IE, OL
<i>Diporochaeta duodecimalis</i> (Michaelsen, 1923)	Megascolecidae	IE, OL
<i>Diporochaeta heterochaeta</i> Benham, 1909	Megascolecidae	IE, OL
<i>Diporochaeta minima</i> Lee, 1959	Megascolecidae	IE, OL
<i>Eodrilus fallax</i> (Benham, 1909)	Acanthodrilidae	IE, OL
<i>Eodrilus haplocystis</i> (Benham, 1901)	Acanthodrilidae	IE, OL
<i>Hoplochaetina durvilleana</i> (Benham, 1919)	Acanthodrilidae	IE, OL
<i>Maoridrilus plumbeus</i> (Beddard, 1895)	Acanthodrilidae	
<i>Maoridrilus tetragonurus</i> Michaelsen, 1899	Acanthodrilidae	IE, OL
<i>Maoridrilus volutus</i> Lee, 1959	Acanthodrilidae	IE, OL
<i>Megascolides equestris</i> (Benham, 1942)	Megascolecidae	IE, OL
<i>Megascolides ruber</i> Lee, 1952	Megascolecidae	IE, OL
<i>Megascolides rubicundus</i> Lee, 1959	Megascolecidae	IE, OL

Continued on next page

NAME AND AUTHORITY	FAMILY	QUALIFIERS
<i>Megascolides tasmani</i> Lee, 1959	Megascolecidae	IE, OL
<i>Neodrilus dissimilis</i> Lee, 1959	Acanthodrilidae	IE, OL
<i>Octochaetus kapitiensis</i> Lee, 1959	Acanthodrilidae	IE, OL
<i>Perieodrilus plunketi</i> (Benham, 1909)	Acanthodrilidae	IE, OL
<i>Perieodrilus ricardi</i> (Benham, 1903)	Acanthodrilidae	IE, OL
<i>Perionyx helophilus</i> (Benham, 1909)	Megascolecidae	IE, OL
<i>Perionyx perionychopsis</i> (Benham, 1909)	Megascolecidae	IE, OL
<i>Perionyx shoeanus</i> Cognetti de Martiis, 1912	Megascolecidae	IE, OL
<i>Plutellus aucklandicus</i> Benham, 1909	Megascolecidae	IE, RR
<i>Pontodrilus litoralis</i> Grube, 1855	Megascolecidae	IE, OL
<i>Rhododrilus huttoni</i> (Benham, 1901)	Acanthodrilidae	IE, OL
<i>Rhododrilus insularis</i> Lee, 1959	Acanthodrilidae	IE, OL
<i>Rhododrilus kermadecensis</i> Benham, 1905	Acanthodrilidae	IE, OL
<i>Rhododrilus ravus</i> Lee, 1959	Acanthodrilidae	IE, OL
<i>Rhododrilus subtilis</i> Lee, 1959	Acanthodrilidae	IE, OL
<i>Rhododrilus tetratheca</i> Lee, 1959	Acanthodrilidae	IE, OL

Non-resident Native (0)

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).

No taxonomically determinate earthworm taxa are listed in this category.

Not Threatened (40)

Resident native taxa that have large, stable populations.

NAME AND AUTHORITY	FAMILY	QUALIFIERS
<i>Deinodrilus gracilis</i> Ude, 1905	Acanthodrilidae	
<i>Deinodrilus kanieriensis</i> (Benham, 1945)	Acanthodrilidae	
<i>Dinodriloides beddardi</i> Benham, 1904	Acanthodrilidae	
<i>Diporochaeta obtusa</i> Lee, 1952	Megascolecidae	
<i>Diporochaeta punctata</i> Lee, 1959	Megascolecidae	
<i>Eodrilus paludosus</i> (Beddard, 1892)	Acanthodrilidae	
<i>Leucodrilus digitocystis</i> Lee, 1952	Acanthodrilidae	
<i>Maoridrilus carnosus</i> Lee, 1959	Acanthodrilidae	
<i>Maoridrilus dissimilis</i> (Beddard, 1885)	Acanthodrilidae	
<i>Maoridrilus parkeri</i> (Beddard, 1895)	Acanthodrilidae	
<i>Maoridrilus ruber</i> Lee, 1959	Acanthodrilidae	
<i>Maoridrilus transalpinus</i> Lee, 1959	Acanthodrilidae	
<i>Maoridrilus uliginosus</i> (Hutton, 1877)	Acanthodrilidae	
<i>Maoridrilus wilkini</i> Lee, 1959	Acanthodrilidae	
<i>Megascolex novae-zealandiae</i> Lee, 1952	Megascolecidae	
<i>Megascolides irregularis</i> Lee, 1952	Megascolecidae	
<i>Megascolides maoricus</i> Benham, 1904	Megascolecidae	
<i>Megascolides suteri</i> Benham, 1904	Megascolecidae	
<i>Microcolex aucklandicus</i> (Benham, 1903)	Acanthodrilidae	
<i>Neochaeta forsteri</i> Lee, 1959	Acanthodrilidae	

Continued on next page

Not Threatened continued

NAME AND AUTHORITY	FAMILY	QUALIFIERS
<i>Neodrilus agilis</i> Lee, 1949	Acanthodrilidae	RR
<i>Neodrilus edwardsi</i> Lee, 1959	Acanthodrilidae	
<i>Octochaetus brucei</i> Lee, 1952	Acanthodrilidae	
<i>Octochaetus huttoni</i> Beddard, 1892	Acanthodrilidae	
<i>Octochaetus michaelseni</i> Benham, 1904	Acanthodrilidae	
<i>Octochaetus multiporus</i> (Beddard, 1885)	Acanthodrilidae	
<i>Octochaetus thomasi</i> Beddard, 1892	Acanthodrilidae	
<i>Plagiochaeta sylvestris</i> (Hutton, 1877)	Acanthodrilidae	
<i>Plutellus stewartensis</i> Lee, 1959	Megascolecidae	
<i>Rhododrilus aduncocystis</i> Lee, 1952	Acanthodrilidae	
<i>Rhododrilus albidus</i> Lee, 1952	Acanthodrilidae	
<i>Rhododrilus benhami</i> Lee, 1952	Acanthodrilidae	
<i>Rhododrilus cockaynei</i> Benham, 1905	Acanthodrilidae	
<i>Rhododrilus leptomerus</i> Benham, 1905	Acanthodrilidae	
<i>Rhododrilus macroseptus</i> Lee, 1952	Acanthodrilidae	
<i>Rhododrilus minimus</i> Lee, 1952	Acanthodrilidae	
<i>Rhododrilus robustus</i> Lee, 1952	Acanthodrilidae	
<i>Rhododrilus similis</i> Benham, 1906	Acanthodrilidae	
<i>Spenceriella gigantea</i> (Benham, 1906)	Megascolecidae	
<i>Spenceriella shakespearei</i> (Benham, 1906)	Megascolecidae	

Introduced and Naturalised (2)

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

NAME AND AUTHORITY	FAMILY
<i>Microscolex dubius</i> (Fletcher, 1887)	Acanthodrilidae
<i>Pheretima peregrina</i> (Fletcher, 1886)	Megascolecidae

2.2 Taxonomically indeterminate

This section includes described taxa whose taxonomic status is uncertain and requires further investigation, and also possibly distinct entities whose taxonomic status has yet to be determined. Definitions of threat categories follow those given in the Taxonomically Determinate section above.

Data Deficient (6)

NAME AND AUTHORITY	FAMILY
<i>Maoridrillus ?intermedius</i>	Acanthodrilidae
<i>Maoridrillus ?mauiensis</i>	Acanthodrilidae
<i>Maoridrillus ?thomsoni</i>	Acanthodrilidae
<i>Octochaetus levis</i> (Hutton, 1877)	Acanthodrilidae
<i>Octochaetus microchaetus</i> (Benham, 1950)	Acanthodrilidae
<i>Rhododrilus ?monticola</i>	Acanthodrilidae

3. Acknowledgements

Thomas Buckley and Scott Bartlam were supported by Core funding for Crown Research Institutes from the Ministry of Business, Innovation and Employment's Science and Innovation Group. Earthworm inventories by Stephane Boyer were supported by Solid Energy New Zealand Ltd, Buller Coal Ltd, Rio Tinto Services Limited and DOC as part of a Data Deficient Species Survey Fund (DOCDM-1100332).

4. References

- Boyer, S. 2013: Distribution of New Zealand native earthworms in some locations of the South Island. Scientific report to the New Zealand Department of Conservation. Data Deficient Species Survey Fund DOCDM-1100332. 24 p.
- Boyer, S.; Blakemore, R.J.; Wratten, S.D. 2011: An integrative taxonomic approach to the identification of three new New Zealand endemic earthworm species (Acanthodrilidae, Octochaetidae: Oligochaeta). *Zootaxa* 2994: 21–32.
- Buckley, T.R.; Bartlam, S. 2010: Revising the threat classification status of Data Deficient earthworms from the Auckland and Northland regions. Investigation no. 4175. Landcare Research Contract Report: LC0910/140.
- Buckley, T.R.; James, S.; Allwood, J.; Bartlam, S.; Howitt, R.; Prada, D. 2011: Phylogenetic analysis of New Zealand earthworms (Oligochaeta: Megascolecidae) reveals ancient clades and cryptic taxonomic diversity. *Molecular Phylogenetics and Evolution* 58: 85–96.
- Buckley, T.R.; Palma, R.L.; Johns, P.M.; Gleeson, D.M.; Heath, A.C.G.; Hitchmough, R.A.; Stringer, I.A.N. 2012: The conservation status of small or less well known groups of New Zealand terrestrial invertebrates. *New Zealand Entomologist* 35: 137–143.
- Macfarlane, R.P.; Maddison, P.A.; Andrew, I.G.; Berry, J.A.; Johns, P.M.; Hoare, R.J.B.; Larivière, M.-C.; Greenslade, P.; Henderson, R.C.; Smithers, C.N.; Palma, R.L.; Ward, J.B.; Pilgrim, R.L.C.; Towns, D.R.; McLellan, I.; Teulon, D.A.J.; Hitchings, T.R.; Eastop, V.F.; Martin, N.A.; Fletcher, M.J.; Stufkens, M.A.W.; Dale, P.J.; Burckhardt, D.; Buckley, T.R.; Trewick, S.A. 2010: Phylum Arthropoda Subphylum Hexapoda: Protura, springtails, Diplura, and insects. Pp 233–467 in: Gordon, D.P. (Ed.): New Zealand inventory of biodiversity, Vol 2. Canterbury University Press, Christchurch.
- Townsend, A.J.; de Lange, P.J.; Duffy, C.A.J.; Miskelly, C.M.; Molloy, J.; Norton, D.A. 2008: New Zealand Threat Classification System manual. Department of Conservation, Wellington. 35 p.