



NEW ZEALAND THREAT CLASSIFICATION SERIES 13

# Conservation status of New Zealand mosses, 2014

Jeremy R. Rolfe, Allan J. Fife, Jessica E. Beever, Patrick J. Brownsey  
and Rodney A. Hitchmough



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*Te Papa Atawhai*

Cover: *Epipterygium opararensense*. Photo: P. Knightbridge, March 2005.

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

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# Conservation status of New Zealand mosses, 2014

Jeremy R. Rolfe<sup>1</sup>, Allan J. Fife<sup>2</sup>, Jessica E. Beever<sup>3</sup>, Patrick J. Brownsey<sup>4</sup>  
and Rodney A. Hitchmough<sup>1</sup>

<sup>1</sup> Department of Conservation, Science & Policy, National Office, PO Box 10420, Wellington 6143, New Zealand

<sup>2</sup> Allan Herbarium, Systematics Team, Landcare Research, PO Box 40, Lincoln 7640, New Zealand

<sup>3</sup> Landcare Research Ltd, Private Bag 92170, Auckland 1142, New Zealand

<sup>4</sup> Museum of New Zealand Te Papa Tongarewa, PO Box 467, Wellington 6140, New Zealand

## Abstract

The conservation status of 109 New Zealand moss taxa was assessed using the New Zealand Threat Classification System (NZTCS). Four taxa and one undescribed entity that were not included in previous assessments have been added to the list. The conservation status of only two taxa has changed in this assessment. A full list is presented, along with a statistical summary and brief notes on the changes. This list replaces all previous NZTCS lists for mosses.

**Keywords:** New Zealand Threat Classification System, NZTCS, conservation status, Amblystegiaceae, Bryaceae, Dicranaceae, Fissidentaceae, Orthotrichaceae, Pottiaceae

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# 1. Summary

The conservation status of 109 New Zealand moss taxa was assessed using New Zealand Threat Classification System (NZTCS) criteria (Townsend et al. 2008). This list replaces the 2010 list of moss taxa reported in Glenny et al. (2011), which included liverworts and hornworts as well as mosses. The categories, criteria and process for assessing the conservation status of mosses were identical between the two listings but this 2014 assessment treats mosses only; the conservation status of liverworts and hornworts is reported separately (Glenny et al. 2015). The expert panel for this assessment was Allan Fife, Jessica Beever and Patrick Brownsey, the same people who assessed mosses in Glenny et al. (2011).

Glenny et al. (2011) assessed 520 moss taxa but did not list 424 of the taxa that were deemed to be not threatened or introduced and naturalised. However, they did list 2 taxa as not threatened and 3 taxa as introduced and naturalised that had been assessed previously as indigenous and threatened (Hitchmough et al. 2007). This document reports on the 96 taxa listed in Glenny et al. (2011) plus an additional four taxa and one undescribed entity that are new to the list (Table 1). One taxon has had a name change since Glenny et al. (2011) was published. *Fissidens oblongifolius* var. *hyophilus* (Mitt.) J.E.Beever & I.G.Stone is again accorded species status, so the name *F. hyophilus* Mitt. has been restored (Table 2).

Table 1. Taxa included in this document that were not assessed by Glenny et al. 2011.

NAME AND AUTHORITY	FAMILY
<i>Brachythecium subpilosum</i> (Hook.f. & Wilson) A.Jaeger	Brachytheciaceae
<i>Cryptogonium phyllogonioides</i> (Sull.) Isov.	Phyllogoniaceae
<i>Didymodon</i> (CHR 611390; "Ihu Pott")	Pottiaceae
<i>Sematophyllum fiordensis</i> Fife	Sematophyllaceae
<i>Tayloria tasmanica</i> (Hampe) Broth.	Splachnaceae

Table 2. Name change affecting New Zealand mosses between 2010 (Glenny et al. 2011) and 2014 (this document).

NAME AND AUTHORITY IN GLENNY ET AL. 2011	NAME AND AUTHORITY IN ROLFE ET AL. 2016	FAMILY
<i>Fissidens oblongifolius</i> var. <i>hyophilus</i> J.E.Beever & I.G.Stone	<i>Fissidens hyophilus</i> Mitt.	Fissidentaceae

One other taxon, *Calliergidium austro-stramineum* (Müll.Hal.) E.B.Bartram, was listed by Glenny et al. (2011) as Data Deficient on the basis of a single specimen, but it is now considered to be an aberrant growth form of the Not Threatened aquatic moss *Warnstorfia fluitans* (Hedw.) Loeske (Fife 2014). Therefore, in this document, *W. fluitans* appears in the list of Not Threatened taxa and *C. austro-stramineum* has been removed from the Data Deficient list.

It is intended that future conservation status assessments will report on a comprehensive list of the New Zealand mosses once the revision of the New Zealand Moss Flora is completed. The Moss Flora is being published as fascicles in PDF format (Beever 2014; Fife 2014, 2015) and can be found on-line at <http://www.nzflora.info/publications.html>.

Table 3 provides a summary of the number of taxa in each category listed in Glenny et al. (2011) and this document. A summary of status changes between the 2010 and 2014 lists is presented in Table 4. More comprehensive information on the status of individual taxa, the qualifiers that apply to each, and the criteria that triggered the taxon to be placed in a category, is outlined in section 2.

Table 3. Statistical summary of the status of New Zealand moss taxa and taxonomically indeterminate entities assessed in 2010 (Glenny et al. 2011) and 2014 (this document).

CATEGORY	GLENNY ET AL. 2011	ROLFE ET AL. 2016
Data Deficient	20	20
Threatened—Nationally Critical	12	14
Threatened—Nationally Endangered	2	4
Threatened—Nationally Vulnerable	3	2
At Risk—Naturally Uncommon	47	48
Non-resident Native—Vagrant	7	7
Not Threatened <sup>1</sup>	2	11
Introduced and Naturalised	3	3
<b>Total</b>	<b>96</b>	<b>109</b>

<sup>1</sup> Not Threatened taxa were assessed in 2010 but were not reported in Glenny et al. (2011).

Table 4. Statistical summary of status changes of moss taxa and taxonomically indeterminate entities between 2010 (Glenny et al. 2011, figures in roman type), and 2014 (this document, figures in bold type).

CONSERVATION STATUS 2014	CONSERVATION STATUS 2010	DETERMINATE	INDETERMINATE	TOTAL
<b>DATA DEFICIENT</b>		<b>19</b>	<b>1</b>	<b>20</b>
	Data Deficient	18	0	18
	Not listed	1	1	2
<b>THREATENED</b>		<b>20</b>	<b>0</b>	<b>20</b>
<b>Nationally Critical</b>		<b>14</b>	<b>0</b>	<b>14</b>
	Nationally Critical	12	0	12
	Naturally Uncommon	1	0	1
	Not listed	1	0	1
<b>Nationally Endangered</b>		<b>4</b>	<b>0</b>	<b>4</b>
	Nationally Endangered	3	0	3
	Nationally Vulnerable	1	0	1
<b>Nationally Vulnerable</b>		<b>2</b>	<b>0</b>	<b>2</b>
	Nationally Vulnerable	2	0	2
<b>AT RISK</b>		<b>48</b>	<b>0</b>	<b>48</b>
<b>Naturally Uncommon</b>		<b>48</b>	<b>0</b>	<b>48</b>
	Naturally Uncommon	46	0	46
	Not listed	2	0	2
<b>NON-RESIDENT NATIVE</b>		<b>6</b>	<b>1</b>	<b>7</b>
<b>Vagrant</b>		<b>6</b>	<b>1</b>	<b>7</b>
	Vagrant	6	1	7
<b>NOT THREATENED</b>		<b>11</b>	<b>0</b>	<b>11</b>
	Not Threatened	11	0	11
<b>INTRODUCED AND NATURALISED</b>		<b>3</b>	<b>0</b>	<b>3</b>
	Introduced and naturalised	3	0	3
<b>Total</b>		<b>107</b>	<b>2</b>	<b>109</b>

Of the 96 moss taxa assessed by Glenny et al. (2011), two have changed conservation status in this report. *Timmia norvegica* J.E.Setterst. has been listed as Nationally Critical based on a reassessment of data that shows it to be known from only two locations. It had been assessed as Naturally Uncommon by Glenny et al. (2011).

*Archidium elatum* Dixon & Sainsbury has been reassessed as Nationally Endangered (Nationally Vulnerable in Glenny et al. 2011) because it is known from only two Northland locations and one site on Chatham Island. One of the Northland locations has been invaded by the exotic kikuyu grass (*Cenchrus clandestinus* (Hochst. ex Chiov.) Morrone), and *A. elatum* has possibly been lost from there (Fife 2014).

*Tayloria tasmanica* is new to the list and has been assessed as Nationally Critical. It is a distinctive species that is known from a single location on Stewart Island (Fife 2015).

## 2. Conservation status of New Zealand mosses

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
- S?O Uncertainty as to whether the New Zealand taxon is conspecific with the Secure Overseas taxon
- S?O Uncertain as to whether Secure Overseas
- Sp Sparse
- St Stable
- TO Threatened Overseas
- T?O Uncertainty as to whether 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 moss taxa are listed in this category.

### Data Deficient (19)

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 (for a fuller definition see Townsend et al. 2008).

NAME AND AUTHORITY	FAMILY	QUALIFIERS
<i>Bartramia alaris</i> Dixon & Sainsbury	Bartramiaceae	OL, TO
<i>Brachythecium allisonii</i> Fife	Brachytheciaceae	
<i>Brachythecium subpilosum</i> (Hook.f. & Wilson) A.Jaeger	Brachytheciaceae	OL, SO
<i>Bryum funkii</i> Schwägr.	Bryaceae	S?O
<i>Bryum tenuidens</i> Dixon & Sainsbury	Bryaceae	OL
<i>Calymperes tahitense</i> (Sull.) Mitt.	Calymperaceae	
<i>Dicranella temperata</i> Allison	Dicranaceae	OL
<i>Ditrichum brachycarpum</i> Hampe	Ditrichaceae	OL, TO
<i>Ditrichum rufo-aureum</i> (Hampe) Willis	Ditrichaceae	TO
<i>Fissidens anisophyllus</i> Dixon	Fissidentaceae	RR
<i>Fissidens crispulus</i> var. <i>robinsonii</i> (Broth.) Z.Iwats. & Z.H.Li	Fissidentaceae	
<i>Fissidens dietrichiae</i> Müll.Hal.	Fissidentaceae	
<i>Fissidens perangustus</i> Broth.	Fissidentaceae	S?O
<i>Hymenostylium recurvirostrum</i> (Hedw.) Dixon	Pottiaceae	OL, SO
<i>Macromitrium angulatum</i> Mitt.	Orthotrichaceae	S?O
<i>Meteoriopsis reclinata</i> (Müll.Hal.) Broth.	Meteoriaceae	
<i>Neckeropsis lepineana</i> (Mont.) Fleisch.	Neckeraceae	
<i>Scorpiurium cucullatum</i> (Mitt.) Hedenäs	Brachytheciaceae	S?O
<i>Vesicularia inflectens</i> (Brid.) Müll.Hal.	Hypnaceae	

### Threatened (20)

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

#### Nationally Critical (14)

Criteria for Nationally Critical:

##### **A—very small population (natural or unnatural)**

A(1) <250 mature individuals, regardless of cause

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

A(3) Total area of occupancy ≤1 ha (0.01 km<sup>2</sup>)

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

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

B(2/1) ≤5 subpopulations, ≤300 mature individuals in the largest subpopulation, predicted decline 50–70%

B(3/1) Total area of occupancy ≤10 ha (0.1 km<sup>2</sup>), 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%

NAME AND AUTHORITY	FAMILY	CRITERIA	QUALIFIERS
<i>Cyclodictyon blumeorum</i> (Müll.Hal.) O.Kuntze	Hookeriaceae	A(3)	OL, SO, St
<i>Didymodon calycinus</i> Dixon	Pottiaceae	A(3)	De, DP
<i>Epipterygium opararensense</i> Fife & A.J.Shaw	Mniaceae	A(3)	OL
<i>Erpodium glaucum</i> (Wilson) I.G.Stone	Erpodiaceae	A(3)	DP, TO
<i>Grimmia plagiopodia</i> Hedw.	Grimmiaceae	A(3)	OL, TO
<i>Hampeella pallens</i> (Sande Lac.) M.Fleisch.	Ptychomniaceae	A(3)	DP, RR, S?O
<i>Lindbergia maritima</i> Lewinsky	Leskeaceae	A(3)	OL
<i>Physcomitrella patens</i> subsp. <i>readeri</i> (Müll.Hal.) B.C.Tan	Funariaceae	A(3)	DP, EF, RR, S?O
<i>Physcomitrium pusillum</i> Hook.f. & Wilson	Funariaceae	A(3)	DP, EF, RR
<i>Plagiopus oederiana</i> (Sw.) H.A.Crum & L.E.Anderson	Bartramiaceae	A(3)	OL, S?O
<i>Seligeria diminuta</i> (R.Br.bis) Dixon	Seligeriaceae	A(3)	DP, RR
<i>Willia calobolax</i> (Müll.Hal.) Lightowler	Pottiaceae	A(3)	
<i>Timmia norvegica</i> J.E.Zetterst.	Timmiaceae	A(3)	RR, SO
<i>Tayloria tasmanica</i> (Hampe) Broth.	Splachnaceae	A(3)	DP, OL, SO

**Nationally Endangered (4)**

Criteria for Nationally Endangered:

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

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

A(2/1) ≤5 subpopulations, ≤300 mature individuals in the largest subpopulation, predicted decline 10–50%

A(3/1) Total area of occupancy ≤10 ha (0.1 km<sup>2</sup>), predicted decline 10–50%

***B—small stable population (unnatural)***

B(1/1) 250–1000 mature individuals, stable population

B(2/1) ≤5 subpopulations, ≤300 mature individuals in the largest subpopulation, stable population

B(3/1) Total area of occupancy ≤10 ha (0.1 km<sup>2</sup>), stable population

***C—moderate population and high ongoing or predicted decline***

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

C(2/1) ≤15 subpopulations, ≤500 mature individuals in the largest subpopulation, predicted decline 50–70%

C(3/1) Total area of occupancy ≤100 ha (1 km<sup>2</sup>), predicted decline 50–70%

*Nationally Endangered mosses continued on next page*

Nationally Endangered mosses continued

NAME AND AUTHORITY	FAMILY	CRITERIA	QUALIFIERS
<i>Archidium elatum</i> Dixon & Sainsbury	Archidiaceae	B(2/1)	DP, Sp, T?O
<i>Calymperes tenerum</i> Müll.Hal.	Calymperaceae	A(3)	RR, SO
<i>Dicranoweisia spenceri</i> Dixon & Sainsbury	Dicranaceae	B(2/1)	De, DP
<i>Tortula viridipila</i> Dixon & Sainsbury	Pottiaceae	A(3)	DP

## Nationally Vulnerable (2)

Criteria for Nationally Vulnerable:

### **A—small, increasing population (unnatural)**

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

A(2/1) ≤5 subpopulations, ≤300 mature individuals in the largest subpopulation, predicted increase >10%

A(3/1) Total area of occupancy ≤10 ha (0.1 km<sup>2</sup>), predicted increase >10%

### **B—moderate, stable population (unnatural)**

B(1/1) 1000–5000 mature individuals, stable population

B(2/1) ≤15 subpopulations, ≤500 mature individuals in the largest subpopulation, stable population

B(3/1) Total area of occupancy ≤100 ha (1 km<sup>2</sup>), stable population

### **C—moderate population, with population trend that is declining**

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

C(2/1) ≤15 subpopulations, ≤500 mature individuals in the largest subpopulation, predicted decline 10–50%

C(3/1) Total area of occupancy ≤100 ha (1 km<sup>2</sup>), predicted decline 10–50%

### **D—moderate to large population, and moderate to high ongoing or predicted decline**

D(1/1) 5000–20 000 mature individuals, predicted decline 30–70%

D(2/1) ≤15 subpopulations and ≤1000 mature individuals in the largest subpopulation, predicted decline 30–70%

D(3/1) Total area of occupancy ≤1000 ha (10 km<sup>2</sup>), predicted decline 30–70%

### **E—large population, and high ongoing or predicted decline**

E(1/1) 20 000–100 000 mature individuals, predicted decline 50–70%

E(2/1) Total area of occupancy ≤10 000 ha (100 km<sup>2</sup>), predicted decline 50–70%

NAME AND AUTHORITY	FAMILY	CRITERIA	QUALIFIERS
<i>Fissidens berteroi</i> (Mont.) Müll.Hal.	Fissidentaceae	B(3/1)	RR, TO
<i>Fissidens integerrimus</i> Mitt.	Fissidentaceae	A(3/1)	DP, RR, TO

## At Risk (48)

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

### Declining (o)

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 km<sup>2</sup>), 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 km<sup>2</sup>), 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 km<sup>2</sup>), predicted decline 10–70%

### 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  $\leq$ 100 ha (1 km<sup>2</sup>), and predicted increase >10%

B 5000–20 000 mature individuals or total area of occupancy  $\leq$ 1000 ha (10 km<sup>2</sup>), and predicted increase >10%

No taxonomically determinate moss 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 5000–20 000 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)).

No taxonomically determinate moss taxa are listed in this category.

## Naturally Uncommon (48)

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>Amphidium lapponicum</i> (Hedw.) Schimp.	Rhabdoweisiaceae	RR, Sp
<i>Bartramia crassinervis</i> Mitt.	Bartramiaceae	DP, Sp
<i>Beeveria distichophylloides</i> (Broth. & Dixon) Fife	Hookeriaceae	RR, Sp
<i>Blindia contecta</i> (Hook.f. & Wilson) Müll.Hal.	Seligeriaceae	RR
<i>Blindia seppeltii</i> J.K.Bartlett & Vitt	Seligeriaceae	RR, S?O
<i>Bryum algovicum</i> var. <i>rutheanum</i> (Warnst.) Crundw.	Bryaceae	DP, SO
<i>Bryum amblyodon</i> Müll.Hal.	Bryaceae	DP, SO
<i>Bryum pallescens</i> Schleich. ex Schwägr.	Bryaceae	DP, SO
<i>Cratoneuron filicinum</i> (Hedw.) Spruce	Amblystegiaceae	RR, SO
<i>Crosbya nervosa</i> (Hook.f. & Wilson) Vitt	Daltoniaceae	RR
<i>Cryptogonium phyllogonioides</i> (Sull.) Isov.	Phyllogoniaceae	DP, RR, SO
<i>Dicranella dietrichiae</i> (Müll.Hal.) A.Jaeger	Dicranaceae	DP, SO, Sp
<i>Eccremidium minutum</i> (Mitt.) I.G.Stone & G.A.M.Scott	Ditrichaceae	DP, S?O, Sp
<i>Eccremidium pulchellum</i> (Hook.f. & Wilson) Müll.Hal.	Ditrichaceae	DP, S?O, Sp
<i>Ectropothecium sandwichense</i> (Hook. & Arn.) Mitt.	Hypnaceae	RR, SO
<i>Encalypta rhamnocarpha</i> Schwägr.	Encalyptaceae	RR, SO
<i>Fallaciella robusta</i> Tangney & Fife	Sematophyllaceae	DP
<i>Fissidens hylogenes</i> Dixon	Fissidentaceae	
<i>Fissidens hyophilus</i> Mitt.	Fissidentaceae	DP, S?O, Sp
<i>Fissidens oblongifolius</i> Hook.f. & Wilson var. <i>oblongifolius</i>	Fissidentaceae	DP, SO, Sp
<i>Fissidens rigidulus</i> var. <i>pseudostrictus</i> J.E.Beever	Fissidentaceae	DP, RR, Sp
<i>Fissidens strictus</i> Hook.f. & Wilson	Fissidentaceae	DP, RR, TO
<i>Gigaspermum repens</i> (Hook.) Lindb.	Gigaspermaceae	RR, SO
<i>Grimmia longirostris</i> Hook.	Grimmiaceae	RR
<i>Holodontium strictum</i> (Hook.f. & Wilson) Ochyra	Dicranaceae	DP, RR, S?O, Sp
<i>Hylocomium splendens</i> (Hedw.) B.S.G.	Hylocomiaceae	RR, SO
<i>Ischyrodon lepturus</i> (Taylor) Schelpe	Fabroniaceae	S?O, Sp
<i>Macromitrium ramsayae</i> Vitt	Orthotrichaceae	IE
<i>Muelleriella angustifolia</i> (Hook.f. & Wilson) Dusén	Orthotrichaceae	IE, OL
<i>Muelleriella aucklandica</i> Vitt	Orthotrichaceae	IE
<i>Notoligotrichum bellii</i> (Broth.) G.L.Sm.	Polytrichaceae	RR
<i>Orthotheciella varia</i> (Hedw.) Ochyra	Amblystegiaceae	RR, SO
<i>Orthothecium strictum</i> Lorentz	Hypnaceae	DP, RR, SO
<i>Plagiobryum novae-seelandiae</i> Broth.	Bryaceae	RR, Sp
<i>Pohlia australis</i> A.J.Shaw & Fife	Bryaceae	DP, RR
<i>Pyrrhobryum paramattense</i> (Müll.Hal.) Manuel	Rhizogoniaceae	DP, SO
<i>Racomitrium crumianum</i> Fife	Grimmiaceae	RR
<i>Scorpidium cossonii</i> (Schimp.) Hedenäs	Amblystegiaceae	RR, SO, Sp
<i>Sematophyllum fiordensis</i> Fife	Sematophyllaceae	DP
<i>Sematophyllum kirkii</i> (Beckett) Paris	Sematophyllaceae	DP, RR
<i>Sphagnum compactum</i> DC.	Sphagnaceae	SO, Sp
<i>Sphagnum perichaetiale</i> Hampe	Sphagnaceae	DP, RR, SO, Sp
<i>Syrhropodon armatus</i> Mitt.	Calympereaceae	RR, SO
<i>Tetradontium brownianum</i> (Dicks.) Schwägr.	Tetraphidiaceae	RR, S?O
<i>Thuidium cymbifolium</i> (Dozy & Molk.) Dozy & Molk.	Thuidiaceae	S?O

*Naturally Uncommon mosses continued on next page*

NAME AND AUTHORITY	FAMILY	QUALIFIERS
<i>Tortella cirrhata</i> Broth.	Pottiaceae	DP, RR, S?O
<i>Trematodon mackayi</i> (R.Br.bis) Broth.	Dicranaceae	RR
<i>Zygodon rufescens</i> (Hampe) Broth.	Orthotrichaceae	DP, SO, Sp

## Non-resident Native (6)

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

### Vagrant (6)

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

NAME AND AUTHORITY	FAMILY	QUALIFIERS
<i>Aloina ambigua</i> (B.S.G.) Limpr.	Pottiaceae	SO
<i>Aloina bifrons</i> (De Not.) Delgadillo	Pottiaceae	DP, SO, Sp
<i>Crossidium davidai</i> Catcheside	Pottiaceae	DP
<i>Crossidium geheebii</i> (Broth.) Broth.	Pottiaceae	DP, SO
<i>Entosthodon muehlenbergii</i> (Turner) Fife	Funariaceae	DP, SO
<i>Goniomitrium acuminatum</i> Hook. & Wilson	Funariaceae	OL, SO

### 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.

No taxonomically determinate moss taxa are listed in this category.

## Not Threatened (11)

Resident native taxa that have large, stable populations. These taxa are reported here because they have been formerly assessed as Threatened or At Risk.

NAME AND AUTHORITY	FAMILY	QUALIFIERS
<i>Buxbaumia novae-zelandiae</i> Dixon	Buxbaumiaceae	Sp
<i>Blindia lewinskyae</i> Bartlett & Vitt	Seligeriaceae	
<i>Campyochaete aciphylla</i> Dixon & Sainsbury	Lembophyllaceae	
<i>Campylopus acuminatus</i> var. <i>kirkii</i> (Beckett) J.-P.Frahm	Dicranaceae	
<i>Macromitrium brevicaulis</i> (Besch.) Broth.	Orthotrichaceae	RR
<i>Pendulothecium oblongifolium</i> (Hook.f. & Wilson) Enroth & S.He	Neckeraceae	
<i>Pseudoleskea imbricata</i> (Hook.f. & Wilson) Broth.	Thuidiaceae	
<i>Ptychomnion densifolium</i> (Brid.) A.Jaeger	Ptychomniaceae	
<i>Racomitrium curiosissimum</i> Bednarek-Ochyra & Ochyra	Grimmiaceae	
<i>Thamnobryum pumilum</i> (Hook.f. & Wilson) B.C.Tan	Neckeraceae	Sp
<i>Warnstorfia fluitans</i> (Hedw.) Loeske	Amblystegiaceae	

## Introduced and Naturalised (3)

Taxa that have become naturalised in the wild after being deliberately or accidentally introduced into New Zealand by human agency. These taxa are reported here because they have formerly been considered to be indigenous.

NAME AND AUTHORITY	FAMILY
<i>Fissidens dubius</i> P.Beauv.	Fissidentaceae
<i>Tortula marginata</i> (B.S.G.) Spruce	Pottiaceae
<i>Tortula mucronifolia</i> Schwägr.	Pottiaceae

## 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.

## Data Deficient (1)

NAME AND AUTHORITY	FAMILY
<i>Didymodon</i> [CHR 611390; "Ihu Pott"]	Pottiaceae

## Non-resident Native

## Vagrant (1)

NAME AND AUTHORITY	FAMILY	QUALIFIERS
<i>Tortula</i> sp. "red costa" (CHR 576584: Whakamahi; ? <i>Phascopsis rubicunda</i> I.G.Stone)	Pottiaceae	DP, SO

## 3. Acknowledgements

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## 4. References

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