# Threatened plant survey in Kaimanawa Forest Park and Tongariro National Park

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# CONTENTS

# Threatened plant survey in Kaimanawa Forest Park and Tongariro National Park

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## ABSTRACT

A survey of threatened plants in Kaimanawa Forest Park and part of Tongariro National Park, New Zealand, was undertaken during summer and autumn 2002 as a part of an extensive inventory of the flora of Kaimanawa Forest Park. The focus was on the alpine area, but a few other grassland and shrubland sites below the tree-line were also searched. A list of 14 species was prepared from past records. The following species were found: *Acaena emittens*, *Epilobium pychnostachyum*, *Melicytus* aff. *alpinus*, *Myosotis australis* "yellow", *Myosotis* aff. *pygmaea*, *Stackhousia minima*, *Vittadinia australis*. None of the targeted species were found in Tongariro National Park although they had been recorded in the area in the past. Recommendations are made for further search areas.

Keywords: threatened plants, alpine species, Kaimanawa Forest Park, Tongariro National Park, New Zealand.


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# 1. Introduction

A survey of threatened plants in Kaimanawa Forest Park and Tongariro National Park was undertaken during summer and autumn 2002 as a part of an extensive inventory of the flora of Kaimanawa Forest Park. Its primary aim was to collect data about the distribution and abundance of threatened alpine plants in the Tongariro/Taupo Conservancy. In addition, threats to these populations were observed and their severity and extent were estimated. The selected species all belong to alpine or open grassland habitats. These species are either nationally or regionally endangered or uncommon, or in some cases, data have been insufficient to estimate the degree of rarity or threat. Some of these species are as yet unnamed, although they are affiliated to a similar species; for these, herbarium numbers have been given in order to properly identify them.

# 2. Survey method

The threatened plant species included in the survey of Kaimanawa Forest Park and Tongariro National Park are listed in Table 1. The focus was on the alpine area, but a few other grassland and shrubland sites below the tree-line were also searched.

When appropriate threatened plant habitat was found, thorough searches were made, e.g. greywacke screes for *Epilobium pychnostachyum*. Detailed records of location (grid reference), abundance, flowers, fruits and threats were recorded for each threatened plant located. The location information is available to bona fide researchers from Tongariro/Taupo Conservancy.

Although Tongariro National Park was included in the survey, more time was spent in Kaimanawa Forest Park, as comparatively little botanical work has been done in this area in the past. In contrast, Tongariro National Park has numerous species records and vegetation descriptions.

In the Kaimanawa Ranges most of the alpine area was covered, ranging across Urchin Trig, Umukarikari Trig, Thunderbolt Peak, Middle Range, T2 and Mt Patutu (Fig. 1). The head of Waipakihi River was briefly visited, and several days were spent by Rangitikei River and along Southern Access track. This latter area was visited in autumn when many of the herbs and grasses were difficult to locate and identify effectively.

In Tongariro National Park a search was made in areas around Waihohonou Hut, along the stream from Waihohonou Hut, around Oninepango Springs, along the Tongariro Crossing, around Blue Lake, North Crater, Mt Tongariro, the plains between Waihohonou Springs and Outurere Hut, and around Tama Lakes (Fig. 2).

TABLE 1. THREATENED PLANT SPECIES INCLUDED IN THE SURVEY OF KAIMANAWA FOREST PARK AND TONGARIRO NATIONAL PARK.

Unnamed species are identified by appropriate herbarium record numbers.

| SPECIES | THREAT CLASSIFICATION LEVEL* |
|---|---|
| *Acaena emittens* | Regionally rare |
| *Carex uncifolia* | Sparse |
| *Deschampsia caespitosa* | Gradual decline |
| *Epilobium pychnostachyum* | Regionally rare |
| *Gingidia montana* | Regionally rare |
| *Hypericum* aff. *japonicum* (CHR 165889, Volcanic Plateau) | Serious decline |
| *Lachnagrostis elata* | Sparse |
| *Melicytus* aff. *alpinus* (CHR 541565 Rangipo) | Data deficient |
| *Myosotis australis* "yellow" | Regionally rare |
| *M. pygmaea* var. *pygmaea* | Serious decline |
| *M. pygmaea* var. *glauca* - | Nationally endangered |
| *M.* aff. *pygmaea* (CHR 244566, Volcanic Plateau) | Nationally endangered |
| *Stackhousia minima* | Gradual decline |
| *Vittadinia australis* | Data deficient |

* For definition of categories of threat, see Molloy et al. (2002) and Singers (unpubl. 2003). Other information is taken from Cameron et al. (1995), de Lange et al. (1999), and Dopson et al. (1999).

# 3. Target species found

### *Acaena emittens*

*Acaena emittens* is restricted to the central North Island. The distribution includes eastern Tongariro National Park, southern Kaimanawa Ranges, Kaweka Range and south to the north-western part of Ruahine Range. It grows in open *Nothofagus* forest, scrub especially dominated by *Leptospermum scoparium* and on open disturbed sites (Macmillan 1989). The species is found from 450 to 1500 m altitude.

In this survey *Acaena emittens* was found at two sites, at the Moawhango headwater where the Southern Access track crosses the river, and in the upper little Waipakihi Stream. At the head of the Moawhango it was growing in short tussock vegetation that was heavily browsed by horses. The plant was dominant in an area of several square metres on the floodplains and it is likely to be relatively common in the area around the riverhead. At the head of little Waipakihi Valley near Mt Patutu it was found growing matted along a small creek. *Acaena emittens* is low-growing and unlikely to be threatened by browsing by horses, the horses rather browsing the taller plants that would otherwise compete with it.

Figure 1. Areas surveyed in Kaimanawa Forest Park.

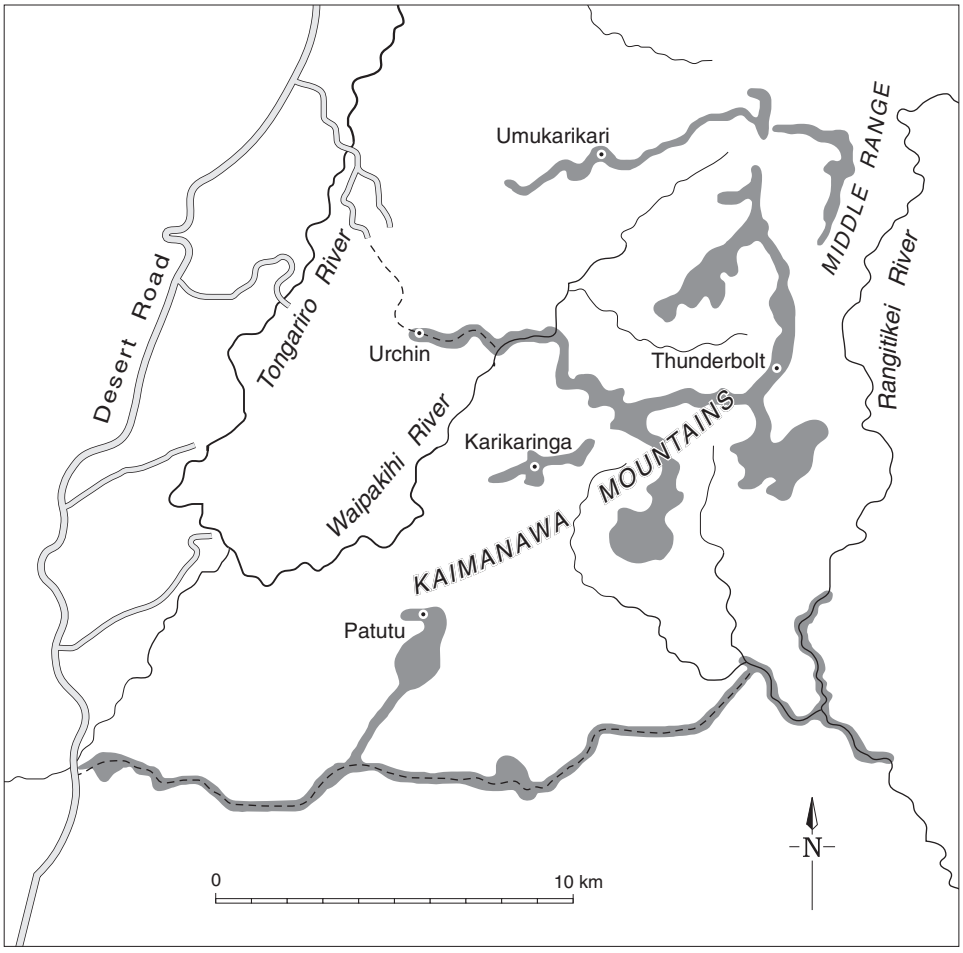
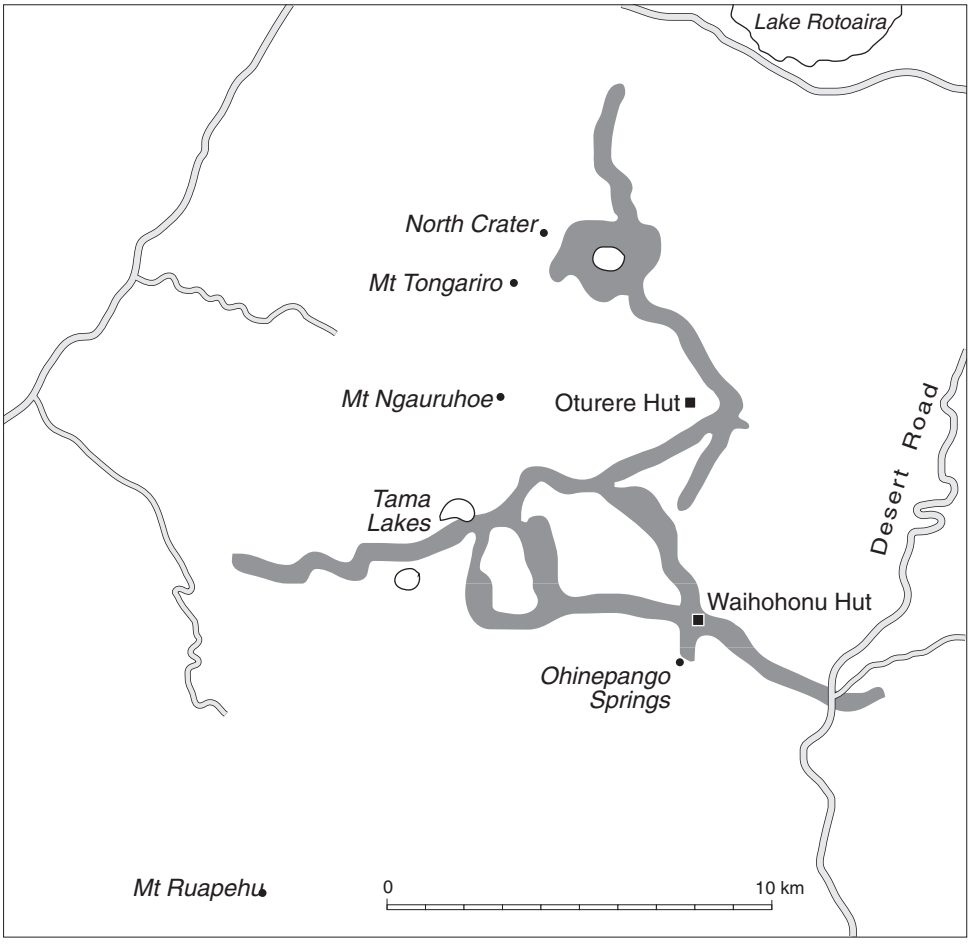



Figure 2. Areas surveyed in Tongariro National Park.



### *Epilobium pychnostachyum*

*Epilobium pychnostachyum* grows on unstable but fine-grained shingle screes in the mountains. In the South Island where this habitat is relatively widespread the species is reasonably common (Raven & Raven 1976). Only a few North Island records exist and they are all from Mt Ruapehu and Kaimanawa and Kaweka Ranges. This plant was found on nearly every top in the Kaimanawa Ranges, where it was growing on greywacke scree in the alpine zone. Most screes encounted in this survey were searched, resulting in ten new records of the plants occurrence, widely distributed in Kaimanawa Forest Park. It is likely to occur on more sites, but the screes are difficult to search and many are dangerous to reach, so only the more accessible ones were properly searched. More than 20 plants were recorded at every site and all plants had abundant flowers and fruit. There are also records of *Epilobium pychnostachyum* from the western side of Mt Ruapehu in Tongariro National Park. My conclusion is that *Epilobium pychnostachyum* is uncommon because its habitat is uncommon. However, there are viable populations at all sites and no threats were observed.

### *Melicytus* aff. *alpinus* (CHR 541565; Rangipo)

There are two records of *Melicytus* aff. *alpinus* in Kaimanawa Forest Park, one from Northern Arm in Boyd Valley (AK 237270, Singers unpubl. 2003) and one new from the upper Waipakihi River. The latter site is close to Waipakihi hut, slightly upstream of where the track crosses the river. Two plants were found amongst red tussock and shrubs a metre from the river. They were growing on volcanic soil with high pumice content. The two plants were browsed, probably by hares and possums. *Melicytus* aff. *alpinus* is likely to be threatened by browsing animals as well as being naturally vulnerable due to its small and sparse population.

The largest known population occurs in the Rangiwaea–Tufa blocks on the south side of Mt Ruapehu and in Karioi Forest. Approximately 20 plants have been recorded scattered in grassland, shrubland and secondary forest. This general area is the likely location of the plants recorded by Druce at Whangaehu Springs (CHR 131256). At this site there is a viable population with several old plants and some younger plants as well. There is an old record from Tongariro National Park from Mangaturuturu Valley south-west of Ruapehu (CHR 245293).

### *Myosotis australis* "yellow"

*Myosotis australis* is a small annual with yellow flowers and bronze-coloured leaves. It grows in alpine, fertile substrates such as rock ledges, stable screes and bare rocky pavement, usually in very little soil. Its distribution includes central North Island and northern parts of the South Island.

In this survey *Myosotis australis* was only found at a previously recorded site on Mt. Patutu (Druce's species list no. 77, Druce unpubl. 1973), where it was growing at a sheltered scree site in association with *Epilobium pychnostachyum* and *E. glabellum*. Twelve plants were found, all of them with flowers and fruits. This plant is small and easily overlooked, especially when not in flower. Many screes were searched in Kaimanawa Forest Park and no other plants were found. Most of the fieldwork was conducted after flowering and plants could have been missed. This plant is also known from the Kaweka

Ranges (Druce's species list no. 72, Druce unpubl. 1972). Mt Patutu is the only current site in the Kaimanawa Ranges, and it is presumed that this species is likely to be threatened here. Short-lived annuals are more susceptible to annual climatic variation than perennials, as they have to complete their life-cycle and set seed every year, in all climatic ranges. Small populations of annuals are therefore particularly vulnerable to annual variation and abundance crashes. *Myosotis* aff. *pygmaea* is likely to be in a similar situation.

### *Myosotis* aff. *pygmaea* (CHR 244566; Volcanic Plateau)

What is now referred to as *Myosotis* aff. *pygmaea* "Volcanic Plateau" was formerly known as *Myosotis pygmaea* var. *drucei.* The species was found on the same site as *M. australis* at Mt Patutu in the southern Kaimanawa Ranges. It was growing on the lower edge of a scree, where scree debris meets low turf vegetation. The site is a small creek that dries out in summer. *Myosotis* aff. *pygmaea* "Volcanic Plateau" is a very inconspicuous plant and it was fortuitously found while I was on my knees to get a close-up photo of another plant. The open temporary wet stream habitats of small turf-like herbs are not a common habitat type and the species is likely to be rare because of this restriction. This habitat type is also particularly vulnerable to weed invasion from exotic rushes, sedges, grasses and heather, which may threaten this species. However, it is present on some species lists (Atkinson unpubl. 1971; Druce unpubl. 1972, 1973) and also herbarium sheets, although currently known only in the Moawhango region in the Army Training Area. Although the Kaimanawa Forest Park has not been comprehensively searched, there is reason to believe that it is not present at many more sites there due to the limitations of habitat.

### *Stackhousia minima*

*Stackhousia minima* is a very small plant that grows on river flats in damp tussock grassland among other herbaceous plants, often forming a carpet. It ranges from lowland to higher montane zone (Allan 1961). One record was made during the survey by Little Waipakihi Stream in southern Kaimanawa Ranges.

This plant was once very common in open red tussock grassland on the lower slopes of Mt Tongariro and Mt Ruapehu (Atkinson unpubl. 1971) and was further recorded as abundant on the Tongariro National Park species list. Heather (*Calluna vulgaris*) has probably invaded much of its range so it could be declining.

The habitat where it was found is quite abundant, both in Kaimanawa Forest Park and Tongariro National Park, and the species is probably more common than observed. As it is inconspicuous it is easily overlooked.

### *Vittadinia australis*

*Vittadinia australis* grows on gravel and sand on river flats, grassland and open places throughout the country (Allan 1961). Since this survey was primarily focused on alpine plants, not much time was spent searching river habitats. Despite this, two ocurrences were recorded at the Rangitikei River in Kaimanawa Forest Park. In the Tongariro/Taupo Conservancy the main distribution of this species is along Waipakihi River and it is reasonably common in the lower section. There are no records from Tongariro National Park.

# 4. Target species not found

None of the targeted species were found in Tongariro National Park although the following species have been recorded in the area in the past: *Acaena emittens, Carex uncifolia, Epilobium pychnostachyum, Gingidia montana, Hypericum* aff. *japonicum, Melicytus* aff. *alpinus, Myosotis australis* "yellow", *Myosotis* aff. *pygmaea* "Volcanic Plateau", and *Stackhousia minima*.

### *Hypericum* aff. *japonicum* (CHR 165889; Volcanic Plateau)

*Hypericum* aff. *japonicum* is a tiny plant that grows in frost flats and peaty-bottomed channels with little vegetation, often among *Carex echinata, Gleichenia dicondrifolia* and *Empodisma minus,* but at the upper end of the fertility sequence where these species start to give way to red tussock. This yet undescribed species is smaller than *H. japonicum*, with erect unbranched stems 3–5 cm, purplish grey leaves, and tiny yellow flowers. It is recorded from most areas in Tongariro National Park (Atkinson unpubl. 1971), where it used to grow just on the border between tussock grassland and ephemeral wetlands. On the western slopes of Mt Tongariro this habitat is currently dominated by heather, resulting in a probable loss of most suitable habitats. There are also old herbarium records from Kaweka Range (CHR 116279), southern Kaimanawa Ranges (CHR 78879, 252489, 79542 and 260222) and Mt Tihia (CHR 156889, 273235 and 165898).

### *Deschampsia caespitosa*

The former distribution of *Deschampsia caespitosa* in New Zealand includes the Volcanic Plateau region of the central North Island and the southern half of South Island (Edgar & Connor 2000). Early records exist from near the Waiouru railway station (1916), the northern arm of Waiotupuritia Stream in the Kaimanawa Ranges (1948), and more recently at Rangitaiki Conservation area (1983) and Kaweka Lakes. It has been assumed that this species has become exceedingly rare because of the browsing pressure from introduced mammals, and it probably now only occurs where they are absent, e.g. Rangitaiki Conservation Area (NZFRI 12653). *Deschampsia caespitosa* grows on damp ground in grassland habitats on the margins of lakes or tarns, coastal swamps and occasionally on rock. I believe I would have identified it during this survey if was still present.

### *Carex uncifolia*

*Carex uncifolia* is a sedge that is found in wet sites in the northern half of the South Island (Edgar & Moore 1976). There are only two records from North Island. One is from the basin east of Mt Hauhungatahi in Tongariro National Park and the other is from the Moawhango region in the Army Training Area (Dopson et al. 1999). The wetland east of Mt Hauhungatahi was not surveyed.

### *Gingidia montana*

*Gingidia montana* was formerly common, but is now mostly restricted to places inaccessible to stock (Allan 1961). It grows in grassland, rock and gravel

habitats, usually associated with mudstone or limestone, from coastal to higher montane zone. Within the survey area it is believed it may be extinct. The only known sites in the Tongariro/Taupo Conservancy are a mudstone road bank on SH 48 west of Waiouru, and on Tukino Road (Tongariro National Park) on the eastern side of Mt Ruapehu. It is a rather conspicuous plant with fresh green leaves and was specifically searched for at rocky outcrops and cliffs where browsing animals would have restricted access.

### *Lachnagrostis elata*

*Lachnagrostis elata* grows in damp ground in tussock grassland and open forest (Edgar & Connor 2000). It ranges from lowland to subalpine zone. The distribution includes Te Urewera National Park, the Volcanic Plateau and Mt Egmont in the North Island and the western part of the South Island. There are no current records of *Lachnagrostis elata* either in Tongariro National Park or Kaimanawa Forest Park. It is likely to be present but has not yet been found.

### *Myosotis pygmaea* var. *pygmaea*

*Myosotis pygmaea* var. *pygmaea* is a very small plant generally found in coastal situations. Historic records of the *M. pygmaea* complex are not detailed enough to identify which subspecies were recorded. It is recorded from north-western Ruahines and southern Taranaki coast (C. Ogle pers. comm.).

### *Myosotis pygmaea* var. *glauca*

*Myosotis pygmaea* var. *glauca* has a very restricted distribution in the North Island (Dopson et al. 1999). The only record is at Moawhango River in the Army Training Area where it grows amongst fine greywacke gravel adjacent to streams and riverbeds (CHR 252336 and 252337).

# 5. Recommendations for further survey

### Kaimanawa Forest Park

1. River flats and open riparian margins are likely habitats for the following species. On forest margins *Melicytus* aff. *alpinus,* and *Acaena emittens* could occur. Dry gravel terraces and short-tussocklands are likely habitats for *Vittadinia australis* and *Stackhousia minima*. Being a temporary wetland plant, *Hypericum* aff. *japonicum* may occur in frostflats, specifically where drainage is poor and water periodically ponds. Likely areas to survey are Waipakihi, Rangitikei, Moawhango Rivers and near Boyd at the Ngaruroro River near Boyd Lodge.

2. One historic record of *Deschampsia caespitosa* exists in Kaimanawa Ranges, on private land in the 'North Arm – Waiotupuritia Stream' collected by Druce in 1948. Permission to survey this area in 2002 was not granted and it is

unknown if this species still occurs here. The most likely place to relocate this species is at Rangitaiki Conservation Area.

3. Several unidentified small *Myosotis* specimens have been found in vegetation monitoring plots in the last several years from southern Rangitikei and Kaweka Forest Park. These areas are *Nothofagus* forest habitats and confident identification was not made. The threatened *Myosotis* species are likely to occur elsewhere and, before further surveys are conducted, habitat requirements need to be further described in order to identify more likely sites.

## Tongariro National Park

Less survey effort was extended in Tongariro National Park. It is recommended that further effort be spent based on old herbarium records and distribution limits on the Tongariro National Park species list.

1. The lower slopes of the eastern side of Mt Ruapehu and Rangipo Desert should be searched because of previous records of *Stackhousia minima* and *Hypericum* aff. *japonicum*. In addition, *Aceana emittens* and *Vittadenia australis* are most likely to be found here, especially along the riverbeds.

2. The wetlands east of Mt Hauhungatahi is a historic site for *Carex uncifolia*. This area and the wetland on Mt Hauhangatahi are also likely habitat for *Myosotis* aff. *pymaea*, and *Hypericum* aff. *japonicum*. Likely places to search for *Myosotis* aff. *pymaea* are under red tussock around depressions where *Gleichinia* and *Empodisma* occur (C. Ogle pers. comm.). Mt Tihia should also be surveyed, although suitable habitats there have been reduced by heather invasion.

3. A historic record of *Melicytus* aff. *alpinus* in the Mangaturuturu valley from 1972 should be examined.

4. *Gingidia montana* is only likely to be present at sites inaccessible to deer, especially limestone or mudstone. Steep banks and cliffs occur throughout the park and special attention should be made to look for this when visiting these areas.

5. Historical records of *Epilobium pychnostachyum* are only known from the southern slopes of Mt Ruapehu. This plant is likely to occur at high altitude and on eroding sites.

6. More information about habitat requirements of *Lachnagrostis eleta* should be obtained prior to further survey of this species.

# 6. Acknowledgements

I wish to thank Harry Keys for facilitating the funding for this survey through the Unprogrammed Science Advice fund. Nick Singers provided invaluable botanical advice and Steve Deverell commented on earlier versions of this report.

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# Addenda/Errata

**Lund, A.S. 2003: Threatened plant survey in Kaimanawa Forest Park and Tongariro National Park. *DOC Science Internal Series 117.***

The table on p. 7 is to be updated as follows:

TABLE 1. THREATENED PLANT SPECIES INCLUDED IN THE SURVEY OF KAIMANAWA FOREST PARK AND TONGARIRO NATIONAL PARK.

Unnamed species are identified by appropriate herbarium record numbers. For definition of categories of threat, see Molloy et al. (2002).

| SPECIES | THREAT CLASSIFICATION LEVEL |
|---|---|
| *Acaena emittens* | Regionally rare[2] |
| *Carex uncifolia* | Range restricted[1] |
| *Deschampsia cespitosa* | Gradual decline (SO, HI)[1] |
| *Epilobium pycbnostachyum* | Regionally rare[2] |
| *Gingidia montana* | Regionally rare[2] |
| *Hypericum* aff. *japonicum* (CHR 165889, Volcanic Plateau) | Serious decline (DP)[1] |
| *Lachnagrostis elata* | Sparse (DP)[1] |
| *Melicytus* aff. *alpinus* (CHR 541565 Rangipo) | Data deficient[1] |
| *Myosotis australis* "yellow" | Regionally rare[2] |
| *M. pygmaea* var. *pygmaea* | Serious decline (DP)[1] |
| *M. pygmaea* var. *glauca* | Nationally endangered (CD, EF)[1] |
| *M.* aff. *pygmaea* (CHR 244566, Volcanic Plateau) | Nationally endangered (CD)[1] |
| *Stackhousia minima* | Regionally rare[2] |
| *Vittadinia australis* | Data deficient[1] |

Sources: [1] Hitchmough 2002; [2] Singers unpubl. 2003

Second paragraph on page 10:

Although *Myosotis* aff. *pygmaea* "Volcanic Plateau" was probably included in *M. pyg.* var. *drucei* in the past, it has been recognised as a separate but unnamed taxon, firstly by the late A. P. Druce, for more than 20 years. They are separate taxa; the paragraph applies to *Myosotis pygmaea* var. *drucei* only.

References section on page 14:
The publication year for Molloy et al. is 2002 not 2001.

Hitchmough, R. (comp.) 2002: New Zealand Threat Classification System lists—2002. *Threatened species occasional publication 23*, 210 p.