Millotia muelleri

clustered bowflower

TASMANIAN THREATENED SPECIES LISTING STATEMENT

Images by Richard Schahinger

Scientific name: ***Millotia muelleri*** (Sond.) P.S.Short, *Muelleria* 7: 246 (1990)

Common Name: Clustered bowflower (Wapstra et al. 2005)

Group: vascular plant, dicotyledon, family **Asteraceae**

Status: *Threatened Species Protection Act 1995*: **endangered**
Environment Protection and Biodiversity Conservation Act 1999: **Not listed**

Distribution: Endemic status: **not endemic to Tasmania**
Tasmanian NRM region: **North**

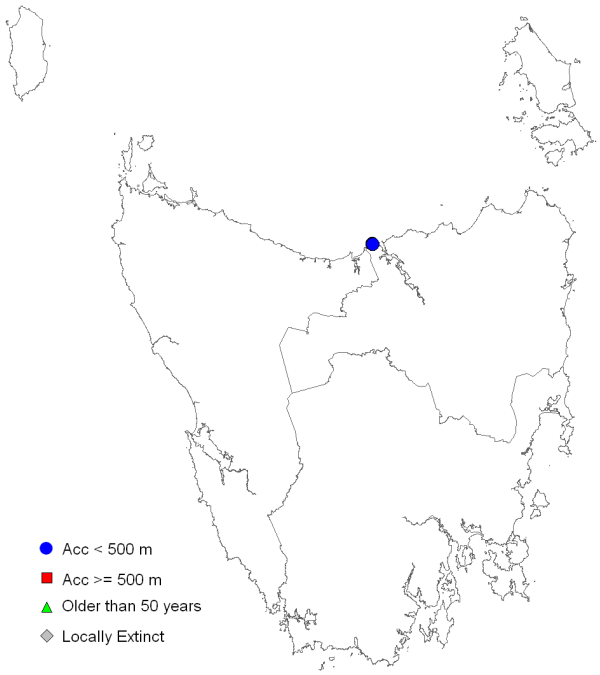

Figure 1. Distribution of *Millotia muelleri* in Tasmania, showing Natural Resource Management regions

Plate 1. Habit of *Millotia muelleri*

SUMMARY: *Millotia muelleri* (clustered bowflower) is an annual herb in the daisy family, known in Tasmania from a single site on the north coast that probably represents the southern limit of its range in Australia. The Tasmanian site occurs in skeletal soils at the top of a dolerite cliff within *Allocasuarina verticillata* woodland. While plant numbers are likely to fluctuate from year to year, fewer than 60 plants have been recorded in any given year in an area of less than 10 m^2. This places the species at a high risk of extinction from inadvertent or chance events, particularly as the species may not emerge in unfavourable years, and makes it susceptible to even small localised changes in environmental conditions. The most pressing needs of the species are to prevent the destruction or degradation of its known and potential habitat.

IDENTIFICATION AND ECOLOGY

Millotia muelleri is an annual species that recruits from soil-stored seed, the longevity of which is unknown. Plant numbers are likely to fluctuate from year to year, with germination, growth and flowering likely to be reliant on the timing and intensity of autumn and winter rains, as well as the availability of bare ground. It is also likely that plants will not emerge in years of severe drought. Flowering plants have been observed in mid to late October in Tasmania, while on mainland Australia the species is reported to flower from August to November (Walsh & Entwisle 1999). The length of flowering is likely to be dependent upon prevailing weather conditions. Insects are the most likely pollination vector for this species (A. Hingston pers. comm.). The fruits have no obvious physical aids to dispersal, their spread likely to be facilitated by animals and water flow. *Millotia muelleri* has a relatively high phylogenetic distinctiveness score, being one of only two species and infra-species in the *Millotia* genus in Tasmania, despite being one of 213 in the family Asteraceae (Baker & de Salas 2013).

Survey techniques

Surveys should be conducted in October when the species is known to flower in Tasmania.

Description

Millotia muelleri is an ascending to erect annual herb with branches 1 to 9 cm long. The stems are covered with stalked glandular hairs and sometimes also with white cottony hairs. The lower leaves are opposite, the upper leaves alternate and all are entire. The leaves are linear- to lance-shaped, 5 to 18 mm long, and covered with glandular hairs and rarely with cottony hairs also. The flowers occur in compound heads at the ends of the branches. They are surrounded by a single row of 4 to 5 bracts that are about 3 mm long. The bracts are also covered in glandular hairs and often have purplish clear margins. Each flower head consists of 3 to 15 bisexual florets. The cream or purplish corollas have 3 or 4 lobes, with the corolla tubes curved. The fruit (an achene) is 4 to 6 mm long and is gradually tapered to a straight or slightly curved terete beak. The surface of the fruit is papillate. There are no scales, hairs or bristles (pappus) at the top of the fruit to aid in dispersal. Tasmanian collections are at the smaller end of the height range described above.

[description based on Walsh & Entwisle 1999]

Confusing species

Millotia muelleri is unlikely to be confused with other species in Tasmania when in flower due to its distinctive curved corolla tubes. The only other species of *Millotia* in Tasmania is *Millotia tenuifolia* which has leaves that are cottony in appearance, a pappus (with 20 to 30 barbellate bristles), and a corolla without a bow.

DISTRIBUTION AND HABITAT

On mainland Australia *Millotia muelleri* occurs in South Australia, Victoria and New South Wales, where it is known from open forest and saline shrublands, mostly on sandy soils and often with rock exposures. In Tasmania, the species is known from a single site in the State's north at West Head (Figure 1, Table 1), where it grows in a thin layer of soil and moss over exposed rock plates at the top of a west-facing dolerite cliff under *Allocasuarina verticillata* (drooping sheoak) at an altitude of about 50 m

Table 1. Population summary for *Millotia muelleri* in Tasmania

	Subpopulation	Tenure	NRM region *	1:25000 mapsheet	Year recorded	Area occupied (m^2)	Number of individuals
1	West Head	Narawntapu National Park	North	Greens Beach	2013 2008 1992	5 4 unknown	51 15 unknown

above sea level (Plates 2 & 3). Associated species include the shrubs *Calytrix tetragona* and *Goodenia ovata*, the sedge *Lepidosperma viscidum*, and the herbs *Poranthera microphylla, Dichondra repens* and a *Hydrocotyle* species.

Plate 2. *Millotia muelleri*: habitat at West Head

Plate 3. *Millotia muelleri*: habitat detail showing sheoak litter, moss, lichens and bare ground

POPULATION PARAMETERS

Millotia muelleri is represented by a single subpopulation in Tasmania, first recorded in 1992. Plant numbers and sites of emergence are likely to fluctuate from year to year, with the total number of mature plants recorded in any given year fewer than 60 plants (Table 1). While one patch of plants was recorded in 2008, two (different) patches were found in 2013 (though one patch consisted of a single plant). The linear range of the species is about 50 m, with an area occupied of less than 10 m^2.

Although the extent of potential habitat is considerable, the chance of detecting additional *Millotia muelleri* sites in Tasmania is likely to be low. The north coast of Tasmania appears to be at the southern limit of its Australian range, and in the last two decades there have been numerous botanical assessments of near-coastal areas in northern Tasmania for development proposals, as well as targeted surveys for other small threatened annual flora species that flower at the same time, including *Calandrinia granulifera*, *Phyllangium divergens* and *Siloxerus multiflorus,* all of which occur in close proximity to the West Head site.

RESERVATION STATUS

The only known site of *Millotia muelleri* in Tasmania occurs in Narawntapu National Park.

CONSERVATION ASSESSMENT

Millotia muelleri was listed as rare on the original schedules of the Tasmanian *Threatened Species Protection Act 1995* as its distribution did not exceed a range defined by a square measuring 100 x 100 km (Flora Advisory Committee 1994). The species was uplisted to endangered in April 2016 meeting criterion D:

- total population estimated to number fewer than 250 mature individuals;
- total population with an area of occupancy less than one hectare, and typically in five or fewer locations that provide an uncertain future due to the effects of human activities or stochastic events, and thus capable of becoming extinct within a very short time period.

THREATS, LIMITING FACTORS AND MANAGEMENT ISSUES

With northern Tasmania at the southernmost extent of its known range in Australia, it is likely that *Millotia muelleri* is naturally rare in Tasmania. The major risks to the species stem from the small size of the population, both in numbers and extent, risks that are exacerbated by the ephemeral nature of the species, particularly if plants do not emerge in unfavourable years. The risk of the species becoming extinct in Tasmania is likely to be governed in a large part by the longevity of soil-stored seed though this is as yet unknown.

Inappropriate disturbance: The thin layer of soil and moss over exposed rock plates that form the habitat of the species is likely to be sensitive to direct physical disturbance such as trampling. Other disturbance may impact the species indirectly through changes to moisture conditions, which affect the recruitment from soil stored seed from year to year. Such changes may arise from events such as fire or drought, with the resulting change of vegetation cover leading to an increase in insolation and subtle changes in hydrology.

Stochastic events: The small size of the population both in numbers and extent makes the species highly susceptible to chance events though the relatively remote location somewhat alleviates the risk of inadvertent events.

Inbreeding depression: Tasmanian plants are at the smaller end of the height range described for the species and the total population is small, suggesting that the population may be suffering from inbreeding.

Climate change: It is likely that even minor shifts in average seasonal conditions and rainfall patterns will have an adverse impact on such a locally restricted species. The impacts are most likely to be mediated through reduced recruitment into and from the soil seed store.

MANAGEMENT STRATEGY

Management objectives

The main objectives for the management of *Millotia muelleri* are to increase the number of known subpopulations through survey and to ensure that the known subpopulation does not decline by protecting and managing habitat.

What has been done?

Surveys: Targeted surveys for the species were undertaken in 2007 (when no plants were found), and 2008 and 2013 (Table 1).

What is needed?

Agencies, groups or individuals may assist with some or all of the following recovery actions. Coordinated efforts may achieve the best and most efficient results.

- update the Management Plan for Narawntapu National Park to include the species and its requirements;
- undertake extension surveys for the species, radiating out from the known site into areas of potential habitat;
- investigate the recruitment strategy of the species, in particular the longevity of soil stored seed;
- undertake regular demographic monitoring of the known site to better understand the possible impacts of drought, fire and climate change;
- provide information and extension support to relevant Natural Resource Management committees, local councils, government agencies, the local community and development proponents on the locality, significance and management of known subpopulations and potential.

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Prepared in January 2013 under the provisions of the Tasmanian *Threatened Species Protection Act 1995*. Approved by the Secretary and published in October 2014. Status updated in 2016.

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