Image by Phil Collier

Brachyscome rigidula

cutleaf daisy

TASMANIAN THREATENED SPECIES LISTING STATEMENT

Scientific name: ***Brachyscome rigidula*** (DC.) G.L.Davis, *Proc. Linn. Soc. New South Wales* 73: 219 (1948)

Common Name: cutleaf daisy (Wapstra et al. 2005)

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

Status: *Threatened Species Protection Act 1995*: **vulnerable**

Environment Protection and Biodiversity Conservation Act 1999: **Not listed**

Distribution: Endemic: **not endemic**

Tasmanian NRM regions: **North, South**

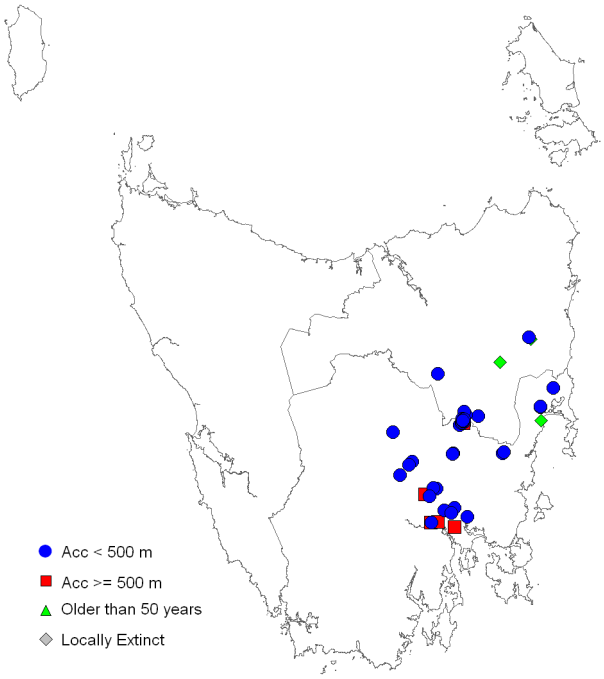

Figure 1. Distribution of *Brachyscome rigidula* in Tasmania, showing Natural Resource Management regions

Plate 1. Habit of *Brachyscome rigidula* (image by Richard Schahinger)

SUMMARY: *Brachyscome rigidula* (cutleaf daisy) is a perennial daisy that in Tasmania extends from the Derwent to Fingal valleys. While known from about 30 subpopulations, about half have not been recorded this century. The species generally occurs in very small localised subpopulations, having only an estimated few thousand plants and occupying less than 5 ha in total. This places the species at risk from local extinctions from chance events, the risk exacerbated as recruitment may be limited. Recruitment is reliant on bare ground gaps that in many instances require disturbance for their creation. Plants, particularly seedlings, are highly palatable and there is a possibility that very small populations do not produce enough viable seed to prevent decline. Threats to the species include clearance, modification and fragmentation of its habitat, heavy stock browsing and woody weed invasion. Appropriate stock and weed management regimes would benefit many of the recorded subpopulations.

ECOLOGY AND IDENTIFICATION

The main flowering period for *Brachyscome rigidula* in Tasmania is November to December, though flowering plants have been observed as late as May. Dispersal of seed occurs mostly in December and January. The stickiness of the seed suggests dispersal by animals (M. Visoiu, pers. comm.). The species recruits from seed in areas of bare ground free from competition. The longevity of plants and of soil-stored seed is unknown. The species is capable of resprouting after fire or physical damage but can only tolerate light grazing.

Brachyscome rigidula has a relatively low phylogenetic distinctiveness score, being one of 13 species and infra-species in the *Brachyscome* genus, and one of 213 in the family Asteraceae in Tasmania (Baker & de Salas 2013).

Survey techniques

Surveys for *Brachyscome rigidula* can be undertaken at any time of year, though detectability is much easier during its peak flowering period, November to December.

Description

Brachyscome rigidula is an ascending to sprawling perennial herb with highly dissected leaves and large purple flowers (Plate 1). It grows to about 30 cm high and has a slender woody root and densely glandular-hairy stems. The leaves are arranged alternately along the stems, obovate in outline and up to 3 cm long. They are deeply pinnately-divided into a few narrow-linear lobes that are distant and spreading and glabrous or sparsely pubescent. The 10 to 15 mm diameter flower-heads are solitary and are on erect glandular-hairy peduncles. The involucral bracts are in a single row and are equal, oblong to oblanceolate and 3.3 to 5.6 mm long with glandular-pubescent outer surfaces and narrow scarious margins. The numerous ray florets are 7 to 13 mm long and have purplish-blue ligules. The achenes are about 3 mm long, obovate, flattened, light to dark brown in colour, with entire or irregularly dissected wings. The pappus is a tuft of unequal hairs up to 0.4 mm long.

[description based on Curtis 1963, Walsh & Entwisle 1999]

Plate 2. Scanned specimen of *Brachyscome rigidula*

Confusing species

Brachyscome rigidula is unlikely to be confused with other *Brachyscome* species in Tasmania due to its foliage (Plate 2). It bears a superficial similarity to *Vittadinia muelleri* (narrowleaf new-

holland-daisy), but the leaves of that species are irregularly lobed rather than pinnate, the involucral bracts are in 2 or 3 rows rather than 1, the rays florets are much smaller (up to about 5 mm long), and its achenes have a distinctive pappus of numerous bristles 3 to 6 mm long.

DISTRIBUTION AND HABITAT

On mainland Australia *Brachyscome rigidula* occurs in New South Wales, the Australian Capital Territory and Victoria, where it grows in alpine and subalpine areas (Walsh & Entwisle 1999). In Tasmania the species is found in the Fingal Valley, Northern and Southern Midlands, Derwent Valley, East Coast and the eastern part of the Central Highlands. The elevation range of recorded sites in Tasmania is 10 to 600 m above sea level, though all but two of the sites, Lemon Hill near Oatlands and Waddamana, are at elevations less than 350 m above sea level.

Brachyscome rigidula grows in native grasslands, grassy shrublands or grassy woodlands on a variety of substrates, including Triassic sandstone, Jurassic dolerite and Tertiary basalt. The surface rock cover is usually high. The dominant eucalypt in woodland situations includes *Eucalyptus amygdalina* (black peppermint), *Eucalyptus pauciflora* (cabbage gum) and *Eucalyptus viminalis* (white gum) with other typical small trees including *Acacia mearnsii* (black wattle) and *Bursaria spinosa* (prickly box). *Themeda triandra* (kangaroo grass) is usually present. The annual mean rainfall of recorded sites ranges from 450 to 600 mm.

POPULATION PARAMETERS

The *Brachyscome rigidula* population in Tasmania is estimated to consist of at least a few thousand plants in about 30 subpopulations, though quantitative estimates are available for fewer than half the sites (Table 1). Three subpopulations are presumed extinct, two of which are known from historical records and the species has not been seen at the Pontville site since 1998 despite a number of targeted surveys. About half of the sites have not been recorded this century though few have been subject to targeted surveys. The linear range of the species is 140 km, the extent of occurrence 8,100 km^2, and the area of occupancy somewhat less than 5 ha.

There are only three sites in Tasmania where mature plant numbers are known to exceed 100 (Township Lagoon, Falls of Clyde and Tea Tree). The majority of sites are localised and support fewer than 50 plants. *Brachyscome rigidula* is known to have persisted in good numbers at Township Lagoon since at least the early 1980s, though its status at many recorded sites is uncertain (Table 1). The species was first collected in the Tunbridge area 1931 where there are now a number of occurrences. Kirkpatrick et al. (1988) noted the species' occurrence in 'Risdon Brook Water Reserve'. However, precise location details are not available and the species has not been recorded there in the interim despite targeted surveys.

As the number of known sites has almost doubled since the species was listed in 1995, there is a reasonable likelihood of additional *Brachyscome rigidula* subpopulations being found in Tasmania given a well-resourced and targeted survey effort, with grassy ecosystems on private land in the Midlands offering the best prospects.

Plate 3. *Bursaria spinosa* grassy shrubland at the Kempton Sugarloaf site of *Brachyscome rigidula*, January 2014 (image by Richard Schahinger)

RESERVATION STATUS

Brachyscome rigidula occurs in Township Lagoon Nature Reserve (Zacharek et al. 1997). Four sites occur on private land covered by conservation covenants under the Tasmanian *Nature Conservation Act 2002* (Table 1).

Table 1. Population summary for *Brachyscome rigidula* in Tasmania

	Subpopulation	Tenure	NRM region	1:25 000 mapsheet	Year last (first) recorded	Area occupied (ha)	Number of mature plants
1	Fingal	private land	North	Mangana	1984 (1879)	unknown	unknown
2	Avoca	private land	North	Hanleth	1891	presumed extinct	
3	Tooms Lake Road	private land	North	Morriston	2011	0.0001	2
4	Macquarie Rd (Isis)	private land *	North	O'Connors	1996	unknown	unknown
5	Oakden Hill	private land *	North	Ellinthorp	1999	unknown	unknown
6	White Lagoon	road reserve	North	Tunbridge	2014 (1990s)	unknown	unknown
7	Murphys Dome (Tunbridge)	private land	North	Tunbridge	2011	0.0001	2
8a	Midland Highway (Tunbridge north)	road reserve	North	Tunbridge	2012 (1984)	0.0002	10
8b	Midland Highway (Tunbridge middle)	road reserve	North	Tunbridge	2012 (1990s)	0.0001	34
8c	Tunbridge	Township Lagoon Nature Reserve	South	Tunbridge	2013 (1983)	1.5	500-600 abundant
8d	Midland Highway (Tunbridge south)	road reserve	South	Tunbridge	2012 (2001)	0.0001	4 1
8e	Tunbridge	rail reserve	South	Tunbridge	1996	unknown	several
9	Lemon Hill	private land	South	Oatlands	2006 (1990s)	unknown	unknown
10	Big Ben	State forest	South	Apslawn	1985	unknown	unknown
11a	Tasman Highway	road reserve	South	Cranbrook	2013 (1993)	0.0004	37
11b	Grange Road	private land *	South	Cranbrook	2006	0.01	20
12	Swansea	private land?	South	Swansea	c. 1900	presumed extinct	
13	Swanston	private land	South	Royalty	2010	0.01	55 (2 patches 1.3 km apart)
14	Waddamana Road	private land	South	Hermitage	1994	unknown	unknown
15	St Lukes Cemetery (Bothwell)	private land	South	Bothwell	2006	unknown	5
16	Falls of Clyde	private land	South	Cawood	2007	0.1	100-1000
17	Langdons Creek	private land	South	Montacute	2011	0.003	11
18	Green Ponds Rivulet	private land	South	Elderslie	2000	unknown	unknown
19	Kempton Sugarloaf	public reserve	South	Elderslie	2014 (2002)	0.05	40-50
20	Huntingdon Tier	private land *	South	Elderslie	2007 (1985)	0.0001	1
21	Clifton Vale Road	private land	South	Elderslie	1967	unknown	unknown
22	Pontville	Commonwealth (Department of Defence)	South	Tea Tree	1998	presumed extinct	
23	Tea Tree	private land & Crown land	South	Tea Tree	2013	0.2	200-300
24	Grices Road (Tea Tree)	private land	South	Tea Tree	1990s	unknown	unknown
25	Prossers Road (Richmond)	private land	South	Tea Tree	2010	0.0001	2
26	Risdon Brook – Grasstree Hill	Mount Direction Conservation Area	South	Richmond	1981	unknown	unknown
27	Granton	private land	South	New Norfolk	1985	unknown	unknown
28	Lyell Highway	road reserve	South	New Norfolk	1995 (1994)	unknown	30

* covered by a conservation covenant under the Tasmanian *Nature Conservation Act 2002*

CONSERVATION ASSESSMENT

Brachyscome rigidula was listed as vulnerable on the original schedules of the Tasmanian *Threatened Species Protection Act 1995*, at which time 15 sites had been recorded (Table 1). The species meets criterion C2a for vulnerable:

- the total population is estimated to number fewer than 10,000 mature individuals;
- there is a continuing decline inferred in the number of mature individuals; and
- the population is severely fragmented (i.e. no subpopulation contains more than 1,000 mature individuals).

THREATS, LIMITING FACTORS AND MANAGEMENT ISSUES

Land clearance and stock grazing: The grassy habitat preferred by *Brachyscome rigidula* has been extensively cleared since European settlement of Tasmania, with the presumed loss of an unknown number of plants and subpopulations. The species is highly sensitive to grazing by stock (Kirkpatrick et al. 1988) and is rarely seen in grazed paddocks. As a consequence the population is now highly fragmented, surviving for the most part in areas free from grazing, such as road and rail reserves. Many subpopulations have little or no room for expansion due to the loss of connecting habitat to agricultural and urban developments. Much of the species' native grassland habitat falls within the ecological community 'Lowland Native Grasslands of Tasmania', a community listed as Critically Endangered on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, with clearance and conversion regulated.

Weeds: Woody weed invasion poses a threat to the species at several sites, including *Ulex europaeus* (gorse), *Rosa rubiginosa* (briar rose) and *Lycium ferocissimum* (african boxthorn).

Lack of disturbance: *Brachyscome rigidula* requires open ground to germinate and recruit, so some form of disturbance may be required to maintain such conditions, either through fire, slashing, physical disturbance or drought. The seed of many daisy species is short-lived following disturbance and the regularity of disturbance may be an important factor for the long-term persistence of subpopulations, particularly as *Brachyscome rigidula* has minimal aids to seed dispersal.

Small size of subpopulations: The small size and localised nature of many subpopulations exposes them to a high risk of extinction due to chance events (stochastic risk). Also, daisy species often have strong self-incompatibility mechanisms, which may restrict the output of viable seed in small subpopulations.

MANAGEMENT STRATEGY

Management objectives

The main objectives for the recovery of *Brachyscome rigidula* are to prevent the inadvertent destruction of subpopulations, maintain existing subpopulations, and promote conditions for successful recruitment.

What has been done?

Management planning: Three roadside sites (Tunbridge north, Tunbridge middle and Tasman Highway, Table 1), are included in a vegetation management program conducted by Tasmania's Department of Infrastructure, Energy and Roads (Sinclair Knight Mertz 2013a & b). Measures were taken to protect plants at the Lyell Highway site during road widening in the mid 1990s.

Census and weeding: A census of the Township Lagoon site was undertaken in 2011 by volunteers with the Wildcare group Threatened Plants Tasmania. Weed works have been conducted at the site by the same group since 2009.

Seed collection: Seed has been collected from the Falls of Clyde and Tea Tree subpopulations for long-term storage at the Tasmanian Seed Conservation Centre based at the Royal Tasmanian Botanical Gardens in Hobart.

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.

- 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 the known subpopulations and areas of potential habitat;

- survey sites not seen in recent years to determine their status and to inform the development of appropriate management strategies;
- investigate longevity of the seed once dispersed to inform gap-forming disturbance requirements;
- investigate whether very small subpopulations produce viable seed;
- control the spread of woody weeds at known sites;
- regulate stock intermittently to allow plants to flower and seedlings to establish;
- monitor selected subpopulations for longevity, recruitment, condition and response to disturbance;
- monitor compliance with existing covenants and, depending on the results of ongoing monitoring, adjust the management prescriptions as required;
- regenerate declining subpopulations by burning or slashing if the vegetation has become overgrown;
- undertake extension surveys of potential habitat within the species' recorded range.

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