Image by H&A Wapstra

grassland candles

Stackhousia subterranea

TASMANIAN THREATENED FLORA LISTING STATEMENT

Scientific name: ***Stackhousia subterranea*** W.R. Barker, *J. Adelaide Bot. Gard.* 21: 90 (2007)

Family: Stackhousiaceae

Common Name: grassland candles (Wapstra *et al.* 2005)

Name History: Previously known in Tasmania as *Stackhousia gunnii,* Gunn's mignonette

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 Regions: **North and South**

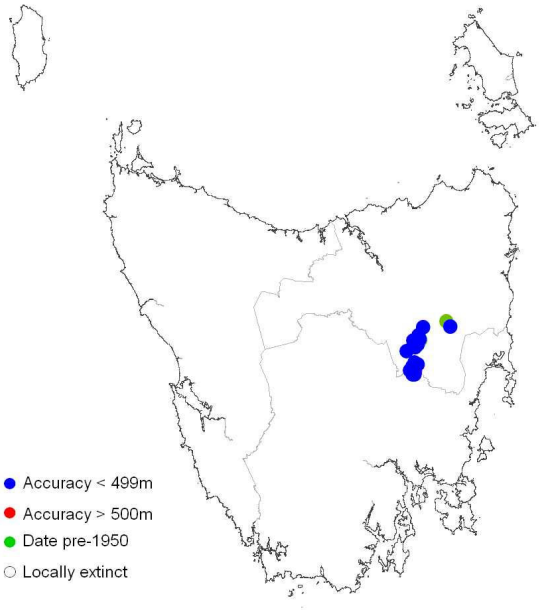

Figure 1. Distribution of *Stackhousia subterranea* in Tasmania.

Plate 1. *Stackhousia subterranea* (Image by Oberon Carter).

IDENTIFICATION AND ECOLOGY

Stackhousia subterranea, until recently known in Tasmania as *Stackhousia gunnii*, is a single-stemmed hairless perennial herb in the Stackhousiaceae family. It grows 15 to 30 cm high, with a few thick linear leaves near the base. At the end of each stem there are deep-cream or yellowish tubular flowers arranged in a candle-like spike.

Stackhousia subterranea is a short-lived perennial with an estimated generation length of 2 to 3 years. It flowers from September to November, with anecdotal evidence suggesting pollination by a range of flies and nocturnal moths.

Surveys for *Stackhousia subterranea* should be undertaken during its main flowering period when the species is most easily identifiable.

Stackhousia subterranea is capable of vegetative reproduction via rhizomes, and has been observed to re-sprout from rootstock after fire (Gilfedder & Kirkpatrick 1998). The species occurs on sites where natural conditions or disturbance, in the form of light grazing, fire or slashing, creates ground free from dense root mats.

Description

Stackhousia subterranea has a creeping rhizome, with aerial shoots that are usually solitary and 15 to 30 cm high. Its leaves are 1 to 4 cm long and rather thick, linear-lanceolate or linear-spathulate in shape and with an acute apex.

The flowers have a strong disagreeable smell, and are arranged in terminal racemes. Sepals are joined with the lobes about 2 mm long, narrow-lanceolate in shape and with an acute apex. Petals are deep cream or yellowish, free at the base then joined to form a narrow cylindrical tube 6 to 7 mm long, with narrow-elliptical free lobes which are spreading and nearly as long as the tube. The flowers have 3 short free styles and 5 stamens opposite the sepals with the filaments shorter than the corolla tube and unequal in length. Fruitlets are 2 to 3 mm long and obovoid, with a reticulate surface (Curtis & Morris 1975).

Confusing Species

The genus *Stackhousia* is readily identifiable when in flower due to its 'candle-shaped' inflorescence (Curtis & Morris 1975). The most similar species to *Stackhousia subterranea* in Tasmania, *Stackhousia monogyna*, has stems that arise from a vertical taproot, thin leaves, and floral bracts that are barely swollen at the base and almost white flowers (Barker 2007). By contrast, *Stackhousia subterranea* is rhizomatous, has thick rather fleshy leaves, floral bracts that are saccate (swollen) in their basal half and flowers that are deep cream to yellow in colour.

DISTRIBUTION AND HABITAT

Stackhousia subterranea occurs in Tasmania's Northern Midlands and Fingal Valley, with an extent of occurrence of 465 km^2 and area of occupancy of less than 10 hectares. The species also occurs in South Australia and Victoria (Barker 2007).

Stackhousia subterranea grows within *Themeda triandra* grassland, or grassy woodland dominated by *Eucalyptus pauciflora*, *Eucalyptus rodwayi* or *Eucalyptus ovata* (Gilfedder & Kirkpatrick 1998). Most sites are on reddish-brown clay-loam soils formed on dolerite or basalt, with others variously on alluvium, sandstone and sand over dolerite. Known sites occur within the altitude range 180 to 260 m, and are within the 650 mm annual isohyet, corresponding to the driest area in Tasmania.

POPULATION ESTIMATE

The total population size is estimated to be between 10,000 and 50,000, with subpopulation estimates ranging from 10s to 10,000s.

There have been at least 13 subpopulations recorded for *Stackhousia subterranea* in Tasmania (Table 1). Given that most occurrences are on private land and the major threat to the species involves a change in land use, the number of locations for the species is considered to be 7 or 8 using land tenure as a surrogate for 'location'. Numbers at known sites have been observed to fluctuate from year to year by at least two orders of magnitude ie 100s to 10,000s (Gilfedder, pers. comm.).

Table 1. Population summary for *Stackhousia subterranea.*

	Subpopulation	Tenure	NRM Region *	1:25000 Mapsheet	Year last seen	Area occupied (ha)	Number of mature plants
1	Township Lagoon	Nature Reserve	South	Tunbridge	2005	1	100s
2	Rattrap	Road reserve	North	Tunbridge	2003	0.01	< 10
3	Tunbridge paddock	Private	North	Tunbridge	2007	2	10,000s
4	Tunbridge Tiers Rd	Road reserve	North	Tunbridge	2005	2	100s
5	Merton Vale	Private	North	Ellinthorp	2005		100s
6	Auburn Road, Ross	Private	North	Ellinthorp	1993	0.025	< 50
7	Preston	Private	North	Jacobs	2002	0.0001	< 10
8	Campbell Town	Private	North	Jacobs			
9	Campbell Town Golf Course	Private	North	Campbell Town	2001	1	10s
10	Campbell Town Cemetery	Private	North	Jacobs	2003	0.01	< 20
11	Wanstead	Private	North	Conara	2007	1	1000s
12	Esk Main Road	Rail reserve	North	Diamond	1995		
13	St Pauls River	Private	North	Roys	1993	1	100s

* NRM region = Natural Resource Management region.
Sites 1–6, 8, 10 and 12–13 were considered in Gilfedder & Kirkpatrick (1998)

RESERVATION STATUS

Reserved within Township Lagoon Nature Reserve, Tunbridge (Zacharek *et al.* 1997).

CONSERVATION ASSESSMENT

Stackhousia subterranea is listed as **endangered** on the Tasmanian *Threatened Species Protection Act 1995*. It was originally listed in 1995 as *Stackhousia gunnii*, which was thought to be a species endemic to Tasmania.

The species qualifies under criterion B as the species extends less than 500 km^2, it occupies less than 10 hectares, it has a severely fragmented distribution, there are extreme fluctuations in the number of mature individuals and there is an observed and projected continuing decline in the quality of habitat and number of mature individuals due to agricultural activities.

THREATS AND LIMITING FACTORS

The majority of sites occur on private land and are threatened by clearance and conversion to pasture or crops, fertiliser application, heavy grazing and woody weed invasion. For those sites on public land, lack of disturbance, in the form of light grazing and/or fire, is considered to be the species' primary threat, with woody weed invasion also an issue.

Clearance & conversion: Much of the species' habitat in Tasmania is thought to have been lost or fragmented through agricultural development since European settlement in the early 1800s (Fensham 1989). Areas of prime habitat in the Tunbridge area are known to have been ploughed and converted to poppies in the past ten years.

Heavy grazing: Many sites on private land are subject to constant year-round stock grazing, limiting the species to roadsides or lightly grazed paddocks (Gilfedder and Kirkpatrick, 1998).

Weed invasion: Many subpopulations are under threat from woody weed invasion, primarily gorse (*Ulex europaeus*).

Lack of disturbance: For those (small) *Stackhousia subterranea* subpopulations within public reserves there has been an observed decline in recent years due to a lack of disturbance and/or competition from grasses. Declines linked to the cessation of traditional stock routes in the Tunbridge area have also been observed.

MANAGEMENT STRATEGY

The main objective for the recovery of *Stackhousia subterranea* is to ensure that there is no decline in any of the subpopulations.

What has been done?

Gilfedder & Kirkpatrick (1994, 1996 & 1998) undertook targeted surveys for *Stackhousia subterranea* and other threatened grassland species during the period 1990 to 1994, with follow-up surveys of known sites in 2002 to 2003 (Gilfedder, pers. comm.) These surveys were preceded by the remnant vegetation studies of Kirkpatrick *et al.* (1988) and Fensham (1989). In the period since there have been numerous Bushcare extension surveys of private property in the Midlands (1998–2003), as well as roadside surveys conducted by the Tasmanian Department of Transport (reports held by the Biodiversity Conservation Branch, DPIW, Hobart).

A management plan has been prepared for native grasslands at the Campbell Town golf course (Nicholson 2000). However, only a few *Stackhousia subterranea* plants were known at this site (Table 1), and these could not be relocated during surveys conducted by the Threatened Section Section (DPIW) in October 2005.

Weeding days were conducted at Township Lagoon Nature Reserve in 2007, with volunteers organised by Wildcare's Threatened Plant Action Group and the Threatened Species Network.

The Private Land Conservation Program (DPIW) has been negotiating with key landholders in Tasmania's Northern Midlands in an attempt to secure land management agreements or conservation covenants, the aim being the long-term security of native grasslands and grassy woodlands, and associated threatened species such as *Stackhousia subterranea.*

What is needed?

Recovery actions necessary to decrease the extinction risk to *Stackhousia subterranea* include:

- Re-survey of known sites to determine status.
- For private land, land management agreements or conservation covenants need to be finalised for properties known to support *Stackhousia subterranea*, with prescriptions to ensure that the species' native grassland habitat is not ploughed, improved or inadvertently destroyed, appropriate grazing levels are in place, and invasive woody weeds are contained.
- For reserved land, active management is needed in the form of biomass reduction of native grasslands and containment of invasive woody weeds. A management plan is required for the Township Lagoon Nature Reserve.
- Classification of the species' preferred habitat, lowland *Themeda* grassland, as a threatened vegetation community under the Tasmanian *Nature Conservation Act 2002.*
- Collection of seed for long-term storage as part of the Tasmanian Seed Safe project set up under the Millennium Seed Bank project being conducted under the auspices of the Royal Botanic Gardens Kew (joint partners in Tasmania include DPIW, the Royal Tasmanian Botanical Gardens and the Tasmanian Herbarium).
- Research to understand the reasons for the species' low seed set and germination cues.
- Monitoring to determine the longevity of plants and the reasons for fluctuating numbers.
- Extension surveys during the species' peak flowering period, September to November.

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View:
http://www.dpiw.tas.gov.au/threatenedspecieslists

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Permit: It is an offence to collect, disturb, damage or destroy this species unless under permit.