Image by Richard Schahinger

Epacris grandis

tall heath

TASMANIAN THREATENED SPECIES LISTING STATEMENT

Scientific name:	***Epacris grandis*** Crowden, *Pap. Proc. Roy. Soc. Tasmania* 120: 19 (1986)
Common Name:	tall heath (Wapstra et al. 2005)
Group:	vascular plant, dicotyledon, family **Epacridaceae** (now Ericaceae)
Status:	*Threatened Species Protection Act 1995*: **endangered** *Environment Protection and Biodiversity Conservation Act 1999*: **Endangered**
Distribution:	Endemic status: **endemic to Tasmania** Tasmanian NRM Region: **North, South**

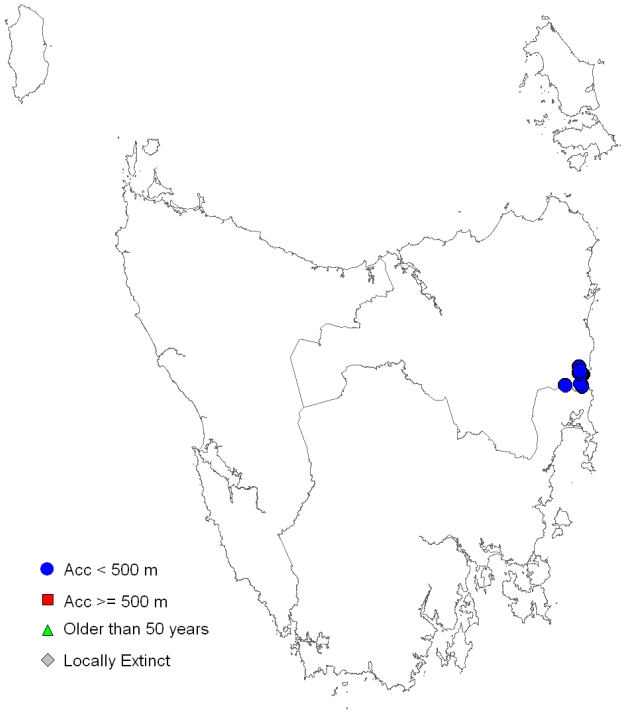

Figure 1. Distribution of *Epacris grandis*, showing Natural Resource Management regions

Plate 1. Flowers and foliage of *Epacris grandis* (image by Richard Schahinger)

SUMMARY: *Epacris grandis* (tall heath) is a leggy shrub restricted to the State's central east coast growing on Jurassic dolerite in dry sclerophyll forest on sheltered slopes above the Apsley and Douglas rivers, and along the banks of the Douglas River. While most occurrences are reserved in the Douglas-Apsley National Park, there are only about 7,000 mature individuals occupying about 2 ha over a small range of about 15 km, putting the species at risk from inadvertent or chance events. Other threats include inappropriate fire regimes and infection by the exotic soil-borne plant pathogen *Phytophthora cinnamomi*.

IDENTIFICATION AND ECOLOGY

Epacris grandis flowers between October and March, with a peak in December. Known pollinators of *Epacris* taxa include a variety of adult carrion flies from the families Tabanidae, Muscidae and Calliphoridae (Keith 1998). Fruit production for *Epacris* taxa depends on plant size, fire history and shading by the canopies of neighbouring plants, with up to several thousand seeds produced each year (Keith 1998). Fruit production is substantially reduced in shaded plants, with high rates of abortion among developing fruits. Other fruit losses may result from predation, browsing herbivores and mechanical damage.

Seed release is likely to peak in late summer and be completed by early autumn (Keith 1998). Dispersal of *Epacris* seeds is passive, and very few seeds are likely to be dispersed more than a few metres from their parent plant (aside from those close to rivers and creeklines). The longevity of *Epacris* seeds is unknown, though Keith (1998) indicates that appreciable numbers of seeds survive for two years after release into the seed bank. Seeds remain dormant until released by heat shock and smoke-related cues associated with the passage of fire (Keith 2004). *Epacris grandis* is thought to be an obligate seeder, recruiting after fire from a soil-stored seed bank. The generation length for *Epacris grandis* is likely to be in the range 8 to 30 years, and longevity around 60 years, based on studies of the life history attributes of the closely allied *Epacris barbata* (Keith 2004).

Survey techniques

Surveys can be conducted at any time of the year for this highly distinctive shrub, although the species is more detectable when in flower (October to March). Care should be taken when conducting surveys to avoid spreading *Phytophthora cinnamomi* by surveying in dry conditions and ensuring field equipment including footwear is disinfected.

Description

Epacris grandis is an erect shrub, rarely branching near the base, and growing up to 3 m high. Its branches are robust, bearing thin lance-shaped leaves that are slightly concave. The leaves are 10 to 15 mm long and 3 to 4 mm wide with short stalks less than 1 mm long. They have 5 veins conspicuous on the lower surface and are usually pungent-pointed (prickly). The flowers are white, solitary in the leaf axils, petiolate, enclosed in hairy bracts and sepals, and are densely clustered along the plant's terminal branches. The corolla tube is bell-shaped and 4 to 5 mm long, with five lobes 5 to 6 mm long. The style is about 2 mm long, enclosed within the corolla tube, whereas the anthers are exserted.

[description based on Crowden 1986]

Confusing species

Epacris grandis may be distinguished from other *Epacris* species in Tasmania by its tall robust growth form, relatively long leaves, hairy bracts and sepals, and short style (Crowden 1986).

DISTRIBUTION AND HABITAT

Epacris grandis is endemic to Tasmania, being restricted to a small area near Bicheno on the State's central east coast (Figure 1). It occurs on Jurassic dolerite within dry sclerophyll forest on sheltered slopes above the Apsley and Douglas rivers (Plate 2), and also along the banks of the Douglas River. The known sites occur within the elevation range 30 to 530 m, with a mean annual rainfall of about 700 mm (Keith 1998).

The species grows on shallow podzolic soils in dry, stony areas (Crowden 1986). Supporting forest is dominated by *Eucalyptus obliqua*, with an understorey consisting of species such as *Banksia marginata*, *Leptospermum grandiflorum*, *Bedfordia salicina* and *Xanthorrhoea australis*, with a small group of plants within a riverine community on alluvial soil (Crowden 1986). The Blindburn Creek subpopulation occurs within shrubby *Eucalyptus amygdalina* forest or at the margins of dry scrub dominated by *Leptospermum grandiflorum* (Plate 2).

POPULATION PARAMETERS

Epacris grandis has been recorded from six subpopulations, where individual sub-populations have been presumed to be discrete patches separated by discontinuities of at least one kilometre (Keith 2000). The species could be viewed as occurring in three locations, namely occurrences associated with the Douglas River, those south of the Denison Rivulet and the subpopulation to the west of the Apsley River (Table 1). The species has a linear range of 15 km, an extent of occurrence of 78 km^2, and an area of occupancy of about 2 ha (Table 1)

The total population size is estimated to be in the order of 7,000 mature individuals. The subpopulation at Blindburn Creek accounts for about two-thirds of the total population, while three of the six subpopulations each support fewer than 100 mature individuals (Table 1).

The cited population size, based largely on surveys in the mid-1990s (Keith 1997), is considered to be a conservative estimate of the mature plant numbers at the known subpopulations. Given the level of past survey efforts, the likelihood of *Epacris grandis* being discovered outside its known extent of occurrence is considered to be low.

Plate 2. *Epacris grandis* at Blindburn Creek (image by Richard Schahinger)

RESERVATION STATUS

Epacris grandis occurs within Douglas-Apsley National Park and Hardings Falls Forest Reserve (Table 1).

Table 1. Population summary for *Epacris grandis*

	Location	Tenure	NRM Region	1:25000 Mapsheet	Year last (first) seen	Area occupied (ha)	Number of individuals
1.1	Heritage Falls (Douglas River)	Douglas-Apsley National Park	North	Seymour	1996	0.0001	5
1.2	Nicholls Cap	Douglas-Apsley National Park	North	Seymour	1996 (1980)	0.7	544
1.3	Douglas River	Douglas-Apsley National Park	North	Seymour	2013 (1979)	0.3	1670
2.1	Blindburn Creek	Douglas-Apsley National Park	North	Bicheno	2009 (1980)	0.6	4812
2.1	Rosedale Road	private land	South	Bicheno	2000	small	100
3	Hardings Falls	Hardings Falls Forest Reserve	South	Henry	1996 (1980)	0.0001	10

NRM Region = Natural Resource Management Region

CONSERVATION ASSESSMENT

Epacris grandis was listed as vulnerable on the Tasmanian *Threatened Species Protection Act 1995* when the Act came into being. It was uplisted to endangered in 2008, meeting criterion B: extent of occurrence estimated to be less than 500 km^2, and

- known to exist at no more than five locations;
- a continuing decline, inferred, observed or projected in area, extent and/or quality of habitat, and number of mature individuals.

THREATS, LIMITING FACTORS AND MANAGEMENT ISSUES

The main threats to *Epacris grandis* include infection by the exotic soil-borne plant pathogen *Phytophthora cinnamomi*, inappropriate fire regimes, and stochastic events.

***Phytophthora cinnamomi*:** *Epacris grandis* is known to be highly susceptible to *Phytophthora cinnamomi* in laboratory conditions (Barker 1994), though Keith (1997) did not note any mortality recorded in the wild. Scattered infestations of the pathogen are known to occur either within or close to most subpopulations, and are considered a potential threat to the species' long-term future (Keith 1997, Schahinger et al. 2003).

Inappropriate fire regimes: A fire frequency of around 15 to 25 years is considered likely to favour the species at a particular site (Keith 1998, Parks & Wildlife Service 1998). Subpopulations may experience a slow attrition as a result of frequent cool fires through mortality and depletion of the soil seed store, while senescence may be expected where fire frequencies are greater than 25 years (Keith 1998). These figures have been inferred from Keith's observations for the allied species *Epacris glabella* and *Epacris graniticola*, where mortality rates of 10 to 23% per year were noted for plants that had not been burnt for 25 to 30 years, compared with a background mortality rate of less than 1% per annum. The vast proportion of the species' habitat at Blindburn Creek and Hardings Falls has not been burnt for more than 30 years. The continued absence of fire at known subpopulations is considered a threat to the species' long-term viability. While a fire management plan is in place for burns that include the Douglas River and Blindburn Creek sites, there are no fire management plans in place for the subpopulations on land managed by Forestry Tasmania (Hardings Falls), nor the subpopulation on private land (Rosedale Road).

Stochastic risk: The low plant numbers at three of the six subpopulations exposes the species to the risk of local extinctions due to unforeseen human activities or chance events. The restricted extent and area of occupancy also places the species at stochastic risk.

Land clearing and/or habitat modification: It seems unlikely that historical land clearing or habitat modification has reduced the extent of occurrence and/or area of occupancy of the species though the small subpopulation on private land is potentially at risk from inadvertent clearing or other adverse activities.

Climate change: A warmer climate and longer periods of drought may impact deleteriously on *Epacris grandis* and its habitat, possibly through reducing recruitment following fire. An increased fire frequency due to climate change may also prove to be detrimental to the species. The risk to the species is exacerbated by its restricted distribution.

MANAGEMENT STRATEGY

Management objectives

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

What has been done?

Recovery planning: *Epacris grandis* is included in the *Flora Recovery Plan: Threatened Tasmanian Forest Epacrids* (Threatened Species Section 2011).

***Phytophthora cinnamomi* research and management:** *Epacris grandis* was included in an assessment of the susceptibility to *Phytophthora cinnamomi* in laboratory conditions (Barker 1994). *Phytophthora cinnamomi*

management zones that include subpopulations 1.2, 1.3, 2.1 and 3 (Table 1) are in place (Barker 1994, Schahinger et al. 2003). The Blindburn Creek management zone was thought to be free of disease in the mid-1990s (Barker 1994), though now there are known scattered infestations of *Phytophthora cinnamomi* close to the *Epacris grandis* subpopulation (Schahinger et al. 2003).

Fire management: The Douglas-Apsley National Park is subject to a fire management plan that aims to maintain levels of biodiversity and foster the long-term survival of threatened species (Parks & Wildlife Service 1998). Ecological burns that include the Douglas River and Blindburn Creek sites have been flagged for burning. Pre-fire monitoring was established with initial results indicating that *Epacris grandis* is an obligate seeder.

Survey: There has been considerable botanical activity over the past 25 years through the species' main area of concentration, the central east coast of Tasmania (e.g. Kirkpatrick et al. 1980, North et al. 1998), and Bushcare and the Private Forest Reserves Program (DPIWE) have carried out surveys on private land in the area over the period 1998 to 2005. Targeted surveys for *Epacris grandis* were undertaken during development of the *Tasmanian Forest Epacrids Recovery Plan* (Keith 1997 & 1998), and extension surveys were undertaken during the Recovery Plan's implementation phase from 1999 to 2002. The last detailed surveys of the *Epacris grandis* subpopulations were undertaken in the mid 1990s (Keith 1997, 1998).

***Ex situ* conservation:** An *ex situ* living plant collection has been established at the Royal Tasmanian Botanical Gardens in Hobart that may allow for suitable stock of the plant to be available for horticultural purposes (Keith 1998). Seed has been collected for long-term conservation storage at the Tasmanian Seed Conservation Centre based at the Royal Tasmanian Botanical Gardens. Further seed collection is being undertaken in 2013 for species considered susceptible to *Phytophthora cinnamomi*, including *Epacris grandis* (J. Wood, pers. comm.).

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.

- survey as a matter of some urgency to determine the disease status of all subpopulations, and review the efficacy of existing *Phytophthora* management zones;
- update and implement fire management plans within reserves, and consider inclusion of the subpopulation in Hardings Falls Forest Reserve within Forestry Tasmania's Tactical Fire Management Project;
- update and implement relevant reserve management plans;
- monitor the response of the species to disturbance and disease regimes to guide future recovery work;
- 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.

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