Epacris limbata

bordered heath

TASMANIAN THREATENED SPECIES LISTING STATEMENT

Image by Richard Schahinger

Scientific name: ***Epacris limbata*** K.J.Williams & F.Duncan, *Aspects of Tasmanian Botany*: 95 (1991)

Common Name: bordered 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: **Critically Endangered**

Distribution: Endemic status: **endemic to Tasmania**

Tasmanian NRM Region: **North, South**

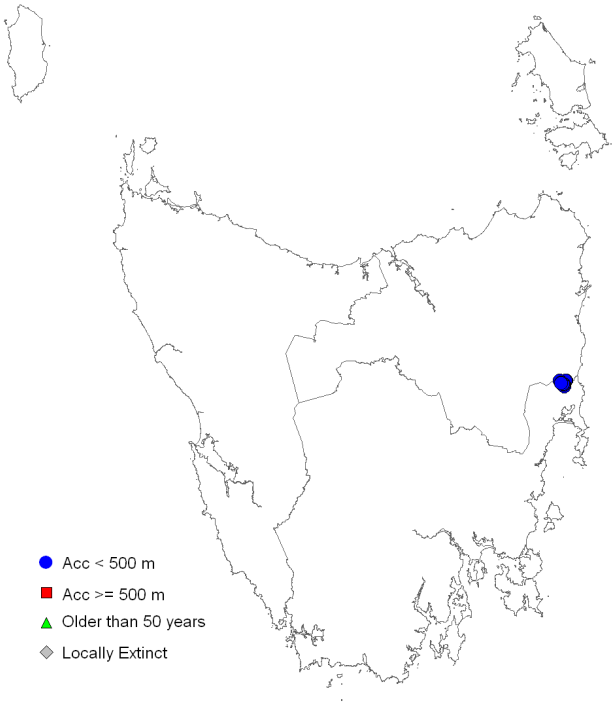

Figure 1. Distribution of *Epacris limbata,* showing Natural Resource Management regions

Plate 1. Growth habit of *Epacris limbata* (image by Tim Rudman)

SUMMARY: *Epacris limbata* (bordered heath) is a shrub occurring in a small part of the catchment of the Apsley and Swan Rivers west of Bicheno in Tasmania. It occurs on damp soils derived from Jurassic dolerite at the margins of marshes where sedgey woodlands grade into heathy forests. The total number of mature individuals is estimated at about 70,000 and the species has a restricted distribution with a linear range of just 5 km putting it at risk from inadvertent, chance or localised events. The main threats to the species are infection by the exotic soil-borne plant pathogen *Phytophthora cinnamomi,* and inappropriate fire regimes and disturbance.

IDENTIFICATION AND ECOLOGY

Epacris limbata flowers in mid spring to summer (Williams & Duncan 1991). 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 of *Epacris limbata* are dispersed in autumn (Keith 1998). Dispersal of *Epacris* seed is passive, and few seed are likely to be dispersed more than a few metres from their parent plant (aside from those close to creeklines). The longevity of *Epacris* seed is unknown, though Keith (1998) indicates that appreciable numbers of seeds survive for two years after release into the seed bank. Seed remains dormant until released by heat shock and smoke-related cues associated with the passage of fire (Keith 2004). Keith (1998) noted that although the first seed crop is likely to be produced in the fourth fruiting season after fire, it may be 6 to 8 years before a seed bank of sufficient size has accumulated to ensure sufficient seedling recruitment after a subsequent fire. *Epacris limbata* is an obligate seeder (Keith 1998), recruiting after fire from soil stored seed.

The generation length for *Epacris limbata* is likely to be in the range 8 to 30 years, based on studies of the life-history attributes of the closely allied *Epacris barbata* (Keith 2004). In the absence of fire, the longevity of individual shrubs is probably in the order of 30 to 40 years (Keith 1998).

Survey techniques

Surveys for *Epacris limbata* can be conducted at any time of year, though the species may be detected more easily from mid-spring to summer when flowers are present. Care should be taken when conducting surveys to avoid spreading *Phytophthora cinnamomi* by ensuring that footwear and all field equipment is disinfected, and if possible surveying in dry conditions.

Description

Epacris limbata is an erect shrub growing up to 3 m tall. Its branches are long and slender, with concave stem-clasping leaves which are broadly ovate-acuminate in shape. The leaves are 4 to 8 mm long and 3 to 5.6 mm wide, with short stalks less than 1 mm long, and have hyaline margins, an acuminate pungent-pointed apex and a cordate base, with 5 to 7 veins conspicuous on the lower surface. The flowers are white, solitary in the leaf axils, petiolate, enclosed in ciliate bracts and sepals, and are densely clustered along the terminal branches. The 0.9 to 1.3 mm long style is enclosed within the campanulate corolla tube which is 2.2 to 3.5 mm long and has five broadly-ovate lobes 3 to 5.8 mm long. The anthers are exserted from the corolla tube.

[description based on Williams & Duncan 1991]

Confusing species

Epacris limbata is unlikely to be confused with other *Epacris* species due to its distinctive leaves and flowers, in particular the hyaline margins of its stem-clasping leaves, and combination of exserted anthers and short style.

DISTRIBUTION AND HABITAT

Epacris limbata is endemic to Tasmania, being restricted to a small part of the catchments of the Apsley and Swan Rivers west of Bicheno, on the State's east coast (Figure 1). It grows on damp soils derived from Jurassic dolerite, and is associated with headwater swamps and drainage depressions at elevations of 200 to 330 m.

Plate 2. *Epacris limbata* habitat at Stringybark Swamp (image by Richard Schahinger)

Williams & Duncan (1991) noted that the species often occurs at the ecotonal margins of marshes, where sedgey *Eucalyptus ovata* woodlands grade into heathy forests dominated by *Eucalyptus amygdalina* and/or *Eucalyptus tenuiramis* (Plate 2) The understorey of the supporting vegetation is diverse, with species characteristic of both the sedgey and heathy vegetation types, including *Allocasuarina littoralis, Banksia marginata*, *Leptospermum scoparium*, *Hibbertia riparia*, *Melaleuca gibbosa*, *Xanthorrhoea australis*, *Lomandra longifolia*, *Lepidosperma* species and *Patersonia fragilis*. Most sites occur close to the geological contact between sediments and Jurassic dolerite, which may be related to the unusual plant associations created by the seepage from the contact zone (Williams & Duncan 1991).

POPULATION PARAMETERS

Epacris limbata has been recorded from five subpopulations, where individual sub-populations have been presumed to be discrete patches separated by discontinuities of at least 500 metres. The species could be viewed as occurring in two locations with the subpopulation near Mt Andrew occurring on the opposite side of the Apsley River to the others (Table 1). The species has a linear range of 5 km, extent of occurrence of 10 km^2, and an area of occupancy of less than 20 hectares.

The total population size is estimated to be in the order of 70,000 mature individuals. 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 (Table 1). Given the level of past survey efforts, the likelihood of *Epacris limbata* being discovered outside its known extent of occurrence is considered to be low.

Table 1. Population summary for *Epacris limbata*

	Location	Tenure	NRM Region	1:25000 Mapsheet	Year last (first) seen	Area occupied (ha)	Number of plants
1.1	2.2 km ENE of Hardings Falls	Hardings Falls Forest Reserve & State forest*	South	Henry	2011 (1996)	1.2	7,477
1.2	2.9 km ESE of Hardings Falls	Hardings Falls Forest Reserve	South	Henry	2011 (1989)	0.5	3,844
1.3	Apsley gate, O Road	State forest*	South	Henry	2011 (1996)	1	28,191
1.4	Stringybark Swamp	State forest*	South	Henry	2013 (1988)	10	32,100
2	2.2 km WSW of Mt Andrew	Douglas-Apsley National Park	North	Henry	2009 (1987)	5	518

NRM Region = Natural Resource Management Region
* proposed for reservation under the *Tasmanian Forests Agreement 2013*

RESERVATION STATUS

Epacris limbata occurs in Douglas-Apsley National Park and Hardings Falls Forest Reserve.

CONSERVATION ASSESSMENT

Epacris limbata was listed as endangered on the Tasmanian *Threatened Species Protection Act 1995* when the Act came into being, 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 in number of mature individuals.

THREATS, LIMITING FACTORS AND MANAGEMENT ISSUES

The primary threats to *Epacris limbata* include infection by the exotic soil-borne plant pathogen *Phytophthora cinnamomi*, inappropriate fire regimes, and indirect disturbance from nearby activities (e.g. forestry and road works).

***Phytophthora cinnamomi*:** *Epacris limbata* is known to be highly susceptible to *Phytophthora cinnamomi* (Barker 1994), and all known subpopulations are infected to some degree (Keith 1997 & 1998, Schahinger et al. 2003). The subpopulations appear to be in continual decline due to infection by the pathogen (Barker 1996).

Inappropriate fire regimes: Inappropriate fire regimes also pose a threat to *Epacris limbata*, as the species is an obligate seeder, that is, all plants subject to 100% leaf scorch are killed (Keith 1998). Recruitment from seed after fire may only occur if there is sufficient rainfall. 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, a very unlikely scenario, while senescence may be expected where the interval between fires is longer than 25 years (Keith 1998). Almost all subpopulations were burnt in September 2007, albeit to varying degrees.

Habitat modification: While the majority of plants occur on State forest, the species is unlikely to be included in wood production areas due to the non-commercial nature of the vegetation. However, forestry roads either pass through or are close to a number of subpopulations, and there may have been plant losses when this occurred. Such roads are probably also the conduit for the introduction of *Phytophthora cinnamomi*. The Stringybark Swamp site is covered by a flora Special Management Zone (Orr & Gerrand 1998). State forest occurrences are in areas proposed for reservation under the *Tasmanian Forests Agreement 2013* (Table 1).

Climate change: A warmer climate and longer periods of drought may impact deleteriously on *Epacris limbata* 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 highly restricted distribution.

MANAGEMENT STRATEGY

Management objectives

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

What has been done?

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

***Phytophthora cinnamomi* research and management:** *Epacris limbata* was included in an assessment of the susceptibility to *Phytophthora cinnamomi* (Barker 1994), with a monitoring site established at subpopulation 1.2 (Table 1) to gauge the effect of phosphonate treatment on diseased plants (Barker 1996). The treatment proved to be ineffective. Some subpopulations are included in *Phytophthora cinnamomi* management zones (Barker 1994, 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). Monitoring plots were established within Douglas-Apsley National Park to gauge the species' response to a broad-scale hazard reduction burn undertaken in the spring of 2007.

Survey and monitoring: 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). Targeted surveys for *Epacris limbata* were undertaken during development of the *Tasmanian Forest Epacrids Recovery Plan* (Keith 1997 & 1998), and extension surveys were also undertaken from 1999 to 2002 during the Recovery Plan's implementation phase.

***Ex situ* conservation:** Seed has been collected for long-term storage at the Tasmanian Seed Conservation Centre, which is based at Royal Tasmanian Botanical Gardens. Further seed collection was planned for 2013 (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 supporting the species, 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 management actions, fire and disease 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 and potential habitat;
- supplement the seed collection held at the Tasmanian Seed Conservation Centre

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