Boronia gunnii

river boronia

TASMANIAN THREATENED SPECIES LISTING STATEMENT

Image by Richard Schahinger

Scientific name: ***Boronia gunnii*** Hook.f., *Bot. Antarct. Voy. III. (Fl. Tasman.)* 1: 68, t.10 (1855)

Common Name: river boronia (Wapstra et al. 2005)

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

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

Environment Protection and Biodiversity Conservation Act 1999: **Vulnerable**

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

Tasmanian NRM Region: **North**

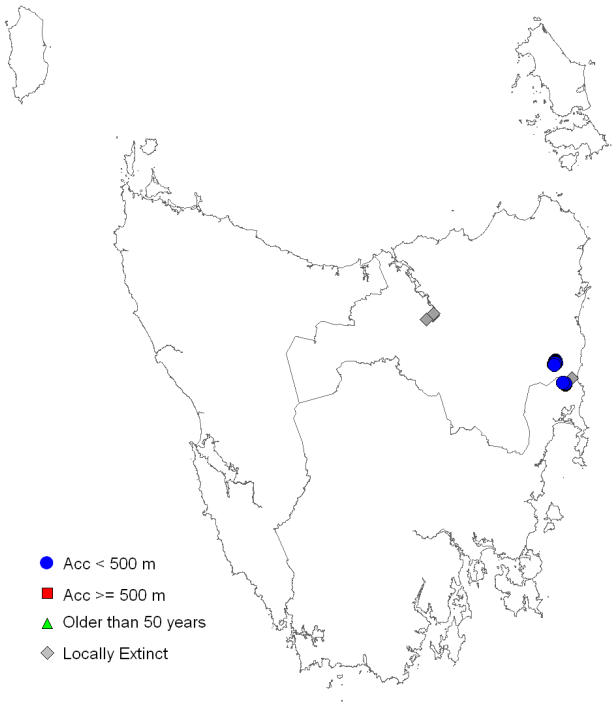

Figure 1. Distribution of *Boronia gunnii*, showing NRM regions

Plate 1. *Boronia gunnii*: flower & leaf detail (image by Bill Higham)

SUMMARY: *Boronia gunnii* (river boronia) is an aromatic woody shrub that occurs in rocky riparian habitats along limited sections of the St Pauls, Dukes and Apsley rivers in eastern Tasmania, with historic records from near Launceston. The extant distribution of the species is restricted and localised, with a linear range of about 17 km, occupying 3 to 5 ha, and the total number of mature individuals is estimated to be fewer than 1,000. This makes the species susceptible to inadvertent or chance events and changed environmental conditions. Threats include inappropriate hydrological regimes, inappropriate management of the riparian zone, including areas upstream of known sites, and an increase in the frequency of fires.

IDENTIFICATION AND ECOLOGY

Boronia gunnii flowers from October to January, with fruit ripening by mid summer. Pollinators are likely to include a range of insects (Hingston & McQuillan 2000). The species' riparian habitat means that seed may potentially be dispersed several kilometres downstream, with recruitment likely to reflect the occurrence of flood events. Riparian species such as *Boronia gunnii* are subject to natural fluctuations in plant numbers in response to drought and flood events, and are able to recruit from seed in the absence of fire. Seed predation by insects is often a feature of closely related species in the Rutaceae family, including *Boronia hippopala,* a close relative of *Boronia gunnii* (James Wood, pers. comm.). The longevity of seeds is unknown, as is the longevity of plants and the age to reproductive maturity. The species is highly aromatic due to oils in the leaves and flowers, its crushed foliage having a scent similar to sage (*Salvia officinalis*).

Survey techniques

Surveys for *Boronia gunnii* can be conducted at any time of the year due to its distinctive foliage, although it is more practical and efficient to survey during its flowering period (October to January) when plants are easier to detect. Surveys should be undertaken at times of lower water levels to allow access along the rocky river-bed.

Description

Boronia gunnii is an erect, multi-branched woody shrub to 1.2 m tall. Its branchlets are slightly glandular, and with minute bristle-like hairs concentrated between faint leaf decurrencies. The glandular projections are small, blunt and often shiny. The leaves are compound, being composed of 5 to 9 distinct parts and are entire in outline (Plate 1). They are 12 to 32 mm long by 16 to 50 mm wide, and glandular. The terminal leaflets are narrowly obovate and 5 to 16 mm long and 0.75 to 2.5 mm wide. The lateral leaflets are similar in shape but are slightly longer, 5 to 25 mm. The lower leaflets are sparsely covered in minute bristle-like hairs at the base, otherwise they are hairless. The inflorescence is situated in the leaf axils, 1- to 7-flowered and shorter than the leaves. The four sepals are triangular and about 1 to 1.5 mm long. The four petals are pink or white, narrowly ovate, pointed and 5 to 8 mm long. The fruit is a hairless capsule.

[description based on Duretto 2003 & 2009, and field observations.]

Confusing species

Boronia gunnii differs from other Tasmanian species by its long narrowly obovate leaflets, stems with minute hairs to 0.1 mm long, relatively small sepals, and glands on its branchlets and leaflets that usually appear as shiny discs (Duretto 2003).

DISTRIBUTION AND HABITAT

Boronia gunnii is endemic to Tasmania (Baker & de Salas 2012). It occurs along the upper reaches of the St Pauls River and its tributary the Dukes River, and also the lower reaches of the Apsley River, with historic records from the lower South Esk River near Launceston and also Denison Rivulet (Figure 1). The elevation range of extant sites is 125 to 500 m above sea level.

The species is strictly riparian in habitat, occurring in the flood zone of rivers in rock crevices or in the shelter of boulders (Schahinger 2004; Plates 2 & 3). The base substrate is Jurassic dolerite. Associated species

include the shrubs *Micrantheum hexandrum*, *Leptospermum lanigerum*, *Acacia mucronata*, *Spyridium obovatum*, *Hakea microcarpa*, *Epacris moscaliana* and, occasionally, the conifer *Podocarpus lawrencei*.

Plate 2. *Boronia gunnii*: habit
(image by Richard Schahinger)

Plate 3. Riparian habitat of *Boronia gunnii*
(image by Anne Chuter)

POPULATION PARAMETERS

Boronia gunnii is known from two extant subpopulations, with plants occurring sporadically along the margins of the rivers in question over a total length of about 8 km. A conservative estimate of the total number of mature individuals is 750 to 900 (Table 1). Mature plant numbers are likely to fluctuate somewhat in response to drought and flood events. The extant subpopulations have a linear range of 17 km, extent of occurrence of 28 km^2 and an area of occupancy 3 to 5 hectares. If the subpopulations presumed to be extinct were included in these estimates, the linear range would be 102 km and extent of occurrence 820 km^2.

The likelihood of new subpopulations being located is considered to be quite low, based on the extent of botanical surveys within the current predicted range of the species. Minor range infillings and extensions within the same major catchments are possible though the more accessible sections of the rivers in question have been subject to reasonably intensive botanical surveys (Schahinger 2004, Chuter 2006 & 2010).

RESERVATION STATUS

Boronia gunnii occurs in Douglas-Apsley National Park and Mount Puzzler Forest Reserve.

CONSERVATION ASSESSMENT

Boronia gunnii was listed as vulnerable on the Tasmanian *Threatened Species Protection Act 1995* in 2005, meeting criterion D:

- total population estimated to number fewer than 1,000 mature individuals.

THREATS, LIMITING FACTORS AND MANAGEMENT ISSUES

Inappropriate hydrological regimes and inappropiate management of riparian habitats are the greatest historical and contemporary threats to subpopulations of *Boronia gunnii*.

Land uses within the catchment: Major physical disturbances to the upstream catchments of the rivers known to support *Boronia gunnii* have the potential to increase the amount of run-off and sediment loads, reducing the opportunities for recolonisation. Such disturbance is also likely to favour the spread of invasive weed species, as evident along the lower South Esk River, with much of the species' assumed former habitat now occupied by gorse and willow.

Table 1. Population summary for *Boronia gunnii*

	Subpopulation	Tenure	NRM Region	1:25000 Mapsheet	Year last (first) seen	Area occupied (km of river)	Number of individuals
1	Apsley River	Douglas-Apsley National Park	North	Henry	2009 (1985)	3.2	250–300
2.1	St Pauls River (lower)]	Mount Puzzler Forest Reserve	North	St John	2013 (1996)	2.6	500–600
2.2	St Pauls River (upper)	State forest*	South	St John	2013 (1992)	1.3	
2.3	Dukes River	Mount Puzzler Forest Reserve & State forest*	South	St John	2013 (2003)	c. 0.8	
3	Denison Rivulet	Douglas-Apsley National Park?	North	Henry	1987	possibly extinct	
4	South Esk River (Reedy Basin – Cataract Gorge)	various	North	Prospect & Launceston	1961 (1863)	presumed extinct	

NRM region = Natural Resources Management region
* proposed for reservation under the *Tasmanian Forests Agreement 2013*

Changes in flow regimes associated with the construction of the Trevallyn Dam in the 1950s are also likely to have affected the habitat of the species in the South Esk River system (North Barker Associates 2001). The 1894 collection from Reedy Basin was from an area that is now inundated.

Inappropriate fire regimes: *Boronia gunnii* grows in rocky riparian vegetation characterised by long fire-free periods indicating that fire should be excluded from areas supporting the species. The Douglas-Apsley National Park is subject to a fire management plan that aims to maintain biodiversity levels and foster the long-term survival of threatened species (Parks & Wildlife Service 1998), including the exclusion of fire from sensitive areas such as the riparian zone.

Land clearing and habitat modification: While *Boronia gunnii* appears to have a patchy distribution along sections of the St Pauls, Dukes and Apsley rivers, its apparent absence from some sections of these rivers may be due to historical land clearing activities, mainly for primary production. Stock access to river systems probably also impacted the species.

Forest management: *Boronia gunnii* occurs on State forest in sections of river adjacent to wood production forests, though given the application of streamside reserves it seems unlikely that native forest silviculture has had a significant impact on the species. However, forestry roads, bridges and fuel reduction activities, all still have potential to affect the species through the introduction and spread of weeds, and changes to hydrology, though it is noted that these activities are tightly regulated to minimise impacts. Proposed reservation under the *Tasmanian Forests Agreement 2013* will result in extant sites becoming fully reserved.

Stochastic risk: The low numbers of plants exposes the species to the risk of local extinctions due to unforeseen human activities or chance events.

Climate change: A warmer climate, longer periods of drought and a change in rainfall patterns may impact deleteriously on *Boronia gunnii* and its habitat through a detrimental increase in fire frequency and alterations to river flows. The risk to the species is exacerbated by its highly restricted distribution.

MANAGEMENT STRATEGY

Management objectives

The main objectives for the recovery of *Boronia gunnii* 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?

Survey and monitoring: The extent of the extant subpopulations has been determined, in the main, by targeted surveys (Schahinger 2004, Chuter 2006 & 2010). Concerted efforts have been made to re-discover the South Esk River sites by professional and amateur botanists over many years. Exhaustive surveys have also failed to relocate the species along the Denison Rivulet. There has been considerable botanical activity over the past 25 years through the species' now main extant areas of concentration, the central east coast of Tasmania (e.g. Kirkpatrick et al. 1980, Duncan 1983, North et al. 1998), and additional surveys have been conducted in riparian habitats (Askey-Doran 1993).

***Ex situ* conservation:** An *ex situ* living plant collection has been established at the Royal Tasmanian Botanical Gardens in Hobart. Seed has been collected for long-term conservation storage at the Tasmanian Seed Conservation Centre based at the Royal Tasmanian Botanical Gardens.

Susceptibility to Phytophthora cinnamomi: As several members of the Rutaceae family in Tasmania are known to be susceptible to the introduced soil-borne plant pathogen *Phytophthora cinnamomi* (Podger et al. 1990), laboratory trials were conducted in 2007 to 2008 to determine the susceptibility of *Boronia gunnii*. The species was found to be resistant to the pathogen, although it may act as a host (Rudman et al. 2008).

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.

- prepare fire management plans for land currently managed by Forestry Tasmania that support the species (i.e. north and east of Mount Puzzler).
- update and implement relevant reserve management plans, including fire management plans;
- undertake further extension surveys radiating out from the known sites into areas of potential habitat;
- monitor the response of the species to management actions, disturbance regimes and threats (e.g. changes to hydrological regime) to guide future recovery work including the need to supplement or establish *ex situ* occurrences using conserved seed to prevent extinctions in the wild;
- 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.

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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 April 2014.

Cite as: Threatened Species and Marine Section (2014). *Listing Statement for* Boronia gunnii *(river boronia).* Department of Primary Industries, Parks, Water and Environment, Tasmania.

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