



Goodenia geniculata

bent native-primrose

TASMANIAN THREATENED SPECIES LISTING STATEMENT

Image by Mark Wapstra

- Scientific name:** *Goodenia geniculata* R.Br., *Prodr.* 577 (1810)
- Common name:** bent native-primrose (Wapstra et al. 2005)
- Group:** vascular plant, dicotyledon, family **Goodeniaceae**
- 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: **Cradle Coast, South**

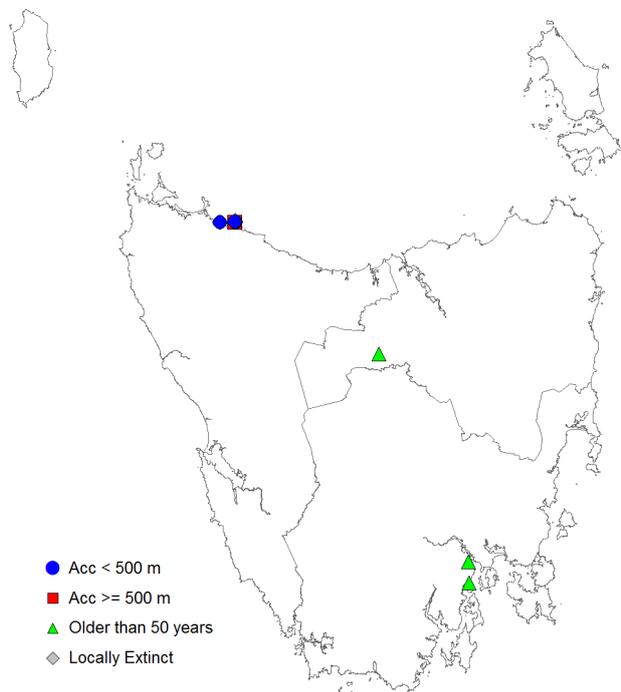


Figure 1. Distribution of *Goodenia geniculata* within Tasmania, showing Natural Resource Management regions



Plate 1. *Goodenia geniculata* from Rocky Cape (image by Mark Wapstra)

SUMMARY: *Goodenia geniculata* is a perennial herb that within Tasmania is known from dry heathland on the northwest coast, and from historical collections near Meander and Hobart. The two contemporary sites in the State's northwest support fewer than 500 plants in an area of about 3 hectares. The species' restricted distribution and low plant numbers place it at risk from chance events, especially as plants may not be seen or only persist in low numbers between disturbance events. The most important needs of the species are the provision of periodic gap-forming disturbance such as fire or slashing to promote recruitment and the persistence of subpopulations. Monitoring studies may help to identify additional needs.

IDENTIFICATION AND ECOLOGY

Members of the Goodeniaceae family have flowers with a tubular corolla with thin lobes, often with large wings that are usually brightly coloured and serve as the main attractant for pollinators. In many species of the genus *Goodenia*, the stigma is only exposed when the insect vector pushes the corolla lobes apart as it seeks nectar at the base of the flower (Carolin 1992).

Recruitment of *Goodenia geniculata* can be from seed or vegetatively by means of stolons, where roots and shoots form from the nodes of shoots that bend to the ground. Observations following fire or slashing suggest that plants may not be long-lived and that recruitment may be promoted by gap-forming disturbance. It is possible that subpopulations only exist temporarily above ground, with seed persisting in the soil seed-bank in between disturbance events.

Survey techniques

Surveys for *Goodenia geniculata* are best undertaken when plants are flowering, which mainly occurs from September to January (Jeanes 1999), and should ideally focus on areas of potential habitat that have been subject to gap-forming disturbance in the past two or three years.

Description

Goodenia geniculata is a decumbent to ascending perennial herb to about 20 cm high, with a slender taproot and short aerial shoots that end in rosettes of leaves. The vegetative parts are hirsute and the stems, which are up to 25 cm long, often form stolons. The leaves are rather thick, basal, linear to oblanceolate narrowing basally, and are usually hairy on both surfaces, with dentate or entire margins. The leaf shape can vary considerably, with the leaf lamina 3 to 10 cm long and 3 to 10 mm wide. The flowers are either in racemes to 5 cm long, or solitary in the leaf axils. The bracts are leaf-like with a 1.5 to 5 cm long peduncle. The bracteoles are linear and about 5 mm long. The pedicels are 2 to 5 cm long, and are often bent at a sharp angle (geniculate) at the bracteoles at flowering. The sepals are oblong to narrowly oblong, 4 to 5 mm long, and are covered in coarse hairs on both surfaces. The corolla is yellow, 14 to 16 mm long and pubescent inside, with stiff yellowish hairs and sometimes cottony hairs on the outside. The indusium (the 'cup' enclosing the stigma) is broadly obovate, and folded so that the opposite sides almost meet. There are 14 to 16 ovules. The fruit, which is a capsule that opens by two shortly bifid valves, is obovoid and about 10 mm long. The seeds are yellow-brown, about 3.5 mm long, flat, elliptic and pointed, with a vestigial wing.

[description based on Curtis 1963, Carolin 1992, Jeanes 1999]

Confusing species

Within Tasmania *Goodenia geniculata* is most similar to the widespread and common *Goodenia lanata*. The latter usually has longer and more prostrate flowering scapes, a vestiture of scattered soft hairs rather than stiff coarse hairs, and a broadly oblong and slightly — rather than strongly — folded indusium.

DISTRIBUTION AND HABITAT

Goodenia geniculata extends from the Eyre Peninsula in South Australia, through southern Victoria and into Tasmania (Carolin 1992, Jeanes 1999). In Tasmania the species' distribution was described by Curtis & Morris (1963) as being '... at Rocky Cape, probably

local elsewhere in the north-west, with historic collections subsequently unearthed from the Hobart area (1805 & 1929) and near Meander (1931). The species has been recorded from two sites in Tasmania over the past 20 years, Cathedral Hill at Rocky Cape, and an unvouchered site at nearby Crayfish Creek (Figure 1).

At Rocky Cape *Goodenia geniculata* occurs in coastal dry low heathland on moderately steep mid-slopes to gentle toe-slopes, on well-drained soils derived from Precambrian metamorphic sequences; aspect ranges from northwest to north to east, and altitudes from 10 and 165 metres above sea level (Plate 2). Near Crayfish Creek the species was recorded from a herb-rich power-line easement at an altitude of about 15 metres above sea level, the adjacent vegetation being described as ‘wet eastern heathy moor’ with a 1–2 m high shrub layer dominated by *Melaleuca squarrosa*, (North et al. 1998).

POPULATION PARAMETERS

There are believed to be two extant *Goodenia geniculata* subpopulations in Tasmania (Table 1). About 500 plants are known from the Cathedral Hill site in an area of about 3 hectares, and at Crayfish Creek site the species was described in 1995 as being ‘local’ (North et

al. 1998). The distance between these two subpopulations is about 10 km, the extent of occurrence 3 km², and the total area of occupancy less than 5 hectares.



Plate 2. Habitat of *Goodenia geniculata* at Cathedral Hill (image by Mark Wapstra)

Rocky Cape National Park has been subject to intensive botanical surveys in the past (e.g., Corbett & Balmer 2003), including targeted surveys for *Goodenia geniculata* (ECOTas 2009). The species’ sparse collection history in Tasmania, allied with its apparently localised distribution in the State’s northwest, suggests that the chances of additional subpopulations being discovered is relatively low, with any new discoveries likely to be serendipitous rather than a result of targeted surveys.

Table 1. Population summary for *Goodenia geniculata* within Tasmania

	Subpopulation	Tenure	NRM Region *	1:25000 Mapsheet	Year last (first) seen	Area occupied (ha)	Number of individuals
1	Cathedral Hill	Rocky Cape National Park	Cradle Coast	Rocky Cape	2015 (1836 ^)	c. 3	450 to 500
2	Crayfish Creek	Crayfish Creek Regional Reserve	Cradle Coast	Rocky Cape	1995	unknown	localised
3	Hobart	unknown	South	Hobart?	1805	unknown	unknown
4	Blackmans Bay	unknown	South	Blackmans Bay	1929	unknown	unknown
5	Near Meander	unknown	South	unknown	1931	unknown	unknown

* NRM region = Natural Resource Management region;

^ Collections from ‘Rocky Cape’ in 1836 ... may not necessarily have been from Cathedral Hill;

The Blackmans Bay and Meander records are based on collections held at the Australian National Herbarium in Canberra, and the Hobart record is based on a collection held at the British Museum (Carolin 1992).

RESERVATION STATUS

Goodenia geniculata occurs in Rocky Cape National Park and possibly Crayfish Creek Regional Reserve (Table 1).

CONSERVATION ASSESSMENT

Goodenia geniculata was listed as rare on the schedules of the Tasmanian *Threatened Species Protection Act 1995* when the Act came into being in 1995. It was uplisted to endangered in 2012, meeting criterion (B): the extent of occurrence is less than 500 km², and

1. the species is known from fewer than 5 locations; and
- 2c. a continuing decline is inferred in area, extent and/or quality of habitat.

THREATS, LIMITING FACTORS AND MANAGEMENT ISSUES

Goodenia geniculata occurs at the southern limit of its range in Tasmania, where it may never have been widespread or common. Its restricted distribution places the species at risk from localised chance events. The likely absence of plants or presence in low numbers in between recruitment events increases the potential for losses through chance events or development. The risk is exacerbated by the limited information on the precise location and/or extent of subpopulations.

Land clearing: Extensive historical land clearing in Tasmania may have impacted upon *Goodenia geniculata*, but the extent to which this factor has, and continues to, operate is unknown. Land clearing is not identified as a specific threat to any subpopulations at present.

Inappropriate disturbance regime: *Goodenia geniculata* appears to require disturbance to promote recruitment and persistence of subpopulations. The Cathedral Hill site at Rocky Cape has been subject to relatively frequent wildfire and fuel reduction burns, with the species present in openings in the low heathland created by low intensity mosaic burning. Plants at the Crayfish Creek site occurred along a power-line easement subject to infrequent slashing, which may have benefited the species, with the recommendation that adjacent potential habitat be subject to a suitable fire regime (North et al. 1998); the site

was last burnt during a wildfire in January 2006. The species is likely to be lost from sites that are not disturbed for long periods due to declining amounts of seed in the soil seed store.

Walking track maintenance: Part of the subpopulation on Cathedral Hill at Rocky Cape is dissected by a narrow walking track (Plate 2); the species appears to be prevalent along the edge of the track and extends into the adjacent low heathland. Any upgrading of the track should consider the localised distribution of the species.

***Phytophthora cinnamomi*:** The coastal heathland vegetation supporting *Goodenia geniculata* is known to be highly susceptible to the effects of this exotic soil-borne pathogen, though the species itself is not. *Phytophthora cinnamomi* is already known from Rocky Cape National Park, and is possible that significant changes to the structure and composition of heathy vegetation may have deleterious flow-on impacts to the *Goodenia geniculata* subpopulation at Cathedral Hill.

Stochastic risk: The restricted nature of the known subpopulations exposes the species to the risk of localised extinction from stochastic events.

MANAGEMENT STRATEGY

What has been done?

- Informal surveys were conducted in Rocky Cape National Park resulting in the location of the species in the Cathedral Hill area in 2006 and 2008 (ECOtas 2009). Targeted surveys of the Cathedral Hill subpopulation were undertaken in late October 2015 about 18 months after a planned burn, increasing the number of known plants at the site to almost 500, and the area of occupancy to about 3 hectares.
- A seed orchard was established at the Royal Tasmanian Botanical Gardens in 2009 using plants from Cathedral Hill, with the 2010 harvest lodged for long-term conservation storage at the Tasmanian Seed Conservation Centre (Hobart).

Management objectives

The main objectives for the management of *Goodenia geniculata* in Tasmania are to increase the number of known subpopulations through survey and to ensure that subpopulations do not decline by managing its habitat.

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 the extant sites to determine the status of subpopulations and their size, extent and current threats;
- undertake extension surveys in potential habitat radiating out from known sites and focussing on more recently disturbed areas;
- monitor the Cathedral Hill and Crayfish Creek subpopulations to determine the species' longevity and its response to disturbance and disease;
- incorporate ecological management requirements for the species (e.g., fire and *Phytophthora cinnamomi*) into any relevant management plans that are prepared for Rocky Cape National Park;
- 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 sites and potential habitat;
- supplement the collection of seed being held for long-term conservation storage at the Tasmanian Seed Conservation Centre.

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