Image by Serge Aubert

Galium antarcticum

subantarctic bedstraw

TASMANIAN THREATENED SPECIES LISTING STATEMENT

Scientific name: ***Galium antarcticum*** Hook.f., *Fl. Antarct.* 1: 303 (1846)

Common name: subantarctic bedstraw (Wapstra *et al.* 2005)

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

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

Environment Protection and Biodiversity Conservation Act 1999: **Critically Endangered**

Distribution: Endemic status: **Within Australia endemic to Macquarie Island**

Tasmanian NRM Region: **South**

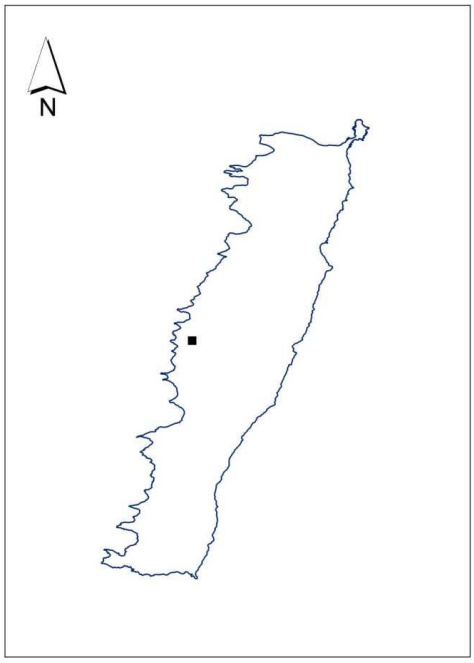

Figure 1. Map of Macquarie Island showing the distribution of *Galium antarcticum* in Australia

Plate 1. *Galium antarcticum* growing amongst *Azorella selago* from the Kerguelen Islands (Image by Serge Aubert)

IDENTIFICATION AND ECOLOGY

Galium antarcticum is a weak perennial herb growing to 4 to 5 cm tall known from herbfields on Macquarie Island. Recruitment is likely to be from long-lived seed and the species can reproduce vegetatively by rooting at nodes along the prostrate main stems. The species is best searched for in January when in flower and conspicuous.

Description

The main stems of *Galium antarcticum* are prostrate and leafless, rooting at nodes. Young stems are erect, sparsely branched, leafy and glabrous. The leaves and stipules are similar, in whorls of 4, obovate to spathulate, blunt, often minutely notched, 3 to 4.5 mm long, thick, fleshy, glabrous and green tinged purple. The flowers are solitary in the upper axils with pedicels 0.8 to 1.2 mm long. A calyx is absent. The corolla is pinkish buff with a tube 0.3 mm long and 3 or 4 lobes that are 1.3 mm long. There are 3 stamens, sometimes 4, 0.5 to 0.7 mm long. The 2 styles are free to the base, 0.5 to 0.6 mm long, and yellowish. The stigmas are capitate. The ovary is 0.8 mm long, dark green and glabrous.

[description from Hnatiuk (1993); Plate 1].

Confusing species

There are no confusing species on Macquarie Island.

DISTRIBUTION AND HABITAT

Galium antarcticum is restricted to the subantarctic, extending from South America (Chile and western Argentina south of latitude 48) to the Falkland Islands, South Georgia, Crozet, Kerguelen Islands and Macquarie Island. Within Australia, the species is known from the northwest side of Skua Lake on Macquarie Island (Figure 1, Table 1) at an altitude of approximately 180 m above sea level.

On Macquarie Island, the species occurs in well drained herbfields rather than boggy soils (Rod Seppelt, pers. comm.).

POPULATION ESTIMATE

The size of the only known subpopulation in Tasmania was not recorded at the time of the 1982 collection (Table 1). Preliminary surveys in February 2013 found a total of 35 individuals spread over 15 metres in the general vicinity of the original collection. The plants appeared to be in good health, with one or two flowers evident.

As the herbfields on Macquarie Island had been severely impacted by rabbits, the likelihood of re-finding the species on Macquarie Island was considered to be relatively low given survey efforts by botanists on the island and the conspicuous nature of the species. The vegetation is now recovering following eradication efforts, and the rediscovery in 2013 of *Galium antarcticum* in the vicinity of the original collection site may have been a result of regeneration from soil-stored seed.

RESERVATION STATUS

The species is reserved in the Macquarie Island Nature Reserve and World Heritage Area.

CONSERVATION STATUS

Galium antarcticum was listed as endangered on the Tasmanian *Threatened Species Protection Act 1995* in 2009, meeting the following criteria:

B. Extent of occurrence estimated to be less than 500 km^2 or occupancy less than 10 hectares, and:

1. known to exist at no more than five locations;
2. continuing decline, inferred, observed or projected, in (c) area, extent and/or quality of habitat.

D. Total population extremely small or area of occupancy very restricted, and;

1. total population estimated to number fewer than 250 mature individuals;
2. total population with an area of occupancy less than 0.01 km^2 (1 hectare), and typically in five or fewer locations that provide an uncertain future due to the effects of human activities or stochastic events, and thus capable of becoming extinct within a very short time.

Table 1. Population summary for *Galium antarcticum* in Tasmania

	Subpopulation	Tenure	NRM region *	1:25 000 mapsheet	Year last seen	Area of occupancy (ha)	Number of plants
1	NW side of Skua Lake	Macquarie Island Nature Reserve	N/A	N/A	2013 (1982)	0.02	35

* NRM region = Natural Resource Management region

THREATS, LIMITING FACTORS & MANAGEMENT ISSUES

Galium antarcticum is likely to have been impacted to an unknown degree by the decline in the extent and quality of its habitat due to feral rabbit activity. The eradication efforts and resultant recovery of the vegetation have now allowed the species to re-establish on Macquarie Island. Threats faced by the species are detailed below.

Impact of rabbits: Rabbits (*Oryctolagus cuniculus*) were introduced to Macquarie Island in the 19th century as a food resource for sealers (Scott 1988), and have had a major impact on elements of the island's flora (Copson 1984).

Rabbit numbers on the island have fluctuated considerably over the last 100 years, undergoing a decline in the late 1970s and 1980s due to the introduction of the myxoma virus in 1978 (Scott 1988). However, the rabbit population had expanded significantly in recent years (Scott & Kirkpatrick 2008). The increase was attributed to a complex suite of factors, including a decrease in the effectiveness of myxomatosis, the eradication of cats, and a changing climate that had permitted rabbits to produce more offspring per year. The rabbit population collapsed as a result of eradication efforts started in 2010 (PWS & BCB 2007) though the threat from rabbits will continue until they are eradicated from the island.

Rabbits had been widespread across the island, including in short herb vegetation and grassland, where they dug and scratched at the vegetation surface. Studies showed that rabbit activity (grazing and burrowing) altered vegetation structure and composition (Copson & Whinam 1998). In mire communities where rabbit activity was high, *Marchantia* (a liverwort) and *Poa annua* (introduced grass) were more abundant (greater cover). Both these species have the ability to outcompete surrounding small species such as *Galium antarcticum*.

If *Galium antarcticum* was grazed by rabbits it would likely have been by mistake (Rod Seppelt, pers. comm.). While digging by rabbits could have caused direct damage to individual plants, the physical action of digging compromised the stability of the peat soils leading to the degradation or destruction of habitat (Shaw 2005, Bryant & Shaw 2007). In addition, where rabbits were active they deposited large (50 x 50 cm) piles of faeces. Decomposition processes are slow in the subantarctic (Tweedie 2000) and piles of scats could have smothered small plants leading to mortality.

Following the collapse of the rabbit population, the rediscovery of *Galium antarcticum* on Macquarie Island is likely to have resulted from recruitment from soil-stored seed in areas that had not been too badly degraded or eroded.

Small population size: The small size of the occurrence on Macquarie Island presents a risk of extinction from stochastic events.

Introduction of alien species: A new introduction of an alien species (plants, vertebrate, invertebrate or pathogen) could severely affect the species directly, through competition or through degradation of habitat.

Climate change: Climate data shows warming of Macquarie Island of over half a degree in 50 years (Pendlebury & Barnes-Keoghan 2007, Tweedie & Bergstrom 2000). It is possible that resultant changes to vegetation may lead to competition pressures influencing the species.

Climate change may also increase the risk of alien species establishing on the island.

MANAGEMENT STRATEGY

What has been done?

Botanical survey on Macquarie Island has been extensive over the last 50 years, with vegetation surveys conducted on the island during most summers. *Galium antarcticum* has been specifically targeted by several researchers (J. Whinam, pers. comm.).

Implementation of the Macquarie Island pest eradication plan (PWS & BCB 2007) has resulted in the collapse and possible eradication of rabbits from the island.

Management objectives

- prevent the loss or degradation of potential habitat;
- search for the species in potential habitat;
- prevent the loss or decline of known subpopulations.

What is needed?

- fully implement the Macquarie Island pest eradication plan (PWS & BCB 2007);
- continue stringent biosecurity controls to prevent the introduction of alien species to Macquarie Island;
- undertake extension surveys for the species in potential habitat in January/February;
- monitor occurrences of the species during recovery of vegetation following the collapse of the rabbit population and to detect emerging issues;
- collect seed for long-term storage at the Tasmanian Seed Conservation Centre.

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View:
www.dpipwe.tas.gov.au/threatenedspecieslists

Contact details: Threatened Species Section, Department of Primary Industries, Parks, Water and Environment, GPO Box 44, Hobart, Tasmania, Australia, 7001. Phone (03) 6233 6556; fax (03) 6233 3477.

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