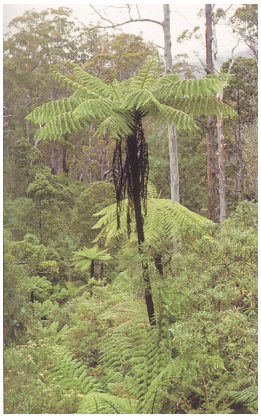

Image by Mike Garrett

# *Cyathea cunninghamii*

## slender treefern

TASMANIAN THREATENED FLORA LISTING STATEMENT

**Scientific name:** ***Cyathea cunninghamii*** Hook.f., *Icon.* Pl. 10, t.985 (1854)
**Common name:** slender treefern (Wapstra *et al.* 2005)
**Group:** vascular plant, pteridophyte, family **Cyatheaceae**

**Status:** *Threatened Species Protection Act 1995*: **endangered**
*Environment Protection and Biodiversity Conservation Act 1999*: **Not Listed**

**Distribution:** Endemic: **Not endemic to Tasmania**
Tasmanian NRM Regions: **Cradle Coast, North and South**

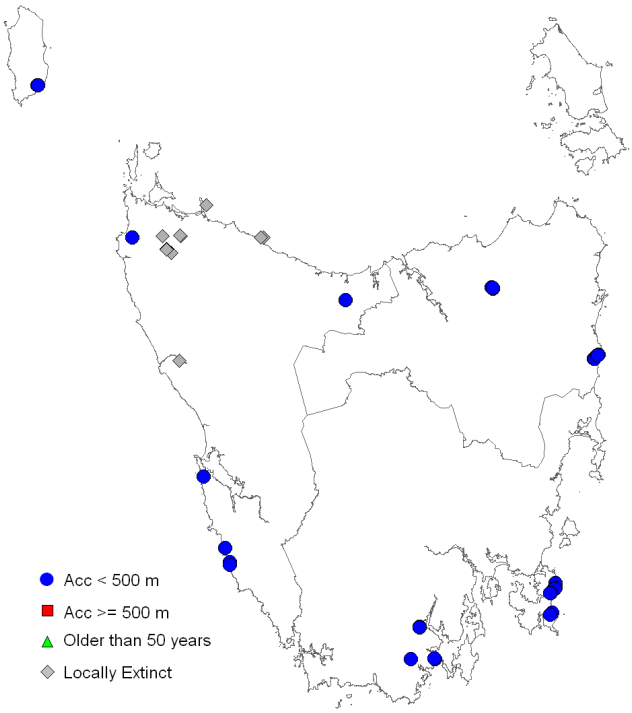


**Figure 1.** Distribution of *Cyathea cunninghamii* in Tasmania

**Plate 1.** *Cyathea cunninghamii*: habit (image by Oberon Carter)

## IDENTIFICATION AND ECOLOGY

*Cyathea cunninghamii* is a tall treefern in the Cyatheaceae family. It has a slender trunk and small crown, and typically occurs along creeks in sheltered coastal fern gullies (Plate 1). Recruitment is from spore, with plants reaching maturity at an age of about 25 to 30 years. *Cyathea cunninghamii* may be recognised in the field from other *Cyathea* species by frond butt (stipe) and scale characters, maturation heights and habitat.

### Survey techniques

Surveys for the species are best undertaken in mid to late summer when identifiable reproductive material is most likely to be present.

### Description

The following description of *Cyathea cunninghamii* is adapted from Duncan and Isaac (1986). *Cyathea cunninghamii* has an erect trunk to 20 m tall and 8 to 10 cm diameter, coated towards the base with adventitious roots; stipe bases are persistent above, crumbly.

**Fronds** are 1.5 to 3 m long and form a relatively small crown. Stipes are short, coarse, black, dull, with numerous, very small, sharp tubercles. The scales at the base of the stipe are papery, shiny, pale fawn to light brown (often with dark central streaks), 1 to 4 cm long, ovate to linear with hair-like tips (Figure 2).

**Lamina** are dark green, sub-triangular to sub-lanceolate, 3-pinnate with pinnae shorter near the stipe. Primary and secondary pinnae are narrowly oblong with secondary pinnae decreasing abruptly to linear tips. The lower surface of each rachis has scattered scales that are usually membranous and flat, with a terminal hair.

**Pinnules** are sessile with adjacent, broad bases continuous, margins shallowly toothed when sterile, and deeply lobed when fertile; lower surface of veins with tiny, colourless, stellate hairs.

**Sori** are conspicuous and in rows on the lower surface of the pinnules, with one sorus per lobe. The indusium is prominent, deeply but incompletely cup-shaped with a notch towards its margin. It is membranous, dark at centre of base and on drying the cup may split and appear as two slightly concave half cups.

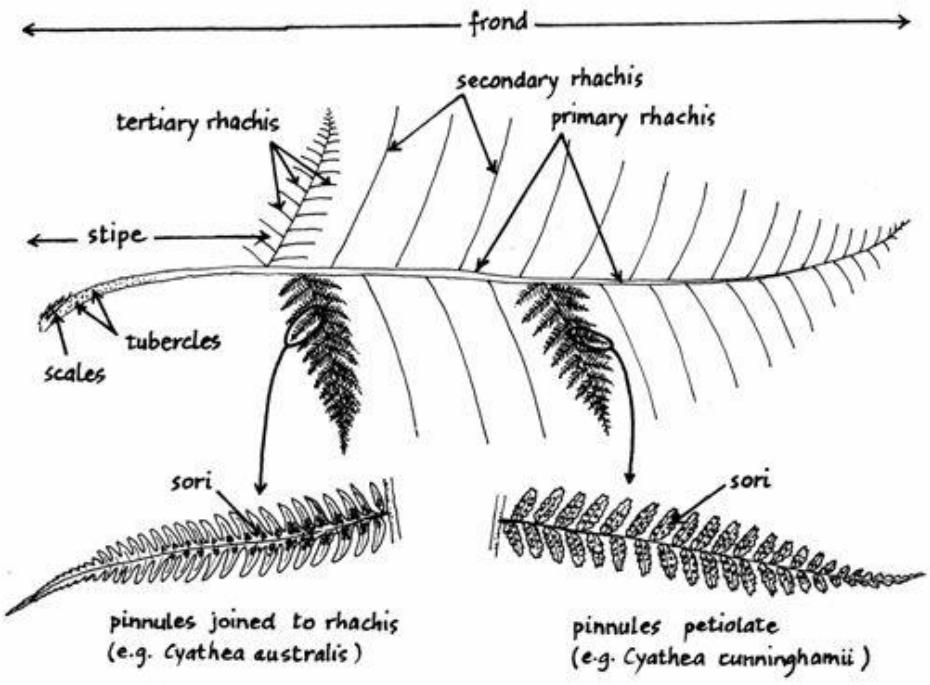


**Figure 2**. Stylised tripinnate frond of *Cyathea* spp. (reproduced with permission from Fred Duncan)

## Confusing Species

Trunk, stipe and indusium characters may be used to distinguish *Cyathea cunninghamii* from the *Cyathea australis* and *Cyathea* X*marcescens*. *Cyathea cunninghamii* has a trunk at maturity of less than 20 cm in diameter, the scales at the base of its stipes are often streaked, its pinnules are petiolate, and the sorus has a large cup-like indusium. The other two taxa have trunk diameters greater than 20 cm, scales at the base of the stipes appear varnished, the pinnules are joined to the rachis, and the indusium is semi-circular for *Cyathea* X*marcescens* and absent for *Cyathea australis* (Duncan & Neyland 1986, Forest Practices Board 2003).

The three species also mature at different heights: 7–8 m for *Cyathea cunninghamii*, 1–1.5 m for *Cyathea* X*marcescens* and less than 1 m for *Cyathea australis*. *Cyathea cunninghamii* and *Cyathea* X*marcescens* grow close to watercourses, while *Cyathea australis* usually occurs higher up the slopes (Garrett 1996).

In the genus *Cyathea* the frond butts have hard protuberances and are covered in long chaffy scales, while sori are situated on the forks of veins away from the edges of the pinnules. For the other common tree fern in Tasmania, *Dicksonia antarctica*, the frond butts are smooth and are clad with a fine soft reddish-brown hair and the sori are marginal (Duncan & Isaac 1986, Garrett 1996).

### DISTRIBUTION AND HABITAT

*Cyathea cunninghamii* occurs in Tasmania, Victoria (from the Otways across into East Gippsland) and Queensland (Lamington National Park); the species is noted as being locally common in New Zealand (Duncan & Isaac 1986, Brownsey & Smith-Dodsworth 1989, Garrett 1996, Bostock 1998).

*Cyathea cunninghamii* is thought to be extant at fifteen sites in Tasmania, the largest stands being at Lower Marsh Creek and Dalco Creek. The species typically grows beside creeks in deep sheltered gullies in areas of moderate rainfall and between 20 and 150 m asl. The majority of the known extant sites occur within 3 km of the coast, exceptions being Hastings Creek (7 km inland), and a site near South Springfield (27 km inland, 370 m asl).

There are unconfirmed reports of plants near Hibbs Lagoon (J. Marsden-Smedley, pers. comm.) and the Pieman River (C. Arthurs, pers. comm.).

*Cyathea cunninghamii* typically grows in deep fern gullies amidst *Eucalyptus obliqua* (stringybark) and/or *Eucalyptus regnans* (giant ash) wet or less-often in mixed forest (Neyland 1986, Garrett 1996 & 1997). Understorey small tree species may include *Pomaderris apetala* (common dogwood) and *Acacia dealbata* (silver wattle). *Dicksonia antarctica* (soft treefern) is usually prominent. The Walkers Creek site is somewhat 'atypical' in that the dominants are *Nothofagus cunninghamii* (myrtle beech) and *Atherosperma moschatum* (sassafras). Plants grow in soil usually no more than several metres from a watercourse and are often in previously disturbed microsites.

*Cyathea cunninghamii* is believed to be extinct at the following locations in Tasmania: Table Cape, Rocky Cape, the Circular Head district (Togari/Christmas Hills), Pieman River (known site near Corinna) and Long Bay to the south of Woodbridge. The linear extent of the known extant sites in Tasmania is 480 km, with an extent of occurrence of about 70,000 km$^2$ (which includes large areas of unsuitable habitat), and an area of occupancy of 20–25 ha.

### RESERVATION STATUS

*Cyathea cunninghamii* is reserved within Tasman National Park, Little Beach State Reserve, Hastings Caves State Reserve, Southwest Conservation Area and Lower Marsh Creek Forest Reserve.

### POPULATION ESTIMATE

The extant subpopulations of *Cyathea cunninghamii* in Tasmania are thought to contain about 250 mature plants (Table 1). Given that some new, albeit small, subpopulations have been discovered in recent years, it is considered likely that additional sites will be located with an intensive survey effort, especially in the State's west.

**Table 1.** Population summary for *Cyathea cunninghamii* in Tasmania

| | Subpopulation | Tenure | NRM region | 1:25 000 mapsheet | Year last (first) seen | Area occupied (ha) | Number of mature plants (& trunked juveniles) |
|---|---|---|---|---|---|---|---|
| 1 | Little Beach Creek | Little Beach State Reserve | North | Ironhouse | 2006 ^ (1993) | 1.5 | 4 (12) * |
| 2 | Lower Marsh Creek | Lower Marsh Creek Forest Reserve | North | Piccaninny | 1996 (1982) | 6.2 | 60 (86) * |
| 3 | Walters Opening | Tasman National Park | South | Murdunna | 2010 (1990s?)+ | 0.1 | 7 ^ |
| 4 | Deep Glen Creek | Tasman National Park | South | Murdunna | 2007 (1984) | 0.00001 | 1 (dead) ^ possibly extinct |
| 5 | Creek west of Deep Glen Bay | Tasman National Park | South | Murdunna | 2010 (2010) | 0.1 | 10 (2) ^ |
| 6 | Eaglehawk Neck | Tasman National Park | South | Taranna | 2007 (1900?) | 1.8 | 9 (9)^ |
| 7 | Bivouac Creek | Tasman National Park | South | Hippolyte | 2008 (1990?) | 0.00001 | 1 ^ (1 *) |
| 8 | Walkers Creek | State Forest | South | Hippolyte | 2010 (2008) | 0.4 0.4 | 28 (1) ^ 23 (2) # |
| 9 | Long Bay | ? | South | Blackmans Bay | 1881 | | presumed extinct |
| 10 | Geeveston | Private | South | Waterloo | 2007 (1999) | 0.1 | 5 (4) ^ |
| 11 | Dalco Creek | State Forest | South | Partridge | 2005 (1991) | 5.4 | c. 50 (200) # |
| 12 | Hastings Creek | Hastings Caves State Reserve | South | Hastings | 1996 (1975) | 0.6 | 10 (8) * |
| 13 | Rheuben Creek | Southwest Conservation Area | Cradle Coast | Mainwaring | 1996 (1915) | 1.9 | 12 (43) * |
| 14 | Cypress Creek | Southwest Conservation Area | Cradle Coast | Mainwaring | 1996 (1915) | 1.3 | 1 (11) * |
| 15 | Pegg Creek | Southwest Conservation Area | Cradle Coast | Montgomery | 2006? | 0.1 | 3 |
| 16 | Dunes Creek | Southwest Conservation Area | Cradle Coast | Table Head | 2003 (2003) | 0.1 | 4 (6) * |
| 17 | Pieman River | Pieman River State Reserve | Cradle Coast | Hardwicke | 1996 | | extinct (1 in 1996) |
| 18 | Redpa | Private | Cradle Coast | Marrawah | 2010 (2010?) | 0.01 | 3 (6) |
| 19 | Trowutta, Circular Head, Table Cape, Rocky Cape | ? | Cradle Coast | ? | 1975 (1890s) | | presumed extinct |
| 20 | Grassy River | Private | Cradle Coast | Grassy | 2007 (1990) | 0.1 | 1 (2) ^ |
| 21 | Marine Creek, Railton | State Forest | Cradle Coast | Railton | 2010 (2010) | 0.2 | 20 |
| 22 | South Springfield | State Forest & Private (with covenant) | North | Lisle | 2003 (2001) | | 10 (6) |

Sites are recorded in a clockwise direction from northeastern Tasmania.
NRM region = Natural Resource Management region; * = Garrett (1997 and unpublished data);
# = Forestry Tasmania figures and Garrett (pers. comm.); ^ = Threatened Species Section surveys; + = Leaman (1999).

## CONSERVATION ASSESSMENT

*Cyathea cunninghamii* was listed as endangered on the Tasmanian *Threatened Species Protection Act 1995* in June 2004, satisfying criteria C and D:

- total population estimated to number fewer than 2,500 mature individuals, with a continuing decline observed in the number of mature individuals and no population estimated to contain more than 250 mature individuals;
- total population estimated to number fewer than 250 mature individuals.

## THREATS, LIMITING FACTORS & MANAGEMENT ISSUES

Land clearance, forestry operations and a high fire frequency are likely to have been the major contributors to the decline of *Cyathea cunninghamii* in Tasmania, with the species now presumed extinct in the State's northwest.

Large trunk-forming ferns such as *Cyathea cunninghamii* are susceptible to physical damage due to a range of disturbances, e.g., flash flooding, storm damage, fire, and the direct impact of stock (rubbing against the trunks) and machinery. A number of mature *Cyathea cunninghamii* plants were destroyed along Lower Marsh Creek and Little Beach Creek by a flood in 1988 (Garrett 1997), while anecdotal reports also indicate recent losses due to flood at Walters Opening (Marsden-Smedley, pers. comm.). Several mature plants at the Eaglehawk Neck site are known to have been felled during storms in recent years (TSS surveys), while a similar fate befell the solitary specimen along the Pieman River. Any activities that disturb the upper catchments of the creek systems in which *Cyathea cunninghamii* occurs will potentially increase the likelihood of such physical destruction, with an unknown impact on recolonisation opportunities due to changes in deposition and scouring levels etc. However, as Garrett (1997) has noted, such dynamic environments are likely to provide *Cyathea cunninghamii* with the conditions necessary for sporeling germination and establishment during the crucial first two years of growth.

Forestry operations have the potential to impact upon *Cyathea cunninghamii* in several ways: logging too close to the species' gully habitat will increase the likelihood of wind-throw of trees, thereby increasing the risk of direct physical damage, while also leading to detrimental hydrological and microclimate changes. The local microclimate is also likely to be affected by fire escape and/or scorching from regeneration burns of adjacent coupes.

Based on our present knowledge, only 3 of the 18 extant *Cyathea cunninghamii* locations in Tasmania support more than 20 mature plants, while good numbers of trunked juveniles *and* sporelings have been observed at only the Lower Marsh Creek and Rheuben Creek sites. *Cyathea cunninghamii* does not become fertile until a trunk height of between 5–8 metres is reached, which equates to an estimated age of 25–30 years (Garrett 1996, pers. obs.). Due to the low number of mature individuals and the species' disjunct distribution, stochastic events such as fire, flood and prolonged drought pose a large risk to the species.

## MANAGEMENT STRATEGY

### What has been done?

Surveys were conducted and management prescriptions prepared for *Cyathea cunninghamii* in preparatory studies for the Regional Forest Agreement (Garrett 1997), and follow-up surveys of sites on King Island, and the Tasman and Forestier Peninsulas were undertaken in 2007–2008 by personnel with DPIPWE's Threatened Species Section as part of an NRM-funded threatened flora verification project.

The subpopulation on private land near South Springfield has been protected by a conservation covenant under the *Nature Conservation Act 2002*, and all occurrences on State Forest are included in flora Special Management Zones.

### Management Objectives

The main objectives for the recovery of *Cyathea cunninghamii* are to minimise the probability of extinction of subpopulations by ensuring habitat protection, and to secure all subpopulations under effective management regimes within the next five years. These objectives are consistent with the *Draft Flora*

*Recovery Plan for Tasmanian Threatened Ferns* (Threatened Species Section 2011).

**What is needed?**

Recovery actions necessary to decrease the extinction risk to *Cyathea cunninghamii* include:

- provide information and extension support to Natural Resource Management committees, local councils, government agencies and the local community on the locality, significance and management of known subpopulations and areas of potential habitat;
- ensure all subpopulations on State Forest have adequate protection, and that the upper reaches of Lower Marsh Creek and Little Beach Creek are included in streamside reserves of appropriate width;
- encourage owners of private land supporting the species to enter into formal land management agreements that incorporate longer-term habitat maintenance objectives and actions as a high priority;
- include specific fire-exclusion provisions for the species and surrounding habitat in fire management plans for Little Beach State Reserve, Lower Marsh Creek Forest Reserve, Tasman National Park and King Island;
- conduct extension surveys of suitable habitat in the following areas: Nabowla – Springfield, Forestier Peninsula, Tasman Peninsula and West Coast
- investigate the feasibility of propagating plants from spores collected from the Grassy River site and supplementing the wild subpopulation;
- monitor known subpopulations for the survival and growth of individual plants and any new threats.

**BIBLIOGRAPHY**

Barnes, R.W., Duncan, F., & Todd, C.S. (2002). *The Native Vegetation of King Island, Bass Strait.* Nature Conservation Report 02/6, Nature Conservation Branch, Department of Primary Industries, Water and Environment, Hobart.

Bostock, P.D. (1998). Cyatheaceae, *Flora of Australia* 48: 193–204.

Brownsey, P.J., & Smith-Dodsworth, J.C. (1989). *New Zealand Ferns and Allied Plants.* David Bateman, Auckland.

Duncan B.D., & Isaac, G. (1986). *Ferns and allied plants of Victoria, Tasmania and South Australia.* Melbourne University Press, Carlton, Victoria.

Duncan, F., & Neyland, M. (1986). Tasmanian tree ferns: a vegetative key and descriptions. *Tasmanian Naturalist* 85: 2–8.

Forest Practices Board (2003). Tree Fern Identification and Management. *Forest Practices Board Flora Technical Note Series No. 5.* Forest Practices Board Botany Section, Hobart.

Garrett, M. (1996). *The Ferns of Tasmania. Their ecology and distribution.* Tasmanian Forest Research Council, Hobart.

Garrett, M. (1997). *Rare or Threatened Tasmanian Forest Ferns.* Report to the Tasmanian RFA Environment and Heritage Technical Committee.

Leaman, D. (1999). *Walk into history in southern Tasmania.* Leaman Geophysics, Hobart.

Neyland, M. (1986). *Conservation and management of treeferns in Tasmania.* Wildlife Division Technical Report 86/1, Parks and Wildlife Service, Tasmania.

Threatened Species Section (2011). *Draft Flora Recovery Plan: Threatened Tasmanian Ferns.* Department of Primary Industries, Parks Water & Environment, Hobart.

Wapstra, H., Wapstra, A., Wapstra, M., & Gilfedder, L. (2005). *The Little Book of Common Names for Tasmanian Plants.* Department of Primary Industries, Water and Environment, Hobart.

**Prepared** in 2006 under the provisions of the Tasmanian *Threatened Species Protection Act 1995*. Reviewed in April 2011.

**Cite as:** Threatened Species Section (2011) *Listing Statement for* Cyathea cunninghamii (*slender treefern*). Department of Primary Industries, Parks, Water & Environment, Tasmania.

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

**Contact details:** Threatened Species Section, Department of Primary Industries, Parks, Water & 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.