Hydrocotyle laxiflora

stinking pennywort

TASMANIAN THREATENED FLORA LISTING STATEMENT

Image by Richard Schahinger

Scientific name: ***Hydrocotyle laxiflora*** DC., *Prodr.* 4: 61 (1830)
Common name: stinking pennywort (Wapstra et al. 2005)
Group: vascular plant, dicotyledon, family **Apiaceae**

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 Region: **South**

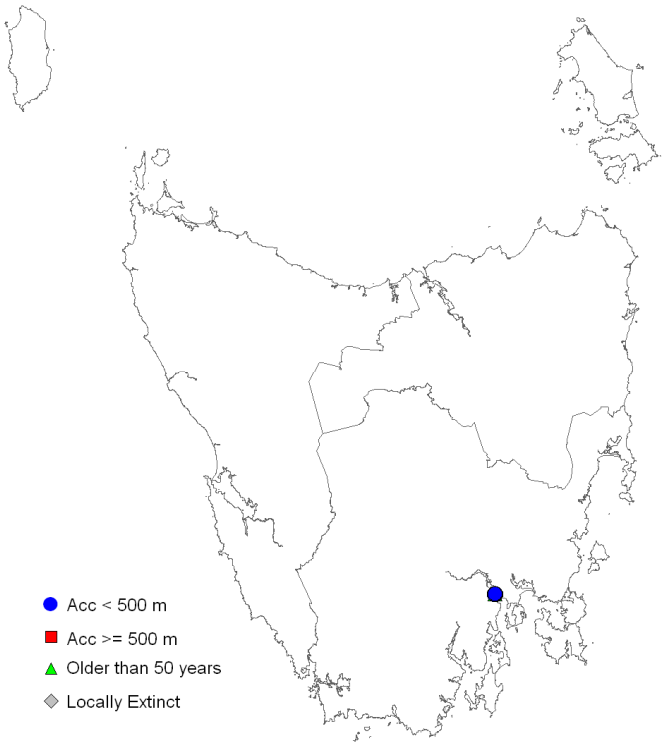

Figure 1. Distribution of *Hydrocotyle laxiflora* in Tasmania

Plate 1. *Hydrocotyle laxiflora*: female flowers (image by Richard Schahinger)

SUMMARY: *Hydrocotyle laxiflora* (stinking pennywort) is a perennial herb known in Tasmania from only 13 plants/patches occupying 0.24 ha in a single location at Queens Domain in Hobart. The species grows in sheoak woodlands and grassy eucalypt woodlands and requires fire or other disturbance to prevent canopy closure and reduce competition from other species. The species is threatened by weeds and because of the small population size is at risk from chance events such as damage from vegetation management activities including herbicide application and dumping of slash. Any change in rainfall patterns associated with climate change may not favour the persistence of this edge of range occurrence of the species.

IDENTIFICATION AND ECOLOGY

Hydrocotyle laxiflora is a known coloniser of bare ground or disturbed areas (Walsh & Entwisle 1999), and may recover vegetatively after drought, fire or other disturbance via underground rhizomes. The species is capable of forming extensive mats (Plate 1) in the growth suppression zone of sheoaks due to the lack of competition from other species, provided the canopy is not closed entirely (Kirkpatrick 2004).

Hydrocotyle laxiflora is mostly dioecious, that is, male and female flowers occur on different plants, and may flower from October to April. Flowers have an offensive odour, with pollinators likely to include a range flies and gnats. The longevity of the soil seedbank and presence of dormancy mechanisms are unknown. Lunt (1997) failed to record the species from soil seedbanks in either grassland or grassy forest plots, despite it being one of the dominant ground flora in the latter. However, it was acknowledged that sampling and germination procedures may not have been appropriate for all species encountered.

Survey techniques

Surveys for *Hydrocotyle laxiflora* are best undertaken during its peak flowering period, late October to mid December, ideally on warm days to allow the species' distinctive odour to assist in detection. The species may also be identified at other times of the year using vegetative characteristics, though plants may die back in dry weather (AVK 2008). Areas of suitable habitat burnt in the previous autumn should be preferentially targeted for survey due to ease of detection of the species in the relatively sparse regrowth.

Description

Hydrocotyle laxiflora is a moderately to densely hirsute perennial herb with stems to more than 1 m long which root at the nodes. Leaves are arranged opposite each other on the stem. They are kidney-shaped and 8 to 50 mm across, each with 5 to 10 shallow lobes. Flowering stems are erect or upward sloping to 15 cm long. Flowers are small, yellowish-green and unisexual. They are arranged in globe-shaped umbels of 30 to 50 flowers, 5 to 16 mm wide. The male and female flowers are in different clusters, with the individual male flowers on stalks that are longer than those of the females (Plate 2). The fruit is 2 to 2.5 mm wide and consists of two hairless and slightly flattened fruitlets (mericarps).

[description based on Curtis 1963, Walsh & Entwisle 1999]

Plate 2. *Hydrocotyle laxiflora*: female and male flowers (images by Richard Schahinger)

Confusing species

Hydrocotyle laxiflora can be distinguished from other species of *Hydrocotyle* in Tasmania by its unpleasant smell, its mostly unisexual flowers and its stalked flowers (Curtis 1963).

DISTRIBUTION AND HABITAT

Hydrocotyle laxiflora is found in Victoria, New South Wales, Queensland and South Australia,

Table 1. Population summary for *Hydrocotyle laxiflora* in Tasmania

	Subpopulation	Tenure	NRM region	1:25 000 mapsheet	Year last (first) observed	Area of occupancy (ha)	Number of patches
1	Queens Domain	Hobart City Council	South	Hobart	2011 (1958)	0.24	13

NRM region = Natural Resource Management region

being widespread in forest, woodland and grasslands (Walsh & Entwisle 1999), and Tasmania. In Tasmania the species is known from the northern flanks of the Queens Domain in Hobart, where it was first collected in 1958. About a dozen discrete patches have been recorded, ranging in size from 20 to more than 200 m^2. The linear range of the species in Tasmania is 0.68 km, the extent of occurrence 0.0126 km^2 (12.6 ha), and the area of occupancy 0.24 ha.

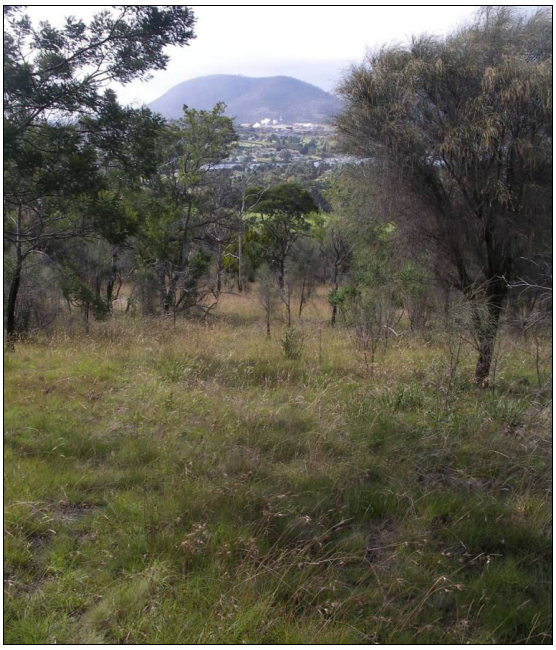

Plate 3. *Hydrocotyle laxiflora*: sheoak woodland habit (image by Richard Schahinger)

In Tasmania, *Hydrocotyle laxiflora* occurs in woodlands dominated by *Allocasuarina verticillata* (drooping sheoak) or *Eucalyptus viminalis* (white gum), or open shrublands dominated by *Allocasuarina verticillata*, *Bursaria spinosa* (prickly box) and *Acacia mearnsii* (black wattle). *Themeda triandra* (kangaroo grass) is the dominant grass in the latter communities (Plate 3). All patches are on Jurassic dolerite, with dark brown to black clay-loam soils that become deeply cracked in dry seasons. Rock cover may be up to 15% and the aspect ranges from northwest to northeast, with the slope from 5 to 15 degrees. The altitude of known sites ranges from 30 to 110 m above sea level, with an annual rainfall of about 620 mm.

POPULATION ESTIMATE

Estimating plant numbers for *Hydrocotyle laxiflora* is problematic given the species' ability to spread vegetatively. About a dozen discrete patches are known to be extant, each of which may consist of single plants (Table 1). There is little data to indicate population trends. Four patches were noted at the Domain in 1995 (Kirkpatrick 1995). Three of these could not be relocated during targeted surveys in 2007 but 5 new patches were found, with another 7 patches uncovered in 2011.

The chances of additional *Hydrocotyle laxiflora* subpopulations being found in Tasmania, aside from the Queens Domain, are considered to be low given the past survey effort and the distinctive character of the species. However, it is considered likely that additional patches will be uncovered on the Queens Domain if intensive surveys are undertaken of potential habitat in the spring following any burn.

RESERVATION STATUS

The species is not formally reserved. The only known subpopulation in Tasmania occurs on land managed by Hobart City Council.

CONSERVATION ASSESSMENT

Hydrocotyle laxiflora was listed as vulnerable on the original schedules of the Tasmanian *Threatened Species Protection Act 1995*, and was

uplisted to endangered in October 2011, meeting criterion D:

2. total population with an area of occupancy less than 1 hectare and typically in 5 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 period.

THREATS, LIMITING FACTORS AND MANAGEMENT ISSUES

Inappropriate fire regimes: *Hydrocotyle laxiflora* was described by Curtis (1963) as being local in open grassland at Queens Domain. In the interim much of the Domain has been invaded by *Allocasuarina verticillata*, a species favoured not only by the prolonged absence of fire but also by low intensity fires (Kirkpatrick 1986 & 2004). Closure of the forest canopy is likely to be detrimental to the species, as is competition from dense native grasses in more open conditions. The objective of the fire management plan for the Queens Domain (AVK 2008) is to maintain a range of different vegetation communities, the majority of which should provide suitable habitat for the species given its capacity to recover readily from fire.

Weed invasion & maintenance issues: Woody weeds, in particular *Rosa rubinigosa* (sweet briar), pose a threat to the species at some sites, with the perennial herb *Urospermum dalechampii* (false dandelion), an escapee from the nearby Royal Tasmanian Botanical Gardens, looming as a threat in the longer term. The indiscriminate treatment of weeds with herbicides poses a threat to the species, as a number of sites occur on roadside embankments or track margins that may be impacted during maintenance activities. Indiscriminate dumping of debris during mowing exercises is known to have impacted one site in the 1990s (Kirkpatrick 1995). The site has not been relocated since.

Stochastic events: The small size of some of the patches on the Queens Domain exposes them to a high risk of local extinction due to chance events.

Climate change: Any alterations in rainfall patterns associated with climate change have the potential to compromise the species' ability to persist at what is its southernmost site in Australia.

MANAGEMENT STRATEGY

What has been done?

- A fire management plan has been prepared for Queens Domain that includes specific recommendations for the species, including targeted pre- and post-fire weeding and surveys of potential habitat in the spring after any burn (AVK 2008).
- A census of the Queens Domain population was undertaken in 2010/2011 by DPIPWE's Threatened Species Section, with assistance from the Hobart Council's Bushland Operations team and volunteers with the group Threatened Plants Tasmania (Schahinger 2011).
- Seed was collected in 2010 and lodged for long-term conservation storage at the Tasmanian Seed Conservation Centre at the Royal Tasmanian Botanical Gardens, with germination and viability trials underway.
- A molecular study was undertaken to investigate the native status of the species in Tasmania though the results of this study were inconclusive (Schahinger et al. 2009).

Management objectives

The main objectives for the recovery of *Hydrocotyle laxiflora* are to maintain the viability of the existing population, promote conditions for the species' successful recruitment, and, if possible, increase the number of subpopulations through survey.

What is needed?

- implement the Queens Domain fire management plan (AVK 2008), including targeted pre- and post-burn weeding at the species' known sites;
- monitor the known patches for health, recruitment and response to disturbance;
- survey potential habitat on the Queens Domain during the spring after any burns;

- provide information and extension support to relevant Natural Resource Management Committees, local councils, government agencies, development proponents and the local community on the locality, significance and management of the known population and potential habitat.

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