Image by Mark Wapstra

# *Senecio psilocarpus*

## swamp fireweed

TASMANIAN THREATENED SPECIES LISTING STATEMENT

**Scientific name:** ***Senecio psilocarpus*** Belcher & Albr., *Muelleria* 8: 113 (1994)

**Common name:** swamp fireweed (Wapstra et al. 2005)

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

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

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

**Distribution:** Endemic status: **Not endemic to Tasmania**

Tasmanian NRM Regions: **Cradle Coast, North**

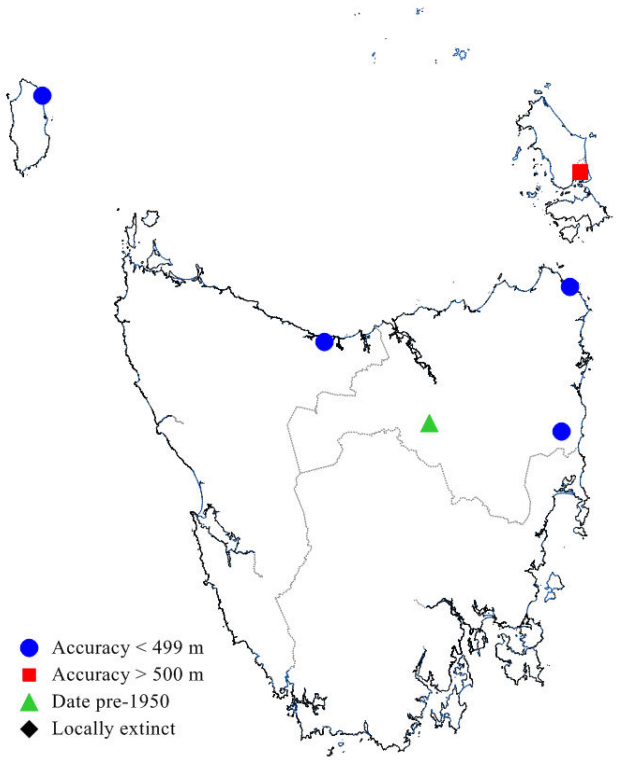


**Figure 1.** The distribution of *Senecio psilocarpus* within Tasmania

**Plate 1.** Specimen of *Senecio psilocarpus* from Dukes Marshes

**SUMMARY:** *Senecio psilocarpus* (swamp fireweed) is a semiaquatic perennial herb, so far detected in Tasmania from six widely scattered sites. The data suggest that the total population in Tasmania is small, and likely to number fewer than 250 plants and occupy well less than 1 ha in total, placing the species at risk from chance events, the risk exacerbated as fireweed plants may not be seen or only persist in low numbers in between disturbance events. Agricultural activities on private land risk the loss or degradation of habitat and perhaps explain the fragmented distribution of the species in Tasmania. The most important needs of the species are to prevent overgrazing by stock, competition from weeds, and changed hydrology of known sites, as well as destruction of known and potential habitat by clearing, inundation or severe degradation.

## IDENTIFICATION AND ECOLOGY

*Senecio psilocarpus* has only recently been recognised as occurring in Tasmania (Thompson 2004). The occurrence of the species in Tasmania was not recognised when it was formally described and segregated from *Senecio squarrosus* 10 years earlier (Belcher & Albrecht 1994).

Species of *Senecio* are usually annual to short-lived perennial herbs referred to as fireweeds or groundsels. They are categorised by the form of the capitulum (the compound flowerhead). Radiate capitula can be seen in the typical garden daisy, with a heart of tubular florets (disk florets) surrounded by ray florets with their radiating ligules. Non-radiate capitula do not have ray florets. They are categorised as disciform if the central florets are bisexual and the outer florets are female and, in Australian *Senecio*, the outer florets have a more slender and fewer-lobed corolla; or discoid if all florets are bisexual. *Senecio psilocarpus* is one of 17 disciform species in Tasmania.

Species of *Senecio* reproduce by seed (referred to as achenes), which are usually produced in high numbers on each plant and are wind-dispersed as most species have seeds with a long pappus (a ring of very fine bristles or hairs at the tip of the body of the achene) that aid in dispersal. As such, species of *Senecio* are often one of the first colonisers of bare and disturbed ground, but can produce locally and temporarily dense populations that are short-lived and decrease as competition with other plants progresses. Observations of *Senecio psilocarpus* on King Island suggest that the species responds positively to fire events. The species can also reproduce vegetatively by developing long stems on or under the ground that root at nodes and produce stems that emerge above the surface of the water.

### Survey techniques

The peak flowering period of most species of *Senecio* is spring through summer and into autumn but many species are detectable and identifiable at most times of the year (Wapstra et al. 2008). Collections of *Senecio psilocarpus* in Tasmania have been made from November through to February (Table 1), but the detection window is likely to be much wider.

### Description

*Senecio psilocarpus* is an erect perennial herb growing to 80 cm tall, with an inconspicuous taproot and fleshy secondary roots. The stems are sprawling and hairless or nearly so. The leaves in the middle third of stems are more or less evenly spaced and sized and narrow-oblanceolate, very narrow-elliptic or linear. They are 7 to 10 cm long, with a length to width ratio of 7 to 10. They are not dissected and their bases are attenuate or with small auricles (basal lobes). The upper surface is more or less glabrous or sparsely scabridulous and the lower surface is glabrous. The leaf margins have scattered denticulations. The progressively smaller uppermost leaves are narrow-linear, with a length to width ratio of 2 to 30. They have auriculate bases, with auricles often bidentate and mildly stem clasping. The margins of the leaves often appear entire due to rolling. The branches in the unit inflorescence each support several capitula (flowerheads), of which there are often 8 to 30 per stem. There are 6 to 10 bracteoles, 2 to 4 mm long, grouped to resemble a calyx at the base of each flower head. The peduncles and margins of the

**Table 1.** Population summary for *Senecio psilocarpus* within Tasmania

| | Subpopulation | Tenure | NRM Region | 1:25000 Mapsheet | Year last seen | Area occupied (ha) | Number of individuals |
|---|---|---|---|---|---|---|---|
| **1** | Nook Swamps, King Island | Lavinia State Reserve | Cradle Coast | Egg Lagoon | 2007 | 0.0025 | <50 |
| **2** | Forth | private property? | Cradle Coast | Kindred | 1987 | unknown | unknown |
| **3** | Near Cressy | private property? | North | Cressy | 1943 | unknown | unknown |
| **4** | Dukes Marshes | State forest | North | St John | 2008 | 0.1 | 5-10 |
| **5** | South of Mussleroe Bay | Mount William National Park | North | Musselroe | 2008 | 0.1 | 5 |
| **6** | Pot Boil Lagoon, Flinders Island | Logan Lagoon Conservation Area? | North | Logan | 1970 | unknown | unknown |

NRM region = Natural Resource Management region

bracteoles are more or less glabrous at flowering. The involucre (ring of bracts called phyllaries that surround the group of the florets in the capitulum) is 4.5 to 6.5 mm long and about 2.3 to 2.8 mm in diameter. The 12 to 16 phyllaries are glabrous and their apices erect. The phyllaries are commonly minutely black at the tip and often purple in a zone about 1 mm below the tip. The 50 to 60 florets in each capitulum are mainly female, the remainder bisexual. The fruiting receptacle is 4.5 to 6.5 mm diameter. The achenes are narrow-obloid, 1.8 to 2.5 mm long and usually orange to reddish-brown, without hairs and lustrous. The pappus is about 5 to 6 mm long.

[description based on Belcher & Albrecht 1994, Thompson 2004]

### Confusing species

*Senecio psilocarpus* is one of 20 species of *Senecio* in Tasmania that have non-radiate flowerheads. Although many of these non-radiate species are superficially similar (Wapstra et al. 2008), *Senecio psilocarpus* is one of the more easily identified species. *Senecio psilocarpus* is most likely to be confused with *Senecio squarrosus* though it can be identified using a combination of its semi-aquatic habitat (more low-lying and poorly-drained than that of *Senecio squarrosus*), smooth hairless seeds, habit (through vegetative reproduction not evident for *Senecio squarrosus*), virtually glabrous appearance of leaves and stems, and apparently a carrot-like smell of bruised leaves (tomato-like in *Senecio squarrosus*) (Thompson 2004, Belcher & Albrecht 1994, Wapstra et al. 2008).

## DISTRIBUTION AND HABITAT

*Senecio psilocarpus* has been recorded from western Victoria and southeastern South Australia (Belcher & Albrecht 1994, Thompson 2004, Barker et al. 200), where it is known from approximately 10 sites (TSSC 2008), and Tasmania (Thompson 2004), where it is known from six widely scattered sites in the northern half of the State, including King and Flinders islands (Table 1, Figure 1). The extent of occurrence within Tasmania of *Senecio psilocarpus* is about 40,000 km$^2$, but this includes large expanses of Bass Strait. The area of occupancy of the three subpopulations with available data is less than one hectare.

All collections of *Senecio psilocarpus* from Tasmania have been from swampy habitats including broad valley floors associated with Midland river systems (Cressy area), edges of farm dams amongst low-lying grazing/cropping ground (Forth area), herb-rich native grassland in a broad swale between stable sand dunes (Nook Swamps, King Island), adjacent to wetlands in native grassland (Mount William), herbaceous marshland (Dukes Marshes) and low-lying lagoon systems (Flinders Island).

On mainland Australia, *Senecio psilocarpus* occurs in high-quality herb-rich wetlands on generally

treeless plains that can be inundated in winter with up to 60 cm or more of water, but are almost dry in summer (Belcher & Albrecht 1994, TSSC 2008).

## POPULATION ESTIMATE

The total population for *Senecio psilocarpus* in Tasmania is estimated at fewer than 100 mature individuals, although there is no available data for half the known subpopulations (Table 1). The data suggest a generally small size of subpopulations given the low number of plants in the King Island subpopulation in 2007 despite the fire in 2005 that would have been expected to promote recruitment. Even though the species was only recently recognised for Tasmania (Thompson 2004), several additional factors suggest that a significant increase in the number of mature individuals is unlikely. These include the wide identification window of the species, the low number of redeterminations on re-examination of herbarium specimens of *Senecio,* and the non-discovery of new subpopulations despite the recent extensive survey effort in potential habitat associated with the development of irrigation schemes for Tasmania. However, an increase in the number of known sites is expected with targeted survey of herb-rich wetlands at low altitudes, particularly in the vicinity of known sites.

## RESERVATION STATUS

*Senecio psilocarpus* is reserved in the Lavinia State Reserve and Mount William National Park. The site on Flinders Island may be within the Logan Lagoon Conservation Area. The Dukes Marshes site occurs in an informal reserve on State forest (Orr & Gerrand 1998).

## CONSERVATION ASSESSMENT

*Senecio psilocarpus* was listed as endangered on Schedules of the *Threatened Species Protection Act 1995* in 2011, meeting the criterion B for endangered as the area of occupancy is estimated to be less than 10 ha, and

1. the species has a severely fragmented distribution;

2c. a continuing decline is observed in area, extent and/or quality of habitat.

The species also meets criterion D as the total population is estimated to number fewer than 250 mature individuals.

## THREATS, LIMITING FACTORS AND MANAGEMENT ISSUES

On mainland Australia, the main threats to *Senecio psilocarpus* are considered to be grazing pressure by both stock and introduced herbivores and weed invasion, and potential threats including trampling by domestic stock and kangaroos and changed hydrology leading to salinity (TSSC 2008). Similar and additional threat factors may operate in Tasmania. The absence of plants or presence in very low numbers in between recruitment events increases the potential for losses through development or chance events.

**Land clearing:** In Tasmania, threats to *Senecio psilocarpus* have historically been extensive land clearing of low-lying ground for the development of pasture and cropping lands, which included substantial modifications to many areas of natural wetlands that may have supported the species. This may explain the disjunct contemporary distribution of the species. Loss and modification of potential habitat continues through agricultural activities including dam development and irrigation activities which have the potential to impact or eliminate as yet undetected subpopulations.

**Inappropriate disturbance regime:** Disturbance regimes associated with known sites of *Senecio psilocarpus* may include cultivation, fertilising, and stock grazing (e.g. low-lying sites in the Midlands and north coast) and fire (e.g. King Island, Flinders Island, Dukes Marshes). The type of disturbance required to maintain or enhance subpopulations is not known.

**Weeds and browsing:** Proximity of sites to agricultural areas increases the risk of invasion by weeds, particularly for small subpopulations, and agricultural areas attract native and introduced animals potentially resulting in an increase in browsing pressure.

**Climate change:** A warmer climate and longer periods of drought may deleteriously impact on the habitat of *Senecio psilocarpus*, through effects

such as the drying out of low-lying areas and increased competition with weeds. Stock grazing at some sites may exacerbate these impacts.

**Stochastic risk:** The highly localised distribution of subpopulations of *Senecio psilocarpus*, combined with the usually relatively low abundance and possible absence of plants in between recruitment events, makes the species subject to losses from chance events at most of its known sites. Small populations separated by long distances supporting unsuitable habitats exacerbate the risk of losses that would result in a severe reduction in the range of the species, and are not conducive to genetic exchange, potentially leading to a reduction in the adaptability of species through inbreeding and loss of genetic variation.

## MANAGEMENT STRATEGY

### *What has been done?*

- The collection history of the species in Tasmania has been compiled (Wapstra 2010) increasing the awareness of the species in Tasmania.
- Seed has been collected for long-term conservation storage at the Tasmanian Seed Conservation Centre based at the Royal Tasmanian Botanical Gardens.

### *Management objectives*

The main objective for the management of *Senecio psilocarpus* in Tasmania is to ensure that there is no decline in known subpopulations through management based on an improved understanding of the abundance, distribution and threats to the species.

### *What is needed?*

- determine the full extent and condition of known subpopulations to inform the development of an appropriate management strategy for each site;
- conduct extension surveys of potential habitat focussed on the vicinity of known sites e.g. determine the extent of the species in the Nook Swamps land system on King Island and determine the extent of the species on private properties associated with the low-lying parts of the Midlands;
- undertake demographic monitoring of the species at selected subpopulations, especially before and after burns and other disturbance events;
- support the Private Land Conservation Program (DPIPWE) with the establishment of conservation covenants for private land supporting *Senecio psilocarpus*, and ensure that current priorities for the species are incorporated into the program's reservation strategies;
- provide information and extension support to relevant Natural Resource Management committees, local councils, Government agencies, development proponents and the local community on the location, significance and management of known subpopulations and areas of potential habitat.

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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. Ph (03) 6233 6556; fax (03) 6233 3477.

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