# **National Recovery Plan for the Austral Pipewort** Eriocaulon australasicum

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**Government of South Australia** Department for Environment and Heritage



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# Summary

The Austral Pipewort *Eriocaulon australasicum* is small, semi-aquatic, annual herb endemic to a small area in western Victoria and adjoining South Australia. The species has suffered a major decline in range and abundance, especially through widespread clearing of habitat and draining of shallow freshwater swamps. Current major threats include climate change, grazing and weed invasion. There are fewer than 2000 plants remaining in five wild populations. The Austral Pipewort is listed as Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999. This national Recovery Plan for the Austral Pipewort is the first recovery plan for the species, and details its distribution and biology, conservation status, threats, and recovery objectives and actions necessary to ensure its long-term survival.

# **Species Information**

### Description

The Austral Pipewort *Eriocaulon australasicum* (F. Mueller) Koern (family Eriocaulaceae) is a small, semi-aquatic, annual herb with a basal tuft of linear leaves 20–50 mm long and 1–1.5 mm wide. Flowers appear in summer as egg-shaped to almost globular heads 3–4 mm wide. These flower heads are enclosed by lance-shaped outer bracts and linear inner bracts. The fruits are smooth, with three celled capsules, each containing a single seed (description from Cunningham *et al.* 1992). Little is known of its biology and ecology. The Austral Pipewort is an annual species, possibly requiring some period of inundation to enable germination from soil-stored seed. Plants start to grow in shallow water (up to 20 cm deep), particularly where the water is clear and the substrate high in organic matter; they are less common in turbid water (Scarlett 1999). Flowering and seed-set follow rapidly as the water level drops and the depressions dry out. Seed set, seed bank accumulation and persistence are unknown. Seed viability is also unknown, although it may be several years, as the species does not appear at some sites every year (Scarlett 1999). The species apparently does not reproduce vegetatively.

### Distribution

The Austral Pipewort is endemic to south-eastern Australia, where it is currently restricted to a small area in south-western Victoria and adjoining South Australia, with an old record from the Murray River in north-western Victoria (Figure 1), in the Murray Darling Depression IBRA bioregion (*sensu* DEH 2000). Maps showing the distribution of the Austral Pipewort are available from the Department of Sustainability and Environment for Victoria and the Department for Environment and Heritage for South Australia.

### **Population information**

The Austral Pipewort is known from three separate locations, containing perhaps 2000 plants. Three populations with more than 1,000 plants (1987) occur in the Mereek Flora Reserve near Edenhope (Vic). Another population containing an estimated 500–700 plants (1990) occurs in the Little Desert National Park (Vic) along the Border Track, and on adjoining private land at Bangham in South Australia (which has <10% of the total population). There is a single 1987 record from the Grampians National Park near Woohlpooer (Vic), although precise location, population persistence and size are unknown. Current population size is not known due to the sites being mostly dry for the last decade, and the lack of recent surveys. These are all important populations necessary to the long term survival and recovery of the Austral Pipewort. All populations in Victoria are on reserved land managed by Parks Victoria.

#### Habitat

The Austral Pipewort grows in shallow, seasonally-inundated depressions and swamp margins on clay plains. Commonly associated species include Black Bristle-sedge *Chorizandra enodis*, Running Marsh-flower *Villarsia reniformis*, Dwarf Brooklime *Gratiola pumilo*, Wiry Centrolepis *Centrolepis polygyna*, Water-milfoil *Myriophyllum* species and Purple Bladderwort *Utricularia*  *dichotoma*. Recovery actions include the identification of habitat that is critical to the survival of the Austral Pipewort.



Figure 1. Distribution of Austral Pipewort.

# **Decline and Threats**

Little is known of the prior distribution and abundance of the Austral Pipewort. There is an old (pre-1900) record from an unknown location along the Murray River in north-western Victoria. Widespread clearing and draining of swamps in western Victoria and south-east South Australia since European settlement has greatly reduced potential habitat, so it is reasonable to assume that the species was possibly once more widespread and abundant than current records indicate. The limited suitable remaining habitat and isolation of current populations make the Austral Pipewort particularly susceptible to extinction.

Aspects of the ecology and biology of *Eriocaulon kornickianum* (a related species from North America) such as annual or weak perennial life history, no vegetative reproduction, low seed set, small soil seed bank, high genetic homogeneity, restricted habitat and poor competitive ability predispose it to decline in the face of habitat disturbance or destruction (Watson *et al.*1994). The biology and ecology of the Austral Pipewort appear to be similar to *E. kornickianum*, as it is also an annual, does not reproduce vegetatively and is of restricted habitat, although seed set, seed bank accumulation, persistence and competitive abilities are unknown.

Major current threats to the Austral Pipewort are:

<u>Climate change:</u> This is the major medium to long-term threat to the species, as it occurs in seasonally wet habitats, and most likely requires some period of inundation in swampy depressions to enable germination from soil stored seed to occur. There is likely to be a decrease in rainfall and increase in average temperatures and evaporation rates in south-eastern Australia associated with projected global warming (CSIRO 2001). Less frequent inundation of the seasonally wet habitats required by the species will reduce habitat availability.

<u>Grazing:</u> Grazed and trampling by sheep are a major threat to plants growing on private land in South Australia, where the population was considered in very poor condition, with very few plants remaining (Scarlett 1987). Populations in reserves in Victoria were considered less at risk from grazing, although the level of threat from grazing by rabbits and macropods is unknown.

<u>Weed invasion:</u> Weeds are a threat at the private land site in South Australia, but less so in the populations within reserves in Victoria.

# **Recovery Information**

#### **Current conservation actions**

Boundary fencing was repaired to remove grazing of the population occurring in the Little Desert (Vic), and a vehicle track passing through the site prior to 1990 was realigned to eliminate the threat of vehicle disturbance. Fuel reduction burning programs in Victorian parks and reserves have been modified to avoid disturbance at sites where the Austral Pipewort occurs (Scarlett 1999).

#### **Recovery Objectives**

The **overall objective** of recovery is to minimise the probability of extinction of Austral Pipewort in the wild and to increase the probability of important populations becoming self-sustaining in the long term.

Within the life span of this Recovery Plan, the **specific objectives** for recovery of the Austral Pipewort are to:

- 1. Determine distribution, abundance and population structure
- 2. Determine habitat requirements
- 3. Manage threats to populations
- 4. Identify key biological functions
- 5. Determine growth rates and viability of populations
- 6. Establish a population in cultivation
- 7. Build community support for conservation

#### **Program implementation**

This Recovery Plan guides recovery actions and will be managed by the Department of Sustainability and Environment in Victoria and the Department for Environment and Heritage in South Australia. Contact will be maintained between the agencies on implementation issues, and technical, scientific, habitat management or education components of the Recovery Plan will be referred to specialist sub-committees on research, *in situ* management, community education and cultivation.

#### **Program evaluation**

The Recovery Team will be responsible for annual assessments of progress towards recovery. This Recovery Plan will be reviewed within five years of the date of its adoption under the EPBC Act.

# **Recovery Actions and Performance Criteria**

Action	Description	Performance Criteria							
Specific Objective 1: Determine distribution, abundance and population structure									
1.1	Undertake surveys to determine the area and extent of populations, the number, size and structure of populations, and inference or estimation of population change.	All populations accurately counted and mapped.							
	Responsibility: DSE/DEH								
Specific Objective 2: Determine habitat requirements									
2.1	Accurately survey known habitat and collect floristic and environmental information describing community ecology and condition.	<ul> <li>Requirements for completion of essential life history stages, recruitment and dispersal identified at known sites.</li> </ul>							
	Responsibility: DSE/DEH, PV	Habitat critical to survival identified and mapped.							
2.2	Identify and survey potential habitat, using ecological and bioclimatic information indicating habitat preference	• Predictive model for potential habitat developed and tested.							
	Responsibility: DSE/DEH, PV	<ul> <li>Potentially suitable areas in Little Desert National Park, Grampians National Park, private land adjacent to Meereek Flora Reserve (Vic) and private land in South Australia searched.</li> </ul>							
Specific	Specific Objective 3: Ensure that all populations and their habitat are legally protected								
3.1	Protect populations on private property.	Fencing and protection for population on private land.							
	Responsibility: DEH, PIRSA								
Specific	CObjective 4: Manage threats to populations								
4.1	Determine whether specific disturbance regimes are required to maintain habitat. Responsibility: DSE, PV	<ul> <li>Preparation of management prescriptions for Little Desert NP, Meereek FR and Grampians NP sites.</li> </ul>							
4.2	Control threats from pest animals.	Fences erected and maintained; stock grazing excluded from all							
	Responsibility: PV	sites.							
		Rabbit control programs initiated where necessary.							
4.3	Control threats from introduced plants.	Potential problem weed species identified.							
	Responsibility: PV/DEH	<ul> <li>Specific control methods identified and tested to ensure least impacts on non target species and habitat.</li> </ul>							

Description	Performance Criteria									
Specific Objective 5: Determine the growth rates and viability of populations										
Measure population trends and responses against recovery actions by collecting demographic information including recruitment and mortality, timing of life history stages and morphological data.	<ul><li>Techniques for monitoring developed and implemented.</li><li>Annual census data collected.</li></ul>									
Specific Objective 6: Establish populations in cultivation										
Establish a seed bank, determine seed viability and seed germination requirements.	Seed from important populations in storage.									
Responsibility: DSE/DEH										
Specific Objective 7: Build community support for conservation										
Involve field naturalists in further survey of known sites and potential areas.	Field naturalists groups and individuals identified, trained and									
Responsibility: DSE/DEH, PV	involved.									
Undertake community extension by encouraging individuals to report sightings of Austral Pipewort to regional DSE/PV personnel and promoting threatened flora conservation.	Presentations to community nature conservation groups.									
Responsibility: DSE/DEH, PV										
	Description Measure population trends and responses against recovery actions by collecting demographic information including recruitment and mortality, timing of life history stages and morphological data. Responsibility: DSE/DEH Description Description Establish a seed bank, determine seed viability and seed germination requirements. Responsibility: DSE/DEH Description Description Involve field naturalists in further survey of known sites and potential areas. Responsibility: DSE/DEH, PV Undertake community extension by encouraging individuals to report sightings of Austral Pipewort to regional DSE/PV personnel and promoting threatened flora conservation. Responsibility: DSE/DEH, PV									

Abbreviations: DEH – Department for Environment and Heritage (SA); DSE – Department of Sustainability and Environment (Victoria); PIRSA – Primary Industries and Resources South Australia; PV – Parks Victoria

#### **Affected interests**

In Victoria, all populations occur on reserved land managed by Parks Victoria, and the Department of Sustainability and Environment is also involved in its conservation. Both organisations have approved the actions outlined in this recovery plan subject to availability of resources for implementation. A portion of one population extends on to private land in South Australia. The Department of Environment and Heritage in conjunction with Primary Industries and Resources (Rural Solutions) are pursuing protection of the site with the property owner.

#### Role and interests of indigenous people

Indigenous communities on whose traditional lands the Austral Pipewort occurs have been advised, through the relevant Indigenous facilitator, of this Recovery Plan and invited to be involved in the implementation of the Recovery Plan.

#### Benefits to other species/ecological communities

The Recovery Plan includes a number of potential biodiversity benefits for other species and vegetation communities, especially in Victoria. Principally, this will be through the protection and management of habitat. The type of wetland in which Austral Pipewort occurs is now very rare, so wetland communities will benefit from protection, particularly those species with similar life forms and/or flowering responses. Other rare or threatened plants that occur within this habitat include the Swamp Onion-orchid *Hydrorchis orbicularis* and the Dwarf Brooklime *Gratiola pumilo*.

#### Social and economic impacts

The implementation of this Recovery Plan is unlikely to cause significant adverse social and economic impacts. Almost all plants occur on public land where nature conservation is already a high priority. Protection of the private land site in South Australia is being pursued through voluntary agreement with the property owner.

## **Management Practices**

On-ground site management will aim to mitigate threatening processes and thereby insure against extinction. Major threats requiring management include further drainage to or drying of wetlands, accidental destruction, competition from pest plants and grazing. A range of strategies will be necessary to alleviate these threats including protective fencing, weed control and maintenance of hydrological regimes. In addition, searches of known and potential habitat should continue to better define the distributions and size of populations.

The Recovery Plan also advocates strategies to fill some of the major gaps in our knowledge to date. These include an understanding of the mechanisms underlying recruitment and regeneration. Successful *in situ* population management will be founded on understanding the relationships between the Austral Pipewort and associated flora, and its response to environmental processes. Demographic censusing will be necessary to gather life history information and to monitor the success of recovery actions.

In addition to the above, *ex situ* conservation measures will be required and will include seed storage. Community participation in recovery actions will be sought, particularly in regard to implementation of on-ground works.

#### Management practices required for conservation of Austral Pipewort include:

- Maintenance of or improvement to wetland hydrological regimes.
- Control of pest plants and animals.
- Investigation of the biology and ecology of the species to enable better targeted conservation management actions.
- Maintenance of ex situ population (e.g. seed bank).

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Action	Description	Priority	Feasibility	Responsibility	Cost estimate					
					Year 1	Year 2	Year 3	Year 4	Year 5	Total
1	Distribution, abundance									
1.1	Surveys	1	100%		\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$25,000
2	Habitat requirements									
2.1	Survey known habitat	2	100%		\$10,000	\$10,000	\$10,000	\$0	\$0	\$30,000
2.2	Identify survey potential habitat	2	75%		\$0	\$0	\$10,000	\$10,000	\$10,000	\$30,000
3	Legal protection of habitat									
3.1	Protect private land habitat	1	50%		\$5,000	\$5,000	\$0	\$0	\$1,000	\$11,000
4	Manage threats									
4.1	Identify disturbance regimes	1	75%		\$5,000	\$5,000	\$5,000	\$0	\$0	\$15,000
4.2	Control pest animals	1			\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$25,000
4.3	Control pest plants	1	75%		\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$25,000
5	Growth rates, pop. viability									
5.1	Conduct censusing	1	100%		\$10,000	\$7,000	\$7,000	\$7,000	\$7,000	\$38,000
6	Cultivation									
6.1	Seed bank	2			\$2,000	\$2,000	\$5,000	\$5,000	\$2,000	\$16,000
8	Community support									
7.1	Community involvement	1			\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$10,000
7.2	Community extension	2	75%		\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$10,000
Totals				<b>\$51,000</b>	\$48,000	\$56,000	\$41,000	\$39,000	\$235,000	