National Recovery Plan for the Leafy Greenhood *Pterostylis cucullata*

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This Recovery Plan has been developed with the involvement and cooperation of a range of stakeholders, but individual stakeholders have not necessarily committed to undertaking specific actions. The attainment of objectives and the provision of funds may be subject to budgetary and other constraints affecting the parties involved. Proposed actions may be subject to modification over the life of the plan due to changes in knowledge.

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Cover photograph: Leafy Greenhood *Pterostylis cucullata* Tootgarook Vic, by Mike Duncan

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Summary

The Leafy Greenhood (*Pterostylis cucullata* R.Br.) is a perennial, terrestrial orchid endemic to south-eastern Australia, in Victoria, Tasmania and South Australia. About 110 populations containing approximately 50,000 plants are known. Major threats include weed invasion, grazing and disturbance to and destruction of plants and habitat. The species is listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. It is listed as Endangered under the South Australian *National Parks and Wildlife Act 1972* and the Tasmanian *Threatened Species Protection Act 1995*, and as Threatened under the Victorian Flora *and Fauna Guarantee Act 1988*. This national Recovery Plan for the Leafy Greenhood is the first recovery plan for the species, and details its distribution, habitat, threats and recovery objectives and actions necessary to ensure its long-term survival.

Species Information

Description

The Leafy Greenhood (*Pterostylis cucullata* R.Br.) is a perennial, terrestrial orchid emerging annually from an underground tuber. It has a stem-encircling basal rosette of 5–7 leaves. A greenish flower stem to 25 cm tall bears several large leafy bracts and a single, large white, green and reddish-brown flower. The dorsal sepal and petals are combined to form a galea which is erect for ¾ of its length and then curved forward in a semi-circle, ending in a blunt point. The lateral sepals are erect and joined at the base, the free points embracing the galea. The labellum is brown and just visible above the sinus (description from Bates & Weber 1990; Backhouse & Jeanes 1995). The Leafy Greenhood is illustrated in Bates and Weber (1990, plates 157 & 158), Backhouse and Jeanes (1995, pg 278) and Jeanes and Backhouse (2006, pg. 171).

Two subspecies of the Leafy Greenhood have been described: *P. cucullata* subsp. *cucullata* and *P. cucullata* subsp. *sylvicola* D.L.Jones (Jones 2006). Subspecies *sylvicola* differs from nominate subsp. *cucullata* by its generally taller habit (to 25 cm tall), leaves usually extending up the scape, and slightly smaller flower on a longer pedicel, with the upper bract well separated from the flower. The habitat of each subspecies is generally distinct, with subsp. *cucullata* occurring in coastal and near-coastal habitats (with the exception of the population at Mt Eccles in western Victoria), whereas subsp. *sylvicola* occurs in foothill and montane habitats well away from the coast.

Little is known of the ecology of the Leafy Greenhood. It is dormant during the drier summer months, then dormancy is broken in response to autumn/winter rains, with leaves emerging and growing throughout the winter and early spring. Flowering occurs from August to December, depending upon altitude, with coastal plants flowering first and plants in montane populations flowering later. Plants reproduce mainly from seed, with limited vegetative propagation occurring. Pollination is probably by small flying insects such as gnats, flies or mosquitoes. Fruits usually take 5-8 weeks to mature following pollination. Each mature capsule may contain tens of thousands of microscopic seeds that are dispersed by the wind when the capsule dries out and splits.

Distribution

The Leafy Greenhood is endemic to south-eastern Australia, where it occurs in South Australia, Victoria and Tasmania (Figure 1). In South Australia the species (subsp. *sylvicola*) is known only from three locations in the Mount Lofty Ranges (Quarmby 2009), in the Flinders Lofty Block bioregion (*sensu* DEH 2000). In Victoria, subsp. *cucullata* occurs in the coastal strip between Nelson in the west and Bairnsdale in the east (with one population inland at Mt Eccles in the south-west), in the Southeast Coastal Plain, Naracoorte Coastal Plain and Victorian Volcanic Plain IBRA bioregions. Subspecies *sylvicola* occurs in the eastern highlands between Eildon and Benambra in the South Eastern Highlands and Australian Alps IBRA bioregions. In Tasmania, subsp. *cucullata* is known from coastal areas in the the north-west and from King, Hunter, Three Hummock and Flinders Islands in Bass Strait (DPIPWE 2009) in the King and Flinders IBRA bioregions.

Detailed maps showing the distribution of *P. cucullata* are available from the Department for Environment and Heritage (DEH) for South Australia; the Department of Primary Industries, Parks, Water and Environment (DPIPWE) for Tasmania; and the Department of Sustainability and Environment (DSE) for Victoria.

Habitat

The two subspecies of *P. cucullata* occupy generally different habitats. The lowland subsp. *cucullata* occurs in Coast Tea-tree (*Leptospermum laevigatum*) or Moonah *(Melaleuca lanceolata)* coastal scrubs on stabilized sand dunes, with an open understorey and grassy and herbaceous groundcover on seasonally damp but well drained humus rich sandy loams (Backhouse & Jeanes 1995; Jones *et al.* 1999; Potts & Wapstra 2000; DPIPWE 2009). In Tasmania, the species typically grows at the interface between coastal tussock grasslands and scrubs (DPIPWE 2009). The Mt Eccles population of subsp. *cucullata* occurs in Brown Stringybark *(Eucalyptus baxteri)* and Manna Gum (*E. viminalis*) forest with a grassy groundcover.

Victorian populations of subsp. *sylvicola* usually occur on montane river banks or alluvial terraces under Apple Box *(Eucalyptus bridgesiana)*, Yellow Gum *(E. melliodora)*, Red Box *(E. macrorhyncha)*, Manna Gum *(E. viminalis)* or Blue Gum *(E. globulus)*, with scattered shrubs and a grassy and herbaceous groundcover. In South Australia, subsp. *sylvicola* occurs in open forest and woodland of South Australian Blue Gum (*E. leucoxylon)*, often with Messmate Stringybark (*E. obliqua)*, Manna Gum or River Red Gum (*E. camaldulensis)* (Quarmby 2009).

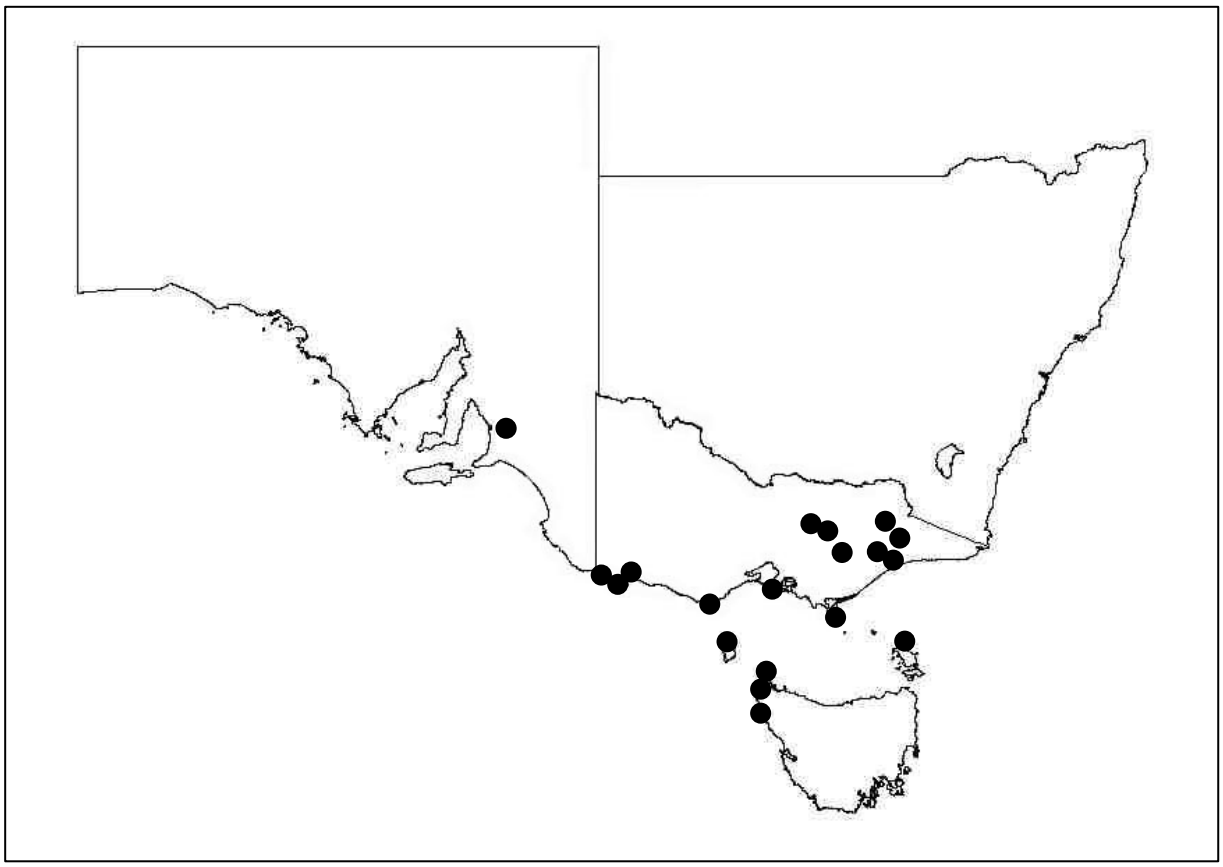

Figure 1. Distribution of *Pterostylis cucullata*

Population Information

The Leafy Greenhood is known from about 110 populations (3 in SA; ~15 in Tas; remainder in Vic) containing perhaps 50,000 plants, with 59 populations being identified as important (Appendix 1), based on representativeness across the range, populations at range limits, size, security and tenure of habitat, for both subspecies. While these populations have been assessed as being important to the ongoing survival of *P. cucullata*, it should be noted that the other known populations should not be ignored or forgotten as they may become important in the future. Specific details of population localities (including GPS data) are held by the relevant State Government departments.

Decline and Threats

The Leafy Greenhood still remains widely distributed, but has declined or disappeared from many locations within its range. There are historical records of this species from locations where the species no longer occurs in South Australia ((Teatree Gully, Fairview Park, McLaren Vale, Hindmarsh Valley, Lake Bonney, Robe and Mt Gambier; ADHERB 2009; NOSSA 2009; Quarmby 2009), Victoria (Frankston, Seaford, Nelson, Queenscliff, Rosebud, Rye and Sorrento) and Tasmania (Circular Head, George Town, Marrawah). In particular, the species must have once been abundant along the eastern side of Port Phillip Bay, between Melbourne and Portsea, with many records from this region, but this area has suffered extensive loss of habitat as a result of urban development and the species is now very rare in this area.

Habitat loss for agriculture and urban development has been the primary cause of the decline of *P. cucullata*, especially in coastal areas. The Tasmanian populations were historically threatened by land clearing/habitat removal/modification of habitat due to fire. Flowers and fruits of *P. cucullata* are likely to be highly palatable and are frequently lost to predation. Very low flowering rates continue at many sites due to the continuing drought in south-eastern Australia. Although this may not cause mortality, it does reduce opportunities for pollination, seed development and subsequent recruitment. Although there are some important populations reserved in national parks, many populations occur on private property, where their future is not secure. There is a risk of extinction due to small population size at many sites, and the highly fragmented distribution of the known populations, leading to low genetic diversity. Inappropriate fire regimes, especially frequent or poorly timed fires, are thought to be detrimental to the species (Quarmby 2009). Remaining populations of *P. cucullata* are at risk from a variety of current and potential threats, including the following.

Grazing/predation

Grazing by native (kangaroos, wallabies, wombats) and/or introduced herbivores (cattle, rabbits, hares) or invertebrates (snails) is a serious threat at many sites. Many Tasmanian populations are threatened by grazing and trampling by cattle (DPIPWE 2009). In Victoria, the introduced Mediterranean Snail (*Microxeromagna vestita*), rabbits and possibly macropods threaten many populations. The Cape Otway private property sites are threatened by grazing and/or trampling by stock. Grazing is considered a significant threat to all South Australian populations. In particular, the Belair National Park population is threatened by rabbits, and both Belair National Park and Lobethal populations are threatened by kangaroos (Quarmby 2009).

Weed invasion/competition

Weed invasion is a major threat to many populations of *P. cucullata*, a reflection of extensive clearing and large edge effects, urban development, garden escapes and invasion from pastures.

In South Australia all extant populations are threatened by weed invasion. Problem weeds include Boneseed, Montpellier Broom (*Genista monspessulana)*, Sweet Pittosporum, Olive *Olea (europaea)*, Blackberry, Gorse *Ulex europaeus*, Tree Heath *Erica arborea*, Sparaxis *Sparaxis bulbifera*, Three-cornered Garlic (*Allium triquetrum)*, Ivy, Plantain (*Plantago lanceolata)*, Cleavers (*Galium aparine)*, and Soursob (*Oxalis pes-caprae)* (Quarmby 2009).

In Victoria, the following weeds are threats at specific sites:

- Blackberry (*Rubus fruticosus*) at the Alpine National Park 5, 7 & 8 sites.
- Introduced grasses *Briza maxima*, *Ehrharta erecta* and *Stenotaphrum secundatum* plus other annual grasses at the Mornington Peninsula National Park 4 & 6, Tootgarook and Private Property (Tootgarook 1 & 2) sites.
- Myrtle-leaf Milkwort *(Polygala myrtifolia)* at the Mornington Peninsula National Park 6 and Roadside (Cape Schanck) sites.
- Boneseed *(Chrysanthemoides monilifera)* and/or Bridal Creeper *(Asparagus asparagoides)* at the Tootgarook and Private Property (Bridgewater Lakes, Cape Schanck, Rye and Tootgarook 1 & 2) sites.
- Freesia *(Freesia alba* X *F. leichtlinii)* at the Rye private property site.
- Ivy *(Hedera helix)* and Sweet Pittosporum *(Pittosporum undulatum)* at the Cape Schanck roadside site.
- Scotch Thistle(*Cirsium vulgare)* and Chickweed *(Cerastium holosteoide)s* at the Alpine National Park 16 site.
- Periwinkle *(Vinca major)* at the Point Nepean National Park site.

In Tasmania, the Three Hummock Island Nature Reserve site is being overgrown by the successional coastal scrubs and invaded by pasture grasses.

Disturbance/destruction

Disturbance to or destruction of plants and habitats remains a major risk throughout the range of *P. cucullata*, from impacts such as land development, damage from recreational users, stock trampling and road maintenance works. The private property sites on King Island are at risk of development for housing. Accidental trampling or destruction by people (campers) and/or disturbance caused by track/campground maintenance activities is a threat at the Alpine National Park 8 & 12 sites. Accidental trampling by walkers and/or disturbance caused by track maintenance activities is a threat at the Mornington Peninsula National Park 4 site. Rubbish dumping is an existing problem at the Cape Schanck roadside and Tootgarook reserve and private property sites. Accidental disturbance by land managers or contractors is a threat at the Cape Otway private property, Cape Bridgewater roadside and Tootgarook sites. Accidental disturbance caused by road/track maintenance and/or weed spraying activities is a threat at the Wilsons Promontory National Park 2 & 6 sites and some South Australian sites. Accidental trampling/damage caused by recreational activities and road/track maintenance activities are a threat to the Belair National Park population in South Australia (Quarmby 2009). All undeveloped private property sites are at risk of accidental disturbance or destruction resulting from property development. There is a risk of the Cape Schanck (private property) site being cleared for development in the future.

Recovery Information

Existing Conservation Measures

A number of measures for the conservation of Leafy Greenhood have already been undertaken, including:

- Removal of cattle from the Three Hummock Island NR site and preparation of a management plan that will include the conservation requirements of *P. cucullata*.
- Preparation of an action statement (Davies 2004) and a regional recovery plan for the South Australian populations (Quarmby 2009).
- Monitoring quadrats established at the Alpine National Park 2, 5, 15 & 16, Cape Otway National Park, Tootgarook, Mornington Peninsula National Park 1 & 2 and Belair National Park sites.
- Collection of seed from 10 Vic & 3 SA populations and placement in long-term storage.
- Fencing at the Bridgewater Lakes (private property) site to protect it from stock grazing.
- Weed control at the Alpine National Park 16, Tootgarook, Tootgarook 1 & 2 (private property), Mornington Peninsula National Park 6, Bridgewater Lakes (Vic) and Belair National Park, Cherry Gardens (private property) and Lobethal (private property) (SA) sites.
- Caging of plants at the Lobethal (SA) site to protect them from grazing.
- Rubbish removal from the Tootgarook site.
- Protection of the Cape Schanck (roadside) population from trampling by placement of barriers.
- Translocation in 1998 and 2006 of plants from private property sites at risk of destruction to two sites in the Mornington Peninsula National Park (sites 1 & 2).
- Ongoing consultation and liaison with landholders, land managers, and stakeholders at all sites.

Recovery Objectives

The overall objective of recovery is to minimise the probability of extinction of the Leafy Greenhood in the wild and to increase the probability of populations becoming self-sustaining in the long term.

Within the 5-year duration of this Recovery Plan, the specific objectives for the recovery of the Leafy Greenhood are to:

1. Monitor distribution, abundance, growth rates and viability of populations
2. Determine habitat requirements
3. Protect vulnerable populations and their habitat
4. Manage threats to populations
5. Build community support for conservation
6. Revise conservation status

Program Implementation and Evaluation

This Recovery Plan guides recovery actions for the Leafy Greenhood and will be implemented and managed by the Department for Environment and Heritage in South Australia, the Department of Primary Industries, Parks, Water and Environment in Tasmania, and the Department of Sustainability and Environment in Victoria, supported by other agencies, educational institutions, regional natural resource management authorities and community groups as appropriate. Technical, scientific, habitat management or education components of the Recovery Plan will be referred to specialist groups on research, *in situ* management, community education and cultivation as required. Contact will be maintained between the state agencies on recovery issues concerning the Leafy Greenhood. The Recovery Plan will run for five years from the date of its adoption under the EPBC Act, and will be reviewed within five years of the date of its adoption.

Recovery Actions and Performance Criteria

Action	Description
Specific Objective 1: Monitor distribution, abundance, growth rates and viability of populations	
Performance Criterion: Population sizes and trends are determined from annual monitoring of 15 populations	
1.1	Undertake surveys of priority sites to determine the area and extent of populations, the number, size and structure of populations, and inference or estimation of population change.
	Responsibility: DSE, DEH, DPIPWE
1.2	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, DPIPWE
Specific Objective 2: Determine habitat requirements	
Performance Criterion: Habitat critical to survival mapped for 15 populations	
2.1	Survey known habitat of priority sites and collect floristic and environmental information relevant to community ecology and condition.
	Responsibility: DSE, DEH, DPIPWE
2.2	Identify and survey potential habitat, using ecological and bioclimatic information that may indicate habitat preference.
	Responsibility: DSE, DEH, DPIPWE
Specific Objective 3: Protect vulnerable populations and their habitat	
Performance Criterion: Public/private land management agreements established for 10 populations	
3.1	Initiate Public Authority Management Agreements under the *FFG Act* 1988 and/or Special Protection Zones in State Forest for the Strathbogie Ranges, Tootgarook, Winkie Creek, Cape Bridgewater roadside and Cape Schanck roadside sites.
	Responsibility: DSE
3.2	Initiate private land management agreements at the Bridgewater Lakes, Cape Otway, Cape Schanck, Rye, and Tootgarook 1, 2, 3 & 4 private property sites.
	Responsibility: DSE
Specific Objective 4: Manage threats to populations	
Performance Criterion: Measurable reduction in weed cover and predation rates and increase in recruitment at treated sites	
4.1	Control threats from pest plants.
	Responsibility: DSE, PV, DEH, DPIPWE
4.2	Control threats from pest animals.
	Responsibility: DSE, PV, DEH, DPIPWE
4.3	Control site disturbance by protecting plants and modifying management activities at the Hunter Island, King Island and Arthur-Pieman sites (Tas) and Alpine National Park 5, 8 & 12, Mornington Peninsula National Park 4, Wilsons Promontory National Park 2 & 6, Point Nepean National Park, Cape Bridgewater roadside, Cape Schanck roadside, Tootgarook and 1, Cape Otway & Tootgarook 1 & 2 private property sites (Vic).
	Responsibility: DSE, DPIPWE
Specific Objective 5: Build community support for conservation	
Performance Criterion: Community group participation in recovery of the species	
5.1	Identify opportunities for community involvement in the conservation of the Leafy Greenhood.
	Responsibility: DSE, PV, DEH, DPIPWE

Specific Objective 6: Revise Conservation Status	
Performance Criterion: New IUCN conservation status determined for each subspecies	
5.2	Undertake a revision of conservation status using IUCN Red List process and determine status of each subspecies. **Responsibility: DSE, DEH, DPIPWE**

Abbreviations: DEH=Department for Environment and Heritage, South Australia; DPIPWE=Department of Primary Industries, Parks, Water and Environment, Tasmania; DSE=Department of Sustainability and Environment (Victoria); PV=Parks Victoria

Management Practices

On-ground site management will aim to mitigate threatening processes and thereby insure against extinction. Major threats requiring management include accidental destruction, competition from pest plants, inappropriate fire regimes and grazing by pest animals. A range of strategies will be necessary to mitigate these threats including weed control, caging/fencing, control of pest animals, and fire management. Broadscale protection measures applicable to all populations include legal protection of sites, habitat retention and liaison with land managers including private landholders. 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 seed bank dynamics and recruitment. Successful *in situ* population management will be founded on understanding the obligate relationships between each threatened orchid taxon and associated flora, as well as its response to environmental processes. These are directly linked to seed production, recruitment and regeneration and are thus vital to recovery. A demographic census will be necessary to gather life history information and to monitor the success of particular management actions. In addition to the above, translocation of cultivated plants will be considered only where there is a high chance of success (see Vallee *et al*. 2004), and where secure sites exist. Community participation in recovery actions will be sought, particularly in regard to recovery team membership and implementation of on-ground works.

Particular management practices that will avoid significant adverse impacts to one or more important populations of *P. cucullata* include providing land managers and landholders with detailed location, distribution, habitat and ecology data about *P. cucullata* to protect existing populations against inadvertent damage, and raise awareness that may lead to the discovery of new populations. Populations occurring in high-risk locations (eg. roadsides) may benefit from signposting. Identification and protection of current and potential habitat such as through planning scheme overlays and restrictions on clearance of native vegetation is necessary to avoid damage to or destruction of populations.

Affected Interests

Populations of *P. cucullata* occur in national parks, state parks, coastal parks, flora reserves, nature conservation reserves, nature reserves, conservation areas, state forest, roadsides, and private property. Consequently, their management is variously the responsibility of the Department for Environment and Heritage (South Australia), Department of Primary Industries, Parks, Water and Environment (Tasmania), Department of Sustainability and Environment (Victoria) and Parks Victoria, plus several local government areas managing small reserves and roadsides. With many populations on private land, the continued cooperation of landowners is necessary for the ongoing survival of many populations. Community involvement in the conservation of *P. cucullata* will be encouraged. This will involve creating, fostering, maintaining and upgrading links with local community groups in the conservation of this species.

Role and Interests of Indigenous People

Indigenous communities on whose traditional lands the *P. cucullata* occurs have been advised, through the relevant regional Indigenous facilitator, of the preparation of this Recovery Plan and invited to provide comments and be involved in the implementation of the plan.

Biodiversity Benefits

The recovery plan includes a number of potential biodiversity benefits for other species or vegetation communities. Principally, this will be through the protection and management of habitat. The adoption of broad-scale management techniques and collection of baseline data will also benefit a number of other plant species growing in association with the threatened orchid (e.g. Moonah Woodland

community), or species with similar life forms and/or flowering responses (e.g. *Pterostylis aenigma*). The recovery plan will also provide an important public education role as orchids have the potential to act as 'flagship species' for highlighting broader nature conservation and biodiversity issues such as land clearing, grazing, weed invasions and habitat degradation. Germination and cultivation techniques developed during the recovery phase will be of use for other threatened orchids elsewhere in southeast Australia while the requirement to recover taxa across state boundaries will better develop working relationships between state departments on a broader range of biodiversity conservation issues.

Social and Economic Impacts

The implementation of this recovery plan is unlikely to cause significant adverse social and economic impacts. Most populations occur on public land, either crown land reserved for various public purposes, or on road reserves, managed by a variety of local and State government agencies. Any protection measures required at these sites (e.g. fencing, signage, track closures) will have minimal impact on current recreational and commercial activities. Protection of these populations has been negotiated with the relevant land manager. Protection of the few populations on private land or on land managed by other authorities will be achieved through voluntary agreements with landowners and managers.

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Appendix 1. Population information for *Pterostylis cucullata*

Location	Pop. size	Extent	Land Manager
South Australia			
Belair National Park	~5,350 plants	<5 ha	DEH
Lobethal	>50 plants	<1ha	Adelaide Hills Council
Cherry Gardens (private property)	>260 plants	<1ha	private
Tasmania			
Arthur-Pieman Conservation Area Gardiner Point	23 plants	<1 ha	DPIPWE
Arthur-Pieman Conservation Area Possum Banks	2–3,000 plants	~10 ha	DPIPWE
King Island Cape Wickam (private property)	~1,800 plants	1 ha	private
King Island Springs (private property)	~2,900 plants	2 ha	private
Three Hummock Island Nature Reserve	~120 plants	~10 ha	DPIPWE
Hunter Island Conservation Area	>1,000 plants	~6 ha	DPIPWE
Flinders Island Tanners Bay (private property)	11 plants	<1 ha	private
Victoria			
Alpine National Park 1	2,850 plants	<5 ha	PV
Alpine National Park 2	2,150 plants	<2 ha	PV
Alpine National Park 3	1,950 plants	<2 ha	PV
Alpine National Park 4	1,800 plants	<1 ha	PV
Alpine National Park 5	1000 plants	<1 ha	PV
Alpine National Park 6	850 plants	<2 ha	PV
Alpine National Park 7	800 plants	<1 ha	PV
Alpine National Park 8	750 plants	<2 ha	PV
Alpine National Park 9	400 plants	<1 ha	PV
Alpine National Park 10	270 plants	<1 ha	PV
Alpine National Park 11	360 plants	<1 ha	PV
Alpine National Park 12	320 plants	<1 ha	PV
Alpine National Park 13	430 plants	<1 ha	PV
Alpine National Park 14	280 plants	<1 ha	PV
Alpine National Park 15	300 plants	<1 ha	PV
Alpine National Park 16	1000 plants	<5 ha	PV
Alpine National Park 17	350 plants	<2 ha	PV
Alpine National Park 18	<100 plants	<1 ha	PV
Cape Otway National Park	100 plants	<1 ha	PV
Eildon National Park	<200 plants	<1 ha	PV
Mornington Peninsula National Park 1	<100 plants	<1 ha	PV
Mornington Peninsula National Park 2	1400 plants	<1 ha	PV
Mornington Peninsula National Park 3	30 plants	<1 ha	PV
Mornington Peninsula National Park 4	65 plants	<1 ha	PV
Mornington Peninsula National Park 5	150 plants	<1 ha	PV
Mornington Peninsula National Park 6	250 plants	<1 ha	PV
Mt Eccles National Park	>1000 plants	<5 ha	PV
Point Nepean National Park	200 plants	<1 ha	PV
Wilsons Promontory National Park 1	>1000 plants	~3 ha	PV
Wilsons Promontory National Park 2	>1000 plants	<2 ha	PV
Wilsons Promontory National Park 3	1000 plants	<1 ha	PV
Wilsons Promontory National Park 4	300 plants	<2 ha	PV
Wilsons Promontory National Park 5	250 plants	<1 ha	PV
Wilsons Promontory National Park 6	200 plants	<1 ha	PV
Wilsons Promontory National Park 7	200 plants	<1 ha	PV
Wilsons Promontory National Park 8	150 plants	<1 ha	PV
Discovery Bay Coastal Park	50 plants	<1 ha	PV
Strathbogie Ranges	>1000 plants	<2 ha	?

Winkie Creek	200 plants	<1 ha	?
Cape Schanck (roadside)	120 plants	<1 ha	?
Cape Schanck (private property)	800 plants	<5 ha	private
Cape Bridgewater (roadside)	300 plants	<1 ha	?
Bridgewater Lakes (private property)	100 plants	<1 ha	private
Cape Otway (private property)	>1000 plants	<10 ha	private
Rye (private property)	120 plants	<1 ha	private
Tootgarook	2000 plants	~10 ha	?
Tootgarook 1 (private property)	1000 plants	<5 ha	private
Tootgarook 2 (private property)	100 plants	<1 ha	private
Tootgarook 3 (private property)	50 plants	<1 ha	private
Tootgarook 4 (private property)	100 plants	<1 ha	private

Priority, Feasibility and Estimated Costs of Recovery Actions

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%	DSE, DEH, DPIPWE	$50,000	$50,000	$0	$0	$0	$100,000
1.2	Censusing	1	100%	DSE, DEH, DPIPWE	$25,000	$25,000	$25,000	$25,000	$25,000	$125,000
2	**Habitat requirements**									
2.1	Known habitat	1	100%	DSE, DEH, DPIPWE	$0	$50,000	$50,000	$0	$0	$100,000
2.2	Potential habitat	2	75%	DSE, DEH, DPIPWE	$0	$0	$0	$50,000	$50,000	$100,000
3	**Protection**									
3.1	Public land	1	100%	DSE	$5,000	$5,000	$5,000	$5,000	$5,000	$25,000
3.2	Private land	1	75%	DSE	$5,000	$5,000	$5,000	$5,000	$5,000	$25,000
4	**Threat management**									
4.1	Pest plants	1	75%	DSE, PV, DEH, DPIPWE	$50,000	$50,000	$50,000	$50,000	$50,000	$250,000
4.2	Pest animals	1	75%	DSE, PV, DEH, DPIPWE	$50,000	$50,000	$50,000	$50,000	$50,000	$250,000
4.3	Site disturbance	1	75%	DSE, PV, DEH, DPIPWE	$20,000	$20,000	$20,000	$20,000	$20,000	$100,000
5	**Community support**									
5.1	Community extension	3	75%	DSE, PV, DEH, DPIPWE	$5,000	$5,000	$5,000	$5,000	$5,000	$25,000
5	**Conservation status**									
5.1	Status revision	3	100%	DSE, DEH, DPIPWE	$0	$0	$1,000	$0	$0	$1,000
				TOTALS	$210,000	$260,000	$211,000	$210,000	$210,000	$1,101,000