# National Recovery Plan for the **Gaping Leek-orchid** Prasophyllum correctum

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**Australian Government** 



and Environment

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# Summary

The Gaping Leek-orchid *Prasophyllum correctum* D. L. Jones is a small, slender, deciduous terrestrial orchid endemic to a small area near Bairnsdale in central Gippsland. Only two populations are known, containing about 150 plants. The species has undoubtedly suffered an extensive decline in range and abundance due to the almost complete loss of its grassland and grassy woodland habitat from the Gippsland plains. Major threats to remaining populations include grazing from pest and native animals, altered fire regimes leading to competition from grasses and shrubs, and disturbance to plants and habitat from vehicle or machinery movement.

The Gaping Leek-orchid is listed as <u>Endangered</u> under the *Environment Protection and Biodiversity Conservation Act 1999* and <u>Threatened</u> under the Victorian *Flora and Fauna Guarantee Act 1988*. This national Recovery Plan 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 Gaping Leek-orchid *Prasophyllum correctum* is a deciduous, terrestrial orchid with a single hollow terete leaf 11–40 cm long, and 0.5–4.5 mm wide at about 1 cm above the ground. The flower stem emerges from a split in the leaf, is up to 47 cm tall (av.  $32.5 \pm 8$  cm) and bears 5–27 yellowish-green, non-resupinate flowers arranged in an open spike. Some flowers may have pale brown stripes. The dorsal sepal is up to 8 mm long and is ovate with a pointed apex; petals are about 8 mm long, slender and widely spreading; lateral sepals are up to 10 mm long, erect, with incurved margins. The labellum is up to 5 mm long, ovate with a short basal claw, and recurved at right angles near the centre. The callus is broad at the base, raised, fleshy, channelled and extends almost to the labellum apex. The ovary is 6 mm long, sessile and obovoid. Pollinia are easily seen and hang from the rostellum by a thread of tissue (description from Bates 1994; Backhouse & Jeanes 1995). The species is illustrated in Backhouse and Jeanes (1995, p. 235) and Jeanes and Backhouse (2006, p. 277).

The Gaping Leek-orchid is a summer-dormant species. Leaves emerge from below ground between mid April and mid June. The flowering stem emerges from the base of the leaf in late September, and buds are fully formed by mid October. Peak flowering time occurs in about the third week of October, when the first flowers open from the centre of the spike, followed by flowers at the base of the spike and then those at its apex. Flowering is complete by early November, by which time the leaf begins to senesce. If pollination occurs, seed capsules develop and reach maturity by late November/early December, with seed dispersal soon after. By mid December little or none of the plant remains above ground. The species survives the dry summer as a dormant subterranean tuber.

Individual plants do not always appear every year and typically remain below ground for one to two years, and occasionally up to seven years. Plant longevity or age at reproductive maturity are not known. Seedling recruitment is very difficult to observe, and plants may return to a sterile state resembling very young plants after flowering the previous year, making it virtually impossible to correlate life history stages with plant age. Plants are most easily detectable when flowering, otherwise non-flowering plants are readily concealed within their grassland habitat and are very difficult to detect.

*Prasophyllum correctum* is a nectar-rewarding orchid. Many *Prasophyllum* species are visited by a wide range of insects such as small native bees and wasps seeking nectar, so it may not have a specific insect pollinator. Seed viability varied from 40–80% (Huynh 1999). Recruitment is predominantly by seedling establishment, rarely from vegetative reproduction by tuber division. Seed germination relies on the presence of a suitable mycorrhizal fungi. Two fungal isolates (basiodomycetes) were cultured from *P. correctum* plants at Munro, which were closely matched (>98%) with a fungus isolated from *Pterostylis nutans*, suggesting that these two orchid genera share similar mycorrhizal fungi (Clements 1981; Huynh 1999). Both isolates germinated fresh *P. correctum* seed under laboratory conditions (Huynh 1999).

# Taxonomy

There has been some confusion as to the correct scientific name applying to the Gaping Leekorchid, and the correct distribution of the species. It was originally described as *Prasophyllum chasmogamum* (Jones 1991). However, the population of plants from which the type specimen of *P. chasmogamum* was collected was subsequently found to comprise two distinct species: the 'real' *P. chasmogamum* (known from fewer than five plants at the type locality) and the more numerous Gaping Leek-orchid, which was left without a valid name. The situation was eventually rectified when a new name – *Prasophyllum correctum* – and description were published (Jones 1994). Plants resembling *Prasophyllum correctum* were subsequently discovered in Tasmania, and were included in *P. correctum* for a time However, these plants were determined to be a distinct, unnamed species and were subsequently described as *Prasophyllum incorrectum* (Jones 2003).

# Distribution

The Gaping Leek-orchid is known from only two sites, at Munro and Lindenow South, between Stratford and Bairnsdale in central Gippsland (Jones 1991, 1994; Hoey & Lunt 2003), in the South East Coastal Plain IBRA bioregion (*sensu* DEH 2000). Maps showing the distribution of *P. correctum* are available from the Department of Sustainability and Environment.



Figure 1. Distribution of Prasophyllum correctum

# **Population Information**

The Gaping Leek-orchid is known only from two small populations at Munro and Lindenow South, both on rail line easements. The population at Munro contains 132 tagged individuals (although up to 70 of these may be dormant in any year) and covers an area of just 20 m x 30 m. Fewer than 15 plants are known from Lindenow South. Both populations are vital to the survival of the species.

# Habitat

The Gaping Leek-orchid occurs in remnant Central Gippsland Plains Kangaroo Grass (*Themeda triandra*) grassland and Forest Red Gum (*Eucalyptus tereticornis*) grassy woodland. Dominant grasses are *Themeda triandra* and *Poa clelandii*, with a diverse assemblage of intertussock species including *Chrysocephalum apiculatum*, *Craspedia variabilis*, *Burchardia umbellata*, *Bulbine bulbosa*, *Leptorhynchos squamatus*, *Dichopogon strictus*, *Thysanotus patersonii*, *Caesia calliantha and Lomandra longifolia*. Shrubs are predominantly *Dillwynia cinerascens*, *Grevillea lanigera* and *Pimelea humilis*. Associated orchid taxa include *Diuris punctata*, *Diuris* sp. aff. *dendrobioides*, *Diuris chryseopsis*, *Diuris sulphurea*, *Microtis unifolia*, *Lyperanthus suaveolens* and *Thelymitra pauciflora*. Soils are freely draining sandy loams derived from alluvium.

# **Decline and Threats**

The previous distribution and abundance of *P. correctum* is not known, but it is possible to infer a probable substantial decline in both range and abundance, based on the almost complete loss of habitat in which the species occurs. The degradation and depletion of grassy ecosystems has been more extreme than for any other vegetation type in Australia (Kirkpatrick *et al.*1995). The Central Gippsland Plains Grasslands were once extensive between Rosedale, Stratford and Sale (Craigie & Moorees 2003). Prior to European settlement, the Gippsland Plains supported about 1200 km<sup>2</sup> of *Eucalyptus tereticornis* woodland with a ground layer likely to have been dominated by *T. triandra* (Hoey & Lunt 2003). However, these habitats have declined to less that 1% of their former distribution, mainly due to clearance for agriculture (Lunt *et al.* 1998). The Central Gippsland Plains Grassland community and Forest Red Gum Grassy Woodland community are both listed as Threatened communities under the *Flora and Fauna Guarantee Act* 1988.

The current perilous situation faced by *P. correctum* is almost certainly a direct result of this habitat destruction. The remaining two populations are both very small, and the species is therefore at a high risk of extinction due to stochastic events. A range of other threats have the potential to impact on the two populations, including:

#### Competition from native and introduced plants

The greatest risk to *P. correctum* is competition from both native and introduced plants including grasses and shrubs. After construction of the Gippsland railway line in the 1880s the railway easements continued to be regularly burned (almost annually) by railway staff, but the frequency of burning declined from the 1970s to three or more years between burns (Lunt 1997). This pattern of regular burning may well have enabled the species to persist at the two railside locations, by reducing competition from grasses, maintaining openness and inhibiting establishment of invasive woody species. Grass biomass has been estimated to accumulate at an average of 2.8–4.6t/ha at Munro two years after fire (Lunt 1994; Coates & Duncan 2007).

Fire is a vital component in grassy ecosystems for maintaining a diverse, species rich native flora (Lunt 1997), and it is likely it was an almost annual occurrence prior to European arrival (Kirkpatrick *et al.* 1995). Frequent burning reduces the biomass of dominant grasses, thereby decreasing competition and providing establishment opportunities for other life forms and ultimately increasing native plant diversity (Lunt 1994). The Munro rail line grassland is the most important grassland remnant in the region and maintaining a frequent burning regime for *P. correctum* will undoubtedly benefit this community. Inappropriate fire regimes or the exclusion of fire may have lead to the decline of *P. correctum* (and other threatened plants such as *Diuris punctata*) from remaining patches of habitat (Lunt 1997).

Regular burning will also reduce the dormancy periods of *P. correctum* and improve the population growth rate. The proportion of reproductive adults is greatest when burning occurs at intervals of three years or less, and both emergence and reproduction decline when fire intervals exceed three years. Flowering or vegetative plants are more likely to return to flowering than dormant plants (Coates *et al.* 2006; Coates & Duncan 2007). Therefore, burning regimes of three years or less offer the best chance of population persistence while burning at intervals greater than three years may be insufficient to enable population persistence.

Encroachment of several native shrubs and trees such as *Alloacasuarina littoralis, Kunzea ambigua* and *Grevillea lanigera* at the Munro site is also a potential threat, and a regular burning regime would also control these species

Weed invasion is currently a minor problem, although there is some localised invasion of annual grasses such as *Aira* and *Briza*, especially at the Lindenow South site. However, weeds pose a substantial potential threat, especially if there is extensive soil disturbance, as the sites are surrounded by agricultural land.

#### Grazing

Grazing by rabbits and hares, and possibly by Eastern Grey Kangaroos is a moderate problem at both sites. Grazing of emerging plants, particularly in the first two seasons after fire, has significantly reduced flowering if plants are not protected. Grazing by invertebrates (e.g. slugs and

caterpillars) also occurs, and birds have apparently also removed mature seed capsules from plants.

#### Disturbance to plants and habitat

Soil disturbance by rabbit digging is becoming a serious problem at Munro and to a lesser extent at Lindenow South. Some plants have been destroyed by rabbit burrowing. The bare ground also provides a site for weeds to establish. Vehicle and machinery movement, and soil compaction and trampling by visiting naturalists, are potential threats at both sites.

# **Recovery Information**

# **Existing Conservation Measures**

There has been a considerable amount of work undertaken on *P. correctum*, including both research on biology and ecology, and on-ground management of habitat, which has substantially helped to inform current recovery objectives. Conservation measures include:

- Listing of the species and the ecological community in which it occurs as threatened under the FFG Act. The sites are recognised as Biosites of National Significance (Craigie 2006) and neighbouring landowners, the Wellington Shire and the Country Fire Authority have been advised of the sites' significance.
- Annual monitoring since 1992; plants were permanently marked in 1992 and any new plants detected also marked.
- Fencing of the Munro site in 1992 and the Lindenow South site in 1994, to increase protection of *P. correctum* and its habitat.
- Periodic burning of both sites to reduce biomass accumulation and promote flowering of *P. correctum* and other associated grassland species.
- Slashing to control invasive shrubs and removal of shading trees.
- Control of rabbits.
- Research including experimental burning and assessment of post-fire grazing, estimating population fecundity and potential for hand pollination, and seed burial trials to assess the potential for direct seeding as a means of promoting seedling recruitment.
- Isolation and identification of the mycorrhizal fungus; assessment of seed viability.
- Searches along the Traralgon to Stratford rail line for the species.
- Funding from the Australian Government and Australian Flora Foundation to assist with research projects.
- Participation by the Bairnsdale and District Field Naturalists Club and La Trobe University, as well as the Victorian Government, in conservation work.

# **Recovery Objectives**

The Overall Objective of recovery is to minimise the probability of extinction of the Gaping Leekorchid in the wild and to increase the probability of populations becoming self-sustaining in the long term. Within the duration of this Recovery Plan, the Specific Objectives for the recovery of the Gaping Leek-orchid are to:

- 1. Promote population fecundity and recruitment.
- 2. Protect plants from threats
- 3. Measure population trends against recovery actions
- 4. Establish an *ex situ* population
- 5. Increase plant numbers through restocking
- 6. Build community support for conservation

The criteria for assessing the success of these objectives are:

- Improved knowledge of the importance of fire and drought on population growth rate and dynamics, incorporated in a comprehensive biological and ecological knowledge base.
- A measurable decrease in grazing pressure, and damage to the sites and plant communities resulting from threatening processes.
- A measurable decrease in dormancy rates and an increase in seedling recruitment in both populations,

• Successful establishment of an *ex-situ* collection consisting of 100 plants to be held in cultivation.

# **Program Implementation and Evaluation**

This Recovery Plan guides recovery actions for the Gaping Leek-orchid and will be managed by the Victorian Department of Sustainability and Environment. A Threatened Flora Recovery Team, consisting of scientists, land managers and field naturalists has been established to oversee threatened flora recovery in Victoria in general. 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. The Recovery Plan will run for a maximum of five years from the date of its adoption under the EPBC Act, and will be reviewed and revised within five years of the date of its adoption.

# **Recovery Actions and Performance Criteria**

Action	Description	Performance Criteria								
Specific	objective 1: Promote population fecundity and	recr	ruitment							
1.1	Conduct ecological burning (<3 year fire intervals) to maintain an open grassland structure to reduce competition from grasses and reduce invasion of <i>Kunzea ericoides</i> .	•	Decreased dormancy rates. Increase in the number of plants that emerge above ground each year. Measurable increase in seedling recruitment.							
	Responsibility: DSE	-								
Specific objective 2: Protect plants from threats										
2.1	Control rabbits, especially in the first 2 years after fire. Responsibility: DSE	• •	Reduction in number of grazed plants. Increase in number of fruiting plants. No soil disturbance.							
2.2	Protect populations from damage by vehicle/machinery movement.	•	Install and maintain fencing and gates at both populations.							
	Responsibility: DSE/Shire of Wellington	•	Maintain surveillance patrols.							
Specific	objective 3: Measure population trends agains	t rec	overy actions							
3.1	Undertake demographic censusing of both populations. Responsibility: DSE	•	Long term trends/population dynamics evaluated with respect to fire management and rainfall.							
		•	Environmental determinants of dormancy understood.							
Specific	objective 4: Establish an ex situ collection									
4.1	Develop propagating techniques and establish plants in cultivation.	•	At least 100 mature plants in cultivation.							
	Responsibility: DSE, RBG									
Specific	objective 5: Increase plant numbers through re	esto	;king							
5.1	Introduce cultivated plants and sow seed at the Lindenow South site to increase plant numbers.	•	Adult survival over two seasons (i.e. survive two summers).							
	Responsibility: DSE	•	Seedling recruitment.							
Specific objective 6: Build community support for conservation										
5.1	Maintain and build on community involvement in the recovery program. Responsibility: DSE	•	Community nature conservation and Landcare groups aware of the species and support its conservation.							

# **Management Practices**

On-ground site management will aim to mitigate threatening processes and thereby insure against extinction. The major threat requiring management is the implementation of an appropriate fire regime (<3 year intervals). Other management actions include decreasing grazing, site

disturbance and invasion of the site by woody weeds. A range of strategies will be necessary to mitigate these threats including regular burning of the grassland, weed control, fencing and control of pest animals. 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. The demographic census should continue in order to gather life history information and to monitor the success of particular management actions. In addition to the above, translocation of cultivated plants should be considered, using the Lindenow South location. Community participation in recovery actions will be maintained, particularly in regard to implementation of on-ground works.

Particular management practices that will avoid significant adverse impacts to both populations of *P. correctum* include providing land managers with detailed location, distribution, habitat and ecology data about *P. correctum* to protect existing populations against inadvertent damage, and raise awareness that may lead to the discovery of new populations. Since both populations occur in a railway reserve which is also a roadside, they 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

The two extant populations of *P. correctum* occur in a rail-line easement and consequently the management of the sites is the responsibility of the Department of Sustainability and Environment. The community group Australasian Native Orchid Society (Victorian group) Inc. assists DSE with activities such as monitoring and seed collection, and this assistance will continue. The recovery plan has the support of government agencies, statutory authorities and community groups involved in orchid conservation in Victoria who will assist in the management and monitoring of this species.

#### **Role and Interests of Indigenous People**

Indigenous communities on those traditional lands in which *P. correctum* occurs are being advised, through the relevant DSE Regional Indigenous Facilitator, of the preparation of this draft Recovery Plan and invited to provide comments if so desired. Opportunities to involve indigenous communities in the implementation of the Recovery Plan will be explored once it is finalised.

# **Biodiversity Benefits**

The Gippsland Plains grasslands and grassy woodlands have suffered extensive loss. Consequently, grassland remnants such as along railway lines are now extremely important refugia for many species that have been lost elsewhere. The management actions outlined in this recovery plan will maintain habitat viability and integrity, species richness and other threatened flora associated with remnant Central Gippsland Plains Grassland and *Eucalyptus tereticornis* Grassy Woodland (listed as threatened communities under the Victorian *Flora and Fauna Guarantee Act* 1988, Action Statement no. 182). In addition, these actions will support the maintenance of other highly threatened flora such as *Diuris punctata* and *Prasophyllum chasmogamum*.

# **Social and Economic Impacts**

The implementation of this recovery plan will not cause significant adverse social or economic impacts. Both populations occur on rail reserve land managed by DSE. The management of this species also has the potential to provide community involvement. The Bairnsdale and District Field Naturalists Club have participated in censusing and searches for new plants since 1991 and will be encouraged to maintain their involvement.

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# **Estimated Costs of Recovery Actions**

						Cost estimate (\$)					
Action	Description	Priority	Agency	Year 1	Year 2	Year 3	Year 4	Year 5	Total		
1. Pro	moto nonulation f		ngeney	ont					Total		
1. Fromote population recurdity and recruitment											
1.1	Ecological burns			\$15,000	\$0	\$0	\$15,000	\$0	\$30,000		
2: Protect plants from potentially threats											
2.1	Grazing			\$5,000	\$2,000	\$2,000	\$5,000	\$2,000	\$16,000		
2.2	Disturbance			\$5,000	\$2,000	\$2,000	\$2,000	\$2,000	\$13,000		
3: Measure population trends and responses against recovery actions											
3.1	Censusing			\$8,000	\$8,000	\$8,000	\$8,000	\$8,000	\$40,000		
4: Establish an <i>ex situ</i> collection											
4.1	Propagation			\$8,000	\$8,000	\$5,000	\$2,000	\$2,000	\$25,000		
5: Increase plant numbers through restocking											
5.1	Restocking			\$0	\$6,000	\$4,000	\$6,000	\$4,000	\$20,000		
6: Build community support for conservation											
5.1	Participation			\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$10,000		
			TOTAL	\$43,000	\$28,000	\$23,000	\$40,000	\$20,000	\$154,000		

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