Department of Sustainability and Environment

Action Statement

Flora and Fauna Guarantee Act 1988 No. 245

Colourful Spider-orchid

Caladenia sp. aff. *colorata* (Lower Glenelg River)

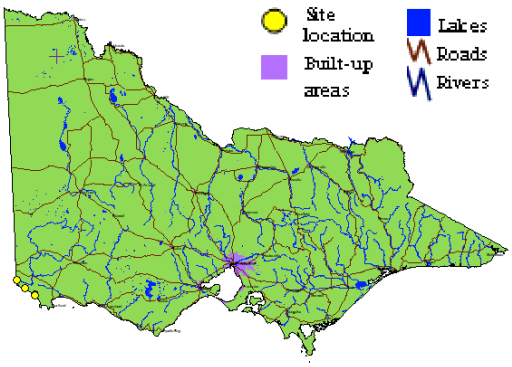
This revised Action Statement is based on the Recovery Plan prepared for this species by DSE under contract to the Commonwealth Department of the Environment, Water, Heritage and the Arts.

Description

The Colourful Spider-orchid (*Caladenia* sp. aff. *colorata* (Lower Glenelg River) *sensu* Ross & Walsh (2003)) is an unnamed taxon within the *Caladenia patersonii* complex, within which there is continuing taxonomic revision. Jeanes and Backhouse (2000) describe *C.* sp. aff. *colorata* (Lower Glenelg River) as a terrestrial, deciduous herb which grows to approximately 30 cm tall, with one or two flowers that vary from cream-green with reddish streaks to wholly reddish in colour. The labellum is red with dark red marginal teeth. The tepals are up to 35 mm long and have tapering, filamentous tips. Flowering occurs in September and October.

Distribution

The Colourful Spider-orchid is endemic to Victoria, where it occurs in the Naracoorte Coastal Plain bioregion (Environment Australia 2000). The historical distribution of this species is unknown, but it is likely to have occurred in similar vegetation in southwest Victoria and southeast South Australia prior to land clearing for agriculture, viticulture and forestry.



Distribution in Victoria
(Flora Information System DSE 2007)

Abundance

The Colourful Spider-orchid is known from one wild population containing approximately 150 individuals.

Habitat

The Colourful Spider-orchid occurs in an open area in low, mixed Swamp Gum (*Eucalyptus ovata*) / Brown Stringybark (*E. baxteri*) / Messmate Stringybark (*E. obliqua*) woodland. The heathy understorey contains Prickly Moses (*Acacia verticillata*), Myrtle Wattle (*A. myrtifolia*), Flame Heath (*Astroloma conostephioides*), Horny Cone-bush (*Isopogon ceratophyllus*), Sweet Bursaria (*Bursaria spinosa*), Moonah (*Melaleuca lanceolata*), Sticky Hop-bush (*Dodonaea viscosa*) and sedge species. The population is growing on calcerous sands and sandy loams derived from limestone, with areas of exposed limestone rock.

Life history and ecology

Although little is known about the biology and ecology of the Colourful Spider-orchid, they are likely to be similar to those of other south-eastern Australian members of the genus. The majority of *Caladenia* species are terrestrial, deciduous herbs which emerge annually from spherical, subterranean tubers protected by a tough, fibrous tunic. These tubers are replaced annually and are dormant during the drier summer months. Dormancy is broken in response to soaking rains in early autumn, and the plants produce a single, basal leaf which is generally long, narrow and conspicuously hairy. This leaf remains almost dormant throughout the winter. The plants flower in spring, and the flowers remain open for a few days to a few weeks depending on pollination and climatic factors. Plants reproduce solely from seed. The fruits usually take 5-8 weeks to mature following pollination. Each mature capsule may contain tens of thousands of microscopic seeds which are dispersed by the wind when the capsule dries out.

Pollination occurs via sexual deception through the process of pseudocopulation. Spider orchids are characterised by their often large, attractive flowers with long tapering sepals and petals with a dense apical covering of glands. These glands emit pheromones which attract pollinators, usually male thynnid wasps (Jones 1988, Backhouse and Jeanes 1995, Jeanes and Backhouse 2000). Once attracted to a flower, the male wasp usually attempts to copulate with the labellum, mistaking it for a female wasp, and effecting pollination. The identity of the pollinator(s) for most spider orchids is not known.

Observations suggest that the period available for effective pollination may be quite short, possibly as little as a few days. Successful pollination may be influenced by the receptiveness of the stigma to pollen, the number of pollinators in an area, insect behaviour and climatic conditions. Higher rates of pollination usually occur immediately following wasp-emergence as inexperienced juvenile wasps attempt to copulate with many flowers (G. Carr, pers. comm.). It is possible that pollinators become habituated to the presence of flowers in their territory over time and that rates of pollination consequentially decline with wasp maturity (C. Bower, pers. comm.); attempted copulation rates by wasps may be as low as 7.5% for some *Caladenia* species (Peakall and Beattie 1996), and anecdotal evidence suggests that non-synchronous flowering may prevent pollination in some species (G. Walker, Friends of Betty Clift Conservation Reserve, Victoria, pers. comm.). These factors may be important when considering a species with critically low population sizes.

The role of fire in the ecology of many spider orchids is not understood, but is likely to be an important factor. Many species exhibit strong flowering responses in the years following fire (e.g. Southern Spider Orchid (*C. australis*) at Anglesea, Scented Spider Orchid (*C. fragrantissima* subsp. *fragrantissima*) near Portland, and French Island Spider Orchid (*C. insularis*) on French Island). Fire is an integral part of the physical environment of most vegetation types in southern Australia (Gill *et al.* 1999), and is required to maintain plant diversity (Wark 1996). Fire removes the surrounding vegetation, thereby increasing light levels and temperature at ground level; increased moisture levels possibly also result as a consequence of reduced plant competition for water (Purdie 1977). The soil ecology changes and mycorrhizal fungal symbionts become more prevalent. Allelopathic inhibition by the surrounding vegetation may be reduced or removed (Gill *et al.* 1981). Seedling establishment may be critically dependent on fire.

The timing of fire is also important: the best time for orchids is late summer or early autumn, after seed dispersal but prior to new shoot growth. Fuel reduction burning of state forests in spring and autumn is considered to be a threatening process for many orchid species. The variation in seasonal climatic conditions, most notably rainfall and temperature, also influences flowering. Flowering is often aborted when flower opening is followed by periods of sustained hot, dry weather.

Conservation status

Caladenia sp. aff. *colorata* (Lower Glenelg River) is listed as endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.*

Caladenia sp. aff. *colorata* (Lower Glenelg River) is listed as threatened under the Victorian *Flora and Fauna Guarantee Act 1988* (DSE 2003).

Caladenia sp. aff. *colorata* (Lower Glenelg River) is considered endangered in the Department of Sustainability and Environment's *Advisory List of Rare or Threatened Vascular Plants in Victoria – 2005* (DSE 2005).

Decline and threats

Grazing

Grazing by rabbits poses a significant threat to the population; invertebrate and native herbivore grazing also impact the site.

Weed invasion

Weeds do not currently pose a major threat but should be monitored.

Inappropriate biomass reduction / fire regimes

Fire is natural part of the vegetation in which this species occurs. However, the timing of any fire events is critical.

Site disturbance

All known plants occur within the vicinity of a walking track and therefore may be accidentally trampled by people. All known plants occur close to a cliff and therefore are at risk of a potential land-slip.

Reservation status

The only known site is reserved within the Lower Glenelg National Park.

Illegal collection

There is no evidence of collection in the past, and the only known site is remote.

Ecology / biology

The conditions for seed recruitment and maintenance of the pollinator and fungal activity are unknown. There is a high risk of extinction due to the small area of occupancy.

Trampling

The population may be at risk from inadvertent damage or trampling by orchid enthusiasts who may visit the site.

Previous management action

A number of conservation measures have been undertaken at the known site, including:

- A monitoring transect was established in 1994 and re-surveyed in 1996.
- Annual monitoring has occurred at the Lower Glenelg National Park site since 1996. Demographic data is collected annually, including recruitment, mortality, timing of life history stages and morphological data.
- A habitat survey was conducted by DSE staff and community groups in spring 2008 and potential sites for reintroductions were identified. No new populations or individuals were located.
- Natural pollination has been observed at the Lower Glenelg National Park site. Flowering orchids were also hand-pollinated in 2007.
- Microhabitat has been managed to encouraged seedling recruitment.
- Leaf samples were collected on behalf of the Royal Botanic Gardens for use in a statewide DNA analysis of spider orchid populations.
- Seed and fungi were collected in 2007 - 2009 and sent to the Royal Botanic Gardens, Melbourne to establish an *ex situ* population. Unfortunately, fungal isolation in 2008 was unsuccessful. Fungi were collected again in 2009.
- A Threatened Orchid Recovery Team operated between 2004 and 2008.
- Community awareness of the species has been promoted, and local orchid enthusiasts and the Australian Native Orchid Society members have participated in recovery activities.
- DSE Statewide Services – South West are coordinating activities and exchanging knowledge with local government agencies about recovery activities for this species.

Objectives and intended management actions

The intended management actions listed below are further elaborated in DSE's Actions for Biodiversity Conservation (ABC) system. Detailed information about the actions and locations, including priorities, is held in this system and will be provided annually to land managers and other authorities.

Long term objective

To ensure that the Colourful Spider-orchid can survive, flourish and retain its potential for evolutionary development in the wild.

Specific Objectives, Actions and Targets

Objective I To improve knowledge of biology, ecology and management requirements

Action	*Targets*	*Responsible*
1. Clarify taxonomy to enable a more accurate conservation status assessment.	▪ Review of taxonomy and formal description of taxon is completed.	Royal Botanic Gardens, Centre for Plant Biodiversity Research
2. Acquire baseline population data by conducting detailed field surveys including (a) identification of the area and extent of populations; (b) estimates of the number, size and structure of populations, and (c) inference or estimation of population change.	▪ Baseline data collected. ▪ Conservation status reassessed. ▪ Populations accurately mapped.	DSE, Parks Victoria
3. Assess habitat characteristics and/or condition. Accurately survey known habitat in spring, and collect floristic and environmental information relevant to community ecology and condition.	▪ Habitat data collected and analysed. ▪ Important habitat mapped.	DSE, Parks Victoria
4. Identify and survey potential habitat using ecological and bioclimatic information that may indicate habitat preference.	▪ Predictive model for potential habitat developed and tested. ▪ Potential habitat searched.	DSE, Parks Victoria
5. Undertake research to identify key biological functions. Determine seed germination requirements by conducting laboratory and field trials aimed to identify key stimuli and determine stimuli for vegetative regeneration.	▪ Stimuli for recruitment/regeneration identified. ▪ Management strategies identified to maintain, enhance or restore regenerative processes fundamental to reproduction and survival.	DSE
6. Undertake detailed population monitoring and collect demographic information. Measure population trends and responses against recovery actions by collecting demographic information including recruitment and mortality, timing of life history stages and morphological data.	▪ Techniques for monitoring developed and established. ▪ Census data for target populations collected.	DSE, Parks Victoria
7. Analyse population trends. Collate, analyse and report on census data and compare with management histories.	▪ Population growth rates determined and Population Viability Analysis completed for target populations.	DSE

Objective II To secure populations, community occurrences or habitat from potentially incompatible use

Action	*Targets*	*Responsible*
8. Incorporate actions in relevant park or reserve management plan.	▪ Park management plans identify the species, and provide for its protection and active management. ▪ Fire management plans provide for the species protection and active management.	DSE, Parks Victoria
9. Establish cultivated plants *ex situ* to safeguard from the unforeseen destruction of the wild population.	▪ At least 15 mature plants in cultivation as safeguard.	DSE
10. Collect and store reproductive material. Establish a threatened orchid seed bank and determine seed viability.	▪ Reproductive material securely stored. ▪ Seed viability determined.	Royal Botanic Gardens

Objective III To improve the extent and/or condition of habitat

Action	*Targets*	*Responsible*
11. Monitor impact of weeds. Manage environmental weeds using herbicide application and / or hand removal where necessary.	▪ Measurable reduction in cover/abundance of environmental weeds. ▪ Seedling recruitment observed.	Parks Victoria
12. Control introduced animals to reduce grazing. Control predators / herbivores and investigate grazing impacts by fencing sites and / or caging plants.	▪ Measurable reduction in grazing damage or loss. ▪ Measurable seedling recruitment in affected population.	Parks Victoria
13. Control site disturbance from walkers by protecting site and modifying management activities.	▪ Measurable reduction in damage to plants from trampling in affected population.	Parks Victoria
14. Control the potential introduction and spread of Cinnamon Fungus (*Phytophthora cinnamomi*).	▪ Ensure site of known population remains unaffected by *P. cinnamomi*.	Parks Victoria

Objective IV To increase number of populations or individuals

Action	*Targets*	*Responsible*
15. Manage microhabitat for seedling recruitment.	▪ Measurable increase in recruitment at Lower Glenelg National Park site.	DSE, Parks Victoria
16. Pollinate plants and collect seed.	▪ Seed from known site in short term storage.	DSE, Parks Victoria
17. Test seed viability and restock population with seed.	▪ Measurable increase in recruitment at Lower Glenelg National Park site.	DSE, Parks Victoria, Royal Botanic Gardens
18. Prepare a plan for reintroduction / translocation. Select and evaluate a site that is ecologically / biologically suitable, has secure land tenure, and is managed appropriately.	▪ Criteria for site suitability identified and sites selected. ▪ Translocation plan prepared.	DSE, Threatened Orchid Recovery Team
19. Propagate seedlings and/or cuttings for reintroduction or reinforcement.	▪ Effective propagation and tissue culture techniques developed. ▪ At least 50 vigorous and disease free plants in cultivation for reintroduction.	Royal Botanic Gardens

20. Establish a reintroduced / translocated population. Prepare site to achieve maximum survival of plants and germination of seed, using fungal baiting techniques. Introduce and monitor plants / seed stock.	▪ Successful fungal baiting, direct seeding, and translocation techniques developed. ▪ Measurable increase in population size at the site.	DSE
21. Maintain the Threatened Orchid Recovery Team.	▪ Threatened Orchid Recovery Team maintained and contributing to the species' recovery.	DSE

Objective V To increase community awareness and support

Action	*Targets*	*Responsible*
22. Involve community groups and volunteers in recovery activities.	▪ Opportunities for involvement identified, promoted and supported.	DSE

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