

# THREATENED SPECIES SCIENTIFIC COMMITTEE

Established under the *Environment Protection and Biodiversity Conservation Act 1999*

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The Minister's delegate approved this Conservation Advice on 16/12/2016.

## Conservation Advice

### *Caladenia thysanochila*

fringed spider-orchid

#### Conservation Status

*Caladenia thysanochila* (fringed spider-orchid) is listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) effective from the 16 July 2000. The species was eligible for listing under the EPBC Act as on 16 July 2000 it was listed as Endangered under Schedule 1 of the preceding Act, the *Endangered Species Protection Act 1992* (Cwlth).

Species can also be listed as threatened under state and territory legislation. For information on the listing status of this species under relevant state or territory legislation, see <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>

The main factors that are the cause of the species being eligible for listing in the Endangered category are its small population size, limited distribution and continuing decline due to threats from habitat loss and degradation, weed invasion and grazing.

#### Description

The fringed spider-orchid (Orchidaceae) is an herbaceous perennial geophyte which is 30 cm high, with a single leaf 20 cm long and a single flower. It is a deciduous orchid that dies back annually to a small, spherical, underground tuber. The single leaf is long and narrow, green with reddish spots and hairy (Backhouse & Jeanes 1995). The slender flower stem grows to 30 cm tall and has a single white flower to 50 mm across with reddish midlines (Backhouse & Jeanes 1995). The petals and sepals are up to 30 mm long with slender tips (Backhouse & Jeanes 1995). The uppermost sepal is erect and incurved with petals widely spreading and drooping (Backhouse & Jeanes 1995). The central petal (labellum) is flat and recurved. The expanded part of the labellum has four rows of clubbed fleshy lumps and the sides are fringed with slender curved teeth extending towards curved tips (Bishop 2006).

#### Distribution

The fringed spider-orchid is endemic to Victoria. In 2006, this species was known from one site at Mt Eliza on the Mornington Peninsula, where there were two plants growing in a reserve managed by the Mornington Peninsula Shire (Bishop 2006). The historical distribution of this species was not known however may have included the broader Mornington Peninsula (Duncan et al., 2010). In 2010, this species was most likely extinct (Duncan et al., 2010) however further surveys are required in order to confirm this status.

#### Relevant Biology/Ecology

The fringed spider orchid occurs on herb-rich coast *Eucalyptus prioriana* (manna gum) woodland, on well-drained sandy loam soil, in the South East Coastal Plain Interim Biogeographic Regionalisation for Australia Bioregion (Duncan et al. 2010).

The fringed spider-orchid is a winter active geophyte with emergence occurring in concert with cooler conditions and onset of winter rainfall. Flowering in the fringed spider-orchid occurs in October (Backhouse & Jeanes 1995). This information is all that is known about this species. The pollinator of this species is unknown.

The following general information applies to the biology and ecology of spider-orchids.

Spider-orchids use either food deception or sexual deception for pollination (Jones 1988; Bishop 2006). The usual pollinators for spider-orchids are male wasps from the family Thynnidae. A scent that mimics female thynnid wasp pheromone is produced by the glandular tips of the sepals and acts as a sexual attractant for the pollinators (Backhouse & Jeanes 1995; Bishop 2006). Once the pollinator reaches the flower, it attempts to copulate with the labellum of the flower, mistaking it for the female wasp, and effects pollination (Todd 2000). The life cycle and ecological requirements of pollinators involved in sexual deception is generally unknown and represents a major risk in management the long-term reproductive capability of the orchid.

Spider orchids generally reproduce from seed (Backhouse & Jeanes 1995). Fruits of spider-orchids normally take five to eight weeks to reach maturity following pollination and each mature capsule may contain tens of thousands of microscopic seeds that are dispersed by the wind when the capsule dries out (Todd 2000). Most spider-orchids grow in a complex relationship with mycorrhizal fungi (Warcup 1981). The fungus assimilates some nutrients for the orchid, but the degree of nutritional dependence upon the fungus by spider-orchids is not clearly understood (Todd 2000). The long term persistence of a suitable mycorrhiza is however critical for growth and development of the orchid yet little is known of the ecological requirements for long-term maintenance of the mycorrhizal fungus in soil. Longevity of most spider-orchids is not known but there are examples of individuals of one species having survived for at least 17 years in the wild (Carr 1999).

Most terrestrial orchids have evolved under conditions of hot summer fires, generally when the plants have been dormant (Backhouse & Jeanes 1995). Some *Caladenia* species flower vigorously following hot summer fires (Backhouse & Jeanes 1995; Todd 2000). However, this may be as much the result of the removal of surrounding vegetation and reduced competition as any chemical effect of the fire (Backhouse & Jeanes 1995). The timing of fire for orchids is important, with the best time during late summer or early autumn, after seed dispersal but prior to new plant emergence. The variation in seasonal climatic conditions, most notably rainfall and temperature also influences flowering. Flowering is often aborted when periods of sustained hot, dry weather follow flower opening (Todd 2000).

### Threats

The fringed spider-orchid is at risk from a combination of threats across its range. Risk posed by each of these threats may vary depending on geographical, environmental, biological and sociological factors.

Table 1 – Threats impacting the fringed spider-orchid in approximate order of severity of risk, based on available evidence.

Threat factor	Threat type and status	Evidence base
Habitat loss, disturbance and modification		
Land clearance for residential development	known current	In 2010, the small reserve, managed by the Mornington Peninsula Shire, where this species was recorded was surrounded by extensive and expanding residential development (Duncan et al., 2010).
Illegal collection	known current	In 2000, the extremely low numbers and the relative rarity of individual plants made this species vulnerable to collection (Todd 2000).

Trampling	known current	In 2010, trampling including the accidental damage to individual plants and/or seedlings by recreational users was a threat to this species (Duncan et al., 2010).
Invasive species		
Weed invasion	known current	Weed invasion, particularly invasion by perennial grasses such as veldt grass ( <i>Ehrharta longifolia</i> ) and large quaking grass ( <i>Briza maxima</i> ), were a threat to this species (Duncan et al., 2010). Weeds can directly out-compete the fringed spider-orchid for resources and change the vegetation type and structure of habitat. Weeds can also alter microhabitats, which can indirectly cause a negative impact on the fringed spider-orchid (Duncan et al., 2005).
Grazing		
Grazing by rabbits	known current	Grazing by rabbits ( <i>Oryctolagus cuniculus</i> ) was a threat for this species as it destroys individual plants (Duncan et al., 2010).
Fire		
Timing and frequency	potential	The role of fire for the fringed spider-orchid is unknown. However, fires that occur in autumn, winter and spring, after the species shoots but before seed is set, may pose a threat. Too frequent fire or aseasonal fires may pose a threat by altering the habitat, removing organic surface materials and negatively impacting pollinators and mycorrhizal agents.

## **Conservation Actions**

### **Conservation and Management priorities**

#### Habitat loss, disturbance and modification

- Ensure public and private land managers are aware of the presence and location of the fringed spider-orchid on their land and provide protection measures against known and potential threats to the species.
- Manage access to known locations of the fringed spider-orchid to prevent the accidental trampling of plants.
- Ensure confidentiality of the known locations of the fringed spider-orchid is maintained to reduce the potential threat from illegal collection.

#### Invasive species

- Collaborate with public and private land managers to control and reduce the spread of invasive species, particularly perennial grasses. Consult with local experts in determining the most appropriate physical or chemical control methods for these weeds that will not have a detrimental effect on the fringed spider-orchid.

#### Grazing

- Manage total grazing pressure by rabbits through exclusion fencing and other barriers.
- Control rabbits using appropriate methods in accordance with the 'Threat abatement plan for competition and land degradation by rabbits' (refer to DEWHA 2008), which

may include undertaking a range of control techniques (for example, poisoning and warren destruction).

## Fire

- Fires must be managed to ensure that prevailing fire regimes do not disrupt the life cycle of the fringed spider-orchid, that they support rather than degrade the habitat necessary to the fringed spider-orchid, that they do not promote invasion of exotic species, and that they do not increase impacts of grazing.
- Ensure that prescribed fires occur only within the habitat during the dormant phase of the threatened species life cycle.
- Ensure that prescribed fires occur only within the habitat during the dormant phase of the fringed spider-orchid's life cycle (summer to late autumn).
- Physical damage to the habitat and individuals of the fringed spider-orchid must be avoided during and after fire operations. Ensure retention of surface soil organic material and leaf litter on soil as it is important for many terrestrial orchids that rely on these materials for regeneration from seed.
- Fire management authorities and land management agencies should use suitable maps and install field markers to avoid damage to the fringed spider-orchid.

## Seed collection, propagation and other ex-situ recovery action

- Establish plants in cultivation in appropriate institutions such as the Royal Botanic Gardens Victoria.
- To manage the risk of losing genetic diversity, undertake appropriate seed and mycorrhizal fungi collection and storage in appropriate institutions, such as the Victorian Conservation Seedbank, Royal Botanic Gardens Victoria, and curate the collection to ensure sustained viability of stored seed. Seeds from representative populations to be collected and stored.

## Stakeholder engagement

- Identify partners including traditional owners, landholders, community-based organisations and conservation management organisations that may be associated with recovery of the fringed spider-orchid.
- Promote opportunities for partners to participate in recovery efforts for the fringed spider-orchid, as appropriate.

## Survey and Monitoring priorities

- Undertake emergency survey work when plants are likely to be flowering (in October), in suitable habitat and potential habitat to locate any potential occurrences including previously identified known and potential populations to establish baselines where required to identify changes (if any) in population size, distribution, ecological requirements and relative impacts of threatening processes.
- Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.
- Monitor the size, structure and reproductive status of populations of fringed spider-orchids at different stages in the fire cycle. Opportunities to monitor after planned and unplanned fires should be undertaken where they occur in order to improve understanding of the fire response of this species.

- Precise fire history records must be kept for the habitat and extant populations (confirmed and suspected) of the fringed spider-orchid.

### **Information and research priorities**

- Investigate options for establishing in situ and/or ex situ populations of this species.
- If new occurrences are identified, establish representative populations in cultivation in appropriate institutions such as botanic gardens.
- If occurrences are identified, to manage the risk of losing genetic diversity, undertake appropriate seed and mycorrhizal fungi collection and storage in national seed banks and determine viability of stored seed. Seeds from all natural populations to be collected and stored.
- If populations/occurrences/remnants are identified, investigate reproductive status, longevity, fecundity and recruitment levels for this species in order to form a view on the resilience of this species to known and potential threats and adjust conservation actions as required.
- If populations/occurrences/remnants are identified, undertake seed germination and/or vegetative propagation trials to determine the requirements for successful establishment, including disturbance and mycorrhizal fungi requirements.
- If populations/occurrences/remnants are identified, improve understanding of the mechanisms of response to different fire regimes and identify appropriate fire regimes for conservation of this species by undertaking appropriately designed experiments in the field and/or laboratory.
- Where demonstrated to be applicable, use understanding and research on fire responses among related (e.g. congeneric) or functionally similar species/ECs to develop fire management strategies for conservation.
- Identify optimal fire regimes for regeneration (vegetative regrowth and/or seed germination), and response to other prevailing fire regimes.
- Undertake research into pollinator activity and the ecological requirements to support pollinator communities of the orchid.

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