



# **Recovery Plan for the Crimson Spider Orchid (*Caladenia concolor*)**

**(Including populations at Bethungra  
and Burrinjuck to be described as  
two new species)**



**July 2003**

**NSW  
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**Cover photograph:** Gillian McDonald

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# Recovery Plan for the Crimson Spider Orchid (*Caladenia concolor*) (Including the populations at Bethungra and Burrinjuck to be described as two new species)

## Executive Summary

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This document constitutes the formal draft New South Wales State Recovery Plan for the Crimson Spider Orchid *Caladenia concolor*. It also includes recovery actions for the related undescribed and as yet unlisted spider orchids *Caladenia* sp. (Bethungra, D. L. Jones 15743) and *Caladenia* sp. (Burrinjuck, D. J. Mallinson 409). The plan considers the conservation requirements of these species across their known range in NSW, it identifies actions to be undertaken to ensure their long-term viability in nature and the parties who will carry these out.

The Crimson Spider Orchid is listed as Vulnerable in the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* and Endangered (Schedule 1, Part 1) in the NSW *Threatened Species Conservation Act 1995*. In New South Wales it is known to occur only in the Nail Can Hill Crown Reserve outside of Albury City.

The Bethungra Spider Orchid and Burrinjuck Spider Orchids are not currently described or listed, however, they meet the criteria for Endangered under State legislation and may meet the criteria for Critically Endangered under Commonwealth legislation. The Bethungra Spider Orchid is known only from private property near Bethungra in Cootamundra Shire whilst the Burrinjuck Spider Orchid is found only in the Burrinjuck Waters State Park and Burrinjuck Nature Reserve (Yass Shire). The first actions to recover these species were carried out in 1994.

The future recovery actions detailed in this recovery plan include; (i) further survey to find additional populations, if they exist, and monitoring of known populations, (ii) control of threats such as weed infestation, (iii) implementation of a program to increase the population of Crimson Spider Orchid, (iv) description and nomination for listing under the TSC Act of the two new species, (v) research on the genetics and fire requirements of the species, (vi) development of a formal arrangement to ensure the long term conservation and management of the population of the Crimson Spider Orchid, (vii) provision of information to the community, and (viii) active encouragement of community participation in the implementation of the plan.

It is intended that this Recovery Plan will be implemented over a five-year period. Actions will be largely carried out using existing resources of various NSW Government agencies and community groups. An additional \$20,600 will be required to implement some currently unfunded actions.

**Brian Gilligan**  
Director-General

## **Acknowledgments**

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Lorraine Oliver of the NPWS prepared the map presented in this plan.



## 1 Introduction

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This document constitutes the formal draft New South Wales Recovery Plan for the Crimson Spider Orchid *Caladenia concolor*. It also includes recovery actions for the, as yet, undescribed and unlisted Bethungra Spider Orchid *Caladenia* sp. (Bethungra, D. L. Jones 15743) and the Burrinjuck Spider Orchid *Caladenia* sp. (Burrinjuck, D. J. Mallinson, 409). This plan considers the requirements of these species across their known ranges, identifies the actions to be taken to ensure their long term viability in their natural environment and the parties responsible for carrying these out.

The attainment of the objectives of this Recovery Plan is subject to budgetary and other constraints affecting the parties involved. It is also subject to amendments, if necessary. The information this plan is based on is accurate to January 2003.

## 2 Legislative Context

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### 2.1 Legal Status

The Crimson Spider Orchid was first recognised as threatened in the literature in Briggs and Leigh (1996) where it is listed as 3Vci.

The species was initially listed as Vulnerable in Schedule 2 of the NSW *Threatened Species Conservation Act 1995* (TSC) however, its status was amended to Endangered on 18 July 1997. The Crimson Spider Orchid is listed as Vulnerable on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC).

The Bethungra Spider Orchid and Burrinjuck Spider Orchid are not currently listed however, they meet the criteria for Endangered under State legislation and may meet the criteria for Critically Endangered under Commonwealth legislation.

Among the consequences of listing as a threatened species on the TSC Act are that:

- A Recovery Plan must be prepared;
- consideration be given to the species in assessing the impacts of developments and activities with the aim of minimising adverse impacts;
- actions that are likely to result in the harming or picking of that species or damage to its habitat are licensed.

### 2.2 Recovery Plan Preparation

The TSC Act provides a legislative framework to protect and encourage the recovery of threatened species, endangered populations and endangered ecological communities in NSW. Under this legislation the Director-General of National Parks and Wildlife (NPW) has a responsibility to prepare Recovery Plans for all species, populations and ecological communities listed as endangered or vulnerable on the Schedules of the Act. Similarly, the EPBC Act requires the Commonwealth Minister for the Environment to ensure the preparation of a Recovery Plan for nationally listed species and communities or adopt plans prepared by others, including those developed by State agencies. Both Acts include specific requirements for the matters to be addressed by Recovery Plans and the administrative process for preparing Recovery Plans.

This Recovery Plan has been prepared to satisfy both the requirements of the TSC Act and the EPBC Act. It is the intention of the Director-General of NPW to forward the final version to the Commonwealth Minister of the Environment for adoption, once it has been placed on public exhibition and approved by the NSW Minister for the Environment.

### 2.3 Recovery Plan Implementation

The TSC Act requires that a public authority must take any appropriate measures available to implement actions included in a Recovery Plan for which they have agreed to be responsible. Public authorities and councils identified as responsible for the implementation of Recovery Plan actions are required by the TSC Act to report on measures taken to implement those actions. In addition, the Act specifies that public authorities must not make decisions that are inconsistent with the provisions of the plan.

Public authorities responsible for the implementation of this Recovery Plan as it relates to the Crimson Spider Orchid are the National Parks and Wildlife Service (NPWS), AlburyCity, and the Department of Infrastructure, Planning and Natural Resources (DIPNR). Consequently, the actions outlined for each of these agencies must be implemented as described in the plan.

Cootamundra Shire Council will have responsibilities under the TSC Act, as will the NPWS and DIPNR, once the Bethungra Spider Orchid is listed on the NSW Schedules. Listing of the Burrinjuck Spider Orchid will place responsibilities upon the NPWS and DIPNR.

The EPBC Act additionally specifies that a Commonwealth agency must not take any action that contravenes an approved Recovery Plan.

#### 2.4 Relationship to other legislation

The lands on which the three orchids occur include those that are owned by private landholders and lands under the care and management of the NSW National Parks and Wildlife Service (NPWS) and the Department of Infrastructure, Planning and Natural Resources (DIPNR). Relevant legislation includes:

- *NSW National Parks and Wildlife Act 1974*
- *NSW Environmental Planning and Assessment Act 1979*
- *NSW Local Government Act 1993*
- *NSW Rural Fires Act 1997*
- *NSW Native Vegetation Conservation Act 1997*
- *NSW Crown Lands Act 1987*
- *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*

The interactions between these Acts and the TSC legislation are varied. The most significant implications are described below and in Section 2.5.

The clearing of native vegetation in NSW is subject to consent from the DIPNR in accordance with the *NSW Native Vegetation Conservation Act 1997* (NVC Act). The Act is integrated with the *Environmental Planning and Assessment Act 1979* (EP&A Act), and requires that threatened species are taken into account when considering clearing applications under Part 4 of the EP&A Act.

*The Rural Fires Act 1997* requires that all parties involved in fire suppression and prevention must have regard to the principles of Ecologically Sustainable Development (ESD) when exercising their functions and when preparing Draft Operational Plans and Draft Bush Fire Risk Management Plans. Consideration of the principles of ESD must include the conservation of biological diversity and ecological integrity. Within this, consideration must be given to the impact on threatened species and their habitats.

#### 2.5 Environmental Assessment

The *NSW Environmental Planning and Assessment Act 1979* (EP&A Act) requires that consent and determining authorities and the Director-General of the NPWS, as a concurrence authority, consider relevant Recovery Plans when exercising a decision making function under Parts 4 & 5 of the EP&A Act.

Decision makers must consider known and potential habitat, biological and ecological factors, and regional significance of individual populations.

The following public authorities currently have a decision making function in relation to the Crimson Spider Orchid:

- AlburyCity;
- DIPNR in relation to the Crown Land where this species is found, subject to the provisions of the *Crown Lands Act 1989*, and in relation to the requirements of the NVC Act; and
- NPWS where a concurrence role under the EP&A Act is required or where a Section 91 Licence (under the TSC Act) is required.

Additional public authorities may have a decision making function if the species is located in other areas in the future.

Once the Bethungra Spider Orchid and the Burrinjuck Spider Orchid are listed, other public authorities may also have functions with regard to them. These authorities will include Cootamundra Shire Council (for the Bethungra Spider Orchid) and the NPWS with regard to both the Bethungra Spider Orchid and the Burrinjuck Spider Orchid.

Any other action not requiring development consent under the EP&A Act, and which is likely to have a significant impact on the Crimson Spider Orchid, requires a Section 91 licence from the NPWS under the provisions of the TSC Act. Such a licence can be issued with or without conditions, or can be refused. Routine agricultural activities however, are exempt from the provisions of the TSC Act.

The EPBC Act regulates actions that may result in a significant impact on nationally listed threatened species and ecological communities. It is an offence to undertake any such actions in areas under State or Territory jurisdiction, as well as on Commonwealth-owned areas, without obtaining prior approval from the Commonwealth Environment Minister. As the Crimson Spider Orchid is listed nationally under the EPBC Act, any person proposing to undertake actions likely to have a significant impact on the Crimson Spider Orchid should refer the action to the Commonwealth Minister for the Environment of consideration. The Minister will then decide whether the action requires EPBC approval.

Administrative guidelines are available from Environment Australia to assist proponents in determining whether their action is likely to have a significant impact. In cases where the action does not require EPBC Act approval but will result in the death

or injury of an individual of Crimson Spider Orchid and the individual is in or on a Commonwealth area, a permit issued by the Commonwealth Minister under the EPBC Act will be required.

The Environment Minister can also delegate the role of assessment and approval to other Commonwealth Ministers under a Ministerial Declaration, and to the States and Territories under bilateral agreements. The development of a bilateral agreement between NSW and the Commonwealth is not yet complete, but when in place will avoid the need for duplication of environmental assessment.

## 2.6 Critical Habitat

The TSC Act makes provision for the identification and declaration of Critical Habitat. Under the TSC Act, Critical Habitat may be identified for any endangered species, population or ecological community occurring on NSW lands. Once declared, it becomes an offence to damage Critical Habitat (unless the action is exempted under the provisions of the TSC Act) and a Species Impact Statement is mandatory for all developments and activities proposed within declared Critical Habitat.

Under the EPBC Act, Critical Habitat may be registered for any nationally listed threatened species or ecological community. When adopting a Recovery Plan the Federal Minister for the Environment must consider whether to list habitat identified in the Recovery Plan as being critical to the survival of the species or ecological community. It is an offence under the EPBC Act for a person to knowingly take an action that will significantly damage Critical Habitat on Commonwealth land (unless the EPBC Act specifically exempts the action). Any action that is likely to have a significant impact on a listed species occurring within registered Critical Habitat on other areas is still subject to referral and approval under the EPBC Act. Proposed actions within registered Critical Habitat on non-Commonwealth areas are likely to receive additional scrutiny by the Commonwealth Minister.

To date, Critical Habitat has not been declared for the Crimson Spider Orchid under the TSC Act. However, this Recovery Plan identifies those habitat features and the location (sections 3.2 - 3.4) currently known to be critical to the survival of the Crimson Spider Orchid, as required by the EPBC Act.

## 3 Species Information

### 3.1 Description and Taxonomy

The Crimson Spider Orchid was first described by Fitzgerald in 1882 (Fitzgerald 1882). As the name suggests the flowers of this species are a deep crimson colour with a spidery shape. The strong fragrance of the flowers has been described as being like that of a hot motor. The description below is taken from Harden (1993):

*“Terrestrial herb. Leaf narrow-lanceolate, to 16 cm long and 13 mm wide, sparsely hairy. Inflorescence to 25 cm high, rarely >2-flowered, hairy, dark red. Sepals and lateral petals c. 4.5 cm long, dark red; tails filamentous, dark and hairy, up to half the length of the segments; tails of lateral petals and lateral sepals drooping or obliquely deflexed. Labellum ovate, 5-10 mm long, lobes poorly differentiated, dark red; lateral lobes fringed with acute, curving marginal teeth to 3 mm long ending in acute curving tips; midlobe with short blunt teeth. Central calli stalks short, heads swelling to broadening but not conspicuously overlapping, in 4-6 rows. Column base with 2 yellow glands.”*

Both the Bethungra Spider Orchid and Burrinjuck Spider Orchid closely resemble the Crimson Spider Orchid. There are differences in the morphology of their flowers, however, these would not be obvious to the non-specialist. The Bethungra Spider Orchid is currently undescribed but is believed to have affinities with the Crimson Spider Orchid. The Burrinjuck Spider Orchid is also undescribed and is expected to be more closely related to the *Caladenia montana* complex which is known to occur in the ACT, Western Blue Mountains, Orange and Northeast Victoria (D Jones, CSIRO, pers. comm.).

### 3.2 Distribution

The current known habitat of the Crimson Spider Orchid is confined to granite ridge country in the Nail Can Hill Crown Reserve near Albury (Fig.1). It was from here that the species was originally described. Anecdotal evidence from local residents suggests that the species was previously much more common in the Albury area. It may be, however, that the main concentration of the species was in habitat somewhat different to the area in which it remains today. Areas in the vicinity of Albury and also Tabletop Mountain, Yambla Range (north of Albury) need to be investigated in greater detail for possible further occurrences of the species. The species is also reported from a number of localities in Victoria including Stanley and Chiltern. The taxonomic status of these populations remains uncertain and for this

reason they have not been included in this Recovery Plan.

The Bethungra Spider Orchid is also known only from a very restricted area on private property between Bethungra and Cootamundra (Fig. 1) where three small subpopulations occur. The area of Crown Land and private property in the general vicinity of this site is poorly known and further survey work in the area could yield additional populations of the species and a better understanding of its habitat requirements.

The two known sub-populations of the Burrinjuck Spider Orchid are found in the Burrinjuck Waters State Park and Burrinjuck Nature Reserve (Fig 1). Other populations of the species have been reported from private land in the area and it is possible that additional occurrences within the Nature Reserve will also be found when further survey work is carried out.

### 3.3 Habitat

The habitat for the single known population of the Crimson Spider Orchid is regrowth woodland on granite ridge country in the Nail Can Hill Crown Reserve outside of Albury. Clearing took place in this reserve in the early part of the century but despite a history of grazing and burning, the regenerating woodland has retained a high diversity of plant

species. The dominant trees of the woodland are Blakely's Red Gum *Eucalyptus blakelyi*, Red Stringybark *E. macrorhyncha*, Red Box *E. polyanthemos* and White Box *E. albens*. The understorey is made up of a variety of shrubs, herbs and grasses including: Native Cherry *Exocarpos cupressiformis*, Silver Wattle *Acacia dealbata*, Hickory Wattle *A. implexa*, Mountain Grevillea *Grevillea alpina*, Austral Indigo *Indigofera australis*, Hop Bitter-pea *Daviesia latifolia*, Showy Parrot-pea *Dillwynia sericea*, Common Beard-heath *Leucopogon virgatus*, Slender Rice-flower *Pimelea linifolia*, Purple Coral-pea *Hardenbergia violacea*, Spreading Flax-lily *Dianella revoluta*, Many-flowered Mat-rush *Lomandra multiflora*, Kangaroo Grass *Themeda australis*, Snow Grass *Poa sieberiana* and Wallaby Grasses *Austrodanthonia* spp.

The Bethungra Spider Orchid is also found in woodland which is broadly similar to the above. Dominant tree species are again: Blakely's Red Gum *Eucalyptus blakelyi*, Red Stringybark *E. macrorhyncha*, White Box *E. albens*. Red Ironbark *Eucalyptus sideroxylon* and Tumbledown Red Gum/Dwyer's Red Gum *E. dealbata/dwyeri* may also be present. Understorey species at this site include: Hickory Wattle *Acacia implexa*, Varnish Wattle *A. verniciflua*, Spreading Wattle *A. genistifolia*, Native Cherry *Exocarpos cupressiformis*, Violet Kunzea *Kunzea parvifolia*, Native Box *Bursaria spinosa*, Sticky Hop-bush *Dodonaea viscosa*, Peach Heath *Lissanthe strigosa*, Common Fringe-myrtle *Calytrix tetragona*, Austral Indigo *Indigofera australis*, Cunningham's Bush-pea *Pultenaea cunninghamii*, Daphne Heath *Brachyloma daphnoides*, Purple Coral-pea *Hardenbergia violacea*, Ivy Goodenia *Goodenia hederacea*, Nodding Blue Lily *Stypandra glauca*, Creamy Candles *Stackhousia monogyna* and Bluebell *Wahlenbergia* sp.

The two areas at Burrinjuck Nature Reserve for which records of the Burrinjuck Spider Orchid exist support somewhat different natural communities. The population along the road occurs in an Open Forest dominated by several Eucalypt species including: Long-leaf Box *Eucalyptus goniocalyx*, Broad-leaved Peppermint *E. dives*, Brittle Gum *E. mannifera* and Scribbly Gum *E. rossii*. The understorey is dominated by the

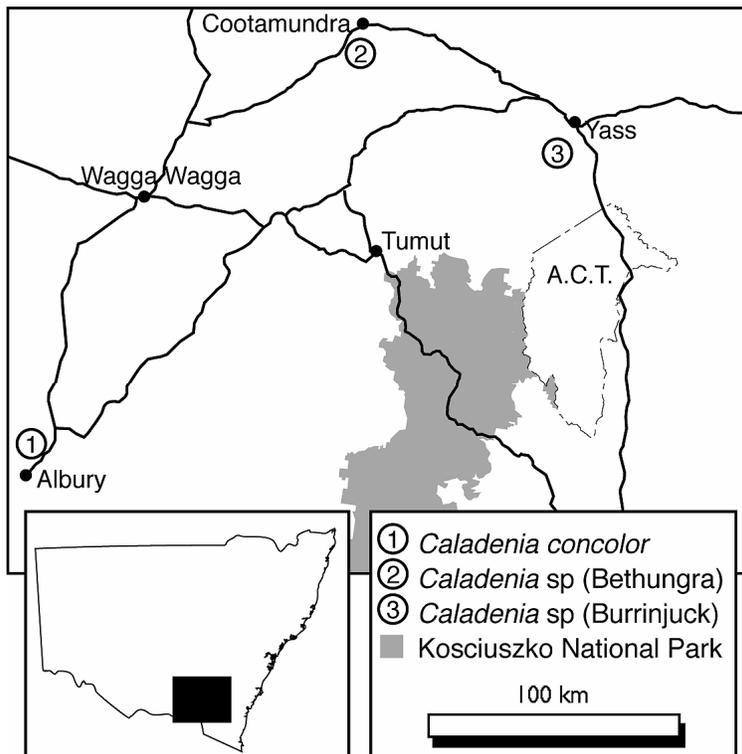


Figure 1. Map showing the locations of *Caladenia concolor* and two related undescribed spider orchids.

shrubs Dogwood *Cassinia aculeata*, Sticky Hopbush *Dodonaea viscosa* and Waxy Wattle *Acacia caesiella* and the ground layer contains: Handsome Flat-pea *Platylobium formosum*, Cunningham's Bush-pea *Pultenaea cunninghamii*, Rock Fern *Cheilanthes austrotenuifolia* and Snow Grass *Poa sieberiana*. Further up the ridge where the second population occurs this community grades into a Tall Open Forest in which the tree species Broad-leaved Peppermint *Eucalyptus dives*, Long-leaf Box *E. goniocalyx* and Red Stringybark *E. macrorhyncha* predominate. The understorey here includes: Rusty Wattle *Acacia rubida*, Grey-leaved Hibbertia *Hibbertia obtusifolia*, Bidgee-widgee *Acaena novaezelandiae*, Twining Glycine *Glycine clandestina*, Starwort *Stellaria pungens* and Snow Grass *Poa sieberiana*.

### 3.4 Ecology

#### *Life Cycle*

Very little is known of the biology and ecology of these three spider orchids. They are all terrestrial deciduous herbs, emerging annually from a subterranean tuber. The single leaf appears in autumn/winter, coinciding with and in response to rainfall. Flowering takes place from late August to October; earlier during this time period for the Crimson Spider Orchid and Bethungra Spider Orchid and later for the Burrinjuck Spider Orchid. The exact timing and amount of flowering can vary from year for reasons that are not fully understood. By early summer, if pollination has occurred, the seed capsule is ripening. Seed is shed by early December and the leaf withers soon after this. All three species survive the dry summer and early autumn as a dormant tuber. Reproduction is entirely from seed for these species; none are able to reproduce vegetatively as far as is known. Each year a replacement tuber grows from the root stem. These orchids grow in a interdependent relationship with a mycorrhizal fungus. The fungus assimilates some nutrients for the orchid, but the type of fungus, whether or not it is the same in all three species and degree of dependence upon the fungus are not known. Similarly, nothing is known about longevity in these species but with the ability to produce a new tuber annually it could be considerable. Eventually individual plants most probably succumb to predation, disease or environmental stress. However, some other species of spider orchids can survive for many years. For example, an individual of Melblom's Spider-Orchid *Caladenia hastata* is known to have lived for at least 16 years (Backhouse *et al.* 1998).

These species are pollinated by sexual deception through a process called pseudocopulation (Jones 1988). The glands on the perianth segments are the source of the sexual attractants for the pollinators,

usually male thynnine wasps, drawn to the flowers by scent mimicking the female thynnine wasp pheromone. Once in sight of the flower, the male attempts to copulate with the labellum of the flower, mistaking it for the female wasp, and effects pollination. The pollinator or pollinators for these three species are not known. Research on the pollinators of species of Bird-orchid (*Chiloglottis*) has shown that the pollinator is orchid species-specific (Bower 1996). Although this has yet to be demonstrated for many species of spider orchids, several orchids in the *Caladenia dilatata* complex studied apparently have a unique insect pollinator (Backhouse *et al.* 1998). Natural pollination of the Crimson Spider Orchid appears to be an extremely rare event, most likely due to the absence of an appropriate pollinator or the small number of plants remaining in the wild (and hence rarely are there two flowers in close proximity to one another opening together). Pollination in the other two species appears to take place more frequently; perhaps due to the greater numbers of individuals.

#### *Population Size and Structure*

The most detailed information on population size has been gathered for the Crimson Spider Orchid (Table 1). Since the Albury population was rediscovered by P. Branwhite in 1995, the population has been closely monitored and data collected on leaf emergence, flowering and pod formation for individual plants. From an initial four plants observed in 1995 the numbers now under observation have increased to 16 in 2002. Some of these are individuals newly recruited to the population; others were probably already present in 1995 but did not reappear above ground until several years later.

The three subpopulations of the Bethungra Spider Orchid (all within 200m of each other) have been visited annually since 1998 (except in 2000). The numbers of leaves and flowers were recorded in each census except for 1998 when flowering plants only were counted. Table 2 summarises this information. The permanent tagging of all individuals will commence in 2003 (Action 2.5) and it will then be possible with time to build up a more precise picture of population size and structure.

Little information is available on the status of the population of the Burrinjuck Spider Orchid. This species was first observed (one senescing plant) by D. Mallinson in 1992. Approximate numbers for subsequent years are: 1993-12, 1995-25 and 1998-14. More recent searches in 1999 and 2001 have not located any individuals of this species. Detailed searches are planned for 2003 following the January 2003 fires (see Action 6.3) and any plants found will

be permanently tagged and annual monitoring will commence (Action 2.5).

period for the growing season and hence result in reduced flowering in the following season.

Plant No	1995	1996	1997	1998	1999	2000	2001	2002 ***
1	FS, PF	FS, PN	FS, PF	FS, PN	FS, PF	FS, PN, HP(3)	FS, PF, HP(10), SC	FS, PN
2				FR, FS, PN	FS, PN	FS, PN, HP(1)	FS, PF, HP(3), SC	FS, PF, NoHP**
3				FR, LO	FS, PN	FS, PF, HP(2), SC	FS, PF, SC, HP(1), CC	LO
4				FR, FS, PN	LO	FS, PF*, NoHP, SC	FS(very small)	LO
5						FR, FS, PN	NE	NE
6	FS, PN	FS, PN	NE	NE	NE	NE	NE	NE
7	FS, PN	LO	LO	FS, PN	FS, FG, LG	NE	LO(very small)	LO
8	FS, PF	FS, PN	FS, PN	FS, PF	FS, FG, LG	NE	LO(very small)	FS, PN
9							FR, LO(very small)	LO(very small)
10					FR, LO	LO	FS, PN, HP(2)	FS, PN
11						FR	FS, PN	FS, PN
12							FR, LO	LO
13							FR, LO	LO, LG
14								FR, LO
15								FS, PN, seedling
16								FS, PN
A13	FS, PN	FS, PN	LO	FS, PN	FS, PN	LO	FS, PN	LO, LG

Until a better understanding of the role of fire in the ecology of these species is obtained, it is considered that no planned burning should be carried out in or near where they occur (Action 1.2). In order to improve our understanding of the effects of fire, studies of the Burrinjuck subpopulations which burned in January 2003 will commence in the Spring of 2003 (Action 6.3).

**3.5 Land Tenure**

The population of Crimson Spider Orchid at Albury occurs in the Nail Can Hill Reserve which is Reserved Crown Land for which the Department of Infrastructure, Planning and Natural Resources informally shares responsibility with Albury City for maintenance. This land is currently zoned Open

Space.

*Disturbance Regimes*

The role of fire in the ecology of these orchids is not known. It is likely that they do not directly require fire, although fire may have a positive influence upon

The population of the Bethungra Spider Orchid is on private property, and the former owner and present manager of the property are members of the Recovery Team. A Registered Property Agreement with the Department of Infrastructure, Planning and Natural Resources exists for the part of the property on which the species occurs. The zoning of this land is Non-Urban A in the current Cootamundra Shire Development Control

Table 1. Census data compiled from records of Paul Scannell and Peter Branwhite for the *Caladenia concolor* population at Albury from 1995 to 2002 (FR – First Recorded, NE – No Emergence, LO – Leaf Only, FS – Flower Stem, PF – Pod Formed, PN – No Pod Formed, CC – Collar Collected to Isolate Fungal Associate, HP(3) – Hand Pollinated (From Plant Number), SC – Seed Collected)  
 \*Flower closed early as if naturally pollinated, \*\*Naturally pollinated,  
 \*\*\* No hand pollination in 2002  
 Note: A13 leaves have green margins and may not be *C. concolor*

seedling germination and establishment through effects on the surrounding vegetation (reduced competition), nutrient availability and mycorrhizal activity. On the other hand fire could kill some of the orchid tubers.

Fire could also have a greater detrimental impact on these Spider Orchids if the habitat is burnt while the species is flowering or in fruit. Such a fire event would destroy the reproductive effort for that year and possibly weaken tubers by reducing the photosynthetic

Year	Population	Flowers	Leaves	Totals
1998	Subpop A	90-100		100+
	Subpop B	30		30+
	Subpop C	6		6+
1999	Subpop A	35	100	135
	Subpop B	20	5	25
	Subpop C	3	10	13
2001	Subpop A	55	95	150
	Subpop B	10	34	44
	Subpop C	17	29	46
2002	Subpop A	20	50	70
	Subpop B	24	45	69
	Subpop C	0	4	4

Plan.

Two separate populations of Burrinjuck Spider Orchid are currently known. One of these is within the Burrinjuck Waters State Park under the jurisdiction of the Minister for Sustainable Natural Resources and the other occurs in the NPWS managed Burrinjuck Nature Reserve. The land is zoned Special Uses by Yass Shire Council.

### 3.6 Ability of Species to Recover

It is possible that the Albury population of the Crimson Spider Orchid has been reduced to a size at which the ability of the species to recovery may be seriously impaired. While flowering is occurring, very little pollination is taking place naturally. Only two natural pollination events have been observed; one in 2000 and one in 2002 (see Table 1). This may be due to the absence of a suitable pollinator or to the extremely low numbers which make it difficult for a pollinator to find and visit more than one flower.

Artificial pollination has been carried out on three plants in 2000 and again in 2001. Capsules recorded between 1995 and 1999 resulted from hand pollinations done by P. Branwhile prior to the commencement of recovery planning. Beginning in 2001, the Recovery Team has been following a protocol developed as a guide for native orchid conservation on South Australia (Bickerton, 2001). This protocol, now also in use in Victorian orchid conservation work, provides guidance on how many plants should be hand pollinated and how frequently. Seed capsule diameter is considered to be indicative of any depletion of the resources of individual plants and will be monitored closely and guide decisions about how frequently hand cross-pollination should be carried out. No artificial pollination was carried out in 2002.

The hand cross-pollination carried out in 2000 and 2001 made possible the collection of a small quantity of seed for *ex-situ* propagation work commenced at Kings Park Botanic Gardens in Perth (see Action 5.2). Also in 2001 collar material was collected from one plant in order to isolate the fungal associate essential to successful *ex situ* propagation. This collection was non-destructive and the plant reappeared in 2002.

A further concern is whether the genetic heterogeneity of the population is sufficiently great, though experience with other orchid species is more encouraging in this regard (D. Jones, pers. comm.). Work on the genetics of the Crimson Spider Orchid is planned (Action 6.2) which will provide information on the genetic heterogeneity of the three known populations of the species (Albury and Chiltern and

Stanley in Victoria) and the extent to which they differ from one another.

The situation for the other two undescribed species, the Bethungra Spider Orchid and the Burrinjuck Spider Orchid is more positive. The population size at Bethungra is considerably larger than at Albury and a higher frequency of natural pollination is taking place. To date no measurements of seed set have been made but close monitoring and the gathering of more precise population data for this species including natural pollination frequency and seed set will commence in 2003 (Action 2.5). Given the creation of a Registered Property Agreement over this site there is a less urgent need for active intervention and it may be that over time a natural increase in population numbers will take place.

While the Burrinjuck Spider Orchid has not been observed since 1998, the area is not well surveyed and it is considered likely that further populations will be located with additional survey work. The occurrence of a fire in areas where this species has been observed provides an opportunity to learn more about the fire response of this and related Spider Orchid species and survey work will be given the highest priority (Action 6.3) and a more active intervention program deferred until the results of the survey are known.

## 4 Management Issues

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### 4.1 Crimson Spider Orchid

The Nail Can Hill Crown Reserve where the Crimson Spider Orchid is found has a long history of disturbance including clearing, grazing, uncontrolled access and possibly inappropriate fire regimes. The area currently supports regrowth woodland from clearing that took place early in the century. It has also been grazed over a long period of time and, until recently, unrestricted vehicle access led to a proliferation of tracks, rubbish dumping, and firewood collection. Noxious weeds (Blackberry and St Johns Wort) and rabbits are also present. Fencing and locked gates have significantly reduced many of these problems and the noxious weeds and rabbits are receiving attention. The fire hazard is being managed through a firebreak, a system of mosaic burns and controlled grazing in restricted areas and at restricted times of the year. The area in which the Crimson Spider Orchid is found is being excluded from all planned fire.

The main disturbance of current concern is the dense growth of the annual exotic grasses (*Briza* spp.) in close proximity to the individuals in the surviving

population. This is being controlled through hand clearing; an approach that will continue as long as it is feasible and proves effective.

Anecdotal information suggests that the species was formerly present in the area in much larger numbers and one or more of the above types of disturbance has resulted in its decline. Most of this disturbance is now under better control with fencing and more active management of the reserve. Dense growth of annual grasses (*Briza* spp.) is still of concern as is the potential for inadvertent damage to the small surviving population from track maintenance or vehicles leaving established tracks. There are tentative signs that initial stages in the recovery of the population may be taking place (see Table 1). Recovery actions are designed to control remaining threats and encourage further recovery.

#### **4.2 Bethungra Spider Orchid**

There are few potential or actual disturbance problems in the area in which the Bethungra Spider Orchid occurs due to a history of responsible land management. Some exotic species are present such as Fescue *Vulpia* sp. and, although their impact appears to be minimal, it will be monitored. A dense regrowth of Spreading Wattle also has the potential to impact upon the population. Again the situation will be monitored, however, it is expected that natural senescence will obviate the need for any active clearing of this species.

#### **4.3 Burrinjuck Spider Orchid**

Known populations of the Burrinjuck Spider Orchid are confined to the Burrinjuck Waters State Park and Burrinjuck Nature Reserve. Although one of these populations was not relocated during survey in 1998 and neither was found in 2000 or 2001, there are no obvious signs of disturbance that could account for this absence. A decision has been made to remove exotic pines in close proximity to this site. The other population was relocated during the 1998 survey and also appears free of any threats or disturbance.

All three species face the threat of illegal collection by orchid growers.

## 5 Previous recovery actions

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- Prior to the establishment of the Recovery Team and its first meeting on 18 March, 1999 a number of actions for the Crimson Spider Orchid were undertaken by concerned local residents in conjunction with the Albury Botanic Gardens and the DIPNR. This included restricting vehicle access by fencing of the Nail Can Hill Reserve. This also reduced the impacts of grazing, the indiscriminate dumping of rubbish and the removal of firewood.
- During 1999 further fencing and weed control measures were funded by DIPNR and the NSW Biodiversity Strategy and undertaken by the Australian Trust for Conservation Volunteers. In addition, hand cross-pollination of individuals in the Albury population and localised hand removal of *Briza* spp. (with DIPNR funding) commenced.
- The Albury Hume Bush Fire Risk Management Plan was finalised on 12 July, 2000. Since then, discussions have been held with representatives of the Albury Hume Bush Fire Management Committee on the exclusion of fire from areas where the Crimson Spider Orchid occurs and the incorporation of this management requirement in the Fuel Management Plan for Nail Can Hill.
- Work is in progress on the *ex-situ* cultivation of both the Bethungra Spider Orchid and the Crimson Spider Orchid. The fungal associate of both species has been successfully cultured by Kings Park Botanic Gardens and small quantities of seed have been successfully germinated.
- Progress in the protection of the Bethungra Spider Orchid has also been made. The property on which it occurs has for a number of years been managed in a manner which has met its requirements for survival. A Registered Property Agreement with the DIPNR is in place and fencing of the property has been completed.
- Management of the currently known populations of the Burrinjuck Spider Orchid are under the jurisdiction of the Queanbeyan Area of the NPWS and the State Recreation Section of the Department of Lands. Both agencies have been made aware of the locations of the populations in the Burrinjuck Nature Reserve and the Burrinjuck Waters State Park and of their management requirements (so far as they are known given our current limited understanding of the ecology of the species).
- All pines in the vicinity of the population of Burrinjuck Spider Orchids were removed from Burrinjuck Waters State Park in 1999.
- Survey work was undertaken in October of 1999 to locate additional populations of the Burrinjuck Spider Orchid. This work centred on areas of suitable habitat extending outward from the known populations in both Burrinjuck Nature Reserve and Burrinjuck Waters State Park. No new populations were located.
- Extensive surveys for further populations of the Crimson Spider Orchid were carried out in Spring, 2000. Areas searched included potential habitat in Nail Can Hill, Tabletop Mountain/Yambla Range, Holbrook and Tarcutta Hills. One additional individual was found in the vicinity of the Nail Can Hill population, however, no new populations were discovered.

## 6 Proposed Recovery Objectives, Actions and Performance Criteria for 2003-2007

The overall objective for the Recovery Plan during 2003-2007 is to reduce the risk of imminent extinction by increasing plant numbers in the populations of all three species and establishing the Crimson Spider Orchid in cultivation.

In the longer term the overall objective is to achieve viable populations of all three species in the wild as a basis for downlisting them from endangered to vulnerable under the TSC Act.

### **Specific Objective 1: To determine the extent and severity of threatening processes, and eliminate or minimise the impact as necessary.**

*Action 1.1: Ensure that road and track maintenance does not impact on the existing population of the Crimson Spider Orchid.*

Albury City Council, Rural Fire Services and DIPNR carry out road and track maintenance in the Nail Can Hill Crown Reserve. Their cooperation in avoiding direct or indirect disturbance to the orchid in carrying out such works will be obtained. Information will also be provided to these authorities on the general areas in which the species occurs and the potential for harm that can result from maintenance work. This may include the provision of signs at the entrances to the Reserve advising on the presence of significant flora if it is deemed necessary.

*Action 1.2: Secure the agreement of the Albury City Bush Fire Risk Management Committee to exclude planned fire from the Crimson Spider Orchid population until a better understanding of the fire ecology of the species is obtained.*

There is no evidence available at the present time to suggest that the Crimson Spider Orchid would respond positively to low intensity hazard reduction burning. Until a better understanding is gained of the role of fire in the ecology of this species (see Action 6.3), it is considered that this type of burning should not be carried out in or near the area where the Crimson Spider Orchid occurs.

*Action 1.3: Carry out hand removal of *Briza* spp. and other weeds in the immediate vicinity of individuals of the Crimson Spider Orchid.*

Careful hand removal of *Briza* spp in the immediate vicinity of individuals of the Crimson Spider Orchid

at Albury has been carried out since 1999. This has been done within the overall guidelines of Bradley (undated). Specifically, *Briza* plants have been cut with secateurs at ground level avoiding any soil disturbance. This has been done annually prior to seed set and within a radius of 800mm around each orchid.

The continuation of this work in future years will be required and may be expanded to enlarge the area in which colonisation can take place once seed is produced as a result of the hand cross pollination work being undertaken (see Recovery Action 3.1). Such work will continue to be undertaken by a suitably qualified and experienced person.

*Action 1.4: Removal of pines that occur at the site of the population of the Burrinjuck Spider Orchid within Burrinjuck Waters State Park.*

Removal of mature pines has occurred, however, follow up work will be needed for a number of years to control new seedlings resulting from soil seed and colonisation from surrounding areas.

*Performance Criterion 1: Cooperation of authorities in avoiding impacts on the Crimson Spider Orchid in the Nail Can Hill Crown Reserve secured within one year. Exotic species with the potential to harm *Caladenia* spp. removed at least every two years.*

### **Specific Objective 2: Collect additional information on the occurrence of the three orchids and regularly monitor all populations to detect population trends, anticipate potential threats and facilitate early management intervention.**

*Action 2.1: Carry out detailed survey of the physical environment and associated plant species where the three species currently occur.*

Data on the attributes of the physical environment and other plant species need to be collected in order to increase our ability to identify other areas of potential habitat for the species. The NPWS will also liaise with authorities in Victoria to obtain this information from the sites at Stanley and Chiltern.

*Action 2.2: Survey for additional populations of the Crimson Spider Orchid will be carried out in areas in which it could potentially occur.*

There are extensive areas in the vicinity of the known Albury population where the species could possibly also be found. In addition to these areas other potential sites have been identified in the Tabletop Mountain/Yambla Range area. Survey has already commenced in these areas (see Recovery Actions completed) but further work is a priority because of the critically small size of the population of this species in New South Wales.

*Action 2.3: Survey for additional populations of the Bethungra Spider Orchid.*

The private property where the Bethungra Spider Orchid is found is extensive and a complete detailed survey needs to be carried out. There are also large areas of crown land and private property adjacent to the known site where the species could potentially occur.

*Action 2.4: Survey for additional populations of the Burrinjuck Spider Orchid.*

Two separate populations of the Burrinjuck Spider Orchid are known from Burrinjuck Waters State Park and Burrinjuck Nature Reserve. These reserves and adjacent private property in the vicinity of them could support other populations. Surveys of these areas commenced in 1999 and will be continued as a priority in 2003 due to the recent burning of large areas of suitable habitat.

*Action 2.5: Design and implement a detailed monitoring program for all three Spider Orchid species.*

A program of monitoring will be designed and implemented for known populations of the species in order to follow any trends in health and numbers and also to assess the effectiveness of recovery actions undertaken.

All individuals in known populations of the three species will be permanently marked using well established techniques (Coates and Lunt, 2001; Environment ACT, pers. comm). Data to be collected for each individual annually will include: appearance/non-appearance, leaf emergence, flowering, herbivory and seed set. The observed demographic patterns will be related to climatic variables and other habitat information such as increased cover of associated species with the intention of understanding under what conditions the highest shift to a flowering state is achieved. This

monitoring is ongoing for the Crimson Spider Orchid and will commence in 2003 for the other two species. In the case of the Burrinjuck Spider Orchid, this will be integrated with Action 6.3.

*Performance Criterion 2: Detailed descriptions of the sites in which all three species occur completed by 2004. Survey of potential habitat for all three species completed by 2007. A monitoring program designed and implemented within three years of commencement of the Recovery Plan.*

### **Specific Objective 3: Increase the population of Crimson Spider Orchids.**

*Action 3.1: Hand cross-pollinate selected individuals in the Albury population of the Crimson Spider Orchid*

It appears that little or no pollination is taking place at the Albury site due to either the small numbers in the population or the absence of the pollinator. Hand cross-pollination should be carried out by suitably qualified individual (to be determined by the Recovery Team) at the appropriate time. Records will be kept of the crosses made in an attempt to promote natural recruitment in the population. Seed capsule diameter will be monitored as an indication of depletion of plant resources and will guide decisions about frequency of hand pollination. This work was commenced in 2000. Apart from the small percentage of seed collected for *ex situ* propagation (see Action 5.1) the seed produced from hand cross-pollination will be distributed in close proximity to the parent plants.

*Action 3.2: Progressively implement and evaluate a program of carefully controlled in-situ management techniques designed to promote recruitment of the Crimson Spider Orchid.*

In-situ management techniques have already been developed and applied to *Caladenia amoena* (Beardsell, unpubl. data) and *Caladenia hastata* (Govanstone, Hill and Pritchard, 2001 and Hill and Pritchard, 2002) and proven to be highly successful. These include simple horticultural practices such as: removal of weeds, hand pollination, mulching, supplementary watering, seed harvest and dispersal and caging. Several of these practices have already been trialled in a careful and controlled way for the Crimson Spider Orchid (see Actions 1.3 and 3.1). The other techniques will be trialled initially on one or two plants in the Albury population (closely following the approach proven in Victoria) and

carefully evaluated by the Recovery Team before being extended to other individuals in the population.

*Performance Criterion 3: Increased numbers from natural recruitment achieved through hand cross-pollination and in-situ management techniques by 2007.*

**Specific Objective 4: Describe the two new species of *Caladenia* occurring at Bethungra and Burrinjuck and nominate them for listing under the TSC Act.**

*Action 4.1: Complete and publish scientific descriptions of the two new species.*

It would appear on the basis of preliminary evidence that both the Bethungra Spider Orchid and the Burrinjuck Spider Orchid are separate and distinct species from the Crimson Spider Orchid at Albury. Descriptions of these two new species need to be published in the scientific literature so that listing under the TSC Act can proceed.

*Action 4.2: Nominate the two new species of *Caladenia* for listing in the Schedules of the TSC Act.*

Although further survey work needs to be done (see Recovery Actions 2.3 and 2.4) on *Caladenia* sp. (Bethungra, D. L. Jones 15743) and the Burrinjuck Spider Orchid *Caladenia* sp. (Burrinjuck, D. J. Mallinson, 409), it is likely that nomination for listing as Endangered under the TSC Act would be appropriate.

*Performance Criterion 4: Descriptions of the two new species published and listing under the TSC Act achieved by 2005.*

**Specific Objective 5: Establish the Crimson Spider Orchid and Bethungra Spider Orchid in cultivation.**

*Action 5.1: Collect a small percentage of seed from the Albury and Bethungra populations for ex situ propagation.*

Following successful hand cross pollination in 2000 and 2001, a small amount of seed was collected from two Crimson Spider Orchid individuals. A small quantity of seed resulting from natural pollination was also collected from the Bethungra Spider Orchid. This is an essential first step in *ex situ* propagation of both species. This seed has been sent to Kings Park and the

Botanic Gardens in Perth, Western Australia. It may necessary to collect further seed as year to year production permits.

*Action 5.2: Establish and grow the species in cultivation.*

This Action follows on from Action 5.1. It is important to establish the Crimson Spider Orchid and the closely related Bethungra Spider Orchid in cultivation as insurance against catastrophic loss in the wild and to make possible re-introduction at a suitable site should this be considered desirable at some future time. Any such planned re-introduction or translocation will follow the ANPC Guidelines (ANPC, 1998) or any NPWS guidelines which may be current at that time. Kings Park and the Botanic Gardens in Perth Western Australia are currently working on the *ex situ* propagation of both the Bethungra and Crimson Spider Orchids. The Recovery Team will determine the most appropriate use of any seed produced from *ex situ* propagation when it becomes available. Cultivation of the Burrinjuck Spider Orchid will be considered should the above prove successful.

*Performance Criterion 5: Crimson Spider Orchid and Bethungra Spider Orchid successfully established and grown in cultivation by 2005.*

**Specific Objective 6: Investigate the biology and ecology of the three Spider Orchid species to obtain the detailed knowledge necessary to make informed and effective management decisions.**

*Action 6.1: Develop a model of habitat for the Crimson Spider Orchid.*

Use the results of further survey work (Action 2.2) and the detailed descriptions of the known sites including associated species and physical attributes (Action 2.1) to develop a model of habitat for Crimson Spider Orchid. This model will be used to guide further survey work or identify sites for possible translocation at some future time (see Recovery Action 5.2).

*Action 6.2: Carry out AFLP analyses of all individuals in the Albury population of the Crimson Spider Orchid as well as all individuals in the two Victorian populations at Chiltern and Stanley.*

AFLP analyses can be performed on leaf tip material and, hence, without harming any individuals of these populations. The analyses will provide information on the genetic heterogeneity of all three of the populations and on the extent to which the populations differ from one another. The results will give an indication of whether there are any genetically based limitations to the ability of the populations to maintain and increase themselves and also whether any exchange of genetic material between the populations might be advantageous.

*Action 6.3: Initiate a study of the effect of fire in promoting recruitment in the population of the Burrinjuck Spider Orchid.*

Both subpopulations of the Burrinjuck Spider Orchid burned at varying levels of intensity in the fires occurring in the Burrinjuck Nature Reserve and Burrinjuck Waters State Park. This provides an opportunity to evaluate the effect of fire on this species which has shown signs of decline since first discovered in 1992. Survey work will be carried out in the Spring of 2003 and all plants found will be permanently tagged and a data collection protocol identical to that specified in Action 2.5 will be followed. Monitoring will continue on an annual basis with new individuals also being permanently tagged as they appear.

Further information on the response of the Crimson Spider Orchid to fire may be obtained from monitoring a small area at Nail Can Hill where three individuals in the population were burned by an arson lit fire in April, 2001. The need for increased understanding of the response of the Crimson Spider Orchid to fire is also recognised by Department of Natural Resources and Environment staff in Victoria (Glen Johnson, pers. comm.) and an area at Chiltern that burned in wildfires in the Summer of 2002 is being monitored.

*Performance Criterion 6: A workable model for predicting suitable habitat for the Crimson Spider Orchid is developed by 2004. Allozyme analyses completed and fire research commenced by 2005*

**Specific Objective 7: Provide for the long term conservation and management of the population of Crimson Spider Orchid and the Burrinjuck Spider Orchid.**

*Action 7.1: Develop an appropriate arrangement to ensure the long term conservation and management of the*

*Crimson Spider Orchid population and its habitat.*

Currently there are three land managers that have some involvement in the conservation management of the Crimson Spider Orchid at the Nail Can Hill Crown Land Reserve. However, at this stage there is no formal management agreement in place. It is proposed that a conservation management regime is formalised within the life of this plan. This could be achieved via a Joint Management Agreement under the TSC Act between NPWS, DIPNR and AlburyCity and/or the creation of a Trust under DIPNR involving NPWS, AlburyCity and Albury Wodonga Parklands. The latter option would necessitate the preparation of a management plan to guide the future management of the Reserve.

*Action 7.2: Develop an appropriate arrangement to ensure the long term conservation and management of the Burrinjuck Spider Orchid population and its habitat.*

Similarly, whilst interim agreement has been reached on the management of the Burrinjuck Spider Orchid in Burrinjuck Waters State Park, this has not been formalised. Once the species has been described and listed under the TSC Act, a conservation management regime will be initially formalised by a Memorandum of Understanding between the DIPNR and NPWS. This can then form the basis of a Joint Management Agreement under the TSC Act.

*Performance Criterion 7: Formal arrangements in place ensuring the long term conservation and management of the Crimson Spider Orchid and the Burrinjuck Spider Orchid by 2005.*

**Specific Objective 8: Inform and involve the community in the conservation of the Crimson Spider Orchid, the Bethungra Spider Orchid and the Burrinjuck Spider Orchid.**

*Action 8.1: Inform the local community about the value of the three Spider Orchid species and the bushland in which they occur.*

Educational material such as posters or brochures will be prepared and made available to the local and wider community in order to make the public aware of the value of the species and to enlist support for the recovery efforts being undertaken. In order to ensure the continued protection of the species, specific site information will remain confidential at all times.

*Performance Criterion 8: Educational material prepared and distributed to the local and wider community and support for recovery efforts enlisted by 2004.*

## 7 Implementation

Table 1 outlines the implementation of recovery actions specified in this plan for the period of five years from publication.

## 8 Social and Economic Consequences

The main social/economic benefit of conserving the three species of spider orchids and associated species and habitat is in meeting the desire of many in the community that the further loss of threatened species and the ecological communities in which they occur should be prevented. Preserving these species in their natural environments will provide an educational and recreational resource for the benefit and enjoyment of future generations.

The potential social and economic costs of the implementation of this plan will be very limited as the lands upon which these species occurs are already within reserves or, in the case of the Bethungra Spider Orchid, subject to a Registered Property Agreement.

## 9 Roles and Interests of Indigenous People

The Local Land Councils, Elders and other groups representing indigenous people in the areas where the Crimson Spider Orchids occur have been identified and a copy of the draft Recovery Plan sent to them. It is also the intention of the Recovery Team to consider the roles and interests of these indigenous communities in the implementation of the recovery actions identified in this plan.

## 10 Biodiversity Benefits

The Crimson Spider Orchid and the related Bethungra and Burrinjuck Spider Orchids are spectacular representatives of the genus and have the potential to raise awareness in the general community of the plight of threatened plant species. This increased awareness will in turn lead to greater opportunities for the conservation of the habitat in which these and other threatened species occur. The habitat associated with the Crimson Spider Orchid, the Nail Can Hill Crown Reserve, supports over 191 native plant species including at least 45 other orchid species. Regent Honeyeaters and Turquoise Parrots are also known from the Nail Can Hill Crown Reserve

and other threatened or rare fauna may be represented here.

The habitats associated with the Bethungra and Burrinjuck Spider Orchids are less well documented but they also support a diverse flora including a variety of other orchid species. In the case of the Bethungra Spider Orchid, these associated species are being conserved through a Property Management Agreement with the Department of Infrastructure, Planning and Natural Resources. The Burrinjuck Spider Orchid, at least so far as its distribution is currently known, is already conserved within the Burrinjuck Waters State Park and Burrinjuck Nature Reserve.

## 11 Preparation Details

This Recovery Plan was prepared by Stephen Clark, Senior Threatened Species Officer, and edited by Michael Saxon, Manager Threatened Species Unit, both of the Southern Directorate of NPWS.

It has been formulated with the advice and assistance of a Recovery Team. The Recovery Team is a non-statutory group of expert biologists, landowners/managers and other stakeholders and has been established by the NSW NPWS to discuss and resolve issues relating to the conservation and management of the species.

## 12 Review Date

This Recovery Plan will be reviewed and updated 5 years from the date of publication.

## 13 References

- Australian Network for Plant Conservation (ANPC). (1998). *Guidelines for the Translocation or Threatened Plants in Australia*. ANPC Canberra.
- Backhouse, G., Beardsell, C., Tonkinson, D. & French, G. (1998). *Recovery Plan for the Charming Spider Orchid* (*Caladenia amoena*). Department of Natural Resources and Environment. Victoria.
- Bower, C. C. (1996). Demonstration of pollinator-mediated reproductive isolation in sexually deceptive species of *Chiloglottis* (Orchidaceae: Caladeniinae). *Australian Journal of Botany* 44:15-33.
- Bradley, J. (undated). *Bush Regeneration*. Mosman Parklands and Ashton Park Association. Sydney.

- Briggs, J.D. & Leigh, J.H. (1996). *Rare or Threatened Australian Plants: 1995 Revised Edition*, pp. 466. CSIRO Publishing: Melbourne.
- Coates, F. & Lunt, I. (2001). Patterns of appearance and transition to flowering in *Prasophyllum correctum* D. L. Jones, a threatened orchid from south eastern Australia. 1<sup>st</sup> International Orchid Conservation Congress, Perth, Western Australia.
- Fitzgerald, (1882). *Caladenia concolor*. *Austral. Orch. 1*(7): tab. 8
- Govanstone, A., Hill, J. & Pritchard, A. (2001). Melblom's Spider Orchid *Caladenia hastata* - Managing the *in situ* recovery of a Critically Endangered Spider Orchid. 1<sup>st</sup> International Orchid Conservation Congress, Perth, Western Australia.
- Harden, G (Ed.). 1993. *Flora of New South Wales*. Vol 4. University of NSW Press.
- Hill, J. & Pritchard, A. (2002). *Caladenia hastata*: Continuing Improvement. Mutual Gains Co-operative Orchid Conservation in South-eastern Australia Symposium, Melbourne, Victoria.
- Jones, D. L. (1988). *Native Orchids of Australia*. Reed. Sydney.

**Table 1:** Estimated costs, funding source and responsible parties for implementing the actions identified in the Crimson Spider Orchid Recovery Plan.

Action No.	Action Description	*Priority	Responsible Party	Fund source	Cost Estimate (\$'s/year)					Total (\$'s)
					2003	2004	2005	2006	2007	
1.1	Ensure that road and track maintenance does not impact on the existing population of Crimson Spider Orchid	1	NPWS	In Kind	\$350		\$350		\$350	\$1050
1.2	Secure agreement of the AlburyCity Bush Fire Risk Management Committee to exclude planned fire from the Crimson Spider Orchid population	1	NPWS	In Kind	\$700					\$700
1.3	Carry out hand removal of <i>Briza</i> spp. And other weeds in the vicinity of the existing population of Crimson Spider Orchid	1	AlburyCity	In Kind	\$600	\$600	\$600	\$600	\$600	\$3000
1.4	Remove pines occurring at the site of the population of Burrinjuck Spider Orchid	1	NPWS	In Kind	\$350	\$350	\$350	\$350	\$350	\$1750
2.1	Carry out detailed survey of the physical and biological environment where the three species currently occur	2	NPWS	In Kind	\$700	\$350	\$350			\$1400
2.2	Carry out additional survey for populations of Crimson Spider Orchid	2	NPWS	In Kind	\$350	\$350	\$350	\$350	\$350	\$1750
			DIPNR	In Kind	\$600	\$600	\$600	\$600	\$600	\$3000
			AlburyCity	In Kind	\$1500	\$1500	\$1500	\$1500	\$1500	\$7500
2.3	Survey for additional populations of Bethungra Spider Orchid	2	NPWS	In Kind		\$700				\$700
				Cash		\$3000				\$3000
2.4	Survey for additional populations of Burrinjuck Spider Orchid	2	NPWS	Cash	\$2100					\$2100
2.5	Design and implement a detailed monitoring program for all three Spider Orchid species	2	NPWS	Cash	\$1200	\$1200	1200	\$1200	\$1200	\$6000
			AlburyCity	In Kind	\$1200	\$1200	\$1200	\$1200	\$1200	\$6000
3.1	Hand cross-pollinate selected individuals of the Crimson Spider Orchid	1	AlburyCity	In Kind	\$300	\$300	\$300	\$300	\$300	\$1500
3.2	Implement and evaluate a program of carefully controlled <i>in situ</i> management techniques to promote recruitment of the Crimson Spider Orchid	1	AlburyCity	In Kind	\$500	\$500	\$500	\$500	\$500	\$2500
4.1	Complete and publish scientific descriptions of the two new species	2	Centre for Plant Biodiversity Research/NPWS	In Kind			\$900	\$900		\$1800
4.2	Nominate the two new species of spider orchid for listing under the TSC Act	2	NPWS	In Kind					\$350	\$350
5.1	Collect a small percentage of seed from the Albury population for propagation	2	AlburyCity	In Kind		\$300				\$300
5.2	Establish and grow Crimson and Bethungra Spider Orchids in cultivation	2	NPWS	Cash		\$2500				\$2500
6.1	Develop a habitat model for Crimson Spider Orchid	3	NPWS	In Kind		\$700				\$700
6.2	Carry out AFLP analyses of all individuals of the Crimson Spider Orchid at Albury and at Chiltern and Stanley in Victoria	2	CSIRO Plant Industry	In Kind		\$2500	\$2500	\$2500	\$2500	\$10000
6.3	Initiate a study of the effect of fire in promoting recruitment in the population of the Burrinjuck Spider Orchid	2	NPWS	Cash	\$1200	\$1200	\$1200	\$1200	\$1200	\$6000
7.1	Develop an appropriate arrangement for the long term conservation and management of Crimson Spider Orchid	1	NPWS	In Kind				\$1750		\$1750
			DIPNR	In Kind			\$600		\$600	
			AlburyCity	In Kind			\$600		\$600	
7.2	Develop an appropriate arrangement for the long term conservation and management of Burrinjuck Spider Orchid	1	NPWS	In Kind				\$1750		\$1750
			DIPNR	In Kind			\$600		\$600	

**Approved Recovery Plan**

**The Crimson Spider Orchids**

8.1	Inform the local community about the value of Crimson Spider Orchid and its habitat	3	NPWS NPWS DIPNR AlburyCity	In Kind Cash In Kind In Kind	\$300 \$1000 \$300 \$600	\$300 \$300 \$300 \$600	\$300 \$300 \$300 \$600	\$300 \$300 \$300 \$600	\$300 \$300 \$300 \$600	\$1500 \$1000 \$1500 \$3000
<b>Total</b>				<b>Cash</b>	<b>\$5500</b>	<b>\$7900</b>	<b>\$2400</b>	<b>\$2400</b>	<b>\$2400</b>	<b>\$20,600</b>
<b>Total</b>				<b>In Kind</b>	<b>\$8350</b>	<b>\$11150</b>	<b>\$10700</b>	<b>\$15300</b>	<b>\$9800</b>	<b>\$55,300</b>
<b>Total</b>	<b>Annual cost</b>			<b>Cash + In Kind</b>	<b>\$13850</b>	<b>\$19050</b>	<b>\$13100</b>	<b>\$17700</b>	<b>\$12200</b>	<b>\$79900</b>

\*Priority ratings are as defined by Commonwealth Recovery Plan Guidelines: 1 - Action critical to prevent extinction; 2 - Action prevents negative impact short of extinction; 3 - All other actions.



Appendix 1. Summary of Scientific Committee Advice and Amendments Made to Crimson Spider Orchid Recovery Plan

Scientific Committee Advice	Amendments Made to Recovery Plan/ Reasons for Departure from Advice
The Plan needs to define the conservation problems associated with the orchids more clearly, identify the information needs and a clear rationale for the recovery approach.	The approach, now more clearly articulated in the Plan, is as follows: The overall objective is to reduce the risk of imminent extinction by increasing plant numbers in the populations of all three species. Actions in the Recovery Plan directed to this end are Actions 1.1-1.4 (control threatening processes); Actions 2.1-2.5 (survey and monitoring); Actions 3.1 & 3.2 (directly promote recruitment) and Actions 2.5 & 6.1-6.3 (carry out research to improve management decisions. There are also additional actions supporting the above: 4.1 & 4.2, 5.1 & 5.2, 7.1 & 7.2 and 8.1.
The Plan needs to lucidly summarise existing knowledge on each of the three species, especially the Crimson Spider Orchid.	Two new subsections have been added to section 3.4 Ecology. These are: Population Size and Structure and Disturbance Regimes. The first summarises information on the populations of all three species with particular emphasis on the Crimson Spider Orchid. The second provides detail on potential detrimental effects of planned hazard reduction fire which is the basis for excluding planned fire for the present from areas where the three species occur (Action 1.2). The lack of actual data on fire effects is also acknowledged and this is the basis for research Action 6.3.
It is questioned whether there can be a Recovery Plan for non-listed species under the TSC Act	The populations at Bethungra and Burrinjuck are currently considered to be part of <i>Caladenia concolor</i> and will continue to be until described as new species. Once they are described they will be nominated for listing under the TSC Act.
It is suggested that it might be appropriate to approach the Commonwealth to change the listing for <i>Caladenia concolor</i> to Endangered.	A Recovery Plan for a group of threatened orchid species in Victoria (including <i>C. concolor</i> ) is currently being finalised. As a part of the implementation of this Plan it is intended to propose a change to the Commonwealth listing.
Consideration should be given to describing the locality of the known population of the Crimson Spider Orchid in less specific terms to maintain the security of the site from unscrupulous collectors.	NPWS considers that the description of the location of the known population is not specific enough to be easily found for illegal collection purposes. If the description of the location were less detailed, the Plan would not provide enough detail to land managers for the protection requirements of the species.
Further information on seed set for the three species is requested.	Information on seed set (where available) is now included in Section 3.4 Ecology (subsection Population Size and Structure) and Section 3.6 Ability of the species to recover.
Further information on artificial pollinations is requested.	Table 1 is now included in Section 3.4 Ecology (subsection Population Size and Structure. Information on cross-pollinations and seed collections carried out appears here.
Some appraisal needs to be made of genetically based limitations to population dynamics.	A new action has been included under Objective 6 – Action 6.2: Carry out allozyme analyses of all individuals in the Albury population as well as the two Victorian populations of Crimson Spider Orchid. The results of these analyses will give some indication of genetically based limitations to the ability of the populations to maintain and increase themselves.
A graphical summary and appraisal of census data should be presented in the Plan.	Table 1 in Section 3.4 summarises census data for the Albury population including emergence, leaf, flower, stem and pod formation since 1995. Table 2 presents annual counts for the Bethungra population and counts for the Burrinjuck population in 1993, 1995 and 1998 appear in the text of Section 3.4.
The Plan needs to state explicitly the aims and biological basis for actions related to fire management.	Action 1.2 now reads: ‘Secure the agreement of the AlburyCity Bush Fire Risk Management Committee to exclude planned fire from the Crimson Spider Orchid population until a better understanding of the fire ecology of the species is obtained.’

	There is no information presently available to suggest that the Crimson Spider Orchid would respond positively to low intensity hazard reduction burning. Section 3.4 summarises potential detrimental effects of such burning and acknowledges the need for research to increase our understanding of the response of this species to fire. This research is proposed in Action 6.3.
Some reference to weed control strategies that minimise the harm to <i>Caladenia</i> is needed.	Careful hand removal of <i>Briza</i> spp. in the immediate vicinity of individuals of the Crimson Spider Orchid at Albury has been carried out since 1999. <i>Briza</i> plants have been cut off at ground level with secateurs avoiding any soil disturbance. These procedures, widely accepted and followed in other areas where weeds are found in association with threatened orchid species, are summarised below Action 1.3.
Some details of the monitoring approach need to be described including basic parameters and a reference provided.	Action 2.5 has been amended to include details of the basic parameters of the sampling to be carried out and reference is made to similar methodologies employed by Environment ACT for <i>Prasophyllum petilum</i> and NRE in Victoria for <i>P. correctum</i> .
The pros and cons of hand pollination require explicit evaluation in the Plan and evidence for the conclusion that natural pollination is not operating at Albury presented.	Section 3.6 has been expanded to include information on the frequency of naturally occurring pollination and the procedures being followed to ensure that the risks associated with hand pollination are being properly managed. Only two natural pollination events have been observed since 1995. In carrying out hand pollinations (3 plants in 2000 and 3 in 2001) the Recovery Team follows a protocol developed for native orchid conservation in South Australia (Bickerton, 2001). These hand pollinations made possible the collection of seed for <i>ex situ</i> propagation work (Action 5.2)
Action 5.2 needs to refer to and follow ANPC and any NPWS guidelines for translocation/re-introduction.	The paragraph following Action 5.2 has been amended by the addition of: 'Any such planned re-introduction or translocation will follow the ANPC Guidelines (ANPC, 1998) or any NPWS guidelines which may be current at the time.'
Research actions must be identified to begin to answer the most pressing biological questions	Three areas for research have been identified as having a high priority for increasing our understanding of the biology of the Crimson Spider Orchid and informing future management decisions. These are articulated in Action 6.2 (Carry out allozyme analyses of all individuals of the Crimson Spider Orchid at Albury and at Chiltern and Stanley in Victoria; Action 6.3 (Initiate a study of the effect of fire in promoting recruitment in the Burrinjuck population) and Action 2.5 (Carry out research on the demography and population dynamics of all three populations of Crimson Spider Orchids). Budgets are provided for these actions in Table 1.
Security of the site needs priority in any interpretive material produced. What kind of support is sought from the public in Action 8.1	No specific details will be given in any interpretive material produced. The Recovery Team has received support in the past in the form of participation in survey work. This type of support will continue to be encouraged. There may also, in the longer term, be less tangible support in terms of general community appreciation of the significance of such species and their long term conservation.



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