INTERIM RECOVERY PLAN NO. 175

CARBUNUP KING SPIDER ORCHID (*CALADENIA PROCERA*)

INTERIM RECOVERY PLAN

2004-2009

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Photograph: Andrew Brown

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FOREWORD

Interim Recovery Plans (IRPs) are developed within the framework laid down in Department of Conservation and Land Management (CALM) Policy Statements Nos. 44 and 50.

IRPs outline the recovery actions that are required to urgently address those threatening processes most affecting the ongoing survival of threatened taxa or ecological communities, and begin the recovery process.

CALM is committed to ensuring that Critically Endangered taxa are conserved through the preparation and implementation of Recovery Plans or Interim Recovery Plans and by ensuring that conservation action commences as soon as possible and always within one year of endorsement of that rank by the Minister.

This Interim Recovery Plan will operate from July 2004 to June 2009 but will remain in force until withdrawn or replaced. It is intended that, if the taxon is still ranked Critically Endangered, this IRP will be reviewed after five years.

This IRP was given regional approval on 16 July 2004 and was approved by the Director of Nature Conservation on 22 July 2004. The allocation of staff time and provision of funds identified in this Interim Recovery Plan is dependent on budgetary and other constraints affecting CALM, as well as the need to address other priorities.

Information in this IRP was accurate at July 2004.

ACKNOWLEDGMENTS

The following people have provided assistance and advice in the preparation of this Interim Recovery Plan:

Leonie Monks	Research Scientist, CALM's W.A. Herbarium
Dr Andrew Batty	Research Scientist, BGPA

Thanks also to the staff of the W.A. Herbarium for providing access to Herbarium databases and specimen information, and CALM's Wildlife Branch for assistance.

SUMMARY

Scientific Name:	*Caladenia procera*	**Common Name:**	Carbunup King Spider Orchid
Family:	Orchidaceae	**Flowering Period:**	September – October
CALM Region:	South West	**CALM District:**	Blackwood
Shire:	Busselton	**Recovery Team:**	South West Region Threatened Flora Recovery Team

Illustrations and/or further information: Hopper, S.D. and Brown, A.P. (2001) Contributions to Western Australian Orchidology: 2. New taxa and circumscriptions in *Caladenia* (Spider, Fairy and Dragon orchids of Western Australia). *Nuytsia* 14(1/2), 27-308.

Current status: *Caladenia procera* was declared as Rare Flora in April 2002. It currently meets World Conservation Union (IUCN 2000) Red List Category Critically Endangered (CR) under criteria C1 as there is a total of less than 250 plants, with continuing decline in the number of adult plants and available habitat. The main threats are land clearing, road and firebreak maintenance, weed invasion, inappropriate fire regimes and grazing.

Critical habitat: The critical habitat for *Caladenia procera* comprises the area of occupancy of the known populations; similar habitat within 200 metres of known populations; corridors of remnant vegetation that link populations and additional nearby occurrences of similar habitat that do not currently contain the species but may have done so and may be suitable for translocations.

Habitat critical to the survival of the species, and important populations: Given that this species is listed as Critically Endangered it is considered that all known habitat for wild and translocated populations is critical to its survival and that all populations, including any based on translocation, are important.

Benefits to other species/ecological communities: The critically endangered *Caladenia busselliana* and *C. viridescens* occur in the habitat of Population 1 of *Caladenia procera*. In addition, the habitat at this site is a threatened ecological community '*Eucalyptus calophylla* woodlands on heavy soils of the southern Swan Coastal Plain'. This community is listed as Vulnerable in Western Australia. Recovery actions implemented to improve the quality or security of the habitat of the species, such as weed control and rehabilitation, will be of benefit to the other threatened species and the threatened ecological community that occur with *C. procera*.

International Obligations: This plan is fully consistent with the aims and recommendations of the Convention on Biological Diversity, ratified by Australia in June 1993, and will assist in implementing Australia's responsibilities under that convention. The taxon is not listed under any specific international treaty, however, and therefore this IRP does not affect Australia's obligations under any other international agreements.

Role and interests of indigenous people: According to the Department of Indigenous Affairs Aboriginal Heritage Sites Register, no sites have been discovered near the *Caladenia procera* population. Input and involvement will be sought from any indigenous groups that have an active interest in the areas that are habitat for *C. procera*, and this is discussed in the recovery actions.

Social and economic impacts: It is possible that there will be some economic impacts associated with the implementation of this plan. There are development proposals for private land that contains populations of *Caladenia procera*. Other populations occur on Shire managed reserves. Recovery actions refer to continued negotiations between stakeholders with regard these areas.

Evaluation of the Plan's Performance: The Department of Conservation and Land Management, in conjunction with the Recovery Team will evaluate the performance of this IRP. In addition to annual reporting on progress with listed actions and comparison against the criteria for success and failure, the plan is to be reviewed within five years of its implementation.

Habitat requirements: *Caladenia procera* is currently known from a linear range of less than 15 km in an area south west of Busselton, where it grows in Jarrah, Marri and Peppermint woodland on alluvial sandy-clay loam flats with *Anigozanthos manglesii* (Hopper and Brown 2001).

Existing Recovery Actions: The following recovery actions have been or are currently being implemented:

1. Land managers have been made aware of the location and threatened status of the species.
2. Negotiations have taken place between CALM and land manager to reserve most of the plants at Population 2.
3. Negotiations are ongoing regarding the future land use in the habitat of Population 4.
4. Seed, and the associated mycorrhizal fungus, has been collected and is stored at the Botanic Garden and Parks Authority (BGPA).

5. Staff from CALM's Blackwood District regularly monitor populations of the species.
6. The South West Region Threatened Flora Recovery Team is overseeing the implementation of this IRP and will include information on progress in an annual report to CALM's Corporate Executive and funding bodies.

IRP Objective: The objective of this Interim Recovery Plan is to abate identified threats and maintain or enhance *in situ* populations to ensure the long-term preservation of the species in the wild.

Recovery criteria

Criteria for success: The number of individuals within populations and/or the number of populations have increased by ten percent or more over the period of the plan's adoption under the EPBC Act.

Criteria for failure: The number of individuals within populations and/or the number of populations have decreased by ten percent or more over the period of the plan's adoption under the EPBC Act.

Recovery actions

1. Coordinate recovery actions
2. Seek long-term protection of habitat
3. Conduct further surveys
4. Collect seed and fungal material
5. Undertake translocation
6. Develop and implement a fire management strategy
7. Monitor populations
8. Liaise with land managers
9. Obtain biological and ecological information
10. Promote awareness
11. Undertake weed control as necessary
12. Rehabilitate habitat, as necessary
13 Review the need for a full Recovery Plan

1. BACKGROUND

History

E. Coleman made the first collection of *Caladenia procera* from the Busselton area in 1929. Unfortunately, there was not enough detail to relocate this population. However, four populations have now been recorded, and these contain a total of approximately 220 plants. This species was at one time considered to be a subspecies of *Caladenia pectinata*, but is now formally described as a separate species (Hopper and Brown 2001).

Caladenia procera is found in a sandy habitat in an area that has been extensively cleared for agriculture. A proportion of the remaining habitat is now subject to development for residential and associated purposes.

Description

Caladenia procera is a perennial herb that dies back to a dormant tuber over the hot summer months. It grows to 70 cm tall, and has a single pale green leaf that is 10-30 cm long and 6-10 mm wide. The stiffly-held petals and sepals of the flowers are greenish lemon yellow with lines and spots of dull maroon to pink. The labellum is also greenish yellow with pale pink to fawn radiating stripes, ending in a dark maroon recurved tip (Hopper and Brown 2001).

Caladenia procera is closely related to *C. pectinata* and *C. decora*, differing from both in its consistently greenish yellow sepals, petals and basal labellum lamina, and its somewhat taller scapes. *C. procera* also differs from *C. decora* in its consistently ascending petals lacking an osmophore (a scent producing gland), and its broader more acute column wings. It has a taller broader column and somewhat longer labellum than *C. pectinata*. *C. procera* hybridizes with *C. attingens* (Hopper and Brown 2001).

Distribution and habitat

Caladenia procera is currently known from a linear range of less than 15 km to the south-west of Busselton, where it grows in Jarrah, Marri and Peppermint woodland on alluvial sandy-clay loam flats with *Anigozanthos manglesii* (Hopper and Brown 2001).

Critical habitat

Critical habitat is habitat identified as being critical to the survival of a listed threatened species or listed threatened ecological community. Habitat is defined as the biophysical medium or media occupied (continuously, periodically or occasionally) by an organism or group of organisms or once occupied (continuously, periodically or occasionally) by an organism, or group of organisms, and into which organisms of that kind have the potential to be reintroduced. (*Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)).

The critical habitat for *C. procera* comprises:

- the area of occupancy of known populations;
- areas of similar habitat within 200 metres of known populations, i.e. Jarrah, Marri and Peppermint woodland on alluvial sandy-clay loam flats (these provide potential habitat for natural range extension);
- corridors of remnant vegetation that link populations (these are necessary to allow pollinators to move between populations and are usually road and rail verges);
- additional occurrences of similar habitat that do not currently contain the species but may have done so in the past (these represent possible translocation sites).

Habitat critical to the survival of the species, and important populations

Given that this species is listed as Critically Endangered it is considered that all known habitat for wild and translocated populations is critical to its survival and that all populations, including any based on translocation, are important.

Benefits to other species/ecological communities

The critically endangered *Caladenia busselliana* and *C. viridescens* occur in the habitat of Population 1 of *Caladenia procera*. In addition, the habitat at this site is the threatened ecological community '*Eucalyptus calophylla* woodlands on heavy soils of the southern Swan Coastal Plain'. This community is described in Gibson *et al*. (1994) and is listed as Vulnerable in Western Australia. Recovery actions implemented to improve the quality or security of the habitat of the species, such as weed control and rehabilitation, will be of benefit to the other threatened species and the threatened ecological community that occur with *Caladenia procera*.

International Obligations

This plan is fully consistent with the aims and recommendations of the Convention on Biological Diversity, ratified by Australia in June 1993, and will assist in implementing Australia's responsibilities under that convention. The taxon is not listed under any specific international treaty, however, and therefore this IRP does not affect Australia's obligations under any other international agreements.

Role and interests of indigenous people

According to the Department of Indigenous Affairs Aboriginal Heritage Sites Register, no sites have been discovered near the *Caladenia procera* populations. Input and involvement will be sought from any indigenous groups that have an active interest in the areas that are habitat for *C. procera*, and this is discussed in the recovery actions.

Social and economic impacts

It is possible that there will be some economic impacts associated with the implementation of this plan. There are development proposals for private land that contains populations of *Caladenia procera*. Other populations occur on Shire managed reserves. Recovery actions refer to continued negotiations between stakeholders with regard these areas.

Evaluation of the Plan's Performance

The Department of Conservation and Land Management, in conjunction with the Recovery Team will evaluate the performance of this IRP. In addition to annual reporting on progress with listed actions and comparison against the criteria for success and failure, the plan is to be reviewed within five years of its implementation.

Biology and ecology

Caladenia species such as *C. procera* typically have a growing phase from March through to late November. Early in the growing season the orchid remains below ground as a newly sprouted shoot from the dormant tuber. Following the break of the season a single leaf appears above ground and mycorrhizal (soil-inhabiting, apparently symbiotic) associations are active. As there are no roots in the genus Caladenia, the infection point for mycorrhizal associations is in the collar. During winter the replacement tuber, which is essential for survival until the following year, is initiated and continues to develop until late in the growing season. Not all plants in the population will produce flowers in any one year. Generally, for every plant in flower, a number of vegetative plants will be present. The proportion of flowering to non-flowering individuals is influenced by environmental conditions including the presence or absence of summer fire and the amount of rainfall received during winter and spring.

Thynid wasps pollinate this species. These wasps have a requirement for intact habitat as they utilise other plants species for food (A. Brown[1] personal communication).

Flowering individuals will produce a bud mid growing season that continues to grow until flowering. Plants flower for approximately two weeks or until pollination occurs, after which flowers collapse and if pollination was successful a seed capsule develops. The capsule swells as seed matures, and this can take from six to eight weeks to develop depending on climatic conditions. If temperatures are higher than average seeds may mature

[1] Andrew Brown: CALM Threatened Flora Coordinator

faster. Prior to seeds being released the green capsule turns yellow and then brown. Small slits develop in the capsule from which the seed is dispersed.

Seeds will remain dormant in the soil over summer until the break of the season the following year. Once wet, the seeds imbibe water and the seed coat splits. At this point infection by a suitable fungus is required for germination to occur, which will result in a protocorm and subsequent seedling. Not all of these seedlings will mature, as those that fail to produce a tuber will not survive dry summer conditions. If no fungus is present, seed remains dormant until the following summer, and those which are not predated are killed by dry summer conditions (Batty *et al.* 2000).

Orchid seedlings are very small for the first growing season and are difficult to locate. Leaves are typically less than 20 mm long and only a few mm wide. It appears that leaf and tuber size increase over the next 4 to 5 years until adult plants capable of flowering are present.

Threats

Caladenia procera was declared as Rare Flora in April 2002 and recommended for ranking as Critically Endangered (CR) in August 2001. It currently meets World Conservation Union (IUCN 2000) Red List Category 'CR' under criterion C1 as there are less than 250 plants, with continuing decline in the number of plants and the extent of habitat. The main threats are road and firebreak maintenance, land clearing, weed invasion, inappropriate fire regimes and grazing.

- **Road and firebreak maintenance** threatens all road reserve populations and most populations on private property. Threats include grading, chemical spraying, construction of drainage channels and the mowing of roadside vegetation. Several of these actions also encourage weed invasion.

- **Land clearing** for development is a threat to Populations 2 and 4.

- **Weed invasion** is a minor threat to all populations. Weeds suppress early plant growth by competing with the orchids and their associated vegetation for soil moisture, nutrients and light. They also exacerbate grazing pressure and increase the fire hazard due to the easy ignition of high fuel loads, which are produced annually by many grass weed species.

- **Inappropriate fire regimes** may affect the viability of populations. The undergrowth gets excessively dense and competitive if an area is too long unburnt. However, fire that occurs when the orchid has above-ground growth will prevent seed set and possibly kill the tuber through a lack of opportunity to build up starch reserves. Most orchid species emerge from the soil by mid April and dehisce their seed by late November. The optimum time for fire in orchid populations is therefore from December to March. The orchids become dormant at this time because climatic conditions are typically hot and dry. There are often difficulties associated with conducting controlled burns at this time because of the risks of fire becoming uncontrolled and risking lives and property. People conducting any approved controlled burn in orchid populations will need to be very aware of the timing of summer rainfall or other conditions that reduce those risks. In addition to the detrimental effects of inappropriate fire on the vegetative stages of the species, a proliferation of weeds often follows burning due to a temporary increase in the availability of nutrients (Panetta and Hopkins 1991).

- **Grazing** by rabbits, kangaroos or stock has impacted on all *Caladenia procera* populations, but Population 3b in particular. The high level of palatable weeds in and near the populations and adjacent farming properties attract herbivorous animals, which are often unselective in their grazing.

- **Recreational impacts** are a threat to Populations 2 and 4. The habitat of the plants is subject to recreational impacts including trampling by walkers and BMX riders.

Summary of population information and threats

Pop. No. & Location	Land Status	Year/No. plants	Condition	Threats
1a. NE of Blackwood	Shire Road Reserve	1986 43 2001 * 43 2002 *61	Moderate	Road maintenance, inappropriate fire, fire break maintenance, indiscriminate herbicide spraying
1b. NE of Blackwood	Shire Reserve for Parks and Recreation	1999 13 2000 4 2001 * 43 2002 *61	Healthy	Inappropriate fire, fire break maintenance, indiscriminate herbicide spraying
2. NE of Blackwood	Private Golf Course (Prop'd Cons Res)	2000 13 2001 48 2002 79	Healthy	Land clearing, firebreak maintenance, weed invasion, inappropriate fire
3a. NE of Blackwood	Shire Road Reserve	2000 2 2001 22 2002 25	Moderate	Road maintenance, weed invasion, inappropriate fire
3b. S of Blackwood	Private Property	2001 3	Moderate	Firebreak maintenance, grazing, weed invasion, inappropriate fire
4.	Private Property	2001 100+ 2002 107	Healthy	Land clearing, weed invasion, recreational impacts, inappropriate fire

* = total for both subpopulations combined.

Guide for decision-makers

Section 1 provides details of current and possible future threats. Any on-ground works (clearing, firebreaks, roadworks etc) in the immediate vicinity of *Caladenia procera* will require assessment. On-ground works should not be approved unless the proponents can demonstrate that they will not have an impact on the species, its habitat or potential habitat.

2. RECOVERY OBJECTIVE AND CRITERIA

Objectives

The objective of this Interim Recovery Plan is to abate identified threats and maintain or enhance *in situ* populations to ensure the long-term preservation of the species in the wild.

Criteria for success: The number of individuals within populations and/or the number of populations have increased by ten percent or more over the period of the plan's adoption under the EPBC Act.
Criteria for failure: The number of individuals within populations and/or the number of populations have decreased by ten percent or more over the period of the plan's adoption under the EPBC Act.

3. RECOVERY ACTIONS

Existing recovery actions

All landholders have been notified of the location and threatened status of the species. The notification details the Declared Rare status of *Caladenia procera* and the legal responsibility to protect it.

Declared Rare Flora (DRF) markers have been installed to mark the locations of all road reserve populations of the species to help prevent damage through road maintenance activities. Pegs have also been placed on internal firebreaks within the habitat of Population 2. These markers alert maintenance workers to the presence of the population and help to ensure that the habitat is not accidentally damaged.

Negotiations have taken place between staff of Blackwood District and the land manager/developer to create a Nature Reserve in part of the site of Population 2. Agreement has been reached that this reserve will be created when the current lease expires in approximately five years time. Until that time, the Blackwood District staff may undertake such management actions as necessary in that area.

Negotiations are also ongoing between staff of Blackwood District, other CALM staff and the land manager/developers at Population 4. Agreement has not yet been reached on ways to satisfactorily protect *Caladenia procera* at that population, however, stakeholders have discussed the boundaries for a proposed reserve and discussions are continuing.

Botanic Garden and Parks Authority (BGPA) staff have collected seed for storage from one population. They also isolated endophytic material (the soil fungus associated with the orchid). Seed and fungus are stored at the BGPA facility.

Monitoring is done annually during the flowering season, and plant numbers and current threats are recorded. Global Positioning System (GPS) locations of all populations and have been recorded in Blackwood District's Geographic Information System database. Highly accurate Differential GPS locations of individual *Caladenia procera* plants have also been recorded for Population 4.

G. Bussell[2] and CALM Staff have undertaken extensive survey for new populations in many areas of likely habitat. This resulted in an extension of Population 2.

The South West Region Threatened Flora Recovery Team (SWRTFRT) will be overseeing the implementation of this IRP and will include information on progress in its annual report to CALM's Corporate Executive and funding bodies.

Future recovery actions

Where populations occur on lands other than those managed by CALM, permission has been or will be sought from appropriate land managers prior to recovery actions being undertaken. The following recovery actions are roughly in order of descending priority; however this should not constrain addressing any of the priorities if funding is available for 'lower' priorities and other opportunities arise.

1. Coordinate recovery actions

The SWRTFRT will continue to oversee the implementation of the recovery actions for *Caladenia procera* and will include information on progress in its annual report to CALM's Corporate Executive and funding bodies.

Action: Coordinate recovery actions
Responsibility: CALM (Blackwood District) through the SWRTFRT
Cost: $500 per year

2. Seek long-term protection of habitat

Liaison with land managers and landowners will continue to help prevent accidental damage or destruction of populations. Negotiations will continue with regard the future management of the habitat of the two populations that occur on private land. Ways and means of improving the security of populations and their habitat will also be investigated. This may include conservation covenants through a range of agencies, the Land for Wildlife scheme, ceding of land for conservation, possibly land acquisition, and maintenance of Declared Rare Flora markers on road reserves.

Action: Seek long-term protection of habitat
Responsibility: CALM (Blackwood District) through the SWRTFRT
Cost: $2,500 in the first year and $1,000 in subsequent years

3. Conduct further surveys

Community volunteers will be encouraged to be involved with further surveys in likely habitat supervised by Departmental staff during the species' flowering period (September to October). Sites proposed for development between Busselton and Dunsborough will be surveyed, where landholder agreement is obtained. Owners of land near Population 3 have offered to allow CALM staff on to the site to search for additional populations. Locke Nature Reserve has also been recommended for further survey. The sites will be searched in collaboration with the relevant landowners during the flowering season if any areas are found to contain likely habitat.

[2] Greg Bussell: local orchid enthusiast

Action: Conduct further surveys
Responsibility: CALM (Blackwood District) through the SWRTFRT
Cost: $2,000 per year

4. Collect seed and fungal material

Preservation of germplasm is essential to guard against extinction if wild populations are lost. Such collections are also needed to propagate plants for translocations. Some seed and endophytic material has been collected from one population but further collections are required so that there is a store of genetic material from all populations.

In addition, collections of seed and fungal material are necessary to enable DNA studies of the fungal diversity in each population of this species.

Action: Collect seed and fungal material
Responsibility: CALM (Blackwood District), BGPA through the SWRTFRT
Cost: $ 6,000 in the first and second years

5. Undertake translocation

As the number of extant plants of *C. procera* is very low and populations are not secure from threats, a Translocation Proposal will be developed and suitable translocation sites selected. This will be coordinated by the SWRTFRT. Information on the translocation of threatened animals and plants in the wild is provided in CALM's Policy Statement No. 29 *Translocation of Threatened Flora and Fauna*. All Translocation Proposals require endorsement by CALM's Director of Nature Conservation.

Action: Undertake translocation
Responsibility: CALM (Blackwood District), BGPA through the SWRTFRT
Cost: $ 15,000 for first year $8,000 per year for years 2, 3 and 4

6. Develop and implement a fire management strategy

A coordinated fire response plan has been developed for the South West Region and incorporated into the Fire Control Working Plan. It includes strategies for fire control at each location of *C. procera*. The information is also being communicated to other fire response organisations.

It is thought that autumn-to-spring fire kills terrestrial orchids, but summer fire is unlikely to affect adult plants in their dormant phase of underground tubers. Little is known about the effects of fire on orchid fungi. Fire may also encourage weed invasion, so monitoring of burnt areas and undertaking any necessary weed control is important. Fire should be prevented from occurring in the area of populations, except where it is being used experimentally as a recovery tool. This species is to be programmed for summer burns (late -November to early - April) on a 10 to 15 year rotation. The germination and flowering will be closely monitored during and after any burning to help determine the effects of all fire-associated variables including intensity, timing, frequency and control methods. Plots will be marked and the numbers and status of flowering plants within specified areas will be monitored.

Action: Develop and implement a fire management strategy
Responsibility: CALM (Blackwood District) through the SWRTFRT
Cost: $3,400 in first year and $2,500 in subsequent years

7. Monitor populations

Annual monitoring of factors such as habitat degradation (including weed invasion, plant diseases such as *Phytophthora cinnamomi*, and salinity), population stability (expansion or decline), pollination activity, seed production, recruitment, longevity and predation is essential. Where possible, the position of each individual

will be mapped using a differential GPS system when in flower, to give a truer indication of the size of the population even when a small proportion of the plants in the population are flowering.

Action: Monitor populations
Responsibility: CALM (Blackwood District) through the SWRTFRT
Cost: $2,500 per year

8. Liaise with land managers

Staff from CALM's Blackwood District will continue liaison with land managers and landowners to ensure that populations are not accidentally damaged or destroyed. Input and involvement will also be sought from any indigenous groups that have an active interest in areas that are habitat for *Caladenia procera*.

Action: Liaise with land managers
Responsibility: CALM (Blackwood District) through the SWRTFRT
Cost: $2,000 per year

9. Obtain biological and ecological information

Improved knowledge of the biology and ecology of *Caladenia procera* will provide a better scientific basis for its management in the wild. An understanding of the following is particularly necessary for effective management:

1. Ecological requirements of *C. procera* and associated fungi
2. Effects of fire, competition, rainfall and grazing in recruitment and survival of orchids and associated fungi.
3. The pollination biology of the species and the requirements of the Thynnid wasps that cross pollinate this taxon.
4. The population genetic structure, levels of genetic diversity and minimum viable population size.
5. Seed baiting techniques will be used to locate possible translocation sites that contain suitable mycorrhizal fungi.

Action: Obtain biological and ecological information
Responsibility: CALM (Blackwood District), and BGPA through the SWRTFRT
Cost: $ 17,000 in the first and second years

10. Promote awareness

The importance of biodiversity conservation and the need for the long-term protection of wild populations of this species will be promoted to the community through poster displays and the local print and electronic media. Formal links with local naturalist groups and interested individuals will also be encouraged. An information sheet will be produced, and will include a description of the plant, its habitat, threats, recovery actions and photos.

Action: Promote awareness
Responsibility: CALM (Blackwood District) through the SWRTFRT
Cost: $1,500 in first year and $900 in subsequent years.

11. Undertake weed control as necessary

The current level of threat from weeds is low to moderate. However, if weed numbers increase they could impact on *C. procera* by competing for resources, degrading habitat, exacerbating grazing pressure, and increasing the risk and severity of fire. If monitoring indicates that the threat from weeds has increased significantly, weed control will be undertaken in consultation with the landholders. This will be through hand weeding or spot spraying with appropriate herbicide to minimise the effect of herbicide on the orchids and the surrounding native vegetation.

Action: Undertake weed control as necessary
Responsibility: CALM (Blackwood District) through the SWRTFRT
Cost: $700 per year

12. Rehabilitate habitat as necessary

If identified as required during monitoring, CALM will undertake habitat restoration in populations of this species. This may include the re-introduction of local provenance plants of species native to the habitat, particularly if species can be identified that provide other needs of pollinators (for example, habitat).

Action: Rehabilitate habitat as necessary
Responsibility: CALM (Blackwood District) through the SWRTFRT
Cost: $3,000 in first two years and $1,000 in subsequent years

13. Review the need for further recovery actions and/or a full Recovery Plan

At the end of the fourth year of its five-year term this Interim Recovery Plan will be reviewed and the need for further recovery actions, a revised plan, or a full Recovery Plan will be assessed. If the species is still ranked as Critically Endangered at that time a full Recovery Plan may be required.

Action: Review the need for further recovery actions and/or a full Recovery Plan
Responsibility: CALM (WATSCU, Blackwood District) through the SWRTFRT
Cost: $20,300 in the fifth year (if full Recovery Plan required)

4. TERM OF PLAN

This Interim Recovery Plan will operate from July 2004 to June 2009 but will remain in force until withdrawn or replaced. If the taxon is still ranked Critically Endangered after five years, the need to review this IRP or to replace it with a full Recovery Plan will be determined.

5. REFERENCES

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6. TAXONOMIC DESCRIPTION

Hopper, S.D. and Brown, A.P. (2001) Contributions to Western Australian Orchidology: 2. New taxa and circumscriptions in *Caladenia* (Spider, Fairy and Dragon orchids of Western Australia). *Nuytsia* 14(1/2), 27-308.

Caladenia procera

Plant solitary or in small clumps. *Leaf* erect, linear, 10-30 cm x 6-10 mm, pale green, basal third usually irregularly blotched with red-purple. *Scape* 35-70 cm tall. *Flowers* 1-4, *c.* 5-9 cm across, predominantly greenish lemon yellow with variable suffusions, lines and spots of dull maroon to pink; floral odour absent. *Sepals and petals* stiffly held, linear-lanceolate in basal quarter (sepals) or third (petals), then abruptly narrowing (sepals) or tapering (petals) to a long-acuminate apex; osmophore prominently tumescent, 15-25 mm long in sepals, absent from petals, yellow-brown, consisting of minute densely packed globular sessile glandular cells. *Dorsal sepal* erect and slightly incurved, 5-7 cm x 4-5 mm. *Lateral sepals* spreading and downcurved, 5.5-6.5 cm x 6-8 mm. *Petals* obliquely ascending, 3.5-4.5 cm x 4.5-5 mm. *Labellum* obscurely 3-lobed, prominently 2-coloured, greenish lemon yellow with pale pink to fawn radiating stripes, terminating in a uniformly dark maroon recurved apex, stiffly articulate on a claw *c.* 2.5 mm wide; lamina narrowly-cordate to cordate in outline when flattened, 22-30 x 15-20 mm, basal third curving from erect to oblique, middle third curving to horizontal, apical third sharply recurved, margins at widest point moderately curved upwards and terminated by obliquely ascending margins and calli; lateral lobes erect with entire margins near the claw, becoming fimbriate with slender acuminate linear greenish lemon yellow calli to 10 mm long which are abruptly decrescent near midlobe; midlobe margins with short broad slightly forward-facing obtuse hooked dull maroon calli decrescent towards the apex. *Lamina calli* in 4 rows extending at least ¾-4/5 the length of the labellum, dull maroon, sometimes white at base, golf stick-shaped, the longest *c.* 3 mm tall, decrescent towards apex and becoming sessile. *Column* 22-25 x 13-15 mm, broadly winged, greenish lemon yellow with pale pink to fawn blotches. *Anther c.* 4 x 4 mm, pink. *Pollinia c.* 4 mm long, yellow. *Stigma c.* 4 mm wide, dark yellow-green. *Capsule* not seen.

Distribution and habitat. Confined to a small range south-west of Busselton, growing in Jarrah, Marri and Peppermint woodland on alluvial sandy-clay loam flats with *Anigozanthos manglesii*.

Flowering period. September to October.

Etymology. Named from the Latin *procerus* (very tall, high) alluding to the scape height compared with that of *C. pectinata*.

Notes. A locally common but highly restricted species closely related to *Caladenia pectinata* and *C. decora*, differing from both in its consistently greenish yellow sepals, petals and basal labellum lamina, and its somewhat taller scapes. *C. procera* also differs from *C. decora* in its consistently ascending petals lacking an osmophore, and its broader more acute column wings. It has a taller broader column and somewhat longer labellum than *C. pectinata*. *C. procera* hybridizes with *C. attingens*.

SUMMARY OF RECOVERY ACTIONS AND COSTS

Recovery Action	Year 1			Year 2			Year 3			Year 4			Year 5		
	Dept.	**Other**	**Ext.**	**Dept.**	**Other**	**Ext.**	**Dept.**	**Other**	**Ext.**	**Dept.**	**Other**	**Ext.**	**Dept.**	**Other**	**Ext.**
Coordinate recovery actions	300	100	100	300	100	100	300	100	100	300	100	100	300	100	100
Seek long-term protection of habitat	1500	500	500	500	500		500	500		500	500		500	500	
Conduct further surveys	500	500	1000	500	500	1000	500	500	1000	500	500	1000	500	500	1000
Collect seed and fungal material	500	2500	3000	500	2500	3000									
Undertake translocation	2000	6000	7000	2000	4000	2000	2000	4000	2000	2000	4000	2000			
Develop and implement fire management strategy	1400	1000	1000	1000	1000	500	1000	1000	500	1000	1000	500	1000	1000	500
Monitor populations	2000		500	2000		500	2000		500	2000		500	2000		500
Liaise with land managers	1000	500	500	1000	500	500	1000	500	500	1000	500	500	1000	500	500
Obtain biological and ecological information	1000	8000	8000	1000	8000	8000									
Promote awareness	1000		500	900			900			900			900		
Undertake weed control, as necessary	500		200	500		200	500		200	500		200	500		200
Rehabilitate habitat, as necessary	500	1000	1500	500	1000	1500	500		500	500		500	500		500
Review the need for a full Recovery Plan													11200		9100
Total	12200	20100	23800	10700	18100	17300	9200	6600	5300	9200	6600	5300	18400	2600	12400
Yearly Total		**56,100**			**46,100**			**21,100**			**21,100**			**33,400**	

Ext. = external funding (funding to be sought), Other = in kind contribution and the BGPA.

Total Department: $ 59,700
Total Other: $ 54,000
Total External Funding:$ 64,100
Total Costs: $ 177,800