INTERIM RECOVERY PLAN NO. 63

ELEGANT SPIDER ORCHID

(*CALADENIA ELEGANS* MS)

INTERIM RECOVERY PLAN

2000-2003

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Photograph: A. Brown

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Natural Heritage Trust

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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This Interim Recovery Plan will operate from May 2000 to April 2003 but will remain in force until withdrawn or replaced. It is intended that, if the taxon is still Critically Endangered, this IRP will be replaced by a full Recovery Plan after three years.

This IRP was approved by the Director of Nature Conservation on 20 August 2000. The 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 May 2000.

SUMMARY

Scientific Name: *Caladenia elegans* ms
Family: Orchidaceae
CALM Region: Midwest
Shire: Northampton
Recovery Team: Geraldton District Threatened Flora Recovery Team (GDTFRT)
Common Name: Elegant spider orchid
Flowering Period: Late July-August
CALM District: Geraldton

Illustrations and/or further information: Brown, A., Thomson-Dans, C. and Marchant, N. (Eds) (1998). *Western Australia's Threatened Flora*. Department of Conservation and Land Management, Western Australia; Hoffman, N. and Brown, A. (1998). *Orchids of South-west Australia*. Revised 2nd edition with supplement. University of Western Australia Press, Nedlands.

Current status: *Caladenia elegans* ms was declared as Rare Flora in May 1991 and was ranked in September 1995 as Critically Endangered (CR). It is currently ranked 'CR' under IUCN Red List criteria B1+2c (IUCN 1994) due to continued decline in the quality of the habitat and populations being severely fragmented. Threats include weeds, water erosion, accidental destruction due to road and track maintenance, grazing, inappropriate fire regimes and chemical drift.

Habitat requirements: *Caladenia elegans* ms grows west-north-west and east of Northampton and is known from eight populations, growing amongst open *Melaleuca* low scrub in low heath in winter-wet depressions. This species co-occurs with two other species of DRF, *Pterostylis* sp. Northampton and *Caladenia hoffmanii* subsp. *hoffmanii* at Population 1, and *Pterostylis* sp. Northampton at Populations 1, 2, 3, and 6.

Critical habitat: The area of occupancy of the known populations, the local catchment for the surface and ground waters that provide the wetland habitat of the species; areas of similar habitat ie. open *Melaleuca* low scrub in low heath in winter-wet depressions within 200 metres of known populations; corridors of remnant vegetation that link populations; additional occurrences of similar habitat ie. open *Melaleuca* low scrub in low heath in winter-wet depressions.

Existing Recovery Actions: The following recovery actions have been or are currently being implemented:
1. Appropriate land managers have been informed of the species' locations and the associated legal obligations.
2. Declared Rare Flora (DRF) markers have been installed at Population 1 and at Subpopulations 3a, 4a, 5a and 7a.
3. Dashboard stickers and posters that illustrate DRF markers and describe their purpose have been distributed.
4. A poster that provides a description of the species, and information about threats and recovery actions has been produced for the species.
5. Population 2 and Subpopulations 3b, 7b and 7c were fenced to prevent grazing, and to help prevent illegal clearing.
6. A 1080 baiting program was undertaken in 1989 by the Agriculture Protection Board to control feral pigs that were impacting populations.
7. Leaf material was collected in 1999 for DNA analysis.
8. A quadrat was established at Population 1 in 1990 by CALM staff. The quadrat continues to be monitored.
9. A Rare Flora information session and maps have been provided to personnel involved in road maintenance at Population 5.
10. The gravel pit above Population 1 has been ripped and a culvert rock wall constructed to improve drainage.
11. Weed control was conducted at Populations 1, 6 and 7 in April/May 2000.
12. The Geraldton District Threatened Flora Recovery Team is overseeing the implementation of this IRP.
13. Staff from CALM's Geraldton District Office regularly monitor the populations.

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

Recovery criteria
Criteria for success: The number of individuals within populations and/or the number of populations have increased.
Criteria for failure: The number of individuals within populations and/or the number of populations have decreased.

Recovery actions
1. Coordinate recovery actions.
2. Undertake weed control.
3. Seek to acquire buffers, and rehabilitate land adjacent to Population 1.
4. Develop and implement a drainage and rehabilitation strategy for Population 1.
5. Collect seed and tissue culture material.
6. Conduct further surveys.
7. Fence Population 5.
8. Liaise with land managers.
9. Develop and implement a fire management strategy.
10. Monitor populations.
11. Control feral animals that impact the species.
12. Obtain biological and ecological information.
13. Propagate plants for translocation.
14. Undertake and monitor translocation.
15. Promote awareness.
16. Negotiate to acquire land at Population 6.
17. Write full Recovery Plan.

1. BACKGROUND

History

The genus *Caladenia* is comprised of approximately 180 species, distributed widely over southern Australia and extending to New Zealand, New Caledonia and Java. *Caladenia elegans* ms is one of 140 species of the genus found in the south west of Western Australia (Hoffman and Brown, 1998).

Caladenia elegans ms was first collected by A. Brown in August 1982 from west of Northampton. In 1990**,** two further populations, Populations 2 and 3 were discovered north of the original population. Unfortunately, the largest of these populations was cleared shortly after discovery, leaving 2200 plants in the two remaining populations. Some regeneration of Population 2 was noted during a survey in 1996.

Three previously unrecorded populations were also discovered during the 1996 survey, increasing the range of the species to 61 km. A total of over 3000 plants was recorded from the populations that were known at this time.

In 1996 a further population (Population 6) was discovered on a shire reserve west of Northampton by a member of the general public. The reserve also contains a population of another Critically Endangered orchid, *Pterostylis* sp. Northampton.

Further survey in 1998 by the West Australian Native Orchid Study and Conservation Group (WANOSCG) located another population of *Caladenia elegans* ms on a pastoral station well north of its previously known range. It is currently known from eight populations totalling about 900 plants.

Description

Caladenia elegans ms is an erect tuberous herb to 30 cm high, and has a narrow hairy leaf, 6 to 12 cm long and 3 to 5mm wide. It has up to three large creamy-yellow flowers, 5 to 8 cm across and dark maroon hairs on the tips of the slender, filamentous petals and sepals. The pale yellow labellum (lip) is striped with dark red. The edge of the labellum has irregular teeth and the calli (glands) are in two rows. Flowering occurs from late July to August (Brown *et al*. 1998; Hoffman and Brown, 1998).

Distribution and habitat

Caladenia elegans ms is known from eight populations growing west-north-west, and east of Northampton growing amongst open *Melaleuca* low scrub in low heath in winter-wet depressions.

Associated species include *Thryptomene denticulata, Chorizema ericifolium, Dodonaea inaequifolia, Acacia acuminata, Hakea recurva, Melaleuca uncinata, Grevillea thelemanniana* subsp. *pinaster, Conostylis prolifera* and *Drosera neesii* subsp. *borealis*. *Caladenia elegans* ms co-occurs with two other species of DRF, *Pterostylis* sp. (Northampton) and *Caladenia hoffmanii* subsp. *hoffmanii* at Population 1, and *Pterostylis* sp. Northampton at Populations 1, 2, 3 and 6.

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 (a) occupied (continuously, periodically or occasionally) by an organism or group of organisms; or (b) once occupied (continuously, periodically or occasionally) by an organism, or group of organisms, and into which organisms of that kind that the potential to be reintroduced. (sections 207A and 528 of Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)).

The critical habitat for *Caladenia elegans* ms comprises:

- the area of occupancy of the known populations,
- the local catchment for the surface and ground waters that provide the wetland habitat of the species (the species occurs in seasonal damplands and is dependent on maintenance of local hydrology),
- areas of similar habitat, ie. open *Melaleuca* low scrub in low heath in winter-wet depressions, within 200 metres of known populations (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, ie. open *Melaleuca* low scrub in low heath in winter-wet depressions (this represents possible translocation sites).

Biology and ecology

As for other terrestrial orchids, seed germination of *Caladenia elegans* ms relies on the presence of a species specific mycorrhizal fungus. This symbiotic relationship is essential for any seedling establishment. Although very large quantities of seed are released from each capsule, few grow to maturity (Carstairs and Coates, 1994).

Caladenia elegans ms does not require fire to complete its life cycle, however there is some evidence to suggest that it may benefit from fire every ten years or so. Fire opens up the understorey thereby reducing competition for space and light, and provides a source of nutrients for the growth of mycorrhiza on which *C. elegans* ms seedlings depend for their establishment and growth. Research has indicated that adult plants are most vulnerable to fire during their vegetative stage (April-July), when replacing their parent tuber (Carstairs and Coates, 1994).

Adult plants are probably long-lived (tens of years), and flower regularly every year. Flowering is synchronised within and among populations to produce an expansive bloom of short duration. The flowers are sweetly scented and pollinated by male thynnid wasps, possibly attracted in response to pheromones emitted by the flowers. Once the wasp has been attracted to the flower, visual and tactile cues stimulate further pollination responses (Carstairs and Coates, 1994). Mating season (August) is the only time the male thynnid wasp pollinators of *Caladenia elegans* ms are active above ground.

Threats

Caladenia elegans ms was declared as Rare Flora in May 1991 and was ranked in September 1995 as Critically Endangered (CR). It is currently ranked ‘CR’ under IUCN Red List criteria B1+2c (IUCN 1994) due to the severe fragmentation of populations, and continuing decline in the extent and quality of habitat. The main

threats include weeds, water erosion, accidental destruction associated with road and track maintenance, grazing, inappropriate fire regimes and chemical drift.

- Habitat degradation by **weed invasion** is one of the greatest threats to the populations. Weeds suppress early plant growth by competing 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.

- **Water erosion** in a drainage channel at Population 1 is directly effecting *Caladenia elegans* ms plants and their habitat. The site may originally have been a natural drainage line, but road building and land clearing have resulted in large volumes of runoff into the road reserve that contains Population 1. A drainage culvert and constructed levy bank in an adjacent paddock on the south side of the road have served to further direct the water into the road reserve. This has resulted in the erosion of large sections of the road reserve, creating wide channels up to five metres in width adjacent to the road. Parallel erosion channels have begun to form in the centre of the road reserve. The water flowing from adjacent land is also channelling seeds of pasture grasses, fertilisers and silt into the habitat of the orchid, causing weed infestation and a coverage of silt. A monitoring site established at that site in 1990 has become densely infested with weeds, and no orchids were observed within the plot in 1994. Similarly, on the north side of the road at Population 1, a spoon drain directs water, silt and weed seeds into the road reserve.

- **Road and track maintenance activities** threaten the *Caladenia elegans* ms and its habitat. Threats include actions such as grading road reserves, road widening, spraying of chemicals, constructing drainage channels and mowing the roadside vegetation to improve visibility. These disturbance events also often encourage weed invasion into adjacent habitat, as well as causing damage to actual plants. Population 5a was damaged during road maintenance activities in early 2000.

- **Feral pig** activity has been observed in most populations. As well as grazing the orchids themselves, pigs can destroy the underground tubers of the orchid and also affect the growth of symbiotic fungi that are essential for germination and for providing starches for the plant (Hoffman and Brown, 1998).

- **Grazing** by kangaroos (*Macropus fuliginosus*) and rabbits (*Oryctolagus cuniculus*) has impacted upon all populations. In addition, disturbance of soil by rabbit warren construction, increased nutrient levels from their droppings and the introduction of weeds impact on the habitat of the species. Grazing may impact on the establishment of *Caladenia elegans* ms seedlings thereby limiting natural recruitment. In recent years, the impact of rabbits has declined due to rabbit baiting by many landholders, and the introduction of the calici virus.

- **Inappropriate fire** during autumn, winter and spring can adversely affect populations by killing flowering plants, preventing seed set or destroying the underground tubers. However fire is less likely at these times of the year. Some orchids require fire to stimulate flowering, but such fires must occur only in summer when plants are dormant. Most orchid species emerge from the soil by mid April and dehisce their seed by late November. The optimum time for fire is therefore from late November to mid April. In addition to the detrimental effects of fire on the vegetative stages of this species, proliferation of weeds is often a consequence of burning. Conversely, increased competition from dense understorey species can result from infrequent fire.

- **Chemical drift** from herbicide and fertiliser applications from adjacent farmland have the potential to impact the species' growth and survival.

Summary of population information and threats

Pop. No. and Location	Land Status	Year/No. plants	Condition	Threats
1. WNW of Northampton	Shire road reserve	1990 2000+ 1994 1000+ 1996 500+ 1998 231+ 1999 150+	Poor	Weed invasion, water erosion, herbicide drift, chemical drift, road maintenance, grazing
2. WNW of Northampton	Private	1990 500+ 1994 1 1995 12 1999 20+	Poor	Cleared in 1992 Track maintenance, weeds, grazing, chemical drift
3a. WNW of Northampton	Shire road reserve	1990 200+* 1994 200+* 1996 10* 1999 22+*	Moderate	Weed invasion, road and firebreak maintenance, chemical drift, grazing
3b. WNW of Northampton	Private	1990 200+* 1994 200+* 1996 10* 1999 22+*	Healthy	Weed invasion, chemical drift, fire, grazing
4a. WNW of Northampton	Shire road reserve	1994 200*	Moderate	Weed invasion, road maintenance, chemical drift
4b. WNW of Northampton	Private	1994 200*	Moderate	Weed invasion, chemical drift
5a. East of Northampton	Shire road reserve	1996 300+* 1999 210+*	Damaged (status to be assessed)	Road maintenance, weed invasion, road widening
5b.East of Northampton	Private / Unallocated Crown Land	1996 300+* 1999 210+*	Healthy	Weed invasion
6. WNW of Northampton	Shire reserve	1996 1000+ 1998 100+	Healthy	Weed invasion, chemical drift, inappropriate fire, grazing
7a. WNW of Northampton	Shire road reserve	1996 500+* 1999 20+	Moderate	Road maintenance, weed invasion, chemical drift, grazing
7b. WNW of Northampton	Private	1996 500+* 1999 100+	Healthy	Weed invasion, chemical drift, grazing, water erosion
7c. WNW of Northampton	Private	1996 500+* 1999 80+	Healthy	Weed invasion, chemical drift, grazing, water erosion
8. NNW of Northampton	Pastoral Lease	1998 4	Healthy	Grazing, track and firebreak maintenance

Note: * total for subpopulations combined.

Guide for decision-makers

Section 1 provides details of current and possible future threats. Developments in the immediate vicinity of any of the populations or within the defined critical habitat of *Caladenia elegans* ms require assessment. No developments should be approved unless the proponents can demonstrate that they will have no significant impact on the species, its habitat or potential habitat, or on the local hydrology.

2. RECOVERY OBJECTIVES 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 taxon in the wild.

Criteria for success: The number of individuals within populations and/or the number of populations have increased.
Criteria for failure: The number of individuals within populations and/or the number of populations have

decreased.

3. RECOVERY ACTIONS

Existing recovery actions

All relevant people have been made aware of the existence of this taxon and its location. Local shires and private property owners have been formally notified of the presence of the *Caladenia elegans* ms populations on lands that they manage. These notifications detailed the Declared Rare status of the taxon and the associated legal responsibilities.

Declared Rare Flora (DRF) markers have been installed at Population 1 and Subpopulations 3a, 4a, 5a and 7a. These alert people working in the area to the presence of significant flora, helping to prevent accidental damage during maintenance operations. Awareness of the significance of these markers is being promoted to relevant bodies such as shires. To this end, dashboard stickers and posters have been produced and distributed. These illustrate DRF markers, inform of their purpose and provide a contact telephone number to use if such a marker is encountered.

An A4 sized poster that provides a description of the species, and information about threats and recovery actions, has been developed for *Caladenia elegans* ms. It is hoped that the poster will result in the discovery of new populations.

Population 2 and Subpopulations 3b, 7b and 7c were fenced to prevent grazing by feral pigs, kangaroos and sheep, and to help prevent illegal clearing.

In 1989, the Agriculture Protection Board conducted a 1080 baiting program throughout Northampton in an attempt to control feral pigs. By 1991, pigs had reinvaded the area, and in August 1994 recent pig diggings were observed near the populations of *Caladenia elegans* ms. Liaison between staff of CALM Geraldton District and Agriculture WA is continuing with regard to pig control.

Leaf material was collected in 1999 for DNA analysis. This is part of the revision of *Caladenia* and allied genera being undertaken by the Department of Botany at Okhlahoma University, U.S.A.

A 10 x 10 metre quadrat was established at Population 1 in August 1990 by CALM staff. Seventy *Caladenia elegans* ms plants were originally counted in this plot. The condition of the vegetation and number of *Caladenia elegans* ms plants are monitored regularly by CALM staff.

A Rare Flora information session and maps have been provided to the shire and personnel involved in road maintenance at Population 5 by Geraldton District staff.

The gravel pit above Population 1 has been ripped and a culvert rock wall constructed in the adjacent drainage channel by the shire to improve drainage.

Weed control was conducted at Populations 1, 6 and 7 in April/May 2000 by Geraldton District staff.

The Geraldton District Threatened Flora Recovery Team (GDTFRT) is overseeing the implementation of this IRP and will include information on progress in its annual report to CALM's Corporate Executive and funding bodies.

Staff from CALM's Geraldton District Office regularly monitor the populations.

Future recovery actions

Where populations occur on lands other than those managed by CALM, permission has been or will be sought from the appropriate land managers prior to recovery actions being undertaken.

1. Coordinate recovery actions

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

Action: Coordinate recovery actions
Responsibility: CALM (Geraldton District) through the GDTFRT
Cost: $6900 per year.

2. Undertake weed control

Weeds are a major threat to all populations. The following actions will be implemented:

1. Selection of appropriate herbicides after determining which weeds are present.
2. Controlling invasive weeds by hand removal or spot spraying around *Caladenia elegans* ms plants when weeds first emerge.
3. Scheduling weed control to include spraying at other threatened flora populations within the district.

The tolerance of associated native plant species to herbicides at the site of *Caladenia elegans* ms is not known and weed control programs will be undertaken in conjunction with research.

Action: Undertake weed control
Responsibility: CALM (Geraldton District, CALMScience) through the GDTFRT
Cost: $1100 per year.

3. Seek to acquire buffers, and rehabilitate land, adjacent to Population 1

The management of drainage at Population 1 is dependent upon managing water flowing from adjacent land. CALM will therefore seek to acquire, fence and rehabilitate buffer areas currently on private land adjacent to the population on either side of the road, and manage drainage in the buffer to control water flow into the road reserve. This will also increase the potential habitat for the orchid, and provide a buffer from weed invasion and chemical drift to extant plants. The rehabilitation strategy will also include seeding of the gravel pit that occurs adjacent to Population 1, and which contributes additional water flow into the road reserve.

Action: Seek to acquire buffers, and rehabilitate land, adjacent to Population 2
Responsibility: CALM (Geraldton District) through the GDTFRT
Cost: $6000 in first year and $9300 in second year.

4. Develop and implement a drainage strategy for Population 1

Strategies to restore the habitat through drainage management, controlling weeds and reintroducing plant species native to the site is essential to conserve Population 1. A drainage control and rehabilitation strategy will be developed and implemented in liaison with relevant stakeholders including the local shire. Water flows around the population will be examined during a high rainfall event to help determine local topography and to help determine the most appropriate actions.

Possible actions include:

- Diverting the road.
- Lining the current erosion channels on the south side of the road with rocks.
- Levelling the spoon drain formed on the north side of the road, to ensure water flowing off the road flows along side the road and not into the road reserve.
- On the south side of the road, channelling water so that it flows off farm land and into the road reserve in a different area.
- Fill in the current channel on the south side of the road and duct water through a large concrete pipe.
- Completely fill in the channel on the south side of the road with clean soil and create a much narrower rock-lined channel.

- Fill the current channel on the south side of the road at intervals with rocks to create riffles to slow the water flow and decrease erosion.
- Place smaller 'blunt ended' rock lined channels at angles to the current channel on the south side of the road to divert the water, and allow it to drain away more slowly (not a favoured option, as it will remove possible habitat and increase disturbance, weeds and flooding in the road reserve).
- Fill the channel on the south side of the road at intervals with brush cut from local species to slow water flow. Note that this is unlikely to have any real effect as the brush is likely to be washed away due to the high water flows at the site. This action may be more effective if combined with partial filling of the channel.

Action: Develop and implement a drainage and rehabilitation strategy for Population 1
Responsibility: CALM (Geraldton District) through the GDTFRT
Cost: To be determined.

5. Collect seed and tissue culture material

Seed from *Caladenia elegans* ms has yet to be collected. Collection of germplasm will be given a high priority as there is a possibility of extinction of wild populations, and recovery of the species in the long-term may require *ex situ* propagation techniques. Hand pollination of the orchid may be required to promote a higher seed set. However, if it is not possible to collect adequate quantities of viable seed, other more costly germplasm storage may need to be investigated. This can involve living collections or storage of tissue culture material. If resources are limited these techniques will need to be carefully prioritised in relation to *in situ* conservation.

Action: Collect seed and tissue culture material
Responsibility: CALM (Geraldton District, Threatened Flora Seed Centre) and Botanic Gardens and Parks Authority (BGPA), through the GDTFRT
Cost: $3600 per year.

6. Conduct further surveys

Further surveys will be conducted during the species' flowering period (late July to August). Local volunteers such as members of naturalists clubs, WANOSCG and wildflower societies will be encouraged to be involved in surveys supervised by CALM staff.

Action: Conduct further surveys
Responsibility: CALM (Geraldton District) through the GDTFRT
Cost: $3400 per year.

7. Fence Population 5

Wherever feasible, remnant vegetation that contains Population 5 will be fenced. This may include small areas on unallocated Crown land, private land and road reserve. This will help ensure the road is not further widened into areas that contains the orchid.

Action: Fence Population 5
Responsibility: CALM (Geraldton District) through the GDTFRT
Cost: $2300 in the first year.

8. Liaise with land managers

Staff from CALM's Geraldton District will continue to liaise with the Shire and adjacent landowners to ensure that populations are not accidentally damaged or destroyed.

Action: Liaise with land managers
Responsibility: CALM (Geraldton District) through the GDTFRT
Cost: $800 per year.

9. Develop and implement a fire management strategy

A fire management strategy that defines fire control measures, and fire frequency and timing will be developed in consultation with relevant authorities and land managers. In particular, at Population 1 occasional fire, in conjunction with weed control, may be necessary to reduce competition from dense understorey shrubs.

Action: Develop and implement a fire management strategy
Responsibility: CALM (Geraldton District) through the GDTFRT
Cost: $2600 in first year and $1000 in subsequent years.

10. Monitor populations

Monitoring of factors such as weed invasion, pig activity, habitat degradation, and population stability (expansion or decline), pollinator activity, seed production, recruitment, and longevity is essential. The populations will be inspected annually.

Action: Monitor populations
Responsibility: CALM (Geraldton District) through the GDTFRT
Cost: $2300 per year.

11. Control feral animals that impact the species

Disturbance by feral animals will be monitored at all populations, and if necessary numbers will be controlled through baiting or other alternative methods.

Action: Control feral animals that impact the species
Responsibility: CALM (Geraldton District) through the GDTFRT
Cost: $1100 per year.

12. Obtain biological and ecological information

Increased knowledge of the biology and ecology of the species will provide a scientific basis for management of *Caladenia elegans* ms in the wild. Investigations will include:

1. Study of the role of various factors including disturbance, competition, rainfall and grazing in recruitment and seedling survival.
2. Determination of reproductive strategies, phenology and seasonal growth.
3. Investigation of the mating system and pollination biology.
4. Investigation of population genetic structure, levels of genetic diversity and minimum viable population size.

Action: Obtain biological and ecological information
Responsibility: CALM (CALMScience, Geraldton District) through the GDTFRT
Cost: $18,100 per year.

13. Propagate plants for translocation

The propagation of plants in readiness for translocation is essential as the only known populations are under threat in the wild.

Action: Propagate plants for translocation
Responsibility: CALM (Geraldton District) and BGPA, through the GDTFRT
Cost: $1400 in the first and second years.

14. Undertake and monitor translocation

Although translocations are generally undertaken under full Recovery Plans, the many threats to wild populations of this species indicate that the development of a translocation proposal is required within the time frame of this IRP. This will be coordinated by the GDTFRT. Information on the translocation of threatened animals and plants in the wild is provided in CALM Policy Statement No. 29 *Translocation of Threatened Flora and Fauna.* All translocation proposals require endorsement by the Director of Nature Conservation. Monitoring of the translocation is essential and will occur during the flowering period of the species.

Action: Undertake and monitor translocation
Responsibility: CALM (CALMScience, Geraldton District) through the GDTFRT
Cost: $15,500 in first year and $4900 in subsequent years.

15. Promote awareness

The importance of biodiversity conservation, the preservation of Critically Endangered species generally and the existence of *Caladenia elegans* ms in particular will be promoted to the public. Awareness will be encouraged in the community by a publicity campaign through the local print and electronic media and poster displays. Formal links with local naturalist groups and interested individuals will also be encouraged.

An information sheet for *Caladenia elegans* ms has been produced and distributed (see existing recovery actions). CALM will also produce a mail-out information flier for distribution in the Northampton area. These fliers are aimed at local residents to provide information and a contact if they locate the species.

Action: Promote awareness
Responsibility: CALM (Geraldton District, Corporate Relations) through the GDTFRT
Cost: $700 per year.

16. Negotiate to acquire land at Population 6

Population 6 of *Caladenia elegans* ms is located on a Shire reserve for "Picnic Ground and Flora". The possibility of acquiring this reserve and placing it under the control of the National Parks and Nature Conservation Authority will be investigated.

Action: Negotiate to acquire land at Population 6
Responsibility: CALM (Geraldton District, WATSCU) through the GDTFRT
Cost: $500 in second year.

17. Write full Recovery Plan

At the end of the three-year term of this Interim Recovery Plan, the need for further recovery will be assessed. If the species is still ranked Critically Endangered, a full Recovery Plan will be developed to describe action required for long-term maintenance. A Recovery Plan will be prepared with the benefit of knowledge gained over the time frame of this Interim Recovery Plan.

Action: Write full Recovery Plan
Responsibility: CALM (WATSCU, Geraldton District) through the GDTFRT
Cost: $18,200 in the third year.

4. TERM OF PLAN

This Interim Recovery Plan will operate from May 2000 to April 2003 but will remain in force until withdrawn or replaced. It is intended that, if the taxon is still Critically Endangered, this IRP will be replaced by a full Recovery Plan after three years.

5. ACKNOWLEDGMENTS

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

Andrew Batty	Botanic Gardens and Parks Authority
Alanna Chant	Conservation Officer, CALM Geraldton District
Stephen Hopper	Director, Botanic Gardens and Parks Authority
Mike Meinema	District Manager, CALM Geraldton District
Sue Patrick	Senior Research Scientist, CALM W.A. Herbarium
Phil Roberts	Wildlife Officer, CALM Geraldton District

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7. TAXONOMIC DESCRIPTION

From Brown *et al.* (1998).

Caladenia elegans ms is an erect tuberous herb to 30 cm high that has a narrow hairy leaf, 6 to 12 cm long and 3 to 5mm wide. It has up to three large creamy-yellow flowers, 5 to 8 cm across and dark maroon hairs on the tips of the slender, filamentous petals and sepals. The pale yellow labellum (lip) is striped with dark red. The edge of the labellum has irregular teeth and the calli (glands) are in two rows.