INTERIM RECOVERY PLAN NO. 81

LONELY HAMMER ORCHID

(*DRAKAEA ISOLATA* MS)

INTERIM RECOVERY PLAN

2000-2003

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Photograph: A. 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This Interim Recovery Plan will operate from December 2000 to November 2003 but will remain in force until withdrawn or replaced. It is intended that, unless the taxon is no longer threatened with extinction, this IRP will be replaced by a full Recovery Plan after three years.

This IRP was approved by the Director of Nature Conservation on 27 June 2001. 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 December 2000.

SUMMARY

Scientific Name: *Drakaea isolata* ms
Common Name: Lonely Hammer Orchid
Family: Orchidaceae
Flowering Period: September to early October
CALM Region: Wheatbelt
CALM District: Katanning
Shire: Kent
Recovery Team: Katanning District Threatened Flora Recovery Team (KDTFRT)

Illustrations and/or further information: Brown, A., Thomson-Dans, C. and Marchant, N. (Eds) (1998). *Western Australia's Threatened Flora*. Department of CALM, Western Australia; Hoffman, N. and Brown, A. (1998). *Orchids of South-west Australia*. Revised 2nd edition with supplement. University of Western Australia Press, Nedlands; Stoutamire, W.P. (1975). Australian Terrestrial Orchids, Thynnid Wasps and Pseudocopulation. *American Orchid Society Bulletin*, 43:13-18.

Current status: *Drakaea isolata* ms was declared as Rare Flora in November 1993 and ranked as Critically Endangered (CR) in 1997. It is currently ranked 'CR' under IUCN Red List criteria C2b (IUCN 1994) as less than 250 mature individuals are known and there is a continuing decline in plant numbers in the single known subpopulation. Threats include road and track maintenance, airborne dust, changes to hydrology, salinity and inappropriate fire.

Habitat requirements: *Drakaea isolata* ms is endemic to Western Australia where it appears to be confined to the Chinocup area in the southern wheatbelt. It grows with the broad-billed duck orchid (*Paracaleana triens*) in patches of bare white, sandy-clay soil between low shrubs and mallee eucalypts, on rises above saline flats (Hoffman and Brown, 1998). It is known from a single population of approximately 75 mature plants.

Critical habitat: The critical habitat for *Drakaea isolata* ms comprises: the habitat of the known population, similar habitat within 200 metres of the known population, the local catchment which provides the seasonally moist habitat of the species and corridors of remnant vegetation that link the population with other nearby areas of apparently suitable habitat that do not currently contain the species.

Existing Recovery Actions: The following recovery actions have been or are currently being implemented:
1. Appropriate land managers have been informed of the species' location and their legal obligations.
2. Dashboard stickers and posters that illustrate DRF markers and describe their purpose have been produced and distributed.
3. An A4 sized poster has been produced that provides a description of the species, information about threats and recovery actions.
4. Leaf material was collected in 1999 for DNA analysis.
5. Staff of the BGPA collected seed and tissue material in 1999 for propagation.
6. Surveys for the species have been undertaken but no new populations have been found.
7. Water tables are being monitored to detect changes and increased salinity.
8. CALM staff from the Katanning District Office regularly monitor the population.
9. The Katanning District Threatened Flora Recovery Team is overseeing the implementation of this IRP.

IRP Objective: The objective of this Interim Recovery Plan is to abate identified threats and maintain and/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.
Criteria for failure: The number of individuals within populations and/or the number of populations have decreased.

Recovery actions
1. Coordinate recovery actions.
2. Install DRF markers at subpopulation. 1c.
3. Notify and liaise with land managers.
7. Conduct further surveys.
8. Obtain biological and ecological information.
9. Promote awareness.

4. Develop and implement a fire management strategy.
5. Monitor population.
6. Collect seed.
10. Start translocation process.
11. Investigate the possibility of acquiring unallocated crown land.
12. Develop a full Recovery Plan.

1. BACKGROUND

History

Drakaea isolata ms was originally discovered near Pingrup in the 1980s by the noted South Australian orchidologist and author Bob Bates. It is currently known only from a single population of about 75 mature plants. The scientific name *isolata* is derived form the Latin '*isolatus*', meaning isolated and refers to the inland distribution of the orchid, which disjunct from all other *Drakaea* species (Hoffman and Brown, 1998).

Drakaea isolata ms appears to be naturally rare and restricted. It has highly specific habitat requirements with regard to associated species, soil moisture and soil type. It is currently known from relatively low numbers at a single location on a Nature Reserve north of Pingrup. The margins of a nearby lake are being mined for gypsum with an access road to the mine cutting through the middle of the population. Maintenance of the track, possible changes in hydrology and dust associated with mining may threaten the small number of existing plants of this species.

Description

Drakaea isolata ms grows 10 to 30 cm high. Its stem arises from a single, dull green, heart-shaped, shortly hairy leaf that is one to two centimetres long and eight to twelve millimetres wide. The single flower is two to three centimetres long and three to four millimetres wide. Although it is similar to the late hammer orchid (*Drakaea confluens*) ms in having a shortly-hairy leaf, *Drakaea isolata* ms has a smaller, generally uniformly coloured flower and a somewhat earlier flowering period (Hoffman and Brown, 1998).

Distribution and habitat

Drakaea isolata ms is endemic to Western Australia where it is confined to the Chinocup area in the southern wheatbelt. At the single known locality it grows with the Broad-billed Duck Orchid (*Paracaleana triens*) in patches of bare white, sandy-clay soil among low shrubs and mallee eucalypts, on a slight rise above a large salt lake (Hoffman and Brown, 1998). It is known from a single population of approximately 500 plants.

Critical habitat

Critical habitat is habitat identified as being critical to the survival of a listed threatened species or community. Habitat means 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 have the potential to be reintroduced. (*Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)).

The critical habitat for *Drakaea isolata* ms comprises:

- The habitat of the known population.
- Similar habitat within 200 metres of the known population (these provide potential habitat for natural recruitment).
- The catchment area which provides the necessary hydrology.
- Corridors of remnant vegetation that link the population with other nearby areas of apparently suitable habitat that do not currently contain the species.
- Areas of similar habitat that may be used for future translocation.

Explanatory Note: Adjacent uncleared vegetation linked to the known habitat of the species and additional occurrences of the habitat are potential areas for the species and provide opportunities for reintroduction, re-invasion, pollination and translocation.

Biology and ecology

Drakaea is a small genus of nine species, all of which are endemic to the south-west of Western Australia (Hoffman and Brown, 1998). Collectively, they are commonly known as hammer orchids because of the hinged, hammer-like labellum characteristic of all species. The unusually shaped labellum approximates a female thynnid wasp in both scent and appearance. Male wasps attempt to fly away with the labellum, and in doing so bring themselves into contact with the column from which they either remove or deposit pollen (Stoutamire, 1974).

Preliminary observations by staff of the Botanic Gardens and Parks Authority (BGPA) on pollinator activity suggest that hand pollination is needed to produce more seed than is currently produced through natural pollination events in order to enhance natural recruitment (personal observation A. Batty[1]).

Although the response of *Drakaea isolata* ms to fire is not known, it is likely that the orchid would be killed by fire during its active growing period (May - October).

Threats

Drakaea isolata ms was declared as Rare Flora in November 1993 and was ranked as Critically Endangered (CR) in 1997. It is currently ranked 'CR' under IUCN Red List criteria C2b (IUCN 1994) as less than 250 mature individuals are known and there is a continuing decline in plant numbers in the single known subpopulation. Threats include road and track maintenance, airborne dust, changes to hydrology, salinity and inappropriate fire.

- **Road and track maintenance** are threats to *Drakaea isolata* ms and its habitat. Grading and road widening may destroy existing plants and also encourage weed invasion into adjacent habitat. Relevant authorities have been informed of the location of the population so that appropriate protective measures can be implemented. Adjacent landowners should also be informed to prevent possible damage to the population through farming activities.

- **Airborne dust** produced from vehicle movement along the access track to the mine may threaten *Drakaea isolata* ms. Dust may coat and damage associated vegetation and may also modify the soil pH (current pH is 6). This has the potential to adversely affect *Drakaea isolata* ms.

- **Changes to hydrology** would radically affect *Drakaea isolata* ms. The species depends on seasonally moist soil and if the water table either rises or falls it is likely to result in the death of plants.

- **Salinity** is a possible follow-on effect of changing hydrology. It would seriously threaten the single known population of *Drakaea isolata* ms and severely degrade its habitat.

- **Fire** in late Autumn, Winter and Spring (May to October) would kill plants of *Drakaea isolata* ms. 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 or early May and dehisce their seed by 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. These produce an annual fuel load that is usually more combustible than the original native vegetation. Further investigation is required and will be addressed in recovery action 8.

Summary of population information and threats

Pop. No. & Location	Land Status	Year/No. plants	Condition	Threats
1a,b. Chinocup	Nature Reserve and unallocated Crown land	1989 250* 1999 62 (77)	Moderate	Salinity, dust, water logging, road maintenance, fire
1c. Chinocup	Shire road reserve	1989 unknown 1999 13	Moderate	Salinity, dust, water logging, road maintenance, fire

Note: * total for both subpopulations combined. Numbers in brackets refers to immature (non-flowering) plants.

Guide for decision-makers

[1] Andrew Batty, Botanic Gardens and Parks Authority

Section 1 provides details of current and possible future threats. Development, including road maintenance or widening, in the immediate vicinity of the population or within the defined critical habitat of *Drakaea isolata* ms will require assessment. Developments should not be approved unless the proponents can demonstrate that they will not have a negative impact on the species, its habitat or its potential habitat.

2. RECOVERY OBJECTIVES AND CRITERIA

Objectives

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

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

Criteria for failure: The number of individuals within the population has decreased or the population is destroyed.

3. RECOVERY ACTIONS

Existing recovery actions

Appropriate land managers have been informed of the species' location and their legal obligations. The Shire of Kent and the Department of Land Administration (DOLA) have been formally notified of the presence of *Drakaea isolata* ms on land under their control. These notifications detailed the Declared Rare status of the taxon and the associated legal responsibilities.

Awareness of the significance of Declared Rare Flora (DRF) markers is being promoted to Shires and landowners through the distribution of dashboard stickers and posters. These illustrate DRF markers, describe their purpose and provide a contact telephone number if a marker is encountered during works.

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

In 1999 BGPA collected seed from approximately 12 plants and stored it in liquid nitrogen. An attempt to isolate the associated mycorrhizal fungus failed as *Drakaea* mycorrhizal fungi are very slow growing and difficult to work with. Isolations are likely to be attempted by BGPA again in 2000. Germination and propagation trials will begin once the appropriate mycorrhizal fungus has been obtained.

CALM and members of the Western Australian Native Orchid Study and Conservation Group have undertaken several surveys for the species but no new populations were found. The Katanning District Conservation Officer, in conjunction with WATSCU and BGPA, undertook a full survey of the Chinocup area in September-October 1999. Seventy five flowering orchids and 77 juvenile plants were counted.

Leaf material was collected in 1999 for DNA analysis. This was part of a world orchid classification study undertaken by the Department of Botany at Oklahoma University, U.S.A.

Water tables are being monitored to detect any rise or increasing salinity.

Seed and plant material was collected by BPGA in 1999 for propagation trials.

The Katanning District Threatened Flora Recovery Team (KDTFRT) is overseeing the implementation of this IRP and will include it in its annual report to CALM's Corporate Executive and funding bodies.

Staff from the CALM Katanning District Office regularly monitor the population.

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 KDTFRT oversees the implementation of recovery actions for *Drakaea isolata* 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 (Katanning District) through the KDTFRT
Cost: $600 per year

2. Install Declared Rare Flora markers at Subpopulation 1c

Declared Rare Flora (DRF) markers are required for a track running past subpopulation 1c. Their purpose is to alert people operating in the area (eg, Shire staff and contractors, Bushfire Brigade and so on) to the presence of DRF.

Action: Install DRF markers at Subpopulation 1c
Responsibility: CALM (Katanning District) through the KDTFRT
Cost: $500 in first year

3. Notify and liaise with land managers

Officially notify the mining company of the presence of DRF adjacent to their lease. Staff from CALM's Katanning District will continue liaison with the tenement holder and the adjacent landowners to ensure the population is not damaged or destroyed accidentally.

Action: Notify and liaise with land managers
Responsibility: CALM (Katanning District) through the KDTFRT
Cost: $600 per year

4. Develop and implement a fire management strategy

A fire management strategy that includes fire control measures, fire frequency and timing will be developed in consultation with relevant authorities and land managers.

Action: Develop and implement a fire management strategy
Responsibility: CALM (Katanning District) through the KDTFRT
Cost: $2,600 in first year and $1,100 in subsequent years

5. Monitor population

Monitoring of factors such as dust levels and its impact on the habitat of *Drakaea isolata* ms, weed invasion, habitat degradation, and population stability (expansion or decline), pollinator activity, seed production, recruitment, and longevity will be conducted annually.

Action: Monitor population
Responsibility: CALM (Katanning District) through the KDTFRT
Cost: $1,500 per year

6. Collect seed

Due to their being a single wild population, collection of germplasm will be given a high priority. Hand pollination of the orchid may be required to promote a higher seed set.

Action: Collect seed
Responsibility: CALM (Katanning District) and BGPA, through the KDTFRT
Cost: $3,200 per year

7. Conduct further surveys

Further surveys will be conducted during the species' flowering period (September to early October). These will include volunteer members of naturalists clubs, the WA Native Orchid Study and Conservation Group (WANOSCG) and wildflower societies and will be supervised by CALM staff.

Action: Conduct further surveys
Responsibility: CALM (Katanning District) through the KDTFRT
Cost: $2,100 per year

8. Obtain biological and ecological information

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

1. Determination of reproductive strategies, phenology and seasonal growth.
2. Study of seed set and natural recruitment.
3. A study of the population dynamics and the effect of disturbance, competition, rainfall, and grazing on recruitment and seedling survival.
4. Investigation of population genetic structure, levels of genetic diversity and minimum viable population size.
5. The effect of changes in hydrology on the population.

Action: Obtain biological and ecological information
Responsibility: CALM (CALMScience, Katanning District) through the KDTFRT
Cost: $16,800 per year

9. Promote awareness

The importance of biodiversity conservation and the need the need for the long-term protection of *Drakaea isolata* ms in the wild will be promoted to the public through the local print and electronic media and through poster displays. An information sheet that includes a description of the plant, its habitat type, threats and management actions has been produced. Formal links with local naturalist groups and interested individuals will also be encouraged.

A poster for *Drakaea isolata* ms has been produced and distributed. It includes photographs of the species and its habitat, a description of the plant, and a description of its habitat, threats and management actions. The exact location of the species will remain confidential.

Action: Promote awareness
Responsibility: CALM (Katanning District, Corporate Relations) through the KDTFRT
Cost: $800 per year

10. Start the translocation process

Due to the single known population and the low number of extant plants, translocation may be essential for the long-term conservation of this species. Although translocations are generally undertaken under full Recovery Plans, it is possible to begin the translocation process within the time frame of an Interim Recovery Plan by ensuring that seed is stored, plants are cultivated and suitable translocation sites are selected. 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.

Action: Start the translocation process
Responsibility: CALM (CALMScience, Katanning District) through the KDTFRT
Cost: $3,700 in third year

11. Investigate the possibility of acquiring unallocated crown land

The possibility of adding the area of unallocated crown land that contains *Drakaea isolata* ms subpopulation 1b to Chinocup Nature Reserve will be investigated.

Action: Investigate the possibility of acquiring unallocated crown land
Responsibility: CALM (Katanning District, WATSCU) through the KDTFRT
Cost: $600 in second year

12. Develop a full Recovery Plan

At the end of the second-year of this IRP, the need for further recovery will be assessed. If *Drakaea isolata* ms is still ranked Critically Endangered at that time a full Recovery Plan will be developed that prescribes actions required its long-term recovery.

Action: Develop a full Recovery Plan
Responsibility: CALM (WATSCU, Katanning District) through the KDTFRT
Cost: $17,100 in third year

4. TERM OF PLAN

This Interim Recovery Plan will operate from December 2000 to November 2003 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 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
Brett Beecham	Regional Ecologist, CALM Wheatbelt Region
Norm Caporn	Senior Forester, Environmental Protection Branch
Mal Graham	District Operations Officer, CALM Katanning District
Bethea Loudon	Flora Conservation Officer, CALM Katanning District

We would like to thank the staff of the W.A. Herbarium for providing access to Herbarium databases and specimen information, and CALM's Wildlife Branch for their extensive assistance.

6. REFERENCES

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7. TAXONOMIC DESCRIPTION

Hoffman, N. and Brown, A. (1998). *Orchids of South-west Australia*. Revised 2nd edition with supplement. University of Western Australia Press, Nedlands.

Although it is similar to the Late Hammer Orchid, *Drakaea confluens* in having a densely-hairy leaf, this species has a much smaller, uniformly coloured flower and a somewhat earlier flowering period. Its scientific name is derived from the latin '*isolatus*', meaning isolated and refers to this orchid's distribution which is well inland of all other *Drakaea* species.

S.D. Hopper and A.P. Brown (ined.) Revision of the genus *Drakaea*

Drakaea isolata is related to *D. confluens*, differing in its smaller flowers, and its uniformly coloured labellum lamina with a narrow abdomen in side view gradually curving up to the tail. It is also similar to *D. thynniphila*, but has a shorter scape, and a labellum with a convexly curved outline to the abdomen in side view, longer hairs and a narrower more extended neck. *D. isolata* is noticeably disjunct from all other *Drakaea* species except *D. confluens*, and occurs with similarly disjunct populations of *Paracaleana triens*.