INTERIM RECOVERY PLAN NO. 24

SPIRAL FRUITED WATTLE

(ACACIA COCHLOCARPA SUBSP. *COCHLOCARPA* MS*)*

INTERIM RECOVERY PLAN

1999-2002

by
Gillian Stack and Val English

Photograph: Bruce Maslin

April 1999

Department of Conservation and Land Management
Western Australian Threatened Species and Communities Unit
PO Box 51, Wanneroo, WA 6946.

Natural Heritage Trust
Helping Communities Helping Australia

Department of Conservation and Land Management

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This Interim Recovery Plan will operate from April 1999 to March 2002 but will remain in force until withdrawn or replaced.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.

This IRP was approved by the Director of Nature Conservation on 30 August 1999. 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 March 1999.

SUMMARY

Scientific Name: ***Acacia cochlocarpa* subsp. *cochlocarpa* ms**
Common Name: Spiral fruited Wattle
Family: MIMOSACEAE
Flowering Period: June-July
CALM Region: Midwest
CALM District: Moora
Shire: Moora
Recovery Team: Moora District Threatened Flora Recovery Team (MDTFRT)

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.

Current status: *Acacia cochlocarpa* subsp. *cochlocarpa* ms was Declared as Rare Flora in November 1997, and ranked as Critically Endangered (CR) in November 1998. It currently meets World Conservation Union (IUCN) Red List category 'CR' under criterion C2a (IUCN 1994) as there are currently only 132 plants known from a single wild population. This population occurs in a highly disturbed situation on a road reserve and private property, and the taxon is affected by loss and fragmentation of habitat. The main threats are road and track maintenance activities, fire and insect galling.

Habitat requirements: *A. cochlocarpa* subsp. *cochlocarpa* ms is found on clayey sand with laterite. Plants occur in disturbed open low scrub on a road reserve and on private property. Associated species include *Allocasuarina campestris,* a number of *Acacia* species and *Hakea scoparia*. The taxon is endemic to the Watheroo area of Western Australia.

Existing Recovery Actions: The following recovery actions have been or are currently being implemented -
1. Surveys for new populations.
2. Land managers notified of presence of *A. cochlocarpa* subsp. *cochlocarpa* ms.
3. Declared Rare Flora (DRF) markers installed.
4. Seed collected and stored.
5. Implementation of first phase of the translocation plan.
6. All populations regularly monitored.

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

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

Recovery actions
1. Implement approved Translocation Proposal.
2. Monitor population.
3. Develop a fire management strategy.
4. Preserve genetic diversity of the taxon.
5. Obtain biological and ecological information.
6. Conduct further surveys.
7. Disseminate information.
8. Write full Recovery Plan.

1. BACKGROUND

History

This taxon was first collected over 150 years ago, and a taxonomic description of *A. cochlocarpa* was published in 1855. During surveys undertaken in 1996 only one extant population was located from old collection sites. A translocation was carried out in August 1998 to address the significant immediate threats posed to this taxon from the low number of plants and fragmentation of habitat. This translocation is being conducted on an experimental basis, and will also provide information about effective techniques for future translocations.

Description

Acacia cochlocarpa subsp. *cochlocarpa* ms is a sprawling, glabrous shrub to 70 cm tall and up to 3 m wide, with slightly flexuose branchlets. The phyllodes are curved and erect, up to 7.5 cm long and 6 mm wide, with 7 nerves per face. The flower heads are golden, sessile and cylindrical, 7-10 mm long. The tightly coiled seedpods are 3-4 mm wide (Chapman and Maslin, unpublished). The distinctive and attractive appearance of this plant may offer appeal for horticulture. *A. cochlocarpa* subsp. *velutinosa* ms occurs near Manmanning and differs in its shorter phyllodes, velvety branchlets, phyllodes and legumes, and in its smaller, oblongoid flower heads. *A. cochlocarpa* subsp. *cochlocarpa* ms is also similar to *A. alocophylla*, which has 8-nerved phyllodes, and to *A. tetraneura*, which has 4-nerved phyllodes and bracteoles exserted on the buds (Chapman and Maslin, unpublished).

Distribution and habitat

A. cochlocarpa subsp. *cochlocarpa* ms has been recorded in the past over a range of almost 250 km, from north of Watheroo to the Swan River near Perth. The majority of these collections were made over a range of about 20 km to the north of Watheroo, but most of these roadside populations appear to have been lost. Only one population is currently known to exist. The subspecies is found in a disturbed roadside on clayey sand with laterite. It occurs in open low scrub of *Allocasuarina campestris*, a number of *Acacia* species and *Hakea scoparia*.

Biology and ecology

The biology and ecology of *A. cochlocarpa* subsp. *cochlocarpa* ms is poorly known. It appears to be highly palatable to stock. In 1996, CALM Threatened Flora Seed Centre (TFSC) staff observed predation of fruits and low fruit production due to galling of the flowers caused by insects. In 1997 fruit production was greater than the previous year. The causes of these variations are unknown, but not uncommon in wild populations of native plants.

Many Australian species of *Acacia* are highly adapted to surviving the fires that are a regular occurrence in many Australian habitats. Germination of *Acacia* seed is often stimulated by fire but depends on factors such as fire intensity and seed depth in the soil. Some *Acacia* species are 'soft-seeded' and are damaged by fire (Cavanagh 1987). No accurate information is available about the response of *A. cochlocarpa* subsp. *cochlocarpa* ms to fire, but it is most frequently the case that germination of the soil seed bank will be stimulated by such an event.

Threats

This taxon is ranked as Critically Endangered under IUCN Red List Criterion C2a (IUCN 1994) due to the low number of extant plants (132) and all individuals being in a single population. The main threats are road and track maintenance activities, inappropriate fire regimes and insect galling.

- **Road maintenance activities** threaten *A. cochlocarpa* subsp. *cochlocarpa* ms plants as well as the surrounding habitat, as plants occur close to the road edge. Activities that threaten the plants include grading of the road reserve, construction of drainage channels and mowing the roadside vegetation to improve visibility. These disturbance events also often encourage weed invasion into the habitat.

- **Track maintenance activities** such as grading could impact on the taxon, as some plants occur downslope of a track and could be partially buried by road material.

- **Inappropriate fire regimes** could adversely affect the viability of the population. Seeds of *A. cochlocarpa* subsp. *cochlocarpa* ms probably germinate following fire and the soil seed bank would rapidly be depleted if fires recurred before regenerating or juvenile plants reached maturity and replenished the soil seed bank. However, it is likely that occasional fires are needed for reproduction of this taxon.

- **Insect galling** is a threat to the reproductive capacity of the taxon as the galls occur on flowers and prevent them from being pollinated and developing seed.

Summary of population information and threats

Pop. No. & Location	Land Status	Date / No. of Plants	Condition	Threats
1a. N of Watheroo	Private property	09.91 12 10.91 38 07.96 42 07.98 47	Moderate	Track maintenance activities, fire, insect galling
1b. N of Watheroo	MRWA Road reserve	10.91 13 07.96 60 07.98 85	Moderate	Road maintenance activities, fire, insect galling

2. RECOVERY OBJECTIVES AND CRITERIA

Objective

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

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

3. RECOVERY ACTIONS

Existing recovery actions
All appropriate people have been made aware of the existence of this taxon and its locations. Main Roads Western Australia (MRWA) and the private property owners were formally notified of the presence of *A. cochlocarpa* subsp. *cochlocarpa* ms populations on their lands in January 1998. These notifications detailed the Declared Rare status of the taxon and the associated legal responsibilities. The area of private property is used by other land managers for access to other properties. These land managers have also been shown the plants and have expressed an interest in the rare flora.

Declared Rare Flora (DRF) markers have been installed at Population 1. 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, MRWA and Westrail. 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.

Seed was collected from 11 plants from the only known population in November 1996, resulting in over 1500 seeds being stored at -18°C in CALM's TFSC. The TFSC tests the viability of the seed initially, after one year in storage, and again after five years. The initial germination rate of this seed was found to be approximately 39%, and after one year in storage was 42%. Over 10 000 seeds were collected from 30 plants in the same population in November 1997. This material had an initial germination rate of 72%. It was noted that fruit set was much better in 1997 than 1996.

In August 1998, 1500 *A. cochlocarpa* subsp. *cochlocarpa* ms seeds were planted into a Nature Reserve near Watheroo, consistent with an approved Translocation Proposal. It is not expected that all of these will germinate or survive, but it is hoped that some will survive at each of 300 grid points. By December 1998 there had been 25% germination. The translocation is being conducted on an experimental basis, and will also provide information about effective techniques for future translocations. The treatments being tested are mulching, watering once a week from early November to late April, and a combination of the two. The site will be monitored quarterly until May 2001. After that, the site will be monitored annually.

Staff from CALM's Moora District regularly monitor the population.

The Moora District Threatened Flora Recovery Team (MDTFRT) 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.

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. Implement approved Translocation Proposal

Translocation is essential for the conservation of this taxon as the number of extant plants is very low, and the only known population occurs on road reserve and private property, where it is threatened by weed competition, fire and road maintenance activities. 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*.

A Translocation Proposal has been approved for this taxon. The first planting has occurred, and monitoring will be ongoing. A second planting is proposed for June 1999.

Action: Implement approved Translocation Proposal
Responsibility: CALM (CALMScience, Moora District) through the MDTFRT, KPBG
Cost: $16,500 for year 2; $5,300 for year 3.

2. Monitor population

Monitoring of factors such as weed densities, habitat degradation, population stability (expansion or decline), pollination activity, seed production, recruitment and longevity is essential. The visibility of DRF markers will also be monitored. The paint may become dull, and weed or other vegetation growth may obscure markers, rendering them ineffective. Their visual prominence will be maintained so that they remain effective.

Populations will be inspected annually.

Action: Monitor population
Responsibility: CALM (Moora District) through the MDTFRT
Cost: $700 per year.

3. Develop a fire management strategy

Little is known about the effects of fire on this taxon. It is likely that the taxon requires occasional fire for recruitment from soil-stored seed, but frequent fires may be detrimental to its long-term survival. Fire also promotes the introduction and proliferation of weed species.

A fire management strategy will be developed by CALM's Moora District in consultation with relevant land managers and the MDTFRT.

Action: Develop a fire management strategy

Responsibility: CALM (Moora District) through the MDTFRT, relevant land managers
Cost: $2,900 for year 1.

4. Preserve genetic diversity of the taxon

It is necessary to store germplasm as a genetic resource, available for use as stock for translocation purposes and as an *ex situ* genetic 'blueprint' of the taxon. The germplasm stored will include seed and live plants in cultivation. Some seed has been collected from Population 1. However, some of this has been used for translocation and further collection is necessary to maintain adequate representation of the remaining genetic diversity of this taxon. Care needs to be taken, as these processes carry an inherent risk of depletion of seed bank reserves. The first aim of germplasm collection should be the preservation of the taxon in the wild.

Propagation of the taxon by cuttings will be attempted. If this is unsuccessful, other techniques such as grafting or propagation of tissue culture material may need to be investigated. As resources are limited these techniques will need to be carefully prioritised in relation to *in situ* conservation. This will be coordinated by the MDTFRT.

Action: Preserve genetic diversity of the taxon
Responsibility: CALM (TFSC, Moora District), KPBG, through the MDTFRT
Cost: $2,800 for year 1 and 2.

5. Obtain biological and ecological information

Increased knowledge of the biology and ecology of the taxon will provide a scientific basis for future management of *A. cochlocarpa* subsp. *cochlocarpa* ms in the wild. Investigations will include:

1. Study of the soil seed bank dynamics and the role of various factors (disturbance, competition, rainfall, 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, Moora District) through the MDTFRT
Cost: $16,500 per year.

6. Conduct further surveys

Further survey for the taxon will be undertaken during its flowering period (June-July) on a systematic basis in areas of suitable habitat. Appropriate habitat on private lands will be surveyed where possible. Volunteers from the local community, Wildflower Societies, Naturalist Clubs and other community-based groups will be involved in surveys supervised by CALM staff.

Suggested survey locations include Watheroo National Park and likely habitat near previous collection sites south of Marchagee, and west of Moora.

Action: Conduct further surveys
Responsibility: CALM (Moora District, Perth District) through the MDTFRT
Cost: $2,000 per year.

7. Disseminate information

The importance of biodiversity conservation, the preservation of critically endangered species generally and *A. cochlocarpa* subsp. *cochlocarpa* ms in particular will be promoted to the public. Awareness will be encouraged in the community through a publicity campaign using the local print and electronic media and poster displays. Formal links with local naturalist groups and interested individuals will also be encouraged. A poster illustrating all critically endangered flora taxa in Moora District will be prepared and displayed at Shire Offices and

shopping centres. An information sheet for *A. cochlocarpa* subsp. *cochlocarpa* ms will also be produced. This will include photographs, a description of the plant, its habitat type, threats and management actions. The exact location of this taxon will remain confidential. The information sheets will be distributed to the public through CALM's Moora District office and at the office and library of the Shire of Moora. Copies will also be supplied to the Fire and Rescue Service, Westrail, MRWA and Agriculture Western Australia (AgWA) to raise their awareness of the plant and its appearance. Such activities may lead to the discovery of new populations of the taxon.

Action: Disseminate information
Responsibility: CALM (Moora District, Corporate Relations Division) through the MDTFRT
Cost: $400 for years 1 and 3, $1,000 for year 2.

8. 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 taxon is still ranked Critically Endangered, a full Recovery Plan will be written to describe action required for long-term maintenance of the taxon.

Action: Write full Recovery Plan
Responsibility: CALM (Moora District) through the MDTFRT
Cost: $19,100 for year 3.

4. TERM OF PLAN

This Interim Recovery Plan will operate from April 1999 to March 2002 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:

Anne Cochrane	Manager, CALM Threatened Flora Seed Centre.
Sophie Juszkiewicz	Propagator, Kings Park and Botanic Garden.
Bruce Maslin	Senior Research Scientist, CALMScience.
Leonie Monks	Research Scientist, CALMScience.
Diana Papenfus	Botanist, previously CALMScience.
Sue Patrick	Senior Research Scientist, CALMScience.
Robyn Phillimore	Project Officer, CALM W.A. Threatened Species and Communities Unit.
Rebecca Wolstenholm	Previously Conservation Officer, CALM Moora District.

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

6. REFERENCES

Brown, A., Thomson-Dans, C. and Marchant, N. (eds.) (1998). *Western Australia's Threatened Flora*. Department of Conservation and Land Management, Western Australia.

CALM (1992). Policy Statement No. 44 *Wildlife Management Programs*. Department of Conservation and Land Management, Western Australia.

CALM (1994). Policy Statement No. 50 *Setting Priorities for the Conservation of Western Australia's Threatened Flora and Fauna*. Department of Conservation and Land Management, Western Australia.

CALM (1995). Policy Statement No. 29 *Translocation of Threatened Flora and Fauna*. Department of Conservation and Land Management, Western Australia.

Cavanagh, T. (1987). Germination of Hard-seeded Species (Order Fabales). Pp. 58-70 in P.L. Langkamp (ed.). *Germination of Australian Native Plant Seed*. Inkata Press, Melbourne.

Chapman A.R. and Maslin, B.R. (unpublished reference). Taxonomic Description of *Acacia cochlocarpa* subsp. *cochlocarpa* ms.

World Conservation Union (1994). IUCN Red List Categories prepared by the IUCN Species Survival Commission, as approved by the 40th meeting of the IUCN Council. Gland, Switzerland.

7. TAXONOMIC DESCRIPTION

This unpublished taxonomic description of *A. cochlocarpa* subsp. *cochlocarpa* ms by A.R. Chapman and B.R. Maslin is included with kind permission from Australian Biological Resources Study (ABRS). This description was prepared as a treatment for *Flora of Australia*.

Two subspecies of *Acacia cochlocarpa* are recognised in the following key:

1. Phyllodes generally >4 cm long, branchlets, phyllodes and legumes glabrous, heads 7-10 mm long, oblongoid to short-cylindrical ..... **Acacia cochlocarpa subsp. cochlocarpa**
2. Phyllodes generally <4 cm long, branchlets, phyllodes and legumes velutinous, heads 5-7 mm long, subglobular ..... **Acacia cochlocarpa subsp. velutinosa**

***Acacia cochlocarpa* subsp. *cochlocarpa* ms**

Glabrous shrub. Phyllodes linear to narrowly elliptic, 3-7.5 cm long, commonly 7 nerves per face, midrib equidistant from margins; stipules caducous. Heads oblongoid to short-cylindrical, 7-10 mm long; bracteoles obovate, obtuse. Legumes tightly coiled.

Restricted to near Watheroo with an early collection W of Moora, W.A. Grows on sand or sandy laterite. Survives in disturbed roadside situations.