TRANSLOCATION PROPOSAL
Spiral-fruited Wattle,
Acacia cochlocarpa Meisn. subsp. *cochlocarpa* ms.

1. SUMMARY

Acacia cochlocarpa Meisn subsp. *cochlocarpa* ms (Spiral-fruited Wattle) is known from two small populations, of just 38 and 13 individuals respectively. The populations are only 500 m apart, occurring on a narrow road verge and in a small area of remnant vegetation north of Watheroo in the Moora CALM District.

A. cochlocarpa subsp. *cochlocarpa* is a sprawling, glabrous shrub to 0.7 m tall and up to 3 m wide. The branchlets are slightly flexuose. The phyllodes are linear to slightly elliptic, 3-7.5 cm long, 3-6 mm wide, incurved and erect, with 7 nerves per face. The flower heads are golden, sessile and cylindrical, 7-10 mm long. Flowering occurs from June to July.

This species was first collected from the "Swan Colony" by James Drummond and subsequently named by Meissner in 1855. Since then only 12 further collections have been made. An intensive survey for this species was undertaken by Diana Papenfus in 1996, however, no new populations were located. It is believed that the rarity of this species is caused by the extensive clearing for agriculture that has occurred in the area. The species was declared as Rare Flora in November 1997 and subsequently ranked as Critically Endangered in 1997. An Interim Recovery Plan is being written for this subspecies (Stack and Brown in prep).

The aim of this translocation proposal is to conserve the wild genetic stock of the subspecies by establishing another viable population of *A. cochlocarpa* subsp. *cochlocarpa.* This will be achieved by translocating (introducing) this species to a secure CALM managed reserve. This translocation proposal outlines the need for translocation of the critically endangered *A. cochlocarpa* subsp. *cochlocarpa*, the site selection process, the design of the translocation site and the provisions for monitoring. In addition it outlines the criteria for success or failure of this proposed translocation.

2. PROPONENTS

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3. BACKGROUND

3.1 History, Taxonomy and Status

Acacia is a large Australia genus, commonly known as wattles, comprising of some 700 named species.

Acacia cochlocarpa subsp. *cochlocarpa* is a sprawling, glabrous shrub to 0.7 m tall wide. The branchlets are slightly flexuose. The phyllodes are glabrous, linear to slightly elliptic, 2.5-4 cm long, 3-6 mm wide, leathery to touch, incurved and erect, with 5-7 strongly raised nerves per face and olive green in colour. Inflorescence are simple, 2 per axil, golden, sessile and short-cylindrical, 7-10 mm long. The legumes are tightly coiled into pendulous cylinders 3-4 mm wide. (Chapman and Maslin, in prep.). Very little is known about the biology and ecology of this subspecies. Germination is known to be low, ranging from 36 - 71% (A. Cochrane pers comm).

The first known collection of *A. cochlocarpa* was made by J. Drummond and subsequently named by Meissner in 1855. Maslin and Cowan (1994), after assessing much of Meissners' work suggested that there are two subspecies within the species - *A. cochlocarpa* subsp. *cochlocarpa* and *A. cochlocarpa* subsp. *velutinosa.* They differ in that *A. cochlocarpa* subsp. *velutinosa* has shorter phyllodes, smaller oblongoid flower heads and branchlets, phyllodes and seed pods covered in velvety hairs. *A. cochlocarpa* subsp. *velutinosa* is restricted to an area near Manmanning and is listed as Priority One under the W. A. Wildlife Conservation Act.

Due to the small population sizes and restricted distribution *Acacia cochlocarpa* subsp. *cochlocarpa* was declared as Rare Flora in November 1997, and ranked as Critically Endangered in 1997. An Interim Recovery Plan is being written for this subspecies (Stack and Brown in prep).

3.2 Distribution and Habitat

Only two populations of *A. cochlocarpa* subsp. *cochlocarpa* are known at present, despite the fact that this subspecies has been recorded in the past over a range of ca. 20 km north of Watheroo. Numerous searches in the Watheroo area have found no new populations of this subspecies and most of the areas where it was collected from in the past appear to have been cleared for agriculture.

The two known populations grow only 500 metres apart, occurring in red-brown clayey-gravel, within open low and dwarf scrubland over very open low grass and open herbs.

4. THE TRANSLOCATION

4.1 The Need to Translocate

The rarity of *A. cochlocarpa* subsp. *cochlocarpa* is probably due to the amount of clearing that has occurred for agricultural purposes in the Watheroo area. The largest population occurs on a small piece of remnant vegetation adjacent to the Midlands Highway, the other exists on the road side reserve along the Midland Highway. Due to the unsecured nature of the land in which the populations occur and small number of individuals the need for translocation is considered to be high. A draft Interim Recovery Plan (Stack and Brown, in prep) also recommends the translocation of this species to a secure site.

4.2 Translocation Site Selection.

A search was made of areas around the known populations at Watheroo on 23rd February 1998 to locate a suitable translocation site. An area on the north eastern corner of Reserve # was chosen as the translocation site. Endorsement for the use of this site was received from the CALM Midwest Region (Appendix three). This site was chosen because it is only 4.3 km from population 2 and 4.8 km from population 3 (by road), as well as having several attributes in common with the existing populations. The site selected was within a disused gravel pit which has subsequently been deep ripped by CALM Midwest Region in preparation for this translocation and to allow natural rehabilitation to occur. The gravel pit site was chosen so that there will be no further disturbance of the nature reserve.

As this species has not previously been recorded from this reserve this translocation can be considered an introduction under the definitions provided by Policy Statement 29 and the Guidelines for Translocation of Threatened Plants in Australia. A map of the proposed translocation site in relation to the known populations is shown in Appendix one.

The two known populations of *A. cochlocarpa* subsp. *cochlocarpa* both occur on a soil type of red-brown clay gravel. They have underlying geology of Noodine Chert (chert is defined as a form of fine grained silica) (Carter and Lipple 1982). This form of Chert contains different sizes of grains of quartz sand cemented together by silica (Carter and Lipple 1982). The proposed translocation site occurs on an identical soil type and geological formation as the two known populations.

Both the translocation site and the existing populations have a similar vegetation structure of open low scrub A and dwarf scrub D and over very open low grass and open herbs (using Muir's classification) in an area that has been disturbed in the past (D. Papenfus pers. comm). The proposed translocation site has many associated species in common with the know populations. These are shown below in Table 1. No individuals of *A. cochlocarpa subsp. cochlocarpa* were found in the proposed site during surveys for translocation sites, despite the similarity of the vegetation. It is considered highly unlikely that *A. cochlocarpa subsp. cochlocarpa* will hybridise with any species within the reserve (B. Lepschi pers. comm).

Table 1. A comparison of the main associated vegetation at the proposed translocation site within the Gunyidi Nature Reserve with the known populations of *A. cochlocarpa* subsp. *cochlocarpa*.

Main associated species of the original populations of *A. cochlocarpa* subsp. *cochlocarpa*.	Main associated species of the proposed translocation site
Acacia bidentata	
Acacia jacksonioides	
Acacia neurophylla	
Allocasuarina campestris	*Allocasuarina campestris*
	Allocasuarina drummondiana
Astroloma sp.	
Cryptandra leucopogon	
Eucalyptus sp. - mallee	
Gastrolobium appressum	
Glischrocaryon aureum	
	Grevillea ?levis
Grevillea thyrsoides	*Grevillea thyrsoides* subsp. *pusulata*
Hakea scoperia	*Hakea scoperia*
Hypocalymma sp.	
	Leucopogon sp.
Melaleuca sclerophylla	
	Petrophile shuttleworthiana

The proposed translocation site is in a previously disturbed area which has recently been deep ripped to allow natural rehabilitation to occur. The proposed site is considered to have almost identical environmental attributes of climate, soil type, vegetation structure and associated vegetation to the known populations of this species. The proposed translocation site is 4.3 and 4.8 km from the two known occurrences of this taxon, secure in a conservation reserve and therefore is considered to be the best site available for the translocation.

4.3 Translocation Design

A total of five replicates of 16m x 5m each will be measured. Each replicate will be divided into a grid of 15 x 4 rows.

In the absence of any data as to what is the best pretreatment method a fairly standard pretreatment technique will be used. That is, if there are wet soil conditions, seeds will be soaked overnight in just boiled water prior to planting out. If there are dry soil conditions seed will only be soaked in near boiling water for 15 seconds before being dried and then planted. This species is known to have a germination of between 36 and 71% (A. Cochrane pers. comm). Each hole in the grid will be planted with five seeds to increase the chance of a hole eventually containing a germinant.

A total of four treatments will be tested: control, watering, mulching or watering and mulching (see Table 2). Treatments will be randomly assigned to a row in the grid (see Appendix two for site diagram).

An irrigation system will be set up in November 1998 to water once a week those plants assigned to the watering or watering and mulching categories. A soil wetting agent will be added to the soil around all plants in November 1998.

Each plant will be permanently tagged so that each individual will always be identifiable. A cage of rabbit netting will be placed around each plot to prevent grazing of the seedlings by large herbivores.

All equipment used during translocation planting will be maintained under strict disease hygiene.

Table 2. Description of experimental treatments.

Treatment	Description of Treatment
Control	Plants not given any treatment.
Mulched	A layer of mulch is placed around the plant to see whether it enhances survival by increasing water retention.
Watered	Plants will be watered with a set amount of water once a week for 24 weeks from the start of November to the end of April to see whether watering over the first summer enhances survival
Watered and mulched	A layer of mulch is placed around the plant and in addition plants will be watered with a set amount of water once a week for 24 weeks from the start of November to the end of April to see whether it is a combination of both watering and mulching that enhances survival.

Monitoring of the translocated population will be undertaken every second month commencing one month after the planting out of the seeds. Monitoring will include counting the number of surviving germinants, height of the surviving germinants, width of the crown of the surviving germinants in two directions (so that crown volume can be calculated), reproductive state, number of inflorescences and pods, whether second generation plants are present and general health of the plants. A set photo point will be allocated for each plot and a photo will be taken each time monitoring takes place.

Monitoring of the original populations will also occur every second month in conjunction with monitoring of the translocated populations. This will provide essential baseline data for assessing the performance of the translocated population. Monitoring will include counting the number of individuals, height and crown width of the individuals, reproductive state, number of inflorescences and pods and general health of the plants.

4.4 Source of Plants

Seed was collected under guidelines outlined in Appendix four. Seed has been sourced from both populations from a bulk collection from 30 plants for planting at the translocation site in 1998.

4.5 Criteria for Success or Failure

Criteria for Success

- Short Term: germination and establishment of translocated seed
  production of flowers and seed
  after one generation the number of individuals is sustained by natural recruitment
- Long Term: after two or more generations the number of individuals is sustained by natural recruitment, and a soil stored seed bank has been established.
- The production of guidelines for the establishment of future translocations of related species.

Criteria for Failure

- Short Term: failure of translocated seed to germinate and establish
  failure of plants to produce flowers and seed
- Long Term: there is a significant decline in the size of the translocated population due to lack of natural recruitment

5. TIMETABLE

Time	Action
November 1997	Seed collection.
February 1998	Translocation site selected.
April 1998	Translocation proposal submitted for review.
June - July 1998	Translocation of seeds into the Gunyidi Nature reserve.
July - August 1998	Follow up monitoring and maintenance of translocation site.
August 1998 - May 1999	Monitoring and maintenance of translocation site.
November 1998	Seed collection.
October 1998	Translocation proposal for 1999 translocation submitted for review.
November 1998	Setting up of irrigation system.
November 1998	A batch of seeds put down for germination. Resulting seedlings raised at Kings Park and Botanic Gardens.
April 1999	Progress report.
May - June 1999	Translocation of seedlings into the Gunyidi Nature Reserve.
June - July 1999	Follow up monitoring and maintenance of translocation site.
August 1999 - May 2001	Monitoring and maintenance of translocation site.
May 2001	Final Report

6. FUNDING

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7. ACKNOWLEDGMENTS

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8. REFERENCES

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Maslin B.R. and Cowan R.S. (1994) C.F. Meissner's species of *Acacia* (Leguminosae: Mimosoideae): typification of the names. Nuytsia 9(3), pp 399 - 414.

Stack G. and Brown A. (In Prep) Spiral-fruited Wattle *(Acacia cochlocarpa* subsp. *cochlocarpa)* Interim Recovery Plan.

Appendices One, three and four may be available on contacting the authors.

Appendix Two.

Site Diagram for Proposed Translocation of *Acacia cochlocarpa subsp. cochlocarpa*

1500 seeds will be planted with 5 seed planted per hole to ensure at least one seedling per hole will eventuate. These will be planted as shown in the diagram below, with five seeds planted at each point marked with an asterix (*).
The four treatments of control, watered and mulched, watered and mulched will be assigned as per the diagram below.

Replicate 1

Watered	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Control	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Watered and Mulched	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Mulched	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

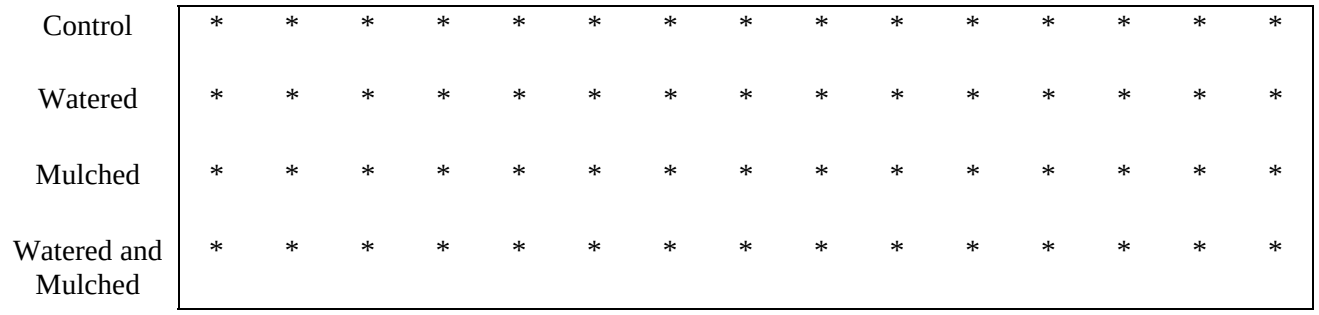
Replicate 2

Control	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Watered and Mulched	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Mulched	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Watered	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

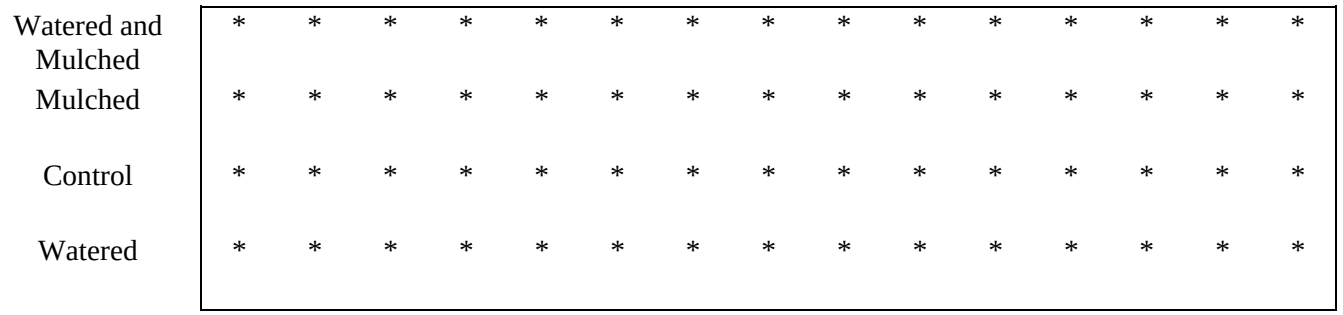
Replicate 3

Mulched	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Watered and Mulched	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Watered	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Control	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

Replicate 4



Replicate 5



Scale: 1 m