INTERIM RECOVERY PLAN NO. 70

WONGAN CACTUS

(*DAVIESIA EUPHORBIOIDES*)

INTERIM RECOVERY PLAN

2000-2003

Robyn Phillimore & Andrew Brown

Photograph: Stephen Hopper

July 2000

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

FOREWORD

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

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

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

This Interim Recovery Plan will operate from July 2000 to June 2003 but will remain in force until withdrawn or replaced.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.

This IRP was approved by the Director of Nature Conservation on 24 October, 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 July 2000.

SUMMARY

Scientific Name: ***Daviesia euphorbioides***
Common Name: Wongan Cactus
Family: Papilionaceae
CALM Region: Wheatbelt
CALM District: Merredin
Shires: Wongan-Ballidu, Dowerin, Goomalling
Recovery Team: Merredin District Threatened Flora Recovery Team (MDTFRT)
Flowering Period: June - July

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; Leigh, J., Boden, R. and Briggs, J. (1984) Extinct and Endangered Plants of Australia. The MacMillan Company of Australia Pty Ltd, Melbourne.

Current status: *Daviesia euphorbioides* was declared as Rare Flora in October 1996 and was ranked as Critically Endangered (CR) in February 1997. It currently meets World Conservation Union (IUCN 1994) Red List Category 'CR' under criterion C2a due to the severe fragmentation of populations and a continuing decline in plant numbers. It is known from only 12 populations totalling 72 mature individuals. The main threats include weeds, fire, chemical drift, rabbit warren construction, road and track maintenance, and poor regeneration.

Habitat requirements: *Daviesia euphorbioides* is endemic to the Merredin District where it is found between Wongan Hills and the Dowerin area, over a geographic range of 85 km. It appears to prefer sandplain habitat, with heath dominated by *Casuarina* and *Actinostrobus*. Associated species include *Conospermum brownii*, *Boronia coerulescens*, *Glischrocaryon aureum*, *Lysinema ciliatum*, *Verticordia chrysantha* and *Calytrix* sp. It is also often found growing with sticky hemigenia (*Hemigenia viscida*) (Rye, 1980).

Critical habitat: The critical habitat for *Daviesia euphorbioide*s comprises the area of occupancy of the known populations; areas with a sandplain habitat, with heath dominated by *Casuarina* and *Actinostrobus* within 200 metres of known populations; corridors of remnant vegetation that link populations; additional areas with a sandplain habitat, with heath dominated by *Casuarina* and *Actinostrobus* and that do not currently contain the species.

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

1. All appropriate land managers have been informed of the species' location and their legal obligations.
2. Declared Rare Flora (DRF) markers have been installed at most road and rail populations.
3. Dashboard stickers and posters that illustrate DRF markers and describing their purpose have been produced and distributed.
4. An A4 sized poster, which provides a description of the species, and information about threats and recovery actions, has been produced for the species.
5. A collection of 84 seeds was made in 1997 from population 2, and a further collection of 122 seeds from populations 1 and 2 in 1999. These are currently being stored in CALM's Threatened Flora Seed Centre at -18°C.
6. Thirteen cuttings have been taken from the wild and other ex situ sources, with a success rate of up to 50 %.
7. Investigations on habitat requirements, seed longevity, life history and germination requirements were undertaken in 1995 by CALM Science and the Botanic Garden and Parks Authority (BGPA).
8. An experimental burn was undertaken in August 1998by CALMScience.
9. Weed control research is being conducted at population 7 by CALMScience.
10. The gravel pit at subpopulation 1b was closed and the area deep ripped in 1998. The track leading into the pit from the road was also closed. The access track that runs parallel to the railway line on the northern side also has been closed to traffic and the track left to rehabilitate.
11. The Merredin District Threatened Flora Recovery Team is overseeing the implementation of this IRP.
12. CALM staff from the Merredin District Office are regularly monitoring 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 species 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. Coordinate recovery actions.
2. Stimulate germination.
3. Undertake weed control.
4. Develop and implement a fire management strategy.
5. Liaise with relevant land managers.
6. Conduct further surveys.
7. Monitor populations.
8. Control feral animals.
9. Collect seed and cutting material.
10. Rehabilitate habitat.
11. Obtain biological and ecological information.
12. Negotiate to acquire land at subpopulation 3b.
13. Propagate plants for translocation.
14. Undertake and monitor translocation.
15. Promote awareness.
16. Write full Recovery Plan.

1. BACKGROUND

History

Daviesia euphorbioides is easily recognised by its cactus-like habit, hence the common name of Wongan cactus. The species name *euphorbioides* is derived from *Euphorbia*, which is the generic name of spurge weed. The name refers to the superficial resemblance of *Daviesia euphorbioides* to that genus.

The first known collection of *Daviesia euphorbioides*, housed at the Western Australian Herbarium, was made in 1924 from Wongan Hills by C.A. Gardner. Various other collections were made between 1924 and 1984 from the Wongan Hills area.

Daviesia euphorbioides was known from 12 populations, most of which have died out over the last five years. There are currently 72 mature individuals known, most of which are located on road and rail reserves. These plants are particularly vulnerable to firebreak and access track grading and herbicide application.

Description

Daviesia euphorbioides is an erect leafless and hairless shrub to 80 cm high with very thick cylindrical branches of a pithy texture inside. The smaller branches are erect, several centimetres in length and 6 to 10 mm in diameter. The leaves are minute, scattered, prickly, conical scales less than 2 mm long. Flowers are yellow and maroon (pea-like), 7 to 8 mm in diameter, with several borne in very short racemes or clusters arising from the leaf axils along the stems. The fruit is an inflated triangular pod about 1 cm long with a large beak at one end (Leigh, Boden & Briggs, 1984). Flowering occurs from September to October (Brown *et al*., 1998).

Distribution and habitat

Daviesia euphorbioides is endemic to the Merredin District where it is confined to the Wongan Hills to Dowerin area, over a geographic range of 85 km.

Daviesia euphorbioides appears to prefer sandplain habitat, with heath dominated by *Casuarina* and *Actinostrobus*. Associated species include *Conospermum brownii*, *Boronia coerulescens*, *Glischrocaryon aureum*, *Lysinema ciliatum*, *Verticordia chrysantha* and *Calytrix* sp. It is also often found growing with sticky hemigenia (*Hemigenia viscida*) (Rye, 1980).

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 *Daviesia euphorbioides* comprises:

- the area of occupancy of the known populations,
- areas of similar habitat ie. sandplain habitat, with heath dominated by *Casuarina* and *Actinostrobus*, 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. sandplain habitat, with heath dominated by *Casuarina* and *Actinostrobus*, that do not currently contain the species (this represent possible translocation sites).

Biology and ecology

While the biology of many *Daviesia* species is well researched, the biology of *Daviesia euphorbioides* is poorly known. *D. euphorbioides* is thought to be a disturbance opportunist that lives only for a few years, reaching maturity relatively quickly (Crisp, 1985). Field evidence suggests that most populations are reaching senescence and while the sites remains undisturbed, the populations will continue to age and decline.

Daviesia euphorbioides has a hard seed coat that requires breaking or cracking for germination to occur (personal communication Anne Cochrane[1],). Hard seediness is a characteristic of many plant species which form persistent soil stored seed banks. In many of these hard seeded species the environmental cue which most commonly cracks the seed coat thereby breaking seed dormancy and allowing germination to occur is fire. Consequently it might be expected that fire is the environmental cue which initiates recruitment of seedlings in *D. euphorbioides* populations.

Currently, little is known about the fire ecology of *Daviesia euphorbioides* but recent experimental burning of five dead plants by staff from CALMScience Division resulted in the emergence of eighteen seedlings from soil-stored seed. Moreover, in areas surrounding adjacent dead plants that were not burnt, no seedlings were observed during the same period (Obbens 2000). These results together with *D. euphorbioides* germination physiology suggest that fire is an important component in the species regeneration niche.

Observations of seedling recruitment in *Daviesia euphorbioides* have also been observed following mechanical disturbance of the soil from activities such as road grading and earthworks during track rehabilitation. These events are probably consistent with germination being initiated by cracking of the seed coat, in these cases mechanical scarification associated with soil disturbance. In a recent experiment undertaken by CALMScience, which attempted to mimic the above disturbances by raking the soil around dead plants, no seedlings emerged following the treatment (Obbens 2000).

Clearly the available evidence suggests that fire may be a useful tool for increasing the number of plants and populations of *Daviesia euphorbioides*. However, fire should be used judiciously so as not to endanger extant plants. It is not known how adult *D. euphorbioides* plants respond to fire but is likely that they are killed. Consequently small carefully managed fires that are set on dead plants and which aim to stimulate the germination of soil-stored seed offers the best strategy for promoting natural regeneration.

It is presumed that *Daviesia euphorbioides* is insect pollinated, but there is currently no supportive field evidence.

[1] Anne Cochrane- Manager, CALM Threatened Flora Seed Centre

Threats

Daviesia euphorbioides was declared as Rare Flora in October 1996 and was ranked in February 1997 as Critically Endangered under IUCN Red List Criterion C2a, due to a severe fragmentation of populations and a continuing decline in plant numbers. The main threats are weeds, fire, chemical drift, rabbit warren construction, road and track maintenance and poor regeneration.

- **Weed invasion** is a threat to all 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. Narrow linear populations such as road and rail reserves are severely affected by influences from adjacent cleared land, commonly referred to as edge effects (Lynch 1987; Saunders *et al*. 1987; Taylor 1987). In addition to the proximity of a weed seed source, effects include increased wind speed, increased fertiliser runoff, modified hydrology and altered disturbance regimes, including fire.

- **Inappropriate fire regimes** may affect the viability of plants. Soil-stored seed germinates following fire and the seed bank would therefore be rapidly depleted if overly frequent fires occurred before plants have reached maturity. Too frequent fires could also deplete nutrients stored in the roots and so affect the plants' capacity to resprout. However, infrequent fires are necessary for the replacement of mature plants. In some populations, weed control will be required following fire.

- **Chemical drift** from herbicide and fertiliser applications from adjacent farmland may affect the species' growth and survival.

- **Road and track maintenance** threaten nearly all populations and their habitat. Threats include actions such as grading road reserves, spraying of chemicals, constructing drainage channels and mowing the roadside vegetation to improve visibility. As well as causing damage to actual plants, these disturbance events also often encourage weed invasion into adjacent habitat. Relevant authorities need to be informed of the location of populations so that appropriate protective measures can be implemented. Adjacent landowners should also be informed to prevent possible damage due to grazing, crop maintenance, firebreak maintenance or other activities that may threaten the populations.

- **Rabbit (*Oryctolagus cuniculus*) warren construction** at subpopulations 1b and 3a disturbs the soil around *Daviesia* plants. Increased nutrient levels from rabbit droppings and the introduction of weeds in soil disturbed by rabbits also have the potential to impact on the habitat of the species. Grazing may have an impact on the establishment of *D. euphorbioides* seedlings thus limiting the natural recruitment of the species.

- **Lack of associated native vegetation:** The species exists on some of the most degraded road reserves in CALM's Merredin District, and there is little, if any associated native vegetation to support the plants that are there. This has consequences not only for the survival of the actual plants due to exposure but also for the continued reproduction of the species. There is no associated native vegetation to support, pollinating insects (bees), seed dispersers (ants), or to provide seedling protection. Given the current degraded habitats there is little chance that this species will survive the next few years if rehabilitation is not undertaken.

- **Poor regeneration**, due to lack of appropriate disturbance, threatens most populations as very few young plants of *Daviesia euphorbioides* have been observed. This lack of regenerative capacity threatens the species as it reduces the species ability to adapt to change.

Summary of population information and threats

Pop. No. & Location	Land Status	Year/No. plants	Condition	Threats
1a. Wongan Hills	Shire Road reserve	1980 36 (4) 1999 3	Moderate	Road maintenance, no recruitment
1b. Wongan Hills	Nature Reserve	1989 27 (5) 1999 (32)	Disturbed	Grazing, trampling, weed invasion, rabbit warren construction
2. Wongan Hills	Westrail rail reserve	See 3a	Moderate	Rail maintenance, weed invasion, no recent recruitment
3a. Wongan Hills	Westrail rail reserve	1993 36 (58) 1999 +67 (2)*	Moderate	Rail maintenance, weed invasion, rabbit warren construction, poor recruitment
3b. Wongan Hills	Dept Agriculture	1989 4 1999 0	No extant plants	Weed invasion, firebreak maintenance, no recruitment
4. Dowerin	Westrail rail reserve	1983 2 1999 0	No extant plants	Rail maintenance, weed invasion, no recruitment
5a. Goomalling	Shire Road reserve	1985 9 1999 0	No extant plants	Road maintenance, weed invasion, no recruitment
5b. Goomalling	Shire Road reserve	1989 1 1999 0	No extant plants	Road maintenance, weed invasion, no recruitment
6. Wongan Hills	Shire Road reserve	1981 4 1999 0	No extant plants	Road maintenance, weed invasion, no recruitment
7. Dowerin	Shire Road reserve	1985 56 1999 0 (14)	Poor	Road maintenance, weed invasion, lack of associated native vegetation
8. Goomalling	Shire Road reserve	1987 1 1999 0	No extant plants	Road maintenance, weed invasion, no recruitment
9. Wongan Hills	MRWA Road reserve	1987 2 1999 0	No extant plants	Road maintenance, weed invasion, lack of associated native vegetation, chemical drift, no recruitment
10. Dowerin	Shire Road reserve	1987 1 1996 0 1999 2 (7)	Poor	Road maintenance, weed invasion, lack of associated native vegetation, water inundation
11.Goomalling	Shire Road reserve	1987 10 1999 0	No extant plants	Road maintenance, weed invasion, lack of associated native vegetation, no recruitment
12. Goomalling	Shire Road reserve	1987 3 1999 0	No extant plants	Road maintenance, weed invasion, lack of associated native vegetation, no recruitment
13. Goomalling	Shire Road reserve	1996 2 1999 0	No extant plants	Road maintenance, weed invasion, lack of associated native vegetation, no recruitment

Numbers in brackets are seedlings *****Populations 2 and 3a have now been 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 *Daviesia euphorbioides* require assessment. No developments should be approved unless the proponents can demonstrate that they will have no significant impact on the species, and its habitat or potential habitat.

2. RECOVERY OBJECTIVE AND CRITERIA

Objective

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

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 land managers have been made aware of the existence of *Daviesia euphorbioides* and its locations. Notifications detail the Declared Rare status of the taxon and the associated legal responsibilities.

Declared Rare Flora (DRF) markers have been installed at most road and rail populations. DRF markers alert people working in the area of the presence of threatened flora and prevent accidental damage. 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, which provides a description of the species, and information about threats and recovery actions, has been produced for *Daviesia euphorbioides*. It is hoped that the poster will result in the discovery of new populations.

A collection of 84 seeds was made in 1997 from population 2, and a further collection of 122 seeds was made from populations 1 and 2 in 1999. These are currently being stored in CALM's Threatened Flora Seed Centre at -18°C.

Thirteen cuttings of *Daviesia euphorbioides* have been taken from a combination of wild and *ex situ* sources. The success rate of these cuttings has been up to 50%. Eight plants have been produced by the Botanic Garden and Parks Authority (BGPA) from wild plants. A further eight plants were recently propagated from cuttings taken from cultivated plants grown in the BGPA nursery.

CALMScience and the BGPA undertook research on several Endangered species of *Daviesia*, including *D. euphorbioides*, in 1995. Investigations included habitat requirements, seed longevity, life history and germination requirements.

CALMScience undertook an experimental burn in August 1998, on two dead plants at population 7. Sixteen seedlings germinated as a result of the burn.

CALMScience also is conducting weed control research at population 7. Fusilade, Roundup wicking, hand weeding and fencing with shade cloth are the treatments being tested.

The gravel pit at subpopulation 1b was closed and the area deep ripped in 1998. This resulted in germination of 32 seedlings. The track leading into the pit from the road and the access track that runs parallel to the railway line on the northern side have been closed to traffic and left to rehabilitate.

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

CALM's Merredin District Office staff regularly monitors all populations.

Future recovery actions

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

1. Coordinate recovery actions

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

Action: Coordinate recovery actions
Responsibility: CALM (Merredin District) through the MDTFRT
Cost: $350 per year.

2. Stimulate germination

Burning has been shown to be an effective method of stimulating seed germination of *Daviesia euphorbioides* and will be undertaken around a number of dead plants. Yearly monitoring should continue to record the time when flowering first occurs, seed is produced and the age of senescence is reached. This will enable the interval time between disturbances to be estimated. Soil seed bank monitoring will be addressed under Recovery Action 11.

Action: Stimulate germination
Responsibility: CALM (Merredin District) through the MDTFRT
Cost: $4,600 in first and second years, $1,800 in third year.

3. Undertake weed control

Weeds are a major threat to all populations. The aim of weed control is to maintain the pre-invasion condition of the habitat (prevention), control or arrest ongoing weed invasion (intervention) and reverse the degraded condition of the habitat where applicable (rehabilitation) (Panetta & Hopkins, 1991). Weed control will be undertaken in conjunction with stimulating germination of soil stored seed by burning dead plants (Recovery Action 2) and also with habitat rehabilitation by the replanting of associated species (Recovery Action 9). The following actions will be implemented:

1. Selection of appropriate herbicides after determining which weeds are present.
2. Control invasive weeds by hand removal or spot spraying around *Daviesia euphorbioides* plants when weeds first emerge.
3. Schedule 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 *Daviesia euphorbioides* is not known and weed control programs will be undertaken in conjunction with research (see Recovery Action 10).

Action: Undertake weed control
Responsibility: CALM (Merredin District, CALMScience) through the MDTFRT
Cost: $1,000 per year.

4. Develop and implement a fire management strategy

Fire appears to kill adult plants of the species, and regeneration is likely to be largely from seed. Frequent fire may prevent the accumulation of sufficient soil stored seed to allow regeneration of the population. Fire should therefore be prevented from occurring in this area at least in the short term. A fire management strategy will be developed to determine fire control measures and fire frequency.

Action: Develop and implement a fire management strategy
Responsibility: CALM (Merredin District) through the MDTFRT
Cost: $2,400 in first year and $1,000 in subsequent years.

5. Liaise with relevant land managers

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

Action: Liaise with relevant land managers
Responsibility: CALM (Merredin District) through the MDTFRT
Cost: $800 per year.

6. Conduct further surveys

Further surveys supervised by CALM staff and with assistance from local naturalists and wildflower society members will be conducted during the species' flowering period (June to July).

Action: Conduct further surveys
Responsibility: CALM (Merredin District) through the MDTFRT
Cost: $2,100 per year.

7. Monitor populations

Monitoring of factors such as weed invasion, habitat degradation, salinity levels and population stability (expansion or decline), pollinator activity, seed production, recruitment, and longevity is essential. Rabbit activity will be monitored at subpopulation 1b and 3a and control undertaken if necessary. The populations will be inspected annually.

Action: Monitor populations
Responsibility: CALM (Merredin District) through the MDTFRT
Cost: $1,300 per year.

8. Control feral animals

Disturbance by feral animals will be monitored at subpopulations 1b and 3a, and if necessary numbers will be controlled through baiting or other alternative methods.

Action: Control feral animals
Responsibility: CALM (Merredin District) through the MDTFRT
Cost: $1,100 per year.

9. Collect seed and cutting material

A small quantity of seed has been collected from populations 1 and 2. Additional seed will be collected as required. Cuttings will also be collected to add to the living collection of genetic material at the BGPA.

Action: Collect seed and cutting material
Responsibility: CALM (Merredin District, TFSC) and the BGPA, through the MDTFRT
Cost: $3,200 per year.

10. Rehabilitate habitat

The habitat of *Daviesia euphorbioides* at populations 7, 9, 10, 11, 12 and 13 will be rehabilitated through reintroduction of local plant species. Site rehabilitation will extend beyond the current boundary of the *D. euphorbioides* populations to discourage weed invasion and to provide a buffer for extant plants.

Action: Rehabilitate habitat
Responsibility: CALM (Merredin District) through the MDTFRT
Cost: $9,600 in second year.

11. Obtain biological and ecological information

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

1. Study of the soil seed bank dynamics and the role of various factors including 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; and
5. The impact of changes in the level of salinity in the habitat.

Action: Obtain biological and ecological information
Responsibility: CALM (CALMScience, Merredin District) through the MDTFRT
Cost: $16,600 per year.

12. Negotiate to acquire land at subpopulation 3b

Subpopulation 3b is adjacent to a nature reserve that previously contained *Daviesia euphorbioides*. The possibility of acquiring the land that contains subpopulation 3b will be investigated.

Action: Negotiate to acquire land at subpopulation 3b
Responsibility: CALM (Merredin District, WATSCU) through the MDTFRT
Cost: $500 once in the second year. Additional funding required if land owner agrees to sell.

13. Propagate plants for translocation

The propagation of plants in readiness for translocation is essential as all known wild populations of *Daviesia euphorbioides* are under threat.

Action: Propagate plants for translocation
Responsibility: CALM (Merredin District) and the BGPA through the MDTFRT
Cost: $2,100 in first and second years.

14. Undertake and monitor translocation

Translocation is essential for the conservation of this species, as the total number of extant plants is low, and the only known populations are not secure. Although translocations are generally undertaken under full RPs, the many threats to wild populations of this CR subspecies requires the development of an urgent translocation proposal within the time frame of an IRP. This will be coordinated by the MDTFRT. 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, Merredin District) through the MDTFRT
Cost: $12,400 in first year, $7,100 in subsequent years.

15. Promote awareness

The importance of biodiversity conservation and the protection of the Critically Endangered *Daviesia euphorbioides* will be promoted to the public. An information sheet that includes a description of the plant, its habitat type, threats and management actions, and photos has been produced. Formal links with local naturalist groups and interested individuals will be encouraged.

Action: Promote awareness
Responsibility: CALM (Merredin District, Corporate Relations) through the MDTFRT
Cost: $600 per year.

16. 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, Merredin District) through the MDTFRT
Cost: $16,800 in third year.

4. TERM OF PLAN

This Interim Recovery Plan will operate from July 2000 to June 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:

Alex Agafonoff	Previously the Flora Conservation Officer, CALM Merredin District
Brett Beecham	Regional Ecologist, CALM Wheatbelt Region
Karen Bettink	Flora Conservation Officer, CALM Merredin District
Anne Cochrane	Manager, CALM Threatened Flora Seed Centre
Rebecca Evans	Previously, Project Officer, CALM W.A. Threatened Species and Communities Unit
Mike Fitzgerald	Project Officer, CALM Merredin District
Sophie Juszkiewicz	Propagator, Botanic Garden and Parks Authority
Leonie Monks	Research Scientist, CALMScience
Frank Obbens	Consultant, CALMScience
Diana Papenfus	Formerly, Consultant, CALM W.A. Threatened Species and Communities Unit
Paul Roberts	Manager, CALM Merredin District
Amanda Shade	Horticulturalist, Botanic Garden and Parks Authority
Colin Yates	Research Scientist, CALM W.A. Herbarium

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.

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7. TAXONOMIC DESCRIPTION

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Daviesia euphorbioides is an erect leafless and hairless shrub to 80 cm high with very thick cylindrical branches of a pithy texture inside, the smaller branches erect, several centimetres in length and 6-10 mm in diameter. Leaves are reduced to minute, scattered, prickly, conical scales rarely 2 mm long. Flowers are pea-like, yellow and maroon, about 7-8 mm in diameter, with several borne in very short racemes or clusters arising from the leaf axils along the stems. Fruit is an inflated triangular pod about 1 cm long with a large beak at one end.