

Interim Recovery Plan No. 9

INTERIM RECOVERY PLAN NO. 9

**DWARF ROCK WATTLE (*ACACIA PYGMAEA*)
INTERIM RECOVERY PLAN**

1996-1999

by

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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 are designed to run for three years only and will be replaced by full Recovery Plans where required.

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 IRP was approved by the Director of Nature Conservation on 7 May 1997. Approved IRPs are subject to modification as dictated by new findings, changes in status of the taxon or ecological community and the completion of recovery actions. 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, 1997.

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SUMMARY

Dwarf Rock Wattle, *Acacia pygmaea***Family:** MIMOSACEAE**Flowering period:** November-March**CALM Region:** Wheatbelt**CALM District:** Merredin**Shire:** Wongan-Ballidu**Current status:** Declared as Rare Flora in May 1991, ranked as Critically Endangered in September 1995**Recovery team:** Merredin District Threatened Flora Recovery Team**Illustrations and/or further information:** Hopper *et al*, *Western Australia's Endangered Flora*, (1990); Maslin, *Acacia Miscellany* 12. *Nuytsia* **10** (1995); B. L. Rye, *Wongan Hills Species* No. 4, Unpubl. (1980).

Acacia pygmaea is a small shrub to 70 cm high with prominently ribbed branchlets and elliptic to obovate phyllodes 20 to 30 mm long. Its globular flowers are pale in colour with white filaments that turn orange with age. First collected in 1977 and formally described by B. Maslin in 1995, the species is endemic to the Wongan Hills area where it is confined to crevices on lateritic outcrops, in open heath mallee communities. Five populations with a combined total of 129 plants (1995, 1996) have been recorded over a range of approximately eight km.

The extremely localised nature of the populations is a major threat to the survival of the species. Although populations are generally well protected from threats associated with land use such as weed invasion and agricultural chemical drift, all are vulnerable to localised singular environmental events.

The aim of this Interim Recovery Plan is to abate identified threats and maintain viable *in situ* populations of *A. pygmaea* in order to conserve the wild genetic stock of the species. To achieve this aim the following essential and desirable recovery actions are prescribed.

Recovery actions:

Essential		Desirable	
1.	Protect from inappropriate fire	1.	Conduct further surveys
2.	Monitor populations annually	2.	Acquire land
3.	Preserve genetic diversity of the species	3.	Information dissemination
4.	Conduct research	4.	Survey for possible translocation sites

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Acacia pygmaea

Illustration not available

Distribution of *Acacia pygmaea*

Illustration not available

1. BACKGROUND

1.1 History, taxonomy and status

Acacia pygmaea Maslin is a dwarf shrub to 70 cm tall with prominently ribbed branchlets. The green phyllodes are elliptic to obovate, 20-30 mm long and 9-13 mm wide with yellow marginal nerves (pale red when young). The inflorescences, produced from November to March, are globular with white filaments which turn orange with age. Seed pods are narrowly oblong to 30 mm long. *A. pygmaea* has similar phyllodes to *A. disticha* and is closely allied to that species. *A. disticha* and *A. pygmaea* have affiliations with *A. myrtifolia*, and belong to the “*Acacia myrtifolia*” group. The name of the species is derived from the Latin *pygmaeus*, meaning dwarf, and refers to the diminutive height of the mature plant.

A. pygmaea was first collected in 1977 by K. F. Kenneally from private property at Mount Matilda in the Wongan Hills area. The species was known as *Acacia* sp. (Wongan Hills) until formally described in 1995 by Bruce Maslin. A full taxonomic description is included in Appendix 1.

In 1980 B. L. Rye undertook surveys in the Wongan Hills area for 13 geographically restricted species (including *A. pygmaea*). At this time one population of 25 plants was recorded from private property (Pop. 1). This population was again surveyed in September 1991 by CALM and the Toodyay Naturalists Club and 57 plants were recorded. A second population of approximately 15 plants (Pop. 2) was discovered during these surveys. Further surveys were undertaken by E. Holland and F. Bunny in September 1995 and April 1996, during which two new populations were found (Pops 3 and 4). A fifth population was located by N. Woolfrey in 1996. *A. pygmaea* is known from a combined total of 129 plants.

The Shire of Wongan-Ballidu is situated in an extensively cleared, wheat and sheep farming district, however the Wongan Hills township is surrounded by substantial areas of bushland which support a great diversity of flora with many endemic and threatened species. The following threatened and priority flora occur in Mount Matilda Nature Reserve and in the vicinity of Mount O’Brien:

Threatened flora	Priority flora
<i>Acacia denticulosa</i>	<i>Lepidium pseudotasmanicum</i> (P.3)
<i>Acacia pharangites</i>	
<i>Acacia pygmaea</i>	
<i>Acacia semicircularis</i>	
<i>Daviesia spiralis</i>	
<i>Eremophila ternifolia</i>	
<i>Eriostemon wonganensis</i>	
<i>Microcorys eremophiloides</i>	
<i>Rhagodia acicularis</i>	

Due to the low number of populations and plants and threats associated with a highly restricted habitat, *A. pygmaea* was declared as Rare Flora in May 1991. Although a second population was found in 1991, it was relatively small and the species was ranked as Critically Endangered in September 1995.

1.2 Distribution and habitat

A. pygmaea occurs over a range of approximately eight km where it is known from five populations, two of which contain sub populations.

Its habitat consists of open mallee *Eucalyptus ebbanoensis* over an open heath of *Allocasuarina campestris*, *Dryandra comosa*, *D. hewardiana*, *D. pulchella* and *Persoonia divergens*. The species is confined to the ridges of lateritic breakaways, growing in rock crevices with the roots presumably reaching into the underlying clay.

Other associated species are listed in Appendix 2.

Table 1: Summary of population information

Pop. No & Location.	Land Status	No. of plants.	Condition	Threats
1A. Mount Matilda	Private	1980, 25 1991, 57	Good	Inappropriate fire regime
1B. Mount Matilda	Nature Reserve	1996, 71	Good	Inappropriate fire regime
2A. Mount Matilda	Private	1991, 15 1995, 16	Good	Inappropriate fire regime
2B. Mount Matilda	Nature Reserve	1995, 3	Good	Inappropriate fire regime
3. Mount Matilda	Nature Reserve	1995, 6	Good	Inappropriate fire regime
4. Mount O'Brien	Private	1996, 5	Good	Inappropriate fire regime
5. NW of Wongan Hills	Nature Reserve	1996, 28	Good	Inappropriate fire regime

1.3 Biology and ecology

The genus *Acacia* is estimated to contain more than 1,200 species, of which more than 700 are native to Australia. It is pantropical, occurring in Asia, the Americas and Africa (Simmons 1981).

Many species of *Acacia* are highly adapted to surviving fires which are a regular occurrence in many Australian habitats. Germination of seed is often stimulated by fire but depends on factors such as fire intensity and seed depth in the soil. No information is available for the response of *A. pygmaea* to fire, however it is presumed that germination of the soil seed bank will be stimulated by such an event.

Pollination is probably by insects (Rye 1980), although the process is poorly understood. Unlike most *Acacia* species which fruit and shed their seeds a short time after flowering, the pods of *A. pygmaea* take nearly a year to mature with flower buds and unopened pods borne on the plant simultaneously. *A. pygmaea* appears to produce relatively few fruits with each pod containing just 2-3 seeds (Rye, 1980).

1.4 Threatening processes

1.4.1 Causes of the Critically Endangered status

Despite numerous searches for the species since its discovery in 1977 and an abundance of suitable habitats (lateritic breakaways), only five populations with a combined total of 129 plants are known. The critically endangered status of *A. pygmaea* may be partly attributed to its naturally restricted geographical range. The species may also require specific components within the ecosystem for its success in the wild.

1.4.2 Threats to the ongoing survival of this species in the wild

Inappropriate fire regimes may interfere with the reproductive phases of *A. pygmaea* (ie. flowering, pollination, seed production and seed dispersal) resulting in low/nil seedling recruitment. High fire frequency may lead to the degradation of the habitat of *A. pygmaea* due to factors such as depletion of soil seed banks and a temporary increase in the availability of nutrients for weed establishment (Panetta and

Hopkins 1991). Conversely, a lack of fire may cause the disappearance of extant populations due to poor or no recruitment from the soil seed store (soil stored seed may require fire stimulation for germination).

1.5 Conservation status

A. pygmaea is known from three localities in the Wongan Hills, which are separated by cleared farmland. Populations 1b, 2b and 3 are located in Mount Matilda Nature Reserve, Class A, which is vested in the National Parks and Nature Conservation Authority (NPNCA) for the purpose of Conservation of Flora and Fauna. Populations 1a and 2a are located on private property adjoining Mount Matilda Nature Reserve. The border between the nature reserve and private property is unmarked. Population 4 is on private property at Mount O'Brien. Population 5 is located in Rogers Nature Reserve, Class A, which is vested in the NPNCA for the purpose of Conservation of Flora and Fauna.

1.6 Strategy for recovery

The following essential strategies will be implemented:

1. Control the most threatening factors currently affecting *A. pygmaea* as outlined at 3.2.
2. Conserve the genetic diversity of *A. pygmaea* by including it in a seed bank, cryostorage and/or *ex situ* cultivation (see 3.2.3).
3. Research the biology, ecology and management of *A. pygmaea* (3.2.4).

The following desirable strategies will be implemented if resources permit:

1. Protect *A. pygmaea* from possible future threats (eg. clearing of private property) by appropriate management practices (see 3.3).
2. Enhance plant numbers (eg. by removal of a limiting factor or by direct interference by propagation and translocation techniques) (see 3.3.4, and CALM Policy Statement No 29 *Translocation of Threatened Flora and Fauna*).
3. Ensure that relevant land managers and CALM personnel are aware of the presence of *A. pygmaea*, and the need to protect it (eg. fire management) and ensure that all are familiar with the threatening processes identified in these guidelines (see 3.3.3).

2. RECOVERY OBJECTIVE AND CRITERIA

2.1 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 species in the wild.

2.2 Criteria

2.2.1 Criteria for success

Recovery will be deemed a success if threatening processes identified within this IRP have been reduced or removed within the three year period.

2.2.2 Criteria for failure

The recovery process will have been unsuccessful if identified threats have not abated within the three year period of this IRP or there has been a substantial decrease in population size.

3. RECOVERY ACTIONS

3.1 Existing recovery actions

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A single Declared Rare Flora (DRF) marker has been placed at population 2a, approximately three metres east of the walk trail.

The owners of the private property containing populations 1a and 2a were notified in June 1991 and January 1992 respectively.

Staff from Kings Park and Botanic Garden (KPBG) collected seed, cuttings and grafts from population 1 in December 1991 and 1993. Results from cuttings gave a 0.3 % success rate and one plant has been grown on and potted. A total of 148 seeds are in storage at -20°C.

Staff from CALM's Threatened Flora Seed Centre (TFSC) collected 53 seeds from populations 1 and 2 in November 1995 which are currently in storage at -18°C.

The Merredin District Threatened Flora Recovery Team (MDTFRT) will oversee the implementation of this IRP and report annually to CALM's Corporate Executive.

3.2 Essential recovery actions

3.2.1 Develop a fire management plan

Little is known of the effects of fire on this species (see 1.3). Until additional surveying has been undertaken and the fire response of *A. pygmaea* has been determined, fire should, as far as possible, be prevented from occurring in the populations (see 1.4.2). A fire management plan for the areas will be developed in consultation with relevant authorities and land managers. Collation of historical fire data is essential in developing such a plan. It is likely that the species requires occasional fire for recruitment.

It is recommended that the fire management plan incorporates other priority and threatened flora species in the district (see Information dissemination 3.3.3).

Action:	Develop fire management plan
Responsibility:	CALM (Merredin District, Western Australian Threatened Species and Communities Unit (WATSCU))
Cost:	\$450

3.2.2 Monitor populations

Monitoring of factors such as habitat degradation, population stability (expanding or declining), pollination activity, seed production, recruitment, and longevity is prescribed.

The populations require annual inspection as a requirement under CALM's Policy Statements No. 9 *Conservation of Threatened Flora in the Wild* and No 28 *Reporting Monitoring and Re-evaluation of Ecosystems and Ecosystem Management*. See also below 3.2.4, *Development of a quadrat/transect based monitoring system for threatened plant species*.

Action:	Monitor populations annually
Responsibility:	CALM (Merredin District, WATSCU))
Cost:	\$450 pa

3.2.3 Preserve genetic diversity of the species

Germplasm collections should be given a high priority if the extinction of populations of *A. pygmaea* is considered a high probability through disease, its limited distribution or low number of plants. If this is deemed to be the case, recovery of the species is likely to need *ex situ* conservation techniques.

Genetic diversity conservation of the species should be incorporated into the research component (see 3.2.4) and should include collection of seed from all populations, ensuring an adequate representation of genetic diversity.

If it is not possible to collect adequate quantities of viable seed, other more costly germplasm storage methodologies may need to be investigated. These can involve living collections from cutting or other source material, or storage of tissue culture material. If resources are limited these techniques will need to be carefully prioritised in relation to *in situ* conservation. This will be coordinated by the MDTFRT.

It is also important that the size and viability of the soil seed bank is determined and research undertaken to develop techniques for stimulating germination of soil stored seed. Care, however, should be taken as these processes inherently carry a significant risk of depletion of seed bank reserves.

Action: Collect seed and/or other genetic material from all populations
Responsibility: MDTFRT, KPBG, TFSC, CALM (WATSCU)
Cost: \$1600

3.2.4 Conduct research

Research designed to increase an understanding of the biology of the species will provide a scientific base for the management of *A. pygmaea* in the wild. Research should include:

1. The response of *A. Pygmaea* and its habitat to herbicide treatments.
2. Pollination biology and seed set.
3. Investigation of factors determining level of flower and fruit abortion.
4. Quantification of level of invertebrate grazing or removal of seed.
5. The size and viability of the soil seed bank.
6. The seed germination requirements of *A. pygmaea*.
7. The role of disturbance in regeneration.
8. The response of *A. pygmaea* and its habitat to fire.
9. Longevity of plants, and time taken to reach maturity.
10. Knowledge of the extent of genetic variation within and between populations. This is essential if new populations are to be established.
11. The development of a monitoring system. Specific protocols for rare flora will be outlined in a future CALM discussion paper “*Development of a quadrat/transect based monitoring system for threatened plant species*”, A. Brown, P. Pigott and D. Coates (in prep).

Action: Conduct research
Responsibility: CALM (Science and Information Division (SID), WATSCU, Merredin District)
Cost: \$3000

3.3 Desirable recovery actions

3.3.1 Conduct further surveys

It is recommended that reserves with suitable habitats (lateritic breakaways) are surveyed on a systematic basis for the presence of *A. pygmaea*, particularly during its flowering period (November-March) and following disturbances such as fire. Volunteers from the local community, wildflower societies and naturalist clubs could be involved in surveys supervised by CALM staff.

The following Class A nature reserves are vested in the NPNCA for the Conservation of Flora and Fauna and may contain suitable habitats for survey and future possible translocation of *A. pygmaea*. All reserves are located within the Wongan-Ballidu Shire.

Elphin NR ↑ 25808

Gathercole NR ↑ 20436

Rogers NR ↑ 39145

Fowler Gully NR ↑ 42375 Lake Ninan NR ↑ 27026

Action: Survey areas of suitable habitat
 Responsibility: CALM (Merredin District, WATSCU)
 Cost: \$900 pa.

3.3.2 Land acquisition

To secure the long term survival of populations 1a and 2a, it is desirable that the areas of remnant bush on private property (south east of the reserve) be added to the Mount Matilda Nature Reserve. In addition, acquisition of adjacent narrow strips of cleared land (eg. 10 m wide) to function as fire breaks should be considered. Population 4 is located on private property in a relatively large area of remnant vegetation. This area should also be considered for acquisition as a nature reserve. Acquisition will only be by negotiated agreement. Close liaison between CALM and the landowners is essential. Conservation of other threatened and priority flora in the area should also be considered.

Action: Liaise with landowners, determine possibility of land acquisition
 Responsibility: CALM (Merredin District, WATSCU)
 Cost: \$unknown

3.3.3 Information dissemination

In order to increase the awareness of *A. pygmaea* with relevant CALM staff (Merredin District) and within the Shire of Wongan-Ballidu, the production of posters and vehicle dashboard stickers is recommended. Posters should illustrate the species and provide relevant information. Dashboard stickers should illustrate a rare flora marker and provide a contact telephone number if one is encountered.

The importance of biodiversity conservation and the preservation of critically endangered species need to be promoted to the general public, however, it is recommended that the exact location of populations of *A. pygmaea* be kept confidential. Awareness can be sensitively encouraged throughout the community by a publicity campaign in the local print and electronic media and by providing poster displays in venues of high exposure. Formal links with local naturalist groups and interested individuals should also be encouraged.

Action: Produce posters, dashboard stickers, publicity campaign
 Responsibility: CALM (Merredin District, Corporate Relations Division, WATSCU)
 Cost: \$2000

3.3.4 Translocation

Information on the translocation of threatened animals and plants in the wild is provided in CALM Policy Statement No 29. Some areas for consideration for translocation are listed in Conduct further surveys (see 3.3.1). Surveying potential habitat for possible future translocation sites is recommended within the scope of IRPs, with actual translocation addressed in full Recovery Plans where necessary. This should be coordinated by the MDTFRT. All translocation proposals require endorsement by the Director of Nature Conservation.

Action: Survey potential habitats for translocation
 Responsibility: MDTFRT, CALM (WATSCU)
 Cost: See Section 3.3.1 (Conduct further surveys)

Table 2: Summary of recovery actions

Recovery Actions	Population	Priority	Responsibility	Completion date
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Essential

Develop a fire management plan	All	High	CALM (Merredin District)	June 1996, ongoing
Monitor populations	All	High	CALM (Merredin District, WATSCU)	1996, 1997, 1998
Preserve genetic diversity of the species	All	High	MDTFRT, KPBG, TFSC, CALM (WATSCU)	1996, ongoing
Conduct research	All	High	CALM (SID, WATSCU, Merredin District)	ongoing

Desirable

Conduct further surveys	-	Moderate	CALM (Merredin District, WATSCU)	1996, 1997, 1998
Land acquisition	1a, 2a	Moderate	CALM (Merredin District)	
Information dissemination	-	Moderate	CALM (Merredin District, WATSCU)	1996, ongoing
Translocation	-	Low	MDTFRT, CALM (WATSCU)	

3.4. Costs

Table 3: Summary of costs for each recovery action

Recovery Action	1996			1997		1998	
	CALM	EA	KPBG	CALM	EA	CALM	EA
Essential							
Develop a fire management plan	200	250					
Monitor populations	200	250		200	250	200	250
Preserve genetic diversity of the species		500	1100				
Conduct research	1000			2000			
Sub-total	\$1400	\$1000	\$1100	\$2200	\$250	\$200	\$250
Desirable							
Conduct further surveys	400	500		400	500	400	500
Land acquisition							
Information dissemination		500			1500		
Sub-total	\$400	\$1000		\$400	\$2000	\$400	\$500
Total	\$1800	\$2000	\$1100	\$2600	\$2250	\$600	\$750

EA: Environment Australia (formerly ANCA)

Total of all costs \$11 100 (+ costs relating to any land acquisitions)

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Appendix One: Taxonomic description

Maslin, B.R. (1995). *Acacia* Miscellany 12. *Acacia myrtifolia* (Leguminosae: Mimosoideae: section *Phyllodineae*) and its allies in Western Australia. *Nuytsia* **10** (1):85-101.

Appendix Two: Associated species

PROTEACEAE	PAPILIONACEAE	RUTACEAE
<i>Dryandra comosa</i>	<i>Bossiaea eriocarpa</i>	<i>Eriostemon wonganensis</i>
<i>Dryandra hewardiana</i>	<i>Daviesia</i> sp.	
<i>Dryandra pulchella</i>	<i>Daviesia spiralis</i>	LAMIACEAE
<i>Dryandra</i> sp. aff. <i>hewardiana</i>	<i>Gastrolobium spinosum</i>	<i>Microcorys</i> sp.
<i>Grevillea biternata</i>		<i>Microcorys eremophiloides</i>
<i>Hakea coriacea</i>	MYRTACEAE	
<i>Hakea scoparia</i>	<i>Eucalyptus ebbanoensis</i>	MYOPORACEAE
<i>Isopogon divergens</i>	<i>Eucalyptus flocktoniae</i>	<i>Eremophila oldfieldii</i>
<i>Persoonia divergens</i>	<i>Eucalyptus salmonophloia</i>	<i>Eremophila ternifolia</i>
<i>Petrophile shuttleworthiana</i>	<i>Melaleuca adnata</i>	PHORMIACEAE
	<i>Melaleuca radula</i>	<i>Dianella revoluta</i>
	<i>Melaleuca uncinata</i>	
MIMOSACEAE		
<i>Acacia semicircularis</i> (DRF)		
<i>Acacia botrydion</i> (P1)	CASUARINACEAE	
	<i>Allocasuarina campestris</i>	
