KUNDIP WATTLE

(*Acacia rhamphophylla*)

RECOVERY PLAN

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Australian Government

Government of Western Australia

Department of Environment and Conservation

FOREWORD

Interim Recovery Plans (IRPs) are developed within the framework laid down in WA Department of Conservation and Land Management (CALM), now) policy statements Nos 44 and 50. Note: the Department of CALM formally became the Department of Environment and Conservation (DEC) in July 2006. DEC will continue to adhere to these Policy Statements Nos. 44 and 50.until they are revised and reissued.

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.

DEC is committed to ensuring that Threatened taxa are conserved through the preparation and implementation of Recovery Plans (RPs) or IRPs and by ensuring that conservation action commences as soon as possible.

This IRP will operate from October 2005 to August 2010 but will remain in force until withdrawn or replaced. It is intended that, if the taxon is still ranked Endangered (WA), this IRP will be reviewed after five years and the need further recovery actions assessed.

This IRP was given regional approval on 26 October, 2005 and was approved by the Director of Nature Conservation on 26 October, 2005. The provision of funds identified in this IRP is dependent on budgetary and other constraints affecting DEC, as well as the need to address other priorities.

This IRP has been updated with information contained herein and is accurate as at January 2008.

This IRP was prepared with financial support from the Australian Government to be adopted as a National Recovery Plan under the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

ACKNOWLEDGMENTS

The following people have provided assistance and advice in the preparation of this Interim Recovery Plan:

Anne Cochrane	Manager, DEC's Threatened Flora Seed Centre
Andrew Brown	Threatened Flora Coordinator, Species and Communities Branch, DEC
Malcolm Grant	Conservation Officer, DEC Ravensthorpe

Thanks also to staff of the W.A. Herbarium for providing access to Herbarium databases and specimen information, and DEC's Species and Communities Branch for their assistance.

SUMMARY

Scientific Name:	*Acacia rhamphophylla*	**Common Name:**	Kundip Wattle
Family:	Mimosaceae	**Flowering Period:**	August to September
DEC Regions:	South Coast	**DEC District:**	Albany Work Centre
Shire:	Ravensthorpe	**Recovery Team:**	Albany District Threatened Flora Recovery Team

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; Western Australian Herbarium (1998) FloraBase - Information on the Western Australian Flora. Department of Conservation and Land Management, Western Australia. http://www.calm.wa.gov.au/science/.

Current status: *Acacia rhamphophylla* was declared as Rare Flora in 1996 under the Western Australian *Wildlife Conservation Act 1950* and is currently ranked as Vulnerable (VU) in Western Australia under World Conservation Union (IUCN 2001) Red List Criterion D2, as 2000 plants are known over 5 hectares with little evidence of decline. The species is listed as Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Description: This erect, woody-stemmed subshrub 0.2–0.4 m high, has densely crowded greyish-green, spreading phyllodes (flattened leaf stalks that function as leaves) that are 11 to 17 mm long. Each phyllode is prominently grooved and round ended, with a short point below the tip. The stems of the plant appear black due to a covering of short hairs and black recurved, bristly stipules that are 5 mm long. The globular yellow flower heads are 2.5 to 3 mm and are on stalks up to 12 mm long. They are solitary and held in the axils of phyllodes at the ends of the branches. The hard, thin, brittle and blackish pods are 10 to 15 mm long and semi-circular in cross-section.

Habitat requirements: *Acacia rhamphophylla* is found in open shrub mallee on stony slopes in well drained sandy clay on or near contact between serpentine and banded iron formations. Plants are prominent in disturbed areas and along a drainage line.

Habitat critical to the survival of the species, and important populations: Habitat critical to the survival of *Acacia rhamphophylla* includes the area of occupancy of important populations and areas of similar habitat surrounding important populations. These areas of similar habitat are important where they provide potential habitat for natural range extension and/or for allowing pollinators or biota essential to the continued existence of the species to move between populations. Additional occurrences of similar habitat that may contain important populations of the species or be suitable for future translocations or other recovery actions intended to create important populations are also considered habitat critical to survival. The single known population is important for the long-term recovery and survival of the species.

Benefits to other species/ecological communities: The Ravensthorpe Range occurs within one of the fifteen National Biodiversity Hotspots. The Ravensthorpe Range is habitat for a number of endemic species and threatened species, and some twenty Priority taxa. Recovery actions put in place for *Acacia rhamphophylla* will benefit these species and reciprocally, recovery actions put in place for these species will benefit *A. rhamphophylla*.

International obligations: This plan is fully consistent with the aims and recommendations of the Convention on Biological Diversity. *Acacia rhamphophylla* is not specifically listed under any international treaty and therefore this plan does not affect Australia's obligations under any other international agreements.

Role and interests of Indigenous people: Involvement of the Indigenous community is being sought through the advice of the Department of Indigenous Affairs to determine whether there are any issues or interests identified in the plan. A search of the Department of Indigenous Affairs Aboriginal Heritage Sites Register has identified six registered sites occurring in close proximity to the *Acacia rhamphophylla* population. Where no role is identified for the Indigenous community associated with this species in the development of the recovery plan, opportunities may exist through cultural interpretation and awareness of the species. Indigenous involvement in the implementation of recovery actions will be encouraged.

Affected interests: This species is located on Crown land under mining tenements.

Social and economic impacts: The implementation of this recovery plan has the potential to have some social and economic impact as the population is located on mining tenements. However, recovery actions refer to continued negotiations between stakeholders with regard to these areas.

Evaluation of the Plan's Performance: The Department of Environment and Conservation (DEC), in conjunction with the Albany District Threatened Flora Recovery Team (ADTFRT) will evaluate the performance of this IRP.

Completed Recovery Actions: The following recovery actions have been completed:

1. All land managers have been notified of the location and threatened status of the species.
2. Volunteers and staff from the DEC Albany Work Centre have regularly monitored the population.

Objectives

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.

Criteria for success: The number of individuals within the population remains stable or increases over the five years of the plan.
Criteria for failure: The number of individuals within the population decreases over the five years of the plan.

Recovery actions

1. Coordinate recovery actions.
2. Monitor the population.
3. Liaise with land managers.
4. Implement fire management.
5. Collect seed.
6. Obtain biological and ecological information.
7. Conduct further surveys.
8. Investigate the methodology for future translocation(s).
9. Map habitat critical to the survival of the species.
10. Promote awareness.
11. Review the IRP and assess the need for further recovery actions.

1. BACKGROUND

History

Kundip wattle was discovered in a single area during a flora survey in 1992 and, despite extensive surveys of similar habitat by the Ravensthorpe Wildflower Society and DEC staff, is still known only from the type population in the Ravensthorpe Range. The population is located on mining tenements, and mining and track maintenance pose the greatest threat. The current leaseholder is aware of the population and has assisted with conservation efforts to date.

Description

This erect, woody-stemmed subshrub 0.2–0.4 m high, has densely crowded greyish-green, spreading phyllodes (flattened leaf stalks that function as leaves) that are 11 to 17 mm long. Each phyllode is prominently grooved and round ended, with a short point below the tip. The stems of the plant appear black due to a covering of short hairs and black recurved, bristly stipules that are 5 mm long. The globular yellow flower heads are 2.5 to 3 mm and are on stalks up to 12 mm long. They are solitary and held in the axils of phyllodes at the ends of the branches. The hard, thin, brittle and blackish pods are 10 to 15 mm long and semi-circular in cross-section.

Acacia rhamphophylla appears most closely related to *A. laricina* and *A. cedroides* (Maslin 2001).

Distribution and habitat

Acacia rhamphophylla is known from a single population, occupying approximately five hectares in the Ravensthorpe Range. It occurs in open shrub mallee on stony slopes in well drained sandy clay, on or near contact between serpentine and banded iron formations. While plants are most common in disturbed areas, they also occur in lower numbers under mature vegetation. Most plants are concentrated along a drainage line but some are also found upslope.

Associated species include *Eucalyptus cernua, E. pleurocarpa, E. transcontinentalis, Alyogyne hakeifolia, Beaufortia schaueri, Acacia durabilis, A. pinguiculosa, Coopernookia polygalacea, Hybanthus floribundus* and *Melaleuca* species.

The species was not found during detailed surveys of Bandalup Hill, approximately sixteen kilometres east of the known population. Similarly, no *Acacia rhamphophylla* juveniles were found in neighbouring vegetation burnt during a 2000 wildfire.

Biology and ecology

Little is known about the biology and ecology of *Acacia rhamphophylla*. Mature plants flower from August to September, though the juvenile period is unknown. In some species of *Acacia*, all of the flowers are hermaphrodite, while in others a percentage of the flowers on an individual are purely male. Unlike many other flower structures, acacia flowers have no complex morphological traits to exclude specific visitor taxa. As a result, acacias are visited by a large variety of insect and some bird pollinators and are vulnerable to exploitation by non-pollinators. Pollinators may favour certain *Acacia* species however, depending on such factors as number and density of flower heads. Pollinator limitation is a concern for endangered *Acacia* species in Australia (Stone *et al.* 2003).

Prior to *Acacia rhamphophylla* being recognised as Declared Rare Flora, mining activities resulted in some disturbance from fire and vehicle movements (M. Grant, personal communication [3]). The species appeared to recover well with regeneration of seedlings in the disturbance areas. This, coupled with its prolific flowering ability, suggests the species is capable of producing good quantities of viable seed (M. Grant, personal communication).

[3] Malcolm Grant Conservation Officer, DEC Ravensthorpe

Legumes are described as disturbance opportunists (Schwarten 1995). Fire is the most common environmental cue for breaking seed dormancy in the majority of *Acacia* species (Yates and Broadhurst 2002). In recent years, a significant number of deaths amongst mature *A. rhamphophylla* have been observed in the population. This may suggest a senescent population and reinforce the necessity for germination stimulants.

Research has shown that the majority of *Acacia* species are resistant to *P. cinnamomi*, however *A. rhamphophylla* has not been tested to date, nor have the two species (*A. laricina* and *A. cedroides*) thought to be most closely related to it (B. Shearer, personal communication [4]).

Threats

Acacia rhamphophylla was declared as Rare Flora in 1996 under the Western Australian *Wildlife Conservation Act 1950* and is currently ranked as Vulnerable (VU) in Western Australia under World Conservation Union (IUCN 2001) Red List Criterion D2, as 2000 plants are known over 5 hectares with little evidence of decline. The species is listed as Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

All areas occupied by *Acacia rhamphophylla* are affected or potentially affected by one or more threats identified in this IRP. Threats include:

- **Mining:** Population 1 occurs on Crown land subject to a live mining lease, a pending mining lease and a pending exploration licence. Future impacts of mining may include vegetation clearing, ground compaction, dust, introduction of weeds and pathogens such as *Phytophthora cinnamomi*, increased risk of fires and discharge of waste products and hazardous materials.

- **Inappropriate fire regime:** Poorly timed, intense and too frequent fire may be detrimental, as plants need to reach reproductive maturity to build up a seed bank. An estimation of the minimum desirable fire interval may be determined by doubling the primary juvenile period (time to first flower from germination, in 50% of the population) (Gill and Nichols 1989), however for *Acacia rhamphophylla*, this period is unknown. Equally, if the fire interval exceeds the longevity of the plants and the seed bank, population decline and extinction can occur (Yates and Broadhurst 2002).

- **Small population size:** As population size decreases, the population may become more vulnerable to extinction for three main reasons. Firstly, loss of genetic variation and increased inbreeding are considered to be associated with a reduction in the ability of a population to adapt to short-term environmental change. Secondly, small populations are more susceptible to chance events associated with demographic and environmental stochasticity. Finally, Allee effects may occur, whereby at some density or population size, reproductive capacity drops below a threshold and the organism can no longer replace itself (Hobbs and Yates 2003).

- **Climate change:** Long-term climate change may affect the *Acacia rhamphophylla* population given the predicted decrease in rainfall and increases in temperature and evaporation. It has been considered that those groups likely to be most affected by climate change include geographically localised taxon such as *A. rhamphophylla*, peripheral or disjunct populations, specialised species, poor dispersers, genetically impoverished species, and coastal communities (Peters & Darling 1985). Studies show that a decrease in rainfall and a shorter wet season may have been responsible for the reduced flowering, fruiting and seed production in a number of *Acacia* species over recent years (Yates and Broadhurst 2002).

[4] Bryan Shearer Principle Research Scientist, DEC Science

Summary of population land vesting, purpose and tenure

Population	Vesting	Purpose	Tenure
1. Mt Iron	Unvested	Common	Crown

Summary of population information and threats

Pop. No. & Location	Year/No. plants		Habitat Condition	Threats
1. Mt Iron	1996	1000+	Healthy	Mining
	1997	2000+	Healthy	Track maintenance
	1999	2000+	Healthy	Fire
	2002	1000-2000	Healthy (few deaths)	Mining
	2004	2000+/-	Healthy (<5% death)	Mining
	2007	2000+/-	Healthy	Mining

Habitat critical to the survival of the species, and important populations

Habitat critical to the survival of *Acacia rhamphophylla* includes the area of occupancy of the single known population and areas of similar habitat surrounding this population. These areas of similar habitat are important where they provide potential habitat for natural range extension and/or for allowing pollinators or biota essential to the continued existence of the species to move between populations. Additional occurrences of similar habitat that may contain important populations of the species or be suitable for future translocations or other recovery actions intended to create important populations are also considered habitat critical to survival. The single known population is important for the long-term recovery and survival of the species.

Benefits to other species/ecological communities

The Ravensthorpe Range is an area of high conservation value and occurs within one of the fifteen National Biodiversity Hotspots, which are areas of species richness and endemism, and areas under major threat (CALM 2004). The Ravensthorpe Range is habitat for a number of endemic species and Threatened species, including *Daviesia megacalyx* (En, EPBC Act), *Marianthus villosus* (Vu WA) and some twenty Priority taxa, such as *Melaleuca stramentos*a (P1), *Pultenea* sp. Kundip (P1), *Melaleuca* sp. Kundip (P1), *Acacia laricina* var. *crassifolia* (P2), *Spyridium glaucum* (P3) and *Siegfriedia darwinioides* (P4). Recovery actions put in place for *Acacia rhamphophylla* will benefit these species and reciprocally, recovery actions put in place for these species will benefit *A. rhamphophylla*.

International Obligations

This plan is fully consistent with the aims and recommendations of the Convention on Biological Diversity, ratified by Australia in June 1993, and will assist in implementing Australia's responsibilities under that Convention. However, as *Acacia rhamphophylla* is not listed under any international agreement, the implementation of other international environmental responsibilities is not affected by this plan.

Role and interests of Indigenous people

The Department of Indigenous Affairs Aboriginal Heritage Sites Register identifies Claytup Surface Scatter, Kundip, Coujinup Surface Scatter, Gnamma Hole and North Jerdacuttup River 1 & 2 as registered sites that occur in close proximity to *Acacia rhamphophylla*.

Involvement of the Indigenous community is being sought through the advice of the Department of Indigenous Affairs to determine whether there are any issues or interests identified in the plan. Where no role is identified for the Indigenous community associated with this species in the development of the recovery plan, opportunities may exist through cultural interpretation and awareness of the species. Indigenous involvement in the implementation of recovery actions will be encouraged.

Affected Interests

The population occurs on Crown land under mining tenements.

Social and economic impacts

The implementation of this recovery plan has the potential to have some minimal social and economic impact as the population is located on mining tenements. However, recovery actions refer to continued negotiations between stakeholders with regard to these areas.

Guide for decision-makers

Section 1 provides details of current and possible future threats. Developments in the immediate vicinity of the population or within the defined habitat critical to the survival of *Acacia rhamphophylla* require assessment for the potential for a significant level of impact.

Evaluation of the Plan's Performance

The Department of Environment and Conservation, in conjunction with the Albany District Threatened Flora Recovery Team will evaluate the performance of this recovery plan. In addition to annual reporting on progress against the criteria for success and failure, the plan is to be reviewed within five years of its implementation. Any changes to management and/or recovery actions made in response to monitoring results will be documented accordingly.

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.

Criteria for success: The number of individuals within the population remains stable or increases over the five years of the plan.
Criteria for failure: The number of individuals within the population decreases over the five years of the plan.

3. RECOVERY ACTIONS

The land managers have been notified of the location and threatened status of *Acacia rhamphophylla*. The notification details include the Declared Rare status of the species and the legal responsibility to protect it.

Staff at the DEC Albany Work Centre regularly monitor the population and liaise with the land holder.

Where populations occur on lands other than those managed by DEC, permission has been or will be sought from appropriate land managers prior to recovery actions being undertaken.

The following recovery actions are roughly in order of descending priority; however this should not constrain addressing any of the priorities if funding is available and other opportunities arise.

1. Coordinate recovery actions

The Albany District Threatened Flora Recovery Team (ADTFRT) is coordinating recovery actions for *Acacia rhamphophylla* and include information on progress in their annual report to DEC's Corporate Executive and funding bodies.

Action: Coordinate recovery actions
Responsibility: DEC (Albany Work Centre) through the ADTFRT
Cost: $3,000 per year

2. Monitor population

Regular monitoring of *Acacia rhamphophylla* has commenced and is ongoing.

Action: Monitor population
Responsibility: DEC (Albany Work Centre)
Cost: $730 per year

3. Liaise with land managers

Staff from DEC Albany District will continue to liaise with current and future mining leasees to ensure populations on mining tenements are not accidentally damaged or destroyed and that the impacts of identified threats are minimised. Input and involvement will also be sought from Indigenous groups that have an active interest in areas that are habitat for *Acacia rhamphophylla*.

Action: Liaise with land managers
Responsibility: DEC (Science Division and Albany Work Centre)
Cost: $600 per year

4. Implement fire management

A fire management strategy is being implemented. The use of fire to stimulate recruitment will continue to be considered if the population shows signs of decline.

Action: Implement fire management
Responsibility: DEC (Albany Work Centre)
Cost: $2,600 in the first year

5. Collect seed

One collection of *Acacia rhamphophylla* seed was made by DEC staff in 2006 but further collections are required. Preservation of germplasm is essential to guard against the possible extinction of wild populations and seed is required to propagate plants for future translocations. Seed collection will be ongoing so as to obtain material from as wide a range of individuals as possible to maximise the genetic diversity of *ex situ* material.

Action: Ongoing seed collection
Responsibility: DEC (Albany Work Centre)
Cost: $1,530 per year

6. Obtain biological and ecological information

Improved knowledge of the biology and ecology of *Acacia rhamphophylla* provides a better scientific basis for management of the wild populations. This process has commenced through the contracting of consultants.

An understanding of the following is particularly necessary for effective management:

1. Disease susceptibility.
2. Soil seed bank dynamics and the role of various disturbances, competition and rainfall in germination and recruitment.
3. The pollination biology, phenology and seasonal growth of the species.
4. The population genetic structure, levels of genetic diversity and minimum viable population size.

Action: Obtain biological and ecological information
Responsibility: DEC (Science Division and Albany Work Centre) through the ADTFRT
Cost: $24,000 per year for the final three years

7. Conduct further surveys

Surveys supervised by DEC staff have commenced with assistance from local naturalists and wildflower society members, however no new populations have been discovered. Surveys are conducted during the species flowering period (August to September). Information on soil and vegetation types will be used to identify similar habitat to target for further survey.

Action: Conduct further surveys
Responsibility: DEC (Albany Work Centre)
Cost: $2,500 per year

8. Investigate the methodology for future translocation(s)

Within the 5-year time frame of the plan, the best methodology for future translocations will be investigated. The most appropriate translocation site and procedure should be determined. Surveys have begun but no suitable translocations sites have been found as yet.

Action: Investigate the methodology for future translocation(s)
Responsibility: DEC (Science Division and Albany Work Centre)
Cost: $2,500 per year

9. Map habitat critical to the survival of the species

Although habitat that is critical to the survival of the species is described in Section 1, all the areas described have not yet been accurately mapped and will be addressed under this action. If additional populations are located, habitat critical to their survival will also be determined and mapped.

Action: Map habitat critical to the survival of the species
Responsibility: DEC (Albany Work Centre)
Cost: $400 in first year

10. Promote awareness

The importance of biodiversity conservation and the need for the long-term protection of wild populations of this species are being promoted to the community through poster displays and the local print and electronic media. Formal links with local naturalist groups and interested individuals are being encouraged. The owner of the mining lease has been informed of the species and its threatened status. The species is the subject of one of a series of management documents being prepared by mining companies.

Action: Promote awareness
Responsibility: DEC (Albany Work Centre) through the ADTFRT
Cost: $900 per year

11. Review the IRP and asses the need for further recovery actions

If *Acacia rhamphophylla* is still ranked as Vulnerable (WA) at the end of the fourth year of the five-year term of this IRP, the plan will be reviewed and the need for further recovery actions assessed.

Action: Review the IRP and assess the need for further recovery actions
Responsibility: DEC (Species and Communities Branch and Albany Work Centre) through the ADTFRT
Cost: $4,000 in the fifth year (if required)

4. TERM OF PLAN

Western Australia

This Interim Recovery Plan will operate from August 2005 to July 2010 but will remain in force until withdrawn or replaced. If the taxon is still ranked as Endangered (WA) after five years, this IRP will be reviewed and if necessary, further recovery actions put in place.

Commonwealth

In accordance with the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) this adopted recovery plan will remain in force until revoked.

The recovery plan must be reviewed at intervals of not longer than 5 years.

5. REFERENCES

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6. TAXONOMIC DESCRIPTION

Spreading, open subshrub 0.2–0.4 m high. Stems slender, dark grey. Branchlets densely pubescent. Stipules setaceous, 5–7 mm long, recurved. Phyllodes crowded, linear, 11–17 mm long, 1–1.5 mm wide, narrowed at base, excentrically rostellate, dark green, glabrous but pulvinus pubescent adaxially; midrib near abaxial margin and prominently raised, the 2-nerved adaxial margin thick and nerve-like. Inflorescences rudimentary, 1-headed racemes with axes <0.5 mm long; peduncles 8–13 mm long, glabrous, recurved in fruit; basal bract cucullate-navicular; heads globular, 2.5–3 mm diam., 12–16-flowered, light golden. Flowers 5-merous; sepals free. Pods subterete, 10–15 mm long, thinly crustaceous, blackish. Seeds longitudinal, oblong-elliptic to ovate, 2–2.5 mm long, c. 1.5 mm wide, shiny, dark brown; aril pileiform.