INTERIM RECOVERY PLAN NO. 188

SPLENDID WATTLE

(*ACACIA SPLENDENS* MS)

INTERIM RECOVERY PLAN

2004-2009

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Photograph: Leonie Monks

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Natural Heritage Trust
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DEPARTMENT OF Conservation AND LAND MANAGEMENT
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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 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This Interim Recovery Plan will operate from October 2004 to September 2009 but will remain in force until withdrawn or replaced. It is intended that, if the taxon is still ranked Endangered, this IRP will be reviewed after five years and the need for a full Recovery Plan assessed.

This IRP was given regional approval 7 December 2004 and approved by the Director of Nature Conservation 14 February 2005. The allocation of staff time and 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 in October 2004.

ACKNOWLEDGMENTS

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

Anne Cochrane	Manager, CALM's Threatened Flora Seed Centre
Carole Elliott	Ecological geneticist, W.A. Herbarium
Steve Hopper	School of Plant Biology, Faculty of Natural & Agricultural Sciences, University of W.A.
Bruce Maslin	Botanist (Acacia specialist), CALM's Science Division
Amanda Shade	Horticulturalist, Botanic Garden and Parks Authority

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

SUMMARY

Scientific Name:	*Acacia splendens* ms	**Common Name:**	Splendid Wattle
Family:	Mimosaceae	**Flowering Period:**	May-June
CALM Region:	Midwest	**CALM District:**	Moora
Shires:	Dandaragan, Victoria Plains	**Recovery Team:**	Moora 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; C. Elliott (2000) Genetic Relationships and Population Biology of *Acacia* sp. Dandaragan, Honours Dissertation, Murdoch University, Western Australia; C.P. Elliott, C.J. Yates, P.G. Ladd and D.J. Coates (2002) Morphometric, genetic and ecological studies clarify the conservation status of a rare *Acacia* in Western Australia, *Australian Journal of Botany* 50, 63-73.

Current status: *Acacia splendens* ms was declared as Rare Flora in July 1989, and is ranked as Critically Endangered (CR) under the *Wildlife Conservation Act 1950*. It currently meets World Conservation Union (IUCN) Red List category Endangered (EN) under criteria B1ab(iii) + 2ab(iii) (IUCN 2000), as the two populations that have been recently confirmed have a geographic range of less than 20 km, and due to the extremely impoverished nature of the habitat at Population 1b, where the overwhelming majority of plants occur. *A. splendens* ms is listed as Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) under its previous taxonomic name *Acacia* sp. Dandaragan. Its previous common name is also listed under the EPBC Act as Dandaragan wattle, but this has been superseded by the name splendid wattle as a population is now known to occur outside the Dandaragan area. The main threats are degraded habitat, weeds, grazing and inappropriate fire.

Description: *Acacia splendens* ms is a tall, spindly shrub to 4 m, or rarely a tree to 8 m, with one to four stems arising at ground level. These plants often spread by root suckers. The main stems have smooth light grey bark with a white bloom at first, which becomes rough and dark grey with age. Upper branches can be similar or smooth, and branchlets are thick and slightly angled. The phyllodes are bluish-green and are highly variable in size, shape and curvature, having juvenile, adolescent and adult forms. Juvenile phyllodes are a broad egg-shape, to 9 cm long and 6 cm wide, with a whitish bloom. Adult phyllodes are longer and narrower, to 12 cm long and 3 cm wide. The showy golden densely flowered heads are oblong to globular, up to 12 mm in diameter and are held towards the ends of branchlets. The purple-brown pods are flat but gently rounded over seeds, up to 11 cm long and 8-12 mm wide (Maslin and Elliott in prep.).

This species is closely related to *Acacia microbotrya* and *A. daphnifolia*, from which it differs in its pruinose branchlets and pods (the trunks are also smooth and white-pruinose, at least on young plants), more numerous flowers per head, broader phyllodes (especially the juvenile ones) and narrowly oblong pods. It is further distinguished from *A. microbotrya* by its golden-coloured heads and from *A. daphnifolia* by its smaller seeds (Maslin and Elliott in prep.).

Habitat requirements: *Acacia splendens* ms has only been relocated recently at two of the three populations that occur over a range of about 60 km in the Dandaragan to Mogumber area. Population 1 is the largest, and occurs on road reserve and adjoining private property. Population 2 also occurs on private property, and consists of less than twenty plants. These two populations cover a range of less than 20 km. Population 3 is recorded by a herbarium specimen collected in 1985 from a nature reserve. The health or even ongoing existence of this population is uncertain, as it hasn't been relocated since.

At Population 1, *Acacia splendens* ms grows in brown gravelly loam on the slopes of a lateritic breakaway, and on the adjoining colluvial slope and alluvial flat below the breakaway. On the lateritic slopes of Population 1a, *A. splendens* ms occurs in a low woodland of *Corymbia calophylla* over low scrub with *Xanthorrhoea preissii*, *Hakea lissocarpha* and *Hypocalymma angustifolium*. The original native understorey in Population 1b, that contains the overwhelming majority of plants, is practically non-existent. A virtual monoculture of *A. splendens* ms exists with occasional *E. loxophleba* trees and prolific weeds. At Population 3, *A. splendens* ms grows with *Corymbia calophylla*, *Eucalyptus todtiana* and *E. leptophylla* over low heath on deep sand. This species occurs near a creekline at Population 2, and in the vicinity of a river at Population 3.

Critical habitat: The critical habitat for *Acacia splendens* ms comprises the area of occupancy of the known populations; similar habitat within 200 metres of known populations; corridors of remnant vegetation that link populations and additional nearby occurrences of similar habitat that do not currently contain the species but may have done so in the past and may be suitable for translocations.

Habitat critical to the survival of the species, and important populations: Given that this species is listed as Endangered, it is considered that all known habitat for wild and translocated populations is habitat critical to its survival, and that all populations are important populations.

Benefits to other species or ecological communities: There are no other known listed threatened species or ecological communities in the habitat of *Acacia splendens* ms. However, recovery actions such as improving the security of tenure of *Acacia splendens* ms populations will also help to protect the ecological community in which the populations are located.

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. *Acacia splendens* ms is not specifically listed under any international treaty, and therefore this plan does not affect Australia's obligations under any other international agreements.

Affected interests: The land holders that would be affected by the implementation of this plan include the Shire of Dandaragan, as managers of the road reserve habitat at Population 1a, and the owners of private land that contains Populations 1b and 2. The Department of Conservation and Land Management manages the Nature Reserve from which Population 3 was originally recorded.

Role and interests of indigenous people: The Aboriginal Sites Register maintained by the Department of Indigenous Affairs does not list any significant sites in the vicinity of the populations. Implementation of recovery actions under this plan will include consideration of the role and interests of indigenous communities in the region and this is discussed in the recovery actions.

Social and economic impact: The implementation of this recovery plan has the potential to have some limited social and economic impact where populations are located on private property or other lands not specifically managed for conservation. Recovery actions refer to continued liaison between stakeholders with regard to these areas.

Evaluation of the plan's performance: The Department of Conservation and Land Management in conjunction with the Moora District Threatened Flora Recovery Team will evaluate the performance of this IRP. In addition to annual reporting on progress with listed actions and comparison against the criteria for success and failure, the plan is to be reviewed within five years of its implementation.

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

1. Relevant land managers have been made aware of the location and threatened status of the species.
2. DRF markers were installed at Population 1 in May 1993.
3. Approximately 13,000 seeds were collected from Population 1 in September 1995. They have high viability, and are stored in CALM's Threatened Flora Seed Centre (TFSC) at –18°C.
4. The Botanic Garden and Parks Authority (BGPA) currently have 41 plants of *A. splendens* ms from four genetic lines.
5. The taxonomic status of this species has been clarified, and a taxonomic description drafted.
6. The future care, control and management of the habitat of Population 1a has been discussed.
7. An information sheet that describes and illustrates the species has been prepared and will be printed in the future.
8. Staff from CALM's Moora District monitor populations of the species.
9. The Moora District Threatened Flora Recovery Team is overseeing the implementation of this IRP.

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

Recovery criteria

Criteria for success: The number of individuals within populations and/or the number of populations have increased by ten percent or more over the five year period of the plan.

Criteria for failure: The number of individuals within populations and/or the number of populations have decreased by ten percent or more over the five year period of the plan.

Recovery actions

1. Coordinate recovery actions
2. Map critical habitat
3. Liaise with relevant land managers
4. Seek long-term protection of habitat
5. Implement weed control
6. Rehabilitate habitat
7. Monitor populations
8. Conduct further surveys
9. Develop and implement a fire management strategy
10. Collect seed
11. Promote awareness
12. Review the need for a full Recovery Plan

1. BACKGROUND

History

The first collection of *Acacia splendens* Maslin and C.P. Elliott ms was made from the Dandaragan area by S.J. Green in 1917. No other collections were made until A. Popplewell[1] brought it to the attention of B.R. Maslin[2] in 1981. Popplewell's surveys and knowledge of the area indicated that this species was likely to have a very restricted natural distribution (Maslin and Elliott in prep).

The taxonomic status of this taxon was uncertain until recently, as it was thought to intergrade with the common *Acacia microbotrya*. However, a morphological and allozyme study showed the close affinity between *A. splendens* ms and *A. microbotrya*, but a combination of floral and phyllode characters clearly separate the two (Elliott *et al*. 2002; Elliott 2000). Further work by B.R. Maslin and C.P. Elliott[3] has resulted in the preparation of a draft description of this taxon as a distinct species (Maslin and Elliott in prep.).

There are currently three populations known. Two are known from the Dandaragan region, and one from the Mogumber area. Population 1 is overwhelmingly the largest, with an estimated 25,000 plants. No recent plant counts are available from the other two populations, but both are likely to contain fewer than twenty plants.

Description

Acacia splendens ms is a tall, spindly shrub to 4 m, or rarely a tree to 8 m, with one to four stems arising at ground level. These plants often spread by root suckers. The main stems have smooth light grey bark with a white bloom at first, which becomes rough and dark grey with age. Upper branches can be similarly rough or smooth, and branchlets are thick and slightly angled. The phyllodes are bluish-green and are highly variable in size, shape and curvature, having juvenile, adolescent and adult forms. Juvenile phyllodes are a broad egg-shape, to 9 cm long and 6 cm wide, with a whitish bloom. Adult phyllodes are longer and narrower, to 12 cm long and 3 cm wide. The adult plants carry showy golden densely-flowered heads in May to June. These are oblong to globular, up to 12 mm in diameter and are held towards the ends of branchlets. The purple-brown seedpods are flat but gently rounded over seeds, up to 11 cm long and 8-12 mm wide (Maslin and Eliott in prep.).

This species is closely related to *Acacia microbotrya* and *A. daphnifolia*, but it differs in its pruinose branchlets and pods (the trunks are also smooth and white-pruinose, at least on young plants), more numerous flowers per head, broader phyllodes (especially the juvenile ones) and narrowly oblong pods. It is further distinguished from *A. microbotrya* by its golden-coloured heads and from *A. daphnifolia* by its smaller seeds (Maslin and Elliott in prep.).

Distribution and habitat

Acacia splendens ms is currently known from three populations about 60 km apart in the Dandaragan to Mogumber areas. Population 1 is the largest, and occurs on road reserve and adjoining private property. Population 2 also occurs on private property, and consists of less than twenty plants. Population 3 is recorded in a herbarium specimen collected in 1985 from a nature reserve. The health or even ongoing existence of this population is uncertain, as it hasn't been relocated since 1985.

At Population 1, *Acacia. splendens* ms grows in brown gravelly loam on the slopes of a lateritic breakaway, and on the adjoining colluvial slope and alluvial flat below the breakaway. On the lateritic slopes of Population 1a, *A. splendens* ms occurs in a low woodland of *Corymbia calophylla* over low

[1] Alf Popplewell (deceased), farmer and naturalist in the Dandaragan area with a strong interest in conservation
[2] Bruce R. Maslin, Botanist (Acacia specialist), CALM's Science Division
[3] Carole P. Elliott, Ecological geneticist, CALM's Science Division

scrub with *Xanthorrhoea preissii*, *Hakea lissocarpha* and *Hypocalymma angustifolium*. The original native understorey in the habitat of Population 1b, that contains the overwhelming majority of plants, is practically non-existent. A virtual monoculture of *A. splendens* ms exists with occasional *Eucalyptus loxophleba* trees and prolific weeds. At Population 3, *A. splendens* ms grows with *Corymbia calophylla*, *E. todtiana* and *E. leptophylla* over low heath on deep sand. This species occurs near a creekline at Population 2, and was apparently collected from the vicinity of a river at Population 3.

Biology and ecology

Acacia splendens ms is morphologically highly variable, and is similar to *A. microbotrya* and *A. daphnifolia*. Like both of those species, *A. splendens* ms is capable of root suckering. This, combined with its prolific seed production (Prescott 1999), means the species is able to regenerate well after fire provided there is a suitable length of time between burns.

Prescott observed that the insects he caught on inflorescences at Population 1 were relatively numerous and diverse, and suggests that the insect community visiting *Acacia splendens* ms is possibly more intact than those that occur in close association with wheat farms, with their relatively high input of chemicals (Prescott 1999). Population 1 is surrounded by relatively large areas of native bush and cattle pasture. Prescott found that muscid and syrphid flies were eating pollen from the surface of inflorescences and were thought to be strong candidates as generalist pollinators. The honey bees were aggressive and rapid gatherers of pollen that often circled around many neighbouring inflorescences as they foraged (Prescott 1999).

Observations suggest that a moderately intense fire burnt much of Population 1b sometime in the 1990s. Prescott suggests that many of the individuals growing on this property are therefore likely to be the result of post-fire regeneration. In December 1999 many dead plants were reported from Population 1a, possibly attributable to senescence. However, there were approximately 130 juveniles compared to 120 remaining adults at that time, so the deaths do not represent a major threat to this sub-population.

Population 1 of *A. splendens* ms has been calculated to occupy 11.6 ha of a 110.9 ha area of the remnant vegetation (Elliott 2000). Approximately 25 000 reproductive plants are estimated to occur in that population (Elliott 2000). Some of these plants occur on a wide area of road reserve in reasonable quality habitat, while the majority occur on private land which has been severely degraded by past grazing. Weeds are extensive, and associated native species have been almost completely removed.

Threats

Acacia splendens ms was declared as Rare Flora in July 1989. It is ranked as Critically Endangered (CR) under the *Wildlife Conservation Act 1950*. It currently meets IUCN (2000) category Endangered (EN) according to World Conservation Union (IUCN) Red List criteria B1ab(iii) + 2ab(iii) (IUCN 2000), as there are only two recently relocated populations that occur over a range of less than 20km, and the habitat at Population 1b, where the overwhelming majority of plants occur, is extremely impoverished. *A. splendens* ms is listed as Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) under its previous name *Acacia* sp. Dandaragan. The main threats are degraded habitat, weeds, grazing and inappropriate fire.

- **Degraded habitat** represents a threat to Population 1b. The native understorey species, which would provide habitat for pollinators, have been almost completely replaced by weeds.

- **Weed invasion and competition** is intense in Population 1b. Weeds suppress plant growth and recruitment 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.

- **Grazing** by kangaroos and possibly by stock (cattle) is a threat to Population 1b. Grazing has left some adult plants stunted, and with minimal foliage. The large area of remnant vegetation (ca. 111 ha) is thought to support resident kangaroos, and certainly provides a useful habitat for kangaroos to move through. Generally stock are excluded from this area, but it provides good shelter, particularly after the three dry years experienced recently (2001-2004). In addition to the impact on *Acacia splendens* ms plants, ongoing grazing would also interfere with efforts to rehabilitate the habitat at that site.

- **Track and firebreak maintenance** threatens Population 1a and 1b, and possibly Population 3. Threats include grading, chemical spraying, construction of drainage channels and the mowing of roadside vegetation. Several of these actions also encourage weed invasion.

- **Inappropriate fire regimes** may affect the viability of populations. It is likely that occasional fire is beneficial for the reproduction of this species, as seeds of *A. splendens* ms germinate following fire. However, fire may deplete the soil seed bank and the reserves of adult plants (which regenerate from rootstock), if it recurs before plants can grow to maturity and set new seed. An additional consideration is the role of frequent fire in causing further degradation of the surrounding habitat.

Summary of population information and threats

Pop. No. & Location	Land Status	Year/No. plants	Condition	Threats
1a. NW of Dandaragan	Shire road reserve	1988 100+ * 1995 100+ * 1999 120 (130) 2000 ca 25 000 * 2003 600+ (100+) (partial survey)	Healthy	Track maintenance, inappropriate fire
1b. NW of Dandaragan	Private property	1988 * 1995 * 2000 * 2003 300+ (partial survey)	Plants healthy, habitat degraded	Grazing, weed competition, firebreak maintenance, inappropriate fire
2. NNW of Dandaragan	Private property	1992 ca. 12	Healthy	Inappropriate fire
3. Mogumber	Nature reserve	1985 1+	Unknown	Unknown

Numbers in brackets = number of juveniles. * = total for both subpopulations combined.

Guide for decision-makers

Section 1 provides details of current and possible future threats. Any on-ground works (clearing, firebreaks, roadworks etc) in the immediate vicinity of *Acacia splendens* ms will require assessment. On-ground works should not be approved unless the proponents can demonstrate that they will not have an impact on the species, or on its habitat or potential habitat.

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 occupied (continuously, periodically or occasionally) by an organism or group of organisms or once occupied (continuously, periodically or occasionally) by an organism, or group of organisms, and into which organisms of that kind have the potential to be reintroduced (EPBC Act).

Acacia splendens ms meets the criteria for Endangered, and as such it is considered that all known habitat for wild and translocated populations is critical habitat. This includes:

- the area of occupancy of populations;
- areas of similar habitat within 200 metres of populations, i.e. brown gravelly loam with low woodland over low scrub or deep sand with woodland over low heath (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); and
- additional occurrences of similar habitat that do not currently contain the species but may have done so in the past (these represent possible translocation sites).

Benefits to other species or ecological communities

There are no other known listed threatened species or ecological communities in the habitat of *Acacia splendens* ms. However, recovery actions such as improving the security of tenure of *A. splendens* ms populations will also help to protect the ecological community in which the populations are located.

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. *A. splendens* ms is not specifically listed under any international treaty, and therefore this plan does not affect Australia's obligations under any other international agreements.

Affected interests

The land holders that would be affected by the implementation of this plan include the Shire of Dandaragan, as managers of the road reserve habitat at Population 1a, and the owners of private land that contains Populations 1b and 2. The Department of Conservation and Land Management manages the Nature Reserve from which Population 3 was originally recorded.

Role and interests of indigenous people

The Aboriginal Sites Register maintained by the Department of Indigenous Affairs does not list any significant sites in the vicinity of populations. Implementation of recovery actions under this plan will include consideration of the role and interests of indigenous communities in the region and this is discussed in the recovery actions.

Social and economic impacts

The implementation of this recovery plan has the potential to have some limited social and economic impact where populations are located on private property or other lands not specifically managed for conservation, such as road reserves. *Acacia splendens* ms Populations 1b and 2 occur on private land, and Population 1a occurs on a road reserve, and negotiations will continue with regard to the future management of these populations. Recovery actions refer to continued liaison between stakeholders with regard to these areas.

Evaluation of the plan's performance

CALM will evaluate the performance of this IRP in conjunction with the Moora District Threatened Flora Recovery Team. In addition to annual reporting on progress with listed actions and comparison against the criteria for success and failure, the plan is to be reviewed within five years of its implementation.

2. RECOVERY OBJECTIVE AND CRITERIA

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 populations and/or the number of populations have

increased by ten percent or more over the five year period of the plan.
Criteria for failure: The number of individuals within populations and/or the number of populations have decreased by ten percent or more over the five year period of the plan.

3. RECOVERY ACTIONS

Existing recovery actions

All relevant land managers have been notified of the location and threatened status of the species. The notification details the Declared Rare status of *Acacia splendens* ms and the associated legal obligations.

Declared Rare Flora (DRF) markers were installed at Population 1a in May 1993. These serve to alert people working in the vicinity to the presence of DRF, and the need to ensure vegetation in the area is not damaged.

Approximately 13,000 seeds were collected from 10 plants at Population 1 in September 1995, and these have been found to have high viability. A germination rate of 92% was recorded initially, and 78% after one year in storage (unpublished data A. Cochrane[4]). Seed is stored in CALM's Threatened Flora Seed Centre (TFSC) at –18°C. Some seed was collected in June 1990 by staff from Botanic Garden and Parks Authority (BGPA; then Kings Park and Botanic Gardens). This has been placed into storage.

There are 41 *Acacia splendens* ms plants from four genetic lines held at BGPA. Thirty one of those plants have been planted into the Botanic Garden and ten remain in the Nursery (A. Shade[5], personal communication).

Assessment of the immediate recovery actions required for this species was undertaken in 2000. Yates *et al.* (2000) recommended that taxonomy of this species be resolved before resources were allocated to recovery actions.

Acacia splendens ms is part of the *Acacia microbotrya* complex. A morphometric, genetic and ecological study of the species (then known as *A.* sp. Dandaragan (S.van Leeuwen 269)) was undertaken to clarify its taxonomic status (Elliott 2000; Elliott *et al.* 2002). Elliott (2000) found enough evidence to recommend that this taxon be recognised as distinct, at least at the rank of subspecies. She also recommended that further analysis be undertaken with reference to additional populations of *A. microbotrya*. B.R. Maslin and C.P. Elliott are currently undertaking this analysis, and have found that the taxon is a distinct species. A draft manuscript describing this species as *Acacia splendens* has now been prepared and will be submitted for publication in the near future (Maslin and Elliott in prep).

Population 1a occurs in a large area of shire road reserve. Negotiations have taken place to reserve some of this area as a nature reserve. Although the response was initially positive, the Shire of Dandaragan has recently voted to reject this change and retain its current vesting.

A double-sided information sheet has been prepared, and includes a description of *Acacia splendens* ms, its habitat, threats, recovery actions and photos. This will be printed, and then distributed to community members through local libraries, wildflower shows and other avenues. It is hoped that this may result in the discovery of new populations, and raise community awareness of the value of native flora.

Staff from CALM's Moora District regularly monitor all populations of this species.

[4] Anne Cochrane, Manager, CALM's Threatened Flora Seed Centre
[5] Amanda Shade, Horticulturalist, Botanic Garden and Parks Authority

The Moora District Threatened Flora Recovery Team is overseeing the implementation of this IRP.

Future recovery actions

Where populations occur on lands other than those managed by CALM, 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, influenced by their timing over the life of the Plan. However this should not constrain addressing any of the priorities if funding is available for 'lower' priorities and other opportunities arise.

1. Coordinate recovery actions

The Moora District Threatened Flora Recovery Team will coordinate recovery actions for *Acacia splendens* ms and other Declared Rare Flora in their district. They will include information on progress in their annual report to CALM's Corporate Executive and funding bodies.

Action: Coordinate recovery actions
Responsibility: CALM (Moora District) through the MDTFRT
Cost: $1,500 per year

2. Map critical habitat

It is a requirement of the EPBC Act that spatial data relating to critical habitat be determined. Although critical habitat is described in Section 1, the areas as described have not yet been mapped and that will be redressed under this action. If any additional populations are located, then critical habitat will also be determined and mapped for these locations.

Action: Map critical habitat
Responsibility: CALM (Moora District, WATSCU) through the MDTFRT
Cost: $2,000 in the first year

3. Liaise with relevant land managers

Staff from CALM's Moora District will continue to liaise with relevant land managers and landowners to ensure that populations are not accidentally damaged or destroyed through maintenance or other activities. Input and involvement will also be sought from any Aboriginal groups that have an active interest in areas that are habitat for *Acacia splendens* ms.

Action: Liaise with relevant land managers
Responsibility: CALM (Moora District) through the MDTFRT
Cost: $1,300 per year

4. Seek long-term protection of habitat

Ways and means of improving the security of populations and their habitat will be investigated. On private land (Populations 1b and 2), this may include conservation covenants with a range of agencies, registration through the Land for Wildlife scheme, or possibly acquisition.

Action: Seek long-term protection of habitat
Responsibility: CALM (Moora District) through the MDTFRT
Cost: $800 per year

5. Implement weed control

Weeds are prolific at Population 1b. Weeds can impact on *Acacia splendens* ms by competing for resources, degrading habitat, exacerbating grazing pressure, affecting pollinators, and increasing the risk and severity of fire. Recruitment may be particularly affected. Weed control will be undertaken in consultation with the land managers. This will be by localised application of herbicide during the appropriate season to minimise the effect of herbicide on this species and the surrounding native vegetation. All applications of weed control will be followed by a report on the method, timing and success of the treatment against weeds, and the effect on *Acacia splendens* ms and any associated native plant species.

Action: Implement weed control
Responsibility: CALM (Moora District) through the MDTFRT; relevant land managers
Cost: $1,500 per year

6. Rehabilitate habitat

Depauperate habitat is the major threat to Population 1b, which contains the vast majority of plants of this species. Habitat restoration will be undertaken in a proportion of Population 1b in consultation with the landowners. This will be guided by trials of treatments such as smoke water, raking and fire to stimulate the germination of any existing soil seed bank. No fire has been experienced at this site for approximately thirty or forty years. The results of these trials will indicate whether it is necessary to collect seed and broadcast it to re-establish plant species appropriate to the site.

Consideration of how to exclude kangaroos from the rehabilitation area will be necessary, especially if any watering is done. They have been known to dig up planted seedlings searching for water in damp ground (L. Monks[6] personal communication).

Action: Rehabilitate habitat
Responsibility: CALM (Moora District) through the MDTFRT
Cost: $2,000 in first, third and fifth years and $3,500 in second and fourth years

7. Monitor populations

Annual monitoring of factors such as habitat degradation (including weed invasion, grazing and plant diseases such as *Phytophthora cinnamomi*), population stability (expansion or decline), pollination activity, seed production, recruitment, longevity and predation is essential. Monitoring of Population 3 is a particular priority as it has not been monitored since 1985. Population demographics will be monitored through plots in both the rehabilitated area and the remaining area of Population 1b.

Action: Monitor populations
Responsibility: CALM (Moora District) through the MDTFRT
Cost: $1,100 per year

8. Conduct further surveys

Although it hasn't been relocated recently, the collection from Population 3 has been confirmed as this taxon, and this suggests that there may be other populations between known locations. Volunteers will be encouraged to be involved in further surveys supervised by CALM staff, to be conducted during the flowering period of the species (May to June). Records of areas surveyed will be sent to Wildlife Branch and retained at the districts, even if *Acacia splendens* ms is not located.

[6] Leonie Monks, Research Scientist, CALM's Science Division

Action: Conduct further surveys
Responsibility: CALM (Moora District) through the MDTFRT
Cost: $900 per year

9. Develop and implement a fire management strategy

It is thought very likely that adults regenerate from rootstock after fire, and that fire also stimulates germination of seed. Frequent fire may overtax the reserves of adult plants, and prevent the accumulation of soil-stored seed. Fire also promotes the introduction and proliferation of weed species. Fire should therefore be prevented from occurring frequently in the habitat of populations. A fire management strategy will be developed in consultation with land managers to determine fire control measures, and fire frequency, timing and intensity. Fire is likely to be a useful tool for management of this species. Response to fire frequency will be investigated in small sections of Population 1b if resources allow.

Action: Develop and implement a fire management strategy
Responsibility: CALM (Moora District) with relevant land managers through the MDTFRT
Cost: $2,000 in first year, and $1,600 in subsequent years

10. Collect seed

It is necessary to store germplasm as an *ex situ* genetic 'blueprint' of the species. Seed previously collected from Population 1 indicates that this species produces ample seed of high viability. Additional collections will be made from different areas of Population 1b and other populations to maintain adequate representation of the genetic diversity of this taxon.

Action: Collect seed
Responsibility: CALM (TFSC, Moora District) through the MDTFRT
Cost: $2,700 in the second and fourth years

11. Promote awareness

The importance of biodiversity conservation and the need for the long-term protection of wild populations of this species will be promoted to the community through poster displays and the local print and electronic media. Formal links with local naturalist groups and interested individuals will also be encouraged. An information sheet has been developed, and includes a description of the plant, its habitat, threats, recovery actions and photos. This will be printed and distributed to the public through CALM's Moora District office and at the offices and libraries of the Shires of Dandaragan and Victoria Plains. Such information may lead to the discovery of new populations. It is also planned to incorporate this species into a Threatened Flora Garden proposed for the Dandaragan townsite.

Action: Promote awareness
Responsibility: CALM (Moora District) through the MDTFRT
Cost: $1,700 in first year, and $1,100 per year

12. Review the need for a full Recovery Plan

At the end of the fourth year of its five-year term this Interim Recovery Plan will be reviewed and the need for further recovery actions will be assessed. If the species is still ranked Endangered after five years, the need to review this IRP or to replace it with a full Recovery Plan will be determined.

Action: Review the need for further recovery actions and/or a full Recovery Plan
Responsibility: CALM (WATSCU, Moora District) through the MDTFRT
Cost: $20,300 in the fifth year (if full Recovery Plan required)

4. TERM OF PLAN

This Interim Recovery Plan will operate from October 2004 to September 2009 but will remain in force until withdrawn or replaced. If the taxon is still ranked Endangered after five years, the need to review this IRP or to replace it with a full Recovery Plan will be determined.

5. REFERENCES

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6. TAXONOMIC DESCRIPTION

Extracted from: Maslin, B.R. and Elliott, C.P. (in prep.) *Acacia splendens* (Leguminosae: Mimosoideae), a new, rare species from near Dandaragan, Western Australia.

Acacia splendens Maslin & C.P. Elliott, *sp. nov*.
Somewhat spindly, open, craggy *shrubs* 1-4 m tall, maturing to erect or spreading *trees* 5-8 m (may reach 10 m in cultivation), single-stemmed or sometimes with up to c. 4 main stems arising from ground level, stems to about 20 cm dbh (on oldest trees, commonly 4-8 cm at ground level on mature shrubs) and sub-straight to crooked; commonly spreading by root suckers. *Bark* smooth, light grey with a white bloom at first, aging rough and dark grey to grey-brown or blackish on main stems, the upper branches similar or smooth and pruinose. *New shoots* light purple. *Branchlets* thick and angled by narrowly winged ribs on young plants, becoming terete, often more slender and ribs not winged with age, glabrous, pruinose. *Phyllodes* very variable (see discussion below), positioned on obvious stem projections, outer edge often continuous with the branchlet rib, glabrous, (6-)8-12 cm long; *juvenile phyllodes* elliptic to obovate, generally 3-6(-8) cm wide with l:w = 1.5-2(-3), straight, coriaceous, +/- undulate, glaucous, pruinose, rounded-obtuse; *adult phyllodes* narrowly elliptic to oblanceolate, generally 1-3 cm wide with l:w = 4-8, straight to shallowly recurved, grey-green to sub-glaucous, sub-acute to acuminate; *base* oblique; *midrib* rather prominent, central or slightly excentric; finely penninerved, the smallest veins anastomosing. *Gland* not prominent, situated on upper margin of phyllode 2-6 cm above pulvinus. *Inflorescences* racemose (occasionally some paniculate), racemes single within axils of phyllodes towards ends of branchlets; *raceme axes* (1.5)2.5-8(-15) cm long with (6-)9-30(-42) heads, glabrous or sparsely to moderately appressed light golden hairy, indumentum densest prior to anthesis; *peduncles* (3-)4-6(-7) mm long, indumentum as on raceme axes; *heads* obloid to globular, golden, showy, densely (33-)40-60(-75)-flowered, 8-12 mm diam. (fresh), 6-9 mm diam. (dry). *Bracteoles* spathulate to sub-peltate, 1-1.5 mm long, claws linear, laminae sub-circular to depressed-trullate, brown and fimbriolate with yellow hairs. *Flowers* 5-merous, 2 mm long; *calyx* ¾ length of corolla, gamosepalous, very shallowly dissected into inflexed, +/- rounded lobes which are yellow-hairy and slightly thickened abaxially, calyx tube red-brown (dry) and glabrous; *petals* glabrous to sparsely appressed-hairy (hairs yellow), very obscurely 1-nerved. *Pods* narrowly oblong, straight-edged to +/- shallowly constricted between seeds, occasional deep constrictions occur on some pods, flat but gently rounded over seeds, to 11(-14) cm long but often shorter, (7-)8-10(-12) mm wide, firmly chartaceous to thinly coriaceous, straight to shallowly curved, dehiscing unilaterally, glabrous, purple-brown, variably pruinose, often persisting (in clumps) on plants for some time following dehiscence. *Seeds* longitudinal to oblique in pods, oblong to elliptic or circular, 4-6 mm long, 3-5 mm wide, flattened (2 mm thick), slightly shiny, +/- smooth, very dark brown to black; *pleurogram* obscure, continuous; *areole* 2-3 x 1-1.5 mm; *funicle* cream, light brown or dark red-brown (when fresh: colour probably age-dependent), dark red-brown when dry, ¾ to wholly encircling seed in single or double fold; *aril* clavate, creamy white.

Distribution and habitat. Known from only a single population NW of Dandaragan, W.A., where it forms a dense stand on slopes and at base of a small laterite breakaway. Grows on brown loamy clay or gravelly loam in Eucalyptus low woodland with little understorey (probably due to former stock grazing of the site); *Dryandra sessilis* var. *flabellifolia* A.S. George is a common associate. The species does not extend to sandy soils which occur adjacent to the western edge of the population. There appear to be about 111 000 plants in the population but many of these undoubtedly represent ramets of clonal individuals; the frequency of plants varies according to landform, with the highest density (1.22 plants m^{-2}) occurring on the colluvial slopes of the breakaway (Elliott *et al.* 2002).

Flowering and fruiting periods. The main flowering flush is in May and June. Flowering may commence on plants as small as 1 m tall (but these may be ramets of clonal individuals). Pods with mature seeds have been collected in late November and early December.

Characteristic features. *Acacia splendens* is recognized by its glabrous, pruinose branchlets, 1-nerved phyllodes which are large, glaucous and +/- undulate when young, many-flowered, golden heads that are arranged in showy racemes, narrowly oblong, variably pruinose pods and relatively small seeds that are encircled by a normally red-brown funicle. Perhaps the most striking feature of this new species is its great range of variation in phyllode shape and size with juvenile phyllodes significantly different in form from adult ones (see *Variation* below).

Variation. Phyllodes vary considerably in shape, size and curvature, and in the shape of their apices. This variation appears to be related to the biological maturity of the foliage which seems to vary independently of the actual age of the plants. For the purpose of this discussion the phyllodes are classed as juvenile, adolescent and adult (this same terminology has been used to describe phyllodes of the *A. aneura* group, fide Miller *et al.* 2002). The juvenile phyllodes (Figure *) are elliptic to obovate, very broad (generally 3-6(-8) cm wide with l:w = 1.5-3), +/- undulate, coriaceous, glaucous, pruinose, straight and rounded-obtuse. Adult phyllodes are very different (Figure *), they are narrowly elliptic to oblanceolate, narrower and more elongate (generally 1-3 cm wide with l:w = 4-8), not undulate, straight to shallowly recurved, more thinly textured, straight to shallowly recurved and acute to acuminate. These different phyllode forms, and many intermediates between them (i.e. adolescent phyllodes, see Figure *) occur on biologically mature plants (i.e. plants that produce flowers and fruits). It is not known what factors control the change in phyllode form, however, it appears not to be strictly correlated with the age of the plants. For example, shrubs as tall as 4 m with clearly mature (rough) bark may have only juvenile phyllodes, while seemingly young plants just 2 m tall with smooth stems may have adolescent phyllodes. Most biologically mature plants in the population have either juvenile or adolescent phyllodes and these are presumably neotenous; plants with the adult phyllode form are not common. Additionally, it is not uncommon to observe branches with adult phyllodes at the base giving way to adolescent or juvenile 'reversion' foliage higher up. Neoteny, or presumed neoteny, has been reported in species of the Mulga group (i.e. *A. aneura* and its allies, see Miller *et al.* 2002); it is also present in *A. daphnifolia*, a close relative of A. *splendens* (see below).

Affinities. The new species is most closely related to *A. microbotrya* and *A. daphnifolia* on account of its 1-nerved phyllodes, globular to obloid heads arranged in racemes, seeds encircled by a dark-coloured funicle and more particularly by its gamosepalous calyx, yellow-hairy raceme axes, peduncles, flowers and bracteoles and its overall flower, bracteole and seed morphology. Like its two relatives *A. splendens* may spread by root suckers and it flowers earlier in the season than many other Wattles in southwest Western Australia. *Acacia splendens* is readily distinguished from both *A. microbotrya* and *A. daphnifolia* by its pruinose branchlets and pods (the trunks are also smooth and white-pruinose, at least on young plants), more numerous flowers per head, broader phyllodes (especially the juvenile ones) and narrowly oblong pods. It is further distinguished from *A. microbotrya* by its golden-coloured heads and from *A. daphnifolia* by its smaller seeds. Details of *A. microbotrya* and *A. daphnifolia* are given in Maslin **(in press). Other differences between these taxa are given in Elliott *et al.* (2002; note that in this work *A. splendens* is referred to as A. sp. 'Dandaragan' and *A. daphnifolia* is as *A. microbotrya* var. *borealis*).

Biology. Judging from the performance of plants in cultivation in Perth *A. splendens* has quite a fast growth rate. For example, plants at Kings Park and Botanic Garden attained a height of about 10 m with a basal trunk diameter of 26 cm in 13 years while the most vigourous plants grown at the Western Australian Herbarium attained 5 m in height with a basal trunk diameter of 15 cm in about 5 years. Interestingly in both these cases the bark on the main trunks was smooth and white-pruinose; the distinctive rough dark-coloured bark which is found on most plants in the wild presumably develops on older plants (although it is not known to what extent, if any, the growing conditions under cultivation influences bark development).

In nature plant recruitment occurs from both seeds (which are produced in great profusion) and by suckers (the level of clonality is unknown but it appears to be reasonably considerable). The size class structure of plants in the Dandaragan population shows a reverse J curve with a large number of small plants and a few large ones with many plants less than 30 cm tall and of these 98.8% were clonal ramets. The remaining 1.2% of plants were seedlings, indicating recruitment from a soil seed bank (20 ± 11.3seeds m^{-2}) in the population. Further information on the ecology, population structure and life history of *A. splendens* is provided by Elliott *et al*. (2002).

Conservation status. Formally gazetted a rare species in 1989, under the name of *Acacia* sp. Dandaragan (*S. van Leeuwen* 269).

Etymology. The specific epithet is derived from the Latin 'splendeo' (shine) in allusion to the bright golden-coloured flower heads that are produced in great profusion in May and June.

SUMMARY OF RECOVERY ACTIONS AND COSTS

Recovery Action	Year 1			Year 2			Year 3			Year 4			Year 5		
	CALM	**Other**	**Ext.**	**CALM**	**Other**	**Ext.**	**CALM**	**Other**	**Ext.**	**CALM**	**Other**	**Ext.**	**CALM**	**Other**	**Ext.**
Coordinate recovery actions	1,000	500		1,000	500		1,000	500		1,000	500		1,000	500	
Map critical habitat	1,500		500												
Liaise with land managers	600		700	600		700	600		700	600		700	600		700
Seek long-term protection of habitat	800			800			800			800			800		
Implement weed control	500		1,000	500		1,000	500		1,000	500		1,000	500		1,000
Rehabilitate habitat	1,300		700	1,300		2,200	1,300		700	1,300		2,200	1,300		700
Monitor populations	700		400	700		400	700		400	700		400	700		400
Conduct further surveys	500		400	500		400	500		400	500		400	500		400
Develop and implement a fire management strategy	1,000	500	500	800	300	500	800	300	500	800	300	500	800	300	500
Collect seed				1,000		1,700				1,000		1,700			
Promote awareness	1,100		600	1,100			1,100			1,100			1,100		
Review the need for a full Recovery Plan													11,200		9,100
Total	9,000	1,000	4,800	8,300	800	6,900	7,300	800	3,700	8,300	800	6,900	18,500	800	12,800
Yearly Total		**14,800**			**16,000**			**11,800**			**16,000**			**32,100**	

Ext. = External funding (funding to be sought), Other = funds contributed by NHT, in-kind contribution and BGPA.

Total CALM:	$51,400
Total Other:	$4,200
Total External Funding:	$35,100
Total Costs:	**$111,700**