BADGINGARRA BOX

(*Eucalyptus absita*)

RECOVERY PLAN

Department of Environment and Conservation
Moora District, PO Box 638, Jurien Bay 6516

Australian Government

Government of Western Australia

Department of Environment and Conservation
Our environment, our future

FOREWORD

Interim Recovery Plans (IRPs) are developed within the framework laid down in Department of Conservation and Land Management (CALM) [now Department of Environment and Conservation (DEC)] 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 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 and, in the case of Critically Endangered (CR) taxa, always within one year of endorsement of that rank by the Minister.

This IRP will operate from February 2006 to January 2011 but will remain in force until withdrawn or replaced. It is intended that, if the taxon is still ranked CR, this IRP will be reviewed after five years and the need for further recovery actions assessed.

This IRP was given regional approval on 2 March, 2006 and approved by the Director of Nature Conservation on 21 March, 2006. The allocation of staff time and 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 accurate as at April 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).

IRP PREPARATION

This IRP was prepared by Gina Broun[1]

[1]Flora Conservation Officer, DEC's Moora District, PO Box 638, Jurien Bay 6516.

ACKNOWLEDGMENTS

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

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Dr Margaret Byrne	Principal Research Scientist, Science Division, DEC
Ian Wilson	Farmer, Badgingarra
Gillian Stack	Project Officer, Species and Communities Branch, DEC
Sue Patrick	Senior Research Scientists, Science Division, DEC
Andrew Brown	Threatened Flora Coordinator, Species and Communities Branch, DEC
John Riley	Administrative Officer, Flora, Species and Communities Branch, DEC
Alice Reaveley	(Former) Conservation Officer, Moora District, DEC
Val English	A/Principal Ecologist, Species and Communities Branch, DEC

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

Cover photograph by Gina Broun

CITATION

This Interim Recovery Plan should be cited as:

Department of Environment and Conservation (2008). Badgingarra Box (*Eucalyptus absita*) Recovery Plan. Interim Recovery Plan No. 226. Department of Environment and Conservation, Perth, Western Australia.

SUMMARY

Scientific Name:	*Eucalyptus absita*	**Common Name:**	Badgingarra Box
Family:	MYRTACEAE	**Flowering Period:**	April-July
DEC Region:	Midwest	**DEC District:**	Moora
Shires:	Dandaragan	**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; FloraBase - Information on the Western Australian Flora. Department of Conservation and Land Management, Western Australia. http://www.calm.wa.gov.au/science/.; Grayling, P and Brooker, M. (1992) *Four new species of Eucalyptus (Myrtaceae_ from Western Australia*. Nyutsia Volume 8, No. 2 (1992), pp209-218; Napier, A., Talyor, A. and Hopper, S. (1988) *Survey of Rare and Poorly Known Eucalypts of Western Australia, Field Guide No. 3 Greenough Region* CALM Wildlife Research Centre, Wanneroo WA.

Current status: *Eucalyptus absita* was declared as Rare Flora in July 1989 under the Western Australian *Wildlife Conservation Act 1950* and ranked as Critically Endangered (CR) in May 1997. It currently meets World Conservation Union (IUCN 2000) Red List Category of Critically Endangered (CR) under criterion D as it is believed that there are less than 50 mature individuals in total, though, due to the clumping habit of the species, it is often difficult to ascertain the true number of individual plants and there may be up to 100. The species is listed as Endangered (EN) under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The main threats are road maintenance, lack of associated vegetation, weed invasion, stock damage and lack of recruitment.

Description: (adapted from Patrick and Brown, 2001) A mallee to 4 m tall, which may be either smooth-stemmed or rough-barked at the base, with fibrous grey-brown to yellowish, box-type bark for up to 2 m. Above this the bark is smoother, with coloration ranging from grey over copper or greenish above, sometimes with entirely smooth green upper stems. The seedling leaves are opposite, dull, glaucous, and ovate to deltoid in shape.

Adult leaves are glossy with a dense vein network and few or no glands. The inflorescence is apparently terminal and seven-flowered. The buds are club-shaped, up to 5 mm long, with a hemispherical operculum. The stamens are bent inwards, each flower having an inner ring of fertile stamens and an outer ring of staminodes (stamens without anthers) that are longer than the inner stamens. The fruits are obconical to club-shaped, with a thin rim. The inward sloping disc encloses four valves that have fused tips and are shed as a lid. The seeds are dark grey-brown and are compressed-ovoid in shape.

Habitat requirements: The species is known from a narrow 15 km range near Badgingarra in the Shire of Dandaragan. Populations occur between 24 km and 27 km west of a fault line that runs north-north west to south-south east and between elevations of 210 m and 290 m above sea level. They seem to be associated with minor drainage lines flowing downhill from upper catchment areas. These populations occur on white sands with some lateritic gravel and on clayey sand on sandy flats where they are lower in the landscape. The most northerly population occurs on the floodplain of the Hill River on dark grey sandy loam.

Where *Eucalyptus absita* occurs in remnant vegetation, the majority of associated species are in the Proteaceae and Myrtaceae families, which is typical of Kwongan heathland. In paddock populations, associated native species are generally restricted to larger trees that grow taller than the height of stock. These species may include *E. loxophleba, E, wandoo, E. camaldulensis* and *Corymbia calophylla*

Habitat critical to the survival of the species, and important populations: Habitat critical to the survival of *Eucalyptus absita* is the area of occupancy of important populations, areas of similar habitat surrounding important populations i.e. white sands with some lateritic gravel and on clayey sand on sandy flats where they are lower in the landscape and additional 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. 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.

As *Eucalyptus absita* is listed as Critically Endangered under the Western Australian *Wildlife Conservation Act 1950* and Endangered under the Commonwealth EPBC Act all populations are considered important populations.

Benefits to other species or ecological communities: Protection of the habitat of *Eucalyptus absita* will also directly benefit nearby populations of *E. absita x loxophleba* (Priority 1)

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. *Eucalyptus absita* 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 Sites Register did not reveal any sites however further investigation identified two sites which may be surveyed for new populations in the future. These sites are registered as having open access and neither have any restrictions on gender visitation. The Department of Indigenous Affairs will be consulted if either of these areas need to be accessed or surveyed.

Social and economic impact: The occurrence of *Eucalyptus absita* populations on land managed by the Shire of Dandaragan, on land managed by DEC and on commercially farmed private property will influence management practices on these lands. There will also be additional time required in the planning and implementation of maintenance regimes and management practices. Recovery actions refer to continued liaison between stakeholders with regard to management of all of these areas.

Evaluation of the plan's performance: DEC, 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.

Affected interests: The implementation of this plan has some implications for land mangers, particularly where populations occur on lands not specifically managed for conservation. The occurrence of *Eucalyptus absita* populations on private property will have implications for managers of land on which it occurs. Where it occurs on road reserves under the care, control and management of the Shire of Dandaragan (such as the type population), the local authority will be required to ensure protection of those populations. Where populations occur in Conservation Estate, DEC as managing authority will be required to protect populations from threatening processes and potential damage from management practices such as prescribed burning and track maintenance. Recovery actions refer to continued liaison between stakeholders with regard to all of these areas.

IRP objective

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

Recovery criteria

Criteria for success: The number of known populations and area of occupancy of populations remains stable or increases over the five years of the plan.

Criteria for failure: The number of known populations or area of occupancy of populations decreases by greater than 5% over the five years of the plan.

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

1. All populations have been monitored on an ongoing basis since the species was first recommended for Gazettal as DRF in 1986.
2. The Shire of Dandaragan and private property owners/managers have been informed of the importance of the *Eucalyptus absita* populations occurring within their landholdings They have also been formally notified of the locations which occur on their land in letters from the Executive Director of DEC
3. Since initial interest in the species in the early 1980s, areas surrounding known populations have been surveyed. The most recently discovered populations are 5, 6A, 6B, 7A, 7B, and 7C. Opportunistic surveys have resulted in finds of F1 hybrids of *E. absita* and *E. loxophleba*.
4. Technical information and the results of scientific research on the species are included in four separate publications dating from 1989 to 2001.
5. Information about the species that is intended specifically as an educational tool for the general public is included in a Threatened Species Network funded booklet that has been distributed to landholders and land managers.
6. Seed collected from populations 2 and 3 is held in long term storage at the Threatened Flora Seed Centre.
7. DNA samples were taken from all known populations in 2004 to assess the differences between and within populations. A report into the genetics and taxonomy of *Eucalyptus absita* and *E. absita x loxophleba* by Dr Margaret Byrne and Dr Peter Grayling is pending.

Recovery Actions

Below are listed those Recovery Actions considered most important to fulfill the criteria for success of this plan. Whilst some actions will be undertaken simultaneously, they are ordered in a way that assigns the most urgent recovery actions towards the top of the list. Each is explained in more detail under the heading *Future Recovery Actions.*

1. Coordinate Recovery Actions
2. Monitor populations
3. Liaise with land managers
4. Ensure populations on private property are fenced and that these fences are adequately maintained
5. Implement weed control
6. Collect seed for long term storage
7. Raise awareness in the local and extended community about the species
8. Maintain roadside markers
9. Map habitat critical to the survival of the species
10. Conduct further surveys
11. Develop, implement and monitor translocations
12. Develop fire management and suppression practices based on fire response research
13. Review the need for further recovery actions

1. BACKGROUND

History

The type specimen of *Eucalyptus absita* was collected by M.H. Brooker from Badgingarra in 1986 and its name was formally published in 1992.

In 1990 *Eucalyptus absita* was known from two small stands between Moora, the Old Badgingarra townsite and just north of Badgingarra. In 1991, 1992 and 2000 further populations were located during surveys in areas of similar soil type and topography resulting in the current total of 8 known populations. The species occurs across several tenure types, including road reserves, private property and conservation estate.

No Interim Recovery Plan (IRP) or Recovery Plan (RP) has previously been written for this species.

Description

Eucalyptus absita is a mallee to 10 m tall (although commonly reaching only 4 m) with either rough yellow-brown bark up to 2 m from the base, or occasionally with wholly smooth stems. The upper branches are always smooth, and may be a grey or coppery colour with a green tinge. Both the pith of young branchlets and the leaves themselves almost completely lack oil glands. The leaves are alternate in their arrangement, glossy green in colour with a dense reticulation and are lanceolate to broadly lanceolate in shape, growing to 10.5 x 3.3 cm in size. Inflorescences appear as terminal peduncles consisting of seven flowers with peduncles of up to 1.1 cm long. Buds are clavate in shape and range in size from 0.4–0.5 cm wide and 0.3-0.4 cm long. Stamens are white in colour, with the outer whorl consisting of staminodes (stamens without anthers) giving the flowers a “fluffy” appearance. The fruits are cup-shaped, pedicellate, with an inward sloping disk and are thin rimmed. They have four valves (rarely 3 or 5) that are fused and these are shed together as a “lid”. Seeds are dark grey-brown, compressed-ovoid, with very shallow reticulum.

Distribution and habitat

The species is known from a narrow 15 km range near Badgingarra in the Shire of Dandaragan. Its distribution closely follows a north-north west to south-south east alignment, with the exception of a single sterile northerly population and a WA Herbarium specimen recorded as being collected 25 km to the east by a community volunteer in 1986, however, this population has not been re-found. Known populations occur between 24 km and 27 km west of the north-north west to south-south east fault line and between elevations of 210 m and 290 m above sea level. They seem to be associated with minor drainage lines that flow downhill from upper catchment areas within the Yerramullah geological formation.

As most favourable areas of habitat near existing populations of *Eucalyptus absita* have been cleared for farmland, it is difficult to extrapolate former natural range of the species. Known populations occur on white sands with some lateritic gravel and in clayey sand on sandy flats lower in the landscape. The most Northerly population occurs on dark grey sandy loam on the Hill River floodplain.

Where *Eucalyptus absita* occurs in remnant vegetation, the majority of associated species are in the Proteaceae and Myrtaceae families, as is typical of Kwongan heathland. Associated species include *Acacia microbotrya, Allocasuarina humilis, Astroloma glaucescens, Calothamnus sanguineus, Drosera gigantosa, Dryandra fraseri, Dryandra nivea, Gastrolobium spinosum, Hakea incrassata, Hakea lissocarpha, Hakea trifurcata, Hypocalymma robusta, Mesomelaena stygia, Sowerbaea laxiflora, Viminea juncea*, a range of species in the *Petrophile, Daviesia, Isopogon, Acacia, Calothamnus,* and *Melaleuca* genera and a suite of native grasses.

In farmland populations, associated native species are generally restricted to larger trees that are taller than the height of stock (sheep and cattle) and are able to withstand grazing. These species may include *E. absita* x *loxophleba, E. loxophleba, E, wandoo, E. camaldulensis* and *Corymbia calophylla.*

Summary of population land vesting, purpose and tenure

Pop. No. & Location	DEC District	Shire	Vesting	Purpose	Tenure
1. NNE of Badgingarra	Moora	Dandaragan	Conservation Commission	Conservation of flora and fauna	Nature Reserve
2. SSE of Badgingarra	Moora	Dandaragan	Shire of Dandaragan	Road reserve	Shire Reserve
3. SSE of Badgingarra	Moora	Dandaragan	-	Private Property	Private Property
4. SSE of Badgingarra	Moora	Dandaragan	-	Private Property	Private Property
5 SSE of Badgingarra	Moora	Dandaragan	Shire of Dandaragan	Road reserve	Shire Reserve
6a SSE of Badgingarra	Moora	Dandaragan	-	Private Property	Private Property
6b SSE of Badgingarra	Moora	Dandaragan	-	Private Property	Private Property
7a SSE of Badgingarra	Moora	Dandaragan	-	Private Property	Private Property
7b SSE of Badgingarra	Moora	Dandaragan	-	Private Property	Private Property
7c SSE of Badgingarra	Moora	Dandaragan	-	Private Property	Private Property
8 SE of Badgingarra	Moora	Dandaragan	Shire of Dandaragan	Road reserve	Shire Reserve

Biology and ecology

Eucalyptus absita has a close affinity with *E. cuprea* from which it differs in juvenile leaf shape and colour, floral morphology, flowering period and distribution. *Eucalyptus cuprea* occurs north of Geraldton and flowers from August to November whereas *E. absita* flowers earlier, between April and July. *Eucalyptus loxophleba* sometimes occurs with *E. absita* and in some populations hybrids are present (Dr P. Grayling[1] personal communication).

The most northerly population consists of a mallee clump to 2 m wide, the trunks of which differ from the type population in their smooth bark and in several features of the leaves, including the presence of oil glands. This population produces few flowers and appears sterile, although its pollen fertility is similar to the other populations which produce an abundance of fertile seed.

Although *Eucalyptus absita* produces seed that has a fertility rate of between 25% and 35% which is typical of many *Eucalyptus* species (P. Grayling, personal communication), there is a lack of seedling recruitment within and around populations. It is thought that grazing by stock may contribute towards this; however, it is unknown whether other ecological factors such as altered fire regimes may also contribute. Pollinators are likely to consist of a suite of small animals such as ants, native beetles, bees and possibly small birds such as honeyeaters as all have been observed on the flowers during peak flowering periods.

The species is distinguishable in the field from *Eucalyptus absita* x *loxophleba* and *E. loxophleba* by the presence of staminodes and its densely reticulated leaves with few glands.

Threats

Eucalyptus absita was declared as Rare Flora in July 1989 under the Western Australian *Wildlife Conservation Act 1950* and ranked as Critically Endangered (CR) in May 1997. It currently meets World Conservation Union (IUCN 2000) Red List Category of Critically Endangered (CR) under criterion D as it is believed that there are less than 50 mature individuals in total, though, due to the clumping habit of the species, it is often difficult to ascertain the true number of individual plants and there may be up to 100. The species is listed as Endangered (EN) under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The main threats to

[1] Dr Peter Grayling, Project Officer, DEC's Revegetation Systems Unit

Eucalyptus absita are road maintenance, track and firebreak maintenance lack of associated vegetation, spray drift, fertilizer runoff, weed invasion, stock damage habitat degradation, inappropriate fire regimes and lack of recruitment. Threats include:

- **Degraded habitat and grazing**. Given that most populations occur in largely cleared paddocks on farms and are unfenced and unprotected from stock (sheep and cattle), there is very little chance of habitat restoration or of seedling recruitment.
- **Spray drift and fertilizer runoff**. All populations surrounded by or adjoining farmland (except for the northern sterile population located in Conservation Estate) are at risk from the increased nutrient loading that results from accumulations of stock faeces and from application of crop fertilizer. The result may be direct physical damage to adult plants and seedlings of *Eucalyptus absita* and associated vegetation and/or increased competition by weeds. Similarly, these populations may be at risk from spray drift of herbicide applied to surrounding crops or pasture.
- **Weed invasion and competition.** In road reserve populations, annual weeds have encroached on the species' habitat. It is also expected that weed invasion will become a greater problem as populations in cleared farmland are fenced from stock and weeds are not grazed.
- **Track and firebreak maintenance.** The location of known populations needs to be considered by land managers prior to undertaking management of reserves, roads, road verges or farm tracks. There is potential to adversely affect populations through mechanical damage to roots, stems and branches as well as retarding growth of individual plants through increased soil compaction.
- **Inappropriate fire regimes.** There is currently no data available on the response of *Eucalyptus absita* to fires of different intensities, seasons and frequencies. Populations may be at risk from fires that are too hot or to cool; too frequent or too infrequent. Typically, complex ecological relationships exist between plants in different vegetation communities and their response to wildfire. Whilst resprouting species such as *E. absita* can lose vigour with fires that are too frequent and deplete the plant's reserve of nutrients before they can be adequately replenished, the ability of individuals to reproduce may be hindered by a lack of fire as seedling germination may be stimulated by heat or smoke.

Summary of population information and threats

Pop. No. & Location	No. plants (year last surveyed)	Habitat Condition	Threats
1. NNE of Badgingarra	2000 4 clumps*	Recovering from 2002/3 summer wildfire	Frequent fires, limited life span due to seed sterility
2. SSE of Badgingarra	2000 1 clump*	Healthy, although showing no seedling recruitment	Road maintenance, spray drift from adjoining paddocks, weed infestation, lack of recruitment
3. SSE of Badgingarra	2003 >100 stems	Healthy, although showing no seedling recruitment	Disturbance by stock, grazing of seedlings by stock, spray drift from surrounding paddocks, fertilizer runoff from surrounding paddocks, weed invasion, lack of recruitment
4. SSE of Badgingarra	2000 1 tree	Healthy, although showing no seedling recruitment	Disturbance by stock, grazing of seedlings by stock, spray drift from surrounding paddocks, fertilizer runoff from surrounding paddocks, weed invasion, lack of recruitment
5 SSE of Badgingarra	2000 1 tree	Healthy plants although large fuel load of annual grassy weeds evident	Road maintenance, spray drift from adjoining paddocks, weed infestation, lack of recruitment
6a SSE of Badgingarra	2000 11 clumps*	Very healthy, no seedling recruitment evident	Disturbance by stock, grazing of seedlings by stock, spray drift from surrounding paddocks, fertilizer runoff from surrounding paddocks, weed invasion, lack of recruitment
6b SSE of Badgingarra	2000 1 clump*	Healthy, although showing no seedling recruitment. Sheep faeces observed under plants.	Disturbance by stock, grazing of seedlings by stock, spray drift from surrounding paddocks, fertilizer runoff from surrounding paddocks, weed invasion, lack of recruitment

7a SSE of Badgingarra	2000 35 clumps*	Healthy, although showing no seedling recruitment. Sheep faeces observed under stand.	Disturbance by stock, grazing of seedlings by stock, spray drift from surrounding paddocks, fertilizer runoff from surrounding paddocks, weed invasion, lack of recruitment
7b SSE of Badgingarra	2000 23 clumps*	Healthy, although showing no seedling recruitment. Sheep faeces observed under stand.	Disturbance by stock, grazing of seedlings by stock, spray drift from surrounding paddocks, fertilizer runoff from surrounding paddocks, weed invasion, lack of recruitment
7c SSE of Badgingarra	2000 32 clumps*	Healthy, although showing no seedling recruitment. Sheep faeces observed under stand.	Disturbance by stock, grazing of seedlings by stock, spray drift from surrounding paddocks, fertilizer runoff from surrounding paddocks, weed invasion, lack of recruitment
8 SE of Badgingarra	1999 0	Was not refound (herbarium record only)	Road maintenance, spray drift from adjoining paddocks, weed infestation, lack of recruitment

* Due to the growth habit of *Eucalyptus absita* it is very difficult to ascertain the correct number of individuals.

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 *Eucalyptus absita* will require assessment (WA). 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.

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

Habitat critical to the survival of *Eucalyptus absita* comprises the area of occupancy of important populations, areas of similar habitat surrounding important populations i.e. white sands with some lateritic gravel and on clayey sand on sandy flats where they are lower in the landscape, and additional 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. 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.

As *Eucalyptus absita* is listed as Critically Endangered under the Western Australian *Wildlife Conservation Act 1950* and Endangered under the Commonwealth EPBC Act all populations are considered important populations.

Benefits to other species or ecological communities

Protection of the habitat of *Eucalyptus absita* will also directly benefit nearby populations of *E. absita* x *loxophleba* (Priority 1)

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. *Eucalyptus absita* 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 Sites Register did not reveal any sites however further investigation identified two sites which may be surveyed for new populations of *Eucalyptus absita* in the future. These sites are registered as having open access and neither have any

restrictions on gender visitation. Should either of these areas require any recovery actions to be undertaken on behalf of *Eucalyptus absita*, including access to and surveying the area, the Department of Indigenous Affairs will be consulted prior to this occurring. The local Indigenous Liaison Officer, employed with the Northern Agricultural Catchments Council will also be invited to be involved with the process.

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.

Evaluation of the plan's performance

DEC 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.

Recovery Actions undertaken will be included in the Moora District Threatened Flora Recovery Team's annual reports to DEC's Corporate Executive.

Affected interests

The occurrence of *Eucalyptus absita* populations on private property will impact on the land management practices of its owners or occupiers. In particular, cropping and grazing activities will be affected. Where the species occurs on road reserves the Shire of Dandaragan will amend its management operations, including standard road maintenance regimes. Technical assistance and support will be made available to land managers by the local DEC District. With consultation, and depending on resources available, fencing materials may be provided to land managers to erect stock exclusion around populations. Where populations occur in Conservation Estate, the Department of DEC will protect populations from threatening processes and potential damage from practices such as prescribed burning and track maintenance.

2. RECOVERY OBJECTIVE AND CRITERIA

Objectives

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.

Criteria for success: The numbers of known populations and area of occupancy of populations remains stable or increases over the five years of the plan.

Criteria for failure: The number of known populations or area of occupancy of populations decreases by greater than 5% over the five years of the plan.

3. RECOVERY ACTIONS

Existing recovery actions

All populations have been monitored on an ongoing basis since the species was first recommended for Gazettal as DRF in 1986.

The Shire of Dandaragan and private property owners/managers have been informed of the importance in protecting *Eucalyptus absita* populations within their landholdings. They have also been formally notified of locations on their land.

This species received attention as one of thirty six DRF *Eucalyptus* species targeted during a large-scale survey in WA involving ninety volunteers between 1987 and 1990. Although the survey did not result in an extension of the species' distribution or an increase in the number of populations, it was a valuable educational and promotional exercise.

Technical information and the results of scientific research on the species is included in the following publications:

Grayling, P. (1989) *An Investigation of Taxonomy, Reproductive Biology and Hybridity in Four Taxa of Eucalypts of Extreme Rarity. University of Western Australia.* Nedlands, WA.
Grayling, P. and Brooker, M (1992) *Four New Species of Eucalyptus (Myrtaceae) from Western Australia*. In: *Nyutsia Volume 8, Part 2* pp209-218. CALM, WA
Kelly, A., Napier, A. and Hopper, S. (February 1995) *Survey of Rare and Poorly Known Eucalypts of Western Australia. In: Western Australian Journal of Conservation and Land Management, Supplement 2*, pp1-206. CALM, WA.
Patrick, SJ and Brown AP. (2001) *CALM Wildlife Management Program No 28 Declared Rare and Poorly Known Flora in the Moora District.* Conservation and Land Management, Bentley, Western Australia

Information about the species' that is intended specifically as an educational tool for the general public is included in the following publication:

Broun, G. and Smith, L (2003) *Declared Rare Flora in the Shire of Dandaragan*. CALM, WA
Napier, A., Taylor A. and Hopper, S.(1988*) Survey of Rare and Poorly Known Eucalypts of Western Australia. Field Guide No. 3 Greenough Region* CALM, WA.

Since initial interest in the species in the early 1980s, areas surrounding the then known populations have been thoroughly surveyed and this has resulted in other populations and subpopulations being found. The most recent found are 5, 6A, 6B, 7A, 7B, and 7C. These were located with the assistance of landowners.

Seed collected from populations 2 and 3 is held in long term storage at the Threatened Flora Seed Centre (Accession No. 1222 and 1227 respectively).

Tissue samples were taken from all known populations in 2004 to assess the genetic differences between and within populations. A report on the genetics and taxonomy of *Eucalyptus absita* and *E. absita* x *loxophleba* by Dr Margaret Byrne and Dr Peter Grayling is pending. This information will enhance other recovery actions including targeted seed collection and translocation.

Future Recovery Actions

1. Coordinate recovery actions

The Moora District Threatened Flora Recovery Team coordinates recovery actions for *Eucalyptus absita* and other Declared Rare Flora in the Moora District and includes information on progress in their annual report to DEC's Corporate Executive and funding bodies.

Action: Coordinate recovery actions
Responsibility: DEC (Moora District) through the MDTFRT
Cost: $1,700 per year

2. Monitor populations

Staff from the Moora District will continue to monitor known populations of *Eucalyptus absita* on a regular basis, with assistance from DEC Science division where research is required.

Action: Monitor populations
Responsibility: DEC (Moora District and Science Division) through the MDTFRT
Cost: $900 per year plus $2,000 additional in the second year

3. Liaise with land managers

Staff from DEC'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 contain new populations of *Eucalyptus absita*.

Action: Liaise with land managers
Responsibility: DEC (Moora District) through the MDTFRT
Cost: $900 per year

4. Ensure populations on private property are fenced and that these fences are adequately maintained

Most populations on private property remain unfenced and are at risk from damage by stock. Whilst mature plants do not appear to be suffering from stock damage, there is likelihood that seedlings would be eaten by stock and fencing is therefore required. This may be done by the landowners with financial assistance or provision of fencing materials. These fences will need to be assessed for renewal in ten years time.

Action: Fence populations on private property
Responsibility: DEC (Moora District) through the MDTFRT, with assistance from land owners
Cost: $5,700 in the first year, $3,400 in the fifth year

5. Implement weed control

Weeds are known to occur around populations 2 and 5 and are also likely to be a problem in populations of *Eucalyptus absita* that occur within cleared farmland (Populations 3, 4, 6A, 6B, 7A, 7B, 7C). Weeds can impact on *E. absita* by competing for resources, degrading habitat, exacerbating grazing pressure, affecting pollinators, and increasing the risk and severity of fire. Recruitment may be particularly affected due to the competition for resources (soil, nutrient, sunlight and water) from rapidly growing annual weed species. 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 *E. absita* and the surrounding native vegetation.

Action: Implement weed control
Responsibility: DEC (Moora District) through the MDTFRT, with assistance from land managers
Cost: $2,300 per year

6. Collect seed for long term storage

There are currently two accessions of *Eucalyptus absita* (taken from two of the ten known populations) held in long-term storage at DEC's Threatened Flora Seed Centre. Preservation of genetic material is paramount to the conservation of the species given the threats of surrounding land use. Ongoing germination testing is required to determine the long tem viability of seed. Stored seed can be used for future translocation of the species into areas of more secure tenure.

Action: Collect seed for long term storage
Responsibility: DEC (Threatened Flora Seed Centre) through the MDTFRT
Cost: $1,700 in the first year then $2,000 per year in the second, third, fourth and fifth years

7. Raise awareness in the local and extended communities about the species

Raising awareness is an important part of species preservation and protection. Methods used to achieve this include media articles, distribution of flyers, postcards and posters, and including species information in publications. The species may be included in a rare flora garden proposed for in the townsite of Dandaragan.

Action: Promote awareness
Responsibility: DEC (Moora District and Species and Communities Branch) through the MDTFRT
Cost: $600 in the first, third and fourth years, and $3,800 in the second and fifth year

8. Maintain roadside markers

Roadside markers are essential as they provide physical identification of areas containing DRF species to managers. The Shire of Dandaragan provides a basic map depicting approximate locations of DRF populations to its maintenance crew. It is important for these markers to be periodically maintained and repositioned as necessary.

Action: Maintain Roadside DRF markers
Responsibility: Dandaragan Shire with assistance from DEC (Moora District) through the MDTFRT
Cost: $1,400 in the first and fifth year

9. Map habitat critical to survival of the species

Although this is described in Section 1, these areas have not yet been mapped and that will be redressed under this action. If any additional populations are located, then habitat critical for the survival of the species in those areas will also be determined and mapped.

Action: Map habitat critical to the survival of the species
Responsibility: DEC (Moora District) through the MDTFRT
Cost: $1,900 in the first year

10. Conduct further surveys

Surveys will be conducted for new populations of *Eucalyptus absita* in areas of suitable habitat around known populations. As there seems to be a pattern of distribution from upper to lower watersheds in sub-catchments, these areas will be targeted for initial survey efforts. Surrounding landholders will be encouraged to look out for the species in their paddocks.

Action: Conduct further surveys
Responsibility: DEC (Moora District) through the MDTFRT
Cost: $2,900 in the second year.

11. Develop, implement and monitor translocations

As all known fertile populations are located outside the conservation estate, the species remains under significant threat from land management practices over the long term. Translocation of the species into areas that have a more secure tenure, preferably Conservation Estate, may be necessary.

Action: Develop, implement and monitor translocations
Responsibility: DEC (Science Division and Moora District) through the MDTFRT
Cost: $13,400 in the third year, $2,700 in the fourth and fifth years

12. Develop fire management and suppression practices based on fire response research

Little is known of the effects of fire on *Eucalyptus absita*. However, its location amongst typically fire prone heathland vegetation suggests that it would have developed ecological responses to naturally occurring wildfires. Fire can play a major part in the reproductive processes of plants and it is possible that too frequent or too infrequent fire events could have a negative impact on seedling recruitment, cause weed invasion and result in population decline. Based on appropriate fire response research, a fire management strategy will be developed in consultation with land managers to determine fire control measures and fire frequency requirements.

Action: Develop fire management and suppression practices based on fire response research
Responsibility: DEC (Science Division and Moora District) through the MDTFRT
Cost: $10,800 in the first year, $2,300 in the second, third, fourth and fifth years

13. Review the need for further recovery actions

At the end of the fourth year of its five-year term this IRP will be reviewed and the need for further recovery actions assessed.

Action: Review the need for further recovery actions
Responsibility: DEC (SCB) through the MDTFRT
Cost: $1,000 in the fifth year

4. TERM OF PLAN

Western Australia

This Interim Recovery Plan will operate from February 2006 to January 2011 but will remain in force until withdrawn or replaced. If the taxon is still ranked as CR (World Conservation Union (IUCN 2000) Red List Category) 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.

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6. TAXONOMIC DESCRIPTION

Extracted from: Grayling and Brooker (1992)

Mallee to 10 m tall with fibrous (box type) grey-brown to yellowish bark for up to 2 m, smooth grey over coppery or greenish above, or whole stems smooth. Pith of Branchlets lacking oil glands. Cotyledons reniform. Seedling leaves opposite for 2-4 pairs, petiolate, ovate to deltoid, to 4.5 x 3.7 cm, green to blue-grey, dull. Juvenile leaves petiolate, alternating, lanceolata to broadly lanceolata, to 10.5 x 3.3 cm, concolorous, green, glossy; intramarginal vein less than 0.2 cm from leaf edge; reticulation very dense; apparently glandless, or with extremely sparse intersectional oil glands, generally situated near the midrib. Inflorescences axillary, unbranched, often appearing as terminal panicles due to the presumed early loss of leaves or bracts which subtend the peduncles, 7-flowered; peduncles slightly angular, 0.5-1.1 cm long. Buds pedicellate, clavate, 0.4 – 0.5 x 0.3-0.4 cm; outer operculum abscising early in bud development, but often adhering to the apex of the inner operculum until shortly before flowering; inner operculum hemispherical, apiculate. Stamens inflexed, the outer ones without anthers (staminodes), and considerably longer than the inner whorls; anthers subversatile, basifixed, globose, opening by terminal pores, filaments white. Ovules in 4 vertical rows. Fruit pedicellate, obconical to copular, 0.4-0.5 x 0.3-0.5 cm; rim thin, disc obliquely descending, valves usually 4 (rarely 3 or 5), enclosed, their tips often fused and shed ass a circumscile lid. Seed dark grey-brown, compressed-ovoid, with very shallow reticulum.

***Etymology*.** The specific epithet is derived from the Latin ‘ absitus’, referring to most related species being found only in the Eastern States of Australia. (Sharr, 1996)