INTERIM RECOVERY PLAN NO. 311

VASSAL'S WATTLE

(*Acacia vassalii*)

INTERIM RECOVERY PLAN

2010-2015

November 2010
Department of Environment and Conservation
Kensington

GOVERNMENT OF WESTERN AUSTRALIA

Government of **Western Australia**
Department of **Environment and Conservation**

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. 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This plan will operate from November 2010 to October 2015 but will remain in force until withdrawn or replaced. It is intended that, if the taxon is still ranked as Critically Endangered (CR) in WA, this plan will be reviewed after five years and the need for further recovery actions assessed.

This plan was given regional approval on 7 July 2011 and was approved by the Director of Nature Conservation on 14 July 2011. The provision of funds identified in this plan is dependent on budgetary and other constraints affecting DEC, as well as the need to address other priorities.

Information in this plan was accurate at November 2010.

PLAN PREPARATION

This plan was prepared by Robyn Luu[1], Gillian Stack[2] and Andrew Brown[3].

[1] Project Officer, DEC Species and Communities Branch, Locked Bag 104, Bentley Delivery Centre, WA 6983.
[2] Former Project Officer, DEC Species and Communities Branch, Locked Bag 104, Bentley Delivery Centre, WA 6983.
[3] Threatened Flora Coordinator, DEC Species and Communities Branch, Locked Bag 104, Bentley Delivery Centre, WA 6983.

ACKNOWLEDGMENTS

The following people provided assistance and advice in the preparation of this plan:

Anne Cochrane	Manager (Threatened Flora Seed Centre), DEC Science Division
Joel Collins	Flora Conservation Officer, DEC Central Wheatbelt District
Andrew Crawford	Principal Technical Officer (Threatened Flora Seed Centre), DEC Science Division
Mia Podesta	Ecologist – TEC database, DEC Species and Communities Branch
Amanda Shade	Assistant Curator (Nursery) Botanic Gardens and Parks Authority
Benson Todd	Nature Conservation Coordinator, DEC Moora District

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 Joel Collins.

CITATION

This plan should be cited as:

Department of Environment and Conservation (2010) *Acacia vassalii* Interim Recovery Plan 2010-2015. Interim Recovery Plan No. 311. Department of Environment and Conservation, Western Australia.

SUMMARY

Scientific Name:	***Acacia vassalii***	**Common Name:**	Vassal's Wattle
Family:	Mimosaceae	**Flowering Period:**	June - August
DEC Regions:	Wheatbelt, Midwest	**DEC Districts:**	Moora, Central Wheatbelt
Shires:	Wongan-Ballidu, Moora, Victoria Plains	**NRM Regions:**	Avon, Northern Agricultural
Recovery Teams:	Moora District Threatened Flora Recovery Team (MDTFRT); Central Wheatbelt District Threatened Flora Recovery Team (CWDTFRT)		

Illustrations and/or further information: Brown, A., Thomson-Dans, C. and Marchant, N. (Eds) (1998) *Western Australia's Threatened Flora*; Collins, J. (2009) *Threatened Flora of the Western Central Wheatbelt*, Department of Environment and Conservation; Maslin, B.R. (1978) Studies in the genus *Acacia* (Mimosaceae) - 7: The taxonomy of some diaphyllodinous species. *Nuytsia* 2(4): 200-219; Maslin, B.R. (2001) Acacia. *Flora of Australia* 11A: 558-562; Western Australian Herbarium (1998–) *FloraBase – The Western Australian Flora*. Department of Environment and Conservation. http://florabase.dec.wa.gov.au/.

Current status *Acacia vassalii* was declared to be Rare Flora under the Western Australian *Wildlife Conservation Act 1950* in September 1987 and is ranked in WA as Critically Endangered under World Conservation Union (IUCN 1994) Red List criteria B1+2ce, C2a and D due to the severe fragmentation of populations, continuing decline in the area, extent and quality of habitat and the number of mature individuals. The species is listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999) as Endangered. The main threats to the species are land clearing, road, firebreak and rail maintenance, weed invasion, recreational activities, rubbish dumping, inappropriate fire regimes, galling, poor recruitment, competition from other plants, grazing and farming activities.

Description: *Acacia vassalii* is a spreading shrub to 60 cm high which forms a low, dense cushion in open areas, but is more diffuse and upright when shaded by other shrubs. The branches are felty at the apices but become hairless with age. The epidermis is grey with cracks that run the length of the branch, revealing smooth red bark underneath. The phyllodes are 4-8 mm long by 1 mm wide, and are slightly horizontally flattened with hooked tips. The flower heads are globular and yellow, and occur singly rather than in clusters. The pods are up to 2 cm long and 0.1 to 0.15 cm wide (Maslin 1978; Patrick and Brown 2001).

Habitat requirements: *Acacia vassalii* is currently known over a range of approximately 120 km, from Wongan Hills to east and southeast of Moora, and north-east of Watheroo. It occupies areas of brown sand and gravel over laterite or yellow sand in scrub or heath.

Habitat critical to the survival of the species, and important populations: *Acacia vassalii* is ranked in WA as Critically Endangered, and as such it is considered that all known habitat for wild populations is critical to the survival of the species, and that all wild populations are important populations. Habitat critical to the survival of *A. vassalii* includes the area of occupancy of populations, areas of similar habitat surrounding and linking populations (these providing potential habitat for population expansion and for pollinators), additional occurrences of similar habitat that may contain undiscovered populations of the species or be suitable for future translocations, and the local catchment for the surface and/or groundwater that maintains the habitat of the species.

Benefits to other species or ecological communities: Recovery actions implemented to improve the quality or security of the habitat of *Acacia vassalii* will also improve the status of associated native vegetation, as well as five Declared Rare Flora (DRF) species and nine Priority flora taxa.

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. The plan does not affect Australia's obligations under any other international agreements.

Indigenous Consultation: A search of the Department of Indigenous Affairs Aboriginal Heritage Sites Register did not reveal any sites of Aboriginal significance within or adjacent to populations of *Acacia vassalii*. However, input and involvement has been sought through the South West Aboriginal Land and Sea Council (SWALSC) and Department of Indigenous Affairs to determine if there are any issues or interests. Indigenous opportunity for future involvement in the implementation of the Recovery plan is included as an action in the plan.

Social and economic impacts: The implementation of this plan may potentially cause some social and economic impact as several Subpopulations occur on private property (Subpopulations 5b, 6d, 6e, 8a).

Affected interests: The protection of the species will have implications on on Shire operations; WestNet Rail maintenance activities; and private landholder activities.

Evaluation of the Plans Performance: The DEC in conjunction with the Moora District Threatened Flora Recovery Team (MDTFRT) and Central Wheatbelt District Threatened Flora Recovery Team (CWDTFRT) will evaluate the performance of this plan. In addition to annual reporting on progress and evaluation against the criteria for success and failure, the plan will be reviewed following five years of implementation.

Existing Recovery Actions: The following recovery actions have been or are currently being implemented and have been considered in the preparation of this plan:

1. All relevant stakeholders have been made aware of the existence of this species and its locations.
2. Declared Rare Flora (DRF) markers have been installed at Populations 3, 9, 13, 15, 16 and 17, and Subpopulations 1a, 1b, 2a, 2b, 2c, 2d, 2e, 5a and 10a
3. Dashboard stickers and posters describing the significance of DRF markers have been produced and distributed to relevant Shires and other authorities.
4. Bollards were erected at Subpopulation 1b in March 2000 to protect plants from roadworks and road users.
5. The area containing Population 8 on private property was fenced by the landowners in 1982.
6. Bennett Environmental Consulting Pty Ltd was commissioned to undertake a Declared Rare and Priority Flora search of the proposed extension to the WestNet Rail line between Miling and Toodyay in 2003. As a result of this survey six new populations were discovered.
7. New populations (Populations 14, 15, 16 and 17) were located in 2008 through surveys conducted by a DEC volunteer in the Shire of Wongan-Ballidu.
8. Approximately 1159 seeds were collected from Populations 1 and 2 in November 1996, and 3,080 seeds in 1997. These are stored in DEC's Threatened Flora Seed Centre.
9. Propagation by cuttings, taken in 1995 and 1996, was undertaken at BGPA with limited success.
10. BGPA also hold 0.57g of seed collected in November 1996.
11. A double-sided information sheet, including a description of *Acacia vassalii*, its habitat, threats, recovery actions and photos, was printed and distributed to community members through local libraries, wildflower shows and so on.
12. Staff from DEC's Moora and Central Wheatbelt Districts monitor the populations annually where practicable.
13. The MDTFRT and CWDTFRT are overseeing the implementation of this plan and will include information on progress in their annual report to DEC's Corporate Executive and funding bodies.

Plan Objective: The objective of this 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.

Recovery Criteria

Criteria for success: The number of populations has increased and/or the number of mature individuals has increased by ten percent or more over the term of the plan.

Criteria for failure: The number of populations has decreased and/or the number of mature individuals has decreased by ten percent or more over the term of the plan.

Recovery actions

1. Coordinate recovery actions
2. Install DRF markers
3. Conduct weed control
4. Ensure long-term protection of habitat
5. Undertake regeneration trials
6. Deter access
7. Monitor populations
8. Collect propagation material
9. Undertake rabbit control
10. Remove rubbish from Subpopulation 6a
11. Increase biological and ecological information
12. Develop a translocation proposal
13. Develop and implement a fire management strategy
14. Undertake surveys
15. Map habitat critical to the survival of *Acacia vassalii*
16. Undertake liaison with land managers and indigenous communities
17. Promote awareness
18. Review this plan

1. BACKGROUND

History

The first collection of *Acacia vassalii* was made from the Wongan Hills area in 1935 by E.H. Ising and the formal description published in 1978 – the species being named after the contemporary French botanist Dr Jacques Vassal. At that time, the exact location of the species was unknown, as the information with the specimens had been vague. The species was not relocated in the Wongan Hills area until 1983, and its presence in DEC's Moora District was discovered in 1984. There are currently 17 known populations, containing an estimated 2033 mature plants in the Wongan Hills, Moora and Coorow areas. The majority of the 17 populations contain fewer than forty plants. Most populations occur in disturbed sites on insecure tenure with only one population of 12 plants in a nature reserve. A number of populations within the townsite of Wongan Hills are surrounded by housing. These are threatened by further development with the habitat of two subpopulations already cleared to construct dwellings.

Description

Acacia vassalii is a spreading shrub to 60 cm tall which forms a low, dense cushion in open areas, but is more diffuse and upright when shaded by other shrubs. The branches are felty at the apices but become hairless with age. The epidermis is grey with cracks that run the length of the branch, revealing smooth red bark underneath. The phyllodes are 4-8 mm long by 1 mm wide, and are slightly horizontally flattened with hooked tips. The flower heads are globular and yellow, and occur singly rather than in clusters. The pods are up to 2 cm long and 0.1 to 0.15 cm wide (Maslin 1978; Patrick and Brown 2001).

Acacia vassalii is most closely related to *A. ericifolia* and *A. leptospermoides*, both of which have blunt, rather than the hooked phyllodes found in *A. vassalii* (Maslin 2001). *Acacia leptospermoides* subsp. *leptospermoides* is also known to occur in the Wongan Hills area.

Distribution and habitat

Acacia vassalii is currently known over a range of approximately 120 km from Wongan Hills to the east and southeast of Moora, and north-east of Watheroo. Nine populations are found in DEC's Central Wheatbelt District and comprise a combined total of 357 plants (18%), while the other eight populations are in DEC's Moora District and comprise approximately 1676 plants (82%). The species is found in scrub or heath in areas of brown sand and gravel over laterite or yellow sand. Associated species include *Acacia microbotrya*, *Allocasuarina campestris*, *Banksia fraseri*, *B. carlinoides*, *Actinostrobus arenarius*, *A. pyramidalis*, *Daviesia hakeoides* subsp. *subnuda*, *Ecdeiocolea monostachya*, *Gastrolobium calycinum*, *Grevillea biformis*, *Grevillea eriostachya* and *Xylomelum angustifolium*.

Table 1. Summary of population land vesting, purpose and manager

Pop. No. & Location	DEC District	Shire	Vesting	Purpose	Manager
1a. Wongan Hills	Central Wheatbelt	Wongan-Ballidu	DPI	School-site	
1b. Wongan Hills	Central Wheatbelt	Wongan-Ballidu	Shire of Wongan-Ballidu	Road reserve	Shire of Wongan-Ballidu
1c. Wongan Hills	Central Wheatbelt	Wongan-Ballidu	Non vested	UCL	
2a. South of Bindi Bindi	Moora	Moora	Shire of Moora	Road reserve	Shire of Moora
2b. South of Bindi Bindi	Moora	Moora	Public Transport Authority	Rail reserve	WestNet Rail
2c. South of Bindi Bindi	Moora	Moora	Public Transport Authority	Rail reserve	WestNet Rail
2d. South of Bindi Bindi	Moora	Moora	Public Transport Authority	Rail reserve	WestNet Rail
2e. South of Bindi Bindi	Moora	Moora	Public Transport Authority	Rail reserve	WestNet Rail
2f. South of Bindi	Moora	Moora	Shire of Moora	Road reserve	Shire of Moora

Bindi					
2g. South of Bindi Bindi	Moora	Moora	Public Transport Authority	Rail reserve	WestNet Rail
3. SE of Moora	Moora	Moora	Shire of Moora	Road reserve	Shire of Moora
4. Wongan Hills	Central Wheatbelt	Wongan-Ballidu	DPI	UCL	
5a. NE of Watheroo	Moora	Moora	Shire of Moora	Road reserve	Shire of Moora
5b. NE of Watheroo	Moora	Moora	Freehold	Private Property	Landowners
5c. NE of Watheroo	Moora	Moora	Conservation Commission of WA	Conservation of Flora and Fauna	DEC
6a. Wongan Hills	Central Wheatbelt	Wongan-Ballidu	Shire of Wongan-Ballidu	Municipal Purposes	Shire of Wongan-Ballidu
6b. Wongan Hills	Central Wheatbelt	Wongan-Ballidu	Non vested	UCL	Shire of Wongan-Ballidu
6c. Wongan Hills	Central Wheatbelt	Wongan-Ballidu	Shire of Wongan-Ballidu	Road reserve	Shire of Wongan-Ballidu
7. East of Wongan Hills	Central Wheatbelt	Wongan-Ballidu	DPI	Government Requirements	DPI
8a. SE of Coorow	Moora	Moora	Freehold	Private Property	Landowners
8b. SE of Coorow	Moora	Moora	Shire of Moora	Road reserve	Shire of Moora
9. S of Bindi Bindi	Moora	Moora	Public Transport Authority	Rail reserve	WestNet Rail
10a. S of Bindi Bindi	Moora	Moora	Public Transport Authority	Rail reserve	WestNet Rail
10b. S of Bindi Bindi	Moora	Moora	Public Transport Authority	Rail reserve	WestNet Rail
11a. S of Bindi Bindi	Moora	Moora	Public Transport Authority	Rail reserve	WestNet Rail
11b. S of Bindi Bindi	Moora	Moora	Public Transport Authority	Rail reserve	WestNet Rail
12. N of Calingiri	Moora	Victoria Plains	Public Transport Authority	Rail reserve	WestNet Rail
13. E of Piawaning	Central Wheatbelt	Wongan-Ballidu	Shire of Wongan-Ballidu	Road reserve	Shire of Wongan-Ballidu
14. E of Wongan Hills	Central Wheatbelt	Wongan-Ballidu	Shire of Wongan-Ballidu	Road reserve	Shire of Wongan-Ballidu
15. E of Wongan Hills	Central Wheatbelt	Wongan-Ballidu	Shire of Wongan-Ballidu	Road reserve	Shire of Wongan-Ballidu
16. E of Wongan Hills	Central Wheatbelt	Wongan-Ballidu	Shire of Wongan-Ballidu	Road reserve	Shire of Wongan-Ballidu
17. E of Wongan Hills	Central Wheatbelt	Wongan-Ballidu	Shire of Wongan-Ballidu	Road reserve	Shire of Wongan-Ballidu

Note: Populations in **bold text** are considered to be important populations. Subpopulations 6d and 6e are thought extinct.

Biology and ecology

Although it is likely that *Acacia vassalii* plants are killed by fire, germination of *Acacia* seed is often stimulated by fire (germination also depends on factors such as fire intensity and seed depth in the soil). Most plants in Population 2 occur in an area that was burnt; supporting the supposition that *A. vassalii* requires fire or other disturbance to promote germination (Patrick and Brown 2001).

Galling of the flower heads of *A. vassalii,* produced by the larvae of a wasp in the Pteromalidae family (*Perilampella* sp.), was first recorded in 1998, in particular at Population 1. Seed collected in 1996 had a viability of approximately 10%. However, seed collected in 1997 had a viability of approximately 90%. Additional seed collections will shed further light on the general pattern of viable seed production, and whether action needs to be taken to address low seed production.

Threats

Acacia vassalii was declared to be Rare Flora under the Western Australian *Wildlife Conservation Act 1950* in September 1987 and is ranked as Critically Endangered in WA under World Conservation Union (IUCN 1994) Red List criteria B1+2ce, C2a and D due to the severe fragmentation of populations, continuing

decline in the area, extent and quality of habitat and the number of mature individuals. The species is listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999). The main threats to the species are clearing, road, firebreak and rail maintenance, weed invasion, recreational activities, rubbish dumping, inappropriate fire regimes, galling, poor recruitment, competition from other plants, grazing and farming activities.

- **Clearing** of bushland for development is likely at several sites where *Acacia vassalii* is found. Negotiations will occur between relevant parties at each site. As the species is listed as Declared Rare Flora under the Western Australian *Wildlife Conservation Act 1950*, no *A. vassalii* plants may be taken or damaged without Ministerial approval.
- **Road and rail maintenance** threatens all road and rail reserve populations. Threats include grading, chemical spraying, and construction of drainage channels and the mowing of roadside vegetation. Several of these actions also encourage weed invasion.
- Habitat degradation by **weed invasion** is a potential future threat to all populations of *Acacia vassalii*, although most remain largely weed-free at present.
- **Recreational activities** are a threat to Subpopulations near the Wongan Hills town site (Subpopulations 1a, 1c, 4 and 6b). Pedestrian and vehicular traffic (off-road motorbikes) are known to occur near some populations.
- **Rubbish dumping**, including garden refuse and other material into bushland is a possible threat to Subpopulation 6a.
- **Inappropriate fire regimes** may affect the viability of populations. Seeds of *Acacia vassalii* are thought to germinate following fire and the soil seed bank would rapidly be depleted if fires recur before plants reach maturity. An additional consideration is the role of fire in facilitating weed invasion. Many populations have weeds currently restricted to the edges of the habitat, but they are likely to invade post-fire in the absence of weed control.
- **Galling** by the larvae of a wasp in the Pteromalidae family (*Perilampella* sp.) is present on the flower heads of many plants, particularly at Population 1. Seed collections from Population 1 have showed varied viability, from very low (ca 10%) to very high (ca 90%). This is thought to be a result of seasonal variability, and more collections are needed to ascertain whether the flower head galling is a serious impediment to recruitment.
- **Poor recruitment** is apparent at most populations with no seedlings recently observed. With seed viability known to be high at least some of the time, this seems most likely to be due to an absence of germination triggers.
- **Competition** from a local native species, *Cassytha sp*. (dodder), is a threat to Subpopulation 1c as it is growing over and choking adult plants of *Acacia vassalii*.
- **Grazing** by rabbits (*Oryctolagus cuniculus*) is a threat to Population 13 and Subpopulation 8b. Grazing would have an impact on the establishment of young plants of *A. vassalii* thereby limiting natural recruitment.
- **Farming activities** including spray drift are a threat to Populations 14, 15, 16 and 17. Herbicide and fertilizer applied on properties adjacent to these populations have the potential to drift onto road reserves.

The intent of this plan is to provide actions that will deal with immediate threats to *Acacia vassalii*. Although climate change may have a long-term effect on the species, actions taken directly to prevent the impact of climate change are beyond the scope of this plan.

Table 2. Summary of population information and threats

Pop. No. & Location	Land Status	Year / No. of plants	Current Condition	Current and potential threats
1a. Wongan Hills	School reserve	1995 10 1998 26 2001 26 2004 2	Healthy	Clearing, recreational activities (including off-road motorbikes), galling, fire
1b. Wongan Hills	Shire road reserve	1996 5 1998 5 (1) 1999 5 2001 2 2004 5 [1 dead]	Healthy	Roadworks, weeds, galling, fire
1c. Wongan Hills	Unallocated Crown Land (UCL)	1998 9 2001 9 2004 7	Healthy	Clearing, roadworks, recreational activities, galling, dodder
2a. South of Bindi Bindi	Shire road reserve	1991 ~100* 2000 380+* 2008 10	Moderate	Roadworks, weeds, fire
2b. South of Bindi Bindi	Railway reserve	1991 ~100* 2000 380+* 2008 280	Moderate	Rail maintenance, weeds, fire
2c. South of Bindi Bindi	Railway reserve	2003 2 2008 623	Moderate	Rail maintenance, weeds, fire
2d. South of Bindi Bindi	Railway reserve	2003 53 2008 316	Moderate	Rail maintenance, weeds, fire
2e. South of Bindi Bindi	Railway reserve	2003 6 2008 273	Moderate	Rail and firebreak maintenance, weeds, fire
2f. South of Bindi Bindi	Shire road reserve	2003 2 2008 10	Moderate	Roadworks, weeds, fire
2g. South of Bindi Bindi	Railway reserve	2003 3		
3. SE of Moora	Shire road reserve	1987 10	Unknown	Not found recently
4. Wongan Hills	UCL	1996 2 1998 1 2004 0		Clearing, recreational activities, weeds, fire
5a. NE of Watheroo	Shire road reserve	2000 33 2008 34	Poor	Roadworks, weeds
5b. NE of Watheroo	Private property	2000 6	Healthy	Weeds
5c. NE of Watheroo	Nature Reserve	2008 12	Poor	Firebreak maintenance, weeds
6a. Wongan Hills	Private property	2000 2 2001 0 2004 300*	Disturbed – Burnt April 2001	Clearing, weeds, rubbish dumping
6b. Wongan Hills	UCL	2000 9 2004 300*	Healthy	Possibly recreational activities (adjacent to housing)
6c. Wongan Hills	Shire road reserve	2000 2 2001 2 2004 300*	Healthy	Roadworks
6d. Wongan Hills	Private property	2000 1 2001 1 2004 1 2005 (11)	Cleared	
6e. Wongan Hills	Private property	2000 11 2004 9	Cleared	
7. East of Wongan Hills	Government reserve	2000 36 2004 25	Healthy	Weeds, recreational activities, roadworks
8a. SE of Coorow	Private property	2000 11 2003 11 2008 5	Poor	Weeds
8b. SE of Coorow	Shire road reserve	2008 5	Poor	Roadworks, weeds, rabbits
9. S of Bindi Bindi	Railway reserve	2003 14 2008 47	Poor	Rail maintenance, weeds
10a. S of Bindi Bindi	Railway	2003 115	Moderate	Rail maintenance, weeds, recreational

	reserve	2008	28		activities (off-road motorbikes)
10b. S of Bindi Bindi	Railway reserve	2003	1		
11a. S of Bindi Bindi	Railway reserve	2003	9		
11b. S of Bindi Bindi	Railway reserve	2003	1		
12. N of Calingiri	Railway reserve	2003	3		
13. E of Piawaning	Shire road reserve	2005	11	Disturbed	Roadworks, weeds, grazing (rabbits)
14. E of Wongan Hills	Shire road reserve	2008	[1 dead]	Dead	Farming activities (herbicide drift)
15. E of Wongan Hills	Shire road reserve	2008	1	Disturbed	Roadworks, weeds, farming activities (herbicide drift)
16. E of Wongan Hills	Shire road reserve	2008	4	Disturbed	Roadworks, weeds, farming activities (herbicide drift)
17. E of Wongan Hills	Shire road reserve	2008	2	Disturbed	Roadworks, weeds, farming activities (herbicide drift)

Note: * = total for both subpopulations, ( ) = number of seedlings.

Guide for decision-makers

Section 1 provides details of current and possible future threats. Actions for development and/or land clearing in the immediate vicinity of *Acacia vassalii* may require assessment.

Actions that could result in any of the following may potentially result in a significant impact on the species:

- Damage or destruction of occupied or potential habitat
- Alteration of the local surface hydrology or drainage
- Reduction in population size
- a major increase in disturbance in the vicinity of a population

This species is protected under the Environment Protection and Biodiversity Conservation Act *1999* and by the Western Australian *Wildlife Conservation Act 1950*.

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

Acacia vassalii is ranked in WA as Critically Endangered, and as such it is considered that all known habitat for wild populations is habitat critical to the survival of the species, and that all wild populations are important populations. Habitat critical to the survival of *A. vassalii* includes the area of occupancy of populations, areas of similar habitat surrounding and linking populations (these providing potential habitat for population expansion and for pollinators), additional occurrences of similar habitat that may contain undiscovered populations of the species or be suitable for future translocations, and the local catchment for the surface and/or groundwater that maintains the habitat of the species.

Benefits to other species or ecological communities

Recovery actions implemented to improve the quality or security of the habitat of *Acacia vassalii* will also improve the status of associated native vegetation. Five Declared Rare Flora (DRF) species and nine Priority flora taxa occur within 500 m of *A. vassalii*. These taxa are listed in the table below:

Table 3. Conservation–listed flora species occurring within 500m of *Acacia vassalii*

Species name	Conservation Status (WA)	Conservation Status (EPBC Act 1999)
Acacia cochlocarpa subsp. velutinosa	Critically Endangered	Critically Endangered
Daviesia dielsii	Endangered	Endangered
Gastrolobium appressum	Endangered	Vulnerable
Gastrolobium hamulosum	Critically Endangered	Endangered
Grevillea bracteosa subsp. bracteosa	Endangered	-

Commersonia sp. Bindoon (C. Wilkins & F. & J. Hort CW 2155)	Priority 1	-
Acacia arcuatilis	Priority 2	-
Acacia drewiana subsp. minor	Priority 2	-
Eucalyptus macrocarpa x pyriformis	Priority 3	-
Lechenaultia juncea	Priority 3	-
Leucopogon sp. Bungulla (R.D. Royce 3435).	Priority 3	-
Verticordia huegelii var. *tridens*	Priority 3	-
Banksia bella	Priority 4	-
Daviesia spiralis	Priority 4	-

For a description of the Priority categories see Smith (2010).

Acacia vassalii does not occur within or adjacent to any Threatened or Priority Ecological Communities (TECs/PECs).

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. This plan does not affect Australia's obligations under any other international agreements.

Indigenous Consultation

A search of the Department of Indigenous Affairs Aboriginal Heritage Sites Register did not reveal any sites of Aboriginal significance within or adjacent to populations of *Acacia vassalii*. Input and involvement has been sought through the South West Aboriginal Land and Sea Council (SWALSC) and Department of Indigenous Affairs to determine if there are any issues or interests. Indigenous opportunity for future involvement in the implementation of the Recovery plan is included as an action in the plan.

Social and economic impacts

The implementation of this plan may potentially cause some social and economic impacts. For populations occurring on private property (5b, 6d, 6e, 8a) through the loss of production farmland and/or land available for development, as well as the cost of implementing recovery actions (such as weed control, fencing). Social and economic impacts may also be incurred for populations on land vested with Westnet Rail (Populations 2b-e, 2g, 9-12) and local Shires (Populations 1b, 2a, 2f, 3, 5a, 6c, 8b, 13-17), due to the implementation of recovery actions (deterring access, controlling weeds and rabbits).

Affected interests

The protection of the species may potentially impact on Shire operations; WestNet Rail maintenance activities; and private landholder activities.

Evaluation of the Plans Performance

The DEC in conjunction with the Moora District Threatened Flora Recovery Team (MDTFRT) and Central Wheatbelt District Threatened Flora Recovery Team (CWDTFRT) will evaluate the performance of this plan. In addition to annual reporting on progress and evaluation against the criteria for success and failure, the plan will be reviewed following five years of implementation.

2. RECOVERY OBJECTIVE AND CRITERIA

Objective

The objective of this 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 populations has increased and/or the number of mature individuals has increased by ten percent or more over the term of the plan.
Criteria for failure: The number of populations has decreased and/or the number of mature individuals has decreased by ten percent or more over the term of the plan.

3. RECOVERY ACTIONS

Existing recovery actions

All relevant stakeholders have been made aware of the existence of this species and its locations. These notifications detail the current status of the species as Declared Rare Flora (DRF) and the associated legal obligations regarding its protection.

Declared Rare Flora (DRF) markers have been installed at Populations 9, 13, 15, 16 17 and Subpopulations 1a, 1b, 2a, 2b, 2c, 2d, 2e, 3, 5a and 10a. These alert people working in the vicinity to the presence of DRF and the need to avoid work that may damage the species or its habitat. Dashboard stickers and posters describing the significance of DRF markers have been produced and distributed to relevant Shires and other organisations.

Bollards were erected at Subpopulation 1b in March 2000 to protect it from roadworks and road users.

The area on private property containing Population 8 was fenced by the landowners in 1982.

Bennett Environmental Consulting Pty Ltd was commissioned to undertake a Declared Rare and Priority Flora search of the proposed extension to the WestNet Rail line between Miling and Toodyay in 2003. As a result of this survey six new populations were discovered.

New populations were located in 2008 through surveys conducted by a local DEC volunteer in the Shire of Wongan-Ballidu.

Approximately 1159 seeds were collected from Populations 1 and 2 in November 1996 and a further 3,080 seeds collected from the same populations in 1997. Seeds from both collections are stored in DEC's Threatened Flora Seed Centre (TFSC) at –18°C. Germinants resulting from TFSC viability trials were delivered to Botanic Gardens and Parks Authority (BGPA) nursery but none survived.

Cuttings taken in 1995 and 1996 by the BGPA were propagated limited success. Out of 363 cuttings treated, only 23 (6%) developed roots. There are currently three *Acacia vassalii* plants in BGPA's Nursery, representing two genetic lines. Two plants are now fifteen years old and the third is 11 years old. BGPA also hold 0.57g of seed collected in November 1996.

A double-sided information sheet with a description of *Acacia vassalii*, its habitat, threats, recovery actions and photos, was printed and distributed to Shires and community members. It is hoped that this will result in the discovery of new populations.

Staff from DEC's Moora and Central Wheatbelt Districts monitor populations annually if possible.

The MDTFRT and CWDTFRT are overseeing the implementation of this plan and will include information on progress in their annual report to DEC's Corporate Executive and funding bodies.

Future recovery actions

Where recovery actions occur on lands other than those managed by DEC, permission has been or will be sought prior to actions being undertaken. The following recovery actions are generally in order of descending priority, influenced by their timing over the life of the plan. However this should not constrain addressing any of the actions if funding is available and other opportunities arise.

1. Coordinate recovery actions

The MDTFRT and CWDTFRT will oversee the implementation of the recovery actions for *Acacia vassalii* and will include information on progress in their annual report to DEC's Corporate Executive and funding bodies.

Action: Coordinate recovery actions
Responsibility: DEC (Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT
Cost: $6,000 per year

2. Install DRF markers

DRF markers are required at Subpopulations 2f and 8b and need to be replaced at Subpopulation 1b.

Action: Install DRF markers
Responsibility: DEC (Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT
Cost: $3,000 in year 1

3. Conduct weed control

Weeds, and a local species *Cassytha sp*. (dodder), are a potential threat to many populations. The following actions will be implemented:

1. Determine which weeds are present.
2. Select appropriate technique; herbicide, mowing or hand weeding.
3. Control invasive weeds and *Cassytha sp*. by hand removal and/or spot spraying around *Acacia vassalii* plants.
4. Monitor the success of the treatment on weed death, and the tolerance of *Acacia vassalii* and associated native plant species to the treatment.
5. Report on the method and success of the threatment, and effect on *Acacia vassalii* plants and associated species.

Action: Conduct weed control
Responsibility: DEC (Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT
Cost: $6,000 per year, as required

4. Ensure long-term protection of habitat

The conservation status of land that supports Populations 1a, 1c, 4, 6a, 6b and 7 will be reviewed and the possibility of purchase, a change of land tenure and/or establishment of nature conservation covenants investigated.

Action: Ensure long-term protection of habitat
Responsibility: DEC (Moora and Central Wheatbelt Districts, Land Unit); Department of Planning and Infrastructure (DPI); Department of Mines and Petroleum (DOMP), through the MDTFRT and CWDTFRT
Cost: $3,000 per year

5. Undertake regeneration trials

Natural disturbance events may be the most effective means of germinating *Acacia vassalii* seed in the wild. Different techniques should be investigated (i.e. soil disturbance, fire, smoke water), to determine the most appropriate method. Records will need to be maintained for future research. Any disturbance trials will need to be undertaken in conjunction with weed control.

Action: Undertake regeneration trials

Responsibility: DEC (Science Division, Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT
Cost: $7,000 in years 1 and 3, $2,000 in years 2, 4 and 5

6. Deter access

To deter access to Subpopulations 1a, 1c, 6b and Population 4, barriers such as bollards or fencing may be needed. Signs indicating the significance of the area may also needed.

Action: Deter access
Responsibility: DEC (Central Wheatbelt District), Shire of Wongan-Ballidu, through the CWDTFRT
Cost: $5,000 in years 1 and 2

7. Monitor populations

Monitoring of factors such as weed invasion, habitat degradation, hydrology (inlcuding salinity), population stability (expansion or decline), pollinator activity, seed production, recruitment, and longevity is essential. The populations will be inspected and an accurate location recorded. In particular, Populations 2, 10 and 11 will be resurveyed to determine if they are actually the one population.

Action: Monitor populations
Responsibility: DEC (Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT
Cost: $10,000 per year

8. Collect propagation material

Further seed collections are required. The germination for most *Acacia vassalii* seed is relatively low so the number of seedlings that can be produced from current collections is low.

Action: Collect propagation material
Responsibility: DEC (Moora and Central Wheatbelt Districts, TFSC), BGPA through the MDTFRT and CWDTFRT
Cost: $5,000 per year

9. Undertake rabbit control

The level of threat at Populations 8b and 13 posed by rabbits may vary from year to year with conditions and numbers. When monitoring ascertains the threat is high, control measures may be required. Control should be undertaken in summer months when less green feed is available as an alternative food source.

Action: Undertake rabbit control
Responsibility: DEC (Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT; relevant land managers
Cost: $7,000 in years 1, 3 and 5

10. Remove rubbish from Subpopulation 6a

Garden waste and other rubbish has been dumped at Population 6a. Rubbish removal will need to be carried out by a contractor and/or DEC staff during summer to avoid spreading disease and increase soil disturbance, with careful supervision from DEC District staff to ensure that disturbance to surrounding plants is minimized. Signs to warn the public about the illegality of rubbish dumping will be erected where needed.

Action: Remove rubbish from Subpopulation 6a
Responsibility: DEC (Central Wheatbelt District) through the CWDTFRT
Cost: $5,000 in the first year

11. Increase biological and ecological information

Increased knowledge of the biology and ecology of the species will provide a scientific basis for management of *Acacia vassalii* in the wild. Overall investigations will ideally include:

1. Study of the soil seed bank dynamics and the role of various factors including disturbance, competition, drought, inundation and grazing in recruitment and seedling survival.
2. Determination of reproductive strategies, phenology and seasonal growth.
3. Investigation of reproductive sucess and pollination biology.
4. Investigation of population genetic structure, levels of genetic diversity and minimum viable population size.
5. Investigation of the impacts of dieback disease and control techniques on *Acacia vassalii* and its habitat.
6. The impact of changes in flooding regime in the habitat.

Action: Increase biological and ecological information
Responsibility: DEC (Science Division, Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT
Cost: $10,000 per year

12. Develop a translocation proposal

Translocation may be deemed desirable for the conservation of this species if surveys fail to locate new populations. A translocation proposal will be developed and suitable translocation sites selected. Information on the translocation of threatened plants and animals in the wild is provided in DEC's Policy Statement No. 29 *Translocation of Threatened Flora and Fauna* (CALM 1995), and the Australian Network for Plant Conservation translocation guidelines (Vallee et al 2004). All translocation proposals require endorsement by DEC's Director of Nature Conservation. Monitoring of translocations is essential and will be included in the timetable developed for the Translocation Proposal.

Action: Develop a translocation proposal
Responsibility: DEC (Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT
Cost: $5,000 in year 4

13. Develop and implement a fire management strategy

Fire will be prevented from occurring in the habitat of populations, except where it is being used experimentally as a recovery tool. A fire response strategy will be developed that recommends fire frequency, intensity, season, and control measures.

Action: Develop a fire management strategy
Responsibility: DEC (Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT
Cost: $10,000 in first year and $2,000 in subsequent years

14. Undertake surveys

It is recommended that areas of potential suitable habitat be surveyed for the presence of *Acacia vassalii* during the flowering period in June to August.

All surveyed areas will be recorded and the presence or absence of the species documented to increase survey efficiency and reduce unnecessary duplicate surveys. Where possible volunteers from the local community, Landcare groups, wildflower societies and naturalists clubs will be encouraged to be involved.

Action: Undertake surveys
Responsibility: DEC (Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT
Cost: $5,000 in years 1, 3 and 5

15. Map habitat critical to the survival of *Acacia vassalii*

It is a requirement of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) (Section 207A) that spatial data relating to critical habitat be determined. Although critical habitat to the survival of the species is alluded to in Section 1, it has not yet been mapped and will be addressed under this action. If additional populations are located, then habitat critical to the survival of the species will be determined and mapped for these locations also.

Action: Map habitat critical to the survival of *Acacia vassalii*
Responsibility: DEC (SCB, Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT
Cost: $6,000 in year 2

16. Undertake liaison with land managers and indigenous communities

Staff from DEC's Moora and Central Wheatbelt Districts will liaise with appropriate land managers to ensure that populations of *Acacia vassalii* are not accidentaly damaged or destroyed. Indigenous consultation will take place to determine if there are any issues or interests in areas that are habitat for *A. vassalii*.

Action: Undertake liaison with land managers and indigenous communities
Responsibility: DEC (Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT
Cost: $2,000 per year

17. Promote awareness

The importance of biodiversity conservation and the protection of *Acacia vassalii* will be promoted to the public. This will be achieved through an information campaign using local print and electronic media and by setting up poster displays. Formal links with local naturalist groups and interested individuals will also be encouraged.

Action: Promote awareness
Responsibility: DEC (Moora and Central Wheatbelt Districts, SCB, Strategic Development and Corporate Affairs Division) through the MDTFRT and CWDTFRT
Cost: $4,000 in year 1 and $2,000 in years 2-5

18. Review this plan

If *Acacia vassalii* is still ranked as Critically Endangered at the end of the five-year term of this plan, the need for further recovery actions, or a review of this plan will be assessed and a revised plan prepared if necessary.

Action: Review this plan
Responsibility: DEC (SCB, Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT
Cost: $3,000 in year 5

Table 4. Summary of Recovery Actions

Recovery Action	Priority	Responsibility	Completion Date
Coordinate recovery actions	High	DEC (Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT	Ongoing
Install DRF markers	High	DEC (Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT	2011

Conduct weed control	High	DEC (Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT	Ongoing
Ensure long-term protection of habitat	High	DEC (Moora and Central Wheatbelt Districts, Land Acquisition Branch); Department of Planning and Infrastructure (DPI); Department of Mines and Petroleum (DOMP), through the MDTFRT and CWDTFRT	Ongoing
Undertake regeneration trials	High	DEC (Science Division, Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT	2015
Deter access	High	DEC (Central Wheatbelt District), Shire of Wongan-Ballidu, through the CWDTFRT	2012
Monitor populations	High	DEC (Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT	Ongoing
Collect propagation material	High	DEC (Moora and Central Wheatbelt Districts, TFSC), BGPA through the MDTFRT and CWDTFRT	2015
Undertake rabbit control	Medium	DEC (Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT; relevant land managers	Ongoing
Remove rubbish from Subpopulation 6a	Medium	DEC (Central Wheatbelt District) through the CWDTFRT	2011
Increase biological and ecological information	High	DEC (Science Division, Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT	2015
Develop a translocation proposal	Medium	DEC (Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT	Ongoing
Develop and implement a fire management strategy	High	DEC (Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT	Developed by 2011 with implementation ongoing
Undertake surveys	High	DEC (Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT	Ongoing
Map habitat critical to the survival of *Acacia vassalii*	High	DEC (SCB, Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT	2012
Undertake liaison with land managers and indigenous communities	Medium	DEC (Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT	Ongoing
Promote awareness	Medium	DEC (Moora and Central Wheatbelt Districts, SCB, Strategic Development and Corporate Affairs Division) through the MDTFRT and CWDTFRT	Ongoing
Review this plan	Medium	DEC (SCB, Moora and Central Wheatbelt Districts) through the MDTFRT and CWDTFRT	2015

4. TERM OF PLAN

This plan will operate from November 2010 to October 2015 but will remain in force until withdrawn or replaced. If the species is still ranked Critically Endangered after five years, the need for further recovery actions will be determined.

5. REFERENCES

Brown, A., Thomson-Dans, C. and Marchant, N. (Eds). (1998) *Western Australia's Threatened Flora*. Department of Conservation and Land Management, Western Australia.

Collins, J. (2009) *Threatened Flora of the Western Central Wheatbelt*, Department of Environment and Conservation.

Department of Conservation and Land Management (1992) Policy Statement No. 44 *Wildlife Management Programs*. Department of Conservation and Land Management, Western Australia.

Department of Conservation and Land Management (1994) Policy Statement No. 50 *Setting Priorities for the Conservation of Western Australia's Threatened Flora and Fauna*. Department of Conservation and Land Management, Western Australia.

CALM (1995) Policy Statement No. 29 *Translocation of Threatened Flora and Fauna*. Department of Conservation and Land Management, Western Australia.

Government of Australia (1999) Environment Protection and Biodiversity Conservation Act.

Maslin, B.R. (1978) Studies in the genus *Acacia* (Mimosaceae) - 7: The taxonomy of some diaphyllodinous species. *Nuytsia* 2(4): 200-219.

Maslin, B.R. (2001) Acacia. *Flora of Australia* 11A: 1-605. Australian Biological Resources Study, Canberra.

Smith M.G. (2010) *Declared Rare and Priority Flora List for Western Australia.* Department of Environment and Conservation, Perth, Western Australia.

Vallee, L., Hogbin T., Monks L., Makinson B., Matthes M. and Rossetto M. (2004) Guidelines for the Translocation of Threatened Australian Plants. Second Edition. *The Australian Network for Plant Conservation*. Canberra, Australia.

Western Australian Herbarium (1998) *FloraBase – The Western Australian Flora*. Department of Environment and Conservation. http://florabase.dec.wa.gov.au/.

World Conservation Union (1994) *IUCN Red List Categories prepared by the IUCN Species Survival Commission, as approved by the 40th Meeting of the IUCN Council*. Gland, Switzerland.

World Conservation Union (2001) *IUCN Red List Categories: Version 3.1*. Prepared by the IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK.

6. TAXONOMIC DESCRIPTION

Acacia vassalii

Maslin, B.R. (1978) Studies in the genus *Acacia* (Mimosaceae) - 7: The taxonomy of some diaphyllodinous species. *Nuytsia* 2(4), 200-219.

Shrub (further details unknown); *branches* terete, very obscurely ribbed, densely tomentose towards apices but becoming glabrous with age; *epidermis* grey, finely longitudinally fissured (exposing a smooth red bark beneath). *Stipules* deciduous with age, very narrowly triangular, 1-2 mm long, scarious, ciliolate, otherwise glabrous, light brown and connate near base when very young (ie on new shoots) but becoming darker and separated (laterally displaced) with age. *Phyllodes* spreading to ascending, rather distant, slightly horizontally flattened (i.e. diaphyllodinous), ± plano-convex in cross section, sometimes medially sulcate above when dry, narrowly oblong but tapered towards base in plane view, 4-8 mm long, ca. 1 mm wide, straight or gently arched upwards and always prominently uncinate (thus sometimes producing a shallowly sigmoid outline), finely puberulous to glabrescent, obscurely finely wrinkled when dry; *nervature* very obscure, *principal nerves* 3 (2 marginal, 1 central abaxially), nerveless on adaxial surface; *apex* rostellate, apiculum ca. 0.3 mm long and light brown; *pulvinus* ca. 0.5 mm long, orange. *Gland* (often absent) situated on distal 1/3 of upper surface of phyllode, circular, 0.2 mm diam., lip not raised. *Inflorescences* simple, 1 per node; *peduncles* 3-4.5 mm long, glabrous or glabrescent; *basal peduncular bracts* persistent, solitary, triangular to oblong, concave, slightly curved, ± 0.5 mm long, ciliolate, sometimes sparsely puberulous abaxially; *flower heads* yellow, globular, with 15-16 flowers. *Bracteoles* spathulate, 0.5 mm long; claws linear, ± equalling laminae in length; laminae ovate, inflexed, slightly concave, puberulous abaxially. *Flowers* 5-merous; *calyx* ± 1/3 length of corolla, divided for 1/4 its length into ± oblong ciliolate lobes which are slightly inflexed at apex, tube very obscurely 5-nerved a little angular when dry and ± sparsely puberulous; *petals* 1 mm long, connate for 2/3 their length, glabrous, 1-nerved; ovary sessile, glabrous. *Legumes* and seeds not seen.

SUMMARY OF RECOVERY ACTIONS AND INDICATIVE COSTS

	Year 1			Year 2			Year 3			Year 4			Year 5		
Recovery Action	**DEC**	**Other**	**Ext.**	**DEC**	**Other**	**Ext.**	**DEC**	**Other**	**Ext.**	**DEC**	**Other**	**Ext.**	**DEC**	**Other**	**Ext.**
Coordinate recovery actions	3000	1000	2000	3000	1000	2000	3000	1000	2000	3000	1000	2000	3000	1000	2000
Install DRF markers	1500		1500												
Conduct weed control	3000		3000	3000		3000	3000		3000	3000		3000	3000		3000
Ensure long-term protection of habitat	3000			3000			3000			3000			3000		
Undertake regeneration trials	5000		2000	1000		1000	5000		2000	1000		1000	1000		1000
Deter access	1000		4000	1000		4000									
Monitor populations	6000		4000	6000		4000	6000		4000	6000		4000	6000		4000
Collect propagation material	2000	1000	2000	2000	1000	2000	2000	1000	2000	2000	1000	2000	2000	1000	2000
Undertake rabbit control	3500		3500				3500		3500				3500		3500
Remove rubbish from Subpopulation 6a	2500		2500												
Increase biological and ecological information	5000		5000	5000		5000	5000		5000	5000		5000	5000		5000
Develop a translocation proposal										2500		2500			
Develop and implement a fire management strategy	6000		4000	1000		1000	1000		1000	1000		1000	1000		1000
Undertake surveys	3000	1000	1000				3000	1000	1000				3000	1000	1000
Map habitat critical to the survival of *Acacia vassalii*				2000		4000									
Undertake liaison with land managers and indigenous communities	1000		1000	1000		1000	1000		1000	1000		1000	1000		1000
Promote awareness	2000		2000	2000			2000			2000			2000		
Review this plan													1500		1500
Total	47500	3000	37500	30000	2000	27000	37500	3000	24500	29500	2000	21500	35000	3000	25000
Yearly Total	**88,000**			**59,000**			**65,000**			**53,000**			**63,000**		

Ext. = External Funding (funding to be sought), Other = funds contributed by other agencies, volunteer input and BGPA in-kind contribution.

Total DEC: $179,500
Total Other: $13,000
Total External Funding: $135,500
Total Costs: **$328,000**

EXACT LOCATION OF POPULATIONS OF *ACACIA VASSALII* (NOT FOR PUBLICATION)

Pop	Location	Vesting	Purpose	Manager	Latitude	Longitude
1a.	Wongan Hills townsite on a block of uncleared bushland Town Location 176 (Lot 443). East side of Wilding Rd, School Reserve No. 22526.	DPI	School-site		30° 53' 23"	116° 43' 29"
1b.	Wongan Hills townsite on a block of uncleared bushland Town Location 176 (Lot 443). On road verge south side of Johnston St, 50-200 m east of junction with Wilding Rd, and 10 m from sealed surface on edge of roadside clearing.	Shire of Wongan-Ballidu	Road reserve	Shire of Wongan-Ballidu	30° 53' 23"	116° 43' 29"
1c.	Wongan Hills townsite, Lot 173, on corner of Wandoo Cr and Airport Rd, extending on east side of Airport Rd and into bush north of Wandoo Cr along drainage line.	Non vested	UCL		30° 53' 10"	116° 43' 40"
2a.	7.5 to 12.5 km south of Bindi Bindi, on the east side of the Bindi Bindi-Toodyay Rd. Shire of Moora road reserve.	Shire of Moora	Road reserve	Shire of Moora	30° 43' 06"	116° 23' 22"
2b.	7.5 to 12.5 km south of Bindi Bindi, on the east side of the Bindi Bindi-Toodyay Rd. Westrail rail reserve, between 104km and 110km markers on Bolgart-Miling Line.	Public Transport Authority	Rail reserve	WestNet Rail	30° 42' 10"	116° 23' 21"
2c.	Rail reserve adjacent to Bindi Bindi-Toodyay Road. Ca. 10.2 to 11.3 km south of Bindi Bindi. East side of road in E+W side of railway reserve. South of the creek and north of Gabalong East Road.	Public Transport Authority	Rail reserve	WestNet Rail	30° 42' 51"	116° 23' 21"
2d.	Railway siding. Gabalong West Road., at intersection with Bindi Bindi-Toodyay Road. North and south sides of road. Ca. 11.5 km south of Bindi Bindi.	Public Transport Authority	Rail reserve	WestNet Rail	30° 43' 21"	116° 23' 13"
2e.	Rail reserve adjacent to Bindi Bindi-Toodyay Road. Ca. 11-13 km south of Bindi Bindi. East side of road on E+W sides of railway track.	Public Transport Authority	Rail reserve	WestNet Rail	30° 43' 45"	116° 23' 06"
2f.	Gabalong East Road, ca. 200 m east of intersection with Bindi Bindi-Toodyay Road. North and south sides of road.	Shire of Moora	Road reserve	Shire of Moora	30° 43' 16"	116° 23' 30"
2g.	Gabalong Road East, west side of railway track.	Public Transport Authority	Rail reserve	WestNet Rail	30° 42' 48"	116° 23' 18"
3.	13.5 km south of Bindi-Bindi on the west side of the Bindi-Bindi - Piawaning Road. Between private property and Shire of Moora road verge.	Shire of Moora	Road reserve	Shire of Moora	30° 44' 27"	116° 23' 11"
4.	Lots 598 and / or Lot 599 Korralling Way, Wongan Hills in uncleared townsite Lots between Korralling Street and Manmanning Road.	DPI	UCL		30° 53' 53"	116° 43' 25"
5a.	5.5 to 6.8 km north of Carot Well Rd on Masons Rd, north east of Watheroo. East and west sides of road.	Shire of Moora	Road reserve	Shire of Moora	30° 12' 51"	116° 16' 16"
5b.	Vict. Loc. No. 8827 (or 8844), 5.5 to 6.8 km north of Carot Well Rd on Masons Rd, north east of Watheroo.	Freehold	Private Property	Landowners	30° 12' 51"	116° 16' 16"
5c.	Jocks Well Nature Reserve (20025). Along south side of reserve, from road verge heading west along old firebreak (boundary of PP Lot 8827-5b).	Conservation Commission of WA	Conservation of Flora and Fauna	DEC	30° 12' 18"	116° 15' 58"
6a.	Wongan Hills townsite, on private property Grant No. 486, adjacent to water supply Reserve No. 24423, near base of radio tower support cables.	Shire of Wongan-Ballidu	Municipal Purposes	Shire of Wongan-Ballidu	30° 53' 37"	116° 42' 47"
6b.	Wongan Hills townsite, on north eastern side of Ellis St, just south of Wongan Grant No. 486, on UCL adjacent to water supply Reserve No. 24423.	Non vested	UCL	Shire of Wongan-	30° 53' 50"	116° 42' 47"

				Ballidu		
6c.	Wongan Hills townsite, on north eastern side of Ellis St, just south of Wongan Grant No. 486, ca. 80 m from Hospital Rd and directly opposite boundary fence between Lots 559 and 560. Shire of Wongan-Ballidu road verge.	Shire of Wongan-Ballidu	Road reserve	Shire of Wongan-Ballidu	30° 53' 50"	116° 42' 20"
6d.	Wongan Hills townsite, on western side of Ellis St, in undeveloped Lot 559 near fence line, ca. 80 m from Hospital Rd. – *cleared*	Freehold	Private Property	Landowners	30° 53' 50"	116° 42' 05"
6e.	Wongan Hills townsite, on western side of Ellis St, in undeveloped Lot 560 near fence line, ca. 80 m from Hospital Rd. – *cleared*	Freehold	Private Property	Landowners	30° 53' 55"	116° 42' 05"
7.	Reserve No. 36175 (Unvested, C class, Govt Req'ts, 43.726ha). Eastern side of Wongan Hills townsite, on both sides of a dirt track that runs south from Melbourne Road, 150 m east from intersection of Melbourne & Pioneer Rds.	DPI	Government Requirements	DPI	30° 53' 17"	116° 44' 24"
8a.	Koobabbie Farm, ca 25 km SE of Coorow. South-east corner of Vict. Loc. 8776, near Teasdale Rd. From the very south-east corner, walk west for ca 750 m.	Freehold	Private Property	Landowners	29° 58' 58"	116° 17' 22"
8b.	Teasdale Road, 5.3-6.7 km north from junction with Buntine-Marchagee Road. Adjacent to Koobabbie Farm (Loc 8776). Ca. 25 km southeast of Coorow.	Shire of Moora	Road reserve	Shire of Moora	29° 58' 58"	116° 17' 14"
9.	Garrong Homestead Railway crossing, ca. 4.8 km south of Bindi Bindi, adjacent to Bindi Bindi-Toodyay Road. Plants are located on both side of the track (4.9-6 km).	Public Transport Authority	Rail reserve	WestNet Rail	30° 40' 07"	116° 22' 29"
10a.	Railway reserve adjacent to Summers East Road. East and west sides of railway track. 6.9 km south of Bindi Bindi, along Bindi Bindi-Toodyay Road. North and south of Garrong crossing.	Public Transport Authority	Rail reserve	WestNet Rail	30° 41' 04"	116° 22' 58"
10b.	Railway reserve, adjacent to Summers East Road. North and south of Garrong crossing on the east and west sides of the track.	Public Transport Authority	Rail reserve	WestNet Rail	30° 41' 19"	116° 23' 03"
11a.	Railway reserve, north of King Road crossing, near railway 104 marker.	Public Transport Authority	Rail reserve	WestNet Rail	30° 43' 48"	116° 23' 04"
11b.	Railway reserve, north of King Road crossing, near railway 104 marker.	Public Transport Authority	Rail reserve	WestNet Rail	30° 43' 56"	116° 23' 02"
12.	Railway reserve, north of Calingiri near the railway 62 marker.	Public Transport Authority	Rail reserve	WestNet Rail	31° 05' 00"	116° 26' 23"
13.	Waddington-Wongan Hills Road, north and south verges. Ca. 29 km west of Wongan Hills.	Shire of Wongan-Ballidu	Road reserve	Shire of Wongan-Ballidu	30° 50' 28"	116° 28' 41"
14.	Moonijin West Road, north verge. Ca. 5.8 km west of junction with Sewell Road. Ca. 25 km east of Wongan Hills.	Shire of Wongan-Ballidu	Road reserve	Shire of Wongan-Ballidu	30° 54' 32"	116° 55' 15"
15.	Moonijin West Road, north verge. Ca. 2.3 km west of junction with Sewell Road. Ca. 25 km east of Wongan Hills.	Shire of Wongan-Ballidu	Road reserve	Shire of Wongan-Ballidu	30° 54' 47"	116° 57' 28"
16.	Moonijin West Road, south verge. Ca. 1.3-1.4 km west of junction with Sewell Road. Ca. 25 km east of Wongan Hills.	Shire of Wongan-Ballidu	Road reserve	Shire of Wongan-Ballidu	30° 54' 49"	116° 57' 02"

17.	Moonijin West Road, south verge. Ca. 0.1-0.4 km west of junction with Sewell Road. Ca. 25 km east of Wongan Hills.	Shire of Wongan-Ballidu	Road reserve	Shire of Wongan-Ballidu	30° 54’ 49”	116° 58’ 49”

Note: Populations 10 and 11 may be the same as Population 2 and need resurveying to determine if they need to be deleted.