INTERIM RECOVERY PLAN NO. 202

ALBANY WOOLLYBUSH

(*ADENANTHOS x CUNNINGHAMII*)

INTERIM RECOVERY PLAN

2005-2010

Sandra Gilfillan[1], Sarah Barrett[2] and Renée Hartley[3]
[1] Conservation Officer, CALM Albany Region, 120 Albany Hwy, Albany 6330.
[2] Flora Conservation Officer, CALM Albany Work Centre, 120 Albany Hwy, Albany 6330
[3]Technical Officer, CALM Albany Work Centre, 120 Albany Hwy, Albany 6330

Photo: Ellen Hickman

April 2005

Department of Conservation and Land Management
Albany Work Centre, South Coast Region,
120 Albany Hwy, Albany WA 6331

Natural Heritage Trust
Helping Communities Helping Australia

Government of Western Australia

DEPARTMENT OF Conservation AND LAND MANAGEMENT
Conserving the nature of WA

FOREWORD

Interim Recovery Plans (IRPs) are developed within the framework laid down in Department of Conservation and Land Management (CALM) Policy Statements Nos. 44 and 50.

IRPs outline the recovery actions that are required to urgently address those threatening processes most affecting the ongoing survival of threatened taxa or ecological communities, and begin the recovery process.

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

This IRP will operate from April 2005 to March 2010 but will remain in force until withdrawn or replaced.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

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

Information in this IRP was accurate in April 2005.

ACKNOWLEDGMENTS

Andrew Brown Threatened Flora Coordinator, CALM Species and Communities Branch

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

SUMMARY

Scientific Name:	*Adenanthos x cunninghamii*	**Common Name:**	Albany Woollybush
Family:	Proteaceae	**Flowering Period:**	September to October
CALM Regions:	South Coast	**CALM District:**	Albany Work Centre
Shires:	Albany	**Recovery Team:**	Albany District Threatened Flora Recovery Team

Illustrations and/or further information: Brown, A., Thomson-Dans, C. and Marchant, N. (Eds). (1998) *Western Australia's Threatened Flora*. Department of Conservation and Land Management, Western Australia; Western Australian Herbarium (1998) FloraBase - Information on the Western Australian Flora. Department of Conservation and Land Management, Western Australia. http://www.calm.wa.gov.au/science/.

Current status: *Adenanthos x cunninghamii* was declared as Rare Flora (DRF) in 1980 under the Western Australian *Wildlife Conservation Act 1950* and was ranked as Endangered (EN) in 1999 under World Conservation Union (IUCN) Red List criterion D. However, due to its hybrid origin (*Adenanthos sericeus* x *cuneatus*), it was removed from the DRF list in June 2004 and placed on the Department of Conservation and Land managements (CALM's) Priority flora list as P4. It is still ranked as Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation* (EPBC) *Act 1999*. The taxon is currently known from 109 plants in 24 populations.

Description: *Adenanthos* x *cunninghamii* is an erect woody spreading shrub to 1.5m in height. The single, dull-red flowers can be held at the tips or in the axils of the branchlets. The leaves are deeply divided into three parts, like a trident. Each part is further divided into two, so there are generally six segments. The leaves are soft to touch and hairy.

Habitat requirements: *Adenanthos x cunninghamii* is found in coastal areas near Albany, growing on deep sandy soils in association with low woodland, heath or low scrub. Associated species included *Adenanthos sericeus, A. cuneatus, Agonis flexuosa, Allocasuarina humilis, Banksia occidentalis and B. coccinea.*

Habitat critical to the survival of the species, and important populations: The habitat critical to the survival of *Adenanthos* x *cunninghamii* comprises the area of occupancy of the known population; similar habitat within 200 metres of the known population; remnant vegetation that may link future populations; and additional nearby occurrences of similar habitat that do not currently contain the species but may have done so in the past and may be suitable for translocations. Given that this taxon is listed as Endangered it is considered that all populations are important populations.

Benefits to other species/ecological communities: *Adenanthos x cunninghamii* occurs in association with the DRF species *Calectasia cyanea* (CR) and in close proximity to *Banksia verticillata* (VU) and at Two Peoples Bay it occurs in Noisy Scrub–bird (*Atrichornus clamosus*) habitat, a species that is listed as Vulnerable under the *Western Australia Wildlife Conservation Act 1950* and the Commonwealth *Environmental and Biodiversity Protection Act 1999*. Recovery actions put in place for *A. x cunninghamii* will benefit these other threatened species.

International obligations: This plan is fully consistent with the aims and recommendations of the Convention on Biological Diversity and will assist in implementing Australia's responsibilities under that convention. *Adenanthos x cunninghamii* is not listed under any specific international treaty and this IRP does not affect Australia's obligations under any other international agreements.

Role and interests of indigenous people: According to the Department of Indigenous Affairs Aboriginal Heritage Sites Register, two registered sites occur near *Adenanthos x cunninghamii* populations. Population 11 occurs within 500m of "Limekilns Point" site (S01904) and Population 5 occurs at "Ledge Beach Rd" site (S01509). CALM has welcomed consultation that will seek input and involvement from Noongar groups that have an active interest in areas that are habitat for *A. x cunninghamii*, and this is discussed under the relevant recovery actions.

Affected interests: Populations occur on a variety of land tenures including Private, Shire, Conservation Reserves and National Parks.

Social and economic impacts: As some populations are located on private property, the implementation of this recovery plan has the potential to have some minimal social and economic impact. Recovery actions refer to continued negotiations between stakeholders with regard to these areas.

Evaluation of the Plans Performance: CALM, in conjunction with the Albany District Threatened Flora Recovery Team (ADTFRT) will evaluate the performance of this IRP.

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

1. All relevant land managers have been notified of the location and threatened status of the species.
2. The hybrid status of the species has been established through propagation and DNA analysis
3. Volunteers and staff from the CALM's Albany Work Centre regularly monitor populations.
4. Roadside markers have been installed for all populations on road reserves.

IRP Objective: The objective of this Interim Recovery Plan is to abate threats to adjacent parent populations in order to maximise potential for evolutionary processes.

Recovery criteria
Criteria for success: Existing populations are stable over the period of the plan's adoption under the EPBC Act
Criteria for failure: The loss of one or more populations over the period of the plan's adoption under the EPBC Act.

Recovery actions

1. Coordinate recovery actions.
2. Monitor populations.
3. Implement fire management.
4. Obtain biological and ecological information.
5. Liaise with landholders.
6. Map habitat critical to the survival of the species.
7. Review the IRP and assess the need for further recovery actions.

1. BACKGROUND

History

Adenanthos x *cunninghamii* was first collected at King George Sound (present day Albany) in 1827 by Charles Fraser (colonial botanist of New South Wales) during a survey voyage with Captain James Stirling. The hybrid species was named in honour an early colonial botanist from New South Wales.

Botanist Charles Nelson found just three plants when collecting in Western Australia in 1973. Since then a number of populations have been found in coastal areas near Albany. The plants were not found in large numbers and were always in association with two other *Adenanthos* species, *A. sericeus* (coastal woollybush) and *A. cuneatus* (coastal jugflower). Plants of *A.* x *cunninghamii* displayed leaves that were intermediate between the terete leaves of coastal woollybush and the broad, slightly divided leaves of coastal jugflower. This led botanists to suggest that *A. x cunninghamii* was a first generation hybrid of these two species. Hybridisation tests and DNA analysis confirmed that *A.* x *cunninghamii* is not a genetically discrete species but an unstable hybrid of *A. sericeus* and *A. cuneata*. The taxon does not breed true and is therefore not self-perpetuating (Cochrane *et al.* 2004).

Description and taxonomy

A member of the family Proteaceae, *Adenanthos* x *cunninghamii* is an erect woody spreading shrub to 1.5 m in height. The single, dull-red flowers can be held at the tips or in the axils of the branchlets. The leaves are deeply divided into three parts, like a trident. Each part is further divided into two, so there are generally six segments. The leaves are soft to touch and hairy.

Distribution and habitat

The species is found in coastal areas near Albany from Two Peoples Bay to Werrillup Hill. *Adenanthos* x *cunninghamii* occurs on deep sandy soils in southern coastal areas in association with low woodland, heath or low scrub. The taxon is known from approximately 15 km south west of Albany at Torndirrup National Park and surrounding private property and Shire Reserve, and east of Albany at Two Peoples Bay Nature Reserve and Gull Rock. Associated species included *A. sericeus, A. cuneata, Agonis flexuosa, Allocasuarina humilus, Banksia occidentalis and B. coccinea.*

Biology and ecology

Adenanthos x *cunninghamii* is a seeder that is killed by fire. Plants burnt in February 2003 in Torndirrup NP (Population 2A and 20) in a hot fire were dead and had not resprouted by June 2004. In addition, no seedlings were observed (S. Gilfillan, personal observation).

Recent observations indicate that the species resprouts after slashing (S. Barrett, personal observation). Seed is stored in the soil but is not known for how long the seed is viable and the juvenile period is also unknown.

Phytophthora cinnamomi is an introduced soil-borne plant pathogen. Infection results in plant death in susceptible species through the destruction of root systems. The impact of the disease on plant communities is variable between sites as it is dependent on temperature, soil type, nutrient status, water and species susceptibility. The greatest impact usually occurs where soils are infertile and drainage is poor (Weste and Marks 1987; Shearer and Tippett 1989; Wilson *et al*. 1994). The disease is most virulent in the plant families Proteaceae, Epacridaceae and Papilionaceae, as well as grass trees, *Xanthorrhoea* spp. (CALM 2000).

Adenanthos x *cunninghamii* as a member of the Proteaceae has been considered to be moderately susceptible to *Phytophthora cinnamomi* (Brown *et al.* 1998), however there have been no deaths in existing populations which could be attributed to *P. cinnamomi* (S. Barrett, personal observation). The species occurs on coastal limestone and associated calcareous soils in which the impact of *P. cinnamomi* is low (Shearer 1990).

Threats

Adenanthos x *cunninghamii* was declared as Rare Flora (DRF) in 1980 under the Western Australian *Wildlife Conservation Act 1950* and was ranked as Endangered (EN) in 1999 under World Conservation Union (IUCN) Red List criterion D. However, due to its hybrid origin (*Adenanthos sericeus* x *cuneatus*), it was removed from the DRF list in June 2004 and placed on the Department of Conservation and Land managements (CALM's) Priority flora list as P4. It is still ranked as Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation* (EPBC) *Act 1999*. It currently occurs in 24 small populations, some containing only one plant.

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

- **Small population size:** The small size of all *Adenanthos* x *cunninghamii* populations renders them vulnerable to local extinction by either demographic stochasticity (eg. lack of recruitment in one year), or environmental stochasticity (random variation in for example rainfall or fire).

- **Inappropriate fire regimes:** As *Adenanthos* x *cunninghamii* is not self-perpetuating, threats to the parent species must be abated in order to conserve the taxon. *A. sericeus* is a seeder that is killed by fire and *A. cuneata* is a resprouter. A fire interval that enables sufficient seed store of *A. sericous* to accumulate is required to maintain this parent species. The juvenile period for *A. sericeus* is unknown. A recommended action is therefore to determine the appropriate fire regime for south coastal heaths and woodlands in general, which will include such species as *A. sericeus.*

Summary of population land vesting, purpose and tenure

Population	Vesting	Purpose	Tenure
1A	WA Conservation Commission	National Park	National Park
1B	WA Conservation Commission	National Park	National Park
2A (previously 2A + 2B)	WA Conservation Commission	National Park	National Park
2C	WA Conservation Commission	National Park	National Park
3	City of Albany	Recreation	Non CALM Act - General
4	WA Conservation Commission	Conservation of Fauna	Nature Reserve
5	Unvested	National Park Act 113-1975	Non CALM Act - General
6A	WA Conservation Commission	National Park	National Park
6B	West Australian Rifle Association Inc.	Rifle Range	
6C			Freehold
7A	City of Albany	Public Utility	Crown
7B	City of Albany	Public Utility	Crown
8	WA Conservation Commission	National Park	Crown
9	WA Conservation Commission	National Park	Crown
10A	WA Conservation Commission	National Park	Crown
10B	WA Conservation Commission	National Park	Crown
11A		Freehold Land	
11B		Freehold Land	
11C	Minister for Water Resources	Water Supply	Crown
11D	WA Conservation Commission	National Park	Crown
11E		Freehold Land	
12		Freehold Land	
13	WA Conservation Commission	National Park	Crown
14	City of Albany	Conservation Recreation Water Supply & Wind Power Generation	Crown
15	City of Albany	Conservation Recreation Water	Crown

		Supply & Wind Power Generation	
16	City of Albany	Conservation Recreation Water Supply & Wind Power Generation	Crown
17	City of Albany	Conservation Recreation Water Supply & Wind Power Generation	Crown
18	City of Albany	Conservation Recreation Water Supply & Wind Power Generation	Crown
19	City of Albany	Conservation Recreation Water Supply & Wind Power Generation	Crown
20	WA Conservation Commission	National Park	Crown
21	Water Corporation	Water	Crown
22	City of Albany	Conservation Recreation Water Supply & Wind Power Generation	Crown
23		Freehold Land	
24	WA Conservation Commission	National Park	Crown

Summary of population information and threats

Pop. No. & Location		Year/No. plants	Condition	Threats
1A	National Park	1996 4	Healthy	Small population size and inappropriate fire regimes
1B	National Park	1996 3	Healthy	Small population size and inappropriate fire regimes
2A	National Park	2002 20+ seen 2004 0? (5 plants observed killed by fire)	Burnt in Feb 2003, plants killed	Small population size and inappropriate fire regimes
2C	National Park	1991 2	Healthy	Small population size and inappropriate fire regimes
3	Crown Reserves vested in Local Government	1996 1	Healthy	Small population size and inappropriate fire regimes
4	Nature Reserve	1995-2002 46+/- (1 Juvenile)	Healthy	Small population size and inappropriate fire regimes
5	Unvested Crown Reserve	1994 1	Healthy	Small population size and inappropriate fire regimes
6A	National Park	2001 4	Healthy	Small population size and inappropriate fire regimes
6B	Other Crown Reserve	1991 1	Healthy	Small population size and inappropriate fire regimes
6C	Freehold Land	1991 1	Healthy	Small population size and inappropriate fire regimes
7A	Crown Reserves vested in Local Government	1996 3	Healthy	Small population size and inappropriate fire regimes
7B	Unvested Crown Reserve	1996 4	Healthy	Small population size and inappropriate fire regimes
8	National Park	1996 4	Healthy	Small population size and inappropriate fire regimes
9	National Park	2004 7	Healthy	Small population size and inappropriate fire regimes
10A	National Park	1996 3	Healthy, burnt in 1992, 3 plants pre-fire	Small population size and inappropriate fire regimes
10B	National Park	1998 1	Healthy	Small population size and inappropriate fire regimes
11A	Freehold Land	2000 1	Healthy	Small population size and inappropriate fire regimes
11B	Freehold Land	2000 1	Healthy	Small population size and inappropriate fire regimes
11C	Crown Reserve	1996 1	Healthy	Small population size and inappropriate

				fire regimes
11D	Freehold Land	1996 1	Healthy	Small population size and inappropriate fire regimes
11E	National Park	2000 1	Healthy	Small population size and inappropriate fire regimes
12	Freehold Land	1996 2	Healthy	Small population size and inappropriate fire regimes
13	National Park	1996 1	Healthy	Small population size and inappropriate fire regimes
14	Crown Reserves vested in Local Government	2000 1	Healthy	Small population size and inappropriate fire regimes
15	Crown Reserves vested in Local Government	1999 1	Healthy	Small population size and inappropriate fire regimes
16	Crown Reserves vested in Local Government	1999 3	Healthy	Small population size and inappropriate fire regimes
17	Crown Reserves vested in Local Government	1999 1	Healthy	Small population size and inappropriate fire regimes
18	Crown Reserves vested in Local Government	1999 1	Healthy	Small population size and inappropriate fire regimes
19	Crown Reserves vested in Local Government	1999 2	Healthy	Small population size and inappropriate fire regimes
20	National Park	2001 5 2004 0 (5 killed by fire)	Burnt in Feb 2003, plants killed	Small population size and inappropriate fire regimes
21	Other Crown Reserve	2000 2	Healthy	Small population size and inappropriate fire regimes
22	Crown Reserves vested in Local Government	2000 1	Healthy	Small population size and inappropriate fire regimes
23	Freehold Land	2002 4	Healthy	Small population size and inappropriate fire regimes
24	National Park	2002 2 2004 0 (2 killed by fire)	Burnt in Feb 2003, plants killed	Small population size and inappropriate fire regimes

Guide for decision-makers

Section 1 provides details of current and possible future threats. Developments in the immediate vicinity of the population or within the defined critical habitat of *Adenanthos* x *cunninghamii* require assessment for the potential for a significant level of impact. No developments should be approved unless the proponents can demonstrate that they will not have a detrimental impact on the species, or its habitat or potential habitat, or the local surface and ground water hydrology.

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

Given that this species is listed as Endangered under the Commonwealth EPBC Act, it is considered that all known habitat is habitat critical to the survival of the species. In addition all populations, including any translocated populations, are considered important to the survival of the species. Habitat is defined as the biophysical medium or media occupied (continuously, periodically or occasionally) by an organism or group of organisms, or once occupied (continuously, periodically or occasionally) by an organism or group of organisms, and into which organisms of that kind have the potential to be reintroduced (*Environment Protection and Biodiversity Conservation Act 1999*). The area of occupancy of the currently known *Adenanthos x cunninghamii* populations has been mapped. However, other parts of the habitat

critical to the survival of *C. misera* have not been mapped and an action outlined in this Interim Recovery Plan is to map all habitat as defined above.

The habitat critical to the survival of *Adenanthos x cunninghamii* therefore comprises:

- the area of occupancy of known populations;
- areas of similar habitat within 200 metres of known populations that provide potential habitat for natural recruitment;
- remnant vegetation that surrounds and links populations (this is necessary to allow pollinators to move between populations) and
- additional occurrences of similar habitat that do not currently contain the species but may have done so in the past (these represent possible translocation sites).

Benefits to other species/ecological communities

Adenanthos x *cunninghamii* occurs in association with the Threatened flora taxon *Calectasia cyanea* (CR) and in close proximity to *Banksia verticillata* (VU). At Two Peoples Bay, *A.* x *cunninghamii* occurs within the vicinity of Noisy Scrub–bird (*Atrichornus clamosus*)(VU), Australasian Bittern (*Botaurus poiciloptilus)*(VU) and Western Bristlebird (*Dasyornis longirostris*)(VU) habitat. At Torndirrup National Park, *A.* x *cunninghamii* is in the locality of *P. nigrogularis* and at Waychinicup National Park it occurs within the vicinity of *A. clamosus*, *P. nigrogularis* and *D. longirostris*. Recovery actions put in place for *A.* x *cunninghamii* will benefit these other threatened species and reciprocally, other threatened species recovery actions will benefit *A.* x *cunninghamii*.

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 taxon is not listed under any specific international treaty, however, and therefore this IRP does not affect Australia's obligations under any other international agreements.

Role and interests of indigenous people:

According to the Department of Indigenous Affairs Aboriginal Heritage Sites Register, two registered sites exist near *Adenanthos x cunninghamii* populations. Population 11 occurs within 500 m of "Limekilns Point" site (S01904) and Population 5 occurs at "Ledge Beach Rd" site (S01509). The Department has welcomed any future consultation that will seek input and involvement from any Noongar groups that have an active interest in the areas that are habitat for *A.* x *cunninghamii*, and this is discussed in the recovery actions.

Affected interests

Populations occur on a variety of land tenures including Private, Shire, Conservation Reserves and National Parks.

Social and economic impacts

The implementation of this recovery plan has the potential to have some minimal social and economic impact, as some populations are located on private property. Recovery actions will include continued liaison between stakeholders with regard to the conservation of this species on private property.

Evaluation of the Plan's Performance

The Department of Conservation and Land Management (CALM), in conjunction with the Albany District Threatened Flora Recovery Team (ADTFRT) will evaluate the performance of this recovery plan. In addition to annual reporting on progress against the criteria for success and failure, the plan is to be

reviewed within five years of its implementation. Any changes to management and/or recovery actions made in response to monitoring results will be documented accordingly.

2. RECOVERY OBJECTIVE AND CRITERIA

Objectives

The objective of this Interim Recovery Plan is to abate threats to adjacent parent populations to maximise potential for evolutionary processes.

Criteria for success: Existing populations are stable over the period of the plan's adoption under the EPBC Act.
Criteria for failure: The loss of one or more populations over the period of the plan's adoption under the EPBC Act.

3. RECOVERY ACTIONS

Existing or completed recovery actions

All land managers have been notified of the location, threatened status and legal responsibility to protect *Adenanthos* x *cunninghamii*.

In spring 2001, seeds were collected from five *A.* x *cunninghamii* plants in Torndirrup NP (Population 2A). The seed was germinated in CALM's Threatened Flora Seed Centre and the resulting seedlings did not consistently have the flattened leaf segments characteristic of *A.* x *cunninghamii*, but instead showed a range of leaf shape from broad slightly divided leaves to fine terete leaves (Cochrane *et al.* 2004).

Subsequent DNA analysis of populations at Torndirrup NP and Two Peoples Bay NR by [4]Margaret Byrne and Murdoch University student Esther Walker confirmed that *Adenanthos* x *cunninghamii* is not a genetically discrete species but hybrid of *A. sericeus* and *A. cuneata.* The plants in Torndirrup NP represent the F1 generation, whereas the plants at Two Peoples Bay represents a hybrid swarm containing the F1 generation (*A.* x *cunninghamii*) as well as plants showing segregation of morphology from selfing of F1s or from backcrossing with the parental species (Walker 2002).

The difference in appearance of plants germinated from *Adenanthos* x *cunninghamii* seeds to the parent *A.* x *cunninghamii* plants indicates that this taxon is an unstable hybrid, ie. the species does not breed true (Cochrane *et al.* 2004).

Staff from the Department's Albany Work Centre and CALM volunteers regularly monitor populations of this species.

Roadside markers have been installed for all populations that occur on road reserves

Future recovery actions

Where populations occur on lands other than those managed by CALM, permission has been or will be sought from appropriate land managers prior to recovery actions being undertaken. The following recovery actions are roughly in order of descending priority; however this should not constrain addressing any of the priorities if funding is available for 'lower' priorities and other opportunities arise.

1. Coordinate recovery actions

[4] Margaret Byrne Principal Research Scientist, CALM Science Division

The Albany District Threatened Flora Recovery Team (ADTFRT) is coordinating recovery actions for *Adenanthos* x *cunninghamii* and will include information on progress in their annual report to the Department's Corporate Executive and funding bodies.

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

2. Monitor populations

Continue regular monitoring of population stability (expansion or decline).

Action: Monitor populations
Responsibility: CALM (Albany Work Centre)
Cost: $2000 per year.

3. Implement fire management

As the minimal tolerable fire interval for the parent species *A. sericeus*, and of south coastal heaths and woodlands in general, is not well understood, extensive, intense and frequent wildfires should be excluded from these communities where possible.

Action: Implement fire management
Responsibility: CALM (Albany Work Centre)
Cost: $1,000 per year.

4. Obtain biological and ecological information

Improved knowledge of the biology and ecology of *A.* x *cunninghamii* will provide a better scientific basis for management of the wild populations. A recommenced action is to determine the appropriate fire regime for its habitat, which will include such species as *A. sericeus* and *A.* x *cunninghamii*.

Action: Obtain biological and ecological information
Responsibility: CALM (Albany Work Centre)
Cost: $2000 in first year and $1500 in subsequent years.

5. Liaise with landholders

Staff from CALM Albany District will continue to liaise with the City of Albany and private landholders to ensure populations on Shire Reserve are not accidentally damaged or destroyed, and that the impacts of identified threats, are minimised. Input and involvement will also be sought from any Noongar groups that have an active interest in areas that are habitat for *A.* x *cunninghamii.*

Action: Liaise with landholders
Responsibility: CALM (Albany Work Centre)
Cost: $1,200 per year.

6. Map habitat critical to the survival of the species

It is a requirement of the EPBC Act (Section 207A) that spatial data relating to critical habitat be determined. Although habitat critical to the survival of the species is alluded to in Section 1, the areas described have not yet been accurately mapped and will be addressed under this action. If additional populations are located, critical habitat will also be determined and mapped.

Action: Map habitat critical to the survival of the species
Responsibility: CALM (Albany Work Centre, WATSCU)

Cost: $400 in the first year.

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

If the hybrid species is still listed under the Commonwealth EPBC Act at the end of the fourth year of the five-year term of this IRP, the plan will be reviewed and the need for further recovery actions assessed. However, as the hybrid is no longer listed in WA recovery actions are likely to be confined to monitoring.

Action: Review IRP and asses the need for further recovery actions
Responsibility: CALM (WATSCU and Albany Work Centre) through the ADTFRT
Cost: $4,000 in the fifth year (if required).

4. TERM OF PLAN

This Interim Recovery Plan will operate from April 2005 to March 2010 but will remain in force until withdrawn or replaced. If the taxon is still listed under the Commonwealth EPBC Act at the end of the fourth year of the five-year term of this IRP, the plan will be reviewed and the need for further recovery actions assessed.

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;

Cochrane, A., Barrett, S. and Byrne, M. (2004). A rare hybrid beauty. Albany Woollybush. *Landscope* Autumn 2004.

Shearer, B.L. and Tippett, J.T. (1989). Jarrah dieback, the dynamics and management of Phytophthora cinnamomi in the jarrah (*Eucalyptus marginata*) forest of south-western Australia. Research Bulletin No.3. (Department of Conservation and Land Management: Perth).

Shearer, B.L. (1990). Dieback of native plant communities cased by *Phytophthora* species – A major factor affecting land use in south-western Australia. *Land and Water Research News* 5: 15-26.

Walker, E. (2002). Determining the hybrid status of *Eucalyptus bennettiae* and *Adenanthos x cunninghamii.* Honours Thesis, Murdoch University.

Weste, G. and Marks, G.C. 1987. The biology of *Phytophthora cinnamomi* in Australasian forests. *Annual Review of Phytopathology* 24: 207-229.

Wilson, B.A., Newell, G., Laidlaw, W.S. and Friend, G. (1994). Impact of plant diseases on faunal communities. *Journal of the Royal Society of Western Australia* 77: 139-144.

6. TAXONOMIC DESCRIPTION

Original description by Meisner in *Lehm Pl. Preiss*. 513 (1845).

Description derived from Blackall, W. E. and Grieve, B.J. How To Know Western Australian Wildflowers. Part 1. University of Western Australia Press. and Brown, A., Thomson-Dans, C. and Marchant, N. (Eds). (1998) *Western Australia's Threatened Flora*. Department of Conservation and Land Management, Western Australia

Adenanthos x *cunninghamii* is an erect woody spreading shrub to 1.5 m in height. The single, dull-red flowers can be held at the tips or in the axils of the branchlets. The perianth tube is nearly straight and all four anthers are fertile. The style is glabrous. The leaves are to 25mm long, silvery grey and deeply divided into three parts, like a trident. Each part is further divided into two, so there are generally six segments. The segments are soft to touch and hairy.