

Toolinna Adenanthos

(Adenanthos eyrei)

RECOVERY PLAN



Department of Environment and Conservation
Esperance District



Australian Government



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This IRP will operate from March 2007 to February 2012 but will remain in force until withdrawn or replaced. It is intended that, if the species is still ranked Endangered this IRP will be reviewed after five years and the need for further recovery actions assessed.

This IRP was given regional approval on 27th August 2007 and was approved by the Director of Nature Conservation on 10th September 2007. The provision of funds identified in this Interim Recovery Plan is dependent on budgetary and other constraints affecting DEC, as well as the need to address other priorities.

Information in this IRP was accurate at May 2008.

IRP PREPARATION

This IRP was prepared by Emma Adams¹ and Andrew Brown²

¹ Conservation Officer, DEC's Esperance District, 92 Dempster St. Esperance WA 6450.

² Threatened Flora Coordinator, Species and Communities Branch, DEC, PO Box 51 Wanneroo, 6946.

ACKNOWLEDGMENTS

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

Mike Fitzgerald	Nature Conservation Coordinator, Esperance District, DEC
Greg Keighery	Principal Research Scientist, Science Division, DEC
Craig Douglas	Project Officer, Species and Communities Branch, DEC

Thanks 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 Andrew Brown

CITATION

This Recovery Plan should be cited as:

Department of Environment and Conservation (2009). Toolinna *Adenanthos* (*Adenanthos eyrei*) Recovery Plan. Department of Environment and Conservation, Perth, Western Australia.

SUMMARY

Scientific Name:	<i>Adenanthos eyrei</i>	Common Name:	Toolinna Adenanthos
Family:	PROTEACEAE	Flowering Period:	All year
DEC Region:	South Coast	DEC District:	Esperance
Shire:	Esperance	Recovery Team:	Esperance District Threatened Flora Recovery Team (EDTFRT)

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; Nelson, E. C. (1978). *A taxonomic revision of the genus Adenanthos (Proteaceae)*. *Brunonia*, 1: 303-406;

Current status: *Adenanthos eyrei* was declared as Rare Flora under the Western Australian *Wildlife Conservation Act* 1950 in November 1980 and currently meets World Conservation Union (IUCN 2001) Red List Criteria Endangered (EN) under criterion D as the population is estimated to number fewer than 250 mature individuals. The species is listed as EN under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act)

Description: *Adenanthos eyrei* is an erect, open shrub to 1 m tall. The branchlets are hairy, while older branches have very warty bark. The leaves are also hairy, and on stalks. They vary in shape, but are mostly divided into flat segments up to 15 mm long. The deep crimson, softly hairy flowers are held on stalks in leaf axils or at the end of branches. The narrow floral tubes, which are 25 mm in length, have long, protruding styles up to 35 mm long.

There is currently question over whether *A. eyrei* is a distinct species due to its similarity to *A. forrestii*. Key differences between the two species appears to be the absence of a lignotuber in *A. eyrei* as opposed to its presence in *A. forrestii*, and the colour of the flowers, with *A. eyrei* having dark crimson flowers and *A. forrestii* having pale red and cream flowers. However, recent observation has shown the flower colour of both taxa to be variable and the lack of a lignotuber and the lack of a woody underground rootstock are not normally used to distinguish taxa at a species level without additional morphological features (Brown *et. al.* 1998). A taxonomic review of *A. eyrei* is currently being carried out and a DNA analysis may follow.

Habitat requirements: *Adenanthos eyrei* occurs in an undisturbed area on the edge of the Great Australian Bight, where there is just one known population. Plants resemble the common, widespread Forrest's woollybush (*A. forrestii*) and they are difficult to distinguish from one another due to variable leaf morphology. Habitat is deep siliceous sand dunes above limestone cliffs, in low open scrub with *Adenanthos forrestii* and *Banksia media*.

Habitat critical to the survival of the species, and important populations: The habitat critical to the survival of *Adenanthos eyrei* comprises the area of occupancy of the known population, similar habitat surrounding the known population 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 the species is listed as Endangered it is considered that all known habitat for wild and possible future translocated populations is habitat critical to its survival, and all populations, including translocated populations, are important populations.

Benefits to other species/ecological communities: *Adenanthos eyrei* occurs with *Banksia media* and several priority species including *Goodenia varia*, *Eucalyptus surgens*, *Opercularia loganioides* and *Galium migrans*. Recovery actions implemented to improve the quality or security of the habitat of *Adenanthos eyrei* will also improve the status of the vegetation type in which these priority species occur.

International Obligations: This plan is fully consistent with the aims and recommendations of the Convention on Biological Diversity, ratified by Australia in 1993, and will assist in implementing Australia's responsibilities under that convention. This species is not specifically listed under any international treaty and therefore does not affect Australia's obligations under any other international agreements.

Role and interests of Indigenous people: The Department of Indigenous Affairs Aboriginal Heritage Sites Register lists no sites at or near the *Adenanthos eyrei* population. However, the involvement of the Indigenous community is currently being sought to determine whether there are any issues or interests identified in the Plan. If no role is identified for Indigenous communities in the recovery of this species, opportunities may exist through cultural interpretation and awareness of the species.

The advice of the South West Aboriginal Land and Sea Council (SWALSC) and Department of Indigenous Affairs is being sought to assist in the identification of potential indigenous management responsibilities for land occupied by threatened species, or groups with a cultural connection to land that is important for the species' conservation.

Recovery Plan for *Adenanthos eyrei*

Continued liaison between DEC and the Indigenous community will identify areas in which collaboration will assist implementation of recovery actions.

Affected interests: All known populations are on Crown land managed by DEC.

Social and economic impact: The implementation of this recovery plan has minimal social and economic impact as all populations are on Department of Environment and Conservation (DEC) managed land.

Guide for decision-makers: Proposed actions in the immediate vicinity of the populations or within the defined habitat critical to the survival of *Adenanthos eyrei* require assessment for the potential for a significant level of impact.

Evaluation of the Plans Performance: DEC in conjunction with the EDTFRT will evaluate the performance of this recovery plan.

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

1. Land managers have been notified of the location and threatened status of the species.
2. Staff from CALM (now DEC) have been monitoring the population.
3. A taxonomic review is currently being carried out to assess the distinctiveness of *A. eyrei*.

Recovery plan objective: The objective of this recovery plan is to abate identified threats and maintain a viable *in situ* population of *Adenanthos eyrei* to ensure the long-term preservation of this species in the wild.

Recovery criteria

Criteria for success: The number of populations have increased and/or individuals within the known population have increased by ten percent or more over the 5 year term of this plan.

Criteria for failure: The known population becomes extinct or individuals within the known population have decreased by ten percent or more over the 5 year term of this plan.

Recovery actions:

1. Coordinate recovery actions	7. Map habitat critical to the survival of <i>Adenanthos eyrei</i>
2. Complete a taxonomic review	8. Seed collection and storage
3. Conduct DNA analysis	9. Collect cuttings for cultivation
4. Re-assess access track	10. Obtain biological and ecological information
5. Monitor population	11. Promote awareness
6. Conduct further surveys	12. Review the recovery plan and assess the need for further recovery reactions

1. BACKGROUND

History

Adenanthos eyrei was first discovered by Ernest Nelson in October 1973 and was named in *Brunonia* by him in 1978 in honour of the explorer Edward John Eyre. This is the only collection of the species held at the W.A Herbarium. Nelson noted that *A. eyrei* had a limited distribution and was known from one population on the edge of the Great Australian Bight.

Greg Keighery from DEC visited the site in 1985 and located the original population described by Nelson in *Brunonia*. Between 1987 and 1994 Bernie Haberley from DEC monitored the population, visiting the site several times. Haberley noted that there were other species of *Adenanthos* in the area which looked very similar and in 1987 took three separate voucher specimens all of which were later identified as *Adenanthos eyrei*. Early inspection records by Haberley stated that the number of individuals observed in the population was in excess of 200 plants.

Over the past ten years the site has been visited several times by Greg Keighery, Andrew Brown, Ryan Butler, Mike Fitzgerald and Klaus Tiedemann from DEC. The most recent visit was in May 2004 by Brown and Butler. At that time they observed over 200 plants, which were healthy and in full flower.

Although there have been numerous field inspections, given its close similarity to *A. forrestii* there is still a taxonomic question as to the distinctiveness of *Adenanthos eyrei*. During a field survey in May 2004, twenty samples were collected for DNA analysis, however, further samples are required before this work can be undertaken. It is hoped once done, this laboratory work will provide further insight if a taxonomic review is inconclusive. As a result, the application of recovery actions associated with this species may depend on the results of the taxonomic review and possible additional DNA analysis.

Description

Adenanthos eyrei is an erect, open shrub to 1 m tall. The branchlets are hairy, while older branches have very warty bark. The leaves are also hairy, and on stalks. Leaves vary in shape, but most have three flat segments up to 15 mm long. The deep crimson (note that recent surveys have shown that these may be variable in colour), softly hairy flowers are held on stalks in leaf axils or at the end of branches. The narrow floral tubes, which are 25 mm in length, have long, protruding styles up to 35 mm long.

The taxonomic status of *Adenanthos eyrei* is questionable, and there is currently much discussion over whether it is a distinct, separate species due to its similarity to *A. forrestii*. The most distinct differences are said to be the absence of a lignotuber in *A. eyrei* as opposed to its presence in *A. forrestii*, and the colour of the flowers, with *A. eyrei* having dark crimson flowers and *A. forrestii* having pale red and cream flowers. However, recent surveys have shown that flowers may be variable in colour, and the lack of a lignotuber is not normally used without additional morphological information to distinguish species (Brown *et. al.* 1998). A taxonomic review is therefore currently being carried out by Greg Keighery to confirm whether or not *A. eyrei* and *A. forrestii* are two distinct species. If this review fails to clarify the issue, then a DNA analysis will be conducted.

Distribution and habitat

Adenanthos eyrei is located within the Nuytsland Nature Reserve on the edge of the Great Australian Bight where it is restricted to a small undisturbed area 200 m East of Toolinna Cove. Its habitat is on deep siliceous sand dunes above limestone cliffs, in low open scrub with *Banksia media*.

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

Pop. No. & Location	DEC District	Shire	Vesting	Purpose	Manager
1. Nuytsland Nature Reserve	Esperance	Esperance	Conservation Commission of Western Australia	Nature Reserve	DEC

Biology and ecology

It is thought that *Adenanthos eyrei* is killed by fire and regenerates from seed (Brown *et al.* 1998). Therefore frequent fires may result in the plants being killed before they are large enough to replenish the soil seed bank.

Threatening processes

Threats include:

- **Inappropriate fire regimes** that occur during the reproductive phase of *Adenanthos eyrei* (i.e. flowering, pollination, seed development and seed dispersal) may result in poor or no seed production. Frequent fire that occurs before plants have reached reproductive maturity may result in poor recruitment as plants need to build up a seed bank.
- **Access tracks.** One of the tracks in the Nature Reserve runs directly into the population posing a threat from direct vehicle damage. It also provides a vector for transferring *Phytophthora cinnamomi*.
- **Disease** is a possible threat to the species. It has not been confirmed that *Adenanthos eyrei* is affected by *Phytophthora* but other species of *Adenanthos* are prone to the pathogen. Due to limited information on its affect on *A. eyrei* it should be considered as a possible threat until it is confirmed otherwise.
- **Wind Erosion.** the population is situated on a sand dune on the edge of the Great Australian Bight and is highly susceptible to impacts from wind erosion, particularly following fire. The presence of vehicle tracks in the area exacerbates the problems of erosion.

Table 2. Summary of population information and threats

Pop no & location	Land status	Year/No of plants	Condition	Threats
1 Nuytsland Nature Reserve, 200 m East of Toolinna Cove	DEC Nature Reserve	2004 200	Healthy	Inappropriate fire, access tracks, disease, wind erosion

Guide for decision-makers

The above table provides details of current and possible threats. Proposed actions in the immediate vicinity of the populations or within the defined habitat critical to the survival of *Adenanthos eyrie* require assessment for the potential for a significant level of impact.

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

The habitat critical to the survival of *Adenanthos eyrei* comprises the area of occupancy of the known population, similar habitat surrounding the known population 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 the species is listed as Endangered, it is considered that all known habitat for the wild population and any future translocated populations is habitat critical to its survival, and that all wild and translocated populations are important populations.

Benefits to other species/ecological communities

Adenanthos eyrei occurs with *Banksia media* and several Priority flora species including *Goodenia varia*, *Eucalyptus surgens*, *Opercularia loganioides* and *Galium migrans*. Recovery actions implemented to improve the quality or security of the habitat of *Adenanthos eyrei* will also improve the status of associated species and the vegetation type in which these species occur.

International Obligations

This plan is fully consistent with the aims and recommendations of the Convention on Biological Diversity, ratified by Australia in 1993, and will assist in implementing Australia's responsibilities under that convention. This species is not specifically listed under any international treaty and therefore does not affect Australia's obligations under any other international agreements.

Role and interests of indigenous people

The Department of Indigenous Affairs Aboriginal Heritage Sites Register lists no sites at or near the *Adenanthos eyrei* population. However, the involvement of the Indigenous community is currently being sought to determine whether there are any issues or interests identified in the Plan. If no role is identified for indigenous communities in the recovery of this species, opportunities may exist through cultural interpretation and awareness of the species.

The advice of the South West Aboriginal Land and Sea Council (SWALSC) and Department of Indigenous Affairs is being sought to assist in the identification of potential indigenous management responsibilities for land occupied by threatened species, or groups with a cultural connection to land that is important for the species' conservation.

Continued liaison between DEC and the indigenous community will identify areas in which collaboration will assist implementation of recovery actions.

Affected interests

The known population is on Crown land managed by DEC.

Social and economic impacts

The implementation of this recovery plan will have minimal social and economic impact as all populations are on DEC managed land.

Evaluation of the Plans Performance

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

2. RECOVERY OBJECTIVE AND CRITERIA

Objective

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

Criteria

Criteria for success: The number of populations have increased and/or individuals within the known population have increased by ten percent or more over the 5 year term of this plan.

Criteria for failure: The number of individuals within the known population have decreased by ten percent or more over the 5 year term of this plan.

3. RECOVERY ACTIONS

Existing and completed recovery actions

Staff at DEC's Esperance District are aware of the Declared Rare status of *Adenanthos eyrei* and the legal responsibility to protect it. Populations are monitored as regularly as practicable, and population numbers, condition and threats are recorded.

A taxonomic review is currently being carried out by DEC's Science Division to determine if *Adenanthos eyrei* is a distinct species or a form of *A. forrestii*.

Future recovery actions

The following recovery actions are roughly in order of descending priority; however this should not constrain addressing any action if funding is available and the opportunity arises.

1. Coordinate recovery actions

The Esperance District Threatened Flora Recovery Team (EDTFRT) is coordinating recovery actions for *Adenanthos eyrei* and will include information on progress in their annual report to DEC's Corporate Executive and funding bodies.

Action: Coordinate recovery actions
Responsibility: DEC (Esperance District) through the EDTFRT
Cost: \$1,500 per year.

2. Complete a taxonomic review

Due to the similarity of *Adenanthos eyrei* to *Adenanthos forrestii*, a taxonomic review is currently being carried out. This needs to be completed and a report prepared

Action: Complete a taxonomic review
Responsibility: DEC (Esperance District, Science Division) through the EDTFRT
Cost: \$4000 in the first year.

3. Conduct DNA analysis

If the above review (recovery action 2) fails to determine the taxonomic status of *Adenanthos eyrei* a DNA analysis will be conducted.

Action: Conduct DNA analysis
Responsibility: DEC (Esperance District, Science Division) through the EDTFRT
Cost: \$4,500 in the second year.

4. Re-assess access track

A track which passes into the population may need to be closed to prevent accidental vehicular damage to the population and associated habitat, to prevent the possible introduction of *Phytophthora*, and to reduce the impact of wind erosion.

Action: Re-assess access track and re-align or close as appropriate
Responsibility: DEC (Esperance District) through the EDTFRT
Cost: \$1000 in the first year.

5. Monitor population

Monitoring of factors such as weed encroachment, habitat degradation, sub-population stability (expanding or declining), seed production, recruitment and longevity is required. The population will be inspected annually.

Action: Monitor population
Responsibility: DEC (Esperance District) through the EDTFRT
Cost: \$2,500 per year

6. Conduct further surveys

Surveys supervised by DEC staff, with assistance of volunteers, should be conducted during the species' main flowering period. Due to the remote location of the species, surveys have been limited in the past and are required to further investigate its range and habitat requirements. This can be done in conjunction with recovery action 5.

Action: Conduct further surveys
Responsibility: DEC (Esperance District) through the EDTFRT
Cost: \$1,600 after the second year

7. Map habitat critical to the survival of *Adenanthos eyrei*

Spatial data relating to habitat that is critical to the survival of *Adenanthos eyrei* needs to be determined. Although this habitat is described in Section 1, it has not yet been fully mapped and this will be redressed under this action. If any additional populations are located habitat critical to their survival will also be determined and mapped.

Action: Map habitat critical to the survival of *Adenanthos eyrei*
Responsibility: DEC (Esperance District) through the EDTFRT
Cost: \$800 in the second year.

8. Collect and store seed

Seed collection will be ongoing to obtain seed from as wide a range of individuals as possible. Seed will be maintained in ex-situ collection in the DEC Threatened Flora Seed Centre (TFSC). The "Germplasm Conservation Guidelines for Australia" produced by the Australian Network for Plant Conservation (ANPC) should be used to guide this process (Offord & Meagher 2009).

Action: Collect seed from *Adenanthos eyrei*
Responsibility: DEC (Esperance District, Science Division TFSC) through the EDTFRT
Cost: \$9,300 per year (for three years)

9. Collect cuttings for cultivation

Cuttings will be taken from as wide a range of individuals as possible, and provided to the Botanic Gardens and Parks Authority (BGPA) so they can be cultivated for use in future translocations. Any translocations undertaken will be in accordance with the National Guidelines for the translocation of threatened plants, produced by the Australian Network for Plant Conservation (Vallee et al. 2004)

Action: Collect cuttings of *Adenanthos eyrei*
Responsibility: DEC (Esperance District, Science Division) and the BGPA through the EDTFRT
Cost: \$5,800 in the third year.

10. Obtain biological and ecological information

Improved knowledge of the biology and ecology of *Adenanthos eyrei* will provide a better scientific basis for its management in the wild and will include:

- Defining the habitat requirements of the species.
- Determining the reproductive methodology, phenology and seasonal growth of the species.
- Investigating the population genetic structure, levels of genetic diversity and minimum viable population size.
- Longevity of plants, and time taken to reach maturity.

Action: Obtain biological and ecological information
Responsibility: DEC (Esperance District, Science Division) through the EDTFRT
Cost: \$500 for each year.

11. Promote awareness

As this species occurs in a remote area and is relatively poorly known, promoting an awareness of it may lead to the discovery of new populations.

Action: Promote awareness
Responsibility: DEC (Esperance District) through the EDTFRT
Cost: \$500 in the first year.

12. Review the recovery plan and assess the need for further recovery actions

If *Adenanthos eyrei* is still ranked as Endangered at the end of the five-year term of this recovery plan, the plan will be reviewed and the need for further recovery actions assessed

Action: Review the recovery plan and assess the need for further recovery actions
Responsibility: DEC (Species and Communities Branch, Esperance District) through the EDTFRT
Cost: \$4,000 in the fifth year (if required).

Table 3. Summary of recovery actions

Recovery Actions	Priority	Responsibility	Completion date
Coordinate recovery actions	High	DEC (Esperance District) through EDTFRT	Ongoing
Complete a taxonomic review	High	DEC (Science Division) through EDTFRT	2010
Conduct DNA analysis	High	DEC (Science Division) through EDTFRT	Subject to results of taxonomic review
Re-assess access track	Medium	DEC (Esperance District) through EDTFRT	2009
Monitor population	Medium	DEC (Esperance District) through the EDTFRT	Ongoing. Annually if possible
Conduct further surveys	Medium	DEC (Esperance District) through the EDTFRT	Annually
Map habitat critical to the survival of <i>Adenanthos eyrei</i>	Medium	DEC (Esperance District) through the EDTFRT	2009

Recovery Actions	Priority	Responsibility	Completion date
Seed collection and storage	Medium	DEC (Esperance District, Science Division TFSC) through EDTFRT	2010
Collect cuttings for cultivation	Medium	DEC (Esperance District, Science Division) and BGPA through EDTFRT	2009
Obtain biological and ecological information	Medium	DEC (Esperance District, Science Division) through the EDTFRT	Ongoing
Promote awareness	Low	DEC (Esperance District) through the EDTFRT	2009
Review the recovery plan and assess the need for further recovery actions	Low	DEC (Esperance District, Species and Communities Branch) through the EDTFRT	2012

4. TERM OF PLAN

Western Australia

This IRP will operate from March 2007 to February 2012 but will remain in force until withdrawn or replaced. If the species is still ranked EN after five years, this IRP will be reviewed and, if necessary, further recovery actions put in place.

Commonwealth

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

The recovery plan must be reviewed at intervals of not longer than five years,

5. REFERENCES

- Brown, A., Thomson-Dans, C. and Marchant, N. (Eds). (1998) *Western Australia's Threatened Flora*. Department of Conservation and Land Management, Perth, Western Australia.
- Department of Conservation and Land Management (1992). Policy Statement No. 9 *Conservation of Threatened Flora in the Wild*. Department of Conservation and Land Management, Perth, Western Australia.
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- Department of Conservation and Land Management (1995). Policy Statement No. 29 *Translocation of Threatened Flora and Fauna* Department of Conservation and Land Management, Perth, Western Australia.
- Department of Environment and Conservation (2007) *Western Australian Herbarium FloraBase* – Information on the Western Australian Flora. Department of Environment and Conservation, Perth, Western Australia.
- Nelson, E.C. (1978). A taxonomic review of the genus *Adenanthos* (Proteaceae). *Brunonia*, 1:303-406
- Offord, C.A. and Meagher, P.F. 2009. *Plant germplasm conservation in Australia: strategies and guidelines for developing, managing an utilizing ex situ collections*. Australian Network for Plant Conservation Inc., Canberra.
- Vallee, L., Hogbin, T., Monks, L., Makinson, B., Matthes, M. and Rossetto, M. 2004. *Guidelines for the translocation of threatened plants in Australia*. Second edition. Australian Network for Plant Conservation Inc., Canberra

6. TAXONOMIC DESCRIPTION

Nelson, E.C. (1978). A taxonomic review of the genus *Adenanthos* (Proteaceae). *Brunonia*, 1:303-406

Adenanthos eyrei is an erect, diffuse shrub, to 1 m tall, without a lignotuber. Branches erect or ascending, the older branches glabrous with a very warty bark, young branches with short appressed hairs. Leaves divided into three segments, rarely entire, petiolate, to 15 mm long, with very short appressed hairs: segments obovate-lanceolate, laminar, to 10 mm long, c. 3mm broad, margins entire, apex obtuse with very prominent apical gland on dorsal surface, occasionally \pm uncinat. Inflorescence solitary, axillary and terminal; peduncle c. 4 mm long, with short appressed hairs, with two basal bracts, ovate, c. 1 mm long, villose on exterior, with short appressed hairs, glabrous interiorly; margins entire, ciliate; apex obtuse; with about two similar bracts at mid-point of peduncle; c. 1.5 mm long; involucre bracts ten or more, innermost largest, triangular –ovate, to 6 mm long, with short appressed hairs or glabrous exteriorly, glabrous interiorly, margins entire, ciliate, apex obtuse. Flowers dark crimson; in bud perianth tube very slightly swollen at base, distal portion rectangular in cross-section, limb acute. Tepals c. 25 mm long, with short hairs on exterior, glabrous interiorly, dorsal tepal broadest above mid-point; claw c. 22 mm long; lamina c. 3mm long, bearded inside behind anther. Anthers c. 3 mm long. Nectaries broadly triangular, c. 2 mm long, glabrous, apex obtuse. Ovary c. 1mm long, glabrous; style glabrous, c. 35 mm long; style-end c. 2 mm long. Fruit and seedlings not seen.

Distribution: Western Australia; known only from Toolinna sand patch, south of Caiguna on coast of Great Australian Bight (Nelson 1974b).

Table 4: Summary of costs for each recovery action

Recovery Action	Year 1			Year 2			Year 3			Year 4			Year 5		
	DEC	Other	Ext	DEC	Other	Ext	DEC	Other	Ext	DEC	Other	Ext	DEC	Other	Ext
1. Coordinate recovery actions	1500			1500			1500			1500			1500		
2. Complete a taxonomic review	1000		3000												
3. Conduct DNA analysis				1000		3500									
4. Close access track	250		750												
5. Monitor population	600		1900	600		1900	600		1900	600		1900	600		1900
6. Conduct further surveys							500		1100	500		1100	500		1100
7. Map habitat critical to the survival of <i>Adenanthos eyrei</i>				300		500									
8. Collect seed							1900		7400	1900		7400	1900		7400
9. Collect cuttings for cultivation							1000		4800						
10. Obtain biological and ecological information	300		200	300		200	300		200	300		200	300		200
11. Promote awareness	500														
12. Review the recovery plan and assess the need for further recovery actions															4000
Total	\$4150		\$5850	\$3,700		\$6,100	\$5,800		\$15,400	\$4,800		\$10,600	\$4,800		\$14,600
Yearly Total	\$10,000			\$9,800			\$21,200			\$15,400			\$19,400		

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

Total DEC: \$23,250
Total Other: \$0
Total External Funding: \$52,550
TOTAL COSTS: \$75,800

