



Recovery Plan for the Araluen Zieria (*Zieria adenophora*)



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Cover photograph: A flowering branchlet of the Araluen Zieria
Photographer: J. D. Briggs

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Recovery Plan for the Araluen Zieria (*Zieria adenophora*)

Executive Summary

This document constitutes the formal National and New South Wales State Recovery Plan for the Araluen Zieria (*Zieria adenophora*), and as such considers the conservation requirements of the species across its known range. It identifies the actions to be taken to ensure the long-term viability of the Araluen Zieria in nature and the parties who will carry these out.

The Araluen Zieria is listed as Endangered under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999*, and Endangered (Schedule 1, Part 1) on the NSW *Threatened Species Conservation Act 1995*. It is a small shrub, usually up to 50 cm tall and 50 cm wide. This species occurs only in NSW, where it appears to be confined to a single site on a slope above a tributary of Araluen Creek, near the township of Araluen. The site is primarily on Crown leasehold owned by the NSW Department of Land and Water Conservation, but extends a short distance onto private freehold land.

The future recovery actions detailed in this Recovery Plan include; (i) fencing to exclude feral goats, (ii) obtaining long term security for the known site from development or other disturbance, (iii) ecological research, (iv) investigating whether an *ex-situ* populations should be established, (v) monitoring, and (vi) further survey in an effort to locate additional populations in the two areas from where there have been old collections of the species.

It is intended that this Recovery Plan will be implemented over a five year period. Much of the Plan will be carried out using the existing resources of NSW Government agencies and Commonwealth NHT funding already received. An additional \$5,400 will be required to implement some of the currently unfunded actions.



BRIAN GILLIGAN
Director-General



BOB DEBUS MP
Minister for the Environment

Acknowledgments

This Plan has been prepared by a Recovery Team consisting of John Briggs and Warwick Smith from the NSW National Parks and Wildlife Service and Noel Whitem and Allison Treweek from the NSW Department of Land and Water Conservation (DLWC).

The owner of the private land and lessee of the Crown land, is thanked for allowing access to the site and for their cooperation in the recovery program.

The substantial contribution of funds by DLWC from its Biodiversity Conservation Program to enable fencing of the site from feral goats is gratefully acknowledged.

Environment Australia provided funding which enabled the preparation of the Recovery Plan and which will assist with the implementation of actions.

1 Introduction

The Araluen Zieria (*Zieria adenophora* Blakely) occurs only in New South Wales, and is currently only known from a single population of about 56 mature plants near Araluen. The species was first recorded between 1888 and 1890, but apparently was not seen again until 1988.

This document constitutes the formal National and State Recovery Plan for the Araluen Zieria, and as such considers the requirements of the species across its known range. It identifies the actions to be taken to ensure the long-term viability of the Araluen Zieria in nature and the parties who will carry these out. The attainment of this Recovery Plan's objectives is subject to budgetary and other constraints affecting the parties involved. It may also be necessary to amend this plan in the event of new information or following recommended changes to the Recovery Program by the Recovery Team. The information contained within is accurate to May 2001.

This plan has been prepared by the New South Wales National Parks and Wildlife Service (NPWS) in consultation with the Department of Land and Water Conservation (DLWC) and the private landowner/lessee.

2 Legislative Context

2.1 Legal Status

The Araluen Zieria is listed as Endangered under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Endangered (Schedule 1, Part 1) on the NSW *Threatened Species Conservation Act 1995* (TSC Act). It is also listed as Endangered (Code 2E) in *Rare or Threatened Australian Plants* (Briggs & Leigh 1996).

Among the consequences of listing as a threatened species on the TSC Act are:

- that a Recovery Plan must be prepared;
- that consideration be given to the species in assessing the impacts of developments and activities with the aim of minimising adverse impacts; and
- that other actions that are likely to result in the harming or picking of that species or to damage its habitat are licensed.

2.2 Recovery Plan Preparation

The TSC Act provides a legislative framework to protect and encourage the recovery of threatened species, endangered populations and endangered ecological communities in NSW. Under this legislation the Director-General of National Parks and Wildlife (NPW) has a responsibility to prepare Recovery Plans for all species, populations and ecological communities listed as endangered or vulnerable on the TSC Act schedules. Similarly, the EPBC Act requires the Commonwealth Minister for the Environment to ensure the preparation of a Recovery Plan for nationally listed species and communities or adopt plans prepared by others including those developed by State agencies. Both Acts include specific requirements for the matters to be addressed by Recovery Plans and the administrative process for preparing Recovery Plans.

This Recovery Plan has been prepared to satisfy both the requirements of the TSC Act and the EPBC Act and therefore will be the only Recovery Plan for the species. It is the intention of the Director-General of NPW to forward this Recovery Plan to the Commonwealth Minister of the Environment for adoption, once it has been approved by the NSW Minister for the Environment.

2.3 Recovery Plan Implementation

The TSC Act requires that a public authority must take any appropriate measures available to implement actions included in a Recovery Plan for which they have agreed to be responsible. Public authorities and councils identified as responsible for the implementation of Recovery Plan actions are required by the TSC Act to report on measures taken to implement those actions. In addition, the Act specifies that public authorities must not make decisions that are inconsistent with the provisions of the Plan. The government agencies relevant to this Plan are Tallaganda Shire Council, DLWC and NPWS. Consequently, the actions outlined for each of these agencies must be implemented as described in the Plan.

The EPBC Act specifies that a Commonwealth agency must not take any action that contravenes a Recovery Plan.

2.4 Relationship to other legislation

The only site on which the Araluen Zieria is known to occur is mainly Crown leasehold land administered by DLWC and partly private freehold land. Relevant legislation includes:

- NSW *National Parks and Wildlife Act 1974*
- NSW *Environmental Planning and Assessment Act 1979*

- NSW *Local Government Act 1993*
- NSW *Rural Fires Act 1997*
- NSW *Native Vegetation Conservation Act 1997*
- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

The interaction of these Acts with the TSC legislation is varied. The most significant implications are described below and in Section 2.6.

The clearing of native vegetation in NSW is subject to consent from the DLWC in accordance with the NSW *Native Vegetation Conservation Act 1997* (the NVC Act). The NVC Act is integrated with the *Environmental Planning and Assessment Act 1979* (EP&A Act), and requires that threatened species are taken into account when considering clearing applications under Part 4 of the EP&A Act. There are however a series of exemptions and the NVC Act does not apply to certain types of land including land zoned as 'residential', 'township', 'village', 'industrial', or 'business'. The private land supporting the Araluen Zieria is zoned Rural 1a and thus the NVC Act applies.

The zoning 'Rural 1(a)' means the site can be used for general rural purposes. However, the area is also mapped as environmentally sensitive under clause 28 of the Tallaganda Local Environment Plan (LEP) 1991.

Clause 28 of the Tallaganda LEP states that:

2. A person shall not carry out development on environmentally sensitive land for the purposes of:
 - a) intensive livestock keeping;
 - b) junk yards;
 - c) liquid fuel depots;
 - d) offensive or hazardous industries;
 - e) sawmills; or
 - f) commercial stockholding yards
3. A person must not carry out forestry works on environmentally sensitive land except with the consent of Council.
4. A person shall not clear or drain environmentally sensitive land for any purpose, except with the consent of Council.
5. Council may not grant consent to the clearing or draining of land unless:
 - g) in the opinion of the Council, the clearing or draining will be carried out in a manner which minimises:
 - i) the risk of soil erosion or other degradation;
 - ii) the loss of scenic amenity; and
 - iii) the destruction of significant vegetation systems and natural wildlife (including aquatic) habitats; and

- h) the area to be cleared or drained does not exceed 1 hectare or does not exceed 5% of the area of environmentally sensitive land within an existing holding (whichever is less) and is not within 30 metres of a watercourse.

The Rural Fires Act 1997 requires that all parties involved in fire suppression and prevention must have regard to the principles of Ecologically Sustainable Development (ESD) when exercising their functions and when preparing Operational Plans and Bush Fire Risk Management Plans. Consideration of the principles of ESD must include the conservation of biological diversity and ecological integrity. Within this, consideration must be given to the impact on threatened species and their habitats.

2.5 Critical Habitat

The TSC Act makes provision for the identification and declaration of Critical Habitat. Under the TSC Act, Critical Habitat may be identified for any endangered species, population or ecological community occurring on NSW lands. Once declared, it becomes an offence to damage Critical Habitat (unless the action is exempted under the provisions of the TSC Act) and a Species Impact Statement is mandatory for all developments and activities proposed within declared Critical Habitat.

Under the EPBC Act, Critical Habitat may be registered for any nationally listed threatened species or ecological community. When adopting a Recovery Plan the Federal Minister for the Environment must consider whether to list habitat identified in the Recovery Plan as being critical to the survival of the species or ecological community. Although this offence only applies to a Commonwealth area, any action that is likely to have a significant impact on a listed species occurring within registered Critical Habitat on other areas is still subject to referral and approval under the EPBC Act. Proposed actions within registered Critical Habitat on non-Commonwealth areas are likely to receive additional scrutiny by the Commonwealth Minister.

To date, Critical Habitat has not been declared for this species under the TSC Act. However, this Recovery Plan identifies those habitat features and the location (sections 3.2 - 3.4) currently known to be critical to the survival of the Araluen Zieria, as required by the EPBC Act.

2.6 Environmental Assessment

The New South Wales *Environmental Planning and Assessment Act 1979* (EP&A Act) requires that consent and determining authorities, and the Director-

General of National Parks and Wildlife, as a concurrence authority, consider relevant Recovery Plans when exercising a decision-making function under Parts 4 and 5 of the EP&A Act. Decision-makers must consider known and potential habitat, biological and ecological factors and the regional significance of individual populations.

The following public authorities currently have a decision making function in relation to the Araluen Zieria:

- Tallaganda Shire Council;
- the DLWC in relation to Crown land, subject to the provisions of the *Crown Lands Act 1989*, and in relation to private land under the requirements of the NVC Act and the *Rivers and Foreshores Improvement Act 1948*; and
- the NPWS where a concurrence or consultation role under the EP&A Act is required, or where a Section 91 Licence (under the TSC Act) or a Section 132 Licence (under the NPW Act) is required.

Additional authorities may have responsibilities if the species is located in other areas in the future.

Any other activity not requiring development consent under the EP&A Act, and which is likely to have a significant impact on the Araluen Zieria, requires a Section 91 licence from NPWS under the provisions of the TSC Act. Such a licence can be issued with or without conditions, or can be refused. Routine agricultural activities however, are exempt from the provisions of the TSC Act. This means, for example, that the population of Araluen Zieria or its habitat can, in some circumstances, be legally subject to grazing by domestic stock under the provisions of the TSC Act.

Any owner or occupier of private land is required to obtain a Section 132 licence from the Director-General of NPW if they wish to grow a native plant species listed as threatened under the TSC Act for the purposes of sale.

The EPBC Act regulates actions that may result in a significant impact on nationally listed threatened species and ecological communities. It is an offence to undertake any such actions in areas under State or Territory jurisdiction, as well as on Commonwealth-owned areas, without obtaining prior approval from the Commonwealth Environment Minister. As the Araluen Zieria is listed nationally under the EPBC Act, any person proposing to undertake actions likely to have a significant impact on this species should refer the action to the Commonwealth Minister for the Environment for consideration. The Minister will then decide whether the action requires EPBC Act approval.

Administrative guidelines are available from Environment Australia to assist proponents in determining whether their action is likely to have a significant impact. In cases where the action does not require EPBC Act approval, but will result in the death or injury of a member of the Araluen Zieria and the member is in, or on a Commonwealth area, a permit issued by the Commonwealth Minister under the EPBC Act, will be required.

The Environment Minister can also delegate the role of assessment and approval to other Commonwealth Ministers under a Ministerial Declaration, and to the States and Territories under bilateral agreements. The development of a bilateral agreement between NSW and the Commonwealth is not yet complete, but when in place will avoid the need for duplication of environmental assessment.

3 Species Information

3.1 Description and Taxonomy

Individuals of the Araluen Zieria are small erect, open sub-shrubs to about 50 cm high, with the branchlets and leaves covered in numerous small warts (tubercles). The leaves are opposite, small, comprised of three leaflets (trifoliate) and are strongly aromatic when crushed. The central leaflet is elliptical to obovate, 2-8 mm long and 2-4 mm wide, with the secondary leaflets of similar shape and size.

The flowers of the Araluen Zieria are very pale-pink to white, arranged singly or in small clusters in the leaf axils. Each flower is about 5 mm across with 4 oblanceolate petals. The fruits are warty capsules about 5 mm across and deeply divided into 4 chambers. Each chamber contains one or rarely two elliptical seeds about 2 mm long (Briggs and Leigh 1990) (see front cover of this Recovery Plan for photograph of the leaves and flowers of the Araluen Zieria).

3.2 Distribution

The Araluen Zieria is currently known from a single population of 56 mature plants located in a valley north of Araluen (Figure 1). The population consists of two sub-populations located approximately 100 m apart. They occur above and below a 20 m high rockface that separates them.

The species was first collected near Araluen in 1888, and again from near Araluen in 1889 and 1890. It was also collected, 'near the Clyde' in 1889 and 'Some of

the remotest sources of Murrumbidgee at Maneroo' in 1888 (cited in Briggs and Leigh 1990). Briggs and Leigh (1990) concluded from this that there have been two or three different collection sites; one from a tributary of Araluen Creek, one near the Clyde and possibly another site somewhere along the Murrumbidgee on the Monaro Tablelands.

Because of the imprecise nature of the descriptions of the two later mentioned localities it will be difficult to conduct specific searches for those sites.

3.3 Land Tenure

The known site is primarily Crown leasehold land owned by DLWC, but it appears the population may extend some metres onto private property (the absence of fence along one side of the portion boundary has made it difficult to precisely pinpoint the population on a cadastral map). The owner of the private block is also the lessee of the DLWC land.

3.4 Habitat

The only known extant site is on the steep upper slopes of a north-north-west facing hillside in a shrub community on the margins of Maiden's Gum (*Eucalyptus maidenii*) low open-forest. The Araluen

Zieria grows in shallow gravelly loam amongst granite boulders (Briggs and Leigh, 1990). The shrub community includes Black Wattle (*Acacia mearnsii*), Sticky Dodonaea (*Dodonaea viscosa*), Common Correa (*Correa reflexa*), Rusty Fig (*Ficus rubiginosa*), Mock Olive (*Notelaea venosa*), *Plectranthus parviflorus*, and Tussock Grass (*Poa sieberiana*).

3.5 Ecology

Little is known about the ecology of this species. The mature plants flower prolifically and the level of fruit set is high.

The Araluen Zieria grows on a steep exposed north-north-west-facing slope with large exposed granite boulders. The plants seem to flourish in either full sun or part shade provided by the boulders and associated taller shrubs. Conditions on the site during summer afternoons would be extremely hot. During winter the site probably experiences moderated minimum temperatures due to cold air drainage effects on the steep slope and likely heat retention by the large boulders. Severe frosts may thus be uncommon. The site however, is exposed to strong westerly and south-westerly winds.

Competition, at least under current conditions, from other native species is relatively low, as there is much exposed gravelly soil where the Araluen Zieria grows and few herbaceous species are present.

Life Cycle

The Araluen Zieria commences flowering in August and flowering extends through to October. The species is almost certainly insect pollinated, and native bees, hover flies and blowflies have been observed visiting the flowers. Fruit at all stages through to maturity can be found on plants still producing flowers in October. The fruits develop and ripen rapidly, and seed shed appears to be mostly complete by the end of December.

Individuals have not been monitored in the field, but two plants grown from cuttings are known to have been in cultivation in a private garden in Canberra for 12 years. One of these still appears very healthy whilst the other is showing signs of senescence. Of the 16 plants growing at the Australian

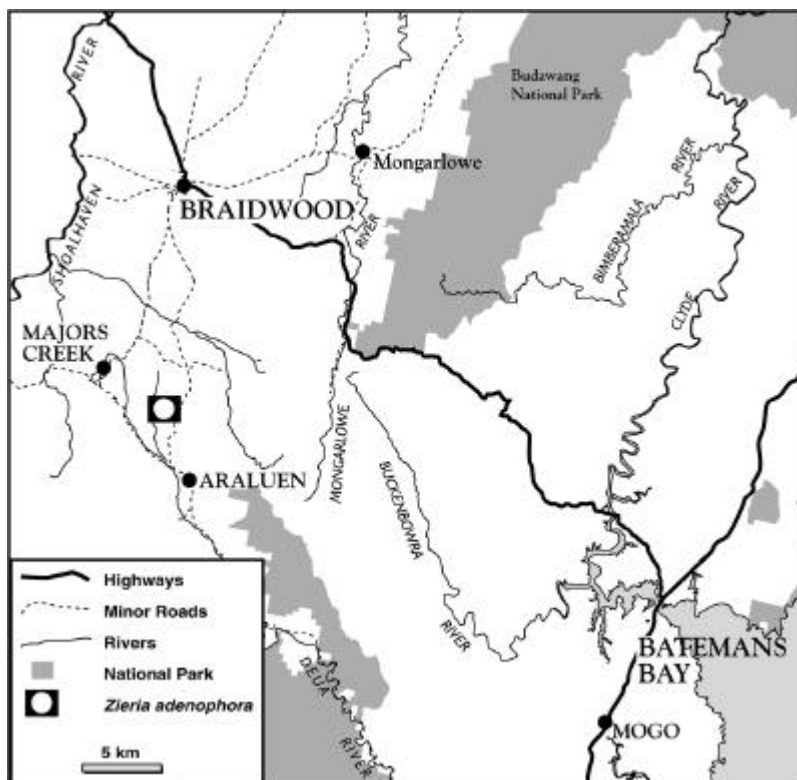


Figure 1. Known distribution of the Araluen Zieria (*Zieria adenophora*).

National Botanic Gardens (ANBG) from cuttings taken in 1988, only one survives. Collectively this suggests that individuals in cultivated situations do not have long life spans. Several dead shrubs were observed in the field in 1999, and it is thought these were alive on the site in 1988. The average longevity of individuals in the wild seems likely to be in the order of 20-30 years.

Population Structure

The current size-class distribution of the known population is strongly bimodal, with plants mostly being either very young seedlings or mature plants. In September 1999, 26 adults and 33 seedlings were counted in the upper sub-population and 30 adults and 9 seedlings were counted in the lower sub-population. It appears that the activities of feral goats are preventing almost all of each season's cohort of seedlings from surviving and contributing to recruitment to the population.

Disturbance Regimes

The sensitivity of this species to fire is not known. However plants both in the wild and in cultivation have shown no signs of sprouting from low down on the stems and do not appear to sucker from the rootstock. This is an indication that plants may be killed by fire. However, some other *Zieria* species are known to resprout following fire.

Given the rocky, sparsely vegetated site on which it occurs it would be extremely unlikely for a fire to burn the whole site at one time.

3.6 Ability of Species to Recover

On the label of the specimen collected in 1890 from near Araluen, Baeuerlen noted that only one plant was seen (cited in Briggs and Leigh 1990). This is an indication that the species was not abundant at that site and that its abundance may not have changed significantly since that time. The Araluen *Zieria* may have always been restricted to the small area it currently occupies at the site near Araluen because of its dependence on the unique microhabitat conditions. If this is the case, then the problems associated with managing a very small population may never be overcome.

It seems clear that seed production, seed germination and seedling establishment are not limiting factors at the site. Provided feral goats can be kept off the site then there would seem to be a high probability of many seedlings developing through to mature plants and of the Araluen *Zieria* population increasing significantly in numbers within the site without further intervention.

Even with the removal of the threat posed by goats, it seems unlikely that the population will expand beyond the area currently occupied.

4 Threats and Management Issues

4.1 Current Threats

Trampling, soil disturbance and removal of associated vegetation by goats and wallabies are ongoing threats both directly to individuals and to the habitat. While the goats do not appear to browse on the Araluen *Zieria*, they cause damage directly to individuals, particularly seedlings by exposing the roots and by trampling. Long term effects of the presence of goats may include erosion of the shallow soils, increased weed invasion and the prevention of adequate recruitment to the population.

4.2 Potential threats

The fact that the population is reduced to such small numbers in such a restricted area makes it extremely vulnerable to extinction through perturbations such as severe wildfire or drought and other unforeseen stochastic events.

5 Previous Recovery Actions

- Around the time of the rediscovery of the species near the township of Araluen in 1988, other surveys were conducted in the same area and on Clyde and Sugarloaf Mountains. These surveys failed to locate any additional populations (Briggs & Leigh 1990).
- In 1988 propagation material was collected from five individuals from the upper sub-population of the Araluen site and the species was established in cultivation at both the ANBG Canberra, and the Mount Annan Botanic Gardens (MABG), Sydney. Plants from only three of the five original sampled wild plants have survived at the ANBG. Currently ANBG has 59 plants of one clone, two plants of another and two plants from the third (John Nightingale (ANBG), pers. comm.). Fortunately the ANBG also provided the MABG with cuttings from the same five individuals. The MABG currently have three plants in cultivation from the two clones that did not survive at the ANBG (Peter Cunio (MABG), pers. comm.). Three plants from the clone best represented at ANBG are also growing at the Jervis Bay Botanic Gardens.
- A Recovery Team consisting of officers from DLWC and NPWS was established in 1998.
- Successful applications by the South Coast Region of DLWC for funds from the organisation's State-wide Biodiversity Program has secured sufficient

funds to enable the entire population to be protected by the construction of a goat-proof fence.

- Further survey by NPWS and DLWC in the area on 7 September 1999 resulted in the discovery of the lower sub-population (39 plants) at the Araluen site.

6 Proposed Recovery Objectives, Actions and Performance Criteria for 2000-2004

The overall objective of this Recovery Plan is to ensure that the current population size is maintained or increased over time. Whilst only the single wild population remains known, it is difficult to envisage a change in the conservation status being achievable.

Specific Objective 1: Control known threats

Action 1: Exclude goats from the known site near Araluen

The only currently identified threat is trampling, soil disturbance and erosion caused by feral goats, particularly within the higher of the two sub-populations. Although rocky and steep, it should be possible to fence the site and exclude goats. The private landholder has agreed to allow access to the land and the construction of a goat proof fence. During 1999 and 2000 the DLWC committed a total of \$10,000 from its State Biodiversity Program to enable the fence to be constructed. The fence will require monitoring and maintenance.

Performance Criterion 1

The population site is successfully fenced within one year of the approval of this Plan and remains free of goats for the duration of the Plan.

Specific Objective 2: Obtain appropriate protection and management of the land occupied by the species

Action 2.1: NPWS to negotiate with the DLWC and the private land-owner for the long-term security for the site

Mechanisms which could be used to achieve this include:

- A Joint Management Agreement between the NPWS and DLWC for the protection of the population on Crown land; or
- a Memorandum of Understanding between DLWC and the NPWS; or
- transfer of the DLWC land to the NPWS and managing the area as a conservation reserve; and
- a Voluntary Conservation Agreement (for that part of the site which is on private, freehold land).

All of these options will be considered and discussed by NPWS, DLWC and the landowner/lessee.

Action 2.2: Identification and nomination of Critical Habitat

The NPWS will consider the benefits of nominating Critical Habitat and, if appropriate, make a recommendation to the Minister regarding what area should be listed.

Performance Criterion 2

Within three years long-term security for the population is achieved.

Specific Objective 3: Conduct investigations into the general ecology of the Araluen Zieria to provide information to assist in future management decisions

Action 3: Conduct investigations into the general ecology of the species

Information on pollination, growth rates, longevity, response to fire and other general ecological aspects of the biology of this species would be valuable in making management decisions for the site. This work is likely to be conducted primarily by a University or other research institution.

Performance Criterion 3

Within five years investigations into aspects of the species ecology will have commenced.

Specific Objective 4: Determine whether or not expansion of the *ex-situ* population is required/desired and if so, establish a more comprehensive *ex-situ* planting/collection.

Action 4.1: Review the results of Actions 1-3 and determine the need for ex-situ conservation efforts

If the current number of reproductively mature plants is not maintained or increased over the next three years, consideration should be given to the expansion of the *ex-situ* population and/or the establishment of a long-term *ex-situ* seed store. An *ex-situ* collection would serve primarily as a source of propagating material which could then be used in the propagation of plants for reintroduction into the natural site in the event of a catastrophic reduction in the size of the natural population. Such an event is more likely if the natural population remains very low. An *ex-situ* population

should represent the range of genetic diversity in the wild.

Performance Criterion 4.1

Within four years of the approval of this Plan, the need for ex-situ conservation has been assessed.

Action 4.2: If required, expand the ex-situ population and/or establish an ex-situ seed bank and maintain for the purposes of recovery and research

If the results from Action 4.1 dictate that expansion of the ex-situ populations is necessary and/or an ex-situ seed bank is required, then botanical gardens will be requested to undertake this action. This is likely to require an associated genetic study to determine the extent of variation within the population and to guide the sampling strategies.

Performance Criterion 4.2

If necessary, the ex-situ population is expanded and/or an ex-situ seed bank has been established within five years.

Specific Objective 5: Monitoring

Action 5: Monitoring

The population must be monitored, initially every year, to determine the effect of goat exclusion, and every two years once the population appears stable. Monitoring should also determine whether browsing by kangaroos/wallabies is also having an adverse impact.

Performance Criterion 5

Within one year of the approval of this Plan, base-line information on population structure will have been obtained and a monitoring program developed and conducted annually for at least the first three years.

Specific Objective 6: Locate previously recorded populations or other new populations

Action 6: Undertake additional survey

Surveys of other potential habitat not already covered by Briggs and Armstrong between 1988 and 1990 need to be conducted. A review will be carried out of the sites already surveyed and a list of other potential sites will be made based on similarity of habitat. These sites will then be surveyed pending the permission of landowners.

Performance Criterion 6

Within two years a concerted effort has been made to re-locate populations in the vicinity of the previously recorded 'Clyde Mountain' site and within four years a

concerted effort has been made in the vicinity of the previously recorded 'Manneroo' site.

7 Implementation

Table 1 allocates responsibility for the implementation of Recovery Actions specified in this Plan to relevant government agencies and/or parties for a period of five years and identifies costs associated with each Recovery Action. The total estimated cost for the implementation of these actions is \$39,700. The majority of the funds will be provided from existing resources within the NPWS and DLWC, however an additional \$5,400 is required to fully undertake some of the actions.

These unsecured funds will be sought via such avenues as corporate sponsorship, and other external funding sources.

8 Social and Economic Consequences

The site is extremely steep, rocky and has low fertility, highly erodible soil and the alternate uses are extremely limited. There are minimal social or economic costs resulting from the protection of this species.

The main social benefit of conserving the habitat in which the Araluen Zieria survives is in meeting the desire of many in the community that further loss of this and other threatened species, as well as the ecological communities in which they occur, should be prevented.

9 Biodiversity Benefits

The conservation of this species will also benefit the localised shrub community in which it occurs.

10 Preparation Details

This Plan was prepared by John Briggs and Warwick Smith of NPWS with input from the Noel Whitem of the DLWC and in consultation with the landowner and lessee of the site near Araluen. The Plan was edited by Michael Saxon of NPWS.

11 Review Date

Any major changes to this Recovery Plan will require the revised Plan to be placed on public exhibition in NSW and re-approval by the NSW Minister for the Environment. The NPWS or Environment Australia should be contacted if it is believed any change to the Recovery Plan or to the Recovery Program should be considered. This Recovery Plan is to be formally reviewed by the NPWS in conjunction with DLWC and the landowner and lessee within five years from the date of its publication.

12 References

Briggs, J.D. & Leigh J.H. (1990), *Delineation of Important Habitats of Threatened Plant Species in South-eastern New South Wales*, 312 pp. Research Report to the Australian Heritage Commission. (CSIRO: Canberra).

Briggs, J.D. & Leigh J.H. (1996), *Rare or Threatened Australian Plants: 1995 revised edition*. (CSIRO: Melbourne).

13 Acronyms Used in this Document

ANBG – Australian National Botanic Gardens

DLWC – Department of Land and Water Conservation

EP&A Act – NSW *Environmental Planning and Assessment Act 1979*

EPBC Act – Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

ESD – Ecologically Sustainable Development

LEP – Local Environment Plan

MABG – Mount Annan Botanic Gardens

NPW Act – NSW *National Parks and Wildlife Act 1974*

NPWS – NSW National Parks and Wildlife Service

NVC Act - NSW *Native Vegetation Conservation Act 1997*

TSC Act – NSW *Threatened Species Conservation Act 1995*

Table 1: Estimated costs, funding source and responsible parties for implementing the actions identified in the Araluen Zieria Recovery Plan.

Action No.	Action Description	*Priority	^Feasibility	Responsible Party	Fund source	Cost Estimate (\$'/year)					Total Cost (\$'s)
						99-00	00-01	01-02	02-03	03-04	
1	Construction and subsequent maintenance of goat-proof fence	1	90	DLWC	SBP ¹	5,000	5,000				10,000
				NPWS	NHT ²	900	1,500	1,200			3,600
				NPWS	'in kind'	600	900	600	600	600	3,300
2.1	Negotiate protection of sites	2	70	NPWS	NHT ²	600	1,200				1,800
				NPWS	'in kind'		900	1,200	1,200	1,200	4,500
				DLWC	'in kind'	600	600	1,500	1,500		4,200
2.2	Identification of Critical Habitat	2	100	NPWS	'in kind'			600		600	
3	Research	2	80	Research institution	Unsecured					Uncosted	
4.1	Determine need for ex-situ collections	2	100	NPWS	'in kind'				600	600	1,200
4.2	Establish ex-situ collections	2	80	Botanic Gardens	Unsecured						Uncosted
5	Monitoring	2	100	NPWS	NHT ²	1,200	1,200	1,200			3,600
				NPWS	Unsecured			600	600	600	1,800
6	Additional survey	2	100	NPWS	Unsecured			1,200	1,200	1,200	3,600
				NPWS	NHT ²		1,500				1,500
Total					NHT² + SBP¹	7,700	10,400	2,400	0	0	20,500
Total					Unsecured	0	0	1,800	1,800	1,800	5,400
Total					'in kind'	1,200	2,400	3,900	3,900	2,400	13,800
Total					Unsecured + 'in kind' + NHT² + SBP¹	8,900	12,800	8,100	5,700	4,200	39,700

14 Costing Explanations

Costing is based on 2001 dollar rates.

Where *fund source* is listed as 'Unsecured', funding will be sought from sources such as NHT, industry sponsors, the State Biodiversity Program and internal NPWS threatened species budget.

Salary for 'in-kind' contributions is calculated at \$300/day, which includes officer salary, provision of office space, vehicles, admin support and management.

* Priority ratings as defined by Commonwealth Recovery Plan Guidelines: 1 - action critical to prevent extinction, 2 - action prevents negative impact short of extinction,

^Feasibility assessment reflects estimated chance of success of the action on a scale of 0-100%.

¹ Funding obtained by DLWC from NSW State Biodiversity Program

² Funding already allocated from the Commonwealth's Natural Heritage Trust Endangered Species Program



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