

# NSW SCIENTIFIC COMMITTEE

## *Zieria adenophora* Blakely (Rutaceae)

### Review of Current Information in NSW

June 2008

#### **Current status:**

*Zieria adenophora* (Araluen *Zieria*) is currently listed as Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The NSW Scientific Committee recently determined that *Zieria adenophora* meets criteria for listing as Critically Endangered in NSW under the *Threatened Species Conservation Act 1995* (TSC Act), based on information contained in this report and other information available for the species.

#### **Species description:**

*Zieria adenophora* is described in Armstrong (2002) as follows: “Small, divaricate, densely tuberculate shrub up to 1 m. Younger branches not ridged, densely tuberculate, minutely pubescent (with simple hairs) all over; tubercles reddish-brown, glabrescent on top but pubescent at the base. Branches glabrescent, lenticellate. Leaves trifoliolate, opposite (very occasionally subopposite), petiolate. Petiole c. 1.5-2.0 mm long, tuberculate only on the abaxial surface, pubescent on both surfaces; tubercles glabrous. Central leaflet cuneate-obovate, c. 2.5-8.0 x 2.0-4.0 mm; upper surface prominently tuberculate, glabrous except for the occasional simple hair; lower surface tuberculate on the primary vein, glabrous except for the odd scattered hair, slightly more hirsute along the primary vein, the tubercles glabrous; apex rounded to emarginate; margin dentate (because of the large glandular tubercles) and slightly revolute; venation (excluding the primary vein on the lower surface) obscure on both surfaces. Inflorescence axillary, shorter than the leaves, c. 1-3-flowered. Peduncle c. 0.4-2.0 mm long, tuberculate, glabrescent. Bracts persistent, narrow obovate, c. 1.0-1.5 x 0.6-0.8 mm, foliaceous, glabrous, tuberculate on the abaxial surface only, otherwise similar to the lamina in all surface features but much smaller. Pedicel not ridged, c. 1.0-1.5 mm long, not tuberculate, pubescent. Flowers white or pale-pink, c. 5.0 mm diameter. Calyx lobes deltoid, c. 1.0 x 0.8 mm, very much shorter than the petals, tuberculate only on the abaxial surface, glabrous on both surfaces. Petals valvate in bud, c. 2.0-3.0 x 1.0 mm, with a small inflexed mucro at the apex, pubescent on the abaxial surface, glabrous to glabrescent adaxially, tubercles obvious on the abaxial surface towards the apex. Stamens not persisting in the fruiting stage; filaments c. 1.0 mm long, glabrous to minutely hirsute, not prominently dilated towards the base, not warty towards the apex; anthers orbicular, c. 0.5 x 0.4 mm, not apiculate. Disc interrupted and distinct, glabrous. Ovary densely tuberculate, glabrous. Style c. 0.9 mm long, glabrous. Stigma c. 0.4 mm broad. Fruit tuberculate, glabrous. Cocci ovate, glabrous, lacking an appendage. Seed not seen.”

# NSW SCIENTIFIC COMMITTEE

## Taxonomy:

The species was described by Blakely (1941) and has been known previously as *Zieria obcordata* subsp. B (Jacobs & Pickard 1981). *Zieria adenophora* is closely related to *Z. obcordata* from which it is distinguished by cocci with no hair or with hairs only on margins.

## Distribution and number of populations:

*Zieria adenophora* is currently known from a single population located in the Bells Creek valley area north of Araluen (south of Braidwood) (Figure 1). The population consists of two sections located approximately 100 m apart, separated by a 20 m high rockface. As there is believed to be genetic exchange between these two sections, they are considered to be one population (expert advice). The population is mainly on Crown leasehold land, but may extend on to adjacent private land (NSW NPWS 2001).

The species was first collected near Araluen in 1888. From other specimens collected in 1888-1890, Briggs & Leigh (1990) concluded that there had been two or three different *Z. adenophora* sites; one from a tributary of Araluen Creek (upper section of the current population), one near the Clyde River, and possibly another site somewhere along the Murrumbidgee River on the Monaro Tablelands. Because of the vagueness of the descriptions provided for the latter two localities, they have not been relocated despite several searches (expert advice). Information associated with these records suggested that even at that time the species was extremely rare (NSW NPWS 2001).

This species was not collected at Bells Creek for another 100 years and was considered extinct (Briggs & Leigh 1990) until its rediscovery in the 1980s.

Further surveys by NPWS and DLWC in the area in September 1999 resulted in the discovery of the lower section of the population at the Araluen site (NSW NPWS 2001). Other surveys in and around the area did not locate any additional populations (Briggs & Leigh 1990; NSW NPWS 2001; expert advice).



**Figure 1.** Location of *Zieria adenophora* in NSW.

# NSW SCIENTIFIC COMMITTEE

## **Ecology:**

### Key habitat requirements

The only known population occurs in shrubby vegetation growing in shallow sandy to gravelly loam, amongst granite boulders on the steep, upper slope of a hillside with a north to north-west aspect (Briggs & Leigh 1990; NSW NPWS 2001; Armstrong 2002).

Co-occurring plant species include *Acacia mearnsii* (Black Wattle), *Dodonaea viscosa* (Sticky Dodonaea), *Correa reflexa* (Common Correa), *Ficus rubiginosa* (Rusty Fig), *Notelaea venosa* (Mock Olive), *Plectranthus parviflorus* (Cockspur Flower), and *Poa sieberiana* (Tussock Grass). It grows adjacent to a *Eucalyptus maidenii* (Maiden's Gum) low open-forest (Briggs & Leigh 1990; Armstrong 2002).

### Life history

Little is known about the ecology of this species. The mature plants flower prolifically from August to October and are most likely pollinated by flying insects (NSW NPWS 2001). There is a high level of fruit set. Fruits develop quickly with the majority of seed shed by the end of December (NSW NPWS 2001).

The longevity of wild plants is thought to be 20-30 years (NSW NPWS 2001) and the age to maturity is around five years (expert advice). The generation length (IUCN 2008) of this species is estimated to be 13 to 18 years.

The population consists of both very young seedlings and mature plants (NSW NPWS 2001; Armstrong 2002; expert advice), so the limiting factors do not appear to be seed production, seed germination and seedling establishment.

## **Number of mature individuals:**

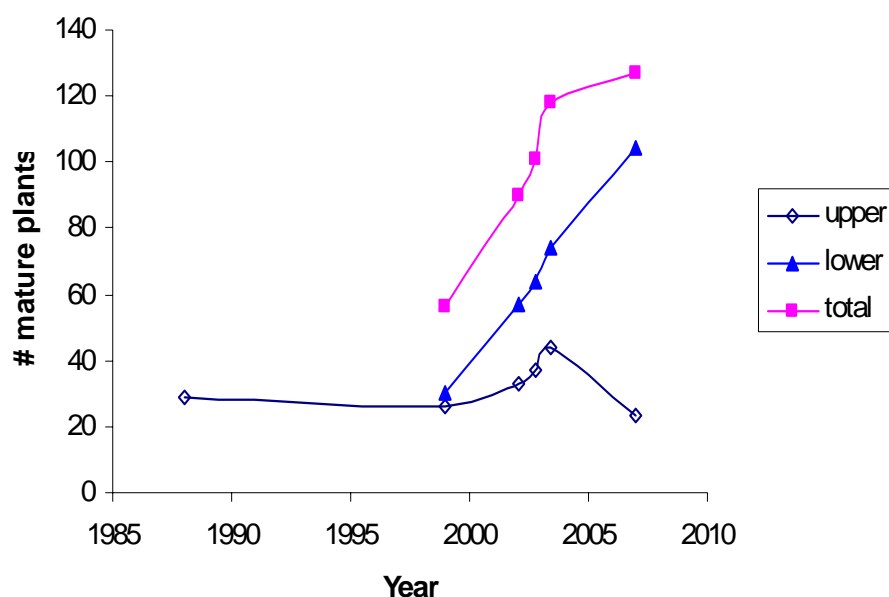
The total known population of mature adults of *Z. adenophora* is 127 (expert advice). All plants taller than 30cm were assumed to be reproductive adults (expert advice).

In 1988, 29 mature plants (and no seedlings) were recorded in the upper section of the population (Briggs & Leigh 1990; Figure 2). The lower section of the population was not discovered until 1999. A survey at this time found 56 mature plants in total (26 adults and 33 seedlings in the upper section; 30 adults and 9 seedlings in the lower section) (NSW NPWS 2001). In September 2000 a fence was constructed around the entire population to manage the threat from feral goats. This resulted in an increase in the population to 90 mature plants by February 2002 (expert advice). By October 2002, the population had increased slightly to 101 mature plants (37 in upper section and 64 in the lower section) and by May 2003 the population had further increased to 118 mature plants (44 plants recorded in the upper area and 74 on the lower section).

In 2007, the number of mature adults in the upper section of the population had declined since May 2003 by 50% (to 23), possibly due to drought. The lower section of the population had

# NSW SCIENTIFIC COMMITTEE

however, increased (to 104), so that the total population included 127 mature individuals (expert advice; Figure 2).



**Figure 2.** Change in *Zieria adenophora* over time since its rediscovery in the 1980s.

## Threats:

The main threats include trampling, soil disturbance and removal of associated vegetation by goats and wallabies. This directly affects individual plants and their habitat. Goats cause damage directly to individuals, particularly seedlings by exposing the roots and by trampling. Long term effects of goats may include erosion of the shallow soils, increased weed invasion and the prevention of adequate recruitment to the population (NSW NPWS 2001). Although a fence was constructed to keep goats out, they may still pose a threat, as the condition of the fence is not regularly assessed (it is checked only about once every few years). Goats may therefore gain access to the population if the fence is somehow compromised, for example by vandals or tree fall (expert advice). ‘Competition and habitat degradation by Feral Goats, *Capra hircus*’ is listed as a Key Threatening Process under the TSC Act in NSW.

Drought has also severely affected this species, causing a significant decrease in number of mature individuals in the upper section of the population. The upper section had been more affected by goats and so was less resilient to the drought than the lower section (expert advice).

The response of *Z. adenophora* to fire is not known (NSW NPWS, 2001), although many *Zieria* species are killed by fire and particular fire regimes may threaten the species.

The small population size and restricted area makes this species highly susceptible to extinction through events such as wildfire, drought and other unforeseen stochastic events.

# NSW SCIENTIFIC COMMITTEE

## **Extreme fluctuations:**

There is no information/evidence of this species experiencing extreme fluctuations. All surveys undertaken since the construction of the goat-proof fence suggest that the population has remained relatively stable while steadily increasing.

## **Population reduction and continuing declines:**

The upper part of the population experienced a 50% decline in the last four years due to drought and the impact of goat grazing on seedlings. The lower section of the population, however, has continued to increase since 2000, when the goat-proof fence was constructed. Overall, the total population of mature adults has been increasing since 2000 (from 56 to 127). However, although the current trend is that of an increase, there remains a significant risk of future decline as the continued integrity of the fence protecting the population from goats is uncertain due to infrequent monitoring and maintenance (expert advice).

The private tenure of the land also contributes to risks of future population decline. The property which contains the upper section of the population has recently been sold and the future co-operation of owners in managing the site and allowing access is uncertain.

## **Extent of Occurrence (EOO) & Area of Occupancy (AOO):**

The population consists of two sections located approximately 100 m apart, separated by a 20 m high rockface. The entire population therefore falls within a single 2 x 2 km grid cell, the scale recommended by IUCN (2008) for assessing areas of occupancy.

Due to the specific rocky microhabitat conditions required, it seems unlikely that the distribution of the species will expand in the local area (NSW NPWS 2001).

## **Severe fragmentation:**

There is no information/evidence that this species is severely fragmented.

## **References:**

Armstrong JA (2002) *Zieria* (Rutaceae): a systematic and evolutionary study. *Australian Systematic Botany* **15**, 277-463.

Blakely WF (1941) Additions to the Australian flora. *Contributions from the National Herbarium of New South Wales* **1**, 123.

Briggs JD, Leigh JH (1990) 'Delineation of Important Habitats of Threatened Plant Species in South-Eastern New South Wales.' (Australian Heritage Commission: Canberra)

# NSW SCIENTIFIC COMMITTEE

IUCN (2008) 'Guidelines for using the IUCN Red List Categories and Criteria. Version 7.0.' (Standards and Petitions Working Group of the IUCN Species Survival Commission Biodiversity Assessments Sub-committee: Switzerland)  
(<http://intranet.iucn.org/webfiles/doc/SSC/RedList/RedListGuidelines.pdf>).

Jacobs SWL, Pickard J (1981) 'Plants of New South Wales: a census of the cycads, conifers, and angiosperms.' (National Herbarium of New South Wales, Royal Botanic Gardens: Sydney)

NSW NPWS (2001) 'Approved Recovery Plan for the Araluen Zieria (*Zieria adenophora*).'  
NSW NPWS, Hurstville.

## Explanatory note

Between 2007 and 2009 the NSW Scientific Committee undertook a systematic review of the conservation status of a selection of plant and animal species listed under the Threatened Species Conservation Act. This species summary report provides a review of the information gathered on this species at the time the Review was undertaken.

The Scientific Committee's report on the Review of Schedules project and final determinations relating to species that were either delisted or had a change in conservation status can be found on the following website: [www.environment.nsw.gov.au](http://www.environment.nsw.gov.au).

The Committee gratefully acknowledges the past and present Committee members and project officers who ably assisted the Committee in undertaking the Review of Schedules Project. Information on the people involved in the project can be found in the Acknowledgement section of the project report entitled "Review of the Schedules of the Threatened Species Conservation Act 1995. A summary report on the review of selected species" which is available on the abovementioned website.

This species summary report may be cited as:

NSW Scientific Committee (2008) *Zieria adenophora*. Review of current information in NSW. June 2008. Unpublished report arising from the Review of the Schedules of the Threatened Species Conservation Act 1995. NSW Scientific Committee, Hurstville.

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