

# NSW SCIENTIFIC COMMITTEE

## *Zieria buxijugum* J.D. Briggs & J.A. Armstrong (Rutaceae)

### Review of Current Information in NSW

June 2008

#### **Current status:**

*Zieria buxijugum* (Box Range *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 buxijugum* 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 buxijugum* is described in Armstrong (2002) as follows: "Erect shrub up to 3.5 m; young branches terete, densely tuberculate and covered with a velvety indumentum of short stellate hairs throughout; older branches less conspicuously tuberculate, glabrescent. Leaves palmately trifoliolate, opposite, petiolate. Petiole 2.0-5.0 mm long, tuberculate, pubescent all over with a dense velvety indumentum of very short stellate hairs. Central leaflet linear to narrow oblanceolate (7.0) 15.0-28.0 (41.0) x (1.5) 2.0-3.0 (4.0) mm, dull grey-green above, pale green below; upper surface tuberculate, with a fine velvety indumentum of very short stellate hairs, midrib conspicuously sunken, lateral veins slightly sunken; under surface tuberculate, with a dense velvety indumentum of short stellate hairs; apex obtuse; margin entire, recurved; primary vein prominent on under surface, densely stellate-pubescent, with numerous tubercles; secondary venation slightly raised but largely obscured on under surface. Secondary leaflets similar to central leaflet but smaller, usually 0.6--0.8 times as long. Inflorescence an axillary cyme, as long as or longer than the leaves (2) 10-16 (28)-flowered. Peduncle (3) 4-10 mm (15) long, densely tuberculate, densely pubescent with short stellate hairs. Bracts persistent (2 bracts are present on the peduncles of juvenile inflorescences, only I bract or bracteole is present at each node in mature inflorescences), linear to oblanceolate, 1.0-5.0 x 0.5-1.0 mm, sparsely tuberculate. Pedicel terete, 1.0-1.5 mm long, not tuberculate, densely stellate hairy, subtended at the base by a pair of minute bracts. Flowers white, moderately conspicuous, 6.0-7.0 mm diameter. Calyx lobes deltoid, 0.8-1.0 x 0.6-0.8 mm, very much shorter than the petals, tuberculate, hirsute adaxially, densely pubescent abaxially with very short stellate hairs. Petals imbricate in bud, ovate-elliptic to broad oblanceolate, 3.5-4.0 x 1.5-2.0 mm, with a very small inflexed acuminate tip; adaxial surface moderately to sparsely stellate-pubescent; abaxial surface tuberculate, densely stellate-pubescent, Stamens not persisting in the fruiting stage; filaments 0.8-1.0 mm long, glabrous, not tuberculate; anthers 0.4 x 0.4 mm, not apiculate, attached in the lower third, orange-red in colour (cream in dry state). Disc interrupted and distinct, glabrous, white. Ovary dotted with pellucid oil glands, glabrescent. Stigma 0.3 mm broad, 4-lobed. Fruit red-brown when young, becoming green-brown to green at maturity, densely tuberculate (i.e. glands obvious on carpel surface),

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with sparsely scattered stellate hairs when young, becoming glabrescent at maturity. Cocci lacking an appendage. Seed dark brown to dark grey-brown, striate, 1.8-2.0 x 1.0-1.3 mm; covering to the raphe shiny black and striate, not smooth, Seed surface: ridges well-developed but flattened; branches and cross-ridges not common; wax absent. Elaiosome 2.0 x 0.8 mm.”

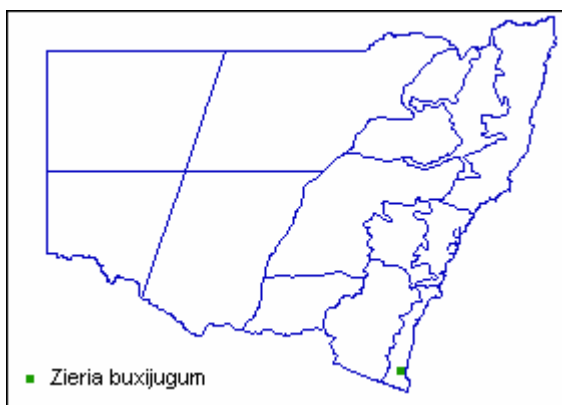
## Taxonomy:

The species was described by J. D. Briggs & J. A. Armstrong and has been known by a number of informal names, including: ‘*Z. buxijugum* J. D. Briggs & J. A. Armstr. ms (Parris 9079)’ (Armstrong & Harden 2002); ‘*Z. sp. G*’ (Armstrong 1991); ‘*Z. sp. 14*’ (Briggs & Leigh 1988) and ‘*Z. sp. P* (Box Range North)’ (expert advice). *Zieria buxijugum* is closely related to *Z. formosa*, from which it is distinguished by the absence of small terminal appendages on its anthers and narrower leaflets (2-3 mm wide *cf.* 3-5 mm wide in *Z. formosa*).

## Distribution and number of populations:

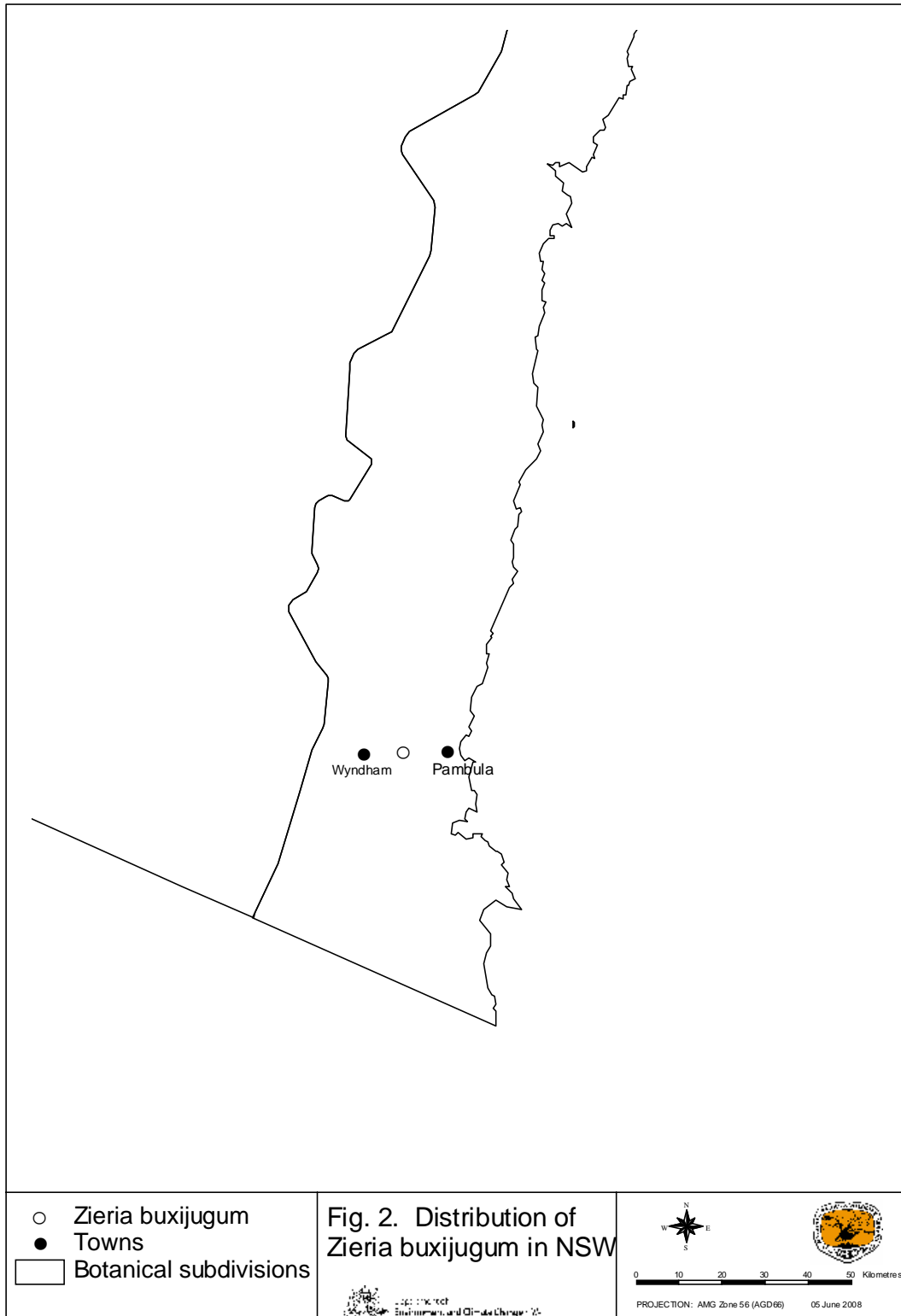
*Zieria buxijugum* is known from a single population on an ignimbrite rock outcrop west of Pambula on the far south coast of NSW (Briggs & Leigh 1990, Armstrong 2002; Armstrong & Harden 2002; NSW NPWS 2002). This population occurs on private freehold land, adjacent to a State Forest and close to grazing land (Briggs & Leigh 1990; Armstrong 2002; NSW NPWS 2002).

This species was discovered in 1986 during a botanical survey in the area. Extensive searches of similar habitat in the region by several botanists failed to locate other populations (Briggs & Leigh 1990; Armstrong 2002; expert advice).



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

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## **Ecology:**

### Key habitat requirements

*Zieria buxijugum* is known from one population occurring near the top of a steep east-facing ignimbrite rock outcrop with an altitude of 290m. The soil is skeletal brown loam and contains a high content of organic matter (Briggs & Leigh 1990; Armstrong 2002; NSW NPWS 2002). It grows in shrubby heath dominated by *Melaleuca armillaris* (Bracelet Honey-myrtle) and has a sparse shrub layer including *Cassinia longifolia* (Shiny Cassinia), *Plectranthus parviflorus* (Cockspur Flower), *Olearia iodochroa* (Violet Daisy-bush), *Platysace lanceolata* (Shrubby Platysace) and *Dendrobium speciosum* (Rock Lily) (Briggs & Leigh 1990). The shrub community is surrounded by *Eucalyptus sieberi* (Silver-top Ash) – *E. muelleriana* (Yellow Stringybark) open-forest (Briggs & Leigh 1990; Armstrong 2002; Armstrong & Harden 2002; NSW NPWS 2002).

### Life history

*Zieria buxijugum* flowers prolifically in September (NSW NPWS 2002; Armstrong 2002). It is thought to be pollinated by insects such as native bees, hover flies and blowflies (NSW NPWS 2002). Fruiting begins in November; they develop quickly and by the end of December the majority of the seed is shed (NSW NPWS 2002; Armstrong 2002). There is little data on the longevity of this species in the wild but it is estimated to live for around 30-50 years (expert advice). The age to maturity is around 10 years (expert advice). The generation length (IUCN 2008) of the species is therefore estimated to be around 20 to 30 years.

### **Number of mature individuals:**

When *Z. buxijugum* was first surveyed in 1987 there were an estimated 68 adult plants (those of more than 1 m in height) in the population (Briggs & Leigh 1990). In February 1999 the population had increased to 121 adults (NSW NPWS 2002). In April 2001, however, the population had declined to only 32 adult plants. This reduction was a result of mortality attributed to drought and browsing by wallabies (NSW NPWS 2002). By October 2001 these ongoing threats resulted in the population declining further, with only 10 adults remaining (expert advice). When the population was last surveyed in October 2002, there were six adult plants (and 74 smaller plants). To combat browsing, wire-mesh guards have been constructed around selected plants.

The current adult population is estimated to be 20 – 30 assuming the caged plants have survived (expert advice).

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## **Threats:**

The main threat to this species is severe browsing by swamp wallabies (*Wallabia bicolor*). Wallabies are known to inhabit the bushland where this species exists and feed on the nearby pasture at night (Armstrong 2002). Wallabies were apparently not a significant threat until the winter 2000 when drought resulted in an increased browsing pressure. The local population of wallabies is likely to have increased as a result of the surrounding area being cleared and pasture established (NSW NPWS 2002). Plants over 2 m tall are less vulnerable to heavy browsing than smaller plants (NSW NPWS 2002). The small population size and restricted area exposes this species to very high risks of extinction through events such as wildfire, and severe drought.

## Recovery actions undertaken:

In April 2001, NSW NPWS installed 10 wire mesh guards around selected *Z. buxijugum* plants to protect them from browsing by wallabies. The plants chosen for protection were scattered across the site, with the aim of ensuring a source of seed-producing plants would remain across the site in case there are further severe browsing events. If further severe browsing does occur, it is expected that protection of some large seed-producing plants will assist future seedling recruitment and population recovery.

## **Extreme fluctuations:**

There is no information/evidence of this species experiencing extreme fluctuations.

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

Until the winter of 2000 this species had been experiencing an increase in numbers. However, as a result of drought, browsing pressure increased and *Z. buxijugum* became vulnerable to swamp wallaby browsing. Between 1999 and October 2002 (the last time surveyed) the population had been reduced by 95% (from 121 to six adults) (NSW NPWS 2002, expert advice).

As a result of tree-guards that have been installed, it is likely that the population would now have increased. This outcome is unknown however, as the population has not been checked for five years (expert advice). Even if the population has increased, there remains an inferred risk of decline as the guards are very infrequently assessed and, unless they are maintained to stop wallaby browsing, it is highly likely the population will continue to decline.

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

The EOO and AOO are estimated to be less than 4 km<sup>2</sup> as the entire population of the species falls within a single 2 x 2 km grid cell (the scale recommended by IUCN (2008) for assessing areas of occupancy).

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## Severe fragmentation:

All individuals are found in one small subpopulation. Although there has been clearing of some native vegetation in the vicinity, the species population is not severely fragmented.

## References:

- Armstrong JA (1991) *Zieria*. In 'Flora of New South Wales, Volume 2'. (Ed. GJ Harden) pp. 236-246 (NSW University Press: Kensington, NSW)
- Armstrong JA (2002) *Zieria* (Rutaceae): a systematic and evolutionary study. *Australian Systematic Botany* **15**, 277-463.
- Armstrong JA, Harden GJ (2002) *Zieria*. In 'Flora of New South Wales, Volume 2'. (Ed. GJ Harden) pp. 277-288 (NSW University Press: Kensington, NSW)
- Briggs JD, Leigh JH (1988) 'Rare or Threatened Plants: 1988 Revised Edition.' (Australian National Parks and Wildlife Service: Canberra)
- Briggs JD, Leigh JH (1990) 'Delineation of Important Habitats of Threatened Plant Species in South-Eastern New South Wales.' (Australian Heritage Commission: Canberra)
- 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>).
- NSW NPWS (2002) 'Draft Recovery Plan for *Zieria formosa*, *Zieria buxijugum* and *Zieria parrisiae*.' 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 buxijugum*. 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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