

**Advice to the Minister for the Environment, Heritage and the Arts
from the Threatened Species Scientific Committee (the Committee)
on Amendment to the list of Threatened Species
under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)**

1. Scientific name (common name)

Darwinia sp. Muceha (B.J.Keighery 2458) (Muceha Bell)

2. Reason for Conservation Assessment by the Committee

This advice follows assessment of information gathered through the Commonwealth's Species Information Partnership with Western Australia, which is aimed at systematically reviewing species that are inconsistently listed under the EPBC Act and relevant Western Australian legislation/lists.

The Muceha Bell is listed as Declared Rare Flora under the Western Australian *Wildlife Conservation Act 1950* and is managed as endangered (according to IUCN criteria) by the Western Australian Government. The Committee provides the following assessment of the appropriateness of the species' inclusion in the critically endangered category in the EPBC Act list of threatened species.

This is the Committee's first consideration of the species under the EPBC Act.

3. Summary of Conclusion

The Committee judges that the species has been demonstrated to have met sufficient elements of Criterion 2 to make it **eligible** for listing as **critically endangered**.

The Committee judges that the species has been demonstrated to have met sufficient elements of Criterion 3 to make it **eligible** for listing as **endangered**.

The highest category for which the species is eligible to be listed is **critically endangered**.

4. Taxonomy

The species is conventionally accepted as *Darwinia* sp. Muceha (B.J.Keighery 2458) (CHAH 2008, Australian Plant Census).

5. Description

The Muceha Bell is a tangled, domed shrub growing to 0.6 m high. This species has green flowers and the flowering period is from October to November (WA Herbarium, 2006).

6. National Context

The Muceha Bell is endemic to Western Australia. It has been recorded at three locations near the town of Muceha, approximately 70 km north of Perth. It is located within the Swan Natural Resource Management Region. This species is listed as Declared Rare Flora under the Western Australian *Wildlife Conservation Act 1950* and is managed as endangered by the Western Australian Government.

7. Relevant Biology/Ecology

The Muehea Bell grows in grey-white sand on swampy, seasonally wet sites. Plants are found alongside sump land, that is, land acting as a pit or well where water collects (CALM, 2006). The flowering period for this species is from October to November. The pollinating mechanism is unknown, however field evidence suggests that the species reseeds after fire and is therefore likely to be a disturbance opportunist (Evans et al., 2003).

8. Description of Threats

The primary current threat to the Muehea Bell is grazing by rabbits. Other threats include weed invasion, changes in hydrology, inappropriate fire regimes and dieback caused by the root-rot pathogen, *Phytophthora cinnamomi*, although the impact of *Phytophthora cinnamomi* on this species is currently unknown.

Weed infestations have been observed adjacent to some of the Muehea Bell populations. Weeds suppress early plant growth by competing for soil moisture, nutrients and light. They also may exacerbate grazing pressure and may increase the fire hazard due to the easy ignition of high fuel loads, which are produced annually by many weed species. The species that potentially pose the greatest threat to the Muehea Bell populations are likely to be grass species such as wild oats (*Avena* sp.) and veldt grass (*Ehrharta* sp.) (CALM, 2006) and also Arum lilies (*Zantedeschia aethiopica*).

Changes in hydrology are a potential threat as the species depends on seasonally moist soil, therefore if the water table either rises or falls inconsistently with historic seasonal flow, it may result in the death of plants. Installation of water bores, clearing of vegetation, drought and irrigation may cause changes in local hydrology. Drought may also impact upon this species.

Inappropriate fire regimes are a further potential threat as mature plants are killed by fire and the species recruits by soil-stored seed following fire. Frequent fires may prevent the accumulation of sufficient seed, and/or reduce the vigour of the adult plants (CALM, 2006).

An additional historic and potential threat is vegetation clearance, which has occurred within the species' range since the 1960s. The Muehea Bell is known to occur close to tracks and firebreaks, where accidental destruction of plants may occur during track or firebreak maintenance (CALM, 2006).

9. Public Consultation

The information used in this assessment was made available for public exhibition and comment for 30 business days. No comments were received.

10. How judged by the Committee in relation to the criteria of the EPBC Act and Regulations

The Committee judges that the species is **eligible** for listing as **critically endangered** under the EPBC Act. The assessment against the criteria is as follows:

Criterion 1: It has undergone, is suspected to have undergone or is likely to undergo in the immediate future a very severe, severe or substantial reduction in numbers

There are insufficient data to determine historic or current population trends in the Muchea Bell. However, some historic decline is known to have occurred, through the clearing of one known population that was recorded in 1960 (CALM, 2006). There are no data indicating the size of this population and therefore what proportion of the species was cleared. The Muchea Bell is known from three isolated populations that consisted of at least 1300 mature individuals in 2006 (DEC, 2008). A full survey was conducted in 2001 and additional plants were found in one of the populations in 2002 (CALM, 2006), however a survey in 2006 found no mature individuals at one of the populations where mature individuals had previously been recorded.

It is likely that there has been a decline in the species' numbers in more recent times, due to grazing by rabbits, weed invasion, changes in hydrology, inappropriate fire regimes, further vegetation clearance and dieback caused by *Phytophthora cinnamomi*, which may continue in the future. However, there are no quantitative data available to judge whether this decline has been very severe, severe, substantial or not substantial. Although the Committee judges that the species is likely to undergo a reduction in numbers, there are insufficient data available to judge whether this reduction would be very severe, severe, substantial, or not substantial. Therefore, the species has not been demonstrated to have met each of the required elements of Criterion 1, and is **not eligible** for listing in any category under this criterion.

Criterion 2: Its geographic distribution is precarious for the survival of the species and is very restricted, restricted or limited

The Muchea Bell has been recorded at three locations near the town of Muchea, approximately 70 km north of Perth (CALM, 2006). The species' distribution is very restricted and fragmented, as the known populations are small and exist within patches of remnant vegetation surrounded by cleared land (CALM, 2006). The species also has very specific habitat requirements, depending on swampy, seasonally wet habitat.

The extent of occurrence for the Muchea Bell has been estimated to be 1.2 km². There are insufficient data to calculate the actual area of occupancy but it is estimated to be approximately 0.03 km². The species' geographic distribution is considered to be very restricted given that the known populations are surrounded by cleared land and require seasonally wet, swampy sites.

As discussed under Criterion 1, the Muchea Bell is likely to have experienced a historic decline and this decline may continue due to current and potential threats. Despite evidence of grazing by rabbits, there is no quantitative information on the impact of grazing on the species, or what proportion of the populations are being grazed.

The Committee considers that the species has a very restricted geographic distribution, which is precarious for the survival of the species due to the population being fragmented and the current threat of grazing by rabbits and potential threats of weed invasion, changes in hydrology, inappropriate fire regimes, vegetation clearance and dieback caused by *Phytophthora cinnamomi*. Therefore, the species has been demonstrated to have met the relevant elements of Criterion 2 to make it **eligible** for listing as **critically endangered**.

- Criterion 3: The estimated total number of mature individuals is limited to a particular degree; and either**
- (a) evidence suggests that the number will continue to decline at a particular rate; or**
 - (b) the number is likely to continue to decline and its geographic distribution is precarious for its survival**

The estimated total number of mature individuals is at least 1300, which the Committee considers to be low. Ongoing threats such as grazing by rabbits and potential threats of weed invasion, changes in hydrology, inappropriate fire regimes, vegetation clearance and dieback caused by *Phytophthora cinnamomi* may cause this number to decline further. The geographic distribution is considered precarious for the species' survival, given its fragmented populations, and restrictive habitat requirements.

The Committee considers that the estimated total number of mature individuals of the species is low; and the number is likely to decline in the future. The Committee also considers that the species' geographic distribution is precarious for its survival. Therefore, the species has been demonstrated to have met the relevant elements of Criterion 3 to make it **eligible** for listing as **endangered**.

- Criterion 4: The estimated total number of mature individuals is extremely low, very low or low**

The estimated total number of mature individuals of the Muchea Bell is at least 1300.

For the purposes of Criterion 4, the Committee does not consider that the estimated total number of mature individuals of the species is extremely low, very low or low. Therefore, as the species has not been demonstrated to have met any required element of Criterion 4, it is **not eligible** for listing in any category under this criterion.

- Criterion 5: Probability of extinction in the wild that is at least:**

- a) 50% in the immediate future; or**
- b) 20% in the near future; or**
- c) 10% in the medium-term future.**

There are insufficient data available to estimate a probability of extinction of the species in the wild over a relevant timeframe. Therefore, as the species has not been demonstrated to have met the required elements of Criterion 5, it is **not eligible** for listing in any category under this criterion.

11. CONCLUSION

Conservation Status

This advice follows assessment of information gathered through the Commonwealth's Species Information Partnership with Western Australia, which is aimed at systematically reviewing species that are inconsistently listed under the EPBC Act and the Western Australian *Wildlife Conservation Act 1950*.

The Committee accepts that there has been a decline in the number of mature individuals but notes that this decline is historic and unquantified. The Committee further accepts that the extent of occurrence is 1.2 km² and area of occupancy is 0.03 km², which represents a very restricted geographic distribution. This geographic distribution is considered precarious for the survival of the species given the ongoing threats, the species' fragmented population and its limited capacity for dispersal given it is restricted by narrow habitat requirements. Therefore, the species has been demonstrated to have met sufficient elements of Criterion 2 to make it **eligible** for listing as **critically endangered**.

The Committee accepts that the estimated total number of mature individuals is at least 1300. For a species with likely ongoing decline in numbers, a fragmented population and a very restricted location, this is judged by the Committee to be low for the purpose of this criterion. Given its geographic distribution is also precarious for its survival, the species has been demonstrated to have met sufficient elements of Criterion 3 to make it **eligible** for listing as **endangered**.

The highest category for which the species is eligible to be listed is **critically endangered**.

Recovery Plan

The Committee considers that there should not be a recovery plan for this species.

The approved conservation advice for the species now provides sufficient direction to implement priority actions and mitigate against key threats. A recovery plan is not considered to be necessary at this time.

12. Recommendations

- (i) The Committee recommends that the list referred to in section 178 of the EPBC Act be amended by **including** in the list in the **critically endangered** category:

***Darwinia* sp. *Muchea* (B.J.Keighery 2458) (*Muchea* Bell)**

- (ii) The Committee recommends that there should not be a recovery plan for this species.

Associate Professor Robert J.S. Beeton *AM FEIANZ*

Chair

Threatened Species Scientific Committee

13. References cited in the advice

CALM (2006). Records held in CALM's Declared Flora Database and rare flora files. WA Department of Conservation and Land Management.

Council of Heads of Australian Herbaria (2008). Australian Plant Census. IBIS database. Centre for Plant Biodiversity Research. viewed 15 June 2007, <http://www.chah.gov.au/apc/index.html>.

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Evans R, Willers N and Mitchell D (2003). Threatened flora of Swan Region. Unpublished report to the Department of Conservation and Land Management, and Environment Australia.

Western Australian Herbarium (2006). FloraBase – The Western Australian Flora. Department of Conservation and Land Management. Available on the Internet at: <http://florabase.calm.wa.gov.au/>