

# NSW SCIENTIFIC COMMITTEE

## *Gentiana bredboensis* L. Adams (Gentianaceae)

### Review of Current Information in NSW

November 2008

#### **Current status:**

*Gentiana bredboensis* (Bredbo Gentian) is currently listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act). The NSW Scientific Committee recently determined that *Gentiana bredboensis* 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:**

*Gentiana bredboensis* is described by Harden (1996) as follows: “Annual or possibly biennial herb 2–9 cm high, glabrous; stem usually many-branched, minutely scabrous; basal leafless portion very short. Basal leaves 3–6 pairs, sessile, broad-ovate, 8–20 mm long, 8–12 mm wide, margins smooth to minutely scabrous; cauline leaves 3–6 pairs, becoming smaller and thicker up stem, 6–15 mm long and 5–8 mm wide. Flowers 1–6 per plant. Calyx 5–8 mm long; ribs narrow-winged; lobes 2.5–3.5 mm long. Corolla 8–10 mm long, pinkish ribbed outside, pure white inside; lobes spreading, 2–4 mm free. Stipe elongating to 2.5 mm in fruit. Capsule oblong-ovoid, 5–6 mm long.”

#### **Taxonomy:**

*Gentiana bredboensis* was described in 1988 by L. Adams. It is one of four species of *Gentiana* within NSW, with the others being; *G. baeuerlenii*, *G. wissmannii* and *G. wingecarribiensis*. *G. bredboensis* can be distinguished from these species by its following characters: longer basal leaves (mostly 10–20 mm), leaf apex acute or acuminate, usually mucronate; corolla lobes white inside; corolla folds lacerate or mostly 2-lobed; anthers c. 1 mm long; fruiting stipe 2.5 mm long (Harden 1992).

#### **Distribution and number of populations:**

*Gentiana bredboensis* is known only from a single population, in the Monaro Region on the NSW Southern Tablelands (Figure 1). The species is confined to a small section of the Bredbo River on private property.

When this species was first discovered in 1967, two other small patches existed, each located a couple of hundred metres from the Type locality on the adjacent property (expert advice). By 1999 these colonies/subpopulations had disappeared, probably as a result of changes to the land management (including changes in stocking rates) (Hogbin 2002).

In November 2008, searches conducted along the river on the adjoining property did not find any additional individuals of the species and the habitat in the area was found to be heavily infested

# NSW SCIENTIFIC COMMITTEE

with exotic grasses, and not supporting the short herbfield vegetation that occurs at the Type locality (expert advice).

Potential habitat may exist on another adjacent property but this has not been confirmed (expert advice).



**Figure 1.** Location of *Gentiana bredboensis* in NSW

## **Ecology:**

### Key habitat requirements

*Gentiana bredboensis* grows along the margin of very wet seepage slopes in pasture on granitic sandy soil (Harden 1996). The species grows in short herbfield communities amongst *Baeckea-Leptospermum* thickets (DECC 2005).

### Life History

*Gentiana bredboensis* is an annual herb. During September and October single small bell-shaped flowers are produced (DECC 2005). These flowers are pinkish on the outside and pure white within and only open in periods of sunshine (Harden 1996). The generation length (IUCN 2008) for this species is estimated to be one to two years (expert advice).

## **Number of mature individuals:**

A survey undertaken in November 2008 found a population of 20 plants (expert advice).

## **Threats:**

The known threats to this species are:

- Trampling by stock: When this species was first discovered the area was grazed by sheep (expert advice Nov. 2008). However, in more recent years the area is grazed by cattle, at least once a year (expert advice). Cattle have recently been given access to the site again (within the last month) and damage to the habitat has been observed (expert advice Nov. 2008).

# NSW SCIENTIFIC COMMITTEE

- Habitat destruction by feral pigs: Recent habitat damage caused by feral pigs has been observed (expert advice Nov. 2008). 'Predation, habitat degradation, competition and disease transmission by Feral Pigs, *Sus scrofa*' is listed as a Key Threatening Process in NSW under the TSC Act.
- Habitat clearing: Small-scale clearing may be undertaken in the area to increase access and pasture for livestock grazing. 'Clearing of native vegetation' is listed as a Key Threatening Process in NSW under the TSC Act.
- Competition from exotic pasture species.
- Use of fertiliser for improvement of adjacent pastures: This is likely to exacerbate invasion of weed species in the riparian habitat.
- Vulnerability to demographic and environmental stochasticity, as this species is known only from a single location.

Potential threats include:

- Frequent fires: ACTCE (2004) recommends that there is fire no more than once every six years. 'High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition' is listed as a Key Threatening Processes in NSW under the TSC Act.
- Changes in hydrology: As this species grows in periodically waterlogged areas, changes in stream flow in the Bredbo River associated with climate change or water extraction may result in drying of the habitat. 'Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands' and 'Anthropogenic Climate Change' are listed as a Key Threatening Processes in NSW under the TSC Act.

## **Recovery actions:**

Negotiations for protection of the site are being undertaken by Bush Heritage. Fencing of site is currently being arranged (expert advice Nov. 2008).

## **Extreme fluctuations:**

There is no information/evidence of this species experiencing extreme fluctuations. However, given its annual or biennial life-cycle, it is likely that considerable fluctuations occur in the population over short time scales.

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

When this species was first collected in 1967, the population contained several hundred plants (expert advice). In 2002, when the NSW conservation status of this species was reviewed (and subsequently upgraded from Vulnerable to Endangered), the population was estimated to be 50-200, and two colonies/subpopulations had gone extinct (Hogbin 2002). A survey conducted in late 2007 estimated the population to be 30-40 plants (expert advice). A year later a survey was conducted and the population had decreased to 20 mature individuals, as a result of habitat

# NSW SCIENTIFIC COMMITTEE

damage caused by cattle and feral pigs (expert advice Nov. 2008). The appropriate timeframe over which to measure decline for this species is 10 years (the minimum time frame when three 'generation lengths' are less than 10 years' duration, IUCN 2008). From 2002 (six years) to present the population has declined from between 60 and 90%. In the last year the population experienced a decline of 33 – 50 %.

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

Currently the plants cover a much smaller area (of no more than 30 m<sup>2</sup>) than when the species was first discovered (expert advice May 2008).

Based on 2 x 2 km grid cells (the spatial scale of assessment recommended by IUCN (2008)) the AOO and EOO are likely to be no greater than 4 km<sup>2</sup>.

## **Severe fragmentation:**

All individuals are known from one population and there is no evidence that the natural habitat has been fragmented. This species has undergone a reduction in area of occupancy, but this would not be considered 'smaller than would be required to support a viable population' (IUCN 2008). Hence, there is no evidence that the population of *G. bredboensis* is severely fragmented.

## **References:**

- ACTCE (2004) 'State of the Environment Report, Fire management in threatened ecological communities and threatened species.' ACT Commissioner for the Environment, Canberra.
- Adams LG, Williams, JB (1988) *Gentiana* sect. *Chondrophyllae* (Gentianaceae) in Australia. *Telopea* **3**, 167-176.
- DECC (2005) Bredbo Gentian – profile, viewed November 2008,  
<http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/profile.aspx?id=10346>
- Harden GJ (1992) *Gentianaceae*. In 'Flora of New South Wales, Vol. 3.' (Ed. GJ Harden) pp. 508-512. (University of NSW Press: Kensington, NSW)
- Hogbin P (2002) 'Review of the Threatened Species Conservation Act Flora Schedules: recommendations to the Scientific Committee. Final Summary Report.' NSW NPWS, Hurstville.
- 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 Scientific Committee (2003) '*Gentiana bredboensis* - Endangered species determination - Final.' DEC, Sydney.

# NSW SCIENTIFIC COMMITTEE

## 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) *Gentiana bredboensis*. Review of current information in NSW. November 2008. Unpublished report arising from the Review of the Schedules of the Threatened Species Conservation Act 1995. NSW Scientific Committee, Hurstville.