

THREATENED SPECIES SCIENTIFIC COMMITTEE

Established under the *Environment Protection and Biodiversity Conservation Act 1999*

The Minister's delegate approved this Conservation Advice on 01/04/2016.

Conservation Advice

Euphrasia crassiuscula subspecies *glandulifera*

thick eyebright

Conservation Status

Euphrasia crassiuscula subspecies *glandulifera* (thick eyebright) is listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act). The subspecies is eligible for listing as prior to the commencement of the EPBC Act, it was listed as Vulnerable under Schedule 1 of the *Endangered Species Protection Act 1992* (Cwlth).

The main factors causing the subspecies to be eligible for listing in the Vulnerable category are its limited number of mature individuals (< 10 000) and its limited geographic distribution which is precarious for its survival based on the number of mature individuals in each subpopulation (< 1000).

The thick eyebright is listed as threatened under the Victorian *Flora and Fauna Guarantee Act 1988* and as Vulnerable under the non-statutory Advisory List of Rare or Threatened Plants in Victoria.

Description

The thick eyebright is a perennial, semi-parasitic herb, to 20 cm (rarely 30 cm) tall with many crowded ascending branches rising from a reduced stem. Glandular hair length and density varies are short to long on lowest leaves and parts of the branches. Leaves are opposite, ovate or elliptic, to about 13 x 8 mm, with margins bearing 1-3 pairs of teeth. Flowers appear in summer and are pale to deep lilac or purple, rarely white. The flowers bear anthers with connectives surrounded by long, usually dense hairs. Fruit is an ovoid capsule slightly compressed laterally, to about 8.5 mm long and 3.2 mm broad (Barker 1982; Walsh & Entwisle 1999).

Distribution

The thick eyebright is endemic to Victoria, where it occurs in the north-east near Mt Bogong and Mt Nelse, at altitudes ranging from 1800 m to 1950 m (Walsh & Entwisle 1999), in the Australian Alps IBRA Bioregion (DEH 2000). Prior to the 2003 bushfires, there were known to be three populations of thick eyebright, containing about 1300 plants, occurring in the following locations within the Alpine National Park (Carter et al., 2006):

- Quartz Ridge, west side of walking track from Bogong Creek Saddle to Mt Bogong: about 150 plants in 0.5 ha.
- Hooker Plateau, Mt Bogong, both sides of walking track between Hooker Plateau and Mt Bogong central: about 450 plants in 9 ha.
- Mt Nelse, Bogong High Plains: about 700 plants in 3 ha.

At least three additional populations described by Barker (1983) may occur, however these populations have not recently been confirmed (Carter et al., 2006).

Two populations were affected by the 2003 bushfires (DSE 2008) in which a 50 percent loss of individuals in these populations is estimated to have occurred (N. Walsh pers. comm., cited in DSE 2008). The current abundance of thick eyebright is unknown.

Relevant Biology/Ecology

In Australia, the genus *Euphrasia* occurs frequently in environments where light levels are very high (Potts 1999).

The thick eyebright occurs in low open to closed alpine heath. Associated species include *Asterolasia trymalioides* (alpine starbush), *Aciphylla glacialis* (mountain celery), *Celmisia pugioniformis* (slender snow-daisy), *Craspedia aurantia*, *Craspedia maxgrayi*, *Grevillea australis* (alpine grevillea), *Kunzea muelleri*, *Leucopogon montanus*, *Orites lancifolia* (alpine orites) and *Poa hiemata* (soft snowgrass). Plants occurred in shallow alpine loams derived from sedimentary substrate, on gentle to steep (approximately 10–40°) slopes, on eastern aspects at all three sites (Carter et al., 2006).

The effect of fire on alpine *Euphrasia* species including thick eyebright is unknown (DSE 2008).

Threats

Table 1 – Threats impacting the thick eyebright in order of severity of risk, based on available evidence.

Threat factor	Threat type	Threat status	Evidence base
Fire			
Altered fire frequency / intensity	potential / known	current	It is estimated that two populations were reduced by 50 percent in the 2003 bushfires (N. Walsh pers. comm., cited in DSE 2008). The threat is inferred as the long term effect of fire on the subspecies is unknown (Carter et al., 2006; DSE 2008).
Habitat loss, disturbance and modifications			
Trampling	potential / known	current	The populations at Quartz Ridge and Hooker Plateau/Mt Bogong are located adjacent to walking tracks and some plants are at risk from trampling by recreational walkers (Carter et al., 2006).
Invasive species (including threats from grazing, trampling, predation)			
Weed invasion	potential	current	Populations at Quartz Ridge and Hooker Plateau/Mt Bogong are at risk of weed invasion due to proximity to walking tracks, where the seeds of invasive species can be dispersed by recreational walkers. The risk of weed invasion is considered low; however, the orange hawkweed (<i>Hieracium aurantiacum</i>) has been identified as a high risk species in the Alpine

			National Park (DSE 2008).
Grazing by cattle	potential	past	The subspecies is likely to be palatable to cattle (DSE 2008). Grazing by cattle may have historically threatened the subspecies (Carter et al., 2006).
Climate change			
Increased temperature, altered precipitation and altered seasonality	potential	future	<i>Euphrasia</i> species may tolerate interannual climatic variation (J Morgan pers. comm. 2016). However, the long term capacity of <i>Euphrasia</i> species to tolerate and/or adapt to climatic factors such as increased temperature, altered precipitation and altered seasonality is unknown. Climate change is an inferred threat for thick eyebright (Carter et al., 2006; DSE 2008).

Conservation Actions

Conservation and Management priorities

Fire

- Develop an appropriate fire management regime for protection of key habitat including buffers to prevent wildfire or managed fire from impacting populations.
- Provide maps of population sites to local and state Rural Fire Services and seek inclusion of mitigation measures in bush fire risk management plan/s, risk register and/or operation maps.

Habitat loss, disturbance and modifications

- Prevent habitat disturbance. Control access to populations at Quartz Ridge and Hooker Plateau/Mt Bogong by installing fences around sites and/or caging plants most susceptible to damage and/or installing educational signage, to prevent accidental trampling by people using walking tracks.

Invasive species (including threats from grazing, trampling, predation)

- Manage sites by hand removal to identify, control and reduce the spread of invasive weed species.
- Identify and undertake weed control in the local area that could become a threat to the subspecies, using appropriate methods including hand removal and spot spraying. Consider the possible disturbance/overspray threats associated with the control method.
- The tolerance of thick eyebright and associated native plant species to herbicides is unknown and weed control programs should be undertaken in conjunction with research.

Breeding, propagation and other *ex situ* conservation action

- Maintain the seed stored in the Victorian Conservation Seedbank.
- Develop effective propagation and cultivation techniques for an *ex situ* cultivation program.

- Establish cultivated plants *ex situ* for inclusion in living collections, to safeguard against any unforeseen destruction of wild populations.

Stakeholder Engagement

- Liaise with the Victorian Government Department of Environment, Land, Water and Planning (formerly the Department of Sustainability and Environment), Parks Victoria and the Royal Botanic Gardens.
- Erect appropriate conservation signs to educate the public using tracks in the Quartz Ridge and Hooker Plateau/Mt Bogong areas.
- Encourage formal links with local naturalist groups and interested individuals.

Survey and Monitoring priorities

- Design and implement a monitoring program to more precisely assess population size, distribution, population structure, recruitment and the relative impacts of threatening processes by monitoring weed invasion and disturbance to plants near walking tracks.
- Monitor the progress of recovery, including the effectiveness of management actions and adapt them if and when necessary.
- Undertake survey work in suitable habitat and potential habitat to locate any additional populations/occurrences/remnants.

Information and research priorities

- Investigate options for linking, enhancing or establishing additional populations.
- Undertake research to identify stimuli for recruitment and regeneration.
- Identify the effect of disturbance regimes on the subspecies, in particular the effect of varying fire frequency and intensity.
- Undertake seed germination and/or vegetative propagation trials to determine the requirements for successful establishment.

References cited in the advice

Barker, W. R. (1982). Taxonomic studies of *Euphrasia* L. (Scrophulariaceae). A revised infrageneric classification and a revision of the genus in Australia. *Journal of the Adelaide Botanic Gardens* 5, 1-304.

Carter, O., Walsh, N. & Murphy, A. H. (2006). National Recovery Plan for the Thick Eyebright *Euphrasia crassiuscula* subspecies *glandulifera*. Department of Sustainability and Environment. Victorian Government, Melbourne.

Department of Environment and Heritage (DEH) (2000). Revision of the Interim Biogeographic Regionalisation of Australia (IBRA) and the Development of Version 5.1. - Summary Report. Department of Environment and Heritage, Canberra.

Department of Sustainability and Environment (DSE) (2008). Action Statement. Thick Eyebright *Euphrasia crassiuscula* subsp. *glandulifera*. Victorian Government, Melbourne

Potts W. C. (1999). Threatened Tasmanian Lowland *Euphrasia* Species Recovery Plan 1997 – 2001. Nature Conservation Branch, Resource Conservation Division, Department of Primary Industries, Water and Environment, Hobart.

Walsh, N. G., & Entwisle, T. J. (1999). Flora of Victoria, Volume 4: Dicotyledons: *Cornaceae* to *Asteraceae*. Inkata Press, Melbourne.

Other sources cited in the advice

Morgan, J. W. (2016). Personal communication, 12 February 2016, La Trobe University.