

Action Statement

Flora and Fauna Guarantee Act 1988

No. 230

Thick Eyebright

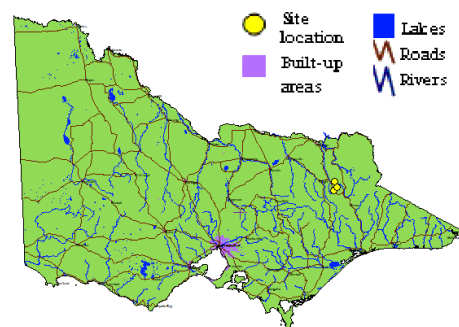
Euphrasia crassiuscula subsp. *glandulifera*

This Action Statement is based on a draft Recovery Plan prepared for this species by DSE under contract to the Australian Government Department of the Environment, Water, Heritage and the Arts.

Description

Thick Eyebright (*Euphrasia crassiuscula* subsp. *glandulifera*) is a perennial, semiparasitic herb, to 20 cm (rarely 30 cm) tall, with many crowded ascending branches rising from a reduced stem. The leaves are opposite, ovate or elliptic, to about 13 x 8 mm; the leaf margins bear 1-3 pairs of teeth. The glandular hairs are short to long, and may be sparse to dense on the lowest leaves and parts of the branches. The flowers are pale to deep lilac or purple, rarely white. The flowers bear anthers with connectives surrounded by long, usually dense hairs. Flowering occurs in summer. The fruit is an ovoid capsule which is slightly compressed laterally, and grows to approximately 8.5 mm long and 3.2 mm wide (Barker 1982; Walsh & Entwisle 1999).

Three subspecies of *Euphrasia crassiuscula* have been described by Barker (1982): subsp. *crassiuscula*, subsp. *glandulifera*, and subsp. *eglandulosa*. All three subspecies are confined to mountain areas in the Victorian Alps (Barker 1982). They are distinguished from other Australian species of *Euphrasia* by their conspicuous dense long woolly fringe of glandular hairs, which often lines the leaves, bracts and calyces (Barker 1982). *E. crassiuscula* subsp. *glandulifera* differs from *E. crassiuscula* subsp. *eglandulosa* in having dense hairs on the back of the anthers (Barker 1982). *E. crassiuscula* subsp. *glandulifera* and *E. crassiuscula* subsp. *crassiuscula* both have densely haired anther backs. However, *E. crassiuscula* subsp. *crassiuscula* only has glandular hairs on the corolla, while *E. crassiuscula* subsp. *glandulifera* has glandular hairs on the axes and leaves of lower parts, sometimes extending to upper leaves (Barker 1982).



Distribution in Victoria
(Flora Information System DSE 2007)

Distribution

Thick Eyebright is confined to areas near Mount Bogong and Mount Nelse at approximately 1800-1950 m above sea level (Walsh & Entwisle 1999; N. Walsh pers. obs.).

Abundance

It is estimated that 1116-1130 individuals exist. These plants occur in three populations. At least three further populations are described by Barker (1983), but have not been recently confirmed. The extent of range and abundance of Thick Eyebright prior to European settlement is unknown.

Important populations

Important populations necessary to the long term

survival and recovery of Thick Eyebright occur in the following locations within the Alpine National Park:

- Quartz Ridge, west side of foot track from Bogong Creek Saddle to Mt Bogong (~150 plants in an area approximately 100 x 50 m.).
- Hooker Plateau, Mt Bogong, both sides of walking track between Hooker Plateau and Mt Bogong central (~420 plants in an area approximately 300 x 300 m).
- Mt Nelse, Bogong High Plains (~550-730 plants in an area approximately 300 x 100 m).

Habitat

Populations of Thick Eyebright occur in low, open to closed alpine heath. Associated species present at all known recently confirmed sites include Alpine Star-bush (*Asterolasia trymalioides*), Slender Snow-daisy (*Celmisia pugioniformis*), Alpine Grevillea (*Grevillea australis*) and Soft Snow-grass (*Poa hiemata*). Other associated species include Snow Aciphyll (*Aciphylla glacialis*), Orange Billy-buttons (*Craspedia aurantia*), Silver Billy-buttons (*C. maxgrayi*), Yellow Kunzea (*Kunzea muelleri*) Snow Beard-heath (*Leucopogon montanus*) and Alpine Orites (*Orites lancifolia*). Soils tend to be shallow alpine loams derived from sedimentary substrate. Topography varies from gentle to steep (approximately 10° - 40°).

Apparently identical habitat to that of known populations on two hills north of Mt Nelse (includes Mt Nelse North and intervening knoll) were searched in 2003 by N. Walsh but no plants of *E. crassiuscula* subsp. *glandulifera* were found. *E. crassiuscula* subsp. *eglandulosa* was abundant on eastern aspects of all three hills.

Life history and ecology

Little is known of the ecology of high altitude *Euphrasia* species including Thick Eyebright. This species, however, is likely to be palatable to livestock. Grazing was excluded from the Mt Nelse population in 1991, and is currently excluded from all known Thick Eyebright sites.

Conservation status

National conservation status

Thick Eyebright is listed as vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Victorian conservation status

Thick Eyebright has been listed as threatened under the Victorian *Flora and Fauna Guarantee Act 1988*.

It is considered vulnerable in Victoria according to DSE's *Advisory List of Rare or Threatened Vascular Plants in Victoria - 2005* (DSE 2005).

Potentially threatening processes

There were approximately 1,116-1,300 plants known in three wild populations immediately prior to the bushfires of January 2003. Two of these populations were significantly affected by the fires, but at least one population appeared to be regenerating well in 2005. Given the restricted habitat of *Euphrasia crassiuscula* subsp. *glandulifera*, climate change caused by global warming is the most critical threatening process acting upon populations.

The impacts of recent fires on Thick Eyebright populations are currently unknown and should be investigated. The 2003 bushfires have caused the apparent loss of approximately 50 percent of individuals within these populations (Neville Walsh, pers. comm.), but the long term response of these populations is unknown. Some lowland *Euphrasia* species may require fire for germination or maintenance of habitat. Little is known, however, of the effects of fire on alpine and sub-alpine *Euphrasia* species.

Inappropriate fire regimes

Recent bushfires in the region have led to a loss of 50 percent of the populations.

Weed invasion

Populations situated close to walking tracks may be highly susceptible to weed invasion due to the accidental dispersal of seeds by recreational walkers. Weeds are not generally a major problem in intact vegetation of alpine areas in Victoria, but the recent expansion of Orange Hawkweed (*Hieracium aurantiacum*) has been identified as a high risk species in the Alpine National Park.

Global warming

Global warming could lead to the extinction of this taxon.

Previous management action

- Habitat has been surveyed, and floristic and environmental information was collected.
- Life history stages, recruitment and dispersal mechanisms have been identified at known sites.
- Impacts of the January 2003 fires have been assessed. A Bushfire Recovery program has been initiated to monitor and manage weed invasions.
- Population and line monitoring have been established at key sites, and populations were counted and regeneration measured following the 2003 fires.

Long term objective

To ensure that the Thick Eyebright can survive, flourish and retain its potential for evolutionary development in the wild.

Specific objectives, actions and targets

The intended management actions listed below are further elaborated in DSE's Actions for Biodiversity Conservation (ABC) system. Detailed information about the actions and locations, including priorities, is held in this system and will be provided annually to land managers and other authorities.

Objective I To increase knowledge of biology, ecology and management requirements

Action	Targets	Responsible
1. Acquire baseline population data. Conduct detailed field and desk top surveys including identification of the area and extent of the population; estimates of the number, size and structure of the population; and inference or estimation of population change.	<ul style="list-style-type: none"> ▪ Updated records on all state databases (Flora Information System, VROTPop and Herbarium) ▪ Target populations accurately mapped. 	DSE, Parks Victoria
2. Assess habitat characteristics and/or condition. Accurately survey known habitat, and collect and analyse floristic and environmental information relevant to community ecology and condition.	<ul style="list-style-type: none"> ▪ Requirements for completion of essential life history stages, recruitment and dispersal identified at known sites. ▪ Core habitat mapped. 	DSE, Parks Victoria
3. Conduct survey to locate suitable habitat. Identify and survey potential habitat using ecological and bioclimatic information that may indicate habitat preference.	<ul style="list-style-type: none"> ▪ Predictive model for potential habitat developed and tested. 	DSE, Parks Victoria
4. Identify disturbance regimes to maintain habitat or promote regeneration and recruitment. Slashing should initially only be applied to a small areas to reduce the risk of potentially damaging a whole population.	<ul style="list-style-type: none"> ▪ The impact of the January 2003 Alpine National Park fires on all three known populations assessed. ▪ The effects of slashing on track-side populations at Quartz Ridge and Hooker Plateau determined. 	DSE
5. Undertake research to identify key biological functions. Evaluate current reproductive/regenerative status, seed bank status and longevity, fecundity, and recruitment levels by conducting field based experimental trials. Determine seed germination requirements by conducting laboratory and field trials aimed to identify key stimuli and determine stimuli for vegetative regeneration.	<ul style="list-style-type: none"> ▪ Seed bank/regenerative potential quantified for target populations. ▪ Stimuli for recruitment/regeneration identified. ▪ Management strategies identified to maintain, enhance or restore regenerative processes fundamental to reproduction and survival. 	DSE, Royal Botanic Gardens

6.	Analyse population trends. Measure population trends and responses against recovery actions by collecting demographic information including recruitment and mortality, timing of life history stages and morphological data. Collate, analyse and report on census data and compare with management histories.	<ul style="list-style-type: none"> ▪ Techniques for monitoring developed and implemented. ▪ Census data for target populations collected. ▪ Population growth rates determined. ▪ Population Viability Analysis completed for targeted populations. 	DSE
Objective II To secure populations or habitat from potentially incompatible land use or catastrophic loss.			
Action			
7.	Establish cultivated plants <i>ex situ</i> to safeguard from the unforeseen destruction of the wild population.	<ul style="list-style-type: none"> ▪ Development of effective propagation and cultivation techniques. ▪ At least 30 mature plants in cultivation. 	DSE, Royal Botanic Gardens
Objective III To improve the condition of habitat			
Action			
8.	Manage environmental weeds.	<ul style="list-style-type: none"> ▪ Threat posed by weeds, particularly Orange Hawkweed, remains low. 	Parks Victoria
Objective IV To increase the number of populations or individuals			
Action			
9.	Store reproductive material. Establish a seed bank.	<ul style="list-style-type: none"> ▪ Long-term storage facility identified. ▪ Seed from target populations in storage. 	DSE, Royal Botanic Gardens
10.	Determine seed viability.	<ul style="list-style-type: none"> ▪ Seed viability determined. 	Royal Botanic Gardens
Objective V To increase community awareness and support			
Action			
11.	Involve community groups and volunteers in recovery activities.	<ul style="list-style-type: none"> ▪ Opportunities for involvement identified, promoted and supported. 	DSE

References

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- Potts W.C. (1999) *Threatened Tasmanian Lowland Euphrasia Species Recovery Plan 1997 - 2001*, Nature Conservation Branch, Resource Conservation Division, DPIWE, Hobart.
- Walsh, N.G. & Entwisle, T.J. (1999) *Flora of Victoria, Vol 4: Dicotyledons: Cornaceae to Asteraceae*, Inkata Press, Melbourne.

This Action Statement has been prepared under section 19 of the Flora and Fauna Guarantee Act 1988 under delegation from Mr Peter Harris, Secretary, Department of Sustainability and Environment, July 2008.

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