

Action Statement

Flora and Fauna Guarantee Act 1988

No. 180

Bellarine Yellow Gum

Eucalyptus leucoxylon subsp. *bellarinensis*

Description and distribution

The Bellarine Yellow Gum *Eucalyptus leucoxylon* F. Muell subsp. *bellarinensis* K. Rule is a small mallee-like, multi-trunked tree to 12 m high (Rule 1998). The bark is box-like in appearance on the base and lower trunk, light brown to grey brown, fibrous and persistent. The bark on the upper trunk is smooth, mottled white and grey. Juvenile leaves are frequently connate, opposite and sessile, broadly ovate, blue-grey in colour and waxy. Cream flowers occur from April to May and large hemispherical fruits are borne on markedly long pedicels. The globular buds often have prominently beaked opercula (for a detailed description see Rule 1998).

This taxon has recently been described (Rule 1998) as a new subspecies of *Eucalyptus leucoxylon* due to morphological and geographical features that are distinct from other subspecies. Bellarine Yellow Gum's closest relatives are *Eucalyptus leucoxylon* subsp. *connata* Rule and *E. leucoxylon* subsp. *pruinosa* Boland. *Eucalyptus leucoxylon* subsp. *connata* occurs in less exposed subcoastal habitats and is smooth barked throughout. The buds have a shorter beaked operculum, with smaller fruits borne on shorter pedicels (Rule 1998). *Eucalyptus leucoxylon* subsp. *pruinosa* is also smooth barked with smaller adult leaves and a low frequency of connate pairs of juvenile leaves. The buds are smaller without a prominent beak and the small fruits are borne on shorter pedicels (Rule 1998).

The Bellarine Peninsula supports the only known locations of this subspecies. The sites occur in coastal regions close to Bass Strait. It is estimated that Bellarine Yellow Gum currently occupies approximately 110ha (Trenrove 2001); the main populations occur in the vicinity of Ocean Grove and Torquay with scattered occurrences in Wallington and Jan Juc.



The Bellarine Yellow Gum *Eucalyptus leucoxylon*



Distribution in Victoria

(from *Flora Information System*, DSE 2004)

The size of existing populations varies from 20 to 200 individuals, however most plants occur as isolated scattered trees. The populations of Bellarine Yellow Gum are severely fragmented with an estimated population reduction of 95% over the last three generations (DSE 2004).

Habitat

Bellarine Yellow Gum occurs in dry coastal and near coastal habitats and hence is influenced by environmental attributes such as coastal winds. Bellarine Yellow Gum occurs in the Grassy Woodland Ecological Vegetation Class that currently occupies 2% of its former range. The understorey structure of this grassy woodland would have consisted of a sparsely distributed shrub layer with a ground layer dominated by tussock grasses and herbaceous species. Bellarine Yellow Gum prefers heavy clay soils that are waterlogged in winter. This subspecies has been observed in association with various Eucalypts including *Eucalyptus viminalis* Labill., *Eucalyptus ovata* Labill. and *Eucalyptus camaldulensis* Dehnh., as well as *Allocasuarina* species.

Life history and ecology

The original extent and situation of the Bellarine Yellow Gum in the landscape is poorly known. The species distribution appears to be adjacent to areas of the related floristic communities Coastal Moonah Woodland and *Allocasuarina* Woodland, with some overlap occurring. Bellarine Yellow Gum can be dominant or co-dominant with other Eucalypt species in grassy woodland habitat.

Bellarine Yellow Gum is considered a long-lived tree. This species is winter flowering and it provides an important source of nectar during this period when little else is flowering. Pollination vectors are unknown, although pollination is thought to involve insects and nectarivorous birds. Seed dispersal is passive and wind-aided. Seed fall is greatest downwind of the parent tree and is likely to be dispersed one to three tree heights away. Like many other eucalypts it is likely to have fluctuations in annual seed production and thus heavy seed fall may be infrequent. Climatic factors such as water availability and temperature fluctuations are thought to influence seed production.

Little is known about the requirements for recruitment of this subspecies. Although seeds germinate and establish successfully under controlled conditions little germination has been observed in the field. Where recruitment has been observed it often follows a disturbance event, such as soil disturbance or fire. Attempts have been

made to recreate soil disturbance events at sites supporting *E. leucoxydon* subsp. *bellarinensis* but without subsequent germination success of note. The role of fire is unknown although regeneration has occurred after fire events. Weed invasion and soil compaction may be contributing to limited recruitment. Seed predation by ants may also limit regeneration in the absence of fire. Following fire, seed falls may be heavier or seed predation reduced, allowing for more abundant seedling establishment. Further research is required to determine optimum conditions for recruitment.

Conservation status

National conservation status

Bellarine Yellow Gum has not been listed under the Commonwealth **Environment Protection and Biodiversity Conservation Act 1999**.

Victorian conservation status

Bellarine Yellow Gum has been listed as 'threatened' under the **Flora and Fauna Guarantee Act 1988**.

Bellarine Yellow Gum is considered 'endangered' in Victoria according to 'Rare or Threatened Vascular Plants in Victoria - 2000' (DSE 2003).

Decline and threats

There are few extant populations of Bellarine Yellow Gum and those remaining include many trees with canopy dieback and have inadequate regeneration. Most occurrences of Bellarine Yellow Gum are of scattered mature individuals on the outskirts of developing townships, where clearing for residential development, infrastructure and agricultural activities have left remnants on roadsides, small nature reserves and farms. Most remnants are not reserved and are threatened by residential development.

Bellarine Yellow Gum recruitment is insufficient to adequately replace senescence of mature trees. In the Surf Coast Shire, for example, 86% of sites are without regeneration (Trengove 2001). The lack of suitable microsites for germination may be due to inappropriate disturbance regimes, weed invasion, stock grazing or soil compaction. There are suggestions that mature trees are not producing abundant viable seed (Trengove pers. comm.), which, if proven, may have implications for maintenance of genetic diversity within this taxon.

Existing mature plants are suffering from defoliation and dieback, the causes of which are unknown (SAC 1998). However, the abundance of Noisy Miners (with the consequent effects perhaps including modifying insect populations and depleting populations of insectivorous birds) and the degraded nature of the tree's habitats (through

weed invasion, surfactant pollution, stock grazing and trampling) may be contributing factors.

This species is declining in area, extent and quality of habitat, and in the number of sub-populations and mature individuals. Populations are highly fragmented and population sizes are often small, hence genetic diversity and therefore seed viability are of concern.

The frequent planting of specimen trees of *Eucalyptus leucoxylon* (almost invariably not subspecies *bellarinensis*) on roadsides and in private and public gardens on the Bellarine Peninsula has led to hybridisation between subspecies (Trenrove *pers. comm.*). Swamping of the relatively small gene pool (genetic pollution) of Bellarine Yellow Gum is therefore a major threat.

Existing conservation measures

There are few existing conservation measures for this subspecies. Extant populations of Bellarine Yellow Gum are predominantly on freehold land with scattered small populations on road, coastal and nature reserves.

- Some of the larger nature and coastal reserves have management plans that recognise the subspecies and its management requirements. However, it is unknown whether these recommendations have been implemented. Some roadside reserves have been fenced to exclude stock but no other management strategy appears to have been implemented. Signage of these sites is inadequate.
- Seed collection is undertaken each year but has proved to be difficult due to poor tree health and fluctuations in seed production. Few seed are stored, as the majority is propagated into tubestock for revegetation projects.

Conservation objectives

Long term objective

To ensure that the Bellarine Yellow Gum can survive, flourish and retain its potential for evolutionary development in the wild.

Objectives of this Action Statement

1. To protect key populations.
2. To secure habitat to allow natural recruitment within, and adjacent to, extant populations. Recruitment will need to be assisted in some circumstances.
3. To increase knowledge of the distribution, ecology and biology of Bellarine Yellow Gum.
4. To determine the nature and impact of canopy dieback on population dynamics and implement appropriate management actions.

Intended management actions

The intended management actions listed below are further elaborated in DSE's Actions for Biodiversity Conservation 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.

Site protection

1. Endeavour to protect and enhance stands of Bellarine Yellow Gum on private land by negotiating management agreements with landholders and providing incentives, such as rate rebates and fencing assistance.

Responsibility: DSE (Port Phillip Region), City of Greater Geelong, Surf Coast Shire

2. Develop and implement management plans for Crown land reserves and publicly owned freehold that support Bellarine Yellow Gum, including specific measures to protect and enhance populations.

Responsibility: DSE (Port Phillip Region), City of Greater Geelong, Surf Coast Shire

3. Include Bellarine Yellow Gum sites in Environmental Significance Overlays and applying planning restrictions to ensure their long-term protection.

Responsibility: City of Greater Geelong, Surf Coast Shire

4. Incorporate actions to protect, enhance and restore Bellarine Yellow Gum habitat into relevant Regional Catchment Strategies or their subordinate strategies via Biodiversity Action Plans. Implement these actions, according to priority, as resources become available, in conjunction with other agencies, community groups and landholders.

Responsibility: Port Phillip Catchment Management Authority

5. Erect signs to alert maintenance crews to the location, extent and significance of Bellarine Yellow Gum populations to prevent or minimise disturbance.

Responsibility: DSE (Port Phillip Region), City of Greater Geelong, Surf Coast Shire

6. Liaise with landholders adjoining Crown land reserve or roadside sites to prevent or minimise disturbance to Bellarine Yellow Gum populations.

Responsibility: DSE (Port Phillip Region)

7. Discourage the planting of other subspecies of Yellow Gum near stands of Bellarine Yellow Gum.

Responsibility: DSE (Port Phillip Region)

Site management

8. Assess the threat posed by weed infestations, especially exotic perennial tussock grasses, at Bellarine Yellow Gum sites and manage these where required.

Responsibility: DSE (Port Phillip Region), City of Greater Geelong, Surf Coast Shire

9. Fence Bellarine Yellow Gum stands to exclude domestic stock so as to encourage natural recruitment.

Responsibility: DSE (Port Phillip Region), City of Greater Geelong, Surf Coast Shire

10. Collect seed, propagate and plant Bellarine Yellow Gum to reinforce populations where natural recruitment is not adequate.

Responsibility: DSE (Port Phillip Region), City of Greater Geelong, Surf Coast Shire

Community information

11. Prepare community information materials, such as fact sheets, addressing topics including Bellarine Yellow Gum recognition, habitat restoration, community dynamics, recruitment, weed invasion, soil compaction and grazing.

Responsibility: DSE (Port Phillip Region), City of Greater Geelong, Surf Coast Shire

12. Involve community groups in conservation activities for Bellarine Yellow Gum, especially monitoring, propagation and planting

Responsibility: DSE (Port Phillip Region), City of Greater Geelong, Surf Coast Shire

Monitoring

13. Monitor all populations regularly using DSE's VROTPop system.

Responsibility: DSE (Port Phillip Region), City of Greater Geelong, Surf Coast Shire

Research

14. Undertake and / or support research into the following aspects of Bellarine Yellow Gum:

- assess the role and impact of fire on recruitment. Assessments of seed viability, hybridisation with other subspecies and genetic diversity should also be undertaken.
- determine the availability of pollinators and success of flowering, pollination, seed set and viability.
- initiate a long term monitoring experiment to determine the causes and management actions required for canopy dieback.
- define the habitat of Bellarine Yellow Gum and its associated floristic community to give a better understanding of ecosystem processes and inform site selection for future planting.

- develop experiments to determine the most effective methods for species' establishment and the requirements for long-term survival.
- undertake studies in south-west Victoria to determine the relationships between the various subspecies and their distribution.

Responsibility: DSE (Biodiversity and Natural Resources Division)

References

- DSE (2003) *Advisory List of Rare or Threatened Plants in Victoria - 2003*. Department of Sustainability and Environment: East Melbourne. (available on the DSE web site)
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- Rule K. (1998). A new, rare Victorian subspecies of *Eucalyptus leucoxylon* F. Muell. *Muelleria*. **11**: 133-136.
- SAC (1998). Final Recommendation on a nomination for listing: Bellarine Yellow Gum *Eucalyptus leucoxylon* subsp. *bellarinensis* (Nomination No. 435). Flora and Fauna Guarantee, Scientific Advisory Committee, Department of Natural Resources and Environment: Melbourne.
- Trengove, M. (2001). Bellarine Yellow Gums in the Surf Coast Shire. Surf Coast Shire.

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Further information can be obtained from Department of Sustainability and Environment Customer Service Centre on 136 186.

Flora and Fauna Guarantee Action Statements are available from the Department of Sustainability and Environment website: <http://www.dse.vic.gov.au>

This Action Statement has been prepared under section 19 of the Flora and Fauna Guarantee Act 1988 under delegation from Professor Lyndsay Neilson, Secretary, Department of Sustainability and Environment, September 2003.

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Published by the Department of Sustainability and Environment, Victoria. 8 Nicholson Street, East Melbourne, Victoria 3002 Australia

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ISSN 1448-9902