

THREATENED SPECIES SCIENTIFIC COMMITTEE

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

The Minister's delegate approved this conservation advice on 01/10/2015. Following a taxonomic revision, the name in the EPBC Act list of threatened species was updated to *Eucalyptus x phylacis* on 07/12/2016.

Conservation Advice

Eucalyptus phylacis

Meelup mallee

Conservation Status

Eucalyptus phylacis (Meelup mallee) is listed as endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act). The species is eligible for listing as endangered as, prior to the commencement of the EPBC Act, it was listed as endangered under Schedule 1 of the *Endangered Species Protection Act 1992* (Cwlth). It is listed as Declared Rare Flora under the *Western Australian Wildlife Conservation Act 1950*.

The main factors that are the cause of the species being eligible for listing in the endangered category are its very low number of mature individuals, as well as threats from insect damage, aerial canker, and inappropriate fire regimes, road maintenance activities, low genetic diversity, and poor regeneration.

Description

The Meelup mallee is a small tree that can grow up to five metres tall with distinctive coarse, loose bark overlying thick, corky bark. It is related to *E. decipiens* but differs in that its younger leaves are round, not notched, have larger fruit and larger, broadly cone-shaped buds (Brooker and Kleinig 1990). Adult leaves are a uniform in colour, faintly glossy blue-grey green. The blossoms and white flowers occur at the tips of its branches. (Brown et al., 1998). The species is confined to one genotype (Rosetto et. al. 1999 pp.321 – 331).

Distribution

Eucalyptus phylacis is endemic to the Meelup area of Western Australia. It is found on the crest of a near-coastal ridge, growing in loamy granitic and lateritic soils. Multiple stems originally thought to represent a number of mature plants are now considered to be parts of a 'super mallee' extending many metres (Rosetto et al., 1999 pp.321 – 331). As such the species is essentially represented by one plant, despite the above-ground presence of multiple mallee clumps in 4-5 distinct groups over ca. one-tenth of a hectare. In 2004, these clumps comprised 27 above ground stems — or "ramets" as they have been termed.

Threats

The threats operating include weeds, insect damage, aerial canker, and inappropriate fire regimes, low genetic diversity, poor regeneration, and road maintenance activities. The following table lists key threat factors with supporting evidence.

Threat factor	Threat type	Threat status	Evidence base
Inappropriate fire regimes	potential	future past	<p>It is likely that occasional fires are required for regeneration as with other mallee eucalypt species. However a large fire could be catastrophic for this species (Patten 2004)</p> <p>A severe wildfire in 2005, which destroyed the above-ground component of the entire population, resulted in the loss of three of the original ramets but also the re-sprouting of a ramet which was not documented prior to the fire Recovery plan review 2011¹</p>
Low genetic diversity	known	present	All known wild and micro-propagated plants originate from the one clone. Limited genetic diversity restricts the species' capacity to adapt to changes in its environment.
Insects/Disease	known	present	<p>The poor condition of the ramets circa. 2004 was due to the presence of borer and fungal pathogens (Recovery Plan review 2011)².</p> <p>Insect damage caused by <i>Phoracantha</i> sp. (Cerambycidae) (Longicorn or Longhorn beetles) and borers caused stress damage to all stems on some trees, while only one or two stems are affected on others.</p> <p>The beetle larvae damage has caused extensive fissures in the bark that has introduced a secondary fungal pathogen (Patten 2004). Aerial canker was another major threat to the <i>Eucalyptus phylacis</i> population as at 2004, with stem death evident and <i>Cytospora eucalylocoda</i>, <i>Botryosphaeria</i> sp., <i>Endotheilla</i>, and <i>Ravostrama</i> aerial canker fungi found (Patten 2004).</p> <p>Further monitoring undertaken in 2011 showed that pathogen problems identified above remained persistent threats to the population (B. Lullfitz)³</p>
Poor regeneration	known	present	Probably due to lack of fertile propagules, and/or appropriate disturbance, no natural regeneration of <i>Eucalyptus phylacis</i> has been observed. Bark splits and limb deaths are common, and the plants are old and senescing. The species is suspected to be a hybrid and to date has produced few viable seeds. The main method of regeneration of <i>Eucalyptus phylacis</i> is through resprouting. Lack of other regeneration threatens the health and resilience of the species (Patten 2004).
Weeds	known	present	Woody weed species were identified at the site in 2011 (B. Lullfitz, 2011) ⁴
Road maintenance activities	suspected	present	Road maintenance may threaten the <i>Eucalyptus phylacis</i> plants along the road verge. Threats include actions such as grading of road reserves and access tracks, spraying of chemicals, constructing drainage channels and slashing or completely removing the roadside vegetation to improve visibility (Patten 2004). These disturbance events also often encourage weed invasion into adjacent habitat, as well as causing damage to actual plants.

¹ 2011 review of the interim recovery plan, citing Meelup Mallee Recovery Team, 2005. Meelup Mallee (*Eucalyptus phylacis*) Annual Report. Department of Environment and Conservation, Perth.

² 2011 review of the interim recovery plan, citing the Department of Environment and Conservation, Threatened and Priority Flora Database; accessed 27th January 2011.

³ *Ibid.*

⁴ *Ibid.*

Dieback disease	potential	future	Dieback disease is present in the park in which the species occurs, but it has not been determined if the habitat of <i>Eucalyptus phylacis</i> or the plants themselves are infected with the disease (Patten 2004).
-----------------	-----------	--------	---

Conservation Actions

Conservation and Management Actions

Fire

It appears that *Eucalyptus phylacis* resprouts following fire, as vigorous coppice growth occurred at the base of a ramet burnt in 1985 (Pattern, 2004), and also following a fire simulation experiment in 2001.

- Prepare and incorporate a fire response strategy for the area containing *Eucalyptus phylacis* into the Blackwood District's Fire Control Working Plan.
- An Emergency Response Plan is required for *Eucalyptus phylacis*. Other fire fighting agencies should be informed of appropriate responses to fire threatening this site.
- Continue to maintain firebreaks to protect the site where the species occurs.

Poor genetic diversity and poor regeneration

- Collect fruits in order to obtain seeds for propagation.
- Develop a cryostorage protocol for long term storage of tissue cultured shoot apices.
- Undertake further seed and cutting collections.
- Should there be clear evidence to suggest lack of coppicing has led to a decline in the species, develop a program of gradual coppice treatment, where one or two individuals are coppiced in spring as plant health and conditions determine, in consultation with stakeholders and land managers.
- Collect *Eucalyptus phylacis* material for tissue culture and attempt propagation.

Insects/Disease

- Test samples of *Eucalyptus phylacis* for fungus for *Botryosphaeria* and *Cytospora* cankers.
- Investigate control methods for borers. Trial and monitor the application of insecticides and fungicides to determine effectiveness
- Use *ex-situ* examples of *Eucalyptus phylacis* (clones held by the Botanical Gardens and Parks Authority) to determine its susceptibility to *Phytophthora* sp. If *Eucalyptus phylacis* is shown to be susceptible to *Phytophthora* sp., the entire population is to be fenced to prevent the transfer of infected soils.
- Develop and implement disease hygiene measures to reduce the likelihood of introducing or amplifying the impacts of disease. Ensure dieback hygiene is adhered to for activities such as installation and maintenance of firebreaks and walking into the population in wet soil conditions.

Weeds

- Identify and remove woody weed species from the site and continue weed control after rehabilitation work is complete.

Habitat modification

- Raise awareness with the local council regarding the impact of road maintenance on the species. In consultation with land managers develop a management plan for activities in the area.

Stakeholder Management:

- Inform relevant stakeholders of the occurrence of the species as a starting point.
- Liaise with the current land managers, including the Meelup Regional Park Management Committee, to help ensure continued awareness of the population, so that it is not damaged or destroyed accidentally.
- Include in information provided to visitors to the site the need for the application of dieback hygiene procedures.

Produce materials to inform stakeholders about the species, which may include local print, electronic media, info sheets, fliers and poster displays promoting the importance of biodiversity conservation and the need for the long-term protection of *Eucalyptus phylacis* in the wild.

- Continue to encourage formal links with local naturalist groups and interested individuals.
- Identify and seek input from any Indigenous groups that have an active interest in areas that are habitat for *Eucalyptus phylacis*.

Survey and Monitoring priorities

- Monitoring of factors such as insect and canker damage, weed invasion, habitat degradation, population health and stability (expansion or decline), pollinator activity, seed production, recruitment, and longevity is essential.
- Adopt intensive monitoring protocols at an individual ramet level, which incorporate measures of population health including epicormic growth, weeds, grazing, insect damage, canker presence, and conduct monitoring periodically.
- Tag ramets and record data (including stem diameter at a height of 1.3m off the ground, the number, size and state of splits or lesions in the bark at various heights, any insect activity, and stem and leaf health), preferably twice annually.
- Encourage interested groups such as the Meelup Regional Park Management Committee, Wildflower Society members and Naturalists' Clubs to be involved in further surveys supervised by relevant managing staff where possible. These should be conducted during the species' flowering period (February to March).

Information and research priorities

Increased knowledge of the biology and ecology of the species provides a scientific basis for management of *Eucalyptus phylacis* in the wild. Investigations to include:

1. A study of the effect of disturbance (such as coppicing and fire), competition, rainfall and grazing on stem production.
 2. Determining reproductive strategies, phenology and seasonal growth.
 3. Determining time when flowering first occurs following disturbance, and the age at which stem splitting and senescence is reached
- As a starting point, refer to published work on *Eucalyptus phylacis*, including Bunn (2000) on cloning through tissue culture and Scott (2003) on possible causal agents of canker formation
 - Collate the intensive monitoring data gathered since the 2005 into a report⁵

⁵ 2011 review of the interim recovery plan, citing communication with Ben Lullfitz, Flora Conservation Officer, Blackwood District, Department of Environment and Conservation.

- Conduct morphological and genetic testing of the three seedlings produced in 2003, as well as any future seedlings produced to determine whether the seed was produced from *Eucalyptus phylacis* self pollinating, or outcrossing with another species.

References cited in the advice

- Bunn, E. (2000) Conservation of threatened mallees. In: *Friends of Kings Park Magazine: Special Western Power Parkland*. Issue 34; Kings Park and Botanic Garden.
- Department of Environment and Conservation (no date) 'Threatened and Priority Flora Database', accessed 27th January 2011.
- Meelup Mallee Recovery Team, (2005) 'Meelup Mallee (*Eucalyptus phylacis*) Annual Report' Department of Environment and Conservation, Perth.
- Patten, J. (2004) 'Meelup Mallee (*Eucalyptus phylacis*) Interim Recovery Plan 2004 – 2009', Western Australia: Department of Conservation and Land Management
- Robinson, R.M. and Spencer, M. (2004) 'Coppice treatment gives hope to rare and endangered mallee eucalypt in the south-west of Western Australia' *The Journal of the Royal Society of Western Australia*, Issue 1 2004, pp.109 – 114
- Rossetto, M., Jezierski, G., Dixon, K.W. and Hopper, S.D. (1999) Conservation genetics and clonality in two critically endangered eucalypts from the highly endemic south-western Australian flora. *Biological conservation* 88: pp. 321 – 331.
- Scott, P (2003) The analysis and identification of possible causal agents of canker formation in *Eucalyptus phylacis* (Meelup Mallee) from Cape Naturaliste in the south west of Western Australia. Murdoch University Honours Thesis.