

# THREATENED SPECIES SCIENTIFIC COMMITTEE

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

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

## Conservation Advice

### *Eucalyptus strzeleckii*

Strzelecki gum

#### Conservation Status

*Eucalyptus strzeleckii* (Strzelecki gum) is listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act). The species 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 that are the cause of the species being eligible for listing in the Vulnerable category are its limited geographic distribution, fragmentation and continuing decline due to a number of ongoing threats.

*Eucalyptus strzeleckii* (Strzelecki gum) is listed as threatened in Victoria under the *Flora and Fauna Guarantee Act 1988* and as Vulnerable under the non-statutory *Advisory list of rare or threatened plants in Victoria*.

#### Description

The Strzelecki gum is a member of the swamp gum group, probably most closely related to *Eucalyptus ovata* and *E. brookeriana* (Rule 1992). It is a medium to tall forest tree growing to approximately 30 m high, identifiable from the glaucous (waxy) new growth that gives a blue-grey colouring to the crown. The species has small ovoid buds, and fruit that is broader than it is long. The species has loose, rough bark at the base of a whitish-grey, with red mottling, trunk (Carter 2006; Ecology Australia 2006; Rule 1992; Walsh & Entwistle 1996). Adult leaves are 15 x 25 mm, lanceolate or ovate, asymmetrical, dark green and glossy (Carter 2006; Ecology Australia 2006).

Immature trees may have copious fibrous grey-brown bark on the trunk, and alternate, glossy green leaves (that vary from ovate to elliptical) that are darker on one side than the other (Carter 2006; Ecology Australia 2006).

#### Distribution

The Strzelecki gum is endemic to the Strzelecki Ranges, in Gippsland, Victoria. It extends north to Neerim South, south to Foster, east to Woodside – Yarram area, and west to Western Port Bay – Bass River area (Carter 2006; MEL undated; Rule 1992; VIC DSE 2008). In 1999, the species was found just south of Hillend, Victoria, and also on the Moonlight Head track, within the Otway Ranges National Park. These occurrences may be naturalized populations from forestry activities (Victorian Workshop 2000, pers. comm.). The Strzelecki gum also occurs on private property at Darham and south-east of Morwell (Carr 2000, pers. comm.).

Distribution of Strzelecki gum is severely fragmented, with most populations now being found in small, isolated pockets in road reserves or private property, with little recruitment being noted (VIC DSE 2008). Approximately 50 populations are known, though many more single paddock trees or small stands in road reserves are also known (Carter 2006).

The population is estimated to be between 3300–4500, though small occurrences of the species throughout its range may increase the population to 5000–15 000 plants (Carter 2006). Herbarium records indicated that the species was 'locally common' at some sites (MEL undated). In the 1990s it was relatively common and widespread, although sporadic, in south-

west Gippsland. In areas such as Korumburra and Poowong only individuals or small groups of trees dot the landscape, indicative of the past, apparently extensive populations (Rule 1992).

Two populations of unidentified size are known in reserves:

- 15 ha Koonwarra Fish Bed Geological Reserve, approximately 3 km south-east from Koonwarra township.
- 11 ha Wonwron Flora Reserve, approximately 5 km south-west from Woodside. This population represents the western-most known occurrence of the species (MEL undated).

### Relevant Biology/Ecology

*Eucalyptus strzeleckii* favours a range of sites including ridges, slopes and along the banks of streams, but particularly foothills and flats (Schinagl et al. 2014). Its preferred soils are grey, deep, fertile loams which are seasonally waterlogged. In a few cases it occurs on undulating or flat terrain close to creeks on the periphery of the ranges (Rule 1992). Herbarium specimens indicate an association with heavy clay loam and alluvial soils (MEL undated). Associated eucalypts include *E. viminalis*, *E. ovata*, *E. obliqua*, *E. globulus*, *E. Radiata* and *E. regnans*. Other commonly associated species include *Melaleuca ericifolia*, *Lepidosperma elatius* and *Poa labillardierei*, particularly on moist flats (Anon 1995).

The Strzelecki Ranges is a cretaceous sandstone formation of rolling hills fanning out from two central ridges, with annual rainfall in excess of 1000 mm over much of the area.

The Strzelecki gum flowers in spring and ripe fruit has been collected in November (Rule 1992).

Many of the existing populations are dominated by mature, senescing trees in highly degraded habitats and recruitment of the species is rarely observed. In one study of stands with recruitment occurring, areas that had been recently burnt (within the past five years) had 15 times the number of Strzelecki gum recruits. Disturbance by flooding may also be positively associated with recruitment. Litter cover, habitat quality and density of intermediate-sized Strzelecki gums were all strong positive predictors for the density of Strzelecki gum recruits (Schinagl et al. 2014).

### Threats

Table 1 – Threats

Threat factor	Threat type	Threat status	Evidence base
Impacts of domestic species			
Grazing and trampling	known	current	Domestic stock congregate in stands of Strzelecki gum damaging paddock trees by rubbing (in some cases causing ringbarking). Seedling recruitment is reduced by grazing. Trampling damages root systems and causes soil compaction, leading to changes in the habitat (Carter 2006).
Invasive species			
Weed invasion	known	current	This is a major threat, particularly on private land (Carter 2006). Blackberry ( <i>Rubus fruticosus</i> spp. agg.), English ivy ( <i>Hedera helix</i> ) and Cape ivy ( <i>Delairea odorata</i> ) are capable of invading and drastically altering the understorey of areas where Strzelecki gum is dominant (Anon 1995). Competition with weeds for light, water or nutrients may also prevent seedling recruitment. (Carter 2006). Pasture weeds include white

			clover ( <i>Trifolium repens</i> ), canary grass ( <i>Phalaris aquatica</i> ), brome ( <i>Bromus sp.</i> ), and spear thistle ( <i>Cirsium vulgare</i> ) (Carter 2006; VIC DSE 2008). A study by Moxham and Dorrough (2008) found that, even with the removal of grazing, seedling recruitment into stands of Strzelecki gum was reliant on control of competing vegetation such as weeds.
Habitat loss, disturbance and modifications			
Habitat loss	known	past current	The habitat favoured by Strzelecki gum includes deep rich fertile soils that are also favoured for agriculture such as grazing. In many sites, generally only large remnant trees remain, and seedling recruitment is uncommon (Anon 1995). In 1994, the flora of the Tarwin River catchment was surveyed, using data in Rule (1992). It was noted that this was the stronghold of Strzeleckii gum, and the species was 'rare and endangered', and that as a plant community, it may be locally extinct (David & Paget 1994).
Road works	known	current	Individual or small groups of Strzelecki gum have been removed during road works, and this is an ongoing threat, particularly in relation to roadside populations and isolated paddock trees (Carter 2006).
Firewood	known	current	Individual or small groups of Strzelecki gum have been removed for firewood and this is an ongoing threat, particularly in relation to roadside populations and isolated paddock trees (Carter 2006).
Changes to hydrology	potential	future	The reliance of Strzelecki gum on damp sites, especially along small watercourses, makes it quite susceptible to any alteration of local hydrology, such as draining or impounding streams, or altering upstream water sources (Carter 2006).
Agricultural activities	potential	future	Increased nutrient levels from fertiliser application and animal manure may be a threat, especially through enhancing pasture and weed growth. Runoff with elevated nutrient levels poses a potential threat to streamside populations (Carter 2006).
Habitat loss	potential	future	Loss of climatic habitat is a major potential threat, with raised temperatures, reduced rainfall, and increased climatic variability, resulting in long-term drying out of many Strzelecki gum sites.
Fire			
Fire frequency	potential	future	Strzelecki gum grows in habitats that are seasonally wet and probably quite susceptible to fire. However, the physical effects of fire on Strzelecki gum survival and recruitment are unknown (Carter 2006).
Breeding			
Loss of genetic diversity	known	current	The isolation of stands from one another and subsequent lack of gene flow is a long-term threat. Seed collection from only one tree and subsequent revegetation efforts may also compromise the genetic diversity of this species (Carter 2006).

## **Conservation Actions**

### **Conservation and Management priorities**

#### Impacts of domestic species

- If livestock grazing occurs in the area, ensure land owners/managers use an appropriate management regime and density that does not detrimentally affect this species to allow regeneration from seedlings and manage total grazing pressure at important sites through exclusion fencing or other barriers.
- Develop and implement a stock management plan for Strzelecki gum for road side verges and travelling stock route. Distribute this information to drovers and graziers in the area to increase awareness of the species requirement.

#### Invasive species

- Undertake weed control in the local area that could become a threat to the Strzelecki gum, using appropriate methods hand weeding and herbicide spraying. Consider the possible disturbance/overspray threats associated with the control method.

#### Habitat loss, disturbance and modifications

- Prevent habitat disturbance. Control access routes by installing and pacing signs on gates to suitably constrain stock and public access to known sites on public land and manage access on private land and other land tenure, to prevent damage to trees, tree removal and firewood collection.
- Establish and/or maintain a public land protected area network for threatened taxa within the Baw Baw Shire and South Gippsland Shires.
- Ensure 'Sites of Environmental Significance' overlays are incorporated into council planning schemes within Baw Baw Shire, Shire of South Gippsland and City of Latrobe.
- Establish and/or maintain a Special Protection Zone established in Wonwron State Forest, if the previously recorded population is rediscovered there.
- Ensure land managers are aware of the species' occurrence and provide protection measures against key and potential threats.
- Identify sites on private land that may be suitable for establishment of a private land protected area network for threatened taxa.
- Preparation of management prescriptions using soil disturbance techniques to promote germination at Hawkey Rd, Koonwarra – Tarwin River Crossing, and Coal Creek Hillside and Bass River.
- Provide maps and raise awareness of the species location to local councils undertaking road maintenance activities.

#### Breeding, propagation and other exsitu recovery action

- Evaluate current reproductive/regenerative status determining seed bank status and longevity, fecundity and recruitment.
- Quantify seed bank/regenerative potential for three important populations.
- Determine seed germination requirements by conducting field trials aimed to identify key stimuli, and determine stimuli for vegetative regeneration.

- Management strategies identified to maintain, enhance or restore processes fundamental to reproduction and survival.

#### Fire

- Implement an appropriate fire management regime for protecting key habitat includes ensuring buffers to prevent wildfire or managed fire from impacting the habitat unless prescribed fire is being used following sound scientific evidence of the critical need for such a prescribed fire.
- Critically, any use of prescribed or experimental fires must be very well justified, and is typically an action of last resort. It must have a carefully planned weed management strategy and demonstrated funding to ensure post-fire monitoring and control actions occur (e.g. weed control based on sound scientific evidence).
- Provide maps of known occurrences 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.

#### Stakeholder Engagement

- Relevant stakeholders are local people, private landowners, public land managers, drovers (travelling stock routes), the general public, developers.
- Identify opportunities for community involvement in the conservation of the Strzelecki gum, including undertaking presentations to community nature conservation groups.
- Inform private landholders of fencing incentives that may be provided by the State government and the threatened species network.

#### **Survey and Monitoring priorities**

- Acquire baseline population data by conducting detailed field and desk top surveys including (a) identification of the area and extent of populations; (b) estimates of the number, size and structure of populations and (c) estimation of population change.
- Accurately survey known habitat and collect floristic and environmental information relevant to community ecology and condition.
- Identify and survey potential habitat, using ecological, historical and anecdotal information that may indicate habitat preference.
- Map sites supporting potential habitat.
- Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.

#### **Information and research priorities**

- Investigate options for linking, enhancing or establishing additional populations.
- Identify essential life history stages and recruitment and dispersal processes.
- Identify stimuli for recruitment/regeneration in-situ.
- Undertake seed germination and/or vegetative propagation trials to determine the requirements for successful establishment.
- Develop and implement monitoring techniques.

- Measure population trends and responses against recovery actions by collecting demographic information including recruitment and mortality, timing of life history stages and morphological data.
- Determine growth rates and complete Population Viability Analysis for targeted populations.
- Implement an annual census to monitor emergence and resprouting success.
- Collate, analyse and report on census data and compare with management histories.
- Fire trials should only be undertaken as a last resort when all other means of regeneration of the species has been investigated and, in addition, all weed management and fire impacts including the timing of fire impacts are fully understood.

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