



FLORA & FAUNA
GUARANTEE

FLORA AND FAUNA GUARANTEE - SCIENTIFIC ADVISORY COMMITTEE

FINAL RECOMMENDATION ON A NOMINATION FOR LISTING

Mountain Ash Forest Community

Date of receipt of nomination: 14 November 2016
Date of preliminary recommendation: 4 December 2017
Date of final recommendation: 8 August 2019

File No.: FF/54/3752

Validity: The nomination is for a valid item.

Prescribed Information: The prescribed information was provided.

Name of the Nominator is adequately provided.

Name of the Item is adequately provided.

The nominated community is adequately defined and described according to accepted practice, and described in such a way as to be distinguished from all other communities.

Description of the community

Mountain Ash Forest Community is contained within the Ecological Vegetation Class defined as Wet Forest (EVC 30), which is characterised by a eucalypt overstorey often more than 30 m tall with scattered understorey trees over a broad-leaved shrubby understorey and a moist, shaded, fern-rich ground layer that is usually dominated by tree-ferns; with tree canopy cover of 40% (DELWP 2016). The Mountain Ash Forest Community can be distinguished from the broader classification of Wet Forest EVC based on the presence of a distinct Mountain Ash *Eucalyptus regnans* dominated overstorey.

Mountain Ash Forest Community occurs in fertile, well-drained loamy soils and is largely restricted to protected sites in gullies and on southern aspects of hills and mountains where rainfall is high and cloud cover at ground level is frequent (DELWP 2016) at altitudes between 85 and 1,380 m above sea level in mesic conditions favourable for tree growth (Mackey et al. 2002). The climate is typically characterized by mild, humid winters with occasional periods of snow, generally cool summers, mean annual temperature varying from 7.2 to 14.1°C and mean annual precipitation varying from 815 to 1775 mm (Burns et al. 2015).

Mountain Ash Forest Community is well described in the scientific literature e.g. Burns et al. (2015) and Mueck (1990). While many of the characteristic plant species listed below may occur within other forest communities, they do not occur under a Mountain Ash dominated overstorey anywhere else in Victoria.

The Mountain Ash Forest Community is generally dominated by a uniform single-species Mountain Ash overstorey, however the overstorey can also comprise other tree species such as Alpine Ash *E. delegatensis* and Shining Gum *E. nitens* at higher elevations, or Messmate *E. obliqua* Mountain Grey Gum *E. cypellocarpa* and Red Stringybark *E. macrorhyncha* at lower elevations (Burns et al. 2015).

A range of plant species can occur in the midstorey layer of the community. These include Myrtle Beech *Nothofagus cunninghamii*, Southern Sassafras *Atherosperma moschatum*, Silver Wattle *Acacia dealbata*, Forest Wattle *Acacia frigescens* and Mountain Hickory Wattle *Acacia obliquinervia*, which are typically 15 to 40 m in height (Burns et al. 2015).

The shrub layer of the Mountain Ash Forest Community comprises of a diverse array of plants varying from 2 to 15 m in height. These include Blanket Leaf *Bedfordia arborescens*, Elderberry *Panax Polyscias sambucifolia*, Mountain Pepper *Tasmannia lanceolata*, Balm Mint-bush *Prostanthera melissifolia*, Tree Lomatia *Lomatia fraseri*, Banyalla *Pittosporum bicolor*, Soft Tree Fern *Dicksonia antarctica*, Rough Tree Fern *Cyathea australis*, Musk Daisy Bush *Olearia argophylla*, Dusty Daisy Bush *Olearia phlogopappa*, Hazel Pomaderris *Pomaderris aspera*, Mountain Correa *Correa lawrenciana*, Dogwood *Cassinia aculeata*, Tree Geebung *Persoonia arborea*, Stinkwood *Zieria arborescens*, Victorian Christmas Bush *Prostanthera lasianthos*, and Austral Mulberry *Hedycarya angustifolia* (Mueck 1990, Burns et al. 2015).

Other plant species occur in Mountain Ash Forest Community including a distinct suite of bryophytes (Ashton 1986) but few plant species are confined to Mountain Ash Forest Community e.g. Tall Astelia *Astelia australiana*. Fauna is well represented through successional stages with over 70 bird species (Loyn 1985) including a number that are dependent on hollows for nesting (e.g. Sooty Owl *Tyto tenebricosa*; Powerful Owl *Ninox strenua*). Due to the environmental envelope occupied by

Mountain Ash Forest Community it tends to be low in reptile (Brown & Nelson 1993) and amphibian (Lumsden et al. 1991) diversity but contains FFG-listed species such as the Baw Baw Frog (*Philoria frosti*). The Flora and Fauna Guarantee-listed Barred Galaxias (*Galaxias fuscus*) is also found within the bounds of the community. Thirty mammal species are recorded within this community including several FFG-listed taxa (e.g. Smoky Mouse *Pseudomys fumeus*; Leadbeater's Possum *Gymnobelideus leadbeateri*). Other faunal components of the community are less well known (e.g. invertebrates in general) but research on beetles suggest that they are functionally and taxonomically diverse (Pulsford 2012).

Community dynamics

A key feature of Mountain Ash forest that shapes the structure and processes in the community relate to the response of Mountain Ash to disturbance. The principal form of disturbance is wildfire and because of the fire-sensitivity of Mountain Ash, wildfires can be stand replacing — that is, entire areas of mature Mountain Ash will be killed by wildfire. Young seedlings germinate from seed released from the crowns of Mountain Ash, producing a new even-aged regrowth stand (Lindenmayer 2009). Mountain Ash are self-thinning, which, after a recruitment event, leads to a marked reduction in the number of stems per unit area over time. The self-thinning process results in a stand density of 380 stems/ha at 40 years and 40 to 80 stems/ha in mature forest. Small suppressed pole and sapling trees, which add greatly to the density of vegetation in regrowth forests, die and collapse as the forests mature. Mountain Ash seedlings are shade intolerant and only rarely survive under the crowns of mature trees (Lindenmayer 2009).

Over time, the crowns of dominant trees become more open and increasingly separated from surrounding trees. Mountain Ash is also self-pruning, with branches lost from the effects of wind and snow as trees mature. The combined processes of self-thinning, self-pruning and 'crown shyness' result in mature stands comprising large, relatively well-spaced trees with open crowns and few lateral branches on the lower trunk (Lindenmayer 2009). A distinguishing feature of Mountain Ash forest community is the size of the trees. Mountain Ash is the world's tallest flowering plant and individual trees may reach 50 m height within 35 years of germination (Ashton 1975). They can eventually exceed 90 m after several hundred years with some trees reaching over 100 m tall and records of 120 m tall trees exist (Mace 1996, Beale 2007). Mountain Ash trees may live for up to 500 years and following death remain standing for a further 10 to 75 years.

As with any community the component species (e.g. under and midstorey plant species) vary not only with microclimate (e.g. drier or wetter sites) but are also influenced by abiotic (e.g. soil type) and biotic factors (e.g. Lyrebird disturbance; Ashton & Bassett 1997). Complex interactions between flora and fauna influence the particular composition of community in both space and time (e.g. Ashwell 1985). In the mature stages of this community, from about 120 years since recruitment, cavities appear and provide nest sites for birds and mammals but some mammal species generally do not occur until trees exceed 190 years (Lindenmayer et al. 2012). Due to the structure and habitat provided by large, old Mountain Ash trees, they are considered a keystone structural attribute of Mountain Ash forests (Lindenmayer 2016). The greatest abundance of living hollow-bearing trees is typically found in *old growth* forests (defined here as the least disturbed forest with stands exceeding 200 years old). However, living and dead cavity trees can also occur in much younger stands of Mountain Ash as remnants of previous old growth forest (Lindenmayer et al. 2012). Large living and dead trees with cavities are a critical nesting and denning resource for more than 40 species of native vertebrates in Mountain Ash forests (Lindenmayer et al. 2012). Threatened fauna species that rely on hollow bearing trees in Mountain Ash forests include: Sooty Owl *Tyto tenebricosa* which is particularly concentrated across the Central Highlands, Greater Glider *Petauroides volans* and the Powerful Owl *Ninox strenua*. The long lived nature of the community means component species also vary with time depending on stand age of the Mountain Ash.

Distribution and extent

Temperature and precipitation are the key abiotic variables in the Mountain Ash forest and climatic conditions are largely the key determinant of its broad distribution patterns (Lindenmayer et al. 1996).

Mountain Ash Forest Community is represented in the following bioregions across Victoria: Central Victorian Uplands, Highlands – Southern Fall, Highlands – Northern Fall, East Gippsland Uplands, Strzelecki Ranges, Otway Ranges and Victorian Alps.

The extent of the community within these bioregions is extremely variable. The majority of the community (approximately 157,000 ha) is located within the area known as the Central Highlands of Victoria (Burns et al. 2015) that lies largely within the Highlands - Northern Fall bioregion and to a lesser extent, the Highlands - Southern Fall bioregion, with the outer limits edging within the Victorian Alps bioregion. A smaller yet significant community of Mountain Ash exists in the Otway Ranges bioregion.

Across the rest of the state Mountain Ash Community exists in very small fragmented stands. The Strzelecki Ranges bioregion, originally covered by a mosaic of Mountain Ash forest and temperate rainforest, retained an estimated 19% of its original extent in 2001 as a result of clearing for agriculture in the late 19th and early 20th centuries, as well as logging with conversion to plantation (Traill & Porter 2001).

Ineligibility for listing as a community under the Flora and Fauna Guarantee

In the opinion of the Scientific Advisory Committee (SAC) the nominated item does not satisfy at least one criterion of the set of criteria prepared and maintained under Section 11 of the *Flora and Fauna Guarantee Act 1988*, and stated in Schedule 1 of the Flora and Fauna Guarantee Regulations 2011.

The nomination identified a number of sub-criteria (2.1.1, 2.1.2 and 2.1.3) as its basis; the SAC's response to these is as follows:

Evidence provided:

Sub-criterion 2.1.1 *The community is in a demonstrable state of decline which is likely to result in a significant loss of its component taxa.*

Evidence:

In order to satisfy this sub-criterion, the community must be in a demonstrable state of decline that will likely result in loss of component taxa. Based on a recent Central Highlands assessment of Mountain Ash forest (Burns et al. 2015) the nominator argued that the community had a 92% chance of ecosystem collapse by 2067. However, this assessment did not include the full extent of Mountain Ash Forest Community across Victoria. As presented in the nomination there has been a change in "old growth" forest from an estimated 30 to 60% pre-European to 1.1% (around 1,700 ha) today (Lindenmayer et al 2011). Mature trees (from about 120 years old) provide important habitat hollows for more than 40 species of native vertebrates (Lindenmayer et al. 2012) and so on this basis the nomination argues that the decline in old growth is likely to result in loss of component taxa dependent on hollows. The nature of regeneration of this community through stand replacement means that over long time scales this community will oscillate through periods of extensive old growth to periods of extensive regeneration and component taxa will vary in response. The nomination presents the case that changed fire regimes and forestry practices have resulted in a landscape trap whereby current feedbacks result in a community that consists of young, fire prone stands that cannot transition into old growth forests. The community is currently skewed towards younger age stands as a result of fire events and timber harvesting and provided a proportion of these regenerating forests mature through to old growth stage (120 years plus) the system will continue to contain component taxa.

Although the SAC accepts there is ample evidence of change to the community age structure this does not equate to community decline. The SAC does however note in order for component taxa to remain in the system that a proportion of regenerating stands of Mountain Ash need to be allowed to progress through the 120 year age class and into old growth forest.

Sub-criterion 2.1.2 *The community's distribution has decreased markedly in a short time and the decrease is continuing.*

Evidence:

The nominator noted that the distribution of Mountain Ash had remained relatively stable in the Central Highlands but significant losses were recorded elsewhere. In particular the Strzelecki Ranges bioregion, where an estimated 81% of the original mosaic of Mountain Ash forest and temperate rainforest had been lost (Traill & Porter 2001). Mountain Ash forest occurs within a 'wet and cool' environmental envelope which makes this ecosystem vulnerable to the effects of climate change, particularly higher temperatures and reduced rainfall (Burns et al. 2015). An increase in mean annual temperature of 1.4 degrees Celsius and a decline in annual precipitation by 5% are predicted to cause significant contraction in 20 (flora) species regeneration niches and significant changes in the size and location of species potential ranges (Nitschke & Hickey 2007). Due to the stand replacing nature of fires, a fire frequency greater than that required for trees to reach sexual maturity (20 to 30 years) has the potential to replace Mountain Ash Forest Community with other communities (e.g. *Acacia*). Consequently, the predicted increase in fire and fire severity with climate change has the potential to decrease the area occupied by this community.

In the opinion of the SAC while the Mountain Ash Forest Community distribution has decreased since European settlement (particularly in the Strzelecki Ranges) the area currently occupied is relatively stable and so this criterion is not satisfied. However, the SAC does agree that this community could be vulnerable to the effects of climate change, particularly higher temperatures and reduced rainfall (Burns et al. 2015) that could alter the potential ranges of species (Nitschke & Hickey 2007) within the system. The SAC is also concerned that increased fire frequencies could restrict this community to fire refugia such as streambanks and deep gullies in the same way that Cool Temperate Rainforest is currently constrained across parts of its range. However, sub-criterion 2.1.2 is not met as the distribution has not decreased in a short period of time.

Sub-criterion 2.1.3 *The community's composition has altered markedly in a short time and the alteration is continuing.*

Evidence:

The nomination argued that - the Mountain Ash Forest Community had changed from a composition of around an estimated 30 to 60% old growth to only 1.1% (around 1,700 ha) with the species composition of young regrowth forest being different to old growth. This differs from the SAC interpretation of composition which has revolved around change to species make up of a community rather than the percentage of various age classes of Mountain Ash

forests. Plant communities often pass through successional stages and the inability of Mountain Ash to regenerate under its own (or any other) canopy means maintenance of this community in the landscape requires disturbance events (fire) that are stand replacing. In the absence of stand replacing events Mountain Ash Forest Community will be replaced by other communities such as Cool Temperate Rainforest or Mixed Forest Communities. The corollary of this is that the shift from old growth to young regrowth while associated with changes in species composition (due to the different age classes that certain species occupy in the system) has not resulted in changes in the species composition of the community.

The SAC agrees that there has been a decrease in old growth forest from an estimated 30 to 60% in pre-European times to less than 1.1% present today but believes the composition of the community is unaltered. What is altered is the proportion of various stages of the community from early successional through to mature forest and consequently the proportion of species that occupy these various stages. Therefore, the nomination does not fulfil sub-criterion 2.1.3 as the community's composition has not changed.

Documentation

The published information and research data provided to the SAC has been assessed. To the best of its knowledge, the SAC believes that the data presented are not the subject of scientific dispute and the inferences drawn are reasonable and well supported.

Advertisement for public comment

In accordance with the requirements of Section 14 of the *Flora and Fauna Guarantee Act 1988*, the preliminary recommendation was advertised for a period of at least 30 days.

The preliminary recommendation was advertised in:

‘The Age’ – on 27 December 2017

‘The Weekly Times’ on 27 December 2017

The *Government Gazette* on 28 December 2017

Submissions closed on 9 February 2018.

Further evidence provided:

Seven submissions were received against the preliminary recommendation, based around: the impact of climate change trajectories; the current proportion of old growth forests (1.1%) relative to the historically accepted pre-European estimate (30 to 60%); increase in wildfire and the development of a landscape trap; and timber harvesting practices. The Scientific Advisory Committee considered these submissions in detail however none of the submissions provided compelling evidence to warrant a change to the preliminary recommendation that the community was not eligible for listing.

Additional Information considered by the Scientific Advisory Committee

Following publication of the preliminary recommendation report (PRR), the SAC received seven submissions requesting the SAC consider in more detail certain aspects of the PRR. The SAC was also aware of further research that was nearing completion and wished to consider that as well once it was available. Since the publication of the PRR there have been new surveys on species that occur with the Mountain Ash Forest Community (e.g. Nelson et al 2017), and several publications relevant to the community (e.g. Lindenmayer & Sato 2018, Cawson et al 2018, Bowd et al 2018). In formulating its Final Recommendation on this item, the SAC has considered both the submissions and the new information available, but has not received or is aware of any information that would alter its opinion that the Mountain Ash Forest Community does not currently fulfil any criteria that would result in it being listed under the FFG Act.

Final Recommendation of the Scientific Advisory Committee

The Scientific Advisory Committee concludes that on the evidence available the nominated item is not eligible for listing in accordance with Section 11(1) of the Act because none of the listing criteria have been satisfied.

The Scientific Advisory Committee recommends that the nominated item not be supported for listing under the *Flora and Fauna Guarantee Act 1988*.

Selected references:

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Internet links

DELWP (2016) Department of Environment, Land, Water and Planning BioEVC Benchmarks
<https://www.environment.vic.gov.au/biodiversity/bioregions-and-evc-benchmarks>

Endorsement by the Convenor of the Scientific Advisory Committee

Date



28 August 2019

Prof Emeritus Barbara Evans
Convenor