

THREATENED SPECIES SCIENTIFIC COMMITTEE

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

The Minister's delegate approved this Conservation Advice on 01/04/2016. Following a taxonomic revision, the name in the EPBC Act list of threatened species was updated to *Kelleria bogongensis*, effective on: 05/05/2016.

Conservation Advice

Kelleria laxa

Kelleria

Conservation Status

Kelleria laxa (kelleria) 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 extent of occurrence (less than 100km²) and low population, population decline (although the extent of decline is difficult to determine), and the threat posed by an increasing population of feral horses.

Kelleria is listed as threatened under the *Victorian Flora and Fauna Guarantee Act 1988* and as Vulnerable under the non-statutory *Advisory List of Rare or Threatened Plants in Victoria*.

Description

Kelleria is a shrub that grows by spreading across the ground. The shrub grows to at least 40 cm in diameter and can reach up to 200 cm. Its stems, which feature short hairs at the bases of its leaves, grow numerous roots along their length. Leaves themselves are grey-green, narrow, and alternately rounded and pointed. Kelleria blooms in January, producing one to four tubular, white or cream coloured flowers at the ends of each of its branches. Its seeds are rounded and about 2 mm long, contained in a thin sheath (see Carter & Walsh 2006 p.3)

Distribution

Kelleria is endemic to Victoria, where it is known from a single location on the Bogong High Plains, in the Victorian Alps (Carter & Walsh 2006 p.3). Specifically, kelleria may be found near Mt Jim, at about 1800 metres above sea level (Walsh & Entwisle 1996), in the Australian Alps IBRA Bioregion (DEH 2000).

In 2006 abundance was estimated at between 400 to 2000 plants (Carter & Walsh 2006). A 2009 Action Statement by the Victorian Government suggests approximately 1700 individuals existed at that time, in 19 patches within a single population (DSE 2009 p.2). In 2014, Marks and Walsh counted 18 patches that ranged in size from 0.1 m² to 5 m², within an area of 1.5 x 0.5 km (Marks & Walsh 2014). There is therefore some evidence to suggest decline although the extent of the decline is difficult to determine. The extent of range and abundance of kelleria prior to European settlement is unknown.

Relevant Biology/Ecology

There have been no known targeted studies of the ecology of kelleria but some aspects of the species' ecology were addressed in an Honours study (Marks 2002). Kelleria was found to most closely resemble *K. multiflora* in leaf size, shape, texture and stem pubescence (Heads 1990 p.630). However, it was found to exhibit gynodioecy (a breeding system in which male-sterile individuals (i.e. females) coexist with hermaphroditic individuals in populations) where *K. multiflora* exhibits hermaphroditism. While both kelleria and *K. multiflora* 'are less tied to wet conditions' (Heads 1990 p.613) than other members of the genus, kelleria are commonly in damp sites and can be found in waterlogged bogs. Further, in cases where kelleria shares

subalpine grassland with *K. dieffenbachii*, it was shown to favour damper, south-facing slopes (Heds 1990 p.613).

Kelleria laxa flowers from late November to February, producing fruit from December through to March (Heds 1990 p.630).

Threats

Table 1: The following table lists the threats to kelleria in approximate order of significance.

Threat factor	Threat type	Threat status	Evidence base
Impact of introduced species			
Feral horses (Grazing and trampling pressure)	known	current	<p>The threat to kelleria by feral horses is reported in the 2010 – 2011 'Preliminary Recommendation on a nomination for listing Degradation and loss of habitats caused by feral horses.' (VNPA 2013 url). In 2014, feral horse density had increased in the vicinity of Mt Jim. This poses a significant threat through grazing and trampling pressure (Walsh pers. obs cited in Marks & Walsh 2014).</p> <p>The specific nature of the impact of feral horses in the Victorian alps is detailed in a Parks Victoria Background Paper (2013 p.9) and includes:</p> <ul style="list-style-type: none"> • removal of native vegetation cover • dispersal of weed seeds • changes to the vegetation structure species composition of the ground stratum • native tree mortality • increase vulnerability of threatened vegetation • increased nutrient loads.
Cattle (trampling and ecological modification)	known potential	past future	<p>The practice of cattle grazing the Bogong High Plains in summer and early autumn began in the early 1900s and continued until it was withdrawn in the early 2000s (see Marks & Walsh 2014: see also Premier of Victoria 2015 url). Since then cattle grazing was briefly reinstated in the form of scientific trials, but is currently banned by the <i>National Parks Amendment (Prohibiting Cattle Grazing) Bill 2015</i> (Premier of Victoria 2015 url).</p> <p>The impact cattle grazing had on kelleria was characterised by trampling and modification of the plant community rather than by direct browsing on the species itself. The extent of this impact on the species is unknown.</p>
Unmanaged public access			

Public access (trampling)	known	current	Some plants grow directly on the route of the Alpine Walking Track and are trampled by bushwalkers (Walsh 2002, pers. comm. cited in SPRAT url).
Climate change			
Decreased soil moisture/drier conditions (decreased rainfall/increased average temperatures/increased risk of fire)	potential	future	Unpublished data collected from permanent study plots established in 1993 (Marks & Walsh 2014 p.9) revealed a decline in kelleria between 1993 and 2002, corresponding to 'a period of extended drought'. Personal observations by N. Walsh, cited in the recovery plan, confirm this decline, with particular regard to 'patches on drier sites' - indicating a sensitivity to drying conditions which could be exacerbated by drier conditions or extended droughts in future.
Fire			
Fire frequency and intensity	potential	future	Fire does not appear to be a threat for kelleria based on observations following a significant fire event in the area in 2003 (J. Morgan pers. comm. in Carter & Walsh 2006). However, Catling (1991) predicts that feral horses (the key threat for this species) may be advantaged by frequent low intensity fires due to a simplification in forest structure. As such, fire may become a future threat where the previously mentioned threats remain unmitigated (see DSE 2009 p.2) ¹ .

Conservation Actions

Conservation and Management priorities

Impact of introduced species

- Remove or exclude horses from the areas supporting kelleria.
- Establish the level of threat from feral horses by initiating exclusion trials on some patches (i.e. the establishment of fenced or caged patches).
- Circulate information to inform the local community of the past and potential future damage posed by Cattle trampling the site and causing ecological modification.

Unmanaged public access

- Place signage near the individuals growing adjacent to the Alpine Walking Track, and/or, consider fencing or caging options that would assist in limiting the risk of trampling.

¹ "Fires in the future may damage populations and recovery is likely to be hampered if grazing threats remain."

- Build community support and awareness for *Kelleria* and the importance of its conservation, potentially through signage and inclusion of information about the species in Alpine National Park promotional material, maps, *et cetera*.

Fire

- Develop and/or implement an appropriate fire management regime for protecting key habitat; this is likely to include buffers to prevent wildfire or managed fire from impacting the habitat unless prescribed fire is being applied for a specific management purpose.
- 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.
- Establish populations in cultivation *ex situ* to safeguard against any unforeseen destruction (i.e. future droughts, increased temperatures, increased frequency or intensity of fires).
- Establish the role of fire in breeding and propagation for this species.

Stakeholder Engagement

- Provide information and extension support to relevant Natural Resource Management committees, local councils, Government agencies, the local community and development proponents on the location, significance and management of known subpopulations and areas of potential habitat.
- Continue to provide information to the local community about the potential damage caused by cattle grazing in the area.

Survey and Monitoring priorities

- Acquire baseline population data by conducting detailed field surveys including (a) identification of the area and extent of populations; (b) estimates of the number, size and structure of populations and (c) inference or estimation of population change.
- Accurately survey known habitat and collect floristic and environmental information describing community ecology and condition.
- Identify and survey potential habitat, using ecological and bioclimatic information indicating habitat preference.
- Monitor the progress of recovery, including the effectiveness of exclusion actions in preventing damage by horses. Also monitor the trackside individuals for any ongoing signs of damage associated with public access.

Information and research priorities

- Collect demographic information including recruitment and mortality rates, fecundity, longevity, timing of life history stages and morphological data and seed bank status, including germination requirements. This information should assist in further understanding the role of fire for this species, including greater understanding of potential thresholds of timing and intensity before fire could become a significant threat. The investigation of such thresholds should take into consideration the potential interaction of fire with the other threats on this species; including feral horses and potentially drier soil conditions.
- Investigate options for linking, enhancing or establishing additional populations.

- Undertake survey work in suitable habitat and potential habitat to locate any additional populations/occurrences/remnants and more precisely assess population size and distribution.
- Develop habitat suitability models to determine the ecological/environmental indices responsible for a species distribution, and how it may change due to the impending threats. Requires a reasonable high number of presence records, plus the environmental variables located at this site and other sites chosen at random (Guisan et al., 2000). These models should aim to establish *Kelleria*'s response to drier soil conditions and increased temperatures with a view to establishing if long-term climatic and/or ecological changes will affect the viability of the population.

Recruitment (in light of all threats, including longer-term climate change impacts)

- Determine seed germination requirements by conducting laboratory and field trials aimed to identify key stimuli. This will allow greater certainty of the level of impact of any future changes to local ecology (including those associated with climate change) on the viability of the population.

References cited in the advice

- DEH (Department of the Environment and Heritage) 2000. Revision of the Interim Biogeographic Regionalisation of Australia (IBRA) and the Development of Version 5.1. — Summary Report.
- Department of Sustainability And Environment (DSE) (2009). Action Statement: Flora and Fauna Guarantee Act 1988 No. 220
- Carter, O. & Walsh, N. (2006) National Recovery Plan for the *Kelleria laxa*. Viewed: 15 January 2016. Available on the internet at: <http://www.environment.gov.au/system/files/resources/5b708749-eef4-4f24-82b7-dfa99fe7d8eb/files/k-laxa.pdf>
- Catling, P. (1991). Ecological effects of prescribed burning practices on the mammals of southeastern Australia. In Lunney, D. (ed.) Conservation of Australia's Forest Fauna. pp. 353 – 364.
- Guisan, A. & Zimmermann N.E. (2000). Predictive habitat distribution models in ecology. *Ecological Modelling* 135, 147 – 186.
- Heads, M.J. (1990). *Kelleria*, *Podostemaceae* to *Combretaceae*, George, A.S. (ed), *Flora of Australia* 18
- Marks, C. (2002). *Investigations into Kelleria laxa and Kelleria dieffenbachii*. Honours thesis, School of Botany, University of Melbourne.
- Marks, C., & Walsh N. (2014). Taxonomic reassessment of *Kelleria* (Thymelaeaceae) in Australia and recognition of a new endemic Victorian species. *Muelleria* 33, 3 – 11.
- Parks Victoria (2013). Background Paper 1 — The Ecology of Wild Horses and their Environmental Impact in the Victorian Alps. Viewed: 15 January 2016. Available on the internet at: http://parkweb.vic.gov.au/_data/assets/pdf_file/0009/574146/Background-Paper-1-Wild-horse-ecology-and-environmental-impacts.pdf
- VNPA (Victorian National Parks Association) (2013). Wild horse management in the Victorian Alps. Viewed: 15 January 2016. Available on the internet at: http://vnpa.org.au/admin/library/attachments/PDFs/Submissions/FFG%20Nomination_Feral_Horses.pdf

Walsh, N.G. and Entwisle, T.J. (1996). *Dicotyledons: Winteraceae to Myrtaceae*. Inkata Press
Flora of Victoria 3.

Other sources cited in the advice

Morgan, John (2006). Personal communication, 2006. Plant Ecologist, La Trobe University.
Cited in Carter & Walsh 2006 National Recovery Plan for *Kelleria kelleria laxa*.

Premier of Victoria (2015) Cattle banned from the alpine national park. Viewed: 15 January
2016. Available on the internet at: <http://www.premier.vic.gov.au/cattle-banned-from-the-alpine-national-park>

Walsh, Neville (2014). Personal observation, 2014. Senior Conservation Botanist, Royal Botanic
Gardens Melbourne. Cited in Marks, C., & N. Walsh 2014. Taxonomic reassessment of
Kelleria (Thymelaeaceae) in Australia and recognition of a new endemic Victorian species.

Walsh, Neville (2006). Personal observation, 2006, Senior Conservation Botanist, Royal Botanic
Gardens Melbourne. Cited in Carter & Walsh 2006 National Recovery Plan for *Kelleria
kelleria laxa*.

Walsh, Neville (2002). Personal communication, 2002. Senior Conservation Botanist, Royal
Botanic Gardens Melbourne. Cited in the SPRAT profile for *Kelleria laxa* (URL:
[http://apps.internal.environment.gov.au/cgi-
bin/sprat/intranet/showspecies.pl?taxon_id=88203](http://apps.internal.environment.gov.au/cgi-bin/sprat/intranet/showspecies.pl?taxon_id=88203))