NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the *Threatened Species Conservation Act* 1995 (the Act), has made a Final Determination under Section 23 of the Act to list Windswept Feldmark in the Australian Alps Bioregion as a CRITICALLY ENDANGERED ECOLOGICAL COMMUNITY in Part 2 of Schedule 1A of the Act.

This determination contains the following information:

Parts 1 & 2: Section 4 of the Act defines an ecological community as "an assemblage of species occupying a particular area". These features of Windswept Feldmark in the Australian Alps Bioregion are described in Parts 1 and 2 of this Determination, respectively.

Part 3: Part 3 of this Determination describes the eligibility for listing of this ecological community in Part 2 of Schedule 1A of the Act according to criteria as prescribed by the *Threatened Species Conservation Regulation* 2010.

Part 4: Part 4 of this Determination provides additional information intended to aid recognition of this community in the field.

Part 1. Assemblage of species

1.1 Windswept Feldmark in the Australian Alps Bioregion (hereafter referred to as Windswept Feldmark) is characterised by the assemblage of species listed below.

Agrostis muelleriana
Brachyscome spathulata subsp. *spathulata*
Colobanthus pulvinatus
Colobanthus affinis
Craspedia jamesii
Epacris gunnii
Epacris petrophila
Epilobium tasmanicum
Euphrasia collina subsp. *lapidosa*
Ewarta nubigena
Hypogymnia lugubris
Kelleria dieffenbachii
Leptorhynchos squamatus
Luzula australasica subsp. *dura*
Lycopidium fastigiatum
Pentachondra pumila
Poa fawsettiae
Polytrichum juniperum
Ranunculus acrophilus
Rhytidosperma pumilum
Scleranthus singuliflorus
Senecio pectinatus var. *major*
Trisetum spicatum subsp. *australiense*
Veronica densifolia

1.2 The total species list of the community across all occurrences is likely to be larger than that given above. Due to variation across the range of the community, not all of the above species are present at every site and many sites may also contain species not listed above.

Characteristic species may be abundant or rare and comprise only a subset of the complete list of species recorded in known examples of the community. Some characteristic species show a high fidelity (are relatively restricted) to the community, but may also occur in other communities, while others are more typically found in a range of communities.

The number and identity of species recorded at a site is a function of sampling scale and effort. In general, the number of species recorded is likely to increase with the size of the site and there is a greater possibility of recording species that are rare in the landscape.

Species presence and relative abundance (dominance) will vary from site to site as a function of environmental factors such as soil properties (chemical composition, texture, depth,

drainage), topography, climate, and through time as a function of disturbance (eg fire) and weather (eg snow cover, extreme cold).

At any one time, above ground individuals of some species may be absent, but the species may be represented below ground in the soil seed bank or as dormant structures such as bulbs, corms, rhizomes, rootstocks or lignotubers.

The species listed above are vascular and cryptogamic plants, however the community also includes micro-organisms, fungi, vertebrate and invertebrate fauna. These components of the community are less well documented.

Part 2. Particular area occupied by the ecological community

2.1 The assemblage of species listed in Part 1.1 above which characterises Windswept Feldmark occurs within the Australian Alps Bioregion. This Bioregion is defined by SEWPaC (2012) Interim Biogeographic Regionalisation for Australia, Version 7. Department of Sustainability, Environment, Water, Population and Communities. http://www.environment.gov.au/parks/nrs/science/bioregion-framework/ibra/maps.html

2.2 It is the intent of the Scientific Committee that all occurrences of the ecological community (both recorded and as yet unrecorded, and independent of their condition) that occur within this Bioregion be covered by this Determination.

2.3 Windswept Feldmark occurs on high alpine ridgelines along the Main Range of Kosciuszko National Park.

Part 3. Eligibility for listing

3.1 Reasons for determining eligibility for listing

3.1.1 The extent of occurrence and area of occupancy (AOO) of Windswept Feldmark are estimated to be 24 km^2. The AOO is based on six 2 x 2 km grid cells, the scale recommended for assessing occupancy by IUCN (2014). The geographic distribution of Windswept Feldmark is therefore considered to be very highly restricted.

3.1.2 Windswept Feldmark has been altered by walking track use and trampling by humans, resulting in soil erosion and changes in community composition. The Main Range walking track divides much of the Windswept Feldmark community. Between 5–11% of the community between Carruthers Peak and Mount Northcote has been lost or damaged by trail-based fragmentation (Ballantyne *et al*. 2014). Trampling by humans also results in damage to Windswept Feldmark, with the exposed soil colonised by dominant species of the adjoining Tall Alpine Herbfield vegetation community such as *Celmisia costiniana* and *Aciphylla glacialis* (M. Ballantyne *in litt.* November 2013). Repeated trampling of feldmark vegetation in Kosciuszko National Park has been shown to reduce vegetation cover and species richness as well as regeneration of vegetation (McDougall and Wright 2004). The dominant species *Epacris gunnii* is highly vulnerable to trampling impacts (McDougall and Wright 2004; M. Ballantyne *in litt.* November 2013), with regeneration of the species impeded across the Main Range walking track (Ballantyne *et al.* 2014). Humans using the Main Range walking track are also likely to facilitate the input of exotic plant species' propagules to the community. The exotic herb *Acetosella vulgaris* is common in Windswept Feldmark although as yet poses little threat (Costin *et al*. 2000; M. Ballantyne *in litt.* November 2013).

3.1.3 Windswept Feldmark is restricted to the highest ridges in the Australian Alps and thus is likely to be highly vulnerable to warming and drying due to climate change (Ballantyne *et al.* 2014).

However Pickering and Armstrong (2014) state that it is not clear if Windswept Feldmark will increase, stabilise or decline in the long term with climate change (> 30 years). It is possible that Windswept Feldmark may increase in area as snow cover in winter decreases, resulting in increased exposure to freezing conditions that plant species of adjacent communities are less tolerant of (Pickering and Armstrong 2014). Alternatively, warmer temperatures may result in grass and herb species of Tall Alpine Herbfield replacing species of Windswept Feldmark (Pickering and Armstrong 2014). Windswept Feldmark is also likely to be vulnerable to an increase in fire frequency associated with climate change, resulting in reduced regeneration of the community's component species (S. Garrett *in litt*. February 2014). Regeneration of the dominant shrub *Epacris gunnii* after a bushfire in 2003 has been very slow and the burned patches of Windswept Feldmark now more closely resemble Tall Alpine Herbfield vegetation (Pickering and Venn 2013).

3.2 Criteria for listing

Windswept Feldmark in the Australian Alps Bioregion is eligible to be listed as a Critically Endangered Ecological Community in accordance with Section 12 of the Act as, in the opinion of the Scientific Committee, it is facing an extremely high risk of extinction in New South Wales in the near future, as determined in accordance with the following criteria as prescribed by the *Threatened Species Conservation Regulation* 2010:

Clause 18 Restricted geographic distribution of the ecological community

The ecological community's geographic distribution is estimated or inferred to be:

(b) Very highly restricted,

and the nature of its distribution makes it likely that the action of a threatening process could cause it to decline or degrade in extent or ecological function over a time span appropriate to the life cycle and habitat characteristics of the ecological community's component species.

Dr Mark Eldridge
Chairperson
Scientific Committee

Exhibition period: 02/10/15 – 27/11/15 Proposed Gazettal date: 02/10/15

Part 4. Additional information about the ecological community

The following information is additional to that required to meet the definition of an ecological community under the Act, but is provided to assist in the recognition of Windswept Feldmark in the field. Given natural variability, along with disturbance history, Windswept Feldmark may sometimes occur outside the typical range of variation in the features described below.

4.1 Windswept Feldmark occurs along high alpine ridgelines along the Main Range of Kosciuszko National Park in south-eastern New South Wales (Costin *et al.* 2000). It occurs mainly between Mt Twynam and Rawsons Pass (McDougall and Walsh 2007). The community occurs in small patches (< 2.5 ha) and is interspersed with Tall Alpine Herbfield. The total area of Windswept Feldmark is 28.5 ha (Costin *et al.* 2000).

4.2 Windswept Feldmark is described by McDougall and Walsh (2007) as *Epacris gunnii-Chionohebe pulvinatus* feldmark (Community 40) that occurs on high ridges from 2010–2150 m a.s.l. It is described as a short alpine heathland (McDonald and Walsh 2007) or tundra-like plant community (Costin *et al*. 1979). The shallow soils and strong winds result in vegetation cover of Windswept Feldmark being relatively sparse with low plant diversity. The dominant shrub (*Epacris gunnii*) grows in discrete 'halo-like' patches typically less than 1 m^2 in area and accounts for 25–50% cover of Windswept Feldmark (McDougall and Wright 2004). A small

number of sub-shrub, herb and graminoid species, typically < 50 cm in height, are associated with *E. gunnii*. *Epacris gunnii* is thought to be important in facilitating regeneration and growth of other key component species of the community (Ballantyne and Pickering 2015; Costin *et al*. 2000; McDougall and Wright 2004).

4.3 Windswept Feldmark has been recorded in the local government areas of Snowy River and Tumbarumba Shires (within the Australian Alps Bioregion), however unrecorded stands of the ecological community may occur elsewhere in the Bioregion.

References:

Ballantyne M, Pickering CM, McDougall KL, Wright GT (2014) Sustained impacts of a hiking trail on changing Windswept Feldmark vegetation in the Australian Alps. *Australian Journal of Botany* **62**, 263–275.

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IUCN Standards and Petitions Subcommittee (2014) Guidelines for Using the IUCN Red List Categories and Criteria. Version 11. Prepared by the Standards and Petitions Subcommittee. http://www.iucnredlist.org/documents/RedListGuidelines.pdf.

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Pickering CM, Armstrong T (2014) Climate change and the plant communities of the Kosciuszko alpine zone in the Australian Alps. (Cooperative Research Centre for Sustainable Tourism: Griffith University)

Pickering CM, Venn SE (2013) Increasing the resilience of the Australian alpine flora to climate change and associated threats: a plant functional traits approach. (National Climate Change Adaptation Research Facility: Gold Coast)