

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion, as a CRITICALLY ENDANGERED ECOLOGICAL COMMUNITY in Part 2 of Schedule 1A of the Act and as a consequence, to omit reference to New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion, from Part 3 of Schedule 1 (Endangered Ecological Communities) of the Act. Listing of Critically Endangered Ecological Communities is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion is the name given to the ecological community characterised by the species assemblage listed in paragraph 2. This Bioregion is defined by SEWPaC (2012) Interim Biogeographic Regionalisation for Australia, Version 7. A map of IBRA 7 is available at:
<http://www.environment.gov.au/parks/nrs/science/bioregion-framework/ibra/maps.html>.

New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodland is listed as critically endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (TSSC 2011). New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion falls within the definition of the nationally-listed community. However, the Commonwealth listing advice excludes some patches here regarded as New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion on the basis of condition thresholds (including patch size, ground cover and tree density).

2. New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion is characterised by the following assemblage of species:

<i>Acaena novae-zelandiae</i>	<i>Acaena ovina</i>
<i>Ammobium alatum</i>	<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>
<i>Asperula conferta</i>	<i>Bothriochloa macra</i>
<i>Bulbine bulbosa</i>	<i>Carex inversa</i>
<i>Cassinia quinquefaria</i>	<i>Chrysocephalum apiculatum</i>
<i>Craspedia variabilis</i>	<i>Crassula sieberiana</i>
<i>Cymbonotus lawsonianus</i>	<i>Cymbopogon refractus</i>
<i>Desmodium varians</i>	<i>Dichelachne micrantha</i>
<i>Dichondra repens</i>	<i>Dichopogon fimbriatus</i>
<i>Dillwynia sieberi</i>	<i>Discaria pubescens</i>
<i>Drosera peltata</i>	<i>Echinopogon caespitosus</i> var. <i>caespitosus</i>
<i>Echinopogon mckiei</i>	<i>Echinopogon ovatus</i>
<i>Einadia nutans</i>	<i>Elymus scaber</i>
<i>Epilobium billardierianum</i> subsp. <i>cinereum</i>	<i>Eucalyptus blakelyi</i>
<i>Eucalyptus dalrympleana</i> subsp. <i>heptantha</i>	<i>Eucalyptus nicholii</i>

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Eucalyptus nova-anglica
Eucalyptus radiata subsp. *sejuncta*
Geranium solanderi var. *solanderi*
Gonocarpus micranthus
Haloragis heterophylla
Hibbertia cistoidea
Hydrocotyle laxiflora
Hypoxis hygrometrica var. *splendida*
Juncus subsecundus
Kunzea parviflora
Lachnagrostis filiformis
Lespedeza juncea subsp. *sericea*
Leucopogon lanceolatus var. *lanceolatus*
Lomandra multiflora subsp. *multiflora*
Melichrus urceolatus
Mentha satuireioides
Olearia viscidula
Oxalis exilis
Oxalis radicata
Pimelea curviflora var. *divergens*
Plantago gaudichaudii
Poa labillardieri
Poranthera microphylla
Pultenaea microphylla
Rubus parvifolius
Rytidosperma racemosum var. *racemosum*
Scleranthus biflorus
Sorghum leiocladum
Stackhousia monogyna
Stylidium graminifolium
Themeda australis
Veronica calycina
Viola betonicifolia
Vittadinia muelleri
Wahlenbergia planiflora var. *longipila*
Wahlenbergia queenslandica

Eucalyptus pauciflora
Euchiton gymnocephalus
Glycine clandestina
Gonocarpus tetragynus
Hardenbergia violacea
Hybanthus monopetalus
Hypericum gramineum
Juncus filicaulis
Juncus usitatus
Lachnagrostis aemula
Leptorhynchus squamatus subsp. A
Leucopogon fraseri
Lissanthe strigosa
Luzula densiflora
Melicytus dentatus
Microlaena stipoides var. *stipoides*
Opercularia aspera
Oxalis perennans
Phyllanthus virgatus
Pimelea glauca
Plantago hispida
Poa sieberiana
Pteridium esculentum
Rhodanthe anthemoides
Rumex brownii
Schoenus apogon
Solenogyne dominii
Sporobolus creber
Stellaria angustifolia
Swainsona parviflora
Thesium australe
Veronica plebeia
Vittadinia cuneata
Wahlenbergia communis
Wahlenbergia planiflora var. *planiflora*
Wahlenbergia stricta subsp. *stricta*

3. The total species list of the community is considerably larger than that given above, with many species present in only one or two sites or in low abundance. The species composition of a site will be influenced by the size of the site, recent rainfall or drought condition and by its disturbance (including fire) history. The number of species, and the above ground relative abundance of species will change with time since fire, and may also change in response to changes in fire regime (including changes in fire frequency). 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 banks or as dormant structures such as bulbs, corms, rhizomes, rootstocks or lignotubers. The list of species given above is of vascular plant species; the community also includes micro-organisms, fungi, cryptogamic plants and a diverse fauna, both vertebrate and invertebrate. These components of the community are poorly documented.

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4. New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion is dominated by trees of *Eucalyptus nova-anglica* and occasionally with *E. dalrympleana* subsp. *heptantha*, as a co-dominant. The tree layer is usually 8-20 m tall with a sparse cover up to 30%. There are few shrub species present, and none are abundant within the community (Benson and Ashby 2000). Ground cover is usually dense with *Asperula conferta*, *Poa sieberiana*, *Themeda australis*, *Juncus filicaulis*, *Dichondra repens*, *Carex inversa*, *Rumex brownii*, *Acaena ovina* and *Desmodium varians* common. There is some variation in the structure due to different stages of regrowth after clearing or dieback (Benson and Ashby 2000).
5. New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion is described in Benson and Ashby (2000) who list species to provide a guide to identification of the community. Care should be taken in the application and interpretation of indicator plant species because of sampling limitations and the reduction in species diversity in degraded sites. In addition, at certain times some species may only be present at a site at some times as a soil seed bank or as dormant buds or tubers.
6. New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion occurs primarily in valley flats subject to cold air drainage.
7. New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion is referable to 'New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalt' (Community 8) and 'New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Sediment' (Community 9) of Benson and Ashby (2000); 'New England Peppermint grassy woodland on sedimentary or basaltic substrates' (VCA 534) of Benson *et al.* (2010). The community may also be referable to parts of 'New England Peppermint Woodland' (RVC14) of Eco Logical Australia (2009) mapped on sediments and basalts, however in the absence of any floristic plot data for RVC14, the relationship between the two assemblages is uncertain. New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion belongs to the 'Tableland Clay Grassy Woodlands' class of Keith (2004).
8. New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion has been recorded from the local government areas of Armidale Dumaresq, Glen Innes Severn Shire, Guyra, Inverell, Tenterfield and Uralla, and may occur elsewhere in the Bioregion. Stands of New England Peppermint Woodland mapped on basalt and sediments by Eco Logical Australia (2009) within the eastern portion of the Namoi Catchment, within the Walcha and Tamworth Regional local government areas, may also be referable to the community as described above.
9. New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion has been extensively cleared for grazing and agricultural development because it often occurs on flat and relatively fertile soils (Benson 1999). For example, within the Guyra mapsheet only 2 300 ha (approximately 11%) of the original distribution remains (Benson and Ashby 2000) and this is indicative of a very large reduction in geographic distribution. Much of the remaining areas are in poor condition, with the understorey dominated by exotic plant species (Benson and Ashby 2000). Disturbed remnants are considered to form part of the community, including where the vegetation would respond to assisted natural regeneration, such as where the natural soil and associated seedbank

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are still at least partially intact. Clearing has dramatically decreased the extent of occurrence of the community and the resulting fragmentation has made New England Peppermint Woodland more vulnerable to other threatening processes such as weed invasion. 'Clearing of native vegetation' is listed as a Key Threatening Process under the *Threatened Species Conservation Act 1995*.

10. Weed invasion is a major threat to New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion and a large proportion of remnant stands no longer support a native understorey (Benson and Ashby 2000, Benson *et al.* 2010). The following exotic species have been recorded in the community:

<i>Aira elegantissima</i>	Delicate Hairgrass
<i>Anthoxanthum odoratum</i>	Sweet Vernal Grass
	Shivery Grass, Small Shivery Grass, Quaking Grass
<i>Briza minor</i>	
<i>Bromus brevis</i>	
<i>Bromus hordeaceus</i>	Soft Brome
<i>Centaureum erythraea</i>	Common Centaury
<i>Centaureum tenuiflorum</i>	
<i>Cerastium vulgare</i>	Mouse Ear Chickweed
<i>Cirsium vulgare</i>	Spear Thistle
<i>Conyza sumatrensis</i>	Tall Fleabane
<i>Dactylis glomerata</i>	Cocksfoot
<i>Festuca pratensis</i>	Meadow Fescue
<i>Gamochaeta coarctata</i>	
<i>Holcus lanatus</i>	Yorkshire Fog
<i>Hypochaeris radicata</i>	Catsear, Flatweed
<i>Leucanthemum vulgare</i>	Ox-eye Daisy
<i>Lolium perenne</i>	Perennial Ryegrass
<i>Modiola caroliniana</i>	Red-flowered Mallow
<i>Paronychia brasiliiana</i>	Chilean Whitlow Wort, Brazilian Whitlow
<i>Paspalum dilatatum</i>	Paspalum
<i>Petrorhagia nanteuillii</i>	
<i>Plantago lanceolata</i>	Lamb's Tongues, Plantain
<i>Rosa rubiginosa</i>	Sweet Briar, Eglantine
<i>Rubus ulmifolius</i>	Blackberry
<i>Taraxacum officinale</i>	Dandelion, Pissabed
<i>Trifolium arvense</i>	Haresfoot Clover
<i>Trifolium campestre</i>	Hop Clover
<i>Trifolium glomeratum</i>	Clustered Clover
<i>Trifolium repens</i>	White Clover
<i>Vulpia myuros</i>	Rat's Tail Fescue

'Invasion of native plant communities by exotic perennial grasses' and 'Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants' are listed as Key Threatening Processes under the *Threatened Species Conservation Act 1995*.

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11. New England Peppermint (*Eucalyptus nova-anglica*), the dominant species of the community, is highly susceptible to eucalypt dieback and is the species most affected by eucalypt dieback on the New England Tablelands (Nadolny 2008). The causes of dieback are complex, however outbreaks of leaf-eating insects are a major factor since these insects can repeatedly defoliate trees. Between 2008 and 2010, New England experienced the worst outbreak of scarab beetles (*Anoplognathus* spp.) in approximately 25 years (C Nadolny *in litt.* Jan 2010). New England Peppermints have been severely defoliated over an area extending more than 100 km, from south of Walcha to at least Guyra in the north. Insect outbreaks have been intensified by land use practices such as developed pasture and fertiliser application that increase food availability for insects. Fragmentation and the decline of native insectivores further reduce the community's resilience to dieback (Nadolny 2008).
12. Climate change may pose an important threat to New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion, including the potential to exacerbate other threats such as weed invasion and dieback. Nadolny (2008, *in litt.* Jan 2010) suggests that high summer rainfall is favourable for scarab beetles which preferentially feed on *Eucalyptus nova-anglica*, and that summer rainfall in the New England Tablelands is predicted to increase. The community is likely to be adversely affected by higher temperatures, particularly warmer winter minimums and fewer frosts, as it generally occupies 'frost hollow' situations at high elevations, and much of its current distribution could be replaced by other communities (Eco Logical Australia 2009). Changes to fire regimes and intensity predicted under climate change scenarios could lead to changes in the understorey composition and the shrub layer may also become more prominent. 'Anthropogenic Climate Change' is listed as a Key Threatening Process under the *Threatened Species Conservation Act 1995*.
13. New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion continues to be threatened by further clearing of remnants, grazing of the understorey, dieback, pasture improvement and weed invasion. Collectively, these threats are indicative of a very large reduction in ecological function.
14. New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion is very poorly reserved throughout its range. Less than 3% of the remaining area is thought to occur within the conservation estate (Benson and Ashby 2000, Benson *et al.* 2010). Reserves containing the community include Bolivia Hill, Booroolong, Duval, Imbota and Yina Nature Reserves.
15. New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion provides habitat for a number of threatened plant and animal species (Benson *et al.* 2010) listed under the *Threatened Species Conservation Act 1995*:

<i>Eucalyptus nicholii</i>	Narrow-leaved Black Peppermint	Vulnerable
<i>Thesium australe</i>	Austral Toadflax	Vulnerable
<i>Stagonopleura guttata</i>	Diamond Firetail	Vulnerable
<i>Melanodryas cucullata</i>		Vulnerable
<i>cucullata</i>	Hooded Robin (South-eastern form)	
<i>Phascolarctos cinereus</i>	Koala	Vulnerable
<i>Chthonicola sagittata</i>	Speckled Warbler	Vulnerable

ESTABLISHED UNDER THE THREATENED SPECIES CONSERVATION ACT 1995

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16. The New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion is eligible to be listed as a Critically Endangered Ecological Community as, in the opinion of the Scientific Committee, it is facing an extremely high risk of extinction in New South Wales in the immediate future, as determined in accordance with the following criteria as prescribed by the *Threatened Species Conservation Regulation* 2010:

Clause 17 Reduction in geographic distribution of the ecological community

The ecological community has undergone, is observed, estimated, inferred or reasonably suspected to have undergone or is likely to undergo within a time span appropriate to the life cycle and habitat characteristics of its component species:

- (a) a very large reduction in geographic distribution.

Clause 19 Reduction in ecological function of the ecological community

The ecological community has undergone, is observed, estimated, inferred or reasonably suspected to have undergone or is likely to undergo within a time span appropriate to the life cycle and habitat characteristics of its component species:

- (a) a very large reduction in ecological function,
as indicated by any of the following:
 - (d) change in community structure,
 - (e) change in species composition,
 - (f) disruption of ecological processes,
 - (g) invasion and establishment of exotic species,
 - (h) degradation of habitat.
 - (i) fragmentation of habitat.

Dr Andrea Wilson
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Scientific Committee

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Exhibition period: 27/09/13 – 22/11/13

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