

Montane Peatlands & Swamps

of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands & Australian Alps

Introduction

These guidelines provide background information to assist land managers and approval authorities to identify remnants of Montane Peatlands and Swamps, an Endangered Ecological Community (EEC). For more detailed information refer to the Montane Peatlands and Swamps Profile and the NSW Scientific Committee Final Determination at: threatenedspecies.environment.nsw.gov.au



Keith McDougall

A bog in the Australian Alps bioregion.

What is an Endangered Ecological Community?

An ecological community is an assemblage of species which can include flora, fauna and other living organisms that occur together in a particular area. They are generally recognised by the trees, shrubs and groundcover plants that live there. An Endangered Ecological Community is an ecological community listed as facing a very high risk of extinction in NSW under the *Threatened Species Conservation Act 1995*.

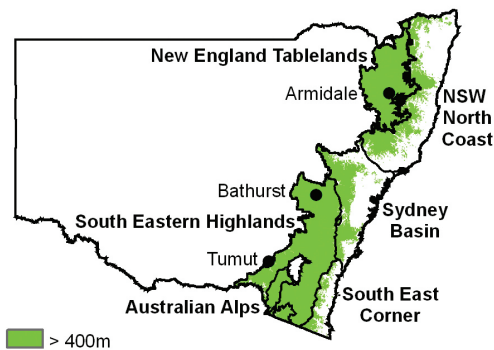
What are Montane Peatlands and Swamps?

Montane Peatlands and Swamps are generally a treeless community of plants with scattered to dense shrubs, including Tea-trees (*Leptospermum* species), *Baeckea* species, *Epacris* species, *Callistemon* species and/or *Hakea* species, and a groundlayer of grasses, sedges and herbs. The community often has large amounts of *Sphagnum* moss (the hummock peat forming mosses) in the understorey mixed with a layer of sedges. This community is often referred to as either a Bog or Fen. Fens are found in the wettest part of a site

and consist of mainly herbs and soft leaf sedges/grasses, whilst Bogs consist of more sclerophyllous shrubs.

There are a number of different recognisable structural types within the Montane Peatlands and Swamps community. Particularly, where soils are derived from basalt the community tends to consist of dense soft leaved tussock sedges and grasses with few shrubs and not usually with *Sphagnum* moss. On more siliceous soils, the community consists of more sclerophyllous (hard-leaved) shrubs and rhizomatous sedges (i.e. with horizontal underground stems), although this variation may also be a product of impeded drainage. The community may include more permanently inundated and localised marsh and open-water areas.

Where are Montane Peatlands and Swamps found?



Montane Peatlands and Swamps occur on undulating tablelands and plateaux, above 400m elevation, generally in catchments with soils derived from basalt, fine-grained sedimentary soils, or occasionally, granite or metamorphic sedimentary substrates. They are associated with accumulated peaty or organic-mineral sediments on poorly drained flats in the headwaters of streams. They are found in New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps Bioregions as mapped. This community occurs from above 400m and extends into the sub-alpine (1500-1800m) and alpine areas (>1800m).



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Description of the community

The Tree layer

Montane Peatlands and Swamps do not have an overstorey of tree species but will often be surrounded by woodland containing Snow-Gum (*Eucalyptus pauciflora*), Black Sally (*E. stellulata*) and/or Mountain Gum (*E. dalrympleana*) and may contain isolated individuals of small trees such as Black Sally or Blackwood (*Acacia melanoxylon*).

The Shrub layer

The shrub layer of this community is mostly open to very sparse, comprising shrubs 1-5 m tall, and commonly include species of *Baeckea*, *Callistemon* (bottlebrushes), *Leptospermum* (tea-trees), *Epacris* and *Hakea microcarpa*. Denser, closed shrubland or wet heath may also occur in localised swamp areas. Swamp-dwelling *Grevilleas* such as *Grevillea acanthifolia* or *G. rosmarinifolia* may also occur. In some peatlands and swamps, particularly those with a history of disturbance to vegetation, soils or hydrology, the shrub layer comprises dense thickets of *Leptospermum* species. In other peatlands and swamps with a history of grazing by domestic livestock, the shrub layer may be very sparse or absent.

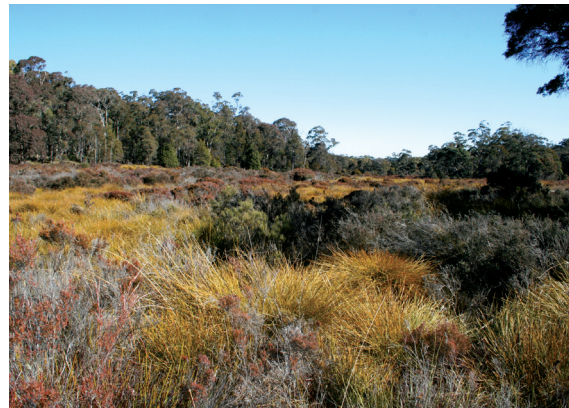
The Ground layer

The community has a continuous groundcover of sedges, grasses, herbs and wildflowers, except where a dense cover of tall shrubs casts deep shade. Soft-leaved species of *Carex* and *Poa* species typically make up most of the groundcover plants, with other common sedge-like plants including *Baloskion* species, *Baumea rubiginosa*, *Empodisma minus*, *Juncus* species, *Xyris* species and *Schoenus apogon*. On some substrates, these sedge-like species may dominate the groundcover. Herbs and wildflowers growing amongst the sedges include *Drosera* species, *Geranium neglectum*, *Gonocarpus micranthus*, *Gratiola* species, *Ranunculus* species, *Viola* species and *Wahlenbergia ceracea*. Hummocks of *Sphagnum* moss may occur amongst other components of the ground layer and sometimes dominate the ground-layer in localised patches. The continuity of the ground layer may be interrupted by disturbances such as erosion, trampling, partial clearing, earthworks, or in localised seepage areas and water-filled depressions.

Degraded sites – conservation significance of remnants

The degree of disturbance (i.e. the site condition) of any remnant of Montane Peatlands and Swamps may vary dependant on past land use, management practices and/or natural disturbance and this should be considered at the time of assessment. Whilst not exhaustive, the following are a number of variations of Montane Peatlands and Swamps you may encounter on your land:

1. Occurrence of regrowth of native understorey species along with herbaceous and/or woody weeds due to prior clearing or fire;



John Hunter

A Montane Peatland in Cathedral Rocks National Park with a dominant coverage of sedges and shrubs.

2. Exposed peaty terraces with incised gullies from trampling by stock (sheep, cattle) and feral hard hoofed animals (pigs, brumbies). Combined with lowered groundwater levels this can affect community structure and composition making the community prone to fire;
3. Weed invaded depressions from sedimentation and nutrification associated with pastoral land uses, and sedimentation from drains, roadways and other developments;

Identifying Montane Peatlands and Swamps

The following are 'Key Indicators' to look for when determining whether Montane Peatlands and Swamps exist on a site:

1. Is the site above 400m in the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands or Australian Alps bioregion (see map)?
2. Is the site on a generally boggy flat area near the headwaters of a stream (refer to topographic maps)?
3. Is the site associated with accumulated peaty or organic-mineral sediments generally in catchments with soil derived from basalt or fine-grained sedimentary substrates or, occasionally, granite and metamorphic sediments (refer to soil maps)?
4. Does the site have a noticeably low number to complete absence of trees?
5. Does the site contain more than trace amounts of *Sphagnum* moss (if the community is highly stressed from drought or otherwise *Sphagnum* may be rare on site to completely absent)?
6. Is there a reasonable representation of the shrubs and groundcover species present from those listed as characteristic of Montane Peatlands and Swamps in the table (check with local botanist, consult reference books or go to plantnet.rbgsyd.nsw.gov.au)?

If you answered yes to the above questions your site is likely to consist of Montane Peatlands and Swamps and you should seek expert advice.

Characteristic Species List

Montane Peatlands and Swamps are characterised by the species listed in table below. They have been identified by the NSW Scientific Committee and from the scientific literature. The species present at any site will be influenced by the size of the site, recent rainfall or drought conditions and by its disturbance (including fire and grazing) history. Note that NOT ALL the species listed below need to be present at any one site for it to constitute Montane Peatlands and Swamps.

Scientific Name	Common Name (range)
Tree Canopy Species >6m	
<i>Eucalyptus dalrympleana</i>	Mountain Gum
<i>Eucalyptus ovata</i>	Swamp Gum (S - Oberon)
<i>Eucalyptus pauciflora</i>	Snow Gum
<i>Eucalyptus stellulata</i>	Black Sally
Shrub Species (~1.5-6m)	
<i>Asperula gunnii</i> +	Mountain Woodruff (S-Dor)
<i>Baeckea gunniana</i> +	Alpine Baeckea
<i>Baeckea utilis</i> +	Mountain Baeckea
<i>Boronia Boroniadeanii</i>	Dean's Boronia (T)
<i>Callistemon pityoides</i>	Alpine Bottlebrush
<i>Comesperma retusum</i>	Mountain Milkwort
<i>Epacris breviflora</i>	Small Leaved Heath
<i>Epacris microphylla</i>	Coral Heath
<i>Epacris paludosa</i> +	Swamp Heath (S - B-Mtns)
<i>Grevillea acanthifolia</i>	Bog Grevillea
<i>Grevillea rosmarinifolia</i>	Rosemary Grevillea
<i>Hakea microcarpa</i> +	Small fruited Hakea
<i>Leptospermum juniperinum</i>	Prickly Tea-tree
<i>Leptospermum lanigerum</i>	Wooly Tea-tree (S - Mitta)
<i>Leptospermum myrtifolium</i>	Myrtle Tea-tree (S - Ora)
<i>Leptospermum obovatum</i>	A Tea-tree (S - Lith)
<i>Leptospermum polygalifolium</i> subsp. <i>polygalifolium</i>	Tantoon (N - B-Tops)
Groundcover species (~0-1.5m)	
Sedges	
<i>Baloskion australe</i> +	Southern Cordrush
<i>Baloskion stenocoleum</i>	Cordrush
<i>Baumea rubiginosa</i>	Twigrush
<i>Eleocharis acuta</i>	Spike-sedge
<i>Eleocharis pusilla</i>	Spike-sedge
<i>Eleocharis sphacelata</i>	Spike-sedge
<i>Empodisma minus</i> +	Empodisma
<i>Gahnia sieberiana</i>	Red-fruit Saw-sedge
<i>Juncus falcatus</i>	A Rush (S - Arm)
<i>Juncus planifolius</i>	A Rush
<i>Juncus sarophorus</i>	A Rush
<i>Schoenus apogon</i>	Common Bog Rush
<i>Scirpus polystachyus</i>	Large-headed Club Rush
Grasses	
<i>Carex appressa</i>	Tall Sedge
<i>Carex fascicularis</i>	Tassell Sedge
<i>Carex gaudichaudiana</i> +	Stream Sedge
<i>Deyeuxia gunniana</i>	Bent-grass
<i>Deyeuxia quadriseta</i>	Bent-grass
<i>Hypoxis hygrometrica</i>	Golden Weather Grass
<i>Poa costiniana</i>	(S - Glen Innes)
<i>Poa labillardieri</i>	Tussock Grass
<i>Poa sieberiana</i> var. <i>sieberiana</i> +	Snow Grass

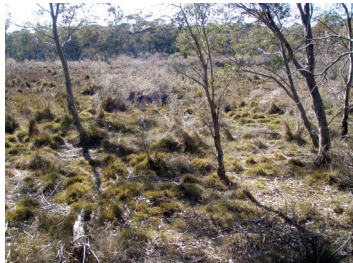
Scientific Name	Common Name (range)
Ferns	
<i>Blechnum nudum</i>	Fishbone Waterfern
<i>Blechnum penna-marina</i>	Alpine Waterfern
<i>Gleichenia dicarpa</i>	Tangle Fern
<i>Pteridium esculentum</i>	Bracken
Herbs and wildflowers	
<i>Acaena novae-zelandiae</i>	Bidgee-Widgee
<i>Arthropodium milleflorum</i>	Pail Vanilla-lily
<i>Brachyscome graminea</i>	Daisy
<i>Chionogentias cunninghamiana</i>	Snow Gentian
<i>Drosera binata</i>	Forked Sundew
<i>Drosera peltata</i>	Sundew
<i>Epilobium billardierianum</i>	Willowherb
<i>Epilobium gunnianum</i>	Gunns Willow Herb (S-Arm)
<i>Geranium neglectum</i> +	Cranes Bill
<i>Gonocarpus micranthus</i> +	Creeping Raspwort
<i>Gratiola peruviana</i>	Australian Brooklime
<i>Hydrocotyle peduncularis</i>	Pennywort
<i>Hypericum gramineum</i>	Small St Johns Wort
<i>Hypericum japonicum</i> +	Matted St John's Wort
<i>Isotoma fluviatilis</i>	Swamp Isotome
<i>Lagenifera stipitata</i>	Slender Lagenophora
<i>Lepyrodia anarthria</i>	Lepyrodia
<i>Lythrum salicaria</i>	Purple Loosestrife
<i>Mitrasacme serpyllifolia</i>	Thyme Mitrewort
<i>Myriophyllum pedunculatum</i>	Water Milfoil
<i>Neopaxia australasica</i>	White Purslane
<i>Oreomyrrhis ciliata</i>	Bog Caraway (S - B-Tops)
<i>Phragmites australis</i>	Common Reed
<i>Prasophyllum canaliculatum</i>	Summer Leek Orchid (T)
<i>Pratia pedunculata</i>	Trailing Pratia
<i>Prunella vulgaris</i>	Heal All
<i>Ranunculus lappaceus</i>	Common Buttercup
<i>Ranunculus pimpinellifolius</i>	Buttercup
<i>Sphagnum cristatum</i> +	Sphagnum
<i>Sphagnum novo-zelandicum</i>	Sphagnum
<i>Spiranthes sinensis</i> subsp. <i>australis</i>	Ladies Tresses
<i>Stellaria pungens</i>	Prickly Starwort
<i>Stylidium graminifolium</i>	Grass Trigger-plant
<i>Utricularia dichotoma</i>	Fairy Aprons
<i>Scaevola hookeri</i>	Creeping Fan Flower
<i>Viola betonicifolia</i>	Native Violet
<i>Viola caleyana</i>	Swamp Violet
<i>Viola hederacea</i>	Ivy-leaved Violet
<i>Wahlenbergia ceracea</i> +	Waxy Bluebell

+ = Key Indicator Species*; N = North of; S = South of; Arm = Armidale; B-Mtns = Blue Mountains; B-Tops = Barrington Tops; Dor = Dorrigo; Lith = Lithgow; Mitt = Mittagong; Ora = Orange; (T) = Threatened Species. For further help with plant identification see: plantNET.rbgnsyd.nsw.gov.au/search/simple.htm

* Key indicator species occurred in >20% of sites in [Whinam and Chilcott](#) (2002)



4WD vehicle tracks destroy soft peat soils and expose them to drying out, fire and weed incursion. Photo: Lucas McKinnon



A Montane Peatland and Swamp heavily impacted upon by fire. Photo: Ian Baird



Grazing in Montane Peatlands destroys soil structure and kills sensitive species such as Sphagnum. Photo: Lucas McKinnon



Fragile peat soils trampled by cattle on the edge of Wingecarribee Swamp. Photo: Lucas McKinnon

4. Extensive pine tree (*Pinus* species) and Pussy Willow (*Salix cinerea*) invasion around and within swamps which leads to altered community structure and shading out of native plants.
5. Some Montane Peatlands and Swamps may have lost their *Sphagnum* moss element due to a prolonged period of disturbance. Consider the other indicators outlined in this guideline before deciding whether or not you are within a remnant of this EEC.

Even where a remnant is considered to be heavily degraded and in poor condition, it may still have conservation value for a number of reasons including:

1. Swamps play an important role of filtering and slowly releasing water into the environment;
2. It may provide important habitat for threatened fauna such as Corroboree Frogs (*Pseudophryne pengillei* and *P. corroboree*) and Giant Dragonflies (*Petalura gigantea*);
3. It may contain threatened species of flora (e.g. Dean's Boronia or Summer Leek Orchid);
4. It may be part of a wildlife corridor that has connective importance at local and/or regional scales;
5. It may maintain a healthy native seed bank, very important in highly cleared landscapes;
6. It may have good restoration potential, requiring only minimal or moderate levels of intervention.

It is important to take these factors into account when determining the conservation significance of remnants.

For further assistance

This and other EEC guidelines are available on DECC Threatened Species website:

threatenedspecies.environment.nsw.gov.au

The references listed below also provide further information to aid in identifying EECs.

- Botanic Gardens Trust plant identification assistance: rbgsyd.nsw.gov.au/information_about_plants/botanical_info/plant_identification
- Botanic Gardens Trust PlantNET: plantnet.rbgsyd.nsw.gov.au/search/simple.htm
- Keith, D. (2004) *Ocean Shores to Desert Dunes. The Native Vegetation of NSW and the ACT*. Dept of Environment and Conservation.
- Harden, G. (ed) *Flora of NSW Vols 1 – 4* (1990-2002). NSW University Press.
- Montane Peatlands and Swamps EEC profile: threatenedspecies.environment.nsw.gov.au/tsprofile/profile.aspx?id=10936
- NSW Scientific Committee Determinations: environment.nsw.gov.au/committee/FinalDeterminations.htm
- Thackway, R. and Cresswell, I. (1995) (eds) 'An interim biogeographic regionalisation of Australia: a framework for establishing the national system of reserves.' (Australian Nature Conservation Agency: Canberra).
- Whinam, J. Chilcott, N. and Morgan, J.W. (2002) *Floristic composition and environmental relationships of Sphagnum dominated communities in NSW & ACT*. Cunninghamia. Vol 7 (3), pp. 463-500.

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Sphagnum cristatum, stressed by the drought is normally a lush green colour. Photo: Lucas McKinnon



Small-leaved Hakea and Swamp Heath, shrub species common to Montane Peatlands & Swamps. Photos: Lucas McKinnon & Anne Carey



Empodisma (*Empodisma minus*). Photo: Lucas McKinnon