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## **Sensitive Vegetation Units**

**in the**

## **City of Blue Mountains**

**Peter Smith and Judy Smith**

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## 1. Introduction

We have been engaged by Blue Mountains Conservation Society, acting also on behalf of Residents against Improper Development, Coalition of Residents for the Environment, Springwood-Winmalee Action Group, Peter Dodd and Lyndal Sullivan, to review the issue of sensitive vegetation units in the Blue Mountains and their protection by buffer zones. These matters have been discussed in a separate report (Smith and Smith 1997). In that report we identified a need for more comprehensive descriptions of the significant and sensitive vegetation units of the Blue Mountains. The present report provides such descriptions for the units currently identified as significant in the relevant planning instruments.

Two principal planning instruments will guide future development within the City of Blue Mountains. Local Environmental Plan 1991 (LEP 1991) applies to the rural and urban fringe areas of the City. Local Environmental Plan 1997 (LEP 1997), which has been exhibited in draft form and is now the subject of a Public Inquiry, will apply to the urban areas. Protection of the unique natural environment of the Blue Mountains is an important objective of both planning instruments, and both recognise certain ‘environmentally sensitive vegetation units’ (LEP 1991) or ‘significant flora and fauna habitats’ (LEP 1997) as having special conservation significance.

Schedule 3 of LEP 1991 identifies seven vegetation units as environmentally sensitive (Table 1). In a subsequent flora and fauna study for LEP 1997, we identified 19 vegetation units found in and around the Blue Mountains townships as significant flora and fauna habitats (Smith and Smith 1995a-e). These include all the sensitive vegetation units identified in LEP 1991, but also a number of additional units (Table 1). Our assessments have since been adopted in the Local Environmental Study for LEP 1997 (Blue Mountains City Council 1997a-e).

**Table 1. Comparison of significant vegetation communities identified in LEP 1991 and LEP 1997.**

<b>LEP 1991 – environmentally sensitive vegetation units (Schedule 3)</b>	<b>LEP 1997 – significant flora and fauna habitats (BMCC 1997a-e)</b>
Closed sedgeland (hanging swamps, sedge swamps)	Lagoon vegetation (Glenbrook Lagoon)
Closed heath, open heath (hanging swamps, shrub swamps)	Blue Mountains sedge swamps
Closed heath, open heath (heath)	Montane heath
	Lower Blue Mountains heath
Closed forests, tall closed forests (rainforests, warm temperate rainforests)	<i>Ceratopetalum apetalum-Doryphora sassafras</i> rainforest
	<i>Ceratopetalum apetalum-Backhousia myrtifolia</i> rainforest
Open forest, tall open forest (alluvial forests)	<i>Eucalyptus deanei-Syncarpia glomulifera</i> tall open-forest*
Closed scrub, open scrub (alluvial swamps)	<i>Melaleuca linariifolia</i> low open-forest
Low woodland, low open woodland (dry alluvial bench woodland)	<i>Eucalyptus sclerophylla</i> woodland – tall form on alluvium
	<i>Eucalyptus piperita-E. deanei</i> tall open-forest
	<i>Eucalyptus cypellocarpa-E. piperita</i> tall open-forest
	<i>Eucalyptus dalrympleana-E. piperita</i> tall open-forest
	<i>Eucalyptus amplifolia</i> tall open-forest
	<i>Syncarpia glomulifera-Eucalyptus punctata</i> open-forest
	<i>Eucalyptus mannifera</i> woodland
	<i>Eucalyptus mannifera-E. radiata</i> woodland
	Creepline vegetation
	Moist cliffline vegetation
	Escarpment and rock outcrop vegetation

\* The alluvial *E. deanei* forests (termed *E. deanei* tall open-forest in the Study Area 5 reports, Smith and Smith 1995e, BMCC 1997e) are only one form of this community, which is associated with other geological formations as well. However, Clause 10.5 of LEP 1991 recognises all forests dominated by *E. deanei* as significant.

Expanded descriptions of the significant vegetation units identified for LEP 1997 are provided below and the conservation significance of each unit is discussed. Some minor changes in nomenclature have been made as follows:

‘*Ceratopetalum apetalum-Backhousia myrtifolia* rainforest’ has been changed to ‘*Backhousia myrtifolia-Ceratopetalum apetalum* rainforest’ to emphasise the importance of *Backhousia myrtifolia* as a defining characteristic of the community.

‘*Eucalyptus mannifera* woodland’ and ‘*Eucalyptus mannifera-E. radiata* woodland’ are combined as sub-forms of ‘*Eucalyptus mannifera* alluvial woodland.’

'*Eucalyptus sclerophylla* woodland – tall form on alluvium' has been simplified to '*Eucalyptus sclerophylla* alluvial bench woodland.'

'Montane heath' and 'Lower Blue Mountains heath' are combined as sub-forms of 'Blue Mountains heath.'

'Blue Mountains sedge swamps' has been changed to 'Blue Mountains swamps.' The former term is well established in the literature, but has been a source of much confusion, since many of the swamps are dominated by shrubs or ferns rather than sedges.

'Creekline vegetation' has been changed to 'Blue Mountains creekline vegetation' to make the name more specific.

Similarly, 'moist cliffline vegetation' has been changed to 'Blue Mountains moist cliffline vegetation.'

'Escarpment and rock outcrop vegetation' has been changed to 'escarpment and rock outcrop vegetation complex' to emphasise that this unit is actually a complex of several different vegetation communities.

The lists of typical species for each vegetation unit have been derived mainly from our own observations, with additional records for the *Ceratopetalum apetalum-Doryphora sassafras* rainforest obtained from Floyd (1984), and additional records for Glenbrook Lagoon obtained from Brodie and Lembit (1992) and Stricker and Wall (1995).

Not all of the significant and sensitive vegetation units of the Blue Mountains have been identified in LEP 1991 and LEP 1997. Schedule 3 of LEP 1991 lists only seven such units, while LEP 1997 only deals with the vegetation within and immediately adjacent to the Blue Mountains townships. A wider survey would probably identify additional vegetation units in the City of Blue Mountains that warrant similar recognition as sensitive vegetation units. Examples are some of the different eucalypt communities found in the Mounts area and Megalong Valley, the different rainforest communities of the Mounts area, and the *Casuarina cunninghamia* riparian forest in Megalong Valley.

## **2. *Ceratopetalum apetalum-Doryphora sassafras* Rainforest**

### ***Description***

*Ceratopetalum apetalum-Doryphora sassafras* rainforest is the name applied to a rainforest community found on sedimentary geology at upper and middle altitudes in the Blue Mountains. It is replaced at lower altitudes by *Backhousia myrtifolia-Ceratopetalum apetalum* rainforest. The two communities intergrade in the Springwood area. *Ceratopetalum apetalum-Doryphora sassafras* rainforest occurs on relatively fertile soils in sheltered, moist sites that are rarely, if ever, burnt. In Floyd's (1990) classification of New South Wales rainforests, it corresponds to the *Ceratopetalum-Doryphora* suballiance within the *Ceratopetalum apetalum* alliance of the 'warm-temperate rainforest' subform.

The dominant tree species are usually *Ceratopetalum apetalum* (Coachwood) and/or *Doryphora sassafras* (Sassafras). Other trees that are common in some stands are *Acacia elata* (Mountain Cedar Wattle), *Acmena smithii* (Lilly Pilly), *Callicoma serratifolia* (Black Wattle), *Hedycarya angustifolia* (Native Mulberry) and *Quintinia sieberi* (Possumwood).

*Backhousia myrtifolia* (Grey Myrtle) is usually absent, although sometimes a minor component of the community. The vegetation structure is usually a closed-forest or low closed-forest. There may be a layer of emergent eucalypts above the rainforest canopy. Ferns, vines and epiphytes are usually prominent features of the community.

*Ceratopetalum apetalum*-*Doryphora sassafras* rainforest is characterised by the following assemblage of native plant species. Other species also occur, and not all of the following species are present in every stand of the community, but the list is indicative of the species composition of the vegetation.

<i>Acacia elata</i>	<i>Elaeocarpus holopetalus</i>	<i>Parsonsia straminea</i>
<i>Acmena smithii</i>	<i>Elaeocarpus reticulatus</i>	<i>Passiflora cinnabarina</i>
<i>Asplenium australasicum</i>	<i>Eucalyptus oreades</i>	<i>Pellaea falcata</i>
<i>Asplenium flabellifolium</i>	<i>Eucalyptus piperita</i>	<i>Pittosporum revolutum</i>
<i>Blechnum ambiguum</i>	<i>Fieldia australis</i>	<i>Pittosporum undulatum</i>
<i>Blechnum cartilagineum</i>	<i>Gleichenia microphylla</i>	<i>Polystichum proliferum</i>
<i>Blechnum gregsonii</i>	<i>Grammitis billardieri</i>	<i>Pyrrhosia rupestris</i>
<i>Blechnum nudum</i>	<i>Hakea salicifolia</i>	<i>Quintinia sieberi</i>
<i>Blechnum patersonii</i>	<i>Hedycarya angustifolia</i>	<i>Rubus hillii</i>
<i>Blechnum watsii</i>	<i>Hydrocotyle peduncularis</i>	<i>Rubus rosifolius</i>
<i>Callicoma serratifolia</i>	<i>Hymenophyllum cupressiforme</i>	<i>Smilax australis</i>
<i>Calochlaena dubia</i>	<i>Lastreopsis acuminata</i>	<i>Smilax glyciophylla</i>
<i>Cassytha pubescens</i>	<i>Leptopteris fraseri</i>	<i>Stenocarpus salignus</i>
<i>Cephalalaria cephalobotrys</i>	<i>Leptospermum polygalifolium</i>	<i>Sticherus flabellatus</i>
<i>Ceratopetalum apetalum</i>	<i>Libertia pulchella</i>	<i>Sticherus lobatus</i>
<i>Cissus hypoglauca</i>	<i>Lomandra montana</i>	<i>Syncarpia glomulifera</i>
<i>Clematis aristata</i>	<i>Lomatia myricoides</i>	<i>Tasmannia insipida</i>
<i>Coprosma quadrifida</i>	<i>Microsorium diversifolium</i>	<i>Todea barbara</i>
<i>Cyathea australis</i>	<i>Microsorium scandens</i>	<i>Tristania neriifolia</i>
<i>Cyathea leichhardtiana</i>	<i>Morinda jasminoides</i>	<i>Tristaniopsis collina</i>
<i>Dendrobium teretifolium</i>	<i>Notelaea longifolia</i>	<i>Tristaniopsis laurina</i>
<i>Dicksonia antarctica</i>	<i>Notelaea venosa</i>	<i>Tylophora barbata</i>
<i>Doodia aspera</i>	<i>Pandorea pandorana</i>	<i>Viola hederacea</i>
<i>Doryphora sassafras</i>	<i>Parsonsia brownii</i>	
<i>Dracophyllum secundum</i>	<i>Parsonsia leichhardtii</i>	

### ***Conservation Significance***

Rainforest is limited in extent in the Blue Mountains region and constitutes only 1.6% of the total area of Blue Mountains National Park. It is a distinctive vegetation type, with many plant and animal species more or less restricted to rainforest, including one rare plant species, *Blechnum gregsonii*. It is also an important habitat for two vulnerable fauna species, the Sooty Owl (*Tyto tenebricosa*) and the Stuttering Frog (*Mixophyes balbus*). Rainforest vegetation has scenic value, especially for the contrast it presents to the eucalypt forests and woodlands that dominate the local vegetation. It also has scientific and educational value as a remnant of a vegetation type that was much more widespread in the past, when the Australian climate was wetter.

### 3. *Backhousia myrtifolia*-*Ceratopetalum apetalum* Rainforest

#### *Description*

*Backhousia myrtifolia*-*Ceratopetalum apetalum* rainforest is the name applied to a rainforest community found on sedimentary geology at lower altitudes in the Blue Mountains. It is replaced at middle and upper altitudes by *Ceratopetalum apetalum*-*Doryphora sassafras* rainforest. The two communities intergrade in the Springwood area. *Backhousia myrtifolia*-*Ceratopetalum apetalum* rainforest occurs on relatively fertile soils in sheltered, moist sites that are rarely, if ever, burnt. In Floyd's (1990) classification of New South Wales rainforests, it corresponds to the *Backhousia myrtifolia*-*Acmena smithii* suballiance within the *Choricarpia*-*Backhousia* spp. alliance of the 'dry rainforest' subform.

*Backhousia myrtifolia* (Grey Myrtle) is the dominant tree species or co-dominant with *Ceratopetalum apetalum* (Coachwood) and/or *Acmena smithii* (Lilly Pilly). Other trees that are common in some stands are *Acacia elata* (Mountain Cedar Wattle), *Callicoma serratifolia* (Black Wattle) and *Syncarpia glomulifera* (Turpentine). *Doryphora sassafras* (Sassafras) is often present, but not as a dominant. The vegetation structure is usually a closed-forest or low closed-forest. There may be a layer of emergent eucalypts above the dense rainforest canopy. Ferns, vines and epiphytes are usually prominent features of the community.

*Backhousia myrtifolia*-*Ceratopetalum apetalum* rainforest forest is characterised by the following assemblage of native plant species. Other species also occur, and not all of the following species are present in every stand of the community, but the list is indicative of the species composition of the vegetation.

<i>Acacia elata</i>	<i>Cyathea australis</i>	<i>Persoonia mollis</i>
<i>Acmena smithii</i>	<i>Dianella caerulea</i>	<i>Pittosporum revolutum</i>
<i>Acrotriche divaricata</i>	<i>Doodia aspera</i>	<i>Pittosporum undulatum</i>
<i>Adiantum aethiopicum</i>	<i>Doryphora sassafras</i>	<i>Prostanthera violacea</i>
<i>Adiantum hispidulum</i>	<i>Elaeocarpus reticulatus</i>	<i>Pultenaea flexilis</i>
<i>Allocasuarina littoralis</i>	<i>Entolasia stricta</i>	<i>Pyrrosia rupestris</i>
<i>Allocasuarina torulosa</i>	<i>Eucalyptus piperita</i>	<i>Rapanea variabilis</i>
<i>Asplenium flabellifolium</i>	<i>Lepidosperma gunnii</i>	<i>Schoenus melanostachys</i>
<i>Astrotricha latifolia</i>	<i>Lepidosperma laterale</i>	<i>Smilax australis</i>
<i>Backhousia myrtifolia</i>	<i>Lomandra longifolia</i>	<i>Smilax glycyphylla</i>
<i>Blechnum cartilagineum</i>	<i>Lomandra montana</i>	<i>Sticherus flabellatus</i>
<i>Boronia fraseri</i>	<i>Morinda jasminoides</i>	<i>Syncarpia glomulifera</i>
<i>Callicoma serratifolia</i>	<i>Notelaea longifolia</i>	<i>Tasmannia insipida</i>
<i>Calochlaena dubia</i>	<i>Ozothamnus diosmifolius</i>	<i>Todea barbara</i>
<i>Ceratopetalum apetalum</i>	<i>Pandorea pandorana</i>	<i>Tylophora barbata</i>
<i>Cissus hypoglauca</i>	<i>Parsonsia straminea</i>	<i>Zieria smithii</i>

#### *Conservation Significance*

Rainforest is a significant vegetation type in the Blue Mountains because of its limited extent in the region (it constitutes only 1.6% of Blue Mountains National Park) and because of its distinctive flora and fauna. Rainforest vegetation has scenic value, especially for the contrast it presents to the eucalypt forests and woodlands that dominate the local vegetation. It also has scientific and educational value as a remnant of a vegetation type that was much more widespread in the past, when the Australian climate was wetter.

#### 4. *Eucalyptus deanei-Syncarpia glomulifera* Tall Open-forest

##### *Description*

*Eucalyptus deanei-Syncarpia glomulifera* tall open-forest is the name applied to a vegetation community found on deep, fertile soils in moist, sheltered sites at lower and middle altitudes in the Blue Mountains. It is characterised by *Eucalyptus deanei* (Mountain Blue Gum), which is the dominant tree species or co-dominant with *Syncarpia glomulifera* (Turpentine). The community occurs on alluvial soils, where *E. deanei* is the sole dominant, and on Wianamatta Shale and volcanic diatreme soils, where *E. deanei* and *S. glomulifera* are co-dominant. Other tree species that may be present include *Angophora costata* (Sydney Red Gum), *A. floribunda* (Rough-barked Apple), *Eucalyptus notabilis* (Mountain Mahogany), *E. piperita* (Sydney Peppermint) and *E. punctata* (Grey Gum). The typical vegetation structure is tall open-forest, although this may vary depending on site conditions and history. It is a wet sclerophyll forest, with soft-leaved plants prominent in the understorey.

The alluvial form of this community may warrant recognition as a separate community (*Eucalyptus deanei* tall open-forest), although it shares many species with the *E. deanei-S. glomulifera* forest on shale and diatreme soils.

*Eucalyptus deanei-Syncarpia glomulifera* tall open-forest is characterised by the following assemblage of native plant species. Other species also occur, and not all of the following species are present in every stand of the community, but the list is indicative of the species composition of the vegetation.

<i>Acacia elata</i>	<i>Entolasia marginata</i>	<i>Oplismenus imbecillis</i>
<i>Acacia longifolia</i>	<i>Entolasia stricta</i>	<i>Pandorea pandorana</i>
<i>Acacia parramattensis</i>	<i>Eucalyptus deanei</i>	<i>Persoonia linearis</i>
<i>Acacia parvipinnula</i>	<i>Eucalyptus notabilis</i>	<i>Phyllanthus hirtellus</i>
<i>Acianthus exsertus</i>	<i>Eucalyptus piperita</i>	<i>Pittosporum revolutum</i>
<i>Adiantum aethiopicum</i>	<i>Eucalyptus punctata</i>	<i>Pittosporum undulatum</i>
<i>Allocasuarina torulosa</i>	<i>Eustrephus latifolius</i>	<i>Platysace lanceolata</i>
<i>Angophora costata</i>	<i>Gahnia sieberiana</i>	<i>Polyscias sambucifolia</i>
<i>Angophora floribunda</i>	<i>Geitonoplesium cymosum</i>	<i>Pratia purpurascens</i>
<i>Astrotricha latifolia</i>	<i>Glycine clandestina</i>	<i>Pseuderanthemum variabile</i>
<i>Backhousia myrtifolia</i>	<i>Gonocarpus teucroides</i>	<i>Pteridium esculentum</i>
<i>Blechnum cartilagineum</i>	<i>Hakea dactyloides</i>	<i>Pterostylis nutans</i>
<i>Blechnum nudum</i>	<i>Hardenbergia violacea</i>	<i>Pultenaea flexilis</i>
<i>Breynia oblongifolia</i>	<i>Hibbertia diffusa</i>	<i>Rubus parvifolius</i>
<i>Callicoma serratifolia</i>	<i>Hibiscus heterophyllus</i>	<i>Schoenus melanostachys</i>
<i>Callistemon citrinus</i>	<i>Imperata cylindrica</i>	<i>Smilax australis</i>
<i>Calochlaena dubia</i>	<i>Kennedia rubicunda</i>	<i>Smilax glyciphylla</i>
<i>Cassytha pubescens</i>	<i>Lepidosperma laterale</i>	<i>Stylidium graminifolium</i>
<i>Ceratopetalum gummiferum</i>	<i>Lepidosperma urophorum</i>	<i>Stylidium productum</i>
<i>Cissus antarctica</i>	<i>Leptospermum polygalifolium</i>	<i>Stypandra glauca</i>
<i>Clematis aristata</i>	<i>Leucopogon lanceolatus</i>	<i>Syncarpia glomulifera</i>
<i>Dianella caerulea</i>	<i>Lomandra longifolia</i>	<i>Telopea speciosissima</i>
<i>Dichelachne rara</i>	<i>Lomatia silaifolia</i>	<i>Themeda australis</i>
<i>Dichondra repens</i>	<i>Melaleuca linariifolia</i>	<i>Tristaniopsis collina</i>
<i>Dodonaea triquetra</i>	<i>Microlaena stipoides</i>	<i>Tylophora barbata</i>
<i>Doodia aspera</i>	<i>Oplismenus aemulus</i>	

## Conservation Significance

*Eucalyptus deanei*-*Syncarpia glomulifera* tall open-forest is significant in the Blue Mountains because of its rarity. It is also a rich habitat for fauna, supporting greater numbers and a greater diversity of mammals and birds than the more typical, lower, drier eucalypt forests and woodlands of the Blue Mountains region. The *Eucalyptus deanei* trees are a major source of nest hollows for owls, parrots, gliders and other hollow-dependent fauna, including threatened species such as the Powerful Owl (*Ninox strenua*) and Glossy Black-Cockatoo (*Calyptorhynchus lathami*).

## 5. *Eucalyptus piperita*-*E. deanei* Tall Open-forest

### Description

*Eucalyptus piperita*-*E. deanei* tall open-forest is the name applied to a vegetation community of mixed tree species composition, including *Eucalyptus piperita* (Sydney Peppermint), *E. deanei* (Mountain Blue Gum), *Syncarpia glomulifera* (Turpentine), *Angophora costata* (Sydney Red Gum), *A. floribunda* (Rough-barked Apple), *Eucalyptus punctata* (Grey Gum) and *E. crebra* (Narrow-leaved Ironbark). Not all of these species occur in every stand, except for *E. deanei*, whose presence is characteristic of the community. The community is found in moist, sheltered sites on the talus slopes below the sandstone escarpments of the Jamison, Kedumba and Grose Valleys. It is replaced further west in the Megalong and Kanimbla Valleys by *Eucalyptus cypellocarpa*-*E. piperita* tall open-forest. The community also occurs in some moist, sheltered sites away from the escarpments. The typical vegetation structure is tall open-forest, although this may vary depending on site conditions and history. It is a wet sclerophyll forest, with soft-leaved plants prominent in the understorey.

*Eucalyptus piperita*-*E. deanei* tall open-forest differs from *Eucalyptus deanei*-*Syncarpia glomulifera* tall open-forest in that it occurs on different geology (Illawarra Coal Measures, Shoalhaven Group and Narrabeen Group) and *E. deanei* is less dominant.

*Eucalyptus piperita*-*E. deanei* tall open-forest is characterised by the following assemblage of native plant species. Other species also occur, and not all of the following species are present in every stand of the community, but the list is indicative of the species composition of the vegetation.

<i>Acacia elata</i>	<i>Ceratopetalum apetalum</i>	<i>Exocarpos cupressiformis</i>
<i>Acacia falciiformis</i>	<i>Clematis aristata</i>	<i>Gahnia sieberiana</i>
<i>Acacia longifolia</i>	<i>Cyathea australis</i>	<i>Galium propinquum</i>
<i>Adiantum aethiopicum</i>	<i>Desmodium varians</i>	<i>Geitonoplesium cymosum</i>
<i>Allocasuarina torulosa</i>	<i>Dianella caerulea</i>	<i>Gleichenia microphylla</i>
<i>Angophora costata</i>	<i>Dichelachne rara</i>	<i>Glycine clandestina</i>
<i>Angophora floribunda</i>	<i>Dichondra repens</i>	<i>Hakea dactyloides</i>
<i>Arthropodium minus</i>	<i>Doodia aspera</i>	<i>Hakea salicifolia</i>
<i>Astrotricha latifolia</i>	<i>Elaeocarpus reticulatus</i>	<i>Hibbertia scandens</i>
<i>Banksia spinulosa</i>	<i>Entolasia stricta</i>	<i>Hydrocotyle peduncularis</i>
<i>Blechnum cartilagineum</i>	<i>Eucalyptus crebra</i>	<i>Indigofera australis</i>
<i>Callicoma serratifolia</i>	<i>Eucalyptus deanei</i>	<i>Leptospermum polygalifolium</i>
<i>Calochlaena dubia</i>	<i>Eucalyptus piperita</i>	<i>Leucopogon lanceolatus</i>
<i>Carex longebrachiata</i>	<i>Eucalyptus punctata</i>	<i>Lomandra longifolia</i>
<i>Cassytha pubescens</i>	<i>Eustrephus latifolius</i>	<i>Lomandra montana</i>



<i>Melaleuca styphelioides</i>	<i>Plectranthus parviflorus</i>	<i>Sticherus lobatus</i>
<i>Oplismenus aemulus</i>	<i>Pratia purpurascens</i>	<i>Syncarpia glomulifera</i>
<i>Pandorea pandorana</i>	<i>Pteridium esculentum</i>	<i>Todea barbara</i>
<i>Platylobium formosum</i>	<i>Rubus parvifolius</i>	<i>Tristaniopsis collina</i>
<i>Platysace lanceolata</i>	<i>Smilax australis</i>	<i>Tylophora barbata</i>

### **Conservation Significance**

*Eucalyptus piperita*-*E. deanei* tall open-forest is significant in the Blue Mountains because of its limited extent and because it is a rich habitat for fauna, supporting greater numbers and a greater diversity of mammals and birds than the more typical, lower, drier eucalypt forests and woodlands of the region. The *Eucalyptus deanei* trees are a major source of nest hollows for owls, parrots, gliders and other hollow-dependent fauna, including threatened species such as the Powerful Owl (*Ninox strenua*) and Glossy Black-Cockatoo (*Calyptorhynchus lathami*).

## **6. *Eucalyptus cypellocarpa*-*E. piperita* Tall Open-forest**

### **Description**

*Eucalyptus cypellocarpa*-*E. piperita* tall open-forest is the name applied to a vegetation community characterised by the presence of *Eucalyptus cypellocarpa* (Monkey Gum), occurring in association with one or more of *E. piperita* (Sydney Peppermint), *E. oreades* (Blue Mountain Ash) and *E. radiata* (Narrow-leaved Peppermint). The community is found in moist, sheltered sites on the talus slopes below the sandstone escarpments of the western Blue Mountains (Megalong and Kanimbla Valleys). The community also occurs in some moist, sheltered sites away from the escarpments, and even occurs as far east as Woodford. The typical vegetation structure is tall open-forest, although this may vary depending on site conditions and history. It is a wet sclerophyll forest, with soft-leaved plants prominent in the understorey.

*Eucalyptus cypellocarpa*-*E. piperita* tall open-forest is characterised by the following assemblage of native plant species. Other species also occur, and not all of the following species are present in every stand of the community, but the list is indicative of the species composition of the vegetation.

<i>Acacia elata</i>	<i>Entolasia stricta</i>	<i>Lomandra longifolia</i>
<i>Acacia longifolia</i>	<i>Epacris pulchella</i>	<i>Lomatia silaifolia</i>
<i>Banksia cunninghamii</i>	<i>Eucalyptus cypellocarpa</i>	<i>Microlaena stipoides</i>
<i>Banksia spinulosa</i>	<i>Eucalyptus mannifera</i>	<i>Monotoca scoparia</i>
<i>Blechnum cartilagineum</i>	<i>Eucalyptus oreades</i>	<i>Persoonia mollis</i>
<i>Callicoma serratifolia</i>	<i>Eucalyptus piperita</i>	<i>Persoonia myrtilloides</i>
<i>Callistemon citrinus</i>	<i>Eucalyptus radiata</i>	<i>Petrophile pulchella</i>
<i>Calochlaena dubia</i>	<i>Gahnia sieberiana</i>	<i>Platysace lanceolata</i>
<i>Cassytha pubescens</i>	<i>Gleichenia microphylla</i>	<i>Polyscias sambucifolia</i>
<i>Chionochloa pallida</i>	<i>Gonocarpus teucroides</i>	<i>Pteridium esculentum</i>
<i>Comesperma ericinum</i>	<i>Hakea dactyloides</i>	<i>Pultenaea flexilis</i>
<i>Cyathea australis</i>	<i>Hydrocotyle peduncularis</i>	<i>Pultenaea scabra</i>
<i>Dianella caerulea</i>	<i>Leptospermum grandifolium</i>	<i>Todea barbara</i>
<i>Empodisma minus</i>	<i>Leptospermum polygalifolium</i>	<i>Tristaniopsis collina</i>
<i>Entolasia marginata</i>	<i>Leucopogon lanceolatus</i>	

## Conservation Significance

*Eucalyptus cypellocarpa*-*E. piperita* tall open-forest is significant in the Blue Mountains because of its limited extent and because it is a rich habitat for fauna, supporting greater numbers and a greater diversity of mammals and birds than the more typical, lower, drier eucalypt forests and woodlands of the region. The *Eucalyptus cypellocarpa* trees are a major source of nest hollows for owls, parrots, gliders and other hollow-dependent fauna, including threatened species such as the Powerful Owl (*Ninox strenua*) and Glossy Black-Cockatoo (*Calyptorhynchus lathami*).

### 7. *Eucalyptus dalrympleana*-*E. piperita* Tall Open-forest

#### Description

*Eucalyptus dalrympleana*-*E. piperita* tall open-forest is the name applied to a vegetation community characterised by the presence of *Eucalyptus dalrympleana* (Mountain Gum), occurring in association with *E. piperita* (Sydney Peppermint) and *E. radiata* (Narrow-leaved Peppermint). In the City of Blue Mountains, this community appears to be restricted to one small stand at the upper end of Popes Glen Creek, Blackheath. It occurs there on a sheltered, south-facing slope on Narrabeen Group geology. The vegetation structure is variable within this disturbed stand, from tall open-forest to open-forest and woodland. It is a wet sclerophyll forest, with soft-leaved plants prominent in the understorey.

*Eucalyptus dalrympleana*-*E. piperita* tall open-forest is characterised by the following assemblage of native plant species. Other species also occur, but the list is indicative of the species composition of the community at Blackheath.

<i>Acacia longifolia</i>	<i>Empodisma minus</i>	<i>Leucopogon lanceolatus</i>
<i>Acacia melanoxylon</i>	<i>Epacris pulchella</i>	<i>Lomandra longifolia</i>
<i>Arrhenechthites mixta</i>	<i>Eucalyptus dalrympleana</i>	<i>Lomatia silaifolia</i>
<i>Baumea rubiginosa</i>	<i>Eucalyptus piperita</i>	<i>Lycopodium deuterodensum</i>
<i>Billardiera scandens</i>	<i>Eucalyptus radiata</i>	<i>Microlaena stipoides</i>
<i>Blechnum nudum</i>	<i>Gahnia sieberiana</i>	<i>Olearia erubescens</i>
<i>Chionochloa pallida</i>	<i>Gleichenia dicarpa</i>	<i>Persoonia myrtilloides</i>
<i>Cyathea australis</i>	<i>Gonocarpus teucrioides</i>	<i>Poa sieberiana</i>
<i>Daviesia ulicifolia</i>	<i>Hakea dactyloides</i>	<i>Polyscias sambucifolia</i>
<i>Deyeuxia parviseta</i>	<i>Helichrysum scorpioides</i>	<i>Pteridium esculentum</i>
<i>Dianella prunina</i>	<i>Leptospermum polygalifolium</i>	<i>Pultenaea scabra</i>
<i>Dianella tasmanica</i>	<i>Lepyrodia scariosa</i>	

#### Conservation Significance

*Eucalyptus dalrympleana*-*E. piperita* tall open-forest is significant as a very rare community in the City of Blue Mountains.

## 8. *Eucalyptus amplifolia* Tall Open-forest

### *Description*

*Eucalyptus amplifolia* tall open-forest is the name applied to a vegetation community dominated by *Eucalyptus amplifolia* (Cabbage Gum) that occurs on the diatreme at Sun Valley. An associated tree species is *Eucalyptus eugenioides* (Thin-leaved Stringybark). Although there is still good tree cover in the area (remnant trees and regeneration), the understorey of this community has been grossly altered through clearing and grazing. Remaining native understorey species include *Acacia parramattensis*, *Imperata cylindrica*, *Lomandra longifolia* and *Pteridium esculentum*, but the original composition of the understorey is difficult to assess.

### *Conservation Significance*

*Eucalyptus amplifolia* tall open-forest is a very rare and unusual vegetation community in the Blue Mountains. Other diatremes in the region support quite different communities. Attempts at restoration of this community at Sun Valley are certainly warranted. The site also supports a population of a threatened species, the Squirrel Glider (*Petaurus norfolkensis*).

## 9. *Syncarpia glomulifera*-*Eucalyptus punctata* Open-forest

### *Description*

*Syncarpia glomulifera*-*Eucalyptus punctata* open-forest is the name applied to a vegetation community in which *Syncarpia glomulifera* (Turpentine) and *Eucalyptus punctata* (Grey Gum) are usually both present, together with one or more of the following species, *E. eugenioides* (Thin-leaved Stringybark), *E. globoidea* (White Stringybark), *E. crebra* (Narrow-leaved Ironbark), *E. notabilis* (Mountain Mahogany), *E. beyeriana* (Beyer's Ironbark) and *E. fibrosa* (Red Ironbark). The community occurs on Wianamatta Shale soils in the lower Blue Mountains, occupying drier, more exposed sites than the *Eucalyptus deanei*-*Syncarpia glomulifera* tall open-forest, which also occurs on these soils. The typical vegetation structure is open-forest, although this may vary depending on site conditions and history.

*Syncarpia glomulifera*-*Eucalyptus punctata* tall open-forest is characterised by the following assemblage of native plant species. Other species also occur, and not all of the following species are present in every stand of the community, but the list is indicative of the species composition of the vegetation.

<i>Acacia implexa</i>	<i>Bossiaea obcordata</i>	<i>Entolasia marginata</i>
<i>Acacia parvipinnula</i>	<i>Bursaria spinosa</i>	<i>Entolasia stricta</i>
<i>Acianthus exsertus</i>	<i>Cyathochaeta diandra</i>	<i>Eucalyptus beyeriana</i>
<i>Adiantum aethiopicum</i>	<i>Daviesia squarrosa</i>	<i>Eucalyptus crebra</i>
<i>Allocasuarina littoralis</i>	<i>Daviesia ulicifolia</i>	<i>Eucalyptus eugenioides</i>
<i>Allocasuarina torulosa</i>	<i>Dianella caerulea</i>	<i>Eucalyptus eximia</i>
<i>Angophora costata</i>	<i>Dianella revoluta</i>	<i>Eucalyptus fibrosa</i>
<i>Aristida vagans</i>	<i>Dichondra repens</i>	<i>Eucalyptus globoidea</i>
<i>Arthropodium minus</i>	<i>Doodia aspera</i>	<i>Eucalyptus gummifera</i>
<i>Billardiera scandens</i>	<i>Echinopogon caespitosus</i>	<i>Eucalyptus notabilis</i>

<i>Eucalyptus punctata</i>	<i>Microlaena stipoides</i>	<i>Pittosporum undulatum</i>
<i>Exocarpos cupressiformis</i>	<i>Notelaea longifolia</i>	<i>Poa cheelii</i>
<i>Glycine clandestina</i>	<i>Olearia microphylla</i>	<i>Polyscias sambucifolia</i>
<i>Hakea sericea</i>	<i>Oplismenus aemulus</i>	<i>Pratia purpurascens</i>
<i>Hydrocotyle peduncularis</i>	<i>Oplismenus imbecillis</i>	<i>Pseuderanthemum variabile</i>
<i>Hypolepis muelleri</i>	<i>Oxylobium ilicifolium</i>	<i>Pteridium esculentum</i>
<i>Imperata cylindrica</i>	<i>Pandorea pandorana</i>	<i>Pultenaea ferruginea</i>
<i>Kunzea ambigua</i>	<i>Panicum simile</i>	<i>Stipa pubescens</i>
<i>Lepidosperma laterale</i>	<i>Persoonia linearis</i>	<i>Stipa rudis</i>
<i>Lindsaea microphylla</i>	<i>Petrophile pulchella</i>	<i>Syncarpia glomulifera</i>
<i>Lomandra filiformis</i>	<i>Pimelea linifolia</i>	<i>Themeda australis</i>
<i>Lomandra longifolia</i>	<i>Pittosporum revolutum</i>	<i>Tylophora barbata</i>

### **Conservation Significance**

*Syncarpia glomulifera-Eucalyptus punctata* open-forest has always had a restricted distribution in the Blue Mountains and has become much rarer through clearing. Occurring on relatively fertile soils and easy topography, it has been a favoured site for agricultural and urban development. Representation of the community in Blue Mountains National Park is very poor. It is a distinctive community, differing markedly in species composition from the typical sandstone vegetation of the region.

## **10. *Eucalyptus mannifera* Alluvial Woodland**

### **Description**

*Eucalyptus mannifera* alluvial woodland is the name applied to a vegetation community found on alluvial soils along certain creeks in the upper Blue Mountains, in which *Eucalyptus mannifera* (Brittle Gum) is the dominant tree species or co-dominant with *E. radiata* (Narrow-leaved Peppermint). The association of the community with creekside alluvium is a critical feature in its definition, since *E. mannifera* and *E. radiata* are common species in the upper Blue Mountains and occur in other communities as well. The vegetation structure is woodland or open-forest. *E. mannifera* occurs in some sites as a sparse tree layer (an open-woodland) over swamp vegetation, but such stands are better classified as the Blue Mountains swamps community rather than as *E. mannifera* alluvial woodland.

Two forms of *Eucalyptus mannifera* alluvial woodland may be distinguished. At higher altitudes (Mount Victoria-Blackheath), *E. mannifera* is the main tree species and the community is termed *E. mannifera* woodland in our Study Area 1 report (Smith and Smith 1995a). At slightly lower altitudes (Katoomba-Leura), *E. mannifera* and *E. radiata* are co-dominant and the community is termed *E. mannifera-E. radiata* woodland in our Study Area 2 report (Smith and Smith 1995b).

*Eucalyptus mannifera* alluvial woodland is characterised by the following assemblage of native plant species. Other species also occur, and not all of the following species are present in every stand of the community, but the list is indicative of the species composition of the vegetation.

<i>Acacia dealbata</i>	<i>Baeckea linifolia</i>	<i>Blechnum nudum</i>
<i>Acacia melanoxylon</i>	<i>Banksia cunninghamii</i>	<i>Boronia microphylla</i>
<i>Acacia terminalis</i>	<i>Banksia spinulosa</i>	<i>Caustis flexuosa</i>

<i>Chionochloa pallida</i>	<i>Grevillea acanthifolia</i>	<i>Lomandra longifolia</i>
<i>Dampiera stricta</i>	<i>Hakea dactyolides</i>	<i>Microlaena stipoides</i>
<i>Deyeuxia parviseta</i>	<i>Helichrysum scorpioides</i>	<i>Mirbelia platylobioides</i>
<i>Dillwynia retorta</i>	<i>Hibbertia serpyllifolia</i>	<i>Olearia erubescens</i>
<i>Empodisma minus</i>	<i>Lepidosperma laterale</i>	<i>Persoonia myrtilloides</i>
<i>Entolasia stricta</i>	<i>Leptospermum continentale</i>	<i>Pimelea linifolia</i>
<i>Epacris purpurascens</i>	<i>Leptospermum grandifolium</i>	<i>Poa sieberiana</i>
<i>Eucalyptus blaxlandii</i>	<i>Leptospermum juniperinum</i>	<i>Polyscias sambucifolia</i>
<i>Eucalyptus mannifera</i>	<i>Leptospermum polygalifolium</i>	<i>Pteridium esculentum</i>
<i>Eucalyptus radiata</i>	<i>Leptospermum trinervium</i>	<i>Stipa pubescens</i>
<i>Gahnia sieberiana</i>	<i>Lepyrodia scariosa</i>	<i>Stipa rudis</i>
<i>Gleichenia dicarpa</i>	<i>Leucopogon lanceolatus</i>	<i>Styphelia tubiflora</i>
<i>Gonocarpus teucroides</i>	<i>Lomandra filiformis</i>	<i>Tetrarrhena turfosa</i>

### **Conservation Significance**

*Eucalyptus mannifera* alluvial woodland is a significant community in the Blue Mountains because of its rarity and because, as a creekline community, it has an important function in stream protection. The community has suffered loss and degradation through urban development, and is particularly susceptible to weed invasion.

## **11. *Eucalyptus sclerophylla* Alluvial Bench Woodland**

### **Description**

*Eucalyptus sclerophylla* alluvial bench woodland is the name applied to a vegetation community that occurs on dry sandy alluvial benches along certain creek systems in the lower Blue Mountains. *Eucalyptus sclerophylla* (Hard-leaved Scribbly Gum) is the dominant tree species or co-dominant with *Angophora bakeri* (Narrow-leaved Apple). The typical vegetation structure is woodland, although this may vary depending on site conditions and history. The association between this community and alluvial soils is a critical feature in its definition, since *E. sclerophylla* is also the dominant tree species in another, more common vegetation community, with a different understorey, that occurs on north- or west-facing slopes on sandstone geology in the middle and upper Blue Mountains. The *E. sclerophylla* trees in the latter community tend to be smaller than those in the *E. sclerophylla* alluvial bench woodland.

*Eucalyptus sclerophylla* alluvial bench woodland is characterised by the following assemblage of native plant species. Other species also occur, and not all of the following species are present in every stand of the community, but the list is indicative of the species composition of the vegetation.

<i>Acacia brownii</i>	<i>Banksia spinulosa</i>	<i>Dampiera stricta</i>
<i>Acacia rubida</i>	<i>Bossiaea heterophylla</i>	<i>Daviesia corymbosa</i>
<i>Acacia ulicifolia</i>	<i>Bossiaea obcordata</i>	<i>Dillwynia floribunda</i>
<i>Angophora bakeri</i>	<i>Bossiaea rhombifolia</i>	<i>Entolasia stricta</i>
<i>Aristida benthami</i>	<i>Cassytha glabella</i>	<i>Epacris pulchella</i>
<i>Aristida vagans</i>	<i>Cassytha pubescens</i>	<i>Eriostemon hispidulus</i>
<i>Baeckea virgata</i>	<i>Caustis flexuosa</i>	<i>Eucalyptus gummifera</i>
<i>Banksia oblongifolia</i>	<i>Conospermum longifolium</i>	<i>Eucalyptus notabilis</i>
<i>Banksia serrata</i>	<i>Cyathochaeta diandra</i>	<i>Eucalyptus piperita</i>

<i>Eucalyptus sclerophylla</i>	<i>Leptospermum trinervium</i>	<i>Persoonia oblongata</i>
<i>Eucalyptus sparsifolia</i>	<i>Lepyrodia scariosa</i>	<i>Petrophile pulchella</i>
<i>Grevillea buxifolia</i>	<i>Lomandra brevis</i>	<i>Phyllota phyllicoides</i>
<i>Grevillea mucronulata</i>	<i>Lomandra filiformis</i>	<i>Pimelea linifolia</i>
<i>Hakea dactyloides</i>	<i>Lomandra glauca</i>	<i>Platysace linearifolia</i>
<i>Hakea sericea</i>	<i>Lomandra longifolia</i>	<i>Pteridium esculentum</i>
<i>Hovea linearis</i>	<i>Lomandra obliqua</i>	<i>Ptilothrix deusta</i>
<i>Imperata cylindrica</i>	<i>Melaleuca linariifolia</i>	<i>Schoenus villosus</i>
<i>Isopogon anemonifolius</i>	<i>Melaleuca thymifolia</i>	<i>Stipa pubescens</i>
<i>Lambertia formosa</i>	<i>Mirbelia rubiifolia</i>	<i>Stylidium graminifolium</i>
<i>Lepidosperma laterale</i>	<i>Monotoca scoparia</i>	<i>Themeda australis</i>
<i>Leptospermum arachnoides</i>	<i>Panicum simile</i>	<i>Xanthorrhoea media</i>
<i>Leptospermum parvifolium</i>	<i>Persoonia hirsuta</i>	
<i>Leptospermum polygalifolium</i>	<i>Persoonia laurina</i>	

### **Conservation Significance**

*Eucalyptus sclerophylla* alluvial bench woodland is significant because of its rarity in the Blue Mountains. The total extent of this community in the Blue Mountains City Council area is only 59 ha (out of a total area of about 70 000 ha). Significant species associated with the community include an endangered species, *Persoonia hirsuta*, and a rare species, *Lomandra brevis*, which is especially rare in the Blue Mountains. There is also a record of a possible undescribed species of *Grevillea*, although this requires further investigation to determine its true status. The community is important to fauna, with the *E. sclerophylla* trees providing many hollows for nesting and roosting, and the abundant *Banksia spinulosa* and *B. oblongifolia* shrubs in the understorey providing a rich source of nectar. The alluvial soils and vegetation are important hydrologically, serving to filter and slow the flow of water from the surrounding upland areas into the creeks. They are also of scientific interest because of their unusual geomorphic history, which is associated with the Kurrajong Fault.

## **12. Blue Mountains Heath**

### **Description**

Blue Mountains heath is the name applied to the heath vegetation of the Blue Mountains. Heath vegetation consists of a well developed shrub layer, with no tree layer or only a sparse layer of scattered low trees. It occurs in exposed sites with very shallow soils on Narrabeen Group and Hawkesbury Sandstone geology. Typical situations are cliff tops and high, rocky ridges, especially ones with a westerly aspect. The skeletal soils and exposed conditions inhibit eucalypt growth except as mallees (low, multi-stemmed shrub eucalypts). The vegetation structure is typically an open-heath, less often a closed-heath, and may be interspersed with patches of open-scrub or closed-scrub formed by stands of mallees. It is also typically interspersed with areas of bare rock. Sometimes, in the prolonged absence of fires, the heath shrubs grow taller and thicker, transforming the vegetation from an open-heath to a closed-scrub, especially in relatively sheltered sites.

Blue Mountains heath has a mixed and variable species composition. Common shrub species include *Allocasuarina distyla*, *A. nana*, *Banksia ericifolia*, *Epacris microphylla*, *Eucalyptus stricta*, *Hakea dactyloides*, *Hakea teretifolia*, *Kunzea capitata*, *Leptospermum trinervium* and *Petrophile pulchella*. Common sedge and herb species include *Actinotus minor*, *Lepidosperma filiforme*, *L. viscidum*, *Lepyrodia scariosa*, *Ptilothrix deusta* and *Schoenus*

*villosus*.

Two forms of Blue Mountains heath have been distinguished (Keith and Benson 1988, Smith and Smith 1995a-e): montane heath above about 850-900 m elevation and lower Blue Mountains heath below this level. The two forms intergrade between Wentworth Falls and Katoomba. Montane heath is characterised by the presence of high altitude species such as *Allocasuarina nana*, *Darwinia taxifolia* and *Phyllota squarrosa*, while lower Blue Mountains heath is characterised by the presence of low altitude species such as *Allocasuarina distyla*, *Darwinia fascicularis* and *Phyllota phyllicoides*. However, most of the more common heath plants occur across the full altitudinal range.

It is also possible to distinguish two forms of lower Blue Mountains heath: a Hawkesbury Sandstone form at lower altitudes (chiefly in the Faulconbridge to Woodford area), and a Narrabeen Sandstone form at intermediate altitudes (Hazelbrook to Wentworth Falls). The Hawkesbury Sandstone form is characterised by species such as *Acacia oxycedrus*, *Baeckea brevifolia* and *Eucalyptus burgessiana* that are absent from heath on Narrabeen Sandstone.

Considered as a whole, Blue Mountains heath is characterised by the following assemblage of native plant species. Other species also occur, and not all of the following species are present in every stand of heath, but the list is indicative of the species composition of the vegetation.

<i>Acacia baueri</i>	<i>Eriostemon obovalis</i>	<i>Leucopogon esquamatus</i>
<i>Acacia oxycedrus</i>	<i>Eucalyptus apiculata</i>	<i>Leucopogon microphyllus</i>
<i>Acacia suaveolens</i>	<i>Eucalyptus burgessiana</i>	<i>Lindsaea linearis</i>
<i>Actinotus helianthi</i>	<i>Eucalyptus gregsoniana</i>	<i>Lomandra glauca</i>
<i>Actinotus minor</i>	<i>Eucalyptus gummifera</i>	<i>Micromyrtus ciliata</i>
<i>Allocasuarina distyla</i>	<i>Eucalyptus ligustrina</i>	<i>Mirbelia baueri</i>
<i>Allocasuarina nana</i>	<i>Eucalyptus mannifera</i>	<i>Mirbelia rubiifolia</i>
<i>Anisopogon avenaceus</i>	<i>Eucalyptus moorei</i>	<i>Mitrasacme polymorpha</i>
<i>Baeckea brevifolia</i>	<i>Eucalyptus multicaulis</i>	<i>Monotoca ledifolia</i>
<i>Baeckea densifolia</i>	<i>Eucalyptus sparsifolia</i>	<i>Monotoca scoparia</i>
<i>Baeckea ramosissima</i>	<i>Eucalyptus stricta</i>	<i>Patersonia sericea</i>
<i>Banksia ericifolia</i>	<i>Gonocarpus teucroides</i>	<i>Petrophile pulchella</i>
<i>Banksia serrata</i>	<i>Goodenia bellidifolia</i>	<i>Phebalium lachnaeoides</i>
<i>Banksia spinulosa</i>	<i>Hakea dactyloides</i>	<i>Phyllota phyllicoides</i>
<i>Bossiaea heterophylla</i>	<i>Hakea propinqua</i>	<i>Phyllota squarrosa</i>
<i>Cassytha glabella</i>	<i>Hakea teretifolia</i>	<i>Platysace lanceolata</i>
<i>Caustis flexuosa</i>	<i>Hemigenia purpurea</i>	<i>Platysace linearifolia</i>
<i>Chionochloa pallida</i>	<i>Isopogon anemonifolius</i>	<i>Pseudanthus divaricatissimus</i>
<i>Cyathochaeta diandra</i>	<i>Kunzea capitata</i>	<i>Ptilothrix deusta</i>
<i>Dampiera purpurea</i>	<i>Lambertia formosa</i>	<i>Pultenaea elliptica</i>
<i>Dampiera stricta</i>	<i>Lepidosperma filiforme</i>	<i>Restio fastigiatus</i>
<i>Danthonia tenuior</i>	<i>Lepidosperma urophorum</i>	<i>Schoenus ericetorum</i>
<i>Darwinia fascicularis</i>	<i>Lepidosperma viscidum</i>	<i>Schoenus imberbis</i>
<i>Daviesia corymbosa</i>	<i>Leptocarpus tenax</i>	<i>Schoenus villosus</i>
<i>Dianella caerulea</i>	<i>Leptospermum arachnoides</i>	<i>Stipa pubescens</i>
<i>Dillwynia floribunda</i>	<i>Leptospermum continentale</i>	<i>Stylidium lineare</i>
<i>Dillwynia retorta</i>	<i>Leptospermum parvifolium</i>	<i>Thelionema caespitosum</i>
<i>Entolasia stricta</i>	<i>Leptospermum petraeum</i>	<i>Velleia perfoliata</i>
<i>Epacris microphylla</i>	<i>Leptospermum polygalifolium</i>	<i>Woollsia pungens</i>
<i>Epacris obtusifolia</i>	<i>Leptospermum trinervium</i>	
<i>Epacris pulchella</i>	<i>Lepyrodia scariosa</i>	

## *Conservation Significance*

Heath is limited in extent in the Blue Mountains and constitutes only 1.1% of the total area of Blue Mountains National Park. It is a distinctive vegetation type with many plant species that are more or less restricted to heath. These include one endangered species (*Phebalium lachnaeoides*), eight rare species (*Eriostemon obovalis*, *Eucalyptus apiculata*, *E. burgessiana*, *E. gregsoniana*, *Leptospermum petraeum*, *Monotoca ledifolia*, *Pseudanthus divaricatissimus* and *Velleia perfoliata*) and three regionally significant species (*Acacia baueri*, *Darwinia fascicularis* and *Mirbelia baueri*).

The flowers of several heath plants, particularly *Banksia ericifolia*, are an important food source for nectar-feeding birds and mammals. The winter-flowering *Banksia ericifolia* attracts large numbers of honeyeaters to the heath, including winter migrants from outside the Blue Mountains region. A number of fauna species are more or less restricted to heath vegetation, including one regionally significant species, the Tawny-crowned Honeyeater (*Phylidonyris melanops*). The rock outcrops associated with the heath provide habitat for an endangered species, the Broad-headed Snake (*Hoplocephalus bungaroides*).

Heath also acts to stabilise the shallow, sandy soils on which it grows. Clearing of heath can lead to rapid erosion of these soils and unsightly landscape scars in visually prominent locations.

## **13. Blue Mountains Swamps**

### *Description*

Blue Mountains swamps is the name applied to the swamp vegetation of the Blue Mountains. Swamp vegetation develops on poorly drained sites where the soil is waterlogged for prolonged periods. Swamps occur in the Blue Mountains not only in low-lying sites on valley floors ('valley swamps'), but also in the headwaters of creeks and on steep hillsides ('hanging swamps'). Some swamps represent a combination of valley swamp and hanging swamp. The upper boundary of the swamp is often a clearly defined line coinciding with the outcropping of a layer of claystone. Groundwater seeps along the top of the impermeable claystone layer, reaching the surface where the claystone outcrops, and forming a swamp on the hillside below. Other swamps receive their water supply from feeder streams rather than groundwater, or from a combination of the two.

Blue Mountains swamps vary in structure and plant species composition from closed-sedgeland or closed-fernland to open-heath or closed-heath, sometimes open-scrub or closed-scrub. The shrub-dominated swamps are similar in vegetation structure to Blue Mountains heath, but they differ in species composition and ecological function, and are more appropriately classified with the sedge- and fern-dominated swamps. Common shrubs in the Blue Mountains swamps include *Acacia ptychoclada*, *Baekkea linifolia*, *Banksia ericifolia*, *Callistemon citrinus*, *Epacris obtusifolia*, *Grevillea acanthifolia*, *Hakea teretifolia*, *Leptospermum grandifolium*, *L. juniperinum* and *L. polygalifolium*. Common sedges include *Empodisma minus*, *Gymnoschoenus sphaerocephalus*, *Lepidosperma limicola* and *Xyris ustulata*. The main fern species is *Gleichenia dicarpa*.

One type of swamp vegetation that may be distinguished from the typical Blue Mountains swamps is the Kurrajong Fault swamps (Smith and Smith 1996). These are valley swamps



that occur in the lower Blue Mountains on sandy alluvial deposits associated with the Kurrajong Fault. The vegetation structure is usually an open-scrub or closed-scrub. Common shrubs are *Acacia rubida*, *Callicoma serratifolia*, *Callistemon citrinus*, *Leptospermum juniperinum* and *Melaleuca linariifolia*. Common species in the understorey are *Baumea rubiginosa*, *Gahnia clarkei*, *Gleichenia dicarpa* and *Schoenus melanostachys*.

Blue Mountains swamps are characterised by the following assemblage of native plant species. Other species also occur, and not all of the following species are present in every swamp, but the list is indicative of the species composition of the vegetation.

<i>Acacia ptychoclada</i>	<i>Eucalyptus mannifera</i>	<i>Lepyrodia scariosa</i>
<i>Acacia rubida</i>	<i>Eucalyptus moorei</i>	<i>Leucopogon esquamatus</i>
<i>Actinotus minor</i>	<i>Gahnia clarkei</i>	<i>Lindsaea linearis</i>
<i>Almaleea incurvata</i>	<i>Gahnia sieberiana</i>	<i>Melaleuca linariifolia</i>
<i>Baekkea linifolia</i>	<i>Gleichenia dicarpa</i>	<i>Mirbelia rubiifolia</i>
<i>Banksia ericifolia</i>	<i>Gleichenia microphylla</i>	<i>Notochloe microdon</i>
<i>Banksia oblongifolia</i>	<i>Gonocarpus micranthus</i>	<i>Olearia quercifolia</i>
<i>Bauera rubioides</i>	<i>Goodenia bellidifolia</i>	<i>Patersonia sericea</i>
<i>Baumea rubiginosa</i>	<i>Grevillea acanthifolia</i>	<i>Petrophile pulchella</i>
<i>Blandfordia grandiflora</i>	<i>Gymnoschoenus</i>	<i>Pimelea linifolia</i>
<i>Blechnum cartilagineum</i>	<i>sphaerocephalus</i>	<i>Ptilothrix deusta</i>
<i>Blechnum nudum</i>	<i>Hakea dactyloides</i>	<i>Pultenaea divaricata</i>
<i>Burnettia cuneata</i>	<i>Hakea teretifolia</i>	<i>Schoenus brevifolius</i>
<i>Callicoma serratifolia</i>	<i>Hibbertia cistiflora</i>	<i>Schoenus melanostachys</i>
<i>Callistemon citrinus</i>	<i>Isopogon anemonifolius</i>	<i>Schoenus villosus</i>
<i>Celmisia longifolia</i>	<i>Kunzea capitata</i>	<i>Selaginella uliginosa</i>
<i>Dampiera stricta</i>	<i>Lepidosperma filiforme</i>	<i>Sprengelia incarnata</i>
<i>Dillwynia floribunda</i>	<i>Lepidosperma forsythii</i>	<i>Symphionema montanum</i>
<i>Drosera binata</i>	<i>Lepidosperma limicola</i>	<i>Tetrarrhena juncea</i>
<i>Drosera spatulata</i>	<i>Leptocarpus tenax</i>	<i>Tetrarrhena turfosa</i>
<i>Empodisma minus</i>	<i>Leptospermum continentale</i>	<i>Xanthosia dissecta</i>
<i>Epacris microphylla</i>	<i>Leptospermum grandifolium</i>	<i>Xyris juncea</i>
<i>Epacris obtusifolia</i>	<i>Leptospermum juniperinum</i>	<i>Xyris ustulata</i>
<i>Epacris paludosa</i>	<i>Leptospermum polygalifolium</i>	
<i>Eucalyptus copulans</i>	<i>Leptospermum squarrosus</i>	

### **Conservation Significance**

Swamp vegetation is limited in extent in the Blue Mountains and constitutes only 0.8% of the total area of Blue Mountains National Park. It is a distinctive vegetation type with many plant species that are more or less restricted to the swamps. These include one endangered species (*Eucalyptus copulans*), four rare species (*Almaleea incurvata*, *Burnettia cuneata*, *Notochloe microdon* and *Olearia quercifolia*) and four regionally significant species (*Acacia ptychoclada*, *Celmisia longifolia*, *Grevillea acanthifolia* ssp. *acanthifolia* and *Xanthosia dissecta*).

The swamps are an important fauna habitat, with a number of dependent species. One species restricted to swamp vegetation is the Blue Mountains Water Skink (*Eulamprus leuraensis*), an endangered species and the only vertebrate fauna species endemic to the Blue Mountains. The swamps also provide habitat for three regionally significant fauna species, the Southern Emu-wren (*Stipiturus malachurus*), Lewin's Rail (*Dryolimnas pectoralis*) and Buff-banded Rail (*Gallirallus philippensis*). Many swamps support populations of nectar-rich plants such

as *Banksia ericifolia*, *B. oblongifolia*, *Callistemon citrinus* and *Grevillea acanthifolia*. These are an important food source for nectar-feeding birds and mammals. The winter-flowering *Banksia ericifolia*, in particular, attracts large numbers of honeyeaters to the swamps, including winter migrants from outside the Blue Mountains region. The swamps also provide a source of water for fauna, especially during dry periods.

The swamps have important hydrological functions. They act somewhat like a sponge, soaking up and storing moisture, which is then released slowly and helps to maintain creek flows during dry periods. They also serve to filter and purify the water flowing into them, and they protect the stream banks during peak water flows.

## 14. Lagoon Vegetation (Glenbrook Lagoon)

### *Description*

Lagoon vegetation (Glenbrook Lagoon) is the name applied to the wetland vegetation associated with Glenbrook Lagoon. Glenbrook Lagoon is the only naturally occurring upland lagoon in the City of Blue Mountains, although wetland vegetation has also developed around artificially created water bodies such as Wentworth Falls Lake and Woodford Lake. Glenbrook Lagoon consists of an area of open water with submerged aquatic vegetation, surrounded by extensive reedbeds dominated by the large sedges *Lepironia articulata* and *Eleocharis sphacelata*. Fringing the reedbeds is a narrow band of low paperbark trees (*Melaleuca linariifolia*).

Native wetland plants recorded at Glenbrook Lagoon include the following species. Other species are also likely to be present.

<i>Acacia rubida</i>	<i>Isachne globosa</i>	<i>Persicaria decipiens</i>
<i>Agrostis avenacea</i>	<i>Juncus holoschoenus</i>	<i>Persicaria strigosa</i>
<i>Baumea articulata</i>	<i>Juncus usitatus</i>	<i>Philydrum lanuginosum</i>
<i>Callistemon citrinus</i>	<i>Lepidosperma longitudinale</i>	<i>Phragmites australis</i>
<i>Callistemon linearis</i>	<i>Lepironia articulata</i>	<i>Rumex brownii</i>
<i>Centella asiatica</i>	<i>Leptospermum polygalifolium</i>	<i>Schoenoplectus validus</i>
<i>Cynodon dactylon</i>	<i>Ludwigia peploides</i>	<i>Typha domingensis</i>
<i>Eleocharis sphacelata</i>	<i>Melaleuca linariifolia</i>	<i>Typha orientalis</i>
<i>Epilobium billardierianum</i>	<i>Melaleuca thymifolia</i>	<i>Vallisneria gigantea</i>
<i>Gratiola pedunculata</i>	<i>Myriophyllum variifolium</i>	<i>Viminaria juncea</i>
<i>Gratiola peruviana</i>	<i>Nymphoides geminata</i>	
<i>Hydrocotyle peduncularis</i>	<i>Paspalum distichum</i>	

### *Conservation Significance*

Glenbrook Lagoon has been modified by construction of a low dam around the turn of the century to enhance it as a water storage for steam trains. However, there was a naturally occurring lagoon at the site before this, as shown by the explorer Gregory Blaxland's description of it in 1813 as "a large lagoon of good water full of very coarse rushes." Natural lagoons are rare in upland areas of the Hawkesbury-Nepean catchment; the only other examples are Mountain Lagoon and Thirlmere Lakes (Stricker and Wall 1995). Glenbrook Lagoon is an important habitat for wetland flora and fauna, including two regionally significant plant species, *Lepidosperma longitudinale* and *Gratiola pedunculata*, and a variety of waterbirds. The most abundant reed species at the lagoon, *Lepironia articulata*, is

also noteworthy as it occurs at only a few localities in the Sydney and Blue Mountains regions.

## 15. Blue Mountains Creekline Vegetation

### *Description*

Blue Mountains creekline vegetation is the name applied to the narrow band of riparian vegetation found along perennial and non-perennial watercourses in the Blue Mountains. It applies to those sections of the creek where there are distinct differences between the creekside vegetation and the adjacent vegetation away from the creek. Creekline vegetation is diverse and variable in structure and composition. It typically consists of species that are restricted to the immediate riparian environment plus other species from the adjacent vegetation community or communities through which the creek runs. Common shrubs and low trees characteristic of creekline vegetation in the Blue Mountains include *Acacia rubida*, *Baeckea linifolia*, *Bauera rubioides*, *Callicoma serratifolia*, *Callistemon citrinus*, *Leptospermum polygalifolium*, *Lomatia myricoides*, *Tristania neriifolia* and *Tristaniopsis laurina*. Ferns tend to be a major component of the creekline vegetation, such as *Blechnum nudum*, *Calochlaena dubia*, *Gleichenia microphylla*, *Sticherus flabellatus* and *Todea barbara*. Common sedges and rushes include *Gahnia sieberiana*, *Juncus planifolius* and *Schoenus melanostachys*. Pockets of rainforest, swamp and moist cliffline (waterfall) vegetation are often present along the creeks and add to the floristic diversity of the creekline vegetation.

Blue Mountains creekline vegetation is characterised by the following assemblage of native plant species. Other species also occur, and not all of the following species are present along every creek, but the list is indicative of the species composition of the vegetation. The list does not include *Eucalyptus* species. Although a variety of eucalypts occur along the creeks, they reflect the composition of the adjacent vegetation community rather than the creekline vegetation itself.

<i>Acacia elata</i>	<i>Centella asiatica</i>	<i>Leptospermum polygalifolium</i>
<i>Acacia linifolia</i>	<i>Ceratopetalum apetalum</i>	<i>Lepyrodia scariosa</i>
<i>Acacia longifolia</i>	<i>Cissus hypoglauca</i>	<i>Lomandra fluviatilis</i>
<i>Acacia obtusifolia</i>	<i>Dodonaea multijuga</i>	<i>Morinda jasminoides</i>
<i>Adiantum aethiopicum</i>	<i>Drosera spatulata</i>	<i>Notelaea longifolia</i>
<i>Austromyrtus tenuifolia</i>	<i>Entolasia marginata</i>	<i>Persoonia mollis</i>
<i>Backhousia myrtifolia</i>	<i>Entolasia stricta</i>	<i>Phebalium squamulosum</i>
<i>Baeckea linifolia</i>	<i>Eriostemon myoporoides</i>	<i>Pteridium esculentum</i>
<i>Bauera rubioides</i>	<i>Gahnia clarkei</i>	<i>Schoenus melanostachys</i>
<i>Blechnum ambiguum</i>	<i>Gahnia sieberiana</i>	<i>Smilax glyciphylla</i>
<i>Blechnum cartilagineum</i>	<i>Gleichenia dicarpa</i>	<i>Sticherus flabellatus</i>
<i>Blechnum nudum</i>	<i>Gleichenia microphylla</i>	<i>Sticherus lobatus</i>
<i>Blechnum patersonii</i>	<i>Gonocarpus teucroides</i>	<i>Syncarpia glomulifera</i>
<i>Blechnum wattsii</i>	<i>Grevillea longifolia</i>	<i>Todea barbara</i>
<i>Boronia fraseri</i>	<i>Grevillea sericea</i>	<i>Triglochin procera</i>
<i>Bossiaea lenticularis</i>	<i>Hibbertia saligna</i>	<i>Tristania neriifolia</i>
<i>Callicoma serratifolia</i>	<i>Imperata cylindrica</i>	<i>Tristaniopsis laurina</i>
<i>Callistemon citrinus</i>	<i>Juncus planifolius</i>	
<i>Calochlaena dubia</i>	<i>Leptospermum emarginatum</i>	

## *Conservation Significance*

The creekside environment is a particularly rich habitat for flora and fauna, supporting a wide variety of plant and animal species, many of which are restricted to this habitat. Species closely associated with creeks in the Blue Mountains include one vulnerable fauna species (Giant Burrowing Frog *Heleioporus australiacus*), two rare plant species (*Grevillea longifolia* and *Lomandra fluviatilis*), two regionally significant plant species (*Dodonaea multijuga* and *Leptospermum emarginatum*) and two regionally significant fauna species (Swamp Snake *Hemiaspis signata* and Azure Kingfisher *Alcedo azurea*). Pockets of rainforest, swamp and moist cliffline vegetation often occur along the creeklines, providing habitat for other significant species. The creekline vegetation also plays an important role in preventing erosion of the stream banks and protecting water quality.

In our study for Blue Mountains City Council's Local Environmental Plan 1997 (Smith and Smith 1995a-e), we mapped the creekline vegetation along major creeklines as a significant flora and fauna habitat. Major creeklines were defined by us as typically commencing where there was a junction with a tributary creek about 500 m downstream of the creek source. Although such a definition was necessary for mapping purposes, we would emphasise that it is a fairly arbitrary definition and that significant creekline vegetation can occur upstream of this point. For the purpose of recognising the significant creekline vegetation in the field, a better definition is the one used above, i.e. those sections of the creek where there are distinct differences in plant species composition between the creekside vegetation and the adjacent vegetation away from the creek.

### **16. *Melaleuca linariifolia* Low Open-forest**

#### *Description*

*Melaleuca linariifolia* low open-forest is the name applied to a vegetation community found on sandy alluvial soils along certain creeks in the lower Blue Mountains, in which the vegetation is dominated by the low paperbark tree, *Melaleuca linariifolia* (Snow-in-summer). It is a type of creekline vegetation that is associated with creeks on deep alluvial sand deposits, rather than the sandstone substrates more typical of Blue Mountains creeks. The typical vegetation structure is a narrow band of low open-forest or low closed-forest along the creek. Occasional emergent *Eucalyptus* or *Angophora* trees may be present above the *Melaleuca* canopy.

*Melaleuca linariifolia* low open-forest is characterised by the following assemblage of native plant species. Other species also occur, and not all of the following species are present in every stand of the community, but the list is indicative of the species composition of the vegetation.

<i>Acacia longifolia</i>	<i>Cyathea australis</i>	<i>Hypolepis muelleri</i>
<i>Acacia rubida</i>	<i>Cyperus polystachyos</i>	<i>Imperata cylindrica</i>
<i>Adiantum aethiopicum</i>	<i>Eleocharis sphacelata</i>	<i>Isolepis inundata</i>
<i>Blechnum nudum</i>	<i>Entolasia marginata</i>	<i>Juncus continuus</i>
<i>Blechnum watsii</i>	<i>Entolasia stricta</i>	<i>Juncus planifolius</i>
<i>Callicoma serratifolia</i>	<i>Gahnia clarkei</i>	<i>Juncus usitatus</i>
<i>Callistemon citrinus</i>	<i>Gleichenia dicarpa</i>	<i>Kennedia rubicunda</i>
<i>Calochlaena dubia</i>	<i>Hydrocotyle peduncularis</i>	<i>Leptospermum polygalifolium</i>

*Melaleuca linariifolia*  
*Microlaena stipoides*

*Pittosporum undulatum*  
*Pteridium esculentum*

*Schoenus melanostachys*  
*Typha orientalis*

### **Conservation Significance**

*Melaleuca linariifolia* low open-forest is significant because of its rarity in the Blue Mountains and because as creekline vegetation it plays an important role in preventing erosion of the stream banks and protecting water quality.

## **17. Blue Mountains Moist Cliffline Vegetation**

### **Description**

Blue Mountains moist cliffline vegetation is the name applied to a distinctive vegetation community associated with moist, sheltered rock faces in the Blue Mountains, growing in crevices, on ledges, in caves and at the base of the rock faces. Species commonly found in these sites include *Alania endlicheri*, *Baeckea linifolia*, *Blechnum ambiguum*, *B. watsii*, *Callicoma serratifolia*, *Dracophyllum secundum*, *Drosera binata*, *Epacris reclinata*, *Gleichenia microphylla*, *G. rupestris*, *Leptospermum rupicola*, *Sprengelia monticola* and *Todea barbara*.

Blue Mountains moist cliffline vegetation is characterised by the following assemblage of native plant species. Other species also occur, and not all of the following species are present in every stand of the community, but the list is indicative of the species composition of the vegetation.

<i>Acrophyllum australe</i>	<i>Epacris muelleri</i>	<i>Lomandra montana</i>
<i>Adenochilus nortonii</i>	<i>Epacris reclinata</i>	<i>Lycopodium laterale</i>
<i>Alania endlicheri</i>	<i>Euphrasia bowdeniae</i>	<i>Melaleuca squamea</i>
<i>Baeckea linifolia</i>	<i>Gahnia sieberiana</i>	<i>Microstrobos fitzgeraldii</i>
<i>Bauera rubioides</i>	<i>Gleichenia dicarpa</i>	<i>Pterostylis pulchella</i>
<i>Blechnum ambiguum</i>	<i>Gleichenia microphylla</i>	<i>Rimacola elliptica</i>
<i>Blechnum watsii</i>	<i>Gleichenia rupestris</i>	<i>Rupicola apiculata</i>
<i>Bossiaea lenticularis</i>	<i>Goodenia decurrens</i>	<i>Rupicola sprengelioides</i>
<i>Callicoma serratifolia</i>	<i>Goodenia rostrivalvis</i>	<i>Scaevola hookeri</i>
<i>Ceratopetalum gummiferum</i>	<i>Grammitis billardieri</i>	<i>Schoenus melanostachys</i>
<i>Dracophyllum secundum</i>	<i>Isopogon fletcheri</i>	<i>Smilax glycyphylla</i>
<i>Drosera binata</i>	<i>Lepidosperma evansianum</i>	<i>Sprengelia monticola</i>
<i>Empodisma minus</i>	<i>Leptopteris fraseri</i>	<i>Sticherus flabellatus</i>
<i>Entolasia marginata</i>	<i>Leptospermum polygalifolium</i>	<i>Sticherus lobatus</i>
<i>Epacris coriacea</i>	<i>Leptospermum rupicola</i>	<i>Sticherus tener</i>
<i>Epacris crassifolia</i>	<i>Lepyrodia scariosa</i>	<i>Stylidium productum</i>
<i>Epacris hamiltonii</i>	<i>Lindsaea microphylla</i>	<i>Todea barbara</i>

### **Conservation Significance**

Blue Mountains moist cliffline vegetation is significant because of its limited extent in the region and because it is the habitat of many significant plant species. These include two endangered species (*Epacris hamiltonii* and *Microstrobos fitzgeraldii*), two vulnerable species (*Acrophyllum australe* and *Isopogon fletcheri*), eleven rare species (*Adenochilus nortonii*, *Alania endlicheri*, *Epacris coriacea*, *E. muelleri*, *Euphrasia bowdeniae*, *Goodenia*

*rostrivalvis*, *Leptospermum rupicola*, *Pterostylis pulchella*, *Rupicola apiculata*, *R. sprengelioides* and *Sprengelia monticola*) and one regionally significant species (*Scaevola hookeri*).

## 18. Escarpment and Rock Outcrop Vegetation Complex

### *Description*

The escarpment and rock outcrop vegetation complex is the name applied to the vegetation associated with the escarpments and other extensive outcroppings of Narrabeen Group sandstones in the upper Blue Mountains (west of Bodington Hill). The vegetation consists of a diverse mixture of moist cliffline vegetation, heath, swamp, rainforest and eucalypt forest communities.

### *Conservation Significance*

The escarpment and rock outcrop vegetation complex is limited in extent and comprises a mixture of significant vegetation communities. Many significant plant species are associated with the moist cliffline vegetation community. In addition, there are two rare eucalypt species, *Eucalyptus baeuerlenii* and *E. cunninghamii*, which grow only in cliff-top sites. Other significant species occur in the pockets of heath, swamp, rainforest and eucalypt forest amongst the rock outcrops. Two rare species are associated particularly with the communities when they occur as part of this vegetation complex: *Blechnum gregsonii* grows in rock crevices within rainforest, and *Blandfordia cunninghamii* typically grows in cliff-top swamps. Rock outcrops are also the habitat of the endangered Broad-headed Snake (*Hoplocephalus bungaroides*) and of the Rockwarbler (*Origma solitaria*), a species which, although not particularly rare, is noteworthy because it is the only bird species endemic to mainland New South Wales.

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