

MU11 ESCARPMENT GREY GUM FOREST

Number of Sites: 35 No. taxa/plot: 55.2

□ DESCRIPTION

Escarpment Grey Gum Forest is a widespread sheltered forest found on the Permian soils in the Burragorang, Nattai and Little River Valleys. It is associated with deeper colluvial soils on escarpment midslopes and benches on southern and eastern aspects. This community is generally found at elevations between 200 and 450 metres above sea level.

Escarpment Grey Gum Forest is a tall forest with a canopy dominated by *Eucalyptus punctata* and *Allocasuarina torulosa*. *Eucalyptus tereticornis*, *E. fibrosa*, *Syncarpia glomulifera* subsp. *glomulifera* and *E. deanei* also occur, but are less frequent. The understorey typically has a relatively sparse shrub layer comprised of *Breynia oblongifolia*, *Olearia viscidula*, *Indigofera australis* and *Clerodendrum tomentosum*. The retention of soil moisture provides for a typically dense cover of herbaceous species mixed with low growing vines, some ferns and grasses. Common ground cover species include *Dichondra repens*, *Desmodium varians*, *Pratia purpurascens*, *Plectranthus parviflorus*, *Tylophora barbata*, *Glycine clandestina*, *Oplismenus imbecillis*, *Adiantum aethiopicum*, *Microlaena stipoides* var. *stipoides* and *Lomandra longifolia*.



This community grades into MU10 Sheltered Escarpment Blue Gum Forest and MU12 Escarpment Tall Box Forest in more protected locations. As soil depth decreases and the aspect becomes more exposed, MU24 Escarpment Slopes Dry Ironbark Woodland becomes increasingly prevalent.

Distribution of this community outside of the reserves and the Warragamba Special Area is not well understood. It is unlikely to be extensive elsewhere as available knowledge (NPWS, 2000a) point to different plant community occurring in deep gorges and escarpment slopes of the Shoalhaven and Wingecarribee Catchments. This community has been identified as widespread in the Warragamba Special Area (NPWS, 2003b) and this profile has been adapted from that report.

□ **FLORISTIC SUMMARY**

Trees: Mean Upper Height 28m. Mean Projected Canopy Cover 30% SD 13.1

Eucalyptus punctata, *Eucalyptus tereticornis*, *Eucalyptus deanei*

Minor associates: *Eucalyptus fibrosa*, *Syncarpia glomulifera* subsp. *glomulifera*, *Angophora floribunda*, *Eucalyptus crebra*, *Eucalyptus eugenioides*, *Eucalyptus hypostomatica*, *Eucalyptus moluccana*

Small Trees: Mean Upper Height 13m. Mean Projected Canopy Cover 15% SD 12.9

Allocasuarina torulosa, *Melaleuca styphelioides*, *Backhousia myrtifolia*

Shrubs: Mean Upper Height 2m. Mean Projected Canopy Cover 7% SD 5.1

Breynia oblongifolia, *Olearia viscidula*, *Indigofera australis*, *Clerodendrum tomentosum*, *Persoonia linearis*, *Notelaea longifolia* forma *longifolia*

Ground Covers: Mean Upper Height 0.8m. Mean Projected Canopy Cover 40% SD 25.6

Dichondra repens, *Desmodium varians*, *Pratia purpurascens*, *Plectranthus parviflorus*, *Tylophora barbata*, *Glycine clandestina*, *Oplismenus imbecillis*, *Adiantum aethiopicum*, *Microlaena stipoides*, *Lomandra longifolia*, *Pseuderanthemum variabile*, *Dianella caerulea*, *Geitonoplesium cymosum*, *Billardiera scandens* var. *scandens*, *Eustrephus latifolius*.

□ **KEY IDENTIFYING FEATURES**

Easily recognisable features to assist in identifying this map unit are:

- A tall forest with abundant Forest Oak (*Allocasuarina torulosa*) in combination with Grey Gum (*Eucalyptus punctata*) is particularly indicative of this community.
- Well developed cover of herbs, grasses and vines on moderately deep colluvial Permian Sediments.
- This community tends to occupy sheltered midslopes locations in preference to upper escarpment slopes, lower slopes, footslopes or valley flats.

□ **EXAMPLE LOCATIONS**

Sheltered escarpment slopes off East and West Nattai Walls; Wanganderry Walls; Sheehys Creek; Burrangorang Walls

□ **CONDITION ASSESSMENT**

Disturbance Class	Area (ha)	Proportion Extant (%)
A Low	2430	61
B Medium	1353	34
C High	218	5
Total	4002	100

□ **THREATENED PLANT SPECIES**

Eucalyptus hypostomatica (3RC-), *Lissanthe sapida* (3RCa), *Lomandra fluviatilis* (3RCa), *Myoporum floribundum* (3RCi), *Epacris coriacea* (3RC-), *Eucalyptus hypostomatica* (3RC-), *Grevillea longifolia* (2RC-)

□ **DIAGNOSTIC SPECIES**

The diagnostic species presented below have been derived from NPWS (2003b).

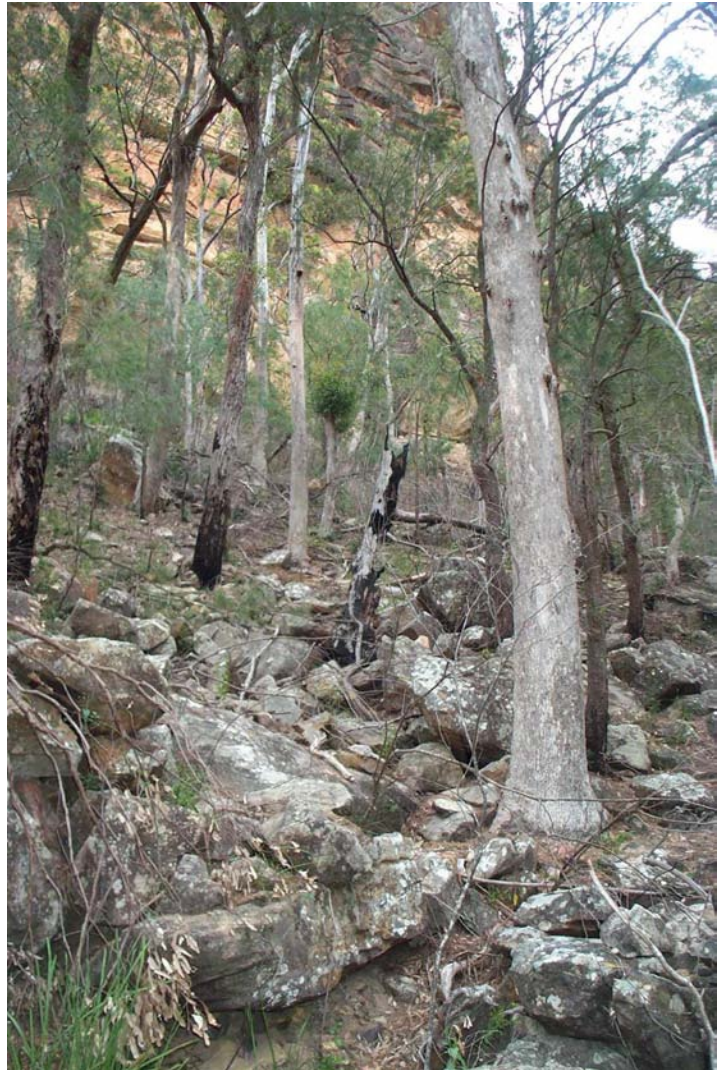
Species Name	Group Score	Group Freq	Non Group Score	Non Group Freq	Fidelity Class
<i>Adiantum aethiopicum</i>	2	0.61	2	0.21	positive
<i>Allocasuarina torulosa</i>	3	0.85	3	0.15	positive
<i>Billardiera scandens</i> var. <i>scandens</i>	2	0.51	1	0.32	positive
<i>Breynia oblongifolia</i>	2	0.59	1	0.17	positive
<i>Cayratia clematidea</i>	2	0.51	2	0.06	positive
<i>Cissus hypoglauca</i>	2	0.56	2	0.08	positive
<i>Clerodendrum tomentosum</i>	2	0.61	1	0.06	positive
<i>Desmodium varians</i>	2	0.80	2	0.26	positive
<i>Dianella caerulea</i>	2	0.83	2	0.33	positive
<i>Dichondra repens</i>	3	0.76	2	0.35	positive
<i>Doodia aspera</i>	2	0.51	2	0.09	positive
<i>Entolasia marginata</i>	2	0.51	2	0.08	positive
<i>Eucalyptus punctata</i>	4	0.65	3	0.33	positive
<i>Eustrephus latifolius</i>	2	0.51	1	0.14	positive
<i>Geitonoplesium cymosum</i>	2	0.83	2	0.27	positive
<i>Glycine clandestina</i>	2	0.76	2	0.29	positive
<i>Hardenbergia violacea</i>	2	0.59	1	0.26	positive
<i>Indigofera australis</i>	2	0.56	2	0.18	positive
<i>Lepidosperma laterale</i>	2	0.56	2	0.25	positive
<i>Lomandra fluviatilis</i>	3	0.05	0	0.00	positive
<i>Microlaena stipoides</i>	3	0.73	2	0.35	positive
<i>Olearia viscidula</i>	2	0.63	2	0.31	positive
<i>Oplismenus imbecillis</i>	3	0.66	2	0.16	positive
<i>Pandorea pandorana</i> subsp. <i>pandorana</i>	2	0.56	2	0.25	positive
<i>Plectranthus parviflorus</i>	2	0.76	2	0.15	positive
<i>Pratia purpurascens</i>	2	0.66	2	0.32	positive
<i>Rubus parvifolius</i>	2	0.54	2	0.11	positive
<i>Stephania japonica</i> var. <i>discolor</i>	2	0.56	2	0.08	positive
<i>Tylophora barbata</i>	3	0.80	2	0.15	positive
<i>Lomandra longifolia</i>	2	0.76	2	0.54	constant

MU12 ESCARPMENT TALL BOX FOREST

Number of Sites: 6 No. taxa/plot: 51.5

□ DESCRIPTION

Escarpment Tall Box Forest is a restricted community, being found in isolated ribbons on benches directly below escarpment cliffines. It grows on Permian Sediments, and may trace a geological layer that is exposed beneath the sandstone plateau. The deep soils are combined with sandstone colluvium on protected aspects to produce a tall forest dominated by *Eucalyptus hypostomatica*, *E. tereticornis* and *E. punctata*. A number of smaller trees may be present *Brachychiton populneus* subsp. *populneus* and *Allocasuarina torulosa*. The latter species can be particularly abundant and can result in a soft cushion of *Casuarina* needles being present on the forest floor. The understory is moderately shrubby with species such as *Olearia viscidula*, *Bursaria spinosa*, *Acacia parramattensis* and *Dodonaea viscosa* subsp. *angustifolia* commonly found. The ground layer is quite herbaceous and viny but provides little cover. Common species include *Desmodium varians*, *Eustrephus latifolius*, *Lepidosperma laterale*, *Geitonoplesium cymosum*, *Solanum prinophyllum*, *Clematis aristata* and *Stephania japonica* var. *discolor*.



This community is forms a component of several closely related vegetation communities found on sheltered aspects of the major Permian Valleys. Other communities MU11 Escarpment Grey Gum Forest and MU12 Sheltered Escarpment Blue Gum Forest represent drier and moister grades respectively. The distribution of Escarpment Box Forest outside of the reserves is not well understood. In mapping for the Warragamba Special Area (NPWS, 2003c) similar communities were included within MU12 as areas were not considered extensive enough to map. Beyond this area, a similar vegetation community has been observed in Pokolbin State Forest and Yengo National Park in the Hunter Valley (D. Connolly pers.obs).

□ **FLORISTIC SUMMARY**

Trees: Mean Upper Height 28m. Mean Projected Canopy Cover 29% SD 5.9

Eucalyptus hypostomatica, *Eucalyptus punctata*, *Eucalyptus tereticornis*

Minor associates: *Eucalyptus fibrosa*, *Eucalyptus globoidea*

Small Trees: Mean Upper Height 12m. Mean Projected Canopy Cover 12% SD 2.6

Brachychiton populneus subsp. *populneus*, *Allocasuarina torulosa*, *Pittosporum revolutum*

Shrubs: Mean Upper Height 2.8m. Mean Projected Canopy Cover 23% SD 21.0

Olearia viscidula, *Bursaria spinosa*, *Acacia parramattensis*, *Dodonaea viscosa* subsp. *angustifolia*, *Plectranthus parviflorus*, *Dodonaea triquetra*, *Indigofera australis*

Ground Covers: Mean Upper Height 0.8m. Mean Projected Canopy Cover 21% SD 11.4

Desmodium varians, *Eustrephus latifolius*, *Lepidosperma laterale*, *Geitonoplesium cymosum*, *Solanum prinophyllum*, *Clematis aristata*, *Crassula sieberiana*, *Sarcopetalum harveyanum*, *Sigesbeckia orientalis* subsp. *orientalis*, *Stephania japonica* var. *discolor*, *Tylophora barbata*, *Urtica incisa*, *Dichondra repens*, *Pandorea pandorana* subsp. *pandorana*, *Viola hederacea*

□ **KEY IDENTIFYING FEATURES**

Easily recognisable features to assist in identifying this map unit are:

- The presence of the tall box, *Eucalyptus hypostomatica* with Grey Gum (*E. punctata*). Kurrajong (*Brachychiton populneus* subsp. *populneus*) is also often present.
- Escarpment benches and upper slopes directly below sandstone walls and cliffs in the Nattai and Little River Valleys.
- A rocky surface with a sandy loam soil. Port Jackson Fig (*Ficus rubiginosa*), Rough-fruit Pittosporum (*Pittosporum revolutum*) and Snake Orchid (*Cymbidium suave*) are sometimes seen growing amongst the boulders.
- A mix of shrub, grass and vine species comprise the generally sparse understorey. Common species include Wallaby Weed (*Olearia viscidula*), Slender Tick-trefoil (*Desmodium varians*), Wombat Berry (*Eustrephus latifolius*) and Scrambling Lily (*Geitonoplesium cymosum*).

□ **EXAMPLE LOCATIONS**

Below Wanganderry Lookout; beneath escarpment cliffline on Nattai Road; Burragorang Walls;

□ **CONDITION ASSESSMENT**

Disturbance Class	Area (ha)	Proportion Extant (%)
A Low	601	83
B Medium	123	17
C High	0	0
Total	723	100

□ **THREATENED PLANT SPECIES**

Eucalyptus hypostomatica (3RC-), *Myoporum floribundum* (3RCi)

□ **DIAGNOSTIC SPECIES**

Species Name	Group Score	Group Freq	Non Group Score	Non Group Freq	Fidelity Class
<i>Allocasuarina torulosa</i>	4	0.83	2	0.15	positive
<i>Brachyscome angustifolia</i> var. <i>angustifolia</i>	2	0.50	1	0.13	positive
<i>Dendrobium linguiforme</i>	1	0.17	0	0.00	positive
<i>Desmodium varians</i>	2	0.83	2	0.21	positive
<i>Dianella caerulea</i>	2	0.67	2	0.43	positive
<i>Dichondra repens</i>	3	1.00	2	0.30	positive
<i>Doodia caudata</i>	3	0.17	0	0.00	positive
<i>Entolasia marginata</i>	2	0.50	2	0.16	positive
<i>Eucalyptus fibrosa</i>	4	0.50	3	0.05	positive
<i>Eucalyptus hypostomatica</i>	4	1.00	1	0.01	positive
<i>Eucalyptus punctata</i>	4	1.00	3	0.33	positive
<i>Geitonoplesium cymosum</i>	2	0.83	2	0.26	positive
<i>Glycine clandestina</i>	3	0.67	2	0.22	positive
<i>Goodenia ovata</i>	2	0.50	2	0.06	positive
<i>Hardenbergia violacea</i>	2	0.67	1	0.28	positive
<i>Lepidium pseudohyssopifolium</i>	1	0.17	0	0.00	positive
<i>Lepidosperma laterale</i>	2	0.83	2	0.40	positive
<i>Lomandra longifolia</i>	2	0.67	2	0.43	positive
<i>Maytenus silvestris</i>	1	0.17	0	0.00	positive
<i>Melaleuca styphelioides</i>	3	0.50	2	0.05	positive
<i>Microlaena stipoides</i> var. <i>stipoides</i>	2	0.67	2	0.42	positive
<i>Olearia viscidula</i>	3	1.00	2	0.30	positive
<i>Oplismenus imbecillis</i>	3	0.50	2	0.07	positive
<i>Pandorea pandorana</i> subsp. <i>pandorana</i>	3	0.67	2	0.19	positive
<i>Plectranthus parviflorus</i>	3	0.83	2	0.10	positive
<i>Pratia purpurascens</i>	2	0.50	2	0.28	positive
<i>Solanum prinophyllum</i>	2	1.00	1	0.21	positive
<i>Solanum vescum</i>	1	0.17	0	0.00	positive
<i>Tylophora barbata</i>	2	0.83	2	0.16	positive
<i>Vernonia cinerea</i> var. <i>cinerea</i>	2	0.50	1	0.06	positive
<i>Entolasia stricta</i>	2	0.67	2	0.55	constant
<i>Persoonia linearis</i>	2	0.67	2	0.50	constant

MU13 SHELTERED SANDSTONE BLUE-LEAVED STRINGYBARK FOREST

Number of Sites: 26 No. taxa/plot: 49.7

□ DESCRIPTION

Sheltered Sandstone Blue-leaved Stringybark Forest is extensively distributed across mid to lower slopes in sandstone gullies of the Nattai and Wanganderry Tablelands. It is an open forest assemblage with a canopy dominated by *Corymbia gummifera*, *Eucalyptus punctata*, *E. piperita* and *E. agglomerata*. An unusual occurrence of *Angophora costata* near Mount Wanganderry is also included within this community. Sites of greater shelter may include small trees of *Acacia elata*, *Ceratopetalum gummiferum* and *Allocasuarina torulosa*, which occur just below the Eucalypt canopy. The shrub layer is more consistent with species such as *Persoonia linearis*, *Elaeocarpus reticulatus*, *Leucopogon lanceolatus* var. *lanceolatus*, *Astrotricha latifolia*, *Xylomelum pyriforme* and *Banksia spinulosa* var. *spinulosa* a common feature. These species generally reflect the drier, less protected locations that characterise this forest. Low shrubs such as *Lomatia silaifolia*, *Gonocarpus teucroides* and *Phyllanthus hirtellus* grow amongst *Pteridium esculentum*, *Blechnum cartilagineum* and *Entolasia stricta*. Small vines including *Smilax glycyphylla* and *Pandorea pandorana* subsp. *pandorana* are found at low abundance.



Sheltered Sandstone Blue-leaved Stringybark Forest extends outside of the study area into the Warragamba Special Area and Metropolitan Catchments in areas of similar habitat. In the latter area it has been mapped and described as Nepean Sandstone Gully Forest (NPWS, 2003c). This community marks the gradient that links the exposed forests and woodlands of the ridges to the tall sheltered and closed forests of the deeper gorges. This community was mapped and described in the Warragamba Special Area (NPWS, 2003b) and this profile has been adapted from that report. It is well conserved throughout its range.

□ **FLORISTIC SUMMARY**

Trees: Mean Upper Height 23.7m. Mean Projected Canopy Cover 33% SD 9.4

Corymbia gummifera, *Eucalyptus punctata*, *Eucalyptus piperita*, *Eucalyptus agglomerata*

Minor associates: *Angophora costata*, *Angophora floribunda*, *Eucalyptus deanei*, *Angophora bakeri*, *Eucalyptus sieberi*, *Syncarpia glomulifera* subsp. *glomulifera*, *Eucalyptus eugenioides*, *Eucalyptus globoidea*

Small Trees: Mean Upper Height 10m. Mean Projected Canopy Cover 19% SD 13.5

Elaeocarpus reticulatus, *Ceratopetalum gummiferum*, *Allocasuarina torulosa*, *Acacia elata*

Shrubs: Mean Upper Height 3.8m. Mean Projected Canopy Cover 20% SD 16.9

Persoonia linearis, *Astrotricha latifolia*, *Leucopogon lanceolatus* var. *lanceolatus*, *Xylomelum pyriforme*, *Banksia spinulosa* var. *spinulosa*, *Persoonia levis*, *Bossiaea* spp. (*neo-anglica*, *obcordata*, *heterophylla*), *Acacia obtusifolia*, *Leptospermum polygalifolium* subsp. *polygalifolium*

Ground Covers: Mean Upper Height 1m. Mean Projected Canopy Cover 37% SD 23.1

Lomatia silaifolia, *Phyllanthus hirtellus*, *Gonocarpus teucroides*, *Pteridium esculentum*, *Entolasia stricta*, *Dianella caerulea*, *Dampiera purpurea*, *Lepidosperma laterale*, *Xanthosia pilosa*, *Blechnum cartilagineum*, *Billardiera scandens* var. *scandens*, *Lomandra longifolia*

□ **KEY IDENTIFYING FEATURES**

Easily recognisable features to assist in identifying this map unit are:

- Steep sandstone slopes (generally sheltered) of the Nattai and Wanganderry Tablelands.
- Open forest dominated by Red Bloodwood (*Corymbia gummifera*), Blue-leaved Stringybark (*Eucalyptus agglomerata*), Sydney Peppermint (*E. piperita*) and Grey Gum (*E. punctata*).
- Shrubs and small trees such as Narrow-leaved Geebung (*Persoonia linearis*), Blueberry Ash (*Elaeocarpus reticulatus*), Lance-leaf Beard-heath (*Leucopogon lanceolatus* var. *lanceolatus*) and *Astrotricha latifolia*.

□ **EXAMPLE LOCATIONS**

Wild Goat Plateau; southern Nattai Tableland; north and south Wanganderry Tableland; and Bargo River area

□ **CONDITION ASSESSMENT**

Disturbance Class	Area (ha)	Proportion Extant (%)
A Low	9257	97
B Medium	54	1
C High	224	2
Total	9535	100

□ **THREATENED PLANT SPECIES**

Lissanthe sapida (3RCa)

□ **DIAGNOSTIC SPECIES**

The diagnostic species presented below have been derived from NPWS (2003b).

Species Name	Group Score	Group Freq	Non Group Score	Non Group Freq	Fidelity Class
<i>Astrotricha latifolia</i>	2	0.62	2	0.08	positive
<i>Banksia spinulosa</i> var. <i>spinulosa</i>	2	0.50	2	0.21	positive
<i>Blechnum cartilagineum</i>	3	0.58	3	0.10	positive
<i>Clematis aristata</i>	2	0.69	2	0.34	positive
<i>Corymbia gummifera</i>	4	0.81	4	0.11	positive
<i>Dampiera purpurea</i>	2	0.62	2	0.16	positive
<i>Dianella caerulea</i>	2	0.73	2	0.34	positive
<i>Elaeocarpus reticulatus</i>	2	0.77	1	0.15	positive
<i>Entolasia stricta</i>	2	0.77	2	0.35	positive
<i>Eucalyptus agglomerata</i>	4	0.62	4	0.13	positive
<i>Eucalyptus piperita</i>	4	0.65	4	0.14	positive
<i>Eucalyptus punctata</i>	2	0.77	3	0.33	positive
<i>Gonocarpus teucroides</i>	3	0.77	2	0.15	positive
<i>Lepidosperma laterale</i>	2	0.62	2	0.25	positive
<i>Leucopogon lanceolatus</i> var. <i>lanceolatus</i>	2	0.62	2	0.27	positive
<i>Lomatia silaifolia</i>	2	0.88	2	0.24	positive
<i>Pandorea pandorana</i> subsp. <i>pandorana</i>	2	0.50	2	0.25	positive
<i>Persoonia linearis</i>	3	0.92	2	0.43	positive
<i>Phyllanthus hirtellus</i>	2	0.85	2	0.27	positive
<i>Polycarpaea corymbosa</i> var. <i>minor</i>	3	0.04	0	0.00	positive
<i>Pteridium esculentum</i>	3	0.77	2	0.35	positive
<i>Smilax glycyphylla</i>	2	0.54	1	0.07	positive
<i>Xylomelum pyriforme</i>	2	0.62	2	0.06	positive
<i>Lomandra longifolia</i>	2	0.42	2	0.55	negative

MU14 COURIDJAH SHELTERED SANDSTONE FOREST

Number of Sites: 13 No. taxa/plot: 51.5

□ DESCRIPTION

Couridjah Sheltered Sandstone Forest is found on the southern end of the Burragorang Tableland between Sheehys and Blue Gum Creeks. It has an unusual distribution in that it is found on ridgetops where a strong shale influence is present in the soil as well as in more typical sheltered forest locations on slopes and gullies. At first glance the community appears similar to other sheltered sandstone forests particularly MU13 Sheltered Sandstone Blue-leaved Stringybark Forest. However, in many locations the forest includes very dense stands of *Syncarpia glomulifera* var. *glomulifera* growing as small trees. This species is not present in MU13. While not always profuse, the species is often an indicator of changes to the soil in the Nattai and Bargo reserves. The tree species *Eucalyptus resinifera* subsp. *resinifera* is a similar indicator of the enriched soils, having been only recorded within this forest.

The forest is moderately tall and has a dense canopy dominated by *Eucalyptus piperita* and *E. punctata*. *Eucalyptus deanei* and *E. agglomerata* are also found as is either *Corymbia eximia* or *Corymbia gummifera*. A small tree layer is also usually present consisting of abundant *Allocasuarina torulosa*. Common shrub species include *Lomatia silaifolia*, *Leucopogon lanceolatus* var. *lanceolatus*, *Persoonia linearis*, *P. mollis* and *Elaeocarpus reticulatus*. Ground covers occur at lower abundance and are a mixture of shelter loving species such as *Dianella caerulea*, *Entolasia stricta*, *Lomandra longifolia*, *Pteridium esculentum* and *Clematis aristata*. Shrubs common to MU13 such as *Banksia spinulosa* var. *spinosa* are not frequently recorded within this community.

On Hoddles Track residual shale caps provide soil deep and rich enough to support a distinctively tall forest compared to the surrounding ridgetop woodlands. The floristic composition of these sites are aligned to this community as they support a number of species more typical of sheltered locations such as *Eucalyptus deanei*, *E. punctata*, *Leucopogon lanceolatus* var. *lanceolatus* and *Ceratopetalum gummiferum*. The community is an interesting variation to the forests occurring throughout the broad plateaus of the Burragorang Tableland and Woodford Ranges in the Lower Blue Mountains NP. It is well protected in formal reserves though it is not extensive in area.



□ **FLORISTIC SUMMARY**

Trees: Mean Upper Height 23m. Mean Projected Canopy Cover 41% SD 8.6

Eucalyptus piperita, Eucalyptus punctata, Eucalyptus deanei, Eucalyptus agglomerata

Minor associates: *Corymbia eximia, Corymbia gummifera, Angophora floribunda, Eucalyptus resinifera* subsp. *resinifera, Eucalyptus elata, Eucalyptus crebra, Eucalyptus fibrosa*

Small Trees: Mean Upper Height 12m. Mean Projected Canopy Cover 23% SD 12.9

Allocasuarina torulosa, Syncarpia glomulifera subsp. *glomulifera, Acacia falciformis*

Shrubs: Mean Upper Height 4m. Mean Projected Canopy Cover 20% SD 13.7

Lomatia silaifolia, Leucopogon lanceolatus var. *lanceolatus, Persoonia linearis, Hibbertia aspera* subsp. *aspera, Persoonia mollis, Phyllanthus hirtellus, Elaeocarpus reticulatus, Persoonia levis, Pimelea linifolia, Astrotricha latifolia, Podolobium ilicifolium*

Ground Covers: Mean Upper Height 1m. Mean Projected Canopy Cover 37% SD 28.9

Dianella caerulea, Entolasia stricta, Lomandra longifolia, Pteridium esculentum, Clematis aristata, Lepidosperma laterale, Xanthosia pilosa, Blechnum cartilagineum, Glycine clandestina, Billardiera scandens var. *scandens, Hardenbergia violacea, Pomax umbellata*

□ **KEY IDENTIFYING FEATURES**

Easily recognisable features to assist in identifying this map unit are:

- A tall forest found on protected aspects of the southern Burragorang Tableland, between Sheehys Creek and Little River.
- A dense canopy dominated by Sydney Peppermint (*Eucalyptus piperita*), Grey Gum (*E. punctata*), Bloodwoods (*Corymbia eximia* or *Corymbia gummifera*) and often with a small tree layer of Forest Oak (*Allocasuarina torulosa*) and dense Turpentine (*Syncarpia glomulifera* subsp. *glomulifera*).
- A diverse understorey with some shelter loving species such as Blueberry Ash (*Elaeocarpus reticulatus*) and Gristle Fern (*Blechnum cartilagineum*) mixed with species commonly found in more exposed locations including Narrow-leaved Geebung (*Persoonia linearis*).

□ **EXAMPLE LOCATIONS**

Blue Gum Creek; Couridjah Creek; Kittys Creek; Slopes off Hoddles Track

□ **CONDITION ASSESSMENT**

Disturbance Class	Area (ha)	Proportion Extant (%)
A Low	793	52
B Medium	618	41
C High	115	8
Total	1526	100

□ **THREATENED PLANT SPECIES**

Lissanthe sapida (3RCa)

□ **DIAGNOSTIC SPECIES**

Species Name	Group Score	Group Freq	Non Group Score	Non Group Freq	Fidelity Class
<i>Allocasuarina torulosa</i>	4	0.69	2	0.15	positive
<i>Blechnum cartilagineum</i>	4	0.62	3	0.16	positive
<i>Clematis aristata</i>	2	0.77	2	0.25	positive
<i>Dianella caerulea</i>	2	1.00	2	0.43	positive
<i>Eucalyptus piperita</i>	4	0.77	4	0.35	positive
<i>Eucalyptus resinifera</i> subsp. <i>resinifera</i>	4	0.15	0	0.00	positive
<i>Glycine clandestina</i>	2	0.62	2	0.22	positive
<i>Hibbertia aspera</i> subsp. <i>aspera</i>	3	0.77	2	0.16	positive
<i>Lepidosperma laterale</i>	2	0.62	2	0.40	positive
<i>Leucopogon lanceolatus</i> var. <i>lanceolatus</i>	2	0.92	1	0.26	positive
<i>Lomandra longifolia</i>	2	0.85	2	0.43	positive
<i>Lomatia silaifolia</i>	2	0.85	2	0.46	positive
<i>Persoonia levis</i>	2	0.54	2	0.35	positive
<i>Persoonia mollis</i>	2	0.77	2	0.07	positive
<i>Pteridium esculentum</i>	3	0.69	2	0.40	positive
<i>Tristaniopsis collina</i>	2	0.54	3	0.02	positive
<i>Viola hederacea</i>	2	0.62	2	0.20	positive
<i>Entolasia stricta</i>	2	0.92	2	0.55	constant
<i>Persoonia linearis</i>	3	0.69	2	0.50	constant

MU15 NATTAI SANDSTONE DRY SHRUB FOREST

Number of Sites: 21 No. taxa/plot: 49.0

□ DESCRIPTION

Nattai Sandstone Dry Shrub Forest is a dry open forest found on the broad Hawkesbury Sandstone ridges and exposed upper slopes of the Nattai, Wanganderry and Burragorang Tablelands. The canopy is moderately tall and open with *Corymbia gummifera*, *Eucalyptus piperita* and Stringybarks (*E. agglomerata*, *E. globoidea*, *E. oblonga* and *E. eugenioides*) most frequently recorded. The understorey is a diverse mix of low shrubs and heath species such as *Banksia spinulosa* var. *spinulosa*, *Persoonia levis*, *Leptospermum trinervium*, *Acacia linifolia*, *Xylomelum pyriforme* and *Leucopogon lanceolatus* var. *lanceolatus*. The sparse ground stratum is comprised of *Lomatia silaifolia*, *Entolasia stricta*, *Phyllanthus hirtellus*, *Pomax umbellata*, *Patersonia sericea* and *Lomandra obliqua*.

The broad ridgetops where Nattai Sandstone Dry Shrub Forest occurs have an infertile but marginally deeper soil than those types found on the bony narrow ridges where a heath understorey becomes more abundant. In these areas the canopy tends to be lower and more open supporting shrub-heath woodlands such as MU26 Exposed Burragorang Sandstone Shrub Woodland. This community was mapped in the Warragamba Special Area (NPWS, 2003b) and is known to occur extensively across the Nattai and Lacys Tablelands. This profile has been adapted from that report.



□ FLORISTIC SUMMARY

Trees: Mean Upper Height 21m. Mean Projected Canopy Cover 38% SD 7.3

Corymbia gummifera, *Eucalyptus piperita*, *Eucalyptus agglomerata*, *Eucalyptus globoidea*, *Eucalyptus oblonga*

Minor associates: *Syncarpia glomulifera* subsp. *glomulifera*, *Corymbia eximia*, *Eucalyptus punctata*, *Eucalyptus sieberi*, *Eucalyptus sclerophylla*, *Eucalyptus eugenioides*, *Eucalyptus fibrosa*, *Angophora bakeri*

Shrubs: Mean Upper Height 3.5m. Mean Projected Canopy Cover 29% SD 17.1

Banksia spinulosa var. *spinulosa*, *Persoonia levis*, *Leptospermum trinervium*, *Acacia linifolia*, *Xylomelum pyriforme*, *Leucopogon lanceolatus* var. *lanceolatus*, *Bossiaea neo-anglica*, *Leptomeria acida*,

Podolobium ilicifolium, *Acacia ulicifolia*, *Grevillea mucronulata*, *Gompholobium latifolium*, *Pimelea linifolia*, *Persoonia linearis*

Ground Covers: Mean Upper Height 0.9m. Mean Projected Canopy Cover 32% SD 21.1

Lomatia silaifolia, *Entolasia stricta*, *Phyllanthus hirtellus*, *Pomax umbellata*, *Patersonia sericea*, *Lomandra obliqua*, *Billardiera scandens* var. *scandens*, *Xanthosia pilosa*, *Dianella caerulea*, *Goodenia hederacea* subsp. *hederacea*, *Hovea linearis*

□ **KEY IDENTIFYING FEATURES**

Easily recognisable features to assist in identifying this map unit are:

- Broad Hawkesbury Sandstone ridges and exposed upper slopes of the Nattai, Wanganderry and Burragorang Tablelands.
- Open Forest dominated by Red Bloodwood (*Corymbia gummifera*), Sydney Peppermint (*Eucalyptus piperita*) and Stringybarks (*E. agglomerata*, *E. globoidea*, *E. eugenioides*, *E. oblonga*). Note the Stringybarks are difficult to identify in this region and are a source of taxonomic uncertainty.
- Diverse shrub understorey featuring Banksias, Geebung (*Persoonia* spp.), Wattles (*Acacia ulicifolia*, *A. linifolia*) and Tea-tree (*Leptospermum trinervium*).

□ **EXAMPLE LOCATIONS**

Centre Ridge, Wattle Ridge, Long Nose Ridge (Nattai Tableland); Mount Gorman, Bonnum Pic (Wanganderry Tablelands)

□ **CONDITION ASSESSMENT**

Disturbance Class	Area (ha)	Proportion Extant (%)
A Low	4565	85
B Medium	804	15
C High	2	0
Total	5371	100

□ **THREATENED PLANT SPECIES**

Persoonia hirsuta (E1), *Tetratheca glandulosa* (V), *Lissanthe sapida* (3RCa), *Lomandra fluviatilis* (3RCa)

□ **DIAGNOSTIC SPECIES**

The diagnostic species presented below have been derived from NPWS (2003b).

Species Name	Group Score	Group Freq	Non Group Score	Non Group Freq	Fidelity Class
<i>Acacia linifolia</i>	2	0.62	2	0.08	positive
<i>Banksia spinulosa</i> var. <i>spinulosa</i>	3	0.71	2	0.21	positive
<i>Billardiera scandens</i> var. <i>scandens</i>	2	0.67	1	0.32	positive
<i>Boronia polygalifolia</i>	1	0.05	0	0.00	positive
<i>Bossiaea neo-anglica</i>	3	0.52	2	0.01	positive
<i>Corymbia gummifera</i>	3	0.95	4	0.11	positive
<i>Dianella caerulea</i>	2	0.52	2	0.35	positive
<i>Dillwynia elegans</i>	4	0.05	0	0.00	positive
<i>Entolasia stricta</i>	3	0.90	2	0.35	positive
<i>Eucalyptus piperita</i>	4	0.71	4	0.14	positive
<i>Lepidosperma laterale</i>	2	0.52	2	0.26	positive
<i>Leptomeria acida</i>	2	0.52	1	0.07	positive
<i>Leptospermum trinervium</i>	4	0.62	3	0.16	positive
<i>Leucopogon lanceolatus</i> var. <i>lanceolatus</i>	2	0.57	2	0.27	positive
<i>Lomandra obliqua</i>	2	0.76	2	0.19	positive
<i>Lomatia silaifolia</i>	2	1.00	2	0.24	positive
<i>Patersonia sericea</i>	2	0.81	2	0.07	positive
<i>Persoonia hirsuta</i>	2	0.05	0	0.00	positive
<i>Persoonia levis</i>	2	0.71	1	0.14	positive
<i>Phyllanthus hirtellus</i>	2	0.90	2	0.27	positive
<i>Platysace linearifolia</i>	2	0.57	2	0.06	positive
<i>Podolobium ilicifolium</i>	2	0.52	2	0.17	positive
<i>Pomax umbellata</i>	2	0.86	2	0.29	positive
<i>Pultenaea hispidula</i>	4	0.05	0	0.00	positive
<i>Xanthosia pilosa</i>	2	0.67	2	0.07	positive
<i>Xylomelum pyriforme</i>	2	0.62	2	0.07	positive
<i>Lomandra longifolia</i>	2	0.33	2	0.55	negative

MU16 HIGHLANDS SANDSTONE DRY SHRUB FOREST

Number of Sites: 22 No. taxa/plot: 44

□ DESCRIPTION

Highlands Sandstone Dry Shrub Forest is found on the higher elevation sandstone sediments of the southern Nattai and Wanganderry Tablelands. It is generally found across elevations between 500 and 800 metres in the south west corner of the study area. The principal canopy species are *Eucalyptus agglomerata*, *E. punctata*, *E. sieberi*, *Angophora costata*, *E. piperita* and *E. sclerophylla*. *Eucalyptus sieberi* and *E. piperita* are often dominant in exposed positions. *Eucalyptus agglomerata* and *E. punctata* tend to occur on the upper slopes and crests where soils are marginally deeper and sometimes slightly shale influenced. The forest is tall, usually above twenty metres in height, and may include *Allocasuarina littoralis* as a small tree layer. The forest has an open cover of tall dry shrubs. This includes *Persoonia linearis*, *P. levis*, *Leptomeria acida*, *Acacia terminalis*, *A. ulicifolia*, *Podolobium ilicifolium*, *Banksia spinulosa* var. *spinulosa*, *Bossiaea obcordata* and *Leptospermum trinervium*. The presence of *Boronia algida* in the shrub layer is indicative of the higher elevations. Low growing shrubs feature prominently amongst the ground covers. These include *Phyllanthus hirtellus*, *Tetratheca thymifolia* and *Hibbertia empetrifolia* subsp. *empetrifolia*. *Patersonia glabrata*, *Pomax umbellata*, *Stypandra glauca* and *Entolasia stricta* are also common amongst this sparse low stratum.



Outside of the study area this community is more extensively distributed throughout the Shoalhaven and Wollondilly Catchments (Forest Ecosystem 15, NPWS 2000a). NPWS (2000a) suggests that the original distribution has been reduced through clearing with only small areas currently located in formal reserves. Within the study area, this community grades into MU15 Nattai Sandstone Dry Shrub Forest, which is found at lower elevations to the north and east. This community was mapped in the Warragamba Special Area (NPWS, 2003b) and this profile has been adapted from that report.

□ **FLORISTIC SUMMARY**

Trees: Mean Upper Height 21m. Mean Projected Canopy Cover 24% SD 10.1

Eucalyptus agglomerata, *Eucalyptus punctata*, *Eucalyptus sieberi*, *Angophora costata*, *Eucalyptus piperita*, *Eucalyptus sclerophylla*

Minor associates: *Eucalyptus globoidea*, *Eucalyptus sideroxylon*, *Syncarpia glomulifera* subsp. *glomulifera*, *Angophora floribunda*, *Eucalyptus elata*

Shrubs: Mean Upper Height 6.6m. Mean Projected Canopy Cover 19% SD 12.7

Persoonia linearis, *Persoonia levis*, *Tetradlea thymifolia*, *Podolobium ilicifolium*, *Bossiaea obcordata*, *Leptospermum trinervium*, *Banksia spinulosa* var. *spinulosa*, *Leptomeria acida*, *Allocasuarina littoralis*

Ground Covers: Mean Upper Height 0.8m. Mean Projected Canopy Cover 10% SD 7.9

Pomax umbellata, *Entolasia stricta*, *Stypandra glauca*, *Dampiera purpurea*, *Lomatia silaifolia*, *Pteridium esculentum*

□ **KEY IDENTIFYING FEATURES**

Easily recognisable features to assist in identifying this map unit are:

- Crests and upper slopes of the southern Nattai and Wanganderry Tablelands, above 500 metres in elevation.
- A canopy dominated by Blue-leaved Stringybark (*Eucalyptus agglomerata*) and sometimes Silvertop Ash (*E. sieberi*), Sydney Peppermint (*E. piperita*) and Smooth-barked Apple (*Angophora costata*). Grey Gum (*E. punctata*) is often associated with these species.
- An absence of Red Bloodwood (*Corymbia gummifera*) which is consistently found on sandstones of lower elevations, but not within in this community.
- A tall dry shrub layer comprising *Banksia spinulosa* var. *spinulosa*, Geebung (*Persoonia* spp.) and Sunshine Wattle (*Acacia terminalis*).
- The prominence of Nodding Blue Lily (*Stypandra glauca*) amongst a sparse ground cover.

□ **EXAMPLE LOCATIONS**

Ridgetops north of Mt Wanganderry; Burragorang Lookout; Wanganderry Lookout

□ **CONDITION ASSESSMENT**

Disturbance Class	Area (ha)	Proportion Extant (%)
A Low	4040	95
B Medium	148	3
C High	81	2
Total	4269	100

□ **THREATENED PLANT SPECIES**

Hakea constablei (2RCa)

□ **DIAGNOSTIC SPECIES**

The diagnostic species presented below have been derived from NPWS (2003b).

Species Name	Group Score	Group Freq	Non Group Score	Non Group Freq	Fidelity Class
<i>Banksia spinulosa</i> var. <i>spinulosa</i>	2	0.56	2	0.21	positive
<i>Billardiera scandens</i> var. <i>scandens</i>	2	0.76	1	0.32	positive
<i>Boronia algida</i>	2	0.04	0	0.00	positive
<i>Bossiaea obcordata</i>	3	0.68	2	0.08	positive
<i>Dampiera purpurea</i>	2	0.72	2	0.16	positive
<i>Entolasia stricta</i>	2	0.80	2	0.35	positive
<i>Eucalyptus agglomerata</i>	4	0.72	4	0.13	positive
<i>Gonocarpus teucrioides</i>	2	0.68	2	0.15	positive
<i>Goodenia hederacea</i> subsp. <i>hederacea</i>	3	0.76	2	0.25	positive
<i>Hibbertia empetrifolia</i> subsp. <i>empetrifolia</i>	2	0.80	2	0.07	positive
<i>Leptospermum trinervium</i>	2	0.60	3	0.16	positive
<i>Lomandra cylindrica</i>	2	0.52	2	0.04	positive
<i>Lomandra obliqua</i>	2	0.60	2	0.19	positive
<i>Lomatia silaifolia</i>	2	0.72	2	0.25	positive
<i>Patersonia glabrata</i>	2	0.80	2	0.10	positive
<i>Persoonia levis</i>	2	0.76	2	0.14	positive
<i>Persoonia linearis</i>	2	1.00	2	0.43	positive
<i>Phyllanthus hirtellus</i>	2	0.72	2	0.27	positive
<i>Podolobium ilicifolium</i>	2	0.72	2	0.16	positive
<i>Pomax umbellata</i>	2	0.88	2	0.28	positive
<i>Stypandra glauca</i>	3	0.72	3	0.20	positive
<i>Tetralthea thymifolia</i>	2	0.76	2	0.03	positive
<i>Lomandra longifolia</i>	1	0.40	2	0.55	negative

MU17 TABLELANDS RIVER OAK FOREST

Number of Sites: 15 No. taxa/plot: 54.1

□ DESCRIPTION

Tablelands River Oak Forest is found along the fringes of major watercourses and associated river banks in broad valleys. Tall *Casuarina cunninghamiana* subsp. *cunninghamiana* form a narrow ribbon of vegetation on mobile alluvial sediments which settle amongst river boulders and pebbles. With increasing soil depth *Angophora floribunda* is common, often with a wide variety of Eucalypt species. The understorey is highly variable depending on time since flooding, soil depth, disturbance and distance from waterline. Commonly, the ground cover features a layer of rapid recolonising herbs and grasses such as *Microlaena stipoides*, *Dichondra repens*, *Lomandra longifolia* and *Oplismenus aemulus*. Close to the water edge *Juncus subsecundus*, *Ranunculus plebeius* and *R. lappaceus* are found. Shrubs are sparse and may include *Hymenanthera dentata*, *Ficus coronata* and on rocky river banks, the small tree *Tristaniopsis laurina*. Twiners and vines are common on rocks and amongst the ground cover with *Pandorea pandorana* subsp. *pandorana* and *Stephania japonica* var. *discolor* being typical.

Tablelands River Oak Forest is a highly variable in its floristic composition, with variations of it extending from the Tablelands to the Coast within the Sydney Basin Bioregion. Widespread clearing has depleted much of the original distribution, with existing areas often highly degraded by ongoing grazing pressures and weed infestation. Feral pigs also feed and wallow on the deeper soils of the riverbanks, which often support this community. This community was mapped in the Warragamba Special Area (NPWS, 2003b) and this profile has been adapted from that report.



□ FLORISTIC SUMMARY

Trees: Mean Upper Height 26m. Mean Projected Canopy Cover 35% SD 17.3

Casuarina cunninghamiana subsp. *cunninghamiana*

Minor associates: *Backhousia myrtifolia*, *Eucalyptus tereticornis*, *Angophora floribunda*, *Eucalyptus eugenioides*, *Eucalyptus deanei*, *Eucalyptus crebra*, *Eucalyptus punctata*, *Eucalyptus quadrangulata*

Small Trees/Shrubs: Mean Upper Height 6m. Mean Projected Canopy Cover 21% SD 17

Hymenanthera dentata, *Ficus coronata*, *Tristaniopsis laurina*, *Sigesbeckia orientalis* subsp. *orientalis*

Ground Covers: Mean Upper Height 0.8m. Mean Projected Canopy Cover 51% SD 30.3

Microlaena stipoides, *Lomandra longifolia*, *Oplismenus aemulus*, *Pandorea pandorana* subsp. *pandorana*, *Dichondra repens*, *Entolasia marginata*, *Stephania japonica* var. *discolor*, *Rubus* spp., *Rumex brownii*, *Commelina cyanea*, *Isolepis inundata*

□ **KEY IDENTIFYING FEATURES**

Easily recognisable features to assist in identifying this map unit are:

- A canopy dominated by River Oak (*Casuarina cunninghamiana* subsp. *cunninghamiana*) growing on mobile alluvial sediments, on the fringes of major watercourses often with many river pebbles and boulders.
- An understorey dominated by herbs and grasses, but also containing vines and moisture loving small trees such as Sandpaper Fig (*Ficus coronata*) and Water Gum (*Tristaniopsis laurina*).

□ **EXAMPLE LOCATIONS**

All major rivers within the study area including Wollondilly, Nattai and Little Rivers.

□ **CONDITION ASSESSMENT**

Disturbance Class	Area (ha)	Proportion Extant (%)
A Low	162	52
B Medium	50	16
C High	99	32
Total	311	100

□ **THREATENED PLANT SPECIES**

Gonocarpus longifolius (3RC-)

□ **DIAGNOSTIC SPECIES**

The diagnostic species presented below have been derived from NPWS (2003b).

Species Name	Group Score	Group Freq	Non Group Score	Non Group Freq	Fidelity Class
<i>Adiantum aethiopicum</i>	3	0.50	2	0.22	positive
<i>Amyema cambagei</i>	1	0.13	0	0.00	positive
<i>Casuarina cunninghamiana</i> subsp. <i>cunninghamiana</i>	5	0.88	3	0.02	positive
<i>Clematis glycinoides</i> var. <i>glycinoides</i>	2	0.56	2	0.16	positive
<i>Dichondra repens</i>	2	0.69	3	0.36	positive
<i>Entolasia marginata</i>	2	0.63	2	0.09	positive
<i>Geitonoplesium cymosum</i>	2	0.50	2	0.29	positive
<i>Hymenanthera dentata</i>	3	0.94	2	0.08	positive
<i>Leptospermum morrisonii</i>	1	0.06	0	0.00	positive
<i>Microlaena stipoides</i>	4	1.00	2	0.36	positive
<i>Oplismenus aemulus</i>	3	0.75	2	0.07	positive
<i>Pellaea falcata</i>	2	0.56	2	0.16	positive
<i>Potamogeton tricarinatus</i>	4	0.06	0	0.00	positive
<i>Ranunculus plebeius</i>	3	0.06	0	0.00	positive
<i>Rumex brownii</i>	2	0.50	1	0.04	positive
<i>Sigesbeckia orientalis</i> subsp. <i>orientalis</i>	2	0.50	2	0.13	positive
<i>Stephania japonica</i> var. <i>discolor</i>	2	0.63	2	0.09	positive
<i>Urtica incisa</i>	3	0.56	2	0.06	positive
<i>Lomandra longifolia</i>	2	0.88	2	0.54	constant

MU18 PERMIAN FOOTSLOPES GRASSY RED GUM-BOX FOREST

Number of Sites: 9 No. taxa/plot: 52.4

□ DESCRIPTION

Permian Foothslopes Grassy Red Gum-Box Forest is an open forest found on flat and gently sloping escarpment foothslopes of the broad Burragorang and Nattai Valleys. *Eucalyptus moluccana* and *E. tereticornis* are prominent in this community which contrasts to their restricted distribution (especially *E. moluccana*) in surrounding vegetation communities. *Eucalyptus eugenioides* and *Angophora floribunda* are also frequent amongst the tree layer. Smaller trees are also usually present including *Acacia parramattensis*, *Acacia floribunda* and *Melaleuca styphelioides*. Shrubs commonly present include *Olearia viscidula*, *Rubus parvifolius* and *Breynia oblongifolia*. The ground cover supports an abundant cover of grasses such as *Microlaena stipoides* var. *stipoides*, *Entolasia marginata* and *Austrostipa ramosissima* with the herbs *Dichondra repens* and *Solanum prinophyllum* also common.

Permian Foothslopes Grassy Red Gum-Box Forest is found on finer grained Permian sediments. These are typically found on lower escarpment slopes particularly at the confluence of major alluvial terraces. Much of the suitable habitat for this community is in the lower Burragorang Valley and has been flooded since the construction of Warragamba Dam. Remnants can be observed on some of the foreshores of Lake Burragorang and in foothslopes of the Nattai River Valley.



The unusual occurrence of Grey Box Forest was noted in the field observations of Lembit (1989) who also commented on the conservation importance of such remnants. Many examples of this community are regenerating from previous disturbance associated with land clearing and grazing across the valley. Permian Foothslopes Grassy Red Gum-Box Forest is closely related to other grassy forests and woodlands such as those found on richer soils derived from shale and porphyry material. This community was described and mapped as MU32 in the Warragamba Special Area (NPWS, 2003b) and this profile has been adapted from that report. Similar forests are not described outside of the Special Area and the community is likely to be restricted to these major valley systems.

□ **FLORISTIC SUMMARY**

Trees: Mean Upper Height 23m. Mean Projected Canopy Cover 31% SD 10.9

Eucalyptus tereticornis, *Eucalyptus eugenioides*, *Eucalyptus moluccana*

Minor associates: *Angophora floribunda*, *Eucalyptus elata*, *Eucalyptus punctata*, *Eucalyptus fibrosa*, *Eucalyptus crebra*

Small Trees: Mean Upper Height 7m. Mean Projected Canopy Cover 18% SD 15.0

Acacia parramattensis, *Acacia floribunda*, *Melaleuca styphelioides*, *Casuarina cunninghamiana* subsp. *cunninghamiana*, *Allocasuarina torulosa*, *Brachychiton populneus* subsp. *populneus*

Shrubs: Mean Upper Height 2.3m. Mean Projected Canopy Cover 22% SD 9.5

Olearia viscidula, *Rubus parvifolius*, *Pimelea linifolia*, *Hibbertia aspera* subsp. *aspera*, *Breynia oblongifolia*, *Lissanthe strigosa*, *Phyllanthus gunnii*, *Clerodendrum tomentosum*

Ground Covers: Mean Upper Height 1m. Mean Projected Canopy Cover 40% SD 31.2

Microlaena stipoides var. *stipoides*, *Entolasia marginata*, *Austrostipa ramosissima*, *Solanum prinophyllum*, *Billardiera scandens* var. *scandens*, *Dichondra repens*, *Pratia purpurascens*, *Echinopogon ovatus*, *Stephania japonica* var. *discolor*, *Glycine clandestina*, *Poranthera microphylla*, *Pteridium esculentum*, *Clematis glycinoides* var. *glycinoides*, *Veronica plebeia*, *Oplismenus aemulus*

□ **KEY IDENTIFYING FEATURES**

Easily recognisable features to assist in identifying this map unit are:

- The presence and abundance of Grey Box (*Eucalyptus moluccana*) and Forest Red Gum (*E. tereticornis*) are dominant features of this community, being rarely found in other vegetation communities growing on Permian soils. A small tree layer generally occurs typically including Wattles (*Acacia* spp.) and Rough-barked Apple (*Angophora floribunda*).
- This community has a predominantly grassy understorey. Indicative understorey species include *Microlaena stipoides* var. *stipoides*, Bordered Panic Grass (*Entolasia marginata*), Stout Bamboo Grass (*Austrostipa ramosissima*), Forest Nightshade (*Solanum prinophyllum*), Kidney Weed (*Dichondra repens*) and Wallaby Weed (*Olearia viscidula*).
- Found in disturbed isolated patches on escarpment footslopes and benches predominantly around the foreshores of Lake Burragarang and through the Nattai River Valley.

□ **EXAMPLE LOCATIONS**

Footslopes in the Nattai River Valley (Colleys Flat, Middle Flat, McArthurs Flat); Disturbed remnants on the foreshores of Lake Burragarang (Tonalli River, Lacys Creek and Blattman Point)

□ **CONDITION ASSESSMENT**

Disturbance Class	Area (ha)	Proportion Extant (%)
A Low	239	31
B Medium	155	20
C High	374	49
Total	767	100

□ **THREATENED PLANT SPECIES**

None recorded

□ **DIAGNOSTIC SPECIES**

Species Name	Group Score	Group Freq	Non Group Score	Non Group Freq	Fidelity Class
<i>Acacia filicifolia</i>	1	0.11	0	0.00	positive
<i>Acacia parramattensis</i>	2	0.67	1	0.07	positive
<i>Alternanthera denticulata</i>	2	0.11	0	0.00	positive
<i>Austrostipa ramosissima</i>	2	0.67	2	0.03	positive
<i>Babingtonia pluriflora</i>	4	0.11	0	0.00	positive
<i>Billardiera scandens</i> var. <i>scandens</i>	2	0.78	1	0.48	positive
<i>Calystegia marginata</i>	1	0.11	0	0.00	positive
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	2	0.78	1	0.18	positive
<i>Chenopodium pumilio</i>	1	0.11	0	0.00	positive
<i>Dichondra repens</i>	2	0.89	2	0.30	positive
<i>Entolasia marginata</i>	3	0.67	2	0.16	positive
<i>Eucalyptus eugenioides</i>	4	0.56	3	0.06	positive
<i>Eucalyptus tereticornis</i>	4	0.78	4	0.12	positive
<i>Gahnia aspera</i>	2	0.56	2	0.07	positive
<i>Hydrocotyle laxiflora</i>	2	0.67	2	0.13	positive
<i>Lissanthe strigosa</i>	3	0.56	2	0.18	positive
<i>Lomandra longifolia</i>	2	0.67	2	0.43	positive
<i>Microlaena stipoides</i> var. <i>stipoides</i>	4	0.89	2	0.42	positive
<i>Olearia viscidula</i>	2	0.89	2	0.30	positive
<i>Pimelea curviflora</i> var. <i>subglabrata</i>	4	0.22	0	0.00	positive
<i>Poranthera microphylla</i>	2	0.67	2	0.13	positive
<i>Pratia purpurascens</i>	2	0.78	2	0.28	positive
<i>Pterostylis longipetala</i>	1	0.11	0	0.00	positive
<i>Scaevola albida</i>	2	0.11	0	0.00	positive
<i>Stephania japonica</i> var. <i>discolor</i>	2	0.56	2	0.11	positive
<i>Entolasia stricta</i>	2	0.44	2	0.55	negative
<i>Persoonia linearis</i>	1	0.56	2	0.50	negative

MU19 TRANSITIONAL SHALE DRY IRONBARK FOREST

Number of Sites: 21

□ DESCRIPTION

Transitional Shale Dry Ironbark Forest occurs along the western edge of the Metropolitan Catchment where shale soils of the Cumberland Plain interface with the sandstone geologies of the Mittagong and Hawkesbury Formations. Remnant caps of shale soil also occur on top of the sandstone geologies at a number of disjunct locations in this area. The mix of both shale and sandstone soils produces a species composition that reflects the ecotone between the two environments. The ecotones vary in the degree of shale influence in the soil such that NPWS (2000b) identified two Transitional Shale-Sandstone Forests. This variation can be gradual as the distance from shale soil increases into sandstone geology or highly localised on the isolated shale caps. No attempt has been made to map these two variations separately.

Ironbarks (*Eucalyptus crebra*, *E. fibrosa* and *E. paniculata* subsp. *paniculata*) and Stringybarks (*E. globoidea* and *E. eugenioides*) characterise the canopy species in this community, with *Eucalyptus punctata* a regular associate species. Other associated canopy species depend upon the thickness of the shale soil. At greater thickness, boxes (*Eucalyptus moluccana* and *E. bosistoana*) and Forest red gum (*E. tereticornis*) are more pronounced, while *Corymbia gummifera* marks the sandstone end of the gradient. The shrub stratum responds similarly to slight changes in soil fertility. *Bursaria spinosa* is the characteristic species of the small shrub layer in areas with greater shale influence. Scattered individuals of *Allocasuarina littoralis*, *Acacia irrorata* subsp. *irrorata* and *Acacia decurrens* are an occasional taller shrub stratum. In contrast, additional species such as *Kunzea ambigua*, *Persoonia linearis*, *Banksia ericifolia* subsp. *ericifolia* and *B. spinulosa* var. *spinulosa* are more common in the shrub layer where the sandstone influence is greater. The ground cover is distinctly grassy, supporting an amalgam of *Themeda australis*, *Entolasia stricta*, *E. marginata*, *Imperata cylindrica* var. *major* and *Echinopogon caespitosus* var. *caespitosus*. *Lepidosperma laterale*, *Lomandra longifolia*, *Pomax umbellata*, *Glycine clandestina* and *Hardenbergia violacea* also feature prominently.



Transitional Shale Dry Ironbark Forest forms a component of Shale Sandstone Transition Forest listed on Part 3 of Schedule 1 of the NSW TSC Act (1995). Elsewhere, Benson and Howell (1994) refer to this community as Bargo Brush Forest, in response to early settler descriptions (cf. Atkinson, 1826, in Benson and Howell, 1994) of the vegetation in the Bargo area. The community is considerably more extensive than this area alone. Similar vegetation is present outside of the study area, extending northwards into

Holsworthy Military Area and Westwards near Picton and Camden. This community was identified in the Metropolitan Catchments mapping (NPWS, 2003c) and this profile has been adapted from that report.

□ **FLORISTIC SUMMARY**

Trees: 20-30m tall. Mean Projected Canopy Cover 25%

Eucalyptus crebra, *Eucalyptus fibrosa*, *Eucalyptus paniculata* subsp. *paniculata*, *Eucalyptus globoidea*, *Eucalyptus eugenioides*, *Eucalyptus punctata*

Minor associates: *Eucalyptus moluccana*, *Eucalyptus bosistoana*, *Eucalyptus tereticornis*, *Eucalyptus longifolia*, *Corymbia gummifera*, *Eucalyptus pilularis*, *Eucalyptus oblonga*, *Eucalyptus sparsifolia*, *Eucalyptus resinifera* subsp. *resinifera*, *Eucalyptus beyeriana*, *Angophora floribunda*, *Syncarpia glomulifera* subsp. *glomulifera*

Shrubs: 2-5m tall. Mean Projected Canopy Cover 25%

Allocasuarina littoralis, *Acacia decurrens*, *Acacia mearnsii*, *Acacia irrorata* subsp. *irrorata*, *Bursaria spinosa*, *Angophora bakeri*, *Daviesia ulicifolia*, *Kunzea ambigua*, *Persoonia linearis*, *Banksia ericifolia* subsp. *ericifolia*, *Banksia spinulosa* var. *spinulosa*, *Ricinocarpos pinifolius*, *Jacksonia scoparia*, *Dodonaea triquetra*, *Lissanthe strigosa*

Ground Covers: Mean Upper Height m. Mean Projected Canopy Cover % SD

Themeda australis, *Aristida vagans*, *Entolasia stricta*, *Entolasia marginata*, *Aristida ramosa*, *Imperata cylindrica* var. *major*, *Lepidosperma laterale*, *Echinopogon caespitosus* var. *caespitosus*, *Hardenbergia violacea*, *Lomandra longifolia*, *Lomandra glauca*, *Lomandra multiflora* subsp. *multiflora*, *Opercularia diphylla*, *Pomax umbellata*

□ **KEY IDENTIFYING FEATURES**

Easily recognisable features to assist in identifying this map unit are:

- Ironbarks (*Eucalyptus fibrosa*, *E. paniculata* subsp. *paniculata* and *E. crebra*) in combination with White Stringybark (*E. globoidea*) and Grey Gum (*E. punctata*).
- Small and discontinuous patches of shale soil amongst an expanse of exposed sandstone woodland and forest. Restricted to the eastern edge of study area in the Bargo area.
- An open grassy understorey dominated by Kangaroo Grass (*Themeda australis*), Blady Grass (*Imperata cylindrica* var. *major*) and Spiny-headed Mat-rush (*Lomandra longifolia*). A shrub layer with typical sandstone species as well as a number usually found on shale. Species include Native Blackthorn (*Bursaria spinosa*), *Banksia* spp. and Dogwood (*Jacksonia scoparia*).

□ **EXAMPLE LOCATIONS**

Yerrinbool; Avon Dam Road near Freeway Junction; Picton Road near Cascade Creek

□ **CONDITION ASSESSMENT**

Forms a component of the Shale/Sandstone Transition Forest, an Endangered Ecological Community listed under the Threatened Species Act (1995).

Disturbance Class	Area (ha)	Proportion Extant (%)
A Low	45	56
B Medium	0	0
C High	35	44
Total	80	100

□ **THREATENED PLANT SPECIES**

Epacris purpurascens var. *purpurascens* (V)

□ **DIAGNOSTIC SPECIES**

The diagnostic species presented below have been derived from NPWS (2003c) and are based on a 1-6 Cover Score system.

Species Name	Group Score	Group Freq	Non Group Score	Non Group Freq	Fidelity Class
<i>Aristida ramosa</i>	2	0.67	2	0.02	positive
<i>Dodonaea triquetra</i>	3	0.67	2	0.12	positive
<i>Entolasia marginata</i>	3	0.67	2	0.23	positive
<i>Eucalyptus globoidea</i>	2	0.67	3	0.12	positive
<i>Eucalyptus paniculata</i> subsp. <i>paniculata</i>	3	0.67	3	0.01	positive
<i>Eucalyptus punctata</i>	2	1.00	2	0.08	positive
<i>Glycine clandestina</i>	2	0.67	1	0.13	positive
<i>Jacksonia scoparia</i>	2	0.67	1	0.01	positive
<i>Kunzea ambigua</i>	3	1.00	1	0.06	positive
<i>Lepidosperma laterale</i>	2	0.67	1	0.32	positive
<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	2	0.67	2	0.10	positive
<i>Lomandra longifolia</i>	2	0.67	2	0.43	positive
<i>Phyllanthus hirtellus</i>	2	0.67	2	0.22	positive
<i>Pomax umbellata</i>	2	1.00	1	0.11	positive
<i>Themeda australis</i>	2	0.67	2	0.08	positive
<i>Corymbia gummifera</i>	2	0.67	2	0.52	constant
<i>Entolasia stricta</i>	2	1.00	2	0.53	constant

MU20 CUMBERLAND PLAIN SHALE SANDSTONE TRANSITION FOREST (HIGH SANDSTONE INFLUENCE)

Number of Sites: 59 No. taxa/plot: 50.1

□ DESCRIPTION

Cumberland Plain Shale Sandstone Transition Forest (High Sandstone Influence) occurs along the very eastern edge of the Nattai and Bargo reserves between Buxton and Warragamba. A small area is found within the Nattai NP which links to more extensive areas found on the Burratorang Plateau to the east and north. Comprehensive survey, analysis and mapping of this community was undertaken by NPWS (2000b) and this information forms the basis of this profile. This community is extensively distributed around the periphery of the Cumberland Plain in close proximity to the shale/sandstone boundary. The majority of sample sites for this community were located within approximately 400 metres of the shale/sandstone boundary and varied considerably in response to the degree of sandstone influence evident in the soil.



Cumberland Plain Shale Sandstone Transition Forest (High Sandstone Influence) is dominated by a wide variety of Eucalypt species. *Eucalyptus punctata* and *E. crebra* were regularly recorded, with *E. fibrosa*, *Corymbia gummifera* and *Syncarpia glomulifera* subsp. *glomulifera* occurring less frequently. Within the study area *Eucalyptus notabilis* and the closely related *E. resinifera* subsp. *resinifera* may be more prominent with *Corymbia eximia* also featured. A smaller tree stratum is usually present and is most often dominated by *Allocasuarina littoralis*, *Syncarpia glomulifera* subsp. *glomulifera* and *Acacia decurrens*. This community usually has a well-developed shrub layer which is more diverse in species than in communities with less sandstone influence in the soil. *Kunzea ambigua*, *Persoonia linearis* and *Bursaria spinosa* dominate the shrub stratum with *Jacksonia scoparia* becoming more common with increasing sandstone influence. The ground stratum is dominated by *Entolasia stricta*, *Themeda australis*, *Austrostipa pubescens*, *Lepidosperma laterale*, *Aristida vagans* and *Pomax umbellata*.

Cumberland Plain Shale Sandstone Transition Forest (High Sandstone Influence) is essentially a shale community, and is most likely to occur on shallow, residual clay soils derived from Wianamatta Shale.

However, it may also be found on high-quartz sandstone-derived soils where there is a strong colluvial shale influence (for example, the upper slopes of sandstone gullies adjoining shale soils), and on outcrops of pure shale soils derived from the Mittagong Formation. It occurs primarily on upper slopes and ridges on gently undulating terrain and grades into Cumberland Plain Shale Sandstone Transition Forest (Low Sandstone Influence) as the influence of shale increases (not found in the study area). Sometimes this transition is abrupt, and it may grade directly into Cumberland Shale Plains Woodland (outside the study area).

□ **FLORISTIC SUMMARY**

Trees: Mean Upper Height 21m. Mean Projected Canopy Cover 20% SD 9.9

Eucalyptus punctata, *Eucalyptus crebra*

Minor associates: *Eucalyptus fibrosa*, *Eucalyptus eugenioides*, *Eucalyptus pilularis*, *Eucalyptus globoidea*, *Corymbia eximia*, *Eucalyptus notabilis*, *Eucalyptus beyeriana*, *Eucalyptus tereticornis*, *Corymbia gummifera*

Small Trees: Mean Upper Height 10m. Mean Projected Canopy Cover 11% SD 9.1

Syncarpia glomulifera subsp. *glomulifera*, *Allocasuarina littoralis*, *Acacia decurrens*

Shrubs: Mean Upper Height 3m. Mean Projected Canopy Cover 12% SD 10.6

Persoonia linearis, *Kunzea ambigua*, *Pimelea linifolia* subsp. *linifolia*, *Bursaria spinosa*, *Ozothamnus diosmifolius*, *Phyllanthus hirtellus*

Ground covers: Mean Upper Height 0.7m. Mean Projected Canopy Cover 34% SD 21.3

Lepidosperma laterale, *Aristida vagans*, *Entolasia stricta*, *Lomandra multiflora* subsp. *multiflora*, *Pomax umbellata*, *Panicum simile*, *Cheilanthes sieberi* subsp. *sieberi*, *Pratia purpurascens*, *Echinopogon caespitosus* var. *caespitosus*, *Themeda australis*, *Austrostipa pubescens*, *Glycine clandestina*, *Billardiera scandens*

□ **KEY IDENTIFYING FEATURES**

Easily recognisable features to assist in identifying this map unit are:

- The canopy is dominated by Grey Gum (*Eucalyptus punctata*) and Narrow-leaved Ironbark (*E. crebra*). Blue Mountains Mahogany (*E. notabilis*) is prevalent between Buxton and Oakdale.
- The presence of Red and Yellow Bloodwood (*Corymbia gummifera* and *C. eximia*) help distinguish transition forests with high sandstone influence.
- A diverse shrub layer highlights its variation from communities found on richer shale soils. Such species include Tick Bush (*Kunzea ambigua*), Narrow-leaved Geebung (*Persoonia linearis*) and Dogwood (*Jacksonia scoparia*).
- The ground cover includes a diverse cover of grasses that are not present on soils derived from Quartz Sandstones. These include Threeawn Speargrass (*Aristida vagans*), Tufted Hedgehog Grass (*Echinopogon caespitosus* var. *caespitosus*) and Kangaroo Grass (*Themeda australis*).

□ **EXAMPLE LOCATIONS**

Almost entirely outside the study area except for a few small patches in the Couridjah Area (Cedar Creek, Stonequarry Creek)

□ **CONDITION ASSESSMENT**

Forms a component of the Shale/Sandstone Transition Forest, an Endangered Ecological Community listed under the Threatened Species Act (1995).

Disturbance Class	Area (ha)	Proportion Extant (%)
A Low	7	3
B Medium	11	58
C High	1	38
Total	19	100

□ **THREATENED PLANT SPECIES**

Persoonia hirsuta (E1), *Lissanthe sapida* (3RCa)

□ **DIAGNOSTIC SPECIES**

The diagnostic species presented below are taken straight from NPWS (2003b). Sites collected in the current study were not utilised to generate this list.

Species Name	Group Score	Group Freq	Non Group Score	Non Group Freq	Fidelity Class
<i>Allocasuarina torulosa</i>	4	0.50	3	0.18	positive
<i>Angophora costata</i>	3	0.50	4	0.11	positive
<i>Aristida vagans</i>	2	0.88	2	0.13	positive
<i>Austrostipa pubescens</i>	3	0.63	2	0.05	positive
<i>Billardiera scandens</i> var. <i>scandens</i>	3	1.00	1	0.31	positive
<i>Bursaria spinosa</i>	2	0.50	2	0.22	positive
<i>Corymbia gummifera</i>	3	0.63	4	0.14	positive
<i>Dianella caerulea</i>	2	0.75	2	0.33	positive
<i>Dichopogon strictus</i>	1	0.13	0	0.00	positive
<i>Entolasia marginata</i>	3	0.50	2	0.11	positive
<i>Entolasia stricta</i>	3	1.00	2	0.41	positive
<i>Eucalyptus eugenoides</i>	4	0.63	4	0.13	positive
<i>Glycine clandestina</i>	2	1.00	2	0.32	positive
<i>Gonocarpus tetragynus</i>	2	0.75	2	0.24	positive
<i>Goodenia hederacea</i> subsp. <i>hederacea</i>	2	0.88	2	0.27	positive
<i>Grevillea mucronulata</i>	2	0.63	2	0.05	positive
<i>Hardenbergia violacea</i>	2	0.75	1	0.28	positive
<i>Hibbertia aspera</i> subsp. <i>aspera</i>	3	0.63	2	0.12	positive
<i>Hibbertia diffusa</i>	2	0.63	1	0.03	positive
<i>Kunzea ambigua</i>	4	0.50	1	0.02	positive
<i>Lepidosperma laterale</i>	3	0.50	2	0.28	positive
<i>Lindsaea microphylla</i>	2	0.63	1	0.10	positive
<i>Lomandra multiflora</i> subsp. <i>multiflora</i>	2	0.75	2	0.39	positive
<i>Lomandra obliqua</i>	2	0.63	2	0.21	positive
<i>Melaleuca thymifolia</i>	3	0.13	0	0.00	positive
<i>Microlaena stipoides</i>	3	0.50	2	0.41	positive
<i>Panicum simile</i>	2	0.88	1	0.06	positive
<i>Persoonia lanceolata</i>	2	0.13	0	0.00	positive
<i>Persoonia linearis</i>	2	1.00	2	0.44	positive
<i>Phyllanthus hirtellus</i>	2	1.00	2	0.31	positive

Species Name	Group Score	Group Freq	Non Group Score	Non Group Freq	Fidelity Class
<i>Pimelea linifolia</i> subsp. <i>linifolia</i>	2	0.75	2	0.08	positive
<i>Pomax umbellata</i>	2	0.88	2	0.31	positive
<i>Pratia purpurascens</i>	2	0.63	2	0.32	positive
<i>Syncarpia glomulifera</i> subsp. <i>glomulifera</i>	4	1.00	4	0.11	positive
<i>Themeda australis</i>	3	0.63	1	0.08	positive
<i>Tricoryne simplex</i>	1	0.13	0	0.00	positive
<i>Lomandra longifolia</i>	3	0.50	2	0.58	constant