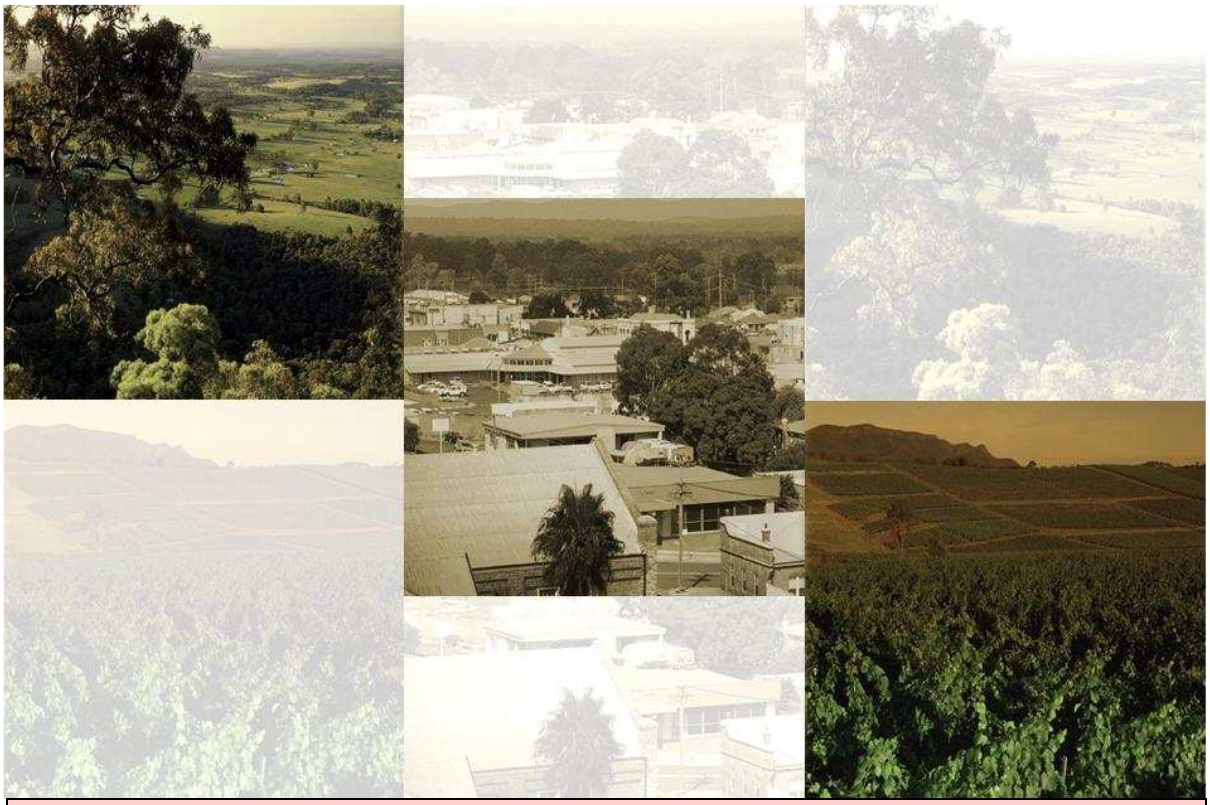
CESSNOCK

DEVELOPMENT CONTROL PLAN

PART E
SPECIFIC AREAS



E.8: BOW WOW CREEK GORGE

Amendment History

Version No.	Nature of Amendment	Date in force
1	Initial adoption by Council on 19 May 2004 (DCP 57)	5 May 2006
2	Consequential amendments to site-specific development control plans arising from the Cessnock DCP 2006	1 December 2006
3	Incorporation into Part E: Specific Areas	30 March 2007
4	Consequential amendments as a result of Cessnock Local Environmental Plan.	23 December 2011

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E.8: BOW WOW CREEK GORGE

8.1 INTRODUCTION

The Bow Wow Creek Catchment Area and Habitat Corridors comprise a combined area of 2924 hectares. The gorge is currently heavily vegetated, with little direct impact from nearby agricultural practices. However, there is evidence of past minor logging of rainforest species. Within the Bow Wow Creek Gorge Catchment there has been considerable clearing for grazing purposes, particularly in the upper reaches of the catchment.

The Bow Wow Creek Gorge Catchment and Habitat Corridors have features making them important for both geological and ecological reasons.

The Gorge is listed on the Australian Heritage Council's 'Register of the National Estate' due to its considerable scientific significance. It is the type locality for five to six Permian fossil species and its galleries are spectacular with their congested masses of marine fossils and stalactites. In addition, the rugged narrow gorge has high scenic quality and considerable stratigraphic significance, with good exposures of the Wollong strata of the Permian Branxton formation.

Furthermore, the Gorge comprises nationally significant ecological attributes, and is likely to represent the most biologically diverse privately owned land within the Cessnock Local Government Area (LGA). Literature review and field surveys of the area by Bell & Murray (2001), identified the presence of 7 native vegetation communities (2 of which are endangered ecological communities), over 260 plant species and the presence, or likely presence, of 28 threatened fauna species.

8.1.1 Application

This Chapter applies to Bow Wow Creek Gorge Catchment & Habitat Corridors (see Figure 1).

Purpose

This Chapter provides detailed guidelines for those wishing to develop land within Bow Wow Creek Gorge Catchment and Habitat Corridors. The Chapter also provides a basis upon which to implement stated objectives for Bow Wow Creek Gorge Catchment and Habitat Corridors.

Planning Provisions

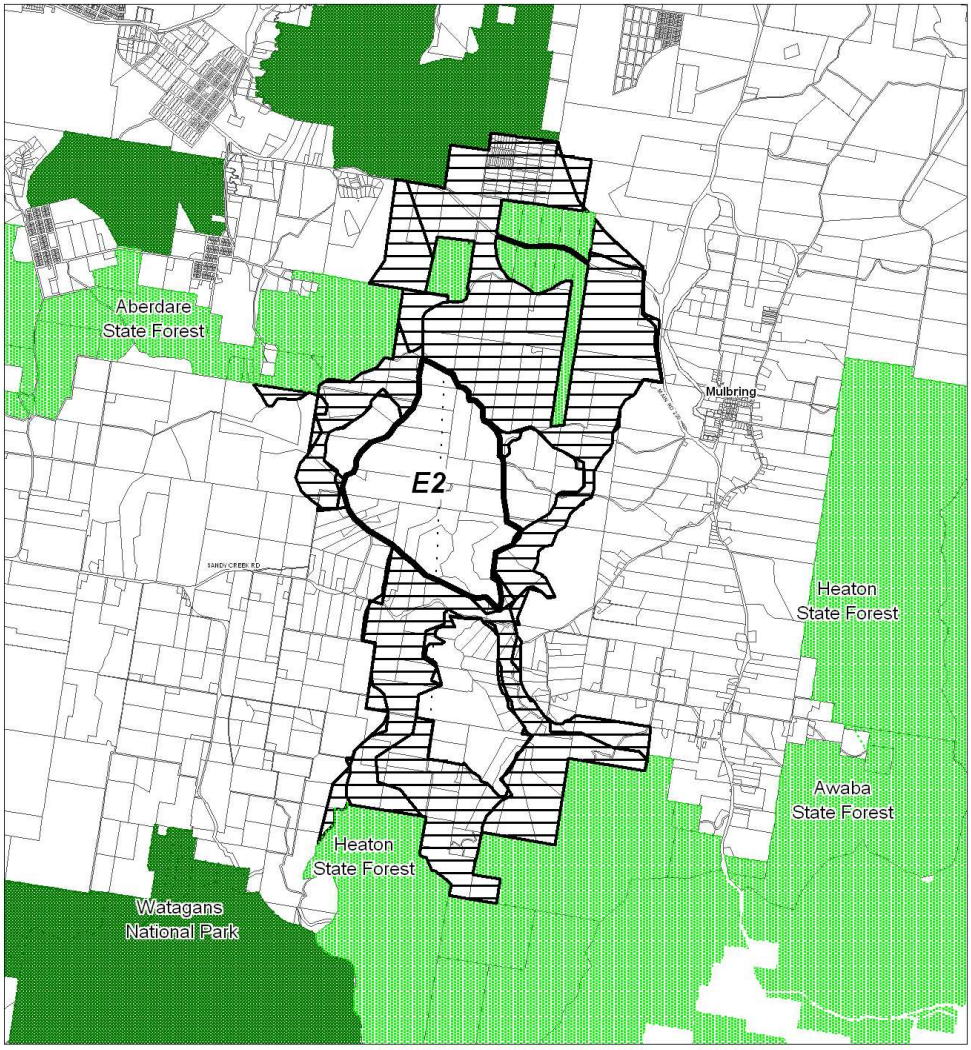
This Chapter applies to land in Figure 1, zoned E2: Environmental Conservation and land shown by horizontal hatching zoned RU2: Rural Landscape under Cessnock Local Environmental Plan (CLEP).

Prior to granting consent to development on land to which this Chapter applies, Council shall have regard to whether the development may carried out on areas of the site that do not have established native vegetation on them.

Council shall not consent to development on land to which this Chapter applies unless it is satisfied that the development:

is designed to minimise disturbance to the existing structure and species composition of native vegetation communities; and

will allow native fauna and flora to breed, disperse, colonise or migrate (whether seasonally or nomadically) by:



Zone No : E2 - Environmental Conservation

Bow Wow Creek Gorge Catchment E2

Habitat Corridors RU2

N

SCALE 1 : 90,000

FIGURE 1 :

BOW WOW CREEK GORGE CATCHMENT & HABITAT CORRIDORS

being carried out on areas of the site that have already been cleared (unless Council is satisfied that the development cannot be appropriately carried out on other areas of the site that have already been cleared);
adequate provision being made, satisfactory to Council, for protection from the threat of bushfire;
the clustering of development and the minimisation of any driveways;
landscaping with local native species;
designing and erecting any fences so that fauna movement is neither impaired nor restricted; and
minimising the use of any herbicides and pesticides.

8.1.4 Objectives

Council has the following objectives in Bow Wow Creek Gorge Catchment and Habitat Corridors:

(a) to conserve the biological diversity of the Bow Wow Creek Gorge Catchment;
(b) to conserve the native ecosystems of the Bow Wow Creek Gorge Catchment;
(c) to prohibit development that would adversely impact on the conservation of the native ecosystems and biological diversity of the Bow Wow Creek Catchment;
(d) to minimise the clearing of native vegetation;
(e) to facilitate the movement and survival of native fauna and flora by conserving habitat corridors;
(f) to minimise the impact of development on the water quality and quantity of Bow Wow Creek, downstream creeks and river systems;
(g) to protect the geological significance of the Bow Wow Creek Gorge;
(h) to protect the scenic qualities of land within the Bow Wow Creek Gorge Catchment; and
(i) to protect the Aboriginal heritage values of land within the Bow Wow Creek Gorge Catchment.

8.2 GENERAL DEVELOPMENT CONSIDERATIONS

The following development considerations apply to development within Bow Wow Creek Gorge zoned E2: Environmental Conservation and the surrounding habitat corridors zoned RU2: Rural Landscape, as indicated by horizontal hatching in Figure 1.

Flora and Fauna Requirements

Detailed study of the Bow Wow Creek Catchment has found it to comprise of nationally significant ecological attributes, and likely to represent the most biologically diverse privately owned land within the Cessnock Local Government Area (LGA). The findings of this study (Bell & Murray, 2001), indicate that it possesses the following features of ecological significance:

- it provides an essential wildlife linkage between the bushland areas of Aberdare State Forest and Werakata National Park to the north, with the Watagan Mountain system of State Forests and Watagans National Park to the south;

- it supports a high diversity of flora and fauna for such a small fragmented area, comparable to conservation reserves elsewhere in the region;

- it supports the only known population of the nationally rare *Callistemon shiressii* and *Eucalyptus fergusonii* ssp. *dorsiventralis* occurring on Permian Sediments;

- it supports substantial populations of the nationally rare *Macrozamia flexuosa*;

- it provides potential habitat for an additional five threatened or rare flora species (*Callistemon linearifolius, Cynanchum elegans, Grevillea montana, Grevillea parviflora* ssp. *parviflora, Persoonia pauciflora*) and supports an additional eight plant species considered regionally significant;

- it provides habitat for potentially 28 threatened fauna species, including the Powerful Owl, Spotted-tail Quoll, Koala, Yellow-bellied Glider, Long-nosed Potoroo, Fishing Bat and Giant Barred Frog already recorded from the site and immediate area;

- it provides potential habitat for 6 threatened bird species, including the Speckled Warbler and Grey-crowned Babbler already recorded from the site;

- due to the variety of habitats present, the catchment probably supports the highest bird species diversity of any private land within the Cessnock LGA, and this is likely to also extend to other major faunal groups;

- it supports a small portion of the only known stand of Quorrobolong Scribbly Gum Woodland, and a component of the Hunter Lowland Redgum Forest, endangered ecological communities under the *Threatened Species Conservation Act 1995*;

- excluding the gorge vegetation itself, the vegetation communities comprising the catchment are poorly conserved within Cessnock LGA;

- it supports the largest stand of sub-tropically influenced warm temperate rainforest remaining on the Permian sediments of the Hunter Valley floor; and

- it supports the largest stand of sub-tropically influenced warm temperate rainforest in private ownership in the region.

The *Environmental Planning and Assessment Act 1979* and the *Threatened Species Conservation Act 1995*, require Council to give consideration to the likely impact of development on the flora and fauna characteristics of a site and its locality.

Council will require the preparation of a flora / fauna assessment in accordance with the requirements of current legislation and Council's requirements. Detailed survey of fauna is yet to be performed, and should therefore be specifically targeted in any site specific flora / fauna assessment.

Objectives

- To foster and actively encourage the concepts of ecological sustainability and enhanced biodiversity through requirements for the continued existence of native flora and fauna in the Bow Wow Creek Gorge Catchment and Habitat Corridors, including threatened species and endangered ecological communities.

    - To ensure development applications are supported by appropriately detailed information concerning likely impacts upon flora and fauna.

Requirements

- Council will require the preparation of a flora / fauna assessment. Check with Council's Development Assessment Planners to determine requirements for preparation of a flora / fauna assessment and Species Impact Statement.

Habitat Corridors

Council is seeking to promote the protection and enhancement of habitat corridors that connect Bow Wow Creek Gorge with bushland areas of Aberdare State Forest and Werakata National Park to the north, and the Watagan Mountain system of State Forests and Watagan National Park to the south (see Figure 1). Landowners are also encouraged to undertake further revegetation of habitat corridors, and should contact Council, the Hunter – Central Rivers Catchment Management Authority, the Department of Environment, Climate Change and Water (DECC&W) or local Landcare groups concerning any available funds for revegetation. Appropriate species compositions are detailed in Appendix 1.

In addition to this clause, further measures designed to assist the protection and enhancement of these corridors are contained in Clauses 8.2.3, 8.2.4 and 8.3.1 of this Chapter.

Objectives

- To enhance native fauna habitat and conserve the biodiversity of the Bow Wow Creek Gorge Catchment.

- To ensure Bow Wow Creek Gorge Catchment does not become isolated from surrounding remnant bushland to the north and south.

Requirements

- Any revegetation of habitat corridors is to be performed with regard to the location and species composition included in Appendix 1.

Clearing of Vegetation

Objectives

- To enhance native fauna habitat and conserve the biodiversity of Bow Wow Creek Gorge Catchment.

- To maintain the wildlife linkage that Bow Wow Creek Gorge Catchment provides between remnant bushland to the north and south.

Requirements

- In accordance with the Cessnock Local Environmental Plan (CLEP), Clause 5.9: Preservation of trees or vegetation, a person shall not clear land within the Bow Wow Creek Gorge or habitat corridors, without development consent or the approval of the Hunter – Central Rivers Catchment Management Authority.

- Notwithstanding the above, consent for tree removal is not required for the following:

  bushfire hazard reduction works carried out in accordance with the *Rural Fires Act 1997*;
  land survey, geotechnical or similar investigation in accordance with the *Surveying Act 2002*;

the removal of noxious weeds within the meaning of the *Noxious Weeds Act 1993*;
the removal or trimming of trees in accordance with the *Electricity Supply Act 1995*;
the removal or trimming of trees in accordance with the *Roads Act 1993*;
the removal of vegetation to give effect to development in accordance with a consent;
obtaining fenceposts for use on the land from which they are removed noting that consent is required to clear for fencing; and
slashing to maintain existing lawfully cleared land.

- In considering an application for consent to carry out any development on land, Council shall have regard for the siting of development on areas of land which do not house established native vegetation.

- Council may grant consent to development of the land, that involves the clearing of land only if the Council is satisfied that the development cannot be appropriately located on other parts of the site that have already been cleared.

- Council must not grant consent to the clearing of land, that involves the removal of native vegetation, unless it has considered the impact of such removal on:

    - water quality and quantity of the Bow Wow Creek Gorge Catchment;
    - riparian vegetation;
    - habitat values and habitat corridors;
    - the visual significance of Bow Wow Creek Gorge;
    - slopes greater than 15 degrees; and
    - ecological communities, populations and species as listed in the *Threatened Species Conservation Act 1995* and the *Environment Protection and Biodiversity Conservation Act 1999.*

- Council must not grant consent to the clearing of land, that involves the removal of vegetation unless the conditions of that consent require that an equivalent amount of native vegetation to the amount of vegetation to be cleared, be re-established and maintained in strategic locations elsewhere on the land from which the native vegetation is to be cleared, being native vegetation of a composition specified in Appendix 1. This clause does not apply to fully vegetated sites.

    Note: Council will give priority to new plantings on previously cleared parts of the site being developed that are within the habitat corridor boundary.

- Any clearing shall be restricted to the minimum extent necessary to achieve its purpose.

    Note: Despite any consent from Council to the clearing of vegetation it may not relieve the proponent from also obtaining separate consent under any other Act.

Building Siting and Design

Objectives

- To enhance the habitat of threatened species and the biodiversity of the site.

- To ensure that development is appropriately sited and designed having regard to the opportunities and constraints of a site and its surrounds and the need to minimise vegetation removal.

- To ensure that built developments proposed in close proximity to Bow Wow Creek Gorge have regard to its significant landscape features and geological significance.

Requirements

- In accordance with CLEP and the provisions of this Chapter, Council will not grant consent to the development of land within Bow Wow Creek Gorge Catchment and Habitat Corridors unless the proposed development:

  (a) is designed to minimise disturbance to the existing structure and species composition of native vegetation communities; and

  (b) allows native fauna and flora to breed, disperse, colonise or migrate (whether seasonally or nomadically) by:

  being sited in locations that have already been cleared (unless Council is satisfied that the development cannot be appropriately located on other parts of the site that have already been cleared);
  (ii) making adequate provision, satisfactory to Council, for protection from the threat of bushfire;
  (iii) the clustering of development and the minimisation of any driveways; and
  (iv) landscaping with local native species;
  (v) designing and erecting any fences so that fauna movement is neither impaired nor restricted; and
  (vi) minimising the use of any herbicides and pesticides.

- Applications for development with the potential to impact upon the visual significance of Bow Wow Creek Gorge will need to be supported by a visual analysis, prepared by a suitably qualified professional, outlining the impact of the proposed development within its visual landscape. Check with Council's Development Assessment Planners to determine requirements for preparation of a visual analysis.

- Construction activities with the potential to impact upon the geological significance of Bow Wow Creek Gorge and cliffs (such as drilling, vibrating, rock hammering, excavation etc) will need to be assessed by an appropriately qualified and experienced geologist and / or geotechnical engineer.

- Landscaping required as part of any development will be required to comprise locally indigenous species (refer Appendix 1).

- Buildings are to be located so as to maximise setbacks from watercourses forming part of Bow Wow Creek Gorge Catchment. Where land straddles the catchment boundary, buildings should preferably be located outside the catchment area of Bow Wow Creek Gorge.

- Buildings should be located so as to ensure bushfire hazard reduction areas result in minimal vegetation removal. For further information refer to *Planning for Bushfire Protection 2006.*

Bushfire Hazard

Inappropriate fire regimes will alter the floristic composition of vegetation within Bow Wow Creek Gorge, allowing the dominance of more fire-tolerant species and simplifying understorey vegetation (Bell and Murray, 2001).

Requirements

- A fire management plan is to be prepared as part of any development and is to incorporate measures to ensure that the biodiversity of the area is protected.

- Development designed in accordance with *Planning for Bushfire Protection 2006***.**

Aboriginal Heritage

An Aboriginal site is any place which has the remains of prehistoric and historic occupation, or is of contemporary significance to the Aboriginal community. The lack of detailed field study work and investigations of Aboriginal occupation in the Bow Wow Creek Gorge Catchment makes it difficult to identify areas which have more archaeological potential than others.

In general, the most common sites known are *Open Stone Artefact Scatters*.

Open sites usually consist of scatters of stone artefacts found in the open. They are places where people lived and contain evidence of Aboriginal activities such as the manufacture of stone tools. Rarer features such as earth ovens, stone hearths and heat treatment pits also reveal evidence of a range of activities such as the preparation and cooking of food.

Open sites can be found on riverbanks, plains, hillsides, crests, ridges and saddles. They are usually situated in a level position near fresh water. Some sites may be difficult to detect as they can be large and scattered and may also be buried by deposits which can reach a metre or so in depth. They may also be obscured by leaf litter or have vegetation growing over the site.

These sites are significant to Aboriginal people because they are evidence of past Aboriginal occupation of Australia, and are valued as a link with their traditional culture. They are also of scientific significance providing information about stone technology. Undisturbed open sites can be excavated to reveal hearths containing charcoal which can be used to date commencement of Aboriginal occupation of a site.

All Aboriginal 'objects' are protected under the *National Parks and Wildlife Act 1974*, and as such, may not be interfered with, defaced, damaged or destroyed without the written consent of the Director –General of the Department of Environment, Climate Change and Water (DECC&W). If a site is discovered it must be reported immediately to the Director –General of the DECC&W.

Objectives

- To recognise and conserve the aboriginal archaeology and heritage values of the Bow Wow Creek Gorge Catchment.

Requirements

(a) Council shall not grant consent to development of land to which this Chapter applies, unless it has undertaken an assessment of the potential impact of the development on the Aboriginal heritage values of the site / locality.

(b) Investigate the Aboriginal qualities of your site and the likely impact of your proposal on items of such heritage. A qualified archaeologist may be required to carry out investigations in areas of likely impact. Please discuss the need for such investigation with Council's Development Assessment Planners.

Note: The Department of Environment, Climate Change and Water (Parks & Wildlife Group) can be contacted for further information and advice on Aboriginal heritage including requirements for undertaking an Aboriginal Heritage Impact Assessment, and for a list of qualified consultants to undertake such assessments.

Outdoor Lighting

Objectives

- To recognise that the night sky is an important part of the natural environment.
- To control outdoor lighting to reduce disturbance to native fauna and minimise sky-glow in the Bow Wow Gorge Catchment and Habitat Corridors.

Requirements

- Where outdoor lighting is proposed adjacent to roads, it is to be of a nature which does not adversely impact on traffic movements and traffic safety.
- Outdoor lighting details are to be provided with the development application.

Fencing

Objectives

- To inform landowners of the potential impacts of the use of barbed wire fencing on native animals whilst reinforcing the need to contain stock.
- To allow fencing which is consistent with rural character.

There are potential impacts in using barbed wire in their fencing. Advice has been received (Native Animal Trust Fund) that a significant number of animals, particularly bats and squirrel gliders, are being killed or seriously injured as a result of flying into and / or being entrapped in such wire. Wherever possible in the interests of trying to maintain and improve biodiversity and minimise the suffering of our native wildlife, Council encourages the use of plain wire fencing, designed and erected so that fauna movement is neither impaired or restricted.

Requirements

- Details of the type of fencing to be used, if any, is to be provided with applications for development. Such fencing must be in keeping with the rural character of the Bow Wow Creek Gorge Catchment.

Servicing

Objectives

- To ensure that adequate utility services are made available to a development.
- To ensure that services are located so as to minimise the clearance of and disturbance to native vegetation.

Water Supply

Requirements

- Developments are required to comply with Hunter New England Area Health Service (HNEAHS) requirements for provision of a potable water supply.

Disposal of Waste

Further detail concerning the location of waste disposal facilities within the Bow Wow Gorge Catchment is outlined in Section 8.3.3 of this chapter.

Electricity and Telecommunications

Requirements

- Developments will be required to be appropriately serviced, with details being provided from servicing authorities regarding availability.
- Electricity and telecommunications are to be located with minimal clearance of and disturbance to native vegetation. The location of electricity and telecommunications is to be determined in consultation with the Council prior to site works being undertaken for this purpose.

Note: Some energy authorities are now able to provide 'green energy' options. Consult with your local electricity authority for further details. Alternative energy sources are acceptable in particular circumstances.

8.3 CATCHMENT AREA DEVELOPMENT CONSIDERATIONS

The following development considerations apply to development within the E2: Environmental Conservation Zone (Bow Wow Creek Gorge Catchment).

Tourist Development Densities

Objectives

- To protect and enhance the biodiversity and native ecosystems of the Catchment Area by ensuring that it does not become over-developed.

- To promote the establishment and maintenance of native vegetation within the Bow Wow Creek Gorge Catchment through the facilitation of increased tourist development densities.

Requirements

CLEP, Clause 6.2(2) – Rural tourist and visitor accommodation in zones RU2, RU4 and E2 (Bow Wow Creek Gorge and Habitat Corridors), states as follows:

> *Consent must not be granted to development for the purposes of tourist and visitor accommodation on land within Zones RU2 and E2 (Bow Wow Creek Gorge Catchment and Habitat Corridors) unless the lot on which the development is to be carried out has an area of not less than 10 hectares and has a dwelling entitlement pursuant to clause 4.2A of this plan.*

- Council will consider applications for development in the E2: Environmental Conservation Zone (Bow Wow Creek Gorge Catchment) in accordance with the following criteria:

  (1) Subject to subclause (2), Council shall not grant consent to tourist development on land zoned E2: Environmental Conservation, which exceeds the maximum number of permissible tourist & visitor accommodation buildings and units specified in the following Table for the lot:

	Column 1	***Column 2***	***Column 3***	***Column 4***
Lot Size (hectares)	***Maximum number of individual units.***	***Maximum number of individual buildings.***	***Maximum number of individual units with habitat enhancement.***	***Maximum number of individual buildings with habitat enhancement.***
Minimum 10 but less than 40	2	NA	4	NA
40 and greater	2	NA	8	6

  (2) Council may consent to tourist & visitor accommodation development on land zoned E2: Environmental Conservation at the densities permitted in Columns 3 and 4, where a proposal seeks to fully comply with the requirements for maintenance of existing habitat corridors, or where a proposal seeks to establish and maintain a minimum of 900 native trees or shrubs per individual unit.

Staged development of tourist & visitor accommodation units including those with habitat enhancement shall not be consented to unless at least 2 tourist & visitor accommodation units are constructed in the first stage of the development.

- Where an application seeks to develop tourist & visitor accommodation buildings with habitat enhancement, details of the proposed planting must be clearly specified in the application (both plans and text accompanying the application), including proposed ground preparation, species planting and maintenance and fencing details. See Appendix 1 for further detail concerning habitat enhancement and information to be submitted with applications.

- Consents issued on the basis of habitat enhancement will include specific conditions relating to the continued maintenance of such habitat, remaining the responsibility of the land owner (eg. through instruments attached to the title of the property). A refundable bond or bank guarantee will be required in the order of $3000 per tourist & visitor accommodation unit, above the allowable density of tourist & visitor accommodation units under Columns 1 & 2. The total amount of the bond will be released upon attainment of a 90% establishment rate within 3 years of the completion of planting activities.

Soil and Water Management

Note: CLEP, Schedule 3: Complying Development states the requirements with regard to dams (waterbody artificial) in the RU2: Rural Landscape zone.

Vegetation within Bow Wow Creek Gorge is likely to be sensitive to upstream disturbances such as erosion and water pollution (Bell and Murray, 2001). For this reason particular care is needed to control sediment upstream of the gorge.

Objectives

- To provide mechanisms for the protection of the environment through minimisation of erosion and sedimentation.

- To protect the quality of water of receiving streams, particularly Bow Wow Creek and Wallis Creek, and to reduce land degradation.

Requirements

- Applications for development within the Bow Wow Creek Catchment shall be accompanied by a preliminary Soil and Water Management Plan. Preparation of a Soil and Water Management Plan shall be a condition of any consent.
- Proposals for construction of dams are subject to Council's requirements.

The following matters may need to be addressed in the preparation of a Soil and Water Management Plan. The headings are generic in nature and may not be appropriate for different types and scales of development:

- construction of a perimeter or diversion bank to manage water movement;
- construction of sediment traps and sediment basins and filter fences to collect sediment, nutrients and trash prior to site disturbance;
- minimisation and prompt stabilisation of disturbed areas;
- staggered site works (with progressive landscaping);
- drainage control measures to control water movement and quality;
- the sowing of a cover crop on disturbed areas to minimise the time and period disturbances are exposed and to reduce erosion;

- the collection of silts and clays through flocculation where soils are known to be dispersable.;
- soil and water management measures should be designed for the 1 in 5 year storm event;
- Council should be notified 48 hours prior to the commencement of site works, so as to enable a site inspection of the control measures;
- polluted and nutrient rich runoff from the site, should not contaminate receiving waters or ground waters;
- development of slopes greater than 20% (18^0) shouldshall be avoided;
- any development on land with slopes greater than 20% (18^0) will require an evaluation of the site's stability by means of a geotechnical report. In such areas, cut and fill should not exceed depths of 1.0 metre;
- the discharge of water through adjoining lands should reflect the pre-existing or natural situation. Concentration flows of unpolluted water, should be channelled to natural drainage systems or absorbed into the ground water in an appropriate manner.; and
- energy dissipaters should be used to reduce the velocity of stormwater into watercourses.

Disposal of Waste

Objectives

- To ensure that wastewater is disposed of in an environmentally acceptable manner which does not impact upon the quality of water in Bow Wow Creek, and its vegetation.

Requirements

- Wastewater disposal facilities shall be located so as to maximise setbacks from watercourses.

- Details of the methods proposed to dispose of wastewater must be clearly outlined in applications for development.

Note: Landowners should refer to 'The easy septic guide' available at Council's offices for advice on maintaining a safe and healthy septic system.

REFERENCES

Bell, S., and Murray, M., 2001, *The Ecological Significance of Bow Wow Creek Gorge, Mulbring, Hunter Valley, New South Wales: A Nationally significant site*, unpublished.

Fallding, M., Kelly, A., Bateson, P., and Donovan, I., 2001, *Biodiversity planning guide for NSW Local Government,* NSW National Parks and Wildlife Service, Hurstville.

James, R. and Brennan, W., 1997, *Preliminary Archaeological Investigations of the Proposed Rothbury Country Resort Development Area near Cessnock, N.S.W.*, unpublished.

NSW Department of Local Government, 2000, *The Easy Septic Guide*. Developed by Social Change Media for the New South Wales Department of Local Government. Amendments by Cessnock City Council.

NSW Rural Fire Service, 2006, *Planning for Bushfire Protection 2006.* Prepared by NSW Rural Fire Service in cooperation with the Department of Planning.

APPENDIX 1

Bow Wow Creek Gorge Catchment Habitat Corridors & Revegetation Guidelines

Council is seeking to promote the establishment and enhancement of habitat corridors in Bow Wow Creek Gorge Catchment generally in accordance with locations and details specified in this Appendix. Other mass plantings are also being encouraged in strategic locations.

Objectives

- To enhance native fauna habitat and conserve the biodiversity of the Bow Wow Creek Gorge.
- To ensure Bow Wow Creek Gorge does not become isolated from surrounding remnant bushland to the north and south.
- To promote a more sustainable environment.

DEVELOPMENT INCENTIVES AND MAINTENANCE

- As detailed in the provisions of this Chapter, Council may consent to increased tourist & visitor accommodation development densities within the E2: Environmental Conservation zone, where a proposal seeks to fully comply with the requirements for maintenance of existing habitat corridors (see Figure 1), or where a proposal seeks to establish and maintain a minimum of 900 native trees or shrubs per tourist & visitor accommodation unit.

Notes: 1. The requirements for the maintenance of existing habitat corridors applies only to sites that are fully vegetated, in all other cases supplementary plantings, as discussed in 2 below, will be required to qualify for increased tourist & visitor accommodation development densities.

2. Where corridors partially exist within a property, the density outlined above can be achieved through appropriate supplementation of native vegetation (determined on-merit due to species selection and associated sizes) and where such total areas are maintained in perpetuity as outlined below.

- Where an application seeks to develop tourist & visitor accommodation buildings with habitat enhancement, details of the proposed planting must be clearly specified in the application (both plans and text), including proposed ground preparation, species planting, maintenance and fencing details. This Appendix provides further detail concerning habitat enhancement and information to be submitted with applications.
- Consents issued on the basis of habitat enhancement will include specific conditions relating to the continued maintenance of such habitat, remaining the responsibility of the land owner (eg. through instruments attached to the title of the property). A refundable bond or bank guarantee will be required in the order of $3000 per tourist & visitor accommodation unit above the allowable density of tourist & visitor accommodation units under Columns 1 & 2.
- The total amount of the bond will be released upon attainment of a 90% establishment rate within 3 years of the completion of planting activities. A 90% survival rate (of establishment of planted trees / shrubs) must be achieved at the end of 18 months following completion of planting activities, or at a later date to be agreed upon by

Council for environmental reasons such as seasonality and / or drought factors. To be considered successful at the time of inspection by Council staff, all tree plantings musts have achieved a minimum height of 800mm and have visual evidence of healthy shoot growth. A Council appointed person may undertake a site assessment at a nominal cost to the applicant to determine compliance with this requirement.

- The locations of habitat corridors are to be modified around existing service lines including electricity, reticulated water, telephone and gas. Whilst the location of these services is generally available from Council's Geographic Information System at a strategic scale, applicants should consult with the relevant servicing authorities to ensure that appropriate locations have been selected.

- For applications which seek to establish native vegetation, the location of the proposed native vegetation is to be considered on-merit with the aim to ensure the expansion of:

  (a) wildlife corridors and connecting areas between vegetation remnants;
  (b) existing vegetation remnants, habitats for threatened species and plant communities;
  (c) riparian areas adjoining watercourses; and
  (d) buffers to National Parks and State Forests.

- All plantings are to be in keeping with the locally indigenous plant communities (see Figures 2 and 3 and where necessary consult the LHCCREMS report entitled 'Vegetation Survey, Classification and Mapping – Lower Hunter and Central Coast Region Version 1.2' and accompanying map detailing vegetation community composition and distribution to identify local communities). Where the land to be planted is cleared it may be necessary to consult the LHCCREMS Pre 1750 Vegetation Community mapping (see Figure 4) to identify a suitable community for the site. In the Bow Wow Creek Gorge Catchment, cleared areas largely comprised Hunter Lowland Redgum Forest.

- Submission to Council of a Native Vegetation Management Plan detailing the revegetation program and timetable by which activities will be carried out on site. The content of the management plan shall include the following:

  (a) the principal aims and objectives of the plan as they relate to the flora and fauna communities and habitat on site;
  (b) a planning strategy to achieve these aims and objectives;
  (c) expected completion date for planting activities;
  (d) details of site preparation in planting areas, including the clearing of competitive / inhibiting grass and weeds;
  (e) a species list appropriate to the local area (this should be based on the vegetation communities and species composition as identified by LHCCREMS mapping and detailed in their report entitled 'Vegetation Survey, Classification and Mapping – Lower Hunter and Central Coast Region Version 1.2', an extract of which is provided overleaf);
  (f) names and mature heights of selected species;
  (g) specific planting locations (accompanied by a site map detailing this information), spacing / density, names and mature heights of tree and shrub species to be planted;
  (h) irrigation measures and source of water supply;
  (i) details of how local species stock will be sourced;
  (j) mechanisms to protect plantings from stock (fencing essential) or other browsing animals, where necessary; and
  (k) nature and duration of weed maintenance program to ensure the success of the planting work undertaken.

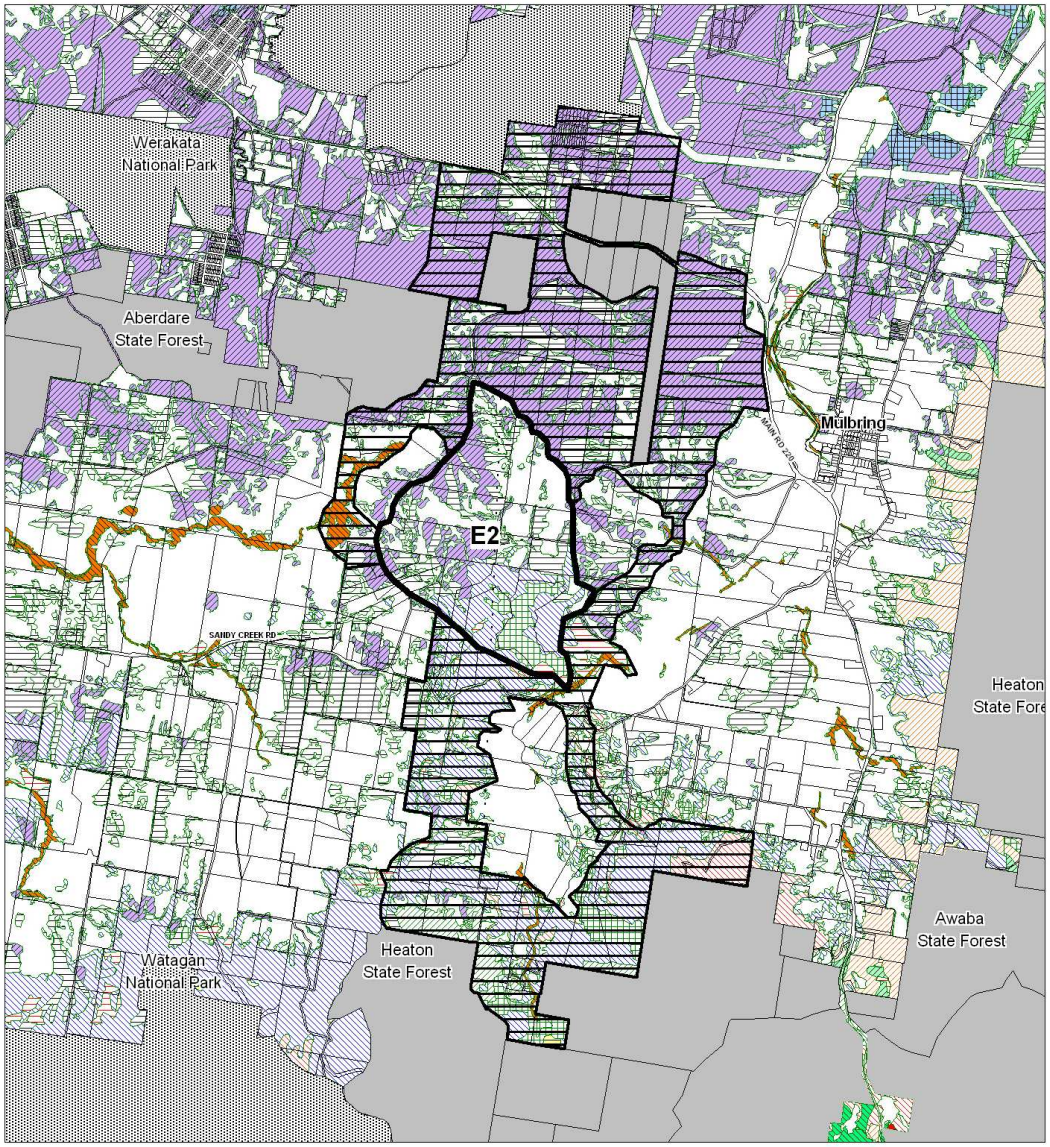


FIGURE 2: EXTANT VEGETATION
Bow Wow Creek Gorge Catchment
& Habitat Corridors

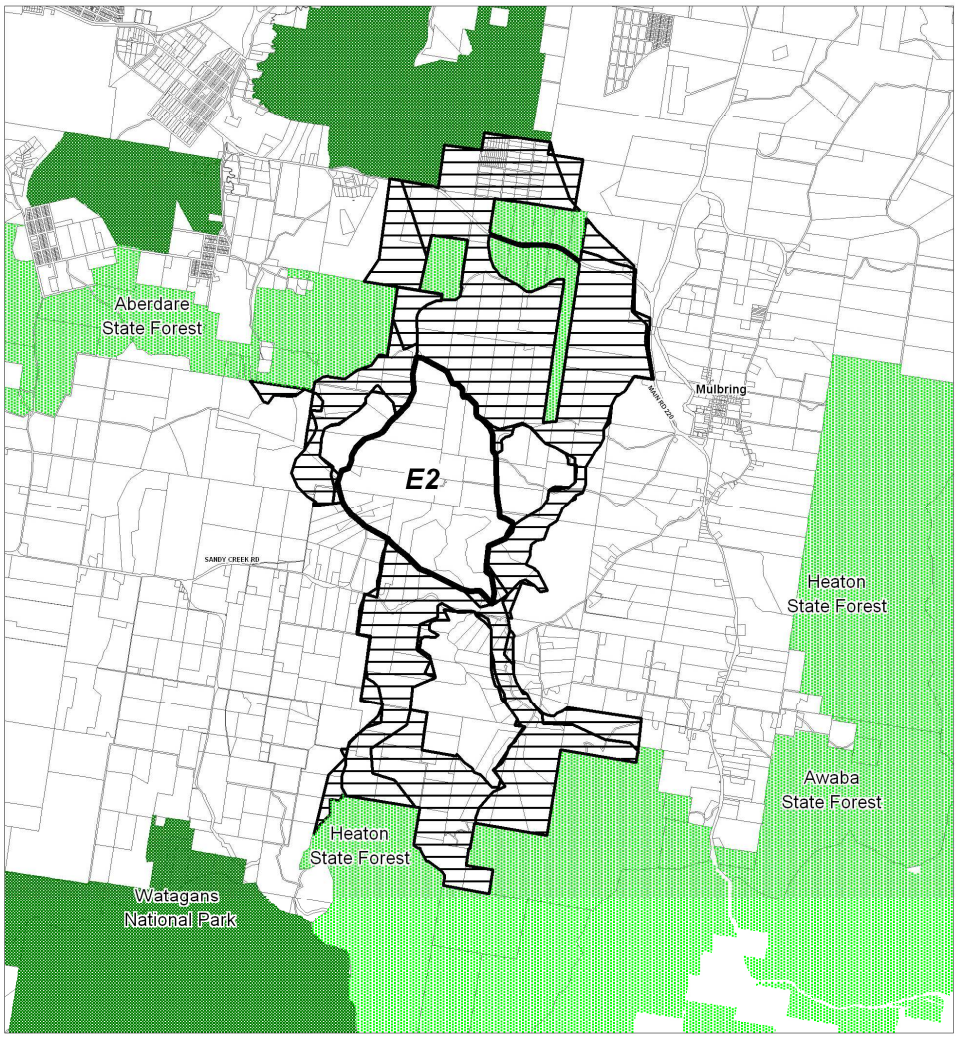


FIGURE 3:
DISTRIBUTION OF QUORROBOLONG SCRIBBLY GUM WOODLAND
Bow Wow Creek Gorge Catchment
& Habitat Corridors

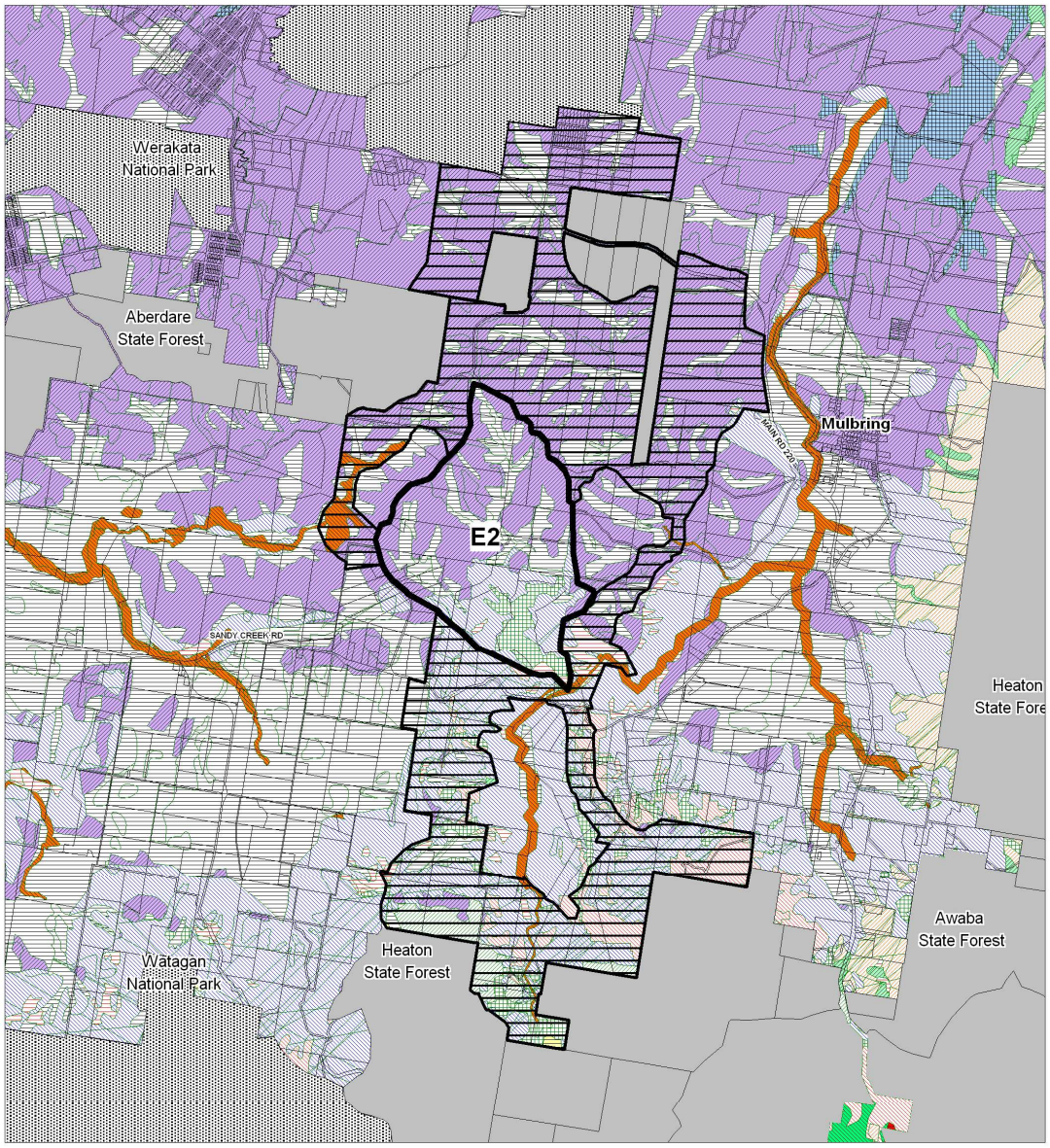


FIGURE 4:
PRE 1750 VEGETATION DISTRIBUTION
Bow Wow Creek Gorge Catchment
& Habitat Corridors

APPENDIX 2:

SUGGESTED PLANTING LISTS

Tree and shrub species have been selected following detailed ecological study (see Bell and Murray, 2001 and the LHCCREMS mapping and report entitled 'Vegetation Survey, Classification and Mapping – Lower Hunter and Central Coast Region Version 1.2') and through local knowledge of the Bow Wow Creek Gorge Catchment.

Tree and shrub species have been selected to enhance biodiversity and provide wildlife habitat.

Please refer to Figures 2 & 3 for current vegetation community identification and locations or alternatively contact Council. For cleared sites, please refer to Figure 4 (LHCCREMS Pre 1750 Vegetation Community mapping) for guidance or alternatively contact Council.

This Chapter and more specifically these figures (detailed and in colour) can be viewed at www.cessnock.nsw.gov.au > Building & Development > Development Control Plan > Part E: Specific Areas, Chapter 8: Bow Wow Creek Gorge.

Coastal Wet Gully Forest (Map Unit 1)

Stratum	Common Name	Species
Emergent	*Turpentine*	*Syncarpia glomulifera*
	Sydney Blue Gum	*Eucalyptus saligna*
	Mountain Blue Gum	*Eucalyptus deanei*
	White Mahogany	*Eucalyptus acmenoides*
	Rough Barked Apple	*Angophora floribunda*
	Large-fruited Red Mahogany	*Eucalyptus scias subsp scias*
	Blackbutt	*Eucalyptus pilularis*
Tallest	*Lillypilly*	*Acmena smithii*
	Guioa	*Guioa semiglauca*
	Sassafras	*Doryphora sassafras*
	Brown Beech	*Cryptocarya glaucescens*
	Coachwood	*Ceratopetalum apetalum*
	Murrogun	*Cryptocarya micronеura*
	Grey Myrtle	*Backhousia myrtifolia*
	Bangalow Palm	*Archontophoenix cunninghamiana*
	Native Quince	*Alectryon subcinereus*
	Sandpaper Fig	*Ficus coronata*
	Soft Corkwood	*Caldcluvia paniculosa*
	-	*Sarcomelicope simplicifolia subsp simplicifolia*
	-	*Mischocarpus australis*
	Scentless Rosewood	*Synoum glandulosum*
	Scrub Beefwood	*Stenocarpus salignus*
	Doughwood	*Melicope micrococca*
	Black Plum	*Diospyros australis*
	Black Apple	*Planchonella australis*
	Cabbage-tree Palm	*Livistona australis*
Mid	*White Bolly Gum*	*Neolitsea dealbata*
	Native Guava	*Eupomatia laurina*
	Tree Heath	*Trochocarpa laurina*
	Buff Hazelwood	*Symplocos thwaitesii*
	Scrub Ironwood	*Austromyrtus acmenoides*
	Birdlime Tree	*Pisonia umbellifera*
	Orange Thorn	*Citriobatus pauciflorus*
	Settlers Flax	*Gymnostachys anceps*
	Wilkiea	*Wilkiea huegeliana*
	Brittlewood	*Claoxylon australe*
	-	*Psychotria loniceroides*
	Brush Pepper-bush	*Tasmannia insipida*

Lowest (<1m)	*Rasp Fern*	*Doodia aspera*
	Pastel Flower	*Pseuderanthemum variabile*
	Creeping Shield Fern	*Lastreopsis microsora*
	Giant Maidenhair	*Adiantum formosum*
	-	*Polystichum australiense*
	-	*Adiantum silvaticum*
	Gristle Fern	*Blechnum cartilagineum*
	Trim Shield Fern	*Lastreopsis decomposita*
	Basket Grass	*Oplismenus imbecillis*
	-	*Pollia crispata*
	-	*Asplenium attenuatum*
	-	*Lomandra spicata*
Vines and Epiphytes	*Jasmine Morinda*	*Morinda jasminoides*
	Kangaroo Grape	*Cissus antarctica*
	Water Vine or Native Grape	*Cissus hypoglauca*
	-	*Ripogonum fawcettianum*
	Rock Felt-fern	*Pyrrosia rupestris*
	Spider Orchid	*Dendrobium tetragonum*
	Wheatgrain Bulbophyllum	*Bulbophyllum shepherdii*
	-	*Smilax australis*
	Wong-Wonga Vine	*Pandorea pandorana*
	Bird's Nest Fern	*Asplenium australasicum*
	Tangle Orchid	*Plectorrhiza tridentata*

Alluvial Tall Moist Forest (Map Unit 5)

Stratum	Common Name	Species
Emergents	*Sydney Blue Gum*	*Eucalyptus saligna*
	Turpentine	*Syncarpia glomulifera*
	Flooded Gum	*Eucalyptus grandis*
	Rough-barked Apple	*Angophora floribunda*
	Swamp Mahogany	*Eucalyptus robusta*
	Blackbutt	*Eucalyptus pilularis*
	Forest Red Gum	*Eucalyptus tereticornis*
	Mountain Blue Gum	*Eucalyptus deanei*
	Tallow Wood	*Eucalyptus microcorys*
	Sydney Peppermint	*Eucalyptus piperita*
	White Mahogany	*Eucalyptus acmenoides*
	Red Mahogany	*Eucalyptus resinifera subsp resinifera*
	Swamp She-Oak	*Casuarina glauca*
	Spotted Gum	*Corymbia maculata*
	Red Bloodwood	*Corymbia gummifera*
Tallest	*Cheese Tree*	*Glochidion ferdinandi*
	Lillypilly	*Acmena smithii*
	Prickly-leaved Paperbark	*Melaleuca styphelioides*
	Sandpaper Fig	*Ficus coronata*

	Snow-in-summer	*Melaleuca linariifolia*
	Grey Myrtle	*Backhousia myrtifolia*
	Willow Bottlebrush	*Callistemon salignus*
	Red Ash	*Alphitonia excelsa*
	Buff Hazelwood	*Symplocos stawellii*
	Forest Oak	*Allocasuarina torulosa*
	-	*Melaleuca biconvexa*
	Cabbage-tree Palm	*Livistona australis*
Lower Mid	*-*	*Gahnia clarkei*
	Settlers Flax	*Gymnostachys anceps*
	Breynia	*Breynia oblongifolia*
	-	*Acacia irrorata subsp irrorata*
Lowest (<1m)	*Common Maidenhair Fern*	*Adiantum aethiopicum*
	Pastel Flower	*Pseuderanthemum variabile*
	-	*Entolasia marginata*
	Mat Rush	*Lomandra longifolia*
	Basket Grass	*Oplismenus imbecillis*
	White Root	*Pratia purpurascens*
	Basket Grass	*Oplismenus aemulus*
	Kidney Weed	*Dichondra repens*
	Bracken	*Pteridium esculentum*
	-	*Hydrocotyle laxiflora*
	Native Violet	*Viola hederacea*
	Rasp Fern	*Doodia aspera*
	-	*Austrosteenisia blackii*
	Floating Burr-reed	*Sparganium subglobosum*
		Youngia japonica
	Harsh Ground Fern	*Hypolepis muelleri*
	False Bracken Fern	*Calochlaena dubia*
Vines and Epiphytes	*Scrambling Lily*	*Geitonoplesium cymosum*
	Yam	*Dioscorea transversa*
	Jasmine Morinda	*Morinda jasminoides*
	-	*Smilax australis*
	Love Creeper	*Glycine clandestina*
	Wonga-Wonga Vine	*Pandorea pandorana*
	Monkey Rope	*Parsonsia straminea*
	Stephania or Snake Vine	*Stephania japonica var discolor*
	Kangaroo Grape	*Cissus antarctica*
	Wombat Berry	*Eustrephus latifolius*
	Pearl Vine	*Sarcopetalum harveyanum*

Coastal Narabeen Moist Forest (Map Unit 6)

Stratum	Common Name	Species
Tallest	*Turpentine*	*Syncarpia glomulifera*
	Sydney Blue Gum	*Eucalyptus saligna*
	White Mahogany	*Eucalyptus acmenoides*
	Mountain Blue Gum	*Eucalyptus deanei*
	Blackbutt	*Eucalyptus pilularis*
	Rough-barked Apple	*Angophora floribunda*
	Grey Ironbark	*Eucalyptus paniculata subsp paniculata*
	Northern Grey Ironbark	*Eucalyptus siderophloia*
	Spotted Gum	*Corymbia maculata*
	Grey Gum	*Eucalyptus punctata*
	Small-fruited Gum	*Eucalyptus propinqua*
	Large-fruited Red Mahogany	*Eucalyptus scias subsp scias*
Upper Mid	*Murrogun*	*Cryptocarya microneura*
	Scrub Turpentine	*Rhodamnia rubescens*
	Scentless Rosewood	*Synoum glandulosum*
	Forest Oak	*Allocasuarina torulosa*
	Cheese Tree	*Glochidion ferdinandi*
	Guioa	*Guioa semiglauca*
	Lillypilly	*Acmena smithii*
	Cabbage-tree Palm	*Livistona australis*
Lower Mid	*Settlers Flax*	*Gymnostachys anceps*
	Native Guava	*Eupomatia laurina*
	-	*Astrotricha latifolia*
Lowest (<1m)	*Pastel Flower*	*Pseuderanthemum variabile*
	Rasp Fern	*Doodia aspera*
	Basket Grass	*Oplismenus imbecillis*
	Twining Guinea Flower	*Hibbertia dentata*
	Giant Maidenhair	*Adiantum formosum*
	Gristle Fern	*Blechnum cartilagineum*
	False Bracken Fern	*Calochlaena dubia*
	-	*Entolasia stricta*
	-	*Dennstaedtia davallioides*
	Christmas Orchid	*Calanthe triplicata*
	Forest Germander	*Teucrium corymbosum*
Vines and Epiphytes	-	*Smilax australis*
	Yam	*Dioscorea transversa*
	Jasmine Morinda	*Morinda jasminoides*
	Wonga-Wonga Vine	*Pandorea pandorana*
	Kangaroo Grape	*Cissus antarctica*
	-	*Ripogonum fawcettianum*

Sheltered Rough Barked Apple Forest (Map Unit 7)

Stratum	Common Name	Species
Tallest	*Rough-barked Apple*	*Angophora floribunda*
	Turpentine	*Syncarpia glomulifera*
	Mountain Blue Gum	*Eucalyptus deanei*
	Sydney Peppermint	*Eucalyptus piperita*
	Blackbutt	*Eucalyptus pilularis*
	Sydney Blue Gum	*Eucalyptus saligna*
	Grey Ironbark	*Eucalyptus paniculata subsp paniculata*
	Grey Gum	*Eucalyptus punctata*
Upper Mid	*Forest Oak*	*Allocasuarina torulosa*
	Mountain Cedar Wattle	*Acacia elata*
Lower Mid	*Breynia*	*Breynia oblongifolia*
	Tree Heath	*Trochocarpa laurina*
	Lillypilly	*Acmena smithii*
	Corkwood	*Duboisia myoporoides*
	Cheese Tree	*Glochidion ferdinandi*
Lowest (<1m)	*Blue Flax Lily*	*Dianella caerulea*
	Gristle Fern	*Blechnum cartilagineum*
	False Bracken Fern	*Calochlaena dubia*
	-	*Hydrocotyle laxiflora*
	Mat Rush	*Lomandra longifolia*
	Basket Grass	*Oplismenus imbecillis*
	-	*Desmodium varians*
	White Root	*Pratia purpurascens*
	Rasp Fern	*Doodia aspera*
	Pastel Flower	*Pseuderanthemum variabile*
	Bracken	*Pteridium esculentum*
	Blady Grass	*Imperata cylindrica var major*
	Common Maidenhair Fern	*Adiantum aethiopicum*
	-	*Entolasia stricta*
	-	*Entolasia marginata*
Vines and Epiphytes	*Love Creeper*	*Glycine clandestina*
	Stephania or Snake Vine	*Stephania japonica var discolor*
	Native Grape	*Cissus hypoglauca*
	Native Raspberry	*Rubus parvifolius*
	-	*Smilax australis*
	Wombat Berry	*Eustrephus latifolius*
	Wonga-Wonga Vine	*Pandorea pandorana*
	Old Man's Beard	*Clematis aristata*

Coastal Ranges Open Forest (Map Unit 9)

Stratum	Common Name	Species
Tallest	*Turpentine*	*Syncarpia glomulifera*
	Blackbutt	*Eucalyptus pilularis*
	Rough-barked Apple	*Angophora floribunda*
	Mountain Blue Gum	*Eucalyptus deanei*
	Sydney Blue Gum	*Eucalyptus saligna*
	White Mahogany	*Eucalyptus acmenoides*
	Broad-leaved White Mahogany	*Eucalyptus umbra*
	Tallow Wood	*Eucalyptus microcorys*
	Grey Ironbark	*Eucalyptus paniculata subsp paniculata*
	Spotted Gum	*Corymbia maculata*
	Grey Gum	*Eucalyptus punctata*
	Northern Grey Ironbark	*Eucalyptus siderophloia*
Upper Mid	*Forest Oak*	*Allocasuarina torulosa*
	Hickory or Maiden's Wattle	*Acacia maidenii*
Lower Mid	*Narrow-leaved Geebung*	*Persoonia linearis*
		Podolobium ilicifolium
	Breynia	*Breynia oblongifolia*
	-	*Psychotria loniceroides*
	-	*Maytenus silvestris*
Lowest (<1m)	*Blue Flax Lily*	*Dianella caerulea*
	Blady Grass	*Imperata cylindrica var major*
	Pastel Flower	*Pseuderanthemum variabile*
	Mat Rush	*Lomandra longifolia*
	White Root	*Pratia purpurascens*
	Bracken	*Pteridium esculentum*
	Basket Grass	*Oplismenus imbecillis*
	Weeping Grass	*Microlaena stipoides var stipoides*
	-	*Desmodium varians*
	-	*Entolasia stricta*
	False Bracken Fern	*Calochlaena dubia*
	Rasp Fern	*Doodia aspera*
	Tussock Grass	*Poa labillardieri*
Vines and Epiphytes	*Forest Clematis*	*Clematis glycinoides var glycinoides*
	Dusky Coral Pea	*Kennedia rubicunda*
	Golden Guinea Flower	*Hibbertia scandens*
	Twining Guinea Flower	*Hibbertia dentata*

Hunter Valley Moist Forest (Map Unit 12)

Stratum	Common Name	Species
Tallest	*Spotted Gum*	*Corymbia maculata*
	Grey Gum	*Eucalyptus punctata*
	Northern Grey Ironbark	*Eucalyptus siderophloia*
	Rough-barked Apple	*Angophora floribunda*
	Narrow-leaved Ironbark	*Eucalyptus crebra*
	Turpentine	*Syncarpia glomulifera*
	White Mahogany	*Eucalyptus acmenoides*
	Forest Red Gum	*Eucalyptus tereticornis*
	White Stringybark	*Eucalyptus globoidea*
	Narrow-leaved Stringy Bark	*Eucalyptus sparsifolia*
	Sydney Red Gum	*Angophora costata*
	Mountain Blue Gum	*Eucalyptus deanei*
	Broad-leaved Ironbark	*Eucalyptus fibrosa*
	Red Bloodwood	*Corymbia gummifera*
Upper Mid	*Forest Oak*	*Allocasuarina torulosa*
	Kurrajong	*Brachychiton populneus subsp populneus*
	Prickly-leaved Paper Bark	*Melaleuca styphelioides*
Lower Mid	*Indian-weed*	*Sigesbeckia orientalis*
	Mutton Wood	*Rapanea variabilis*
	Breynia	*Breynia oblongifolia*
	-	*Maytenus silvestris*
	Mock Olive	*Notelaea longifolia*
Lowest (<1m)	*White Root*	*Pratia purpurascens*
	Kidney Weed	*Dichondra repens*
	-	*Plectranthus parviflorus*
	-	*Desmodium varians*
	Common Maidenhair	*Adiantum aethiopicum*
	Weeping Grass	*Microlaena stipoides var stipoides*
	Slender Plaintain	*Plantago debilis*
	Kangaroo Grass	*Themeda australis*
	Basket Grass	*Oplismenus aemulus*
	-	*Entolasia marginata*
Vines and Epiphytes	*Wombat Berry*	*Eustrephus latifolius*
	Scrambling Lily	*Geitonoplesium cymosum*
	Slender Grape	*Cayratia clematidea*
	Forest Clematis	*Clematis glycinoides var glycinoides*
	Native Raspberry	*Rubus parvifolius*

Central Hunter Riparian Forest (Map Unit 13)

Stratum	Common Name	Species
Tallest	*Swamp She-Oak*	*Casuarina glauca*
	Forest Red Gum	*Eucalyptus tereticornis*
	River Red Gum	*Eucalyptus camaldulensis*
	Rough-barked Apple	*Angophora floribunda*
	Grey Box	*Eucalyptus moluccana*
	Broad-leaved Ironbark	*Eucalyptus fibrosa*
	Yellow Box	*Eucalyptus melliodora*
	Narrow-leaved Ironbark	*Eucalyptus crebra*
	Cabbage Gum	*Eucalyptus amplifolia subsp amplifolia*
	Grey Gum	*Eucalyptus punctata*
Mid		*Allocasuarina luehmannii*
Lowest (<1m)	*Common Couch*	*Cynodon dactylon*
	Weeping Grass	*Microlaena stipoides var stipoides*
	Native Wandering Jew	*Commelina cyanea*
	Three-awn Speargrass	*Aristida vagans*
	Lovegrass	*Eragrostis leptostachya*
	-	*Paspalidium aversum*
	-	*Amaranthus macrocarpus var macrocarpus*
	Starfruit	*Damasonium minus*
		Goodenia gracilis
	-	*Linaria pelisseriana*
	Common Onion Orchid	*Microtis unifolia*
Vines and Epiphytes	-	*Lysiana exocarpi subsp tenuis*

Coastal Foothills Spotted Gum - Ironbark Forest (Map Unit 15)

Stratum	Common Name	Species
Tallest	*Spotted Gum*	*Corymbia maculata*
	Broad-leaved White Mahogany	*Eucalyptus umbra*
	Northern Grey Ironbark	*Eucalyptus siderophloia*
	Turpentine	*Syncarpia glomulifera*
	Sydney Red Gum	*Angophora costata*
	Small-fruited Gum	*Eucalyptus propinqua*
	White Mahogany	*Eucalyptus acmenoides*
	Grey Gum	*Eucalyptus punctata*
	Broad-leaved Ironbark	*Eucalyptus fibrosa*
	Tallow Wood	*Eucalyptus microcorys*
	White Stringybark	*Eucalyptus globoidea*
	Grey Ironbark	*Eucalyptus paniculata subsp paniculata*
Upper Mid	*Forest Oak*	*Allocasuarina torulosa*
Mid	*Narrow-leaved Geebung*	*Persoonia linearis*
	Elderberry Panax	*Polyscias sambucifolia*
	Breynia	*Breynia oblongifolia*
	-	*Daviesia ulicifolia*
	Ball Honey Myrtle	*Melaleuca nodosa*
Lowest (<1m)	*White Root*	*Pratia purpurascens*
	Blady Grass	*Imperata cylindrica var major*
	-	*Entolasia stricta*
	Kangaroo Grass	*Themeda australis*
	Pastel Flower	*Pseuderanthemum variabile*
	Weeping Grass	*Microlaena stipoides var stipoides*
	King Greenhood	*Pterostylis baptistii*
	-	*Brachycome graminea*
	-	*Pterostylis furcillata*
	Blue Flax Lily	*Dianella caerulea*
	-	*Vernonia cinerea var cinerea*
	Wombat Berry	*Eustrephus latifolius*
	Mat Rush	*Lomandra longifolia*
	Apple Berry	*Billardiera scandens*
	-	*Desmodium rhytidophyllum*
	-	*Maytenus silvestris*
	Love Creeper	*Glycine clandestina*
Vines and Epiphytes	*Hardenbergia*	*Hardenbergia violacea*

Lower Hunter Spotted Gum - Ironbark Forest (Map Unit 17)

Stratum	*Common Name*	*Species*
Tallest	*Spotted Gum*	*Corymbia maculata*
	Broad-leaved Ironbark	*Eucalyptus fibrosa*
	Grey Gum	*Eucalyptus punctata*
	Narrow-leaved Ironbark	*Eucalyptus crebra*
	Grey Box	*Eucalyptus moluccana*
	Blue-leaved Stringy Bark	*Eucalyptus agglomerata*
	Broad-leaved White Mahogany	*Eucalyptus umbra*
	Red Bloodwood	*Corymbia gummifera*
	Turpentine	*Syncarpia glomulifera*
	White Stringybark	*Eucalyptus globoidea*
	Northern Grey Ironbark	*Eucalyptus siderophloia*
	Grey Ironbark	*Eucalyptus paniculata subsp paniculata*
	Narrow-leaved Stringy Bark	*Eucalyptus sparsifolia*
	Sydney Red Gum	*Angophora costata*
	White Mahogany	*Eucalyptus acmenoides*
	-	*Eucalyptus fergusonii subsp fergusonii*
	Forest Red Gum	*Eucalyptus tereticornis*
	Dusky-leaved Ironbark	*Eucalyptus nubila*
		Corymbia eximia
Mid	*-*	*Daviesia ulicifolia*
	-	*Acacia parvipinnula*
	Ball Honey Myrtle	*Melaleuca nodosa*
	-	*Oxylobium ellipticum*
	-	*Daviesia leptophylla*
	Narrow-leaved Geebung	*Persoonia linearis*
	Native Cranberry	*Lissanthe strigosa*
	Breynia	*Breynia oblongifolia*
	-	*Pultenaea cunninghamii*
Lowest (<1m)	*Mulga Fern*	*Cheilanthes sieberi subsp sieberi*
	-	*Entolasia stricta*
	Pomax	*Pomax umbellata*
	White Root	*Pratia purpurascens*
	Mauve Flax Lily	*Dianella revoluta var revoluta*
	Love Creeper	*Glycine clandestina*
	-	*Lepidosperma laterale*
	Weeping Grass	*Microlaena stipoides var stipoides*
	Kangaroo Grass	*Themeda australis*
	Thyme Spurge	*Phyllanthus hirtellus*
	-	*Vernonia cinerea var cinerea*
	Barbed-wire Grass	*Cymbopogon refractus*
		Aristida lignosa
		Austrodanthonia induta
		Calotis cuneata var cuneata
	Snake-tounged Greenhood	*Pterostylis ophioglossa*
		Solanum papaverifolium
		Sporobolus caroli

Hunter Lowlands Redgum Forest (Map Unit 19)

Stratum	***Common Name***	***Species***
Tallest	*Forest Red Gum*	Eucalyptus tereticornis
	Grey Gum	*Eucalyptus punctata*
	Narrow-leaved Ironbark	*Eucalyptus crebra*
	Rough-barked Apple	*Angophora floribunda*
	Spotted Gum	*Corymbia maculata*
	Grey Box	*Eucalyptus moluccana*
	Thin-leaved Stringybark	*Eucalyptus eugenioides*
	White Stringybark	*Eucalyptus globoidea*
	Broad-leaved Ironbark	*Eucalyptus fibrosa*
	Blackbut	*Eucalyptus pilularis*
	Grey Ironbark	*Eucalyptus paniculata subsp paniculata*
	Sydney Red Gum	*Angophora costata*
	White Mahogany	*Eucalyptus acmenoides*
	Cabbage Gum	*Eucalyptus amplifolia subsp amplifolia*
	Broad-leaved White Mahogany	*Eucalyptus umbra*
	Turpentine	*Syncarpia glomulifera*
Mid	*Breynia*	*Breynia oblongifolia*
	Bearded Heath	*Leucopogon juniperinus*
	-	**Daviesia ulicifolia**
	Narrow-leaved Geebung	*Persoonia linearis*
	Dogwood	*Jacksonia scoparia*
Lowest (<1m)	*Mulga Fern*	*Cheilanthes sieberi subsp sieberi*
	Weeping Grass	*Microlaena stipoides var stipoides*
	White Root	*Pratia purpurascens*
	Barbed-wire Grass	*Cymbopogon refractus*
	-	*Lomandra multiflora subsp multiflora*
	Pomax	*Pomax umbellata*
	Kidney Weed	*Dichondra repens*
	-	*Vernonia cinerea var cinerea*
	Blue Trumpet	*Brunoniella australis*
	Tufted Hedgehog Grass	*Echinopogon caespitosus var caespitosus*
	-	*Lagenifera stipitata*
	-	*Desmodium varians*
	Lovegrass	*Eragrostis leptostachya*
	Blady Grass	*Imperata cylindrica var major*
	Two Colour Panic	*Panicum simile*
	Forest Nightshade	*Solanum prinophyllum*
	Kangaroo Grass	*Themeda australis*
	Smallflower Fingergrass	*Digitaria parviflora*
	-	*Entolasia stricta*
	Apple Berry	*Billardiera scandens*
	Mat Rush	*Lomandra longifolia*
	Brown's Love Grass	*Eragrostis brownii*
	-	*Paspalidium distans*
		Austrodanthonia monticola
	Love Creeper	*Glycine clandestina*

Hunter Range Grey Gum Forest (Map Unit 21)

Stratum	*Common Name*	*Species*
Tallest	*Grey Gum*	*Eucalyptus punctata*
	Sydney Red Gum	*Angophora costata*
	Narrow-leaved Stringy Bark	*Eucalyptus sparsifolia*
	Turpentine	*Syncarpia glomulifera*
	Narrow-leaved Ironbark	*Eucalyptus crebra*
	Blue-leaved Stringy Bark	*Eucalyptus agglomerata*
	Rough-barked Apple	*Angophora floribunda*
	-	*Eucalyptus prominula*
		Corymbia eximia
	Spotted Gum	*Corymbia maculata*
	Sydney Peppermint	*Eucalyptus piperita*
	White Mahogany	*Eucalyptus acmenoides*
Upper Mid	*Forest Oak*	*Allocasuarina torulosa*
Lower Mid	*Narrow-leaved Geebung*	*Persoonia linearis*
		Podolobium ilicifolium
	Mutton Wood	*Rapanea variabilis*
	Dwarf Currant	*Exocarpos strictus*
	Dogwood	*Jacksonia scoparia*
	-	*Acacia parvipinnula*
Lowest (<1m)	*-*	*Entolasia stricta*
	Pomax	*Pomax umbellata*
	-	*Goodenia heterophylla*
	Kangaroo Grass	*Themeda australis*
	Weeping Grass	*Microlaena stipoides var stipoides*
	Native Parsnip	*Platysace lanceolata*
	Grey Guinea Flower	*Hibbertia obtusifolia*
	-	*Poa affinis*
	-	*Pterostylis revoluta*
	-	*Vittadinia dissecta var dissecta*
Vines and Epiphytes	*Hardenbergia*	*Hardenbergia violacea*
	Dusky Coral Pea	*Kennedia rubicunda*

Kurri Sand Swamp Woodland (Map Unit 35)

Stratum	***Common Name***	***Species***
Tallest	*Drooping Red Gum*	*Eucalyptus parramattensis subsp decadens*
	Narrow-leaved Apple	*Angophora bakeri*
	Blue-leaved Stringy Bark	*Eucalyptus agglomerata*
	Broad-leaved Ironbark	*Eucalyptus fibrosa*
	Scribbly Gum	**Eucalyptus signata**
	Narrow-leaved Stringy Bark	*Eucalyptus sparsifolia*
Mid	*Ball Honeymyrtle*	*Melaleuca nodosa*
	Hair-pin Banksia	*Banksia spinulosa*
	Dogwood	*Jacksonia scoparia*
	Finger Hakea	*Hakea dactyloides*
	Prickly Moses	*Acacia ulicifolia*
	Mountain Devils	*Lambertia formosa*
	White Feather Honeymyrtle	*Melaleuca decora*
	White Spider Flower	*Grevillea linearifolia*
	Narrow-leaved Geebung	*Persoonia linearis*
Lowest (<1m)	*-*	*Entolasia stricta*
	Heathy Parrot Pea	*Dillwynia retorta*
	Native Cranberry	*Lissanthe strigosa*
	-	*Melaleuca thymifolia*
	Rice Flower	*Pimelea linifolia*
	Mauve Flax Lily	*Dianella revoluta var revoluta*
	-	*Phebalium squamulosum*
		Macrozamia flexuosa

Quorrobolong Scribbly Gum Woodland

Stratum	*Common Name*	*Species*
Trees		*Eucalyptus racemosa*
		Eucalyptus punctata
		Eucalyptus piperita
		Eucalyptus resinifera
		Angophora costata
		Syncarpia glomulifera
Small tree		*Leptospermum trinervium*
		Xylomelum pyriforme
		Acacia parvipinnula
		Melaleuca nodosa
		Persoonia linearis
Shrubs		*Zieria smithii ssp. smithii*
		Acacia ulicifolia
		Leptospermum polygalifolium ssp. cismontanum
		Daviesia ulicifolia
		Correa reflexa var. reflexa
		Jacksonia scoparia
		Banksia spinulosa var. collina
		Breynia oblongifolia
		Dillwynia retorta
		Leucopogon juniperinus
		Melaleuca sieberi
		Lomatia silaifolia
		Comesperma ericinum
		Polyscias sambucifolia
		Exocarpos cupressiformis
		Callistemon pinifolius
		Hakea sericea
		Allocasuarina littoralis
Vines		*Billardieria scandens var. sericata*
		Hardenbergia violacea
		Glycine clandestina
		Cassytha glabella forma glabella
Herbs		*Hibbertia diffusa*
		Phyllanthus hirtellus forma A
		Goodenia heterophylla ssp. heterophylla
		Platysace ericoides
		Pratia purpurascens
		Dampiera stricta
		Pseuderanthemum variabile
		Pomax umbellata
		Gompholobium minus
		Goodenia rotundifolia
		Laxmannia compacta

Grasses		*Imperata cylindrica var. major*
		Themeda australis
		Aristida vagans
		Eragrostis brownii
		Panicum simile
		Microlaena stipoides var. stipoides
		Entolasia stricta
		Echinopogon ovatus
		Digitaria ramularis
		Anisopogon avenaceus
		Paspalidium distans
		Lomandra cylindrica
		Lomandra glauca
		Lomandra multiflora ssp. multiflora
		Gahnia aspera
		Dianella caerulea var. assera
		Lepidosperma gunnii
		Xanthorrhoea ?macronema
Ferns		*Pteridium esculentum*
Orchids		*Cryptostylis subulata*

APPENDIX 3:

PLANTING PREPARATION

The following is a general prescription for establishing habitat corridors as well as for plantings in general.

Details following in this Appendix have been provided by Greening Australia (1998).

Calendar for planting

12 months before planting

Design a plan to establish the location of the planting, species selection from the lists within this Appendix, dimensions of site for planting and what alternatives are available.

9 months before planting

Order your seedlings from your local nursery. If you have collected your own seed start propagating now.

Deep rip the site in rows or a grid pattern. This is best on most soils, however black soils or cracking earths are best cultivated. Mounding of waterlogged or very damp sites on heavy soils will assist with growth. Soils which are considered moderate to highly erodable may not be suitable for deep ripping. (advice from the Department of Water and Energy should be sought).

To deep rip or cultivate within the riparian zone (approximately 40 metres either side of a creek) you may require permission from the Department of Water and Energy.

Continue to allow grazing to reduce pasture.

6 months before planting

Apply a knockdown herbicide along rip lines or cultivate several times to reduce weeds.

Fallow to build up moisture. Continue to allow grazing to reduce pasture.

Fence the site, leaving space between outside rows and the fence of about 3.0 metres to restrict stock from grazing your growing plants from over or through the fence. Also leave space for machinery to get in and out of the site.

2 to 3 weeks before planting

Apply a Glyphosate based herbicide or grade over the riplines to remove weeds and weed seeds. Grading should be a scalping process at least 1.0 metre wide. Residual herbicides give long term protection from weeds, however care must be taken. Herbicides should only be used in accordance with legislation and safety handling data. Consult with your local Weed Control Officer at the Council.

When to establish native plants

Generally, plant establishment is carried out mid March to late April throughout the Hunter. This is usually the period of greatest rainfall and soil temperatures provide conditions for optimum germination and growth. Planting times will vary dependent on local climatic conditions. ***Only plant seedlings when the soil is moist.***

Location

- Plant species in mixed groups of 3 to 5.
- Randomly locate groups with a maximum of 15 metres between each group.
- Infill planting around existing vegetation. Do not plant within the dripline of existing trees.
- All areas subject to detailed site analysis prior to commencement.

Planting

Only plant as many seedlings in a day that can be watered in that same day. When planting, dig a hole about twice the size of the seedling pot, fill some loose soil back in, place the seedling in the hole (you do not have to 'tease' the roots of native plants) and gently fill the remaining soil back around the plant.

Tubestock should be planted between 1.5 and 8.0 metres apart depending on the species selected.

With a foot on either side of the seedling, press down firmly. This will help hold the seedling in place and remove air pockets.

Watering after planting should be the only time the plants are hand watered. A 10 litre bucket of water for each seedling should be sufficient. Planting after or during rain is often easier.

Mulch around stem to 500mm diameter - avoid direct contact of mulch with stem to avoid trunk rot.

Guard seedlings to protect against rabbits, hares, wallabies, frosts and to help with moisture retention. Tree guards should be installed at the time of planting. Use milk cartons with two stakes, or mesh or plastic with three stakes. Plastic tree guards can usually be removed after twelve months (and can be reused!).

Seedling establishment can be carried out with tree planting machinery, dependent on the size of the site and the suitability of the machinery to the site.

Follow - up

Follow up watering should not be necessary with good ground preparation and soil moisture at the time of planting.

Weed control will usually be needed as a follow up to planting. Good weed control prior to planting can avoid this. Any weed control chemical application should be done using equipment which ensures no contact of the chemical with seedlings. Hand weeding is a safer option.

Direct Seeding

Direct seeding is a cost-effective and efficient method of establishing large numbers of native plants. Direct seeding is simply the direct sowing of native plant seed to the soil where you wish to establish trees and shrubs. Advantages of direct seeding include lower costs as seed is usually cheaper to purchase or collect than tubestock; a more natural look or mix of trees and shrubs and that mature plants are usually more stable as their root systems have not been restricted or disturbed.

Successful direct seeding is usually achieved by good site preparation, effective seed preparation, sowing at the correct time (when soil is moist and the soil temperature is warm).

Site preparation is a critical component of tree and shrub establishment by direct seeding. Any direct seeding site should have minimal weed infestation and competition. Methods of site preparation include grading or scraping the soil surface to remove weeds, chemical application using a residual pre-emergent herbicide and a knockdown herbicide prior to direct seeding and cultivation of the site prior to direct seeding.

Seed may need pre-treatment depending on the species being used. To combat the ants taking seed for their 'lunch', seed is usually treated with an low toxicity insecticide.

On slopes steeper than 1:3, a bituminous binder should be added to the seed slurry.

There are many methods of direct seeding. Row seeding, spot seeding and belt seeding are the most common.

Row seeding is usually carried out using a single row seeding machine. This method is efficient for lengthy rows on windbreaks or shelterbelts and ensures the seeding application rate is sufficient. Row seeding can also be a done in figure eights or cross over lines to give a more natural and random effect. Weed control and maintenance is also easy along the sides of the rows.

Spot seeding is usually carried out by hand and can be very effective at appropriate sites. Spot seeding may be used for sites where machinery will not be effective such as rocky sites or inaccessible sites. Other times to use spot seeding is when machinery may cause serious erosion problems, such as near creeks or if the site is too small to warrant using machinery. A hoe is often the best tool for carrying out spot seeding.

Belt seeding is simply the term used for wide belts or areas of direct seeding. Often belt seeding is carried out by converted agricultural machinery or using a fertiliser spreader.

APPENDIX 4:

SPECIES SELECTION GUIDE

The Hunter – Central Rivers Catchment Management Authority recommended a ratio of about 2:1 shrubs to trees for dry eucalypt forests. It should be noted however that this depends on the soil type, the vegetation structure and species richness of the community being re-established. This planting ratio may be applied for all identified communities in the Bow Wow Creek Catchment and Habitat Corridors, except those discussed below.

For moister forests, which typically have taller trees that create a more pronounced microclimate below them, a higher proportion of trees is necessary to grow rapidly to modify the understorey environment. This will enable the appropriate shrubs and groundcover to colonise. Hence, pioneer species, being those that will typically colonise disturbed sites and grow rapidly, modifying the microclimate below and therefore allowing other rainforest species to grow, are important in these locations. The Hunter – Central Rivers Catchment Management Authority recommends a ratio of 1:1 or 1:2 shrubs to trees in these communities. Communities in the Bow Wow Creek Catchment and Habitat Corridors that may be included in this category are Map Units (MU) 1, 5, 6, 7, 12 & 13.

FUNDING SOURCES - VOLUNTARY PLANTING

Financial assistance related to the planting of native vegetation is available from a number of sources including the Department of Planning, Department of Environment and Climate Change and Water (DECC&W) and the Hunter – Central Rivers Catchment Management Authority (HCREMS). In addition, please contact Council's Strategic and Community Services Section for advice on available funding.