

# Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains bioregions

## Introduction

These guidelines provide background information to help land managers to identify remnants of the Endangered Ecological Community (EEC) Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains bioregions. For more detailed information refer to the EEC profile for Brigalow, which includes the Final Determination of the NSW Scientific Committee, on the Department of Environment, Climate Change and Water (DECCW) Threatened Species website:  
[www.threatenedspecies.environment.nsw.gov.au](http://www.threatenedspecies.environment.nsw.gov.au)

### What is an Endangered Ecological Community?

An ecological community is a unique and naturally occurring assemblage of plants and animals. The presence of an ecological community can be determined by factors such as soil type, position in the landscape, climate and water availability, all of which influence species composition. An EEC is an ecological community listed under the *Threatened Species Conservation Act 1995* as being at risk of extinction, unless the threats affecting it are managed and reduced.

Although most ecological communities are recognised by their typical plant species, these communities include all the organisms that occur in that particular area. The survival of each species relies on complex interactions among all of the inhabitants of an ecological community, through biotic mechanisms such as food webs, mutualisms and pollination, and through abiotic mechanisms such as water, nitrogen and carbon cycles. Consequently, the loss of any species may have detrimental flow-on effects for the ecological functioning of the whole community.



Brigalow foliage, Cudgulla National Park  
Photo: M. Porteners

### What is a particular area?

The NSW Scientific Committee defines a particular area as the Bioregion and Local Government Area where an EEC may be found. The particular area may be further delineated by using other supplementary factors such as landscape, soil type and climatic variables.

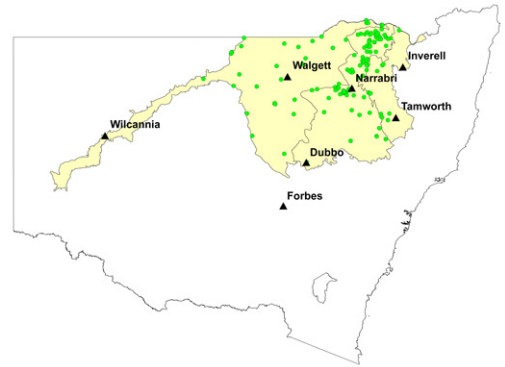
### What is a Brigalow EEC?

Brigalow is a plant community recognised by a low woodland or taller forest dominated by brigalow (*Acacia harpophylla*), often with pockets of belah (*Casuarina cristata*), poplar box (*Eucalyptus populnea* subsp. *bimbil*) or Pilliga box (*Eucalyptus pilligaensis*). The canopy tends to be quite dense and the understorey and groundcover sparse. The closed canopy form of the community consists of stands

of *Acacia harpophylla* found on deep gilgaied clay soils on gently undulating country, forming dense forests to 25 m high. Brigalow also forms a low woodland with moderately dense canopy, dominated by small trees of *A. harpophylla* with pockets of vegetation dominated by belah, poplar box or Pilliga box. This variation relates to site drainage characteristics, with belah favouring sites of impeded drainage, and poplar box and Pilliga box areas with better drainage. In both structural forms of the community, the sparse understorey and groundcover comprise scattered shrubs, forbs and grasses. See 'Identifying the Brigalow EEC' below for further help.

### Where is the Brigalow EEC found?

Brigalow is found as scattered remnants on clay-loam or heavy clay soils, mainly on the north-west slopes and plains in the Brigalow Belt South Bioregion, with outliers in the Darling Riverine Plains and Nandewar bioregions (see Map). The community also extends into south-eastern Queensland. The largest patches of brigalow are distributed south and west of Narrabri and north-east of Moree. Small areas are also found in Pilliga East State Forest. Outliers also occur in the Darling Riverine Plains Bioregion, on the Liverpool Plains, and at Mt Misery in the upper Hunter Valley. The community has been extensively cleared for agriculture and is now severely fragmented, with most surviving remnants found as small linear patches along roadsides and paddock edges.



The bioregions in NSW where Brigalow EEC occurs and the locations where brigalow, as a species, has been recorded to date. The Brigalow EEC occurs elsewhere in these bioregions.

## Description of the community

### The tree layer

The tree or upper canopy layer of the Brigalow EEC is dominated by *A. harpophylla*, growing in dense monospecific stands or with patches of belah (*C. cristata*) on less gilgaied clays, and poplar box (*E. populnea* subsp. *bimbi*) and Pilliga box (*E. pilligaensis*) on the better drained, sandier soils.

### The understorey: small trees and shrubs

Small trees and shrubs that may be present in the sparse understorey include: wilga (*Geijera parviflora*), turkey-bush (*Eremophila deserti*), warrior bush (*Apophyllum anomalum*), ruby saltbush (*Enchylaena tomentosa*), butterbush (*Pittosporum angustifolium*), wild orange (*Capparis mitchellii*), budda (*Eremophila mitchellii*), desert lime (*Citrus glauca*), thorny saltbush (*Rhagodia spinescens*), black cottonbush (*Maireana decalvans*) and copperburrs (*Sclerolaena* species).



Brigalow regrowth, Brigalow Park Nature Reserve  
Photo: J. Plaza, RBG Sydney

### The understorey: groundcover plants

Groundcover species that are common across the range of brigalow include: grasses such as fairy grass (*Sporobolus caroli*), small-flowered wallaby grass (*Austrodanthonia setacea*), stout bamboo grass (*Austrostipa ramosissima*), slender rat's tail grass (*Sporobolus creber*), curly windmill grass (*Enteropogon acicularis*), small-flowered beetle grass (*Diplachne parviflora*), pigeon grass (*Setaria paspalidioides*), yabila grass (*Panicum queenslandicum* var. *queenslandicum*), brigalow grass (*Paspalidium*

Table 1. Characteristic species recorded in the Brigalow EEC

Common name	Scientific name	Common name	Scientific name
<b>Overstorey – tree or shrub layer species (1.5 m+)</b>			
Brigalow <sup>+</sup>	<i>Acacia harpophylla</i>	Galvanised burr <sup>+</sup>	<i>Sclerolaena birchii</i>
Weeping myall (SE)	<i>Acacia pendula</i>	Grey copperburr <sup>+</sup>	<i>Sclerolaena diacantha</i>
Western rosewood <sup>+</sup>	<i>Alectryon oleifolius</i> subsp. <i>canescens</i>	Tangled copperburr	<i>Sclerolaena divaricata</i>
Warrior bush <sup>+</sup>	<i>Apophyllum anomalum</i>	Black roly-poly <sup>+</sup>	<i>Sclerolaena muricata</i> var. <i>semiglabra</i>
Nepine <sup>+</sup>	<i>Capparis lasiantha</i>	Brigalow burr <sup>+</sup>	<i>Sclerolaena tetracuspis</i>
Wild orange <sup>+</sup>	<i>Capparis mitchellii</i>	Streaked poverty-bush <sup>+</sup>	<i>Sclerolaena tricuspis</i>
Belah <sup>+</sup>	<i>Casuarina cristata</i>	Cotton fireweed	<i>Senecio quadridentatus</i>
Coolibah <sup>+</sup> (NW)	<i>Eucalyptus coolabah</i> subsp. <i>coolabah</i>	High sida	<i>Sida trichopoda</i>
Black box <sup>+</sup> (NW)	<i>Eucalyptus largiflorens</i>	London rocket	<i>Sisymbrium irio</i> *
Silver-leaved ironbark <sup>+</sup>	<i>Eucalyptus melanophloia</i>	Quena	<i>Solanum esuriale</i>
Pilliga box <sup>+</sup>	<i>Eucalyptus pilligaensis</i>	Nightshade <sup>+</sup>	<i>Solanum parvifolium</i>
Poplar box <sup>+</sup>	<i>Eucalyptus populnea</i> subsp. <i>bimbil</i>	Swamp starwort <sup>+</sup>	<i>Stellaria angustifolia</i>
Leafless cherry	<i>Exocarpos aphyllus</i>	Fuzzweed <sup>+</sup>	<i>Vittadinia cuneata</i> sens. lat.
Wilga <sup>+</sup>	<i>Geijera parviflora</i>	Fuzzweed	<i>Vittadinia pterochaeta</i>
Butterbush <sup>+</sup>	<i>Pittosporum angustifolium</i>	Fuzzweed	<i>Vittadinia sulcata</i>
<b>Groundcover/understorey species (0-1.5 m)</b>			
<b>Shrubs / forbs</b>			
Lantern bush	<i>Abutilon leucopetalum</i>	Golden everlasting <sup>+</sup>	<i>Xerochrysum bracteata</i>
Flannel weed	<i>Abutilon oxycarpum</i>	<b>Herbs / ferns</b>	
Joyweed	<i>Alternanthera species A</i>	Small vanilla-lily	<i>Arthropodium minus</i>
Grey mistletoe <sup>+</sup>	<i>Amyema quandang</i>	Cut-leaved daisy	<i>Brachyscome multifida</i> var. <i>multifida</i>
Slender-fruited saltbush <sup>+</sup>	<i>Atriplex leptocarpa</i>	Blue trumpet <sup>+</sup>	<i>Brunoniella australis</i>
Mealy saltbush <sup>+</sup>	<i>Atriplex pseudocampanulata</i>	Small purslane <sup>+</sup>	<i>Calandrinia eremaea</i>
Lagoon saltbush	<i>Atriplex suberecta</i>	Spreading sneezeweed <sup>+</sup>	<i>Centipeda minima</i> var. <i>lanuginosa</i>
Currant bush	<i>Carissa ovata</i> large-leaved form	Desert sneezeweed	<i>Centipeda thespidioides</i>
Maltese cockspur	<i>Centaurea melitensis</i> *	Dense stonecrop <sup>+</sup>	<i>Crassula colorata</i> var. <i>acuminata</i>
Desert goosefoot	<i>Chenopodium desertorum</i> subsp. <i>microphyllum</i>	Native carrot	<i>Daucus glochidiatus</i>
Desert lime <sup>+</sup>	<i>Citrus glauca</i>	Small woolly burr medic	<i>Medicago minima</i> *
Tall fleabane	<i>Conyza albida</i> *	Peppergrass	<i>Lepidium aschersonii</i>
Sticky hopbush <sup>+</sup>	<i>Dodonaea viscosa</i> subsp. <i>spatulata</i>	Common nardoo	<i>Marsilea drummondii</i>
Berry saltbush	<i>Einadia hastata</i>	Wood sorrel	<i>Oxalis chnoodes</i>
Climbing saltbush <sup>+</sup>	<i>Einadia nutans</i> subsp. <i>eremaea</i>	Variable plantain	<i>Plantago varia</i>
Ruby saltbush <sup>+</sup>	<i>Enchylaena tomentosa</i>	Poison pratia	<i>Pratia concolor</i>
Eurah <sup>+</sup>	<i>Eremophila bignoniiflora</i>	Native spinach	<i>Tetragonia moorei</i>
Turkey-bush	<i>Eremophila deserti</i>	Native spinach <sup>+</sup>	<i>Tetragonia tetragonioides</i>
Emu bush	<i>Eremophila longifolia</i>	Tufted bluebell	<i>Wahlenbergia communis</i>
Budda <sup>+</sup>	<i>Eremophila mitchellii</i>	Gall weed	<i>Zygophyllum apiculatum</i>
Rough raspwort	<i>Haloragis aspera</i>	Pale twinleaf <sup>+</sup>	<i>Zygophyllum glaucum</i>
Woolly plover-daisy <sup>+</sup>	<i>Ixiolaena tomentosa</i>	<b>Grasses / sedges</b>	
Cut-leaf peppergrass	<i>Lepidium bonariense</i> *	Wallaby grass <sup>+</sup>	<i>Austrodanthonia bipartita</i>
African boxthorn	<i>Lycium ferocissimum</i> *	Straw wallaby grass	<i>Austrodanthonia richardsonii</i>
Cottonbush <sup>+</sup>	<i>Maireana aphylla</i>	Small-flowered wallaby grass	<i>Austrodanthonia setacea</i>
Black cottonbush	<i>Maireana decalvans</i>	Stout bamboo grass	<i>Austrostipa ramosissima</i>
Eastern cottonbush	<i>Maireana microphylla</i>	Rough speargrass <sup>+</sup>	<i>Austrostipa scabra</i> subsp. <i>scabra</i>
Yellow-berry bush	<i>Maytenus cunninghamii</i>	Knob sedge	<i>Carex inversa</i>
Lignum <sup>+</sup>	<i>Muehlenbeckia florulenta</i>	Windmill grass <sup>+</sup>	<i>Chloris truncata</i>
Clammy daisy-bush	<i>Olearia decurrens</i>	Sedge	<i>Cyperus gracilis</i>
Tiger pear	<i>Opuntia aurantiaca</i> *	Small-flowered beetle grass	<i>Diplachne parviflora</i>
Common prickly pear	<i>Opuntia stricta</i> var. <i>stricta</i> *	Small spike-rush	<i>Eleocharis pusilla</i>
Gargaloo	<i>Parsonia eucalyptophylla</i>	Windmill grass <sup>+</sup>	<i>Enteropogon acicularis</i>
Shrubby rice-flower <sup>+</sup>	<i>Pimelea microcephala</i> subsp. <i>microcephala</i>	Curly windmill grass	<i>Enteropogon ramosus</i>
Poison rice-flower <sup>+</sup>	<i>Pimelea pauciflora</i>	Common rush	<i>Juncus usitatus</i>
Turnip weed	<i>Rapistrum rugosum</i> *	Umbrella canegrass <sup>+</sup>	<i>Leptochloa divaricatissima</i>
Thorny saltbush <sup>+</sup>	<i>Rhagodia spinescens</i>	Yabila grass	<i>Panicum queenslandicum</i> var. <i>queenslandicum</i>
Buckbush	<i>Salsola tragus</i> subsp. <i>tragus</i>	Brigalow grass <sup>+</sup>	<i>Paspalidium caespitosum</i>
Caustic vine	<i>Sarcostemma australe</i>	Pigeon grass	<i>Setaria paspalidioides</i>
Goat-head burr <sup>+</sup>	<i>Sclerolaena bicornis</i> var. <i>horrida</i>	Fairy grass	<i>Sporobolus caroli</i>
		Slender rat's tail grass	<i>Sporobolus creber</i>
		Small burr-grass	<i>Tragus australianus</i>

Key indicator species from Final Determination are marked +. Weed species are marked \*. Common names are as per Royal Botanic Gardens, see: <http://plantnet.rbgsyd.nsw.gov.au>. Additional species from Benson (2009) and Portners (2006) (see references).

*caespitosum*) and windmill grass (*Chloris truncata*); native forbs, including climbing saltbush (*Einadia nutans* subsp. *eremaea*), berry saltbush (*Einadia hastata*), native spinach (*Tetragonia moorei*), gall weed (*Zygophyllum apiculatum*), wood sorrel (*Oxalis chnoodes*), cut-leaved daisy (*Brachyscome multifida* var. *multifida*), joyweed (*Alternanthera* species A), fuzzweeds (*Vittadinia sulcata*, *Vittadinia pterochaeta*), variable plantain (*Plantago varia*), flannel weed (*Abutilon oxycarpum*) and tufted bluebell (*Wahlenbergia communis*).

### Characteristic species list

There are over 150 plant species that occur in the Brigalow environment. A list of plant species that generally characterise a patch of Brigalow EEC across its range are provided in the Table 1. Not all the species listed need to occur in any one site for it to be considered Brigalow EEC, and sites may include other species not listed as characteristic.

Your final decision should be based on the weight of evidence from the key indicators outlined above. If in doubt refer to the full NSW Scientific Committee determination or seek further help from DECCW or your local catchment management authority.

## Identifying the Brigalow EEC

The following are key indicators to look for when determining whether Brigalow EEC exists on a site:

- Is the site in the Brigalow Belt South, Darling Riverine Plains or Nandewar bioregion? (see Map)
- Is the site on heavy, gilgaied, grey or brown cracking clay or clay-loam soils, on a flat or gentle rise on alluvial plains or undulating penneplains?
- Is the site a woodland or forest dominated by brigalow (*A. harpophylla*) with a sparse low shrub understorey and/or open forb and grass groundcover?
- Does the site contain a combination of the diagnostic tree species marked in bold in Table 1?
- Does the site contain dense, even-aged brigalow regrowth or a cohort resulting from an earlier disturbance or clearing event?
- Does the site contain pockets of belah on less gilgaied soils, or patches of poplar box or Pilliga box on relatively sandy soil, intermixed with the brigalow?
- Are there any plant species present at the site that are listed as characteristic in Table 1? (See photos in this guideline, check with a local botanist, or consult reference books or NSW Flora Online: [plantnet.rbgsyd.nsw.gov.au/](http://plantnet.rbgsyd.nsw.gov.au/)).

If you answered yes to the above questions your site is likely to consist of Brigalow EEC.

### What does this mean for my property?

As an EEC listed under the *Threatened Species Conservation Act 1995*, brigalow has significant conservation value and some activities affecting the EEC may require consent or approval. Please contact the Department of Environment, Climate Change and Water or your local catchment management authority for further information.

### EECs that may adjoin or intergrade with Brigalow EEC

This community would have previously occurred with the following other western slopes and plains vegetation types that are now also listed as EECs:



Brigalow remnant, north of Gunnedah  
Photo: J. Benson, RBG Sydney

- *Brigalow - Gidgee Woodland/Shrubland in the Mulga Lands and Darling Riverine Plains bioregions* towards the west of its range, on alluvial plain and floodplain landscapes (this EEC contains different understorey species), occurring mainly west of the Culgoa River
- *Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions*, predominantly on alluvial soils of riverine plains in the south-western parts of its range
- *Semi-Evergreen Vine Thicket in the Brigalow Belt South and Nandewar bioregions* grading in on hills with basaltic soils, mainly to the south and east
- *Coolibah – Black Box Woodlands of the northern riverine plains in the Darling Riverine Plains and Brigalow Belt South bioregions*, primarily on floodplains in the west of its range.

### Determining the conservation value of remnants

The degree of disturbance (i.e. the site condition) of any remnant of Brigalow EEC may vary depending on past land use, management practices and/or natural disturbance, and this should be considered at the time of assessment. Although the following list is not exhaustive, it describes a number of variations of the Brigalow EEC you may encounter on your land:

1. as isolated small stands, or narrow linear roadside or fenceline remnants within heavily cleared country
2. modified sites where brigalow is present but the understorey and ground layer are depauperate, predominantly composed of exotic species with few native grasses, forbs or shrubs remaining
3. remnants of brigalow that have been subjected to clearing or disturbance in the past and may form closed shrublands, with the canopy comprising a single cohort of plants arising from root-suckers
4. incursions of the weeds tiger pear (*Opuntia aurantiaca*), common prickly pear (*Opuntia stricta* var. *stricta*), turnip weed (*Rapistrum rugosum*), African boxthorn (*Lycium ferocissimum*), Maltese cockspur (*Centaurea melitensis*) or London rocket (*Sisymbrium irio*).

The conservation significance of each remnant should be assessed at each site, noting that even where a remnant is considered to be heavily degraded and in poor condition, it may still have conservation value for a number of reasons, including:

1. as part of a wildlife corridor that has connective importance at local and/or regional scales
2. as an important habitat and food source for birds, small and large mammals, terrestrial invertebrates and insectivorous bats
3. because it contains threatened species of flora and fauna in their own right, such as the Endangered aquatic *Aponogeton queenslandicus*, the Vulnerable peppergrass (*Lepidium aschersonii*) and ooline (*Cadellia pentastylis*), or populations of the black-striped wallaby (*Macropus dorsalis*) which is Endangered in NSW
4. maintaining a healthy native seed bank, which is crucial for the perpetuation of vegetation communities and individual species in highly cleared and fragmented landscapes

Any native vegetation remnant has habitat value and contributes to local and regional biodiversity. It is important to take these factors into account when determining the conservation significance of remnants.



*Brigalow (Acacia harpophylla) in flower* Photo: J. Hosking

## For further help

This and other EEC guidelines are available on the DECCW website at [threatenedspecies.environment.nsw.gov.au/tsprofile/home\\_tec.aspx](http://threatenedspecies.environment.nsw.gov.au/tsprofile/home_tec.aspx) or [www.environment.nsw.gov.au/pnf/eecfieldidguidelines.htm](http://www.environment.nsw.gov.au/pnf/eecfieldidguidelines.htm)

The resources listed below also provide information on NSW plants, native vegetation and EECs.

- Botanic Gardens Trust plant identification help: [www.rbgsyd.nsw.gov.au/plant\\_info/identifying\\_plants/](http://www.rbgsyd.nsw.gov.au/plant_info/identifying_plants/)
- Department of Environment, Climate Change and Water threatened species profiles: [www.threatenedspecies.environment.nsw.gov.au/tsprofile/home\\_species.aspx](http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/home_species.aspx)
- information on bioregions of New South Wales (determinations use IBRA version 4 boundaries): [www.environment.nsw.gov.au/bioregions/Bioregions.htm](http://www.environment.nsw.gov.au/bioregions/Bioregions.htm)
- NSW Scientific Committee Determinations: [www.environment.nsw.gov.au/committee/ListofScientificCommitteeDeterminations.htm](http://www.environment.nsw.gov.au/committee/ListofScientificCommitteeDeterminations.htm)
- Benson, J.S. (2009) New South Wales Vegetation Classification and Assessment: Part 2. Plant communities of the NSW South-western Slopes Bioregion and update of the NSW Western Plains plant communities, Version 2 of the NSWVCA database: *Brigalow – Belah open forest or woodland on alluvial often gilgaied clay soil mainly in the Brigalow Belt South Bioregion* (pp. 16–19). *Cunninghamia* 10(4): 599–673.
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*Isolated Brigalow trees, Culgoa National Park*  
Photo: M. Porteners