

Regional ecosystems: Brigalow



RE 12.8.23

Brigalow open forest on younger volcanic rocks, mainly basalt

One of the legendary trees of outback Queensland is Brigalow (*Acacia harpophylla*). It is a medium to tall tree with dark-furrowed bark and silvery-grey foliage. Brigalow is a wattle and has bright yellow flowers.

Brigalow trees form dense stands colloquially known as 'Brigalow Scrubs', which include Regional Ecosystem (RE) 12.8.23. The early European settlers found the Brigalow Scrub soils to be relatively fertile but efforts to clear the country for agriculture were restricted by Brigalow's dense regrowth.

Brigalow country also became heavily invaded by the introduced Prickly Pear or Tree Pear (*Opuntia spp.*) until the successful introduction of a natural predator, the Cactoblastis moth. The Brigalow Scrubs of inland, central and southern Queensland were eventually transformed into grazing pasture and cropland through the availability of heavy machinery which cleared large areas quickly, and synthetic herbicides that controlled the regrowth.

In parts of South East Queensland (SEQ), the relatively low rainfall and soil types are suitable for Brigalow, and scattered occurrences occur east towards Ipswich. These are notable as they are geographically separated from the main body of Brigalow Scrub west of the Great Dividing Range. The Brigalow Scrubs of SEQ contain isolated populations of other plant species that are also more typical of inland Queensland, for example Belah (*Casuarina cristata*) and Plumwood (*Santalum lanceolatum*).

It has been observed that the phyllodes (leaves) of the Brigalows in SEQ tend to be greener than the silvery leaves found in Brigalow Scrubs in inland Queensland. The shady conditions under a relatively dense canopy of Brigalow limit plant growth and the ground layer is often reduced to a sparse cover of grasses, small shrubs, herbs and sedges growing among leaf litter and fallen branches. Heavier soils with Brigalow can develop small depressions called melonholes or gilgai that are swampy after rain. Through time the understorey of Brigalow Scrub may develop a dense shrub and low tree layer composed of shade-tolerant softwood scrub species.



Brigalow is the characteristic species of RE 12.8.23. They are distinctive trees with weeping dark green-silver foliage and a periodic covering in yellow wattle flowers.

Regional Ecosystems (Res) are used in Queensland to describe native vegetation types based on where they grow, the plant species in the tallest layer and the underlying geology. There are about 150 different REs in SEQ, all of which have a unique three-part number usually starting with '12'.

For more information on REs visit www.qld.gov.au/environment/plants-animals/plants/ecosystems



Distribution

RE 12.8.23 is restricted to geology associated with the basalt ranges of the western Scenic Rim – Toowoomba – Bunya Mountains. Most occurrences are on the geological formation known as the Main Range Volcanics and the Brigalow Scrubs are restricted to drier, lower spurs and foothills. The soils are dark cracking clays and clay-loams and may contain weathered rock floaters.

Road cuttings are a great window to the underlying geology. The soils of RE 12.8.23 will often be dark and cracking, with large basalt ‘floaters’ (as shown here) present in the soil.

Variations and similarities

In SEQ, Brigalow Scrubs are confined to two major types of geology; sedimentary rocks and Cainozoic igneous (young basalt) rocks. The corresponding Regional Ecosystems are:

- **RE 12.8.23** - Brigalow open forest on Cainozoic igneous (young basalt) rocks.
- **RE 12.9-10.6** - Brigalow open forest on sedimentary rocks.

On basalt, RE 12.8.23 Brigalow Scrubs can co-occur with RE 12.8.21 semi-evergreen vine thicket. The two REs often intergrade on hillslopes where large Brigalow trees overtop a dense understorey of softwood scrub species.

In RE 12.8.23, Belah can grow with or replace Brigalow, especially on lighter soils, and Black Tea-tree (*Melaleuca bracteata*) is often present along watercourses and in swampy depressions.



12.8.23 Brigalow Scrub will often co-occur with RE 12.8.21 semi-evergreen vine thicket. Over time, transitional patches with mature Brigalow and an established understorey of scrub species (top right), may transition entirely to RE 12.8.21.

A dominant understorey of scrub species may prevent young Brigalow plants from establishing, causing Brigalow to gradually disappear as the old trees die and are not replaced. A roadside patch of Brigalow in the Lockyer Valley (bottom right).



Distribution map 12.8.23

In SEQ, only small remnant areas have been mapped west and south-west of Ipswich and north-west of Crows Nest. The occurrence of RE 12.8.23 has always been limited in the broader landscape, but these have in turn been heavily fragmented over time. As a result, RE 12.8.23 is considered to be 'endangered' under Queensland legislation as only 5% of the pre-clearing extent remains. RE 12.8.23 does not occur in any reserves in SEQ.

1. Cochranes Road, Tallegalla

A drive along this short road is a great opportunity to view some remnant RE 12.8.23 patches on the properties along this road, and a chance to interact with many of the species of this RE growing along the road easement.

2. Rosewood Arboretum, Rosewood

Flora representative of RE 12.8.23 is available to view at Rosewood Scrub Arboretum at Matthew Stree, Rosewood.

3. Boonah-Fassifern Road, Boonah

Although few remnant patches of RE 12.8.23 remain in this location, isolated Brigalow trees in the landscape around the lower slopes of Mount French give an indication of the former extent of this RE in this area.



Vegetation Management Act (1999) status: Endangered
Level of Protection (extent in protected areas): Low

■ Pre-clearing (~180 years ago)
 ■ Today's distribution

**Map is indicative only - Due to scale, some RE occurrences may not be visible.*

Pre-clearing extent,
or estimated amount
~180 years ago
(hectares)

8,413

Current extent
(hectares)

416

Percent of pre-
clearing extent
remaining

5%

Amount
protected in
reserves
(hectares)

0

Past to present

Brigalow Scrubs are highlighted in the diaries of early European explorers of southern Queensland because they proved slow and difficult to traverse, necessitating detours. The patches are also well documented in the early land survey records.

The Brigalow Scrubs of SEQ were whittled away through time by clearing and fire. However, clumps of Brigalow have continued to survive due to the capacity of the species to reproduce vegetatively from root suckers.

Unfortunately, there is limited information about the species that would have grown with Brigalow in SEQ (e.g. grasses, sedges) and it is likely that some of these species have become quite rare or locally extinct.

The extent of Brigalow forests in SEQ has been greatly reduced over time by clearing for agriculture and changed fire regimes. Today, many remaining examples exist as 'islands' in otherwise cleared landscapes (below). Mistletoes (right) are an important food source in Brigalow scrubs for many bird and bat species.



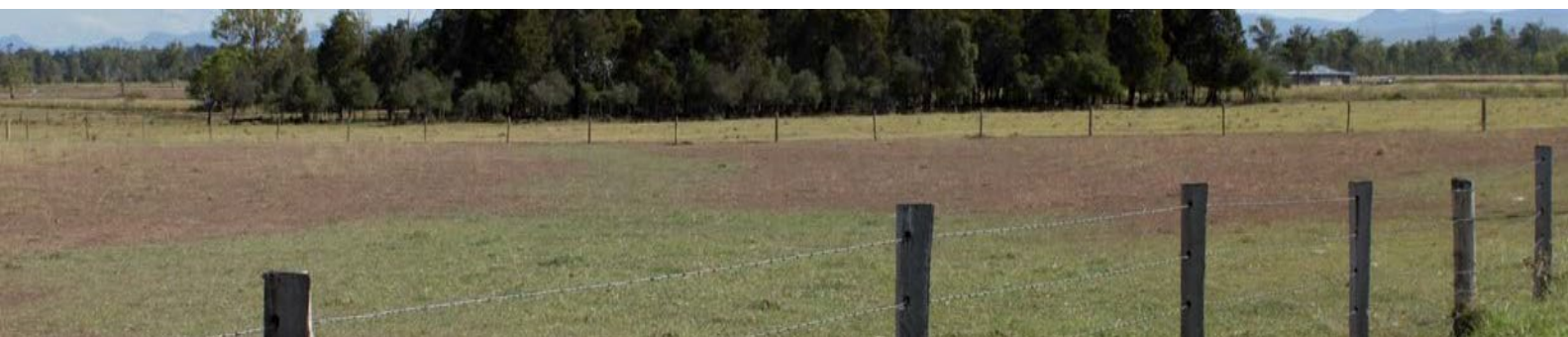
Natural values and functions

Brigalow is adapted to growing on clay soils that expand and shrink with wetting and drying and which frequently have sodic or saline subsoils. Consequently, Brigalow Scrubs play a significant role in intercepting, storing and recycling energy, carbon and nutrients in environments that are unsuited to many of the locally-occurring tree species.

Brigalow also plays a role in regulating ground water and lowering water tables in areas that are prone to rising salinity.

Remnant patches are utilised by a wide range of animals for shelter and food. They are rich in birds and reptiles and provide habitat for several threatened species. Geckoes, dragons and skinks live and forage around fallen timber and in the grooves and furrows of the tree bark.

Mistletoes on Brigalow and Belah trees are an important food source for birds and bats. The threatened Glossy Black Cockatoo is a seasonal visitor that feeds on the seed produced by Belah, while another vulnerable bird, the ground-dwelling Black-breasted Button Quail (*Turnix melanogaster*) is a sedentary species that survives in Brigalow Scrubs with a shrubby understorey of softwood scrub species.





Management

Brigalow Scrubs tend to be even-aged due to the role of major disturbance events in initiating regeneration. Much of the observed regeneration of Brigalow is from suckering from lateral roots following disturbance to the soil or hot fires. While suckering is commonplace, Brigalow intermittently produces large crops of seed which will also trigger a wave of regeneration if conditions are suitable. In areas managed for pasture, Brigalow suckers are controlled by ploughing or herbicide.

Retained patches of Brigalow are susceptible to weed invasion. The more serious environmental weeds in SEQ include Climbing Asparagus Fern (*Asparagus africanus*), Tree Pear, Lantana (*Lantana camara*), Creeping Lantana (*Lantana montevidensis*), African Boxthorn (*Lycium ferocissimum*), Dutchman's Pipe (*Aristolochia* spp.), Cat's Claw Creeper (*Dolichandra unguis-cati*) and Chinese Elm (*Ulmus parviflora*).

Grazing of Brigalow understorey (above) is effective in controlling weedy regrowth and reducing fire hazard, but this also restricts the ability of natural species to regenerate. Brigalow patches with restricted or no grazing (right) contain many regenerating species, but this also allows weed species such as Green Panic to proliferate, and greatly increases the fire hazard. A balanced management regime will be required to restore or establish RE 12.8.23 to a representative, sustainable patch.

Guinea Grass (*Megathyrus maximus*) is also a major pest of remnant Brigalow patches. It can establish in shade and increases the risk of fire encroachment when conditions are dry.

Fire promotes establishment of weedy species in Brigalow patches, and fire may also result in death and injury to established Brigalow and Belah trees. Consequently, use of fire breaks and cool season hazard reduction burns are recommended around retained patches. These areas would also benefit from fencing to exclude livestock to limit the risk of damage from trampling and further introduction of weeds.



Restoration and regeneration

Activities that aim to restore the ecosystem to an approximation of original condition will require different approaches depending upon the condition of the site. For example, a degraded patch that retains Brigalow and Belah trees is likely to require intensive weed control.

Regenerating a grassy paddock that used to be Brigalow Scrub will need a carefully planned and staged project over a long period of time. If some Brigalow Scrub plants are still present, albeit in a suppressed state, they can be very helpful in restoration projects. Any surviving trees and regrowth can be used as a basic framework or skeleton for the project. Brigalow or Belah regrowth could be encouraged in the vicinity of surviving trees through light disturbance of the ground using a blade or plough. This may require careful experimentation. Regrowth can be very dense and will require thinning or the intense competition will suppress growth and development.

Planting will be necessary where Brigalow or Belah trees no longer occur or where it is not feasible to produce suckers. Where planting is required, a look out for Brigalow flowering and seeding will be necessary well in advance, given the irregular nature of flowering and seed production. Belah is a more regular seed producer than Brigalow. Seed viability is limited (around 12 months) so the seed should be planted soon after it matures.

Weed control will be necessary until the developing canopy is dense enough to provide shade. However, there will always be a potential for birds and wind to carry new weed species to the site and early control of infestations will save a lot of work later on. Severe infestations of Climbing Asparagus and other vines in retained Brigalow patches are very labour intensive to control. A systematic approach may be the most effective in these situations, gradually working away from the starting point in small stages. A suitable starting point could be an area where risk or rate of re-infestation is judged to be relatively low, for example the edge of the infestation.

Fire and grazing are not recommended in Brigalow Scrub restoration projects apart from initial phases where they may be useful in reducing grass cover. Consequently, fencing and fire breaks are recommended where there is a risk of damage. Browsing from macropods and possums may also be an issue and tree guards may be required around palatable plants.

Restoration tips

- Plan the project thoroughly as ecological restoration of Brigalow Scrub is likely to require intensive effort. There is not a lot of expertise to draw on in SEQ and the project is likely to throw up some interesting challenges along the way.
- Become familiar with the local Brigalow Scrub flora by observing the species surviving in nearby patches and learn to differentiate the native flora from the weeds. Bear in mind that some of those prickly or insignificant-looking plants are likely to be native species.
- Observe and record progress and share your findings with others.
- If your project is going to need lots of planting, try growing your own from locally collected seed and cuttings.
- Control or limit use of fire and grazing to avoid damage to the regeneration.



Climbing Asparagus (*Asparagus africanus*) can form severe infestations in Brigalow, eventually smothering the canopy, and killing the host trees (right). It is important to remain vigilant even post initial treatment of this weed, as the small red seeds (above) are favoured by birds and can quickly re-infest a regenerating patch without regular inspections.

Some native plants of RE 12.8.23

Trees and shrubs

Belah	<i>Casuarina cristata</i>
Bellfruit Tree	<i>Codonocarpus attenuatus</i>
Bitter Bark	<i>Alstonia constricta</i>
Black-fruited Thornbush	<i>Pittosporum viscidum</i>
Brigalow	<i>Acacia harpophylla</i>
Leopard Ash	<i>Flindersia collina</i>
Currant Bush	<i>Carissa ovata</i>
Lolly Bush	<i>Clerodendrum floribundum</i>
Narrow-leaved Croton	<i>Croton phebalioides</i>
Native Olive	<i>Notelaea microcarpa</i>
Peach Bush	<i>Ehretia membranifolia</i>
Plumwood or Sandalwood	<i>Santalum lanceolatum</i>
Red Ash	<i>Alphitonia excelsa</i>
Scrub Boonaree	<i>Alectryon diversifolius</i>
Scrub Ironbark	<i>Bridelea exaltata</i>
Shiny-leaved Canthium	<i>Psydrax odorata form buxifolia</i>
Small-leaved Abutilon	<i>Abutilon oxycarpum</i>
Wilga	<i>Geijera parviflora</i>



Scrub Ironbark (*Bridelea exaltata*)



Lolly Bush (*Clerodendrum floribundum*)



Leopard Ash (*Flindersia collina*)

Grasses, forbs, ferns and epiphytes

Australian Millet	<i>Panicum decompositum</i>
Berry Saltbushes	<i>Einadia hastata</i> and <i>Rhagodia spinescens</i>
Blue Burr Daisy	<i>Calotis cuneata</i>
Blue Trumpet	<i>Brunoniella australis</i>
Brigalow Grass	<i>Paspalidium caespitosum</i>
Bristle Cloak Fern	<i>Cheilanthes distans</i>
Chaff Flower	<i>Nyssanthes diffusa</i>
Dwarf Plectranthus	<i>Plectranthus parviflorus</i>
Eastern Cottonbush	<i>Maireana microphylla</i>
Mulga Fern	<i>Cheilanthes sieberi</i>
New Zealand Spinach	<i>Tetragonia tetragoniodes</i>
Sedge	<i>Cyperus</i> spp. (e.g. <i>Cyperus bifax</i> , <i>C. fulvus</i> , <i>C. gracilis</i>)
Slender Chloris	<i>Chloris divaricata</i>
Slender Rat's Tail Grass	<i>Sporobolus creber</i>
Solanum spp.	<i>Solanum</i> spp.
Stout Bamboo Grass	<i>Austrostipa ramosissima</i>
Square-stemmed	<i>Spartothamnella juncea</i>
Tropical Speedwell	<i>Evolvulus alsinoides</i>



Scrub Boonaree (*Alectryon diversifolius*)

Vines and scramblers

Forest Grape	<i>Clematicissus opaca</i>
Native Jasmine	<i>Jasminum didymum</i> subsp. <i>racemosum</i>
Wonga Vine	<i>Pandorea pandorana</i>

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Information provided in the Regional Ecosystems of South East Queensland series provide a general guide and should not be taken to replace professional advice or a formal recommendation of land management.

Further Reading

SEQ Healthy Land & Water Ecological Restoration Framework - www.hlw.org.au

SEQ Land for Wildlife Notes - www.lfwseq.org.au

Queensland Government - www.qld.gov.au (search Regional Ecosystems and Planned Burn Guidelines)



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