Healthy land & water

REGIONAL ECOSYSTEMS OF SOUTH EAST QUEENSLAND

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RE 12.11.8

Silver-leaved Ironbark and Narrow-leaved Ironbark woodland on metamorphic rocks

Grassy woodlands containing Narrow-leaved Ironbark (*Eucalyptus crebra*) and Silver-leaved Ironbark (*Eucalyptus melanophloia*) grow on the hills and ranges throughout much of South East Queensland (SEQ). The ironbark woodlands have a relatively open canopy of trees, a sparse cover of shrubs and a dense sward of grasses.

Ironbark woodlands, such as Regional Ecosystem (RE) 12.11.8, provide a range of important services for people, including native pasture for cattle grazing and plentiful pollen for honey production. Ironbark trees provide durable structural timbers and the timbered hills provide a scenic backdrop.

These grassy woodlands, when intact, protect the slopes from soil erosion enabling rainfall to infiltrate soil and recharge aquifers. Despite these economically and socially important qualities, it is easy to take ironbark woodlands for granted. For example, only very small areas have been set aside for conservation. In addition, five of the eight Regional Ecosystems in which Narrow-leaved Ironbark and/or Silver-leaved Ironbark are the predominant species have an 'of concern' status under Queensland legislation meaning that less than 30% of the original pre-clearing extent remains.

Although the bark and trunks of the two ironbark trees that define RE 12.11.8 are very similar, the leaves of each make them easily distinguishable, with Silver-leaved Ironbark (*Eucalyptus melanophloia*) having broad, silvery blue leaves (top left) and Narrow-leaved Ironbark (*Eucalyptus crebra*) having thin, pendulous, grey-green leaves (lower left).

Regional Ecosystems, or REs for short, 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 12.11.8 grows on steep hills in near inland parts of SEQ. Average rainfall is 800-1100 mm per year. RE 12.11.8 grows on shallow 'texture contrast soils', meaning that the soils have a sharp boundary between the loamy topsoil and clayey subsoil. These soils are derived from metamorphic rocks.

Variations and Similarities

Within SEQ, ironbark woodlands grow on a range of geologies. Consequently different REs are recognised based upon the type of country where they grow. The identification of REs also recognises that while Narrow-leaved Ironbark and Silver-leaved Ironbark frequently co-occur, one of the two species is often predominant.

The colours of the crowns of Narrow-leaved and Silver-leaved Ironbark can be used to distinguish them on hillsides in the distance. Narrow-leaved Ironbark has a dull grey-green appearance and Silver-leaved Ironbark, as the name suggests, a blueish-silvery hue.

The ironbark woodlands similar to RE 12.11.8 are:

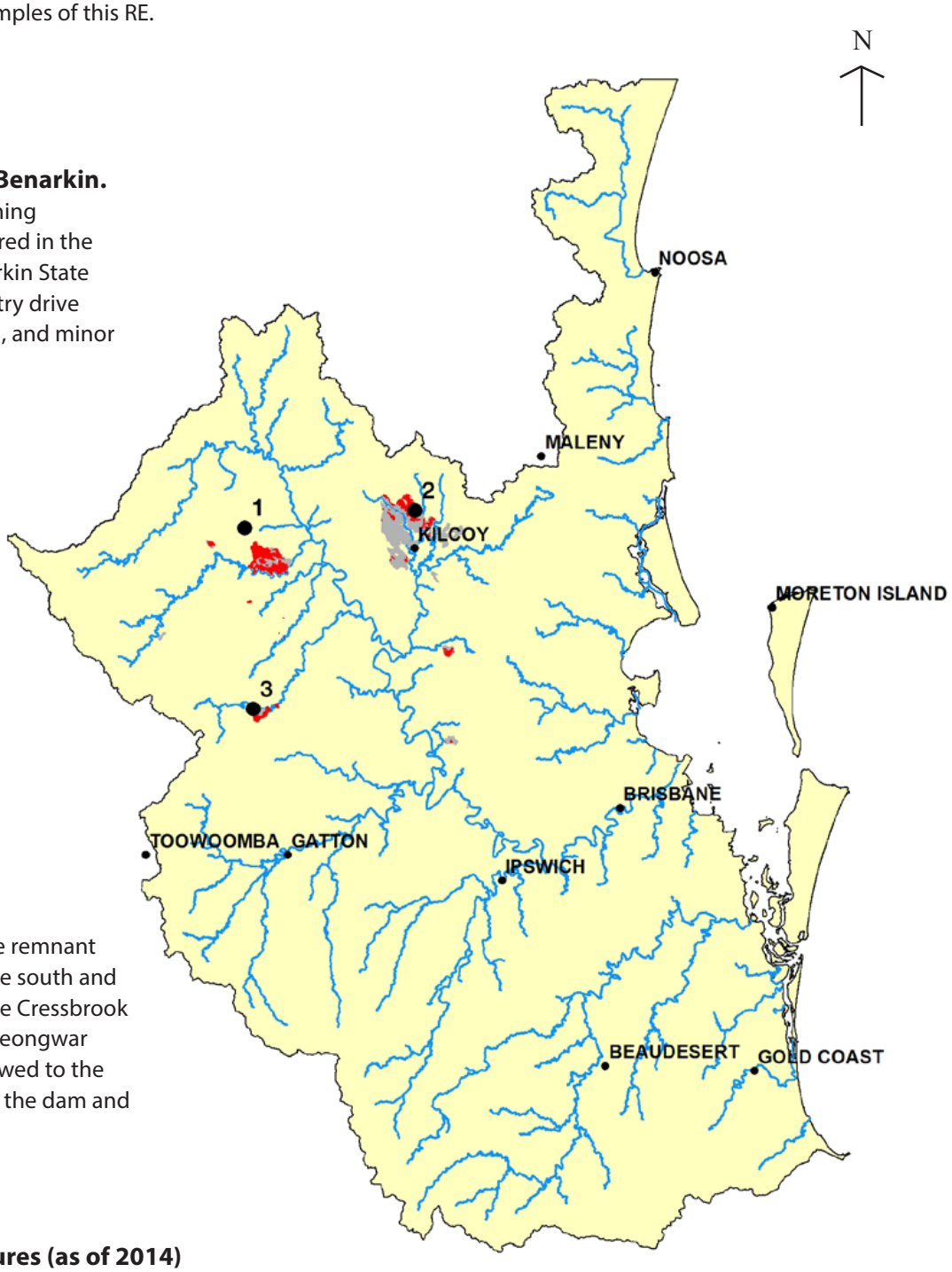
- RE 12.8.16 and RE 12.8.17 – Silver-leaved Ironbark, Narrow-leaved Ironbark, Moreton Bay Ash and Queensland Blue Gum on Cainozoic igneous (young basalt) rocks.
- RE 12.9-10.7 and RE 12.9-10.8 – Narrow-leaved Ironbark, Queensland Blue Gum, Moreton Bay Ash and Silver-leaved Ironbark woodland on sedimentary rocks.
- RE 12.11.7 – Narrow-leaved Ironbark woodlands on metamorphic rocks.
- RE 12.12.7 and RE 12.12.8 – Narrow-leaved Ironbark woodlands on Proterozoic igneous (old basalt) rocks.

RE 12.11.8 can often be seen from a distance on hillsides and ridges, showing up as a mosaic of silvery blue and/or grey green (depending on the relative abundance of Silver-leaved Ironbark and Narrow-leaved Ironbark).

The geology of RE 12.11.8 is typically a thin layer of topsoil with a rocky substrate, comprised of metamorphic rock (volcanic or sedimentary rocks that have been changed through heat and/or pressure). The rocks in RE 12.11.8 are generally quite old and are often degraded and decomposed closer to the soil surface as a result of weathering. This is particularly evident on the hillslopes where RE 12.11.8 often grows, with portions of the underlying rock often weathering to the surface.

Distribution Map - Past and Present

RE 12.11.8 is restricted to localised patches, sometimes small, on the western slopes and foothills of the D'Aguilar and Conondale Ranges and Emu Creek valley north-west of Toogoolawah. As a result of the limited distribution of RE 12.11.8, it is listed as 'of concern' under Queensland legislation. The limited distribution also means that there are not many representative, accessible examples of this RE.



1. Benarkin State Forest, Benarkin. A portion of the largest remaining remnant of RE 12.11.8 is captured in the south eastern portion of Benarkin State Forest, accessible via the forestry drive from the township of Benarkin, and minor forestry roads.

2. Northern Ranges, Kilcoy. The hills and ranges just north of the township of Kilcoy are capped with examples of RE 12.11.8. These can be viewed along the Kilcoy -Murgon Road, and the Mount Kilcoy Road, for a distance of approximately 10 km north of Kilcoy.

3. Lake Cressbrook. A large remnant patch of RE 12.11.8 exists to the south and east of the dam wall in the Lake Cressbrook catchment and the adjacent Deongwar State Forest. This RE is best viewed to the east of the day use area across the dam and is accessible by walking trails.

RE 12.11.8 - Facts and Figures (as of 2014)

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

	Pre-clearing Extent, or estimated amount ~180 years ago (hectares)	Current Extent (hectares)	Percent of Pre-clearing Extent Remaining	Amount Protected in Reserves (hectares)
12.11.8	**38,507**	**11,984**	**31%**	**1,765**

Ironbark trees were used as blaze and survey markers because of their resilient timber and the ability to hold a mark over a long period.

Past to Present

Ironbark woodlands are highlighted in the diaries of the early European explorers of southern Queensland. The open vegetation provided respite from traversing dense rainforest, vine thickets and Brigalow scrubs on foot or horseback. More sparsely vegetated hilltops were popular places to climb to gain a vantage point to appraise the country ahead and to set a compass bearing of distant known landmarks.

The woodlands are also well documented in the early land survey records that make frequent reference to ironbark country and describe locally occurring features they contained, for example patches of dense grass trees.

The open nature of ironbark country meant that it was often left uncleared after settlement, although selective removal of trees occurred to provide fence posts, poles and beams for buildings, sheds, bridges and telephone lines. The country was initially grazed by sheep. Changes in the composition of the native pasture and disease and illness caused by wet summers resulted in the replacement of sheep with cattle.

Through time areas of ironbark woodland were ring-barked or poisoned to increase pasture growth. While the long history of cattle grazing appears to have altered the species composition of the ironbark woodland ground layer, it is still predominantly made up of native species at many sites.

Natural Values and Functions

Ironbark woodlands are adapted to growing on hillslopes with aspects receiving high levels of sunlight. Consequently they are subject to high temperatures and periodic moisture stress. The woodlands play a significant role in intercepting, storing and recycling energy, carbon and nutrients in environments that are relatively hostile for plant growth. The vegetation also plays an important role in intercepting rainfall and recharging aquifers during heavy rainfall.

Remnant patches of ironbark woodland are often large or semi-continuous and provide significant habitat for birds, bats, macropods, invertebrates and small mammals such as the Common Planigale, Common Dunnart and Echidna. Ironbark woodlands are rich in birds and reptiles and provide habitat for several threatened or declining species including Collared Delma (*Delma torquata)*, Black-chinned Honeyeater, Glossy Black Cockatoo and Square-tailed Kite.

High altitude woodlands on basalt along the Great Dividing Range may contain isolated patches of the rare grass *Bothriochloa bunyensis,* and the threatened Baileys Cypress (*Callitris baileyi*) .

A distinctive feature of ironbark woodlands is the presence of lichens growing on trees, especially on the more shaded southerly side of trunks and branches. Lichens are able to establish as the bark is not shed regularly, unlike many other eucalypts. Different life forms of lichen can be present including flat crustose lichens (usually greyish coloured but sometimes orange) and three-dimensional foliose and fruticose lichens which are usually a dull green colour. The density of lichens seems to vary with altitude, with greater density on trees in higher altitude woodlands.

Channelled Boat-lip Orchid (*Cymbidium canaliculatum*) has a strong association with ironbark trees and can often be found perched in older ironbarks in RE 12.11.8. These orchids are often an indicator that the trunk is hollow, and that the orchid roots may extend inside the trunk down to the ground.

Remnant patches of RE 12.11.8 should have a high proportion of older trees, some younger canopy species regenerating, and a diverse understorey of grasses, twiners and forbs. The example (left) is typical of an area recovering from timber extraction, with an absence of large trees and lots of young trees of a similar age.

Management

Remnant patches of ironbark woodland in good condition usually have a high proportion of large, older trees and a low rate of small, regenerating trees. The gumtrees that make up the canopy have lignotubers (woody swellings on the roots that act as a food reserve enabling regrowth after fire or other disturbance), which enables individual trees to 'sit and wait' for many years until there is a space for them to grow. Often they need to wait until another tree has died of old age, pathogens, lightning or wind-throw.

The occassional small trees that are present are often kept in check by periodic fire and stay alive by re-shooting. The shrub layer in ironbark woodland is variable, but is usually sparse or absent from patches that are burnt regularly. However, it can become denser if unburnt for long intervals. The main shrubs present are wattles.

The ground layer is made up of a dense sward of perennial, clumping and tussock-forming grasses interspersed with leguminous twiners and forbs many of which are seasonal. The perennial grass cover and litter ensure that a minimal area of bare soil is exposed to rainwash.

The species growing in ironbark woodlands are adapted to periodic fire. The gumtrees store seed in small capsules held in the tree canopy. The fine seed is released when the capsules dry. Fire will also trigger release of seed. The seedlings establish on a bare mineral soil after fire. Most seedlings do not survive for long. Dense seedling regeneration can often be seen around isolated paddock trees after removal of grazing.

The fire guidelines for ironbark woodlands recommend low intensity fire in summer to late autumn at intervals of 3-6 years. Ironbark woodlands have traditionally been burnt in spring to promote pasture growth. There is a risk of intense fire in spring when conditions are dry. Burning in steep country needs to take into account the risk of exposing bare ground to heavy storm rain – in these situations, soil loss due to rainwash can exceed the rate at which soil is formed. Burning when soil moisture is high will assist with controlling fire intensity and in ensuring that habitat provided by ground litter and fallen timber remains unconsumed.

Burning based upon spot ignition should aim to produce fine-scale mosaics of unburnt areas which assist fauna to survive by providing ongoing food and shelter. Ironbarks are susceptible to catching alight near their base and this can result in attrition of older hollow trees which fall as a consequence of the fire damage. Where feasible, raking litter, woody debris and dried vegetation (especially Lantana) away from the base of large habitat trees will help to prevent bark and exposed dead wood from catching alight.

Weeds can invade and become established in ironbark woodland. The most serious environmental weeds are species that can potentially modify the ecological community over time by out-competing and suppressing regeneration of native species and altering fire behaviour. Examples include Lantana (*Lantana camara*), Creeping Lantana (*Lantana montevidensis*) and grasses such as Giant Rat's Tail Grass (*Sporobolus natalensis*) and Green Panic (*Megathyrsus maximus*). Woody weed species include Leucaena (*Leucaena leucocephala*), Chinese Elm (*Ulmus parvifolia*) and *Albizia lebbeck* can establish in semi-disturbed woodland sites such as roadsides and potentially move into adjacent woodlands.

Some herbaceous weeds become established with grazing but their density tends to remain relatively low provided dense ground cover is retained. Examples of herbaceous weeds include Balloon Cotton (*Gomphocarpus physocarpus*), Narrow-leaved Cottonbush (*Gomphocarpus fruticosus*), *Sida* spp. and Red Natal Grass (*Melinus repens*).

Another group of weeds will colonise areas that have been severely disturbed or extremely grazed exposing bare, mineral soil. Examples of weeds that colonise these sites include Fireweed (*Senecio madagascariensis*), Stinking Roger (*Tagetes minuta*), Blue Billgoat Weed (*Ageratum houstonianum*) and Blue Heliotrope (*Heliotropium amplexicaule*).

Restoration & Regeneration

The key objective of restoring or regenerating ironbark woodland is to establish a tree canopy with appropriate gumtrees, a ground layer diverse in native plants and life forms, and a site with few weeds.

Encouraging natural regeneration is preferable to replanting, as less effort will be required and plants are adapted to local conditions. The capacity of an area to regenerate will be influenced by a number of factors including presence of natural regeneration, extent of weeds, proximity to similar vegetation and habitat that can allow plants and animals to move into the regenerating patch, and the potential to manage fire and other agents of disturbance.

Ironbarks and co-occurring tree species will regenerate readily from seed, while suppressed plants often survive in paddocks and will shoot from lignotubers. Seedlings and suckers are damaged or killed by fire and grazing so regeneration requires exclusion of cattle and fire until young trees are sufficiently robust to withstand their impacts.

Where some large seed trees remain present but there are no young trees, fire or mechanical disturbance to provide a bare, mineral soil can be trialled to germinate seedlings. Ploughing or ripping may be beneficial at sites where soils have become compacted. Tree planting will be required where there are no longer any surviving seed trees. In these situations plants should be sourced from local populations and species chosen to reflect the local variation in soils and drainage.

Retention of dead trees, fallen timber and woody debris will provide homes and shelter for wildlife as well as protecting the soil. A healthy ground layer of native grasses, herbs, leaf litter and fallen timber will also help the soil retain moisture.

Woody weeds are not generally a major issue in the management of ironbark woodlands that are grazed or burnt periodically. However some land types are susceptible to invasion by Lantana and Creeping Lantana and both species require intensive management to control or eliminate. Lantana can be removed and killed using mechanical methods and herbicides. Follow-up treatment is required to treat suckers and seedlings.

It is important to remember the value of standing and fallen dead timber in an ecosystem, as these features support a diversity of native animals for shelter and roosts. Fallen timber also provides habitat for many invertebrates and fungi that help decomposition, and are also food for other wildlife. Selective logging takes away this timber and reduces the functions and usefulness of the ecosystem for wildlife.

Fire may also play a role in reducing the density of Lantana although it carries a risk of damaging or killing regrowth. Lantana is dispersed by birds and monitoring is required at sites prone to invasion to detect re-infestation. A number of different techniques can assist with control of Creeping Lantana, which is a hard-to-control weed where it has become established.

Soils that have been grazed for long periods may be compacted or hard setting which can limit or slow restoration and ecosystem recovery. Grazed hillsides sometimes develop terracettes, a step-like pattern formed by soil creep or erosion of surface soils exacerbated by the trampling by cattle. While the ground layer species composition has been altered by grazing, native species generally remain predominant.

Spelling pasture during flowering and seeding (generally late summer – early autumn) has been demonstrated to increase the abundance of grazing sensitive native grass and herb species within relatively short periods of time.

Restoration Tips

- Plan the project thoroughly as ecological restoration of ironbark woodland may require intensive effort over a period of time.
- Check out the ground layer species when growing conditions are good, There are often more species present than you think.
- Look at trialling a late summer – autumn burn rather than traditional spring fire.
- Restrict use of grazing and fire while the woody regeneration is young as it will be prone to damage.
- 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.

Spotted Gum (*Corymbia citriodora*).

Hopbush (*Dodonaea viscosa*).

Silver-leaved Ironbarks.

Some Native Plants of RE 12.11.8

Trees and Shrubs

Batswing Coral Tree	*Erythrina vespertilio* subsp. *vespertilio*
Black Wattle	*Acacia leiocalyx* subsp. *leiocalyx*
Boobialla	*Myoporum montanum*
Broad-leaved Apple	*Angophora subvelutina*
Dogwood	*Jacksonia scoparia*
Dysentery Plant	*Grewia latifolia*
Early-flowering Black Wattle	*Acacia concurrens*
Forest Oak	*Allocasuarina torulosa*
Hickory Wattle	*Acacia disparrima* subsp. *disparrima*
Hopbush	*Dodonaea viscosa*
Kurrajong	*Brachychiton populneus*
Lightwood	*Acacia implexa*
Long-fruited Bloodwood	*Corymbia clarksoniana*

Maiden's Wattle	*Acacia maidenii*
Moreton Bay Ash	*Corymbia tessellaris*
Narrow-leaved Ironbark	*Eucalyptus crebra*
Native Cherry	*Exocarpos cupressiformis*
Native Indigo	*Indigofera spp.*
Pink Bloodwood	*Corymbia intermedia*
Pretty Wattle	*Acacia decora*
Red Ash	*Alphitonia excelsa*
Rough-barked Apple	*Angophora floribunda*
Sally Wattle	*Acacia salicina*
Silver-leaved Ironbark	*Eucalyptus melanophloia*
Small-leaved Abutilon	*Abutilon oxycarpum*
Spotted Gum	*Corymbia citriodora*
Tephrosia	*Tephrosia* spp.

Queensland Blue Grass (*Dicanthium sericeum*).

Tussock Grass (*Poa labillardieri*).

Kangaroo Grass (*Themeda triandra*).

Scented Top (*Capillipedium spicigerum*).

Vines and Scramblers

Darling Pea	*Swainsona galegifolia*
Forest Grape	*Clematicissus opaca*
Native Desmodium	*Desmodium spp.*
Native Glycine	*Glycine spp.*
Native Sarsaparilla	*Hardenbergia violacea*
Rhynco	*Rhynchosia minima*

Grasses, Forbs, Ferns and Epiphytes

Australian Bugle	*Ajuga australis*
Barbed-wire Grass	*Cymbopogon refractus*
Berry Saltbushes	*Einadia spp.*
Black Spear Grass	*Heteropogon contortus*
Blue Trumpet	*Brunoniella australis*
Blady Grass	*Imperata cylindrica*
Digitaria	*Digitaria spp.*
Flax Lily	*Dianella caerulea*
Kangaroo Grass	*Themeda triandra*
Lespedeza juncea	*Lespedeza juncea*
Love Grass	*Eragrostis spp.*
Matrush	*Lomandra spp.*
Mulga Fern	*Cheilanthes sieberi*
Native Panic	*Panicum spp.*
Native Rat's Tail Grass	*Sporobolus spp.*
Native Sorghum	*Sarga leiocladum*
Pitted Blue Grass	*Bothriochloa decipiens*
Queensland Blue Grass	*Dichanthium sericeum*
Rostellularia	*Rostellularia spp.*
Scented Top	*Capillipedium spicigerum*
Slender Chloris	*Chloris divaricata*
Slug Herb	*Murdannia graminea*
Tambookie Grass	*Hyparrhenia filipendula*
Tropical Speedwell	*Evolvulus alsinoides*
Veronia	*Cyanthillium cinereum*
Winter Apple	*Eremophila debilis*
Wire Grass	*Aristida spp.*

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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 Ecological Restoration Framework - www.seqcatchments.com.au/seq-ecological-restoration-framework
SEQ Land for Wildlife Notes - www.lfwseq.org.au
Queensland Government - Regional Ecosystems - www.ehp.qld.gov.au/ecosystems/biodiversity/re_introduction.html
Queensland Government - Planned Burn Guidelines - www.nprsr.qld.gov.au/managing/pdf/pbg-seq.pdf

Australian Government

National Landcare Programme

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