Healthy land & water

REGIONAL ECOSYSTEMS OF SOUTH EAST QUEENSLAND

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RE 12.9-10.7

Narrow-leaved Ironbark woodland on sedimentary 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) 12.9-10.7, 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.

The trees described as growing in RE 12.9-10.7 include Narrow-leaved Ironbark (*Eucalyptus crebra*) along with Queensland Blue Gum (*E. tereticornis*), Moreton Bay Ash (*Corymbia tessellaris*), Rusty Gum (*Angophora leiocarpa*) and Silver-leaved Ironbark (*Eucalyptus melanophloia*).

The distinctive dark, rough trunks of Narrow-leaved Ironbark (*Eucalyptus crebra*) stand out in the open grassy understorey of RE 12.9-10.7.

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 12.9-10.7 grows on undulating hills in near inland and western parts of SEQ. Average rainfall is 700-1100 mm per year. RE 12.9-10.7 grows on 'texture contrast soils', meaning that the soils have a sharp boundary between the loamy topsoil and clayey subsoil. These soils are derived from sedimentary rocks.

The open canopy of RE 12.9-10.7 promotes the growth of a diverse, grassy understorey, including twiners and forbs. Shrubs are usually sparse and infrequent.

Variations and Similarities

Within SEQ, different ironbark woodlands are recognised and mapped based upon the predominant ironbark species present, and the type of geology. RE 12.9-10.7 occurs on sedimentary rocks and Narrow-leaved Ironbark (*Eucalyptus crebra*) is the main species. Where Silver-leaved Ironbark is the major species the ecosystem would be classified as RE 12.9-10.8.

The Regional Ecosystems dominated by Narrow-leaved Ironbark that are similar to RE 12.9-10.7, but occur on different geologies include:

- RE 12.8.16 - Narrow-leaved Ironbark on Cainozoic igneous (young basalt) rocks.
- RE 12.11.7 – Narrow-leaved Ironbark on metamorphic rocks.
- RE 12.12.7 – Narrow-leaved Ironbark on Proterozoic igneous rocks.

The one subtype of RE 12.9-10.7 is:

- RE 12.9-10.7a, defined as Queensland Grey Ironbark (*Eucalyptus siderophloia*), Pink Bloodwood (*Corymbia intermedia*), Queensland Blue Gum (*E. tereticornis*) and Brush Box (*Lophostemon confertus*) open forest. RE 12.9-10.7a grows on sedimentary rocks in the eastern parts of SEQ.

Narrow-leaved and Silver-leaved Ironbark often grow together. The colours of the crowns can be used to distinguish them viewed from a distance. Narrow-leaved Ironbark has a dull grey-green appearance (ridge in the background) and Silver-leaved Ironbark, as the name suggests, a blueish-silvery hue (ridge in the foreground).

Distribution Map - Past and Present

RE 12.9-10.7 grows throughout near-inland parts of SEQ from the Beaudesert - Boonah districts in the south to the mid-Brisbane Valley and around Cooyar. This RE once covered many of the hillsides throughout the western half of the SEQ region, however it has been heavily impacted by clearing activities over time, with approximately 17% remaining. For this reason, RE 12.9-10.7 is considered to be 'of concern' under Queensland legislation.

1. Linville Township. A patch of RE 12.9-10.7 is visible on the roadsides as you enter the town from the south. Many of the hillsides in this area also have remnant patches of RE 12.9-10.7 remaining, and can be viewed from the road between the townships of Moore and Linville, and at the base of the Blackbutt range, just to the west of Moore.

2. Redwood Park, Toowoomba. This conservation park located on the Toowoomba range, has a large intact and accessible remnant of RE 12.9-10.7 just at the entrance to the Warrego Highway and around the car parking area.

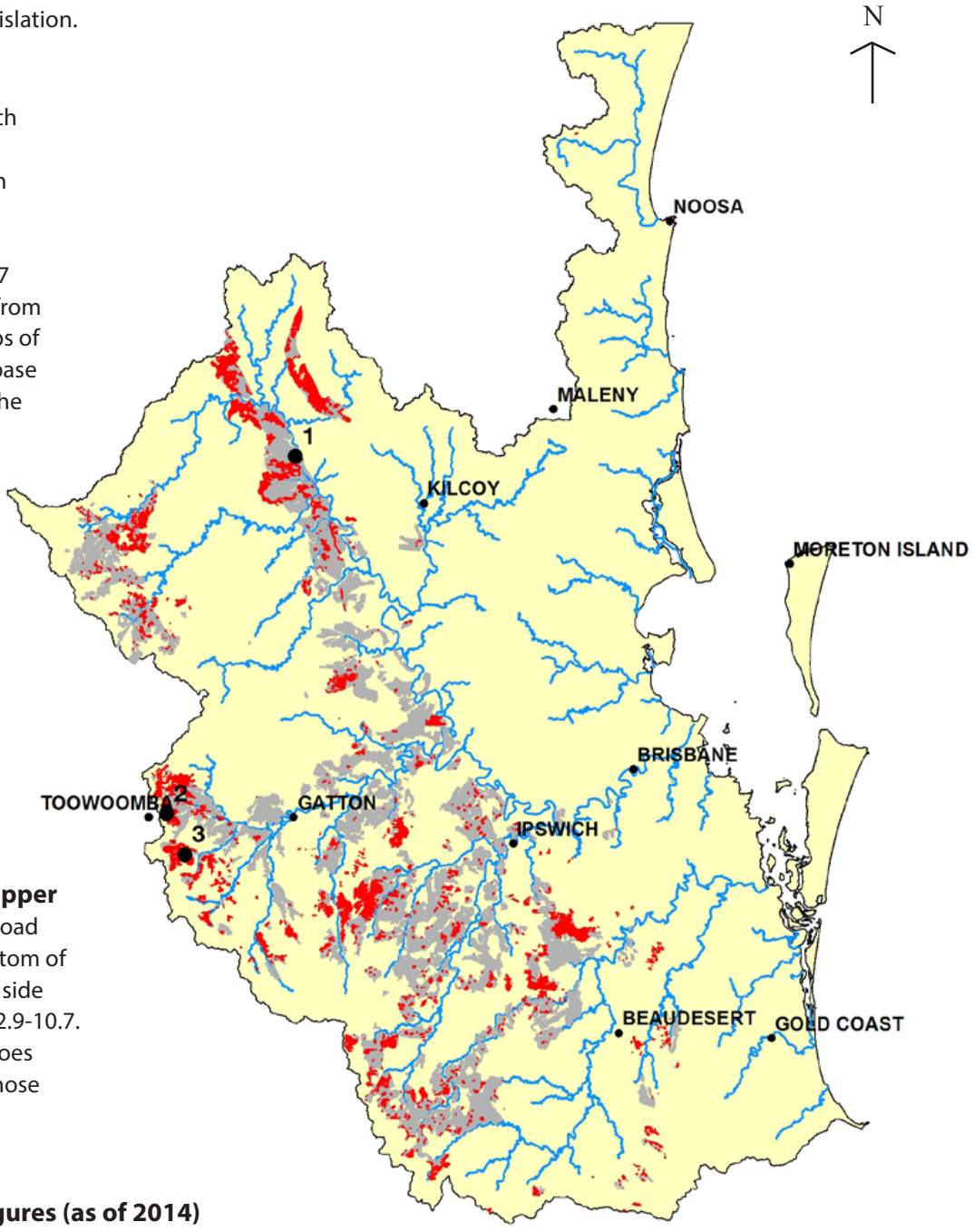
3. Flagstone Creek Road, Upper Flagstone. Flagstone Creek Road follows the creek along the bottom of a valley, with the hills on either side predominantly covered in RE 12.9-10.7. Sutcliffes Road in this vicinity does traverse a larger remnant, for those wanting a closer inspection.

RE 12.9-10.7*

Pre-clearing (~180 years ago)

Today's distribution

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



RE 12.9-10.7 - 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)
12.9-10.7	**224,075**	**37,663**	**17%**	**6,786**
12.9-10.7a	**14,031**	**2,751**	**19%**	**147**

This photo highlights the distinct boundary that often exists between ironbark woodlands (left) and denser vegetation types such as rainforest, vine thicket and Brigalow Scrub (right). These fire sensitive vegetation communities need to be considered when planning or implementing periodic burns of RE 12.9-10.7.

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.

Ironbark Eucalypts do not shed their bark regularly like many other Eucalypts, allowing crustose lichens to adorn the trunks, usually on the southern aspect.

Management

Remnant patches of ironbark woodland in good condition usually have a high proportion of large, older trees and a correspondingly low rate of small, regenerating trees. The Eucalyptus and Corymbia that make up the canopy are lignotuberous species which enables individuals 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 Eucalyptus and Corymbia 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*).

A healthy RE 12.9-10.7 understorey will consist of a diverse range of grasses, and other twiners and forbs, such as Yellow Buttons (*Chrysocephalum apiculatum*).

Prickly Pear (*Opuntia stricta*) is a succulent weed adapted to drier landscapes, and will persist in RE 12.9-10.7 if not treated or removed (above).

Established Narrow-leaved Ironbark (*Eucalyptus crebra*) have a strong capacity to re-shoot from lignotubers if the plant is damaged after fire or clearing (left).

Restoration & Regeneration

The key objective of restoring or regenerating ironbark woodland is to establish a tree overstorey and a ground layer in which a range of native species and life forms is present and where there is a low abundance of 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 and woody debris at the site will provide homes and shelter for fauna.

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.

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. The species has characteristics which may require a departure from conventional regeneration approaches, for example, as an initial step, a period under cultivation (slope permitting) with a cover crop (or seeding with native grasses) may be effective in removing the species from the restoration site.

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 trampling by cattle. Despite being altered by cattle grazing, native species generally remain as the predominant plants in the ground layer.

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!

Some Native Plants of RE 12.9-10.7

Trees and Shrubs

Batswing Coral Tree	*Erythrina vespertilio*
Black Wattle	*Acacia leiocalyx* subsp. *leiocalyx*
Broad-leaved Apple	*Angophora subvelutina*
Bull Oak	*Allocasuarina luehmannii*
Cough Bush	*Cassinia laevis*
Dogwood	*Jacksonia scoparia*
Dysentery Plant	*Grewia latifolia*
Early-flowering Black Wattle	*Acacia concurrens*
Hickory Wattle	*Acacia disparrima* subsp. *disparrima*
Hopbush	*Dodonaea viscosa*
Kurrajong	*Brachychiton populneus*
Lightwood	*Acacia implexa*
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*
Queensland Grey Ironbark	*Eucalyptus siderophloia*
Quinine Berry	*Petalostigma pubescens*
Red Ash	*Alphitonia excelsa*
Rough-barked Apple	*Angophora floribunda*
Rusty Gum	*Angophora leiocarpa*
Sally Wattle	*Acacia salicina*
Silver-leaved Ironbark	*Eucalyptus melanophloia*
Small-leaved Abutilon	*Abutilon oxycarpon*
Spotted Gum	*Corymbia citriodora*
Tephrosia	*Tephrosia spp.*
Weeping Pittosporum	*Pittosporum angustifolium*

Kurrajong *(Brachychiton populneus).*

Hickory Wattle (*Acacia disparrima* subsp. *disparrima*).

Narrow-leaved Ironbark leaves.

Native Sarsparillla (*Hardenbergia violacea*).

Foliose lichen in an ironbark woodland.

Black Spear Grass (*Heteropogon contortus*).

Vines and Scramblers

Darling Pea	*Swainsona galegifolia*
Desmodium	*Desmodium spp.*
Glycine	*Glycine spp.*
Forest Grape	*Clematicissus opaca*
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*
Finger Grass	*Digitaria spp.*
Flax Lily	*Dianella caerulea*
Grass Lily	*Murdannia graminea*
Kangaroo Grass	*Themeda triandra*
Lespedeza	*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*
Scented top	*Capilllipedium spicigerum*
Slender Chloris	*Chloris divaricata*
Tambookie Grass	*Hyparrhenia filipendula*
Tropical Speedwell	*Evolvulus alsinoides*
Vernonia	*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

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