

Regional ecosystems: Open forest & woodland



RE 12.5.3

Scribbly Gum open forest/woodland on low, flat-topped crests with red on brown loamy soils

The coastal lowlands of South East Queensland (SEQ) support many different types of vegetation, much of which is dense or swampy due to the high rainfall, terrain and soils.

Regional Ecosystem (RE) 12.5.3 is scattered among Coastal Paperbark (*Melaleuca quinquenervia*) forests, gallery rainforests, wet sclerophyll forests, shrubby open forests, heathlands and swamps where it forms on slightly elevated crests and slopes.

RE 12.5.3 contains a mix of tall and medium-sized trees with Scribbly Gum (*Eucalyptus racemosa* subsp. *racemosa*) being the most prominent. Other tree species that characteristically form part of this ecosystem include Pink Bloodwood (*Corymbia intermedia*), Brown Bloodwood (*C. trachyphloia*), Queensland Grey Ironbark (*Eucalyptus siderophloia*), Queensland White Mahogany (*E. tindaliae*), Red Stringybark (*E. resinifera*), Blackbutt (*E. pilularis*), Tallowwood (*E. microcorys*), Rusty Gum (*Angophora leiocarpa*) and Smudgee (*A. woodsiana*).

Coastal Paperbark is prominent on lower slopes. The mix of trees in RE includes several important Koala food species and the ecosystem provides high quality habitat for this iconic species.

Old Scribbly Gums are important habitat trees for wildlife offering many hollows in which native animals such as gliders, birds and possums shelter and breed.



Scribbly Gum is a dominant and characteristic species of RE 12.5.3. The scribbles in the bark (far left) are formed by the larvae of a moth as it feeds on the inner bark of the tree. Old Scribbly Gums (left) are important habitat trees for wildlife.

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 12.5.3 has a scattered distribution in SEQ, being found between the North Pine River and Glasshouse Mountains, Redlands-Logan-southern suburbs of Brisbane, and also near Noosaville. It is associated with a series of small flat-topped crests resembling miniature plateau with gently sloping scarps. These areas are slightly elevated above the surrounding landscape and are the remains of a once continuous and relatively level land surface that formed millions of years ago.

RE 12.5.3 will often have small ironstone nodules present that have worked to the surface as the sandy loams have eroded.

Lateritic (iron rich) soils help to distinguish this Regional Ecosystem. They comprise relatively deep red or yellow-brown coloured loamy to sandy soils that often have a layer of ironstone nodules. The deeper soils on crests and ridges generally overlie pale clays with reddish-purple mottling. The soils are shallower on mid and lower slopes due to the effects of erosion. The laterite soil profiles overlie sedimentary rocks which can be close to the surface where soils have been eroded away.

Variations and similarities

RE 12.5.3a is a sub-type of RE 12.5.3 that mainly grows on the southern outskirts of Brisbane and Logan. Differences in tree species distinguish the subtype:

- The major species in **RE 12.5.3a** include Pink Bloodwood and Narrow-leaved Grey Gum (*Eucalyptus seeana*) with associated species comprising Scribbly Gum, Rusty Gum, Queensland Grey Ironbark, Spotted Gum (*Corymbia citriodora* subsp. *variegata*) and Swamp Mahogany (*Lophostemon suaveolens*).
- The understorey of **12.5.3** is quite variable. It is frequently open and grassy but can be shrubby in places particularly on lower slopes subject to waterlogging. In these situations, the understorey shrubs include species that grow in heathlands.
- **RE 12.5.3** has a similar species composition to RE 12.9-10.4, which occurs on sedimentary rocks that do not have any cover of lateritic material. Consequently, the soils on RE 12.9-10.4 are different from 12.5.3.



RE 12.5.3 is a variable ecosystem across its range, dependent on waterlogging and the depth of the lateritic soil cap. The top right photo shows RE 12.5.3 with Queensland White Mahogany (*Eucalyptus tindaliae*) dominating. The bottom right photo shows RE 12.5.3 with a Scribbly Gum (*Eucalyptus racemosa* subsp. *racemosa*) dominated open woodland with Forest Grass Trees (*Xanthorrhoea johnsonii*) in the understorey.

Distribution map 12.5.3

RE 12.5.3 and RE 12.5.3a have experienced widespread clearing as the soils were suited to horticulture, tobacco and tree crops including exotic pine plantations and macadamia nuts. In places, land use has now shifted from rural to urban and rural amenity. Most surviving patches of RE 12.5.3 are small and scattered and restricted to Redlands, Caboolture to Beerwah and Tewantin areas. The limited extent of this ecosystem has resulted in it being listed as 'endangered' under Queensland legislation.

1. Tewantin Forest Reserve, Tewantin

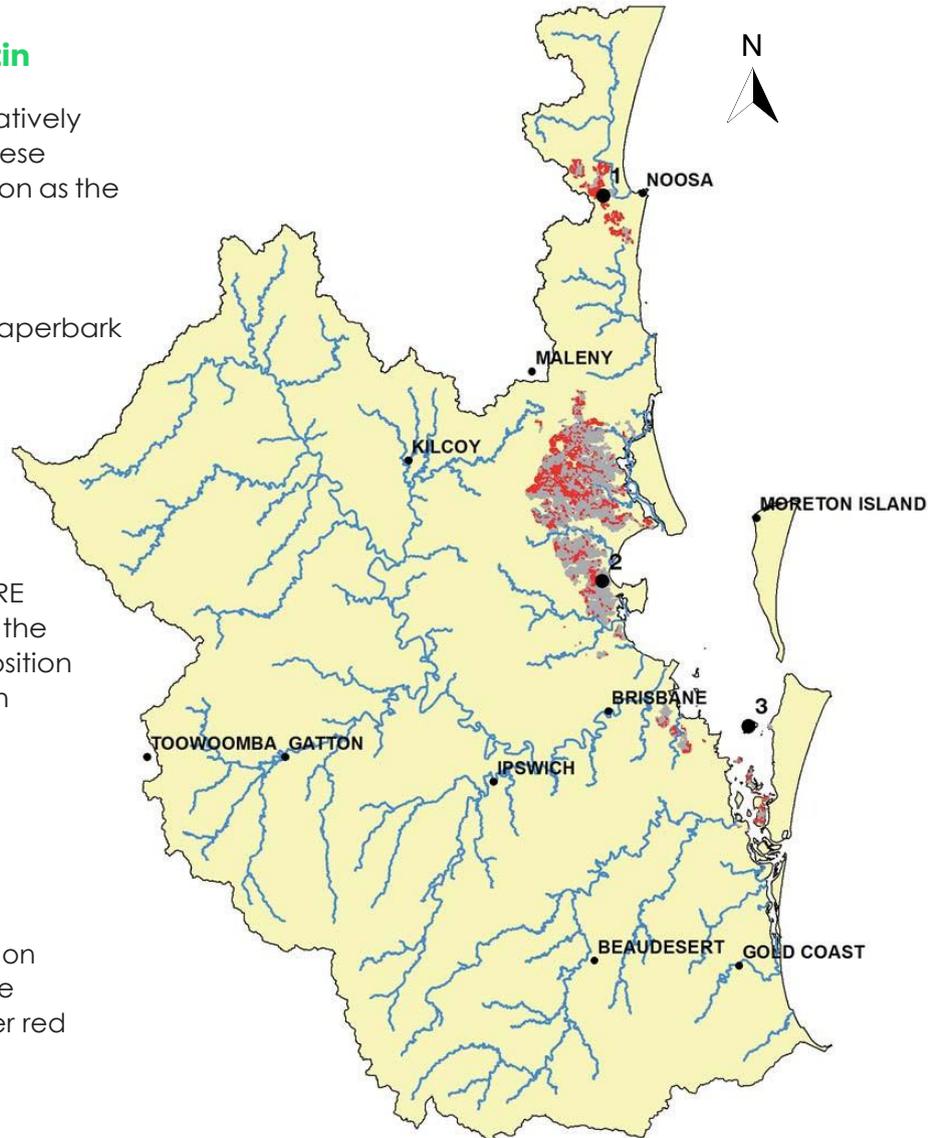
An example of RE 12.5.3 on comparatively shallow soils and low topography. These features are reflected in the vegetation as the trees are relatively stunted and open with a dense shrubby understorey. The community is interspersed with paperbark swamp.

2. Freshwater National Park, Deception Bay

A relatively large accessible patch of RE 12.5.3, with a gentle gradient across the site showing how the species composition in this RE can change, depending on access to water.

3. Teerk Roo Ra National Park, Peel Island

A representative example of RE 12.5.3 on the offshore islands of SEQ. Many of the island occurrences of this RE on deeper red soils have been cleared for small crop farming over time.



■ Pre-clearing (~180 years ago)

■ Today's distribution

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

Vegetation Management Act (1999) status: ENDANGERED

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)
12.5.3	47,353	5,684	12%	2,546
12.5.3a	8,513	556	7%	8

Past to present

For the early European settlers, the wallum country of SEQ was a challenging environment due to the extensive tracts of swampy vegetation and the abundance of rivers and creeks. Initially settlement was confined to patches of higher ground and boats were the main form of transport.

Much of the habitable country between Brisbane and Caloundra and in parts of Redlands comprised low rises with red to light brown loamy soils. RE 12.5.3 was one of the major types of vegetation on these well, drained elevated islands which were isolated by paperbark forests, heath and swamp.

The relatively deep soils and reliable rainfall were suited to a broad range of crops which over time ranged from maize, sugar and tobacco to vegetables, pineapples and strawberries. Intensive horticulture, urbanisation and the establishment of pine plantations around Beerwah and Beerburrum have removed much of the vegetation cover of RE 12.5.3 although small remnants and regrowth patches survive.

Much of the extent of RE 12.5.3 was previously cleared and converted to commercial pine (Pinus spp.) plantations (above and below). Today, many former pine plantations are being converted to urban settlement to accommodate the SEQ region's growth.



Urban expansion has been and continues to be one of the greatest threats to RE 12.5.3. Most of the SEQ population wishes to live on the coastal plains where RE 12.5.3 once thrived. New developments (below) may impact the RE by initial clearing, or through population pressures over time, such as dumping of garden waste, unrestricted recreation, collection of firewood, and a range of other actions that can cumulatively affect the integrity of the ecosystem over time.



Natural values and functions

RE 12.5.3 is a biologically productive ecosystem. On the deep red soils of crests, trees develop spreading crowns and these large, deep-rooted trees play a prominent role in intercepting, storing and recycling nutrients.

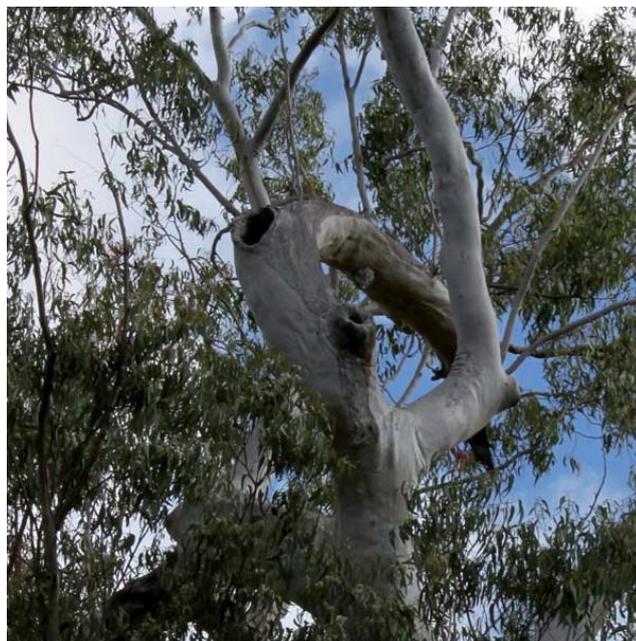
They also protect the soil from erosion, reduce stream sediment loads during high intensity rainfall events and regulate the ground water.

The lower slopes form an ecotone with ground-water dependent ecosystems including Coastal Paperbark ecosystems and swamps.

RE 12.5.3 provides food and shelter for a wide range of animals including wallabies, gliders, Koalas, bandicoots, birds, flying foxes, bats, native rats and mice, reptiles and many invertebrates.

The proximity of patches of RE 12.5.3 to seasonal or permanent water is another factor contributing to wildlife diversity as it provides habitat for frogs including threatened species such as the Green-thighed Frog (*Litoria brevipalmata*).

The open nature of the ecosystem enables ease of movement for larger mobile species especially the Koala. Large mature trees develop hollows that provide important nesting and roosting sites for a range of birds and arboreal mammals including gliders.



Large mature Scribbly Gums provide an important haven for wildlife. Hollows form in old trees and these provide shelter and nesting opportunities for a multitude of animals.



Koalas will utilise trees within RE 12.5.3 for both food and shelter.



Once thickening has occurred, it is difficult to avoid a hot fire, which may damage or kill mature trees.

Management

Stands of RE 12.5.3 usually have a range of different size classes of tree species. Tree regeneration occurs in patches that arise from the death of individuals due to old-age, attack by pathogens or damage by wind, storms, floods and fire. Young trees regenerate from seed when suitable conditions arise, for example, following burning which exposes a bare mineral soil.

Eucalypts and Corymbias store seed for a period in capsules carried high in the tree crown and the heat from a fire can trigger its release. Most seedlings do not survive long due to moisture stress and competition from other plants. The surviving seedlings of the majority of the tree species present in RE 12.5.3 develop lignotubers 18-36 months after germination. The lignotuber contains food reserves and buds which enable plants to reshoot following damage from low intensity fire and browsing. This gives the young trees the capacity to survive and 'sit and wait' for an opportunity to grow when a canopy gap is formed.

Regrowth patches of RE 12.3.5 that have regenerated in areas that were formerly cleared for farming tend to be even-aged and can be very dense resulting in shaded conditions in the understorey.

In these situations, the growth of grasses and forbs is restricted by the low levels of light and the ground is largely bare.

The grassy understorey of RE 12.5.3 is maintained by occasional fire. The fire guidelines for the RE recommend fire intervals of at least seven years. Fires should aim for a burn mosaic of 40-60% over the burn area. A diversity of season and fire intensity is important, as well as spot ignition in cooler or moister periods to encourage mosaics. Late summer burns assist with reducing the risk of high intensity fires that can kill and damage trees.

Frequent fires will eliminate species that regenerate from seed rather than re-sprouting. It also encourages the dense growth of fire-tolerant species, for example Bracken Fern (*Pteridium esculentum*) and Blady Grass (*Imperata cylindrica*).

RE 12.5.3 is prone to dense growth of Black She-oak (*Allocasuarina littoralis*) and wattles (*Acacia spp.*) in the absence of fire especially along edges and roadsides. Dense growth of Black She-oak is difficult to remove safely using fire once established and may require mechanical methods. Black She-oak, a preferred food source of Glossy Black Cockatoos, is sensitive to fire. A fire interval of at least seven years will enable the species to establish a soil seed store while preventing build-up of dense stands of trees that will eventually irreversibly alter the species composition of this ecosystem.

RE 12.5.3 is a relatively resilient ecological community in terms of invasive weeds. The higher risk weed species include Groundsel Bush (*Baccharis halimifolia*), Slash Pine (*Pinus elliotii*), Lantana (*Lantana camara*), Camphor Laurel (*Cinnamomum camphora*), Easter Cassia (*Senna pendula* var. *glabrata*), African Love Grass (*Eragrostis curvula*) and Molasses Grass (*Melinis minutiflora*). The recommended fire frequencies will assist in reducing the risk of weeds establishing in this ecosystem.

Fire frequency is an important consideration in RE 12.5. 3. Infrequent fires will allow Black She-oak (*Allocasuarina littoralis*) and wattles (*Acacia spp.*) to flourish and thickening to occur as shown above.



Restoration and regeneration

The key objective of restoring RE 12.5.3 is to establish a mix of trees, a diverse native understorey with lots of different life forms and 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 the presence of natural regeneration, the extent of weeds, proximity to similar vegetation and habitat that can allow plants and animals to move into the regenerating patch through time and the potential to manage fire and other agents of disturbance.



Some indicator understorey species for healthy RE 12.5.3 are Feather Sedge (*Ptilothrix deusta*) above and Matrush (*Lomandra multiflora*) left.



Rapid, naturally occurring regeneration is a feature of formerly cleared RE 12.5.3, provided seed sources remain present nearby. The regenerating trees require a period of several years free from fire and browsing.

Where some large seed trees remain 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 also 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.

The type of understorey should reflect local conditions. Where RE 12.5.3 is a naturally shrubby heath-type ecosystem, then heath species such as Forest Boronia (*Boronia rosmarinifolia*), Hairy Pea Bush (*Pultenaea villosa*) and Forest Grass Tree (*Xanthorrhoea johnsonii*) may be suitable. Where RE 12.5.3 has a grassy understorey, then different grasses or herbs may be more suitable. Many native grasses and forbs are relatively resilient and continue to survive in modified and regrowth RE 12.5.3 albeit in low densities.

Dense shade, for example, the conditions under dense thickets of Black She-oak, reduces the ability of some understorey species to grow. A thorough check of the ground layer during good growing conditions will provide an indication of the relative abundance of native species as well as undesirable, highly competitive weeds such as Molasses Grass.

Herbaceous weeds such as Blue Billygoat Weed (*Ageratum houstonianum*) may be prominent on disturbed sites but tend to decline over time after disturbance is removed and the cover of native species increases.

Restoration Tips

- Plan the project in detail, as some of activities that may be required, such as weed control, can be labour intensive and require ongoing attention.
- Observe the mix of species that are present when growing conditions are good, keeping an eye out for perennial grasses, forbs and shrubs. The ground layer is often more diverse than you think and some of those weedy looking plants may be beneficial natives.
- If restoring a degraded patch of forest that still has some remaining canopy trees, be prepared to experiment to see how small patches of regeneration can be successfully established.
- Don't use burning when the regenerating trees are young as they will be damaged or killed.
- Use local seed to protect the genetic resources of local wild populations of plants by reducing the risk of cross pollination with planted species sourced from outside the local area. The same applies to plants likely to disperse into adjacent remnants especially species that did not occur naturally in the local area. If re-introducing species that have become locally extinct try to secure seeds from the closest comparable populations.
- Let others know about your project, especially the successes. This will add to the pool of information to guide projects in the future.

Some indicator understorey species for healthy RE 12.5.3 are (left to right): Forest Grass Tree (*Xanthorrhoea johnsonii*), Forest Boronia, (*Boronia rosmarinifolia*) and Coastal Banksia (*Banksia integrifolia* subsp. *Integrifolia*).



Some native plants of RE 12.5.3

Trees and shrubs

Blackbutt	<i>Eucalyptus pilularis</i>
Black Wattle	<i>Acacia concurrens</i>
Blackwood	<i>Acacia melanoxylon</i>
Black She-oak	<i>Allocasuarina littoralis</i>
Brown Bloodwood	<i>Corymbia trachyphloia</i>
Brush Box	<i>Lophostemon confertus</i>
Cheese Tree	<i>Glochidion ferdinandi</i>
Coastal Banksia	<i>Banksia integrifolia</i> subsp. <i>integrifolia</i>
Dogwood	<i>Jaksonia scoparia</i>
Early-flowering Black Wattle	<i>Acacia leiocalyx</i> subsp. <i>leiocalyx</i>
Flaky-barked Tea-tree	<i>Leptospermum trinervium</i>
Forest Boronia	<i>Boronia rosmarinifolia</i>
Geebung	<i>Persoonia stradbrokeensis</i>
Forest Grass Tree	<i>Xanthorrhoea johnsonii</i>
Hairy Pea Bush	<i>Pultenaea villosa</i>
Hickory Wattle	<i>Acacia disparrima</i> subsp. <i>disparrima</i>

Narrow-leaved Red Gum	<i>Eucalyptus seeana</i>
Coastal Paperbark	<i>Melaleuca quinquenervia</i>
Pink Bloodwood	<i>Corymbia intermedia</i>
Queensland Grey Ironbark	<i>Eucalyptus siderophloia</i>
Queensland White Mahogany	<i>Eucalyptus tindaliae</i>
Red Ash	<i>Alphitonia excelsa</i>
Red Stringybark	<i>Eucalyptus resinifera</i>
Rusty Gum	<i>Angophora leiocarpa</i>
Scribbly Gum	<i>Eucalyptus racemosa</i> subsp. <i>racemosa</i>
Smudgee	<i>Angophora woodsiana</i>
Swamp Mahogany	<i>Lophostemon suaveolens</i>
Tallowwood	<i>Eucalyptus microcorys</i>
Three-nerved Willow Hakea	<i>Hakea florulenta</i>

Grasses, forbs, ferns and epiphytes

Barbed Wire Grass	<i>Cymbopogon refractus</i>
Blady Grass	<i>Imperata cylindrica</i>
Bracken Fern	<i>Pteridium esculentum</i>
Common Rush Lily	<i>Tricoryne elatior</i>
Dodder Laurel	<i>Cassytha pubescens</i>
Cockatoo Grass	<i>Alloteropsis semialata</i>
Forked Comb Fern	<i>Schizaea bifida</i>
<i>Goodenia rotundifolia</i>	<i>Goodenia rotundifolia</i>
Guinea Flower	<i>Hibbertia vestita</i>
Hairy Panic	<i>Panicum effusum</i>
Hairy Trefoil	<i>Desmodium rhytidophyllum</i>
Kangaroo Grass	<i>Themeda triandra</i>
Matrush	<i>Lomandra multiflora</i> , <i>L. longifolia</i>
Phyllanthus	<i>Phyllanthus virgatus</i>
Poverty Grass	<i>Eremochloa bimaculata</i>
Rice Flower	<i>Pimelea linifolia</i>
Scented Top	<i>Capillipedium spicigerum</i>
Small-flowered Finger Grass	<i>Digitaria parviflora</i>

Spreading Panic Grass	<i>Paspalidium distans</i>
Twining Glycine	<i>Glycine clandestina</i>
Variable Sword Sedge	<i>Lepidosperma laterale</i>
Vernonia	<i>Cyanthillium cinereum</i>
White Root	<i>Lobelia purpurascens</i>
Wire Grasses	<i>Aristida</i> spp.
Wiry Panic	<i>Entolasia stricta</i>
Wombat Berry	<i>Eustrephus latifolius</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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