



REGIONAL ECOSYSTEMS OF SOUTH EAST QUEENSLAND

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RE 12.9-10.16

Complex Hoop Pine vine forest on sedimentary rocks

Hoop Pine (*Araucaria cunninghamii*) is one of the few native conifers that occurs naturally within South East Queensland (SEQ). It is a close relative of the Bunya Pine (*Araucaria bidwillii*) and the two species sometimes grow together in parts of SEQ. The Hoop Pine is an iconic tall, straight tree that can form dense stands that tower above a closed canopy of smaller rainforest trees.

Regional Ecosystem (RE) 12.9-10.16 is a structurally complex dry rainforest

ecosystem with many different plant life forms such as vines, epiphytes, trees, shrubs and ferns. Given that RE 12.9-10.16 grows under a relatively low rainfall regime, many of the leaves are small and tough.

RE 12.9-10.16 is technically referred to as a 'microphyll to notophyll vine forest'. Microphyll and notophyll refer to the average size of the leaves of the tallest (canopy) trees when they are exposed to sunlight (not leaves in the shade). Leaf size is used to classify

types of rainforest growing under different environmental conditions. Microphyll-sized leaves are relatively small – up to 7.5 cm long and 3.5 cm wide, whereas notophyll-sized leaves are around 12 cm x 5 cm. The average leaf size of rainforest trees in higher rainfall areas is larger, over 12 cm long, and these are called mesophyll-sized.

Alternative common names for this type of ecosystem are vine forests, dry rainforests, dry vine scrubs or Hoop Pine scrubs.



RE 12.9-10.16 is identified by the presence of Hoop Pine (left) towering above a diverse forest of other plant species, and a geology derived from sedimentary rock, such as this piece of conglomerate (far left) on the forest floor.

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 12.9-10.16 has a wide but limited distribution in SEQ. It occurs on loamy soils derived from a range of sedimentary rocks on gently undulating to steep hillsides in the Beaudesert - Boonah – Rosewood - Marburg districts and mid and Upper Brisbane Valley. The rainfall ranges from 750-1000mm per annum.

RE 12.9-10.16 is often found on hillsides within its range, forming dense patches of dark green that stand out from the surrounding landscapes.

Variations and Similarities

Within SEQ, Hoop Pine vine forests grow on a range of geologies. Consequently, five different Regional Ecosystems, including RE 12.9-10.16, are recognised based upon the type of country where they grow.

The four other Regional Ecosystems similar to RE 12.9-10.16 that occur on different geologies are:

- RE 12.5.13 - Complex Hoop Pine microphyll to notophyll vine forest growing on remnant Tertiary surfaces.
- RE 12.8.13 - Complex Hoop Pine microphyll vine forest growing on Mesozoic to Proterozoic igneous rocks.
- RE 12.11.11 - Complex Hoop Pine microphyll vine forest growing on metamorphic rocks often with interbedded volcanics.
- RE 12.12.13 - Complex Hoop Pine microphyll to notophyll vine forest growing on Mesozoic to Proterozoic igneous rocks (eg. andesite).

These four other dry vine forests are covered in the *Regional Ecosystems of South East Queensland* factsheet series.

Complex Hoop Pine microphyll vine forest transitions into semi-evergreen vine thickets or softwood scrubs where rainfall is lower or where local site conditions are harsher. It is replaced by notophyll type vine forests where rainfall is higher or where levels of moisture are enhanced by slope and shelter.

Buttressed trees such as this White Booyong (*Argyrodendron trifoliolatum*) are indicative of higher localised moisture (e.g. on sheltered slopes), and perhaps a transitional boundary to a wetter (notophyll) vine forest ecosystem.



The typical soils of RE 12.9-10.16 (above) include sedimentary rock fragments and light loamy soils. Leaf litter is usually minimal and patchy, except during dry weather when trees can shed their leaves.



RE 12.9-10.16*

Distribution Map - Past and Present

RE 12.9-10.16 has been extensively cleared for dairying and cropping. Much of the remaining extent persists in steep or rocky country that was too difficult to clear for other uses, or scattered amongst the Hoop Pine Forestry plots in the region. Whilst many of the remaining patches of RE 12.9-10.16 are afforded some protection in state reserves, the limited extent of this RE in the SEQ landscape means that it is regarded as 'of-concern' under Queensland legislation

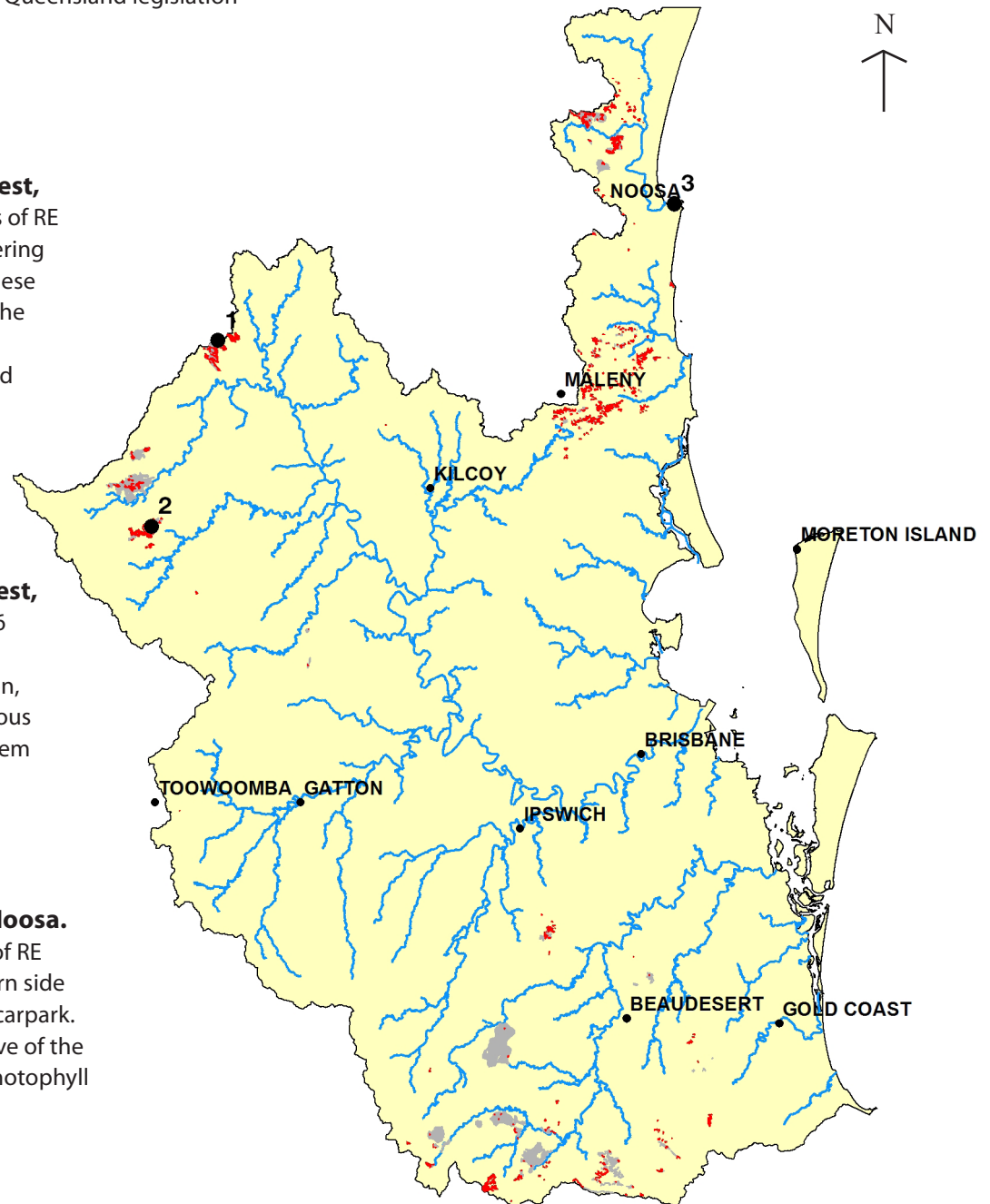
- Pre-clearing (~180 years ago)
- Today's distribution

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

1. East Nanango State Forest, Nanango. Remnant patches of RE 12.9-10.16 can be found bordering the Hoop Pine plantation of these forests. The trees also display the lichens and epiphytic growth reflective of higher altitude and access to cloud moisture.

2. Mount Binga State Forest, Mount Binga. RE 12.9-10.16 remnant borders much of the abundant Hoop Pine plantation, which approximates the previous extent of the Regional Ecosystem in this location.

3. Noosa National Park, Noosa. A small, rare coastal example of RE 12.9-10.16 exists on the western side of the park, close to the main carpark. The vegetation is representative of the high rainfall in this area, with notophyll species present.



RE 12.9-10.16 - Facts and Figures (as of 2014)

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

	Pre-clearing Extent, or estimated amount ~180 years ago (hectares)	Current Extent (hectares)	Percent of Pre-clearing Extent Remaining	Amount Protected in Reserves (hectares)
12.9-10.16	22,922	8,985	39%	5,791

Past to Present

The early European explorers and surveyors of the country inland from Moreton Bay in SEQ made frequent references to vine forests with Hoop Pine in the region. They talked about hillsides that were black with pine, and tropical jungles with lofty pines that reared above the canopy.

One of the first recorded uses of Hoop Pine was in the provision of sailing ship masts. The versatile nature of the pale softwood timber meant that it became widely used for interior walls and flooring, furniture and packing crates for local fruit and produce. Hoop Pine scrubs also provided cabinet and speciality timbers, for example Crow's Ash (*Flindersia australis*) and Silky Oak (*Grevillea robusta*).

Logging on the steep slopes was hazardous due to the densely packed nature of the trees and tangle of vines, particularly for the bullock teams used for snigging and hauling. Hoop Pine was found to be highly suited to being grown in plantations. These were established on state forests in parts of SEQ during the inter-war period last century. The establishment of plantations was intensive, back-breaking work and required clearing of extensive tracts of vine forest.

Early plantings used maize and papaws in the initial stages to provide shelter for the Hoop Pine seedlings and to reduce the growth of weeds. The fertile soils supporting Hoop Pine vine forests were also cleared for dairying and fruit growing. However, many patches survived on lands set aside as state forest and on slopes that were too steep or rocky to clear.



Much of the original extent of RE 12.9-10.16 has been cleared and replaced with Hoop Pine plantations (shown here in the background).



RE 12.9-10.16 contains plants with both microphyll (small) and notophyll (medium-sized) leaves. This photo shows the dappled light that is formed on the canopy floor of vine forests, even if there are no mature Hoop Pines present (due to past logging activities).



Mature Hoop Pines and other trees harvested for timber are still absent or uncommon in patches of RE 12.9-10.16 many years after logging. During early logging operations much of the low scrub vegetation was retained, and the shade and competition reduced the ability of some trees, such as Hoop Pine, to regenerate.

Management

The patches of Hoop Pine vine forest present in SEQ today are a mix of logged and unlogged patches, and regrowth. Weeds and fire are the key management issues for each of these despite their different land management histories.

Lantana (*Lantana camara*) is a major environmental weed as it spreads readily, tolerates shade, and can form dense mono-specific thickets that exclude native species. Other serious weeds include introduced vines, especially Madeira Vine (*Anredera cordifolia*), Cat's Claw Creeper (*Dolichandra unguis-cati*), Climbing Asparagus (*Asparagus plumosus*), Climbing Nightshade (*Solanum seaforthianum*), Dutchman's Pipe (*Aristolochia spp.*) and Passionflower (*Passiflora spp.*). Plus exotic trees Chinese Elm (*Ulmus parvifolia*), Privet (*Ligustrum spp.*) and Camphor Laurel (*Cinnamomum camphora*).

Most native vine forest plants are sensitive to fire - the SEQ fire management guidelines recommend managing rainforest patches in the context of the surrounding country to minimise fire risk. This may entail cool burns of adjacent grassy woodlands or pasture when moisture levels are high and using slashed or graded breaks to protect patches from wildfire during high risk times. Hot fires during dry weather will penetrate into vine forest patches for a considerable distance resulting in tree death and promoting post-fire growth of weedy vines and Lantana.

Patches that have had minimal disturbance are generally weed-free or largely so apart from edges. Lantana is often present along the narrow ecotone between vine forest and eucalypt forest and its presence will promote fire during drier weather when the dry leaves and stems become flammable. Where rainforest patches abut cleared grazing

pasture, the highly invasive introduced pasture species Green Panic (*Megathyrsus maximus*) plays a similar role in increasing fire risk. The species tolerates semi-shaded conditions under a broken tree canopy and like Lantana, becomes highly flammable when dry.

Patches of vine forest that have been severely damaged by logging, storms or fire are prone to the formation of dense Lantana thickets that may persist for many decades.

Linear disturbances such as roads and power line easements promote weed invasion which take advantage of the increased light and disturbed ground – weeds can then spread into the adjacent vine forest.

Areas that have been logged for Hoop Pine and other species recover through time provided they are not affected by fire. This is especially true for logging that was undertaken using bullock teams as the ground and canopy disturbance was localised. However, the density of Hoop Pine often remains relatively low in stands that were logged half a century ago or longer. This appears to be related to competition from other rainforest tree species that survived the logging operation.

Although not technically a pioneer species, Hoop Pine regenerates best in open sunny conditions, often after some disturbance, and germinates in patches of sunlight that reach the forest floor.



Dry vine forests, such as RE 12.9-10.16, are very susceptible to damage from fire, particularly on patch edges (shown on the right side in the photo above). Any controlled burns in adjacent woodlands should consider mechanisms to exclude or prevent fire from going into the vine forest.



Despite the tough, hardy and prickly nature of many dry vine forest plants, most species are fire intolerant and will die in a fire. Shown here are Pine Mountain Coral Tree (*Erythrina numerosa*), left foreground, and the Large-leaved Sickle Fern (*Pellaea paradoxa*), right.



These round scratchings, called 'platelets', indicate the presence of button quails, which are small ground dwelling birds. There are several different button quail species in SEQ.

Natural Values and Functions

Hoop Pine vine forests are a structurally complex and biologically productive ecosystem that performs a wide range of ecological functions at varying scales. The diversity of vegetative life forms present play a prominent role in intercepting, generating, storing and recycling energy, carbon, nutrients and pollutants, protecting soil from rain-wash and erosion and filtering and trapping sediments.

Vine forests are used for shelter and food by a wide range of birds and small to medium-sized mammals. Many plant species are bird-dispersed and some of the fruit-eating species use vine forest patches as stepping stones on seasonal and annual migration routes. Butterflies, bats, litter-foraging vertebrates and a broad range of insects, land snails and other invertebrates are associated with pollination and decomposition cycles.

Restoration Tips

- Plan the project thoroughly, as ecological restoration and regeneration of dry vine forest is relatively slow and requires major inputs.
- Make use of the huge volume of information about dry vine forests in SEQ and nearby areas available on the internet and talk to people involved in restoration activities.
- Become familiar with the flora by observing the species surviving in local remnant patches.
- If your project is going to need lots of planting, try growing your own! Most dry vine forest trees and shrubs are easy to germinate from seed or cuttings. The seed you collect doesn't usually stay viable for long so remember, fresh is best.
- Don't get carried away planting vines too early in the project. They tend to become rampant and smother trees and shrubs.
- Don't use fire as it will kill the young plants. Grazing is also undesirable as it may result in damage to the regeneration due to trampling and browsing.
- Keep a record of progress and note interesting occurrences such as the arrival of new plants to the site. Be prepared to share your findings with others.



The dappled shade beneath the trees in RE 12.9-10.16 affords protection for ferns, such as the Rock Felt Fern (*Pyrrhosia rupestris*), top image, and lichens (shown in both photos) that would otherwise be burnt by the sun.

Remnant patches of vine scrub also play an important role as reservoirs or source populations for plant and animal species that are able to re-colonise adjacent areas when conditions are suitable.

A number of rare and threatened plants and animals live in the Hoop Pine scrubs of SEQ. There are plants with highly localised or restricted distributions for example the endangered Shiny-leaved Coondoo (*Planchonella eerwah*) and Grease Nut (*Hernandia bivalvis*). The threatened Black-breasted Button Quail is a sedentary ground-dwelling bird that has suffered a major population decline due to clearing and fragmentation of its habitat.

Restoration & Regeneration

Hoop Pine vine forest can be successfully re-established on lands where it formerly grew. Some native rainforest species may remain as old remnant trees or more recent arrivals, and these can be used to advantage in restoration by providing a basic framework or skeleton for the project.

Fast-growing, short-lived shrubs and small trees (commonly referred to as pioneer plants) can be used to good effect in restoration projects as they tend to be the fastest growing species and will provide dappled shade and will reduce exposure to wind. Hoop Pine can be planted in the initial stages of the project as the species is extremely hardy and sun-tolerant.

Lantana and pasture grasses will be the main weeds competing with regenerating species in more open situations. Shade from a developing canopy is beneficial in reducing weed vigour and competition. 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.

Degraded patches of dry vine forest can be restored over a period of time by focusing on reducing the extent of weeds

and re-establishing trees in canopy gaps.

Lantana thickets can be removed using mechanical methods or herbicides. Where there are gaps in the canopy, they are probably filled with Lantana, and they can be gradually filled by replanting, preferably with Hoop Pine. Smaller gaps can be tricky due to the amount of shade so experimentation with local tree species may be required to determine those likely to respond best.

Severe infestations of weeds other than Lantana, especially climbers such as Madeira Vine, are 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 dry vine scrub restoration projects due to the potential damage these agents can cause to young plants. 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 needed around palatable species.

Some Native Plants of RE 12.9-10.16

Pioneer Species

Celerywood	<i>Polyscias elegans</i>
Green Kamala	<i>Mallotus claoxyloides</i>
Hickory Wattle	<i>Acacia disparrima</i> subsp. <i>disparrima</i>
Lolly Bush	<i>Clerodendrum floribundum</i>
Maiden's Wattle	<i>Acacia maidenii</i>

Native Cascarilla	<i>Croton insularis</i>
Native Rosella	<i>Hibiscus heterophyllus</i>
Native Peach	<i>Trema tomentosa</i>
Red Kamala	<i>Mallotus philippensis</i>
Velvet Leaf	<i>Callicarpa pedunculata</i>
White Cedar	<i>Melia azedarach</i>

Grasses, Forbs, Ferns and Epiphytes

Bird's Nest Fern	<i>Asplenium australasicum</i>
Dwarf Sickle Fern	<i>Pellaea nana</i>
King Orchid	<i>Dendrobium speciosum</i>
Large-leaved Sickle Fern	<i>Pellaea paradoxa</i>
Maidenhair Fern	<i>Adiantum aethiopicum</i> , <i>A. atroviride</i>
Resurrection Fern	<i>Doryopteris concolor</i>
Robber Fern	<i>Pyrrhosia confluens</i>

Rock Felt Fern	<i>Pyrrhosia rupestris</i>
Rough Maidenhair Fern	<i>Adiantum hispidulum</i>
Square-stemmed Broom	<i>Spartothamnella juncea</i>
Staghorn	<i>Platyterium superbum</i>
Straggly Pencil Orchid	<i>Dockrillia bowmanii</i>
Tiger Orchid	<i>Dendrobium gracilicaule</i>

Vines and Scramblers

Black Silkpod	<i>Parsonsia leichhardtii</i>
Blood Vine	<i>Austrosteensia blackii</i>
Bower Vine	<i>Pandorea pandorana</i>
Burney Vine	<i>Trophis scandens</i>
Corky Prickle Vine	<i>Caesalpinia subtropica</i>
Hairy Silkpod	<i>Parsonsia velutina</i>
Hairy Water Vine	<i>Cayratia acris</i>
Hoya	<i>Hoya australis</i>
Kangaroo Vine	<i>Cissus antarctica</i>
Lloyd's Milk Vine	<i>Marsdenia lloydii</i>

Native Grape	<i>Tetrastigma nitens</i>
Native Jasmine	<i>Jasminum didymum</i> subsp. <i>racemosum</i>
Pleogyne	<i>Pleogyne australis</i>
Scrambling Caper	<i>Capparis sarmentosa</i>
Stiff Jasmine	<i>Jasminum volubile</i>
Stinging Vine	<i>Tragia novae-hollandiae</i>
Wombat Berry	<i>Eustrephus latifolius</i>
Zig Zag Vine	<i>Melodorum leichhardtii</i>

Trees and Shrubs

Bastard Crow's Ash	<i>Pentaceras australis</i>
Booyong	<i>Argyrodendron trifoliolatum</i>
Broad-leaved Cherry	<i>Exocarpos latifolius</i>
Broad-leaved Leopard Ash	<i>Flindersia collina</i>
Broad-leaved Whitewood	<i>Atalaya multiflora</i>
Blunt-leaved Tulip	<i>Harpullia hillii</i>
Chain Fruit	<i>Alyxia ruscifolia</i>
Crow's Ash	<i>Flindersia australis</i>
Crow's Apple	<i>Owenia venosa</i>
Cudgerie or Ribbonwood	<i>Euroschinus falcata</i>
Deep Yellowwood	<i>Rhodospaera rhodantha</i>
Diplospora	<i>Triflorensa cameronii</i>
Foambark Tree	<i>Jagera pseudorhus</i> subsp. <i>pseudorhus</i>
Grey Ebony	<i>Diospyros fasciculosa</i>
Hard Alectryon	<i>Alectryon subdentatus</i>
Hairy Alectryon	<i>Alectryon tomentosus</i>
Hard Cryptocarya	<i>Cryptocarya sclerophylla</i>
Holly-leaved Pittosporum	<i>Auranticarpa rhombifolia</i>
Hoop Pine	<i>Araucaria cunninghamii</i>
Ivorywood	<i>Siphonodon australis</i>
Lacebark Tree	<i>Brachychiton discolor</i>
Lignum Vitae	<i>Vitex lignum-vitae</i>
Mock Olive	<i>Notelaea macrocarpa</i>
Moreton Bay Fig	<i>Ficus macrophylla</i>
Native Holly	<i>Alchornea ilicifolia</i>
Native Witch Hazel	<i>Turraea pubescens</i>
Native Pomegranate	<i>Capparis arborea</i>
Orange Bark	<i>Maytenus bilocularis</i>
Palm Lily	<i>Cordyline petiolaris</i> , <i>C. rubra</i>
Pavetta	<i>Pavetta australiensis</i>
Pine Mt Coral Tree	<i>Erythrina numerosa</i>
Pitted Coogera	<i>Arytera foveolata</i>
Pitted-leaf Steelwood	<i>Toechima tenax</i>
Prickly Pine	<i>Bursaria incana</i>
Python Tree	<i>Gossia bidwillii</i>

Queensland Ebony	<i>Diospyros geminata</i>
Red Olive Plum	<i>Elaeodendron australe</i>
Scrub Bloodwood	<i>Baloghia inophylla</i>
Scrub Whitewood	<i>Atalaya salicifolia</i>
Scrub Ironbark	<i>Bridelea exaltata</i>
Scrub Poison Tree	<i>Excoecaria dallachyana</i>
Scrub Wilga	<i>Geijera salicifolia</i>
Shiny-leaved Canthium	<i>Psydrax odorata</i> form <i>buxifolia</i>
Shiny-leaved Stinging Tree	<i>Dendrocnide photinophylla</i>
Shrubby Deeringia	<i>Deeringia amaranthoides</i>
Silky Oak	<i>Grevillea robusta</i>
Small-leaved Acalypha	<i>Acalypha capillipes</i>
Small-leaved Alectryon	<i>Alectryon connatus</i>
Small-leaved Canthium	<i>Everistia vacciniifolia</i>
Small-leaved Coondoo	<i>Pouteria cotinifolia</i>
Small-leaved Fig	<i>Ficus obliqua</i>
Small-leaved Tuckeroo	<i>Cupaniopsis parvifolia</i>
Smooth Wilkiea	<i>Wilkiea macrophylla</i>
Southern Erythroxylon	<i>Erythroxylon</i> sp. 'Splityard Creek'
Strychnine Tree	<i>Strychnos pilosperma</i>
Thorny Yellow Wood	<i>Zanthoxylum brachyacanthum</i>
Tulipwood	<i>Harpullia pendula</i>
Veiny Denhamia	<i>Denhamia pittosporoides</i>
Veiny Pear-fruit	<i>Miscocarpus anodontus</i>
Whalebone Tree	<i>Streblus brunonianus</i>
White Tamarind	<i>Elattostachys xylocarpa</i>
Yellowwood	<i>Flindersia xanthoxyla</i>



Dwarf Sickle Fern (*Pellaea nana*).

Designed and produced by Healthy Land & Water, a community based, not-for-profit organisation that works to protect and restore the natural resources of South East Queensland. Visit www.hlw.org.au

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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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