Respecting our

NATURAL ENVIRONMENT

THE FRASER COAST GREENING GUIDE

All you need to know to make our environment greener

Fraser Coast
REGIONAL COUNCIL

This guide provides simple yet inspiring advice for residents of the Fraser Coast Region about using water-wise local native plants as replacements for introduced plants that are harmful to the local environment. It also contains simple information on creating habitat and providing for native wildlife species.

CONTENTS

TIP!

Choose native plants local to your area so you know they'll grow well and be resilient to conditions.

USING THIS PLANTING GUIDE

Gardens in South-East Queensland face challenging climatic and environmental conditions. Issues include extended dry periods to extremely wet seasons, nutrient-deficient acidic and sandy or sometimes deep clay soils.

However, it is possible to change the environment within your yard or around your home by choosing resilient, local coastal native plant species that can cope with tough conditions.

This guide explains how to utilise the abundant variety of local native plants available to make an attractive and functional habitat.

It also includes information on non-native plants and what can be done to prevent them becoming invasive weeds in local environments.

Some technical language has been included in the text. These words have been highlighted and their definitions included in a glossary contained in the back of the booklet.

By using this guide, you can help repopulate local areas with more native plants, create habitat for native species, connect wildlife corridors and make a practical contribution to mitigating increasing heat.

LOCAL PLANTS EXPLAINED

WHAT DEFINES A LOCAL PLANT SPECIES?

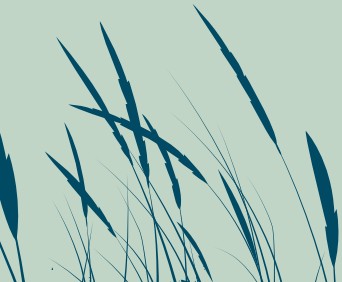
Local, or indigenous plants, are species that naturally occur in your area that have evolved over time to suit local conditions.

WHY USE LOCAL PLANTS?

Local plants offer a wide range of benefits for both the environment and urban habitats.

- Low maintenance
- Most are drought tolerant and require minimal watering, thereby conserving water resources
- Many 'wet' adapted species can grow in low-lying wet coastal areas
- Hardy by nature, with no synthetic pesticides or fertilisers required
- Save time and money (longer lasting, therefore requiring less replacement)
- Attractive and adaptable for a wide range of applications
- Native plants flower at different times of the year, therefore they attract and provide year-round food and habitat for a range of native fauna.

Local plants have adapted to survive the harsh conditions of sand and salt, prolonged sun exposure, nutrient-deprived soils, winds and limited or excessive water availability. These attributes and others make locally native plants the ideal choice for the environment that we all share.



ENVIRONMENTAL BENEFITS OF NATIVE SPECIES

Key environmental benefits of native species are identified pictorially throughout this guide.

Provide habitat, food and shelter for local fauna	**Attract butterflies, birds and native insects**
Used by native mammals	**Ideal for planting in nature strips**
Edible*	**Traditional use**

** Many plants are poisonous. Ensure accurate species identification before tasting.*

TIP!

Invasive plants can grow out of control quickly so prompt removal of any weed will stop further spreading.

CURTAILING INVASIVE PLANTS

WHY WEEDS ARE AN ENVIRONMENTAL THREAT

The term 'weeds' can be applied to many non-local plants that grow prodigiously, often where they are not wanted. They can also be plants other than bindi-eye or thistles.

In fact, many seemingly harmless non-local plants that escape from gardens become serious environmental weeds which can threaten the health and value of natural environments.

HOW WEEDS DAMAGE THE ENVIRONMENT

Weeds can damage the environment in a number of ways.

- Threaten local native plants by smothering and outcompeting
- Block waterways and affect water quality entering the ocean
- Harbour pest animals such as foxes and feral cats which prey on native wildlife
- Reducing biodiversity by displacing native species
- Non-local plants that spread from gardens are costly to control, drawing resources away from other important issues.

NON-LOCAL PLANTS THAT SPREAD FROM GARDENS ARE COSTLY TO CONTROL, DRAWING RESOURCES AWAY FROM OTHER IMPORTANT ISSUES.

WHY DO WEEDS THRIVE?

The majority of weed species that endanger our environment often originate from regions with similar climates, such as the Mediterranean, South Africa and South America.

Therefore, they thrive in the similar conditions found here, outcompeting local native plants as they don't have the pests and diseases that controlled them in their original environment.

HOW DO GARDEN PLANTS BECOME INVASIVE WEEDS?

Garden plants can escape into local environments naturally, accidentally and deliberately.

- Seeds can be spread by birds and other animals, wind, water (including stormwater) or humans (on clothing, shoes etc)
- Dumped garden waste containing seeds or plant cuttings can continue to grow months later
- The deliberate growing of garden plants in natural environments
- Garden plants can grow through, under and over fences.

DON'T PLANT

Cape / Blue Waterlily

Nymphaea caerulea

Native of parts of Africa; similar habit to Mexican waterlily. Attached perennial with round wavy olive floating leaves often crowded and sitting above the waterline with bright yellow flowers. Produces vertical rhizomes, spread by humans and stolons which break off easily. Blocks waterways and quickly crowds out other plants.

Parrots Feather

Myriophyllum aquaticum

Native to South America. Emergent aquatic perennial with leaves in whorls of 4-6 around stems, blue green and finely toothed. Spread by humans and broken off plant pieces. Forms dense mats in and around waterways smothering other water plants and restricting recreational activities.

Dense Water Weed

Egeria densa and other fishtank/pond species

Native to South America. Submerged aquatic with thin curled down green/brown leaves to 4cm in whorls of 4-5 on stems up to 1.5m long. Spread by plant fragments, popular fish tank plant. Becomes a dense mat, blocking waterways and outcompeting other vegetation.

Fountain Grass

Cenchrus setaceum – declared

Native to NE Africa. Densely tufting perennial grass to 1m. Flower heads are a feathery brown/purple spike produced throughout most of the year. Spread by seed, wind, water and humans. Found along drainage lines, creeks and roadsides. Becomes a dense stand outcompeting native vegetation.

PLANT ME

Saw Sedges
Gahina Siberiana Clarkei

Leafy clump forming sedge to 3m. Sharp saw toothed edges, blue/white undersides. Flower spikes reddish turning almost black. Common in swampy moist sites.

Knobby Club-Rush
Ficinia nodosa
(formerly Isolepis nodosa)

Clumping sedge common to coastal and foreshore areas. Grows to 90cm, produces distinctive clustered inflorescences just below the tips of the stems.

Water Snowflake
Nypmphoides indica
Swamp Lily
Ottelia ovalifolia
Long-lived attached aquatic with rounded surface floating leaves. Small white fringed flowers to 2.5cm from Sept-April. Propagates from old leaves producing small plantlets.

Bacopa
Bacopa monnieri

Prostrate fleshy long lived herb forming dense mats along creeks and lagoons. Leaves paired to 2cm. Single tubular white to pale blue flowers from spring to autumn. Excellent bank stabiliser (Beware exotic look-alikes!).

Bladderwort
Utricularia aurea
Tricarinatus

Submerged aquatic carnivorous plant forming floating mats below water surface. Yellow flowers produced above the water from Nov-June.

PLANT ME

Kangaroo Grass
Themeda triandra

Soft leaved tufting grass, light green turning brown in winter to 40cm. Pendulous bunched pointed seed heads to 1.5m from spring to summer. Well drained soils, sun to shade. Tolerates mowing.

Barb Wire Grass
Cymbopogan refractus

Hardy clumping grass to 1m with arching seed stems that resemble barb wire. Suitable for most soils positioned in full sun to part shade. Will tolerate dry spells. Prune after seeding. Provides habitat for small mammals and frogs and is a host plant for native butterflies.

Twigrushes
Machaerina teretifolia
B. rubiginosa

Smooth-stemmed sedge growing to about 1m with brown seed heads. Creamy-yellow to mauve flowers from late winter to spring. Prefers moist soils. Spreads from an underground rhizome.

DON'T PLANT

Singapore Daisy
Sphagneticola trilobata – declared

Native to tropical America. A dense groundcover with glossy slightly fleshy leaves. Bright yellow 'daisy-like' flowers throughout the year. Spread by underground stems and garden waste. Common garden escapee found in urban bushland, lawns, paths and waterways.

Mother Of Millions
Bryophyllum delagoense

Succulent, erect plant growing from 30-180cm tall with clusters of bell shaped orange flowers arranged around a central stem. Mottled, cylindrical leaves have 3-9 'teeth' at the end. Tiny plantlets are often produced from these teeth and any part of the leaves and stems that make contact with the soil.
A widespread weed of degraded soils, coastal sands and dry inland areas.

Glory Lily
Gloriosa superba

Native to Africa and Asia. Perennial herb with underground tubers and climbing stems up to 4m long. Flowers bright, yellow, orange or red, with 'petals' turned back to expose the stamens. Flowers October-May.
Declared Fraser Island only.

Purple Succulent *Callisia fragrans*
Creeping Inchplant *Callisia repens*

Native of Mexico. A dense spreading groundcover with fleshy green leaves and purple undersides to 30cm in a rosette like cluster. Spreads by seed, runners and garden waste. Found in shaded areas in urban bushland, roadsides, foreshore and gardens. Smothers and excludes understorey plants.

The Creeping Inchplant *(Callisia repens*) is related to Purple Succulent with small leaves up to 3cm long alternately arranged around a purplish stem. There are many cultivated forms of this species.

Purple Joyweed
Alternanthera brasiliana

Native to Central and South America. Commonly cultivated fast-growing soft sprawling herb to 60cm with glossy dark purple/red oval leaves. Easily spread by dumped garden waste, cuttings and seeds into urban bushland, wetlands and roadsides.

Asparagus Fern
Asparagus aethiopicus – declared

Native to South Africa. Low growing plant with sprawling stems. Small white flowers with glossy red berries. Spread by birds, water and garden waste. Invades foreshore areas, urban bushland. Common garden escapee.

PLANT ME

Guinea Flower
Hibbertia scandens

Vigorous climber or scrambler growing to 2m. Yellow buttercup-like flowers to 6cm from spring to summer. Tolerates a wide range of climates including salt laden winds. Prefers well-drained soils.

Sword Fern
Microsorum punctatum

A hardy clumping evergreen fern to 1m tall that can spread to form dense colonies in the understorey of trees and shrubs. It will tolerate dry shade once established in either sandy or clay soils. The upright sword shaped leaves are attractive displayed as a container plant indoors.

Scrambling Lily
Geitonoplesium cymosum

This scrambling slender vine bears delicate clusters of dainty lily like flowers followed by black juicy berries attractive to birds. Although it can grow to several metres, it will not smother other plants. It is adaptable to most soils and combines well with groundcovers and small shrubs under a shady tree. Bush tucker – the new green shoots are edible and taste like snow peas.

Coastal Pigface
Carpobrotus glaucescens

Creeping succulent with angular fleshy leaves. Purple/pink flowers to 6cm throughout the year. Edible, salty-sweet, reddish fruit. Prefers well-drained sandy soils. Excellent stabiliser.

Thyme Leaf Honey Myrtle
Melaleuca thymifolia

Compact rounded growth to 1m. Mauve flower clusters in summer and sporadically throughout the year. Adapted to most soil types, will tolerate periodic wet soils in sun or part shade. Responds well with regular tip pruning after flowering.

Spiny Head Mat Rush
Lomandra longifolia

Hardy, tufted clumping habit with flat grass-like leaves to 70cm. Produces creamy-yellow flowers on a spike at the centre of the plant, winter to spring. Adaptable to most soils in open shaded areas. Good foliage contrast, back filler.

PLANT ME

Midyim Berry
Austromyrtus dulcis

Spreading growth to 1m with small aromatic leaves and pinkish new growth. Flowers small white five petalled throughout summer. Edible speckled, mauve-white soft skinned berries. Responds well to regular pruning. Excellent border or hedge, especially when mass planted.

Yellow Buttons
Chrysocephalum apiculatum

Prostrate sprawling herb to 10cm and up to 1m wide. Silvery grey hairy leaves with clusters of yellow papery flowers spring to summer. Adaptable to most soils, prefers full to dappled sun, frost hardy.

Beach Fan Flower
Scaevola calendulacea

A succulent prostrate groundcover to 2m wide and 40cm high found on sand dunes. Short spikes of blueish purple flowers and dark purple berries appear most of the year among the fleshy green leaves. It is suitable for planting in sandy to sandy loam soils, full sun and is salt tolerant.

Blue Flax Lily
Dianella congesta

Tufting grass like herb with green strap like leaves. Blue/purple often pendulous star shaped flower spikes and blue/purple berries throughout the year. Hardy, adaptable full sun-shade. Excellent in rockeries, mass planting or as a filler.

Everlasting Daisy
Xerochrysum bracteatum

This bright yellow paper daisy produces flowers throughout spring and summer providing a source of nectar and pollen to many butterflies. It can be grown as an annual or herbaceous shrub and is adaptable to most soils. Prune lightly to increase flowering and bushy growth.

Goodenia Species
Goodenia rotundifolia
G. paniculate
G. stelligera

Small herbs with clumping or prostrate trailing habit. Sprays of bright yellow flowers spring to autumn. Adaptable to most soils, tolerates shade.

PLANT ME

Winter Apple
Eremophila debilis

A prostrate groundcover to 1m across with pretty white flowers with pink edible berries during summer. Suited to a range of soils, full sun to partial shade.
Will tolerate dry periods.
Bird and butterfly attracting.

Guinea Flower
Hibbertia stricta
H. vestita

Low growing, dense shrubs with bright buttercup like flowers and short linear or blunt leaves.
These small shrubs grow from 30 to 60cm and are hardy in most soils once established. They prefer full sun to dappled shade.
A pollen source for native bees.

Native Iris
Patersonia sericea
P. fragilis

Clumping strap-like leaves to 50cm. Flowers with three deep violet petals winter to spring and after good rain. Prefers full sun for best flowering and well drained soils. *P. fragilis* prefers swampy conditions.

Queensland Wax Flower
Philotheca queenslandica

Low slender habit to 80cm. Short waxy leaves. Brilliant five petalled wax flowers erupt profusely from winter to spring. Adaptable to most soils, prefers full sun to part shade.

Slender Rice Flower
Pimelea linifolia

Prostrate to slender erect habit to 60cm. Two pairs of opposite linear leaves to 3cm. Terminal clusters of white/pink flowers mainly winter and spring. Adaptable to most soils, frost tolerant, shade to full sun.

Hairy Bush-Pea
Pultenaea villosa

Dense, weeping shrub to 2m with soft hairy foliage and reddish new growth. Masses of bright yellow pea-shaped flowers with red centres mainly from spring to summer. Adaptable to most soils, sun-part shade. Excellent feature plant.

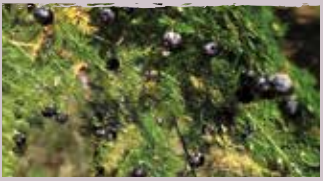
DON'T PLANT

Coral Creeper
Barleria repens

Creeper or scrambler up to 2m. Easily roots at each joint/node. Tubular flowers pink/red summer to autumn. Spreads by wind, water and dumped garden waste. Becomes dense mat on ground and over plants. Invades urban bushland, foreshores and waterways.

Black-Eyed Susan
Thunbergia alata

Native to Africa. Twining vine to 5m. Flowers bright orange with a black/brown centre (sometimes white). Spread by water and dumped garden waste. Found along roadsides, waterways and in urban bushland.



Climbing Asparagus
Asparagus plumosus – declared

Climbing stems to 8m with spines to 1cm. Fine dark green needle-like leaves, orange/black berries. Spread by birds, water and garden waste. Invades vine forests, foreshore and urban bushland.

Flame Vine
Pyrostegia ignea syn.
P. venusta

Abundant clusters of large tubular bright orange flowers in winter. Smothers native vegetation.

Coastal Morning Glory
Ipomoea cairica
Blue Morning Glory
I. indica

Vigorous twining climber. Large funnel shaped purple flowers in summer. Spread by water, garden waste. Found along roadsides, in urban bushland, waterways and on vacant land. I.cairica has pink flowers. Smothers native vegetation. Declared K'Gari (Fraser Island) only.

Blue Trumpet Vine
Thunbergia grandiflora – declared

Native to India and South China. Vigorous twining long lived vine. Large trumpet-shaped pale blue flowers with white throats form in clusters. Large tuberous root system. Found in gardens, roadsides, waterways and urban bushland. Smothers native vegetation.

PLANT ME

Native Lilac
Hardenbergia violacea

Attractive climber, trailing pot-plant or small shrub. Dark green leaves with squared off base, sprays of bright purple pea flowers, flowers from winter to early spring.
Full sun to shade. Does not tolerate direct coastal exposure.

Dusky Coral Pea
Kennedia rubicunda

Prostrate or climbing vigorous twiner to 4m. Clusters of large deep red pea flowers to 4cm winter and spring. Found along bushland edges. Grows in disturbed areas, adaptable to most soils, best in full sun.

Wombat Berry / Orange-Vine
Eustrephus latifolius

Hardy slender twiner with wiry stems to 6m. Clusters of showy white to pale pink star shaped flowers spring to summer.
Requires support by tying, prefers shaded position in most soils.

Fraser Island Creeper
Tecomanthe hillii

Vigorous climber with pink tubular flowers on old wood in spring. Grows and flowers best in part shade or morning sun. Prefers free draining but moist soils. Propagation by cuttings or seed.

Native Hoya
Hoya australis

Slow growing trailing twiner with waxy cream clusters of flowers. Grows in sun or semi-shade in well drained soils. Suitable for hanging baskets, along fences and as an understorey creeper. Avoid pruning old flowering points as this is where new flowers will occur. Propagation from cuttings.

Native Wisteria
Austrocallerya megasperma syn Milletia megasperma

Vigorous woody climber with glossy leaves. Produces masses of hanging sprays of lilac pea-shaped flowers to 15cm in spring (similar to exotic *Wisteria spp.*). Sun to part shade in moist soils, frost tolerant. Excellent trellis plant for pergolas etc.

DON'T PLANT

Mickey Mouse Plant
Ochna serrulata

Native of South Africa. Common in older gardens growing to 2.5m tall. Flowers yellow producing 4-6 green to black berries surrounded by bright red 'sepal'. Spread by birds and garden waste. Thriving in native and urban bushland, roadsides, foreshore and waterways. Declared Fraser Island only.

Shoe Button
Ardisia elliptica

Native of South East Asia. Shade tolerant single trunked, branching habit to 3m. Produces clusters of pinkish-white star shape flowers throughout the year. Masses of red-black berries rapidly spread by birds, mammals and dumped garden waste forming dense stands suppressing regrowth in local bushland, mangroves and wetlands.

Mock Orange
Murraya paniculata

A commonly cultivated garden shrub usually to 4m but occasionally to 7m with deep green oval leaves and highly perfumed white flowers from late winter to spring. It is becoming an invasive plant through bushland regions being spread by birds eating the red fruits and dumped garden waste.

Pigeon Berry
Duranta erecta

Native to Central and South America. Slightly spiny to 4-7m. Clusters of light purple-white tubular flowers and clusters of yellow/orange toxic fruit. Common garden and hedge plant spread by birds, bats and water.

Common Indian Hawthorn
Rhaphiolepis indica

Native to Southern China. Grows 1-4m tall with clusters of white-pink flowers in spring. Bluish-black berries in summer. Spread by birds, water and humans. Commonly grown ornamental garden plant, increasingly found in bushland areas and along waterways.

Sisal Hemp
Agave sisalana

Native to Mexico. Tough succulent that suckers from the base and produces bulbils. Flowers are cream clusters on a long central stem to over 5m. Found on foreshores, roadsides and vacant land, rapidly forming dense stands. Declared K'Gari (Fraser Island) only.

PLANT ME

Lolly Bush
Clerodendrum floribundum

Single trunked, rounded canopy. Fragrant white tubular flowers spring to summer. Fruits from March to December with large round glossy black berries surrounded by red calyx. Grows in most soils.

Hairy Pittosporum
Pittosporum revolutum

Single trunked compact habit growing to 4m. Clusters of creamy flowers winter to spring. Orange/yellow rounded warty capsules opening up to reveal red sticky seeds from autumn to winter.

Carrol / Cinnamon Myrtle
Backhousia myrtifolia

A dense bushy shrub to 7m with aromatic leaves and beautiful creamy white clusters of flowers during summer. Prefers a sandy soil type in well drained moist soil in full sun or light shade. A good hedging plant that will provide habitat for little birds. Bush tucker – the cinnamon scented leaves are used for flavouring foods.

Wild May
Leptospermum polygalifolium

Rounded habit to 4m. Small aromatic narrow oblong leaves with masses of white flowers late spring to summer. Responds well to regular pruning. Adapted to most soils. Flowers best in full to dappled sun.

Coffee Bush
Beynia oblongifolia

A hardy shrub or small tree up to 3-4 m found in many ecosystems. It is adaptable to full sun or shade areas under trees and suited to most soil types. They produce many small red berries eaten by the Brown Cuckoo Dove. The leaves and fruit are hosts for several species of native butterflies.

Swamp Lily
Crinum pendunculatum
C. angustifolium

Hardy clumping habit with large fleshy strap-like leaves to 1m. Clusters of large scented white flowers from spring to summer. Adaptable to most soils and conditions. Tolerates frost and salt laden winds. Crushed leaves relieve marine sea jelly stings.

PLANT ME

Prickly Moses
Acacia ulicifolia
A. hubbardiana

Open rounded shrub to 2m. Small stiff prickly leaves. *A. hubbardiana* has triangular leaves. Cream ball flowers from late winter to spring. Adaptable to most soil types, will tolerate poorly drained soils. Responds well to light pruning to shape.

Heath Aotus
Aotus ericoides
A. lanigera

Dense rounded bush to 2m. Producing long stems near the base and compact clusters of narrow and recurved leaves. Beautifully coloured bright yellow pea flowers with red throats from late winter to spring.

Wallum Grasstree
Xanthorrhoea johnsonii
Swamp Grasstree
Xanthorrhoea latifolia or X. fulva

Older plants grow a distinctive trunk to 2m. Produce creamy white deeply scented flowers on long spikes from spring to summer. Prefers well drained soils. Swamp grasstree has wider lighter green leaves, no trunk and prefers damper soils.

Twiggy Myrtle
Sannantha bidwillii

A hardy evergreen shrub to 4m with a weeping habit that bears masses of tiny white flowers during summer. Suitable for most soil types, full sun to part shade. Responds well to pruning. A good nectar source for butterflies and native bees.

Swamp Banksia *Banksia robur*
Dwarf Banksia *B. oblongifolia*
Hairpin Banksia *B. spinulosa*

Erect speading habit to 2m. Showy cylindrical flowerheads to 18cm blue/green to yellow/green from summer to winter. Hardy, tolerates frosts, adaptable to most soils, sunny swampy sites. No fertiliser. *B. spinulosa* multi-stemmed to 3m with reddish to yellow flowers.

Chain Fruit
Alyxia ruscifolia

Upright habit to 3m. Showy white perfumed star shaped flowers in summer. Orange/red berries often forming a chain in autumn. Full sun to heavy shade. Good feature and pot plant, responds well to light pruning.

PLANT ME

Hop Bush
Dodonaea triquetra

Woody erect bushy habit to 5m. Flowers in terminal clusters from August to November. Fruit showy red/brown 2-3 winged papery capsules winter to summer. Hardy, well-drained soil, full sun to part shade. Responds well to light pruning. Similar growth habit and cultivation requirements to *D. viscosa subsp. burmanniana*, height to 3m.

Pointed Leaf Hovea
Hovea acutifolia

Erect slender habit to 1.5m. Rusty hairs along stems and under leaves. Elliptical green stiff leaves. Clusters of showy dark purple pea-flowers winter to spring. Prefers well drained soil, part shade.

Wallum Bottlebrush
Melaleuca pachyphylla

Light multi-stemmed habit to 1.5m. Lime green bottle brush flowers to 10cm from spring to autumn. Hardy, tolerates poor drainage in full sun.

Boobialla
Myoporum acuminatum
M. boninense

Groundcover growing 30cm high to 5m wide. Small green leaves, dainty white or pale purple flowers from spring to summer. Good soil stabiliser and trailer down rock walls. Sensitive to coastal exposure. Shelter for small lizards.

Blue tongue / Nunyi-um
Melastoma malabathricum syn.
M. affine

Low rounded habit to 2m. Clusters of showy 5cm pink/mauve flowers from April to January and sporadically throughout the year. Edible dark purple/red fruits in December. Sun-shade, frost tender, prefers well composted moist soils.

Wallum Hakea
Hakea Actities
Broad Leaf Hakea
Hakea benthamii

These upright shrubs to 3m bear showy clusters of white flowers amongst the leaves during spring attracting many butterflies and native insects. The needle like foliage of *H. actites* provides good habitat for small birds. Suitable for sunny or partly shaded areas with well drained or sandy soils.

DON'T PLANT

Broad-Leaved Pepper Tree

Schinus terebinthifolius - declared

Native of South America. Multi stemmed, 3m to 7m tall, readily suckers. Cream flowers in autumn. Shiny red berries in winter. Spread by water, birds and garden waste. Pollen may cause allergies. All parts of the plant are toxic. Found along stream banks, wetlands and coastal dunes areas, becoming dominant species if not controlled.

Brazillian Cherry

Eugenia uniflora

Native to South America, dense rounded habit grows 3-6m high. Succulent ribbed orange/red fruits spread by birds, small mammals and water into urban bushland, roadsides and waterways. Forms dense stands that outcompete native plants.

Easter Cassia

Senna pendula var. glabrata

Native to tropical America. Rounded bush grows 1.5 to 5m with mid green compound leaves and rounded leaflets. Yellow flowers in autumn and winter. Produces long rounded pea-like pods and easily colonises disturbed areas and invades bushland. Declared Fraser Island only.

Captain Cook Tree

Cascabela thevetia syn t. peruviana - declared

Native to tropical South America. Spreading about 2-5m with yellow bell flowers. Rounded triangular hard green-black fruit. All parts poisonous if ingested. Seeds spread by water and dumped garden waste. Found in dense stands along water ways and coastal areas.

Leucaena / Coffee Bush

Leucaena leucocephala

Native to Central America. Grows to 10m or more. Creamy white flowers in dense round clusters and long flattened red/brown pods. Used as a fodder plant. Forms dominant stands along creeks, drainage channels and bushland.

Yellow Bells

Tecoma stans - declared

Native to tropical America. Branched tree 1.5 to 5m tall with rough, furrowed brown bark. Clusters of yellow tubular flowers in spring. Long narrow seed pods with winged papery seeds spread by wind, water and garden waste. Found along roadsides, vacant land and water ways.

PLANT ME

Coast Canthium / Supple Jack
Cyclophyllum coprosmoides

Variable habit. Clusters of cream-white fragrant star flowers mostly from summer to autumn. Showy orange/red rounded fruit. Prefers well drained soil, full to part sun. Good screen/hedge. Dune stabilisation.

Fringed Wattle
Acacia fimbriata subsp

Fast growing, with dense pendulous habit to 4m when in flower. Masses of yellow scented ball flowers winter to spring. Adaptable to most soils, well drained, full sun. Excellent feature or screen.

Leichhardt Bean
Cassia brewsteri

A small tree to 10m with attractive sprays of yellow and red flowers during summer followed by long brown pods. A quick growing hardy species that tolerates most soil types, light frost and extended dry periods. Host plant for the Yellow Migrant and Tailed Emperor butterflies.

Muttonwood
Myrsine variabilis

Single trunked with dense narrow canopy to 12m. Small cream bell-flowers along branches winter to spring. Round purple fruit from November to March. Adaptable to most soils, sun to shade.

Maiden's Wattle *Acacia maidenii*
Irish Wattle *Acacia oshanesii*

These acacias are small fast-growing trees from 7 to 10m, long lived, usually found growing along rainforest margins. Hardy, suitable for most soil types, prefers full sun to partial shade. Host plants for many native butterflies. *A. oshanesii* – creamy yellow ball flowers winter to spring and sporadically throughout the year. *A. maidenii* – creamy yellow flower spikes appear from summer to autumn.

Wallum Banksia
Banksia aemula
Coast Banksia
B. integrifolia

Dense rounded habit with heavy trunk grows to 8m. Creamy yellow cylindrical flowerheads to 20cm from autumn to winter. Prefers well drained soils, but tolerates poor drainage on sandy soils.

DON'T PLANT

Cadagi
Corymbia torelliana

A native of North Queensland. Tree to 30m. Clusters of white flowers in spring. Seeds spread by wind, water, insects and garden waste. Resin can detrimentally affect native bees. Prone to limb drop, shades out understorey plants. Found along roadsides, waterways and vacant land close to urban areas.

Cocos Palm
Syagrus romanzoffiana

Native of South America. A single-stemmed palm that grows 12 to 20m. Feather-like fronds to 5m are retained on trunk for several months. Produces bunches of orange-yellow fruits in spring which are spread by flying foxes, birds, small mammals, water and garden waste. Invades bushland and along waterways.

Racehorse Tree
Tipuana tipu

Native to South America. Fast growing tree to 30m. Many yellow pea shaped flowers in summer with winged fruit following. Seeds germinate readily and are spread easily by wind and water. Invades native bushland and along waterways.

African Tulip Tree
Spathodea campanulata – declared

Native of tropical West Africa. Fast growing to 24m. Flowers orange-red tulip shaped throughout the year. Large pods with papery seeds spread by wind and water. Reproduce by suckers. Invades creeks and gullies. Flowers potentially kill bees.

Slash Pine
Pinus elliotii

Radiata Pine
P. radiata

Native to the Americas and Mexico. Grows to 30m. *P. elliotii* has large symmetrical cones with prickles on tips and winged seeds, spread by wind and water, birds and garden waste. *P. radiata* cones egg shaped. Found on roadsides, urban bushland and woodland quickly forming dense stands.

Umbrella Tree
Heptapleurum actinophyllum

Native to North Queensland. Fast-growing, multi stemmed to 15m. Produces many dark red seeds on erect spikes in summer. Spread by birds and flying foxes. Roots invasive, damage paths, foundations and pipes. Invades bushland, along waterways, gardens and roadsides. Declared Fraser Island only.

PLANT ME

Moreton Bay Ash
Corymbia tessellaris

Graceful form to 25m. Masses of honey scented flowers in winter. Small rounded woody capsules/ nuts. Adaptable to most soils, tolerates growth close to dunes. Excellent shade and feature tree.

Weeping Cabbage Palm
Livistona australis
L.decora

Single trunked palm to 20m. Leaf stalks have spines along the margins. Flower spikes to 1m spring to summer. Black/red fruits. Adaptable to most soils, but prefers moist soils.

Tulipwood
Harpullia pendula

Spreading rounded crown to 15m. Creamy flowers. Fruits opening to show black seeds in summer. Excellent shade or feature tree. Adaptable to most soils, prefers deep well drained composted moist soils with protection from coastal winds.

Paper Bark
Melaleuca quinquenervia
Soapy Tea Tree
M. dealbata

Grows to 20m. Creamy or red bottlebrush-like flowers from summer to winter. Adaptable but naturally found in moist swampy soils near the coast. *M. dealbata* to 20m, creamy-white flowers in cylindrical spikes, winter to summer.

Black She-Oak
Allocasuarina littoralis
Coastal She-Oak
Casuarina equisetifolia

Rounded dense habit to 10m. Male flowers produce rusty flush at end of branchlets. Female flowers small red from autumn to spring. Woody cylindrical cones to 3cm. Hardy, tolerates coastal winds and salt spray. Adaptable to most well drained soils. Excellent screen or shelter belt.

Pink Euodia
Melicope elleryana syn
Euodia elleryana
Fast growing open canopy to 10m. Profuse star-shaped pink flowers borne along branches from old leaf axils. Hardy and adaptable, moist soil, flowers at two-three years old. Food plant of native butterflies.

GROWING LOCAL PLANT SPECIES

WHEN TO PLANT

With the subtropical climate, planting can be undertaken almost any time of year. However, the ideal time is after rain when soil is moist.

DEPTH

Scrape back and remove any organic mulch on the soil surface, then dig a hole about 10cm deeper than the pot size. Plant native tree or shrub with the root ball covered by soil a few centimetres below ground level. This prevents the root ball drying out, especially during hot weather. Firm down the soil around the plant and leave a slight depression to catch water.

WATERING

Always water-in new native plants. Then, over the first summer, occasional deep watering may be required, but no more than once a week. After the first summer, plants should cope on rainfall alone. Prior to severe heat waves, give plants a thorough watering, so water penetrates deep into the soil.

The goal is to establish strong, deep root systems which are water-efficient and drought tolerant. Over-watering leaches nutrients from the soil and creates excessive growth, less flowering and shorter-lived plants.

Be mindful of current water restrictions and prescribed times allocated for watering.

MULCH AND GRAVELS

A layer of mulch can reduce evaporative water loss by more than seventy percent.[1] Organic mulch keeps soil temperatures down, which benefits root density, suppresses weed growth, and helps to promote good soil structure and productivity.

Apply 5–10 cm of mulch or gravel, creating a bowl shape around the plant to assist water retention. To avoid plant disease, keep mulch away from plant stems.

[1] SA Department of Environment and Natural Resources – backyards4wildlife.com.au

TIP!

Garden mulch can come from many sources, so check that what you use does not contain invasive seeds or contaminates.

FERTILISING AND WATERING

Fertilisers are not usually needed with local native plants. If you decide to fertilise, seek advice from a nursery as products with high levels of phosphorus can harm some plants. Rapid growth should be avoided as it makes plants leggy, weak and short-lived.

Potted local plants require more care than those planted. Water pot plants more regularly in summer, and apply a low-phosphorus fertiliser in spring and summer (ask a nursery to recommend a suitable product). Do not over-apply fertiliser as it can harm local native plants. Generally, plants may need re-potting every one to two years.

PRUNING

Pruning is beneficial for many plant species.
Most species appreciate a light trim to maintain shape, promote new growth and encourage flowering.
Pruning is best done after flowering, usually late spring or early summer. Young plants can be pruned lightly and regularly, older plants can be refreshed with a more extensive prune after flowering. Replace old plants that die or become straggly.

SUSTAINABLE LANDSCAPING

Help the environment by using sustainable and locally sourced materials, and by avoiding materials taken from natural ecosystems, such as moss rocks, river stones, fallen logs and red gum mulch.

More information on sustainable landscaping can be found on the Sustainable Gardening Australia website **sgaonline.org.au**

MORE INFORMATION

For further information on establishing local native plants, visit the Urban Forest Biodiversity Program website **backyards4wildlife.com.au**

HEAT MITIGATION

The world's warming climate is having negative consequences for ecosystems.

Rising temperatures are changing the physical environments that support living systems, by causing the expansion or decrease of habitats, or altering the timing of seasons.

TEMPERATURE AND ECOSYSTEMS

Temperature has a major part to play in ecosystems as it can impact an organism's **physiology**. Very few species can survive extreme temperatures, such as below 0°C, and even less can survive temperatures over 45°C.

One example of how temperature change can affect animals occurred in 2019 when extreme heat in Cairns killed a third of the local flying fox population over two days as temperatures climbed to 42°C. Proof that even hardy Australian animals like flying foxes are at risk from rising temperatures created by climate change.

To survive variations in temperature, organisms need to sustain their internal temperature, or live in an environment that will help their body stay within a temperature range which will enable them to survive. Sometimes however, animals will adapt to survive extreme temperature fluctuations. For example, by **hibernation** or reptilian **torpor**.

ESTIMATES SUGGEST THAT
BY 2070
UP TO 20% OF TROPICAL PLANT SPECIES WILL BE UNABLE TO REPRODUCE
DUE TO HAVING REACHED THEIR TEMPERATURE LIMIT TO TOLERANCE.

HOW SPECIES RESPOND

Rising temperature can impact where living things call home. For example, rising temperatures can alter flowering patterns of some plant species. This means that animals which rely on these flowers as a source of food may have to migrate further to find it. This also impacts their ability to locate a mate for reproduction, which impacts a species ability to survive.

Migration might mean moving just a short distance, or a long one. For Regent honeyeaters (*Anthochaera phrygia*), rising heat resulting from climate change threatens their habitat in several ways, from an increased risk of fire and drought to altered flowering patterns. This potentially means more habitat loss and degradation, and the prospect of forced migration.

Migration of native species can result in invasive species seeking new habitats. This can cause native species to decline or go extinct, which further alters local ecosystems.

FUTURE FEARS

Any species which cannot move and is living in habitat that is already testing their tolerance face the very real threat of extinction. Estimates suggest that by 2070 up to 20% of tropical plant species will be unable to reproduce due to having reached their temperature **limit to tolerance**.

Additionally, within the next 100 years we may lose up to one quarter of Earth's plant and animal species as a result of climate change.

SHADE AND COOLING

A simple and effective way to counter temperature change and its impact on ecosystems lies with trees and other vegetation.

They can help cool the environment by lowering surface and air temperatures by providing shade as well as through the process of **evapotranspiration**.

Through shading, it is estimated that plants can help mitigate heat and cool an area between 11-25°C, with **evapotranspiration** providing cooling of up to 5°C.

STRATEGIC POSITIONING

Native vegetation can significantly mitigate heat if planted in the right locations. This includes around buildings, along streets or in open spaces such as car parks.

Research studies have shown that **deciduous** trees or vines planted facing west are often more effective at providing cooling shade, especially over windows or sections of roofing. Using trees to provide shading to buildings can also decrease requirements for air conditioning, thereby helping to reduce energy requirements and save on energy costs.

There are other benefits, too, including:

- **Improvements to air quality and a reduction in greenhouse gases:** When trees and vegetation contribute to reducing energy, they also lower the level of air pollutants and greenhouse gas emissions, and store and **sequester**~ carbon dioxide.
- **Improved stormwater control and quality of water:** Planting vegetation can help reduce the amount of runoff and enhance water quality through the absorption and filtering of rainwater.
- **Less maintenance of pavements:** The shade created by trees reduces the break down of pavement, which means less time and money spent on maintenance.
- **Benefits all round:** Planting more trees and vegetation improves the look and feel of local areas, provides habitat for different species and can even help decrease noise levels.

URBAN HEAT ISLANDS

The 'urban heat island' effect is another result of increasing temperatures. Most urban spaces, from large cities to suburban areas, can be hotter than rural places due to development which has removed cooling vegetation and installed heat-trapping materials such as concrete and steel.

Reducing vegetation equates to less shade and moisture which is essential for keeping urban spaces cool. Also, roofing and pavement materials don't reflect the heat from the sun. Instead, they absorb it, which results in increases in surrounding temperatures.

Taller buildings and narrower streets result in decreased air flow. This traps heat (for example, from cars, industrial areas and air conditioner vents) which creates urban heat islands. As climate change progresses, and events of extreme heat intensify, the number, and temperature, of heat islands will increase.

FEELING THE HEAT

Urban heat islands have higher day-time temperatures compared to rural areas and do not receive as much benefit from night-time cooling.

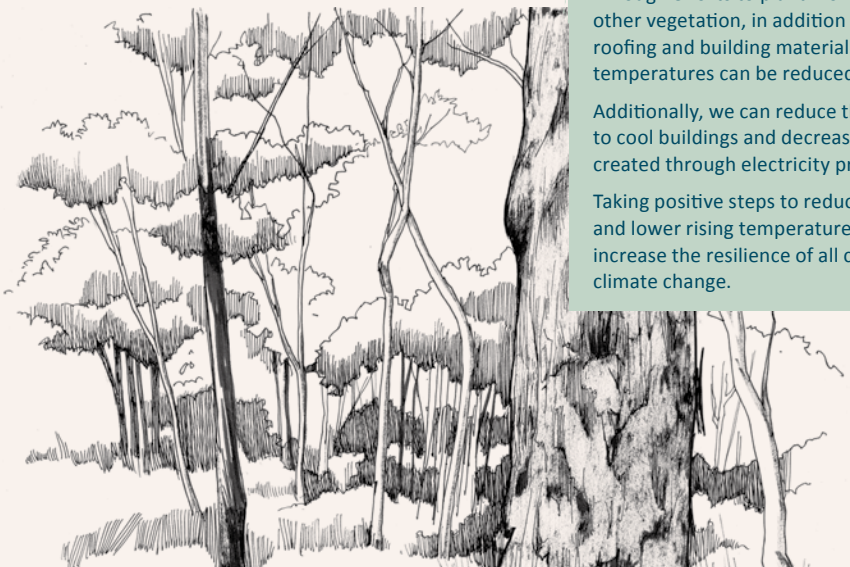
An urban area may be as much as 1-3°C warmer in the day compared to a rural area, with the night-time difference approximately 12°C.

POSITIVE STEPS

Through efforts to plant more shade trees and other vegetation, in addition to using cooling roofing and building materials, surface and air temperatures can be reduced.

Additionally, we can reduce the energy required to cool buildings and decrease **greenhouse gases** created through electricity production.

Taking positive steps to reduce urban heat islands and lower rising temperatures in general will increase the resilience of all communities to climate change.



SHADE TREES

These trees are much smaller in cultivation, usually less than half their maximum height when planted in open space as they are not in competition for sunlight.

Queensland Kauri Pine
Agatha robusta

A slow growing conifer from 20 to 50m high with a canopy spread up to 18m at maturity. Young trees have a narrow upright habit.
The tree has distinctive grey and brown mottled bark and glossy leathery leaves. Suitable for most soils and will tolerate dry times with the occasional deep watering.
A good habitat tree providing seed for large parrots and nest sites for other birds.

Hoop Pine
Araucaria cunninghamii

Often seen as an emergent in dry rainforest and along ridge tops.
It is a tree for large properties.
This is the tallest tree species in Qld from 20 to 60m high with a wide spread to 18m. It grows in a wide variety of soils from clay to deep sand. The protective prickly foliage is attractive to birds for nesting.

Jackwood
Cryptocarya glaucescens

A hardy tree from subtropical forests from 15 to 30m tall usually found on poorer soils. Green glossy aromatic foliage and scaly brown bark. Black fruits in autumn and winter are an important food source for native pigeons.
Host plant for the Orchard Swallowtail butterfly.

Yellow Kamala
Mallotus discolor

A common tree in the region's littoral vine forests to 15m high.
It has a dense canopy of lime green leaves with whitish undersides.
Bright yellow fruits are produced on separate female trees during summer. These fruits have traditionally been used to produce a yellow dye. Bird attracting.
A hardy tree once established.

Brown Kurrajong
Commersonia bartramia

A fast-growing bushy tree from 6 to 15m with layered horizontal branches. Clusters of white flowers cover the branches during summer with the large lime green, heart shaped leaves providing a shady canopy. Attractive to many nectar eating birds, butterflies and native bees.

Three-Veined Laurel
Cryptocarya triplinervis

A small tree to 10m common in littoral and riverine forests. It has a dense crown of glossy green leaves and pinkish new growth. Small fragrant white flowers are produced in spring followed by purplish black fruits attractive to birds. Host plant for native butterflies.

Eumundi Quandong
Elaeocarpus eumundi

A small slow growing tree with a narrow upright habit from 5 to 10m high. Flushes of new growth is an attractive bronze contrast to the dark green foliage. Delicate cream bell-shaped flowers lining the branches bear purplish blue fruits in autumn. Prefers fertile moist soil.

Tulipwood
Harpullia pendula

A rainforest tree from 6 to 20m with a dense canopy of light green leaves. Commonly planted as a street tree. In spring, showy red and yellow seed capsules open to reveal glossy black seeds eaten by the Australian King Parrot. Ample moisture and fertile soil will improve slow growth.

Crow's Ash
Flindersia australis

A hardy tree from 10 to 30m with a large spreading canopy, occasionally deciduous before flowering. Small scented flowers in spring produce star shaped woody pods during summer. Suitable for most soil types. Tolerates dry conditions.

Cheese Tree
Glochidion ferdinandi

A fast growing, pioneer species from 8 to 20m. The segmented round seed capsules were thought to resemble cheese rounds, hence the name. The shiny deep green leaves provide food for native butterflies. Suitable for most soils and tolerant of dry conditions. Useful for screening and windbreaks.

Brush Cherry
Syzigium australe

This Lilly pilly is a hardy adaptable rainforest tree that is fast growing if supplied with plenty of moisture and nutrition. It grows from 10 to 20m high, is very bushy with glossy deep green leaves and fluffy white flowers in spring. The pink edible fruits are eaten by many birds. Beware of planting it near underground plumbing.

Fraser Island Apple
Acronychia imperforata

An evergreen tree with glossy green leaves from 9 to 15m tall. Tiny star shaped fragrant flowers appear in summer followed by yellow edible, although sour, fruit. Tolerates exposed coastal areas. Prefers well drained and sandy soils. A host plant for the Orchard Swallowtail butterfly.

Firewheel Tree
Stenocarpus sinuatus

As the name suggests, this rainforest tree has spectacular fiery red and orange flowers. In cultivation it rarely grows more than 6m and has large, leathery, dark green, glossy leaves with an upright growth habit. Protect from strong winds and sun while young. It makes a fabulous specimen tree if allowed to grow to its full size and shape. Prefers deep, fertile, well drained soils.

Red Ash
Alphitonia excelsa

This hardy pioneer tree can grow from 5 to 15m. Also known as the Soap Tree as its leaves can be crushed in water to produce a bush soap to cleanse the skin. The mottled bark and the contrasting dark green leaves with white undersides is a distinct feature. Clusters of creamy yellow flowers attract butterflies and native bees. Suitable for most soils.

Lemon-Scented Myrtle
Backhousia citriodora

A bushy rainforest tree from 6 to 20m with lemon scented leaves. Clusters of white star shaped flowers with fluffy stamens occur in spring attracting many native butterflies and beneficial insects. The leaves are used as a flavouring in culinary dishes. Plant in a well-drained area and water well during summer.

Ivory Curl Flower
Buckinghamia celissima

This hardy rainforest tree grows from 8 to 25m tall. Its long cream flowers, similar to a grevillea cover the tree in summer. These attract many birds and butterflies for the rich nectar they produce. Adaptable to most soils. Will tolerate dry conditions when established.

Blueberry Ash
Elaeocarpus reticulatus

This evergreen small tree grows between 4-15m tall and 3-5m wide. It has a dense crown of silvery edged green leaves with attractive pink new growth. Delicate fringed flowers during spring produce shiny blue berries which last on the tree for many months. The berries are eaten by many native birds. A hardy tree once established that is suitable for most soils.

Swamp Box
Lophostemon suaveolens

Fast growing tree with weeping habit and grey-brown fibrous bark, 10-15 metres high. Foliage is dark green, with younger shoots bearing erect white hairs. When crushed, young leaves produce a geranium-like smell. Prior to falling, older leaves turn orange-red. Creamy-white flowers appear through spring and summer. Prefers a sunny position and will grow well in most soil types. Will tolerate poor drainage and swampy conditions. Bird and butterfly attracting and koala food tree.

Golden Penda
Xanthostemon chrysanthus

A hardy evergreen tree from 6 to 15m high with long dark green leaves and contrasting white and brown scaly bark. Masses of bright yellow many stamened flowers occur in summer which are highly attractive to birds. Suitable for most soils. Will tolerate dry conditions.

Brush Box
Lophostemon confertus

This fast-growing rainforest tree from 10 to 25m tall and a 5 to 15m canopy is known as a half bark as it has rough bark on the trunk and smooth pinkish upper limbs. It has a dense canopy of dark green glossy leaves and white multi stamened flowers in spring and summer. Water well to establish. Adaptable to most soils. Provides nectar and pollen for native bees and butterflies.

ECOSYSTEM SERVICES

Ecosystem services are benefits humans receive from naturally occurring processes in healthy ecosystems. They support and sustain life, however biodiversity loss is impacting these services and threatening the critical processes necessary for the survival of all species.

The key services provided through these processes occur through the four systems of provisioning, supporting, regulating and cultural (scientific and intrinsic values).

PROVISIONING

Services within this category are those which supply valuable commodities such as fresh water, food, fuel, fibre and medicine.

SUPPORTING

These services include long-term processes which are fundamental to maintaining life support systems such as nutrient cycling, soil formation, provision of habitat, production of oxygen, erosion prevention and flood mitigation.

IN 1997, EARTH'S ECOSYSTEM SERVICES VALUED AT $33 TRILLION PER YEAR

REGULATING

Regulating services are those relating to productivity, including climate regulation, carbon sequestration, seed dispersal and pollination.

CULTURAL

These services relate specifically to the scientific and intrinsic values of natural experiences within ecosystems. This includes recreational experiences, education and scientific research, as well as spiritual and religious connections.

In 1997, Earth's ecosystem services were calculated and valued at $33 trillion per year, by **ecologist** Robert Costanza. At the time, this value was almost twice the collective gross national product of every country on Earth.

WILDLIFE CORRIDORS AND HABITAT

Wildlife corridors are vegetated areas which provide linkages and connection to two or more habitat landscapes.

They allow native animals to move freely without crossing human-implemented barriers, such as roads, development and fences, which can potentially put them at risk.

Corridors increase opportunities for animals to find suitable habitat, food sources and mates for reproduction, which helps to reduce inbreeding. They also have a critical role in maintaining ecological processes, such as pollination and supporting landscape resilience against climate change through the storage of carbon.

Wildlife corridors are often classified according to size, from urban backyards to nationally significant corridors stretching across many kilometres.

Small corridors, for example, could be a narrow patch of vegetation which provides connectivity between two small areas of bushland, enabling animals to move freely between habitats. Large-scale corridors can span hundreds of kilometres and cover different landscapes and jurisdictions. Corridors of this type often rely on collaboration between various groups to oversee and manage them.

SUSTAINING WILDLIFE

Human-related actions, such as clearing natural areas for urban growth or agriculture, contributes to **habitat fragmentation**, which is now recognized as one of the biggest threats to **biodiversity**. As **habitat fragmentation** increases, the number of species becoming isolated is growing. This results in populations becoming cut-off from not only supporting habitats, but also from other members of their own species. This increases their vulnerability to events such as fire, flood and disease and results in a loss of biodiversity.

Adjusting land use practices, use and management can help retain and restore ecosystem connectivity across the landscape. This can include:

- Maintaining existing corridors.
- Increasing conservation activities, such as creating wildlife friendly gardens.
- Increasing invasive species (pest plants and animals) management to protect the health of natural environments.
- Retaining **remnant** and **regrowth vegetation** to provide structural habitat diversity (including leaf litter and fallen logs).
- Restricting domestic pet access to natural environments to reduce disruption to native wildlife.

CREATE A WILDLIFE FRIENDLY BACKYARD

Encouraging native wildlife into a backyard and creating a habitat that a variety of species can utilise is a simple and rewarding exercise. Providing a habitat which is as natural as possible, along with plenty of natural food sources is important for keeping native species healthy and resilient. Feeding animals from dishes or feeders (in addition to providing food sources which are not a natural part of their diet) may encourage the spread of disease and is, therefore, not recommended.

When setting up a wildlife friendly backyard that will attract different species habitat features that animals are drawn to in their natural environment should be incorporated.

These include a reliable water source and a good supply of natural food that animals can depend on year-round, along with shelter from the elements and possible predators. Providing habitat that offers the opportunity to breed is also encouraged.

The following suggestions can help to make a backyard attractive, and suitable as a habitat for local native species.

Frog ponds

Establishing a frog pond not only draws in frogs it creates a water supply for other animals to use. There are many different style of frog pond to choose from, however regardless of the style it should be located in a sheltered spot in the garden. Additionally, a wet or damp space in a yard can be repurposed and made even more inviting to frogs by adding some native shrubs, sedges and grasses.

To improve the suitability of a frog habitat and provide safety from predators, large stones or old logs that frogs can perch on or shelter beneath should be included. Native plants also offer protection and food. Ponds should have both deep and shallower sections so adult frogs and juvenile tadpoles can swim and leave the water. Only water which is clean and free of pollutants should be used.

Note: Chemicals are harmful to both frogs, and the insects they eat, so avoid using chemicals in and around your pond.

Birds

The most critical threat to native birds in urban areas is cats, who are responsible for killing an estimated 377 million birds each year (that equates to more than a million each day). Cat owners can help protect native bird species by including a bell on their cat's collar and keeping it indoors.

By planting a variety of plants, many different bird species can be catered for. This includes (for example) nectar-producing plants for honeyeaters, seed producing plants for cockatoos, parrots, pigeons and finches, and fruit/berry producing plants for wattlebirds, currawongs, cuckoo-shrikes and figbirds.

Wildlife, such as birds, that don't obtain water from what they eat require a dependable water source to survive, especially when the weather is hot or dry.

Through the provision of water in various safe places, birds can access offered water without being harassed by other species who may be aggressive or threatened by domestic animals such as cats.

Nest boxes

A behavioral trait shared by many wildlife is living or nesting in hollows found in trees.

The needs of different species vary, with some preferring a particular type of opening oriented a certain way, while others may like hollows with entrances and chamber spaces.

A nest box works well as an alternative if the surrounding area doesn't have trees with hollows. They can be installed in an existing native tree or attached to an appropriate pole standing amongst native vegetation.

Having one or more nest boxes in a backyard provides welcome habitat spaces for many species such possums, gliders, bats and birds.

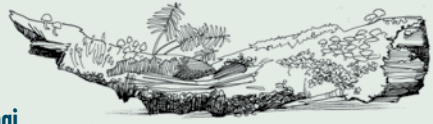
Natural habitat

Adding rocks and logs to a garden contributes to sheltering and protection of ground dwellers like geckos, lizards and frogs, along with the wide variety of invertebrates they consume for food.

Trees are essential for any natural environment, as they provide food and shelter for birds and other animals, cooling shade as well as helping to reduce atmospheric carbon. Native species with thick and thorny foliage provide small birds with protection. Large trees are ideal for high perches, watching out for predators or as places to roost. Trees also connect canopies, providing **arboreal animals** with increased opportunities to move around. A variety of plant species, which meet habitat requirements and are able to provide food throughout the year will encourage native animals to remain in an area.

Connected backyards and wildlife corridors

Opportunities to link vegetation through adjoining properties allows connectivity to be established and increases the amount of habitat available for wildlife. This then allows native species to move more readily across the landscape and provides them additional areas to forage, roost and nest.



Fungi

Fungi is an important component of a healthy ecosystem, making vital contributions to ecological cycles and processes. Two types of fungi commonly found in natural environments are:

- Decomposing fungi help to recycle nutrients and break down organic material. Decomposer fungi, is the secret to healthy compost.
- Mycorrhizal fungi attach to plant roots and, effectively, expand the area in which a plants root system can reach. This allows plants to increase the amount of nutrients and water they are able to extract from the soil.

Plants which grow in healthy soil enriched with decomposing organic matter and mycorrhizal funghi are hardier and more resistant to threats such as drought or diseases.

Fungi is also a valuable food source for a variety of native species. Research shows there are, at least, 30 species of Australian mammals, including possums, kangaroos, wallabies, gliders and bandicoots which will eat fungi (evidence taken from fungal spores found in animal droppings).

Pollinators

Species such as bees, butterflies, birds and flying foxes play a critical role in sustaining healthy ecosystems, with an estimated 90% of all (global) wild flowering species depending on them for pollination. Not only do they transfer pollen between plants as part of the plant's reproductive cycle, they are fundamental for maintaining **biodiversity**, habitats and ecological processes. Additionally, pollinators are an important part of food production practices.

In recent years, however, their numbers have been in decline. Ongoing alterations to natural landscapes have resulted in reduced habitat, with fragmentation and degradation reducing pollinators food and nesting resources.

Perennial plants which are grouped together offer considerably more opportunities for pollination to occur than a single plant. Including native species which flower at different times will provide food sources for pollinators year-round. Flowering plants attract winged insects such as butterflies, which often lay their eggs on the underside of leaves. When the larvae hatch, they then use the leaves as a food source.

Bees are one of the most important pollinating species. Up to 25% of all food and drink is thanks to the work of bees.

Soil

Soil is one of the key components for life on Earth. With up to 1 billion organisms contained in 1 teaspoon of healthy soil, it is the richest source of life on Earth. Soil organisms include bacteria, fungi, protozoa, nematodes, arthropods and earthworms.

Soil has the ability to absorb, store and filter water. As surface water moves through the soil, dust, chemicals and other pollutants are left behind and clean water is deposited into underground aquifers for use by plants and animals.

It also contains twice as much carbon as the atmosphere and approximately three times the amount stored in vegetation. When plants and animals die, they decompose (break down) and provide nutrients (food) back into the soil to be used by plants and other organisms. This decaying organic matter (humus) helps to store carbon and prevent it from being released into the atmosphere.

Soil quality is important for healthy ecosystems. Groundcover such as fallen leaves, twigs, bark and flowers provides a naturally occurring mulch and improves soil quality by returning nutrients to the soil through decomposition. The more fertile and healthier the soil is, the better plants will grow.

VEGETATION LAYERS – A MOSAIC OF HABITATS

Within natural environments you can often see tall trees, shrubs, groundcovers and vines all living within the same area. On the ground there will be an abundance of fallen leaves, twigs, moss, and fungi.

Nature has found a way for all these plants to grow together, making sure they all receive the right amount of light, water and nutrients they need to reproduce. When describing parts of a natural environment we often refer to the different vertical layers. Each layer plays an important role in the ecosystem and provides a mosaic of different habitats which meet the needs of a variety of wildlife species.

As ecosystems grow, the composition of these layers may change. Large trees may die and fall over, crushing many smaller plants along the way. This creates space for new plants to emerge. Taller trees take longer to grow, however in the meantime smaller ones will fill the gap.

EMERGENT

Emergents are very tall, straight trees that rise above the rest of the canopy. Their crown branches out widely allowing their leaves to make use of the available sunlight.

CANOPY

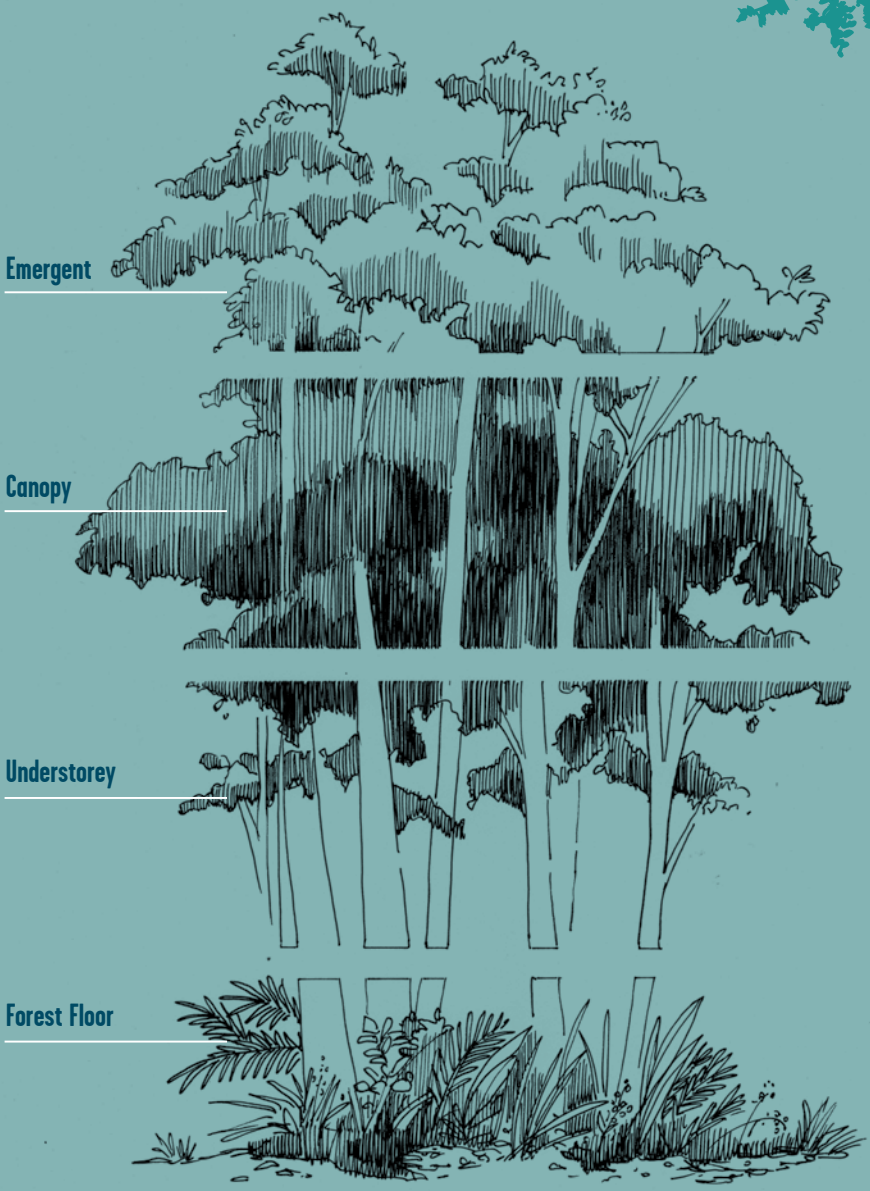
The canopy is where the crowns of most of an ecosystems trees meet and form a thick layer. This maintains cool and moist conditions and shields the rest of the system from harsh sun, dry wind, loss of moisture and sudden changes in temperature.

UNDERSTOREY

The understorey of ecosystems consist of immature trees and small trees or shrubs that are shorter than the main canopy level. Epiphytes, plants that grow on other plants, can often be found in this layer. Understorey species provide shelter for a wide range of animals.

FOREST FLOOR

The forest floor is often blanketed with decaying leaves, twigs, fallen trees, animal scats and other detritus. You can also find ground ferns, seedlings, mosses and fungi. The forest floor is where recycling occurs as fungi, insects, bacteria and earthworms break down organic materials and make the nutrients available for use by other plants in the forest.


Emergent
Canopy
Understorey
Forest Floor

GLOSSARY

Arboreal animal An animal that lives in trees

Biodiversity The variety and variability of life on Earth, which is measured at the genetic, species and ecosystem levels

Deciduous A tree or shrub that sheds its leaves annually

Ecologist A scientist who studies the relationships between organisms and their environment

Evapotranspiration The process by which water is transferred from the land to the atmosphere by evaporation from the soil and other surfaces and by transpiration from plants

Greenhouse gases Gases in the Earth's atmosphere that trap heat

Habitat fragmentation The process of transforming large areas of habitat into smaller patches which are isolated from each other

Hibernation The condition or period of an animal or plant spending the winter in a dormant state

Limit to tolerance The upper and lower limits of an environmental factor (eg. light, temperature, water) within which an organism can survive

Physiology How organisms or bodily parts function

Remnant vegetation An ecological community containing vegetation that has not been significantly disturbed by destructive activities such as agriculture, logging or pollution

Regrowth vegetation Vegetation that is not remnant, or has not been cleared for 15 years

Sequester The storage of carbon dioxide in vegetation such as grasslands or forest, as well as in soils and oceans

Stolon A creeping horizontal plant stem or runner that takes roots at points along its lengths to form new plants

Torpor A state of physical or mental inactivity

USEFUL RESOURCES

WEBSITES

- Fraser Coast Regional Council **frasercoast.qld.gov.au/environmental-management**
- Noosa and District Landcare Nursery **noosalandcare.org/plant-sales/**
- Noosa's Native Plants **noosasnativeplants.com.au**
- Weeds Australia **weeds.org.au**

BOOKS

- Beach Plants of South Eastern Australia, P.Carolin & P.Clarke (1991)
- Eucalyptus of the Sunshine Coast and the Coast from Bundaberg to Coffs Harbour, T.Bean (1995)
- Field guide to the eucalypts of the Gympie, Imbil and Maryborough Forestry Districts, M.Podberscek (1993)
- Grasses, Native and Introduced Grasses of The Noosa Biosphere Reserve & Surrounding Regions, S.MacDonald, S.Haslam (2009)
- Mangrove to Mountains revised edition, G.Leiper, J.Glazebrook, D.Cox & K.Rathie (2008)
- Rainforest Climbing Plants, A field guide to their identification, G.Harden, B.McDonald, J Williams (2007)
- Rainforests Trees and Shrubs, A field guide to their identification, G.Harden, B.McDonald, J.Williams (2006)

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Respecting our
NATURAL ENVIRONMENT