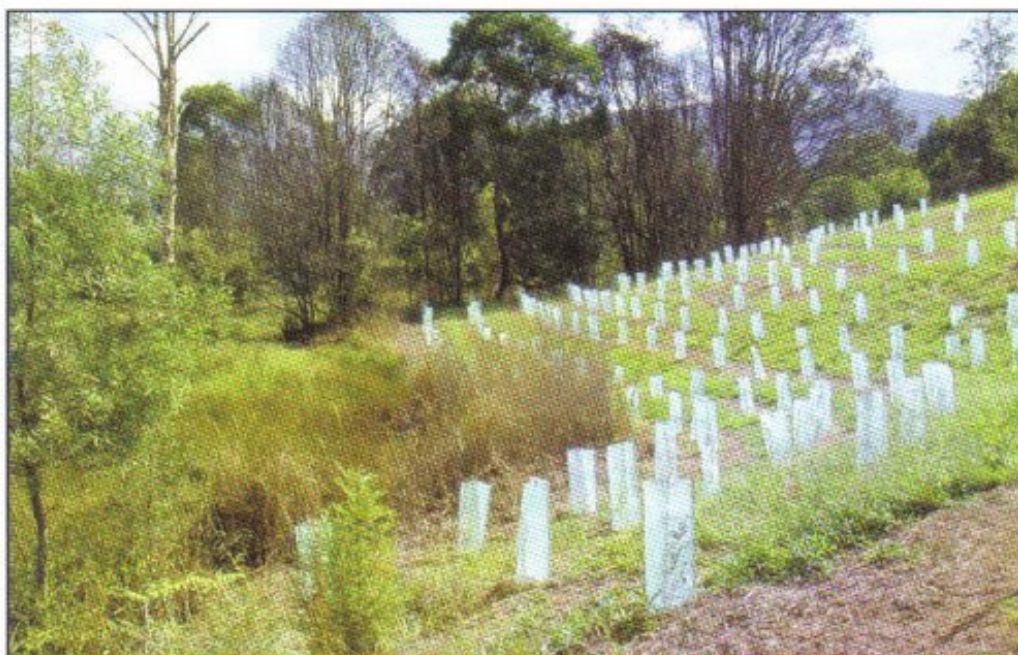




Revegetating Streams in the Bellinger and Coffs Harbour Catchments

A GUIDE TO SPECIES, PLANTING LOCATIONS AND PLANTING METHODS





Reprinted by: Northern Rivers Catchment Management Authority

Original material prepared by: A. Raine and J. Gardiner, 1997

This report is copyright. Parts of it may be reproduced for the purposes of study and/or research provided acknowledgment of the source is clearly made. Enquiries should be addressed to the Northern Rivers Catchment Management Authority. This document should be cited as:

Revegetating Streams in the Bellinger and Coffs Harbour Catchments, Northern Rivers Catchment Management Authority, Grafton, 2007.

ISBN 978 0 7347 5867 5

Northern Rivers Catchment Management Authority
May 2007

Disclaimer

While this booklet has been prepared exercising all due care and attention, no representation or warranty, expressed or implied is made as to the accuracy, completeness or fitness for the purpose in respect of any user's purpose.

Any representation, statement opinion or advice, expressed or implied in this publication is made in good faith and on the basis that the State of New South Wales, its agents and employees are not liable (whether by reason of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement or advice referred to above.

INTRODUCTION

This guide lists the plant species that occur in the fresh water section of the Bellinger (including Kalang) and Coffs Coastal Catchments.

The location of the plants are shown as:

- a) position within the catchment (upstream – downstream)
- b) position on the river bank (zone)

** indicate if the plant species only occurs in a particular river system or only in one zone of the system.

It is unlikely that *all* of the species listed will be found in one location. In choosing species to plant for the restoration of a site, it is advisable to:

- a) follow the recommendation indicated in the table as suitable for restoration, and
- b) take note of species that are already present at or near the site and mimic nature.

What is the riparian zone?

The term riparian zone describes any land which adjoins, directly influences, or is influenced by a body of water. These zones act as a link between the terrestrial and aquatic ecosystems which lay either side of them.

Why is riparian vegetation important to in-stream health?

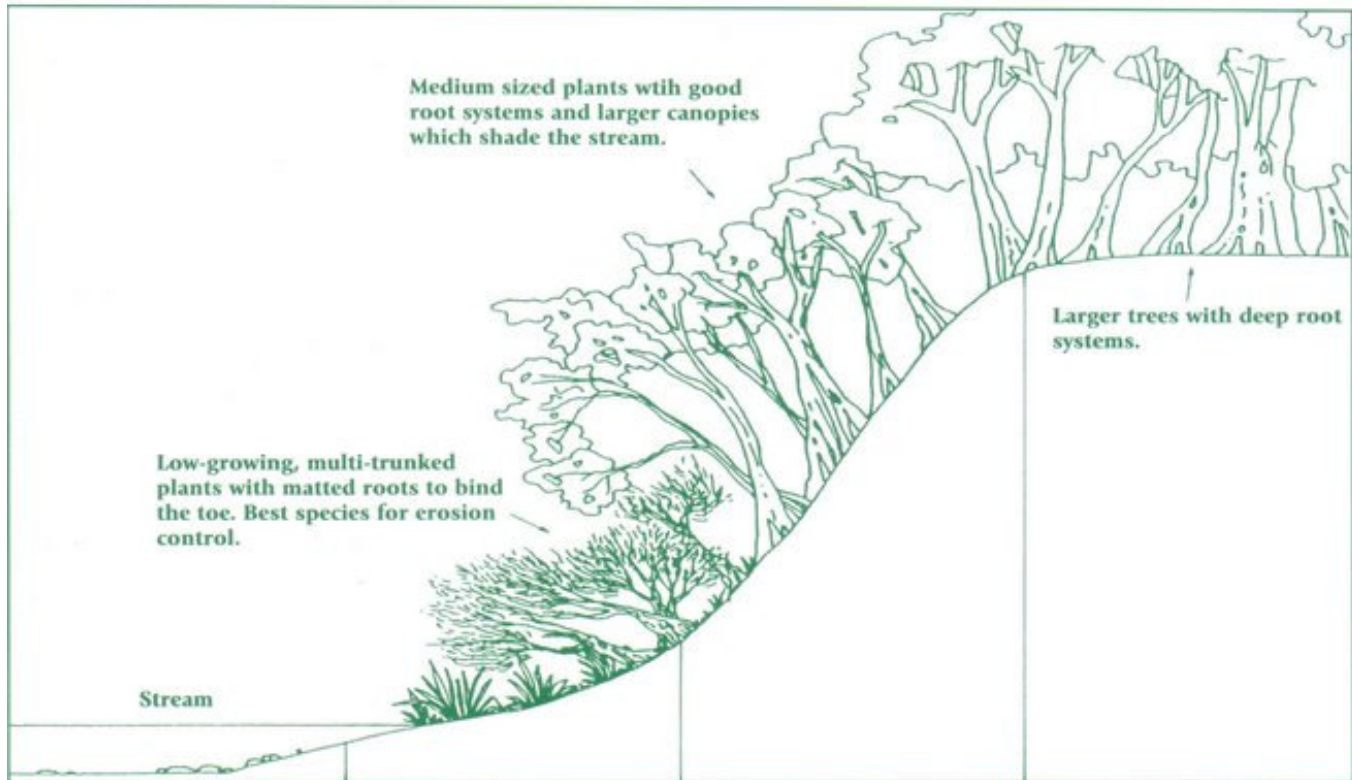
Clearing of riparian vegetation and disturbance through continuous grazing in the riparian zones degrades stream health in a number of ways:

- it reduces shade, thereby increasing water temperature
- it increases surface water run-off and sediment, as well as the removal of shelter and habitat for terrestrial and aquatic fauna
- it destabilises banks and leads to accelerated stream bank erosion

Replanting cleared or disturbed riparian zones is an important land management action as it helps to stabilise banks and provide a buffer against sediment.

Using a variety of native species ranging from tall, deep-rooted trees to fibrous root grasses and shrubs will help to hold the soil in place and maintain the soils structural integrity.

SPECIES BY STREAM AND LOCATION



STREAM	TOE	MIDDLE	UPPER
ALL STREAMS (including Coffs Creek) * well protected sites ** lower reaches of streams only *** lower Kalang River only **** absent from Coffs Creek	<i>Ficus coronata</i> <i>Leptospermum brachyandrum</i>*** <i>Lomandra hystrix</i> <i>Tristaniopsis laurina</i> <i>Waterhousea floribunda</i>**/*	<i>Acacia melanoxylon</i> <i>Alphitonia excelsa</i> <i>Amorphospermum whitei</i>* <i>Archontophoenix cunninghamiana</i>* <i>Backhousia anisata</i>**** <i>Backhousia myrtifolia</i> <i>Callicoma serratifolia</i>* <i>Casuarina cunninghamiana</i> <i>Cordyline stricta</i> <i>Cryptocarya glaucescens</i> <i>Cryptocarya microneura</i> <i>Cryptocarya obovata</i>* <i>Daphnandra micrantha</i>* <i>Diploglottis australis</i>* <i>Ehretia acuminata</i> <i>Elaeocarpus obovatus</i> <i>Endiandra discolor</i>* <i>Endiandra muelleri</i>* <i>Ficus coronata</i> <i>Glochidion ferdinandi</i> <i>Guioa semiglauc</i> <i>Heritiera trifoliolata</i>* <i>Jagera pseudorhus</i> <i>Melicope micrococca</i> <i>Neolitsea dealbata</i> <i>Planchonella australis</i>* <i>Rhodomyrtus psidioides</i> <i>Sloanea australis</i>* <i>Syzygium australe</i> <i>Tristaniopsis laurina</i>	<i>Acacia melanoxylon</i> <i>Alphitonia excelsa</i> <i>Elaeocarpus obovatus</i> <i>Eucalyptus grandis</i> <i>Eucalyptus microcorys</i> <i>Ficus spp.</i> <i>Flindersia schottiana</i> <i>Hymenosporum flavum</i> <i>Lophostemon confertus</i> <i>Melia azedarach</i> <i>Pittosporum undulatum</i> <i>Toona australis</i>

NOW GO TO THE SPECIES DESCRIPTIONS TO CHECK COMMON NAMES AND SEE WHICH ARE BEST FOR YOUR SITE

Botanical/ Common name	Brief Description	Position in Catchment (upper, mid, lower)	Zone (instream, Toe, mid-bank, upper-bank)	Growth Form	Max Height (m)	Growth Rate (F=fast, M=moderate, S=slow)	Recommended species for restoration	Frost Tolerance	Wildlife	Comments
<i>Acacia melanoxylon</i> , Blackwood /Sally wattle	Medium sized bushy wattle, pale yellow flowers, very hardy	Upper, middle & lower	Mid, upper-bank	Small tree	10m	F	X	3	Seeds attract birds	Widespread distribution, especially at higher altitudes, useful buffer tree for protecting streamside and RF plantings.
<i>Acronychia oblongifolia</i> , Common	Small to medium size tree with obovate leaves to 10cm, bears small white flowers and small fleshy fruits.	Middle, predom nantly lower	? Mid, upper	Small tree	14m	M	X	1		Grows in warmer RF and in regrowth RF, widespread in coastal areas, may sucker in cultivation.
<i>Acronychia aggregata</i> , Tall groundberry	Erect spreading shrub, flowers sept-oct.	Middle	Mid, upper-bank	Shrub	1.2m	M		1		Grows in RF and sclerophyll forest on rocky sandstone and granite areas with skeletal sandy soils.
<i>Aegiceras corniculatum</i> , River mangrove	Small mangrove tree, thick and leathery yellow-green leaves, white flowers in sept-oct.	Lower estuary	Instream, Toe	Shrub	4m	S	X	1		Grows in less saline water than the grey mangrove.
<i>Akania lucens</i> , Turnipwood	Small tree with long, dark, green, shiny, pinnate leaves to 75cm, white or pink fragrant flowers.	Upper, middle & lower	? Mid, upper	Small tree	10m	F		1		Accepts heavy shade, young plants remain unbranched for some time.
<i>Alangium villosum</i> , Musk wood	Small RF tree with cream or yellowish flowers and black fruits.	Lower	? Mid, upper	Tree	20m	M		1		Can tolerate a variety of soil types and coastal locations.
<i>Alocasia brisbanensis</i> , Cunjevoi lily	Very large, spade-shaped leaves, fleshy stalks, RF plant, flowers similar to Arum lily.	Middle, predom nantly lower	Lower	Herb	up to 1.5m	F		1		Suitable for poorly drained and heavily shaded areas, good regeneration capabilities, propagate by seed or rhizome division.
<i>Alphitonia excelsa</i> , Red Ash	Medium sized tree with some drought tolerance, leaves white underneath, hardy	Upper, middle & lower	Mid, upper-bank	Tree	12m	F	X	3	Seeds attract birds	Often in sheltered gullies or on steep slopes, stock forage tree, good RF regeneration tree
<i>Alpinia caerulea</i> , Native ginger	Erect stems with large, light-green leaves in a single plane on opposite sides of stem, rising from a creeping rhizome, bears white flowers followed by blue globular fruits.	Lower	Lower-mid upper	Herb	1.5m	M		1		Keep moist
<i>Amorhospersmum whitei</i> , Rusty Plum	Rare, medium sized RF tree with large leaves that are rusty-fairy beneath, large black fruits in spring.	Upper, middle & lower	Mid bank	Tree	10m	?S		1	Fruit attracts birds	Feature tree for RF plantings, best for protected sites.
<i>Archontophoenix cunninghamiana</i> , Bangalow Palm	Single stemmed, best for well-watered, protected sites	Lower	Mid bank	Tree	10m +	F		1	Fruit attracts birds	Best for protected sites.
<i>Baloghia inophylla</i> , Brush Bloodwood	Small to medium size tree with white flowers and brown fruits approx. 1.5cm.	Middle, lower	Mid bank?	Tree	15m	m		1		Widespread in all warmer RF types, recommended for foliage, sap is red when tree is cut or injured.

Botanical/ Common name	Brief Description	Position in Catchment (upper, mid, lower)	Zone (instream, Toe, mid-bank, upper-bank)	Growth Form	Max Height (m)	Growth Rate (F=fast, M=moderate, S=slow)	Recommended species for restoration	Frost Tolerance	Wildlife	Comments
<i>Blechnum nudum</i> , Fishbone Water Fern	Very common fern, light green pinnate fronds to 70cm, older specimens can develop trunk to 30cm.	Middle, lower	Upper, mid bank	Fern	1m	F		1		Hardy, requires damp, well composted soils, often forms colonies along creek banks.
<i>Boehmeria</i> <i>platyphylla</i> var. <i>astroqueenslandica</i> , Native ramie	Soft hairy shrub.	Middle, lower	Toe	Shrub	2m	S		1		Grows in open rocky places in RF watercourses.
<i>Callicoma</i> <i>serratifolia</i> , Callicoma	Tall shrub or RF tree with distinct toothed leaves and white underside, usually on shaded rocky banks, need water to establish	Middle, predomi nantly lower	Mid bank	Small tree	10+m	F	X	1		Common along creeks and rocky gullies, useful understory species in protected, shady areas.
<i>Callistemon</i> <i>salignus</i> , White bottlebrush	Small, dense tree with papery bark and narrow leaves to 10cm, pink foliage when young, white flower spikes to 8cm by 3cm diameter	Middle, lower	Mid bank, Toe	Small tree	9m	F	X	2	Attracts birds and insects.	Mostly grows in low-lying river flats and damp creeks, rarely in dry areas, good in coastal areas, can tolerate poorly drained areas.
<i>Carex appressa</i> , Cutty (tall) sedge	Tufted plant with leaves growing to 60cm in height.	Upper, middle & lower	Toe	Groun d cover	60cm	M	X	2		Propagates by division, needs wet soil and will tolerate wet roots, needs full sun.
<i>Carex</i> <i>longibrachiatum</i> , Bergalia Tussock	Tussock forming sedge with flowers and seeds on spikes.	Middle, lower	Toe Mid upper bank	Groun d cover	60cm	M		1		Understorey/ground cover Grows in wet places in RF and swamp-forest, understorey/ground cover.
<i>Carex maculata</i> , Native Sedge	Tussock forming sedge with flowers and seeds on spikes.	Lower	Toe	cover	60cm	M		2		Needs water, mulch and ample soil nutrients.
<i>Castanospora</i> <i>alphandii</i> , Brown Tamarind	Tree with weeping foliage, small, white, scented flowers and fleshy, peach coloured seed capsules.	Lower	Mid upper	Tree	15 - 30m	M		1	Larger, older trees are roosting sites.	Distributed along permanent freshwater streams, fixes Nitrogen, good canopy cover species for RF regeneration, direct seeding.
<i>Casuarina</i> <i>cunninghamiana</i> , River Oak	Tall, pine like species, very common on north coast, hardy, needs management as it may contribute to erosion.	Upper, middle & lower	Toe, mid bank	Tree	20m	F	X	2		Found in brackish situations along coastal streams, further inland along major river valleys, adaptable to most soils.
<i>Casuarina glauca</i> , Swamp oak	Conical or rounded tree with slightly pendulous branches, cylindrical cones to 1.8cm.	Lower	Toe, mid bank	Tree	20m	F	X	2		Not edible, prefers dry-subtropical RF, on poorer soils and moist, scrubby watercourses, resistant to salt spray.
<i>Choricarpia</i> <i>leptopetala</i> , Brown Myrtle	Large shrub or small tree with rough bark and dense canopy, flowers June to September.	Lower	upper-bank	Tree	15m	M	X	2		Can be used in coastal areas, insignificant flowers.
<i>Cinnamomum</i> <i>oliveri</i> , Oliver's sassafras	Tall tree with fragrant, rough bark, large lanceolate leaves with pale underside.	Lower	Mid upper	Tree/ Shrub/ small tree	30m	M	X	1		Can be used as a cover plant when establishing RF species, will accept up to half shade.
<i>Commersonia</i> <i>bartramia</i> , Brown Kurrajong	Bushy shrub with heart shaped leaves, yellow-green-grey underside, cream flowers in spring/summer.	Lower	Mid upper	Shrub/ tree	6m	F		2		On coastal lowlands and ranges.
<i>Cordylone stricta</i> ,	Slender shrub, often forming clumps,	Middle,	Mid bank	Shrub/ tree	2-5m	S		1	Fruit	

Botanical/ Common name	Brief Description	Position in Catchment (upper, mid, lower)	Zone (instream, Toe, mid-bank, upper-bank)	Growth Form	Max Height (m)	Growth Rate (F=fast, M=moderate, S=slow)	Recommended species for restoration	Frost Tolerance	Wildlife	Comments
Slender Palm-Lily	with long, narrow leaves.	lower		small tree					attracts birds	understorey plant in shady areas.
<i>Corymbia intermedia</i> , Pink bloodwood	Eucalypt with grey bark and large urn shaped fruits.	Lower	Mid upper	Tree	35m	F	X	2		Locally abundant, reliable in most soils, can resist salt spray.
<i>Crinum pedunculatum</i> , Swamp lily	Large plant with upright leaves 1m by 10cm at base, bears open white flowers about 10cm diameter on a thick stem.	Lower, coastal	Mid bank	Shrub	1m	M		1		Grows in swamps and along stream banks in coastal districts, needs a damp position in full sun or part shade.
<i>Cryptocarya glaucescens</i> , Jackwood	Medium sized, dense crowned, RF tree producing wrinkled black fruits in autumn.	Middle, lower	Mid bank	Small tree	10m	M	X	2	Fruit attracts birds	Best planted in protected areas
<i>Cryptocarya microneura</i> , Murrogon	Medium sized RF species producing shiny black fruits in summer/autumn.	Middle, lower	Mid bank	Small tree	10m	M		2	Fruit attracts birds	Reasonably hardy species for RF plantings.
<i>Cryptocarya obovata</i> , Pepperberry Tree	Medium to tall densely-crowned RF tree with hairy new growth and dark leaves.	Middle, lower	Upper, mid bank	Tree	up to 40m	S		1	Fruit attracts birds	Found in basaltic soils and alluvial flats, good shade tree.
<i>Cupaniopsis anacardioides</i> , Tuckeroo	Small-medium tree with shiny pinnate leaves, leaflets to 12cm, orange fruits.	Lower	Mid, upper- bank	Small tree	13m	M	X	1		Most soils and aspects, will tolerate salt spray, hardy on coast.
<i>Cyperus exaltatus</i> , Tall flatsedge	Stand forming sedge in often flooded areas, flowering spring-summer.	Middle, lower	Instream, Toe	Grass cover	2m	M		1		Grows in shallow water and on banks of streams and lagoons, widespread.
<i>Daphnandra micrantha</i> , Sockeywood	Medium, straight stemmed RF tree with compact, dense canopy and horizontal branches.	Middle, lower	Mid bank	Small tree	12m	S	X	1		Commonly on rocky sites near creeks, best planted in protected sites.
<i>Excelsa</i> , Giant Stinging Tree	Tree with large heart-shaped leaves to 20cm long covered in stinging hairs, autumn fruits pink and spiny.	Middle, lower	Upper	Tree	35m	M	X	1		Pioneer RF species on the coast and ranges, stinging hairs cause severe pain.
<i>Derrisfaedra davallioides</i> , Lacy ground fern	Soft creeping fern, densely covered with short, red-brown hairs.	Middle	Upper, mid bank	Grass cover	1.5m	M		1		Widespread, occurs in RF margins or moist sites in tall open forests.
<i>Diospyros pentamera</i> , Myrtle ebony	Small-medium tree with dark green, elliptical leaves.	Middle, lower	Upper, mid bank	Small tree	10m	M?		1	Fruits attract birds	Widespread in RF in coastal areas.
<i>Diploglottis australis</i> , Native Tamarind	Tall RF tree with very large compound leaves and rusty, hairy new growth.	Upper, middle & lower	Mid bank	Tree	15m	M	X	1	Fruit attracts birds	Best planted in protected sites.
<i>Duboisia myoporoides</i> , Corkwood	Tall shrub or small tree with corky bark, shiny leaves to 10cm and black fruits.	Upper, middle & lower	Upper, mid bank	Small tree	6m	F		2		Grows in high rainfall areas on RF margins up to 1000m, hardy, can grow in most soils and full sun to full shade, good screen plant, foliage can be attractive to caterpillars.
<i>Dysoxylum gaudichaudianum</i> , Hairy rosewood	Small-medium sized tree with finely wrinkled grey bark, new growth rusty coloured.	Middle, lower	Upper, mid bank	Small tree	10m	M		1		In subtropical and dry RF, seed pod has golden irritating hairs.

Botanical/ Common name	Brief Description	Position in Catchment (upper, mid, lower)	Zone (instream, Toe, mid-bank, upper-bank)	Growth Form	Max Height (m)	Growth Rate (F=fast, M=moderate, S=slow)	Recommended species for restoration	Frost Tolerance	Wildlife	Comments
<i>Ehretia acuminata</i> , Koda	Medium-sized RF tree, deciduous with grey fissured bark and masses of orange fruits in summer/autumn	Middle, predomi- nately lower	Mid bank	Tree	30m	M		2	Fruit attracts birds	Grows in RF margins or in disturbed areas.
<i>Elaeocarpus grandis</i> , Blue Quandong	Feathery green-white flowers in winter and large blue fruits to 3cm.	Lower	Upper bank	Tree	30m	F		2	Attracts birds	Buttress begins to form after about 10 years.
<i>Elaeocarpus obovatus</i> , Hard Quandong	Medium-tall RF tree tolerant of wet soils, hardy, produces masses of small, blue fruits.	Middle, lower	Mid, upper- bank	Tree	15m	F	X	2	Fruit attracts birds	Shade tree
<i>Elaeostachys nervosa</i> , Green tamarind	Flowers insignificant, small pinky-red fruits.	Lower	? Mid, upper-bank	Tree	10m	M		1	Fruits attract birds.	In warmer RF, attractive foliage.
<i>Endiandra discolor</i> , Rose Walnut	Bushy tree with swellings on the leaf underside, producing black fruits in autumn.	Middle, lower	Mid bank	Small tree	12m	S		1	Fruit attracts birds	Found in warmer RF, often on poorer soils or on alluvial flats near streams.
<i>Endiandra muelleri</i> , Green-leaved Rose Walnut	Bushy tree with pink new growth and black fruits in autumn.	Middle, lower	Mid bank	Tree	25m	S		1	Fruit attracts birds	Best planted in protected sites and on poorer soils in subtropical RF's.
<i>Eucalyptus grandis</i> , Flooded Gum	Very tall eucalypt with smooth white bark.	Middle, lower	Upper bank	Tree	40m +	F	X	1	Flowers attract birds, habitat tree	Community dominant, good pollen tree.
<i>Eucalyptus microcorys</i> , Tallowwood	Tall, dense crowned eucalypt with rusty coloured stringy bark, hardy.	Middle, lower	Upper bank	Tree	35m +	F	X	1	Flowers attract birds, habitat tree	Shade tree Locally abundant in heath on low swampy sites on sandy soils, good shade tree, tolerates damp conditions.
<i>Eucalyptus robusta</i> , Swamp mahogany	Medium size tree with rough bark and large coarse foliage.	Lower	Toe, mid bank	Tree	15m	F	X	1	Blossoms attract birds.	Widespread and abundant, often on slopes, fast growing with ample water supply.
<i>Eucalyptus saligna</i> , Sydney blue gum	Tall, straight tree with smooth white bark.	Upper, middle	Mid, upper- bank	Tree	50m	F	X	1		Community dominant, widespread in grassy, wet or dry forest or woodland on soils of medium to high fertility.
<i>Eucalyptus tereticornis</i> , Forest Red Gum	Tall tree with smooth pale trunk of mottled greys.	Upper, middle	Upper bank	Tree	30 - 40m	F	X	1	Blossom attracts birds.	Excellent riparian species with edible fruit, widespread in coast and tablelands.
<i>Ficus coronata</i> , Creek Sandpaper Fig	Shrub or small tree with sandpaper leaves and hairy fruits produced on the trunk and branches, hardy.	Upper, middle & lower	Toe, mid bank	Small tree	6m	M	X	2	Fruit attracts birds	
<i>Ficus</i> spp., Other Figs	Large trees with buttress roots and spreading canopy.	Upper, middle & lower	Upper bank	Tree	20m	M	X	1	Fruit attracts birds	Excellent shade tree, edible fruit.
<i>Flindersia schottiana</i> ,	Tall tree with open canopy, very hardy.	Lower	Upper bank	Tree	30m	F	X	2		Very fast growing, ideal for RF regeneration.

Botanical/ Common name	Brief Description	Position in Catchment (upper, mid, lower)	Zone (instream, Toe, mid-bank, upper-bank)	Growth Form	Max Height (m)	Growth Rate (F=fast, M=moderate, S=slow)	Recommended species for restoration	Frost Tolerance	Wildlife	Comments
Cudgerie										
<i>Glochidion ferdinandi</i> , Cheese Tree	Small to medium RF tree with spreading canopy, fruits look like small cheeses, hardy.	Middle, predomi- nantly lower	Mid bank	Small tree	10m	M	X	1	Fruit attracts birds	Widespread in coastal areas, excellent riparian regeneration species and small shade tree.
<i>Guioa semiglaucua</i> , Guioa	Small RF tree, leaves with silvery underside, hardy. Medium-tall RF tree with leaflets arranged in threes and a bronze under surface, winged fruits produced in autumn.	Lower	Mid bank	Tree	10m	M	X	1	Fruit attracts birds	Useful for RF regeneration.
<i>Heritiera trifoliolata</i> , White Booyong		Middle, lower	Mid bank	Tree	30m	M		1	Habitat tree	Common in lowland rainforest on rich soils to 600 m.
<i>Hymenosporum flavum</i> , Native Frangipani	Small RF tree producing yellow and white flowers in spring, hardy. Erect fern with soft fronds and red- brown hairs on axis and rhizomes, colony forming in open sites near RF's.	Upper, middle & lower	Upper bank	Small tree	10m	F	X	1	Flowers attract birds.	Useful species for RF regeneration.
<i>Hypolepis glandulifera</i> , Ground fern	Common erect fern with soft fronds and rough axis.	Middle, middle, lower	Mid, upper- bank Mid, upper bank	Groun dcover Groun dcover	60cm 30 - 100cm	M F		2 2		Groundcover Found along creeks and swamps in woodlands
<i>Hypolepis muelleri</i> , Harsh ground fern	Small RF tree with ferny foliage and hairy yellow-brown fruits, hardy.	Lower	Mid bank	Tree	15m	M	X	2	Fruit attracts birds	Useful for RF regeneration.
<i>Jagera pseudorhus</i> , Foambark										
<i>Leptospermum brachyandrum</i> , Thin-fruited Tea Tree	Small, multi-trunked tree, bark peels in spring, turning from copper colour to white, very hardy.	Upper	Toe, upper bank	Small tree	4m	F	X	1	Good stream edge habitat species.	Good habitat species for shading the stream edge.
<i>Lomandra hystrix</i> , Spiny Mat-rush	Small, tussocky rush forming thick clumps, hardy.	Middle, lower	Toe, mid & upper bank	Groun d cover	1m	F	X	2	Useful habitat tree when large.	Good for erosion control if planted in sufficient density, large spreading root system.
<i>Lophostemon confertus</i> , Brush Box	Tall tree with dense crown when grown in open, large leaves and salmon-coloured smooth bark, hardy.	Lower	Upper bank	Tree	25m	F	X	1		Shade tree, good quality nectar and pollen for bees.
<i>Mallotus philippensis</i> , Red kamala	Medium sized tree with pale trunk bark, leaves stiff to 12cm. Small to medium sized tree with papery bark, leaves to 9cm, creamy white or rarely red flowers on cylindrical spikes.	Middle, lower	Mid, upper- bank	Tree	18m	F		2		Fast growing
<i>Melaleuca quinquenervai</i> , Paperbark	Very hardy deciduous tree producing fruits in spring, drought tolerant.	Lower Upper, middle & lower	Toe, mid bank	Tree	up to 20m	F	X	2	Blossom attract birds.	Widespread in coastal swamps and around lake margins, excellent for damp conditions.
<i>Melia azedarach var. australasica</i> , White Cedar			Upper bank	Tree	15m	F	X	2	Fruit attracts birds	
<i>Melicope</i>	Small RF tree with light green	Middle,	Mid bank	Shrub	10m	F		1	Fruit	Useful RF regeneration species on

Botanical/ Common name	Brief Description	Position in Catchment (upper, mid, lower)	Zone (instream, Toe, mid-bank, upper-bank)	Growth Form	Max Height (m)	Growth Rate (F=fast, M=moderate, S=slow)	Recommended species for restoration	Frost Tolerance	Wildlife	Comments
<i>Micrococca</i> , White Euodia	Foliage, leaflets arranged in threes.	lower							attracts birds	protected sites.
<i>Neolisea dealbata</i> , White Bolly Gum	Small bushy tree with large drooping leaves which are vivid white underneath.	Middle, lower	Mid bank	Tree	10m	M		1	Fruit attracts birds	Understorey tree for protected sites.
<i>Omalanthus nutans</i> , Bleeding Heart	Rounded, erect shrub with ovate leaves on a long petiole, leaves turn bright red before falling.	Upper, middle & lower	Mid, upper- bank	Shrub	2 - 5m	F	X	1	Fruit attracts birds	Very hardy and likes shade, pioneer RF species.
<i>Parachidendron</i> <i>prinosum</i> , Snow wood	Small dense tree, shiny bipinnate leaves, cream fluffy flowers followed by twisted pods with red inside.	Middle, lower	Upper	Tree	10m	M		1		Suitable for heavily shaded conditions.
<i>Pennantia</i> <i>cunninghamii</i> , Brown Beech	Small RF tree, thin, glossy leaves with wavy margins, white flowers followed by succulent black berries in February.	Middle	Mid bank	Tree	25m	M		1	Fruit attracts birds	Chiefly in the coastal ranges, needs protection as it is normally found in deep gullies near streams.
<i>Persicaria</i> <i>strigosum</i> , Rough smartweed	Erect herb with distinctive leaves about 10cm long, found in fresh water marshes and beside creeks.	Middle, lower	Toe, mid bank	Shrub	2m	F		2		Can dominate unshaded wetland areas.
<i>Phragmites</i> <i>australis</i> , Common reed	Bamboo like perennial, tall with broad leaves set at right angles, tall willowy floral plumes in summer, fresh or brackish water.	Upper, middle & lower	Toe	Grass	2m	F		2		Grows in wet places especially at the edge of dams and streams and in tidal waters, widespread.
<i>Pitiosporum</i> <i>undulatum</i> , Native Daphne	Small bushy tree with fragrant flowers in spring, hardy.	Upper, middle & lower	Upper bank	Small tree	10m	F	X	2	Fruit attracts birds	Wide spread on the coast and ranges, low windbreak tree, good for RF regeneration.
<i>Planchonella</i> <i>australis</i> , Black- Apple	Medium-sized RF tree with dark glossy leaves and large black fruits in spring/summer.	Upper, middle & lower	Mid bank	Small tree	12m	M		1	Fruit attracts birds	Best planted in protected sites.
<i>Rhodomyrtus</i> <i>psidioides</i> , Native Guava	A bushy, small tree with light brown scaly bark, produces yellow fleshy fruits in late summer/autumn.	Middle, lower	Mid bank	Small tree	6m	M	X	2	Fruit attracts birds	Useful RF regeneration species, fruits are edible.
<i>Rumex brownii</i> , Swamp dock	Erect herb with reddish brown flower spikes.	Upper	Lower	Groun dcover	50cm	M		1		
	Small tree with bipinnate leaves with 4-6 leaflets with pale underside and prominent veins, small flowers followed by three angled reddish fruits.	Middle, lower	?	Tree	12m	M	X	1	Good shade tree, possibly some salt tolerance.	Found in warmer RF Grows along creeks, lakes and open swamps (in fresh and brackish water), widespread but scattered.
<i>Sarcocropteryx stipitata</i> , Steelwood	Tall blue-green to grey-green sedge with round stems.	Upper, middle & lower	Toe, mid bank	Sedge	2m	M		2	Fruit attracts birds	Needs a well watered, protected site.
<i>Schoenoplectus</i> <i>validus</i> , River sedge	Medium RF tree with large glossy toothed leaves, likes plenty of water.	Middle, lower	Mid bank	Tree	15m	S		1	Fruit attracts	Tree will be shorter in open situations, tolerates full sun but
<i>Sloanea australis</i> , Maiden's Blush	A tall tree with a trunk which buttresses with age, dark green,	Middle, lower	Upper bank	Tree	40m	S		3		

Botanical/ Common name	Brief Description	Position in Catchment (upper, mid, lower)	Zone (instream, Toe, mid-bank, upper-bank)	Growth Form	Max Height (m)	Growth Rate (F=fast, M=moderate, S=slow)	Recommended species for restoration	Frost Tolerance	Wildlife	Comments
	glossy, toothed leaves.								birds	prefers shade.
<i>Sticherus flabellatus</i> , Shiny fan fern	Clump forming fern with tiered fan foliage on tall stems, found in RF's and creeks.	Middle, lower	Toe, mid bank	Ground cover	50cm	M		1		Forms large colonies along creeks or in moist gullies, height depends on soil depth, good in shade and damp areas.
<i>Syzgium floribunda</i> , Weeping Myrtle/Weeping Lillypilly	Medium-large tree, densely crowned with weeping foliage and round green fruit in summer/autumn, hardy.	Lower	Toe	Tree	15m	F	X	1	Roots provide habitat for stream dwelling animals.	Excellent erosion control species with extensive mat-like root system.
<i>Syzgium myrtifolia</i> , Grey Myrtle	Bushy RF tree, with some drought tolerance, usually found on steep rocky banks, Hardy.	Middle, lower	Mid bank	Tree	8m	S	X	2	Good host for orchids and ferns	Widespread in warmer RF, screen plant
<i>Syzgium smithii</i> , Lillypilly	Medium size tree with tiny white flowers and pink fruits.	Upper, middle & lower	Mid, upper	Tree	20m	M	X	1	Fruits attract birds.	Widespread in RF, from coast to ranges, often along watercourses, will withstand salt winds.
<i>Syzgium anisata</i> , Ringwood	A tall dense-crowned RF tree, crushed leaves have distinct aniseed smell.	?	Mid bank	Tree	15m	M	X	1		Durable timber
<i>Syzgium australe</i> , Bush Cherry	Small, dense-crowned RF tree with dark green leaves and red fruits from summer to early winter.	Middle, lower	Mid-bank	Small tree	10m	M	X	2	Fruit attracts birds, good host for ferns.	Good riparian RF regeneration species, edible fruit.
<i>Syzgium francisii</i> , Giant Water Gum	Large RF tree, smaller when cultivated, light brown bark and shiny lanceolate leaves, bluish fruits & red new growth.	Middle, lower	Mid, upper bank	Tree	up to 30m	M	X	1	Attracts birds	Grows in subtropical, dry and littoral RF, often in alluvial valleys, tolerates damp conditions.
<i>Toechima dasycarpus</i> , Blunt Leaved Steelwood	Pink new growth, red fruits.	Middle, lower	Mid, upper bank	Shrub/ small tree	8m	M	X	1		Occurs in lowland subtropical rainforest.
<i>Toona australis</i> , Red Cedar	Large RF tree with large, compound leaves and spreading canopy, semi-deciduous, hardy.	Middle, lower	Upper bank	Tree	20m	F	X	2		Subject to attack by tip moth.
<i>Tristanopsis laurina</i> , Water Gum	Medium-sized tree, with light flaky bark and yellow flowers produced in summer, hardy.	Middle, lower	Toe, mid bank	Tree	20m	F	X	2	Roots provide habitat for stream dwelling animals.	Useful erosion control species, useful nectar and pollen species, used for direct seeding.

How to plant out your site?

1. Choose species from the table
2. Design the site and work out plant numbers, as outlined below.
3. Place your order with nurseries by October and plan for a February/March planting.
4. Prepare the site in time for planting. Things to consider are:
 - a) Minimising competition from other plants (especially grasses) by weeding, spraying or mulching
 - b) Allowing time for any herbicide treatment to act – usually 2 weeks
 - c) Fencing out stock before planting
 - d) Allowing access for maintenance
 - e) General weed control on site prior to planting
5. Plant and protect from wallabies, hares and frosts using guards and stakes
6. Maintain planting, water weekly for the first month if possible and reduce competition by regular weeding and/or mulching.

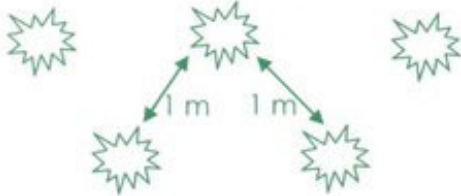
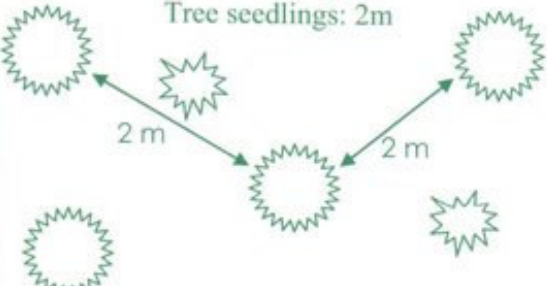
Design Principles

Planting densely will result in early shading of the ground layer which helps reduce grass and weed growth and ensures 'control' of the site at an early stage. This means less maintenance is needed overall and the effect of the planting is achieved within the first few seasons. The trees will also give each other some protection from the sun, wind and cold.

Dense planting creates competitive conditions that favours faster growing species and produces taller trees in a shorter time. These conditions will not necessarily produce the type of tree form that would emerge with wider plant spacings or through natural regeneration, but will ensure rapid reinforcement of river bank soils.



Plant spacing and design

Toe Lomandras and Rushes: ½ to 1m Tree Seedlings: 2m 	Middle to Upper Tree seedlings: 2m 
Lomandras, River Lily and Rushes: Plant at 0.5 to 1m centre. <i>Lomandra hystrix</i> and <i>lomandra longifolia</i> are readily available from nurseries, while other species may be more difficult to obtain. Division of clumps near your site may be an option. The clumps will quickly expand and form dense mats.	Trees: On all areas of the bank spacing should be at 2m centres along and between rows in a zig-zag pattern. Twenty percent of the total number should be selected for fast growth, in order to protect and provide early shade. These should be spread evenly throughout the planting. Lomandras can be interplanted at 1metre centres. Fast growing species include: Blackwood (<i>Acacia melanoxylon</i>), River Oak (<i>Casuarina cunninghamiana</i>), Red Ash (<i>Alphitonia excelxa</i>), and White Cedar (<i>Melia azedarach</i>).

Planting methods

Most tree seedlings are sold in a "tube" or a "hiko". These small pot sizes promote the best leaf/root system ratio, considering weight, speed of growth and price. The planting hole should be just big enough to comfortably fit the rootball. The rootball should be placed into the hole with its top surface level with the ground. **Guards** can be made out of plastic or simple milk cartons however all guards must be straightened to prevent them from leaning on tree seedlings. **Mulch** will reduce grass growth and preserve soil moisture. Mulch must not be heaped against the stem of the seedling, as this can rot the bark.

In **sandy coastal soils** the "bundling" technique can help prevent drying of seedlings. The rootball is placed on three sheets of newspaper with potting mix, water holding crystals and slow-release fertiliser. The paper is rolled up and soaked prior to planting and gives the young plant a protective sleeve.

