A guide to selection for revegetation projects

Using local native plants for revegetation projects contributes significantly to improving biodiversity. By understanding the natural habitat of native plants we can improve our chances of reinstating native vegetation. A range of different plant species occurs along the Clarence River. Where they are located is largely dependent upon their geographic range and distribution as well as preferences for soil conditions and tolerances of different levels of inundation by salt, brackish or fresh water. Species selection for each site is determined by assessing the many factors that influence tree growth, the purpose of the riparian planting and consideration of the following;

- availability of seed resources
- suitability of height and width for location
- soil type
- tolerance to saline or brackish water
- shading of water courses
- harvesting and maintenance of crops
- proximity to power lines, vehicular tracks, fences
- availability of fresh water
- landowner's ability to maintain the site.

The aftercare of revegetation projects is vitally important and maintenance of plantings should be considered as part of any project. This is especially important for threatened, rare and endangered plants.

The Importance of Riparian Vegetation

The riparian area is commonly defined as the land alongside creeks and rivers, including the riverbank itself. Riparian vegetation grows next to a waterway, whether it is a gully, creek, swamp, wetland, river, fresh or saline. Aside from the aesthetic and biodiversity benefits provided by healthy riparian vegetation, plants along the Riparian zone provide important functions such as;

- filtering of sediment, nutrients and pollutants before they reach the waterway.
- protection against wave and flood erosion - the roots of trees bind and reinforce soils.
- shading of waterways – provides fish friendly habitat and reduces blue - green algae growth.
- ensures healthy ecosystems.
- a source of food and habitat for aquatic and terrestrial species.
- important locations for conservation and movement of wildlife.

The factors that most influence plant distribution along the river estuary are salt exposure and regular fluctuations in water level caused by tides. As these change with distance from the sea so does the species composition of the riparian vegetation.

The mouth of the Clarence River is located between the towns of Yamba and Iluka with its estuarine reaches extending approximately 108 km upstream to Copmanhurst. The estuarine limit of Mangroves is noted at around Ulmarra (downstream of Grafton).

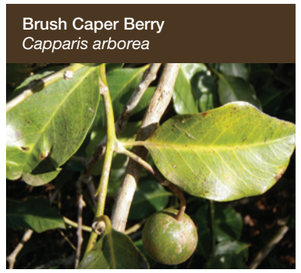
Generally speaking, the Grey Mangrove occurs in the lowest part of the estuary where salt levels are highest e.g. around Yamba, Iluka, the lower estuary islands and channels. The River Mangrove is more shrub - like than the taller Grey Mangrove and is usually found where salt levels are slightly lower or as an understory to the Grey Mangrove. Saltmarsh generally occur on the landward side of mangroves. Red Samphire (*Sarcocornia quinqueflora*), Saltwater Couch (*Sporobolus virginicus*) and Marine Couch (*Paspalum vaginatum*) are common Saltmarsh species. Saltmarsh can include a mosaic of different habitat types such as; tidal pools, rush meadows, herb fields, and mudflats.

Zones

To give an indication of where species mainly occur along the river the plant list is divided into three main zones of occurrence - i.e. different plants and their varying tolerances of saline or brackish water.

Zone S is predominantly saline, Zone B is predominantly Brackish and Zone F is predominantly Freshwater - with some mixing of brackish waters during high tides. **Plants listed in B and F** may also be found along tidally influenced freshwater creeks and rivers that flow into the Clarence.

Banana Bush
Tabernaemontana pandacaqui



Brush Caper Berry
Capparis arborea

Brown Kurrajong
Commersonia bartramia

River Lilly
Crinum pedunculatum

Tuckeroo
Cupaniopsis anacardiodes

Sandpaper Fig
Ficus coronata

How wide should the Riparian zone be?

Riparian zone width is heavily influenced by human activity. Agriculture, tourism, fishing, boating and commercial activity has influenced riparian zone width since European settlement. If we were to have an ideal width for riparian ecosystems it would be in the range of 10 - 40 m or more. However, the majority of existing riparian areas of the Mid – lower Clarence River which are accessible for revegetation are currently in the range of 5 - 20 m.

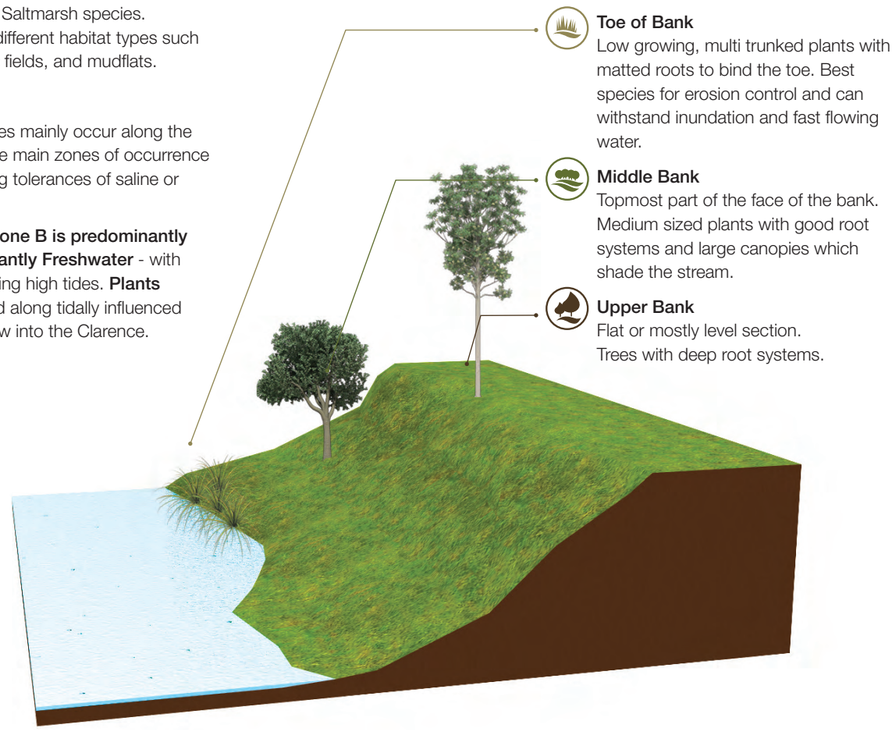
How salty is the river?

Seawater is approximately 35,000 ppm while freshwater is generally defined as water with a salinity of less than 3,000ppm. Brackish water can be anywhere between 500 to 30,000ppm. Water sampling is regularly carried out at various locations on the Clarence River and the table below provides an example of how salty the river can be at the time when the sampling is carried out. This can be different from month to month and year to year depending on river flows and tides.

River Salinity Levels at various parts of the Clarence & Coldstream Rivers & Shark Creek on 26th & 27th November 2012

Location	Salinity (ppm)
Clarence River at Grafton	590
Clarence River at Swan Creek mouth	3110
Clarence River at Southgate mouth	5410
Clarence River at Ulmarra	3960
Clarence River at Lawrence	9225
Clarence River at Maclean	14300
Clarence River at Harwood Bridge	18900
Upper Shark Creek at bridge on Byrons Lane	2620
Upper Coldstream River at Briner Bridge	2000
Lower Coldstream River at Calligans Creek mouth	5320

Source: Clarence Valley Council Floodplain Project Newsletter, December 2012.



Toe of Bank
Low growing, multi trunked plants with matted roots to bind the toe. Best species for erosion control and can withstand inundation and fast flowing water.

Middle Bank
Topmost part of the face of the bank. Medium sized plants with good root systems and large canopies which shade the stream.

Upper Bank
Flat or mostly level section. Trees with deep root systems.

For further information or a copy of the guide contact Clarence Landcare.

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Clarence Landcare

CARING FOR OUR COUNTRY

MID – LOWER CLARENCE RIVER RIPARIAN PLANTS

A guide to selection for revegetation projects

ZONE S

Zone S - Saline

Toe of Bank

Avicennia marina **Grey Mangrove**	T
Bruguiera gymnorhiza **Large-leaved Mangrove (not common)**	T
Crinum pedunculatum **River Lily**	
Rhizophora stylosa **Red or Stilted Mangrove (not common)**	T
Tetragona tetragonioides **NZ Spinach, Warrigal Green**	HB

Middle Bank

Acrostichum speciosum **Mangrove Fern**	
Avicennia marina **Grey Mangrove**	T
Casuarina glauca **Swamp Oak**	T
Crinum pedunculatum **River Lily**	
Excoecaria agallocha **Milky Mangrove**	T
Juncus kraussii **Sea Rush**	

Upper Bank: Landward of the toe

Alphitonia excelsa **Red Ash**	T
Casuarina glauca **Swamp Oak**	T
Banksia integrifolia **Coast Banksia**	T
Cupaniopsis anacardiodes **Tuckeroo**	T
Elaeocarpus obovatus **Hard Quandong**	T
E. tereticornis **Forest Red Gum**	T
Glochidion ferdinandi **Cheese Tree**	T
Guioa semiglauca **Guioa**	T
Hibiscus tiliaceus **Cottonwood Hibiscus**	T
Melaleuca quinquenervia **Broad-leaved Paperbark**	T
Myoporum acuminatum **Mangrove Boobialla**	T

ZONE B

Zone B - Brackish

Toe of Bank

Aegiceras corniculatum **River Mangrove**	S
Avicennia marina **Grey Mangrove**	T
Casuarina cunninghamiana **River Oak**	T
Casuarina glauca **Swamp Oak**	T
Crinum pedunculatum **River Lily**	
Hibiscus tiliaceus **Cottonwood Hibiscus**	T
Lomandra hystrix **River Mat Rush**	G
Lomandra longifolia **Spiny Mat Rush**	G
Phragmites autralis **Common Reed**	

ZONES B & F

Zones B & F - Brackish & Freshwater

Toe of Bank

Carex gaudichaudiana **Carex**	R
Phylidrum lanuginosum **Frogsmouth**	R
Schoenoplectus mucronatus **Club Rush**	R
Schoenoplectus validus **River Club Rush**	R

Middle Bank

Acmena smithii (minor) **Creek Lilly Pilly**	Small T
Alectryon subcinereus **Wild Quince**	T
Aphananthe philippinensis **Rough Leaved Elm**	Small T
Backhousia myrtifolia **Grey Myrtle**	Small T
Baeckea virgata **Twiggy Baeckea**	Small T
Breynia oblongifolia **Breynia**	S
Cupaniopsis anacardiodes **Tuckeroo**	T
Cupaniopsis parvifolia **Small-leaved Tuckeroo**	T

Middle Bank - *Continued*

Callistemon viminalis **Weeping Red Bottlebrush**	Small T
Capparis arborea **Brush Caper Berry**	Small T
Cryptocarya glaucescens **Jackwood**	Small T
Cryptocarya triplinervis **Three-veined Laurel**	Small T
Dianella caerulea. **Blue Flax Lily**	
Dysoxylum mollissimum subsp. molle (D. muelleri) **Red Bean**	T
Ehretia acuminata **Koda**	T
Elaeocarpus obovatus **Hard Quandong**	T
Elaeodendron australis **Red Olive Plum**	T
Ficus coronata **Sandpaper Fig**	T
Ficus fraseri **Sandpaper Fig**	T
Glochidion ferdinandi **Cheese Tree**	T
Guioa semiglauca **Guioa**	T
Jagera pseudorhus **Foambark**	T
Leptospermum brachyandrum **Thin-fruited Tea Tree**	T
Leptospermum polygalifolium subsp. cismontanum **Creek Tea Tree**	S
Lophostemon suaveolens **Swamp Turpentine**	T
Mallotus discolor **Yellow Kamala**	Small T
Mallotus philippensis **Red Kamala**	Small T
Melaleuca linariifolia **Snow in Summer**	Small T
Melaleuca stypheliodes **Prickly Paperbark**	T
Mischocarpus pyriformis **Yellow Pear-fruit**	T
Oplismenus aemulus & O.imbecillis **Basket Grasses**	G
Notelaea longifolia **Large Mock Olive**	T
Persoonia stradbrokiensis **Geebung**	T
Pittosporum undulatum **Sweet Pittosporum**	T
Psychotria loniceroides **Hairy Psychotria**	T
Myrsine variabilis **Variable Muttonwood**	T
Rhodamnia rubescens **Scrub Turpentine**	T
Streblus brunonianus **Whalebone Tree**	T
Tabernaemontana pandacaqui **Banana Bush**	S

Upper Bank

Acacia disparrima subsp.disparrima **Ironbark Wattle**	T
Acacia floribunda **White Sallow Wattle**	T
Acacia irrorata **Green Wattle**	Small T
Acacia melanoxylon **Blackwood**	T
Acmena smithii **Lilly Pilly**	T
Alectryon tomentosus **Hairy Alectryon**	T
Allocasuarina littoralis **Black She-Oak**	T
Alphitonia excelsa **Red Ash**	T
Angophora subvelutina **Broad-leaved Apple**	T
Araucaria cunninghamii **Hoop Pine**	T
Baeckea virgata **Twiggy Baeckea**	Small T
Bridelia exaltata **Brush Ironbark**	T
Backhousia sciadophora **Shatterwood**	T
Callistemon salignus **White Bottlebrush**	T
Castanospermum australe **Black Bean**	T
Commersonia bartramia **Brown Kurrajong**	T
Corymbia intermedia (Eucalyptus intermedia) **Pink Bloodwood**	T
Dysoxylum rufum **Hairy Rosewood**	T
Eucalyptus tereticornis **Forest Red Gum**	T
Elaeocarpus grandis **Blue Quandong**	T
Endiandra sieberi **Hard Corkwood**	T

Upper Bank - *Continued*

Eucalyptus robusta **Swamp Mahogany**	T
Eucalyptus grandis **Flooded Gum**	T
Eucalyptus siderophloia **Northern Grey Ironbark**	T
Euroschinus falcata **Ribbonwood**	T
Ficus virens var. sublanceolata **White Fig**	T
Ficus macrophylla **Moreton Bay Fig**	T
Ficus obliqua **Small-leaved Fig**	T
Ficus superb var. henneana **Deciduous Fig**	T
Ficus rubignosa **Rusty Fig**	T
Flindersia australis **Australian Teak**	T
Flindersia schottiana **Cudgerie**	T
Flindersia bennettiana **Bennett's Ash**	T
Gmelina leichardtii **White Beech**	T
Grevillea robusta **Silky Oak**	T
Lophostemon confertus **Brush Box**	T
Syncarpia glomulifera **Turpentine**	T
Toona ciliata **Red Cedar**	T

Zones B & F - Brackish & Freshwater

Common Vines

Derris involuta **Native Derris**	V
Eustrephus latifolius **Wombat Berry**	V
Flagelaria indica **Whip Vine**	V

Common Vines - *Continued*

Maclura cochinchinensis **Cockspur Thorn**	V
Pandorea pandorana **Wonga Wonga Vine**	V
Parsonsia straminea **Common Silkpod**	V
Stephania japonica **Snake Vine**	V

ZONE F

Zone F - Freshwater

Toe of Bank

Acmena smithii (minor) **Creek Lilly Pilly**	Small T
Callistemon viminalis **Weeping Red Bottlebrush**	T
Casuarina cunninghamiana **River Oak**	T
Ficus coronata **Sandpaper Fig**	T
Leptospermum brachyandrum **Thin-fruited Tea Tree**	S
Lomandra hystrix **River Mat Rush**	R
Lomandra longifolia **Spiny Mat Rush**	R
Phragmites autralis **Common Reed**	
Potamophila parviflora **Potamophila (instream sp.)**	GC
Tristaniopsis laurina **Water Gum**	T
Waterhousea floribunda **Weeping Myrtle**	T

The plant species guide represents many of the known species occurring on the Mid - Lower Clarence River. These species do not occur exclusively in these zones but they occur most commonly there.

LEGEND

Zone S - Saline	R Rush
Zone B - Brackish	LR Littoral Rainforest
Zone B & F	V Vine
Zone F - Freshwater	GC Groundcover
T Tree	G Grasses
S Shrub	HB Herb

Plants listed in B and F may also be found along tidally influenced freshwater creeks and rivers that flow into the Clarence.

Publication Reference: Mousley, J.G. (2012). *Mid – Lower Clarence River Riparian Plants – a guide to selection for revegetation projects.* Published by Clarence Landcare Inc., Grafton NSW and the Australian Government CFOC-Community Action Grants.

References and Resources

Books

Floyd, A.G. (2008) *Rainforest Trees of Mainland South-eastern Australia,* Terania Creek Publishing, Lismore Australia

Harden, G., McDonald, B. & Williams, W. (2006) *Rainforest trees and shrubs: A field guide to their identification,* Gwen Harden Publishing Nambucca Heads.

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Romanowski, N., (1998) *Aquatic and wetland plants: a field guide for non – tropical Australia* published by UNSW, Sydney.

Van Son, J. (2nd Edition 2012), *Nambucca Valley Vegetation & Planting Guide, Local Native Plants and Weeds*, published by CFOC & Nambucca Valley landcare Inc. Community Action Grant.

Companion publications:

Clarence Coast & Estuary Resource Kit, The Northern Rivers Resource Kit for Rural Landholders, Clarence River Floodplain & Estuary Native Plant Species Guide & Clarence Coast Dune Plants.

Websites

PlantNET National Herbarium of NSW Flora Online at http://plantnet.rbgsyd.nsw.gov.au/

CRC for Australian Weed Management at www.weedscrc.org.au

Weeds Australia at www.weeds.org.au

Useful local contacts

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