

THIS GUIDE IS TO ASSIST LANDOWNERS SELECT THE RIGHT SPECIES OF PLANTS FOR RIVERBANK RESTORATION WORKS IN THE ESTUARINE WATERWAYS OF THE NAMBUCCA VALLEY.

Why?

Native riparian vegetation plays a vital role in riverbank stability and contributes to overall estuary health.

Estuary and river studies highlight the close correlation between the condition of riparian vegetation and bank stability. Plant roots provide much needed reinforcement of floodplain soft alluvial soils.

Riparian vegetation has a profound influence on the physical, chemical and biological properties of a waterway.

Bank stability, water quality, seagrasses, fish stocks, other aquatic species, bird life and the aesthetic beauty of a river are all reliant on riparian vegetation.

Whilst erosion is a natural river process, restoration of riparian areas seeks to provide improved robustness and resilience to the rivers foreshore which in turn helps improve bank stability with flow on benefits of protecting valuable productive farm land and a healthy estuary.

Stream side vegetation changes as the river becomes less salty upstream. The Nambucca River estuary has been divided into four zones characterised by particular groupings of plants species and their preferred location on the river bank. This leaflet will assist landowners to recreate healthy riparian vegetation.

Acknowledgements

Information in this leaflet is based on 'Estuarine Geomorphology, Physical Condition and Mapping of Nambucca' by Damon Telfer 2005 and Nambucca Valley Landcare's 'Estuary Vegetation Survey and Restoration Guide' by Stuart Johnson 2000 and report on. Production of this brochure was jointly funded by Nambucca Shire Council and States Estuary Program administered by DECCW.

Printed Nov 2010



NAMBUCCA RIVER ESTUARY RIVER BANK

Restoration Guide



Typical Bank Treatment Options Used in Estuaries

Over the past 20 years Government has funded a large amount of research on the management of Australian rivers. Much of this effort has focussed on developing assessment tools to help understand river ecology and processes and to determine priorities for action using practical alternatives that encompass broad river health goals for addressing bank erosion.

Note: Where rockwork is used to provide structural stability suitable trees and shrubs must also be planted to provide long term stability to the site. Rockwork by itself

may improve stability but does little to reinstate many of the other important values of an estuary.

The following 3 bank treatment techniques have proven to be effective in estuary areas. This is a guide only and it is recommended that you seek further advice about the technique relevant to your site from your local Landcare Officer and other specialists listed in this guide.

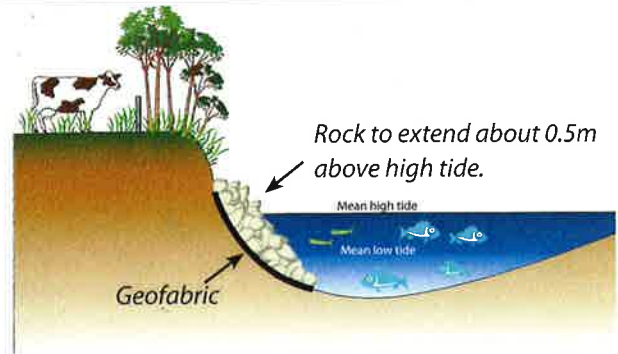
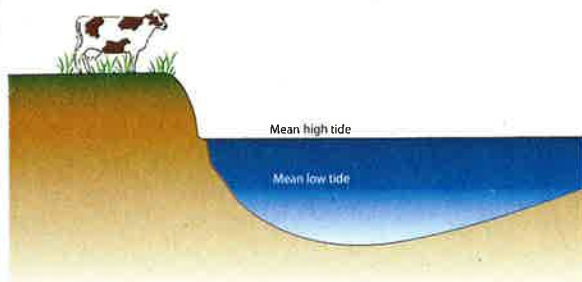
If in doubt about how to rehabilitate your river bank, find a reach nearby in a comparable setting that's in good condition and copy that.

Fencing and Natural Regeneration

A low cost method of improving bank stability and estuary health is simply to manage stock access and allow natural regeneration to occur. As to how much setback is required a useful rule of thumb is at least the depth of water plus height of bank as a minimum. If located in a low profile area then at least a 5m setback should be considered to allow for reestablishment of a riparian zone.

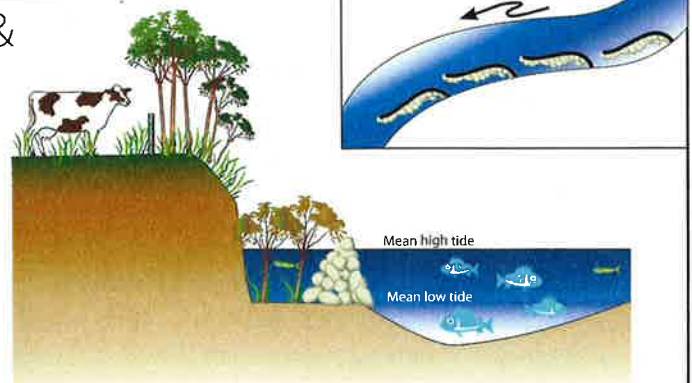
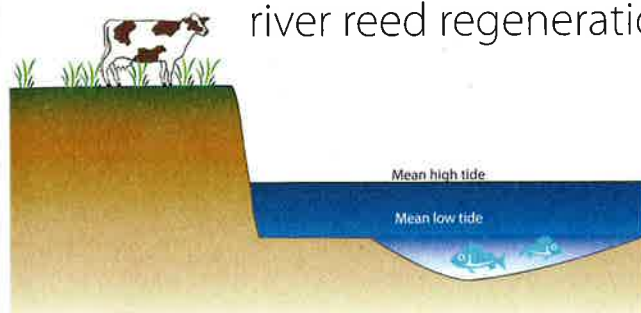


Best Practice Rock Revetment



Often used where assets are at risk or where the channel is close to the eroding bank, it is an effective means of protecting the toe of the bank. Rock work must always incorporate vegetation into the works to provide long term stability and to reinstate river health values. *Lomandra spp* (Spiny Matt rush) is an excellent groundcover that helps bind the bank soil and rock material together and in the absence of other vegetation should be planted at 1 metre centres. Dense coverage of *Lomandra spp* help protect the bank during flood flows. Geofabric is recommended beneath the rock to prevent fines from washing out and undermining the works.

Rock Embayments (fillets), mangrove & river reed regeneration



Applicable where a suitable bench exists in front of the eroding bank, this technique is designed to reduce the effect of waves on susceptible riverbanks, and allows mangrove and reed establishment on the intertidal foreshore. Rock embayments are constructed to just above mean high water mark. They are keyed into the bank at the upstream end then run parallel to bank and are open downstream. Similar cost to rock revetment.





Nambucca River Estuary - species by location (see map on back page)

	toe of bank	middle of bank	top of bank
Zone A	Grey Mangrove - <i>Avicennia marina</i>	Grey Mangrove - <i>Avicennia marina</i> (mid-upper bank) Swamp She Oak - <i>Casuarina glauca</i> Swamp Rush <i>Juncus</i> sp.	Swamp She Oak - <i>Casuarina glauca</i> Hard Quandong - <i>Elaeocarpus obovatus</i> Cheese Tree - <i>Glochidion ferdinandi</i> Tuckeroo - <i>Cupaniopsis anarcardioides</i> Guoia - <i>Guoia semiglauca</i> Broad leaved Paperbark - <i>Melaleuca quinquenervia</i> Yellow Pear Fruit - <i>Mischocarpus pyriformis</i> Red Ash - <i>Alphitonia excelsa</i> Rusty leaved Fig - <i>Ficus rubiginosa</i>
Zone B	Grey Mangrove - <i>Avicennia marina</i> River Mangrove - <i>Aegiceras corniculatum</i>	Swamp She Oak - <i>Casuarina glauca</i> River Lily - <i>Crinum pedunculatum</i> (upper bank) Hard Quandong - <i>Elaeocarpus obovatus</i> Guoia - <i>Guoia semiglauca</i> Cheese Tree - <i>Glochidion ferdinandi</i> Tuckeroo - <i>Cupaniopsis anarcardioides</i>	Swamp She Oak - <i>Casuarina glauca</i> Foambark - <i>Jagera pseudorhus</i> Red Ash - <i>Alphitonia excelsa</i> Broad leaved Paperbark - <i>Melaleuca quinquenervia</i> Rusty leaved Fig - <i>Ficus rubiginosa</i> Deciduous Fig - <i>Ficus superba</i> Cudgerie - <i>Flindersia schottiana</i> Blackbutt - <i>Eucalyptus pilularis</i> White Bottlebrush - <i>Callistemon salignus</i> Grey Ironbark - <i>Eucalyptus siderophloia</i> Blackwood - <i>Acacia melanoxylon</i>
Zone C	lower - toe of bank River Mangrove - <i>Aegiceras corniculatum</i> Swamp She Oak - <i>Casuarina glauca</i> River Lily <i>Crinum pedunculatum</i> upper - toe of bank Hard Quandong - <i>Elaeocarpus obovatus</i> Cheese Tree - <i>Glochidion ferdinandi</i> Guoia - <i>Guoia semiglauca</i> Mat Rush - <i>Lomandra hystrix</i>	Swamp She Oak - <i>Casuarina glauca</i> Hard Quandong - <i>Elaeocarpus obovatus</i> Cheese Tree - <i>Glochidion ferdinandi</i> Guoia - <i>Guoia semiglauca</i> Red Bottlebrush - <i>Callistemon viminalis</i> Tea Tree - <i>Leptospermum brachyandrum</i> Water Gum - <i>Tristaniopsis laurina</i> Red Ash - <i>Alphitonia excelsa</i> Foambark - <i>Jagera pseudorhus</i> Mat Rush - <i>Lomandra hystrix</i> Tuckeroo - <i>Cupaniopsis anarcardioides</i> Sandpaper Fig - <i>Ficus coronata</i> White Bottlebrush - <i>Callistemon salignus</i>	Brown Kurrajong - <i>Commersonia fraseri</i> Broad leaved Paperbark - <i>Melaleuca quinquenervia</i> Lilly Pilly - <i>Syzygium australe</i> Crabapple - <i>Schizomera ovata</i> Native Guava - <i>Rhodomyrtus psidioides</i> Rose Walnut - <i>Endiandra discolor</i> Prickly Paperbark - <i>Melaleuca styphelioides</i> Brush Box - <i>Lophostemon confertus</i> Tallowood - <i>Eucalyptus microcorys</i> Blackwood - <i>Acacia melanoxylon</i> Green Wattle - <i>Acacia irrorata</i> Rusty leaved Fig - <i>Ficus rubiginosa</i>
Zone D	toe of bank Swamp She Oak - <i>Casuarina glauca</i> River Mangrove - <i>Aegiceras corniculatum</i> upper - toe of bank Hard Quandong - <i>Elaeocarpus obovatus</i> Tea Tree - <i>Leptospermum brachyandrum</i> Red Bottlebrush - <i>Callistemon viminalis</i> Mat Rush - <i>Lomandra hystrix</i> River She Oak - <i>Casuarina cunninghamiana</i> Guoia - <i>Guoia semiglauca</i> Cheese Tree - <i>Glochidion ferdinandi</i> Sandpaper Fig - <i>Ficus coronata</i>	River She Oak - <i>Casuarina cunninghamiana</i> Water Gum - <i>Tristaniopsis laurina</i> Weeping Cherry - <i>Waterhouse floribunda</i> Lilly Pilly - <i>Acmena smithii</i> Lilly Pilly - <i>Syzygium australe</i> Foambark - <i>Jagera pseudorhus</i> Yellow Pear Fruit - <i>Mischocarpus pyriformis</i> Native Guava - <i>Rhodomyrtus psidioides</i> Rose Walnut - <i>Endiandra discolor</i> Crabapple - <i>Schizomera ovata</i>	Brown Kurrajong - <i>Commersonia fraseri</i> Tuckeroo - <i>Cupaniopsis anarcardioides</i> White Cedar - <i>Melia azedarach</i> Brush Box - <i>Lophostemon confertus</i> Flooded Gum - <i>Eucalyptus grandis</i> Tallowood - <i>Eucalyptus microcorys</i> Red Cedar - <i>Toona australis</i> Rusty leaved Fig - <i>Ficus rubiginosa</i> Superb Fig - <i>Ficus superba</i> Bleeding Heart - <i>Omalanthus populifolius</i> Blackwood - <i>Acacia melanoxylon</i>





Legend

	ZONE A
	ZONE B
	ZONE C
	ZONE D

CONTACTS	ACTIVITY THAT WILL TRIGGER INTEREST
Nambucca Valley Landcare Phone: 6564 7838	Funding support Project development
Nambucca Shire Council - Planning and Environment Department Macksville Phone: 6568 2555 Development application forms www.nambucca.nsw.gov.au/cmst/nc001/lp.asp?cat=28	Any activity that requires Development Consent from Council under the Local Environment Plan.
Land and Property Management Authority, Crown Lands Division Phone: 6640 3400 Grafton, 6591 3500 Taree, Coffs Harbour 6691 9610 Boundary determinations general information http://rgdirections.lands.nsw.gov.au/deposited_plans/boundary_definition/general_principles Natural boundaries including riparian boundaries http://rgdirections.lands.nsw.gov.au/deposited_plans/natural_boundaries	Consent may be needed from LPMA who may "own" part of the land (the river bed and foreshore) that the works being carried out on.
NSW Office of Water (part DECCW), Grafton Phone: 6641 6521 Information on approvals and link to Controlled Activity Application form http://www.water.nsw.gov.au/Water-licensing/Approvals/Controlled-activities/rights_controlled_faq/default.aspx	River restoration works within 40m of a watercourse require a Controlled Activity Permit under the Water Management Act 2000.
NSW Department of Industry and Investment (Fisheries) Aquatic Habitat Protection Unit, Wollongbar Phone: 6626 1269 Info on planning & approvals www.dpi.nsw.gov.au/fisheries/habitat/protecting-habitats Link to permit under Fisheries Management Act www.dpi.nsw.gov.au/fisheries/habitat/protecting-habitats/activities-requiring-a-permit	A permit under the Fisheries Management Act 1994 may be needed if works and structures are likely to have impacts on fish passage, harm marine vegetation or involve excavation in waterways.
Northern Rivers Catchment Management Authority, Coffs Harbour Phone: 6653 0150 Approvals www.northern.cma.nsw.gov.au/programmes_native_vegetation.php Guidelines for clearing exotic vegetation on state protected land www.environment.nsw.gov.au/resources/vegetation/splguideline.pdf	Where native vegetation is required to be cleared for works within 20m of stream bank, an approval is required under the Native Vegetation Act 2003.
Department of Environment, Climate Change and Water Phone: 6561 4975 Environmentally Friendly Seawalls http://sydney.cma.nsw.gov.au/component/option,com_remository/Itemid,116/func,select/id,51/	Estuary management and river processes