

HEALTHY WATERWAYS

BENEFITS OF HEALTHY WATERWAYS ON YOUR PROPERTY

Healthy waterways support a healthy environment and are vital for our social and economic wellbeing. They play a key role in agriculture, industry and recreation and provide essential habitat for wildlife including many rare and threatened species.

The land that immediately surrounds waterways is some of the most productive fertile land we have and is known as riparian land. Riparian land is described as the part of the landscape adjoining rivers and streams that has a direct influence on the water and aquatic ecosystems within them, so it is important to manage this land sensitively, as down stream effects impact on both production and biodiversity". It includes the stream banks and a strip of land of variable width along the banks.

The benefits of riparian vegetation in good condition include:

Biodiversity

- Landscape refuge for native flora and fauna
- Corridors for wildlife to move through the landscape
- Habitat for rare and threatened species
- Contributes to water availability and nutrients cycling on a property and landscape scale
- Healthy aquatic life including fish: riparian vegetation creates shade therefore regulating water temperature and sheds timber into waterways that is used by fish for shelter, feeding and spawning



Productivity

- Water resources used in agriculture and industry
- Stock management and shelter: riparian vegetation creates shade and acts as a wind break
- Supports biological agents, such as predatory species that control pests of crops and pasture
- Increase in capital values
- Opportunities for diversification such as ecotourism, fishing tours, amenity for accommodation



Soil and water conservation

- Reduces erosion and retains sediment by physically slowing water and wind movement
- Maintains river courses: stabilises soil surfaces through the action of roots, organic matter and increased infiltration
- Lowers the water table through root action reducing water logging and salinity
- Filters pollutants from surface water flows: ground cover plants and the litter layer help filter out pollutants before they reach the waterways



Aesthetics and well being

- Provide a connection to place
- Support recreation (bird-watching, bush walking, fishing)
- Provide landscape values
- Preserving original landscape
- "Spiritual, therapeutic effect"



CHARACTERISTICS OF RIVERS

The characteristics in the following table are based on a river* typically found in the mid to upper reaches of a catchment, immediately downstream of a mountainous area or hilly bedrock dominated headwater. This type of river is classified as a 'partially confined' river under the River Styles Framework and is commonly found in Tasmania's Huon Valley.

The characteristics of rivers will vary among different river 'styles' depending on where they are situated in the landscape. This will have a direct bearing on their short to long term management. Clearly a mountain river tumbling through a narrow bedrock valley is different to a slow-flowing, meandering river on a flat plain.

Partially confined rivers as the name suggests are able to move to some limited extent within their valley setting compared to the headwaters of a catchment where movement of the channel is restricted by the existing bedrock.

* The generic term "river" is used here to include all watercourses e.g. streams, gullies etc.

Figure: The River Styles Framework has been developed by Macquarie University to classify the character and behaviour of different river systems.

Examples of partially confined River Styles are common in the Huon Valley.

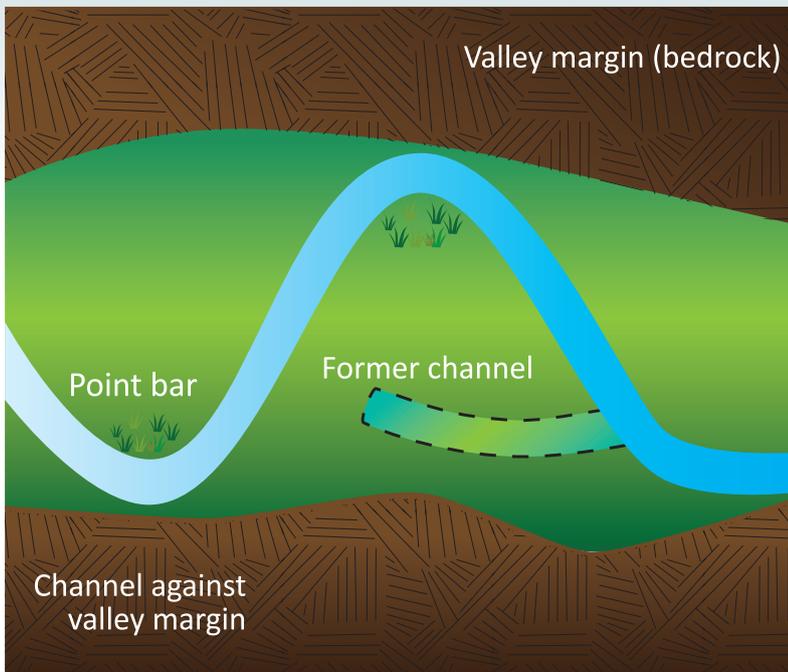


Illustration of a partially confined river

CHARACTERISTICS OF A OF A TYPICAL RIVER IN TASMANIA'S HUON VALLEY - MID TO UPPER CATCHMENTS

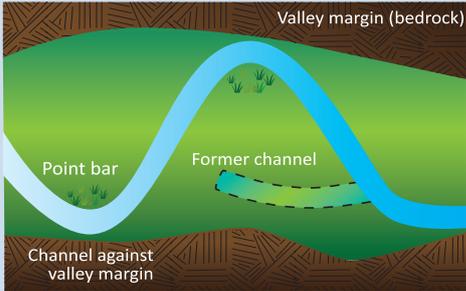
CHARACTERISTIC	GOOD CONDITION	POOR CONDITION
<p>Shape of the channel zone 'Partially Confined' river style</p>	<p>A single meandering asymmetric channel with 10% to 50% of the channel against the valley margin. Channel has pools, riffles, point bars (sediment bar on inside bend) and benches (abandoned floodplain). Behaviour: In wider reaches, bends migrate down-stream. Phases of bed lowering are normal.</p> 	<p>Partially Confined rivers in poor condition exhibit straightened channels. Behaviour: Accelerated bed and bank erosion giving rise to channel expansion. Sudden changes in channel position (avulsions).</p>
<p>Floodplain 'Partially Confined' river style</p>	<p>Irregular floodplain surfaces. Presence of former sections of curved channel. Sections of bend cut off when new, shorter channels short cut during high energy floods) Sections of remnant floodplain no longer connected to the river. Some naturally formed ridges (levees)</p>	<p>Short cutting of bends. Lateral movement of the channel that erodes the floodplain. Localised scouring of surface material from the floodplain (floodplain stripping).</p>
<p>Large Woody Debris</p>	<p>Plenty of large wood debris, including large logs, occupy over 10% of the cross section of the river bed. Large woody debris helps trap sediment & helps to "lock" the bed of the river together, which means it plays a key role in erosion control. It also provides habitat and food for aquatic life.</p> 	<p>A river that has been cleared of large woody debris (de-snagged) is vulnerable to erosion (bed lowering) from fast flowing water.</p> 
<p>Riparian Vegetation</p>	<p>The presence of a range of native riparian plants shrubs and trees growing at the top of a river bank to rushes and sedges (e.g. <i>Lomandra</i>) growing on the toe of the bank, will help minimise bank erosion. Native riparian vegetation helps trap soil and nutrients that 'run off' from the surrounding land, preventing them from entering adjoining waterways. Native riparian vegetation provides shade which regulates water temperature. This shading provides the right conditions for aquatic flora and fauna to thrive and prevents the excessive growth of algae and certain aquatic plants (macrophytes). Native riparian vegetation provides an essential refuge and habitat for native plants, animals and birds many of which are threatened. It also provides food and habitat for in-stream life.</p> 	<p>Bank covered in exotic grasses only. Regular areas of bank erosion evident. A bank with little or no vegetation can be subject to four times the erosive force during floods compared to a bank with a good cover of native riparian vegetation. Destabilisation of banks often resulting in massive increases in channel width, channel incision and gully erosion. Significant quantities of nutrients and sediment can enter waterways and adversely affect water quality. Increased nutrient levels (e.g. nitrogen and phosphorus), combined with increase temperatures from a lack of shade, stimulate weed and algal growth. A lack of shade, created by an absence of native riparian vegetation can lead to fluctuating and usually high water temperatures encourage growth of green algae and certain aquatic plants (macrophytes). This may cause major changes in aquatic habitat, reduce oxygen levels in the water column causing a reduction in aquatic fauna, including fish. Significant in-stream vegetation can also lead to slowing of the stream flow and the watercourse becomes broader and shallower, leading to bank erosion. The absence of native riparian vegetation means there is a lack of suitable habitat for native plants, animals and birds including threatened species.</p>

Photo Rick James

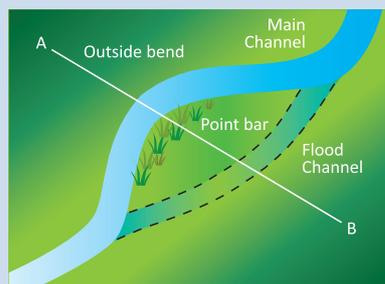
CHARACTERISTICS OF A OF A TYPICAL RIVER IN THE TASMANIA'S HUON VALLEY - MID TO UPPER CATCHMENTS)

CHARACTERISTIC	GOOD CONDITION	POOR CONDITION
Weeds	Few, if any, exotic plants (weeds) occur. If weeds are present, then they are low impact species only that will not affect the regeneration of native plants.	River bank more or less covered with exotic plants including many high threat weeds that will prevent the natural regeneration of native plants. Willow trees can gradually encroach into the centre of a waterway creating a shallower wider water course, which in turn leads to flooding and bank erosion.
Livestock	Livestock should have restricted or controlled access to riparian areas through adequate fencing. If access is occasionally given, this should only be to areas that are not erosion prone e.g. the inside of a bend. Stock should be prevented from entering the water course.	Livestock have free access to riparian areas including erosion prone sections of the channel e.g. outside bends, for water and grazing. This causes baring or pugging of waterlogged areas and watercourse banks, leading to soil compaction and erosion. Livestock will also foul waterways leading to water quality and public health issues.
Landscape health	The surrounding landscape, both native and productive contains little of no bare ground; soils are healthy with good physical structure. These conditions allow rain to easily penetrate the soil profile, vegetation traps sediment and the lack of bare ground means soil is retained in the landscape and is prevented from entering a water course. 	The presence of bare ground and compacted soil resulting from activities such as retaining fallow ground for extended periods, overgrazing and land clearance can lead to significant soil erosion, this can result in soil, nutrients and harmful chemical entering waterways. 
Connectivity	Intact riparian vegetation (along a watercourse) provides connectivity for wildlife, enabling species to access essential resources and new habitat in the landscape. Example below: 	Fragmented riparian vegetation (containing large areas of exotic vegetation and/or cleared land) can prevent native wildlife from accessing essential resources and colonising new habitat in the landscape. Example below: 

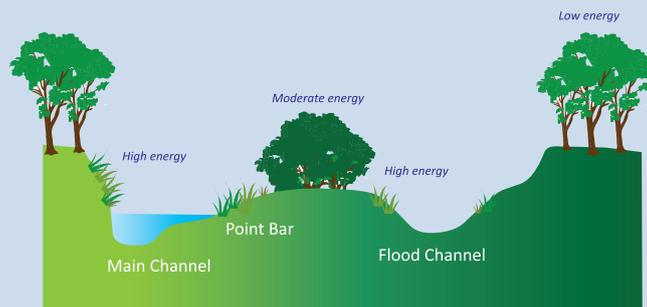
RIVER DYNAMICS AND RIPARIAN VEGETATION

Waterways are dynamic systems, which mean they constantly erode, transport sediment, change course, and flood their banks in natural and recurring patterns. Across the channel zone and river floodplain of a watercourse, the flood energy experienced varies greatly. That is, the energy exerted by the flowing water changes from place to place, with higher energy experienced where the water is deeper and faster flowing, and lower energy where the water is shallow and slower flowing.

Riparian plants differ in their ability to cope with different levels of energy flow and this creates distinct vegetation communities within waterways. The type of vegetation present can often be representative of species that can withstand high or low energy flows. (See 'Managing Waterways' factsheet for revegetation considerations including what to plant where). The following diagrams show the typical variation in water energy flow across the channel of a partially confined watercourse.



River Bend on a Partially Confined River



A. Outside bend

Cross Section

B

Diagram showing typical bend configuration for rivers in the partially confined River Style family rivers typically found in Tasmania's Huon Valley. In addition to the main channel, a flood channel is located across the back of the point bar feature. As its name suggests, this channel conveys flood flows taking some of the pressure off the main channel. The cross section A – B shows how the energy rating changes across the channel zone. High flow energy is experienced on the outside of the bend in the main channel and within the flood channel. Only plants with the ability to survive high flood energy will grow in these areas. The moderate energy zone between the two channels will have a distinct vegetation community too, while the lower energy bank top and flood plain areas can support a wider range of plants i.e. those that only have a low tolerance of flood forces. See 'Managing Waterways' factsheet for information about planning revegetation work in and around waterways.

FURTHER INFORMATION

Price P, Lovett S. 1999. **Riparian Land Management Technical Guidelines. Volume One: Principles of Sound Management.** LWRRDC.

Price P, Lovett S. 1999. **Riparian Land Management Technical Guidelines. Volume Two: On-ground Management Tools and Techniques.** LWRRDC.

Riparian factsheets kit: <http://lwa.gov.au/files/products/river-landscapes/>

<http://www.derwentestuary.org.au/stormwater-factsheets>

Australian River Restoration Centre: <http://arrc.com.au/>

River Styles web page <http://www.riverstyles.com/>

Geomorphology and River Management: Applications of the River Styles Framework. Available from <http://www.blackwellpublishing.com/>

A guide to managing stock around waterways including livestock fencing: Jansen A, Nicolson B, Askey-Doran M, Lovett S, Price P, Dean J. 2007. **Managing rivers and streams in Tasmania: A woolgrowers guide.** LWRRDC.

Link to download: <http://lwa.gov.au/files/products/land-water-and-wool/px071295/px071295.pdf>

Wright D, Jacobson, T. 2000. Managing streambanks: stock control, fencing & watering options.

Link to download: <http://lwa.gov.au/files/products/river-landscapes/pr061132/pr061132.pdf>

Private Forests Tasmania factsheets and case studies: <http://www.pft.tas.gov.au/>

Tasmanian case study on gully restoration - Trees on Farms: <http://www.rmccg.com.au>

Glazik R, Askey-Doran M. 2004. Tasmanian Streambank Plants: a guide to common plants along streams. DPIPWE

Long-stem Planting Guide: <http://www.environment.nsw.gov.au/resources/grants/longstemguide.pdf>

Brock M. 1997. Are there seeds in your wetland? Assessing wetland vegetation. LWRRDC and UNE.

Tasmanian Platypus Management Plan 2010: <http://dpipe.tas.gov.au/wildlife-management/animals-of-tasmania/mammals/echidnas-and-platypus/platypus/platypus-management-plan>

D'Entrecasteaux report: [http://www.dpipe.tas.gov.au/internnsf/Attachments/TPRY-6DT3CY/\\$FILE/Land_Cap_Report_DEntrecasteaux.pdf](http://www.dpipe.tas.gov.au/internnsf/Attachments/TPRY-6DT3CY/$FILE/Land_Cap_Report_DEntrecasteaux.pdf)

For more information please refer to NRM South's Healthy Farming & Environment Reference Guide:

<http://www.nrmsouth.org.au/>

