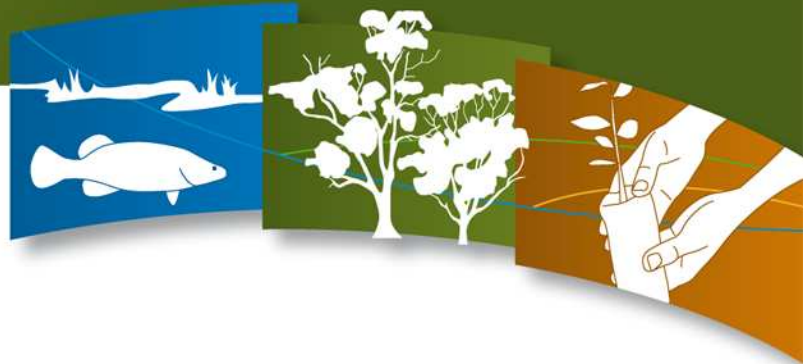


The changing shape of river channels



NORTH CENTRAL
Catchment Management Authority
Connecting Rivers, Landscapes, People



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Rivers are dynamic ecosystems, shaped by the influences of climate, vegetation, geology and surrounding land uses. River courses are affected by processes of erosion and deposition which occur under natural and flood conditions.



Changes in the shape of a river channel can be subtle or obvious. Photo: Angela Gladman, North Central CMA

Changes to channel form

In addition to natural changes, the shape of the Loddon River is also likely to have occurred due to flow regulation. The hydrology of the Loddon River has been impacted by the reservoirs and weirs and the disruption these structures cause to the flow of sediment.

Laanecoore Reservoir has trapped a lot of silt since it was constructed, to the extent that its capacity has been seriously diminished. Although this process has deprived the river downstream of sediment, to some extent it has spared the river of excessive sedimentation because much of the sediment in

Laanecoore Reservoir is the product of accelerated erosion and mining disturbance.

Rivers downstream of dams can become narrow and deep due to transportable sediment being trapped in the dam, or they can contract if the dam significantly reduces the frequency of channel forming flows. Contraction (or narrowing) is likely in the case of the Loddon River storages because they significantly reduce the frequency of small and medium sized floods. Reduced frequencies of freshes (small flow events) would be expected to result in less flushing of fine sediment from the bed of the river.

On the other hand, constant regulated flows can cause accelerated erosion of the banks and channel widening.

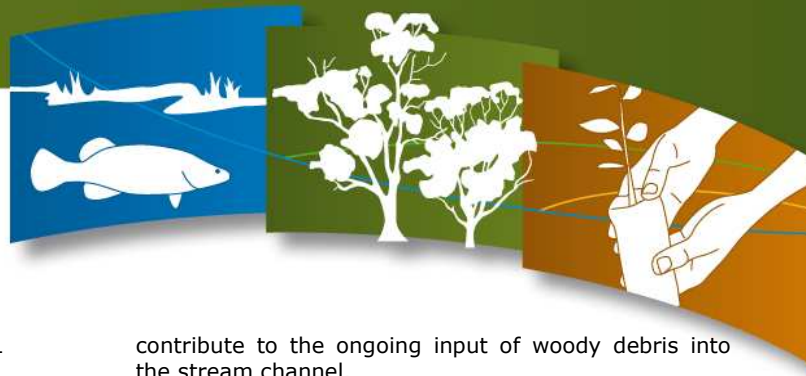
Large woody debris (or snags) is known to assist in streambed stabilisation as it provides stable habitat in areas with fine bed material, which is common in the Loddon River downstream of Laanecoore. It also helps create scour features that contribute to the diversity of habitat created by variable flow speeds (e.g. riffles).

Current condition

The waterways of the Loddon catchment vary in size and shape depending on their location in the catchment. The Loddon River and Tullaroop Creek meet at Laanecoore Reservoir, which marks the boundary between the upland and lowland areas of the catchment.

Upstream of the reservoir, Tullaroop Creek flows along the edge of the basalt plain with steep banks, occasional deep pools and a gravel streambed. However, the Loddon River is much wider (10-20m) with a silt streambed. The banks slope gently and many of the natural pools have filled with sand and gravel.

Downstream of the Laanecoore Reservoir, the Loddon River widens (20-40m) as it flows in a single thread to just south of Serpentine. Here the Loddon becomes a series of parallel channels weaving north across the flat plain which leads to widespread sheet flooding during high flows. Along this reach, the floodplain is confined to approximately 1 km wide. However,.



downstream of Serpentine it broadens to around 21 km wide with numerous narrow, leveed, shallow channels. In the Canary Island area, surveys indicate 1.5-2m of sediment has been deposited on the floodplain. The Loddon River between Kerang and the Murray River is characterised by fairly steep banks due to adjustments to the increased flows received from waterways used as irrigation carriers.



The Loddon River between Kerang and the Murray River, Photo: North Central CMA

Current channel form issues

Some of the key issues with maintaining the stream channels of the Loddon River and Tullaroop Creek are:

- evidence of infilling of pools downstream of Laanecoorie Reservoir
- notching of the riverbank indicating constant regulated flows, which contribute to bank erosion
- a variable amount of instream snags along the length of the Loddon River
- stream power so low in the lower Loddon River that silt and clay naturally deposits on the bed.

Actions to address these issues

The environmental flow recommendations for the Loddon bulk entitlement (BE) process with regard to channel form issues include high flows to maintain the current channel form and variability of flow speeds. Brief small rises in water levels due to short periods of rain (termed 'freshes') are also recommended primarily to flush sediment through the river system and also to maintain aquatic habitat.

Fencing to protect and control stock access along the banks will minimise erosion and the input of sediment into the waterways. Reducing grazing pressure on riparian plants will aid bank stabilisation and

contribute to the ongoing input of woody debris into the stream channel.

The reintroduction of large woody debris into some sections of river may also serve to stabilise the stream and diversify instream habitat.

Assistance is available

As part of a Victorian Government initiative, the North Central CMA is offering funding and technical assistance for waterway fencing to landholders along the Loddon River (from Cairn Curran Reservoir to the River Murray) and Tullaroop Creek (downstream of Tullaroop Reservoir).

In addition, supplementary planting of indigenous shrubs, grasses and aquatic plants that may have disappeared due to years of continuous grazing is available.

The North Central CMA is also offering landholders assistance with the reintroduction of large woody debris into areas of the Loddon River where they are currently absent, due either to stream clearing works or lack of riparian trees.

Minor erosion control along the banks of the Loddon River and Tullaroop Creek is also available.

Would you like to find out more?

These incentives are delivered in a partnership arrangement between the North Central CMA and the Department of Primary Industries (DPI).

To find out more about incentives for waterway fencing and revegetation along the Loddon River and Tullaroop Creek contact:

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Or visit our website at:
www.nccma.vic.gov.au

Information for this fact sheet was sourced from:

- Price, P. and Lovett, S. (2002) 'Streambank stability', *Fact Sheet 2*. Land & Water Australia, Canberra.
- Loddon River Environmental Flows Scientific Panel (2002) *Environmental Flow Determination of the Loddon River Catchment: Final Report*. Unpublished Report to the NCCMA and NRE.