



Australian Government



Natural Resource Management

FACT SHEET: RIPARIAN RESTORATION EXPERIMENT

RIPARIAN RESTORATION SUPPORTS LOWLAND STREAM FOOD WEBS IN THE MURRAY-DARLING BASIN

RIPARIAN RESTORATION IN THE MURRAY-DARLING BASIN

The Riparian Restoration Experiment was initiated to evaluate the ecological responses to replanting and stock exclusion along streams within the Murray-Darling Basin. The Murray Darling Basin Authority, together with scientists from Monash University have collected ecological information from five lowland streams across the southern Murray basin about the effects of riparian canopy cover on the amounts of leaf matter within the stream channel.

River red gum (*Eucalyptus camaldulensis*) provides organic input and shade to many lowland streams throughout south eastern Australia. This iconic species is the most widespread overstorey tree species in Australia and is closely associated with a range of riparian habitats. The distribution and abundance of the river red gum and other riparian species has declined with clearing of native vegetation for agriculture, dramatically altering the landscape and concurrently altering in-stream structure and function.

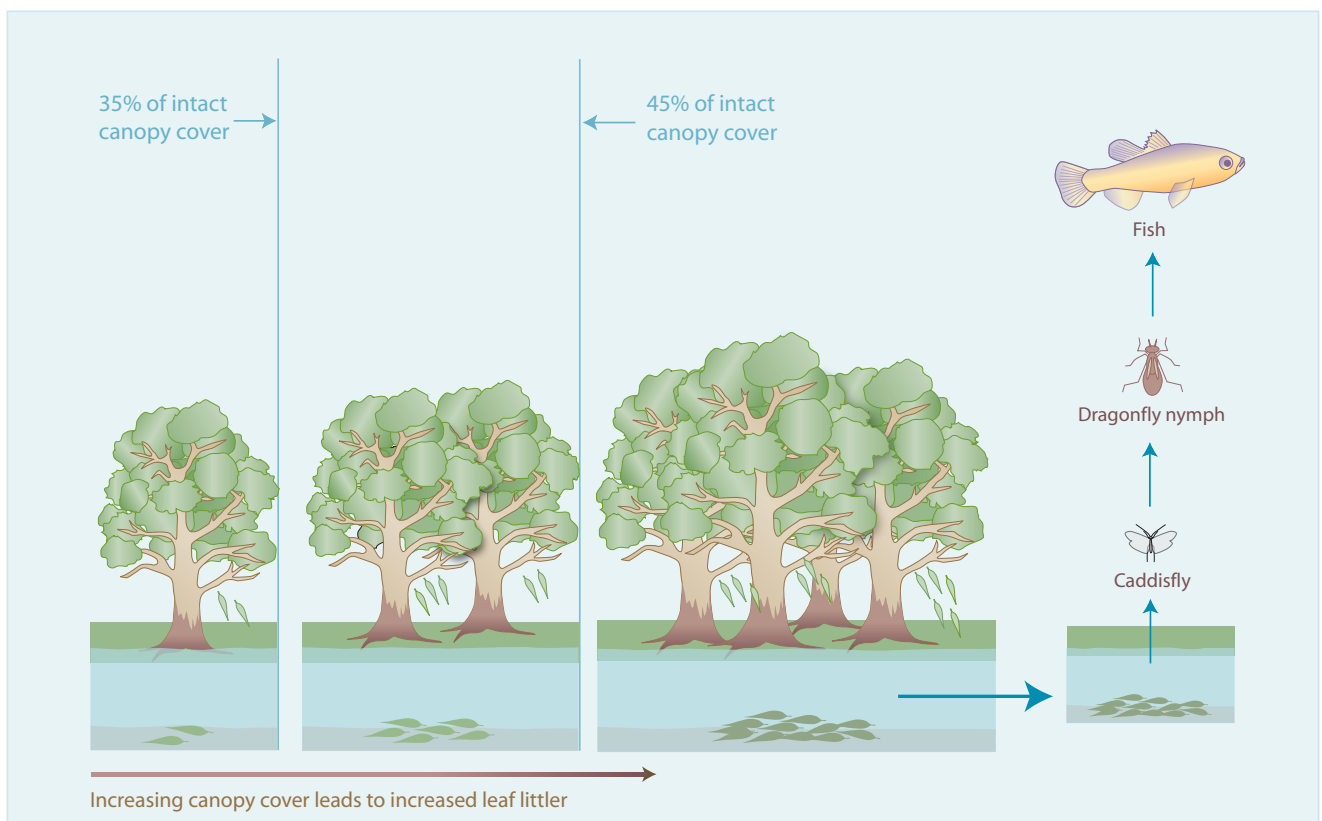


Fig 1: An increase in canopy cover influences the amount of leaf litter entering the stream, potentially having flow-on effects in the food chain.

Effective riparian restoration activities require protection and enhancement of existing riparian corridors to ensure adequate input of leaf matter into the food web. Increasing canopy cover to at least 45% of that of an "intact" canopy site, is likely to increase the chance of organic matter accumulating in low order streams, to a level close to pre-disturbance levels. This can be achieved in the long term through fencing of riparian areas to exclude livestock, and revegetating the area. The results outlined here are based on two reference papers, listed below, produced by the scientific team.

KEY MESSAGES:

- Fencing lowland streams from livestock and restoring the area (via replanting) increased riparian vegetation and the amount, composition and distribution of leaf matter in a stream channel
- The amount of leaf matter in streams was consistently very low where the streamside canopy cover was below ~35% (Figure 1)
- The amount of leaf matter in streams only began to consistently accumulate where canopy cover was above ~45% (Figure 1).
- Leaf matter input from vegetation such as the river red gums is a crucial component of the aquatic food web.

CANOPY COVER AND LEAF LITTER IN LOWLAND STREAMS

As the amount of canopy cover increases following riparian restoration, the potential for leaf matter to fall into and accumulate in these low-gradient streams increases. This is important because imported organic material from trees forms the basis of food webs in most stream ecosystems. Moreover, our analysis of the food webs within these lowland streams has clearly shown that river red gum leaves are the major source of organic material supporting the aquatic biota (Figure 1). While research from similar systems has concluded that algae is the primary driver of the food webs of lowland streams our data suggests otherwise. An intact canopy should therefore be the primary goal of stream restoration as an increase in canopy cover influences the amount of litter entering the stream, potentially having flow on effects in the food chain.

KEY FINDINGS:

- The removal of overstorey trees along streams in agricultural catchments has led to a large-scale reduction in leaf matter available to in-stream biota.
- Measurements of canopy cover and leaf matter input at relatively intact sites may serve as a benchmark for restoration, as they best approximate levels that would have occurred prior to degradation.
- Management should target a minimum canopy cover of 45% of that of relatively intact sites, along lowland streams to ensure a supply of leaf matter.
- Our data suggest that the relationship between canopy restoration and leaf matter is highly localised (~50m of stream length) in lowland streams.
- Sections of stream with low canopy cover cannot necessarily rely on longitudinal input of leaf litter from upstream.
- Restoring canopy cover along short lengths of stream will provide local benefits to some aquatic biota.

The results outlined in this fact sheet are based on data presented in two scientific papers.

Reid, D.J., Quinn, G.P., Lake, P.S. and Reich, P. (2008). Terrestrial detritus supports the food webs in lowland intermittent streams of south-eastern Australia: a stable isotope study. *Freshwater Biology*, 53, 2036-2050

Reid, D.J., Lake, P.S., Quinn, G.P. and Reich, P. (2008). Association of reduced riparian vegetation cover in agricultural landscapes with coarse detritus in lowland streams. *Marine and Freshwater Research*. 59, 998-1014

FURTHER INFORMATION

Additional information on the Riparian Restoration Experiment is available through the Murray-Darling Basin Authority website: www.mdba.gov.au

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