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Waterway Management Program

Program Leader: Dr Peter Hairsine

Project W3: Rehabilitation and management of riparian lands: sediment, nutrients and erosion

Introduction

Practitioners need to take a strategic approach to rehabilitation and revegetation of riparian land adjacent to rivers and streams. Where in the target catchment does most of the stream sediment originate? What section of a stream should be planted with buffer strips to make the most impact on sedimentation? Accurate information about hydrological processes in the target stream and catchment are required before such projects can achieve long-term success.

This CRC joint project, carried out with LWRRDC, has documented riparian processes within experimental catchments in five States - Queensland, Western Australia, Tasmania, New South Wales, and Victoria. Strong links to catchment management agencies in each State have facilitated the transfer of research findings from the CRC to catchment managers and other user groups. Much of the recent work has centred on bringing research findings together into a single framework to improve riparian zone management.

Riparian processes studied include sediment trapping and 'saturation' in riparian and grass buffer strips; stabilisation of stream banks by tree roots; the role of large woody debris in shaping stream channels; and the use of wetlands in trapping sediment and preventing scour. Researchers have also developed large-scale sediment delivery models for predicting the impact of different management regimes over a catchment.

Project's Intended Outcomes

- Improved understanding of water movement through riparian zones
- Knowledge of conditions under which riparian zones will effectively trap sediment and nutrients, prevent bank erosion, or assist in reducing flooding
- Computer based model of riparian processes
- Design and management guidelines for riparian zones to achieve a range of ecological functions

Key Project Achievements

- Completed research on the role of trees in stabilising stream-banks in the LaTrobe River, Victoria. Results indicate that banks could be stabilised by tree planting.
- Completed review of the role of large woody debris in stream geomorphology. Findings indicate that Australian timber lasts longer in streams than elsewhere, and that woody debris has a more significant impact than previously believed.





Completed Projects

1997-1999

Project W3:
Rehabilitation and management of riparian lands: sediment, nutrients and erosion

- Demonstrated effectiveness of buffer strips in reducing sedimentation and pollution input to streams in high-rainfall agricultural areas of North Queensland. The strips can trap about 70 - 80% of sediment, except where loading is too high (e.g. paddock draining at a single point).
- Completed flume experiments to evaluate sediment trapping capacity of grass buffer strips. Results have been developed into design guidelines for riparian buffer strips, assisting landholders to satisfy new legislative requirements
- Investigated the role of wetlands in protecting streams by trapping sediment and preventing scour. Research centred on the 2000km² Jugiong Creek, NSW, about one-quarter of which is wetlands. The CRC estimated that these wetlands have trapped a sediment volume equivalent to five years of erosion.
- Large-scale sediment delivery modelling in Jugiong Creek to identify areas with sediment delivery potential, which is related to hillslope hydrology.
- Communicated research findings to practitioners through LWRRDC website and publications, and through the Second Australian Stream Management Conference in February 1999.

Staff Involved:

Project Leader

Dr Ian Prosser (CSIRO Land and Water)

Senior Researchers

Dr Peter Hairsine (CSIRO land and Water)

Dr Ian Rutherford (Monash University)

Participating Organisations

CSIRO Land and Water

Department of Agriculture, Western Australia

Department of Land and Water Conservation, NSW

Hydro-Electric Commission, Tasmania

Land and Water Resources Research and Development Corporation (LWRRDC)

Monash University

Queensland Department of Natural Resources and Mines

The University of Melbourne