Getting a GRIP 2 RAP D ASSES VIENT of riparian health and relationships with land management practices

Development of a rapid survey technique for riparian condition

Assessing the health or condition of ecosystems over large areas requires a technique with the appropriate balance of detail and breadth. In the case of the riparian zone along the edge of large rivers, remote sensing techniques provide broad coverage, but lack detail regarding ecological processes. Traditional ecological studies provide detail at specific sites, but do not provide the coverage necessary to gain an understanding of relationships at the scale at which management generally occurs — paddocks and properties.

To overcome such problems, work was undertaken to develop and test a rapid appraisal survey technique. The technique was based on the assessment of a variety of indicators of ecological function in the riparian zone. Riparian zones serve a number of functions in the riverine environment

- 1. riparian vegetation has a significant influence on bank stability, through intercepting water and dissipating energy, and stabilising and enhancing soil;
- 2. living and dead components of the riparian zone provide important physical habitat diversity for terrestrial and aquatic fauna;
- 3. riparian vegetation supplies materials (leaf fall, wood) for aquatic food chains; and
- 4. riparian zones are efficient filters of sediment and nutrients entering river channels.

Indicators of riparian condition were chosen that provided some measure of the degree to which the ecological functions of the riparian zone were being maintained. These indicators were divided into six components as follows

- habitat continuity and extent (width and longitudinal continuity of riparian vegetation)
- vegetation cover and structural complexity (number of vegetation layers, cover of each layer)
- debris as habitat (leaf litter, standing dead trees and terrestrial coarse woody debris)
- banks and soil (bank stability, aquatic coarse woody debris and soil structure)
- biotic integrity (relative dominance of native vs exotic species in each vegetation layer)

 indicative species (*Eucalyptus camaldulensis* regeneration, damage to the regeneration, *Phragmites*)

A single, trained person can obtain information on each of the indicators in approximately 1 hour by walking a 1 km reach of river bank and scoring the indicators.

Riparian health on the Murrumbidgee River

The rapid appraisal index of riparian condition was used to survey 138, 1 km reaches of the Murrumbidgee River between Gundagai and Hay. Reaches were surveyed on private grazing properties, State Forests and River Reserves managed by the Department of Land and Water Conservation. At the same time that reaches were surveyed for riparian condition, counts of cow pats on river banks were recorded as a measure of grazing intensity.

The possible range of scores for the riparian index is zero (highly degraded) to 50 (excellent condition). There is a wide range of riparian condition scores for the banks of the Murrumbidgee River (Figure 1). The highest condition scores were for riverbanks that have had stock removed for long periods or are traditionally very lightly grazed (such as some State Forests and a few private properties). The poorest scores were recorded for sections of the riverbank on private properties at the upstream end of the area surveyed.

There is a strong negative relationship between grazing intensity and riparian condition, and it is clear that riverbanks on private properties are generally in poorer condition than those in State Forests and River Reserves (Figure 2).

Full analyses of the riparian zone condition data have shown that when factors such as: distance down the river; stocking rate in the riparian paddock; presence of additional watering points in the paddock; type of rotational practice used; how much of the river bank is accessible to stock; and paddock size are considered, they account for 70% of the variation in riparian condition. The major findings of this analysis were that condition is lower By Amy Jansen and Alistar Robertson

For further information

Dr Amy Jansen School of Science & Technology Charles Sturt University PO Box 588 Wagga Wagga NSW 2678 Tel: (02) 6933 4092 Fax: (02) 6933 2737 Email: ajansen@csu.edu.au

Getting a $\operatorname{Grip} 2$



Figure 1: Frequency distribution of condition index scores at 138 sites of three tenure types on the Murrumbidgee River between Gundagai and Hay



Figure 2: The relationship between cow pat counts and the condition of the riparian zone at 138 sites along the Murrumbidgee River between Gundagai and Hay on private properties (\blacklozenge), in State forests (\blacktriangle) and in reserves (\blacksquare).

- in paddocks with higher stocking rates
- ~ in paddocks which have shorter, or no periods of rest from grazing
- \sim $\,$ when there are no alternative sources of water in the paddock.

These findings suggest the following options for improved management of grazing in the riparian zone

- grazing regimes short periods of grazing, even at relatively high stocking rates, interspersed with long periods of rest, are likely to have the least impact on the riparian zone.
- planting/natural regeneration planting and/or temporary fencing to allow natural regeneration of trees and shrubs may be necessary to restore native vegetation cover.
- alternative watering points the provision of appropriately placed (in shade) watering points in paddocks may reduce the impact of stock on river banks and wetlands in those paddocks.

Future developments

The condition index will be used to survey sites on a number of rivers in the Murray–Darling Basin in the next two years. In collaboration with the Department of Land and Water Conservation, we will also be producing a publication detailing the survey method for use by landowners and managers.

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By Dr Luke Pen

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Fax: (08) 9278 0704

Email: carolyn.atkinson@wrc.wa.gov.au

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