

Grazing management impacts on the riparian zone and water quality

S.R. Aarons, A. Melland and C.J.P. Gourley

Ellinbank Research Institute, PIRVic Ellinbank, RMB 2460 Hazeldean Rd, Ellinbank, Victoria, 3821 Australia, Email: sharon.aarons@dpi.vic.gov.au

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Introduction Inappropriate farm management activities such as stock access to creeks, and poor fertiliser and effluent management can negatively impact riparian zones and waterways, contributing to increased in-stream nutrient, sediment and microbiological loads and loss of riparian biodiversity, amongst other impacts. Nutrient budgets for dairy systems indicate that on-farm nutrient accumulation and redistribution is common (Gourley 2004), which in large part is due to the uneven distribution of dairy cow dung and the nutrients they contain (Aarons *et al.*, 2004). The 'Gippsland Dairy Riparian Project – Environmental Monitoring module' was established in Jan. 2003 to monitor the impact of dairy farm management and changed riparian zone management on the riparian zone and water quality.

Materials and methods The research site is located on two adjacent commercial dairy farms which incorporate 1.7 km of the Sandy Creek, a dairy-dominated catchment, in southeastern Victoria. Six weirs and 11 nests of piezometers were installed at the site to assist in determining the impact on soil and water of tracks, paddock management, dairy shed and stand-off areas, effluent ponds, and effluent-irrigation of pasture. Monitoring of soil (nutrients), stream (height, nutrients, solids, microbiology), groundwater (levels, nutrients), habitat condition (stream temperature, canopy cover) and rainfall, commenced in late autumn (May) 2003.

Results Intensive soil sampling identified nutrient accumulation zones near the creek that could contribute to degraded water quality (Figure 1). Soil P and EC concentrations, as well as total N, total K and EC concentrations in the shallow groundwater were higher in these zones compared with nearby areas. Weekly creek grab samples (Figure 2) indicated that suspended solid concentrations were elevated downstream of the track crossing the creek (at Weir 2), while increased total N concentrations occurred downstream of areas where run-off from pasture was observed (Weir 3).

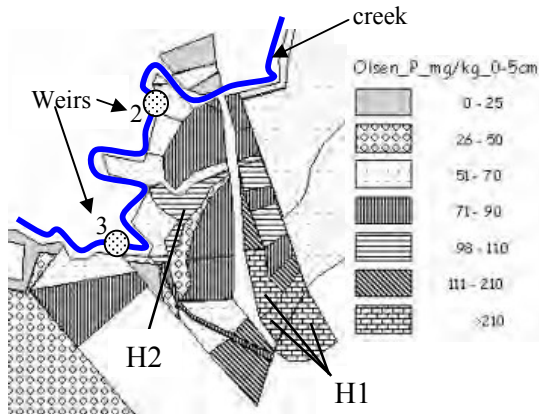


Figure 1 Soil Olsen P (mg/kg) in the 0-5cm layer in each of the sample areas. Those areas with the highest (H1) P levels are indicated. Movement of water from H2 into the creek is observed upstream of weir 3

Conclusions The riparian and in-stream data indicate that dairy farm management activities are having a measurable impact at the research site. Nutrient accumulation within the landscape in areas that can have a potential negative impact on water quality, appears to be associated with increases in stream nutrient concentrations. On-farm activities that can improve riparian zone condition and the waterway have been identified and used to develop practical on-farm management actions.

References

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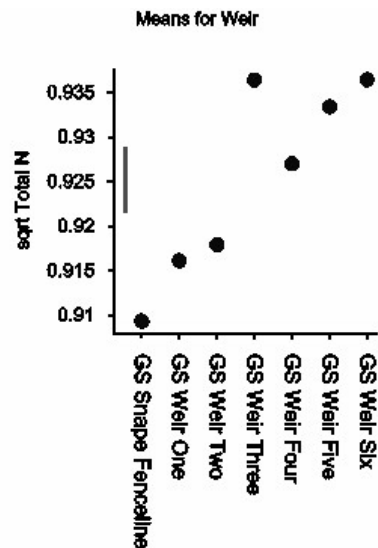


Figure 2 Mean total nitrogen (square root) of grab samples collected at seven locations along the creek. Fenceline – where the creek enters the property; Weirs 1 to 6 – progressively located downstream. See Figure 1 for locations of Weirs 2 and 3