



## PAPER 5

### Grassland farming and water quality in New Zealand

Quinn, J M <sup>\*1</sup>, Wilcock, R J <sup>1</sup>, Monaghan, R M <sup>2</sup>, McDowell, R W <sup>2</sup>, Journeaux, P <sup>3</sup>

<sup>1</sup>NIWA, PO Box 1115 Hamilton, New Zealand; <sup>2</sup>AgResearch, Invermay, PO Box 50034, Mosgiel, NZ; <sup>3</sup>MAF Policy. Private Bag <sup>3</sup>123, Hamilton, NZ. Presenter

Pastoral agriculture is the dominant land use in New Zealand, covering 38% of the country, and plays a key role in the economy, with dairy and meat products accounting for 34% of export earnings in 2007. Dairying has intensified and expanded in the last 20 years, at the expense of sheep and beef farming. Dairying now covers c. 23% of the grassland area, but accounted for 21% of the country's merchantable exports in 2007. Deer farming has increased four-fold since 1994, but only comprises 2% of grassland area.

Water quality is relatively good in New Zealand but many lowland agricultural streams and rivers do not meet guideline values for contact recreation. Pastoral land cover has also been associated with river and lake degradation.

The main pressures on water quality from grassland agricultural impacts are exerted through riparian vegetation change, increased input of microbial pathogens, sediment and nutrients, and altered flow regimes associated with land use change, pasture drainage and irrigation. These pressures and their impacts vary widely across New Zealand with farm systems and practices, natural factors that control contaminant delivery pathways (climate, landform, soils and geology), and receiving water characteristics/sensitivities. Conflicts over agricultural effects on water quality have been greatest where dairying occurs or was expanding in catchments with nutrient sensitive lakes or spring-fed streams. In the case of the iconic Lake Taupo catchment, this has recently resulted in a cap on nitrogen load from pastoral farming.

Legislative management of the environmental impacts of agriculture on water quality has been largely devolved to Unitary Authorities who can develop rules in Regional Plans and issue consents for certain activities through the Resource Management Act 1991. The dairy industry has been proactive in promoting improved environmental practice on farms. For example, the main dairy company, Fonterra, has committed its farmers to the Dairying and Clean Streams Accord, which requires several core practice improvements (involving nutrient management, effluent management, exclusion of cows from streams, provision of bridges/culverts at regularly used stream crossings) by 2012.

Agricultural and water researchers are working with industry to develop a toolbox of mitigation measures to control agricultural impacts on water values. This includes riparian management; matching land use to land capability; dairy shed effluent treatment; effluent storage and improved land application methods; artificial wallows for deer, nutrient budgeting; use of nitrification inhibitors; livestock winter grazing strategies; and use of drainage treatment wetlands. The application of these tools to catchments with sheep and beef, deer or dairy farms has shown water quality benefits.