What counts is what works: a review of howagricultural diffuse pollution is managed for water quality in New Zealand and key aspects to approaches going forward [oral]

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The management of agricultural diffuse pollution is at the heart of a conflict facing New Zealand between land use and water quality. Nowhere is this conflict more apparent than in Canterbury.This paper reviews therelative success ofpublic and private sector approaches used to manage agricultural diffuse pollution for water quality in Canterbury and draws out key messages for an approach going forward.

Pollution of freshwater from point-source discharges is now largely controlled by the RMA (1991), and attention of resource managers has turned to reducing diffuse pollution from intensive land use (MfE, 2007). Water quality in rivers and lakes has declined in regions dominated by pastoral farming (e.g.OECD, 2007; MfE, 2009) and, despite efforts to promote new management policies and practices, the continuing decline of environmental conditions suggest that persuasion and the regulatory frameworks used have not prevented environmental deterioration in areas used for intensive farming production(Jay and Morad, 2007).

Canterbury is home to many valued water resources iconic high country lakes, high quality ground-watersand high value alpine and mountain streams. However, Canterbury also accounts for 70% of irrigated land in New Zealand, approximately 500,000ha (CMF, 2009). Some impacts of intensification have already been seen, both in terms of quality and altered flow regimes. In 2006, half of rivers subject to irrigation off-takes were on restriction, 40%of monitored river recreation sites were not suitable for contact recreation, poor ecosystem health and water quality characterises lowland streams and coastal lakes (ECan, 2009; CMF, 2009) and approximately 10% of monitored wells exceed the drinking water standard for nitrate (CMF, 2009). Yet current irrigation accounts for only half of potentially irrigable land (Morgan, 2002). The high aspirations for both agricultural intensification and environmental water quality articulated for Canterbury in the Canterbury Water Management Strategy (CWMS) (2009) will bring any weaknesses in the current methods for managing diffuse pollution into sharp relief.

Environmental water quality in the Canterbury region is degradedin some areas, particularly lowland streams (ECan, 2008), caused in part by pollution from agriculture. Where this degradation is unacceptable, it suggests that in these areas the current system of regulation hasbeen unsuccessful in adequately managing the cumulative impacts of intensification of agriculture. Although the deterioration of water quality may have multiple causes; from lack of guidance at central government level(e.g. LAWF, 2010), through poor ability to assess cumulative effects using the RMA(e.g. Gunningham, 2008) to the more routine criticism of variable compliance with rules and consent conditions. In addition, the current permitted activity rules and consent conditions may have inadequate coverage of activities to effectively manage diffuse pollution losses for water quality. However, command

and control regulation remains an important tool in managing diffuse pollution. Regulation has an important general and specific deterrence role for environmental management (e.g. Shimshak, 2007), and the regulatory authority has a key strategic rolein any proposed management approaches.

According to Gaines and Kimber (2001),the growing interest in industry self-regulation has arisen due to little improvement seen in environmental quality despite environmental regulations. However, an interest in self-regulation may arise for other reasons such asstrategy, marketing and PR andbusiness future proofing, as well as to combat poorly performing environmental regulations. Potential benefits of industry self-regulation include, improved efficiencies, more focused action through the industry's in depth knowledge, less resistance to self-regulation than external regulation, and more effective pressure on non complying enterprises(e.g. Gunningham, 1998; Van Amstel-Van Saane, 2007)Potential weakness of industry self-regulation include the adoption of easier environmental targets, cosmetic compliance, poor transparency, process rather than outcome driven, increased risk of prosecution and net environmental degradation(e.g. Calcott, 2010; Heyes, 1996; Innes, 1999; Van Amstel-Van Saane, 2007). The impacts of the "Dairying and Clean Streams Accord", an example of industry self-regulation, highlights that without a strategic assessment of catchment capacity and development potential, the industry approach alone, however well intentioned, is unlikely to be able to deliver effective water quality management.

Modes of governance combining hierarchy and collaboration has been found to have particular attractions in addressing wicked problems such as water quantity management in Canterbury (Gunningham, 2008) who sees that this combination was likely to be most effective in balancing the economic needs of various stakeholders and the environmental interest. The nature of the conflict between different well-beings around water and governance issues reflect parallels between water quantity managing diffuse pollution for water quality. All the modes of management of diffuse pollution for water quality have merits and a hybrid approachwould need to retain the important and effective elements from traditional regulation, voluntary programmes, industry self-regulation and market instruments. These key elements fall under the categories of: science, governance and implementation.

The Land and Water Forum(2010), the Canterbury Water Management Strategy (2009)and the Environment Canterbury Land Use and Water Quality programmeall signal a drive for a new approach for tackling diffuse pollution. By drawing out the relative successes, strengths and weaknesses of current modes of management, this paper provides some key principles for future hybrid approaches.

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