

Lessons learned from integrated modelling in the Healthy Rivers Wai Ora process

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Abstract for John Quinn symposium

The broad-scale establishment of resilient and sustainable agroecosystems is challenging, especially in locations dominated by intensive agriculture. It is particularly complicated by the need to balance multiple values—across environmental, cultural, economic, and social domains—while designing new directions for a diverse landscape. The National Policy Statement for Freshwater Management 2014 charges communities throughout New Zealand to work together to identify tools for improving water quality and ecosystem health. Integrated modelling plays a key role in this legislative landscape, to help predict the elements of alternative policy futures.

The Healthy Rivers Plan for Change Project has used a collaborative stakeholder group to establish policies to restrict contaminant loss to water bodies across the Waikato and Waipa River catchments. Enormous effort was invested throughout this process in meeting the technical-information needs of this stakeholder group. An economic-optimisation model was used to explore the cost and distributional implications of different policies and targets. This model synthesised information from a broad range of sources—including four diverse models that estimated contaminant sources and transport across a catchment around 1 m hectares in size. Economic and hydrological modelling was supported by a qualitative integrated assessment, which was used to provide insights on biophysical, cultural, and social issues for which quantification was not possible.

The application of these frameworks offered several benefits to the collaborative process. Key advantages were a capacity to engage in iterative learning, while focusing discussion on key issues that communities face in guiding ecological restoration. However, this application also showed that challenges persist regarding how models can best be used within such processes. A key issue is how to build accessibility, confidence, and understanding, while maintaining academic rigour. Another is the modelling of transition, given that long lead times for policy enactment complicate the prediction of adjustment costs.