

# 1. Introduction

A research programme aimed at improving management of land and water resources<sup>1</sup> by adopting an integrated, catchment-based approach has been initiated in the Motueka River<sup>2</sup> catchment. The project originated from a workshop in March 1998 with a wide range of science stakeholders in Nelson who identified the main regional research issue as:

*“the need to improve understanding of the effects of land use on freshwater, coastal and marine ecosystems”.*

Similar concerns exist elsewhere in New Zealand and the Motueka River study is intended as a case study to develop a framework for integrated catchment management (ICM) research that can be applied anywhere.

The research programme is based on the Motueka River for a number of reasons including:

- the diversity of resource management issues

on the land, the rivers and streams, and in the coastal and marine environment;

- the wide variety of land uses including intensive horticulture, forestry, pastoral farming, dairying and a large area of national park in the headwaters;
- the complexity of environmental characteristics (climate, geology, soils) in the catchment;
- the large amount of existing knowledge about the catchment; and
- a willingness by a wide range of affected individuals and groups to be involved in, and contribute to, the research programme.

The major resource management issues in the Motueka Catchment include:

- debate over water resource allocation between different user groups, particularly horticulture and forestry;
- competition between in-stream and out-of-stream water uses, highlighted by the application

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<sup>1</sup> Where land and water resources or issues are referred to, this includes land, freshwater, coastal and marine components.

<sup>2</sup> Both the Motueka and Riwaka catchments are included in the research programme as they are managed under a single management plan, and both influence the marine environment of Tasman Bay. Where the Motueka Catchment is referred to throughout the text it includes the Riwaka River.

in progress for a Water Conservation Order on parts of the Motueka River;

- water management issues arising from uncertainty about the degree and extent of linkages between surface and groundwater and how to manage these in an integrated manner;
- concerns about sediment and nutrient delivery into rivers from some land-use activities, and the impact on the internationally renowned trout fishery in the Motueka River;
- the debate over aquaculture opportunities in Tasman Bay, with concerns about both the environmental impact of aquaculture and the potential impact of terrestrial land use on marine water quality and aquaculture.

Integrated catchment management is an approach that recognises the catchment<sup>3</sup> as the appropriate biophysical unit for organising research on ecosystem processes for the purpose of managing natural resources. It also recognises that social, economic and political frameworks are integral elements of the management of natural resources, and of resource management research.

Rather than focusing on small-scale processes or isolated activities, this ICM approach seeks to provide an integrative framework for understanding the cumulative interactions of past, present, and possible future natural resource uses on land, freshwater, and marine resources. It takes a “ridge tops to the sea” perspective to address large-scale, regional issues that often perplex communities and resource managers (e.g., water allocation, water quality, habitat quality, land and coastal productivity). As well as a biophysical focus in understanding how resource use influences land, freshwater, and marine ecosystems there is a strong focus on developing an understanding of how to create a favourable social environment in which science can best be used to make decisions about resource management. This ICM approach is receiving increasing international support, such as through the UNESCO/WMO programme “Hydrology for the Environment, Life

and Policy” (HELP) which recognises that sustainable management is as much a social and economic question as a technical biophysical one (Fenemor, 2002a).

The Motueka ICM programme is a partnership between Landcare Research, the Cawthron Institute and Tasman District Council. It has the stated outcome of

*“Improved management of and social learning about land, freshwater, and near-coastal environments in catchments with multiple, interacting, and potentially conflicting land uses”.*

The initial objectives of the programme are to:

- develop a knowledge base to promote information integration, synthesis and delivery about integrated catchment management of the Motueka River;
- construct catchment water-balance (and ultimately nutrient-balance) models to explore past, present and possible future connections between rainfall, land characteristics, land use and land management practices, surface and groundwater resources;
- identify the nature, value, and functions of riparian and in-stream habitats;
- quantify the processes and controls on productivity in the coastal sea environment of Tasman Bay; and
- promote social learning for integrated catchment management in the Motueka River catchment.

This report is a contribution to the first objective, namely the knowledge base aimed at promoting information integration, synthesis and delivery for the Motueka River catchment. It reviews the available information on the physical, social and cultural environment, lists the range of existing data sources, and describes the current statutory framework for land, fresh water and coastal resource management. From this synthesis it has been possible to identify a number of major resource management issues and the research needed to underpin improved management of land and water resources.

<sup>3</sup> The land area drained by a river. In this case it also includes the marine area affected by river discharge.