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**A Development and Application
of GIS in
Whanganui Catchment Based River Environment
Classification System**

A dissertation presented in partial
fulfilment of the requirements for the
degree of
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in
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Dedication

This thesis is lovely dedicated to my Mother and Father

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Abstract

This thesis concerns a development and implementation of Geographical Information System (GIS) for the New Zealand Whanganui catchment, based on a new methodology for river environment classification systems in New Zealand. The Ministry for the Environment (MfE) and National Institute of Water and Atmospheric Research (NIWA) are developing this system with assistance from regional councils. The river habitat classification is sometimes called river "ecotyping". It describes the process of dividing rivers into similar or different physical classes based on the habitat requirements of the plants and animals that live there (Murray McLea, 1999). This project focuses on generating a Digital Terrain Model (DTM) for the Whanganui river catchment to determine Whanganui catchment boundaries and a series of hydrology parameters such as catchment patterns and channel slopes, etc. It comprises layers of elevation, rainfall, geology, land-cover and additional ecotyping related attributes for classification of each arc of the Whanganui River.

There are five sections in this thesis.

The first section introduces the basic concept of hydrology in environmental and ecological aspects. It reviews the hydrology model with GIS and DTM. It also briefly describes the river environment classification system ---- ecotyping methodology. Finally, it describes the aims and achievements of this project.

The second section focuses on the ARC/INFO software environment, using different ways to generate the DTMs and present criteria that will be used to test and analyse the accuracy of DTMs. Also the Whanganui catchment and catchment boundaries will be determined.

The third section focuses on the river analysis. The main target is to test whether the 1: 50000 topographic data can be used to determine the channel slope and channel sinuosity for river sections other than reaches (Snelder et al. 1999).

The fourth section describes the method of using ecotyping parameters and classification rules to classify each arc of the river into a database. These rules are introduced in the article "Further development and application of a GIS based river environment classification system" (Snelder et al. 1999).

The last section as a conclusion of the thesis will summary the achievements, the methodology of the processing and the results of the application of this research.

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