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**THE ECONOMIC VALUATION OF WATER FROM THE ASHBURTON
RIVER: IMPLICATIONS FOR ALLOCATION**

A thesis presented in partial fulfilment
of the requirements for the degree of
Masters of Agricultural Science
in Resource Economics
at Massey University

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ABSTRACT

Recent legislative changes in New Zealand allow much greater flexibility in the procedures used by regional authorities to allocate water resources. In certain river catchments where competition for water in alternative uses is high, estimates of the economic value of water could prove useful in designing an allocation scheme. In this study two methods were used to value the water from the Ashburton River. First, a mathematical programming approach to estimate the value of water to farmers in the Ashburton catchment. This value is about \$0.62 million. Second, a contingent valuation approach to estimate the value of in-stream flows of the Ashburton to the residents of the Canterbury region. This value is estimated at between \$2.47 million and \$5.15 million. We assess the methods and the results for implications in allocating Ashburton water between irrigators and in-stream flows.

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TABLE OF CONTENTS

ABSTRACT	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF FIGURES	ix
LIST OF TABLES	x

CHAPTER ONE 1

INTRODUCTION

1.1	The Resource Management Act	2
1.2	Resource Management And Local Government Reform	5
1.3	The Canterbury Region	7
1.4	Organisation Of This Thesis	9

CHAPTER TWO 12

ECONOMIC THEORY APPLIED TO WATER

2.1	Conditions Necessary for Economic Efficiency	12
2.2	The Physical Characteristics of Water	15
	2.2.1 Mobility	15
	2.2.2 Variability in Supply	15
	2.2.3 Solvent Properties	15
	2.2.4 Sequential Use	15
	2.2.5 Complementarity of Outputs	16
	2.2.6 Bulkiness	16
	2.2.7 Cultural And Social Values	16
2.3	Economic Characteristics Of Water	17
	2.3.1 Marketable Private Good Characteristics	17
	2.3.2 Public Good (Or Collective Good) Characteristics	17
	2.3.3 Common Property Resource Characteristics	18
	2.3.4 Externality Characteristics	19
	2.3.5 Public Utility Characteristics	20

2.4	Valuation Of Water That Has Private Good Characteristics	20
2.4.1	Production Function Analysis	21
2.4.2	Farm Crop Budget Analysis	21
2.5	Consumer Surplus	22
2.6	Value	29
2.6.1	Option Value	29
2.6.2	Existence Value	34
2.6.3	Quasi-option Value	34
2.7	Nonmarket Valuation Techniques	36
2.7.1	Contingent Valuation Method	36
2.7.2	Travel Cost Method	37
2.7.3	Hedonic Pricing	38

CHAPTER THREE 40

INSTITUTIONAL CONSIDERATIONS

3.1	Institutions	40
3.1.1	Diversion Versus Consumptive Water Rights	49
3.1.2	Priority Rights Versus Proportional Rights	51
3.2	Water Markets	54
3.2.1	Conditions Necessary For A Market To Work	55
3.2.2	Tradable Water Permits	60
3.2.2.1	Examples Of Water Markets	61
3.3	Evaluating A Water Allocation System	65

CHAPTER FOUR 68

THE ASHBURTON CATCHMENT

4.1	The Canterbury Region	68
4.2	Mid Canterbury	74
4.3	The Ashburton River	76
4.3.1	Water Use Of The Ashburton River	80
4.3.2	Management Of The River	82
4.4	Issues For Economic Analysis	84

CHAPTER FIVE

84

METHODS TO VALUE WATER

5.1	Linear Programming	84
5.1.1	Parametric Linear Programming	90
5.1.2	Advantages And Disadvantages Of Linear Programming	91
5.2	Contingent Valuation	93
5.2.1	Economic Theory Of Contingent Valuation	94
5.2.2	Willingness-To-Pay Versus Willingness-To-Accept	95
5.2.3	The Market Scenario	98
5.2.4	Techniques To Elicit Payment	99
5.2.4.1	Open-ended question	99
5.2.4.2	Iterative bidding	100
5.2.4.3	Payment-card	101
5.2.4.4	Contingent ranking	101
5.2.4.5	Dichotomous-choice format	101
5.2.5	Biases	106
5.2.5.1	Misrepresent biases	107
5.2.5.2	Implied value clues	109
5.2.5.3	Misspecification issues	110
5.2.5.4	Sampling and aggregation issues	110
5.2.6	Advantages and Disadvantages of Contingent Valuation	111

CHAPTER SIX

113

VALUE OF IRRIGATION WATER

6.1	Linear Programming	114
6.2	Developing The Model	114
6.2.1	Ashburton Lyndhurst Irrigation Scheme Survey	117
6.2.1.1	Sheep and beef farm	118
6.2.1.2	Mixed cropping farm	120
6.2.1.3	Intensive crop farm	121
6.2.1.4	Dairy farm	121
6.2.2	Other Assumptions	121
6.3	The Linear Programming Models	127
6.3.1	The Intensive Crop Farm Linear Program	127
6.3.2	The Mixed Cropping Farm Linear Program	129
6.3.3	The Sheep And Beef Farm Linear Program	131
6.3.4	The Dairy Farm Linear Program	132
6.4	Estimation of Demand for Irrigation Water	134

6.5	Aggregation	144
6.6	Value Of Ashburton River Water To Farmers	147

CHAPTER SEVEN 150

ESTIMATING THE VALUE OF IN-STREAM FLOWS

7.1	Survey Construction And Implementation	150
	7.1.1 The Survey Scenario	151
	7.1.2 The Target Population	152
	7.1.3 The Appropriate Sampling Unit	153
	7.1.4 Sample Size	153
	7.1.5 Pretest	155
	7.1.6 Sampling Procedure	158
7.2	Survey Implementation	159
7.3	Survey Response Rate and Other Biases	160
7.4	Representativeness of the Sample	163

CHAPTER EIGHT 168

ACTIVITIES ON THE ASHBURTON RIVER

8.1	Activity Data of Respondents Who Live in the Ashburton District	168
8.2	Activity Data of Respondents Who Live Outside the Ashburton District	181
8.3	Reasons Respondents Value the Ashburton River	183

CHAPTER NINE 193

ECONOMIC VALUE OF INCREASED STREAM FLOWS

9.1	The Dichotomous Choice Results	193
9.2	The Bidding Game Results	200
9.3	Aggregation Of Willingness-To-Pay	207

CONCLUSIONS AND RECOMMENDATIONS FOR WATER ALLOCATION IN THE ASHBURTON RIVER

10.1	Evaluation of the Current Allocation of Ashburton River Water	215
10.1.1	Evaluation Of The Management Plan	215
10.1.1.1	Dependability	215
10.1.1.2	Permanence	216
10.1.1.3	Adaptability	216
10.1.1.4	Equity	216
10.1.1.5	Incentives for maximum effort	217
10.1.1.6	Economy	217
10.1.1.7	Political attractiveness	218
10.1.1.8	Minimal interference with private decisions	218
10.1.2	Allocation of Irrigation Water by the Community Irrigation Schemes	218
10.1.2.1	Dependability	218
10.1.2.2	Permanence	219
10.1.2.3	Adaptability	219
10.1.2.4	Equity	219
10.1.2.5	Incentives for maximum effort	219
10.1.2.6	Economy	220
10.1.2.7	Political attractiveness	220
10.1.2.8	Minimal interference with private decisions	220
10.2	An Alternative Allocation System	221
10.2.1	Evaluation Of The Alternative Allocation System	224
10.2.1.1	Dependability	224
10.2.1.2	Permanence	225
10.2.1.3	Adaptability	225
10.2.1.4	Equity	225
10.2.1.5	Incentives for maximum effort	225
10.2.1.6	Economy	225
10.2.1.7	Political attractiveness	226
10.2.1.8	Minimal interference with private decisions	226
10.2.2	Variations On The Alternative Allocation System	226
10.3	Further Work	228
BIBLIOGRAPHY		230
APPENDICES		241

LIST OF FIGURES

Figure 1.1	Braided Rivers in Canterbury	11
Figure 2.1	Consumer Surplus	25
Figure 2.2	Hicksian Demand Curves	26
Figure 2.3	Willingness-to-pay Locus	32
Figure 3.1	Externality	44
Figure 3.2	Optimal Solution in the Absence of Transaction Costs	46
Figure 3.3	Optimal Solution When Transaction Costs Exist	46
Figure 4.1	Rate of pasture Growth	73
Figure 4.2	Ashburton River Flow Statistics	77
Figure 6.1	Demand Curve for Net Irrigation Water for the Representative Intensive Crop Farm	140
Figure 6.2	Demand Curve for Net Irrigation Water for the Representative Mixed Cropping Farm	141
Figure 6.3	Demand Curve for Net Irrigation Water for the Representative Sheep and Beef Farm	142
Figure 6.4	Demand Curve for Net Irrigation Water for the Representative Dairy Farm	143
Figure 6.5	Aggregate Demand Curve for Net Irrigation Water	146
Figure 9.1	Effect of Trimming the Mean	203

LIST OF TABLES

Table 3.1	Alternative Entitlement Rules	48
Table 3.2	A Comparison of Priority And Proportionate Right Systems . .	53
Table 4.1	Irrigation Schemes in the Ashburton District	75
Table 6.1	Summary of Farms in the Ashburton Lyndhurst Irrigation Scheme	119
Table 6.2	Coefficients For Winter Wheat	123
Table 6.3	Coefficients For Spring Wheat	123
Table 6.4	Coefficients For Barley	123
Table 6.5	Coefficients For Field Peas	124
Table 6.6	Coefficients For Ryegrass Seed	124
Table 6.7	Coefficients For Pasture	125
Table 6.8	Coefficients For Stock Enterprises	125
Table 6.9	Partial Matrix For Representative Intensive Crop Farm	133
Table 6.10	Effect of Reduced Water to the Representative Intensive Crop Farm	136
Table 6.11	Effect of Reduced Water to the Representative Mixed Cropping Farm	137
Table 6.12	Effect of Reduced Water to the Representative Sheep And Beef Farm	138
Table 6.13	Effect of Reduced Water to the Representative Dairy Farm .	139
Table 6.14	Area in the Ashburton Catchment by Farm Type	145
Table 6.15	Aggregated Net Irrigation Demand	145
Table 7.1	Protest Bids for Households in the Ashburton District	165
Table 7.2	Protest Bids for Households Outside the District	165
Table 7.3	Ashburton Occupations	166

Table 7.4	Regional Occupations	166
Table 7.5	Population by District	167
Table 8.1	Current Activities by Households in the Ashburton District . .	170
Table 8.2	Number of Days Per Annum Per Activity for Households in the Ashburton District	170
Table 8.3	Number of Activities Per Household in the Ashburton District	173
Table 8.4	Most Important Activity for Households in the Ashburton District	173
Table 8.5	Users Versus Occupation of Respondents in the Ashburton District	174
Table 8.6	Future Activities by Households in the Ashburton District	177
Table 8.7	Activities Expected to be Undertaken by New Users in the Ashburton District	177
Table 8.8	Changes in Usage for Households in the Ashburton District	179
Table 8.9	Future Most Important Activity for Households in the Ashburton District	179
Table 8.10	Future Number of Days Per Annum for Households in the Ashburton District	180
Table 8.11	Current Activities for Households Outside the Ashburton District	182
Table 8.12	Number of Activities Per Household Outside the Ashburton District	182
Table 8.13	Number of Days Per Annum Per Activity for Households Outside the Ashburton District	183
Table 8.14	Most Important Activity for Households Outside the Ashburton District	183
Table 8.15	Future Activities by Households Outside the Ashburton District	186
Table 8.16	Future Most Important Activity for Households Outside the Ashburton District	186

Table 8.17	Change in Usage for Households Outside the Ashburton District	187
Table 8.18	Future Number of Days per Annum for Households Outside the Ashburton District	187
Table 8.19	Ranking of Values in the Ashburton District	191
Table 8.20	Ranking of Values Outside the Ashburton District	191
Table 8.21	Ranking of Decision Emphasis for Respondents in the Ashburton District	192
Table 8.22	Ranking of Decision Emphasis for Respondents Outside the Ashburton District	192
Table 9.1	Logit Equations for the Ashburton District	194
Table 9.2	Logit Equations for Outside the Ashburton District	194
Table 9.3	Classification Table for the Ashburton District Model	197
Table 9.4	Classification Table for Outside the Ashburton District Model	197
Table 9.5	Dichotomous Choice Values	199
Table 9.6	Distribution of Bids in the Ashburton District	201
Table 9.7	Sensitivity of the Trimmed Mean for the Ashburton District	204
Table 9.8	Summary of the Bids in the Ashburton District	204
Table 9.9	Distribution of Bids Outside the Ashburton District	206
Table 9.10	Sensitivity of the Trimmed mean for Outside the Ashburton District	206
Table 9.11	Aggregated Willingness-to-Pay	209

CHAPTER ONE

INTRODUCTION

The New Zealand economy has gone from being heavily regulated to a more market orientated, less regulated economy. Local government has been restructured and the new Regional Councils have a greater role in managing their local natural resources. As from 1 October 1991, Regional Councils are responsible for land and water management under the Resource Management Act. Prior to this Regional Councils were subject to the Soil Conservation and Rivers Control Act 1941, and the Water and Soil Conservation Act 1967.

Although some natural resource management issues will affect all regions, the significance of the issue and the method of management will vary from region to region. Water is one example of a natural resource that some regions have in abundance to meet current demand. In other regions, including Canterbury, local scarcities occur from time to time. The shortage of irrigation water for the Loburn orchards during the 1988/89 season is a recent example (Yates, 1991).

Water is the focus of this study because of the importance of water to Canterbury. With the changes that have occurred in New Zealand in recent years, there are opportunities that did not previously exist that may potentially benefit the region and assist the region in managing its resources.

This chapter briefly describes the changes that have occurred in resource management law in New Zealand, the changes in local government structure and some of the issues surrounding water in Canterbury, before outlining the organisation of this thesis.

1.1 THE RESOURCE MANAGEMENT ACT

Water management in New Zealand had been established through the Water and Soil Conservation Act 1967 and its subsequent amendments. Water rights were the fundamental tool that was being used. The Act vested the sole right to dam any river or stream, divert or take natural water, or discharge natural water or waste into any natural water, or to use any natural water in the Crown.

Regional Water Boards and Catchment Authorities were established to carry out water management for the Crown. Water rights were issued to individuals or groups that entitles to use the water within the limits specified in the right. Water rights were normally tied to land and could not be transferred to other sites, although they could be transferred with the sale of the land. It was usual for catchments to have a common expiry date so that the supply and demand for water within that catchment could be reviewed. The 1967 Act allowed for the continuation of notified existing lawful uses by granting rights in perpetuity. Traditionally, water had been allocated on a first come first served basis. This resulted in problems when demand for water outstrips supply. A common practice when seasonal flows were low was to restrict water to all users on a

proportional basis (Sharp, 1988).

Bryan Bates (1988) identified several problems with water management in New Zealand. These included inflexible legislation, lack of integration between water and land use management, unclear legislation direction on cultural values, lengthy water right process, and funding.

The Resource Management Act 1991 replaced the 1967 legislation. The purpose of the Act is to promote the sustainable management of natural and physical resources. In the Act, sustainable management means managing the use, development, and protection of natural and physical resources in a way, or a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while

- a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and
- b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and
- c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.

The 1991 Act promotes an integrated approach to resource management. It specifically encourages the use of economic instruments to manage the use and

quality of natural resources, including water, and provides regional authorities with broader powers than previously existed.

The Resource Management Act replaces the concept of "water right" with "water permit". A resource consent (a water permit is one of many differing resource consents) can be granted for a duration of up to 35 years. The Resource Management Act allows transfers of permits to occur within a catchment, if authorised by a resource management plan. Existing notified uses that were granted in perpetuity will be phased out (Resource Management Act, 1991).

The Act states that regional resource management plans should contain clear and reasonably specific sustainable management objectives or outcomes. Plans should be concerned with both ends (outcomes) and means. The means must clearly serve or enable the ends to be met. The plan must set out what state represents the desired level of sustainable management, determine the means by which the ends are to be achieved and how the system will be monitored (Mulcock, 1991).

These changes allow the Regional Councils greater flexibility in allocating its resources.

1.2 RESOURCE MANAGEMENT AND LOCAL GOVERNMENT REFORM

Local government in New Zealand was reformed in 1989. More than 600 local authorities have been reduced to 94: 13 regional councils, 74 district councils and 7 special authorities. Previously existing city, borough, district, town and country councils, catchment and regional water boards and most other special purpose authorities have been abolished (Department of Statistics, 1990).

All of New Zealand except the Chatham Islands is divided into 14 regions based on water catchment boundaries. They are governed by 13 regional councils and a district council. Gisborne Region is unique in that its district council is also the regional council for that area.

Regional councils took over many of the responsibilities performed in the past by many special purpose authorities. This includes the functions carried out by catchment boards, harbour boards, and pest and noxious plants authorities.

The regional councils will also play an important planning role through their involvement in resource management and its ability to set policy for matters which are of concern for the whole region.

In addition to the regional structure, New Zealand is divided into districts administered by either a district council or a city council. These carry out the day to day local government functions. They provide essential services such as water

supply, roads, sewage disposal and rubbish collection. They also provide amenities such as parks, recreational facilities, libraries and community centres. They continue to carry out district scheme planning (Department of Statistics, 1990).

The mission of the Canterbury Regional Council is to safeguard, enhance, develop and promote the physical, social, economic and cultural environment of the Canterbury region and its people. In pursuit of this mission, the council undertakes (amongst other goals) to

- a) manage wisely the resources of the region so as to yield balanced and sustainable benefits to present and future generations;
- b) develop policies and plans which will protect and enhance the region's natural environment;
- c) encourage, promote and monitor the economic growth and prosperity of the region;
- d) undertake all activities in a cost-effective manner and with a minimum of bureaucracy (Canterbury Regional Council, 1990)

Local government now has a greater control in managing its local resources. It is envisaged that schemes such as flood protection and community irrigation schemes will not be funded to the same degree (if at all) by central government. It is expected that funding for any local project will come not from central government, but either from regional council, district council, private funding, or some combination of the above.

A close working relationship between regional councils and district councils is expected. There is some overlap in their roles in such areas as developing a region's resources. The exact nature of the relationship will develop over time and will depend on the individual councils concerned.

There is also potential conflicts between the roles of the regional council. These may occur in such areas as protecting versus developing the region's resources. This will most likely occur due to imperfect information and the different values held by individuals regarding the region's resources.

1.3 THE CANTERBURY REGION

The Canterbury region has large quantities of both surface and ground water and a history of reliance on its water resources to enhance its economic potential. Stockwater races were cut across the plains in 1870. Irrigation has played a major role in the development of the region with both community and private border dyke schemes being developed. Spray irrigation is also widely used especially on the heavier soils which have traditionally been used for cropping or dairy farming, but now increased interest is being expressed in horticultural crops (Ministry of Agricultural and Fisheries, 1980).

Over 150,000 hectares of Canterbury farmland is currently being irrigated from surface water sources, whilst ten major hydroelectricity schemes supply over 30 percent of the nation's electricity requirements (Talbot, 1991).

The rivers in Canterbury are important for recreational use. For example, the Rakaia catchment attracts over 75,000 visits per year. Activities include salmon and trout angling, jet boating, canoeing, ice skating, and picnicking. The salmon angling is considered of exceptional local and regional value, high national value and of significant international value (Bowden, 1983).

The Canterbury rivers have significant scenic and habitat values. Canterbury has many braided rivers (see Figure 1.1). A braided river consists of two or more unstable channels divided by shingle flats and islands. Channels successively divert and rejoin. Canterbury's rivers support a wide variety of wetland bird species, including three endemic birds: the wrybill plover, black-billed gull and black-fronted tern, which have specific adaptations for breeding and/or feeding on riverbeds. For example, the Rakaia River is New Zealand's most important breeding habitat for the wrybill plover, and the Ashburton River is a major habitat for the black-fronted tern and the black-billed gull (O'Donnell and Moore, 1983).

In recent times there has been conflict over water use in Canterbury. A major conflict involved the Rakaia river, regarding the value of the water for in-stream use versus out-of-stream use, mainly irrigation. This resulted in a National Water Conservation Order for the river, which came into force on 10 November 1988. The Conservation Order took over five years to resolve and the full public cost of management planning and the conservation order has been very high, possibly as much as \$3 - \$4 million (Mason, 1988).

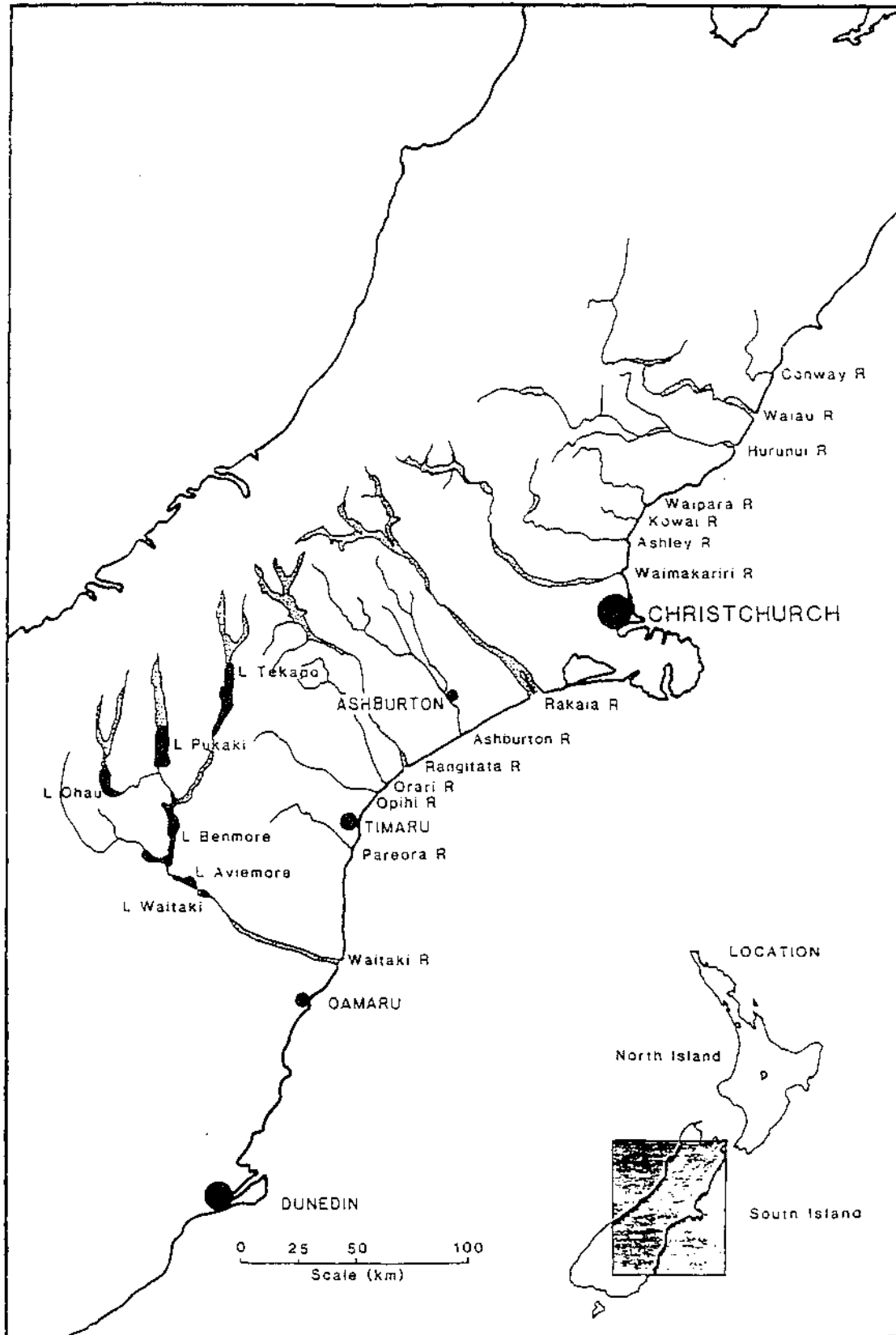
Currently, the management plan for the Ashburton River is being reviewed. The allocation of the water between in-stream and out-of-stream uses is one of the issues that will be addressed. The result of this review and the resulting allocation of water may have economic implications to the region.

The Regional Council has a vested interest in encouraging the economic growth of the region, which may be through the use of its natural resources, but it must also develop policies which will protect and enhance the region's natural environment. From the Council's viewpoint, the region's resources need to be allocated to ensure the greatest benefit to the region. This may be different from the national interest.

1.4 ORGANISATION OF THIS THESIS

The objective of this study is to estimate the economic impact of water allocation and assess whether the recent changes that have occurred in New Zealand may be beneficial to the region and assist resources managers to more effectively manage the region's water resources. The Ashburton River will be used as a case study.

Figure 1.1 Braided Rivers in Canterbury



Source O'Donnell and Moore (1983)