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**IMPLEMENTATION OF SUSTAINABLE RESOURCE  
MANAGEMENT  
A PROCESS FOR ENVIRONMENTAL EVALUATION  
AORANGI AWARUA CASE STUDY**

**A thesis presented in fulfilment of  
the requirements for the degree of  
Master of Resource and Environmental Planning  
at Massey University**

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**1992**

*IN MEMORY*  
*OF*  
*DR KEVIN MAKIN*

## ABSTRACT

"Implementing Sustainable Resource Management - A Process for Environmental Evaluation" is a review and discussion of the theoretical concepts associated with sustainability; and the development of these into practical guidelines for implementation.

Regional councils have a legislative responsibility to carry out sustainable resource management. This implies a commitment to ecological sustainability; the management of resources within the life supporting capacity of the environment, and the recognition of all of the environmental effects (costs) associated with resource use.

Implementation of sustainable resource management will require the development of a set of practical guidelines and tools. Such mechanisms necessarily range from the conceptual to the practical, and will include general principles relating to the concept of sustainability and legislative tools such as regional policy statements, regional plans and resource consents. A "Model for Sustainable Resource Management" has been developed which allows for the integration of the ecological, economic and social schools of thought. A programme for environmental and performance monitoring and the development of appropriate indicators is a prerequisite for sustainable resource management. Such a programme will enable and assist with the identification of environmental limits. The requirement for a process for the assessment of the effects of current and proposed resource use on the environment is also emphasised.

Rather than develop all of these mechanisms in detail, this thesis focuses on the development of an "Environmental Evaluation Process" within the planning context, for the determination of the adverse environmental effects associated with resource consent applications in New Zealand.

The natural environment has value independent of the instrumental or mechanistic (use) value attributed to it by human beings. These values can be categorised as non-use and intrinsic.

Traditional analytical techniques such as Environmental Impact Assessment, Cost-Benefit Analysis and Planning Balance Sheet are useful in terms of identifying, organising and attributing dollar terms to tangible environmental costs and benefits. However, these methods do not go far enough. For a comprehensive analysis of any resource management issue, the true environmental costs of "development" must be incorporated into the decision making process. Contingent valuation method is the most appropriate method for non-market valuation of natural resources and environments.

A process for environmental evaluation (which includes the Contingent Valuation Method) has been developed and applied to the Aorangi-Awarua Case Study.

The Thesis concludes with some recommendations as to the implementation of sustainable resource management, with particular reference to the practicality of parts and all of the Process for Environmental Evaluation for use by regional councils.

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## TABLE OF CONTENTS

	PAGE
<b>ABSTRACT</b>	iii
<b>ACKNOWLEDGEMENTS</b>	v
<b>TABLE OF CONTENTS</b>	vi
<b>LIST OF TABLES</b>	xvii
<b>LIST OF FIGURES</b>	xviii
<b>LIST OF MAPS</b>	xviii
<b>LIST OF ACRONYMS</b>	xix
<b>GLOSSARY</b>	xxii
<b>CHAPTER ONE INTRODUCTION TO THESIS</b>	
<b>1.1 Background and Motivation</b>	1
<b>1.2 Overall Aim</b>	3
<b>1.3 Goals and Objectives</b>	3
1.3.1 Operating Climate	3
1.3.2 Literature Review	4
1.3.3 Process and Aorangi Awarua Case Study	5
<b>1.4 Outline of Thesis</b>	6
<b>CHAPTER TWO OPERATING CLIMATE</b>	
<b>2.1 Purpose</b>	9
<b>2.2 Legislative Framework</b>	9
2.2.1 Introduction	9

	PAGE
2.2.2 The Purpose of the Resource Management Act - Sustainable Resource Management	10
2.2.2.1 <i>Protection</i>	13
2.2.2.2 <i>Maintain or Enhance</i>	15
2.2.2.3 <i>Guardianship</i>	15
2.2.2.4 <i>Efficient Use and Development</i>	16
2.2.2.5 <i>Treaty of Waitangi</i>	16
2.2.3 Functions of Regional Councils	17
2.2.4 Regional Policy Statements	18
2.2.5 Regional Plans	18
2.2.6 Monitoring	18
2.2.7 Discussion and Conclusions	19
<b>2.3 Institutional Framework</b>	<b>20</b>
<b>2.4 Discussion and Conclusions</b>	<b>22</b>

### **CHAPTER THREE            THE CONCEPT OF SUSTAINABILITY**

<b>3.1 Purpose</b>	<b>24</b>
<b>3.2 Background</b>	<b>24</b>
<b>3.3 The Concept of Sustainability - Three Schools of Thought</b>	<b>25</b>
3.3.1 Economic School	25
3.3.2 Ecological (Stewardship) School	27
3.3.2.1 <i>Carrying Capacity</i>	28
3.3.2.2 <i>Risk and Uncertainty</i>	29
3.3.2.3 <i>Irreversibility</i>	30
3.3.2.4 <i>Maximum Sustainable Yields, Safe Minimum Standards and Biophysical Bottom Lines</i>	30
3.3.3 Social School	33

3.3.4	Integration of the Economic, Ecological and Social Schools of Thought	35
<b>3.4</b>	<b>Defining the Concept of Sustainability -Three Components</b>	<b>37</b>
3.4.1	Sustainability	38
3.4.2	Sustainable Development	40
3.4.3	Sustainable Resource Management	42
3.4.3.1	<i>Ecological Sustainability</i>	43
3.4.3.2	<i>Sustainable Resource Use</i>	43
3.4.3.3	<i>Sustainable Waste Management</i>	43
3.4.3.4	<i>Sustainable Society</i>	44
<b>3.5</b>	<b>Discussion and Conclusions</b>	<b>47</b>

## CHAPTER FOUR IMPLEMENTING SUSTAINABLE RESOURCE MANAGEMENT

<b>4.1</b>	<b>Purpose and Background</b>	<b>49</b>
<b>4.2</b>	<b>Regional Policy Statements</b>	<b>51</b>
<b>4.3</b>	<b>Regional Plans</b>	<b>51</b>
<b>4.4</b>	<b>A Model for Sustainable Resource Management</b>	<b>52</b>
<b>4.5</b>	<b>Regional Monitoring Strategy</b>	<b>55</b>
<b>4.6</b>	<b>Identifying Environmental Limits</b>	<b>57</b>
<b>4.7</b>	<b>A Process for Environmental Evaluation</b>	<b>60</b>
<b>4.8</b>	<b>Discussion and Conclusions</b>	<b>61</b>

**CHAPTER FIVE ENVIRONMENTAL VALUES - TECHNIQUES FOR THEIR ASSESSMENT**

<b>5.1</b>	<b>Purpose</b>	62
<b>5.2</b>	<b>Background</b>	62
<b>5.3</b>	<b>Values Associated with Natural Resources</b>	63
5.3.1	Use Value	63
5.3.2	Non-Use Value	64
5.3.3	Intrinsic Value	65
<b>5.4</b>	<b>Total Economic Value</b>	65
<b>5.5</b>	<b>Analytical Techniques for Assessing the Environment</b>	67
5.5.1	Environmental Impact Assessment	67
5.5.2	Cost-Benefit Analysis (CBA)	67
5.5.3	Extended CBA - Integrating Sustainability into CBA	69
5.5.4	Planning Balance Sheet (PBS)	71
<b>5.6</b>	<b>Non-Market Valuation Techniques</b>	72
5.6.1	Background	72
5.6.2	Basic Economic Principles	74
5.6.2.1	<i>Indifference Curves</i>	74
5.6.2.2	<i>Consumer Surplus</i>	75
5.6.2.3	<i>Compensating Measures</i>	75
5.6.2.4	<i>Equivalent Measures</i>	75
5.6.3	Techniques for Non-Market Valuation	76
<b>5.7</b>	<b>Discussion and Conclusions</b>	77

<b>CHAPTER SIX</b>	<b>SELECTION OF THE CONTINGENT VALUATION METHOD</b>	
<b>6.1</b>	<b>Purpose</b>	81
<b>6.2</b>	<b>Background</b>	81
<b>6.3</b>	<b>Introduction to the Methodology of CVM</b>	83
6.3.1	Elicitation - How the CV Question Will be Posed	86
6.3.1.1	<i>Open Ended Questions</i>	86
6.3.1.2	<i>Dichotomous Choice - The "Take-it-or-Leave-it" Approach</i>	87
6.3.1.3	<i>Iterative Bidding Technique</i>	88
6.3.1.4	<i>The Payment Card Method</i>	89
6.3.1.5	<i>Contingent Ranking</i>	89
<b>6.4</b>	<b>Reliability, Validity and the Issue of Bias - Sources of Error in Contingent Valuation Studies</b>	89
6.4.1	Reliability	90
6.4.2	Validity	90
6.4.2.1	<i>Strategic Bias</i>	91
6.4.2.2	<i>Hypothetical Bias</i>	92
6.4.2.3	<i>Instrument Bias/Vehicle Bias</i>	93
6.4.2.4	<i>Information Bias</i>	94
6.4.2.5	<i>Starting Point Bias</i>	94
<b>6.5</b>	<b>Enhancing Reliability and Validity -Reference Operating Conditions</b>	95
<b>6.6</b>	<b>Recent Examples of the Use of the Contingent Valuation Method</b>	98
<b>6.7</b>	<b>Discussion and Conclusions</b>	103

**CHAPTER SEVEN AORANGI AWARUA - A RESOURCE  
MANAGEMENT ISSUE**

<b>7.1</b>	<b>Purpose</b>	105
<b>7.2</b>	<b>Background</b>	105
	7.2.1 Planning Application	108
	7.2.2 Section 34 Application	109
	7.2.3 Hearing on the Planning Application	110
	7.2.4 Appeal to the Planning Tribunal	111
	7.2.5 Legislative Background	112
<b>7.3</b>	<b>Major Resources of the Aorangi Awarua Block</b>	113
	7.3.1 Aorangi Awarua Block - Physical Description	113
	7.3.2 Botanical (Indigenous Forest and Vegetation)	114
	7.3.2.1 <i>Intactness</i>	114
	7.3.2.2 <i>Representatives and Significance</i>	115
	7.3.3 Wildlife	116
	7.3.3.1 <i>The Habitat and its Significance</i>	116
	7.3.3.2 <i>The Wildlife and its Significance</i>	116
	7.3.4 Rangitikei River	117
	7.3.5 Recreation	118
	7.3.6 Landscape Amenity	119
	7.3.7 Historical	120

	PAGE
7.3.8 Summary of Resources Associated with the Aorangi Awarua Block	121
<b>7.4 The Application</b>	<b>122</b>
7.4.1 Logging	122
7.4.2 Access to the Block - Bridging	124
7.4.3 Roading and Tracking	124
<b>7.5 Potential Effects of the Application</b>	<b>125</b>
7.5.1 Erosion Potential	125
7.5.2 Implications of the Proposed Bridge	131
7.5.3 The Effects of Logging on Indigenous Forest and Vegetation	131
7.5.4 The Effects of Logging on Wildlife	132
7.5.5 The Effects of the Proposal on Fisheries and Angling	134
7.5.6 The Effects of the Proposal on Recreation	135
7.5.7 The Effects of the Proposal on Landscape Amenity	135
7.5.8 The Effects of the Proposal on Water Quality	136
<b>7.6 Issues Associated with the Application</b>	<b>137</b>
7.6.1 Cultural	137
7.6.2 Access	138
7.6.3 Private Property Rights	139
7.6.4 Local Government Rates	140
7.6.5 Public Interest	140

	PAGE
7.6.6 Economic Welfare of the Region	142
7.6.7 NWASCA Conditions	143
<b>7.7 Alternative Resource Use Options</b>	<b>143</b>
7.7.1 Alternative Logging Options	144
7.7.2 Protection of the Block and Development of Associated Recreation and Tourism Potential	145
7.7.3 Summary	148
<b>7.8 Discussions and Conclusions</b>	<b>148</b>

## CHAPTER EIGHT PROCESS FOR ENVIRONMENTAL EVALUATION

<b>8.1 Purpose</b>	<b>150</b>
<b>8.2 Background</b>	<b>150</b>
<b>8.3 Process</b>	<b>151</b>
<b>8.4 Application of the Process to Aorangi Awarua</b>	<b>153</b>
8.4.1 Step 1. Project Description	153
8.4.2 Step 2. Project Team	154
8.4.3 Step 3. Field Survey/Site Inspection	154
8.4.4 Step 4. Scope	155
8.4.5 Step 5. Environmental Impacts and Interactions	156
8.4.6 Step 6. Identify 'Stakeholders'	158
8.4.7 Step 7. Planning Balance Sheet	159
8.4.8 Step 8. Cost Benefit Analysis	161
8.4.8.1 <i>Assumptions</i>	161
8.4.8.2 <i>Timber Resource</i>	163

	PAGE
8.4.8.3 <i>Royalties</i>	163
8.4.8.4 <i>Financial Analysis</i>	164
8.4.8.5 <i>A Regional Perspective</i>	171
<b>8.5 Discussion and Conclusions</b>	<b>173</b>
 <b>CHAPTER NINE APPLICATION OF THE CONTINGENT VALUATION METHOD</b> 	
<b>9.1 Purpose and Background</b>	<b>174</b>
<b>9.2 Methodology</b>	<b>175</b>
9.2.1 Determine Sample	176
9.2.2 Design of the Questionnaire	176
9.2.3 Pilot Survey	177
9.2.4 Select Final Survey Design	178
9.2.5 Draw Random Sample	178
9.2.5.1 <i>Sample Size</i>	178
9.2.5.2 <i>Sampling Procedure</i>	181
9.2.6 Implementation of the Survey	185
<b>9.3 Analysis of Survey Results</b>	<b>185</b>
9.3.1 Response Rate	185
9.3.2 Location	186
9.3.3 Awareness and Use	187
9.3.4 Future Use of the Aorangi Awarua Forest	188
9.3.5 Importance of Preservation	189
9.3.6 Characteristics of Respondents	191

	PAGE
9.3.7 Willingness to Pay	195
<b>9.4 Discussion and Conclusions</b>	<b>200</b>
<b>CHAPTER TEN THESIS DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS</b>	
<b>10.1 Discussion</b>	<b>204</b>
<b>10.2 Conclusions</b>	<b>204</b>
<b>10.3 Recommendations</b>	<b>210</b>
<b>10.4 Concluding Comment</b>	<b>211</b>
<b>REFERENCES</b>	<b>212</b>
<b>APPENDICES</b>	
A1 Regional Monitoring Strategy	231
B1 EIA Methodology	238
B2 CBA Methodology	240
B3 Non-Market Valuation Techniques	248
C1 Typology of Potential Response Effect Biases in CV Studies	250
D1 Current and Proposed CV Research From Around the World	254
E1 Map of Aorangi Awarua Forest Block	274
E2 NWASCA Decision	275
E3 Decision of Rangitikei District Council	276
E4 Reeves Contractors - Grounds for Appeal	280

	PAGE
E5 Rangitikei District Council - Reply	282
E6 Proposed Bridge Design	286
E7 Draft National Conservation Order for the Middle and Upper Rangitikei River	287
E8 Contract Between Reeves Contractors and the Maori Owners	290
F1 Preliminary Covering Letter and Questionnaire	301
F2 Final Covering Letter and Questionnaire	308
F3 Follow-up Letter	316
F4 Correlation Coefficients	317
F5 Sample Size	318

LIST OF TABLES

	PAGE
Table 1.	Cash Flows for Timber Resource - Aorangi Awarua Block 167
Table 2.	Timber Value by Species - Aorangi Awarua Block 168
Table 3.	Royalties to be Paid to the Maori Owners - Aorangi Awarua Block 169
Table 4.	Cost Benefit Analysis of Native Timber Resource - Aorangi Awarua Block 170
Table 5.	Distribution of Sample 182
Table 6.	Telecom Districts and Sample Size 183
Table 7.	Sampling Interval 184
Table 8.	Response Rate 187
Table 9.	Use of the Aorangi Awarua Block
Table 10.	Future Use of the Aorangi Awarua Block 188
Table 11.	Importance of Preservation 189
Table 12.	Reason for Preservation 191
Table 13.	Age Distribution of Respondents Compared with Regional Population 192
Table 14.	Occupation of Respondents 193
Table 15.	Income Distribution of Respondents 194
Table 16.	Willingness to Pay 197
Table 17.	Results of Two Sample T Test 198

### LIST OF FIGURES

		PAGE
Figure One	Thesis Structure	8
Figure Two	Mechanisms for Implementing Sustainable Resource Management	50
Figure Three	A Model for Sustainable Resource Management	53
Figure Four	Ecological and Social Bottom Lines	59
Figure Five	Process for Environmental Evaluation	152
Figure Six	Environmental Interactions for Aorangi Awarua Block	157
Figure Seven	Planning Balance Sheet for Aorangi Awarua Block	160

### LIST OF MAPS

		PAGE
Map 1.	Location of Aorangi Awarua Forest	106
Map 2.	Aorangi Block and Awarua 1DB No.s 1 and 2 Blocks (Aorangi Awarua Forest)	107

NPV	Net Present Value
NWASCA	National Water and Soil Conservation Authority
NZFS	New Zealand Forest Service
OECD	Organisation for Economic Co-operation and Development
PBS	Planning Balance Sheet
PSDR	Private Sector Discount Rate
PV	Present Value
PW	Present Worth
RFBS	Royal Forest and Bird Society
RMA	Resource Management Act 1991
RMS	Regional Monitoring Strategy
RPS	Regional Policy Statement
ROC's	Reference Operating Conditions
RWCB	Rangitikei-Wanganui Catchment Board
RWTP	Real Willingness to Pay
SCBA	Social Cost Benefit Analysis

SCRCA	Soil Conservation and Rivers Control Act
SDA	Social Discount Rate
SMS	Safe Minimum Standard
SOCR	Social Opportunity Cost Rate
STPR	Social Time Preference Rate
TCPA	Town and Country Planning Act 1977
TEV	Total Economic Value
TWTP	True Willingness to Pay
WAC	Wanganui Acclimatization Society
WCED	World Commission on Environment and Development
WSCA	Water and Soil Conservation Act 1967
WTA	Willingness to Accept
WTP	Willingness to Pay

## GLOSSARY

AORANGI AWARUA BLOCK/ FOREST	Aorangi Block and Awarua 1DB Nos. 1 and 2 Blocks.
BIAS	Systematic error in relation to CV surveys.
BIOPHYSICAL BOTTOM LINE	Refer Environmental Limits
ECOLOGICAL SUSTAINABILITY	The persistence of all components of the biosphere.
EFFECT	In relation to any use, development or protection of resources includes any positive or adverse effect; any temporary or permanent effect; any past, present or future effect; and any cumulative effect which arises over time or in combination with other effects - regardless of the scale, intensity, duration, or frequency of the effect, and also includes - any potential effect of high probability; and any potential effect of low probability which has a high potential impact (RMA).
ENVIRONMENT	Ecosystems and their constituent parts, including people and communities; and amenity values; and the social, economic, aesthetic, and cultural condition which affect ecosystems, natural and physical resources and amenity (RMA).
ENVIRONMENTAL EVALUATION	The assessment of all potential environmental effects and impacts using analytical and non-market valuation techniques.
ENVIRONMENTAL GOODS AND SERVICES	Natural resources and the services that these provide to other components of ecosystems and human beings.

ENVIRONMENTAL LIMITS	Critical points, or zones beyond which further depletion or or degradation of a resource will be irreversible.
EXISTENCE VALUE	This is a type of "intrinsic" value and is the value of simply knowing that a resource exists.
GOALS	An end towards which a design trends.
KAWANATANGA	The right of sovereignty given to the Crown by the Treaty of Waitangi
INTRINSIC VALUE	Value associated with natural resources and the environment that is unrelated to human beings altogether.
OBJECTIVES	Specific steps towards the attainment of a goal.
OPTION VALUE	Value associated with still having the opportunity to use a resource in the Future.
MAXIMUM SUSTAINABLE YIELD	Maximum harvest that can be taken from a resource each year without causing irreversible environmental damage.
QUASI-OPTION VALUE	The value of preserving options in anticipation of improved knowledge and technology.
RANGITIRATANGA	The right of Maori to manage their tribal resources.
SAFE MINIMUM STANDARDS	Refer Environmental Limits
STAKEHOLDERS	Individuals and Organisations who have an interest in, or who will be affected by a proposal.
SUSTAINABILITY	The overall concept of society living within the self perpetuating limits of the environment (biosphere).

SUSTAINABLE DEVELOPMENT	World economic progress within the biophysical imposed by nature, together with a concern for social inequities and the global redistribution of wealth.
SUSTAINABLE RESOURCE MANAGEMENT	"Managing the use, development and protection of natural and physical resources, in a way, or at a rate, that enables people and communities to provide for their social, economic and cultural well being and for their health and safety" - without compromising ecological sustainability.
USE VALUE	The value of present and future use of a resource (commercial, recreation, scenic etc.)
WILLINGNESS TO ACCEPT	The amount of money people would be willing to accept as compensation for a loss of an environmental "good or service".
WILLINGNESS TO PAY	The amount of money people would be willing to pay to ensure the preservation or continued supply of an environmental "good or service".