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**INCORPORATING ECONOMIC, SOCIAL AND
ENVIRONMENTAL FACTORS INTO A DECISION
MODEL FOR SUSTAINABLE MANAGEMENT OF
NATURAL RESOURCES:**

**A CASE STUDY OF THE NINGALOO COAST,
WESTERN AUSTRALIA**

A thesis presented in partial fulfilment of the requirements for the degree

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ABSTRACT

There is growing demand for many of Australia's coastal areas to be conserved and retained in their natural state. The reconciliation of competing demands; such as residential, industrial, recreation, conservation and tourism; in a manner that ensures the sustainability of natural areas is a major issue facing coastal planners.

The Ningaloo coastal strip in Western Australia is a prime example of a fragile coastal environment, subject to increasing visitation, complex economic, social, environmental and institutional forces and a wide range of stakeholders. The challenge for managers and planners of the coastal strip is to determine an appropriate level of development and a management regime that meets the needs of stakeholders while still achieving the state government's goals in relation to coastal zone management. To meet this challenge, decision need to carefully balance human needs with the environment's ability to assimilate the pressures placed upon it.

This research integrates social, environmental and economic factors into a decision framework for the sustainable management of natural resources. This framework differs from existing frameworks in two ways; firstly, it specifically includes stakeholder analysis as an individual assessment technique and secondly, it focuses on rapid appraisal techniques. Three individual assessment techniques; environmental impact assessment, cost benefit analysis and stakeholder analysis; are incorporated into a multiple criteria analysis model. This model is applied to a case study of the Ningaloo coast, Western Australia.

The results show that a co-management arrangement between indigenous communities and the Department of Conservation and Land Management is consistently superior to other management options identified. Another favourable management option is sole management by the Department of Conservation and Land Management. When weightings that reflect an environmental perspective are used, low visitation scenarios are preferred.

The research concludes with land use and management recommendations for the Ningaloo coastal strip. This recommended management regime would involve some form of co-management between stakeholder groups and CALM, particularly the traditional Aboriginal inhabitants. The level of development would be low, with at most, a single wilderness lodge facility.

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TABLE OF CONTENTS

ABSTRACT	ii
ACKNOWLEDGEMENTS.....	iii
TABLE OF CONTENTS.....	iv
LIST OF TABLES.....	vii
LIST OF FIGURES	ix
LIST OF ABBREVIATIONS	x
STATEMENT OF ORIGINALITY.....	xi
1 INTRODUCTION.....	1
1.1 Problem Statement.....	3
1.2 Aim	3
1.3 Objectives.....	4
1.4 Importance of Research.....	4
1.5 Research Approach.....	4
1.6 Outline of Thesis.....	6
2 THE NINGALOO COASTAL STRIP.....	8
2.1 Introduction	8
2.2 Regional Setting.....	8
2.3 Location and Boundaries of Study Area.....	10
2.4 The Coastal Environment.....	12
2.4.1 <i>Climate</i>	12
2.4.2 <i>Geomorphology and Landforms</i>	12
2.4.3 <i>Water</i>	13
2.4.4 <i>Flora and Fauna</i>	14
2.4.5 <i>Ningaloo Reef</i>	16
2.5 Land use.....	17
2.6 Historical and Cultural Features.....	18
2.6.1 <i>Aboriginal Heritage</i>	18
2.6.2 <i>European Heritage</i>	19
2.7 Infrastructure	19
2.7.1 <i>Accommodation</i>	19
2.7.2 <i>Roads</i>	20
2.8 Relevant Environmental Planning and Policy	21
2.8.1 <i>Draft Carnarvon Coastal Strategy (Stage One)</i>	21
2.8.2 <i>Exmouth-Learmonth Structure Plan</i>	22
2.8.3 <i>Environmental and Planning Guideline for Tourism Development on the North West Cape</i>	22
2.8.4 <i>Environmental Protection of Cape Range Province</i>	22
2.8.5 <i>General Planning Policy Relevant to Coastal Areas</i>	23

3	LITERATURE REVIEW	24
3.1	Introduction	24
3.2	The Economics of Natural Areas	24
	3.2.1 <i>Institutions and Property Rights</i>	25
	3.2.2 <i>Public and Private Goods</i>	28
3.3	The demand for natural areas - tourism	29
	3.3.1 <i>Mass and Alternative Tourism</i>	29
	3.3.2 <i>Nature-Based Tourism</i>	32
3.4	Sustainable Development.....	34
3.5	Techniques to Aid Natural Area Decision Making.....	41
	3.5.1 <i>Environmental Impact Assessment</i>	41
	3.5.2 <i>Cost Benefit Analysis</i>	42
	3.5.3 <i>Stakeholder Analysis</i>	47
	3.5.4 <i>Integrated Evaluation Techniques</i>	51
3.6	Conclusion.....	55
4	METHODOLOGY	56
4.1	Introduction	56
4.2	Phase I – Designing the Model.....	56
	4.2.1 <i>The Conceptual Framework for Integrated Evaluation</i>	56
	4.2.2 <i>Stakeholder Analysis</i>	58
	4.2.3 <i>Cost Benefit Analysis</i>	65
	4.2.4 <i>Environmental Impact Assessment</i>	77
	4.2.5 <i>Multiple Criteria Analysis</i>	81
4.3	Phase II – Visit to Sites and Stakeholders	100
4.4	Phase III – Implementing the Model.....	102
4.5	Conclusion.....	102
5	ANALYSIS AND RESULTS	103
5.1	Introduction	103
5.2	Stakeholder Analysis	104
5.3	Cost Benefit Analysis.....	107
	5.3.1 <i>Net Present Values</i>	107
	5.3.2 <i>Sensitivity Analysis</i>	108
5.4	Environmental Impact Assessment.....	111
	5.4.1 <i>Pastoral alternatives</i>	111
	5.4.2 <i>Co-management Options</i>	113
	5.4.3 <i>CALM options</i>	114
	5.4.4 <i>The Adapted Leopold Matrices</i>	115
5.5	Analysis of scores in the performance matrix.....	123
	5.5.1 <i>Environmental Attributes</i>	123
	5.5.2 <i>Economic Attributes</i>	124
	5.5.3 <i>Social Attributes</i>	124
	5.5.4 <i>Institutional Attributes</i>	126
5.6	Integrated Assessment.....	129
	5.6.1 <i>Performance Matrix</i>	129
	5.6.2 <i>MCA Results – Environmental Weighting</i>	132
	5.6.3 <i>MCA Results – Equal Weighting</i>	133
	5.6.4 <i>Sensitivity Analysis</i>	135
5.7	Conclusion.....	144

6	DISCUSSION	145
6.1	Introduction.....	145
6.2	Results of the Integrated Evaluation.....	145
6.3	Results of the Individual Assessment.....	148
	<i>6.3.1 Environmental Impact Assessment</i>	148
	<i>6.3.2 Cost Benefit Analysis</i>	149
	<i>6.3.3 Stakeholder Analysis</i>	149
6.4	The Research Methodology.....	150
	<i>6.4.1 Integrated Assessment Framework</i>	150
	<i>6.4.2 Development of Attributes</i>	151
	<i>6.4.3 Impact Assessment</i>	152
6.5	Policy Implications.....	153
6.6	Conclusion.....	154
7	CONCLUSION AND RECOMMENDATIONS	155
7.1	Conclusion.....	155
7.2	Policy Recommendations.....	158
8	REFERENCES	159
9	APPENDICES	172
	Appendix I – Visitation Scenarios.....	172
	Appendix II – CBA Calculations.....	177

LIST OF TABLES

Table 2.1	Possible Vertebrate Species Richness for Three Habitats on the Coastal Strip.....	15
Table 2.2	Number of Campsites on the Coastal Strip, CALM Aerial Survey Data	17
Table 3.1	Common Resource Management Regimes.....	26
Table 3.2	Comparison of Methodologies for the Two Natural Resource Management Approaches to Stakeholder Analysis	50
Table 4.1	Classification of Stakeholders for the Ningaloo Coastal Strip	59
Table 4.2	Identification of Benefits and Costs	67
Table 4.3	Assumed Monthly Distribution of Campsites	70
Table 4.4	Visitation Growth Rates for the Pastoral Alternatives	70
Table 4.5	Visitation Growth Rates for All Non-Pastoral Alternatives.....	71
Table 4.6	Assumed Occupancy Rates for the Calculation of Visitor Nights in Year One, Gnaraloo 3-mile Campground.....	72
Table 4.7	Visitation Growth Rates for the Gnaraloo 3-mile Campground.....	72
Table 4.8	Variables Changed for the Sensitivity Analysis.....	77
Table 4.9	Environmental Elements and Project Activities in the Adapted Leopold Matrix.....	80
Table 4.10	Pastoral Alternative – Low Visitation Scenario	84
Table 4.11	Pastoral Alternative – High Visitation Scenario	84
Table 4.12	Co-management Between Exmouth and Carnarvon Shires and CALM – Low Visitation Scenario.	85
Table 4.13	Co-management Between Exmouth and Carnarvon Shires and CALM – High Visitation Scenario	85
Table 4.14	Co-management Between the Gnulli Native Title Claimants and CALM – Low Visitation Scenario	86
Table 4.15	Co-management Between the Gnulli Native Title Claimants and CALM – High Visitation Scenario	86
Table 4.16	CALM Alternative – Low Visitation Scenario.....	87
Table 4.17	CALM Alternative – Low Visitation Scenario.....	87
Table 4.18	Attributes for the Ningaloo Study	90
Table 4.19	Assumptions Regarding Regional Tourist Expenditure.....	92
Table 4.20	Activities and Accommodation Types Included in the Index of Recreational Opportunity.....	93
Table 4.21	Likert Scale for Involvement of Aboriginal Community in Planning and Management of the Ningaloo Coastal Strip.....	94
Table 4.22	Factors in the Index of Institutional Capacity for Positive Environmental Outcomes for the Terrestrial and Marine Ecosystems.....	95
Table 4.23	Likert Scale for Involvement of Stakeholder Groups in Planning and Management of the Ningaloo Coastal Strip.....	95
Table 4.24	Weight Sets Used in the Multiple Criteria Analysis.....	99
Table 4.25	Weight Sets Using the Priority Order Method	99
Table 5.1	Stakeholder Objectives for the Ningaloo Coastal Region	104
Table 5.2	Net Present Values and Expected Annual Returns for Alternatives (Eight Percent Discount Rate)	107
Table 5.3	Net Present Values and Expected Annual Returns for Alternatives Under an Optimistic Scenario (Eight Percent Discount Rate)	108
Table 5.4	Net Present Values and Expected Annual Returns for Alternatives Under a Pessimistic Scenario (Eight Percent Discount Rate).....	109
Table 5.5	Total Net Present Values for Alternatives at Six, Eight and Ten Percent Discount Rates	110

Table 5.6	Guide to the Leopold Matrices Presented in the Text for Each Management Alternative.....	111
Table 5.7	Impacts Associated With the Pastoral Management Alternative, Low Visitation Rate (Pastoral – Low)	115
Table 5.8	Impacts Associated with the Pastoral Management Alternative, High Visitation Rate (Pastoral – High)	116
Table 5.9	Impacts Associated with the Co-management Alternative between the Shires and CALM, Low Visitation Rate (Shires – Low).....	117
Table 5.10	Impacts Associated with the Co-management Alternative between the Shires and CALM, High Visitation Rate (Shires – High).....	118
Table 5.11	Impacts Associated with the Co-management Alternative between the Gnulli Native Title Claimants and CALM, Low Visitation Rate (Gnulli – Low).....	119
Table 5.12	Impacts Associated with the Co-management Alternative between the Gnulli Native Title Claimants and CALM, High Visitation Rate (Gnulli – High).....	120
Table 5.13	Impacts Associated with the CALM Sole Management Alternative, Low Visitation Rate (CALM – Low)	121
Table 5.14	Impacts Associated with the CALM Sole Management Alternative, High Visitation Rate (CALM – High).....	122
Table 5.15	Scores for the Index of Recreational Opportunity.....	125
Table 5.16	Scores for the Involvement of the Aboriginal Community in Planning and Management of the Ningaloo Coastal Strip.....	126
Table 5.17	Scores for the Capacity to Achieve Positive Environmental Outcomes in the Medium-Long Term, for the Terrestrial Ecosystem	126
Table 5.18	Scores for the Capacity to Achieve Positive Environmental Outcomes in the Medium-Long Term, for the Marine Ecosystem.....	128
Table 5.19	Scores for the Involvement of Stakeholder groups in Planning and Management of the Ningaloo Coastal Strip	129
Table 5.20	Performance Matrix for the Ningaloo Coastal Region.....	131
Table 5.21	Ranking of Alternatives using the TopDec Software Rating Method and an Environmental Weighting.....	133
Table 5.22	Ranking of Alternatives using the TopDec Software Rating Method and Equal Weighting.....	134
Table 5.23	Performance Matrix for the Optimistic Scenario	140
Table 5.24	Performance Matrix for the Pessimistic Scenario	141
Table 5.25	Summary of Rankings of Alternatives for all MCA Evaluations	144
Table 9.1	Guide to Labels Used to Denote the Alternatives in Appendix One.....	172
Table 9.2	Assumptions for Visitation Calculations and Regional Tourism Expenditure	173
Table 9.3	Visitation Calculations for the Pastoral Alternatives	174
Table 9.4	Visitation Calculations for all Alternatives – Wilderness Camping and Gnaraloo 3-mile Campground.....	175
Table 9.5	Calculations for Regional Tourism Expenditure.....	176
Table 9.6	Guide to Labels Used to Denote the Alternatives in Appendix Two	177
Table 9.7	Data for Pastoral Operation Calculations.....	178
Table 9.8	Data for Wilderness Lodge Operation.....	179
Table 9.9	Data for Visitor Revenue Calculations and Campsite Infrastructure.....	181
Table 9.10	Data for Roding Infrastructure and Maintenance Costs.....	182
Table 9.11	Data and Assumptions for Management Costs.....	183
Table 9.12	Calculations for Pastoral and Wilderness Lodge Operations.....	184
Table 9.13	CBA Calculations for Camping and Management Operations.....	185
Table 9.14	CBA Calculations for all Operations – Total Discounted Returns	187

LIST OF FIGURES

Figure 2.1	The Ningaloo Coast, Warroora Station.....	2
Figure 2.1	Regional Setting for the Ningaloo Coastal Strip.....	9
Figure 2.2	The Ningaloo Coastal Strip.....	11
Figure 2.3	Coastal Dunes on Warroora Station.....	13
Figure 2.4	An Extensive Area of Buffel Grass, Warroora Station.....	15
Figure 3.1	International Tourist Arrivals to Australia (1991 – 2000).....	30
Figure 3.2	A Systems Approach to Sustainable Development.....	38
Figure 4.1	The Conceptual Framework for an Integrated Evaluation of Land Use and Management Alternatives for the Ningaloo Coastal Strip.....	57
Figure 4.2	Timeline of Visits to Sites and Stakeholders.....	100
Figure 5.1	Ranking of Alternatives using the TopDec Software Rating Method and an Environmental Weighting (L = Low Visitation, H = High Visitation).....	132
Figure 5.2	Ranking of Alternatives using the TopDec Software Rating Method and Equal Weighting (L = Low Visitation, H = High Visitation).....	134
Figure 5.3	Ranking of Alternatives using the TopDec Software Priority Order Method and Weight Set One (L = Low Visitation, H = High Visitation).....	135
Figure 5.4	Ranking of Alternatives using the TopDec Software Priority Order Method and Weight Set Two (L = Low Visitation, H = High Visitation).....	136
Figure 5.5	Ranking of Alternatives using the TopDec Software Rating Method and an Economic Weight Set (L = Low Visitation, H = High Visitation).....	137
Figure 5.6	Ranking of Alternatives using the TopDec Software Rating Method and a Social Weight Set (L = Low Visitation, H = High Visitation).....	138
Figure 5.7	Ranking of Alternatives for the Optimistic Scenario, using the TopDec Software Rating Method and Equal Weighting (L = Low Visitation, H = High Visitation).....	142
Figure 5.8	Ranking of Alternatives for the Pessimistic Scenario, using the TopDec Software Rating Method and Equal Weighting (L = Low Visitation, H = High Visitation).....	143

LIST OF ABBREVIATIONS

CALM	Western Australian Department of Conservation and Land Management
CBA	Cost Benefit Analysis
CPI	Consumer Price Index
DOLA	Western Australian Department of Land Administration
DPI	Western Australian Department of Planning and Infrastructure
DSE	Dry Stock Equivalent
EAA	Equivalent Annual Annuity or Return
EIA	Environmental Impact Assessment
EPA	Western Australian Environmental Protection Agency
4WD	Four-Wheel Drive
NPV	Net Present Value
NROCA	Ningaloo Reef Outback Coast Association
RAC	Australian Resource Assessment Commission
SEA	Strategic Environmental Assessment
TEV	Total Economic Value
2WD	Two-Wheel Drive
WAPC	Western Australian Planning Commission
WATC	Western Australian Tourism Commission
WCED	World Commission on Environment and Development
WTO	World Tourism Organisation
WTP	Willingness-To-Pay

STATEMENT OF ORIGINALITY

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I declare that:

- This is an original report/thesis and is entirely my own work.
- Where I have made use of the ideas of other writers, I have acknowledged the source in every instance.
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