

TABLE OF CONTENTS

	<i>Page</i>
ACKNOWLEDGEMENTS	i
EXECUTIVE SUMMARY	ii
Introduction	ii
Objectives	iii
Methodology and Results	iii
Recommendations	vii
1. INTRODUCTION	1
1.1 Background	1
1.2 Project Objectives	2
1.3 Time Frame	3
1.4 Study Area, Scope and Scale of Study	4
1.5 Achieving Objectives	5
1.6 Literature Review	6
1.7 Nomenclature	6
2. METHODOLOGICAL APPROACH	8
2.1 Approach to the Study	8
2.2 Assessing the Nature and Extent of Invasions	8
2.2.1 Baseline data	8
2.2.2 Use of existing databases	9
2.2.3 Methods of capturing data	14
2.2.4 The expert approach	14
2.2.5 Data extrapolation in KwaZulu-Natal	16
2.2.6 Data storage	17
2.2.7 Verification	17
2.3 Modelling Impacts on Streamflow	18
2.4 Assessing the Risks of Invasion	19
2.5 Prioritizing Catchment Areas	19
2.6 Ground Truthing	20
3. NATURE, EXTENT AND DISTRIBUTION OF ALIEN INVADERS IN SOUTH AFRICA	21
3.1 Introduction	21
3.2 Mapping Alien Invaders	22
3.2.1 Specifications for the capture of data	22

3.2.2	Mapping rivers	26
3.2.3	Map joining and attribute data	28
3.2.4	Interpreting 'expert' data and 'real' data	28
3.2.5	Areas of no invasion	29
3.3	Results and Discussion	29
3.3.1	Species ranking	29
3.3.2	Distribution and extent - South Africa and Lesotho	31
3.3.3	Distribution and extent - data for provinces and Lesotho	36
3.3.4	Patterns of species distribution	54
3.3.5	Correlations with rainfall	60
3.4	Impact of Clearing Initiatives	61
4.	IMPACT OF ALIEN INVADERS ON SURFACE WATER RESOURCES	63
4.1	Introduction	63
4.1.1	The model	63
4.1.2	Allowing for limited water availability	64
4.2	Methodology	65
4.2.1	Estimating the biomass	66
4.2.2	Estimating the age of invaders	67
4.2.3	Plantation water-use	68
4.3	Verification and Validation of the Models	69
4.4	Results	69
4.4.1	National overview	70
4.4.2	Provincial overview	76
4.5	Discussion	88
5.	PROCESS AND RISKS OF INVASION	90
5.1	Introduction	90
5.2	Factors Determining the Approach	90
5.2.1	Nature of the project	90
5.2.2	The limited amount of information available on invasion rates	91
5.2.3	The role of disturbance	92
5.3	Estimating Rates of Spread and Densification	92
5.3.1	Expansion	93
5.3.2	Densification	94
5.3.3	Available space or habitat	94
5.4	Synthesis	96
5.4.1	Riparian zones	96
5.4.2	Landscapes	98
5.4.3	Additional risks	98

6.	COST IMPLICATIONS AND PRIORITIZING CATCHMENTS FOR THE CLEARING OF ALIEN INVADERS	105
6.1	Introduction	105
6.2	Principles Guiding Prioritization	106
6.3	Factors for Prioritization	107
6.4	A Scheme for Prioritization of Catchments	109
6.5	Calculating Costs of Control	111
6.5.1	Background on costs	111
6.5.2	An approach to calculating the costs	112
6.6	Costs to Clear South Africa	115
6.7	Potential Benefits of Biocontrol	118
6.7.1	Assessing the potential for biocontrol	118
6.8	Species' Impact on Water Resources	121
6.9	Scenarios	121
7.	SUMMARY	123
7.1	Introduction	123
7.2	Approach and Methodology	123
7.2.1	Participation	123
7.2.2	Mapping approach	124
7.2.3	Water-use estimates	124
7.3	Results	126
7.3.1	Extent	126
7.3.2	Most invading species	127
7.3.3	Impacts on water	128
7.3.4	Costs of control	128
7.3.5	Risks of invasion	129
7.3.6	Prioritizing catchments	130
7.4	Knowledge Gaps	130
8.	THE WAY FORWARD	131
8.1	Introduction	131
8.2	The Problem	132
8.3	A Vision	132
8.4	Basic Prerequisites	133
8.5	Strategies	134
8.5.1	Co-ordination and networking	134
8.5.2	Community involvement	135
8.5.3	An information system	135
8.5.4	Integrated control	136
8.6	Integrating Current Reality with the Vision	137

9.	RECOMMENDATIONS	139
9.1	Recommendations for Action	139
9.1.1	Information	139
9.1.2	Public participation	140
9.2	Recommendations for Research	141
9.2.1	Extent and biology	141
9.2.2	Impact and modelling of water-use	142
9.2.3	Invading plant control	142
9.2.4	Quantifying the costs of invaders	143
9.2.5	Monitoring and evaluation	143
9.2.6	Getting more from the data	143
9.2.7	Benefits of alien plant species	143
10.	DATA STORAGE AND AVAILABILITY	144
10.1	Description of Data	144
10.2	Data Storage	145
10.3	Ownership of Data	145
	REFERENCES	146