Contents

Foreword		V
Figures & Ac	knowledgments	x
Acknowledgi	nents	xii
Preface		xiii
Executive Su	mmary	1
Overview		4
Chapter 1	Why are we Here ?	12
Chapter 2	What Is Risk?	18
Chapter 3	What Is Risk Assessment, Anyway?	24
Chapter 4	So What Is Australia Doing?	38
Chapter 5	Worst Things First — Setting Priorities Using Risk	
	Analysis	43
Chapter 6	Risk To People From Development	54
Chapter 7	Risk To The Environment From Development	65
Chapter 8	Risks Associated With Chemicals And Contaminated	Í
	Sites	78
Chapter 9	Risks Of The Uncertainty Of Nature	92
Chapter 10	The Risk Associated With Political Decision Making	105
Chapter 11	Where To From Here?	113
Appendix 1		118
Appendix 2		120
Index		121

Figures & Acknowledgments

Figure 1	Risk Assessment Framework	2
Figure 1.1	Relationship between judged frequency and statistical estimates of the number of deaths per year (US) for 40 causes of death. Copyright © Cambridge University Press 1981. Reprinted with the permission of Cambridge University Press.	15
Figure 1.2	Two dimensions of a three-dimensional risk space link a hazard's controllability (dreadfulness) and observability (understanding). From Risk Analysis and Management, M. Granger Morgan, Copyright © July 1993 by Scientific American, Inc. All rights reserved.	16
Figure 2.1	Modern English Usage for "Events with potentially undesirable effects." Reprinted with permission.	19
Figure 2.2	The probability distribution function for an assumed share purchase links the consequences (measured in terms of price movements) with their probability of occurrence.	20
Figure 3.1	Basic Methodology for Hazard Analysis. Reprinted with permission.	24
Figure 3.2	Risk Assessment US (1983) Framework. Reprinted with permission from Risk Assessment in the Federal Government: Managing the Process. Copyright 1983 by the National Academy of Sciences. Courtesy of the National Academy Press, Washington, DC.	25
Figure 3.3	Recommended risk assessment framework (Smith et al. 1988:23). Reprinted with permission.	25
Figure 3.4	Integrated Risk Management. Reprinted with permission from Battelle.	30
Figure 3.5	Risk Assessment - Asian Development Bank Evaluation Matrix. Reprinted with permission.	31
Figure 3.6	Aquatic Environmental Classification EEC Directive. Adapted from EC originals.	33
Figure 3.7	Decision Making for Controls in the EU. Adapted from EC originals.	34
Figure 3.8	Aquatic Risk Characterisation Decision Scheme for Further Testing. Adapted from EC originals.	34
Figure 4.1	The Environment Protection Agency Structure Chart.	40
Figure 4.2	Hazard Assessment as currently conducted by EPA	41
Figure 5.1	Making a Decision	44
Figure 5.2	Three Different Shapes for Utility Functions	4 5
Figure 5.3	DAM vs PIT	45
Figure 5.4	Risks for Selected Engineering Project. Reprinted with permission.	47
Figure 5.5 (a, b, c	c) EMV-PIT/DAM	48
Figure 5.6	Relationship of basic concepts to the ERA process and the Guidelines. Reprinted with permission.	48
Figure 6.1	Predicted risk to the individual for long-term scenario. Reprinted with permission.	57
Figure 6.2	Predicted Societal Risks. Reprinted with permission.	58
Figure 6.3	Societal risk curves for some human-caused events in the USA	58
Figure 6.4	Incremental group risk limits for major accidents. Reprinted with permission.	59
Figure 7.1	Framework for Ecological Risk Assessment (US EPA - 1992)	66
Figure 7.2	Steps in Uncertainty Analysis for Ecological Risk Assessment	67

Figure 7.3	Characteristics of populations relevant to monitoring programs and environmental disturbances. Commonwealth of Australia copyright reproduced by permission.	68
Figure 7.4	Uncertainty Analysis	7 0
Figure 7.5	Cumulative Probability Results of Radiation Exposure from Land Application of Effluent Water	74
Figure 8.1	A dose-response curveReprinted with permission.	78
Figure 8.2	A summary of the registration process for agricultural and veterinary chemicals	81
Figure 8.3	Chemical structure of Atrazine	84
Figure 9.1	Two Possible Forms of the Precautionary Principle	97
Figure 9.2	Sea level change by the year 2500 for different IPCC CO ₂ stabilisation scenarios and climate sensitivities. Reprinted with permission.	98
Figure 9.3	High (H), Medium (M) and Low (L) Sea Level Changes for the 450ppm Stabilisation Case. Reprinted with permission.	99
Figure 9.4	High (H), Medium (M) and Low (L) Sea Level Changes for the 750ppm Stabilisation Case. Reprinted with permission.	99
Figure 9.5	Ranking of environmental risks (EPA 1987, 1990). Reprinted from Shlyakhter et al, Integrated risk analysis of global climate change, Copyright 1995, page 1598, with kind permission from Elsevier Science Ltd, The Boulevard, Langford Lane, Kidlington 0X5 1GB, UK. 101	