

METHODS OF ENVIRONMENTAL IMPACT ASSESSMENT

3RD EDITION

EDITED BY PETER MORRIS AND RIKI THERIVEL

OF THE NATURAL AND BUILT ENVIRONMENT THE NATURAL AND BUILT ENVIRONMENT THE NATURAL
AND BUILT ENVIRONMENT THE NATURAL AND BUILT ENVIRONMENT THE NATURAL AND BUILT ENVIRO
OF THE NATURAL AND BUILT ENVIRONMENT THE NATURAL AND BUILT ENVIRONMENT THE NATURAL
AND BUILT ENVIRONMENT THE NATURAL AND BUILT ENVIRONMENT THE NATURAL AND BUILT ENVIRO

ROUTLEDGE



Contents

<i>Contributors to this edition</i>	xiii
<i>Preface and acknowledgements</i>	xv
PART I	
Methods for environmental components	1
1 Introduction	3
RIKI THERIVEL AND PETER MORRIS	
1.1 <i>EIA and the aims of the book</i>	3
1.2 <i>The EIA process</i>	3
1.3 <i>The current status of EIA</i>	11
1.4 <i>Book structure</i>	14
1.5 <i>Integration of component assessments</i>	15
1.6 <i>The broader context and the future of EIA methods</i>	16
<i>References</i>	19
2 Socio-economic impacts 1: overview and economic impacts	22
JOHN GLASSON	
2.1 <i>Introduction</i>	22
2.2 <i>Definitions and concepts: socio-economic impacts</i>	22
2.3 <i>Baseline studies: direct and indirect economic impacts</i>	30
2.4 <i>Impact prediction: direct employment impacts</i>	37
2.5 <i>Impact prediction: wider economic impacts</i>	40
2.6 <i>Mitigation and enhancement</i>	45
2.7 <i>Monitoring</i>	46
2.8 <i>Conclusions</i>	47
<i>References</i>	47

3	Socio-economic impacts 2: social impacts	51
	ANDREW CHADWICK	
	3.1 Introduction	51
	3.2 Baseline studies	51
	3.3 Impact prediction	55
	3.4 Mitigation	63
	3.5 Monitoring	64
	3.6 Sources of further information	65
	References	67
4	Noise	73
	RIKI THERIVEL (BASED ON THERIVEL AND BRESLIN 2001)	
	4.1 Introduction	73
	4.2 Definitions and concepts	74
	4.3 Legislative background and interest groups	80
	4.4 Scoping and baseline studies	84
	4.5 Impact prediction	87
	4.6 Mitigation	90
	4.7 Monitoring	91
	4.8 Conclusion	92
	References	92
5	Transport	94
	CHRIS FRY AND RIKI THERIVEL (BASED ON RICHARDSON AND CALLAGHAN 2001)	
	5.1 Introduction	94
	5.2 Definitions and concepts	94
	5.3 Legislative background	96
	5.4 Interest groups and sources of information	100
	5.5 Scoping and baseline studies	101
	5.6 Impact prediction and evaluation	104
	5.7 Mitigation measures	113
	5.8 Monitoring	115
	5.9 Conclusions	115
	References	118
6	Landscape and visual	120
	REBECCA KNIGHT (BASED ON THERIVEL AND GOODEY 2001)	
	6.1 Introduction	120
	6.2 Definitions and concepts	121
	6.3 Legislative background and interest groups	124

6.4	<i>Baseline studies</i>	128
6.5	<i>Impact prediction</i>	133
6.6	<i>Mitigation and enhancement</i>	139
6.7	<i>Monitoring</i>	140
6.8	<i>Concluding issues</i>	142
	<i>References</i>	142

7 Heritage

145

RIKI THERIVEL (BASED ON GROVER AND THERIVEL 2001)

7.1	<i>Introduction</i>	145
7.2	<i>Definitions and concepts</i>	145
7.3	<i>Legislative background and interest groups</i>	149
7.4	<i>Scoping and baseline studies</i>	155
7.5	<i>Impact prediction</i>	164
7.6	<i>Mitigation and enhancement</i>	168
7.7	<i>Monitoring</i>	170
7.8	<i>Conclusions</i>	170
	<i>References</i>	171

8 Air quality and climate

173

DAVID WALKER AND HANNAH DALTON (BASED ON ELSOM 2001)

8.1	<i>Introduction</i>	173
8.2	<i>Legislative background and interest groups</i>	175
8.3	<i>Scoping and baseline studies</i>	182
8.4	<i>Impact prediction</i>	187
8.5	<i>Mitigation</i>	196
8.6	<i>Monitoring</i>	198
	<i>References</i>	198

9 Soils, geology and geomorphology

201

CHRIS STAPLETON, KEVIN HAWKINS AND MARTIN HODSON
(BASED ON HODSON, STAPLETON AND EMBERTON 2001)

9.1	<i>Introduction</i>	201
9.2	<i>Definitions and concepts – geology and geomorphology</i>	201
9.3	<i>Definitions and concepts – soils</i>	202
9.4	<i>Legislative background and interest groups</i>	211
9.5	<i>Scoping and baseline studies</i>	215
9.6	<i>Impact prediction</i>	222
9.7	<i>Mitigation</i>	227
9.8	<i>Monitoring</i>	230
	<i>References</i>	230

10 Water

235

SALLY-BETH KELDAY, ANDREW BROOKES AND PETER MORRIS
(BASED ON MORRIS, BIGGS AND BROOKES 2001)

- 10.1 *Introduction* 235
- 10.2 *Definitions and concepts of water quantity* 236
- 10.3 *Definitions and concepts of water quality* 244
- 10.4 *Legislative background and interest groups* 250
- 10.5 *Scoping* 256
- 10.6 *Baseline studies on water quantity* 263
- 10.7 *Baseline studies on water quality* 269
- 10.8 *Impact prediction* 276
- 10.9 *Mitigation* 285
- 10.10 *Monitoring* 288
- References* 289

11 Ecology

294

PETER MORRIS AND ROY EMBERTON (BASED ON MORRIS AND
EMBERTON, BIGGS ET AL., MORRIS AND THURLING 2001)

- 11.1 *Introduction* 294
- 11.2 *Definitions and concepts* 296
- 11.3 *Legislative background and interest groups* 305
- 11.4 *Scoping and baseline studies* 313
- 11.5 *Phase 1 baseline surveys* 318
- 11.6 *Phase 2 surveys and evaluation of baseline conditions* 321
- 11.7 *Impact prediction* 333
- 11.8 *Mitigation* 347
- 11.9 *Monitoring* 353
- 11.10 *Conclusions* 354
- References* 354

12 Coastal ecology and geomorphology

364

RICHARD COTTLE AND SIAN JOHN (BASED ON THOMPSON
AND LEE 2001)

- 12.1 *Introduction* 364
- 12.2 *Definitions and concepts* 365
- 12.3 *Legislative background and interest groups* 374
- 12.4 *Scoping and baseline studies* 379
- 12.5 *Impact prediction* 386
- 12.6 *Mitigation* 399

- 12.7 *Monitoring* 402
- 12.8 *Conclusions* 404
- References* 405

PART II

- Shared and integrative methods** 413

- 13 Environmental risk assessment and risk management** 415
 - ANDREW BROOKES

 - 13.1 *Introduction* 415
 - 13.2 *Definitions and concepts* 416
 - 13.3 *Legislative and policy background and interest groups* 419
 - 13.4 *Key steps in performing an ERA* 420
 - 13.5 *Different levels of ERA* 424
 - 13.6 *Parallels between EIA and ERA* 426
 - 13.7 *Opportunities and challenges for ERA* 426
 - 13.8 *Risk communication* 429
 - 13.9 *Concluding issues* 430
 - References* 432

- 14 Geographical Information Systems and EIA** 434
 - AGUSTIN RODRIGUEZ-BACHILLER AND GRAHAM WOOD

 - 14.1 *Introduction* 434
 - 14.2 *GIS concepts and techniques* 435
 - 14.3 *GIS and environmental impact assessment* 442
 - 14.4 *GIS in screening, scoping and baseline studies* 445
 - 14.5 *GIS in impact prediction* 448
 - 14.6 *GIS in mitigation* 453
 - 14.7 *GIS in monitoring* 454
 - 14.8 *Conclusions* 454
 - References* 456

- 15 Quality of life capital** 460
 - RIKI THERIVEL

 - 15.1 *Introduction* 460
 - 15.2 *The quality of life capital approach* 461
 - 15.3 *An example of the approach* 462
 - 15.4 *Advantages of the approach* 464
 - 15.5 *Links between EIA and quality of life capital* 465
 - References* 466

16 Sustainable development and sustainability appraisal	467
ROY EMBERTON AND RIKI THERIVEL	
16.1 <i>Introduction</i>	467
16.2 <i>The UK Government's sustainable development agenda</i>	470
16.3 <i>Sustainable development and EIA</i>	471
16.4 <i>Sustainability appraisal</i>	473
16.5 <i>Conclusion</i>	478
<i>References</i>	478
Appendices	482
A Acronyms, internet addresses, chemical symbols, and quantitative units	482
B UK environment, conservation and heritage organisations	489
C Habitat, vegetation and land classifications	490
PETER MORRIS	
D Evaluating species, communities, habitats and sites	511
PETER MORRIS	
<i>Glossary</i>	529
<i>Index</i>	547