

# Table of contents

## **PART I: THE SETTING**

### **1 The Coastal Zone Environment: A Place to Work, Rest, Play and to Manage**

*S.D. King*

Introduction	1
The Need for Better Coastal Management	2
Managing the Coastal Landscape in the UK	3
Some Problems with the SMP	4
A Different Approach	5
Legislation	6
Sea Defence (Flooding)	6
Coast Protection (Erosion)	7
New Strategies for Defence	8
Sediment Cells	10
Voluntary Coastal Defence Groups	10
Shoreline Management Plans (SMPs)	11
Coastal Processes	11
Coastal Defence	11
Coastal Defence Schemes	12
Offshore Breakwaters	13
Beach Nourishment	13
Artificial Seaweed	15
Summary	16

### **2 The North East Coastline of Scotland**

*J.S. Smith*

The Geological Skeleton	21
Glaciations, Deglaciation and Changing Land-Sea Relationships	23
Shoreline Regularisation	24
The Building of Dune Systems and Human Impacts	24
Offshore Topography and Deposits - The Coastal Sediment Bank	26
Sustainability of the Beach/Dune Resources	29
Coastal Zone Land Uses	30
Conclusion	32

## **PART II: THE COASTAL ZONE**

### **3 Coastal/Marine GI/GIS - A Pan-European Perspective**

*R. A. Longhorn*

Introduction	35
Diverse Coastal Zone Activities Require Diverse Programmes of Research Initiatives from EU Institutions	36
DG XII Programmes with Marine and Coastal Zone Related Actions	38
DG Joint Research Centre (JRC), Ispra, Italy	41
European Environment Agency (EEA)	43
Initiatives from Non-EU Institutions	45
Initiatives and Actions for the Mediterranean and/or Black Sea	46
Initiatives and Actions for the Baltic Sea	48
International Initiatives/Programmes Active in Europe	49
Potential Impact of the EU's Fifth Framework Programme for RTD (1998-2002)	51
GI2000: Towards a European Policy Framework for Geographic Information	53
GISDATA and AGILE	54
Conclusion and Recommendations	55

### **4 Plans for the Coastal Zone**

*P.A.G. Watts*

Introduction	61
A Map-Oriented Appraisal for the Coastal Zone	62
Mapping (Geographic Information) and the Coastal Zone	63
Mapping (Geographic Information) for the Coastal Zone	64
The GIS Dimension	66
Mapping the Changes	66
Matching Mapping (Geospatial Information) to Applications	67
Shoreline Management Planning	67
Coastal Communications	69
Contingency Planning	69
Flood Risk and Hazard Analysis	70
Why GIS for Best Practice?	70
The National Geospatial Data Framework and the Coastal Zone	71
Coastal Map Data Availability and Accessibility	71
Summary	72

### **5 Hydrographic Data and Geographical Information Systems**

*P. Wright*

Introduction	75
Stage 1 of the HO/OS Coastal Zone Mapping Project	76

Stage 2 of the HO/OS Coastal Zone Mapping Project	76
Applications	76
Data Compatibility	81
Data Suitability	83
Way Ahead	83

### **PART III: EXAMPLE APPLICATIONS**

#### **6 GIS for Sustainable Coastal Zone Management in the Pacific - A Strategy**

*B. Crawley and J. Aston*

Introduction	85
International and Regional Initiatives	86
Data Requirements for Coastal Management	90
Constraints to Coastal Management in the Pacific	91
Information Constraints and Sources	94
Conclusion	94

#### **7 Managing Marine Resources: The Role of GIS in EEZ Management**

*S. Fletcher*

Introduction	97
United Nations Convention on the Law of the Sea	98
Rights and Responsibilities in the EEZ	99
EEZ Management	99
Co-operation Amongst Coastal Nations	100
Information Requirements	101
The Role of GIS in EEZ Management	102
Conclusion	103

#### **8 The Management Plan of the Wadden Sea and its Visualisation**

*M.A. Damoiseaux*

Introduction	105
The Management Plan of the Wadden Sea	106
Use of GIS	106
The Sector Notes	107
The Management Plan	109
Information Management for the benefit of the Wadden Sea	109
New Initiatives	111
Acknowledgements	111

<b>9</b>	<b>Using GIS For Siting Artificial Reefs - Data Issues, Problems And Solutions: 'Real World' To 'Real World'</b>	
	<i>D.R. Green and S.T. Ray</i>	
	Introduction	114
	Artificial Reef Siting	115
	Moray Firth Project	116
	Datasets	124
	Discussion	127
	Solutions and Recommendations	128
	Summary and Conclusions	128
	Additional Reading on Artificial Reefs	131
<b>10</b>	<b>Collating the Past for Assessing the Future: Analysis of the Subtidal and Intertidal Data Records Within GIS</b>	
	<i>C.I.S. Pater</i>	
	Introduction	133
	Research Objectives	134
	Shoreline Management Plans	136
	The Selection of Datum	137
	Digital Representation of Subtidal and Intertidal Topography	138
	Boston Port Authority Surveys	138
	Environment Agency Intertidal Levelling	140
	Remote Sensing and Aerial Imagery	141
	Critique of Methodology	141
	Historical and Modern Inconsistencies	143
	Suitability of Analysis within a GIS	144
	The Value of GIS to Shoreline Management Plans	144
	Conclusions	146
	Acknowledgements	146
<b>11</b>	<b>Identifying Sites for Flood Protection - A Case Study from the River Clyde</b>	
	<i>G. Jones</i>	
	Introduction	149
	Main Reasons for Attempting to Predict Flood Risk	150
	Predictions for Sea Level Change	150
	Computer Model of the Clyde Estuary	151
	Interpreting the Results	154
	Analysis of Flood Scenario	156
	Conclusion	159

<b>12</b>	<b>Arctic Coastal and Marine Environmental Monitoring</b>	
	<i>H. Goodwin and R. Palerud</i>	
	Background	163
	Data Collection	164
	Software Development	165
	Data Input to the Environmental Database	166
	GIS Interface	166
	Modelling with GIS	167
	The Future	170
<b>13</b>	<b>A GIS Application for the Study of Beach Morphodynamics</b>	
	<i>L.P. Humphries and C.N. Ligdas</i>	
	Introduction	174
	Data Development and Analysis	175
	Results	179
	Discussion	184
	Conclusions	188
<b>14</b>	<b>Determination and Prediction of Sediment Yields from Recession of the Holderness Coast</b>	
	<i>R. Newsham, P.S. Balson, D.G. Tragheim and A.M. Denniss</i>	
	Introduction	191
	The Holderness GIS	193
	Calculation of Sediment Yield	195
	Calculation of Sediment Yields by Lithology	198
	Future	198
	Summary	198
	Acknowledgements	199
<b>15</b>	<b>Tracing the Recent Evolution of the Littoral Spit at El Rompido, Huelva (Spain) Using Remote Sensing and GIS</b>	
	<i>J. Ojeda Zújar, E. Parrilla, J. Márquez Pérez, and J. Loder</i>	
	Introduction	201
	Time Scales	202
<b>16</b>	<b>Littoral and Shoreline Processes in Large Man-Made Lakes</b>	
	<i>A. Sh. Khabidov</i>	
	Introduction	205
	Main Peculiar Features of Man-Made Lakes	206
	Surface Processes in the Coastal Zone	208



<http://www.springer.com/978-0-7923-5686-8>

Coastal and Marine Geo-Information Systems

Applying the Technology to the Environment

Green, D.R.; King, S.D. (Eds.)

2003, XX, 596 p., Hardcover

ISBN: 978-0-7923-5686-8