

CONTENTS

Foreword	v
List of contributors	xiii
1 Introduction	1
Samantha Capon, Michael Reid and Cassandra James	
Note from the editors	3
References	4
Section 1: Australia's riverine vegscapes in space and time	5
2 The physical template of Australia's rivers	7
Martin Thoms, Melissa Parsons and Mark Southwell	
Introduction	7
The geological and climatic setting of Australia's river templates	8
The hierarchical nature of river templates	11
The hierarchical river template	13
Associations between physical features and riverine vegetation	20
Conclusions	22
References	23
3 The physical template of Australia's floodplain landscapes	27
Martin Thoms and Melissa Parsons	
Introduction	27
What are floodplain landscapes?	30
Elements of the floodplain physical template	30
A framework for understanding the role of the physical template in floodplain ecosystems	37
Conclusions	40
References	40
4 A history of Australia's riverine habitats and vegetation	45
Michael Reid, Sophie Bickford, Peter Gell and Christine Kenyon	
Introduction	45
Riverine vegetation of the late Pleistocene and last glacial maximum	46
Riverine vegetation of the Pleistocene-Holocene transition	50
Riverine vegetation of the Holocene	51
Aboriginal influences on riverine vegetation	53
Riverine vegetation since European settlement	55
Conclusions	58
References	58
	vii

Section 2: Riverine plants	65
5 Macroalgae, charophytes and bryophytes	67
Michelle Casanova and Lucy Nairn	
Introduction	67
Description	67
Ecology	69
Habitats	73
Biogeography	73
Diversity	74
Ecosystem services	75
Resilience	77
Conclusions	77
References	78
6 Aquatic vascular macrophytes of Australia's riverine systems	87
Stephen Mackay and Cassandra James	
Introduction	87
Diversity	88
Adaptations to life in water	90
Distributions and dynamics	91
Resources	94
Conclusions	96
References	97
7 Riparian herbs	103
Samantha Capon	
Introduction	103
Riparian habitats: from a herb's perspective	103
Plant diversity	106
Plant traits	108
Distributions and dynamics	112
Ecosystem services	114
Conclusions	114
References	114
8 Riverine trees and shrubs	119
Samantha Capon, Cassandra James and Amy George	
Introduction	119
Floristics and biogeography	119
Woody plant traits	124
Woody vegetation dynamics	132

Ecosystem services	134
Conclusions	135
Acknowledgements	135
References	135

Section 3: Riverine vegetation **143**

9 Vegetation of coastal floodplains and wetlands in south-eastern Australia	145
Paul Boon, David Keith and Elisa Raulings	
Introduction	145
A primer on the hydrology of coastal floodplains and wetlands	147
Vegetation communities of coastal floodplains and wetlands in south-eastern Australia	149
Changes to coastal floodplain and wetland vegetation since European colonisation	159
Threats to coastal floodplains and wetlands	160
Conclusions	167
Acknowledgements	167
References	167
10 Riverine vegetation of inland south-eastern Australia	177
Jane Roberts, Matthew Colloff and Tanya Doody	
Introduction	177
Riverine landscapes of inland south-eastern Australia	178
Riverine plants of inland south-eastern Australia	180
Spatial patterns in riparian vegetation	184
Riverine habitats and plant traits: a whole-of-river framework	186
Vegetation responses to changing flood regimes	192
Conclusions	193
Acknowledgements	194
References	194
11 Pattern and process in riparian vegetation of the treeless high country of Australia	201
Jamie Kirkpatrick	
Introduction	201
Riparian flora	203
Riparian vegetation types	210
Riparian ecosystem dynamics	214
Conclusions	216
References	217
12 Riparian vegetation of tropical northern Australia	221
Neil Pettit, John Dowe and Ian Dixon	
Introduction	221

Biogeography of riverine plant communities in northern Australia	223
Temporal and seasonal dynamics of riparian vegetation	226
Status, threats and management of tropical riparian landscapes	228
Conclusions	231
References	232

13 Vegetation of Australia's desert river landscapes 239

Samantha Capon, John Porter and Cassandra James

Introduction	239
Desert river landscapes of Australia	240
Plant diversity	244
Vegetation ecology	248
Management issues	250
Conclusions	253
References	253

Section 4: Management concerns 259

14 Flow alteration and its effects on Australia's riverine vegetation 261

Richard Kingsford

Introduction	261
Flow alteration in Australia	262
Effects of flow alteration on riverine vegetation	264
Environmental flow management	267
Conclusions	268
Acknowledgements	268
References	268

15 Salinisation and its impacts on Australia's riverine vegetation 273

George Ganf and Kaylene Morris

Introduction	273
Primary and secondary salinisation in Australia	274
Impacts of salinity on plant growth	281
Management implications	286
Conclusions	288
References	289

16 Fire in Australia's riparian landscapes 297

Michael Douglas, Neil Pettit and Samantha Setterfield

Introduction	297
Fire regimes and fire behaviour in riparian zones	297
Impacts of fire on riparian vegetation	299

Interactions between fire and invasive species	301
Fire management in the riparian zone	302
Conclusions	303
References	303
17 Grazing	307
Christopher Jones and Peter Vesk	
Introduction	307
The occurrence of grazing in Australia's riverine landscapes	308
The role of grazing in shaping vegetation	309
Direct effects of grazing on plants: herbivory and trampling	311
Indirect effects of grazing on vegetation	313
Grazing management	314
Conclusions	317
References	317
18 Alien plant invasions in Australia's riparian zones	325
Jane Catford and Garreth Kyle	
Introduction	325
Stages and mechanisms of plant invasion	326
Traits of invasive plants	328
Ecological impacts of invasive plants	331
Management of invasive plants	332
Current knowledge gaps and future research directions	333
Conclusions	336
Acknowledgements	336
References	336
19 The ongoing challenge of restoring Australia's riparian zones	343
Paul Reich, Laura Williams, Tim Cavagnaro and P. Sam Lake	
Introduction	343
The damage done	343
Fixing the damage	345
The big challenges	346
A way forward	354
Conclusions	356
Acknowledgements	357
References	357
20 Monitoring and assessment of vegetation in Australian riverine landscapes	365
Nicholas Souter, Kasper Johansen and Michael Reid	
Introduction	365
The nature and purpose of monitoring and assessment	365

Developing monitoring and assessment programs: general considerations and challenges	366
Techniques	368
Conclusions and future directions	378
References	380
21 Climate change and the future of Australian riverine vegetation	387
Cassandra James, Michael Reid and Samantha Capon	
Introduction	387
Australia's changing climate	388
Climate change effects on riverine plants and vegetation	391
Adaptive capacity of Australian riverine vegetation	395
Managed adaptation	397
Conclusions	399
References	399
Index	407