

Grazing and Conservation Management

Edited by

Michiel F. WallisDeVries

Senior Research Scientist
Department of Environmental Sciences
Wageningen Agricultural University
Wageningen, The Netherlands

Jan P. Bakker

Professor in Nature Conservation
Laboratory of Plant Ecology
University of Groningen
Haren, The Netherlands

Sipke E. Van Wieren

Senior Lecturer
Department of Environmental Sciences
Wageningen Agricultural University
Wageningen, The Netherlands



KLUWER ACADEMIC PUBLISHERS

DORDRECHT / BOSTON / LONDON

Contents

List of contributors	xi
Preface	xv
1 Large herbivores as key factors for nature conservation	1
<i>Michiel F. WallisDeVries</i>	
1.1 Grazing and nature conservation: a contradiction?	1
1.2 The keystone function of large herbivores	4
1.3 Scope and contents of this book	13
References	17
Part One	
Historical and Ecological Background	21
2 Grazing for conservation management in historical perspective	23
<i>Jan P. Bakker and Ger Londo</i>	
2.1 Introduction	23
2.2 Agricultural exploitation in semi-natural landscapes	25
2.3 From agriculturally exploited landscapes to nature conservation	29
2.4 Which landscapes to manage for conservation interest?	31
2.5 From maintenance management towards restoration management	32
2.6 Grazing as a management tool in nature conservation	35
2.7 Nature conservation and the ecological frame of reference	39
References	47
3 Origins and development of grassland communities in northwestern Europe	55
<i>Herbert H.T. Prins</i>	
3.1 Introduction	55
3.2 Open vegetation before the Pleistocene	56
3.3 Open vegetation during the Pleistocene	59
3.4 The transition from Pleistocene to Holocene	70
3.5 Vegetation development during the Holocene	79
3.6 Human impact	86

3.7	Conclusions and consequences for nature conservation	95
	Acknowledgement	97
	References	97
4	Effects of human interference on the landscape with special reference to the role of grazing livestock	107
	<i>Richard Pott</i>	
4.1	Introduction	107
4.2	Historical development of the landscape	108
4.3	The role of herbivory and the development of <i>Waldhude</i> communities	111
4.4	Vegetation patterns and processes in wood-pasture landscapes	113
4.5	Conclusion	129
	References	130
Part Two		
	Impact of Grazing on Community Structure	135
5	The impact of grazing on plant communities	137
	<i>Jan P. Bakker</i>	
5.1	Effects of excluding grazing animals	137
5.2	Effects of introducing grazing animals	142
5.3	Vegetation patterns at various spatial scales	149
5.4	Vegetation patterns in time	157
5.5	Effects on abiotic conditions	160
5.6	Dispersal of diaspores	163
5.7	Effects of multi-species grazing on the vegetation	169
5.8	Grazing and management goals	171
5.9	Concluding remarks	173
	References	174
6	Effects of large herbivores upon the animal community	185
	<i>Sipke E. Van Wieren</i>	
6.1	Introduction	185
6.2	Relationships between mammals and birds and vegetation structure	188
6.3	Herbivore–herbivore interactions in natural and semi-natural systems	189
6.4	Low and moderate density	191
6.5	High density of large herbivores	193
6.6	Grazing and animal species richness: potential and limits of a management tool	207
	References	210

Part Three	
Management Applications	215
7 Hydrological conditions and herbivory as key operators for ecosystem development in Dutch artificial wetlands	217
<i>J. Theo Vulink and Mennobart R. Van Eerden</i>	
7.1 Introduction	217
7.2 Description of the Oostvaardersplassen system and management practices	218
7.3 Vegetation and birds within the marsh zone in relation to water-level management	225
7.4 Herbivory in the marsh zone mediated through water-level management: greylag geese as habitat modifiers of the marsh system	230
7.5 Herbivory in the border zone: interrelations between grazing pressure by large herbivores and birds	232
7.6 Retrospect and perspectives	240
Acknowledgements	248
References	248
8 The practical use of grazing in nature reserves in The Netherlands	253
<i>Harm Piek</i>	
8.1 Introduction	253
8.2 Objectives of grazing management	254
8.3 Evaluation of the effects of grazing	256
8.4 Dilemmas and problems in the use of grazing	266
References	272
Part Four	
Perspectives and Limitations	273
9 Habitat quality and the performance of large herbivores	275
<i>Michiel F. WallisDeVries</i>	
9.1 Introduction	275
9.2 Condition cycles in seasonal environments	276
9.3 Habitat influences on individual performance	281
9.4 Animal performance and population dynamics	296
9.5 Habitat quality and carrying capacity	299
9.6 Management considerations	305
9.7 Conclusions	308
References	308

10	The role of scientific models	321
	<i>Michiel F. WallisDeVries and Johan Van de Koppel</i>	
10.1	Introduction	321
10.2	An overview of relevant models	321
10.3	Challenges for the future	328
10.4	Concluding remarks	339
	Acknowledgement	340
	References	340
11	Grazing for conservation in the twenty-first century	349
	<i>Sipke E. Van Wieren and Jan P. Bakker</i>	
11.1	Introduction	349
11.2	Species-oriented objectives	351
11.3	Plant species richness	353
11.4	Diversity of plant communities	354
11.5	Wilderness	355
11.6	Sustainability of biological diversity	357
11.7	Future research	359
	References	363
	Index	365