Conservation of Faunal Diversity in Forested Landscapes

Edited by
Richard M. DeGraaf
Northeastern Forest Experimental Station, University of Massachusetts, USA

and

Ronald I. Miller
Senior Associate, Pioneer Geographic Designs, Massachusetts, USA
Contents

Colour plates appear between pages 10 and 11 and 234 and 235
List of contributors xiii
Preface xvii
Acknowledgements xxi

Part One Prevailing Contrasts in the Status of Forested Biodiversity 1

1 The importance of disturbance and land-use history in New England: implications for forested landscapes and wildlife conservation 3
Richard M. DeGraaf and Ronald I. Miller
1.1 Introduction 3
1.2 Long-term changes in forest and fauna 4
1.3 Short-term habitat changes in New England 10
1.4 Faunal responses to forest habitat changes in New England 12
1.5 The historical pattern of disturbance in New England 19
1.6 Summary 25
1.7 Acknowledgements 26
1.8 References 26

2 Changes in global forest distribution 37
David B. Kittredge, Jr
2.1 Introduction 37
2.2 Total forest area 38
2.3 Forest area per capita 45
2.4 Human population 45
2.5 Wood production and consumption 47
2.6 Overall implications 51
2.7 Conclusion 55
2.8 Summary 57
2.9 References 58

3 The status of forested wetlands and waterbird conservation in North and Central America 61
R. Michael Erwin
3.1 Introduction 61
viii  Contents

3.2  Sources of information 63
3.3  Scope 67
3.4  Waterbirds and forested wetland habitat use 71
3.5  Status reports by country and region 73
3.6  Management recommendations 98
3.7  Summary 101
3.8  Acknowledgements 102
3.9  References 102

4  Modern forestry and the capercaillie 111
  Kjell Sjöberg
  4.1  The capercaillie – a static bird in a changing world? 111
  4.2  Population levels and trends 113
  4.3  Population regulating factors affected by forestry 115
  4.4  A small-scale to large-scale view of forestry 119
  4.5  Forestry influence at the stand level 119
  4.6  The influence by forestry at the landscape and regional levels 121
  4.7  The future forest landscape 127
  4.8  Summary 129
  4.9  Acknowledgements 129
  4.10  References 130

5  Conservation of large forest carnivores 137
  Todd K. Fuller and David B. Kittredge, Jr
  5.1  Introduction 137
  5.2  Current status 139
  5.3  Historic causes of population change 149
  5.4  Conservation actions 153
  5.5  Conclusions 159
  5.6  Summary 159
  5.7  References 160

Part Two  Habitat Change and Wildlife Responses 165

6  Forest raptor population trends in North America 167
  Mark R. Fuller
  6.1  Introduction 167
  6.2  Selection of species 168
  6.3  Forest characteristics associated with raptors 175
  6.4  Raptor occurrence and forest conditions 183
  6.5  Management and conservation 198
  6.6  Information needs 201
Contents ix

6.7 Summary 202
6.8 Acknowledgements 203
6.9 References 204

7 Bird community dynamics in boreal forests 209
Pekka Helle and Gerald J. Niemi
7.1 Introduction 209
7.2 Problems of dynamics 211
7.3 Short-term dynamics 212
7.4 Long-term dynamics: forest succession 218
7.5 Temporal and spatial variation 226
7.6 Conclusions 228
7.7 Summary 229
7.8 Acknowledgements 229
7.9 References 230

8 The impact of forestry on ungulates in Japan 235
Naoki Maruyama and Kunihiko Tokida
8.1 Introduction 235
8.2 Afforestation, population growth of ungulates and damage to plantations and crops 236
8.3 Impact of the collapse of rural communities on ungulate—forestry problems 245
8.4 Progress on ungulate—forestry problems 246
8.5 Prospects for the future and some proposals 247
8.6 Summary 249
8.7 References 250

9 Effects of hurricanes on wildlife: implications and strategies for management 253
Joseph M. Wunderle, Jr and James W. Wiley
9.1 Introduction 253
9.2 Direct effects of hurricanes 255
9.3 Indirect effects of hurricanes on wildlife 256
9.4 Response of wildlife populations to hurricane effects 257
9.5 Potential management strategies 258
9.6 Summary 260
9.7 References 261

10 Trends in moose—forest system in Fennoscandia, with special reference to Sweden 265
Göran Cederlund and Roger Bergström
10.1 Introduction 265
10.2 Factors contributing to increased moose densities 269
Contents

10.3 Population dynamics and management of moose in North America and the former Soviet Union 275
10.4 Forest damage by moose in Fennoscandia 276
10.5 Conclusions 277
10.6 Summary 278
10.7 Acknowledgements 279
10.8 References 279

Part Three Effective Conservation Tools and Strategies 283

11 The ghost of forest past – natural disturbance regimes as a basis for reconstruction of biologically diverse forests in Europe 287
Per Angelstam
11.1 Introduction 287
11.2 Natural disturbance regimes in European forests 290
11.3 Boreal forest 293
11.4 Temperate lowland forest 312
11.5 Riverine forest 319
11.6 Discussion 322
11.7 Conclusions 326
11.8 Summary 327
11.9 Acknowledgements 327
11.10 References 327

12 Conservation and management of eucalypt forest vertebrates 339
Harry F. Recher
12.1 Introduction 339
12.2 Politics and forest management 341
12.3 Australian forests 342
12.4 Old-growth forest 346
12.5 Forest vertebrate fauna 348
12.6 Habitat and resource conservation 355
12.7 Habitat manipulation and predator control 368
12.8 Reintroductions 371
12.9 Conclusions 372
12.10 Summary 377
12.11 Acknowledgements 378
12.12 References 379

13 The importance of forest for the world’s migratory bird species 389
John H. Rappole
13.1 Introduction 389
13.2 Ecological questions and perspectives 391
Contents

13.3 Conservation questions and perspectives by region 400
13.4 Conclusions 401
13.5 Summary 402
13.6 References 402

14 Wildlife habitat evaluation in forested ecosystems: some examples from Canada and the United States 407
Paul A. Gray, Duncan Cameron and Ian Kirkham
14.1 Introduction 407
14.2 The context: an ecosystem approach to management 408
14.3 Models 418
14.4 Descriptive models 420
14.5 Predictive models 461
14.6 Decisive (decision support) models 491
14.7 Monitoring 499
14.8 Guidelines for habitat evaluation model development 500
14.9 Conclusions 503
14.10 Summary 505
14.11 Acknowledgements 505
14.12 References 506

15 The 'spatial solution' to conserving biodiversity in landscapes and regions 537
Richard T.T. Forman and Sharon K. Collinge
15.1 Introduction 537
15.2 The spatial solution 538
15.3 Animal movement and spread of disturbance in land mosaics 545
15.4 Fragmentation and spatial processes in land transformation 551
15.5 Detecting an ecologically optimum sequence in changing land 552
15.6 Conservation planning for less natural vegetation 555
15.7 Ecological planning of regions, even continents 557
15.8 Conclusion 562
15.9 Summary 563
15.10 References 563

16 Ecosearch: a new paradigm for evaluating the utility of wildlife habitat
Henry L. Short, Jay B. Hestbeck and Ralph W. Tiner
16.1 Information needs of natural resource managers 569
16.2 Building maps to represent wildlife habitats 570
16.3 Ecosearch: a way to describe and map wildlife habitats 575
Contents

16.4 The development of maps predicting habitats for wildlife species 582
16.5 The utility of Ecossearch 586
16.6 Summary 592
16.7 Acknowledgements 593
16.8 References 593

17 Modern approaches to monitoring changes in forests using maps 595
Ronald I. Miller
17.1 Introduction 595
17.2 Issues of scale and resolution that pertain to modern forest maps 596
17.3 Contemporary classification of the landscape 599
17.4 Important scale and resolution concerns regarding forest data 602
17.5 Contemporary monitoring of forest biodiversity at the broad scale 605
17.6 Conclusions 610
17.7 Summary 610
17.8 Acknowledgements 611
17.9 References 611

Some conclusions 615

Species index 617

Subject index 627