
Contents

Preface..... xiii

Author xv

Chapter 1 Introduction 1

 What Is Habitat?..... 1

 Habitat Function2

 Habitat for Humans5

 Forests as Habitat5

 Historical Approaches to Managing Forests as Habitat6

 Why Manage Habitat?7

 Case Study: The Forests of British Columbia9

 Summary 11

 References 11

Chapter 2 Humans as a Forest-Dependent Species..... 13

 Ecological Restoration and Ecosystem Services..... 13

 Social Values Associated with Forests and Wildlife..... 15

 Environmental Ethics 15

 Ecological Psychology 17

 Public Resources on Private Lands 17

 Case Study: Environmental Activism and Effects on Habitat 18

 Summary 18

 References 19

Chapter 3 Vertebrate Habitat Selection..... 21

 Hierarchical Selection 21

 Where in the World Should I Live?22

 Looking for a Home in a Nice Community.....25

 Buying a House and Buying Groceries26

 What Would You Like for Dinner?26

 Density-Dependent Habitat Selection26

 Relationship between Habitat Quality and Demographics28

 Population Fitness.....29

 Measuring Habitat Selection30

 Proximate and Ultimate Cues to Habitat Quality31

 Social Cues in Habitat Selection32

 Case Study: American Marten Habitat Selection32

 Summary33

 References34

Chapter 4 Forest Structure and Composition..... 37

 Food and Cover in a Cellulose-Managed System37

 Vertical Complexity.....37

	Horizontal Patchiness.....	40
	Forage Availability and Quality	40
	Fruit Production.....	43
	Dead and Damaged Trees.....	44
	Tree Species and Invertebrate Associations	45
	Tree Size and Density	46
	Forest Floor Litter and Soil	47
	Proximity to Water	47
	Case Study on Plant Response to Herbivores, or, It Is a (Chemical) War Out There!.....	48
	Summary	48
	References	49
Chapter 5	Physical Influences on Habitat Patterns	53
	The Physical Environment	53
	Geology	53
	Topography: Slope, Aspect, and Elevation.....	55
	Soils	56
	Climate	56
	Hydrology.....	60
	Vegetation Patterns.....	60
	Summary	62
	References	63
Chapter 6	Cultural Effects on Habitat Patterns	67
	Land Use	67
	Urbanization	67
	Forest Clearing for Agriculture	68
	Energy Production and Biofuels.....	68
	Climate Change.....	69
	Invasive Species	71
	Synergistic Effects.....	75
	Case Study: Passenger Pigeons, Humans, and Forests	75
	Summary	77
	References	77
Chapter 7	Disturbance Ecology and Habitat Dynamics	79
	Disturbance Size and Pattern	79
	Disturbance Severity	81
	Disturbance Frequency.....	82
	Disturbance Frequency, Size, Severity Relationships	83
	Stand Dynamics	83
	Stand Initiation	83
	Stem Exclusion	85
	Understory Reinitiation	86
	Old-Growth	86
	Succession as a Continuum of Habitat Elements	87
	Successional Pathways.....	88

	Management Implications from Disturbances	89
	Summary	90
	References	91
Chapter 8	Silviculture and Habitat Management: Even-Aged Systems.....	93
	Silviculture as a Forest Disturbance.....	93
	Characteristics of Even-Aged Stands	94
	Considering the Capabilities of the Site	95
	Choosing a Regeneration Method	96
	Identifying Legacy Elements to Retain.....	98
	Site Preparation Effects on Habitat Elements	98
	Natural Regeneration and Planting Options.....	99
	Vegetation Management Effects on Habitat Elements	100
	Herbicides and Pesticides	101
	Direct Effects.....	102
	Indirect Effects	102
	Precommercial Thinning.....	103
	Commercial Thinning	103
	Fertilization	107
	Rotation Length: Ecological and Economic Trade-Offs.....	107
	Case Study: Douglas-Fir Plantation	108
	Summary	111
	References	112
Chapter 9	Silviculture and Habitat Management: Uneven-Aged Systems.....	117
	Characteristics of Uneven-Aged Stands	117
	Considering the Site Potential.....	120
	Uneven-Aged Regeneration Methods.....	120
	Natural Regeneration and Planting Options.....	120
	Uneven-Aged Stand Development.....	121
	Habitat Elements in Uneven-Aged Stands	122
	Vertical Structure	122
	Horizontal Diversity	123
	Forage and Browse	123
	Dead and Dying Trees.....	124
	Mast	124
	Challenges to Using Uneven-Aged Methods.....	124
	Nontraditional Management Approaches.....	125
	Case Study: Managing a Small Privately Owned Forest	126
	Summary	127
	References	128
Chapter 10	Desired Future Conditions	131
	Developing the Stand Prescription	131
	Species Background	132
	Current Stand Condition.....	132
	Desired Future Condition	132
	Management Actions to Achieve the Desired Future Condition.....	132

Monitoring Plans	132
Budget.....	132
Schedule	132
References.....	132
Case Study: Growing Red-Cockaded Woodpecker Habitat.....	133
Species Background and Management Options.....	133
Current Stand Condition.....	134
Desired Future Condition	135
Management Actions to Achieve the DFC	136
Monitoring Plans	140
Budget.....	141
Summary	143
References	143
Chapter 11 Riparian Area Management	145
Animal Associations with Riparian Areas	146
Gradients within Riparian Zones	147
Riparian Functions	150
Riparian Buffers.....	152
Managing within Streamside Management Areas	154
Beavers: The Stream Managers?	155
Case Study: Riparian Area Management in a Patchwork Ownership	156
Summary	157
References	158
Chapter 12 Dead Wood Management	161
Primary Cavity Excavators	161
Secondary Cavity Users	163
Log Users	164
Patterns of Dead Wood Following Disturbance.....	165
Changes in Dead Wood Over Time.....	166
Dead Wood during Stand Development.....	167
Management of Tree Cavities and Dead Wood.....	168
Live Cavity-Tree Management in Managed Stands	171
Dead Wood Retention and Harvest System Considerations.....	172
Creating Snags and Logs for Wildlife	173
Monitoring Cavity Trees, Snags, and Logs	174
Case Study: Managing Dead Wood in Oregon Forests.....	174
Summary	176
References	176
Chapter 13 Managing Fire in Forests	181
Effects of Fire on Habitat Elements and Succession.....	181
Species, Fuels, Fire Frequency, and Severity	182
Creation and Loss of Dead Wood.....	182
Effects on Species Composition	183
Changing Fire Risk through Management.....	183
Salvage Logging	183

Effects of Fuels Treatments on Habitat Elements	184
Use of Prescribed Fire in Managed Forests	185
Case Study: To Salvage Log or Not? A Scientific Debate with a Social Solution.....	185
Summary	187
References	187
Chapter 14 Urban Forests and Habitat Elements	189
Defining Urban Forests along an Urban–Rural Continuum	189
How Some Species Interpret the “Built Environment?”	190
Finding Spaces for Habitat Management	191
Habitat Elements Limiting Species in Urban and Suburban Settings.....	191
Urban Streams and Wetlands	192
Urban Expansion, Wetlands, and Mitigation	193
Managing Trees, Parks, and Forests in Urban Settings	194
Summary	195
References	195
Chapter 15 Landscape Structure and Composition	197
Landscapes	197
Defining the Landscape.....	198
Habitat Quality at the Landscape Scale	200
Living on the Edge	200
Edge Geometry.....	203
Habitat Fragmentation.....	205
Habitat Area: Species–Area Relationships.....	206
Case Study: Habitat Area or Pattern?.....	209
Summary	211
References	211
Chapter 16 Landscape Connections.....	213
Dispersal.....	213
Understanding the Probability of Successful Dispersal	214
Connectivity and Gap-Crossing Ability.....	218
Understanding Physical and Genetic Connectivity	220
Management Approaches to Connectivity	222
Case Study: Matrix Management for a Wide-Ranging Species.....	222
Summary	224
References	225
Chapter 17 Managing Woodlands in Agricultural Environments.....	227
Value of Woodlots to Landowners	228
Edge Effects in Agricultural Settings	228
Habitat Elements in Woodlots.....	228
Fencerows and Shelterbelts.....	229
Loss of Forests in Industrial Agricultural Settings	229
Field and Farm Management That Influences Woodlot Function.....	230
Annual Crop Management	230

Grazing Management	231
Land Sparing	231
Specialty Crops and Agroforestry	232
Organic versus Traditional Agriculture	232
Multifunctional Landscapes	233
Certification of Agricultural Lands for Wildlife: The Role of Trees	234
Summary	234
References	235
Chapter 18 Approaches to Biodiversity Conservation	237
What Is Biodiversity?	237
Setting Biodiversity Goals	239
How Do We Conceptualize “Biodiversity” to Be Able to Conserve It?	239
Coarse-Filter Approaches	240
Meso-Filter Approaches	243
Fine-Filter Approaches	243
Challenges to Managing Biodiversity	245
Spatial Scale	245
Time	247
Uncertainty	248
Summary	249
References	250
Chapter 19 Landscape Management Plans	253
Establishing Goals	253
Current Conditions	255
Desired Future Conditions	255
Pathways to Desired Future Conditions	256
Developing the Landscape Management Plan	256
Policy Guidelines for Habitat Conservation Plans	258
General Structure of the Landscape Management Plan	259
Considering Alternative Plans	260
Finding Solutions to Land Management Planning Problems	261
Plan Effectiveness	263
Summary	264
References	264
Chapter 20 Ecoregional Assessments and Conservation Priorities	267
Ecoregional Assessments	267
Examples of Ecoregional Assessments	271
Conducting an Ecoregional Analysis	272
Assessing Patterns of Habitat Availability and Quality	273
Prioritizing Management and Assessing Policies	275
Coarse-Filter Approach	275
Integrated Coarse-, Meso-, and Fine-Filter Approaches	276
Fine-Filter Approaches	277
Utility and Effectiveness of Ecoregional Assessments	279
Summary	280
References	280

Chapter 21	Viable Populations in Dynamic Forests	283
	Extinction Risks	283
	Goals of PVAs	285
	PVA Models	285
	Conducting a PVA for a Forest-Associated Species	286
	Examples of PVA Analyses	289
	Grizzly Bear	289
	Marbled Murrelet	290
	Neotropical Migrant Birds	291
	Model Errors and Uncertainties	291
	Poor Data	292
	Difficulties in Parameter Estimation	293
	Weak Ability to Validate or Verify Models	293
	Effects of Alternative Model Structures	294
	Interpreting Results from PVA Projections	294
	Summary	295
	References	295
Chapter 22	Monitoring Habitat Elements and Populations	297
	Adaptive Management	297
	Designing Monitoring Plans	299
	Selection of Indicators	301
	Describe the Scope of Inference	301
	Describe the Experimental Design	302
	Sampling Intensity, Frequency, and Duration	302
	Monitoring Habitat Elements	303
	Monitoring for Species Occurrence	304
	Monitoring Trends	305
	Cause and Effect Monitoring Designs	307
	Are Data Already Available and Sufficient?	308
	Making Decisions with Data	309
	Examples of Approaches to Monitoring	310
	Monitoring Clonal Plants	310
	Monitoring the Occurrence of a Small Mammal Species	310
	Monitoring Trends in a Salamander Subpopulation	311
	Monitoring Response of Neotropical Migrant Birds to Forest Management	311
	Monitoring Habitat Elements	313
	Summary	313
	References	313
Chapter 23	Forest Sustainability and Habitat Management	317
	Defining the Resources to Be Sustained	318
	Scales of Sustainability	318
	Humans Are Part of the System	319
	Are We Making Progress?	319
	Forest Certification	320
	Effectiveness of Certification	323
	Sustaining and Marketing Ecosystem Services: Habitat Banking	324

Summary	325
References	325
Chapter 24 Regulatory and Legal Considerations	327
International Laws and Agreements	327
National Laws	328
State Laws	332
Municipal Policies	334
Policy Analysis	335
How Decisions in the United States Influence Habitat in the World	336
Case Study: The Endangered Species Act and Climate Change	337
Summary	337
References	338
Chapter 25 Should I Manage the Forest?	341
What Does Restoration Mean?	341
Human Requirements as Constraints on Goals	342
Developing a Personal Management Philosophy	343
Our Place on Earth	344
Living Simply and Sustainably	344
Leaving the World a Better Place	345
Summary	346
References	346
Appendix 1: Common and Scientific Names of Species Mentioned in the Text	347
Appendix 2: Glossary	353
Appendix 3: Measuring and Interpreting Habitat Elements	359
Appendix 4: Wildlife–Habitat Relationships Models	365
Appendix 5: Projecting Habitat Elements through Time	369
Index	375