
Table of Contents

Preface	xiii
The Author	xv
Chapter 1	
Introduction	1
What Is Habitat?	1
Habitat Function	2
Habitat for Humans	5
Forests as Habitat	5
Historical Approaches to Managing Forests as Habitat	6
Why Manage Habitat?	7
Case Study: The Forests of British Columbia	9
Summary	12
References	12
Chapter 2	
Vertebrate Habitat Selection	15
Hierarchical Selection	15
Density-Dependent Habitat Selection	20
Relationship between Habitat Quality and Demographics	21
Population Fitness	23
Measuring Habitat Selection	24
Proximate and Ultimate Cues to Habitat Quality	25
Case Study: American Marten Habitat Selection	26
Summary	27
References	27
Chapter 3	
Forest Structure and Composition	29
Food and Cover in a Cellulose-Managed System	29
Vertical Complexity	29
Horizontal Patchiness	32
Forage Availability and Quality	32
Fruit Production	35
Dead and Damaged Trees	36
Tree Species and Invertebrate Associations	37
Tree Size and Density	38
Forest Floor Litter and Soil	39
Proximity to Water	39
Case Study: Plant Response to Herbivores, <i>or</i> It's a (Chemical) War out There!	40
Summary	41
References	41

Chapter 4

Physical and Cultural Influences on Habitat Patterns..... 45

 The Physical Environment..... 45

 Geology 45

 Topography: Slope, Aspect, and Elevation 47

 Soils 47

 Climate 48

 Hydrology 51

 Vegetation Patterns 52

 Cultural Effects on Habitat Patterns..... 54

 Land Use 54

 Climate Change 55

 Invasive Species 55

 Case Study: Passenger Pigeons, Humans, and Forests 58

 Summary 60

 References 61

Chapter 5

Disturbance Ecology and Habitat Dynamics..... 65

 Disturbance Size 65

 Disturbance Severity 67

 Disturbance Frequency 67

 Disturbance Frequency, Size, and Severity Relationships 69

 Stand Dynamics 69

 Stand Initiation..... 69

 Stem Exclusion 71

 Understory Reinitiation..... 72

 Old Growth..... 72

 Succession as a Continuum of Habitat Elements 72

 Successional Pathways..... 73

 Management Implications from Disturbances 75

 Summary 76

 References 77

Chapter 6

Silviculture and Habitat Management: Even-Aged Systems..... 79

 Silviculture as a Forest Disturbance..... 79

 Characteristics of Even-Aged Stands 81

 Considering the Capabilities of the Site..... 81

 Choosing a Regeneration Method 82

 Identifying Legacy Elements to Retain 83

 Site Preparation Effects on Habitat Elements..... 84

 Natural Regeneration and Planting Options 85

 Vegetation Management Effects on Habitat Elements 86

 Precommercial Thinning..... 87

 Commercial Thinning..... 88

 Fertilization..... 91

 Rotation Length: Ecological and Economic Trade-Offs 91

 Case Study: Douglas-Fir Plantation 92

 Summary 95

 References 96

Chapter 7

Silviculture and Habitat Management: Uneven-Aged Systems	99
Characteristics of Uneven-Aged Stands	99
Considering the Site Potential	102
Uneven-Aged Regeneration Methods	102
Natural Regeneration and Planting Options	103
Uneven-Aged Stand Development	103
Habitat Elements in Uneven-Aged Stands	104
Vertical Structure	105
Horizontal Diversity	105
Forage and Browse	105
Dead and Dying Trees	106
Mast	106
Challenges to Using Uneven-Aged Methods	106
Nontraditional Management Approaches	107
Case Study: Managing a Small Privately Owned Forest	109
Summary	110
References	110

Chapter 8

Desired Future Conditions	113
Developing the Stand Prescription	113
Case Study: Growing Red-Cockaded Woodpecker Habitat	114
Species Background and Management Options	115
Current Stand Condition	116
Desired Future Condition	117
Management Actions to Achieve the Desired Future Condition	117
Monitoring Plans	122
Budget	123
Summary	125
References	125

Chapter 9

Riparian Area Management	127
Animal Associations with Riparian Areas	128
Gradients within Riparian Zones	129
Riparian Functions	132
Riparian Buffers	134
Managing within Streamside Management Areas	135
Beavers — The Stream Managers?	137
Case Study: Riparian Area Management in a Patchwork Ownership	138
Summary	139
References	140

Chapter 10

Dead Wood Management	143
Primary Cavity Excavators	144
Secondary Cavity Users	145
Log Users	146
Patterns of Dead Wood Following Disturbance	148
Changes in Dead Wood over Time	148
Dead Wood during Stand Development	149

Management of Tree Cavities and Dead Wood	149
Live Cavity-Tree Management in Managed Stands	153
Dead Wood Retention and Harvest System Considerations	154
Creating Snags and Logs for Wildlife	154
Monitoring Cavity Trees, Snags, and Logs	156
Case Study: Managing Dead Wood in Oregon Forests	157
Summary	158
References	159
Chapter 11	
Landscape Structure and Composition	163
Defining the Landscape	164
Habitat Quality at the Landscape Scale	165
Living on the Edge	166
Edge Geometry	169
Habitat Fragmentation	171
Habitat Area: Species–Area Relationships	172
Case Study: Habitat Area or Pattern?	175
Summary	177
References	177
Chapter 12	
Landscape Connections	179
Dispersal	179
Understanding the Probability of Successful Dispersal	180
Connectivity and Gap-Crossing Ability	184
Management Approaches to Connectivity	186
Case Study: Matrix Management for a Wide-Ranging Species	187
Summary	188
References	188
Chapter 13	
Approaches to Biodiversity Conservation	191
What Is Biodiversity?	191
Setting Biodiversity Goals	192
How Do We Conceptualize “Biodiversity” to Be Able to Conserve It?	193
Coarse-filter Approaches	193
Meso-filter Approaches	197
Fine-filter Approaches	197
Challenges to Managing Biodiversity	199
Spatial Scale	199
Time	200
Uncertainty	202
Summary	203
References	204
Chapter 14	
Landscape Management Plans	205
Establishing Goals	205
Current Conditions	207
Desired Future Conditions	207
Pathways to DFCs	208

Developing the Landscape Management Plan	209
Policy Guidelines for HCPs.....	209
General Structure of the Landscape Management Plan	211
Considering Alternative Plans	212
Finding Solutions to Land Management Planning Problems	214
Plan Effectiveness	215
Summary	215
References	216
Chapter 15	
Ecoregional Assessments and Prioritization	217
Ecoregional Assessments	217
Examples of Ecoregional Assessments	221
Conducting an Ecoregional Analysis	222
Assessing Patterns of Habitat Availability and Quality	223
Prioritizing Management and Assessing Policies	225
Coarse-Filter Approach	225
Integrated Coarse- and Fine-Filter Approaches	225
Fine-Filter Approaches	226
Utility and Effectiveness of Ecoregional Assessments	229
Summary	229
References	230
Chapter 16	
Viable Populations in Dynamic Forests	233
Extinction Risks	233
Goals of PVAs	235
PVA Models	235
Conducting a PVA for a Forest-Associated Species	236
Examples of PVA Analyses	238
Grizzly Bear	238
Marbled Murrelet	240
Northern Spotted Owl	240
Model Errors and Uncertainties	242
Poor Data	242
Difficulties in Parameter Estimation	242
Weak Ability to Validate Models	242
Effects of Alternative Model Structures	243
Interpreting Results from PVA Projections	243
Summary	244
References	244
Chapter 17	
Monitoring Habitat Elements and Populations	247
Adaptive Management	247
Designing Monitoring Plans	249
Selection of Response Variables	249
Describe the Scope of Inference	250
Describe the Experimental Design	250
Sampling Intensity, Frequency, and Duration	251
Monitoring Habitat Elements	251

Monitoring for Species Occurrence	253
Monitoring Trends	254
Cause-and-Effect Monitoring Designs	256
Are Data Already Available and Sufficient?	256
Making Decisions with Data	257
Examples of Approaches to Monitoring	258
Monitoring Clonal Plants	258
Monitoring the Occurrence of a Small-Mammal Species	259
Monitoring Trends in a Salamander Subpopulation	259
Monitoring Response of Neotropical Migrant Birds to Forest Management	259
Monitoring Habitat Elements	261
Summary	261
References	262
 Chapter 18	
Forest Sustainability and Habitat Management	263
Defining the Resources to Be Sustained	264
Scales of Sustainability	264
Humans Are Part of the System	265
Forest Certification	265
Effectiveness of Certification	268
Summary	269
References	269
 Chapter 19	
Regulatory and Legal Considerations	271
International Laws and Agreements	271
National Laws	272
State Laws	275
Municipal Policies	277
Policy Analysis	278
How Decisions in the United States Influence Habitat in the World	279
Summary	280
References	280
 Chapter 20	
Should I Manage a Forest?	283
What Does Restoration Mean?	283
Human Requirements as Constraints on Goals	284
Developing a Personal Management Philosophy	285
Our Place on Earth	286
Living Simply and Sustainably	286
Leaving the World a Better Place	287
Summary	288
References	288
 Appendix 1: Common and Scientific Names of Species Mentioned in the Text	
Mammals	289
Birds	290
Amphibians	291
Reptiles	292

Insects 292

Fish 292

Plants 293

Appendix 2: Glossary 295

Appendix 3: Measuring and Interpreting Habitat Elements 303

 Methods 303

 Random Sampling 303

 Measuring Density 304

 Estimating Percent Cover..... 304

 Estimating Height 304

 Estimating Basal Area 304

 Estimating Biomass 305

 Using Estimates of Habitat Elements to Assess Habitat Presence 305

 Using Estimates of Habitat Elements to Assess Habitat Suitability 306

 Assessing the Distribution of Habitat across a Landscape 306

 References 308

Subject Index 309

Species Index 317