

CONTENTS

	Page
PREFACE	viii
CHAPTER 1	
A CONSERVATION ASSESSMENT FRAMEWORK FOR FOREST CARNIVORES	
Background	1
Purpose	2
Overview	2
The Quantity and Quality of Existing Information	3
Geographic Limitations	3
Extensive Information From Few Studies	4
Small Sample Sizes and/or Highly Variable Results	4
Ambiguous Parameters and Problems of Scale	4
Definition of Terms and Inappropriate Inference	4
Inappropriate Methods	5
Management Considerations and Information Needs	5
Literature Cited	6
CHAPTER 2	
AMERICAN MARTEN	
<i>Steven W. Buskirk, Department of Zoology and Physiology, University of Wyoming, Laramie, Wyoming Leonard F. Ruggiero, USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Laramie, Wyoming</i>	
Introduction	7
Natural History	7
Current Management Status	8
Distribution and Taxonomy	9
Distribution	9
Taxonomy	11
Population Insularity	11
Management Considerations	12
Research Needs	13
Population Ecology	13
Demography	13
Ecological Influences on Population Size and Performance	14
Population Sizes and Trends	14
Direct Human Effects	15
Metapopulations	15
Population Genetics	15
Management Considerations	16
Research Needs	16
Reproductive Biology	16
Phenology	16
Den Sites	17
Mating Systems and Behavior	17
Modes of Communication	18
Parental Care	18

Survival of Young	18
Management Considerations	18
Research Needs	18
Food Habits and Predator-Prey Relationships	18
General Foraging Ecology and Behavior	18
Seasonal, Supra-annual, Geographic Variation in Diets	19
Principal Prey Species	20
Habitat Associations of Principal Prey	20
Management Considerations	21
Research Needs	21
Habitat Relationships	21
General Considerations	21
Use of Major Vegetation Zones	21
Habitat Use in Relation to Sex, Age, and Season	23
Special Requirements and Spatial Scales	23
Effects of Forest Fragmentation	24
Response to Human Disturbances	24
Structural Features Relative to Succession	25
Use of Nonforested Habitats	26
The Refugium Concept	26
Management Considerations	26
Research Needs	26
Home Range	27
Variation in Home Range Attributes	27
Territoriality	27
Spatial Relationships Among Cohorts	28
Management Considerations	28
Research Needs	28
Movements	28
Management Considerations	28
Research Needs	28
Community Interactions	28
Management Considerations	29
Research Needs	29
Conservation Status	29
Literature Cited	30

CHAPTER 3

FISHER

*Roger A. Powell, Department of Zoology, College of Agriculture and Life Science,
North Carolina State University, Raleigh, North Carolina*

William J. Zielinski, USDA Forest Service, Pacific Southwest Research Station, Arcata, California

Introduction	38
Natural History	38
Current Management Status	39
Distribution and Taxonomy	40
Range	40
Historical Changes in Populations and Distribution	41
Taxonomy	43

Management Considerations	43
Research Needs	43
Population Ecology	43
Population Densities and Growth	43
Survivorship and Mortality	44
Age Structure and Sex Ratio	45
Management Considerations	45
Research Needs	45
Reproductive Biology	46
Reproductive Rates	46
Breeding Season and Parturition	46
Den Sites	47
Scent Marking	47
Management Considerations	47
Research Needs	47
Food Habits and Predator-Prey Relationships	47
Principal Prey Species and Diet	47
Diet Analysis by Age, Season, and Sex	51
Foraging and Killing Behavior	51
Management Considerations	52
Research Needs	52
Habitat Relationships	52
General Patterns and Spatial Scales	52
Forest Structure	53
Habitat and Prey	53
Snow and Habitat Selection	54
Elevation	55
Use of Openings and Nonforested Habitats	55
Habitat Use by Sex, Age, and Season	55
Resting Sites	56
Management Considerations	57
Research Needs	57
Home Range	57
Home Range Size	57
Territoriality	59
Management Considerations	60
Research Needs	60
Movements	60
Activity Patterns	60
Movement Patterns	60
Dispersal	60
Movements and Reintroduction	61
Management Considerations	61
Research Needs	61
Community Interactions	61
Food Webs and Competition	61
Predation on Fishers	62
Management Considerations	62
Research Needs	63
Conservation Status	63
Human Effects on Fishers	63

Trapping	63
Forest Management	64
Conservation Status in the Western United States	64
Literature Cited.....	66
CHAPTER 4	
LYNX	
<i>Gary M. Koehler, 65005 Market Road, Deming, Washington</i>	
<i>Keith B. Aubry, USDA Forest Service, Pacific Northwest Research Station, Olympia, Washington</i>	
Introduction	74
Natural History	74
Current Management Status.....	76
Distribution, Taxonomy, and Zoogeography.....	77
Distribution in North America	77
Taxonomy	77
Zoogeography of Lynx in the Western Mountains	78
Management Considerations	79
Research Needs	80
Population Ecology	80
Population Dynamics of Snowshoe Hares and Lynx in the Western Mountains	80
Reproductive Biology	80
Mortality	82
Age and Sex Structure	83
Density	83
Management Considerations	84
Research Needs	84
Food Habits and Predator-Prey Relationships	84
Foraging Ecology	84
Prey Requirements and Hunting Success	84
Temporal and Spatial Variations in Diet	85
Management Considerations	86
Research Needs	86
Habitat Relationships	86
Components of Lynx Habitat	86
Foraging Habitat	86
Denning Habitat	88
Travel Cover	88
Management Considerations	89
Research Needs	89
Home Range and Movements	89
Home Range	89
Movements and Dispersal	91
Management Considerations	92
Research Needs	92
Community Interactions	92
Management Considerations	93
Research Needs	93
Conservation Status in the Western Mountains	93
Literature Cited.....	94

CHAPTER 5

WOLVERINE

*Vivian Banci, Province of British Columbia, Ministry of Environment, Lands and Parks,
Wildlife Branch, Victoria, British Columbia*

Introduction	99
Current Management Status	101
Conterminous United States	101
Distribution and Taxonomy	102
Distribution	102
Taxonomy and Morphological Variability	104
Management Considerations.....	104
Research Needs.	104
Population Ecology	105
Reproduction and Natality	105
Sampling Problems and Population Characteristics	106
Natural Mortality	106
Trapping Mortality	108
Density and Population Trends	108
Management Considerations	108
Research Needs	109
Reproductive Biology	109
Mating Behavior	109
Natal Dens	110
Management Considerations	110
Research Needs	111
Food Habits and Predator-Prey Relationships	111
Diets	111
Foraging Behavior	113
Management Considerations	113
Research Needs	114
Habitat Relationships	114
Habitat Use	114
Impacts of Land-use Activities	115
Management Considerations	116
Research Needs	116
Home Range	117
Spatial Patterns	118
Communication	119
Management Considerations	119
Research Needs	119
Movements and Activity	119
Dispersal	120
Management Considerations.....	120
Research Needs	120
Community Interactions	121
Wolverine and Prey	121
Wolverine, Wolves, and Humans	121
Wolverine and Wilderness	121
Conservation Status	122
The Future of Wolverine Populations	122

Acknowledgments	122
Literature Cited	123
CHAPTER 6	
THE SCIENTIFIC BASIS FOR CONSERVING FOREST CARNIVORES:	
CONSIDERATIONS FOR MANAGEMENT	
Introduction	128
Spatial Relationships	128
Categories of Management Considerations.....	128
Habitat Management Considerations	123
Stands and Components Within Stands.....	123
Landscape Considerations	132
Population Management Considerations	132
Landscapes and Metapopulations	132
Fragmentation and Linkages	133
Detecting Carnivore Populations	133
Population Abundance and Trends	134
Population Dynamics and Habitat Management	134
The Effects of Trapping	134
Species Management Considerations	135
Regional Management	135
Reintroduction	135
Existing Populations.....	135
Conclusions: The Major Considerations for Management	136
Literature Cited	137
CHAPTER 7	
INFORMATION NEEDS AND A RESEARCH STRATEGY FOR	
CONSERVING FOREST CARNIVORES	
Introduction	138
Overview of Existing Knowledge.....	138
Information Needs	139
Habitat Requirements at Multiple Scales.....	139
Community Interactions	143
Movement Ecology	144
Population Ecology and Demography	145
Behavioral Ecology	145
A Comprehensive Approach to Meeting Research Needs	147
General Research Considerations	147
Recommended Studies	148
Western Forest Carnivore Research Center	150
Literature Cited	151
APPENDIX A. Ecoprovinces of the Central North American Cordillera and Adjacent Plains	153
APPENDIX B. Fisher, Lynx, and Wolverine Summary of Distribution Information	168
APPENDIX C. National Forest System Status Information	176