

# Table of Contents

|                  |      |
|------------------|------|
| Preface          | x    |
| Acknowledgments  | xiii |
| About the Author | xiv  |

## SECTION I: ZOOLOGY AND ECOLOGY BASICS 1

|                                                                               |           |
|-------------------------------------------------------------------------------|-----------|
| <b>CHAPTER 1 Principles of Zoology</b>                                        | <b>2</b>  |
| Classification of Animals                                                     | 3         |
| Animal Behaviors and Habits                                                   | 4         |
| Animal Structure or Anatomy                                                   | 6         |
| Animal Nutrition and Digestion                                                | 8         |
| Animal Growth                                                                 | 10        |
| Animal Reproduction                                                           | 11        |
| <b>CHAPTER 2 Principles of Ecology</b>                                        | <b>17</b> |
| Conservation of Matter                                                        | 18        |
| Laws of Energy                                                                | 24        |
| The First Law of Energy                                                       | 25        |
| The Second Law of Energy                                                      | 26        |
| Natural Cycles                                                                | 27        |
| The Carbon Cycle                                                              | 27        |
| The Nitrogen Cycle                                                            | 29        |
| The Water Cycle                                                               | 30        |
| Food Chains                                                                   | 33        |
| <b>CHAPTER 3 Understanding Relationships Between Wildlife and Agriculture</b> | <b>39</b> |
| Fundamentals of Ecology                                                       | 40        |
| Agricultural Impacts on Ecosystems                                            | 43        |
| Biological Succession                                                         | 46        |
| <b>CHAPTER 4 Biomes of North America</b>                                      | <b>53</b> |
| Freshwater Biomes                                                             | 55        |
| Marine Biome                                                                  | 60        |
| Terrestrial Biomes                                                            | 64        |
| Desert Biome                                                                  | 64        |
| Tundra Biome                                                                  | 66        |
| Grassland Biome                                                               | 68        |
| Deciduous Forest Biome                                                        | 69        |
| Temperate Forest Biome                                                        | 70        |
| Coniferous Forest Biome                                                       | 70        |

|                                            |           |
|--------------------------------------------|-----------|
| <b>CHAPTER 5 Our Wildlife Resources</b>    | <b>75</b> |
| A National Treasure                        | 76        |
| The U.S. Endangered Species Act            | 78        |
| Controversy and Protectionism              | 79        |
| Extinction and its Causes                  | 85        |
| Managing Endangered and Threatened Species | 88        |

## SECTION II: ZOOLOGY AND ECOLOGY OF MAMMALS

93

|                                    |            |
|------------------------------------|------------|
| <b>CHAPTER 6 Gnawing Mammals</b>   | <b>94</b>  |
| Mice, Rats, Voles, and Lemmings    | 97         |
| Squirrels                          | 105        |
| Marmots and Prairie Dogs           | 113        |
| Rabbits, Hares, and Pikas          | 117        |
| Porcupines                         | 123        |
| Gophers and Beavers                | 124        |
| <b>CHAPTER 7 Hoofed Mammals</b>    | <b>130</b> |
| Pronghorn                          | 133        |
| Deer                               | 135        |
| Bison and Musk Ox                  | 142        |
| Wild Sheep                         | 145        |
| Mountain Goats                     | 148        |
| Peccary                            | 149        |
| Horses and Burros                  | 150        |
| <b>CHAPTER 8 Predatory Mammals</b> | <b>155</b> |
| Wild Cats                          | 156        |
| Wild Dogs                          | 161        |
| Bears                              | 167        |
| Weasels                            | 171        |
| Raccoons                           | 181        |
| <b>CHAPTER 9 Marine Mammals</b>    | <b>186</b> |
| Seals                              | 187        |
| Eared Seals                        | 189        |
| True Seals                         | 191        |
| Walrus                             | 193        |
| Manatees                           | 194        |
| Whales                             | 196        |
| Baleen Whales                      | 197        |
| Toothed Whales                     | 199        |
| <b>CHAPTER 10 Unusual Mammals</b>  | <b>209</b> |
| Opossums                           | 210        |
| Shrews and Moles                   | 212        |
| Bats                               | 214        |
| Armadillo                          | 218        |

|                                                      |            |
|------------------------------------------------------|------------|
| <b>CHAPTER 11 Waterfowl</b>                          | <b>224</b> |
| Ducks                                                | 227        |
| Geese                                                | 233        |
| Swans                                                | 236        |
| <b>CHAPTER 12 Game Birds</b>                         | <b>242</b> |
| Quails                                               | 244        |
| Partridges                                           | 246        |
| Pheasants                                            | 247        |
| Grouse                                               | 249        |
| Turkeys                                              | 253        |
| Pigeons and Doves                                    | 255        |
| <b>CHAPTER 13 Birds of Prey</b>                      | <b>261</b> |
| Hawk-like Birds                                      | 262        |
| Eagles, Hawks, and Kites                             | 262        |
| Falcons                                              | 270        |
| Vultures                                             | 273        |
| Osprey                                               | 275        |
| Owls                                                 | 276        |
| Typical Owls                                         | 276        |
| Barn Owls                                            | 281        |
| <b>CHAPTER 14 Songbirds and Other Perching Birds</b> | <b>286</b> |
| Songbirds                                            | 287        |
| Crows and Jays                                       | 301        |
| Cuckoos                                              | 303        |
| Kingfishers                                          | 304        |
| Hummingbirds                                         | 304        |
| <b>CHAPTER 15 Other Birds of North America</b>       | <b>309</b> |
| Long-legged Wading Birds                             | 310        |
| Gull-like Birds                                      | 314        |
| Upright Perching Waterbirds                          | 316        |
| Duck-like Birds                                      | 318        |
| Sandpiper-like Birds                                 | 321        |
| Chicken-like Marsh Birds                             | 324        |
| Upland Ground Birds                                  | 325        |
| Swallows and Swifts                                  | 327        |
| Tree-Clinging Birds                                  | 329        |
| Basis for Commerce                                   | 489        |
| The Principle of Stewardship                         | 490        |
| Ethics, Privileges, and Responsibilities             | 491        |
| Wildlife Management                                  | 494        |
| Outdoor Recreation Management                        | 495        |

# SECTION IV:

## ZOOLOGY AND ECOLOGY OF FISH, REPTILES, AND AMPHIBIANS

337

|                                                  |            |
|--------------------------------------------------|------------|
| <b>CHAPTER 16 Freshwater Fish</b>                | <b>338</b> |
| Catfish                                          | 340        |
| Sunfish                                          | 342        |
| Perch                                            | 345        |
| Trout, Char, and Whitefish                       | 347        |
| Pike                                             | 352        |
| Sturgeons                                        | 353        |
| Minnows and Suckers                              | 354        |
| <b>CHAPTER 17 Anadromous and Diadromous Fish</b> | <b>359</b> |
| Salmon                                           | 365        |
| Steelhead                                        | 370        |
| Striped Bass                                     | 371        |
| Shad                                             | 373        |
| Freshwater Eels                                  | 373        |
| <b>CHAPTER 18 Saltwater Fish and Fauna</b>       | <b>378</b> |
| Sharks, Skates, and Rays                         | 379        |
| Mackerel, Tuna, and Marlins                      | 383        |
| Flounder, Halibut, and Sole                      | 385        |
| Herring                                          | 387        |
| Codfish                                          | 389        |
| Smelts                                           | 390        |
| Sea Bass and Groupers                            | 391        |
| Mollusks                                         | 392        |
| Crustaceans                                      | 394        |
| <b>CHAPTER 19 Reptiles and Amphibians</b>        | <b>400</b> |
| Reptiles                                         | 401        |
| Alligators and Crocodiles                        | 403        |
| Lizards                                          | 405        |
| Snakes                                           | 410        |
| Turtles and Tortoises                            | 416        |
| Amphibians                                       | 419        |
| Frogs and Toads                                  | 420        |
| Salamanders and Newts                            | 422        |



**CHAPTER 20 Responsible Management of Wildlife Resources** ..... **430**

|                                    |     |
|------------------------------------|-----|
| Role of Private Institutions       | 431 |
| Farmers and Ranchers               | 432 |
| Industry                           | 439 |
| Private Citizens                   | 440 |
| Game Farms and Preserves           | 441 |
| Role of Special Interest Groups    | 443 |
| Environmental Organizations        | 443 |
| Recreational Interests             | 444 |
| Role of Government                 | 445 |
| Government Agencies                | 446 |
| National Parks and Monuments       | 447 |
| National and International Law     | 448 |
| Multiple-Use Concept of Management | 450 |
| Wildlife Careers                   | 451 |
| Education                          | 451 |
| Supervised Experience Programs     | 451 |
| Employer Expectations              | 453 |
| Occupational Safety                | 454 |

**CHAPTER 21 Conservation of Natural Resources** ..... **458**

|                                                               |     |
|---------------------------------------------------------------|-----|
| Conserving the Soil                                           | 460 |
| Maintaining a Pure Water Supply                               | 463 |
| Preserving Air Quality                                        | 465 |
| Preserving and Restoring Wildlife Populations<br>and Habitats | 467 |
| Reclaiming Damaged or Polluted Resources                      | 469 |

**CHAPTER 22 The Human Connection to Wildlife and Natural Resources** ..... **475**

|                                                    |     |
|----------------------------------------------------|-----|
| Foundation for Agriculture                         | 476 |
| Source of Materials for Medicines                  | 477 |
| Mechanism for Natural Cycles                       | 477 |
| Recreation                                         | 479 |
| Intrinsic Value                                    | 479 |
| Hunting and Fishing for Sport                      | 481 |
| Game Laws and Regulations                          | 482 |
| Using Campgrounds, Trails, Roads,<br>and Waterways | 483 |
| Safety Education                                   | 487 |
| Basis for Commerce                                 | 489 |
| The Principle of Stewardship                       | 490 |
| Ethics, Privileges, and Responsibilities           | 491 |
| Wildlife Management                                | 492 |
| Outdoor Recreation Management                      | 495 |

|          |     |
|----------|-----|
| Glossary | 499 |
| Index    | 508 |