# **Contents**

## Preface ix

## Part | Historical and Geological Perspective

- 1 The Fires of 1988: A Chronology and Invitation to Research Linda L. Wallace, Francis J. Singer, and Paul Schullery 3
- 2 Postglacial Fire, Vegetation, and Climate History of the Yellowstone-Lamar and Central Plateau Provinces, Yellowstone National Park Sarah H. Millspaugh, Cathy Whitlock, and Patrick J. Bartlein 10
- 3 Yellowstone Fires and the Physical Landscape Grant A. Meyer 29

#### Part II Effects on Individuals and Species

- 4 Establishment, Growth, and Survival of Lodgepole Pine in the First Decade *Jay E. Anderson, Marshall Ellis, Carol D. von Dohlen, and William H. Romme* 55
- **5** Fire Effects, Elk, and Ecosystem Resilience in Yellowstone's Sagebrush Grasslands *Benjamin F. Tracy* 102

6 Elk Biology and Ecology Before and After the Yellowstone Fires of 1988 Francis J. Singer, Michael B. Coughenour, and Jack E. Norland 117

### Part III Effects on Aquatic Systems

- **7** Effects of Wildfire on Growth of Cutthroat Trout in Yellowstone Lake *Robert E. Gresswell* 143
- 8 Stream Ecosystem Responses to Fire: The First Ten Years
  G. Wayne Minshall, Todd V. Royer, and Christopher T. Robinson 165
- 9 Food Web Dynamics in Yellowstone Streams: Shifts in the Trophic Basis of a Stream Food Web After Wildfire Disturbance *Timothy B. Mihuc* 189
- 10 Role of Fire in Determining Annual Water Yield in Mountain Watersheds *Phillip E. Farnes, Ward W. McCaughey, and Katherine J. Hansen* 200

## Part IV Terrestrial Ecosystem and Landscape Perspective

- 11 Early Postfire Forest Succession in the Heterogeneous Teton Landscape *Kathleen M. Doyle* 235
- 12 Snags and Coarse Woody Debris: An Important Legacy of Forests in the Greater Yellowstone Ecosystem Daniel B. Tinker and Dennis H. Knight 279
- 13 Fire Patterns and Ungulate Survival in Northern Yellowstone Park: The Results of Two Independent Models *Linda L. Wallace, Michael B. Coughenour, Monica G. Turner, and William H. Romme* 299
- 14 Ten Years After the 1988 Yellowstone Fires: Is Restoration Needed? William H. Romme and Monica G. Turner 318
- 15 Epilogue: After the Fires. What Have We Learned? *Linda L. Wallace and Norman L. Christensen* 362

List of Contributors 373 Index 375