

Contents

1 Systemic management—what and why?	1
1.1 Tenets of management	2
1.2 Motivation for change	5
1.3 Introducing pattern-based management: systemic management in the eastern Bering Sea	12
1.4 Summary and preview	18
2 Patterns among species: information	22
2.1 Patterns among species	23
2.2 The eastern Bering Sea example	52
2.3 Summary and preview	54
3 Selective extinction and speciation	55
3.1 Natural selection among individuals and species	56
3.2 Understanding extinction and speciation	59
3.3 Interaction of evolutionary processes	64
3.4 Influence of environment on extinction, speciation, and selectivity	68
3.5 Historical perspective	70
3.6 Implications for management	74
3.7 The eastern Bering Sea example	75
3.8 Summary and preview	77
4 Why conventional management does not work	78
4.1 Transitive management in relation to identified criteria for management	78
4.2 Other recognized drawbacks of conventional management	84
4.3 Inadequacy of current approaches to management by focal level	93
4.4 Fatal flaws in conventional management by focal level	108
4.5 Including ecosystems and the biosphere in management	111
4.6 The case for systemic management	116
4.7 The eastern Bering Sea example	117
4.8 Summary and preview	120
5 Why systemic management works	121
5.1 Systemic management adheres to the tenets of management	122
5.2 Limitations of systemic management	141
5.3 Why extinction should be a management issue	147

5.4 A protocol for systemic management	148
5.5 The eastern Bering Sea example	153
5.6 Summary and preview	157
6 Humans: a species beyond limits	159
6.1 Limits to natural variation as limits to sustainability	159
6.2 Consideration of hierarchy	190
6.3 The eastern Bering Sea example	196
6.4 Summary and preview	203
Epilogue	204
Notes	227
List of Appendices	251
References	253
Author Index	279
Subject Index	285