

Contents

Chapter 1 INTRODUCTION: POLAR ENVIRONMENTS	1
1.1 Polar and subpolar regions	1
1.2 Arctic and Subarctic	16
1.3 Antarctic and Subantarctic	19
1.4 Summary and conclusions	22
Chapter 2 ENERGY, CLIMATE AND MICROCLIMATES	23
2.1 Introduction: why polar cold?	23
2.2 Solar energy	24
2.3 Weather and climate	40
2.4 Polar climates	44
2.5 Organisms at low temperatures	56
2.6 Summary and conclusions	60
Chapter 3 TERRESTRIAL ENVIRONMENTS	62
3.1 Introduction: polar land environments	62
3.2 Deglaciation: soil formation	64
3.3 Land plant communities	80
3.4 Land animal communities	94
3.5 Summary and conclusions	105
Chapter 4 FRESHWATER ENVIRONMENTS	106
4.1 Introduction: fresh water in polar regions	106
4.2 Polar freshwater habitats	106
4.3 Aquatic ecology: food webs and productivity	111
4.4 Summary and conclusions	124
Chapter 5 MARINE ENVIRONMENTS	125
5.1 Introduction: polar seas	125
5.2 Polar marine habitats	126
5.3 Arctic Ocean ecology	138
5.4 Southern Ocean ecology	144
5.5 Summary and conclusions	158
Chapter 6 ACCLIMATION, ADAPTATION AND SURVIVAL	159
6.1 Organisms and polar environments	159
6.2 Survival in plants	162
6.3 Survival in invertebrates	171

6.4	Survival in fish, birds and mammals	174
6.5	Summary and conclusions	180
 Chapter 7 MAN AND THE POLAR REGIONS		181
7.1	Introduction	181
7.2	Man and cold	181
7.3	Arctic man	185
7.4	Man in the Antarctic	189
7.5	Polar conservation	191
7.6	Summary	197
 REFERENCES		198
 INDEX		215