

# Contents

Preface and Acknowledgments	ix
Introduction	1
1. The Water Environment	6
The Hydrologic Cycle	7
Natural Conditions That Influence Water Quality	9
<i>Geology</i>	9
<i>Climate</i>	10
<i>Vegetation</i>	10
<i>Morphology</i>	11
<i>Location</i>	12
Human Activities That Affect Water Quality	12
<i>Rivers and Streams</i>	13
<i>Lakes and Ponds</i>	13
<i>Wetlands</i>	15
<i>Bays and Estuaries</i>	16
<i>Oceans and Seas</i>	18
<i>Groundwater</i>	19
<i>Atmospheric Water</i>	20
Summary	21
Additional Reading	22
2. Water Chemistry and Microbiology	23
The Water Molecule	25
Dissolved Oxygen and Temperature	26
pH	30
Organic Substances	31
Inorganic Substances	34
Solids	35
<i>Nutrients</i>	37
Toxics	40
Microorganisms	42
Summary	44
Additional Reading	44

3. Sources of Water Pollution	46
Stormwater Runoff	47
Domestic Discharges	48
<i>Septic Systems</i>	49
<i>Sewage Treatment Plants</i>	49
Industrial Discharges	52
Accidental Spills	53
Water Control Structures	55
Summary	57
Additional Reading	57
4. Preventing Water Pollution	59
Prevention	61
Natural Water Pollution Control Processes	63
Stormwater Treatment	66
Domestic Treatment	70
<i>Septic Systems</i>	70
<i>Sewage Treatment Plants</i>	71
Industrial Treatment	75
Spill Prevention and Cleanup	77
Summary	79
Additional Reading	80
5. Water Quality Regulations	81
Federal Regulations	82
<i>Clean Water Act</i>	82
<i>Safe Drinking Water Act</i>	85
<i>National Environmental Policy Act</i>	88
<i>Endangered Species Act</i>	90
<i>Hazardous Waste Regulations</i>	91
State Regulations	93
<i>National Pollutant Discharge Elimination System</i>	93
<i>Water Quality Standards</i>	95
<i>Water Quality Certification</i>	98
<i>Wetlands Protection</i>	99
<i>State Environmental Policy Act</i>	101
Local Regulations	101
<i>Construction Related Ordinances</i>	102
<i>Special District Ordinances</i>	103
Summary	104
Additional Reading	104

6. The Watershed Approach	106
Watershed Characteristics	110
Activities Affecting Water Quality	111
Alternatives for Addressing Concerns	112
Monitoring the Watershed	114
Summary	116
Additional Reading	116
7. Drinking Water	118
Drinking Water Sources	119
Drinking Water Treatment	120
Drinking Water Concerns	123
<i>Watershed Disturbances</i>	123
<i>Groundwater Contamination</i>	125
<i>Microbial Contamination</i>	126
<i>Chlorinated Organics</i>	127
<i>Copper and Lead</i>	128
Drinking Water Standards	129
Summary	132
Additional reading	132
8. Getting Personal about Clean Water	134
Water Quality at Home	135
<i>Use Environmentally Friendly Cleaning Products</i>	135
<i>Use Household Water Wisely</i>	136
<i>Use Household Energy Wisely</i>	138
<i>Compost Your Lawn Clippings, Yard Debris,</i> <i>and Food Wastes</i>	139
<i>Recycle and reuse Household Goods instead of Throwing</i> <i>Them in the Trash</i>	140
<i>Follow Good Car Maintenance Practices</i>	142
<i>Use Your Automobile Less and Use It More Selectively</i>	142
<i>Be Mindful of Your Use of Pesticides, Herbicides,</i> <i>and Fertilizers in Home Landscaping</i>	143
<i>Educate and Involve Your Children, and Set a Good Example</i>	144
<i>Be Mindful of Runoff from Your Property</i>	145
Public Involvement	145
Environmental Organizations	148
Internet Resources	149
Summary	154
Additional Reading	155
Glossary	156
Index	176