

CONTENTS

Preface / xi

PART I: INTRODUCTION

1: Wetlands and Wetland Science / 3

Human History and Wetlands / 4

Wetland Science and Wetland Scientists / 10

Wetland Managers and Wetland Management / 13

Summary / 13

2: Definitions of Wetlands / 15

Distinguishing Features of Wetlands / 15

The Problem of Wetland Definition / 16

Formal Definitions / 17

Summary / 20

3: Wetland Types and Wetland Resources of the United States / 21

Wetland Terms and Types / 22

Status of Wetlands in the United States / 32

Some Major Regional Wetlands in the United States / 41

Summary / 51

PART II: THE WETLAND ENVIRONMENT

4: Hydrology of Wetlands / 55

The Importance of Hydrology in Wetlands / 55

The Hydrologic Budget of Wetlands / 58

Specific Effects of Hydrology on Wetlands / 78
Wetland Hydrology Studies / 84
Summary / 87

5: Biogeochemistry of Wetlands / 88

Wetland Soils / 89
Chemical Transformations in Wetland Soils / 93
Chemical Transport into Wetlands / 106
Chemical Mass Balances of Wetlands / 110
Summary / 125

6: Biological Adaptations to the Wetland Environment / 126

Protists / 127
Vascular Plants / 130
Animals / 140
Summary / 145

7: Wetland Ecosystem Development / 147

The Classical Idea of Succession / 148
The Continuum Idea / 153
A Modern Theory of Wetland Succession / 157
Ecosystem-Level Processes and Wetland Development / 159
The Strategy of Wetland Ecosystem Development / 165
Summary / 169

PART III: COASTAL WETLAND ECOSYSTEMS

8: Tidal Salt Marshes / 173

Geographical Extent / 173
Geomorphology / 176
Hydrology / 181
Chemistry / 183
Ecosystem Structure / 189
Ecosystem Function / 193

Ecosystem Models / 203

Summary / 206

9: Tidal Freshwater Marshes / 209

Geographical Extent / 209

Geomorphology and Hydrology / 213

Soil and Water Chemistry / 213

Ecosystem Structure / 215

Ecosystem Function / 222

Ecosystem Models / 227

Summary / 228

10: Mangrove Wetlands / 231

Geographical Extent / 232

Geomorphology and Hydrology / 234

Chemistry / 238

Ecosystem Structure / 240

Ecosystem Function / 246

Ecosystem Models / 255

Summary / 257

PART IV: INLAND WETLAND ECOSYSTEMS

11: Freshwater Marshes / 261

Geographical Extent and Geological Origins / 262

Hydrology / 265

Chemistry / 265

Ecosystem Structure / 268

Ecosystem Function / 274

Ecosystem Models / 284

Summary / 284

12: Northern Peatlands and Bogs / 287

Geographical Extent / 288

Geomorphology and Hydrology / 291

Chemistry / 295
Ecosystem Structure / 299
Ecosystem Function / 305
Ecosystem Models / 314
Summary / 315

13: Southern Deepwater Swamps / 317

Geographical Extent / 319
Geomorphology and Hydrology / 319
Chemistry / 324
Ecosystem Structure / 327
Ecosystem Function / 336
Ecosystem Models / 348
Summary / 350

14: Riparian Wetlands / 353

Bottomland Hardwood Forests / 354
Geographical Extent / 355
Geology and Hydrology / 358
Chemistry / 365
Ecosystem Structure / 370
Ecosystem Function / 378
Ecosystem Models / 387
Summary / 388

PART V: MANAGEMENT OF WETLANDS

15: Values and Valuation of Wetlands / 393

Wetland Values / 393
Quantifying Wetland Values / 406
Summary / 414

16: Wetland Management and Protection / 415

An Early History of Wetland Management / 416
Wetland Alteration / 418
Wetland Management by Objectives / 429
Wetland Creation / 439

Legal Protection of Wetlands in the United States / 440
Summary / 448

17: Classification and Inventory of Wetlands / 450

Goals of Wetland Classification / 450

History of Wetland Classification / 451

Present United States Classification—The National Wetlands
Inventory / 460

Inventorying Wetlands / 469

Summary / 473

References / 475

Index / 517

About the Authors / 539