

Contents

Foreword ix

Preface xi

Acknowledgments xiii

CHAPTER 1 Introduction to Wetlands 1

WHAT ARE WETLANDS? 2

WHY ARE WETLANDS IMPORTANT? 4

TYPES OF WETLANDS 7

Estuaries 7

Rivers, Streams, and Creeks 7

Lakes and Ponds 9

Marshes and Wet Meadows 9

Forested Wetlands 9

Shrub Wetlands 10

Bogs 11

CHAPTER 2 Conservation of Wetlands 13

IDENTIFYING AND PROTECTING NATURAL WETLANDS 14

Wetland Protection 15

INCORPORATING WETLANDS INTO MANAGED AREAS 20

Natural Landscaping 27

IMPORTANCE OF VEGETATION ZONES 29

TRANSITION TO THE TERRESTRIAL ENVIRONMENT 31

CHAPTER 3 Restoring and Creating Wetlands 35

WHAT IS WETLAND RESTORATION? 36

Hydrology 41

Soils 42

Vegetation 42

Additional Suggestions 43

SITE PREPARATION 43

CHOOSING AND OBTAINING APPROPRIATE

WETLAND PLANTS 44

DESIGN CONSIDERATIONS 47

ECOLOGICAL SUCCESSION 47

CONTROLLING EXOTIC SPECIES 53

WILDLIFE CONSIDERATIONS 59

CHAPTER 4 Structure, Biology, Restoration, and Management of Wetlands by Type 61

ESTUARIES 62

Physical Characteristics of Estuaries 62

Plants and Animals of Estuaries 65

Restoration and Management of Estuaries 67

Key Species by Region 69

RIVERS, STREAMS, AND CREEKS 71

Physical Characteristics of Rivers, Streams,
and Creeks 71Plants and Animals of Rivers, Streams, and
Creeks 77Restoration and Management of Rivers, Streams,
and Creeks 79

Key Species by Region 80

LAKES AND PONDS 88

Physical Characteristics of Lakes and Ponds 88

Plants and Animals of Lakes and Ponds 97

Restoration and Management of Lakes and
Ponds 104

Key Species by Region 105

MARSHES AND WET MEADOWS	113
Physical Characteristics of Marshes and Wet Meadows	113
Plants and Animals of Marshes and Wet Meadows	113
Restoration and Management of Marshes and Wet Meadows	118
Key Species by Region	120
FORESTED WETLANDS	126
Physical Characteristics of Forested Wetlands	126
Plants and Animals of Forested Wetlands	128
Restoration and Management of Forested Wetlands	129
Key Species by Region	129
SHRUB WETLANDS	134
Physical Characteristics of Shrub Wetlands	134
Plants and Animals of Shrub Wetlands	135
Restoration and Management of Shrub Wetlands	135
Key Species by Region	135
BOGS	138
Physical Characteristics of Bogs	138
Plants and Animals of Bogs	139
Restoration and Management of Bogs	140
Key Species by Region	140
CHAPTER 5 Golf Courses and Wetlands	145
PAST AND PRESENT ROLES OF WETLANDS ON GOLF COURSES	145
Opportunities for Integrating Wetlands on Golf Courses	146
Wetlands on Existing Golf Courses	147
New Golf Course Developments	149
Golfer and Community Education	151
Environmental Management Planning	151
Self-Assessment Checklist for Managing Wetlands on Golf Courses	153

APPENDIX **A** Common and Scientific Names of Organisms 159

APPENDIX **B** Wetland Resources 169

APPENDIX **C** Wetland Regulatory Issues 175

Glossary 183

Bibliography and References 187

About the Authors 193

Index 195