

# Contents

---

Preface to the second edition *page* [ix]

Preface to the first edition [xiii]

Acknowledgments [xvii]

## 1 Wetlands: an overview [1]

1.1 Definitions and distribution [2]

1.2 Wetland classification [4]

1.3 Wetland soils [15]

1.4 Flood tolerance: the primary constraint [18]

1.5 Secondary constraints produce different types of wetlands [22]

1.6 Wetlands provide valuable functions and services [28]

1.7 Causal factors in wetland ecology [30]

1.8 More on definitions and classification of wetlands [34]

Conclusion [38]

## 2 Flooding [43]

2.1 Flooding and humans: an old story [46]

2.2 Some biological consequences of flooding [48]

2.3 A survey of water level fluctuations [54]

2.4 General relationships between wetlands and water level fluctuations [67]

2.5 Reservoirs, dams, and floodplains [68]

2.6 Predicting consequences for wetlands [74]

Conclusion [77]

## 3 Fertility [79]

3.1 Fertility and plants [80]

3.2 Infertile wetlands are constrained by low nutrient levels [84]

3.3 Other issues related to fertility [88]

3.4 Animals and fertility [94]

3.5 Eutrophication: too much of a good thing [96]

3.6 Calcium interacts with fertility in peatlands [104]

3.7 Fertility and hydrology explain a great deal about wetlands [106]

Conclusion [107]

## 4 Disturbance [109]

- 4.1 Disturbance has four properties [111]
- 4.2 Disturbance triggers regeneration from buried propagules [112]
- 4.3 Examples of disturbance controlling the composition of wetlands [113]
- 4.4 Disturbances can create gap dynamics [130]
- 4.5 Measuring the effects of disturbance in future studies [133]
- Conclusion [136]

## 5 Competition [139]

- 5.1 Some examples of competition in wetlands [141]
- 5.2 Competition is often one-sided [145]
- 5.3 Competition for light produces competitive hierarchies [146]
- 5.4 Dominant plants are often larger than subordinate plants [148]
- 5.5 Escape in space: competition in patches [148]
- 5.6 Escape in time: competition and disturbance [149]
- 5.7 Gradients provide another way of escaping in space [150]
- 5.8 Competition gradients produce centrifugal organization [153]
- 5.9 Rare animals are found in peripheral habitats: the case history of the bog turtle [156]
- Conclusion [158]

## 6 Herbivory [161]

- 6.1 Some herbivores have large impacts on wetlands [162]
- 6.2 Wildlife diets document which animals eat which plants [166]
- 6.3 Impacts of some other herbivores on wetlands [168]
- 6.4 Plants have defenses to protect them against herbivores [174]
- 6.5 General patterns in herbivory [179]
- 6.6 Three pieces of relevant theory [181]
- Conclusion [186]

## 7 Burial [189]

- 7.1 Exploring rates of burial [192]
- 7.2 Burial changes the species composition of wetlands [201]
- 7.3 Burial has impacts on many animal species [205]
- 7.4 Sedimentation, sediment cores, and plant succession [206]

7.5 Ecological thresholds: burial, coastlines, and sea level [207]

7.6 So is sediment bad or good? [210]

Conclusion [211]

## 8 Other factors [213]

8.1 Salinity [214]

8.2 Roads [222]

8.3 Logs and coarse woody debris [225]

8.4 Stream type [227]

8.5 Human population density is becoming a key factor [229]

Conclusion [233]

## 9 Diversity [235]

9.1 Introduction to diversity in wetlands [236]

9.2 Four general rules govern the number of species in wetlands [238]

9.3 Selected examples [242]

9.4 Some theory: a general model for herbaceous plant communities [255]

9.5 More theory: the dynamics of species pools [261]

9.6 Conservation of biological diversity [264]

Conclusion [265]

## 10 Zonation: shorelines as a prism [269]

10.1 The search for fundamental principles [270]

10.2 Shorelines provide a model system for the study of wetlands [271]

10.3 Possible mechanisms of zonation [273]

10.4 Zonation and changing sea level [286]

10.5 Statistical studies of zonation [289]

10.6 General lessons from analysis of zonation [298]

Conclusion [299]

## 11 Services and functions [301]

11.1 Wetlands have high production [302]

11.2 Wetlands regulate climate [306]

11.3 Wetlands regulate the global nitrogen cycle [310]

11.4 Wetlands support biological diversity [314]

11.5 Wetlands provide recreation and cultural services [317]

11.6 Wetlands reduce flood peaks [319]

- 11.7 Wetlands record history [323]
- 11.8 Adding up the services: WWF and MEA evaluate wetland services [325]
- Conclusion [328]

## 12 Research: paths forward [331]

- 12.1 Some context: the great age of explorers [332]
- 12.2 Four basic types of information [334]
- 12.3 Limitations to species-based research [337]
- 12.4 Empirical ecology [338]
- 12.5 Assembly rules driven by key factors [341]
- 12.6 Simplification through aggregation into groups [347]
- 12.7 Six tactical guidelines [360]
- Conclusion [363]

## 13 Restoration [365]

- 13.1 The importance of understanding wetland restoration [366]
- 13.2 Three examples [367]
- 13.3 More on principles of restoration [373]
- 13.4 More examples [377]
- 13.5 One big problem: invasive species [383]
- 13.6 A brief history of restoration [385]
- Conclusion [387]

## 14 Conservation and management [391]

- 14.1 Humans have greatly changed wetlands [392]
- 14.2 Wetlands have changed with time [397]
- 14.3 Two views on conservation objectives [400]
- 14.4 Protection: creating reserve systems [403]
- 14.5 Problems and prospects of reserve systems [411]
- 14.6 More on restoration [415]
- 14.7 So what shall we create with restoration? [416]
- 14.8 Indicators: setting goals and measuring performance [417]
- 14.9 Humans as the biggest problem [424]
- Conclusion [425]

References [427]

Index [476]

The color plates are situated between pages 238 and 239