want to stay on top of the rapidly evolving field of ecological modeling.

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Wetlands, Third Edition


This is the latest edition of one of the only comprehensive texts on wetlands available. The authors are well-known wetland ecologists who have made a serious attempt to include soils information. The two earlier editions are well known to wetland professionals and others interested in wetlands. This edition includes approximately 1800 citations, with 700 of them not found in the second (1985) edition. The latest references are for the year 2000. The glossary is comprehensive and defines more than 280 terms. Definitions for organic soil, redoximorphic features, bulk density, and sapric, hemic, and fibric materials, as well as other common soil terms, have been included in the glossary. Three appendices have been included that list useful books (both scientific and popular), web sites, and conversion factors for computations. New figures have been added and unlike earlier editions, virtually all figures have been drawn in a consistent style using similar fonts, and all are clear and easy to read. The level of coverage should appeal to advanced undergraduates and graduate students, particularly from the biological sciences. The pace of the discussion is quick because in many places facts are presented rather than concepts explained. The ample references allow readers to find additional material to enhance the discussion.

Like the second edition this book is organized into five parts: “Introduction,” “The Wetland Environment,” “Coastal Wetland Ecosystems,” “Inland Wetland Ecosystems,” and “Management of Wetlands.” This edition has 21 chapters compared with the 18 chapters found in the second edition. A separate chapter is now devoted to North American wetlands, and the second edition’s chapter on wetland management has been split into two chapters entitled “Human Impacts and Management of Wetlands” and “Wetland Laws and Protection.” In addition, a new chapter, “Treatment Wetlands,” has been added. The titles of remaining chapters are similar to those of the second edition. All chapters have been updated and many expanded in this edition. In the Preface the authors list an additional 32 major changes that were made for this edition. The chapter on hydrology has been expanded, new nomenclature of hydric soils has been introduced, the hydrogeomorphic classification system (HGM) is discussed, case studies on wetland creation and restoration are included, use of wetlands for wastewater treatment are discussed in detail, and a new section has been added on wetland delineation.

Part 1 defines wetlands and discusses wetlands around the world. Part 2 includes chapters on hydrology and chemistry, which are of particular interest to soil scientists. The hydrology chapter of earlier editions was unique in that it stressed water budgets. This edition has kept that emphasis but has expanded the discussion of the components of the water budget, such as precipitation, evapotranspiration, and surface and subsurface inflows and outflows, and added important equations to enhance the discussion of these components. Inundated wetlands are of interest to the authors and there are numerous examples of hydroperiods of flooded soils while virtually no examples are shown of soils affected by high ground water. Approximately one page is devoted to monitoring techniques. Piezometers are mentioned but no examples of piezometer data or ground water flow are given. On the other hand, one entire page is taken up with photographs of a beaver and an alligator. This strikes me as a missed opportunity to explain the uses of piezometers and wells for assessing wetland hydrology, because while most students can imagine what a beaver or alligator looks like, few have an understanding of the differences between wells and piezometers.

The chapter on biogeochemistry has been expanded and improved over that in the second edition. This is the chapter where soil characteristics are discussed, such as redoximorphic features, soil color, and the differences between organic soils and mineral soils in wetlands. The major oxidation-reduction reactions are reviewed, and the cycles of N, S, and C in wetlands are discussed and illustrated in clear figures. Nearly 12 pages have been devoted to chemical mass balances in wetlands. This section explains chemical inflow and outflows in wetlands as well as transformations. While the section is packed with data, the authors have done a good job of explaining the central ideas rather than reviewing the literature. The chapter could be improved by expanding on the role of microbes in creating anaerobic conditions, and including a discussion of how anaerobic conditions, which lead to fish kills, develop in lakes and streams.

Parts 3 and 4 contain chapters on specific wetland types and I found these to be comprehensive, clear, and well illustrated. The authors give balanced discussions that include geographic distribution, geomorphology, hydrology, and water chemistry, as well as the vegetation of marshes, swamps, peatland, and riverine wetlands, among others. The most obvious improvement in these chapters over their counterparts in the second edition is the inclusion of excellent redrawn figures. More data are also included and the discussion expanded to areas other than biology.

Part 5 (“Management of Wetlands”) seems to have changed the most from the second edition. The chapter on wetland laws gives a good, organized overview of the major wetland rules. Table 18-1 is valuable for listing the 31 major national laws or rules used for wetland enforcement. This can be a confusing topic but the authors have done an excellent job of putting the major issues in perspective. The chapter on wetland restoration was general. It reviews four case studies and lists restoration principles, but does not really illustrate any details about the topic, and is not anything close to a “how to” manual for building wetlands. This shortcoming is overcome in the next chapter on treatment wetlands. Here the authors give a heavy dose of design criteria that includes estimates of loading rates and a discussion of costs. The chapter shows that the design and construction of treatment wetlands has reached a high level.

The final chapter—"Wetland Classification, Inventory, and Delineation"—reviews the major scientific classification systems and the National Wetlands Inventory. The hydrogeomorphic classification system (HGM) is illustrated briefly in this chapter, and was also discussed earlier in the chapter on wetland values. In both cases the HGM discussion is so brief that the readers will have to consult the cited references for a complete understanding. It may have been better to discuss the HGM system in the chapter on wetland values, and expand the discussion to include examples of equations for simple functions. The delineation section focuses primarily on the procedures required by the 1987 Corps of Engineers Wetlands Delineation Manual. Hydric soil field indicators as found in the manual are mentioned but not discussed. There is no mention at all of the USDA Hydric Soil Field Indicators of...