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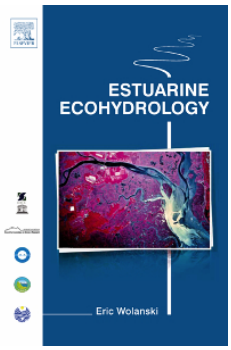

Estuarine Ecohydrology, by Eric Wolanski, 2007. Elsevier Science & Technology, P.O. Box 211, 1000 AE Amsterdam, The Netherlands. Hardback, 157 pages. Price EUR 74.95; USD 71.96; GBP 51.99. ISBN 978-0-444-53066-0.

Not many authors close the gap between the abiotic world of hydraulics and sediment-transport mechanisms on the one hand and that of ecology and biology on the other. Wolanski manages to clearly introduce the reader to estuarine hydraulics, sediment dynamics, and ecology, as well as to their interrelations and the human influence on estuarine sediment dynamics and ecology. His aim to provide clear, specialist knowledge to enable an interaction between aquatic, marine and wetlands biologists, geologists, geomorphologists, chemists, modellers and ecologists has definitely been achieved.

In his latest book, he brings ecohydrology forward as the principle to guide the management of entire river basins (from headwaters to the coastal zone) as a means to cope with increasing environmental degradation of estuaries. Ecohydrology is more than integrated river- basin management because it uses the natural capacity of the physical system to absorb or process excess nutrients and pollutants resulting from human activities. Restoration of estuaries using ecohydrology requires a thorough understanding of the estuary as an ecosystem. This book describes the principal components of ecohydrology, being the fluvial and estuarine waters, sediment transport and deposition, transport of nutrients, wetlands, the aquatic food web, and the modeling thereof. Each of these components is explained in a separate chapter.

The estuarine hydrology is strongly focused on the transport of pollutants, and therefore the scope is on residence time, mixing and stratification, and flushing. The chapter on estuarine sediment dynamics is the most extensive chapter of the book, and ranges from large-scale (geological time scale) estuarine infilling, to fine-sediment transport processes. Of specific interest in the chapter, giving it added value over existing textbooks and overview papers, is the integration of sediment dynamics with ecology and the effect of human interventions (mainly dam building) on large-scale morphology and ecology. The focus in the chapter on tidal wetlands is more strongly on ecology (primary production, nutrient fluxes, biology, fish productivity) than on the hydraulics, although wetland hydrodynamics and wave attenuation (and the modeling thereof) are also clearly introduced.

It is noteworthy that the attention given to salt marshes (temperate regions) and mangrove systems (tropics) is evenly balanced. The chapter on estuarine food webs deals with the role of physics (stratification/mixing, turbidity, ground water flow) on biology (primary production, photosynthesis, plankton growth and algal blooms, seagrass and coral reefs). Also human influences on ecosystem health (resulting in eutrophycation, hypoxia, harmful algal blooms) are discussed.

In the modeling chapter, Wolanski distinguishes between engineering models and ecosystem models developed in the scientific community. The engineering models capture the hydrodynamics and sediment dynamics in great detail and with much accuracy. However, they

subsequently oversimplify the ecology and lag scientific developments, and are therefore useless for ecosystem modeling. Scientists, on the other hand, develop very extensive ecosystems relationships, which are very unpractical, however, because they require parameters that are unavailable for most ecosystems. Also, they oversimplify the hydrology. Nevertheless, this approach is advocated by Wolanski and therefore is presented in much greater detail than the engineering models. He proposes an estuarine ecohydrology model which is based on relatively simple formulations, and reasonably reproduces the along-estuary variation in nutrients, plankton and fish biomass, and the onset of toxic algae blooms. Also the complexity of the model can be easily increased when more information at a specific site is available.

As the optimum compromise, ecohydrology is proposed as the best-practice management to achieve sustainable development. Environmental degradation can only be remedied by restoring some of the working of the ecosystem, and by helping the partially restored system to improve itself naturally. This is underlined with a number of examples that show that habitat restoration fails if the underlying factors are not addressed. All environmental developments must be required to consider the environmental impact on the estuary, coastal waters and produce a cost/benefit analysis in which all of this is taken into account.

The strength of the book is that it makes specialist knowledge ranging from biology to geology to modeling accessible to scientists from any of these fields, but also to managers, engineers and the general public. This is due to the broad and in-depth knowledge of the author, a clear writing style, and a large number of functional illustrations and photographs. It is clear that not all of these processes can be captured in detail in a book of only 157 pages, and therefore it is the integration and the broad scope that gives the book its value.

So, are there any negative thinks about the book? Yes, although they are minor. The first chapters are excellent overviews of estuarine ecosystem functioning. However, the modeling part is somewhat biased because the author focuses too strongly on one (his own) ecosystem model. Other ecosystem models, and especially engineering models, are given insufficient credit in this book. It is true that comparatively simple ecosystem models may be more suitable to model large-scale ecosystem functioning but, for prediction of e.g. algal blooms or nutrient transport, engineering models are probably a better choice than ecosystem models. An additional point of criticism is the visualization of model results. All figures are in black and white, and most of the figures and photos are sufficiently clear. Unfortunately, several figures with colorbar have clearly been constructed in color, but are printed in black and white, making their interpretation difficult.

Overall, I have enjoyed reading the book very much. Because of its broad scope, the book is most suitable for bachelor as well as M.Sc. students and engineers. But also the scientific community will benefit from the book because scientists tend to specialize in either ecology and biology, or hydraulics and morphology.

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