

## **Natural Wastewater Treatment Systems**

By Ronald W. Crites, E. Joe Middlebrooks, and Sherwood C. Reed. CRC Press, \$170.

Reviewed by **Joan Gable, Ph.D.** – WASS Gerke and Associates Inc.

The preface to *Natural Wastewater Treatment Systems* states, "This book is intended for the practicing engineers and scientists who are involved in the planning, design, construction, evaluation, and operation of wastewater management facilities." The book certainly meets its objective: practicing engineers and scientists will benefit from the concise information presented in these 552 pages. The introductory chapter provides a substantial overview of various natural wastewater treatment systems for both liquid and solid wastes. It is followed in the second chapter by a methodical approach to assessing the feasibility of such systems, planning for their implementation, and evaluating site conditions.

Remaining chapters cover such topics as: basic process responses and interactions (fundamental relationships, and geophysical and biochemical processes); design and modification of wastewater pond systems; free water surface constructed wetlands; subsurface- and vertical-flow constructed wetlands; land treatment systems; sludge management and treatment; and on-site systems. The lists of cited literature alone provide a valuable directory of knowledge for each topic.

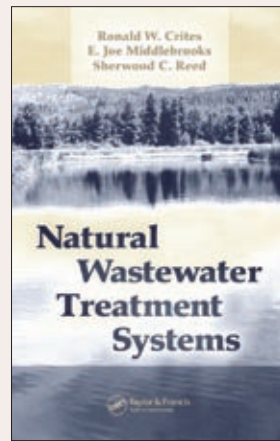
The theories and principles for each process are so thoroughly presented that professors who contemplate offering a graduate course on natural treatment systems would do well to use this book as a course text.

*Natural Wastewater Treatment Systems* effectively incorporates the theories and processes of several core civil engineering disciplines into a single text. It was refreshing to read a book that includes

not only the long-studied principles of natural treatment systems, but also lesser-known topics and timely concerns that are easily overlooked without an extensive literature search. Long-studied principles include groundwater hydrology, treatment pond design, and modifications. Some lesser-known topics that are detailed, such as vertical flow wetlands and soil aquifer treatment, have been practiced for decades in Europe and other regions. The fate of emerging contaminants such as personal care products and endocrine disruptors are also discussed where they are applicable to system type.

Although one could take issue with some of the specifications presented as design criteria, the text clearly presents the fundamental principles that are crucial to understanding natural treatment processes. The authors stress that individual site constraints and characteristics will dictate appropriate design.

The authors' extensive experience is evident in these pages, and years of data



are provided. Unique case studies are also presented, such as the use of subsurface wetlands to treat airport de-icing fluids in stormwater runoff. Numerous tables and graphs allow the reader to quickly comprehend the processes and topics covered. Relevant example calculations are clearly presented.

This book provides a comprehensive overview of

the various types of natural wastewater treatment systems and applications. The focus is on wastewater management processes that provide passive treatment in natural sustainable systems with minimal mechanical and operating requirements. For engineers, scientists, operators, professors, and students who are interested or involved in natural wastewater treatment systems and do not own the earlier editions, *Natural Systems for Waste Management and Treatment* (1988 and 1995), this new edition will be especially valuable.

Visit CRC Press at [www.crcpress.com](http://www.crcpress.com). Contact Joan Gable at [joan@wetlandsbywass.com](mailto:joan@wetlandsbywass.com).



*Sediment chemistry of the Colorado River delta of Lake Powell, Utah, 2001*, by R.J. Hart, H.E. Taylor, R.C. Antweiler, D.D. Graham, G.G. Fisk, S.G. Riggins, and M.E. Flynn.

<http://pubs.usgs.gov/of/2005/1178/>

*Hydrologic conditions in Arizona during 1999-2004: a historical perspective*, by J.V. Phillips and B.E. Thomas.

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*An assessment of optical properties of dissolved organic material as quantitative source indicators in the Santa Ana River Basin, southern California*, by B.A. Bergamaschi, Erica Kalve, Larry Guenther, G.O. Mendez, and Kenneth Belitz.

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