models in general—the concepts used, their application, and parameter estimation. The second part contains case studies in which models are applied to specific situations. There are several appendices containing data useful for estimating the environmental properties and fate indices of a wide variety of chemicals.

S.E. Jorgensen, the editor, is author of 10 of the 15 chapters and compiled all of the appendices. Most of the remaining authors, the references and case studies are of European origin, and probably reflect current thinking in ecotoxicological modeling in Europe.

For soil scientists and agronomists, the book expands our horizons from that of the soil to the wider ecosystem, demonstrating the assumptions and approximations that need to be made in assessing the impact of toxic materials in larger physical and biological systems. There is a wealth of information concerning the estimation of environmental fate parameters from physical and chemical properties and chemical structure. Procedures are described for parameters required in soil transport and fate models, such as Henry’s Law constants, solubility and partition coefficients, adsorption isotherms, and rates of hydrolysis, photodegradation, and biodegradation. All of these methods are included in ECOTOX, a software package available from the ISEM in Denmark at a cost of $298 (US). Examples of its use are described in a separate chapter. A feature of ECOTOX is that, depending on the data already available, several different pathways may be followed in arriving at estimates of an unknown property. The program presents the results of all these as well as the average value.

The case studies include several concerning the sorption and release of heavy metals and organic compounds in lake and marine sediments and their entry into the food chain, the contamination of agricultural products by atmospheric and soil-borne Cd and Pb, the exchange of sulfur dioxide between plant and atmosphere, and its transport in the atmosphere on a local scale. Unfortunately, the source and availability of the models used in these application is not mentioned. A brief overview of pesticide transport in soils contains little concerning modeling; it consists largely of a discussion of measured pesticide movement in relation to soil and pesticide properties.

Editorially, the volume shows signs of hasty production and poor reviewing and proofreading. Several figures were reproduced from handrawn sketches. The standard of English expression is frequently poor and there are many typographical errors. Nevertheless, the book contains an informative collection of techniques and application and should be a useful reference for all scientists working on the fate and impact of chemicals in the environment.—JOHN L. HUTSON, Department of Soil, Crop, and Atmospheric Sciences, Cornell University, Ithaca, New York, NY 14853.

Natural Resource Management of Water and Land


The effective management of water and land resources is a broad topic that spans many scientific disciplines. This topic is of particular recent concern because of emerging issues in areas such as global climate change, water quality, cumulative effects of management activities on natural resources, ecosystem approaches to watershed management, and biodiversity. Unlike the title suggests, this book presents a series of poorly integrated chapters that are focused on very narrow resource issues or on specific amelioration practices. Much of the material is rather dated. About half of the chapters were previously published in one of two aquatic plant journals (from 1976 to 1988) and many of the other chapters read as if they were abstracted from U.S. Army Corps of Engineers manuals.

The first part of the book contains seven short chapters and is entitled “Problem Identification.” The scope of individual chapters is highly variable. For example, Chapter 1 provides a brief overview of western water law (despite its title “Water and Land Use in North American Arid Lands”); Chapter 2 emphasizes the effects of groundwater pumping for irrigation on drawdown in the Ogallala Aquifer in the midwest; and Chapter 7 discusses the use of introduced fish species to control aquatic weeds in managed waterways and impoundments. Chapter 4 examines fish and wildlife resources from a narrower perspective. Interactions of stream channels and riparian vegetation are not discussed, nor is there any mention of harmful effects of fine sediment or depleted oxygen levels on aquatic organisms. “Instream flow” is discussed only in relation to short-term effects on fish population (i.e., minimum flow requirements) and not with regard to peak flows required to maintain channel form and quality of substrate. Interesting examples are presented for reservoir management. Chapter 5 presents an overview of remote sensing developments and their application to natural resource issues, especially water development projects.

The remainder of the book (Chapters 8 through 17) focuses exclusively on the distribution, control, and harmful effects of aquatic plants. These chapters are typified by case studies that briefly describe results of control strategies for aquatic weeds as well as taxonomy and distribution of different species. Emphasis is on direct control, either with herbicides or insects, with almost no attention to the possible contributing effects from nearby land uses. Chapter 10 outlines relationships between land use and macrophyte abundance, but the treatment is rather superficial.

The focus on aquatic weed control in managed waterways and impoundments reflects the background of the editor. Certainly this is an important issue in such managed systems, but it in no way represents the more wholistic concept of natural resource management, which is implied in the title. Because the editor authored more than half of the chapters and because the book is inconsistent in scope and poorly integrated, this reviewer believes that it may represent merely a collection of reports and previously published papers. Although various chapters may be of use to biologists and managers interested in the control of aquatic weeds, the book is not recommended for natural resource managers—a claim stated by the publisher.—ROY C. SIDLE, Forestry and Forest Products Research Institute, P.O. Box 16, Tsukuba Norin Kenkyu, Danchi-Nai, Ibaraki, 305 Japan.

Out of the Earth: Civilization and the Life of the Soil


Daniel Hillel has written a fine book about the history of soil and water use and the impact this has had on civilization. The book has basically four sections: the nature of soil and water, the lessons of the past, the problems of the present, and lastly a global accounting of current environmental problems.

The author has drawn on a long career in conservation to provide us with this informative book. He starts with the hunter-gatherers and progresses through the early civilizations of the Near-East, Mediterranean, Indus Valley, Mesoamerica, China, etc. The mismanagement of soil and water