BOOK REVIEW

Introduction To Water Resources and Environmental Issues

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Cambridge University Press; 2010; x + 457 pp.; ISBN 978-0-521-86988-1; $67.

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Water is an essential life-sustaining resource whose existence and availability for human use are often taken for granted. It is often utilized by people who are unaware of where the water originated and what happens to the water following use. Beyond meeting direct human use, water enables all living species to survive and flourish and is a renewable natural resource. The authors' preface frames the context for this book; namely, it is to make the subject of water, water resources, and water's interactions in the environment understandable, approachable, and relevant to a wide range of students.

To this end, the authors present 14 chapters that provide the reader with valuable knowledge and insight into the many dimensions of this precious and valuable resource. Each chapter begins with an introduction to the topic, followed by more in-depth material for the reader to absorb and understand. The text is supplemented by excellent photographs, relevant tables, and appropriate graphics that combine to illustrate the specific water resource and its related environmental issues. Questions that build upon the information presented are blended into the text, which encourages the reader to reflect upon the subject matter throughout each chapter. At the end of each chapter the authors provide a series of bulleted points drawn from the chapter materials, a list of questions for analysis, suggested additional readings, and a list of cited references. The careful organization of each chapter coupled with the comprehensive range of the material presented make this book an outstanding introductory water resources text for students at all levels as well as for individuals in government, industry, and nongovernmental organizations who have responsibility for water issues.

The chapter titles are as follows: Perspectives on water and environmental issues; The water environment of early civilization; The hydrologic cycle; Water quality; Watershed basics; Groundwater; Lakes and ponds; Rivers and streams; Wetlands; Dams and reservoirs; Drinking water and wastewater treatment; Water allocation law; Roles of federal, regional, state, and local water management agencies; and the concluding chapter, Water conflicts, solutions, and our future. It is not feasible to consider each of these chapters in this review. Two chapters are briefly discussed to illustrate the range and scope of the information presented to the reader.

The hydrologic cycle chapter includes clear and concise explanations, graphs, process diagrams, and photographs. An understanding of the hydrologic cycle is fundamental knowledge essential to grasping the complexities embedded in the water-environment interfaces. The distinction between weather and climate is presented along with natural dynamic forces, including a change in atmospheric circulation and the subsequent global weather impacts of El Niño, a warm phase, and La Niña, a cool phase. The chapter explains the pathways followed by precipitation on land surfaces: evaporation and transpiration, infiltration into the soil, and groundwater and surface water runoff. Precipitation on areas of urban development falls where human intervention has disrupted the natural pathways, creating impervious areas that limit infiltration into the ground as well as increasing the volume and intensity of storm water runoff that may result in flooding and potential loss of life.

The drinking water and wastewater treatment chapter presents the history of methods used to filter drinking water to improve its taste and palatability without the benefit of the science needed to protect the individuals consuming the water from waterborne illnesses. The chapter reviews the research conducted in the nineteenth century that advanced understanding of the causes and transmission of waterborne illnesses including cholera. In the 1800s, sand filtration to remove waterborne contaminants from drinking water began to be implemented in Europe, England, Scotland, and the United States. The first application of chlorine to prevent cholera took place in England in the 1850s. Chlorine today is used worldwide for disinfection of drinking water, although ozone treatment has now supplanted its use in the more developed countries. This chapter addresses additional drinking water contaminants that need to be removed to protect the public, including biological contaminants, inorganic chemicals, fertilizers, organic chemicals, and radioactive elements. In less developed countries, more than 1 billion people do not have access to safe drinking water. This leads to the death of nearly 2 million children each year (about 5000 children each day) from waterborne illnesses. Contributing to this childhood mortality are the inadequate sanitation facilities worldwide for more than 2.6 billion people.

The authors' core goal for this book is to emphasize the need not just to learn facts but also to recognize interactions and consequences and to analyze what the results might be in a variety of circumstances. In this reviewer's opinion, the authors have provided a solid foundation for the reader to be able to achieve this goal and subsequently apply the information presented to a variety of current and future water resources and environmental issues.

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