



## Water Resources: Science and Society

reviewed by Samuel C. Zipper

*Water Resources: Science and Society* (Hornberger and Perrone 2019) is a concise but comprehensive exploration of water science fundamentals as well as interlinkages between water management and social, ecological, and economic topics. The text goes beyond standard water resource management concepts to include topics such as life cycle assessment, food production systems, and the United Nations Sustainable Development Goals, always focusing on how these topics relate back to water.

The book is organized into four sections and 13 total chapters. The first section, “Water Availability: A Physical Science Primer,” provides the fundamental hydrological knowledge that underpins the subsequent chapters such as an introduction to the water cycle and its various stores and fluxes. The second section, “Demand-Side Sectors,” dives into the water needs and impacts of the agricultural, energy, domestic, and environmental sectors. The third section, “Anthropogenic Drivers of Change,” focuses explicitly on past and future global change drivers such as population and climate change, as well as an overview of water law. While the majority of the book focuses on water quantity concerns, there is also a chapter specifically addressing water quality issues in this section. The fourth section, “Water Resources Supply and Demand in Context,” is a brief synthesis of key messages from the previous sections and discussion of how to balance these competing demands.

Each chapter covers a specific topic, often intermixing physical and socioeconomic concepts to highlight the need for interdisciplinary understanding. The text is well balanced by frequent plots, boxes, and practice problems throughout each chapter, as well as a summary of key points and example problems at the end of each chapter. There are also helpful quick reference features, such as an appendix focusing on units and conversions, and a glossary for key terms used throughout the text. Despite the thoroughness of the text, the authors inject some good-natured levity throughout the book, which makes it an enjoyable read, such as illustrating trade-off frontiers by plotting potential expenditures on bread and butter.

The book covers many topics which are currently areas of active research and therefore have considerable uncertainty. In these contexts, Hornberger and Perrone present the limits of current knowledge and do an admirable job presenting alternative or completing theories. For example, five alternate viewpoints are presented on the relationship between population growth, resource requirements, and impacts on water resources. The authors also are mostly successful in presenting an international perspective. Given the variety of global legal systems, the water law section reasonably chooses to focus primarily on the United States with some discussion of other countries. Throughout the rest of the book, case studies are distributed around the world, and give a sense of the global magnitude and variability of water challenges.

Dr. Hornberger’s prior textbook, *Elements of Physical Hydrology* (Hornberger et al. 2014), is a staple in introductory hydrology courses. In contrast, Hornberger and Perrone’s *Water Resources: Science and Society* takes a broader lens to examine the interconnections between the water cycle and socioeconomic considerations. As such, it could fill multiple niches in a university setting, from providing the fundamentals of water resources in an introductory course intended for nonmajors, to the foundation of an upper-level course for students with strong quantitative understanding looking to better connect their quantitative expertise to societal challenges, and many courses in-between. Given the important role that water managers play in our globalized society, this text will be a valuable resource in training the well-rounded water managers needed to prepare for an uncertain future.

### References

- Hornberger, G.M., and D. Perrone. 2019. *Water Resources: Science and Society*. Baltimore, Maryland: Johns Hopkins University Press.
- Hornberger, G.M., P.L. Wiberg, J.P. Raffensperger, and P. D’Odorico. 2014. *Elements of Physical Hydrology*, 2nd ed. Baltimore, Maryland: Johns Hopkins University Press.