IN PRINT

Groundwater Recharge in a Desert Environment: the Southwestern United States

edited by **James F. Hogan**, **Fred M. Phillips**, and **Bridget R. Scanlon**, Washington, D.C., American Geophysical Union, $90 ($63 to AGU members)

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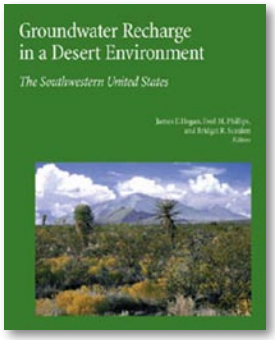

This American Geophysical Union Water and Science Application monograph is a remarkable compendium of useful information on a key area that is currently lacking in the scientific literature: recharge of groundwater in arid and semiarid environments. As noted in this highly technical work, current and projected population growth and increasing demands on water supply make improved conceptualization and quantification of recharge processes critically important for sustainable management of groundwater resources and the natural environment. More than 40 authors from academia and government contributed.

The book is divided into four sections: an introduction and overview; recharge mechanisms and processes; case studies at the basin scale; and a final synthesis. The first section provides a conceptual framework for basin scale recharge, a historical perspective on the science and understanding of recharge, and future directions for improving understanding of recharge in semiarid and arid environments. The section on recharge mechanisms and processes covers individual mechanisms and processes that can occur within a basin, including recharge through the basin floor, recharge beneath ephemeral channels, mountain front recharge, and mountain block recharge. The third section describes basin-scale case studies involving modeling and the use of isotopic tracers to identify recharge processes, and emphasizes the importance of distinguishing recharge mechanisms in developing a groundwater balance. The final synthesis section is a higher-level examination of basin-scale recharge analytical tools, and covers methods for estimating basin-scale recharge, distributed-dynamic modeling for estimating recharge and partitioning water budgets across varied landscapes, and the effects of environmental change on groundwater recharge in the Southwest.

Well-researched and thorough, this work provides a reference for the many tools and technologies currently available to assess groundwater resources and recharge processes, and provides context at regional, basin, local, and small scales. Woven throughout is a conceptual framework approach that addresses the distinct recharge processes that occur in different desert basin regions.

Fundamental gems of scientific wisdom are dispersed throughout the book. It reinforces the importance of applying multiple approaches to estimate recharge and evaluate physical, chemical, isotopic, and modeling processes and addresses the need to develop a consistent conceptualization of the process being studied. Advances in computational technologies and models have far exceeded our progress in understanding recharge processes. Such improved understanding would greatly benefit recharge quantification. As data sets grow in size and complexity, so will resource requirements for data acquisition, management, and documentation for practical recharge estimation. Finally, heterogeneity in geologic systems is typically an impediment to prediction, and the least-understood domain remains the mountain block regions.

The editors also point out one area that warrants further attention: remote sensing. This technological area is highly promising to exploit high resolution spatial models including parameters such as geology, vegetation, precipitation, temperature, and soil moisture.

This book is an excellent contribution to understanding groundwater recharge processes in arid and semiarid environments—much needed in the effort to effectively manage groundwater resources for long-term sustainability. Any groundwater professional involved in management of water resources would find this monograph a valuable acquisition.

Visit www.agu.org/pubs/pubs.html. Contact Tim Parker at tparker@water.ca.gov. The opinions expressed in this article are those of the author and not of the California Department of Water Resources.