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BOOK NOTES

JEFFREY S. ASHLEY AND ZACHARY A. SMITH, GROUNDWATER

MANAGEMENT IN THE WEST, University of Nebraska Press, Lincoln, Nebraska (1999); 319pp; \$50.00; ISBN 0-8032-4276-X, hardcover.

Groundwater Management in the West details the current and future status of groundwater management in nineteen western states on a state-by-state basis. Jeffrey Ashley and Zachary Smith provide extensive statistics covering demographics, growth, geography, and climate. They discuss current groundwater management practices, state law controlling such practices, and the political factors influencing the future quality and availability of these states' groundwater.

The book divides the West into four regions: Pacific Coast, Rocky Mountain, Great Plains, and Southwest. Each region begins with a brief overview, and proceeds to a detailed discussion of each state within that region.

In Section One, *Pacific Coast Region*, the authors discuss Alaska, California, Hawaii, Oregon, and Washington. The authors concentrate their discussion on the mainland states of California (Chapter Two), Oregon (Chapter Four), and Washington (Chapter Five). Saltwater intrusion affects all of these states. In addition, mountain ranges block and wring moisture out of weather systems coming off the Pacific Ocean. Consequently, the mainland states generally receive a disparity of rainfall between their eastern and western sections. Further, these states generally receive a majority of their precipitation as snow, a factor that influences water availability during the growing season. Finally, the mainland Pacific Coast states have developed most available surface water, and therefore must rely on groundwater for future growth. All of these factors contribute to challenges the region will face in managing groundwater in the future.

The authors conclude Alaska (Chapter One) and Hawaii (Chapter Three) have a bright future regarding groundwater. Both states receive ample rainfall and have implemented effective management strategies to ensure future groundwater quality and availability. The primary challenge facing both states is saltwater intrusion.

In the *Pacific Coast Region* section, the authors also address California's, Oregon's, and Washington's heavy population growth, which has increased pressure on groundwater quality and availability. Since the states have developed most surface water, they have relied on groundwater more, depleting the resource. California's primary management challenge is the consistent application of laws. The state relies heavily on local management, which has resulted in inconsistent

application of regulations. Although Oregon has an effective management structure in place, the state has restricted funding, and may see enforcement decrease due to those restrictions. In all three states, agriculture uses a large percentage of water relative to its economic impact. If these states are to continue growing without groundwater supply interruptions, they must restrict agricultural use of groundwater and redirect groundwater use towards municipal needs.

In Section Two, the *Rocky Mountain Region*, the authors discuss Colorado, Idaho, Utah, Montana, and Wyoming. The authors again recognize agriculture's declining impact on state economies as a significant management challenge facing these states. Both Utah (Chapter Nine) and Colorado (Chapter Six) allow water right transfers to some degree. Thus, these states may be better equipped to manage this change. Idaho (Chapter Seven) and Montana (Chapter Eight) are situated well for the future. Both states expect to experience little or no population growth and currently have an adequate groundwater supply. Montana's most pressing problem is quality. Although the problem is still in its infancy, the authors anticipate contamination problems if Montana does not implement changes soon. Septic tanks, shallow injection wells, storage tanks, mining, and mine drainage all threaten Montana's groundwater. Montana must protect groundwater before the problem worsens. Finally, Wyoming (Chapter Ten) is situated perhaps the best to plan for the future. The state has completed extensive water supply research, appears well informed of its current situation, and is taking steps to anticipate future supply problems.

In Section Three, the *Great Plains Region*, the authors discuss Kansas, Nebraska, North Dakota, and South Dakota. With the possible exception of North Dakota (Chapter Thirteen), Ashley and Smith point to these states' heavy agricultural reliance as the most important factor affecting their futures. Although the Great Plains states generally have an adequate groundwater supply, pesticides and other farming and ranching chemicals threaten the resource. Kansas (Chapter Eleven) has allowed large-scale groundwater mining with minimal management. However, Kansas recently restricted agricultural use of groundwater in order to gain control of the problem. The authors conclude the Great Plains region is well situated for the future, assuming the states continue to closely monitor and manage groundwater use.

In Section Four, the *Southwest Region*, the authors discuss Arizona, Nevada, New Mexico, Oklahoma, and Texas. Very low precipitation, warm temperatures, and rapid population growth characterize the region. These factors strain groundwater supplies. The states in this region must manage conflicts between competing interests. Although extremely dry, Arizona (Chapter Fifteen) has aggressively managed its water supplies and seems to be well situated for the future. Conversely, Nevada (Chapter Sixteen) has seen significant groundwater overdrafting. The authors believe Nevada's water officials permit overdrafting for immediate economic gain and rely on

the future development of additional water sources. As the nation's fastest growing state, Nevada must secure additional water sources if it is to sustain its growth.

New Mexico (Chapter Seventeen) and Texas (Chapter Nineteen) have allowed groundwater mining, resulting in significant overdrafting. The authors believe both states now realize their policies' implications and now monitor the situation more closely. Oklahoma (Chapter Eighteen) has experienced downturns in two primary water users: the oil and gas industry, and agriculture. Although the downturn has hurt the state economically, it has proved beneficial to its groundwater supply. In addition, Oklahoma now closely monitors and manages its groundwater.

The authors have exhaustively reviewed the groundwater status of nineteen western states. *Groundwater Management in the West* offers an insightful look at groundwater problems facing the arid west.

Brian L. Martin

DAVID CARLE, DROWNING THE DREAM: CALIFORNIA'S WATER CHOICES AT THE MILLENNIUM, Praeger Publishers, Westport, Connecticut (2000); 235pp; \$45.00; ISBN 0-275-96719-0, hardcover.

Projections of future water demand lead to water development. Water development leads to population growth. Population growth leads to increased demand for water and new projections. According to David Carle, California is drowning its dream through this cycle. In *Drowning the Dream*, Carle presents his theory that water development in twentieth century Southern California negatively transformed California's environment and thereby the quality of human life. Carle asserts this transformation and its consequences were the result of human choices. His text analyzes the history of California's water and population, the choices to bring in water, and the effects of those choices. Carle suggests an alternative for the next millennium.

Drowning the Dream begins with an overview of California's history. Carle describes the early Southern California landscape populated by grizzly bears and the greatest concentration of Native Americans on the continent. It touches on the years of Spanish exploration and settlement, and then on American settlement. Carle narrates events that expanded California's population and impacted its environment, such as the gold rush, statehood, the railroad, real estate interests, and the citrus boom.

In Parts Two through Four, Carle analyzes past water developments from the Eastern Sierras, the Colorado River, and Northern California and their effects. Carle observes that each of the three projects followed the cycle of projection, growth, demand, and projection.

In Chapter Six, Carle first describes the layout of the Sierra Nevadas, the people in this area, and the effect of water transfers on