Water Law Review

Volume 6 | Issue 2 Article 76

1-1-2003

Robert Glennon, Water Follies: Groundwater Pumping and the Fate of America's Fresh Waters

Gloria Maria Soto

BOOK NOTES

ROBERT GLENNON, WATER FOLLIES: GROUNDWATER PUMPING AND THE FATE OF AMERICA'S FRESH WATERS, Island Press, Washington, D.C. (2002); 300pp; $25.00; ISBN 1-55963-223-2, hardcover.

This book explores the future crisis of water shortage due to the overdrafting of groundwater throughout the United States. The author is effective in bringing one's attention to the dangers of exploiting aquifers, for these waters feed and sustain our rivers, lakes, and wetlands, as well as provide more than half our drinking water. Throughout the book, the author clearly and passionately describes how much is at stake if we continue to squander water, especially underground water, and he provides suggestions as to how to avoid the further negative impact on the environment.

The book is divided into fifteen chapters. The first two provide an introduction to the importance of aquifers. Glennon discusses the culture of water use in the United States and explains our increased reliance on groundwater. He then covers the history of a few key rivers and aquifers from around the country, illustrating the science and hydrology as well as the legal aspects of water use and conflicts.

In chapters three through thirteen, the author tells a series of stories of how excessive pumping of our aquifers has created an environmental catastrophe. After reading these tales, it is clear to the reader that there is a causal connection between groundwater pumping and environmental degradation. The stories describe how water is being used around the country, from Tampa Bay to Down East Maine; from Minnesota to California's Central Valley; from the suburbs north of Boston to the Hopi Reservation in Arizona; and from Grand Canyon National Park to coastal regions of Florida. The author describes how water in such localities is being used to accommodate population growth; to supply private homeowner wells; to irrigate fields; to mine gold and coal; and to support tourism in national parks and forests. Some of the stories are poignant; some are tragic – but all lead to the conclusion that the overdrafting of groundwater is a serious problem, which has the potential of causing catastrophic damage to the environment.

In Chapter One, *The Worth of Water in the United States*, the author sketches the development of water law in the United States. He describes how the legislature and the courts changed the legal rules at each step in history to promote economic development and create private property rights in water. The author points out how such rules encouraged waste and placed no importance on protecting the environment.

Chapter Two, *Human Reliance on Groundwater*, discusses the excess reliance on groundwater in the United States. The author begins by giving various reasons for this occurrence. One of them is the quality of groundwater. Much surface water is highly saline, especially in the West. High salinity in water causes problems for farmers, and it also creates problems for domestic users – thus, the preference for groundwater. Another reason for the overuse of groundwater is the fact that legal rules fail to conform to the physical reality and the science of hydrology.

The author opines that developments in technology making pumping more efficient and economical, together with a permissive legal doctrine, have made groundwater a critical source of water throughout the nation. Glennon goes on to discuss how great expansion of groundwater pumping since the 1940s has caused a number of serious environmental problems – the most disturbing of which is actually running out of water. He also discusses other negative effects, such as land subsidence, and the devastating effects on surface water, including lakes, ponds, rivers, creeks, streams, springs, wetlands, and estuaries.

Chapter Three, *How Does a River Go Dry?*, is the first story in the book. In this chapter, the author discusses the catastrophic effect that groundwater pumping had on the Santa Cruz River in Tucson, Arizona. The author traces the history of the Santa Cruz River and its surroundings, explaining how the river provided the impetus for original settlements in Tucson. For hundreds of years, the river sustained farming communities. Today, however, the river is practically dry. The author provides the reader with pictures and a clear explanation as to how water moves. His explanation makes it easier to understand the grave effects of excessive underground water pumping on our rivers.

Chapter Four, *A River at Risk*, discusses the prospect of harm to the San Pedro River in Arizona as a result of an increase in population growth groundwater pumping. In 1999, American Rivers, a national environmental group, declared the San Pedro one of the ten most endangered rivers in the United States. In this chapter, the author points out how not everyone realizes the dangers of underground water pumping – not even those with the power to make a change, like politicians and wealthy land developers. On the contrary, such groups are afraid that bringing attention to these environmental issues may retard growth. The author notes that although there has been congressional intent to protect the flows of the San Pedro, the river is still in jeopardy.

The author explains how continued groundwater pumping will affect the San Pedro. He also delineates a series of possible options, which may actually save the river, such as retiring agricultural irrigation, installing low-flow fixtures, and mandating water conservation. However, he points out that even if all the above ideas were implemented, they would not bring the present rate of overdraft

to zero. Glennon insists that to prevent this river from suffering the same fate as the Santa Cruz, dramatic changes must occur.

Chapter Five, *Tampa Bay's Avarice*, tells the story of how explosive population growth in the Tampa Bay area has led to extensive groundwater pumping. Florida is the fourth most populous state, and it has the highest per capita consumption of water in the world. The author describes the great impact groundwater pumping has had on the region's wetlands. Florida's wetlands, once fifty-four percent of its land surface, now cover only thirty percent of the state. The author explains that the decline in wetlands is critical, because wetlands perform valuable functions - they enhance water quality, store water, and recharge water to the aquifer.

Glennon also discusses the efforts to reduce groundwater pumping. The Tampa water authority came up with one alternative – building the largest water desalinization plant in the western hemisphere. Although the process of desalinization generates a substantial amount of potable water, however, it also produces as water product highly saline water, which is dumped back into the ocean. Environmentalists fear the long-term impact this could have on Florida's west coast. The population in the Tampa area will increase another thirty-seven percent by 2010. The Tampa Bay water authority has the pressure of seeking feasible water sources for the future.

The next story occurs in Texas. In Chapter Six, *The Tourist's Mirage*, the author discusses San Antonio's River Walk, the Edwards Aquifer, and endangered species. River Walk is a 2.5-mile section of the San Antonio River, which flows through the heart of downtown. River Walk is a major tourist attraction bringing in $3.5 billion a year. The author notes that most tourists would be surprised to find out that the river is not a naturally flowing one. Rather, the river's water comes from groundwater pumped from the Edwards Aquifer. Astoundingly, up to ten million gallons a day of groundwater are fed into the river just to create the economically useful illusion of a real river.

Glennon then discusses the Edwards Aquifer, which plays a critical economic role in the life of south-central Texas. San Antonio is the eighth-largest city in the nation, and it relies on groundwater from the Edwards Aquifer for over ninety-nine percent of its municipal supply of water. This makes it the largest city in the country to rely so heavily on groundwater. As a result of pumping the Edwards Aquifer, the water level in two of the largest springs in Texas, which is home to five endangered species, has declined. The author then discusses the results of litigation initiated by the Sierra Club for violating ESA provisions, which protect threatened and endangered species. Glennon concludes by discussing alternatives for San Antonio's future water supply.

In Chapter Seven, *Suburban Development and Watershed Initiatives*, the author begins by explaining how the Ipswich River in Massachusetts, which receives on average forty-five inches of rain per year dried up in 1995, 1997, and 1999. This fact is surprising when

compared to the San Pedro River in Arizona, which also dried up but only receives twelve inches of rain per year.

The author describes the river and its surroundings before explaining why it dried up. The author notes that one of the problems facing the Ipswich River is the suburban sprawl. This growth has fueled high summer water use. The author describes how residents waste water by building large homes, which are usually accompanied by Olympic-sized swimming pools and enormous lawns. Thousands of gallons of water evaporate from a single swimming pool each summer. Moreover, automatic in-ground sprinkler systems water those sprawling lawns. Based on the author's research, it is estimated that new developments consume fifty percent more water than the older ones; and communities use two to three times as much water in the summer as during the rest of the year. The author concludes by warning that a critical part of any solution against the depletion of water from our rivers is to stop treating water as a free resource.

In the next chapter, *A Game of Inches for Endangered Chinook Salmon*, the author tells the story of how the Corps' flood control program in California's Central Valley, together with farmers' groundwater pumping and surface water diversions have left the Cosumnes River in a precarious state. The author describes how the lower water levels in the Cosumnes have endangered the Chinook salmon, where they migrate to spawn. During September and October, when the Chinook enter the river, they face their worst obstacle. As they swim upriver, they come upon a section that is bone-dry. The severe decline in numbers of the Chinook has forced the United States Fish and Wildlife Services listing it as an endangered species. The author notes that scientists, as well as environmental organizations and government agencies have great interest in saving the Cosumnes for this is the last undammed river, it has endangered Chinook, and it supports the largest surviving valley oak forest. Glennon concludes this chapter by examining the various efforts to restore flows in the Cosumnes.

In Chapter Nine, *Wild Blueberries and Atlantic Salmon*, Glennon explains how the state of Maine, a large part of which consists of lakes, ponds, rivers, streams, and wetlands, has water problems. The author mentions various reasons why Maine has such water problems. However, he dedicates the rest of the chapter to discuss the reasons for the decline in the number of Atlantic salmon. He tells the story of the conflict created by blueberry growers who are irrigating their fields with water diverted from rivers with populations of endangered Atlantic salmon. Unfortunately for the salmon, farmers need the additional water exactly when the salmon are swimming into the rivers from the ocean. Glennon examines the various options under consideration to save the salmon, and notes that Maine's awareness of the relationship between groundwater and surface water has made possible a potentially viable solution.

Chapter Ten, *Size Does Count, at Least for French Fries*, tells an interesting tale of how the demand by the fast-food industry for a specific type of potato is negatively affecting Minnesota's Straight River

Basin. The author describes the potato farming industry and the extensive irrigation needed to grow what he calls industrial potatoes – those with uniform length, appearance, and color. These potatoes are mainly used for french fries, and are preferred over potatoes which are not constantly irrigated because those are of odd shapes and have knobs. These potatoes are not profitable. One of the problems is that farmers who are growing the industrial potatoes are using groundwater for irrigation. More water is needed for processing. The author discusses the negative effects the overdrafting is having on the Straight River, such as placing the trout population in danger, changing the equilibrium of the aquifer, and lowering river flows. The author concludes by suggesting that Americans accept french fries which are of slightly different colors and that are of different sizes.

In Chapter Eleven, *The Black Mesa Coal Slurry Pipeline*, the author discusses how groundwater pumping by Peabody Energy Company is affecting the Hopi tribe in Arizona. Peabody Energy Company is the world's largest private-sector coal business. In 1968, Peabody began strip-mining the Black Mesa, Arizona. As part of the mining operation, Peabody pumps groundwater for the slurry pipeline. The problem is that Peabody extracts ten times as much water per year as that used by the entire Hopi tribe of 9,000 people. The pumping is affecting the largest source of surface water in the Hopi reservation – the Moenkopi Wash. At one time, the Moenkopi Wash contained sufficient water to irrigate fields, water livestock, and provide swimming holes during hot summers. Today, however, Moenkopi Wash only flows intermittently.

The author ends this chapter by providing suggestions for the solution of this problem. The most obvious one is that other methods for transporting the coal should be used. The Black Mesa is the only coal slurry pipeline in the country. Other states have made it illegal to use water for coal transportation. The author suggests that Peabody transport coal like others do - on trucks or railroads. He concludes by examining the viability of using other methods of coal transportation.

Chapter Twelve, *Is Gold or Water More Precious?*, discusses the effect of groundwater withdrawals from the Humboldt River basin for gold mining operations in Nevada. The author discusses the process known as "dewatering," which is a part of mining. In open-pit mining, heavy machines dig pits that are so deep that they hit the water table. It is then when the bottom of the pit fills with water and the mine operator has to wait until the water is removed. Although that water is high-quality glacial water, it is of no use, and mine owners have to get rid of it. The author explains the negative effects of dewatering, which are astounding. He notes how it is apparent that the economic benefits of gold mining are more important to the State of Nevada than the industry's impact on the environment, including springs and rivers.

In Chapter Thirteen, *All's Fair in Love and Water*, the author describes the problems that are occurring in Apalachicola Bay, which is located at the southernmost point on Florida's panhandle. The bay supports a diverse ecosystem that yields ninety percent of Florida's commercial oyster harvest. Apalachicola Bay oysters depend on water

from the Apalachicola River. The author discusses the problems that are created and which affect the oysters when the Apalachicola estuary receives smaller volumes of fresh water. Although the author tells us that until recently the Bay has been healthy, he points out there have been three major factors which have contributed to harming the bay: (1) upstream diversions of water from the Chattahoochee for Atlanta's rapidly growing population; (2) uncontrolled diversions from the Flint together with groundwater pumping adjacent to the Flint for agricultural irrigation by Georgia farmers; and (3) extensive dredging of the Apalachicola River by the U.S. Army Corps of Engineers. The author goes on to discuss these in more detail and discusses the struggles of the different parties to resolve this problem.

Chapter Fourteen, *The Future of Water*, is the story of how increased interest in touring the Grand Canyon and its surroundings has raised the demand for water, surface and underground. At the same time, not only is tourism increasing, there is also the threat of new development which will create an increase in the building of houses, restaurants, hotels, and other facilities and amenities. As the author states, all of this development poses very serious questions about the availability of water.

In this chapter, the author discusses the danger of increased pumping to support new development. The Canyon has many seeps, creeks, and even streams, which receive discharges from the aquifer. One of the fears is that increased pumping will reduce flows to these surface watercourses. One of the consequences would be that animals that depend on this water would be placed at risk. In addition, the author discusses other effects of increased groundwater pumping, which includes the negative effect on the Havasupai tribe. This tribe's reservation is located west of the South Rim. Their economy depends on tourists enjoying Havasu Springs. Continued and extensive groundwater pumping would substantially diminish the flow of these springs. Not only would the Havasupai tribe members suffer economic damage, the springs are also of spiritual and cultural importance to them. After introducing the various issues resulting from underground water pumping, the author goes on to examine and evaluate a range of possible alternatives in connection with the proposed development.

Finally, in Chapter Fifteen, *The Tragedy of Law and the Commons*, the author concludes his series of stories by pointing out that certain problems, such as population growth, wasteful water consumption practices, and inappropriate agricultural water use must be addressed by the society as a whole. As the author noted throughout his stories, growth presents the ultimate threat to our springs, streams, rivers, wetlands, and estuaries. Moreover, after reading the various stories, it becomes clear (if it is not already) that citizens waste an appalling amount of water, be it in the mining industry, in the agricultural industry, or for recreation purposes.

The author concludes by offering various solutions to the very important issue of water and water use. Some of those suggestions

include the enactment of water conservation standards; the establishment by the legislatures of minimum stream flows; and provisions to protect those flows from pumping of hydrologically connected groundwater; the elimination of unregulated groundwater pumping; the imposition of extraction taxes on water pumped from any well within a certain distance of any river, spring or lake; and for the implementation of regulations that will impose homeowners and businesses to pay the true cost of water. The author describes each of these proposed solutions in detail, and urges the reader that each of us, as a citizen, can contribute to effect changes and make a difference.

Gloria Maria Soto

OLIVER HOUCK, THE CLEAN WATER ACT TMDL PROGRAM: LAW, POLICY, AND IMPLEMENTATION 2ND ED., Environmental Law Institute, Washington, D.C. (2002); 362pp; $35.96; ISBN 1-58576-038-2, softcover.

In the second edition of his book on the total maximum daily load ("TMDL") program, Oliver Houck provides a useful guide to section 303(d) of the Clean Water Act ("CWA"). Simply stated, section 303(d) requires the use of water quality standards when the best available technology requirements do not bring a body of water up to standard. Section 303(d) serves as a safety net for when technology-based standards do not accomplish the goals of the CWA. Houck exposes the history and main issues and controversies associated with this section of the CWA. The reader not only learns about the Clean Water Act, but also immerses herself into other topics such as federalism, historical patterns of environmental law, and the wild world of Washington politics. The back cover of the book touts this work as "The First Complete Guide to TMDLs Ever Published." "Complete" might be the best adjective to describe the work.

The first chapter sets the roadmap for the book and also establishes the tone. Drawing upon a metaphor, Houck starts the book by stating that the CWA "is changing course." From the beginning, Houck tries to make the book accessible to all readers. Lawyers, scientists, citizens, and regulators feel at home when reading this book because it provides the proper balance of law, policy, history, and scientific data to give perspective to the unrelenting problem of water pollution.

Chapter two entangles the reader in the history of the CWA. He charts the changing course of water pollution laws starting with Water Pollution Control Act of 1948. Houck starts the reader with a quandary about the oldest dilemma in environmental law: should the nation and states protect the environment or simply manage it for human use? He provides the arguments for a water quality based set of standards and also a technology-based set of standards. He also discusses in depth the federalism arguments associated with