

# BOOK REVIEWS

## Water Follies: Groundwater Pumping and the Fate of America's Fresh Waters



**ROBERT GLENNON**

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Water is an essential natural resource. The supply of water at any given location is limited, and the limits vary considerably in space. The unprecedented economic development of the United States has been based in part on our ingenuity in providing water to various users, often through the use of elaborate strategies for storing and transporting it. Many of these water supply activities were subsidized by the federal government, in recognition of the critical role of water in economic development.

Water is also essential to ecosystems. So it is not surprising that our use and manipulation of water resources has had severe environmental consequences. Many of these impacts were obvious from the beginning, such as the damages resulting from hydraulic mining in the Sierra Nevada Mountains in the latter part of the 19th century. Others, such as land subsidence due to pumping, took time to manifest themselves, often because they were the cumulative effect of numerous seemingly insignificant actions. However, the combination of rising demand for water, increasing societal valuation of ecosystems, and growing recognition that the water-use strategies of the past may be inefficient

and perhaps unsustainable has led to major conflicts over the use of water.

In *Water Follies*, Robert Glennon focuses on the use of water pumped from the ground. His main thesis is that groundwater pumping in many parts of the United States is excessive, in some cases causing catastrophic impacts that are not widely appreciated. His goals are to increase awareness of these impacts, and illustrate the inadequacies of our current laws and policies for managing groundwater. Glennon presents about a dozen stunning examples of the impacts of excessive groundwater pumping throughout the United States. These examples are generally well researched, providing rich detail that makes the book both interesting and informative.

Although Glennon is not an expert in groundwater hydrology, he does a very good job of explaining basic groundwater principles. I found his discussion of the issues surrounding blueberry cultivation in Maine to be particularly effective at conveying the scientific, economic, and political complexities surrounding groundwater use in today's environment. I also enjoyed learning how Americans' craving for perfect french fries has contributed to the degradation of one of Minnesota's most productive trout streams. Glennon ends the book with a brief but insightful discussion of strategies that states could use to avert further environmental degradation.

Glennon is most passionate in his mission to expose the folly of our present use of groundwater. As a result, he often oversimplifies the issues. The characters in his case studies are all victims, heroes, or villains. The victims include the unfortunate Florida homeowners whose lakes were dried up by the thirsty residents of the expanding Tampa Bay region. The

heroes are the local experts and citizens who work together to expose misuse of groundwater and improve groundwater water management. The villains provide the most interesting characters. They include developers; short-sighted politicians; corporations that make "windfall" profits selling bottled spring water; paid experts ("hydrostitutes") that use complex models to obfuscate the impacts of water use; and federal agencies, such as the U.S. Army Corps of Engineers, whose engineers suffer from the belief that they can "control nature." As an aside, Glennon is so passionate in his criticism of the Corps of Engineers that he devotes several pages to the unrelated issue of flood control.

One example of how Glennon's advocacy posture leads to over-simplification of an issue is when he attributes the inability of The Perrier Group of America to site a spring-water bottling plant in Wisconsin to environmental issues. While it may be true that Perrier's original proposal would have damaged a prized trout stream, implementation of a subsequent proposal would have likely produced a net environmental benefit, as it included restoration of a spring system that had been severely degraded by years of agricultural abuse. Defeat of this second proposal probably had more to do with local hostility to multinational corporations, such as Perrier, than environmental considerations. (The Perrier Group of America is a subsidiary of the Swiss-based Nestle Corporation.) A proposed brewery with comparable water demand at the second site would have likely generated much less opposition.

Of course, Glennon's advocacy posture and lively prose make *Water Follies: Groundwater Pumping and the Fate of America's Fresh Waters* a compelling book. Hopefully, it will succeed in calling attention to the critical issues surrounding groundwater use and water use in general in the United States.

—KENNETH W. POTTER, University of Wisconsin, Madison

## Sea Legs



**KATHLEEN CRANE**

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Forty-foot, storm-swept seas, Spitzbergen polar bears roaming vast expanses of Arctic ice, furtive exchanges of forbidden manuscripts in Cold War Moscow, the New York city fashion scene, diving in mini-sub to sea floor hot springs, life with the astronauts, romance and heartbreak, and invading the last bastions of male exclusivity: all are present in this fast-moving, non-fiction account of one woman's fascinating adventures in the world of marine geology and oceanography.

*Sea Legs* has three recurrent themes: the excitement of deep sea exploration, especially at a time when so little was known; the role of the Cold War—both good and bad—in shaping basic research; and the challenges that

women face in pursuing scientific careers, especially at sea.

Kathleen Crane's explorations of the deep sea began in the 1970s, but in some ways, it was almost like she'd been cast back to the 1870s. It was a good time to be a natural scientist seeking interdisciplinary connections. Vast expanses of the sea floor were unexplored. Even the most up-to-date charts revealed regions thousands of square kilometers in area devoid of even a single sounding line. Some of the largest mountain ranges in the world were misplaced by over 100 km. Deep-sea hot springs had not been discovered and were only the subject of speculation, while the extraordinary animals that flourish there were not even imagined. And a woman onboard a ship was viewed with concern, ranging from the ludicrous to the territorial to the superstitious.

Enter the young Kathleen Crane who wants to explore deep-sea, mid-ocean ridge volcanoes in hopes of discovering the first sites of vigorous hydrothermal venting. She was oblivious of the unwritten rules of competition and

engagement in oceanography, and when she became aware of the rules, she decided they were outdated and not for her. She collected some of the first evidence of active hydrothermal venting on the East Pacific Rise and Galapagos Spreading Center, but the signals were small and could be dismissed as artifacts of mixing water masses. Part of the dismissal might have occurred because of her disregard for those unwritten rules, and some who dismissed her work were eager to jump on the hydrothermal bandwagon themselves. The story of Crane's dedicated and sometimes flamboyant search for hydrothermal vents bears some resemblance to the story of Rosalind Franklin's search for the secrets of DNA (retold in an excellent recent episode of NOVA). In spite of these obstacles, she gives credit to those who did believe in her, including her cadre of graduate student friends—a list of very successful scientists today—and her graduate and post-graduate mentors, Fred Spiess and Robert Ballard.

The role of the Cold War during this era of exploration was larger than many of us