

Whose Water Is It?

THE UNQUENCHABLE THIRST
OF A WATER-HUNGRY WORLD

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BOTTLING A BIRTHRIGHT?

Robert Glennon

In 1999, Nestlé Waters North America decided to build a bottled-water plant in rural Wisconsin. Some local residents embraced the proposal because it seemed to represent economic development without environmental damage. “When you look at the different types of industry,” remarked one real estate broker, “you can’t get one much cleaner. There is no pollution, no noise.” Others welcomed it because of the jobs that would be created, paying between \$10.00 and \$18.00 per hour, in an area sorely in need of an infusion of revenue and job

opportunities. But the proposal alarmed environmentalists, who feared that pumping groundwater from a well located next to a small spring that flows naturally into the Mekan River would harm the river itself, a blue-ribbon trout stream.

The consumption of bottled water in the United States jumped 1,300 percent between 1978 and 2001. Bottled water has become a cultural phenomenon—a ubiquitous presence from gyms to movie theaters to classrooms. Bottled water has become Americans' third most popular beverage, behind only alcohol and carbonated drinks. The spurt in bottled-water sales from 2.5 billion dollars in 1991 to 7.7 billion dollars in 2002 has created enormous marketing opportunities because the retail markup for bottled water is extraordinary: The better-known brands of springwater fetch between \$4.50 and \$7.50 per gallon. Bottled water has a higher retail value than milk, oil, gasoline, or, paradoxically, many commodities made with water, such as Coca-Cola.

Beginning in the 1950s, the state of Wisconsin targeted the Mekan River for protection and since then has acquired over 6,000 acres of land on the river and its tributaries. Historically one of Wisconsin's most popular trout streams, the Mekan River sustains large populations of wild brown, brook, and rainbow trout. Nestlé's proposed pumping from the spring was a threat to the Mekan River because any reduction in the flow of the spring would diminish the flow in the river. Reducing its flow by as little as one cubic foot per second (7.5 gallons) would increase the river's temperature and impair fish spawning and larval rearing.

We know from the science of hydrology that pumping would have reduced the spring's flow. Nestlé planned to pump water

from a well located only 60 feet away from the spring. The flow in this small spring ranges between 1,350 and 2,250 gallons per minute. The company wanted to pump 500 gallons per minute every hour of every day in the year, which amounts to 263 million gallons per year. The pumping from the well would have intercepted water beneath the surface of the Earth that is moving slowly toward the point where the spring emerges from the ground. As a consequence of the pumping, less water would have emerged from the spring and, in turn, less water would have flowed into the Mekan River. The pumping would have had catastrophic consequences.

Nestlé could have obtained water with a similar chemical content and potentially not degraded the river had it located its well as little as a mile away from the spring, but was reluctant to do so because it couldn't have labeled this water as "springwater." For marketing reasons, Nestlé has apparently determined that the term "springwater" has greater cachet with the American public than "artesian," "natural," "filtered," or "mineral" water. In order to sell "springwater," U.S. Food and Drug Administration rules require that the water come from a well located next to a spring. The FDA rules create a perverse, though unintended, incentive to harm the environment by pumping groundwater from a well so close to a spring that it reduces the spring's flow.

In Wisconsin, local residents quickly organized against Nestlé. Jon Steinhaus, co-chair of Waterkeepers of Wisconsin, proclaimed, "The springwater issue has struck a nerve like no other. This isn't a local issue. It is a state and national issue." Yet as local opposition to Nestlé's proposal grew, the state of Wisconsin found itself with few ways to prevent Nestlé from constructing the plant. Although

Wisconsin law required Nestlé to obtain a permit from the Department of Natural Resources, the department could deny the permit only if the well would interfere with a municipal water supply—an irrelevant issue in a rural area. The department had no choice but to grant Nestlé a permit. Environmental groups immediately filed lawsuits challenging the decision, but before these lawsuits were resolved, Nestlé moved on to the state of Michigan.

Michigan found itself in the same position as Wisconsin. An aide to Michigan's governor cautioned, "Michigan won't just be giving away the water; it will be paying a private and foreign-owned firm to take it away. If it were trees, natural gas, minerals, oil, or even sand, they would compensate the state." Despite this warning, the state granted Nestlé a permit, and construction of the bottling plant began in August 2001. Michigan had little choice. Under Michigan law, the Michigan Department of Environmental Quality could assess only the quality of the water that Nestlé would bottle, not the impact on the environment from the quantity of water that Nestlé would pump. In both Wisconsin and Michigan, state law required Nestlé to obtain a permit, but the standards for issuing the permits were so lax that the state agencies were unable to deny the permits.

Pumping for bottled water varies dramatically from most other water uses. When farmers or cities use water, they generate either return flow from agricultural runoff or effluent from a municipal water-treatment plant. Both return flow and effluent can be reused. In contrast, bottling water for sale is entirely for consumption. The water that goes into the bottles leaves the region for consumers in other cities and states.

The bottled-water controversy raises a serious issue of public policy: Should a state allow a private company to obtain control over a natural resource, such as water? For some natural resources, economics and history provide the answer. Mining oil, for example, requires an enormous investment of time, effort, and money. And even then there is no assurance that oil will be found in sufficient quantity to make the effort financially worthwhile. Hence, it makes some sense to reward those who risk labor and capital; otherwise people will be reluctant to take the gamble. But pumping springwater is a different matter altogether. The spring makes its presence known by bubbling to the surface. The bottler merely needs to conduct water-quality tests, construct a pipeline and a bottling facility, and bottle the water. It is difficult to justify windfall profits when a company has not underwritten the kind of risky investment required to find oil, and when the pumping either threatens the water supply of others or harms the environment.

Companies like Nestlé have an economic incentive to maximize their profit by selling water from a common resource—the aquifer. The company need not pay the costs of whatever environmental degradation occurs. Instead, it transfers these costs, what economists call externalities, to neighboring landowners and to society at large. These costs do not show up on the company's balance sheet. They never show up on a tax bill, on a monthly statement, or as an appropriation item. Instead, they appear as costs to the environment, for which we all must pay: degraded rivers, endangered species, depleted springs, dying trees, lost wetlands, ruined fisheries, altered flora, and threatened fauna.

The story of Nestlé's activities therefore raises vital questions: Who owns water? Should the government regulate its use? And, if the government does not, does that lead to systematic overuse?

The answer can be found in the history of water law in the United States. If we understand that history, we will understand how we arrived at this critical juncture and what we can do about it.

In the United States, water is both a public resource and a private property right, such as the law recognizes in land. But water is quite different from land: It moves, is reused, and is essential to the very existence of human life. The law historically has recognized water as a commodity—something to be used for economic development. Yet a water right is not an absolute right. There is a public interest component to all water rights in the United States. A right in water is a right to *use* the water, not a right of absolute ownership. Thus, rights in water differ fundamentally from rights in real estate, money, or jewels.

History accounts for this unique blend of public and private in water law. In the eastern United States, the early colonists borrowed the English system of riparian water rights, which emphasizes proximity. An owner of land abutting a lake or river had a right, by virtue of mere ownership of the real estate, to make use of the water in the lake or river. The right was shared with all other property owners on the lake or river. In the 19th century, riparian principles enabled the industrial revolution to flourish as New England factories harnessed the power of rivers. The legal structure of riparian rights has remained in effect in the eastern United States.

In the American West, courts developed a very different doctrine known as “prior appropriation,” the essence of which is “first-in-time is first-in-right.” Given the dearth of rivers in the West, miners and farmers were reluctant to undertake the considerable effort required to divert water from a river to their mines or fields (often several miles) without some assurance that they would be rewarded with a consistent and reliable supply of water. The prior appropriation doctrine encouraged development by rewarding the earliest diverters with rights to as much water as needed for any beneficial purpose. The courts liberally interpreted beneficial use to sanction the diversion of water through earthen (unlined) ditches for flood irrigation (notoriously inefficient) to grow water-guzzling but low-value crops, such as alfalfa. This doctrine still governs the uses of surface water in every western state (except California, which combines both riparian and prior appropriation rules).

This terribly inefficient system encouraged appropriators to divert as much water as possible, ignored the economic value of the activity for which the water was diverted, rewarded economic speculation, and created an incentive to hoard the resource because the appropriator was not required to pay. The government essentially gave away water to anyone who could use it. By recognizing rights to a specific quantity of water (whatever could be put to beneficial use), the prior appropriation doctrine transformed water into a commodity, like gold or timber. A public resource thus became private property.

The prior appropriation doctrine did insist that the water not be “wasted;” otherwise the water right would be forfeited or

abandoned. To modern ears, however, the doctrine's conception of waste has a curious ring.

In 1926, Herbert Hoover expressed the economic and philosophical attitude of his day toward natural resources in general and water in particular. He put it this way: "True conservation of water is not the prevention of its use. Every drop of water that runs to the sea without yielding its full commercial returns to the nation is an economic waste."

Then, to waste water was to fail to *use* the water, as opposed to fail to *conserve* the water. Over time, as western farmers irrigated additional lands with surface water, more and more water was diverted from rivers—eventually drying up many. Until recently, the dewatering of a river seemed a small price to pay for the benefits of economic development. Early settlers were not concerned with environmental protection, ecosystem management, or riparian habitat. Nature was to be explored, conquered, and tamed.

To understand how Nestlé could obtain rights to water for its bottled-water operations, it is necessary to understand that groundwater use, unlike surface water use, is largely unregulated to this day. In the 19th century when American courts developed groundwater law, the science of hydrology was in its infancy. The principles by which water moved beneath the ground were not well known. Given this uncertainty, American courts essentially shrugged their shoulders and said: "If you can get the water out of the ground, it is yours." Since then the science of hydrology has matured, and we understand how groundwater moves. Alas, the legal system has not kept pace, and as a

consequence the legal rules fail to conform with physical reality. Most states have two different sets of rules, one for surface water and another for groundwater.

When American courts developed these groundwater rules in the 19th century, the judges believed that groundwater was an inexhaustible resource. Now we know better. Groundwater comes from aquifers—geologic formations in which water has collected over thousands of years. Think of an aquifer as a giant milkshake glass and each well as a straw in the glass. Most states permit a limitless number of straws to be put into the single glass.

The recent drought caused U.S. cities, mines, farmers, and individual homeowners to scramble in search of new water supplies. Most often groundwater was identified as the solution to the problem of water shortages. Groundwater pumping in the United States has increased dramatically in recent decades. For domestic purposes alone, groundwater use jumped from 8 billion gallons per day in 1965 to approximately 18.5 in 1995, the most recent year for which federal statistics have been compiled. This is equivalent to 65 gallons *per day* for every man, woman, and child in the country. And domestic consumption is only a small fraction of the country's total groundwater use—a staggering 28 *trillion* gallons in 1995. Farmers used two-thirds of that to irrigate crops, and the mining industry pumped approximately 770 billion gallons. Groundwater use has increased so sharply that even in 1995 it constituted more than 25 percent of the nation's water supply and provided drinking water for more than half of the country's population.

The country cannot sustain the current levels of groundwater use, never mind the increases that are expected over the next two decades, as the U.S. population increases and sources of surface water, already scarce, become increasingly unavailable for human use. Our enormous expansion of groundwater pumping since the 1940s—a blink of an eye in geologic time—has caused serious environmental problems. Overdrafting, or the “mining” of groundwater, raises the specter of running out of water altogether. In some areas of the country, water table levels are dropping, requiring the drilling of deeper wells, often at considerable expense. Pumping from lower depths will increase costs, because it will require substantially more energy to lift the water. And water pumped from lower levels is often of poorer quality because naturally occurring contaminants, such as arsenic, fluoride, and radon are more prevalent at deeper levels in the Earth, and the Earth’s higher internal temperature at these levels dissolves more of these elements into solution. Along coastal areas, overdrafting may cause the intrusion of salt water into the aquifer, which ruins the water for human consumption. Groundwater pumping may also cause land subsidence, a phenomenon in which the land surface actually cracks open or drops, in some cases dramatically. Finally, groundwater pumping can have very serious consequences for the health of lakes, rivers, streams, springs, wetlands, and estuaries.

Allowing unlimited use of a common resource inevitably produces what biologist Garrett Hardin called “the tragedy of the commons.” In the case of resources not owned by individuals, such as air, water, oceans, and wildlife, consumers who seek to maximize their individual welfare will simultaneously reduce social

welfare. Examples of the tragedy of the commons include fouled air, polluted water, overgrazed public lands, clear-cut public forests, overharvested fisheries, and overhunted buffalo. Economists describe these activities as creating externalized costs, ones not absorbed by the individuals who engage in the activity but imposed instead on their neighbors or on society generally. As long as the resource is public and no barriers limit consumption, the possibility exists for individuals to decimate the common resource. For groundwater, the benefit from increased pumping—each new straw in the glass—goes entirely to the pumper, but the costs of environmental degradation are shared by all citizens who use the aquifer and by society at large.

The excessive pumping of aquifers has created an environmental catastrophe known to only a few scientists, a handful of water-management experts, and those unfortunate enough to have suffered the direct consequences. As groundwater use has increased, the pumping has caused rivers, springs, lakes, and wetlands to dry up, ground to collapse, wildlife, trees, and shrubs to die. In the Southwest, verdant rivers, such as the Santa Cruz in Tucson, have become desiccated sandboxes as cities pumped underground water until the surface water simply disappeared. Around Tampa Bay, Florida, groundwater pumping has turned lakes into mudflats and has cracked the foundations of homes. Outside Boston, the Ipswich River has gone dry in four of the last eight years. These illustrations offer a glimpse of the future, as operations such as Nestlé’s cater to the voracious demand of a burgeoning population. Fresh water is becoming scarce, not just in the arid West, with its tradition of

battling over water rights, but even in places we think of as relatively wet.

The need to regulate groundwater pumping is a matter of considerable urgency, because groundwater moves slowly and it may take years or even decades until groundwater pumping affects surface waters. The hidden tragedy and irremediable fact is that groundwater pumping that has occurred already will cause environmental damage in the future. But we can control future pumping. So let's consider how to reform the system.

To prevent the tragedy of the commons, we must break the cycle of unrestricted access to the common-pool resource (groundwater). The question is how to do so. Some advocates oppose recognizing private rights in water on the ground that water is a public resource. They resist any privatization of water resources. The notion of water as a public resource has an appealing ring in the abstract, but in the concrete, water-allocation decisions would be made by public officials (elected or appointed). That's our current system. Few would argue that the existing distribution of water through the decisions of public officials is efficient, rational, or equitable. Nor would many economists or political observers argue that legislative decisions are made strictly in the public interest—even assuming we could agree on a definition of “the public interest.”

At the other end of the spectrum, some economists and free-market advocates yearn for an ideal world: water as private property. They argue that the only way to avoid the tragedy of the commons is to end limitless access to the common-pool resource and to create, as a substitute, a system of private property rights

in water. A market in water rights would certainly encourage more efficient use of water. At the same time, those who worship the market must put their faith in egregious fictions, such as the assumption that consumers have perfect knowledge of all available choices. For water rights, in particular, the market is less than efficient because of what economists call transaction costs, those costs necessary to make the market work. It takes time and money to identify willing sellers of water, to establish the value of their water rights, to determine whether the water rights of third parties may encumber the sale, to negotiate the terms, and to assess whether the proposed contracts can be enforced.

Even more important is the fact that any market system has difficulty internalizing environmental costs. Economists expect, in a private property system, that a rational property owner will protect the environment on his or her property. But the holder of a water right—whether ground or surface water—has no incentive to protect rivers or streams on someone else's (or the government's) land. Therefore, creating private property rights in water will not eliminate the degradation of rivers and riparian habitat or prevent other environmental harm from groundwater pumping. A property right in water creates an incentive for landowners to protect the resource only to the extent necessary to assure them access to the full quantity of their rights. For groundwater pumpers, this incentive is quite modest because they will almost always be able to pump the full measure of their rights, regardless of how many other wells draw from the same aquifer. Over time, their collective action may draw down the water table, which will increase the cost of pumping, but probably not to such

a degree that pumpers are prevented from obtaining all the water they want.

To control the impact of water use on the environment, a command-and-control model of government rules and regulations must be combined with the market forces of transferable rights and price incentives. The first step toward more efficient water use is to quantify the rights of existing users and to make those rights transferable. If they can be transferred, they become valuable. And by protecting existing users, the states can break free of the relentless cycle of increasing use by placing restrictions on individual freedom to drill *new* wells.

States need to foster a market in water rights by allowing rights to be easily transferred from existing users to newcomers. Water markets involve voluntary decisions made by willing buyers and sellers. Much water use in the United States currently sustains low-value economic activity, such as growing alfalfa for cattle feed. A water-rights market would help to shift water from low-value uses to higher-value ones. A farmer growing alfalfa, for example, might then choose to transfer (sell) some of his water to a developer or municipality. The value of the water right would increase as the use for the water generated greater economic benefits.

Yet market forces alone are inadequate to protect our environment. States should also craft water conservation standards that require all users to make more efficient use of water resources. And to eliminate the tragedy of the commons, states must get tough on unregulated groundwater pumping. In particular, states should reexamine permissive rules that allow corporations, such as Nestlé, to tap into a resource that provides the water supply for a

community or that sustains critical environmental habitat. It makes no sense for states to continue to give away their water.

Local governments should also use financial incentives as a significant part of water policy. To put it quite simply, we are not paying the true cost of water. When homeowners or businesses receive a monthly water bill from a city's water department or a private water company, that bill usually includes only the extraction costs of drilling the wells, the energy costs of pumping the water, the infrastructure costs of the distribution and storage system, and the administrative costs of the water department or company. Water rates, with rare exceptions, do *not* include a commodity charge for the water. The water itself is free! To illustrate the absurdity of this, imagine Texaco charging a customer at the pump only the cost of the electricity to pump the gas.

Even though water is a scarce commodity, in the sense that unchecked demand can easily exceed available supply, most Americans have not yet faced the condition that economists call *scarcity*, which occurs when people alter their consumption patterns in response to price increases. Habits of water use will not change until the cost of water rises sufficiently to force an alteration. Therefore, we must increase water rates so that all users pay the *replacement* value of the water, which is not just the cost of drilling a new well, but also the cost of retiring an existing user's well.

Economists agree that significant price increases would create incentives for all users to conserve. Each farmer, homeowner, business, or industrial user could then decide which uses of water to continue and which to curtail. Rate increases would encourage the elimination of marginal economic activities and the movement

of water toward more productive uses. An increase in rates might stimulate new technologies and water-harvesting efforts. It would certainly encourage greater use of effluents, a by-product that can be employed for uses such as outdoor watering.

At the same time, persons of fixed or modest income should be sheltered from any significant increase in water rates for basic domestic needs. Residential use that exceeds a certain threshold—particularly during the summer as contrasted with the winter—usually reflects water use associated with discretionary purposes, such as swimming pools or lush outdoor landscaping, which need not be protected. Water rights ought to target such discretionary uses by imposing graduated, increasing block rates for consumption above the threshold requirement for basic human needs.

Through these reforms, we can break the relentless cycle of overuse and begin to use our water resources more wisely. Change will not come easily or quickly. However, if we succeed, there is reason to be optimistic because nature has enormous regenerative capacity. And there is incentive to try. The future of our springs, rivers, lakes, and wetlands depends on it.