



Book Aqua Shock

The Water Crisis in America

Susan J. Marks
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Recommendation

While water may seem to be a simple substance, the United States and the rest of the world face a dangerous water crisis due to a complex culmination of events. Journalist Susan J. Marks uses a deft writing style that glides from anecdotal reports to studies of the scientific and environmental dimensions of water scarcity, as well as the implications for national security. Unfortunately, in some places, a staccato of bullet-point factoids prevent the story from developing powerful momentum. *BooksInShort* recommends this detailed presentation of water problems and possible solutions to readers who seek a thorough factual introduction to this vital subject.

Take-Aways

- Pollution, drought and population growth challenge the notion that water is a renewable resource.
- About 17% of the world’s population lacks access to safe drinking water.
- Water scarcity is severe in the western U.S. and prevalent in some other parts of the nation.
- American laws governing water use vary widely on a state-by-state and regional basis.
- Inefficient storm sewer systems and other types of aging public infrastructure waste water.
- The U.S. has not constructed any major dams or reservoirs since the 1980s.
- Leaky pipes in the U.S. waste about seven million gallons of clean water daily.
- Diverted rainfall that streams across paved surfaces can contaminate groundwater.
- Water pollutants include both natural substances and products of human technology.
- The thirsty energy industry needs five gallons of water to produce one gallon of gasoline.

Summary

Liquid Gold

People take water for granted, but it is a diminishing resource. Water occupies 70% of the earth’s surface, but less than 1% of it is readily available freshwater. Population growth, increased consumption due to growing affluence, greater pollution and climate change strain the supply of safe drinking water. The quantity of water on earth is constant. But just as its form varies from vapor and rain to snow and ice, water’s quality and accessibility also are subject to change, and some of the shifts are very dramatic.

“Water was once without question a renewable resource, but that’s not necessarily the case today.”

In the United States, water scarcity is a national issue even beyond the arid western states. At least 36 states expect to declare water shortages by 2013, according to the U.S. General Accounting Office. In fact, the problem is global in scope. The World Bank has reported that in Latin America alone, 76 million people have inadequate supplies of safe water. The United Nations estimates that up to one billion people worldwide lack access to drinkable water.

Meteorological and Manmade Impacts

A 2009 global weather study found that warmer water and higher air temperatures lead to downpours, and raise sea levels by melting both sea ice and permafrost. Long-term climate change affects the number and severity of storms and droughts in the Saharan region of Africa and in the American Southwest. Experts say societies can adapt to climate change if it occurs slowly. For instance, tribes in the Gobi desert developed a nomadic culture to adapt to changes in water supply.

“Water has become the golden commodity of the twenty-first century.”

Shifting weather patterns also have a big impact on water supplies. Droughts complicate water management by increasing evaporation and melting snow packs. Greater rainfall and less snowfall can make reservoirs shallower. This is especially significant in California, which relies heavily on its reservoir system.

“Individual rights to control, buy and sell water are a phenomenon of the U.S. West, where prior appropriation is king.”

Americans’ thirst for water has had international ramifications. In 2008, government officials in the Canadian province of Ontario accused the city government of Detroit, Michigan, of continually stealing water from a section of the Detroit River north of the U.S.-Canadian border during the previous 40 years. In 2009, Ontario legitimized the practice but limited the amount of water that Detroit could draw from the Canadian part of the river. Water use also affects U.S. relations with Mexico. As part of a 1945 treaty, the Mexican government agreed to deliver water from the Rio Grande River to the U.S. in exchange for water from the Colorado River. In 2005, a dispute over the arrangement forced the U.S. State Department to take steps to resolve the issue.

Consumption Patterns

Due to increases in population and demand, not one U.S. city draws all of its water supplies from within its own geographic boundaries. Because of booming populations, streams that once hydrated small villages now provide water for entire cities. State and local governments commonly sue one another over access to streams and aquifers.

“The reality is that the United States has tapped into, sucked up and maxed out its once abundant and replenishable supplies of fresh water on the surface and underground.”

Increasing affluence is a major factor in U.S. water consumption. While the population of the U.S. increased 100% from 1950 to 1980, its water usage grew 600%. As people become wealthier, they increasingly consume goods that require water to produce. Population growth puts pressure on water supplies, and much of today’s population growth is occurring in places where water is scarce.

“Meanwhile, health threats – real and unknown – continue to infiltrate the water Americans across the country drink.”

Daily average U.S. consumption of water averages more than 400 billion gallons, mostly from fresh water sources. The average American uses 36,000 gallons a year for washing, flushing toilets and other household needs, much of which people could conserve. However, household use is just part of the picture. The main engines of the U.S. economy run on water.

“Antiquated infrastructure represents a tremendous threat to our water supply.”

Water plays a crucial role in almost all phases of production and manufacturing. The water consumption of the U.S. energy and agricultural industries exceed household use. The energy industry, for example, consumes 195 billion gallons of water daily to run coal-fired, oil-fired and nuclear power plants. Producing one gallon of gasoline requires five gallons of water and making a gallon of corn-based ethanol takes 980 gallons of water.

Wasted Water

The U.S. needs better water containment systems. The nation began intensive dam construction to build its water supply system starting in the early 1900s. However, since the Carter and Reagan presidential administrations, the United States has built no significant new dams or reservoirs. Beginning in the 1970s, Americans began pumping from groundwater supplies. This consumption trend has depleted many of the nation’s aquifers, some of them a million years old.

“There have already been hundreds of conflicts over water over the last 200 years.”

Water pipe leakage also contributes to waste. One study found that leaky pipes in the U.S. waste about seven billion gallons of clean water daily. The U.S. Environmental Protection Agency has reported that replacing the nation’s drinking and wastewater infrastructure would take 20 years and cost as much as \$1.2 trillion.

“Beyond U.S. borders, water is emerging as a national security issue, too.”

Developmentally driven water run-off, another major source of waste, occurs when paved surfaces prevent rainwater from entering the ground, forcing it instead into wastewater systems. One study found that Atlanta, Georgia’s run-off problem is so severe that the amount of water the city wasted in 1997 could have met the household needs of at least 1.5 million residents for a year. In the Boston area, storm sewers carry away an estimated 120 billion gallons of run-off rainwater a year, this is double the annual flow of the city’s Charles River.

“Each person in the United States uses, on average, one hundred gallons of water a day. Most people could save 30 percent of that.”

Unchecked run-off water also picks up surface contaminants that leach into the groundwater. Because groundwater provides 25%-40% of the world’s drinking water,

this “nonpoint source pollution” is a major threat to water quality. This type of pollution has affected every aquifer in California, for example. Run-off contamination limits the water that is available for consumption, irrigation, electricity production and community development.

Is It Safe to Drink?

While the United States is one of the few countries where citizens have safe drinking water, an estimated seven million Americans annually suffer from illnesses related to impure drinking water. These health risks are linked to pollution, antiquated piping and inadequate water treatment processes. The Environmental Protection Agency (EPA) has found water contaminants that include microbes, inorganic materials (metals, salts, wastewater), pesticides, herbicides, radioactive materials and organic chemicals, which can come from petroleum and industrial waste.

“Water contamination doesn’t happen only on a citywide scale, and sometimes the perpetrators don’t even realize it’s occurring.”

A 2008 U.S. Geological Survey study found low concentrations of manmade chemicals in public water supplies before and after water treatment. The good news is that these concentrations may not pose health hazards. Scientists have been surprised to discover that wastewater treatment removed some of these chemicals, even though the treatment process was not designed to do so.

“The water shortage isn’t consistent geographically, geologically, hydrologically or historically.”

Agriculture is another source of chemicals entering the water system. Among other examples, excess pesticides and fertilizer enter the mighty Mississippi River. Lake Okeechobee, the largest lake in Florida, suffers from high phosphorous and nitrogen levels from farm runoffs. While many contaminants are manmade, others occur naturally. Arsenic, selenium, radon, uranium and salts leach into aquifers. For example, a well drilled in Bangladesh tapped into water contaminated with naturally generated arsenic.

“Bow to those who control the water, for they decide who gets it and who doesn’t.”

People can reduce various types of water contamination by taking these actions:

- Re-use chemicals. Improve production processes, so fewer chemicals end up as waste.
- Do not dump discarded hazardous waste materials in landfills and incinerators.
- Recycle manufacturing byproducts, such as wastewater and cleaning solutions, and workplace products like fluorescent bulbs, batteries, capacitors, lab instruments and mercury.
- Replace toxic chemicals with environmentally friendly ones.
- Institute clean water manufacturing policies. For instance, factories must be responsible for containing industrial spills and workers should handle contaminants only on sealed surfaces enclosed in berms.

Water Laws

Even if you own property with water on it or running through it, you may not own the rights to that water. Those rights may reside with another person or entity. Water rights are generally classified as “riparian” or “prior appropriation.” Riparian rights originated in English Common law and are more common on the U.S. East Coast. Riparian rights give landowners with property adjacent to a river or stream reasonable rights to use water, if they share it. Landowners cannot transfer their riparian rights to other parties.

Prior appropriation rights, which are common in western U.S., are based on the concept that the person or group that first used a stream or river has a claim that is senior to the subsequent users’ claims. Rights can also cover the use of aquifers, groundwater and surface water. Homeowners ignore these legal subtleties at their own peril. Entire housing subdivisions have faced wells that went dry due to aquifer depletion.

Jurisdictions overlap in many areas. Water use is subject to regulation by municipal and state governments, as well as such federal entities as the U.S. Army Corps of Engineers, the Bureau of Reclamation and the Department of the Interior. Regulatory schemes can be very complex. For instance, in some parts of the West, landowners may have separate property rights for mineral deposits and water supplies.

Critical water shortages in one place can have widespread effects throughout a region. The Colorado River, for example, is the source of the Hoover Dam’s hydraulic power. The river feeds Lake Mead, and water from the lake moves through the dam in a power-generating controlled flow. But if other users diverted enough water from the Colorado River, the lake would become too shallow to flow through the dam, knocking out hydraulic power used to generate electricity for millions of people. The ripple effect would be felt in agricultural regions in New Mexico and California.

Water Power

Political control over water resides mainly at the state level of government. No federal regulator is directly responsible for the allocation and management of water, and that may be the case for some time to come. However, policy makers have discussed alternatives, such as appointing an interdisciplinary federal team to work with a coordinating group of involved parties to produce a comprehensive plan to control flooding and pollution and to protect water quality. A national water policy should reflect careful consideration of local hydrological differences.

In 2007, Governor Bill Richardson of New Mexico floated the idea of forming a U.S. Department of Water. But critics assailed the proposal as federal interference in efforts to resolve nonfederal water issues. Critics also noted that the proposal would have given larger states such as California an advantage over smaller states in gaining control of shared water resources.

Debate persists over the relative merits of public or private control of water distribution. The rates that water users pay are central to the debate. In the U.S., the highest municipal water rates are in the Northeast and West, and the cheapest are in the South and Midwest.

Affordable tap water is especially critical for lower-income households. After all, the most expensive water is bottled. One 2003 study found that bottled water is 240 to 10,000 times more expensive than tap water. Keeping clean tap water affordable will become more challenging if availability further wanes due to pollution, climate change and population growth. People need to consume less water and public authorities must improve their water management practices. Given the severity of the situation, every drop counts.

About the Author

Susan J. Marks, a former *Denver Post* reporter, is an award-winning journalist with more than 30 years experience. She has written or collaborated on more than a dozen books on consumer issues. Her work has appeared in such publications as *BusinessWeek*, the *Los Angeles Times*, *Forbes* and *Woman's World*.
