

# Troubled Water

## Student Reading

Many people take for granted that a clean, plentiful water supply will always be available. Unfortunately, overconsumption and pollution pose dire threats to this critical life support system. As the world's population escalates, so does the demand for water. Population growth and economic expansion have caused global withdrawals of fresh water to more than quadruple between 1940 and 1990.<sup>1</sup> Residents of rapidly expanding U.S. states like Florida, Arizona, and California, as well as citizens of other countries, are dealing with the dilemma of strained water resources on a daily basis.

Because many people live in arid regions, we have developed the ability to transport water and satisfy demands for water in many different ways. However, we have not developed adequate methods of ensuring the best and most efficient use of this limited resource. Twenty countries already suffer water shortages extreme enough to impede development and harm human health, and by 2050, the number of people living in water-scarce countries is projected to be between 1 and 2.5 billion people — equal to 13 to 20 percent of the world population.<sup>2</sup> According to the 1996 United Nations Human Development Report, nearly 1.3 billion people in the developing world still lack access to safe water, and efforts to supply it are falling behind population growth rates.

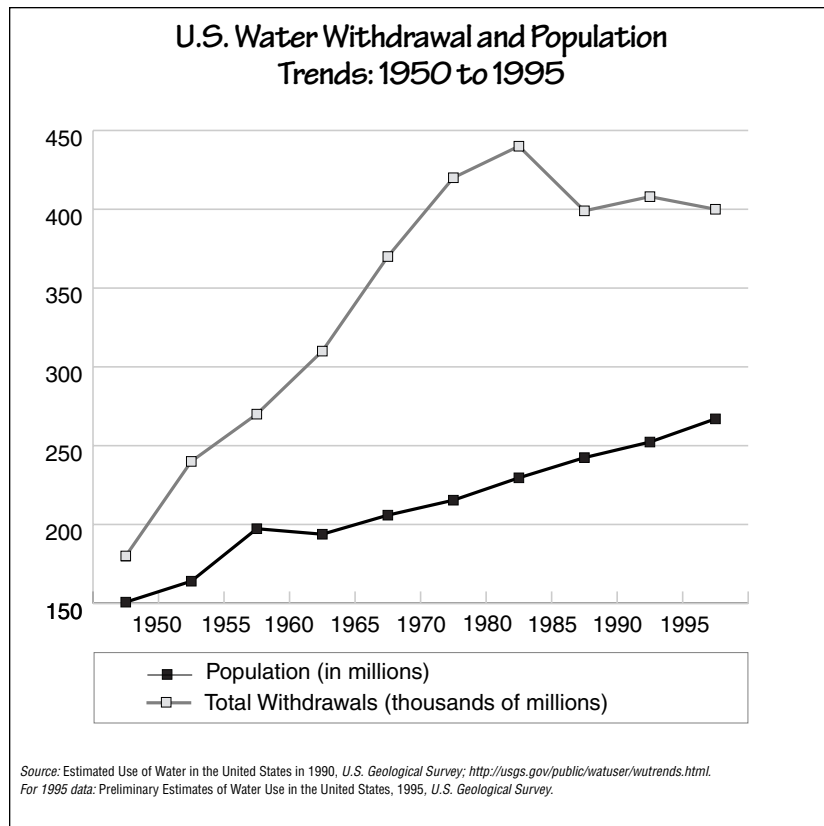
Americans get water from two main sources: the surface water of rivers, lakes, streams and reservoirs, and underground water supplies contained in aquifers. An **aquifer** is a permeable layer of sand, gravel or rock where water collects. This **groundwater** provides drinking water for half the nation. As our demand for water depletes surface water resources, groundwater sources must supply more of the water we use. One example of a strained surface water resource in the United States is the Colorado River. The amount of river water allotted to each state or city by law actually adds up to more water than flows in the river. In China, unsustainable use of groundwater for domestic, industrial and agricultural needs has lowered the water table under Beijing from 5 meters below ground level to around 50 meters.<sup>3</sup>

According to David Seckler, Director General of the International Irrigation Management Institute, slowing down the rate at which the amount of water available per person is decreasing may depend more on stabilizing population than anything else that policy-makers can do.<sup>4</sup>

### An Unquenchable Thirst

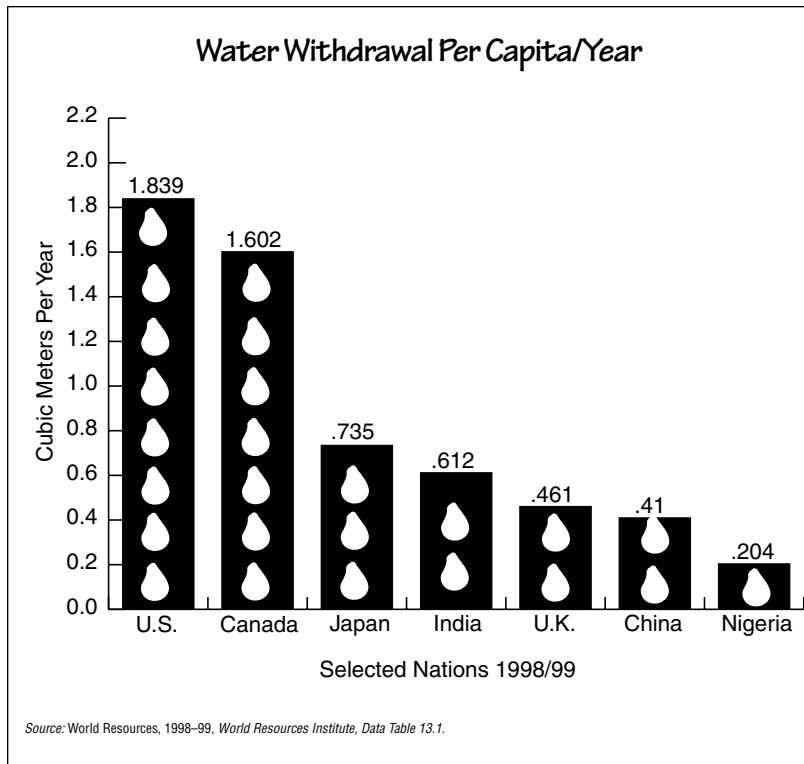
**Irrigation** and other agricultural practices are responsible for about 69 percent of all water withdrawals on a global scale.<sup>5</sup> In fact, the irrigation of land solely for livestock feed accounts for a major portion of the United States water consumption.

Aside from irrigation, water is used for manufacturing and food processing. Hydroelectric power plants use water to generate electricity. Nuclear power plants and other industries use water for cooling purposes. Water is used countless times each day by individuals for bathing, drinking, washing clothes and dishes, and flushing toilets.



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As a nation, we withdraw about 400 billion gallons of water each day for residential, industrial and agricultural purposes. This figure translates into approximately 1,500 gallons per person; only about 150 gallons of this is what we use directly in our households every day.<sup>6</sup> Although per capita water use has stabilized with improved technology and water conservation in recent years, Americans still use more water, both in total and in per capita terms, than any other industrialized country in the world. An average resident of Germany or France, for example, uses about one-third the water of a typical American.<sup>7</sup>

### Muddying the Waters

Pollution further compounds water shortages. Various human activities and water uses have degraded the nature and quality of the world's water supply. The health of two-thirds of the world's population is endangered by the water they drink and use to cook and bathe. Polluted and poisoned by sewage, agricultural runoff and industrial wastes, water flows back into our streams, rivers, lakes and oceans.

In cities of the developing world, some 90 percent of sewage is released untreated into surface water.<sup>8</sup> Frequently these wastes pollute waters used for drinking and irrigation. As urbanization in developing countries increases, more people may be exposed to unsafe drinking water.

There are three main areas of water pollution: Ocean pollution, groundwater contamination and surface water contamination. Comprising 71 percent of the Earth's surface, the oceans receive most of the world's wastes. In recent years, unmanaged urban growth, coastal construction, intensive agriculture, offshore oil drilling, mineral extraction, deforestation, boating, overfishing and acid rain have increasingly fouled the seas around us. The industrialized countries of the world now put more tons of trash into the ocean each year than they take out in tons of fish. More than 1,300 major industrial facilities in the United States have federal permits to dump their waste directly into coastal waterways. This waste includes hundreds of chemicals, as well as many persistent toxins.

Another source of ocean pollution is spilled oil. Great attention was brought to this phenomenon when the Exxon Valdez went aground in Alaska's Prince William Sound in 1989, spilling nearly 11 million gallons of crude oil, soiling more than 700 miles of beach, and killing thousands of birds and marine wildlife.<sup>9</sup> During the 1991 Persian Gulf War, Iraq's leader, Saddam Hussein, ordered oil spills as a military tactic. The destruction caused by these spills was estimated to be more than a dozen times greater than the Valdez disaster.<sup>10</sup> The United Nations has tried to control the pollution and overexploitation of the oceans through international conferences and global initiatives, but there is still much to be done in cleaning up global waters.

### A Deadly Drink

Groundwater and surface water contamination is also a grave concern throughout the world. In developing countries, **water-borne biological hazards** (bacteria, viruses, parasites, etc.) are responsible for high infant mortality rates. Parasites, resulting from water pollution

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or poor sanitation practices, are found in surface waters of many semi-arid countries. Microbiological agents and parasites can be contracted from swimming in polluted waters or from eating contaminated shellfish. This problem is not only found in less developed countries. Popular tourist beaches around the world are dealing with this pollution in varying degrees of intensity.

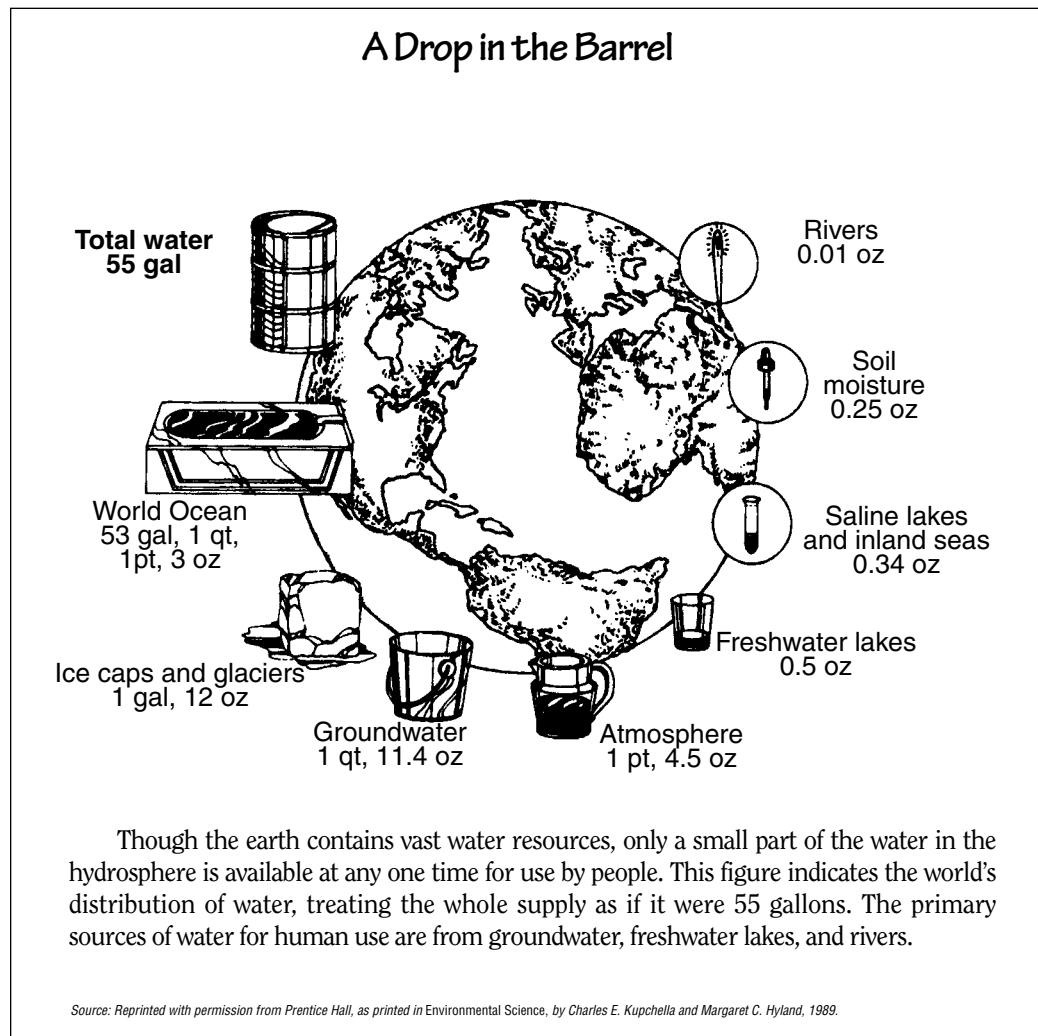
While water-borne germs are found mostly in less developed countries, developed nations suffer chemical pollution, which has emerged as a serious threat to all countries which have introduced industrialization and chemically-supported agriculture. The most immediate stress on human health is the consumption of contaminated water. Thus far, 800 different organic and inorganic chemicals have been found in drinking water. Some organic contaminants occur naturally, but inorganic constituents of drinking water are usually the result of various industrial solvents discharged from manufacturing plants, small trade sources, and households.

In Milwaukee, Wisconsin, in April of 1993, almost 400,000 people were victims of **cryptosporidiosis**, a water-borne disease outbreak, as a result of poor water treatment methods. According to the U.S. Environmental Protection Agency (EPA), 80 large water systems throughout the United States have failed to meet regulations for basic filtration.<sup>11</sup>

When human wastes and pesticide and herbicide runoff wash into surface water sources or oceans, they alter the nutrient and chemical composition of

the water, making it more suitable for various kinds of algae. The algae blocks light and, when it decays, uses oxygen needed by fish and other aquatic species to survive. This process, called **eutrophication**, is very hazardous to aquatic habitats. Although substantial global research has been done on this phenomenon, it is still considered one of the most serious water quality problems and continues to increase in many parts of the world.

Just over half of all Americans are dependent on groundwater, at least in part, as a source of drinking water.<sup>12</sup> Any pollutant that comes in contact with the ground may contaminate groundwater. Underground toxic storage tanks, pesticides, toxic waste dumps and septic



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tanks all pose serious threats to groundwater quality. For example, a single gallon of used motor oil which comes into contact with a source of fresh water can render one million gallons of that fresh water undrinkable. More than 65 percent of all water pollutants originate in our homes: the sinks and toilets in American households often become the conduits for caustics and household cleaning products. The oil that drips from our cars and the chemicals washed from our lawns can also enter drains and reach groundwater supplies. These practices comprise a huge source of often unmonitored hazardous wastes.

### Staying Above Water

In 1972, deciding that something needed to be done on a federal level concerning contamination of waters, the U.S. Congress passed the Clean Water Act. This was the most comprehensive and expensive environmental legislation in the nation's history. The bill commenced a major change in the country's approach to water pollution control by limiting the contaminated discharges and setting water quality standards. Although great strides have been made in cleaning up the nation's waters, significant levels of water pollution still persist.

Very little has been done on the federal level to address water shortages in much of the western United States. Although water withdrawals are lower than they were in 1980, parts of the country are suffering from a decreasing fresh water supply. For example, the amount of irrigated land in four Great Plains states has

decreased due to a drawing down of the Ogallala aquifer.<sup>13</sup> Water crises extend around the globe, especially in areas experiencing growth and increased urbanization, where supplies of clean water are rapidly diminishing.

Every effort should be made to preserve the precious two percent of Earth's waters that we depend on to sustain life. Individuals can aid this effort by using water judiciously and disposing of toxins safely. National governments can encourage cleaner, more plentiful water supplies by strictly regulating industry and agriculture's water use. Because the vast oceans belong to all the world's people, international cooperation is essential for ensuring water quality for present and future generations.

### Endnotes

<sup>1</sup> *World Resources: A Guide to the Global Environment, 1996-1997*. New York: Oxford University Press, 1996, p. 301.

<sup>2</sup> *Ibid.*, p. 302.

<sup>3</sup> Lester R. Brown. "Facing the Prospect of Food Scarcity." *State of the World 1997*. Washington, DC: Worldwatch Institute, 1997, p. 30.

<sup>4</sup> *Ibid.* p. 31.

<sup>5</sup> *Op. cit.* note 1.

<sup>6</sup> "Preliminary Estimates of Water Use in the United States, 1995" U.S. Geological Survey homepage: [www.usgs.gov](http://www.usgs.gov).

<sup>7</sup> *Op. cit.* note 1, pp. 306-307.

<sup>8</sup> *Op. cit.* note 1, pp. 71-72.

<sup>9</sup> Timothy Egan. "Alaska Wants \$1.2 Billion to Drop Suit Over Spill." *The New York Times*, January 31, 1991.

<sup>10</sup> Sharon Begley. "Saddam's Ecoterror." *Newsweek*, February 4, 1990.

<sup>11</sup> *EPA Journal: Clean Water Agenda; Remaking the Laws that Protect our Water Resources*. Vol. 20, No. 1-2. Summer 1994.

<sup>12</sup> *National Water Quality Inventory: 1994 Report to Congress*. U.S. Environmental Protection Agency.

<sup>13</sup> *Op. cit.* note 3.