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STUDY SUMMARY

BOTTLED WATER PRODUCTION IN THE UNITED STATES: HOW MUCH GROUND WATER IS ACTUALLY BEING USED?

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THE ISSUE

Reliable and comprehensive data on the quantity of the nation's water resources and its uses are needed to support important—and increasingly contentious—decisions about how to allocate these resources among a variety of competing uses. While the need for data increases, organizations such as the U.S. Geological Survey (2002), the National Research Council (2000), and the U.S. Government Accounting Office (2004), have documented that serious shortages exist in the water usage data available to decision makers.

Ground water is water that occurs underground in the pore space of rocks or sediments and that can be collected with wells or that flows naturally to the earth's surface via seeps or springs. There have been reports suggesting that the bottled water industry is a major user of ground water in the United States. However, in reality, data are not readily available on the amounts of ground water withdrawn from various regions of the U.S., sources of ground water, the amount of ground water used for bottled water production relative to other uses, and the amount of bottled water production relative to renewable ground water supplies.

RESEARCH STRATEGY

A comprehensive, quantitative survey of bottled water producers in the U.S. was conducted to collect data on bottled water production, specifically on production from ground water, the primary source for bottled water. The resulting data were used to estimate the annual (2001) volume of ground water withdrawals by the bottled water industry, both regionally and nationally.

MAJOR FINDINGS AND SIGNIFICANCE

Data from 149 bottled water sources were collected. Of these 149 sources, 114 (77%) were ground water and 35 (23%) were municipally sourced. Relative to other uses of ground water, bottled water production was found to be a de minimus user of ground water. In 2001, total annual ground water withdrawals for bottled water production were determined to be 6.15 billion gallons. According to the U.S. Geological Survey, total fresh ground water withdrawals in the U.S. in 1995 (the latest year for which published data were available) were 27.6 trillion gallons. Thus, ground water withdrawals for bottled water production represent only 0.022% (two one-hundredths of one percent) of the total fresh ground water withdrawals in the U.S.

In comparison, agricultural use of ground water (irrigation) comprises 65% (17.8 trillion gallons) of total ground water withdrawals on a national basis.

Ground water supplies are continuously "recharged" or replenished by precipitation, thus ground water resources are considered "renewable." Based on data published by the U.S. Geological Survey, the 1995 renewable ground water supply was determined to be 1.27 trillion gallons per day or 463.7 trillion gallons per year. Bottled water production was found to use an infinitesimal percentage of renewable supplies at the national scale and in all but one water resource region (Lower Colorado). It was determined that annual bottled water production accounted for only 0.0012% of the nation's total renewable supply.

Scaling of the data using information on the U.S. market for domestic bottled water showed that bottled water production varies as a complex function of both population (i.e., demand) and water availability (i.e., supply). The highest rates of bottled water production were shown to occur in the relatively populous and water-rich regions along the Atlantic, Pacific and Gulf of Mexico coasts, while the lowest rates of production were generally found throughout most of the mid-western and interior western U.S.

Nearly all industries utilize water as an essential production material, including large-volume users producing steel, automobiles, transportation equipment, chemical products, paper products, mining resources, and petroleum refining. The portion of water withdrawn that is lost due to evaporation, being incorporated into products, etc., varies with different manufacturing processes. Large amounts of water can be lost in the production processes in such industries. Results from this study indicate that bottled water production is a highly efficient manufacturing process: on average, 87% of water withdrawn in 2001 was actually bottled for the purpose of human consumption.

CONCLUSION

While all ground water withdrawals should be managed in a sustainable and compatible manner, the study concluded that concerns about the bottled water industry's use of ground water are not science-based. Furthermore, effective management of ground water resources may be better accomplished by focusing on multi-jurisdictional ground water management policies that are based on sound science, consider all users, and treat all users equitably.

This Study Summary was created by the Drinking Water Research Foundation (DWRF) and is intended as general information about the project.