

## **The coming water crisis**

*Many billions of dollars will be needed to quench America's thirst, but is private business the answer?*

By Marianne Lavelle and Joshua Kurlantzick

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The tap water was so dark in Atlanta some days this summer that Meg Evans couldn't see the bottom of the tub when she filled the bath. Elsewhere in her neighborhood, Gregg Goldenberg puts his infant daughter, Kasey, to bed unbathed rather than lower her into a brew "the color of iced tea." Tom Crowley is gratified that the Publix supermarket seems to be keeping extra bottled water on hand; his housekeeper frequently leaves notes saying, "Don't drink from the faucet today." All try to keep tuned to local radio, TV, or the neighborhood Web site to catch "boil water" advisories, four of which have been issued in the city since May to protect against pathogens. "We've gotten to the point where I'm thinking this is just normal," Evans says. "It's normal to wake up and take a bath in dirty water."

In a nation where abundant, clear, and cheap drinking water has been taken for granted for generations, it is hard to imagine residents of a major city adjusting to life without it. But Atlanta's water woes won't seem so unusual in the years ahead. Across the country, long-neglected mains and pipes, many more than a century old, are reaching the end of their life span. When pipes fail, pressure drops and sucks dirt, debris, and often bacteria and other pathogens into the huge underground arteries that deliver water. Officials handle each isolated incident by flushing out contaminants and upping the chlorine dose (Atlanta says its water meets health standards despite its sometimes unappetizing appearance), but no one sees this as a long-term solution. America's aging water infrastructure needs huge new investment, and soon.

Decayed pipes alone would be a serious challenge. Now, add these: Providing water free of disease and toxins is ever more difficult, as old methods prove inadequate and new hazards emerge. Shortages have become endemic to many regions, as record drought and population sprawl sap rivers and aquifers. Then there's the threat, unthinkable a year ago, that now seems to trump all others: terrorism. Put it all together, and it's easy to see why concern over clean drinking water might someday make the energy crisis look like small potatoes.

"The idea of water as an economic and social good, and who controls this water, and whether it is clean enough to drink, are going to be major issues in the country," says economist Gary Wolff, at Oakland's Pacific Institute for

Studies in Development, Environment, and Security. In March, Environmental Protection Agency Administrator Christie Whitman called water quantity and quality "the biggest environmental issue that we face in the 21st century."

Water providers say that Americans can still trust the product on tap. "People should feel good about their water. Water is safe and we're working hard to keep it that way," says Thomas Curtis, deputy executive director of the American Water Works Association. But the Natural Resources Defense Council's Erik Olson detects a "schizophrenic" element in industry assurances. "They say we need hundreds of billions of dollars to fix the system, but when people ask, 'Is there a public-health issue?' they say, 'No, no.' But clearly, there's a public-health problem."

Both the sanguine and the worried agree on one thing: High costs will force the nation's water delivery system to evolve into something quite different. Citizens will be asked to pay more and use less. And big business, still a minor player in this country's water scene, is seeking a leading role. Private industry promises needed new capital and greater efficiency, but the jury is still out on whether it can deliver. Witness, for instance, the plight of Atlanta, which in 1999 became the largest U.S. city to privatize its water system. Already the city is weighing whether to nullify its 20-year contract with United Water, a subsidiary of the French company Suez.

**Buried troubles.** For now, issues of ownership, infrastructure, and health have been back-burnered while governments grapple with the threat of water system terrorism. Terrorism, however, cannot long postpone action on the fissures spreading in the 700,000 miles of pipes that deliver water to U.S. homes and businesses. Three generations of water mains are at risk: cast-iron pipe of the 1880s, thinner conduits of the 1920s, and even less sturdy post-World War II tubes. While refusing to call it a crisis, Curtis says, "We are at the dawn of an era where utilities will need to make significant investments in rebuilding, repairing, or replacing their underground assets." Cost estimates range from EPA's \$151 billion figure to a \$1 trillion tally by a coalition of water industry, engineering, and environmental groups. The AWWA projects costs as high as \$6,900 per household in some small towns.

Health is at risk if nothing is done. Already, water mains break 237,600 times each year in the United States. An industry study last year found pathogens and "fecal indicator" bacteria at significant levels in soil and trench water at repair sites. Of the 619 waterborne disease outbreaks the Centers for Disease Control and Prevention tracked between 1971 and 1998, 18 percent were due to germs in the distribution system. Researchers also question whether Americans are getting sick from their drinking water far more often than is recognized. "Is this happening below the radar screen, with low-level [gastrointestinal] things, where people will stay home from work, or be miserable at work, and not ever go to the doctor?" asks Jack Colford of the University of California-Berkeley. He is leading a major EPA-CDC-funded study comparing disease rates between participants who drink tap water

through a sophisticated filter and those using a fake look-alike filter. Harvard researchers reported in 1997 that emergency-room visits for gastrointestinal illness rose after spikes in dirt levels that still remained well within federal standards.

**Quality concerns.** Just keeping up with federal regulations is increasingly difficult. The next five years will see more new rules than have been adopted in all the years since enactment of the Safe Drinking Water Act in 1974. Environmental advocates blame the logjam on delays in addressing many health hazards. The arsenic standard, which produced an uproar early in the Bush administration, was years in the making. The EPA ultimately approved the same standard President Bill Clinton chose in his last days in office—reducing the arsenic limit from 50 to 10 parts per billion. The change of heart coincided with a National Academy of Sciences report, released to little notice the week of September 11. It indicated that even the Clinton standard was weak: As little as 3 ppb arsenic carries a far higher bladder and lung cancer risk than do other substances EPA regulates.

New science has also undermined confidence in older methods of purifying water. Chlorination has been one of the 20th century's great public-health achievements, smiting the deadliest waterborne diseases, cholera and typhoid. But this sword has developed a double edge. Nearly 200 women in Chesapeake, Va., sued their water system, claiming that miscarriages they suffered in the 1980s and 1990s are traceable to trihalomethanes, chemicals produced when chlorine reacted with their region's murky river water. While pregnancy-risk research is hotly debated, the EPA decided that cancer risk from chlorine by-products is high enough that it ordered water system reductions earlier this year. Localities have already spent millions of dollars converting to another disinfectant, chloramine (a chlorine and ammonia mix), which curbs some byproducts.

Cities and towns are finding that they must deal with new science on contaminants at a much faster pace than the EPA can regulate them. This summer, Bourne, Mass., the southern gateway to Cape Cod, had to close three of its six drinking water wells, having discovered they were contaminated with perchlorate, a rocket fuel component that leaked from a nearby military reservation. Across the country, the Metropolitan Water District of Southern California, serving 17 million people, announced in April that its new treatment system "will remove a large portion of perchlorate" leaking into a major regional reservoir, Lake Mead. But *U.S. News* has obtained material distributed at a June 11 MWD board meeting showing the treatment was not working as hoped.

The EPA is still studying possible drinking water limits for perchlorate as well as for MTBE, a gasoline additive meant to reduce air pollution that proved to be a frighteningly efficient groundwater pollutant. (South Tahoe and Santa Monica, Calif., last month obtained big settlements from oil and chemical companies to help restore MTBE-poisoned water supplies.) And in April, a

U.S. Geological Survey report revealed that streams nationwide are laced with prescription and over-the-counter drugs and even caffeine.

Pollution is shrinking water supplies for communities at the same time that burgeoning population and weather are causing severe shortages. Norman, Okla., with 95,700 people the largest system currently afoul of arsenic standards, very likely will shut down some wells even though it expects average daily water demand to more than double in the next 40 years. "We don't want to be a poster child" for arsenic contamination, says utilities director Brad Gambill. This summer, more than 40 percent of the nation—over twice the normal rate—has suffered drought conditions. "Normally, we get tons of flowers, but now we have nothing growing," says Donna Charpiet, a farmer in Riverside County, Calif., pointing to withered plants on her small homestead. Some ecologists believe global warming will make drought the norm in much of the West. Drought breeds anger: The CIA predicts that by 2015, drinking-water access could be a major source of world conflict.

Some cities have already instituted drastic conservation programs. Santa Fe has restricted lawn watering, leading New Mexicans to decorate yards with spray-painted artificial flowers. In parched Denver, a conservation campaign encourages residents to shower in groups. Omaha has an odd-even residential address lawn-watering program.

One spring Saturday morning this April, Chuck Maurer of San Antonio realized while brushing his teeth that he and his neighbors had become victims of a water conservation program gone awry. "It was grotesque," he recalls. "The water was brown in color and cloudy with particulates, and a really bad odor. It was sewer water." Precisely. The San Antonio Water System had accidentally cross-connected his neighborhood's drinking water lines with pipes delivering treated sewage water to a public golf course. Watering fairways and greens with "reclaimed water" has become popular in water-short tourist areas, especially Florida. But experts say such systems require extra care to keep sewage from entering potable systems.

**Big business to the rescue.** With immense challenges ahead, U.S. drinking water systems are considering something never tried here on a large scale: privatization. In March, Indianapolis announced a \$1.5 billion agreement with USFilter, the largest U.S. privatization to date, and in May, San Jose, Calif., voted to consider privatizing. Private firms helped supply water to Boston as early as 1796, and utilities have long hired outside contractors to build, but not operate, plants and distribution systems. But over the past five years, an IRS ruling that helped firms obtain longer-term tax-free water contracts, combined with politicians' push for deregulation and municipal-system breakdowns, opened the door for firms to actually manage systems. Only 15 percent of utilities are investor-owned, but in recent years, a handful of big water corporations, mostly foreign owned, have moved onto the U.S. scene: from France, Suez and the media-water conglomerate, Vivendi; from Germany, the utility RWE. (One domestic player with giant ambitions was

Enron's water subsidiary, Azurix, which had touted a plan to plumb the Everglades and manage the water.)

Congress is considering hiking federal funding for infrastructure, but the Bush administration encourages the privatization trend, saying that water systems cannot expect to get all the dollars they need from Washington. Says G. Tracy Mehan, EPA assistant administrator for water: "I think the needs are so great especially when you see the demands of homeland security and the federal budget. Private capital is one of several options that are going to have to be considered much more than they have been."

One private-sector success story is Leominster, Mass., a town of 40,000, which signed a 20-year deal with USFilter in 1996. Before then, "our treatment plant was totally corroded. We fixed leaks by putting out old coffee cans to catch the water," says Mayor Dean Mazarella. USFilter saved the city money it then used to upgrade a 60-year-old filtration plant that was "held together by wire and chewing gum," says city environmental inspector Matthew Marro.

Experience in other countries suggests that privatization can, indeed, pour needed capital into drinking water. Investment in the United Kingdom increased more than 80 percent after it turned to total privatization. "Public-private partnerships are going to sweep the U.S.," says Andrew Seidel, president of USFilter. "The country has 50,000 different water systems, and those will consolidate into bigger systems aligned with private companies and able to handle the growing number of water-treatment issues."

But in Atlanta, the experience has not been so positive. This summer, Mayor Shirley Franklin sent a formal notice to United Water that the city was dissatisfied with its performance under the 20-year contract signed with the city's previous administration. Problems cited by Franklin included the firm's staffing levels, bill collection, and meter installation. Atlanta had hoped to halve the \$49 million annual cost of running its water system by privatizing; one city official says savings are less than \$3 million. "You have to keep in mind that a public-private partnership is an ongoing dialogue between the customer and its private partner," says United Water spokesman Rich Henning. "We certainly have struggled. But within the last six to nine months we have dedicated more resources, and we've been listening more to the client." He calculates Atlanta's savings to be about \$15 million a year but says the city should be using that money to address the infrastructure problems that United Water inherited.

Gordon Certain, president of the civic association of North Buckhead, the neighborhood hardest hit with water-quality problems, says United Water is unresponsive to complaints. "They're acting kind of like they have a 20-year contract," he says, wryly. (Of course, they do.) The company's response to complaints has ranged "from polite to totally inappropriate," he says. "They told one woman who wanted her water tested that she should get it tested

herself." But resident Jacques Davignon thinks privatization "has only made the finger-pointing much more complex." He says the company and the city should share responsibility. "Let's not get on TV and beat United Water up," he says. "Let's do a little forward thinking, come up with a strategic plan."

Private enterprise also has rushed in with water-shortage solutions. The agribusiness firm Cadiz Inc. wants to store water in the barren Mojave Desert, where tidal waves of dust sweep across salt-rimmed dry lakes. The water, taken from the Colorado River and from an indigenous underground aquifer, would flow to thirsty Los Angeles during droughts. "Storing and selling aquifer water will be the key to California's future," says Mark Liggett, Cadiz's senior vice president.

Jim André, a desert biologist working in the Mojave, says Cadiz has no impartial scientific study of the potential impact. Environmental groups warn that drawing groundwater from the Mojave will create a dust bowl similar to California's Owens Lake region, a water grab that inspired the film *Chinatown*. But Cadiz says it has a monitoring system to prevent overpumping. "We have solicited tons of input from all groups for our environmental assessment," Liggett says.

**Creative solutions.** Other ideas seem somewhat fanciful. Ric Davidge, a former Reagan administration official, wants to siphon 10 billion gallons of water each winter from northern California rivers, pump it into 850-foot-long plastic bladders, and ship it downstate. Other entrepreneurs suggest melting Alaska icebergs. Oilman T. Boone Pickens hopes to pipeline water from Texas's Ogallala aquifer to water-short cities like San Antonio and Dallas.

Privatization projects are also dogged by accountability concerns. Industry sources worry that the terrorism vulnerability assessments U.S. water systems are developing will wind up in corporate parent offices overseas, possibly unprotected from disclosure. In New Orleans, an official highly familiar with its water system told *U.S. News* that the Big Easy's move toward privatization lacks oversight. "The whole approach to having companies bid for the water system was 'public, catch us if you can,' since after bids were taken the public had only 10 days to examine the proposals," she says.

Privatization worries have even made it to Broadway: In the comedy *Urinetown*, a firm privatizes toilets and raises toilet fees. Residents caught urinating in other places are arrested. "With private control, who guarantees that the less well off will get affordable water, and who picks up the cost if the private company fails?" asks Sandra Postel, director of the Global Water Policy Project, a research institute in Amherst, Mass.

**Progress report.** Indeed, the financial viability of some leading water companies has been called into question recently. Cadiz lost \$2.5 million in the most recent quarter; the firm recently tried to reduce its debt through a deal with Saudi Prince Al Waleed ibn Talal, but in July the effort collapsed.

Suez's water arm saw revenues grow by just 1 percent. Vivendi, though experiencing revenue growth of 12 percent, made major missteps in its media division that have left it laden with debt and is divesting its stake in one water investment, Philadelphia Suburban.

Nor have private companies, by and large, delivered savings to consumers. In fact, most private water providers surveyed by *U.S. News* charged higher-than-average rates. George Raftelis, a Charlotte, N.C., industry consultant, points out that unlike public utilities, private firms do not enjoy tax-exempt financing, are subject to income taxes, and must return profits to shareholders. Moreover, "privatization does not equal competition," says Janice Beecher, director of the Institute of Public Utilities at Michigan State University. "After bidding, you're transferring the monopoly powers of a public utility to a private company." She suggests cities and towns award shorter contracts and make public utilities and private firms compete.

Citizen outcry over the water rates private firms charge has boiled over into riots in countries such as Bolivia. But so far in the United States disputes have been hashed out in the political process. Peoria and Pekin, Ill., both are moving to deprivatize their water systems, having determined that if private ownership continued, future rate increases would be as much as 60 percent higher than if the systems were publicly run. Because other communities have done the same, Curtis of AWWA does not see a mass movement to privatize: "Some are looking at it, and some are trying to move in the other direction."

But the harsh reality is that the price of drinking water will most likely rise whether private industry or government manages the system. The EPA estimates that the water bill consumes only seven tenths of 1 percent of U.S. household median income; Americans spend more than triple that on bottled water and filters. A recent Harvard School of Public Health analysis pointed out that rates in many developed countries are significantly higher. "[W]ater rates have been insufficient to cover long-run costs," such as maintenance of pipes and plants, let alone larger issues such as preserving clean rivers and surrounding watershed, the report said.

"People think water is free because it falls from the sky," says Seidel of USFilter. "Well, it is—but treated, filtered, and piped water isn't." Privatization advocates contend that only market-oriented pricing can force H<sub>2</sub>O-hogging Americans to conserve. "Unless you put a market-determined price on something, it is not respected," says Clay Landry, a research associate at Bozeman, Mont.'s Political Economy Research Center. "Right now, who even thinks about the cost of water coming out of their tap?"

But public officials are loath to hike rates for fear of burdening lower-income families. That's certainly a problem in big cities, but even more so in small towns, where, lacking economies of scale, water treatment and distribution is more expensive. Consultant Raftelis found that water bills in small systems

average 25 percent higher than in large ones he has surveyed. The new arsenic rule is projected to cost households under \$1 annually in the largest systems but over \$300 in those serving fewer than 100 customers.

Economist Wallace Oates of the think tank Resources for the Future says arsenic's economic realities make a case for abandoning national standards and letting localities weigh costs and benefits on their own. Congress and the EPA already let small water systems operate with less regulation and enforcement—some will have 14 years, instead of four years, to meet the new arsenic rule. The Bush administration is studying whether to relax small-system standards even more. Yet all but a fraction of health violations occur in small systems, which serve some 50 million citizens. "What you have is a two-tier drinking water system, and that's pretty troubling," says NRDC'S Olson. He argues that health and efficiency require a major consolidation among the 54,000 U.S. water suppliers. Says EPA's Mehan, "Citizens and systems are going to have to look at this option."

**Turning off the tap.** Citizens are certainly looking at other options, but less with an eye to changing the system than to just protecting themselves and their families. "We're looking at having a plumber put a filter on our entire house," said Atlanta resident Davignon. In the meantime, he buys bags of ice and water from the supermarket, adding, "I hate to pay for water, but if it's undrinkable, or the kids can't bathe, you do it." Already, 76 percent of Californians rely on bottled or filtered water. "We have reached a breaking point beyond which central treatment can no longer go," says Peter Censky, executive director of the Water Quality Association, which represents filter makers. Joseph Cotruvo, a former EPA water administrator, agrees: "You wouldn't think of drinking orange juice out of a pipe, would you? I wouldn't be surprised if 25 years from now the thought of drinking water as a beverage rather than a commodity will dominate."

The drive toward bottled water and filters will, however, widen the gap between haves and have-nots, a result some hope technology can prevent. "[G]oing into the 21st century, you can't get the kind of long-term improvements in water quality that are needed without the next generation of technology," says Olson. A few U.S. water systems are trying disinfectants used in Europe: ozone, ultraviolet light, and perhaps the best purifier (used by bottlers Pepsi and Coke), reverse-osmosis membrane technology. "It removes just about everything," says Olson, "so you don't have this contaminant-of-the-month approach."

And yesterday's clean water may not be clean enough for the future. L. D. McMullen, chief executive officer of the Des Moines water system, believes as the population ages and more people have compromised immune systems, cities and towns will have to provide water much lower in contaminants than they do today. "We will totally have to deliver water to customers in a totally different way," he says. "You may see what I like to call 'neighborhood polishing units,' that develop ultrapure water in the neighborhoods and



deliver it to homes" through much smaller pipe systems. Households need relatively little superclean water, McMullen points out, since less than 15 percent of "drinking water" is drunk or bathed in. Most goes to flushing toilets and watering lawns.

Des Moines has learned from experience that its citizens will pay for such improvements: In 1992, the city raised water rates 25 percent to build the world's largest removal plant for nitrate, an agricultural runoff that can reduce infants' oxygen uptake (blue-baby syndrome) and cause other ills in adults. But whether public water systems tackle their challenges on their own or turn the job over to private enterprise, or some combination, the changes ahead will require a revolution in how Americans think about drinking water. "People's knowledge of water comes from beer commercials, focused on the land of sky-blue waters, or mountain springs and aquifers underlying some Wisconsin hillside," says Censky of the Water Quality Association. "The public thinks water in these sources is pure, but it's not. Really, pure water is a man-made product."

*With David D'Addio*

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