

## *Conspicuous Consumption*

**T**HEIR MAGNIFICENT ARCHES still stretching across parts of Europe from Italy to Istanbul, the Roman Empire's crumbling aqueducts stand as reminders of one of humankind's most enduring feats of engineering: the capture and carrying of water.

In his treatise on the water supply of ancient Rome, Sextus Julius Frontinus, the proud *curator aquarum*, or water commissioner, wrote that for 441 years the empire got by on natural water supplies. "The needs of Romans were satisfied by the water that they used to draw either from the [River] Tiber, from wells or from springs," the memory of which, he wrote around A.D. 100, "is still considered holy and revered."<sup>1</sup>

Indeed, most Roman cities had plenty of drinking water, with individual houses supplied by cisterns or wells. So why did the Romans spend five hundred years building thirty-one aqueducts, some as long as one hundred kilometers, throughout the empire? It was not out of necessity. They did so to sustain, and also to symbolize, a lifestyle of luxury, one based upon water.<sup>2</sup>

Emperors ordered aqueducts built or expanded primarily to supply water to the imperial public baths that were so central to the Roman way of life. But ostentation was a factor, too. Along with the baths, a gener-

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ous water supply meant a city could have public water shows, glorious fountains, lush watered terraces, and other hydroluxuries.<sup>3</sup>

Take the ancient city of Perge, in what is now Turkey. There, water shot from an intricate, two-story aqueduct terminal before cascading into a canal that flowed down the middle of the main street and across the entire length of Perge. Adding to the pleasant sound and sight of moving water, the canal cooled the Mediterranean city. “Extravagances such as this surely reflect more than just a pride in the water system,” writes classics scholar Trevor Hodge. “They reflect the particular form that took: an ostentatious insistence on abundance, or, as we would now call it, conspicuous consumption.”<sup>4</sup>

## D O W N T H E D R A I N

In the modern world, Americans win the chariot race as the most conspicuous consumers of water. In all, the United States draws up 408 billion gallons of water a day, with crop irrigation by far the largest use. California, Texas, and Florida, where 50 percent of the nation’s future population growth is forecast to occur, are the thirstiest. These three states use a quarter of all freshwater in the United States.<sup>5</sup> Managers for the nation’s water supply stay awake at night worrying that we use more than nature replenishes. Water managers in thirty-six states believe they will see water shortages in the next decade. And that’s without drought.<sup>6</sup>

But most Americans do not spend a moment fretting about the source or quality of their water. They expect it will gush out when they turn on the tap. It almost always does. The abundance, low cost, and cleanliness of water in the United States all help make Americans the heaviest water users on the planet. The average American uses more water each day than anyone in any other developed or undeveloped country.<sup>7</sup>

Each of us uses about 90 gallons of drinking water a day at home; each household about 107,000 gallons of water a year. Almost all of that is treated to meet federal drinking-water standards. We use it to flush toilets, water lawns, and wash dishes, clothes, and cars. More than half of all home water use in the United States goes to greening lawns and gardens. About 14 percent is never used at all. It leaks out of our pipes.<sup>8</sup>

Still, Americans care enough about water that they have made significant strides to conserve it. People are often surprised to learn that

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U.S. water consumption has been on the decline for thirty years. Thanks to public awareness, modest water-conservation measures, and progressive pricing models that charge consumers based on how much they use, the country has seen particularly dramatic decreases in consumption since the 1980s. Nationally, average per capita use in 2000 was lower than it had been since the 1950s. And total freshwater withdrawals in 2000 were less than in 1975 despite population growth.<sup>9</sup>

That is not, unfortunately, the case in Florida. In the Sunshine State, both per-person consumption and total water withdrawals are on the upswing.<sup>10</sup> Perhaps because they see so much of it, Floridians view their supply of water as endless.

That too, of course, is not the case.

#### THE WATER STATE

Lawmakers designated Florida the Sunshine State in 1970, though car license tags carried the nickname for years before.<sup>11</sup> The legislature wanted to bolster the peninsula's balmy image. "Humid subtropical"—the state's official climate category, whose primary characteristic is hot, humid summers—was not quite so catchy.

In his book *Florida Weather*, geographer Morton Winsberg tells a tale of another Sunshine State: Queensland, Australia. The two Sunshine States are similar in climate. Both have stretches along their east coasts known as the Gold Coast and coastal roads called Highway 1. Each is home to a Miami, and a Palm Beach too.<sup>12</sup> But in Florida's case, the Sunshine State moniker is a misnomer. In the drier states of Arizona, California, and New Mexico, the sun is visible from the ground longer than anywhere in Florida, where clouds frequently obscure it.<sup>13</sup>

Floridians are not so much defined by the sun. They are defined, instead, by the water. It surrounds the peninsula on three sides. It seeps into the skin from the heavy, humid air. Depictions of Florida—whether by the most talented painters or the cheesiest promoters—are usually waterfront: vistas of the state's beaches, its wide bays, its 10,000 miles of rivers and streams, its 7,800 lakes.

Like ancient Rome, Florida sits in a water-rich part of the world; it is blessed with an extraordinary supply of groundwater; and it is home to hundreds of springs—seven hundred, to be precise. As much water as you can see in Florida, there is even more of it you cannot. More than 1

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quadrillion gallons pulse through deep cracks and channels in the state's limestone core.<sup>14</sup>

But, like the Romans, Floridians are not satisfied with their natural water wonders. They like to show off, to play in, their artificial ones. Fountains grace the wealthiest city centers, the entrances of the best gated communities, and the best resort hotels. Canals cut through subdivisions so middle-class residents can enjoy the waterfront lifestyle of the rich. Florida is second only to California in its number of swimming pools, with 681,340 installed in 2004 alone.<sup>15</sup> Residents and tourists not content with beaches or pools can find more than a dozen water parks, where they can plunge down steep water slides or surf machine-made waves to a thumping beat of classic rock.

Typhoon Lagoon may not compare to a Roman city's waterworks or even, in the words of Frontinus, those "useless" wonders of the ancient Greeks: "With so many indispensable structures carrying so many aqueducts you may compare the idle pyramids or the other useless, although famous, works of the Greeks!" Frontinus brags in *De Aquaeductu*.<sup>16</sup> But the point is this: like the ancient Romans, Floridians are such conspicuous consumers of water that they can no longer get by on their bountiful natural supply.

## THE STORY UNDERGROUND

By the turn of the twenty-first century, Florida's population had passed 15 million. The aboveground consequences were clear to anyone navigating the traffic-choked highways or the condo-crowded coasts. But the more insidious impacts were invisible. They were happening underground, in the vast Floridan Aquifer. The Floridan is one of the most productive aquifers in the world. It underlies 100,000 square miles of the southeastern United States, carrying groundwater through southern Alabama, eastern and southern Georgia, southeastern Mississippi, the bottom third of South Carolina, and most of Florida.<sup>17</sup>

In 2005, the U.S. Geological Survey reported on the cumulative effects of enormous groundwater withdrawals from the Floridan between 1950 and 2000. Geologists Richard Marella and Marian Berndt found alarming groundwater-level declines and saltwater intrusion throughout the aquifer. In northeastern Florida and eastern Georgia near Savannah, water levels since 1950 dropped at an average one-third to one-

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half foot per year. Along the coastal panhandle of Florida, water levels plummeted one hundred feet since 1950, causing utilities to punch wells farther and farther inland. Groundwater withdrawals sucked the life from numerous lakes, wetlands, and springs as well.<sup>18</sup> Kissengen Springs, a once-popular tourist attraction in Central Florida that bubbled up thirty cubic feet of groundwater each second, was the first major spring in the Sunshine State to completely dry up due to groundwater over-pumping.<sup>19</sup>

Along the coasts of Georgia and South Carolina, large groundwater withdrawals in the Savannah and Hilton Head areas resulted in saltwater intrusion, which in turn caused high chloride concentrations in the remaining groundwater.

The scientists also reported grimly on groundwater quality. They found that throughout densely populated areas in Florida and Georgia, urban runoff and septic tank discharges tainted groundwater with nitrates and organic compounds. In Orlando, 240 drainage wells sent untreated storm water and urban runoff straight into the Upper Floridan.<sup>20</sup>

Throughout the Floridan Aquifer, groundwater was contaminated by land-use practices, too. Sinkholes and streams serve as funnels down which contaminants pour directly into groundwater. Chemical fertilizers, large numbers of farm animals, and septic tanks all cause nitrate pollution. Marella and Berndt found nitrates, as well as herbicides and pesticides, in springs and wells throughout North Florida. Nitrate concentrations in Manatee Springs near Gainesville, for example, had increased from 0.4 milligrams per liter in 1946 to more than 1.5 milligrams per liter in the late 1990s.<sup>21</sup>

Nitrates are notoriously bad for springs; they can turn a pane-clear blue grotto into pea soup, fill it with weeds. Elevated nitrate concentrations in rivers and springs also cause eutrophication, resulting in algal blooms and oxygen depletion that can lead to fish kills.<sup>22</sup> Nitrates pose dangers to humans, too, particularly to infants. In babies younger than six months old, nitrates can prevent blood from delivering oxygen to different parts of the body, causing sometimes-fatal "blue baby disease," which colors the sick baby's mouth, hands, and feet an obvious blue.<sup>23</sup>

The U.S. EPA's drinking-water standard allows 10 milligrams of nitrate per liter. Some advocacy groups advise against using water with levels exceeding 1.0 milligram per liter to mix infant formula.

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Pollutants' harm is relative, depending on whether you're an adult or a tiny baby, a fish or a Florida spring pool. Even though it is safe to drink, groundwater with ten milligrams of nitrate would devastate the springs, reports Bruce Ritchie at the *Tallahassee Democrat* in a story about how Florida's nitrate standards are not nearly strong enough to keep its springs healthy. The standard "needs to be changed," springs biologist Jim Stevenson told Ritchie. But that could affect things like development, fertilizer use, and how wastewater plants operate. "That would influence a lot of land uses," Stevenson observed.<sup>24</sup>

## DEVASTATING DROUGHT

Just as most Americans hardly think about water when they turn on the tap, the average Floridian did not really have to think about the state's groundwater problems, despite their enormity. But that changed in the year 2000. For many, the year was an unbearably long one. It was the driest in Florida's recorded history, the worst in a four-year drought that stretched from 1998 to 2001.<sup>25</sup> Nearly 1 million acres of wildfires burned throughout the state—despite a ban on outdoor fires that extended even to Boy Scout campfires.<sup>26</sup> Yawning sinkholes opened in yards, in the middle of highways. Thousands of private wells went dry. Lake beds turned to sand, sprouting ten-foot-tall weeds. In a Tampa warehouse, the Salvation Army stockpiled hundreds of cases of bottled water for families whose wells dried up. Florida's governor, the two-term Republican Jeb Bush, convened a "drought summit" of state leaders who drafted an emergency plan that called for trucking water to parched towns and cities, rationing supply to one gallon per person per day, and leasing portable desalination trucks similar to those used by the military during the Persian Gulf War. The governor called the drought "a crisis, not a potential crisis."<sup>27</sup>

Across the state, residents endured water restrictions. They could water their lawns or wash cars only once or twice a week. Power washing was banned in some communities; fountains ordered shut off in others. The shortage turned people surly, with neighbors calling special hotlines to tattle on wasteful neighbors and "water cops" patrolling subdivisions to look for violators. In South Florida, the water shortages were so severe that children were restricted in their use of "water-based recreation toys"<sup>28</sup>—like the ubiquitous yellow Slip N' Slide.

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**Lack of rainfall and groundwater pumping both can dry up lakes in Florida. At Lake Brooklyn in the Keystone Heights area of north-central Florida, docks stretch out into sand and grass.**

(Photograph by Jon M. Fletcher, courtesy of *The Gainesville Sun*.)

Yet there was one group of Floridians under little pressure to curb water use: real estate developers. Florida has five water-management districts that oversee the state's water supply. The districts can permit or restrict water use, and they do. But the gubernatorial appointees who run the district boards are not inclined to quash economic development. While all five districts ordered water restrictions during the drought, overall water use actually climbed—in part because of new development. In the South Florida Water Management District, regulators say they were practically relieved when builders finally paved over the last possible piece of developable land in western Broward County. Finally, they could stop doling out large water permits. But then the builders surprised them by turning back to the east, and knocking down single-family neighborhoods to construct high-rise condominiums with even greater water needs.

In the sinkhole-prone Southwest Florida Water Management District, then-executive-director Sonny Vergara tried to explain to the *Lake-land Ledger* newspaper in parched Polk County how he could dole out water permits for new development with one hand and stop people from watering their lawns with the other. The drought, he said, was a short-

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term issue, while development was a long-term one. The biggest complaint he heard from the public, he said, “is that they’re fined by governments for watering too much while the same governments are issuing permits for more building.”<sup>29</sup>

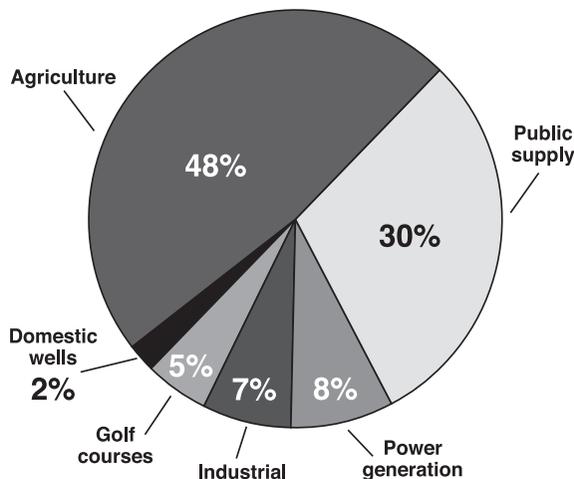
Florida drinks up a total of 8.2 billion gallons of freshwater a day. The largest slice of the state’s water pie—3.92 billion gallons, or 48 percent—goes to agricultural crops. Florida’s farmers make the biggest withdrawals for irrigation east of the Mississippi River. In the year 2000, inefficient flood irrigation still quenched 45 percent of the state’s farmland.<sup>30</sup> For most of Florida’s modern history, the state’s farmers were so revered that few dared question their water use. That trend has changed in recent years, though, as they have lost literal and political ground to home builders.

In almost every other part of the country where agriculture is being converted to housing, water consumption is going down. But just the opposite is happening in Florida. Even as total water use and per-person use dropped in the United States as a whole over the past few decades, both increased in Florida. The state’s total freshwater withdrawals increased 46 percent between 1970 and 2000.<sup>31</sup> Per-person use climbed, too. In 1955, it was a little less than 140 gallons a day. Now, it is 174 gallons a day.<sup>32</sup> The upward trend has continued in recent, water-conscious years. Nationally, per-person water use dropped between 1995 and 2000, the latest period for which data are available. But in Florida, it increased—by 5 gallons per person per day.<sup>33</sup>

State water officials blame the four-year drought, saying it kept residents running their sprinklers in an effort to turn brown lawns green. Moreover, they maintain that it is unfair to compare Florida to the rest of the United States because of the Sunshine State’s year-round climate. Up to 75 percent of domestic water use in Florida is for outdoor purposes, depending on the time of year.<sup>34</sup>

Indeed, Florida’s green-grass culture does not look kindly on conservation. Just ask Sol Koppel, a retired computer programmer from New York. Koppel never had a yard until he was in his sixties. That is when he and his wife moved from Brooklyn to a community called Oakwood Village in the Tampa Bay area. In Brooklyn, he had never had more than a houseplant. Now, he had a huge lawn that he had to mow, weed, and water—even during times of severe water shortages.<sup>35</sup>

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**Water withdrawals in Florida.**

(Data from 2000 U.S. Geological Survey. © Christopher Sheek.)

Koppel went to his local library to read up on drought-friendly landscaping, known as “xeriscaping.” Then, piece by piece, he began to tear out his grass and plant drought-tolerant flowers, trees, and shrubs: Indian hawthorn, verbenas, and the like. Koppel’s work earned him a native-gardening award from the University of Florida’s Cooperative Extension Service. But it earned him the scorn of the Oakwood Village Homeowners Association. The association cited him for “noncompliance with deed restrictions” for not having grass. After a month-long fight, the mild-mannered Koppel reached a compromise with the Oakwood Village officers that let him keep some of his water-wise yard. He had to replace a 25-foot-by-8-foot swath with grass. “It was my first crime,” he says. “Can you imagine? Not having enough grass.”

Xeriscaping has become increasingly popular in Florida in recent years, and it is required in a few particularly water-stressed communities. But somehow, the greenness of grass has become a status symbol, so much so that some homeowners associations measure the shade of green—and ticket residents whose lawns are not bright enough. Some of the more notorious associations ticket residents for having yellow or brown lawns even during periods of drought, forcing them to choose between violating water restrictions and facing the wrath of their neighbors.

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This copious irrigation, combined with the fact that the state is among the wettest in the United States, with at least 50 inches of rain a year in most places, makes Florida's lawns and landscapes the most watered anywhere in the world.

Green matters especially to golfers. Florida is home to more than 1,200 golf courses, far more than any other state in the nation.<sup>36</sup> At last count, they covered an estimated 134,000 acres, 90 percent of which were irrigated. Golf course acreage increased 58 percent between 1985 and 2000, while golf course irrigation increased 126 percent, again because dry conditions kept the sprinklers whirling.<sup>37</sup>

Nowhere are the golf greens more plentiful than in southwest Florida, where the Rosens dug their canals off the Caloosahatchee River in the 1950s and 1960s. The region's coastline, home to cities such as Naples and Fort Myers, has become a sea of vast gated communities, extra-large-lettered road signs, sparkling new healthcare facilities, and late-model Cadillacs. Until recently, anyone driving just a few miles inland could see that agriculture still ruled the region, with farmers dominating both land use and water use. Tomatoes, bell peppers, watermelons, and other thirsty crops covered most of the southwest interior all the way to Lake Okeechobee. But just as the farms replaced the wetlands in the twentieth century, the suburbs are replacing the farms in the twenty-first. Water managers say that by 2020 farmers will no longer be the biggest water users in southwest Florida.

For the first time anywhere in the United States, that honor will go to golf courses.<sup>38</sup>

## C R I S I S I N A L A N D O F P L E N T Y

From the humanitarian standpoint, it is ludicrous to fret over water for golf courses and water for lawns—or to call a shortage of water for such things a “crisis.” In the fall of 2005, Hurricane Katrina's drowning of New Orleans proved that wetlands drainage, development patterns, and engineered waterworks could have deadly consequences to Americans. But no true water “crises” exist in this nation, if your measure is the number of people dying for lack of clean water.

Water-related disease is the leading cause of sickness and death in the world, killing between 2 million and 5 million people a year. The vast majority of those deaths are children under five.<sup>39</sup> This was the rallying

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cry for the late Paul Simon, the bow-tie-wearing U. S. senator from Illinois. Around the world, 9,500 children die each *day* because of lack of water or, more frequently, diseases caused by polluted water.

“If one 747 plane filled with 350 children were to crash, killing all those on board, we would be mesmerized by the television and radio reports, and the story would fill the front pages of our newspapers,” Simon wrote in his book *Tapped Out*. “Yet at least sixteen times that many children die each day for water-related reasons, but they do it quietly, and their stories rarely reach our living room TV sets and seldom even appear in the back pages of our newspapers.”<sup>40</sup>

Around the world, more than a billion people do not have access to safe drinking water, and their numbers are growing. The World Health Organization reports that 1.1 billion people globally do not have access to “improved water supply,” and more than 2.4 billion—40 percent of all people—lack basic sanitation.<sup>41</sup> By midcentury, the planet’s population will increase from today’s 6 billion to nearly 9 billion. Almost the entire increase will occur in countries already suffering water shortages.<sup>42</sup>

“The failure to provide safe drinking water and adequate sanitation services to all people is perhaps the greatest development failure of the twentieth century,” says Dr. Peter H. Gleick, president of the California-based Pacific Institute for Studies in Development, Environment, and Security and one of the world’s leading water scholars.

In 2000, the United Nations declared in one of its Millennium Development Goals that the international community would half, by 2015, the proportion of people without access to clean water. Other global summits have made similar vows. Instead, the trend is headed in the opposite direction.<sup>43</sup> The number of people without access to fresh-water is expected to grow to between 2.6 billion and 3.1 billion by 2025. By that time, too, the number of countries facing water crises will grow from 25 today to between 36 and 40—most of those in Africa and western Asia.<sup>44</sup>

Florida, in the early years of the twenty-first century, was all about globalization—Jeb Bush trotting on trade missions around the globe, the state’s public universities setting up global centers for this and for that. What would happen if a land of water-plenty put just a fraction of its wealth and science toward one of water scarcity? A Tampa cardiologist named Kiran Patel posed just such a question in 2005, when he made the largest single cash donation in the history of Florida’s universities—with

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matching grants it would amount to \$62.5 million—for a Center for Global Solutions at the University of South Florida. One of its research areas is water supply in the third world. “How much less water can our children drink?” asks Patel.<sup>45</sup> His own children live in Tampa. He was referring to the children of India.

The global water crisis demands America’s attention for reasons beyond humanitarian aid. The lack of clean water and sanitation knocks more than \$550 billion a year off world economic growth, or 1 percent of global gross domestic product.<sup>46</sup> At the same time, dwindling water supplies threaten violence in several hot spots: water is at the heart of tensions between Israelis and Palestinians; between Turkey and Syria; and along the Nile, Niger, and Zambezi rivers in Africa, just to name a few spots.<sup>47</sup>

The “crisis” of water supply in the United States is clearly incomparable to that of water shortages in Africa, China, and India. But whether viewed through an international, national, or Florida-centric lens, the basic facts are the same: The population skyrockets by the day. The amount of water available to the population stays the same. Whether at the global, continental, national, or state level, the problem is not really supply. It is timing and distribution.

Although water is the most widely occurring substance on Earth, only 2.53 percent of the planet’s water is fresh; the rest is salt water. Of that slice of freshwater, two-thirds is trapped in glaciers and permanent snow cover.<sup>48</sup> So all in all, less than 1 percent of the world’s water is available for humans. And its distribution is skewed. North and Central America have 15 percent of the world’s freshwater and 8 percent of its population. South America has 26 percent of the water and 6 percent of the population. Australia has 5 percent of the water and less than 1 percent of the people. Europe, Africa, and Asia all have higher percentages of population and lower percentages of water. Asia is the most dramatic example, with 60 percent of the world’s population and only 36 percent of the available water.<sup>49</sup>

Within continents, the issue is the same. Parts of Chile, Peru, and other South American countries have extreme shortages in some areas and severe flooding in others. In North America, it is the same. Here in the United States, the Great Lakes region holds 95 percent of the country’s fresh surface water but only 8 percent of its population. Within

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states, it is the same. In Florida, where the primary source of freshwater is groundwater recharged by rainfall, most of the rain falls in the north of the state, while most of the people live in the south.

This is one weird fact about Florida's weather you may not have learned on the Weather Channel. The state is split in half, just above Orlando, by a horizontal line that geologists call the "hydrologic divide." Only 44 percent of Florida's rain falls south of the line, yet 78 percent of the state's permanent population has settled south of it. In her book *Florida Waters*, Florida State University professor Elizabeth D. Purdum explains how neither surface water nor groundwater crosses this line, making South Florida an island wholly dependent upon rainfall.<sup>50</sup>

At the beginning of the nineteenth century, more than half of Florida's 36 million acre peninsula was submerged. By the beginning of the twenty-first, vast drainage and reckless groundwater pumping finally proved the limits of the state's water bounty. Floridians were getting rid of more groundwater every day than the state's water cycle could replace.<sup>51</sup> In a region lashed by hurricanes each summer, in a state that gets 150 billion gallons of rainfall each day, and another 26 billion gallons a day from rivers that flow from Georgia and Alabama,<sup>52</sup> it was an astonishing feat.