The Ten Biggest American Cities That Are Running Out Of Water

October 29, 2010 by Douglas A. McIntyre

Some parts of the United States have begun to run low on water. That is probably not much of a surprise to people who live in the arid parts of America that have had water shortages for decades or even centuries. No one who has been to the Badlands in South Dakota would expect to be able to grow crops there.

The water problem is worse than most people realize, particularly in several large cities which are occasionally low on water now and almost certainly face shortfalls in a few years. This is particularly true if the change in global weather patterns substantially alters rainfall amounts in some areas of the US.

24/7 Wall St. looked at an October, 2010 report on water risk by environmental research and sustainability group, Ceres. We also considered a comprehensive July, 2010 report from the National Resources Defense Council which mapped areas at high risk of water shortage conflict. 24/7 Wall St also did its own analysis of water supply and consumption in America's largest cities, and focused on the thirty largest metropolitan areas. One goal was to identify potential conflicts in regions which might have disputed rights over large supplies of water and the battles that could arise from these disputes. And, 24/7 Wall St. examined geographic areas which have already been plagued by drought and water shortages off and on.

The analysis allowed us to choose ten cities which are likely to face severe shortages in the relatively near-term future. Some of these are likely to be obvious to the reader. The area around Los Angeles was once too dry to sustain the population of a huge city. But, infrastructure was built that allowed water to be pumped in from east of the region. Las Vegas had similar problems. It was part of a great desert until Lake Meade was created by the Hoover dam built on the Colorado river.

Severe droughts that could affect large cities are first a human problem. The competition for water could make life in some of America's largest cities nearly unbearable for residents. A number of industries rely on regular access to water. Some people would be out of work if these industries had poor prospects for continued operation. The other important trouble that very low water supplies creates is that cities have sold bonds based on their needs for infrastructure to move, clean, and supply water. Credit ratings agencies may not have taken drought issues into account at the level that they should. Extreme disruptions of the water supply of any city would have severe financial consequences.

The National Resources Defense Council (NRDC) report takes the following into account when assessing the likelihood of water shortages: "The risk to water sustainability is based on the following criteria: (1) projected water demand as a share of available precipitation; (2) groundwater use as a share of projected available precipitation; (3) susceptibility to drought; (4) projected increase in freshwater withdrawals; and (5) projected increase in summer water deficit."

The ten cities on this list are the ones with the most acute exposure to problems which could cause large imbalances of water supply and demand. There are a number of metropolitan areas which could face similar problems but their risks are not quite as high. The water problem for US cities is, although it may not be evident, one of the largest issues that faces urban areas over the next ten years.

These are the ten largest cities by population that have the greatest chance of running out of water.

10. Orlando, FL

 Major Water Supply: Floridan Aquifer
Population (U.S. rank): 235,860 (80th)
Population Growth Rate: 26.8% since 2000
Average annual rainfall: 48.35 in.

North-central Florida, especially Orange County where Orlando is located, has experienced frequent droughts in the last decade. As a consequence, the area has implemented extreme conservation measures, including aggressive water-rationing policies and lawn-watering bans. After the drought and resulting wildfires subsided, however, Orlando faced another problem. As of 2013, Orlando will no longer be able to increase the rate at which it uses water from the Floridan aquifer, the city's main source of fresh water supply. This presents a major problem for city officials: how does the limited water supply continue to meet demand for one of the fastest-growing regions in the state? It is estimated that water usage in the Orlando area will increase from 526 million gallons per day from 1995 to 866 million in 2020. On the city website, the mayor is quoted, saying: "Orlando Utilities Commission water usage trends show Orlando water demand exceeding the supply by approximately 2014 if no action is taken." There are plans in the works to tap the St. John's river for irrigation, and eventually drinking water. Many, however, are skeptical that even this will be enough to meet Orlando's growing demand.

9. Atlanta, GA

 Major Water Supply: Lake Lanier, GA
Population (U.S. rank): 540,922 (33rd)
Population Growth Rate: 29.9% since 2009
Average annual rainfall: 50.2 in.

Between 2007 and 2008, the southeast experienced a major drought, which depleted the region's major water supplies. No city in the south suffered more than Atlanta, the second-fastest-growing metropolitan area in the last eight years. The crisis began when the Army Corps of Engineers released more than 20 billion gallons of water from Lake Lanier, the city's primary source of water. Continued poor rainfall brought the lake to its lowest recorded levels. At one point, city officials reported there was only three months left of stored fresh water to supply Atlanta. The drought eventually subsided and consistent rain returned the lake to less dangerous levels. However, Atlanta may continue to be at risk, as the lake is the site of an ongoing legal conflict between Georgia, Alabama, and Florida, all of which rely on the reservoir for fresh water. Last year, a federal judge declared Atlanta's withdrawals from the lake illegal, and if the ruling stands, the city will lose roughly 40% of its water supply by 2012.

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8. Tucson, AZ

 Major Water Supply: local ground water
Population (U.S. rank): 543,000 (32nd)
Population Growth Rate: 20% since 2000
Average Annual Rainfall: 12.17 in.

The NRDC study rates Pima county, Arizona, where Tuscon is located, as an area with extreme risk of water shortage. The city is in the Sonoran desert, an extremely arid region which receives less than 12 inches of rainfall each year. Currently, the Tucson region uses about 350,000 acre-feet of water per year. At this rate, Tucson's groundwater supply, which now provides the majority of the city's water, has a very limited life span. In addition to this, the city is currently bringing in 314,000 acre-feet per year from the Colorado River under the Central Arizona Project. However, Tuscon is growing rapidly, adding more than 20,000 people since 2000. This, combined with the political uncertainty of the Central Arizona Project allocation, places Tucson at extreme risk for future water shortages.

7. Las Vegas, NV

 Major Water Supply: Lake Mead/Colorado River
Population (U.S. rank): 567,000 (28th)
Population Growth Rate: 18.6% since 2000
Average Annual Rainfall: 4.5 in.

In the middle of the Mojave Desert, with an annual precipitation rate of only 10 cm, Las Vegas must rely on distant sources for its fresh water. The city's main source is Lake Mead, which supplies 85% of the water used in the Las Vegas Valley. Unfortunately, the lake is 59% empty and is approaching its first water shortage ever. In addition to Las Vegas, it would affect other areas of Nevada and Arizona. Moreover, it could potentially stop the Hoover dam from producing electricity – as soon as 2013. This would affect many big California cities that receive hydro-electric power through the dam.

6. Fort Worth, TX

 Major Water Supply: multiple
Population (U.S. rank): 727,577 (17th)
Population Growth Rate: 36.1% since 2000
Average annual rainfall: 34.01 inches

As Fort Worth continues to grow (its population is expected to hit 4.3 million by 2060), the amount of water demand has continued to exceed the amount of water available through local supply. As a result, the city, which is in Tarrant County, must rely on storage water, making the system much more exposed to the worst effects of prolonged drought. To remedy this problem, the Tarrant Regional Water District is trying to bring in more water from Oklahoma's Red River. Oklahoma, wishing to preserve its water sources, limits interstate water sales. Fort Worth has countered with a lawsuit, which is pending in the U.S. Court of Appeals.

5. San Fransisco Bay Area, CA

 Major Water Supply: various, including Lake Hetch Hetchy
Population (U.S. rank): San Fransisco: 815,359 (12th), Oakland: 409,189 (44th), San Jose: 964,695 (10th)
Population Growth Rate: 20% since 2000
Average annual rainfall: 20.4 in.

Much like the southeast in the early 2000's, California has experienced intermittent droughts that have brought the area's water supply to the brink of disaster. After several years of drought between 2005 and 2007, the Bay Area, which represents more that 3.7 million people, was forced to adopt aggressive water usage restrictions. Legal battles ensued between San Fransisco area legislators and those in the Sacramento delta who believed they deserved bay area water from major sources, like Lake Hetch Hetchy. According to the NRDC and CERES studies, the San Fransisco Bay area, including adjacent cities San Jose and Oakland, are "very likely" to experience a severe crisis as a result of water shortage within the next 50 years.

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4. San Antonio, Texas

 Major Water Supply: various ground water sources
Population (U.S. rank): 1,373,668 (7th)
Population Growth Rate: 20% since 2000
Average annual rainfall: 30.24 in.

Bexar County, Texas, where San Antonio is located, possesses the highest rating given by the Natural Resources Defense Council with regards to water sustainability. This means that the area is at extremely high risk for water demand exceeding supply by 2050 if no major systematic changes are made. As most surface water from lakes and rivers in Texas have already been claimed by varying districts across Texas, most counties are now looking at groundwater to meet future demand. San Antonio has attempted to secure water from a number of Texas groundwater conservation districts. Due to legal obstacles,this has proven to be difficult. Today, many experts, including members of the Texas Water Development Board, recommend undertaking a major project to ensure future sustainability, such as a desalination plant on the Gulf Coast.

3. Phoenix, AZ

 Major Water Supply: Colorado River Basin
Population (U.S. rank): 1,593,659 (5th)
Population Growth Rate: 21.2% since 2000
Average annual rainfall: 8.3 in.

Like many of the other western cities on this list, Phoenix is extremely dependent on water imported from the Colorado River. This is because nearly half of the water the city's residents use comes from this significant source. As the Colorado River Basin enters the eleventh year of its drought, the city's reliance on the river may soon become a serious problem. If the drought continues, water deliveries to Arizona could potentially be cut back. To keep up a sufficient water supply, Phoenix is adopting an aggressive campaign to recycle water, replenish groundwater, and try to dissuade over-consumption. Time will tell if it these measures will be enough.

2. Houston, TX

 Major Water Supply: Jasper Aquifer, Lake Houston, Lake Conroe
Population (U.S. rank): 2,257,926 (4th)
Population Growth Rate: 15.6%
Average annual rainfall: 53.34 inches

Throughout most of its history, the city of Houston primarily drew water from the Jasper Aquifer, located along the southeastern coast of Texas. Over the last 30 years, the city began to suffer from dramatic rises in sea level of nearly an inch a year. Geologists eventually realized that the cause was Houston's withdrawal of fresh water from the aquifer located under the city. This discovery forced city officials to use nearby Lake Houston and Lake Conroe for municipal water instead of the aquifer. Since 2000, Houston has been the fifth-fastest-growing city in the country, and its presence in an area with high drought likelihood makes it an immediate risk for serious water shortages.

1. Los Angeles, CA

 Major Water Supply: Colorado River Basin
Population (U.S. rank): 3,831,868 (2nd)
Population Growth Rate: 3.7%
Average annual rainfall: 14.77 in.

In the 1980's, Los Angeles suffered a major crisis when the city was forced to stop using 40% of its drinking water due to industrial runoff contamination. Like Las Vegas, the city now relies on importing water from the Colorado river via hundreds of miles of aqueducts. The Colorado may only be a temporary solution, however, as the fastest growing city in the country continues to increase its demand at an unsustainable rate. In its utility risk rating, CERES gave the Los Angeles Department of Water & Power the highest likelihood of risk among the cities it assessed. That list included Atlanta and the Ft. Worth Area. On top of this, The Hoover Dam, which is the main source of electricity for LA and much of the greater southwest, is also producing at a lower rate than it has historically. Some scientists suspect this drop-off will continue to a point where its electricity production is too small to sustain the dam economically. Los Angeles, even if the dam doesn't cease production in 2013, as some predict, it still faces serious water shortages.

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