

## WATER SUPPLY

# Southeast Drought Sparks Brawls But Reuse Meets One Utility's Needs

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After a drought of nearly two years, metropolitan Atlanta is facing possible water rationing, and some forecasters say that the supply in its principal reservoir will last only about 90 days more. But one county in the metropolitan area is floating on a river of reused water, and utilities from as far away as Australia have come to see the results.

"In Clayton County it's raining every day because we're putting 10 million gallons per day back into our supply," says Mike Thomas, general manager of Clayton County Water Authority, Morrow, Ga. "We have 200 days of supply."

Since 2000, the utility and engineer CH2M Hill Cos., Denver, have pursued a phased plan of transition from land application of treated wastewater to wetlands treatment. The first three phases of wetlands construction have been completed and now treat 10 million gallons per day. Ground has been broken for a fourth phase, expected to add 3 mgd when it is completed in two years, Thomas says.

"It's primarily a dirt-moving job," consisting of raising berms to retain water, says Thomas. The cells are planted with seven different species of vegetation both for esthetic reasons and for the protection resulting from natural diversity. "There's no reason to believe one plant performs better than another," he says.

The wetlands are being created on land formerly used for land application systems, where treated wastewater was dispersed by pumps and sprinklers and returned to the reservoirs via groundwater migration. They are less land-intensive than the land application systems, requiring only about 10 to 20 acres per million gallons, or 10% of the 150 to 200 acres per million gallons under the land application system, Thomas says. Operation and maintenance costs also are lower. With no more pipes and sprinklers to maintain, the O&M staff of 12 to 15 required for land application has been cut to four people now.

Capital cost for the wetlands system also is lower than for other systems. Clayton County's costs run about \$1.50 to \$2.00 per gallon of capacity, or \$5.00 per gallon including the wastewater treatment plant. A conventional system discharging water treated to a "very advanced" level can cost about \$10.00 per gallon, Thomas says. The utility plans eventually to add a fifth phase to the program, boosting wetlands treatment to the permitted level of 24 mgd.

Clayton County's water use currently averages 26 mgd, says Thomas. The wastewater is treated to advanced secondary levels and pumped directly to the wetlands. Land application still is used for 4 mgd to 5 mgd, and the rest about 10 mgd goes to wetlands treatment. After polishing the effluent to reduce levels of BOD, nitrogen, heavy metals and other contaminants, the wetlands drain directly into the reservoirs. Average retention time is two weeks. "We've increased our ability to sustain our reservoirs," Thomas says.

Water reuse is not a new technology, but "this is larger and unusual in putting water back into the drinking water system," Thomas says. Some communities have blocked programs to recycle treated wastewater into the drinking water system, denigrating the practice with the distasteful moniker "toilet to tap." But Clayton County Water Authority has been polishing treated wastewater through land application for 25...

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...years, and it worked at communicating the wetlands reuse plan to the public, says Thomas. "The environmental barrier of the wetlands and reservoir gives people some comfort," he says. Only about 30% of the raw water in the reservoirs is polished reuse water, he notes. The rest is rainfall runoff. Moving the water from wastewater treatment to water treatment takes about two years.

## Brawling

But drought has reduced rainfall in the Southeast by 30 in. per year, about half the normal rate, says Brian Fuchs, climatologist at

the National Drought Mitigation Center of the University of Nebraska at Lincoln. A brawl broke out over water in the dry Southeast after a September forecast by the U.S. Army Corps of Engineers said that Atlanta's water supply could be exhausted in about 90 days. The state of Georgia called on the Corps to reduce outflows to match inflows at the lowest reservoir in the river basin that supplies Atlanta. When the Corps did not comply, the state sought an injunction in federal court. The downstream states of Alabama and Florida protested Georgia's request, citing the needs of their own drought-stricken industries and people.

"We've been accused of favoring mussels over people," says Maj. Daren Payne, deputy commander of the Corps' Mobile District. He says the Corps is bound by the minimum-flow requirements of the Endangered Species Act as well as the needs of the powerplants, factories, pulp and paper mills and other water users in the Apalachicola-Chattahoochee-Flint river basin.

But the controversial forecast, given in an Oct. 4 stakeholder conference call, was based on worst-case assumptions, not the likely ones. The Corps recognizes three levels in a reservoir, Payne says. "Flood storage" is the maximum level a reservoir can hold; "conservation pool" is its normal operating level, about 60% of total volume; "reserve storage" is the lowest operating level, but still holds 40% of the reservoir's total volume. Lake Lanier now holds slightly more than 100 days of supply in the conservation pool. The lake's reserve storage still holds enough water to meet demand through June, Payne says.

The reserve pool's water quality does not significantly differ from the rest of Lake Lanier's water, Payne says. Nothing in its turbidity or mineral content would cause serious problems for a water treatment plant. "These are upland lakes," he says. "They don't have silting problems."

"Our concern is that even the smallest chance of [exhausting the supply] is unacceptable," says Pat Stevens, environmental planning chief at the Atlanta Regional Commission. "The Endangered Species Act gives flexibility to work with the Fish & Wildlife Service to find a way to modify the Interim Operation Plan [for the river basin] over the next few months. They just need to find options that won't make the species go extinct, and I think they can do that. The two lower reservoirs are pretty much empty."

Using Lake Lanier's reserve pool is not an option for Stevens. "We're getting into uncharted territory," she says. "These are earthen dams on Lake Lanier. They've never been drawn down this low." She worries about water quality in the reserve pool. "It will be really muddy if we get any rain at all. Most of the lake bed will be exposed," she says. Options

Conservation and maximizing the use of available water appear to be the only options for utilities in the drought-stricken Southeast. Alabama and Tennessee and the northern half of Georgia, together with parts of Kentucky and the Carolinas, are in the grip of "exceptional" drought, according to the **National Drought Mitigation Center**. "There's a limited supply of land in the watershed" supplying Atlanta, says Steve Cannon, executive director of the Gwinnett Environmental and Heritage Center, Atlanta. "If we had managed our water properly, I don't think you'd see restrictions on supply."

Parts of Florida also are in drought, though it's "not as severe as Atlanta," says Philip Waller, vice president in MWH's Tampa office. Lake Okeechobee, the main water supply for southeast Florida, is at a record low, he notes, and rainfall has been below normal.

In southwest Florida, the Peace River Manasota Water Supply Authority, Bradenton, is planning construction of a 6-billion-gallon reservoir in De Soto County. "This will be the water grid for four counties," says Waller. MWH Americas Inc. is the project design consultant and is providing construction management services and Barnard Construction Co. Inc., Bozeman, Mont., is the construction contractor. Reservoir construction is valued at \$65 million, with water-treatment plant expansion and a pipeline adding \$55 million more.

Tampa Bay Water has struggled to operate the Tampa Bay Seawater Desalination Plant, but that has been running at 25 mgd for two weeks, Waller says. "A lot of utilities are waiting for Tampa Bay Water to prove the technology," he says. The Oct. 15 report to the board was "positive," he says.

There's also a big need for reclaimed water in Florida, but it requires a dual plumbing system to bring potable water to homes and waste to the wastewater treatment plant, Waller notes. The growing populations in Georgia and Florida will need reused water as well as rainfall and groundwater to meet their needs.