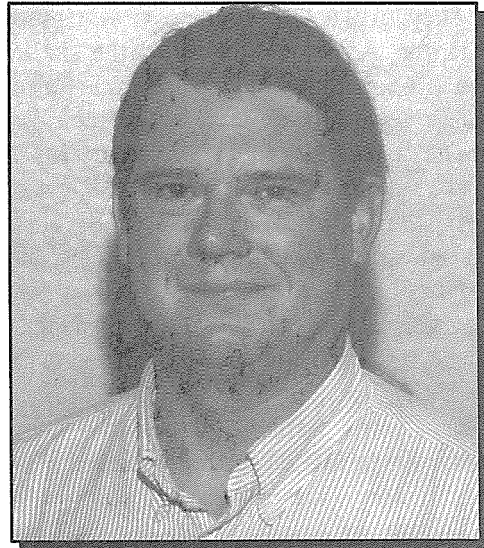


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WATER MANAGEMENT POLICY FOR THE ALBUQUERQUE BASIN: WHAT CAN WE LEARN FROM TUCSON?

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Albuquerque long believed itself to be a uniquely gifted city, an enchanted exotic anomaly, a desert metropolis with plentiful water stored in the deep alluvial sand and gravel sloughed off the Sandia Mountains. The Sandia pediment was believed to store enough water to provide for all possible future needs. Of all the problems Albuquerque might face, a water shortage, thankfully, was not among them.

That is, until 1992, when the U.S. Geological Survey's report entitled *Geohydrologic Framework and Hydrologic Conditions in the Albuquerque Basin in Central New Mexico* revealed a fault, or rather several, in our water plan. The pediment, our aquifer, is not all of a piece. Instead of a veritable lake underfoot, we now understand there to be more a series of ponds or isolated cells of water.

Rather than a uniform recharge sweeping across the valley to replenish our groundwater, localized surface subsidence gave evidence of serious resource depletion. Albuquerque was suddenly neither exotic nor enchanted; Albuquerque has become a rather ordinary desert city. Albuquerque has a water problem.

Tucson also is a desert city with a water problem. Tucson is roughly the same size as Albuquerque. Tucson is a university town with a military base. Tucson and Albuquerque have both experienced extraordinary growth. Tucson and Albuquerque have long been, in a sense, sister cities; we share similar physical situations, but with one major difference: in Tucson it has always been understood there wasn't much water, not in the upland Sonoran Desert.

In the brief time I have this afternoon I will be outlining the recent history of water management policy in Tucson with possible lessons for Albuquerque. As I have described the similarities between Albuquerque and Tucson I must also note some very important differences between our two cities. The first is that in Tucson, water is, for the most part, a local issue. What we decide to do with our water here effects every community along the Rio Grande, but in addition, by rippling through the economy what we decide to do here impacts every community in the state. And secondly, Tucson, is the terminus of the Central Arizona Project (CAP).

The Central Arizona Project was the most expensive single line item in the Bureau of Reclamation's history. The Gadsden Purchase, which made Tucson an American city for \$10 million, was less than one-tenth of the \$1.2 billion cost of the CAP. Water policy in Tucson has, to a large extent, been determined since 1968 by the Colorado River Basin legislation of that year, which authorized the CAP. Today it is easy to find critics who question this decision to run water 300 miles and 2,000 feet uphill, in open ditches, to deliver turbid salinated water to the Tucson Mains. Nevertheless, Tucson now has access to what might be thought of as an emergency reserve of water, sufficient for an additional few hundred years at projected consumption levels, not in the oversubscribed Colorado River water, for which the canal was built to deliver, but in the virtually untapped aquifers underlying sparsely populated La Paz County in western Arizona, conveniently at the head waters of the Central Arizona Project.

There is not going to be a similar solution to a water shortage in Albuquerque. The Bureau of Reclamation has probably built its last monumental water project with the CAP, and even if that were not so, there is no longer any unsubscribed water west of the one-hundredth meridian for Albuquerque to tap. Albuquerque is discovering a water problem later than most western cities. There is an ever increasing pressure on water resources throughout the region. Large scale water transfers are not a likely source of relief for Albuquerque.

Smaller, localized transfers are, however, possibly part of the solution. Tucson has been

buying water rights from both the Avra and Alter valleys, south and west of Tucson, since the 1970s. Much of the criticism of the CAP has come from those who believed that by simply retiring these two valleys from agriculture, there would be more than enough water to meet Tucson's requirements for several hundred more years. Agriculture was responsible for 89% of consumptive use in Arizona in 1970. By 1980 it was down to 54% of consumption in the Tucson Basin and it is now less than 40% of total water use in the Tucson Active Management area.

Yet for having both the CAP and the Avra and Alter valleys, Tucson Water Company projections still estimate demand for water in Tucson will outstrip current supplies sometime near the year 2020, a scant quarter century from now. Despite a declining percentage of agricultural water use, despite decreasing per capita urban consumption, despite more efficient commercial use, *total* water consumption today has not significantly changed since 1980, the year the state passed the Groundwater Management Act, mandating a "safe yield"—that is, "a balance between the amount of groundwater pumped and the amount that is naturally recharged,"—a goal Tucson is as far as ever from meeting.

Other studies of Tucson's water future are more pessimistic. Their projections, estimates and models indicate that demand will outstrip supply before the end of the next decade. Others optimistically give Tucson more than a century of adequate water supply. What is important to realize is that in all studies, regardless how the statistics are massaged, and given expected growth, the groundwater does eventually run out, or rather, is so depleted that delivery costs become prohibitive.

Until we begin to break the hydrologic cycle by directly desalinating seawater, and reverse the natural tendency for water to drain downhill, sweet water will remain a limited, finite resource for both Tucson and Albuquerque. The fact that we cannot put an absolute number on how long this resource will last, that experts cannot agree to within a hundred years or so what the water supply for a major American city like Tucson, or Albuquerque, is, should give us pause. Long-term, the Tucson Water Company suggests "many innovative technologies, such as weather modification

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and iceberg harvesting may someday become affordable ways of supplementing our water supply." Perhaps so. But the short-term, a quarter of a century, a half a century, is all either of our communities have to solve our water equation. This should indicate that the only prudent and rational course of action is to conserve what resources we do have. But water, especially in an arid area, is always more than precious, more than sacred, more than the stuff of life itself—it is political. Water conservation must not only be prudent, or rational, it must be politically acceptable.

The Tucson City Council learned this in 1976. In an exceptionally hot and dry June of that year, a new water rate was adopted and implemented. The new rate was intended to reflect the full market price of the water, and, in addition, included a "lift charge," to reflect the pumping costs to deliver water to the wealthy neighborhoods built in the foothills. Water conservation was the object. The first water bills reflecting the higher rates were mailed in July. The next January, just a few days over the mandatory six month waiting period from the first filing of the paperwork, all four city council members who had voted for the rate hike were defeated in a recall election.

Two ironic turn of events occurred when the new council took office. The first is that in the next council election, no politician was willing to talk about what had been until then Tucson's most important political issue, one that had just mobilized an extraordinary recall election. Water issues were now suddenly, wherever possible, deferred to the "experts" and the civil servants at Tucson Water. Following the recall election, the major political debate shifted from water to "growth."

The second irony is that the new City Council did not roll back water rates. Once in office the new council announced that the capital expenses of providing new service to a growing city justified the higher water rates. They did, however, eliminate the lift charges. Higher prices for water in Tucson now were linked not with conservation but development.

At the same time, the council implemented a public relations campaign to promote reduced demand. The "Beat the Peak Campaign" has generally been credited with reducing per capita water consumption. Today, xeriscaping is almost a cult

phenomena in Tucson. Tucson residents now use an average 160 gallons per day, down from approximately 250 gallons in the 1960s. In Tucson, water-use projections estimate an eventual 110 gallons per capita residential consumption, but with the price of water today now less, corrected for inflation, than in 1976, residential water consumption in Tucson has been once again edging up.

So today Tucson finds itself with what is essentially the same, if not a worse water situation than it had in 1976, and except for the CAP, there are fewer possible solutions. There are no longer large tracts of agricultural land to retire for water rights. Per capita residential water use may not get much lower than the current 160 gallons per day, and even if the projected 110 gallons goal is reached, population growth is expected to more than absorb the difference. The one place dramatic progress has been made is in the reuse of treated effluent, but this resource is limited, a direct function of indoor water use. And even the CAP today is not available to Tucson residential customers, having been taken off-line for maintenance and cleaning in the hopes that CAP water can be brought up to a quality acceptable to the Tucson Water customer. Today, Tucson, after two decades of private and public effort, has not by any means solved its water problem.

The title of this paper is "What Can We Learn From Tucson?" If Tucson is still so far from solving her water problems it might seem that the answer is very little. Yet there are many things we can learn, both from the failures of Tucson to deal with its water problems and those successes Tucson has had.

First, one of Tucson's successes. In researching this paper I discovered it is somewhat difficult to get current information on water usage in Albuquerque. Even such a figure as per capita residential water consumption in Albuquerque is not commonly known, not even at the water department. In Tucson, virtually everyone knows how much water they use. If a city has trouble formulating a water policy with a citizenry as water literate as Tucson, then in Albuquerque, where the water issue is new, where the facts are hard to find and analyze, the difficulties are going to be compounded. Let me give an example of the

difference between our cities in this regard: when I wrote Tucson Water for information, I received five pounds of brochures and booklets; when I called Albuquerque Public Works, the receptionist didn't even know the water department had an office for Public Relations. Tucson's water conservation campaigns may have had some counterproductive results, but they have served the invaluable role of introducing the people of Tucson to the serious water issues confronting them.

Second, Tucson should be justly proud of their reclamation and reuse of effluent. The closest and most readily available new source of water for Albuquerque is, literally, going down our drains. Our golf courses, parks, highway medians and public gardens could all be watered with reclaimed effluent. What can't be used now can be recharged into the aquifer. Albuquerque has much to learn about recycling water from Tucson.

Finally, the most important thing Albuquerque can learn from Tucson is that water cannot be treated like an otherwise ordinary political issue. Every political decision in Tucson and in Albuquerque is going to affect, and in turn impact, the water situation. Tucson failed to realize this. Economic development, zoning and land-use plans, and infrastructure development were all decided as if the water problem did not really exist, that somehow water would be solved for, that water would always be cheap and clean, somehow always there.

Economic development is linked with water, but it is not entirely dependent upon water. Albuquerque, unlike Tucson, could begin at once to treat water as the rare and valuable resource it actually is. Albuquerque could begin pricing water at replacement cost and stop providing infrastructure subsidies for new development. Albuquerque may have to restructure its zoning, to encourage less detached single-family dwellings with lawns and evaporative coolers, and encourage higher density. By raising the price of water and removing subsidies, Albuquerque would reduce consumption, and begin to bank water for the future, where it will be worth even more than today. Our water problems would no longer be put off for the future, economic development would not become, as in Tucson, something of a pyramid

scheme, dependent on never ending population growth.

Albuquerque can learn from Tucson that water is, in the end, everything. Whether we recognize it or not, water is our blood, water is our future. When we decide our water future we are deciding everything. Like Narcissus, when we look into our water we can see ourselves. It is water that decides what kind of city Albuquerque will be, what kind of people we shall become, how we will live, how we will earn our way. If we fail to see beneath the surface of the problem, like Narcissus, enchanted, we will be lost.

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The Nile river is subject to political interactions. It is the world's longest river flowing 6,700 kilometers through ten countries in northeastern Africa – Rwanda, Burundi, Democratic Republic of the Congo (DRC), Tanzania, Kenya, Uganda, Ethiopia, South Sudan, Sudan and Egypt with varying climates. Considering the basin area of the Nile, Sudan has the largest size (1.9 million km²) whereas, of the four major tributaries to the Nile, three originate from Ethiopia – the Blue Nile, Sobat and Atbara. The The Research-Inspired Policy and Practice Learning in Ethiopia research project led to an increase in finance and support for functioning water pumps and access to safe water for rural populations in the region. The programme looked at ways to make sure that water supply systems are both functional and sustainable. By getting rid of human waste safely we can reduce diarrhoea by more than a third. At a global level we are also working with international partners to raise the profile of sanitation and speed up progress through –Sanitation and water for all: a global framework for action™. Handwashing and hygiene. The simple message to wash hands with soap is relatively cheap to spread, but priceless in terms of the millions of lives it can save.