

No Standing News

Since we have no standing, we stand with those left standing.

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Rolla's Shrinking Aquifer

Part 4 of WATER, WATER EVERYWHERE?

What happens to a town when it runs out of water? That's easy. Industry leaves first, retail businesses follow and everybody else bails out while a few die-hards who didn't want to deal with the problem try to figure out how to get water piped in at great expense from miles away. In a September NSN issue entitled, "Taking Rolla for a (Helicopter) Ride," we discussed Rolla's development expenditures to attract industry while ignoring the questionable condition of water, sewer and electric services that industries must have. Rolla is not the most highly industrialized town, but what industry we do have uses most of the water. Of the total water pumped by Rolla wells in 1992, 43% was for commercial customers and 17% was used by UMR, (a total of 60%), but only 40% was used by residential customers. A report we found says that the aquifer is shrinking faster than it is refilling, Rolla's well pumps have been set deeper and deeper to keep up with the dropping water level in the aquifer. Just how much water is left, how long will it last and what plans do the city and county have to deal with an area-wide water shortage?

The following is the general statement of condition from an extensive hydrological analysis in 1992, of Rolla's wells and aquifer by James E. Vandike, Missouri Department of Natural Resources, Division of Geology and Land Survey.

"The City of Rolla, as well as nearly every person in the Rolla area, depends entirely on groundwater produced from the Ozark aquifer for water supply. Use of this aquifer is shared with several other nearby major users, including the City of St. James, the Phelps County Public Water Supply District #2, and several private high-yield well owners. Additionally, there are several thousand private domestic wells within a few miles of Rolla that produce water from the same aquifer." That was in 1992. The area has grown a lot since then. Public Water Supply districts now almost completely encircle the town.

The Water Level is Dropping. After studying RMU's own data, Vandike reported that the water level of every city well was dropping. The hydrologic analysis of Rolla's operating wells showed an average decline of the water level of 3 feet per year; as much as 7.7 feet per year in well #10. The abstract to the report summarized the condition of the aquifer: **"Since 1900, approximately 32.6 billion gallons of water has been produced in Rolla and the rural Rolla area; about 72 percent of this has been produced by the City. A prominent northeast-trending cone of depression about 4 miles long and 1.5 miles to 2 miles wide has developed in the Ozark aquifer in Rolla. The axis of this drawdown cone roughly parallels I-44 in the western and northern parts of the City. Water-level declines in excess of 200 feet have occurred near City wells #9 and #10, but average water-level decline is**

between 75 feet and 100 feet in Rolla, and less beyond the corporate boundary of Rolla." Vandike's geological analysis asked the following question: **"The Ozark aquifer has supplied water to nearly every resident, business, farm, and industry in the Rolla area for nearly a century, and will likely continue to be the major water-supply source for many years. An important question is whether the aquifer is capable of continuing to supply the needed volume of water, or is present water use exceeding the safe yield of the aquifer."** That's some question. The problem is that no one is trying to answer it.

The Ozark aquifer is used by the city and the surrounding rural area; the "rural area" studied by Vandike included the unincorporated parts of Miller, Rolla and Dillon townships. St. James also draws from the same Ozark aquifer. In Vandike's opinion, because of the distance between the two towns, pumping in St. James probably has little effect on the water levels in Rolla. But Vandike made that statement eight years before St. James got a million-square-foot warehouse. Who knew?

Potentiometric maps in the report show the Ozark aquifer for each 10-year period from 1960 to 1992. The aquifer maps graphically illustrate that our accelerating rate of drawdown is causing the aquifer to shrink at a dramatic rate. Water-level declines in and near Rolla show about 29 billion feet of aquifer has been - as the geologists say - "dewatered." In the

60-year period from 1900 to 1960 the water used by Rolla and the four rural Public Water District Supply wells was estimated to be 8 billion gallons. From 1960 to 1992 we used another 24.5 billion gallons of water. **In the last 32 years we used three times the amount of water as in the previous 60 years.**

We checked the 1996 Rolla Comprehensive Plan for updated information on the wells and water levels, but it said nothing about the sinking water levels or the shrinking size of the aquifer. Does that mean the problem has been solved, reversed or just ignored? Did city hall not know about the 1992 Vandike report when they updated the comprehensive plan, or did they prefer not to reveal such negative information? Rolla's 1996 comprehensive plan says this: *"The wells produce a combined capacity of 12 million gallons per day."* That's 4,380,000,000 gallons a year - four billion gallons? Has city water consumption really increased by 3,653,210,000 gallons in just six years or did someone in city hall get the math wrong? If they're wrong, the misinformation needs to be corrected; if they're right we shouldn't just be alarmed, we should be packing.

Aquifers are complicated. Unlike big rivers, lakes or reservoirs that supply water to some cities, aquifers aren't easy to get to or easy to manage. The Ozark aquifer is composed of dense layers of sedimentary dolomite and sandstone. Some layers, and some areas in the layers of these layered rock formations, provide lots of gallons of water per minute, but another well just a few miles or a few feet away can produce very little water. Water production depends on how lucky you are when you pick a spot to drill. Rolla has been unlucky several times; 18 wells have been drilled, and only 15 are still in use. Contrary to local legend we do not have giant "underground domes" full of water; we do not have vast underground streams full of water. We have an aquifer of porous dolomite or sandstone water-bearing rock that is

recharged (refilled) only from local rainfall. In the last few years we have had severe drought conditions, so it's logical to assume that the problem hasn't gotten better and may have gotten much worse. Only RMU knows how low the water is and they aren't telling us. However our shrinking aquifer is a problem that can't be cured with a few good make-up years of rain because we passed the "sustainable" point, the point-of-no-return, decades ago.

Vandike explained what was happening to the aquifer, **"The continuing water-level decline in the Ozark aquifer in the Rolla area shows that the aquifer is not under steady-state conditions; outflow from the aquifer is greater than inflow, resulting in lowering of water-level within the aquifer. It is difficult to predict the magnitude of future water-level changes. Such predictions depend on accurately forecasting population changes and changes in per capita water use. Assuming no increase in aquifer withdrawal rates, the cone of depression will continue to gradually expand until 1) recharge within the radius of influence equals the volume of water being produced from the aquifer, or 2) the volume of water moving into the cone of depression from up-gradient, plus recharge, is sufficient to replenish the volume of water produced."** In non-technical terms the "cone of depression" is the vast space in the aquifer that has been emptied. In solution 2, the up-gradient is the surrounding rural area which is also experiencing lower water levels as Rolla's withdrawal pulls their water in to the Rolla "cone of depression". He was really saying that the only cure is to QUIT SUCKING OUT MORE THAN THE ANNUAL RAINFALL CAN REPLACE. Vandike explained that after about 1960 we were no longer in a **"steady-state condition where discharge balanced recharge with no long-term change in groundwater levels. Recharge to the Ozark aquifer is from precipitation."** Other studies show that only 6% of our annual

precipitation stays in the aquifer to replace the water we take out.

In closing his report, Vandike offered only one stopgap measure that might slow down the speed of this oncoming train. **"Further water-level decline can hopefully be minimized by selectively pumping wells within Rolla where yields and specific capacities are highest, and where water-level decline has been the least."** Has RMU done that? Have the water levels in Rolla's wells ceased dropping or significantly slowed their rate of decline as a result? Rotating wells is only a short-term solution.

Vandike, being a geologist and not a political scientist, hinted at but didn't address the political solution - community discussion of the development of a public policy on voluntary and/or mandatory controls on water use. That's the only way to relieve pressure on the aquifer and give it time to recharge, at least to some extent. Our minimum public policy goal should be to stop the rapid rate of decline in the water level. Future candidates for city offices must be asked pointed questions about what they will do about protecting the quality and quantity of our water. Rolla city council candidates need to be pinned down on why they appoint a utility board that operates the two most critical utilities in town and require no accountability from them and no explanation of what is happening to these critical resources. It isn't only desert communities that are discussing measures to protect their water. Water is becoming a topic of concern and the subject of lawsuits across the country in all climate zones.

If we do want the area to grow rapidly, as a matter of prudence, both city and county residents should be discussing the future of the water we have left and decide what restrictions and controls we are willing to live with before access to water becomes a crisis. We need to deal with the issue now and protect our ability to supply all the clean water that a high

growth rate demands. Just drilling more wells or deeper wells isn't a solution. Deeper wells are more expensive wells and there is no guarantee they will be productive; more and deeper wells will just drain the aquifer faster. Rolla could, in extremis, drill new wells far out in the county away from their "cone of depression" (the big empty space), and pipe water in to Rolla. Can you imagine the cost of such a project and the howls of Rolla taxpayers when they find out such enormous expense might have been prevented? Will the rest of the county just sit and watch while Rolla comes out and "dewater" more of the county water supply? We don't think so. We think if that happens it will be lock n' load time for sure.

Don't fill up your bathtub yet; Rolla isn't going to run out of water in the near future. The comprehensive plan says, with what we think is unjustified optimism, that **"Under the current Rolla Municipal Utilities long-range plan the utilities is expected to provide water services to meet future growth well into the year 2015."** Judging from the other figures the city probably has wrong in their plan, we're not reassured by their estimate. It was news to us that RMU has a long-range plan. The year 2015 is now only 14 years away and there have been significant increases in the demand on the aquifer since the report was written.

RMU Knew. The RMU board and management knew the water levels in the wells were dropping even before the Vandike study was given to them in 1992. How much further have the water levels dropped since 1992? Why is this information not reported to the city? Faced with such compelling expert evidence one would imagine that their reaction would have been to share this information with the public and, as a public board, take the initiative in helping to formulate a public water policy that would mitigate the dropping water level of the aquifer. One would only imagine that IF one did not know RMU. We know a lot about the RMU

and what we know about them is not reassuring. Our democratically elected representatives in the city have allowed this secretive group of appointees to run a critical public service like the Politburo of Water and Power. If they are ever forced to disclose what may be a problem with no easy solution, don't imagine that they will stick around to take the blame or help solve the problem.

Vandike, James E., 1992, **A Hydrologic Analysis of the Ozark Aquifer in the Rolla Area, Missouri**, Missouri Department of Natural Resources, Division of Geology and Land Survey. Water Resources Report No. 41, 84 p., 29 figs., 34 tables. P.O. Box 250, Rolla, MO 65401. \$8.00

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SILENCE EQUALS CONSENT

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