Importation Certain to Harm Upper Verde River

Many of us concerned with maintaining continuous flow in the Upper Verde River have concluded that importation of groundwater from the Big Chino by the municipalities in the Prescott area will reduce flow in the river by an amount equal to, or nearly equal to, the importation. We base our conclusion on information in studies by the Bureau of Reclamation (1994), the Arizona Department of Water Resources (2000) and by the USGS (2005 & 2006).

Recently, the Upper Verde River Protection Coalition, which includes the municipalities that plan to import water from the Big Chino, hired the consulting firm of Montgomery and Associates to review the USGS reports. Their review found fault with these reports, and the Coalition has used that to foster uncertainty about whether importation will affect the Verde River.

Despite the Montgomery review, our conclusion, based on the following three points, remains intact: 1. A high percentage of the base flow in the Upper Verde comes from the Big Chino. 2. The only outlet from the two aquifers that underlie the Big Chino is the Upper Verde. 3. Given the above two points, a well-established hydrologic concept dictates that removal of groundwater by wells placed in either aquifer will result in a near equal reduction in Upper Verde flow.

What does the Montgomery review say about these essential points? Although critical of the USGS report that concluded that 80 to 86 % of the base flow in the Upper Verde comes from the Big Chino, the company itself independently concluded that about 80% of the Upper Verde flow comes from the Big Chino. Thus, Montgomery does not challenge the conclusion that the Big Chino supplies a very high percentage of the flow.

Concerning the issue that removal of groundwater will result in a near equal reduction of flows to the Verde regardless of which aquifer is pumped, Montgomery representative Ed McGavock made two salient points. At a presentation to the Coalition he stated, "The crux of the matter from a technical standpoint is pretty simple. If the entire Big Chino basin acts as one aquifer, [then] the [upper] basin-fill [aquifer] is very well connected to the lower limestone [aquifer]. You pump out of either aquifer; it's all one aquifer. It is almost inescapable you will eventually impact the springs. You are taking out part of the water that is going to the springs."

Here, McGavock is clearly supporting all three of our points. He went on to

say, however, that it is not known whether the basin-fill and limestone aquifers are connected, meaning that water moves vertically between the two. If unconnected, you could pump from the basin-fill aquifer, where the importation wells are to be placed, to the theoretical point of eventually emptying that aquifer, but still maintain some reduced flow to the Verde via the limestone aquifer. When questioned privately by one of us, McGavock said that the possibility that the basin acted as two unconnected aquifers was "low." Nevertheless, his reference to two separate aquifers has allowed potential importers to indicate there is uncertainty about the impact of importation from the Big Chino on the Verde River.

Is there enough information to substantiate our conclusion, or should McGavock's "low" possibility of separate aquifers be considered? We must emphasize that all other major investigators, including the consultant that Prescott has used to study the availability of groundwater in the Big Chino, have concluded that the two aquifers are connected.

McGavock rejected this conclusion, because, in his opinion, the only means to establish whether the aquifers are connected is to compare water levels in the two. Because there are no wells from which water levels in the limestone can be measured, the question, according to McGavock, remains open. It is not necessary, however, to compare water levels. Hydrologic studies throughout the world have shown that gravity causes water to move vertically between aquifers when one overlies the other, as do the two in the Big Chino. This movement was theoretically confirmed by the Bureau of Reclamation's study of the Big Chino. To state that the connectivity cannot be established without more data would seem to state that it's possible that gravity does not work in the Big Chino.

In conclusion, we do not believe that the concept of two separate aquifers deserves further consideration. Those planning to import water from the Big Chino must recognize that they will impact the Verde and must develop mitigation plans before pumping begins.