

9/20/07

# Tapping Big Chino will reduce Verde River flow

By JOHN ZAMBRANO  
and BILL MEYER  
Special to the Courier

Many of us concerned with maintaining continuous flow in the Upper Verde River believe importing groundwater from the Big Chino by Prescott area municipalities 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 Montgomery and Associates to review the USGS reports. Their review found fault with the reports, and the Coalition has used the review to foster uncertainty about whether importation will affect the Verde River.

Despite the Montgomery review, our conclusion, remains intact, because:

- A high percentage of the base flow in the Upper Verde comes from the Big Chino.
- The only outlet from the two aquifers that underlie the Big Chino is the Upper Verde.
- 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 percent of the Upper Verde base flow comes from the Big Chino, the company itself independently concluded that about 80 percent of the Upper Verde flow comes from the Big Chino. Thus, Montgomery does not disagree that the Big Chino supplies a great percentage of the flow.

On the issue that removal of groundwater will result in a near equal reduction of Verde flows regardless of which aquifer users pump, 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 did say, however, that we don't know 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 go, to the theoretical point of eventually emptying that aquifer, but still maintain some reduced flow to the Verde via the limestone aquifer.

When asked privately, McGavock said the possibility that the basin acted as two unconnected aquifers was "low." Nevertheless, his reference to two separate aquifers has allowed potential importers to exploit uncertainty about the impact of importation from the Big Chino on the Verde River.

Does enough information exist to substantiate our conclusion, or should people consider McGavock's "low" possibility of separate aquifers? 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 he believes the only means to establish the connection is to compare water levels in the two. Because no wells exist to measure water levels in the limestone, 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. The Bureau of Reclamation's study of the Big Chino confirmed this movement theoretically. To argue that we cannot establish connectivity without more data would be to argue that gravity does not work in the Big Chino.

Those planning to import water from the Big Chino must recognize that they will affect the Verde and must develop mitigation plans before pumping begins.

*John Zambrano is a retired environmental engineer and vice president of the Citizens Water Advocacy Group. Bill Meyer is a retired USGS hydrologist with 40 years of experience in quantifying groundwater resources and the impact of wells on rivers.*