

# CWAG #6A Bulletin

## The Endangered Upper Verde River

### *The Loss of Base Flow*

by John Zambrano



In 2006, American Rivers designated the Verde River as one of the nation's ten most endangered rivers. The endangered portion is the upper 24-mile stretch from the River's confluence with Granite Creek to Perkinsville.

The Upper Verde is a natural riparian area, serving as home to abundant wildlife and a recreation area for humans. The threat is the potential loss of base flow, the flow that comes from groundwater. A river without base flow is ephemeral, a dry wash except during precipitation. Thus, the very existence of the Upper Verde River and its wondrous habitat is under threat.

Officials have muddled discussion of the endangered Verde by referring to high base flows in the downstream sections of the River or the high flows that occur during storm events. Those flows are not at issue.

In 2005, a U.S. Geological Survey report provided determinations of the recent sources of base flow to the Upper Verde River as follows: 80 to 86 % from the Big Chino aquifer; 14% from the Little Chino aquifer and 0-6% from an aquifer to the north of the River near Big Black Mesa. It is obvious that the Upper Verde is almost entirely dependent on groundwater from the Big and Little Chino aquifers.

The Little Chino aquifer serves the growing communities in the Prescott area. Its water table is decreasing. There is a goal to achieve safe yield and stop the decline, but that goal allows the decline to continue until all natural outflow ceases. It is, therefore, easy to see that the Little Chino will stop contributing groundwater to the Upper Verde and relatively soon.

The Big Chino aquifer serves primarily agricultural uses today, but residential development is increasing and becoming significant. Just as important, the communities in the Prescott area have a legal right to import groundwater from the Big Chino.

The outflow of groundwater from the Big Chino is only to the Verde River. As such, any removal of groundwater will result in a near equal reduction of flow in the River. Three independent government investigations evaluated the natural or predevelopment contribution of the Big Chino as approximately 24,000 acre-feet per year (AFY). If this amount were withdrawn, the Big Chino would no longer contribute groundwater to the River.

Municipalities in the Prescott Active Management Area (PAMA) can legally import water from the Big Chino under two provisions. First, the City of Prescott has a special provision that as determined by the Arizona Department of Water Resources in 2008 allows importation of 8,067 AFY. This water will be shared with Prescott Valley and the two municipalities are designing a pipeline that can transport this quantity and more. They expect to begin importation by 2011.

The second provision allows any municipality in the PAMA to obtain water from certain historically irrigated acres (HIA) in the Big Chino. The Department of Water Resources has identified the qualifying acreage, and the amount of water that can be imported has been preliminarily

determined to be 9,923 AFY. Together, the two provisions allow exporting 17,990 AFY from the Big Chino aquifer and thus from the Verde River.

If the municipalities import the allowed quantity, the remaining flow to the River from the Big Chino would be about 6,010 AFY. Current agricultural and other uses in the Big Chino already exceed this value. Agricultural use may diminish either by itself or as agricultural land is retired by municipalities to acquire HIA rights. However, residential development alone will soon exceed 6,010 AFY. The effect would be no contribution from the two sub-basins to the River. Flow in the Upper Verde would consist only of the contribution from the aquifer near Big Black Mesa, which has been estimated by USGS to be about zero to 1,080 AFY. The Upper Verde River would be ephemeral.

The time it would take for new withdrawals of water to reduce base flow at the Upper Verde is uncertain, and the effect would not be immediate. Likewise, were the withdrawals to cease, restoration would not be immediate. The USGS expects to complete a numerical model in 2009 that will provide better, but still rough estimates of the time for effects to occur. However, the fact that base flow in the Upper Verde River currently is approximately 18,000 acre-feet per year, which is well below a natural (maximum) value of 31,500 acre-feet per year, indicates that a significant effect from withdrawals may not take very long.

Will the municipalities import all 17,990 AFY? The purchase of Big Chino Water Ranch by Prescott with Prescott Valley allows importation of about 11,550 AFY because of the special Prescott exemption and the Ranch's HIA right. Chino Valley intends to import about 4,600 AFY, and most public officials express a desire to continue rapid growth.

Can the effects of importation be mitigated? The mitigation option most often mentioned is the cessation of irrigation in the Big Chino, but as you have seen, the analysis above assumes that all irrigation ceases. Other mitigation options appear problematic.

Officials talk about preserving the Verde. The public needs to demand clear plans that limit importation and provide mitigation for the amount imported. These plans should begin with an Environmental Impact Statement for any importation project.

CWAG Bulletin 6B is a companion bulletin that presents the natural contributions and potential losses in tabular form and includes references.

~ Those interested in learning more about local water issues and how our citizen based group is working with area officials are encouraged to visit our website at [www.cwagAZ.org](http://www.cwagAZ.org). Please join with us by attending our meeting held on the second Saturday of each month, 10am-Noon at the Granite Peak Unitarian Universalist Congregation, 882 Sunset Avenue in Prescott.

**CWAG ♦ PO Box 13145 ♦ Prescott, AZ 86304 ♦ [www.cwagAZ.org](http://www.cwagAZ.org) ♦ [info@cwagAZ.org](mailto:info@cwagAZ.org) ♦ (928) 445-4218**