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Verde Watershed CURRENTS

VERDE WATERSHED ASSOCIATION

"Barring heroic mitigation, expected demand over the coming decades for water to support the growing populations in the Prescott Active Management Area, the Big Chino and Williamson Valleys, and the Verde Valley will eventually doom perennial flow in some reaches of the Verde River"

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THE VERDE RIVER—A CAUTIONARY TALE OF TWO STREAMGAGES

The records of two U.S. Geological Survey (USGS) streamgages on the Verde River show the repeated occurrence of irrigation-season stream flows of 34 cubic feet per second (cfs) or less within the past forty years (Figs. 1 and 2) and portend the eventual loss of perennial flow in some reaches of the Verde River.

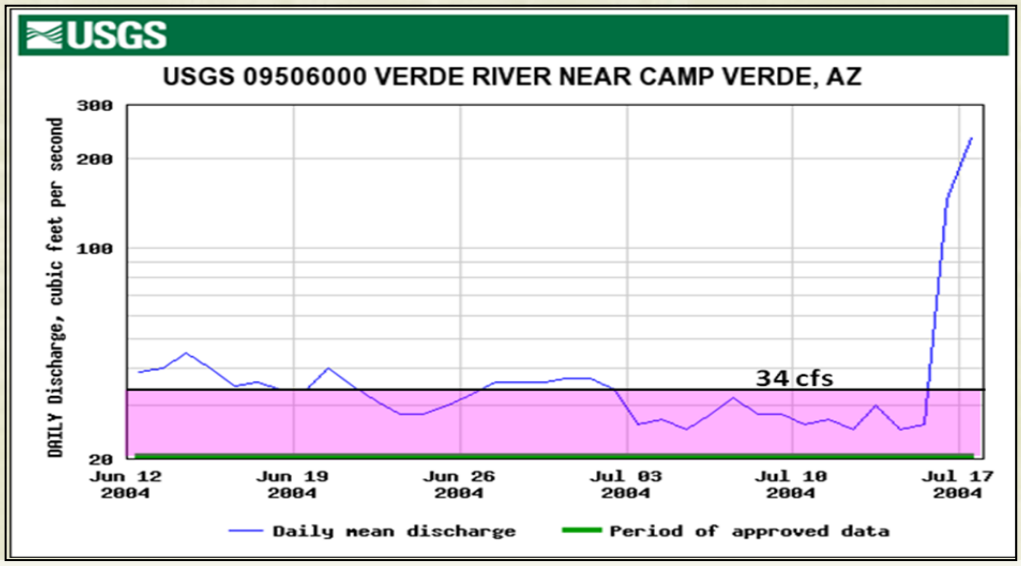

Figure 1. Record of Verde River flow, June 12, 2004 through July 17, 2004, at USGS streamgage 09506000, about 8 miles south of Camp Verde, downstream from Beasley Flat and within the Verde Wild and Scenic River reach. The curve shows the daily mean river flow at the gage in cfs. The top of the colored band represents 34 cfs. Segments of the curve touching or within the colored bar represent periods during June and July of 2004 when a base-flow reduction of 34 cfs would have caused the river to be dry.

The selection of 34 cfs as a potential tipping point for Verde River base flow in coming decades is based on: (1) estimates of future new water use

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within the upper and middle Verde River watersheds; and (2) recognition that pumping intercepts and removes groundwater that would otherwise reach the river. The effect on base flow is not instantaneous, but eventually the base flow decreases by an amount approximately equal to what is pumped and consumed. Please see more detail about these matters in the full report at:
http://www.vwa.org/newsletters/the-verde-river-a-cautionary-tale-of-two-streamgages-full-version.pdf

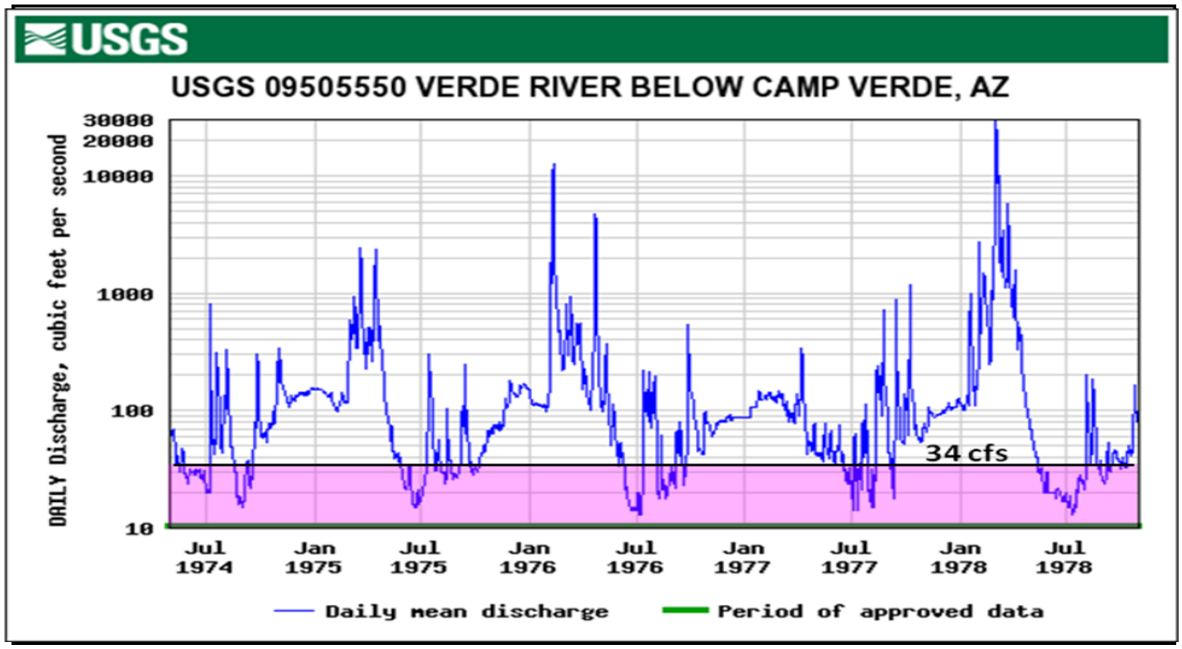

Figure 2. Record of Verde River flow, 1972 through 1978, at the former USGS streamgage at White Bridge, where AZ 260 crosses the Verde River. The gage recorded continuous data from late 1971 through 1978. The curve shows the river flow at the gage in cfs. The top of the colored band represents 34 cfs. Thus, segments of the river-flow curve within the colored band represent periods during the summer and fall months of 1972 through 1978 when a base-flow reduction of 34 cfs would have caused the river to be dry.

Groundwater coming from the upper Verde watershed passes the USGS streamgage near Paulden and provides all or nearly of the base flow in the upper 25 miles of the river. In recent years the summer base flow recorded at the gage has been about 20 cfs; for this analysis summer base flow is of primary concern because, owing to irrigation demands in the Verde Valley, summer is the time of lowest base flow. Springs above the Paulden gage provide all or nearly all of the base flow measured at the gage. Potential as-yet-unmet water demands in the upper Verde River watershed (Prescott Active Management Area and Big Chino and Williamson Valleys) substantially exceed the current 20-cfs summer base flow. If that future demand is met by additional groundwater pumping in the upper Verde River watershed, the result would be the loss of approximately 20 cfs of the Verde River base flow that now enters the Verde Valley above Clarkdale.

Base flow is the component of river flow that is provided by groundwater flowing directly to the river from springs and seeps in the river bed or banks. Without its base flow, the Verde would be an intermittent stream or dry wash that flows only in response to rain or snowmelt events.

In addition, a recent projection of potential unmet water demand owing to population growth in the Verde Valley is approximately 14 cfs by 2050. Additional pumping of groundwater to meet this demand would eventually cause a base-flow reduction of approximately 14 cfs. Added to the loss of approximately 20 cfs of

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base flow supplied by the upper Verde River, the total potential decrease of flow in the Verde is approximately 34 cfs.

A projected hypothetical 34-cfs reduction of base flow at the gage below Beasley Flat would have caused 23 days of no flow in 2004; it also would have caused 8 days of no river flow in 2007 and 4 days of no river flow in 2009. At White Bridge, the same hypothetical reduction in base flow would have caused 7 days of no flow in 1972, and 71, 84, 65, 44, and 78 days of no measurable flow in 1974, 1975, 1976, 1977, and 1978, respectively (Fig. 2).

There is, of course, an oversimplification in this analysis—that the irrigation diversions would continue to operate as normal. However, if there was no water flowing in the river in the southern part of the Verde Valley, there would be no river water available there to divert. On the other hand, reduction of the amount of river flow diverted for irrigation could reduce the likelihood of having periods of no river flow at White Bridge or at the current USGS gage below Beasley Flat.

Elimination of perennial flow in Arizona rivers because of over-commitment of the groundwater and their conversion to intermittent washes that flow only after storms or when snow is melting has been a common occurrence in Arizona. Is it too late to prevent parts of the Verde River from becoming intermittent like its southern Arizona counterparts, the Santa Cruz River (Fig. 3) and, recently, part of the upper San Pedro River? Barring heroic mitigation, expected demand over the coming decades for water to support the growing populations in the Prescott Active Management Area, the Big Chino and Williamson Valleys, and the Verde Valley will eventually doom perennial flow in some reaches of the Verde River.

Figure 3. Dry streambed of the Santa Cruz River on Guevavi Ranch, southeastern Arizona. (Courtesy of Dan Campbell of The Nature Conservancy).

Written by Ed Wolfe

Yavapai County Water Advisory Committee (WAC) Update

The Yavapai County Water Advisory Committee (WAC) is continuing with its priority project, the Central Yavapai Highlands Water Resource Management Study (CYHWRMS) with the Arizona Department of Water Resources (ADWR) and U.S. Bureau of Reclamation. Additionally, the WAC is looking forward to reviewing the Northern Arizona Regional Groundwater Flow Model and the results of water-use scenario runs by the USGS. The WAC has also agreed to continue to fund basic hydrology data collection through the USGS and water resource education through the University of Arizona Yavapai County Cooperative Extension office.

The first and second phases of the CYHWRMS study have been largely completed (the Demand Analysis Table of Phase 1 and supporting documentation are posted to the WAC website (http://www.co.yavapai.az.us/Content.aspx?id=20562)). The results of phase 1 indicate a potential unmet demand of approximately 45,000 to 80,000 acre feet per year in 2050 within the study area. The Technical Working Group (TWG) has also completed a water supply assessment to characterize water resources that could be included into various water supply portfolios to meet 2050 water demands within the study area (Phase 2). The results of Phase 2 will be presented to the WAC in January 2011, and will be posted to the WAC website. In Phase 2, potential sources of water are compiled in a table that includes location, type, availability, quantity, quality, and other comments. Currently the TWG is following up Phase 2 with development of alternatives to meet future demands based on the results of phase 1 and 2. Alternative development will continue into 2011 and will involve evaluation of potential alternatives as outlined in the original Plan of Study (posted on WAC website). The alternative evaluation criteria include environmental, economic, legal and institutional analyses as well as Reclamation's four tests of viability (completeness, effectiveness, efficiency and acceptability).

The TWG typically meets on the first Thursday of each month at 10:30 following the meeting of the Technical Committee of the WAC.

The Model Report for the current USGS Northern Arizona Regional Groundwater Flow Model is in the final publication process. The WAC has prepared a set of scenarios for the model that will investigate a range of groundwater pumping conditions in the Big Chino, Little Chino and Verde Valley areas. The results of these model runs should be available by early spring 2011 and will be reported to the WAC upon completion. The WAC will work with the media and others to explore the results of these model runs and other studies in order to facilitate clear understanding of what the studies are and are not, and how the results can be applied to water-resource management.

The WAC will continue its Joint Funding Agreement (JFA) with the USGS to collect hydrologic data in the Verde watershed. A copy of the current JFA and work plan is available on the Yavapai County website under the November 17, 2010 meeting minutes and agendas (http://www.co.yavapai.az.us/meetings.aspx). The WAC has also agreed to continue to fund half of a full-time position of water resource education through Edessa Carr at the Yavapai County Cooperative Extension Office (http://ag.arizona.edu/yavapai/).

Please contact the WAC Coordinator, John Rasmussen, for meeting dates, details on any of the WAC activities or if you would like to be added to the WAC email-recipient list (john.rasmussen@co.yavapai.az.us or 928-442-5199).

Written by John Rasmussen

WINTER OUTLOOK FROM SALT RIVER PROJECT

(*SRP provided this winter outlook report at the end of October. Did they get it right? Time will tell.*)

With near normal monsoon rainfall and a great start to fall one might ask what this winter has in store. Unfortunately, climate indicators point to a dry winter. The strongest indicator, El Niño Southern Oscillation (ENSO), has shifted since last winter from El Niño to La Niña. Current conditions along with the latest guidance indicate a moderate to strong La Niña event this winter with Equatorial Pacific sea surface temperatures well below normal. Since 1950, there have been eighteen La Niña winters. The majority of those eighteen winters have been dry with six being normal and four experiencing above normal precipitation.

Official forecasts from the National Weather Service and the Climate Prediction Center all point to a greater likelihood of a dry winter. However, even with what seems to be a sure thing, we can always keep our fingers crossed and hope for one of those rare wet La Niña winters.

SRP's Daily Water Report (http://www.srpwater.com/dwr/) for January 4, 2011, shows that the Verde River reservoirs (Horseshoe and Bartlett) combined are 53 percent full. The total reservoir system (Salt plus Verde) is 86 percent full. For comparison, storage in the total reservoir system a year ago was at 73 percent of capacity.

Membership Form for Verde Watershed Association

Government units	$100 per year	Make Checks Payable to:
Business for profit	$100 per year	**Verde Watershed Association**
Civic groups and non-profits	$50 per year	**P.O. Box 4001**
Individuals	$25 per year	**Cottonwood, AZ 86326**

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