

Verde Watershed Currents

Fall 2014

Wonder where your water comes from?

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Common black-hawks: raptors along our waterways.

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A wet summer, but what will the fall bring?

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Where Does Your Water Come from?

The Earth's water is in constant motion. The heat of the sun and gravity drive this motion. Water moves through the atmosphere, oceans, streams, lakes, glaciers, and below the surface of the Earth as groundwater. Most of the Earth's water is in the oceans. Groundwater comprises less than one percent of the total amount of water on Earth. Fresh surface water, in lakes and rivers, comprises less than .01 percent.

The Earth's water supply is essentially finite; little water is either added or removed. The same water has cycled for billions of years around the globe, being used over and over again to support life.

Our water here in the Verde River Watershed is, of course, part of the global water cycle. Our precipitation occurs primarily during two seasons: (1) the summer monsoon, generally July through September; and (2) the winter storm season, generally December through March. In between these two seasons there can be months of dry and sometimes hot conditions.

In the Upper and Middle Verde River Watersheds, virtually all of the water that we depend upon in our homes, yards, and businesses, as well as some of the water used for agricultural irrigation, is supplied solely from thousands of local wells that pump groundwater. Thus, in these areas, it is groundwater that fills our sinks when we turn on our faucets.

Precipitation - rain or snow - is the ultimate source of our groundwater. Both rain and snow are greatest in areas of high elevation - which, in the upper and middle Verde River watersheds, occurs mostly along the Mogollon Rim and in the Juniper, Santa Maria, and Bradshaw Mountains.



Fall at Dead Horse Ranch State Park by Derek Von Briesen
Title photo of Oak Creek by Derek Von Briesen

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The Verde River emerges from groundwater at its headwaters. Photo by Gary Beverly

Where Does Your Water Come from? (continued from page 1)

Some of the snow transforms directly into water vapor and escapes into the atmosphere. The rest of it melts, producing water that flows overland, driven by gravity - this is called runoff. A small portion of the runoff infiltrates (soaks into the ground).

During warmer weather - largely during the summer monsoon months - the precipitation occurs mostly as rain. Like snowmelt, the rain-produced runoff also flows overland. In our dry, warm climate, a great amount of water evaporates, forming water vapor, which rises directly into the atmosphere.

Runoff, whether from snowmelt or rain, finds its way into dry washes, streams, and rivers. In the Verde River Watershed, the runoff may be stored in reservoirs such as Watson and Willow Lakes in Prescott or Horseshoe and Bartlett Reservoirs on the lower Verde River northeast of Scottsdale. During wet years, runoff that reaches the Verde River may exceed the capacity of the reservoirs and must be released, flowing downstream to the Salt River and beyond.

Some runoff soaks into the ground as infiltration, and gravity carries it downward. Within the upper few feet of the ground surface - and especially during the warmer months - some of the infiltrated water escapes to the atmosphere by evaporation, and some is consumed, or transpired, by plants. The combination of these processes is called evapotranspiration. Whatever part of the infiltrating water gets past the root zone of plants continues to move downward to become part of the groundwater. In our temperate and relatively dry climate, most of our precipitation and resulting runoff is consumed by

evapotranspiration. A lesser part of it leaves as streamflow. Only a small part of the precipitation actually becomes groundwater - about one to two percent in the Upper Verde River Watershed, and about four percent in the Middle Verde River Watershed.

Groundwater is stored in the void spaces of rock, sediment, or soil. Groundwater flows slowly and continuously under the influence of gravity from areas where it infiltrates into the ground (recharges) to areas where it exits (discharges) to our wetlands, springs, streams, or lakes. Groundwater is one component of the Earth's never-ending water cycle.

Thousands of water wells, distributed throughout the Upper and Middle Verde River Watersheds pump groundwater for treatment and delivery to our towns, homes, yards, and businesses. Most of the water for irrigation in the Verde Valley is diverted from the Verde River and its perennial tributaries. Irrigation ditches (shallow canals) deliver the water to fields and gardens near the streams.

If you don't live in the Upper or Middle Verde Watershed, do you know where your water comes from? Taking a moment to learn the answer and reflect on this often underappreciated yet literally vital resource can help us all recognize why it's important to study and understand the Earth's water distribution, movement, and properties - this will help us all plan for our future.

Adapted from an original article by Edward W. Wolfe
Chair, Verde River Basin Partnership

"It is life, I think, to watch the water. A man can learn so many things."

- Nicholas Sparks



Common Black-Hawks

The common black-hawk (*Buteogallus anthracinus*) is a bird of prey in the family Accipitridae, which also includes eagles, hawks, buzzards, and kites. It is a stocky bird (1.4 to 2.9 pounds and 20 to 22 inches) with a hooked beak, broad wingspan (40 to 50 inches), broad white band across the tail, and yellow cere (the fleshy skin just above the beak where the bird's nostrils are located) and legs. When soaring, its wings are flat, with a light spot visible on the underside. In flight, it somewhat resembles the Black Vulture (since the wings are V-angled) and Zone-Tailed Hawk (a smaller hawk with more white bars on the tail).

In the Southwest US, they are obligate riparian nesters favoring mature, streamside gallery forests of Fremont cottonwood or Arizona sycamore. They feed mainly on aquatic creatures such as frogs, toads, small fish, crabs, and crayfish as well as lizards and snakes. They often perch for long periods on a branch over water, waiting for their prey to appear.

Their range includes areas of the Southwest US, Mexico, Central America, and it stretches into northern South America to Guyana.

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Photo by Doug Von Gausig
Article by Kathy Davis

The State of the Watershed

The Verde River Watershed saw significant rainfall during the summer monsoon for the second year in a row. With the monsoon season officially over (defined as June 15 through September 30), we can recap some of the highlights. The Verde River Watershed measured an accumulated average rainfall total of 10.30 inches. This is quite a bit more than last year's 8.70-inch seasonal rainfall total, and comes in at 170% of normal. This ranks as the third wettest monsoon season out of the last 65 years.

August really stands out with a total of 5.26 inches of rain, which is 214% of normal and ranks as the fourth wettest August over the past 115 years. The three biggest rain days in the watershed occurred on August 12, 19, and 26 when an average of 0.91 inches, 1.56 inches, and 0.49 inches of rain fell respectively. The heavy rainfall days did result in significant flows on the Verde River. The Verde River below Tangle Creek gauge observed a peak flow of 8,900 cubic feet per second (cfs) on August 19 and the Verde River at the Camp Verde gauge measured a peak flow of 2,710 cfs on August 27.

Do the summer rains mean anything for the fall and winter precipitation outlook? It's not likely; there is not a strong correlation with monsoon rains and fall and winter precipitation over the watershed. However, there are a few climate indicators that do well at indicating a direction of wetness/dryness for the fall and winter seasons. At the moment the strongest indicators, El Niño and Pacific Decadal Oscillation, both favor above normal precipitation this fall and winter. This also agrees with the Official Forecast produced by the Climate Prediction Center, which predicts a greater likelihood of above normal precipitation.

Article by James Walter, Salt River Project



Ocotillo (*Fouquieria splendens*)
fall leaves

Water Conservation at Home

Tiered Water Rates

When water is priced by tiers, the water's per-unit (such as per-gallon) cost to the consumer increases as the amount of water used increases, but only when the consumer reaches the next tier. Tiered water rates compel customers to use cost-effective water-conservation practices by providing a low-priced first tier for an average amount for indoor and outdoor uses. The system rewards customers who use water efficiently and it discourages water waste.

Water budgets based on tiered rates are effective water-conservation strategies, and the rate structure is the most equitable means to base costs on needs of individual households. Studies have shown that implementing water budgets reduces use. Prices indicate value to consumers and determine whether consumers use water efficiently. When prices are low, the data shows that consumers use more water.

Tiered water rates also help municipalities and private water companies pay for the true (full) cost of water as it is delivered. The true cost of providing water includes covering all operations, maintenance, and capital expenses.

The Verde River Basin Partnership

◆ Informing the community about our water ◆

The Verde River Basin Partnership is a non-profit organization comprised of both individual members and entity partner members (public and private organizations) who share a common goal. This goal is to support and preserve the long-term health of the Verde River and its watershed.

Our Mission:

The Partnership is a scientific and educational resource raising awareness among citizens and community leaders about the workings and limitations of Verde River Basin's interconnected groundwater and surface water systems, and the life they support.

Our Vision:

The Partnership aims to secure the long-term health of Verde River Basin's groundwater and surface waters, by assisting citizens and community leaders in exploring strategies and management practices that will sustain the Verde River system for all future generations.

Learn more about us and get involved:

- Visit our website
- Find us on Facebook
- Read our Guiding Principles
- Become a volunteer
- Make a donation
- Email us at info@vrbp.org

We offer free community events such as presentations and field trips, which are opportunities to learn about different aspects of the watershed and to discuss your ideas on topics such as wildlife, recreation, water-resource management, natural history, etc.

Please visit our website to find out about our community events.

www.vrbp.org

Common Black-Hawks (continued from page 3)

The northernmost breeding populations arrive in the US to breed as early as March and April, then leave by mid-October. Individuals occasionally overwinter in Arizona and New Mexico.

Their breeding range is along streams draining eastern and north central Arizona, western New Mexico, and southwestern Utah - for example in the Verde, Big Sandy, upper Gila and Virgin River drainages.

They are vulnerable to disturbance near their nesting sites. The utmost threats are alteration and elimination of riparian habitat through clearing, water diversion, damming, livestock grazing, and lowering of the water table by groundwater pumping. Protecting and regenerating gallery forest trees is essential for their continued presence in the Southwest. The Common Black-Hawk is protected in the US under the Migratory Bird Treaty Act of 1918.



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