

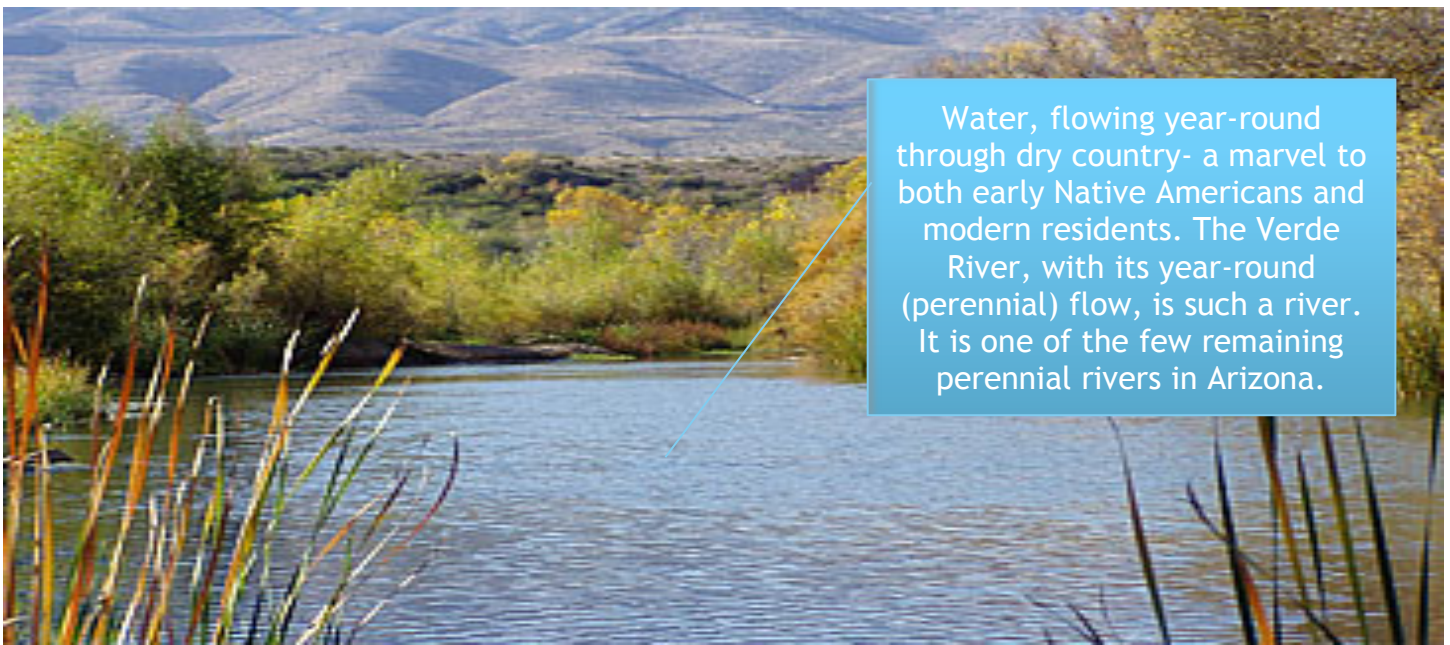


Informing the community about our water

Verde River Basin Water-Resource Notes no.1

The Verde River- A Desert Treasure At Risk

This is the first of a series of Verde Water-Resource Notes prepared by the Verde River Basin Partnership. The Partnership's goal is to help citizens and their elected and appointed officials understand the science of our interconnected groundwater/surface-water system that maintains the Verde River, appreciate the fragility of the system, and value the river, and the life and lifestyles it supports. Supporting resources can be found in the Verde River Basin Partnership Water-Resources Primer at www.vrbp.org.



Water, flowing year-round through dry country- a marvel to both early Native Americans and modern residents. The Verde River, with its year-round (perennial) flow, is such a river. It is one of the few remaining perennial rivers in Arizona.

The Verde River is an irreplaceable treasure viewed as unique by people around the world. Unfortunately, the continued existence of its year-round flow and the life and lifestyles it supports are at risk.

The Value of the Verde River

Rivers that flow year-round in dry country give us great value. The riparian corridors of the Verde River and its perennial tributaries provide a striking visual contrast to the adjacent more arid landscape. The Verde's riparian corridor is the zone of abundant plant and animal life supported by the continuously flowing river. It is particularly striking in spring and summer, when the leaves of cottonwoods, willows, and other trees and shrubs are bright green, and the corridor is lush. Indeed, the name *Verde* denotes this green riparian zone.

The riparian zone of a desert river teems with life that can't survive in the drier areas farther from the river. Many species of plants and animals cluster, shelter, feed, and reproduce in the Verde River's rich riparian habitat. The water, along with the vegetation it supports, provides travel corridors for wildlife moving through the area, as well as flyways for migrating birds. It furnishes habitat for eagles and hawks, including suitable nesting areas for bald eagles and many other breeding birds. The Verde River is home to beaver and river otter, and also to several endangered species of birds, fish, amphibians and reptiles.

Not surprisingly, the Verde River has also served as a vital resource for people—for native peoples through thousands of years, right up to all the citizens who live here today. Water diverted directly from the river has historically supplied most of the irrigation for agriculture in the Verde Valley, and it still does.

But there's another part of the river system: the natural underground water that feeds the river and creeks. This groundwater is also the critical main source of fresh water, through pumping wells, for local communities. Throughout the basin, it provides nearly all household water used in our towns and in rural areas. Beyond these uses, farther downstream the Salt River Project receives the stream-flow of the Verde River, which supplies nearly 40 percent of the surface water delivered to its Phoenix-area consumers.

These uses represent important values of the Verde River and its perennial tributaries as a resource, but there's more. This unique watercourse in a dry land is a natural recreational draw for people from near and far who want to get away to a beautiful place.

They come for kayaking, tubing, hiking, bird watching, picnicking, and fishing. There's an economic value as well provided by the Verde River and its perennial tributaries.

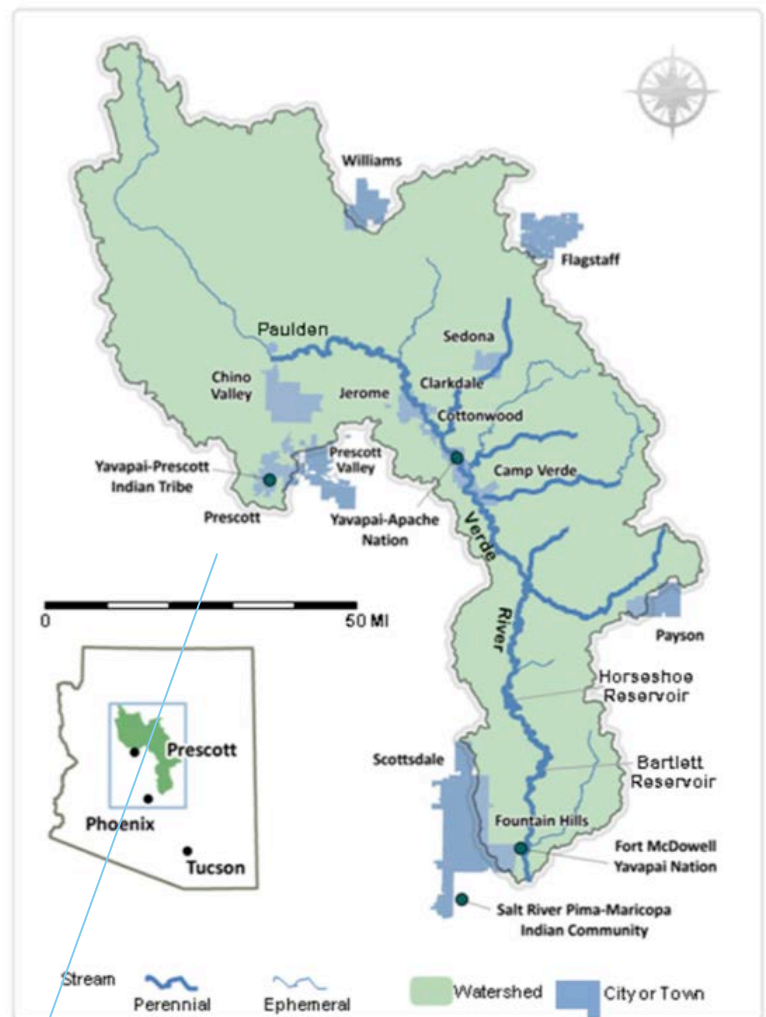
So the Verde River and its perennial tributaries are clearly the lifeblood of agriculture and rural/suburban lifestyles along its length and its perennial tributaries, in and around the Verde Valley. It fuels a recreation industry; it provides crucial habitat, serves as a lifeline for a wide variety of wildlife and vegetation—and this very habitat plays a role in drawing people to the river for recreation. And like so many valuable resources, subject to so many needs and demands, the Verde River faces challenges.

WHY IS YEAR-ROUND FLOW OF THE VERDE RIVER AT RISK?

The water flowing in the Verde River comes from two main sources: (1) surface runoff from rain and snowmelt; and (2) groundwater that springs and seeps release into the river and its perennial tributaries. If the river had to rely on rain and snowmelt runoff alone, it would be dry much of the year. This vital groundwater supplies about half the Verde River's annual stream flow; it alone maintains the river's year-round flow. Without it, the river would flow only after periods of rain or snowmelt; its channel would be dry most of the year. Over-pumping of groundwater elsewhere in Arizona has dried up numerous other rivers that once carried water year round.

Groundwater and surface waters are connected. Science has shown for more than 70 years that water underground—groundwater—forms an intimately interconnected system with water flowing locally, above ground, in perennial rivers and streams. A small percentage of each year's total rain and snowmelt manages to seep down into permeable underground deposits or rock formations, forming water-saturated layers called aquifers. Within aquifers all of the connected pores or cracks are filled with groundwater. The groundwater, driven by gravity, moves constantly through the aquifers toward lower areas—toward springs and streambeds.

In a natural, or predevelopment setting (before humans began to develop water infrastructure, and especially before wells), such an interconnected system of groundwater and surface water was in balance. Over the long term the quantity of water seeping into aquifers was balanced by the amount of water seeping out, through springs and into streams. But water wells disrupt that long-term natural balance. Pumping of wells can intercept groundwater that was en route to springs and streams.



Rising near the community of Paulden, the Verde flows east through rugged canyon country, and then turns south in the broad Verde Valley, passing through the river towns of Clarkdale, Cottonwood, and Camp Verde. After another lengthy journey through wild canyon territory, the river enters the reservoirs created by Horseshoe and Bartlett dams. The Verde joins the Salt River 25 miles below the Bartlett dam and 190 miles from the source.

It can also deplete groundwater beneath the riverbed, even though distant from the wells, causing water to flow away from the river into the groundwater. The movement of groundwater is much slower than the movement of water flowing on the surface. Thus the effect on stream flow from the pumping of groundwater doesn't show up immediately. But, inevitably and eventually, the component of groundwater that contributes to stream flow is reduced by an amount nearly equal to the consumption of water pumped from wells.

Substantial groundwater pumping in the Verde River Basin began in the late 1930's, mainly for irrigation. Today, groundwater pumped from thousands of wells in the basin provides essentially all the water for human usage; drinking, cooking, washing, toilet flushing, landscaping, industrial and municipal uses, and still some agricultural irrigation. A significant exception is that nearly all agricultural irrigation in the Verde Valley is supplied by water diverted directly from the Verde River and its perennial tributaries.

The inescapable consequence is that if we continue to support an ever-expanding population, as we currently do in the Verde River Basin—by simply pumping and consuming more groundwater—the Verde, or at least substantial parts of it, will become another Arizona dry wash flowing only briefly in response to storms or snowmelt.

The abundance of dry rivers in Arizona makes the problem clear: there is little legal support for managing groundwater pumping to protect stream-flow. Nor is there substantial protection for assuring sufficient Verde River basin groundwater to sustain our growing population over the long term. Indeed, **Arizona law generally fails to support conjunctive management of our intimately connected and interdependent groundwater and surface water.**

CAN WE PRESERVE YEAR-ROUND FLOW OF OUR TREASURED VERDE RIVER?

YES! But only if we understand and act on the issues.

www.vrbp.org



A recent study funded by The Nature Conservancy, concluded that river connected recreation & tourism in the Verde Valley account for an estimated \$87.5 million, & over 700 jobs.

Concerned, active, and educated citizens are the only force likely to change this situation. Of course, even without legal support, we can still take voluntary actions to reduce water demand. The Verde River Basin Partnership aims to educate our citizens and their elected and appointed officials to understand the science of our linked groundwater/surface-water system. It is critical that modern, well-founded science informs our water-management policy.

Already, the effects of groundwater pumping are apparent in different parts of the Verde River Basin. For example, Haskell Springs, located in the Verde Valley at the base of the Black Hills once flowed continuously, discharging hundreds of gallons of water per minute and providing water to the Town of Clarkdale. Haskell Springs is now dry.

Another example is Del Rio Springs, located within the Town of Chino Valley. Discharge of groundwater from the springs fed the once-perennial Little Chino Creek, which is a tributary to the Verde River. Little Chino Creek is now virtually a dry wash. The current groundwater flow from Del Rio Springs is about a tenth of its early-1940s rate. The Arizona Department of Water Resources estimates the springs will be dry by about 2025.

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