Verde River Basin PARTNERSHIP

Informing the community about our water

Verde Watershed Currents

Fall 2016

Rainwater Harvesting

The practice of rainwater harvesting is thousands of years old and has been used in many places around the world. Technologies have advanced in recent years, but the concepts are quite the same. Rainwater harvesting is simply the process of capturing rain and using it as close as possible to where it falls.

Often, people think about rain gardens or rain barrels when envisioning harvesting rain - perfect examples of simple techniques, which exemplify the two ways to consider rainwater harvesting: 1) utilizing landscape features to promptly place rain (i.e. stormwater) where it is used, referred to as passive rainwater harvesting and 2) utilizing rooftops to collect rain for storage and later use, referred to as active rainwater harvesting. Both passive and active techniques have great variability in sophistication and scale.

Water from hard surfaces can be directed into swales to fully irrigate native and climate appropriate plants. Title photo: Verde River by Doug Von Gausig

Passive rainwater-harvesting systems consist of catchment areas, distribution means, and holding areas. Active systems have these three components, but also include means to use the stored water. Passive systems are comprised of earthworks and can incorporate hardscapes as well. Successful passive harvesting slows stormwater runoff, directs or spreads this water into holding areas, and allows the water to soak into the ground. Water infiltration on-site can create self-sustaining oases, enhancing our landscapes, gardens, parks, and farms. This process mimics a healthy natural ecosystem on sites where the built environment has supplanted it.

To achieve these goals, the ground is shaped into features such as berms, swales, channels, and basins, while accommodating existing plants and adding new ones in suitable locations. Additional techniques can include utilizing impermeable surfaces (like concrete patios, or even rooftops) to direct runoff, building planted terraces on slopes to slow runoff, and using porous materials where reduced runoff is desired. Once the landscape is complete, the system becomes “passive” to the builder, but it is then that soil and plants get to work.

Inside This Issue

Active rainwater-harvesting systems can be scaled in size and complexity based on water needs.

Rainwater Harvesting (continued from page 1)

Passive rainwater-harvesting benefits go well beyond the rain garden wildflowers or apple tree one sees. Passive rainwater harvesting performs watershed services: decreasing erosion and sediment runoff, reducing flooding, and minimizing water pollution caused by chemicals and organisms. These services in turn preserve and restore water quality and habitat in rivers, creeks, and lakes, and also facilitate reduced size, maintenance, and cost of storm-sewer systems. Better yet, harvesting can vastly reduce or eliminate outdoor watering - critical, since throughout Arizona, up to 70% of total summer residential water use is outdoors (ADWR, 2015).

Another reason for passively harvesting rainwater is groundwater recharge, where geologic conditions permit, both at macro and micro scales. At a larger scale, employing the same principles of slow, spread, and soak, stormwater can recharge aquifers. Sierra Vista and Fort Huachuca, Arizona have constructed voluminous basins to help mitigate groundwater depletion that has affected flows of the San Pedro River. Additionally, in Phoenix and Chandler, a multitude of simple dry wells (pits or boreholes with rocks) constructed over the last 30 years, mainly for stormwater control, has been proven to significantly increase groundwater recharge.

At a smaller scale, landowners may be able to improve local shallow groundwater levels for their own wells by directing water via earthwork or downspouts to dry wells. Also, collective implementation within localized areas can help the flow of springs and streams, even if ephemeral, where they are fed by shallow groundwater, such as the Tanque Verde Wash in Tucson.

Active rainwater harvesting "extends" the rainfall season and can optimize water use. By definition, active systems require some owner involvement and are more expensive than passive systems. The catchment component in an active system is most often a roof. The distribution means are downspouts and gutters, and piping if the storage container is underground or enclosed. The holding area is a storage container appropriate for the water's intended use (rain barrels, food-grade cisterns, etc.) In addition, active rainwater harvesting requires means to move and use stored water, ranging from a garden hose to a thoroughly designed, constructed, and permitted system for potable usage.

Sophisticated systems for indoor, non-potable (toilets, laundry) and potable (with extensive filtration and disinfection) uses are becoming more commonplace. Many communities have enacted incentives and ordinances toward water sustainability. For example, Santa Fe County mandates that new large residences and commercial buildings have catchment systems for active harvesting, and smaller residences utilize active or passive systems for all landscaping water needs.

Fortunately in Arizona, rainwater harvesting is legal for property owners. However, on any property, state statues dictate that waters flowing in streams, canyons, ravines, or other natural channels, like washes, cannot be captured unless the owner has legal appropriation rights.

Rainwater harvesting alone won't solve all our regional water issues, yet if used even moderately, it could prove measurably helpful in achieving water security. By enacting or even observing rainwater-harvesting techniques, one becomes aware of the intricate balance between water supply and water use. This awareness is key to progress toward water sustainability. Applying strategies such as rainwater harvesting is surely preferable to failing to meet the water security needs of citizens and the over-drafting of groundwater, which affects flows of our rivers, creeks, and springs.

Article by Marianne Davis

"When you drink the water, remember the spring." ~ Chinese Proverb

Native Fish

Arizona's native fish have adapted for thousands of years to habitat changes, whether living in small ponds or powerful river flows. Their ability to adjust to periods of drought then flash floods is a marvel of nature and essential to their survival. However, native fish have not adapted as well to human influences on their environment.

Groundwater depletion, decreased flows in waterways, dams, and other changes have resulted in significant habitat loss and alteration. Introduction of non-native species, such as other fish and bullfrogs, has caused declines in native fish populations. Of the 36 fish species native to Arizona, one is extinct; 34 are identified as Species of Greatest Conservation Need by the state; and 20 are federally listed as endangered or threatened. If these fish were lost, an exceptional part of Arizona's natural and social environment would disappear.

The Verde River is one of Arizona's last-remaining perennial river systems and provides the state's longest stretch of continuous riparian habitat, with extensive woody riverside and wetland vegetation, which supports a diversity of native aquatic

>> continued on page 4 >>

Article by Kathy Davis
Photo: razorback sucker, by U.S. Fish and Wildlife Service, CC BY 2.0

The State of the Watershed

This year's Monsoon did not disappoint for some, yet did for others over the Verde River Watershed. The Watershed as a whole accumulated an average of 6.85 inches of rain from June 15 through September 30, which is 114 percent of normal. Some of the wetter locations were Prescott, which reported its 8th wettest Monsoon on record and Flagstaff, which reported its 12th wettest (period of record for both cities is 119 years). For the summer months, August stood on top, with an average of 3.41 inches of rain across the Watershed.

The Verde River also saw the greatest responses to the rain during the month of August, with river flows above average for much of the entire month. The peak flow of the Monsoon occurred on August 20th, when the Verde River below the Tangle Creek USGS gauge measured a flow of 1,120 cubic feet per second.

So, what does the remainder of fall and winter hold? Climate models indicate the potential for a weak La Niña event. For the Verde River Watershed, the outlook is ambiguous under these conditions. Both wet and dry falls and winters have occurred under such conditions. Even with a high degree of variability, the National Weather Service's official forecast calls for slightly better odds of a dry fall and winter.

Photo by Coconino National Forest

Article by James Walter, Salt River Project

Conservation: Finding Leaks

According to the EPA, the average household loses more than 10,000 gallons of water each year through leaks - with that water, you could wash 280 loads of laundry, take 600 showers, or meet an average family's water needs for a month. Most leaks can be easily found if you know where to look.

First, turn off all fixtures and water-using devices, and then check your water meter before and after a two-hour period without water use. If the meter does not read exactly the same, you probably have a leak. While looking at your meter, be sure to look for wetness in the valve box.

Continue your search outside for leaks by checking your hose bibbs and search the ground for wet areas, when there hasn't been recent watering or rain. The most common outdoor leaks are in irrigation systems. If you have one, turn the system on, tour the emitters, and check for signs of overwatering.

Moving inside, the biggest wasters are worn toilet flappers, dripping faucets, and leaking valves. Look online for instructions for the food-coloring toilet-leak test. Listen for dripping sounds and look for signs of moisture around fixtures and under sinks. For water-using devices (washers, icemakers, RO systems, etc.), look and listen for running or dripping water.

There is a helpful online step-by-step inspection guide from the Arizona Municipal Water Users Association: http://www.smarthomewaterguide.org. Good luck on your leak search!

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

Our organization, like so many other non-profits, owes much of its success to the hard work of volunteers and the support of the community. We appreciate your time and efforts.

Native Fish (continued from page 3)

and riparian-dependent species. Native fish require dependable baseflows and periodic high flows/floods to maintain water quality, diverse in-stream habitats, and reductions or removals of non-native aquatic species.

Historically, 16 native fish species lived in the Verde River and/or its tributaries. These species are currently present: spikedace (threatened, extremely rare), loach minnow (extirpated in Verde), Colorado pikeminnow (endangered, reintroduced), razorback sucker (endangered), roundtail chub (candidate species, covered under a Statewide Conservation Agreement), longfin dace (species at risk), speckled dace (species at risk), Sonora sucker (species at risk), and desert sucker (species at risk).

Recognition of native fish importance has created opportunities for positive changes. Fish barriers have been placed in Fossil Creek and Spring Creek to prevent non-native fish moving upstream. The Arizona Game and Fish Department recently finished an interactive online Verde Watershed Fisheries Management Plan: http://arcgis.azgfdportal.com/verdewatershed/. Along the Verde, there is strategic removal of non-native invasive plants coupled with restoration of native riparian habitat. Many agencies, organizations, and citizens have united to better manage water resources to conserve habitat and minimum baseflows for our native fish.

Speckled dace (*Rhinichthys osculus*), by Brian Gratwicke, CC BY 2.0

Verde River Basin Partnership
PO Box 1831
Cottonwood, AZ 86326

info@vrbp.org
www.vrbp.org

Produced by the Communications Committee of the Partnership

Committee Chair: Kathy Davis
Editor: Marianne Davis