Verde River Basin PARTNERSHIP

Informing the community about our water

Verde Watershed Currents

Fall 2015 - Winter 2016

Tucson conserves water; what we can learn? Read More - Page 1

Monarch butterflies are flitting through our lives. Read More - Page 3

Late fall and winter likely wet after average monsoon. Read More - Page 3

Conservation Lessons from Tucson

What can Tucson teach other communities about the efficient use of water? Plenty, it turns out. Perhaps the most important lesson may be that comprehensive efforts and commitment to those efforts yield impressive results over a relatively short time.

As a result of four decades of water conservation efforts, with increasing intensity over the last 25 years, Tucson has realized impressive results, reducing its residential water use by 29% since 1996. Last year, Tucson's residential water use was 86.3 gallons per capita per day (GPCD), a substantial difference from the 2010 Arizona average of 147 GPCD for residential use.

The city has used a combination of codes, incentives, ordinances, infrastructure, and community education to reduce demand and increase efficiencies. Most of the methods have easy metrics to gauge their success, while some are more difficult to measure; yet each program contributed to perhaps the most remarkable result - a culture of water conservation, including recognition of living in a desert with water supply limitations.

Tucson is inside an Active Management Area (AMA). In 1980, Arizona identified and designated some areas as AMAs due to their heavy reliance on mined groundwater. The five current AMAs in Arizona – including the Prescott area AMA - are subject to specific regulations by the state to meet targets for managing their water supply and demand, as established by the Arizona Department of Water Resources (ADWR). Yet, Tucson has gone beyond to create a culture where water efficiency is the norm. Although each AMA has different requirements and different water supplies available to them, lessons can be learned from one another on methods that work to reduce the demand for water.

Incentives and ordinances help Tucson reach goals to reduce demand at the meter for both residential and commercial properties. One example of a strategy focused on commercial development, as well as multi-family and industrial development, is their xeriscaping ordinance, which started in 1991. It requires the use of drought-tolerant plants throughout the site, with an exception for very small "oasis" areas (2.5% or 5% of a site).

Inside This Issue

Title photo: East Verde River by Derek Von Briesen

Tucson and the Santa Catalina Mountains, photo courtesy: University of Arizona

Lessons from Tucson (continued from page 1)

For commercial and multi-family customers, the city also offers an irrigation upgrade rebate. Since, irrigation systems are often incorrectly installed, poorly maintained, or outdated in either technology or for the landscape design it serves, they average an efficiency of around 30%. This inefficiency offers large potential water savings, even without changing landscape plants.

Another commercial water-demand reduction measure is the rainwater-harvesting ordinance, enacted in 2008. This ordinance was the first regulation of its kind to require developers of commercial properties to harvest rainwater for at least 50 percent of their landscaping needs.

Outdoor ordinances and incentive programs are also critical to residential water-demand reduction, since residences use approximately 76% of Tucson's potable water delivery. Considering that ADWR states up to 70% of residential water use is for outdoor purposes in Arizona (but less in Tucson), it is obvious where the most water can be conserved for most households.

The residential rainwater-harvesting rebate program – for both passive and active rainwater collection methods - was started in 2012. Additionally, a gray water ordinance was enacted in 2008 to require all new homes to have roughed-in gray water plumbing. The ordinance is coupled with a rebate program for retrofitted gray water systems.

What about indoor water savings? Toilets are an easy target, comprising about 27% of average indoor water use. In 1991, the new plumbing codes went into effect, requiring high-efficiency fixtures. For residents with homes built prior to 1991, the city offers the very popular High-Efficiency Toilet (HET) Rebate Program.

Much of the success of both residential and commercial indoor water conservation is based on the overhaul of plumbing codes in 1989 and the continuing re-evaluation and evolution of these codes. In concert with those codes, add in ordinances and incentive programs and the stage is set for real change in water-use. Now, how do you get them to come to theater? Public and professional education and outreach.

The education and outreach programs and resources of Tucson Water are many and far-reaching: from training to educate landscape professionals and plumbers to primary and high school programs to multiple general public bilingual-outreach avenues to water-use audits for homes and businesses.

In speaking holistically about Tucson's strategies, we must mention the critical role of infrastructure efficiency – in design, operation, and maintenance. Tucson's system-wide water loss is just over 7%. When adopting policies for this, states now often set this benchmark at 10%. Additionally, Tucson Water has been producing and delivering reclaimed water since 1984, which comprises approximately 11% of their total water delivery.

Tucson is looking at indirect potable reuse for the future – blending treated wastewater into a natural water source (groundwater basin or reservoir) and then further treating it for use. Beyond proven commitment to comprehensive strategies, it seems Tucson has something to teach us about innovation in water conservation as well. These lessons can help increase water supply security and create a cultural appreciation of living in the desert and living within our means.

Article by Marianne Davis
Special thanks to Fernando Molina, City of Tucson

"Water is the driver of nature." ~ Leonardo di Vinci

Monarch Butterflies

Dreaming of summer days, flowers, and butterflies as the winter weather approaches? Are you picturing beautiful monarch butterflies perhaps?

The iconic North American monarch butterfly (*Danaus plexippus*), a milkweed butterfly, has two populations – an eastern and a western population. Most monarchs are migratory, covering thousands of miles on their journeys.

Each fall, the eastern population migrates from Southern Canada and the Northern U.S. primarily to Mexico, but some go to Florida. The western population (those west of the Rockies, including Arizona) migrates mainly to California from other Western U.S. states and Southern Canada. During just one year, there are four separate generations of butterflies that complete four unique phases in migration. The first three generations hardly survive beyond 6 weeks of emerging from their pupas. Together, these three generations, breeding and dying as they go, cover some of the spring migration route already started by their parents - the fourth generation from the previous year. It is the fourth generation, living eight to nine months, which

>> continued on page 4 >>

The State of the Watershed

This year's monsoon season is going down in the record books as a typical year with near to slightly below normal rainfall being recorded across the Verde River Watershed. This fall, we are already seeing some wet weather throughout the Verde River Watershed.

For the June 15 through September 30 period, the watershed averaged 5.93 inches of rain, which comes in at 97 percent of normal. This year was no different than previous summers where thunderstorms create significant differences in rainfall accumulations for gauges that are relatively close to each other. For example, Prescott Airport measured 7.54 inches of rain this summer, while Prescott only measured 4.78 inches. In addition, the near to slightly below normal precipitation resulted in below normal flows on the Verde River during months of August and September, with July experiencing near-normal flows as the wet spring conditions carried over into the beginning of summer. Since we had above average precipitation this October, we saw near-normal streamflow for October.

Photo by Russ Kleinman

What can we expect to see for the rest of the fall and winter? All indicators point to a greater likelihood of above normal valley rain and mountain snow. The strongest climate indicator, El Niño, is currently in a favorable state and for a wet fall and winter. It will continue to be favorable through the spring. Some similar El Niño analogue years are the fall and winter of 1972/73, 1982/83, and 1997/98, in which the Verde received above normal precipitation.

Article by James Walter, Salt River Project

Wasting Energy Wastes Water

Did you know that your direct water use - that's the water you can see or measure yourself using at your home and business - only makes up a small portion of all the water you use?

Much, much more water is used in the food, goods, and services you consume, as well as in the energy you use. This is considered your virtual or indirect water use and comprises nearly 95% of your total water use.

Water is an integral part of energy development and production. In the United States the energy sector is the second-largest water consumer, behind agriculture. Likewise, energy is just as necessary in each phase of our water-use cycle: it is used for water extraction, purification, distribution, wastewater collection and treatment, and in our homes to heat water.

While it's challenging and sometimes unfeasible to analyze every decision we make in our consumption of goods or energy, being aware of the integral connection between water and all resources we use can guide our behavior to a less wasteful lifestyle in general, which will make big impacts, whether we can see them locally or not.

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

The Partnership believes that strong science should form the basis for informed discussion and policy decisions about our water resources.
Visit our website at www.vrbp.org for fact sheets, summaries of reports, and more.

Monarch Butterflies (continued from page 3)

migrates the entire distance in fall to overwinter and begin the cycle again by embarking on spring migration, and producing the new first generation.

Western *D. plexippus* overwhelmingly overwinter in California, with a few choosing Mexico and Arizona. One known overwintering AZ population is on the Salt River. Their overwintering habitat must have specific conditions for their survival, including access to streams, plenty of sunlight (enabling body temperatures that allow flight), and roosting vegetation (including oaks, mulberries, pecans, willows, cottonwoods, and mesquites). While breeding, monarch habitat includes fields, pastures, prairies, gardens, and roadsides where milkweeds grow, the larval host plants.

Photo by Marianne Davis

Monarch populations have been declining. The primary goal in conservation efforts is habitat restoration. Habitat requirements vary throughout the migration route. During fall migration, butterflies must have access to nectar-producing plants. During spring migration, butterflies require both larval food plants and nectar plants. We are continuing to learn how the Verde River Watershed provides critical habitat, especially along riparian corridors, for the unique, iconic monarchs.

Article by Kathy Davis

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