



EFFECTIVE WATER RESOURCE MANAGEMENT IN A GROWING RURAL COMMUNITY

By Karen Probert, Town of Payson Water Department

The air was cold and crisp and filled with a light foggy mist. A brilliant white powdery snow shimmered from the branches of the ponderosa pine trees, spreading out across the landscape to create a peaceful and breathtaking scene amidst the silence of the early morning. I watched as a cottontail rabbit appeared from underneath a piñon pine, hesitant at first with only a single hop and then a pause to look about. Seeing nothing, he scampered across the snow, leaving a light trail of footprints and then quickly disappeared into a hole. Winter had brought the first snow of the season to Payson and the Rim Country and with it the basis for all life—water.

Water is the lifeblood of our Southwest economy and environment, and yet it's also our scarcest resource. One of the most significant challenges that we face as professionals is supplying water of sufficient quantity and quality to our growing communities.

Here in Payson, we know from past groundwater studies that three basic factors influence our ability to provide an adequate supply of drinking water:

- 1) Geology – Our town is located in a unique area and the structure of the ground is unusual and complex.
- 2) Drought – We live in an area that is drought- sensitive and has historically received highly variable amounts of rainfall. The water cycle is especially important in the Payson area, because all of our drinking water wells are replenished solely by water from rainfall and snow melt.
- 3) Perceptions and Changing Environment – Although we live amidst the cool pine trees in the high country of Arizona, we still live in an arid Southwest state with constantly changing weather patterns.

Drought is a normal recurring feature of climate, not a rare, random event. It occurs somewhere every year in the United States. It can and does extend over long periods and large areas

causing damage and costing billions of dollars in emergency relief funds. Most of Arizona has been in a state of severe to extreme drought, with some areas in exceptional drought.

In a recent report, the National Drought Policy Commission stated that the only way we can reduce our vulnerability to the impacts of drought is to be prepared. We must remember the lessons learned from the past and act on them to prepare for future droughts.

The Governor's Drought Task Force (GDTF) is preparing a comprehensive, long-term drought plan for the State of Arizona, as discussed by Thomas Sands from Salt River Project in the September, 2003 issue of the AWPCA Newsletter. Similarly, many communities, such as Payson, are also preparing drought mitigation plans that address local issues and concerns and evaluate drought risk.

In addition to drought planning, another critical aspect of Payson's program for water resource management is the concept of "Safe Yield" for monitoring and maintaining an adequate volume of water in the aquifers. Safe yield means that we're not pumping out more water from the aquifers than is being replenished, either naturally or artificially. At the end of last year, we were at 99% of our safe yield value. So, in addition to searching for new drinking water supplies for the community, Town staff has been implementing methods to reduce water demands.

After discovering that voluntary conservation methods were not effective at reducing water consumption during the critical summer months, the Town Council approved a water rate increase in April, 2003 to promote effective conservation and to help price water at levels that better reflect its true value.

Year-round education programs and audits for high water-use customers are offered by the Water Department to prevent water waste and promote conservation. To date, over 1,000 high flow toilets and urinals have been replaced with low flow fixtures and waterless urinals. Rebates are available for customers who install hot water re-circulating systems.

During the past four years, Payson Water Department staff has also worked with a local group of volunteers to educate the community about appropriate outdoor water use. In 2000, work began to create a public demonstration project that could evolve as a "living laboratory" to explore water-saving techniques for local landscapes. The president of the local community college, Dr. Barbara Ganz, offered the school campus as the educational site for the project. In October 2002, the Arizona Land Department and Community Tree Council provided a \$16,000 matching fund grant for a demonstration garden at the college. The project was dedicated in October, 2003 and showcases native and low-water use plants that are appropriate for our high country climate zone. Boulder outcroppings, swales, and retention basins throughout the site direct water from rain gutters and downspouts to the plants and ultimately back into the ground. The rainwater harvesting system in the garden has been so successful that during two record thunderstorms this



*"And it never failed that during the dry years the people forgot about the rich years, and during the wet years they lost all memory of the dry years. It was always that way."
~ John Steinbeck, East of Eden*

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summer, all of the rain water entering the site percolated into the ground before reaching the safety overflow structure.

As more communities experience growth and face concerns about dwindling water supplies, the ancient technique of rainwater harvesting has been gaining popularity. Rainwater harvesting has its history in biblical times, but the principles are still applicable today. Many utilities are encouraging their customers to use rainwater harvesting, because it provides a variety of potential solutions to environmental problems. By retaining rainwater on site, slowing its flow and allowing it to percolate into the ground, we can help prevent street flooding and erosion. In addition, when rainwater is used for outdoor irrigation, the stress on our potable water supply may be decreased, helping to control storm water pollution by eliminating contaminated runoff. And as customers work to keep their landscapes healthy and green with rainwater, we as utilities may also realize the added benefit of additional groundwater recharge.



This weather station in Green Valley Park provides information that can be used for drought mitigation and water conservation efforts. Currently, the station monitors for precipitation, wind speed, solar radiation, relative humidity, and air and soil temperature. Evapotranspiration rates are calculated for more accurate outdoor irrigation.

The concept of rainwater harvesting is to slow the flow of the water and allow the water to percolate into the ground, instead of running off. A landscape may be designed to direct and utilize rainwater through the use of berms, swales, rocks or channels. A system can be as simple as a series of rock-lined bowls or a more complex system with storage tanks and pumps. A PDF brochure on rainwater harvesting (The Texas Guide to Rainwater Harvesting) is available at: http://www.twdb.state.tx.us/assistance/conservation/Alternative_Technologies/Rainwater_Harvesting/Rain.htm.

In addition to rainwater, another largely untapped source of water is gray water. Anyone in Arizona who is interested in using gray water at their residence may now legally recycle up to 400 gallons of water per day without a permit. However, in order to protect public health and safety, a set of 13 best management practices developed by the Arizona Department of Environmental Quality for gray water use must be followed. A brochure with additional information on gray water use and permit requirements is available at: www.adeq.state.az.us/environ/water/permits/download/graywater.pdf.

A variety of tools exists for all of us as water managers to help educate our customers to use our water resources more effectively and efficiently. Replacement of water-wasting appliances with more efficient, low water use fixtures and free

water use audits can significantly reduce water use and improve customer satisfaction. Educating customers about appropriate outdoor water use and effective supplemental techniques, like rainwater harvesting, can help mitigate the effects of drought and provide a variety of environmental benefits. With a well-designed program for water resource management, we can truly make every drop count.



The High Country Xeriscape Project invites visitors to explore the native and low water use plants within via a cobblestone pathway. An information kiosk provides a variety of educational materials on rainwater harvesting, gray water use and landscape design and maintenance.