

Hard work pays dividends

Our watershed coalition has made great strides in 2020.

Grant-funded projects to demonstrate conservation practices and uses for juniper biomass have been completed. The hard work and dedication over the last five years has yielded immediate results with the recent \$2.7 million grant from the USDA Natural Resource Conservation Service to broadly apply these innovations across the watershed. Our efforts are paying dividends to forward sustainability of water supplies, support grassland restoration, reduce the risk of catastrophic wildfire, improve wildlife habitat, and mitigate a variety of ecosystem issues, such as erosion. This work also supports reinvigoration of our forest products' industry and provides a boost to the local economy by bringing in federal dollars that provide opportunities for our citizens and businesses. It is the proverbial win-win situation.

All of the projects undertaken by the coalition have a common denominator – our partners. We have received funding from the Arizona Department of Water

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Federal government awards \$2.7 million to optimize aquifer recharge

The Upper Verde River Watershed Protection Coalition (UVRWPC) recently received notification from the United States Department of Agriculture Natural Resource Conservation Service (NRCS) that it had been awarded a \$2.7 million grant. Awarded through the Regional Conservation Partnership Program, the five-year project will focus on optimization of recharge with other benefits including grassland rebound, mitigation of erosion, and reduced wildfire risk.

Collaborating with local, state and federal agencies, as well as local resource conservation districts and agricultural producers, the UVRWPC will manage a multi-faceted effort. Partners will integrate science-based



View of juniper silt dam installed on the Barney-York Ranch

planning and hydrologic modeling with monitoring and the application of innovative technologies to improve watershed health and support increased productivity on working agricultural lands. They will work with agricultural producers to apply biomass utilization technologies developed and/or tested over the last five years including

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Coalition receives state grant for innovative approach to rainwater harvesting

The Arizona Department of Water Resources (ADWR) recently notified the Upper Verde River Watershed Protection Coalition (UVRWPC) that its grant request of \$65,000 to further demonstrate its unique rainwater harvesting for aquifer recharge system has been awarded.

Three systems will be installed in the Prescott Active Management Area (PrAMA) at visible locations including the Rowle Simmons Adult Center in Prescott, and Town Library and Territorial Early Childhood Center in Chino Valley.

“This will allow us to further demonstrate the project and provide an opportunity for public education at outreach at sites that are commonly visited by our citizens,” Lora Lee Nye, Chair of the UVRWPC Executive Board, said.

The aquifer recharge application for rainwater harvesting was developed after UVRWPC Executive Board members expressed concern about the

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Upper Verde River Watershed Protection Coalition

Editor's Note: Previously published by the Council of Western State Foresters, Forest Utilization Network, 2020 Success Stories.

Juniper Works, a brand established by the Upper Verde River Watershed Protection Coalition (Coalition), was developed to promote an under-utilized species with high market potential. Designed to be the local forest product industry's marketing and public relations arm, it brings together landowners, business owners, and citizens, as well as federal, state, and local government personnel in service of common goals to restore historic grasslands and sustainably manage and protect woodlands in the Upper Verde River Watershed.

From 2016 to 2020, the Coalition and its partners have strategically worked with private forestry consultants and marketing professionals to quantify the supply of raw material, identify forest products with the greatest market potential, acquire funding to demonstrate utilization, promote business development, build public awareness of the need for market-based solutions, and address policy constraints hindering broad-scale utilization.

Early on, it became abundantly clear that without commercial utilization of juniper biomass, the Coalition and its partners would fall woefully short of the Upper Verde Watershed restoration goal of 27,000 acres per year. Value-added products identified as having the greatest market potential are juniper chip sediment wattles, biochar, soil amendments, juniper silt dams, and landscape and playground cover.

Coalition partners support business development with on-the-ground, visible projects that demonstrate a variety of uses for value-added products manufactured from juniper biomass, including:

“Pinyon-juniper ecosystems throughout the western United States represent a significant potential woody biomass resource.”
– Biomass Feedstock Supply Availability Assessment for Yavapai County, TSS Consultants

1. Juniper chip wattles for stormwater management,
2. Juniper chip wattles infused with biochar for filtration of contaminants at open pit mine sites,
3. Juniper chip wattles infused with biochar for filtration of contaminants in streams and creeks,
4. Biochar as a soil amendment
5. Juniper biomass to build silt dams for erosion control

Funding to support Coalition projects was provided by the USDA Forest Service, Arizona Department of Forestry and Fire Management, and Arizona Department of Water Resources. The critical next step is working with local, state, and federal legislators and policy makers to address barriers to use of these value-added products manufactured from woody biomass.



Juniper biomass converted to biochar. Photo Credit: Upper Verde River Watershed Protection Coalition (UVRWPC)



Juniper wattles on the Barney-York Ranch. Photo Credit: Richard Van Demark



Juniper silt dam installed for erosion control. Photo Credit: UVRWPC

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Resources, Arizona Department of Forestry and Fire Management, USDA Natural Resource Conservation Service, US Forest Service, and Prescott Active Management Area Groundwater Users Advisory Council. Numerous personnel working with a variety of agencies and in the private sector have provided hundreds, if not thousands, of hours of technical assistance. Our landowners have been critical in the implementation of our projects. We are thankful for every person and there are not enough words to describe how much we appreciate their contributions.

This All Hands, All Lands strategy to addressing critical ecosystem issues threatening the long-term health of the watershed and forestlands is working. We will continue with that approach as we move forward. Over the coming year, we will focus on managing projects associated with the NRCS funding, expand the demonstration of our rainwater harvesting for aquifer recharge system, and improve outreach to stakeholders and the public. We have a goal to address planning needs including updating our water conservation plan, and developing a drought contingency plan for the watershed. They will become components of our already developed watershed plan. We hope to build on the \$2.7 million investment by the NRCS to attract more funding to the watershed.

Stay tuned. We are just getting started !

1980 Groundwater Management Act

Arizona's Groundwater Management Act, passed by state lawmakers in 1980, remains one of the most stringent groundwater codes in the United States. It addresses concerns about how to support water supply needs for economic development and residents' quality of life in areas of the state with a high reliance on groundwater.

Five active groundwater management areas were established by the Act, including the Prescott Active Management Area (PrAMA), 485 square miles in central Yavapai County encompassing the City of Prescott, Town of Prescott Valley, Yavapai-Prescott Indian Reservation, and portions of the Towns of Chino Valley, Dewey-Humboldt and unincorporated areas of Yavapai County.

The Act established the Department of Water Resources as the state regulatory agency charged with overseeing management of groundwater resources and progress toward reaching identified water management goals identified for each active management area.

To assist communities in reaching their identified water management goals, the Act mandated development of a series of five management plans through 2025. Each plan is tailored to the specific active management area, and the 4th Management Plan currently is in effect for the PrAMA.

Achievement of Safe Yield by 2025 is the PrAMA water management goal. Safe Yield is reached when the amount of groundwater annually withdrawn from the aquifer is equal to the amount of groundwater annually recharged. An aquifer is a saturated zone of permeable rock beneath the groundwater table that holds water in interconnected pore spaces.

The Act also prohibits the expansion of irrigated agriculture supported by groundwater, and requires developers to demonstrate to ADWR that they have a 100-year assured water supply before lots can be sold. It set up mandatory reporting requirements for large water providers, such as municipalities, and authorized incentives for water reuse and effluent recharge. Large water providers must use ADWR Best Management Practices to support water conservation and conduct public education.

Learn more about your water resources by visiting the ADWR website at www.new.wateraz.gov or Upper Verde River Watershed Protection Coalition website at www.yavapaiwatersmart.org.

OVERVIEW OF WATER SUPPLY IN THE PRESCOTT ACTIVE MANAGEMENT AREA

The Arizona Department of Water Resources (ADWR) recently gave an update on the status of the Prescott Active Management Area's (PrAMA) progress on reaching safe yield by the year 2025. Einav Henenson and Natalie Mast from ADWR noted that although the groundwater overdraft in the PrAMA has continued the groundwater withdrawals have not increased in spite of area growth. They attribute this success to the strong water conservation and management programs established by the communities and enforced by ADWR. Although there is at least a 100-year supply of water reserved in the groundwater basin, water levels are in a slow decline.

More than 100 people attended the event at the Centennial Center in Prescott

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Prescott Active Management Area

Established with passage of the 1980 Groundwater Management Act (GMA), the Prescott Active Management Area (PrAMA) is one of five areas in the State of Arizona that were identified as being heavily reliant on groundwater use to support residential and economic growth.

A 485 square mile area in central Yavapai County, the PrAMA encompasses the City of Prescott, Town of Prescott Valley, Yavapai-Prescott Indian Tribe and portions of the Towns of Dewey-Humboldt and Chino Valley and unincorporated areas of Yavapai County.

The Arizona Department of Water Resources (ADWR) is the regulatory authority governing management of groundwater supplies in the PrAMA. Personnel work with municipalities, and local leaders through the Groundwater Users Advisory Council (GUAC) to collaboratively make decisions on the development and implementation of groundwater management plans.

Reaching Safe Yield by 2025 is the PrAMA water management goal. Safe Yield is achieved when the amount of groundwater annually withdrawn is equal to the amount of water annually recharged. In 1999, ADWR issued a groundwater mining declaration (out of safe yield) for the PrAMA.

ADWR collects and analyzes hydrologic data within the PrAMA to evaluate groundwater conditions and determine progress toward reaching Safe Yield.

Large water users, such as municipal providers, submit annual water use reports to ADWR. Personnel, in partnership with the Yavapai County Flood Control District and U.S. Geologic Survey, manage an extensive stream gauging network. The state agency also relies on a comprehensive groundwater monitoring network and computer modeling program to collect information.

Most of the groundwater currently pumped in the PrAMA is for municipal use. The shift from predominantly agriculture to predominantly municipal began in the 1980s.

According to the hydrologic data, groundwater use in 1985 was about 25,000 acre/feet when the PrAMA population was around 40,000. By 2017, annual groundwater use had declined to about 22,500 acre/feet with a population of about 130,000, and the PrAMA is trending toward Safe Yield.

For more information visit the ADWR website at www.new.azwater.gov or the Upper Verde River Watershed Protection Coalition website at www.yavapaiwatersmart.org.

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juniper silt dams, juniper chip wattles, juniper chip wattles infused with bio-char, bio-char as a soil amendment and rainwater harvesting for aquifer recharge systems.

The Upper Verde River Watershed is located in an NRCS designated critical conservation area with water quantity identified as the primary resource issue of concern.

According to Lora Lee Nye, chair of the UVRWPC Executive Board, this award is a culmination of five years of work planning and demonstration.

“We embarked on this process five years ago with little more than an idea and a goal,” she said. “Our partners set about doing the necessary research and planning, as well as developing innovative ideas for the use of juniper biomass. We laid the necessary foundation and completed our due diligence. The funding not only benefits our watershed and water supply, it

also provides a boost to the local economy.”

The UVRWPC has received grant funding from numerous agencies to support its planning and demonstration efforts including the US Forest Service, Arizona Department of Forest and Fire Management, Arizona Water Protection Fund, Sonoran and Lincoln Institutes, Arizona Department of Water Resources Water Management Assistant Program, and Arizona Department of Commerce.

“In addition to direct grant funds, we have benefited from thousands of hours of technical assistance provided our partners, and support from the owner of Barney-York Ranch, the site for our biomass demonstrations,” Nye added.

John Munderloh, chair of the UVRWPC Technical Advisory Committee, said the next step is negotiating a grant agreement with the NRCS slated to be complete by the end of calendar year 2020. Project work, he added, will begin shortly after the start of 2021.

PRESCOTT ACTIVE MANAGEMENT AREA

4th Management Plan

Charting the direction for management of groundwater resources

Since 1980 with passage of the Groundwater Management Act, communities in central Yavapai County and the Arizona Department of Water Resources (ADWR) have dedicated thousands of hours and millions of dollars to manage groundwater resources in the Prescott Active Management Area (PrAMA).

The PrAMA, established with passage of the Act, includes the City of Prescott; Town of Prescott Valley; Yavapai-Prescott Indian Reservation; the Towns of Dewey-Humboldt and Chino Valley; and portions of Yavapai County. The PrAMA is the only area within Yavapai County under the regulatory authority of ADWR for management of its groundwater.

A series of five management plans from 1980 to 2025 were mandated by the Act. Communities in the PrAMA are currently implementing the 4th Management Plan. It will be in effect until the 5th and final management plan for the PrAMA is adopted.

Over the last four decades, plans have progressed to include more rigorous management requirements.

The 298-page management plan, available for download from the Upper Verde River Watershed Protection Coalition website at www.yavapaiwatermart.org, is a comprehensive representation of the groundwater situation in the PrAMA. It delineates strengths and threats covering everything from hydrology,

and water demand and supply; to municipal, industrial and agricultural uses and water conservation requirements.

According to John Munderloh, water resources manager for the Town of Prescott Valley, the 4th Management Plan is the primary planning document for the PrAMA. It is the roadmap for management of finite groundwater resources and achievement of Safe Yield by 2025. Safe Yield is reached when the amount of groundwater annually withdrawn from the aquifer is equal to the amount of water annually recharged.

Munderloh provided specific examples of how PrAMA communities, both individually and in partnership, have worked to achieve a groundwater balance and implement provisions included in management plans.

“Communities in the PrAMA actively develop and participate in water conservation programs,” he said. “They regularly report progress to the ADWR, adhere to state programs that limit development, reclaim and reuse water, adopt and utilize ADWR best management practices, and partner with other communities in the AMA and Yavapai County to investigate alternative water supplies, and manage the Upper Verde River Watershed. The broad agreement with Salt River Project to import water from the Big Chino into the PrAMA, at some future date, was finalized in 2010.”

According to the plan, the PrAMA is trending toward Safe Yield. To reach and sustain Safe Yield, it will require continued water conservation, importation of water from the Big Chino Sub-basin or other source, water reuse and reclamation, and an aggressive effort to convert residential neighborhoods to systems on centralized wastewater collection.

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to hear the presentation and talk to representatives from communities in the Prescott AMA and Yavapai County. The AMA communities have made significant progress in the areas of water use per capita, conservation, and recharge. The ADWR projects that Safe Yield can be reached with imported water. Safe Yield is achieved when the amount of groundwater withdrawn annually equals the amount recharged.

In order to be sure that the AMA has sufficient water during droughts, stops the local water level decline and meets growth needs, the City of Prescott and Town of Prescott Valley are developing a groundwater supply from the Big Chino Sub-basin. The communities are working with Salt River Project (SRP), the largest water supplier in the Phoenix area, to ensure that groundwater pumping does not harm the Upper Verde River.

Did you know:

The Prescott AMA has 900 billion gallons of groundwater in the aquifer that supplies local communities.

That is a water resource the size of Roosevelt Lake, when it is full. Due to area water management, groundwater withdrawals in the PrAMA have not increased since the mid-1960s.

The PrAMA uses about the same amount of water from the aquifer as farmers did in the 1960s.

Water rights for farming have been converted into municipal use. Large water users within the AMA, (such as municipalities, agriculture and golf courses), are required to conserve water, report annual water use, and restrict groundwater use.

By law, groundwater supplies are reserved for existing homes and lots, and cannot be used for new subdivisions. New subdivisions must prove a 100-year water supply from other than groundwater before being permitted. All of the local governments coordinate their water conservation outreach message through the “Water Smart” program.

GROUNDWATER USERS ADVISORY COUNCIL

State, local leaders collaborate to manage water supplies

A local group of governor appointed community leaders work with the Arizona Department of Water Resources (ADWR) to assure our communities have a voice in state decisions that impact the management of regional water supplies. The Groundwater Users Advisor Council or GUAC is a five-member group of citizens who voluntarily serve six year terms. Established with passage of the Groundwater Management Act of 1980, GUAC is charged with advising ADWR on issues impacting groundwater supplies in the Prescott Active Management Area (PrAMA), a 485 square mile area encompassing the City of Prescott, Towns of Chino Valley and Prescott Valley, Yavapai-Prescott Indian Tribe Reservation, and portions of the Towns of Chino Valley and Dewey-Humboldt and unincorporated areas of Yavapai County.

GUAC members provide advice and make recommendations to ADWR on groundwater management programs and policies, operation of an extensive stream gaging network, and use of the groundwater withdrawal fees paid by municipal

water providers operating in the PrAMA.

The council plays a pivotal role in development and implementation of groundwater management plans which chart the path to reaching Safe Yield, a water management goal achieved when the amount of groundwater annually withdrawn in the PrAMA is equal to the amount of water annually recharged. Members also partner with local organizations, such as the Upper Verde River Watershed Protection Coalition (UVRWPC), to support and promote water conservation education and projects in the PrAMA.

GUAC members meet quarterly in open public meetings which are posted according to the Arizona Open Meeting Law. Agendas are also available on the Upper Verde River Watershed Protection Coalition website at www.yavapaiwatersmart.org. To learn more about your water resources visit the ADWR website at www.new.wateraz.gov or the coalition website.

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proliferation of exempt wells in the Prescott Active Management Area (PrAMA). In October 2017, they directed the UVRWPC Technical Advisory Committee (TAC) to develop a new, non-regulatory approach to water resource management for exempt well owners.

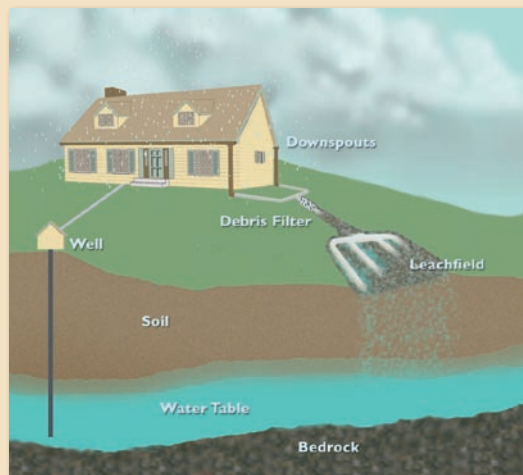
According to data collected by the ADWR, the PrAMA includes 13,000 exempt wells, the highest density of exempt wells in the State of Arizona. Proliferation of exempt wells was identified by ADWR in the PrAMA 4th Management Plan as a significant threat to achieving Safe Yield by 2025. Exempt wells in the PrAMA were also identified as significant threat to the PrAMA by participants on the Governor's Water Augmentation, Innovation and Conservation Council Post-2025 AMAs Committee as recently as February 13, 2020.

According to ADWR, as existing water supplies that meet the State's Assured Water Supply standards for planned subdivisions become more difficult to obtain, development turns more toward the "lot-split with an

exempt well" model to meet demands of growth.

TAC members came back to the Executive Board with the Rainwater Harvesting for Aquifer Recharge concept. Instead of attempting to capture rainwater in barrels or cisterns, this approach uses available storage capacity in the aquifer. Systems capture and recharge rainwater to offset aquifer overdraft caused by pumping.

An initial pilot project was designed and a system was installed at a Yavapai County owned building in Dewey-Humboldt in the PrAMA in June 2018.



Implementation resulted in a successful demonstration of aquifer recharge

with 53,000 gallons recharged between July 2018 and April 2019 from a roof size typical of a single family residence.

System Characteristics

- French drain system that is less expensive and more efficient than a traditional rainwater harvesting system
- Less operational knowledge and maintenance than a traditional rainwater harvesting system
- All harvested rainwater returned to the aquifer
- Harvested yield is much higher than a traditional rainwater harvesting system.
- Extends well life
- No mosquitoes and algae growth
- Benefits groundwater supplies Potential to replenish 25-40% of water pumped from private wells with rainwater

The Town of Prescott Valley recovers majority of 2019 water deliveries, recharges aquifer

The Town of Prescott Valley, through its Advanced (Wastewater) Treatment Facility, recovered nearly two-thirds of the groundwater delivered to town water customers in 2019.

According to John Munderloh, Town Water Resources Manager, 2,550 acre-feet of the 4,540 acre-feet served to town customers was reclaimed and used to recharge the aquifer while another 360 acre-feet were delivered for direct use at Mountain Valley Parks and the Stone Ridge golf course, reducing demand on the aquifer. This effort is part of a larger water management strategy to optimize and manage the Town's groundwater supply. Of the amount recharged, 1,730 acre-feet were credited to the Town's long-term storage account. About 40 acre-feet, or around 2%, were lost to evaporation at the recharge facilities. The remainder, or over 820 acre-feet, were permanently contributed to the aquifer. An acre-foot is equal to 325,851 gallons or enough to meet the water needs of nine people for a year.

Accounting of municipal recharge is defined in Arizona Revised Statutes.



Town of Prescott Valley Advanced Treatment Facility

Aerial view of recharge basins located west of Prescott Valley.



Long-term storage credits are held for future use by the municipality. Water permanently contributed to the aquifer cannot be recovered by the municipality for use at a later date. The Arizona Department of Water Resources (ADWR) administers the Town's recharge efforts by issuing permits and conducting annual audits of the Town's recharge activities. Groundwater recharge projects are located at dozens of sites throughout Arizona, including in Prescott and Chino Valley, and are an important part of the State's water supply. Long-term storage credits allow the Town to meet future water needs without increasing net groundwater pumping and reduces infrastructure costs that would otherwise be required to pipe the reclaimed water directly to end users.

Recharge occurs at two locations in the Town where reclaimed water is held in ponds or behind small dams to allow water to seep into the ground. The rate of seepage is far larger than the rate of evaporation and only about 2% of the total is lost to evaporation. Once the water is stored underground it is no longer subject to evaporation losses as it would be if stored on the surface. Studies at the Town's recharge sites have determined that the reclaimed water travels down at around 120 feet per year where it replenishes the aquifer.

<https://www.pvaz.net/244/Water-Reuse-Recharge>.

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