

Solutions in Times of Shortage Soluciónes en Tiempos de Escasez

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COVER: A rare aerial view of the Tanque Verde Bosque, where seasonal flows have returned thanks to reduced groundwater pumping, conservation efforts, and winter and





**Top:** Volunteers and staff work on WMG's first ever community demonstration site for rainwater harvesting at Tucson's Ward 3 Council office in 2006. Bottom: WMG staff and volunteers build basins in the Flowing Wells neighborhood of Tucson, October 2022.

#### Is it time to pack our bags and leave Tucson?

Many people in Tucson and other communities across the West are asking this question, or similar ones. In essence: Is there enough water where I live to sustain the human population?

I asked that question myself when I first came to Tucson for graduate school. To me, it was obvious that there wasn't enough water to sustain all the people living in the desert, so I planned to move to a wetter part of the country after graduate school.

But during those years, I learned about traditional practices like water harvesting and native edible plants, and I fell in love with the Sonoran Desert. I also learned that Tucson is the oldest continuously inhabited and cultivated area in the U.S., with an archaeological record of habitation and crop cultivation extending back more than 4,000 years.

My perspective started to shift, and I realized I could stay and be part of the solution. My husband and I settled in Tucson committed to growing our fledging non-profit, Watershed Management Group, and spreading what we now call hydro-local solutions: those that make the most of local, self-replenishing water resources like rainwater, stormwater, and greywater, instead of sucking distant watersheds like the Colorado River dry. In March 2023, we'll be celebrating 20 years of fostering hydro-local solutions and working towards a vision to restore Tucson's heritage of flowing rivers.

So in this moment, I'm not asking myself when to pack my bags. Instead, I'm asking my community: How do we, collectively, respond to the Colorado River shortage? How do we, as a community, shift from being water consumers to water stewards, restoring a reciprocal relationship with our watershed? How do we scale up hydro-local solutions to create a resilient, water secure future in Tucson and across the West?

That's where you come in, to grow this movement to a critical tipping point. We have proven that hydro-local solutions work. Now we need to amplify those solutions by sharing them more widely and embedding them into our local policies and everyday practices. Even in times of shortage, there are tangible solutions at hand, and we at WMG are here to partner with you to make hydro-local programs and policies more relevant, affordable, and inclusive.

Water in the Western U.S. is not a bucket that we empty until it's dry, though we've been treating it that way. Water in the West, like everywhere else in the world, is a precious and life-giving resource, constantly renewed through nature's water cycle.

The solutions WMG has focused on — from water harvesting at home, to green stormwater infrastructure in neighborhoods, to restoring groundwater and river floodplains — are the solutions we need to scale up right now to meet this moment and reconnect to our local, self-replenishing water cycle.

Our journey is just beginning. Thank you for believing in this work and creating a hydro-local future together.



Sincerely

Lisa Shipek, Executive Director

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# Policy Solutions for a Hydro-Local Future

Greater Tucson currently draws from the Colorado River for the majority of our potable water supplies. This needs to change quickly and happen sustainably, without depleting our groundwater even further. That's why we're calling for bolder leadership from local governments at this time - especially in Tucson and Pima County.

What more can be done at the local policy level to steward our watershed? A lot, it turns out! We believe these solutions will go a long way in creating a secure, hydro-local water future in Tucson and beyond:

#### 1. Expand conservation incentives to all water users in the Tucson basin.

There are many people living in the greater Tucson area who don't get the water conservation incentives offered by Tucson Water – people who are served by smaller water utilities (like the Winterhaven neighborhood), or get water from private wells instead. Everyone is tapping into the same shared aquifer, so everyone should have access to conservation programs.

#### Here's what we can do:

- ٠ flow toilet.

Flow along Tangue Verde Creek. WMG supports expanding conservation incentives to all Tucson basin residents - including smaller utilities and well users – to protect and restore local flows like these.

#### As the Colorado River shortage affecting Arizona and other communities across the West gets worse, WMG has deepened our work on local policy solutions.

Extend rainwater and greywater harvesting incentives to everyone (not just Tucson Water customers).

Launch a pilot to extend toilet rebates to everyone - let's make sure everyone in the Greater Tucson Area has access to a low-

Streamline permitting for composting toilets to be easy and affordable through the City and County, and extend toilet rebates to cover composting toilets in addition to flush toilets.

Secure additional local, state, and federal water conservation funding to expand programs.



San Gabriel Traffic Circle. Instead of nonfunctional turf, spaces like median strips and traffic circles can be home to native rain gardens – reducing water used for irrigation, recharging the aquifer, and cooling down our cities. Photo Courtesy of Tucson Clean & Beautiful.

> When Tucson had its driest year on record in 2020, with 4.17 inches of rainfall, there was no drought declaration or drought response from the City or the County. That needs to change. Our drought response should consider local watershed conditions, so that we act differently when we have less local water, while creating a climate resilient community.

#### 2. Extend "Conservation Rates" to Tucson's **Commercial Water Users.**

Conservation incentives are already included in pricing for Tucson Water's residential customers, because if residences use over a certain amount of water, they pay more per unit - encouraging lower water use. However, commercial users pay the same amount per unit no matter how much water they use. Creating a pricing incentive for commercial users to save water is a practical, equitable solution for smart water conservation in Tucson.

#### 3. Prioritize recycled water for groundwater recharge, river flow, and essential irrigation for schools and parks. All water is valuable, including recycled water, so it should be priced similarly to potable supplies.

Stop offering recycled water for a subsidized price to golf courses and Homeowners Association (HOA) landscapes, and ask them to pay their fair share.

#### 4. Update the City of Tucson's Drought Preparedness and Response Plan to be based on local watershed conditions—including local annual rainfall and groundwater levels.

Tucson's current drought response plan is based solely on water levels in Lake Mead, and doesn't consider local watershed conditions at all. When Tucson had its driest year on record in 2020, with 4.17 inches of rainfall, there was no drought declaration or drought response from the City or the County. That needs to change. Our drought response should consider local watershed conditions, so that we act differently when we have less local water, while creating a climate resilient community.

Update Tucson Water's Drought Preparedness and Response Plan to be responsive to the following triggers:

- Tucson's long-term drought condition defined by the Arizona Department of Water Resources' Quarterly Drought Status Update, which includes annual rainfall.
- Declining groundwater levels in Tucson Water wellfields, and significant shallow groundwater areas that support our creeks and rivers.
- Percent of production wells that are contaminated by PFAS or other emerging contaminants, requiring special treatment to bring this water to potable levels.

#### 5. Require new residential and commercial developments to implement conservation practices.

- Ban non-functional turf in new developments and phase it out in commercial and residential settings through restrictions and incentives for turf removal.
- Implement a "Net Blue" development policy that requires new developments to offset 1.5 times the amount of water they use or more. New developments should focus water conservation and recharge efforts first on their sites. Once on-site efforts are exhausted, conservation practices should be done within the Tucson Water Service Area, or in areas impacted by their groundwater pumping.

You can help move these policies forward by speaking up for these changes to your local elected officials! The time is now to create a foundation for a hydro-local future. Learn more at:

#### watershedmg.org/advocate

By expanding rainwater harvesting incentives, we can create a more hydrolocal and climate resilient future, reducing demand on Colorado River water.

7



## **Can Tucson Water Customers Cut Their Water Use** in Half?

## Steps to go Hydro-Local.

The average resident served by Tucson Water uses 80 gallons of water per capita per day (gpcd). For Tucson residents to no longer be dependent on Colorado River water, WMG has calculated that we'd need to cut this number in half to 40 gpcd.

What does that look like in practice? Here are some primary ways to cut down your water use through changes outside and inside vour home.

## **Go Hydro-Local With Your Landscape**

As desert dwellers, we can make big water-saving shifts by inviting beautiful desert plants into our yards. Outdoor water use can be 27-50% of residential water use, so you might be able to cut your water use in half just by using rainwater and greywater for outdoor watering.

Add organic mulch to your landscape to reduce irrigation. Mulch is essential for rainwater harvesting landscapes, reducing the amount of water soil loses through evaporation. By putting several inches of organic mulch on your landscape, you can reduce the amount and frequency of irrigating your plants.

Pull up turf (aka grass) and replace it with native, desertadapted plants. Let's say you have 100 square feet of turf that you water with a sprinkler system. By replacing your turf with native, desert-adapted plants, you'd save 4,300 gallons of water per year! Native plants can thrive solely on rainwater, not needing any additional irrigation most years.

Water citrus trees with a Laundry-to-Landscape greywater system. Let's say you have a semi-dwarf citrus tree, requiring an average of 58 gallons of water per week. By doing two loads of laundry per week using a highly-efficient front-loading washing machine, you'd create 30 gallons of greywater per week, saving

about 1,500 gallons on citrus tree irrigation per year.



## **Go Hydro-Local In Your Home**

Whether you live in a house or an apartment, there are many ways you can reduce your indoor water use to reach 40 gpcd – and the City of Tucson provides financial support for many of them!

Install a low-flow toilet with the help of rebates. The City of Tucson provides a \$100 rebate for installing a highly-efficient, low-flow toilet that uses 1.1 gallons or less per flush. You'll receive a \$100 rebate per toilet for up to two toilets. For low-income homeowners, the labor for the toilet replacement is free, courtesy of Tucson Water.

Switch to a front-loading washing machine. Front-loading washing machines use about 40% less water than top-loading ones, so if you have a washing machine, switching to a frontloading washer will save about 7,000 gallons of water per year. Plus, you'll get a \$200 rebate from Tucson Water for the shift!

Try a low-flow showerhead. Standard showerheads typically use 2.5 gallons of water per minute (gpm), while showerheads with the EPA Water Sense label use 2 gpm or less. Switching to lowflow showerheads, which cost as little as \$10, can save an average of 2,000 gallons per person per year.



## **How Do I Calculate** My Daily Water Use?

If you're a Tucson Water user, your water bill displays your water use in hundred cubic feet, or CCF. One CCF is equivalent to 748 gallons. If you have a landscape, look at your water use in the summer and winter to see your maximum and minimum water use. Then, take your monthly total water use and divide by the number of days in that month (or billing period) and then by the number of persons living at home. The result is your average water use per capita per day.

Are you a renter and never see your water bill? No problem – just reach out to your landlord or apartment manager for a copy. (If they pay the bill, hopefully they'll thank you for reducing it!)

## Get Ready to Learn, Hydro-Locally!



## WMG is here to help you along your hydro-local journey. Here are some ways to learn with us:

#### Laundry-To-Landscape and Compost Toilet Kits

We offer L2L and composting toilet kits for purchase through our website and for pickup in Tucson! The L2L kit is easy to install on your own, and Tucson Water customers can get reimbursed for 50% of qualified costs for installing one. We also offer barrel composting toilet kits, and can consult with you directly about installation or refer you to a provider. Learn more at watershedmg.org/services/home.

#### **Build Your Own Basin: Neighborhood Leaders**

Build Your Own Basin (BYOB) workshops teach participants how to build a basin and plant a rain garden, and then provide the supplies to build a basin at home. This fall, we trained 14 **Neighborhood Leaders** on how to build basins in Tucson's Palo Verde neighborhood, who then organized their fellow neighbors and co-taught BYOB workshops with WMG. In September alone, these Neighborhood Leaders taught three workshops with 63 neighbors, and 41 BYOB kits went home with participants! Learn more at **watershedmg.org/BYOB**.

#### **Rainwater and Greywater Rebate Classes**

Learn the basics of rainwater and greywater harvesting with WMG, and then qualify for a rebate! Tucson Water customers qualify for up to \$1,000 for greywater systems and up to \$2,000 for rainwater systems. Sign up for our virtual rebate classes at **Watershedmg.org/event**.

#### Hydrate Classes in Tucson and the Phoenix Valley

Hydrate classes dive into many ways to make the most of local water resources, with topics like native edible landscapes, rain tanks and irrigation systems, and rain garden care. This series includes our **Laundry-To-Landscape (L2L)** and **composting toilet** classes, which show desert dwellers how to reduce two major forms of water use: outdoor irrigation and flush toilets. Learn more at **Watershedmg.org/event**.

"WMG taught us everything we need to know in order to teach our neighbors. That workshop was super fun – it rained a bunch that evening, so we were picking and digging and learning in the rain." - Maria "Val" Timin, BYOB Neighborhood Leader

"WMG nos enseñó todo lo que necesitamos saber para enseñar a nuestros vecinos. Ese taller fue súper divertido: llovió mucho esa noche, así que estuvimos recogiendo, cavando y aprendiendo bajo la lluvia." – Maria "Val" Timin, Líder Vecinal de BYOB



## **¡Prepárate para Aprender, Hidro-Local!** WMG está aquí para ayudarte en tu viaje hidro-local. Aquí hay algunas maneras de aprender con nosotros:

#### Kits de Lavadora-A-Jardín (L2L) y Baños Composteros

¡Tenemos a la venta los kits de L2L y baños composteros a través de nuestro sitio web y para recoger en Tucson! El kit L2L es fácil de instalar por tu cuenta, y los clientes de Tucson Water pueden recibir un reembolso del 50% de los costos calificados para instalar uno. También ofrecemos kits de baños composteros de barril y podemos hablar contigo directamente sobre la instalación o sugerirte a un proveedor. Obten más información en watershedmg.org/services/home.

#### **Cuéncamelo Todo: Líderes Vecinales**

Los talleres de Cuéncamelo Todo (BYOB) enseñan a los participantes cómo construir una cuenca y plantar un jardín de lluvia, y luego proporcionar los materiales para hacer lo mismo en casa. Este otoño, capacitamos a 14 Líderes Vecinales sobre cómo construir cuencas en el vecindario Palo Verde de Tucson, quienes luego organizaron a sus vecinos y enseñaron conjuntamente talleres BYOB con WMG. ¡Solo en septiembre, estos Líderes Vecinales impartieron tres talleres con 63 vecinos y 41 kits BYOB se enviaron a casa con los participantes! Obtén más información en **watershedmg.org/BYOB**.

#### Clases de Reembolso de Aguas Pluviales y Aguas Grises

¡Aprende los conceptos básicos de la cosecha de agua de lluvia y aguas grises con WMG, y luego aplica para un reembolso! Los clientes de Tucson Water califican para hasta \$1,000 para sistemas de aguas grises y hasta \$2,000 para sistemas de agua de lluvia. Regístrate para nuestras clases virtuales de reembolso en **Watershedmg.org/event**.

#### Clases de Hidratación en Tucson y Phoenix Valley

Las clases de Hidratación se enfocan en las distintas maneras de aprovechar al máximo los recursos hídricos locales, con temas como jardines comestibles nativos, tanques de lluvia y sistemas de riego, y cuidado de jardines de lluvia. Esta serie incluye nuestras clases de **Lavadora-A-Jardín (L2L)** y **baños composteros**, que muestran a los habitantes del desierto cómo reducir dos formas principales del uso de agua: riego al aire libre e inodoros con descarga de agua. Obtén más información en **Watershedmg.org/event**. **Top Left:** WMG's Program Manager & Educator Charlie Alcorn and Docent Dan Stormont show off L2L and composting toilet kits at the Living Lab.

**Top Right:** 14 BYOB Neighborhood Leaders cotaught 63 of their neighbors how to build basins in September 2022. That's a lot of new rain gardens and social networks!

**Top Left:** Arriba: Nuestro Gerente de Programa y Educador de WMG Charlie Alcorn y el Docente Dan Stormont mostrando los kits de L2L y de baños composteros en el Laboratorio Vivo.

**Top Right:** Abajo: 14 Líderes Vecinales de BYOB enseñaron conjuntamente a 63 de sus vecinos cómo construir cuencas en septiembre de 2022. ¡Demasiados jardines de Iluvia nuevos y conexiones con la comunidad!





## Celebrating Joaquin Murrieta-Saldivar's 9 Years at WMG

WMG sadly said goodbye to Cultural Ecologist Joaquin Murrieta-Saldivar, PhD this fall, who moved on from staff to a role as the Conservation Director at Borderlands Restoration Network.

Joaquin made an enormous impact on WMG's programs over the past nine years, bringing his contagious excitement, welcoming energy, and personal touch to everything he worked on.

He began his time at WMG in 2013 leading Co-op workshops, and quickly became the Schoolyard Program Manager, designing and teaching hands-on and heartfelt lessons on living in a reciprocal relationship with nature to K-12 students. Through this work, he also put into practice his love for organic, grassroots outreach. "After the students finished their lessons, they'd go home and influence their parents, nanas, aunts, others in the community," Joaquin says. "When the students start talking with and teaching their families, you know you're doing something meaningful."

Joaquin's community conservation work spanned the borderlands, with particular emphasis on South Tucson and cities in Sonora, Mexico. Among his many achievements, he convened a major water harvesting training in La Paz in 2015, where his presentations included spreading the word about Tippy Taps – simple hand-washing stations that conserve water and build community. With Joaquin leading the charge, WMG then became the lead trainer on water harvesting and green stormwater infrastructure for the Border Environment Cooperation Commission (BECC) from 2015-2018, educating officials in U.S.-Mexico border cities like Tijuana, Hermosillo, Ambos Nogales, El Paso-Ciudad Juarez, and Torreon about how to bring these practices to their own communities.

"In the end, this work is about making time for community, people, and nature, and taking the time to listen," Joaquin reflects. "For me that's been the most important thing – to take the time."

Joaquin has made an impact on countless students, volunteers, agency officials, and community members, breaking down barriers with his kindness and imagination for a better world. Words can't do justice to Joaquin's many years with WMG, so we'll leave it at thank you, and see you soon!



Joaquin teaches best practices for the ranching community along the San Pedro River in Sonora, Mexico.

Joaquin tears up the dance floor at a WMG party in 2017.

13

## **Tanque Verde Bosque Flow Returns**

## Local Conservation Efforts Help Keep Water in the Creek







Our Flow365 monitors captured over 500 photos of Tucson's creeks and rivers in the last water year, painting a very detailed picture of what's going on in our watershed. Special thanks to the 75 Flow365 volunteers who are active at 45 different monitoring spots across the Tucson basin!

Flow365 data helps us understand what's really happening in our creeks and rivers —showing when and where our creeks are flowing — and includes the gentler flows, typical of desert rivers, that aren't captured by other monitoring efforts. One of our favorite emerging stories is of the Tanque Verde Bosque, a middle stretch of Tanque Verde Creek, where we've been documenting the return of seasonal flows since 2019.

Flow365 monitoring data revealed that flow in the Tanque Verde Bosque returned again this August! After last season's record-breaking 288 days of consecutive flow (July 2021-May 2022), the creek was dry for a few months until the monsoons really ramped up in August. Flow365 monitors Sara Birtalan, Richard Pello, and Lee Pello captured the first

flow day since May on August 8th, and have been recording consistent flow in the creek since then.

This year's average monsoon followed last year's 3rd wettest monsoon on record. Even with average rain, though, we expect the flows to continue into the fall. Reduced groundwater pumping, local conservation efforts, and October rains continue to recharge the aquifer and support flows.

River Run Network members are also helping to keep more water in Tanque Verde Creek through a massive effort to remove invasive Arundo donax. Last season we removed 18 tons of Arundo, and we plan to double or triple that this season, with a goal of completely eradicating Arundo from Tanque Verde Creek. Arundo drinks up 3-4 times the amount of water as native plants, so when Arundo is gone, that water stays in the ground and contributes to flows. Join the fun by attending one of our upcoming Saturday workshops, scheduled almost every Saturday September-April. Learn more and sign up at Watershedmg.org/Flow365.

**Tanque Verde Bosque 2022** Water Year: Oct. 1st 2021–Sept. 30th 2022 **Total Days of Flow:** 2022 Water Year: 270 Days of Flow 2021 Water Year: 70 Days of Flow

> **288 Days** of Consecutive Flow – July 23rd 2021–May 7th, 2022

**Most Consecutive Flow Days:** 

**52 Days** of Consecutive Flow and Counting: Aug. 9th 2022–Sept. 30th 2022 (\*still flowing)

You can check out all the data collected by our Flow365 monitors on our live Flow365 Dashboard at: Watershedmg.org/Flow365



# **A Desert Creek Finds Its Flow Again**

Seasonal flows have returned to Tucson's Tanque Verde Creek thanks to reduced groundwater pumping, conservation efforts, and winter and monsoon rains. This photo captures the Tanque Verde Bosque, one of WMG's priority areas for monitoring, conservation projects, and removal of invasive Arundo. One of the remaining segments of the historic mesquite bosque, this riparian forest can expand again with restored groundwater levels. Help protect and extend these recent gains by joining the River Run Network at Watershedmg.org/RRN.



## **Support Hydro-Local Education Through the Learning Center!**



The Learning Center, WMG's new classroom planned for our Living Lab campus, will be a place to gather and educate our community about hydro-local solutions in the desert for decades to come. Can you help us raise the final funds to bring the Learning Center to life?

We still have \$141,100 left to raise to reach our \$525,000 capital campaign goal. With construction slated to start in December, gifts and pledges made by the end of the year will ensure we have the resources needed.

Thousands of people visit WMG's Living Lab annually, participating in tours, workshops, family programs, green job trainings, and social events. However, the demand for our services has outpaced our resources and infrastructure, and many of our programs require a large, multi-purpose space.

With increasing water shortages and climate impacts in the Southwest, it's more important than ever to have adequate space to teach about hydro-local water solutions. To make our vision for the Learning Center a reality, you can set up your gift by contacting WMG's Executive Director Lisa Shipek at lisa@watershedmg.org.

Learn more at Watershedmg.org/LearningCenter.

## Here's What Motivated Other **Capital Campaign Donors to Give:**



#### **Dr. William Horst, MD**

"I'm a long-time resident of Tucson since 1962 and very water-conscious, so after attending a dinner at the Living Lab, I became very interested in supporting the Learning Center. I learned about the naming opportunities, and being able to give in memory of my wife, Margaret Ann Horst, really struck home, because it's something she would be so proud of. I'm really pleased to be part of the Learning Center expansion, and having the opportunity to do this in memory of my wife was perfect."

#### **Stacey Plassman**

"Dynamic community-building organizations, like our WMG, have a crucial need for functional and comfortable SPACE to do this essential work. WMG is lucky to have the spot to build such a space, and the Learning Center is the perfect way to honor that blessing. The Learning Center design is awesome, conceived and designed in a thoughtful, earnest, and environmentally-sensitive way to be eminently versatile for the diverse activities of WMG. I want to see the Learning Center design fully realized, and experience the vigor that WMG can express when this vital functional space has become a reality."

#### **Joe Plassman**

"We love that WMG, in addition to advocating for water conservation, is also focused on implementing these ideas and teaching a wide range of people. We love supporting this work and think WMG has created a strong impact on our local community and how people think about sustainable water use. Supporting the Learning Center was a great opportunity to create an educational space that will ultimately help improve the livability of our city."

#### In memory of Margaret Ann Horst



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# Support hopeful, hydro-local solutions with a gift to WMG today!

Sustain these efforts by becoming a monthly donor or planning a gift through your IRA, donor-advised fund, stocks, or estate.

Get started at Watershedmg.org/Give.