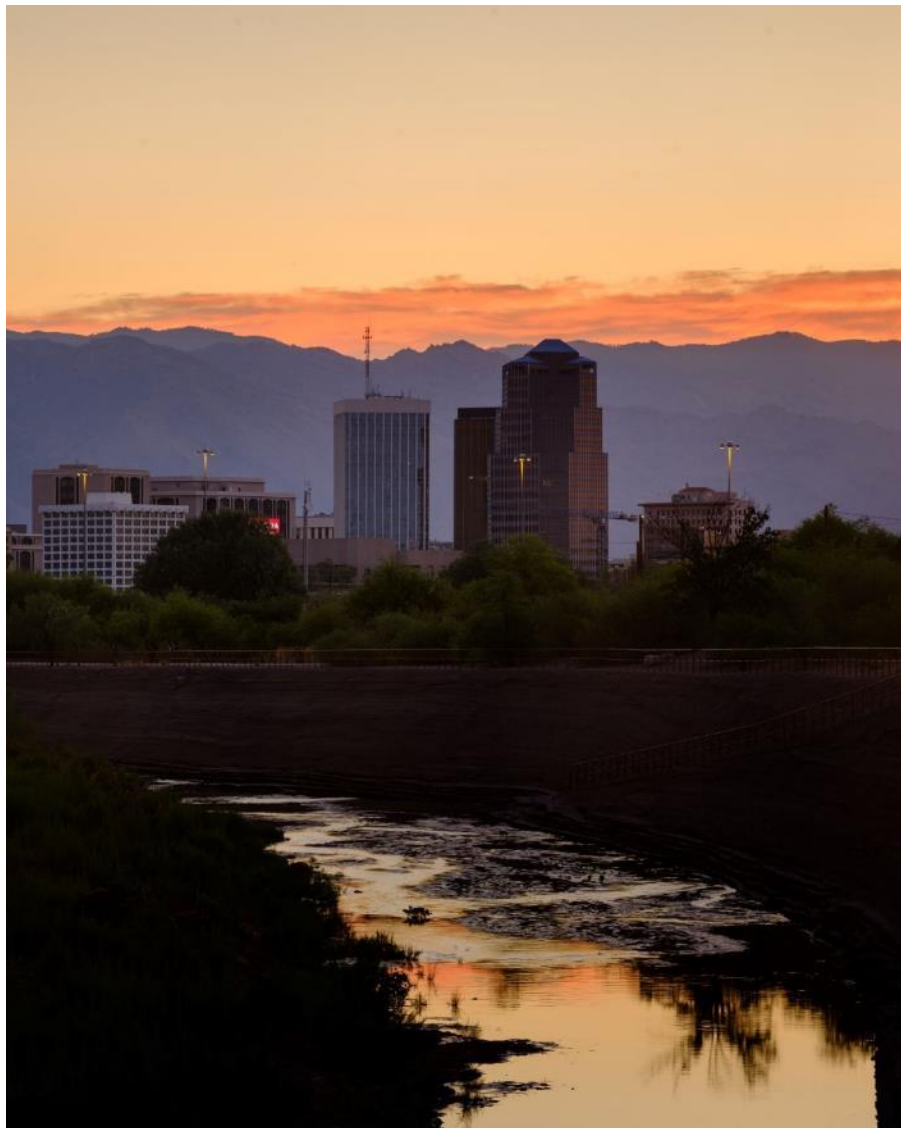


River Run Network Strategic Plan 2020-2070



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Appendix A: WMG’s River Restoration Vision Illustrations with Bilingual Captions

The Santa Cruz River now has year-round flow through downtown Tucson thanks to a recycled water project that came online June 2019 managed by Tucson Water.

Vision and Introduction

Watershed Management Group (WMG) was founded in 2003 with a mission to develop community-based solutions to ensure the long-term prosperity of people and the health of the environment. We envision a world where the relationship between the Sonoran Desert and its people creates prosperity for all. This includes all people, plants, animals, land, and water of the United States, Mexico, and Native American nations found in the Sonoran Desert.

In 2013, WMG launched a 50-year vision to restore Tucson's heritage of flowing creeks and rivers. We knew this vision was possible hydrologically, and it aligned with many other efforts underway to improve watershed health, integrate watershed planning, and restore the sacred value of our creeks and rivers. We're thrilled to see many efforts aligning and to be a part of a restorative and reciprocal path for the people, plants, animals, and rivers of the Santa Cruz Watershed.

50-year Vision

In 2070, the Santa Cruz River, the Rillito River, and their tributaries are a cooling ribbon of green that's central to the city's economy, culture, and livability. The Great Mesquite Forest, a riparian forest along the Santa Cruz River, the Rillito River, and Tanque Verde Creek, has regained some of its historic extent, with functional floodplains that make up an expansive green infrastructure network harvesting stormwater and floodwaters. The rivers are once again places for the community to play, wade and swim, and refresh under the shade of mesquite and cottonwood trees. Stretches of Sabino, Ciénega, and Tanque Verde Creeks and the Rillito and the Santa Cruz Rivers flow year-round supported by a healthy groundwater aquifer. The waterways are connected with stream sections that flow

seasonally, linking populations of Gila topminnow, longfin dace, and other native fish and wildlife. Tucson's rivers are revered by the community, led by the children who grew up with this vision and became public servants, biologists, artists, and elected officials who ensure we properly manage, conserve, and protect our water to revive flowing rivers.

Our Commitment to Diversity, Equity, and Inclusion

Land and Water Acknowledgement

Watershed Management Group acknowledges that we live, learn, work, and engage with community on the ancestral lands of the Hohokam, Sobaipuri, and Apache, and the Pascua Yaqui and Tohono O'odham, whose relationship with this land continues to this day. We acknowledge that water in the Sonoran Desert is of great spiritual, physical, and ecological significance to be protected, cherished, and celebrated.

We commit ourselves to engaging those communities in the work of WMG in culturally responsive ways, valuing their perspectives and worldviews on water management and by employing strategies that will benefit them and the Southern Arizona region.

Through WMG's Diversity, Equity and Inclusion (DEI) committee, made of board members as well as staff, we are enhancing and formalizing DEI practices throughout the organization from our hiring practices, to our public communications, to how we design our programs.

Watershed Management Group

RRN STRATEGIC PLAN 2020-2070

River Run Network

In 2016, WMG launched the River Run Network (RRN) to organize and mobilize community members in valuing and restoring our desert creeks and rivers, with a focus on the greater Tucson area.

The River Run Network honors the heritage of our arroyos, creeks, and rivers and the value that water holds for the peoples of Southern Arizona. In particular, we acknowledge the indigenous communities that have respected and stewarded our rivers for thousands of years and the Pascua Yaqui, Tohono O’odham, and Latinx communities that continue to steward the rivers today. People of all ages, diverse ethnic and racial backgrounds, beliefs, and many other diverse communities are invited to participate in restoring our heritage of seasonal and year-round water flows.

Membership in the River Run Network is free and includes an email newsletter with river-focused activities and news in Southern Arizona. RRN members are invited to participate in creek walks, river restoration workshops, river cleanups, community science monitoring, and other educational and advocacy opportunities.

In 2019, we started developing the River Run Network 50-Year Strategic Plan as a road map to guide our long-term efforts. This plan has four main goals, each with measurable metrics, timelines, action steps, and community input. The four goals are:

1. Renew community pride in our heritage of flowing rivers by growing a powerful and engaged River Run Network movement.
2. Develop river restoration priority actions, plans, and tracking metrics to guide WMG’s efforts as well as partner efforts.

3. Lead and partner on restoration efforts in the Tucson Basin to restore regular flows, ecological function, and the sacred value of our creeks and rivers.
4. Support adoption of policies to protect and enhance river flow through public education and advocacy with decision-makers at the municipal, county, state, and federal levels.

Hydro-Local Approach

Central to our 50-year plan is a hydro-local approach, our word for stewarding and using local, renewable sources of water as the primary water supply instead of mining groundwater or depleting local or distant rivers and watersheds. Local, renewable supplies for the Tucson area include rainwater, greywater, stormwater, annually-renewed groundwater and surface water.

Through a hydro-local framework, we reduce our dependence on the Colorado River for our water supply and contribute to preserving flows in the Colorado River for the benefit of all.

Santa Cruz Watershed Collaborative

In 2017, WMG helped develop and co-launch the [Santa Cruz Watershed Collaborative](#) (SCWC). The Collaborative was co-convened by agencies including Tucson Water, Pima County, Bureau of Reclamation, University of Arizona Water Resources Research Center, Pima Association of Governments and non-profit organizations including Watershed Management Group, Sky Island Alliance, Sonoran Institute, Community Water Coalition, and American Rivers.

Watershed Management Group

RRN STRATEGIC PLAN 2020-2070

By 2021 SCWC had grown to 35 partners including government, NGO, tribal, business, farm, and mine representatives, all committed to SCWC’s vision: People working together to ensure a healthy urban watershed with flowing rivers and streams. Partners have collaborated on a [Watershed Restoration Plan](#) and move forward actions outlined in the plan through a monthly Coordinating Team and several working groups.

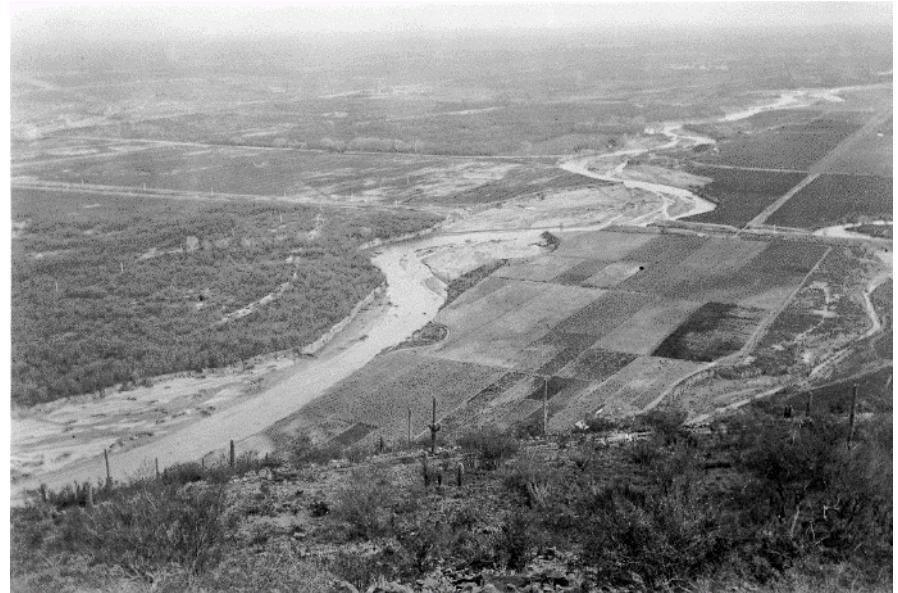
While SCWC is not part of the River Run Network, it is a complimentary effort working toward a similar vision, guided by a diverse array of partners.

We believe that we can achieve our vision of the restoration of Tucson’s rich natural and cultural heritage of flowing creeks and rivers through the River Run Network and through other community efforts like the Santa Cruz Watershed Collaborative. We invite you to get involved by visiting our website, Watershedmg.org/RRN.

Background Information

Tucson’s River Heritage

For thousands of years, the Santa Cruz River and its tributaries, including the Rillito and Pantano Rivers and the Tanque Verde, Sabino, and Ciénega Creeks, had stretches of year-round and seasonal flows that supported Indigenous populations and a huge diversity of plant and animal life. The Santa Cruz River supported the Great Mesquite Forest—a forest that historically covered seven square miles and was so rich with birdlife that it was a hotspot for ornithologists from the early to mid-1900s.



The Santa Cruz River in 1919 from the side of Sentinel Peak (A Mountain). The river is flowing through agricultural fields and remnant mesquite forests.

Ornithologist William Dawson described the Santa Cruz River and Great Mesquite Forest on a scientific visit in 1917: “Fed by secret springs of the Santa Cruz River, which has been alternatively flowing and trickling underground ever since it left the Mexican border, some sixty miles southward, the humble mesquite... rises here to a dignity of a real tree, and this forest, once matchless for size and extent, contained trees sixty and seventy feet in height and up to three feet in diameter.” [1]

In 1935, ornithologist Herbert Brandt wrote of the bosque: “It reminded me very much of a semiarid, hotland Sinaloa jungle, with its lively community of strange animals and plants. This woodland...drew to itself such a fine list of unusual birds, that I feel it merits designation as a separate type of desert area...” [2]

Historically, the Rillito River also had an extensive riparian forest with sections of year-round and seasonal flows. The Rillito was fed largely

by winter flows from Tanque Verde Creek and summer flows from the Pantano Creek.

Engineer and geologist George E.P. Smith did a study of the Rillito Valley in 1910, and described how he imagined the Rillito Valley looked prior to European settlement: “The entire valley was at that time an unbroken forest, principally of mesquite, with a good growth of grama and other grasses between the trees. The river course was indefinite—a continuous grove of tall cottonwood, ash, willow, and walnut trees with underbrush and sacaton and galleta grass, and it was further obstructed by beaver dams. The vegetative covering on mountain slopes, on foothills and plains held the rainfall, causing a large proportion of it to be absorbed into the soil. Such portion as found its way to the river channel was retarded and controlled in its flow, and perhaps not oftener than a century did a master flood erode and sweep the river channel.” [3]

A Century of Mismanagement and Rivers Forgotten

From the early to mid-1900s, these creeks and rivers dried up due to extensive groundwater pumping. Now most of these creeks and rivers flow only after heavy rains, with just a few patches of perennial flows remaining. With dropping groundwater levels and loss of surface flow, much of the riparian habitat has disappeared—including the Great Mesquite Forest along the Santa Cruz River and the cottonwoods, willows, and mesquites that died off along other river courses.

As we over pumped and diminished our groundwater over the last century, we also denuded and built on our floodplains, channelized our rivers, and turned our rivers into storm drains. Increased urban flooding due to poor land management has resulted in using our river

beds for peak flood capacity, which is designed to move water as quickly as possible out of the city.

Tucson pumped groundwater as our sole municipal water supply until we brought in water from the Colorado River in the 1990s via the Central Arizona Project aqueduct. The Colorado River water supply has allowed Tucson to reduce groundwater pumping in many areas, but it is not the ultimate solution to our local water needs with climate change, drought, and many competing demands affecting the Colorado River’s supply.

We can choose a more sustainable path and lead our region to strive for resilience, livability, and connection to nature. New thinking and innovation in river management and urban development is opening our rivers to new possibilities. Help us envision the future and be part of the change we want to see for rivers in Tucson and the Southwest.

Acknowledgements

Thanks to the WMG staff who created and contributed to the plan as part of the River Run Network Staff team, including Lisa Shipek, Catlow Shipek, Joaquin Murrieta, Lauren Monheim, Trevor Hare, and Eliza Stokes. Special thanks to the peer-reviewers who provided feedback, including Mark Briggs, Julia Fonseca, and Jeff Odefey. We appreciate the contributions of many WMG board members, including: Ceanne Alvine, Emma Bowers, L. René Corrales, Ph.D, Jennifer Diffley, Brian Drummond, Garry Forger, Margot Garcia, Judith LeFevre, Jennifer Psillas, John Shephard, and Jesús Treviño, Ph.D. Feedback was also provided through a community survey, with participants from the River Run Network and other interested community members.

[1 & 2] *Requiem for the Santa Cruz*, by Robert H. Webb, Julio L. Betancourt, R. Roy Johnson, and Raymond M. Turner, The University of Arizona Press, 2014. [3] *Little River*, by Scott O’Mack, Scott Thompson, and Eric Eugene Klucas, Statistical Research, Inc. 2004.

Goal 1: Renew community pride in our heritage of flowing rivers by growing a powerful and engaged River Run Network movement.



RRN Members get their feet wet at a pop-up creek walk along Tanque Verde creek.

Flow365 monitors attend WMG's annual Flow and Feast event for RRN members.

Metrics	2025	2030	2040	2050	2060	2070
a) Total # of River Run Network members.	5,000	7,000	12,000	20,000	25,000	30,000
b) Total # of RRN business members and/or sponsors.	25	50	100	100	100	100
c) Total # of Flow365 monitors (2-3 per observation station).	100	150	150	150	150	150
d) Total # of groundwater monitoring observation locations.	10	15	20	20	20	20
e) Total # of RRN activities offered annually including creek walks, river cleanups, and restoration workshops (% of events in Latinx or underserved neighborhoods).	25; 25%	30; 50%	40; 50%	50; 50%	50; 50%	50; 50%
f) Total # of RRN activities featuring Latinx, Black, Indigenous, or other diverse voices.	25%	50%	50%	50%	50%	50%
g) Total # of RRN members that participate in WMG's water conservation and water harvesting activities at home to reduce household water use.	200	250	300	500	500	500

g) Develop a \$5 million endowment that funds RRN education and restoration efforts.		\$1M	\$2.5M	\$5M	\$5M	\$5M
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Action Steps

1. Build RRN membership with community members, landowners, businesses, and organizations that represents Tucson’s diverse community.
 - a. Develop a strong RRN brand and share through media, social media, and community events.
 - b. Develop relationships with diverse organizations by participating in and supporting their events.
 - c. Pair historic, present, and future vision imagery sets to highlight restoration goals for iconic places within the Tucson Basin.
 - d. Engage Latinx, Black, Indigenous, and People of Color in RRN.
 - e. Include demographic questions in RRN surveys to build demographic data about the RRN and see change over time. Plan a more extensive RRN member survey with demographic data every 5 years.
2. Grow Release the Beavers education and advocacy campaign to ensure beavers are embraced as an essential part of river restoration in Southern AZ.
 - a. Lead regular beaver-themed education activities, including family events.
 - b. Organize annual binational beaver survey.
 - c. Research significance and meaning of beavers for local Native American and Latinx communities to incorporate into education activities.
3. Develop and organize creek walks, cleanups, restoration workshops, and special events to connect diverse community members to their local creeks & rivers and restoration goals.
 - a. Conduct monthly creek walks throughout the Tucson Basin featuring a variety of partner organizations and agencies.
 - b. Organize annual culturally-centered community events to connect people to local rivers, social activism, and new traditions.
 - c. Develop kid and family focused activities for RRN.
 - d. Offer conservation activities members can do at home, both indoors and outdoors, whether a homeowner or renter, to conserve water and steward rivers.
 - i. Rain garden kits
 - ii. Greywater kits
 - iii. Water use and irrigation audits
 - iv. Kids conservation activities
4. Develop a RRN Leadership Program to increase engagement and actions of RRN members. RRN Leaders will be trained and empowered to lead creek walks, cleanups, and projects in their neighborhoods. RRN leaders will also receive cultural competency training regarding the diverse communities served by WMG.
5. Grow the Flow365 Community Science Monitoring Program to provide consistent flow and groundwater data at 50 monitoring points across the Tucson Basin.
 - a. Provide a Tucson River Flow Annual Report to the public to share trends in flow and groundwater data.
6. Promote water conservation with RRN members through a “40 by 2040” campaign - with the goal of achieving 40 GPCD (gallons per person per day) and foster a hydro-local approach.¹

¹ A hydro-local approach utilizes local, renewable sources of water as the primary water supply instead of mining groundwater or depleting local or distant rivers and watersheds. Local, renewable supplies for

Tucson include rainwater, greywater, stormwater, annually-renewed groundwater and surface water.

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7. Develop a bilingual Tucson River Heritage exhibit that features oral histories, historic photos, and multimedia storytelling through partnerships with historical and art organizations.
8. Develop experiential educational activities to engage children and families in the River Run Network's restoration and monitoring goals.

RRN Actions to Attract & Engage More Diverse Membership by 2025

- 25% of on-the-ground events will be bilingual events, planned in Latinx neighborhoods, and engaging neighborhood-based partners.
- 25% of on-the-ground events will be in culturally-rich, limited income neighborhoods.
- 25% of presentations/events will feature Latinx, Black, Indigenous, and other diverse voices or partners.

Community Input

In our 2020 survey to community members, respondents ranked the following as the top three strategies to recruit and engage River Run Network members:

- 1) Hands-on activities: creek walks, river cleanups, and restoration workshops.
- 2) Family or children's activities.
- 3) Leadership programs to build capacity of members to lead programs in their own neighborhoods.



WMG offered Build Your Own Basin (BYOB) workshops and kits to families to help them build rain gardens at home. Households received a native shade tree, organic mulch, native shrubs, and wildflower seeds to start their rain gardens. The BYOB Kits were part of a Steward In Place effort for River Run Network members.

Goal 2: Develop and implement river restoration priority actions, plans, and tracking metrics to guide WMG’s efforts as well as partner efforts.



A Flow365 volunteer’s photo captures monsoon flows along the Cañada del Oro River.

Santa Cruz Watershed Collaborative (SCWC) participants build a shared vision and goals at a 2019 forum.

Metrics	2025	2030	2040	2050	2060	2070
a) Engage Tucson with outreach to culturally-diverse communities in river restoration vision and planning with surveys, focus groups, and peer review.	X	X	X	X	X	
b) Share RRN Strategic Plan via website, storymaps, videos, and presentations.	X					
b) Update RRN Strategic Plan and restoration goals every five years.		X	X	X	X	X
c) Assist the Santa Cruz Watershed Collaborative (SCWC) in adopting and implementing a shared Watershed Restoration Plan.	X					
d) Assist SCWC in developing common monitoring techniques and strategies to track progress towards Watershed Restoration Plan.	X					
f) Assist SCWC in updating a shared Watershed Restoration Plan every 5-10 years and including progress toward SCWC goals.		X	X	X	X	X

Action Steps

1. Identify appropriate adaptive restoration strategies and update plans for WMG's priority streamsheds² including establishing restoration goals, priority actions, general strategies, and share historical knowledge, and metrics to track progress. WMG's priority areas include:
 - a. Lower Sabino Creek
 - b. Tanque Verde Creek
 - c. Ciénega Creek from the upstream Las Ciénegas National Conservation Area through to Pantano Creek
 - d. Santa Cruz River from the San Xavier District through to Marana
 - e. Rillito River from Craycroft Road to Columbus Road
 - f. Sutherland Creek
2. Engage RRN members and the public in restoration actions through accessible, interactive content via website, storymaps, videos, and social media.
 - a. Develop and maintain a Flow365 dashboard to share monitoring data and analysis.
 - b. Develop and maintain a RRN dashboard to build watershed restoration awareness and facilitate connection among RRN members.
 - c. Facilitate educational tours and community trainings at restoration project sites.
 - d. Co-create family and youth-focused content in collaboration with diverse youth and family groups through art, science, and story-telling initiatives
3. Engage targeted community groups to increase diverse representation and input into ongoing planning processes and support other community-based approaches.
 - a. Engage RRN members and greater community to get feedback on restoration vision and priorities every 3-5 years when restoration plans are updated through surveys, focus groups, and peer review.



Perennial flow has resurfaced along this stretch of Lower Sabino Creek starting in 2016. The persistence of flow has been recorded by WMG's Flow365 monitors and is likely the result of reduced groundwater pumping upstream.

² Streamsheds are made up of a specific stream section and the adjacent land area the most influences their stream hydrology.

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- b. Support efforts which promote traditional ecological knowledge awareness and applications.
- 4. Coordinate and collaborate through the Santa Cruz Watershed Collaborative (SCWC) to align RRN and SCWC partner restoration efforts as appropriate.
 - a. Support and be an active representative through SCWC's Coordinating Team and committees (as appropriate).
- 5. Assist in the development and adoption of and regular updates to SCWC's Watershed Restoration Plan.
 - a. Maintain and update SCWC storymap and Plan visualization and documentation.
 - b. Assist in updating SCWC metrics for tracking progress towards SCWC goals.

Community Input

In our 2020 survey to community members, respondents ranked which stream or river sections were the highest priority to restore flow and riparian habitat, with #1 indicating their first priority.

- 1) Santa Cruz River through downtown Tucson
- 2) Rillito River between Craycroft Road and Columbus Road
- 3) Lower Sabino Creek
- 4) Tanque Verde Creek
- 5) Pantano Creek
- 6) Lower Ciénega Creek
- 7) Cañada del Oro River

The top two reasons community members gave for their rankings were 1) these areas are more known and visible to the public, and 2) they are important from a cultural and historical perspective.



Enjoying flows along the Santa Cruz Heritage project in downtown Tucson.

Goal 3: Lead and partner on restoration efforts in the Tucson Basin to restore regular flows, ecological function, and the sacred value of our creeks and rivers.

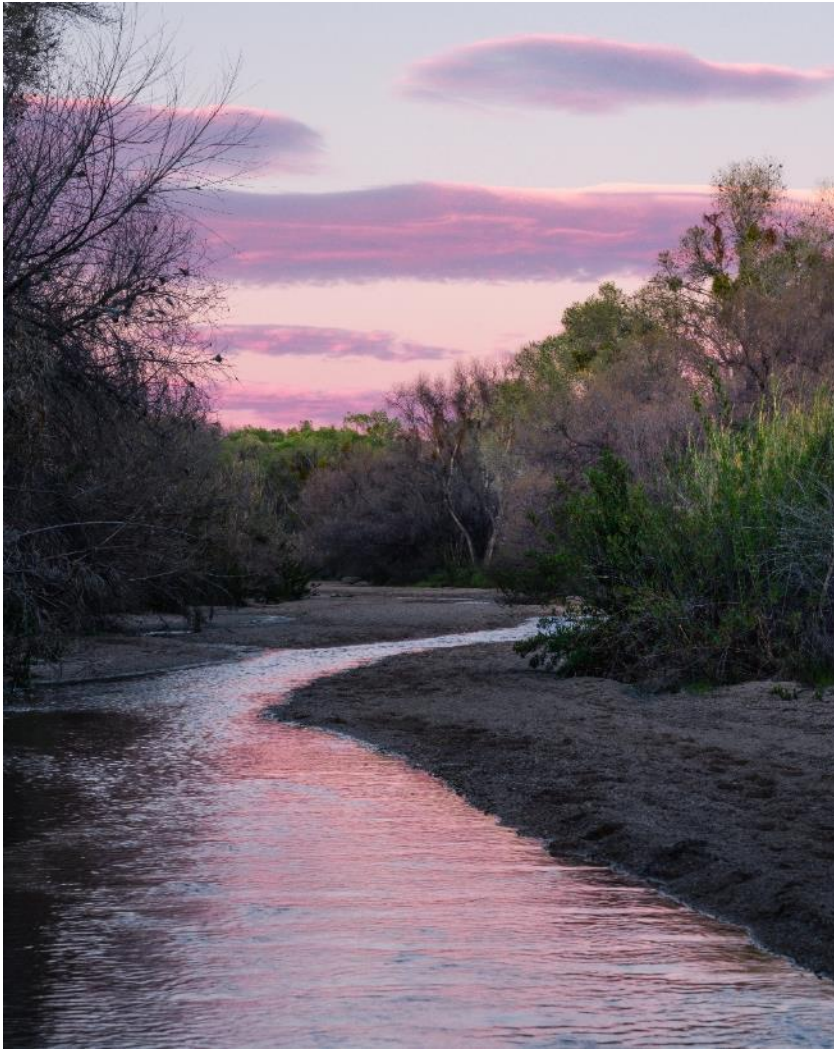
Metrics	2025	2030	2040	2050	2060	2070
a) Increase perennial flow extent along Lower Sabino Creek (perennial flow extent = 0.2 miles; 2016-2021 Flow365 data)	20%	20%	20%	20%	20%	Restored, adaptive management
b) Increase perennial flow extent along lower Ciénega Creek based on historic flows (perennial flow extent = 2.7 miles; 2019 PAG data)	10%	20%	20%	20%	15%	Restored, adaptive management
c) Increase # of seasonal flow days in Middle Tanque Verde Creek (seasonal flow extent = 1.1 miles; averaging 87 days of flow from 2020-2021 Flow365 data)	10%	20%	20%	20%	20%	Restored, adaptive management
e) Preserve and raise groundwater levels to support riparian forest health and support seasonal flow extent along the Rillito River from Craycroft Road to Swan Road (depth to groundwater at confluence area is 50ft, with recent groundwater declining status; 2018 Tucson Water data)	Stabilize groundwater levels	Raise groundwater levels by 10%	Raise groundwater levels by 10%	Raise groundwater levels by 10%	Raise groundwater levels by 10%	Raise groundwater levels by 10%
f) Acreage of riparian restoration project areas completed by WMG and Santa Cruz Watershed Collaborative partners annually (present day estimate = ~100 acres per year)	200	300	500	500	500	Managing for old growth forests
g) Acreage of upland arroyos treated annually by WMG to enhance infiltration (area of hydrological impact, 2020 estimate = 10 acres)	20	30	50	50	50	Continuing adaptive management
h) Square miles of mesquite bosque (forest) restored and preserved along the Santa Cruz River and Tanque Verde Creek by WMG and SCWC partners (historical estimate of 18.5 square miles based on 1936 aerial photo analysis)		1	3	5	7	8

Action Steps

1. Lead or partner on watershed restoration projects focused on restoring creek and floodplain function through upland restoration projects, invasive species removal, and expansion of riparian forests.
 - a. Implement restoration projects with private and public landowners in shallow groundwater areas and floodplains. Build collaborative partnerships with agencies. Build private landowner interest through site consultations, presentations, and restoration assessments.
 - b. Focus efforts on identified priority streamsheds.
2. Conduct strategic outreach to landowners in shallow groundwater areas and floodplains to share our vision, RRN program, cultivate sacred value of water as part of a desert ethos, and build interest in enhancing stormwater recharge on their property and/or reducing groundwater use.
 - a. Pilot conservation incentive programs with exempt well owners to reduce consumptive use.
3. Enhance and accelerate river restoration outcomes through beaver-based restoration efforts.
 - a. Support Bureau of Land Management (BLM) and Arizona Game and Fish Department (AZGFD)'s effort to reintroduce beavers to Las Ciénegas National Conservation Area as well as augment population along San Pedro River.
 - b. Assess what other public and private lands are suitable for beaver introductions.
 - c. Enhance suitable beaver habitat through enhanced infiltration practices like one-rock dams, native plant propagation, and beaver dam analogs.
 - d. Organize annual binational beaver survey - community science monitoring effort.
4. Develop, collaborate on, and engage in monitoring and management activities to ensure long-term watershed health and to protect ecosystem integrity.
 - a. Grow and refine WMG's Flow365 community monitoring program to better understand river flow dynamics, track progress towards flow restoration goals, and build community connection to rivers.
 - b. Assist SCWC watershed metrics annual monitoring and dissemination among partners to track progress.



WMG volunteers build one rock dams to slow and sink flows in Empire Gulch – a tributary to Ciénega Creek. Spring 2021.



Surface flows in Tucson creeks are impacted by nearby groundwater pumping, especially in shallow groundwater areas. This stretch of the Tanque Verde Creek near Wentworth Road has seen renewed seasonal flows thanks to reduced groundwater pumping from nearby users, including Forty Niner Country Club (who switched to reclaimed water instead of groundwater to irrigate the golf course).

Note: Restoration metrics were based largely on Pima County's historic flow from the 1890s to 1910s and present-era perennial (PStreams) and intermittent (IStreams) flow status GIS layers. Current flow status information was updated to reflect 2019 conditions directly observed due to shifts in water resource management (e.g. Santa Cruz River Heritage Project or Lower Sabino Creek), through WMG's Flow365 volunteer flow monitors, or through conversations with other local experts. The projected percentage increases in flow length are for both perennial and intermittent reaches as compared to the total stream length based on Pima County's stream layer. Projected flow status changes are a conservative comparison to historic flow status lengths. Restoration of flow along the Santa Cruz River does account for channel reaches receiving treated wastewater discharges.

Community Input

In our 2020 survey to community members, respondents ranked the following as the top three strategies to motivate groundwater well users (either residential or commercial) to reduce groundwater pumping:

- 1) Water harvesting rebates (for passive and active water harvesting systems like rain gardens, green infrastructure, greywater systems, and cisterns).
- 2) Incentives to connect to alternate water supplies through larger water utilities or use of reclaimed water.
- 3) Grants for restoration projects.

Goal 4: Support adoption of policies to protect and enhance healthy river ecosystems through public education and advocacy with decision-makers at the municipal, county, state, and federal levels.

Metrics	2025	2030	2040	2050	2060	2070
a) City and County prioritize instream recharge as the preferred strategy for recycled water recharge projects.		X				
b) Water harvesting incentives instituted for other water providers in Tucson and extended to commercial users and well users in addition to residential users and schools.	X					
c) Grow City of Tucson's Green Stormwater Infrastructure Fund to provide increased funding for the wide-scale implementation and maintenance of GSI in public spaces, with a portion of targeted funding to enhance shallow groundwater areas and river restoration priorities (\$3 million fund in 2020)	\$5M	\$10M	\$20M	\$30 M		
d) Santa Cruz Watershed Collaborative is a fully funded collaborative with diverse partner representation, including indigenous and environmental justice groups	X					
e) Statewide water conservation incentives re-established to support a hydro-local approach		X				
f) City of Tucson and/or Pima County adopts Environmental Flows Policy by 2030; State of Arizona adopts Environmental Flows Policy by 2050		X		X		
g) City of Tucson and/or Pima County adopts Managed Retreat from Floodplains Policy			X			
h) Historic landfills along rivers are remediated to ensure rivers can be restored and groundwater levels recovered in urban, limited income neighborhoods.			X			

Action Steps

- 1) Advocate to prioritize groundwater recharge strategies in or near riparian areas. Groundwater recharge strategies would include larger-scale green stormwater infrastructure projects, Central Arizona Project (CAP) recharge projects, and recycled water recharge projects.
 - a) Advocate for in-channel recycled water recharge projects with local effluent producers and/or to achieve equity of in-channel long-term groundwater recharge credits (a legislative change). Build support through SCWC partners and the Arizona Sustainable Water Working Group.
 - b) Advocate for conservation programming to shallow groundwater users in Tucson Water service area and at the state level for all shallow groundwater users to promote stormwater infiltration as well as demand reduction incentives.
 - c) Advocate for increased funding of the City of Tucson's Green Stormwater Infrastructure Fund, and the development of a Pima County Watershed Restoration Fund to support stormwater infiltration investments to strategically enhance the long-term resilience of natural and community water supplies across the watershed.
- 2) Help build partners in SCWC to represent diverse and underserved communities, including representatives from the Tohono O'odham and Pascua Yaqui nations, Latinx communities, and environmental justice groups.
- 3) Promote hydro-local strategies in the Tucson Basin to establish clear, community-wide water conservation goals for both demand management and rainwater/stormwater utilization.
- 4) Advocate for environmental flows policies to be implemented at the city and/or county level to increase recognition of the sacred value of water.
- 5) Support One Water³ management by the City of Tucson and Pima County, and the integration of watershed health and riparian restoration with One Water management plans.



This lower stretch of Tanque Verde Creek is in a shallow groundwater area with seasonal flows that historically flowed perennially near the confluence with the Pantano Creek and supported a large ciénega or marshland.

³ The One Water framework views all water—groundwater, surface water, rainwater, stormwater, wastewater, and reclaimed water—as valuable resources that must be managed holistically and sustainably.

Watershed Management Group

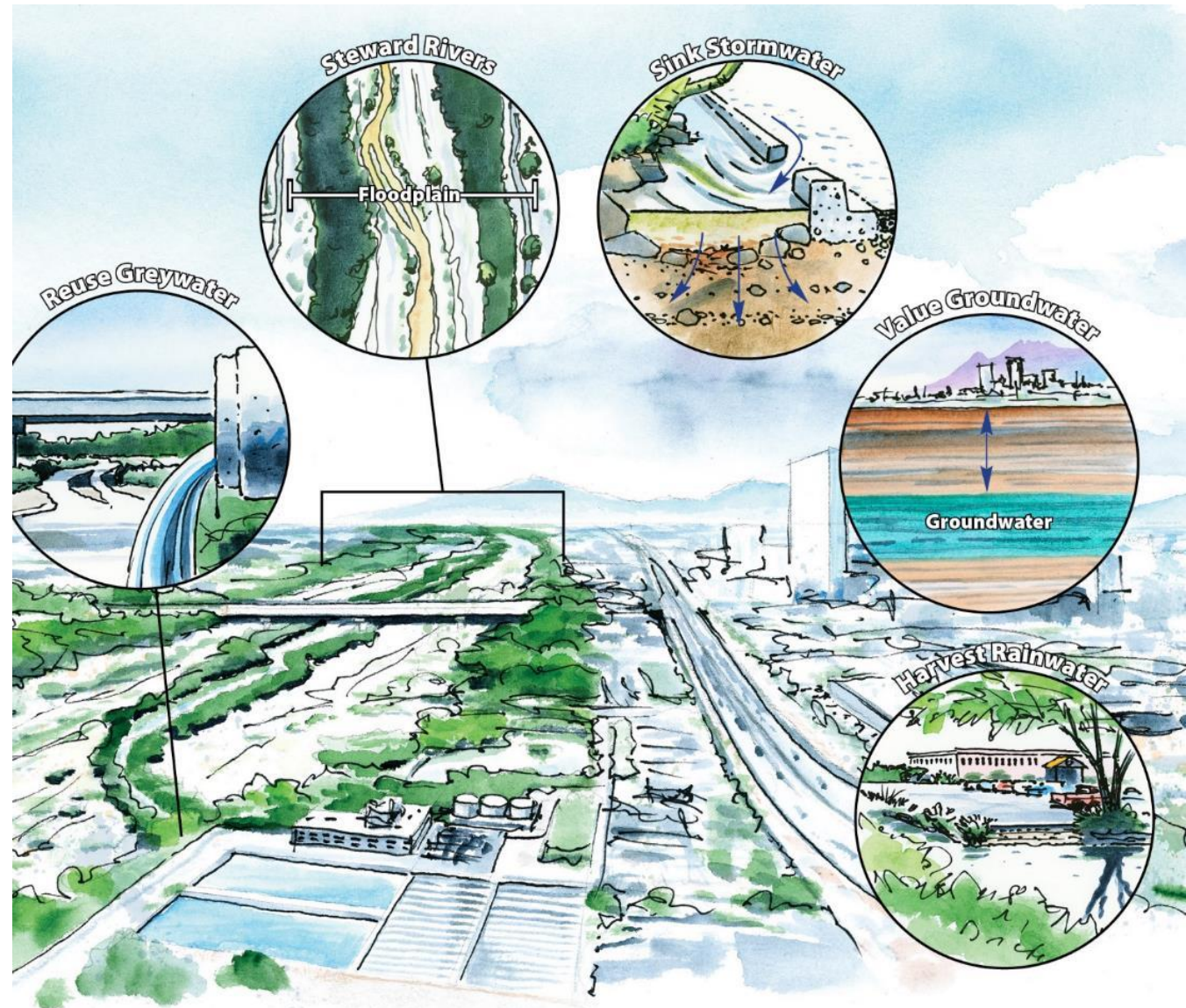
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- 6) Engage the RRN membership in policy issues through informing members about current and future policy needs and engaging members in advocacy campaigns on specific topics. Advocate for increased funding for critical habitat acquisitions along our creeks in rivers (i.e. Floodprone Land Acquisition Program (FLAP) and Open Space Bonds) with Pima County.
- 7) Support watershed planning and a grant proposal to remediate historic landfills along the Santa Cruz River near downtown Tucson and the Rillito River.
- 8) Provide public education on river restoration, green infrastructure policies, and opportunities for advocacy with River Run Network members.

Community Input

In our 2020 survey to community members, respondents ranked the following as the top two policy priorities:

- 1) Increasing the City of Tucson's Green Stormwater Infrastructure Program fund over time from \$3 million to \$30 million to ensure 20% urban forest cover.
- 2) Establishing a local environmental flows policy to ensure water is allocated to our rivers to sustain river ecosystems and the plants, animals, and people they support.



Aspects of a hydro-local approach at the city scale.



OUR RIVERS REBORN

Vision: Las Ciénegas National Conservation Area

The American Beaver once again is a keystone species in the Santa Cruz Watershed with a robust population thriving in Las Ciénegas National Conservation Area. Ciénega Creek has regained its historic flow extent with over 13 miles of perennial flow in the conservation area, thanks to the return of the beavers and a collaborative community effort to protect the groundwater aquifer. The beaver's small, natural dams slow the flow and pond water across a broader floodplain. The more frequent, deeper pools of water supports a larger population of native fish and is a hotspot for Gila chub, Gila topminnow, and longfin dace, as well as yellow-billed cuckoo, Southwestern willow flycatcher, Chiricahua leopard frog, and the Mexican garter snake. The spreading of water across the landscape widens the floodplain to support one of the largest riparian forests in Southern Arizona, as well as allowing more water to seep into the aquifer. The aquifer is a big sponge, storing water for later to create water security for greater Tucson, and providing 20% of the groundwater inflow to Tucson.

Vision: Tanque Verde Creek at Isabella Lee Natural Preserve

Tanque Verde Creek at Isabella Lee has sections of year-round and seasonal meandering flow fed by groundwater and surface flow from the Rincon Mountains as well as the Santa Catalina Mountains through Agua Caliente Creek. Seasonal flow supports large populations of the lowland leopard frog and Mexican gartersnakes. The large cottonwood-willow riparian forests support rare birds such as the blackhawk, cactus-ferruginous pygmy owls and yellow-billed cuckoo. The creek has an extensive floodplain, a natural sponge to absorb large flood events and increase recharge, supporting a vast velvet mesquite-ash-hackberry bosque (forest). The area is treasured by the communities in the Tanque Verde Valley as a destination for bird watching, hiking, horseback riding and nature appreciation.



RENACIMIENTO DE NUESTROS RÍOS

Visión: Las Cienegas National Conservation Area

El Castor Americano, una vez más, es una especie clave en la Cuenca del Santa Cruz con una población robusta que prospera en el Las Cienegas National Conservation Area. Ciénega Creek ha recuperado su extensión de flujo histórico con más de 13 millas de flujo perenne en el área de conservación, esto fue posible gracias al regreso de los castores y un esfuerzo comunitario de colaboración para proteger el acuífero subterráneo. Las pequeñas represas naturales del castor retienen el flujo y el agua se esparce a través de una planicie de inundación más amplia. Las lagunas de agua más frecuentes y profundas sostienen una población más grande de peces nativos y son un punto de acceso para Gila chub, charalito Gila, longfin dace, así como cuco de pico amarillo, papamoscas del suroeste, rana leopardo Chiricahua y la serpiente chicotera mexicana. La extensión del agua a través del paisaje ensancha la planicie de inundación para darle vida a uno de los bosques ribereños más grandes del sur de Arizona, y permite que se filtre más agua en el acuífero. El acuífero es una gran esponja, almacena agua para más seguridad hídrica para Tucson, y proporciona el 20% del flujo de agua subterránea a Tucson.

Visión: Riachuelo Tanque Verde en el Preserva Natural Isabella Lee

El Riachuelo Tanque Verde en Isabella Lee tiene secciones de flujo serpenteante durante todo el año y estacional alimentado por agua subterránea y flujo superficial de las montañas Rincón y las montañas de Santa Catalina a través del Riachuelo Agua Caliente. El flujo estacional alimenta a grandes poblaciones de la rana leopardo en las tierras bajas y la culebra nómada de agua Mexicana. Los grandes bosques ribereños de álamos y sauces sostienen aves raras como el halcón negro, los búhos pigmeos ferruginosos-cactus y el cuco de pico amarillo. El riachuelo tiene una extensa planicie de inundación, una esponja natural para absorber grandes inundaciones y aumentar la recarga, apoyando un vasto bosque de mezquite-almezo-cenizo. El área es atesorada por las comunidades en el Valle de Tanque Verde como un destino para la observación de aves, caminatas, cabalgatas y apreciación de la naturaleza.



OUR RIVERS REBORN

Vision: Confluence of Tanque Verde Creek and Pantano River

The lower Tanque Verde Creek has year-round and seasonal, meandering flow that feeds a ciénega (wetland) with tall stands of riparian grasses, alive with the sounds of native frog and toads. Regular flow invites native fish populations of the Gila topminnow and Gila chub to return as well as the illustrious American beaver. The reintroduced beavers enhance the creek through low mud-packed leaf dams that help slow the flow of water and provide for rich and diverse riparian habitat. Seasonal flows of the Pantano River help connect populations of native fish from Ciénega Creek to Tanque Verde Creek. The extensive floodplain is a natural sponge to absorb large flood events and increase recharge supporting an extensive mesquite bosque (forest). The mesquites, interspersed with cottonwoods and ash trees, create a shady oasis home to an abundance of wildlife and endless recreation opportunities for families.

Vision: The Rillito

The Rillito is Tucson's darling, capturing the community's heart and imagination by bringing its wet and wild wonder into the urban core. The river is alive with seasonal flows, supported by healthy groundwater levels, which are fed by stormwater infiltrated through green infrastructure throughout the surrounding neighborhoods. Parking lots and impervious areas are reduced and replaced with rain garden parks and native habitat. The Rillito's lush floodplain supports important riparian species with great wildlife viewing and recreation opportunities, tying into cultural amenities like the racetrack, restaurants, and the bike loop. People come to view the growing bat populations, hear breeding toads in the monsoons, along with enjoying fabulous bird watching all winter long.



RENACIMIENTO DE NUESTROS RÍOS

Visión: Confluencia del Riachuelo Tanque Verde y Río Pantano

La porción baja del Riachuelo Tanque Verde tiene un flujo serpenteante durante todo el año y estacional que alimenta a una ciénega (humedal) con alta presencia de pastos ribereños, y con ruidos sonoros de ranas y sapos nativos. Las corrientes regulares invitan a regresar a las poblaciones nativas de peces del charalito Gila y Gila chub, así como al ilustre castor Americano. Los castores reintroducidos mejoran el arroyo a través de presas de hojarasca llenas de lodo que ayudan a disminuir el flujo de agua y proporcionan un hábitat ribereño rico y diverso. Los flujos estacionales del Río Pantano ayudan a conectar las poblaciones de peces nativos del Riachuelo Ciénega al Riachuelo Tanque Verde. La extensa planicie de inundación es una esponja natural para absorber grandes inundaciones y aumentar la recarga que soporta un extenso bosque de mezquite. Los mezquites, intercalados con álamos y fresnos, crean un oasis sombreado que alberga una gran cantidad de vida silvestre y un sinfín de oportunidades de recreación para las familias.

Visión: El Rillito

El Rillito es el amor de Tucson, captura el corazón y la imaginación de la comunidad al llevar su maravillosa humedad salvaje al núcleo urbano. El río está vivo con flujos estacionales, alimentados por niveles saludables de agua subterránea, que son alimentados por aguas pluviales infiltradas a través de la infraestructura verde en los vecindarios circundantes. Los estacionamientos y las áreas impermeables se reducen y se reemplazan con parques de jardines de lluvia y hábitat de plantas nativas. La exuberante planicie de inundación del Rillito da vida a importantes especies ribereñas con excelentes oportunidades para la observación de la vida silvestre y la recreación, vinculando éstos con servicios culturales como el hipódromo, los restaurantes y el circuito para bicicletas (The Loop). La gente viene a ver las crecientes poblaciones de murciélagos, escuchan la cría de sapos en los monzones y disfrutan de la observación de aves durante todo el invierno.



OUR RIVERS REBORN

Vision: The Santa Cruz River - Downtown

The Santa Cruz River flows year-round at the base of Sentinel Peak – supported by a healthy groundwater aquifer. The flowing river is a cultural and ecological gem of our desert community that is essential to our city’s economy and livability. A river walk meanders near the Santa Cruz under a mesquite bosque for people to enjoy the riverside up close, where they can picnic and recreate. Restaurants and parks dot the outskirts of the floodplain and are popular places for fiestas and festivals –once again becoming the center of cultural affairs. The riparian forest is a haven for dozens of bird species, and native wildlife is abundant.



Vision: The Santa Cruz River - from Martínez Hill to Downtown

The Santa Cruz River’s shallow, meandering course has sections of year-round and seasonal flow from Martínez Hill (near San Xavier Road) to downtown Tucson. This flow is groundwater supported, running subsurface from the restored Great Mesquite Forest on the San Xavier District lands of the Tohono O’odham Nation. The forest, once the largest mesquite bosque in the United States, has recovered much of its historic territory and supports over 80 summer bird species, thanks to the rich habitat provided by mesquite trees reaching up to 60 feet tall. Native fish thrive in the year-round flows, with restored populations of Longfin dace, Gila chub, Sonora sucker, Desert sucker, and the Gila topminnow. Small, family farms, found throughout the floodplain, provide fresh food to local markets while preserving open space with practices that protect precious groundwater and topsoil. The river is a cherished natural area for Tucson-area residents to walk, bike, and enjoy family gatherings along the river bank.

RENACIMIENTO DE NUESTROS RÍOS

Visión: Río Santa Cruz – Centro

El Río Santa Cruz fluye durante todo el año en la base del Cerro del Centinela, avivado por un acuífero saludable. El río fluyendo es una joya cultural y ecológica de nuestra comunidad del desierto que es esencial para la economía y la habitabilidad de nuestra ciudad. Un sendero por el río serpentea cerca del Santa Cruz bajo la sombra de un bosque de mezquites donde la gente disfruta del ambiente ribereño, con áreas para los picnics y recreación. Restaurantes y parques esparcen las afueras de la planicie aluvial y son lugares populares para fiestas y festivales, una vez más convirtiéndose en el centro de actividades culturales. El bosque ribereño es un refugio de decenas de especies de aves, y la vida silvestre nativa es abundante.

Visión: de Martínez Hill al Centro

El trayecto serpenteante y poco profundo del Río Santa Cruz tiene secciones de flujo estacional y durante todo el año desde Martínez Hill (cerca de San Xavier Road) hasta el centro de Tucson. Este flujo está alimentado por el agua subterránea, y se extiende bajo la superficie del gran bosque restaurado de Mesquite en las tierras del distrito de San Xavier de la Nación Tohono O’odham. El bosque, una vez el bosque de mezquite más grande de los Estados Unidos, ha recuperado gran parte de su territorio histórico y da refugio a más de 80 especies de aves de verano, gracias al rico hábitat proporcionado por los árboles de mezquite que alcanzan hasta 60 pies de altura. Los peces nativos prosperan en las corrientes permanentes, con poblaciones restauradas de Longfin dace, Gila chub, Sonora sucker, Desert sucker y Gila topminnow. Pequeñas granjas familiares, que se encuentran en toda la planicie de inundación, proporcionan verduras frescas a los mercados locales y al mismo tiempo preservan el espacio abierto con prácticas que protegen las valiosas aguas subterráneas y el suelo superficial fértil. El río es una área natural respetada por los residentes del área de Tucson para caminar, andar en bicicleta y disfrutar de reuniones familiares a lo largo de los bancos del río.