



**WATER RESOURCES  
RESEARCH CENTER**

# The Santa Cruz

## a river of transition and hope

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Santa Cruz River program

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[SONORANINSTITUTE.ORG](http://SONORANINSTITUTE.ORG)



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# Santa Cruz River

90-mile riverbed from border to Pinal County

- Santa Cruz County: 15 miles flowing
- Pima County/Tucson: 25 miles flowing

3 major wastewater treatment plants

A vital and rare wildlife corridor

- Vital migration corridor and north–south flyway for hundreds of species of birds and other native wildlife
- Critical jaguar habitat
- Threatened and endangered species:
  - Gila topminnow, Mexican Spotted Owl, Chiricahua Leopard Frog, Pima Pineapple Cactus...









AZ Historical Society



Natalie Luna Rose



Artistic collage by Terry Moody

# 12,000+ years of rich history













Mark Dimmitt ca. 1985 *Carnegiea gigantea*



Tom Wiewandt 1981

Juanita Ahil (saguaro harvest)



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John Russell Bartlett, 1852



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PAUL MIROCHA ©2009

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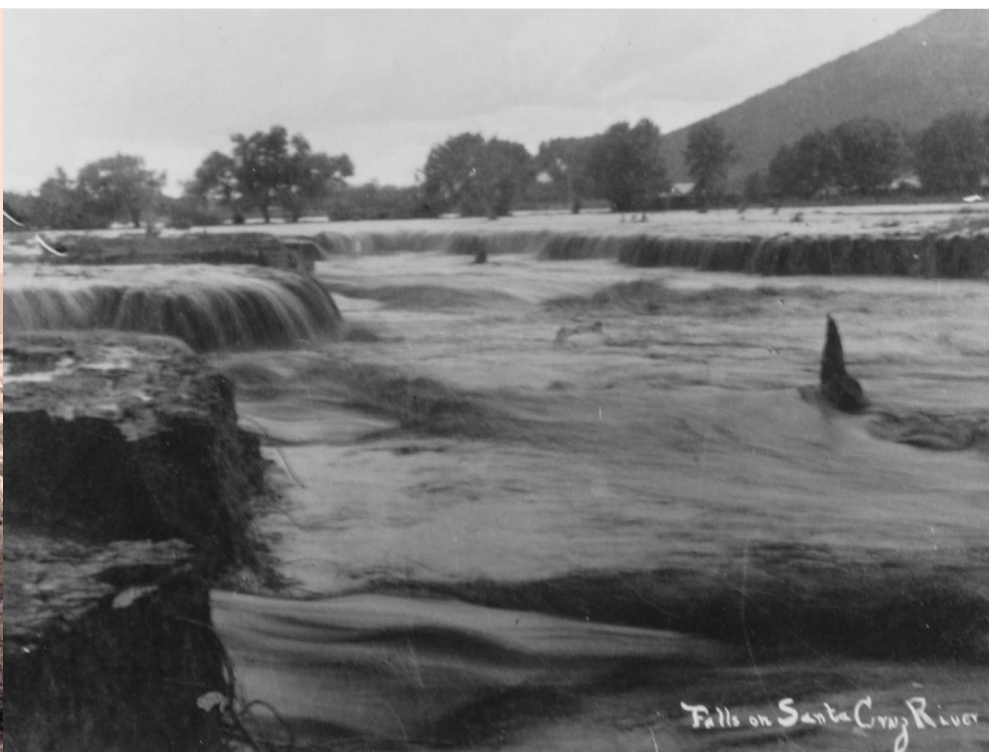


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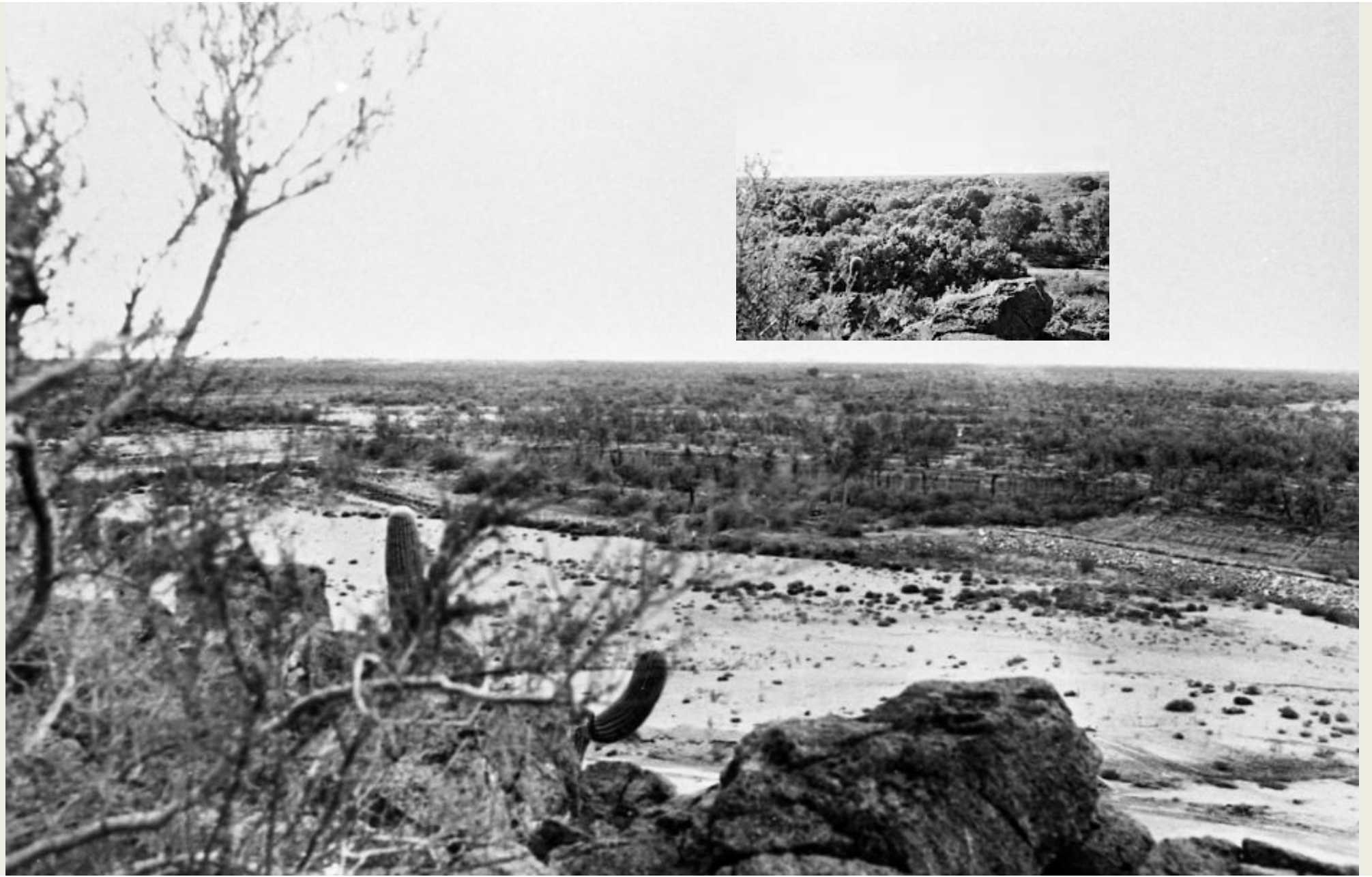








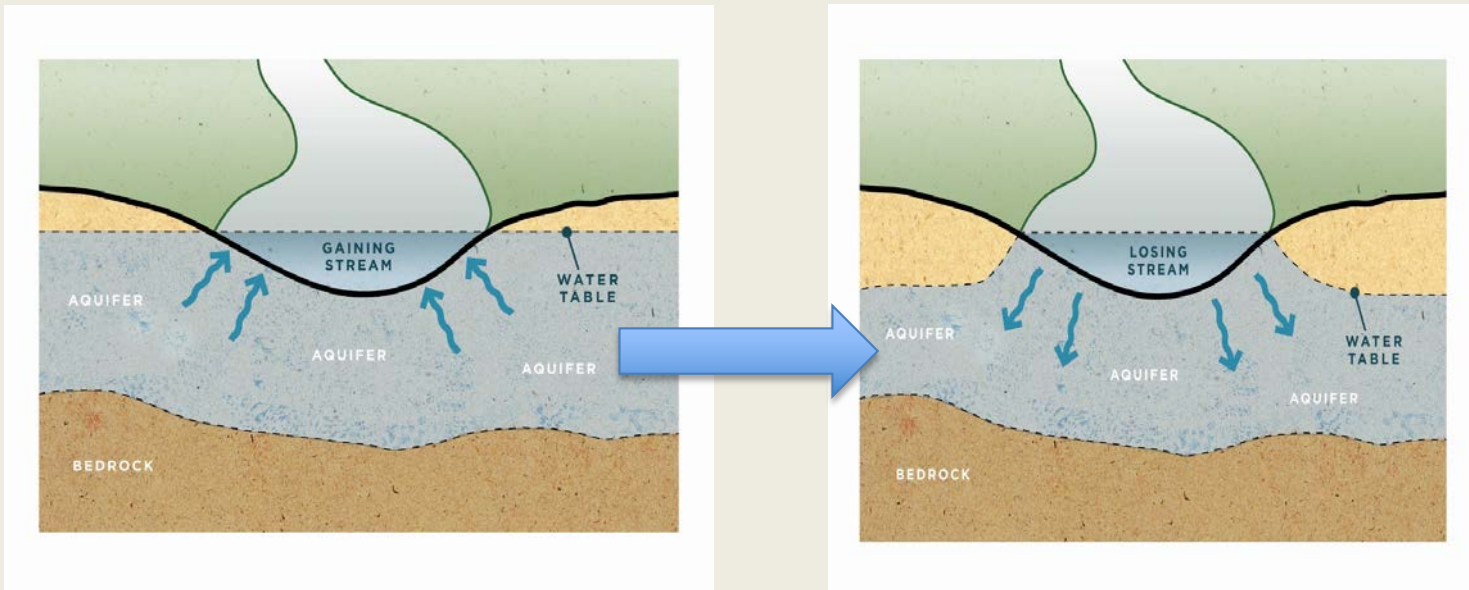


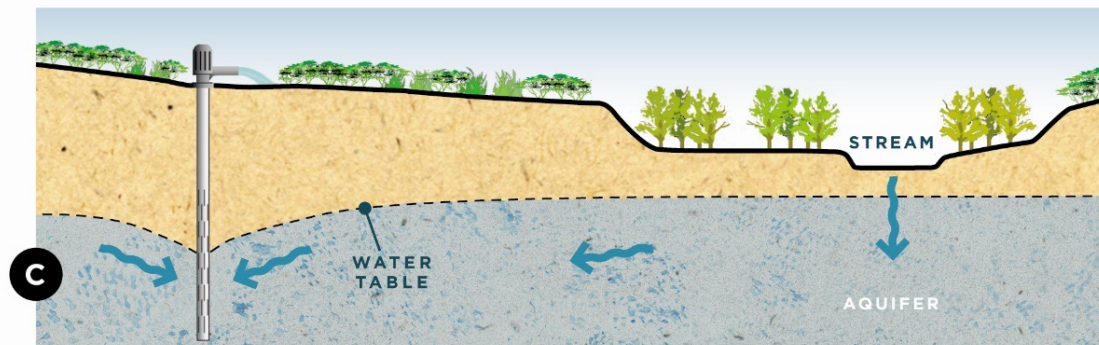
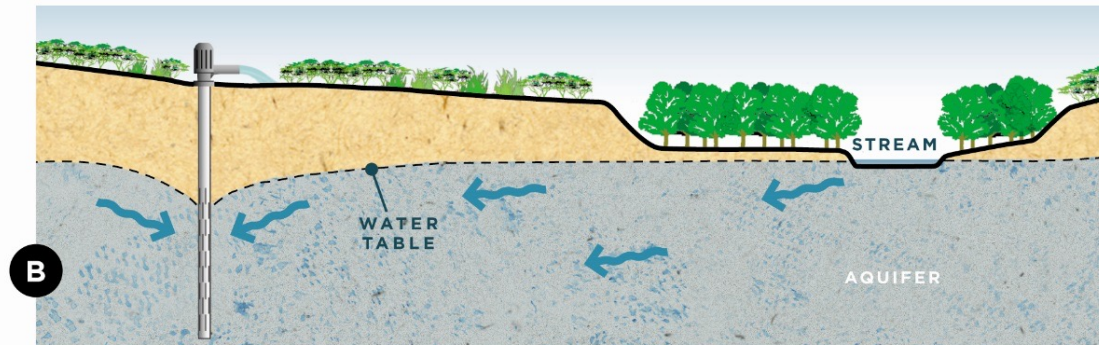
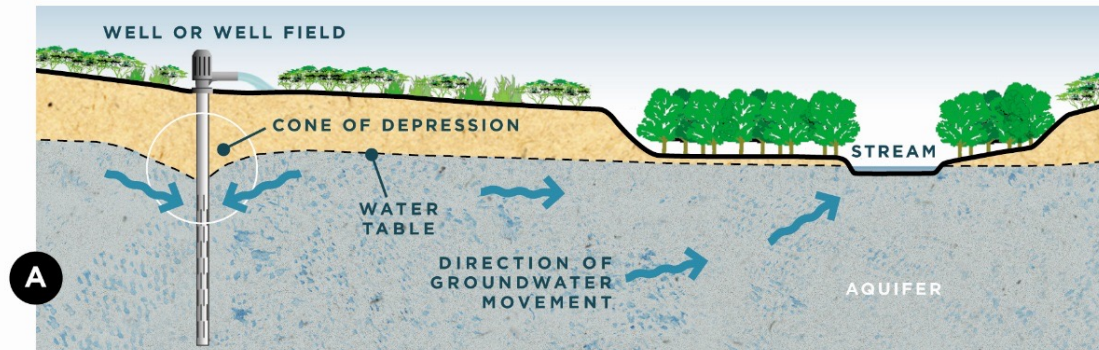




# A river runs dry in 1915

- After a century of ranching and agriculture
- Steam-powered groundwater pumps
  - Used mesquite wood for fuel
- Aquifer overdrafting turned Santa Cruz to a falling stream





A cone of depression forms

Reversing the direction of flow

Severing connection between stream channel and aquifer







# Poor water quality adding insult to injury





2005



# Santa Cruz River Watershed

## A brief, modern timeline

**2008–2009:** Nogales upgrade

**2012–2013:** Pima County build and upgrades

**2019:** Santa Cruz River Heritage Project









**Santa Cruz River near  
Tumacácori, 2024**



**Santa Cruz River near  
Downtown, 2024**



**Santa Cruz River in Marana, 2023**





# Living River reports: a collaborative model



All reports available at [www.sonoraninstitute.org](http://www.sonoraninstitute.org)

## The potent path to creating a Living River report

Report timeframe: October 1 to September 30

## Production timeframe: January to August

Parallel to all this is the Nogales Living River report which is released in early December



	J	F	M	A	M	J	J	A	S	O	N	D
Sonoran Institute	Drafting, analysis, partner coordination				Partner review, design			Final, print, distribution		Outreach into following year		
Pima County	Data analysis and sharing, monthly review					Report review and edit for final			Distribution and outreach support			
City of Tucson	Data analysis and sharing, monthly review					Report review and edit for final			Distribution and outreach support			
U of A	Routine data collection and analysis, report input and review								Routine data collection, outreach support			
USGS	Groundwater and flow data collection											
NOAA	Precipitation and temperature data collection											
Community Science	E-Bird, I Naturalist, Water Quality, Flow Extent, and survey response											



# Water Quantity:

## Average annual volume released

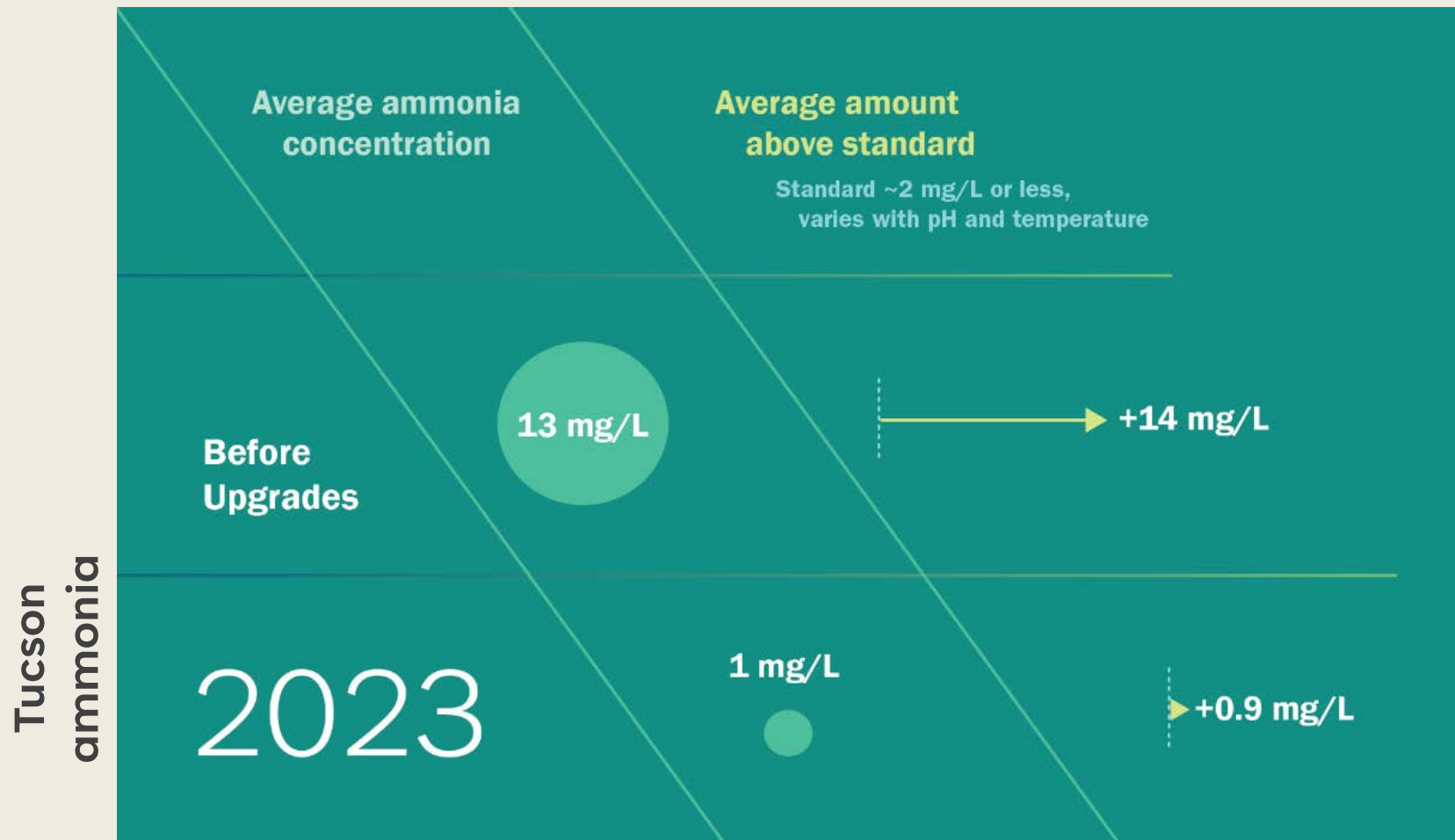


**16,000 acre-feet**  
**5,300 million gallons**  
**23 million m<sup>3</sup>**  
Nogales



**43,000 acre-feet**  
**14,000 million gallons**  
**61.7 million m<sup>3</sup>**  
Tucson

# Water Quality: Very low levels of ammonia post upgrade





# Stable water quality support diverse aquatic wildlife



◆ Longfin dace



Gila topminnow



Western mosquitofish



◆ Black bullhead



◆ Common carp



◆ Yellow bullhead



Channel catfish



◆ Green sunfish



Bluegill sunfish

- Native species
- ◆ Only found in Nogales reach
- ◆ Only found in Tucson reach





# Native species released near Tucson

Gila topminnow 2020

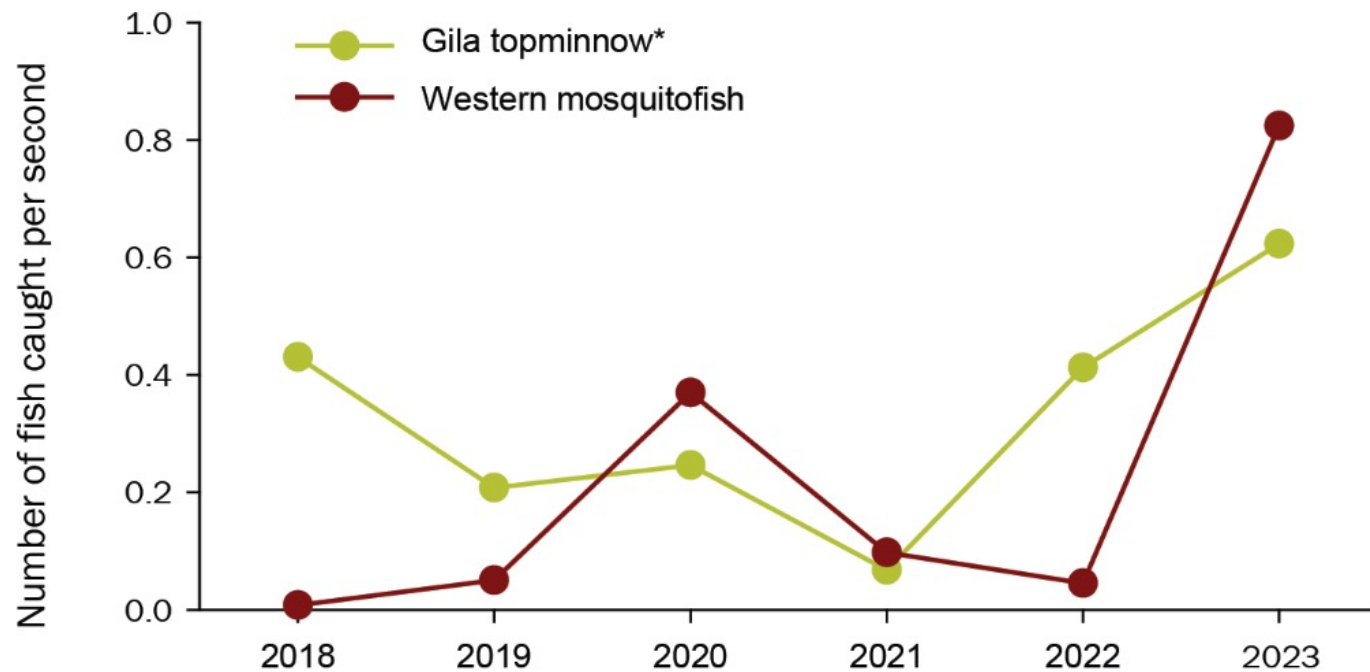


Longfin dace 2022





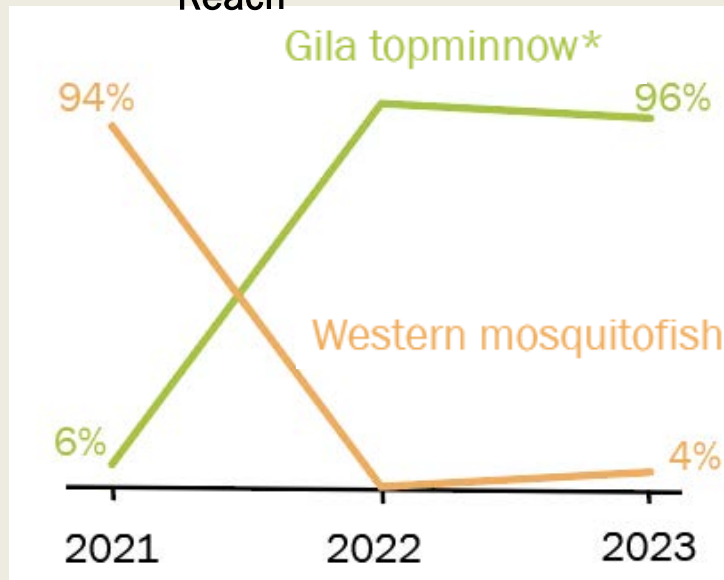
# Gila topminnow appear to be increasing near Tumacácori



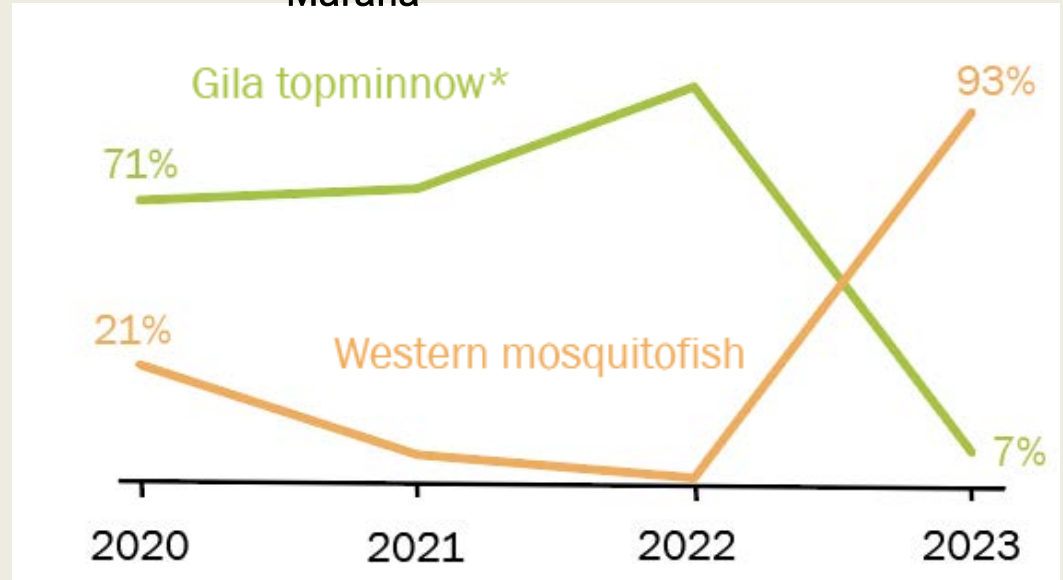
\*Number of Gila topminnow that are the all-female hybrid is unknown.

# Gila topminnow doing well at Heritage

Heritage Project  
Reach



Northwest Tucson to  
Marana



## Percent of randomly collected fish

\*percent of Gila topminnow that are hybrids with the headwater livebearer is unknown







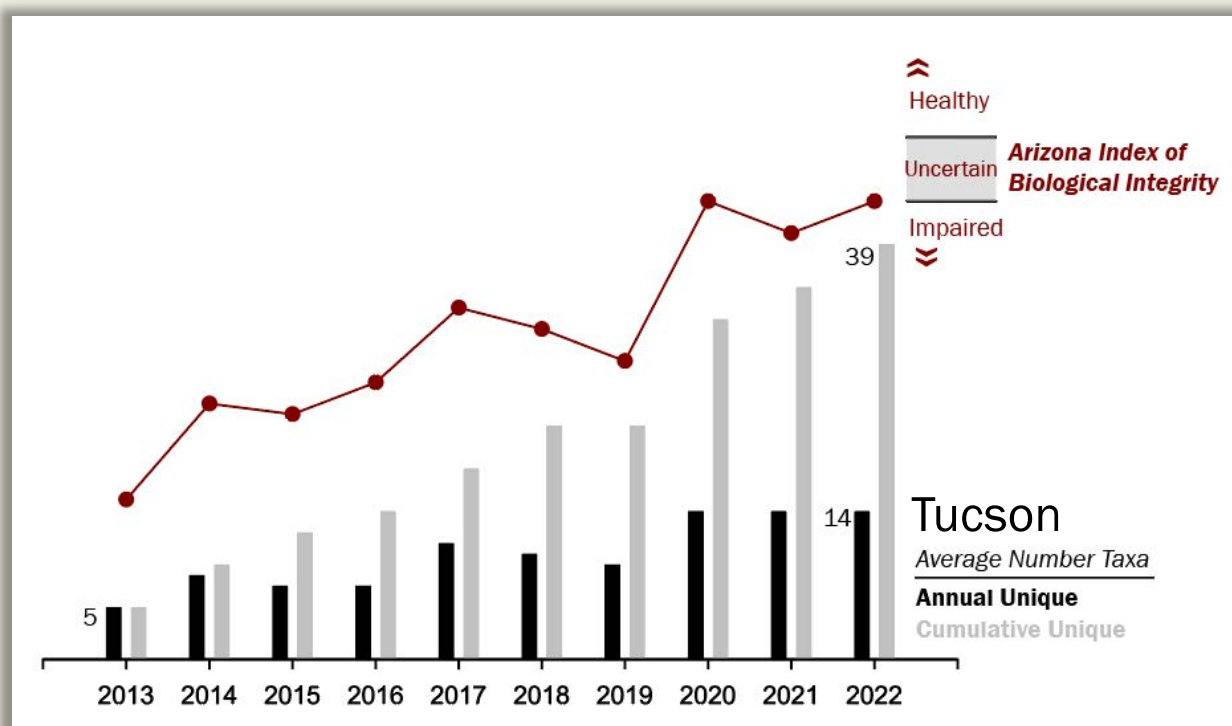
- Effluent-dependent flowing stretches and areas Gila topminnow rediscovered
- Direction of flow of water
- Water treatment plant
- Santa Cruz River Watershed



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- Flows originate from Tucson Airport Remediation Project (TARP)
- Flows and shallow groundwater with recharge of CAP water in the area

# Increased aquatic invertebrate diversity





# Southwestern synchronous firefly appears to be thriving along the river

Surveys find as many as 3,000 at Tumacácori NHP

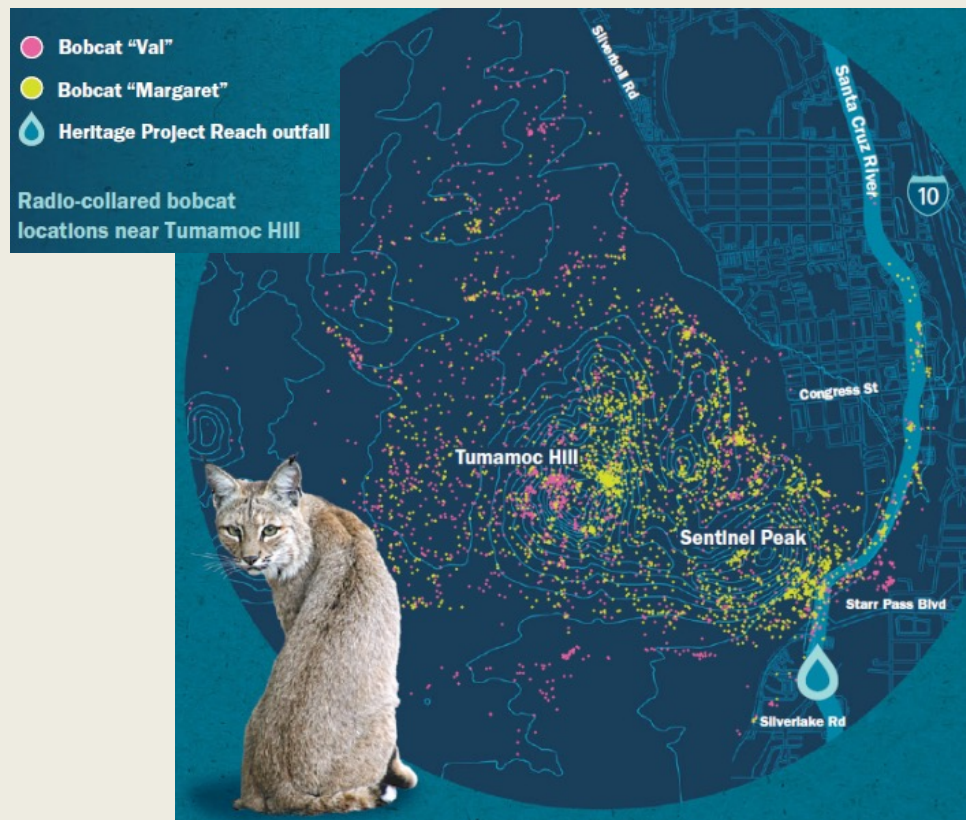


*Photinus knulli*

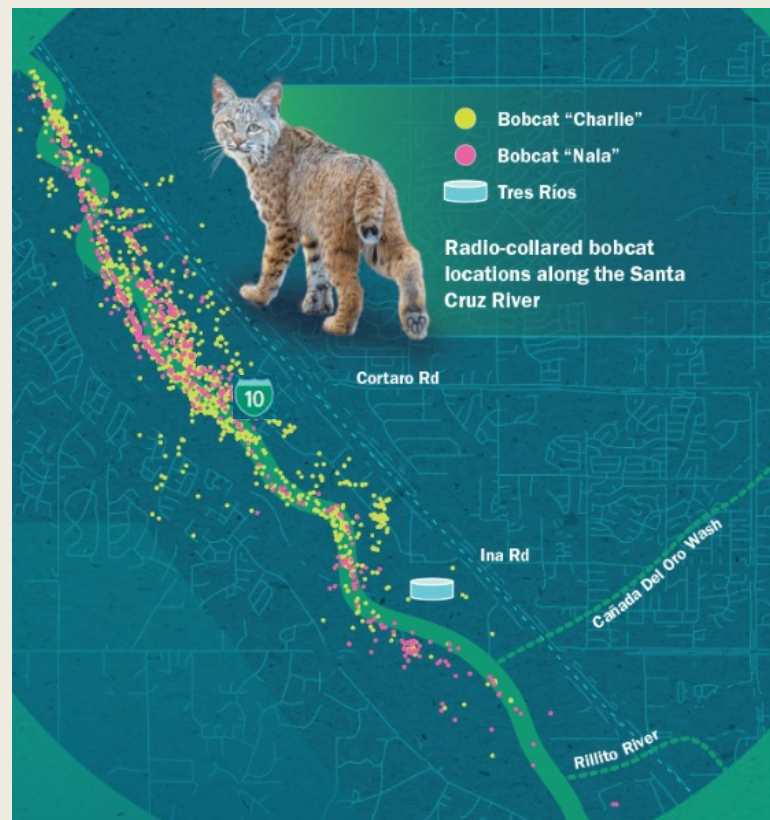
photos by Julius Schlosburg



# Bobcats are using the river



Heritage Project  
Reach

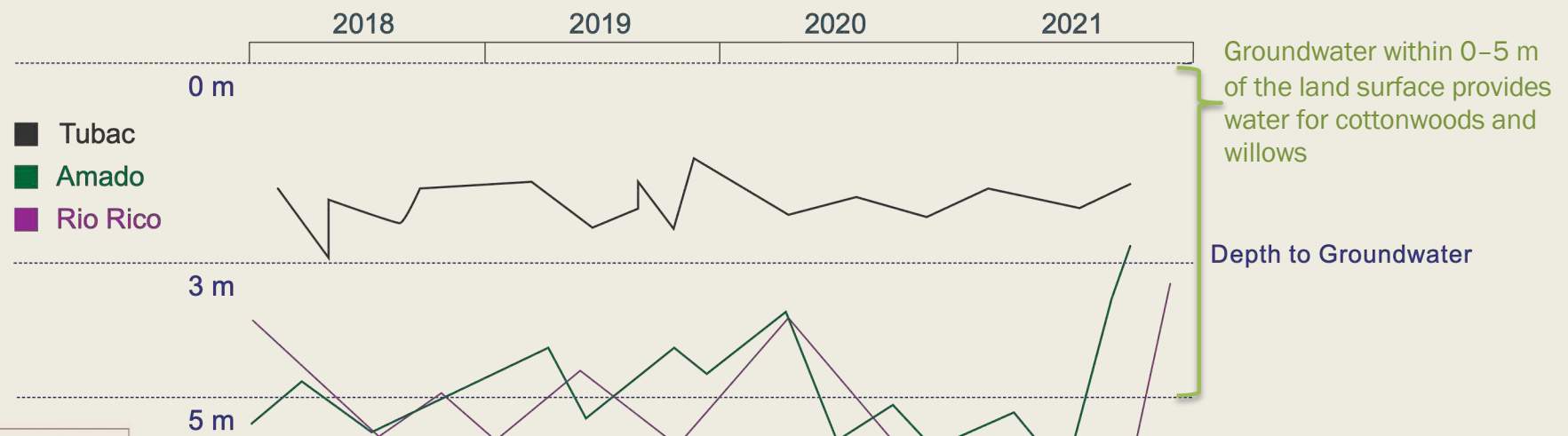


Northwest Tucson to  
Marana

**BOBCATS IN TUCSON RESEARCH  
PROJECT ©**



# Monsoon rains replenishes shallow groundwater



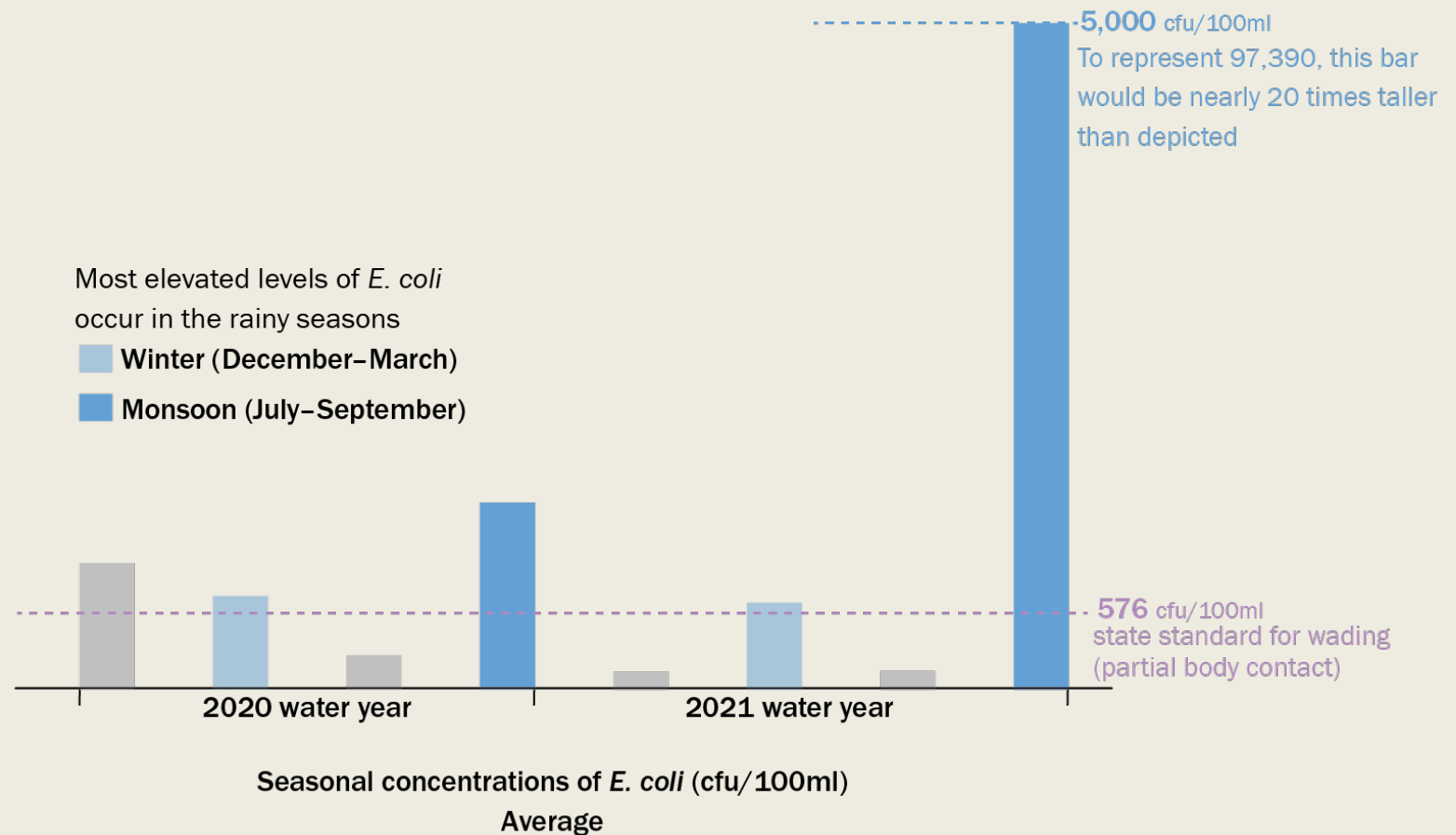
# Huge *E. coli* levels indicate monsoons also “wash” the watershed into the river



Most elevated levels of *E. coli* occur in the rainy seasons

■ Winter (December–March)

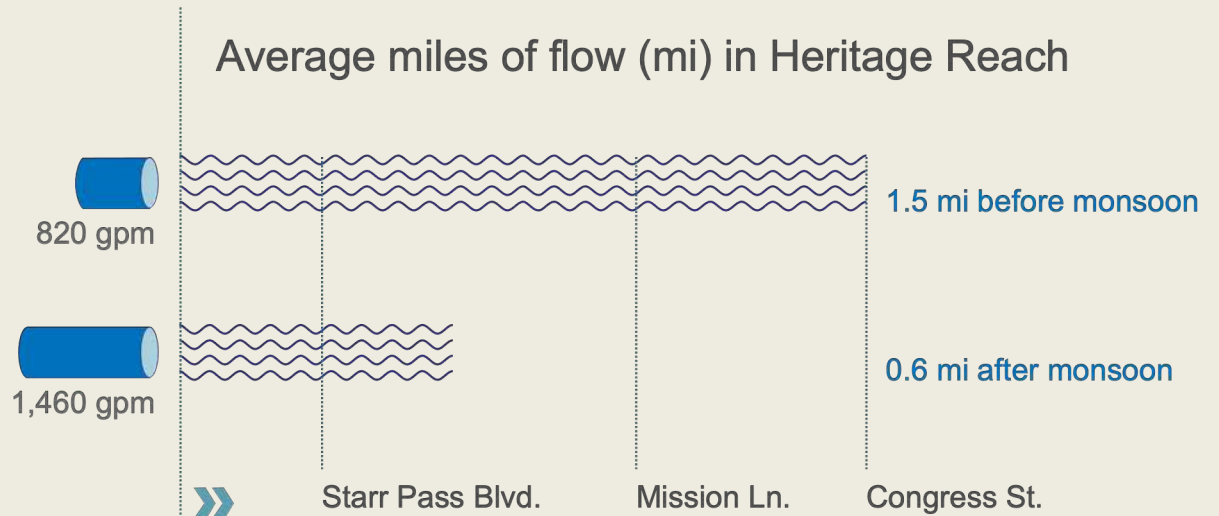
■ Monsoon (July–September)



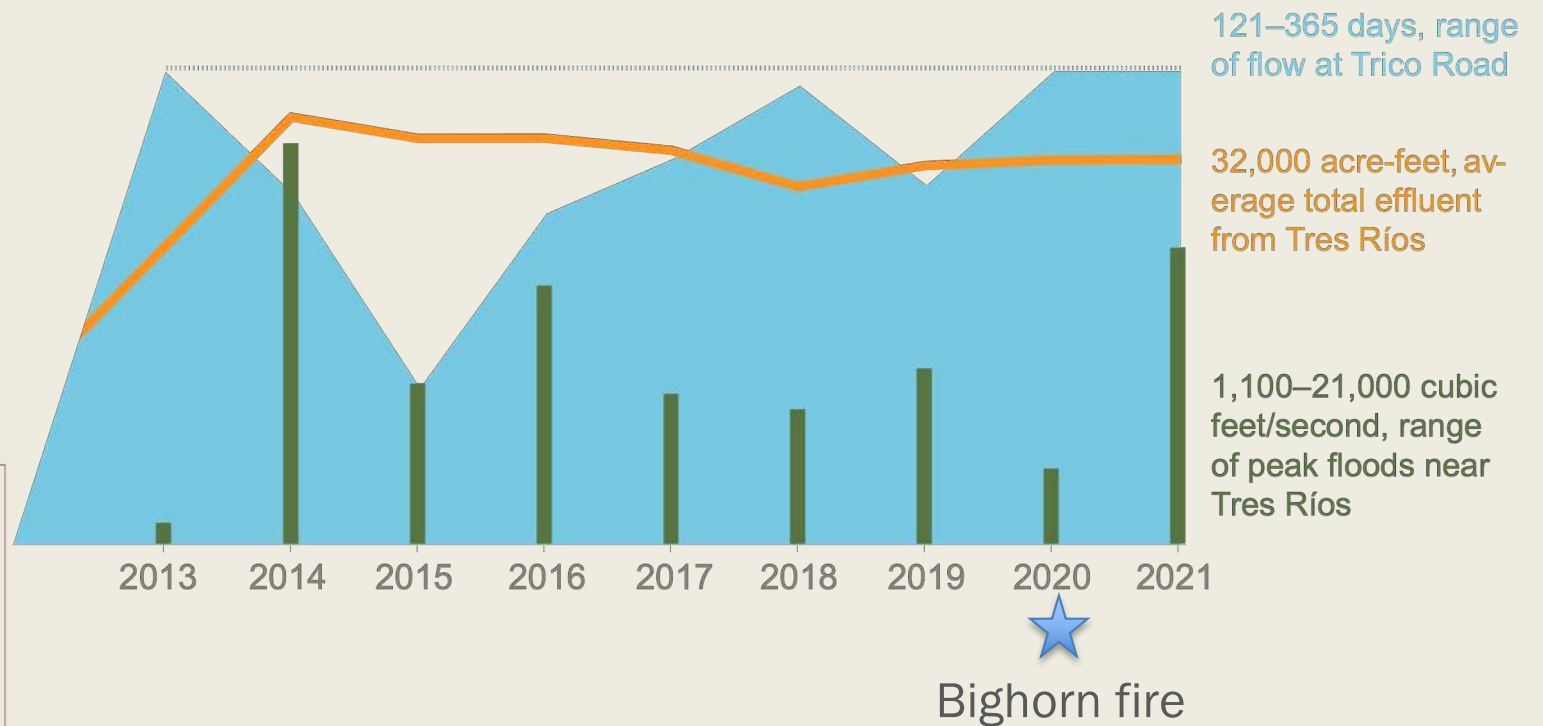


# 2021 flooding increases recharge and shortens flow extent

**Effluent flow rate**  
Average daily  
gallons per minute (gpm)



# Flooding also brings ash flows that cover the riverbed





# The Santa Cruz River Heritage Project





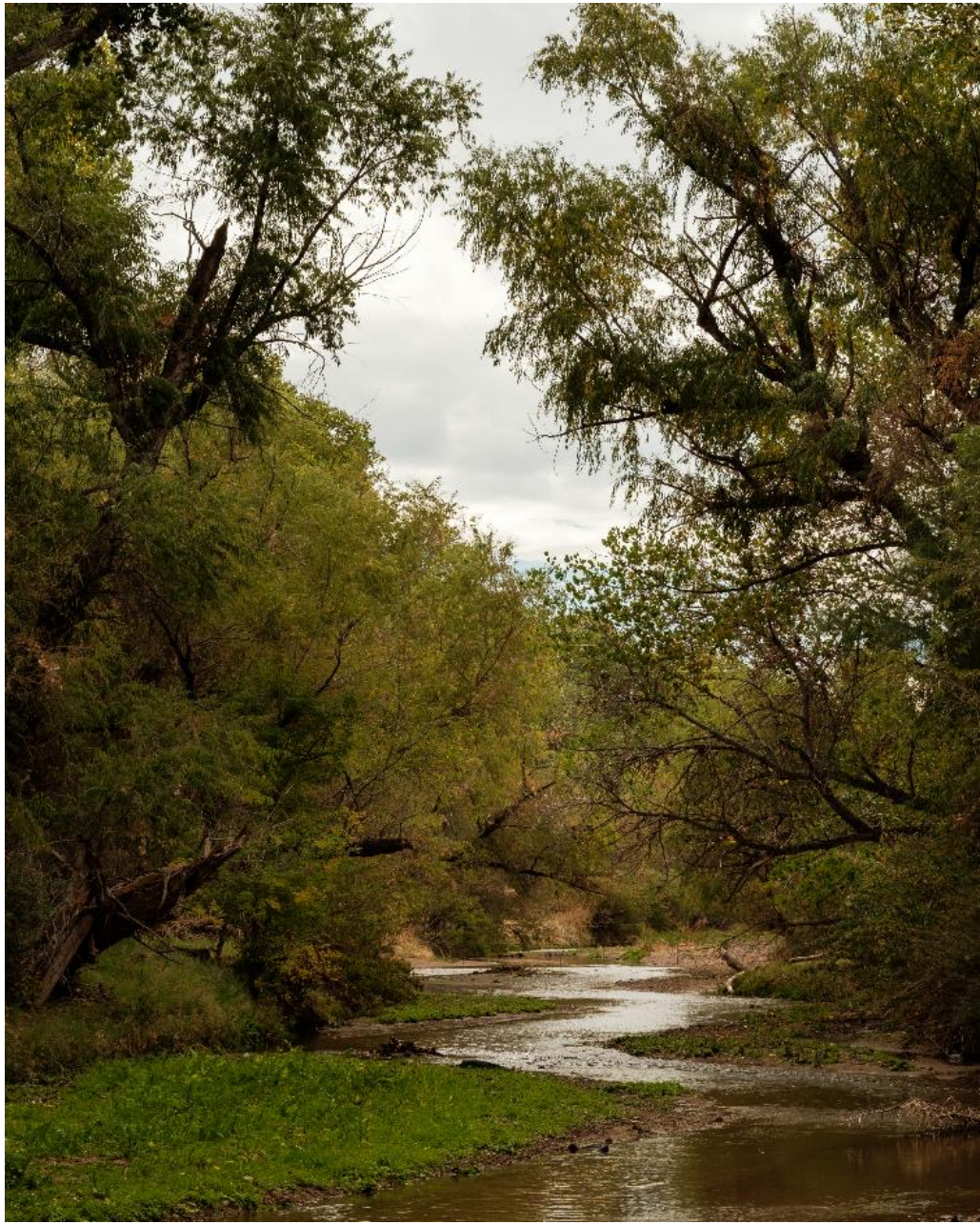
# New Pedestrian Bridge



BG Boyd, 360 photos: [bgboydphoto.com](http://bgboydphoto.com)









# **AN ACTIVATED SANTA CRUZ RIVER COMMUNITY**



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# Santa Cruz River National Wildlife Refuge

Action and successes to date:

Dec 2023: SCR Urban National Wildlife Refuge Coalition

2023+2024: Site visits with USFWS and DOI leadership

April 2024: Santa Cruz County BOS resolution

May 2024: Pima County BOS proclamation

May 2024: Landscape Conservation Design submitted

June 2024: San Xavier District Council resolution

October 2024: City of Tucson resolution

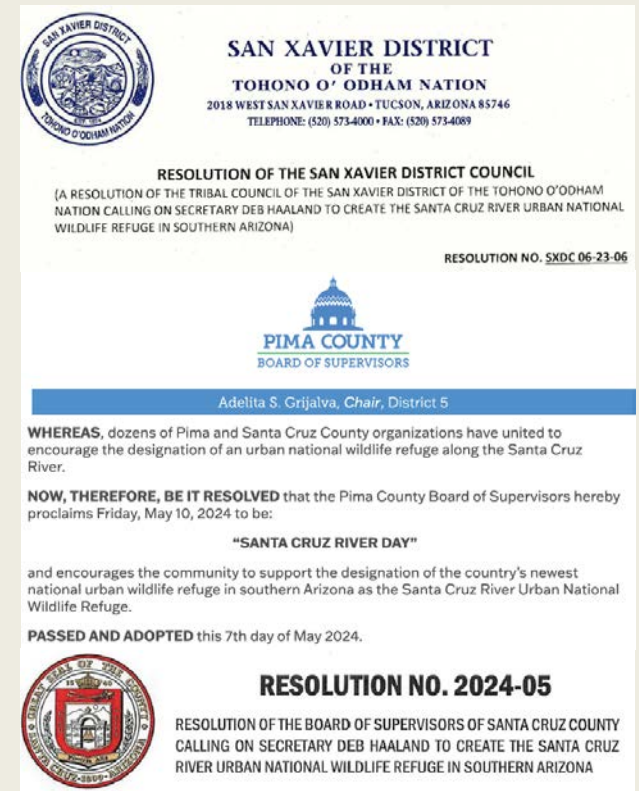
November 2024: Letter of Support from  
Arizona Gov Hobbs

November 2024: Wildlife Partnership Signing Ceremony

December 2024: UA awarded the NFWF

America the Beautiful Grant

January 2025: Land Protection Strategy approved



- Adelita S. Grijalva, Pima County Board of Supervisors, Chair, District 5
- Alisha Vasquez
- Antonio Ramirez
- Anthony Nelson
- Arizona Land and Water Trust
- Arizona-Sonora Desert Museum
- Barrio Neighborhood Coalition
- Calabasas Alliance
- Center for Biological Diversity
- Cienega Watershed Partnership
- Coalition for Sonoran Desert Protection
- Corazón Latino Inc.
- Diana Hadley
- Favor Celestial
- Friends of the Santa Cruz River
- Gloria Fenner
- Ironwood Tree Experience
- Joanie Sawyer
- Reconciliación en el Río
- Santa Cruz Valley National Heritage Area
- Sloane Haywood
- Sky Island Alliance
- Sonoran Institute
- The Arizona Native Plant Society
- The Sierra Club
- The Wilderness Society
- Trust for Public Land
- Jose Maria Menendez
- Josefina Cardenas
- Kathleen G. Williamson, J.D.,LL.M., Ph.D.
- Kara Harter
- Kelly Badeau
- Kevin Dahl, Vice Mayor and Ward 3 Councilmember
- Laiken Jordahl
- Lane Santa Cruz, Ward 1 Councilmember
- Leigh Sontheimer
- Logan Phillips
- Los Desendientes de Tucson
- Luis Alfredo Salgado
- Mauro Trejo
- Maxie Adler
- Menlo Park Neighborhood Association
- Mexican American Heritage and History Museum Mission Garden
- Raul Ramirez
- Tucson Audubon Society
- Tucson Birthplace Open Space Coalition (TBOSC)
- Tucson Herpetological Society
- Tucson Mountains Association
- University of Arizona
- Watershed Management Group
- YWCA of Southern Arizona



Santa Cruz River Refuge Coalition  
[SantaCruzRiver.org](http://SantaCruzRiver.org)





# An Activated Community





# An Activated Community

Date	Location	# volunteers	# of bags	Total weight (lbs)
230225	Grant Rd	110	207	6766
230520	St. Mary's Rd	69	131	4000
240120	Verdugo Park	330	100	2500
240420	St. Mary's Rd	187	175	4400
241012	Grant Rd	70	122	1842
241214	St. Mary's Rd	125	137	2517
250315	Verdugo Park	63	70	1025
# of cleanups	# of volunteers	Total weight (lbs)		Total weight (tons)
7	954	23050		11.525







**Santa Cruz  
River Tours!**

**Virtual lectures**

**Drag and Burlesque  
Cabaret!**

**@ Club Congress**

**Bugs and Bites  
@ Playground**




**Every Month**  
**3<sup>rd</sup> Thursday**  
**MotoSonora, 5:30–7:30 pm**



Network with environmental Leaders

Find us on Facebook   
search Green Drinks Tucson

Follow us on Instagram   
@sonoraninstitute





learn more:  
**sonoraninstitute.org**

