

# a living river

THE SANTA CRUZ RIVER FROM MEXICO TO MARANA



Charlie Alolkoy

**Claire Zugmeyer, Luke Cole, and Madeleine Oliver**



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# Life Returns

Drop by drop, we restore flowing rivers and healthy landscapes to enable all people and nature to thrive.

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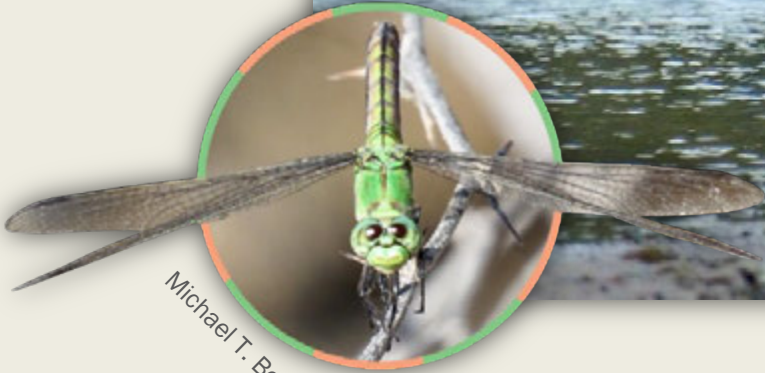
Julius Schlosburg

**The Santa Cruz River, from Mexico to Marana, is a living flowing river and the foundation of community health and prosperity.**





Bruce Taubert

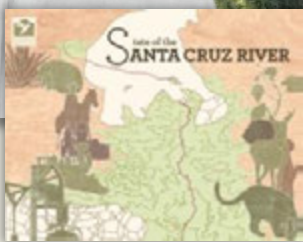


Michael T. Bogan

Julius Schlosburg



# 12,000 years of rich history



Artistic collage from *State of the Santa Cruz River*



Santa Cruz River near "A" Mountain, 1904



Looking south from "A" Mountain, 1927

# Santa Cruz River Watershed





Santa Cruz River near  
Tumacácori, 2022



Julius Schlosburg



Santa Cruz River near  
Downtown, 2021



Charlie Alolkoy

Santa Cruz River near Cortaro Road, 2019









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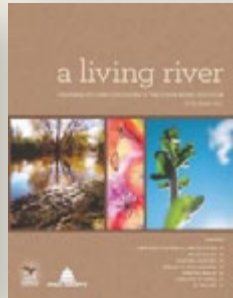
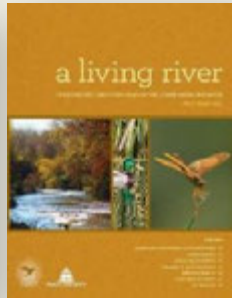
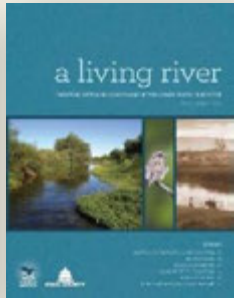
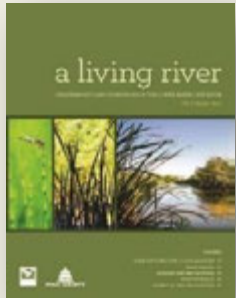


# Living River reports track improvements on Santa Cruz River near Nogales from 2008 to 2021

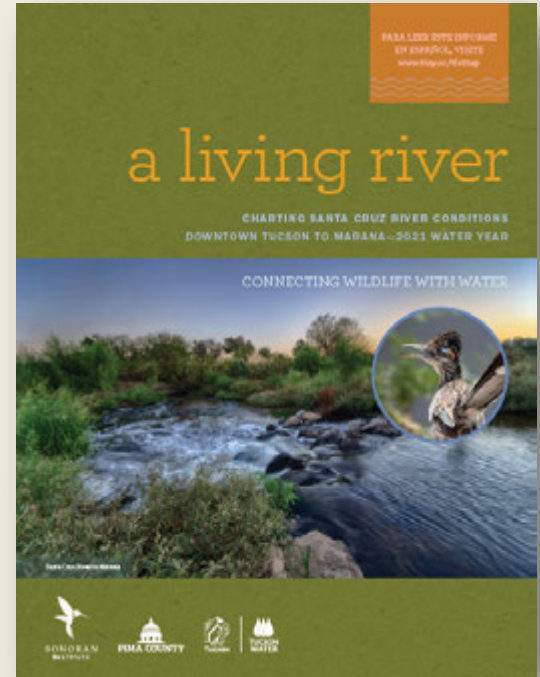
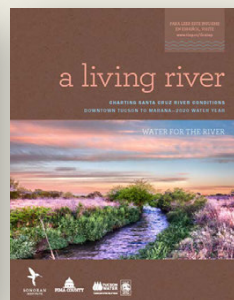
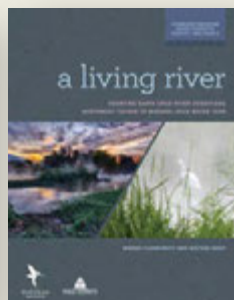
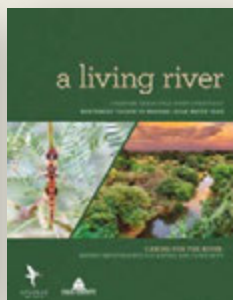
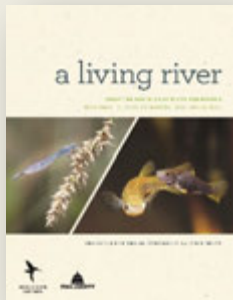


All reports available at [www.sonoraninstitute.org](http://www.sonoraninstitute.org)

# Living River expands to Tucson in partnership with Pima County and Regional Flood Control District



2013 Baseline



2021 Water Year

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





# How is the river doing?



Julius Schlosburg

# Consistent water supplied to the river



**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\*

\*released from Heritage Project, Agua Nueva, and Tres Rios outfalls



# Flooding brings more water and natural changes



Santa Cruz River in Heritage Reach 2021  
monsoon season

# 2021 flooding increases recharge and shortens flow extent

Effluent flow rate  
Average daily  
gallons per minute (gpm)

820 gpm

1,460 gpm

Average miles of flow (mi) in Heritage Reach

1.5 mi before monsoon

0.6 mi after monsoon



Starr Pass Blvd.

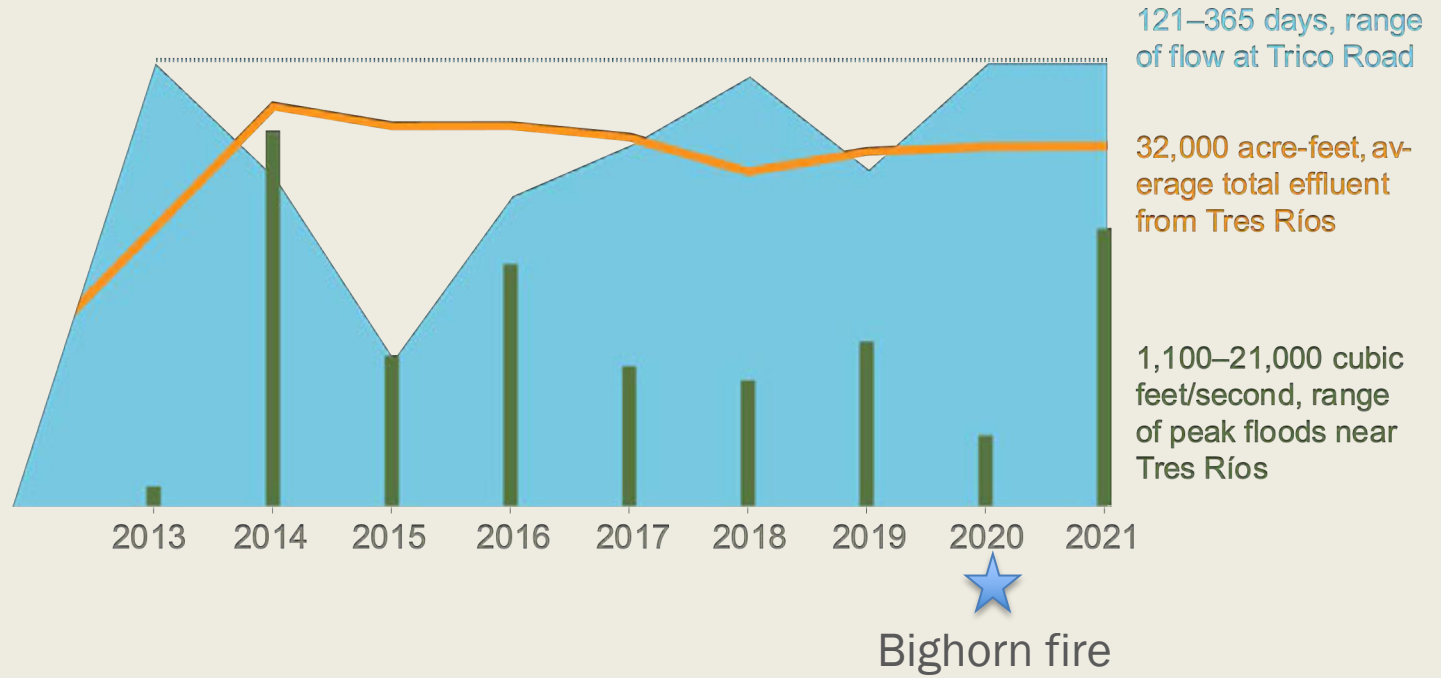
Mission Ln.

Congress St.

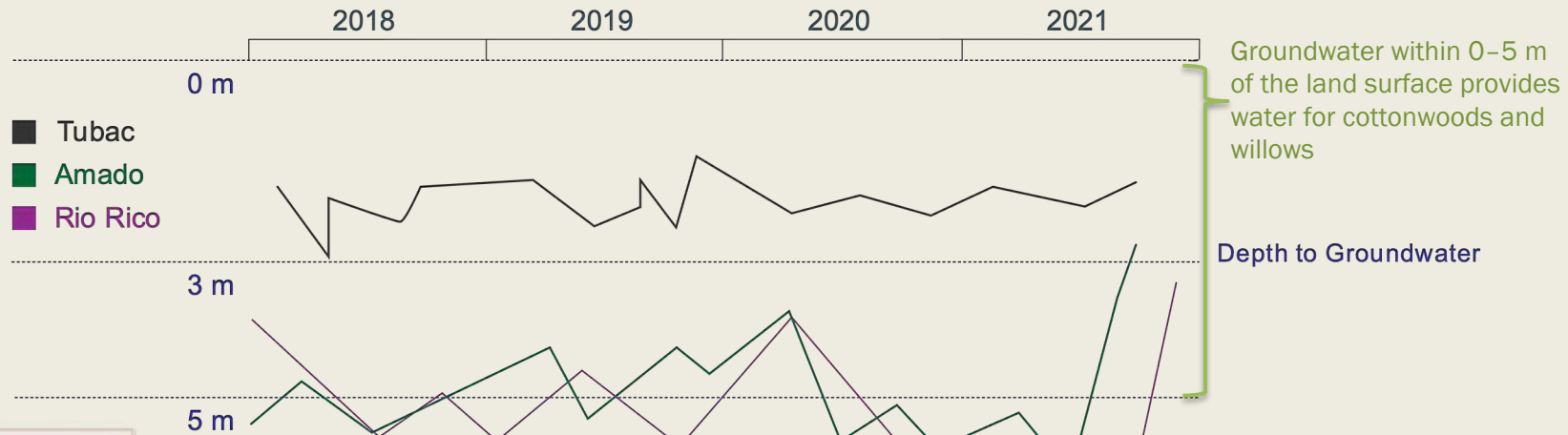




# Flooding also brings ash flows that cover the riverbed



# Monsoon rains replenishes shallow groundwater



Groundwater within 0-5 m of the land surface provides water for cottonwoods and willows

Depth to Groundwater



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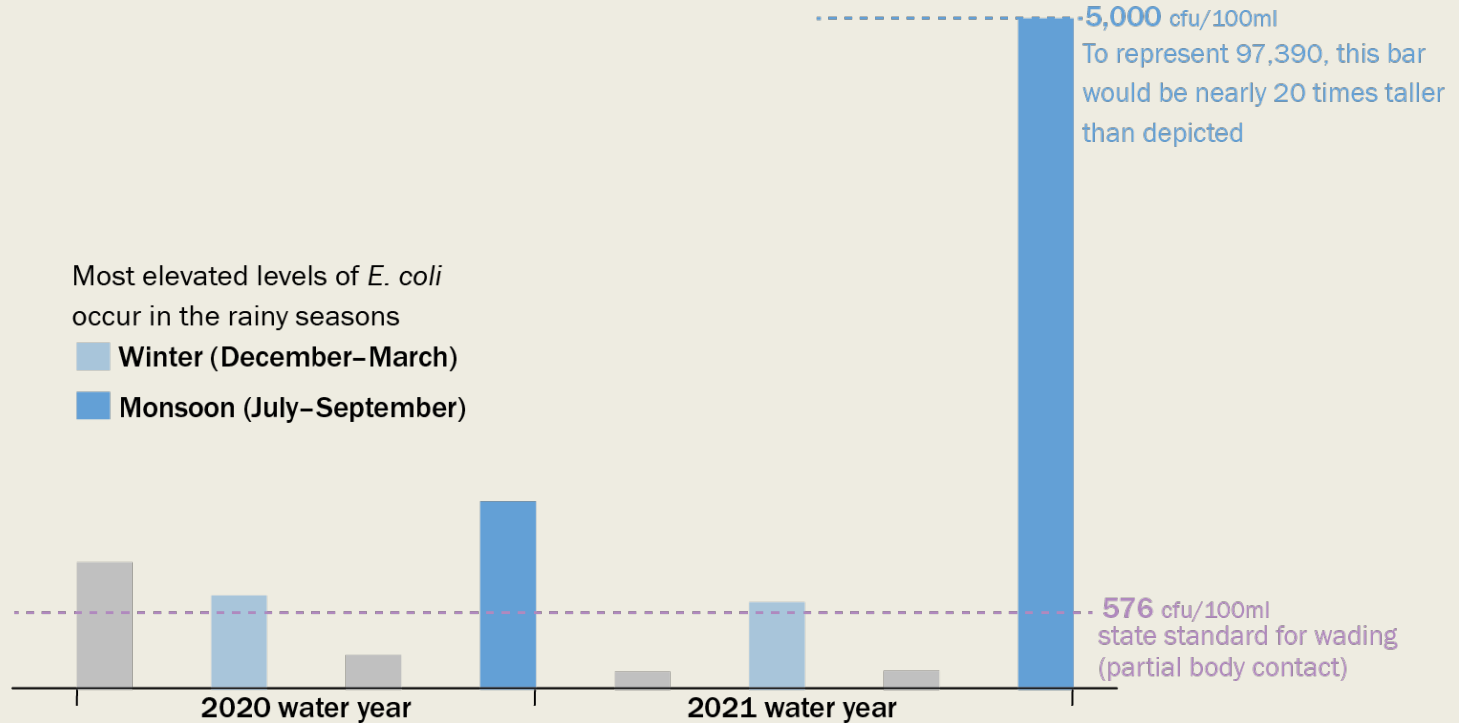


# Huge *E. coli* levels indicate monsoons also “wash” the watershed into the river

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

■ Winter (December–March)

■ Monsoon (July–September)



Seasonal concentrations of *E. coli* (cfu/100ml)

Average



# Water quality remains high, supporting aquatic life



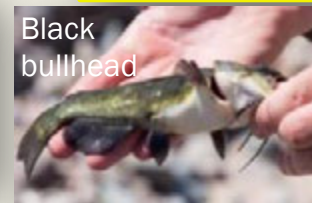
Longfin dace



Gila topminnow



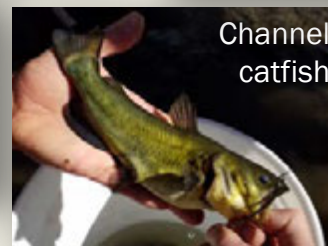
Western mosquitofish



Black bullhead



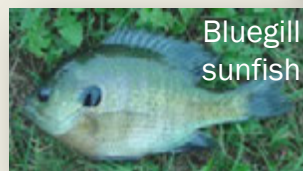
Yellow bullhead



Channel catfish



Common carp



Bluegill sunfish



Green sunfish



Gila topminnow 2020

# Native species released near Tucson



Longfin dace 2022



# Increased aquatic invertebrate diversity

Before Upgrade



2021



Number of aquatic invertebrate species

Cumulative total = 49

Nogales



Number of aquatic invertebrate species  
*Average*

Cumulative total = 69

Tucson

# What's new along the river?



Julius Schlosburg



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# Multi-year rehabilitation project to repair IOI





# Tres Ríos Renewable Gas Facility

*Turning wastewater into sustainable energy*



© Pima County

Opened October 2021



© Steve Jess, AZPM

# Wildlife Ramp at El Rio Preserve



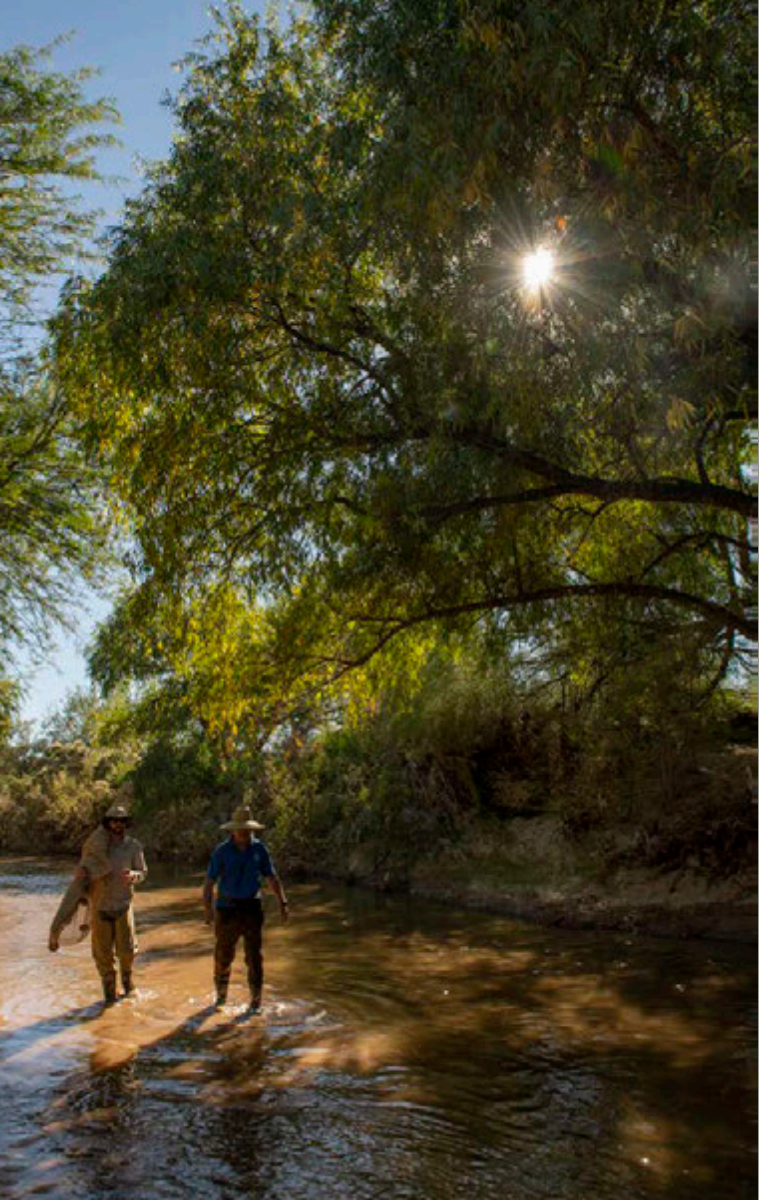
© Bob Stinson, 2022



Image credit: Terry Moody,  
Living River Report 2022

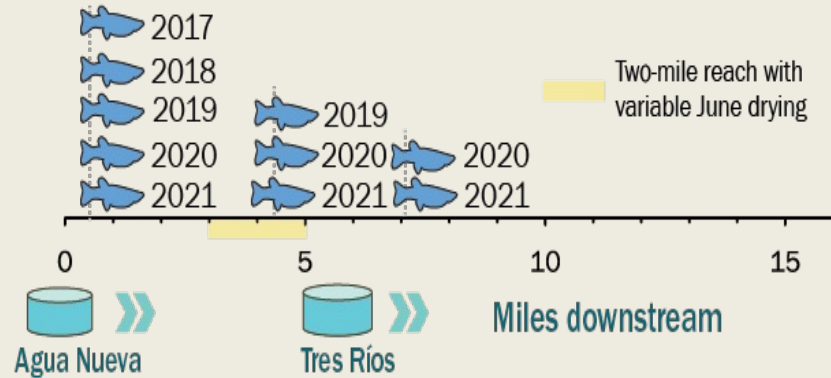
Coming soon!





# Water secured for the Gila topminnow!

Years Gila topminnow found in fall surveys





# What else are we working on?

- Water for the river
- Addressing trash accumulation
- Urban Wildlife Refuge
- Diverse outreach to connect people to the river



# Can we increase water near Green Valley?

## Bureau of Reclamation study

- Term: 2 years (2023–24)
- WaterSmart Phase 1 grant

Goal: Establish conditions and recommend viable floodplain and in-stream recharge opportunities





# Addressing trash in the Santa Cruz River



Trash is a threat to the riparian ecosystem AND an opportunity to address societal drivers through research, outreach, and education

# What can be done?

## Basin-wide interest in a solution

- Nonprofits
  - Sonoran Institute
  - Tucson Clean and Beautiful
  - Friends of the Santa Cruz River
- Municipal representation
  - Pima County RFCD/RWRD/NRPR
  - PDEQ
  - PAG
  - Santa Cruz County
- Tumacácori National Historical Park
- Neighborhood associations and guerilla groups



Meghan Smart, ADEQ

# So, what *can* be done?

Multiple proven approaches

- Trash clean-ups
- Engineering solutions

+ Organized clean-up events can inform the engineering solutions





# #Notinmyriver campaign launched in 2020



- 7 videos made
- 10,000 video views

# A three-year strategy to assess conditions

**Year 1 (2021–2022):** identify the components of trash

- Non-randomized; go to where the trash is
- Create a profile of trash in Pima County

**Year 2 (2022–2023):** assessment of trash load in the Santa Cruz

- Randomized design
- Overall trash load

**Year 3 (2023–2024):** assessment of trash load in tributaries



# First assessment of trash in the Santa Cruz is underway

- UA Earth Grant intern
- Funding from Pima Co. Regional Flood Control District
- Quantify make-up of trash on a per unit area basis
- Outputs: categorization, load, and potentially, sources

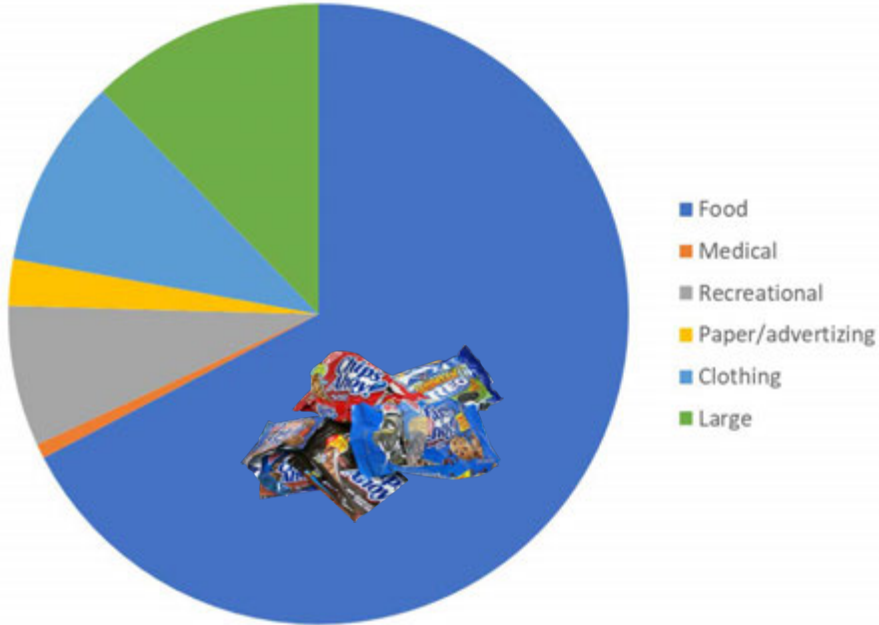




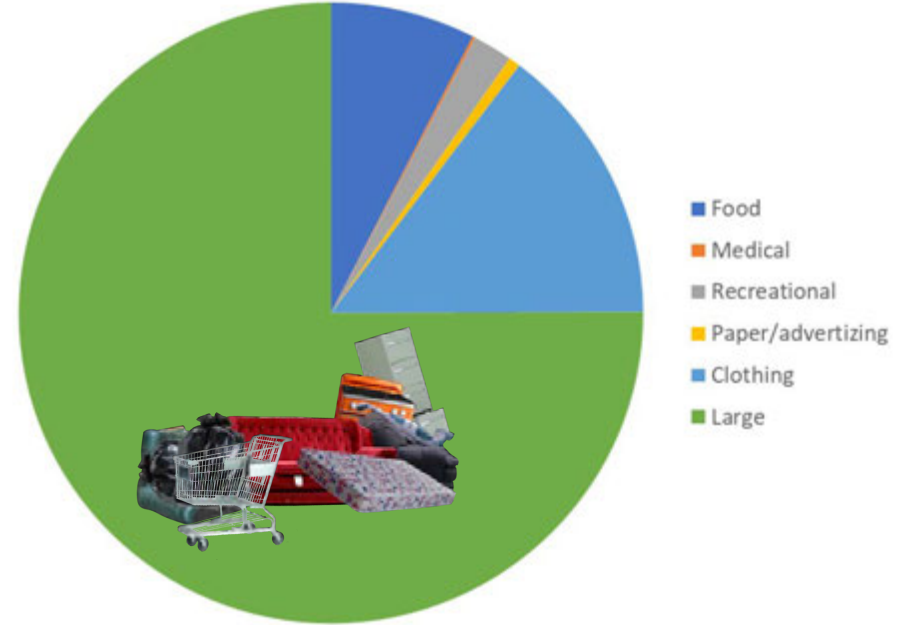
# —Some Results—

## Categories may lead to source control

Trash counts by category



Trash weights by category





**We are working to establish an Urban Wildlife Refuge  
for the Santa Cruz River in Tucson!**





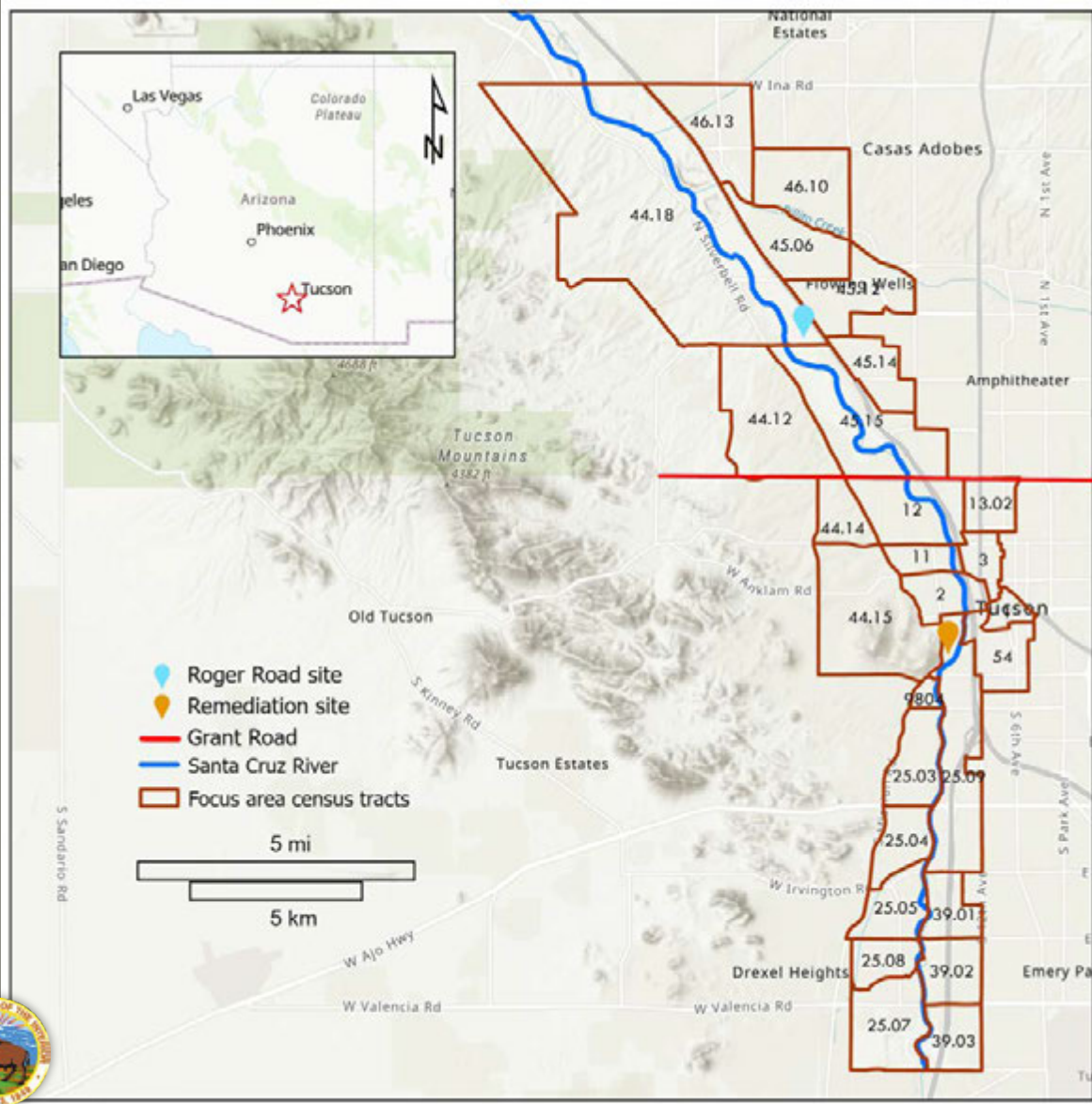
## Benefits of UWRs:

- Engages urban communities to strengthen conservation
- Establishes a federally recognized refuge within 25 miles of an urban center.
- Boosts populations subject to environmental injustice

Considering locations up and down the river's urban corridor

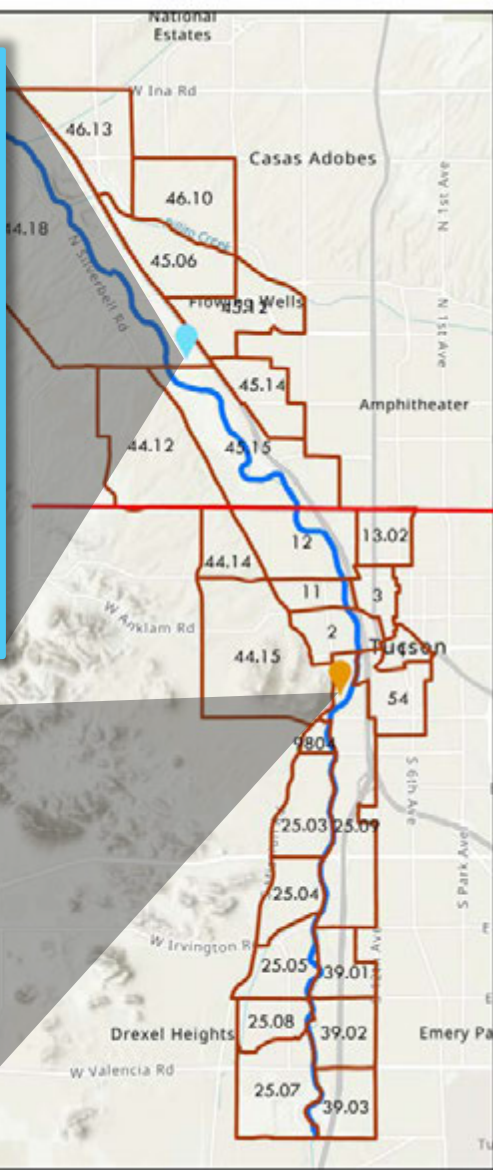
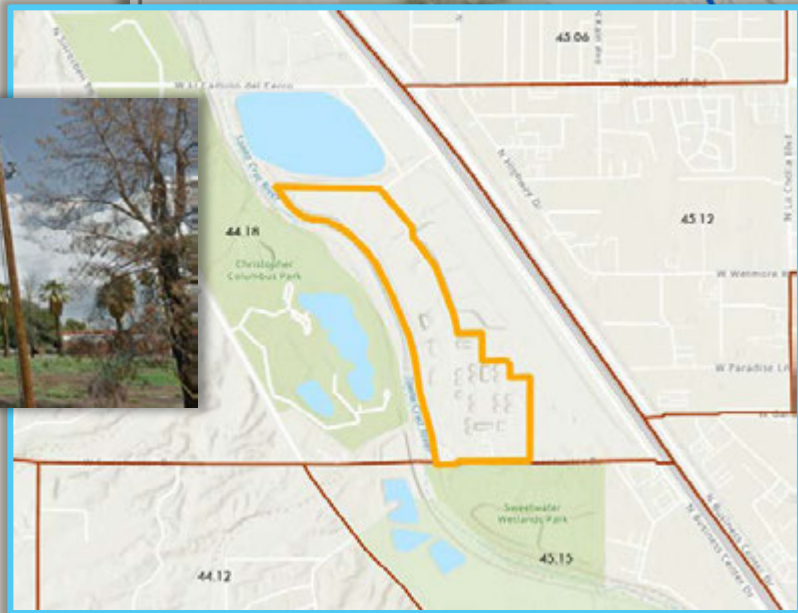
## Supported by:

- Dept. of Interior || U.S. Fish & Wildlife Service || Urban Wildlife Conservation Program



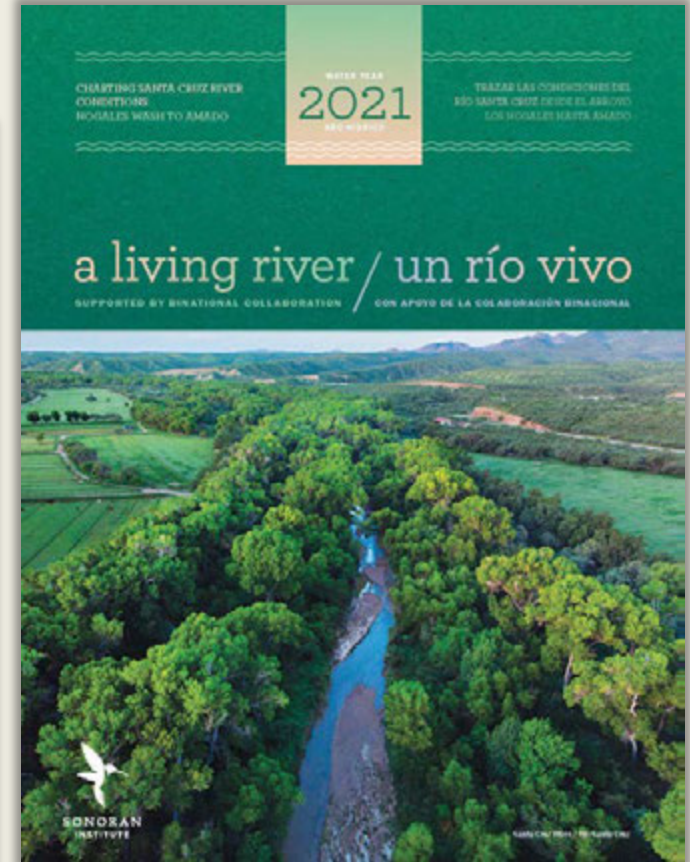
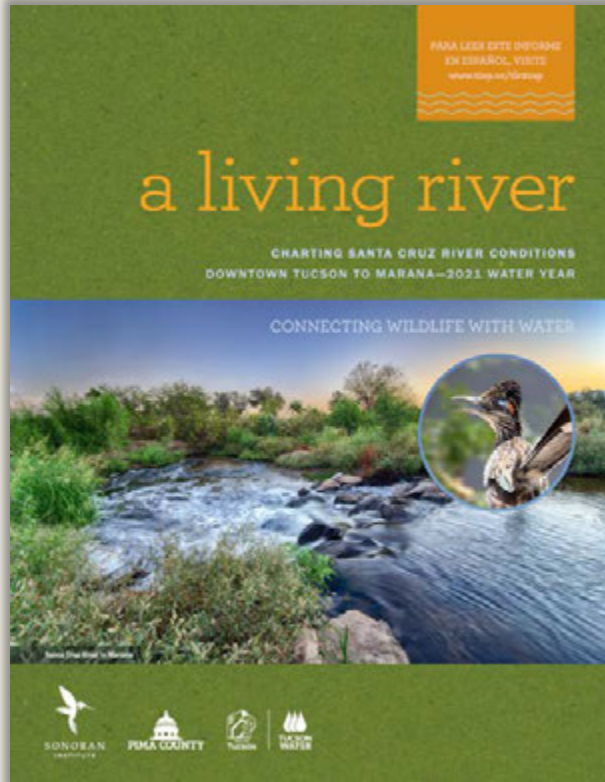


# Roger Road site

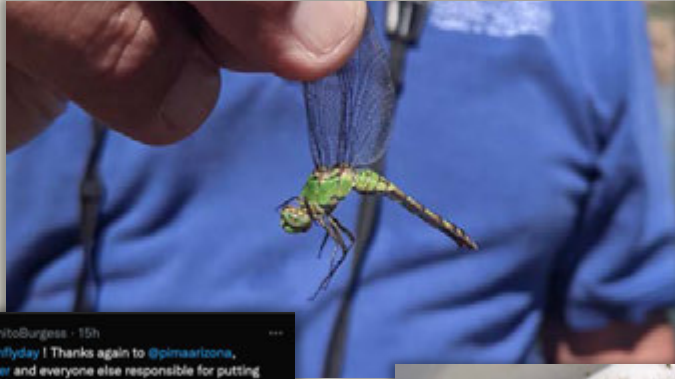




# There's more to the Living River project...



# Dragonfly Day on the Santa Cruz



THE UNIVERSITY OF ARIZONA  
COLLEGE OF AGRICULTURE & LIFE SCIENCES  
Natural Resources  
& the Environment

Special thanks to: **PIMA COUNTY PUBLIC LIBRARY**





# SANTA CRUZ RIVER CLEANUP & Fundraiser EVENT: FEB 25

Cleanup: 10am to 12pm | 2301 Forbes Blvd  
After party: Dragoon Brewing Co.

Help us remove **2,000lbs** of trash in 2 hours!

Donate to see a cleaner river!  
Every donation makes an impact.



SCAN QR CODE TO  
REGISTER & DONATE!

## #NotInMyRiver

Afterwards, we'll be heading over to our friends and sponsors, [Dragoon Brewing Co.](#), to celebrate a clean river with a cold beverage. See you there!

OUR PARTNERS



Contact Dr. Luke Cole with any questions at [lcole@sonoraninstitute.org](mailto:lcole@sonoraninstitute.org)

#PROCEEDS BENEFIT SONORAN INSTITUTE



# Trash Clean-up February 25, 2023



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# 2023 River Research Days: April 20 & 21

## Santa Cruz RIVER RESEARCH DAYS

**MARCH 24 – MARCH 25, 2022**

Virtual Presentations and In-Person Tour

## CULTURE AND ARCHAEOLOGY OF THE SANTA CRUZ RIVER

With an established human presence dating back over 12,000 years, the Santa Cruz River is home to the longest continuous agricultural presence in North America, is federally recognized as a National Heritage Area, and flows through Tucson, the first UNESCO City of Gastronomy in the United States of America. This two-day event will present the newest projects and research from a rich array of the academic, nonprofit, policy, arts, and business communities.

Real-time English–Spanish translation. Speakers and attendees will be able to participate in the event in their preferred language, allowing new opportunities for discovery, networking, and community-building.

This year's field trip will take place on Friday, March 25 at Mission Garden.

### PURPOSE

Santa Cruz River Research Days was founded in 2009 with the goal of sharing of experiences and results across diverse institutions and disciplines. Our program is designed to:

- identify new research questions,
- expand the Santa Cruz River research community,
- foster awareness of each other's research and conservation efforts, and
- catalyze new collaborative projects.

### 2021 STEERING COMMITTEE

Michael Bogan, University of Arizona  
Luke Cole, Sonoran Institute  
Cannon Daughtrey, PaleoWest  
Ben Lomeli, Friends of the Santa Cruz River  
Tony Palmer, Tumacácori National Historical Park  
Claire Zugmeyer, Sonoran Institute



Photograph by Charlie Alosky

## Santa Cruz RIVER RESEARCH DAYS

**24 Y 25 DE MARZO, 2022**

Evento Virtual de Zoom

## CULTURA Y ARQUEOLOGÍA DEL RÍO SANTA CRUZ

Con presencia humana establecida desde hace más de 12,000 años, el río Santa Cruz registra las actividades agrícolas más antiguas de Norte América. El río, está reconocido a nivel federal como Área de Patrimonio Nacional y fluye a través de Tucson, la primera Ciudad de la Gastronomía declarada por la UNESCO. Este evento de dos días presentará los proyectos e investigaciones más recientes de una amplia variedad de comunidades académicas, sin fines de lucro, políticas, artísticas y empresariales.

Traducción inglés-español en tiempo real. Los expositores y asistentes podrán participar en el evento en su idioma preferido, lo que permitirá nuevas oportunidades para el descubrimiento, la creación de redes y la creación de comunidades.

La excursión de este año se llevará a cabo el viernes 25 de marzo en Mission Garden.

### OBJETIVO

Los Días de Investigación del Río Santa Cruz se fundó en 2009 con el objetivo de compartir experiencias y resultados entre diversas instituciones y disciplinas. Nuestro programa está diseñado para:

- Identificar nuevas preguntas de investigación,
- Ampliar la comunidad de investigación del río Santa Cruz,
- Fomentar la conciencia de los esfuerzos de conservación e investigación de los demás, y
- Catalizar nuevos proyectos colaborativos.

### COMITÉ DIRECTIVO 2022

Michael Bogan, Universidad de Arizona  
Luke Cole, Sonoran Institute  
Cannon Daughtrey, PaleoWest  
Ben Lomeli, Amigos del Río Santa Cruz  
Tony Palmer, Parque Histórico Nacional Tumacácori  
Claire Zugmeyer, Sonoran Institute



Fotografía por Charlie Alosky

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