

# ANNUAL REPORT | 2019

[wrrc.arizona.edu](http://wrrc.arizona.edu)



**GREATER DEPTH,  
BROADER PERSPECTIVE  
FOR A CLEAR WATER FUTURE**



COLLEGE OF AGRICULTURE & LIFE SCIENCES  
COOPERATIVE EXTENSION

**WATER RESOURCES  
RESEARCH CENTER**



COLLEGE OF AGRICULTURE & LIFE SCIENCES  
COOPERATIVE EXTENSION

# WATER RESOURCES RESEARCH CENTER

## 2019 ANNUAL REPORT: EXPANDING COMMUNICATION AROUND WATER

In 2019, the Water Resources Research Center (WRRC) strengthened its already substantial engagement and outreach across Arizona, working with communities, establishing collaborations, and building relationships. WRRC professionals conducted research addressing real-world water issues; convened and contributed to public discussions of local, regional, and statewide water resources challenges; and disseminated critical water-related information in various formats. Continuing its tradition of cooperative problem-solving and partnership, the WRRC extended its communication network and its reach throughout the community.

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Cover Photo: 2019 WRRC Photo Contest, Jerry Webster – Bobcat in the Santa Cruz



## MESSAGE FROM THE DIRECTOR

It is with pleasure that I present this overview of Water Resources Research Center activities for 2019. In 2019, the WRRC endeavored to strengthen engagement and outreach across Arizona. We focused on programs and real-world projects that align with our mission to “tackle key water policy and management issues, empower informed decision-making, and enrich understanding through engagement, education, and applied research.” We also expanded and reinforced community partnerships, including with our colleagues in the Cooperative Extension system. Already active in many areas of the state, WRRC professionals initiated and expanded projects and programs to inform, educate, and assist a broad range of stakeholders. As this report illustrates, our collaborative approach has yielded impactful work.



### About the Director

**WRRC Director Sharon B. Megdal** oversees programs and operations of the WRRC and conducts applied research through which she engages with multiple partners on water resources and management projects. In 2019, Megdal contributed professionally through publications and speaking engagements, including several on the implications of Arizona’s Drought Contingency Plan. She worked closely with several graduate students from various departments, one of whom successfully defended her dissertation in November 2019. She advised Ph.D. students as they prepared now-published papers on managed aquifer recharge in Mexico and the market for long-term storage credits in Arizona, respectively. Megdal found internship positions for student advisees at the Center for the Future of Arizona and the Community Water Company of Green Valley and taught the graduate course “Water Policy in Arizona and Semi-arid Regions” to a diverse and talented group of students. She served on the boards of professional associations, including the American Water Resources Association and the Universities Council for Water Resources, from which she received the 2019 Warren A. Hall Medal for outstanding lifetime achievement. In addition, she served her 11th year as an elected member of the Board of the Central Arizona Water Conservation District, for which she serves as secretary, and was appointed to the Pinal Active Management Area Stakeholder Group.

Director Megdal is the C.W. & Modene Neely Endowed Professor for Excellence in Agriculture and Life Science and University Distinguished Outreach Professor. She also serves as director of the University of Arizona’s Water, Environmental, and Energy Solutions (WEES), which is funded by the Technology Research Initiative Fund (TRIF). A member of the faculty in the Department of Environmental Science, she holds numerous courtesy appointments in departments and colleges across the UArizona campus.

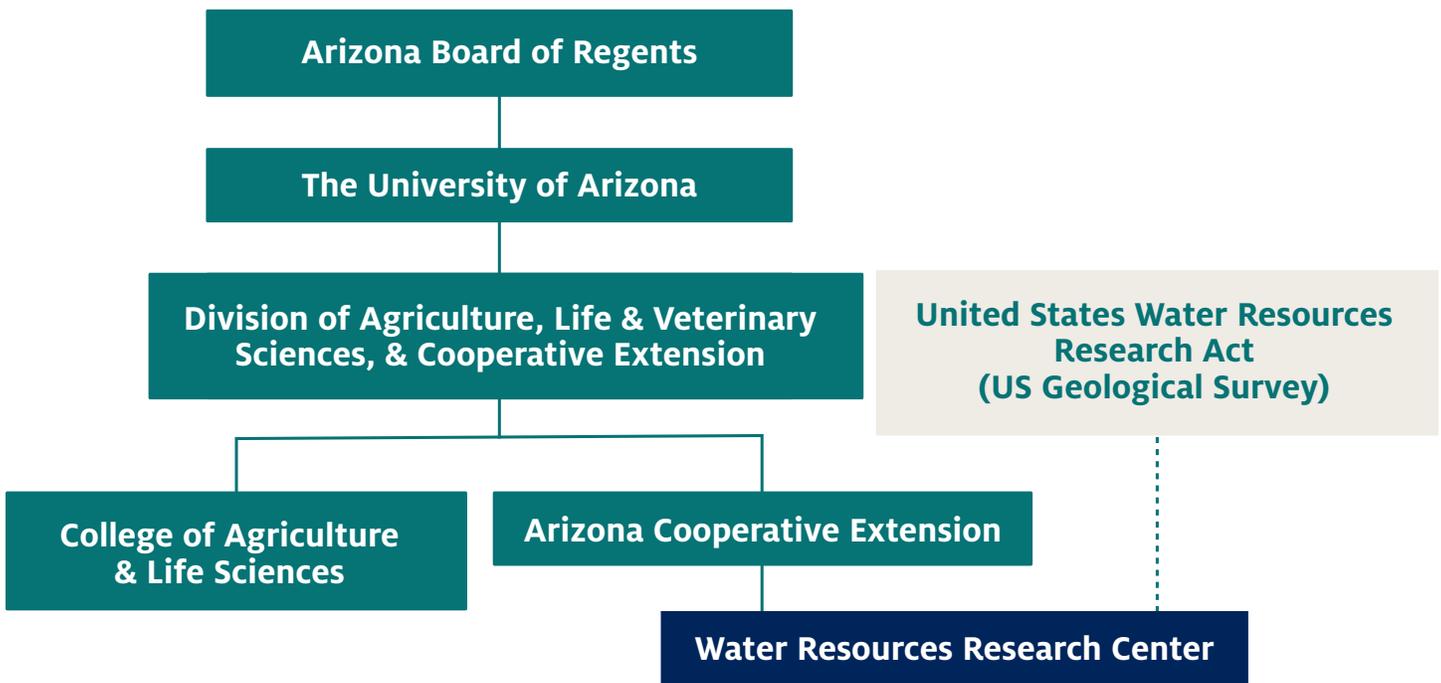
# EXTERNAL ADVISORY COMMITTEE

The WRRC's External Advisory Committee (EAC) meets at least once annually. In 2019, they met on December 17 at the Salt River Project's PERA Club in Tempe, Arizona. The members of the EAC with their affiliations as of December 2019 are listed below.

- **Tom Buschatzke**, Arizona Department of Water Resources
- **Guy Carpenter**, Stanley Consultants
- **Ted Cooke**, Central Arizona Project
- **Maria Dadgar**, Inter Tribal Council of Arizona
- **Tom Davis**, Yuma County Water Users' Association
- **Scott Deeny**, The Nature Conservancy
- **Alan Forrest**, HDR Engineering, Inc.
- **William Garfield**, Arizona Water Company
- **Andy Groseta**, Groseta Ranches
- **Joe Gysel**, EPCOR, Water USA, Inc.
- **Jason Hauter**, Akin Gump Strauss Hauter & Feld LLP and Attorney for the Gila River Indian Community
- **Bradley (Brad) Hill**, City of Flagstaff
- **Michael Lacey**, Freeport-McMoRan Copper and Gold
- **James (Jim) Leenhouts**, US Geological Survey, Arizona Water Science Center
- **Randy Matas**, Arizona Department of Environmental Quality
- **Juliet McKenna**, Montgomery & Associates
- **Vacant**, Farmers Investment Co. (FICO)
- **Leslie Meyers**, US Bureau of Reclamation
- **Richard Morrison**, Morrison Institute for Public Policy, Arizona State University
- **Joe Olsen**, Metropolitan Domestic Water Improvement District
- **Sarah Porter**, Kyl Center for Water Policy, Morrison Institute for Public Policy, Arizona State University
- **Philip Richards**, Arizona Public Service
- **Dave Roberts**, Salt River Project
- **John Shepard**, Sonoran Institute
- **David Snider**, Pinal County Board of Supervisors (Retired)
- **Kathryn Sorensen**, Phoenix Water Services
- **Warren Tenney**, Arizona Municipal Water Users Association
- **Timothy (Tim) Thomure**, Tucson Water
- **Chris Udall**, Agribusiness & Water Council of Arizona
- **Christopher (Kip) Volpe**, The Estes Company
- **Sid Wilson**, Central Arizona Project (Retired)
- **Brian Wong**, BKW Farms

# ORGANIZATION

The following organizational chart displays the University of Arizona structure within which the WRRC operates.



## ENGAGING WITH ARIZONA’S COMMUNITIES

The WRRC conducted several projects in 2019 to help communities across the state develop water awareness and understanding of local water resources issues by enlisting local knowledge and learning local information needs.

### Responding to Public Information Needs

#### Local Water Basics:

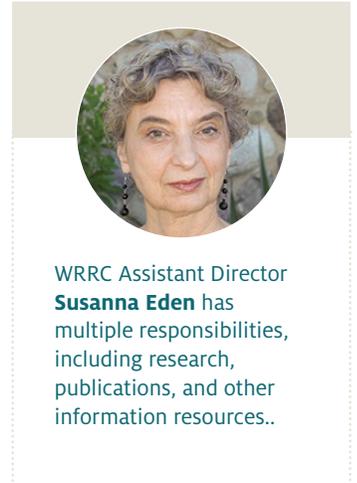
“Know About Your Water” was a project initiated with funding from the Freeport McMoRan Community Investment Program and aided by support from local stakeholders and media. For this project, the WRRC polled Green Valley-Sahuarita residents on what they wanted to know about water and then created a presentation with area-specific water information placed in a broader Arizona context. The project wrapped up in November with three public presentations. Revised after each event, the presentation was designed as a community resource for online access from the WRRC website. The project also produced a framework for efficiently creating “Know About Your Water” presentations for other localities, potentially other areas where Freeport has interests.

In addition, the center collaborated with Maricopa County Cooperative Extension to plan a series of three events entitled Arizona Runs on Water: A Maricopa County Cooperative Extension Education Series. At the first event, the WRRC presented “Water 101,” which was similar to “Know About Your Water,” but focused on issues specific to Maricopa County/Phoenix Active Management Area. Two other events in the series, featuring experts speaking on water for agriculture and water for turf/landscaping, were scheduled for January 30 and April 30, 2020. The April event was canceled following the University of Arizona COVID-19 stay-at-home order. The WRRC and Mohave County Cooperative Extension have talked about creating a similar series for Mohave County next year.



## Answering FAQs:

As a center within Arizona Cooperative Extension, the WRRRC contributed to the Extension mission with several informative products, including “Answering Questions About Water,” a presentation during the August 2019 Arizona Cooperative Extension annual conference. Drawing on the WRRRC’s experience fielding questions from the public, the center shared strategies for answering questions on a range of topics from big-picture issues to individual situations. The WRRRC also produced and posted [a handout](#) listing online resources for more information.



## Water Planning Assistance

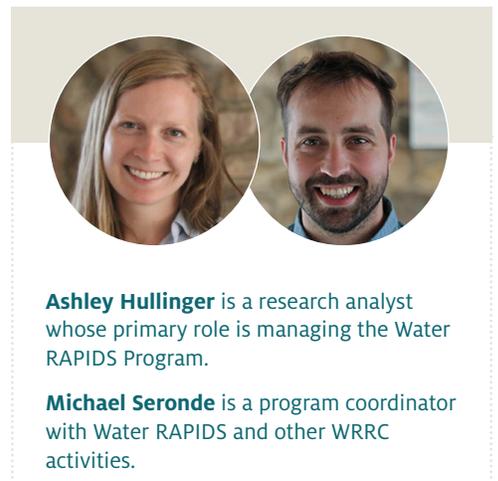
### Fresh Successes in Rural Watershed Planning - Cobre Valley:

Water RAPIDS, a WRRRC program, that has been working in the Globe-Miami area for several years, received additional funding from the U.S. Bureau of Reclamation for the next phase of collaborative watershed planning in Cobre Valley. In 2019, the RAPIDS team followed up on water planning priorities from the community to develop a local water budget and strengthen the link between a healthy economy and environment. To share water budget results and decide the next phases of research, staff convened the Second Cobre Valley Water Forum on April 9, 2019 bringing together more than 70 local and regional stakeholders and partners. In partnership with Gila County Cooperative Extension, new funding is being used to build scenarios and evaluate ecosystem services in support of community planning and watershed resilience. Products of this iterative stakeholder engagement process will be publicly accessible through the WRRRC website, newsletters, working group meetings, and an annual public forum. The team also will help build the Cobre Valley Watershed Partnership, which provides a platform to support informed local decision-making.

## Providing a Platform for Sharing Community-based Solutions

### 2019 Annual Conference and Follow-up:

More than 350 people attended the WRRRC 2019 Annual Conference, “Arizona Runs on Water – Scarcity, Challenges, and Community-based Solutions,” held on February 1, 2019, at the Black Canyon Conference Center in Phoenix. The conference explored how communities across Arizona are working to make sure they have sufficient water to meet their future needs. The event began with several framework presentations, which led into panels featuring numerous place-based examples of water challenges and solutions from across Arizona. Members of the Arizona State Legislature participated in a concluding panel. Following on the conference, the WRRRC’s annual [Arroyo](#) publication discussed the conference themes in the issue, “Community-based Solutions to Local Water Challenges in Arizona.”



## Community Service

WRRRC personnel served their communities as individuals and WRRRC representatives on various boards and committees, including the Tucson Citizens’ Water Advisory Committee, Pima County Regional Wastewater Reclamation Advisory Committee, and UArizona University Staff Council (formerly Appointed Professionals Advisory Council). In addition, they are active on projects and programs spearheaded by others, including the US Bureau of Reclamation sponsored Lower Santa Cruz River Basin Study and the cooperative Santa Cruz Watershed Collaborative.

# ADDRESSING REAL-WORLD NEEDS

## Working with Stakeholders

### Supporting Local Participation in Policy Making:

Acknowledging the groundwater situation in Pinal County, Arizona, the WRRC and Babbitt Center for Land and Water Policy at the Lincoln Institute of Land Policy initiated a series of conversations and meetings with community leaders, local water experts, and stakeholders to illuminate the challenges and opportunities that Pinal County faces. A Water RAPIDS project has been identifying activities that will assist local efforts to increase water resilience in the region. In addition, Water RAPIDS staff has been working with the Babbitt Center to develop water use indicators for the Colorado River Basin, providing context about the state of land and water resources in the basin.

## Beyond Sky Island Waters

### Sharing Perspectives on Water for Natural Areas:

The WRRC and the local non-profit Sky Island Alliance (SIA) wrapped up a three-year initiative funded by the Nina Mason Pulliam Charitable Trust to develop regional dialogues and local on-the-ground actions, involving more than 700 people, to protect and enhance water resources in southeastern Arizona. In April, 2019 the WRRC and SIA convened the Desert Waters International Symposium, to share water resource management experiences and perspectives from Arizona and South Australia. This two-day event produced recommendations about connecting water for natural areas and healthy communities and economies. The symposium was dedicated to the late Rod Lewis, a champion for indigenous water rights and a statewide leader on water issues.



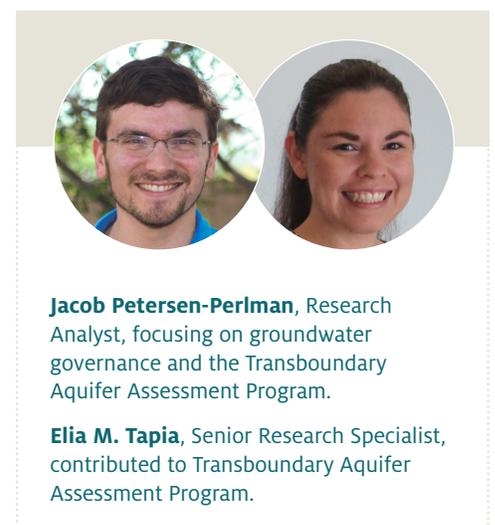
WRRC Research Scientist **Jean McLain** is assistant dean for faculty advancement in the College of Agriculture and Life Sciences (CALs) and is a research scientist in the Department of Environmental Science.

**Victoria Obergh** manages the daily operations of the McLain Laboratory.

## Water Quality Research

### Examining Treated Wastewater:

In 2019, a new research project with faculty from the Mel and Enid Zuckerman College of Public Health and the School of Animal and Comparative Biomedical Sciences in the College of Agriculture and Life Sciences (CALs) is assessing the significance of the flow of poorly treated and untreated wastewater from Mexico into the United States. Specifically, researchers are examining whether the flows are increasing the presence of antibiotic-resistant bacteria in riverine sediments north of the border. Other research projects examine the quality of harvested rainwater in Arizona and assess the potential for the development of toxin-producing algae in Arizona surface waters. The latter project is the subject of a (CALs)-produced video, [Deciphering Deadly Algae](#), which has been widely distributed through UArizona news outlets, YouTube, and Twitter.



**Jacob Petersen-Perlman**, Research Analyst, focusing on groundwater governance and the Transboundary Aquifer Assessment Program.

**Elia M. Tapia**, Senior Research Specialist, contributed to Transboundary Aquifer Assessment Program.

## International Cooperation

### Transboundary Aquifer Assessment Program (TAAP):

As part of the [Transboundary Aquifer Assessment Program](#), a joint effort between the U.S. and Mexico to evaluate shared aquifers, the WRRC and TAAP partners worked together on revising the Binational Study of the Transboundary Santa Cruz Aquifer. The WRRC team also surveyed other transboundary aquifers along the Arizona/Sonora border, focusing on wastewater issues, jurisdictional responsibility, available infrastructure, and ongoing projects. The team assessed the applicability

of the TAAP Cooperative Framework to other transboundary waters. Another TAAP task assessed the impacts of climate uncertainties on surface and groundwater flows within the Santa Cruz River Aquifer in Mexico. Team members gave 15 presentations at regional, national, and international meetings and conferences, including the Binational Summit on Groundwater at the U.S.-Mexico Border, convened by the International Boundary and Water Commission (IBWC) in El Paso, Texas. Partners included the USGS, IBWC, Universidad de Sonora, Colegio Sonora, the Mexican National Water Commission (CONAGUA), New Mexico State University, Texas A&M University, and University of Texas at El Paso, among many other academic, governmental, and private institutions from both the U.S. and Mexico.

### **Middle East Water:**

Arizona, Jordan, Israel, and the Palestinian Territories are arid/semi-arid lands that face water challenges similar to each other. In 2019, Director Megdal continued to facilitate communication and develop partnerships related to water management and policy with a focus on transboundary waters. Major presentations included a keynote address to the International Workshop on Sustainable Development of Arid Lands at the Hashemite University in Jordan. Workshop participants engaged in a discussion of natural resource and agricultural challenges common to semi-arid, arid, and hyper-arid regions. For the November 2019 WATEC (Water Technology and Environmental Control) conference in Tel Aviv, Israel, Megdal organized and moderated a panel titled “Implementing Technologies Across Borders,” which featured expert from the U.S., Mexico, and Israel, and published a [\*Reflections\*](#) piece on the conference experience.

## **Water Resources Research Act Programs**

### **Supporting Student Research:**

The WRRRC is the Water Resources Research Institute for Arizona, federally authorized under the Water Resources Research Act (WRRRA). The WRRRA base (104b) funding supports a portion of the WRRRC information transfer activities and a small competitive research grants program, which is open to students and their faculty advisors at all three state universities. The WRRRC also administers Arizona’s applications and selected projects, if any, for the National Competitive Grants (104g) program.

The three student 104b research projects funded for the 2019-2020 grant year will be completed in 2020. They include:

1. Solar nanofiltration for off-grid water purification in Navajo Nation, (Principal Investigator: Kerry Hickenbottom, Co-Principal Investigator: Bob Arnold, Student Co-Principal Investigator: Christopher Yazzie, University of Arizona);
2. A citizen science approach to monitoring water resources in a vulnerable aquifer, (Principal Investigator: Jennifer McIntosh, Student Co-Principal Investigator: Sean Schrag-Toso, University of Arizona); and
3. Detecting Colorado River Tamarix phenology using publicly available satellite images, (Principal Investigator: Temuulen Sankey, Student Co-Principal Investigator: Nathaniel Bransky, Northern Arizona University).

Based on the success of the past three years, the WRRRC again called for student research proposals in fall 2019. The Technical Review Committee, made up of external professionals and UArizona faculty from various fields, evaluated and ranked the proposals for funding in the 2020-2021 grant year, beginning March 1, 2020.

## **OUTREACH TO A DIVERSE PUBLIC**

The WRRRC engages with partners, stakeholders, and the public throughout Arizona and beyond through multiple media platforms. A committee of WRRRC personnel met weekly to coordinate work on outreach activities and products. WRRRC personnel routinely responded to requests for information and media interviews. Additionally, a variety of external news and information outlets, including the New York Times, featured WRRRC personnel and programs in 2019.

# In Person

## Annual Conference:

After the successful [WRRC annual conference](#), “Arizona Runs on Water: Scarcity, Challenges, and Community-based Solutions”, planning commenced for the 2020 WRRC conference, “Water at the Crossroads: The Next 40 Years.”, which commemorates the 40th anniversary of the 1980 Groundwater Management Act. A 22-member conference planning committee formulated an engaging program to look back at the last 40 years of Arizona water management and forward to the next 40 years. Scheduled for Friday, March 27, 2020 at the Black Canyon Conference Center in Phoenix, presentations and moderated panels were programmed to address how water resources are changing, what pressures water users face now and in the future, what choices are being made around the state, and how we can best achieve long-term resilience. For the first time, the WRRC planned to employ in-conference polling technology to tap into the group’s collective knowledge to reveal our ideas and perspectives. In addition, the organizers developed ideas for three pre-conference webinars for delivery in the first quarter of 2020 to set the stage for the conference. Due to the COVID-19 pandemic, the 2020 WRRC conference was postponed and transformed into a virtual event scheduled for June 18-19, 2020.

➤ <https://wrrc.arizona.edu/conference>

## Brown Bag Seminar Series:

The [WRRC’s Brown Bag Seminar Series](#) continued to attract diverse audiences to presentations on a range of water topics. In 2019, the WRRC held 16 Brown Bag seminars featuring state, national, and international experts. Average attendance was 40 people, including off-site participants through GoToWebinar. The in-person audience was approximately equally divided between UArizona personnel and members of the wider community. The WRRC website hosts webinar recordings and copies of the presentation slides for most Brown Bag seminars.

➤ <https://wrrc.arizona.edu/brown-bag-seminars>

## Other Public Events, Presentations, and Posters:

WRRC faculty, staff, and students gave many oral and poster presentations to academic, professional, civic, and community groups, locally, nationally, and internationally throughout the year. The WRRC also cosponsored presentations by distinguished speakers on water-related topics. These included Eran Feitelson, Hebrew University of Jerusalem, Israel, and Susan Ward Harris, Special Master for the Gila River and Little Colorado River General Stream Adjudications in Arizona. The center’s annual February Chocolate Fest provided an opportunity for friends in the water community to meet informally and for showcasing the WRRC 2018 photo contest winners.

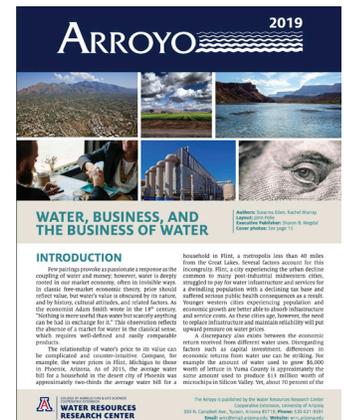
➤ <https://wrrc.arizona.edu/events>

# In Print

## Arroyo Annual Publication:

The 2019 [Arroyo](#), the WRRC’s annual publication on a single topic of timely interest to Arizona, was sent in May to both email and print subscribers, including libraries, schools, businesses, and nonprofits. Each year the *Arroyo* content is linked to the previous year’s conference. A 2018 conference sponsorship from Water Asset Management provided funding for the 2019 summer intern who drafted the 2019 *Arroyo*, Water, Business, and the Business of Water. After reviews and revisions, the 2019 *Arroyo* was published and mailed to its approximately 1,700 print subscribers, posted to the WRRC website, and sent to more than 2,500 non-print subscribers. Following on from the 2019 Annual Conference, the 2020 *Arroyo* expanded on the solutions presented by the many panelists. Summer intern Emily Joiner produced the first draft. A refined draft was sent to external reviewers in November. Southern Arizona Water Users Association and the Walton Family Foundation provided support through their 2019 conference sponsorships.

➤ <https://wrrc.arizona.edu/publications/arroyo>



# Using Electronic Media

## Weekly Wave e-News Digest:



Through December 2019, the WRRC published 33 editions of the [Weekly Wave](#) and seven editions of the bi-monthly Summer Wave. Each edition included updated WRRC and water community news, events, publications, and announcements. The Weekly Wave distribution list increased from 2,257 to 2,734 throughout the year.

## WRRC Website and Communications:

The WRRC maintains three websites: the main [WRRC website](#) and [UArizona Water Network](#) for the Water, Energy, and Environmental Solutions (WEES) initiative, and [Conserve2Enhance](#), a program founded by the WRRC in 2011. The main site includes news, events, and programs, as well as publications and other resources, such as Brown Bag webinar recordings and links to the Arizona Project WET site. Between December 2018 and December 2019, the WRRC website received 130,346 page views by 63,372 users.

The use of Constant Contact enhances direct email communication between the WRRC and its subscribers by simplifying subscriber list maintenance and improving readability. It also permits tracking communication effectiveness, recording a top-tier average open rate of 33% among the listserv's 2,734 subscribers.

Efforts to employ social media - specifically Facebook, Twitter, and Instagram - have resulted in modest gains in 2019 as measured by increased shares, views, retweets, follows, and likes. The WRRC Facebook page had 832 followers as of December, an increase of 254 from 2018, and 847 Twitter followers, an increase of 115. Volunteer Ralph Churchill helped to extend the WRRC social media presence by tracking and evaluating the effectiveness of posts.



**John Polle** manages the WRRC website and is responsible for design of external communications.

## Annual WRRC Photo Contest:

In the fall of each year, the WRRC sponsors a contest for the best photographs of Arizona water on specific themes. Contest winners were fêted at the annual February Chocolate Fest and winning photographs are posted on the WRRC website. The 2019 Photo Contest attracted entries from throughout the state. Photographs are used in multiples ways, including to increase the WRRC presence on Instagram. This past year, photographs from previous years were used to create new promotional postcards.

► <https://wrrc.arizona.edu/2019-photo-contest-winners>



2019 WRRC Contest Photos (Clockwise from left): Gilles Boyer - Lone Rock on Beach -2019; Brian O'Neill - Santa Cruz River at the Crossroads - 2019; Torran Anderson - Chris Yazzie Water Testing - Navajo Nation 2018

# AFFILIATED PROGRAMS

## Arizona Project WET Water and STEM Education

### Teacher Professional Development:



In 2019, Arizona Project WET (APW) kicked off a new USDA-funded project that includes an intensive week of classroom and laboratory training. Working with Dr. Jean McLain, APW staff created an experience that immerses participants in cultural and molecular analysis of bacteria in water and soil samples and provides training in laboratory biosafety and scientific techniques. In addition, APW presented the first-ever Santa Cruz River Field Study Teacher Academy in

February, 2019 and encountered frigid temperatures and heavy snow rather than the dry conditions that were expected. The APW team also taught a three-day STEM academy on rainwater harvesting to Sunnyside Unified School District's 7th grade science teachers; those teachers are now guiding 1200 students as they design rainwater harvesting systems that nourish shade trees, beautify their campuses, and create living laboratories for outdoor learning. APW's newly created 4th grade Curriculum Unit, which is a mandatory part of the Arizona Water Festival Program, fully meets two of the new 4th grade Arizona Science Standards. It challenges students to discover how their local water cycle affects water availability in their region and impacts their lives. By the end of 2019, 238 teachers from seven Arizona counties had participated in the seven-hour workshop.

### Student Engagement:

- Forty 11<sup>th</sup> grade students at Marana High School changed out 42 aerators in faucets across their campus and calculated projected water savings of 598,311 gallons per year.
- A total of 101 students in 30 teams led by coaches participated in an Underwater Robot Competition at the UArizona Recreation Center.
- Through APW efforts, 25 Paulo Freire Freedom School students used the engineering design process to model the Central Arizona Project aqueduct system.
- Working with the UArizona Department of Environmental Science, APW prepared 70 high school students for the 2019 Envirothon competition and hosted 32 Amphi High School AP Environmental Science students in four different Environmental Sciences labs.



(Names listed left to right by row, starting at the top)

**Kerry Schwartz**, an extension specialist with Arizona Cooperative Extension and director of Arizona Project WET

**Betsy Wilkening** is the education coordinator for the APW Tucson Program, leading a NOAA-funded project promoting community resilience through STEM education and started and started an Underwater Robotics & Engineering Design Academy.

**Holly Thomas-Hilburn** is coordinator of applied programs for APW, working with the AquaSTEM Program and Tucson APW.

**Miriam Aleman-Crouch** is the senior instructional specialist for Arizona Project WET's Tucson Program.

**Pam Justice**, is the senior education coordinator at the Maricopa County Cooperative Extension office.

**Sandra Hurlbut** is the Community coordinator leading the Aqua STEM program in Maricopa County.

**Julie Hasty** is a senior instructional specialist with Arizona Water Festivals.

**Pearl Lam** is a senior instructional specialist with APW.

## Community Connections:

Twelve UArizona students worked with APW in the community and gained invaluable workplace experience, including time-management, collaboration, and organizational skills. On Education Outreach Day at the 2019 International Science and Engineering Fair, 60 students from Kayenta and Gilbert joined APW education specialists to learn about public health challenges related to climate change. To celebrate World Water Day in March, APW helped teacher participants in the NOAA-funded Recharge the Rain project teach their students climate science while working on rainwater recharge to grow trees, mitigate flooding, and save drinking water.

► <https://arizonawet.arizona.edu>

## Water, Environment, and Energy Solutions Initiative



THE UNIVERSITY OF ARIZONA  
RESEARCH, DISCOVERY & INNOVATION

Water, Environmental  
& Energy Solutions

The WRRC's productive relationship with the UArizona Water, Environmental, and Energy Solutions (WEES) initiative continued in 2019. WEES enables research that brings innovative solutions to pressing environmental, energy, and water challenges of importance to Arizonans. A very active six-member WEES Executive Committee

consists of representatives from the Colleges of Science, Engineering, Agriculture and Life Sciences, and Social and Behavioral Sciences. The WEES initiative is funded through the voter-approved Technology and Research Initiative Fund. In 2019, WEES invested approximately \$1.7M in water-related grants and new faculty. WEES-supported hires work on a wide array of research topics, including membrane processes for water reuse, the dynamic behavior of managed hydrologic systems, and off-grid water treatment. WEES funds also supported UArizona institutes and centers that interface directly with Arizona stakeholders, promote private-public partnerships, and conduct applied research with tangible benefits. During 2019, WEES promoted interdisciplinary connections at UArizona through three connection luncheons, one of which brought together researchers working on water topics with others working in informatics/modeling/remote sensing. In addition, WEES continued to disseminate information through the Water Network Listserv and promoted water-related research and activities at UArizona through the Water Network Website, which underwent a significant update and graphical design overhaul in August 2019.

## PERSONNEL AND FACILITIES

### WRRC Personnel

Faculty members Sharon B. Megdal, Jean McLain, and Kerry Schwartz are each responsible for their individual programs. As Director, Megdal oversaw support and programmatic staff. A five-person professional staff—Susanna Eden, Ashley Hullinger, Jacob Petersen-Perlman, Elia Tapia, and Claire Zucker—carried out research, Extension, and education projects that focus on enhancing the capacity of stakeholders and communities to tackle water resource issues. Zucker, WRRC associate director, also continued as WEES program director. Schwartz supervised educational professionals at the WRRC (Miriam Aleman, Holly Thomas-Hilburn, Pearl Lam, and Betsy Wilkening) and six other APW professionals located in two county Extension offices. John Polle continued to design, maintain, and update the three WRRC websites and provided expertise in graphic design. In fall 2019, he was awarded a quarterly College of Agriculture and Life Sciences Outstanding Staff Award in recognition of his great work.

In 2019, Bernadette Capossela assisted the director in administrative matters and Leslie Bonilla assisted with financial matters. Bonilla's administrative home is the Department of Environmental Science, which has shared a business center with the WRRC since January 2018. The third member of the administrative team, Lynette Featherston, greeted visitors and callers and maintained the center's public spaces in addition to her other duties.



**Leslie Bonilla** is the WRRC's accountant associate with responsibility for account transactions and reconciliation.

**Bernadette Capossela** is the WRRC's administrative associate, she provides administrative support to the Director and carries out a wide range of administrative duties.

**Lynette Featherston** is the WRRC's office assistant, receptionist, and database administrator

Open to the public, the WRRC facility provides a reception area provides informational materials on water-related topics and is home to the Sol Resnick Conference Room, a space for water-related meetings.

A cadre of outstanding students supported the WRRC's work in important ways including IT support provided by undergraduate Mohamed Hamie. A full list of WRRC students can be found in Appendix B: Supplemental Information. To learn about the center's staff and graduate students, please visit the WRRC Personnel Directory.

► <http://wrrc.arizona.edu/personnel-directory>

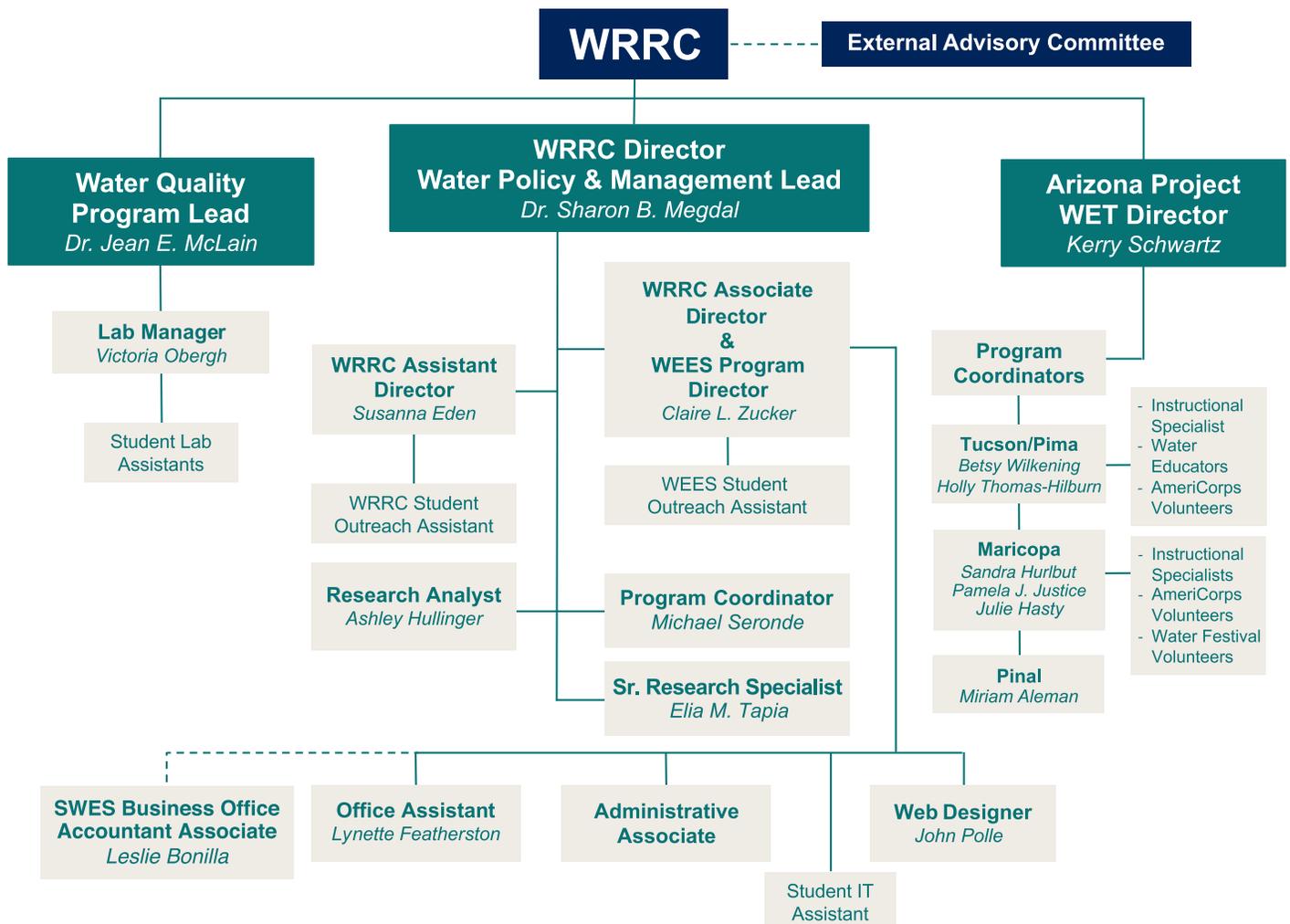
## Changes

McLain's position as the CALS assistant dean for faculty advancement has continued to expand, necessitating some cuts to her research program. Yet, she continued in her position as a research scientist in the Department of Environmental Science and at the WRRC, where she helped develop research and outreach projects.

In September 2019, Jacob Petersen-Perlman accepted an assistant professor position at East Carolina University in the Department of Geography, Planning, & Environment and the Water Resources Center. In October, Michael Seronde joined WRRC staff as a program coordinator. He is involved with the Cobre Valley engagement effort, the WRRR 104 program, and many of the WRRC's communications and reporting efforts. In addition, Administrative Associate Bernadette Capossela left the WRRC in October 2019 for another position at UArizona. Valued volunteer Ralph Churchill passed away on April 18, 2020.

## Organization

The organization chart below displays the WRRC's internal structure as of December 22, 2019.

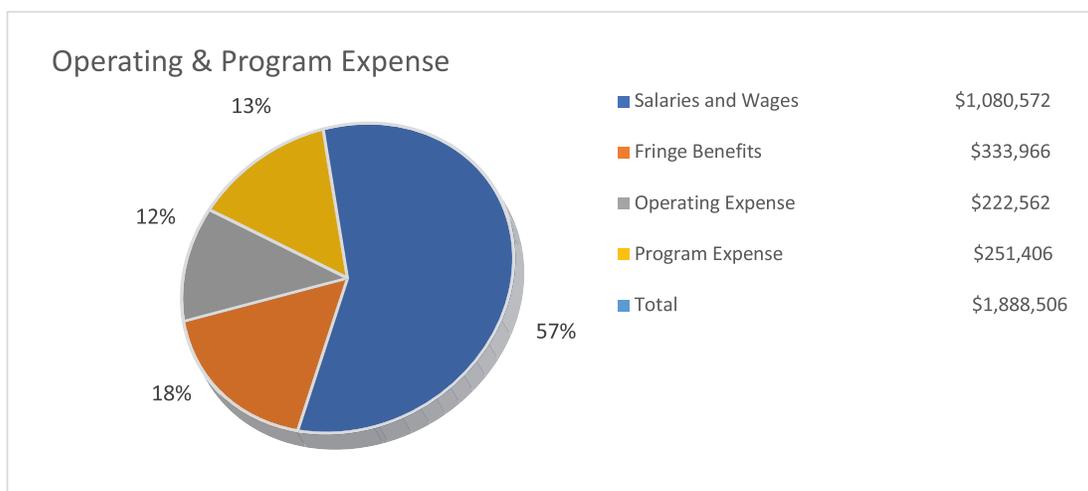
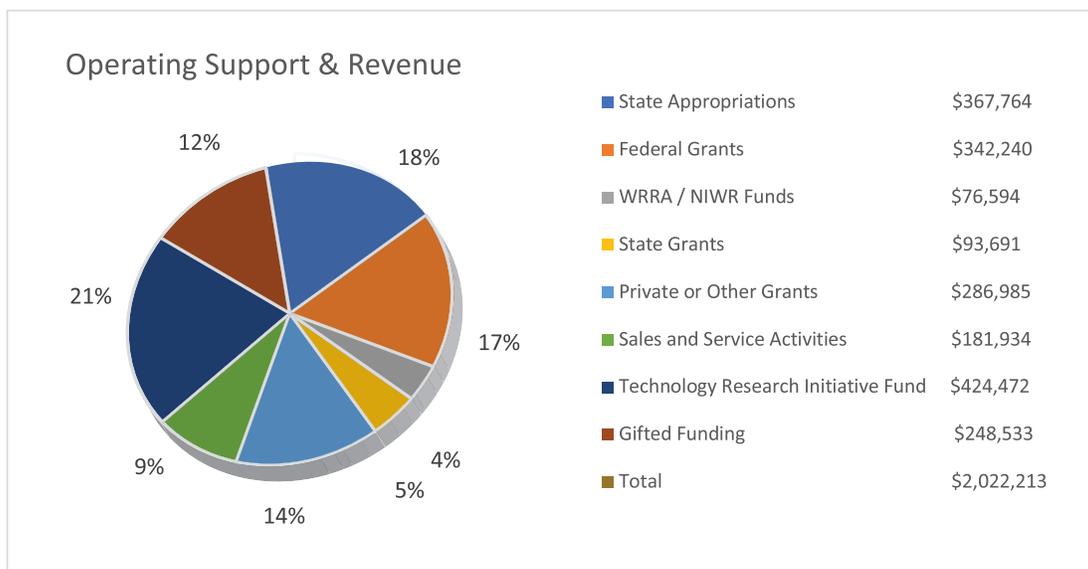


# ANNUAL SELF-REFLECTION

In the past year, the WRRC has been expanding its connections across Arizona. This effort to establish diverse partnerships required increased, focused, and consistent person-to-person communications with key stakeholders, including county Extension personnel and Native leaders, and outreach to many other audiences. In addition, the WRRC made a concerted effort to engage members of the Arizona State Legislature through the planning and presentation of the 2019 annual conference in Phoenix. The event, by chance, fell the day after the state's vital Drought Contingency Plan passed, reinforcing the timeliness of a conference focused on water issues and the importance of building water knowledge among legislators. Conference sponsorships and other external support were essential to these activities, and other WRRC programs expanded through grants and gifts to produce wider ranging impacts. The WRRC was fortunate to marshal the necessary resources in 2019, but looming financial uncertainties cloud the future. As this report demonstrates, however, WRRC services extend throughout Arizona and beyond. The WRRC anticipates responding to needs for water research, outreach, education, and engagement for many years to come.

# FINANCIAL STATUS CALENDAR YEAR 2019

In addition to state funding, much financial support for the center continues to come from grants, sales, service activities, and gifts. Of the total revenue in 2019, 43% came from government awards. The WRRC also received 12% of funding from private gifts, in addition to carryover from prior years. Salaries continued to be the largest expense, accounting for 75% of total expenses, while the remainder of costs stemmed from operations and programs.



# Notes

## Operating Support & Revenue

**State Appropriations:** State General Fund and tuition collections appropriated to CALS by the State of Arizona.

**Federal Grants:** Monies received for awarded competitive national federal grants and federally funded cooperative agreements awarded to the WRRRC.

**WRRRA/ NIWR Funds:** U.S. Geological Survey 104(b) 5-year Cooperative Agreement funded annually in March. The WRRRC receives this federal funding as Arizona's State Water Resources Research Institute.

**State Grants:** Revenue provided by the State of Arizona through competitive grants awarded to the WRRRC by departments of the State of Arizona.

**Private or Other Grants:** Revenues received by the WRRRC through the University of Arizona and the UArizona Foundation from local governmental agencies and non-governmental organizations.

**Sales and Service Activities:** Revenue from one-time transactions accrued over time by the WRRRC from publication sales, annual conferences, and miscellaneous services.

**Technology and Research Initiative Fund:** Revenue from TRIF, a state sales tax derived fund supporting a range of educational programs. TRIF funding is allocated to UArizona Water, Environmental, and Energy Solutions, which provides direct support to the WRRRC.

**Gifted Funding:** One-time gifts from individuals and companies and revenue generated by endowment interest bearing accounts.

## Operating and Program Expense

**Salaries and Wages:** Includes salaries, wages, and supplemental compensation paid to WRRRC faculty, appointed personnel, classified staff, graduate assistants, and hourly student employees.

**Fringe Benefits:** Includes costs of employee fringe benefits (ERE) for insurance, medical, and retirement benefits.

**Operating Expense:** Includes UArizona revenue and expense service fees; facilities and administration (indirect costs); UITS network funding fees (access to university communication systems for staff); background checks; membership dues; subscriptions; building and equipment maintenance and upgrades; employee training; Brown Bag seminar series; *Arroyo* Annual publication; and the WRRRC annual conference.

**Program Expense:** Includes university and lecturer's fees, participant support, and temporary labor; subcontractual research agreements for 104(b) grants at Northern Arizona University; printing and publications; communications; office, research, educational, and general supplies; employee travel; conference registration fees; facility and vehicle rental; and meetings and workshops.

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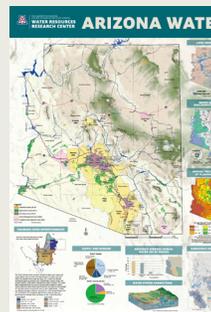
## Weekly Wave

The Weekly Wave e-news digest is distributed on Fridays and contains WRRRC news, events, and much more.



## Arroyo

The *Arroyo* is published each year and summarizes knowledge on a single water topic.



## Arizona Water Map Poster

The updated Arizona Water Map Poster is available exclusively from the WRRRC for \$12.00 (plus tax and shipping).

[wrrc.arizona.edu](http://wrrc.arizona.edu)

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