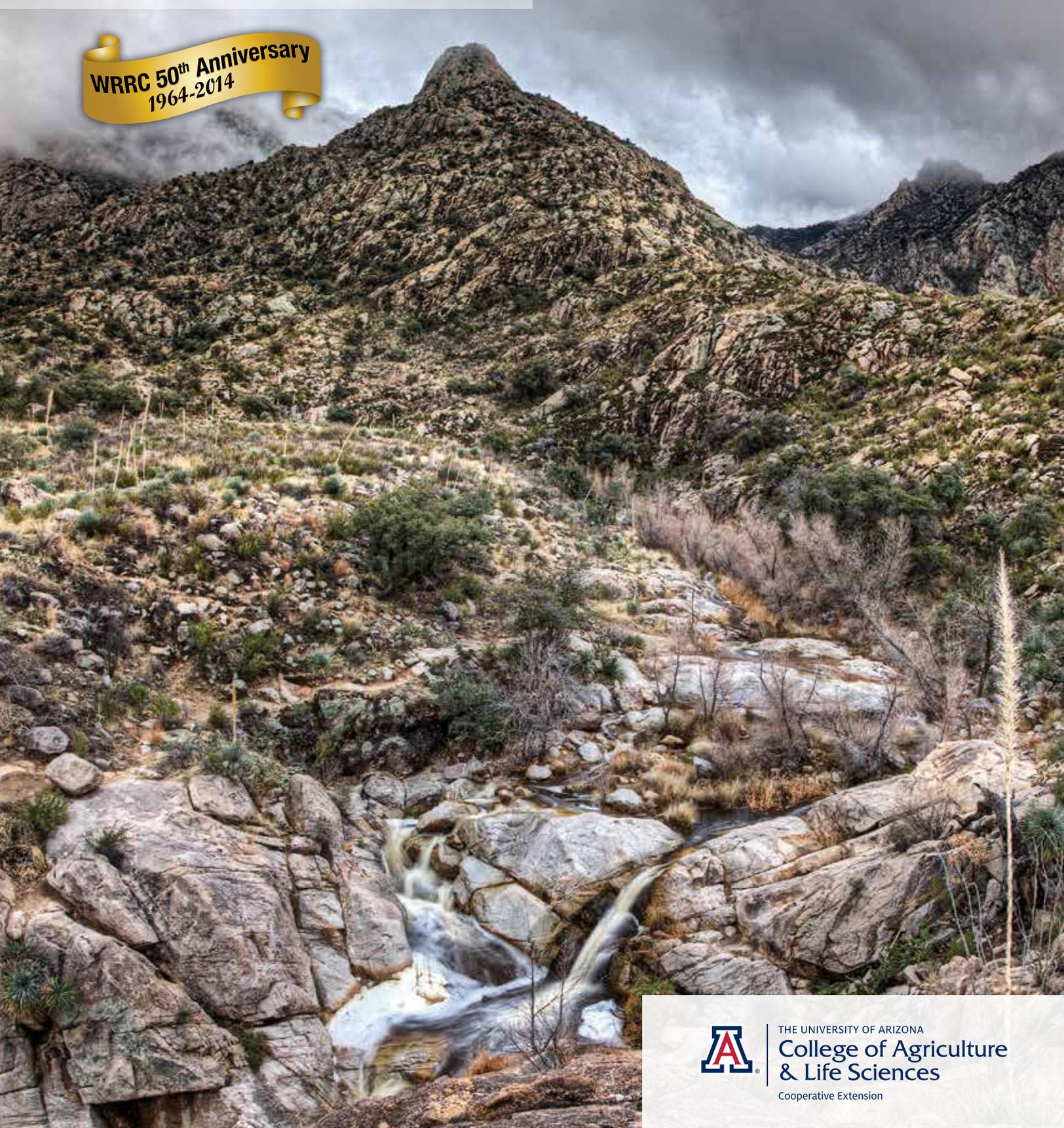




WATER RESOURCES RESEARCH CENTER

ANNUAL REPORT 2014

WRRRC 50th Anniversary
1964-2014



THE UNIVERSITY OF ARIZONA
**College of Agriculture
& Life Sciences**
Cooperative Extension



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Cover photo: Yucca Falls and Mountain - Luke Parsons



50 Years of Engaging Citizens with Water Issues



In 2014 the University of Arizona Water Resources Research Center (WRRRC) celebrated its 50th anniversary as the water resources research institute for the state of Arizona under the federal Water Resources Research Act of 1964. The WRRRC commemorated its anniversary with several events, including a reunion of past directors and staff, a cake cutting ceremony at the annual

conference, and a special insert on WRRRC history in the quarterly newsletter, *Arizona Water Resource*. Throughout the year, the WRRRC proudly displayed a 50th Anniversary banner marking the many years of service to the community.

A unit of the University of Arizona, College of Agriculture and Life Sciences and Arizona Cooperative Extension, the WRRRC's established position as an independent source of objective information and analysis on the frequently contentious subject of water is unique. With a mission to promote understanding of critical state and regional water management and policy issues through research, outreach, education, and engagement, the WRRRC is focusing on program impacts. Strong partnerships are an important part of this focus. New and continuing programs have reached out to partners and invited participation in relevant events and activities as described in this report. The year 2014 was full of accomplishments for the WRRRC as described in this report. Metrics of our progress toward strategic goals, including partnership development, can be found in Appendix A. Supplemental information on accomplishments can be found in Appendix B.



WRRC Director



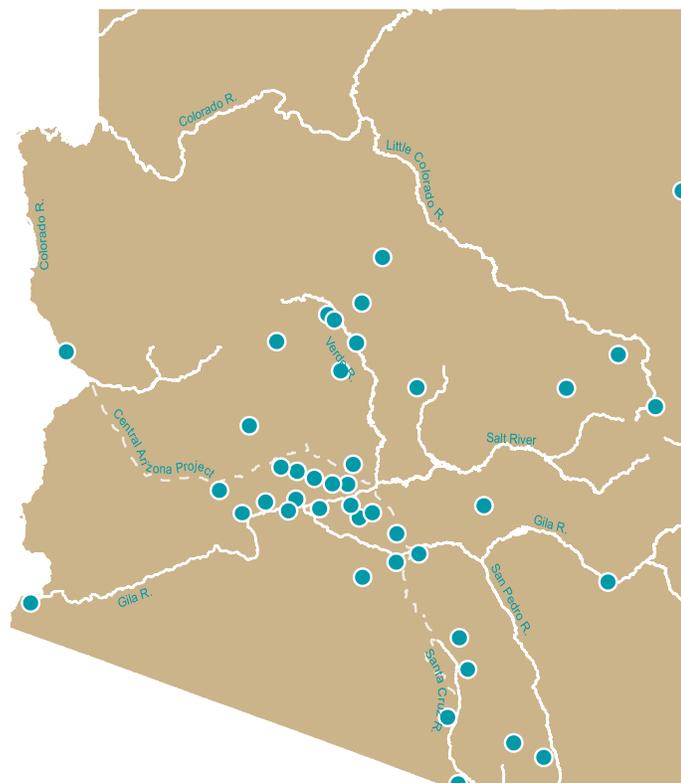
WRRC Director Sharon B. Megdal, Ph.D., continued in her multiple roles at the University of Arizona (UA), including the C.W. and Modene Neely Endowed Professor for Excellence in Agriculture and Life Sciences and Professor in the UA Department of Soil, Water and Environmental Sciences. She continues to teach the graduate Arizona Water Policy class each spring semester and to advise students. She serves on the Executive Committee for the UA interdisciplinary Ph.D. Program in Arid Lands Resource Sciences and remains heavily involved in the Water, Society and Policy M.S. program. Her other appointments include the UA School of Government and Public Policy, the School of Geography and Development, the College of Architecture, Planning and Landscape Architecture, the Mel and Enid Zuckerman College of Public Health, the James E. Rogers College of Law, and the Arizona Center for Judaic Studies.

She also directs the Water Sustainability Program (WSP) and is co-director of its umbrella program, the Water, Environmental, and Energy Solutions (WEES) Initiative.

In addition to being involved in several of the projects mentioned in this report, often as lead principal investigator, she was involved in several additional efforts. These include collaborative research on sustainable agricultural water use and food security policy, which resulted in a book chapter and a comparison of strategies for improving water management in the Jordan and Colorado River Basins, published in the *Journal of Arid Environments*. She spoke about the Colorado River as an invited keynote speaker at a conference on rehabilitating the Lower Jordan River and served as lead guest editor for the special issue of *Water* on Managed Aquifer Recharge,

to which she contributed a paper on Arizona Water Banking. She also presented a paper on stakeholder engagement and improving water resource governance and management at the Organisation for Economic Co-operation and Development (OECD) in Paris.

Location of WRRC Engagement Activities in 2014



As of October 1, 2014, she assumed the role of President of the National Institutes of Water Resources (NIWR), the organization of water institutes funded through the Water Resources Research Act. As President-Elect, she was responsible for the program for the NIWR annual meeting, which was held in Washington, DC in February 2014. She also serves on the board of the Universities Council on Water Resources. Her term on Board of Directors for the Western Regional Development Center, which is funded by the USDA and housed at Utah State University, began in January 2014. After completing a six-year term on the elected board of the Central Arizona Project, she was elected to a second six-year term.

In addition she maintains a busy schedule of public speaking, interviews and lectures. Her many publications and presentations are listed in Appendix B.

External Advisory Committee

The WRRC's External Advisory Committee (EAC), made up of leaders from the Arizona water community, provides valuable advice on programs and initiatives that advance the WRRC mission and goals. The EAC meets annually, and the 2014 meeting was held on December 5 and hosted by the Salt River Project in Tempe, Arizona. Members of the EAC are listed below with their affiliations as of December 2014.

Carpenter, Guy, Carollo Engineers

Chandler, Randy, U.S. Bureau of Reclamation

Cross, Mark, Montgomery & Associates

Darwin, Henry, Arizona Department of Environmental Quality

Ferris, Kathleen, Arizona Municipal Water Users Association

Forrest, Alan, Tucson Water

Garfield, William, Arizona Water Company

Groseta, Andy, Groseta Ranches

Gysel, Joe, EPCOR Water USA, Inc.

Hauter, Jason, Akin Gump Strauss Hauter & Feld LLP and Attorney, Gila River Indian Community

Hill, Trevor, Global Water Resources

Lacey, Mike, Arizona Department of Water Resources

Leenhouts, James, U.S. Geological Survey, Arizona Water Science Center

Lotts, Bob, Arizona Public Service

McAllister, Francis, Freeport-McMoRan

McMullen, Patrick, Inter Tribal Council of Arizona, Inc.

Modeer, David, Central Arizona Project

Morrison, Richard, Morrison Institute of Public Policy, ASU

Neal, Cliff, City of Phoenix

Olsen, Joe, Metro Water

Porter, Sarah, Audubon Arizona

Richter, Holly, The Nature Conservancy

Roberts, Dave, Salt River Project

Shepard, John, Sonoran Institute

Sigg, Joe, Arizona Farm Bureau Federation

Snider, David, Retired (Pinal County Board of Supervisors)

Udall, Chris, Agri-Business & Water Council of Arizona

Walden, Nan, Farmers Investment Co. (FICO)

Wilson, Sid, Retired (Central Arizona Project)

Wong, Brian, BKW Farms

Research Programs that Engage and Inform Federal Funding through the Water Resources Research Act

<http://wrrc.arizona.edu/wrra-104-grants>

For 50 years the WRRC has been the water resources research institute for Arizona federally authorized under the Water Resources Research Act (WRRRA). WRRRA section 104b funding supports a small competitive grants program, which is open to researchers at all three state universities, and a portion of the WRRC's outreach activities and programs. In recent years, the grant for the base 104b program has been \$92,335 annually, from which three or four research grants averaging \$10,000 have been awarded.

In 2013, the water institutes across the country received only \$55,525. The total amount of funding committed to the four projects selected for 2013-14 used more than half of that amount and the WRRC absorbed the shortfall. Because of uncertainty associated with the FY2015 federal budget process, the WRRC took the conservative path and cancelled the call for research proposals for the 2014-15 project year, which runs March 1, 2014 through February 28, 2015. Instead, the 104b funding supported two in-house research projects and the Information Transfer program. Director Sharon B. Megdal led one project (along with Andrea Gerlak and Robert Varady of the Udall Center for Studies in Public Policy) and Associate Director Jean McLain led the second: *Improving Integrated Surface Water and Groundwater Management in the United States: Case studies of innovative groundwater governance approaches; and Development of Antibiotic Resistance during Wastewater Treatment*. These research projects employed three UA students, two Master's students in the Water, Society and Policy program and an undergraduate pre-med student. The project on groundwater governance produced a paper published in the journal *Groundwater*.

A call for proposals was issued as usual in the Fall of 2014 for small research grants for 2015-2016 cycle. The Technical Review Committee evaluated the proposals in December and three were selected for funding: *Water Sources Over Time for a Semi-Arid River: Implications for water resources and groundwater modeling; Impact of Upgraded Wastewater Reclamation Facilities on Chemicals of Emerging Concern in the Effluent-Dependent Lower Santa Cruz River; and Characterization of Uranium and Arsenic in Unregulated Water Sources on the Navajo and Hopi Reservations*.

The WRRRA also funds a nationally competitive grants program, the 104g program. Funded projects in Arizona are administered by the WRRC, which processes proposals from Arizona. No Arizona projects were funded in 2014.

A three-year evaluation of the 54 water resources research institutes covering the period 2008-2010 was carried out by the U.S. Geological Survey based on reports prepared by each water institute. The WRRC was one of only eight institutes to receive an evaluation of Outstanding, the highest rating awarded.

Water Quality Research Lab

WRRC Associate Director Jean McLain and her students investigate the impacts of recycled wastewater on public health and environmental sustainability at the Water Quality Research Lab. This lab hosts five students from the Department of Soil, Water and Environmental Science, in addition to training students from other departments within the College of Agriculture and Life Sciences (Agricultural and Biosystems Engineering, School of Natural Resources and the Environment) and other Colleges within the University (College of Science, School of Public Health). The students, all conducting research related to recycled water irrigation, food safety, and biological impacts of emerging contaminants, had a stellar year, presenting multiple award-winning talks and posters at national and regional meetings. In August 2014, a \$50,000 award from the USDA-Agriculture and Food Research Initiative supported a workshop attended by international experts in antibiotic resistance, "Antibiotics in Agroecosystems: State of the Science," which was held at the UA Biosphere2 Conference Center. This workshop led to a series of five review papers proposing standardized guidelines for laboratory analysis of soil and water samples for assessment of antibiotic resistance. A special issue of the *Journal of Environmental Quality* is planned to publish these papers. As a result of this workshop, McLain received substantial media attention, including an in-depth article in the June 2014 issue of *Crops, Soils, and Agronomy* news and several radio interviews. The National



Jean E. McLain, WRRC Associate Director and Associate Research Scientist in the Department of Soil, Water and Environmental Science (SWES), runs an active laboratory research program examining the microbiology of water and irrigated soils. Since coming to the WRRC, McLain has built a strong program mentoring undergraduate and graduate students in microbiological sciences. In addition, she collaborated on a successful \$1.9 million dollar proposal to the US-Agency for International Development, Developing a Sustainable Seafood Industry Infrastructure in Myanmar, for which she will travel to Burma three times during 2015-2017 to aid research faculty at Yangon University in their development of a seafood safety laboratory.

McLain has also been very active in representing the WRRC at local and national meetings, presenting invited talks statewide (University of Arizona, Pima Association of Governments) and nationally (Onsite Wastewater Association National Meeting, WaterReuse Research Foundation). She also represents the WRRC on professional committees, including the Citizens' Water Advisory Committee (Tucson), the City Manager's Expert Panel on Emerging Contaminants (Flagstaff), and the State of Arizona Steering Committee on Potable Reuse. In 2014, she was appointed to the guiding board of a new project funded by the European Cooperation in the Field of Scientific and Technical Research, New and Emerging Challenges and Opportunities in Wastewater Reuse. In addition, she was named to the Technical Advisory Panel for the WaterReuse Research Foundation project, "Establishing Pathogen Log Reduction Credits for Wastewater Treatment Plants." Jean serves on the editorial boards of two peer-reviewed journals, and her service to Agronomy Journal was noted by an Outstanding Associate Editor Award in November 2014.



Rachael Willis joined Dr. Jean McLain's Water Quality Research Laboratory as a Research Assistant in July 2014. Much of her work focuses on an NSF-funded antibiotic resistance project, on which researchers from the University of Arizona and Virginia Tech University compare antibiotic resistance levels of bacteria in drinking water and recycled water systems in different areas around the United States. She is also involved in a project funded by the Arizona Department of Agriculture, examining the effectiveness of quaternary ammonium compounds for sterilization of harvesting tools used in the produce industry. Rachael is also cross-trained on the projects of McLain lab graduate students, assisting on all research projects as needed.

Science Foundation, the Water Environment Research Foundation, and the Arizona Department of Agriculture also funded Water Quality Research Lab work in 2014.

Water RAPIDS Program

<https://wrrc.arizona.edu/waterrapids>

The WRRC's Water Research and Planning Innovations for Dryland Systems (Water RAPIDS) team focuses on new approaches to water resource management that integrate traditional planning for natural resources with land use planning. Working across regional, state, watershed, and local scales, the team helps communities balance a secure water future for residential, commercial, industrial, and agricultural sectors with the water demands of ecosystems.



Water RAPIDS
Water Research And Planning
Innovations for Dryland Systems

In 2014, the Water RAPIDS program included four projects:

1) Conserve2Enhance (C2E)TM

www.conserve2enhance.org

Conserve2Enhance (C2E), a trademarked program of the WRRC, connects voluntary water conservation to community action by linking participant donations, based on water savings, to funding for local environmental enhancement projects. C2E has been helping make conservation count since 2010 when a pilot program was launched in Tucson, Arizona. The C2E team works with various communities and organizations to establish C2E, and has developed programs with the Tucson community, Arizona Audubon, and Raise the River. Three additional C2E programs are expected to go live early in 2015. More than 15 business participants joined the Tucson C2E



Kelly Mott Lacroix is a Research Analyst and is involved in all aspects of the Water RAPIDS program. In 2014 she was the principal investigator on the Sustainable Clarkdale project that convened experts from Arizona and beyond to build recommendations for the Town of Clarkdale's water resources management program. She also led the engagement process for building scenarios for the future of the Upper Gila Watershed and helped bring together ideas and advice from hundreds of stakeholders across Arizona to build the Roadmap for Considering Water for Arizona's Natural Areas. In the Fall of 2014 she received funding to expand the WRRC's database of environmental flow needs in Arizona to the deserts of the U.S. and Mexico from the Desert Landscape Conservation Cooperative and to continue the WRRC's support of watershed planning efforts in the Upper Gila through support from the U.S. Bureau of Reclamation.

In December 2014 she successfully defended her Ph.D. in Arid Lands Resource Sciences. She is a board member of the Cienega Watershed Partnership and Vice President of the Arizona Riparian Council.



Brittany Xiu is the Outreach Coordinator for WRRC's Water RAPIDS team. Xiu divides her time primarily between the Conserve2Enhance (C2E) water conservation program and Connecting Environmental Water Needs to Arizona Water Planning (EnWaP) project. Working with the Water RAPIDS team, Xiu helped launch the C2E Water Use Dashboard and C2E Program Development Toolkit, as well as present the C2E program and Dashboard to prospective partners and increase the number of C2E programs and participants throughout the Southwest. Xiu also collaborated with Kelly Mott Lacroix to complete the EnWaP Roadmap. Throughout the year they hosted focus group interviews and workshops with Arizona stakeholders to inform the final Roadmap document for considering water for natural areas in Arizona water management and planning decisions



Candice Rupprecht left the WRRC in October after more than six years of valuable contributions to several programs. In 2014, she was a member of the Water RAPIDS team with Kelly Mott Lacroix and Brittany Xiu, focusing primarily on the C2E program. She managed the Tucson C2E program, conducted outreach to communities throughout the Colorado River Basin, and led the development of the C2E Water Use Dashboard — C2E's new online tracking and donation tool. She also worked with Mott Lacroix on developing the Water Resources Management Program for the Town of Clarkdale.

program, achieving an estimated two million gallons of water savings in 2014. In total, C2E participants conserved over 5.7 million gallons of water and invested nearly \$40,000 in community-identified project sites that enhance local washes, reduce flooding, and increase wildlife habitat.

The C2E Water Use Dashboard™ was formally launched in May 2014 with the support of a grant from the Walton Family Foundation. This tool is free to participants and interested communities. Participating homes and businesses can create accounts on the new C2E Water Use Dashboard™ to track their water use, learn conservation tips, and donate to a local C2E program. The Dashboard includes administrative features, such as C2E program web pages, a PayPal donation portal, and participant messaging, as well as participant functions, such as graphical water use reports, donation summaries, and customized conservation tips. As of December 2014, three program pages and 148 participant accounts were created. Dashboard promotion throughout 2014 included four webinars and 10 in-person presentations to more than 100 prospective partners.

To spur new program development, the WRRC released a C2E Program Development Toolkit in August 2014. This electronic resource contains all the materials that a community or group needs to initiate, implement, manage, and market a new C2E program. The Toolkit is available electronically and has been distributed to 14 communities throughout Arizona, Colorado, and California.

2) Connecting the Environment to Arizona Water Planning (EnWaP)

The Connecting Environmental Water Needs to Arizona Water Planning (EnWaP) project was funded by the Nina Mason Pulliam Charitable Trust. The EnWaP project works to build collaborations with individuals and groups at the local, regional, and state levels to explore what it means to include consideration of the environment when undertaking water management and planning. EnWaP has three components:

1. Provide information on environmental water demands
2. Provide technical support to communities for their water management and planning
3. Create a stakeholder-driven “Roadmap” for considering natural areas in Arizona water planning and management

During the past three years, the project engaged more than 1,000 unique individuals who volunteered over 1,900 hours of their time to learn, explore, and develop ideas for how to consider water for natural areas in Arizona. In late 2013 and early 2014, 43 focus groups were held, with more than 225 participants across all water using interests and counties in Arizona. These meetings were designed to elicit the perspectives of different water interest groups on how water for the natural areas should be considered in management and planning decisions. Based on what was learned in these focus groups, the WRRC convened four regional workshops to discuss action items. These action items, as well as other insights from the project, are recorded in the WRRC’s Roadmap for Considering Water for Natural Areas in Arizona, a publication released in November 2014.

In addition to encouraging dialogue on water for the environment, the project succeeded in efforts to better identify water needs of the environment. The Environmental Water Demands Database, initially released in July 2013, was updated to include studies through July 2014 and has been downloaded from the WRRC web page more than 50 times. The WRRC recently received a 15-month grant from the Desert Landscape Conservation Cooperative (LCC) to work with federal land and water managers to expand the database to the entire Desert LCC region (deserts of U.S. and Mexico).

3) Watershed Planning in the Upper Gila Watershed

The Watershed Planning in the Upper Gila Watershed project is a partnership between the WRRC, the Gila Watershed Partnership (GWP) and Arizona Cooperative Extension. In 2012-2014, work in the watershed was funded by a grant from the Bureau of Reclamation WaterSMART program to complete an evaluation of current watershed conditions and develop future scenarios based on stakeholder input. The first grant through WaterSMART ended on September 1, 2014. An additional two years of funding for water planning in the watershed was secured from the Bureau of Reclamation through a Desert Ecosystem Cooperative Studies Unit agreement. This grant began on October 1, 2014 and will be used by the WRRC and our partners to build upon the previously developed scenarios, help residents in the watershed better understand their water resources, and develop a decision support system for watershed management.

In 2014, work built upon the previously completed baseline assessment of watershed resources to develop scenarios that explore possible futures for the watershed. The scenario planning process was designed to help the community plan for coming years by creating narratives describing an array of possible quantitative and qualitative changes to the watershed. The project team conducted interviews and meetings with stakeholders to determine what drives change in the watershed and to form the framework for the narratives. In March 2014, the project team facilitated a day-long scenario-planning workshop that brought together residents from across the Upper Gila Watershed to discuss and determine critical changes and uncertainties within their area. Using the input from this workshop, individual interviews, and reviews from the monthly GWP Steering Committee Meetings as well as peer-reviewed journal articles, the team developed a scenario-planning document that described the major drivers in the watershed and included four theme-based narratives. In October, the Scenarios for the Upper Gila Watershed was presented at the GWP Monthly Meeting; the document has also been posted online for general access.

To ensure that lessons learned through this project are shared beyond the boundaries of the Upper Gila Watershed, a summary document, *Using Watershed Assessments to Inform Planning for Rural Watersheds*, was issued as a University of Arizona Cooperative Extension publication in July 2014. This guide outlines the approach that was used to create the Atlas of the Upper Gila Watershed in the first phase of the Assessment and provides tips and techniques for other watersheds to initiate watershed-based planning efforts. A companion guide, *Using Scenario Planning to Prepare for Uncertainty in Rural Watersheds*, describing the process for scenario planning was also submitted to University of Arizona Cooperative Extension for publication.

4) Town of Clarkdale Water Resources Management Program

The WRRRC worked since January 2013 to assist in the development of a Water Resources Management Program (WRMP) for the Town of Clarkdale. In 2014, the WRRRC conducted extensive research on best practices in municipal water management and planning and hosted two workshops to help Clarkdale create a WRMP. The first workshop, held in February 2014, brought together more than 20 experts from across Arizona to review the Town's water management issues and potential elements of a WRMP. A second workshop, the Small Town Water Forum, held in June 2014, brought together mayors and utility directors from small towns across Arizona to share their experiences on water management and inform the information-gathering and decision-making process by the Town of Clarkdale. Additional water experts with experience in small town water management and/or other water issues relevant to Clarkdale were interviewed by telephone, and this input further strengthened the WRRRC's recommendations for the Town of Clarkdale's WRMP. The final recommendations report was presented to the town council on November 18, 2014.

Groundwater, Climate and Stakeholder Engagement (GCASE)

<http://wrrc.arizona.edu/GCASE>

The NOAA grant titled, *Incorporating Climate Information and Stakeholder Engagement in Groundwater Resources Planning and Management*, called GCASE for Groundwater, Climate And Stakeholder Engagement, continued into 2014, when it focused on evaluating the transferability of the project methodology. The project links climate with streamflow and groundwater through a modeling framework enhanced with information from regionally focused climate change projections. Workshops exploring the transferability of the project methodology were held April 22-23 and 29-30, 2014 in Prescott, Phoenix, Sierra Vista and Tucson. Results indicate that the methodology shows great promise in answering a range of water resources questions in multiple locations. Workshop presentations were posted on the WRRRC's project web pages. An additional workshop held November 13 in Rio Rico extended the transferability research south of the border into Mexico. This workshop was presented in cooperation with the International Boundary and Water Commission; invitations to Mexican participants were sent by the Mexican Section of the Commission (CILA).

Desert Water Harvesting Initiative (DWHI)

<http://wrrc.arizona.edu/DWHI>

The Desert Water Harvesting Initiative (DWHI) is an umbrella program established to enhance outreach and communication between utilities, practitioners of water harvesting, academics, and interested citizens. The



Susanna Eden, Ph.D., the WRRRC's Assistant Director, participates in multiple research and outreach activities and manages the federal WRRRA section 104 program. In 2014, she was responsible for stakeholder engagement in the GCASE project and oversaw completion of work on the Water Harvesting Assessment Toolbox, the product of work for a project funded by the Desert Landscape Conservation Cooperative through the U.S. Bureau of Reclamation WaterSmart program. Part of the Desert Water Harvesting Initiative, the toolbox provides decision support for communities considering water harvesting as an integrated strategy to achieve multiple water resource, stormwater, and other benefits. She compiled the WRRRC's 2013 Annual Report and the Evaluation Report for the U.S. Geological Survey's 3-year evaluation of the WRRRC. She is a member of the team developing the "Beyond the Mirage"

project, which is implementing an innovative concept for providing accurate and objective information on water issues to the layperson in hundreds of short video clips that can be sequenced by the viewer. Along with other team members, Kerry Schwartz and Brittany Xui, she is overseeing content development and vetting. She was responsible for the Montgomery & Associates Summer Writing Internship at the WRRRC and oversaw development of the annual Arroyo publication. She bears primary responsibility for the Arroyo and Arizona Water Resource (AWR) newsletters, for which she writes and edits. In addition, she contributed to planning and implementation of the annual conference and other sponsored and co-sponsored events, responded to inquiries on water related subjects from the public, and made presentations on research results and other water resources topics. She also serves on the UA Appointed Professionals Advisory Council and its policy committee.

initiative has many components. It includes an online data clearinghouse for research, activities, and publications on water harvesting, low-impact development, and green infrastructure. The Rainwater-Stormwater Professionals Networks (RSPN), with 132 members by December 2014, met semi-annually at the WRRC and kept members abreast of current and planned activities, resources, and data, through invited speakers and roundtable discussion. The final product of a 2-year grant from the Desert Landscape Conservation Cooperative through the U.S. Bureau of Reclamation Water SMART Program was completed in the spring of 2014. The product, a Water Harvesting Assessment Toolbox, was posted on the WRRC's website on the Desert Water Harvesting Initiative pages. News releases were sent to media outlets and individual emails were sent to sustainability and water resources officers in communities across Arizona. An article describing water harvesting as a means to achieving multiple integrated benefits and the use of the Toolbox was accepted by *Water Efficiency* and *Stormwater*. The Toolbox received a test implementation at the Town of Clarkdale in October and discussions are on-going for additional community implementations.



Water Education for 21st Century Learners

Arizona Project WET

arizonawet.arizona.edu/

Arizona Project WET (APW) programs contribute to water stewardship and STEM (Science, Technology, Engineering and Math) literacy through professional development for teachers that focuses on 21st century skills and direct student outreach that delivers or extends classroom learning and community engagement. Multiple programs affecting different locations and constituencies are managed under the APW umbrella.



The APW website celebrates a community of supporters and clearly articulates the goals and objectives of APW programs to attract new sponsors and partners in 2014. The Pulliam Foundation invested in APW's Water Investigations Program (WIP) with over \$100,000. The Arizona Water Festival program attracted \$45,000 from seven different sponsors to expand festivals. Tucson Water funding increased three-fold to over \$200,000 per year in support of a broad-based teacher, student, and community education program. In addition, a request was made to the Salt River Project to expand APW funding to support the development of a new STEM Academy focused on SRP's water management and distribution system.

The enhanced and revitalized website also benefited Arizona Project WET by increasing recognition for the program. The Water Investigations Program was accepted to the Change the Equation, STEMworks Database (<http://changetheequation.org/stemworks>) as a promising STEM program. The Arizona Water Festival program will be submitted to the rigorous acceptance process of the STEMworks database early in 2015.

Through the sponsorship of the Pulliam Foundation and continued partnership with The Nature Conservancy, the Water Investigations Program assisted students to develop and refine their environmental perspectives throughout a year of inquiry about water resources and supply, water use, and water in natural systems. In 2014, partnering with the City of Phoenix Parks and Recreation Department, APW received funding from the National Fish and Wildlife Foundation to establish monarch butterfly habitat, which will be created with the assistance of the 2000 WIP students already scheduled to conduct their field investigations at the Rio Salado Habitat Restoration Site.

The importance of APW programs has never been clearer, as issues of water supply and forest health top the list of Arizona decision-makers concerns. APW programs provide the foundational knowledge needed for citizens to build conceptual understanding of today's biggest societal challenges. Understanding themselves as watershed managers, students explore land use changes as a key to forest health and water quality and quantity. Groundwater



Kerry Schwartz is an Associate Specialist with Arizona Cooperative Extension at UA and Director of the APW water education program. She is responsible for programs that teach science and STEM literacy and 21st Century learning skills to teachers, educators, K-12 students, and community members. She works statewide, supervising 20 personnel located in three extension offices. Her geology and geohydrology education and experience enable her to deepen teachers' content knowledge about water resources through applied learning with real world examples and relevancy. During her tenure at the UA, she has raised over 3 million dollars to support APW programming and has sustained partnerships with corporations, foundations, and governmental agencies. She and the APW team work to develop and evaluate STEM focused education programs and teacher professional development that incorporate real world science and engineering practices and foster critical and creative thinking. Under her leadership APW received an Award of Merit in the Environmental Education/Communication category in 2014 at Arizona Forward's 34th Annual Environmental Excellence. In the area of National outreach in 2014, she moderated and presented in the STEM Careers – Feeding the STEM Pipeline Session and facilitated a K-12 teacher workshop at the American Institute of Professional Geologists Annual Conference, won a National competition to host an Americorps Team to work with middle and high school students on Monarch Butterfly Habitat at Rio Salado Habitat Restoration Preserve in Phoenix, was Co-Project Director on a new USDA/NIFA proposal team, and continued as a National Advisor and Invited Conference Attendee on the USDA/NIFA funded project ThinkWater.



Betsy Wilkening is the education coordinator for the Tucson Program. In 2014 she developed a curriculum unit based upon the engineering design of a rain barrel system. Project WET lessons lead students through developing the criteria and constraints of the system. An interactive Excel model assists the students in determining the optimum design. A mini-grant from the National Girls Collaborative Project resulted in the testing of the curriculum and installation of systems at two local middle schools.

is also a focal point of APW programs. APW instruction uses models, inquiry, and exploration at multiple grade levels to ensure that groundwater is understood as part of the water cycle and water supply.

By the end of the 2014-2015 school year, APW will have brought the Arizona Water Festival program to 40 percent more schools than the previous year. Combined with new teachers in already participating school districts, this translates to more than 250 new teachers trained in STEM. The purpose of the AWF program is to instill a deeper understanding of water in the Earth system and Arizona's water resources through a community water festival event, teacher professional development workshop, and extensive volunteer and community involvement. At the end of this year, approximately 9,000 4th graders will join the over 73,000 students who are now 5th, 6th, 7th graders and beyond who participated in APW water festivals.

Tucson programming is growing to meet new needs at the middle and high school levels. Our Tucson STEM Academy is not only effective at disciplinary integration around relevant and real world topics, but with the involvement of City of Tucson professionals, it showcases the wealth of careers involved in today's water distribution systems. Teachers show knowledge gains on content knowledge and engineering across the board and large increases in computer skills (using seven different applications the average knowledge gain was 57 percent). APW is helping teachers evolve their instructional practices through professional development opportunities like this statewide.

APW received an Award of Merit in The Environmental Education Category at the Arizona Forward 34th Annual Environmental Excellence Award event. This award reflects the value of APW efforts to assist in moving STEM education offerings from robotics and dam building alone to a more robust understanding of what it means to engineer solutions for our ever-changing natural and built environments. APW programs challenge students to apply scientific knowledge, mathematics, technology, and ingenuity to develop solutions for the betterment of society.



Mary Ann Stoll is an Education and Technology Coordinator with Arizona Cooperative Extension at the University of Arizona, working with the APW water education program. Stoll develops and delivers curriculum and professional development in STEM literacy, 21st Century learning, and best instructional practices for teachers and educators. She also designs, develops, and maintains APW's website, which provides an online connection to the community and ready resources for participants in APW programs. Her knowledge and extensive experience in engineering and education technology contribute to her insight into the challenges that teachers face and development of effective solutions to those challenges. Continued work with youth through the Phoenix Girls Chorus and FIRST Robotics help to maintain connections with today's youth.



Holly Thomas-Hilburn is Coordinator of Applied Programs for the WIP. She has been involved with WIP assessment and evaluation since its 2010-11 school-year pilot and is responsible for supervision of the community coordinators, curriculum development, teacher professional development, and program assessment. She holds a Master's degree in Teaching and Teacher Education with an emphasis in environmental learning. In 2014, Holly co-wrote a National Fish and Wildlife Foundation grant to expand a butterfly habitat at the Rio Salado Habitat Restoration site by involving students as volunteers in the restoration work during their WIP field days. The grant is an expansion of APW's partnership with the City of Phoenix Parks and Recreation Department. Work will be completed in spring of 2015.



Jessica Ahlstrom joined Arizona Project WET (APW) in November 2013 as an AmeriCorps volunteer working as a water educator for APW's Tucson Education Program, where she educated Tucson students about water stewardship and the water resources here in the desert southwest. After serving as an AmeriCorps volunteer, she became an Instructional Specialist for APW's Tucson Education Program where she continues educating students, works on program development, and co-facilitates teacher professional development workshops.



Chuck Dugan joined Arizona Project WET in March 2014. Working and training with other WET educators in student, teacher, and public programs in Phoenix, Tucson, Casa Grande, Globe, and Florence over the last year has allowed him to learn quickly and fit into his new position as the Pinal County Water Programs Coordinator. In 2014, he led or assisted with four Pinal County Water Festival programs, reaching nearly 2,000 fourth grade students, 74 teachers, and more than 120 local volunteers. As part of his Abbott Nutrition funded duties, Chuck works to promote a community water conservation ethic. Through targeted programs for businesses, schools, and restaurants, he works with various partners to monitor and install water saving fixtures.



Tara Oakes began as a Community Coordinator with the WIP in January 2013 and facilitated programming with 27 schools during the 2013-14 school year and 32 schools for the 2014-15 school year across Maricopa County. During the school year, she works directly with the teachers to facilitate a year-long water program with four units of curriculum. Throughout the school year she also works directly with the students delivering classroom presentations on groundwater, water conservation, coordinates the school water audits (of sinks or outdoor sprinkler systems), and coordinates the spring field investigations to a riparian area.



Pam Justice joined Arizona Project WET in 2003. She is based at the Maricopa County Cooperative Extension office where she coordinates educational and outreach programs that improve the understanding of both youth and adults regarding water issues. She has managed all aspects of multi-year contracts with the City of Phoenix to deliver water conservation targeted to all formal and informal educators in the City's water service area. One of her areas of responsibility is planning, preparing, and facilitating events from one-day workshops to multi-day academies for hundreds of educators annually. In addition, Justice travels to the classroom to deliver the Water Scene Investigation program to hundreds of students. This year she led or assisted in the delivery of several Arizona Project WET Water Festivals impacting over 3,000 students.



Julie Hasty began as a Community Coordinator half-time with the WIP in September 2014, having come to the program initially as a volunteer starting in 2013. She has a Bachelor of Science degree in biology and has completed courses for a secondary teaching licensure. As a Community Coordinator she supported the WIP teachers within 13 of the 32 participating schools in the 2014-15 school year, with approximately 950 students. She made groundwater and water conservation presentations within each classroom and conducted water audits with each school to install high efficiency faucet aerators that conserve water and money



Sean Sederstrom joined Arizona Project WET in January 2015 as the Arizona Water Festivals (AWF) program coordinator. Since joining the Project WET team, Sean has worked to coordinate five festivals throughout Arizona and is set to facilitate 16 in the 2015-2016 school year. As the AWF coordinator, Sean's primary job functions consist of delivering professional development workshops for public school teachers, recruiting and training volunteers, organizing festivals for up to 1,000 students at a time, and developing sponsorship for program funding.

Campus-wide Activities for Water Sustainability

Water Sustainability (WSP) and Related Technology and Research Initiative Fund (TRIF) Programs

wsp.arizona.edu and wees.arizona.edu

The Water Sustainability Program (WSP) is a funding program at UA that is intended to stimulate innovative research relevant to solving Arizona's water issues. It is part of a larger collaborative involving the Institute of the Environment and the Renewable Energy Network under the Water, Environmental and Energy Solutions (WEES) initiative funded through TRIF, which is administered by the Arizona Board of Regents. WEES is focused on enhancing interdisciplinary research relevant to the state and other arid regions across the water-environment-energy nexus. The Water Resources Research Center is an integral part of WSP and WEES, serving as the management hub for WSP programs and activities and co-management of WEES.

WSP invests significant funding for water sustainability initiatives related to state interests: semi-conductor manufacturing, environmentally sustainable mining, water management and policy, technologies for water treatment and reuse, and ecohydrological research at Biosphere2. The expertise and leadership in water treatment and reuse at UA led to the establishment of the WSP-supported Water and Energy Sustainable Technology (WEST) facility currently under construction on the new Pima County Water Reclamation Campus, due to open in the fall of 2015. WSP also provides support for the Arizona Laboratory for Emerging Contaminants (ALEC), a state-of-the-art facility capable of detecting trace levels of organic and inorganic contaminants, essential for research in the water quality area.

WSP continued the Water Sustainability Distinguished Speaker Series in 2014 as part of the program's education and outreach mission to reach campus and community members on important water issues. During the spring 2014 semester, WSP brought in Stanley Pollack, Assistant Attorney General, Water Rights Unit, Navajo Nation Department of Justice; Aaron Wolf, notable international water resources policy and conflict resolution expert from Oregon State University; and Alice Aureli, Chief of Groundwater Resources and Aquifer Systems Section, UNESCO International Hydrological Programme (IHP) Water Sciences Division.

WSP also helped to sponsor special sessions with international guests to encourage interaction with students, faculty and local water leaders. Menny Hesse, Minister for Agriculture and Science Affairs at the Embassy of Israel in Washington, DC, and Mike Young, Research Chair in Water and Environmental Policy at the University of Adelaide, came to UA in the spring of 2014. These exchanges help to build UA's water reputation on the international stage.

WSP continues to support outstanding UA graduate students studying water resources through year-long Fellowships and other mechanisms for graduate student support with the objective of enhancing research opportunities and workforce development. K-12 water education continues to be supported by WSP through Arizona Project WET activities in Maricopa County.

WEES funds are used to support interdisciplinary and cross-sector research concerning scientific, technological, and policy-related solutions to Arizona's water, environmental, and energy issues. Joint funding initiatives in FY2014 included seed funding for research projects, support for major proposal development, new faculty hires, cost-sharing on major grants, and funding for events and workshops. Two new initiatives have been established, the Environment: Exposure Science and Risk Assessment Center (ESRAC) based in the College of Public Health and the Environmental Genomics Institute (EGI) in the College of Science. All of these efforts are intended to lead to return on investment to UA, particularly major research grants.

WSP and WEES continue to support new technology development through Tech Launch Arizona (TLA). This area of investment involves working with TLA to help identify and fund proof of concept projects for promising water-environment-energy related technologies leading to commercialization.

Multiple Methods for Achieving Effective Outreach

The WRRC engages with the university and non-university communities in many ways through its Information Transfer program.

Newsletters

Subscribe to WRRC's newsletters at <https://wrrc.arizona.edu/subscribe>.

Weekly Wave

<https://wrrc.arizona.edu/weekly-wave>

The newly launched Weekly Wave e-news digest included 34 editions of the Weekly Wave and seven editions of the bi-monthly Summer Wave released in 2014. Each edition included updated WRRC and water community events, news, media appearances, announcements, and social media interaction opportunities. Interest in the Weekly Wave grew steadily throughout the year; distribution lists grew by nearly 300 recipients (through October), resulting in increased website traffic, event attendance, and dissemination of WRRC news through other outlets.



Arizona Water Resource

<http://wrrc.arizona.edu/publications/awr>

In 2014 the WRRC's quarterly newsletter, *Arizona Water Resource* (AWR) was released in January, April, July, and October with its new look, 4-color throughout. AWR presents feature articles, news briefs, announcements, notices of new information resources, and Guest Views, along with a regular column on water policy by WRRC Director Megdal. The Winter 2014 issue contained an insert from the USGS, *The Desert*



Jackie Moxley, Program Director for WEES and WSP, is responsible for overall management including program development, delivery and reporting, as well as outreach activities and WEES/WSP-sponsored events. She organizes the WSP Distinguished Speaker Series that brought three renowned professionals in water resource management to the UA in Spring semester 2014. She also supports WRRRC activities, including the Desert Water Harvesting Initiative (DWHI). She was a Co-PI on a U.S. Bureau of Reclamation grant project to develop water harvesting assessment tools for decision makers, completed in Spring 2014. Products from the project are available on the DWHI web pages and publications on this work are in press. She organizes the semi-annual meetings of the Rainwater-Stormwater Professionals Network (RSPN), which bring in special speakers to address the RSPN on topics related to rainwater and stormwater harvesting. Her other activities include serving on the WRRRC conference planning committee and contributing to the planning and organization of Brown Bag seminars and other events. She received a mini UA Green Fund grant in December to hire a graduate student to assemble a database of water harvesting projects on campus during spring semester 2015. Ongoing projects include development of a UA Water Network to centralize information and links to water research and activities spanning numerous colleges, departments, centers and labs; and a project to move content on desert landscaping from WRRRC's earlier CD ROM to free web access.

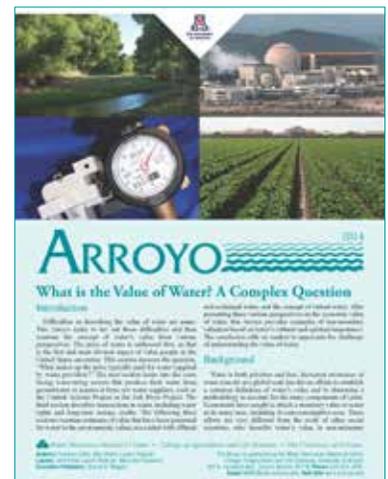
Laboratory Repeat Photography Collection—An Invaluable Archive Documenting Landscape Change. The Spring issue featured an insert on the WRRRC's history for its 50th Anniversary. Several feature articles were contributed by graduate students, including "Arizona Irrigation District Tries Land Fallowing Water Transfer" and "Arizona Researchers Address Water Quality, Reuse and Management". Immediately after the WRRRC's Annual Conference, *Closing the Gap between Water Supply and Demand*, the AWR contained articles on the conference and the following issue contained a feature article that summarized in their own words the remarks of Conference panelists addressing "Closing the Gap: How can we do it?" Guest Views were provided by Jeff Tannler, Active Management Area Director, ADWR, and Chris Udall, Executive Director, Agribusiness & Water Council of Arizona, along with an interview with Raanan Adin, CEO, Adin Holding Ltd. The AWR also provided an opportunity to shine a spotlight on several of the students who work at the WRRRC.



Arroyo

<http://wrrc.arizona.edu/publications/arroyo>

The *Arroyo* is WRRRC's annual newsletter on a single topic of timely interest to Arizona. The 2014 *Arroyo*, "What is the Value of Water? A Complex Question", was published in July. Publication was delayed because multiple reviews were requested to ensure accuracy. Reviews were provided by Kathleen Ferris, Arizona Municipal Water Users Association; Patrick Graham, The Nature Conservancy; Kelly Mott Lacroix, University of Arizona; Tom McCann, Central Arizona Project; Amy McCoy, Ecosystem Economics; Leslie Meyers, Bureau of Reclamation - Lower Colorado Region; Cliff Neal, City of Phoenix; Bill Plummer, Agri-Business & Water Council of Arizona; Dave Roberts, Salt River Project; Ben Ruddell, Arizona State University; Ken Seasholes, Central Arizona Project, and Margaret Wilder, University of Arizona. A summary of the *Arroyo* was published as an opinion piece in the *Capitol Times* and reprinted in *Reeves Journal*, a magazine for plumbing, heating and cooling professionals.



Madeline Ryder, a senior with a dual degree in Natural Resources (B.S.) and Environmental Studies (B.A.), was selected from a highly talented pool as the Montgomery & Associates Summer Intern to work on the 2015 *Arroyo* on the water demand-supply gap, challenges and potential solutions. She produced a first draft over the summer, which was undergoing revisions before before being sent out for review in February 2015.



Jessica Schlievert, Information and Communications Specialist, left the WRRC in October. During her tenure, she collaborated with WRRC staff and students to improve the WRRC’s communications and publicity efforts on a number of platforms. She was responsible for organizing the Brown Bag events and developed the Weekly Wave, an e-news digest, which she initiated and maintained. She also worked to grow the WRRC’s presence in the news media and maintained regular contact with the public through social media outlets on Facebook, Twitter, and YouTube.



John Polle creates, develops, and manages content for the WRRC website, as well as keeping up with the ongoing maintenance of the site. He designs printed and digital outreach materials for the WRRC and the various programs associated with the Center. He also manages and provides support for the audio and visual needs of the WRRC and when necessary, provides IT support.

In 2014, he developed the Desert Water Harvesting website and designed print materials associated with it. He began development of the UA Water Network website and worked closely with students to create video content for this site. He worked with the communication and information specialist to create multiple outreach pieces for the WRRC. Many of these pieces were created to highlight the 50th anniversary of the WRRC.

He worked closely with the Conserve2Enhance program, both maintaining their website and creating print and digital materials and templates to be used by participants and students.

Brown Bags

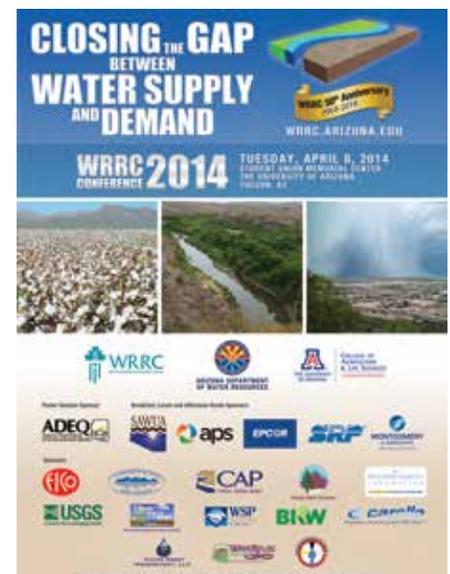
<http://wrrc.arizona.edu/events/brownbag>

The WRRC’s Brown Bag seminar series continues to draw a range of speakers on water-related topics of interest to a wide spectrum of audiences. In 2014, the WRRC held 18 Brown Bag seminars featuring experts from Arizona and the Southwest, as well as other countries. Particularly well-attended seminars included Mike Crimmins, Assoc. Prof. and Ext. Specialist, Climate Science, Dept. of Soil, Water and Environment, UA, “Dusty Dry to Sopping Wet? Summer and Fall Climate Outlook for Southern Arizona”; Robert Webb, Adjunct Professor, Hydrology and Water Resources, UA, “Requiem for the Santa Cruz: An Environmental History of an Arizona River”; and Chris Udall, Executive Director, Agri-Business Council of Arizona, “Agri-Business Council of Arizona’s Perspective on Water and Agriculture in Arizona”. Average attendance was 23 people (in person), approximately 45 percent from UA and 55 percent from the broader community. Access to the WRRC’s Brown Bag series now routinely includes an off-site audience through live webcasts via Go-to-Webinar and in-house video coverage. Offsite attendance grew significantly, and in 2014, the WRRC has had 115 participants avail themselves of remote observation. Past Go-To-Webinar recorded events at the WRRC can be viewed on the WRRC website.

Annual Conference

<http://wrrc.arizona.edu/conference>

The 2014 Conference, Closing the Gap Between Water Supply and Demand, was held on Tuesday, April 8, 2014, at the UA Student Union Memorial Center. The 2014 conference, which also celebrated the WRRC’s 50 year anniversary, was organized in collaboration with the Arizona Department of Water Resources. The conference attracted 350 attendees from 43 Arizona communities and 6 Arizona Native American Nations, Tribes and Communities. A poster session, with 24 water-themed posters, included a competition for best student poster and a celebration of the WRRC’s 50th anniversary. A number of media outlets attended and covered the conference, including Arizona Public Media’s “Arizona Week,” The Arizona Daily Star, the Tucson Weekly, and the Arizona Daily Wildcat. Interviews with conference



speakers were featured on Arizona Week, a news magazine on KUAT, Channel 6 in Tucson (on-line at <http://wrrc.arizona.edu/conference/recap>).

The 2015 Annual Conference will address Tribal water issues. It will be held in June at the Wild Horse Pass Hotel and Casino in Chandler, AZ, in cooperation with the Gila River Indian Community.

Other Public Events

The WRRC has sponsored, co-sponsored and hosted a number of events for a broad range of interests. Among these was co-sponsorship of the Native Eyes Showcase, which consisted of multiple events including a resource fair and film screening at the Loft Cinema in Tucson. At the annual Chocolate Fest, the WRRC celebrated its 50th anniversary with a program recognizing past WRRC Directors and staff. In October, the WRRC hosted a memorial to honor the work of Marybeth Carlile, a major force influencing policy on water issues in Arizona. Among other achievements, she was instrumental in organizing the support needed to ensure the extension of the Central Arizona Project to Tucson. The WRRC was also a co-sponsor of the Biennial Symposium on Managed Aquifer Recharge (BSMAR) held in August in Orange County, CA. The symposium series, which originated in Arizona, had been on hiatus for some time and was revived this year as a cooperative venture shared between California and Arizona. As a follow up to our involvement in BSMAR, the WRRC is involved in the development of the International Symposium on Managed Aquifer Recharge (ISMAR) to be held in 2016 in Mexico City. The 2014 WRRC Photo Contest promoted the theme "Catch the Rain". The winners were announced in the Weekly Wave and all 20 winning photographs (three top prizes and 17 honorable mentions) are displayed on the WRRC website. The three top prize winners are featured in the Winter 2015 AWR. Photo contest submissions are added to the WRRC photo archive, which is drawn upon for images as needed for posting and publications.

WRRC Communications and Website

<http://wrrc.arizona.edu>

Communications efforts at the WRRC continued to expand in 2014. Communications staff regularly submitted WRRC news, events and accolades to University channels – including the weekly newsletters, websites and e-calendars of the College of Agriculture and Life Sciences and UA Cooperative Extension – as well as the UAnnounce e-memo distribution system. The UA Institute of the Environment newsletter and ASU's Sustainability Digest also regularly carried WRRC announcements. Externally, the WRRC has been featured 22 times across a variety of news and media outlets.

Efforts continued throughout the year to expand the WRRC's social media visibility on Facebook, Twitter, and YouTube, resulting in increased shares, views, retweets, follows and likes. Twitter followers of the WRRC nearly doubled from 2013 numbers, and the WRRC's Facebook page surpassed 200 likes. Video recordings of WRRC events – namely select Brown Bag Seminars – previously available only on the WRRC YouTube page were made more readily available directly through the WRRC website (<https://wrrc.arizona.edu/video-gallery>) via a searchable video gallery.

The WRRC furthered branding efforts in 2014 by creating several printed pieces, including banners, bookmarks, rack cards, printed quarterly and annual newsletters – all sharing a recognizable WRRC brand. The UA is engaged in a process of standardizing its brand throughout the university's units. This is creating some confusion regarding the use of the WRRC logo on WRRC products. The situation is evolving and the WRRC is negotiating to continue emphasizing its unique identity while reinforcing its connection with the university and with the College of Agriculture and Life Sciences and Arizona Cooperative Extension.

The WRRC website also saw updates and changes this year. The Water Center expanded and enhanced its History, Press, Video and Personnel pages, and created a number of new and improved websites and program pages, including those for Conserve2Enhance (C2E), the Desert Water Harvesting Initiative (DWHI), and Arizona Project WET. The rotating three-story homepage feature was updated weekly to reflect the latest WRRC news and events, and homepage visibility for listserv signup pages, Annual Conference registration, and the WRRC's 50th Anniversary historical recap was heightened via visually appealing graphics. An archive of past editions of the Weekly Wave e-newsletter was also added to the website in 2014. The WRRC website also provides a link to 380

digitized archival copies of past WRRRC publications, available through the University of Arizona Libraries' Campus Repository. Publications -- which date back to 1958 -- are searchable by title, author, date and subject, and include past editions of the Arizona Water Resource newsletter, the Arroyo, WRRRC studies and much more.

Water Information for the Layperson

During 2014, an innovative multimedia project has been developing through collaboration between the College of Agriculture and Life Sciences (CALs) video and web development teams and the WRRRC. The project, with up-to-date content and modernized format, is being created to provide maximum exposure and usability of water information for the public. The project, "Beyond the Mirage, Arizona's Water Reality," is expected to effectively reach a new and much broader audience than a print document, because of its innovative approach, high production values, and integration with popular social media platforms. The primary medium will be a constellation of short videos—10 seconds to 1 minute—that in concert allow comprehensive exploration of a complicated scientific or social issue. Each video is interconnected, yet can be released individually into the social media sphere to attract specific and fragmented audiences. The content will be factual, relevant and compelling. Supporting the video clips, there is a web interface designed to build a comprehensive informational environment around each clip. The interface operates in a unique way, tailored to the interests of individual viewers. User-created documentaries can be shared to social media or emailed as a link. Development of Beyond the Mirage will occur in parallel with development of a feature length documentary through cooperation with Arizona Public Media (AZPM).

Professional and Public Outreach

Throughout the year, WRRRC faculty, staff and students make many presentations, both oral and poster format. Often these are invited presentations. The WRRRC is called upon frequently to inform audiences about Arizona water and our water management practices and policies. In February and March WRRRC personnel presented classes on WRRRC programs (APW, Water Harvesting, Water Rapids and Water Quality) in a 4-week course titled "Water Resource Education, Conservation, Harvesting and Quality – University of Arizona Water Resources Research Center Programs" for OLLI-Green Valley, a lifelong learning program associated with UA. Plans have been made to present a similar 4-week course in spring 2015.

The WRRRC's Student Workers

Armenta, Mariah
Banister, Kathryn
Barker-Perez, Emma
Bonfield, Jana
Brill-Duisburg, Emilie
Capehart, Mary Ann
Castaneda, Mariela
Clinkenbeard, Dixie
Delano, Nathaniel (Nate)
DeWalt, Emily
Driscoll, Jessica
Edwards, Leah
Eley, Laura
Fullerton, Chistopher

Garcia, Luisana
Gebremariam, Reshet
Gudvangen, Emily
Hancock, Scott
Huang, Ling Yee
Hullinger, Ashley
Joe, Valerisa
Jondall, Kelsea
Jones, Nicholas J.
Kleiman, Beth
Kopp, Darin
Oglesbee, Colin
O'Neil, Brian
Picazzo, Martin

Posegate, Ann
Prescott, Alexander
Prietto, Jacob
Radonic (Vasquez), Lucero
Reidy, Christian
Ryder, Madeline
Schwerin, Kristen
Serwon, Daniel
Sheesley, Nicole
Sittig, Julia
Skiles, Sara
Smith, Sarah
Sprouse, Jason
Tapia, Elia

Administrative Support and Coordination



Jane Cripps, Administrative Associate, is instrumental in the provision and oversight of WRRC administrative duties and operational functions, including support of the organization of WRRC meetings, the Annual Conference, Brown Bag Seminars, and distribution of the WRRC's publications.



LaVonne Walton, Business Manager, provides a high level of service to all members of the WRRC community. As Fiscal Officer for the WRRC and Arizona Project WET, she has responsibility for the Center's financial and human resource operations, and grant submissions and management.



Lynette Featherston, Office Assistant, is a valuable team member, fielding inquiries from the public and overseeing preparation of WRRC facilities for events. She assists the Administrative Associate and Business Manager and handles exceptional tasks as they arise.

Annual Financial Report

(Pending December 31, 2014)

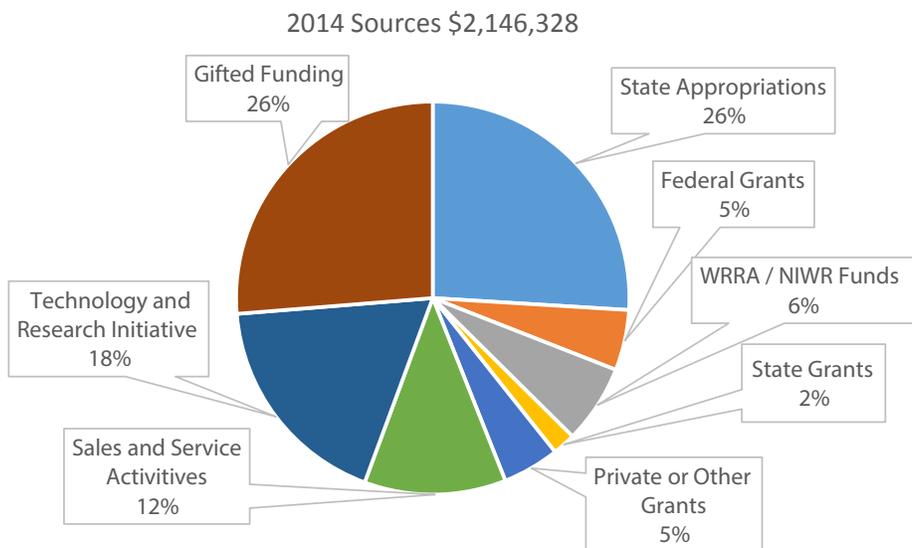
SOURCES	2013	2014
Federal Grants	\$260,131	\$106,209
WRRRA / NIWR Funds	\$26,661	\$138,990
State Grants	\$10,435	\$40,569
Private or Other Grants	\$773,792	\$100,158
Sales and Services Activities	\$43,545	\$250,118
Technology and Research Initiative Fund (TRIF)	\$274,715	\$388,395
Gifted Funding	\$69,038	\$564,249
	\$1,954,742	\$2,146,328
USES		
Salaries and Wages	\$1,076,900	\$1,083,871
Fringe Benefits	\$358,801	\$340,340
Operational Costs	\$665,064	\$524,267
Capital Equipment	\$6,951	\$13,472
	\$2,107,716	\$1,961,950
Revenue Available – December 31, 2014	(\$152,975)	\$184,378

Sources

State Appropriations: State General Fund and tuition collections appropriated to the College of Agriculture and Life Sciences by the State of Arizona. Partial funding is provided for administrative salaries, operations and travel. These monies are distributed to administrative accounts and Sharon B. Megdal and Jean E. McLain's Hatch Project.

Federal Grants: In this section are all monies received for competitive national federal grants and federally-funded cooperative agreements awarded to the WRRC.

WRRRA / NIWR Funds: This total includes U.S. Geological Survey 104(b) 5-year Cooperative Agreement funded annually in March. The WRRC receives this federal funding as Arizona's State Water Resources Research Institute. In 2014 the WRRC received an annual allocation of \$92,335 which funded two research grants [see Section II, Part I (a)]. The remaining monies were used to support administration of the 104(b) program and personnel and activities dedicated to Information Transfer. The grant period is March 1st, 2014 through February 28th, 2015, and 2014 funds were, in part, carried over from calendar year 2013.



State Grants: Revenue provided by the State of Arizona through awarded competitive grants. In 2014 the Arizona Department of Water Resources, the Arizona Department of Environmental Quality and the Arizona Department of Agriculture continued funding for multi-year grants awarded in prior years.

Private or Other Grants: Revenues received by the WRRRC through the University and the UA Foundation from local, county and state governmental agencies (non-competitive), and NGO's. In 2014, the WRRRC received funding from Central Arizona Project (CAP), City of Tucson, the Abbott Fund, Freeport McMoran Copper and Gold, among others.

Sales and Service Activities: Revenue from one-time transactions accrued over time by the WRRRC from publication sales, annual conferences, and miscellaneous services. These monies include fees charged by Arizona Project WET to hold Water Festivals in cities across the state.

Technology and Research Initiative Fund (TRIF): Revenue from the State Technology and Research Initiative Fund (TRIF, a state sales tax- derived fund supporting a range of programs at the three Arizona state universities. TRIF funding is allocated to the UA Water, Environmental and Energy Solutions (WEES) initiative, which provides direct support to WRRRC and also funds the Water Sustainability Program (WSP) housed at the WRRRC. Only WEES funds awarded to WRRRC and WSP funds managed by the WRRRC are included in this report.

Gifted Funding: Included are one-time gifts from individuals and companies and revenue generated by endowment interest bearing accounts over a period of time. These funds are used to support WRRRC programs, including Arizona Project WET.

Uses

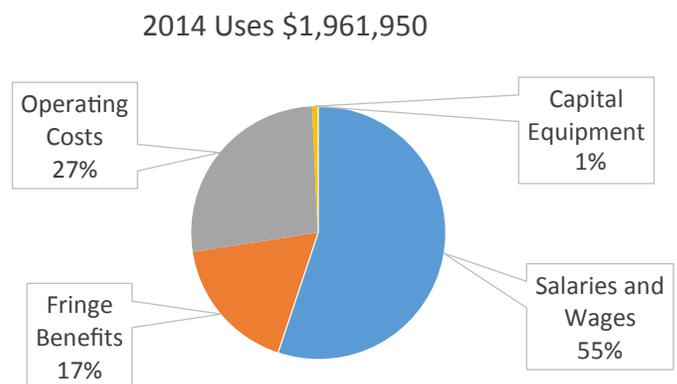
Salaries and Wages: Expenses include salaries, wages and supplemental compensation paid to WRRRC faculty, appointed personnel, classified staff, graduate assistants, and student hourly employees. WRRRC funding provided salary support to employee groups as follows: faculty-21%; appointed personnel-35%; classified staff-25%; graduate students-9%; student hourly/undergraduate wages-10%.

Fringe Benefits: Expenses include costs of employee fringe benefits (ERE), background checks, and required employee training.

Operational Costs: Expenses include: administrative service charges and Indirect Costs (F & A); stipends, lecturer's fees, participant support and temporary labor; sub-contractual agreements 104(b) grants at Arizona State University and Northern Arizona University; printing and publications; communications; educational supply; research supply; office and general supply; travel; conference registration fees; membership dues; building and vehicle rental; business meetings; UITS FTE network funding (Access: University communication systems); building maintenance and upgrades.

Capital Equipment: Expenses include costs for the purchase of capital laboratory research equipment, computer, data processing, and office equipment.

Revenue Available – December 31, 2014: Balance available reflects monies in WRRRC accounts as of December 31, 2014. Balance includes State Appropriations and TRIF accounts that are budgeted on a fiscal year basis (7/1 to 6/30); Sales and Service Activities revenue from one-time transactions accrued over time by the WRRRC; Federal, State, Private or Other Grants; and Gifted Funding that are on varying annual schedules.





WRRC

WATER RESOURCES RESEARCH CENTER

wrrc.arizona.edu

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