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Interview with Tom Buschatzke, Assistant Director of ADWR

By *Stephan Przybylowicz, WRRC Graduate Assistant Outreach*

The following is an interview with Tom Buschatzke, Assistant Director of the Arizona Department of Water Resources (ADWR). Mr. Buschatzke presented a Brown Bag seminar at the WRRC on December 9, 2011 about the future of ADWR, which was attended by more than 40 people. For more information about Brown Bag seminars visit <http://ag.arizona.edu/azwater/events.php>.

Stephan Przybylowicz: What is your role in your new position as Assistant Director of ADWR?

Tom Buschatzke: I'm in charge of several sections at ADWR: Colorado River, Statewide Planning and Tribal Liason, Active Management Area Data, Active Management Area Director—which is more planning and outreach—and the Assured/Adequate and Recharge Permitting Programs. Those programs really fit together because there are a lot of policy implications and a lot of planning pieces in those programs. So, it's a way to combine those together so that hopefully on a statewide basis, there will be better coordination in the policy and planning functions of the department.

SP: What are the personal challenges of moving from managing water at the city scale up to the whole state?

TB: One of the big challenges is that in the City of Phoenix, I was very independent and I was responsible for many projects from start to finish, so I was heavily involved in the details from start to finish. Now, I have twenty-five people to manage in five programs, so my ability to get into the details is pretty much zero. So, I'm there at the beginning to help design the project, a little bit of oversight along the way, and then tweak the final product. But, in between, I'm not involved. I had to learn to let go. I told my managers the first day, "If I start getting too crazy about the details and controlling, kick me," because that's what I did for twenty three years and it's hard to change your mind set.

Obviously, another challenge is that Phoenix, as an entity, was easier to represent out in public—the goals and policies created by the City of Phoenix City Council—than it is to balance all the needs across the entire state with a very diverse group of stakeholders, different industries, etc. Also, it's a bigger challenge to try to build a consensus on a statewide basis than perhaps building consensus the way Phoenix has, even in an active management area or on a regional basis.

Again, the City of Phoenix had a long history of very proactive water management; proactively acquiring water supplies and building

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UA Global Water Brigade helps to install a pipeline in El Canton, Honduras. Photo: Global Water Brigades Arizona

Global Water Brigades

Global Water Brigades (GWB) is a program under Global Brigades, the largest student-led, non-profit, sustainable development organization in the world. Global Brigades works on a holistic model with disciplines in water, public health, medical, dental, architecture, environmental, law, business, and micro-finance. Students across the U.S., and around the world, start chapters at their universities to mobilize students in projects that empower rural areas in Honduras, Panama, and Ghana to improve their conditions. Water Brigades specifically develops clean water solutions for rural Honduras and Ghana. Throughout the school year, GWB discuss and assess the community. Then, over spring break, the group goes to actually build the water system. GWB work alongside community members and make a one day educational presentation to the local school about the importance of clean water. The UA chapter began in September 2010. Last year, UA only had water

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infrastructure to utilize them. So, there was a lot for me to build on that was there already. Many parts of the State have nothing; they have a few wells and they don't have the resources that the City had to support what the City did. The towns outside of the metropolitan areas don't have that. So, it's finding ways to help them move forward.

SP: You mentioned this in your talk [the WRRC Brown Bag Lecture] a little bit, but could you expand on the differences in approach and recommendations of the Fourth Management Plan over the previous three?



ADWR Assistant Director, Tom Buschatzke speaks at a WRRC Brown Bag Seminar. Photo: WRRC

TB: I think it was stated in the questions when the gentleman talked about how the regulatory focus of the first three management plans has born that fruit. There's not a lot of fruit left to bear going in that direction. There's probably still some and there will be regulatory aspects, but we really need to get into looking at how to manage the aquifers within each active management area long term to make them sustainable, to make them essentially a reservoir where you can put water in and take water out, and how that works across the entire AMA to avoid localized problems. One of the challenges of doing that in a regulatory way, besides the pushback by the customers, is that you create

these regulatory programs over time and the aquifer itself is going to change. In the Phoenix area, we've got areas that are in the East Valley where the water table is rising. It wouldn't make sense to regulate that area when the water table is rising. On the West Valley, it's going the opposite direction, but the AMA is in safe yield and that causes problems. So, this, I think, is our future. If you want to have a truly sustainable water resource management program, you're going to have to more closely manage the aquifers in a way that they can be used as below ground reservoirs; you both take water out of them and put water into them.

SP: You've been in your position since July, right?

TB: Correct.

SP: So, what do you see so far as the greatest challenges for your department?

TB: The challenges are, given the budget cuts that have occurred and at the current budget level, how to have meaningful input into all the programs that need attention. One of the challenges is prioritizing what we should be spending our resources on. Again, I mentioned some; Colorado River, Statewide Planning, the Active Management Areas, and the Data Collection are where our priorities lie now. It's a little bit of a shift from historical. For example, the reason the active management areas are in good shape is because of Colorado River water and the CAP, so that needs to be protected.

I think, even though this is not my area directly, it is a priority to create a more efficient department and making the department more user friendly. Again, that will reduce staff time for answering inquiries and reduce the cost to businesses or members of the public who need to spend time looking for data. We need to do more of that online, annual reports for the AMAs need to be more user friendly, and to be able to be done more quickly online. Again, less ADWR staff time answering questions, less time for the various water providers—which equates to money for them—whether they are private water companies or the municipalities. So, we're really trying to make the department more efficient and one of the silver linings in the

cloud of budget cuts is that the department was really forced to do that. The department is way more efficient today than it was a year ago, and this is a result of that's what had to happen.

Another challenge, and it's a goal and a challenge, is to break down some of the silos between departments and to empower employees to be more effective by educating them about issues and programs that they don't work in directly. So, one of our goals is to cross-train folks so that if we need a hydrology person to help on Colorado River, they at least have a hit-the-ground-running level of knowledge.

Breaking down silos also avoids redundancy. At one of my very first staff meetings of my managers, I think I had three managers working on the same thing, because of inquiries from the public, and they didn't know anyone else was working on it. That's the kind of thing that you just can't afford to do anymore, and it wasn't any of their individual faults that that was occurring. Again, when you're at minimal staff and someone calls you and you're trying to be responsible to the public, which is a huge responsibility, they say, "Well, I'm going to go do this and get it done." We need to do a better job with managing those things so we use our resources better. So, that is one of the big goals of the Director.

Our mantra is, "If we ask somebody, 'Why are we doing that,' don't tell us, 'because that's the way it was always done'." We're trying to move past that; take people out of their comfort zones and have them think outside the box a little bit about, "Yeah, it was done this way for the past ten years, but maybe there is a better way." We're really trying to instill that into the staff and any new staff as well.

SP: Related to that, what do you see on the horizon as any major changes in the role of ADWR, either on a state level or on a national level?

TB: Clearly, at the state level, ADWR has been heavily involved in the Colorado River issues and we will continue to be, but we've had some statewide rural initiatives. In the past the legislature has earmarked money to work with various watershed groups for those purposes. But, the Department really needs to start focusing on the water supply and infrastructure needs outside of the three county CAP service area. A lot of folks call that "rural," but they're not really rural areas – it's a shorthand way to describe them. There are still challenges in the active management areas and within the three county CAP service area, but with the combination of the water providers themselves and the Department and lots of different programs, they're in extremely good shape compared to the situation outside of the three central active management areas.

I also have a personal interest and concern about where climate change is going to move us. That's a very difficult issue because the system is already over appropriated and no one wants to hear that there might be less water in the future. I think, because our supplies of renewable water are in-state and Colorado River, the fallout from climate change is probably going to be different between those two water sheds. One of the

concerns I have for the in-state supplies isn't so much a reduction in the volume, it's the environmental impacts and the water quality impacts that might be created from the warming of climate change.

Of course, the information that you have available has more uncertainty in it than what is historically used for water planning. Historical planning has uncertainty too, but with climate change there is way more. It's very difficult for decision makers to understand what that means and how to deal with decision making with data that has a lot of uncertainty inherent in it and to create programs that have a flexibility to adapt to conditions that you can't foresee. So, that, I think, is a huge challenge for water management in our state.

Then again, a huge challenge is to come up with a funding source that parallels the Water Infrastructure Finance Authority's existing funding sources, so that entities in the state that need a loan to either get off mined ground or onto renewable or other supplies, can actually make that happen financially. That's a very controversial issue—how you come up with a funding source that is equitable across the municipal versus rural, equitable across different water stakeholder groups. We have been talking about that since the advent of the Statewide Water Advisory Group – about seven years ago – and we're still talking.

SP: Looking into the future, what would be your major goals or wishes for the department and state water management?

TB: Having a more robust structural program to deal with the needs outside of the three county CAP area, that's one of them. We need to continue to work on some of the Indian Water Rights claims and finish some of those settlements, especially ones that could potentially impact the Colorado River supplies for CAP. We need, obviously, to continue to have a strong presence in the Colorado River with the seven basin states and with Mexico to come up with collaborative solutions that will avoid the train wreck of litigation between the states over the management of the river. That's probably enough for now.

Global Water Brigades continued from page 1



GWB students teach school children watershed protection. Photo: Global Water Brigades Arizona

and medical disciplines as Global Brigades chapters on campus. Now there are two medical groups, dental, public health and business; and a law brigade is starting.

GWB-UA's first brigade traveled to the rural community of El Canton, Honduras during spring break, March 2011. El Canton had no sustainable access to clean water for their 500 residents. Mothers and children had to walk 2-3 miles up and down hills to the water source, but the water source was contaminated. There was a

SP: Ok. Is there anything else you'd like to add? The readership of the AWR is really diverse, so there are anywhere from community members to politicians to water management folks.

TB: Yes, there is one thing for students who maybe will be reading this—us old folk, who are getting grey, we talk a lot about who is going to succeed us. You know I work quite a bit with students – I had an intern from ASU last spring through the resource center, and I've had that kind of contact with folks where they come and interview me, and when I ask them when they're getting their degree, what it's in, what their plans are, very few of them end up staying in the state. That's one of my frustrations. I understand you need a job and you have to make money, and we don't have a very good way to funnel the students that come out of our universities back into the water resources field so that they can move forward into being the leaders of the next generation. The way the budgets work right now, nobody can afford to have two people doing the same thing, so the succession planning has really been hurt, not just in the state, but in just about every entity out there—every water provider, municipality, etc.—is going in the opposite direction. So, that's a big concern of mine. That's why I'm always happy to do things like this and talk to students.

I try to end with this when I talk to students because I would like to see some of them stay and seek employment in the water world. One of the difficulties of that is many of them are very intelligent, getting advanced degrees, and have a great desire to start higher up on the ladder—really difficult to do. It's almost like you have to pay your dues and start kind of at the bottom. Sharon [Megdal, WRRC Director] mentioned in her introduction [to the Brown Bag seminar] that I was an intern. The Director of a department was an intern! There are a whole bunch of people in the department who started off as interns – paid interns – and I think it really bodes well to go that path. You really need to be grounded in a lot of things before you can move up into the decision making roles that are out there. So, that's my plea. 🏠

water system that was started several years ago, but government stopped funding, so this community had an un-finished system. Before spring break, GWB-UA spent the months preparing for the project by educating themselves about the importance of clean water and how it affects the community. They spent three days in El Canton meeting with the Community Health Council so that they could hear what the local community wanted out of this project. During that time, volunteers developed the water system by digging about 300 meters of trench and connecting pipes in the trenches they built. On the 4th day in the community, GWB-UA made a presentation in the local classroom on how to protect their watershed.

This spring break, March 2012, GWB-UA is going to be traveling back to Honduras to finish the water system in El Canton by setting up the last stages of purification. Once the Water Brigade works with a community, public health, medical, dental, and all other brigades follow. GWB has advisors and water brigades staff in Honduras working and accessing communities year-round. Communities are ranked by the need of the water system and the accessibility of the project. They do not know whether they will be going back to El Canton next year or whether they will be assigned to work in a new community to begin constructing a new system.

Interested students and faculty should check out GWB's official website: <http://www.globalbrigades.org/programs/water/objective/>. The UA chapter also maintains a Facebook page for their club updates: <https://www.facebook.com/globalwaterbrigadesua>. Interested people can also email GWB-UA's Co-President, Camille Sabino, at arizona.gwb@globalbrigades.org. 🏠

ANNOUNCEMENTS



March 22 Is World Water Day

An international day to celebrate freshwater was recommended at the 1992 United Nations Conference on Environment and Development (UNCED). The United Nations General Assembly responded by designating 22 March 1993 as the first World Water Day.

Each year, World Water Day highlights a specific aspect of freshwater and the theme for 2012 is water and food security. Alexander Müller, Assistant Director General, Natural Resources Management and Environment, FAO, Rome, Italy explained the water component in food security at a seminar Water and food security: *Feeding the world in a sustainable way*, at the Stockholm World Water Week 2011.

“Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life” and water is one of the fundamental input factors to food production.

International World Water Day is held annually on 22 March to focus attention on the importance of freshwater and advocate for the sustainable management of freshwater resources. www.unwater.org/worldwaterday/

Arid-lands Conference Draws Speakers from across Nation

Some 200 professionals from arid regions across the United States will gather in Tucson in March to focus their diverse expertise on a challenge of growing national significance: using nature’s “green infrastructure” to make cities more healthy, sustainable, and livable.

Tucson-based nonprofit Watershed Management Group and several partners, including the WRRC, will host the third annual Arid Low Impact Development Conference (AridLID) March 27-29, 2012. The innovative conference will feature a workshop organized in collaboration with the WRRC to set a research agenda for green infrastructure in the arid Southwest. Representatives from the U.S. Environmental Protection Agency (EPA) will take part in the agenda setting sessions.

Green infrastructure and low impact development are closely related terms that describe use of natural systems like plants, soils, and rainfall to provide services like cleaning air and water, creating wildlife habitat, and calming traffic. Water harvesting is a major component of Low Impact Development practices. From Philadelphia to Los Angeles, cities across

UA Hosting Wildfire Meeting

The University of Arizona is hosting the 2012 Southwest Wildfire Hydrology and Hazards Workshop this coming April 2 - 5, 2012. Land management and other government agencies are involved in the planning for this conference, making it a good opportunity for agencies and academics to share results and prepare for research and early-warning response to the upcoming fire season in the Southwestern U.S. Organizers are particularly interested in increasing the dialogue among academic researchers (including students!) and the various government agencies that are tasked with responding to wildfires. As many post-fire researchers are aware, this coordination is often difficult in the short time available after landscape-altering fires. It is hoped that the workshop will foster new connections among the various research entities.

More information about the workshop can be found at: <http://register.b2science.org>.

the United States are tapping into strategies like rain gardens and other “green streets” features that capture and utilize rainwater in vegetated areas close to where it falls, instead of sending it downstream where it can contribute to flooding and pollution.

The conference, which was held in Albuquerque its first two years, has a theme this year of “Integrated Approaches to Green Infrastructure,” in recognition of the need for collaboration among many disciplines in order to successfully implement projects.

Keynote speakers include City of Tucson Mayor Jonathan Rothschild; Andy Lipkis, Founder and President of Los Angeles-based TreePeople; and Benjamin Grumbles, President of the Clean Water America Alliance. Additional presentations will be made by Tucson-based world-renowned rainwater harvesting expert Brad Lancaster, celebrated Phoenix-based landscape architect Christine Ten Eyck, Hal Sprague from the innovative national group Center for Neighborhood Technology, and many other experts from across the Southwest.

More information and conference registration can be found at www.aridlid.org



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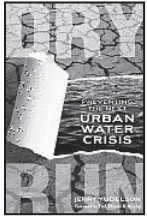
New Website

The WRRC is inaugurating a new, updated website in March 2012, with a new web address. Go to wrcc.arizona.edu for all the same great information in a new, easily accessible format.





Local Authors Fill Water Bookshelves in 2011



Dry Run: Preventing the Next Urban Water Crisis

By Jerry Yudelson, with foreword by Sharon B. Megdal
New Society Publishers
Review by Susanna Eden

Long-term drought in the West and elsewhere coupled with the growth of urban populations, have raised our level of awareness about the need for conservation and water use efficiency. Every week we seem to hear about a water crisis when dire consequences were experienced or narrowly averted. Jerry Yudelson offers several examples in his informative book, *Dry Run: Preventing the Next Urban Water Crisis*, on cities and their water use. In Australia, the City of Perth faced a crisis when its reservoir inflows fell dramatically over several years from 85 billion gallons per year to a low of 16 billion gallons per year in 2007. In response, the city had to quickly implement wastewater reuse and seawater desalination programs in addition to strenuous conservation requirements.

Closer to home, in Atlanta the situation required imposition of mandatory drought restrictions and emergency water planning. Although the situation has improved sufficiently to remove mandatory restrictions since the rains returned in 2009, the Metro Water District projects a shortfall in water supply beginning in 2030 without “aggressive, ongoing water conservation”. In consequence the City has plans to make institutional changes to see that water conservation remains a high priority.

Likewise the San Diego County Water Authority faced an emergency drought situation in 2009, this one precipitated by circumstances hundreds of miles away in the Sacramento-San Joaquin River Delta, where restrictions on surface water pumping translated into a 13 percent reduction in wholesale water deliveries to San Diego.

Yudelson maintains that such crises will become the norm without substantial change in the way we deal with water. If the book has a single dominant theme, it is that change is on the way. The change will bring with it new or increasingly urgent familiar challenges. These include growing demands on finite water supplies and the effects of global climate change.

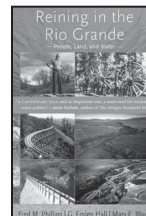
But change also brings new and improved means of meeting these challenges. The book is full of suggestions and examples of success stories. Jerry Yudelson’s expertise is in the built environment, where he sees almost endless opportunity for improved efficiencies without sacrificing, and in many cases actually enhancing quality of life in cities. His explanation of water use in commercial and industrial buildings is perhaps the only summary of this important component of urban water use you will find in the recent crop of water books. The survey of home water use is equally informative regarding opportunities for water savings. In what may today be an unusually optimistic tone, Yudelson cites case after case of new technologies employed to save not only water, but also energy in a two for one improvement over current practice.

In a section on innovative water technologies, Yudelson covers the range of potential supplies, giving graywater and

water harvesting detailed attention along with more conventional technologies such as wastewater reclamation and salt water desalination. He also includes an intriguing chapter on what he calls “Zen Water”, which refers to projects that are self-sufficient in their water use and independent from urban water infrastructure. These projects employ a combination of technologies, including both rainwater harvesting and water recycling that result in “net-zero” water use.

In the concluding chapter, Yudelson lays out “Ten Steps to Preventing the Next Urban Water Crisis.” His prescription contains some familiar components, such as instituting conservation water rate structures. But most of his recommendations promote changes in infrastructure and facilitation of such changes through such methods as building codes, metering and training. He does not shy away from initiatives on a grand scale—training the entire plumbing industry of more than 40,000 working plumbers in green plumbing practices—but the steps boil down to an attitude of focusing innovation and appropriate scale technologies on conservation and the use of locally available resources before investing in grand new water supply schemes.

His hope, at the end of this hopeful book, is for the coming change to embody adoption of sustainability’s “triple bottom line”: living where economy, ecology and ethics intersect in an environment that fosters a healthy urban system now and in the future.



Reining in the Rio Grande - People, Land and Water

By Fred M. Phillips, G. Emlen Hall and Mary E. Black
University of New Mexico Press

Reining in the Rio Grande is an intriguing chronicle spanning over 500 years of human habitation and influence on a once mighty river of the West. The geological and hydrological beginnings of the Rio Grande Basin are the backdrop for the story that has the Cochiti Pueblo, still in place today, as a harbinger of change to come: “The earliest Cochiti Pueblo residents revered the river and used it but they did not attempt to fundamentally change it.” Later, Hispanic settlers arriving in the 1590’s brought acequias (Spanish for “communal irrigation canals”) culture to the banks of the river but into the 19th century, “. . .farmers resigned themselves to a water supply on nature’s terms. This was a world in which the rivers - works of nature - had primacy.” With American expansion across the western frontier in the 19th and 20th century, “The rivers that Hispanos and Pueblos considered beyond their control would eventually be harnessed by the new society, using new technologies and new laws.”

The personalities, politics, law suits and multi-state agreements in the last hundred years of history of the Rio Grande share much with Arizona’s water history. The episodes of flooding and drought and the disconnect of surface water and groundwater hydrology resonate with all of us living in the Southwest. Also common to the region is the quest to balance the needs of humans and the needs of the river as increasing demands stretch supplies. As the story unfolds we see how this book reflects a broader picture of human culture and thought and poignantly shows how our view of the

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Tragedy of the Commons Game

By Marissa T. Isaak, Graduate Student, UA School of Geography and Development, and Frank Van Weert, U.N. International Groundwater Resources Assessment Centre (IGRAC)

“Uncharacteristically cooperative” was how Frank Van Weert described the 14 students who attended the “Tragedy of the Commons” simulation that took place at the Water Resources Research Center on Oct 31, 2011. The purpose of the simulation was to allow students to learn from one another how to manage a common pool resource, in this case, an area of shared groundwater. “Tragedy of the Commons,” first articulated by Garret Hardin in 1968, is the idea that when commonly shared resources are used by a group of profit-maximizing individuals, the common resource will be destroyed or depleted by over-use. This depletion is not good for any of the users, but will happen because of inherent competition between the users. The idea is often mobilized by those who advocate for the privatization a public good, under the argument that in a privatization regime, motivations will align with protection of the resource for its long-term viability.

In the simulation Van Weert divided the students in 10 “families” wherein each one had to make a decision about how much land, out of a possible 100 hectares (247 acres), to bring under production in a fictional agricultural community. More land would mean more revenue generated. However, if each family produced their full 100 hectares, they would collectively draw down the groundwater so as to starve the nearby lake of the necessary water levels. In this case, there would be no fish for the families and each would have to pay a health cost of nutrition deficiency. Moreover, if the groundwater table dropped, then the families would have to pay additional pumping costs, eating up their earned revenue. A few additional features entered the game: Students could agree to an enforceable rule regarding how much land to bring under production, but the rulemaking would be accompanied by a transaction cost and only becomes effective when supported by a majority. Also family teams individually could decide to invest in water-saving technologies for their farms, such as drip irrigation, which would allow them to farm more with less groundwater drawdown. Finally, there were some unexpected events that could impact the farmers, such as climatic changes and pest invasions. With all this information, the 10 families began to farm.

In the first round, most farmers attempted rather aggressive farming, most choosing either 100 hectares or close to that much. This resulted in considerable drawdown of the lake and no fish for any of the community members. The group discussed the matter after the round and, finding this an unsatisfactory outcome, encouraged one another to farm fewer acres. In the subsequent rounds, pressure from the group pushed most of the farmers to

both invest in water-saving technologies at considerable cost and to farm significantly fewer hectares.

There were, however, some outlier farms. One farm chose to continue to free-ride off the generosity of others - he continued to farm near his maximum 100 hectares despite the public pressure. This particular farm’s groundwater never dropped too low because the surrounding farms voluntarily agreed to reduce their amount of production. Another farm chose to bring only the minimal number of hectares under production, oftentimes failing to turn a profit. On this farm, the rationale was that they did not choose to profit-maximize like the others, and instead chose to work less so as to devote time to other leisure time pursuits. Despite these outliers, most of the farms voluntarily agreed to the reduction in land production in order to ensure the health of the lake and all the people within the community.

Van Weert was impressed with the students’ ability to discuss their situation and cooperate without implementing any sort of formal rule. He told the group that in the 12 times that he has run

the simulation, it has never been so amicable. Usually he sees much more free-riding and competition between the farms. Was all this harmonious behavior the result of good training and awareness-building on water resources scarcity at the University of Arizona? Or did it have something to do with the friendly interaction of the students who hailed from Geography, Hydrology, Law, Political Science and SWES?

Van Weert questions whether the students would play as cooperatively when the stakes would be higher for them. Often in game theoretic experiments the players are being paid. What if, for example, the 5 lowest ranking students (in terms of accumulated capital in the game

simulations) would need to pay a fee to the 5 highest ranking students. Or what if the game would be part of an official exam and the students would only pass when they accumulate a certain threshold value of capital in the game.

The game successfully illustrated some of the tradeoffs in a classic “Tragedy of the Commons” situation. But at times, the students had to suspend their true understanding of ecology in order to play the game. This simulation represented an over-simplified version of reality. For example, between simulations, the lake supposedly returned to total health. In the real world, if farmers were to draw down the groundwater in an area so as to decimate a nearby lake, it might not be revivable without considerable cost. Also, the simulation implied that all farmers lived equally with one another. In the real world, there are considerable differences between neighbor farms’ land entitlements, ability to invest in technology and their relative socio-political capital to influence decisionmaking.

Despite the simplified aspects of the game, the simulation gave students a taste of some of the real world decisionmaking calculations that irrigators must entertain as they manage their land both for profit and for protection of a common resource. 🏡



University of Arizona graduate students took part in a role-playing game that simulates the behavior of irrigators who share a groundwater source. Photo: WRRC

WRRC 2012 Annual Conference Highlights

“We need to grow up and not just grow – we need to become water wise.” – David Daugherty, ASU Morrison Institute

The 2012 WRRC Annual Conference, “Urbanization, Uncertainty and Water: Planning for Arizona’s Second Hundred Years,” was held on January 24, 2012, at the University of Arizona in Tucson. Organized in collaboration with the ASU Morrison Institute for Public Policy, the conference attracted more than 300 people to its discussions of the future of water in Arizona. The conference kicked off first with a welcome from



Jack August amused the luncheon audience with stories from Arizona’s water history. Photo: John Polle, WRRC

WRRC Director, Sharon Megdal, who asked conference participants to consider how, moving forward, we will meet the needs of Arizona’s people, agriculture and environment. The welcome by David Daugherty, Director of Research for the Morrison Institute, directed participants’ attention to water as one of Arizona’s most important issues, one which continues to demand active planning despite the recent budget cuts suffered by the Department of Water Resources. While there are likely to be as many opinions about water management as people in the room, Daugherty stated, “We need to grow up and not just grow – we need to become water wise.”

The opening keynote featured Robert Lang, Director of Brookings Mountain West at the University of Nevada, Las Vegas. Lang kept the audience engaged through his irreverent comparison of water policy in the East versus the West. Making light of Atlanta’s claims in their dispute over Lake Lanier, he stated, “Drunk surveyors in the 19th century are responsible for most of what’s wrong in America.” On a more serious note, he also pointed out that, unlike the East, the West has its best people working on water because the stakes are so high; we see the scarcity every day.

Session 1A brought together three recent water reports, which all gave similar answers to the question: Will Arizona run out of water? – “Well, it depends”.

Grady Gammage, the main author of the report by the Morrison Institute, “Watering the Sun Corridor: Managing Choices in Arizona’s Megapolitan Area,” summarized the report’s findings. He told the audience that the report goes beyond whether or not we will have water in the future and into issues of how we use the water we have in an efficient manner, while also accounting for growth. David Brown, Co-Chair of the Water Resources Development Commission described the final report of that Commission. Brown stressed the continued need for study and debate regarding groundwater and surface water and insisted, in a reference to Rob Lang’s talk, that we consider the needs of the whole state and not to let the “East Coast/Maricopa mentality” rule. The third speaker of the session, Karen Smith, a Fellow at the Grand Canyon Institute, presented the Institute’s recent report “Arizona at the Crossroads: Water Scarcity or Water Sustainability?” Smith suggested emphasizing conservation, consideration of water as an economic good, and creation of financing mechanisms and reliable revenue streams to help finance Arizona’s water infrastructure needs.

Session 1B featured commentary regarding the three reports from session 1A. Although the panelists presented diverse perspectives, there was a great deal of agreement on the premise that now is the time to scrutinize the relationship between economic growth and maintaining other important values. Holly Richter, Director of Conservation at the Nature Conservancy, argued for a new way of looking at the need for a balance. The old way requires too much compromise on both sides; we need to try harder to find win-win solutions to our water problems. Her idea was to find solutions that are not gray, but solutions that are both black AND white. During the question and answer period, the audience raised questions regarding “safe yield” versus “sustainable yield” and gave the panel the opportunity to agree that the two terms are not synonymous and we should be thinking more sustainably. The audience also wondered why we are only planning for 100 years of assured supply. In answer, the panel



More than 300 people from across the state attended with WRRC’s Annual Conference at the University of Arizona. Photo: John Polle, WRRC

noted that “safe yield” and “100 years” are artifacts of the Groundwater Management Act of 1980. They emphasized, however, that 100 years may be an arbitrary time frame, but it is looking further out than any other state (California only plans for 20 years).

Following Session 1B, Jim Holway, Director of the Western Lands and Communities, presented the results from the pre-conference workshop on January 23, 2012, an in-depth look at the “Watering the Sun Corridor” report. The workshop was organized by the Lincoln Institute of Land

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Groundwater Governance: From National and Regional Needs to Global Solutions

by Christine Abdallah Iskandar, Consultant, UNESCO - Section on Groundwater Systems Division of Water Sciences, International Hydrological Programme (IHP)

Water policies at national and transboundary levels remain focused almost exclusively on surface water issues. The 'invisibility' of groundwater in local and transboundary aquifers, the time over which impacts are eventually felt and the persistence of pollution, not to mention the differentiation between shallow and deep circulation, make governance problematic. Evidence of an effective management of groundwater resources able to sustain a set of social, economic and environmental services is virtually non-existent. An unprecedented increase in the use of groundwater, both in urban and rural areas, has occurred over the last few decades. This drastic change has been identified as the 'silent revolution' of water-supply, because it has occurred in many national as well as transboundary aquifers in a manner that has gone virtually unnoticed, unplanned and uncontrolled.

Similarly disproportionate are the levels of political consideration and financial investment attributed to the governance and management of groundwater versus surface water. The governance of groundwater resources has failed to feature prominently in either water policy dialogue or resource management at the local level. Consequently, agencies charged with managing groundwater often remain ineffective and poorly funded, and in some areas are non-existent. Furthermore, with a few exceptions, support from development agencies has also focused mainly on resource development as opposed to management and protection.

In response, the UNESCO International Hydrological Programme (IHP), together with the Global Environment Facility (GEF), the Food and Agriculture Organization (FAO), the International Association of Hydrogeologists (IAH) and the World

Bank, initiated the "Groundwater Governance Project: A Global Framework for Country Action" in January 2011. The overall objective of this three-year project is to encourage the inclusion of groundwater governance on national, regional and international political agendas.

The implementation process for the project consists of three components. Firstly, a series of Thematic Papers will serve as the main instrument for establishing a scope for action on groundwater governance in order to prompt active dialogue between policy makers and hydrogeologists. The Papers will synthesize current knowledge and experience in the key economic, policy, institutional, environmental and technical aspects of groundwater management, together with emerging issues and innovative approaches.

Secondly, a fundamental component is a series of Regional Consultations, the results of which will be crucial to the project. These Consultations will focus on the regional characteristics of groundwater use and will seek to answer questions about the significance of regional variation with regard to groundwater governance. The Thematic Papers will provide the background for debate during the Consultations, which will focus on challenges and priorities for the region, as well as possible visions for the future. The Consultations will also consider 'twinning', i.e. the bringing together of successful models of groundwater governance for future collaborations.

These Regional Consultations, taking place across the world, will play a vital role in achieving a shared vision based on real needs and expectations both in the regions and at the country level. Their aim therefore is to:

1. Acquire first-hand knowledge of regional issues from water policy-makers, water managers and groundwater experts;
2. Raise awareness and promote a global groundwater agenda;
3. Build partnerships amongst collaborating project agencies, cross-sectoral stakeholders, decision-makers and specialists.

The third component, which will be ongoing throughout the project, is the Permanent Consultation Mechanism (PCM). Expanding the PCM to include a large number of partners demonstrated the need to undertake a more formal stakeholder

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UA Researchers play major role in Groundwater Governance Framework

Collaborations by UA researchers with UNESCO's International Hydrological Programme (IHP) and the Internationally Shared Aquifer Resources Management Programme (ISARM) have led to substantial involvement in the Global Framework described by Christine Abdallah Iskandar of IHP in this issue (Guest View). In December 2010, IHP convened a conference marking the tenth anniversary of the ISARM. On that occasion, Robert Varady of the Udall Center for Public Policy and Sharon Megdal of the UA's WRRRC presented papers. UA colleague and co-author Chris Scott also participated in the conference. In addition to the presentations, Varady served as General Rapporteur of the conference.

Soon after the conference ended, IHP joined with international organizations forming the project, "Groundwater Governance: A Global Framework for Country Action". The project is preparing a set of ten thematic papers on various aspects of groundwater governance. Robert Varady has been

serving as lead author and coordinator for the first of these papers, "Groundwater Policy and Governance." Coauthors include Sharon Megdal, Andrea Gerlak of the International Studies Association and Udall Center for Studies in Public Policy at the UA, and Lily House-Peters of the UA School of Geography and Development and the Udall Center, among others. This policy paper is unofficially considered "the 'lead' paper in many respects," according to project director Jacob Burke, Senior Water Policy Officer at FAO.

The Global Framework process will soon move to its second stage, a series of regional consultations held in different continents, at which government officials, stakeholders, and scientists will be invited to comment on the papers so as to inform subsequent versions. The first such consultation will be held in Montevideo, Uruguay, between April 18 and 20. Varady and Megdal will be attending and serving as resource persons and rapporteurs. The second consultation is scheduled for May 24-26 in Nairobi, Kenya; and the third for October 8-10, in Amman, Jordan.

NEWS BRIEFS

House Bill Offered on Home Sales, Water Supply Disclosure

House Bill 2025 would require developers who subdivide property outside of an Active Management Area (AMA) to record the subdivision's determination of water adequacy or inadequacy issued by the Arizona Department of Water Resources. A document containing the determination would have to be recorded with the respective county recorder.

ADWR's Water Adequacy Program already requires the developer of a proposed subdivision to submit plans for the water supply for the subdivision and demonstrate the adequacy of the water supply to meet the needs projected by the developer. After evaluation, ADWR makes a water adequacy or inadequacy determination.

Under the Water Adequacy Program, developers are required to disclose any inadequacy of the water supply to potential buyers and may sell lots with an inadequate water supply determination. However, in the past there has been no requirement that documentation of the determination should be recorded with the county.

Two Bills before State Legislature on Water Harvesting

S.B. 1236 would provide for the recharge of harvested rainwater, by directing the Arizona Department of Water Resources to develop rules governing collection, storage and recovery practices. These rules would include a method for calculating the amount of water harvested. Provisions of the bill limit the annual recovery of such recharge to 50 percent of the base amount of water that is harvested. The bill defines "harvested water" as rainfall that is captured before reaching a natural channel, drainage way or navigable waterway.

H.B. 2363 concerns the recharge of "Macro-Harvested Water", which relates to large scale projects rather than projects of individual home owners or commercial establishments. The bill would establish a 28-member Joint Legislative Study Committee on Macro-Harvested Water to analyze and evaluate issues arising from the collection and recovery of large scale harvested water. Macro-harvesting of water involves capturing and storing water that runs off of all impermeable surfaces at scales from subdivisions to watersheds. 🏠

National Climate Assessment Comes to Tucson

On January 18 and 19, 2012, the University of Arizona was host to a Convening Lead Authors (CLAs) meeting with the National Climate Assessment (NCA). Approximately 60 CLAs from 30 NCA chapters met to work through examples of how to use the methodologies, framing, and evaluation tools that have been developed in order to ensure a consistent approach across writing teams and a strong focus on the quality and transparency of the information used to draw conclusions. CLAs discussed potential key messages, explored the "risk-based framing" concept, and started outlining their chapters for the 2013 synthesis report. This meeting also included a "world café" that featured issues like how to most effectively integrate themes across regions/ sectors and identifying remaining issues that need to be addressed in the Assessment process. In addition to the CLAs meeting, the Executive Secretariat met twice to address strategic and management issues.

All of the technical input documents that have been in preparation over the last year will be due on March 1 and the CLAs will work with each chapter's authors to put together 8-page synthesis documents that are due on June 1. Over the summer, a synthesis document will be refined and edited,

aiming for a public review of the full draft towards the end of 2012. CLAs from the University of Arizona include Gregg Garfin, Deputy Director for Science Translation & Outreach, Institute of the Environment (Chapter 20: Southwest Region) and Diana Liverman, Co-Director, Institute of the Environment (Chapter 27: Agenda for Climate Change Science).

The NCA is being conducted under the auspices of the Global Change Research Act (GRCA) of 1990. The GRCA requires a report to the President and the Congress every four years that integrates, evaluates, and interprets the effects and current trends of global change, both human-induced and natural, and projects major trends for the subsequent 25 to 100 years. National climate assessments act as status reports about climate change science and impacts. They are based on observations made across the country and compare these observations to predictions from climate system models. The NCA aims to incorporate advances in the understanding of climate science into larger social, ecological, and policy systems, and with this provide integrated analyses of impacts and vulnerability.

More information about current research and previous NCA reports can be found at <http://www.globalchange.gov/what-we-do/assessment>.

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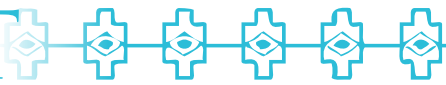
natural world has evolved.

Reining in the Rio Grande has close ties to the University of Arizona. Material in the book is based on work supported by SAHRA, the UA center for Sustainability of semi-Arid Hydrology and Riparian Areas, funded through an STC program of the National Science Foundation. Author Mary Black was a writer and editor at SAHRA and is presently special assistant to the Vice-President for Research at UA. 🏠

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Marissa Isaak came to the University of Arizona with a diverse background. She received her BA from Claremont McKenna College in Economics and International Relations in 2003, worked as an environmental consultant to companies managing their climate change policy risk, served as the Middle East manager for an NGO that promoted global legal reform, and received a prestigious Dorot Fellowship that allowed her to do a variety of environmental projects in Israel. She

returned to school, earning her MA in Geography at the University of Oregon in 2010. Today she is pursuing her PhD in the School of Geography and Development (SGD) at the University of Arizona and working as a graduate research assistant (GRA) for the Water Resources Research Center (WRRC). This semester she is taking a leave of absence to care for her first child, born in January.

She came to the UA to take advantage of its robust resources in arid land management and water policy. As a student in SGD, she has taken courses on water politics and policy, arid lands, Middle East urbanism, and science and technology studies. She taught an undergraduate course on Political Geography. A self-described “water geek,” she cares deeply about finding solutions to water scarcity challenges around the globe. As a GRA at the WRRC, she assisted with a new book project that resulted from a workshop held in 2010, which brought together top water decisionmakers from Israel, Palestine, and Arizona (AzIP). The resulting book will cover challenges in the Middle East and the American southwest regarding water resources. Additionally, Marissa has conducted extensive research on Israeli water policy for Dr. Sharon Megdal, attending the Deserts, Drylands, and Desertification conference held at Sde Boker, Israel in November 2010.

Marissa’s research is closely related to the topics addressed at the AzIP workshop. Drawing on her experiences living in Israel and Jordan, and her Hebrew and Arabic language skills, she is investigating the social and political impact of Israel’s recent transition toward large-scale desalination in its water system. In the last ten years, Israel has moved swiftly to insulate itself from periodic drought by building some of the world’s largest seawater desalination plants along its Mediterranean coast. Much work has been done on the technical (both scientific and economic) aspects of these plants, but comparatively little research has occurred looking at desalination as a social and political force in society. Marissa’s work will lend valuable insight into how policymakers manage both the water and electricity requirements of these plants, how people perceive and treat this “new water”, and how financial risks of desalination are distributed. Given the considerable international popularity of desalination to solve water scarcity in arid regions, Marissa’s analysis will inform other regions with a desalination agenda.

Since beginning her PhD at UA she has received a number of awards. She received the Social and Behavioral Sciences Research Institute (SBSRI) Grant Development Award and additional funding from SBSRI for a pilot study in Israel. She was awarded a Foreign Language and Area Studies (FLAS) grant from the Center for Middle East studies for continued Arabic language study in Jordan in summer of 2011. And she is currently an AICE/Schusterman Israel Scholar for

her work related to Israel studies.

This summer, Marissa will return to the Middle East to begin dissertation field work. She intends to graduate in the spring of 2014.


Brittany Choate Presents WRRC C2E Work and Wins, Twice

On November 4th, Master’s student in Soil and Water Science Brittany Choate was awarded 2nd place in the Agriculture & Environmental Sciences Graduate Student division for her presentation at the University of Arizona’s campus-wide Student Showcase. This event occurs annually during Homecoming weekend and provides more than 100 undergraduate and graduate students with an opportunity to communicate their research with interested community members, university students, and returning alumni. Choate’s poster at this event described the Water Resources Research Center’s Conserve to Enhance (C2E) Tucson Pilot program. C2E is a WRRC program designed to link municipal water conservation with environmental enhancement.

Choate again presented her work at the Institute for the Environment’s Environmental Research Grad Blitz held on November 8th, where she won the Judge’s Choice award for best presentation linking science to society. The Grad Blitz is an opportunity for graduate students to present either a poster or a five minute, rapid fire talk outlining their environmentally related research at the University. Twenty-three oral presentations were given at the Blitz.

More information about Conserve to Enhance and the C2E Tucson Pilot can be found at the WRRC’s website: ag.arizona.edu/azwater/conservetoenhance. 

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 analysis to ensure representative engagement from both groundwater users and the managers directly responsible for implementing groundwater governance. Two recent events organised by UNESCO-IHP: the project Inception meeting, (6-7 September 2011), followed on November 2nd by a Side Event held during the 36th UNESCO General Conference, both generated considerable interest and a significant number of Member States, Permanent Delegates, experts and representatives of institutions expressed their desire to join the PCM.

The results of the above-mentioned components will then feed into a global “Framework of Action”, consisting of a set of best practices for the sustainable management of groundwater resources. Such a framework is essential if we are to ‘inspire’ rather than ‘scare’ potential stakeholders and actors. The project is designed in such a way that it summarises the state-of-the-art in terms of regional priorities to the point where the parties can articulate and agree to a global Framework of Action. The global Framework of Action seeks to penetrate political and economic consciousness and will be used to encourage countries to adopt a broad set of policy, regulatory, institutional, economic, and financial reforms, as well as to provide technical assistance. The ultimate goal is to achieve the sustainable management of groundwater resources. 



By Sharon Medgal



I am taking my first-ever sabbatical this Spring semester. My travels and fact-finding will include lectures in Israel and Australia about water policy under conditions of growth and scarcity. I expect to speak about transboundary aquifer assessment and water banking at the Sixth World Water Forum in Marseille, France. I consider myself lucky to have the opportunity to share our region's water management innovations, along with our challenges. Sharing

experiences and lessons learned is very important for identifying pathways to meeting water management goals. Identifying commonalities actually makes the world seem smaller and gives me the sense that, although many water issues are local or regional, we truly are in this together.

In November 2011, this view was reinforced by my visits to water sites in the Middle East and Mexico. In Israel, I spent two days visiting projects sponsored by the Jewish National Fund of the United States (JNF-USA). Located in the city of Be'er Sheva in the Negev desert, the Be'er Sheva River Park started in the 1990s as a river restoration project. It has grown into a massive water, environment and economic development project, which is transforming the riverfront into the largest municipal park in the country. The ongoing work reminded me of the river restoration sites in Phoenix and Tucson. In fact, in November 2010 I met Itai Freeman, director of this large-scale project, when he spoke of this project and I spoke about successful restoration in central Phoenix. It was gratifying and informative to see the on-the-ground progress they've made in just one short year. I also visited two school-sites, one on a kibbutz and one in Jerusalem, designed by Amir Yechieli, where toilets are being flushed with rainwater collected on site. I saw well drilling activity in Northern Israel, where a new well field will provide supplemental watering of tree orchards when surface water supplies are insufficient. Nearby, I saw the site of a devastating 2010 forest fire. In Jordan, I visited the site in the Jordan Valley, Deir Alla, where grey water is expected to be collected from homes, treated with a specially designed filter, and delivered to nearby farms. The Jordan Valley Authority provides blended wastewater to the Jordan Valley, the largest agricultural region in Jordan. The site for the grey water facility lacks public sewage services, and freshwater supply from the municipal network is limited. The filter, designed by the Jordanian Royal Scientific Society team with whom I've had the pleasure of working, employs a simple low-cost technology suitable for use by local residents and farmers.

A coincidence of timing had me visiting two water bodies, thousands of miles apart, that serve as flyways for many bird

species, one in Israel, the other in Mexico. The first was Agamon Ha'Hula, the "little lake" in the Hula Valley in the northern part of Israel. This successful restoration project, funded by Keren Kayemet L'Israel - Jewish National Fund (KKL-JNF), involved restoring water to an area that was previously drained to increase arable land. The results of the drainage were so severe that, over time, spontaneous underground combustion resulted. The restored area involves a small lake that now attracts many bird species, including migrating euro-asian cranes. At dusk, they swoop into the lake area to sleep for the evening. What a sight to see – and sounds to hear. The little lake is a focal point for eco-tourism and outdoor recreation, with trails established for bicyclists, and motorized tours enable visitors like me to see the splendor of the migrating cranes. The thought that came to mind is a variant of "if you build it, they will come," namely, "if there is water, the birds will come."

In late November, I had the honor of being hosted by the Mexican Commissioner of the International Boundary and Water Commission Roberto Salmón Castelo and accompanied by U.S. IBWC Commissioner Edward Drusina for a visit to the Cienega de Santa Clara. On our way to the Cienega, another important flyway, we visited a Mexicali wastewater treatment plant and adjacent wetlands site. It is expected that the additional treatment provided by the wetlands will produce water suitable for reuse.



Lake Hula, Israel wetlands provide welcoming habitat for waterfowl.

The development of the wetlands, still under construction, is being steered by the Sonoran Institute and Pro Natura. Both nongovernmental organizations had expert staff on hand with us for the day. We crossed a bridge over the Rio Colorado, where the water in the river is agricultural return flows. We lunched at a riparian restoration site, which has received Mexican federal governmental funding to provide short-term employment. Then we arrived at the Cienega and boarded small boats. We saw wonderful bird habitat. It

was inspiring to see this site, about which I had heard so much. The Cienega has significance to the issue of operating the Yuma Desalting Plant – the water that would be directed to the YDP for treatment currently flows into the Cienega. An important part of the recent YDP test run was a historic binational agreement to send additional water to the Cienega in order to mitigate impacts to this wetland, along with an environmental monitoring program implemented by a team of US and Mexican scientists. A monitoring report is expected soon.

Visiting Agamon Ha'Hula, the Cienega de Santa Clara, and the several other sites reinforced the importance of seeing things with one's own eyes and exchanging information and lessons learned. The connections to our region are obvious: river restoration, rainwater harvesting, grey water filtration, water for people and agriculture, drought and fire. These projects also underscore the crucial roles of public-private partnerships and dedication to finding solutions to difficult water challenges. I look forward to sharing my sabbatical experiences in future columns! 🏡



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Policy and the Sonoran Institute to elicit feedback from a group of about 80 participants on goals and priorities for water policy in the Sun Corridor. Most of the participants agreed that future water management will benefit greatly from a broader engagement of citizens on the fundamental values and policy choices that underlie water management decisions. The organizers will be following up the workshop with a more comprehensive analysis of the results, as well as future workshops.

The first afternoon session featured perspectives from various industry sectors. Real estate development, recreation and tourism, and mining were represented on the panel. Each of the speakers described the importance of their industries to the state, their water concerns, and actions that have been or should be taken to improve water use efficiency. For example, the audience learned from Dale Larsen, Professor of Practice of the School of Community Resources & Development at ASU, that golfing is in decline. He told the audience that although golf courses coupled with resorts bring tourists to the state, Arizona has more golf courses than we need (300+). A move towards trails and open space could continue to bring in tourists without the high water use required by golf courses. Audience members commented that pricing will be a large factor in curbing water use for industry and spur innovation. Discussion of the importance of education brought the suggestion that featuring signage about water conservation on golf courses that use reclaimed water will enhance both water education and public image.

A panel on natural resources and land use followed the industry panel. David Rousseau, President of the Board of the Salt River Project, told the story of his experience in farming and then put on his SRP hat to discuss the necessity of conservation across the US, but particularly urged the protection of Central Arizona's forest reserves and water storage. Maria Baier, Commissioner of the Arizona State Lands Department, explained the limits placed

on the disposition of State Lands by the Arizona Constitution and the meaning of their trusteeship of lands for Arizona's future. Comments from the audience suggested there are political trade-offs among factors such as costs, quality and quantity that affect resource use. We need to face these trade-offs, but people are innately resistant to change and do not respond until the impact is visible. Pricing may help in this regard because many people pay attention as soon as their wallets are affected. A Prescott College student expressed the need for urgency in taking action about these water issues, because some areas of Arizona are threatened with scarcity sooner than others.

Finally, the wrap-up session featured a look to the future of Arizona water. Grady Gammage moderated this session and kept the panelists on their toes with pointed and provocative questions. David Snider, District 3 Supervisor for the Pinal County Board of Supervisors, expressed the opinion that facing the hard issues in water is going to be inevitable. He drew an analogy to facing the problems of aging. "If you're not concerned about aging," he said, "just wait!" Audience members made several pointed comments, including the fact that Flagstaff is not included in the Sun Corridor. The commenter said they are working now on actions to avoid growing into the urban corridor. In support of public involvement, conference participants mentioned the importance of water education programs, and held up the Tucson-Pima County regional partnership on water and wastewater infrastructure as an example of how to do things right.

Grady Gammage brought the Annual Conference to a close by pointing out that just the fact that we are talking about the Sun Corridor as an entity is a success. Water planning discussions have never happened on this scale before in such a cohesive fashion. "We're breaking new ground by having these conversations and shifting the water paradigm." 