



## Golf Courses Go Green With Less Green — Two Approaches

by Joe Gelt

Despite its reputation for indulging in water-wasting ways — or perhaps because of this reputation — people take note when Las Vegas makes a special effort to conserve water. Las Vegas is viewed as the prodigal son of cities, much lauded when it takes up the good cause of water conservation after its profligate ways.

The city of Atlanta, for one, found inspiration from Las Vegas's water saving efforts. A story in the *Atlanta Journal-Constitution* stated, "When it comes to water, the Big Peach has a thing or two in common with Sin City." Atlanta officials hired consultants from Las Vegas to help them deal with their unprecedented drought.

That Las Vegas conservation efforts often make a bigger splash and get more attention than do Arizona's is grounds for a critical appraisal of their water saving strategies, especially if you are from Arizona. University of Arizona student researcher Tim Cloninger considered golf courses which are significant water users, comparing Las Vegas and Arizona

*Continued on page 3*



*Golf course at the Hilton Tucson El Conquistador resort.*

## Q & A With Benjamin Grumbles, New AZ Department of Environmental Quality Chief

*In announcing Benjamin Grumbles' appointment as Arizona Director of Environmental Quality Governor Jan Brewer stated, "Mr. Grumbles is an internationally renowned expert in water conservation and water quality and will serve this administration and the citizens of Arizona very well." His most recent position was serving as Assistant Administrator for the Office of Water at the U.S. Environmental Protection Agency.*

*The following exchange is from a recent question-and-answer session between Benjamin Grumbles and Joe Gelt, editor of the Arizona Water Resource newsletter.*

**JG:** *How will your experiences in Washington DC help you in Arizona at the state level?*

**BG:** As part of my Washington experiences I have worked over the years very closely with state environmental professionals throughout the West. I've worked with environmental advocacy groups and also with industries and utilities — water and wastewater.

I have spent 20 years working as an environmental professional, mostly in the water arena. I have focused over the years on collaboration, tackling tough issues and making sure that decision makers got a variety of perspectives and views and to look for common ground, if that were achievable. If that were not possible then middle ground.

I am excited about this opportunity to focus on a particular place — Arizona — and tackle not just water but clean energy and air and waste challenges.

**JG:** *How will working at the state level be different than working at the federal level?*

**BG:** One of the biggest differences is that real-time decisions need to be made at the state level

*Continued on page 2*

Features.....	1
News and Notes.....	2
News Briefs.....	4
Legislation and Law.....	6
Public Policy Review....	7
WRRC Conference.....	9

*Interview...continued from page 1*

and the decisions have direct impact. At the national level this process usually involves developing a broader policy that takes more time and takes into consideration a lot more procedures. Also, working at the state level provides a chance to get closer to the issues and the people impacted by the issues, to see on-the-ground issues and challenges. Working at the state level will give me a greater sense of accomplishment.

**JG:** *In Washington DC you had a national perspective or overview. From that perspective what water issues have Arizona handled well compared to other states?*

**BG:** I think Arizona has been very forward thinking in its regulation of groundwater compared to many other states. What I have seen is that the state has enacted measures and taken steps to protect current and future groundwater supplies. I have also seen in recent years a significant increase in water conservation and water recycling in Arizona. We are really going to focus on water conservation and water recycling. This is one of our priorities as the agency gets developed over the weeks and months.

While there is tremendous work to be done to accelerate the pace of environmental progress and to recycle and reuse water more effectively, I think Arizona has done an exceptional job to date. It is just that I know there is a lot more to be done. One of my favorites saying I have heard people say is: There is no such thing as wastewater just wasted water. Also, I am looking particularly at landscape irrigation and outdoor water use.

**JG:** *Again from the national perspective, what water issues have Arizona not handled as well as other states?*

**BG:** One of the greatest challenges is sustainable growth — making decisions keeping in mind the water scarcity and water quality challenges.

**JG:** What is your strategy for working with the state Legislature?

**BG:** I have worked for years with other legislatures, in particular US Congress, but also other state legislatures and for me the strategy is respect and transparency. A priority for me is to make sure that the legislators get the facts and the respect they deserves. They have

tremendously important responsibility in overseeing the environmental agency and also providing funding for its programs. There are different issues, and sometimes these decision create winners and losers and my goal is not to have that always be the case, to try to find win-win solutions. But I know there will be times when the regulated entities and others or maybe members in the legislature are not comfortable with a decision or don't understand why a decision was made. So for me the most successful strategy is to respect their role and also to provide them the facts in a timely and transparent manner.

I believe I have testified before Congress over 60 times. I always viewed it as an opportunity for me to learn and also for the congressional committees and members to learn more about the issues. I always thought that was an important role, not just testifying but also providing information to them and working with their staff and helping them make the best decisions possible.

**JG:** *What ADEQ priorities have you identified?*

**BG:** My priority is to get to know the Legislature and the agencies and the utilities and all those who are involved in water policy in the

## WRRC News and Notes



**Reclaimed Water Topic of New WRRC Publication** An issue of WRRC's "other" newsletter, the *Arroyo*, has recently been published. Published once a year, the 12-page *Arroyo* focuses on a critical Arizona water issue. This year's issue discusses reclaimed water, a topic of emerging importance. The *Arroyo* will be sent to those on the WRRC mailing list who receive the *Arizona*

*Water Resource* newsletter. Extra copies are available for educational purposes. Also, copies are available on line at the WRRC web site: <http://ag.arizona.edu/AZWATER/>

**WRRC Fetes CAP Chief on Retirement** On March 6 the Water Resources Research Center hosted a reception honoring David "Sid" Wilson on his retirement as general manager of the Central

Arizona Project. Sid has long ties with WRRC. He was student of Sol Resnik's, the first WRRC director, later director emeritus, and he remained a close friend until Sol's death Dec. 11, 2005. Sid has been a strong supporter of CAP partnerships with the WRRC and the University of Arizona. Sid also serves on the WRRC external advisory committee.

His retirement plans include organizing a 501(c)(3) charitable foundation to support the work of the Refuge of Hope in Pucallpa, Peru. The Refuge provides primary and secondary education as well as skills training for physically handicapped and poor children.

**Newsletter contains special supplement, feature.** The supplement included in this edition of the newsletter is devoted to the UA Water Quality Center and describes the five programs included within the AWQC. The newsletter also includes a special feature discussing the March 17 WRRC conference titled, Best Practices for Stakeholder Engagement in Water Resources Planning.

state. That will give me the best framework to develop priorities. The water scarcity problem and the opportunities for conservation and reuse will be a good start at setting priorities. An area receiving a lot of attention, from me, the governor and those in her administration as well as Congress is clean energy, particularly renewable energy. What is the water footprint, for example, of solar power generation? That is an area where I am going to spend quite a bit of time working with both the industry and with the scientific community to learn more about the issue.

*Interview...continued on page 5*

*Golf Courses...continued from page 1*

strategies to promote more water-efficient courses. His study shows two much different approaches that yield different results.

Due to a lack of progress in meeting conservation goals, the Southern Nevada Water Authority in 1991 launched an aggressive multi-million dollar water conservation plan called "water smart landscapes." The rebate program pays residential or commercial water users, such as golf courses, \$1.50 for every square foot of turf replaced with desert landscaping with no cap on the acreage.

Cloninger reports that golf courses have been star achievers in the rebate program. Since 2002, 24 of the 52 Las Vegas Valley golf courses have converted 425 acres of turf to a desert landscape. On average, the turf reduction program for golf courses saves one billion gallons of water per year.

Cloninger describes Arizona's much different approach to ensure water savings on golf courses. The Las Vegas approach of cash up front encourages immediate results and is suitable for a city getting started late and needing to catch up. Arizona has taken a more long-term, institutional approach, with laws and regulations put in place to ensure that golf courses are constructed and managed for greater water efficiency.

Arizona was thinking about golf course water use in 1980 when the Legislature passed the Groundwater Management Act. The GMA established the Arizona Department of Water Resources which then developed management plans in each of the newly established five Active Management Areas. The management plans regulated golf course water use within the AMAs. Golf courses with over ten acres of irrigated turf are considered large turf facilities, covered by the Industrial Conservation Program of the AMA Management Plan.

The management plans recognize that key to ensuring golf course water savings is regulating the amount of turf. Less turf means less water use. Beginning with the First Management Plan in 1984, ADWR regulated acreage of golf courses built after January 1984. The plan limited new golf courses to 23.8 acre-feet of water per hole. At an application rate of 4.6 acre-feet a golf course could have no more than five acres of turf per hole. For an 18-hole golf course, this allows 90 acres of turf.

This new model golf course contrasted with the pre-1984 design defined by a tree-lined layout with more turf. Cloninger reports that ADWR regulations required golf course architects to design more narrow, target style layouts that concentrated the turf in the playing areas. On average, the golf courses within AMAs built after 1984 have 30 acres less turf than the pre-1984 courses.

Along with golf course design another Management Plan strategy is to encourage the use of renewable sources of water. A golf course in Arizona using 100 percent of a "renewable" source of water is not regulated by the maximum total annual water allotment. If one drop of groundwater is used to irrigate the course, however, the golf course is regulated by

the total annual water allotment.

Cloninger reports that since First Management Plan was implemented in 1985 the trend for golf courses to use a renewable source of water is on the rise. For example, in the Tucson AMA in 1995, 34 percent of the water use was from renewable sources, and in 2006, 53 percent was from a renewable source.

Cloninger's study shows that in 2006, the 330 golf courses in Arizona used approximately 160,000 acre feet of water. Of those 160,000 af, approximately 80,000 af were groundwater, 38,000 af surface water, and 46,000 af effluent.

Cloninger concludes that in shaping desert golf course design ADWR conservation plans have saved a significant amount of precious groundwater. In the Phoenix AMA, 1,706 golf course holes or roughly 95 18-hole golf courses have been constructed since the First Management Plan was implemented in 1985

The average size of an eighteen hole golf course in the Phoenix AMA prior to the ADWR regulation was 105 acres of irrigated turf; after 1985 the average size decreased to 84 acres of turf. Ap-



Grignano and ADWR staff for their assistance with his work.

Timothy Cloninger majored in turf grass sciences as an undergraduate at the University of Arizona. He earned a graduate certificate in water policy and is currently working on a graduate certificate in GIS. Cloninger has worked on golf courses in Las Vegas and Arizona. He researched golf course water use for an Arizona Water Policy course. He thanks Laura

plying the ADWR regulatory application rate of 4.9 acre feet per year for turf, the Phoenix AMA potentially saves 3.18 billion gallons of water per year by reducing the size of courses.

That compares very favorably to Las Vegas where the SNWA has spent millions on the golf course turf reduction program over the past seven years saving approximately one billion gallons of water annually. Cloninger concludes that Arizona's GMA demonstrates that the workings of effective policy and regulations is a far better water-saving option than the extensive and costly Las Vegas turf reduction program. 🏗️



**Arizona Water Resource** is published 6 times per year by the University of Arizona's Water Resources Research Center. **AWR** accepts news, announcements and other information from all organizations

#### Arizona Water Resource Staff

Editor: Joe Gelt  
jgelt@ag.arizona.edu

Layout: Patrick Hayes

Web site:  
<http://cals.arizona.edu/azwater/awr>

WRRC Director: Dr. Sharon Megdal

#### Arizona Water Resource

Water Resources Research Center  
College of Agriculture and Life Sciences  
The University of Arizona  
350 North Campbell Avenue  
Tucson, Arizona 85719

520-621-9591 FAX 520-792-8518  
email: [wrrc@cals.arizona.edu](mailto:wrrc@cals.arizona.edu)



## News Briefs

### Fossil Creek, a New Wild and Scenic River

Arizona has another Wild and Scenic River; Fossil Creek with its travertine geological formations and crystal clear waters now shares the same protected designation as a segment of the middle Verde River, the state's only other Wild and Scenic River.

Approving Fossil Creek's special designation was a detail in a massive piece of legislation, the Omnibus Public Land Management Act, a package of over 160 bills, that set aside more than 2 million acres of newly protected wilderness in nine states. More than 3.3 million acres of public lands in Arizona gained permanent protection. President Obama signed the law on March 30.

Fossil Creek is an Arizona success story, an environmental rags-to-riches tale. Dammed early last century for power generation, Fossil Creek's once quick-running water was a mere trickle until the turn of this century. In 1999, Arizona Public Service shut down the power plants, and restoration efforts commenced.

The dam was lowered and diversions ceased in June 2005, restoring full flows to the creek. This is the first Arizona watercourse to have a major water retention structure retired.

In its heyday Fossil Creek was considered the fourth largest travertine system in the world. Fed by underground streams, it ran year-round almost 17 miles to the Verde River, its waters rich with calcium carbonate from the limestone aquifer below.

Fossil Creek was one of 86 newly established Wild and Scenic Rivers with others located in California, Idaho, Massachusetts, Oregon, Utah, Vermont and Wyoming. Efforts are underway to gain support for a Wild and Scenic listing of another Arizona River, the Blue River,

a tributary to the San Francisco River.

Rivers or segment of rivers are designated Wild and Scenic to protect special qualities including scenic, recreational, geologic, and fish and wildlife; they are not to be dammed or otherwise impeded to protect their free-flowing condition.

The recently passed law also provides other water-related provisions benefitting the state. Funding was authorized to support the federal government's role in a comprehensive effort to preserve wildlife habitat along the lower Colorado River. The bill also authorized the Secretary of the Interior to consider ways to supplement water supplies in the Sierra Vista Subwatershed to benefit Fort Huachuca and the San Pedro Riparian National Conservation Area.

### EPA: Groundwater, Not Ground Water

The following is intended more as a public service than a news item. It is a service to all those who have oft pondered whether groundwater or ground water is correct, whether it is one or two words. The issue has been known to cause hurt feelings, even office conflicts.

Whether or not the matter will now be settled once and for all remains to be seen, but the Environmental Protection Agency has come out in favor of the one-word version. This from its March 26 Office of Groundwater Technical Memorandum, 2009.03:

"Language evolves, and it is clear that the one-word spelling of groundwater has

become the preferred usage both nationally and internationally. The one-word spelling has been used by the Merriam-Webster online dictionary since 1998. Most water-resources publications also use the one-word spelling, as do many technical groups, such as the National Research Council. With the emphasis on interdisciplinary science, many USGS scientists who are not specialists in the field commonly use the one-word form, as increasingly do many hydrologists within the Water Resources Discipline ... With this memorandum, we are making a transition to the use of groundwater as one word in USGS."

### Suit Questions Santa Cruz River's Navigability

The controversy over the designation of the Santa Cruz River as a navigable river continues with the decision of state and national home builders groups to sue the federal government for granting the designation.

The Southern Arizona Home Builders Association, the Home Builders Association of Central Arizona and the National Association of Home Builders filed a lawsuit March 23 in U.S. District Court in Washington, D.C., seeking an injunction against the



Photo: National Forest Service

### The Drought is Over: Tears of Joy Rain Down in the Desert

Arizonaans who had noticed the above headline in a Jan. 19 *Arizona Republic* story might have felt that deliverance was at hand, that the dry times were over, that the drought index took a turn for the best, that drought-induced barriers to water use will be lowered and reservoir levels rise. Reading the story, however, would have disabused them of any such notions. The drought referred to was the long-lasting lackluster performance of the Arizona Cardinals, a team that finally proved itself and ended its winless drought by achieving Super Bowl status. Although impressive, the accomplishment failed to increase moisture in the state, even allowing for copious tears of joy.

Environmental Protection Agency and the U.S. Army Corps of Engineers.

This is the latest development in an issue arising when the U.S. Army Corps of Engineers reconsidered its May 2008 deci-

*Interview...continued from page 2*

**JG:** *What will the relationship be between ADEQ and the Arizona Department of Water Resources?*

**BG:** The governor is asking me and Herb Guenther [ADWR director] and others to work closely together to accelerate the pace of conservation, to save more and waste less. One of the things we are focused on is that there are different aspects to water conservation. One that ADWR is taking the lead on is the water quantity decisions and also encouraging consumers and the public to use water-efficient products and appliances. I launched the EPA Water-Sense program while at EPA which is modeled on the Energy Star Program. It provides consumers information so they can purchase the most water-efficient water products and appliances. I will be a big supporter of ADWR with that program. ADEQ will focus on water reuse and recycling using our regulatory authority under the aquifer protec-



*Benjamin Grumbles*

tion permit. But also we need to look at ways to remove potential blind spots, to look at the permitting process as well as economic incentives and other ways to make Arizona a national leader in water recycling. A very important part of that is ensuring that there are protective standards in place — public health and safety — and that a permitting process is efficiently run. It is also about public acceptability and taking on the perception that wastewater or recycled water presents some kind of threat. And so it is important to be working on multiple fronts and in coordination with ADWR and others to increase the pace of reuse and recycling.

For example, it is good policy in water conservation to promote reclaimed water infrastructure in new development; it is much more cost effective than retrofitting. As I learn more about specific areas I am going to be keeping in mind what opportunities there are to advance water conservation and reuse to make Arizona a true national leader in water conservation.

I have been told there is a project involving dewatering an underground copper mine to provide water to the New Magma

---

*State efforts are opportunities that involve the scientific and academic communities in significant ways.*

---

Irrigation and Drainage District. I am interested in that and seeing whether that can be a model. I need to learn more about it, but I am told that it keeps low quality-water out of Queen Creek and puts the water to beneficial use.

I have a lot to learn. I start on June 22 as the director. What I have been doing is reaching out and meeting key players and stakeholders and members of the public, to learn how the state, in a responsible manner, can save more, waste less and reuse and recycle the state's most precious liquid asset. So that is one very important part of the discussion that Herb and I have been having. It is using the various tools we have at the state level.

**JG:** *Any final comments?*

**BG:** One of the reasons I am delighted to talk with you and know about the Water Resources Research Center is that state efforts are opportunities that involve — and need to involve — the scientific and academic communities in significant ways. I have worked for years closely with the National Academy of Sciences. My years of experiences in Washington have taught me that sustainable solutions are based not just on the democratic process of bringing in different stakeholders and looking for a middle ground or a common ground; it is also making sure that decisions are based on sound science and that means involving the scientific community.

This can provide the foundation for what we know, for identifying what we don't know and how we can close the gaps in the technology and other scientific areas.

I am excited about that and working with the science community as well as the water and wastewater utilities and others. For example, I have talked and worked for years with Rain Bird. They have won various awards for being a leader in water efficiency and smart water irrigation systems, and I think this is an example of leadership in the business community that can help Arizona be outstanding in water conservation and recycling. 🏗️

sion classifying two segments of the Santa Cruz River as navigable pending further review. This raised statewide and even national concern that the Corps' action might portend a change in its regulatory approach to the Clean Water Act.

Defining navigable waters became problematic after a 2006 Supreme Court ruling muddled the concept, a decision that federal officials have been laboring ever since to incorporate into their rulemaking. The Corps' decision to review its initial Santa Cruz designation reflected this uncertain state of affairs.

In face of the controversy, EPA stepped in and announced in August that it would consider the Santa Cruz River a "special case" and decide the designation itself. A Dec. 3 letter to the Corps from the Benjamin Grumbles, the then EPA assistant administrator for water, stated that the river segments should be considered "traditional navigable water" as originally posted on the Corps web site.

The designation is important — and controversial — because of the extensive environmental protection it affords to rivers under section 404 of the Clean Water Act.

In making its decision EPA considered the width and depth of recorded flows, whether such recreational activities as canoeing and birding could occur and the possibility of increased flows from future restoration projects.

NAHB Chairman Joe Robson related in a written statement that, "It can't be an 'interstate highway of commerce,' which is the definition of a traditional navigable water." He also faulted what he said was the lack of public input into the decision-making process.



## Legislation and Law

### Apache Water Rights Settlement Worked Out

Another piece in the Indian water rights puzzle fell in place when a settlement was worked out with the White Mountain Apache Tribe. Until recently the tribe had resisted negotiating its claim of between 160,000 and 175,000 acre-feet of the Black and White rivers, a claim that had existed for almost half a century. The two rivers merge in eastern Arizona to form the Salt River.

The settlement resolves outstanding water claims by allocating to the tribe 52,000 acre feet per year; 27,000 acre feet will be from the watersheds of the Salt and Little Colorado rivers and 25,000 acre feet from the Central Arizona Project.

The tribe will be able to lease 22,500 acre feet of its CAP allocation to Valley cities for 100-year terms. The balance of the CAP allotment, 2,500 acre feet, is to be leased back to the Central Arizona Water Conservation District. The tribe cannot sell its CAP allocation.

Senator Jon Kyle introduced the White Mountain Apache Tribe Water Rights Quantification Act authorizing and confirming the tribe's water settlement. The Mesa City Council was the first to sign off on the settlement; the city will be leasing from the Apaches about 866 acre-feet per year with the highest-priority rights and 2,706 acre-feet of lower-priority water for about 100 years. The city will make a single payment of about \$7.8 million.

Along with Mesa, 18 other parties must agree to the settlement that also will need congressional ratification. Proponents of the bill expect smooth sailing.

The bill also authorizes funding for a key drinking water project on the tribe's reservation in northeastern Arizona. The Miner Flat Project, which will be located on the north fork of the White River, is intended as long-term solution to the tribe's drinking water needs.

Settling the White Mountain Apache water right claims also benefits Valley water users. Quantifying water rights on the reservation, which is located at the headwaters of the Salt River, ensures that tribal claims will not threaten Salt River Project water supplies.

With the White Mountain Apache water rights settled, the largest remaining Indian water

right disputes in Arizona involve Navajo and Hopi claims to the Colorado and Little Colorado rivers.

### Court Sides With Power Plants on EPA Cost-Benefit Water Rule

The U.S. Environmental Protection Agency may have to take into account the costs and benefits of new regulations that require power plants to retrofit water intakes to protect aquatic life.

The decision, viewed as a defeat for environmental groups, reverses a 2007 ruling by the 2nd U.S. Circuit Court of Appeals, which precluded cost-benefit testing when determining the most environmentally friendly technology for withdrawing water from rivers and streams to cool turbines.

Key to the Supreme Court's ruling was its interpretation of Section 316(b) of the Clean Water Act that requires the location, design, construction and capacity of cooling water intake structures to reflect the "best technology available for minimizing adverse environmental impact."

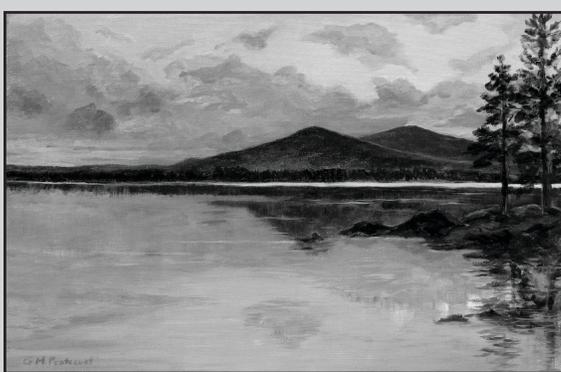
Writing for the 6-3 majority Justice Antonin Scalia stated, "The phrase 'best technology available,' even with the added specification 'for minimizing adverse environmental impact,' does not unambiguously preclude cost-benefit analysis."

Justice Stephen Breyer, often a swing vote when the Court takes on environmental issues, essentially took a middle position. In his concurring opinion he wrote, "I agree with the court that the relevant statutory language authorizes the Environmental Protection Agency to compare costs and benefits. Nonetheless the drafting history and legislative history of related provisions makes clear that those who sponsored the legislation intended the law's text to be read as restricting, though not forbidding, the use of cost-benefit comparisons. And I would apply that text accordingly."

Justice John Paul Stevens, joined by Justices Ruth Bader Ginsburg and David Souter, dissented arguing that Congress never intended to allow cost-benefit analysis. Stevens wrote, "Powerful evidence of Congress' decision not to authorize cost-benefit analysis in the BTA standard lies in the series of standards adopted to regulate the outflow, or effluent, from industrial powerplants. Passed at the same time as the BTA standard at issue here, the effluent limitation standards imposed increasingly strict technology requirements on industry."

It remains to be seen what course the EPA in the Obama administration will take, whether it will forego cost-benefit analyses when resulting in less environmental protection. Previous to becoming EPA administrator, Lisa Jackson directed the New Jersey environmental protection agency, a state that joined other states in challenging the EPA regulation that the court approved.

The cases are Entergy v. EPA, 07-588; PSEG Fossil LLC v. Riverkeeper Inc., 07-589; and Utility Water Act Group v. Riverkeeper Inc., 07-597.



*Hamley Lake on the White Mountain Apache Reservation. The above is an oil painting by Gwen Meyer Pentecost titled Western Sunset. Contact the artist for information about this and other paintings: pentemeyer@gmail.com Western Sunset can be viewed in color at <http://joyouslakegallery.com/Gwen-Pentecost/WesternSunset.htm>*



## Public Policy Review

By Sharon Megdal

### Payoffs From Water-Saving Practices May Have Down-the-Line Costs

*Reduced wastewater flows due to graywater use is a concern*



Practicing water conservation is generally acknowledged to be a good thing. Everyone recognizes that one way to lessen the need to find new water sources to supply growing populations is through demand side reductions or water conservation. As with most water management issues, however, complications invariably arise. One's perspective may depend on what kind of water is being

conserved and where.

Where legal, capture of rainwater or installation of graywater systems reduces demand for potable water. (It is worth noting that states have different statutes governing these practices.) Tucson, long a leader in water conservation, recently became the first city in the country to require rainwater harvesting for new commercial properties and graywater stub outs for new residential properties.

Admittedly, one can't assume that redirecting water use away from the potable system translates into less overall water use. It may just be a replacement of one type of water with another. However, electricity and treatment costs associated with the potable system will be reduced if household demand for potable quality water is reduced. Such water substitution would seem to be a good news for water supply and management agencies. But is it?

A recent newspaper article reported that the Southern Nevada Water Authority is opposed to installation of graywater systems in the Las Vegas area. More reuse of water at the household level means less water delivered to the wastewater treatment plant. For SNWA, this means lower discharges of treated wastewater into the Colorado River and, therefore, reduced return-flow credits. That is, reduced flows to and out of the wastewater treatment plant translate into a reduction in SNWA's overall withdrawal of water from the Colorado River system.

Discouraging graywater use seems to be a strange message to come from the agency that has received national attention for its efforts to replace turf with low water use landscaping. Yet SNWA is being consistent in its focus on reducing outdoor water use which does not result in reduced flows through wastewater treatment facilities.

But it seems a mixed message to say that at the same time outdoor water use should decrease, households must use potable quality water for other outdoor uses. While graywater use may reduce return flow water, it also reduces by a like amount the need to withdraw Colorado River Water for outdoor uses. The SNWA policy position reduces household choice and conveys the message that more use of potable water is better than less use.

Las Vegas is not the only community concerned about reduced wastewater flows associated with greater use of graywater systems. There are two general concerns. One relates to the operation of the wastewater collection system itself. Older systems have been engi-

neered so that dishwasher and washing machine output would flow through the sewer system to the treatment plant, providing relatively clean water to mix with the not-so-clean stuff that flows through the system. The graywater flows are needed to push the solids through the mostly gravity based, engineered systems. Reduced graywater flows could lead to some waste collection problems. For example, the City of Phoenix is experiencing increased wastewater treatment costs due to reduced flow in total water volume while having the same or increasing amounts of solid wastes.

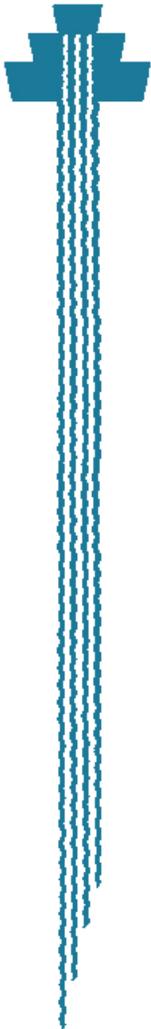
The other concern relates to water quantity, although it works out differently in Arizona than in Las Vegas. In Arizona, outflows from wastewater treatment plants have value as a component of a community's water supply portfolio. Whether through recharge and recovery or through enhanced treatment and delivery to turf or industrial users, water reuse is growing in importance to Arizona communities.

There are other concerns regarding water conservation or increasingly efficient water use. Reduced return flows from agricultural water use, for example, may have adverse impacts on riparian or other systems that rely on those flows. Another concern relates to "hardening" of water demand. If people become so efficient in their water use, fewer less painful opportunities exist for water conservation in situations of natural drought or water cutbacks, such as those being experienced in California due to the cutbacks in water flowing to Southern California through the State Water Project.

In Arizona, we've seen a move to best management practices for all water using sectors in the Active Management Areas; the Groundwater Management Act requires regulatory conservation programs in AMAs. Whereas the industrial conservation programs have long been based on best practices according to industry standards, we've seen a move to BMPs in the agricultural and, more recently, the municipal sectors.

It is important that the effect of moving away from a quantified water conservation target be monitored. After all, we do not want to see per capita consumptive use rates going up as a result of these changes to the regulatory programs! It is important that homeowners remain vigilant regarding their water use as they install rainwater or graywater systems.

I am now nearing the end of another spring semester when graduate students in my water policy class make presentations on their research. It is gratifying that they are connecting the collection of information with its use to consider policy options. Not that I necessarily need such a reminder, but working with them on their papers reminds me how complex evaluating alternatives and implementing water policies can be. Water conservation is no exception. Since water conservation policies are complex and can have unintended consequences, they must be monitored and evaluated, with the public informed to better understand their cost and effectiveness. ■■■



# Engaging Stakeholders in Water Resource Planning is WRRC Forum Topic

by Susanna Eden and Chet Phillips

On March 17, the Water Resources Research Center held its 2009 annual conference at the University of Arizona's Student Union Memorial Center. The topic was "Best Practices for Stakeholder Engagement in Water Resource Planning." More than 250 people attended. Following is a description of "mini-proceedings" covering some of the day's major events.

At first glance, this year's conference might have seemed easier to understand and more approachable than the complex water issues on the agendas of other meetings. After all, stakeholder engagement is essentially about people working together to identify and achieve a common goal. How difficult can that be?

As it became clear from conference presentations and discussions, it is an issue that can be as fraught with complexity as any other topic in water resources management. Years of theoretical and practical research, seat-of-the-pants experimentation, and personal and professional commitment have gone into understanding and improving stakeholder engagement processes.

No, the topic was not chosen for its simplicity. The reason this year's WRRC annual conference focused on stakeholder engagement was to

highlight the fundamental importance of involving stakeholders in water resources planning. Conference planners sought to move our statewide conversation about water planning forward, and progress can be made only through engagement of everyone with a stake in the outcome.

The conference focus also signaled the commitment of organizers to reaching out and encouraging involvement from a broad range of stakeholders. The 2009 conference was organized in collaboration with the Morris K. Udall Foundation and the Arizona Water Institute. The WRRC has collaborated with AWI on past conferences and other projects, but the partnership with the Udall Foundation was new. The Udall Foundation provides professional training and educational outreach on the environment, and through the U.S. Institute for Environmental Conflict Resolution, assists in the resolution of environmental disputes.

One of the well-documented obstacles to stakeholder engagement is the cost of involvement. This year the conference venue was chosen specifically to keep costs low, so that the savings could be passed on through low registration fees. In addition, the generous support of conference sponsors meant that the WRRC could offer fee waivers to all who requested them. In addition, a special effort was made to involve watershed partnerships and similar organizations throughout Arizona. In this effort the support of



*Audience members used the opportunities for questions and comments.*

Arizona NEMO (<http://www.snr.arizona.edu/nemo/>) and the Master Watershed Stewards Program (<http://ag.arizona.edu/watershedsteward/>) was invaluable.

The commitment of conference organizers to broad outreach paid off, with many audience members attending their first WRRC conference. More than 40 communities were represented, with registrations coming in from Arizona towns such as Maricopa, Golden Valley, Globe, Salome, Duncan, Safford, Bisbee and Wilcox, as well as Phoenix and Tucson area cities. Among the participants were three members from the Great Arizona Outback Rumor & Innuendo Historical Society in the McMullen Valley. Although the organization's name seems whimsical, these conference participants were serious about establishing connections

with other grass-roots organizations and gaining access to informa-






## Water Resources Research Center



### Best Practices for Stakeholder Engagement in Water Resources Planning

The University of Arizona  
Student Union Memorial Center Ballroom  
Tuesday, March 17, 2009































*Betsy Rieke delivers keynote address.*

stakeholders? What is engagement? She talked about the fact that there are different kinds of stakeholders. Some processes focus on engaging policy makers and forget the importance of involving the public. As an early conference announcement stated, “We all have a stake in our water future.” Therefore, we all are stakeholders. The fact that we are also all different, with differing interests, goals, beliefs, histories, etc., makes real stakeholder engagement a challenge.

The keynote speaker, Betsy Rieke, was involved in some of the most challenging stakeholder processes of the past thirty year. Rieke was Director of the Arizona Department of Water Resources from 1991 to 1993. In 1993, she was appointed by President Clinton to head the Office of Water and Science in the U.S. Department of the Interior. In that position she led an interagency, state and federal team involved in a complex negotiated planning process for the California Bay Delta, known as CAL-FED. Later, as Area Manager for the U.S. Bureau of Reclamation in Nevada, she was involved in negotiations on the Truckee River and Pyramid Lake restoration plans. Her talk drew lessons from these experiences.

In her keynote address, Rieke set out basic principles for success in resolving complex and contentious environmental and resource issues. She spoke about the need for leadership, what constitutes good leadership, and how to become a good leader in these situations. Key traits she counted off on the fingers of one hand were integrity, listening, team building, persistence, and optimism. She illustrated these principles with “war stories”. Like other war stories, these stories were full of lessons learned the hard way, setbacks and surprises — bad and good, but her overall message was hopeful. Later speakers elaborated on Rieke’s principles with their own specific experiences.

The theme of diversity emerged from the first plenary session “Issues in Stakeholder Engagement.” In her presentation “Tailoring the process to the situation – one size does not fit all,” Megdal spoke about the need to be flexible and adaptable. Different kinds of engagement are needed for different issues and different groups

and other resources to help them address their local water resource issues. The day-long conference provided a unique opportunity for people with a wide range of diverse perspectives to hear from experts, share experiences and discuss strategies for improving future practices.

When WRRC Director Sharon Megdal opened the first plenary session, she began with some basic definitions: Who are



*Panel members Sharon Megdal, Dave White and Dexter Albert take questions from the audience during Session I: Issues in Stakeholder Engagement*

of interested stakeholders. Arizona State University political scientist, Dave White took up a similar theme in presenting the concept of multiple knowledges. According to White, “There are multiple types of knowledge that are legitimate inputs into natural resource decision-making.” What is more, the design of a water planning process — its structure, who has access to information, and the rules and limits on participation — can advantage some and disadvantage others. His research identifies best practices for integrating different types of knowledge into planning processes.

Because of differences in perspective and knowledge systems, in a sense, cross-cultural communication is always a feature of stakeholder processes. Dexter Albert of Intrinsic Consulting talked specifically about engaging native people. Among his key points was the diversity of native people in Arizona. “One size does not fit all” applies to them as well, Albert said. They do not all speak



*Ellen Wheeler, Executive Director, welcomed conference participants on behalf of the Morris K. Udall Foundation.*

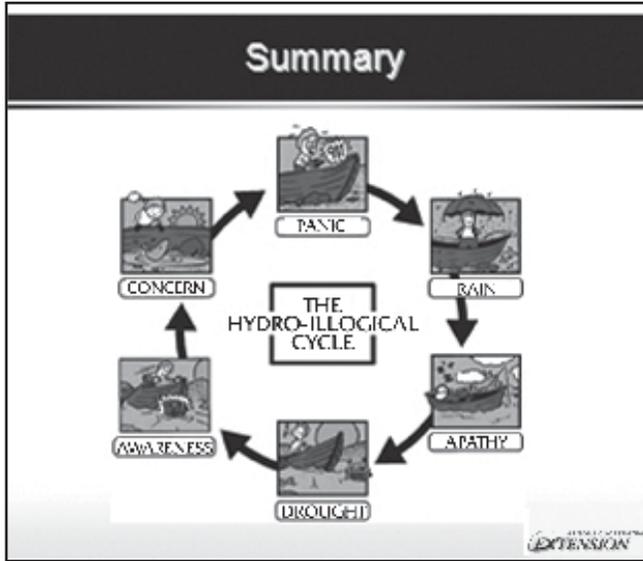
with a single voice. He also reminded the audience that members of tribes are citizens and stakeholders too; they do not always have to be approached through tribal governments. Sensitivity to differences should take into account preferred and customary modes of communication. Some approaches work better than others, like face-to-face meetings to establish relationships and build trust.

Albert’s bottom line could serve as a warning to everyone who approaches stakeholder engagement simplistically. “To sum it up in a nutshell: tribal engagement does not mean conducting a public meeting, holding a public hearing or sending a tribal consultation letter and calling the process complete or successful.”

The midmorning panel focused on the practicalities of building relationships and trust with stakeholders. Not surprisingly, the experiences of the panelists struck many of the same notes as Rieke’s keynote address. Stakeholder processes require leadership, persistence and optimism.

On the subject of local leadership, Michael Crimmins, University of Arizona climate science extension specialist, said that because climate change is likely to bring more frequent and severe droughts to Arizona, communities must plan for variable water supplies. “Finding the real leaders who can deal with this at the county and local level is really essential,” he said.

Crimmins and Susan Craig, Arizona Department of Water



Susan Craig and Mike Crimmins' cartoon of the Hydro-Illogical Cycle depicts the normal cycle of stakeholder interest in drought planning.

Resources, shared the podium to describe their efforts to build drought planning capacity at the local level. Comparing their original, naive plans with on-the-ground realities provided several lessons. Key among these was that collaborative planning works best when everyone has a clear reason to engage. A drought may be the best reason to engage in drought planning, but what happens when the drought abates? Crimmins and Craig described the challenge of keeping stakeholders involved when the crisis is not immediate.

On the subject of persistence, Carolyn Campbell's experience with the Pima County Sonoran Desert Conservation plan provided an example. Executive director of the Coalition for Sonoran Desert Protection, Campbell spoke from more than a decade of experience building support for the Sonoran Desert Conservation Plan, often considered a landmark example of successful collaboration. Still a work-in-progress, the plan has already protected 77,000 acres of land from suburban sprawl, Campbell said. To come up with the



Carolyn Campbell's take on stakeholder engagement in water and landuse plan-

plan, Campbell worked for years on a committee of 50 to 60 people with very different views on appropriate land use and conservation.

In the end, "no one compromised his or her bottom line values. We compromised a number of things that weren't our bottom lines," Campbell said.

Illustrating the triumph of optimism over reason, Tom McCann's blow-by-blow account of the Central Arizona Project's ADD Water process left the audience with a vivid sense of the overwhelming challenge of bringing large numbers of stakeholders together to tackle complex water resource problems.

McCann, CAP resource planning manager, may have been facetious when he highlighted the importance of cookies, but his remark had a serious intent. Cookies add a warm, friendly, informal touch to a meeting, in addition to providing sustenance for hard work, a serious benefit when hammering out differences, accepting



Tom McCann's slide of participants hard at work in CAP ADD Water Process added levity to the meeting.

compromises and untangling knotty issues.

For participants who came to the conference looking for tools, the last plenary session of the day provided a look at technology for stakeholder engagement. Maggie McCaffrey, U.S. Institute for Environmental Conflict Resolution, described her experience with forest planning using models and interactive decision technology to help forest managers develop plans. UA's Kristine Uhman provided a quick overview of the tools Arizona NEMO (Non-point Education for Municipal Officials) has used to engage stakeholders in watershed planning. These tools include training and using volunteers in the wet-dry mapping of intermittent rivers and interactive on-line mapping so that stakeholders can visualize resources, conditions, and scenarios. Tim Lant, Arizona State University's Institute of Sustainability, talked about WaterSim, a dynamic model for running scenarios and evaluating alternative projects and policies for water management. He also introduced the audience to the Decision Theater at ASU and the tools used there to educate and inform decision makers, facilitate group deliberations, and support decision making.

Posters on display at the conference illustrated other tools and techniques for water planning and stakeholder engagement, along with descriptions of on-going research projects and the experiences of local governments and water professionals. The poster session was intended as an inclusive forum. The 22 posters on display reflected the diversity of the audience, covering a wide range of subjects and styles. Several were prepared by watershed groups.

Arizona NEMO assisted watershed groups, providing tem-

plates for poster preparation and printing some of their posters. Master Watershed Stewards provided travel assistance to those



*Poster session offered information about water-related*

watershed group representatives who would otherwise have been unable to attend. A meeting for representatives of many watershed partnerships was held in Tucson the day after the conference to take advantage of all too rare

opportunities to get together.

Always entertaining, luncheon speaker Grady Gammage, a Phoenix attorney, former CAP board member and well-known author and speaker on resource policy issues, elicited laughter and groans from the audience with his challenge of the accepted truth that the good life in Arizona depends on non-stop growth.

In a comment from the floor during the morning plenary, conference participant Madeline Kiser, referring to the inauguration of a new president in Washington DC and the major changes it signals, talked about a “new moment” – a rare opportunity to start afresh with new ideas and new strategies for solving the many problems we face. Gammage took the idea of a new moment as a starting point to describe a new way forward for Arizona. Arizona has been hit hard by the nation’s economic slowdown, Gammage said, but there may be a silver lining.

“There is something in how bad Arizona is doing that gives us an opportunity...a

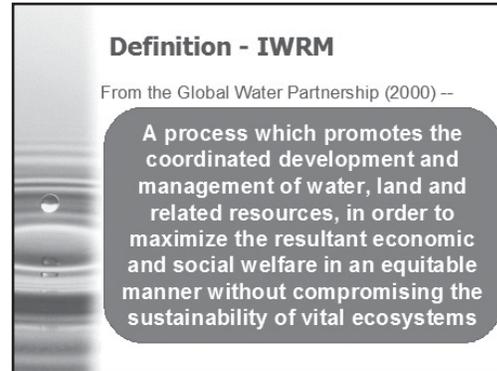
new moment,” said Gammage. He called for “rethinking Arizona” by identifying a new economic engine for the state. Decoupling the state economy from perpetual growth could enable more sustainable concepts to take hold, like tying land development to careful water planning and conservation. With housing development expected to slow for several years, Gammage said Arizona communities have a chance to take a step back and decide what they want their communities to look like.

After lunch, three concurrent workshops provided opportunities for participants to interact with speakers and each other on different aspects of stakeholder engagement in water planning. Workshop facilitators were given the task of drawing out questions, concerns, lessons and novel ideas.



*Anne Browning-Aiken, with help from poster author Prescott Vandervoet, led a small-group discussion on Getting People to Engage.*

The workshop on “Innovations and Experiments” highlighted cutting edge research. Speakers described different research programs, but found similar lessons and raised similar issues. An overarching theme was that water managers are dealing with new challenges and science is producing new tools, but getting the



*Brian Manwaring, workshop facilitator, used this slide to answer the workshop’s title question “IWRM What does it mean?” with this slide.*

two together presents its own problems. One not entirely facetious suggestion was that scientists should serve apprenticeships in the real world. No one suggested that real people serve apprenticeships in science, but there is a serious foundation for

the idea. At least some evidence suggests that people who make the effort to operate in unfamiliar territory learn to understand and solve problems in new ways.

Participants in a second workshop struggled with making the principles of Integrated Water Resource Management (IWRM) practicable. IWRM is a strategy for tackling complex, interrelated technical, social, economic and environmental issues connected with watersheds. Speakers described their experiences with specific projects illustrating the range of IWRM applications, including management of groundwater resources. Multi-level complexity is the watchword for IWRM. WRRRC Director Sharon Megdal and Chris Scott of the University of Arizona Udall Center for Studies in Public Policy described their efforts in the Transboundary Aquifer Assessment Program to establish and maintain stakeholder collaborations across the U.S. – Mexico border. The program aims to establish a common scientific foundation for water management on both sides of the border. Jean Calhoun, director of land and water conservation for the Arizona chapter of The Nature Conservancy, spoke about San Pedro River collaborations and conflicts.

In the San Pedro watershed, the challenge is to balance human water needs with keeping water in Arizona’s few remaining streams that flow year-round. According to Calhoun, large-scale collaborative planning is needed. Implementing any water-saving plan requires political support, Calhoun said. And political support requires building broad support in communities affected by any new plan.

Getting local communities on board with collaborative planning requires “transparency” from government and scientific authorities, said Calhoun. “Don’t be a Pollyanna,” she told conference participants. “Honestly discuss the difficult choices, implications, and trade-offs.”

The “Getting People to Engage” workshop featured three different facilitators who led the audience in group explorations of ideas. After a joint introduction, they split into smaller groups, each one focusing on a particular project or poster as a basis for discussions of a list of questions. These questions included: What has



*Kathy Jacobs summarized workshop outcomes with a list of take-home lessons.*

worked in the past? What do you like and what don't you like? What would you like to see more of/less of? Small group results were brought back to the larger group for consolidation and reporting to the plenary. The recommendations were many and varied, covering the whole process of stakeholder collaboration from reframing issues to establish common goals to inviting people who are about to check out to suggest changes to the process. At the end of the conference, Kathy Jacobs, director of the Arizona Water Institute, took on the challenging task of summarizing the day's lessons. Her list conveyed the broad range of topics and the diversity of participant perspectives. General lessons included the importance of process design and team building; adaptive management; and building capacity to achieve meaningful stakeholder participation. Successful stakeholder engagement must also be inclusive; allow ample time to work through problems and build relationships; acknowledge multiple ways to deal with change, complexity and uncertainty; and recognize leaders who create conditions for oth-

ers to succeed. Other lessons to improve water resource planning included engaging the next generation of decision-makers; using technology to empower stakeholders; disseminating success stories; and integrating economics, social values and quality of life in water related decisions.

Beyond the many individual lessons, the message that emerged from the conference's plenary sessions, workshops and poster presentations was that opening up the decision making process can be complicated and time consuming, but it can also lead to more successful and widely supported outcomes.

In video remarks to the conference, Congresswoman Gabrielle Giffords quoted Benjamin Franklin: “When the well is dry, we know the worth of water.” The people of Arizona have an opportunity now, before the well goes dry, to demonstrate that they understand the worth of water by finding sustainable water management strategies through broad collaboration.

Realizing the conference goals will take maintaining the connections and continuing the dialogues it fostered. The WRRRC remains committed to supporting these goals. Director Sharon Megdal urged conference participants to stay in touch and involved.

Tell us what you think and we will keep providing resources and opportunities for connections.

For the full conference agenda, a view of the conference presentations, poster abstracts, and other information about the conference, visit the WRRRC website at <http://ag.arizona.edu/azwater/programs/conf2009/index.html>