ARIZONA
WATER RESOURCE

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Questions Arise as Water Park Plans to Let the Good Times Flow

Water in the West is pretty serious business, with a whiskey's-fer-drinkin'-water's-fer-fightin' bravado that flavors regional water affairs. If this spirited, feisty attitude sets the tone for many water dealings, the deciding factor determining water use is beneficial use. Got water? Use it beneficially — or else.

This raises a question: Is the recreational use of water beneficial? A multi-featured waterpark called Wateryard that is in the works for Mesa is bringing that question to the forefront in a rather lavish manner. The project promises an extravaganza of water recreational activities including surfing, rafting, kayaking, snorkeling, scuba diving and wakeboarding. Water delights and diversions aplenty are offered, but do the benefits derived from such activities justify the use of as much as 100 million gallons of groundwater per year? Or, is it, as some critics contend, an unjustified water indulgence in an arid environment?

Those of us conditioned by the ubiquitous precepts of water conservation — that includes just about everyone living in semi-arid Arizona — might well feel squeamish about these water spectacles. We have been taught that not all water uses are equal, some

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Prescott Valley's Effluent Water-Rights Auction is Innovative, Profitable

Town learns strategy as it plans, researches, and conducts auction

by Joe Gelt

Prescott Valley town officials are pleased with the results of an auction of 2,724 acre-feet of effluent water rights that could net the town over $67 million, funds the town will use to acquire needed water supplies for the rapidly growing area. The favorable results at auction have been attributed to the careful planning and calculated efforts that went into researching and structuring the unprecedented water marketing transaction.

Developing the auction structure, terms and procedures required a special effort because there were no previous examples to use as a model; the town was breaking new ground. "This is the first auction of its kind, size and magnitude to create an economic value for effluent or wastewater. It is also unique since it involved capital markets in a sophisticated way," says Clay Landry, managing director of WestWater Research, the consultant hired by the town to market the effluent auction nationally.

The auction, conducted Oct. 29-30, 2007, attracted local and national interests. Water Property Investors, LLC, a New York water investment firm, submitted the winning bid of $24,650 per acre foot to acquire the water rights developed by the town through its wastewater treatment and recharge program. As the winning bidder, WPI purchased the 1,103 acre feet of water rights currently in the ground and available together with an option to purchase additional supplies as they become available, up to the 2,724 acre feet approved by the Arizona Department of Water Resources in

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Prescott Valley...continued from page 1

Physical Availability Demonstration No. 20-402187.0000

WPI will receive notice from the town as additional supplies become available and will have 5 years to exercise the option to purchase those water rights. If WPI fails to timely exercise one or more options, the associated water rights will revert back to the town. WPI, however, retains the right to exercise future options until the entire 2,724 acre feet has been tendered. If WPI elects to exercise all options, it will pay the town over $67 million.

Whether WPI uses or sells the water rights to another party, those rights must be put to beneficial use within the town. The water rights can be pledged to meet ADWR's 100-year-assured-water-supply for residential and commercial subdivision within the town. Or, with town approval, the water rights can be used for other purposes such as recreation and wildlife.

According to Colleen Auer, Assistant Prescott Valley town attorney, "A lot of time went into structuring the auction so that it would make sense for the town as well as the purchaser. ... It was designed to be a win-win situation for both sides."

Minimum bid price set

The first step in working out a mutually advantageous water marketing transaction was to establish a minimum-bid price for the water rights at auction; i.e. a price that would ensure that the town received adequate compensation for the resource without exceeding what buyers would be willing to pay. This presented a challenge.

To help determine this minimum-bid price, the town's consultants performed a market analysis of water rights sold in the area. This provided limited guidance since sales were infrequent and did not involve large quantities of water. Auer says, "We were not comparing apples to apples. There was not a lot in regional water market transactions to provide us a road map."

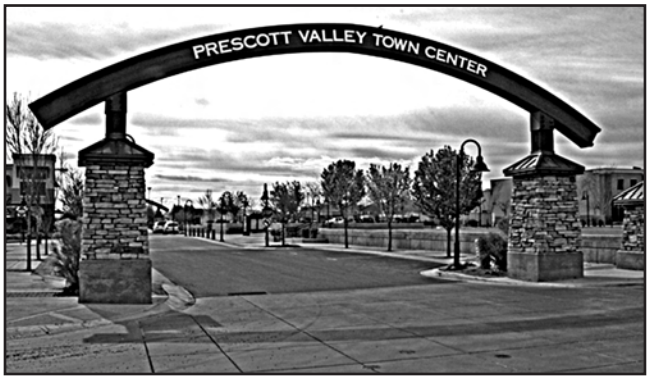

Photo: Prescott Valley Chamber of Commerce

Auer says the information provided by the analysis was taken into consideration as the consultant and town officials applied their own insights about the current water market and the limited resources and supplies available in the region. "We established through our consultant and staff a feeling about where we thought the water price per acre foot should be."

Negotiations with Aqua Capital Management LP, a Nebraska-based water resource and management company, also helped the town arrive at a minimum-bid price for the water rights at auction. This was a key negotiation worked out over a nine-month period that resulted in a price floor agreement guaranteeing the town $19,500 per acre-foot in the event no higher bid was received at auction.

"An auction format with a price-floor agreement is an innovative way to address the increasing water needs in the Southwest and to create a market environment for water trading," says Landry. "The Aqua Capital price-floor agreement provided financial security for the town and created an auction format that encouraged a competitive-market outcome that generated an additional $14 million."

Purchase terms developed

The purchase terms also had to be worked out and, as with setting a minimum-bid price, Prescott Valley wanted to come up with terms suitable to both town and purchasers. For example, a payment schedule needed to be adopted.

Auer says, "We wanted to be paid up-front but in the reality of the development market these costs tend not be carried prior to build-out. We had to appreciate the fact that we were dealing with a business model different from a pay up-front scenario. We changed our payment requirements to a pay-out structure, with payment over time at certain trigger points. ... It was a process that evolved."

A key element of the purchase terms is the option concept that allows the purchaser to test the market and use of the water rights for development purposes before committing to purchase the full 2,724 acre-feet. The developer then has the opportunity to determine if profits from the use of the initial purchase justify exercising the option.

Auer says, "If they don't exercise an option at the end of five years, the water rights revert back to the town and become part of our portfolio again, to be used down the road for other purposes."

The very limited alternative water supplies available in the area add value to the water rights purchased. A future source of water in the offing is a joint importation project, with Prescott Valley partnering with the City of Prescott to pump water from the Big Chino Ranch. Prescott Valley intends to pay its share of the infrastructure costs of the project, which involves constructing a 30-mile pipeline to deliver supplies to the water-strapped communities, with funds derived from the auction.

Auer says, "Our importation project has a lot of hurdles to overcome before we can put it in place. If you are a developer looking to build in the next 3 to 5 years ... you have to be planing for a resource within that time frame. And unless you want to pay a premium and wait for the Big Chino water you are going to be looking at the water rights sold at auction.."

The terms of the auction agreement protect the purchaser's investment when Big Chino Ranch water eventually comes on the market. Auer says, "Whatever water comes into the market place during the time the 2,724 acre feet of water rights are being marketed will be sold at 10 percent above the then-current market price. We are not going to use our eventual supply from the importation project to undercut or compete in the market place."

Price sets benchmark

Auer says the auction's winning bid set a benchmark for other water sellers in the area. She says, "It is comparable to the situation where someone sells a house in your neighborhood for a hundred

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Water Vapors

Community Views on Water Available

Woody Allen once said, "Love is the answer, but while you are waiting for the answer sex raises some pretty good questions." Perhaps a farfetched, overstretched reworking of Allen's quote could be applied to two recent efforts to engage Tucson citizens in water discussions: "Sustainability is the answer, but figuring how to get there raises some pretty good questions."

A Tucson Community Conversation on Water, which took place on Oct. 26, provided a forum for approximately 300 participants to discuss important water supply issues. The event included sessions with water professionals discussing key issues facing the community. This offered a review or refresher course, providing attendees, who varied in their understanding and awareness of water issues, a common background. At the end of the day, a questionnaire was distributed to get participants' responses about the day's discussions and their opinions about water issues.

About a week later, on Oct. 31, a Sustainability Forum was held at the University of Arizona that provided an opportunity for about 125 community members to participate in a series of discussions on the value and meaning of sustainability in the greater Tucson area. Among the topics discussed that day was water, with participants identifying the best case and worst case scenarios. Participants were then asked to identify steps for progressing toward the best case and barriers the community might face in attempting to achieve the best case scenario.

The Tucson Community Conversation on Water. Photo: Joe Gelt

Participants' input from both events is available. Their responses may not be particularly sexy but they do pose some pretty good questions and provide a valuable insight about community water thinking. The responses might be a good starting point in the development of community-supported public policy.

Participants' responses to the questionnaire at the Community Conversation on Water, along with other information about the event, are posted on the Water Resources Research Center web site: http://ag.arizona.edu/AZWATER/

Transcripts of the Sustainability Forum discussions and a summary report will be available via email by contacting Nicole Urban-Lopez at nicole.urban-lopez@tucsonaz.gov or 520-837-6934. You can also request to be added to the sustainability listserv for project updates.

Note to Our Readers...

Updating mailing list

We are in the process of updating the *Arizona Water Resource* mailing list weeding out names, or in a more refined horticultural sense, pruning from the list names of people who for one reason or another don't want to receive the publication or would prefer getting it via email. Please notify us if you no longer want to receive the AWR or if you would rather receive an electronic copy by emailing us at wrrc@cals.arizona.edu

New *Arroyo* to be mailed

Instead of a March-April *AWR* you will be receiving the latest edition of *Arroyo,* the Water Resources Research Center's single-issue newsletter; this edition is devoted to river restoration efforts in the state. The publication continues the *Arroyo* tradition of providing a readable review of important state water issues. *Arroyo* was last published this time last year and addressed artificial recharge.

USGS sponsors newsletter and supplement

This edition of the *AWR* contains a 4-page supplement sponsored by the U.S. Geological Survey titled, "Land Subsidence and Aquifer Compaction in the Tucson Active Management Area, South-Central Arizona 1987 – 2005." The agency is sponsoring this edition of the *AWR* as well as the supplement. We appreciate the opportunity to work with U.S.G.S. and the agency's generous support.

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News Briefs

Study: Cohabitation Conserves Resources

Recent efforts in Arizona to offer the same benefits, including health care, to state employees with unmarried partners, gay or straight, as provided to married couples have sparked a controversy whether it would be good public policy or an incentive to immoral behavior. Not included among the pro-and-con arguments is the effect such a policy would have on the consumption of resources.

Would it make a difference in semi-arid Arizona if it could be shown that cohabiting couples used less water? Would a more solid case be made if cohabitation could be shown as a water conservation strategy like planting native vegetation?

According to a recent Michigan State University study households with cohabiting couples use considerably less resources than split-up households. Focusing on divorced couples, the researchers noted that in 2005 divorced American households consumed between 42 and 61 percent more resources per person than before they separated. They spent 46 percent more per person on electricity and 56 percent more on water. Analyzing data from 12 countries around the world including Belarus, Brazil, Kenya and Greece the researchers found similar results.

The research also reported that if U.S. divorced couples had remained married in 2005 a savings of 73 billion kilowatt-hours of electricity and 627 billion gallons of water would have resulted in that year. Further the researchers surveyed divorced households between 1998 and 2002 finding that they used more space, occupying between 33 and 95 percent more rooms per person than in married households.

Individuals who remarry and establish new households redeem the situation; they return to using the same amount of resources as married couples who never divorced.

The intent of the research, which was published in the Dec. 18 edition of the "Proceedings of the National Academy of Sciences," was to demonstrate the mostly overlooked environmental impact of divorce. Its broader implication is that merging what would otherwise be separate households has an environmental payoff.

Carefree Repeals Surcharge for Excess Water Use

An effort to charge water users extra fees for excess water use came to naught when the Carefree Water Co. Board of Directors voted 6-1 to eliminate the surcharge in response to customers' complaints. In the fall, the company had decided to adopt rate hikes and extra fees to encourage water conservation, a decision that provoked customer discontent. The utility serves about 1,800 customers.

Tiers were established based on water consumption, with rates raised between 28 cents and $3.75 per 1,000 gallons, depending on the tier. The effect of the decision varied greatly, with most customers billed an additional $10 while heavy water users, those using more than 50,000 gallons a month, got a $150 surcharge tacked to their bill.

In getting rid of the extra fees, the company instead implemented an across-the-board rate increase.

According to officials, eliminating the surcharge will likely decrease revenues based on previous estimates. To cope with the loss plans call for fewer, if any, reserves to be set aside this year and possible reduced capital expenditures on improvements.

Carefree's decision to rescind its surcharge comes after receiving editorial kudos from an *Arizona Republic* editorial. A Nov. 17 editorial titled, Heavy Water Users Should Pay, praised both Paradise Valley and Carefree for raising rates to encourage water conservation. The editorial stated, "In our view, such surcharges are responsible reactions to a drought well into its second decade.

"Surcharges may be what it takes to convert denial into recognition of the challenges facing a desert in drought."

N. Arizona Seeks Support for Water Supply Study

Efforts are underway to obtained congressional approval for a feasibility study for several projects that would provide much needed water supplies to northern Arizona. With water shortages looming on the horizon — a 2006 water supply study indicated that the area's current water supplies would not be adequate to meet anticipated demand as soon as 2050 — the northern Arizona communities want to explore their water options, including a controversial pipeline

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are of more value than others. How is the recreational use of water to be valued?

Water park proponents are reassuring saying its water use will not exceed that of a golf course. They also offer an enticing dollar-and-sense argument, claiming the park could generate more than $1 billion in revenue and create 7,500 jobs. This argument holds water for many.

Beyond these across-the-board computations, however, proponents might argue another project benefit, one that is difficult to define much less measure and quantify. They might emphasize that water parks are fun. For most of us, whether hydrologist, government official or researcher, our earliest experiences with water taught us that water is fun. We might have learned this simple fact of life when swimming or boating or playing in the rain and jumping puddles.

Is it far-fetched to consider water recreation as continuing this tradition of early water play? Might it then be considered one of the primary uses of water? Is the profligate use of water at desert waterparks an unequivocal offense against water conservation principles or does such a display offer some redeeming recreational benefits, even at a 100-million gallons per year?

Pumping and Preserving the Verde River

SRP Wants Mitigation Plan for Verde River Flow

The Salt River Project is pressing its demand that Prescott-area communities develop a cooperative mitigation and monitoring plan before pumping groundwater from the Big Chino Sub-basin. Plans are underway to construct a 30-mile pipeline to deliver water from the sub-basin to provide water to the water-strapped communities.

SRP is concerned that the pumping threatens the utilities' senior Verde River water rights that provide one-third of its surface water supplies for Phoenix-area cities. Hydrological studies have shown that the Big Chino aquifer is the source for about 80 percent of the baseflow of the Upper Verde River.

A Dec. 31 *Daily Courier* article reports that SRP sent a detailed five-page letter on Dec. 11 to Prescott, Prescott Valley and Chino Valley officials demanding the action after a private meeting with them on Nov. 19. The letter raised the issue of litigation.

According to the article, some Prescott-area officials were taken aback at what they consider to be a more stringent tone to SRP's demands. They said they have been open to work cooperatively with the utility on a monitoring and mitigation plan. Officials have stated that the communities will make up for any loss of Verde River flow that results from the pumping.

SRP has sought a such binding written plan for years since Prescott announced its intent to pursue its special right to Big Chino groundwater under a 1991 state law.

The Prescott and Prescott Valley plan calls for a pipeline to carry Big Chino water south to augment their depleted water supplies. Chino Valley decided to build its own pipeline, unable to pay the cost needed to participate in the two communities' project.

SRP's is not the only objection to the project. Shortly after Prescott and Prescott Valley purchased the former JWK Ranch, later renamed the Big Chino Water Ranch, to use as a water ranch the Center for Biological Diversity, concerned about adverse effects on the Verde River, threatened to sue.

TNC Buys/Protects Verde River Springs

Fed by aquifers deep below the Big Chino and Little Chino valleys, the Verde River Springs are at the headwaters of the Verde River. The springs are said to be where the Verde River comes to life, emerging from the ground in a deep canyon 25 miles north of Prescott. The Nature Conservancy's recent purchase of a 312-acre parcel containing the springs, the last parcel of private land along the Upper Verde River, will protect the springs.

Included as part of the parcel is a one-mile stretch of the river with lush riparian vegetation providing habitat for a variety of native wildlife including threatened and endangered species.

The Conservancy's new Verde River Springs Preserve provides water for the upper 24 miles of river. It is eventually joined by Sycamore Creek, Oak Creek, Wet Beaver Creek, West Clear Creek and Fossil Creek and flows downstream to join the Salt River east of Phoenix.

The Verde River Springs have a major role in a growing state water controversy. Upstream of the springs, Prescott, Prescott Valley and Chino Valley wells are pumping an unsustainable amount of water from the Little Chino Valley. (See accompanying story.)

Verde River Springs Preserve. Photo: Dan Campbell/The Nature Conservancy

Verde Program Manager Dan Campbell describes TNC plans for the area: "Our work at the Verde River Springs Preserve will include the establishment of hydrologic monitoring in partnership with the U.S. Geological Survey and other science institutions. Additionally, we will support native fish recovery efforts in the Upper Verde by partnering with the Arizona Game and Fish Department and U.S. Fish and Wildlife Service."

TNC purchased the land from Betty and Billy Wells, ranchers who wanted to preserve the land. The Wells also donated two conservation easements to prevent development over adjacent property buffering the river, a 160-acre easement to the TNC and a 2,440-acre easement to the Rocky Mountain Elk Foundation.

from Lake Powell.

In an effort to gain support for a Bureau of Reclamation study, the Coconino Plateau Water Advisory Council met with Arizona's congressional delegation. The council, its membership including local, federal and tribal officials, environmental groups and private entities, hopes that Senator Jon Kyle will introduce legislation authorizing the study, with the federal government paying half its $13.1 million cost.

The study would consider the economic and environmental costs of three water supply projects that could serve the region: the aforementioned Lake Powell pipeline and two well fields that would extract water from two different aquifers.

Some critics have voiced concern that the study might end up paving the way for construction of the Lake Powell pipeline, a longstanding and controversial project. The pipeline was noted as essential in a 1998 ADWR report, if the future water needs in the region were going to be met. Department of Economic Security figures indicate that the area's population will double from 96,125 in 2000 to 184,650 in 2050.

No route has been set for the proposed pipeline. One plan calls for the pipeline to transport water to the western edge of the Navajo Nation; another plan would pipe water to the Hopi village of Moenkopi, Flagstaff, Tusayan and Williams.

The other water supply options of pumping groundwater are not without controversy. One of the proposed well fields could reduce the flow of streams supporting the spinedance and other endangered fish.

Guest View

Collaborative Water Management Faces Tough Demands, Scrutiny

Kirk Emerson, Director, U.S. Institute for Environmental Conflict Resolution of the Morris K. Udall Foundation contributed this Guest View

Over the past ten years, collaborative resource management has spread like Buffelgrass throughout the Western United States. Integrating stakeholder input and representation into natural resource planning and management activities is becoming more and more common, particularly for watershed and water resource issues.

Nowhere is this more apparent than in Arizona, where efforts to engage public and private interests in water-related partnerships, consortia, and advisory groups abound. (See text box) Collaborative water resource management will become even more important as we face the uncertain but increasingly evident challenges that climate change will bring. The current 12-year drought is a likely harbinger of tougher times ahead, making water policy and planning decisions all the more difficult and the need for adaptive management and public engagement even greater. Compounding these challenges, of course, will be the future requirements of the growing Arizona population that is expected to double by 2050.

These increasingly stressful environmental and demographic conditions will demand much more of collaborative water management in the future than has been expected or delivered thus far. Increasing competition for scarcer water resources will require tougher public choices, more timely decision making, and more effective conflict management. Collaborative processes will need to be more effectively institutionalized; stronger legal and financial incentives put in place to engage public and private interests in productive deliberations. Collaborative processes will require the ongoing commitment of public and private leadership to turn stakeholder dialogue into effective collaborative governance.

As our current experiences with collaborative resource management unfold, researchers, managers, and decision makers are beginning to take a harder look at collaboration and ask some important basic questions:

Is collaboration a good thing? The challenges we face in managing water resources in Arizona and throughout the arid Southwest present strong rationales for working together across divided watersheds, interests, and jurisdictions. "Co-laboring" can lead to leveraging combined financial, political and institutional resources to assure adequate water supplies and distribution. All the sectoral interests in water do need to be treated in an equitable and practical manner for the well-being of our communities and our economies. And we need to assure the lifeblood of our natural systems and wildlife habitats is secured in restored riparian systems and adequate instream flows. Hence, collaboration, it would seem, in any form, would enhance our water resource management practices.

Most people would consider collaboration, like motherhood and apple pie, to have a positive value, on its face. To argue against engaging stakeholders in public deliberations over our future water resources seems rather old-fashioned today. Yet it is still legitimate to question the extent to which corporate and non-governmental interests should influence public decision making about water resources. It is still important to articulate the normative value and limits of collaboration.

In part, this question raises the definitional problem. Some stretch the term "collaboration" to describe a myriad of joint efforts, to the point of having very little meaning at all. While others see it laden with code for local control or decentralized federal authority. Some suggest we may have conflated adaptive management with collaborative, consensus decision making. With such instability in our terminology, it is often not clear what to expect from collaborative resource management.

If indeed collaboration is generally a good thing, it may not always be the right thing at the right time. Determining when to engage public and private interests in what kind and degree of joint effort is critical. The more practical questions become: what should the role of other governmental and non-governmental stakeholders be in this collaborative effort and how can we maximize the value of their engagement and reach the best informed and practical management decisions?

Is collaboration working? This is an essential question and its answer will guide future investment in collaborative resource

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Notable collaborative water resource activities in Arizona

- *Glen Canyon Adaptive Management Work Group* chartered in 1997 by the U.S. Department of Interior to engage stakeholders in advising on dam operations and downstream resource issues
- *Lower Colorado River Multi-Species Conservation Program*, one of the largest and longest running river system habitat restoration efforts with stakeholder engagement
- *Sonoita Valley Planning Partnership* focused on watershed-wide planning, leading to the creation of Las Cienegas National Recreation Area
- *Upper San Pedro Partnership* composed of 21 local, state and federal agencies and organizations working together to assure perennial river flows and long term groundwater supply
- *Upper Verde River Adaptive Management Partnership* between the Prescott National Forest, permittees, community members and researchers to address complex resource management issues along the Upper Verde
- *West Branch Restoration Project* on the Santa Cruz River near Tucson, led by landowners, the Arizona Open Land Trust and others to improve riparian habitat.

Legislation and Law

ADWR Director Rejects AZ Water Transfer to Nevada

A proposal that would have allowed a company to pump water from rural northwestern Arizona to Nevada was rejected by the director of Arizona Department of Water Resource. ADWR Director Herb Guenther's action was the latest move in an ongoing controversy that has raised the issue whether Arizona law is effective at prohibiting the interstate transfer of water. It is a situation with broad implications.

Guenther's decision was in accord with the recommendation of an administrative law judge who conducted a three-day hearing on the issue in March.

The next move could be up to the applicant Wind River Resource whether to seek a rehearing, file a new application or challenge the denial in court.

The controversy is being played out in a remote, rugged and sparsely populated corner of Arizona, in the far northwest part of the state, an area where Arizona, Nevada and Utah lie in close proximity. Sides in the controversy are drawn along the Arizona-Nevada border, with the Arizona Strip communities of Beaver Dam, Littlefield and Scenic on one side. Population in that area is estimated to be between 4,000 and 5,000, mostly retirees and ranchers. On the other side of the dispute, ten miles away and across the stateline, is the rapidly growing town of Mesquite, Nevada.

At issue is whether WRR, a Nevada-based Arizona limited liability company, can export groundwater from Beaver Dam Wash in the Littlefield area across the stateline to Mesquite, Nevada. The broader issue has to do with Arizona's ability to prevent other such incidents occurring, not only along its border with Nevada, but also along borders shared with the neighboring states of California, Utah and New Mexico.

Opposing the application are mostly residents in the Beaver Dam or Littlefield areas, owners of the area's businesses, houses and land. They fear for their water supplies. Favoring the application are developers in Mesquite, Nevada, and Scenic, Arizona

Whatever legal action Arizona takes must abide by a U.S. Supreme Court ruling that held that groundwater is an article of interstate commerce subject to congressional regulation. States, therefore, cannot regulate it in a manner that interferes with the Commerce Clause. Passed seven years after the Supreme Court decision, an Arizona law sets conditions allowing water to be transported out of Arizona.

Arizona Revised Statutes § 45-292 states, "A person may withdraw, or divert, and transport water from this state for a reasonable and beneficial use in another state if approved by the director pursuant to this article." According to statute, the ADWR director decides whether to approve the application after considering such matters as potential harm to the public welfare of Arizona citizens; Arizona's water supplies and its current and future demands statewide and in particular the proposed source area; and the availability of alternative sources of water in the other state.

On November 1, Thomas Shedden, the administrative judge who conducted the three-day hearing, issued his recommendation that the Wind River application be denied. He said the company was deficient in updating key aspects and in submitting hydrological studies showing the pumping's likely impact on the Mormon Wells area. He also said the company provided inaccurate information.

Shedden said that as a result ADWR lacked sufficient information to determine whether Wind River had in fact complied with Arizona's law determining whether exported water would be used for a "reasonable and beneficial" use in another state. Further, Shedden dismissed as premature Wind River's argument that the Arizona law requiring the state to grant permission to export water is unconstitutional.

Shedden submitted his recommendation to Guenther who then decided whether or not to approve the application. He essentially accepted the recommendation with few changes.

In response to the situation Republican Rep. Trish Groe of Lake Havasu City proposed earlier this year legislation making it more difficult to transfer water outside of Arizona. The bill did not pass.

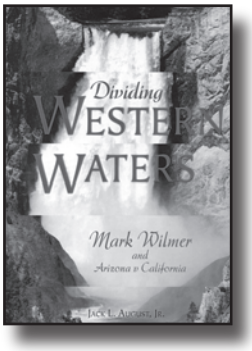
WRRC Has Role in Newly Funded Transboundary Aquifer Assessment

The passage of the FY 08 omnibus appropriations bill will enable the University of Arizona's Water Resources Research Center, along with the water institutes in New Mexico and Texas, to begin work on the new United States-Mexico Transboundary Aquifer Assessment Program. The bill includes $500,000 in the U. S. Geological Survey budget for start-up funding for the program. Authorized in Public Law 109-448 at the end of 2006, the transboundary program directs the USGS and the designated state water institute programs to develop and carry out a systematic assessment of priority transboundary aquifers, in collaboration with Mexican partners.

The program is authorized for a total of 10 years and $50 million. Arizona's priority transboundary aquifers are the Santa Cruz River Valley and the San Pedro aquifers; both underlie Arizona and Sonora, Mexico. To ensure effective use of the federal dollars, the WRRC is coordinating bi-national discussions to plan an integrated scientific approach to assess the priority aquifers.

Publications & On-Line Resources

Lawyer Takes Pioneering Role in Winning Colorado River for Arizona



Dividing Western Waters: Mark Wilmer and Arizona v. California
Jack L. August, Jr. TCU Press $32.95 cloth. For information about ordering call 800-826-8911 or check: http://www.prs.tcu.edu/

Legend has it that the West was won by rugged pioneers trekking through inhospitable terrain to settle in isolated back-country areas. Here they endured brutally harsh conditions to eke out a living, raise families and eventually build communities. Thus were sown the hardy seeds that grew into states.

A new book, "Dividing Western Waters," hails another kind of groundbreaker, Mark Wilmer, a lawyer whose labors, although not as colorful or robust as those of the pioneers of yore, have been credited nonetheless with enabling Arizona to grow, thrive and, some have said, to survive as a state. Wilmer is the attorney credited with Arizona's victory in the 11-year court battle known as *Arizona v California.*

At issue in *Arizona v California* was the amount of Arizona's allocated 2.8 million acre-feet the state could take from the main-stem Colorado River; also at issue was whether California could claim any or most of this allocation based on prior appropriations. Author Jack August gives due recognition to Wilmer who, more than any other single person, ensured that Arizona would get its share of Colorado River water.

A growing Arizona very much needed Colorado River water. Congressman John Rhodes said at the time, "Without more water we are all going to perish."

Clearly *Arizona v California* was viewed as determining the very fate of the state, promising deliverance and seemingly even salvation to a state in desperate need.

August focuses on Wilmer, the main actor in the legal drama, describing his role in leading Arizona to victory in the case. In progress since 1952, the case appeared to be going badly for Arizona, its lawyers pursuing a strategy that U.S. Supreme Court Special Master Simon Rifkind later described as playing into the hands of California. State leaders were understandably dismayed and appointed Wilmer in an effort to the salvage the cause. August cites Wilmer's own appraisal of the situation he was about to take on. He said it was in " a hell of a mess." He took on the case in 1957.

Wilmer's work began at a time when the case appeared to be winding down, with Arizona having finished putting on its case in chief and California in the process of presenting its case. Wilmer advanced a new legal strategy without assurances that the Special Master would even consider the new approach. Basic to the strategy was a consideration of the historical context of the Boulder Canyon Project Act; Wilmer argued his case with reference to a congressional apportionment scheme of Colorado River water found in the congressional consideration of the 1928 Boulder Canyon Project Act.

The decision was never a forgone conclusion. August describes Wilmer as being troubled about its possible outcome; he felt that the Court focused its questions on issues that he thought were irrelevant to his argument.

The final decision, however, was in favor of Arizona. Arizonans would better savor the victory it they knew more about the skirmishes, strategies and maneuverings that won the day. August provides many of these details in focusing on Mark Wilmer, the man said to have won the Colorado River for Arizona.

The Evolution of Arid Land Management Over 50 Years

The Future of Arid Lands Revisited: A Review of 50 years of Drylands Research
Charles F. Hutchinson and Stefanie M. Herrmann. American Institute Physics/aip. Hardback is available through Amazon (www.amazon.com) for $134. Paperback version is available from UNESCO for 33 euros. (http://publishing.unesco.org/details.aspx?Code_Livre=4562)

In reexamining an earlier work, the recently published *The Future of Arid Lands Revisited* shows how the management of arid lands has evolved over the past 50 years. Written by a University of Arizona research team led by Charles Hutchinson, director of the UA Office of Arid Lands Studies, and former UA student Stephanie Herrmann, the new book revisits *The Future of Arid Lands*, a 1956 publication that includes papers delivered at an international arid lands meeting. The papers addressed the major issues then confronting the world's arid lands and developed a research agenda to confront the issues.

Both books focus on agriculture, irrigation systems, new breeds of plants and animals adapted for arid lands, water development, weather modification, ecosystem management and land use.

The new book reviews the state of science and attitudes that prevailed in the mid-1950s that determined strategies for developing dryland regions; it then assesses the changes in scientific knowledge of arid lands over the past 50 years. Being aware of the evolutionary changes that had occurred will help lands managers knowledgeably speculate about the future of arid lands management.

Those who can benefit from this volume are not just land managers, but also others involved in environmental issues who are interested in the state of the world's arid lands, regions that include ecologically fragile grasslands, woodlands and deserts that are currently home to two billion humans.

Special Projects

WRRC Announces 104(b) Funding for University Research

The Water Resources Research Center, in its role as administrator of the Section 104(b) program of the Water Resources Research Act, has selected three programs for 2008 funding. Funded by the U.S. Geological Survey, the 104(b) program supports small research projects investigating water issues of state and regional importance. Only faculty members at Arizona's state universities are qualified to receive 104(b) funding.

The three funded projects were chosen from ten proposals submitted to WRRC. Of the three funded proposals, two were from the University of Arizona and one from Northern Arizona University. The funded projects will receive a total of $31,475.

The following projects were funded:

Real-time Detection of Estrogen in Waste Water by Piezoresistive Microcantilever Sensor, Principal Investigator: Nazmul Islam, Assistant Professor, Northern Arizona University, $10,000.

Project will develop a novel technology for rapid detection of estrogen in water. Strain induced on a microcantilever sensor by estrogen selectively bound to the sensor's surface can be measured as a change in resistance. A device employing this technology has potential for use in rapid on-site monitoring of estrogen in water samples, even at extremely low concentrations.

Meta-Analysis of Rangeland Water-Yield Experiments for the Southwestern U.S., Principal Investigator: Ed de Steiguer, The University of Arizona, $10,000

This study will apply statistical meta-analysis techniques that have been successful in other scientific disciplines to data from a large number (100 or more) watershed and rangeland water yield studies. For the meta-analysis, a database will be created that encodes these studies in terms of water yield and other resource outputs, experimental treatments, site-related variables and factors related to experimental design. The research is expected to provide technical coefficients that may be used in the development of decision support systems, optimization models and other tools for managers of semi-arid rangelands.

Lessons Learned: Extending the Student/Staff/Faculty Collaborative Work Model to the K-12 Environment, Principal Investigator: James Riley, The University of Arizona, $11,475

Project will build on previous work teaching and demonstrating the techniques and benefits of rainwater harvesting on the UA campus extending the work into the community. The successful on-campus collaborative approach will be used to involve the students, parents, faculty and staff at Brichta Elementary School in a rainwater harvesting project. In addition, the project team will design and implement a rainwater harvesting system at UA Cochise Residence Hall to alleviate flooding problems on the grounds and adjacent neighborhood streets. University students with experience on previous projects will take leadership roles.

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management. There are conceptual and methodological challenges that make answering this important question difficult. But researchers are making headway and a number of empirical studies are contributing to our understanding of how collaborative management processes work. There is growing agreement on multiple measures of successful collaborative outcomes, such as better, more informed decisions and improved working relationships among parties. How to measure collaboration itself — its essential attributes and whether they were present and to what degree — remains very challenging given the large variation in processes and contexts. This is important because we need to measure both performance outcomes and those factors that contribute to performance in order to make process improvements.

At the applied level, it can be most useful for public managers and the engaged parties to set forth their expectations and measures of success at the outset. Reaching agreement on the objectives of the collaborative effort can not only make subsequent evaluations easier and more relevant, but will focus the group on more effective deliberations in accordance with shared expectations.

Is collaboration enough? Collaborative processes are sometimes viewed as sufficient unto themselves: bring people together and they will be able to work out their differences and reach win-win consensus agreements. Our evaluation research at the U.S. Institute for Environmental Conflict Resolution suggests otherwise. There are important factors that indeed influence outcomes when people are seeking agreement or resolution of a dispute. Among these factors are having all the right parties at the table and drawing on the skills of a trusted third-party.

But much more is at work in assuring successful collaborative resource management. These are not isolated processes, producing self-implementing solutions. None of this happens outside of existing legal, regulatory, and political contexts. No existing authorities can be usurped or compromised. Without regard for or integration with covering procedures or jurisdictions, such as those required by the National Environmental Policy Act or a court of law, any agreements reached have no guarantee of being acted on, monitored and enforced. Without adequate financial or institutional incentives to negotiate and work together, no one needs to come to or stay at the table. Without skillful leadership

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Announcements

Conflict Resolution Conference Focuses on Collaborative Process

To learn more about collaborative resource management, attend an upcoming conference hosted by the U.S. Institute for Environmental Conflict Resolution in Tucson May 22-24. Conference sessions and training workshops will focus on how to improve collaborative stakeholder processes and participate more effectively in multi-party negotiations and conflict resolution. Many of the cases referred to and lessons learned will be drawn from experiences in ecosystem management and water resources planning, including collaborative water resources modeling and habitat restoration projects. For additional information check www.ecr.gov

Water Quality RFA Issued

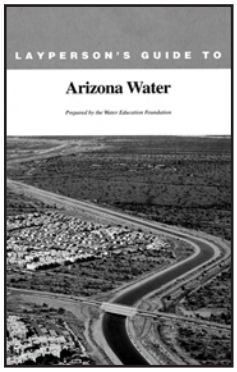
The National Integrated Water Quality Program has issued a Request for Applications from National Facilitation Projects, Extension Education Projects, and Integrated Research, Education, and Extension projects. The closing date for the RFA is April 04. Priority areas or interests for each of the projects, along with other information pertaining to the RFA, are available at: http://www.csrees.usda.gov/fo/fundview.cfm?fonum=1134. Questions regarding the content of the RFA should be directed to Mike O'Neill (moneill@csrees.usda.gov; 202-205-5952).

Conference on State, Federal Roles in Climate Change

The William H. Rehnquist Center, at the James E. Rogers College of Law, and the Institute for the Study of Planet Earth, University of Arizona, are conducting a one-day conference on the future of the federal-state relationship in addressing climate change; the event will be held Feb. 11 in Tucson. Titled "Federalism and Climate Change: The Role of the States in a Future Federal Regime," the conference will present leading academics on federalism, along with appellate court judges, business leaders and policymakers, to discuss what the role of state governments should be as the federal government takes action in response to global climate change. Panels will address the following topics: states as actors on the global stage; federalism: successful and unsuccessful models for a future climate regulatory regime; and constitutional constraints upon state action. Keynote speaker will be Hon. Stephen Breyer, U.S. Supreme Court. For additional information and to register on-line check: www.rehnquistcenter.org

New Layperson's Water Guide Free on New WRRC Web Site

Among its myriad and various activities, WRRC undertakes community outreach and public education knowing that a water-informed citizenry is essential to good public policy. To promote the cause of a water-savvy citizenry the WRRC is offering the recently published Layperson's Guide to Arizona Water online as a public service. Free for the taking, the file can be downloaded in PDF format from the WRRC website: http://ag.arizona.edu/AZWATER/ There is much here to whet (or wet) the interests of readers wanting to know more about Arizona's water legacy and affairs.



The guide meets a longstanding need, offering information about state water issues in a single, reader-friendly publication. Readers will gain an appreciation of Arizona water affairs in many of their diverse, variable, complex and colorful details. The scope of the publication ranges from the building of Hohokam irrigation canals to current strategies for increasing water supplies to details of recent public policy issues. Those who would benefit from the publication include new arrivals to the state, long-time residents and water professionals, all finding in the guide something to satisfy their water interests.

Downloading the Layperson's Guide to Arizona Water will not only provide an abundance of useful water information but also will be an opportunity to check out the new WRRC web site. The web site was recently redesigned to be more attractively formatted and to allow easier and more complete access to WRRC on-line resources.

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from public decision makers as well as from the represented interests, agreements are rarely forged.

The key challenge in practice is how to design effective engagement of contending parties appropriate for a particular situation that is able to produce more effective public decision making. This is particularly important for long standing collaborative efforts that require careful organizational frameworks, representational arrangements and decision rules.

These and other questions are being asked of the first generation of collaborative water resource management initiatives. This increased scrutiny will serve us well as we learn from these collaborative experiments to meet the challenges ahead in managing our water resources in Arizona together.

The opinions expressed are the author's own and do not represent the official view of the U.S. Institute for Environmental Conflict Resolution or the Morris K. Udall Foundation.

Public Policy Review

by Sharon Megdal

"Conserve to Enhance," Conserve Water to Enhance the Environment

Program would enable water users to apply conservation gains to environmental use

Regular readers of this column know I have often discussed the daunting challenge of meeting the water needs of our growing population. Meeting the water needs of the environment is equally challenging. Mostly silent on the issue of water for the environment, Arizona's Groundwater Management Act and related water law offer little help in confronting the challenge. Yet maintaining healthy ecosystems is important to Arizona's economy and our quality of life.

Several years ago, I began to characterize environmental restoration in Arizona. U.S. Army Corps of Engineers funding enabled me to study ecosystem restoration in the state's two major urban areas, Phoenix and Tucson. U.S. Bureau of Reclamation funding then enabled me to broaden the study to include a total of 30 environmental enhancement projects in Arizona. Completed in 2006, the report, "Projects to Enhance Arizona's Environment: An Examination of Their Functions, Water Requirements and Public Benefits," showed that over 60 percent of the projects required supplemental water for revegetation or open water elements.

For some projects, the cost of water was substantial. For 40 percent of these projects, at least one water source was not firm; in other words, no signed contract guaranteed the delivery of a future water supply. The findings highlighted the importance, and in some cases the tenuous security, of water for environmental enhancement projects in Arizona.

Concerned with the problem of increased scarcity of water for both human and non-human needs, my former graduate student, Andrew Schwarz, and I obtained additional Reclamation funding to explore ways that voluntary water conservation by municipal water customers could translate into water for the environment. Our basic premise was if customers knew water they saved could be put to environmental use, they would have an additional inducement to conserve water. In other words, they would be getting added satisfaction from their water-conserving achievements.

To work out the feasibility of such a program, we needed the assistance of experts. Tucson Water staff agreed to work with us on conceptual elements. In addition, we solicited input and feedback from many stakeholders. We originally called the program "Water Conservation Banking" to reflect our original premise of conserved water set aside to meet environmental water needs. We envisioned a "bank" in which water would be deposited based on measured conservation and then withdrawn to use for environmental purposes.

We quickly discovered our concept was fraught with complexities. Early on, stakeholders pointed out that such a program would work only if conservation behavior could translate into dollars that, in turn, could be used to purchase water for the environment. Instead of creating a pool of water, our goal then became converting conserved water into a money account, with the funds used to purchase water for environmental use. The environment would thereby become a water customer.

We considered a number of factors. First and foremost was determining how customers could participate in the program. The program depends on customers volunteering to pay for water they conserved. To determine the amount conserved, baseline water use would need to be established for each participant. We considered alternative baselines, concluding that each customer's historical water use was the most appropriate baseline. Considering whether utility billing systems could accommodate such a program, we found that structural and technological variables created large differences in the ability to implement the program. We also preliminarily explored the mechanism for the allocation of funds. Stakeholders indicated that the mechanism for fund disbursement to projects would likely depend on program design and size. The details of our findings are included in our report to Reclamation, "Water Conservation Banking: Municipal Water Conservation to Support Environmental Enhancement," submitted December 2007 and available on the WRRC web site.

We believe we have come up with a novel concept for a "Conserve to Enhance" program. There are two key elements to it. The first is to provide an additional or different incentive for water conservation. The second is to provide funds to purchase water for the environment. The latter can be separated from the former, with an option available to either consider implementing a full-scale conservation program, as described in our report, or a simple check-off type program, with water customers designating they agree to contribute money over and above their water bills to fund environmental enhancement.

Similar to "Green Watts" programs familiar to electricity customers, this type of check-off program would not require establishing a baseline and would not be connected to conservation behavior. Water utilities could implement the program with relative ease, and it would indicate the breadth and depth of interest in securing water for environmental enhancement projects. To implement, criteria would have to be established for contributions, such as a maximum and minimum, and for a mechanism for expenditure of funds, including targeted or eligible projects. This simpler strategy, however, with participation in the program not connected to measured water conservation, would not accomplish our main objective of providing an additional inducement to conserve water.

Growth stresses the environment. Projects to preserve, restore and enhance the environment abound, with many requiring water. Andrew, who now works as Engineer and Water Resources Planner for the California Department of Water Resources, and I believe the merits of a voluntary Conserve to Enhance program warrant additional investigation. We would like to work with individuals and utilities to pilot such a program. We welcome your indication of interest and suggestions.

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grand more than you paid for the same type of house. If you decide to sell your house too that previous sale is a benchmark. You may not get the full hundred grand above your purchase price but you are going to be able to point to that sale as a benchmark for what your house is worth."

The sale is not likely to have the same effect throughout the state; the value of water varies widely in different locations depending upon, among other factors, available water supplies and projected growth. Water rights auctioned in the Phoenix area would not likely attract the same high bids cast in the Prescott area.

Landry says that the Prescott Active Management Area is one of the hottest markets in the country where the price of water is greatly appreciating and investors expect continued growth and development. They are unlikely to be disappointed if projected figures hold up. With its population having increased 52 percent between 2000 and 2007, Prescott Valley is projecting another 55 percent increase over the next 20 years. The auction price of its effluent water rights reflects this situation.

Auer summarizes what she believes the Prescott Valley auction accomplished. "What it has done in my opinion — this is one person speaking — is fleshed out through the competitive market place the true value of this commodity because it was sold outright, not sold in conjunction with development or real property. It was just the asset, the right itself out there for competitive bidding. That enabled us to determine at this time, in this economy with this type of resource and the future growth that is anticipated here and the scarcity of alternative supplies what the marketplace thinks it is worth."

Save the Date for WRRC's Colorado River Conference: June 24

The Importance of the Colorado River for Arizona's Future is theme of the Water Resources Research Center's annual conference, to be conducted June 24, 2008 in Phoenix at the Arizona Biltmore Resort and Spa. We are collaborating with the Central Arizona Project to bring you an informative and forward-looking session on the importance of the Colorado River to Arizona. Eighty years ago the Boulder Canyon Project Act authorized Arizona's 2.8 million acre-foot allocation, and 40 years ago the Colorado River Basin Project Act authorized construction of the Central Arizona Project. With an eye 40 years into the future, this one-day conference will consider important issues related to Colorado River use and the CAP. Topics include: water use by agriculture, cities and Indian Nations along the Colorado River and in Central Arizona; shortage sharing and drought implications for Arizona; interstate and intrastate water banking and recovery; implementation of the Lower Colorado River Multispecies Conservation Program; meeting the water needs of the Central Arizona Groundwater Replenishment District; and other timely topics. Join Reclamation Commissioner Bob Johnson and others for this informed and thoughtful dialogue. As more information becomes available it will be posted on the WRRC web site: www.cals.arizona.edu/azwater/. Please help us spread the word by sharing this notice with others who might be interested in the program.