ARIZONA
# WATER RESOURCE

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## 2002 — The Year of Clean Water

*The year 2002 is being celebrated as the Year of Clean Water. Thirty years ago, on Oct.18, 1979, the Clean Water Act became law, its passage representing a milestone in the efforts to protect our nation's water resources. The CWA set the goal of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters. Much has been accomplished, and much remains to be done.*

*During the 30 years of the CWA, science has advanced in its ability to detect pollutants in ever decreasing amounts and while technological advances provide solutions to pollution problems, they also raise new pollution concerns. Nonpoint sources of pollution from urban and rural areas alike are posing an increasingly significant threat to the nation's water resources.*

*The Year of Clean Water is providing the opportunity to help rekindle the public stewardship ethic of the 1970s to address the intricate web of human activity that consistently affects the nation's water resources. The Arizona Department of Environmental Quality has scheduled a series of events throughout 2002 to mark the 30th anniversary of the CWA. For information about Arizona events check: www.adeq.state.az.us For a national perspective check: www.yearofcleanwater.org*

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*Shown above are the headwaters of the Colorado River. (Photo: Philip Fortnam)*

## Rural Northern AZ Plans Its Water Future

### *Communities Doing What Needs to be Done*

In a collaborative effort involving diverse interests, water stressed communities in rural North Central Arizona will be examining various options to increase future supplies of water resources, including the possibility of acquiring Colorado River water.

To many knowledgeable in state water affairs they are doing what needs to be done. Rural water planning is being recognized as a need within state water circles, with the Governor's Water Management Commission, the Arizona Department of Water Resources and even a recent editorial in the "Arizona Republic" urging support for rural water management.

The rural northern region of the state confronts the same dilemma that vexes many urban areas of Arizona — greatly expanding population in areas of limited water resources. The population in North Central Arizona is expected to double within the next 50 years. Most of the water to support this rapid growth is expected to come from groundwater wells sunk deep within the Coconino Plateau. Depth to water is more than 1,500 feet in most areas.

A steady withdrawal of groundwater may pose threats to the very limited sur-

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*Rural...continued from page 1*

face water in the area, including springs and seeps within the Grand Canyon as well to the base flow of the Verde and Colorado rivers. The Havasupai Tribe has threatened court action against groundwater pumpers that the tribe claims threaten spring flow within the reservation.

In seeking a remedy to the area's water problems, some interests, including the Navajo and Hopi tribes, see a solution in the idea that inspired the Central Arizona Project — increasing surface water supplies through the delivery of Colorado River water. They consider construction of a pipeline from Lake Powell or some place along the Colorado River as a step in the right direction.

The pipeline figures prominently in the area's water affairs in several ways. Some view the pipeline as a viable, if not a necessary option for providing water to the area. In fact, they say continued growth and development in the region depend upon its construction. They believe water resource options are sufficiently limited that a pipeline will have to be built.

At the same time, however, the pipeline — or scepticism about the pipeline — has figured in the water management schemes of the area in another way. Concern that the pipeline was being promoted to the exclusion of other possible water resource options prompted work in organizing a regional water study. The strategy was to hold off the pipeline plan until other water resource options are examined.

Nikolai Ramsey of the Grand Canyon Trust says, "There was a lot of talk about four years ago about a regional water pipeline to Northern Arizona. That concerned us because there was insufficient data to justify the project."

"We were respectful for the potential for growing water needs. ... But the work had not been done to lay the groundwork for considering the feasibility of a pipeline."

Laying groundwork involved responding to various questions: What are the present and future water demands in the area? What water supply options existed? What groundwater is available for pumping in a sustainable fashion? What can be achieved with different water conservation technologies?

It came down to a consideration about the best way to proceed. Those raising water resource questions believed an organized plan of study was needed before a decision was made. Also, another development was occurring relevant to events in Northern Arizona and elsewhere. DWR was beginning to take notice of the need to encourage water planning in rural areas.

As a result, the agency was working with non-AMA regions of the state to form regional watershed groups or organizations to function as management units outside the AMA mold. The goal for these groups is to develop their own management plans suitable for their watershed areas. The emphasis was on local decision making.

Conditions were thus favorable for working on a regional

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## Lake Powell Pipeline to Northern Arizona — To Be or Not to Be?

A pipeline from the Colorado River is a theme running through the water affairs of Northern Arizona, with various interests at times promoting the idea. The Navajo Tribe has its Western Navajo Water Supply Project. This project is a bargaining chip in the Little Colorado River Adjudication, with the Navajo agreeing to subordinate certain of its reserved water rights if federal and state parties agree to support and partially fund the construction of a waterline from Lake Powell. The line would serve the Navajo communities between LeChee and Cameron.

*Arizona State Library, Archives and Public Records, Archives Division, Phoenix, #01-2054*

Agreement was close at hand when Senator Kyle intervened by commissioning the U.S. Bureau of Reclamation to study in more detail the water demand and supply options of the area.

The Kyle study is serving the same purpose as the Coconino Plateau Water Advisory Council's study plan — to review conditions to determine the necessity of a pipeline. (See main story) One significant difference between the two situations, however, deserves mention. Whereas those involved in the CPWAC's study maintain that initially all options are on an equal footing, with the pipeline one option among others to consider, the Navajo are firmly committed to securing a pipeline.

A Navajo pipeline would also likely benefit the Hopi Tribe. Rivalries between the two tribes, however, might interfere with negotiating a Navajo pipeline extension into Hopi land. If the pipeline were a regional project, such difficulties would likely be avoided. The pipeline would indeed be regional if it served the CPWAC's study area.

Yet the CPWAC study, which is to determine whether the pipeline is even needed, is just getting underway. That, however, does not prohibit speculation. Some officials doubt that a Navajo pipeline would be approved unless it also serves as a regional resource. This could readily be worked out by adding a spur to a Navajo pipeline at Cameron to extend to Flagstaff and the north-central portion of the state, the CPWAC study area.

In effect, a Navajo pipeline project, if built, would be constructed mostly with federal funds and could provide the first major leg of a regional pipeline. Since a regional pipeline would also serve the Grand Canyon National Park, a federal facility, additional federal support might be expected in building a pipeline extending from Cameron.

If the Navajo pipeline is not constructed, any regional pipeline project, left to its own resources, would not likely have the financial backing to see the light of day.

# Water Vapors

## WRRC's Barbara Tellman Retires — Sort Of

Barbara Tellman retired as senior research scientist for the Water Resources Research Center effective June 30. If there were a WRRC Hall of Fame to commemorate outstanding staff, Barbara would undoubtedly have earned a distinctive place within such an institution.

People may know of Barbara in various capacities. Some may know her as a name on the cover of a WRRC publication. She has been the author, co-author or editor of a range of publications, from "Arizona's Changing Rivers" to the recent "Arizona Water Information Directory." Her publication efforts have not just been limited to the WRRC. Her wide ranging interests have led her further afield to take on varied other projects. The University of Arizona Press has recently published a book that Barbara edited, "Invasive Exotic Species in the Sonoran Regions." (See the "Publication" section of this newsletter for a description of the book.)

Many know of Barbara from her work on various committees. She has been an informed and hard working member of many committees devoted to environmental and natural resource issues.

Some may know of Barbara as a voice on the phone, the WRRC staff member who fielded most of the phone inquiries.

Others may know her as a member of good standing of the Arizona water community. She is a generalist in the best sense of the term, aware that a respect for water is basic to understanding all water issues and that the history of water and human affairs is inextricably interlinked.

Finally, there are those of us who were fortunate to know Barbara as a co-worker. Hard working and cheerful, she often was willing to take the initiative in projects and endeavors that others of us gladly put off. She always could be counted on to take on tasks to promote the WRRC cause.

Barbara will continue her work in water affairs. She will now have more time to devote to Pima County's Sonoran Desert Conservation Plan. She also is working on a history of the San Pedro River.

We wish her the best of luck – and we promise her an honored place in a future WRCC Hall of fame.

### WRRC Water Map Revised

A revised edition of the Water Resources Research Center's water map has been published and is available for sale. The new map has revised text and new graphics. For additional information about the water map/poster, including an ordering form, see the "Special Projects" section (page 9) of the newsletter.

## Drought Planning, Then And Now

Water planning is attracting increased notice nowadays. Part of the reason for its added visibility is the work of the Governor's Water Management Commission. It took on the Herculean task of reviewing the workings of the Groundwater Management Act and developing recommendations to improve its efficiency. This was an exercise in water planning, to note areas of concern and consider strategies for improvement.

Water planning in rural areas of the state is an emerging issue. The "Arizona Republic" recently ran an editorial titled, "Raise the levels of water planning. " It said rural areas of the state are due for water planning support.

The need for drought planning is now in the news for obvious reasons. The "Arizona Water Resource" ran a feature on drought planning in Arizona, or the lack thereof, in early summer, 1996. The following excerpts from that piece show how the perceptions on water planning change.

*Tom Carr of the Arizona Department of Water Resources says, "As good planners we have reviewed the idea of a state drought plan, but there has not been a priority to put in place a standardized approach for the entire state. Most of our recent water management policies have focused on long-term overdraft of our aquifers."*

*Arizona has not had the strong incentive to develop such a plan at the state level. Carr explains that, "In the past, drought in Arizona has mainly affected the agricultural community, and they dealt with it by reducing water allocations for certain sections of land and by relying on groundwater to supplement the surface water supplies." Also, some officials believe that Arizona does not need an extensive drought management plan. They say the state is immune to the serious effects of drought because of its heavy reliance on groundwater. A document prepared by the Western States Water Council stated, "Drought is not a major problem in Arizona due to the State's primary dependence on groundwater reserves."*

The article had the good sense to conclude by stating, *In a state where many citizens now feel protective about groundwater, this sentiment may not be widely shared. And, besides, Arizona's reliance on groundwater is lessening.*

**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

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# News Briefs

## Leaking Tanks Pose Risk to Groundwater

A federal official recently testified that more than 76,000 leaking underground storage tanks are polluting the nations's groundwater, with the U.S. Environmental Protection Agency unable to do much to solve the problem.

John Stephenson, director of natural resources and environment of the General Accounting Office, testified before a subcommittee of the Senate Committee on Environment and Public Works that recent studies show that underground tanks across the country are leaking hazardous substances. He says that in fiscal year 2000 more than 14,500 leaks or releases from regulated tanks were reported.

The GAO sponsored a two-year survey that determined that approximately 1.5 million tanks have been permanently closed since the creation of the EPA Underground Storage Tank program in 1984. This left about 693,000 tanks subject to UST requirements, with states' programs in charge of dealing with these tanks. States have received EPA funding to cope with problem tanks, with about $187,000 provided to each state. In addition, Congress established a trust fund in 1986 to assist EPA and the states meet tank cleanup costs that owners and operators were unable or unwilling to pay.

In interpreting state responses to its survey, GAO estimated that although 89 percent of the tanks had the required protective equipment installed, 76,000 had not been properly retrofitted. Information about these tanks often is incomplete or lacking because state agencies are not always well informed about situations within their areas.

A GAO official stated that statistics show that improved inspection, an expanded staff and broader authority to enforce regulations are central to states' efforts to remedy the health hazards posed by the tanks.

The GAO report urges Congress and EPA to take steps to promote better inspections and enforcement. The survey indicates that most states would be receptive to some new initiatives, with officials in 40 states voicing support for a federal mandate requiring states to periodically inspect all tanks. They say such a mandate would provide them needed leverage to prod their state legislatures to fund an adequate inspection staff.

The GAO report recommends that EPA work with states to identify training needs and determine the best means of meeting them.

## ASU, UA Western River Info Goes On Line

Arizona State University and the University of Arizona are participants in the newly formed Western Waters Digital Library. WWDL's specialty is the great rivers of the West, with initial concentration on the Colorado, Columbia, Platte and Rio Grande. It will include materials relating to the interplay between rivers and human development throughout the rivers' watersheds.

The goal of WWDL is to be a scholarly and public digital library, with a broad focus to include social, geographic, economic, legal, scientific, environmental, geologic, policy and planning, recreational and historic information WWDL will gather a wide range of materials including printed text, photographs, maps, manuscripts, audio, video, databases, models, simulations and virtual realities. Data will be culled from a variety of sources, including government reports, oral histories, legal transcripts, water project records and personal papers and photographs.

The WWDL is a institutional group effort. Along with ASU and UA the project also involves 26 other academic and one special research library, all members of the Greater Western Library Alliance, the agency sponsoring the project. Other western academic libraries participating in the project include the University of Nevada-Las Vegas, University of New Mexico, University of Utah and the University of Southern California.

Along with acquiring information from cooperating universities project organizers also expect to attract contributions from local communities, specifically historical documents submitted by individuals. Project organizers say that at present no federal or state agency, organization or collaborative group provides such comprehensive information to researchers, policy makers, educators and citizens.

A vast array of public domain material from the participating academic institutions await processing into the project. ASU collections to be part of WWDL include Central Arizona Project Association Records, 1922-74; Carl T. Hayden Papers; George W.P. Hunt Papers; Eldon Rudd Papers 1962-87; Green Family Collection (documents and materials relating to the Glen Canyon Area 1950-75); and John J. Rhodes Papers 1953-83.

UA collections include Native American Water Rights in Arizona Collection; Frederick Dellenbaugh Papers; M.K. Udall documents relating to the federal government's role in developing the Central Arizona Project; and S.L. Udall documents relating to the federal government's role in developing water resources.

For more information about WWDL check the Water in the West web site: westerwater.org

## Arizona Ranks High in Boating Injuries

Out of a list of the nations' 15 most dangerous waterbodies for boating-related injuries six are found in the state of Arizona. Is it irony that a state with limited recreational surface water ranks high in boating-related injuries? Or does the sparsity of recreational surface water encourage hazardous boating, possibly because of overuse and crowded water conditions?

The U.S. Coast Guard did not provide the analysis when it published its list of the nation's water bodies with the most boating-related injuries. Following is the list along with the number of reported injuries: Colorado River* (520); Atlantic Ocean (499); Lake of the Ozarks, Mo. (457); Gulf

of Mexico (456); Lake Mead* (329); Lake Powell* (263); Mississippi River (221); Lake Havasu* (195); Pacific Ocean (190); Lake Michigan (185); Intercoastal Hwy, Fla. (176); Shasta Lake, Ca. (168); Lake Lanier, Ga. (164); Lake Mohave* (155); Lake Pleasant* (155) (*designates Arizona location)

Consistent with the above list is an accident reported during the Memorial Day holiday when three Californian men were killed in the Parker Strip on the Colorado River. Authorities suspect alcohol played a role in the accident.

## New Zealand Mudsnail Found in Arizona

The New Zealand mudsnail, a species roaming far from its place of origin, has recently been found in Arizona waters, in the Colorado River near Lees Ferry. The mudsnail may soon be joining the roster of 600 other species of non-native plants and animals now found in the Sonoran Desert.

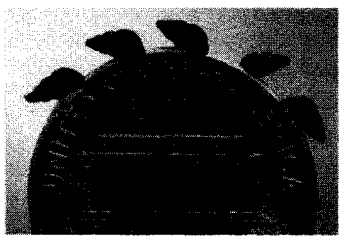


*Photo used with permission of Billings Gazette*

The mudsnails establish their niche in the stable environment of slack waters, away from high flows. The Arizona Game & Fish Department is now attempting to determine if the mudsnail has spread to other areas of the Colorado River. Work is underway to collect water samples from various dowriver sites.

Marc Dahlberg of AGF says, "We don't know how long the mudsnails have been there. This may be a recent occurrence or they may have been there for a long time.

"Right now the state is in the documentation phase. We do not know how extensive the problem is."

The mudsnails were first discovered in the late 1980s in the Snake River, Idaho, and Madison River, Montana. It was not long before this small invasive spread to waters in Yellowstone National Park. By 2001, they were found in the Owens River, California.

The New Zealand mudsnail range in size from a grain of sand to an average size of 3 to 6 mm (1/8 inch). Densities of over 500,000 per square meter have been reported in rivers in Yellowstone National Park.

They can survive several days out of water and are most likely spread by human activities. They can be attached to waders, angling or sampling gear or found in aquatic shipments.

For additional information about the New Zealand mudsnail contact Larry Riley, Chief of Fisheries, Arizona Game & Fish Department, 602-789-3258.

## Satellites Probe Earth's Aquifers

Researchers will be soon be using satellite data for measuring changes in groundwater tables, an improvement over the present method for monitoring aquifer levels throughout the world. The current reliance on ground based wells is labor and equipment intensive, provides incomplete coverage and is not well suited for monitoring groundwater recharge.

James Famiglietti, a University of California at Irvine hydrologist, and Matthew Rodell of NASA's Goddard Space Flight Center will be examining data from NASA's Gravity Recovery and Climate Experiment (GRACE) to monitor groundwater.

Launched in March 2002, the GRACE mission is mapping variations in the Earth's gravity field. Gravitational variations result from measurements of changes in the distribution of the Earth's mass, including all water storage sources, such as oceans, lakes, rivers, ice, soil water and aquifers. Initial GRACE data will be available later this summer.

Famiglietti and Rodell worked out a mathematical model to isolate groundwater information from overall water storage data. They presented their results in the June 10 issue of the "Journal of Hydrology."

"It has been nearly impossible in the past to accurately measure the changes in underground water storage," said Famiglietti, an associate professor of Earth system science and of civil and environmental engineering at UCI. "GRACE presents a breakthrough not only as a means to measure these changes but provides researchers with a way to understand how and why these changes take place, which has significant implications for water resources management."

Famiglietti explains that measuring the absolute mass of groundwater storage will not be possible, only the annual or seasonal changes in mass.

"The prospect of satellite based monitoring of groundwater is intriguing because most other satellites only monitor Earth's surface. GRACE provides us with an exciting opportunity to remotely observe processes beneath the surface and to construct a simultaneous, global view of changes in water storage," Famiglietti said.

The ability to measure all large underground water sources with reasonable accuracy will enable scientists to better assess future development and sustainability in various areas of the world.

Information about GRACE is available at: http://www.csr.utexas.edu/grace/ and http://essp.gsfc.nasa.gov/grace/

**U.S Wells in Place, by Western State and End Use**

| State | Irrigation | Public Supply | Community Supply | Households |
|---|---|---|---|---|
| Arizona | 4,368 | 2,533 | 1,650 | 77,229 |
| California | 71,554 | 8,143 | 3,320 | 465,589 |
| Colorado | 14,353 | 3,116 | 1,465 | 119,941 |
| Nevada | 1,498 | 1,156 | 697 | 36,810 |
| New Mexico | 7,329 | 2,478 | 1,545 | 97,042 |
| Texas | 57,881 | 13,297 | 9,207 | 566,719 |
| Utah | 2,559 | 1,961 | 1,164 | 18,528 |
| Wyoming | 927 | 1,373 | 647 | 40,598 |

*Reprinted from National Ground Water Association Web-site (www.ngwa.org) with permission of the National Ground Water Association. Copyright 1996*

## Guest View

# Watershed Management Holds Promise for U.S.-Mexican Border

*The author of this Guest View is Dr Stephen Mumme. He is a professor of political science at Colorado State University.*

Whether speaking of the Colorado River or the Rio Grande, much of the debate on use of the border's scarce water resources now endorses a watershed management approach. Watershed advocacy assumes sustainable development is more likely to be achieved when policy decisions are based on a full accounting of the complex ecological and socio-economic interrelationships within a particular hydrographic unit.

As public concern with drought, pollution, and the scarcity of natural habitats has risen, there is a corresponding desire on both sides of the border for more integrated approaches to water management. Using watersheds as referents in water management is certainly not new; binational efforts to equitably divide the surface runoff of the Rio Grande and Colorado Rivers hark back nearly a century. As a policy concept, however, the attractiveness of watershed management is driven by more contemporary environmental concerns. Pollution prevention, biodiversity protection, and conservation of renewable and non-renewable resources are problems best understood within a natural catchment framework. At the social level, a sense of the integrity and complexity of watersheds supports both a sense of place and a logic of looking beyond fixed jurisdictions for chances to cooperate in conserving water resources.

The problems of implementing a watershed management approach are at once economic and political. First, watersheds usually clash with markets. Whereas a watershed approach is inherently conservative, in its examination of a water based problem through the lens and limits of the catchment, markets treat water as a commodity that ought to flow freely towards higher values, whether or not these are catchment contained. We all know the Rio Grande and the Colorado now flow outside their original catchments in response to agricultural and urban demands. The old adage that "water flows uphill to money" accurately captures this reality. Water policy in both the United States and Mexico is based to a large extent on market practices, meaning that implementing watershed based concepts often requires modifying market-based commitments. That, in turn, amplifies the state's role in water governance.

Second, watersheds cross established political and administrative jurisdictions. This reality is the bane of watershed management efforts. At the international level the problem is aggravated by greater variation in political and administrative approaches to water management. This creates something of paradox, namely that watershed management requires more governance than market based systems, while conflicting with established jurisdictions. Watershed management is governmentally demanding and politically messy.

Despite these difficulties, watershed management is driven by the benefits of harmonizing management practices across jurisdictions and the need to represent a greater range of stakeholders in management decisions. Watershed management principles have been embraced by federal authorities in both countries with varying degrees of success — the Western Water Policy Review Advisory Commission recently proposed creating a new federal authority to oversee the development of watershed management initiatives in the western United States. On the U.S. side of the border, the Environmental Protection Agency and other federal agencies now endorse watershed management. In Mexico, the development of river basin councils (consejos de cuencas) as required by Mexico's 1990 National Water Law, has steadily evolved, with councils now in place on both the Rio Grande and Colorado rivers.

Such national initiatives are generating new opportunities. These are seen in innovative efforts to coordinate inter-governmental planning within major river basins and tributary watersheds, to forge new partnerships with governmental and non-governmental stakeholders, to establish new advisory and attention groups, sometimes formalized as watershed councils, and to initiate studies within an ambit of public participation and stakeholder involvement. With the support of foundations, universities, and NGOs, a number of important citizen based watershed initiatives have taken root.

As so many of these watershed initiatives are new it is simply not possible to assess their general effects on border water management. Their operational scope, mode of decision-making, and linkages amongst participating actors vary considerably by area and project throughout the border region. What is certain is that more information on water management is now produced, exchanged, and diffused binationally than at any previous time in the border's history. These collaborative and trans-jurisdictional endeavors in particular watersheds, Arizona's San Pedro River, for example, have certainly contributed to binational understanding and a greater level of cooperation than before.

More difficult, however, is reaching consensus on management practices at the watershed level, even in a strictly national context. Within the context of EPA's Border XXI Program, an inter-governmental water working group is struggling to agree on binational priorities for watershed management in the two major international river basins. Various technical studies are linked to this effort. Yet it is not by failure of good intentions that the United States and Mexico have as yet been unable to move forward towards establishing a truly binational watershed council for the Rio Grande or the Colorado River, even at a framework level.

Despite the impediments, watershed management appears to offer the greatest promise for building the sustainable utilization of border area water resources while drawing a broader range of stakeholders into the process. With the federal governments moving in this direction, as local experience grows, it should be possible to strengthen institutional commitments to these new modes of evaluation and decision-making in managing border water resources, commitments that will increasingly bridge the border.

# Legislation and Law

## EPA Plan Allows Utilities More Time to Meet Arsenic Rules

A panel of water industry experts reluctantly endorsed a federal plan to allow thousands of smaller utilities in the country to continue delivering drinking water containing several times the legal limit of arsenic. The plan allows the delivery of the water for years beyond the legal date the new arsenic standard takes effect.

The plan being considered by U.S. Environmental Protection Agency officials would allow smaller water systems serving fewer than 3,300 people a grace period, until 2015, for complying with new federal arsenic standards, in the mean time allowing the utilities to provide drinking water with twice the allowed limit. In effect, such systems carrying up to 20 ppb of arsenic could put off meeting EPA standards for 14 years. Larger systems with water up to 35 ppb could delay compliance for eight years, until 2009. The plan also allows systems to deliver up to 50 ppb arsenic until the rules officially take effect 4.5 years from now, in January 2006.

The EPA's National Drinking Water Advisory Council narrowly approved the proposed exemption plan, 8-6.

The proposed plan is in response to the concerns of many small water systems with arsenic levels far exceeding the standards. They say they have insufficient funds and infrastructure to remove arsenic from their supplies.

Critics of the plan say it is favoring utilities over the safety and health of the public.

According to a National Academies of Science report, approximately four to 10 of every 10,000 U.S. residents drinking water containing 3 parts per billion (ppb) of arsenic can expect to develop lung or bladder cancer.

## Bill Signed to Provide Loans for Water Wells

A $190 billion farm bill recently signed by President Bush includes an amendment authorizing a program of loans to low-to-moderate-income households to help residents install, refurbish or service water well systems. Titled the Affordable Drinking Water Act of 2001, the amendment was sponsored by various industry groups, including the Water Quality Association, the trade organization for the point-of-use industry, and the National Ground Water Association.

The provision authorizes $10 million for grants for fiscal years 2003 to 2007, with a maximum interest rate of 1 percent with a term of up to 20 years. The grants would go to nonprofit entities to provide the loans.

Dick Burke, member of the NGWA Board of Directors and chair of the Government Affairs Committee, says the water bill funding, although a very small portion of the total farm bill, represents an important step in helping rural and semi-rural residents secure safe, affordable drinking water.

Rep. John Boehner, R-OH, introduced the Affordable Drinking Water Act of 2001 in July, with its related bill sponsored by Sen. Rick Santorum, R-PA, in the Senate. In October, the well bill faced a precarious future when President Bush opposed the larger bill, the Agriculture Act of 2001, claiming, among other reasons, it was too costly and premature given "today's economic uncertainty." The well provision, however, survived.

The bill signed by the president deleted funding in several water-related programs, including $590 million for grants to replace water equipment and expand water facilities, and $17.5 million for rural and wastewater projects.

The full text of the provision is available from the government affairs pages on NGWA's web site, http://www.ngwa.org/govaffairs/legis.html or from the NGWA government affairs department 800-551-7379.

## Court Says EPA Can Set Non-point Pollution Limits

The U.S. Environmental Protection Agency can establish limits on non-point source pollution sources, a federal appeals court recently ruled.

The ruling upheld a federal judge's interpretation of provisions of the 1972 Clean Water Act that allow EPA to require states to take action to reduce pollution in rivers and waterways caused solely by runoff. In 1991, EPA began such enforcement at the urging of environmental groups.

The agency had previously set pollutant limits only for discharges from point sources; e.g. sewage system and industrial drain pipes. EPA has since recognized that runoff or non-point source pollution is the leading threat to water quality in the country.

States determine appropriate actions for achieving the prescribed limits, possibly by regulating road building, implementing various land use policies or restricting practices that result in erosion and chemical runoff. Failure to require reductions can result in loss of federal funds.

Farming groups argued that the government has authority only to limit pollution from industrial and sewage sources. Two Mendocino County landowners filed the suit, with the American Farm Bureau Federation and state and farm organizations joining it.

The two landowners have forest property along the Garcia River in southern Mendocino County. The Garcia River was one of 17 rivers on California's North Coast that EPA classified in 1992 as "substandard." EPA said sediment from years of logging severely damaged the river's coho salmon and steelhead populations.

When seeking a logging permit, the landowners were told they needed to reduce erosion. Actions needed to meet the requirement included mitigating 90 percent of the "controllable road-related sediment runoff" from logging activities and to limit harvesting during certain seasons. The landowners, who said the requirement would cost them $750,000, claimed that EPA guidelines did not require such measures. The appeals court was unconvinced.

# Publications & On-Line Resources

**Web Site Offers Healthcare Providers Info About Water-Related Diseases**

This website (http://poseidon.aomc.org/) is to inform primary care physicians about a variety of illnesses that may (or may not) be related to drinking water. Co-sponsored by the American Water Works Association, the user-friendly web site is a service to busy practicing clinicians in need of informational resources and educational tools to assist them in the recognition of waterborne disease and the health effects of water pollution.

**Land Stewardship Through Watershed Management Perspectives for the 21st Century**

*Edited by Peter F. Folliott, et. al*

This volume includes chapters on global watershed management perspectives, problems and programs; a retrospective survey of watershed management, lessons learned, emerging tools and technologies, and locally-led initiatives; the issues confronted when implementing a watershed management approach to land stewardship; the anticipated future contributions of watershed management to land stewardship; and the protocols necessary to realize the contributions of watershed management to land stewardship in practices, projects and programs. $85, with discounted price of $59 through Sept. 16. Kluwer Academic/Plenum Publishers, P.O. Box 358, Accord Station, Hingham, MA 02018-0358; email: kluwer@wkap.com

**San Pedro River Basin Directory**

*Denise Moreno*

The University of Arizona's Udall Center for the Studies in Public Policy has published a binational directory that lists more than 100 entities in the United States and Mexico that are involved in environmental work in the San Pedro River Basin. The publication provides contact and background information on international agencies and organizations, as well as on federal and state agencies, local governments, cooperative and interagency groups, interest groups, research institutions, and media contacts in both Mexico and the United States.

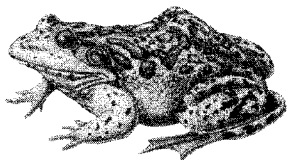
Copies can be obtained for $5 by contacting Kylie Dickman at 520-884-4393. The report also is available at the center's web site: http://udallcenter.arizona.edu

## Water a Theme in Two New UA Press Books

**Invasive Exotic Species in the Sonoran Region**

*Edited by Barbara Tellman*

A May 1998 symposium at the Arizona Sonoran Desert Museum was the event prompting publication of this volume. More than a proceedings, the publication synthesizes symposium material and includes new information. The book's broad canvas covers various issues arising from the expanding population of exotic plants and animal species in the Sonoran Desert and adjacent grasslands and riparian areas. The chapters discuss diverse ecological impacts, their intensity and magnitude depending upon the introduced species and the affected ecological context. Riparian areas get due attention as areas extensively invaded by exotic species. For example, estimates indicate that exotic plants dominate as much as 60 percent of the vegetative cover of the Sonoita Creek-Patagonia Reserve, Arizona's first designated Nature Conservancy area. Further, introduced fish pose a recurrent threat to the native fish of the area.



*The bullfrog (Rana Catesbiana) is an exotic species that has invaded the Arizona Wetlands. Drawing by Joel Floyd.*

Exotic species are lately attracting increased attention and concern, and contributors to this volume, which include experts from academia, government and non-profit organizations, are defining issues of concern to researchers and public officials. The volume provides a focus for debate about preserving biodiversity. 460 pp, $75

**The Lessening Stream**

*Michael F. Logan*

This is a book about the Santa Cruz River. Such books featuring rivers are a genre unto themselves, with most major western rivers the focus of a tome or two. Rivers are a dynamic presence in the landscape, their flow a force to be reckoned with, in both natural history and human affairs. In fact, studying the flow of a river provides a good measure of human interaction with the natural environment, for good or evil.

This volume joins the literary river genre in its review of the changing human uses of the Santa Cruz River and its aquifer, from the earliest human habitation in the valley to the present. The author describes the interweaving of human and river history through three eras — archaic, modern and postmodern, from early Native American farmers through Spanish missionaries to Anglo settlers. The historical coverage is vast. The general reader, however, might be put off by a style that at times has an academic ring to it. Unlike a moving river, the writing style lacks flow. In this sense, the style may be suitable for a book about the Santa Cruz, a river without flow along much of its course. 320 pp, $35.

UA Press books can be ordered through its web site: www.uapress.arizona.edu

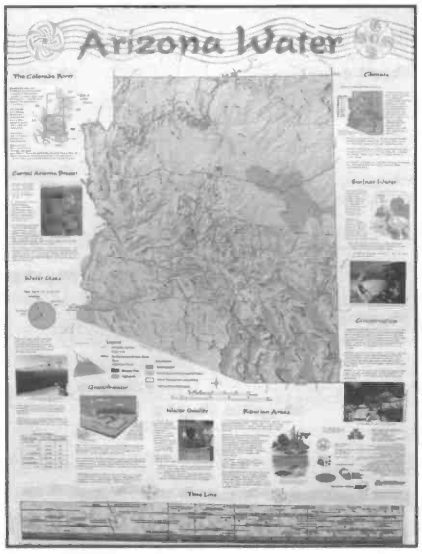
# Special Projects

## WRRC Announces Arizona Water Map II

*Sure to be a Collector's Item*

Every state deserves a water map, and the Water Resources Research Center is the proud producer of the Arizona Water Map. The map was first published in 1994 after a year of preparation and work. Its presence on the walls of offices, classrooms and libraries attests to its popularity and usefulness. Over 7,000 copies of the map were distributed.

WRRC announces the publication of a new edition of the Arizona Water Map, eight years after the printing of its first water map. Like the original map, this completed revised version is designed to be attractive and informative or, in other words, to please the eye and engage the mind.




The map provides a view of water within the Arizona landscape, showing the locations of rivers, lakes, reservoirs, riparian areas, the Central Arizona Project pipeline and major aquifers. Shadings and coloration display Arizona's natural topography, and boundary lines mark Active Management Areas, the water-related political subdivisions of the state.

New color photos, charts and insert maps, each representing a pertinent water issue, surround the map, and accompanying text provides information. Issues addressed include the Colorado River, water uses, groundwater and conservation. Insert maps are provided for the upper and lower basins of the Colorado River, Arizona annual precipitation and Arizona watershed basins. By illustrating important water issues with maps, charts and less text, this edition of the map serves as a more valuable teaching tool in the classroom.

A new feature in the revised edition of the map is a Time Line showing various events of importance in the water history of the state, from early geological times when Arizona was an inland sea to the arrival of CAP water in Tucson. Other important Arizona water events documented are the first Arizona canals, steamboats on the Colorado River and the "Arizona vs. California" Supreme Court Decision. The time line adds a temporal dimension to the map's spatial configuration.

Major contributors to the project include the Arizona Department of Water Resources, the Arizona Department of Environmental Quality, the Central Arizona Project, the Salt River Project and the U.S. Bureau of Reclamation and the University of Arizona's Cooperative Extension Program, College of Agricultural and Life Sciences.

The revised water map follows the tradition set by the original map, of providing a wealth of water information in an attractive and accessible format. Free copies are being supplied to the first 200 schools that request copies on school letterhead. Copies are available for $8.00 from the WRRC. (See Order Form below.) Proceeds from the map are earmarked to support water related educational activities and for future reprinting costs.

**ORDER FORM**

Arizona Water Map $ 8.00

**Special rates for educators:**
For educational pricing, send a request on school letterhead.

**Bulk Orders:**
For information on bulk orders of 25 or more, call 520-792-9591.

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# Announcements

## Funds to Enhance Diversity in Geosciences

National Science Foundation's Opportunities for Enhancing Diversity in the Geosciences program focuses on increasing participation and opportunities for geoscience education and research by students who are African American, Hispanic, Native American, Native Pacific Islanders and persons with disabilities. A secondary goal of the program is to strengthen the understanding of the geosciences and their contribution to modern society by a broad and diverse segment of the population. The OEDG program supports activities that strengthen geoscience teaching and learning to improve access to and retention in the geosciences of these underrepresented groups. Deadline is Sept. 3 for optional letters of intent, and Oct. 17 for full proposals. For additional information contact: Jewel Prendeville, Directorate for Geosciences, NSF, 4201 Wilson Blvd., Arlington, VA 22230. Telephone: (703) 292-8500. email: jprendev@nsf.gov or check the web site: http://www.nsf.gov/pubs/2002/nsf02104/nsf02104.htm

## ADEQ Offers Funds to Control Nonpoint Source Pollution

ADEQ invites applications for Water Quality Improvement funding to be used to implement on-the-ground water quality improvement projects to control nonpoint source pollution. Projects must improve, protect, or maintain a body of water in Arizona and provide at least 40 percent of the project costs as a nonfederal match. Approximately $2 million is available for multiple awards during this grant cycle, with the U.S. Environmental Protection Agency providing the funding under provisions of the 319(h) section of the Clean Water Act. Deadline is Sept. 25 A *2002-2004 Grant Manual* is available detailing the grant program, and it includes application forms. The manual can be obtained from Danese Cameron. phone: 800-234-5677, ext. 4569 it or can be downloaded from the ADEQ web site: http://www.adeq.state.az.us/environ/water/mgmt/planning.html#improve

## Some AWPF Monies Available

Due to the hard times the Arizona Water Protection Fund has limited funds to award this year. AWPF estimates it should have approximately $1 million available for grant awards, with a revised application due day of Aug. 7. The following limitations to the grant cycle apply: only on-the-ground stream/riapaian restorations projects will be considered; no monies will be available for the research category; applications for feasibility studies will not be considered. The grant process is expected to be highly competitive, with a limited number of grants awarded. For more information, phone: 602-417-2400, X 7016; or visit the web site: www.awpf.state.az.us

## Scholarships for Environmental Studies

The Environmental Research and Education Foundation invites applications from outstanding students with a demonstrated interest in environmental research for its annual Fiessinger Scholarships. Applicants must be (presently or in the next school year) full-time Ph.D. students. The award provides up to $12,000 per year, renewable for 2 additional years. Deadline for applications is Sept. 1. For additional information contact: Michael Cagney, Environmental Research and Education Foundation, 4301 Connecticut Ave. NW, Suite 300, Washington, DC 20008; phone: 202- 364-3789; fax: 202-364-3788; email: mcagney@envasns.org; web site: http://www.erefdn.org/scholar.html

## Wildlife Biology Grants for Grad. Students

Sandpiper Technologies awards equipment grants, equipment discount grants and cash grants to aid graduate students in wildlife biology research. The company specializes in burrow probes, underwater and elevated cameras, and time-lapse surveillance devices. Deadline for applications is Dec. 1. For additional information contact: Ann Christensen, Sandpiper Technologies, 535 W. Yosemite Ave., Manteca, CA 95337; phone: 209- 239-7460; fax: 209- 239-1571; email: grants@peeperpeople.com; web site: http://peeperpeople.com/grants.html

## International Arid Lands Meetings in Tucson

The International Arid Lands Consortium will be hosting a workshop and conference Oct. 20-25 in Tucson titled "Assessing Capabilities of Soils and Water Resources in Drylands: The Role of Information Retrieval and Dissemination Technologies." The conference addresses the importance, role and capabilities of soils and water resources in the planning and management of dryland regions, and electronic access to soil and water data. The workshop focus is the use of electronic resources available through World Wide Web sites, interactive decision-making tools, new internet technologies and other electronic means to assist in the planning and management of soils and water resources for development activities. For additional information contact: Dr. Jim P.M. Chamie, International Arid Lands Consortium, The University of Arizona, 1955 E. 6th St., Tucson, AZ 85719-5224; phone: 520-621-3024; email: ialc@ag.arizona.edu or check the web site: http://ialcworld.org

*Tree planting project in Israel. Photo: Jim Chamie*

## Public Policy Review

by Sharon Megdal

# The Central Arizona Groundwater Replenishment District – The Need for Some Fine Tuning

The Central Arizona Groundwater Replenishment District (CAGRD) was created by the Arizona Legislature in 1993. At that time, the Department of Water Resources was developing the Assured and Adequate Water Supply Rules. The AWS concepts under consideration included a significant commitment to use of renewable supplies, particularly in the Phoenix and Tucson Active Management Areas. Concerns were voiced. Without a mechanism that allowed for utilization of renewable supplies, many would face difficulty in demonstrating that their water use would be consistent with the statutory water management goal, a key requirement for a designation or certificate of Assured Water Supply.

The legislation creating the CAGRD was both innovative and complex. It established a mechanism for replenishing groundwater use without creating another layer of government. The replenishment responsibility was given to the operators of the Central Arizona Project. Every ten years, the CAGRD has to develop a plan of operation, which must be approved by the ADWR Director. The first plan was submitted in 1994, a year before the final approval of the AWS Rules.

Because the replenishment obligation could not have been projected with any accuracy, it is not surprising that a lot of guesswork went into the 1994 Plan. Where do we stand as the time for preparing the next plan approaches? The Plan's high-end projection for 2001 replenishment for the Tucson AMA was over 9,000 acre feet (af). Actual replenishment in 2001 was approximately 6,400 af, including replenishment of 5,000 af for Tucson Water, pursuant to a specialized contract developed between the CAGRD and Tucson. Actual replenishment in the Phoenix AMA in 2001 was approximately 6,700 af, well above the 2,300 acre foot high-end projection included in the 1994 Plan. In the Pinal AMA, where replenishment demand is mitigated by the relatively large amount of groundwater use allowed by the AWS Rules, actual replenishment in 2001 was 20 percent above the high-end projection. Overall, total GRD replenishment in 2001 exceeded the high-end estimate included in the 1994 Plan by 15 percent. More significantly, projected total replenishment obligations for 2014 are now running 57,000 acre feet, far more than 37,500 af shown in 1994 as the high replenishment scenario. Is the rapid growth in replenishment obligation a cause for concern? It is not – if the CAGRD-related recommendations of the Governor's Water Management Commission are implemented.

As discussed in my last column, the recommendations of the Commission were withdrawn from last session's legislative agenda. It is expected that the recommendations specifically dealing with the CAGRD will be proposed again next year. If implemented, the most significant of these would establish a replenishment reserve of long-term storage credits. As noted in the Commission's Final Report, in developing this recommendation, the challenge was "to provide a means of ensuring that the CAGRD can meet its long-term obligations, at a reasonable price, and still maintain the operational and legal flexibility to maximize the use of short-term supplies as they become available."

Significant effort went into developing the replenishment reserve recommendation. It is important that the Legislature not delay consideration of the proposal beyond the 2003 legislative session. The CAGRD's members can benefit from implementing this recommendation by taking advantage of the availability of surplus CAP water.

It should be noted that the replenishment reserve proposal was not developed primarily as a means for increasing the state's utilization of CAP water while excess CAP water is available. The operations of the Arizona Water Banking Authority and the pricing policies of the CAWCD Board, in conjunction with increasing demand for renewable water supplies generally, have demonstrated that Arizona can utilize its full apportionment of CAP water. The proposal reflected legitimate concerns that, because the CAGRD allows for growth to occur without there being "firm" renewable water to supply that growth, there could be price shocks in the future for CAGRD members. What happens down the road when there is no surplus CAP water available? Will the CAGRD have planned for this eventuality and secured other supplies at reasonable cost? The replenishment reserve proposal was seen as a means of improving the reliability of the CAGRD and increasing the likelihood that the CAGRD's rates remain stable in the future.

Does the replenishment reserve proposal, along with Commission recommendations for improved planning requirements and the ability for member service areas to de-enroll from the CAGRD, address all the concerns that have been voiced about the CAGRD? It does not, but it is a very significant start. Additional CAGRD-related issues were identified, but there was not time for the Commission to examine them. Instead, the Commission recommended that the CAGRD Board address these additional issues through an appropriate public process. The issues include location of replenishment activities relative to the location of pumping, the need to obtain secure water supplies to meet the CAGRD's future replenishment obligations, and the long-term role of the CAGRD. The CAGRD Board has already begun a process to follow up on this recommendation.

To date, the CAGRD has been successful in assisting developers and water providers in demonstrating that water use will be consistent with the state's management goals. Implementing the replenishment reserve proposal, strengthening the CAGRD's planning requirements, and examining the long-term role of the CAGRD will ensure that this success is continued into the future.

*Rural...continued from page 2*

water management plan. Significant water resource issues were being raised at a time when DWR policy was to encourage rural water planning at the local and regional level.

In response to the situation, a Coconino Plateau Water Advisory Council was formed. The 22-member council, appointed by the Coconino Board of Supervisors, is made up of representatives of the major stakeholders of the area including the Arizona Department of Water Resources, U.S. Bureau of Reclamation, U.S. Geological Survey, the Grand Canyon Trust, the cities of Flagstaff, Williams and Page, the Grand Canyon National Park, three Indian nations, and Coconino County. The council formed a technical working group, consisting of eleven individuals representing the primary players within the region. The technical working group has been working with BuRec to develop a plan of study.

Tom Whitmer of DWR says, "The BuRec study will examine the current state of groundwater and surface water in the Coconino Plateau and forecast demands roughly to 2050 and beyond. They will then identify alternatives for meeting demands. That means not just looking at a pipeline but looking at conservation, alternative well fields, at whatever means or mechanisms they can identify to meet the growing demands."

The BuRec study will include Page, Flagstaff, Williams, unincorporated areas of Coconino County, Tusayan, the South Rim of the Grand Canyon, diverse points along the western half of the Navajo Nation and the Hopi village of Moenkopi.

The BuRec time line for completing the project was considerably shortened since many water-related studies of the area have already been done, and the agency expects to get relevant information as it reviews this work. The BuRec originally expected to take about four years to complete the study but is now looking at about two years. A more optimistic estimate is 18 months.

In commenting on BuRec's participation, Kevin Black, who is project manager of the study, says, "We were invited to participate by the Arizona Department of Water Resources. Our involvement stems from recommendations from the State's Water Commission to improve rural water planning, not only in the north-central part of the state but in a number of areas in rural Arizona."

"The regional water planning being done now takes into account improved management and efficiency of existing waters, including conservation, treatment and reuse of effluent, as alternatives to meet future demands. This study is an example of the current approach Reclamation is taking to address regional water demands throughout the West."

It is not just the federal agency that is breaking new ground. The Water Advisory Council is working out its role. Ramsey, who is also a member of the Advisory Council, says, "We are working at this point somewhat informally without rules of process, but very respectfully and on a consensus basis. We make sure we all agree to the plan of study. There has not been a hitch yet."

Ramsey foresees a possible future legal hitch. He says, "There is a lot of legal ambiguity. What can a rural regional water group do? It is quite possible this will lead to new state law that will give authority to regional water groups to do certain things under the auspices of the state."

Whitmer also sees the possible need for future legislative action. "If the regional water planning effort is to be formalized some potential legislative resolution may be needed."

"Right now the advisory group is relying on consensus based planning. That may break down and something on a more formalized basis will be needed to promote the plan and to make it work. At this point in the game there has not been any discussion regarding that type of entity."

The study plan will be presented to the Advisory Council for approval on June 27 and the actual work begun shortly thereafter.

Arizona Water Resource

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