



ARIZONA WATER RESOURCE

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Tucson Narrows CAP Options

The City of Tucson has narrowed its options for using its Central Arizona Project water allocation to four: direct treatment and delivery through the existing treatment plant after replacing deteriorating mains; augmenting treatment with a filtration stage to remove salts; blending CAP water with equal amounts of groundwater; and recharging CAP water using spreading basins, streambeds, and/or injection wells.

An ongoing study by Dames & Moore considered a number of options, several of which have been set aside. Options no longer being considered include: rejecting the CAP water and continuing to pump groundwater; exchanging CAP water for Pinal County groundwater; exchanging CAP water for groundwater currently pumped by local copper mines; and trading Tucson's CAP water to entities in other states.

continued on page 2



Proper form for taking a surface water grab sample with a DH-81 is demonstrated by Melinda Longsworth of the Arizona Department of Environmental Quality.

Proper form for water quality sampling is the subject of Field Manual for Water Quality Sampling, the Water Resources Research Center's first bilingual publication. See "Special Projects," p. 7.

(Photo by Doug Heath, EPA Region I.)



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New Laws, New Water Policy

The 1995 Arizona legislative session is history. A number of laws were passed that will affect water resources management in the state. Following are brief descriptions of recent water-related legislative actions.

House Bill 2276 amends the surface water adjudication code. A main intent of the bill is to define "de minimis" water users or users who use small amounts of water. The bill provides summary adjudication for such water users to relieve them of involvement in the costly and prolonged court battle over the water rights in the Gila and Little Colorado river systems. An emergency clause in the bill put it into effect immediately upon the governor's signature on March 17.

More specifically, the bill requires that *de minimis* stockponds, defined as those of 15 acre-feet or less, be summarily adjudicated. Also, the bill provides for the summary adjudication of "domestic uses." Such uses are defined as a single appropriation that serves no more than three residences, with outside

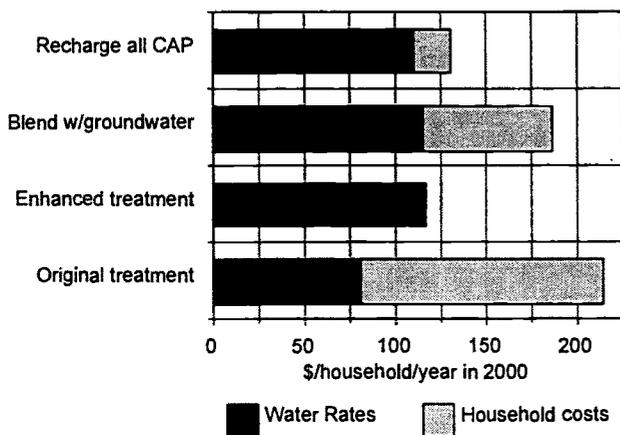
continued in Legislation and Law, page 6

CAP options, continued from page 1

The final plan is expected to be some combination of the four options still under study.

In addition, efforts are being made to exchange CAP water with area farmers. Tucson officials have negotiated with Farmers' Investment Co. about exchanging up to 20,000 acre-feet of CAP water per year with pecan growers in the Sahuarita and Continental areas for credits to pump groundwater. No small obstacle to the plan would be the cost of building a pipeline—estimated at \$5 million to \$10 million—from the CAP aqueduct to the agricultural lands.

INCREASE IN ANNUAL HOUSEHOLD WATER COST for CAP treatment options



The final Tucson CAP plan, scheduled for adoption later this year, likely will take five years to fully implement. In the meantime, Tucson is looking at various short-term strategies to make use of CAP water and alleviate a potential summer peak demand problem. Options such as pouring CAP water into washes to recharge on the nearby Tohono O'odham reservation and running CAP water through the City's effluent distribution system to facilitate streambed recharge have been raised. Each faces substantial logistical and legal hurdles.

The Dames and Moore report indicates a tradeoff between keeping water rates as low as possible and minimizing impacts of lower quality water on households. As the bar chart shows, the City's original strategy of chemically treating and directly delivering CAP water would cost a typical household in the year 2000 only \$81 a year in increased water bills.

Unfortunately, experience and further research showed that the saltier, more corrosive water was costing households considerably more in the form of failing pipes, damaged landscaping, and shortened useful life for water-using appliances. Such household costs were estimated at \$132 a year.

By contrast, enhanced treatment including filtration to remove dissolved solids imposes the greatest rate increase, \$116 a year in the year 2000. However, there are no additional household costs associated with this option.

Household water bills would go up about \$115 a year if CAP water and groundwater are blended in equal amounts before delivery to customers. Using blended water would increase household costs by \$70 a year.

If all CAP water is recharged, household water bills in the year 2000 would increase between \$106 to \$114 a year. The final cost would depend upon the recharge method and location. Recharge likely would increase household costs about \$19 a year.

According to the report the recharge option could present problems because under new state rules Tucson may be unable to demonstrate an assured water supply for new development.

Tucsonans are likely to resist any proposed water rate increases for CAP water. A survey found that most residents "may be unwilling to pay even small rate increases" for CAP water because it is harder and saltier than groundwater. The status quo is, indeed, appealing, with an anticipated increase in the year 2000 of only \$48 a year if the city remains on groundwater.

Public meetings are to be conducted during June to gather input on the various options. A final report is scheduled to go to the City Council June 26.

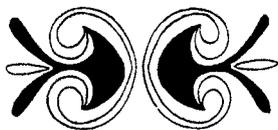
Meanwhile, an effort is underway to place an initiative on the November ballot specifying how CAP water is to be used. It is a case of déjà vu all over again, with many of the same people spearheading the initiative effort who backed an all-recharge initiative in 1987 to commit the city to recharge its entire CAP allocation. That initiative failed.

Since then, a lot of CAP water has gone under the bridge and into people's homes, with destructive and costly results. Supporters of the new initiative now feel they have a better chance to succeed with a CAP initiative. Various strategies are proposed for using CAP water including dumping the water into area washes and rivers, building recharge ponds and installing injection wells in the city's central well field. Part of the proposed plan also includes selling CAP water for mining and agricultural use.

Contributions for Bombing Victim's Son

Two victims of the April 19 Oklahoma City bombing were Trudy Rigney and Robert Chipman, employees of the Oklahoma Water Resources Board (OWRB). The only state employees killed in the blast, both were working in a building across the street from the federal building. Rigney, a 31-year-old intern with the OWRB, would have graduated this spring from Oklahoma University with a degree in geography. She leaves behind an 11-year-old son, Jonmichael. Her student intern status leaves her orphaned son with few benefits.

OWRB attorney Lou Klaver is helping establish a guardianship account for Jonmichael's education. Contributions may be sent to the Jonmichael Rigney Guardianship Account, Oklahoma Water Resources Board, P.O. Box 150, Oklahoma City, OK 73101.



Water Vapors

We are pleased to announce a new sponsor for *Arizona Water Resource* — the Metropolitan Domestic Water Improvement District. Also known as Metro Water District, it provides water service to some 40,000 persons on Tucson's northwest side. Contributions from all 11 our sponsors (see box, p. 9) make possible the continued subscription-free publishing of *AWR*. We deeply appreciate them.

Love your Web Site!

Last issue's article on our Home Page on the World-Wide Web generated plenty of feedback. Rick Volante of the *Arizona Daily Star* writes, "I'm happily throwing away my back issues of *AWR*. Thanks for putting them on the Web and congrats on your new home page. It looks good. I plan to link my readers to it through articles in Starnet."

Rick, check out our new feature that allows searching of *AWR* back issues by key word or phrase.

A friend from Texas writes, "Howdy! I was looking for reasons to put off studying for my final exam when I remembered something about a new Water Resources center site. So I've spent the last half hour putting about a million hits on your server. My impression: Very nice! Things I found spiffy are: the intuitive hierarchical structure (very easy to navigate); the water issues summary (it's a great idea); the Netscape enhancements (someone spent a lot of time on that); the glossary (did that take several man-years to get on-line, or am I missing something?). Great job, guys! Check out my inferior version of your home page and let me know what you think."

What we think is that everything is bigger in Texas, and it takes a big man to concede his home page is "inferior." (If it's any consolation, your newsletter is the standard by which we judge ours.)

Pete Hawkins, UA professor of Renewal Natural Resources, writes, "I just took my first short tour through your new WWW product. Nice job. Several impressions and suggestions: The glossary left out a lot of things; the "Issues" paragraphs on CAP is squeaky clean. From reading it you'd think there is no current contention or troubles. And we all know otherwise. There are a lot of opportunities for posting other Arizona data. How about weather records, small watershed data, lists of studies..."

Pete — the glossary has been greatly expanded. We're trying to prioritize the data to post. Input from users is key to doing that. Thanks.

The best feedback we've received is statistics on home page use — nearly 1,000 "hits" on our main directory per week. Speaking of statistics...

Poland, California Underwater

Many are unmoved by the beauty of pure statistics. Small wonder then that writers seek to creatively convey statistics, without putting off readers with a lot of numbers. For example, Theodore Steinberg in his recent book, *Slide Mountain*, wants to relate that dams on the Missouri River hold back great quantities of water. He writes that the amount of water impounded by dams on the Missouri would suffice to flood the entire nation of Poland to a depth of one foot.

At first glance one is struck with the impression that Steinberg is talking about a whole lot of water. Upon

further reflection one begins to wonder, why Poland? And just how big is Poland, compared to, say, Pennsylvania, Paraguay, or the Palouse? One might even empathize with the Polish people — haven't they suffered enough? Somewhere along the way the significance of the water is lost.

International Water Report works the same strategy with greater effectiveness. It reports that if all the water stored behind the world's 39,000 largest dams were gathered together, it would be enough to put California under water. The significance of all that water becomes immediately apparent. An image of the enormity of California is fixed in most people's minds, at least people from the United States. And further, to other westerners, California under water has a certain poetic attraction like King Midas overwhelmed by his lust for gold. What if California in its greed for water got all it wanted and then some?

The point is that by interpreting quantitative data with an appropriate image, the significance of the data is better understood, and also some political points can be scored.

Row, row, row your boat...

Dorothy Riddle of Yee-Haw! Inc. wants river songs for a collection she hopes to publish. She seeks titles, artists and songwriters, and especially persons with their own river or paddling songs. Contact her at Yee-Haw! Inc., 2407 N. Palomino Court, Chandler, Arizona 85224; 602-963-2030.



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News Briefs

NAWQA Project Begins New Phase

The Arizona section of the U.S. Geological Survey's National Water Quality Assessment Program is moving from the planning to the study phase. A May 2 meeting of the Liaison Committee featured preliminary plans for a surface water sampling network and groundwater study and land use survey plans. This analysis involves literature searches and data collection on past studies, and maintaining sampling networks for the next several years.

Efforts now focus on choosing sampling sites within the study area. Criteria have been established and field surveys will further narrow the options. A preliminary selection of contaminants to be sampled has been made.

Speakers at the meeting included John Zagorski, head of NAWQA's volatile organic compound (VOC) synthesis, who discussed the national program to deal with VOCs. Patti Spindler, an Arizona Department of Environmental Quality biologist,

discussed ADEQ's Biocriteria Program. She reported that a large sampling network is planned to develop baseline data about biological components in water so that water quality biocriteria can be developed. Barry Spicer of Arizona Game and Fish Department described the agency's extensive Biological Data Base for Threatened and Endangered Species available to agencies and the public.

USGS staff available to provide information on the NAWQA study include: Laurie Wirt (surface water study); Dorrie Gellenback (groundwater study); and Gail Cordy (the entire NAWQA program). All are at the Tucson USGS office, 520-670-6112.

Plans Call for Multi-Use Picacho Reservoir

A favorite of local birders for years, Picacho Reservoir, located ten miles east of Casa Grande, may soar out of birdwatching obscurity to become a highly utilized water-based recreation area and an integral part of future water supply plans for Pinal County.

In a recent study (see "Publications," p. 8), Pinal County analyzed options to expand and enhance the reservoir currently serving as an irrigation water storage facility for the Bureau of Indian Affairs' San Carlos

Irrigation Project (SCIP). The reservoir's role as a storage facility would expand to include groundwater recharge, protection of riparian areas, flood control and recreation. Project expansion could be accomplished through various strategies including dredging the existing reservoir, raising and reinforcing its banks, building a new reservoir, and diverting the McClellan Wash.

Brad Gair, Director of Pinal County's Department of Civil Works, indicated that groundwater recharge is an important component of the proposed facility. Potential sources of recharge water include the Gila River, McClellan Wash, Brady Wash and Central Arizona Project water. Banking of CAP water, the largest potential source of project water, requires an agreement between the Central Arizona Water Conservation District and SCIP, and the resolution of environmental issues associated with the introduction of non-native species in CAP water.

The Pinal County Water Augmentation Authority is currently developing its plan which may involve overseeing and/or financing the Picacho project. Other potential project participants include SCIP, U.S. Bureau of Reclamation, Pinal County, Arizona Department of Water Resources, and the City of Mesa.

ADEQ Reorganizing

A proposed reorganization plan for the Arizona Department of Environmental Quality is available for public review. The design scraps the current media-based structure (air, water and waste) in favor of three functionally-oriented divisions: inspections, compliance and enforcement; permits and remediation; and environmental science and planning. In addition, Community Programs (including public information) and Support Services will report to the Deputy Director.

The goal is to improve communication, efficiency and flexibility by consolidating similar functions, thereby improving customer service. After receiving feedback on the plan, ADEQ will begin the implementation phase.



Picacho Reservoir reconsidered, as new uses are proposed. (Photo courtesy Pinal County.)

Arizona Rivers Listed as Endangered

Three rivers that run through Arizona have the dubious distinction of being listed as among the Southwest's most endangered streams. The list, compiled by American Rivers, includes the Gila, San Pedro and Virgin rivers.

American Rivers noted that the Gila River is the only U.S. river basin with all 47 of its freshwater fish species either extinct, listed as threatened or endangered or recommended as candidates of such listings. The Gila enters Arizona from New Mexico and flows through metropolitan Phoenix, before joining the Colorado River near Yuma.

The San Pedro is endangered by groundwater pumping in the Sierra Vista area, a large upriver Mexican copper mine and the introduction of non-native fish, according to the conservation group. The San Pedro flows north from Mexico, joining the Gila River southeast of Phoenix.

The Virgin River in northwest Arizona is considered threatened due to increasing demand for its waters by both Las Vegas and southwestern Utah, according to the organization. Increased water demands purportedly threaten several endangered native fish.

Beavers May Again Dam San Pedro

After a long absence, beaver may return to the San Pedro River. Its reintroduction is proposed in the Habitat Management Plan for the San Pedro Riparian National Conservation Area.

Once abundant in the San Pedro area, the beaver's demise was partly the result of fur trapping during 1820-30. Pressures from settlement — grazing, water diversion and groundwater pumping — later sealed the beavers' fate. The military dynamited beaver dams to halt the spread of malaria.

Beavers now are understood as contributing to the health of riparian areas and reintroduction programs have been underway for more than 75 years. By building dams, beavers

widen the riparian strip, lessen erosion, slow flood waters, as well as provide new habitat for wildlife and fish.

The Bureau of Land Management and the Arizona Department of Game and Fish propose reintroducing the beaver as part of a strategy to restore the San Pedro River within the National Conservation Area. The first beavers could be released in September, and a total of 30 pairs may eventually inhabit the area.

For information about the project contact: the Bureau of Land Management, Attn: Beaver Scoping, 12661 E. Broadway, Tucson Arizona, 85748.

Three Riparian Species Proposed as Endangered

Endangered status is proposed for a salamander and two water plants found only in cienegas in the Santa Cruz and San Pedro river watersheds. The U.S. Fish and Wildlife Service (USFW) proposed listing the Sonora tiger salamander, Canelo Hills ladies' tresses, a yellow and white orchid, and the Huachuca water umbel, a floating plant. Threats to the species include habitat degradation, illegal collection, disease, predation and competition with non-native species.

The proposed designation has sparked controversy. Ranchers fear special protection for the species will restrict their operations. Irrigators fear groundwater pumping may be cut.

"Grazing does not appear to be a real threat," said Jim Rorabaugh, a USFW biologist, although he noted overgrazing may be an issue. The agency indicated, however, that future increases in groundwater pumping and associated declines in perennial surface water flows may pose a threat to the habitat of the two plant species. The salamander species actually depends on ongoing operation of livestock tanks.

The controversy over potential listing of endangered species usually heats up if critical habitat is established by USFW. At the time of the pro-

posed listing, critical habitat was not designated. Jeff Humphrey of USFW indicated that habitat designation may not be part of the management plan for these species. USFW hopes to cooperate with ranchers and the U.S. Forest Service to improve habitat.

For more information contact State Supervisor, U.S. Fish and Wildlife Service, 2321 West Royal Palm Rd., Suite 103, Phoenix, AZ 85021; phone 602-640-2720.

Owl Proposed as Endangered, Too

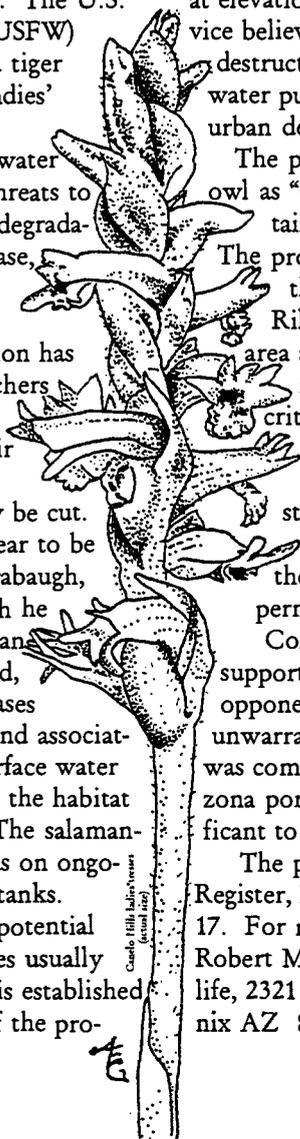
U.S. Fish and Wildlife Service has proposed endangered species status for the Cactus Ferruginous Pygmy Owl. Ranging throughout much of Mexico into Central America, the owl prefers riparian habitat. Its range within Arizona extends north to New River at elevations below 3000 feet. The Service believes its demise is largely due to destruction of habitat, caused by water pumping and diversion, dams, urban development and overgrazing.

The proposed listing designates the owl as "endangered" and declares certain areas "critical habitat."

The proposed areas include most of the Santa Cruz River and Rillito Creek in the Tucson area and portions of the San Pedro, New, and Gila Rivers. A critical habitat designation primarily affects federal actions in the critical area. Private, state, and local government actions are unaffected, unless those actions require a federal permit or involve federal funding.

Comments range from strong support to strong opposition. Some opponents believe listing the owl is unwarranted because the bird never was common in Arizona, and the Arizona portion of its range is not significant to the survival of the species.

The proposal is in the Federal Register, Dec. 12, 1994 - 50CFR Part 17. For more information contact: Robert Marshall, U.S. Fish and Wildlife, 2321 W. Royal Palm, #103, Phoenix AZ 85021. Phone 602-640-2750.



Canelo Hills ladies' tresses



Legislation & Law

New Laws, cont. from p. 1

irrigation limited to no more than one-half acre. Domestic uses are to be summarily adjudicated at a quantity of three acre-feet a year per residential connection.

"Small business use" is defined as a single appropriation serving one business including one-half acre of outside irrigation and a total quantity of no more than three acre-feet a year. Also the bill requires summary adjudication of "stockwatering uses" with reasonable use not to exceed one acre-foot a year.

House Bill 2276 also narrows the court's assignment and introduces procedural changes to streamline the adjudication process. Further, it designated the superior court, not the supreme court, to appoint a special master for the proceedings. HB 2276 also establishes a permanent joint legislative committee to monitor the general stream adjudication and its funding.

The bill sparked a flurry of legal maneuvering to test its constitutionality and resolve other legal questions the legislation raised. In response to requests, Superior Court Judge Susan Bolton ordered a stay of most Gila River adjudication activities until June 2 when she has scheduled a hearing.

Other changes to the surface water code resulted from passage of House Bill 2193, signed by Governor Symington on April 19. This bill defines stockwatering, stockpond, and domestic water rights as connected to both federal and state public lands. The bill assigns state-based water rights, in the case of state and federal leases, to the appropriator of the water—frequently a rancher or farmer.

Further, water certificates are to be issued to the state of Arizona, unless stockwatering, stockpond, and domestic water use is in connection with a

ranch or farm. In such cases, water certificates will be issued in the name of the lease holder who perfected the water right. The bill also requires that the permission of the state land commissioner be obtained before rights established under the ranch and farm exemption are transferred from the public land.

In other action, Senate Bill 2196 repealed a 1986 law that allowed citizens to sue polluters if state environmental officials refused to enforce anti-pollution laws. The repealed law is replaced with a provision that permits individuals to directly sue the Arizona Department of Environmental Quality (ADEQ). Although only several suits resulted from the 1986 law, Rusty Bower, the sponsor of SB 2196, said the business community feared dealing with four million "vigilantes."

House Bill 2319 allows the governor to dismiss members of various boards and commissions without cause. Arizona law previously allowed most board and commission members to serve a fixed term, with removal only for just cause, such as misconduct. The new law permits a governor to remove only his appointees without cause, not those of a predecessor.

Business feared dealing with four million "vigilantes."

Critics charge that Governor Symington supported the bill to discipline the state Game and Fish Department. The department's goal of maintaining habitat for wildlife at times set the agency in conflict with business and ranching interest pushing their land use plans. The governor denies the allegation saying the bill allows him to ensure that he has a more supportive team. An unlikely coalition of hunting and environmental groups are circulating a petition to invalidate House Bill 2319.

Environmental education took a beating this legislative session. The Legislature rescinded Arizona's environmental education mandate. Envi-

ronmental education is no longer a required subject, and if a school district chooses to provide it, certain directives must be followed. For example, the program must be based on the most current scientific data and must address economic and social implications of environmental education.

Further, funds derived from the sale of Arizona environmental plates no longer will go to the Arizona Department of Education to support environmental education. Instead, up to half will be allocated to the Natural Resource Conservation District education centers, with the other half available to schools in the form of grants to teach environmental education.

Senate Bills 1203 and 1249, which assist small communities and new developments in constructing wastewater treatment facilities, were supported by ADEQ. SB 1203 expands the definition of who can participate in the State Revolving Fund (SRF) for wastewater treatment projects so that small and medium-sized rural communities can more easily participate.

The SRF was established in 1989 as part of the Wastewater Management Authority of Arizona to use federal grant monies and local revenues to make low-cost loans to certain qualified Arizona political subdivisions for wastewater treatment projects. The Wastewater Management Authority issues bonds, which are repaid to the SRF over a period of up to 20 years. The bill generated support as both an environmental measure and an economic development initiative.

SB 1249 addresses concerns of municipalities and developers over delays in ADEQ review of on-site wastewater projects. Historically, the problem has been associated with housing booms. The bill deals with the fluctuations in demand for review and approval of on-site wastewater projects by allowing the ADEQ director to use private sector inspectors. The bill also offers developers and others the option of paying for an expedited review of their wastewater treatment plans.



Special Projects

Individuals and organizations involved in water-related studies, pilot projects and applied research are invited to submit information for this section.

Monitoring water quality along the U.S.-Mexico border may be more consistent and uniform in the future with the publication of a bilingual handbook describing proper sampling techniques. The *Field Manual for Water Quality Sampling/Manual de Campo para el Muestreo de la Calidad del Agua* presents a sampling protocol consistent with the practices of Mexican and U.S. federal and state agencies. Developed over a two-year period, the handbook represents the cooperative efforts of numerous agencies and organizations in both countries.

Growing economic ties between Mexico and the U.S. have increased economic activity in the border area. The Water Resources Research Center, College of Agriculture, The University of Arizona (WRRC), in cooperation with the Arizona Department of Environmental Quality (ADEQ) developed the publication in response to growing concern about public health and environmental conditions along the border.

In 1992, the WRRC identified three serious obstacles to environmental monitoring and remediation efforts along the U.S.-Mexico border: 1) absence of a single agreed-upon protocol for taking water quality samples; 2) inadequate training for some persons working in the field taking water quality samples; and 3) technical and bureaucratic barriers to sharing the results of water quality testing. This field manual is intended to address the first of these problems.

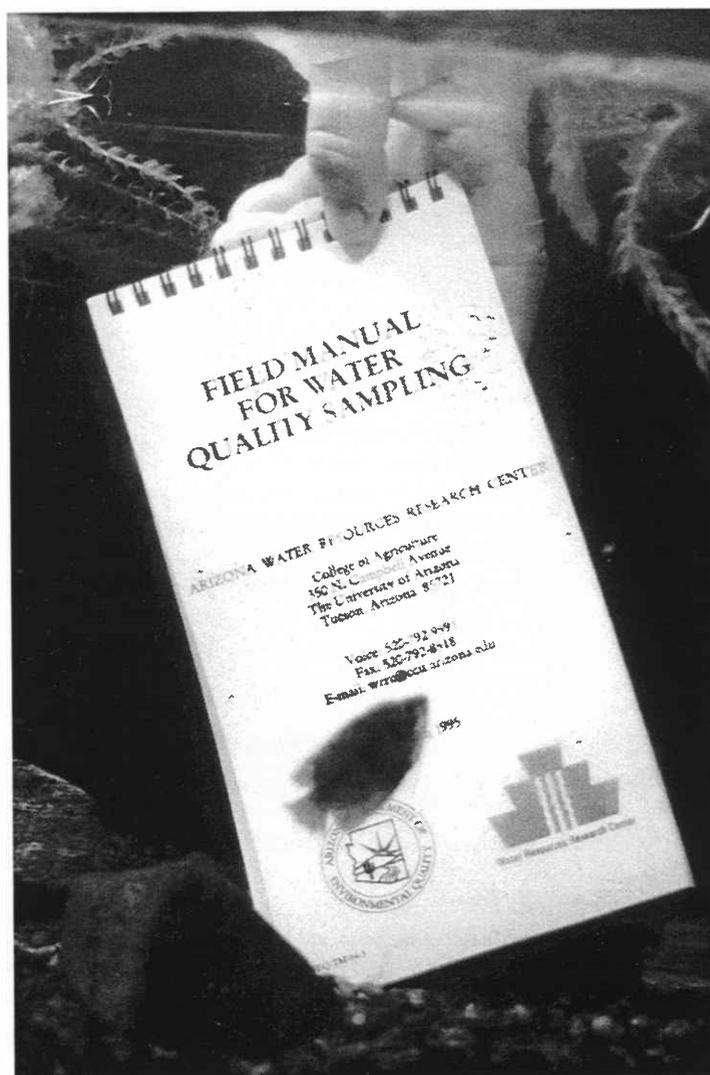
The manual outlines a step-by-step process, from siting a water sampling station to shipping collected samples to analytical laboratories. Beginning with a section on safeguarding samplers' health and safety, the manual covers planning stages, including selecting and establishing sampling stations, and making preparations prior to going into the field. The majority of the handbook is devoted to describing correct procedures for sampling both groundwater and surface water for nearly all types of potential contaminants, including volatile organics, heavy metals, radionuclides, bacteria and viruses. Illustrations, check lists, and step-by-step instructions are provided, as well as post-sampling instructions, reference and glossary information and a full index.

Preparation of this document was made possible by the Water Quality Division, ADEQ, and the U.S. Environmental Protection Agency. The drafting, translation and review process lasted over a year and included meetings with Mexi-

can and U.S. governmental officials and researchers from universities on both sides of the border. State agencies in Arizona, Sonora, Texas and California also participated, along with the International Boundary and Water Commission (IBWC), and its Mexican counterpart, Comisión Internacional de Límites y Aguas (CILA).

Up to two copies of the bilingual manual are available free of charge to agencies and organization with water quality sampling interests; additional copies are available at the cost of printing and distribution, or between \$8 and \$10 each, depending on quantities and method of shipping.

For further information on the bilingual field manual, contact Gary Woodard at the WRRC, 520-792-9591, or Mario Castañeda at ADEQ, 800-234-5677, ext. 4409; those with access to the World Wide Web will find the field manual and related information on the WRRC's home page at <http://ag.arizona.edu/AZWATER/>.



Designed for field use in rugged conditions and sized to fit a back pocket, the manual is printed in indelible ink on water-proof, tear-proof paper. Nearly indestructible, it also floats. (Photo by H. Ameden & B. Tellman, WRRC.)



Publications

Field Manual For Water Quality Sampling/Manual De Campo Para El Muestreo De La Calidad Del Agua

This new bilingual manual, intended to serve as a field reference guide for collection of water quality samples from surface water and groundwater, provides consistent field sampling protocols in both English and Spanish. The manual, prepared by the University of Arizona's Water Resources Research Center with the Arizona Department of Environmental Quality, describes techniques. For more information or how to order, see "Special Projects," p. 7.

The Tucson Basin Environmental Education Resource Guide

This guide lists over 90 private organizations and public agencies that currently are providing environmental education programs to educators, school children and the public. The guide provides contact names and numbers along with brief descriptions of the organizations. Copies may be picked up at the Tucson Resource Center for Environmental Education for \$1 or send \$2 to the T.R.E.E. Center, P.O. Box 2609, Tucson AZ 85702-2609; phone 520-620-6142.

Arid Arizona Not Lacking Water Education Programs

Joe Gelt. Vol 8, No. 2 of *Arroyo*, a quarterly publication of the Water Resources Research Center. This edition describes the abundance and variety of water education programs in Arizona. Knowledge about water affairs in the state broadens if, along with studying specific water concerns, we also learn about the education programs that inform Arizonans about pertinent water issues. Individual copies — also subscriptions of *Arroyo* — are available without charge from the Water Resources Research Center, University of Arizona, 350 N. Campbell Avenue, Tucson, AZ 85721; phone 520-792-9591; fax 520-792-8518.

Drinking Water Treatment for Small Communities: A Focus on EPA's Research

This free, 28-page booklet discusses ways small systems can reduce the risk of contaminated drinking water by using such low-cost treatment alternatives as package plants and home treatment units. According to the booklet, many small systems will need to upgrade existing treatment facilities or design new ones to comply with new Safe Drinking Water Act requirements. This publication describes current research projects at the U.S. Environmental Protection Agency's Office of Research and Development (ORD) related to testing and evaluating drinking water treatment technologies. To order, call ORD's Center for Environmental Research Information in Cincinnati, Ohio, at 513-569-7562, and request publication number 640/K-94/003.

What Am I Drinking? An Analysis of Small Drinking Water System Needs

This report, written by Robert A. Rapoza Associates for the Center for Community Change with funding from the Ford Foundation, analyzes the results of a survey of state officials who assist small drinking water systems. The report concludes that funding is needed to address inadequate technical capability among small drinking water systems, and recommends funding be provided to states and qualified nonprofits for management, operations training, and technical assistance. The report also recommends a national requirement that all drinking water system operators be certified. The report costs \$10. For more information contact, Robert Rapoza, president, or Paul Cohn, policy associate, at Rapoza Associates, 601 Pennsylvania Ave. N.W. Suite 850, Washington, DC 20004; phone 202-393-5225.

Draft Environmental Impact Statement for the Tucson Aqueduct System Reliability Investigation, Central Arizona Project

The Draft EIS evaluates the impacts of three alternatives (surface storage reservoir, underground storage and recovery, and redundant features) for incorporating short-term delivery reliability into the Central Arizona Project (CAP) system for the Tucson area. A "No Federal Action" alternative also is considered. The action proposed in the EIS involves construction of a 15,000 acre-foot surface storage reservoir southwest of the city of Tucson, near Black Wash and the Pascua Yaqui Indian Reservation. The storage would be used during outages of the CAP. Impacts of the surface reservoir alternative include loss of up to 1,100 acres of low to medium habitat, loss of at least 67 Pima pineapple cacti, and potential for significant water-based recreation. Public comments on the Draft EIS will be accepted through July 14, 1995. For further information contact, Bruce D. Ellis, Bureau of Reclamation, P.O. Box 9980, Phoenix, AZ, 85068; phone 602-870-6767.

Picacho Reservoir Enhancement Study for Water Recharge and Allied Purposes

This report, prepared for Pinal County's Department of Public Works by Robert Bein, William Frost and Associates, investigates the feasibility of transforming Picacho Reservoir into a multi-objective facility. (See "News Briefs," p. 4, for related story.) The facility, which currently serves as an irrigation water storage facility, could incorporate several project features including groundwater recharge, storage of CAP water, flood control, enhancement of riparian habitat, and water-based recreation. The report describes the project area and potential water sources, discusses state programs that provide a context for water recharge at Picacho Reservoir, reviews relevant environmental and regulatory policies, and investigates technical issues associated with expansion. For more information, contact Theresa Guillen, Pinal County, Department of Civil Works, P.O. Box 727, 30 North Florence St., Florence, AZ 85232; phone 520-868-6411; fax 520-868-6511.



Transitions

Pat Zurick, Director of Santa Cruz County Public Health Department, has accepted a position as environmental health director of the Gallatin County Health Department in Bozeman, Montana. Zurick, who joined the department six years ago, is credited with bringing threatening environmental problems in Nogales and the surrounding international border area to the attention of state and federal officials and the general public. During his tenure, Zurick has addressed such issues as sewage flowing through Nogales wash, septic system siting standards, and smoke from a burning landfill in Nogales, Sonora. Zurick also has been a strong advocate for federal support for expanded wastewater treatment plant facilities.

In Gallatin County, Montana, Zurick will be dealing with different environmental issues. Located on the edge of Yellowstone National Park, and with a population of 54,000, Gallatin County's environmental concerns involve maintaining the environmental integrity instead of correcting environmental damage.

As stipulated by state law, the newly authorized **Pinal County Water Augmentation Authority** recently has been formed. Members were selected by Governor Symington from a submitted list.

The board is made up of the following members: **Jimmie B. Kerr**, Pinal County Board of Supervisors; **Roger Hooper**, City of Casa Grande; **Jim Sweeney**, City of Eloy; **Paul Prechel**, City of Coolidge; **Jerry Allen**, Town of Florence; **Rick Aguirre**, Central Arizona Irrigation and Drainage District; **Bill Little**, manager of private water districts; **Eric Olsen**, Arizona Water Company; and **Van Tenney**, Maricopa Stanfield Irrigation and Drainage District (but see story below). The Authority currently is working to develop a mission and plan.

Van Tenney has left his position as general manager of Maricopa Stanfield Irrigation and Drainage District to accept a similar position with the Glenn Colusa District in Willows, California. The District, located north of Sacramento, contains some 160,000 irrigable acres. Rice is a principal crop. Maricopa Stanfield's board has elected not to name an interim general manager, choosing instead to immediately launch a nation-wide search for a replacement. The District hopes to have a new general manager on board by late June or early July.

In an unrelated development, **Chairman Bill Scott** recently resigned from Maricopa Stanfield's board. Board member **Dennis Nowlin** is the new chairman. The vacancy on the board created by Scott's resignation has been filled by **Jack Korsten, Jr.**, a farmer from Stansfield.

Thomas C. Turney has been appointed State Engineer of New Mexico by Governor Gary Johnson. Turney replaces **Don Lopez**, who had been serving as Acting State Engineer since the resignation of **Eluid Martinez** last December. Turney, a 45-year-old native of Santa Fe, has a master's degree in sanitary engineering from New Mexico State University, and is licensed to practice civil, electrical, and architectural engineering.

Turney's experience in water rights transfer and stream modeling will be put to use as he tackles several pressing issues, including a five-year study of the water supply situation for the central Rio Grande basin, the need for statewide water planning, and instream flow disputes. New Mexico is the only state with no appropriation mechanism for instream flows to support habitat and recreation.

Noted marine geologist **Robert Dietz** died May 19 at his home in Tempe of a heart attack. He was 80.

Dietz, who was a professor of geology at Arizona State University until his retirement in 1985, was involved in many groundbreaking studies in global geology. In the 1950s, while with the U.S. Navy, he arranged the purchase of aqua-lungs, precursors of scuba equipment, from Jacques Cousteau of France. He also participated in the construction of the bathysphere Trieste and its exploration of the Challenger Deep in the western Pacific.

In the 1960s, Dietz elaborated on Harry Hess's theory of continental drift by describing the phenomenon of sea-floor spreading. During the 1970s, Dietz and colleague John Holden published maps showing how modern continents once had been part of a single continent. Dietz also was associated with Project Mohole, an effort to drill a hole through ocean depths deep into the earth's crust.

Arizona Water Resource is financed in part by sponsoring agencies, including:

Arizona Department of Environmental Quality

Arizona Department of Water Resources

Arizona Hydrological Society

Arizona Municipal Water Users Association

Central Arizona Water Conservation District

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Metro Water District

Salt River Project

Tucson Water

USGS Water Resources Division

Water Utilities Association of Arizona

Their contributions help make continued publication of this newsletter possible.



Announcements

Phoenix GUAC Seeks Member

The Phoenix Active Management Area announces a vacancy on its Groundwater Users Advisory Council. The Council advises the area director concerning groundwater management programs and policies. Council members are appointed by the Governor and serve six year terms. The ideal candidate should have background and knowledge of water resources management issues from a citizen and/or environmental perspective. This vacancy is associated with an existing, unexpired term that ends January 19, 1998. Letters of interest must be submitted by close of business on June 30, 1995. For more information, contact Mark Frank, Phoenix AMA Director, 500 N. 3rd St., Phoenix, AZ 85004; call 602-417-2465.

AWWA Annual Conference Upcoming

The American Water Works Association is holding its 1995 Annual Conference and Exposition at the Anaheim Convention Center, Anaheim, California, June 18-22. This conference for water industry professionals features more than 60 technical sessions, seminars, facility tours, and a products and services exposition.

Technical sessions cover a range of topics including federal and state regulations, water conservation, technical innovations, and public policy and relations. Registration and conference fees vary with program. For more information, contact: AWWA, 6666 W. Quincy Ave., Denver, CO 80235; phone 303-347-6160.

AHS Calls for Abstracts

The Arizona Hydrological Society calls for abstracts of papers or posters for the Eighth Annual Symposium to be held September 14 and 15 in Tucson. Proposed topics include riparian preservation, restoration, CAP issues, constructed wetlands, sustainable hydrology/recharge, water conservation, evaporation/infiltration, border issues, remediation, management and policy, modeling/computer applications, tribal water management, etc.

Abstracts should be limited to 150 words and must be submitted by June 12. For more information contact Mike Geddis, Hydrology and Water Resources Department, J.W. Harshbarger Bld. #11, The University of Arizona, Tucson, AZ 85721.

Sustainable Use of the West's Water Conference Topic

The Natural Resources Law Center, University of Colorado School of Law, is holding its Sixteenth Annual Summer Conference "Sustainable Use of the West's Water," in Boulder, Colorado June 12-14. The conference will explore the meaning of sustainability in the context of the West's demands, development, and natural values. Registration is \$495 if received by June 2, and \$545 thereafter. For more information contact the Natural Resources Law Center, University of Colorado, Campus Box 401, Boulder CO 80309-0401; phone 303-492-1288; fax 303-492-1297.

Scholarship Offered for Water Studies

The Arizona Hydrological Society will award three \$500 student scholarships in 1995. The purpose of the awards is to encourage undergraduate (juniors and seniors) and graduate students in Arizona to excel in hydrology, hydrogeology or any other water-related field. An application letter, official transcripts, and recommendation letters must be submitted by June 30 to Dr. Aregai Teclé, Northern Arizona University, School of Forestry, P.O. Box 15018, Flagstaff, AZ 86011-5018.

Help Wanted: Hydrologists

Four hydrologist positions (Hydrologists I,II,III,IV) are open in the Missouri Department of Natural Resources. These opportunities are for Cole and Phelps County. Salary depends on position and experience (\$2,044-\$2,711 per month for Hydrologist I). Official application forms can be obtained from the Missouri Division of Personnel, Truman State Office Building, P.O. Box 388, Jefferson City, MO 65102; phone 314-751-4162; TDD 314-526-4488.

Phoenix AMA Job Opening

A water resources specialist position (WRS II - salary \$26,985-\$41,912) will soon be open in the Phoenix Active Management Area (AMA). Responsibilities include administering water rights; municipal, industrial and agricultural water planning; regulating groundwater recharge; and operating a grant fund. Minimum qualifications are one year as a WRS I, or two years of professional level water resources management experience. Graduate work can be substituted for work experience. For more information call the Phoenix AMA at 602-417-2465. Submit a resume and cover letter to Jim Holway, ADWR, 500 N. 3rd St., Phoenix, AZ 85004. A resume must also be submitted to State Personnel; for information call 602-542-5216.



Calendar of Events



RECURRING



Arizona Hydrological Society (Flagstaff). Next regularly scheduled meeting will be in Aug./Sept. Meetings in summer by announcement. Contact: Don Bills 520-556-7142.

Arizona Hydrological Society (Phoenix). June 13, 5:30 p.m. Salt River Project, PERA Club, 1 E. Continental Dr., Tempe. RSVP Sandy Kuchan 602-966-2337.

Arizona Hydrological Society (Tucson). 2nd Tuesday of the month, June 13, 7:00 p.m. Tim Allen from Hughes Aircraft will speak about groundwater remediation. WRRC, 350 N. Campbell Ave., Tucson. Contact: Laurie Wirt 520-670-6231.

Arizona Water & Pollution Control Association. Monthly luncheon meetings will resume in the fall. Contact: Brad Jurkovic 520-791-2544.

Arizona Water Protection Fund Commission. 4th Tuesday, Showlow. Contact: Trish McCraw 602-417-2400.

Arizona Water Resources Advisory Board. To be scheduled. Contact: Craig Sullivan 602-417-2440.

Central Arizona Project. 1st Thursday of the month, 12:30 p.m. CAP Board Room, 23636 N. 7th St., Phoenix. Contact: Donna Micetic 602-870-2333.

City of Tucson Citizens Advisory Committee. 1st Tuesday of the month, 7:00 a.m. 310 W. Alameda, Tucson. Contact: Karen Alff 520-791-2666.

Maricopa Association of Governments / Water Quality Advisory Committee. Next meeting to be announced. Contact: Eileen Miller 602-254-6308.

Maricopa County Flood Control Advisory Board. 4th Wednesday of the month, 2:00 p.m. 2801 W. Durango. Phoenix. Contact: 602-506-1501.

Phoenix AMA, GUAC. June 7, 9:30 a.m. Conference Room A, 500 N. 3rd St., ADWR, Phoenix. Contact: Mark Frank 602-417-2465.

Pima Association of Governments / Water Quality Subcommittee. 3rd Thursday of the month, 9:30 a.m. 177 N. Church St., Suite 405, Tucson. Contact: Gail Kushner 520-792-1093.

Pima Co. Flood Control District Advisory Committee. 3rd Wed. of the month. 7:30 a.m. Room A, 201 N. Stone, Tucson. Contact: Carla Danforth 520-740-6350.

Pinal AMA, GUAC. Contact: Dennis Kimberlin 520-836-4857.

Prescott AMA, GUAC. Tentatively scheduled for June 19, 10:00 a.m. 2200 E. Hillsdale, Prescott. Contact: Phil Foster 520-778-7202.

Santa Cruz AMA, GUAC. June 28, 9:00 a.m. 857 W. Bell Rd., Suite 3, Nogales. Contact: Placido Dos Santos 520-761-1814.

Tucson AMA, GUAC. Tentatively scheduled for July 21, 9:00 a.m. 400 W. Congress, Suite 518, Tucson. Contact: Kathy Jacobs 520-628-6758.

Verde Watershed Association. To be announced. Contact: Tom Bonomo, VWA Newsletter Editor, c/o Verde R.D., P.O. Box 670, Camp Verde, 520-567-4121.

Water Utilities Association of Arizona. Monthly luncheon meeting. Greg Patterson, Director of the Residential Utility Consumers Office, will speak. Jun. 9, 12:00 p.m. at Los Olivos Executive Hotel, 202 E. McDowell Rd., Phoenix. Cost is \$12. To make reservations call 602-234-1315.

Yavapai County Flood Control District Board of Directors 2nd Monday of the month in Prescott, 255 E. Gurley St.; 4th Monday in Cottonwood, 575 E. Mingus. Contact: YCFCD, 255 East Gurley, Prescott, 520-771-3196.

UPCOMING



July 22 & 23, AHS Annual Corporate Board Picnic. An overnight in the San Francisco Peaks area. All members and families are welcome. Events include competition between Tucson and Phoenix chapters in horseshoes and volleyball. Contact Laurie Wirt 520-670-6231.

August 1-4, Whose Thirst is First? A New Paradigm for Water Management? Annual conference of the Universities Council on Water Resources in Portland, Maine. For information contact Camille Hedden, UCOWR Executive Director's Office, 4543 Farner Hall, Southern Illinois University, Carbondale, IL 62901-4526; phone 618-536-7571.

Submit calendar, announcement, or publication information to Holly Ameden at the WRRC; 602-792-9591; fax 602-792-8518.

Announcements, continued from page 10

AWRA Calls for Abstracts

The American Water Resources Association is calling for abstracts for its Annual Summer Symposium, "Watershed Restoration Management: Physical, Chemical, and Biological Considerations" to be held in Syracuse, New York, July 1996. AWRA is requesting papers that address scientific, legal, management, operational, policy, public participation, regulatory, and technical issues pertaining to watershed restoration and function.

Abstracts are due August 1, 1995. For more information, contact Dr. Jeffrey J. McDonnell, Program Technical Chairperson, SUNY College of Environmental Science and Forestry, 1 Forestry Dr., Syracuse, NY 13210; phone 315-470-6565; fax 315-470-6956.

Water Protection Fund Releases Grant Manual, Schedules Workshops

The Arizona Water Protection Fund has released the final version of its application manual. To order a copy, contact Tricia McCraw, Arizona Department of Water Resources, Arizona Water Protection Fund Commission, 500 North Third Street, Phoenix, AZ 85004; phone 602-417-2460.

The Water Protection Fund Commission has \$4 million in grant funds for the current fiscal year and an additional \$6 million for next fiscal year. The Commission anticipates a proposal deadline of August 1, with grants to be awarded by October. The Commission also has scheduled a series of nine grant application workshops around the state starting June 8 in Yuma, and concluding June 21 in Show Low (see accompanying table).

ARIZONA WATER PROTECTION FUND GRANT APPLICATION WORKSHOPS	
Date & Time	Location
Thursday, June 8 6:00 p.m.-8:30 p.m.	City Council Chambers 180 W. 1st St. Yuma, AZ
Monday, June 12 6:00 p.m.-8:30 p.m.	Eastern Arizona Col. Aravaipa Rm Hwy 70 & College Blvd. Thatcher, AZ
Tuesday, June 13 10:00 a.m.-1:00 p.m.	City Council Chambers 160 S. Huachuca Benson, AZ
Tuesday, June 13 6:00 p.m.-8:30 p.m.	Tucson Library Children's Room 101 N. Stone Ave. Tucson, AZ
Thursday, June 15 10:00 a.m.-1:00 p.m.	City Council Chambers 211 W. Aspen Flagstaff, AZ
Thursday, June 15 6:00 p.m.-8:30 p.m.	City Town Hall 435 S. Main St., Rm. 206 Camp Verde, AZ
Monday, June 19 10:00 a.m.-1:00 p.m.	City Council Chambers 300 E. 4th St. Casa Grande, AZ
Monday, June 19 6:00 p.m.-8:30 p.m.	AZ Dept. of Water Resources 500 N. Third St., 3rd flr. Phoenix, AZ
Wednesday, June 21 6:00 p.m.-8:30 p.m.	City Council Chambers 200 W. Cooley Show Low, AZ



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