



“Crypto” Detected, Hazards Studied

Researchers and water quality regulators are paying increased attention to cryptosporidium, a potentially deadly parasite commonly occurring in untreated surface water. Cryptosporidium, nicknamed “crypto,” recently attracted attention in Arizona when the parasite was found in Phoenix’s and Mesa’s treated drinking water supplies.

The Phoenix water department found minute specimens of crypto in tests at two water-treatment plants during the past three months. Follow-up tests of the same batch of water found no traces of the parasite. State officials say the slight traces are no cause for alarm.

The low level occurrence of crypto reported in Arizona does not pose the serious health hazard that the occurrence of the parasite did in Milwaukee and Las Vegas. Crypto killed 100 people and left hundreds of thousands sick in Milwaukee, and last year it contributed to the deaths of

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The following excerpt by Alison Hawthorne Deming, Director of the Poetry Center, University of Arizona, is from “Camp Tontozona,” *Science and Other Poems*, Louisiana State University Press, 1994.

*Rain and more rain
this winter (year of the
world’s
re-mapping) sprung the
grasses
from decades of burnout,
the root tangle
sprouting and taking
the chlorophyll cure
until the desert became
visual velvet.*

(Saguaro National Park East. Photo by Holly Ameden, WRRC)

Planned Grand Canyon Flood Postponed

The U.S. Bureau of Reclamation postponed a scheduled spring flood of the Colorado River below Glen Canyon Dam, to the disappointment of biologists and river raft guides. The flood, which a biologist said was “to clean out the system,” would have been created by high-volume releases from Glen Canyon Dam. Conservationists worry what the postponement portends.

Plans called for flood waters released from Glen Canyon Dam to pour through 225 miles of Colorado River bed during late March or early April, with a velocity unmatched since the high-water summer of 1984. The turbulent waters of the scheduled flood were to repair conditions affected by the dam’s operation.

The surging waters were to scour the river bed, carrying beach sands downstream for redeposit on depleted beaches. The restored beaches would buffer Anasazi ruins along the river corridor. Also, the forceful waters would be replicating the flood environment in which native fish evolved, thus improving their current spawning habitat.

The BuRec halted the scheduled flood saying it required more time to study the “effects of the beach habitat-building.” Although the agency insists the flood is merely postponed, not cancelled, critics charge that the influence of the

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19 AIDS patients in Las Vegas.

Even low-levels are a cause for concern, however. Chuck Gerba of the University of Arizona's Department of Soil and Water Science, says, "At those low levels you probably are not going to see an outbreak. But you may get low-level transmission throughout the community. And so it has to be looked at more from that standpoint." Gerba's UA lab developed the first method for detecting crypto in water.

"They say there were only three cases last year. But, in reality, only six people may have been tested all year."

Arizona Department of Health Services spokesman Jeff Davis said no cases of cryptosporidiosis have been reported in Arizona this year. Seven unrelated cases were reported last year, with four in Maricopa County, and one each in Pima, Apache and Yavapai counties.

Gerba questions the accuracy of such reports providing statistics of numbers infected by the parasite. "They say there were only three cases in Phoenix last year. But, in reality, only six people may have been tested all year."

The effects of crypto at this level are difficult to trace because of the disease's rather lengthy incubation period of seven days. Few cases, therefore, are properly diagnosed. Most infected people assume their nausea and diarrhea are from something they ate the day before.

The parasite comes from the feces of wild and domestic animals and is found in up to 87 percent of untreated water supplies. Rain runoff carries the parasite to surface water supplies. Gerba estimates that crypto is in about one third of the country's finished drinking water supplies.

The parasite causes severe diarrhea and nausea. Healthy individuals recover in about 10 days, but the virus can be deadly for children, the elderly or anyone with a weak immune system, such as those affected by AIDS.

Phoenix and Mesa are testing for crypto even though it is not required. A rule scheduled to go into effect next year will require water utilities servicing more than 10,000 to sample their raw water. If a certain level of crypto is detected, then they are to sample their finished water for 18 months.

The EPA once thought only heavily contaminated water threatened human health. In a recent *New England Journal of Medicine*, however, researchers from the University of Texas reported that crypto is far more infectious than previously thought.

In response to the *NEJM* article, Carol Browner, EPA administrator, called for further research on the parasite and ways of detecting it. She mentioned that Congress is scheduled to vote later this year on the reauthorization of the Safe Drinking Water Act, amid speculation the law will be made less restrictive.

Grand Canyon Flood, continued from p. 1

water and power industry prompted the delaying tactic. They fear the action marks the beginning of political wrangling over the experimental flood.

The Western Area Power Administration, which markets the dam's power, is wary of the flooding strategy and its accompanying high costs. WAPA estimates a \$4.5-million revenue loss from releasing flood waters that would bypass hydropower turbines. The flood would require the release of 45,000 cubic feet of water per second (cfs). The dam has a generating capacity of about 30,000 cfs which means about 15,000 cfs would bypass the turbines.

The Upper Colorado River Commission, which represents four states with Colorado River entitlements in the upper basin, raised a legal objection. Commission Director Wayne Cook claims the BuRec is overstepping its bounds by scheduling the flood.

Also, Cook fears an unfortunate precedent may be set if the Secretary of the Interior is able to authorize a flood. A Grand Canyon flood authorized by the Secretary could lead to other flood approvals, to the disadvantage of the power industry. For example, water could be made to bypass generators in the Northwest to study salmon migration.

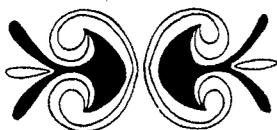
Some flood critics claimed the planned flood was a major action requiring an Environmental Impact Statement. Others countered this argument by pointing out that the experimental flood already is included in the BuRec EIS. To conduct an EIS on the flood would therefore involve doing an EIS on an EIS.

BuRec referred the issue to John Lesly, Interior Department's Solicitor General, to determine if the agency has the right in this instance to schedule a flood and bypass the turbines. Lesly has not yet issued an opinion.

Observers perceive a major legal battle brewing, and some conservationists speculate that BuRec's flood postponement was in response to this legal threat. Such a court battle could play out over a long period of time, well past the scheduled date of the flood. Instead of taking on a legal battle now, a suggested strategy is to wait for the Secretary to act on the EIS which includes provisions for the spring high-water research flows. The floods could then become part of the EIS's record of decision.

Other conservationists are wary of this scenario. Such a record of decision is not expected to be in effect for a year, during spring of 1996. This will be a politically sensitive time, and the Secretary and the Democrats may be reluctant to take on a highly charged environmental issue, with legal challenges threatening. Also, litigation in response to a BuRec approved flood could take years to resolve.

Meanwhile, as the flood controversy runs its course, another issue related to Glen Canyon Dam operations arose. The EIS that included flood release provisions also recommended increasing both the maximum permissible flow from the dam and the rate at which the dam releases may be increased. Environmentalists fear the boosted water releases will harm vegetation and wildlife and further erode beaches.



Water Vapors

Our cover story on the Grand Canyon chronicles the latest struggle between environmentalists and more traditional water interests over the Colorado River. At the center of the debate is Glen Canyon Dam, which Barry Goldwater once described as one of the few legislative accomplishments he regretted. But when the dam was new, confidence was high and spirits soared on wings of purple prose. To celebrate, the Bureau of Reclamation published a booklet entitled *Lake Powell: Jewel of the Colorado* which boasted that the new dam had "tamed the wild river — made it a servant to man's will" and predicted that "it will endure as long as time endures." To really put the accomplishment in perspective, BuRec offered the following free-form verse:

*To have a deep blue lake
Where no lake was before
Seems to bring man
A little closer to God.*

In case you missed the point, that's "closer to God" as in, demi-gods. They don't make men (or dams) like that any more.

Webheads Rejoice!

The Water Center proudly announces its Home Page on the World-Wide Web! We know what you're thinking — your neighbor's dog just got a Web home page. OK, so we're not pioneers here. But our home page is different. Unlike so many home pages on the Web, ours is well-designed and useful. Turn to Special Projects on page 7 for details on how to access it.

Lake Havasu & Spring Break

Our Web home page might have been complete a bit sooner, but for the annual bacchanal known as Spring Break. One of our techheads split for Lake Havasu, official Way-Cool site

for the 1995 spring break. Regulators and scientists remain baffled by the source of bacterial contamination that closed Lake Havasu beaches last summer. Even aerial surveillance by NASA's remote sensing equipment failed to detect the likely source.

Meanwhile, MTV televised footage of beer-swilling, sun-block-coated students boating, vomiting, cannonballing and otherwise scaring the fish. But the source of contamination remains a mystery. Go figure...

Antarctica Doom

Those who relish the cheap thrill of believing that The End is Near will enjoy the latest from Antarctica. The Weddell Sea and Larsen ice shelves are breaking up, sending icebergs the size of Rhode Island drifting north and exposing a rocky landscape buried beneath ice for 20,000 years. The resulting decrease in albedo will further increase temperatures and alter ocean currents at the bottom of the globe. Catastrophic global flooding may result.

Rivers are Forever Changing

The confounding saga of American Rivers and its telephone numbers continues. Readers may recall that the November-December *AWR* announced the closing of its Phoenix office. By January, the Tucson office was scheduled for closing, while the Phoenix office was to remain open, with changes in personnel and phone numbers. Then came the February *AWR*

announcing new American Rivers telephone numbers. Just when we thought it was safe to turn the Rolodex, yet another set of numbers is announced. The new, revised American Rivers phone number is 602-234-3946 (previously the fax number); the new fax number is 602-234-2217. Stay tuned for further developments.

Yes, We Have no Spaghetti

Floods were in the news again, triggered by unseasonably heavy rains this spring. Usually concerned with threats to life, property and well-being, the media uncovered other damage this time. A March 8 *Arizona Republic* story began, "No one ate spaghetti Wednesday at the Grand Canyon." The story related how landslides from heavy rains washed out sections of pipeline supplying the south rim with water, preventing restaurants from boiling pasta. The same edition of the *Republic* offered a story on the latest plague to hit southern California — snakes. The San Diguito River overflowed its banks and washed dozens of dazed serpents onto San Diego beaches.

Coming in Future Issues

Our next issue will review new laws passed by the Arizona legislature that impact water resources management. We'll also describe a project to improve water quality sampling along the U.S.-Mexico border.

As always, your letters, faxes and e-mail on previous issues and new story ideas are welcome.



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News Briefs

Conference Celebrates Sonoran Desert Cultures

Along with celebrating the arts and crafts, foods, dance and music of the Sonoran Desert, the March 2-5 international conference, "A Celebration of Desert Cultures" at Caborca, Sonora discussed the history, pre-history, archeology, and ethnobotany of the region. Water-related issues were prevalent among the presentations.

A day-long session discussed traditional agricultural methods, ethnobotany, and water use. A speaker described agriculture in a region of the Pinacates in Sonora, where crops are successfully raised without supplemental irrigation on less than 4 inches of rainfall per year. Other farms in the same region were unable to irrigate successfully because of the high cost of irrigation systems. Traditional successful farming practices (including dryland farming as well as irrigation) of the Pima Indians also were discussed.

An in-progress study was described looking at the history of human impacts on Arizona rivers. The impacts include such activities as groundwater pumping, diversions, dams, introduction of exotic plant species, urban development and livestock grazing.

This was the third annual conference of the International Sonoran Desert Alliance, an offshoot of the Sonoran Institute in Tucson. The Water Resources Research Center co-sponsored the event. To be included on the mailing list for next year's conference, contact the Sonoran Institute, 520-290-0828.

Ak-Chin Water Leased for Development

Water needed for a proposed Del Webb development at New River could come from the Ak-Chin Indian

Community. Del Webb has purchased an option to lease up to 10,000 acre-feet of water a year from the community for 100 years.

The U.S. Department of Interior has approved the lease, and it is an enforceable, binding contract, said Bill Swan, agency field solicitor. The Ak-Chin would be leasing water received in its 1983 settlement. The tribe was granted about 75,000 acre-feet, including CAP water and water from a Colorado River entitlement.

Although tribes previously have leased water for off-reservation uses, the Ak-Chin agreement represents the first time Indian water would be leased off-reservation for a development. The original Ak-Chin water settlement did not provide for off-reservation leasing. Congress, however, amended the settlement in 1982 granting the tribe this right.

Critics doubt the Ak-Chins have the water to spare. The tribe has the right to 75,000 acre-feet a year, with an extra 10,000 acre-feet during years when extra water is available. The tribe would get 72,000 acre-feet during years of shortages. Last year the Ak-Chin used 70,000 acre-feet.

Critics also question whether the water supply is sufficient for the size of the proposed community. The Maricopa County supervisors are scheduled to vote next month on the controversial Del Webb proposal to build 16,500 houses and three golf courses on an 8.8 square mile tract that would eventually attract a population about equal to that of Flagstaff. The New River property is located about 12 miles north of the urban edge of Phoenix and 33 miles from downtown.

MDWID Survey Reveals Groundwater Preferred

A poll of Metropolitan Domestic Water Improvement District customers revealed a strong desire to continue receiving groundwater rather than treated Central Arizona Project water, and a willingness to pay significantly higher water bills to make it happen. The survey of all MDWID customers

revealed that residents of the northwest Tucson metropolitan area generally approve of the quality of their tap water, and are unwilling to accept treated CAP water from Tucson. By a wide margin, they expressed a preference to have the utility recharge CAP water instead.

Uranium Tailings May Threaten the Colorado

Some 10.5 million tons of radioactive dirt lie exposed in southeastern Utah, three miles north of Moab, the legacy of a uranium mill that operated there during the 1950s. Groundwater in the area is contaminated with up to 1,000 times the allowable federal standard, and the question remains whether any of the contamination has reached the Colorado River. Although the potential threat of the dump is readily recognized, answers to the question vary.

Richard Blubaugh of the Atlas Corp. cites several reasons why he believes contamination has not reached the river. He says the arid conditions of the region and the small size of the aquifer have prevented transport of the contamination to the Colorado River.

Others, including officials from Utah and surrounding states, are not so sure. Some fear that contamination has in fact reached the river, and a national park official says river sampling has demonstrated that some leaching has occurred. Little or no sediment sampling has been done.

To confront the problem, the U.S. Nuclear Regulatory Committee originally intended to simply place a cap on the dump. In response to concerns raised by Utah officials, NRC instead decided to write an environmental impact statement. Along with in-place capping, the EIS also will examine the much more expensive option of hauling the waste to a safer disposal area.

Downstream from Moab the Colorado River flows through or around five national parks and provides drinking water for millions of residents of the Southwest, including those in metropolitan Las Vegas, Los Angeles, and Phoenix.

Municipal Conservation Efforts Redirected

Many municipal water conservation programs in Maricopa and Pima counties are undergoing changes in program direction. Some have been reduced in scope, while others have increased responsibilities. Many are experiencing budget and staff increases, as they attempt to reach out to new groups of water users; a few are being given significantly fewer resources.

Overall, programs aimed at existing residential and indoor water uses are being reduced. Instead, greater emphasis is being put on conservation programs that target multi-family and non-residential water uses. Last year's upsurge in new home construction has caused Glendale, Scottsdale, Phoenix, and Peoria to provide new home buyers with more information on xeriscapes before they buy a home and the yard is planted with turf by default. In addition, Phoenix, Scottsdale, and Tempe are developing xeriscape demonstration gardens.

Raising the visibility of conservation is another priority, with greater emphasis on videos, public service announcements, and school programs. Mesa found an innovative and inexpensive way to spread the conservation message, by printing it on Pogs.

These changes reflect the maturation of conservation programs, which generally begin by focussing on existing residential water uses, and rely heavily on audits and distribution of leak detection kits and low-flow devices. Programs targeting multi-family units and residential landscaping often follow. Eventually, the focus widens, as conservation managers grapple with the more varied commercial and industrial uses of water, and attempt to learn what assistance these customers need to reduce water consumption. An example is AMWUA's current efforts to develop a facility managers' guidebook.

Many programs, including those in Tempe, Chandler and Mesa, have increased staff and funding, although in the case of Mesa, responsibilities also

have been expanded to include natural gas conservation efforts. Scottsdale's budget is not significantly changed.

Programs with reduced staff or budgets include Phoenix, Tucson, and the Arizona Municipal Water Users Association (AMWUA). After flat budgets over the last three years, AMWUA's conservation budget is being trimmed by about 12 percent. Phoenix's conservation program experienced multiple cuts over the last four years, but this year, there will be relatively modest program reductions in some areas and modest increases in multi-family and non-residential programs. The reduced conservation budget mostly reflects the transfer of staff responsible for rate setting from the water department to the city's finance department.

Large cuts are being experienced by the state's oldest conservation program, Tucson's. Both staff and budget have been reduced by over a third, with some popular programs eliminated (see following story).

Tucson Water Plans for Possible Shortage

An emergency ordinance authorizing a temporarily prohibition of landscape irrigation and other water uses has been approved by the Tucson City Council. Tucson Water officials requested the authority due to the threat of supply shortages this summer.

Tucson's Central Arizona Project treatment plant currently is shut down while consultants consider alternative uses of CAP water. A key pipeline that imports 20 percent of the utility's supply from neighboring Avra Valley recently underwent emergency repairs after the discovery of corroded joints, but the possibility of a rupture remains. Limits on pumping from wells located near riparian areas also are constraining the supply.

The move follows major cuts in Tucson's conservation program and elimination of its popular low-flow toilet rebate program. The city also ended summer surcharge water rates. Rates last were raised three years ago.

Water Protection Priorities Noted

As part of its task of completing a draft application manual, the Water Protection Fund Commission (WPFC), which administers the Arizona Water Protection Fund grants program, sent out approximately 900 questionnaires in March to individuals, groups, and agencies. Input was requested on which areas in Arizona to target for protection and restoration projects, issues of concern, and appropriate measures for addressing these issues. Facilitated workshops also were conducted.

The WPFC received 82 responses to the questionnaires, a response rate of 11 percent. The San Pedro, Santa Cruz, Verde, and Gila surface water basins were most often noted as needing protection. Priority issues of concern included groundwater pumping/overdraft, grazing, development, and agriculture.

Respondents further indicated that grazing controls, recharge, revegetation, public education and water conservation projects would be effective in alleviating negative impacts in riparian areas.

The questionnaire and workshop responses, along with other project criteria such as need for the project, feasibility, cost-effectiveness, broad-based local involvement, matching fund availability, habitat impacts, and monitoring capability, have been incorporated into the application criteria rating system.

An informal public hearing on the draft criteria rating system will be held April 25, at the Arizona Department of Water Resources, Phoenix. Also, written comments may be submitted to the WPFC from mid-April, when the draft application manual will be available, through mid-May. Application packets will be available from ADWR starting June 1.

For information regarding the upcoming hearing or WPFC activities, contact Tricia McCraw, Arizona Department of Water Resources, 602-417-2460.



Legislation & Law

Water Company Costs Pass-Through Defeated

Legislation that would have forced the Arizona Corporation Commission to allow private water companies to raise rates up to 10 percent to recover increased operating costs has died in the Senate. (See Nov.-Dec. *AWR*, p. 6). This is the fourth year the Water Utilities Association of Arizona has sought authority for water companies to pass through to customers increases in costs over which they have no control, such as wholesale water, energy, and regulatory compliance costs.

Current law requires water companies to request a formal rate hearing. New rates take effect on an interim basis if the ACC fails to act on the formal rate request within six months for small water companies, or within nine months for larger ones.

Originally introduced as HB 2137, the bill stalled in the House Rules Committee on the issue of whether it constituted an unconstitutional limitation on the ACC's rate-setting authority. The measure reappeared in the Senate as a strike-all amendment to HB 2189. It passed out of the Senate government committee after assurances it would be amended on the Senate floor to allow operating savings as well as costs to be passed through to customers. The bill ultimately was defeated on the Senate floor, in part due to opposition from retirement communities.

Pass-through legislation was opposed by ACC commissioner Renz Jennings, but supported by newly elected commissioner Carl Kunasek. Proponents also claimed support from the Central Arizona Project, Arizona Department of Water Resources, and Arizona Department of Environmental Quality. The ACC currently regulates 350 water companies serving 400,000 persons, mostly in rural Arizona.

Scottsdale Sues Makers of Polyethylene Pipe

The Scottsdale City Council recently approved a \$100,000 annual contract to support litigation over faulty polyethylene pipes. The city hopes to recover an estimated \$8 million, the cost of replacing failed water distribution pipes throughout the city.

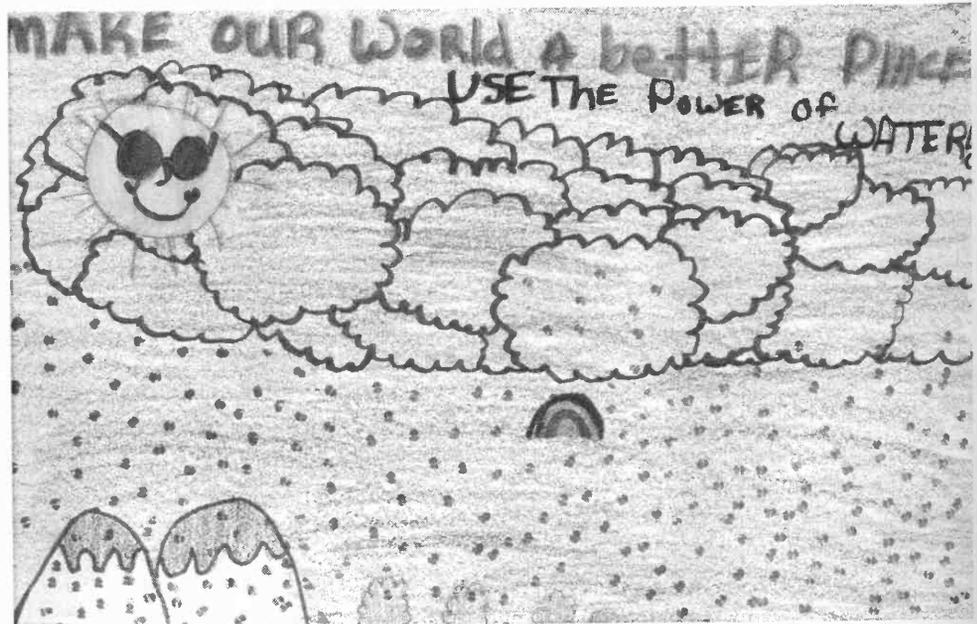
Polyethylene pipes once were widely used for water service lines, but their reliability was questioned beginning in the early 1980s when leaks developed. City officials' concern deepened as the number of leaks increased, until 1986 when the city banned the use of polyethylene pipes in future installations.

Roger Klinger, general manager of Scottsdale water operations, reported that the number of known failures greatly increased in 1989 when his department began tracking the failures. Since 1989 over 6,800 failures have been reported, with an estimated

13,000 additional services needing replacement due to the problem pipe.

City efforts to have the manufacturers reimburse damage costs have been unsuccessful thus far. Costs include replacing failed lines, repairing damaged streets and replacing landscaping on private property, with work taking up to 12 years to complete. These costs could be passed on to city water customers.

Polyethylene pipes are not to be confused with polybutylene pipes, another type of water pipe at the center of a controversy. Failed polybutylene pipes have plagued many Arizona homeowners, causing extensive property damage and resulting in high repair costs (see Nov.-Dec. *AWR*, p. 1). While polyethylene pipes are used as water mains, polybutylene pipes carry water within the house. The Scottsdale City Council considered banning polybutylene pipes but put off action when the courts overturned a similar ban enacted in Chandler due to a technicality.



This picture is the work of Jessica Ann Tracy of Laugharn School in the Clifton United District, Arizona. Jessica's artwork ranked first among Arizona fifth graders in the annual Water Education Poster Contest, sponsored by the International Office of Water Education in Logan, Utah. Some of the winning artwork will appear in a 1996 water calendar. The theme of this year's competition was "The Power of Water," and the contest was open to all elementary school students in various western states. Project WET (Water Education for Teachers) of the Water Resources Research Center coordinates the contest in Arizona.



Special Projects

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

To extend information transfer into new electronic frontiers, the Water Resources Research Center has established AZWATER, a World-Wide Web site on the internet, aka the information superhighway. The Web is the portion of the internet that allows users to "browse" multimedia documents that contain not only text, but color pictures, animated images, sound, and linkages to other Web documents. It is the explosive popularity of the Web which has the likes of Al Gore, Newt Gingrich and *Time* magazine gushing "cyberhype."

The growing number of persons with full access to the internet can use free, graphically-based programs such as Mosaic or Netscape to easily navigate through hypertext that can include links to pictures, sounds, and animation (see sidebar, p. 12).

AZWATER provides round-the-clock, easy and interactive access to a growing collection of water-related text, photos, maps and data. The site is intended to be used by Arizona's water community, educators, and the general public. Services currently available at this site include:

- full text of current and past issues of *AWR* and *Arroyo*. Articles and sections are organized to aid searching and navigating, and the formatted documents can easily be printed or downloaded to disk. In the near future, our periodicals will be available on the Web even before they are mailed to subscribers;

- a glossary of water-related terms and acronyms. Many of AZWATER's documents have links to these terms, so that the click of a mouse button

calls up its definition. Fuller definitions of terms and descriptions of water-related organizations are being developed;

- WRRC's recently updated database on water expertise at the three state universities. The database can be searched by using an electronic interactive form. The interface allows the user to tailor the search by name, general or specific research specialty, institutional affiliation, geographic specialty, and language spoken;

- An overview of water issues in Arizona. Broken down according to the dozen water issue areas presented on WRRC's *Arizona Water* map poster, the overview presents text, photographs and other information. The overview of surface water includes a "clickable" map of selected stream gauge sites around the state — click on the site, and up pops a description of the gauge and historical flow data, presented in both tabular and graphical form; and

- Information about the Water Center and its staff, including areas of current research and recent publications, plus email access.

Sorting out "information superhighway" hype from fact is difficult, and for those researching water issues, the Web can be a mixed blessing. While the number of sites has exploded, many beg the question, "Where's the beef?" Much of the growth of the

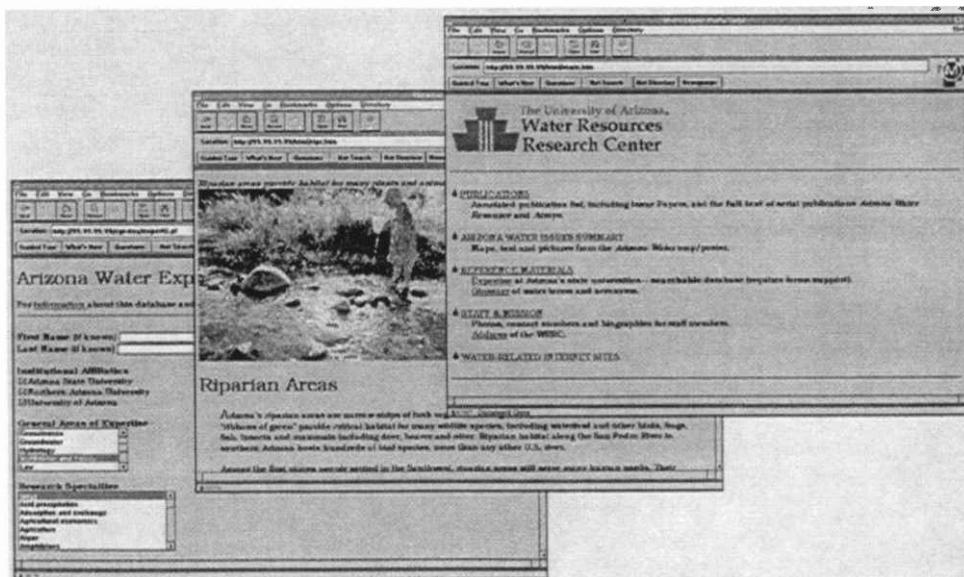
World-Wide Web is fueled by its commercial and entertainment potential, and in the rush to join the Web, form often is emphasized at the expense of content. Fortunately, the Web allows both form and content to be brought together in substantial ways, and there are many water-related home pages with highly useful information to be found on the Web, if the user only knows where to look.

There are several useful tools for navigating the vast array of interconnected sites. The search and organization tool, "Yahoo," (located at <http://www.yahoo.com/>) is one of the better utilities for finding what you want. Easier still, the WRRC's home page includes links to several of the more useful water-related sites, which, in turn, are linked to still more sites. When you stumble upon a particularly interesting site, the browser software allows you to create "bookmarks" for sites that you may wish to revisit.

Web browsers also provide access to less interactive, non-graphical portions of the internet, including Gopher and File Transfer Protocol (FTP).

AZWATER represents the start of an ambitious, long-term effort by the WRRC to provide current, useful information on water issues of interest to Arizona. New publications and features will be added in coming months. Right now, we urge *AWR*

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Sample screens from WRRC's Web site at <http://ag.arizona.edu/AZWATER/>.



Publications

Arizona Water Resources Assessment:

Volume One – Inventory and Analysis

Volume Two – Hydrologic Summary, August 1994

Developed as a tool for long-term water management, the volumes provide a comprehensive overview of Arizona water resources. The first volume presents three areas of information: a description of the legal and institutional framework for water resources management; a description and analysis of potential water resource management problems which may arise over the next 50 years; and an evaluation of the relative priority of the projected water resource issues for Arizona. The second volume describes the hydrologic characteristics of surface water and groundwater, including site-specific water-yields and water quality, and identifies areas where increased demand may impact local resources. Copies of the document have been distributed to institutions such as libraries, cities, counties, agencies, and councils of government. The two volume set costs \$20 and may be obtained by contacting Mason Bolitho, Arizona Department of Water Resources, 500 N. 3rd St., Phoenix, AZ 85004; phone 602-417-2400, ext. 7168.

A Utility Managers's Guide to Water and Wastewater Budgeting

This booklet, prepared by the U.S. Environmental Protection Agency and the University of Tennessee's Municipal Technical Advisory Service, is designed to help utility managers with minimal accounting experience develop an annual budget by presenting basic financial concepts and practical strategies for budgeting. Sources of revenues and expenses are listed and utility managers are guided, by step-by-step instructions, in projecting future financial situations. Other topics covered include tips on how to market the budget to the community, how to make the most of public hearings, and how to measure the efficiency of the budget once it is approved. To order, contact the National Small Flows Clearing House at 1-800-624-8301 and order item #FMBLFN-13. The booklet is free. Shipping and handling costs are \$2.

Annual Static Water Level Basic Data Report: Tucson Basin and Avra Valley, Pima County, Arizona 1993

This volume provides the results of yearly water level and land subsidence monitoring programs in the Tucson Basin and Avra Valley conducted by or in cooperation with the Research & Technical Support Section of Tucson Water. The report includes the results of vertical extensometer measurements taken through the end of 1993. Copies of the report cost \$15. To order contact Bill Hollinshead, Tucson Water, 310 West Alameda, Tucson AZ 85701; phone 520-791-2689.

Chemical, Geologic, and Hydrologic Data from the Little Colorado River Basin, Arizona and New Mexico, 1988-91
G.G. Fisk, S.A. Ferguson, D.R. Rankin and L. Wirt. This volume provides data that the U.S. Geological Survey (USGS) collected from July 1988-September 1991 as part of a four-year study of the occurrence and movement of radio-nuclides and other chemical constituents in surface water and groundwater. Samples were taken from 69 wells; collected data include well-construction information, lithologic logs, water levels, and chemical analysis of water samples. Surface water data collected include flow rate and chemical analysis. Limited copies are available from Patsy Martinez, USGS, Water Resources Division, 375 S. Euclid Ave., Tucson, AZ 85719; phone 520-670-6201.

Modeling Erosion and Transport of Depleted Uranium, Yuma Proving Ground, Arizona (Report #286), June 1994
New Mexico State University researchers evaluated the movement of depleted uranium (DU) with surface water runoff and associated erosion at the U.S. Army's Yuma Proving Ground site in southwestern Arizona. At the site, DU projectiles are tested and not all fragmented pieces of the projectiles are retrieved. In this study, field measurements were taken and used to develop a rainfall/overland soil box model and nine simulations were run. A mass balance of the uranium showed most DU remained in the soil box even under extreme hydraulic conditions. The study concludes therefore that the probability of significant transport of DU from land surface appears to be low. To obtain a free copy contact the New Mexico Water Resources Research Institute, Box 30001, Dept. 3167, Las Cruces, NM 88003-8001; phone 505-646-1813.

Resource Guide to Aquaculture Information

This guide lists over 500 resources for information on all aspects of aquaculture. Sections of the guide are as follows: academic libraries, federal and state libraries, aquaculture journals and newsletters, electronic and online resources, trade and professional associations, extension service contacts, state aquaculture coordinators, federal agencies, regional aquaculture centers, and equipment and supply sources. The guide is available on line. To obtain instructions on downloading, contact the Aquaculture Information Center, National Agricultural Library, USDA, 10301 Baltimore Blvd., Beltsville, MD 20705-2351; phone 301-504-5558.

Accounting for Consumptive Use of Lower Colorado River Water in Arizona, California, Nevada, and Utah

This two-page United States Geological Survey fact sheet briefly discusses the hydrogeology and consumptive use of the Lower Colorado River, the legislative requirement of accounting for water use and distribution, two methods of water accounting – Lower Colorado River Accounting System and the accounting surface, and identification of water users. For copies of the fact sheet contact District Chief, USGS, Water Resources Division, 375 S. Euclid Ave., Tucson, AZ 85719-6644; 520-670-6671.



Transitions

The Bureau of Land Management has appointed six persons to the **Gila Box Advisory Committee**. Safford District Manager **Bill Civish** announced that Secretary of Interior **Babbitt** selected one current and five new representatives from nominations submitted by the public, the Arizona Congressional delegation, the governor's office, and the boards of supervisors of Graham and Greenlee counties.

Reappointed to the committee was Governor Symington's nominee, rancher **Jeff Menges**. Representing Graham County is Safford Mayor **Governor Hunt Aker**; **Gary Jones**, Water Administrator for Phelps Dodge Morenci, will represent Greenlee County.

The other three new members, which are required to have education or experience in natural or cultural resources, are: **Dan Fischer** of Willcox, a retired engineer and former member of the Arizona/New Mexico Parks and Recreation Council; **Steve Marlatt** of Willcox, a seventh-grade life sciences teacher and member of the Arizona Association for Learning in and about the Environment; and **Gayle Hartman** of Tucson, editor of *Kiva, Journal of Southwest Anthropology and History*.

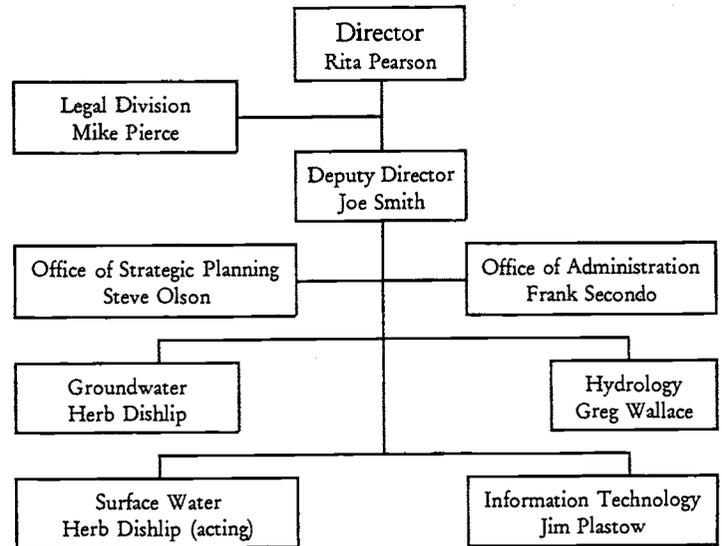
The committee meets two to four times per year to provide advice on managing the Gila Box Riparian National Conservation Area.

Helen Ingram, Director of the Udall Center for Studies in Public Policy, University of Arizona, has accepted an endowed professorship at UC-Irvine. Ingram has published extensively on water, including several articles and books on water issues in the Southwest. She co-authored both *Saving Water in a Desert City* and *A Policy Approach to Political Representation-Lessons from the Four Corners States*. Ingram will remain at the Udall Center until August of 1996.

Governor Symington has appointed Oro Valley Town Manager **Chuck Sweet** to the Arizona Department of Water Resources Tucson Active Management Area's Groundwater Users Advisory Committee. Sweet replaces **Ron Morriss** of Santa Cruz County who now serves on the Santa Cruz AMA GUAC.

Glen Canyon National Park Superintendent **Joseph Alston** has announced that **Dale Ditmanson** has been named Assistant Superintendent of Glen Canyon National Recreation Area. Ditmanson replaces **Larry May**, who now is Chief of the Wildlife and Vegetation Division of the National Park Service. Ditmanson is responsible for operational aspects of the 1.2-million acre Recreation Area that encompasses Lake Powell. The Area receives well over 5 million visitors per year.

The Arizona Department of Water Resources, which continues to work out the details of its reorganization, has filled most of the top administrative positions. Under Director **Rita Pearson** is Deputy Director **Joe Smith**. Also reporting directly to Pearson is Chief Legal Council **Mike Pierce**. **Steve Olson** heads the Office of Strategic Planning as Special Assistant to the Director. **Frank Secondo**, whose title is yet undetermined, is in charge of the Office of Administration.



The four operating divisions are headed by assistant directors. **Herb Dishlip** currently is Assistant Director for Groundwater and Acting Assistant Director for Surface Water. Assistant Director **Greg Wallace** heads up the Hydrology Division, and **Jim Plastow** is Assistant Director of the Information Technology Division.

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
- Geraghty & Miller
- 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

ADEQ Initiates Canal Roundtables

Arizona Department of Environmental Quality has initiated a canal roundtable process to remove regulatory uncertainty associated with canals in the state. After the first meeting on February 14th a group of individuals and organizations (e.g., irrigation and flood control districts, municipalities, and private companies) was identified for regular participation in the roundtable process. This group is meeting every other Thursday from 1:00-4:00 p.m., beginning March 9 with the goal of clarifying outstanding issues and developing recommendations on potential rule changes by June 30. Meeting dates and locations are as follows: April 6, Yuma, Bureau of Reclamation Desalinization Plant; April 20, ADEQ, South Mall Public Meeting Room; May 4, City of Chandler; and May 18, CAWCD, 23636 N. 7th St., Phoenix. For more information contact Richard Meyerhoff, ADEQ, Water Quality Standards, 3033 N. Central Ave., 3rd floor, Phoenix, AZ 85012; phone 602-207-4539; fax 602-207-4528.

ASCE to Meet in Boston

The Water Resources Planning and Management Division of the American Society of Civil Engineers will hold its 22nd Annual Conference, "Integrated Water Resources Planning for the 21st Century," at the Hyatt Regency, Cambridge, Massachusetts May 7-11. Conference discussions and accompanying expositions will focus on managing the quality and quantity of surface water and groundwater. Specific topics to be addressed include flood control, wetlands, risk assessment, remote sensing, combined-sewer overflow control, water conservation, water policy and regulations, economics, and finance. For more information contact ASCE, Specialty Conference Department, P.O. Box 832, Somerset, NJ, 08875-0832; phone 800-548-ASCE; fax 212-705-7300.

Cooling Tower Workshop Scheduled

Tucson Water is presenting a cooling tower workshop 8:00 a.m.-12:00 p.m. on Thursday, May 4, at the Doubletree Hotel, 445 S. Alvernon Way. The workshop, which will address evaluating water-cooled systems and operating them for maximum water efficiency, also is sponsored by the Southern Arizona Chapter of the Association of Energy Engineers and the Tucson Chapter of the American Society of Heating, Refrigeration, and Air-conditioning Engineers. Registration begins at 7:30 a.m. in the Bonzai room. Admission is free but pre-registration is required no later than April 17. For a registration form or additional information contact Linda Smith, Tucson Water, 520-791-4331.

AIH Holds Annual Meeting

The Annual Meeting of the American Institute of Hydrology and the International Mine Water Association, "Water Resources at Risk," is being held May 14-18 at the Red Lion Hotel in Denver, Colorado. Papers presented at the meeting include topics in surface water, groundwater, mine water, and nuclear hydrology. A forum will discuss needs of the hydrologic sciences in colleges and high schools. Symposia include sessions on biohydrology, riparian conditions, acid-mine drainage, stream-aquifer relations, groundwater contamination, and groundwater hydraulics. Conference fees are \$200 for AIH and IMWA members; \$250 for non-members, with late registration fee after April 14. For more information contact AIH, 3416 University Ave. S.E., Minneapolis, MN 55414-3328; phone 612-379-1030; fax 612-379-0169.

Water Quality Research RFP

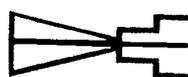
The Water Environment Research Foundation, which supports research on water quality issues impacting water resources, the atmosphere, the land, and quality of life, has issued a request for proposals. Areas of research are: 1) relationship of the whole effluent toxicity to instream toxicity; 2) source control assessment; 3) demonstration of soil remediation with sewage sludge to reduce bioavailability of metals; 4) development of low-cost technologies for production of Class A biosolids; and 5) understanding fate, transport, bioavailability, and cycling of metals in land-applied biosolids. Application deadline is May 19. For more information contact Charles Noss, WERF, 601 Wythe St., Alexandria, VA 22314-1994; phone 703-684-2470; fax 703-684-2492.

Water for People Funding Sought

The American Water Works Association seeks donations to provide water taps for Nicaraguan families. For a \$100 contribution, AWWA's Water for People program will install a tap for a family without water. AWWA also provides the donor with a card giving the family's name and further details about the project. The Water for People program provides support for water and sanitation projects worldwide. For more information, contact Water for People at 303-347-6145.

Water Education Specialist Position

The Oklahoma Conservation Commission is seeking a water education specialist to coordinate water education efforts within the state including the national environmental education program Project WET. At minimum, a B.S. degree in environmental education, elementary or secondary education, natural science, or biological science is required (some masters work preferred) plus three years professional experience. Deadline: April 14, 1995. For more information, contact Lisa Knauf, Education Coordinator, 405-521-2384.



Calendar of Events



RECURRING



Arizona Hydrological Society (Flagstaff). Apr. 11, 6:00 p.m. NAU, Southwest Forest and Science Complex, 2500 S. Pine Knoll Dr., Room 136, Flagstaff. Contact: Don Bills 520-556-7142.

Arizona Hydrological Society (Phoenix). Apr. 11, 7:00 p.m. China Doll Restaurant, 7th Ave. and Osborn, Phoenix. Cost is \$9, RSVP Sandy Kuchan 602-966-2337.

Arizona Hydrological Society (Tucson). 2nd Tuesday of the month. Contact: Laurie Wirt 520-670-6231.

Arizona Water & Pollution Control Association. Monthly luncheon series. Topic: Cryptosporidium: What Are the Risks for Drinking Water? featuring speaker Dr. Charles Gerba, U. of Arizona. Apr 18, 11:45 a.m. Reservation deadline: Apr. 14. Ramada Downtown, 475 N. Granada, Tucson. Contact: Brad Jurkovic 520-791-2544.

Arizona Water Protection Fund Commission. 4th Tuesday, Apr. 20, 10:00 a.m. ADWR, Phoenix. 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. May 3, 9:30 a.m. 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. 3rd Thursday of the month, 1:30 p.m. 1000 E. Racine, Casa Grande. Contact: Dennis Kimberlin 520-836-4857.

Prescott AMA, GUAC. Apr. 17, 10:00 a.m. 2200 E. Hillsdale, Prescott. Contact: Phil Foster 520-778-7202.

Santa Cruz AMA, GUAC. Apr. 22, 9:00 a.m. 857 W. Bell Rd., Suite 3, Nogales. Contact: Placido Dos Santos 520-761-1814.

Tucson AMA, GUAC. Apr. 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.

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



April 13, Northwest Water Alliance Board of Directors Meeting. 7:30 a.m., Oro Valley Town Hall Council Chambers, 11000 N. La Cañada Drive. Agenda items include study updates and a discussion of assured water supply issues. For more information call 520-297-2591.

May 7-13, National Drinking Water Week. An international public service campaign to promote water responsible actions. Activity packets (\$3 for packet, \$2 for shipping) may be ordered by calling 800-624-8301.

May 21-24, Fourth National Watershed Conference. "Opening the Toolbox - Strategies for Successful Watershed Management" is the theme of this conference to be held at the Charleston Civic Center, Charleston, WV. For additional information contact James R. Fisher, National Watershed Coalition, 9150 West Jewell, Suite 102, Lakewood, CO 80232; phone 303-988-1810; fax 303-988-1896.

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

Web, continued from page 7

readers with access to the World-Wide Web to explore AZWATER and tell us what is good, what needs improving, and what you most want added.

What You Need to Get on The Web

To access graphical information on the Web, a user must have "full" access to the internet, rather than just a text-based "shell account." The minimum setup requires a personal computer with a color graphics card and monitor, a 14.4k modem (28.8k is better), and a SLIP or PPP account.

A number of commercial internet providers offer these services, and access fees have declined substantially, to under \$10 per month in some instances. Higher-speed connections from networks at universities and some businesses offer substantially less wait time, and the ability to take full advantage of graphics.

In addition to the hardware, users must have a TCP/IP software "stack," and a Web browser such as Netscape or Mosaic. These are available as freeware all major platforms (PC, Mac, Unix, etc.). Netscape can be downloaded from <ftp://ftp.mcom.com/netscape/>.

Many public schools and libraries also have computers that can access the Web.

If all this seems hopelessly complex and difficult, be patient — several major software vendors are building Web access into future versions of their word processing or operating system software.

Common Terms

Browser: A software package that allows users to examine hypertext on the Web. The first highly useful browser was **Mosaic**; the current version of **Netscape** offers somewhat greater functionality and ease of use.

Home Page: A "table of contents" or starting point for a particular Web site.

HTML: Hypertext Mark-up Language, the rudimentary computer language that formats and links documents on the Web.

Hypertext: Multimedia documents that can contain pictures and sounds as well as text, with imbedded links to other parts of the same or other hypertext documents.

Internet: The global network that links other computer networks.

TCP/IP: A set of data protocols that allows computers on the internet to communicate with one another.

URL: Universal Resource Locator, or address of a particular location on the internet. Web URLs begin with the prefix, "http." WRRRC's URL is <http://ag.arizona.edu/AZWATER/>.

Web: Also known as World-Wide Web or WWW, a portion of the internet that supports hypertext.

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