

divining rod

Vol. XIX, No. 3 New Mexico Water Resources Research Institute November 1996

Northwestern New Mexico Water Issues Discussed at Annual Water Conference

In concluding remarks at this year's 41st Annual New Mexico Water Conference, WRI Director Tom Bahr told participants, "In the ensuing years, when the Navajo water rights have been successfully negotiated, you can tell your grandchildren that you were here when that historic decision was announced."

The historical decision referred to by Bahr was announced earlier in the conference by Stanley Pollack, attorney for the Navajo Nation. Pollack said the tribe was no longer claiming "every drop of San Juan River water" but still believes it has paramount water rights to the river. The Navajos had claimed the water since 1951,

leaving the Four Corners states reluctant to begin water negotiations with the tribe.

Addressing conference participants, Navajo leader Albert Hale said he sent a letter on September 9 to Governor Gary Johnson proposing that New Mexico and the Navajo Nation negotiate water matters.

New Mexico State Engineer Tom Turney, who spoke after President Hale, said Hale's letter was a very positive stand toward settling water rights issues on the Animas and San Juan river systems.

Bruce Whitehead of Colorado's Division of Natural Resources remarked of the disputed Indian water

In this issue...

Summary of 104th major legislation	2
Students participate in research	3
Water reports, CD-ROM available	4
NMTech students win AWRA award	5
WRI funds 1996 projects ..	6
USGS reports published	7
Congratulations to Clark	7



Navajo Nation President Albert Hale (left) and State Engineer Tom Turney enjoy a light moment at lunch during the 41st Annual New Mexico Water Conference.

rights: "...it is important to help uphold the traditions and stipulations of the Indian water rights settlement; it is time to put this issue to bed." However, other Indian water rights settlements have not been put to rest.

The Animas-La Plata Project, for example, dominated many of the talks, including a panel discussion of the pros and cons of the water project. The project of canals and reservoirs was first authorized by Congress in 1968. Twenty years later Congress tied the project to settlement of Indian water rights in the area.

(continued on page 8)

104th Adjourns Summary of Major Legislation

Safe Drinking Water Act Amendments

The Safe Drinking Water Act Amendments (PL 104-182) makes a number of changes in the process by which the Environmental Protection Agency (EPA) sets standards limiting contaminants in drinking water, including new use of risk and cost benefit analysis. The law authorizes \$7.6 billion through fiscal year 2003 for a new state drinking water revolving fund to help communities meet federal drinking water standards. The law also requires EPA to adopt specific regulatory approaches for arsenic, radon and sulfate; requires more detailed public notification of contaminant levels and provides more flexibility for small systems to meet treatment and monitoring standards.



Clean Water Act Reauthorization

The Clean Water Act Reauthorization (H.R. 961) passed the House of Representatives but was virtually ignored by the Senate. The House-passed legislation contained language restating the historic Congressional deference to the State's authority over allocation of water within State boundaries and provided for compensation for regulatory "takings" of private property. Wetlands provisions established a system of protection based on classification of value and vested primary program authority with the Army Corps of Engineers.

Property Rights legislation

Property Rights legislation (H.R. 925) requiring federal agencies to compensate private land owners for federal actions that result in a 20 percent reduction in the value of their land passed the House but failed to receive final consideration in the Senate.



Water Resources Development Act

The Water Resources Development Act (H.R. 3592, S. 640) authorizes construction of \$5.7 billion of water resource development projects by the Army Corps of Engineers for flood control, navigation, beach erosion control, and environmental restoration. The conference report was passed by the House on September 26 and agreed to by the Senate on September 27. President Clinton is expected to sign the bill into law.



Water Desalination Research and Development Act

Water Desalination Research and Development Act of 1996 (S. 811, H. Rpt. 104-790), cleared the Senate on September 27. This bill provides \$55 million over six years for studies into water reuse projects and desalination water studies.



Water Recycling legislation

Water Recycling legislation (H.R. 3660, H. Rpt. 104-703) amending the 1992 Reclamation Projects Authorization and Adjustment Act passed the Senate on September 28. This legislation authorizes additional water recycling and desalination projects and reduces the federal government's

cost-share to 25 percent for recycling projects and 50 percent for desalination projects.



Endangered Species Conservation and Management Act

Endangered Species Conservation and Management Act of 1995 (H.R. 2275) was reported from the House Resources Committee on September 9, 1996. House Resources Chairman Don Young also announced on September 9 that a vote on the House floor would not be pursued. H.R. 2275 is the only Endangered Species Act reform legislation to be reported from a committee in the House or the Senate.



Central Utah Project Completion Act

The Central Utah Project Completion Act will be amended by legislation (H.R. 1823) that passed the Senate on September 28 to allow the Central Utah Water Conservancy District to prepay contracts of the Federal Government.



Unfunded Mandates

Unfunded Mandates legislation (PL 104-4) passed the House and Senate and was signed into law early in 1995. The law makes it more difficult for the Congress to impose mandates on states, counties, and cities without providing funding for compliance.

Students discover research excitement at NMSU

by Catherine Lazorko, New Mexico State University, Communications

Skipper Botsford is coming off a long, hot summer in the laboratory. After he mops his brow, Botsford explains it's not the research so much that challenged him—it was over-seeing a dozen students.

"They learned how to grow bacteria, how to figure statistics and how to use laboratory equipment, the autoclave, spectrophotometer, microbalance and microscope," he said.

Botsford, who has been with NMSU for 26 years, is typical of many faculty members who act as mentors and guide dozens of undergraduate students each semester in science, agricultural and engineering laboratories. The student research experience often leads to study beyond a bachelor's degree.

Over his years at NMSU, Botsford estimates he has mentored about 250 students, many of whom he has kept in touch with.

"Six went on for Ph.D.s, 15 for M.A.s, five or six to med school, one to vet school and two to dental school," he said of his former students. "Two others are faculty at Indiana University and Texas Tech."

One student in Botsford's laboratory this summer, Bill Steen, who is studying microbiology, said: "Everybody does what they can to get into the lab because if you want to be a scientist, you need the experience."

Botsford strives to give his students a taste of real-world research and independent problem solving. He doesn't hesitate to cheer them on or explain something twice, but he doesn't hover either. And he doesn't always hire the best and the brightest.

"Three of the students in my lab this summer took biology with me in spring," he said. "They all got Cs, but they had good questions and they seemed to understand the work ethic."

This past summer, the students worked on testing a method of assaying toxic chemicals by using an indicator organism bacteria. "The chemicals damage living material," Botsford said. "So you need a living organism—bacteria—to test them."

The test, which involves a dye solution, analyzes how the bacteria react to various chemicals. "When it changes color, we have an easy and inexpensive way to tell if something is harmful," he said.

A patent is pending for Botsford's method, but tests need to be conducted to prove its efficiency and accuracy, he said. The student researchers used the bacteria test on 25 chemical compounds. The testing is beneficial to prove his technique, Botsford said, but many of the compounds were tested about 40 times, which is far more testing than needed for his study.

Botsford exhibits abundant energy and enthusiasm in and out of classroom and laboratory. A running enthusiast, Botsford has completed 73 marathons and 30 ultramarathons—30 to 50 miles.

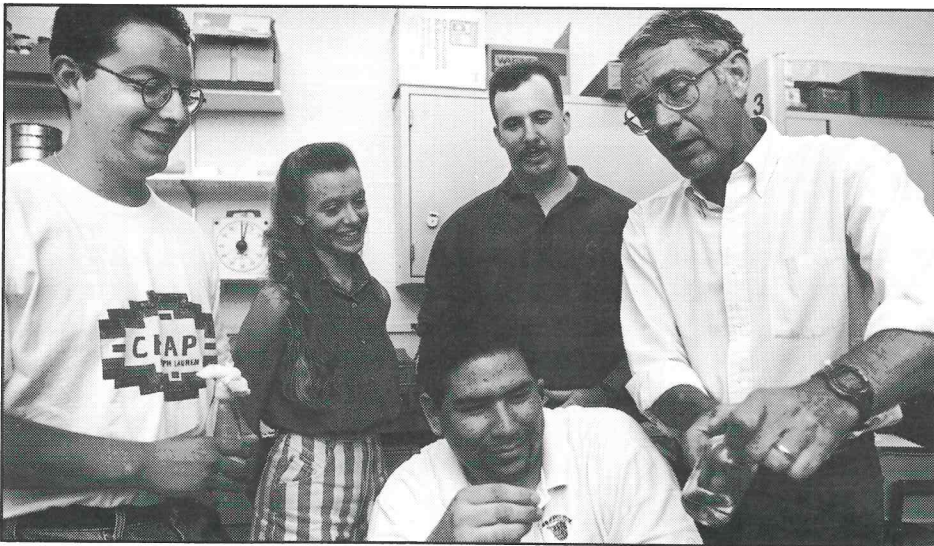
He compares his marathon training to academics and research, and tells his students: Exercise your minds. "So much of what we do in educating students is training their brains and teaching them how to think," Botsford said. "They learn how to solve problems and make decisions."

He shares with his students some of his greatest unsolved dilemmas. For example, for the past 15 years he has pondered how bacteria handle salt stress. "It doesn't go very fast," he said of research. "One thing you realize as a scientist is simply knowing a lot about something is good—you don't know what you'll get out of it."

Meanwhile, he is excited about his toxicity test, which he says may be used immediately in Third World countries lacking sophisticated equipment for measuring pollutants.

"It could change the world a little bit—maybe I can be remembered as this funny guy in New Mexico who ran a lot and happened to invent this thing," Botsford said.

The WRRI provided funding for graduate, undergraduates and high school research students involved in the project, *An Assay for Toxic Chemicals Using Microorganisms*, as part of its 1995 Water Resources Research Program.



NMSU Professor James Botsford (right) typically mentors five to seven students during the summer and three or four in the fall and spring semesters.

Water-related information available

Xeriscaping CD-ROM

The Arizona Water Resources Research Center has developed *Desert Landscaping: Plants for a Water-Scarce Environment*, a multi-media CD-ROM plant selector that lets users browse through award-winning gardens and landscapes, and pick from more than 600 low water-use plants that adapt perfectly to the desert and drought conditions.

Desert Landscaping features more than 1,500 full-screen color photos, including wide shots and close-ups of plants. An audio feature gives pronunciations of both the botanical and the common names of the plants. Users can compare groups of similar plants. A plant selector will help choose appropriate species based on size and growth rate, soil and sun requirements, irrigation needs, the plants' place of origin, allergens, wildlife interactions and dozens of other useful elements. Links to landscaping tips and an illustrated bibliography of plant books also are provided.

Computer requirements for the CD-ROM are a 486-based or faster PC with 4 Mb RAM (8 Mb recommended) and a 2X CD-ROM. A Mac version will be ready by the end of the year. Gary Woodard, Associate Director at WRRRC, located in the College of Agriculture at the University of Arizona, was the project manager for *Desert Landscaping*. The CD-ROM is available at a cost of \$25. Call Gary Woodard at (520) 792-9591, or e-mail woodard@ccit.arizona.edu for more information.

1996 New Mexico Water Directory

The New Mexico Water Resources Research Institute has copies available of the *1996 New Mexico Water Directory: Where to get water information in New Mexico*. This directory provides a listing of federal, state and university departments and personnel having expertise in various areas of water resources. If you are interested in receiving a copy of this publication that is free while supplies last, contact Cynthia Rex at (505) 646-1813 or e-mail crex@wrri.nmsu.edu. The project co-sponsor, New Mexico Interstate Stream Commission, also has a limited number of copies available and you may contact them at (505) 827-6160.

Rio Grande Compact Commission 1995 Report

The New Mexico Interstate Stream Commission (ISC) has issued the *1995 Report of the Rio Grande Compact Commission* to the Governors of Colorado, New Mexico and Texas. The report was prepared by the U.S. Geological Survey and contains water-supply data provided by various federal and state agencies.

A limited number of copies of the report is available from Mike Roark, USGS, (505) 262-5354. Copies are available for inspection at most libraries around the state.

New Water Resources Handbook

The new *Water Resources Handbook* was recently published by McGraw Hill. This has been a four-year effort by the editor-in-chief, Dr.

Larry Mays, Professor in the Department of Civil and Environmental Engineering, Arizona State University. The Handbook is over 1600 pages long with 33 chapters written by 53 of the world's leading experts in their respective fields related to water resources. Five major sections of the Handbook are: Principles for Water Resources; Water Quality of Natural Systems; Water Resources Supply System; Water Resource Excess Management; and Water Resources for the Future.

Western Water Policy

The Powell Consortium—an organization of seven Water Institutes from the Southwest—has produced a series of articles on the *Park City Principles: A New Paradigm for Managing Western Water* published in the most recent Land and Water Law Review. The *Park City Principles* evolved from a series of workshops convened by the Western Governors' Association and the WSWC in Park City, Utah. The volume [Vol. XXXI, No. 2 (1996)] is available from the *Land and Water Law Review*, University of Wyoming, College of Law, University Station, Box 3035, Laramie, WY 82071, or phone (307) 766-2251.

The volume contains an article written by the Council's Executive Director D. Craig Bell and former Legal Counsel Norman K. Johnson, et al., entitled, "Retooling Western Water Management: The Park City Principles." The article outlines the six key Park City Principles concerning the optimal roles and relationships of various levels of government "to deal with the increasingly complex world of water."

The volume also includes a discussion paper by Council member Charles T. DuMars entitled, "Application of Park City Principles to Federal-State Conflicts." It "applies the Park City Principles to typical water-management institutions which have evolved to address three federal/state areas of conflict arising from the U.S. Constitution."

The first federalism conflict arises between states over shares of common river systems and is based on principles of state sovereignty under the Tenth Amendment. The second principle arises under the Commerce Clause and addresses the balance of federal and state regulatory powers in allocating water resources as market or quasi-market commodities.

The third issue involves litigation over federal Indian reserved water rights. This principle concerns the duty of the United States, as a sovereign and as trustee for Native American tribes, "to ensure that tribes have sufficient water resources to fulfill the purposes of the reservations on which they reside," and the tribes' sovereign duties to protest and preserve the tribes' natural resources. DuMars notes: "These duties often directly confront the state's obligation to maximize the water rights not only for the tribal members, but also for the non-Native Americans residing within the state. The institution most frequently employed for resolving these conflicts is a state or federal court."

WRRI Technical Report #300

The New Mexico Water Resources Research Institute recently published *Selective Removal of Toxic Heavy Metals from Contaminated Water Supplies Using Immobilized Humic Substances* as part of its technical report publication series.

The study's main objective was to develop the use of immobilized organic

peat, an inexpensive material, for the removal of heavy metal ions from polluted waters.

NMSU principal investigator, Dr. Gary D. Rayson, and four student assistants present results demonstrating the applicability of this material for selective binding of toxic heavy metal ions.

To receive free copies of the report either write or call WRRI, Box 30001, Dept. 3167, Las Cruces, NM 88003; (505) 646-1813, or place an order via WRRI's home page at <http://wrri.nmsu.edu>

National Water Quality Study

Nitrate contamination of groundwater occurs in predictable patterns, according to results of a recent study of water quality in the United States by the U.S. Geological Survey. The study is part of the National Water-Quality Assessment (NAWQA) program, an ongoing study of water quality funded by the federal government and launched by the USGS in 1991.

The USGS report, *Nutrients in the Nation's Drinking Waters: Too Much of a Good Thing*, was based on analyses of over 10,000 samples of water across the U.S. taken from 60 of the largest river basins and aquifer systems in the country.

The study found that nutrient concentrations—primarily nitrates, ammonia, and phosphates—now commonly found in much of the nation's drinking water, are generally related to land use in the upstream watershed or are related to the area overlying a groundwater aquifer.

The 1996 report written by D.K. Mueller and D.R. Helsel is available from: USGS, Information Services, Box 25286, MS 306, Denver Federal Center, Denver, CO 80225-0046.

NMTech students win AWRA poster competition

The American Water Resources Association, New Mexico Section, held its annual conference at the Ruidoso Convention and Civic Events Center in Ruidoso, Oct. 17-18, 1996.

Twenty-three speakers addressed participants on a variety of topics related to this year's theme, *Southern New Mexico Water Issues: Bridging the Gap Between Scientists, Engineers, Policy Makers, and Water Users*.

As in past years, the AWRA sponsored a student poster competition at the conference. This year's winners and recipients of \$250 were Dennis Romero and Gina DeRosa for their poster and paper, *Rio Pojoaque Water Rights Adjudication: The Aamodt Case*.

The paper was originally prepared for an Interactive Television Course offered by the Waste-management Education & Research Consortium. The course, taught by NMSU Professor John Hernandez, "New Mexico Water Law for Engineers" was transmitted statewide including UNM, NMSU, NMTech, Sandia National Laboratories, and Los Alamos National Laboratory.

Courses offered through WERC's interactive television program for Spring 1997 include Natural Water and Pollution Control (NMSU), Environmental Toxicology (NMSU), Environmental Law and Regulations (NMTech), Biological Wastewater Treatment (UNM), and Groundwater Engineering (UNM).

For course descriptions and more information, contact: WERC, (505) 646-2038.

WRRI funds three projects for 1996

Three continuation projects were funded under the WRRI's FY96 Seed Money Research Program. The program supports seed money projects that target new investigators or propose new and novel approaches to solving water resources problems.

The program encourages student participation. Awards this year will provide support for three graduate students and three undergraduates. Each project was funded for a one-year period.

Spatial Distribution of Total and Methylmercury Concentrations in Elephant Butte and Caballo Reservoirs - Colleen Caldwell, Department of Fishery and Wildlife Sciences, New Mexico State University

This continuing research will provide an opportunity to measure methylmercury in two New Mexico reservoirs. Results will provide a comprehensive picture on the distribution of methylmercury in south-central New Mexico. Past research measured total mercury, which does not represent the species of mercury that is available to the biota. Using advanced technology, this study will provide measurement of methylmercury at levels that were, until recently, non-detectable.



Colleen Caldwell holding day-old Great Blue Heron chick.

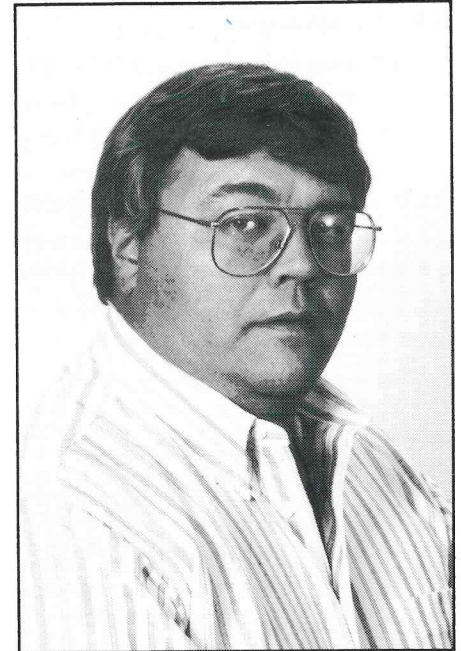
Arsenic Removal from Groundwater - Michael Johnson, Department of Chemistry and Biochemistry, New Mexico State University



Students Chris Vogels (left) and Bob Wingo in Dr. Johnson's laboratory.

Another project continuing into its second year of WRRI funding involves studying new methods for arsenic removal. Dr. Johnson employs a technique utilizing forms of iron reagents in the +2 or +6 oxidation states. Through oxidation of the iron, the +3 oxidation is obtained which forms insoluble precipitates of ferric arsenate and hydrated ferric oxides. The additional year of funding will allow the researchers to improve the cost effectiveness and decrease sludge production associated with these treatment advances.

Geologic Membrane Controls on Saturated Zone Heavy Metal Transport - Mike Whitworth, Bureau of Mines & Mineral Resources, New Mexico Tech



Mike Whitworth

During the first year of this project, Dr. Whitworth and student assistants precipitated copper and lead minerals by passing undersaturated solutions through clay membranes. The presence of copper and lead minerals in the precipitate was confirmed by electron microprobe and X-ray fluorescence spectrographic analysis. Now the researchers want to measure the membrane properties of actual shales to see how they compare to the sedimented clay membranes used in the laboratory. Ultimately, quantifying clay-membrane induced precipitation of heavy metals in contaminant plumes will improve our understanding of heavy-metal contaminant behavior in the subsurface, which will assist in aquifer remediation.

USGS Reports

The U.S. Geological Survey has published the following New Mexico related publications since the last issue of the *Divining Rod*. Copies are available for inspection at the USGS District Office in Albuquerque (4501 Indian School Road NE, Suite 200). The Water Resources Research Institute library also has the reports on file. They may be ordered from the USGS, Federal Center, Box 25286, MS 517, Denver, CO 80225. You may call (303) 236-7476 for price information.

Use of geophysical logs to estimate the quality of ground water and the permeability of aquifers by J.D. Hudson (WRIR 95-4266)

Geohydrologic site characterization of the Municipal Solid Waste Landfill Facility, U.S. Army Air Defense Artillery Center and Fort Bliss, El Paso County, Texas by Cynthia G. Abeyta (WRIR 95-4217)

Hydrogeology and ground-water quality of the Chromic Acid Pit site, U.S. Army Air Defense Artillery Center and Fort Bliss, El Paso, Texas by Cynthia G. Abeyta and Carole L. Thomas (WRIR 96-4035)

Analysis of ground-water data for selected wells near Holloman Air Force Base, New Mexico, 1950-95 by G.F. Huff (WRIR 96-4116)

Analysis of the magnitude and frequency of peak discharge and maximum observed peak discharge in New Mexico by Scott D. Waltemeyer (WRIR 96-4112)

Hydrogeology and steady-state simulation of ground-water flow in the San Juan Basin, New Mexico, Colorado, Arizona, and Utah by John Michael Kernodle (WRIR 95-4187)

Reconnaissance investigation of water quality, bottom sediment, and biota associated with irrigation drainage in Vermejo Project Area and the Maxwell National Wildlife Refuge, Colfax County, north-eastern New Mexico, 1993 by J.R. Bartolino, L.A. Garrabrant, M. Wilson, and J.D. Lusk (WRIR 96-4157)

Kudos to Clark

Ira G. Clark has won a 1996 Excellence in the Humanities award from the New Mexico Endowment for the Humanities. The award recognizes outstanding individual and institutional contributions to the humanities in New Mexico. Recipients are selected for excellence in research, scholarship and writing in the humanities; teaching the humanities; and bringing the humanities to the public.

Dr. Clark is professor emeritus of history at NMSU. He has written numerous books including *Water in New Mexico: A History of Its*

Management and Use, published by the University of New Mexico Press in 1987.

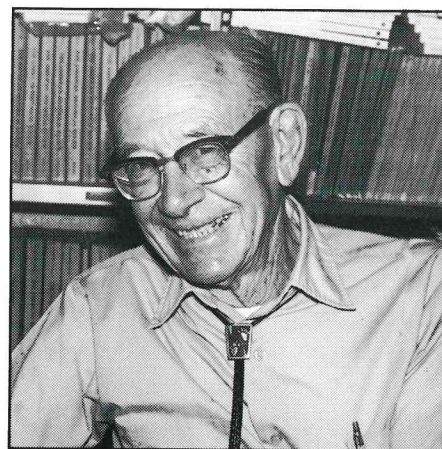
The 800-plus page book is the most comprehensive study of New Mexico's water history. Twenty-five years in the making, the book begins with New Mexico's ancient irrigators 1,000 years ago and ends with the El Paso suit.

A member for many years of the WRRRI Water Conference Advisory Committee, Dr. Clark continues to contribute to New Mexico's water community. He also has participated on three WRRRI-funded projects over the years, beginning in 1968.

Dr. Clark, 87, can be seen in Las Cruces rallying on an NMSU tennis

court three times a week. He recently remarked, "I'm not going to let myself grow old."

Congratulations to Ira Clark on all fronts!



Ira Clark

According to panelist Scott McElroy, special counsel for water rights to the Southern Ute Indian Tribe, the agreement was dependent on the Animas-La Plata Project being built—part of the entire formula that went into place for resolving tribal water rights claims on the Animas and La Plata rivers.

During the first phase of the proposed project, water would be siphoned from the Animas and La Plata rivers and pumped into a giant offstream reservoir near Durango. Part of the water could be used by the Southern and Ute Mountain Utes for irrigation and development, satisfying the two tribes' century-old water rights. The rest of the water would go to Durango, several New Mexico communities, including Farmington, the Navajo Nation and to Colorado farmers.

Sarah Dormon, a researcher with the Sierra Club Legal Defense Fund, attacked the project on economic grounds citing statistics on the project's escalating costs.

In support of the project, Randy Kirkpatrick, San Juan Water Commission, commented that without the Animas-La Plata Project, northwestern New Mexico would have no efficient long-term water plan. Liz Taylor, counsel to the San Juan Water Commission, told of frustrated



1996 water conference participants enjoyed a brisk fall evening picnicking along the Animas River in Farmington. Nearly 200 participants gathered at this year's conference, the first ever in northwestern New Mexico.

local residents who see two-million acre-feet of San Juan River water flowing yearly, but who for the last 40 years have not been able to tap the approximately 31,000 acre-feet they knew was reserved for them.

Conference participants learned of another controversial topic—endangered species recovery efforts in the Upper Colorado River Basin. Indeed, preserving the Colorado squawfish may be another impediment to the completion of projects such as the Animas-La Plata Project.

Reflecting on the water problems facing the Four Corners area, Public Service Company of New Mexico counsel Cindy Murray recalled Al Utton's description of the development of Colorado River compacts despite nearly insuperable difficulties. In light of this history, Murray is optimistic that "... the very complex and difficult problems facing us today are similar to those problems confronted and overcome in years past."

**Tom Bahr, Director, New Mexico Water Resources Research Institute
Catherine T. Ortega Klett, Editor**

the diving rod
New Mexico Water Resources
Research Institute
Box 30001 - Department 3167
Las Cruces, NM 88003-8001
(address correction requested)

Nonprofit Organization
U.S. Postage PAID
Las Cruces, NM
Permit 162