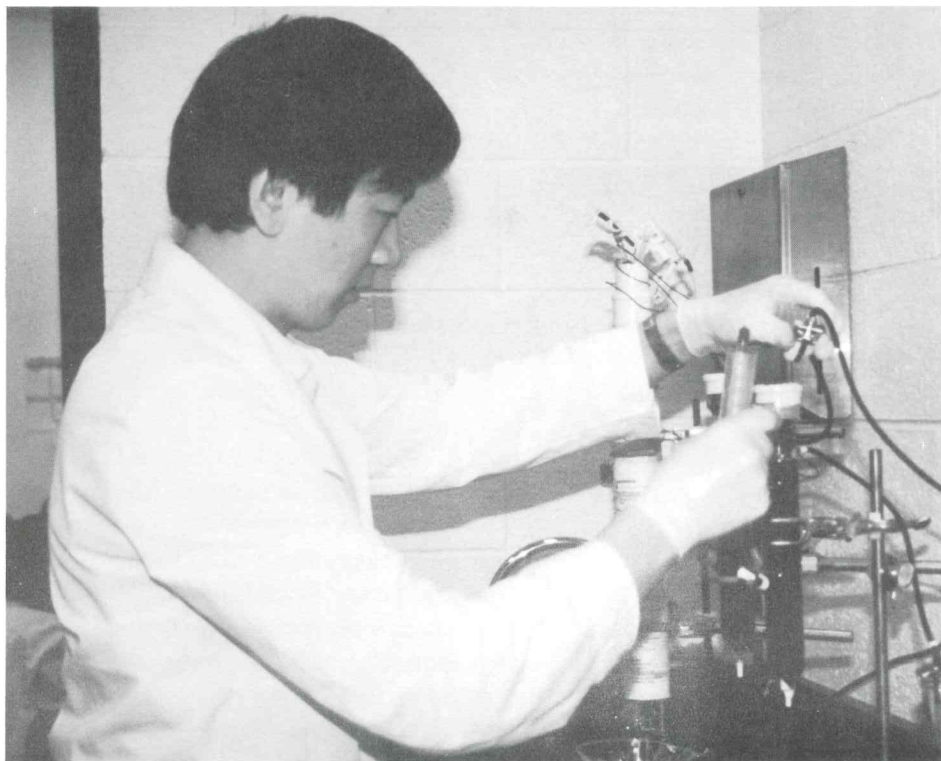


## Microbiologists study bacteria to clean up THMs, other aliphatic compounds

New Mexico State University microbiologist Geoffrey Smith, assisted by doctoral student Zhongtang Yu, has spent the past year investigating the potential for a group of common aquatic bacteria called *Hyphomicrobium* to biodegrade halogenated aliphatic compounds such as freons and trichloroethylene (TCE). The *Hyphomicrobium* use short-chain, single carbon aliphatic compounds as their

normal carbon and energy source. Therefore, Smith suspects that some of them will be able to metabolize similar short-chain halogenated compounds. Also, *Hyphomicrobium* are potentially useful in biodegradation of contaminants in groundwater because of their ability to grow under the anaerobic and low-carbon conditions found in many contaminated aquifers. In addition to

*continued on page 7*



*Graduate student Zhongtang Yu compares influent and effluent THM concentrations between sterile and live columns in a biology lab at New Mexico State University. Yu works with Dr. Geoffrey Smith on a WRRRI-funded project.*

### Announcing The 38th Annual New Mexico Water Conference

The 38th Annual New Mexico Water Conference will be held in Carlsbad September 30-October 1, 1993. This year's water conference will focus on conflict resolution as a tool in water management and planning. We'll look at case studies of conflict resolution as well as methods of conflict resolution.

Also lined up for the conference are special tours of the Waste Isolation Pilot Plant scheduled for September 29 and October 1 and a cookout along the banks of the Pecos. More information on the conference will be mailed to *Divining Rod* readers in August.

### Call for Papers

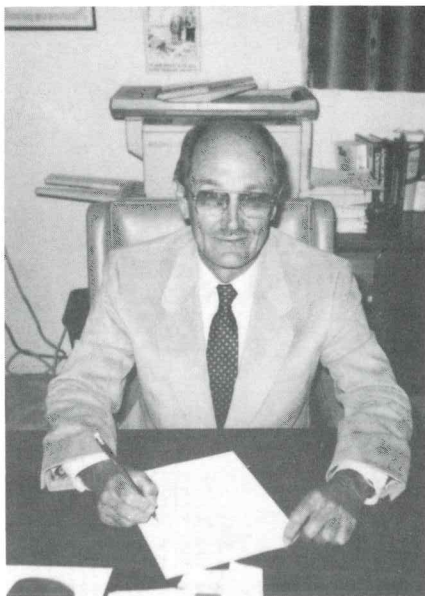
If you have a conflict resolution topic you'd like to discuss at this year's water conference, please send an abstract along with a brief bio to Leslie Blair, WRRRI, Box 30001 - Dept. 3167, Las Cruces, NM 88003 by **July 10**. Written copies of the presentation will be required for the proceedings in the fall.

## Three leaving WRRI's Program Development and Review Board

A number of changes are on the horizon for WRRI's Program Development and Review Board as one member has resigned and two long-time members are retiring later this year.

Dr. Ron Cummings, chairman of the Department of Economics at the University of New Mexico, has resigned from the PDRB after serving on the board for eight years. Dr. Stuart Burness, also a professor in the Department of Economics, was appointed by UNM President Richard Peck to take Cummings' place on the board.

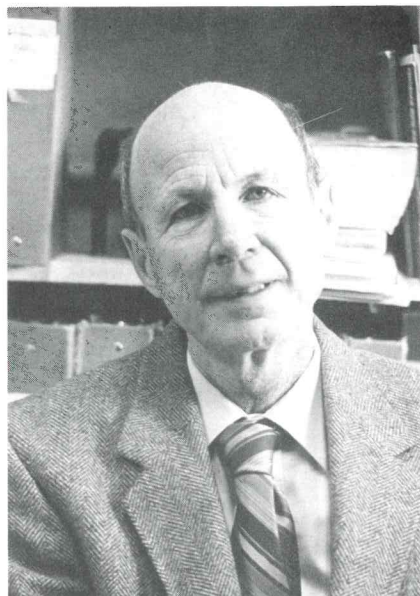
In addition to serving on the PDRB, Cummings has authored or co-authored over 80 articles, books, monographs and reports, has been a member of the Economic Development and Tourism Board for the State of New Mexico, and was named an Eminent Scholar in the New Mexico Eminent Scholars program.



*Dr. Ron Cummings*

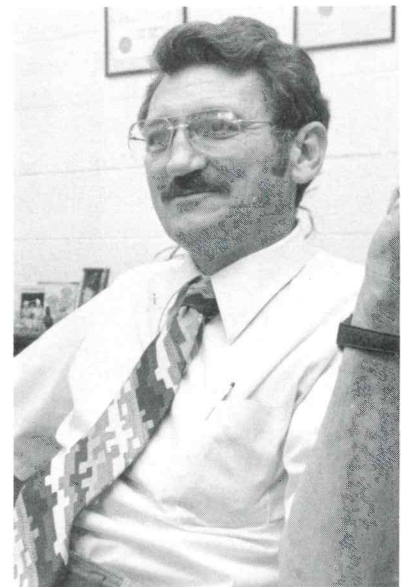
We welcome Dr. Burness as a board member and look forward to his input in the years to come. Dr. Burness completed a two-year project funded by WRRI last year, "Depletion of Groundwater in New Mexico's Confined Aquifers: Developing Policy Relevant Economic Measures," and has worked on several other water-related research projects. Dr. Burness has been with UNM for 15 years.

Our senior PDRB member, New Mexico Tech professor of geophysics, Dr. Gerardo Gross, has announced his retirement at the end of 1993. Dr. Gross has served on the board for 23 years and was recently named the recipient of New Mexico Tech's Distinguished Research Award for 1993 (see related story, page 11) for his research on the electrical properties of ice and for his research tracing groundwater movement in the Roswell Basin.



*Dr. Gerardo Gross*

Dr. Sam Maggard, a professor in the Civil, Agricultural, and Geological Engineering Department at New Mexico State University, will retire this July. Dr. Maggard has been a board member since 1975 and has served as the head of the civil engineering department and director of the Engineering Research Center at NMSU. He was one of the organizers of the NMSU Quality Concrete School in 1964 and has been active in a number of professional organizations as well as serving on the PDRB.



*Dr. Sam Maggard*

WRRI staff will miss Drs. Cummings, Gross, and Maggard greatly. We appreciate the time and effort they have contributed over the years. In addition to reviewing many preproposals and proposals annually, the PDRB members help in setting long-term goals for the institute, and identifying high-priority research areas.

## Western governors, Western States Water Council endorse Park City Paradigm

Historically, the West's water system has been a source of pride. As needs and interests have changed over time, the system has evolved and adapted to keep up with the changes. In recent years however, decision makers in the West have realized there is a near gridlock in water management resulting from: changing demands for water resources in a period of

rapid urban growth; recognition of Indian water rights; enforcement of endangered species laws; public concern for instream flow and other environmental values; lack of support for new water projects; scarce public funds; conflicting and overlapping laws and programs; and polarized positions among competing parties.

Two groups, the Western

Governors' Association (WGA) and the Western States Water Council (WSWC), have been working to find ways to make the Western water system work better. Over a two-year period they convened a series of three workshops in Park City, Utah, which included a broadly representative mix of major players in water management, and produced a consensus-based vision of what western water management should look like and how it should function, called the Park City Paradigm.

The paradigm established a set of principles or criteria for considering what is often termed the "public interest," (although participants agreed there is no single public interest but rather many special interests), and includes paradoxes which recognize the complicated nature of the decisions required (see the list of principles at left and the paradoxes on page 4).

The findings from the workshops and the Park City Principles yielded several recommendations, such as states should begin playing a more pivotal role in governance of water management. Another is that as values and demands change, and in order to respond appropriately, states should determine the public interest—balancing between current uses and rights and future needs.

Another recommendation was that the concept of "problemshd" must be incorporated into important decisions. The "problemshd" is the area that encompasses the problem and all the affected interests. Often, the most effective level for implementing solutions will be the water-

### *The Park City Principles*

- **Recognize diverse interests.** There should be meaningful legal and administrative recognition of diverse interests in water resources planning.
- **Problemshd approach.** Problems should be approached in a holistic or systemic way that recognizes cross-cutting issues, cross-border impacts and concerns, and the multiple needs within the broader "problemshd"—the area that encompasses the problem and all affected interests. The capacity to exercise governmental authority at problemshd, especially basinwide, levels must be provided to enable and facilitate direct interactions and accommodate interests among affected parties.
- **Flexible, predictable, adaptable.** The policy framework should be responsive to economic, social and environmental considerations. Policies must be flexible and yet provide some level of predictability. In addition, they must be able to adapt to changing conditions, needs, and values; accommodate complexity; and allow managers to act in the face of uncertainty.
- **Decentralize to states.** Authority and accountability should be decentralized within national policy parameters. This includes a general policy of recognizing and supporting the key role of states in water management as well as delegation to states and tribes of specific water-related federal programs patterned after the model of water quality enforcement.
- **Negotiation and market-like approach.** Negotiation and market-like approaches as well as performance standards are preferred over command and control patterns.
- **Joint policy participation.** Broadly based state and basin participation in federal program policy development and administration is encouraged, as is comparable federal participation in state forums and processes.

## *The Park City Paradoxes*

During the Park City Workshops, it was recognized there is no pat formula for water management. Continuing tension from the following paradoxes will always require special attention as solutions to problems are crafted:

- The tradeoff between certainty and flexibility.
- The tradeoff between federal mandates as motivators for states and others to solve their own problems.
- The tradeoff between data sufficiency and overkill (recognizing there is frequently a need to act in the face of incomplete information).
- The tradeoff between public involvement and expeditious decision-making.
- The tradeoff between fragmentation and tidy but potentially narrow and unrepresentative systems.
- The tradeoffs between individual rights and the public interest.
- The problem of "multiple problemsheds" (a basin with a number of issues, each of which involves a different problemshed).

## **Water Law Project provides overview of federal laws, shows impact on states**

Following the three Park City workshops, the Western Governor's Association (WGA) passed a resolution endorsing the Park City Principles, and published a document entitled *Pioneering New Solutions: Directing Our Destiny*. The report contained several recommendations, one of which asked cooperation with the university-based water research institutes to analyze federal statutes and clarify public interest requirements.

The Powell Consortium, composed of the water institutes in the seven Colorado Basin states of California, Arizona, Nevada, Utah, Wyoming, Colorado, and New Mexico, picked up on this suggestion and began further discussions with the

WGA and the Western States Water Council (WSWC) to plan a study to examine federal statutes and their relationship to the Park City Principles. The project, the "Park City Federal Water Law Project" began in the fall of 1992 and was designed to prepare concise overviews of selected federal water law policies and display their impact on the ability of states to manage and resolve conflicts by and between themselves.

The study examined federal statutes, regulations and court decisions that impact the ability of non-federal entities (state and local governments, interstate organizations, etc.) to manage

*continued on page 5*

## **Western governors, continued**

shed—relying on local people who understand the problem, the area, and how to tailor solutions to their unique circumstances. It was also suggested that states will need to provide the necessary technical assistance and resources, and if states want to play a more pivotal role, they will need to internalize values and concerns currently assumed by federal agencies. This might include delegation of some federal responsibilities to the states.

As federal representatives observed, they are seeking opportunities for states and federal agencies to forge new arrangements. This means state leaders must develop a better understanding of how the federal government addresses the public interest, including what laws define it, how it is protected, and how it gets integrated into existing programs. Once that is understood, opportunities for partnerships and delegation to states will become easier. States will also need to step up what has been a very problematic issue throughout the twentieth century—designing and implementing effective mechanisms for basinwide management.

One of the paramount results of the Park City workshops was the recognition that no one interest acting alone can solve our water problems, and that participation by all interested and affected stakeholders is necessary.

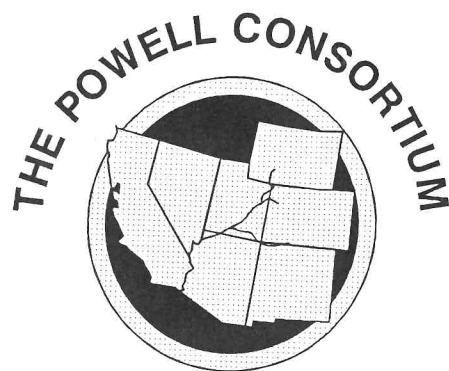
## Powell Water Law Study, continued

water resources and resolve water conflicts involving competing interests. It is not unusual for states to design a solution to a water conflict that makes sense at the local, state or regional level, only to have federal policy "kick in" and conflict with the solution. Identifying these conflicts was an important element of the project.

As Powell Consortium president, NM Water Resources Research Institute Director Tom Bahr oversaw the project. Bahr says, "The project was not designed to be a comprehensive analysis of all relevant laws but rather an undertaking to produce a provocative talking piece for focusing discussion and debate in a workshop setting like those held in Park City." The WGA and WSWC planned a fourth workshop for early 1993 so the timing was right to factor in the study results if the project could be completed in time.

A group of five legal scholars was selected to prepare separate "White Papers" examining the following categories: 1) Species Protection; 2) Water Quality; 3) Interstate Issues; 4) Water Supply Issues; and 5) Hydropower. The study team included Mark Squillace, University of Wyoming (species protection); Larry McDonnell, University of Colorado (water quality); Chuck DuMars, University of New Mexico (interstate issues); Brian Gray, University of California (water supply issues); and George William Sherk, former Justice Department Trial Lawyer (hydropower). Frank Gregg, University of Arizona, assisted in the overall study design.

The white papers were completed in time for the fourth workshop which was held in Newport



Beach, CA February 18-19, 1993. The papers and presentations sparked lively discussion and several participants stated they were pleased to see the Park City Principles moving from "motherhood and apple pie" statements to something that could begin to work in the real world. McDonnell discussed the Clean Water Act and suggested ways for states to pursue their own objectives without the need to change federal law. Gray put forth a provocative case study on the implications of transferring the Bureau of Reclamation's Central Valley Project to the State of California. Sherk discussed conflicts between states and the Federal Energy Regulatory Commission, and Squillace covered the Endangered Species Act, suggesting areas where states could become more involved. Finally, DuMars presented three semi-hypothetical scenarios concerning interstate allocation of water, specifically highlighting how present conflict resolution stacks up against the Park City Principles.

The Powell Consortium currently is examining the best way to publish the papers and make this information available to a wide audience. Bahr states "As soon as the papers are in final form we will

announce their availability in the *Divining Rod* and elsewhere."

### *Consortium seeks to improve technical, scientific bases for decision making*

Named in recognition of geologist, teacher, philosopher John Wesley Powell (1834-1902), the Powell Consortium seeks to improve the technical and scientific bases for decision making on water and environmental issues.

The Consortium is made up of the seven Water Resources Research Institutes and Centers from the states of Arizona, California, Colorado, Nevada, New Mexico, Utah and Wyoming. It utilizes the collective expertise of its member universities and over twenty other cooperating universities to develop and disseminate knowledge to solve problems in the Colorado/Great Basin Region, and other arid regions in the world.

Members of the Powell Consortium have collaborated on a variety of research and outreach programs for nearly 20 years. They collectively generate approximately \$17.5 million per year in total funding. There are over 250 currently active research projects among members of the Consortium, involving training for over 360 graduate and undergraduate students.

## New institute reports available free of charge

Since January 1993, WRI has published three reports, all of which are available at no cost. To order, call WRI at 505-646-1813 or write Box 30001, Dept. 3167, Las Cruces, NM 88003.

**Report No. 274, *Tilting of Surficial Strata and Groundwater Level Fluctuations in the Subsiding Mimbres Basin, New Mexico*** by William C. Haneberg and Robert L. Friesen.

Haneberg and Friesen monitored tilts and water levels near an earth fissure in the Mimbres Basin between January and September, 1992. The researchers sought to compare observed tilts near the fissure with deformation patterns predicted by existing models of plane strain draping and differential compaction. Short-term tilt and water-level records exhibit diurnal and semi-diurnal cycles superimposed on long-term trends, which can be explained using a regression model that includes earth tide, barometric, and annual irrigation harmonics, plus a linear monotonic trend. Daily water level maxima generally correspond to daily tilt maxima, and suggest that the fissure closes as the water level rises. Long-term records (tens to hundreds of days) show complicated patterns of oblique tilt both toward and away from the fissure.

These patterns Haneberg and Friesen observed are inconsistent with a model of simple plane strain stretching perpendicular to the fissure, and are not easily correlated with long-term changes in water level beneath the fissure. A model of an elastic plate subjected to complicated loading suggests that highly variable tilts may be a consequence of shallow stratigraphic and/or structural irregularities.

**Report No. 275, *Air Quality Studies in Albuquerque, New Mexico*** by Carl J. Popp.

During the course of this project (funded by WRI through the Chino Mines grant fund) a comprehensive program was developed to analyze air samples in Albuquerque for low molecular weight carbonyl compounds, peroxyacetyl nitrate, nitric acid, and oxides of nitrogen.

Air quality samples were taken for one year to provide a database for the evaluation of air pollution control strategies adopted by the City of Albuquerque. Researchers found the concentrations of low molecular weight carbonyl compounds were relatively high compared with highly polluted areas such as Los Angeles. They also found that ratios of certain compounds were higher than expected, which may be related to the use of oxygenated fuels which are used to mitigate carbon monoxide concentrations.

**Report No. 276, *Analysis of Relationships between Lightning, Precipitation, and Runoff*** by James Gosz, Douglas R. Moore, Herbert Grover, William Rison, Carol Rison, Tim Ward, Kenny Stevens, and Susan M. Bolton.

This study developed algorithms between lightning and precipitation depth, used lightning data to determine rainfall depth for input to a distributed parameter hydrologic model, and tested the model to predict discharge. There was a significant correlation between rain-gauge measured precipitation and lightning within a 3 km radius of the gauge location. Precipitation prediction was greatest using regressions that included lightning strikes and relative humidity. The preliminary hydrologic modeling reinforced the need for future research to improve the estimate of spatial and temporal characteristics of lightning-related precipitation events.



*New Mexico Tech graduate student Michelle Cash uses high-performance liquid chromatography to analyze air quality samples (Air Quality Studies in Albuquerque, Report No. 275).*

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## Microbiologists study bacteria, continued

cleaning up these halogenated chemicals widely used in industry, the bacteria may be able to get rid of another class of halogenated aliphatic compounds, trihalomethanes (THMs), by-products of chlorinating drinking water. Smith sees *Hyphomicrobium* and other similar groundwater bacteria as a potentially inexpensive method to clean up groundwater instead of the long-term, costly pump-and-treat and air-stripping methods now preferred, and as a way to remove THMs at water treatment plants.

Smith notes, "The most promising approach is to stimulate the bacteria that are already present in the aquifer, rather than to inoculate the groundwater with an external source of bacteria."

Smith and Yu have been working in the laboratory thus far, using samples from a pristine aquifer beneath the Sevilleta National Wildlife Refuge and samples from an aquifer contaminated with freons and TCE. The samples from the Sevilleta aquifer contain significant numbers of bacteria which are metabolically similar to *Hyphomicrobium*, and are therefore available for manipulation. Samples from the contaminated aquifer contain significant numbers of sulfate-reducing bacteria, and have been shown to degrade freon-11.

About a year ago, Smith and Yu set up a column filled with the Sevilleta aquifer material and began running tap water from the NMSU water system through the column. Within 11 months the researchers saw a twenty-fold increase in the number of microbes, which surprised them because there is little carbon supply in the aquifer material and in the tap water. Initial data suggest that the microbes are me-

tabolizing the THMs in the NMSU water supply, which has a very low concentration of THMs, about 5 parts per billion (the maximum THM level allowed by the Environmental Protection Agency is 100 ppb). This demonstrates not only the carbon-scavenging capabilities of the aquifer bacteria, but also its ability to degrade THM on a small scale.

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**Initial data suggest that the microbes are metabolizing the trihalomethanes in the NMSU water supply, which has a very low concentration of THMs.**

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In two other experiments, Smith and Yu have filled one column with the sterilized aquifer material from the Sevilleta and added organisms from the Fred Hervey Wastewater Treatment Plant in El Paso. In one column, they killed the inoculum and aquifer bacteria; in the other, kept them live. By comparing influent and effluent THM concentrations between sterile and live columns, the researchers can distinguish between abiotic effects such as contaminant sorption or volatilization and biological degradation of THMs.

"Now that we have activity," says Smith, "we are exploring more interesting questions such as 'Are microbes using the pollutant as a carbon source or electron acceptor?'" Smith explains, "If the aquifer is anaerobic, microbes may be using the pollutant as an electron acceptor instead of oxygen, and the activity in the aquifer can be accelerated by adding carbon. Vice-ver-

sa, if they are using the pollutant as a carbon source, they may be electron acceptor-limited, and addition of oxygen, sulfate or nitrate may stimulate the process."

To study how the bacteria or microbes are using the pollutant, Smith and Yu added tap water containing 100 ppb chloroform to the pristine aquifer material in another column. The rates of chloroform consumption increased more than five-fold when 100 ppm nitrate was added along with the chloroform, indicating the bacteria are using the THMs as a carbon source under denitrifying conditions.

Yet another component of the project is genetic analysis. Smith has been using genetic probes to analyze pure cultures and mixed communities of microbes for the presence of biodegradative genes. By using genetic probes to identify the presence of biodegradative genes in an environmental sample, the researchers can get information as to the biodegradative potential of a particular site. Also through the genetic work, factors important in controlling the biodegradation rates can be identified.

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**By using genetic probes to identify the presence of biodegradative genes in an environmental sample, the researchers can get information as to the biodegradative potential of a particular site.**

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## Rocky Mountain Ground Water Conference to be held in Albuquerque

After a 16-year hiatus, the Rocky Mountain Ground Water Conference returns to New Mexico October 27-29, 1993. The RMGWC will be held in conjunction with the Sixth Annual Conference of the New Mexico Section of the American Water Resources Association, and will be held at the Albuquerque Hilton.

The RMGWC planners have solicited papers on all aspects of subsurface water science and engineering. Michael Campana, from the University of New Mexico Department of Earth and Planetary Sciences and president of the New Mexico Section of the AWRA, is serving as general conference chair (505-277-3269). William J. Stone from the New Mexico Environment Department's Ground Water Bureau is serving as technical chair for the conference (505-827-3434), and Douglas Earp, City of Albuquerque Environmental Health Department, is serving as exhibits chair (505-768-2000).

WRRI is one of the co-sponsors of the conference. More information regarding this meeting will follow in the next issue of the *Divining Rod*.

## Assessment program helps evaluate groundwater contamination potential

New Mexico State University's Cooperative Extension Service will release *New Mexico Farm-A-Syst* within the next few months. *Farm-A-Syst* is a farmstead assessment system to evaluate a farmstead's potential for groundwater contamination and also educates users on good farmstead management practices.

Marsha Duttie, one of the members of Cooperative Extension's water quality team, says the program is unique because it combines information on wells, hazardous wastes, household wastes, pesticides, and livestock wastes in one document. Duttie says it also provides a system whereby *Farm-A-Syst* users can rank themselves to determine if they are already doing a good job managing wastes, fertilizers, and petroleum products. She stresses it does not address any in-field practices.

*New Mexico Farm-A-Syst* is based on a program developed by the National Farmstead Assessment

Program and the University of Wisconsin Cooperative Extension Service. It consists of ten fact sheets on various topics related to farmsteads and twelve worksheets which help users assess their farmstead with regard to numerous problems which might affect water quality. The document is easy to read and contains good basic information on improving drinking water quality, making certain water wells are well-designed and well-maintained, and that various chemical products are handled and stored properly. It contains several glossaries related to different subjects covered in the document, a "pesticide leachability" chart and includes a helpful list of contacts.

*New Mexico Farm-A-Syst* will be distributed through the county Cooperative Extension offices and Soil Conservation Service offices. For more information, contact Marsha Duttie or at 505-646-1132 or Craig Runyan at 505-646-1131.

## Cunningham elected treasurer of NWRA board

Wayne P. Cunningham, who serves on WRRI's Water Conference Advisory Committee, has been elected treasurer of the National Water Resources Association Board of Directors. Cunningham, who is an Agricultural Policy Analyst for the New Mexico Department of Agriculture, is the senior member of the Board of Directors, having served continuously on the board for 20 years. He also serves on the NM Water Quality Control Commission and the Western States Water Council.



Wayne Cunningham



## ***New USGS reports focus on groundwater levels in Sandoval County and rainfall/runoff data for Albuquerque***

A new report published by the U.S. Geological Survey, *Groundwater-level fluctuations in the Cochiti Dam-Peña Blanca area, Sandoval County, New Mexico, 1976-89* (Water-Resources Investigations Report 92-4193), indicates that groundwater levels in the Peña Blanca area were affected by high water levels in Cochiti Reservoir during 1985-1988. The groundwater levels in this area were higher and changed less seasonally during these years than they did prior to 1985 and since 1988.

During nearly stable water levels in Cochiti Reservoir, from 1980-1982, the groundwater system was in approximate equilibrium with the reservoir. Water levels in wells in and close to the Rio Grande flood plain typically had seasonal fluctuations related to irrigation and flow in the Cochiti East Side Main Canal. From spring 1985 to spring 1988, however, water levels in the reservoir fluctuated rapidly and typically were higher than the recreation pool level. Water levels in wells in the upland area near the reservoir rose as much as 40 feet. Water levels in

wells in and close to the Rio Grande flood plain and north of the Santa Fe River rose 4 to 7 feet. In wells near Peña Blanca, water levels were near the annual maximum for longer than normal in 1987, then declined in 1988-89 when the water level in Cochiti Reservoir declined to less than 5,350 feet.

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### ***Groundwater levels in the Peña Blanca area were affected by high water levels in Cochiti Reservoir during 1985-1988.***

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Twelve pairs of wells were established to determine the vertical component of groundwater flow in the upper 150 feet of the saturated zone. According to Paul Blanchard, the author of the report, "No substantial upward component of vertical flow was observed at any of the sites."

In another recently released USGS report, rainfall and runoff data from 20 precipitation-gaging and nine streamflow-gaging stations in the Albuquerque metropolitan area are presented for 1984 through 1988. The data include mean daily discharge for selected storms and can be used for the design of flood-control structures and urban runoff modeling efforts.

*Rainfall and runoff data for the Albuquerque, New Mexico, metropolitan area, 1984-1988*, (Open-File Report 92-653) by K. D. Metzker, R. L. Gold, and R. P. Thomas, was prepared in cooperation with the Albuquerque Metropolitan Arroyo Flood Control Authority and the City of Albuquerque.

Copies of the two reports are available for inspection at the District Office, U.S. Geological Survey, 4501 Indian School Rd. N.E., Suite 200, Albuquerque, NM 87110 or at the WRRI library in Stucky Hall on the NMSU campus. For information on ordering the publications, contact the USGS office in Denver, Books and Open-File Reports, (303) 236-7476.

### **"Soil and Groundwater Remediation" workshop slated for July**

The University of New Mexico College of Engineering will hold its third "Soil and Groundwater Remediation" workshop July 14-16 at the Quality Four Seasons Hotel in Albuquerque.

The workshop is intended primarily for scientists, consulting engineers, and practicing hydrogeologists who are involved in

designing, managing, controlling, or evaluating soil and groundwater remediation projects. Emphasis will be placed on theoretical concepts, design procedures, and process selection criteria.

Professors Bruce M. Thomson (UNM), Nirmala Khandan (NMSU) and Adrian Hansen (NMSU) will lead the workshop.

They will also demonstrate computer software for design and analysis of selected Best Available Technologies.

For registration information contact the UNM Professional Engineering Development Office at 800-453-3940 or 505-277-0435.

## Western Coalition of Arid States aims to protect regional interests

A belief that federal standards particularly those affecting ephemeral streams in the arid southwest states should be based on "good scientific data and not arbitrary calculations," is the conceptual basis for a newly formed group of cities and districts that seeks to protect regional water interests. Toward the top of the list of issues being addressed by the Western Coalition of Arid States (WESTCAS) is the assumption by regulatory agencies that all of the nation's waters are fishable and swimmable.

"The members of WESTCAS believe ephemeral or effluent-dominated streams in the arid west should be classified as fishable and swimmable," said George Brinsko, director of Pima County Wastewater Management in Tucson, who serves as president of the coalition. "Our members also believe that regulatory criteria, guidelines, and standards should be based on good scientific data and common sense practices rather than on arbitrary calculations."

WESTCAS was not established to compete with existing water organizations such as the National Water Resources Association or the Western States Water Council, noted Brinsko. "We organized to deal with specific issues," he said. The group initially has focused on legislation and funding for increased uses of reclaimed water and potential conflicts between the Clean Water Act and water allocations. Goals of WESTCAS include:

- Present arid states' water quality concerns to federal, state, and local officials in a unified and cohesive manner;
- Encourage development of

water quality criteria/standards appropriate for the arid west ecosystems;

- Inform public officials that management of the total water resource cycle is essential in the arid west, and;
- Advocate legislative and regulatory programs that ensure adequate water quality and quantity are available to all citizens of the arid west.

The organization has an office in Washington, D.C. and provides an opportunity for members to have a say in certain water matters by drafting proactive legislation and addressing water quality and water supply language on federal, regional, state and local levels.

David Stoliker, the New Mexico state coordinator for WESTCAS, says a number of New Mexico municipalities are members of the organization. There are several levels of membership including a special category for regulatory agencies and commissions, as well as an affiliate membership with no voting rights. For more information on joining WESTCAS, contact Stoliker c/o City of Santa Fe, P.O. Box 909, Santa Fe, NM 87504, 505-473-7250.

*(Editor's note: information regarding WESTCAS was taken from WESTCAS brochures, a phone conversation with David Stoliker, and from an article appearing in U.S. Water News.)*



## UNM offers short course

The University of New Mexico College of Engineering will be presenting its popular short course, **Hydrologic Modeling and Drainage Criteria** on October 20-21.

The course, taught by Clifford Anderson, drainage engineer for the Albuquerque Metropolitan Arroyo Flood Control Authority and Richard Heggen, associate professor of Civil Engineering at UNM, will cover hydrologic modeling and drainage criteria using the AHYMO program. The course will focus on Southwest hydrology and includes case studies and hands-on activities.

The course will be held on the UNM campus and costs \$325, including all class materials, the AHYMO computer program, parking passes, lunches and breaks for both days.

For more information or to register for the workshop, call Ellen Winchester at 277-0435 or (800) 453-3940 or FAX 277-5585.

## Conservation workshop to be held Sept. 19

The Rocky Mountain Section of the American Water Works Association will hold a water conservation workshop in Albuquerque September 19, 1993. The day-long workshop will feature a number of presentations covering topics such as implementing a water conservation program, using computer programs to design a conservation plan, and retrofitting, as well as discussions of case studies.

More information on the workshop will appear in the August issue of the *Divining Rod*.

## Gross named Tech's distinguished researcher

*Dr. Gerardo Gross arrived at Tech in 1960 to investigate the electrical properties of ice, a subject he says he continues to study "more intensely than ever."*



Dr. Gerardo Gross, professor of geophysics and senior research geophysicist at New Mexico Tech, has been named the recipient of Tech's Distinguished Research Award for 1993.

Gross is being honored for a lifetime of significant research accomplishments in two unrelated fields—electrical properties of ice and groundwater recharge.

Gross arrived at Tech in 1960 to investigate the electrical properties of ice, a subject he says he continues to study "more intensely than ever." Gross began his studies based on the discovery in the 1950s by then Tech President E. J. Workman that electrical charge begins to build in thunderclouds at the same time as ice begins to form in those same clouds.

Today, Gross continues to clarify the processes by which

charge is separated in thunderclouds and the effect of contaminants, both naturally occurring and man-made, on these processes. He points out that since thunderstorms are a fundamental part of weather patterns, a change in thunderstorms in one area due, for instance, to air pollution, may cause a change in weather around the world.

In recent years, Gross's ice research has taken a second direction in helping to interpret the geologic record of polar ice caps. Gross calls polar ice caps "the archives of past climatic conditions," and says they provide a chronicle of changes in the world's climate dating back thousands of years.

Another line of Gross's research spans almost as many years as his ice studies at Tech. In 1969, Gross took over research begun at

the university which centers on the use of tritium, the radioactive isotope of hydrogen, to trace the movement of groundwater in the Roswell Basin. This research has helped lead to an understanding of the fundamental behavior of aquifers.

In addition to his research, Gross has taught a variety of classes at Tech, ranging from geophysics to hydrology to German. He also initiated a class at the college on the history of science and technology because he believes that the formal study of that history is an essential subject for everyone involved in scientific and technical fields.

Gross, who has announced his retirement at the end of 1993, says he hopes to continue his ice-related research.

*-Kimberly Eiland  
Tech Public Information Office*

## Congratulations, Ellie!

WRI Administrative Secretary Ellie Maese Duran recently celebrated her 15th anniversary with New Mexico State University. Ellie is shown at right with her father, Cipriano Maese and her husband, Danny Duran, during the 1993 NMSU Employee Service Awards ceremony.

Before coming to WRI in 1986, Ellie worked for the Chicano Studies Program, Auxiliary Services, and the Physical Science Laboratory on campus. Her enthusiasm, positive attitude and polished secretarial skills have kept the institute operating smoothly and efficiently.



## Lopez named Assistant State Engineer

For more than 37 years (since Steve Reynolds' appointment as State Engineer), the New Mexico State Engineer Office has functioned without an Assistant State Engineer, although state statute provides for such positions. In January State Engineer Eluid Martinez named Donald T. Lopez as Assistant State Engineer.

Martinez decided an Assistant State Engineer was necessary so the general public and agency staff could have access to the highest level administrative response at times the State Engineer may be unavailable. In a memo issued to SEO staff, Martinez noted, "During my absence from the state or the Santa Fe office as appropriate, Mr. Lopez will direct the staff and activities of the office of State Engineer. Mr. Lopez will also handle special projects as assigned by the State Engineer."

Lopez will carry out the duties of the position along with his present responsibilities of Chief of the SEO Technical Division. He holds a bachelor's degree in Civil Engi-

neering from New Mexico State University and a master's degree in the same field from the University of New Mexico. Lopez has been employed by the SEO for over 14 years and had prior service with the U.S. Bureau of Reclamation and the U.S. Army Corps of Engineers. He has been a registered professional engineer since 1972.



*Donald T. Lopez*

## Water erosion formula revised

The U.S. Department of Agriculture has revised the equation it uses to predict soil loss from water erosion and expects to start using the new version by late summer. The Universal Soil Loss Equation has been a primary tool in conservation planning worldwide since it was first published in 1959. It considers rainfall and runoff, soil erodibility, slope and steepness of the land, plant cover and management, and landowner practices to predict average annual soil erosion. The revised equation, known as RUSLE, uses new and more specific data for rainfall, seasonal changes such as freezing and thawing, and such factors as crop growth, crop residue cover and decomposition, surface roughness and soil moisture.

RUSLE will be ready for use in some field offices where water erosion is a major problem by August. The SCS will develop information specifically for each local field office and correlate the information across state and regional boundaries before it begins using the updated version in field offices.

**Tom Bahr, Director, New Mexico Water Resources Research Institute**  
**Leslie Blair, Editor**

### the diving rod

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