

divining rod

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Two New Mexico projects recommended for USGS funding

Of 30 proposals reviewed under the new U.S. Geological Survey Western Regional Competitive Grants Program, 6 projects have been recommended for funding—2 of which include participation by New Mexico researchers.

In this initial year of funding, the USGS has made available \$805,000 to each of four regions to distribute awards on a competitive basis within each region. The Western region includes New Mexico, Alaska, Oregon, Washington, California, Idaho, Utah, Nevada, Arizona, Wyoming, Colorado, Texas and Oklahoma.

One project slated for funding, *Institutional Adjustments for Coping with Prolonged and Severe Drought in the Rio Grande Basin*, is a two-year project involving researchers from NMSU, Colorado State University, Texas A&M, University of New Mexico and Alfred University.

This project will characterize probable drought scenarios and the capabil-

ity of existing infrastructural and institutional systems to respond to drought. Results will assist water managers with their drought contingency planning and help researchers focus on water management issues during drought.

The project's principal investigator is Dr. Frank Ward, an economist from NMSU. He'll be joined by two other NMSU faculty: hydrologist Phil King and economist Tom McGuckin. UNM law professor Chuck DuMars will participate as will several master's and doctoral students.

A second recommended project, *Effectiveness of Irrigation District Conservation Price Programs*, is a collaborative project with researchers from Washington State University, University of Nebraska and New Mexico State University.

The project will study irrigation districts that provide water to 9.2-million acres of agricultural land. Districts have been encouraged by the

U.S. Bureau of Reclamation and others to implement conservation measures, and in particular, conservation oriented pricing policies. However, irrigation districts and farmers have expressed strong concern and a reluctance to adopt conservation pricing stemming from their inexperience with such programs and their uncertainty about the impacts on their water use and economic well-being.

This research will develop empirical evidence of farmer response to conservation oriented pricing of water by irrigation districts in the western U.S.

NMSU economics professor Tom McGuckin is a principal investigator on the project and has developed an extensive database on irrigation district crop production and water use. McGuckin also has worked on designing and implementing irrigation district conservation rates and the effectiveness of residential water price and

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U.S. Geological Survey Western Regional Competitive Grants Program FY96-97 Recommended Proposals

Institutional Adjustments for Coping with Prolonged and Severe Drought in the Rio Grande Basin - New Mexico, Colorado, Texas

One Thousand Years of Colorado River Flow: The Proxy Record of Oxygen Isotopes in Maine Mollusks from the Colorado Delta - Arizona, California

Enteric Pathogen Reduction by Artificial Wetlands - Arizona, California, Hawaii

Near-Surface Hydrology of the Eastern Palouse Region - Idaho, Washington

Effectiveness of Irrigation District Conservation Price Programs - Washington, New Mexico, Nebraska

Paleohydrological and Hydro-Climatological Analysis of the Magnitude and Frequency of Large Floods in the Verde River Basin, Central Arizona - Nevada, Arizona

Students Display Water Projects at 44th New Mexico Science and Engineering Fair

Secondary students from throughout New Mexico gathered at New Mexico Tech in early April for the state science fair competition. The New Mexico WRRRI presented first and second place certificates and savings bonds for water-related research in both junior and senior divisions.



In the Junior Division, first place and \$100 savings bond was awarded to Katherine T. Royer, an 8th grader at Annunciation School in Albuquerque. Hoping to become an environmental scientist someday, Katherine is off to a great start with the knowledge she acquired from her project, *Do You Know What's in Your Drinking Water? Part III: The Influence of Arsenic and Our Changing Water Quality*.

She found, as she hypothesized, that arsenic levels continue to increase



in Albuquerque's water supply with the city's southwest quadrant having the highest levels. Next year, she may look at other contaminants in Albuquerque's water or participate in a group project.

Second place went to Rebecca Woodard of San Miguel School, Socorro, for her project, *Comparison of Irrigation Methods*. The project tested the effect of three irrigation methods; drip, surface and sprinkle, on the production of Bluelake beans. In her study, Rebecca found the sprinkle system produced the best results, although each of her trials produced similar results.

Rebecca says she will participate in next year's fair but is undecided on a project. She received a \$50 savings bond and certificate from the WRRRI along with several other science fair awards for her project.

Senior Division first place went to Jennifer Thompson of Farmington for her project, *Refuse Reclamation of Saccharomyces cerevisiae in Creating a Flocculant Aid for Wastewater*. Her project's goal was to improve methods for removing lead from wastewater using cationic polyelectrolytes and the cell walls of lyced *S. cerevisiae* yeast.

She found the lyced cells did increase the polyelectrolytes filtration method by 15%. Polyelectrolytes by themselves result in a 77% efficiency, so the filtration method using the lyced *S. cerevisiae* cell walls in conjunction with the polyelectrolytes resulted in a 92% efficiency. Refuse reclamation of *S. cerevisiae* provides a practical solution to treating lead-contaminated wastewater.

In the fall, Jennifer will attend either Ft. Lewis College in Durango or New Mexico Tech where she will study environmental engineering. She hopes to continue her musical aspirations as she's also a talented pianist.



Justin Alexander, a senior at Lovington High School, presented a project he has worked on throughout high school, *Environmentally Safe Wastewater Management III*.

Previously, Justin had constructed a wastewater treatment plant able to process raw sewage without chemicals, yet maintain environmental safety. However, the resulting nitrate levels were too high. By introducing Matua grass into the process, Justin was able to lower nitrate levels and produce wastewater that was cleaner and had fewer bacteria and viruses.

Justin has received several scholarship offers from New Mexico universities and will study agriculture and a water-related field. He received second place in the Senior Division from the WRRRI and a \$50 savings bond.



Photos clockwise from top left: K. Royer, J. Thompson, J. Alexander and R. Woodard.

Genetics used to solve Rio Grande problems

What does genetics have to do with river system management? A lot, says Phil King, an associate professor in the civil, agricultural, and geological engineering department at New Mexico State University.

King is using a genetic algorithm to pinpoint strategies that will help water managers get the most economic benefit from the Rio Grande.

King has studied genetic algorithms, mathematical processes based on Darwin's theory of natural selection, since 1991. He is now applying this technique to help optimize water management in the Rio Grande. King said the same idea of evolution choosing certain factors that allow species to survive over time also can be applied to the decisions involved in water management for a system as complex as the Rio Grande.

For this project, King is looking only at the New Mexico portion of the Rio Grande Project, from Elephant Butte Reservoir to the Texas border. One of the reasons King has been working on the project is that the Rio Grande is a multipurpose, complex reservoir river system undergoing changes with new demands being made on the available resources.

For instance, El Paso is now using river water for domestic use, which raises some serious questions not only about supply, but also water quality. Already, the Rio Grande has many purposes, such as supplying water for irrigation, hydropower generation, recreational uses, and municipal and industrial uses.

In addition, New Mexico water managers must be sure that compact water requirements for Texas and Mexico are delivered.

There are many factors that determine water allocation along the Rio Grande. Water rights, system capacities, and seasonal demands such as

irrigation and recreation affect water outflow, and the inflow from the north varies seasonally and annually.

Balancing the inflow and outflow and trying to fulfill the needs of the different users along the river is a complex problem that has a virtually infinite number of solutions.

King said there are so many factors that contribute to a river system's supply and demand flows that it is basically impossible to optimize such systems with conventional techniques.

This technique uses the power of natural selection to find optimum releases of water for varying supplies and demands.

Traditional approaches to computer assisted water resources management generally takes one or two approaches. Simulation models use detailed hydrologic representations of the system and allow the user to try various strategies. However, the simulation approach offers little hope of finding the best solution.

Optimization techniques, such as linear programming or dynamic programming, can find the "best" solution to a simple system, but for real-world systems, the complexity of the system requires gross simplification, resulting in a model that misses much of the important detail of the system's behavior.

King is combining detailed hydrological and economic simulation with an optimization technique to provide more useful results to water resources managers.

The optimization technique King is applying is one of a class of

methods known as genetic algorithms. This technique uses the power of natural selection to find optimum releases of water for varying supplies and demands.

Just as nature uses natural selection over many generations to fit living organisms into ecological niches, genetic algorithms can be used to selectively "breed" possible water management solutions in a computer.

The fitness of each possible solution is evaluated by the detailed hydrologic/economic model of the system, and those that have better fitness—based on economic return to the system users—are combined over many generations.

Eventually an optimal solution evolves, but it may take several million simulations of the system to breed this optimum.

King, graduate students Hazem Fahmy and Mark Wentzel, and agricultural economics professor Frank Ward used data from the Rio Grande Project to develop a hydrologic/economic model of the New Mexico portion. Management decisions were then optimized for one year of operation based on actual inflow records using genetic algorithms.

"Thus far, we have demonstrated the applicability of genetic algorithms to river-reservoir management optimization," King said. "This has been one of the classic challenges in water resources management, and the (genetic algorithm) works very well. Our next step will be to work with larger, more complex systems that already have detailed simulation models working."

The project, funded by the New Mexico Water Resources Research Institute, concluded last year and its results are reported in WRRRI Report No. 295.

Water Quality Reports Issued by USGS

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.

◇ **Water quality and benthic macroinvertebrate bioassessment of Gallinas Creek, San Miguel County, New Mexico, 1987-90** by H.S. Garn and G.Z. Jacobi (WRIR 96-4011) - Upper Gallinas Creek serves as the public water supply for the City of Las Vegas. This report evaluates the baseline water-quality characteristics of Gallinas Creek and spatial differences in water quality and aquatic macroinvertebrates.

Both the water-quality and biological assessments indicated that three upstream sites tested in the Gallinas watershed had good biological conditions and were nonimpaired, whereas the two downstream sites tested had lowered biological conditions and were slightly impaired.

◇ **Water-quality assessment of the Rio Grande Valley, Colorado, New Mexico, and Texas—Occurrence and distribution of selected pesticides and nutrients at selected surface-water sites in the Mesilla Valley, 1994-95** by D.F. Healy (WRIR 96-4069) - Surface-water samples were collected during May-June 1994 and January 1995 at 19 sites in the Mesilla Valley on the main stem of the Rio Grande, agricultural

drains, and discharge flumes of two wastewater treatment plants.

The main purpose of the study according to its author, Denis Healy, "...was to get a snapshot picture of the pesticide and nutrient concentrations in these surface waters during the irrigation and nonirrigation seasons to provide basic data for federal, state, and local managers in the area." Results indicate the presence of pesticides in the surface water of the Mesilla Valley is erratic and highly dependent on the location, timing, and method of application. As many as 38% of the pesticide detections may be attributed to sources upstream from the Mesilla Valley or to nonagricultural use within the valley.

◇ **Concentrations and loads of selected trace elements and other constituents in the Rio Grande in the vicinity of Albuquerque, New Mexico, 1994** by T. Kelly and H.E. Taylor (OFR 96-126) - Sampling was conducted at seven sites upstream from, in, and downstream from metropolitan Albuquerque during high-flow and low-flow conditions during 1994.

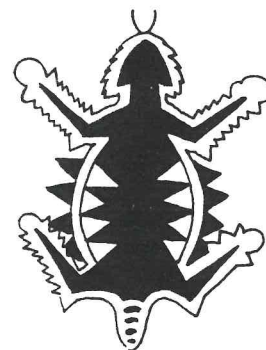
Trace-element concentrations historically have been greater than the maximum permissible concentrations allowed by water-quality standards established for the Rio Grande by the Pueblo of Isleta, located downstream from Albuquerque, and the New Mexico Environment Department. It is not known if these concentrations are due to sources from the Albuquerque metropolitan area or are from natural or other sources outside Albuquerque.

Todd Kelly, the author of the report, said that "this uncertainty is due in part to current standard sampling and laboratory methods that may not detect small differences in concentrations among sampling sites on the river." Study samples were analyzed using the lower-minimum reporting limits, separately for trace elements

dissolved in water and for those contained in suspended sediment.

◇ **Summary of the San Juan structural basin regional aquifer-system analysis, New Mexico, Colorado, Arizona, and Utah** by G. W. Levings, J.M. Kernodle, and C.R. Thorne (WRIR 95-4188) - The San Juan structural basin, which covers an area of about 21,600 square miles in the Four Corners area contains a multilayered aquifer system. This report summarizes data presented in 13 reports published as a result of the study.

Sedimentary rocks of Triassic through Tertiary age were emphasized because the major aquifers in the basin are in these rocks. The geological framework, geochemical analysis, and computer simulation analysis will be useful for future evaluation of the regional groundwater system.



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nonprice conservation programs. He and his co-investigators have worked together previously on similar conservation pricing programs.

The two-year project will provide training for two master's level research assistants in economics, one at WSU and the other at NMSU.

It is anticipated that the USGS will approve the recommended proposals during the month of August so that projects can begin September 1, 1996.

WRRI issues three new technical reports

Each project funded through the WRRI culminates in a technical completion report published by the institute as part of its technical report series. These reports can be obtained by contacting the WRRI at (505) 646-1813 or writing to WRRI, Box 30001/ Dept. 3167, Las Cruces, NM 88003 or by placing an order through WRRI's home page at <http://wrri.nmsu.edu>

◇ Report No. 296 - Wetting Front Instability in the Vadose Zone of New Mexico's Soils by J.M.H. Hendrickx and T-M Yao

New Mexico Tech researcher Jan Hendrickx and his graduate student, Mike Yao, conducted field experiments in the Sevilleta dunes north of Socorro. After water application, the depth and stability of the wetting front was observed by digging an observation pit. Contrary to unstable wetting front theories, no instabilities were encountered. The researchers then moved to the laboratory where they conducted lysimeter experiments to validate current wetting front instability theories with four grades of sieved and air-dried perlite and quartz sand.

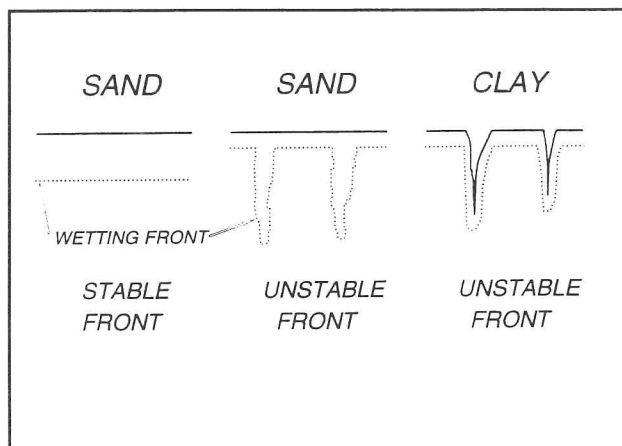
Laboratory results were used to develop a simple approach for evaluating wetting front stability in dry soils. Hendrickx's approach distinguishes stability criteria for wetting events that cause a high, intermediate, and low infiltration rate. The study applied the stability criteria to a case study from the Sevilleta dunes.

The study's most important conclusion was that the occurrence of unstable wetting not only depends on soil type, but also on the amount and intensity of the precipitation or applied irrigation water. This observation

makes it possible to use readily available soil data and rainfall data (amount and intensity) to predict whether or not unstable wetting will occur in a particular soil.

◇ Report No. 298 - Biodegradation of Trihalomethanes and Other Halogenated Aliphatic Compounds by G.B. Smith

NMSU biologist Geoffrey Smith set out to screen samples from groundwater, wastewater and pure cultures of bacteria, for biological dehalogenation



Graphic visualization of a stable and unstable wetting front in a homogeneous sand soil and a typical wetting front in dry clay soil from WRRI Report No. 296.

activity and to identify the metabolic and genetic bases of these processes.

In his report, Smith documents biological dechlorination of chloroform, dichloromethane and chlorofluorocarbons (CFCs) in both wastewater and aquifer samples. Genetic probe analyses of dichloromethane degraders showed that bacteria grew in response to contaminant exposure, complementing data obtained from biodegradation assays. Thermodynamic calculations were used to predict the pathway for biological dehalogenation reactions, particularly for the CFCs.

Information from these studies was used to develop a two-stage anaerobic bioreactor to mineralize and detoxify contaminants such as chloroform. Results support the contention that biological dechlorination can be stimulated under diverse environmental conditions and can be used to remediate or prevent water contamination by halogenated aliphatic compounds.

◇ Report No. 299 - Expression and Function of a Highly Conserved Water Stress Protein by P.J.

Lammers, J. Bongiani, and S. Mori

New Mexico agriculture relies on irrigation to avoid water deficit stress in crops. Targeted manipulation of plant genomes for enhanced salinity and water deficit tolerance through genetic engineering requires a sophisticated understanding of plant water stress proteins and their genes.

Photosynthetic cyanobacteria, the free-living relatives of chloroplasts, share with higher plants at least one ubiquitous water stress protein, dehydrin. The biochemical function of dehydrin is still unknown. The NMSU researchers have cloned and sequenced the cyanodehydrin gene and shown it to be distantly related to the plant

dehydrins with respect to primary structure. These results lay the foundation for a genetic analysis of dehydrin function in the cyanobacterial model system that currently is not possible in higher plants. Ultimately, these studies will help us understand how cyanobacteria survive desiccation and perhaps lead to improvements in water and salt stress in agricultural plants.



41st Annual New Mexico Water Conference Integrated Water Resources Management: Northwestern New Mexico as a Case Study

September 19-20, 1996
San Juan College, Farmington
Preliminary Program

Overview of the Colorado River Region

Dividing the Waters of the Colorado: A Century of Achievement - **Al Utton**, University of New Mexico

Overview of Important Upper Colorado River Basin Issues - **Phil Mutz**, NM Interstate Stream Commission

Geology and Hydrogeology of Northwestern New Mexico - **Steven C. Semken**, Navajo Community College

Water Resources Issues of the Four Corners Region

The New Mexico Perspective - **Tom Turney**, New Mexico State Engineer Office

The Colorado Perspective - **Jennifer Gimbel**, Colorado Attorney General's Office

The Navajo Nation Perspective - **Stanley Pollack**, Navajo Nation Department of Justice

Current Bureau of Reclamation Policies Affecting the Colorado River Region - **Charles Calhoun**, U.S. Bureau of Reclamation

Current Issues Impacting the Colorado River Region

Overview of Endangered Species Recovery Efforts in the Upper Colorado River Basin - **John Hamill**, U.S. Fish and Wildlife Service

Panel: Perspectives on ESA Recovery Efforts

Jim Brooks, U.S. Fish and Wildlife Service

Dick Gerding, Tansey, Rosebrough, Gerding and Strother

Cindy Murray, Public Service Company of NM

Tom Pitts, San Juan River Recovery Program

David Propst, NM Department of Game and Fish

Patrick Simpson, NM State Engineer Office

Water and Extractive Industries

Environmental Concerns and Regulation of the Oil and Gas Industry - **Bill Olson**, Oil Conservation Division, NM Department of Energy, Minerals & Natural Resources

Coal Mining, Power Generation and Water Resources - **Charles Roybal**, BHP Minerals

Oil, Natural Gas and Groundwater in the San Juan Basin - **Ron Broadhead**, NM Bureau of Mines and Mineral Resources

Groundwater Issues Related to Coalbed Methane Production, Northern San Juan Basin, New Mexico and Colorado - **Steve Finch**, John Shomaker & Associates, Inc.

Water Supply and Regional Water Planning

Regional Water Planning: Institutional Arrangements and Politics in Northwestern New Mexico - **Richard Cheney**, NM Interstate Stream Commission

Regional Water Planning Cooperation in Times of No Water

Mike Hamman, City of Santa Fe, Water Services Division

Maryanne Reilly, Santa Fe County Attorney's Office

Sherry Tippett, City of Santa Fe, Attorney's Office

Panel: Views on the Animas/La Plata Project

Jim Dunlap, National Rural Water Association

Frank E. (Sam) Maynes, Maynes, Bradford, Shippis, and Sheftel

Scott McElroy, Greene, Meyer, and McElroy, P.C.

Lori Potter, Sierra Club Legal Defense Fund

Pat Schumacher, U.S. Bureau of Reclamation

Liz Taylor, Sheehan, Sheehan and Stelzner, P.A.

At this year's Annual New Mexico Water Conference to be held in Farmington on September 19-20, participants have the option of attending one of three field trips on Wednesday afternoon, September 18, 1996. Tours are scheduled for the Four Corners Power Plant, the Navajo

Indian Irrigation Project, and the Animas/La Plata Project. Participants are urged to register as soon as possible for one of the tours. You can register for the conference through WRR's home page at <http://wrr.nmsu.edu> or by contacting Cynthia Rex at email crex@wrr.nmsu.edu.

News Briefs

UNM's Water Resources Administration Program will offer *Water Allocation in an Era of Increased Competition*, Public Administration 571 this fall on Mondays and Wednesdays from 4:00-6:30 p.m. The course will focus upon the issue of increased competition for water and upon public management policies and instruments for allocating water under highly competitive conditions. The course will examine the fundamental questions underlying these debates: How severe is the competition? What are alternative ways of allocating water under competitive conditions? How can we make a good decision? The course includes a series of communications classes on writing and critical analysis. Instructors include F. Lee Brown, Olen Paul Matthews, John W. Shomaker and Michele Minnis. Contact Kerstin Lynam at (505) 277-7759 for more information.

WRRI Program Reauthorized - Congress passed and the President signed the bill that included reauthorization of the state Water Resources Research Institutes program for the next five years. It is too early to tell what, if any, funds will be appropriated for next fiscal year. However, reauthorization is a significant milestone for the program.

The Natural Resources Conservation Service has announced that Debra E. Hughes of Carlsbad has been named executive director by the New Mexico Association of Conservation Districts. As executive director, Hughes will organize, coordinate and promote activities of the Association and develop partnerships to conserve and use wisely the state's natural resources. Gary D. Wooten, former resource conservationist in Rio Rancho has been named wildlife biologist with the NRCS in Albuquerque. Wooten will lead the agency's wetlands programs and offer expertise in wildlife habitat management.

USGS Plans Additional \$1 Million this year for groundwater studies in the Middle Rio Grande Basin. Considering the aquifer system in the Middle Rio Grande Basin as a "critical aquifer," the USGS announced in late May that it would direct an additional \$1 million this year in support of groundwater resources in the Middle Rio Grande Basin between Cochiti Dam and San Acacia. The new studies, expected to require 4-5 years for their completion, are intended to provide a broader regional understanding of the aquifer system.

Reports Available

Severe Sustained Drought - Managing the Colorado River System in Times of Water Shortage is available from the Powell Consortium for \$15.00 per copy plus shipping & handling. The report includes 13 articles reprinted from the *Water Resources Bulletin* on sustained drought including hydrologic scenarios, institutional options for dealing with drought, social implications, environmental effects, economic impacts and mitigating impacts of severe droughts. For copies, contact Arizona Water Resources Research Center, 350 North Campbell, University of Arizona, Tucson, AZ 85771; (520) 792-9591; e-mail wrrc@ccit.arizona.edu

USGS has released two general-interest publications - A new USGS circular summarizes for the public what is known about nutrients in the nation's waters, and what that means to them. *Nutrients in the Nation's Waters—Too Much of a Good Thing?* by D.K. Mueller and D.R. Helsel (USGS Circular 1136) can be obtained at no charge from the USGS, Branch of Information Services, Box 25286, Denver, CO 80225 or view it on the Internet at <http://www.wreres.usgs.gov/nawqa/CIRC-1136.html>. A new USGS fact sheet, *Nitrate in Ground Waters of the United States—Assessing the Risk*, provides a summary and national map of nitrates in groundwater. Copies of the fact sheet can be requested from the USGS National Information Center @ 1-800-426-9000 or viewed on the Internet at <http://www.wreres.usgs.gov/nawqa/FS-092-96.html>

WWW Water Directory - The Center for Environmental Studies at Florida Atlantic University and the Universities Water Information Network are collaborating to create the *Directory of Water Resources Organizations in North America* and the *Directory of Water Related Training Opportunities in North America for the Inter-American Water Resources Network (IWRN)*. The IWRN is a network of people and information dedicated to improving water management in the Western Hemisphere. These directories will be publicly available on the World Wide Web and will be fully searchable with hotlinked email addresses and URL's. You can include your organization's information in these directories by filling out the on-line forms at <http://www.uwin.siu.edu/FORMS/> or by requesting that these forms be mailed to you. Contact Faye Anderson, fax 618-536-7571; email faye@uwin.siu.edu

Drought increases water conservation activities

The hot topic in New Mexico's water news this year is the drought, which has significantly affected several water suppliers and many water users. According to Alice Darilek of the State Engineer Office's Water Conservation Program, the program has experienced significantly heightened interest in its conservation brochures and other informational materials. Several communities have asked for technical assistance in planning conservation related ordinances, programs and community events.

Santa Fe, Las Vegas and Ruidoso, among other cities, have been affected significantly by the drought and their water supplies are critically low. Las Vegas had enacted a phase of its ordinance which restricts all outdoor watering; but because of recent rains, the city has gone back to allowing watering once a week. Santa Fe has called for all commercial and residential water customers to reduce

their water use from last summer by 25 percent. Users not complying with the reduction mandate are subject to large surcharges and penalties.

Darilek is interested in gathering information about drought impacts experienced by water suppliers and users and the actions that have been taken in response to those impacts. Those having such information should contact her at 1-800-WATERNM, the SEO's toll-free number.

Because of the drought and the need to conserve water on a long-term basis, state government has initiated several conservation activities. Program staff have been working with the purchasing, contracting and building services functions of state government to incorporate water conservation into those functions.

In July, the governor sent a memo to all cabinet secretaries urging them to reduce water use in their agencies to help Santa Fe maintain an adequate water supply during the drought.

The Water Conservation Subcommittee of the Interstate Stream Commission has begun work on developing recommendations on water



'96 drought continues to take its toll. (photo by J. Victor Espinoza)

conservation guidelines for agricultural water right applicants.

Several opportunities for learning more about conservation efforts are being offered around the state including a two-day conference, August 15-16, in Las Cruces. Contact Elvia Cisneros of NMSU's Agricultural Engineering Program, (505) 646-3802 for more information.

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

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