the divining rod

New Mexico Water Resources Research Institute

80-2 SPRING 1980

Twenty-fifth

Water Conference A Success

Registration

The 25th Annual New Mexico Water Conference was held on April 24-25, on the Las Cruces campus of New Mexico State University. Hosted by the New Mexico Water Resources Research Institute, the event drew approximately 125 participants from throughout the southwestern United States. The central theme was "A Quarter Century of Water Research."

Following the conference theme, the April 24th opening sessions covered the history and accomplishments of the past 25 years of New Mexico water research. Speakers included Ralph Stucky, founder of the conference, and the first institute director; Steve Reynolds, New Mexico State Engineer; and Eldon Hanson, NMSU professor emeritus of agricultural engineering.

Current projects discussed in the afternoon sessions on April 24th included: "Salinity Research--An International Perspective" and "Computer Modeling of Groundwater Flow." During the same session, Frank DuBois, New Mexico Department of Agriculture, reported on "160-Acre Limitation: Current Status"; Jim Daniel, U. S. Geological Survey, described current activities of his agency; and Marvin Wilson and Bill Melton, NMSU agronomists, discussed "Water Conservation through Plant Breeding (Alfalfa)."

The final conference session on April 25th covered future water research directions. Speakers included: Col. Bernard Roth, U. S. Army Corps of Engineers; Larry Kehoe, Secretary of the New Mexico Energy and Minerals Department;

(Continued on page 6)

Display Area.

Research Highlights

Breeding Alfalfa

According to Dr. Marvin Wilson, a research agronomist with New Mexico State University's Agricultural Experiment Station, his current research with Dr. Bill Melton would be made easier if more were known about water management. The agronomists have been working for two years on the problem of improving alfalfa production under less-than-optimum conditions. Because water is frequently the limiting factor of New Mexico's agriculture, better ways of utilizing the limited supply must be found. If a farmer knows he will only have 30 acre-inches of water for the season, would it be better to apply a few heavy irrigations, or a larger number of lighter irrigations, distributed over the season? These are some of the questions which need to be answered, since very little research as been done to determine the best distribution of water under such circumstances.

The forage yield of alfalfa is generally considered to be proportional to the water available. The crop is a high water user, although there have been reports which commented on the drought resistance of alfalfa. These apparently conflicting conclusions indicate that genetic manipulation of alfalfa might produce some varieties which would perform better than others under conditions of moisture stress.

The importance of this potential has been emphasized by increased energy costs for pump irrigation, laws limiting the amount of water which can be pumped, and drought conditions limiting the availability of surface water and recharge of the water table.

The low prices for certain grain crops and high hay prices indicate that alfalfa should be re-evaluated as a dryland crop. Recent plantings in the dryland farming areas in Quay County, New Mexico, gave preliminary indications that alfalfa may provide four to five times the gross dollar returns as wheat under current prices. Research might provide better varieties for dryland conditions and increase the acreage of dryland alfalfa production.

Wilson and Melton have determined that there is significant genetic variability among varieties of alfalfa and within varieties as well. They have tested over twenty varieties in greenhouse and field studies for productivity at various moisture levels and for drought tolerance. The most promising individuals from these tests were cross-bred and their progeny are now being tested. Field plantings have been made in Las Cruces, Artesia, and San Jon, involving 24 varieties and 40 germplasm sources under three

Harvesting Alfalfa Plants

Research Notes (Continued)

irrigation regimes (16, 48, and 80 acre-inches), except at San Jon, which is a dryland location.

The results to date indicate that all varieties do not perform the same under the various moisture regimes. One variety might be a relatively high producer under all water conditions. But others will do well with one regime, different on a second, and poorly on a third. This indicates that there is some evidence that breeding for genetic drought resistance may be possible. Although there has been considerable study of drought tolerance of different crops, such as wheat and sorghum, Wilson believes that no one has tried to breed to improve yield under limited moisture conditions. The progenies of selected plants will be evaluated as this research continues. The main goal is to determine if an alfalfa plant breeding program is feasible.

If a variety can be developed that will perform well under irrigation with 40 to 45 acre-inches of water, the amount of water required for New Mexico's alfalfa crop could be reduced by approximately 400,000 acre-feet.

John W. Clark Chair Lectures

In honor of the late Professor John Clark, New Mexico State University established a distinguished professorship entitled the "John W. Clark Chair" which was announced at the 1979 New Mexico Water Conference. A search committee was formed to identify outstanding candidates for the position.

For the Fall Semester of 1980 the distinquished "Chair" will be replaced by a lecture series bringing in nationally prominent authorities in the following areas:

*Water Rights and Legal Aspects of Water Management
*Economics of Water Resources Development
*Water Quality Management
*Groundwater Hydrology
*Water Conservation in Semi-arid Regions.

These lectures will be presented in conjunction with the Water Resources Development class of the Department of Civil Engineering at New Mexico State University. More details will follow in coming issues of the Divining Rod.

Professor Clark

WRRI A Leader In

State

Annual Allotme

Appropriation

For the past two years, WRRI has been among the top competitors nationally for matching grant funds from OWRT. This year WRRI requested and received an additional $120,000 from the State Legislature for use as state matching funds for this program and others.

We have again been successful in competing for Federal Grants. Had it not been for this supplemental appropriation, we would have been unable to accept the Federal funds. The $120,000 has now been fully committed to these projects.

Interstate Stream Commission

The New Mexico Interstate Stream Commission will again be awarding grants from the Water Research, Conservation and Development Fund.

The WRRI can serve as a clearinghouse for proposals where the investigator would like us to pre-review the proposal and make suggestions for improvements. Proposals should be in our hands no later than August 15. The Commission will probably meet to review the proposals in early October.

The following projects have been approved by the WRRI Program Development and Review Board and are scheduled to start this fall, pending final approval by OWRT of the Federal portion of the program:

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PRECONDITIONING COTTON TO IMPROVE WATER USE EFFICIENCY AND CONSERVE IRRIGATION WATER. Investigator: James L. Fowler, New Mexico State University.

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SODIUM SEALED MINIWATER SYSTEM FOR CROP PRODUCTION WITH LIMITED RAINFALL. Investigator: Dale Fuehring, New Mexico State University, Plains Branch Station.

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DISINFECTION OF WASTEWATER. Investigator: Robert T. O'Brien, New Mexico State University.

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EFFECTS OF SALINE WATER ON NITROGEN FIXATION BY RHIZOBIUM MELILOTI IN ALFALFA. Investigator: James L. Botsford, New Mexico State University.

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EFFECTS OF DECREASED WATERING ON CROP YIELDS, PHASE II. Investiga-

Research Support

ent Program

tor: Theodore W. Sammis, New Mexico State University.

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EVALUATION OF SEDIMENTS IN THE MIDDLE RIO GRANDE AND CABALLO AND ELEPHANT BUTTE RESERVOIRS AS A POTENTIAL SOURCE OF TOXIC MATERIALS. Investigators: Thomas R. Lynch, Carl J. Popp, and Donald K. Brandvold, New Mexico Institute of Mining and Technology.

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AGRONOMIC EVALUATION OF SALT GRASS (DISTICHLIS SPICATA (L.) GREENE) AS A POTENTIAL FORAGE CROP IN PASTURES IRRIGATED WITH SALINE WATER. Investigator: David G. Lugg, New Mexico State University.

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EFFECTS OF COAL COMBUSTION IN NEW MEXICO ON AIR QUALITY AND SURFACE WATER QUALITY RATON STUDY AREA. Investigators: Carl J. Popp, R. Wayne Ohline, Donald K. Brandvold, New Mexico Institute of Mining and Technology, and Lynn A. Brandvold, New Mexico Bureau of Mines.

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THE IMPACT OF RANGE MANURE MOBILIZATION ON RUNOFF WATER QUALITY. Investigator: Richard A. Cole, New Mexico State University.

Federal

Matching

WRRI is pleased to announce two new matching grants from OWRT. The first is to Daniel P. Stephens, New Mexico Institute of Mining and Technology, and Shlomo P. Neuman, University of Arizona, for "In Situ Determination of Hydraulic Conductivity in the Vadose Zone Using Borehole Infiltration Tests: A Regional Proposal." The second grant is to Robert R. Lansford, New Mexico State University, for "Irrigated Agricultural Decision Strategies for Variable Weather Conditions."

Technology Transfer

A proposal to conduct a regulatory conference for water utility companies has been approved and funded by the OWRT Technology Transfer Program and WRRI. Sponsors of this proposed conference are David Smith, Kenneth Nowotny, and Bruce Stockton of the Center for Business Research and Services, New Mexico State University.

Professional Writer Joins Staff

Lynda MacKichan has joined the WRRI staff as Professional Writer. A graduate of New Mexico State University, Lynda has an extensive background as an editor and writer. She was previously employed at NMSU as Administrative Assistant to Vice President Peggy Elder. Before coming to New Mexico, Lynda served in editorial positions at Harvard and Stanford, and was Assistant Editor of the Annual Review of Biochemistry. Her background and interest in New Mexico's agricultural history are particularly suited to her job as technology transfer officer.

Linda MacKichan

Southern Plains Directors Meet

Institute Directors from four Southern Plains Region Institutes and representatives from the Office of Water Research and Technology met May 5-7 in New Mexico. Norm Durham (OK), Bill Powers (KS), Jack Runkles (TX), Tom Bahr (NM), and Luther Davis (OWRT) discussed a number of important upcoming regional projects including an assessment of the effectiveness of OWRT-sponsored irrigation efficiency research in the southern plains states and the five-year research plans. After formal sessions in Las Cruces, the group adjourned to the southwestern part of the state to look at some of New Mexico's water resources.

Water Conference (Continued)

Harold Brayman, U. S. Senate Environment and Public Works Committee; and Peter Krenkel, Nevada Water Resources Center.

The speaker at the Annual Banquet was Pat O'Meara, Executive Vice President of the National Water Resources Association. Honored at the banquet was State Engineer Steve Reynolds, who has held this position with distinction for 25 years.

The Water Conference Proceedings are currently being prepared for publication. It is hoped that publication will be completed by the end of July 1980.

Water Capsule

The Technology Transfer Program of the Office of Water Research and Technology has provided a series of capsule reports highlighting research projects utilizing federal funds through various State Water Resources Research Institutes. The brochures are illustrated with color photographs and graphics. The WRRI has received a limited number of copies of three new titles in the series: "Alternative Wastewater Treatment: Aquatic and Land Systems," "Electrodialysis Technology," and "Scale-Free-Vapor-Compression Evaporation." We still have copies of the following five titles as well: "Water Well Location by Fracture Trace Mapping," "Conservation of Water, Chemicals, and Energy in Dying Nylon Carpet," "Water Conservation Devices-Residential Water Conservation," "Water Factory 21," and "Reverse Osmosis." Single copies are available free of charge by writing to:

New Mexico Water Resources
Research Institute
P.O. Box 3167, NMSU
Las Cruces, New Mexico
88003.

Thank You

The Institute is pleased to acknowledge receipt of a Hach-DR-EL/2 Direct Reading Engineers Laboratory Spectrophotometer from Gaines H. (Smokey) Billue of McPherson, Kansas. This gift is deeply appreciated by the Institute and will be put to good use. To Mr. Billue, a warm "thank you."

MEETING

Mark your calendars now to attend the Second Inter-American Conference on Salinity and Water Management to be held December 11 and 12, 1980, in Juarez, Mexico. Further information on the format for contributed papers and the program will be announced in the next issue of Divining Rod.

Free Booklet

Everybody's Problem: Hazardous Waste

Of the nation's wasteload, fifty million metric tons can be classified as hazardous. Included in the range of wastes are household trash, industrial wastes, sewage sludge, agricultural residues, mining refuse and pathological wastes from hospitals and laboratories.

An informative new pamphlet entitled Everybody's Problem: Hazardous Waste has been published by the U.S. Environmental Protection Agency. Hazardous waste and its impact on surface water, groundwater and the atmosphere are discussed, as well as hazardous waste management and mismanagement.

Also discussed in this booklet are transportation guidelines, safety standards and emergency measures for waste disposal, along with standards and permits for facilities.

This pamphlet can be obtained free of charge from the Office of Public Awareness, U.S. Environmental Protection Agency, Room 2203, JFK Federal Building, Boston, MA 02203.

New WRRI Reports

These Publications are available free of charge while the supply lasts. Publications marked (*) are being printed or bound and will be ready for distribution in the near future.

107 Water Treatment for Small Public Supplies-Report of Operation: Cuba, Carrizozo, La Luz, San Ysidro, Bluewater, Moriarty, and Hagerman - Folster, H. G.; Wilson, D. B.; Kramer, G.; Hanson, S.; Duran, R.; Boyle, W.; and Bennett, C. - July 1979

108 The Survival of Enteric Viruses in Septic Tanks and Septic Tank Drain Fields - Hain, K. and O'Brien R. T. - September 1979

109 International Groundwater Management: The Case of the Mexico-United States Frontier - Utton, A. and Atkinson, C. - October 1979

110 Chemical and Biological Survey of the Upper Gila River System in New Mexico: Preliminary Study of Nutrients in Snow and Quemado Lakes - Brandvold, D. K.; Brierley, J. A.; and Popp, C. J. - November 1979

111 Enterovirus Inactivation in Soil and Structural Changes Associated with the Inactivation of Soil-Bound Viruses - Yeager, J. and O'Brien, R. - November 1979

112 Proceedings of the Twenty-Fourth Annual New Mexico Water Conference, "The New National Water Policy: Will It Work in New Mexico?" - November 1979

113 Paul Spring: An Investigation of Recharge in the Roswell (NM) Artesian Basin - Gross, G. W.; Davis, P.; and Rehfeldt, K. R. - December 1979

114 Effects of Bacteria on Nitrate and Nitrite Concentrations in Groundwater of the Ogallala Aquifer - Russell, T. W. ; Taylor, R. G.; and Foster, M. - December 1979

115 Consumptive Use and Yields of Crops in New Mexico - Sammis, T. W. et. al. - December 1979

116 Spring Characteristics of the Western Roswell Artesian Basin - Davis, P.; Wilcox, R.; and Gross, G. W. - January 1980

117 Demonstration of Irrigation Return Flow Water Quality in the Mesilla Valley, New Mexico - Sammis, T. W. - January 1980

118 A Study of Possible Toxic Effects of Chili-Processing Waste Water on Activated Sludge Process - Isaacs, W. P. and Schumacher, A. M. - February 1980

119 Water Treatment for Small Public Supplies, Operation Data-1979, San Jon and Alamogordo - Folster, H. G.; Wilson, D. B.; Hanson, S.; and Duran, R. - February 1980

120 Demonstration of Irrigation Return Flow Water Quality Control in the Mesilla Valley, New Mexico - Lansford, R. R. and Creel, B. J. - May 1980

121 Irradience, Temperature and Salinity Effects on Growth, Leaf Anatomy and Photosynthesis of Distichlis spicata (L.) Greene - Cunningham, G. L. and Kemp, P. R. - April 1980*

122 A Geochemical and Hydrological Investigation of Groundwater Recharge in the Roswell Basin of New Mexico: Summary of Results and Updated Listing of Tritium Determinations - Gross, G. W. and Hoy, R. N. - April 1980*

123 The Energy Impact on Irrigated Agricultural Production of the Estancia Basin, New Mexico - Lansford, R. R., et. al. - April 1980*

DR. THOMAS BAHR, Director, New Mexico Water Resources Research Institute.

LINDA MACKICHAN, Editor

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