

divining rod

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New Mexico Water Resources Research Institute

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WATER RESOURCES RESEARCH INSTITUTES CELEBRATE 25TH

Twenty-five years ago President Lyndon B. Johnson signed into law the Water Resources Research Act (WRRRA). Based on the 1887 Agricultural Experiment Station Act, this act established water institutes at land grant colleges "to assist in assuring the nation at all times a supply of water of sufficient quantity and quality to meet the requirement of its expanded population."

At the forefront was New Mexico, with Senator Clinton P. Anderson and Congressman Thomas G. Morris spearheading passage of the legislation, and the New Mexico Water Resources Research Institute, the first of its kind in the nation. The latter was organized over a year prior to July 17, 1964 when the WRRRA was signed. It was established by New Mexico State University's Board of Regents to train water scientists and engineers through research of water problems.

New Mexico Faces Water Problems

New Mexico has always been at the vanguard of solving water problems. Dr. H. Ralph Stucky, the first director of WRRRI, explained in a 1965 interview, "We (New Mexicans) have almost every problem water engineers and scientists are working on anywhere. If New Mexico leads when it comes to counting problems, it's almost among the first to do something about them."

Such was the case in the late 1920s and early 1930s when the state passed legislation providing for ground water administration, declaring ground waters to be public waters, and protecting ground waters from excessive use and waste. Not only did sixteen

states model ground water legislation after ours, but the National Resources Planning Board recommended legislation similar to that of New Mexico.

Over two decades later, New Mexicans were still interested in water issues. So much so that 150 of them attended the First Annual New Mexico Water Conference held at NMSU on October 31 to November 2, 1956, and voted to make it an annual event. Stucky, who organized the initial conference while head of NMSU's Agricultural

Economics Department, wrote in *A History of the New Mexico Water Resources Research Institute*, "These conferences may have helped to focus the interests of Senator Clinton P. Anderson from New Mexico and Congressman Thomas G. Morris on the urgency of water problems and the need for national legislation."

Chronology of the WRRRA

By the late 1950s, New Mexicans weren't the only ones concerned

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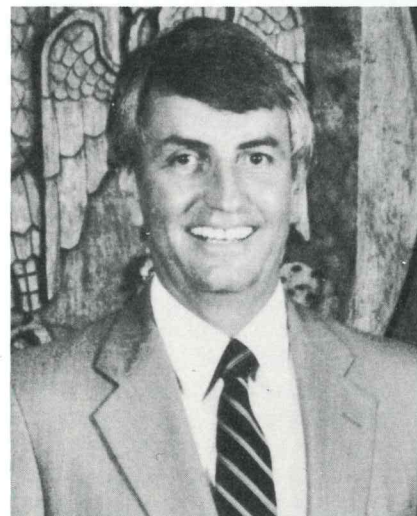
GOVERNOR PAYS TRIBUTE TO WRRRI

One of the most pleasant and productive times of my public life was the time I spent as Acting Director of the Water Resources Research Institute. During this time, I developed a much greater appreciation of the relationship of water to the welfare and quality of life of New Mexicans. It was during those years in the 1970s that the Institute was focusing a great deal of attention on water quality problems — problems that are just now capturing public policy-makers' attention. The Institute was active in assessing potential uses of brackish water, a currently vast but unused resource of our state. And they had deliberated often and responsibly over issues as diverse as Indian water claims, federal rights, the market plan as an allocator of water, and non-point source pollution.

The Institute has always been ahead of the times. They have utilized the best of academic talent in all our universities and have

relied heavily on the views of the public through the many water conferences. Few institutions have served the state so long and so well. I am proud I once passed your way. New Mexicans — all — are proud of your contributions.

— Governor Garrey Carruthers



Governor Garrey Carruthers

OGALLALA PROJECT PROMISES ECONOMIC, AQUIFER PRESERVATION

The High Plains Study Council, made up of representatives from the eight states overlying the Ogallala aquifer, is working to get funding appropriated for a comprehensive research and development program which could have far-reaching economic effects and conserve the aquifer. Through irrigated agriculture, ground water resources now provide much of the economic base in the region. However the Ogallala is being mined at a rate of 21 million acre-feet a year — substantially more than the aquifer can provide for the long term.

The Ogallala Aquifer Research and Demonstration Program (Public Law 99-662) was passed by Congress in 1986, although it was allocated no money. The program provides for each of the eight states to receive money for research and demonstration projects involving efficient irrigation technologies, soil and water conservation management systems, and growing and marketing more water-efficient crops. It is hoped that by improving irrigation techniques, irrigation management procedures, and drought-tolerant crops, the aquifer's life can be extended. Extending the life of the Ogallala could mean increased production with corresponding increases in regional income and in U.S. agricultural exports.

Bob Creel, WRRI acting director and New Mexico's representative on the council says, "This program could be very beneficial to New Mexico in providing added support for research in developing the new technology needed and also in getting it into the hands of our agricultural producers." He added that "the council is working to encourage Congress to appropriate the funds authorized in the program."

PL 99-662 was passed in response to the six-year Ogallala Aquifer Regional Study, completed in 1982, which highlighted the need for action to be taken in regard to the aquifer. The study concluded over 5 million acres would revert to

dryland production by 2020 unless current policies regarding aquifer use were changed. Such a loss in acreage would reduce the value of agricultural commodities produced in the region by \$1.5 billion annually and potentially reduce the value of



U.S. agricultural exports by about the same amount. It could mean also a \$3.75 billion reduction in economic output for the region, given the amount of spending and re-spending of the agricultural sales dollars which would normally occur. This translates into approximately 36,000 jobs lost.

Beside the possible economic devastation, there is the aquifer's importance during times of drought to consider. The High Plains region provides over 15 percent of the nation's wheat, corn, sorghum and cotton, and 38 percent of the nation's livestock. Because of its large irrigated acreage, the region can serve as a major buffer during drought periods.

Each state has drafted a proposal for implementation if the funding is

appropriated. Some of New Mexico's priorities under this program include:

- Learn to manage deficit irrigation optimally since a major policy alternative could include limiting the water irrigators may pump
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WRRI PRESENTS SCIENCE FAIR AWARD

WRRI gave Mary L. Fischer the "Best Water Resources Project" award for her project "Lead in the Environment" at the 37th Annual New Mexico Science and Engineering Fair on April 8. Fischer, a junior at Silver High School in Silver City is interested in a career in astrophysics or medicine.

Fischer spent 200 hours on the project which included chemically analyzing water samples from the Cleveland Mine Mill site and household water samples as well as samples of gasoline sold in the Silver City area. Her project was selected out of the other senior-division projects related to water resources because of her adherence to scientific method and her understanding of the chemistry principles with which she worked.

INSTITUTES, cont'd.

about water problems. A Select Committee on National Water Resources was established in 1959. Anderson was a member of the committee formed to decide what types of water resources projects would be needed to meet the nation's water requirements until 1980 and determine the necessary funding. The committee held hearings in 22 states and published 32 papers covering such topics as surface and ground water sources, projected agricultural use of water, pollution control, recreational needs and evapotranspiration reduction. Its final report called for immediate congressional action in five areas including water research.

Under Anderson's direction the WRRR legislation was drafted. His staff assistant, Benton Stong, is credited as the bill's principle architect.

Anderson first introduced the WRRR bill to the U.S. Senate during the Eighty-seventh Congress on July 27, 1962. On January 14, 1963, during the eighty-eighth session, he reintroduced the bill on behalf of thirty-two other senators. Morris introduced a similar bill in the House of Representatives on January 24, 1963.

The law was passed not only through the efforts of Anderson and Morris, but also the National Association of State Universities and Land Grant Colleges which formed a Water Resources committee. Dr. William Morgan, president of Colorado State University and the committee chairman, garnered support for the act in the academic community. According to Stucky's WRRR history, Morgan and Dr. Roger B. Corbett, president of NMSU, who served on the committee, too, had helped draft the bill.

The WRRR provided for the Office of Water Resources Research to be organized under the Department of Interior to oversee the federal program. It also stipulated that the water research agencies could be established at land grant institutions or some other institution of higher education if the governor so designated. There was financial incentive for the college chosen to house the institute — \$75,000 per year from the federal government.



H. Ralph Stucky and Agricultural Economist Eldon Hanson observe graph readings on a water stage recorder, c. 1962. At the time Stucky headed the Agricultural Economics Department. As head of the department, he added water resources courses to the curriculum and set the stage for the establishment of the New Mexico Water Resources Research Institute. Photo courtesy of the Hobson-Huntsinger University Archives, NMSU.

NMSU Selected as WRRR Site

Apparently NMSU was not the only institution lobbying for and being considered for New Mexico's water institute. In 1978, NMSU President Gerald Thomas hosted a dinner for Corbett; Stucky; Professor John Clark, who followed Stucky as WRRR director from 1971-1976; Dr. Garrey Carruthers, who served as Acting Director of WRRR from July 1, 1976-February 28, 1978; and Dr. Thomas Bahr, who took the institute's reins from Carruthers. During the dinner an audio tape was made regarding WRRR's history.

According to the conversation among the men, New Mexico Institute of Mining and Technology had an interest in serving as the water center because of its well-respected geoscience department. Dr. C.E. Jacobs, a member of that department, was an internationally known hydrologist. Stucky thought competition from the University of New Mexico was great, too, because of Dr. Nathaniel Wollman, who played an important role nationally in the field of water resources economics.

However, the September after the WRRR became law, Governor Jack

Campbell wrote to Secretary of the Interior Steward Udall, requesting NMSU become the institute center for New Mexico, citing the university's nine previous water conferences and "many studies in connection with its outstanding agricultural and scientific programs." As a result, the first water resources research center under the federal program was established in New Mexico.

In July, 1966, an intergovernmental agreement was made between UNM, NMIMT and NMSU, not only making possible cooperation between the universities and WRRR, but later interdisciplinary, interuniversity research.

Stucky was largely responsible for making New Mexico's institute well known. On the 1978 tape, Clark said of his tenure as WRRR director, "I feel that the prestige (of the WRRR) had been set up through the efforts of Ralph...It eased my job considerably because as you traveled around the country, everyone already knew about the New Mexico Water Resources Research Institute. They were all envious of the building and the state support."

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WRRI's Present Status

Today, the institute is still one of the leaders among the water resources research program. During the past eighteen years, it has published 240 technical reports covering a wide range of topics. These include analyzing water rights issues, modeling, developing drought- and saline- tolerant crops, and addressing water quality and water conservation problems. According to a recent national Association of Water Institute Directors (NAWID) survey, WRRI is fifth out of the fifty-four institutes in newsletter circulation, and in the top twenty for the amount of support received.

More importantly, the WRRI is near the top for the number of water resource professionals it trains. In the most recent NAWID handbook, *A Guide to the National Water Research Institute Program*, it was reported: "in recent years, the number of students supported and trained each year by the Institute Program has been reduced through the impact of inflation, and as a result, the average number has declined to approximately 500, or one-third of the original number." In the early years, an average of 1,700 students nationwide were trained through the program. New Mexico's institute has been fortunate in that it has been able to continue to provide

training for a good number of students. Last year, 102 students were trained; in fiscal year 1987, 64, and in fiscal year 1986, 70.

Through the years, research priorities may have changed some, but the WRRI is still dedicated to good, solid research to help solve water problems throughout the state, region and nation. The water conference remains an important part of its program, providing a public outlet for discussion of relevant water issues. Over 200 attend the conference annually. Other information transfer activities have expanded in recent years to include more press releases, publications and video productions for popular audiences in an effort to reach more New Mexicans.

The institute now has an annual budget of approximately \$1.4 million. \$105,130 of this amount is provided by the U.S. Geological Survey, which has overseen the federal institute program since 1983.

Future of the Federal Institute Program

By working with the USGS in recent years, the institutes have been able to identify and prioritize water problems on local, regional and national levels and generate interest and support on three levels. In fiscal

year 1988, 46 percent of the federal funds were allocated to groundwater research projects. Fifty-four percent of the federal funds went toward nine other areas including irrigation, heavy metals, waste water treatment, water policy, law and economics, acid precipitation, and flooding.

This year the WRRRA must be reauthorized. Present versions of the bill now in the House and Senate include two new components, reflecting growing concerns among the institutes. One component includes regional grants directed toward technology development in the areas of ground water contamination and climate changes. The other enhances the institutes' information transfer programs. Information transfer is becoming more important to all institutes due to an information explosion in water resources and the need to pass information on to the public as well as exchange information among researchers.

As the 54 institutes celebrate the silver anniversary of the WRRRA's passage, it is hoped the institutes will, as was written in the NAWID commemorative publication, "not end our commemoration with a celebration of the past, but with a renewed commitment to the future."



Above, a 1978 photo of the four men who had served as WRRI directors, taken at the home of NMSU President Gerald Thomas. From left to right, Tom Bahr, Garrey Carruthers, John Clark and H. Ralph Stucky.

HARRIS WINS FOR INSTITUTE PROJECTS

During the recent New Mexico Press Women convention, former Information Coordinator Linda Harris won four awards for projects she completed while at the WRRI.

Harris took first and second places in the video category of the Press Women communication competition for *Water and Energy: When Conservation is the Only Choice* and *Toward Irrigation Efficiency*, respectively. In the manuals and handbooks category, she won first place for her work on *Water: Lifeblood of New Mexico* and second place for WRRI's *Procedural and Editorial Guidelines*.

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WATER QUALITY DOMINATES 1989-1990 PROJECTS

New Mexico's water quality is becoming increasingly important as demands on our limited supply increase. This is reflected in the selection of the seven research projects funded by the New Mexico Water Resources Research Institute for the 1989-1990 fiscal year. Out of seven, four concern water quality, one concerns water conservation, and two focus on surface/ground water relationships. Total funding for the projects is \$171,136.

Water Quality Projects

Preferential Flow Effects on Chemical Transport and Retardation in Soils, Robert S. Bowman, Geoscience Department, New Mexico Institute of Mining and Technology.

The proposed research will provide quantitative data on the effects of water flow rate, water application method, and degree of preferential water flow on the sorption and retardation of a model organic compound in soil.

Onsite Treatment of Septic Tank Effluent: An Evaluation of Rotating Biological Contactor Capabilities, Yucel R. Tokuz and Ricardo B. Jacquez, Civil, Agricultural and Geological Engineering Department, New Mexico State University.

Tokuz and Jacquez will evaluate the feasibility of using rotating biological contactor (RBC)

technology to provide extensive treatment of septic-tank effluent. The RBC would replace the soil absorption field as the second stage of the effluent treatment.

Regenerative Properties of Spent Tailored Soils, Fernando Cadena, Civil, Agricultural and Geological Engineering Department, New Mexico State University.

This project will evaluate the adsorption capacity of exhausted tailored soils and bentonite which have been thermally regenerated after adsorbing benzene, toluene and o-xylene.

Alluvial Aquifer Heterogeneities in the Rio Grande Valley: Implications for Ground Water Contamination, Phase II, Fred M. Phillips, Geoscience Department, New Mexico Institute of Mining and Technology.

Phillips will test a new method for evaluating permeability distributions that incorporates geological data and hydraulic measurements on selected outcrops near Albuquerque.

Surface/Ground Water Relationships

Field and Model Study of an Ephemeral Stream Aquifer System with a Clogging Layer, Daniel B. Stephens, Geoscience Department, New Mexico Institute of Mining and Technology.

Stephens proposes to analyze data at the Rio Puerco, an ephemeral stream near Socorro, and test whether a numerical model can predict the observed response in the aquifer.

An Assessment of Alternative Policies for Managing Ground Water in the State of New Mexico, Shaul Ben-David, Department of Economics, The University of New Mexico.

The principal investigator will re-examine current ground water management policies and recommend changes in administrative practices in light of the growing scarcity of ground water in New Mexico.

Water Conservation

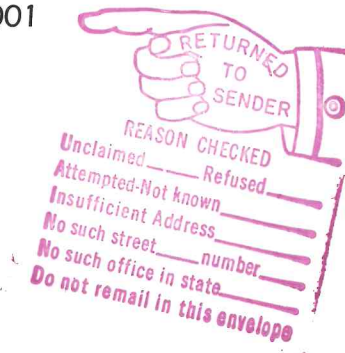
Somatic Cell Selection to Genetically Improve Plant Water Use Efficiency and Tolerance to Stresses, Gregory C. Phillips, Agronomy and Horticulture Department, New Mexico State University.

Phillips will test the hypothesis that certain uncommon polyamines are involved in mechanisms of plant water-use efficiency and/or tolerances to water deficit and heat stresses.

Bob J. Creel, acting director, New Mexico Water Resources Research Institute
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