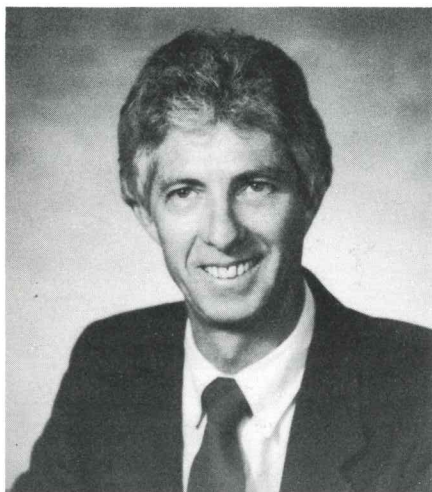


New director values board expertise



Bob Creel

When Gov. Garrey Carruthers, the institute's acting director in 1976-78, assumed office Jan. 1, he took Tom Bahr with him. Bahr, the institute's director since 1978, is now on leave serving as secretary of New Mexico's Natural Resources Department.

Although there was no formal swearing in, Bob Creel also took office New Year's Day. Creel, who already seems at ease in his new position as institute acting director, knows his way around both the institute and research.

His first experience at the institute was in 1972-73 as its assistant to the director. He returned last year as program advisor. In the intervening years he worked on some 25 research projects resulting in dozens of publications.

Creel quickly put his research and administrative knowledge to work in reviewing proposals for the institute's annual allotment grants. He also is drawing on the expert advice of the institute's Program Development and Review Board.

"The board provides the continuity that's important to a good research program. Its members know both the state's water resources needs and which needs are most critical," he said. This year the 10-member board received 30 proposals competing for the annual allotment pool. Armed with the proposals plus outside reviews of each one, the board will meet in February to review the proposals and recommend those for funding.

The board originated in 1965 as a research advisory board with its members all from New Mexico State University. With the signing of the Interuniversity Memorandum in 1977, membership on the board was expanded to include representatives from New Mexico State University, the University of New Mexico and the New Mexico Institute of Mining and Technology. The board was later to include representatives of the State Engineer Office, the New Mexico Environmental Improvement Division and the U.S. Geological Survey.

Creel also looks to the board for guidance in areas that may not be addressed in the proposals. "Sometimes the board will suggest research areas that need investigation. In that case, we will send out an additional request for proposals and direct funds to that particular problem," he said.

The board's range of expertise also benefits the institute's research program. Creel cites John Kemp, the board's newest member, as an example. Kemp, director of the Plant Genetic Engineering Laboratory at NMSU, has university and private industry research experience.

Kemp said the institute's review and selection process is similar to those for federally funded projects. "A board is valuable because it has a broad perspective of the state's water resources needs. And when it comes down to who should get money to do what, the outside reviews are excellent," he said.

Creel, who previously was always on the receiving end of funding, appreciates an unbiased review board. "Researchers recognize a board's fairness," he said, "because it eliminates the possibility of a program being directed in one particular area."

1987 Review Board

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Research Institute

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Study proposes region-by-region water plans

New Mexico lawmakers soon will have a chance to decide whether the state undertakes region-by-region water planning. The proposed legislation will authorize the Interstate Stream Commission to fund regional water planning, appropriate ground water and buy existing water rights.

The proposed law is the outcome of a two-part ground water study requested by the Legislature and conducted by the University of New Mexico Law School and the Water Resources Research Institute. The first study, completed in January 1986, advocated that the state enter the water market by appropriating ground water rights to itself.

The Legislature then directed the study team to determine the cost of a state appropriation program, how it would be funded, who would administer it, and how to ensure that the program would be responsive to all regions of the state.

Charles DuMars, study committee chairman and UNM law school professor, said the study recommends that each of the state's eight hydrologic regions be eligible for funding to determine their long-range water needs.

DuMars believes regional water planning is crucial to the program.

"You can't have water planning from the top down. Instead each region should determine its own needs." He said, for example, that the needs of the Albuquerque region are very different from those in the Canadian River region. The state would then allocate its appropriated water supply based on those needs.

The committee's survey of local officials throughout the state shows a strong commitment to water planning. A majority was willing to consider participating in a state appropriation program and two-thirds were willing to commit local resources such as technical and planning assistance to the program.

Nearly three-fourths saw an immediate need for state appropriation, reflecting the concern of most respondents in every region that they would run out of water in 40 years. Nearly half estimated they had only a 20-year supply.

Regional planning is also important because, if the state appropriates water and then allocates it to the regions, according to New Mexico law, those regions must have plans to put the water to beneficial use.

The bill is asking the Legislature for \$550,000 over a two-year period.

The money would fund regional planning and provide administrative support to the Interstate Stream Commission, which the study recommends as best suited to administer the program.

The study recommends that the initial funding come from the state's general fund. In two years, when regional planning is completed, the money to support state appropriation and water rights purchases should come from taxes, DuMars said. The study outlines several sources of tax revenue.

The study recommends, however, that agriculture be excluded from further taxation. "Although agriculture uses most of the water, their future stake in acquiring water rights is marginal. They already have water rights," he said.

Instead, he said a water tax should be shouldered by the future beneficiaries of new water rights such as municipalities and industry.

DuMars believes water rights would make a good long-term investment. He cited, for example, the cost of an acre-foot of water in Santa Fe, which increased from \$1,000 in 1963 to \$11,000 in 1975. "If an acre-foot is worth more than a stock certificate, then the state should get some water," he said.

NMSU holds water seminars

This spring New Mexico State University students are getting a first hand look at the complexities of river management through a seminar series sponsored by NMSU's civil engineering department.

Department Head Conrad Keyes, Jr. came up with the seminar idea driving home from the Annual New Mexico Water Conference in Santa Fe. The October conference, entitled "Managing the Rio Grande," featured many of the people Keyes later scheduled as seminar speakers.

"The seminars provide the students with the educational opportunity to hear leaders in industry and government discuss the real world of environmental and water management," said Keyes.

The weekly seminars, which run from January to May, offer students the choice of one to three credit hours depending upon the amount of course work involved.

Graduate students, for example, will attend the Tuesday seminars and then with the help of undergraduates, will prepare a lecture on one of the seminar topics. "By the end of the semester, some students will prepare a report on how they would manage water in a district," he said. For example, one student may be assigned a topic such as Elephant Butte Irrigation District while another may write about the Middle Rio Grande Conservancy District.

The seminars are patterned after the John Clark Memorial Lecture Series, which the department sponsored several years ago. John Clark served as institute director from 1971 to 1976 and was also on the civil engineering faculty.

The seminars are free and open to the public. For more information contact Conrad Keyes at Civil Engineering, 646-3801.

New publications now available

#210 -- *Biosorption of Heavy Metal Ions from Industrial/Mining Waste Waters* -- Darnall, D.W.

#211 -- *Evaluation of Salt Tolerance in Azolla* -- Johnson, G.V.

#212 -- *Projections of Water Availability in the Gila/San Francisco and Lower Rio Grande Surface Water Basins to the Year 2010* -- McDonald, B. and Tysseling, J.C.

#213 -- *A Selective Breeding Program to Improve the Water-Use Efficiency and Nutritive Acceptability of Kochia as a Forage Grazing Crop* -- Fuehring, H.D. and Finkner, R.E.

High tech works for high value crops

New Mexico State University agronomist Peter Wierenga spent seven years testing trickle irrigation on high value crops. Now he wants to see it used.

New Mexico is slower to adopt this high tech irrigation technique, Wierenga said, because water is still relatively inexpensive and the farmer can't justify the costs of setting up trickle irrigation.

Wierenga's research, however, has proved that trickle irrigation can pay off when used on high value crops such as grapes and chile. "Trickle irrigation is a natural for vineyards. You just hang the drippers in the air and release the water automatically," he said.

About half the vineyards in the Deming area use trickle irrigation on fully automated systems.

Trickle irrigation seems most popular in those states with both an arid climate and a scarce water supply. "San Diego County has gone almost exclusively to trickle irrigation for its cash crops. All their strawberry production is under trickle," he said. Some farmers in Arizona also have adopted trickle irrigation for cotton production and some West Texas vineyards use the system.

In his research on chile, Wierenga found that under trickle irrigation, chile yield doubled from its normal 8 tons an acre to 16 tons an acre. In addition, trickle irrigation increased this yield using half the normal 50 inches of irrigation water.

Although cotton is not an obvious candidate for trickle irrigation, Wierenga's research shows that under trickle irrigation, cotton yields were above average and the crop used less water in comparison to flood irrigated cotton. He said one management option might be to rotate field crops such as cotton with high value crops such as chile.

Trickle irrigation works like a one-way circulatory system where water transports nutrients and chemicals through a network of plastic tubes. Delivery is precisely controlled by a series of holes and emitters in the tubes, which divert the water to each plant's root system.

Wierenga says the trickle system maintains "optimum" water con-

tent, applying just the right amount of water at the right time. Unlike flood irrigation, which saturates the soil, trickle irrigation allows the soil breathing room.

In his studies on the effects of salinity using trickle irrigation, Wierenga found very little salt build-up. Winter rains, he said, drained off any salt accumulation.

The cost of trickle irrigation is one of its greatest hurdles. Tubing plus installation and maintenance costs run as high as \$1,200 an acre. "You can afford these costs when yields are substantially higher," he said. Larger above ground tubing will last 10 to 15 years, while smaller tubing lasts only about three to four years. Fields with irrigation tubing can be cultivated but not plowed.

His latest irrigation research project, which is sponsored by the Southwest Consortium on Plant Genetics, has put him in collaboration with other researchers to devise an integrated system of genetic engineering and irrigation management. In the future, the high tech team may look at using trickle irrigation systems to deliver organisms directly to the plant. Those organisms, for example, could promote growth, or combat drought and frost.

The proposed research is in line with Wierenga's philosophy on trickle irrigation. "You should not look at trickle irrigation just as a means of applying water. You should look at it as a totally new management system," he said.



Michael Favre of Sun Vineyards talks to NMSU researchers Peter Wierenga and Scott Van Pelt about vineyard management. The Deming vineyard depends entirely upon trickle irrigation.

El Paso: Hueco water is first choice

For six years, the El Paso case has produced its share of theatrics, but since the hearings began in November, the drama has been mostly a contest of numbers. Twenty lawyers, 40 witnesses, and boxes of red files all figure in the case to drill 21 wells in southern New Mexico.

El Paso is seeking a permit to drill the wells in the Hueco Bolson in New Mexico from which it plans to pump 10,000 acre-feet of water a year across the state line to El Paso.

El Paso has based its case on the testimony of Santa Fe hydrologist Lee Wilson and John Hickerson, chairman of the El Paso Public Service Board. Wilson conducted a long-range study of El Paso's water supply alternatives for the PSB.

Calling the import plan a "bridge to the future," Wilson testified that the region's economic development depends upon El Paso having access to the underground water supply in the Hueco and Mesilla bolsons.

Wilson warned that unless El Paso gets access to the Hueco in New Mexico, that aquifer will be depleted within 40 years. The Hueco straddles the New Mexico/Texas state line.

Without the New Mexico supply he said El Paso would be forced to increase pumping on the Texas side of the bolson, which would increase the downflow from New Mexico resulting in salinity encroachment

into the aquifer. Water from the Hueco would buy time for El Paso to develop other water supplies, he said.

Of the seven supply alternatives listed in his study, Wilson said the Hueco would be the least expensive at \$200 an acre-foot. Rio Grande surface water would cost the city \$300 an acre-foot and trans-Pecos water, more than \$586 an-acre foot. He ruled out desalting at \$1,000 an acre-foot as too expensive.

Under cross examination, Wilson said El Paso had considered building a pipeline from Caballo Dam, about 100 miles north of El Paso, to transport about 200,000 acre-feet of water to the city each year. However, he said obstacles such as cost and the lack of cooperation from the Elephant Butte Irrigation District killed the idea.

Steve Hubert, an attorney for the EBID, said the irrigation district would cooperate on such an effort only if El Paso agreed to drop its applications in the Mesilla Bolson.

Hickerson, head of the PSB for 21 years, chronicled the board's failed attempts to obtain more water rights from the El Paso County Water Improvement District, which holds title to area irrigation rights. The long-standing dispute stems from a 1941 contract with the district that limits the city to no more than 2,000 acres with water rights inside district boundaries, which encom-

pass 69,010 acres. The district refuses to modify the contract to allow the city more acreage.

The PSB also has failed to win an agreement with the irrigation district that would give the city credit for sewage effluent. Hickerson said the district objected to the water credit because of the water's quality.

Under cross examination, Hickerson said litigation costs are paid from revenue from the sale of PSB lands, which he said have been appraised at \$60 million. He said El Paso has spent at least \$3.5 million in its six-year attempt to gain access to the New Mexico water.

Leo Eisel, a Denver consulting engineer to the New Mexico protestants, testified that through a conjunctive use alternative El Paso could use surface water and ground water in Texas without having to tap into the New Mexico portion of the Hueco Bolson.

Eisel said El Paso could take about 75,000 acre-feet from the Rio Grande, another 52,000 acre-feet from diversions, and 23,000 acre-feet from an exchange of treated effluent for usable Rio Grande surface water. He said El Paso also would have to amend the 1941 contract to allow purchase of more water rights.

Eisel was the third witness for the New Mexico protestants. As many as 35 more witnesses could be called when the hearings resume March 25.

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the divining rod

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