

DIVINING ROD

NEW MEXICO WATER RESOURCES RESEARCH INSTITUTE

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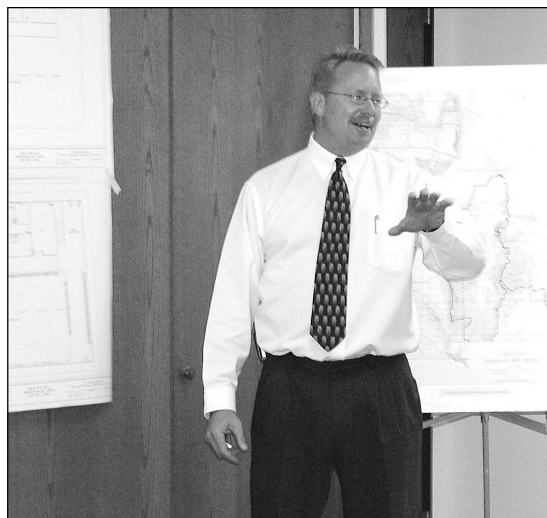
July 2002

Desalination Feasibility Study Underway

Saline and brackish waters constitute over 97% of the water in the world and an estimated 90% of New Mexico's water. The latest cost-effective "revolutionary," desalination technologies offer a means by which to supplement our fresh water supplies.

To address the development of the "next generation," of desalination technologies, a partnership has been formed between Sandia National Laboratories and the Bureau of Reclamation. The

Members of the Executive Committee have been meeting monthly and toured Tularosa Basin sites and pilot desalination operations.



Eddie Livingston of Livingston Associates, Inc. provides committee members with details of facility options.

New Mexico Water Resources Research Institute will support the partnership with organizational and technical assistance.

Sandia scientists, known for their unique expertise in energy efficiency and renewable energy resources, will cooperate with the Bureau's staff which brings a history of well-established desalination research and testing capabilities to the effort. These organizations will provide expertise in salt and brine chemistry, geology, engineering, desalination testing and evaluation, re-

newable energy, environmental technology, and materials science.

A feasibility study is now underway to evaluate the need for a facility to support pilot testing of desalination technologies. For example, testing could be conducted to evaluate the application of renewable energy techniques to reduce desalination costs. In addition, the cost-effectiveness of small-scale or portable desalination systems could be explored, as well as its application at the other extreme to large-scale surface flows. Other studies could establish whether the treatment and beneficial use of produced water (from oil and gas
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wells) is feasible with desalination systems. Similar studies could evaluate the environmental impact (i.e., the disposal problem) of inland brine and salt produced by desalination.

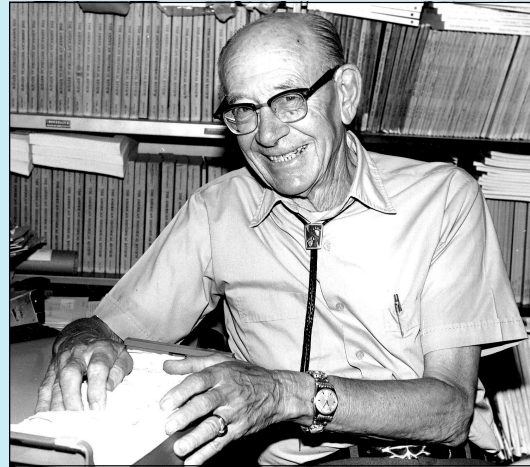
The Tularosa Basin in New Mexico is the proposed site for the desalination facility. This basin has been extensively studied and has substantial amounts of brackish and saline water. Within a 5-mile radius, waters with salinities from 2000 ppm Total Dissolved Solids (TDS) to 100,000 ppm TDS are available. Also, a wide range of water chemistries including sodium-chloride, carbonate, and sulfate-based brine waters are available. Further, the Tularosa Basin is one of the world's leading areas of wind, solar, and geothermal renewable energy.

The design, construction, and operation of the Tularosa Basin Desalination Research Center facility would be managed jointly by the Bureau and Sandia.

During 2002, the feasibility study will review siting issues, identify construction and operational costs, and suggest operational and management plans.

The New Mexico WRI is providing technical support for the Executive Committee overseeing the feasibility study. The Executive Committee is composed of regional and national desalination and water resources experts. The institute is hosting meetings, providing technical expertise, and disseminating information on the feasibility study including the creation of a web site created for the Center. The Tularosa Basin National Desalination Research and Demonstration Center Feasibility Study website can be found on the WRI site wri.nmsu.edu/. For more information on the project contact Bobby Creel at WRI at (505) 646-4337.

In Memoriam - Ira G. Clark



1909 - 2002

Historian

Author of *Water in New Mexico*

Member of WRI's New Mexico Water Conference
Advisory Committee 1988-2002

Clark penned water law history

By Marvin Tessner, Las Cruces Sun News

It was a driving desire to defend New Mexico's water that led Ira G. Clark to write his famous water law book, "Water in New Mexico,,," according to fellow historian Ray Sadler.

The book is now considered the most reliable legal reference on the topic of water.

Clark, who died June 12, at age 93, was a history professor at New Mexico State University specializing in western history. He came to the university in 1942 and retired in 1975.

Sadler joined the faculty in 1969 and had an office down the hall from Clark. He recently recalled Clark's dedication to historical research and putting it down on paper to share with

other historians and people interested in the development of New Mexico.

"Clark knew how important water is to the western United States, specifically in New Mexico,,," Sadler said. "People in places like New Mexico had to work very hard to protect their water. And I believe that was why Ira wrote his book, 'Water in New Mexico.' It was to lay the predicate on how water rights in New Mexico could be conserved and protected. I think he understood that New Mexico's water was under attack, and this was his contribution to the fight to preserve New Mexico's water.,,"

"We'll never see the likes of Ira Clark again,,," Sadler declared. "He was a giant in his field. He was the

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father of the NMSU history department. He was driven by a passionate desire to do his part to save and protect New Mexico's water. Any lawyer who works on water laws has [Ira's] book on his shelf. And it's well thumbed.,,

Clark's book, 839 pages including text, footnotes, selective bibliography, table of water cases and index, was published in 1987 by the University of New Mexico.

He was retired by then. But he had the title of professor emeritus and was able to continue working on the book in his NMSU campus office. Compiling information, writing and rewriting drafts was a long process, Sadler said.

"He was the most meticulous historian I had ever seen.,," Sadler said. "His book was a landmark in the study of New Mexico water rights law. It gave an enormously valuable historical perspective for attorneys, engineers, and other people who were involved in the study of New Mexico water.,,"

Clark's first draft of his book was twice as long as the published work, Sadler said, as he recalled Clark researching papers in his

office down the hall. The University of New Mexico had commissioned him to write the book because it recognized the need to put the history of New Mexico water rights law into a reliable reference. But the university associates worked with him to keep the book within a workable form, Sadler said.

"Water in New Mexico.,," traces irrigation from the Indian systems through the Spanish and territorial days settlements to the present day irrigation districts.

His writing was not limited to that book. In 1975, his article, "The Elephant Butte Controversy: A Chapter in the Emergence of Federal Water Law.,," was published in the *Journal of American History*.

"That particular article played a major role in the evolution of federal law in the United States.,," Sadler said.

Several entities were involved in the Elephant Butte Project, at first designated as the New Mexico-Texas, Rio Grande Project, which was formed in the early 1900s. The great number of entities and claims led to many conflicts. The entities included the United States and several of its federal agencies,

Mexico, New Mexico, Texas and Colorado and many private and community irrigation systems.

"Clark broke it down into different events, how they affected other events and all in chronological order.,," Sadler said.

Clark borrowed from his *Journal of American History* article when writing about the Elephant Butte Project in his book. From the chapter, *From Reclamation to Conservation*, he wrote in part: "The Elephant Butte Water Users' Association inaugurated a campaign to attract settlers as early as 1913, and with the completion of the dam in 1916 there was a greater activity in clearing lands and subdividing large holdings into smaller tracts.,,"

According to the book, before 1920, the main Elephant Butte Project crops were alfalfa, corn and wheat with lesser acreage planted in cantaloupes, vegetables and fruit trees. In 1919, some farmers planted cotton as an experiment.

But the new crop was commercially successful and within a few years cotton was the project's dominant crop. And more settlers continued to move in to use the water and establish more rights.,,

USGS Launches Drought Website for New Mexico

<http://nm.water.usgs.gov/drought>

Featuring real-time information as well as a comprehensive source of links to other drought-related and weather information provided by government and non-government organizations.



**47th Annual New Mexico Water Conference
There,s No Doubt, We,re in a Drought!**

Preliminary Program

Wednesday afternoon, October 9, 2002

- 12:00 Golf Tourney - The Links of Sierra Blanca
- 1:00 Tour of Carrizo Valley Ranch -OR-
Alamogordo's Treatment Plant and Reservoirs

Thursday, October 10, 2002

- 8:30 Welcome
Karl Wood, WRI Director
Leon Eggleston, Ruidoso Mayor
- 9:00 *Short and Long-Range Weather Forecasting:
What is in Our Future?*
Charlie Liles, National Weather Service
- 9:30 *The Klamath Experience and What It Means to
New Mexico*
Michael Gabaldon, Bureau of Reclamation
- 10:15 BREAK
- 10:45 *Drought Impacts on Water Supplies and Delivery in
New Mexico*
Tom Turney, New Mexico State Engineer
- 11:15 *The Need for a U.S.-Mexico Border Environment
and Human Health Initiative*
Chip Groat, Director, U.S. Geological Survey
- 12:00 LUNCHEON
Winning High School Student Essays
- 1:30 *The Economic Impacts of Drought on Uses of the
Rio Grande*
Frank Ward, NMSU, Department of Agricultural
Economics
- 2:00 *Desalination as a Supply for Drought Relief*
Eddie Livingston, Livingston Associates
- 2:30 *New Uses of Produced Water from Oil Fields*
Robert Lee, Petroleum Recovery Research Center,
NM Tech
- 3:00 BREAK

- 3:30 *Current Technology for Drought and Irrigation*
Phil King, NMSU and **Gary Esslinger**, EBID
- 4:00 *Inside New Mexico (Moderated by **Sherry Tippett**)
How Does Water Law Affect Management of
New Mexico's Water During Times of Drought?*
Steve Hernandez, Hubert and Hernandez
Fred Hennighausen, Pecos Valley Artesian
Conservancy District
DL Sanders, Office of the State Engineer
Stanley Pollack, Navajo Nation Dept. of Justice
(invited)
David Benavides, Community and Indian Legal
Services of Northern New Mexico (invited)
- 6:00 - Dinner Barbeque and Flying J Ranch Western Stage
8:00 Show - Ruidoso Convention Center

Friday, October 11, 2002

- 8:30 *Meeting Compact Delivery Obligations During
Times of Drought*
Norman Gaume, NM Interstate Stream Comm.
- 9:00 *Water Banking: Panacea or Placebo*
Bob Grant, NM Interstate Stream Commissioner
Pauline Gubbels and **Sue Wilson Beffort**, New
Mexico Legislators (invited)
- 9:30 *How A Large Municipality Deals with a
Limited Water Supply*
Ed Archuleta, El Paso Water Utilities
- 10:00 BREAK
- 10:30 *How a Small Town Deals with Drought Conditions*
Alan Briley, Village Manager, Ruidoso
- 11:00 *Water Requirements for Endangered Species in
New Mexico*
Dave Cowley, NMSU, Dept.of Fish and Wildlife
Alleta Belin, Belin and Sugarman
Joy E. Nicholopoulos, U.S. Fish and Wildlife Srvc.

Annual Water Conference Information on WRI,s Homepage

Check the WRI's Homepage for updated information about the conference. You can register for the conference using our Homepage at wrii.nmsu.edu. Choose the Water Conference link and follow the instructions. Hotel rates and information on the golf tournament and tours are also contained on the website.



Meet the Researchers

J. Phillip King, Ph.D., P.E.

Associate Professor and Associate Department Head, Department of Civil, Agricultural, and Geological Engineering, New Mexico State University

Research Focus

Civil engineering, erosion and sediment control, agricultural engineering, water resources engineering, surface and groundwater hydrology, computer applications and modeling, teaching, training, and curriculum development

Education

Ph.D. agricultural engineering, Colorado State University, 1990. Dissertation entitled *Knowledge based expert systems methods for irrigated crop management*

M.S. agricultural engineering, Colorado State University, 1988

B.S. civil engineering, University of California, Berkeley 1982

M.B.A. New Mexico State University, anticipated completion, 2002

Experience

1990-Present: Department of Civil, Agricultural, and Geological Engineering, New Mexico State University. Teaching, research, service. Initiated the Water Resources Engineering program.

1991-Present: Consulting Engineer.

1986-1989: Graduate Research Assistant, Department of Agricultural and Chemical Engineering, Colorado State University.

1983-1985: Peace Corps volunteer/irrigation engineer, Ngabu Agricultural Development Division, Malawi, Africa.

Teaching

Computing for Engineers, Construction Engineering, Irrigation and Drainage Engineering Design, Hydraulic Structures, Water Resources Technician Training, Surface Water Hydrology, Groundwater Modeling, Surveying Technician Training, GIS/GPS Foundations and Applications, Geohydrology, Irrigation System Management, Drainage

Engineering Theory and Design, Hydraulic Design of Irrigation Structures, Irrigation Flow Regulation and Measurement, Social and Technical Aspects of Irrigation Organizations, Irrigation Scheduling

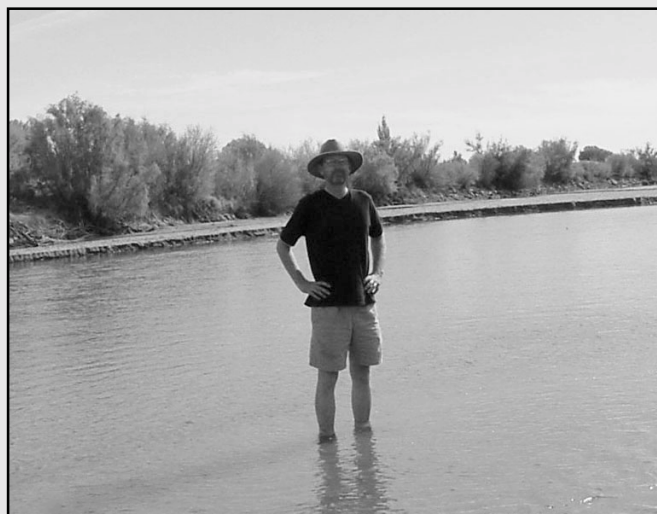
Advising

Currently 40 undergraduate students; Completed 17 master students, currently 4 master students; Completed 4 Ph.D. students, currently 2

Research

PI, Riparian Evapotranspiration Study of the Middle Rio Grande (1998-2001). Provides water-use planners with information, methods, and models to assess and predict the consumptive use of water by crops and riparian vegetation species, with particular focus on the Middle Rio Grande Project. Funded through the U.S. Bureau of Reclamation and the NM Interstate Stream Commission.

Co-PI, Evaporation Estimation at Elephant Butte Reservoir (2000-2003). Funded by the New Mexico Interstate Stream Commission.



The engineer out standing in the hydrology of the Rio Grande

PI, Evapotranspiration Study of Doña Ana County (2000-2002). Will quantify the consumptive use of water in the Rincon and Mesilla valleys by crops, using diverse data. Funded by the Environmental Protection Agency through the Lower Rio Grande Water Users Organization.

PI, Bureau of Indian Affairs Water Resources Training Program (1993-2002). Funded by the BIA.

Co-PI, Economic Impact of Severe and Sustained Droughts on the Rio Grande Basin (1996-2000). Multi-state project funded by U.S. Geological Survey.

Researcher and Technical Reviewer, URGWOM (1994-2000). Collaborating in development of the Upper Rio Grande Water Operations Model project with U.S. Bureau of Reclamation, Army Corps of Engineers, City of Albuquerque, U.S. Geological Survey, and researchers from other universities. Personal focus is riparian and crop evapotranspiration modeling, weather station instrumentation

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and telemetry, and technical review of overall model structure.

PI, Groundwater Impacts of NMSU Landfill (1997). Evaluated groundwater quality monitoring and geo-hydrological data to assess NMSU's compliance with state environmental regulations. Funded by NMSU.

Consulting

1992-Present: Elephant Butte Irrigation District, New Mexico. Working on retainer with EBID's engineering and hydrology sections to maintain flow measurement stations, install new measurement stations, develop an internal water quality monitoring program, develop operating procedures, study reuse of drainage water for irrigation, and evaluate contract bids and designs.

1996-1998: The Land Group, Inc. Developing geohydrology studies for municipal water supply and providing expert support in litigation regarding sedimentation problems on Rio Chama.

1995-1999: El Paso Water Conveyance Plan Reviewer. Reviewing technical aspects of consultants' proposals to convey surface water from Caballo Reservoir to the City of El Paso.

A. Salim Bawazir, Ph.D.

College Assistant Professor, Department of Civil, Agricultural, and Geological Engineering, New Mexico State University

Research Focus

Water resources engineering and management, water resources teaching and professional training, water supply, water quality and sanitation engineering, irrigation and drainage engineering

Education

Ph.D. civil engineering, water resources engineering emphasis, New Mexico State University, 2000. Dissertation entitled *Saltcedar and Cottonwood Riparian Evapotranspiration in the Middle Rio Grande*.

M.S. civil engineering, New Mexico State University, 1993. Thesis entitled *Unsaturated Flow Through Engineered (Capillary) Barriers*.

B.S. civil engineering, New Mexico State University, 1988.

B.S. agricultural engineering, New Mexico State University, 1988.

Experience

1991-Present: Teaching graduate and undergraduate courses in the Department of Civil, Agricultural, and Geological Engineering, NMSU. Started teaching as a graduate assistant and progressed to college assistant professor.

2002-Present: Consulting, Jobe Concrete Products, Inc. Developing a strategy for composting solid waste sludge from El Paso water utilities.

1988-1991: Water Resources Engineer, Well and Pump Efficiency Testing Project. Department of Civil, Agricultural, and Geological Engineering, NMSU.

1989-1990: International consulting, Sana'a, Republic of Yemen, Consulting engineer for NMSU, *Agricultural Education Yemen Project*, Consortium for International Development.

1982-1983: Assistant Farm Manager, Ibb Institute of Agriculture, Ibb, Yemen

Teaching

Hydrodynamics II, Mechanics-Statics, Irrigation System Design Short Courses to International Students from Various Countries, Computer Applications in Agriculture Short Course, Water Technician-Training Courses for Native Americans (7 years experience).

Advising

Currently, 3 undergraduates (advising and training in research)

Currently, 2 graduate students

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Research

PI, Measuring Evapotranspiration Depletions in the Middle Rio Grande Bosque (2002-2003). Funded by the New Mexico Interstate Stream Commission.

Research Specialist, Riparian Evapotranspiration Study of the Middle Rio Grande (1998-2003). Provides water-use planners with information, methods, and models to assess and predict the consumptive use of water by crops and riparian vegetation species, with particular focus on the Middle Rio Grande Project. Funded by the U.S. Bureau of Reclamation and the NM Interstate Stream Commission.

PI, Evaporation Estimation at Elephant Butte Reservoir (2000-2002). Funded by the New Mexico Office of the State Engineer.

PI, Evapotranspiration Study of Doña Ana County (2000-2002). Will quantify the consumptive use of water in the Rincon and Mesilla valleys by crops, using diverse data. Funded by the Environmental Protection Agency through the Lower Rio Grande Water Users Organization.

Co-Investigator and Program Coordinator (1998), for project *Tribal Water Technology Training Program* in the

Department of Civil, Agricultural, and Geological Engineering, NMSU. The project was to assist Southwestern Indian Polytechnic Institute (SIPI) develop a water resources program. Project accomplishments included education and training activities, developed a curriculum for associate of applied science degree in water resources technology, 2-year program. Provided technical assistance in the acquiring and housing of laboratory equipment for water resources technology program.



Upcoming Meetings

August 13, 2002 - Water Research Symposium, New Mexico Tech, Socorro, NM, wri.nmsu.edu.

August 15-16, 2002 The Clean Water Act, CLE Water Law Institute, Omni Hotel, Los Angeles, CA, www.cle.com.

August 26-27, 2002 New Mexico Water Law, Bishops Lodge Resort, Santa Fe, NM, www.cle.com

August 29, 2002 - *Water Conservation: A Sensible Business Solution for Your Facility*, Crowne Plaza Pyramid Hotel, Albuquerque, NM, <http://wri.nmsu.edu/wrdis/nmwca/alliance.html>.

September 12-13, 2002 - Western Water Law - Water Shortage, Supply and Quality in the Arid West, Adam's Mark Hotel, Denver, CO, www.cle.com.

September 19-21, 2002 - The United States-Mexico Law Institute, Inc. El Dorado Hotel, Santa Fe, NM, 505-277-7825; email: Conrad@LAW.UNM.EDU

October 9-11, 2002 - 47th Annual New Mexico Water Conference, *There's No Doubt, We're in a Drought*, Ruidoso, NM, wri.nmsu.edu.

October 20-23, 2002 - International Arid Lands Consortium and Workshop Assessing Capabilities of Soil and Water Resources in Drylands: The Role of Information Retrieval and Dissemination Technologies, Sheraton Tucson, Tucson, AZ, <http://ag.arizona.edu/OALS/IALC/Home.html>.

October 28-30, 2002 - 7th Annual New Mexico Environmental Health Conference, Sheraton Old Town, Albuquerque, www.nmehc.org.

November 3-7, 2002 - AWRA's 2002 Annual Water Resources Conference, Wyndham Franklin Plaza Hotel, Philadelphia, PA, <http://www.awra.org>.

November 18-22, 2002 - First International Symposium on Transboundary Waters Management, Monterrey, Mexico, <http://www.TransboundaryWatersMexico.org>.



New Mexico Annual Water Conference Registration Form

To attend the 47th Annual New Mexico Water Conference, please complete one form for each person. Mail form with check or purchase order payable to NMWRRI-Water Resources Research Institute, MSC 3167, Box 30001, Las Cruces, NM 88003-8001.

For the Early Bird best rate of \$150, registration must be received by August 31, 2002. Registration from September 1 until October 1 is \$200. After October 1 and at the door, registration is \$225. The registration fee will be refunded if written notice of cancellation is received by September 27, 2002. A \$25 cancellation fee will be charged.

The registration fee includes the day-and-a-half conference, optional tours, all breaks, lunch on Thursday, Thursday evening's barbeque and show, and a copy of the proceedings on CD to be published within a few months of the conference.

Please check the following:

- Registration \$150 before August 31, 2002 (Early Bird)
- Registration \$200 from September 1 to October 1, 2002
- Registration \$225 after October 1 and at the door
- Full-time** student registration \$50
- Luncheon ticket(s) for guest(s) \$15/guest
- Dinner barbeque/show ticket(s) for guest(s) \$30/guest
- Will attend the Carrizo Valley Ranch Tour - OR -
- Will attend the Alamogordo Reclaimed Water Tour - OR -
- Will play the Golf Tourney; handicap
- Check enclosed
- Purchase order enclosed, no.
- Please bill my credit card:
Type _____ Card No. _____
- Expiration date _____ Signature _____

Name _____

Affiliation _____

Mailing address _____

City, State, Zip _____

Phone No., Fax No. _____

Email address _____

The *Divining Rod* is published by the New Mexico Water Resources Research Institute.

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