

WATER RESOURCES RESEARCH - THE EARLY YEARS

H. Ralph Stucky
Professor Emeritus
New Mexico State University

INTRODUCTION

I want to thank Tom Bahr for asking me to prepare this paper. It seems that Tom has asked a country boy, who grew up on a 240-acre irrigated farm in the Gallatin Valley of Montana, to review some of his life history, as well as review early water research. I appreciate the invitation.

From working on the home-irrigated farm in the 1910s and 1920s, and seeing some of the crops dry up, when our farm's 1881 water rights had to be shut off by the ditch rider, because those rights were junior to other rights on the ditch filed in the 1870s, I almost inherited an interest in water problems.

Then, as County Agent in two irrigated areas in Idaho, and later as County Agent and Extension Economist in Montana, a lot of work was required with irrigated farms and with several irrigation projects.

In May 1954, before coming to New Mexico as head of the Department of Agricultural Economics at New Mexico State University, I had just completed a thesis entitled Settlement and Repayment Policies on Irrigation Projects in the 17 Western States for my doctor's degree from the University of Minnesota.

The strongest impression I had from my first trip around New Mexico was the great lack of water for many uses, and the problems

New Mexicans were experiencing as a result of these shortages. Some of these water problems have been recognized for centuries and partial solutions have been developed.

The story of New Mexico's water resource problems and of water resources research is a story of people, many people. It is a story that began with the native people and the unfolding problems occurring with the settlement and development of the state and region.

Water is required by all life. It influences all factors of the environment. It is the lifeblood of New Mexico, and has been since the early records of man in this area.

The cisterns high up on the cliffs of the Acoma Pueblo, near Grants, supplied domestic water for the Indians living there. In the Chaco Canyon in northwestern New Mexico, at Pueblo Bonito, which dates from about 920 A.D., archeologists have found stone diversion dams that show considerable knowledge of irrigation on the part of the Indians of that time. The journal of Captain Juan Jaramillo, who traveled with Coronado on his expedition along the Rio Grande Valley in 1540-1542, refers to irrigation among the Pueblo Indians, noting that, "There is an irrigation stream, and the country is warm. They have corn, beans, and melons for food." Other evidence that irrigation was practiced by the early-day Indians has been found near Santa Rosa and Pecos, and among the Navajos.

Water, starting with a raindrop on a particular spot, moves very quickly to a small trickle, later to a stream, and on to the ocean. It also moves as surface water and groundwater.

New Mexico's distinctive tri-cultural history is apparent in its water laws. Indian, Spanish, and Mexican farmers of pre-Territorial New Mexico practiced the principle of prior appropriation, which was based on early Spanish and Mexican law. This principle, public ownership of surface water, with rights assigned by prior appropriation and beneficial use, was perpetuated in early treaties, land grants, the New Mexico Territorial Constitution, and the 1912 State Constitution. The same principles were applied to groundwater in 1931 by New Mexico law.

EARLY DISCUSSIONS

As some aspects of water were discussed with the Agricultural Economics staff and with others, it became evident that our staff and students needed more information on water and the numerous problems associated with water. As a result, a seminar on water was scheduled for the spring semester of 1956. When the public heard the seminars were being held and who the speakers were, several people called and asked how they might attend. We could not invite the public into the classroom, but we did agree to reschedule as many of the seminar speakers as possible for a public forum in the fall of 1956. The forum was held with an attendance of about 150 people from most parts of the state. Farmers, businessmen, university people, local, state and federal officials, and individuals with various interests came.

At the end of that meeting in Milton Hall on the university campus, it was agreed that this conference be designated the "First

Annual New Mexico Water Conference." The early conferences became a great force in the understanding of the water problems of the individuals, local, state and nation.

Some of those who prepared papers for the early conferences and participated in the discussions were: State Engineer Steve Reynolds (Steve has attended and participated in at least 23 of the 25 Annual Water Conferences; in addition, he has been a major speaker on a number of the annual programs); Roger B. Corbett, President of NMSU; Governor Edwin L. Mechem; Rogers Aston of Roswell; Lloyd Calhoun of Hobbs; Dean of Agriculture Robert H. Black; U.S. Senator Clinton P. Anderson; U.S. Congressman Thomas C. Morris of Tucumcari; Ross Malone of Roswell, at that time President of the American Bar Association; Justice Irwin Moise of the New Mexico State Supreme Court; Arthur S. Fiedler, U.S. Geological Survey, Washington, D.C.; William Hale, Groundwater Resources Division, USGS, Albuquerque; and Jack Campbell, Chairman of the Governor's Water Resources Committee, later Governor of New Mexico.

Water Resources Research Institute Established

The first eight Annual New Mexico Water Conferences, 1956 through 1963, with speakers such as the above and many others, might be considered forerunners of the Water Resources Research Institute. The Institute was established by the New Mexico State Board of Regents in February 1963, 17 months before Senate Bill S-2 (Water Resources Research Act of 1964) was signed by President Johnson on July 17, 1964. The participation of Senator Anderson and

Congressman Morris in the very early water conferences may have specifically directed their attention to the great need for water resources research and led them to be the first men to introduce the water research legislation in the Senate and House. These bills, with minor revisions, eventually became the Water Resources Research Act of 1964, establishing Water Resources Research Centers in each of the 50 states and Puerto Rico.

Senator Anderson, in presenting the legislation to the Senate, said he had patterned the water research bill after the Experiment Station Act of 1887, which established an Agricultural Experiment Station at the land grant colleges in each of the states. By coincidence, the Agricultural Experiment Station Act and the Water Resources Research Act were signed into law by the Presidents, one on July 17, 1887 and the other on July 17, 1964 -- 77 years to the day later.

Characteristics of Water

Water is as complex in its nature as in its uses. It does not recognize boundaries, whether private, county, state or even international. It is used and reused as it moves along. Therefore, all segments of our society -- government units, industry and individual citizens in all walks of life -- must share in the proper use of water and the control of pollution.

As stated by an unknown author, "Water is a 'must' for all forms of life on earth -- for drinking, growing food, keeping clean. Water is needed for work, for cooling, carrying, lifting and

building. And water is needed for play -- for swimming, boating, fishing and camping."

The late John W. Clark, a civil engineer who became the second Director of the Water Resources Institute, stated during the First Annual Water Conference, "Remember, water is neither created or destroyed. Nor is it changed in form; it merely becomes dirty and all we have to do is wash it."

Some of those present here today will remember that John Clark emphasized that point by taking up a beaker of sewage water which had been "washed" in the laboratory and drank it. John did not get sick, but some of the audience felt like they might. He demonstrated what was a fact at that time, but is now a process being used by several cities to maintain their water supplies, by reclaiming their sewage waters for domestic use.

WATER RESOURCES RESEARCH INSTITUTE

The Board of Regents of New Mexico State University recognized the need for water research when it authorized the establishment of New Mexico State University Research Institute in February, 1963.

When the Water Research Act of 1964 was passed by Congress and signed by President Johnson in 1964, the Office of Water Resources Research was established in the Department of Interior. At that time Governor Jack Campbell recommended New Mexico State University as the institute center for New Mexico. In his letter of recommendation to the Department of Interior, Governor Campbell stated, "New Mexico State University had held nine water conferences

and had conducted many studies in connection with its outstanding agricultural and scientific programs."

Objectives of the New Mexico Water Resources Research Institute:

1. To promote scientific endeavor in the area of water resources research.
2. To encourage and facilitate the entry of qualified scientists into water resources research through their particular disciplines.
3. To coordinate, integrate and facilitate the efforts of scientists and organizations conducting water resources research at New Mexico State University.
4. To interest, encourage and train young scientists through research, experiments, and investigations.
5. To disseminate the results of New Mexico's water resources research work in both broad and specific areas to the public and to organizations interested in such research.
6. To provide the means of contact between the scientists doing this research and organizations supporting such research.

Institute has Statewide Responsibility

The Institute, although located at New Mexico State University, has statewide responsibility to encourage and conduct water resources research at New Mexico State University and other institutions of higher learning in New Mexico. It also can, and

does, cooperate with private, county, state, and federal organizations interested in water research.

Specific Characteristics

The New Mexico Institute has the following characteristics:

1. There has been a full-time Director of the Institute continuously since March 15, 1964.
2. The Institute operates as a unit administered directly from the New Mexico State University President's office.
3. The Institute has been housed since 1970 in a separate building, "Stucky Hall," built specifically for the exclusive use of the Water Resources Research Institute located on the University campus.
4. The Institute has signed agreements setting out its working relationships as follows:
 - a. Memorandum of Agreement between the United States Office of Water Resources Research, New Mexico State University, and the New Mexico Water Resources Research Institute, signed March 12, 1965 by the Director of the New Mexico Water Resources Research Institute.
 - b. Annual allotment project agreement, signed March 12, 1965.
 - c. Policy statement issued January 6, 1967 by New Mexico State University President Roger B. Corbett.

- d. Basic objectives and operating statement, issued January 6, 1967 by Richard Duncan, Vice President for Research.
 - e. Memorandum of Agreement between University of New Mexico, New Mexico Institute of Mining and Technology, and New Mexico State University, signed July 8, 1966.
 - f. Supplement to the July 8, 1966 agreement between University of New Mexico, New Mexico Institute of Mining and Technology, and New Mexico State University, signed June 23, 1970.
5. Because of the New Mexico Water Resources Research Institute's unique relationships established by legislation and by the above agreements, the Institute does not have a research staff of its own, but draws on the faculties and research assistants from the appropriate departments in one or more universities by soliciting either single faculty member proposals or by organizing multidisciplinary projects and again soliciting faculty member participation in the various phases of larger projects. This avoids building a staff which quickly gets "cast in concrete." When a project is completed the Institute is not obligated to support an in-house staff.
6. Some projects are single-discipline, one-man efforts, while others are multidisciplinary, multiuniversity projects with joint participation in the funding, the gathering of data,

and the research procedures and analysis. Participation by private, state, or federal agencies may become available for support of either type of project, depending on the subject being studied.

New Mexico Water Resources Research Institute the First in the Nation to Receive Approval Under S.2

Senator Clinton P. Anderson in his newsletter to his constituents, dated August 10, 1965, included the item: "Just 12 months ago Congress created the water resources research program. As a result, a state water resources research center has been established in each of the 50 states and Puerto Rico -- the first at New Mexico State University."

A Broad Program of Water Resources Research

The Water Resources Research Act of 1964 established a Water Resources Research Institute or Center in each of the 50 states and Puerto Rico. The institutes or centers were to add to, and not substitute for, the research being conducted by the Agricultural and Engineering Experiment Stations, the several federal and state agencies, such as the State Engineer Offices and the U.S. Bureau of Reclamation, or private business and individuals. As stated above, the objectives of the program are to: (1) encourage and facilitate the entry of qualified scientists into water resources research; (2) interest, encourage, and train young scientists through research, experiments, and investigations; and (3) provide the means of

contact between scientists doing research and organizations supporting research.

Scientists, Students and Financing Attracted

The New Mexico Institute in its first 11 years of operation attracted research scientists from six institutions of higher learning, representing 31 different academic disciplines. Also, direct appropriations were made to the institute by the New Mexico State Legislature, and direct funding for professional personnel was made available to collect data. Also, direct funding was provided to the institute by 16 local, state, or federal agencies. A total of 816 students in five academic institutions of higher education in New Mexico and one in Texas were employed by the principal investigators working on research projects funded in whole or in part through the New Mexico Water Research Institute during its first 11 years of operation.

These students not only made possible the volume and quality of research accomplished, but they gained valuable education and training from this employment.

Water Resources Research - The Early Years

Water is intertwined in the lives of every person in the United States, the North American Continent and the World. Water is required in almost every activity -- whether family, business and industry, social and political, or in governments and between governments. It involves studies in single disciplines such as engineering, agriculture, hydrology, meteorology, economics,

business and political science, to name a few. Water does not respect political and legal boundaries, and does not respect disciplinary boundaries. For this reason, a great amount of research in many disciplines, and in multidisciplines is needed to assist in the most beneficial use of our water resources.

To address the topic, "Water Resources Research - The Early Years" -- even though many research projects have been completed and even more investigations begun, much, much more will be required to guide the development and management of our vital water resources.

Water development and management is related to the sources of water, qualities of water at a particular location, river basins, population, population locations, and endless other factors.

It appears to me that we are still in the early years of water resources research. The New Mexico State Water Resources Research Institute can assist in this work in New Mexico, the region, and the nation. This research institute, together with the 50 other water research institutes and centers, through cooperation and through leadership, can contribute to the knowledge required to develop and manage the resources. Other established agencies must also contribute in their areas of authorization and expertise.

As Dr. Gerald W. Thomas, President of New Mexico State University and member for three years of the U.S. Board of International Food and Agricultural Development, recently wrote, "Water is a renewable resource, the supplies are limited. Over the long term, water will likely be the most limited factor in world

food and fiber production, exceeding both land and energy in importance."

The National Water Resources Research Institutes program, with its increased emphasis in both the state and nation, is still in its teen years (1964-1980). With the large volume of national and state legislation, court decisions, and increasing populations, water research has just begun.

Yes, truly we are still in the early years of water resources research.