

WATER IN THE ECONOMIC DEVELOPMENT OF NEW MEXICO

Governor Jack M. Campbell^{1/}

The story of the relationship between man and water in New Mexico is a long and dramatic one. It is not surprising that the central character in a Pulitzer prize-winning book by a New Mexico author should be a river. I am referring, of course, to Paul Horgan's epic of the Rio Grande -- "Great River." The Rio Grande is the center of our country's oldest known inhabited area. New Mexico is the oldest irrigated area in the nation. When Coronado came this way in 1540, he found irrigation works developed by the Indians of that period along the river. The relationship has sometimes been less than friendly where New Mexicans and water are concerned. As one of our state's favorite writers, Erna Fergusson, wrote: "Water is what New Mexico never has enough of -- except where and when it has too much."

April 1, 1965 finds us continuing our centuries old struggle to secure enough water in the right place at the right time. Our tools and strategy may range from the very old to the very new: windmills, ditches, an experimental desalinization plant, dirt dams, a \$13 million tunnel through the Continental Divide, pipelines and professional rain makers. We use every means at our disposal to provide that precious liquid that makes life not only pleasant, but possible, and, I believe, we are making progress. Thanks to new public and private projects and the programs of educational and research institutions such as New Mexico State University, I am optimistic about our future. We have some of the finest water laws in the nation and an outstanding agency, the State Engineer's office, to administer them. The state's water program generally reflects an official recognition of the need for development of water for agricultural, municipal and industrial use with increased attention to the demands for water-related recreation.

New Mexico, like other states, has moved from a rural to an urban economy in the past three decades. This population shift has brought changes, some of them painful, to the organization and administration of education, government and business in this state. There is no reason why water priorities should escape the effects of this social and economic evolution. The philosophy of utilization of all natural resources is undergoing a transition throughout the West. When this area was first settled, those who exploited its timber, oil and minerals, its grass, water and farmland were a powerful economic and political force.

They still are. However, the sportsman, the conservationist and the tourist, also are beginning to exert public pressure, alongside the traditional interests of the mine owners, cattlemen and lumbermen.

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Since 1950, the West, including New Mexico, has grown twice as fast as the nation. There is a surge of new life, much like the frontier spirit. What has been called "The great western tilt" is pouring millions of people into these states. There is new interest in bridging the gap between what our economy now produces and what it might produce in human benefits. This process of wiping out the distance between the actual and the potential is what we call economic development. Education is speeding up this process throughout our nation, and in New Mexico, colleges and universities are playing an increasingly important role in the efforts of government and industry to promote economic growth.

A recent water study indicated that the value added to our economy by use of an acre-foot of water applied to agriculture in New Mexico is about \$50, while the value of that amount added to industrial use is about \$4,000. As you know, at the present time about 93 percent of all water diverted in New Mexico is used for irrigation. Most of the other 7 percent goes to municipal and industrial purposes. Conferences such as this one can help point the way toward development of all our resources, including water.

WATER SUPPLY

Although New Mexico is located generally in a semi-arid area, we do have water. Precipitation averages about 13 inches a year over the state -- for a gross product of roughly 85 million acre-feet. About 3 million acre-feet of that sum appears as runoff in streams. The remainder returns to the atmosphere through evaporation and use by natural vegetation, or it percolates into the earth as recharge to underground aquifers, which do not discharge to streams within the state.

In addition, New Mexico receives about 2.5 million acre-feet annually of stream flow from Colorado, via the San Juan River and Rio Grande, and about 2,000 from Arizona, via the San Francisco River. Of the combined inflow and in-state surface water yield, about 2 million acre-feet is used up in New Mexico and about 3.5 million is discharged to downstream states. When New Mexico has fully developed her surface-water resources within the allowances of the seven interstate compacts to which she is a party, river inflow to the state will approximately equal outflow, and this state will use about the amount of streamflow that she produces.

In addition, New Mexico is fortunate in having large quantities of water in underground storage -- estimated by the U. S. Geological Survey to total 20 billion acre-feet, of which a fourth, or 5 billion acre-feet, is thought to be fresh or only slightly brackish. Of course, not all the ground water in storage is physically and economically extractable, and we cannot rely on these quantities in planning our future.

WATER DEMANDS

In New Mexico, we are presently diverting about 2.7 million acre-feet of water annually for the irrigation of about 960,000 acres of land. Of that amount, about 1.6 million acre-feet is diverted as surface water and the remaining 1.1 million acre-feet is pumped from wells. About 135,000 acres of the 960,000 irrigated is furnished water from both wells and surface sources, with the underground source being used when surface supplies are deficient.

Most of the irrigated acreage in three of our major irrigation districts -- the Carlsbad Irrigation District on the Pecos River, and the Middle Rio Grande Conservancy District, and the Elephant Butte Irrigation District on the Rio Grande -- are served with both surface and ground water.

Only about 170,000 acre-feet of water is used annually for municipal and industrial purposes. About 70 percent of this amount is taken from ground water sources. All but a few of our major cities rely entirely on ground water sources for municipal supply.

GROUND-WATER PROBLEMS

Use of ground water in New Mexico for irrigation and other purposes increased from less than one-half million acre-feet in 1940 to about one million in 1960. New Mexico's ground-water code, vesting in the State Engineer authority to supervise the appropriation and use of ground water, dates from 1931. Thus far the State Engineer has declared 20 basins, embracing a total of about 25,000 square miles -- more than a fifth of the state's area.

The locations of all large supplies of economically usable ground water in New Mexico are believed to be generally known and an increase in ground-water usage in the next 20 years, comparable with that of the past 20 years cannot be anticipated. However, the problems of administration are certain to increase in number and complexity as demands continue to rise, as supplies diminish, and as competition stiffens.

Most of the 1.1 million acre-feet of ground water being pumped in New Mexico at present is being "mined." That is, in most areas the average withdrawal from the aquifer exceeds the average annual recharge, and water levels are declining. It is desirable that groundwater resources be available to future generations; however, the mining of water can be justified as readily as the mining of our other natural resources, such as gold, oil or coal.

In some instances, it may be possible to meet these problems by adjustment of the area economy. The municipal and industrial market for water can bear much higher costs than irrigation agriculture.

Thus, when reduced yields per well or excessive pumping lifts make pumping for agriculture uneconomic, the residual water may supply the municipal and industrial needs of a vigorous nonagricultural economy for many years. The problems of the future may be met in part by importation of water and by desalinization of locally available saline and brackish waters.

FUTURE WATER DEVELOPMENT

There are several ways in which the growing need for water in New Mexico can be met. One of these is to develop the substantial amounts of the water which New Mexico is entitled to use under our interstate compacts and which have not yet been put to beneficial use.

San Juan River .

Under the Colorado River Compact of 1922 and the Upper Colorado River Basin Compact of 1948, New Mexico may deplete the flow of the San Juan River and its tributaries in New Mexico by 800,000 acre-feet or more annually. We are presently depleting the flows of the San Juan system by about 100,000 acre-feet per year, or one-eighth of the depletion to which we are entitled.

The Colorado River Storage Project Act of 1965 authorized the Bureau of Reclamation to construct four large storage reservoirs. The first major unit to be completed was Navajo Dam and Reservoir near Aztec three years ago. Besides providing one of the best boating and fishing lakes in the Southwest, this unit will store water for the Navajo Indian Irrigation Project and the small Hammond Irrigation Project. The Navajo project is presently under construction and will irrigate 110,000 acres on the reservation in the San Juan Basin. The \$135 million completed arrangement of canals, tunnels, siphons, pumps and power plants will also supply municipal, industrial and recreation needs.

Also under construction is the San Juan-Chama Transmountain Diversion Project, sponsored by the federal government to bring dramatic expansion in recreation, conservation, agriculture and industry in northern New Mexico and the Rio Grande Basin. When completed in 1971, it will bring an average of 110,000 acre-feet of water a year from Colorado through the Continental Divide into New Mexico.

Digging began early this year on the first tunnel of the \$89 million project with the use of a new machine, called the Mole, chewing its way through the mountains west of Chama. In addition to conservancy district and tributary units allotments, this system will supply 53,000 acre-feet annually for the city of Albuquerque, and 5,000 acre-feet to maintain the Cochiti recreation lake to be formed on the Rio Grande between Santa Fe and Albuquerque.

The total cost of works constructed and authorized for New Mexico as part of the Colorado River Storage Project appears to come to more than \$270 million.

Canadian River

The Canadian River Compact, executed in 1950 by New Mexico, Oklahoma and Texas, allots to New Mexico free and unrestricted use of all waters originating in the drainage basin of the Canadian River below Conchas Dam, with a 200,000 acre-feet limit for conservation storage.

The Ute Dam was built in 1961-62 with \$5 million of state funds near the village of Logan in Quay County. It was the first major dam in New Mexico to be constructed entirely with state financing. A number of communities in eastern New Mexico are planning a pipeline transmission system and negotiating with the Interstate Stream Commission for purchase of water from Ute Reservoir. With a 50,000 acre-feet permanent pool for recreation, it appears the recreation usage alone will go a long way toward justifying the state's investment.

Gila River

We also hope to develop additional water for use in New Mexico on the Gila and San Francisco Rivers, which rise in our state and flow through Arizona to the Lower Colorado River. Studies indicate it would be possible to construct Hooker Dam in western New Mexico and increase our uses by 50,000 acre-feet per year in an exchange for Colorado River water if the Central Arizona Project is authorized. We have not yet been able to persuade Arizona officials to agree to this exchange. I am optimistic that agreement can be reached, although it may be delayed by what is sometimes called "hydropolitics".

FUTURE WATER DISTRIBUTION

Current plans for the development of the unused waters of the San Juan and Canadian Rivers should meet the growing municipal and industrial needs in the San Juan Basin, the Lower Canadian River Basin, and at least the Albuquerque area of the Rio Grande Basin for several decades, and at the same time provide for substantially increased agricultural usage and recreation opportunities.

In other areas of the state, growing municipal and industrial needs can be met by acquiring water rights presently being exercised for irrigation. It seems clear that the necessity to pay a fair price for redistribution of water from agricultural to industrial use should be no deterrent to the establishment of an industrial economy. Industries that come to New Mexico are those that do not place a heavy demand on water resources: minerals development and processing, lumber products, food processing, electronics and instrumentation.

Generally speaking, competition among various types of water users in New Mexico is not intense at this time as the industrialization and urbanization which the experts anticipate for New Mexico is just beginning. In 1950 our population was 681,000. It passed the million mark last year, and it has been predicted by the New Mexico Bureau of Business Research that there will be more than two million residents here by 1980. Whether or not these projections are realized will depend on a number of factors, including the manner in which we manage our water resources.

In projecting population and water needs, we realize that agricultural activities will provide little opportunity for increased employment. For example, it is estimated that the proposed 110,000 acre Navajo Indian Irrigation Project will provide for the livelihood of about 18,000 people on the Navajo Reservation. The operation will divert about 508,000 acre-feet of water and will deplete the supply by 254,000 acre-feet, a depletion of about 14 acre-feet per person. In an urban-industrial economy, such as that presently existing in the Albuquerque area, the depletion requirement is only about one-tenth of an acre-foot per person. So, if current projections of population are correct, progressively larger amounts of the state's water supply must be put to municipal and industrial uses to meet what will be a spectacular rise in our economic base and population.

Also, the demand for water-related recreation is bound to boom as we experience continued growth in number of people and hours for leisure.

RECREATION WATER

Those who think of New Mexico as a desert state will find it difficult to believe that the State Park and Recreation Commission has registered almost 9,000 boats.

There are 14 important storage reservoirs in New Mexico, reservoirs having a usable capacity of 30,000 acre-feet or more. While some of these are primarily for flood control, at least 11 of them provide substantial recreational opportunity. Two of them -- the Navajo and the Ute -- also are designed for municipal and industrial uses.

Recreational facilities will be found at the Alamogordo Reservoir on the Pecos River; Bluewater Lake on Bluewater Creek; Caballo on the Rio Grande; Conchas on the Canadian River; Eagle Nest on Cimarron Creek; Elephant Butte on the Rio Grande; El Vado on Rio Chama; Lake McMillan on the Pecos River; Morgan Lake on La Plata River; Navajo on the San Juan; and Ute Reservoir on the Canadian. Cochiti Pool on the Rio Grande will provide recreational opportunities for the most heavily populated area of New Mexico when it is completed.

New Mexico has some of the best trout streams and lakes and warm-water fishing in the Southwest. The state's fish and game resources attract sportsmen by the hundreds of thousands, thus bolstering the economy by many millions of dollars annually. In the mountainous northern sections and in the southwestern mountains are hundreds of miles of clear, cold, trout water, where one can find various species from Loch Leven to Brown. Lake fishing offers crappie, sunfish, largemouth black bass, catfish and walleye.

Most of the warm water fishing is provided by four large reservoirs: Conchas Lake, Elephant Butte, Caballo and Alamogordo. In addition, there are about 175 smaller lakes and reservoirs in the state, totalling 375,000 surface miles. There are about 15 fishing streams that are 20 feet wide and have a combined length of 1,300 miles. There are 250 fishing streams under 20 feet in width and totalling 2,250 miles in length.

MODERN NEW MEXICO

I have mentioned this morning a few of the reasons why I am optimistic about New Mexico's future, not only in regard to meeting our water needs, but in every aspect of economic and human progress.

I would like to add that our state's economy is entering its fifth year of uninterrupted growth. I believe the advances we have seen the past few years indicate what we can expect in the future if we continue to utilize efficiently our natural and human resources.

You have all heard by now of the article that appeared in a national magazine last year describing New Mexico as a center of scientific-related industry and smokeless think-and-theory businesses. The emergence of the Land of Enchantment as a leader in the new age of atomic energy and space travel has been the result of world history, our unique geography, and finally, recognition of the economic value of brainpower.

History provided World War II and the demand for a super weapon to stop that slaughter. Geography provided in New Mexico the wide open spaces and isolated mountain region suitable for secret production and testing of the secret bomb.

A desolate area not far from Las Cruces provided space for the first nuclear blast that early morning 20 years ago this coming July 16. Later, it offered enough room for the testing of rockets and missiles as the United States aerospace program took its first tottering steps across White Sands Missile Range. Just for good measure, nature threw in the largest deposits of uranium in the free world in northwestern New Mexico.

Developments up to that point had been the result of coincidences in history and geography. Then education and government realized the

practical value of these mysterious research and testing centers. New Mexico State University and the University of New Mexico strengthened their scientific disciplines and recruited top personnel to direct their departments. Laboratory and research facilities were improved and enlarged, and they received valuable contracts to conduct important projects for the military services and the Atomic Energy Commission. The State Department of Development took a survey and found that New Mexico had more citizens per capita with advanced degrees in scientific and engineering fields than any other state.

I believe the future of New Mexico, including the development of its water resources, lies in giving top priority to quality education at every level and to the attraction of scientifically oriented personnel and industry. The high growth businesses of tomorrow will be based on brain, power and human excellence. This kind of industry will not be looking so much for communities with railroad sidings and low-cost water as for intellectual climate receptive to new ideas and unconventional ways of doing things. This is the kind of climate that this institution and you who are present at this conference are helping to create.

I believe the Land of Manana can move into the 21st century of nuclear-powered space ships, without sacrificing its friendly charm and colorful mingling of Spanish, Indian and Anglo cultures. We do not need to neglect our traditional economic base of agriculture, mining and oil production, while luring technical and electronic operations, and promoting tourism and outdoor recreation. The type of person who works at a laboratory or research center will enjoy the kind of scenery and outdoor activities to be found in the Southwest.

You might be interested in some of the things that state government and private enterprise are doing cooperatively to bring visitors and new residents to New Mexico. When I leave here this afternoon, I will go to Albuquerque to take part in our second statewide conference on tourism, conventions and recreation. We will meet with people from all areas of New Mexico to help them promote their particular type of enchantment. Our national advertising campaign has been expanded this year to seven major magazines and 15 newspapers. The State Department of Development is assisting White Sands Missile Range officials in establishing tourist information facilities at road blocks set up during missile firings. The Junior Chamber of Commerce is going all out to help sell the New Mexico Magazine. Our state will be represented at the New York World's Fair again this year with an exhibit financed out of private funds in cooperation with state development leaders.

New Mexico streams and rivers will receive 50 percent more trout this year over last as the result of the recent construction of new and improved fish hatchery facilities by the State Game and Fish Department. The State Park and Recreation Commission has doubled

the number of facilities at state parks the past two years. Boat launching ramps, access roads and other public facilities have been built at Elephant Butte and Caballo recreation areas, which have been turned over to the state by the federal government for operation.

CONCLUSION

In conclusion, I would like to repeat that there is no phase of economic development in New Mexico in which water does not play some role, usually an important one. That is why I appreciate this conference and you who have come here to exchange ideas and to help us find ways of using efficiently the water that we have and finding new sources of this indispensable resource. Water has been the key to great happiness and the cause of great misery to the people of the Rio Grande for many centuries. I believe the challenges we New Mexicans face in 1965 are as exciting and hopeful as any in the history of man.

In a message to Congress in 1962, our late President John F. Kennedy said, "Our nation's progress is reflected in the history of our great river systems. The water that courses through our rivers and streams holds the key to full national development." He went on to add: "Our goal, therefore, is to have sufficient water sufficiently clear in the right place at the right time to serve the range of human and industrial needs."

I am confident that with the counsel and leadership of citizens like yourselves, we in New Mexico will meet and solve these problems successfully.