

## STATE WATER PROGRAM

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It is often said that water is the limiting factor in the economic development of our State. The statement is a truism, but it is too often implied that we are already at, or very near, the limit of economic development because of the scarcity of water in New Mexico. Such an implication is certainly not justified. Substantial quantities of water which we are entitled to have not yet been developed for beneficial use; also, our economic development can be greatly extended by the orderly redistribution of water among beneficial uses under our law, by the salvage of water now lost to nonbeneficial evaporation and transpiration, and by improving the efficiency of agricultural water use.

### Undeveloped Water

The average annual recorded outflow from the State in the San Juan River is about 2,200,000 acre-feet. Under the Colorado River compacts the State of New Mexico may deplete the flow of the Upper Colorado River system by about 840,000 acre-feet per year. Present depletions of the San Juan River in New Mexico amount to only about 92,000 acre-feet per annum. Additional uses now authorized will bring our depletion to about 275,000 acre-feet per year.

Plans for further development of our share of the waters of the San Juan River under the Colorado River Storage Project are well advanced. These plans have been developed by the Bureau of Reclamation and Bureau of Indian Affairs in close cooperation with the State. The Colorado River Storage Project was authorized by Public Law 485 in April of 1956. The act provides for four large reservoirs on the Upper Colorado River system which will insure deliveries to the lower Colorado River Basin in accordance with the 1922 compact, provide a regulated supply for uses in the upper basin, and produce electrical energy. The revenues from this power will be used first to repay the cost of the main storage reservoirs, and then to repay a large share of the construction costs of irrigation projects in the Upper Basin states.

The first unit of construction in New Mexico, Navajo Dam and Reservoir, with a capacity of 1,700,000 acre-feet, is now about 75% complete. This regulatory unit of the storage project will store water for the proposed 110,000 acre Navajo Indian irrigation project and 3900 acre Hammond Irrigation Project, which is now under construction, as well as water for future municipal and industrial needs in the San Juan Basin. The unit will also provide excellent opportunity for recreation and fish and wildlife propagation, as well as flood and sediment control benefits.

Plans for the development of the waters of the San Juan Basin also include the proposed Animas-La Plata Project which would use the flows of the Animas and La Plata Rivers to irrigate about 60,000 acres in Colorado and about 20,000 acres in New Mexico. The Bureau of Reclamation is presently making a feasibility investigation of this project.

Our plans include the San Juan-Chama Project which would take water from tributaries of the San Juan River in Colorado through the Continental Divide in about 40 miles of tunnel and closed conduit for use in the Rio Grande Basin.

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The State is presently seeking authorization for only the initial stage of the San Juan-Chama Project which would be limited to an average diversion of 110,000 acre-feet per year. The diversion would provide for these depletions: 29,900 acre-feet in exchange for Rio Grande system water used on rehabilitated irrigation units on tributaries of the Rio Grande in northern New Mexico; 22,600 acre-feet for supplemental irrigation supplies for the Middle Rio Grande Conservancy District; and 57,500 acre-feet for the City of Albuquerque.

The plans contemplate that the San Juan-Chama Project would be constructed so that the works could be extended by the construction of subsequent stages to provide for total diversions from the San Juan Basin to the Rio Grande Basin averaging up to 235,000 acre-feet per year. Whether these extensions will be constructed depends upon the time at which future needs arise in the San Juan and Rio Grande Basins, and the State's judgment as to what distribution of the water resources of the San Juan Basin will best serve the public interest.

While the plans for development of the waters of the San Juan River provide large amounts of new water for agricultural purposes, large amounts are also allocated for future municipal and industrial uses. Under existing plans and authorizations the depletion amount available for municipalities and industry is about 204,000 acre-feet. This amount of water would serve the needs of more than 2 million people in an economy similar to that of the Albuquerque area.

Our plans for the development of the San Juan River must be carried out soon if the growing water needs of the State are to be met. In May of 1959 the United States Senate approved a bill introduced by Senators Anderson and Chavez to authorize the Navajo Irrigation Project and the initial stage of the San Juan-Chama Project. On May 19, 1960, the Secretary of the Interior recommended to the Congress the authorization of these projects. On May 20 a House committee held hearings on bills introduced by Congressman Morris and Congressman Montoya to authorize the projects, but there was not time for the committee report to be presented to the House for action.

Authorization of these projects has been impeded by objections raised by the State of Colorado. The controversy with Colorado seems to be resolved and I think we are justified in being cautiously optimistic about the authorization of these projects by the first session of the 87th Congress.

One of the provisions of the Canadian River Compact is that New Mexico shall have free and unrestricted use of all waters originating in the drainage basin of the Canadian River in New Mexico below Conchas Dam, provided that the amount of conservation storage in New Mexico for impounding these waters shall be limited to an aggregate of 200,000 acre-feet. Within this limitation we should be able to develop an additional firm supply of at least 70,000 acre-feet per year.

The 1959 legislature authorized the New Mexico Interstate Stream Commission to issue bonds guaranteed by \$5 million of severance tax revenues to finance construction of dams on the Canadian River or its tributaries between Conchas Dam and the Texas border. The act also provides that the severance tax funds used to pay the interest and principal of the bonds shall be repaid from water revenues as they become available.

Preliminary studies indicate that the initial stage of a dam and reservoir having an ultimate capacity of about 365,000 acre-feet can be constructed for

about \$5 million. The dam would be constructed on Canadian River just below Ute Creek. The initial stage having a total capacity of about 170,000 acre-feet would yield a firm supply of about 40,000 acre-feet of water annually. There is some potential for agricultural use of this water, but at this time it appears likely that a substantial part of the water would be available for municipal and industrial use. Preliminary estimates suggest that the water in the reservoir could be made available to industry at a cost of around 1.4 cents per 1000 gallons. The price should be attractive to industry and there is good reason to believe that the second stage of construction which would make available an additional 15,000 acre-feet of water per year could be financed with water revenues when the water is needed. We expect that the project will also yield very substantial recreation, and fish and wildlife benefits.

The legislative authorization does not require a showing of economic feasibility before construction is undertaken. The legislature is betting that if the water is developed, users, willing and able to pay the cost of development, will be attracted. I think this is a good bet.

#### Redistribution Among Types of Use

The State's water program reflects a recognition of urgent need for the development of water for both agricultural and municipal and industrial use. A crucial feature of our water problem is the fact that agricultural pursuits will provide little opportunity for increased employment. If current projections of the State's 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 spectacular increases in our economic base and population. To put this in perspective - experts of the Bureau of Business Research at the University of New Mexico predict that our 1960 population of 943,000 will increase to about 2½ million by 1980. Whether or not these increases will occur depends, of course, on a number of factors, including the manner in which we manage our water resources.

The State's program for the 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 in at least the Albuquerque area of the Rio Grande Basin for several decades.

In other areas of the State growing municipal and industrial needs can be met by acquiring water rights presently being exercised for irrigation. Our statutes permit the change of point of diversion, and the change of place and purpose of use of water rights, if such changes will not impair other existing rights to the use of water. Both municipalities and counties have the power under New Mexico law to condemn water rights for public purposes. The process of condemnation, of course, requires fair payment to the owner whose water rights are taken.

At present time about 93% of all water diverted in New Mexico is used for irrigation. Most of the balance of 7% is used for municipal and industrial purposes. It follows that our municipal and industrial usage could be doubled by a reduction of only about 7½% in the amount of water used in the agricultural economy of the State.

A recent report by Dr. Nat Wollman of the University of New Mexico states that about \$50 is the value of an acre-foot of water applied to agriculture in New Mexico, while the value of that amount of water applied to industrial use is about \$4000. Also, in most cases the cost of water is a very small fraction of the initial investment and operating costs of an industry. The necessity to pay a fair price for the redistribution of water from agricultural to industrial use should be no deterrent to the establishment of industrial economy. Numerous water right transfers already on file in my office substantiate the soundness of that statement. I don't think it can be questioned that, under our law, water can be redistributed to growing municipal and industrial requirements, through the exercise of the power of eminent domain and the effects of economic competition.

### Water Salvage

We seem to have an excellent opportunity to increase our economic base and our ability to support a growing population by the development of water which presently flows out of the State, and by redistributing water to new uses. We can also increase the usable amount by salvaging water which is now being lost to evaporation and transpiration by nonbeneficial plants.

In 1950 the Bureau of Reclamation estimated that nonbeneficial losses from the Rio Grande in New Mexico amounted to about 570,000 acre-feet annually exclusive of evaporation from reservoirs. A major part of this loss resulted from the need for flood and sediment control and improved drainage, and from losses to salt cedar, cottonwood, willows and tules. An attack on this problem was launched with the authorization of the Middle Rio Grande Project in the Flood Control Act of 1948. Under this authorization 57 miles of levees have been completed in the Albuquerque-Belen reach of the river; Jemez Dam and Reservoir Project near the mouth of Jemez River is completed; Abiquiu Dam is under construction on the Chama River; 112 miles of river channelization and rectification have been completed; rehabilitation of the drainage works of the Middle Rio Grande Conservancy District is almost complete, and about 60,000 acres of nonbeneficial water consuming vegetation has been sprayed or cleared.

The Flood Control Act of 1960 authorized the construction of Cochiti and Galisteo Reservoirs for flood and sediment control. Cochiti Dam will be built on the main stem of the Rio Grande at the head of the Middle Valley, and Galisteo Dam will be built near the mouth of Galisteo Creek to control both Galisteo Creek and the Santa Fe River. Expenditures by the Bureau of Reclamation and the Corps of Engineers on the Middle Rio Grande Project through this fiscal year will amount to about \$54 million. The completion of work now authorized, including Cochiti and Galisteo Dams will bring total expenditures to about \$111 million.

The State has cooperated with the Bureau of Reclamation and the Middle Rio Grande Conservancy District in drainage and water salvage works to supplement the work authorized under The Middle Rio Grande Project. State expenditures from Ferguson Act funds from 1952 thru June 20, 1961, will total \$760,000. An additional \$125,000 of these funds will have been spent for water salvage work in the Caballo Reservoir area below Elephant Butte Dam.

It is estimated that work under the Middle Rio Grande Project and the supplemental cooperative work will salvage approximately 165,000 acre-feet of the 570,000 acre-feet which was being lost in 1950. Large amounts will still be lost to evaporation and transpiration from the Rio Grande in New Mexico, and further studies of potential water salvage measures have been initiated by the

Bureau of Reclamation with an allocation of \$66,000 in federal funds in this fiscal year, plus an additional State contribution of \$6600 from Ferguson Act funds.

The Pecos River in New Mexico is plagued by the same problems which beset the Rio Grande. Federal agencies, the Pecos River Commission, the States of New Mexico and Texas and local interests are cooperating to develop solutions to the problems on the Pecos. The Corps of Engineers has been authorized to construct Los Esteros Dam of the river about 7 miles above Santa Rosa. These works would provide flood protection and conservation storage to replace conservation capacity in Alamogordo Reservoir. Under present conditions siltation will make Alamogordo Reservoir ineffective as upstream storage for the Carlsbad Irrigation District within about 40 years. The Corps' plan requires that a part of the capacity of Alamogordo Reservoir be used for flood control, and, therefore, that a part of the irrigation district's storage capacity in that reservoir be transferred to Los Esteros Reservoir. The State is making hydrologic studies so that the District can be fully advised concerning the effects of the proposed transfer on its water supply.

The delta of McMillan Reservoir, terminal storage reservoir of the Carlsbad Irrigation District, is choked with salt cedar which use large amounts of water each year. Bureau of Reclamation studies indicate that approximately 24,000 acre-feet of water per year could be saved in the delta. The Carlsbad Irrigation District has accomplished some channel improvement and drainage work in the delta, but the losses are still high. The Bureau of Reclamation has been authorized to construct a low-flow conveyance channel and cleared floodway through the delta, but the authorizing legislation provides that the floodway shall not be cleared until provision is made to replace McMillan Reservoir storage capacity that would be lost by accelerated siltation resulting from floodway clearance. The Bureau is currently studying the feasibility of constructing a low-flow conveyance channel without a cleared floodway and the practicability of utilizing as a part of the low-flow channel the work already constructed by the District.

A recent reconnaissance report by the Bureau describes a plan of development for water salvage, flood control, and replacement of conservation storage on the Pecos. Data in the report suggest that the total amount of water salvagable under present conditions on the river is approximately 100,000 acre-feet per year. The report emphasizes that unless corrective action is taken, nonbeneficial consumptive use may be expected to increase markedly in the next 50 years, ultimately depleting the water supply by almost 340,000 acre-feet annually.

Among the possibilities discussed in the Bureau's report is the construction of Brantley Dam and Reservoir at a site about 4 miles downstream from the existing McMillan Dam. Brantley Dam and Reservoir with a capacity of about 300,000 acre-feet would provide badly needed flood protection for the City of Carlsbad, conservation storage for the Carlsbad Irrigation District to replace that function of McMillan Reservoir, and capacity for sediment control. Construction of Brantley Dam would permit the abandonment of McMillan Reservoir for conservation storage, and thus make it possible to do a full scale water salvage job in the McMillan Reservoir delta. The report suggests a permanent pool in Brantley Reservoir for recreation and fish and wildlife propagation, and the reservation of some storage capacity in McMillan Reservoir for fish and wildlife.

The State has requested a feasibility grade investigation of Brantley Dam and Reservoir Project, and I am advised that the Bureau has scheduled the study for next fiscal year.

#### Desalinization

As Dr. Miller has told you experimental work which has been carried out under the Department of the Interior's Office of Saline Water gives good reason to hope that new techniques for the desalinization of brackish waters and brines can materially enhance the water resources of our State. The techniques can be employed to improve the usefulness of present supplies as well as to make usable abundant brackish water resources presently unsuited for agriculture, domestic, or industrial use.

You have already heard excellent reports on this subject, so I will restrict my remarks to reporting that a proposed agreement, under which the State of New Mexico would contribute up to \$100,000 to the construction cost of the demonstration plant to be built at Roswell, has been submitted for the approval of the Board of Finance at their meeting on November 10. The 1959 session of the legislature authorized this contract. I feel that the people of Roswell and the State of New Mexico should be grateful for the opportunity that we have been given to help point the way to a most promising new source of water for beneficial use.

#### Watersheds

I have discussed at some length the programs of the Department of the Interior and the Corps of Engineers in the State, and it would certainly be amiss if I were not to mention the programs of the Department of Agriculture in a conference whose theme is watersheds.

The Department of Agriculture's Watershed Protection and Flood Prevention Act, better known to some of you as Public Law 566 program, has been well accepted in New Mexico. This program can make important contributions through flood and sediment control, and improved water usage. You have heard a lot about sediment in the last two days, but I can't resist adding a few comments of my own. The problem only starts with the loss of valuable land through erosion. Siltation shortens the life of our flood control and conservation storage reservoirs, increases the cost of operation and maintenance on our irrigation projects, and chokes stream channels creating flood problems and breeding grounds for the nonbeneficial plants which rob us of so much badly needed water.

Not long ago an official of the Department of Agriculture advised me that New Mexico ranked third in progress under the Watershed Protection and Flood Prevention Act. I ought to give you a few statistics to illustrate the progress that we have made. Fifty-nine applications for planning assistance involve a total of 6,800,000 acres. Field examinations have been completed on 24 projects involving 2,110,000 acres. Work-plans have been authorized for 18 projects involving 1,407,000 acres. Construction has been authorized for 11 projects involving 649,000 acres at an estimated cost of \$3,785,000. Construction is presently underway on four projects involving 399,000 acres, with an estimated cost of \$1,678,000. Construction has been completed on three projects involving 25,200 acres at a cost of about \$553,000. I think this is a record we can be proud of.

Some downstream water users are concerned over the possible effects of the Public Law 566 program on water supply. This concern is shared by the federal agencies engaged in soil and water conservation work and water development work. About two years ago the Bureau of Reclamation and the Department of Agriculture initiated a cooperative study to determine the effects of watershed treatment on streamflow. The problem they have attacked is an extremely difficult one. It is my understanding that as yet no method has been found that will consistently measure the effects of land treatment on streamflow from river basins, or even prove that such effects do or do not exist. I am hopeful that these agencies will continue the study until they have an answer to this baffling question. The final answer, to arrive at net effect, will have to go beyond the effect of watershed treatment on measurable surface runoff. The net effect includes the increase in water supply which must result from improved stream channels, the increased reservoir life resulting from sediment control, and the increase in groundwater recharge ultimately reappearing as streamflow.

The Public Law 566 program in New Mexico has been characterized by close cooperation with the State and strict compliance with State water laws. Reserving the right to be wrong, I doubt that the program carried out in this manner will have any material adverse effect on downstream water users, and may well benefit such users.

The Department of Agriculture through the Rocky Mountain Forest and Range Experiment Station at Albuquerque has undertaken a research program in the Sangre de Cristo Mountains above Santa Fe to determine the effects of forest management on water yield. I know you have heard a good bit about this subject here, and I will restrict my remarks to reporting that the Interstate Stream Commission will include in its budget proposal to the legislature, sufficient funds to undertake, in cooperation with the U. S. Geological Survey, the streamflow measurements necessary to this research project. The potential benefits to New Mexico from research of this nature are great, and the work certainly deserves the State's cooperation. As Jack Campbell has told you, the report of the Governor's Water Resources Committee recommends State support of research along these lines.

Other activities of the Department of Agriculture, particularly through the Soil Conservation Service and Agricultural Conservation Program are making important contributions to the more efficient use of water on irrigated farms in the States. Since so much of our water is used in agriculture, improved efficiency in this use can result in a sizeable increase in the total useable amount.

### Conclusion

I regret that it has been necessary for me to neglect any mention of a number of the aspects of our water program and our water problems which are of interest to you - programs such as 1) the administration of our interstate stream compacts, 2) the administration of water rights in New Mexico, 3) our program of basic data collection and our ground-water investigations in cooperation with the U. S. Geological Survey, 4) the problems of declining water tables, and 5) the numerous smaller construction projects and investigations that are being carried out in New Mexico by federal agencies and the Interstate Stream Commission. I sincerely and cordially invite you to talk to me or any of the representatives of my office who are here if time is available after adjournment, and if time is not available here to call on us or write to us in Santa Fe.