NEW MEXICO WATER RESOURCES

By

S. E. Reynolds*

Introduction

New Mexico's-surface and ground-water resources are derived primarily from two sources: precipitation within the boundaries of this enchanting land and runoff from the State of Colorado. The latter source makes most of its contribution through the San Juan River and the Rio Grande.

The total annual precipitation on New Mexico amounts to about 100 million acre-feet each year. However, only about 5% of this becomes divertible as surface or ground water -- thus the annual contribution of 2,500,000 acre-feet from our sister state to the north constitutes a substantial portion of our annual divertible supply.

The irrigator is inclined to rue the "loss" of the 95% of our precipitation which never reaches our streams or ground-water basins, but the contribution which that water makes to our grazing and forestry industries as it goes up in smoke is substantial and must not go unappreciated. Furthermore, to avoid the clogging of our streams and reservoirs with silt, a certain amount of precipitation must be consumed by plants at the point of fall.

Our meteorologic system is a metastable machine and relatively small changes in the synoptic pattern can result in wide variations in precipitation from day to day and from year to year -- and, as is forcefully demonstrated by the records of the ten or more years just past, wide variations on the deficiency side can persist for extended periods. These wide variations in precipitation make the utilization of reservoirs -- either man-made or natural underground reservoirs -- essential to the effective use of our water resources. These reservoirs explain the paradox of agricultural land in a region of variable and deficient rainfall being more valuable than the fertile land of our humid Middle West.

New Mexico contains portions of the headwaters of three of the principal river systems of the United States: the Mississippi, Colorado, and Rio Grande. Figure 1 shows the various natural surface drainage basins in the State. Basins 4, 4A, 4B, 8, 8A, 15, 18, 22, and 23 are

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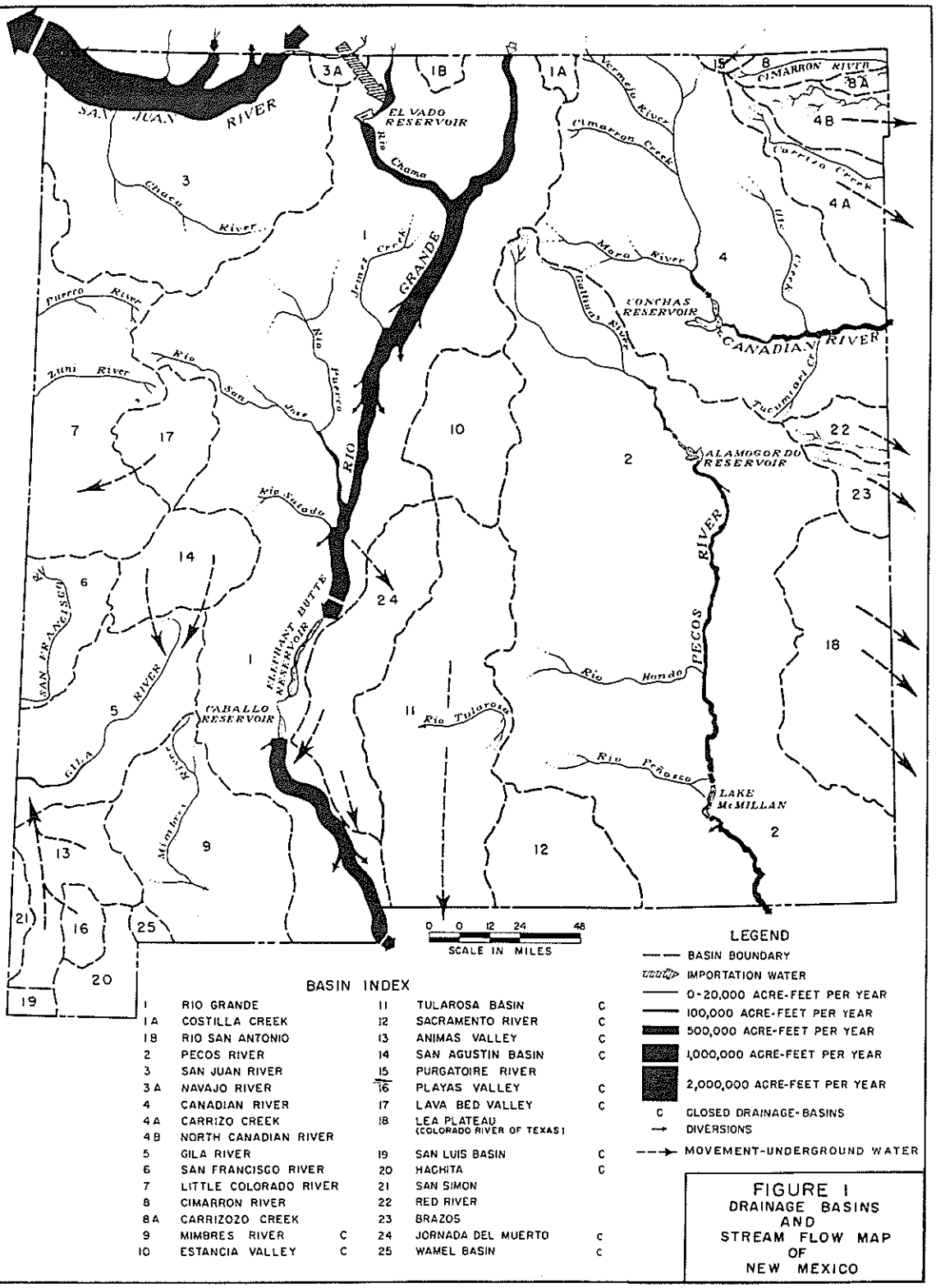
*State Engineer and Secretary, Interstate Stream Commission.



BASIN INDEX

1	RIO GRANDE		11	TULAROSA BASIN	C
1A	COSTILLA CREEK		12	SACRAMENTO RIVER	C
1B	RIO SAN ANTONIO		13	ANIMAS VALLEY	C
2	PECOS RIVER		14	SAN AGUSTIN BASIN	C
3	SAN JUAN RIVER		15	PURGATOIRE RIVER	
3A	NAVAJO RIVER		16	PLAYAS VALLEY	C
4	CANADIAN RIVER		17	LAVA BED VALLEY	C
4A	CARRIZO CREEK		18	LEA PLATEAU (COLORADO RIVER OF TEXAS)	
4B	NORTH CANADIAN RIVER				
5	GILA RIVER		19	SAN LUIS BASIN	C
6	SAN FRANCISCO RIVER		20	HACHITA	C
7	LITTLE COLORADO RIVER		21	SAN SIMON	
8	CIMARRON RIVER		22	RED RIVER	
8A	CARRIZOZO CREEK		23	BRAZOS	
9	MIMBRES RIVER	C	24	JORNADA DEL MUERTO	C
10	ESTANCIA VALLEY	C	25	WAMEL BASIN	C

LEGEND

- BASIN BOUNDARY
- IMPORTATION WATER
- 0-20,000 ACRE-FEET PER YEAR
- 100,000 ACRE-FEET PER YEAR
- 500,000 ACRE-FEET PER YEAR
- 1,000,000 ACRE-FEET PER YEAR
- 2,000,000 ACRE-FEET PER YEAR
- C CLOSED DRAINAGE-BASINS
- DIVERSIONS
- MOVEMENT-UNDERGROUND WATER

FIGURE 1
DRAINAGE BASINS AND STREAM FLOW MAP OF NEW MEXICO

tributary to the Mississippi River; basins 3, 3A, 5, 6, 7, and 21 are tributary to the Colorado River, basins 5, 6, and 21 draining to the Gila River on the Lower Colorado River system; basins 1, 1A, and 1B are parts of the Rio Grande drainage; basin 2 drains to the Pecos River, a principal tributary of the Rio Grande. Basins 9, 10, 11, 12, 13, 14, 16, 17, 19, 20, 24, and 25 are areas from which surface water does not discharge to principal streams within the State.

All of our significant surface streams are involved in interstate water compacts -- in fact one of them, the La Plata River, is subject to three compacts, the Colorado River Compact of 1922, the Upper Colorado River Compact, and the La Plata River Compact.

All too commonly our interstate water compacts are viewed as oppressive agreements under which we have given up much more than we have received. A quick assessment of that notion can be made from the following figures: Under present conditions the approximate average annual flow of surface water into the state is 2,500,000 acre-feet and the average annual outflow is 3,500,000 acre-feet; when we have fully developed, within the limits of economic feasibility, the rights guaranteed us in the various compacts our average annual outflow will be about 2,600,000 acre-feet. As water becomes more valuable this outflow might be reduced slightly more. Thus, even though we are largely a headwater state, our receipts under the compacts nearly equal our disbursements.

Administration

All surface waters in New Mexico belong to the public and may be used in accordance with the doctrine of prior appropriation. The office of the State Engineer (originally known as the Territorial Engineer) was created by the Legislature in 1907. The office is charged with the general supervision, including measurement, appropriation, and distribution, of all the waters of the State. Beneficial use is the basis, the measure, and the limit of the right to the use of the water, and priority in time of appropriation gives the better right. The State Engineer must supervise the apportionment of the water according to licenses issued by him and his predecessors and according to the adjudication of the courts.

Relation of Surface- and Ground-Water Basins

Ground water is derived from the portion of the precipitation that penetrates below the soil and root zone of the ground. In addition to being the source of water for wells, ground water moves underground to reappear as the springs and invisible accretions that furnish the perennial base flow for all New Mexico streams.

The relations of natural ground-water basins in New Mexico to

surface- water basins can be illustrated by referring again to Figure 1. Ground-water in Estancia Valley (number 10) and Playas Valley (number 16) is discharged by evapo-transpiration from playa lakes within these respective valleys. The ground water of the Crow Flats area, the Sacramento River Basin (number 12), is discharged into playa lakes in Texas, and ground water from four surface drainage basins in southwestern New Mexico (numbers 19, 20, 25, 9) discharges into playa lakes in northern Chihuahua, Mexico. Most of the ground water in the four other closed drainage basins discharges to the valleys of the principal streams in adjacent drainage basins, as shown by the arrows on the figure. Ground water in the San Augustin Plains (basin 14) probably discharges to the Upper Gila River. Ground water in Lava Bed Valley (basin 17) discharges to the Zuni River, a tributary of the Colorado River, and to the Rio San Jose, a tributary of the Rio Grande. Ground water in the Jornada del Muerto (basin 24) discharges to the Rio Grande. The Tularosa Valley ground water discharges to the Rio Grande although a large portion of the natural discharge in this valley occurs in the playa lakes near the White Sands.

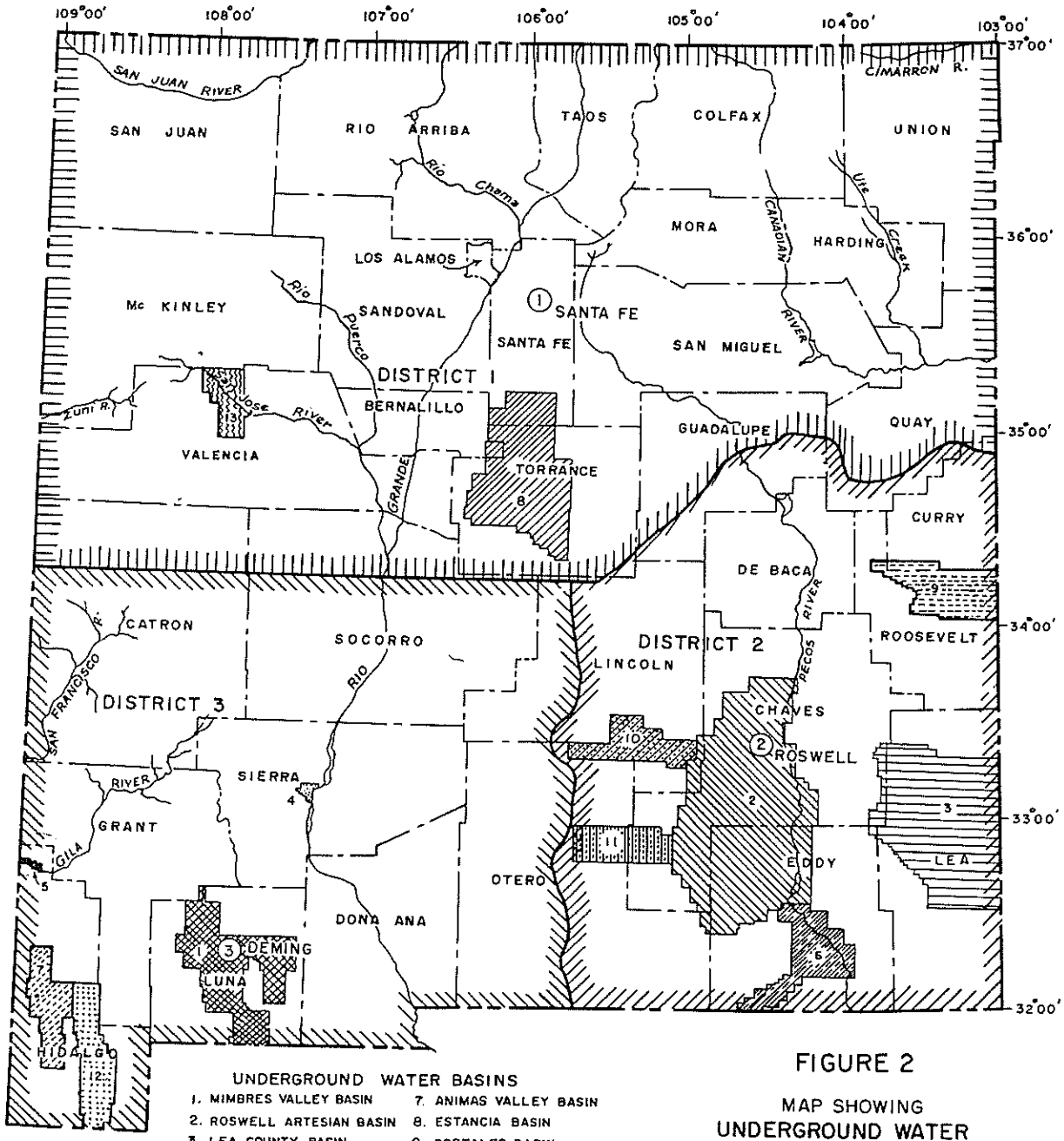
Ground water in the Animas Valley (basin 13) and the northern part of Playas Valley (basin 16) discharges to the Gila River near the Arizona-New Mexico line. Ground water in the northeastern part of the State discharges to numerous stream valleys within the area, ultimately reaching Mississippi River tributaries in Texas. The ground water in the Ogallala formation in eastern New Mexico below the Canadian River watershed discharges into tributaries of the Colorado and Brazos rivers in Texas. Ground water in the Pecos River Basin discharges naturally to the Pecos River.

Ground Water Administration

In the past 15 years there has been a great upsurge in the use of ground water in New Mexico. This increased usage results from several factors: favorable farm markets in the 1940's and early 1950's increased population and industry in the State, and the reduced availability of surface water in these drouth years.

Here are some data that the U. S. Geological Survey has provided me:

In 1940 there were 1,558 irrigation pumps in New Mexico; in 1950, 3,942; and in 1955, 7,500. In 1955 ground water was applied to 576,000 of a total of about 873,000 acres under irrigation. Much of this pumpage was to supplement the surface water normally used on these lands. Ground water now contributes 79% of the water used for industry and 92% of that used for municipal purposes.



UNDERGROUND WATER BASINS

1. MIMBRES VALLEY BASIN
2. ROSWELL ARTESIAN BASIN
3. LEA COUNTY BASIN
4. HOT SPRINGS BASIN
5. VIRDEN VALLEY BASIN
6. CARLSBAD BASIN
7. ANIMAS VALLEY BASIN
8. ESTANCIA BASIN
9. PORTALES BASIN
10. HONDO BASIN
11. PENASCO BASIN
12. PLAYAS VALLEY BASIN
13. BLUEWATER BASIN

DISTRICT OFFICES

(1) SANTA FE
(2) ROSWELL
(3) DEMING

FIGURE 2

MAP SHOWING
UNDERGROUND WATER
DISTRICTS
OF THE
STATE ENGINEER
OFFICE

10 0 10 30 50 70 90
SCALE IN MILES

COMPILED BY: F. E. IRBY
DRAWN BY: J. J. FOX
JUNE 30, 1956

A law declaring that ground water occurring in underground basins having boundaries that are reasonably ascertainable is public water and subject to use in accordance with the doctrine of prior appropriation was enacted in 1931. In 1953 the State Legislature declared that all underground waters of the State are public waters, but that permits to appropriate are required only in basins declared by the State Engineer.

Since establishment of the ground-water law in 1931 the State Engineer has declared the 13 underground water basins shown on Figure 2.

The Roswell, Mimbres, and Animas Basins are closed to all new appropriations except for domestic and stock use; in limited areas of the Lea County, Portales, Estancia, and Hot Springs Basins ground-water appropriations may still be made. In the Playas Basin the applications on file in our office more than fully appropriate the available water supply. These applications are in litigation and have not yet been granted.

In the Hot Springs, Hondo, Penasco, Carlsbad, Bluewater, and Virden Valley Basins, ground water is closely related to surface-water supplies, and ground-water withdrawals are nearly in equilibrium with the long-term recharge in these areas. New appropriations in these areas are permitted only to supplement existing surface-water rights or for stock and domestic use.

Ground water in the Animas, Mimbres, Playas, Portales, Lea County, and Estancia Basins is being withdrawn primarily from storage and water levels will continue to decline in those basins. The time limit for irrigation in the Portales, Lea County, and Estancia areas is set by the thickness of the saturated aquifer whereas the thickness of the aquifer in most of the Animas, Mimbres, and Playas Basins is so great that pumping costs will probably limit withdrawals of water for agriculture long before the water supply is actually exhausted. The policy of the State Engineer Office is, insofar as possible, to limit withdrawal in these areas to that which can be sustained for a reasonable pay-out period, usually about 40 years.

The wisdom of mining the ground-water resources in some of our basins is not infrequently questioned since many feel that these resources should be available to future generations in perpetuity. It seems to me that the mining of water might be justified as readily as the mining of any of our other mineral resources such as gold, oil, or coal. The impracticality of operating all basins on a continuous-yield basis can be more readily appreciated when it is realized that in the Lea County Basin, for example, the average annual

recharge is 29,000 acre-feet per annum while the permitted withdrawal averages about 500,000 acre-feet per year. To justify the marketing, storage, and transportation facilities essential to a competent agricultural economy in the area, it is necessary for the withdrawals to exceed the recharge.

Roswell Basin

The Roswell Basin is susceptible to operation on a continuous yield basis, but the present withdrawals considerably exceed the average annual recharge, especially in recent years, and ground water is being mined in that area also. The average recharge to the basin, including irrigation return flow, has been computed by Hantush to be about 336,000 acre-feet; approximately 116,000 acre-feet of this amount is natural discharge that cannot be intercepted by the pumps. The average withdrawals of both shallow and artesian water is about 420,000 acre-feet; thus the appropriation amounts to 190% of the safe yield.

Reduction in total water consumed from the Roswell Basin would probably alleviate the rapid decline of water levels in the shallow aquifer as well as in the artesian aquifer since the two are hydraulically related. Otherwise, water levels will probably continue to decline rapidly. A series of wet years would probably only alleviate the situation temporarily.

While the annual safe yield in the Roswell Basin is adequate for a competent agricultural economy, it might be possible to justify ground-water mining in that basin during the war years; however, it is essential that we are fully aware of the course being pursued. The pinch is already being felt in some areas of the Roswell Basin in terms or artesian head lowering, salt encroachment in the artesian aquifer, and depletion of water in storage in the shallow water aquifer. Remedial measures are being sought by the State Engineer and the Pecos Valley Artesian Conservancy District with a sense of urgency.

The decline of artesian pressures and consequent salt encroachment and early depletion of the shallow water supply will be staved off to some degree by the adjudication of water rights in the Roswell Basin which is now in progress. It is estimated that 15,000 to 20,000 acres of a total of 140,000 acres now being irrigated in the basin do not have valid water rights.

The Pecos Valley Artesian Conservancy District in cooperation with the U. S. Geological Survey is studying the salt-encroachment problem. There is some hope that partial relief may be had by selectively sealing off strata in the artesian aquifer that are producing more concentrated salts.

Some reduction in withdrawals will result as the farmers avail themselves of the advantages of the Federal Soil Bank plan. We are considering legislation that will hold in abeyance the forfeiture statute to enable the farmer to take full advantage of the Soil Bank without risking abandonment of his water right.

The situation might be further alleviated by the purchase and drying up of valid ground-water rights, and I am informally advised that the Pecos Valley Artesian Conservancy District is giving consideration to this recourse. There is a remote possibility that artificial recharge or water-salvage measures might be employed without impairing existing surface-water rights, and this possibility is being studied by our office and the U. S. Geological Survey.

The Future

A. Upper Colorado River Project

Contrary to much public opinion New Mexico is still far from the maximum utilization of her water resources. However, several great steps toward this end, long strived for and long awaited, are about to be taken.

The Upper Colorado River Storage Project was authorized last spring by Public Law 485. This project will permit New Mexico to utilize fully the 838,000 acre-feet of consumptive use allotted us by the Upper Colorado River Compact. We currently are using only about 100,000 acre-feet of our share of the water of the Upper Colorado River System.

Public Law 485 provides for three large reservoirs on the Upper Colorado system which will ensure deliveries to the Lower Colorado Basin in accordance with the 1922 Compact, provide a regulated supply for uses in the Upper Basin, and produce power revenues which will be used first to repay the costs of the main storage reservoirs and then to repay a large share of the construction costs of irrigation projects in the Upper Basin States. All construction costs allocable to municipal and industrial uses must be fully repaid, with interest, by the user.

Public Law 485 also authorized the construction of Navajo Dam on the San Juan River above Farmington in New Mexico; the construction costs of this dam and reservoir are to be paid from power revenues. The primary purpose of this structure is to regulate the flow of the San Juan River for the 115,000-acre Navajo Irrigation Project. The legislation did not authorize this project but did give priority to its study and set forth that when authorized the project should be constructed with nonreimbursable Federal funds.

This latter concession is in recognition of a national responsibility to the Navajo Indians which should not be met entirely with the water and power resources of the Upper Basin states.

The legislation also authorized construction of the Hammond Project -- a 3,700-acre irrigation project on the San Juan River near Farmington -- and gave priority to the study of the Animas-LaPlata Irrigation Project and the San Juan-Chama Diversion Project.

The San Juan-Chama Diversion Project will bring from the San Juan Basin water urgently needed in the Rio Grande Basin for municipal and industrial purposes and supplemental irrigation. The project provides, by exchange, supplemental water for tributary irrigation units in northern New Mexico, and also provides for $22,000,000 worth of construction and rehabilitation work on these units. This work should do much to revitalize the economy of these depressed areas in New Mexico.

The provisions of the Upper Colorado River Storage Project make it possible for about $240,000,000 worth of water development work to be undertaken in New Mexico in the next few years, with over $200,000,000 of this being financed by power revenue credits or nonreimbursable Federal funds. This may sound like "something for nothing" of which we are always suspicious, but it should be remembered that the power revenue credits are no more a gift than any of our God-given natural resources.

With the exception of the Navajo Irrigation Project, essentially all of the Federal investment in the Upper Colorado River Storage Project will be repaid -- most of it with interest.

B. Canadian River

The Canadian River Compact gives New Mexico the unrestricted use of all of the waters of the Canadian River below Conchas Dam, but limits us in that reach to a conservation storage capacity not to exceed 200,000 acre-feet. The Interstate Stream Commission has authorized the expenditure of $20,000 from the New Mexico Irrigation Works Construction Fund for the purpose of investigating the construction of works to utilize the waters of the Canadian below Conchas Dam.

The studies made thus far are quite preliminary, but they indicate that there is a dam site on the Canadian below Logan which would provide a reservoir of about 200,000 acre-feet capacity. The studies indicate that this reservoir would develop a firm supply of about 80,000 acre-feet from the average of 240,000 acre-feet per annum that currently leaves New Mexico at the Texas line.

There is little possibility of using this water supply for irrigation, principally because the river there flows in a deeply incised canyon, and prohibitive pumping lifts would be required. However, the potentialities for industrial use of this water supply seem good because of the proximity of rail and truck transportation, and because our preliminary estimates show that the water can be made available in the reservoir for as little as 0.2 of a cent per 1000 gallons.

C. Gila River

We are currently using only about 20,000 acre-feet of the waters of the Gila River and its tributaries in New Mexico and about 270,000 acre-feet annually flows from New Mexico into Arizona. The Colorado River Compact of 1922 did not apportion the waters of the Lower Basin among the states involved, and while several attempts have been made the Lower Basin States have never succeeded in reaching an agreement allocating the waters of the Lower Colorado among themselves. Because of uncertainity about her share, New Mexico has had little incentive to prepare plans for a greater utilization of the waters of the Gila River.

We are now engaged in a Supreme Court contest to establish our rights to the waters of the Gila River. The Interstate Stream Commission staff is conducting hydrologic studies which it is hoped will provide the basis for a stipulation that will save us the expense of full participation in this Supreme Court litigation. I feel that under any equitable stipulation, or court decree, New Mexico will be able to substantially increase her uses of the waters of the Gila River. Embryonic plans for this increased utilization envision some increased irrigation along with the development of municipal and industrial usage.

D. Water Salvage

Water lost to noncommercial vegetation along our streams represents a potential source of water for beneficial uses of considerable magnitude, and steps are already being taken to recover this water for man's activities. The Bureau of Reclamation's Middle Rio Grande Project, which will rehabilitate the Middle Rio Grande Conservancy District and channelize many miles of the Rio Grande from Espanola to Elephant Butte Reservoir, is already salvaging an estimated 80,000 acre-feet per year, and will salvage considerably more when construction is complete. A major element of this project is the already constructed low-flow channel and floodway through the delta of the Elephant Butte Reservoir. The fact that the unofficial Rio Grande Compact computations for the last year showed New Mexico with a credit of about 20,000 acre-feet for the year can be attributed in considerable measure to the water salvaged by these works.

One hundred thousand dollars of the proceeds of a land grant fund known as the Fund for the Improvement of the Channel of the Rio Grande were appropriated by the legislature to implement the Middle Rio Grande Project over the past two fiscal years. In May of 1956 the Interstate Stream Commission authorized the expenditure of an additional $36,000 for this purpose.

The Interstate Stream Commission at its last meeting authorized the expenditure of an additional $150,000 to be spent in this and the next fiscal year on a program of water-salvage works which, it is estimated, will save about 9,000 acre-feet of water per year. The Bureau of Reclamation and the Middle Rio Grande Conservancy District are cooperators and a total of $360,000 will be spent in the program.

The Pecos River Commission and the Bureau of Reclamation have planned works similar to those constructed in the Elephant Butte delta for the McMillan Reservoir delta on the Pecos River above Carlsbad. It is estimated that these works, which will cost about $2,000,000, will be capable of salvaging about 26,000 acre-feet per annum.

Planning for work in the McMillan delta is complicated by the fact that the clearing of a floodway might lead to the rapid siltation of the already seriously depleted capacity of McMillan Reservoir, which provides terminal storage for the Carlsbad Irrigation District. For this reason the floodway will not be cleared and water salvaged will be limited to an approximate 16,000 acre-feet to be saved by the low-flow channel and spur drains until such time as provision for replacing the terminal storage for the Carlsbad Irrigation District can be made.

The natural discharge of the Roswell ground-water basin to the Pecos River amounts to about 116,000 acre-feet per year and somewhere between 30,000 and 60,000 acre-feet of this natural discharge is lost to evapo-transpiration before it reaches the river. Our Technical Division and the U. S. Geological Survey are cooperating in a study to determine the actual amount of water lost and what steps might be taken to salvage this water. This study is to cost $30,000 in this fiscal year; it is financed by expenditures from the New Mexico Irrigation Works Construction Fund, authorized by the Interstate Stream Commission, and matching funds furnished by the U. S. Geological Survey.

The water-salvage programs mentioned will fall far short of salvaging all of the approximately 600,000 acre-feet of water that is being non-beneficially consumed in New Mexico; but the State, with the cooperation of the Bureau of Reclamation and the Geological Survey, will continue to study this problem intensively and to work toward the salvage of the maximum that is economically feasible.

The amount of water that remains unsalvaged may be viewed as a resource that we can tap as the demand for water and its value increase.

E. Small Projects

I have made allusion at least twice to the New Mexico Irrigation Works Construction Fund. This fund was established by the 1955 legislature to make feasibility studies of water-development projects and derives its monies from the income from a Federal land grant. The 1955 legislation authorized the Interstate Stream Commission to make expenditures from the Irrigation Works Construction Fund for feasibility studies, and to issue revenue bonds to finance the construction of feasible water utilization projects. The income from these projects would be used to retire the revenue bonds, with interest, and to repay the cost of the feasibility study. This legislation was passed to enable the State and local interests to take full advantage of an anticipated Federal Small Reclamation Projects Law.

A very preliminary survey conducted by the Technical Division in 1954 showed a need for 34 small construction or rehabilitation projects to improve water utilization in the State. However, it was apparent that few if any of these could show feasibility if it were necessary to repay construction costs with interest.

The Federal Small Reclamation Projects Act, Public Law 984, was passed in the last session of Congress, and since this law provides for 50-year interest-free loans of up to $5,000,000, we feel that a number of the small projects in New Mexico will be feasible under its provisions. The Interstate Stream Commission has authorized three feasibility studies at a total cost of $31,500 and has authorized the expenditure of $20,000 for reconnaissance studies of other small projects over the State to determine whether feasibility studies of these projects are warranted.

John Bliss, my predecessor as State Engineer and now New Mexico's Upper Colorado River Commissioner, was chairman of the National Reclamation Association's Small Projects Committee, and in the latter capacity he played a role of leadership in bringing about the passage of the Federal Small Reclamation Projects Act. He has been of great service to his State in this matter.

It is my belief that the Federal Small Reclamation Projects Law and the Department of Agriculture Small Watersheds Act operating in conjunction with the State's water development act can accomplish a great deal toward increasing the beneficial use of water in New Mexico, particularly where there are involved small irrigation districts in which financial restrictions have led to serious deterioration of the project's works.

F. Rain Making

I cannot close without commenting on at least two somewhat more visionary prospects for water resources development. The first of these is rainmaking, in which I have some personal experience. The President's Advisory Committee for Weather Control has recently released a report in which it is stated that their statistical analyses have given good evidence of precipitation increases of from 9% to 17% resulting from the use of ground-operated silver-iodide generators under the relatively ideal conditions presented by orographic storms on the west coast of the United States.

Most statisticians feel that while the analyses provide some evidence of precipitation increases, they fall far short of conclusive proof to this effect. It is my opinion that there is as yet little reliable evidence that precipitation in the Southwest can be significantly increased by rain-making techniques, but that the picture is by no means clear as yet and further research in this field is warranted.

The present state of the art, as I know it, is such that we cannot expect increases in our water supply from rainmaking for a number of years, and in one sense I am grateful for this -- I am appalled by the water-rights controversies that might arise from widespread application of rainmaking techniques in the Southwest.

G. Evaporation Control

A second proposition which stimulates my imagination is the use of monomolecular films to inhibit evaporation from reservoirs. The basic discovery of the effects of monomolecular layers as evaporation suppressants apparently belongs to Drs. Langmuir and Schaefer, as do many of the basic discoveries in rainmaking. W. W. Mansfield of the Commonwealth Scientific and Industrial Research Organization apparently deserves credit for suggesting the use of monomolecular films on water storage reservoirs. Hexadecanol, or cetyl alcohol, is the material that Manfield has worked with most. He has calculated that a monolayer should reduce natural evaporation by about 70% but, because of the temperature increase resulting from reduced evaporation rate, he predicts a mean reduction of about 45% for normal summer conditions in Australia. He believes that about 300 pounds per square mile is an adequate dosage to achieve this effect.

Mansfield's tests thus far indicate that the monolayer does not materially affect the rate at which oxygen and sunlight are absorbed by the water, and that, therefore, it does not impair aquatic life. He finds the material nontoxic to plant or animal life.

It is my understanding from a more or less cursory reading of Mansfield's work that the primary problem is that of dispensing the material. However, despite crude techniques which he described as quite unsatisfactory, he has measured evaporation reductions of from 23% to 73% in field tests on reservoirs of surface areas up to 11 acres. If a reasonably satisfactory method for dispensing the material can be achieved, the costs are expected to amount to about $1 per acre-foot of water salvaged.

The estimated annual evaporation from New Mexico's major impoundments, including the proposed Navajo Reservoir, and including New Mexico's share of evaporation losses from storage reservoirs on the Upper Colorado River, is about 440,000 acre-feet per year. Thus, if evaporation reduction of 45% could be achieved by the use of monolayers, our water resources would be enhanced by 200,000 acre-feet per year, or an amount sufficient to irrigate more than 66,000 acres.

The Bureau of Reclamation, the Southwest Research Institute, and I suppose other agencies in the United States, have become active in this field of research. At the present stage of progress these agencies are probably discovering only unanswered questions, but there does appear to be some reason to hope that Yankee ingenuity may be able to develop a practical technique that will increase our water resources by hundreds of thousands of acre-feet per year.