

THE COLORADO RIVER STORAGE PROJECT
and
PARTICIPATING PROJECTS

By

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The Colorado River Basin

Description of the Area

1. The Colorado River rises in Colorado and Wyoming and flows southwest some 1,400 miles to enter the Gulf of California. It drains 242,000 square miles-- one-twelfth of the continental United States.
2. From the high mountain peaks, it traverses mountain valleys, flows through the spectacular canyons of the Upper Basin, and finally meanders through low, broad, alluvial plains of the Lower Basin.
3. Because of the difficulty of development, the Upper Basin is relatively underdeveloped when compared with the Lower Basin. Eastern Utah, Southern Wyoming, and Western Colorado are estimated to contain one-fourth of the undeveloped coal resources of the United States. Vast deposits of oil shale and bituminous sandstone, as well as great beds of phosphate rock are as yet undeveloped.
4. Present development of hydroelectric power also presents a contrast between the basins. In the Upper Basin there is less than 100,000 kilowatts of installed capacity, while in the Lower Basin the Hoover, Parker, and Davis Dam power plants, together with Pilot Knob, those on the Salt River, and a few other smaller developments, aggregate roughly two million kilowatts of installed capacity.
5. In irrigation development, some two million acre-feet of water are depleted in the Upper Basin as

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compared to seven million acre-feet in the Lower Basin. Likewise, the Upper Basin has about two million acre-feet of storage developed as compared to thirty-seven million in the Lower Basin.

6. Bureau of Reclamation projects provided the basis for Lower Basin development. Construction of Hoover Dam provides control of floods, and permits releases as needed for power development, municipal purposes, and irrigation of lands in the Lower Colorado River, Imperial, and Coachella Valleys. More than a dozen cities in the vicinity of Los Angeles get their domestic water supply from the Colorado River Aqueduct. Most of the project costs are paid from firm power, and the vast industrial expansion of the Pacific southwest has been made possible by low-cost dump power from Hoover Dam.

Division of Water

1. The Colorado River Compact, signed November 24, 1922, apportions the waters of the Colorado River system between the Upper and Lower Basins. It provides that the Upper Basin States, Colorado, New Mexico, Utah, and Wyoming, will not cause the flow of the river at Lee Ferry to be depleted below an aggregate of 75,000,000 acre-feet for any period of 10 consecutive years.
2. The Compact also provides for a division of the surplus waters--those in addition to the 15,000,000 acre-feet average that was allotted--after October 1, 1963.
3. There is not complete agreement among the States regarding the interpretation of the Compact and its associated documents (the Boulder Canyon project Acts, the California Self-Limitation Act, and the several contracts for the delivery of water from Lake Mead).
4. Before approval of the Boulder Canyon Project Act of 1928, California signed, at the President's insistence, the Self-Limitation Act which limited the amount to be used by California to 4,400,000 acre-feet.

5. The Upper Colorado River Basin Compact, signed October 11, 1948, allocates 50,000 acre-feet of water to Arizona, and apportions the remainder of the available water, 51.75 percent to Colorado, 11.25 percent to New Mexico, 23.00 percent to Utah, and 14.00 percent to Wyoming.
6. In this Compact, the State of Colorado assents to storage and diversion of water in Colorado for use in New Mexico.

Water Supply

1. In its virgin condition, based on the 1897-1943 record, it is estimated the Colorado River would have carried an average of 17,720,000 acre-feet of water annually into Mexico. The annual flow would have varied from about 5,000,000 acre-feet to 25,000,000 acre-feet.
2. Under the Mexican Treaty, Mexico would have received about 1,500,000 acre-feet annually, leaving an average, based on this record, of 16,200,000 acre-feet for consumption in the United States.
3. Present water uses in the United States are estimated to deplete the virgin water supply at the International Boundary by about 7,120,000 acre-feet annually, leaving an average of about 9,100,000 to meet future uses.
4. On the basis of the longer term records now available, 1897 through 1955, some engineers believe it may be difficult to deliver 75,000,000 acre-feet at Lee Ferry in each 10 consecutive years, as required by the Compact, if 7,500,000 acre-feet of depletions occur in the Upper Basin.
5. Studies have been made of 143 potential projects in the basin and 20 transmountain diversions. Development of only the within-basin potential projects, 6,000,000 acre-feet; the present depletion, 7,000,000 acre-feet; and expansion of present projects, 4,000,000 acre-feet, would make a total of about 17,000,000 acre-feet of depletion annually, more water than is available.

Authorized Project

1. The Secretary is authorized to construct, operate, and maintain the following initial units consisting of dams, reservoirs, power plants, transmission facilities, and appurtenant works; Curecanti, Flaming Gorge, Navajo (dam and reservoir only) and Glen Canyon.
2. The Secretary must re-examine Curecanti, determine that it is economically justified, and so certify to Congress and the President before its construction can be undertaken.
3. The Secretary is also authorized to construct, operate, and maintain the following 11 participating projects: Central Utah (initial phase), Emery County, Florida, Hammond, LaBarge, Lyman, Paonia, Pine River Extension, Seedskadee, Silt, and Smith Fork.
4. In further investigations, priority shall be given to completion of planning reports on 20 participating including the following New Mexico projects: San Juan-Chama, Navajo, and Animas-LaPlata.
5. Irrigation repayment contracts shall be entered into which, except for the Paonia and Eden projects, provide for repayment of the obligations assumed thereunder with respect to any project contract unit over a period of not more than 50 years exclusive of any development period authorized by law.
6. As to Indian lands within, under or served by any participating project, payment of construction costs within the capability of the land to repay shall be subject to the Leavitt Act.
7. For a period of 10 years from the date of the authorizing law, no water from any participating project shall be delivered for the production on newly irrigated land of any "excess" basic commodity.

Basin Fund

1. The authorizing act sets up a separate fund in the Treasury to be known as the Upper Colorado River Basin Fund.
2. All reimbursable appropriations and all revenues collected in connection with the operation of the Colorado River Storage project shall be paid into the Basin Fund and shall be available without further appropriation for operation, maintenance, replacement, or other authorized payments.
3. Revenues in the Basin Fund in excess of operating needs shall be paid annually into the Treasury to return: (a) the costs of each unit, project or feature allocated to power, within a period of 50 years; (b) the costs of each unit, project or feature allocated to municipal water; (c) interest on the unamortized balance of the power and municipal water investment - and interest shall be a first charge; and (d) the costs of each storage unit allocated to irrigation within a period not exceeding 50 years.
4. Revenues in the Basin Fund in excess of the amounts needed to pay operation and maintenance, and to return the cost of power, municipal water, and irrigation storage, shall be apportioned as follows: Colorado, 46 percent; Utah, 21.5 percent, Wyoming, 15.5 percent; and New Mexico, 17 percent.
5. The Secretary must comply with the Compacts, the Boulder Canyon Project Acts, and the Treaty with the United Mexican States. In the event he fails, any State may maintain an action in the Supreme Court of the United States to enforce compliance.

Costs of the Project

1. The Act authorizes the appropriation of not to exceed \$760,000,000, a compromise figure that may not have too great a significance in view of the time element involved in project construction.
2. Much of the costs allocated to irrigation must be repaid by revenues from power. An illustration of

the approximate amount of such repayment by the initial phase is shown in Table 1.

3. The amount of revenue available for repayment assistance and the rate at which it becomes available depend upon a myriad of variable factors, including the construction schedule for both the storage plan and the participating projects, as well as the amount of water available for power production. A study made to illustrate what might occur under one annual construction and operational schedule gave results shown in Table 2.

TABLE 1
Illustration of Irrigation Cost Allocation and Repayment Requirements

<u>Project</u>	<u>Allocation to Irrigation</u>	<u>Repayment by Irrigation</u>	<u>Assistance Required from Power</u>		<u>State Total Assistance</u>
LaBarge	1,506,000	495,000	1,011,000)	Wyo.	30,211,000
Seedskadee	20,945,000	4,785,000	16,160,000)		
Lyman	9,508,000	2,255,000	7,253,000)		
Silt	2,954,000	1,020,000	1,934,000)		14,320,000 ^{1/}
Smith Fork	3,009,000	1,045,000	1,964,000)		
Paonia	6,315,000	2,414,000	3,901,000)	Colo.	
Florida	5,853,000	1,711,000	4,142,000)		
Pine River Ext.	4,524,000	2,045,000	2,479,000)		
Emery County	8,673,000	3,715,000	4,958,000)		104,386,000
Central Utah	114,619,000	15,191,000	99,428,000)	Utah	
Hammond	2,072,000	370,000	1,702,000	N. M.	1,802,000 ^{1/}
Subtotal	179,978,000	35,046,000	144,932,000		
Eden	7,287,000	1,500,000	5,787,000		
Navajo	31,765,000	---	31,765,000		
Flaming Gorge	27,810,000	---	27,810,000		
Glen Canyon	45,266,000	---	45,266,000		
Curecanti	79,650,000	---	79,650,000		
Subtotal	184,491,000	---	184,491,000		
Total	371,756,000	36,546,000	335,210,000		

^{1/} 4% of the Pine River project allocated to New Mexico

TABLE 2
Estimate of Repayment Assistance
Initial Phase
(Thousands of Dollars - Cumulative)

<u>Year of Operation</u>	<u>Assistance Available ^{1/} Credits in Basin Fund</u>		<u>Assistance Required ^{1/} Credits in Basin Fund</u>	
	<u>Total</u>	<u>New Mexico</u>	<u>Total</u>	<u>New Mexico</u>
25	72,398	12,308	29,002	504
50	230,998	39,269	85,244	1,404
75	347,443	59,005	121,035	1,802
100	582,097	98,956		

^{1/} Exclusive of net irrigation revenues and net power revenues available from participating projects.

San Juan-Chama Project

Present Status

1. A project report, recognizing the informal comments received from the States of Colorado, Texas and New Mexico, has been completed and sent to the Secretary of the Interior with the recommendation that he forward it, together with the report of the proposed Navajo Indian Project, to the Governor of New Mexico for resolution of certain policy questions.

Plan

1. The imported water would be used in the Rio Grande and Canadian River Basins as follows:

Supplemental irrigation	136,700 A.F.
Tributary units.....	39,800
Middle Rio Grande	
Conservancy.....	25,000
Elephant Butte Irrigation	
District.....	71,900
Municipal and industrial water supply.	55,800 A.F.
Replacement of miscellaneous basin	
depletions.....	<u>42,500 A.F.</u>
Total	235,000 A.F.

2. The plan conforms to the limitations of the authorizing act and involves (a) the collection and diversion features in the San Juan River Basin consisting of three storage dams, five diversion dams, and about 48.93 miles of main conduit; (b) the regulation and storage features consisting of Heron No. 4 dam and reservoir on Willow Creek; and (c) the water-use features providing for use of imported waters as follows: (1) new depletions by 45,145 acres in tributary areas, (2) supplemental water for 81,610 acres in the Middle Rio Grande Conservancy District; (3) supplemental water for 98,700 acres in the Elephant Butte Irrigation District; (4) additional municipal water for Albuquerque; and (5) replacement of basin depletions amounting to 20,000 acre-feet annually for watershed improvement programs and 15,000 acre-feet of pumping, plus losses of 7,500 acre-feet.

Construction Costs




Navajo Dam Allocation	\$ 800,000
Pagosa Division	103,708,000
Lobo Dam and Reser voir	10,307,000
Tesoro Dam and Reservoir.	9,044,000
Blanco Dam and Reservoir	9,060,000
Diversion Dams (5)	653,000
Conduits	74,205,000
Permanent Property	439,000
Rio Chama Division	8,254,000
Heron No.4 Dam and Reservoir.	7,680,000
El Vado Outlet Works	574,000
Rio Arriba Division	21,937,000
Cerro Unit	5,377,000
Taos Unit	11,692,000
Llano Unit	1,748,000
Pojoaque Unit	1,567,000
Cimarron Creek Unit	1,553,000
Recreational developments	360,000
Stream measurement facilities	110,000
Total construction expenditure	\$135,169,000
Interest during construction on municipal and industrial water costs	728,000
Total construction costs	\$135,897,000

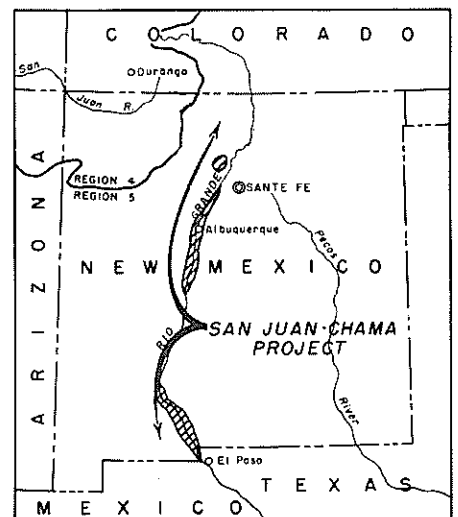
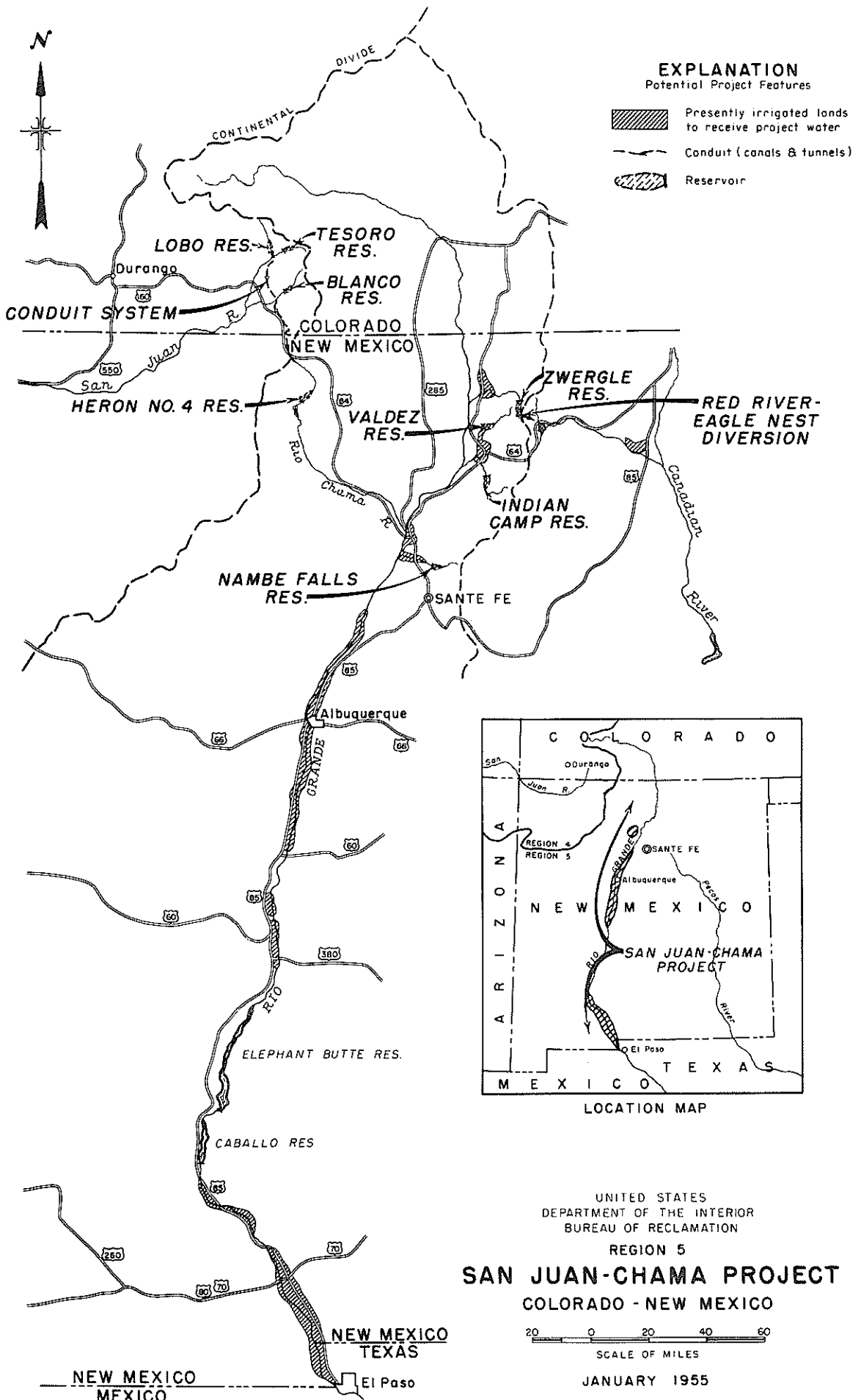
Allocations and Repayment

Allocation of construction costs

	<u>Total</u>	<u>Non-reimbursable</u>	<u>Reimbursable</u>	<u>Repayment</u>
Irrigation	\$87,531,000		\$ 87,531,000	\$21,290,000
M&I water	27,503,000		27,503,000	27,503,000
Basin depletions	20,393,000		20,393,000	6,600,000
Recreation	360,000	\$360,000	- -	- -
Stream measurement	110,000	110,000	- -	- -
Colorado R.Basin Fund - -	- -	- -	- -	80,034,000
Total	\$135,897,000	\$470,000	\$135,427,000	\$135,427,000

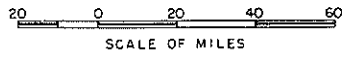


- EXPLANATION**
Potential Project Features
-  Presently irrigated lands to receive project water
 -  Conduit (canals & tunnels)
 -  Reservoir



LOCATION MAP

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 5
SAN JUAN-CHAMA PROJECT
COLORADO - NEW MEXICO



JANUARY 1955

Irrigation

Rio Arriba Division

	<u>Cerro</u>	<u>Taos</u>	<u>Llano</u>	<u>Pojoaque</u>	<u>Cimarron Creek</u>
Irrigable area (acres)	11,820	20,550	5,690	2,440	4,645
Consumptive use requirement (acre-feet per acre)	1.95	2.06	2.38	2.30	1.97
Average annual diversion requirement (acre-feet per acre)	2.24	2.46	3.77	2.72	3.03
Average annual payment capacity (per acre per year)	\$7.18	\$7.11	\$11.43	\$11.54	\$13.36
Amortization capacity available for payment of San Juan-Chama Project costs (per acre per year)	\$4.16	\$4.31	\$2.19	\$8.92	\$5.89
Project O&M costs (per acre per year)					
Joint works	\$0.80	\$0.57	\$1.65	\$0.32	\$1.62
Unit works	\$2.22	\$2.23	\$4.06	\$2.30	\$2.67

Rio Medio Division

Water right lands (acres)	121,680
Irrigable area (acres)	81,610
Consumptive use requirement (acre-feet per acre)	2.37
Average annual crop irrigation requirements (acre-feet per acre)	2.03
Average annual payment capacity (per acre per year)	\$10.05
Amortization capacity available for payment of San Juan-Chama Project costs (per acre per year)	\$0.61
Project O&M costs (per acre per year)	\$0.30

Rio Abajo Division

Irrigable area (acres)	98,700
Average annual farm delivery requirement (acre-feet per acre)	3.35
Average annual payment capacity (per acre per year)	\$20.70
Amortization capacity available for payment of San Juan-Chama Project costs (per acre per year)	\$1.79
Project O&M costs (per acre per year)	\$0.71

Municipal and Industrial Water Supply

Deliveries to Albuquerque, New Mexico, assumed to be 6,000 acre-feet per year initially, and 50,000 acre-feet from 1990 on. Average annual water charge per acre-foot delivered. (based on a uniform rate over a 50-year period with 2-½ percent interest \$29.50).