

A Brief Review of Surface Water Studies in New Mexico

by

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Purposes

Studies of surface waters in New Mexico have been made and are still being made - for many purposes. The more important purposes include:

Stream flow measurements and discharges for (a) flood flows; (b) direct diversion for irrigation; and (c) reservoir storage for irrigation and flood storage, power, and fish and wildlife.

Domestic and Industrial Use

Power Development Possibilities

Inter-state Stream Compacts

Flood Control Investigations to determine feasibility of construction programs

Joint Investigations - Rio Grande and Pecos Rivers, Arkansas, White, Red Rivers Basin studies

Fish and Wild Life on live streams

Rehabilitation of small irrigation systems

Federal Water Program. (President Truman's Committee)

Agencies

Most of the studies have been made by agencies of the Federal Government acting alone or in cooperation. State Agencies also act alone or in cooperation with other state and with Federal Agencies. At times public utilities and private corporations have been cooperators or have made their own studies.

New Mexico State Agencies include the Agricultural Experiment Station, Extension Service, and the Department of Civil Engineering of New Mexico College of A & M A. The State University, the New Mexico Institute of Mining Technology, the State Engineer, Fish and Game Department, Public Health Service and State Highway Department are other New Mexico institutions or agencies active in surface water studies.

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The following is a partial list of Federal Agencies that have been or are concerned with surface water studies.

Department of Agriculture; Bureau of Agricultural Economics, Farmer's Home Administration. (Formerly Farm Security Adm.), Production and Marketing Administration, Forest Service, Soil Conservation Service, Rural Electrification Administration and Bureau of Public Roads

Department of Army; Corps of Engineers

Department of Interior; Bureau of Reclamation, United States Geological Survey, Fish and Wildlife, Bureau of Indian Affairs

Department of Commerce; Weather Bureau

Department of Health and Public Welfare

Federal Power Commission

National Resources Committee

Public Utilities cooperated in the study of the 1941 Rio Grande Flood.

Studies made

The United States Geological Survey began stream flow measurements in 1889, at San Marcial on the Rio Grande. Between that date and the present, gaging station records have been taken on almost all streams in the state. These records cover long periods at specific locations or shorter periods at other places. From 1889 to 1925 gaging stations were in operation for varying periods at 160 different places on 72 streams including streams flowing into closed basins.

The United States Geological Survey records are the basis for stream flow studies made by other agencies for a great variety of purposes. Forecasted possible flood flows are based on stream flow and storm pattern records. Possible supplies for direct or reservoir diversion for irrigation, and possibility of power development are based on United States Geological Survey data.

Flood control investigations are relatively new in the southwest. The first one authorized by Congress was made by the Corps of Engineers on the Dry-Cimarron prior to 1938. The engineers also made surveys on the Pecos and the South Canadian drainage. Their studies are limited primarily to the streams and the flood plains. The U.S.D.A. was directed by Congress to make watershed surveys for erosion prevention

and flood control. The U.S.D.A. has made the following surveys: preliminary - Major Long's Creek, Dry Cimarron, Pecos, Rio Puerco, and Rio Grande. A full survey also was made on the Rio Puerco and the Pecos. The survey of the Dry Cimarron by both agencies resulted in negative reports, as did the Major Long's Creek survey. Definite programs for flood control were made for the Rio Puerco and Pecos. No action has been taken by Congress on these programs. A survey of the Rio Grande has resulted in a flood and sediment control dam on the Jemez River and channel rectification work on the Rio Grande above Elephant Butte reservoir.

The U.S.D.A. was assigned the task of determining damages from and the cost of fighting the Rio Grande flood of 1941 while the flood was in progress. Cooperating agencies included State Engineer and State Highway Departments, Bureau of Reclamation, Bureau of Indian Affairs, Fish and Wildlife Service, Civilian Conservation Corps, Middle Rio Grande Conservancy District, the Santa Fe Railroad, Mountain States Telephone Company, and the three U.S.D.A. Agencies Bureau of Agricultural Economics, Soil Conservation Service and Forest Service.

Public flood control hearings were held in all watersheds prior to the start of preliminary surveys. The announced purpose of the hearings was to find out the wishes, desires and attitudes of the people in local areas who would be affected by measures to control floods.

The Bureau of Reclamation made feasibility and engineering studies of proposed irrigation projects involving federal funds. Irrigation projects that were initialed by the Bureau or with which the Bureau later became connected include: Elephant Butte, Carlsbad, Ft. Sumner, Tucumcari, and Vermejo. Recently the Bureau has taken over the Middle Rio Grande Conservancy District. Recent engineering and economic feasibility studies of the Bureau have covered the tributaries of the south Canadian above Conchas reservoir, Ute Creek, the tributaries of the Rio Grande above the Chama River, proposed projects in the San Juan area, and the proposed San Juan trans-mountain diversion.

Water Facilities studies were conducted by the U.S.D.A. in the late 1930's and early 1940's. The S.C.S. made the physical survey, the B.A.E. determined the economic feasibility and the F.S.A. was the financing agency. The program covered only small areas, or small groups of water users whose water supply was frequently interrupted by flash floods or arroyo flows. The users were not able to finance rehabilitation except through a long time payment plan which became available through this program. The projects were cooperative. Most projects were in the North Central part of the state. Projects larger than \$50,000 could not be approved. The Farmer's Home Administration now handles the program.

Joint Investigations were made in 1936-37 on the Rio Grande, in 1938-41 on the Pecos, and the Canadian and Dry-Cimarron were covered in the Arkansas, White, and Red River Basins study 1951-55. The Rio Grande and Pecos investigations were under the direction of the National Resources Committee. In all three investigations both State and Federal Agencies were included. Principal items in all three investigations relating to surface water were: normal, minimum, maximum and flood flows; reservoir storage, stream and reservoir sedimentation, beneficial and non-beneficial use of water, water loss through pondage, seepage, evaporation and stream bank overflow, and quality of stream flow and reservoir storage. The reports of the investigations included recommended programs for better methods of water use and control.

Interstate Stream Compacts based on extensive studies of water supply and disappearance cover three major streams and one tributary. They are: the Rio Grande Compact covering the drainage above Ft. Quitman Texas; the Pecos River Compact covering the entire drainage; Costilla Creek, tributary to the Rio Grande, in Colorado and New Mexico; and the South Canadian River from Conchas Reservoir to Oklahoma. The Compacts were worked out by commissions, approved by the legislatures of all states affected, and finally approved by Congress.

The Arkansas, White, Red River Basins investigation is more than a study of water as it was set up to develop plans for the best use of all natural and man made resources of the entire basins. The surface water studies included direct and storage irrigation, flood control,

power development, stream pollution, recreation, fish and wildlife, and control of surface runoff.

Storage Reservoirs. There is a large number of reservoirs in New Mexico but only a few are important other than locally. The more important reservoirs include:

El Vado, on the Chama; Storage for Middle Rio Grande project. 200,000 A.ft.

Jemez, on Jemez River; flood and silt control. 120,000 A.ft.

Costilla, on Costilla Creek. Irrigation and power. 14,500 A.ft. Max. for 60 days.

Elephant Butte, on Rio Grande. Irrigation and supplemental power. The latest estimate of capacity is 2,273,000 A.ft.

Caballo, on Rio Grande. Holding reservoir for water released for power at Elephant Butte; 246,000 A.ft. for irrigation, 100,000 A.ft. for flood control.

Bluewater, on Bluewater Creek. Irrigation. 46,000 A.ft.

Storrio, off channel from Gallinas River originally for irrigation, and original capacity 21,700 A.ft.

Now operated by New Mexico Fish and Game Dept.

Alamogordo, on Pecos. Storage for Carlsbad project, 148,000 A.ft. plus flood control.

McMillan, on Pecos. Transient storage for Carlsbad project. Estimated present capacity about 28,000 A.ft.

Avalon, on Pecos. Transient storage for Carlsbad project, present capacity about 6,200 A.ft.

Eagle Nest Lake, on Cimarron Creek. Irrigation and recreation, 78,000 A.ft.

Conchas, on South Canadian. Irrigation for Tucumcari project 287,000 A.ft. 202,000 A.ft. flood control and 110,000 dead storage.

Vermejo, off channel from Vermejo River. Irrigation for Vermejo project. 26,500 A.ft. in 4 reservoirs.