

DAMS, RESERVOIRS AND WATER SUPPLIES IN OKLAHOMA

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For a number of years the Federal Government has been constructing dams and reservoirs for water storage in the semi-arid regions of the Southwest. The largest project is Boulder Dam and Lake Mead on Colorado River. Roosevelt Dam and Coolidge Dam in Arizona impound water for irrigation. Elephant Butte Dam on the Rio Grande in central New Mexico stores irrigation water for the areas near El Paso, Texas. Eagle's Nest Dam and Conchos Dam store waters of the Canadian River and its tributaries in northeastern New Mexico.

Caddoa Dam is being built across the Arkansas near Lamar, Colorado. In Texas, four dams have been built across Colorado River above Austin.

In Oklahoma, Grand River Dam has been completed and the Denison Dam and the Supply Dam are under construction. A number of other government projects are contemplated in this State.

Four years experience as regional geologist of the National Park Service has provided the author an opportunity to study water conditions in nine of the southwestern states, and particularly in the nearly one hundred national parks, state parks and national monuments in the region.

In the construction of any dam and its attendant reservoir, a considerable number of important factors are involved, of which eight may be considered vital, namely:

1. Character of the bed rock on which the dam rests.
2. Height of the dam and the material of which it is constructed.
3. Area and depth of the proposed reservoir.
4. Area of the drainage basin, and the ratio of the reservoir to that of the drainage basin.
5. Annual rainfall.
6. Annual evaporation, and the ratio of evaporation to rainfall.
7. Character of the soil in the drainage area.
8. Rate of silting.

These eight factors are all more or less interrelated. Let us consider a simple example: Numbers 2, 3, 4, 5 and 6. In an area where evaporation (6) exceeds rainfall (5), the ratio of the area of the drainage basin (4) to the area of the reservoir (3) should be of the order of 10 to 1. But if the dam (2) is too high, the reservoir (3) will be too large, and the result will be that the water in the reservoir will probably never reach spillway level.

Oklahoma now has at least one outstanding example of this condition, where a dam costing approximately \$2,500,000 is much too high, and the reservoir is not full.

There are probably 75 artificial lakes in Oklahoma, the greater number of which supply municipalities. Most of the larger cities of the state use stored water. Examples are Tulsa, Oklahoma City, Ardmore, Lawton, Okmulgee, Henryetta, McAlester, Wewoka, Altus, Holdenville, Stillwater, Clin-

ton, and Ponca City. Many cities have already outgrown their storage facilities and constant agitation is necessary to persuade the reluctant citizenry to vote bonds to provide bigger and better reservoirs.

Among the cities which secure water from wells are Enid, Norman, Sulphur, Bristow, Edmond, Purcell, Pauls Valley, Chickasha, Anadarko, Alva, Kingfisher and Guymon.

Ada, Tahlequah, Buffalo, and a few other cities use spring water. Muskogee and Durant are among the cities that use water directly from rivers.