

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

IRRIGATION AND MUNICIPAL WELLS IN
THE SAN LUIS VALLEY, COLORADO

By

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Prepared in cooperation with the
COLORADO WATER CONSERVATION BOARD
Felix L. Sparks, Director

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The U.S. Geological Survey, in cooperation with the Colorado Water Conservation Board, began an investigation of the water resources of the San Luis Valley in 1966 (fig. 1). The purpose of the investigation is to make a comprehensive study of the hydrology of the San Luis Valley. The study will provide the hydrologic information needed by State and local agencies for recommending sound water-development and water-management practices.

This report is the second in a series of progress reports on the current study; it includes a map (scale 1:125,000) showing the location of large-capacity irrigation and municipal wells (wells more than 300 gallons per minute) and information on the installation rate of wells. The information presented in this report is based on data collected from 1966 to 1969 and on data from previous studies. Additional information on the hydrology of the valley is contained in a report by Emery, Boettcher, Snipes, and McIntyre (1969).

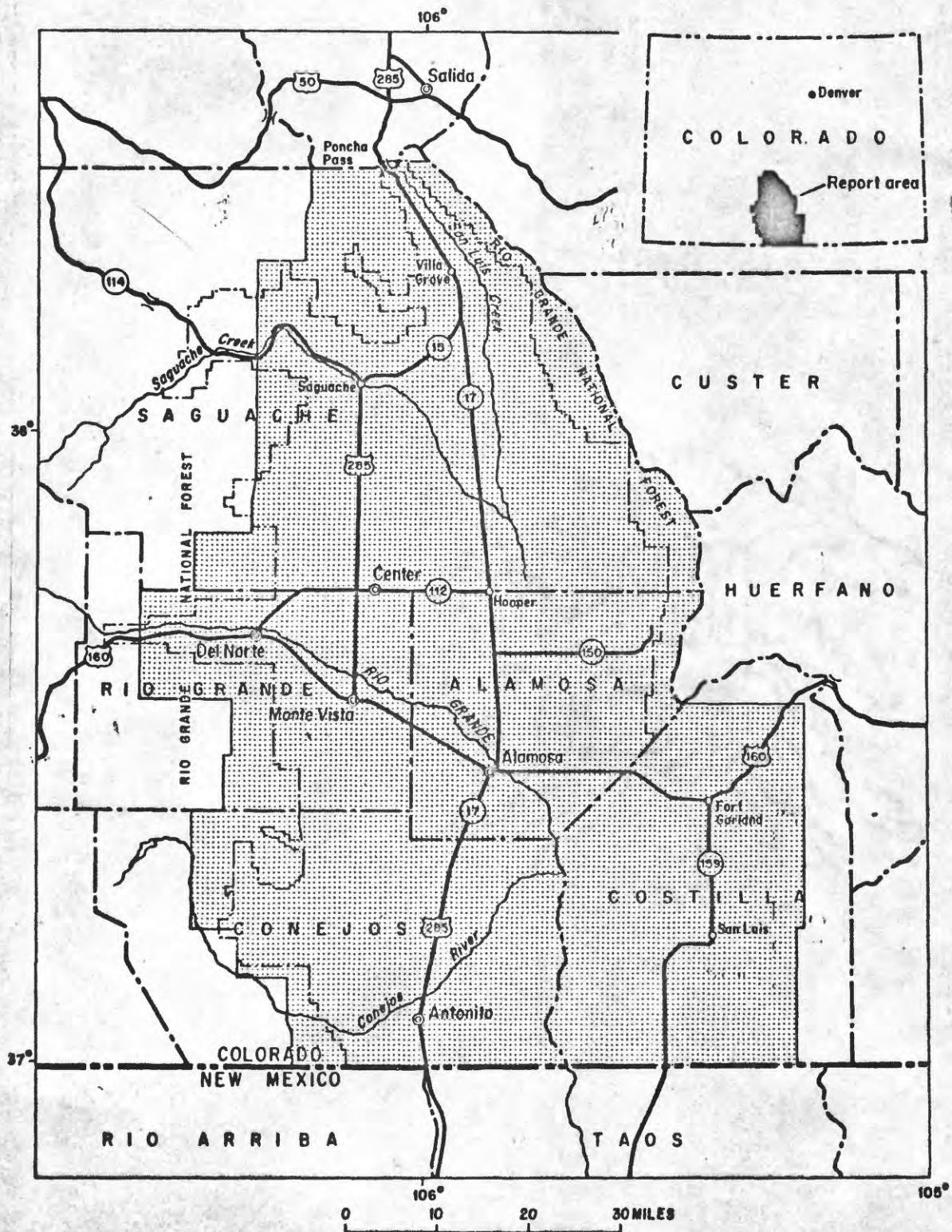


Figure 1. Index map.

The San Luis Valley extends about 100 miles southward from Poncha Pass (near the northeast corner of Saguache County) to a point about 16 miles south of the Colorado-New Mexico State line (fig. 1). The total area is 3,125 square miles, of which about 3,000 are in Colorado. The valley has little topographic relief except in the San Luis Hills area. The altitude of the Colorado part of the valley described in this report is about 7,700 feet above sea level. The valley is bounded on the west by the San Juan Mountains and on the east by the Sangre de Cristo Mountains.

The agricultural economy of the valley depends on irrigation. When the surface-water supply is deficient, ground water is used as a supplemental supply. During the years 1963 and 1964 the surface-water supply was extremely low and more than half of the total water used for irrigation was ground water.

The aquifers of the San Luis Valley contain at least 2 billion acre-feet of water. The water occurs in two major systems referred to as the unconfined and confined aquifers. These aquifers are separated by a "clay series" or by a layer of volcanic rocks. The confining beds are discontinuous and lenticular, and it is difficult to differentiate the boundary between the unconfined and confined aquifers. A summary of the thickness, physical character, and water-supply characteristics of the aquifers is given in table 1.

Table 1.--Summary of geologic units and water-supply

| System or series | Geologic unit | Hydrologic unit | Thickness (feet) | Physical character | Water supply |
|-----------------------|-------------------|--------------------|------------------|--|---|
| Holocene to Oligocene | Valley fill | Unconfined aquifer | 0-200 | Unconsolidated clay, silt, sand, and gravel. | Yields are as much as 3,000 gallons per minute. Provides water to 2,224 irrigation wells and 4 municipal wells. |
| | | Confined aquifer | 50-30,000 | Unconsolidated clay, silt, sand, and gravel interbedded with volcanic flows and tuffs. | Yields are as much as 4,000 gallons per minute. Provides water to 646 irrigation wells and 9 municipal wells. |
| Precambrian | Crystalline rocks | | | Granite, gneiss, and schist. | None |

Large-capacity irrigation and municipal wells are shown on plate 1. Records of the wells were obtained from the Colorado State Engineer's office and field-checked for accuracy of location. The wells are differentiated on plate 1 according to aquifer and use. The principal aquifer contributing water to a given well was determined by the depth and log of the well and by the temperature and chemical quality of water from the well.

The number of large-capacity wells in the San Luis Valley has more than quadrupled during the last 20 years (fig. 2). In January 1969, there were 2,883 large-capacity wells in the San Luis Valley. Of this total, 2,228 tap the unconfined aquifer. The rate of installation was greatest during the years 1950-57 when about 1,200 wells were installed. In addition to the large-capacity wells, there are more than 7,000 small-capacity flowing wells in the valley.

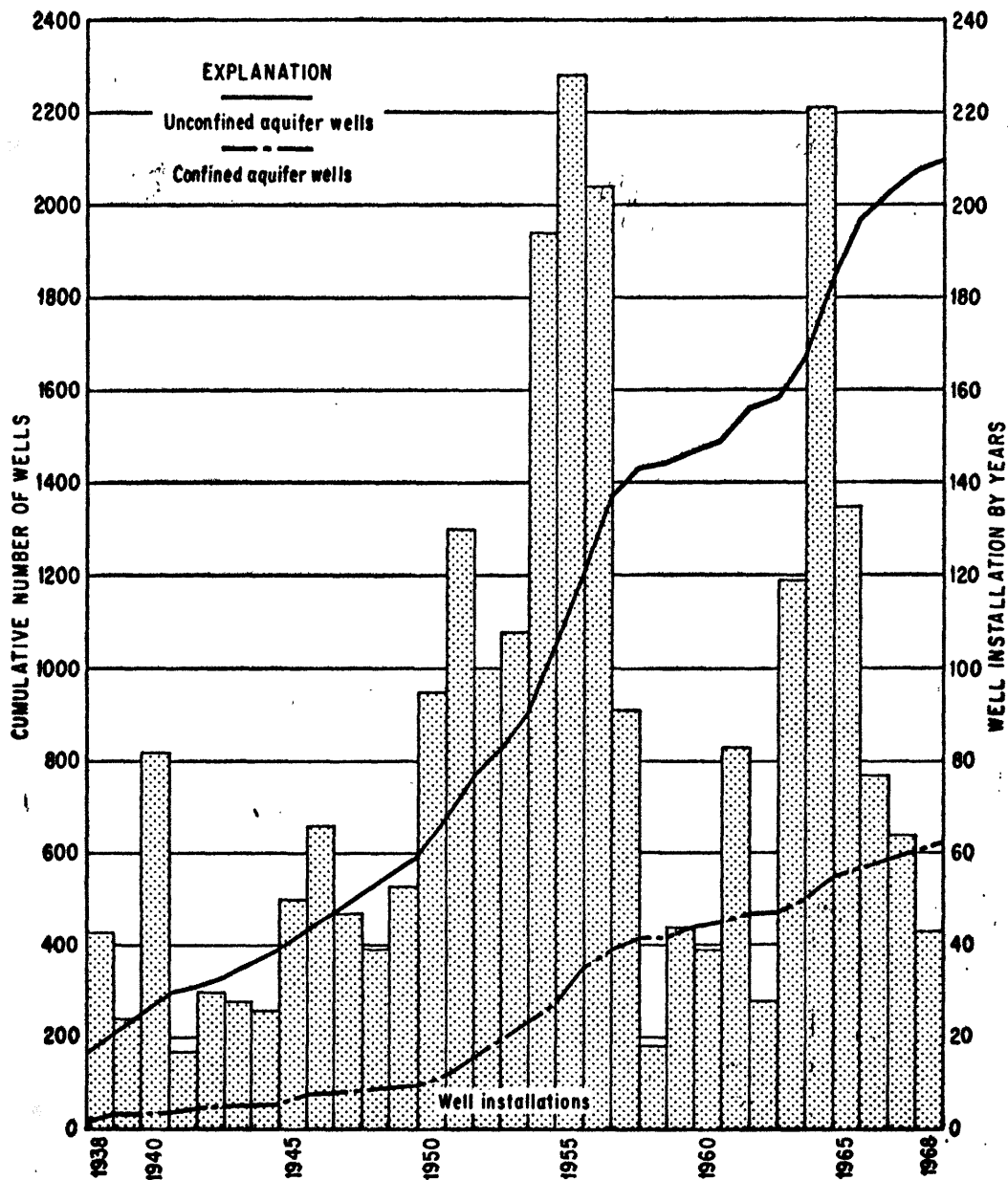


Figure 2. Large-capacity irrigation well installation by years (157 wells of unknown installation date not included).

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