

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

WATER-LEVEL RECORDS FOR THE  
SAN LUIS VALLEY OF COLORADO, 1973-77

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Open-File Report 77-265

Prepared in cooperation with the  
COLORADO DEPARTMENT OF NATURAL RESOURCES,  
DIVISION OF WATER RESOURCES, OFFICE OF THE STATE ENGINEER; and the  
RIO GRANDE WATER CONSERVATION DISTRICT

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Denver, Colorado

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## METRIC CONVERSION

English units used in this report may be converted to metric units by the following conversion factors:

<i>English</i>	<i>Multiply by</i>	<i>Metric</i>
feet (ft)	0.3048	meters (m)
miles (mi)	1.609	kilometers (km)
square miles (mi <sup>2</sup> )	2.590	square kilometers (km <sup>2</sup> )
acres	.4047	hectares (ha)
acre-feet (acre-ft)	1,233	cubic meters (m <sup>3</sup> )

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ABSTRACT

Water-level measurements were made in 122 wells in January 1977. Changes in water levels from January 1976 to January 1977 ranged from a rise of 10.0 feet (3.0 meters) to a decline of 8.6 feet (2.6 meters) both of which occurred in Costilla County. Measurements for the three preceding winters are included to illustrate longer term water-levels changes.

INTRODUCTION

This report provides well owners and water managers with water-level measurements made during the winter prior to the 1977 irrigation season (table 1 at back of report). These data can be used by well owners for planning their irrigation schedules for the next irrigation season and can be used by water managers for developing plans to manage the ground-water resources.

Water-level measurements were made in 122 wells in January 1977. Most were irrigation wells, but several stock and government-owned wells also were measured, especially in areas where there are few irrigation wells. Measurements made during the 4 preceding years are included, where available, to illustrate recent trends in declining or rising water levels.

Water-level records for the San Luis Valley of Colorado are a part of the National Water-Data System and are collected and tabulated by the U.S. Geological Survey in cooperation with the Colorado Department of Natural Resources, Division of Water Resources, Office of the State Engineer; the Colorado Water Conservation Board; and the Rio Grande Water Conservation District.

The San Luis Valley extends about 100 mi (160 km) southward from Poncha Pass (near the northeast corner of Saguache County) to about 16 mi (25 km) south of the Colorado-New Mexico State line. The total area (fig. 1) is 3,125 mi<sup>2</sup> (8,090 km<sup>2</sup>), of which about 95 percent is in Colorado. The valley is bounded on the west by the San Juan Mountains and on the east by the Sangre de Cristo Mountains.

The aquifers in the San Luis Valley contain at least 2 billion acre-ft ( $2.5 \times 10^{12}$  m<sup>3</sup>) of water. Ground water occurs in two major systems referred to as the unconfined and confined aquifers. These basin-fill aquifers are separated by confining beds, which are either a "clay series" or a layer of volcanic rocks. The confining beds are discontinuous and lenticular, so it is difficult to delineate the boundary between the unconfined and confined aquifers.

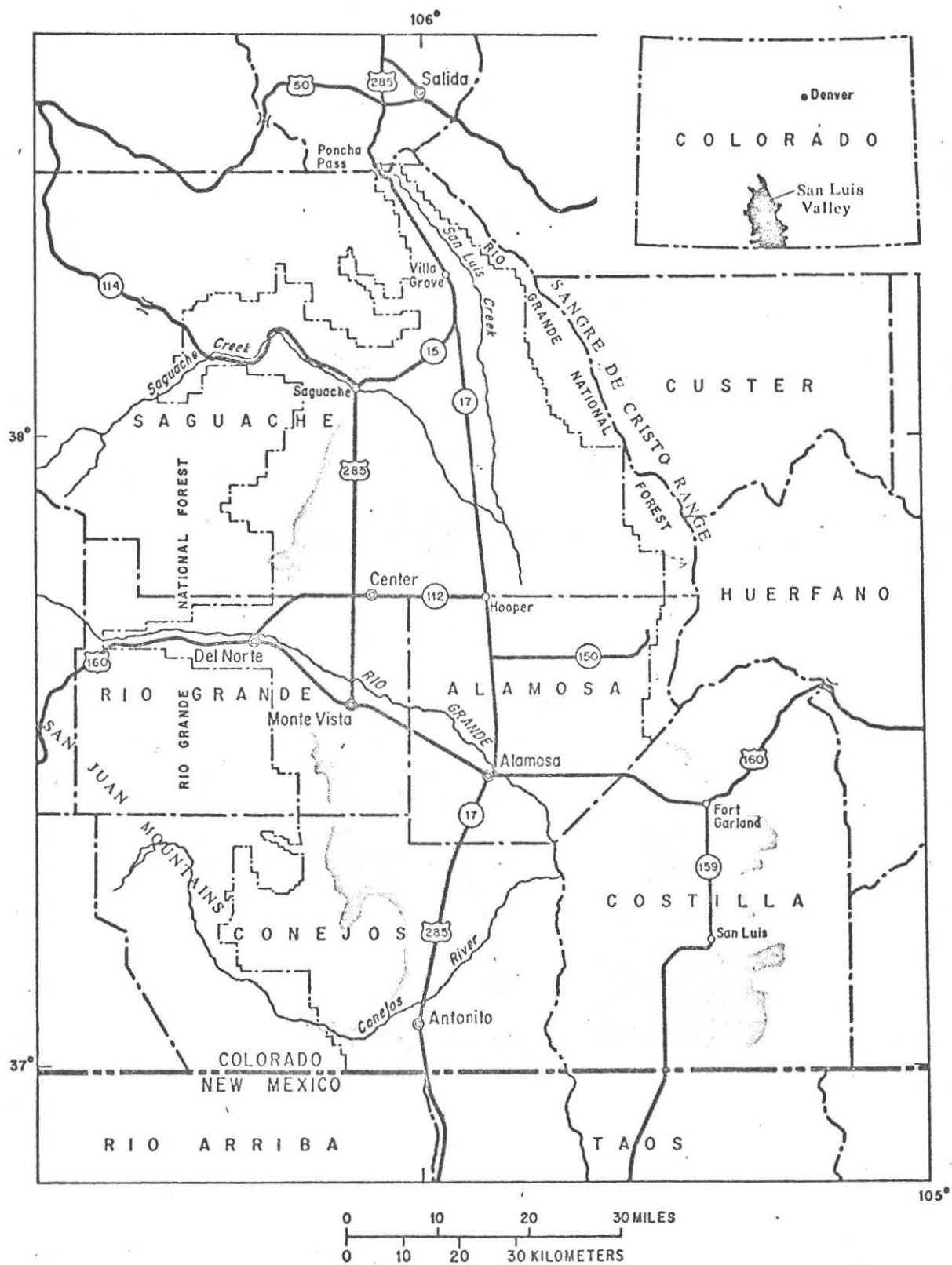


Figure 1.--Location of San Luis Valley (shaded).

## WELL LOCATION

In this report, the locations of wells are based on the U.S. Bureau of Land Management system of land subdivision (fig. 2). The local well number locates a well within a 10-acre (4.0-ha) tract using the U.S. Bureau of Land Management system of land subdivision. The components of the local well number proceed from the largest to the smallest land subdivisions. This is in contrast to the legal description, which proceeds from the smallest to the largest land subdivision.

The largest subdivision is the *survey*. The San Luis Valley of Colorado is governed by two surveys, the Sixth Principal Meridian Survey (S), and the New Mexico Principal Meridian Survey (N) (fig. 2A). Costilla County was not included in either of the above official surveys. This report follows the convention of the Costilla County Assessor in which the northern part of the county is governed by the Sixth Principal Meridian Survey and the southern part of the county is governed by a local system called the Costilla Survey (C). The first letter of the well location designates the survey.

A survey is subdivided into four *quadrants* formed by the intersection of the baseline and the principal meridian. The second letter of the well location designates the quadrant: A indicates the northeast quadrant, B the northwest, C the southwest, and D the southeast.

A quadrant is subdivided in the north-south direction every 6 mi (10 km) by *townships* and is subdivided in the east-west direction every 6 mi (10 km) by *ranges* (fig. 2B). The first number of the well location designates the township and the second number designates the range.

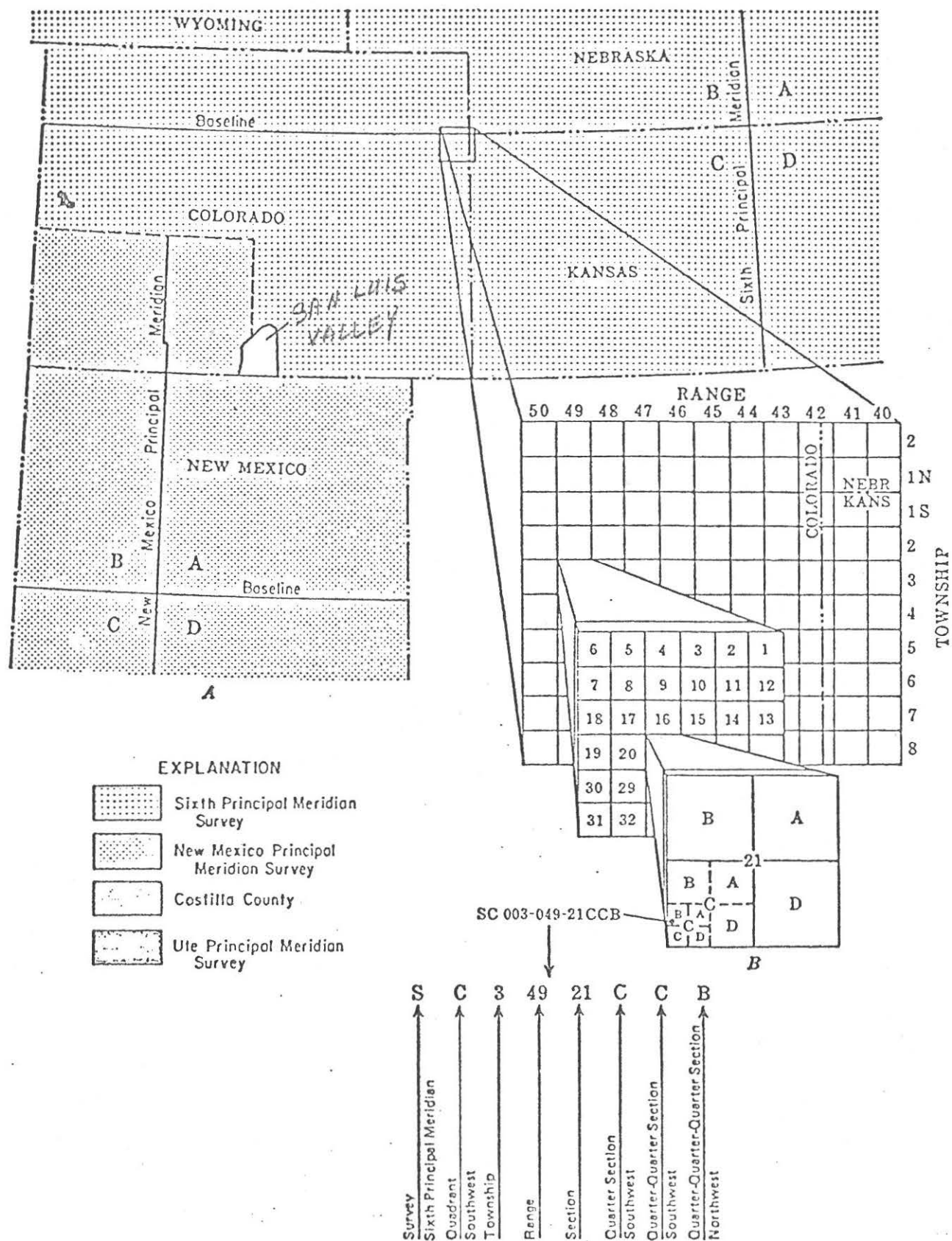


Figure 2.--Well-location diagrams.



The 36-mi<sup>2</sup> (93-km<sup>2</sup>) area described by the township and range designation is subdivided into 1-mi<sup>2</sup> (2.59-km<sup>2</sup>) areas called *sections*. The sections are numbered sequentially in the manner shown on figure 2B. The third number of the well location designates the section.

The section, which contains 640 acres (259.0 ha), is subdivided into *quarter* sections. The 160-acre (64.8-ha) area is designated by the first letter following the section: A indicates the northeast quarter, B the northwest, C the southwest, and D the southeast. The quarter section is subdivided into *quarter-quarter* sections. The 40-acre (16.2-ha) area is designated in the same manner by the second letter following the section. The quarter-quarter section is subdivided into *quarter-quarter-quarter* sections. The 10-acre (4.0-ha) area is designated in the same manner by the third letter following the section.

If more than one well is located within the 10-acre (4.0-ha) tract, the wells are numbered sequentially in the order in which they were originally inventoried. If this number is necessary, it will follow the three-letter designation.

Table 1.--*Water-level records*

WELL LOCATION: See text for description of well-numbering system.

BASIN: RIO - Rio Grande basin

AQUIFER:

Age	Stratigraphic unit and aquifer	Symbol
Quaternary	Alluvium	QAL
Quaternary-Tertiary	Quaternary-Tertiary basin fill	QTB

DEPTH OF WELL: Feet below land surface.

ALTITUDE OF LAND SURFACE: Feet above mean sea level.

DEPTH TO WATER: Feet below land surface, rounded to nearest tenth of a foot.

TABLE 1. WATER-LEVEL RECORDS--CONTINUED

## ALAMOSA COUNTY

WELL LOCATION	BASIN	AQUIFER	DEPTH OF WELL	ALTITUDE OF LAND SURFACE	DEPTH TO WATER				
					1973	1974	1975	1976	1977
NA 36- 9-18CCC1	RIO	QTB	234	7646	9.0	8.7	9.2	8.7	8.3
NA 37- 9- 9DDD	RIO	QTB	24	7572	9.1	7.8	9.3	9.2	9.5
NA 37- 11- 1AAA	RIO	QTB	11	7544	*****	*****	3.1	*****	4.3
NA 37- 11-19CCC	RIO	QTB	12	7526	*****	6.4	6.3	6.8	4.2
NA 38- 10-21BCB	RIO	QTB	45	7554	5.1	5.2	5.8	5.5	5.6
NA 38- 11- 6BCC	RIO	QTB	122	7537	5.4	*****	6.9	*****	*****
NA 38- 11-12CCC	RIO	QTB	22	7521	14.0	*****	13.9	*****	14.0
NA 38- 11-14CCC	RIO	QTB	14	7524	9.0	*****	9.4	*****	9.3
NA 38- 11-35BRB	RIO	QTB	22	7524	7.5	*****	8.0	*****	8.4
NA 38- 12- 2CBC	RIO	QTB	18	7562	*****	*****	6.7	*****	7.2
NA 38- 12-20CCC	RIO	QTB	17	7534	*****	*****	4.1	*****	5.8
NA 38- 12-27BBA	RIO	QTB	17	7571	*****	*****	11.3	*****	11.9
NA 38- 12-33CCC	RIO	QTB	16	7564	*****	*****	6.3	*****	6.7
NA 39- 9-31BAB	RIO	QTB	12	7600	5.3	*****	5.3	*****	*****
8 NA 39- 9-31CCC	RIO	QTB	10	7567	4.6	*****	4.8	*****	3.8
NA 39- 9-33ABA	RIO	QTB	86	7588	7.5	6.0	6.9	5.5	7.0
NA 39- 10- 8ABR	RIO	QTB	104	7564	7.8	7.0	8.0	6.9	7.1
NA 39- 10-26ARC	RIO	QTB	50	7547	10.6	10.9	11.1	11.1	11.0
NA 39- 11- 2ABR	RIO	QTB	13	7526	10.3	*****	9.0	*****	11.5
NA 39- 12- 7CDC	RIO	QTB	18	7523	*****	*****	5.1	*****	5.1
NA 39- 12-10BCD	RIO	QTB	22	7578	*****	*****	5.5	*****	5.8
NA 39- 12-27ADD	RIO	QTB	17	7561	*****	*****	3.7	*****	3.9
NA 40- 9-24CCC	RIO	QTB	62	7576	6.7	5.4	7.1	6.0	7.3
NA 40- 9-31BRB	RIO	QTB	86	7612	5.5	5.0	6.5	5.2	6.2
NA 40- 9-32DDD	RIO	QTB	9	7596	5.2	4.5	5.7	5.2	5.6
NA 40- 10- 8BCB	RIO	QTB	125	7562	7.2	4.8	6.5	5.8	5.8
NA 40- 10-11CRB	RIO	QAL	84	7547	8.4	6.8	8.2	7.3	7.3
NA 40- 10-24BRB	RIO	QTB	110	7544	6.5	5.3	6.6	6.8	6.6
NA 40- 10-33BCB	RIO	QTB	135	7559	6.0	5.2	6.4	4.7	5.5
NA 40- 10-35DCC	RIO	QTB	98	7649	5.5	4.5	5.3	4.6	4.8
NA 40- 11-33DDD	RIO	QTB	7	7524	5.1	*****	4.6	*****	5.2
NA 40- 11-35DDC	RIO	QTB	18	7521	*****	*****	5.0	*****	7.7
NA 40- 12-32CCC2	RIO	QTB	11	7534	7.3	*****	6.1	*****	7.3
NA 40- 12-33DDD	RIO	QTB	12	7579	4.7	*****	3.9	*****	5.2
SC 27- 73-29ABA	RIO	QTB	100	7835	82.6	81.8	82.2	82.6	82.9

TABLE 1. WATER-LEVEL RECORDS -- CONTINUED

## CONEJOS COUNTY

WELL LOCATION	BASIN	AQUIFER	DEPTH OF WELL	ALTITUDE OF LAND SURFACE	DEPTH TO WATER				
					1973	1974	1975	1976	1977
NA 32- 10- 4CCC	RIO	QAL	21	7725	*****	*****	16.2	8.5	8.7
NA 33- 9-13CBB	RIO	QAL	18	7770	*****	*****	10.7	10.0	10.9
NA 33- 10-17BRB	RIO	QAL	28	7720	*****	*****	3.9	3.9	4.1
NA 33- 10-31DDD	RIO	QAL	47	7752	*****	*****	33.8	32.8	33.8
NA 34- 9-23CCC	RIO	QTB	170	7721	12.2	7.6	10.5	10.5	9.6
NA 34- 10-28DDD	RIO	QTB	18	7675	3.8	3.7	3.8	3.6	4.6
NA 35- 8-13DCD	RIO	QTB	22	7677	7.3	6.0	6.6	6.0	5.9
NA 35- 9- 9DDD	RIO	QTB	8	7610	6.8	5.7	7.2	3.3	6.5
NA 35- 9-20CCC	RIO	QTB	16	7640	6.4	*****	6.1	*****	*****
NA 35- 9-34DCC	RIO	QTB	16	7643	5.4	*****	5.6	*****	*****
NA 36- 8- 3DAC	RIO	QTB	75	7680	20.1	18.1	24.4	*****	16.6
NA 36- 9-31CBC	RIO	QTB	195	7668	9.8	12.8	10.8	10.6	11.4
NA 36- 10-26CBB	RIO	QTB	14	7552	*****	6.7	4.9	5.0	5.5

TABLE 1. WATER-LEVEL RECORDS -- CONTINUED

## COSTILLA COUNTY

WELL LOCATION	BASIN	AQUIFER	DEPTH OF WELL	ALTITUDE OF LAND SURFACE	DEPTH TO WATER				
					1973	1974	1975	1976	1977
CB 1- 73-20DCC	RIO	QTB	320	7628	*****	118.6	120.6	119.4	119.9
CB 1- 73-35BAB	RIO	QTB	51	7715	*****	43.2	42.0	46.2	48.1
CB 1- 74-15DBD	RIO	QTB	260	7528	*****	118.2	119.1	120.4	120.1
CB 1- 74-25AAA	RIO	QTB	284	7592	*****	87.0	78.5	76.6	*****
CB 1- 74-27DCD	RIO	QTB	****	7555	*****	*****	141.7	142.6	143.6
CB 1- 74-33DAA	RIO	QTB	230	7500	*****	107.2	108.2	108.7	109.8
CB 2- 71-19ACC	RIO	QTB	16	8208	11.7	4.7	10.4	9.8	7.2
CB 2- 73- 5DDA	RIO	QTB	200	7734	113.8	111.0	112.0	113.1	115.5
CB 2- 73-12BRC	RIO	QTB	****	7771	89.9	91.2	90.6	88.6	88.7
CB 2- 73-16BAA	RIO	QTB	253	7729	148.3	147.6	146.6	149.9	144.6
CB 2- 74-27CBB	RIO	QTB	365	7639	*****	312.2	315.7	318.3	318.1
CB 2- 75-24AAC	RIO	QTB	220	7490	157.4	157.1	157.9	158.7	167.3
CB 2- 75-25AAB	RIO	QTB	210	7501	170.0	169.9	170.0	170.9	170.9
CB 3- 73-11BDB	RIO	QTB	205	7782	*****	51.1	51.8	52.3	52.5
CB 3- 73-24ACA	RIO	QTB	300	7789	22.3	22.4	23.1	20.5	22.5
CB 3- 73-29AAD	RIO	QTB	150	7675	28.2	27.8	26.2	24.1	*****
CB 3- 74-35ADA	RIO	QTB	52	7588	49.4	50.1	50.3	50.8	*****
CB 3- 74-36CAB	RIO	QTB	253	7593	*****	47.4	48.2	48.5	48.7
SC 30- 72-28BRA	RIO	QTB	160	7844	55.8	43.4	61.8	47.6	51.7
SC 30- 72-34DCD	RIO	QTB	154	7895	*****	70.9	78.5	77.4	83.1
SC 30- 73-11ADD	RIO	QTB	310	7836	*****	74.2	75.6	*****	70.7
SC 30- 73-18ADA	RIO	QTB	193	7670	*****	46.0	49.0	57.4	47.2
SC 30- 73-23CCC	RIO	QTB	13	7732	*****	9.9	12.5	11.7	11.8
SC 30- 73-24DDD	RIO	QTB	9	7765	*****	5.6	6.3	5.7	6.1
SC 30- 73-27BAB2	RIO	QTB	170	7724	*****	21.0	17.9	*****	17.5
SC 30- 74-36BCD	RIO	QTB	340	7666	*****	54.6	55.5	55.6	56.2
SC 31- 72- 8AHC	RIO	QTB	192	7827	*****	31.7	35.7	36.1	*****
SC 31- 72-28DAA	RIO	QTB	356	7963	114.5	108.0	117.5	116.4	117.8
SC 31- 73- 6ACC	RIO	QTB	180	7647	*****	10.8	10.6	*****	9.4
SC 31- 74-22DDA	RIO	QTB	142	7616	*****	50.8	54.4	*****	60.0
SC 31- 74-31DAA	RIO	QTB	****	7600	54.6	55.0	58.1	60.1	62.3
SC 31- 75-12DAA	RIO	QTB	800	7565	9.8	*****	*****	*****	*****
SC 31- 75-26AAA	RIO	QTB	13	7517	5.1	5.7	7.1	7.1	6.6
SC 32- 72-22CBA	RIO	QTB	220	8090	94.8	89.8	92.1	94.7	91.3
SC 32- 73- 3DDC	RIO	QTB	415	7794	*****	111.1	112.1	111.0	110.9
SC 32- 73-17DDD	RIO	QTB	450	7750	112.0	112.1	118.0	119.2	111.9
SC 32- 74- 4AAA	RIO	QTB	392	7634	85.3	*****	*****	*****	*****

TABLE 1. WATER-LEVEL RECORDS -- CONTINUED

## RIO GRANDE COUNTY

WELL LOCATION	BASIN	AQUIFER	DEPTH OF WELL	ALTITUDE OF LAND SURFACE	DEPTH TO WATER				
					1973	1974	1975	1976	1977
NA 37- 8-15BRC	RIO	QTB	50	7630	4.3	3.6	4.2	3.9	4.7
NA 37- 8-17ABC	RIO	QTB	125	7649	*****	16.6	23.3	25.2	24.7
NA 37- 8-35DCC	RIO	QTB	50	7647	5.9	5.6	5.2	5.3	5.0
NA 38- 7- 3ABB	RIO	QTB	100	7709	41.5	44.3	41.6	39.6	*****
NA 38- 8- 2CBB2	RIO	QTB	45	7623	10.6	10.1	11.0	9.8	*****
NA 38- 8- 5BAB	RIO	QTB	50	7647	11.0	10.5	10.5	10.2	6.7
NA 38- 8- 8BAA	RIO	QTB	40	7642	8.9	8.2	8.4	7.8	7.4
NA 38- 8-13BBB2	RIO	QTB	35	7616	7.4	7.4	8.2	*****	*****
NA 38- 8-15BBB4	RIO	QTB	45	7624	5.6	5.5	5.9	5.0	5.1
NA 38- 8-22BAA	RIO	QTB	10	7617	6.4	7.1	6.5	5.8	3.4
NA 39- 7- 3ABB	RIO	QTB	100	7722	23.5	18.8	27.2	25.1	15.9
NA 39- 7- 5ABB	RIO	QTB	103	7756	35.8	29.8	38.7	34.1	33.6
NA 39- 7-12BAB	RIO	QTB	107	7690	15.9	12.7	19.9	*****	15.8
NA 39- 8- 6BBB	RIO	QTB	14	7680	8.7	*****	13.4	*****	13.9
NA 39- 8- 8ABB2	RIO	QTB	54	7656	9.0	5.6	12.4	11.7	9.3
NA 39- 8-24BBB2	RIO	QTB	77	7619	5.9	5.0	6.7	5.0	5.5
NA 40- 6-14AAA	RIO	QTB	21	7794	16.8	12.8	15.4	15.7	12.4
NA 40- 6-23DCC	RIO	QTB	122	7816	25.8	21.0	21.7	19.9	20.4
NA 40- 7- 5DCC	RIO	QTB	167	7742	*****	*****	*****	*****	*****
NA 40- 7-14CCB	RIO	QTB	70	7705	22.4	15.7	26.3	24.1	*****
NA 40- 7-16CCC	RIO	QTB	140	7743	27.9	*****	32.4	28.5	*****
NA 40- 7-28BCC1	RIO	QTB	120	7744	27.9	20.5	31.3	27.1	23.5
NA 40- 7-30BCC	RIO	QTB	103	7783	33.7	24.4	33.5	31.0	24.3
NA 40- 8- 1DCC	RIO	QTB	70	7612	5.2	4.8	5.8	5.4	5.2
NA 40- 8- 4BCC2	RIO	QTB	90	7641	9.1	5.9	10.5	7.0	7.4
NA 40- 8- 7DCC1	RIO	QTB	71	7670	14.9	9.1	*****	13.8	15.7
NA 40- 8-13ABB1	RIO	QTB	60	7612	6.0	4.9	6.4	5.6	5.8
NA 40- 8-15CCC	RIO	QTB	100	7640	9.6	5.9	10.8	8.1	8.6
NA 40- 8-28DBB2	RIO	QTB	50	7647	11.3	8.3	13.5	12.5	11.8

TABLE 1. WATER-LEVEL RECORDS -- CONTINUED

## SAGUACHE COUNTY

WELL LOCATION	BASIN	AQUIFER	DEPTH OF WELL	ALTITUDE OF LAND SURFACE	DEPTH TO WATER				
					1973	1974	1975	1976	1977
NA 41- 7- 2CCC1	RIO	QTB	76	7654	9.0	*****	10.1	9.3	9.0
NA 41- 7- 3BRB	RIO	QTB	60	7677	*****	20.7	24.5	*****	*****
NA 41- 7-11DCC	RIO	QTB	64	7655	3.4	4.9	6.0	4.7	4.7
NA 41- 7-26BCC1	RIO	QTB	53	7681	16.3	12.0	*****	19.2	*****
NA 41- 8- 3BRB	RIO	QTB	8	7602	4.3	3.4	4.7	4.1	4.5
NA 41- 8- 5CCC1	RIO	QTB	93	7625	5.0	4.0	5.5	5.1	4.5
NA 41- 8-15CCC3	RIO	QTB	95	7618	6.1	4.8	6.3	4.7	5.1
NA 41- 8-18CCC1	RIO	QTB	150	7650	5.1	5.8	3.8	5.7	7.5
NA 41- 8-26BCC2	RIO	QTB	103	7614	5.7	4.9	6.1	4.9	5.1
NA 41- 8-31CCC3	RIO	QTB	9	7667	*****	5.9	7.9	6.5	*****
NA 41- 9- 8CCC	RIO	QTB	135	7578	2.6	2.8	3.4	3.6	3.4
NA 41- 9-20CCC	RIO	QTB	112	7587	4.0	4.0	5.0	4.3	4.7
NA 41- 9-26BCC	RIO	QTB	100	7570	4.3	4.5	4.9	*****	*****
NA 41- 10-31CCC	RIO	QTB	60	7573	12.8	10.0	12.8	10.4	12.1
NA 42- 7-23CCC	RIO	QTB	130	7641	14.1	12.2	14.8	17.1	13.5
NA 42- 8-10CCC	RIO	QTB	9	7581	3.9	4.1	4.1	4.1	4.0
NA 42- 8-13CCC	RIO	QTB	90	7572	*****	3.1	3.9	3.8	3.6
NA 42- 8-27CCC1	RIO	QTB	170	7596	*****	4.1	4.2	3.7	3.9
NA 42- 9-25DDD	RIO	QTB	10	7548	5.5	5.5	5.5	5.6	6.0
NA 42- 10- 1BAB	RIO	QTB	21	7546	6.4	5.1	5.9	5.7	6.3
NA 42- 10- 7CCC	RIO	QTB	57	7539	5.5	5.5	5.8	5.6	5.0
NA 43- 9-20DDD	RIO	QTB	15	7552	4.3	3.9	5.1	5.4	5.6
NA 44- 9- 5AAA	RIO	QTB	380	7650	35.7	34.8	36.4	36.3	27.5
NA 44- 10- 6BRB	RIO	QTB	12	7628	9.1	7.9	8.9	8.1	8.4
NA 45- 9-13DCA	RIO	QTB	200	7688	45.5	42.9	44.5	48.9	46.5
NA 45- 10-34DAA	RIO	QTB	300	7708	*****	41.5	50.0	48.4	50.3
NA 46- 9-12BCA	RIO	QTB	122	7912	*****	*****	*****	21.1	22.6
NA 46- 10-30CAA	RIO	QTB	219	7812	*****	29.6	42.2	39.6	39.9
NA 47- 9-26CCB	RIO	QTB	99	7980	4.4	*****	*****	3.5	*****