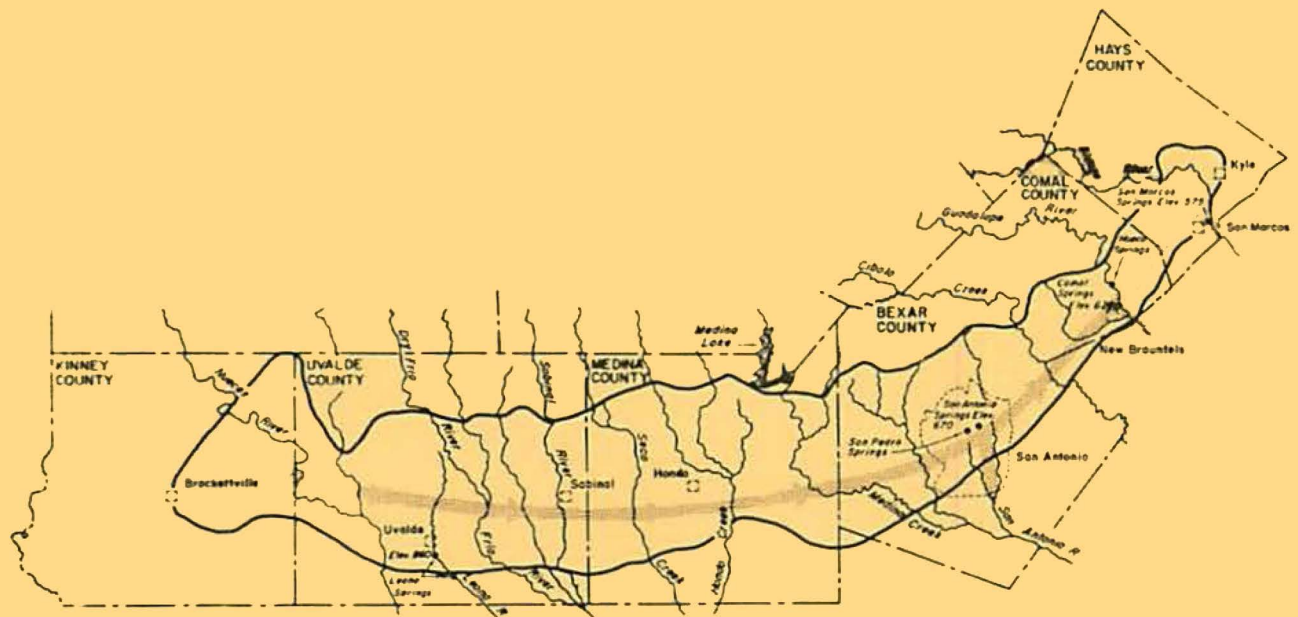


Records of Precipitation, Water Levels and Ground-Water Recharge to the Edwards and Associated Limestones San Antonio Area, Texas, 1970

Bulletin 27
Edwards Underground Water District
San Antonio, Texas



Prepared in cooperation with the U.S. Geological
Survey and the Texas Water Development Board

EDWARDS UNDERGROUND WATER DISTRICT

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BULLETIN 27

RECORDS OF PRECIPITATION, WATER LEVELS, AND GROUND-WATER
RECHARGE TO THE EDWARDS AND ASSOCIATED LIMESTONES,
SAN ANTONIO AREA, TEXAS, 1970

Compiled by

Celso Puente

United States Geological Survey

Prepared by the U. S. Geological Survey
in cooperation with the
Edwards Underground Water District, and the
Texas Water Development Board

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ABSTRACT

Records of precipitation, water levels, and estimates of recharge to the Edwards and associated limestones in the San Antonio area during 1970 are summarized in this report.

Rainfall for 1970 was below average throughout most of the recharge area. The water levels fluctuated just below the record high, owing to recharge from high flood runoff during intense storms.

Ground-water storage in the Edwards Limestone remained above average during 1970. The estimated recharge was 661,600 acre-feet, which is about 30 percent above the average recharge for the period 1934-69.

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INTRODUCTION

Records of precipitation, water levels, and estimates of recharge to the Edwards and associated limestones in the San Antonio area during 1970 are summarized in this report. The compilation of these basic records is part of a continuing hydrologic investigation by the U. S. Geological Survey in cooperation with the Edwards Underground Water District and the Texas Water Development Board. Previous reports are given in the list of references.

PRECIPITATION

The annual precipitation at selected stations throughout the San Antonio area for 1970 and the annual average for each of these stations are shown in table 1. Rainfall was below average throughout most of the recharge area during 1970.

Table 1.--Precipitation at selected stations in the
San Antonio area, 1970

Station	Precipitation (inches)	Long-term mean (inches)
Brackettville	16.50	20.60 (81 years)
Uvalde	13.59	24.04 (69 years)
Sabinal	22.13	25.61 (52 years)
Hondo	30.96	28.62 (67 years)
San Antonio	22.74	27.92 (94 years)
Boerne	27.79	32.20 (76 years)
New Braunfels	35.23	31.26 (77 years)
San Marcos	32.30	33.03 (70 years)

Data from the U. S. Department of Commerce (1970).

WATER LEVELS

The recorded high and low water levels in five selected key wells during 1970 are shown in table 2. During the year, the water levels fluctuated just below the record high. The record highs and lows are also given in table 2. Ground-water storage in the Edwards Limestone remained above average during 1970.

GROUND-WATER RECHARGE

Recharge to the Edwards and associated limestones is chiefly from streams that lose most of their base flow and a part of their flood flow as they cross the Balcones Fault Zone on the outcrop of the aquifer. The recharge is estimated from discharge records at gaging stations located above and below the infiltration areas on most of the streams. The monthly mean discharge at the gaging stations for October-December 1970 is given in table 3. Streamflow records for January-September 1970 will be published by the U. S. Geological Survey in late 1971.

Table 2.--Annual recorded high and low water levels in key wells in the Edwards and associated limestones in the San Antonio area, 1970 (feet above mean sea level)

Well	High	Low	Record High	Record Low	Period of Record
H-5-1 (Uvalde County)	876.2	871.4	878.5 (11-22-61)	811.0 (4-13-57)	1929-32 1934-70
J-1-82 (Medina County)	700.7	678.8	710.3 (2-27-61)	622.3 (8-18-56)	1950-70
J-17 <u>1</u> / (Bexar County)	677.1	650.4	685.5 ² / ₁ (6-26-35)	612.5 ² / ₁ (8-17-56)	1932-70 ³ / ₁
G-49 (Comal County)	627.2	624.3	627.3 (2-19-61)	613.3 (8-21-56)	1948-70
H-23 (Hays County)	593.2	575.0	593.8 (3-29-68)	542.2 (7-12-56)	1937-70

1/ Replaces well 26 and reflects almost the same water level. The water-level data shown is a composite record of wells 26 and J-17.

2/ Record high and low for well 26.

3/ Composite record of wells 26 and J-17.

Table 3.--Monthly mean discharge at stream-gaging stations in
the San Antonio area, October-December 1970
(Figures rounded to nearest cubic foot per second)

Station	1 9 7 0		
	Oct.	Nov.	Dec.
West Nueces River near Brackettville	1	0	0
Nueces River at Laguna	193	116	95
Nueces River below Uvalde	100	41	29
Dry Frio River near Reagan Wells	51	25	18
Frio River at Concan	156	107	88
Frio River below Dry Frio River near Uvalde	<u>1</u> /	0	0
Sabinal River near Sabinal	21	18	18
Sabinal River at Sabinal	1	1	1
Seco Creek at Miller Ranch near Utopia	5	3	2
Seco Creek at Crook Ranch near D'Hanis	0	0	0
Hondo Creek near Tarpley	10	6	4
Hondo Creek at King Waterhole near Hondo	0	0	0
Medina River near Pipe Creek	67	47	44
Medina River near Riomedina	28	20	22
Salado Creek (upper station) at San Antonio	1	<u>1</u> /	<u>1</u> /
Cibolo Creek at Selma	0	0	0
Guadalupe River at Comfort	86	76	76
Guadalupe River near Spring Branch	126	106	107
Guadalupe River at Sattler	108	108	111
Guadalupe River above Comal River at New Braunfels	160	146	149
Comal River at New Braunfels	286	289	286
Blanco River at Wimberley	53	38	35
Blanco River near Kyle	36	27	22
Plum Creek at Lockhart	0	0	0
San Marcos River springflow at San Marcos	193	185	166

1/ Less than 0.5

The recharge in each basin of the San Antonio area for 1970 and the average annual recharge for the period 1934-69 are given in table 4. The basic methods employed by Pettitt and George (1956) and by Garza (1962) were used for estimating the 1970 recharge.

Floods resulting from high intensity rains during the spring and fall seasons provided about 50 percent of the annual recharge, while the remaining recharge was provided by spring-flow from the Edwards Plateau. The total recharge was about 30 percent above the average annual (see table 4).

Table 4.--Estimated recharge to the Edwards and associated
limestones in the San Antonio area, 1970
(in thousands of acre-feet)

Basin	1970	1934-69 Average
Nueces and West Nueces Rivers	112.6	95.9
Frio and Dry Frio Rivers	141.9	86.4
Sabinal River	35.4	32.2
Medina Lake	68.0	50.9
Cibolo and Dry Comal Creeks	113.8	90.1
Blanco River and adjacent area	39.5	32.1
Area between Sabinal and Medina Rivers	81.6	72.8
Area between Cibolo Creek and Medina River	68.8	56.7
Totals	661.6	517.1

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