

# **EDWARDS UNDERGROUND WATER DISTRICT**

1619 Tower Life Building  
San Antonio, Texas

## **BULLETIN 3**

### **RECORDS OF PRECIPITATION, AQUIFER HEAD, AND GROUND-WATER RECHARGE TO THE EDWARDS AND ASSOCIATED LIMESTONES, 1960-62, SAN ANTONIO AREA, TEXAS**

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Prepared in cooperation with the Geological Survey,  
United States Department of the Interior,  
the Texas Water Commission, and  
the City of San Antonio

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Records of precipitation in the San Antonio area and water-level data of the Edwards and associated limestones, the principal aquifer in the area, have been gathered for many years and incorporated in many geologic and hydrologic reports. The recent reports by Petitt and George (1956) and Garza (1962), which summarize all data through 1959, also include estimates of ground-water recharge. The collection of these records is part of the hydrologic investigation being made by the U. S. Geological Survey in cooperation with the Edwards Underground Water District, the Texas Water Commission, and the city of San Antonio.

Records of annual precipitation at selected stations throughout the San Antonio area for the period 1960-62 are shown in table 1; also included is the annual average for each of the stations. Rainfall during 1960 and 1961 generally was near the average throughout the San Antonio area. The annual rainfall in most of the area was below average in 1962, the first year of area-wide deficiency since the end of the recent drought of 1947-57.

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

Station	A N N U A L			Annual Average
	1960	1961	1962	
Brackettville	19.12	17.91	10.87	20.61 (73 years)
Uvalde	23.98	26.26	14.12	24.26 (61 years)
Sabinal	26.24	27.24	13.58	25.61 (44 years)
Hondo	32.37	27.36	17.85	28.54 (59 years)
San Antonio	29.76	26.47	23.90	27.61 (86 years)
Boerne	32.55	25.45	25.26	32.35 (68 years)
New Braunfels	34.28	---	27.40	31.11 (69 years)
San Marcos	45.48	30.02	28.47	33.19 (62 years)

Table 2 shows the annual recorded high and low water levels in five key wells in the San Antonio area for the period 1960-62; the record high and record low for each well are shown also. Water levels in many wells were record highs in 1961, the last year of above-average rainfall during the period 1957-62. The record lows occurred during the peak of the recent drought in 1956 and early 1957. Wells H-5-1 (Uvalde County) and G-49 (Comal County) are close to Leona Springs and Comal Springs, respectively, and their range of water-level fluctuation when the springs are flowing is not as great as in other wells distant from the springs.

Recharge to the Edwards and associated limestones is chiefly by seepage from streams crossing the outcrop of the aquifer along faulted and fractured zones. Basically, the recharge is estimated from results of seepage studies made at different stages of the streams and from discharge measurements made at established gaging stations. Table 3 shows the monthly mean discharge at the gaging stations during October-December 1962; records for the period January 1960 through September 1962 have been published by the U. S. Geological Survey (Hendricks, 1961; United States Dept. of the Interior, Geological Survey-Water Resources Division, 1961 and 1962).

Table 2.-- Annual recorded high and low water levels (feet above mean sea level)  
in key wells tapping the Edwards and associated limestones,  
San Antonio area, Texas, 1960-62

Well	1960		1961		1962		Record High	Record Low
	High	Low	High	Low	High	Low		
H-5-1 (Uvalde County)	876.9	873.1	878.5	875.6	878.3	869.7	878.5 (11-22-61)	811.0 (4-13-57)
J-1-82 (Medina County)	706.3	686.0	710.3	693.4	703.6	676.3	710.3 (2-27-61)	622.3 (8-18-56)
26 (Bexar County)	679.4	657.9	681.2	663.9	675.5	646.9	685.5 (6-26-35)	612.5 (8-17-56)
G-49 (Comal County)	627.1	624.9	627.3	625.7	626.3	623.2	627.3 (2-19-61)	613.3 (8-21-56)
H-23 (Hays County)	589.5	584.3	591.6	573.2	584.1	565.0	593.6 (5-12-58)	542.2 (7-12-56)

Table 3.--Monthly mean discharge, in cubic feet per second, at  
stream-gaging stations in the San Antonio area,

October-December 1962.

(Figures rounded to nearest cubic foot per second.)

Station	1 9 6 2		
	Oct.	Nov.	Dec.
West Nueces River near Brackettville	0	0	0
Nueces River at Laguna	124	99	69
Nueces River below Uvalde	13	12	14
Leona River spring flow near Uvalde	15	12	13
Dry Frio River near Reagan Wells	1	1	7
Frio River at Concan	64	52	51
Frio River below Dry Frio River near Uvalde	0	0	0
Sabinal River near Sabinal	0	0	6
Sabinal River at Sabinal	0	0	0
Seco Creek near Utopia	1	1	1
Seco Creek near D'Hanis	0	0	0
Hondo Creek near Tarpley	1	1	2
Hondo Creek near Hondo	0	0	0
Medina River near Pipe Creek	121	30	36
Medina River near Riomedina	25	23	26
San Antonio River at San Antonio	13	27	20
Cibolo Creek near Bulverde	4	0	0
Cibolo Creek at Selma	0	0	0
Guadalupe River at Comfort	49	42	53
Guadalupe River near Spring Branch	77	69	82
Guadalupe River above Comal River at New Braunfels	93	106	132
Comal River at New Braunfels	239	245	268
Blanco River at Wimberley	29	25	46
Blanco River near Kyle	20	14	47
San Marcos River spring flow at San Marcos	165	141	134

Estimates of recharge for the period 1960-62, shown in table 4, are based on the same concepts employed by Pettitt and George (1956) and Garza (1962); table 4 also lists the annual average recharge in each basin for the period 1934-59 (Garza, 1962, p. 12). Recharge was above average during 1960 and 1961, when rainfall was plentiful. The western part of the San Antonio area, where the major part of the recharge takes place, was particularly deficient in rainfall during 1962; thus, the recharge was only about half the annual average.

#### REFERENCES CITED

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- Hendricks, E. L., 1961, Surface water supply of the United States 1960, Pt. 8, Western Gulf of Mexico basins: U. S. Geological Survey Water-Supply Paper 1712, 511 p.
- Pettitt, B. M., Jr., and George, W. O., 1956, Ground-water resources of the San Antonio area, Texas, A progress report on current studies: Texas Board Water Engineers Bull. 5608, v. I, 80 p.
- U. S. Department of the Interior, Geological Survey, Water Resources Division, 1961, Surface water records of Texas: U. S. Geological Survey duplicated rept., 371 p.
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Table 4.-- Estimated recharge, in thousands of acre-feet,  
to the Edwards and associated limestones,  
San Antonio area, Texas, 1960-62.

Basin	1960	1961	1962	1934-59 Average
Nueces and West Nueces Rivers	88.7	67.4	40.7	94.9
Frio and Dry Frio Rivers	128.1	144.5	42.9	79.1
Sabinal River	64.9	57.4	4.3	31.5
Medina Lake	104.0	88.3	53.3	47.4
Cibolo and Dry Comal Creeks	160.0	110.8	43.9	92.9
Blanco River and adjacent area	62.4	49.4	19.3	29.6
Area between Sabinal and Medina Rivers	127.0	105.4	23.5	67.9
Area between Cibolo Creek and Medina River	89.7	69.3	24.0	58.6
<b>TOTALS</b>	<b>824.8</b>	<b>692.5</b>	<b>251.9</b>	<b>501.9</b>