

EDWARDS UNDERGROUND WATER DISTRICT

1619 Tower Life Building
San Antonio, Texas

BULLETIN 6

RECORDS OF PRECIPITATION, AQUIFER HEAD, AND GROUND-WATER RECHARGE TO THE EDWARDS AND ASSOCIATED LIMESTONES SAN ANTONIO AREA, TEXAS, 1963

Compiled by
Sergio Garza, Hydraulic Engineer
United States Geological Survey

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

OCTOBER 1964

RECORDS OF PRECIPITATION, AQUIFER HEAD, AND GROUND-WATER
RECHARGE TO THE EDWARDS AND ASSOCIATED LIMESTONES,
SAN ANTONIO AREA, TEXAS, 1963

By

Sergio Garza, Hydraulic Engineer,
United States Geological Survey

October 1964

The Edwards and associated limestones, the principal aquifer in the San Antonio area, has been the subject of numerous geologic and hydrologic reports. Records of precipitation, water levels, and estimates of recharge to the aquifer during 1963 are summarized in this report, one of three basic-data reports published yearly by the Edwards Underground Water District. The gathering of these records and data is part of the continuing hydrologic investigation by the U. S. Geological Survey in cooperation with the Edwards Underground Water District, the Texas Water Commission, and the city of San Antonio.

Table 1 shows the annual precipitation at selected stations throughout the San Antonio area for 1963 and the annual average for each of the stations. Rainfall generally was below average during 1963, the second consecutive year of rainfall deficiency in the San Antonio area since the major drought which ended in 1957.

The annual recorded high and low water levels during 1963 in the five key wells in the area are shown in table 2. The

Table 1.--Precipitation, in inches, at selected stations in
the San Antonio area, Texas, 1963.

Station	Precipitation	Long-term mean
Brackettville	15.07	20.54 (74 years)
Uvalde	16.70	24.14 (62 years)
Sabinal	18.99	25.46 (45 years)
Hondo	18.90	28.38 (60 years)
San Antonio	18.65	27.51 (87 years)
Boerne	20.66	32.18 (69 years)
New Braunfels	23.41	31.00 (70 years)
San Marcos	19.90	32.98 (63 years)

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, 1963

Well	High	Low	Record High	Record Low	Period of Record
H-5-1 (Uvalde County)	869.7	861.0	878.5 (11-22-61)	811.0 (4-13-57)	1929-32, 1934-63
J-1-82 (Medina County)	689.1	659.1	710.3 (2-27-61)	622.3 (8-18-56)	1950-63
*J-17 (Bexar County)	665.8	635.0	** 685.5 (6-26-35)	**612.5 (8-17-56)	***1932-63
G-49 (Comal County)	625.0	621.7	627.3 (2-19-61)	613.3 (8-21-56)	1948-63
H-23 (Hays County)	581.6	560.0	593.6 (5-12-58)	542.2 (7-12-56)	1937-63

* Replaces well 26 and reflects almost the same water level (feet above mean sea level).

** Record high and low for well 26.

*** Composite record - wells 26 and J-17.

water levels generally fluctuated above the midpoint between the record high and low levels, shown also for each key well in table 2. Thus, the aquifer head during 1963 remained well above the record low even after two consecutive years of below-average rainfall.

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 records of continuous discharge at gaging stations on the streams and from seepage studies made prior to 1963, which determined streamflow losses across the Balcones fault zone under different rates of base flow. The monthly mean discharges at the gaging stations during October-December 1963 are shown in table 3. Streamflow records for January-September 1963 have been published by the U.S. Geological Survey (U.S. Department of the Interior, Geological Survey-Water Resources Division, 1963).

Table 4 shows the recharge in each basin of the San Antonio area for 1963 and the average annual recharge for the period 1934-62. The latter was computed from previous recharge estimates (Garza, 1962, p. 12; Garza, 1963, p. 7). Basically, the methods employed by Pettitt and George (1956) and Garza (1962) were used for estimating the 1963 recharge, which was considerably below average and the lowest annual total since 1956.

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

October-December 1963.

(Figures rounded to nearest cubic foot per second.)

Station	1 9 6 3		
	Oct.	Nov.	Dec.
West Nueces River near Brackettville	0	0	0
Nueces River at Laguna	21	24	37
Nueces River below Uvalde	7	7	7
Leona River spring flow near Uvalde	<u>1</u> / ₂	<u>1</u> / ₂	<u>1</u> / ₂
Dry Frio River near Reagan Wells	1	4	7
Frio River at Concan	12	37	41
Frio River below Dry Frio River near Uvalde	0	0	0
Sabinal River near Sabinal	0	0	0
Sabinal River at Sabinal	0	0	<u>1</u> / ₂
Seco Creek at Miller Ranch near Utopia	<u>1</u> / ₂	1	<u>1</u> / ₂
Seco Creek near D'Hanis	0	0	0
Hondo Creek near Tarpley	2	1	1
Hondo Creek near Hondo	0	0	0
Medina River near Pipe Creek	2	5	17
Medina River near Riomedina	26	30	28
San Antonio River at San Antonio	31	17	14
Cibolo Creek near Bulverde	0	0	0
Cibolo Creek at Selma	0	0	0
Guadalupe River at Comfort	39	70	46
Guadalupe River near Spring Branch	55	96	64
Guadalupe River above Comal River at New Braunfels	39	85	68
Comal River at New Braunfels	168	194	204
Blanco River at Wimberley	12	12	13
Blanco River near Kyle	0	0	0
San Marcos River spring flow at San Marcos	82	86	86

1/₂ Less than 0.5

Table 4.--Estimated recharge, in thousands of acre-feet,
to the Edwards and associated limestones,
San Antonio area, Texas, 1963.

Basin	1963	1934-62 Average
Nueces and West Nueces Rivers	39.7	91.8
Frio and Dry Frio Rivers	27.0	81.8
Sabinal River	5.0	32.6
Medina Lake	41.9	51.1
Cibolo and Dry Comal Creeks	21.3	93.5
Blanco River and adjacent area	16.2	31.1
Area between Sabinal and Medina Rivers	10.0	69.7
Area between Cibolo Creek and Medina River	9.2	58.6
TOTALS	170.3	510.2

REFERENCES CITED

- Garza, Sergio, 1962, Recharge, discharge, and changes in ground-water storage in the Edwards and associated limestones, San Antonio area, Texas, A progress report on studies, 1955-59: Texas Board Water Engineers Bull. 6201, 42 p.
- Garza, Sergio, 1963, Records of precipitation, aquifer head, and ground-water recharge to the Edwards and associated limestones, 1960-62, San Antonio area, Texas: Edwards Underground Water District Bull. 3, 7 p.
- Petitt, B. M., 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, 1963, Surface water records of Texas: U. S. Geol. Survey duplicated rept., 421 p.