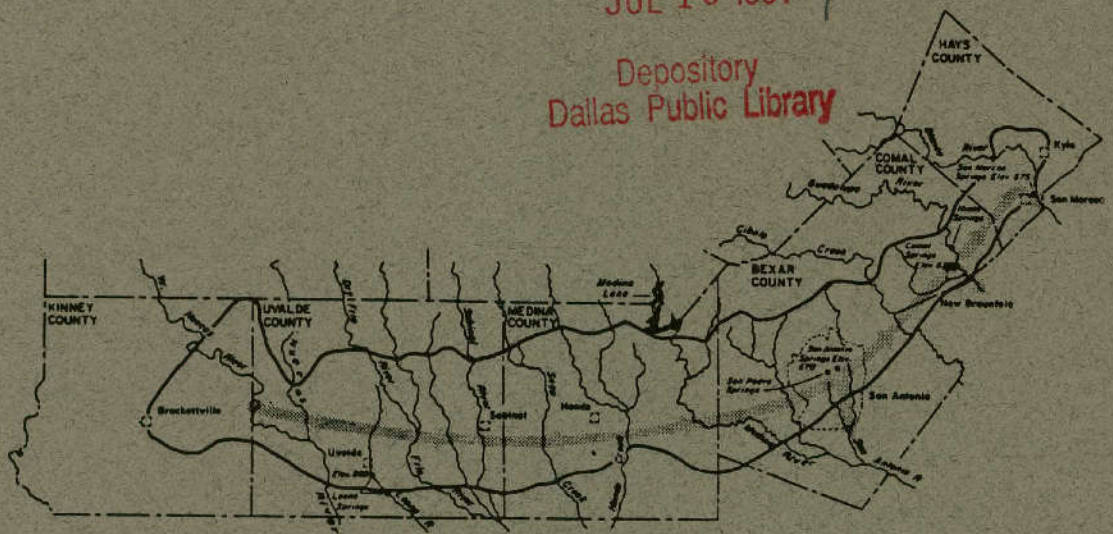
COMPILATION OF HYDROLOGIC DATA FOR THE EDWARDS AQUIFER, SAN ANTONIO AREA, TEXAS, 1989, WITH 1934-89 SUMMARY

Bulletin 49
Edwards Underground Water District
San Antonio, Texas



Prepared by the U.S. Geological Survey in cooperation with the Edwards Underground Water District

EDWARDS UNDERGROUND WATER DISTRICT

1615 North St. Mary's
San Antonio, Texas 78212

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Compiled by

G.M. Nalley and M.W. Thomas
U.S. Geological Survey

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COMPILATION OF HYDROLOGIC DATA FOR THE EDWARDS AQUIFER, SAN ANTONIO AREA, TEXAS, 1989, WITH 1934-89 SUMMARY

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ABSTRACT

The average estimated annual ground-water recharge to the Edwards aquifer in the San Antonio area, Texas, from 1934 through 1989 was 628,000 acre-feet. Recharge in 1989 was 214,400 acre-feet, which is the tenth smallest estimated annual recharge since 1934. The maximum annual recharge of 2,003,600 acre-feet occurred in 1987, and a minimum annual recharge of 43,700 acre-feet occurred in 1956.

The calculated annual discharge from the Edwards aquifer by wells and springs in 1989 was 766,500 acre-feet, which is the fifteenth largest calculated annual discharge since 1934. Annual discharge by wells and springs ranged from a maximum of 960,900 acre-feet in 1977 to a minimum of 388,800 acre-feet in 1955.

Water levels in many of the wells during 1989 fluctuated near the midpoint between record high and low levels, reflecting a near average volume of ground water in storage in the aquifer during most of the year. In 1989, substantial increases occurred during the late winter and early spring, after which water levels remained near average in most of the area.

Water samples from 71 wells and 3 springs in the Edwards aquifer were analyzed for more than 50 properties or constituents, most of which affect the suitability of the water for domestic use. Concentrations of constituents in water from the freshwater zone did not exceed the maximum contaminant levels

established for public water systems. However, trace concentrations of organic compounds were detected at five wells. In 1989, samples were collected and analyzed from wells transecting the freshwater/saline-water interface.

INTRODUCTION

This annual compilation of records of ground-water recharge, discharge, water levels, and water quality for the Edwards aquifer and for surface-water data in the San Antonio area, Texas, is part of a continuing investigation by the U.S. Geological Survey in cooperation with the Edwards Underground Water District.

The calculations of annual recharge are based on data collected from a network of streamflow-gaging stations and on assumptions that relate the runoff characteristics of gaged areas to ungaged areas (Puente, 1978). The basic approach is to use a water-balance equation in which recharge within a stream basin is equal to the difference between measured streamflow above and below the area used for calculating recharge plus the estimated runoff within this area. Locations of the Edwards aquifer and physiographic regions are shown in figure 1, drainage basins are shown in figure 2, and data-collection sites are shown in figure 3.

Annual discharge is compiled from: (1) Data collected by the Texas Water Development Board on pumpage for municipal, military, and industrial use; (2) estimations of pumpage for irrigation by the U.S. Geological Survey as determined from the use of remote sensing techniques (Raymond and Owen-Joyce, 1987) and from irrigated acreage data supplied by the U.S. Soil Conservation Service; and (3) U.S. Geological Survey records of spring flow.

Periodic measurements have been made in observation wells in the Edwards aquifer since 1929 to determine changes in ground-water storage in the aquifer. The first continuous water-stage recorders were installed during the early 1930's. During 1989, periodic water-level measurements were made in 17 wells, and continuous water-stage recorders were in operation on 21 other wells.

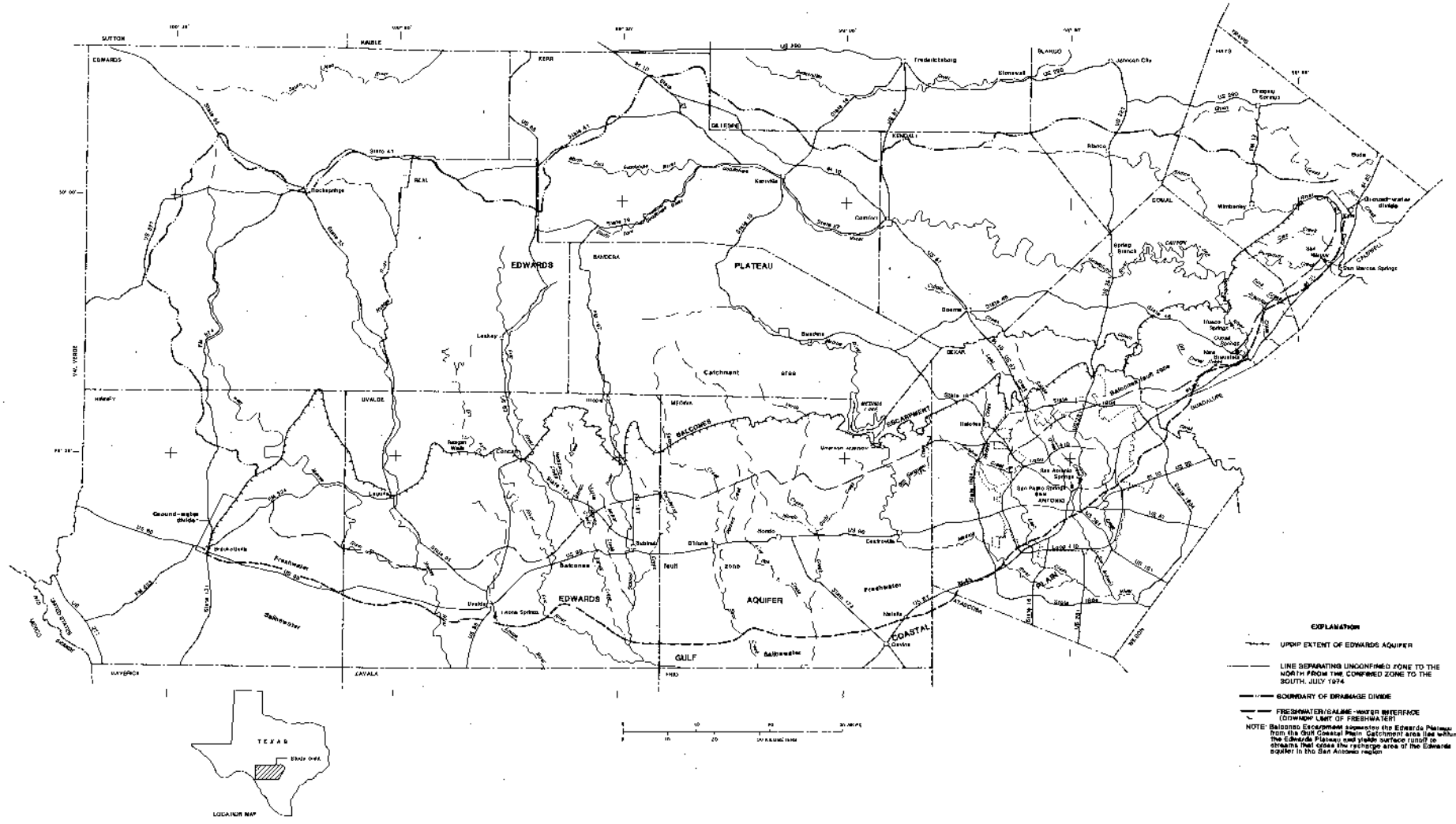

Figure 1.--Location of the Edwards aquifer and physiographic regions in the San Antonio region.

See Plate 1 in back cover.

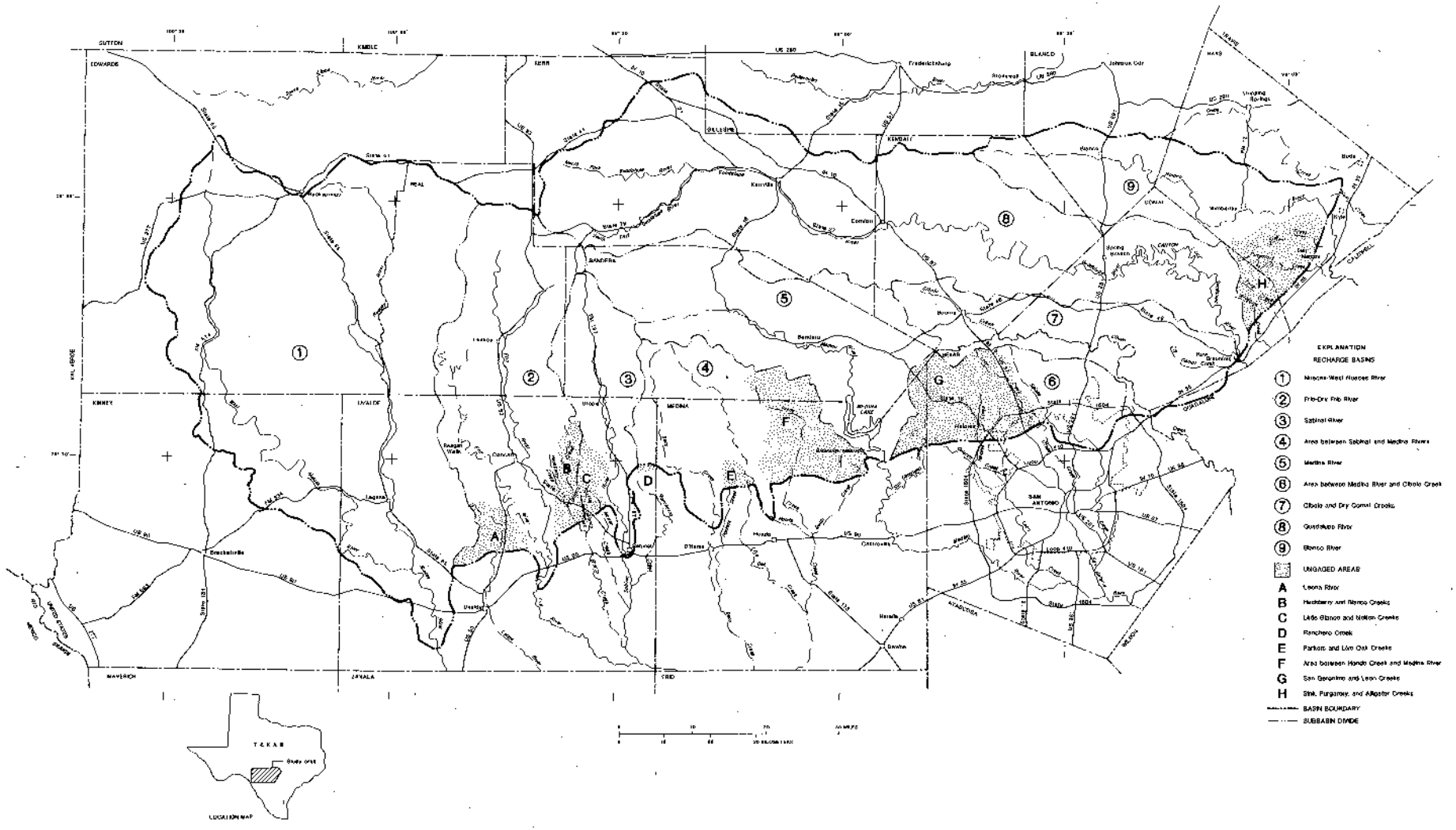

Figure 2.--Location of drainage basins and ungaged areas.

See Plate 2 in back cover.

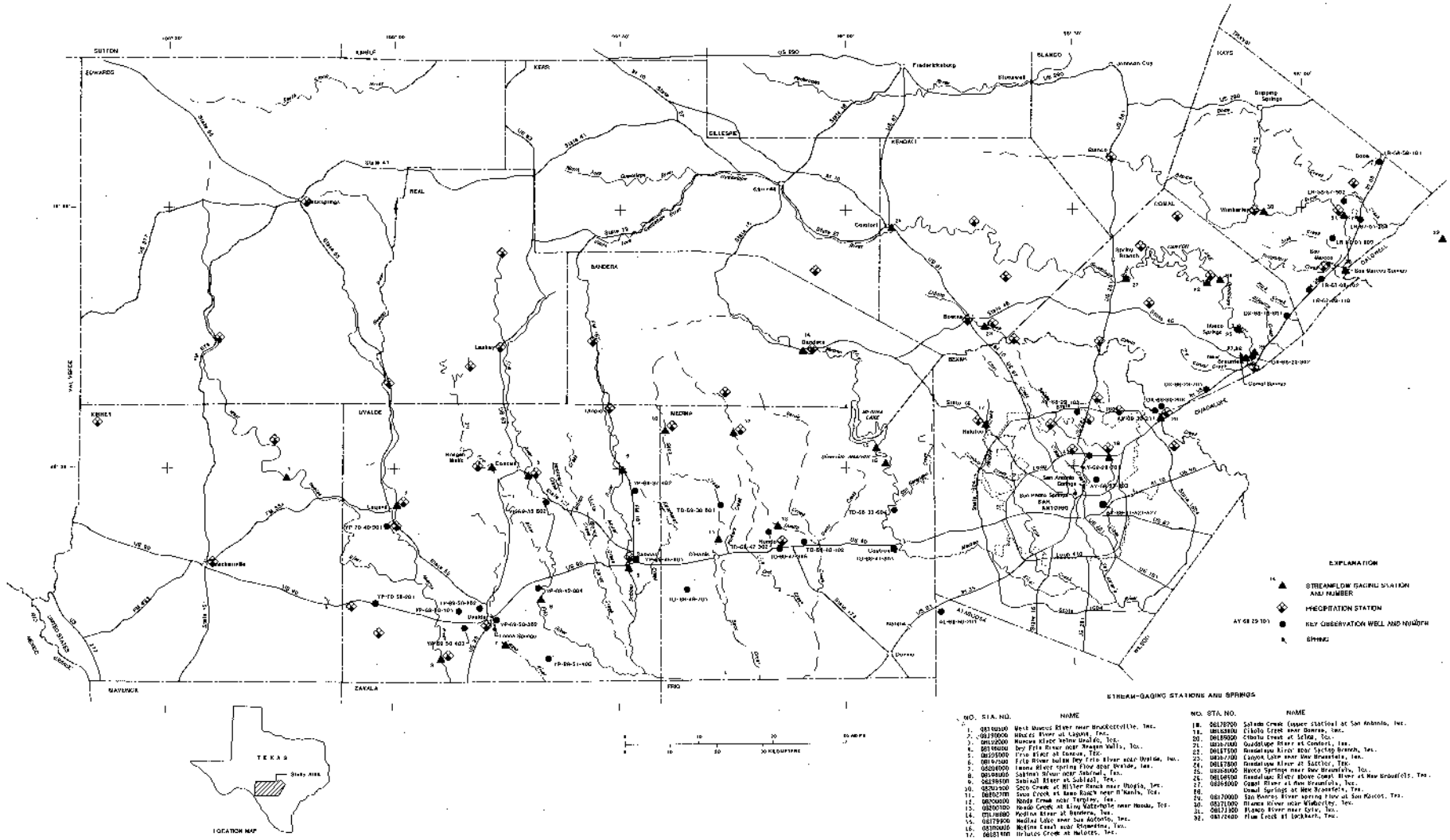

Figure 3.--Location of data-collection sites for streamflow, precipitation, and observation wells, 1989.

See Plate 3 in back cover.

Surface-water data for the San Antonio area for the 1989 water year are presented in Water Resources Data for Texas, Water Year 1989, volume 3 (U.S. Geological Survey, 1990) and are identified by river basins. Provisional data for October-December 1989 were included to calculate annual recharge for 1989. Data consist of records of stage, discharge, and water quality of streams and canals; and records of stage, contents, and water quality of lakes and reservoirs. These data are in computer storage in the National Water Information System operated by the U.S. Geological Survey in cooperation with Federal, State, and local agencies in Texas.

PRECIPITATION

The annual precipitation for 1934-89 and the long-term average, based on period of record, at selected stations in the San Antonio area are given in table 1. Annual precipitation for 1989 was below average at all of the selected stations with complete record and ranged from 20 percent below the long-term average in the Brackettville area to 43 percent below the long-term average in the Hondo area. This below-average precipitation across the aquifer produced a below-average estimated annual recharge for 1989.

During the 5-year period of 1985-89, precipitation fluctuations at selected stations with complete records ranged from 46 percent below the long-term average, for 1988, to 86 percent above the long-term average for 1987. The annual precipitation for all selected stations for 1988-89 was below average, resulting in below-average recharge. However, in 1985-87, the annual precipitation was near average to substantially above average at most stations, resulting in above-average estimated recharge for 1985-86 and the largest estimated recharge since 1934 for 1987. Fluctuations of reported annual precipitation totals for San Antonio for 1934-89, and the annual difference between recharge and discharge for 1934-89 are shown in figure 4.

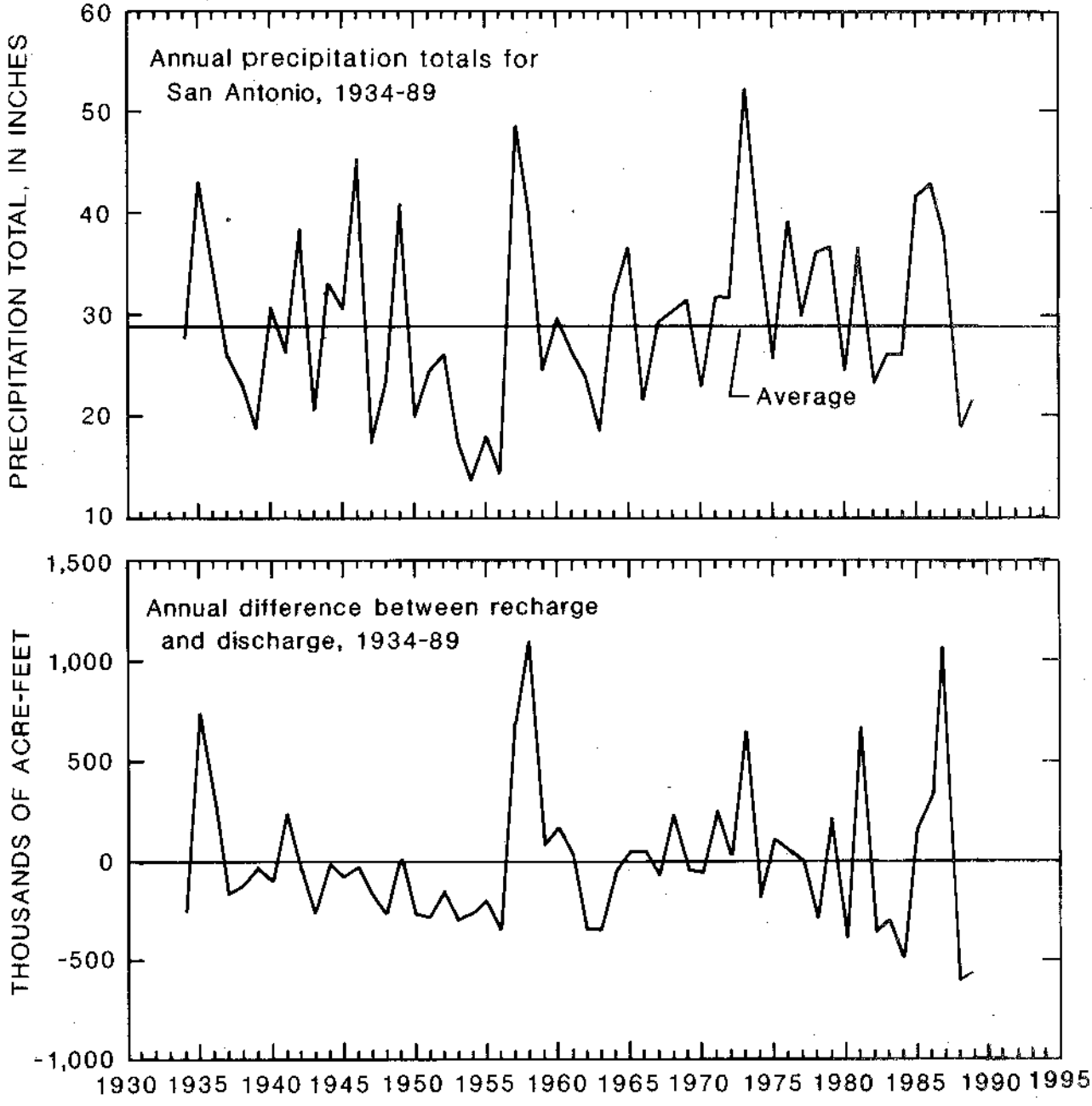

Figure 4.--Annual precipitation totals for San Antonio, 1934-89, and annual difference between recharge and discharge, 1934-89.

Table 1.--Annual precipitation for 1934-89 and long-term average at selected stations a/
[inches]

Calendar year	Brackettville	Uvalde	Sabinal	Hondo	San Antonio	Boerne	New Braunfels	San Marcos
1934	---	16.70	18.07	23.97	27.65	26.78	30.80	35.67
1935	---	41.17	48.21	58.73	42.93	52.93	41.67	41.09
1936	22.34	24.53	26.53	35.27	34.11	47.59	30.41	33.48
1937	16.85	17.88	b/ 9.57	22.93	26.07	32.81	29.19	b/26.03
1938	19.97	13.12	15.39	27.56	23.26	24.14	28.32	28.17
1939	18.38	25.30	c/13.98	23.14	18.83	26.20	13.35	18.59
1940	22.43	27.66	27.51	28.13	30.79	32.29	38.11	43.57
1941	21.52	31.79	b/33.74	44.07	26.34	41.60	42.99	48.41
1942	21.01	19.01	b/11.37	34.83	38.46	31.12	42.08	44.65
1943	c/23.39	20.63	17.21	31.43	20.51	26.33	29.93	25.45
1944	24.76	32.76	b/27.62	32.46	33.19	42.98	43.14	47.42
1945	15.69	22.37	26.60	29.57	30.46	33.50	39.38	c/31.74
1946	19.10	26.41	b/14.16	29.65	45.17	45.62	61.60	52.24
1947	c/22.92	22.67	---	18.98	17.32	21.89	27.52	27.53
1948	b/20.02	18.31	---	28.82	23.64	23.77	c/19.88	b/21.27
1949	31.32	34.41	---	39.90	40.81	41.15	43.21	36.22
1950	17.70	18.27	b/15.28	24.91	19.86	24.94	21.13	21.10
1951	14.71	16.07	15.63	b/24.05	24.44	18.76	24.84	30.88
1952	12.26	18.24	23.16	24.56	26.24	37.54	33.87	39.91
1953	10.12	18.34	21.44	20.61	17.56	21.42	30.06	33.39
1954	19.38	15.60	14.72	11.92	13.70	10.29	10.12	13.42
1955	26.55	18.36	20.87	21.21	18.18	19.27	23.12	26.44
1956	7.58	9.29	11.29	15.54	14.31	12.05	18.41	18.37
1957	34.21	39.30	40.03	35.09	48.83	52.55	51.88	46.51
1958	45.37	39.03	41.18	41.60	39.69	40.94	36.40	39.08
1959	27.51	31.51	27.02	30.68	24.50	35.64	40.45	43.47
1960	19.12	23.98	26.24	32.37	29.76	32.55	34.28	45.48
1961	17.91	26.26	27.24	27.36	26.47	25.45	b/15.70	30.02
1962	10.87	14.12	13.58	17.85	23.90	25.26	27.40	28.47
1963	15.07	16.70	18.99	18.90	18.65	20.66	23.41	19.90
1964	20.75	22.30	23.78	28.29	31.88	27.36	30.65	30.27
1965	21.48	26.21	29.41	30.80	36.65	42.41	45.16	45.00
1966	21.63	20.87	21.54	29.46	21.44	29.05	25.98	27.12
1967	21.95	20.10	23.89	30.33	29.26	26.75	31.74	26.41
1968	17.26	25.20	c/29.88	31.91	30.40	35.14	35.97	37.13
1969	28.53	33.38	33.05	32.30	31.42	38.07	33.01	36.59
1970	16.50	13.59	22.13	30.96	22.74	27.79	35.23	32.30
1971	29.46	31.01	31.00	32.96	31.80	45.24	29.43	31.10
1972	21.21	15.49	21.10	25.43	31.49	35.09	42.02	31.90
1973	30.61	30.85	c/35.14	47.82	52.28	50.93	51.66	47.91
1974	18.25	30.94	c/20.93	c/36.41	37.00	41.80	42.85	b/37.28
1975	26.62	24.92	23.65	b/25.84	25.67	33.49	35.82	48.64
1976	34.40	46.04	40.82	45.21	39.13	45.24	49.06	47.46
1977	15.06	19.90	17.06	19.40	29.64	32.43	24.83	27.69
1978	19.04	18.48	21.28	24.64	35.99	35.17	c/36.35	33.08
1979	16.34	32.35	31.44	28.83	36.64	39.97	36.72	38.74
1980	18.33	23.05	22.67	21.27	24.23	29.02	33.69	29.56
1981	28.73	26.24	30.19	27.40	36.37	41.05	43.23	49.62
1982	19.10	23.35	18.44	21.99	22.96	27.64	21.04	c/22.47
1983	19.35	b/24.45	23.33	c/20.92	26.11	34.60	34.13	36.95
1984	16.24	c/15.33	20.67	b/21.19	25.95	26.97	20.90	b/ 8.26
1985	18.93	b/ 5.76	23.67	21.94	41.43	37.77	37.26	33.54
1986	27.44	c/29.86	c/29.62	c/36.01	42.73	43.52	47.14	42.20
1987	39.45	36.39	38.36	40.09	37.96	39.86	b/37.33	37.94
1988	12.08	15.20	13.52	c/ 9.81	19.01	19.49	c/16.27	21.50
1989	16.98	18.65	17.26	16.10	22.14	25.14	20.99	25.46
Years of record available	92	89	72	87	106	87	95	90
Long-term average	21.16	24.14	25.07	28.28	31.09	32.71	32.07	33.60

a/ Precipitation data from the U.S. Department of Agriculture (1934-40) and U.S. Department of Commerce (1941-89).
b/ Partial record not included in long-term average; missing more than 1 month.
c/ Partial record not included in long-term average; missing 1 month.

GROUND-WATER RECHARGE

The area used for estimating recharge to the Edwards aquifer in the San Antonio area is modified slightly from the area described by Puente (1978) to reflect existing data-collection sites. Delineation of this area is based on surface- and ground-water divides. Recharge to the Edwards aquifer is derived mainly from seepage from streams that cross the outcrop of the aquifer and from direct infiltration of precipitation on the outcrop. The western part of the recharge zone is comprised of the Nueces, the Frio-Sabinal, and the Seco-Hondo-Medina River basins. Collectively, these three basins have a catchment area of about 2,950 mi^2, which is about 60 percent of the total catchment area for the Edwards aquifer, supplying about 70 percent of the total recharge to the aquifer (Burchett and others, 1986). Some recharge also is derived from other aquifers that are hydraulically connected to the Edwards aquifer. Water can move freely between two aquifers either along solution-widened fractures and faults or where the aquifers are in contact from movement along faults (Welder and Reeves, 1962, p. 36). Other aquifers that may contribute recharge to the Edwards aquifer are, from oldest to youngest, Glen Rose Limestone, Buda Limestone, and Austin Group. Only recharge derived from the land surface is included in this compilation.

The estimated annual recharge by basin and the average annual recharge for 1934-89 are given in table 2. Recharge in the Guadalupe River basin is not included because the amount of net recharge to the aquifer is negligible (Puente, 1978).

The annual recharge for 1934-89 ranged from 43,700 acre-ft in 1956 to 2,003,600 acre-ft in 1987. The average annual recharge for 1934-89 was 628,000 acre-ft. The annual recharge for 1989 was 214,400 acre-ft, which is 66 percent below the average annual recharge and is the tenth smallest estimated annual recharge since 1934.

Table 2.--Estimated annual recharge to the Edwards aquifer by basin, 1934-89 a/
[thousands of acre-feet]

Calendar year	Nueces-West Nueces River basin	Frio-Dry Frio River basin b/	Sabinal River basin b/	Area between Sabinal River and Medina River basins b/	Medina Lake	Area between Cibolo Creek and Medina River basins b/	Cibolo-Dry Comal Creek basin	Blanco River basin b/	Total
1934	8.6	27.9	7.5	19.9	46.5	21.0	28.4	19.8	179.6
1935	411.3	192.3	56.6	166.2	71.1	138.2	182.7	39.8	1,258.2
1936	176.5	157.4	43.5	142.9	91.6	108.9	146.1	42.7	909.6
1937	28.8	75.7	21.5	61.3	80.5	47.8	63.9	21.2	400.7
1938	63.5	69.3	20.9	54.1	65.5	46.2	76.8	36.4	432.7
1939	227.0	49.5	17.0	33.1	42.4	9.3	9.6	11.1	399.0
1940	50.4	60.3	23.8	56.6	38.8	29.3	30.8	18.8	308.8
1941	89.9	151.8	50.6	139.0	54.1	116.3	191.2	57.8	850.7
1942	103.5	95.1	34.0	84.4	51.7	66.9	93.6	28.6	557.8
1943	36.5	42.3	11.1	33.8	41.5	29.5	58.3	20.1	273.1
1944	64.1	76.0	24.8	74.3	50.5	72.5	152.5	46.2	560.9
1945	47.3	71.1	30.8	78.6	54.8	79.6	129.9	35.7	527.8
1946	80.9	54.2	16.5	52.0	51.4	105.1	155.3	40.7	556.1
1947	72.4	77.7	16.7	45.2	44.0	55.5	79.5	31.6	422.6
1948	41.1	25.6	26.0	20.2	14.8	17.5	19.9	13.2	178.3
1949	166.0	86.1	31.5	70.3	33.0	41.8	55.9	23.5	508.1
1950	41.5	35.5	13.3	27.0	23.6	17.3	24.6	17.4	200.2
1951	18.3	28.4	7.3	26.4	21.1	15.3	12.5	10.6	139.9
1952	27.9	15.7	3.2	30.2	25.4	50.1	102.3	20.7	275.5
1953	21.4	15.1	3.2	4.4	36.2	20.1	42.3	24.9	167.6
1954	61.3	31.6	7.1	11.9	25.3	4.2	10.0	10.7	162.1
1955	128.0	22.1	0.6	7.7	16.5	4.3	3.3	9.5	192.0
1956	15.6	4.2	1.6	3.6	6.3	2.0	2.2	8.2	43.7
1957	108.6	133.6	65.4	129.5	55.6	175.6	397.9	76.4	1,142.6
1958	266.7	300.0	223.8	294.9	95.5	190.9	268.7	70.7	1,711.2
1959	109.6	158.9	61.6	96.7	94.7	57.4	77.9	33.6	690.4
1960	88.7	128.1	64.9	127.0	104.0	89.7	160.0	62.4	824.8
1961	85.2	151.3	57.4	105.4	88.3	69.3	110.8	49.4	717.1
1962	47.4	46.6	4.3	23.5	57.3	16.7	24.7	18.9	239.4
1963	39.7	27.0	5.0	10.3	41.9	9.3	21.3	16.2	170.7
1964	126.1	57.1	16.3	61.3	43.3	35.8	51.1	22.2	413.2
1965	97.9	83.0	23.2	104.0	54.6	78.8	115.3	66.7	623.5
1966	169.2	134.0	37.7	78.2	50.5	44.5	66.5	34.6	615.2
1967	82.2	137.9	30.4	64.8	44.7	30.2	57.3	19.0	466.5
1968	130.8	176.0	66.4	198.7	59.9	83.1	120.5	49.3	884.7
1969	119.7	113.8	30.7	84.2	55.4	60.2	99.9	46.6	610.5
1970	112.6	141.9	35.4	81.6	68.0	68.8	113.8	39.5	661.6
1971	263.4	212.4	39.2	155.6	68.7	81.4	82.4	22.2	925.3
1972	108.4	144.6	49.0	154.6	87.9	74.3	104.2	33.4	756.4
1973	190.6	256.9	123.9	286.4	97.6	237.2	211.7	82.2	1,486.5
1974	91.1	135.7	36.1	115.3	96.2	68.1	76.9	39.1	658.5
1975	71.8	143.6	47.9	195.9	93.4	138.8	195.7	85.9	973.0
1976	150.7	238.6	68.2	182.0	94.5	47.9	54.3	57.9	894.1
1977	102.9	193.0	62.7	159.5	77.7	97.9	191.6	66.7	952.0
1978	69.8	73.1	30.9	103.7	76.7	49.6	72.4	26.3	502.5
1979	128.4	201.4	68.6	203.1	89.4	85.4	266.3	75.2	1,117.8
1980	58.6	85.6	42.6	25.3	88.3	18.8	55.4	31.8	406.4
1981	205.0	365.2	105.6	252.1	91.3	165.0	196.8	67.3	1,448.4
1982	19.4	123.4	21.0	90.9	76.8	22.6	44.8	23.5	422.4
1983	79.2	85.9	20.1	42.9	74.4	31.9	62.5	23.2	420.1
1984	32.4	40.4	8.8	18.1	43.9	11.3	16.9	25.9	197.9
1985	105.9	186.9	50.7	148.5	64.7	136.7	259.2	50.7	1,003.3
1986	188.4	192.8	42.2	173.6	74.7	170.2	267.4	44.5	1,153.7
1987	308.5	473.3	110.7	405.5	90.4	229.3	270.9	114.9	2,003.6
1988	59.2	117.9	17.0	24.9	69.9	12.6	28.5	25.5	355.5
1989	52.6	52.6	8.4	13.5	46.9	4.6	12.3	23.6	214.4
AVERAGE	104.5	117.5	38.3	97.4	60.8	67.7	104.1	37.8	628.0

a/ Differences may occur due to rounding procedures.
b/ Includes recharge from gaged and ungaged areas within the basin.

GROUND-WATER DISCHARGE

The estimated total discharge from wells and springs in 1989 was 766,600 acre-ft, which is a decrease of about 16 percent from 1988. In 1989, most of the estimated discharge was from well discharge and constituted 71 percent of the total discharge. Spring flow comprised 29 percent of the total discharge for the year. The estimated annual discharge, by county, from the Edwards aquifer during 1934-89 is given in table 3. The calculated average daily and total annual discharge by county and by water use for 1989 is given in table 4.

The total calculated spring flow was 224,100 acre-ft for 1989, a decrease of about 39 percent from 1988. The major springs from which discharge was calculated include San Marcos Springs in Hays County, Comal and Hueco Springs in Comal County, San Antonio and San Pedro Springs in Bexar County, and Leona River Springs in Uvalde County. The combined major spring flow in Comal and Hays Counties was 192,700 acre-ft, which is about 86 percent of the total spring flow for the year. The calculated discharge from Leona River Springs includes underflow into the alluvial gravels along the stream.

The total calculated discharge from wells was 542,400 acre-ft, an increase of 2,400 acre-ft, which is less than a 1-percent increase, from 1988. Bexar County well discharge was 293,000 acre-ft, which is an decrease of 9,900 acre-ft, or about a 3-percent decrease, from 1988. In 1989, approximately 54 percent of the total well discharge was from wells in Bexar County. Most of this well discharge was for municipal, military, and domestic use. Other wells in Bexar County, along with most of the large wells in Uvalde and Medina Counties, supplied water from the Edwards aquifer for the irrigation of approximately 72,600 acres. The number of acres irrigated was estimated using remote sensing techniques (Raymond and Owen-Joyce, 1987). The amount of irrigation water withdrawn from the Edwards aquifer is calculated by multi-

Table 3.--Estimated annual discharge from the Edwards aquifer by county, 1934-89 a/
[thousands of acre-feet]

Year	Kinney-Uvalde Counties	Medina County	Bexar County	Comal County	Hays County	Total	Total spring discharge	Total well discharge
1934	12.6	1.3	109.3	229.1	85.6	437.9	336.0	101.9
1935	12.2	1.5	171.8	237.2	96.9	519.6	415.9	103.7
1936	26.6	1.5	215.2	261.7	93.2	598.2	485.5	112.7
1937	28.3	1.5	201.8	252.5	87.1	571.2	451.0	120.2
1938	25.2	1.6	187.6	250.0	93.4	557.8	437.7	120.1
1939	18.2	1.6	122.5	219.4	71.1	432.8	313.9	118.9
1940	16.1	1.6	116.7	203.8	78.4	416.6	296.5	120.1
1941	17.9	1.6	197.4	250.0	134.3	601.2	464.4	136.8
1942	22.5	1.7	203.2	255.1	112.2	594.7	450.1	144.6
1943	19.2	1.7	172.0	249.2	97.2	539.3	390.2	149.1
1944	11.6	1.7	166.3	252.5	135.3	567.4	420.1	147.3
1945	12.4	1.7	199.8	263.1	137.8	614.8	461.5	153.3
1946	6.2	1.7	180.1	261.9	134.0	583.9	428.9	155.0
1947	13.8	2.0	193.3	256.8	127.6	593.5	426.5	167.0
1948	9.2	1.9	159.2	203.0	77.3	450.6	281.9	168.7
1949	13.2	2.0	165.3	209.5	89.8	479.8	300.4	179.4
1950	17.8	2.2	177.3	191.1	78.3	466.7	272.9	193.8
1951	16.9	2.2	186.9	150.5	69.1	425.6	215.9	209.7
1952	22.7	3.1	187.1	133.2	78.8	424.9	209.5	215.4
1953	27.5	4.0	193.7	141.7	101.4	468.3	238.5	229.8
1954	26.6	6.3	208.9	101.0	81.5	424.3	178.1	246.2
1955	28.3	11.1	215.2	70.1	64.1	388.8	127.8	261.0
1956	59.6	17.7	229.6	33.6	50.4	390.9	69.8	321.1
1957	29.0	11.9	189.4	113.2	113.0	456.5	219.2	237.3
1958	23.7	6.6	199.5	231.8	155.9	617.5	398.2	219.3
1959	43.0	8.3	217.5	231.7	118.5	619.0	384.5	234.5
1960	53.7	7.6	215.4	235.2	143.5	655.4	428.3	227.1
1961	56.5	6.4	230.3	249.5	140.8	683.5	455.3	228.2
1962	64.6	8.1	220.0	197.5	98.8	589.0	321.1	267.9
1963	51.4	9.7	217.3	155.7	81.9	516.0	239.6	276.4
1964	49.3	8.6	201.0	141.8	73.3	474.0	213.8	260.2
1965	46.8	10.0	201.1	194.7	126.3	578.9	322.8	256.1
1966	48.5	10.4	198.0	198.9	15.4	571.2	315.3	255.9
1967	81.1	15.2	239.7	139.1	82.3	557.4	216.1	341.3
1968	58.0	9.9	207.1	238.2	146.8	660.0	408.3	251.7
1969	88.5	13.6	216.3	218.2	122.1	658.7	351.2	307.5
1970	100.9	16.5	230.6	229.2	149.9	727.1	397.7	329.4
1971	117.0	32.4	262.8	168.2	99.1	679.5	272.7	406.8
1972	112.6	28.8	247.7	234.3	123.7	747.1	375.8	371.3
1973	96.5	14.9	273.0	289.3	164.3	838.0	527.6	310.4
1974	133.3	28.6	272.1	286.1	141.1	861.2	483.8	377.4
1975	112.0	22.6	259.0	296.0	178.6	868.2	540.4	327.8
1976	136.4	19.4	253.2	279.7	164.7	853.4	503.9	349.5
1977	156.5	19.9	317.5	295.0	172.0	960.9	580.3	380.6
1978	154.3	38.7	269.5	245.7	99.1	807.3	375.5	431.8
1979	130.1	32.9	294.5	300.0	157.0	914.5	523.0	391.5
1980	151.0	39.9	300.3	220.3	107.9	819.4	328.3	491.1
1981	104.2	26.1	280.7	241.8	141.6	794.4	407.3	387.1
1982	129.2	33.4	305.1	213.2	105.5	786.4	333.3	453.1
1983	107.7	29.7	271.6	186.6	118.5	720.1	301.6	418.5
1984	151.1	46.9	309.7	108.9	85.7	702.3	172.5	529.8
1985	156.9	59.2	295.5	200.0	144.9	856.5	334.0	522.5
1986	b/91.7	41.9	294.0	229.3	160.4	b/817.3	b/388.1	429.3
1987	b/94.9	15.9	326.6	286.2	198.4	b/922.0	b/558.0	364.1
1988	b/156.7	82.2	317.4	236.5	116.9	b/909.7	b/369.8	540.0
1989	155.6	70.5	305.6	147.9	85.6	766.6	224.1	542.4

a/ Differences may occur due to rounding procedures.
b/ Differs from Bulletins 46-48 due to correcting an error found in the method of calculating the Leona Gravel underflow.

Table 4.--Calculated average daily and total annual discharge from the Edwards aquifer by county and by water use, 1989 a/

County	Springs	Municipal supply and military use	Irrigation	Industrial use	Domestic supply, stock, and miscellaneous use b/	Total (million gallons per year)	Total (thousand acre-feet per year)
	Million gallons per day						
Kinney	--	--	1.0	--	0.2	438.0	1.3
Uvalde	16.8	5.1	114.0	0.6	2.3	50,695.0	155.6
Medina	--	6.3	56.0	--	0.6	22,975.4	70.5
Bexar	11.2	221.4	3.9	7.3	29.0	99,567.3	305.6
Comal	107.3	12.1	0.2	11.9	0.6	48,207.1	147.9
Hays	64.8	9.6	0.1	0.6	1.3	27,891.8	85.6
Total (million gallons per year)	73,031.6	92,928.8	63,928.6	7,454.8	12,430.8	249,774.6	
Total (thousand acre-feet per year)	224.1	285.2	196.2	22.9	38.2		766.6

a/ Differences may occur due to rounding procedures.
b/ Includes pumpage from private schools, country clubs, parks, flowing wells, and cemeteries.

plying the duty value for each crop type by the estimated number of acres in that crop type. The remaining discharge was for industrial use and was primarily from wells in Comal and Bexar Counties.

WATER LEVELS AND GROUND-WATER STORAGE

Water levels have been measured periodically in selected observation wells in the Edwards aquifer since 1929 to determine changes in ground-water storage. During the early 1930's, continuous water-level recorders were installed on some of the observation wells.

Water levels in wells fluctuate mainly in response to change in ground-water storage in the aquifer. Changes in ground-water storage occur when there are differences between the amounts of recharge and discharge. When recharge is greater than discharge, water levels rise, and spring flow increases; when discharge is greater than recharge, water levels decline, and spring flow decreases. During the 5-year period, 1985-89, recharge was greater than discharge during 1985-87 and was reflected in rising water levels. However, discharge was greater than recharge during 1988-89 and was reflected in declining water levels for those years. The annual difference between recharge and discharge for 1934-89 is shown in figure 4. The accumulated difference between recharge and discharge and the annual average water level for the Bexar County observation well are shown in figure 5.

In 1989, the general trend of water levels for five selected observation wells in the artesian part of the aquifer was downward, reflecting below normal recharge for the year. The annual and period of record high and low water levels recorded for these five selected observation wells during 1934-89 are given in table 5. Water levels from these wells during 1989 fluctuated near the midpoint between the recorded historical high and low measurements.

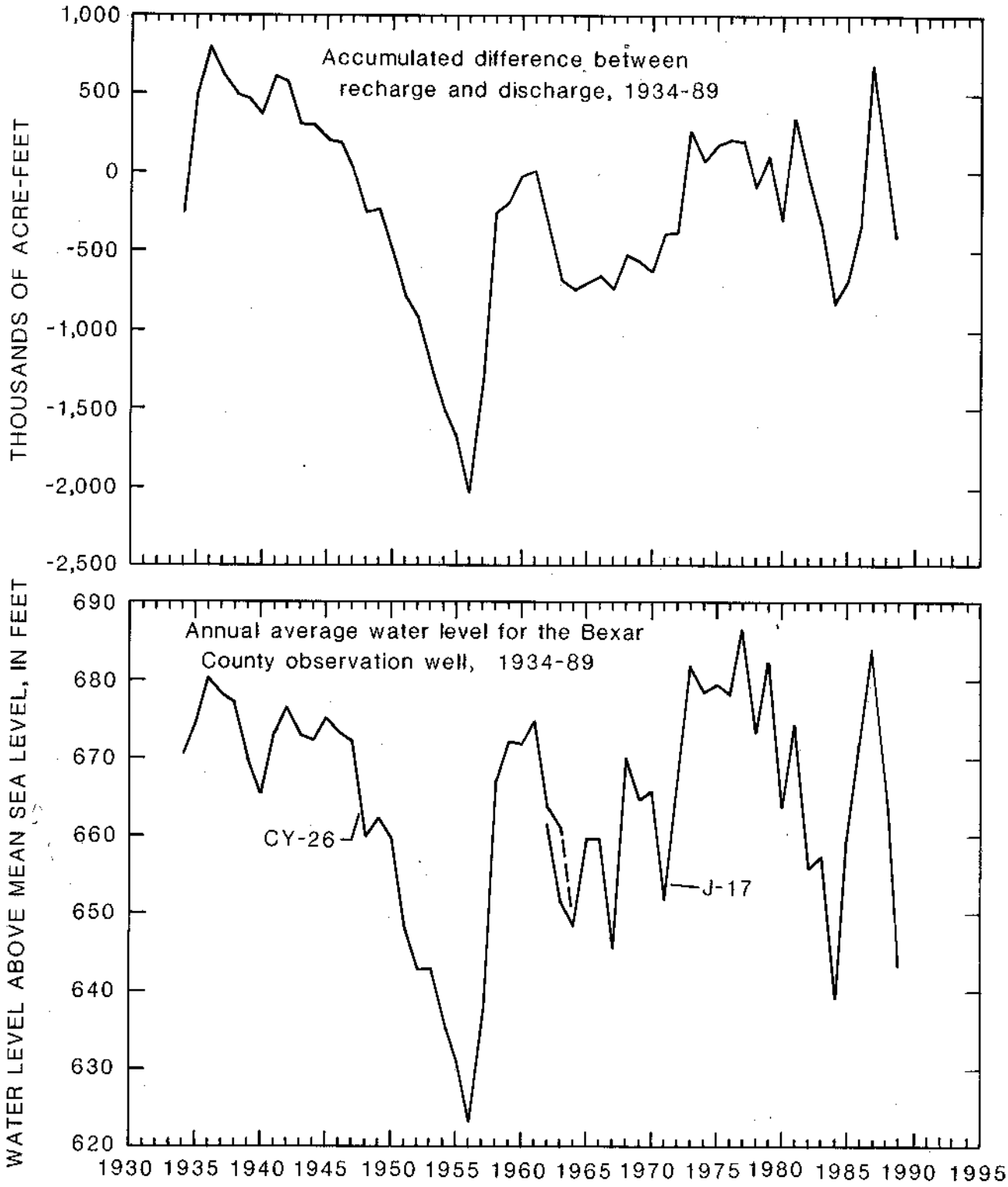

Figure 5.--Accumulated difference between recharge and discharge and annual average water level for the Bexar County observation well, 1934-89.

Table 5.--Annual and period of record high and low water levels in selected observation wells in the Edwards aquifer, 1934-89

[lsd, land-surface datum; ft, feet. Measurements in feet above National Geodetic Vertical Datum of 1929.]

Year	YP-69-50-302 a/ H-5-1 (Uvalde Co.) lsd 904.85 ft		TD-68-41-301 a/ J-1-82 (Medina Co.) lsd 756.84 ft		AY-68-37-203 a/b/ J-17 (Bexar Co.) lsd 730.81 ft		DX-68-23-302 a/ G-49 (Comal Co.) lsd 642.7 ft		LR-67-01-304 a/ H-23 (Hays Co.) lsd 718.0 ft	
	High	Low	High	Low	High	Low	High	Low	High	Low
1934	866.61	--	--	--	675.20	666.81	--	--	--	--
1935	872.12	--	--	--	681.31	666.80	--	--	--	--
1936	876.63	876.51	--	--	683.02	676.62	--	--	--	--
1937	878.11	877.08	--	--	682.08	674.92	--	--	583.4	581.6
1938	875.79	873.95	--	--	681.39	673.58	--	--	590.6	581.5
1939	873.35	869.58	--	--	674.10	665.69	--	--	580.6	569.6
1940	872.33	868.53	--	--	671.43	660.96	--	--	572.2	568.7
1941	875.70	867.74	--	--	682.46	668.26	--	--	587.7	578.6
1942	875.75	871.87	--	--	685.36	669.74	--	--	580.8	573.7
1943	874.53	867.98	--	--	679.58	668.51	--	--	578.2	574.6
1944	869.30	866.80	--	--	677.62	667.13	--	--	580.5	579.3
1945	870.08	865.17	--	--	681.91	668.81	--	--	581.8	--
1946	867.06	862.87	--	--	681.15	663.61	--	--	580.3	--
1947	870.73	867.08	--	--	680.70	665.81	--	--	577.3	577.0
1948	868.37	860.49	--	--	667.74	653.68	624.4	624.3	560.5	559.4
1949	871.15	859.09	--	--	671.59	655.55	626.7	624.1	562.3	561.8
1950	871.24	861.79	686.97	674.86	665.38	653.76	625.2	624.0	575.8	575.2
1951	861.78	846.84	675.17	659.91	656.01	640.63	624.2	622.5	575.3	569.4
1952	846.80	834.87	663.77	649.92	650.49	633.44	623.0	621.5	573.0	569.1
1953	835.21	817.79	665.12	647.69	651.52	630.53	623.6	621.1	584.5	573.2
1954	836.71	823.14	660.34	642.44	646.34	628.09	623.1	620.5	581.8	562.8
1955	834.30	824.05	649.13	635.59	638.49	624.24	621.9	619.8	575.7	558.4
1956	834.20	814.20	641.58	622.31	632.22	612.51	621.0	613.3	569.8	542.2
1957	840.85	810.95	666.11	632.99	653.77	624.36	624.7	620.1	584.9	568.3
1958	866.09	840.82	704.35	665.74	679.56	653.26	626.6	624.6	593.6	580.8
1959	876.06	866.20	703.82	688.95	677.66	661.47	627.1	625.1	591.4	580.5
1960	876.92	873.09	706.29	686.00	679.39	657.86	627.1	624.9	589.4	584.3
1961	878.48	875.60	710.31	693.38	681.16	663.90	627.3	625.7	591.6	573.2
1962	878.26	869.72	703.59	676.34	675.51	646.94	626.3	623.2	584.1	565.0
1963	869.69	860.93	689.12	659.19	665.80	635.02	625.0	621.7	581.6	560.0
1964	860.93	848.97	676.28	654.78	657.04	632.83	624.1	621.6	578.2	562.8
1965	865.82	860.33	689.63	666.77	674.99	645.64	626.6	623.5	590.1	573.4
1966	867.23	860.16	686.06	665.00	668.79	642.74	625.9	623.1	589.0	566.6
1967	867.38	856.44	679.44	645.19	659.69	624.91	624.6	620.0	582.8	556.6
1968	873.31	864.83	701.95	679.19	678.33	655.87	627.2	624.6	593.8	574.4
1969	874.98	866.51	694.76	670.49	676.10	642.77	626.3	623.4	588.7	567.7
1970	876.11	871.32	700.74	678.83	677.08	650.41	627.2	624.3	593.2	575.0
1971	877.65	863.95	701.30	646.43	674.58	627.89	626.2	621.0	577.1	551.5
1972	877.78	874.56	704.59	676.71	678.99	651.17	626.7	624.1	579.7	567.3
1973	881.63	874.50	731.23	690.06	696.52	665.92	629.8	626.1	589.9	572.3
1974	881.35	875.97	723.84	695.96	689.22	660.88	629.1	625.8	593.6	558.5
1975	882.10	879.41	720.99	708.15	686.92	671.99	629.3	626.5	589.8	571.4
1976	884.93	875.97	732.34	694.88	693.11	663.76	629.4	625.8	584.6	571.2
1977	886.21	881.31	737.82	715.27	695.95	675.63	630.2	627.6	587.4	562.1
1978	882.56	875.62	722.40	681.66	684.11	650.13	628.1	624.5	572.0	540.4
1979	881.95	876.06	728.22	710.29	690.52	676.40	629.0	627.3	584.9	572.0
1980	879.07	868.00	716.09	666.76	680.29	640.76	627.5	623.0	572.0	551.8
1981	881.80	867.90	723.17	698.77	685.99	668.57	628.0	625.5	586.2	565.5
1982	881.83	876.35	717.12	682.77	680.45	645.33	627.3	623.6	584.7	544.7
1983	877.05	871.25	698.16	667.69	669.92	642.11	625.6	623.0	588.7	560.4
1984	873.26	856.91	684.52	642.03	656.97	623.29	624.4	619.6	582.5	544.3
1985	876.85	862.24	698.98	670.68	674.50	644.05	626.8	623.3	591.4	561.8
1986	877.82	872.20	704.64	674.19	685.59	649.81	627.7	624.1	595.0	576.3
1987	889.03	877.86	743.48	711.12	699.23	676.88	630.4	627.2	595.9	583.5
1988	887.03	877.99	725.34	679.89	684.87	647.74	627.9	623.9	593.2	585.9
1989	879.02	866.64	695.30	650.52	663.90	626.98	624.9	620.5	581.7	571.5
Record	High	Low	High	Low	High	Low	High	Low	High	Low
	889.08	810.95	743.48	622.31	699.23	c/612.51	630.4	613.3	595.9	540.4
Month	June	Apr.	June	Aug.	June	Aug.	June	Aug.	Sept.	July
Year	1987	1957	1987	1956	1987	1956	1987	1956	1987	1978
Period of record	1929-32, 1934-89		1950-89		1932-89		1948-89		1937-89	

a/ New state well number replaces old well number.
b/ Replaces well CY-26 and reflects the same water level; composite record of wells CY-26 and AY-68-37-203.
c/ Record low for well CY-26.

In 1989, 17 wells were measured periodically, and 21 additional wells were measured with recorders on a continuous basis (fig. 3). Two additional wells shown in figure 3 had no data for 1989. The data from the remaining wells showed a general downward trend, reflecting greater discharge than recharge for the year. The data also show that decreases in storage occurred throughout the year, which is reflective of the below average precipitation. As indicated by the water levels, the volume of water in storage in the Edwards aquifer for the first half of 1989 was above to near average, while the volume of water in storage for the second half of 1989 was near to below average. The water levels in observation wells for 1989 are given in Appendix A. Water Levels.

Some water-level measurements are reported in feet below land-surface datum (lsd), others are actual elevation above National Geodetic Vertical Datum of 1929 (NGVD). Water levels in wells equipped with recorders are reported every fifth day and at the end of the month (eom). If known, the altitude of the land surface above NGVD is given in the well description.

Water levels in about 80 additional wells are measured annually in the San Antonio area by personnel of the Texas Water Development Board. Tabulations of current and historical water-level measurements are available from the Texas Water Development Board in Austin, Texas. These records also are on file in the office of the U.S. Geological Survey in San Antonio, Texas.

WATER QUALITY FOR WELLS AND SPRINGS

Water-quality samples were collected at 71 selected wells and 3 springs during 1989. The locations of these sites are shown in figure 6. The water-quality data-collection sites previously sampled for the area, along with the sites for which data are given in Reeves (1976, 1978), are shown in figures 7

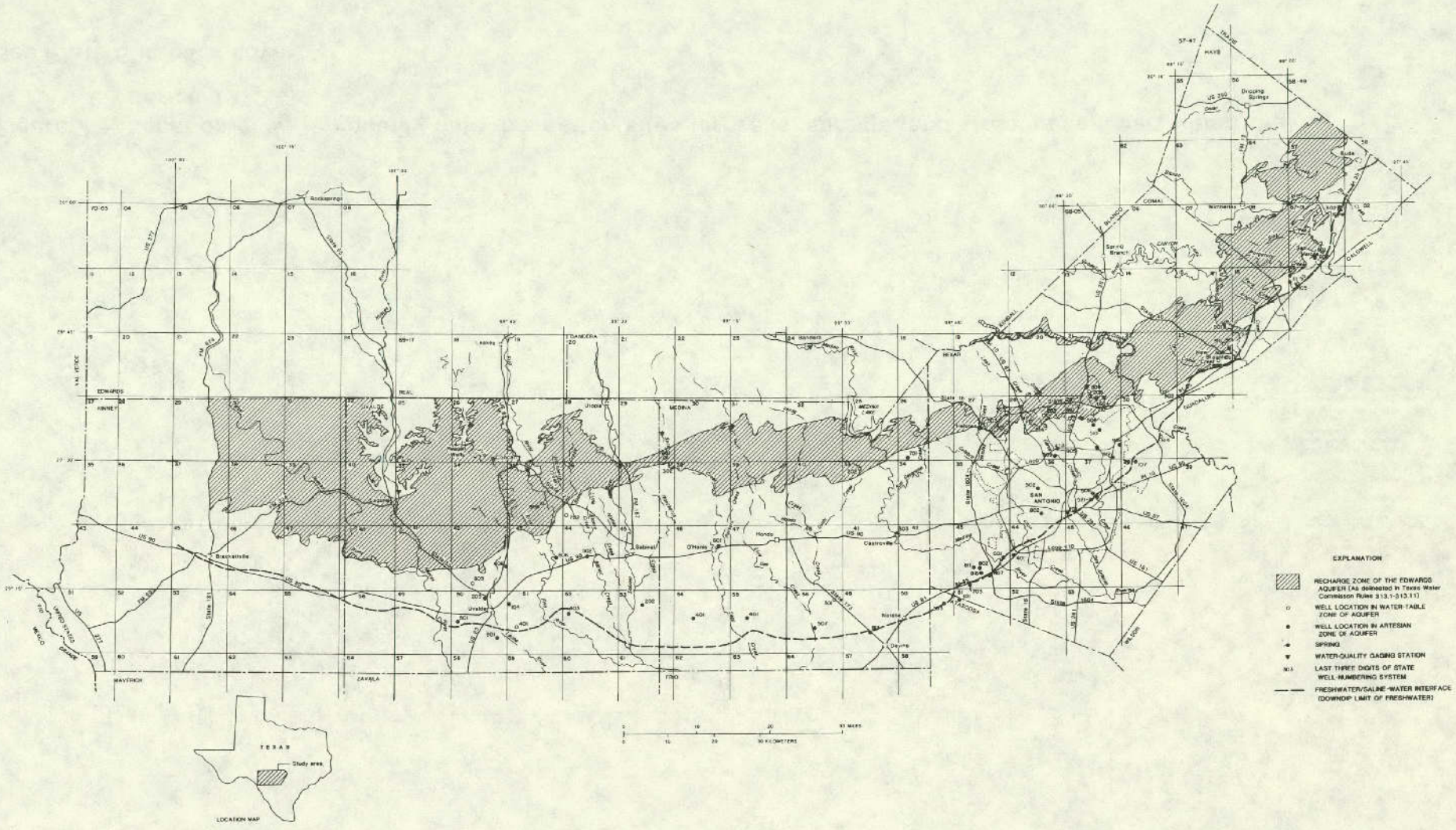

Figure 6.--Location of water-quality data-collection sites for wells, springs, and streams sampled in 1989.

See Plate 4 in back cover.

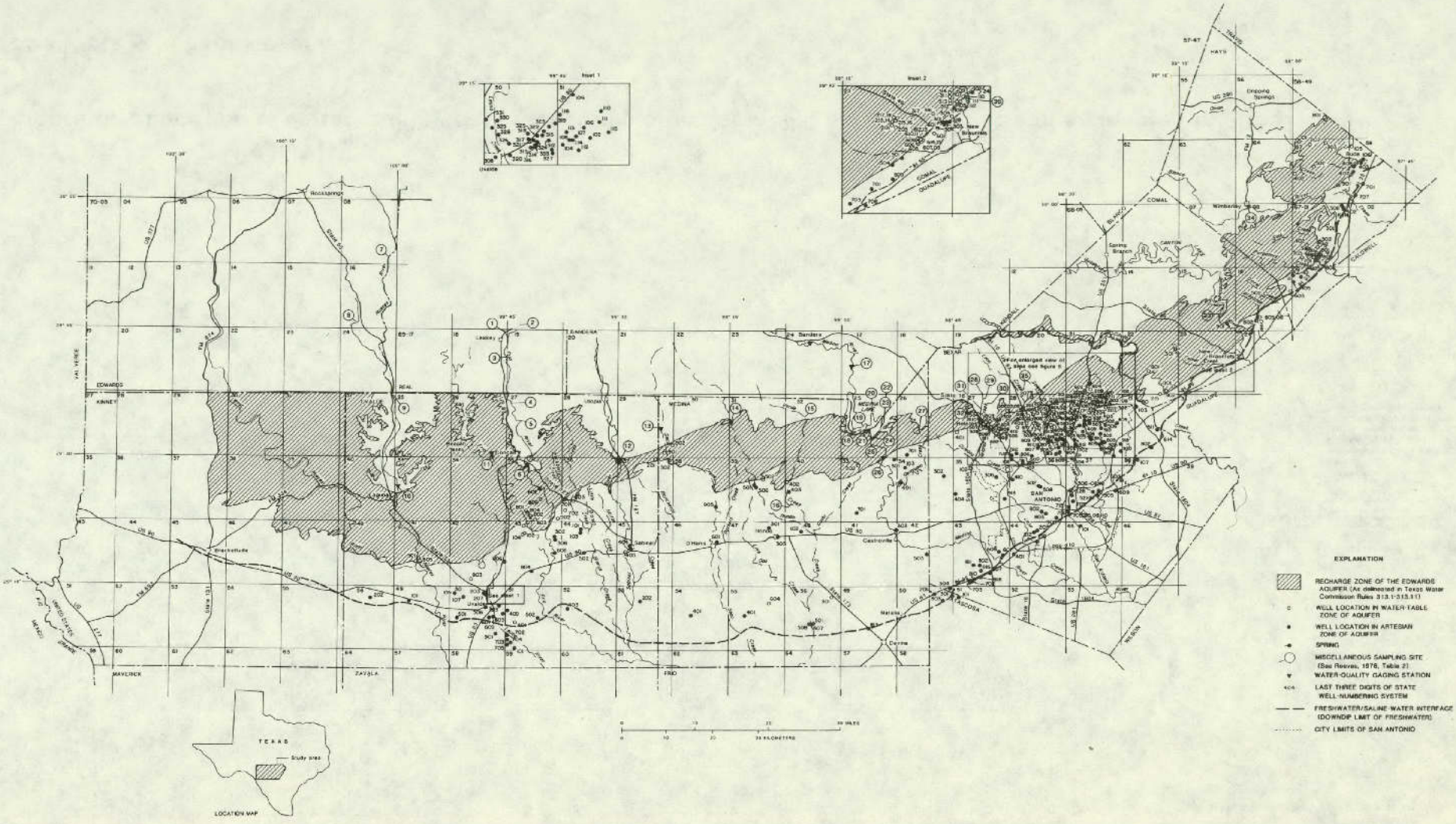

Figure 7.--Location of water-quality data-collection sites for wells, springs, and streams sampled within the period 1972-89.

See Plate 5 in back cover.

and 8. An enlargement of the San Antonio area is shown in figure 8. Although some of the wells previously sampled are no longer in use, additional samples can be collected at most of the sites in order to detect changes in water quality.

The results of the analyses of water samples that were collected from the Edwards aquifer during 1989 are given in Appendix B. Water Quality. Many of the samples were analyzed for more than 50 properties or constituents, most of which affect the suitability of the water for domestic use. The analyses included determinations of the concentrations of major inorganic constituents; minor elements, including heavy metals; pesticides; volatile organic compounds; and isotopes. Analyses of samples from the wells and springs in the freshwater zone of the aquifer showed that no constituents exceeded the maximum contaminant levels established for public water systems (Appendix B).

A general classification of water based on dissolved-solids concentration follows (Winslow and Kister, 1956, p. 5):

Description	Dissolved-solids concentration (mg/L) 1/
Fresh	Less than 1,000
Slightly saline	1,000 to 3,000
Moderately saline	3,000 to 10,000
Very saline	10,000 to 35,000
Brine	More than 35,000

1/ Milligrams per liter (mg/L) is considered equivalent to parts per million (ppm) for water containing less than 7,000 mg/L dissolved solids.

A transitional interface exists between the freshwater zone and the downdip, saline-water zone. A 1,000 mg/L dissolved-solids-concentration contour defines an arbitrary boundary between the freshwater zone and the saline-water

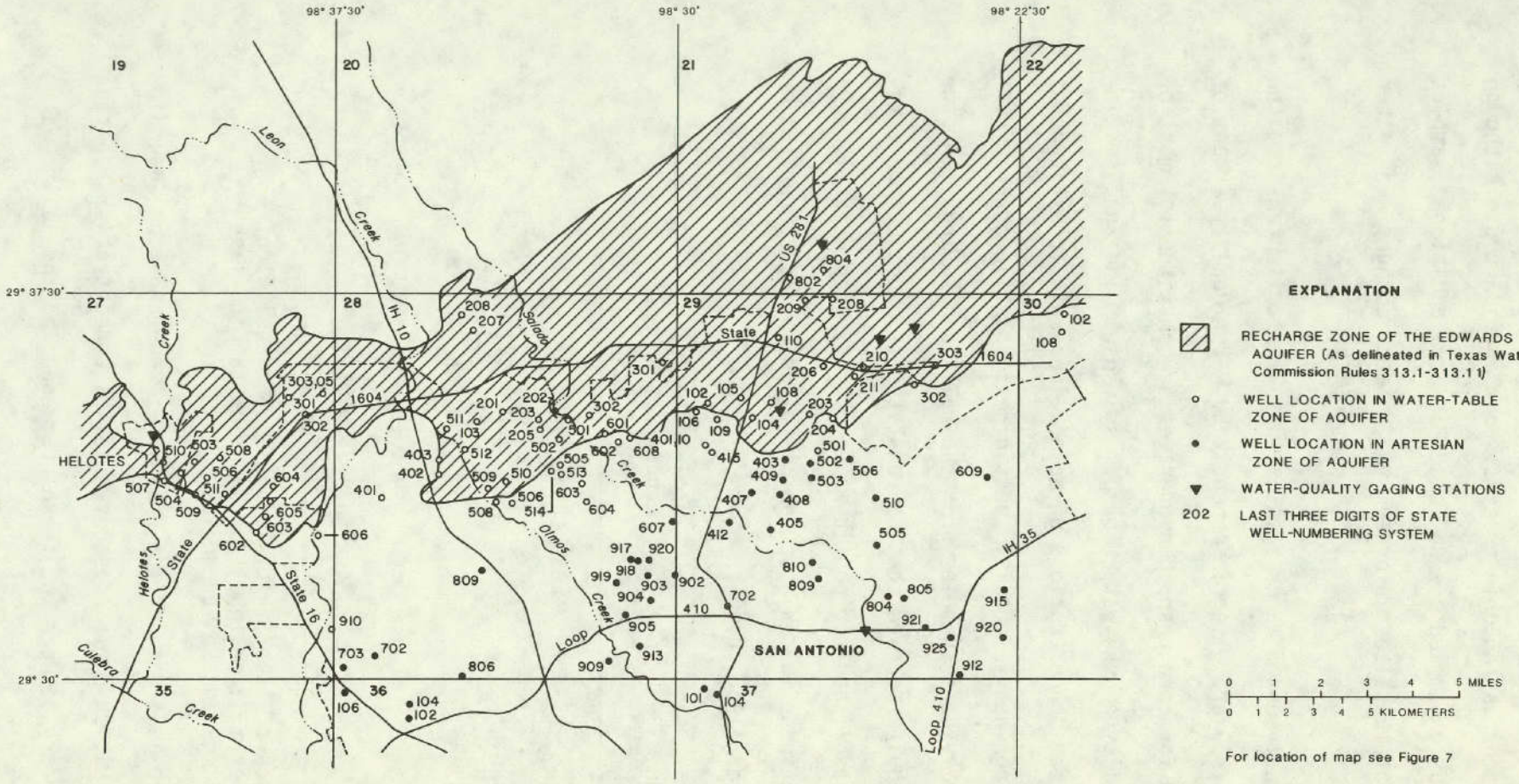

Figure 8.--Location of water-quality data-collection sites for wells, springs, and streams in the vicinity of San Antonio sampled within the period 1972-89.

See Plate 6 in back cover.

zone. Locally, this contour is referred to as the freshwater/saline-water interface which defines the farthest downdip extent of potable water (Pavlicek and others, 1987).

The freshwater/saline-water interface is shown in figures 1, 6 and 7. South and southeast of this line, the water from wells is slightly to moderately saline and has larger concentrations of sulfate and chloride. Water from some wells north of the line and all wells south of the line contains hydrogen sulfide gas. Water from wells in the freshwater zone near the interface generally is more mineralized and has been designated as the transition zone in a previous report by Garza (1962, p. 38). Also, larger concentrations of dissolved solids occur in the lower part of the aquifer in the transition zone and in the slightly to moderately saline zone south and southeast of the freshwater/saline-water interface. A well drilled in the transition zone near the interface can encounter freshwater in the upper part of the aquifer and water that is slightly saline in the lower part (Reeves, 1971, p. 5). For many purposes, the dissolved-solids concentration is a major limitation on the use of water.

A sampling program was begun in 1985 to drill wells that transect the freshwater/saline-water interface in order to detect changes in water quality as the head in the aquifer changes. This program was started in response to the concern that increased withdrawals from the aquifer may result in the encroachment of saline water into the freshwater zone of the aquifer. As part of the water-quality program, monthly samples are collected and analyzed along with continuous water-level monitoring at the transect wells. Other samples are to be collected and analyzed as certain water-level and springflow criteria are met. In 1989, spring flow at Comal Springs decreased to 100 ft^3/s. At this rate of flow, additional water-quality samples were taken along the freshwater/saline-water interface to gather background or reference

analysis data. These data would then be compared to the analyses of any additional samples taken if flow rates were to further decrease.

Samples from wells in the Edwards aquifer were analyzed for several different water-quality constituents, including common inorganics, nutrients, dissolved organic carbon, minor elements, pesticides, volatile organic compounds, and isotopes. The purgeable volatile organic samples taken in 1989 (Appendix B) were analyzed for, but are not limited to, the following compounds on the U.S. Environmental Protection Agency Priority Pollutant list:

Volatile Organic Compounds

Benzene	1,2-Dichloropropane
Bromoform	1,3-Dichloropropene
Carbon tetrachloride	1,3-Dichloropropene
Chlorobenzene	Ethylbenzene
Chlorodibromomethane	Methylbromide
Chloroethane	Methylene chloride
2-Chloroethyl vinyl ether	1,1,2,2-Tetrachlorethane
Chloroform	Tetrachloroethylene
Chloromethane	Toluene
Dichlorobromomethane	1,1,1-Trichloroethane
1,1-Dichloroethane	1,1,2-Trichloroethane
1,2-Dichloroethane	Trichloroethylene
1,1-Dichloroethylene	Trichlorofluoromethane
1,2-trans-Dichloroethene	Vinyl chloride

Analytical methods used for the determination of the organic compounds are described by Wershaw and others (1983) in "Methods for the Determination of Organic Substances in Water and Fluvial Sediments." Although concentrations for benzene, chloroform, methylene chloride, and toluene are given,

these compounds are common solvents used in the laboratory, and their presence in a sample often may be traced to contamination of the sample by laboratory atmosphere.

The volatile organics are determined by purge and trap followed by gas chromatography/mass spectrometry. A water sample is purged with helium and the purgeable organic compounds are carried by the helium and trapped on a porous polymer sorbent. The trapped compounds are thermally desorbed into the gas chromatograph and detected by mass spectrometry.

Mass spectra are obtained for every compound that elutes from the gas chromatograph in sufficient concentration to yield a discernible peak. A computerized search is performed for the unknowns using National Bureau of Standards computer library reference spectra of about 35,000 compounds. Although most common organic compounds can be identified by this method, many of the samples contain compounds that cannot be identified because the concentrations were too small or because reliable library matches could not be obtained.

The U.S. Environmental Protection Agency's (1989) proposed maximum contaminant level (MCL) for nine volatile organic compounds (VOC's) are given at the end of Appendix B. Water Quality. The MCL's were promulgated in the Federal Register on May 22, 1989 (vol. 54, no. 97, p. 22061-22160) as revisions to the National Interim Primary Drinking-Water Regulations. The MCL's are enforceable standards and are set as close to the maximum contaminant level goals (MCLG's) as is feasible. The MCL's are based upon availability and performance of treatment technologies; the availability, performance and cost of analytical methods; and costs for achieving various levels of removal.

MCLG's are non-enforceable health goals which are set at levels which would result in no known or anticipated adverse health effects with an adequate margin of safety. MCLG's for substances considered to be probable human

carcinogens are set at zero, and MCLG's for substances not treated as probable human carcinogens are based upon chronic toxicity or other data. The final MCLG's for eight volatile synthetic organic chemicals in drinking water are:

Compound 1/	Maximum contaminant level goal (MCLG) (micrograms per liter)
Benzene	0
Carbon tetrachloride	0
p-Dichlorobenzene	75
1,1-Dichloroethylene	7
1,2-Dichloroethane	0
1,1,1-Trichloroethane	200
Trichloroethylene	0
Vinyl chloride	0

1/ The MCLG for tetrachloroethylene was proposed at zero. Although the public comment period closed in January of 1986, no final proposal has been received.

Sampling for volatile organic compounds in 1989 was concentrated and conducted in areas where possible or suspected degradation of water quality may occur such as the water-table part of the aquifer. Sampling in other areas of the aquifer was conducted on a rotational monitoring basis.

In 1989, 25 wells and 3 springs were sampled and analyzed for volatile organic compounds. The results of the analyses showed that 23 of the wells and springs contained no detectable amounts of volatile organic compounds. However, samples from five wells contained one or more measurable volatile organic compounds. The results ranged from the detection limit of 0.20 µg/L to a maximum of 7.4 µg/L. Samples from three wells contained one or more volatile organic compounds with concentrations equal to or greater than 1

µg/L, and samples from two of the wells contained concentrations equal or greater than 5 µg/L.

Trihalomethanes, which include bromoform, chloroform, chlorodibromomethane, and dichlorobromomethane, were detected in samples from one well and one spring. These sites were LR-67-01-302 and LR-67-01-806. Concentrations were from 0.60 µg/L in the spring to 6.4 µg/L in the well. The principal source of trihalomethanes in drinking water is the chemical interaction of chlorine (added for disinfection) with natural humic substances in raw water.

One or more of three compounds, tetrachloroethylene, trichloroethylene, and 1,2-transdichloroethylene, were detected in three of the wells sampled. These wells were AY-68-28-514, DX-68-23-303, and YP-69-51-104. The results ranged from the detection limit of 0.20 µg/L to a maximum of 7.4 µg/L. Tetrachloroethylene was detected in one sample from Uvalde County at 7.4 µg/L.

In 1989, 15 wells and 3 springs were sampled and analyzed for pesticides. The results of the analyses showed that 15 wells and 2 springs contained no detectable amounts of pesticides. However, samples from one spring, DX-68-15-901, contained 2,4-D at a concentration of 0.04 µg/L.

In 1989, 60 wells and 2 springs were sampled and analyzed for one or more of the following isotopes--tritium, hydrogen, and oxygen. The results of the analyses are given in Appendix B. Water Quality. Most ground water contains these isotopes in varying concentrations primarily from contact with various types of rock material and from man's activities.

Radioactive isotopes, such as tritium, are used primarily to measure the age of a water. Tritium occurs in the environment as a result of both natural and man-made processes. It is produced naturally by interaction of cosmic radiation with nitrogen and oxygen of the upper atmosphere and enters the hydrologic cycle as part of the water molecules in precipitation. Large amounts of man-made tritium were released to the atmosphere by thermonuclear test explosions during 1953-62.

Tritium in ground water is not significantly affected by chemical processes. Tritium concentrations in ground water can be used to distinguish between water that entered an aquifer prior to 1953 (prior to thermonuclear testing in the atmosphere) and water in contact with the atmosphere after 1953. Pre-1953 ground water contains no tritium detectable by commonly used procedures; post-1953 water contains large levels of tritium (Drever, 1982). Pre-1953 rainwater tritium levels in the San Antonio area have been estimated at 6 to 8 TU by Thatcher (1962). Tritium levels in rainwater have been steadily declining from a maximum in 1963 of 2,000 TU around Waco, Texas, and currently are approaching the pre-bomb estimated levels (P.M. Buszka, U.S. Geological Survey, written commun., 1989). Tritium levels of water from the Edwards aquifer have been determined periodically. Past records and information can be found in studies by Pearson and others (1975) and Maclay, Rettman, and Small (1980).

Stable isotopes like deuterium (^{2}H) and oxygen (^{18}O) are used to understand the probable source of a water and the processes that have affected it. Processes that can affect a water include dissolutioning of the aquifer material and mixing of different waters (Drever, 1982). The results from recent analyses from wells and springs that have historical data are given in Appendix B. Water Quality. Repeat sampling of the same wells allows comparison of results for detecting changes in time.

SURFACE-WATER DATA

Records of discharge (or stage) of streams and of contents (or stage) of lakes and reservoirs, and records of chemical quality, water temperature, and suspended-sediment data for streams are published in U.S. Geological Survey Water-Supply Papers or in U.S. Geological Survey Water-Data Reports. These reports may be seen in the libraries of principal cities of the United States

or in the offices of the Water Resources Division of the U.S. Geological Survey.

Records of streamflow, contents of reservoirs, and measurements of spring flow; and water quality of streams and reservoirs for selected stations in the vicinity of the Edwards aquifer in the San Antonio area are given in Appendix C. Surface Water. These data are used in the calculation of the annual recharge to the aquifer or in the calculation of the annual discharge from the aquifer.

Water-quality data collected at stations upstream from the recharge zone are used to evaluate the quality of recharge water for the aquifer. Data collected at gaging stations throughout the area provide streamflow and water-quality information for areas of different types of utilization and for floods of various magnitudes during all seasons of the year. Data-collection sites are shown in figure 3.

APPENDIX A. WATER LEVELS

Water levels in observation wells in the Edwards aquifer, 1989
(Data collected by Edwards Underground Water District)

[diam., diameter; in., inches; ft, feet; lsd, land surface datum; msl, mean sea level]

291342098475401. AL-68-50-201. Public supply artesian well in Edwards aquifer, diam. 10 to 8 in., depth 2,379 ft, cased to 2,304 ft. Lsd 724.14 ft above msl. Highest water level 14.12 ft below lsd, Nov. 12, 1973; lowest 87.62 ft below lsd, Jan. 12, 1957. Records available 1957-88. No records available for 1989.

293522098291201. AY-68-29-103 (F-214). Unused water-table well in Edwards aquifer, diam. 10 in., depth 547 ft, cased to 100 ft. Lsd 952.67 ft above msl. Highest water level 224.38 ft below lsd, July 29, 1987; lowest 284.35 ft below lsd, Nov. 21, 1957. Records available 1957-89.

Highest 1989 water level 256.59 ft below lsd on Jan. 5; lowest 1989 water level 273.81 ft on Dec. 22.

Highest water level for the day, from recorder graph, 1989

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
5	256.59	257.50	258.41	260.00	260.79	263.84	265.78	268.40	270.28	271.62	271.75	272.15
10	257.08	257.66	258.57	260.38	261.42	264.63	266.10	268.41	270.45	271.45	271.93	272.36
15	257.10	257.66	258.70	260.17	261.64	264.51	266.82	268.80	270.51	271.62	271.75	272.64
20	257.25	257.38	258.93	260.28	261.93	264.75	267.38	269.17	270.88	271.89	271.87	273.05
25	257.23	257.86	259.08	260.55	262.17	264.84	267.69	269.63	271.12	272.14	271.65	273.32
Eom	257.15	257.80	259.43	260.74	262.92	265.27	267.97	269.91	271.28	271.92	272.22	272.87

293215098274601. AY-68-29-701 (F-172). Unused artesian well in Edwards aquifer, diam. 10 in., depth 500 ft, casing information not available. Lsd 778.8 ft above msl. Highest water level 71.15 ft below lsd, June 16, 1987; lowest 165.10 ft below lsd, Aug. 17, 1956. Records available 1952-89.

Highest 1989 water level 114.18 ft below lsd on Feb. 20; lowest 1989 water level 151.32 ft below lsd on Sept. 5.

Highest water level for the day, from recorder graph, 1989

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
5	117.13	115.61	115.02	121.17	123.66	145.42	145.62	149.25	151.32	147.83	137.67	133.07
10	117.76	116.15	116.37	123.17	.....	148.55	146.97	146.57	148.06	143.78	138.57	132.68
15	117.19	115.54	119.57	120.06	.....	139.63	148.31	147.18	145.20	144.42	136.86	133.49
20	117.66	114.18	119.86	119.05	.....	140.97	150.39	148.25	146.81	144.07	136.35	.....
25	117.60	114.64	118.86	120.94	.....	141.00	146.54	149.24	146.67	144.72	133.76	.....
Eom	114.64	115.47	118.29	121.92	145.30	144.45	147.45	150.12	147.21	138.92	134.03	.....

293617098194001. AY-68-30-211 (G-69). Unused artesian well in Edwards aquifer, diam. 6 in., depth 777 ft, cased to 230 ft. Lsd 776.45 ft above msl. Highest water level 85.70 ft below lsd, Oct. 16, 1973; lowest 154.16 ft below lsd, Aug. 3, 1984. Records available 1964-86, 1989.

Date	Water level
June 29, 1989	145.08
Aug. 29	151.12

292845098255401. AY-68-37-203 (J-17)a/. Unused artesian well in Edwards aquifer, diam. 6 in., depth 874 ft, cased to 491 ft. Lsd 730.81 ft above msl. Highest water level 31.58 ft below lsd, June 17, 1987; lowest b/110.05 ft below lsd, Aug. 17, 1956. Records available 1932-89c/.

Highest 1989 water level 66.91 ft below lsd on Feb. 20; lowest 1989 water level 103.30 ft below lsd on July 21.

Highest water level for the day, from recorder graph, 1989

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
5	69.85	67.88	67.57	74.33	78.23	98.78	98.44	101.64	103.83	100.41	90.07	85.44
10	70.65	69.25	69.16	76.17	83.58	101.59	99.89	99.25	100.41	96.29	90.70	85.31
15	69.94	68.34	72.35	72.87	83.53	92.91	101.10	99.81	97.80	96.87	89.21	85.69
20	70.45	66.91	73.21	72.66	87.01	93.81	103.00	100.92	99.38	96.39	88.05	86.36
25	70.42	67.44	71.58	74.10	93.15	94.84	99.16	102.04	99.26	97.20	86.06	90.90
Eom	67.75	68.39	71.25	74.84	97.23	97.10	99.86	102.87	99.69	91.57	86.73	86.84

294720098030001. DX-68-16-801 (G-25). Domestic water-table well in Edwards aquifer, diam. 6 in., depth 210 ft, casing information not available. Lsd 752.71 ft above msl. Highest water level 128.19 ft below lsd, June 22, 1981; lowest 169.56 ft below lsd, Oct. 1, 1956. Records available 1936-89.

Date	Water level
Mar. 1, 1989	148.21
June 29	147.94

Date	Water level
Aug. 29, 1989	150.16

294310098080001. DX-68-23-302 (G-49). Unused water-table well in Edwards aquifer, diam. 8 to 3 in., depth 230 ft, cased to 24 ft. Lsd 642.7 ft above msl. Highest water level 12.30 ft below lsd, June 25, 1987; lowest 29.36 ft below lsd, Aug. 21, 1956. Records available 1948-89.

Highest 1989 water level 17.80 ft below lsd on Mar. 6; lowest 1989 water level d/22.16 ft below lsd on Sept. 6.

Highest water level for the day, from recorder graph, 1989

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
5	18.09	17.92	17.81	18.38	18.58	20.46	20.68	21.59	d22.13	21.63	20.47	19.87
10	18.11	18.00	17.88	18.49	18.95	.....	20.98	21.39	.....	21.15	20.44	19.78
15	18.09	17.93	18.15	18.39	19.09	d20.30	21.32	21.44	21.37	21.13	20.31	19.84
20	18.11	17.84	18.22	18.31	19.36	20.23	21.75	21.55	21.42	21.11	20.14	19.89
25	18.09	17.85	18.23	18.39	19.79	20.50	21.19	21.78	21.48	21.13	19.98	20.01
Eom	17.91	17.89	18.17	18.38	20.23	20.48	21.22	21.94	d21.59	20.65	20.01	19.92

293855098125901. DX-68-23-701 (H-20). Domestic artesian well in Edwards aquifer, diam. 4 in., depth 300 ft, cased to 300 ft. Lsd 684.45 ft above msl. Highest water level 17.84 ft below lsd, Oct. 29, 1973; lowest 70.07 ft below lsd, Oct. 2, 1956. Records available 1934, 1937-89.

Date	Water level
Mar. 10, 1989	41.79
June 29	56.55
Aug. 29, 1989	61.10

293636098190901. DX-68-30-208 (H-36). Unused artesian well in Edwards aquifer, diam. 8 in., depth 292 ft, casing slotted 272-292 ft. Lsd 797.81 ft above msl. Highest water level 109.05 ft below lsd, June 14 and 15, 1987; lowest 184.45 ft below lsd, Aug. 18, 1956. Records available 1945, 1955-89.

Highest 1989 water level 144.57 ft below lsd on Feb. 2; lowest 1989 water level d/171.40 ft below lsd on Aug. 29.

Highest water level for the day, from recorder graph, 1989

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
5	146.28	144.69	.....	148.58	150.54	165.90	166.88	.....	.....	169.98	162.96	159.00
10	146.75	145.32	145.30	150.09	153.92	.....	.....	168.98	.....	d168.45	163.02	158.75
15	146.60	.....	147.07	148.54	154.81	163.66	169.21	169.28	168.65	168.30	162.18	158.96
20	146.49	.....	147.73	148.17	156.08	163.25	170.60	170.09	169.03	168.78	161.22	159.23
25	d146.40	.....	d147.37	148.53	160.70	164.23	d169.07	.....	169.33	d168.42	159.91	161.25
Eom	144.66	.....	146.91	149.20	164.10	165.35	168.82	.....	169.51	.....	159.86	160.00

300025097533501. LR-58-57-902 (E-65). Domestic water-table well in Edwards aquifer, diam. 6 in., depth 450 ft, casing information not available. Lsd 821.55 ft above msl. Highest water level 179.86 ft below lsd, May 25, 1977; lowest 247.63 ft below lsd, Aug. 29, 1956. Records available 1943, 1950-52, 1954, 1956, 1958, 1961, 1971-89.

Date	Water level
Mar. 10, 1989	230.89
June 29	215.07
Aug. 29, 1989	224.70

300510097504001. LR-58-58-101 (E-36). Domestic artesian well in Edwards aquifer, diam. 5 in., depth 244 ft, cased to 230 ft. Lsd 707.23 ft above msl. Highest water level 53.05 ft below lsd, Nov. 29, 1973; lowest 167.38 ft below lsd, Aug. 2, 1984. Records available 1937-89.

Date	Water level
Mar. 10, 1989	140.49
June 29	116.26
Aug. 29, 1989	146.50

295909097523301. LR-67-01-304 (LR-67-02-102) (H-23). Unused artesian well in Edwards aquifer, diam. 5 in., depth 372 ft, cased to 340 ft. Lsd 718.0 ft above msl. Highest water level 122.14 ft below lsd, Sept. 30, 1987; lowest 177.60 ft below lsd, July 10, 1978. Records available 1937-89.

Date	Water level
Mar. 10, 1989	137.04
June 29	136.24
Aug. 29, 1989	146.52

295443097554201. LR-67-01-809 (H-49). Domestic water-table well in Edwards aquifer, diam. 34 in., depth 32.5 ft, casing information not available. Lsd 601.7 ft above msl. Highest water level 17.60 ft below lsd, June 15, 1987; lowest 27.42 ft below lsd, Dec. 25, 31, 1989. Records available 1937, 1950, 1954-55, 1980-89.

Highest 1989 water level 26.58 ft below lsd on June 28; lowest 1989 water level 27.42 ft below lsd on Dec. 25, 31.

Highest water level for the day, from recorder graph, 1989

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
5	26.86	26.88	26.86	26.91	26.85	26.74	26.67	26.77	27.15	27.25	27.25	27.26
10	26.92	26.89	26.86	26.95	26.80	26.73	26.70	26.83	27.18	27.23	27.27	27.28
15	26.91	26.91	26.93	26.93	26.73	26.65	26.67	26.86	27.18	27.22	27.27	27.31
20	26.94	26.85	26.92	26.88	26.67	26.63	26.75	26.95	27.19	27.24	27.28	27.35
25	26.91	26.85	26.93	26.87	26.63	26.60	26.77	27.03	27.23	27.27	27.25	27.42
Eom	26.86	26.86	26.90	26.85	26.70	26.62	26.78	27.10	27.23	27.25	27.28	27.42

295103097583301. LR-67-09-102 (LR-68-16-601) (H-95). Unused artesian well in Edwards aquifer, diam. 6 in., depth 194 ft, casing information not available. Lsd 696.80 ft above msl. Highest water level 108.48 ft below lsd, June 1, 1976; lowest 125.30 ft below lsd, Apr. 11, 1978. Records available 1937-57, 1959-72, 1974-89.

Date	Water level
Mar. 10, 1989	120.24
June 29	123.22
Aug. 29, 1989	120.60

295035097585501. LR-67-09-110. SWT farm well. Unused artesian well in Edwards aquifer, diam. 7 in., depth 634 ft, cased to 141.50 ft. Lsd 678.5 ft above msl. Highest water level 89.18 ft below lsd, June 22, 1987; lowest 102.29 ft below lsd, Oct. 6, 1984. Records available 1973-89.

Highest 1989 water level 101.29 ft below lsd on Jan. 29; lowest 1989 water level 102.04 ft below lsd on Oct. 4-7.

Highest water level for the day, from recorder graph, 1989

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
5	101.31	101.34	101.38	101.48	101.35	101.47	101.51	101.65	101.91	102.04	102.01	101.95
10	101.34	101.38	101.40	101.53	101.35	101.49	101.54	101.67	101.93	102.00	102.02	101.95
15	101.34	101.40	101.42	101.48	101.35	101.44	101.56	101.69	101.95	102.00	102.01	101.93
20	101.35	101.35	101.42	101.34	101.30	101.41	101.61	101.73	101.97	102.00	102.01	102.02
25	101.33	101.38	101.46	101.33	101.38	101.43	101.62	101.79	101.97	101.99	101.97	102.03
Eom	101.29	101.37	101.45	101.32	101.44	101.44	101.64	101.86	101.99	102.01	101.98	102.03

292519099531701. TD-68-33-604 (J-1-41). Domestic artesian well in Edwards aquifer, diam. 6 in., depth 641 ft, cased to 58 ft. Lsd 846.00 ft above msl. Highest water level 96.90 ft below lsd, Apr. 28, 1977; lowest 217.74 ft below lsd, Aug. 31, 1956. Records available 1930, 1934-46, 1951-52, 1954-89.

Date	Water level
Mar. 8, 1989	143.76
June 20	191.35
Aug. 31, 1989	193.18

292110098530001. TD-68-41-301 (J-1-82). Unused artesian well in Edwards aquifer, diam. 6 in., depth 712 ft, casing information not available. Lsd 756.84 ft above msl. Highest water level 13.36 ft below lsd, June 21, 1987; lowest 134.53 ft below lsd, Aug. 18, 1956. Records available 1950-89.

Highest 1989 water level 61.54 ft below lsd on Feb. 20; lowest 1989 water level 106.32 ft below lsd on June 10.

Highest water level for the day, from recorder graph, 1989

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
5	62.45	62.35	62.14	67.04	76.90	102.74	103.86	100.94	101.15	99.16	91.41	86.24
10	63.25	62.97	62.66	69.45	83.19	106.32	101.97	99.93	99.53	97.16	91.03	85.15
15	63.43	62.40	64.51	68.46	84.61	99.90	101.98	99.22	99.87	96.93	90.20	85.97
20	64.23	61.54	66.41	68.90	87.85	99.03	102.79	99.84	97.74	96.56	89.09	86.33
25	63.88	61.86	65.75	69.53	93.57	101.55	101.33	100.29	97.94	96.87	87.83	87.44
Eom	63.17	61.84	65.39	73.50	99.60	102.70	100.19	100.60	98.65	93.81	87.67	87.50

292618099165901. TD-69-38-601 (I-2-104). Unused water-table well in Edwards aquifer, diam. 7 in., depth 538 ft, cased to 74 ft. Lsd 1,008.3 ft above msl. Highest water level 73.41 ft below lsd, Sept. 1, 1979; lowest 274.60 ft below lsd, Sept. 21, 1957. Records available 1957-89.

Highest 1989 water level 113.61 ft below lsd on Jan. 1; lowest 1989 water level 160.59 ft below lsd on Dec. 31.

Highest water level for the day, from recorder graph, 1989

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
5	114.14	117.73	120.61	123.85	127.55	133.23	138.76	143.86	148.65	152.93	155.07	157.99
10	114.93	118.36	121.13	124.46	128.60	134.15	139.66	144.67	149.10	153.66	155.78	158.37
15	115.48	118.70	121.37	124.94	129.27	135.25	140.47	145.39	150.15	153.98	155.96	158.90
20	116.15	118.96	122.03	125.57	130.04	136.07	.....	146.13	150.50	154.79	156.61	159.52
25	116.64	119.68	122.67	126.13	130.81	136.99	.....	146.83	151.45	153.00	156.93	160.01
Eom	117.08	119.75	123.24	126.88	132.12	137.92	.....	147.64	152.70	154.31	157.71	160.59

291550099211001. TD-69-46-701 (I-4-12). Domestic artesian well in Edwards aquifer, diam. 8 in., depth 1,303 ft, casing information not available. Lsd 950.00 ft above msl. Highest water level 130.28 ft below lsd, Sept. 29, 1987; lowest 291.37 ft below lsd, Aug. 31, 1956. Records available 1930, 1934, 1937-38, 1940-88. No records available for 1989.

292209099094801. TD-69-47-302 (I-3-148). Unused artesian well in Edwards aquifer, diam. 5 in., depth 1,410 ft, casing information not available. Lsd 956.1 ft above msl. Highest water level 181.17 ft below lsd, June 22, 1987; lowest 294.74 ft below lsd, June 15, 1971. Records available 1960-89.

Date	Water level
Mar. 13, 1989	235.82
July 10	281.20

Date	Water level
Aug. 31, 1989	278.24

292045099081801. TD-69-47-306 (I-3-134). Unused artesian well in Edwards aquifer, diam. 12 in., depth 1,600 ft, casing to 1,485 ft. Lsd 887.5 ft above msl. Highest water level 113.51 ft below lsd, June 22, 1987; lowest water level 223.67 ft below lsd, June 10, 1989. Record available 1986-89.

Highest 1989 water level 166.70 ft below lsd on Feb. 20; lowest 1989 water level 223.67 ft below lsd on June 10.

Highest water level for the day, from recorder graph, 1989

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
5	169.39	167.48	167.77	175.24	.....	218.27	219.33	213.45	212.97	211.46	202.49	198.08
10	170.62	168.13	168.88	178.70	.....	223.67	215.37	211.96	212.00	208.56	202.63	.....
15	171.83	167.61	171.67	176.35	.....	214.45	215.95	210.39	209.05	210.29	201.70	.....
20	172.33	166.70	173.35	177.30	202.85	214.95	216.63	211.56	209.82	210.19	200.75	.....
25	173.11	167.42	172.89	180.93	208.96	216.50	213.77	211.89	209.32	208.74	199.44	.....
Eom	168.28	167.52	172.39	186.14	215.14	219.47	213.69	212.29	210.60	204.32	199.41	.....

292110099054501. TD-69-48-102 (I-3-146). Irrigation artesian well in Edwards aquifer, diam. 12 in., depth 1,654 ft, cased to 1,320 ft. Lsd 867.2 ft above msl. Highest water level 95.26 ft below lsd, Apr. 28, 1977; lowest 257.36 ft below lsd, Aug. 14, 1963. Records available 1958-89.

Date	Water level
Mar. 13, 1989	151.04
June 30	199.37

Date	Water level
Aug. 31, 1989	194.51

292339099401501. YP-69-35-602 (YP-69-35-501) (H-2-23). Unused water-table well in Edwards aquifer, diam. 7 in., depth 237 ft, cased to 57 ft. Lsd 1,170.8 ft above msl. Highest water level 23.52 ft below lsd, July 18, 1976; lowest 69.15 ft below lsd, Jan. 28, 1964. Records available 1957-89.

Date	Water level
Mar. 13, 1989	65.33
July 10	67.32

Date	Water level
Aug. 30, 1989	67.95

292711099282201. YP-69-37-402. Unused water-table well in Edwards aquifer, diam. 6 in., depth 694 ft, cased to 233 ft. Lsd 1,158 ft above msl. Highest water level 256.05 ft below lsd, July 21, 1977; lowest 385.67 ft below lsd, Dec. 25, 1984. Records available 1974-89.

Highest 1989 water level 320.11 ft below lsd on Jan. 1; lowest 1989 water level 373.00 ft below lsd on Dec. 31.

Highest water level for the day, from recorder graph, 1989

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
5	320.55	.....	327.41	330.57	333.78	339.79	.....	354.58	360.29	364.93	368.14	370.77
10	321.48	324.95	327.64	331.08	334.75	341.12	d348.80	355.57	361.10	367.72	368.88	371.25
15	322.09	325.54	327.78	331.45	335.57	.....	349.90	356.55	361.87	366.30	369.11	371.61
20	322.85	325.58	328.40	332.03	336.48	.....	351.16	357.38	362.71	367.12	369.65	372.20
25	323.35	326.29	329.09	332.60	337.33	.....	352.47	358.37	363.47	367.81	369.95	372.46
Eom	d323.80	326.47	329.91	333.36	d338.70	.....	353.77	359.34	364.17	d368.26	370.71	373.00

291633099413301. YP-69-43-804. Irrigation artesian well in Edwards aquifer, diam. 16 in., depth 967 ft, cased to 365 ft. Lsd 975.00 ft above msl. Highest water level 74.60 ft below lsd, Sept. 29, 1987; lowest 305.60 ft below lsd, Dec. 7, 1971. Records available 1971-89.

Date	Water level
Mar. 7, 1989	102.90

291909099281001. YP-69-45-401 (I-4-35) (I-4-4). Unused artesian well in Edwards aquifer, diam. 10 in., depth 1,476 ft, cased to 937 ft. Lsd 954.04 ft above msl. Highest water level 118.64 ft below lsd, May 20, 1977; lowest 290.03 ft below lsd, Oct. 13, 1956. Records available 1956-89.

Highest 1989 water level 179.00 ft below lsd on Feb. 20; lowest 1989 water level 232.40 ft below lsd on June 30.

Highest water level for the day, from recorder graph, 1989

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
5	180.28	179.62	180.00	187.13	d199.71	224.51	232.00	228.45	227.19	228.18	222.80	219.55
10	181.13	179.64	181.19	189.25	.....	228.70	231.02	226.04	226.61	226.30	222.31	219.07
15	181.86	179.52	183.31	189.12	206.08	227.78	230.45	225.12	225.77	225.60	222.28	219.03
20	182.91	179.00	185.29	190.12	209.70	227.80	230.80	225.39	225.75	226.50	221.63	219.47
25	182.45	179.62	185.92	194.62	214.06	230.40	230.21	226.18	226.40	227.40	220.85	219.50
Eom	180.45	179.49	185.58	197.01	219.43	232.40	228.35	226.49	227.02	224.80	220.75	220.45

291426099510201. YP-69-50-101 (H-4-6). Stock artesian well in Edwards aquifer, diam. 8 in., depth 100 ft, casing information not available. Lsd 950.6 ft above msl. Highest water level 48.15 ft below lsd, May 29, 1980; lowest 126.17 ft below lsd, Mar. 14, 1957. Records available 1929-33, 1935-42, 1944-89.

Date	Water level
Mar. 7, 1989	59.56
July 5	68.25

Date	Water level
Aug. 30, 1989	69.08

291414099475301. YP-69-50-202 (H-5-209). Unused artesian well in Edwards aquifer, diam. 6 in., depth 137 ft, cased to 65 ft. Lsd 928.00 ft above msl. Highest water level 30.95 ft below lsd, Sept. 29, 1987; lowest water level 115.02 ft below lsd, Mar. 11, 1957. Records available 1956-89.

Date	Water level
Mar. 7, 1989	45.35
July 5	56.40

Date	Water level
Aug. 30, 1989	57.59

291237099471201. YP-69-50-302 (H-5-1). Unused artesian well in Edwards aquifer, diam. 12 in., depth 350 ft, casing information not available. Lsd 904.85 ft above msl. Highest water level 15.82 ft below lsd, June 15-18, 1987; lowest 93.90 ft below lsd, Apr. 13, 1957. Records available 1929-32, 1934-89.

Highest 1989 water level 25.83 ft below lsd on Jan. 1; lowest 1989 water level 38.21 ft below lsd on Dec. 31.

Highest water level for the day, from recorder graph, 1989

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
5	25.85	26.03	26.46	27.49	28.73	32.32	36.23	37.83	37.06	37.65	37.72	37.80
10	25.97	26.09	26.67	27.63	29.33	33.18	36.60	37.37	37.01	37.51	37.72	37.82
15	26.04	26.10	26.93	27.59	29.64	33.83	37.00	37.13	37.01	37.73	37.80	37.87
20	26.00	26.10	26.94	27.92	29.98	34.52	37.31	36.97	37.17	37.75	37.85	37.95
25	25.98	26.25	27.15	28.51	30.56	35.20	37.52	36.85	37.26	38.00	37.88	38.14
Eom	25.98	26.30	27.23	28.62	31.55	35.77	37.74	36.90	37.45	37.82	37.85	38.21

291127099501201. YP-69-50-403 (H-4-60). Unused artesian well in Edwards aquifer, diam. 10 in., depth 536 ft, casing information not available. Lsd 918.9 ft above msl. Highest water level 39.19 ft below lsd, May 26, 1977; lowest 111.31 ft below lsd, Feb. 13, 1957. Records available 1954, 1957, 1961-82, 1984-89.

Date	Water level
July 5, 1989	56.72

291025099442701. YP-69-51-406 (H-5-259). Unused water-table well in Leona Formation, diam. 14 in., depth 74 ft, casing information not available. Lsd 874.9 ft above msl. Highest water level 15.81 ft below lsd, June 5, 1987; lowest 61.38 ft below lsd, Mar. 13, 1957. Records available 1956-57, 1966-89.

Highest 1989 water level 28.46 ft below lsd on Feb. 19; lowest 1989 water level 37.90 ft below lsd on June 25, July 6.

Highest water level for the day, from recorder graph, 1989

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
5	28.91	28.61	29.41	29.45	.....	36.75	37.27	.....	33.51	32.83	31.66	30.99
10	28.82	28.59	29.32	29.92	.....	37.22	36.74	.....	33.48	33.29	31.37	30.70
15	28.88	28.69	29.69	31.32	.....	37.31	37.02	.....	33.29	32.21	31.75	30.90
20	28.84	29.15	30.17	32.65	.....	36.99	36.67	.....	33.42	33.09	32.40	31.33
25	29.21	29.51	29.83	32.33	.....	37.90	.....	.....	33.22	33.66	31.59	30.87
Eom	28.79	29.06	29.26	32.62	.....	37.10	.....	.....	33.95	32.30	31.45	31.34

292344100002701. YP-70-40-901 (G-3-19). Unused water-table well in Edwards aquifer, diam. 7 in., depth 140 ft, cased to 70 ft. Lsd 1,122.0 ft above msl. Highest water level 37.03 ft below lsd, Apr. 7, 1988; lowest 43.75 ft below lsd, Aug. 30, 1989. Records available 1957-89.

Date	Water level
Mar. 7, 1989	43.36
July 5	43.65

Date	Water level
Aug. 30, 1989	43.75

291412100033001. YP-70-56-201 (G-6-4). Domestic water-table well in Austin Chalk, diam. 6 in., depth 120 ft, casing information not available. Lsd 1,008.00 ft above msl. Highest water level 34.00 ft below lsd, Dec. 1, 1976; lowest 77.78 ft below lsd, Apr. 8, 1953. Records available 1937-89.

Date	Water level
Mar. 7, 1989	49.02
July 5	67.62

a Replaces well CY-26 and reflects the same water level; composite record of wells CY-26 and AY-68-37-203.
b Record low for well CY-26. Equivalent water level for AY-68-37-203 would be 118.30 ft below lsd.
c Composite record of wells CY-26 and AY-68-37-203.
d Estimated.

Water-level elevations in the Bexar County transect wells in the Edwards aquifer, 1989
(Data collected by U.S. Geological Survey)

[diam., diameter; in., inches; ft, feet; lsd, land surface datum; msl, mean sea level]

292505098254001. AY-68-37-521 (A-1). A transect well in the artesian part of the Edwards aquifer, diam. 9 to 2 in., depth 1,489 ft, cased to 1,275 ft. Lsd 621.17 ft above msl. Records available 1986-89.

Highest 1989 water-level elevation 675.69 ft on Feb. 5; lowest 1989 water-level elevation 623.70 ft on July 21.

Highest water level for the day, from recorder graph, 1989

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
5	600.00	675.69	661.31	653.79	650.39	------	628.71	625.76	623.78	627.63	637.34	642.71
10	658.18	------	658.90	651.92	645.25	626.60	627.51	628.16	627.45	------	637.86	642.62
15	658.95	660.49	656.25	655.42	645.36	634.80	626.46	627.81	630.02	631.09	638.87	642.70
20	658.49	662.22	655.58	655.55	642.00	635.13	------	627.05	628.99	631.69	------	------
25	658.69	661.31	656.39	654.36	635.21	633.62	627.25	625.29	628.54	630.80	641.95	640.35
Eom	660.68	660.60	657.14	653.31	631.30	631.65	627.59	624.86	628.15	636.31	641.38	640.84

292505098254002. AY-68-37-522 (A-2). A transect well in the artesian part of the Edwards aquifer, diam. 9 to 2 in., depth 1,075 ft, cased to 1,075 ft. Lsd 621.17 ft above msl. Records available 1986-89.

Highest 1989 water-level elevation 666.91 ft on Feb. 5; lowest 1989 water-level elevation 624.24 ft on Aug. 24.

Highest water level for the day, from recorder graph, 1989

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
5	659.08	666.91	661.63	655.58	651.76	------	629.83	625.64	625.02	628.77	638.46	643.94
10	658.54	------	661.23	653.71	646.37	627.67	628.53	627.98	628.63	------	638.80	643.68
15	659.19	660.91	658.22	657.18	646.37	635.85	627.44	627.55	631.19	632.31	639.98	643.29
20	658.66	662.55	657.52	657.34	643.02	636.17	------	626.78	630.08	632.80	------	------
25	658.90	661.73	658.57	656.30	636.32	634.84	629.34	625.25	629.88	632.03	643.73	640.84
Eom	661.04	660.98	659.17	655.25	632.31	632.79	629.17	624.69	629.35	637.43	642.72	641.98

292505098254003. AY-68-37-523 (A-3). A transect well in the artesian part of the Edwards aquifer, diam. 9 to 2 in., depth 1,175 ft, cased to 1,175 ft. Lsd 621.17 ft above msl. Records available 1986-89.

Highest 1989 water-level elevation 674.20 ft on Feb. 5; lowest 1989 water-level elevation 623.57 ft on Aug. 24.

Highest water level for the day, from recorder graph, 1989

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
5	657.42	674.20	660.45	654.58	650.63	------	628.62	625.13	624.07	627.91	638.36	643.89
10	656.93	------	660.00	652.64	645.21	626.44	627.34	627.53	627.72	------	638.82	643.79
15	657.74	659.62	656.97	656.24	645.32	634.74	626.26	627.14	630.32	631.46	639.89	643.86
20	657.68	661.33	656.29	656.29	641.88	635.02	------	626.35	629.22	632.03	------	------
25	657.87	660.49	657.32	655.08	635.04	633.62	627.37	624.61	628.86	631.14	643.05	642.34
Eom	659.80	659.76	657.98	654.00	631.14	631.57	627.66	624.11	628.48	636.66	642.44	641.95

292546098260001. AY-68-37-524 (C-1). A transect well in the artesian part of the Edwards aquifer, diam. 9 to 2 in., depth 1,396 ft, cased to 881 ft. Lsd 625.84 ft above msl. Records available 1986-89.

Highest 1989 water-level elevation 665.28 ft on Feb. 20; lowest 1989 water-level elevation 627.05 ft on Sept. 5.

Highest water level for the day, from recorder graph, 1989

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
5	------	------	------	657.44	653.05	------	632.48	629.35	627.05	630.60	641.11	645.65
10	------	------	662.28	655.47	647.57	------	631.05	631.66	630.67	------	640.49	645.93
15	------	------	659.03	659.03	647.72	------	629.91	631.16	633.27	634.22	642.12	645.52
20	------	665.28	658.28	659.33	------	------	------	630.16	631.83	634.58	------	------
25	------	664.74	660.61	657.47	------	------	631.87	628.98	631.74	633.80	645.15	------
Eom	------	------	660.82	------	------	------	631.17	628.28	631.40	639.36	644.47	643.84

Water-level elevations in the Bexar County transect wells in the Edwards aquifer, 1989--Continued

292546098260002. AY-68-37-525 (C-2). A transect well in the artesian part of the Edwards aquifer, diam. 9 to 2 in., depth 1,150 ft, cased to 1,150 ft. Lsd 624.82 ft above msl. Records available 1986-89.

Highest 1989 water-level elevation 660.79 ft on Feb. 20; lowest 1989 water-level elevation 622.57 ft on Sept. 5.

Highest water level for the day, from recorder graph, 1989

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
5	------	------	------	653.23	649.82	------	628.33	624.73	622.57	626.50	636.74	641.65
10	------	------	658.74	651.17	644.18	------	626.73	626.92	626.20	------	636.33	641.96
15	------	------	655.67	654.64	644.05	------	625.65	626.59	628.34	629.86	637.95	641.70
20	------	660.79	654.91	654.92	------	------	------	625.79	627.47	630.37	------	------
25	------	660.04	655.93	653.90	------	------	626.67	623.99	627.18	629.53	640.85	------
Eom	------	------	656.52	------	------	------	627.06	623.53	626.71	634.82	640.48	639.67

292556098260701. AY-68-37-526 (D-1). A transect well in the artesian part of the Edwards aquifer, diam. 9 to 2 in., depth 1,384 ft, cased to 1,223 ft. Lsd 643.26 ft above msl. Records available 1986-89.

Highest 1989 water-level elevation 669.99 ft on Mar. 5; lowest 1989 water-level elevation 630.64 ft on Oct. 4.

Highest water level for the day, from recorder graph, 1989

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
5	661.60	667.04	669.99	657.10	652.94	------	631.92	652.31	650.04	631.19	641.26	645.25
10	660.69	------	662.50	655.33	647.55	------	------	654.86	653.78	------	640.69	645.61
15	661.65	663.04	659.26	658.84	647.78	637.93	------	654.34	------	634.25	642.31	645.26
20	661.08	664.59	658.60	659.10	644.14	637.10	------	653.26	------	634.74	------	------
25	660.82	663.95	659.96	657.39	636.75	635.80	------	651.99	631.99	633.85	644.90	------
Eom	663.68	663.10	660.40	656.70	633.18	633.68	------	651.14	631.84	639.66	644.27	643.17

292556098260702. AY-68-37-527 (D-2). A transect well in the artesian part of the Edwards aquifer, diam. 4 to 7 in., depth 926 ft, cased to 926 ft. Lsd 642.59 ft above msl. Records available 1986-89.

Highest 1989 water-level elevation 664.32 ft on Feb. 20; lowest 1989 water-level elevation 603.09 ft on July 31.

Highest water level for the day, from recorder graph, 1989

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
5	661.86	652.51	663.64	657.28	653.15	------	605.92	629.48	627.01	629.92	641.60	646.18
10	660.80	------	662.65	655.25	647.61	------	------	631.81	630.65	------	640.92	646.35
15	661.64	662.82	659.38	658.68	647.75	611.67	------	631.21	603.29	------	642.06	645.89
20	661.05	664.32	658.64	658.94	------	610.81	------	630.08	603.13	------	------	------
25	660.91	663.90	660.04	657.53	637.00	609.60	631.71	628.95	631.45	632.70	645.45	------
Eom	663.66	662.94	660.32	656.69	633.23	607.29	603.09	627.98	631.08	638.73	644.69	644.22

APPENDIX B. WATER QUALITY

Analyses for common inorganics, nutrients, and dissolved organic carbon for wells and springs in the Edwards aquifer, 1989

ATASCOSA COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3	HARD-NESS TOTAL (MG/L AS CACO3)
AL-68-50-303	07-06-89	1030	2087	1440	700	915	6.7	37.0	193	400
AL-68-51-101	07-06-89	1130	2656	1440	600	2150	6.8	40.5	203	930

LOCAL IDEN-TI-FIER	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	SULFATE DIS-SOLVED (MG/L AS SO4)	IODIDE, DIS-SOLVED (MG/L AS I)	BROMIDE DIS-SOLVED (MG/L AS BR)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)
AL-68-50-303	88	36	36	3.2	210	0.038	0.34	56	2.1
AL-68-51-101	230	79	120	7.2	690	0.093	1.4	240	2.5

LOCAL IDEN-TI-FIER	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	NITRO-GEN, TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)
AL-68-50-303	16	597	--	--	--	--	--	--	--
AL-68-51-101	17	1530	--	--	--	--	--	--	--

Analyses for common inorganics, nutrients, and dissolved organic carbon for wells and springs in the Edwards aquifer, 1989--Continued

BEXAR COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3	HARD-NESS TOTAL (MG/L AS CACO3)
AY-68-21-804	03-27-89	1315	279.00	90	7.0	566	7.0	24.0	262	280
AY-68-27-302	07-17-89	1145	365.00	120	15	535	6.8	23.5	249	270
AY-68-27-303	03-28-89	0915	354.00	60	354	544	7.0	22.5	246	260
AY-68-27-503	03-28-89	1100	375.00	60	15	570	7.1	22.0	244	280
AY-68-28-205	04-18-89	1330	485.00	1440	350	683	6.8	24.0	308	350
AY-68-28-512	05-04-89	1115	400.00	60	10	540	6.9	23.5	262	270
AY-68-28-514	04-18-89	1040	510.00	1440	1100	571	6.8	23.0	272	290
AY-68-28-905	06-28-89	0940	856.00	35	1800	616	6.9	22.0	270	300
AY-68-28-909	08-01-89	1150	867.00	1440	2430	570	7.1	22.0	248	300
AY-68-29-208	05-04-89	1545	266.00	30	8.0	521	7.1	23.5	262	270
AY-68-29-210	05-04-89	1345	329.00	60	15	545	7.0	23.0	279	310
AY-68-29-410	06-27-89	0930	318.00	60	700	551	7.0	23.0	268	270
AY-68-29-506	05-20-89	0930	694.00	60	17	630	7.1	23.5	310	350
AY-68-29-510	07-10-89	1425	500.00	30	20	575	6.8	22.5	287	280
AY-68-29-912	08-07-89	1020	630.00	300	1150	482	7.2	25.0	207	240
AY-68-29-915	07-17-89	0930	824.00	30	5000	502	6.8	24.5	216	250
AY-68-30-614	07-12-89	1200	563.00	240	700	535	7.2	28.0	202	250
AY-68-36-502	07-17-89	1100	1224.00	240	4000	478	6.8	25.0	207	230
AY-68-36-802	07-17-89	1330	1479.00	30	1000	485	6.9	27.5	208	240
AY-68-37-508	07-10-89	1210	1311.00	250	6000	499	7.1	27.0	201	240
AY-68-37-521	01-26-89	0800	1275.00	60	35	5500	6.5	31.5	250	2100
	02-22-89	1030	1275.00	60	35	5520	6.8	31.0	252	2100
	03-23-89	1130	1275.00	60	30	5500	6.8	30.5	252	2100
	04-24-89	1145	1275.00	60	30	5500	6.9	31.5	255	2200
	05-22-89	1300	1275.00	60	15	5430	7.0	31.0	257	2200
	06-21-89	1200	1275.00	80	25	5440	6.7	31.0	257	2000
	07-20-89	1345	1275.00	60	25	5390	7.1	32.0	272	2300
	08-21-89	1315	1275.00	60	7.0	5420	6.8	28.0	258	2200
	09-22-89	1140	1275.00	130	8.2	5420	6.8	29.5	256	2200
	10-23-89	1230	1275.00	120	13	5420	6.7	30.5	258	2100
	11-20-89	1400	1275.00	90	30	5590	6.7	30.5	251	2200
	12-20-89	1330	1275.00	60	19	5550	6.5	30.0	255	2200
AY-68-37-522	01-26-89	1030	1075.00	80	35	4370	6.8	30.0	236	1800
	02-22-89	1045	1075.00	60	35	4430	6.8	30.0	229	1700
	03-23-89	1145	1075.00	60	30	4400	6.8	30.0	230	1700
	04-24-89	1200	1075.00	75	30	4380	7.0	31.0	230	1700
	05-22-89	1315	1075.00	75	17	4360	7.0	31.0	238	1600
	06-21-89	1215	1075.00	90	20	4350	6.8	30.5	236	1700
	07-20-89	1315	1075.00	60	5.0	4340	7.2	27.5	241	1800
	08-21-89	1300	1075.00	120	8.0	4360	6.8	29.0	239	1800
	09-22-89	1030	1075.00	60	10	4360	6.9	28.0	235	1700
	10-23-89	1245	1075.00	130	15	4350	6.9	29.5	238	1600
	11-20-89	1415	1075.00	90	30	4450	6.9	30.5	234	1700
	12-20-89	1320	1075.00	70	19	4430	6.4	29.5	233	1700
AY-68-37-523	01-26-89	1330	1175.00	120	18	5710	6.6	30.0	252	2200
	02-22-89	1100	1175.00	60	20	5770	6.7	28.5	252	2300
	03-23-89	1200	1175.00	90	17	5730	6.7	29.5	259	2200
	04-24-89	1215	1175.00	90	15	5720	6.6	29.5	254	2200
	05-22-89	1345	1175.00	105	10	5690	6.9	30.0	253	2100
	06-21-89	1230	1175.00	100	10	5660	6.8	29.0	259	2200
	07-20-89	1245	1175.00	90	10	5620	6.7	29.5	257	2300
	08-21-89	1245	1175.00	100	9.0	5660	6.8	31.0	258	2400
	09-22-89	1230	1175.00	150	3.8	5630	6.8	26.5	254	2300
	10-23-89	1300	1175.00	150	6.0	5630	6.8	28.5	262	2200
	11-20-89	1430	1175.00	100	25	5820	6.9	29.5	255	2300

Analyses for common inorganics, nutrients, and dissolved organic carbon for wells and springs in the Edwards aquifer, 1989--Continued

BEXAR COUNTY--Continued

LOCAL IDEN-TI-FIER	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	SULFATE DIS-SOLVED (MG/L AS SO4)	IODIDE, DIS-SOLVED (MG/L AS I)	BROMIDE DIS-SOLVED (MG/L AS BR)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)
AY-68-21-804	110	2.1	3.5	0.70	2.0	--	--	9.0	<0.10
AY-68-27-302	89	11	6.3	0.70	11	0.002	0.070	10	0.10
AY-68-27-303	90	9.6	5.8	0.80	11	--	--	10	0.10
AY-68-27-503	84	17	8.3	1.0	19	--	--	16	0.20
AY-68-28-205	130	7.0	8.0	1.1	9.5	0.002	<0.010	24	0.10
AY-68-28-512	83	15	8.9	0.90	13	0.002	0.090	11	0.10
AY-68-28-514	100	8.7	7.0	1.1	15	0.002	0.060	11	0.10
AY-68-28-905	97	14	11	1.2	30	0.003	0.090	16	0.20
AY-68-28-909	95	15	10	1.2	25	0.013	0.090	14	0.20
AY-68-29-208	100	4.1	4.3	0.70	4.0	0.003	0.050	7.6	0.10
AY-68-29-210	110	7.5	4.8	0.70	10	0.002	0.050	7.7	0.10
AY-68-29-410	87	14	6.9	0.80	8.0	0.003	0.070	11	0.20
AY-68-29-506	120	11	7.4	1.0	9.0	--	--	13	0.10
AY-68-29-510	92	13	8.3	1.3	14	0.003	0.080	11	0.10
AY-68-29-912	68	16	10	1.0	18	0.003	0.090	15	0.20
AY-68-29-915	72	16	10	1.3	21	0.003	0.080	15	0.20
AY-68-30-614	68	18	15	1.4	34	0.003	0.11	26	0.30
AY-68-36-502	67	16	9.3	1.1	15	0.002	0.080	14	0.20
AY-68-36-802	55	24	11	1.3	27	0.003	0.080	15	0.40
AY-68-37-508	66	17	11	1.2	22	0.002	0.10	19	0.20
AY-68-37-521	530	200	470	25	1900	0.180	4.5	920	2.4
	530	200	--	--	1800	--	--	890	--
	530	190	--	--	1600	--	--	920	--
	560	200	460	28	1900	0.240	4.1	910	3.1
	540	200	--	--	1900	--	--	940	--
	520	180	--	--	1800	--	--	950	--
	570	210	430	57	1800	0.250	4.1	1000	2.9
	560	200	--	--	1800	--	--	900	--
	570	190	--	--	1900	--	--	900	--
	520	200	470	28	1900	--	--	910	2.8
	570	190	500	31	1900	--	--	890	2.9
	560	190	470	28	1900	--	--	870	2.9
AY-68-37-522	440	160	370	21	1400	0.160	3.5	700	2.2
	420	150	--	--	1400	--	--	730	--
	430	150	--	--	1400	--	--	730	--
	440	150	360	21	1400	0.210	3.5	700	2.8
	410	140	--	--	1400	--	--	710	--
	430	150	--	--	1400	--	--	720	--
	440	160	390	25	1400	0.230	3.7	710	2.7
	440	160	--	--	1400	--	--	750	--
	450	150	--	--	1400	--	--	680	--
	410	150	360	22	1400	--	--	690	2.7
	440	150	360	22	1400	--	--	660	2.7
	420	150	350	23	1400	--	--	650	2.7
AY-68-37-523	540	210	500	26	1900	0.260	4.9	980	2.5
	540	240	--	--	1900	--	--	990	--
	530	210	--	--	1900	--	--	960	--
	550	210	490	25	1800	0.260	4.4	990	2.9
	510	200	--	--	1900	--	--	1000	--
	540	200	--	--	1900	--	--	1000	--
	550	220	520	29	1900	0.240	5.0	1000	2.9
	580	230	--	--	1900	--	--	960	--
	570	210	--	--	1900	--	--	970	--
	520	210	500	28	1900	--	--	960	2.8
	580	200	530	32	1900	--	--	970	3.0

Analyses for common inorganics, nutrients, and dissolved organic carbon for wells and springs in the Edwards aquifer, 1989--Continued

BEXAR COUNTY--Continued

LOCAL IDENTIFIER	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	NITROGEN, TOTAL (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, NITRITE TOTAL (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	PHOSPHORUS TOTAL (MG/L AS P)	CARBON, ORGANIC DISSOLVED (MG/L AS C)
AY-68-21-804	12	297	4.7	0.020	<0.010	0.50	4.20	0.020	0.5
AY-68-27-302	11	289	1.9	0.020	<0.010	0.20	1.70	<0.010	--
AY-68-27-303	11	286	2.5	<0.010	<0.010	0.30	2.20	0.010	0.5
AY-68-27-503	12	304	2.1	<0.010	<0.010	0.30	1.80	<0.010	0.5
AY-68-28-205	14	378	--	0.020	<0.010	<0.20	1.20	<0.010	0.4
AY-68-28-512	12	301	2.0	0.030	<0.010	0.30	1.70	0.020	0.5
AY-68-28-514	13	319	--	0.010	<0.010	<0.20	1.10	<0.010	0.5
AY-68-28-905	12	343	2.3	0.030	0.010	0.30	2.00	0.030	0.5
AY-68-28-909	12	321	--	<0.010	<0.010	<0.20	1.60	0.070	--
AY-68-29-208	12	290	--	0.020	<0.010	<0.20	0.900	0.010	0.3
AY-68-29-210	12	321	--	0.020	<0.010	<0.20	1.10	0.010	0.4
AY-68-29-410	13	302	--	0.030	0.010	<0.20	1.10	0.010	0.3
AY-68-29-506	14	362	2.3	0.030	<0.010	0.60	1.70	0.020	0.3
AY-68-29-510	12	324	1.9	0.020	<0.010	0.60	1.30	0.010	0.5
AY-68-29-912	13	266	--	<0.010	<0.010	<0.20	1.80	0.020	--
AY-68-29-915	13	278	1.9	0.020	<0.010	0.20	1.70	<0.010	0.9
AY-68-30-614	12	298	--	--	--	--	--	--	--
AY-68-36-502	12	259	--	0.010	<0.010	<0.20	1.70	0.010	--
AY-68-36-802	12	271	--	<0.010	<0.010	<0.20	1.00	<0.010	--
AY-68-37-508	12	271	--	--	--	--	--	--	--
AY-68-37-521	21	4220	--	--	--	--	--	--	--
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	21	4240	--	--	--	--	--	--	--
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	21	4260	--	2.20	<0.010	3.6	<0.100	<0.010	--
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	20	4210	--	--	--	--	--	--	--
	21	4260	--	--	--	--	--	--	--
	21	4190	--	--	--	--	--	--	--
AY-68-37-522	19	3260	--	--	--	--	--	--	--
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	19	3230	--	--	--	--	--	--	--
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	19	3300	--	1.50	<0.010	1.5	<0.100	0.020	--
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	--	--	--	--	--	--	--	--	--
	18	3200	--	--	--	--	--	--	--
	18	3190	--	--	--	--	--	--	--
	18	3150	--	--	--	--	--	--	--
AY-68-37-523	19	4330	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	20	4240	--	--	--	--	--	--	--
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	19	4400	--	2.10	<0.010	3.8	<0.100	<0.010	--
	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	19	4300	--	--	--	--	--	--	--
	19	4390	--	--	--	--	--	--	--

Analyses for common inorganics, nutrients, and dissolved organic carbon for wells and springs in the Edwards aquifer, 1989--Continued

BEXAR COUNTY--Continued

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3	HARD-NESS TOTAL (MG/L AS CACO3)
AY-68-37-523	12-20-89	1400	1175.00	90	12	5780	6.5	28.5	254	2200
AY-68-37-524	01-25-89	0800	881.00	60	35	714	6.8	28.0	210	310
	03-23-89	1000	881.00	60	30	716	7.2	28.0	204	310
	04-24-89	1020	881.00	60	30	748	7.2	28.0	203	310
	05-22-89	1030	881.00	70	17	751	6.4	27.0	205	310
	06-21-89	0830	881.00	60	25	762	6.7	27.5	205	300
	07-20-89	1030	881.00	60	35	766	7.3	28.5	207	320
	08-21-89	1100	881.00	75	25	791	7.0	29.0	205	330
	09-22-89	0830	881.00	120	13	796	6.9	27.5	203	340
	10-23-89	0930	881.00	150	15	781	6.7	28.0	203	320
	11-20-89	1145	881.00	100	30	814	6.6	28.0	207	320
	12-20-89	1000	881.00	80	30	813	6.7	27.5	200	340
AY-68-37-525	01-25-89	1000	1150.00	60	20	6130	6.8	28.5	264	2300
	02-22-89	0930	1150.00	60	20	6130	6.7	28.0	246	2500
	03-23-89	1015	1150.00	60	17	6140	6.8	29.0	249	2300
	04-24-89	1040	1150.00	80	15	6100	6.8	29.0	250	2400
	05-22-89	1040	1150.00	80	15	6010	6.5	28.0	258	2300
	06-21-89	0845	1150.00	70	15	6000	6.9	26.5	244	2300
	07-20-89	0930	1150.00	60	26	5970	6.9	29.0	244	2400
	08-21-89	1000	1150.00	60	25	6010	6.9	29.5	244	2400
	09-22-89	0900	1150.00	60	25	6020	6.8	28.5	242	2400
	10-23-89	0915	1150.00	150	7.7	6040	6.8	28.0	251	2300
	11-20-89	1215	1150.00	100	25	6220	6.7	28.5	249	2400
	12-20-89	1015	1150.00	80	25	6210	6.5	29.0	248	2200
AY-68-37-526	01-24-89	0950	1223.00	100	13	937	6.9	26.0	201	370
	02-22-89	0820	1223.00	60	140	920	7.2	25.0	206	380
	03-23-89	0850	1223.00	100	12	911	7.4	25.5	208	370
	04-24-89	0915	1223.00	100	12	922	7.4	25.5	208	370
	05-22-89	1050	1223.00	100	12	1030	6.8	27.0	205	400
	06-21-89	0900	1223.00	100	12	968	7.3	26.5	212	390
	07-20-89	0945	1223.00	90	13	1040	7.4	26.5	209	410
	08-21-89	0845	1223.00	87	14	1020	7.2	26.5	212	410
	09-22-89	0745	1223.00	92	13	967	7.2	26.0	211	400
	10-23-89	0825	1223.00	90	13	930	7.2	25.0	210	370
	12-20-89	1100	1223.00	100	12	920	7.2	26.0	211	380
AY-68-37-527	01-24-89	0800	926.00	60	140	498	6.9	26.0	198	230
	02-22-89	0800	926.00	60	175	495	6.9	25.5	200	240
	03-23-89	0830	926.00	60	175	501	7.2	25.5	199	230
	04-24-89	0815	926.00	60	150	512	7.0	26.0	199	240
	05-22-89	1530	926.00	270	17	530	6.9	27.0	198	240
	06-21-89	1430	926.00	300	12	519	6.9	26.5	203	230
	07-20-89	1430	926.00	270	14	505	6.8	26.5	193	250
	08-21-89	1400	926.00	300	14	503	6.9	27.0	205	240
	09-22-89	1400	926.00	300	13	507	7.1	27.0	200	230
	10-23-89	1400	926.00	300	13	504	6.9	26.5	203	230
	11-20-89	1100	926.00	100	50	515	6.8	26.5	204	230
	12-20-89	0945	926.00	100	50	521	6.7	26.0	203	240
AY-68-37-701	07-10-89	1050	1582.00	1440	6000	494	7.1	26.5	201	240
AY-68-38-107	03-27-89	0800	726.00	120	1200	512	7.1	27.0	199	250
AY-68-43-601	07-12-89	1405	1911.00	1440	20	500	7.2	27.0	223	240
AY-68-43-703	07-07-89	1000	2030.00	240	500	1420	6.6	34.5	206	560
AY-68-43-802	07-11-89	1605	1987.00	25	204	592	7.4	28.0	203	260
AY-68-43-807	07-06-89	0930	2292.00	1440	200	720	7.0	35.5	198	320
AY-68-43-811	07-11-89	1335	2292.00	15	1000	636	7.2	28.0	209	310
AY-68-43-816	07-11-89	1515	1993.00	25	194	1250	7.1	35.0	194	480
AY-68-44-401	07-06-89	1530	1532.00	300	500	510	7.0	28.0	208	240

Analyses for common inorganics, nutrients, and dissolved organic carbon for wells and springs in the Edwards aquifer, 1989--Continued

BEXAR COUNTY--Continued

LOCAL IDEN-TI-FIER	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	SULFATE DIS-SOLVED (MG/L AS SO4)	IODIDE, DIS-SOLVED (MG/L AS I)	BROMIDE DIS-SOLVED (MG/L AS BR)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)
AY-68-37-523	540	200	490	25	1900	--	--	950	3.0
AY-68-37-524	85	24	30	3.2	91	0.033	0.33	50	0.70
	83	25	--	--	100	--	--	50	--
	83	25	30	3.0	110	0.034	0.28	53	0.80
	83	26	--	--	110	--	--	54	--
	82	24	--	--	110	--	--	57	--
	86	26	35	3.4	120	0.034	0.30	58	1.0
	88	27	--	--	130	--	--	58	--
	90	27	--	--	120	--	--	57	--
	85	26	36	3.7	130	--	--	60	1.0
	86	26	35	3.6	130	--	--	61	1.0
	90	27	39	3.6	130	--	--	64	1.0
AY-68-37-525	530	240	530	30	2000	0.240	5.2	1100	2.6
	570	260	--	--	2000	--	--	1100	--
	530	230	--	--	2100	--	--	1100	--
	550	240	540	29	2000	0.300	5.3	1000	2.9
	530	230	--	--	2000	--	--	1100	--
	540	240	--	--	2000	--	--	1100	--
	560	250	540	30	2000	0.270	5.3	1100	2.8
	540	250	--	--	2000	--	--	1100	--
	560	240	--	--	2100	--	--	1000	--
	510	240	550	32	2000	--	--	1000	2.9
	580	230	570	33	2100	--	--	1000	2.9
	530	220	550	28	2100	--	--	1000	2.9
AY-68-37-526	91	34	46	3.4	160	0.010	0.50	85	0.70
	96	35	--	--	160	--	--	93	--
	94	34	--	--	160	--	--	83	--
	93	34	42	3.1	150	0.034	0.42	78	0.70
	100	37	--	--	190	--	--	98	--
	97	35	--	--	170	--	--	92	--
	100	39	55	3.8	200	0.170	2.4	100	0.80
	100	38	--	--	180	--	--	95	--
	100	36	--	--	170	--	--	85	--
	94	33	45	3.4	170	--	--	84	0.70
	97	34	44	3.1	160	--	--	79	0.80
AY-68-37-527	63	17	11	3.4	24	0.004	0.090	21	0.30
	67	18	--	--	27	--	--	19	--
	65	17	--	--	26	--	--	19	--
	67	17	11	1.3	27	0.003	<0.010	20	0.30
	66	19	--	--	34	--	--	24	--
	66	17	--	--	31	--	--	22	--
	69	18	12	1.2	27	0.004	0.10	22	0.30
	66	18	--	--	26	--	--	20	--
	66	17	--	--	26	--	--	19	--
	65	17	13	1.3	31	--	--	21	0.30
	66	17	11	1.3	28	--	--	21	0.30
	68	18	12	1.2	30	--	--	26	0.30
AY-68-37-701	66	17	10	1.1	22	0.002	0.090	18	0.30
AY-68-38-107	69	18	13	1.4	30	--	--	21	0.30
AY-68-43-601	68	17	9.8	1.0	22	0.002	0.080	20	0.30
AY-68-43-703	150	44	74	4.9	340	0.060	0.85	150	1.1
AY-68-43-802	74	18	14	1.4	47	0.006	0.16	38	0.40
AY-68-43-807	83	25	28	2.4	110	0.021	0.24	42	0.70
AY-68-43-811	70	22	11	1.2	88	0.007	0.10	19	2.1
AY-68-43-816	130	36	57	4.3	260	0.044	0.61	120	1.0
AY-68-44-401	67	17	11	1.2	26	0.003	0.10	20	0.30

Analyses for common inorganics, nutrients, and dissolved organic carbon for wells and springs in the Edwards aquifer, 1989--Continued

BEXAR COUNTY--Continued

LOCAL IDEN-TI-FIER	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	NITRO-GEN, TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)
AY-68-37-523	19	4280	--	--	--	--	--	--	--
AY-68-37-524	13	423	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	13	440	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	14	468	--	0.120	<0.010	0.40	<0.100	<0.010	--
	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	13	476	--	--	--	--	--	--	--
	14	481	--	--	--	--	--	--	--
	14	489	--	--	--	--	--	--	--
AY-68-37-525	19	4620	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	19	4540	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	18	4650	--	2.30	<0.010	2.4	<0.100	0.010	--
	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	18	4500	--	--	--	--	--	--	--
	18	4680	--	--	--	--	--	--	--
	19	4600	--	--	--	--	--	--	--
AY-68-37-526	12	553	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	12	538	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	13	639	1.3	0.270	0.050	0.60	0.700	<0.010	--
	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	12	568	--	--	--	--	--	--	--
	13	557	--	--	--	--	--	--	--
AY-68-37-527	12	271	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	12	275	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	13	278	1.6	0.020	0.030	0.40	1.20	<0.010	--
	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
	12	282	--	--	--	--	--	--	--
	12	279	--	--	--	--	--	--	--
	12	289	--	--	--	--	--	--	--
AY-68-37-701	12	269	--	--	--	--	--	--	--
AY-68-38-107	12	284	1.7	<0.010	<0.010	0.40	1.30	<0.010	--
AY-68-43-601	12	286	--	--	--	--	--	--	--
AY-68-43-703	15	910	--	--	--	--	--	--	--
AY-68-43-802	13	330	--	--	--	--	--	--	--
AY-68-43-807	14	429	--	--	--	--	--	--	--
AY-68-43-811	12	394	--	--	--	--	--	--	--
AY-68-43-816	15	746	--	--	--	--	--	--	--
AY-68-44-401	12	281	--	--	--	--	--	--	--

Analyses for common inorganics, nutrients, and dissolved organic carbon for wells and springs in the Edwards aquifer, 1989--Continued

COMAL COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3	HARD-NESS TOTAL (MG/L AS CACO3)
DX-68-15-901	04-03-89	1134	--	--	--	578	7.2	21.0	260	290
DX-68-22-902	07-24-89	1000	240.00	30	800	514	7.0	22.0	248	260
DX-68-23-301	04-06-89	1445	--	--	--	534	7.0	23.0	235	260
	07-14-89	1400	--	--	--	557	7.0	24.0	230	260
DX-68-23-303	05-09-89	1200	1045.00	75	4200	560	7.0	24.5	236	280
	07-18-89	1315	1045.00	45	4200	552	7.1	26.0	238	270
DX-68-23-316	05-09-89	1430	350.00	60	10	545	7.1	24.5	272	300
DX-68-23-501	07-13-89	1645	210.00	60	200	540	7.0	23.5	250	270
DX-68-23-602	05-09-89	1020	790.00	520	2300	526	7.2	23.0	231	260

LOCAL IDEN-TI-FIER	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	SULFATE DIS-SOLVED (MG/L AS SO4)	IODIDE, DIS-SOLVED (MG/L AS I)	BROMIDE DIS-SOLVED (MG/L AS BR)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)
DX-68-15-901	86	18	9.0	1.4	22	--	--	12	0.20
DX-68-22-902	86	12	5.8	0.90	9.0	0.002	0.060	8.9	0.20
DX-68-23-301	79	16	9.5	1.4	25	--	--	13	0.20
	79	16	10	1.4	23	0.005	0.090	14	0.20
DX-68-23-303	82	18	10	0.90	29	0.003	0.090	15	0.20
	80	17	10	1.5	27	0.002	0.090	14	0.20
DX-68-23-316	94	15	6.2	0.90	10	0.002	0.060	9.3	0.10
DX-68-23-501	85	15	7.7	1.2	13	0.003	0.030	13	0.20
DX-68-23-602	81	14	8.1	1.3	21	0.003	0.090	13	0.20

LOCAL IDEN-TI-FIER	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	NITRO-GEN, TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)
DX-68-15-901	11	316	1.6	<0.010	<0.010	0.30	1.30	0.010	0.7
DX-68-22-902	11	283	--	0.020	<0.010	<0.20	1.50	0.020	0.4
DX-68-23-301	12	297	2.1	<0.010	<0.010	0.30	1.80	<0.010	0.3
	13	295	--	--	--	--	--	--	--
DX-68-23-303	13	310	1.8	0.010	<0.010	0.30	1.50	<0.010	0.3
	13	306	--	--	--	--	--	--	--
DX-68-23-316	12	311	--	0.010	<0.010	<0.20	1.40	0.010	0.4
DX-68-23-501	12	297	--	--	--	--	--	--	--
DX-68-23-602	12	289	1.9	0.010	<0.010	0.20	1.70	0.010	0.3

Analyses for common inorganics, nutrients, and dissolved organic carbon for wells and springs in the Edwards aquifer, 1989--Continued

HAYS COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3	HARD-NESS TOTAL (MG/L AS CACO3)
LR-67-01-302	01-20-89	0900	360.00	60	500	606	6.8	24.5	230	310
	07-11-89	1515	360.00	60	550	695	7.4	25.5	248	360
LR-67-01-801	04-06-89	1425	--	--	--	590	7.1	22.0	255	280
	07-13-89	1330	--	--	--	584	7.1	21.5	253	290
LR-67-01-806	07-13-89	1130	115.00	1440	4600	623	7.0	22.5	269	300
LR-67-09-105	07-11-89	1645	330.00	1440	2000	611	7.3	23.5	266	300
LR-67-09-111	07-18-89	1015	264.00	90	200	602	6.7	23.0	262	290

LOCAL IDEN-TI-FIER	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	SULFATE DIS-SOLVED (MG/L AS SO4)	IODIDE, DIS-SOLVED (MG/L AS I)	BROMIDE DIS-SOLVED (MG/L AS BR)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)
LR-67-01-302	63	37	7.5	1.5	95	--	--	12	6.0
	63	39	8.3	1.8	130	0.006	0.040	11	3.4
LR-67-01-801	84	18	12	1.5	28	--	--	18	0.20
	84	19	12	1.5	26	0.003	0.12	17	0.20
LR-67-01-806	93	17	13	1.4	26	0.002	0.080	18	0.30
LR-67-09-105	92	18	15	1.6	30	0.002	0.14	22	0.20
LR-67-09-111	91	16	11	1.4	24	0.002	0.10	15	0.20

LOCAL IDEN-TI-FIER	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	NITRO-GEN, TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)
LR-67-01-302	12	372	--	<0.010	<0.010	0.20	<0.100	<0.010	--
	13	459	--	--	--	--	--	--	--
LR-67-01-801	11	326	--	0.010	<0.010	<0.20	1.10	<0.010	0.4
	11	323	--	--	--	--	--	--	--
LR-67-01-806	12	342	1.9	0.010	<0.010	0.30	1.60	<0.010	0.4
LR-67-09-105	12	351	1.8	0.020	<0.010	0.20	1.60	<0.010	0.4
LR-67-09-111	12	328	2.0	0.030	<0.010	0.30	1.70	0.010	0.3

Analyses for common inorganics, nutrients, and dissolved organic carbon for wells and springs in the Edwards aquifer, 1989--Continued

MEDINA COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3	HARD-NESS TOTAL (MG/L AS CACO3)
TD-68-26-701	05-30-89	1100	750.00	1440	400	531	6.8	23.5	207	270
TD-68-33-202	04-11-89	1030	279.00	60	15	460	7.0	22.0	194	230
TD-68-41-303	06-28-89	1030	717.00	60	350	478	6.7	24.5	204	230
TD-68-49-813	07-06-89	1330	3194.00	60	300	1220	6.6	40.5	282	270
TD-69-29-901	04-12-89	1345	276.00	60	20	465	7.1	22.0	223	240
TD-69-37-302	04-12-89	1230	410.00	60	20	491	7.0	22.5	219	250
TD-69-46-601	05-31-89	1100	1289.00	120	240	475	7.1	24.0	208	240
TD-69-54-401	07-14-89	1320	2000.00	35	20	513	7.2	25.5	200	240
TD-69-55-401	07-12-89	1530	2260.00	1440	1500	535	7.2	25.5	207	250
TD-69-56-301	06-29-89	0830	1950.00	1440	400	469	6.9	26.0	202	230
TD-69-56-507	07-19-89	1450	2157.00	1440	280	503	7.2	34.5	194	230

LOCAL IDEN-TI-FIER	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	SULFATE DIS-SOLVED (MG/L AS SO4)	IODIDE, DIS-SOLVED (MG/L AS I)	BROMIDE DIS-SOLVED (MG/L AS BR)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)
TD-68-26-701	75	21	7.9	1.2	50	--	--	13	0.30
TD-68-33-202	76	10	6.8	1.1	27	--	--	11	0.10
TD-68-41-303	69	14	8.5	1.1	16	--	--	19	0.20
TD-68-49-813	54	22	140	7.4	68	0.180	1.0	180	4.5
TD-69-29-901	84	6.9	5.4	0.90	10	--	--	7.8	0.10
TD-69-37-302	75	14	6.9	1.1	16	--	--	10	0.20
TD-69-46-601	72	15	7.7	1.0	17	--	--	12	0.20
TD-69-54-401	69	15	14	1.1	16	0.002	0.13	25	0.30
TD-69-55-401	73	15	13	1.1	14	0.002	0.12	27	0.20
TD-69-56-301	66	16	9.8	1.1	13	0.002	0.090	18	0.20
TD-69-56-507	53	21	10	1.1	31	0.004	0.070	16	0.60

LOCAL IDEN-TI-FIER	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	NITRO-GEN, TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)
TD-68-26-701	12	305	--	0.010	<0.010	<0.20	1.10	<0.010	0.4
TD-68-33-202	12	261	--	<0.010	<0.010	<0.20	0.800	<0.010	0.6
TD-68-41-303	12	262	2.5	0.020	0.010	0.40	2.10	<0.010	0.4
TD-68-49-813	22	706	--	--	--	--	--	--	--
TD-69-29-901	12	261	1.2	<0.010	<0.010	0.20	1.00	<0.010	--
TD-69-37-302	13	268	1.5	<0.010	<0.010	0.20	1.30	<0.010	--
TD-69-46-601	13	263	--	0.020	0.020	<0.20	1.60	<0.010	0.3
TD-69-54-401	12	275	--	--	--	--	--	--	--
TD-69-55-401	12	281	--	--	--	--	--	--	--
TD-69-56-301	12	259	--	--	--	--	--	--	--
TD-69-56-507	15	276	--	--	--	--	--	--	--

Analyses for common inorganics, nutrients, and dissolved organic carbon for wells and springs in the Edwards aquifer, 1989--Continued

UVALDE COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3	HARD-NESS TOTAL (MG/L AS CACO3)
YP-69-35-806	04-10-89	1400	400.00	150	1000	430	7.3	21.0	186	220
YP-69-36-702	07-11-89	1530	538.00	1440	800	520	6.6	23.0	186	240
YP-69-42-606	04-10-89	1300	525.00	100	1000	514	7.1	23.0	200	240
YP-69-42-803	07-12-89	1100	540.00	30	600	434	6.8	23.5	197	210
YP-69-43-606	05-30-89	1330	698.00	40	460	525	6.9	24.0	207	250
YP-69-44-502	05-30-89	1500	1380.00	1440	800	610	7.0	28.0	195	270
YP-69-50-203	05-31-89	0900	1250.00	1440	710	590	6.7	23.5	212	270
YP-69-50-501	07-11-89	1400	600.00	1440	1000	1400	6.7	23.0	226	530
YP-69-50-901	07-12-89	0830	604.00	1440	600	1840	6.6	32.0	241	620
YP-69-51-104	05-31-89	0800	430.00	1440	610	920	6.7	24.0	259	390
YP-69-51-401	07-11-89	1730	400.00	1440	1000	815	6.8	25.0	249	360
YP-69-52-403	07-12-89	1330	1400.00	1440	800	3090	6.7	33.0	294	790
YP-69-53-202	07-11-89	1130	1230.00	1440	1000	655	6.9	24.0	213	280

LOCAL IDEN-TI-FIER	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	SULFATE DIS-SOLVED (MG/L AS SO4)	IODIDE, DIS-SOLVED (MG/L AS I)	BROMIDE DIS-SOLVED (MG/L AS BR)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)
YP-69-35-806	60	16	7.1	1.0	13	--	--	12	0.10
YP-69-36-702	68	16	10	1.0	16	0.002	0.12	36	0.20
YP-69-42-606	80	8.7	12	1.0	10	--	--	26	0.10
YP-69-42-803	71	8.4	8.1	1.0	10	0.002	0.060	15	0.20
YP-69-43-606	81	11	13	1.0	13	--	--	26	0.10
YP-69-44-502	80	17	14	1.2	24	--	--	50	0.40
YP-69-50-203	88	11	17	1.0	17	--	--	41	0.10
YP-69-50-501	180	20	66	1.5	96	0.020	0.58	240	0.20
YP-69-50-901	190	34	150	7.5	270	0.063	0.90	310	1.3
YP-69-51-104	130	15	39	1.2	46	--	--	100	0.40
YP-69-51-401	120	13	37	1.3	71	0.004	0.22	65	0.40
YP-69-52-403	200	67	350	19	830	0.300	1.5	370	2.8
YP-69-53-202	84	17	25	1.1	26	0.006	0.18	55	0.30

LOCAL IDEN-TI-FIER	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	NITRO-GEN, TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)
YP-69-35-806	12	233	1.8	<0.010	<0.010	0.30	1.50	<0.010	0.7
YP-69-36-702	12	271	2.2	0.030	<0.010	0.20	2.00	0.020	0.4
YP-69-42-606	13	271	3.1	<0.010	<0.010	0.40	2.70	<0.010	0.4
YP-69-42-803	12	244	2.5	0.030	<0.010	0.20	2.30	0.010	--
YP-69-43-606	12	281	3.6	0.020	<0.010	0.50	3.10	0.020	0.5
YP-69-44-502	13	317	2.4	0.020	<0.010	0.20	2.20	<0.010	--
YP-69-50-203	13	315	3.9	0.020	<0.010	0.70	3.20	<0.010	0.3
YP-69-50-501	16	757	--	--	--	--	--	--	--
YP-69-50-901	21	1130	--	--	--	--	--	--	--
YP-69-51-104	16	503	6.8	0.030	<0.010	1.3	5.50	0.020	0.4
YP-69-51-401	14	474	--	--	--	--	--	--	--
YP-69-52-403	17	2050	--	--	--	--	--	--	--
YP-69-53-202	13	351	--	--	--	--	--	--	--

Analyses for minor elements for wells and springs in the Edwards aquifer, 1989

ATASCOSA COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)
AL-68-50-303	07-06-89	1030	2087.00	1440	700	--	60	<1.0	<5
AL-68-51-101	07-06-89	1130	2656.00	1440	600	--	46	<1.0	<5

LOCAL IDEN-TI-FIER	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)	NICKEL, DIS-SOLVED (UG/L AS NI)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)
AL-68-50-303	<10	290	<10	4	--	<10	--	<1.0	6
AL-68-51-101	<10	120	<10	14	--	<10	--	<1.0	8

Analyses for minor elements for wells and springs in the Edwards aquifer, 1989--Continued

BEXAR COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)
AY-68-21-804	03-27-89	1315	279.00	90	7.0	<1	33	<1.0	<1
AY-68-27-302	07-17-89	1145	365.00	120	15	<1	30	<1.0	<1
AY-68-27-303	03-28-89	0915	354.00	60	354	<1	33	<1.0	1
AY-68-27-503	03-28-89	1100	375.00	60	15	<1	37	<1.0	<1
AY-68-28-205	04-18-89	1330	485.00	1440	350	<1	45	<1.0	2
AY-68-28-512	05-04-89	1115	400.00	60	10	<1	38	<1.0	<1
AY-68-28-514	04-18-89	1040	510.00	1440	1100	<1	42	<1.0	1
AY-68-28-905	06-28-89	0940	856.00	35	1800	<1	33	<1.0	2
AY-68-28-909	08-01-89	1150	867.00	1440	2430	<1	100	<1.0	1
AY-68-29-208	05-04-89	1545	266.00	30	8.0	<1	34	<1.0	<1
AY-68-29-210	05-04-89	1345	329.00	60	15	<1	39	<1.0	<1
AY-68-29-410	06-27-89	0930	318.00	60	700	<1	33	<1.0	2
AY-68-29-506	05-20-89	0930	694.00	60	17	<1	40	<1.0	<1
AY-68-29-510	07-10-89	1425	500.00	30	20	<1	41	<1.0	<1
AY-68-29-912	08-07-89	1020	630.00	300	1150	<1	78	<1.0	<1
AY-68-29-915	07-17-89	0930	824.00	30	5000	<1	45	1.0	<1
AY-68-30-614	07-12-89	1200	563.00	240	700	--	140	<1.0	<5
AY-68-36-502	07-17-89	1100	1224.00	240	4000	<1	52	<1.0	<1
AY-68-36-802	07-17-89	1330	1479.00	30	1000	1	170	<1.0	<1
AY-68-37-508	07-10-89	1210	1311.00	250	6000	--	110	<1.0	<5
AY-68-37-701	07-10-89	1050	1582.00	1440	6000	--	110	<1.0	<5
AY-68-38-107	03-27-89	0800	726.00	120	1200	<1	150	<1.0	1
AY-68-43-601	07-12-89	1405	1911.00	1440	20	--	88	<1.0	<5
AY-68-43-703	07-07-89	1000	2030.00	240	500	--	48	1.0	<5
AY-68-43-802	07-11-89	1605	1987.00	25	204	--	110	<1.0	<5
AY-68-43-807	07-06-89	0930	2292.00	1440	200	--	81	<1.0	<5
AY-68-43-811	07-11-89	1335	2292.00	15	1000	--	210	<1.0	<5
AY-68-43-816	07-11-89	1515	1993.00	25	194	--	48	<1.0	<5
AY-68-44-401	07-06-89	1530	1532.00	300	500	--	82	<1.0	<5

Analyses for minor elements for wells and springs in the Edwards aquifer, 1989--Continued

BEXAR COUNTY--Continued

LOCAL IDEN-TI-FIER	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)	NICKEL, DIS-SOLVED (UG/L AS NI)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)
AY-68-21-804	6	11	<5	2	<0.1	--	<1	<1.0	960
AY-68-27-302	6	6	1	<1	<0.1	--	<1	2.0	20
AY-68-27-303	4	13	<5	2	<0.1	--	<1	4.0	250
AY-68-27-503	6	6	5	<1	<0.1	--	<1	3.0	390
AY-68-28-205	1	12	<5	<1	<0.1	--	<1	<1.0	6
AY-68-28-512	57	<3	37	<1	<0.1	--	<1	<1.0	15
AY-68-28-514	9	5	<5	<1	0.1	--	<1	<1.0	30
AY-68-28-905	8	4	1	<1	0.2	--	<1	1.0	10
AY-68-28-909	<1	10	1	<10	<0.1	--	<1	<1.0	10
AY-68-29-208	7	22	2	2	<0.1	--	<1	<1.0	450
AY-68-29-210	8	12	5	<1	<0.1	--	<1	<1.0	500
AY-68-29-410	4	4	<1	<1	<0.1	--	<1	<1.0	9
AY-68-29-506	8	17	5	1	<0.1	--	<1	2.0	280
AY-68-29-510	2	5	2	<1	<0.1	--	<1	<1.0	48
AY-68-29-912	8	3	<1	<1	0.1	--	<1	<1.0	8
AY-68-29-915	7	7	1	<1	0.7	--	<1	1.0	9
AY-68-30-614	<10	<3	<10	<1	--	<10	--	<1.0	<3
AY-68-36-502	4	15	1	<1	0.5	--	<1	<1.0	6
AY-68-36-802	7	6	1	<1	--	--	2	<1.0	22
AY-68-37-508	<10	5	<10	<1	--	<10	--	<1.0	8
AY-68-37-701	<10	5	10	<1	--	<10	--	2.0	5
AY-68-38-107	3	9	<5	<1	0.2	--	1	2.0	8
AY-68-43-601	<10	6	<10	<1	--	<10	--	<1.0	3
AY-68-43-703	<10	8	<10	5	--	<10	--	<1.0	3
AY-68-43-802	<10	15	<10	3	--	<10	--	<1.0	6
AY-68-43-807	<10	200	<10	6	--	<10	--	<1.0	10
AY-68-43-811	10	30	<10	<1	--	<10	--	<1.0	18
AY-68-43-816	<10	88	<10	2	--	<10	--	<1.0	7
AY-68-44-401	<10	8	<10	<1	--	<10	--	<1.0	15

Analyses for minor elements for wells and springs in the Edwards aquifer, 1989--Continued

COMAL COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)
DX-68-15-901	04-03-89	1134	--	--	--	<1	33	<1.0	1
DX-68-22-902	07-24-89	1000	240.00	30	800	<1	28	<1.0	<1
DX-68-23-301	04-06-89	1445	--	--	--	<1	51	<1.0	<1
	07-14-89	1400	--	--	--	--	50	<1.0	<5
DX-68-23-303	05-09-89	1200	1045.00	75	4200	<1	54	<1.0	<1
	07-18-89	1315	1045.00	45	4200	--	53	<1.0	<5
DX-68-23-316	05-09-89	1430	350.00	60	10	<1	33	<1.0	<1
DX-68-23-501	07-13-89	1645	210.00	60	200	--	37	<1.0	<5
DX-68-23-602	05-09-89	1020	790.00	520	2300	<1	37	<1.0	8

LOCAL IDEN-TI-FIER	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)	NICKEL, DIS-SOLVED (UG/L AS NI)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)
DX-68-15-901	2	4	<5	<1	0.1	--	1	<1.0	21
DX-68-22-902	10	5	1	1	0.1	--	1	1.0	6
DX-68-23-301	2	3	<5	<1	<0.1	--	<1	<1.0	8
	<10	5	<10	<1	--	<10	--	1.0	8
DX-68-23-303	7	4	1	<1	<0.1	--	<1	<1.0	46
	10	<3	10	<1	--	<10	--	<1.0	87
DX-68-23-316	15	7	8	<1	<0.1	--	1	<1.0	560
DX-68-23-501	<10	<3	<10	<1	--	<10	--	<1.0	15
DX-68-23-602	7	<3	1	<1	<0.1	--	<1	<1.0	10

Analyses for minor elements for wells and springs in the Edwards aquifer, 1989--Continued

HAYS COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)
LR-67-01-302	07-11-89	1515	360.00	60	550	--	64	<1.0	<5
LR-67-01-801	04-06-89	1425	--	--	--	<1	48	<1.0	<1
	07-13-89	1330	--	--	--	--	34	<1.0	<5
LR-67-01-806	07-13-89	1130	115.00	1440	4600	1	38	<1.0	<1
LR-67-09-105	07-11-89	1645	330.00	1440	2000	<1	40	<1.0	<1
LR-67-09-111	07-18-89	1015	264.00	90	200	<1	39	<1.0	<1

LOCAL IDEN-TI-FIER	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)	NICKEL, DIS-SOLVED (UG/L AS NI)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)
LR-67-01-302	<10	5	<10	<1	--	<10	--	<1.0	50
LR-67-01-801	2	3	<5	2	0.1	--	<1	<1.0	12
	<10	12	10	<1	--	<10	--	<1.0	22
LR-67-01-806	13	4	1	<1	0.1	--	<1	<1.0	15
LR-67-09-105	12	4	2	<1	<0.1	--	<1	<1.0	14
LR-67-09-111	7	4	1	<1	<0.1	--	1	1.0	8

Analyses for minor elements for wells and springs in the Edwards aquifer, 1989--Continued

MEDINA COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)
TD-68-26-701	05-30-89	1100	750.00	1440	400	<1	40	<1.0	<1
TD-68-33-202	04-11-89	1030	279.00	60	15	<1	39	<1.0	<1
TD-68-41-303	06-28-89	1030	717.00	60	350	<1	44	<1.0	2
TD-68-49-813	07-06-89	1330	3194.00	60	300	--	260	<1.0	<5
TD-69-29-901	04-12-89	1345	276.00	60	20	<1	29	<1.0	1
TD-69-37-302	04-12-89	1230	410.00	60	20	<1	40	<1.0	<1
TD-69-46-601	05-31-89	1100	1289.00	120	240	<1	38	<1.0	<1
TD-69-54-401	07-14-89	1320	2000.00	35	20	--	150	<1.0	<5
TD-69-55-401	07-12-89	1530	2260.00	1440	1500	--	70	<1.0	<5
TD-69-56-301	06-29-89	0830	1950.00	1440	400	--	86	<1.0	<5
TD-69-56-507	07-19-89	1450	2157.00	1440	280	--	190	<1.0	<5

LOCAL IDEN-TI-FIER	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)	NICKEL, DIS-SOLVED (UG/L AS NI)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)
TD-68-26-701	13	27	3	1	--	--	<1	<1.0	29
TD-68-33-202	2	3	<5	<1	<0.1	--	<1	<1.0	160
TD-68-41-303	4	8	1	<1	<0.1	--	<1	1.0	4
TD-68-49-813	<10	81	<10	11	--	<10	--	<1.0	12
TD-69-29-901	2	6	<5	<1	<0.1	--	<1	1.0	370
TD-69-37-302	2	5	<5	<1	<0.1	--	<1	<1.0	150
TD-69-46-601	4	9	1	<1	--	--	<1	<1.0	9
TD-69-54-401	<10	4	<10	<1	--	<10	--	1.0	79
TD-69-55-401	<10	<3	<10	<1	--	<10	--	<1.0	18
TD-69-56-301	<10	12	<10	<1	--	<10	--	<1.0	5
TD-69-56-507	10	6	<10	<1	--	<10	--	<1.0	9

Analyses for minor elements for wells and springs in the Edwards aquifer, 1989--Continued

UVALDE COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)
YP-69-35-806	04-10-89	1400	400.00	150	1000	<1	36	<1.0	<1
YP-69-36-702	07-11-89	1530	538.00	1440	800	1	37	<1.0	1
YP-69-42-606	04-10-89	1300	525.00	100	1000	<1	49	<1.0	1
YP-69-42-803	07-12-89	1100	540.00	30	600	1	40	<1.0	<1
YP-69-43-606	05-30-89	1330	698.00	40	460	<1	51	<1.0	<1
YP-69-44-502	05-30-89	1500	1380.00	1440	800	<1	110	<1.0	1
YP-69-50-203	05-31-89	0900	1250.00	1440	710	<1	53	<1.0	<1
YP-69-50-501	07-11-89	1400	600.00	1440	1000	--	110	<1.0	<5
YP-69-50-901	07-12-89	0830	604.00	1440	600	--	39	<1.0	<5
YP-69-51-104	05-31-89	0800	430.00	1440	610	<1	110	<1.0	<1
YP-69-51-401	07-11-89	1730	400.00	1440	1000	--	110	<1.0	<5
YP-69-52-403	07-12-89	1330	1400.00	1440	800	--	20	<2.0	<10
YP-69-53-202	07-11-89	1130	1230.00	1440	1000	--	64	<1.0	<5

LOCAL IDEN-TI-FIER	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)	NICKEL, DIS-SOLVED (UG/L AS NI)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)
YP-69-35-806	5	<3	<5	<1	<0.1	--	<1	<1.0	33
YP-69-36-702	5	6	<1	<1	<0.1	--	<1	<1.0	14
YP-69-42-606	3	18	<5	2	0.2	--	<1	1.0	62
YP-69-42-803	<1	6	<1	<1	<0.1	--	<1	<1.0	5
YP-69-43-606	3	7	2	<1	--	--	<1	<1.0	11
YP-69-44-502	8	15	4	1	--	--	2	<1.0	50
YP-69-50-203	11	<3	4	<1	--	--	<1	<1.0	6
YP-69-50-501	<10	13	<10	<1	--	<10	--	<1.0	58
YP-69-50-901	<10	340	<10	6	--	<10	--	<1.0	4
YP-69-51-104	5	4	2	<1	--	--	1	<1.0	23
YP-69-51-401	<10	6	<10	<1	--	<10	--	<1.0	11
YP-69-52-403	<20	130	<20	6	--	<20	--	<2.0	16
YP-69-53-202	<10	13	<10	<1	--	<10	--	<1.0	19

Analyses for pesticides for wells and springs in the Edwards aquifer, 1989

BEXAR COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)
AY-68-27-302	07-17-89	1145	365.00	120	15	<0.1	<0.10	<0.010
AY-68-27-303	03-28-89	0915	354.00	60	354	<0.1	<0.10	<0.010
AY-68-28-205	04-18-89	1330	485.00	1440	350	<0.1	<0.10	<0.010
AY-68-28-514	04-18-89	1040	510.00	1440	1100	<0.1	<0.10	<0.010
AY-68-29-208	05-04-89	1545	266.00	30	8.0	<0.1	<0.10	<0.010

LOCAL IDEN-TI-FIER	ATRA-ZINE, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)
AY-68-27-302	--	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010
AY-68-27-303	--	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010
AY-68-28-205	--	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010
AY-68-28-514	--	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010
AY-68-29-208	--	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010

LOCAL IDEN-TI-FIER	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)	METHYL TRI-THION, TOTAL (UG/L)
AY-68-27-302	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
AY-68-27-303	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
AY-68-28-205	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
AY-68-28-514	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
AY-68-29-208	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01

LOCAL IDEN-TI-FIER	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
AY-68-27-302	<0.01	<0.01	<0.1	<1	<0.01	<0.01	<0.01	<0.01
AY-68-27-303	<0.01	<0.01	<0.1	<1	<0.01	<0.01	<0.01	<0.01
AY-68-28-205	<0.01	<0.01	<0.1	<1	<0.01	<0.01	<0.01	<0.01
AY-68-28-514	<0.01	<0.01	<0.1	<1	<0.01	<0.01	<0.01	<0.01
AY-68-29-208	<0.01	<0.01	<0.1	<1	<0.01	<0.01	<0.01	<0.01

Analyses for pesticides for wells and springs in the Edwards aquifer, 1989--Continued

COMAL COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)
DX-68-15-901	04-03-89	1134	--	--	--	<0.1	<0.10	<0.010
DX-68-23-301	04-06-89	1445	--	--	--	<0.1	<0.10	<0.010

LOCAL IDEN-TI-FIER	ATRA-ZINE, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)
DX-68-15-901	--	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010
DX-68-23-301	--	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010

LOCAL IDEN-TI-FIER	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)	METHYL TRI-THION, TOTAL (UG/L)
DX-68-15-901	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
DX-68-23-301	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01

LOCAL IDEN-TI-FIER	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
DX-68-15-901	<0.01	<0.01	<0.1	<1	<0.01	0.04	<0.01	<0.01
DX-68-23-301	<0.01	<0.01	<0.1	<1	<0.01	<0.01	<0.01	<0.01

Analyses for pesticides for wells and springs in the Edwards aquifer, 1989--Continued

HAYS COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)
LR-67-01-801	04-06-89	1425	--	--	--	<0.1	<0.10	<0.010
LR-67-09-105	07-11-89	1645	330.00	1440	2000	--	--	--

LOCAL IDEN-TI-FIER	ATRA-ZINE, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)
LR-67-01-801	--	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010
LR-67-09-105	--	--	--	--	--	--	--	--

LOCAL IDEN-TI-FIER	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)	METHYL TRI-THION, TOTAL (UG/L)
LR-67-01-801	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
LR-67-09-105	--	--	--	--	--	--	--	--

LOCAL IDEN-TI-FIER	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
LR-67-01-801	<0.01	<0.01	<0.1	<1	<0.01	<0.01	<0.01	<0.01
LR-67-09-105	--	--	--	--	--	<0.01	<0.01	<0.01

Analyses for pesticides for wells and springs in the Edwards aquifer, 1989--Continued

MEDINA COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)
TD-68-41-303	06-28-89	1030	717.00	60	350	<0.1	<0.10	<0.010
TD-69-37-302	04-12-89	1230	410.00	60	20	<0.1	<0.10	<0.010

LOCAL IDEN-TI-FIER	ATRA-ZINE, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)
TD-68-41-303	--	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010
TD-69-37-302	--	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010

LOCAL IDEN-TI-FIER	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)	METHYL TRI-THION, TOTAL (UG/L)
TD-68-41-303	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
TD-69-37-302	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01

LOCAL IDEN-TI-FIER	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
TD-68-41-303	<0.01	<0.01	<0.1	<1	<0.01	<0.01	<0.01	<0.01
TD-69-37-302	<0.01	<0.01	<0.1	<1	<0.01	<0.01	<0.01	<0.01

Analyses for pesticides for wells and springs in the Edwards aquifer, 1989--Continued

UVALDE COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)
YP-69-35-806	04-10-89	1400	400.00	150	1000	<0.1	<0.10	<0.010
YP-69-36-702	07-11-89	1530	538.00	1440	800	<0.1	<0.10	<0.010
YP-69-42-606	04-10-89	1300	525.00	100	1000	<0.1	<0.10	<0.010
YP-69-42-803	07-12-89	1100	540.00	30	600	<0.1	<0.10	<0.010
YP-69-43-606	05-30-89	1330	698.00	40	460	<0.1	<0.10	<0.010
YP-69-44-502	05-30-89	1500	1380.00	1440	800	<0.1	<0.10	<0.010
YP-69-50-203	05-31-89	0900	1250.00	1440	710	<0.1	<0.10	<0.010

LOCAL IDEN-TI-FIER	ATRA-ZINE, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)
YP-69-35-806	--	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010
YP-69-36-702	--	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010
YP-69-42-606	--	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010
YP-69-42-803	--	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010
YP-69-43-606	--	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010
YP-69-44-502	--	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010
YP-69-50-203	--	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010

LOCAL IDEN-TI-FIER	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)	METHYL TRI-THION, TOTAL (UG/L)
YP-69-35-806	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
YP-69-36-702	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
YP-69-42-606	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
YP-69-42-803	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
YP-69-43-606	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
YP-69-44-502	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
YP-69-50-203	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01

LOCAL IDEN-TI-FIER	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
YP-69-35-806	<0.01	<0.01	<0.1	<1	<0.01	<0.01	<0.01	<0.01
YP-69-36-702	<0.01	<0.01	<0.1	<1	<0.01	<0.01	<0.01	<0.01
YP-69-42-606	<0.01	<0.01	<0.1	<1	<0.01	<0.01	<0.01	<0.01
YP-69-42-803	<0.01	<0.01	<0.1	<1	<0.01	<0.01	<0.01	<0.01
YP-69-43-606	<0.01	<0.01	<0.1	<1	<0.01	<0.01	<0.01	<0.01
YP-69-44-502	<0.01	<0.01	<0.1	<1	<0.01	<0.01	<0.01	<0.01
YP-69-50-203	<0.01	<0.01	<0.1	<1	<0.01	<0.01	<0.01	<0.01

Analyses for volatile organic compounds for wells and springs in the Edwards aquifer, 1989

BEXAR COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	DI-CHLORO-BROMO-METHANE TOTAL (UG/L)	CARBON-TETRA-CHLO-RIDE TOTAL (UG/L)	1,2-DI-CHLORO-ETHANE TOTAL (UG/L)
AY-68-21-804	03-27-89	1315	279.00	90	7.0	<0.20	<0.20	<0.20
AY-68-27-303	03-28-89	0915	354.00	60	354	<0.20	<0.20	<0.20
AY-68-27-503	03-28-89	1100	375.00	60	15	<0.20	<0.20	<0.20
AY-68-28-205	04-18-89	1330	485.00	1440	350	<0.20	<0.20	<0.20
AY-68-28-512	05-04-89	1115	400.00	60	10	<0.20	<0.20	<0.20
AY-68-28-514	04-18-89	1040	510.00	1440	1100	<0.20	<0.20	<0.20
AY-68-29-208	05-04-89	1545	266.00	30	8.0	<0.20	<0.20	<0.20
AY-68-29-210	05-04-89	1345	329.00	60	15	<0.20	<0.20	<0.20
AY-68-29-506	08-30-89	0940	694.00	70	15	<0.20	<0.20	<0.20
AY-68-29-915	07-17-89	0930	824.00	30	5000	<0.20	<0.20	<0.20

LOCAL IDEN-TI-FIER	BROMO-FORM TOTAL (UG/L)	CHLORO-DI-BROMO-METHANE TOTAL (UG/L)	CHLORO-FORM TOTAL (UG/L)	TOLUENE TOTAL (UG/L)	BENZENE TOTAL (UG/L)	CHLORO-BENZENE TOTAL (UG/L)	CHLORO-ETHANE TOTAL (UG/L)	ETHYL-BENZENE TOTAL (UG/L)
AY-68-21-804	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
AY-68-27-303	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
AY-68-27-503	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
AY-68-28-205	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
AY-68-28-512	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
AY-68-28-514	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
AY-68-29-208	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
AY-68-29-210	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
AY-68-29-506	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
AY-68-29-915	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

LOCAL IDEN-TI-FIER	METHYL-BROMIDE TOTAL (UG/L)	METHYL-ENE CHLO-RIDE TOTAL (UG/L)	TETRA-CHLORO-ETHYL-ENE TOTAL (UG/L)	TRI-CHLORO-FLUORO-METHANE TOTAL (UG/L)	1,1-DI-CHLORO-ETHANE TOTAL (UG/L)	1,1-DI-CHLORO-ETHYL-ENE TOTAL (UG/L)	1,1,1-TRI-CHLORO-ETHANE TOTAL (UG/L)	1,1,2-TRI-CHLORO-ETHANE TOTAL (UG/L)
AY-68-21-804	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
AY-68-27-303	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
AY-68-27-503	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
AY-68-28-205	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
AY-68-28-512	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
AY-68-28-514	<0.20	<0.20	0.40	<0.20	<0.20	<0.20	<0.20	<0.20
AY-68-29-208	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
AY-68-29-210	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
AY-68-29-506	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
AY-68-29-915	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Analyses for volatile organic compounds for wells and springs in the Edwards aquifer, 1989--Continued

BEXAR COUNTY--Continued

LOCAL IDEN-TI-FIER	1,1,2,2 TETRA-CHLORO-ETHANE TOTAL (UG/L)	1,2-DI-CHLORO-PROPANE TOTAL (UG/L)	1,2-TRANSDI CHLORO-ETHENE TOTAL (UG/L)	1,3-DI-CHLORO-PROPENE TOTAL (UG/L)	2-CHLORO-ETHYL-VINYL-ETHER TOTAL (UG/L)	DI-CHLORO-DI-FLUORO-METHANE TOTAL (UG/L)	VINYL CHLO-RIDE TOTAL (UG/L)	TRI-CHLORO-ETHYL-ENE TOTAL (UG/L)
AY-68-21-804	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
AY-68-27-303	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
AY-68-27-503	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
AY-68-28-205	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
AY-68-28-512	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
AY-68-28-514	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
AY-68-29-208	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
AY-68-29-210	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
AY-68-29-506	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
AY-68-29-915	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2

Analyses for volatile organic compounds for wells and springs in the Edwards aquifer, 1989--Continued

COMAL COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	DI-CHLORO-BROMO-METHANE TOTAL (UG/L)	CARBON-TETRA-CHLO-RIDE TOTAL (UG/L)	1,2-DI-CHLORO-ETHANE TOTAL (UG/L)
DX-68-15-901	04-03-89	1134	--	--	--	<0.20	<0.20	<0.20
DX-68-23-301	04-06-89	1445	--	--	--	<0.20	<0.20	<0.20
DX-68-23-303	05-09-89	1200	1045.00	75	4200	<0.20	<0.20	<0.20
DX-68-23-316	05-09-89	1430	350.00	60	10	<0.20	<0.20	<0.20
DX-68-23-602	05-09-89	1020	790.00	520	2300	<0.20	<0.20	<0.20

LOCAL IDEN-TI-FIER	BROMO-FORM TOTAL (UG/L)	CHLORO-DI-BROMO-METHANE TOTAL (UG/L)	CHLORO-FORM TOTAL (UG/L)	TOLUENE TOTAL (UG/L)	BENZENE TOTAL (UG/L)	CHLORO-BENZENE TOTAL (UG/L)	CHLORO-ETHANE TOTAL (UG/L)	ETHYL-BENZENE TOTAL (UG/L)
DX-68-15-901	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
DX-68-23-301	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
DX-68-23-303	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
DX-68-23-316	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
DX-68-23-602	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

LOCAL IDEN-TI-FIER	METHYL-BROMIDE TOTAL (UG/L)	METHYL-ENE CHLO-RIDE TOTAL (UG/L)	TETRA-CHLORO-ETHYL-ENE TOTAL (UG/L)	TRI-CHLORO-FLUORO-METHANE TOTAL (UG/L)	1,1-DI-CHLORO-ETHANE TOTAL (UG/L)	1,1-DI-CHLORO-ETHYL-ENE TOTAL (UG/L)	1,1,1-TRI-CHLORO-ETHANE TOTAL (UG/L)	1,1,2-TRI-CHLORO-ETHANE TOTAL (UG/L)
DX-68-15-901	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
DX-68-23-301	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
DX-68-23-303	<0.20	<0.20	0.20	<0.20	<0.20	<0.20	<0.20	<0.20
DX-68-23-316	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
DX-68-23-602	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

LOCAL IDEN-TI-FIER	1,1,2,2 TETRA-CHLORO-ETHANE TOTAL (UG/L)	1,2-DI-CHLORO-PROPANE TOTAL (UG/L)	1,2-TRANSDI CHLORO-ETHENE TOTAL (UG/L)	1,3-DI-CHLORO-PROPENE TOTAL (UG/L)	2-CHLORO-ETHYL-VINYL-ETHER TOTAL (UG/L)	DI-CHLORO-DI-FLUORO-METHANE TOTAL (UG/L)	VINYL CHLO-RIDE TOTAL (UG/L)	TRI-CHLORO-ETHYL-ENE TOTAL (UG/L)
DX-68-15-901	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
DX-68-23-301	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
DX-68-23-303	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
DX-68-23-316	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
DX-68-23-602	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2

Analyses for volatile organic compounds for wells and springs in the Edwards aquifer, 1989--Continued

HAYS COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	DI-CHLORO-BROMO-METHANE TOTAL (UG/L)	CARBON-TETRA-CHLO-RIDE TOTAL (UG/L)	1,2-DI-CHLORO-ETHANE TOTAL (UG/L)
LR-67-01-302	01-20-89	0900	360.00	60	500	4.8	<0.20	<0.20
	07-11-89	1515	360.00	60	550	0.90	<0.20	<0.20
LR-67-01-801	04-06-89	1425	--	--	--	<0.20	<0.20	<0.20
LR-67-01-806	07-13-89	1130	115.00	1440	4600	<0.20	<0.20	<0.20
LR-67-09-105	07-11-89	1645	330.00	1440	2000	<0.20	<0.20	<0.20

LOCAL IDEN-TI-FIER	BROMO-FORM TOTAL (UG/L)	CHLORO-DI-BROMO-METHANE TOTAL (UG/L)	CHLORO-FORM TOTAL (UG/L)	TOLUENE TOTAL (UG/L)	BENZENE TOTAL (UG/L)	CHLORO-BENZENE TOTAL (UG/L)	CHLORO-ETHANE TOTAL (UG/L)	ETHYL-BENZENE TOTAL (UG/L)
LR-67-01-302	1.3	4.1	6.4	<0.20	<0.20	<0.20	<0.20	<0.20
	0.40	1.0	1.2	<0.20	<0.20	<0.20	<0.20	<0.20
LR-67-01-801	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
LR-67-01-806	2.8	0.60	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
LR-67-09-105	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

LOCAL IDEN-TI-FIER	METHYL-BROMIDE TOTAL (UG/L)	METHYL-ENE CHLO-RIDE TOTAL (UG/L)	TETRA-CHLORO-ETHYL-ENE TOTAL (UG/L)	TRI-CHLORO-FLUORO-METHANE TOTAL (UG/L)	1,1-DI-CHLORO-ETHANE TOTAL (UG/L)	1,1-DI-CHLORO-ETHYL-ENE TOTAL (UG/L)	1,1,1-TRI-CHLORO-ETHANE TOTAL (UG/L)	1,1,2-TRI-CHLORO-ETHANE TOTAL (UG/L)
LR-67-01-302	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
LR-67-01-801	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
LR-67-01-806	<0.20	<0.20	0.40	<0.20	<0.20	<0.20	<0.20	<0.20
LR-67-09-105	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

LOCAL IDEN-TI-FIER	1,1,2,2 TETRA-CHLORO-ETHANE TOTAL (UG/L)	1,2-DI-CHLORO-PROPANE TOTAL (UG/L)	1,2-TRANSDI CHLORO-ETHENE TOTAL (UG/L)	1,3-DI-CHLORO-PROPENE TOTAL (UG/L)	2-CHLORO-ETHYL-VINYL-ETHER TOTAL (UG/L)	DI-CHLORO-DI-FLUORO-METHANE TOTAL (UG/L)	VINYL CHLO-RIDE TOTAL (UG/L)	TRI-CHLORO-ETHYL-ENE TOTAL (UG/L)
LR-67-01-302	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
LR-67-01-801	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
LR-67-01-806	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
LR-67-09-105	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2

Analyses for volatile organic compounds for wells and springs in the Edwards aquifer, 1989--Continued

MEDINA COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	DI-CHLORO-BROMO-METHANE TOTAL (UG/L)	CARBON-TETRA-CHLO-RIDE TOTAL (UG/L)	1,2-DI-CHLORO-ETHANE TOTAL (UG/L)
TD-68-26-701	05-30-89	1100	750.00	1440	400	<0.20	<0.20	<0.20
TD-68-33-202	04-11-89	1030	279.00	60	15	<0.20	<0.20	<0.20
TD-68-41-303	06-28-89	1030	717.00	60	350	<0.20	<0.20	<0.20
TD-69-46-601	05-31-89	1100	1289.00	120	240	<0.20	<0.20	<0.20

LOCAL IDEN-TI-FIER	BROMO-FORM TOTAL (UG/L)	CHLORO-DI-BROMO-METHANE TOTAL (UG/L)	CHLORO-FORM TOTAL (UG/L)	TOLUENE TOTAL (UG/L)	BENZENE TOTAL (UG/L)	CHLORO-BENZENE TOTAL (UG/L)	CHLORO-ETHANE TOTAL (UG/L)	ETHYL-BENZENE TOTAL (UG/L)
TD-68-26-701	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
TD-68-33-202	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
TD-68-41-303	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
TD-69-46-601	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

LOCAL IDEN-TI-FIER	METHYL-BROMIDE TOTAL (UG/L)	METHYL-ENE CHLO-RIDE TOTAL (UG/L)	TETRA-CHLORO-ETHYL-ENE TOTAL (UG/L)	TRI-CHLORO-FLUORO-METHANE TOTAL (UG/L)	1,1-DI-CHLORO-ETHANE TOTAL (UG/L)	1,1-DI-CHLORO-ETHYL-ENE TOTAL (UG/L)	1,1,1-TRI-CHLORO-ETHANE TOTAL (UG/L)	1,1,2-TRI-CHLORO-ETHANE TOTAL (UG/L)
TD-68-26-701	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
TD-68-33-202	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
TD-68-41-303	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
TD-69-46-601	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

LOCAL IDEN-TI-FIER	1,1,2,2 TETRA-CHLORO-ETHANE TOTAL (UG/L)	1,2-DI-CHLORO-PROPANE TOTAL (UG/L)	1,2-TRANSDI CHLORO-ETHENE TOTAL (UG/L)	1,3-DI-CHLORO-PROPENE TOTAL (UG/L)	2-CHLORO-ETHYL-VINYL-ETHER TOTAL (UG/L)	DI-CHLORO-DI-FLUORO-METHANE TOTAL (UG/L)	VINYL CHLO-RIDE TOTAL (UG/L)	TRI-CHLORO-ETHYL-ENE TOTAL (UG/L)
TD-68-26-701	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
TD-68-33-202	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
TD-68-41-303	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
TD-69-46-601	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2

Analyses for volatile organic compounds for wells and springs in the Edwards aquifer, 1989--Continued

UVALDE COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	DI-CHLORO-BROMO-METHANE TOTAL (UG/L)	CARBON-TETRA-CHLO-RIDE TOTAL (UG/L)	1,2-DI-CHLORO-ETHANE TOTAL (UG/L)
YP-69-35-806	04-10-89	1400	400.00	150	1000	<0.20	<0.20	<0.20
YP-69-42-606	04-10-89	1300	525.00	100	1000	<0.20	<0.20	<0.20
YP-69-43-606	05-30-89	1330	698.00	40	460	<0.20	<0.20	<0.20
YP-69-50-203	05-31-89	0900	1250.00	1440	710	<0.20	<0.20	<0.20
YP-69-51-104	05-31-89	0800	430.00	1440	610	<0.20	<0.20	<0.20

LOCAL IDEN-TI-FIER	BROMO-FORM TOTAL (UG/L)	CHLORO-DI-BROMO-METHANE TOTAL (UG/L)	CHLORO-FORM TOTAL (UG/L)	TOLUENE TOTAL (UG/L)	BENZENE TOTAL (UG/L)	CHLORO-BENZENE TOTAL (UG/L)	CHLORO-ETHANE TOTAL (UG/L)	ETHYL-BENZENE TOTAL (UG/L)
YP-69-35-806	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
YP-69-42-606	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
YP-69-43-606	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
YP-69-50-203	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
YP-69-51-104	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

LOCAL IDEN-TI-FIER	METHYL-BROMIDE TOTAL (UG/L)	METHYL-ENE CHLO-RIDE TOTAL (UG/L)	TETRA-CHLORO-ETHYL-ENE TOTAL (UG/L)	TRI-CHLORO-FLUORO-METHANE TOTAL (UG/L)	1,1-DI-CHLORO-ETHANE TOTAL (UG/L)	1,1-DI-CHLORO-ETHYL-ENE TOTAL (UG/L)	1,1,1-TRI-CHLORO-ETHANE TOTAL (UG/L)	1,1,2-TRI-CHLORO-ETHANE TOTAL (UG/L)
YP-69-35-806	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
YP-69-42-606	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
YP-69-43-606	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
YP-69-50-203	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
YP-69-51-104	<0.20	<0.20	7.4	<0.20	<0.20	<0.20	<0.20	<0.20

LOCAL IDEN-TI-FIER	1,1,2,2 TETRA-CHLORO-ETHANE TOTAL (UG/L)	1,2-DI-CHLORO-PROPANE TOTAL (UG/L)	1,2-TRANSDI CHLORO-ETHENE TOTAL (UG/L)	1,3-DI-CHLORO-PROPENE TOTAL (UG/L)	2-CHLORO-ETHYL-VINYL-ETHER TOTAL (UG/L)	DI-CHLORO-DI-FLUORO-METHANE TOTAL (UG/L)	VINYL CHLO-RIDE TOTAL (UG/L)	TRI-CHLORO-ETHYL-ENE TOTAL (UG/L)
YP-69-35-806	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
YP-69-42-606	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
YP-69-43-606	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
YP-69-50-203	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2
YP-69-51-104	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2

Analyses for isotopes for wells and springs in the Edwards aquifer, 1989

BEXAR COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	R-2 / H-1 STABLE ISOTOPE RATIO PER MIL	O-18 / O-16 STABLE ISOTOPE RATIO PER MIL	TRITIUM TOTAL (PCI/L)
AY-68-27-302	07-17-89	1145	365.00	120	15	-26.0	-4.65	--
AY-68-28-205	04-18-89	1330	485.00	1440	350	-24.5	-4.35	--
AY-68-28-512	05-04-89	1115	400.00	60	10	-23.5	-4.30	--
AY-68-28-514	04-18-89	1040	510.00	1440	1100	-25.0	-4.35	--
AY-68-28-905	06-28-89	0940	856.00	35	1800	-27.0	-4.30	--
AY-68-28-909	08-01-89	1150	867.00	1440	2430	-22.4	-4.15	--
AY-68-29-208	05-04-89	1545	266.00	30	8.0	-25.0	-4.65	--
AY-68-29-210	05-04-89	1345	329.00	60	15	-24.5	-4.70	--
AY-68-29-410	06-27-89	0930	318.00	60	700	-28.0	-4.40	--
AY-68-29-506	05-20-89	0930	694.00	60	17	-23.9	-4.60	--
AY-68-29-510	07-10-89	1425	500.00	30	20	-29.0	-4.40	--
AY-68-29-912	08-07-89	1020	630.00	300	1150	-24.9	-4.20	--
AY-68-29-915	07-17-89	0930	824.00	30	5000	-23.5	-4.20	--
AY-68-30-614	07-12-89	1200	563.00	240	700	-27.0	-4.45	6.5
AY-68-36-502	07-17-89	1100	1224.00	240	4000	-25.0	-4.25	--
AY-68-36-802	07-17-89	1330	1479.00	30	1000	-25.0	-4.30	--
AY-68-37-508	07-10-89	1210	1311.00	250	6000	-26.0	-4.35	8.6
AY-68-37-521	01-26-89	0800	1275.00	60	35	-26.0	-4.60	--
AY-68-37-522	01-26-89	1030	1075.00	80	35	-27.0	-4.55	--
AY-68-37-523	01-26-89	1330	1175.00	120	18	-29.0	-4.60	--
AY-68-37-524	01-25-89	0800	881.00	60	35	-25.0	-4.35	--
AY-68-37-525	01-25-89	1000	1150.00	60	20	-30.0	-4.60	--
AY-68-37-526	01-24-89	0950	1223.00	100	13	-27.0	-4.35	--
AY-68-37-527	01-24-89	0800	926.00	60	140	-27.9	-4.40	--
AY-68-37-701	07-10-89	1050	1582.00	1440	6000	-25.5	-4.30	8.6
AY-68-43-601	07-12-89	1405	1911.00	1440	20	-29.0	-4.35	9.2
AY-68-43-703	07-07-89	1000	2030.00	240	500	-30.0	-4.30	2.6
AY-68-43-802	07-11-89	1605	1987.00	25	204	-31.0	-4.35	9.0
AY-68-43-807	07-06-89	0930	2292.00	1440	200	-30.5	-4.40	3.8
AY-68-43-811	07-11-89	1335	2292.00	15	1000	-25.5	-4.25	9.3
AY-68-43-816	07-11-89	1515	1993.00	25	194	-26.0	-4.45	<2.5
AY-68-44-401	07-06-89	1530	1532.00	300	500	-28.5	-4.30	10

Analyses for isotopes for wells and springs in the Edwards aquifer, 1989--Continued

COMAL COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	H-2 / H-1 STABLE ISOTOPE RATIO PER MIL	O-18 / O-16 STABLE ISOTOPE RATIO PER MIL	TRITIUM TOTAL (PCI/L)
DX-68-22-902	07-24-89	1000	240.00	30	800	-23.4	-4.55	--
DX-68-23-301	07-14-89	1400	--	--	--	-24.5	-4.15	14
DX-68-23-303	05-09-89	1200	1045.00	75	4200	-23.0	-4.25	--
	07-18-89	1315	1045.00	45	4200	-23.5	-4.20	17
DX-68-23-316	05-09-89	1430	350.00	60	10	-24.5	-4.45	--
DX-68-23-501	07-13-89	1645	210.00	60	200	-22.0	-4.35	19
DX-68-23-602	05-09-89	1020	790.00	520	2300	-23.0	-4.25	--

HAYS COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	H-2 / H-1 STABLE ISOTOPE RATIO PER MIL	O-18 / O-16 STABLE ISOTOPE RATIO PER MIL	TRITIUM TOTAL (PCI/L)
LR-67-01-302	07-11-89	1515	360.00	60	550	-24.0	-4.00	<2.5
LR-67-01-801	07-13-89	1330	--	--	--	-19.5	-3.95	17
LR-67-01-806	07-13-89	1130	115.00	1440	4600	-26.0	-4.35	19
LR-67-09-105	07-11-89	1645	330.00	1440	2000	-25.0	-4.20	18
LR-67-09-111	07-18-89	1015	264.00	90	200	-25.5	-4.25	--

MEDINA COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	H-2 / H-1 STABLE ISOTOPE RATIO PER MIL	O-18 / O-16 STABLE ISOTOPE RATIO PER MIL	TRITIUM TOTAL (PCI/L)
TD-68-26-701	05-30-89	1100	750.00	1440	400	-19.0	-3.50	--
TD-68-41-303	06-28-89	1030	717.00	60	350	-29.0	-4.25	--
TD-68-49-813	07-06-89	1330	3194.00	60	300	-30.0	-4.65	<2.5
TD-69-46-601	05-31-89	1100	1289.00	120	240	-23.5	-4.25	--
TD-69-54-401	07-14-89	1320	2000.00	35	20	-29.0	-4.40	13
TD-69-55-401	07-12-89	1530	2260.00	1440	1500	-25.5	-4.40	18
TD-69-56-301	06-29-89	0830	1950.00	1440	400	-29.5	-4.25	12
TD-69-56-507	07-19-89	1450	2157.00	1440	280	-25.5	-4.25	6.1

Analyses for isotopes for wells and springs in the Edwards aquifer, 1989--Continued

UVALDE COUNTY

LOCAL IDEN-TI-FIER	DATE	TIME	DEPTH OF WELL, TOTAL (FEET)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	H-2 / H-1 STABLE ISOTOPE RATIO PER MIL	O-18 / O-16 STABLE ISOTOPE RATIO PER MIL	TRITIUM TOTAL (PCI/L)
YP-69-36-702	07-11-89	1530	538.00	1440	800	-26.0	-4.25	21
YP-69-42-803	07-12-89	1100	540.00	30	600	-29.0	-4.35	--
YP-69-43-606	05-30-89	1330	698.00	40	460	-26.0	-4.40	--
YP-69-44-502	05-30-89	1500	1380.00	1440	800	-24.5	-4.35	--
YP-69-50-203	05-31-89	0900	1250.00	1440	710	-26.5	-4.40	--
YP-69-50-501	07-11-89	1400	600.00	1440	1000	-27.5	-4.00	15
YP-69-50-901	07-12-89	0830	604.00	1440	600	-31.0	-4.65	7.4
YP-69-51-104	05-31-89	0800	430.00	1440	610	-26.5	-4.25	--
YP-69-51-401	07-11-89	1730	400.00	1440	1000	-31.5	-4.40	12
YP-69-52-403	07-12-89	1330	1400.00	1440	800	-30.0	-5.05	<2.5
YP-69-53-202	07-11-89	1130	1230.00	1440	1000	-27.0	-4.30	16

Summary of maximum contaminant levels for selected water-quality constituents and properties for public water systems 1/

[µg/L, micrograms per liter; mg/L, milligrams per liter]

Constituent 2/	Maximum contaminant level 3/	Secondary maximum contaminant level 4/
	Inorganic chemicals and related properties	
pH (standard units)	--	6.5 - 8.5
Arsenic (As)	50 µg/L	--
Barium (Ba)	1,000 µg/L	--
Cadmium (Cd)	10 µg/L	--
Chloride (Cl)	--	250 mg/L
Chromium (Cr)	50 µg/L	--
Copper (Cu)	--	1,000 µg/L
Iron (fe)	--	300 µg/L
Lead (Pb)	50 µg/L	--
Manganese (Mn)	--	50 µg/L
Mercury (Hg)	2 µg/L	--
Nitrate (as N)	10 mg/L	--
Selenium (Se)	10 µg/L	--
Silver (Ag)	50 µg/L	--
Sulfate (SO_4)	--	250 mg/L
Zinc (Zn)	--	5,000 µg/L
Dissolved solids	--	500 mg/L
Fluoride 5/	4 mg/L	2 mg/L
	Organic chemicals	
Chlorinated hydrocarbons		
Endrin	0.2 µg/L	--
Lindane	4 µg/L	--
Methoxychlor	100 µg/L	--
Toxaphene	5 µg/L	--
Chlorophenoxys		
2,4-D	100 µg/L	--
Silvex	10 µg/L	--

Summary of maximum contaminant levels for selected water-quality constituents and properties for public water systems--Continued 1/

Constituent 2/	Maximum contaminant level 3/	Secondary maximum contaminant level 4/
	Volatile organic compounds 6/	
Tetrachloroethylene	5 µg/L	--
Trichloroethylene	5 µg/L	--
Carbon tetrachloride	5 µg/L	--
Vinyl chloride	2 µg/L	--
1,2-Dichloroethane	5 µg/L	--
Benzene	5 µg/L	--
1,1-Dichloroethylene	7 µg/L	--
1,1,1-Trichloroethane	200 µg/L	--
p-Dichlorobenzene	75 µg/L	--

1 Public water system.--A system for the provision of piped water to the public for human consumption, if such system has at least 15 service connections or regularly serves at least 25 individuals daily at least 60 days out of the year.
2 Constituent.--Any physical, chemical, biological, or radiological substance or matter in water.
3 Maximum contaminant level.--The maximum permissible level of a contaminant in water which is delivered to the free flowing outlet of the ultimate user of a public water system. Maximum contaminant levels are those levels set by the U.S. Environmental Protection Agency (1989) in the National Primary Drinking Water Regulations. These regulations deal with contaminants that may have a significant direct impact on the health of the consumer and are enforceable by the U.S. Environmental Protection Agency.
4 Secondary maximum contaminant level.--The advisable maximum level of a contaminant in water which is delivered to the free flowing outlet of the ultimate user of a public water system. Secondary maximum contaminant levels are those levels proposed by the Environmental Protection Agency (1989) in the National Secondary Drinking Water Regulations. These regulations deal with contaminants that may not have a significant direct impact on the health of the consumer, but their presence in excessive quantities may affect the esthetic qualities of the water and may discourage the use of a drinking-water supply by the public.
5 Fluoride.--Revised (U.S. Environmental Protection Agency, 1989).
6 Proposed maximum contaminant levels (U.S. Environmental Protection Agency, 1989).

APPENDIX C. SURFACE WATER

Streamflow, spring flow, reservoir contents, and water-quality data for streams, October 1988 to September 1989

08167000 GUADALUPE RIVER AT COMFORT, TX

LOCATION.--Lat 29°58'10", long 98°53'33", Kendall County, Hydrologic Unit 12100201, on right bank at downstream side of southbound bridge on Interstate Highway 10 at Comfort, 0.5 mi downstream from Cypress Creek, and at mile 396.2.

DRAINAGE AREA.--839 mi².

PERIOD OF RECORD.--May 1939 to current year.

REVISED RECORDS.--WSP 1632: 1958. WSP 1732: 1939(M). WSP 2123: Drainage area, 1944(M), 1952(M), 1957(M), 1960(M).

GAGE.--Water-stage recorder. Datum of gage is 1,369.83 ft above National Geodetic Vertical Datum of 1929. Prior to Nov. 27, 1939, nonrecording gage. Nov. 27, 1939, to June 2, 1980, water-stage recorder at site 0.4 mi upstream at datum 2.22 ft higher. June 2, 1980, to Sept. 30, 1986, at present site at datum 2.00 ft higher.

REMARKS.--No estimated daily discharges. Records good. Many small diversions above station for irrigation. Several observations of water temperature were made during the year. Satellite telemeter at station.

AVERAGE DISCHARGE.--50 years (water years 1940-89), 203 ft³/s (147,100 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 240,000 ft³/s Aug. 2, 1978 (gage height, 40.90 ft), from high-water mark in well, from rating curve extended above 74,000 ft³/s on basis of current-meter measurement of 124,000 ft³/s (at gage height 32.47 ft) and slope-area measurement of 182,000 ft³/s (at gage height 38.4 ft), made at former gaging station "near Comfort" 5 mi upstream; no flow at times in 1952-57, 1963-64. All stages are at site and datum then in use. Maximum stage since at least 1848, that of Aug. 2, 1978.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 1869 reached a stage of 42.3 ft, present datum, from report by U.S. Army Corps of Engineers. Flood of July 1, 1932, reached a stage of 38.4 ft, from floodmark, and from information by State Department of Highways and Public Transportation. Flood of July 16, 1900, reached about the same stage as that of July 1, 1932, from information by local residents. All stages are at site and datum then in use.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,600 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
Jan. 28	1600	*1,020	*5.27				

Minimum daily discharge, 22 ft³/s June 10.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	198	154	113	118	237	193	192	217	100	58	44	38
2	188	154	114	119	217	193	187	190	98	56	43	37
3	169	149	118	118	207	193	182	188	97	51	46	33
4	160	141	119	115	185	193	180	171	95	55	45	29
5	154	131	117	117	176	187	174	151	90	53	42	29
6	152	123	115	117	171	175	162	149	85	48	45	30
7	148	122	115	117	169	179	162	148	80	45	48	31
8	148	123	116	116	160	180	168	148	47	38	55	32
9	149	123	121	113	154	181	163	142	25	41	47	38
10	148	123	123	113	150	180	152	139	22	45	45	41
11	151	123	126	113	150	179	148	135	26	46	47	73
12	144	124	127	113	150	175	146	144	24	43	49	146
13	141	126	124	122	150	175	158	158	62	43	47	78
14	141	124	125	120	153	174	196	143	218	39	47	65
15	141	123	123	117	153	174	193	141	124	37	44	60
16	139	120	121	116	201	169	182	140	103	36	46	55
17	137	116	121	115	291	166	172	264	91	35	43	53
18	139	116	123	115	350	165	168	191	85	32	46	52
19	137	118	124	122	318	164	241	173	81	29	46	48
20	177	113	123	130	292	177	231	147	76	28	47	44
21	185	113	123	123	264	179	192	142	71	28	43	45
22	171	132	125	123	238	169	179	134	64	30	38	46
23	139	121	123	123	224	165	168	129	61	33	36	43
24	118	123	123	126	213	165	161	152	62	38	36	40
25	129	124	123	127	212	164	156	127	69	45	36	37
26	128	124	123	125	209	163	154	122	68	45	39	38
27	131	121	121	272	204	163	153	117	71	54	45	36
28	131	122	119	680	197	283	151	115	70	59	49	35
29	133	119	118	548	---	295	168	109	63	56	44	37
30	133	117	118	372	---	239	182	105	59	52	39	38
31	141	---	120	278	---	211	---	102	---	50	44	---
TOTAL	4600	3762	3744	5243	5795	5768	5221	4633	2287	1348	1371	1407
MEAN	148	125	121	169	207	186	174	149	76.2	43.5	44.2	46.9
MAX	198	154	127	680	350	295	241	264	218	59	55	146
MIN	118	113	113	113	150	163	146	102	22	28	36	29
AC-FT	9120	7460	7430	10400	11490	11440	10360	9190	4540	2670	2720	2790

CAL YR 1988	TOTAL	95769	MEAN	262	MAX	16500	MIN	73	AC-FT	190000
WTR YR 1989	TOTAL	45179	MEAN	124	MAX	680	MIN	22	AC-FT	89610

08167500 GUADALUPE RIVER NEAR SPRING BRANCH, TX

LOCATION.--Lat 29°23'00", long 98°23'00", Comal County, Hydrologic Unit 12100201, at downstream side of bridge on Ranch Road 311, 1.9 mi southeast of Spring Branch Post Office, 7.5 mi downstream from Curry Creek, and at mile 334.4.

DRAINAGE AREA.--1,315 mi².

PERIOD OF RECORD.--June 1922 to current year.
Water-quality records.--Chemical and biochemical analyses: October 1980 to September 1982.

REVISED RECORDS.--WSP 1562: 1923-24, 1926, 1927-28(M), 1929, 1930(M). WSP 2123: Drainage area.

GAGE.--Water-stage recorder and crest-stage gages. Datum of gage is 948.10 ft above National Geodetic Vertical Datum of 1929. Prior to Jan. 14, 1981, at site 220 ft downstream at same datum.

REMARKS.--No estimated daily discharges. Records good. Several small diversions above station for irrigation. Several observations of water temperature were made during the year. Satellite telemeter at station.

AVERAGE DISCHARGE.--67 years, 330 ft³/s (239,100 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 160,000 ft³/s Aug. 3, 1978 (gage height, 45.25 ft, from floodmark), from rating curve extended above 55,600 ft³/s on basis of slope-area measurement of peak flow; no flow at times in 1951-52, 1954-56, and 1963-64.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1859, about 53 ft in 1869; flood in July 1900 reached a stage of about 49 ft, from information by local resident.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
May 17	2400	*1,620	*5.63				

Minimum daily discharge, 26 ft³/s Sept. 10.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	214	144	127	131	300	209	223	167	107	72	48	32
2	221	150	124	131	260	209	205	186	104	69	47	32
3	199	155	124	132	237	207	196	183	102	67	43	31
4	184	153	127	133	219	207	189	171	99	66	41	30
5	171	143	130	133	209	207	179	160	101	61	40	28
6	163	140	131	133	196	204	179	149	113	60	41	27
7	158	137	131	133	188	189	170	144	100	59	39	28
8	155	133	130	131	188	181	167	142	91	55	40	29
9	153	133	127	130	180	182	163	139	84	53	41	28
10	153	133	132	130	175	182	166	141	67	47	42	26
11	152	131	135	129	173	181	156	135	53	46	42	85
12	153	132	135	129	173	181	156	134	48	48	38	72
13	149	131	133	130	173	180	158	134	46	50	36	70
14	147	133	133	135	173	181	171	135	68	49	38	96
15	145	133	133	137	172	182	190	133	274	47	40	67
16	144	131	131	134	170	178	195	133	170	44	40	59
17	144	127	131	133	191	175	185	322	127	43	41	53
18	140	128	131	133	272	173	176	679	114	43	41	51
19	141	129	132	137	323	172	177	249	104	41	42	50
20	141	127	134	148	311	180	228	206	95	40	39	48
21	151	125	134	142	288	176	230	171	89	38	39	47
22	185	124	134	139	268	183	192	156	83	36	40	44
23	169	131	131	140	247	179	174	150	78	36	39	43
24	153	138	131	140	235	171	164	138	74	41	37	42
25	133	135	131	146	227	173	157	146	74	50	36	42
26	131	135	131	147	223	173	156	139	77	46	35	41
27	133	134	132	152	222	174	152	128	83	51	33	39
28	134	127	131	241	215	206	151	121	80	52	33	38
29	140	130	129	626	---	264	153	119	79	50	34	38
30	138	130	129	510	---	303	160	115	77	49	35	37
31	141	---	130	378	---	252	---	111	---	51	35	---
TOTAL	4835	4032	4054	5423	6208	6014	5318	5336	2861	1560	1215	1353
MEAN	156	134	131	175	222	194	177	172	95.4	50.3	39.2	45.1
MAX	221	155	135	626	323	303	230	679	274	72	48	96
MIN	131	124	124	129	170	171	151	111	46	36	33	26
AC-FT	9590	8000	8040	10760	12310	11930	10550	10580	5670	3090	2410	2680

CAL YR 1988 TOTAL 104150 MEAN 285 MAX 17000 MIN 103 AC-FT 206600
WTR YR 1989 TOTAL 48209 MEAN 132 MAX 679 MIN 26 AC-FT 95620

08167700 CANYON LAKE NEAR NEW BRAUNFELS, TX

LOCATION.--Lat 29°52'07", long 98°11'55", Comal County, Hydrologic Unit 12100201, in intake structure of Canyon Dam on Guadalupe River, 12 mi northwest of New Braunfels, and at mile 303.0.

DRAINAGE AREA.--1,432 mi².

PERIOD OF RECORD.--July 1962 to current year. Prior to October 1970, published as Canyon Reservoir.

REVISED RECORDS.--WSP 2123: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Sept. 24, 1964, nonrecording gage at present site and datum.

REMARKS.--The lake is formed by a rolled earthfill dam 6,830 ft long, consisting of the main dam 4,410 ft long, an earthen dike 210 ft long, a 1,260-foot-long uncontrolled broad-crested-type spillway, and a 950-foot concrete and earthen nonoverflow section. Deliberate impoundment began June 16, 1964, and main part of dam was completed in August 1964. The flood-control outlet works consist of a 10.0-foot-diameter conduit controlled by two 5.7 by 10.0-foot hydraulically operated slide gates. The lake was built for water conservation and flood control. Capacity table beginning Oct. 1, 1974, is based on a sedimentation survey of August 1972. Small diversions above the lake for irrigation. Gage-height telemeter at station. Figures given herein represent total contents. Data regarding the dam and lake are given in the following table:

	Elevation (feet)	Capacity (acre-feet)
Top of dam	974.0	-
Crest of spillway	943.0	736,700
Top of conservation pool	909.0	382,000
Lowest gated outlet (invert)	775.0	240

COOPERATION.--Records furnished by the U.S. Army Corps of Engineers and reviewed by the Geological Survey.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 732,600 acre-ft June 19, 1987 (elevation, 942.68 ft); minimum observed since conservation pool first reached in April 1968, 311,200 acre-ft Nov. 24, 1984 (elevation, 899.85 ft).

EXTREMES FOR CURRENT YEAR.--Maximum contents, 381,900 acre-ft Oct. 2 at 0200 hours (elevation, 908.99 ft); minimum, 348,800 acre-ft Sept. 30 (elevation, 904.86 ft).

Capacity table (elevation, in feet, and total contents, in acre-feet)

904.0	342,200	908.0	373,800
906.0	357,800	909.0	382,000

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	381700	378600	376000	375600	381300	379400	377200	375400	372000	368500	360300	354500
2	381500	378600	375900	375700	381500	379400	376900	375300	372000	368200	360100	354200
3	381300	378600	375900	375800	381300	379400	376800	375300	371700	367900	359900	354000
4	381100	378600	375900	375700	380800	379400	376700	375500	371600	367900	359600	353900
5	380800	378500	375900	375800	380600	378900	376300	375600	371500	367800	359400	353600
6	380500	378300	375900	375800	380400	378600	376100	375500	371300	367500	359200	353500
7	380400	378300	376100	375800	380000	378300	375800	375300	371200	367400	359100	353300
8	380200	378300	375900	375700	379700	378200	375700	375100	371000	366900	359100	353000
9	380000	378200	375900	375600	379500	378000	375200	375000	370700	366600	358800	352800
10	379900	378200	376000	375500	379100	377900	375000	375200	370600	366200	358500	352600
11	379600	378100	376000	375500	378900	377600	374500	375000	370600	365800	358300	352300
12	379500	378100	375900	375600	378600	377500	374300	374800	370300	365600	358100	352300
13	379300	378000	375900	375800	378600	377300	374300	374800	370300	365300	357900	353100
14	379200	378000	375900	375500	378700	377200	374400	374600	371700	365000	357700	352700
15	379000	378100	375900	375400	378800	377100	374300	374600	371800	364600	357600	352400
16	379000	377800	375700	375300	379000	376900	374300	374400	371500	364300	357400	352300
17	378900	377600	375600	375300	379000	376900	374400	375500	371100	364000	357300	352000
18	378900	377600	375500	375100	379100	376800	374600	376400	370700	363700	357200	351800
19	378800	377500	375500	375700	379200	376900	375000	376600	370500	363400	357100	351600
20	378700	377200	375600	375700	379400	377200	375200	376500	370300	363000	356700	351300
21	378600	376900	375700	375600	379400	376900	375300	376300	369900	362600	356600	351200
22	378600	376800	375700	375500	379600	376700	375300	375900	369800	362200	356500	351000
23	378600	376700	375800	375400	379700	376400	375300	375500	369700	362000	356400	350500
24	378600	376700	375700	375600	379700	376300	375300	375000	369500	361900	356100	350200
25	378600	376800	375900	376700	379600	376300	375200	374600	369500	361500	356000	349900
26	378600	376800	375600	377600	379500	376100	375100	374200	369500	361300	355700	349700
27	378600	376600	375800	377600	379500	376100	375000	373800	369300	361100	355700	349400
28	378600	376300	375600	378000	379500	377400	375100	373300	369100	360900	355400	349200
29	378500	376300	375600	379900	---	377400	375400	373000	368800	360700	355300	349000
30	378400	376100	375600	380700	---	377500	375500	372400	368700	360500	355100	348800
31	378700	---	375600	381200	---	377300	---	372100	---	360400	354800	---
MAX	381700	378600	376100	381200	381500	379400	377200	376600	372000	368500	360300	354500
MIN	378400	376100	375500	375100	378600	376100	374300	372100	368700	360400	354800	348800
(†)	908.60	908.28	908.22	908.90	908.70	908.43	908.20	907.79	907.36	906.33	905.62	904.86
(Φ)	-3000	-2600	-500	+5600	-1700	-2200	-1800	-3400	-3400	-8300	-5600	-6000

CAL YR 1988 MAX 414000 MIN 346900 (Φ) +29200
WTR YR 1989 MAX 381700 MIN 348800 (Φ) -32900

(†) Elevation, in feet, at end of month.
(Φ) Change in contents, in acre-feet.

08167800 GUADALUPE RIVER AT SATTLER, TX

LOCATION.--Lat 29°51'32", long 98°10'47", Comal County, Hydrologic Unit 12100202, on right bank 200 ft upstream from Horseshoe Falls, 0.8 mi north of Sattler, 1.8 mi downstream from Canyon Dam, 2.3 mi upstream from Heiser Hollow, 11.2 mi north of New Braunfels, and at mile 301.2.

DRAINAGE AREA.--1,436 mi², of which 1,432 mi² is above Canyon Dam.

PERIOD OF RECORD.--March 1960 to current year.
Water-quality records.--Water temperature: June 1984 to September 1987.

REVISED RECORDS.--WSP 2123: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 742.24 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers bench mark).

REMARKS.--No estimated daily discharges. Records good. Flow completely regulated since July 21, 1962, by Canyon Lake (station 08167700) 1.8 mi upstream. Small diversions above station for irrigation. Satellite telemeter at station.

AVERAGE DISCHARGE.--27 years (water years 1962-89) since regulation began at Canyon Lake, 424 ft³/s (307,200 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,800 ft³/s Oct. 29, 1960 (gage height, 12.20 ft). Maximum discharge since closure of Canyon Dam on July 21, 1962, 5,850 ft³/s Aug. 5, 1978 (gage height, 8.31 ft); no flow July 31 to Aug. 6, 1962 (result of closure of Canyon Dam), and part of Jan. 29, 30, Feb. 1, 1965 (result of closure while constructing present control).

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in July 1869 (stage unknown) has not been exceeded since that date; flood in July 1900 (stage unknown) exceeded 39 ft; maximum stage since at least 1904, 39 ft in July 1932 and June 1935, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 345 ft³/s Feb. 9 at 1700 hours (gage height, 5.26 ft); minimum daily, 53 ft³/s Aug. 16-27, Sept.30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	203	113	99	110	302	236	283	155	112	114	62	88
2	203	114	99	110	303	237	287	156	115	115	63	81
3	203	114	97	111	309	243	277	152	112	117	58	80
4	203	113	97	113	302	244	257	151	112	118	61	79
5	203	108	97	114	304	244	261	156	114	116	62	71
6	203	107	95	112	302	238	257	157	114	116	62	74
7	191	107	96	127	309	242	244	157	114	116	62	74
8	159	108	105	102	303	220	244	161	110	116	64	74
9	157	110	100	107	302	226	239	155	106	116	64	74
10	160	110	93	134	279	234	220	155	107	118	64	74
11	161	108	93	133	317	239	243	155	109	121	64	70
12	161	108	97	126	320	248	207	155	108	118	64	67
13	156	108	104	125	300	246	216	155	108	119	64	68
14	127	108	105	166	218	242	186	153	113	116	64	68
15	145	109	106	131	143	226	178	150	106	115	54	68
16	145	106	106	141	153	210	148	148	195	114	53	68
17	145	106	110	137	161	209	151	150	224	116	53	68
18	141	106	111	177	159	180	152	150	224	116	53	70
19	141	106	110	133	159	196	149	199	224	114	53	77
20	122	106	110	131	160	217	136	271	154	113	53	72
21	132	106	110	140	179	205	142	271	114	110	53	63
22	143	106	110	141	162	218	148	266	114	110	53	60
23	131	86	110	147	163	213	148	274	114	110	53	60
24	110	118	110	149	196	219	145	290	114	130	53	60
25	108	79	110	148	239	210	146	276	114	112	53	60
26	108	114	112	149	241	216	150	272	112	117	53	60
27	109	114	112	142	240	219	150	265	108	98	53	59
28	110	114	112	148	237	171	150	264	108	63	58	63
29	112	85	112	153	---	196	152	264	111	62	61	57
30	114	131	110	141	---	243	155	208	114	62	60	53
31	113	---	110	210	---	253	---	113	---	62	79	---
TOTAL	4619	3228	3248	4208	6762	6940	5821	6004	3804	3360	1826	2060
MEAN	149	108	105	136	241	224	194	194	127	108	58.9	68.7
MAX	203	131	112	210	320	253	287	290	224	130	79	88
MIN	108	79	93	102	143	171	136	113	106	62	53	53
AC-FT	9160	6400	6440	8350	13410	13770	11550	11910	7550	6660	3620	4090

CAL YR 1988 TOTAL 78218 MEAN 214 MAX 791 MIN 61 AC-FT 155100
WTR YR 1989 TOTAL 51880 MEAN 142 MAX 320 MIN 53 AC-FT 102900

GUADALUPE RIVER BASIN

08168000 HUECO SPRINGS NEAR NEW BRAUNFELS, TX

LOCATION.--Lat 29°45'34", long 98°08'24", Comal County, Hydrologic Unit 12100202, two springs located 1,700 ft upstream from mouth of unnamed tributary which enters the Guadalupe River at Slumber Falls, and 4.2 mi north of New Braunfels.

DRAINAGE AREA.--Not applicable.

PERIOD OF RECORD.--August 1944 to current year. Miscellaneous measurements only.

GAGE.--None.

REMARKS.--Discharge represents flow from springs. Surface runoff from precipitation is excluded. No diversion above station.

EXTREMES FOR PERIOD OF RECORD.--Maximum spring discharge measured 131 ft^3/s Jan. 21, 1968; no flow at times in 1948-49, 1951-57, 1963-64, 1967, and 1984.

DISCHARGE MEASUREMENTS, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

Date	Discharge (ft^3/s)	Date	Discharge (ft^3/s)	Date	Discharge (ft^3/s)
Oct. 7, 1988	8.8	Feb. 8, 1989	7.8	June 16, 1989	5.4
Dec. 7	6.4	Apr. 7	6.6	Aug. 23	.6

08168500 GUADALUPE RIVER ABOVE COMAL RIVER AT NEW BRAUNFELS, TX

LOCATION.--Lat 29°42'53", long 98°06'35", Comal County, Hydrologic Unit 12100202, on right bank at New Braunfels, 1.1 mi upstream from Comal River, 21.9 mi downstream from Canyon Lake, and at mile 281.1.

DRAINAGE AREA.--1,518 mi².

PERIOD OF RECORD.--December 1927 to current year.

REVISED RECORDS.--WSP 898: 1935. WSP 1562: 1932. WSP 2123: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 586.65 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records good. Small diversions for irrigation below station 08167800 and above this station. Since July 21, 1962, flow is largely regulated by Canyon Lake (station 08167700) 21.9 mi upstream. Several observations of water temperature were made during the year. Satellite telemeter at station.

AVERAGE DISCHARGE.--34 years (water years 1929-62) prior to regulation by Canyon Lake, 372 ft³/s (269,500 acre-ft/yr); 27 years (water years 1963-89) regulated, 512 ft³/s (370,900 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 101,000 ft³/s June 15, 1935 (gage height, 32.95 ft); no flow July 8, 9, July 17 to Aug. 20, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1845, 38 ft July 8, 1869, and in December 1913, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 334 ft³/s May 24 at 2000 hours (gage height, 2.39 ft); minimum daily, 51 ft³/s Aug. 23, 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	220	130	119	133	305	267	286	185	120	121	64	87
2	221	130	106	136	315	267	300	181	120	121	67	85
3	220	130	105	135	319	271	295	176	122	120	65	84
4	219	129	103	133	314	268	284	173	120	122	60	82
5	219	126	103	135	320	264	286	175	120	120	63	82
6	220	125	106	133	313	262	278	176	118	119	63	74
7	220	127	107	135	312	262	262	174	118	120	64	79
8	186	127	111	143	311	255	266	176	117	120	69	79
9	178	131	136	100	305	251	253	173	111	121	66	78
10	176	131	111	142	306	248	246	180	111	121	64	78
11	176	132	112	150	306	258	250	174	125	122	64	79
12	176	133	111	140	320	275	249	174	112	126	64	75
13	177	129	123	141	318	274	254	173	111	121	64	72
14	166	125	130	137	286	266	218	167	164	121	64	78
15	144	126	130	180	185	261	215	165	128	118	62	71
16	157	124	131	148	178	248	180	165	148	118	55	71
17	155	124	133	155	200	236	170	168	232	118	53	70
18	155	129	133	166	196	194	170	165	231	118	53	72
19	155	124	134	182	196	227	205	162	230	117	54	74
20	155	117	136	156	198	246	176	278	213	116	52	82
21	134	118	136	155	211	234	162	288	125	116	53	73
22	157	121	136	158	196	244	171	286	122	114	52	63
23	157	120	136	163	195	241	168	284	123	117	51	58
24	136	101	136	175	211	237	169	293	125	124	52	58
25	125	123	135	177	267	241	165	284	128	130	55	60
26	124	90	136	173	270	231	169	277	126	120	52	60
27	124	119	136	173	268	241	169	271	119	123	52	60
28	124	120	133	174	267	223	166	269	115	92	51	60
29	124	120	133	204	---	228	186	266	114	65	56	64
30	126	108	136	205	---	234	199	265	120	65	61	58
31	135	---	135	176	---	285	---	141	---	65	61	---
TOTAL	5161	3689	3868	4813	7388	7739	6567	6484	4088	3531	1826	2166
MEAN	166	123	125	155	264	250	219	209	136	114	58.9	72.2
MAX	221	133	136	205	320	285	300	293	232	130	69	87
MIN	124	90	103	100	178	194	162	141	111	65	51	58
AC-FT	10240	7320	7670	9550	14650	15350	13030	12860	8110	7000	3620	4300

CAL YR 1988 TOTAL 90010 MEAN 246 MAX 806 MIN 90 AC-FT 178500
WTR YR 1989 TOTAL 57320 MEAN 157 MAX 320 MIN 51 AC-FT 113700

08169000 COMAL RIVER AT NEW BRAUNFELS, TX

LOCATION.--Lat 29°42'21", long 98°07'20", Comal County, Hydrologic Unit 12100202, on right bank 200 ft upstream from San Antonio Street viaduct in New Braunfels and 1.1 mi upstream from mouth.

DRAINAGE AREA.--130 mi². Normal flow of river comes from springs; drainage area not applicable.

PERIOD OF RECORD.--1882 to current year (1882 to November 1927, discharge measurements only).

REVISED RECORDS.--WSP 2123: Drainage area.

GAGE.--Water-stage recorder. Concrete control since Oct. 1, 1955. Datum of gage is 582.80 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records good. The flow from Comal Springs emerges from the Edwards and associated limestones in the Balcones Fault Zone. Except during periods of rainfall, flow of river is primarily from Comal Springs about 1.0 mi upstream. Flow is affected at times by cleanup operations by the city of New Braunfels at Landa Park Lake and at times by discharge from the flood-detention pools of five floodwater-retarding structures with a combined detention capacity of 17,580 acre-ft. These structures control runoff from 74.6 mi² above station. Several observations of water temperature were made during the year. Satellite telemeter at station.

AVERAGE DISCHARGE.--57 years (water years 1933-89), 294 ft³/s (213,000 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 60,800 ft³/s May 11, 1972 (gage height, 36.55 ft, from floodmark), from rating curve extended above 13,000 ft³/s on basis of contracted-opening measurements on Blieders and Dry Comal Creeks and unit rainfall-runoff studies; no flow from Comal Springs from June 13 to Nov. 3, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood information begins with flood of July 8, 1869, which reached a stage of 36.91 ft, from painted and dated marks in old Remmert Brewery 0.5 mi downstream; the flood of Oct. 17, 1870, reached a stage of 37.65 ft at same site (probably some backwater from Guadalupe River).

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,100 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
Apr. 19	0900	*924	*5.38				

Minimum daily discharge, 62 ft³/s Sept. 2, 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	232	232	233	247	251	257	244	235	127	117	82	67
2	235	233	234	248	257	258	246	231	115	115	87	62
3	229	234	234	246	256	258	242	235	116	106	83	66
4	232	234	235	245	255	258	239	233	117	107	77	66
5	228	233	234	244	256	258	236	225	117	111	77	62
6	230	233	235	243	251	258	234	222	107	107	75	66
7	233	233	236	242	253	260	233	222	103	102	75	72
8	233	231	236	246	252	257	225	222	99	100	77	75
9	231	232	239	243	252	258	226	215	91	99	83	77
10	230	231	238	246	253	256	226	321	93	95	87	78
11	231	233	241	245	253	251	227	219	99	93	82	83
12	232	233	239	248	255	246	229	211	110	90	83	78
13	230	232	239	246	256	250	252	211	108	90	83	82
14	230	232	239	247	254	243	251	208	164	86	84	87
15	229	231	239	245	254	240	238	204	129	89	79	88
16	229	232	241	245	253	238	237	208	133	86	80	88
17	226	233	242	247	255	234	239	219	131	86	80	90
18	227	236	244	247	256	236	234	204	133	80	75	89
19	225	236	243	251	258	237	330	201	135	72	79	86
20	224	236	245	247	261	244	248	194	127	71	79	85
21	225	236	245	245	258	238	240	191	125	67	78	84
22	225	236	243	249	255	248	239	177	124	69	70	84
23	226	234	245	249	259	239	241	159	117	75	70	84
24	226	234	246	253	259	239	238	166	124	80	72	86
25	226	236	248	250	261	241	238	156	127	85	72	87
26	224	235	248	248	260	243	242	150	128	88	75	85
27	224	234	249	250	260	247	230	142	126	91	73	85
28	225	237	246	250	260	261	229	146	126	91	71	83
29	226	233	245	253	---	252	234	143	120	92	67	83
30	227	231	245	259	---	248	237	130	115	91	65	82
31	234	---	243	254	---	245	---	128	---	86	66	---
TOTAL	7084	7006	7469	7678	7163	7698	7204	6128	3586	2817	2386	2390
MEAN	229	234	241	248	256	248	240	198	120	90.9	77.0	79.7
MAX	235	237	249	259	261	261	330	321	164	117	87	90
MIN	224	231	233	242	251	234	225	128	91	67	65	62
AC-FT	14050	13900	14810	15230	14210	15270	14290	12150	7110	5590	4730	4740

CAL YR 1988	TOTAL	101349	MEAN	277	MAX	371	MIN	209	AC-FT	201000
WTR YR 1989	TOTAL	68609	MEAN	188	MAX	330	MIN	62	AC-FT	136100

GUADALUPE RIVER BASIN

COMAL SPRINGS AT NEW BRAUNFELS, TX

LOCATION.--Lat 29°42'21", long 98°07'20", Comal County, Hydrologic Unit 12100202, on right bank 200 ft upstream from San Antonio Street viaduct in New Braunfels and 1.1 mi upstream from mouth.

DRAINAGE AREA.--Not applicable. Flow at station has been corrected to reflect only flow from Comal Springs.

PERIOD OF RECORD.--1882 to current year (1882 to November 1927, discharge measurements only).

GAGE.--Water-stage recorder. Concrete control since Oct. 1, 1955. Datum of gage is 582.80 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--The flow from Comal Springs emerges from the Edwards and associated limestones in the Balcones fault zone. Except during period of rainfall, flow of river is primarily from Comal Springs about 1.0 mi upstream. Flow to gaging station 08169000 Comal River at New Braunfels, Tex., has been corrected to reflect only that flow from Comal Springs.

AVERAGE DISCHARGE.--62 years (water years 1928-89), 285 ft^3/s, 206,626 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily spring discharge, 671 ft^3/s Nov. 25, 1985; no flow June 13 to Nov. 4, 1956.

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR JANUARY TO DECEMBER 1989
MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	247	251	257	244	235	127	117	82	67	81	123	160
2	248	254	258	246	231	115	115	87	62	81	125	163
3	246	256	258	242	235	116	106	83	66	77	132	164
4	245	255	258	239	233	117	107	77	66	76	133	167
5	244	256	258	236	225	117	111	77	62	80	134	173
6	243	251	258	234	222	107	107	75	66	81	137	171
7	242	253	260	233	222	103	102	75	72	88	136	169
8	246	252	257	225	222	99	100	77	75	97	135	169
9	243	252	258	226	215	91	99	83	77	100	134	170
10	246	253	256	226	226	93	95	87	78	101	135	172
11	245	253	251	227	219	99	93	82	83	100	134	171
12	248	255	246	229	211	110	90	83	78	99	134	166
13	246	256	250	230	211	108	90	83	82	99	136	173
14	247	254	243	230	208	123	86	84	87	100	140	171
15	245	254	240	238	204	129	89	79	88	101	142	172
16	245	253	238	237	208	134	86	80	88	100	143	171
17	247	255	234	239	211	131	86	80	90	98	144	171
18	247	256	236	234	204	133	80	75	89	100	145	172
19	246	258	237	234	201	135	72	79	86	102	146	171
20	247	261	242	238	194	127	71	79	85	102	150	170
21	245	258	238	240	191	125	67	78	84	103	149	169
22	249	255	242	239	177	124	69	70	84	103	153	166
23	249	259	239	241	159	117	75	70	84	98	155	166
24	250	259	239	238	166	124	80	72	86	98	158	160
25	250	261	241	238	156	127	85	72	87	101	161	156
26	246	260	243	242	150	128	88	75	85	101	160	157
27	246	260	247	230	142	126	91	73	85	103	161	157
28	246	260	246	229	146	126	91	71	83	105	158	158
29	250	---	252	234	143	120	92	67	83	112	158	159
30	259	---	248	237	130	115	91	65	82	117	161	160
31	254	---	245	---	128	---	86	66	---	120	---	165
TOTAL	7657	7160	7675	7055	6025	3546	2817	2386	2390	3024	4312	5159
MEAN	247	256	248	235	194	118	90.9	77.0	79.7	97.5	144	166
MAX	259	261	260	246	235	135	117	87	90	120	161	173
MIN	242	251	234	225	128	91	67	65	62	76	123	156
AC-FT	15190	14200	15220	13990	11950	7030	5590	4730	4740	6000	8550	10230

CAL YR 1989 TOTAL 59206 MEAN 162 MAX 261 MIN 62 AC-FT 117400

08170000 SAN MARCOS RIVER SPRINGFLOW AT SAN MARCOS, TX

LOCATION (REVISED).--Lat 29°50'35", long 97°58'55", Hays County, Hydrologic Unit 12100203, at ground-water well No. LR-67-09-110, 1250 ft southwest of the intersection of FM 2439 and McCarty Lane, and 3.7 mi south of San Marcos.

DRAINAGE AREA.--Normal flow of river comes from springs, drainage area of stream not applicable.

PERIOD OF RECORD.--May 1956 to current year. June 1915 to January 1916, March 1916 to September 1921, and May to September 1956, published as San Marcos River at San Marcos; records include some surface runoff. Periodic measurements of springflow were made at this location outside period of records since Nov. 14, 1894, and are published as miscellaneous measurements. October 1956 to September 1988, at site 0.7 mi downstream from bridge on Interstate Highway 35, and 2.1 mi upstream from Blanco River.

REVISED RECORDS.--WSP 1923: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 678.50 ft, which is mean land surface, above National Geodetic Vertical Datum of 1929. June 10, 1915, to Jan. 19, 1916, nonrecording gage at site 0.5 mi upstream from Interstate Highway 35, and Mar. 13, 1916, to Sept. 7, 1921, water-stage recorder about 0.7 mi downstream from Interstate Highway 35, datum relations unknown. May 1956 to September 1988, water-stage recorder, 0.7 mi downstream from Interstate Highway 35, and 2.1 mi upstream from Blanco River, datum 536.82 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records fair. Springflow is computed from a regression equation developed using water-level data from a water well LR-67-09-110, and measurements of springflow. Entire flow of river is from San Marcos Springs, located about 1.1 mi upstream from Interstate Highway 35, except during periods of local runoff. San Marcos Springs emerge from the Edwards and associated limestones in the Balcones Fault Zone. Several observation of water temperature were made during the year.

AVERAGE DISCHARGE.--33 years (water years 1957-89), 166 ft^3/s (120,300 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily spring discharge (estimated), 427 ft^3/s June 14, 1987; minimum daily, 46 ft^3/s Aug. 15, 16, 1956.

EXTREMES FOR CURRENT YEAR.--Maximum daily spring discharge, 121 ft^3/s Oct. 1-7; minimum daily spring, 83 ft^3/s Sept. 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	121	118	116	114	115	112	109	113	109	108	101	91
2	121	119	115	114	114	112	109	113	108	108	101	91
3	121	119	115	114	113	112	109	113	108	107	101	90
4	121	119	115	114	113	111	108	113	108	107	101	90
5	121	119	115	114	113	112	107	113	108	107	101	89
6	121	119	115	114	113	112	108	113	108	106	100	89
7	121	119	115	113	112	111	108	113	107	106	100	89
8	120	119	114	113	112	111	107	113	107	106	100	88
9	120	119	114	113	112	111	107	112	107	106	100	88
10	120	118	114	113	112	111	106	112	107	105	100	87
11	120	118	114	113	112	111	106	113	108	105	100	87
12	120	118	114	113	112	111	106	113	108	105	100	87
13	120	118	115	113	112	111	106	113	108	105	100	86
14	119	118	116	113	111	111	107	113	109	105	99	86
15	119	118	115	113	111	110	108	113	109	104	99	86
16	119	118	114	113	111	110	108	113	110	103	99	86
17	119	118	115	113	111	109	108	113	110	103	98	86
18	119	118	115	113	111	108	108	113	111	103	98	86
19	119	118	115	113	112	109	109	113	111	103	98	86
20	119	117	115	113	113	109	113	112	111	103	97	85
21	118	117	114	113	112	108	113	112	110	102	97	85
22	118	117	114	113	112	109	114	112	110	102	96	85
23	118	117	114	113	112	108	114	113	110	102	95	84
24	119	117	113	113	112	108	114	112	110	102	95	85
25	119	117	114	114	112	108	114	112	110	102	95	84
26	118	117	114	113	112	108	114	111	110	102	94	84
27	118	117	114	113	113	109	113	110	110	102	94	84
28	118	117	113	114	112	109	113	111	110	102	93	83
29	118	117	114	114	---	110	113	110	110	101	93	84
30	118	116	114	114	---	109	114	110	109	101	92	84
31	118	---	114	115	---	109	---	110	---	101	92	---
TOTAL	3700	3536	3548	3515	3142	3409	3293	3480	3271	3224	3029	2595
MEAN	119	118	114	113	112	110	110	112	109	104	97.7	86.5
MAX	121	119	116	115	115	112	114	113	111	108	101	91
MIN	118	116	113	113	111	108	106	110	107	101	92	83
AC-FT	7340	7010	7040	6970	6230	6760	6530	6900	6490	6390	6010	5150

CAL YR 1988	TOTAL	51439	MEAN	141	MAX	190	MIN	113	AC-FT	102000
WTR YR 1989	TOTAL	39742	MEAN	109	MAX	121	MIN	83	AC-FT	78830

GUADALUPE RIVER BASIN

08171000 BLANCO RIVER AT WIMBERLEY, TX

LOCATION.--Lat 29°59'39", long 98°05'19", Hays County, Hydrologic Unit 12100203, on left bank at downstream side of highway, near left end of bridge on Ranch Road 12, 0.3 mi southeast of Wimberley, 2,200 ft downstream from Cypress Creek, and at mile 29.0.

DRAINAGE AREA.--355 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1924 to September 1926, June 1928 to current year.

REVISED RECORDS.--WSP 1562: 1929, 1930-31(M), 1935-36(M), 1938(M), 1941-42(M), 1947(M), 1949(M). WSP 2123: Drainage area.

GAGE.--Water-stage recorder and crest-stage gages. Datum of gage is 797.23 ft above National Geodetic Vertical Datum of 1929. Aug. 6, 1924, to Sept. 30, 1926, nonrecording gage at site 1,030 ft upstream at datum 5.00 ft higher. Recording gage from June 6, 1928, to June 12, 1975, at site 1,000 ft upstream at datum 5.00 ft higher.

REMARKS.--No estimated daily discharges. Records good. There are many small diversions above station. Satellite telemeter at station.

AVERAGE DISCHARGE.--63 years (water years 1925-26, 1929-89), 127 ft³/s (4.86 in/yr), 92,010 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 113,000 ft³/s May 28, 1929 (gage height, 33.3 ft, from floodmark), present site and datum, from rating curve extended above 30,000 ft³/s on basis of slope-area measurements of 95,000 and 113,000 ft³/s; minimum, 0.6 ft³/s Aug. 16, 1956.
Maximum stage since at least 1869, that of May 28, 1929.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in July 1869 reached a stage of 25 ft, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,800 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
May 15	0630	3,510	8.02	May 17	1530	*8,480	*11.15
May 15	0900	2,340	7.02				

Minimum daily discharge, 15 ft³/s Sept. 24, 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	34	28	23	22	56	42	44	37	62	57	29	19
2	32	26	23	22	52	44	43	37	60	56	32	19
3	33	27	24	22	44	41	41	36	58	56	30	19
4	33	28	24	22	41	40	40	36	56	55	28	19
5	33	28	23	22	40	37	37	50	56	51	27	19
6	34	26	23	22	38	36	36	41	53	46	27	20
7	35	27	23	23	36	36	36	37	55	46	27	19
8	32	27	24	22	36	36	35	35	54	45	30	18
9	31	27	25	21	35	35	32	33	53	45	28	17
10	30	27	24	21	34	35	31	34	52	44	27	16
11	29	26	25	22	33	37	31	34	56	43	27	17
12	29	27	23	24	35	36	31	35	46	41	25	17
13	29	26	23	23	35	36	32	33	43	39	25	17
14	28	26	23	23	35	34	36	33	521	37	25	18
15	28	26	23	22	36	33	37	768	293	36	25	17
16	28	25	23	22	35	33	41	203	144	36	25	17
17	28	24	22	21	37	33	40	2190	98	36	25	17
18	28	25	23	22	36	32	38	743	82	36	23	17
19	28	26	24	27	36	30	75	272	72	35	23	21
20	27	25	25	25	39	35	49	182	67	33	23	18
21	27	25	23	21	41	29	47	166	66	34	22	17
22	27	25	23	21	39	28	44	138	67	35	22	16
23	28	25	23	21	40	29	42	116	65	34	21	16
24	30	26	23	23	41	30	40	103	63	38	21	15
25	28	26	23	32	39	29	39	93	64	38	23	15
26	28	26	23	48	40	30	36	86	65	32	22	16
27	28	24	23	34	41	31	35	79	66	31	21	17
28	28	23	23	35	41	50	35	74	65	32	21	17
29	27	23	21	66	---	43	34	71	61	32	20	17
30	28	23	22	74	---	44	35	68	60	29	20	17
31	31	---	22	59	---	47	---	65	---	29	19	---
TOTAL	919	773	719	884	1091	1111	1172	5928	2623	1237	763	524
MEAN	29.6	25.8	23.2	28.5	39.0	35.8	39.1	191	87.4	39.9	24.6	17.5
MAX	35	28	25	74	56	50	75	2190	521	57	32	21
MIN	27	23	21	21	33	28	31	33	43	29	19	15
AC-FT	1820	1530	1430	1750	2160	2200	2320	11760	5200	2450	1510	1040
CFSM	.08	.07	.07	.08	.11	.10	.11	.54	.25	.11	.07	.05
IN.	.10	.08	.08	.09	.11	.12	.12	.62	.27	.13	.08	.05

CAL YR 1988	TOTAL	22257	MEAN	60.8	MAX	1600	MIN	21	AC-FT	44150	CFSM	.17	IN.	2.33
WTR YR 1989	TOTAL	17744	MEAN	48.6	MAX	2190	MIN	15	AC-FT	35200	CFSM	.14	IN.	1.86

08171000 BLANCO RIVER AT WIMBERLEY, TX--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical analyses: April 1962 to December 1973. Chemical, biochemical, and pesticide analyses: January 1974 to September 1979, February 1988 to current year. Sediment analyses: November 1965 to April 1966.

PERIOD OF DAILY RECORD.--
WATER TEMPERATURES: December 1976 to September 1978.

INSTRUMENTATION.--From December 1976 to September 1978 water temperature was recorded continuously at this station.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURES: Maximum daily, 36.0°C July 16, 1978, minimum daily, 2.5°C Jan. 20, 1978.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)
OCT 19...	1350	26	442	7.70	25.5	<1	1.3	8.9	111	0.3	K16
MAR 01...	1330	42	460	7.70	13.0	3	0.30	10.3	100	--	K19
JUN 08...	1550	62	423	7.80	30.5	10	1.7	8.1	112	0.5	21

DATE	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CACO3)	HARD-NESS NONCARB WH WAT TOT FLD MG/L AS CACO3	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
OCT 19...	K15	220	43	58	19	8.6	0.3	1.8	180	32	12
MAR 01...	22	240	43	66	19	8.9	0.3	1.8	200	45	13
JUN 08...	K11	210	32	58	16	7.3	0.2	1.6	179	25	11

DATE	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L)	RESIDUE VOLA-TILE, SUS-PENDED (MG/L)	NITRO-GEN, NITRATE TOTAL (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)
OCT 19...	0.20	8.8	248	3	<1	--	<0.010	0.200	0.020	--	<0.20
MAR 01...	0.20	6.5	280	3	3	--	<0.010	0.300	0.040	0.26	0.30
JUN 08...	0.20	9.0	235	5	<1	0.190	0.010	0.200	0.030	0.97	1.0

DATE	PHOS-PHORUS TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)
OCT 19...	0.020	1.3	<1	31	<1	<1	1	4	<5	1	<0.1
MAR 01...	<0.010	1.0	<1	32	<1	<1	1	7	<5	1	<0.1
JUN 08...	<0.010	1.5	<1	29	2	1	1	12	<1	2	<0.1

DATE	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)
OCT 19...	<1	<1.0	8	--	--	--	--	--	--	--	--
MAR 01...	<1	<1.0	6	--	--	--	--	--	--	--	--
JUN 08...	<1	<1.0	4	<0.1	<0.10	<0.010	<0.1	<0.010	<0.010	<0.010	<0.01

DATE	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METH-OXY-CHLOR, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)
OCT 19...	--	--	--	--	--	--	--	--	--	--
MAR 01...	--	--	--	--	--	--	--	--	--	--
JUN 08...	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01

08171000 BLANCO RIVER AT WIMBERLEY, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	METHYL TRI-THION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	SILVEX, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)
OCT 19...	--	--	--	--	--	--	--	--	--	--
MAR 01...	--	--	--	--	--	--	--	--	--	--
JUN 08...	<0.01	<0.01	<0.01	<0.1	<0.01	<1	<0.01	<0.01	<0.01	<0.01

GUADALUPE RIVER BASIN

08171300 BLANCO RIVER NEAR KYLE, TX

LOCATION.--Lat 29°58'45", long 97°54'35", Hays County, Hydrologic Unit 12100203, on left bank 800 ft downstream from Tarbutton Ranch House (Hatchett Ranch), 2.2 mi southwest of Kyle, 4.2 mi downstream from Halifax Creek, and 6.3 mi upstream from bridge on U.S. Highway 81.

DRAINAGE AREA.--412 mi².

PERIOD OF RECORD.--May 1956 to current year.

REVISED RECORDS.--WSP 1923: 1957-58, 1960(M). WSP 2123: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 620.12 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers).

REMARKS.--No estimated daily discharges. Records good. Small diversions above station for irrigation. Most of the low flow of the Blanco River enters the Edwards and associated limestones in the Balcones Fault Zone which crosses the basin upstream from this station and below the station at Wimberley. Several observations of water temperature were made during the year. Recording rain gage at this station.

AVERAGE DISCHARGE.--33 years, 152 ft³/s (5.01 in/yr), 110,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 98,000 ft³/s May 2, 1958 (gage height, 36.3 ft, from floodmark), from rating curve extended above 37,000 ft³/s on basis of slope-area measurement of 139,000 ft³/s and slope-conveyance study; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1882, about 40 ft in May 1929, from information by local residents (discharge, 139,000 ft³/s). Flood of Sept. 11, 1952, reached a stage of 38.0 ft (discharge, 115,000 ft³/s).

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
May 17	1830	*6,590	*14.66	No other peak greater than base discharge.			

Minimum daily discharge, no flow Aug. 24 to Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	9.5	6.3	9.3	35	15	26	19	59	43	2.8	.00
2	12	6.9	6.6	9.0	32	20	24	21	57	39	8.2	.00
3	8.4	5.7	6.8	8.5	29	19	22	19	53	35	5.9	.00
4	8.8	5.5	7.0	8.0	21	17	20	20	51	34	3.6	.00
5	9.1	5.8	7.8	7.7	21	16	17	41	51	31	2.2	.00
6	8.8	5.4	7.6	7.0	22	15	14	41	47	29	1.8	.00
7	9.3	5.2	7.7	6.5	20	15	14	24	45	26	1.6	.00
8	8.9	5.5	9.1	6.0	19	15	14	21	46	24	1.9	.00
9	8.1	5.7	12	5.8	17	15	13	18	42	22	2.7	.00
10	7.1	5.8	13	6.0	16	15	12	37	40	20	2.2	.00
11	6.3	4.9	13	6.3	16	14	13	30	47	19	1.5	.00
12	5.7	4.9	12	7.2	18	15	13	25	39	17	1.3	.00
13	5.5	4.9	11	9.5	18	14	15	24	34	16	1.1	.00
14	5.5	5.2	10	11	17	14	19	20	307	14	.79	.00
15	5.6	5.5	10	9.1	16	13	19	768	351	13	.74	.00
16	5.5	6.3	9.3	7.8	15	12	18	244	139	12	.85	.00
17	5.4	5.6	9.3	7.2	15	12	19	1530	94	10	1.0	.00
18	5.3	5.5	8.9	7.3	17	12	18	1150	74	9.0	1.5	.00
19	5.0	6.3	9.0	8.4	16	11	73	300	65	7.5	1.1	.00
20	4.9	7.0	10	14	16	16	56	184	57	6.7	.38	.00
21	5.0	6.6	10	11	16	18	35	167	54	6.2	.19	.00
22	4.8	6.2	11	7.7	16	13	30	139	53	6.6	.08	.00
23	5.0	6.1	9.7	6.6	15	12	26	117	52	7.5	.02	.00
24	4.8	6.6	9.6	7.2	16	12	24	102	53	8.5	.00	.00
25	5.0	7.4	8.6	10	16	13	23	93	57	20	.00	.00
26	5.4	8.6	8.0	19	16	13	22	85	52	12	.00	.00
27	5.2	7.4	8.8	31	16	13	20	79	52	7.2	.00	.00
28	5.2	6.2	8.3	18	15	27	20	74	49	6.5	.00	.00
29	5.0	5.9	8.2	24	---	38	21	70	47	4.7	.00	.00
30	5.2	6.3	9.0	58	---	25	25	66	46	3.7	.00	.00
31	8.8	---	9.3	45	---	26	---	63	---	3.1	.00	---
TOTAL	215.6	184.4	286.9	399.1	522	505	685	5591	2213	513.2	43.45	0.00
MEAN	6.95	6.15	9.25	12.9	18.6	16.3	22.8	180	73.8	16.6	1.40	.00
MAX	21	9.5	13	58	35	38	73	1530	351	43	8.2	.00
MIN	4.8	4.9	6.3	5.8	15	11	12	18	34	3.1	.00	.00
AC-FT	428	366	569	792	1040	1000	1360	11090	4390	1020	86	.0
CFSM	.02	.01	.02	.03	.05	.04	.06	.44	.18	.04	.00	.00
IN.	.02	.02	.03	.04	.05	.05	.06	.50	.20	.05	.00	.00

CAL YR 1988 TOTAL 15689.9 MEAN 42.9 MAX 1540 MIN 4.8 AC-FT 31120 CFSM .10 IN. 1.42
WTR YR 1989 TOTAL 11158.65 MEAN 30.6 MAX 1530 MIN .00 AC-FT 22130 CFSM .07 IN. 1.01

08172400 PLUM CREEK AT LOCKHART, TX

LOCATION.--Lat 29°55'22", long 97°40'44", Caldwell County, Hydrologic Unit 12100203, on right bank 548 ft upstream from bridge on U.S. Highway 183, 2.7 mi north of Lockhart, 3.7 mi upstream from Town Creek, 5.0 mi downstream from Brushy Creek, and 30.4 mi upstream from mouth.

DRAINAGE AREA.--112 mi².

PERIOD OF RECORD.--April 1959 to current year.

REVISED RECORDS.--WSP 2123: Drainage area.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 431.19 ft above National Geodetic Vertical Datum of 1929. Apr. 30, 1959, to July 25, 1968, at site 548 ft downstream at present datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair. No known diversion above station. Flow is affected at times by discharge from the flood-detention pools of 17 floodwater-retarding structures with a combined capacity of 24,850 acre-ft. These structures control runoff from 67.8 mi² above this station. One observation of water temperature was made during the year.

AVERAGE DISCHARGE.--30 years, 46.9 ft³/s (33,980 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 27,700 ft³/s Nov. 24, 1985 (gage height, 20.89 ft); no flow at times each year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1905, 22 ft in June 1936 at present site; flood in 1951 reached a stage of 20 ft at present site, from information by local resident.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
May 15	1600	*696	*11.33				

Minimum daily discharge, no flow for many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e.00	.00	.00	.00	.00	.00	.09	.74	.00	.00	.00	.00
2	e.00	.00	.00	.00	.00	.00	.02	.24	.00	.00	.00	.00
3	e.00	.00	.00	.00	.00	.00	.00	.06	.00	.00	.00	.00
4	e.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00
5	e.00	.00	.00	.00	.00	.00	.00	5.1	.00	.00	.00	.00
6	e.00	.00	.00	.00	.00	.00	.00	16	.00	.00	.00	.00
7	e.00	.00	.00	.00	.00	.00	.00	6.3	.00	.00	.00	.00
8	e.00	.00	.00	.00	.00	.00	.00	4.2	.00	.00	.00	.00
9	e.00	.00	.00	.00	.00	.00	.00	2.8	.00	.00	.00	.00
10	e.00	.00	.00	.00	.00	.00	.00	206	.00	.00	.00	.00
11	e.00	.00	.00	.00	.00	.00	.00	131	.00	.00	.00	.00
12	e.00	.00	.00	.00	.00	.00	.00	71	.00	.00	.00	.00
13	e.00	.00	.00	.00	.00	.00	.00	40	.00	.00	.00	.00
14	e.00	.00	.00	.00	.00	.00	.00	115	.05	.00	.00	.00
15	e.00	.00	.00	.00	.00	.00	.00	364	.00	.00	.00	.00
16	e.00	.00	.00	.00	.00	.00	.00	307	.00	.00	.00	.00
17	e.00	.00	.00	.00	.00	.00	.00	301	.00	.00	.00	.00
18	e.00	.00	.00	.00	.00	.00	.00	213	.00	.00	.00	.00
19	e.00	.00	.00	.00	.00	.00	.00	120	.00	.00	.00	.00
20	e.00	.00	.00	.00	.00	.00	.96	67	.00	.00	.00	.00
21	e.00	.00	.00	.00	.00	.00	1.2	41	.00	.00	.00	.00
22	e.00	.00	.00	.00	.00	.00	.27	27	.00	.00	.00	.00
23	e.00	.00	.00	.00	.00	.00	.08	18	.00	.00	.00	.00
24	e.00	.00	.00	.00	.00	.00	.02	14	.00	.00	.00	.00
25	e.00	.00	.00	.00	.00	.00	.00	10	.00	.00	.00	.00
26	e.00	.00	.00	.00	.00	.00	.00	7.7	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	4.2	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	3.9	.00	1.2	.00	.00	.00	.00
29	.00	.00	.00	.00	---	5.3	.00	.57	.00	.00	.00	.00
30	.00	.00	.00	.00	---	3.9	.00	.17	.00	.00	.00	.00
31	.00	---	.00	.00	---	.98	---	.01	---	.00	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	14.08	2.64	2094.30	0.05	0.00	0.00	0.00
MEAN	.00	.00	.00	.00	.00	.45	.088	67.6	.002	.00	.00	.00
MAX	.00	.00	.00	.00	.00	5.3	1.2	364	.05	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00
AC-FT	.0	.0	.0	.0	.0	28	5.2	4150	.1	.0	.0	.0

CAL YR 1988 TOTAL 367.79 MEAN 1.00 MAX 57 MIN .00 AC-FT 730
WTR YR 1989 TOTAL 2111.07 MEAN 5.78 MAX 364 MIN .00 AC-FT 4190

e Estimated.

08178700 SALADO CREEK (UPPER STATION) AT SAN ANTONIO, TX

LOCATION.--Lat 29°30'57", long 98°25'51", Bexar County, Hydrologic Unit 12100301, on right bank at downstream side of eastbound bridge on Interstate Highway 410 in San Antonio, 1.0 mi west of Northeast School, 1.1 mi upstream from Perrin-Beitel Creek, and 2.7 mi east of San Antonio International Airport.

DRAINAGE AREA.--137 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1960 to current year.

GAGE.--Water-stage recorder with concrete control. Datum of gage is 684.60 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records poor to Mar. 2 and fair thereafter. Some diversions upstream from gage for irrigation. Flow is affected at times by discharge from the flood-detention pools of eleven floodwater-retarding structures with a combined detention capacity of 26,770 acre-ft. These structures control runoff from 74.6 mi² above this station. Recording rain gage at station with three additional recording rain gages in the watershed.

AVERAGE DISCHARGE.--29 years, 9.49 ft³/s (6,880 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 24,900 ft³/s May 12, 1972 (gage height, 15.22 ft), from rating curve extended above 8,000 ft³/s on basis of slope-area measurement of peak flow; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1853, 23 to 24 ft in October 1913. Flood in September 1921 reached a stage of 18 ft, and flood of Sept. 27, 1946, reached a stage of 18.2 ft, and are the second and third highest since 1899.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 250 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
June 14	0630	*433	*4.64	No other peak greater than base discharge.			

Minimum daily discharge, no flow for many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e.13	e.50	.00	.00	e.20	.00	.04	.29	.00	.00	.00	.00
2	e.13	e.30	.00	.00	e.10	.00	.01	.12	.00	.00	.00	.00
3	e.13	e.10	.00	.00	e.06	1.7	.00	.07	.00	.00	.00	.00
4	e.13	e.03	.00	.00	e.05	.86	.00	.02	.00	1.9	.00	.00
5	e.13	.00	.00	.00	e.03	.15	.00	.00	.00	2.0	.00	.00
6	e.13	.00	.00	.00	e.02	.15	.00	.00	.00	.20	.02	4.0
7	e.13	.00	.00	.00	.00	3.1	.00	.00	.00	.08	.00	.50
8	e.13	.00	e.20	.00	.00	3.5	.00	.00	.00	.03	.06	.01
9	e.35	.00	e.10	.00	.00	2.7	.00	.00	.00	.00	.06	.07
10	2.1	.00	e.20	.00	.00	.22	.00	.00	.00	.00	.00	.07
11	e.75	.00	e.10	.00	.00	.09	.00	.00	17	.00	.00	.06
12	.30	.00	.00	e.30	.00	.02	.08	.00	3.4	.00	.00	.00
13	e.10	.00	.00	e.20	.00	.00	11	.00	.38	.00	.00	4.3
14	e.03	.00	.00	e.10	.00	.02	11	.00	123	.00	.00	1.6
15	.00	.00	.00	.00	.00	.00	1.5	.00	10	.00	.00	.06
16	.00	.00	.00	.00	e.10	.00	.16	.00	.84	.00	.00	.0
17	.00	.00	.00	.00	e.20	.00	.12	.49	.29	.00	.00	.00
18	.00	.00	.00	.00	e.10	.00	.07	.38	.16	.00	.00	.00
19	.00	.00	.00	e.50	.00	.02	12	.04	.11	.00	.00	.00
20	.00	.00	.00	e.10	.00	.19	6.4	.00	.05	.00	.00	.00
21	.00	.00	.00	.00	.00	.08	.42	.00	.01	.00	.00	.00
22	.00	.00	.00	.00	.00	.28	.13	.00	.00	.43	.00	.00
23	.00	.00	.00	.00	.00	.23	.09	.00	.00	.05	.00	.00
24	.00	.00	.00	e.20	.00	.09	.06	.00	.00	6.4	.00	.00
25	.00	.00	.00	e8.0	.00	.03	.01	.00	.05	5.8	.00	.00
26	.00	.00	.00	e2.0	.00	.00	.00	.00	.08	.19	.00	.00
27	.00	.00	.00	e1.0	.00	.04	.03	.00	.02	.00	.00	.00
28	.00	.00	.00	e.60	.00	7.4	.04	.00	.00	.00	.00	.00
29	e.10	.00	.00	e15	---	.29	.25	.00	.00	.00	.00	.00
30	e.10	.00	.00	e2.0	---	.09	9.3	.00	.00	.00	.00	.00
31	.97	---	.00	e.50	---	.05	---	.00	---	.00	.00	---
TOTAL	5.84	0.93	0.60	30.50	0.86	21.30	52.71	1.41	155.39	17.08	0.14	10.67
MEAN	.19	.031	.019	.98	.031	.69	1.76	.045	5.18	.55	.005	.36
MAX	2.1	.50	.20	15	.20	7.4	12	.49	123	6.4	.06	4.3
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	12	1.8	1.2	60	1.7	42	105	2.8	308	34	.3	21

CAL YR 1988 TOTAL 1360.34 MEAN 3.72 MAX 69 MIN .00 AC-FT 2700
WTR YR 1989 TOTAL 297.43 MEAN .81 MAX 123 MIN .00 AC-FT 590

e Estimated.

08178700 SALADO CREEK (UPPER STATION) AT SAN ANTONIO, TX--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, and pesticide analyses: November 1968 to current year. Sediment analyses: November 1971 to September 1973. Water temperatures: November 1968 to current year. Bacteria analyses: May 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)
MAR											
28...	0850	31	626	7.80	19.5	17	15	7.8	88	3.4	980
MAY											
18...	0855	0.18	445	7.80	25.0	35	4.1	5.7	71	3.7	1100
JUL											
26...	1020	0.07	322	7.80	24.5	55	19	4.6	56	2.8	500

DATE	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CACO3)	HARD-NESS NONCARB WH WAT TOT FLD MG/L AS CACO3	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
MAR											
28...	1100	220	54	73	10	29	0.9	17	170	91	27
MAY											
18...	1100	180	41	60	6.5	17	0.6	6.3	136	49	17
JUL											
26...	620	130	27	45	4.4	11	0.4	5.5	104	34	11

DATE	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L)	RESIDUE VOLA-TILE, SUS-PENDED (MG/L)	NITRO-GEN, NITRATE TOTAL (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N)
MAR											
28...	0.60	7.6	357	44	39	--	0.010	<0.100	0.020	0.68	0.70
MAY											
18...	0.40	8.2	246	<1	<1	--	<0.010	<0.100	0.060	0.64	0.70
JUL											
26...	0.40	8.1	182	17	<1	0.160	0.040	0.200	0.050	0.65	0.70

DATE	PHOS-PHORUS TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)
MAR											
28...	0.100	6.3	1	68	<1	<1	1	8	<5	4	<0.1
MAY											
18...	0.040	6.9	1	64	<1	<1	1	6	<1	4	<0.1
JUL											
26...	0.100	11	--	--	--	--	--	--	--	--	--

DATE	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)
MAR											
28...	<1	2.0	10	<0.1	<0.10	<0.010	<0.1	<0.010	<0.010	<0.010	0.03
MAY											
18...	<1	<1.0	6	<0.1	<0.10	<0.010	<0.1	<0.010	<0.010	<0.010	0.15
JUL											
26...	--	--	--	--	--	--	--	--	--	--	--

DATE	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METH-OXY-CHLOR, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)
MAR										
28...	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
MAY										
18...	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
JUL										
26...	--	--	--	--	--	--	--	--	--	--

08178700 SALADO CREEK (UPPER STATION) AT SAN ANTONIO, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	METHYL TRI-THION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	SILVEX, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)
MAR 28...	<0.01	<0.01	<0.01	<0.1	<0.01	<1	<0.01	<0.01	<0.01	<0.01
MAY 18...	<0.01	<0.01	<0.01	<0.1	<0.01	<1	<0.01	<0.01	0.11	<0.01
JUL 26...	--	--	--	--	--	--	--	--	--	--

08178880 MEDINA RIVER AT BANDERA, TX

LOCATION.--Lat 29°43'25", long 99°04'11", Bandera County, Hydrologic Unit 12100302, on left bank, 40 ft downstream from centerline of State Highway 173 at Bandera, 1.9 mi upstream from Bandera Creek, and 5.6 mi downstream from Indian Creek.

DRAINAGE AREA.--427 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1982 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,189.46 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records good except those below 10 ft³/s, which are poor. Several small diversions upstream from station.

AVERAGE DISCHARGE.--7 years, 151 ft³/s (109,400 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 55,800 ft³/s June 3, 1987 (gage height, 24.90 ft), from rating curve extended above 27,000 ft³/s; minimum daily, 2.2 ft³/s Aug. 7, 11, 13, 14, 1984.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since 1880, 46.62 ft Aug. 2, 1978.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 785 ft³/s June 14 at 0300 hours (gage height, 7.34 ft); minimum daily, 3.5 ft³/s Sept. 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	58	47	36	35	106	72	67	58	23	16	6.9	5.4
2	59	45	35	37	96	71	66	62	22	17	7.7	5.4
3	53	44	35	38	90	71	65	56	21	14	7.7	4.0
4	50	43	35	37	81	69	63	52	20	15	8.1	4.3
5	48	41	35	38	77	66	60	50	21	15	8.4	4.6
6	46	40	36	38	73	65	59	48	20	13	6.7	5.7
7	45	40	37	39	71	64	58	46	19	11	5.5	5.8
8	44	40	36	38	68	63	58	44	20	13	8.5	7.0
9	43	40	37	37	66	63	55	43	19	16	14	8.4
10	43	39	37	38	64	62	54	41	19	14	12	7.4
11	41	39	39	38	63	61	53	39	19	11	10	14
12	40	39	39	38	64	61	53	40	20	11	9.7	38
13	40	38	39	40	64	61	58	40	19	11	9.3	18
14	39	39	39	40	63	61	64	41	124	11	8.6	12
15	39	39	39	40	63	60	63	40	22	11	8.3	9.4
16	39	37	38	40	68	60	62	40	23	11	7.5	8.5
17	39	36	38	40	73	58	60	104	24	9.8	6.6	8.1
18	39	37	38	40	89	57	58	45	24	8.3	6.4	8.4
19	39	37	38	43	100	58	57	40	22	9.7	6.6	8.0
20	38	34	39	45	99	62	55	38	20	9.1	6.0	8.0
21	38	33	38	48	93	61	55	36	18	8.2	7.8	7.7
22	39	34	39	53	87	60	53	35	17	7.7	6.6	6.9
23	38	34	38	52	81	59	52	34	16	9.4	6.5	5.0
24	38	34	38	51	78	60	50	33	17	8.5	7.7	3.6
25	37	36	37	50	77	60	50	32	17	9.4	8.8	3.7
26	37	38	38	52	77	61	50	31	17	10	8.3	3.5
27	38	36	37	69	74	59	49	30	17	11	8.3	4.3
28	37	35	35	216	71	79	48	28	17	11	7.7	4.6
29	40	36	35	225	---	81	47	25	16	9.7	7.9	5.1
30	41	37	36	160	---	79	48	24	16	9.1	7.3	5.7
31	48	---	37	126	---	72	---	24	---	7.2	6.4	---
TOTAL	1313	1147	1153	1881	2176	1996	1690	1299	689	348.1	247.8	240.5
MEAN	42.4	38.2	37.2	60.7	77.7	64.4	56.3	41.9	23.0	11.2	7.99	8.02
MAX	59	47	39	225	106	81	67	104	124	17	14	38
MIN	37	33	35	35	63	57	47	24	16	7.2	5.5	3.5
AC-FT	2600	2280	2290	3730	4320	3960	3350	2580	1370	690	492	477

CAL YR 1988 TOTAL 30251 MEAN 82.7 MAX 6770 MIN 20 AC-FT 60000
WTR YR 1989 TOTAL 14180.4 MEAN 38.9 MAX 225 MIN 3.5 AC-FT 28130

08178880 MEDINA RIVER AT BANDERA, TX--Continued

LOCATION.--Lat 29°43'25", long 99°04'11", Bandera County, Hydrologic Unit 12100302, on left bank 40 ft downstream from centerline of State Highway 173, 1.9 mi upstream from Bandera Creek, and 5.6 mi downstream from Indian Creek.

PERIOD OF RECORD.--Chemical, biochemical, and pesticide analyses: January 1983 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND	SPECIFIC CONDUCTANCE (US/CM)	PH (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (NTU)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)	OXYGEN DEMAND, BIOCHEMICAL, 5 DAY (MG/L)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)
JAN 09...	1651	37	537	8.00	13.0	1	0.60	9.6	94	0.6	20
MAY 12...	1003	40	535	8.00	22.5	5	0.50	7.5	91	0.9	47
AUG 31...	1227	6.4	554	8.10	29.0	7	1.0	7.2	98	1.5	21

DATE	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS TOTAL (MG/L AS CACO3)	HARDNESS NONCARB WH WAT TOT FLD MG/L AS CACO3	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)	ALKALINITY WAT WH TOT FET FIELD MG/L AS CACO3	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)
JAN 09...	24	290	110	85	20	7.4	0.2	1.4	187	96	11
MAY 12...	84	270	97	76	19	7.0	0.2	1.6	171	97	12
AUG 31...	41	290	130	79	22	9.0	0.2	1.6	157	130	13

DATE	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	RESIDUE TOTAL AT 105 DEG. C, SUSPENDED (MG/L)	RESIDUE VOLATILE, SUSPENDED (MG/L)	NITROGEN, NITRITE TOTAL (MG/L AS N)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, ORGANIC TOTAL (MG/L AS N)	NITROGEN,AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS TOTAL (MG/L AS P)
JAN 09...	0.20	9.7	343	8	<1	<0.010	0.200	0.030	0.17	0.20	<0.010
MAY 12...	0.20	12	327	<1	<1	<0.010	0.200	0.030	--	<0.20	0.020
AUG 31...	0.30	14	363	9	<1	<0.010	<0.100	0.030	0.27	0.30	<0.010

DATE	CARBON, ORGANIC TOTAL (MG/L AS C)	ARSENIC DISSOLVED (UG/L AS AS)	BARIUM, DISSOLVED (UG/L AS BA)	CADMIUM DISSOLVED (UG/L AS CD)	CHROMIUM, DISSOLVED (UG/L AS CR)	COPPER, DISSOLVED (UG/L AS CU)	IRON, DISSOLVED (UG/L AS FE)	LEAD, DISSOLVED (UG/L AS PB)	MANGANESE, DISSOLVED (UG/L AS MN)	MERCURY DISSOLVED (UG/L AS HG)	SELENIUM, DISSOLVED (UG/L AS SE)
JAN 09...	1.3	<1	40	<1	2	<1	4	<5	4	<0.1	<1
MAY 12...	1.3	--	--	--	--	--	--	--	--	--	--
AUG 31...	1.8	<1	36	<1	<1	<1	<3	<1	2	<0.1	<1

DATE	SILVER, DISSOLVED (UG/L AS AG)	ZINC, DISSOLVED (UG/L AS ZN)	PCB, TOTAL (UG/L)	NAPHTHALENES, POLYCHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLORDANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DIAZINON, TOTAL (UG/L)	DIELDRIN TOTAL (UG/L)
JAN 09...	<1.0	5	--	--	--	--	--	--	--	--	--
MAY 12...	--	--	--	--	--	--	--	--	--	--	--
AUG 31...	<1.0	<3	<0.1	<0.10	<0.010	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010

DATE	DISYSTON TOTAL (UG/L)	ENDOSULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTACHLOR, TOTAL (UG/L)	HEPTACHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALATHION, TOTAL (UG/L)	METHOXYCHLOR, TOTAL (UG/L)	METHYL PARATHION, TOTAL (UG/L)	METHYL TRITHION, TOTAL (UG/L)
JAN 09...	--	--	--	--	--	--	--	--	--	--	--
MAY 12...	--	--	--	--	--	--	--	--	--	--	--
AUG 31...	<0.01	<0.010	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01

08178880 MEDINA RIVER AT BANDERA, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	PHORATE OTAL (UG/L)	SILVEX, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)
JAN										
09...	--	--	--	--	--	--	--	--	--	--
MAY										
12...	--	--	--	--	--	--	--	--	--	--
AUG										
31...	<0.01	<0.01	<0.1	<0.01	<0.01	<1	<0.01	<0.01	<0.01	<0.01

08179500 MEDINA LAKE NEAR SAN ANTONIO, TX

LOCATION.--Lat 29°32'24", long 98°56'01", Medina County, Hydrologic Unit 12100302, at gate-operating platform, 576 ft from left end of Medina Dam on Medina River, 4.2 mi upstream from Medina diversion dam, 13 mi north of Castroville, 28 mi west of San Antonio, and 70.4 mi upstream from mouth.

DRAINAGE AREA.--634 mi².

PERIOD OF RECORD.--May 1913 to current year. Prior to October 1965, monthend contents only.
Water-quality records.--Chemical analyses: October 1969 to September 1984.

REVISED RECORDS.--WSP 1923: Drainage area.

GAGE.--Nonrecording gage read once daily if stage changing materially, otherwise intermittently. Datum of gage is 7.80 ft below National Geodetic Vertical Datum of 1929.

REMARKS.--The lake is formed by a gravity-type concrete dam, 1,580 ft long. The dam was completed and storage began May 7, 1913. The uncontrolled spillway is a cut through natural rock 880 ft long, with a 3-foot-wide cutoff wall, located near right end of dam. The dam and lake are owned and operated by Bexar-Medina-Atascosa Counties Water Improvement District No. 1, which has a permit (from the Texas Department of Water Resources) to irrigate 150,000 acres annually. An undetermined amount of water from the lake enters the Edwards and associated limestones in the Balcones Fault Zone, part of which is above and part below the dam. Water is released downstream to Medina Diversion Reservoir where it is diverted into Medina Canal by the Water District. Figures given herein represent total contents. Data regarding the dam and lake are given in the following table:

	Gage height (feet)	Capacity (acre-feet)
Top of dam	1,084.0	-
Crest of spillway	1,072.0	254,000
Water-supply outlet pipes (invert)	966.5	4,780
Lowest gated outlet (invert)	920.0	0

COOPERATION.--Capacity table, based on survey made prior to June 1912, and gage-height record were provided by the Bexar-Medina-Atascosa Counties Water Improvement District No. 1.

EXTREMES (at 0800) FOR PERIOD OF RECORD.--Maximum contents observed, 289,900 acre-ft May 29, 1987 (gage height, 1,078.2 ft); minimum observed since lake first filled, 780 acre-ft about Apr. 11, 1948 (gage height, 944.0 ft).

EXTREMES (at 0800) FOR CURRENT YEAR.--Maximum contents, 202,100 acre-ft Oct. 1-3 (gage height, 1,062.0 ft); minimum, 98,180 acre-ft Sept. 30 (gage height, 1,034.3 ft).

Capacity table (gage height, in feet, and contents, in acre-feet)

1,034.0	97,320	1,042.0	121,600	1,054.0	166,800
1,036.0	103,100	1,046.0	135,800	1,058.0	183,600
1,039.0	111,700	1,050.0	150,000	1,062.0	202,100

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
OBSERVATION AT 08:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	202100	192000	184900	178100	175200	174800	171400	165100	151600	138300	122700	108800
2	202100	191600	184400	177700	175600	174800	171000	165100	150800	137900	122300	108500
3	202100	191600	184400	177700	175600	174800	171000	164700	150400	137200	121600	107900
4	201600	191200	184000	177700	175600	174300	171000	164200	150000	137200	120900	107400
5	201100	191200	183600	177300	175600	174300	171000	164200	149600	136500	120500	107100
6	200600	190700	183200	177300	175200	174300	170600	164200	149200	135800	119800	106500
7	200100	190300	183200	177300	175200	174300	170600	163800	148200	135400	119500	105900
8	200100	190300	182700	176900	175200	174300	170100	163400	147800	135100	119500	105600
9	199600	190300	182700	176900	175200	173900	170100	162600	147500	134400	118800	105300
10	199100	189900	182700	176900	175200	173900	169700	161700	146800	133700	118400	104800
11	199100	189900	182300	176000	175200	173500	169300	161700	146400	133300	118100	104500
12	199100	189900	181900	176000	175200	173500	168900	160900	145700	132900	117700	104800
13	198100	189500	181900	176000	174800	173100	168900	160900	145300	132200	117400	104500
14	197500	189100	181500	176000	174800	173100	168900	160500	145300	131900	116300	104200
15	197000	189100	181100	175600	174800	172700	168500	160000	145700	131500	115900	103900
16	197000	188600	181100	175200	175200	172700	168000	159200	145000	130800	115600	103300
17	196500	188200	180600	175200	175200	172700	168000	158800	144300	130500	114900	103100
18	196000	188200	180600	174800	175200	172700	167600	159200	143600	130100	114500	102800
19	195500	187800	180200	174800	175200	172200	167200	158400	143200	129400	114200	102200
20	195500	187800	179800	174800	174800	172200	167200	158400	143200	129400	113900	101900
21	195000	187800	179800	174800	175200	172200	166800	157900	142900	128700	113400	101900
22	195000	187400	179800	174800	175200	172200	166800	157500	142200	128000	112800	101300
23	195000	186500	179400	174800	175200	171800	166800	157100	141800	127600	112200	101000
24	194500	186500	179400	174300	175200	171800	166800	156700	141400	126600	111900	100800
25	194000	186100	179400	174300	175200	171800	166300	156300	141100	126600	111700	100200
26	193500	186100	179000	174300	175200	171400	165900	155400	140700	125900	111400	99900
27	193000	185700	179000	174300	174800	171000	165900	155000	140400	125100	110800	99620
28	192500	185700	179000	174800	174800	171800	165900	154200	139300	124400	110500	99040
29	192500	185300	178500	175200	---	171400	165500	153700	139000	124400	109900	98470
30	192500	184900	178500	175600	---	171800	165500	152900	138600	123700	109400	98180
31	192500	---	178100	175600	---	171800	---	152100	---	123000	109100	---
MAX	202100	192000	184900	178100	175600	174800	171400	165100	151600	138300	122700	108800
MIN	192500	184900	178100	174300	174800	171000	165500	152100	138600	123000	109100	98180
(†)	1060.1	1058.3	1056.7	1056.1	1055.9	1055.2	1053.7	1050.5	1046.8	1042.4	1038.1	1034.3
(ϕ)	-9600	-7600	-6800	-2500	-800	-3000	-6300	-13400	-13500	-15600	-13900	-10920

CAL YR 1988 MAX 242400 MIN 178100 (ϕ) -64300
WTR YR 1989 MAX 202100 MIN 98180 (ϕ) -103920

(†) Gage height, in feet, at end of month.
(ϕ) Change in contents, in acre-feet.

08180000 MEDINA CANAL NEAR RIOMEDINA, TX

LOCATION.--Lat 29°30'19", long 98°54'11", Medina County, Hydrologic Unit 12100302, in center of canal, 350 ft downstream from county highway bridge, 1,900 ft downstream from head of canal and diversion dam, 4.6 mi downstream from Medina Dam, 4.7 mi north of Riomedina, and 25 mi northwest of San Antonio.

PERIOD OF RECORD.--March 1922 to May 1934, July 1957 to current year.

REVISED RECORDS.--WSP 568: 1922. WSP 1712: 1922(M), 1924, 1926.

GAGE.--Water-stage recorder. Elevation of gage is 910 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--No estimated daily discharges. Records good except those above 125 cfs, which are fair. Station is above all diversions from canal. Canal diverts water from right end of Medina Diversion Dam 1,900 ft upstream from gage. Water is used for irrigation downstream near La Coste and Natalia. Prior to November 1984, double-barrel flume in canal 54 ft downstream from gage.

AVERAGE DISCHARGE.--43 years (water years 1923-33, 1958-89), 44.5 ft³/s (32,240 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 216 ft³/s May 6, 1971; no flow at times.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	92	27	77	50	1.1	31	54	83	154	151	157	145
2	92	42	74	49	1.1	31	53	97	157	149	156	145
3	91	51	76	48	.57	32	66	102	154	150	154	147
4	90	56	77	46	.09	32	78	119	153	155	150	149
5	102	56	78	45	.00	32	78	141	153	155	146	149
6	117	59	79	51	.00	32	76	142	152	153	141	139
7	114	75	80	62	11	32	85	138	153	154	131	139
8	113	74	81	61	29	38	87	142	155	154	140	144
9	111	73	70	60	27	42	83	147	151	154	143	146
10	108	73	53	60	27	50	87	146	151	154	139	143
11	114	54	45	60	26	56	95	146	152	153	145	136
12	118	46	71	52	26	56	89	147	152	153	147	138
13	113	47	84	34	26	62	83	149	150	154	147	127
14	111	65	76	26	25	70	81	147	149	157	146	115
15	112	73	65	42	25	70	76	148	146	160	144	124
16	112	74	60	58	25	72	76	148	149	158	145	131
17	112	73	57	52	9.9	78	77	134	154	157	146	126
18	112	72	57	44	.80	82	80	145	155	156	143	125
19	110	72	56	39	.47	79	46	145	154	162	143	123
20	107	71	55	9.3	16	48	16	146	149	170	144	129
21	106	71	55	12	36	26	24	146	151	169	168	134
22	104	71	51	27	35	28	37	150	152	175	199	130
23	105	71	46	53	34	31	38	148	152	177	165	126
24	104	70	46	68	33	43	37	146	150	170	149	126
25	106	70	45	73	32	44	43	149	152	166	148	124
26	107	70	45	70	31	45	53	150	152	170	147	121
27	98	70	41	62	31	46	57	153	149	165	146	120
28	84	76	54	36	31	18	59	151	150	161	146	118
29	85	79	52	10	---	41	58	152	154	158	148	118
30	86	78	51	.86	---	30	57	154	152	159	149	118
31	47	---	51	1.1	---	55	---	155	---	160	148	---
TOTAL	3183	1959	1908	1361.26	540.03	1432	1929	4366	4557	4939	4620	3955
MEAN	103	65.3	61.5	43.9	19.3	46.2	64.3	141	152	159	149	132
MAX	118	79	84	73	36	82	95	155	157	177	199	149
MIN	47	27	41	.86	.00	18	16	83	146	149	131	115
AC-FT	6310	3890	3780	2700	1070	2840	3830	8660	9040	9800	9160	7840

CAL YR 1988 TOTAL 30483.33 MEAN 83.3 MAX 203 MIN .00 AC-FT 60460
WTR YR 1989 TOTAL 34749.29 MEAN 95.2 MAX 199 MIN .00 AC-FT 68930

08181400 HELOTES CREEK AT HELOTES, TX

LOCATION.--Lat 29°34'42", long 98°41'29", Bexar County, Hydrologic Unit 12100302, 42 ft to left and 44 ft downstream from centerline of bridge on State Highway 16, 0.1 mi northwest of Helotes, and 8.6 mi upstream from mouth.

DRAINAGE AREA.--15.0 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1968 to current year.

REVISED RECORDS.--WRD TX-73-1: 1972(M).

GAGE.--Water-stage recorder. Datum of gage is 1,014.82 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records good. An undetermined amount of flow is diverted for domestic use above station, and some streamflow enters the Edwards and associated limestones through the Balcones Fault Zone in the vicinity of the gage. Recording rain gage at station.

AVERAGE DISCHARGE.--21 years, 4.13 ft³/s (3.74 in/yr), 2,990 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,680 ft³/s July 16, 1973 (gage height, 10.8 ft, from floodmarks), from rating curve extended above 5,000 ft³/s; no flow most of time.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since 1923, 13.7 ft in 1927, from information by local resident.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 140 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
Jan. 29	1000	*60	*2.24				

Minimum daily discharge, no flow most of year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	.00	.00	.03	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
14	.00	.00	.00	.00	.00	.00	.00	.00	.19	.00	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.05	.35	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
23	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.04	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.33	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	5.7	---	.00	.00	.00	.00	.00	.00	.00
30	.00	.00	.00	3.2	---	.00	.00	.00	.00	.00	.00	.00
31	.00	---	.00	.16	---	.00	---	.00	---	.00	.00	---
TOTAL	0.01	0.00	0.00	9.06	0.00	0.38	0.35	0.00	0.22	0.04	0.00	0.01
MEAN	.000	.00	.00	.29	.00	.012	.012	.00	.007	.001	.00	.000
MAX	.01	.00	.00	5.7	.00	.33	.35	.00	.19	.04	.00	.01
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.02	.0	.0	18	.0	.8	.7	.0	.4	.08	.0	.02
CFSM	.00	.00	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00
IN.	.00	.00	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00

CAL YR 1988 TOTAL 2.59 MEAN .007 MAX 1.2 MIN .00 AC-FT 5.1 CFSM .00 IN. .01
WTR YR 1989 TOTAL 10.07 MEAN .028 MAX 5.7 MIN .00 AC-FT 20 CFSM .00 IN. .02

08181400 HELOTES CREEK AT HELOTES, TX--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical and biochemical analyses: May 1969 to current year. Pesticide analyses: May 1969 to June 1981, October 1984 to current year. Sediment analyses: October 1968 to September 1973.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)
MAR											
28...	0830	0.02	113	7.00	16.0	60	12	7.2	75	4.6	K27000
APR											
19...	1110	0.02	101	7.90	20.0	60	4.8	6.8	77	5.5	50000
AUG											
08...	0910	0.02	113	7.40	22.5	100	2.2	6.3	75	5.1	12000

DATE	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CACO3)	HARD-NESS NONCARB WH WAT TOT FLD MG/L AS CACO3	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
MAR											
28...	54000	53	9	18	2.0	2.1	0.1	2.5	44	26	10
APR											
19...	190000	49	0	17	1.6	0.80	0.0	2.8	49	<1.0	1.3
AUG											
08...	15000	52	8	19	1.2	1.6	0.1	2.3	44	4.0	8.8

DATE	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L)	RESIDUE VOLA-TILE, SUS-PENDED (MG/L)	NITRO-GEN, NITRATE TOTAL (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)
MAR											
28...	0.10	6.1	93	25	11	0.480	0.020	0.500	0.070	1.1	1.2
APR											
19...	0.10	6.7	--	200	35	0.280	0.020	0.300	0.070	0.63	0.70
AUG											
08...	0.10	3.5	67	1	<1	0.950	0.050	1.00	0.070	0.83	0.90

DATE	PHOS-PHORUS TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)
MAR											
28...	0.140	9.8	<1	11	<1	1	2	26	<5	3	0.5
APR											
19...	0.110	8.1	--	--	--	--	--	--	--	--	--
AUG											
08...	0.150	11	--	--	--	--	--	--	--	--	--

DATE	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)
MAR											
28...	<1	17	24	<0.1	<0.10	<0.010	<0.1	<0.010	<0.010	<0.010	0.03
APR											
19...	--	--	--	--	--	--	--	--	--	--	--
AUG											
08...	--	--	--	--	--	--	--	--	--	--	--

DATE	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METH-OXY-CHLOR, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)
MAR										
28...	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
APR										
19...	--	--	--	--	--	--	--	--	--	--
AUG										
08...	--	--	--	--	--	--	--	--	--	--

08181400 HELOTES CREEK AT HELOTES, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	METHYL TRI-THION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	SILVEX, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)
MAR 28...	<0.01	<0.01	<0.01	<0.1	<0.01	<1	<0.01	<0.01	<0.01	<0.01
APR 19...	--	--	--	--	--	--	--	--	--	--
AUG 08...	--	--	--	--	--	--	--	--	--	--

08183900 CIBOLO CREEK NEAR BOERNE, TX

LOCATION.--Lat 29°46'26", long 98°41'50", Kendall County, Hydrologic Unit 12100304, on left bank 0.6 mi upstream from Southern Pacific Lines bridge, 0.9 mi downstream from Menger Creek, and 2.5 mi southeast of Boerne.

DRAINAGE AREA.--68.4 mi².

PERIOD OF RECORD.--March 1962 to current year.

REVISED RECORDS.--WRD TX-73-1: 1964-65, 1966(P), 1968-72(P).

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 1,339.61 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records good. No known diversion above station. Flow is affected at times by discharge from the flood-detention pools of four floodwater-retarding structures with a combined detention capacity of 8,850 acre-ft. These structures control runoff from 34.0 mi². Several observations of water temperature were made during the year.

AVERAGE DISCHARGE.--27 years, 28.1 ft³/s (5.58 in/yr), 20,360 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 36,400 ft³/s Sept. 27, 1964 (gage height, 19.15 ft, from floodmark), from rating curve extended above 2,500 ft³/s on basis of slope-area measurement at 12,000 ft³/s and contracted-opening measurement of 36,400 ft³/s; no flow at times in 1962-64, 1966-67, 1971, and 1984.
Maximum stage since at least 1892, that of Sept. 27, 1964.

EXTREMES OUTSIDE PERIOD OF RECORD.--The second highest flood occurred in 1952, and reached a stage of 16.3 ft (discharge, 25,600 ft³/s), from information by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 900 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
June 14	0215	*90	*2.66				

Minimum daily discharge, 0.07 ft³/s July 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.2	1.1	1.1	.91	2.4	1.7	1.1	3.2	.65	.99	.23	.18
2	1.3	.98	1.3	.90	2.4	3.0	1.2	3.0	.46	.70	.28	.25
3	1.1	1.0	1.3	1.0	2.9	1.9	1.3	3.4	.50	.46	.35	.34
4	1.2	1.2	1.1	.98	2.1	1.7	1.3	3.6	.50	.49	.34	.25
5	1.1	1.5	1.1	1.0	1.8	1.5	1.3	3.3	.37	.47	.51	.35
6	1.0	1.3	1.1	.92	1.7	1.5	1.5	3.4	.52	.45	.42	3.5
7	1.2	1.3	1.1	1.1	1.6	1.5	1.6	3.1	.62	.46	.88	.81
8	.89	1.1	1.2	1.0	1.5	1.5	1.9	2.5	.48	.47	2.3	.23
9	1.3	1.2	1.3	.79	1.6	1.6	1.7	2.2	.67	.43	1.0	.11
10	2.0	1.1	1.4	.83	1.5	1.5	1.6	1.9	.73	.47	.65	.12
11	.90	1.0	1.3	.97	1.5	1.6	1.6	2.2	.66	.23	.69	9.7
12	.81	1.0	1.1	1.1	1.6	1.7	1.6	2.3	.60	.29	.70	1.6
13	.83	.89	.99	1.5	1.6	1.6	2.8	2.1	.49	.26	1.0	.69
14	.94	.95	1.1	1.3	1.5	1.5	3.5	1.9	12	.19	1.0	.42
15	.88	.88	1.2	1.2	1.8	1.4	2.4	1.7	.49	.23	1.0	.59
16	.83	.71	1.2	1.3	2.4	1.2	2.4	1.7	.21	.22	.85	.82
17	.83	.71	1.2	1.5	2.0	1.3	2.0	12	.14	.20	.75	1.4
18	.68	.87	1.1	1.7	2.0	1.3	1.7	2.6	.12	.25	.54	.96
19	.73	.84	1.1	3.7	1.7	1.3	3.4	1.8	.14	.19	.42	.65
20	.79	1.2	1.2	3.0	1.7	2.2	2.5	1.5	.14	.10	.57	.86
21	.79	1.2	1.3	1.6	1.7	1.4	2.0	1.5	.17	.07	.53	1.1
22	.69	1.2	1.3	1.3	1.6	1.2	1.7	1.6	.22	.21	.45	1.0
23	.65	1.0	1.4	1.3	1.6	1.2	1.6	1.5	.27	.32	.31	.95
24	.75	1.1	1.5	1.3	1.6	1.4	1.2	1.4	.39	.49	.23	1.1
25	.81	1.2	2.3	1.8	1.7	1.6	1.3	1.4	.47	.59	.29	1.1
26	.90	1.1	2.1	3.0	1.8	1.6	1.3	1.1	.52	.51	.35	1.0
27	1.0	.97	1.9	3.8	1.7	1.4	1.3	1.2	.68	.57	.42	1.0
28	1.1	1.1	1.4	10	1.6	11	1.6	.91	.63	.54	.41	.92
29	1.2	1.2	1.2	15	---	2.4	2.3	.86	.70	.47	.34	.68
30	1.2	1.0	1.3	5.2	---	1.4	3.2	.81	.70	.39	.28	1.3
31	1.3	---	1.1	3.0	---	1.2	---	.73	---	.28	.28	---
TOTAL	31.90	31.90	40.29	74.00	50.6	58.3	55.9	72.41	25.24	11.99	18.37	33.98
MEAN	1.03	1.06	1.30	2.39	1.81	1.88	1.86	2.34	.84	.39	.59	1.13
MAX	2.2	1.5	2.3	15	2.9	11	3.5	12	12	.99	2.3	9.7
MIN	.65	.71	.99	.79	1.5	1.2	1.1	.73	.12	.07	.23	.11
AC-FT	63	63	80	147	100	116	111	144	50	24	36	67
CFSM	.02	.02	.02	.03	.03	.03	.03	.03	.01	.01	.01	.02
IN.	.02	.02	.02	.04	.03	.03	.03	.04	.01	.01	.01	.02

CAL YR 1988	TOTAL	1345.92	MEAN	3.68	MAX	50	MIN	.38	AC-FT	2670	CFSM	.05	IN.	.73
WTR YR 1989	TOTAL	504.88	MEAN	1.38	MAX	15	MIN	.07	AC-FT	1000	CFSM	.02	IN.	.27

08185000 CIBOLO CREEK AT SELMA, TX

LOCATION.--Lat 29°35'38", long 98°18'39", Bexar-Guadalupe County line, Hydrologic Unit 12100304, on right bank 0.6 mi downstream from Missouri-Kansas-Texas Railroad Co. bridge and 0.9 mi upstream from bridge on Interstate Highway 35 at Selma.

DRAINAGE AREA.--274 mi².

PERIOD OF RECORD.--March 1946 to current year. Figures for water year 1960 in WSP 1813 are in error and should be disregarded.

REVISED RECORDS.--WSP 1923: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 728.34 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records good. Small diversion above station. For statement regarding regulation by Soil Conservation Service floodwater-retarding structures, see station 08183900. Considerable flow of Cibolo Creek enters the Edwards and associated limestones in the Balcones Fault Zone, that crosses basin between this station and the station near Boerne (station 08183900).

AVERAGE DISCHARGE.--43 years, 15.7 ft³/s (11,370 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 65,000 ft³/s July 16, 1973 (gage height, 26.2 ft, from floodmark), from rating curve extended above 16,000 ft³/s on basis of field estimate of 54,000 ft³/s and contracted-opening measurement of 65,000 ft³/s; no flow most of time.
Maximum stage since at least 1869, that of July 16, 1973.

EXTREMES OUTSIDE PERIOD OF RECORD.--A stage of 26 ft occurred in 1889, but stage for flood in 1913 is unknown, from information by local residents.

EXTREMES FOR CURRENT YEAR.--No flow during year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
30	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
31	.00	---	.00	.00	---	.00	---	.00	---	.00	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MEAN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MAX	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CAL YR 1988	TOTAL	0.00	MEAN	.00	MAX	.00	MIN	.00	AC-FT	.00
WTR YR 1989	TOTAL	0.00	MEAN	.00	MAX	.00	MIN	.00	AC-FT	.00

NUECES RIVER MAIN STEM

08190000 NUECES RIVER AT LAGUNA, TX

LOCATION.--Lat 29°25'42", long 99°59'49", Uvalde County, Hydrologic Unit 12110101, on right bank 0.5 mi downstream from Sycamore Creek, 1.0 mi northeast of Laguna, and at mile 370.8.

DRAINAGE AREA.--737 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1923 to current year.

REVISED RECORDS.--WSP 1562: 1930, 1931(M), 1932, 1939. WDR TX-83-3: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,119.72 ft above National Geodetic Vertical Datum of 1929. Prior to Jan. 26, 1925, nonrecording gage at site 2 mi downstream at different datum.

REMARKS.--Records good. Many small diversions above station for irrigation.

AVERAGE DISCHARGE.--66 years, 150 ft³/s (2.76 in/yr), 108,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 307,000 ft³/s Sept. 24, 1955 (gage height, 29.95 ft, in gage well, 32.7 ft, from outside floodmarks), from rating curve extended above 40,000 ft³/s on basis of float measurement of 110,000 ft³/s and slope-area measurements of 213,000 and 307,000 ft³/s; minimum, 2.6 ft³/s Mar. 14-16, 1957. Maximum stage since at least 1866, that of Sept. 24, 1955.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1913 reached a stage of about 29 ft (discharge, 210,000 ft³/s); flood of Sept. 21, 1923, reached a stage of about 26.5 ft (discharge, 160,000 ft³/s); from information by local residents. Discharges based on rating curve mentioned above.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 700 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
Mar. 28	0330	*161	*2.93				

Minimum daily discharge, 16 ft³/s Sept. 23, 26-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	87	78	66	e61	77	95	89	67	55	38	26	19
2	84	75	66	e61	76	95	88	65	53	37	27	18
3	82	75	e66	e61	75	94	87	64	52	37	25	18
4	80	73	e66	e61	75	93	87	63	51	36	24	18
5	79	73	e66	e61	74	91	85	62	50	36	24	18
6	77	71	e65	e61	74	90	83	61	48	36	24	18
7	78	71	e65	e60	73	89	82	60	47	39	26	19
8	78	68	e65	e60	72	88	81	58	45	38	32	19
9	77	68	e65	e60	70	87	80	57	43	36	27	18
10	77	68	e65	60	69	86	78	57	46	35	25	18
11	77	68	e65	60	69	85	78	55	56	34	24	18
12	76	68	e64	60	69	84	79	55	46	34	24	17
13	74	66	e64	58	69	83	83	55	45	33	23	18
14	73	68	e64	58	70	82	84	53	48	32	24	18
15	72	68	e64	58	72	81	82	53	49	32	24	17
16	72	66	e64	56	98	80	80	53	49	30	23	17
17	71	66	e64	56	116	80	78	70	50	30	23	17
18	71	68	e64	58	114	81	77	72	50	29	23	17
19	70	66	e63	60	109	83	76	74	48	28	23	17
20	71	66	e63	63	110	83	75	69	46	28	22	17
21	72	66	e63	64	108	82	73	65	44	28	22	17
22	72	68	e63	63	105	81	71	62	43	27	22	17
23	73	66	e63	63	102	81	70	61	43	26	21	16
24	72	66	e63	62	100	80	70	63	43	26	22	17
25	72	68	e62	62	98	80	70	63	44	26	21	17
26	71	68	e62	64	98	81	72	62	42	28	21	16
27	73	66	e62	87	96	80	79	61	41	28	21	16
28	73	66	e62	100	95	126	73	60	40	28	21	16
29	82	66	e62	93	---	115	71	59	39	27	20	16
30	75	66	e62	84	---	101	69	58	38	26	19	16
31	86	---	e62	79	---	93	---	56	---	25	19	---
TOTAL	2347	2056	1980	2014	2433	2730	2350	1893	1394	973	722	520
MEAN	75.7	68.5	63.9	65.0	86.9	88.1	78.3	61.1	46.5	31.4	23.3	17.3
MAX	87	78	66	100	116	126	89	74	56	39	32	19
MIN	70	66	62	56	69	80	69	53	38	25	19	16
AC-FT	4660	4080	3930	3990	4830	5410	4660	3750	2760	1930	1430	1030
CFSM	.10	.09	.09	.09	.12	.12	.11	.08	.06	.04	.03	.02
IN.	.12	.10	.10	.10	.12	.14	.12	.10	.07	.05	.04	.03

CAL YR 1988 TOTAL 36329 MEAN 99.3 MAX 502 MIN 62 AC-FT 72060 CFSM .13 IN. 1.83
WTR YR 1989 TOTAL 21412 MEAN 58.7 MAX 126 MIN 16 AC-FT 42470 CFSM .08 IN. 1.08

e Estimated.

08190000 NUECES RIVER AT LAGUNA, TX--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical analyses: May 1949 to June 1952, September 1964 to current year. Chemical, biochemical, and pesticide analyses: February 1970 to current year. Sediment analyses: January 1966.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)
JAN 12...	1220	60	403	8.00	16.5	1	0.30	9.1	96	0.4	43
MAY 03...	1625	66	385	8.10	26.0	3	0.20	8.6	111	1.1	K8
AUG 23...	1636	21	410	7.90	30.0	<1	0.30	7.8	108	1.1	K5

DATE	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CACO3)	HARD-NESS NONCARB WH WAT TOT FLD MG/L AS CACO3	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
JAN 12...	K17	200	22	57	13	8.0	0.3	0.90	174	13	13
MAY 03...	K3	190	19	53	14	7.8	0.3	1.0	171	11	13
AUG 23...	27	200	16	55	14	8.5	0.3	0.90	179	11	12

DATE	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L)	RESIDUE VOLA-TILE, SUS-PENDED (MG/L)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)
JAN 12...	0.10	11	220	<1	<1	<0.010	0.700	0.020	0.18	0.20	<0.010
MAY 03...	0.20	12	215	<1	<1	<0.010	0.600	0.020	--	<0.20	<0.010
AUG 23...	0.10	14	223	<1	<1	<0.010	0.500	<0.010	--	0.40	<0.010

DATE	CARBON, ORGANIC TOTAL (MG/L AS C)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)
JAN 12...	0.8	<1	38	3	<1	<1	6	<5	<1	<0.1	<1
MAY 03...	0.9	--	--	--	--	--	--	--	--	--	--
AUG 23...	0.8	<1	41	<1	<1	<1	8	<1	<1	<0.1	<1

DATE	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR, TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)	DI-ELDRIN TOTAL (UG/L)
JAN 12...	<1.0	6	<0.1	<0.10	<0.010	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010
MAY 03...	--	--	--	--	--	--	--	--	--	--	--
AUG 23...	1.0	<3	<0.1	<0.10	<0.010	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010

DATE	DI-SYSTON TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METH-OXY-CHLOR, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)	METHYL TRI-THION, TOTAL (UG/L)
JAN 12...	--	<0.010	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01
MAY 03...	--	--	--	--	--	--	--	--	--	--	--
AUG 23...	<0.01	<0.010	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01

08190000 NUECES RIVER AT LAGUNA, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	PHORATE OTAL (UG/L)	SILVEX, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)
JAN										
12...	<0.01	<0.01	<0.1	--	<0.01	<1	<0.01	<0.01	<0.01	<0.01
MAY										
03...	--	--	--	--	--	--	--	--	--	--
AUG										
23...	<0.01	<0.01	<0.1	<0.01	<0.01	<1	<0.01	<0.01	<0.01	<0.01

08190500 WEST NUECES RIVER NEAR BRACKETTVILLE, TX

LOCATION.--Lat 29°28'21", long 100°14'10", Kinney County, Hydrologic Unit 12110102, at Wilson Ranch on Farm Road 3199, 1.3 mi upstream from Miguel Canyon, 16.0 mi northeast of Brackettville, and 40.2 mi upstream from mouth.

DRAINAGE AREA.--694 mi².

PERIOD OF RECORD.--September 1939 to September 1950, April 1956 to current year.

REVISED RECORDS.--WSP 1312: 1949(M). WDR TX-83-3: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,326.79 ft above National Geodetic Vertical Datum of 1929. Prior to Mar. 14, 1940, nonrecording gage at same site and datum.

REMARKS.--Records good. In ordinary years, a large part of streamflow is lost by seepage into the Balcones Fault Zone of the Edwards and associated limestones above station. No known diversion above station.

AVERAGE DISCHARGE.--44 years (water years 1940-50, 1957-89), 33.6 ft³/s (24,340 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 246,000 ft³/s Sept. 20, 1964 (gage height, 31.3 ft, from floodmark), from rating curve extended above 4,500 ft³/s on basis of slope-area measurements of 10,000, 51,000, 150,000, and 246,000 ft³/s; no flow most of time.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1879, about 40 ft June 14, 1935 (discharge, 550,000 ft³/s, based on slope-area measurements of 580,000 ft³/s at site 33 mi upstream from gage) and 536,000 ft³/s (at site 24 mi downstream from gage, present site and datum), from gage-height relation of 1935 and 1955 flood peaks at site 0.6 mi upstream. Flood in 1900 reached a stage of about 34 ft, and flood of Sept. 24, 1955, reached a stage of 27.1 ft, from floodmark at present site (discharge, 150,000 ft³/s, by slope-area measurement).

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
May 19	1030	*4.2	*1.50				

Minimum daily discharge, no flow May 16, Aug. 21 to Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.70	.31	.16	.12	.21	.30	.11	.02	.53	.36	.01	.00
2	.64	.28	.16	.14	.19	.28	.10	.02	.42	.31	.02	.00
3	.56	.28	.15	.14	.18	.29	.09	.02	.36	.28	.02	.00
4	.56	.28	.14	.14	.16	.30	.09	.01	.36	.28	.01	.00
5	.52	.28	.14	.14	.16	.15	.09	.01	.33	.26	.01	.00
6	.50	.28	.16	.14	.14	.20	.10	.01	.31	.24	.01	.00
7	.50	.28	.16	.14	.12	.22	.10	.01	.27	.23	.01	.00
8	.48	.28	.16	.14	.12	.27	.09	.01	.24	.21	.10	.00
9	.45	.28	.15	.14	.13	.25	.07	.01	.24	.18	.07	.00
10	.45	.28	.14	.14	.14	.24	.07	.01	.38	.16	.05	.00
11	.43	.26	.14	.12	.14	.24	.07	.01	.69	.15	.05	.00
12	.40	.24	.14	.10	.16	.23	.07	.01	.44	.12	.04	.00
13	.40	.23	.15	.07	.18	.21	.09	.01	.71	.12	.04	.00
14	.40	.20	.14	.07	.18	.21	.09	.01	1.3	.12	.04	.00
15	.40	.22	.14	.07	.19	.21	.08	.01	1.8	.10	.03	.00
16	.44	.19	.14	.08	.34	.21	.07	.0	2.6	.10	.02	.00
17	.45	.18	.14	.09	.35	.21	.07	.35	2.0	.10	.01	.00
18	.45	.18	.14	.10	.66	.23	.07	1.1	1.5	.09	.01	.00
19	.42	.16	.16	.16	1.3	.24	.07	4.0	1.1	.09	.01	.00
20	.40	.15	.18	.17	1.2	.23	.06	3.8	1.0	.08	.01	.00
21	.40	.16	.18	.16	.87	.14	.06	2.5	.93	.06	.0	.00
22	.40	.16	.19	.16	.76	.13	.04	1.7	.87	.06	.0	.00
23	.37	.16	.18	.16	.71	.15	.05	1.4	.73	.04	.00	.00
24	.31	.16	.17	.18	.58	.16	.05	1.2	.63	.03	.00	.00
25	.31	.17	.14	.18	.53	.17	.05	1.1	.59	.03	.00	.00
26	.31	.18	.16	.18	.46	.17	.05	.98	.56	.03	.00	.00
27	.31	.16	.14	.35	.41	.16	.05	.89	.50	.03	.00	.00
28	.32	.15	.12	.24	.35	.24	.04	.74	.47	.03	.00	.00
29	.48	.16	.12	.21	---	.17	.03	.67	.38	.03	.00	.00
30	.41	.16	.12	.21	---	.13	.03	.61	.36	.02	.00	.00
31	.42	---	.12	.21	---	.10	---	.56	---	.02	.00	---
TOTAL	13.59	6.46	4.63	4.65	10.92	6.44	2.10	21.78	22.60	3.96	0.57	0.00
MEAN	.44	.22	.15	.15	.39	.21	.070	.70	.75	.13	.018	.00
MAX	.70	.31	.19	.35	1.3	.30	.11	4.0	2.6	.36	.10	.00
MIN	.31	.15	.12	.07	.12	.10	.03	.00	.24	.02	.00	.00
AC-FT	27	13	9.2	9.2	22	13	4.2	43	45	7.9	1.1	.0

CAL YR 1988	TOTAL	858.24	MEAN	2.34	MAX	568	MIN	.06	AC-FT 1700
WTR YR 1989	TOTAL	97.70	MEAN	.27	MAX	4.0	MIN	.00	AC-FT 194

08192000 NUECES RIVER BELOW UVALDE, TX

LOCATION.--Lat 29°07'25", long 99°53'40", Uvalde County, Hydrologic Unit 12110103, on right bank at McDaniel Ranch, 5.7 mi upstream from bridge on U.S. Highway 83, 8.8 mi southwest of Uvalde, 18.2 mi downstream from West Nueces River, and at mile 338.7.

DRAINAGE AREA.--1,861 mi².

PERIOD OF RECORD.--April 1939 to current year. October 1927 to April 1939, published as "near Uvalde"; records are equivalent only during periods of flood flow.

REVISED RECORDS.--WSP 1732: 1956(M). WDR TX-83-3: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 796.12 ft above National Geodetic Vertical Datum of 1929. Oct. 4, 1927, to Apr. 30, 1939, water-stage recorder at site 6.2 mi upstream at different datum.

REMARKS.--No estimated daily discharges. Records good. Part of the flow of the Nueces River enters the Edwards and associated limestones in the Balcones Fault Zone that crosses the basin downstream from Laguna (station 08190000) and upstream from this station. At low stage, most of headwater flow enters this formation. There are many small diversions above station for irrigation.

AVERAGE DISCHARGE.--50 years, 125 ft³/s (90,560 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 189,000 ft³/s Sept. 24, 1955 (gage height, 24.61 ft, from floodmark), from rating curve extended above 34,000 ft³/s on basis of conveyance study and slope-area measurement of peak flow; no flow at times in 1951-57.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1836, 40.4 ft June 14, 1935, from floodmark (discharge at former site, 616,000 ft³/s, by slope-area measurement). Large floods also occurred in 1901 and 1913, stages unknown.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 250 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
Aug. 8	0530	*55	*3.23				

Minimum daily discharge, 8.7 ft³/s Sept. 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	36	30	29	29	29	27	25	22	18	13	10	9.3
2	36	30	29	29	29	27	25	22	18	12	10	9.1
3	36	30	29	29	29	26	25	22	17	12	10	9.0
4	35	29	29	28	29	25	25	21	17	12	10	9.0
5	34	30	29	28	29	24	24	21	17	11	10	8.9
6	35	30	28	28	29	25	24	21	17	12	10	8.9
7	35	30	28	28	27	25	25	21	16	12	10	9.0
8	34	30	29	28	27	25	24	21	16	11	33	9.0
9	34	30	29	28	27	25	24	21	16	11	16	8.8
10	34	30	30	28	27	25	24	25	17	11	13	9.1
11	33	30	29	29	28	25	24	22	16	11	12	9.8
12	33	30	29	29	28	25	25	23	15	11	12	9.0
13	33	29	29	29	28	25	26	22	16	10	11	9.0
14	32	29	29	29	28	25	25	22	18	10	11	8.8
15	32	29	29	29	29	26	25	22	15	10	11	9.0
16	32	29	29	30	29	26	25	22	15	10	11	9.0
17	32	29	29	30	29	26	24	25	14	10	11	9.0
18	31	29	29	30	28	26	24	21	14	10	11	9.0
19	31	28	29	32	27	26	24	21	14	10	10	9.0
20	31	28	29	34	27	25	24	20	14	10	10	9.5
21	31	29	29	31	26	24	24	20	14	10	10	9.5
22	31	29	29	30	26	24	23	20	14	10	10	9.5
23	30	29	28	30	26	25	23	20	14	10	10	8.8
24	30	29	28	30	27	26	22	19	14	10	11	8.7
25	30	30	29	31	26	27	22	19	14	10	11	9.0
26	30	29	30	31	27	27	23	19	14	10	10	9.0
27	30	28	29	34	27	24	27	19	14	10	10	9.0
28	31	29	28	32	27	27	23	19	13	10	10	9.0
29	35	29	28	30	---	25	22	18	13	10	9.8	9.0
30	30	29	27	30	---	24	22	18	13	10	9.5	9.0
31	31	---	29	29	---	25	---	18	---	10	9.5	---
TOTAL	1008	879	893	922	775	787	722	646	457	329	352.8	271.7
MEAN	32.5	29.3	28.8	29.7	27.7	25.4	24.1	20.8	15.2	10.6	11.4	9.06
MAX	36	30	30	34	29	27	27	25	18	13	33	9.8
MIN	30	28	27	28	26	24	22	18	13	10	9.5	8.7
AC-FT	2000	1740	1770	1830	1540	1560	1430	1280	906	653	700	539

CAL YR 1988	TOTAL	22659	MEAN	61.9	MAX	160	MIN	27	AC-FT 44940
WTR YR 1989	TOTAL	8042.5	MEAN	22.0	MAX	36	MIN	8.7	AC-FT 15950

NUECES RIVER BASIN

08195000 FRIO RIVER AT CONCAN, TX

LOCATION.--Lat 29°29'18", long 99°42'16", Uvalde County, Hydrologic Unit 12110106, on left bank 0.7 mi southeast of Concan Post Office, 15 mi upstream from Dry Frio River, and 222.8 mi upstream from mouth.

DRAINAGE AREA.--389 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1923 to September 1929, October 1930 to current year.

REVISED RECORDS.--WSP 1342: Drainage area. WSP 1512: 1926, 1931-32, 1934(M), 1935-36. WSP 1712: 1958. WSP 1923: 1954(M), 1957(M). WDR TX-83-3: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,203.71 ft above National Geodetic Vertical Datum of 1929. Oct. 26, 1923, to July 28, 1924, nonrecording gage at site 86 ft upstream at datum 5.08 ft lower. July 29, 1924, to Oct. 3, 1930, nonrecording gage, and Oct. 4, 1930, to May 18, 1939, water-stage recorder, at site 130 ft downstream at present datum.

REMARKS.--No estimated daily discharges. Records good. Many small diversions for irrigation above station.

AVERAGE DISCHARGE.--64 years (water years 1925-29, 1931-89), 117 ft³/s (4.08 in/yr), 84,770 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 162,000 ft³/s July 1, 1932 (gage height, 34.44 ft, from floodmarks), from rating curve extended above 44,000 ft³/s on basis of flow-over-dam measurement of 56,600 ft³/s and slope-area measurement of 162,000 ft³/s; no flow Aug. 5, 1956, to Jan 6, 1957.
Maximum stage since at least 1869, that of July 1, 1932.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
Feb. 19	1530	*129	*3.99				

Minimum daily discharge, 16 ft³/s Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	79	66	58	63	88	92	83	62	41	30	23	24
2	74	66	58	63	86	92	80	64	40	29	25	24
3	72	66	58	63	83	92	80	65	41	29	24	24
4	73	64	58	63	79	88	79	63	40	28	22	23
5	70	63	58	63	77	86	77	60	40	27	21	22
6	71	63	61	61	76	86	76	61	40	27	21	21
7	69	63	60	62	75	86	75	58	38	27	21	24
8	69	62	64	61	74	84	75	57	37	28	49	26
9	69	63	64	60	72	83	74	55	37	27	37	24
10	70	62	67	61	72	82	73	53	38	26	30	24
11	67	62	65	60	70	81	74	53	51	25	29	23
12	67	62	65	60	72	80	74	55	44	25	28	22
13	66	62	66	61	70	80	78	54	43	25	27	21
14	67	62	65	61	70	79	78	55	54	24	27	22
15	66	62	64	60	72	78	77	55	46	24	27	22
16	67	60	62	60	80	78	74	55	42	24	25	22
17	66	60	63	60	100	78	73	61	41	22	25	21
18	65	62	63	60	118	78	72	58	39	22	24	21
19	65	61	62	62	126	76	72	56	38	22	24	21
20	65	59	62	68	121	78	71	53	36	20	24	21
21	68	60	63	66	112	75	69	51	35	21	25	20
22	66	60	63	67	107	76	67	49	34	21	24	17
23	67	60	63	66	104	76	66	49	34	23	24	17
24	65	60	62	67	101	77	64	48	36	23	25	17
25	64	62	63	67	99	78	64	47	37	23	39	17
26	64	60	63	66	97	76	65	47	35	23	33	17
27	65	58	63	98	94	76	68	46	35	24	30	17
28	65	59	63	97	92	91	63	45	33	26	28	17
29	76	60	63	94	---	89	64	43	31	24	28	17
30	66	58	63	96	---	84	64	41	30	23	27	16
31	66	---	63	92	---	84	---	41	---	22	25	---
TOTAL	2109	1847	1935	2108	2487	2539	2169	1660	1166	764	841	624
MEAN	68.0	61.6	62.4	68.0	88.8	81.9	72.3	53.5	38.9	24.6	27.1	20.8
MAX	79	66	67	98	126	92	83	65	54	30	49	26
MIN	64	58	58	60	70	75	63	41	30	20	21	16
AC-FT	4180	3660	3840	4180	4930	5040	4300	3290	2310	1520	1670	1240
CFSM	.17	.16	.16	.17	.23	.21	.19	.14	.10	.06	.07	.05
IN.	.20	.18	.19	.20	.24	.24	.21	.16	.11	.07	.08	.06

CAL YR 1988 TOTAL 51585 MEAN 141 MAX 3310 MIN 49 AC-FT 102300 CFSM .36 IN. 4.93
WTR YR 1989 TOTAL 20249 MEAN 55.5 MAX 126 MIN 16 AC-FT 40160 CFSM .14 IN. 1.94

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical analyses: June 1952, December 1964 to July 1965. Chemical, biochemical, and pesticide analyses: August 1968 to current year. Pesticide analyses: August 1968 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)
JAN 11...	1449	60	402	7.90	15.5	<1	0.40	10.3	107	0.5	K10
MAY 05...	1421	60	383	8.00	24.0	5	0.20	7.6	94	0.9	120
AUG 25...	1406	44	367	8.00	28.0	<1	0.40	7.8	105	0.8	240

DATE	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CACO3)	HARD-NESS NONCARB WH WAT TOT FLD MG/L AS CACO3	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
JAN 11...	K9	200	20	57	14	7.2	0.2	0.90	180	13	12
MAY 05...	50	190	20	52	14	7.7	0.3	1.1	168	14	12
AUG 25...	69	180	19	48	14	7.9	0.3	1.0	159	13	12

DATE	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L)	RESIDUE VOLA-TILE, SUS-PENDED (MG/L)	NITRO-GEN, NITRATE TOTAL (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)
JAN 11...	0.20	10	222	<1	<1	--	<0.010	0.600	0.020	0.28	0.30
MAY 05...	0.20	11	213	<1	<1	0.380	0.020	0.400	0.010	--	<0.20
AUG 25...	0.10	14	205	<1	<1	--	<0.010	0.200	0.010	0.49	0.50

DATE	PHOS-PHORUS TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)
JAN 11...	<0.010	1.4	<1	30	<1	1	5	16	<5	<1	<0.1
MAY 05...	<0.010	1.2	--	--	--	--	--	--	--	--	--
AUG 25...	<0.010	1.5	<1	31	<1	<1	1	7	<1	1	<0.1

DATE	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)
JAN 11...	<1	<1.0	9	<0.1	<0.10	<0.010	<0.1	<0.010	<0.010	<0.010	0.01
MAY 05...	--	--	--	--	--	--	--	--	--	--	--
AUG 25...	<1	<1.0	6	<0.1	<0.10	<0.010	<0.1	<0.010	<0.010	<0.010	<0.01

DATE	DI-ELDRIN TOTAL (UG/L)	DI-SYSTON TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METH-OXY-CHLOR, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)
JAN 11...	<0.010	--	<0.010	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
MAY 05...	--	--	--	--	--	--	--	--	--	--	--
AUG 25...	<0.010	<0.01	<0.010	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01

08195000 FRIO RIVER AT CONCAN, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	METHYL TRI-THION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	PHORATE OTAL (UG/L)	SILVEX, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)
JAN											
11...	<0.01	<0.01	<0.01	<0.1	--	<0.01	<1	<0.01	<0.01	<0.01	<0.01
MAY											
05...	--	--	--	--	--	--	--	--	--	--	--
AUG											
25...	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<1	<0.01	<0.01	<0.01	<0.01

08196000 DRY FRIO RIVER NEAR REAGAN WELLS, TX

LOCATION.--Lat 29°30'16", long 99°46'52", Uvalde County, Hydrologic Unit 12110106, on right bank 2.3 mi upstream from bridge on U.S. Highway 83, 3.1 mi upstream from Rocky Creek, 4.3 mi southeast of Reagan Wells, and 25.9 mi upstream from mouth.

DRAINAGE AREA.--126 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1952 to current year.

REVISED RECORDS.--WSP 1712: 1953. WSP 1923: 1955(M). WDR TX-83-3: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,335.2 ft above National Geodetic Vertical Datum of 1929, from State Department of Highways and Public Transportation datum.

REMARKS.--No estimated daily discharges. Records good. There are several small diversions above station.

AVERAGE DISCHARGE.--37 years, 35.3 ft³/s (3.80 in/yr), 25,570 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 123,000 ft³/s Aug. 13, 1966 (gage height, 27.6 ft, from floodmark), from rating curve extended above 900 ft³/s on basis of slope-area measurements of 11,400, 30,700, 64,700, and 123,000 ft³/s; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1875 occurred in 1880 (about 33 ft). Flood of June 14, 1935, reached a stage of 26.0 ft (discharge, 64,700 ft³/s, determined at site 2.6 mi upstream), and flood of July 1, 1932, reached a stage of 23 ft (discharge, 30,700 ft³/s, determined at site 2.0 mi upstream), from information by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 200 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
Feb. 17	2045	*30	*2.40				

Minimum daily discharge, 0.15 ft³/s Aug. 7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.8	8.0	6.6	6.6	13	14	13	6.2	2.5	1.3	.21	1.0
2	8.5	7.9	6.8	6.6	12	14	12	5.9	2.4	1.3	.27	.99
3	8.4	7.7	6.7	6.9	11	13	12	5.7	2.2	1.2	.24	.90
4	8.2	7.4	6.6	6.7	10	13	12	5.6	2.2	1.1	.20	.83
5	8.0	7.1	6.7	6.3	9.8	12	11	5.5	1.9	1.0	.16	.78
6	7.5	6.8	6.7	6.3	9.7	12	10	5.4	1.8	.95	.17	.75
7	7.4	6.1	6.9	6.3	9.2	12	10	5.2	1.7	.89	.15	.77
8	7.1	5.8	6.9	6.2	8.9	12	10	5.0	1.6	.86	2.6	.77
9	6.9	6.5	6.8	6.0	8.6	12	9.8	4.8	1.4	.82	3.7	.67
10	6.9	6.8	7.1	6.0	8.2	11	9.6	4.5	1.5	.79	5.5	.61
11	6.6	6.9	7.2	5.8	8.2	11	9.4	4.4	2.0	.72	5.0	.55
12	6.5	6.9	7.2	5.7	8.4	11	9.6	4.4	2.2	.67	3.9	.52
13	6.3	6.6	7.2	5.7	8.6	11	11	4.6	2.5	.60	3.2	.50
14	6.6	6.3	7.2	5.7	8.6	11	11	4.7	3.0	.52	2.8	.49
15	6.6	6.6	7.2	5.7	8.9	10	10	4.8	3.2	.44	2.5	.45
16	6.6	6.5	7.0	5.5	12	10	9.9	5.0	3.0	.33	2.3	.41
17	6.5	6.3	6.9	5.5	22	10	9.4	8.4	2.5	.31	2.2	.36
18	6.3	6.3	6.8	5.5	29	10	9.4	9.0	2.2	.27	1.9	.33
19	6.3	6.8	6.7	6.0	25	11	9.4	7.2	1.9	.25	1.9	.31
20	6.4	6.5	6.9	7.6	23	11	9.3	6.0	1.7	.23	1.8	.32
21	6.6	6.5	6.9	7.1	21	11	8.8	5.4	1.5	.22	1.8	.29
22	7.0	6.6	7.1	6.4	19	11	8.0	4.9	1.5	.22	1.6	.30
23	6.8	6.6	6.9	6.4	18	11	7.5	4.7	1.5	.22	1.5	.25
24	6.7	6.7	6.8	6.6	16	11	7.2	4.4	1.6	.20	1.6	.24
25	6.6	6.9	6.6	6.6	16	11	7.2	4.2	1.5	.21	1.6	.26
26	6.7	7.1	6.6	6.9	15	11	7.3	4.0	1.7	.19	1.4	.26
27	6.9	6.8	6.9	14	15	11	8.4	3.8	1.9	.24	1.4	.25
28	6.9	6.7	6.7	20	14	17	7.7	3.5	1.8	.28	1.3	.25
29	9.3	6.6	6.4	18	---	15	7.0	3.3	1.6	.23	1.2	.25
30	8.9	6.6	6.4	15	---	14	6.4	3.1	1.5	.18	1.2	.21
31	8.2	---	6.6	14	---	14	---	2.9	---	.17	1.1	---
TOTAL	223.0	202.9	212.0	243.6	388.1	368	283.3	156.5	59.5	16.91	56.40	14.87
MEAN	7.19	6.76	6.84	7.86	13.9	11.9	9.44	5.05	1.98	.55	1.82	.50
MAX	9.3	8.0	7.2	20	29	17	13	9.0	3.2	1.3	5.5	1.0
MIN	6.3	5.8	6.4	5.5	8.2	10	6.4	2.9	1.4	.17	.15	.21
AC-FT	442	402	421	483	770	730	562	310	118	34	112	29
CFSM	.06	.05	.05	.06	.11	.09	.07	.04	.02	.00	.01	.00
IN.	.07	.06	.06	.07	.11	.11	.08	.05	.02	.00	.02	.00

CAL YR 1988 TOTAL 4432.4 MEAN 12.1 MAX 266 MIN 3.2 AC-FT 8790 CFSM .10 IN. 1.31
WTR YR 1989 TOTAL 2225.08 MEAN 6.10 MAX 29 MIN .15 AC-FT 4410 CFSM .05 IN. .66

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical and biochemical analyses: January 1966 to current year. Pesticide analyses: January 1974 to current year. Sediment analyses: January 1966.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)
JAN 12...	1645	5.7	359	8.20	14.0	1	0.30	10.4	105	0.6	K18
MAY 04...	1619	5.5	364	8.10	29.0	5	0.30	8.2	113	0.9	K320
AUG 24...	1541	1.5	413	8.50	30.5	<1	0.20	7.7	109	1.1	41

DATE	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CACO3)	HARD-NESS NONCARB WH WAT TOT FLD MG/L AS CACO3	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
JAN 12...	K4	180	19	54	12	6.2	0.2	0.60	166	17	11
MAY 04...	K18	180	21	51	12	6.4	0.2	0.60	156	15	12
AUG 24...	K18	220	25	63	14	7.5	0.2	0.60	190	16	13

DATE	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L)	RESIDUE VOLA-TILE, SUS-PENDED (MG/L)	NITRO-GEN, NITRATE TOTAL (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)
JAN 12...	0.10	8.1	209	<1	<1	--	<0.010	0.400	0.020	0.28	0.30
MAY 04...	0.10	10	201	<1	<1	0.190	0.010	0.200	0.010	0.19	0.20
AUG 24...	0.10	13	241	27	4	--	<0.010	0.300	0.010	--	<0.20

DATE	PHOS-PHORUS TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)
JAN 12...	<0.010	1.3	<1	34	<1	1	<1	20	<5	<1	<0.1
MAY 04...	0.010	1.4	--	--	--	--	--	--	--	--	--
AUG 24...	<0.010	2.1	<1	48	<1	<1	2	6	<1	5	<0.1

DATE	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)
JAN 12...	<1	<1.0	12	<0.1	<0.10	<0.010	<0.1	<0.010	<0.010	<0.010	<0.01
MAY 04...	--	--	--	--	--	--	--	--	--	--	--
AUG 24...	<1	<1.0	<3	<0.1	<0.10	<0.010	<0.1	<0.010	<0.010	<0.010	<0.01

DATE	DI-ELDRIN TOTAL (UG/L)	DI-SYSTON TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METH-OXY-CHLOR, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)
JAN 12...	<0.010	--	<0.010	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
MAY 04...	--	--	--	--	--	--	--	--	--	--	--
AUG 24...	<0.010	<0.01	<0.010	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	METHYL TRI-THION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	PHORATE OTAL (UG/L)	SILVEX, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)
JAN											
12...	<0.01	<0.01	<0.01	<0.1	--	<0.01	<1	<0.01	<0.01	<0.01	<0.01
MAY											
04...	--	--	--	--	--	--	--	--	--	--	--
AUG											
24...	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<1	<0.01	<0.01	<0.01	<0.01

08197500 FRIO RIVER BELOW DRY FRIO RIVER NEAR UVALDE, TX

LOCATION.--Lat 29°14'44", long 99°40'27", Uvalde County, Hydrologic Unit 12110106, on right bank 1.1 mi upstream from Farm Road 1023, 5.7 mi downstream from Dry Frio River, 6.3 mi downstream from bridge on U.S. Highway 90, 7.2 mi northeast of Uvalde, and 194.5 mi upstream from mouth.

DRAINAGE AREA.--631 mi².

PERIOD OF RECORD.--September 1952 to current year. Sum of records published as Frio River at Knippa and Dry Frio River at Knippa for period September 1952 to September 1953 is equivalent to record for this station.

REVISED RECORDS.--WDR TX-83-3: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 882.47 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records good. Part of flow of Frio River enters the Edwards and associated limestones in the Balcones Fault Zone, that crosses the basin between Concan (station 08195000) and this station. Most of the low flow enters this formation. Many diversions for irrigation above station. Satellite telemeter at station.

AVERAGE DISCHARGE.--37 years, 33.7 ft³/s (24,420 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 99,600 ft³/s May 29, 1987 (gage height, 25.05 ft, from floodmark), from rating curve extended above 12,000 ft³/s on basis of slope-area measurements of 24,400, 53,000, and 88,500 ft³/s; no flow most of time each year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1887, about 35 ft in 1894. Flood of July 1, 1932, reached a stage of about 30 ft. A higher flood than that of 1894 occurred prior to 1887. Above information by local residents.

EXTREMES FOR CURRENT YEAR.--No flow during year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
30	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
31	.00	---	.00	.00	---	.00	---	.00	---	.00	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MEAN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MAX	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CAL YR 1988	TOTAL	6945.24	MEAN	19.0	MAX	3520	MIN	.00	AC-FT	13780
WTR YR 1989	TOTAL	0.00	MEAN	.00	MAX	.00	MIN	.00	AC-FT	.00

08198000 SABINAL RIVER NEAR SABINAL, TX

LOCATION.--Lat 29°29'27", long 99°29'33", Uvalde County, Hydrologic Unit 12110106, on right bank 108 ft upstream from concrete dam, 2.3 mi downstream from mouth of Onion Creek, 12.5 mi north of Sabinal, and 41.6 mi upstream from mouth.

DRAINAGE AREA.--206 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1942 to current year.

REVISED RECORDS.--WSP 1312: 1943(M), 1944(M), 1947(M).

GAGE.--Water-stage recorder. Datum of gage is 1,131.20 ft above National Geodetic Vertical Datum of 1929. Prior to Apr. 9, 1971, at site 0.3 mi downstream at same datum.

REMARKS.--No estimated daily discharges. Records good. Several small diversions above station for irrigation.

AVERAGE DISCHARGE.--47 years, 59.3 ft³/s (3.91 in/yr), 42,960 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 55,200 ft³/s June 17, 1958 (gage height, 28.3 ft, from floodmark, at present site), from rating curve extended above 6,900 ft³/s on basis of slope-area measurement of 55,200 ft³/s; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1892, about 33 ft July 2, 1932, from information by local residents. There is a legend that a flood in the middle 1800's reached a stage of nearly 63 ft, see flood history for station 08198500.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
Jan. 28	0300	*85	*5.29				

Minimum daily discharge, 0.02 ft³/s Sept. 26-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	16	11	13	33	26	25	22	5.6	2.8	.70	.30
2	14	14	11	12	30	26	24	19	5.1	2.7	.70	e.26
3	12	13	11	13	27	26	25	18	5.0	2.4	.70	.22
4	12	13	11	12	24	25	25	18	4.5	2.2	.68	.20
5	12	12	11	12	24	24	23	17	4.5	1.9	.52	.17
6	12	11	11	12	23	24	23	17	4.5	1.8	.41	.13
7	11	11	11	11	23	24	23	16	4.1	1.8	.41	.13
8	11	11	11	10	22	24	23	14	4.1	1.8	.78	.13
9	11	11	11	9.7	22	22	22	13	3.7	1.8	.41	.13
10	11	11	11	9.6	21	23	21	13	3.4	1.8	.41	e.11
11	8.8	11	13	10	20	23	21	12	3.7	1.6	e.40	e.09
12	8.4	11	13	10	20	23	22	13	4.1	1.6	e.40	.08
13	9.1	11	13	10	20	24	23	13	3.8	1.4	e.40	.07
14	9.6	10	13	11	20	23	27	13	9.2	1.3	e.40	e.06
15	9.6	10	13	11	20	23	25	13	21	1.3	e.39	e.05
16	9.9	10	13	11	20	24	23	13	13	1.1	e.39	.04
17	10	10	13	11	31	24	22	15	9.5	1.1	e.39	.04
18	9.6	11	12	14	43	24	22	14	8.0	.88	e.39	.04
19	9.6	11	12	16	45	26	21	12	7.3	.87	e.38	.04
20	9.6	11	12	18	41	26	20	11	6.7	.70	e.38	.04
21	9.9	11	12	19	36	25	19	10	5.5	.70	e.38	e.03
22	11	12	12	18	33	24	18	9.6	4.5	.70	e.38	e.03
23	9.9	13	12	17	31	24	18	8.8	4.1	.70	e.37	e.03
24	9.6	13	12	17	29	24	18	8.8	4.3	.68	e.37	e.03
25	9.6	13	12	17	29	24	17	8.0	4.8	.54	e.37	e.03
26	9.6	12	12	17	28	24	17	7.3	5.0	.54	e.37	.02
27	10	12	12	31	27	24	17	6.1	4.2	.54	e.36	.02
28	11	9.7	12	77	27	29	18	5.9	3.8	.62	e.36	.02
29	18	10	11	71	---	31	17	6.1	3.4	.70	.36	.02
30	16	11	11	49	---	30	25	5.6	3.1	.70	e.36	.02
31	18	---	12	37	---	27	---	5.6	---	.70	e.33	---
TOTAL	345.8	345.7	367	606.3	769	770	644	377.8	173.5	39.97	13.65	2.58
MEAN	11.2	11.5	11.8	19.6	27.5	24.8	21.5	12.2	5.78	1.29	.44	.086
MAX	18	16	13	77	45	31	27	22	21	2.8	.78	.30
MIN	8.4	9.7	11	9.6	20	22	17	5.6	3.1	.54	.33	.02
AC-FT	686	686	728	1200	1530	1530	1280	749	344	79	27	5.1
CFSM	.05	.06	.06	.09	.13	.12	.10	.06	.03	.01	.00	.00
IN.	.06	.06	.07	.11	.14	.14	.12	.07	.03	.01	.00	.00

CAL YR 1988 TOTAL 9731.1 MEAN 26.6 MAX 1490 MIN 4.1 AC-FT 19300 CFSM .13 IN. 1.76
WTR YR 1989 TOTAL 4455.30 MEAN 12.2 MAX 77 MIN .02 AC-FT 8840 CFSM .06 IN. .80

e Estimated.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical analyses: November 1964 to July 1965. Chemical and biochemical analyses: February 1970 to current year. Pesticide analyses: August 1971 to current year. Sediment analyses: November 1965.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)
JAN											
11...	0941	8.8	443	7.90	14.0	1	0.40	9.4	94	0.7	20
MAY											
09...	1617	13	440	8.00	27.0	5	0.30	7.7	102	0.6	33
AUG											
29...	1614	0.41	442	8.00	31.5	3	0.30	8.1	115	1.6	70

DATE	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CACO3)	HARD-NESS NONCARB WH WAT TOT FLD MG/L AS CACO3	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
JAN											
11...	31	240	35	72	14	8.7	0.3	1.1	203	33	13
MAY											
09...	31	210	39	63	14	8.5	0.3	1.6	176	30	14
AUG											
29...	120	220	38	64	14	11	0.3	1.3	180	35	16

DATE	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L)	RESIDUE VOLA-TILE, SUS-PENDED (MG/L)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)
JAN											
11...	0.20	11	275	8	<1	<0.010	0.200	0.020	0.28	0.30	<0.010
MAY											
09...	0.20	13	250	<1	<1	<0.010	<0.100	0.020	--	<0.20	<0.010
AUG											
29...	0.20	17	266	<1	<1	<0.010	<0.100	0.010	0.29	0.30	<0.010

DATE	CARBON, ORGANIC TOTAL (MG/L AS C)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)
JAN											
11...	1.3	<1	34	<1	1	<1	7	<5	<1	<0.1	<1
MAY											
09...	1.5	--	--	--	--	--	--	--	--	--	--
AUG											
29...	2.4	<1	36	<1	1	1	6	<1	3	<0.1	<1

DATE	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)	DI-ELDRIN TOTAL (UG/L)
JAN											
11...	<1.0	<3	<0.1	<0.10	<0.010	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010
MAY											
09...	--	--	--	--	--	--	--	--	--	--	--
AUG											
29...	<1.0	8	<0.1	<0.10	<0.010	<0.1	<0.010	<0.010	<0.010	<0.01	<0.010

DATE	DI-SYSTON TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METH-OXY-CHLOR, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)	METHYL TRI-THION, TOTAL (UG/L)
JAN											
11...	--	<0.010	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01
MAY											
09...	--	--	--	--	--	--	--	--	--	--	--
AUG											
29...	<0.01	<0.010	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01

08198000 SABINAL RIVER NEAR SABINAL, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	PHORATE OTAL (UG/L)	SILVEX, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)
JAN										
11...	<0.01	<0.01	<0.1	--	<0.01	<1	<0.01	<0.01	<0.01	<0.01
MAY										
09...	--	--	--	--	--	--	--	--	--	--
AUG										
29...	<0.01	<0.01	<0.1	<0.01	<0.01	<1	<0.01	<0.01	<0.01	<0.01

08198500 SABINAL RIVER AT SABINAL, TX

LOCATION.--Lat 29°18'05", long 99°28'46", Uvalde County, Hydrologic Unit 12110106, on left bank 80 ft downstream from bridge on U.S. Highway 90, 1,100 ft downstream from Southern Pacific Lines railroad bridge, 0.8 mi west of Sabinal, 5.8 mi upstream from Ranchero Creek, and 223 mi upstream from mouth.

DRAINAGE AREA.--241 mi².

PERIOD OF RECORD.--September 1952 to current year.

REVISED RECORDS.--WDR TX-83-3: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 882.17 ft above National Geodetic Vertical Datum of 1929. Prior to July 29, 1958, nonrecording gage, and July 29, 1958, to Mar. 19, 1964, water-stage recorder at site 80 ft upstream at same datum.

REMARKS.--No estimated daily discharges. Records fair. Several small diversions for irrigation above station. Most of low flow of the Sabinal River enters the Edwards and associated limestones in the Balcones Fault Zone, that crosses basin upstream from this station and downstream from Sabinal River near Sabinal (station 08198000). Several observations of water temperature were made during the year. Satellite telemeter at station.

AVERAGE DISCHARGE.--37 years, 33.6 ft³/s (24,340 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 73,300 ft³/s June 17, 1958 (gage height, 33.3 ft); no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1890, 40 ft Aug. 24, 1919, from information by local residents. Flood of July 2, 1932, reached a stage of 31 ft (discharge, 60,000 ft³/s), from information by Southern Pacific Lines. There is a legend that a flood in 1858 covered the townsite of Sabinal. The stage would have been 70 to 80 ft, which seems unlikely. However, it is possible that a flood occurred in 1858 that covered part of the townsite and was higher than any flood since that date.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 100 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
Oct. 31	0830	a Unknown	*4.38	Aug. 8	0600	*13	3.40

a Backwater from debris on control.

Minimum daily discharge, 0.12 ft³/s Aug. 5-7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.7	2.6	2.2	2.0	2.3	1.5	1.4	.85	.65	.40	.16	.58
2	2.5	2.6	2.1	2.0	2.2	1.4	1.4	.85	.65	.30	.16	.58
3	2.5	2.6	2.0	2.0	2.2	1.4	1.4	.85	.65	.30	.16	.58
4	2.5	2.5	2.0	2.0	2.2	1.4	1.4	.85	.65	.30	.15	.58
5	2.5	2.5	2.0	2.0	2.1	1.3	1.4	.85	.65	.30	.12	.58
6	2.5	2.4	2.0	1.9	2.0	1.3	1.4	.85	.65	.30	.12	.68
7	2.5	2.4	2.0	1.9	2.0	1.3	1.4	.85	.65	.30	.12	.71
8	2.5	2.4	2.0	1.9	2.0	1.3	1.4	.85	.64	.25	3.1	.75
9	2.5	2.4	2.0	1.9	1.9	1.3	1.4	.81	.71	.25	1.0	.77
10	2.5	2.4	2.0	1.9	1.9	1.3	1.4	.71	.71	.25	.99	.99
11	2.4	2.4	2.0	1.9	1.9	1.3	1.4	.71	.67	.25	.93	1.6
12	2.4	2.4	2.0	1.9	1.9	1.2	1.4	.71	.68	.25	.82	1.2
13	2.4	2.4	2.0	1.9	1.7	1.1	1.4	.71	.74	.22	.78	.95
14	2.4	2.4	2.0	1.9	1.7	1.1	1.4	.71	1.0	.20	.78	.92
15	2.3	2.4	2.0	2.0	1.7	1.1	1.3	.69	.65	.20	.78	.85
16	2.2	2.4	2.0	2.0	2.0	1.1	1.2	.65	.65	.20	.71	.85
17	2.0	2.4	2.0	2.0	1.8	1.1	1.2	.69	.65	.20	.71	.81
18	2.1	2.4	2.1	2.0	1.8	1.0	1.2	.71	.65	.20	.71	.78
19	2.2	2.5	2.0	2.3	1.7	1.0	1.2	.67	.65	.20	.71	.78
20	2.2	2.6	2.0	2.5	1.6	1.2	1.2	.65	.63	.20	.71	.78
21	2.3	2.6	2.0	2.0	1.6	1.2	1.2	.65	.57	.20	.71	.78
22	2.5	2.6	2.0	2.0	1.7	1.2	1.2	.65	.51	.20	.71	.78
23	2.5	2.6	2.0	2.0	1.7	1.2	1.2	.65	.46	.20	.71	.78
24	2.5	2.6	2.0	2.1	1.6	1.2	1.2	.65	.46	.18	.81	.78
25	2.6	2.6	2.0	2.1	1.6	1.2	1.1	.65	.51	.16	.85	.78
26	2.6	2.6	1.9	2.9	1.6	1.1	1.1	.65	.58	.16	.76	.78
27	2.7	2.6	1.9	2.8	1.5	1.1	1.0	.65	.52	.16	.71	.78
28	2.6	2.5	1.9	2.8	1.5	1.4	.99	.65	.42	.16	.71	.78
29	3.2	2.5	2.0	2.6	---	1.4	1.2	.65	.40	.16	.65	.78
30	2.6	2.4	2.0	2.5	---	1.4	1.0	.65	.40	.16	.62	.78
31	3.3	---	2.0	2.4	---	1.4	---	.65	---	.16	.58	---
TOTAL	77.2	74.7	62.1	66.1	51.4	38.5	38.09	22.37	18.41	6.97	21.54	24.12
MEAN	2.49	2.49	2.00	2.13	1.84	1.24	1.27	.72	.61	.22	.69	.80
MAX	3.3	2.6	2.2	2.9	2.3	1.5	1.4	.85	1.0	.40	3.1	1.6
MIN	2.0	2.4	1.9	1.9	1.5	1.0	.99	.65	.40	.16	.12	.58
AC-FT	153	148	123	131	102	76	76	44	37	14	43	48

CAL YR 1988 TOTAL 2420.0 MEAN 6.61 MAX 1290 MIN 1.5 AC-FT 4800
WTR YR 1989 TOTAL 501.50 MEAN 1.37 MAX 3.3 MIN .12 AC-FT 995

08200000 HONDO CREEK NEAR TARPLEY, TX

LOCATION.--Lat 29°34'10", long 99°14'47", Medina County, Hydrologic Unit 12110107, on left bank 460 ft downstream from bridge on Ranch Road 462, 6.3 mi southeast of Tarpley, and 16.6 mi northwest of Hondo.

DRAINAGE AREA.--95.6 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1952 to current year.

REVISED RECORDS.--WSP 1712: 1957. WDR TX-83-3: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,169.1 ft, from Magnolia Oil Co. datum.

REMARKS.--Records good to June 29 and poor thereafter. There are several small diversions for irrigation above station.

AVERAGE DISCHARGE.--37 years, 40.0 ft³/s (5.68 in/yr), 28,980 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 69,800 ft³/s June 17, 1958 (gage height, 28.2 ft, from floodmark), from rating curve extended above 2,600 ft³/s on basis of slope-area measurements of 18,600 and 69,800 ft³/s; no flow at times in 1952-57, 1962-64, 1967, 1971, 1984, and 1989.
Maximum stage since at least 1907, that of June 17, 1958.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in July 1932 reached a stage of about 26 ft (discharge, 58,500 ft³/s), from information by local resident.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
May 17	0845	*208	*2.41				

Minimum daily discharge, no flow Aug. 24 to Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.8	5.2	2.2	1.7	9.9	9.9	8.6	4.7	1.3	e.20	e.04	.00
2	6.0	5.0	2.1	1.7	9.6	10	8.6	4.4	1.3	e.15	e.05	.00
3	5.9	4.8	2.0	1.7	10	10	7.9	4.4	1.2	.19	e.04	.00
4	5.7	4.3	1.9	1.6	8.1	9.9	7.4	4.5	1.0	e.23	e.03	.00
5	5.4	3.8	2.0	1.6	8.0	8.8	6.9	4.0	1.0	e.23	e.03	.00
6	5.3	3.6	2.0	1.6	7.8	8.7	6.8	1.3	.94	e.20	e.03	.00
7	5.2	3.7	2.0	1.6	7.5	8.7	6.7	1.6	.88	e.19	e.03	.00
8	5.1	3.7	2.2	1.5	7.6	8.4	6.6	2.2	.68	e.19	e.16	.00
9	5.1	3.7	2.3	1.5	7.5	8.4	6.2	2.5	.61	e.19	e.05	.00
10	4.9	3.6	2.5	1.5	7.3	8.0	6.2	2.7	.60	e.18	e.02	.00
11	4.7	3.3	2.4	1.6	7.6	8.0	6.3	2.7	.61	e.13	e.02	.00
12	4.7	3.4	2.1	1.6	7.8	8.0	6.8	2.7	.58	e.13	e.02	.00
13	4.6	3.1	1.8	2.7	7.6	8.0	8.3	2.9	.50	e.13	e.02	.00
14	4.4	3.2	1.8	2.2	7.5	8.0	9.3	2.9	2.5	e.13	e.01	.00
15	4.4	3.3	1.8	1.7	8.3	8.0	7.9	2.9	2.2	e.12	e.01	.00
16	4.4	3.1	1.6	1.5	9.7	8.0	7.5	3.0	1.5	e.11	e.01	.00
17	4.3	2.9	1.7	1.6	10	8.0	7.3	18	1.2	e.11	e.01	.00
18	4.1	3.1	1.7	1.9	10	8.4	7.0	6.0	1.0	e.09	e.01	.00
19	4.1	3.2	1.7	3.2	10	8.4	7.0	4.4	.84	e.09	e.01	.00
20	4.0	2.7	1.8	5.9	10	10	6.6	4.0	.63	e.07	e.01	.00
21	4.3	2.6	1.9	3.2	10	8.7	6.3	3.9	.47	e.07	e.01	.00
22	3.9	2.8	1.9	2.5	10	8.1	6.0	3.7	.39	e.06	e.01	.00
23	4.1	2.8	1.9	2.7	9.9	7.7	5.7	3.2	.31	e.06	e.01	.00
24	4.4	2.6	1.8	2.9	10	7.6	5.5	2.8	.34	e.06	.00	.00
25	3.9	2.7	1.7	2.9	10	7.7	5.4	2.5	.37	e.05	.00	.00
26	4.1	2.7	1.7	7.5	10	8.4	5.4	2.0	.33	e.04	.00	.00
27	4.1	2.3	1.9	17	9.9	8.2	5.2	.61	.29	e.05	.00	.00
28	4.0	2.1	1.8	18	9.7	15	4.8	.43	.28	e.06	.00	.00
29	6.8	2.3	1.7	15	---	11	4.5	.97	.24	e.05	.00	.00
30	4.7	2.4	1.8	13	---	9.5	5.9	1.2	e.20	e.04	.00	.00
31	5.3	---	1.8	11	---	8.7	---	1.2	---	e.03	.00	---
TOTAL	148.7	98.0	59.5	135.6	251.3	274.2	200.6	104.31	24.29	3.63	0.64	0.00
MEAN	4.80	3.27	1.92	4.37	8.97	8.85	6.69	3.36	.81	.12	.021	.00
MAX	6.8	5.2	2.5	18	10	15	9.3	18	2.5	.23	.16	.00
MIN	3.9	2.1	1.6	1.5	7.3	7.6	4.5	.43	.20	.03	.00	.00
AC-FT	295	194	118	269	498	544	398	207	48	7.2	1.3	.0
CFSM	.05	.03	.02	.05	.09	.09	.07	.04	.01	.00	.00	.00
IN.	.06	.04	.02	.05	.10	.11	.08	.04	.01	.00	.00	.00

CAL YR 1988	TOTAL	2897.65	MEAN	7.92	MAX	469	MIN	.90	AC-FT	5750	CFSM	.08	IN.	1.13
WTR YR 1989	TOTAL	1300.77	MEAN	3.56	MAX	18	MIN	.00	AC-FT	2580	CFSM	.04	IN.	.51

e Estimated.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical analyses: November 1965 to September 1969. Chemical and biochemical analyses: February 1970 to current year. Pesticide analyses: August 1971 to current year. Sediment analyses: November to December 1965.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)
JAN											
10...	0953	1.6	351	7.80	9.5	1	0.50	10.7	96	0.9	25
MAY											
11...	1605	2.7	356	8.00	25.0	5	0.30	8.8	112	0.8	160

DATE	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CACO3)	HARD-NESS NONCARB WH WAT TOT FLD MG/L AS CACO3	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
JAN											
10...	38	180	53	55	11	7.2	0.2	1.2	130	51	11
MAY											
11...	43	170	44	48	11	7.3	0.3	1.7	121	41	12

DATE	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L)	RESIDUE VOLA-TILE, SUS-PENDED (MG/L)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)
JAN											
10...	0.20	9.0	224	<1	<1	<0.010	<0.100	0.020	0.28	0.30	<0.010
MAY											
11...	0.20	12	206	<1	<1	0.010	<0.100	0.020	--	<0.20	0.010

DATE	CARBON, ORGANIC TOTAL (MG/L AS C)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)
JAN											
10...	1.2	<1	23	<1	<1	<1	7	<5	2	<0.1	<1
MAY											
11...	1.7	--	--	--	--	--	--	--	--	--	--

DATE	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)
JAN										
10...	<1.0	5	<0.1	<0.10	<0.010	<0.1	<0.010	<0.010	<0.010	<0.01
MAY										
11...	--	--	--	--	--	--	--	--	--	--

DATE	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METH-OXY-CHLOR, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)
JAN										
10...	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
MAY										
11...	--	--	--	--	--	--	--	--	--	--

DATE	METHYL TRI-THION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	SILVEX, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)
JAN										
10...	<0.01	<0.01	<0.01	<0.1	<0.01	<1	<0.01	<0.01	<0.01	<0.01
MAY										
11...	--	--	--	--	--	--	--	--	--	--

08200700 HONDO CREEK AT KING WATERHOLE NEAR HONDO, TX

LOCATION.--Lat 29°23'26", long 99°09'04", Medina County, Hydrologic Unit 12110107, on left bank 0.3 mi downstream from county road low-water crossing, 3.1 mi north of Hondo, 7.8 mi upstream from Verde Creek, and 55.4 mi upstream from mouth.

DRAINAGE AREA.--149 mi².

PERIOD OF RECORD.--October 1960 to current year.

REVISED RECORDS.--WDR TX-83-3: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 897.87 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good. Most of the low flow of Hondo Creek enters the Edwards and associated limestones in the Balcones Fault Zone, that crosses the basin between Tarpley (station 08200000) and this station. There are several small diversions above station for irrigation. Satellite telemeter at station.

AVERAGE DISCHARGE.--29 years, 15.9 ft³/s (11,520 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 51,800 ft³/s May 29, 1987 (gage height, 17.19 ft), from rating curve extended above 16.0 ft; no flow most of time.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1875, 21 ft in September 1919, from information by local resident. Other floods occurred in July 1932, stage 18 ft, and June 17, 1958, stage 17 ft.

EXTREMES FOR CURRENT YEAR.--No flow during year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
30	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
31	.00	---	.00	.00	---	.00	---	.00	---	.00	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MEAN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MAX	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CAL YR 1988 TOTAL 79.90 MEAN .22 MAX 62 MIN .00 AC-FT 158
WTR YR 1989 TOTAL 0.00 MEAN .00 MAX .00 MIN .00 AC-FT .00

08201500 SECO CREEK AT MILLER RANCH NEAR UTOPIA, TX

LOCATION.--Lat 29°34'23", long 99°24'10", Medina County, Hydrologic Unit 12110107, on right bank 200 ft upstream from county road crossing, 4.5 mi downstream from Cascade Creek, 7.9 mi southeast of Utopia, and 58.0 mi upstream from mouth.

DRAINAGE AREA.--45.0 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1961 to current year.

REVISED RECORDS.--WDR TX-83-3: Drainage area.

GAGE.--Water-stage recorder, crest-stage gages, and concrete control. Datum of gage is 1,265.8 ft, from Magnolia Oil Company datum, adjustment unknown.

REMARKS.--No estimated daily discharges. Records good. No known diversion above station.

AVERAGE DISCHARGE.--28 years, 19.0 ft³/s (5.73 in/yr), 13,770 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 38,500 ft³/s July 15, 1973 (gage height, 14.4 ft, from floodmark), from rating curve extended above 910 ft³/s on basis of field estimate of flow over and around the end of dam, 14,100 ft³/s, and slope-area measurement of 52,600 ft³/s; no flow for many days in 1963, 1964, and 1989.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1901, 16.4 ft June 17, 1958, from floodmarks (discharge, 52,600 ft³/s, by slope-area measurement of peak flow).

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
Mar. 28	1300	*9.0	*1.83				

Minimum daily discharge, no flow for many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.1	1.2	.58	.54	2.6	2.8	1.9	1.6	.29	.04	.0	.00
2	1.1	.98	.58	.50	2.4	2.8	1.9	1.3	.25	.03	.00	.00
3	.99	.91	.58	.53	3.0	2.8	2.1	1.2	.23	.02	.00	.00
4	.81	.74	.58	.58	2.3	2.8	2.1	1.2	.23	.02	.00	.00
5	.73	.68	.58	.58	2.2	2.3	2.0	1.2	.15	.02	.00	.00
6	.68	.63	.58	.58	2.3	2.4	1.8	1.2	.14	.02	.00	.00
7	.68	.58	.58	.58	2.1	2.4	1.9	1.1	.15	.02	.00	.00
8	.68	.58	.58	.52	2.2	2.4	1.9	1.1	.14	.02	.06	.00
9	.68	.63	.58	.50	2.2	2.4	1.8	1.0	.11	.01	.01	.00
10	.74	.68	.58	.53	2.2	2.4	1.5	.92	.11	.01	.01	.00
11	.71	.62	.58	.58	2.2	2.4	1.6	.92	.12	.01	.01	.00
12	.68	.62	.58	.62	2.2	2.4	1.6	.92	.11	.01	.01	.00
13	.68	.63	.68	.97	2.4	2.4	2.6	.92	.20	.01	.01	.00
14	.68	.58	.64	.76	2.2	2.4	3.8	.92	.95	.01	.01	.00
15	.68	.58	.58	.68	2.7	2.4	2.1	.92	.21	.01	.01	.00
16	.68	.58	.58	.68	4.1	2.3	1.9	.92	.15	.01	.01	.00
17	.68	.54	.58	.68	3.8	2.2	1.7	2.2	.11	.0	.0	.00
18	.68	.50	.54	.68	3.9	2.3	1.8	2.0	.09	.0	.00	.00
19	.68	.57	.52	.96	3.6	2.3	1.8	1.2	.09	.01	.00	.00
20	.68	.50	.58	2.7	3.6	2.5	1.7	1.0	.09	.0	.00	.00
21	.89	.50	.58	2.2	3.5	2.2	1.6	.85	.09	.0	.00	.00
22	.72	.50	.58	1.4	3.1	1.9	1.5	.62	.05	.0	.00	.00
23	.68	.50	.58	1.3	3.1	1.8	1.4	.57	.05	.0	.00	.00
24	.68	.53	.58	1.2	3.1	1.8	1.4	.53	.04	.0	.00	.00
25	.68	.58	.58	1.1	3.1	1.9	1.4	.49	.05	.00	.00	.00
26	.68	.58	.58	1.6	3.3	2.1	1.4	.43	.04	.00	.00	.00
27	.68	.49	.60	5.6	3.1	2.2	1.4	.42	.04	.01	.00	.00
28	.84	.46	.58	5.8	2.9	5.8	1.4	.39	.04	.01	.00	.00
29	2.6	.52	.58	5.1	---	2.9	1.5	.29	.03	.00	.00	.00
30	1.6	.58	.58	4.0	---	2.2	2.4	.29	.03	.00	.00	.00
31	1.4	---	.58	3.0	---	2.0	---	.29	---	.00	.00	---
TOTAL	26.47	18.57	18.06	47.05	79.4	75.9	54.9	28.91	4.38	0.30	0.14	0.00
MEAN	.85	.62	.58	1.52	2.84	2.45	1.83	.93	.15	.010	.005	.00
MAX	2.6	1.2	.68	5.8	4.1	5.8	3.8	2.2	.95	.04	.06	.00
MIN	.68	.46	.52	.50	2.1	1.8	1.4	.29	.03	.00	.00	.00
AC-FT	53	37	36	93	157	151	109	57	8.7	.6	.3	.0
CFSM	.02	.01	.01	.03	.06	.05	.04	.02	.00	.00	.00	.00
IN.	.02	.02	.01	.04	.07	.06	.05	.02	.00	.00	.00	.00

CAL YR 1988 TOTAL 734.68 MEAN 2.01 MAX 29 MIN .36 AC-FT 1460 CFSM .04 IN. .61
WTR YR 1989 TOTAL 354.08 MEAN .97 MAX 5.8 MIN .00 AC-FT 702 CFSM .02 IN. .29

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical analyses: November 1965 to September 1969. Chemical and biochemical analyses: March 1970 to current year. Pesticide analyses: January 1974 to current year. Sediment analyses: November 1965.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND	SPECIFIC CONDUCTANCE (US/CM)	PH (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (NTU)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)	OXYGEN DEMAND, BIOCHEMICAL, 5 DAY (MG/L)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)
JAN											
10...	1423	0.50	384	8.40	15.0	2	0.30	12.0	123	1.6	37
MAY											
10...	1540	0.94	398	8.20	31.0	3	0.20	11.0	156	1.0	--

DATE	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS TOTAL (MG/L AS CACO3)	HARDNESS NONCARB WH WAT TOT FLD MG/L AS CACO3	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)	ALKALINITY WAT WH TOT FET FIELD MG/L AS CACO3	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)
JAN											
10...	65	200	75	57	13	8.0	0.3	1.2	121	66	14
MAY											
10...	K110	190	87	55	13	8.1	0.3	1.3	104	76	13

DATE	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	RESIDUE TOTAL AT 105 DEG. C, SUSPENDED (MG/L)	RESIDUE VOLATILE, SUSPENDED (MG/L)	NITROGEN, NITRITE TOTAL (MG/L AS N)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, ORGANIC TOTAL (MG/L AS N)	NITROGEN,AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS TOTAL (MG/L AS P)
JAN											
10...	0.20	8.8	241	<1	<1	<0.010	<0.100	0.020	0.48	0.50	<0.010
MAY											
10...	0.20	13	242	<1	<1	0.020	<0.100	0.020	--	<0.20	<0.010

DATE	CARBON, ORGANIC TOTAL (MG/L AS C)	ARSENIC DISSOLVED (UG/L AS AS)	BARIUM, DISSOLVED (UG/L AS BA)	CADMIUM DISSOLVED (UG/L AS CD)	CHROMIUM, DISSOLVED (UG/L AS CR)	COPPER, DISSOLVED (UG/L AS CU)	IRON, DISSOLVED (UG/L AS FE)	LEAD, DISSOLVED (UG/L AS PB)	MANGANESE, DISSOLVED (UG/L AS MN)	MERCURY DISSOLVED (UG/L AS HG)	SELENIUM, DISSOLVED (UG/L AS SE)
JAN											
10...	1.9	<1	24	<1	10	<1	11	<5	<1	<0.1	<1
MAY											
10...	1.9	--	--	--	--	--	--	--	--	--	--

DATE	SILVER, DISSOLVED (UG/L AS AG)	ZINC, DISSOLVED (UG/L AS ZN)	PCB, TOTAL (UG/L)	NAPHTHALENES, POLYCHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLORDANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DIAZINON, TOTAL (UG/L)
JAN										
10...	1.0	46	<0.1	<0.10	<0.010	<0.1	<0.010	<0.010	<0.010	<0.01
MAY										
10...	--	--	--	--	--	--	--	--	--	--

DATE	DIELDRIN TOTAL (UG/L)	ENDOSULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTACHLOR, TOTAL (UG/L)	HEPTACHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALATHION, TOTAL (UG/L)	METHOXYCHLOR, TOTAL (UG/L)	METHYL PARATHION, TOTAL (UG/L)
JAN										
10...	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
MAY										
10...	--	--	--	--	--	--	--	--	--	--

DATE	METHYL TRITHION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARATHION, TOTAL (UG/L)	PERTHANE TOTAL (UG/L)	SILVEX, TOTAL (UG/L)	TOXAPHENE, TOTAL (UG/L)	TOTAL TRITHION (UG/L)	2,4-D, TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)
JAN										
10...	<0.01	<0.01	<0.01	<0.1	<0.01	<1	<0.01	<0.01	<0.01	<0.01
MAY										
10...	--	--	--	--	--	--	--	--	--	--

08202700 SECO CREEK AT ROWE RANCH NEAR D'HANIS, TX

LOCATION.--Lat 29°21'43", long 99°17'05", Medina County, Hydrologic Unit 12110107, on left bank 2.9 mi north of D'Hanis and 8.0 mi downstream from Rocky Creek.

DRAINAGE AREA.--168 mi².

PERIOD OF RECORD.--November 1960 to current year.

GAGE.--Water-stage recorder. Datum of gage is 900.88 ft above National Geodetic Vertical Datum of 1929. Prior to October 1970, published as "at Crook Ranch, near D'Hanis".

REMARKS.--No estimated daily discharges. Records good. All of the low flow of Seco Creek enters the Edwards and associated limestones in the Balcones Fault Zone that crosses the basin between Miller Ranch (station 08201500) and this station. No known diversion above station.

AVERAGE DISCHARGE.--28 years (water years 1962-89), 8.77 ft³/s (6,350 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 35,800 ft³/s May 29, 1987 (gage height, 28.20 ft), from rating curve extended above 25,100 ft³/s on basis of slope-area measurement of 35,800 ft³/s; no flow most of time each year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1852, 35.7 ft May 31, 1935, from information by local resident. Other floods occurred Aug. 31, 1894, 33 ft; September 1919, 28 ft; July 2, 1932, 28.2 ft (discharge, 35,800 ft³/s), by slope-area measurement; and June 17, 1958, 32.4 ft.

EXTREMES FOR CURRENT YEAR.--No flow during year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
30	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
31	.00	---	.00	.00	---	.00	---	.00	---	.00	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MEAN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MAX	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CAL YR 1988 TOTAL 0.00 MEAN .00 MAX .00 MIN .00 AC-FT .00
WTR YR 1989 TOTAL 0.00 MEAN .00 MAX .00 MIN .00 AC-FT .00

NUECES RIVER BASIN

08204000 LEONA RIVER SPRING FLOW NEAR UVALDE, TX

LOCATION.--Lat 29°09'15", long 99°44'35", Uvalde County, Hydrologic Unit 12110106, at old road crossing on White's Ranch, 2.0 mi downstream from Cooks Slough, and 4.7 mi southeast of Uvalde.

DRAINAGE AREA.--Not applicable. Normal flow of river comes from springs.

PERIOD OF RECORD.--1939 to current year. Miscellaneous discharge measurements 1925-39 in connection with seepage investigations. Operated as continuous record station from January 1939 to September 1965. Miscellaneous discharge measurements since September 1965.

GAGE.--Nonrecording. Datum of gage is 838.39 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Discharge represents flow from several springs that enter river above station and below Uvalde. Surface runoff from precipitation is excluded. No known diversion above station.

AVERAGE DISCHARGE.--26 years (during period of continuous record, water years 1940-65), 9.72 ft^3/s, 7,040 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--(1939 to current year.) Maximum measured spring discharge, 82 ft^3/s May 25, 1977; no flow at times in 1948-49, 1951-59, 1964-68, and 1984-85.

DISCHARGE MEASUREMENTS, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

Date	Discharge (ft^3/s)	Date	Discharge (ft^3/s)	Date	Discharge (ft^3/s)
Oct. 28, 1988	36.4	Mar. 10, 1989	34.8	June 29, 1989	4.4
Jan. 23, 1989	40.2	May 4	23.9	Aug. 22	5.1

APPENDIX D. SUPPLEMENTAL INFORMATION

DEFINITIONS OF TERMS

Technical terms and abbreviations used in this report are defined as follows:

acre-foot (AC-FT, acre-ft) is the quantity of water required to cover 1 acre to a depth of 1 foot and is equivalent to 43,560 cubic feet, about 326,000 gallons, or 1,233 cubic meters.

acre-inch (AC-IN, acre-in) is the quantity of water required to cover 1 acre to a depth of 1 inch and is equivalent to 3,630 cubic feet, about 27,200 gallons, or 103 cubic meters.

bacteria are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, often clumped in colonies. Some bacteria cause disease, others perform an essential role in nature in the recycling of materials; for example, by decomposing organic matter into a form available for reuse by plants.

total-coliform bacteria are a particular group of bacteria that are used as indicators of possible sewage pollution. They are characterized as aerobic or facultative anaerobic, gram-negative, nonspore-forming, rod-shaped bacteria which ferment lactose with gas formation within 48 hours at 35 °C (degrees Celsius). In the laboratory these bacteria are defined as the organisms which produce colonies with a golden-green metallic sheen within 24 hours when incubated at 35 °C + 1.0 °C on M-Endo medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL (milliliters) of sample.

fecal-coliform bacteria are bacteria that are present in the intestines or feces of warm-blooded animals. They are often used as indicators of the sanitary quality of the water. In the laboratory they are defined as all organisms which produce blue colonies within 24 hours when incubated at 44.5

°C + 0.2 °C on M-FC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

fecal-streptococcal bacteria are bacteria found in intestines of warm-blooded animals. Their presence in water is considered to verify fecal pollution. They are characterized as gram-positive, cocci bacteria which are capable of growth in brain-heart infusion broth. In the laboratory they are defined as all the organisms which produce red or pink colonies within 48 hours at 35 °C + 1.0 °C on M-enterrococcus medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

biochemical oxygen demand (BOD) is a measure of the quantity of dissolved oxygen, in milligrams per liter, necessary for the decomposition of organic matter by microorganisms, such as bacteria.

cfs-day is the volume of water represented by flow of 1 cubic foot per second for 24 hours. It is equivalent to 86,400 cubic feet, approximately 1.9835 acre-feet, about 646,000 gallons, or 2,447 cubic meters.

chemical oxygen demand (COD) is a measure of the chemically oxidizable material in the water and furnishes an approximation of the amount of organic and reducing material present. The determined value may correlate with natural water color or with carbonaceous organic pollution from sewage or industrial wastes.

color unit is produced by 1 milligram per liter of platinum in the form of the chloroplatinate ion. Color is expressed in units of the platinum-cobalt scale.

contents is the volume of water in a reservoir or lake and, unless otherwise indicated, is computed on the basis of a level pool. The computation does not include bank storage.

control designates a feature downstream from a gage that determines the stage-discharge relation at the gage. This feature may be a natural constriction of the channel, an artificial structure, or a uniform cross section over a long reach of the channel.

cubic foot per second (FT^3/S, ft^3/s) is the rate of discharge representing a volume of 1 cubic foot passing a given point during 1 second. This rate is equivalent to approximately 7.48 gallons per second, 448.8 gallons per minute, or 0.02832 cubic meter per second.

cubic foot per second per square mile (CFSM) is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming that the runoff is distributed uniformly in time and area.

discharge is the volume of water (or more broadly, volume of fluid plus suspended sediment) that passes a given point within a given period of time.

mean discharge (MEAN) is the arithmetic mean of individual daily mean discharges during a specific period.

instantaneous discharge is the discharge at a particular instant of time.

dissolved refers to that material in a representative water sample which passes through a 0.45-μm (micrometer) membrane filter. This is a convenient operational definition used by Federal agencies that collect water data. Determinations of "dissolved" constituents are made on subsamples of the filtrate.

drainage area of a stream at a specified location is that area, measured in a horizontal plane, enclosed by a topographic divide from which direct surface runoff from precipitation normally drains by gravity into the stream above the specified location. Figures of drainage area given herein include all closed basins or noncontributing areas within the area, unless otherwise noted.

drainage basin is a part of the surface of the earth that is occupied by a drainage system, which consists of a surface stream or a body of impounded

surface water together with all tributary surface streams and bodies of impounded surface water.

duty is that amount of water applied to a particular crop in a year when the seasonal precipitation occurrences and crop needs are taken into account, usually measured in acre-inches (acre-in).

gage height (G.HT.) is the water-surface elevation referred to some arbitrary gage datum. Gage height is often used interchangeably with the more general term "stage" although gage height is more appropriate when used with a reading on a gage.

gaging station is a particular site on a stream, canal, lake, or reservoir where systematic observations of hydrologic data are obtained.

hydrologic unit is a geographic area representing part or all of a surface drainage basin or distinct hydrologic feature as delineated by the Office of Water Data Coordination on the State Hydrologic Unit Maps; each hydrologic unit is identified by an eight-digit number.

micrograms per liter (Ug/L, µg/L) is a unit expressing the concentration of chemical constituents in solution as mass (micrograms) of solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to 1 milligram per liter.

milligrams per liter (Mg/L, mg/L) is a unit for expressing the concentration of chemical constituents in solution. Milligrams per liter represent the mass of solute per unit volume (liter) of water. Concentration of suspended sediment also is expressed in milligrams per liter and is based on the mass of sediment per liter of water-sediment mixture.

National Geodetic Vertical Datum of 1929 (NGVD) is a geodetic datum derived from a general adjustment of the first order level nets of both the United States and Canada. It was formerly called Sea Level Datum of 1929 or mean sea level. Although the datum was derived from the average sea level over a

period of many years at 26 tide stations along the Atlantic, Gulf of Mexico, and Pacific Coasts, it does not necessarily represent local mean sea level at any particular place.

pCi/L is the notation for picocuries per liter and is equal to 3.7×10^{-2} radioactive nuclide disintegrations per second per liter.

partial record station is a particular site where limited streamflow and (or) water-quality data are collected systematically over a period of years for use in hydrologic analyses.

pesticides are chemical compounds used to control undesirable plants and animals. Major categories of pesticides include insecticides and herbicides, which control insects and plants, respectively, and are the two categories reported.

polychlorinated biphenyls (PCBs) are industrial chemicals that are mixtures of chlorinated biphenyl compounds having various percentages of chlorine. They are similar in structure to organochlorine insecticides.

runoff in inches shows the depth to which the drainage area would be covered if all the runoff for a given time period were uniformly distributed on it.

sodium adsorption ratio (SAR) is the expression of relative activity of sodium ions in exchange reactions with soil and is an index of sodium or alkali hazard to the soil. This ratio should be known especially for water used for irrigation.

solute is any substance derived from the atmosphere, vegetation, soil, or rocks that is dissolved in water.

specific conductance is a measure of the ability of a water to conduct an electrical current. It is expressed in microsiemens per centimeter at 25 °C. Specific conductance is related to the type and concentration of ions in

solution and can be used for approximating the dissolved-solids concentration in the water. Commonly, the concentration of dissolved solids (in milligrams per liter) is about 65 percent of the specific conductance (in microsiemens) for streams. This relation is not constant from well to well or from stream to stream, and it may vary in the same source with changes in the composition of the water.

stage-discharge relation is the relation between gage height (stage) and the amount of water per unit of time flowing in a channel.

streamflow is the discharge that occurs in a natural channel. Although the term "discharge" can be applied to the flow of a canal, the word "streamflow" uniquely describes the discharge in a surface stream course. The term "streamflow" is more general than "runoff" as streamflow may be applied to discharge whether or not it is affected by diversion or regulation.

suspended, recoverable refers to the amount of a given constituent that is in solution after the part of a representative water-suspended sediment sample that is retained on a 0.45-μm membrane filter has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all particulate matter is not achieved by the digestion treatment, and thus the determination represents something less than the "total" amount (that is, less than 95 percent) of the constituent present in the sample. To achieve comparability of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results. Determinations of "suspended, recoverable" constituents are made either by analyzing parts of the material collected on the filter, or, more commonly, by difference, based on determinations of (1) dissolved and (2) total recoverable concentrations of the constituent.

suspended, total refers to the total amount of a given constituent in the part of a representative water-suspended sediment sample that is retained on a 0.45-μm membrane filter. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent determined. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to determine when the results should be reported as "suspended, total." Determinations of "suspended, total" constituents are made either by analyzing parts of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total concentrations of the constituent.

total refers to the total amount of a given constituent in a representative water-suspended sediment sample regardless of the constituent's physical or chemical form. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent present in both the dissolved and suspended phases of the sample. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to judge when the results should be reported as "total." (Note that the word "total" does double duty here, indicating that the sample consists of water-suspended sediment mixture and that the analytical method determines all of the constituent in the sample.)

total, recoverable refers to the amount of a given constituent that is in solution after a representative water-suspended sediment sample has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all particulate matter is not achieved by the digestion treatment, and thus the determination represents something less than the "total" amount (that is, less than 95 percent) of the constituent present in the dissolved and suspended phases of the sample. To achieve comparability of analytical data, equivalent

digestion procedures would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

tritium unit (TU) is equal to a concentration of 1 tritium atom per 10^{18} hydrogen atoms and is equal to 3.2 picocuries per liter (Pearson and others, 1975). A counting error, commonly reported as 1 standard deviation, is reported with each tritium analysis. This error is calculated so that the true tritium concentration of the sample has a 67-percent probability of being within the reported range, (Maclay, Rettman, and Small, 1980).

WDR is used as an abbreviation for "Water-Data Report" in the REVISED RECORDS paragraph to refer to State annual basic-data reports published after 1975.

WRD is used as an abbrevation for "Water Resources Data" in the REVISED RECORDS paragraph to refer to State annual basic-data reports published before 1975.

WSP is used as an abbreviation for "Water-Supply Paper" in references to previously published reports.

METRIC CONVERSIONS

The inch-pound units of measurement used in this report may be converted to metric units by using the following conversions factors:

From	Multiply by	To obtain
acres	0.4047	hectares (ha)
acre-feet (acre-ft)	1233	cubic meters (m^3)
	0.001233	cubic hectometers (hm^3)
acre-inches (acre-in)	102.75	cubic meters (m^3)
cubic feet per second (ft^3/s)	0.02832	cubic meters per second (m^3/s)
feet (ft)	0.3048	meters (m)
feet per mile (ft/mi)	0.189	meters per kilometer (m/km)
inches (in.)	25.4	millimeters (mm)
miles (mi)	1.609	kilometers (km)
Million gallons per day (Mgal/d)	0.04381	cubic meters per second (m^3/s)
square miles (mi^2)	2.590	square kilometers (km^2)

To convert °C (degrees Celsius) to °F (degrees Fahrenheit):

$$°F = 9/5 \times °C + 32.$$

PREVIOUS AND RELATED STUDIES

The U.S. Geological Survey and the Texas Water Development Board have been collecting hydrologic and geologic data in the San Antonio area on a continuing basis since 1929. Comprehensive reports of previous investigations include Arnow (1959); Bennett and Sayre (1962); DeCook (1963); Garza (1962, 1966); George (1952); Holt (1959); Lang (1954); Livingston and others, (1936); Maclay and Small (1976); Petitt and George (1956); and Welder and Reeves (1962). The Texas Water Development Board has conducted extensive hydrologic and geologic studies to provide data for construction of a digital model of the aquifer.

In 1968, the U.S. Geological Survey, in cooperation with the Texas Water Development Board and the Edwards Underground Water District, began a continuing program to collect historical-reference data for detecting pollution and for determining changes in the quality of water in the Edwards aquifer. The results of the study from August 1968 to August 1969 were reported by Reeves and Blakey (1970), and the results from August 1968 to April 1972 were reported by Reeves, Rawson, and Blakey (1972). A progress report for August 1968 to January 1975 was made by Reeves (1976). Compilations of water-quality data for February 1975 to September 1977 were reported by Reeves (1978), for October 1977 to September 1978 and October 1978 to December 1979 were reported by Reeves, Maclay, Grimm, and Davis (1980, 1981), for January-December 1980 were reported by Reeves, Maclay, and Davis (1982), for January-December 1981 were reported by Reeves, Maclay, and Ozuna (1984), for January-December 1982 and January 1983 to December 1984 were reported by Reeves and Ozuna (1985, 1986), for January-December 1985 were reported by Ozuna, Nalley, and Bowman (1987), for January-December 1986 were reported by Ozuna, Nalley, and Stein (1988), for January-December 1987 were reported by Nalley and Rettman (1988), and for January-December 1988 were reported by Nalley (1989).

In related studies, the U.S. Geological Survey, in cooperation with the Texas Water Development Board and the City of San Antonio, collected data from 1969 to 1980 on the quantity and quality of urban runoff in San Antonio. Data collected in the urban study have been reported in an annual series of hydrologic-data reports by Land (1971-72), Steger (1973-75), Gonzalez (1976), Harmsen (1977-78), Perez and Harmsen (1980), and Perez (1981-83).

Additional reports on the geology and hydrology of the San Antonio area as well as reports on recharge, discharge, water levels, and water quality for the Edwards aquifer are given in the section "Selected References."

WELL-NUMBERING SYSTEM

The well-numbering system in Texas was developed by the Texas Water Development Board for use throughout the State. Under this system, each 1-degree quadrangle is given a number consisting of two digits. These are the first two digits in the well number. Each 1-degree quadrangle is divided into 7-1/2-minute quadrangles which are given two-digit numbers from 01 to 64. These are the third and fourth digits of the well number. Each 7-1/2-minute quadrangle is divided into 2-1/2-minute quadrangles which are given a single-digit number from 1 to 9. This is the fifth digit of the well number. Finally, each well within a 2-1/2-minute quadrangle is given a two-digit number in the order in which it was inventoried, starting with 01. These are the last two digits of the well number.

In addition to the seven-digit well number, a two-letter prefix is used to identify the county. The prefix for each county in the San Antonio area is as follows: AL, Atascosa; AY, Bexar; DX, Comal; LR, Hays; TD, Medina; and YP, Uvalde.

Each water-level observation well is also identified by a 15-digit number based on latitude and longitude and by a local number that is provided for

continuity with older reports. The first 6 digits of the 15-digit number are degrees, minutes, and seconds of north latitude; the next 7 digits are degrees (including a leading 0 for those less than 100), minutes, and seconds of west longitude; and the final 2 digits are sequential numbers assigned in the order in which the wells are established in that 1-second quadrangle. The second seven-digit number is the State well number. A number inside parentheses is a number assigned to the well in some publication prior to 1978.

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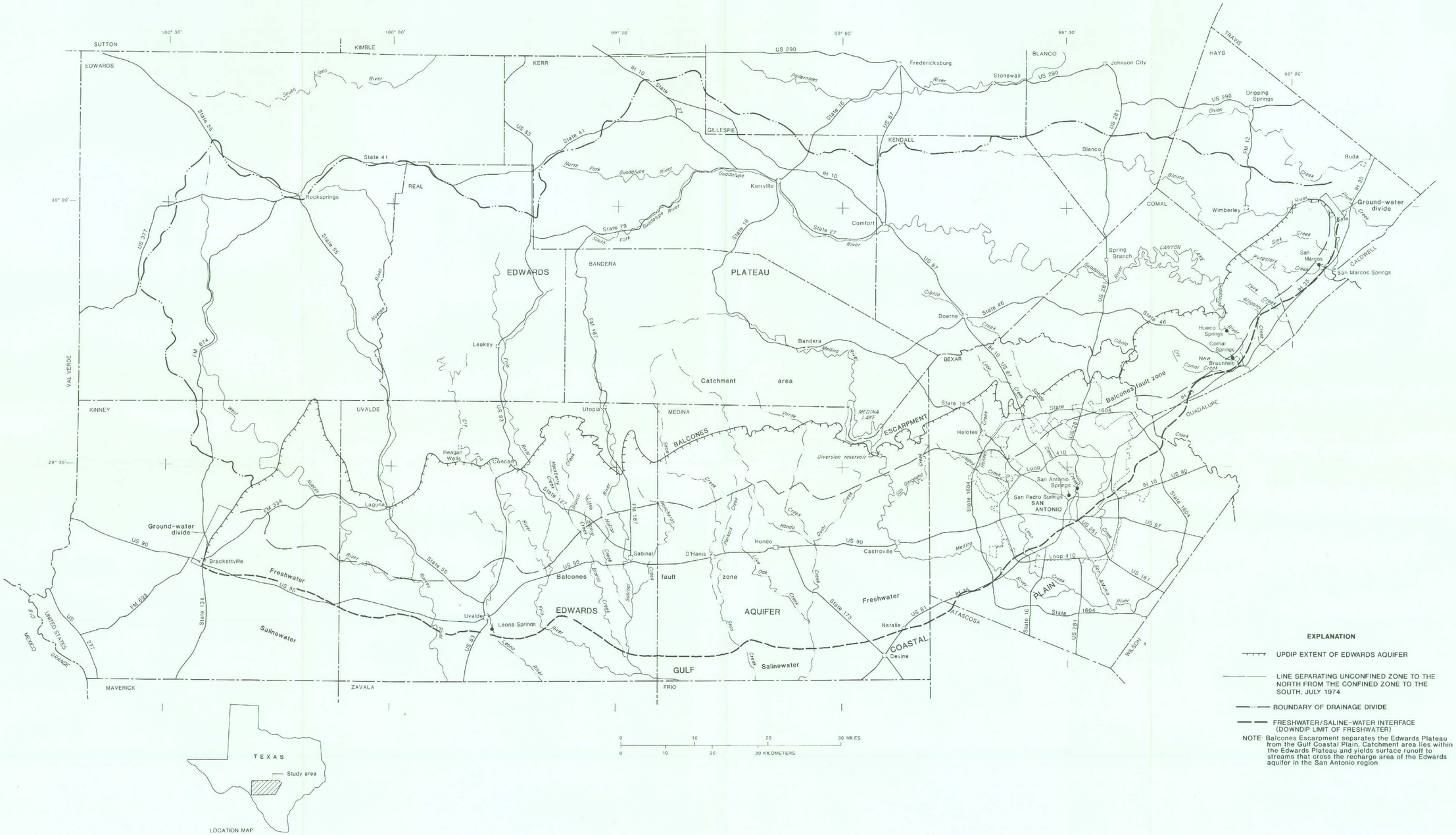


Plate 1.--Location of the Edwards aquifer and physiographic regions in the San Antonio region.

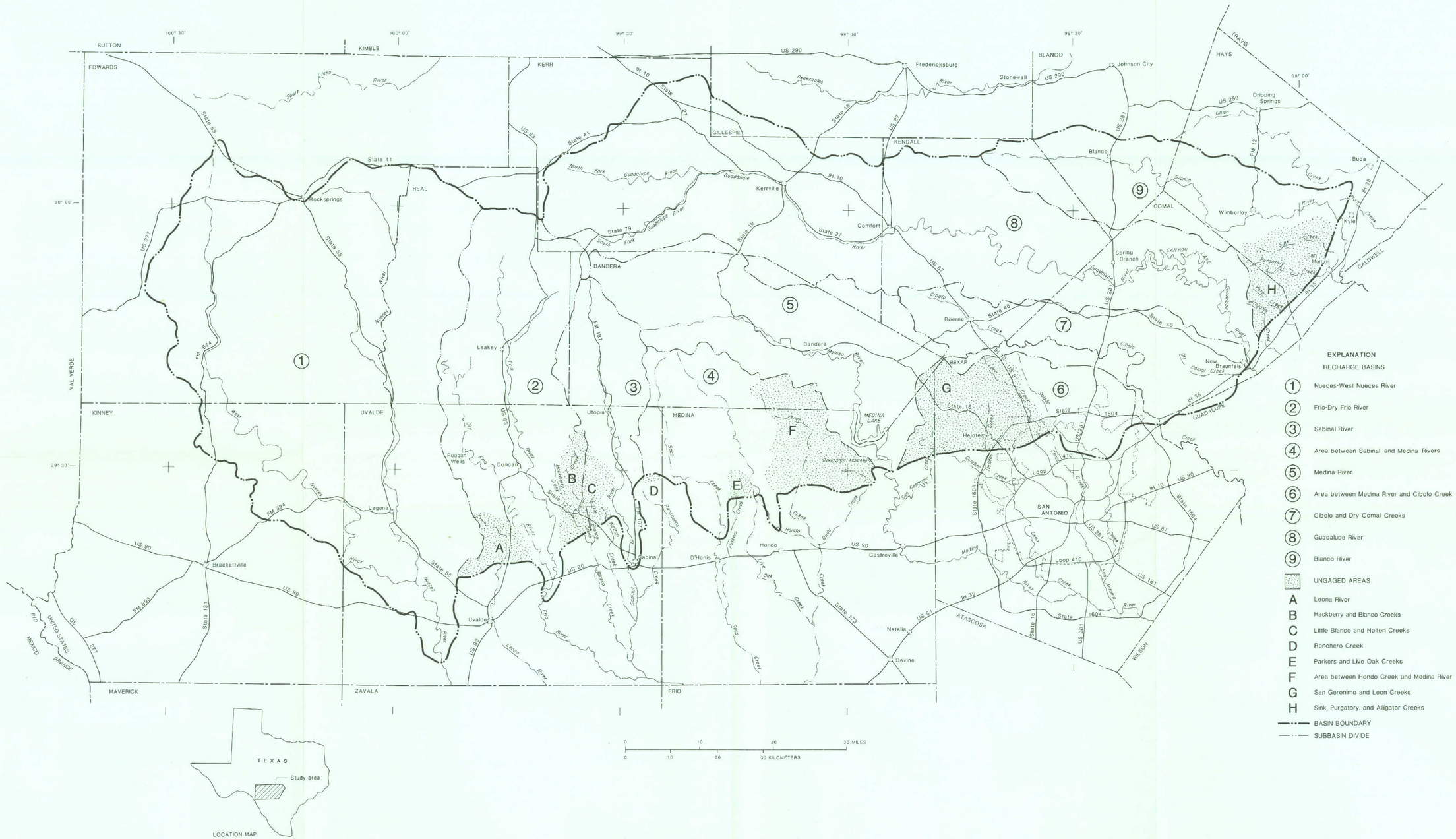
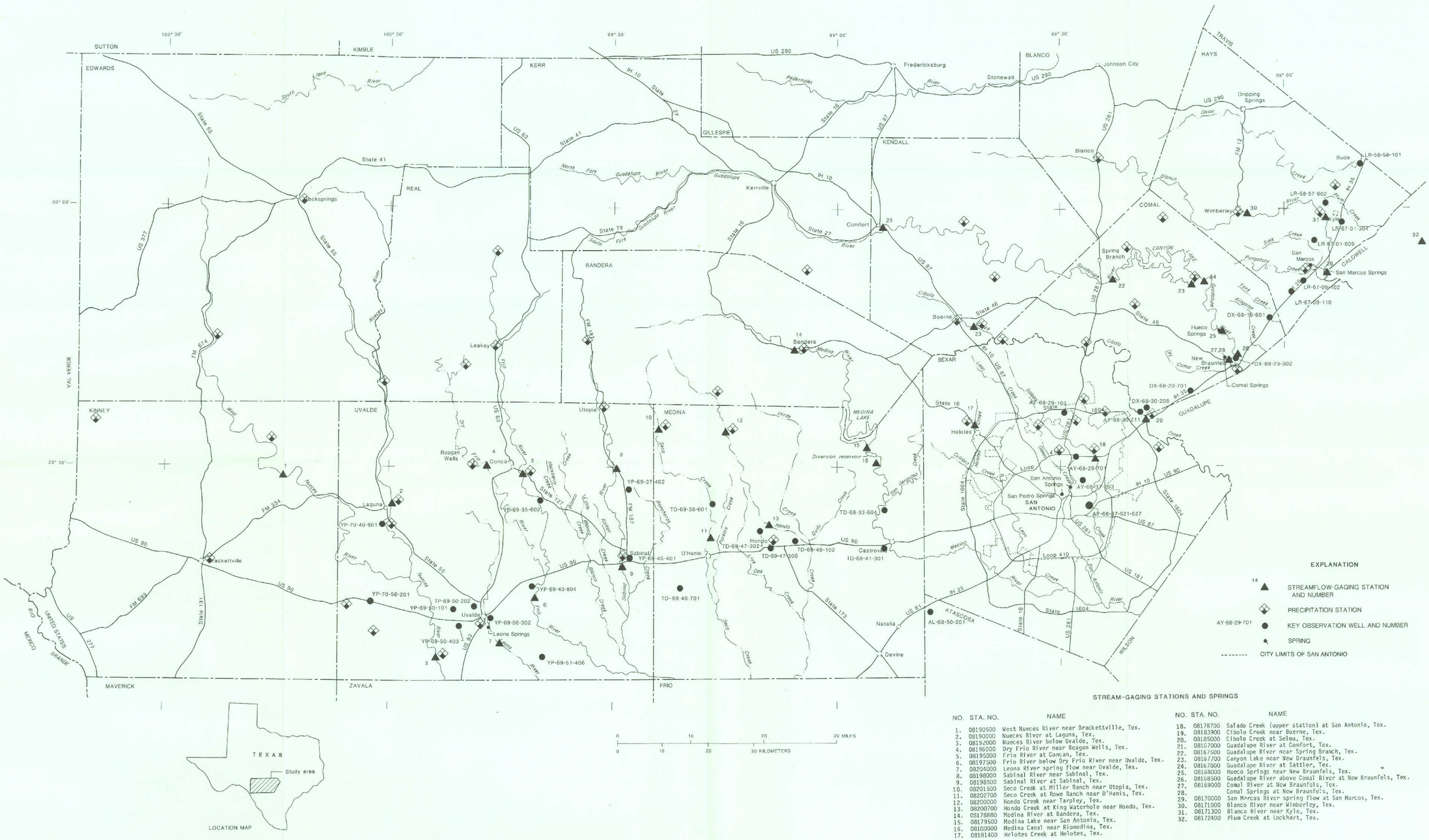


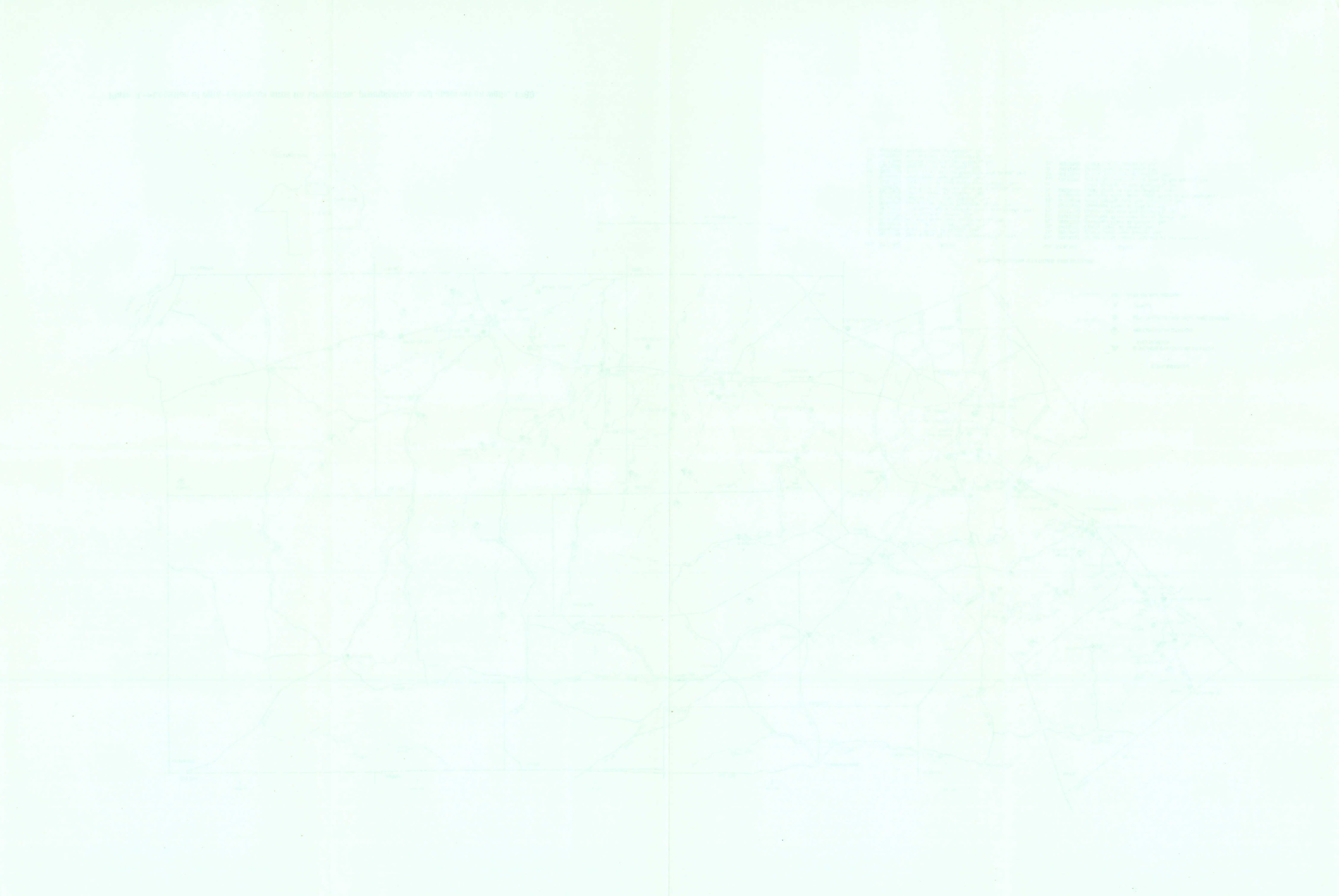
Plate 2.--Location of drainage basins and ungaged areas.



STREAM-GAGING STATIONS AND SPRINGS

NO.	STA. NO.	NAME
1.	08190500	West Nueces River near Brackettville, Tex.
2.	08190000	Nueces River at Laguna, Tex.
3.	08192000	Nueces River below Uvalde, Tex.
4.	08196000	Dry Frio River near Reagan Wells, Tex.
5.	08195000	Frio River at Concan, Tex.
6.	08197500	Frio River below Dry Frio River near Uvalde, Tex.
7.	08204000	Leona River spring flow near Uvalde, Tex.
8.	08198000	Sabinal River near Sabinal, Tex.
9.	08198500	Sabinal River at Sabinal, Tex.
10.	08201500	Seco Creek at Miller Ranch near Utopia, Tex.
11.	08202700	Seco Creek at Rowe Ranch near D'Hanis, Tex.
12.	08200000	Hondo Creek near Tarpley, Tex.
13.	08200700	Hondo Creek at King Waterhole near Hondo, Tex.
14.	08178880	Medina River at Bandera, Tex.
15.	08179500	Medina Lake near San Antonio, Tex.
16.	08102000	Medina Canal near Riomedina, Tex.
17.	08181400	Helotes Creek at Helotes, Tex.
18.	08178700	Salado Creek (upper station) at San Antonio, Tex.
19.	08183900	Cibolo Creek near Boerne, Tex.
20.	08185000	Cibolo Creek at Selma, Tex.
21.	08167000	Guadalupe River at Comfort, Tex.
22.	08167500	Guadalupe River near Spring Branch, Tex.
23.	08167700	Canyon Lake near New Braunfels, Tex.
24.	08167800	Guadalupe River at Sattler, Tex.
25.	08168000	Hueco Springs near New Braunfels, Tex.
26.	08168500	Guadalupe River above Comal River at New Braunfels, Tex.
27.	08169000	Comal River at New Braunfels, Tex.
28.		Comal Springs at New Braunfels, Tex.
29.	08170000	San Marcos River spring flow at San Marcos, Tex.
30.	08171000	Blanco River near Wimberley, Tex.
31.	08171300	Blanco River near Kyle, Tex.
32.	08172400	Plum Creek at Lockhart, Tex.

Plate 3.--Location of data-collection sites for streamflow, precipitation, and observation wells, 1989.



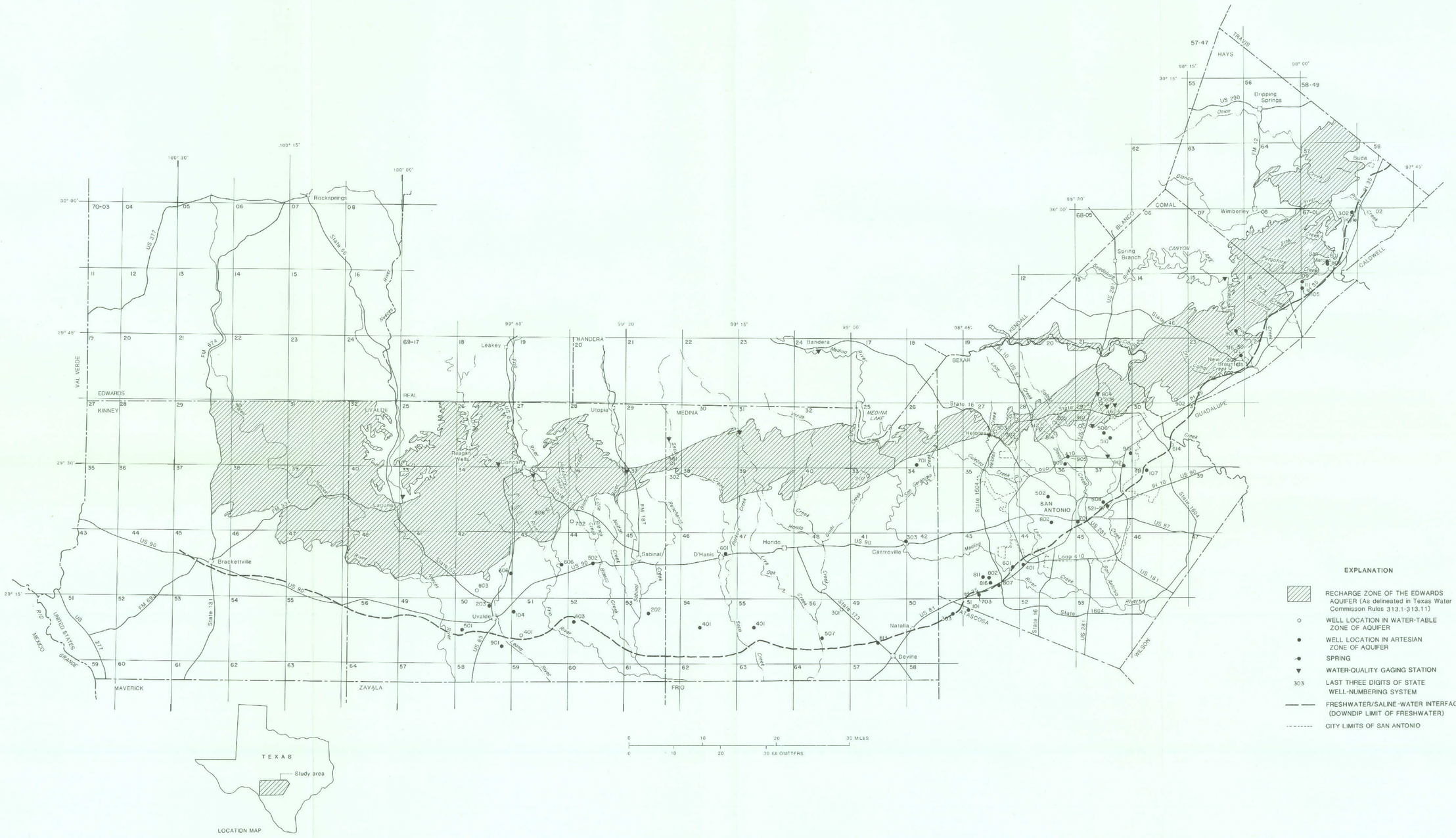


Plate 4.--Location of water-quality data-collection sites for wells, springs, and streams sampled in 1989.

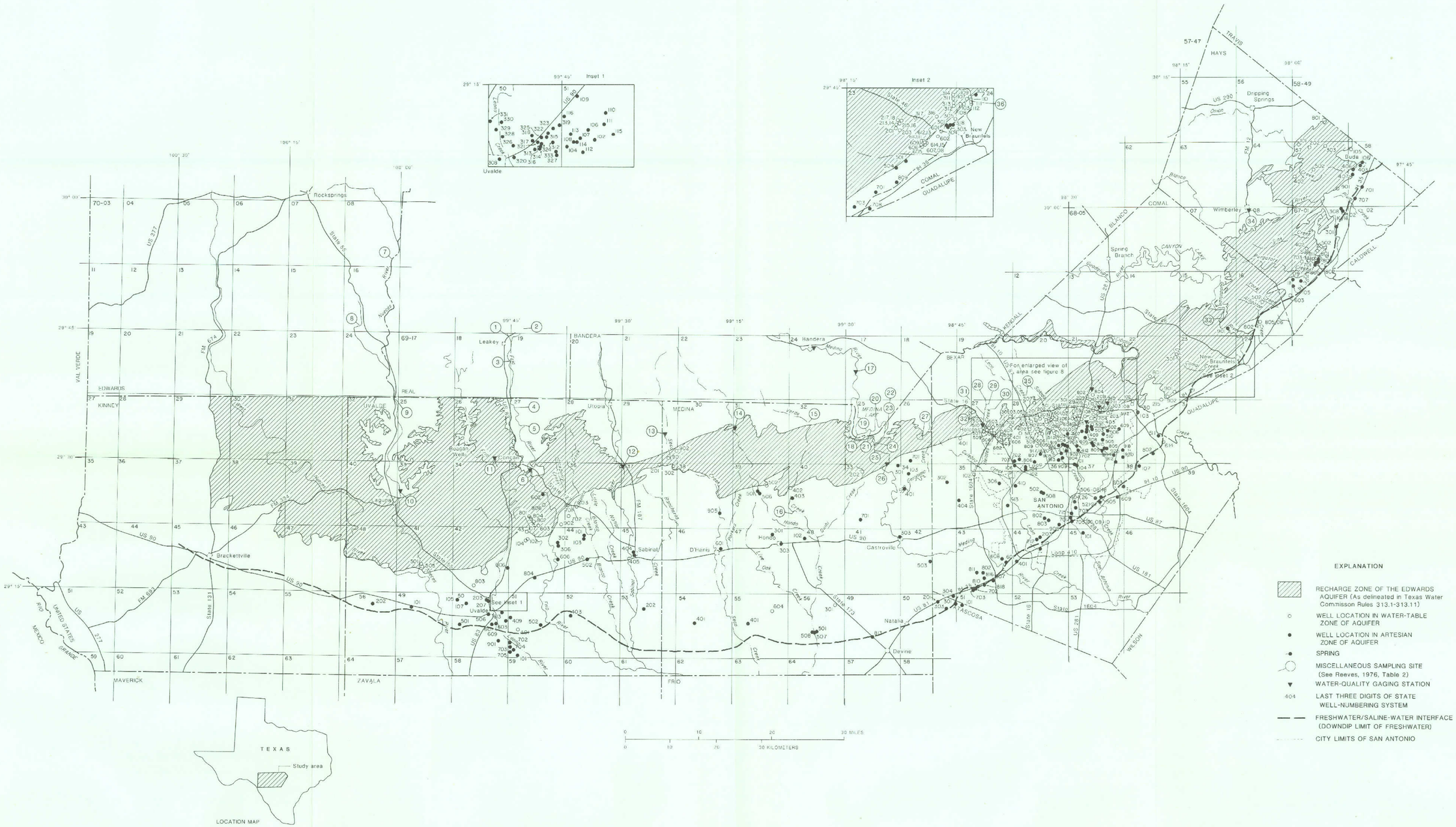
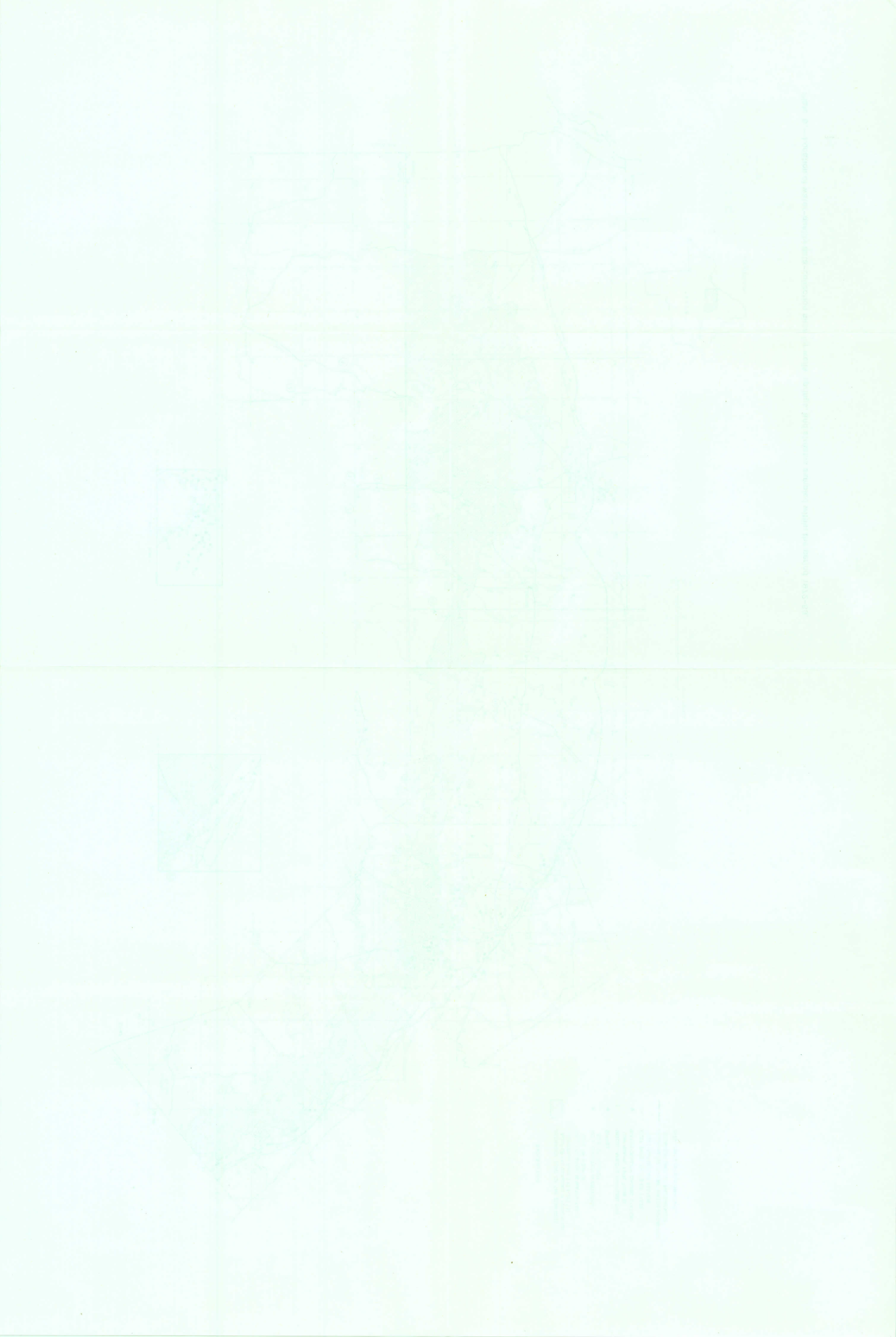
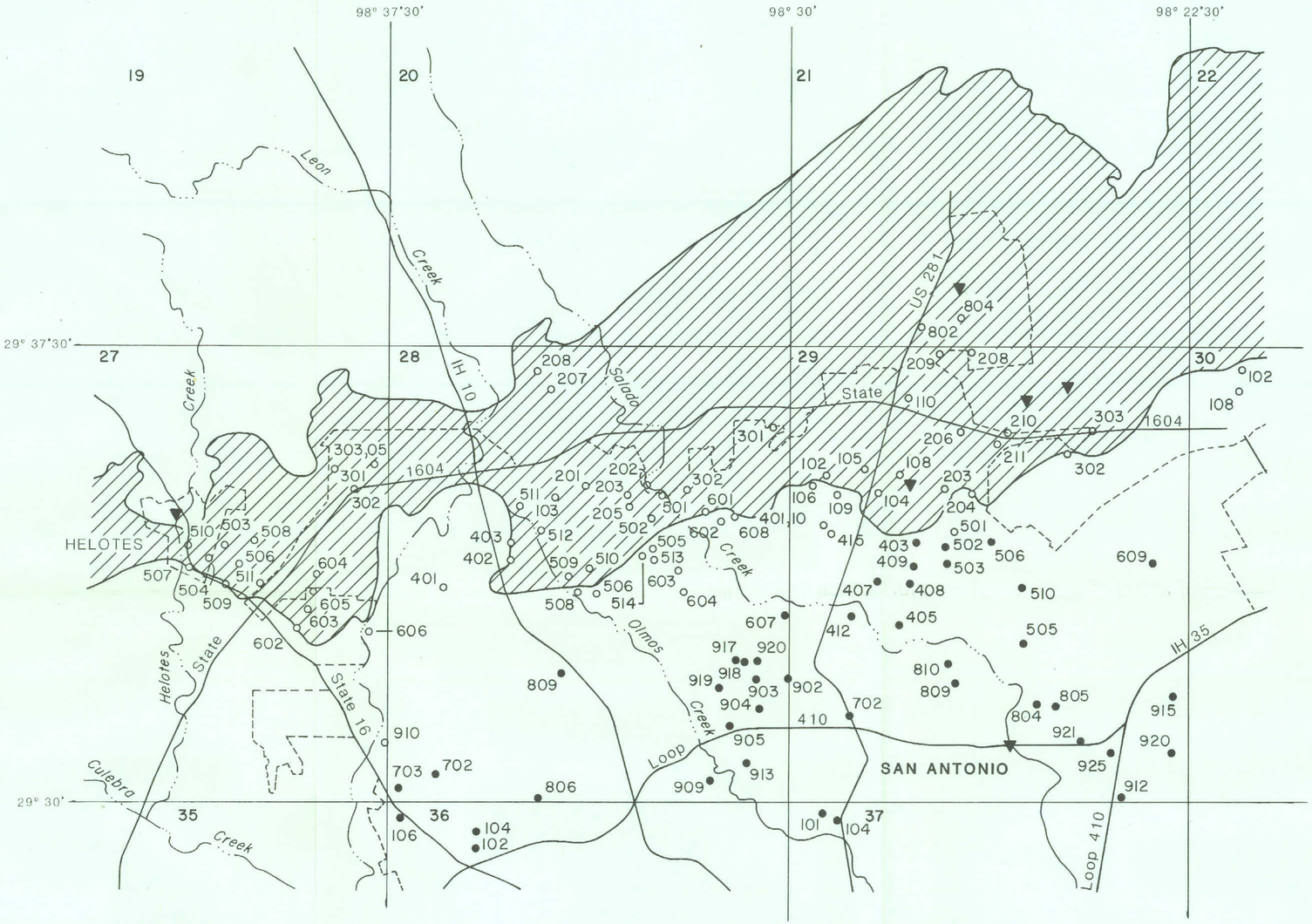


Plate 5.--Location of water-quality data-collection sites for wells, springs, and streams sampled within the period 1972-89.





EXPLANATION

- RECHARGE ZONE OF THE EDWARDS AQUIFER (As delineated in Texas Water Commission Rules 313.1-313.11)
- ○ WELL LOCATION IN WATER-TABLE ZONE OF AQUIFER
- ● WELL LOCATION IN ARTESIAN ZONE OF AQUIFER
- ▼ WATER-QUALITY GAGING STATIONS
- 202 LAST THREE DIGITS OF STATE WELL-NUMBERING SYSTEM

0 1 2 3 4 5 MILES

0 1 2 3 4 5 KILOMETERS

For location of map see Figure 7

Plate 6 --Location of water-quality data-collection sites for wells, springs, and streams in the vicinity of San Antonio sampled within the period 1972-89.