

UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY  
WATER RESOURCES DIVISION

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By

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U.S. Geological Survey

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

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IN THE SAN ANTONIO AREA, TEXAS

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WATER QUALITY AT SELECTED LOCATIONS

IN THE SAN ANTONIO AREA, TEXAS

PROGRESS REPORT, 1972

By

R. D. Reeves and J. F. Blakey  
U.S. Geological Survey

INTRODUCTION

The U.S. Geological Survey, in cooperation with the Edwards Underground Water District and the Texas Water Development Board, is conducting a continuing investigation of water quality in the aquifer formed by the Edwards and associated limestones in the San Antonio area. The program was initiated in 1968 to collect historical reference data for determining changes in water quality and to detect any current pollution of the ground water. Results of the study from August 1968 to August 1969 are reported by Reeves and Blakey (1970).

This report includes water-quality data collected from September 1969 to August 1971 and some data from selected analyses made prior to 1969.

Data for wells and springs are given in table 1, and data for sites other than wells and springs are given in table 2. Sampling-site locations are shown on figure 1.

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Figure 1 (caption on next page) belongs near here.

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## 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 2-digit numbers from 01 to 04. 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 2-digit number in the order in which it was inventoried.

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Figure 1.--Locations of water-quality data-collection sites in the San Antonio area.

Only the last three digits of the well number are shown at each location on Figure 1; the second two digits are shown in the northwest corner of each 7-1/2-minute quadrangle; and the first two digits are shown by the large block numerals in each 1-degree quadrangle.

In addition to the 7-digit well number, a 2-letter prefix is used to identify the county. The prefixes for counties where wells were sampled are as follows: AI, Bexar; BX, Bexar; F, Edwards; LB, Bexar; TD, Medina; and YP, Bexar.

## 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 2-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 2-digit number in the order in which it was inventoried, starting with 01. These are the last two digits of the well number.

Only the last three digits of the well number are shown at each location on figure 1; the second two digits are shown in the northwest corner of each 7-1/2-minute quadrangle; and the first two digits are shown by the large block numerals in each 1-degree quadrangle.

In addition to the 7-digit well number, a 2-letter prefix is used to identify the county. The prefix for counties where wells were sampled are as follows: AY, Bexar; DX, Comal; JJ, Edwards; LR, Hays; TD, Medina; and YP, Uvalde.

REFERENCE CITED

Reeves, R. D., and Blakey, J. F., 1970, Geology and water quality at selected locations in the San Antonio area, Texas, progress report, 1969: Edwards Underground Water District Report, 17 p.

Well number	AY-68-27-503	AY-68-27-503	AY-68-27-504	AY-68-27-507	AY-68-27-507	AY-68-27-507	AY-68-27-507	AY-68-27-507	AY-68-27-507
Date of collection	Apr. 7, 1971	Aug. 5, 1971	Mar. 3, 1971	Apr. 28, 1971	June 3, 1971	June 3, 1971	June 3, 1971	June 3, 1971	June 3, 1971
Depth of well (ft)	435	435	508	385	385	385	385	385	385
Sampled after pumping (min)	Many hours	Many hours	60 minutes	60 minutes	10 minutes	40 minutes	90 minutes	150 minutes	210 minutes
Discharge (gpm) .....	100	100	500	9	9	9	9	9	9
Silica (SiO <sub>2</sub> ) .....	--	--	--	--	--	--	--	--	--
Calcium (Ca) .....	--	--	60	--	--	--	--	--	--
Magnesium (Mg) .....	--	--	17	--	--	--	--	--	--
Sodium (Na) .....	--	--	--	--	--	6.4	--	6.5	6.4
Potassium (K) .....	--	--	--	--	--	1.1	--	1.1	1.2
Bicarbonate (HCO <sub>3</sub> ) .....	--	288	220	--	--	268	--	268	268
Carbonate (CO <sub>3</sub> ) .....	--	0	0	--	--	0	--	0	0
Sulfate (SO <sub>4</sub> ) .....	--	21	33	--	--	25	--	25	24
Chloride (Cl) .....	--	14	14	--	--	14	--	14	14
Fluoride (F) .....	--	--	--	--	--	--	--	--	--
Bromide (Br) .....	--	--	--	--	--	--	--	--	--
Iodide (I) .....	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub> .....	--	270	220	--	--	260	--	260	260
Sodium adsorption ratio (SAR) ....	--	--	--	--	--	--	--	--	--
Specific conductance (micromhos at 25°C) .....	--	523	455	502	500	507	504	504	504
pH .....	--	7.7	7.8	--	--	7.7	--	7.7	7.7
Temperature (°C) .....	--	--	--	--	--	--	--	--	--
Dissolved solids (calc) .....	--	--	--	--	--	--	--	--	--
Ammonia (NH <sub>4</sub> ) .....	.00	.00	.00	--	.00	.00	.00	.00	.00
Nitrate (NO <sub>3</sub> ) .....	7.9	7.1	7.3	--	7.5	7.5	8.0	7.5	8.0
Nitrite (NO <sub>2</sub> ) .....	.00	.00	.00	--	.00	.00	.00	.00	.00
Phosphate (PO <sub>4</sub> ) .....	.00	.00	.37	--	.00	.00	.00	.03	.13
Detergents (MBAS) .....	.01	.00	.00	--	.00	.00	.00	.00	.00
Biochemical oxygen demand (BOD) ..	--	--	.6	--	--	.2	--	.2	1.1
Coliform (colonies per 100 ml) ...	0	30	1400	950	19000	3400	1000	500	64
Fecal coliform (colonies per 100 ml) .....	0	0	0	22	1	0	0	0	0
Streptococci (colonies per 100 ml) .....	0	0	0	49	3	0	0	0	0
Aluminum (Al) .....	--	--	--	--	--	.00	--	.01	.00
Arsenic (As) .....	--	.00	.00	--	--	--	--	--	--
Boron (B) .....	--	--	--	--	--	.04	--	.13	.03
Copper (Cu) .....	--	.007	.004	--	--	.004	--	.007	.003
Iron (Fe) .....	--	--	--	--	--	.01	--	.00	.00
Lead (Pb) .....	--	.000	.000	--	--	.000	--	.000	.000
Lithium (Li) .....	--	--	--	--	--	--	--	--	--
Manganese (Mn) .....	--	--	--	--	--	--	--	--	--
Mercury (Hg) .....	--	<.0005	<.0005	--	--	--	--	--	--
Zinc (Zn) .....	--	.00	.01	--	--	.38	--	.31	.30

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(Results in milligrams per liter except as indicated)

Well number	AY-68-27-308	AY-68-27-308	AY-68-27-309	AY-68-27-309	AY-68-27-309	AY-68-27-309	AY-68-27-309	AY-68-27-309	AY-68-27-309
Date of collection	Sept. 15, 1969	Aug. 5, 1971	Sept. 15, 1969	Feb. 17, 1971	Feb. 17, 1971	Feb. 17, 1971	Feb. 17, 1971	Mar. 3, 1971	Mar. 3, 1971
Depth of well (ft)	320	320	343	343	343	343	343	343	343
Sampled after pumping (min)	10 minutes	80 minutes	10 minutes	10 minutes	40 minutes	90 minutes	150 minutes	10 minutes	40 minutes
Discharge (gpm)	10	10	8	8	8	8	8	8	8
Silica (SiO <sub>2</sub> )	11	--	11	--	--	--	--	--	--
Calcium (Ca)	85	--	88	--	91	--	--	--	--
Magnesium (Mg)	13	--	14	--	16	--	--	--	--
Sodium (Na)	1/ 7.6	--	1/ 7.8	--	--	--	--	--	--
Potassium (K)	--	--	--	--	--	--	--	--	--
Bicarbonate (HCO <sub>3</sub> )	294	288	296	--	308	--	--	--	--
Carbonate (CO <sub>3</sub> )	0	0	0	--	0	--	--	--	--
Sulfate (SO <sub>4</sub> )	16	26	26	--	33	--	--	--	--
Chloride (Cl)	12	13	14	--	13	--	--	--	--
Fluoride (F)	.2	--	.2	--	--	--	--	--	--
Bromide (Br)	--	--	--	--	--	--	--	--	--
Iodide (I)	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub>	270	280	280	--	290	--	--	--	--
Sodium adsorption ratio (SAR)	.2	--	.2	--	--	--	--	--	--
Specific conductance (micromhos at 25°C)	517	526	539	--	570	--	--	--	--
pH	7.4	7.5	7.4	--	7.4	--	--	--	--
Temperature (°C)	22.0	--	23.0	--	--	--	--	--	--
Dissolved solids (calc)	299	--	312	--	--	--	--	--	--
Ammonia (NH <sub>4</sub> )	.00	.00	.00	.00	--	.00	--	.00	.00
Nitrate (NO <sub>3</sub> )	8.9	9.3	4.9	7.1	--	7.1	--	8.1	7.1
Nitrite (NO <sub>2</sub> )	.00	.00	.00	.00	--	.00	--	.00	.00
Phosphate (PO <sub>4</sub> )	.03	.00	.09	.21	--	.21	--	.12	.12
Detergents (NDAS)	--	.00	--	.00	--	.00	--	.00	.00
Biochemical oxygen demand (BOD)	.4	--	.3	2.1	--	1.7	--	--	--
Coliform (colonies per 100 ml)	3	10	225	1400	3500	1800	6500	820	2000
Fecal coliform (colonies per 100 ml)	0	0	3	0	0	1	0	0	0
Streptococci (colonies per 100 ml)	0	0	7	0	0	0	7	0	1
Aluminum (Al)	--	--	--	--	--	--	--	--	--
Arsenic (As)	--	.00	--	--	.00	--	--	--	--
Boron (B)	--	--	--	--	--	--	--	--	--
Copper (Cu)	--	.002	--	--	.001	--	--	--	--
Iron (Fe)	--	--	--	--	--	--	--	--	--
Lead (Pb)	--	.000	--	--	.000	--	--	--	--
Lithium (Li)	--	--	--	--	--	--	--	--	--
Manganese (Mn)	--	--	--	--	--	--	--	--	--
Mercury (Hg)	--	< .0005	--	--	< .0005	--	--	--	--
Zinc (Zn)	--	.46	--	--	.04	--	--	--	--

1/ Sodium and potassium calculated as sodium (Na).



Well number	AY-68-27-509	AY-68-27-509	AY-68-27-509	AY-68-27-509	AY-68-27-509	AY-68-27-509	AY-68-27-509	AY-68-27-509	AY-68-27-509
Date of collection	Mar. 3, 1971	Mar. 3, 1971	Mar. 3, 1971	Mar. 3, 1971	Mar. 3, 1971	Mar. 3, 1971	Mar. 4, 1971	Mar. 4, 1971	Mar. 4, 1971
Depth of well (ft)	343	343	343	343	343	343	343	343	343
Sampled after pumping (min)	90 minutes	150 minutes	270 minutes	390 minutes	510 minutes	630 minutes	10 minutes	40 minutes	90 minutes
Discharge (gpm) .....	8	8	8	8	8	8	8	8	8
Silica (SiO <sub>2</sub> ) .....	--	--	--	--	--	--	--	--	--
Calcium (Ca) .....	--	--	--	72	--	91	--	--	--
Magnesium (Mg) .....	--	--	--	16	--	16	--	--	--
Sodium (Na) .....	--	--	--	--	--	--	--	--	--
Potassium (K) .....	--	--	--	--	--	--	--	--	--
Dicarbonate (HCO <sub>3</sub> ) .....	--	--	--	248	--	310	--	--	--
Carbonate (CO <sub>3</sub> ) .....	--	--	--	0	--	0	--	--	--
Sulfate (SO <sub>4</sub> ) .....	--	--	--	29	--	29	--	--	--
Chloride (Cl) .....	--	--	--	14	--	14	--	--	--
Fluoride (F) .....	--	--	--	--	--	--	--	--	--
Bromide (Br) .....	--	--	--	--	--	--	--	--	--
Iodide (I) .....	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub> .....	--	--	--	250	--	290	--	--	--
Sodium adsorption ratio (SAR) .....	--	--	--	--	--	--	--	--	--
Specific conductance (micromhos at 25°C) .....	--	--	--	486	--	561	--	--	--
pH .....	--	--	--	7.8	--	8.0	--	--	--
Temperature (°C) .....	--	--	--	--	--	--	--	--	--
Dissolved solids (calc) .....	--	--	--	--	--	--	--	--	--
Ammonia (NH <sub>4</sub> ) .....	.00	.00	.00	.00	.00	.00	--	--	--
Nitrate (NO <sub>3</sub> ) .....	7.1	8.1	7.7	7.3	6.7	8.5	--	--	--
Nitrite (NO <sub>2</sub> ) .....	.00	.00	.00	.00	.00	.00	--	--	--
Phosphate (PO <sub>4</sub> ) .....	.12	.12	.12	.12	.12	.12	--	--	--
Detergents (MBAS) .....	.00	.00	.00	.00	.00	.00	--	--	--
Biochemical oxygen demand (BOD) ..	--	--	--	--	--	--	--	--	--
Coliform (colonies per 100 ml) ...	300	660	540	400	420	210	460	150	240
Fecal coliform (colonies per 100 ml) .....	0	0	0	0	0	0	0	0	0
Streptococci (colonies per 100 ml) .....	0	0	0	0	0	0	1	2	0
Aluminum (Al) .....	--	--	--	--	--	--	--	--	--
Arsenic (As) .....	--	--	--	.00	--	.00	--	--	--
Boron (B) .....	--	--	--	--	--	--	--	--	--
Copper (Cu) .....	--	--	--	.005	--	.003	--	--	--
Iron (Fe) .....	--	--	--	--	--	--	--	--	--
Lead (Pb) .....	--	--	--	.000	--	.000	--	--	--
Lithium (Li) .....	--	--	--	--	--	--	--	--	--
Manganese (Mn) .....	--	--	--	--	--	--	--	--	--
Mercury (Hg) .....	--	--	--	<.0005	--	<.0005	--	--	--
Zinc (Zn) .....	--	--	--	.04	--	.03	--	--	--

7

Well number	AY-68-27-508	AY-68-27-509	AY-68-27-510	AY-68-27-510	AY-68-27-511	AY-68-27-511	AY-68-27-602	AY-68-27-602	AY-68-27-603
Date of collection	Mar. 4, 1971	Aug. 5, 1971	Mar. 3, 1971	Apr. 28, 1971	Aug. 5, 1971	Aug. 5, 1971	Aug. 4, 1971	Aug. 4, 1971	Aug. 4, 1971
Depth of well (ft)	343	343	390	390	363	365	389	389	360
Sampled after pumping (min)	130 minutes	60 minutes	15 minutes	60 minutes	10 minutes	60 minutes	10 minutes	60 minutes	10 minutes
Discharge (gpm)	6	8	12	12	7	7	13	15	20
Silica (SiO <sub>2</sub> )	--	--	11	--	--	11	--	11	--
Calcium (Ca)	--	--	34	--	--	86	--	83	--
Magnesium (Mg)	--	--	16	--	--	14	--	14	--
Sodium (Na)	--	--	1/ 3.6	--	--	1/ 3.7	--	1/ 4.8	--
Potassium (K)	--	--	--	--	--	--	--	--	--
Bicarbonate (HCO <sub>3</sub> )	--	--	144	--	--	292	--	288	--
Carbonate (CO <sub>3</sub> )	--	--	0	--	--	0	--	0	--
Sulfate (SO <sub>4</sub> )	--	--	20	--	--	14	--	12	--
Chloride (Cl)	--	--	12	--	--	15	--	13	--
Fluoride (F)	--	--	.2	--	--	.2	--	.2	--
Bromide (Br)	--	--	--	--	--	--	--	--	--
Iodide (I)	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub>	--	--	190	--	--	270	--	260	--
Sodium adsorption ratio (SAR)	--	--	.2	--	--	.2	--	.1	--
Specific conductance (micromhos at 25°C)	--	467	318	493	--	324	--	309	--
pH	--	--	7.9	--	--	7.7	--	7.8	--
Temperature (°C)	--	--	--	--	--	--	--	--	--
Dissolved solids (calc)	--	--	178	--	--	301	--	289	--
Ammonia (NH <sub>4</sub> )	--	.00	.00	--	--	.00	--	.00	--
Nitrate (NO <sub>3</sub> )	--	12	8.0	--	--	11	--	9.3	--
Nitrite (NO <sub>2</sub> )	--	.00	.00	--	--	.00	--	.00	--
Phosphate (PO <sub>4</sub> )	--	.00	.00	--	--	.00	--	.00	--
Detergents (MBAS)	--	.03	.00	.01	--	.00	--	.00	--
Biochemical oxygen demand (BOD)	--	--	.2	--	--	--	--	--	--
Coliform (colonies per 100 ml)	330	5800	0	15	32	19	230	2300	3900
Fecal coliform (colonies per 100 ml)	0	130	0	0	1	0	0	0	500
Streptococci (colonies per 100 ml)	0	280	0	0	0	0	0	1	820
Aluminum (Al)	--	--	--	--	--	--	--	--	--
Arsenic (As)	--	--	.00	--	--	.00	--	.00	--
Boron (B)	--	--	--	--	--	--	--	--	--
Copper (Cu)	--	--	.020	--	--	.011	--	.004	--
Iron (Fe)	--	--	--	--	--	--	--	--	--
Lead (Pb)	--	--	.000	--	--	.000	--	.000	--
Lithium (Li)	--	--	--	--	--	--	--	--	--
Manganese (Mn)	--	--	--	--	--	--	--	--	--
Mercury (Hg)	--	--	<.0003	--	--	<.0003	--	<.0003	--
Zinc (Zn)	--	--	.34	--	--	.23	--	.32	--

1/ Sodium and potassium calculated as sodium (Na).

Well number	AY-68-27-603	AY-68-27-603	AY-68-27-603	AY-68-28-103	AY-68-28-103	AY-68-28-201	AY-68-28-201	AY-68-28-201	AY-68-28-201
Date of collection	Aug. 4, 1971	Aug. 11, 1971	Aug. 11, 1971	Apr. 6, 1971	Apr. 6, 1971	Sept. 19, 1969	Apr. 2, 1970	Feb. 17, 1971	Feb. 17, 1971
Depth of well (ft)	360	360	360	401	401	387	347	387	387
Sampled after pumping (min)	60 minutes	10 minutes	60 minutes	15 minutes	60 minutes	10 minutes	10 minutes	10 minutes	40 minutes
Discharge (gpm)	20	20	20	3	3	8	8	8	8
Silica (SiO <sub>2</sub> )	11	--	--	--	12	11	--	--	--
Calcium (Ca)	86	--	--	--	94	92	--	--	92
Magnesium (Mg)	13	--	--	--	11	9.8	--	--	9.7
Sodium (Na)	1/ 8.0	--	--	--	1/ 2.3	1/ 5.7	--	--	--
Potassium (K)	--	--	--	--	--	--	--	--	--
Bicarbonate (HCO <sub>3</sub> )	294	--	216	--	304	298	--	--	292
Carbonate (CO <sub>3</sub> )	0	--	0	--	0	0	--	--	0
Sulfate (SO <sub>4</sub> )	14	--	14	--	14	15	--	--	18
Chloride (Cl)	13	--	12	--	9.6	11	--	--	11
Fluoride (F)	.2	--	--	--	.2	.1	--	--	--
Bromide (Br)	--	--	--	--	--	--	--	--	--
Iodide (I)	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub>	270	--	210	--	280	270	--	--	270
Sodium adsorption ratio (SAR)	.2	--	--	--	.1	.2	--	--	--
Specific conductance (micromhos at 25°C)	319	--	409	--	524	514	--	--	521
pH	7.7	--	7.6	--	7.6	7.5	--	--	7.2
Temperature (°C)	--	--	--	--	22.0	23.0	23.0	--	--
Dissolved solids (calc)	296	--	--	--	301	300	--	--	--
Ammonia (NH <sub>4</sub> )	.00	--	.00	--	.00	--	.00	--	.00
Nitrate (NO <sub>3</sub> )	8.0	--	8.9	--	6.9	8.5	11	12	--
Nitrite (NO <sub>2</sub> )	.00	--	.00	--	.00	--	.00	.00	--
Phosphate (PO <sub>4</sub> )	.00	--	.00	--	.00	--	.01	.00	--
Detergents (MBAS)	.00	--	.00	--	.01	--	--	.00	--
Biochemical oxygen demand (BOD)	--	--	--	--	.5	--	.0	.8	--
Coliform (colonies per 100 ml)	2300	260	160	1	0	--	76	36	62
Fecal coliform (colonies per 100 ml)	230	18	21	0	0	--	0	0	0
Streptococci (colonies per 100 ml)	380	22	24	0	0	--	0	0	0
Aluminum (Al)	--	--	--	--	--	--	--	--	--
Arsenic (As)	.00	--	--	--	.00	--	--	--	.00
Boron (B)	--	--	--	--	--	--	--	--	--
Copper (Cu)	.003	--	--	--	.003	--	--	--	.003
Iron (Fe)	--	--	--	--	--	--	--	--	--
Lead (Pb)	.000	--	--	--	.000	--	--	--	.002
Lithium (Li)	--	--	--	--	--	--	--	--	--
Manganese (Mn)	--	--	--	--	--	.00	--	--	--
Mercury (Hg)	<.0003	--	--	--	<.0003	--	--	--	<.0003
Zinc (Zn)	--	--	.12	--	.29	--	--	--	.06

1/ Sodium and potassium calculated as sodium (Na).

(Results in milligrams per liter except as indicated)

Well number	AY-68-28-202	AY-68-28-203	AY-68-28-301	AY-68-28-302	AY-68-28-302	AY-68-28-401	AY-68-28-402	AY-68-28-402	AY-68-28-403
Date of collection	Apr. 2, 1970	Apr. 2, 1970	Oct. 13, 1969	Oct. 13, 1969	Dec. 3, 1969	Apr. 6, 1971	Apr. 6, 1971	Apr. 6, 1971	Apr. 29, 1971
Depth of well (ft)	457	435	400	442	442	500	320	320	600
Sampled after pumping (min)	Many hours	Many hours	Many hours	10 minutes	10 minutes	60 minutes	15 minutes	60 minutes	Many hours
Discharge (gpm)	100	175	30	40	40	1000	15	15	10
Silica (SiO <sub>2</sub> )	10	11	12	12	--	12	--	13	--
Calcium (Ca)	86	80	84	80	--	67	--	72	74
Magnesium (Mg)	14	14	9.6	9.6	--	12	--	16	19
Sodium (Na)	6.9	5.7	3.9	3.0	--	1/ 3.0	--	--	--
Potassium (K)	1.2	1.1	1.1	1.4	--	--	--	--	--
Bicarbonate (HCO <sub>3</sub> )	292	290	252	270	--	228	--	208	292
Carbonate (CO <sub>3</sub> )	0	0	0	0	--	0	--	0	0
Sulfate (SO <sub>4</sub> )	28	18	34	13	--	13	--	6.4	8.4
Chloride (Cl)	9.3	9.0	9.0	7.2	--	10	--	8.3	10
Fluoride (F)	.1	.1	.1	.1	--	.2	--	.2	--
Bromide (Br)	--	--	--	--	--	--	--	--	--
Iodide (I)	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub>	270	260	250	240	--	220	--	250	260
Sodium adsorption ratio (SAR)	.2	.2	.2	.1	--	.1	--	--	--
Specific conductance (micromhos at 25°C)	524	502	489	461	--	426	--	469	493
pH	7.2	7.2	7.1	7.2	--	7.3	--	7.7	7.3
Temperature (°C)	22.0	--	23.0	23.0	22.0	23.0	22.0	22.0	--
Dissolved solids (calc)	304	286	283	262	--	239	--	--	--
Ammonia (NH <sub>4</sub> )	.00	.00	--	--	--	.00	--	--	--
Nitrate (NO <sub>3</sub> )	4.5	4.0	5.0	2.8	--	10	--	--	--
Nitrite (NO <sub>2</sub> )	.00	.00	--	--	--	.00	--	--	--
Phosphate (PO <sub>4</sub> )	.01	.01	.04	.02	--	.03	--	--	--
Detergents (NDAS)	--	--	--	--	--	.01	--	.00	.03
Biochemical oxygen demand (BOD)	.0	.0	.2	.1	--	.4	--	.5	--
Coliform (colonies per 100 ml)	2	0	7	2300	380	0	35	24	--
Fecal coliform (colonies per 100 ml)	0	0	0	130	0	0	0	0	--
Streptococci (colonies per 100 ml)	0	0	0	110	5	0	8	1	--
Aluminum (Al)	--	--	--	--	--	--	--	--	--
Arsenic (As)	--	--	--	--	--	.00	--	.00	--
Boron (B)	--	--	--	--	--	--	--	--	--
Copper (Cu)	--	--	--	--	--	.000	--	.007	--
Iron (Fe)	--	--	--	--	--	--	--	--	--
Lead (Pb)	--	--	--	--	--	.000	--	.000	--
Lithium (Li)	--	--	--	--	--	--	--	--	--
Manganese (Mn)	--	--	--	--	--	--	--	--	--
Mercury (Hg)	--	--	--	--	--	<.0005	--	<.0005	--
Zinc (Zn)	--	--	--	--	--	.07	--	.16	--

1/ Sodium and potassium calculated as sodium (Na).

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Well number	AY-68-28-501	AY-68-28-502	AY-68-28-503	AY-68-28-503	AY-68-28-503	AY-68-28-503	AY-68-28-503	AY-68-28-506	AY-68-28-506
Date of collection	Apr. 2, 1970	Apr. 2, 1970	Nov. 11, 1969	Aug. 4, 1971	Aug. 4, 1971	Aug. 11, 1971	Aug. 11, 1971	Apr. 2, 1970	Feb. 3, 1971
Depth of well (ft)	469	506	456	456	456	456	456	490	490
Sampled after pumping (min)	10 minutes	10 minutes	15 minutes	10 minutes	60 minutes	10 minutes	60 minutes	10 minutes	10 minutes
Discharge (gpm) .....	100	100	10	10	10	10	10	20	20
Silica (SiO <sub>2</sub> ) .....	10	--	13	--	--	--	--	9.0	--
Calcium (Ca) .....	98	--	98	--	--	--	--	100	74
Magnesium (Mg) .....	14	--	6.2	--	--	--	--	3.3	12
Sodium (Na) .....	6.9	--	2.3	--	--	--	--	4.4	--
Potassium (K) .....	1.2	--	1.0	--	--	--	--	1.0	--
Bicarbonate (HCO <sub>3</sub> ) .....	294	--	312	--	318	--	--	288	234
Carbonate (CO <sub>3</sub> ) .....	0	--	0	--	0	--	--	0	0
Sulfate (SO <sub>4</sub> ) .....	29	--	3.4	--	8.0	--	--	13	14
Chloride (Cl) .....	8.8	--	8.4	--	10	--	--	7.8	9.0
Fluoride (F) .....	.1	--	.1	--	--	--	--	.0	--
Bromide (Br) .....	--	--	--	--	--	--	--	--	--
Iodide (I) .....	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub> .....	280	--	270	--	270	--	--	260	230
Sodium adsorption ratio (SAR) .....	.2	--	.1	--	--	--	--	.1	--
Specific conductance (micromhos at 25°C) .....	521	--	505	--	519	--	--	504	491
pH .....	7.3	--	7.8	--	7.7	--	--	7.1	7.6
Temperature (°C) .....	21.3	--	23.0	--	--	--	--	21.0	17.3
Dissolved solids (calc) .....	307	--	291	--	--	--	--	296	--
Ammonia (NH <sub>4</sub> ) .....	--	.00	--	--	.00	--	.00	.00	.00
Nitrate (NO <sub>3</sub> ) .....	--	4.1	3.3	--	3.3	--	4.0	13	3.8
Nitrite (NO <sub>2</sub> ) .....	--	.00	--	--	.00	--	.00	.00	.00
Phosphate (PO <sub>4</sub> ) .....	--	.01	.03	--	.00	--	.00	.04	.12
Detergents (MBAS) .....	--	--	--	--	.00	--	.00	--	.00
Biochemical oxygen demand (BOD) ..	--	.0	.2	--	--	--	--	.0	.3
Coliform (colonies per 100 ml) .....	--	11	0	1100	310	0	2	210	45
Fecal coliform (colonies per 100 ml) .....	--	0	0	20	18	0	0	1	0
Streptococci (colonies per 100 ml) .....	--	0	0	48	13	0	1	2	0
Aluminum (Al) .....	--	--	--	--	--	--	--	--	--
Arsenic (As) .....	--	--	--	--	.00	--	--	--	.00
Boron (B) .....	--	--	--	--	--	--	--	--	--
Copper (Cu) .....	--	--	--	--	.002	--	--	--	.013
Iron (Fe) .....	--	--	--	--	--	--	--	.03	--
Lead (Pb) .....	--	--	--	--	.000	--	--	--	.000
Lithium (Li) .....	--	--	--	--	--	--	--	--	--
Manganese (Mn) .....	--	--	--	--	--	--	--	--	--
Mercury (Hg) .....	--	--	--	--	<.0005	--	--	--	<.0005
Zinc (Zn) .....	--	--	--	--	.06	--	--	--	.96

Well number	AY-68-28-506	AY-68-28-601	AY-68-28-602	AY-68-28-702	AY-68-28-702	AY-68-28-703	AY-68-28-903	AY-68-29-102	AY-68-29-104
Date of collection	Mar. 4, 1971	Dec. 3, 1969	Nov. 12, 1969	Nov. 12, 1969	Aug. 4, 1971	Nov. 12, 1969	Apr. 6, 1971	Feb. 5, 1971	Aug. 4, 1971
Depth of well (ft)	490	425	391	450	450	300	762	523	602
Sampled after pumping (min)	40 minutes	10 minutes	15 minutes	15 minutes	Many hours	10 minutes	Several hours	Many hours	Many hours
Discharge (gpm) .....	20	30	10	1000	1000	13	3500	80	140
Silica (SiO <sub>2</sub> ) .....	--	14	14	12	--	12	14	--	12
Calcium (Ca) .....	--	88	118	84	--	78	100	84	79
Magnesium (Mg) .....	--	8.1	3.4	16	--	15	13	18	23
Sodium (Na) .....	--	16	8.5	8.5	--	7.1	1/ 8.3	--	1/ 3.7
Potassium (K) .....	--	1.0	1.4	1.4	--	1.3	--	--	--
Bicarbonate (HCO <sub>3</sub> ) .....	--	292	352	300	296	288	340	304	324
Carbonate (CO <sub>3</sub> ) .....	--	0	0	0	0	0	0	0	0
Sulfate (SO <sub>4</sub> ) .....	--	24	13	24	24	16	16	29	14
Chloride (Cl) .....	--	14	17	13	14	11	14	10	11
Fluoride (F) .....	--	.2	.1	.2	--	.2	.2	--	.3
Bromide (Br) .....	--	--	--	--	--	--	--	--	--
Iodide (I) .....	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub> .....	--	230	320	280	280	260	300	280	290
Sodium adsorption ratio (SAR) .....	--	.4	.2	.2	--	.2	.2	--	.1
Specific conductance (micromhos at 25°C) .....	--	537	620	542	542	500	591	536	534
pH .....	--	7.4	7.5	7.4	7.4	7.5	7.5	7.7	7.4
Temperature (°C) .....	--	23.0	21.0	22.0	--	21.5	22.0	23.0	--
Dissolved solids (calc) .....	--	314	362	314	--	288	340	--	306
Ammonia (NH <sub>4</sub> ) .....	--	.00	--	--	.00	--	.00	.00	.00
Nitrate (NO <sub>3</sub> ) .....	--	4.9	13	7.3	8.0	5.4	7.6	2.2	4.0
Nitrite (NO <sub>2</sub> ) .....	--	.00	--	--	.00	--	.00	.00	.00
Phosphate (PO <sub>4</sub> ) .....	--	.02	.01	.01	.00	.01	.00	.15	.00
Detergents (MBAS) .....	--	--	--	--	.00	--	.01	.00	.00
Biochemical oxygen demand (BOD) ..	--	.2	.2	.1	--	.2	.6	.9	--
Coliform (colonies per 100 ml) ...	840	0	24	1	83	42	0	0	3600
Fecal coliform (colonies per 100 ml) .....	4	0	0	0	0	0	0	0	33
Streptococci (colonies per 100 ml) .....	3	0	0	0	0	0	0	0	170
Aluminum (Al) .....	--	--	--	--	--	--	--	--	--
Arsenic (As) .....	--	--	--	--	.00	--	.00	.00	.00
Boron (B) .....	--	--	--	--	--	--	--	--	--
Copper (Cu) .....	--	--	--	--	.000	--	.002	.004	.004
Iron (Fe) .....	--	--	--	--	--	--	--	--	--
Lead (Pb) .....	--	--	--	--	.000	--	.000	.000	.000
Lithium (Li) .....	--	--	--	--	--	--	--	--	--
Manganese (Mn) .....	--	--	--	--	--	--	--	--	--
Mercury (Hg) .....	--	--	--	--	.0004	--	<.0005	<.0005	<.0005
Zinc (Zn) .....	--	--	--	--	.00	--	.09	.01	.00

1/ Sodium and potassium calculated as sodium (Na).

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Well number	AY-68-29-104	AY-68-29-104	AY-68-29-105	AY-68-29-106	AY-68-29-106	AY-68-29-106	AY-68-29-203	AY-68-29-203	AY-68-29-204
Date of collection	Aug. 6, 1971	Aug. 11, 1971	Nov. 12, 1969	Dec. 3, 1969	Aug. 10, 1971	Aug. 10, 1971	Aug. 11, 1971	Aug. 11, 1971	Aug. 11, 1971
Depth of well (ft)	502	602	285	490	490	490	219	219	280
Sampled after pumping (min)	Many hours	Several hours	10 minutes	15 minutes	10 minutes	60 minutes	10 minutes	60 minutes	10 minutes
Discharge (gpm) .....	120	120	10	10	20	20	10	10	7
Silica (SiO <sub>2</sub> ) .....	--	--	13	12	--	--	--	--	--
Calcium (Ca) .....	--	--	112	74	--	--	--	--	--
Magnesium (Mg) .....	--	--	3.4	20	--	--	--	--	--
Sodium (Na) .....	--	--	5.2	6.4	--	--	--	--	--
Potassium (K) .....	--	--	.6	1.0	--	--	--	--	--
Bicarbonate (HCO <sub>3</sub> ) .....	--	312	352	308	--	254	--	324	302
Carbonate (CO <sub>3</sub> ) .....	--	0	0	0	--	0	--	0	0
Sulfate (SO <sub>4</sub> ) .....	--	14	.0	12	--	7.6	--	10	9.6
Chloride (Cl) .....	--	9.0	9.2	11	--	12	--	7.8	7.6
Fluoride (F) .....	--	--	.0	.3	--	--	--	--	--
Bromide (Br) .....	--	--	--	--	--	--	--	--	--
Iodide (I) .....	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub> .....	--	280	290	270	--	220	--	290	280
Sodium adsorption ratio (SAR) .....	--	--	.1	.2	--	--	--	--	--
Specific conductance (microhos at 25°C) .....	529	518	558	517	--	436	--	528	503
pH .....	--	7.8	7.5	7.6	--	7.6	--	7.7	7.7
Temperature (°C) .....	--	--	23.0	23.5	--	--	--	--	--
Dissolved solids (calc) .....	--	--	319	289	--	--	--	--	--
Ammonia (NH <sub>4</sub> ) .....	--	.00	--	.00	.00	.00	.00	.00	.00
Nitrate (NO <sub>3</sub> ) .....	--	4.0	2.1	1.3	1.3	1.8	5.8	6.2	7.1
Nitrite (NO <sub>2</sub> ) .....	--	.00	--	.00	.00	.00	.00	.00	.00
Phosphate (PO <sub>4</sub> ) .....	--	.00	.01	.02	.00	.00	.00	.00	.00
Detergents (MBAS) .....	--	.00	--	--	.00	.00	.00	.00	.00
Biochemical oxygen demand (BOD) ..	--	--	--	.1	--	--	--	--	--
Coliform (colonies per 100 ml) ...	2000	79	30	0	0	0	69	11	1
Fecal coliform (colonies per 100 ml) .....	200	2	0	0	0	0	0	0	0
Streptococci (colonies per 100 ml) .....	140	5	0	0	0	0	0	0	0
Aluminum (Al) .....	--	--	--	--	--	--	--	--	--
Arsenic (As) .....	--	--	--	--	--	.00	--	.00	--
Boron (B) .....	--	--	.03	--	--	--	--	--	--
Copper (Cu) .....	--	--	.020	--	--	.002	--	.010	--
Iron (Fe) .....	--	--	.000	--	--	--	--	--	--
Lead (Pb) .....	--	--	.010	--	--	.000	--	.000	--
Lithium (Li) .....	--	--	.01	--	--	--	--	--	--
Manganese (Mn) .....	--	--	0	--	--	--	--	--	--
Mercury (Hg) .....	--	--	--	--	--	<.0005	--	.0009	--
Zinc (Zn) .....	--	--	.82	--	--	.16	--	.07	--

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## (Results in milligrams per liter except as indicated)

Well number	AY-68-29-206	AY-68-29-206	AY-68-29-205	AY-68-29-302	AY-68-29-302	AY-68-29-302	AY-68-29-403	AY-68-29-403	AY-68-29-403
Date of collection	Apr. 2, 1970	Aug. 3, 1971	Aug. 3, 1971	Dec. 3, 1969	Aug. 3, 1971	Aug. 3, 1971	Sept. 15, 1969	Apr. 2, 1970	Feb. 3, 1971
Depth of well (ft)	390	390	390	385	385	385	340	340	340
Sampled after pumping (min)	20 minutes	10 minutes	60 minutes	10 minutes	10 minutes	60 minutes	10 minutes	10 minutes	10 minutes
Discharge (gpm) .....	10	10	10	10	10	10	10	10	10
Silica (SiO <sub>2</sub> ) .....	10	--	--	12	--	--	--	--	--
Calcium (Ca) .....	90	--	--	94	--	--	--	--	80
Magnesium (Mg) .....	16	--	--	10	--	--	--	--	9.5
Sodium (Na) .....	4.8	--	--	4.1	--	--	--	--	--
Potassium (K) .....	1.0	--	--	.7	--	--	--	--	--
Bicarbonate (HCO <sub>3</sub> ) .....	332	--	348	320	--	320	--	--	272
Carbonate (CO <sub>3</sub> ) .....	0	--	0	0	--	0	--	--	0
Sulfate (SO <sub>4</sub> ) .....	9.8	--	5.8	8.4	--	8.4	--	--	9.6
Chloride (Cl) .....	7.4	--	9.6	8.8	--	8.2	--	--	8.2
Fluoride (F) .....	.1	--	--	.2	--	--	--	--	--
Bromide (Br) .....	--	--	--	--	--	--	--	--	--
Iodide (I) .....	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub> .....	290	--	310	280	--	290	--	--	240
Sodium adsorption ratio (SAR) .....	.1	--	--	.1	--	--	--	--	--
Specific conductance (microhm at 25°C) .....	548	--	566	322	--	326	--	382	437
pH .....	7.3	--	7.7	7.8	--	7.6	--	--	7.3
Temperature (°C) .....	22.5	--	--	22.5	--	--	--	22.5	22.0
Dissolved solids (calc) .....	312	--	--	299	--	--	--	--	--
Ammonia (NH <sub>4</sub> ) .....	.00	--	.00	.00	--	.00	--	.00	.00
Nitrate (NO <sub>3</sub> ) .....	9.7	--	8.4	6.2	--	5.8	--	3.0	3.1
Nitrite (NO <sub>2</sub> ) .....	.00	--	.00	.00	--	.00	--	.00	.00
Phosphate (PO <sub>4</sub> ) .....	.02	--	.00	.02	--	.00	--	.02	.00
Detergents (MBAS) .....	--	--	.06	--	--	.00	--	--	.00
Biochemical oxygen demand (BOD) ..	.0	--	--	.2	--	--	--	.0	.2
Coliform (colonies per 100 ml) ...	7	83	170	0	42	33	67	740	120
Fecal coliform (colonies per 100 ml) .....	0	2	8	0	0	0	0	0	0
Streptococci (colonies per 100 ml) .....	0	0	2	0	0	1	1	0	0
Aluminum (Al) .....	--	--	--	--	--	--	--	--	--
Arsenic (As) .....	--	--	.00	--	--	.00	--	--	.00
Boron (B) .....	--	--	--	--	--	--	--	--	--
Copper (Cu) .....	--	--	.002	--	--	.002	--	--	.002
Iron (Fe) .....	.02	--	--	--	--	--	--	--	--
Lead (Pb) .....	--	--	.000	--	--	.000	--	--	.000
Lithium (Li) .....	--	--	--	--	--	--	--	--	--
Manganese (Mn) .....	--	--	--	--	--	--	--	--	--
Mercury (Hg) .....	--	--	<.0005	--	--	<.0005	--	--	<.0005
Zinc (Zn) .....	--	--	.20	--	--	.19	--	--	.42

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## (Results in milligrams per liter except as indicated)

Well number	AT-68-29-403	AT-68-29-403	AT-68-29-409	AT-68-29-409	AT-68-29-410	AT-68-29-410	AT-68-29-502	AT-68-29-502	AT-68-29-503
Date of collection	Apr. 7, 1971	Apr. 7, 1971	Aug. 12, 1971	Aug. 12, 1971	Feb. 5, 1971	Aug. 8, 1971	Apr. 2, 1970	Apr. 7, 1971	Sept. 15, 1969
Depth of well (ft)	340	340	460	460	318	318	264	264	349
Sampled after pumping (min)	10 minutes	60 minutes	30 minutes	60 minutes	10 minutes	Many hours	7 minutes	35 minutes	10 minutes
Discharge (gpm)	10	10	6	6	620	620	10	10	10
Silica (SiO <sub>2</sub> )	--	--	--	--	--	--	--	--	--
Calcium (Ca)	--	--	--	--	60	--	--	--	--
Magnesium (Mg)	--	--	--	--	16	--	--	--	--
Sodium (Na)	--	--	--	--	--	--	--	--	--
Potassium (K)	--	--	--	--	--	--	--	--	--
Bicarbonate (HCO <sub>3</sub> )	--	--	--	206	250	330	--	--	--
Carbonate (CO <sub>3</sub> )	--	--	--	0	0	0	--	--	--
Sulfate (SO <sub>4</sub> )	--	--	--	6.8	8.2	8.8	--	--	--
Chloride (Cl)	--	--	--	8.0	10	10	--	--	--
Fluoride (F)	--	--	--	--	--	--	--	--	--
Bromide (Br)	--	--	--	--	--	--	--	--	--
Iodide (I)	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub>	--	--	--	180	220	290	--	--	--
Sodium adsorption ratio (SAR)	--	--	--	--	--	--	--	--	--
Specific conductance (microhm-cm at 25°C)	--	--	--	356	421	537	571	--	--
pH	--	--	--	7.7	7.6	7.7	--	--	--
Temperature (°C)	22.0	22.0	--	--	21.5	23.0	22.0	22.0	--
Dissolved solids (calc)	--	--	--	--	--	--	--	--	--
Ammonia (NH <sub>4</sub> )	--	--	--	.00	.00	.00	.00	--	--
Nitrate (NO <sub>3</sub> )	--	--	--	3.1	4.0	4.0	3.8	--	--
Nitrite (NO <sub>2</sub> )	--	--	--	.00	.00	.00	.00	--	--
Phosphate (PO <sub>4</sub> )	--	--	--	.00	.00	.00	.04	--	--
Detergents (NBAS)	--	--	--	.00	.00	.00	--	--	--
Biochemical oxygen demand (BOD)	--	--	--	--	.8	--	.0	--	--
Coliform (colonies per 100 ml)	18	170	35	26	0	0	0	0	1300
Fecal coliform (colonies per 100 ml)	0	0	1	0	0	0	0	0	1: 0
Streptococci (colonies per 100 ml)	0	0	0	0	0	0	0	0	1
Aluminum (Al)	--	--	--	--	--	--	--	--	--
Arsenic (As)	--	--	--	.00	.00	--	--	--	--
Boron (B)	--	--	--	--	--	--	--	--	--
Copper (Cu)	--	--	--	.005	.005	--	--	--	--
Iron (Fe)	--	--	--	--	--	--	--	--	--
Lead (Pb)	--	--	--	.000	.000	--	--	--	--
Lithium (Li)	--	--	--	--	--	--	--	--	--
Manganese (Mn)	--	--	--	--	--	--	--	--	--
Mercury (Hg)	--	--	--	<.0005	<.0005	--	--	--	--
Zinc (Zn)	--	--	--	.23	.01	--	--	--	--

## (Results in milligrams per liter except as indicated)

Well number	AY-68-29-503	AY-68-29-503	AY-68-29-503	AY-68-29-502	AY-68-29-503	AY-68-29-503	AY-68-29-503	AY-68-29-503	AY-68-29-503
Date of collection	Apr. 2, 1970	May 28, 1970	May 28, 1970	May 28, 1970	May 28, 1970	May 28, 1970	May 28, 1970	Feb. 3, 1971	Mar. 4, 1971
Depth of well (ft)	349	349	349	349	349	349	349	349	349
Sampled after pumping (min)	10 minutes	10 minutes	40 minutes	70 minutes	120 minutes	180 minutes	210 minutes	10 minutes	15 minutes
Discharge (gpm)	10	10	10	10	10	10	10	10	10
Silica (SiO <sub>2</sub> )	--	--	--	--	--	--	--	--	--
Calcium (Ca)	--	--	--	--	--	--	95	98	--
Magnesium (Mg)	--	--	--	--	--	--	11	12	--
Sodium (Na)	--	--	--	--	--	--	--	--	--
Potassium (K)	--	--	--	--	--	--	--	--	--
Bicarbonate (HCO <sub>3</sub> )	--	--	--	--	--	--	336	340	--
Carbonate (CO <sub>3</sub> )	--	--	--	--	--	--	0	0	--
Sulfate (SO <sub>4</sub> )	--	--	--	--	--	--	4.4	4.8	--
Chloride (Cl)	--	--	--	--	--	--	6.8	7.4	--
Fluoride (F)	--	--	--	--	--	--	--	--	--
Bromide (Br)	--	--	--	--	--	--	--	--	--
Iodide (I)	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub>	--	--	--	--	--	--	282	290	--
Sodium adsorption ratio (SAR)	--	--	--	--	--	--	--	--	--
Specific conductance (micromhos at 25°C)	534	--	--	--	--	--	533	537	--
pH	--	--	--	--	--	--	7.0	7.4	--
Temperature (°C)	22.0	--	--	--	--	--	--	21.5	--
Dissolved solids (calc)	--	--	--	--	--	--	--	--	--
Ammonia (NH <sub>4</sub> )	.00	--	--	.00	--	--	.00	.00	--
Nitrate (NO <sub>3</sub> )	3.9	--	--	3.8	--	--	3.8	4.4	--
Nitrite (NO <sub>2</sub> )	.00	--	--	.00	--	--	.00	.00	--
Phosphate (PO <sub>4</sub> )	.03	--	--	.00	--	--	.00	.00	--
Detergents (MBAS)	--	--	--	--	--	--	--	--	--
Biochemical oxygen demand (BOD)	.0	--	--	--	--	--	--	.3	--
Coliform (colonies per 100 ml)	410	1800	410	--	250	100	--	57	14000
Fecal coliform (colonies per 100 ml)	0	0	--	--	0	0	--	0	0
Streptococci (colonies per 100 ml)	4	0	--	--	0	0	--	0	0
Aluminum (Al)	--	--	--	--	--	--	--	--	--
Arsenic (As)	--	--	--	--	--	--	--	.000	--
Boron (B)	--	--	--	--	--	--	--	--	--
Copper (Cu)	--	--	--	--	--	--	--	.04	--
Iron (Fe)	--	--	--	--	--	--	--	--	--
Lead (Pb)	--	--	--	--	--	--	--	.000	--
Lithium (Li)	--	--	--	--	--	--	--	--	--
Manganese (Mn)	--	--	--	--	--	--	--	--	--
Mercury (Hg)	--	--	--	--	--	--	--	<.0005	--
Zinc (Zn)	--	--	--	--	--	--	--	.10	--

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## (Results in milligrams per liter except as indicated)

Well number	AY-68-29-303	AY-68-29-303	AY-68-29-303	AY-68-29-303	AY-68-29-303	AY-68-29-303	AY-68-29-303	AY-68-29-303	AY-68-29-303
Date of collection	Mar. 7, 1971	June 17, 1971	June 17, 1971	June 17, 1971	June 17, 1971	June 17, 1971	June 17, 1971	June 17, 1971	June 18, 1971
Depth of well (ft)	349	349	349	349	349	349	349	349	349
Sampled after pumping (min)	15 minutes	10 minutes	40 minutes	70 minutes	120 minutes	240 minutes	480 minutes	720 minutes	760 minutes
Discharge (gpm)	10	10	10	10	10	10	10	10	10
Silica (SiO <sub>2</sub> )	--	--	13	--	--	--	13	--	12
Calcium (Ca)	--	--	--	--	--	--	--	--	--
Magnesium (Mg)	--	--	11	--	--	--	--	--	--
Sodium (Na)	--	--	--	--	--	--	--	--	--
Potassium (K)	--	--	--	--	--	--	--	--	--
Bicarbonate (HCO <sub>3</sub> )	--	--	--	--	--	--	--	--	--
Carbonate (CO <sub>3</sub> )	--	--	--	--	--	--	--	--	--
Sulfate (SO <sub>4</sub> )	--	--	4.4	--	4.4	--	3.0	--	4.8
Chloride (Cl)	--	--	8.0	--	7.8	--	7.6	--	7.0
Fluoride (F)	--	--	.1	--	--	--	.1	--	.1
Bromide (Br)	--	--	--	--	--	--	--	--	--
Iodide (I)	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub>	--	--	--	--	--	--	--	--	--
Sodium adsorption ratio (SAR)	--	--	--	--	--	--	--	--	--
Specific conductance (micromhos at 25°C)	--	--	--	--	--	--	--	--	--
pH	--	--	7.7	--	7.6	--	7.7	--	7.7
Temperature (°C)	--	23.0	23.0	23.0	--	--	--	--	--
Dissolved solids (calc)	--	--	--	--	--	--	--	--	--
Ammonia (NH <sub>4</sub> )	--	.00	.00	.00	.00	.00	.00	.00	.00
Nitrate (NO <sub>3</sub> )	--	4.2	4.2	4.4	4.1	4.1	4.5	3.9	4.0
Nitrite (NO <sub>2</sub> )	--	.00	.00	.00	.00	.00	.00	.00	.00
Phosphate (PO <sub>4</sub> )	--	.00	.00	.00	.00	.00	.00	.00	.00
Detergents (MBAS)	--	.00	.00	.00	.00	.00	.00	.00	.00
Biochemical oxygen demand (BOD)	--	--	--	--	--	--	--	--	--
Coliform (colonies per 100 ml)	89	89	18	24	24	15	22	6	7
Fecal coliform (colonies per 100 ml)	0	0	0	0	0	0	0	0	0
Streptococci (colonies per 100 ml)	0	0	0	0	0	--	0	0	0
Aluminum (Al)	--	--	--	--	--	--	--	--	--
Arsenic (As)	--	--	.00	--	.00	--	.00	--	--
Boron (B)	--	--	--	--	--	--	--	--	--
Copper (Cu)	--	--	.005	--	.004	--	.003	--	--
Iron (Fe)	--	--	--	--	--	--	--	--	--
Lead (Pb)	--	--	.000	--	.000	--	.000	--	--
Lithium (Li)	--	--	--	--	--	--	--	--	--
Manganese (Mn)	--	--	--	--	--	--	--	--	--
Mercury (Hg)	--	--	.0007	--	.0007	--	.0003	--	--
Zinc (Zn)	--	--	.03	--	.03	--	.04	--	--

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(Results in milligram per liter except as indicated)

Well number	AY-68-29-503	AY-68-29-503	AY-68-29-503	AY-68-29-503	AY-68-29-503	AY-68-29-503	AY-68-29-503	AY-68-29-503	AY-68-29-503
Date of collection	June 18, 1971	June 18, 1971	June 18, 1971	June 18, 1971	June 18, 1971	June 19, 1971	June 19, 1971	June 19, 1971	June 20, 1971
Depth of well (ft)	349	349	349	349	349	349	349	349	349
Sampled after pumping (min)	1200 minutes	1440 minutes	1680 minutes	1920 minutes	2160 minutes	2400 minutes	2640 minutes	2880 minutes	10 minutes
Discharge (gpm)	10	10	10	10	10	10	10	10	10
Silica (SiO <sub>2</sub> )	--	--	--	--	--	--	--	13	--
Calcium (Ca)	--	--	--	--	--	--	--	--	--
Magnesium (Mg)	--	--	--	--	--	--	--	11	--
Sodium (Na)	--	--	--	--	--	--	--	--	--
Potassium (K)	--	--	--	--	--	--	--	--	--
Bicarbonate (HCO <sub>3</sub> )	--	--	--	--	--	--	--	--	--
Carbonate (CO <sub>3</sub> )	--	--	--	--	--	--	--	--	--
Sulfate (SO <sub>4</sub> )	--	4.0	--	4.4	--	4.4	--	4.8	--
Chloride (Cl)	--	7.2	--	7.2	--	7.0	--	7.6	--
Fluoride (F)	--	--	--	--	--	--	--	.1	--
Bromide (Br)	--	--	--	--	--	--	--	--	--
Iodide (I)	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub>	--	--	--	--	--	--	--	--	--
Sodium adsorption ratio (SAR)	--	--	--	--	--	--	--	--	--
Specific conductance (micromhos at 25°C)	--	--	--	--	--	--	--	--	--
pH	--	7.7	--	7.7	--	7.6	--	7.6	--
Temperature (°C)	--	--	--	--	--	--	--	--	--
Dissolved solids (calc)	--	--	--	--	--	--	--	--	--
Ammonia (NH <sub>4</sub> )	.00	.00	.00	.00	.00	.00	.00	.00	.00
Nitrate (NO <sub>3</sub> )	1.9	4.0	3.2	4.1	4.0	4.0	4.0	4.0	4.1
Nitrite (NO <sub>2</sub> )	.00	.00	.00	.00	.00	.00	.00	.00	.00
Phosphate (PO <sub>4</sub> )	.00	.00	.00	.00	.00	.00	.00	.00	.00
Detergents (MBAS)	.00	.00	.00	.00	.00	.00	.00	.00	.00
Biochemical oxygen demand (BOD)	--	--	--	--	--	--	--	--	--
Coliform (colonies per 100 ml)	2	20	4	3	9	7	4	3	720
Fecal coliform (colonies per 100 ml)	0	0	0	0	0	0	0	0	0
Streptococci (colonies per 100 ml)	0	0	0	3	2	0	0	0	0
Aluminum (Al)	--	--	--	--	--	--	--	--	--
Arsenic (As)	--	.00	--	--	--	--	--	.00	--
Boron (B)	--	--	--	--	--	--	--	--	--
Copper (Cu)	--	.002	--	--	--	--	--	.003	--
Iron (Fe)	--	--	--	--	--	--	--	--	--
Lead (Pb)	--	.000	--	--	--	--	--	.000	--
Lithium (Li)	--	--	--	--	--	--	--	--	--
Manganese (Mn)	--	--	--	--	--	--	--	--	--
Mercury (Hg)	--	.0008	--	--	--	--	--	.0006	--
Zinc (Zn)	--	.03	--	--	--	--	--	.00	--

(results in milligrams per liter except as indicated)

Well number	AY-68-29-50J	AY-68-29-50J	AY-68-29-50J	AY-68-29-702	AY-68-29-702	AY-68-29-805	AY-68-30-102	AY-68-30-103	AY-68-35-306
Date of collection	June 20, 1971	June 20, 1971	June 20, 1971	May 3, 1969	Feb. 18, 1971	Apr. 29, 1971	Apr. 29, 1971	Apr. 29, 1971	Apr. 7, 1971
Depth of well (ft)	349	349	349	872	872	800	418	841	335
Sampled after pumping (min)	40 minutes	70 minutes	120 minutes	Many hours	Many hours	Several days	Many hours	30 minutes	Many hours
Discharge (gpm)	10	10	10	1500	1500	2700	1000	500	2000
Silica (SiO <sub>2</sub> )	--	--	--	12	12	--	--	12	12
Calcium (Ca)	--	--	--	87	90	80	92	92	75
Magnesium (Mg)	--	--	--	14	14	17	8.0	14	17
Sodium (Na)	--	--	--	7.1	1/ 9.2	--	--	--	--
Potassium (K)	--	--	--	1.1	--	--	--	--	--
Bicarbonate (HCO <sub>3</sub> )	--	--	--	300	308	274	272	316	254
Carbonate (CO <sub>3</sub> )	--	--	--	0	0	0	0	0	0
Sulfate (SO <sub>4</sub> )	--	--	4.6	22	24	30	32	16	37
Chloride (Cl)	--	--	7.6	12	13	12	10	10	11
Fluoride (F)	--	--	--	.2	.2	--	--	.2	.2
Bromide (Br)	--	--	--	--	--	--	--	--	--
Iodide (I)	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub>	--	--	--	270	280	270	260	290	280
Sodium adsorption ratio (SAR)	--	--	--	.2	.2	--	--	.1	.2
Specific conductance (micromhos at 25°C)	--	--	--	530	546	519	506	543	495
pH	--	--	7.5	7.9	7.4	7.5	7.4	7.5	7.7
Temperature (°C)	--	--	--	21.0	--	--	22.0	--	23.0
Dissolved solids (calc)	--	--	--	310	320	--	--	307	293
Ammonia (NH <sub>4</sub> )	.00	.00	.00	--	.00	.00	.00	.00	.00
Nitrate (NO <sub>3</sub> )	4.1	4.1	4.2	6.2	7.1	7.1	5.3	4.9	10
Nitrite (NO <sub>2</sub> )	.00	.00	.00	--	.00	.00	.00	.00	.00
Phosphate (PO <sub>4</sub> )	.00	.00	.00	--	.03	.02	.06	.00	.02
Detergents (MBAS)	.00	.00	.00	--	.00	.02	.01	.00	.01
Biochemical oxygen demand (BOD)	--	--	--	--	.6	--	--	--	.6
Coliform (colonies per 100 ml)	47	68	32	--	0	0	0	0	27
Fecal coliform (colonies per 100 ml)	0	0	0	--	0	0	0	0	0
Streptococci (colonies per 100 ml)	1	1	0	--	0	0	0	0	0
Aluminum (Al)	--	--	--	--	--	--	--	--	--
Arsenic (As)	--	--	.00	--	.00	--	--	--	.00
Boron (B)	--	--	--	--	--	--	--	--	--
Copper (Cu)	--	--	.003	--	.001	.004	.002	.003	.000
Iron (Fe)	--	--	--	--	--	--	--	--	--
Lead (Pb)	--	--	.000	--	.000	.000	.000	.000	.000
Lithium (Li)	--	--	--	--	--	--	--	--	--
Manganese (Mn)	--	--	--	--	--	--	--	--	--
Mercury (Hg)	--	--	.0009	--	<.0005	--	--	--	<.0005
Zinc (Zn)	--	--	.01	--	.01	.00	.03	.07	.02

1/ Sodium and potassium calculated as sodium (Na).

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## (Results in milligrams per liter except as indicated)

Well number	AY-68-36-102	AY-68-36-106	AY-68-36-302	AY-68-37-101	AY-68-37-104	AY-68-37-404	DX-68-16-502	DX-68-16-604	DX-68-22-301
Date of collection	Feb. 18, 1971	Nov. 12, 1969	Feb. 18, 1971	June 3, 1971	Nov. 3, 1969	Feb. 18, 1971	Nov. 21, 1968	Nov. 1, 1969	May 19, 1970
Depth of well (ft)	786	400	1224	1005	995	1326	230	260	375
Sampled after pumping (min)	Many hours	10	Many hours	Many hours	Many hours	Many hours	10	Bailed	10
Discharge (gpm)	1000	10	2000	5000	3000	--	300	--	15
Silica (SiO <sub>2</sub> )	12	70	13	--	12	12	12	13	12
Calcium (Ca)	85	122	67	--	73	67	88	370	101
Magnesium (Mg)	18	6.7	13	--	17	15	16	199	7.0
Sodium (Na)	1/ 8.3	41	1/ 7.2	7.2	6.9	1/ 7.6	7.6	610	.9
Potassium (K)	--	1.8	--	1.4	1.3	--	.9	34	1.1
Bicarbonate (HCO <sub>3</sub> )	288	398	250	258	260	250	310	356	332
Carbonate (CO <sub>3</sub> )	0	0	0	0	0	0	0	0	0
Sulfate (SO <sub>4</sub> )	31	21	17	33	32	16	19	1140	1.2
Chloride (Cl)	14	53	12	14	12	13	13	1200	7.2
Fluoride (F)	.2	.4	--	--	.2	.1	.1	--	.0
Bromide (Br)	--	--	--	--	--	--	--	--	--
Iodide (I)	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub>	280	350	230	250	252	230	290	1700	280
Sodium adsorption ratio (SAR)	.2	1.0	.2	--	.2	.2	.2	6.3	.0
Specific conductance (micromhos at 25°C)	542	779	453	501	497	455	554	5590	540
pH	7.4	7.2	7.5	7.7	7.7	7.5	7.4	7.3	6.9
Temperature (°C)	--	--	--	--	23.0	--	--	--	22.0
Dissolved solids (calc)	318	470	260	--	288	260	316	3740	297
Ammonia (NH <sub>4</sub> )	.00	--	.00	.00	--	.00	--	--	.00
Nitrate (NO <sub>3</sub> )	9.3	.1	5.8	7.1	5.3	6.6	6.9	.0	3.4
Nitrite (NO <sub>2</sub> )	.00	--	.00	.00	--	.00	--	--	.00
Phosphate (PO <sub>4</sub> )	.03	.04	.00	.03	--	.00	--	--	.02
Detergents (MBAS)	.00	--	.00	.00	--	.00	--	--	--
Biochemical oxygen demand (BOD)	.6	.2	.6	--	--	.6	--	--	.1
Coliform (colonies per 100 ml)	0	10	0	0	--	0	--	--	210
Fecal coliform (colonies per 100 ml)	0	0	0	0	--	0	--	--	1
Streptococci (colonies per 100 ml)	0	0	0	0	--	0	--	--	0
Aluminum (Al)	--	--	--	.01	--	--	--	--	--
Arsenic (As)	.00	--	.00	.00	--	.00	--	--	--
Boron (B)	--	--	--	.08	--	--	--	--	--
Copper (Cu)	.005	--	.000	.002	--	.000	--	--	--
Iron (Fe)	--	--	--	.01	--	--	.00	--	--
Lead (Pb)	.006	--	.000	.000	--	.000	--	--	--
Lithium (Li)	--	--	--	--	--	--	--	--	--
Manganese (Mn)	--	--	--	--	--	--	--	--	--
Mercury (Hg)	<.0005	--	<.0005	<.0005	--	<.0005	--	--	--
Zinc (Zn)	.02	--	.00	.00	--	.01	--	--	--

1/ Sodium and potassium calculated as sodium (Na).

## (Results in milligrams per liter except as indicated)

Well number	DK-68-22-301	DK-68-23-301	DK-68-23-301	JJ-55-61-701	JJ-55-61-702	JJ-55-61-703	JJ-55-61-802	JJ-70-04-302	JJ-70-06-302
Date of collection	May 19, 1970	Feb. 12, 1971	Aug. 12, 1971	Feb. 3, 1970	Feb. 3, 1970	Feb. 3, 1970	Feb. 3, 1970	Feb. 3, 1970	Feb. 3, 1970
Depth of well (ft)	400	Spring	Spring	363	620	146	270	400	326
Sampled after pumping (min)	15 minutes	Continuous flow	Continuous flow	20 minutes	60 minutes	60 minutes	20 minutes	40 minutes	30 minutes
Discharge (gpm)	10	2/ 2000	3/ 200	200	200	3	5	10	2
Silica (SiO <sub>2</sub> )	12	13	--	--	--	--	28	--	--
Calcium (Ca)	93	79	--	--	--	68	100	74	60
Magnesium (Mg)	8.8	16	--	--	--	4.4	11	18	7.6
Sodium (Na)	4.8	1/ 8.7	--	--	--	9.4	19	5.1	2.6
Potassium (K)	1.0	--	--	--	--	.8	3.4	3.6	1.6
Bicarbonate (HCO <sub>3</sub> )	308	284	--	--	--	212	228	204	192
Carbonate (CO <sub>3</sub> )	0	0	--	--	--	0	0	0	0
Sulfate (SO <sub>4</sub> )	6.0	24	--	--	--	7.6	20	13	9.2
Chloride (Cl)	9.4	13	--	--	--	18	46	62	14
Fluoride (F)	.0	.2	--	--	--	--	.0	--	--
Bromide (Br)	--	--	--	--	--	--	--	--	--
Iodide (I)	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub>	270	260	--	--	--	190	290	260	180
Sodium adsorption ratio (SAR)	.1	.2	--	--	--	--	--	--	--
Specific conductance (micromhos at 25°C)	529	519	516	385	400	401	671	681	385
pH	6.9	7.2	--	--	--	7.4	7.5	7.9	7.7
Temperature (°C)	22.0	--	24.0	22.5	22.0	17.0	23.0	--	14.0
Dissolved solids (calc)	296	301	--	--	--	--	347	--	--
Ammonia (NH <sub>3</sub> )	.00	.00	--	.00	.00	.00	.00	.00	.00
Nitrate (NO <sub>3</sub> )	10	7.1	--	3.6	7.2	2.8	7.3	7.6	2.8
Nitrite (NO <sub>2</sub> )	.00	.00	--	.00	.00	.00	.00	.05	.00
Phosphate (PO <sub>4</sub> )	.01	.03	--	.04	.01	.02	.00	.00	.01
Detergents (NDAS)	--	.00	--	--	--	--	--	--	--
Biochemical oxygen demand (BOD)	.2	.7	--	.3	.0	.1	.1	.1	.0
Colifora (colonies per 100 ml)	5	14	29	0	0	88	180	32	96
Fecal colifora (colonies per 100 ml)	0	0	0	0	0	0	1	1	0
Streptococci (colonies per 100 ml)	0	0	0	0	0	12	10	11	52
Aluminum (Al)	--	--	--	--	--	--	--	--	--
Arsenic (As)	--	.00	--	--	--	--	--	--	--
Boron (B)	--	--	--	--	--	--	--	--	--
Copper (Cu)	--	.001	--	--	--	--	--	--	--
Iron (Fe)	--	--	--	--	--	--	--	--	--
Lead (Pb)	--	.000	--	--	--	--	--	--	--
Lithium (Li)	--	--	--	--	--	--	--	--	--
Manganese (Mn)	--	--	--	--	--	--	--	--	--
Mercury (Hg)	--	.0001	--	--	--	--	--	--	--
Zinc (Zn)	--	.01	--	--	--	--	--	--	--

1/ Sodium and potassium calculated as sodium (Na).

2/ Sample collected at one of many spring discharge points. Total flow for Coeal Springs was 246 cfs (cubic feet per second).

3/ Sample collected at one of many spring discharge points. Total flow for Coeal Springs was 187 cfs.

(Results in milligrams per liter except as indicated)

Well number	LR-68-16-603	LR-68-16-603	TD-68-33-301	TD-69-39-502	YP-69-36-701	YP-69-41-503	YP-69-41-102	YP-69-43-102	YP-69-50-203
Date of collection	Aug. 29, 1969	May 19, 1970	May 13, 1970	May 13, 1970	May 13, 1970	May 13, 1970	July 23, 1968	May 13, 1970	Mar. 23, 1970
Depth of well (ft)	230	230	805	530	500	260	685	685	525
Sampled after pumping (min)	10 minutes	10 minutes	Many hours	60 minutes	120 minutes	Many hours	10 minutes	Many hours	Several hours
Discharge (gpm)	20	20	750	800	500	1500	1600	1600	1400
Silica (SiO <sub>2</sub> )	11	--	12	11	12	11	10	12	13
Calcium (Ca)	88	--	68	80	60	62	68	69	86
Magnesium (Mg)	16	--	18	10	15	11	14	13	9.7
Sodium (Na)	1/ 9.9	--	6.0	11	8.3	8.5	5.7	5.2	10
Potassium (K)	--	--	1.4	1.1	1.0	1.1	.9	1.0	1.1
Dicarbonate (HCO <sub>3</sub> )	312	--	230	252	232	214	243	244	264
Carbonate (CO <sub>3</sub> )	0	--	0	0	0	0	0	0	0
Sulfate (SO <sub>4</sub> )	21	--	50	20	14	15	12	12	13
Chloride (Cl)	16	--	11	20	13	15	13	12	29
Fluoride (F)	.3	--	.2	.1	.1	.1	.1	.0	.1
Bromide (Br)	--	--	--	--	--	--	--	--	--
Iodide (I)	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub>	290	--	240	240	210	200	230	230	250
Sodium adsorption ratio (SAR)	.3	--	.2	.3	.2	.3	.2	.2	.3
Specific conductance (micromhos at 25°C)	567	599	484	503	439	421	440	431	538
pH	7.2	7.3	7.1	7.1	7.2	7.1	7.4	6.9	7.1
Temperature (°C)	23.0	--	21.5	21.3	--	21.0	23.0	22.0	23.0
Dissolved solids (calc)	322	--	282	288	247	238	250	235	300
Ammonia (NH <sub>4</sub> )	--	.00	.00	.00	.00	.00	--	.00	.00
Nitrate (NO <sub>3</sub> )	7.3	8.3	2.3	11	9.4	9.2	7.7	11	8.0
Nitrite (NO <sub>2</sub> )	--	.00	.00	.00	.00	.00	--	.00	.00
Phosphate (PO <sub>4</sub> )	--	.01	.00	.00	.00	.00	--	.01	.02
Detergents (NDAS)	--	--	--	--	--	--	--	--	--
Biochemical oxygen demand (BOD)	--	.1	.2	.2	.1	.1	--	.0	.0
Coliform (colonies per 100 ml)	--	60	0	34	8	11	--	48	0
Fecal coliform (colonies per 100 ml)	--	8	--	--	--	--	--	--	0
Streptococci (colonies per 100 ml)	--	31	0	0	0	0	--	0	0
Aluminum (Al)	--	--	--	--	--	--	--	--	.00
Arsenic (As)	--	--	--	--	--	--	--	--	.00
Boron (B)	--	--	--	--	--	--	--	--	--
Copper (Cu)	--	--	--	--	--	--	--	--	.010
Iron (Fe)	100	--	--	--	--	--	--	--	.00
Lead (Pb)	--	--	--	--	--	--	--	--	.000
Lithium (Li)	--	--	--	--	--	--	--	--	.00
Manganese (Mn)	--	--	--	--	--	--	--	--	.00
Mercury (Hg)	--	--	--	--	--	--	--	--	--
Zinc (Zn)	--	--	--	--	--	--	--	--	.01

1/ Sodium and potassium calculated as sodium (Na).

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## (Results in milligrams per liter except as indicated)

	Site 3	Site 3	Site 4	Site 4	Site 5	Site 5	Site 6	Site 6	Site 7
	Frio R. at Hwy. 1120, 1 mile below Leaky.	Frio R. at Hwy. 1120, 1 mile below Leaky.	Frio R. at Hwy. 1050, above Garner Park.	Frio R. at Hwy. 1050, above Garner Park.	Frio R. at Mager's crossing, below Garner Park.	Frio R. at Mager's crossing, below Garner Park.	08195000 Nueces R. at Concan.	08195000 Nueces R. at Concan.	Nueces R. at county road crossing, 3.0 miles north of Vance.
Date of collection	Feb. 4, 1970	June 2, 1971	Feb. 4, 1970	June 2, 1971	Feb. 4, 1970	June 2, 1971	Feb. 4, 1970	June 2, 1971	Feb. 2, 1970
Discharge (cfs) .....	1/ 60	29	1/ 60	34	1/ 70	32	101	35	1/ 15
Silica (SiO <sub>2</sub> ) .....	--	--	--	--	--	--	--	--	--
Calcium (Ca) .....	--	--	--	--	--	--	--	--	--
Magnesium (Mg) .....	--	--	--	--	--	--	--	--	--
Sodium (Na) .....	--	--	--	--	--	--	--	--	--
Potassium (K) .....	--	--	--	--	--	--	--	--	--
Bicarbonate (HCO <sub>3</sub> ) .....	--	--	--	--	--	--	--	--	--
Carbonate (CO <sub>3</sub> ) .....	--	--	--	--	--	--	--	--	--
Sulfate (SO <sub>4</sub> ) .....	--	--	--	--	--	--	--	--	--
Chloride (Cl) .....	--	--	--	--	--	--	--	--	--
Fluoride (F) .....	--	--	--	--	--	--	--	--	--
Bromide (Br) .....	--	--	--	--	--	--	--	--	--
Iodide (I) .....	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub> .....	--	--	--	--	--	--	--	--	--
Sodium adsorption ratio (SAR) .....	--	--	--	--	--	--	--	--	--
Specific conductance (micromhos at 25°C) .....	446	435	445	437	457	405	439	388	406
pH .....	--	7.7	--	7.7	--	7.7	--	7.7	--
Temperature (°C) .....	13.0	25.5	13.0	27.0	11.0	26.0	11.0	28.0	14.5
Dissolved solids (malc) .....	--	--	--	--	--	--	--	--	--
Ammonia (NH <sub>4</sub> ) .....	.00	.00	.03	.00	.14	.00	.00	.00	.00
Nitrate (NO <sub>3</sub> ) .....	8.9	3.1	9.3	3.5	9.3	3.1	11	2.2	6.4
Nitrite (NO <sub>2</sub> ) .....	.00	.00	.00	.00	.00	.00	.00	.00	.00
Phosphate (PO <sub>4</sub> ) .....	.00	.00	.00	.00	.00	.09	.00	.00	.00
Detergents (MBAS) .....	--	.07	--	.00	--	.00	--	.00	--
Biochemical oxygen demand (BOD) ..	.1	.4	.1	1.2	.2	1.1	.2	.6	.0
Dissolved oxygen (DO) .....	--	9.4	9.2	9.2	--	8.4	--	9.0	--
Coliform (colonies per 100 ml) ...	32	5200	24	470	48	20000	44	1400	120
Fecal coliform (colonies per 100 ml) .....	8	4	0	8	10	42	2	4	1
Streptococci (colonies per 100 ml) .....	48	160	42	44	48	100	34	50	88
Aluminum (Al) .....	--	--	--	--	--	--	--	--	--
Arsenic (As) .....	--	--	--	--	--	--	--	--	--
Boron (B) .....	--	--	--	--	--	--	--	--	--
Copper (Cu) .....	--	--	--	--	--	--	--	--	--
Iron (Fe) .....	--	--	--	--	--	--	--	--	--
Lead (Pb) .....	--	--	--	--	--	--	--	--	--
Lithium (Li) .....	--	--	--	--	--	--	--	--	--
Manganese (Mn) .....	--	--	--	--	--	--	--	--	--
Mercury (Hg) .....	--	--	--	--	--	--	--	--	--
Zinc (Zn) .....	--	--	--	--	--	--	--	--	--

1/ Estimated.

(Results in milligrams per liter except as indicated)

	Site 8	Site 9	Site 10	Site 10	Site 11	Site 12	Site 12	Site 13	Site 14
	Pulliam Creek at county road crossing, 4.0 miles northwest of Barkdale.	Nueces R. at Hwy. 55, 1.5 miles south of Camp Wood.	08190000 Nueces R. at Laguna.	08190000 Nueces R. at Laguna.	08196000 Dry Frio R. near Reagan Wells.	08198000 Sabinol R. near Sabinol.	08198000 Sabinol R. near Sabinol.	08201500 Seco Creek at Miller Ranch, near Utopia.	08200000 Hondo Creek near Tarpley.
Date of collection	Feb. 2, 1970	Feb. 2, 1970	Feb. 2, 1970	Aug. 26, 1971	Feb. 4, 1970	Feb. 4, 1970	Aug. 27, 1971	Mar. 23, 1970	Feb. 5, 1970
Discharge (cfs) .....	1/ 10	1/ 30	143	599	22	47	200	18	17
Silica (SiO <sub>2</sub> ) .....	--	--	--	--	--	--	--	--	--
Calcium (Ca) .....	--	--	58	--	65	65	--	64	72
Magnesium (Mg) .....	--	--	14	--	13	14	--	12	11
Sodium (Na) .....	--	--	9.1	--	8.9	7.4	--	6.9	6.5
Potassium (K) .....	--	--	.9	--	.6	1.0	--	1.0	.8
Bicarbonate (HCO <sub>3</sub> ) .....	--	--	216	246	224	216	254	198	216
Carbonate (CO <sub>3</sub> ) .....	--	--	0	0	0	0	0	0	0
Sulfate (SO <sub>4</sub> ) .....	--	--	15	15	20	32	24	39	40
Chloride (Cl) .....	--	--	16	17	15	14	16	13	13
Fluoride (F) .....	--	--	--	--	--	--	--	.2	--
Bromide (Br) .....	--	--	--	--	--	--	--	--	--
Iodide (I) .....	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub> .....	--	--	200	240	220	220	250	210	220
Sodium adsorption ratio (SAR) .....	--	--	--	--	--	--	--	.2	--
Specific conductance (micromhos at 25°C) .....	416	399	415	468	438	468	497	429	467
pH .....	--	--	7.5	8.0	8.0	7.7	7.7	7.5	7.7
Temperature (°C) .....	14.5	13.0	14.0	20.5	13.0	11.5	--	20.5	10.0
Dissolved solids (calc) .....	--	--	--	--	--	--	--	250	--
Ammonia (NH <sub>3</sub> ) .....	.00	.19	.00	--	.00	.00	--	--	.03
Nitrate (NO <sub>3</sub> ) .....	14	11	10	--	13	8.9	--	6.6	8.0
Nitrite (NO <sub>2</sub> ) .....	.00	.03	.00	--	.00	.00	--	.00	.00
Phosphate (PO <sub>4</sub> ) .....	.03	.06	.00	--	.00	.03	--	.06	.00
Detergents (MBAS) .....	--	--	--	--	--	--	--	--	--
Biochemical oxygen demand (BOD) ..	.1	.1	.1	--	.1	.2	--	.2	.1
Dissolved oxygen (DO) .....	--	--	--	--	--	--	--	--	--
Coliform (colonies per 100 ml) ...	92	1500	28	--	32	40	--	440	110
Fecal coliform (colonies per 100 ml) .....	32	20	0	--	0	0	--	6	12
Streptococci (colonies per 100 ml) .....	33	160	0	--	14	26	--	10	130
Aluminum (Al) .....	--	--	--	--	--	--	--	--	--
Arsenic (As) .....	--	--	--	--	--	--	--	--	--
Boron (B) .....	--	--	--	--	--	--	--	--	--
Copper (Cu) .....	--	--	--	--	--	--	--	--	--
Iron (Fe) .....	--	--	--	--	--	--	--	--	--
Lead (Pb) .....	--	--	--	--	--	--	--	--	--
Lithium (Li) .....	--	--	--	--	--	--	--	--	--
Manganese (Mn) .....	--	--	--	--	--	--	--	--	--
Mercury (Hg) .....	--	--	--	--	--	--	--	--	--
Zinc (Zn) .....	--	--	--	--	--	--	--	--	--

1/ Estimated.

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	Site 14	Site 15	Site 16	Site 17	Site 17	Site 18	Site 19	Site 20	Site 21
	08200000 Hondo Creek near Tarpley.	Middle Verde Creek at Hwy. 689, 16.6 miles north of Hondo.	Verde Creek at Hwy. 689, 4.6 miles north of Hondo.	08179000 Medina R. near Pipe Creek.	08179000 Medina R. near Pipe Creek.	Medina Lake at mouth of Plum Creek, and Hamilton Coves.	Medina Lake at Plum Creek Cove.	Medina Lake at Hamilton Cove.	Medina Lake at Angel Cove.
Date of collection	Aug. 27, 1971	Mar. 23, 1970	Aug. 27, 1971	Apr. 28, 1971	Aug. 30, 1971	Apr. 26, 1971	Apr. 28, 1971	Apr. 28, 1971	Apr. 28, 1971
Discharge (cfs) .....	36	1/ 20	1/ 30	20	446	--	--	--	--
Silica (SiO <sub>2</sub> ) .....	--	8.6	--	10	--	--	--	--	--
Calcium (Ca) .....	--	68	--	85	--	56	--	--	--
Magnesium (Mg) .....	--	14	--	23	--	19	--	--	--
Sodium (Na) .....	--	8.0	--	11	--	--	--	--	--
Potassium (K) .....	--	.8	--	--	--	--	--	--	--
Bicarbonate (HCO <sub>3</sub> ) .....	84	228	172	228	238	176	--	--	--
Carbonate (CO <sub>3</sub> ) .....	0	0	0	0	0	0	--	--	--
Sulfate (SO <sub>4</sub> ) .....	27	34	25	120	62	67	--	--	--
Chloride (Cl) .....	18	15	20	15	17	15	--	--	--
Fluoride (F) .....	--	.2	--	.3	--	--	--	--	--
Bromide (Br) .....	--	--	--	--	--	--	--	--	--
Iodide (I) .....	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub> .....	210	230	190	310	280	220	--	--	--
Sodium adsorption ratio (SAR) .....	--	.2	--	.3	--	--	--	--	--
Specific conductance (micromhos at 25°C) .....	419	469	389	596	543	447	446	445	445
pH .....	7.7	7.6	7.6	7.7	7.6	7.7	--	--	--
Temperature (°C) .....	22.0	16.0	22.0	21.0	--	--	--	--	23.0
Dissolved solids (calc) .....	--	265	--	373	--	--	--	--	--
Ammonia (NH <sub>4</sub> ) .....	--	.00	--	.00	--	.00	.00	.00	.00
Nitrate (NO <sub>3</sub> ) .....	--	4.4	--	1.3	--	.0	.4	.4	.4
Nitrite (NO <sub>2</sub> ) .....	--	.00	--	.00	--	.00	.00	.00	.00
Phosphate (PO <sub>4</sub> ) .....	--	.00	--	.06	--	.00	.00	.00	.00
Detergents (MBAS) .....	--	--	--	.07	--	.01	.00	.02	.10
Biochemical oxygen demand (BOD) ..	--	.2	--	1.6	--	--	--	--	--
Dissolved oxygen (DO) .....	--	--	--	--	--	--	--	--	--
Coliform (colonies per 100 ml) ...	--	900	--	31000	--	65	660	270	420
Fecal coliform (colonies per 100 ml) .....	--	13	--	130	--	0	1	1	0
Streptococci (colonies per 100 ml) .....	--	39	--	310	--	0	3	1	0
Aluminum (Al) .....	--	--	--	--	--	--	--	--	--
Arsenic (As) .....	--	--	--	.00	--	--	--	--	--
Boron (B) .....	--	--	--	--	--	--	--	--	--
Copper (Cu) .....	--	--	--	.002	--	--	--	--	--
Iron (Fe) .....	--	--	--	--	--	--	--	--	--
Lead (Pb) .....	--	--	--	.000	--	--	--	--	--
Lithium (Li) .....	--	--	--	--	--	--	--	--	--
Manganese (Mn) .....	--	--	--	--	--	--	--	--	--
Mercury (Hg) .....	--	--	--	<.0005	--	--	--	--	--
Zinc (Zn) .....	--	--	--	.02	--	--	--	--	--

1/ Estimated.

(Results in milligrams per liter except as indicated)

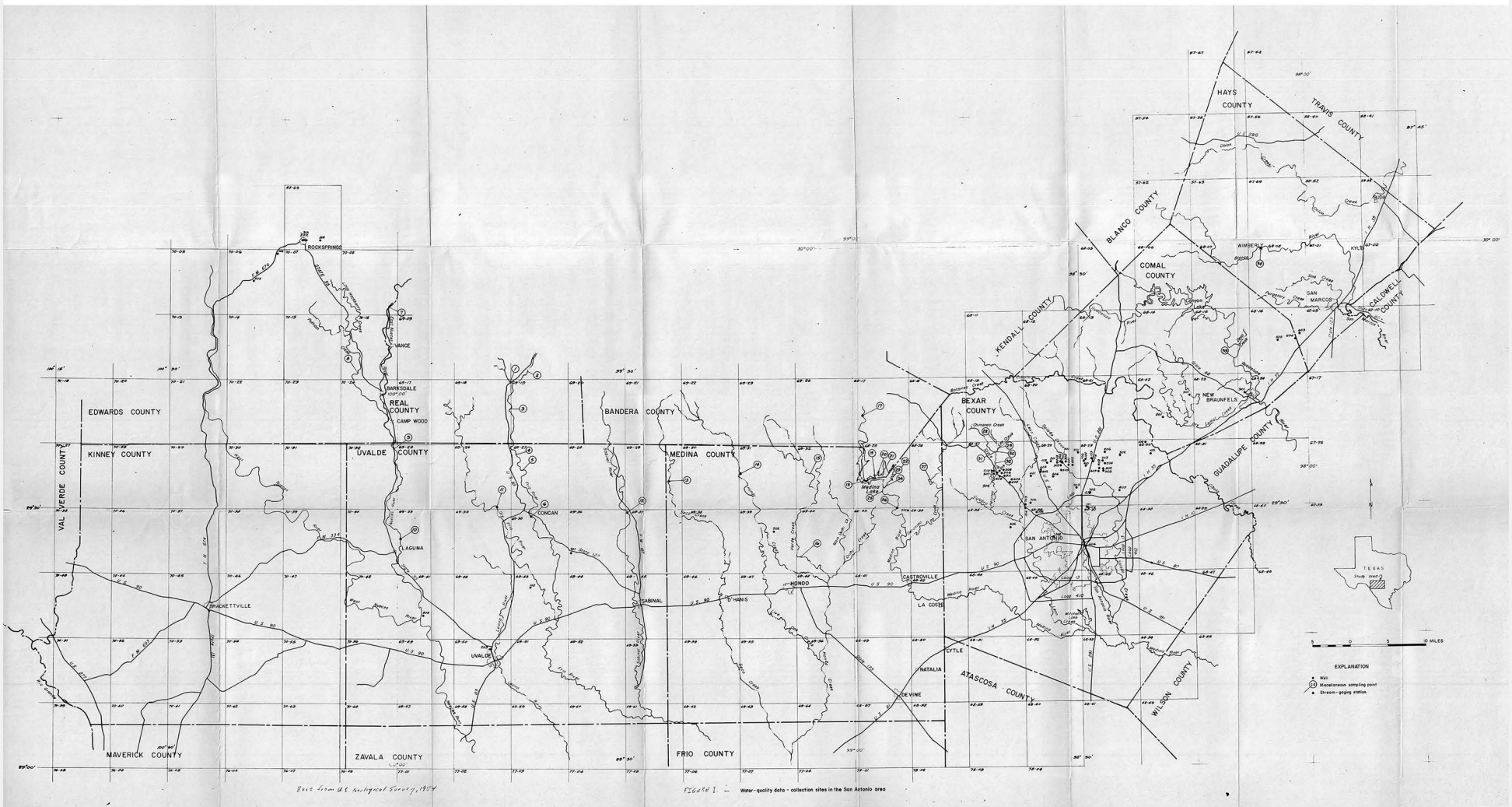
	Site 22	Site 23	Site 24	Site 25	Site 26	Site 27	Site 27	Site 28	Site 29
	Medina Lake at north side of Red Cove.	Medina Lake at south side of Red Cove.	Medina Lake at Dam.	Medina R. at county road crossing, 0.8 miles south of Medina Dam.	08180500 Medina R. near Alameda.	San Gerónimo Creek 3.6 miles south southwest of San Gerónimo.	San Gerónimo Creek 5.6 miles south southwest of San Gerónimo.	Reintus Creek at county road crossing, 1.4 miles upstream from Hwy. 16.	Lee Creek 0.2 mile upstream from mouth.
Date of collection	Apr. 28, 1971	Apr. 28, 1971	Apr. 28, 1971	Feb. 2, 1970	Mar. 23, 1970	Mar. 24, 1970	Aug. 30, 1971	Jan. 29, 1970	Jan. 29, 1970
Discharge (cfw)	--	--	--	--	48	1/ 4	6.2	1/ 0.2	1/ 0.8
Silica (SiO <sub>2</sub> )	--	--	--	--	7.4	8.5	--	--	--
Calcium (Ca)	--	--	--	80	66	62	--	--	--
Magnesium (Mg)	--	--	--	16	15	16	--	--	--
Sodium (Na)	--	--	--	10	7.3	7.8	--	--	--
Potassium (K)	--	--	--	1.9	1.9	1.1	--	--	--
Bicarbonate (HCO <sub>3</sub> )	--	--	--	192	205	220	184	--	--
Carbonate (CO <sub>3</sub> )	--	--	--	0	0	0	0	--	--
Sulfate (SO <sub>4</sub> )	--	--	--	38	51	34	33	--	--
Chloride (Cl)	--	--	--	14	14	14	15	--	--
Fluoride (F)	--	--	--	--	.2	.1	--	--	--
Bromide (Br)	--	--	--	--	--	--	--	--	--
Iodide (I)	--	--	--	--	--	--	--	--	--
Hardness as CaCO <sub>3</sub>	--	--	--	220	220	220	200	--	--
Sodium adsorption ratio (SAR)	--	--	--	--	.2	.2	--	--	--
Specific conductance (micromhos at 25°C)	443	445	444	449	450	443	396	529	444
pH	--	--	--	7.8	7.7	7.6	7.7	7.6	7.7
Temperature (°C)	25.0	--	--	14.0	16.0	16.3	--	16.0	14.0
Dissolved solids (calc) <sup>4</sup>	--	--	--	--	264	253	--	--	--
Ammonia (NH <sub>4</sub> )	.00	.00	.00	.00	.00	.00	--	.03	.04
Nitrate (NO <sub>3</sub> )	.0	.0	.4	3.1	1.8	3.1	--	.4	.0
Nitrite (NO <sub>2</sub> )	.00	.00	.00	.00	.00	.00	--	.00	.00
Phosphate (PO <sub>4</sub> )	.00	.00	.00	.00	.09	.09	--	.61	.15
Detergents (MBAS)	.01	.05	.05	--	--	--	--	--	--
Biochemical oxygen demand (BOD)	--	--	--	.0	.4	.5	--	.3	.1
Dissolved oxygen (DO)	--	--	--	--	--	--	--	8.9	7.7
Colifora (colonies per 100 ml)	240	200	35	2100	7100	760	--	1600	1200
Fecal colifora (colonies per 100 ml)	17	4	1	4	21	25	--	11	13
Streptococci (colonies per 100 ml)	28	4	0	150	59	57	--	51	48
Aluminum (Al)	--	--	--	--	--	.00	--	--	--
Arsenic (As)	--	--	--	--	--	.00	--	--	--
Boron (B)	--	--	--	--	--	--	--	--	--
Copper (Cu)	--	--	--	--	--	.000	--	--	--
Iron (Fe)	--	--	--	--	--	.00	--	--	--
Lead (Pb)	--	--	--	--	--	.000	--	--	--
Lithium (Li)	--	--	--	--	--	.00	--	--	--
Manganese (Mn)	--	--	--	--	--	.00	--	--	--
Mercury (Hg)	--	--	--	--	--	--	--	--	--
Zinc (Zn)	--	--	--	--	--	.01	--	--	--

1/ Estimated.

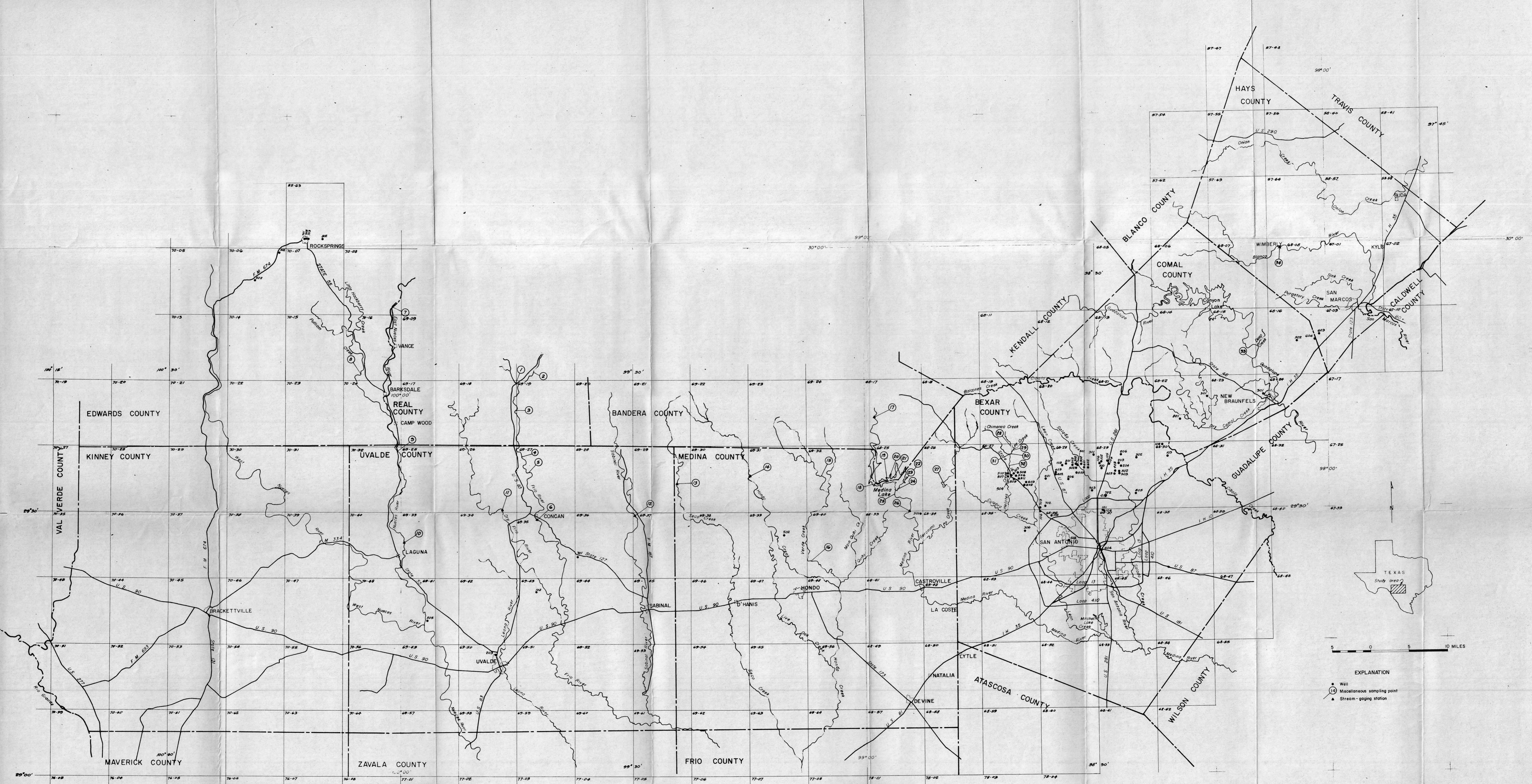
## (Results in milligrams per liter except as indicated)

	Site 30	Site 31	Site 32	Site 32	Site 33	Site 34	Site	Site	Site
	Helotes Creek at county road crossing, 2.2 miles upstream from Hwy. 16.	Chisamen Creek 100 feet upstream from mouth.	Helotes Creek at county road crossing, 0.5 miles upstream from Hwy. 16.	Helotes Creek at county road crossing, 0.5 miles upstream from Hwy. 16.	Guadalupe R. at second crossing, 2.0 miles downstream from Deep Creek.	0511000 Blanco R. at Wimberley.			
Date of collection	Jan. 29, 1970	Jan. 29, 1970	Sept. 15, 1969	Jan. 29, 1970	Mar. 24, 1970	Mar. 24, 1970			
Discharge (cfs) .....	1/ 1.7	1/ 0.4	1/ 0.3	1/ 0.4	--	322			
Silica (SiO <sub>2</sub> ) .....	--	--	13	3.4	8.3	5.8			
Calcium (Ca) .....	--	--	63	68	52	71			
Magnesium (Mg) .....	--	--	16	16	16	14			
Sodium (Na) .....	--	--	8.4	13	8.6	7.2			
Potassium (K) .....	--	--	--	1.1	2.2	1.0			
Bicarbonate (HCO <sub>3</sub> ) .....	--	--	236	260	216	264			
Carbonate (CO <sub>3</sub> ) .....	2	--	0	0	0	0			
Sulfate (SO <sub>4</sub> ) .....	--	--	24	21	17	16			
Chloride (Cl) .....	--	--	16	21	16	12			
Fluoride (F) .....	--	--	.1	.1	.2	.2			
Bromide (Br) .....	--	--	--	--	--	--			
Iodide (I) .....	--	--	--	--	--	--			
Hardness as CaCO <sub>3</sub> .....	--	--	220	240	200	230			
Sodium adsorption ratio (SAR) .....	--	--	.2	.4	.3	.2			
Specific conductance (micromhos at 25°C) .....	521	489	441	481	401	468			
pH .....	7.3	7.4	7.8	7.9	7.9	7.4			
Temperature (°C) .....	13.3	12.0	27.0	13.0	15.0	19.0			
Dissolved solids (calc) .....	--	--	257	272	228	262			
Ammonia (NH <sub>4</sub> ) .....	.13	.22	.00	.09	.00	.00			
Nitrate (NO <sub>3</sub> ) .....	.4	.4	.4	.0	1.8	3.3			
Nitrite (NO <sub>2</sub> ) .....	.00	.00	.00	.00	.00	.00			
Phosphate (PO <sub>4</sub> ) .....	.31	.30	.09	.15	.12	.09			
Detergents (MBAS) .....	--	--	--	--	--	--			
Biochemical oxygen demand (BOD) ..	.1	.1	1.0	.2	.2	.2			
Dissolved oxygen (DO) .....	8.4	8.6	--	8.1	--	--			
Coliform (colonies per 100 ml) ...	2800	310	13000	4200	1700	3100			
Fecal coliform (colonies per 100 ml) .....	84	9	210	40	3	15			
Streptococci (colonies per 100 ml) .....	170	37	4700	170	24	40			
Aluminum (Al) .....	--	--	--	--	--	.10			
Arsenic (As) .....	--	--	--	--	--	.00			
Boron (B) .....	--	--	--	--	--	--			
Copper (Cu) .....	--	--	--	--	--	.000			
Iron (Fe) .....	--	--	--	--	--	.00			
Lead (Pb) .....	--	--	--	--	--	.000			
Lithium (Li) .....	--	--	--	--	--	.00			
Manganese (Mn) .....	--	--	--	--	--	.00			
Mercury (Hg) .....	--	--	--	--	--	--			
Zinc (Zn) .....	--	--	--	--	--	.02			

1/ Estimated.



Note: Large-format version of the original plate is on the following page.



Base from U.S. Geological Survey, 1954

FIGURE 1. — Water-quality data - collection sites in the San Antonio area