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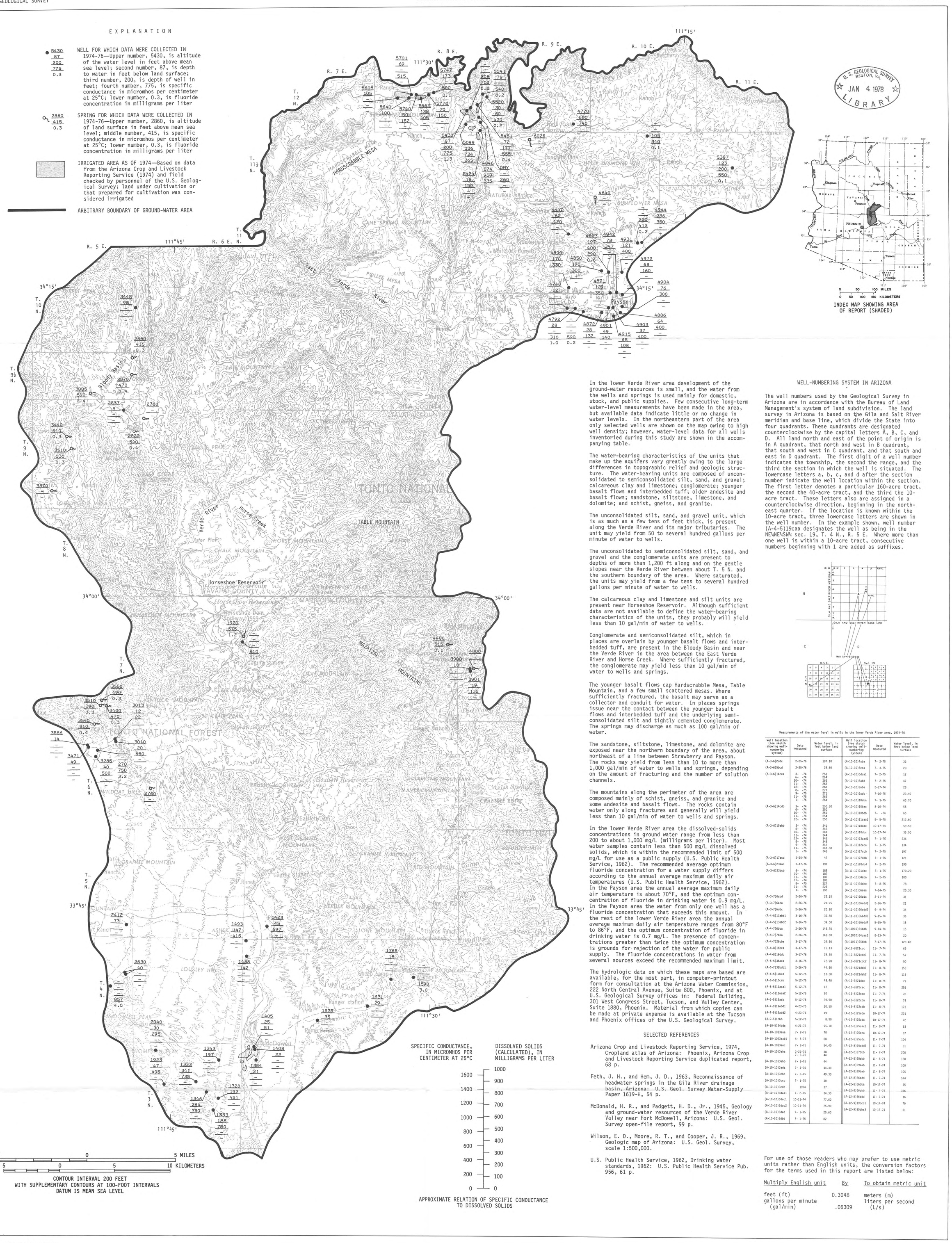

In the lower Verde River area development of the ground-water resources is small, and the water from the wells and springs is used mainly for domestic, stock, and public supplies. Few consecutive long-term water-level measurements have been made in the area, but available data indicate little or no change in water levels. In the northeastern part of the area only selected wells are shown on the map owing to high well density; however, water-level data for all wells inventoried during this study are shown in the accompanying table.

The water-bearing characteristics of the units that make up the aquifers vary greatly owing to the large differences in topographic relief and geologic structure. The water-bearing units are composed of unconsolidated to semiconsolidated silt, sand, and gravel; calcareous clay and limestone; conglomerate; younger basalt flows and interbedded tuff; older andesite and basalt flows; sandstone, siltstone, limestone, and dolomite; and schist, gneiss, and granite.

The unconsolidated silt, sand, and gravel unit, which is as much as a few tens of feet thick, is present along the Verde River and its major tributaries. The unit may yield from 50 to several hundred gallons per minute of water to wells.

The unconsolidated to semiconsolidated silt, sand, and gravel and the conglomerate units are present to depths of more than 1,200 ft along and on the gentle slopes near the Verde River between about T. 5 N. and the southern boundary of the area. Where saturated, the units may yield from a few tens to several hundred gallons per minute of water to wells.

The calcareous clay and limestone and silt units are present near Horseshoe Reservoir. Although sufficient data are not available to define the water-bearing characteristics of the units, they probably will yield less than 10 gal/min of water to wells.

Conglomerate and semiconsolidated silt, which in places are overlain by younger basalt flows and interbedded tuff, are present in the Bloody Basin and near the Verde River in the area between the East Verde River and Horse Creek. Where sufficiently fractured, the conglomerate may yield less than 10 gal/min of water to wells and springs.

The younger basalt flows cap Hardscrabble Mesa, Table Mountain, and a few small scattered mesas. Where sufficiently fractured, the basalt may serve as a collector and conduit for water. In places springs issue near the contact between the younger basalt flows and interbedded tuff and the underlying semiconsolidated silt and tightly cemented conglomerate. The springs may discharge as much as 100 gal/min of water.

The sandstone, siltstone, limestone, and dolomite are exposed near the northern boundary of the area, about northeast of a line between Strawberry and Payson. The rocks may yield from less than 10 to more than 1,000 gal/min of water to wells and springs, depending on the amount of fracturing and the number of solution channels.

The mountains along the perimeter of the area are composed mainly of schist, gneiss, and granite and some andesite and basalt flows. The rocks contain water only along fractures and generally will yield less than 10 gal/min of water to wells and springs.

In the lower Verde River area the dissolved-solids concentrations in ground water range from less than 200 to about 1,000 mg/L (milligrams per liter). Most water samples contain less than 500 mg/L dissolved solids, which is within the recommended limit of 500 mg/L for use as a public supply (U.S. Public Health Service, 1962). The recommended average optimum fluoride concentration for a water supply differs according to the annual average maximum daily air temperatures (U.S. Public Health Service, 1962). In the Payson area the annual average maximum daily air temperature is about 70°F, and the optimum concentration of fluoride in drinking water is 0.9 mg/L. In the Payson area the water from only one well has a fluoride concentration that exceeds this amount. In the rest of the lower Verde River area the annual average maximum daily air temperature ranges from 80°F to 86°F, and the optimum concentration of fluoride in drinking water is 0.7 mg/L. The presence of concentrations greater than twice the optimum concentration is grounds for rejection of the water for public supply. The fluoride concentrations in water from several sources exceed the recommended maximum limit.

The hydrologic data on which these maps are based are available, for the most part, in computer-printout form for consultation at the Arizona Water Commission, 222 North Central Avenue, Suite 800, Phoenix, and at U.S. Geological Survey offices in: Federal Building, 301 West Congress Street, Tucson, and Valley Center, Suite 1880, Phoenix. Material from which copies can be made at private expense is available at the Tucson and Phoenix offices of the U.S. Geological Survey.

SELECTED REFERENCES

Arizona Crop and Livestock Reporting Service, 1974, Cropland atlas of Arizona: Phoenix, Arizona Crop and Livestock Reporting Service duplicated report, 68 p.

Feth, J. H., and Hem, J. D., 1963, Reconnaissance of headwater springs in the Gila River drainage basin, Arizona: U.S. Geol. Survey Water-Supply Paper 1619-H, 54 p.

McDonald, H. R., and Padgett, H. D., Jr., 1945, Geology and ground-water resources of the Verde River Valley near Fort McDowell, Arizona: U.S. Geol. Survey open-file report, 99 p.

Wilson, E. D., Moore, R. T., and Cooper, J. R., 1969, Geologic map of Arizona: U.S. Geol. Survey, scale 1:500,000.

U.S. Public Health Service, 1962, Drinking water standards, 1962: U.S. Public Health Service Pub. 956, 61 p.

WELL-NUMBERING SYSTEM IN ARIZONA

The well numbers used by the Geological Survey in Arizona are in accordance with the Bureau of Land Management's system of land subdivision. The land survey in Arizona is based on the Gila and Salt River meridian and base line, which divide the State into four quadrants. These quadrants are designated counterclockwise by the capital letters A, B, C, and D. All land north and east of the point of origin is in A quadrant, that north and west in B quadrant, that south and west in C quadrant, and that south and east in D quadrant. The first digit of a well number indicates the township, the second the range, and the third the section in which the well is situated. The lowercase letters a, b, c, and d after the section number indicate the well location within the section. The first letter denotes a particular 160-acre tract, the second the 40-acre tract, and the third the 10-acre tract. These letters also are assigned in a counterclockwise direction, beginning in the northeast quarter. If the location is known within the 10-acre tract, three lowercase letters are shown in the well number. In the example shown, well number (A-4-5)19caa designates the well as being in the NE¼NE¼SW¼ sec. 19, T. 4 N., R. 5 E. Where more than one well is within a 10-acre tract, consecutive numbers beginning with 1 are added as suffixes.

Measurements of the water level in wells in the lower Verde River area, 1974-76

Well location (see sketch showing well-numbering system)	Date measured	Water level, in feet below land surface	Well location (see sketch showing well-numbering system)	Date measured	Water level, in feet below land surface
(A-3-6)2ddc	2-25-76	197.10	(A-10-10)4aba	7- 2-75	33
(A-3-6)5bcd	2-25-76	29.60	(A-10-10)5cca	7- 3-75	28
(A-3-6)14cca	3- -74	261	(A-10-10)6dca1	7- 2-75	12
	6- -74	264			
	10- -74	263	(A-10-10)6abd	7- 2-75	47
	11- -74	268			
	12- -74	268	(A-10-10)9aba	2-27-74	28
	8- -75	277			
	9- -75	271	(A-10-10)9adb	7-16-75	23.40
	11- -75	265			
	1- -76	264	(A-10-10)10aba	7- 3-75	63.70
(A-3-6)14cdb	3- -74	250.50	(A-10-10)10bac	8-16-74	55
	6- -74	250			
	10- -74	251	(A-10-10)10bdb	7- -74	65
	11- -74	254			
	12- -74	250	(A-11-10)11aaa1	8- 5-75	212.60
(A-3-6)15abb	3- -74	341	(A-11-10)18dac	10-17-74	59.50
	6- -74	342			
	10- -74	341	(A-11-10)18dbc	10-17-74	35.50
	11- -74	344			
	12- -74	343	(A-11-10)23aad1	7- 1-75	236
	8- -75	348			
	9- -75	343	(A-11-10)12aca	7- 1-75	134
	11- -75	341.50			
	1- -76	341	(A-11-10)17ccb	7- 2-75	197
(A-3-6)17acd	2-25-76	47	(A-11-10)27ddb	7- 1-75	121
(A-3-6)23aac	3-17-76	192	(A-11-10)28dbd	7- 2-75	190
(A-3-6)23dcb	6- -74	185	(A-11-10)31dac	7- 1-75	170.20
	10- -74	187			
	11- -74	187	(A-11-10)34aba	7- 2-75	100
	12- -74	185			
	8- -75	227	(A-11-10)34dcc	7- 8-75	78
	11- -75	225			
	1- -76	185	(A-11-10)36aaa	7-14-75	20.30
(A-3-7)6abd	2-26-76	25.15	(A-11-10)36adc	2-11-74	31
(A-3-7)6aca	2-26-76	21.95	(A-11-10)36add1	2-26-75	21
(A-3-7)6ddc	2-26-76	20.90	(A-11-10)36add2	9- 9-74	34
(A-4-5)13abb1	3-16-76	39.80	(A-11-10)36add3	9-15-74	36
(A-4-5)13abb2	3-16-76	39.50	(A-11-10)36add4	8-25-75	15
(A-4-7)6bba	2-26-76	146.70	(A-11N10)24bdb	9-14-74	15
(A-4-7)7bba	2-26-76	141.60	(A-11N10)24caa2	8-23-74	20
(A-4-7)26cba	3-17-76	34.80	(A-11N11)35bbb	7-17-75	123.40
(A-4-8)16bca	3-17-76	15.13	(A-12-8)21ccc	11- 7-74	69
(A-4-8)19ddc	3-17-76	29.30	(A-12-8)21cdc1	11- 7-74	57
(A-5-5)36aca	3-16-76	72.90	(A-12-8)21cdc2	11- 8-74	50
(A-5-7)32bdb1	2-26-76	44.90	(A-12-8)21dab1	11- 8-74	153
(A-6-5)10bcd	5-12-76	13.50	(A-12-8)21dab2	11- 8-74	115
(A-6-5)10cab	5-12-76	49.40	(A-12-8)21dcc	11- 8-74	79
(A-6-5)11aaa1	5-12-76	12	(A-12-8)22cac	11- 8-74	258
(A-6-5)11aaa2	5-12-76	20	(A-12-8)22ccc	11- 7-74	70
(A-6-5)15aab	5-12-76	39.90	(A-12-8)22cda	11- 8-74	79
(A-7-9)19abd1	4-23-76	10.50	(A-12-8)22cdb	11- 8-74	173
(A-7-9)19abd2	4-23-76	19	(A-12-8)25ada	10-17-74	231
(A-9-5)1cbb	5-12-76	8.50	(A-12-8)25adc	10-17-74	72
(A-10-5)24bdc	4-21-76	95.10	(A-12-8)25cac2	11- 8-74	63
(A-10-10)3aaa	7- 2-75	70	(A-12-8)25cca	10-17-74	87
(A-10-10)3aab1	4- 6-75	68	(A-12-8)25ccc	11- 7-74	104
(A-10-10)3aac	7- 2-75	54.40	(A-12-8)25cdd2	11- 7-74	31
(A-10-10)3aba	3-23-75	38	(A-12-8)27bbb	11- 7-74	200
	7- 3-75	44			
			(A-12-8)28abb	11- 8-74	138
(A-10-10)3abb	7- 2-75	44			
			(A-12-8)29aab	11- 7-74	100
(A-10-10)3ada	7- 3-75	44.30			
			(A-12-8)29bab	11- 8-74	105
(A-10-10)3cbc	7- 2-75	49.30			
			(A-12-8)36add	11- 7-74	574
(A-10-10)3ccc	7- 1-75	30			
			(A-12-8)36bba	10-17-74	45
(A-10-10)3cdb	1974	37			
			(A-12-8)36cbb	11- 7-74	336
(A-10-10)3daa1	7- 2-75	34.30			
			(A-12-8)36ddd	11- 7-74	16
(A-10-10)3dac1	10-11-74	77.60			
			(A-12-9)19ccc1	10-17-74	79
(A-10-10)3dac2	10-11-74	75.90			
			(A-12-9)30bba3	10-17-74	31
(A-10-10)3dad	7- 1-75	25.60			
(A-10-10)3dbd	7- 1-75	82			

For use of those readers who may prefer to use metric units rather than English units, the conversion factors for the terms used in this report are listed below:

Multiply English unit	By	To obtain metric unit
feet (ft)	0.3048	meters (m)
gallons per minute (gal/min)	.06309	liters per second (L/s)

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MESA 1:250,000, 1954, LIMITED
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MAP SHOWING GROUND-WATER CONDITIONS IN THE LOWER VERDE RIVER AREA, MARICOPA, YAVAPAI, AND GILA COUNTIES, ARIZONA—1976

By

P. P. Ross