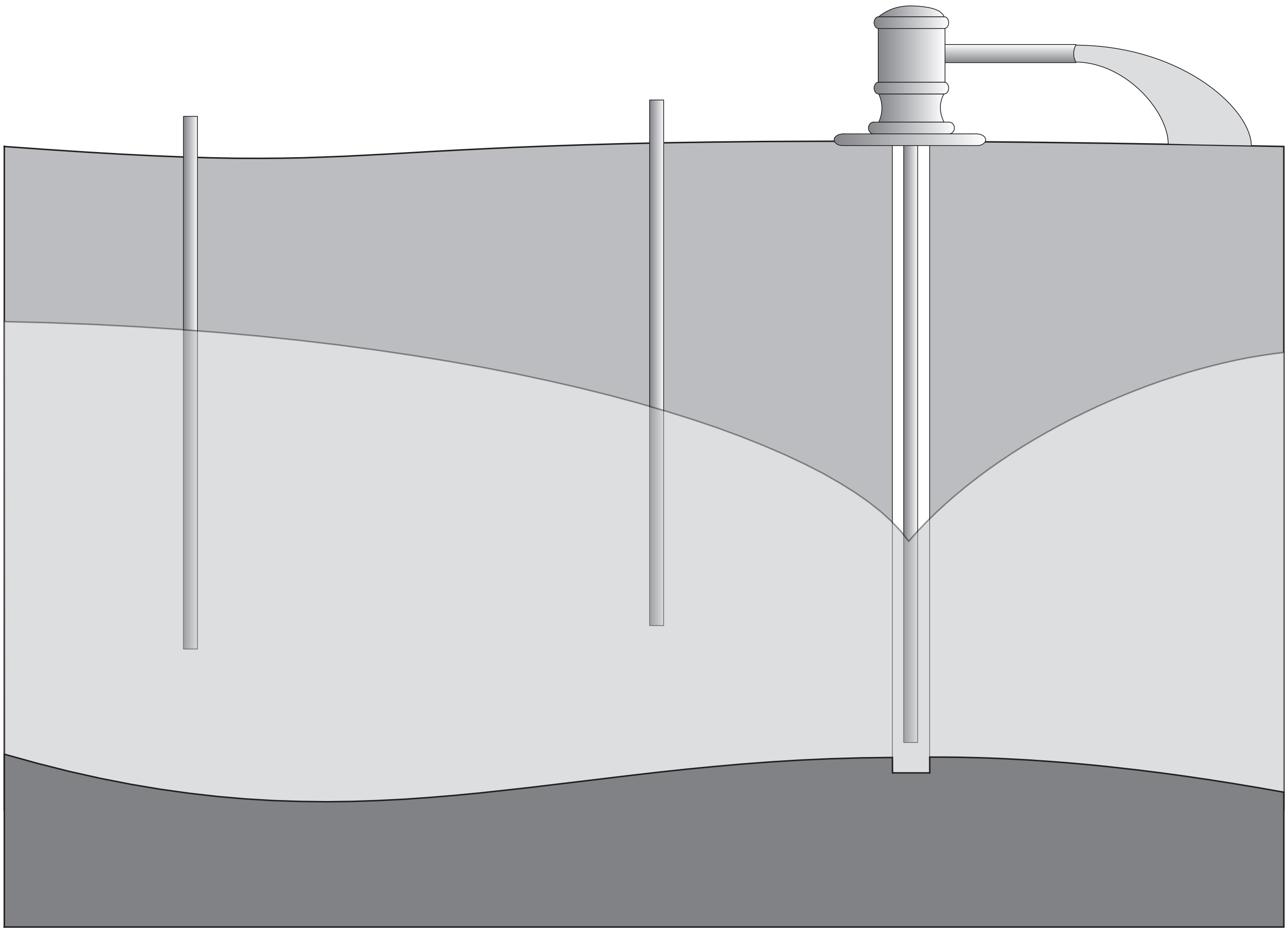
Summary of Aquifer Test Data for Arkansas—1940–2006



Scientific Investigations Report 2008–5149

U.S. Department of the Interior
U.S. Geological Survey

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By Aaron L. Pugh

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U.S. Geological Survey
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Conversion Factors and Datums

Multiply	By	To obtain
	Length	
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
	Area	
square mile (mi^2)	2.590	square kilometer (km^2)
	Volume	
cubic foot (ft^3)	0.02832	cubic meter (m^3)
	Flow rate	
foot per day (ft/d)	0.3048	meter per day (m/d)
gallon per minute (gal/min)	0.06309	liter per second (L/s)
	Specific capacity	
gallon per minute per foot [(gal/min)/ft)]	0.2070	liter per second per meter [(L/s/m)]
	Transmissivity*	
foot squared per day (ft^2/d)	0.09290	meter squared per day (m^2/d)

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD of 1983).

*Transmissivity: The standard unit for transmissivity is cubic foot per day per square foot times foot of aquifer thickness [(ft^3/d/ft^2]ft. In this report, the mathematically reduced form, foot squared per day (ft^2/d), is used for convenience.

Summary of Aquifer Test Data for Arkansas—1940-2006

By Aaron L. Pugh

Abstract

As demands on Arkansas's ground water continue to increase, decision-makers need all available information to ensure the sustainability of this important natural resource. From 1940 through 2006, the U.S. Geological Survey has conducted over 300 aquifer tests in Arkansas. Much of these data never have been published. This report presents the results from 206 of these aquifer tests from 21 different hydrogeologic units spread across 51 Arkansas counties. Ten of the hydrogeologic units are within the Atlantic Plain of Arkansas and consist mostly of unconsolidated and semi-consolidated deposits. The remaining 11 units are within the Interior Highlands consisting mainly of consolidated rock.

Descriptive statistics are reported for each hydrologic unit with two or more tests, including the mean, minimum, median, maximum and standard deviation values for specific capacity, transmissivity, hydraulic conductivity, and storage coefficient.

Hydraulic conductivity values for the major water-bearing hydrogeologic units are estimated because few conductivity values are recorded in the original records. Nearly all estimated hydraulic conductivity values agree with published hydraulic conductivity values based on the hydrogeologic unit material types. Similarly, because few specific capacity values were available in the original aquifer test records, specific capacity values are estimated for individual wells.

Introduction

Two types of hydraulic well tests typically are performed on water wells: single well tests and multiple well tests (Heath, 1982). Single well tests usually involve pumping a single well and are performed to obtain information about the performance and efficiency of the well being tested. In such cases, results are reported in terms of yield, observed drawdown, and specific capacity. These data, taken under controlled conditions, give a measure of the productive capacity of the completed well and provide data from which the selection of the pumping equipment is based.

Information from multiple well tests is used to characterize hydraulic properties of the hydrogeologic units in the area surrounding the wells. Multiple well tests usually involve a pumping well and one or more observation or monitoring wells. Water commonly is pumped at a constant rate for one or more days, while water-level measurements are made at the pumping and observation wells. Multiple well test results characterize the hydrogeologic unit by providing information about the unit's hydraulic conductivity, transmissivity, and specific storage.

The purpose of this report is to assemble and make available to the public the results of 206 single well and multiple well tests (hereafter referred to as aquifer tests) completed by the U.S. Geological Survey (USGS) in Arkansas between 1940 and 2006. Much of the data presented is from previously unpublished work completed for various projects in which the USGS was involved. A number of aquifer tests are not reported because of incomplete records or analyses.

Previous Investigations

Although this report is the first comprehensive listing of aquifer test data collected by the USGS in Arkansas, some of the data herein can be found in previous publications. Reports by Albin (1964), Albin and others (1967), Baker and others (1948), Bedinger and Reed (1961), Cordova (1963), Halberg and others (1968), Hewitt and others (1949), Hosman and others (1968), Kilpatrick and Ludwig (1990a and 1990b), Ludwig (1972), Onellion (1956), Onellion and Criner (1955), and Plebuch and Hines (1969) all contain data found in this report. Most data in these reports were original analyses of aquifer tests conducted by the investigator or the reporting of results obtained by other investigators or consulting engineers. Aquifer test information from these publications is included in this report.

Generalized Hydrogeologic Framework of Arkansas

Ground-water occurrence in Arkansas is associated with the geologic strata beneath seven physiographic sections. Three of these physiographic sections, the West Gulf Coastal Plain, the Mississippi Alluvial Plain, and Crowleys Ridge, are part of the Coastal Plain physiographic province, which is part of the Atlantic Plain major division (fig. 1). The Arkansas Valley and the Ouachita Mountains physiographic sections are part of the Ouachita Province and the remaining two physiographic sections, the Springfield-Salem Plateaus and the Boston Mountains, are part of the Ozark Plateaus province. In turn, the Ouachita Province and Ozark Plateaus physiographic provinces are part of the Interior Highlands physiographic major division (Fenneman, 1938).

The Coastal Plain encompasses approximately 27,000 square miles (mi^2) in the eastern and southern parts of Arkansas and is underlain in part by thick alluvial deposits and gently dipping unconsolidated and semi-consolidated sediments. These Quaternary and Tertiary sediments are of marine and continental origin and consist of alternating sequences of gravel, sand, silt, and clay with local occurrences of limestone and lignite (fig. 2). These sediments form confining and water-bearing hydrogeologic units (Bryant and others, 1985).

In general, the origin and size of the sediment particles making up each hydrogeologic unit determine whether the unit is a confining or water-bearing unit (table 1). The marine deposits making up the Jackson Group (not shown in table 1), Cook Mountain Formation of the Claiborne Group (hereafter referred to as Cook Mountain Formation), and Midway Group are composed of clay and form confining layers. The continental alluvial deposits, predominantly sand and gravel, form

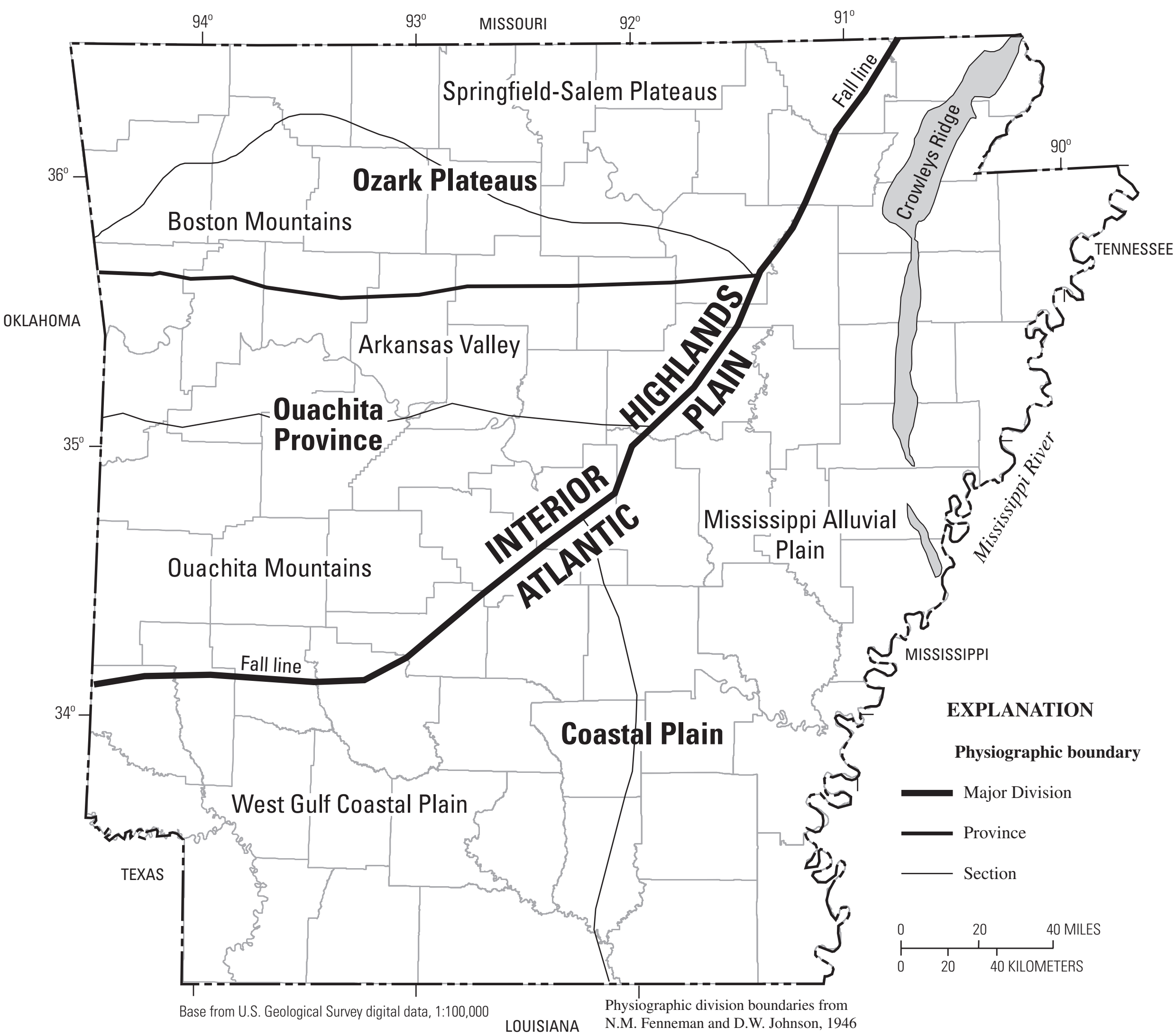

Figure 1. Physiography of Arkansas.

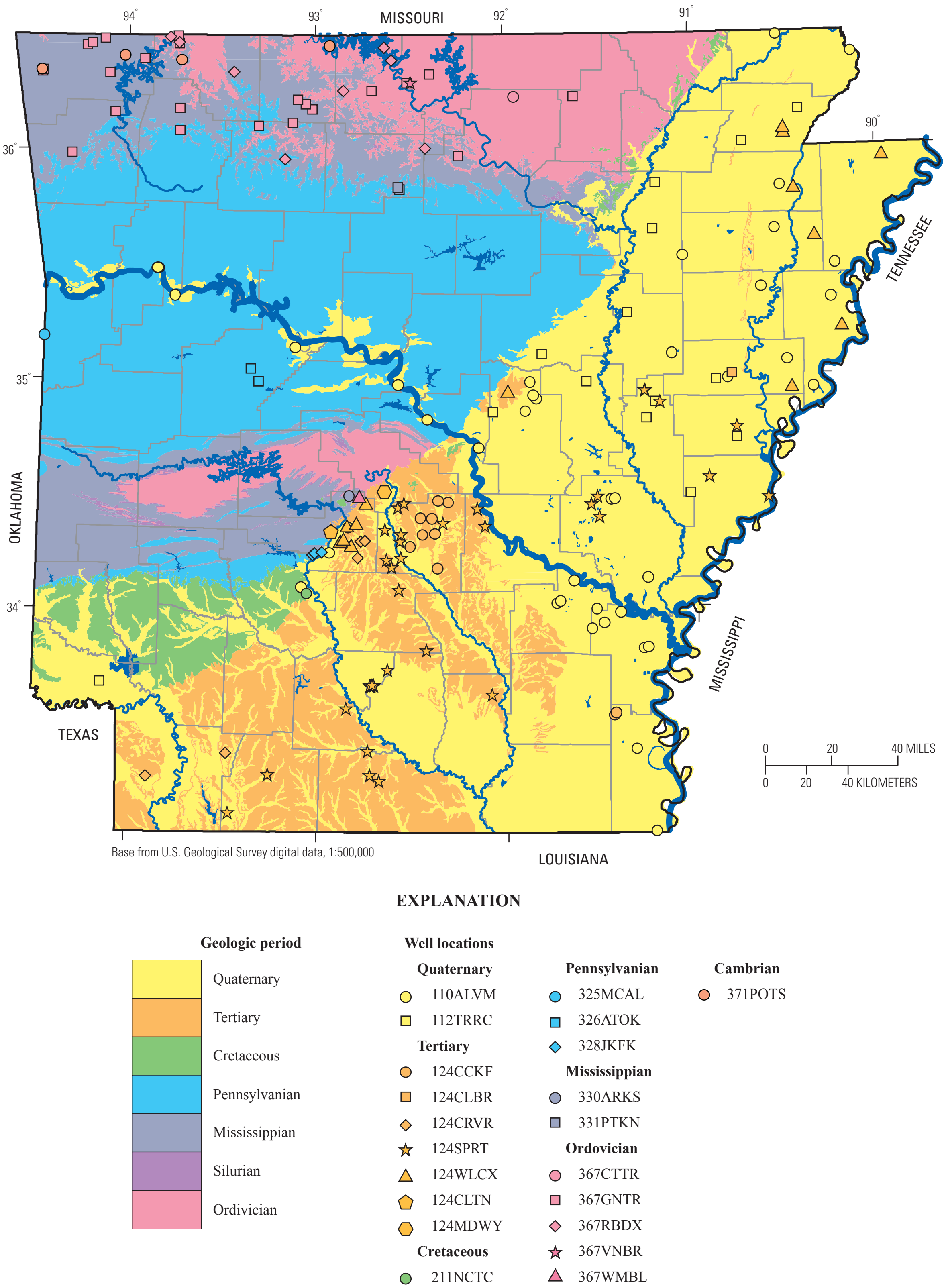

Figure 2. Generalized geology of Arkansas and location of wells with U.S. Geological Survey aquifer test data.

seven major water-bearing hydrogeologic units: the Quaternary alluvium, Terrace deposits, Cockfield Formation of the Claiborne Group (hereafter referred to as Cockfield Formation), Sparta Sand of the Claiborne Group (hereafter referred to as Sparta Sand), Wilcox Group, Nacatoch Sand, and Tokio Formation. Although other hydrogeologic units may be important locally as sources of water, these seven units constitute the majority of ground-water withdrawals from southern and eastern Arkansas.

Although not included in Fenneman's (1938) delineation of the United States physiography, Crowleys Ridge is included in this report because of its importance as a surface- and ground-water divide. Crowleys Ridge varies in width from 0.5 to 12 miles (mi), rising 250 to 400 feet (ft) above the surrounding Mississippi Alluvial Plain and extends approximately 150 mi southwest and south from southeastern Missouri to east-central Arkansas (fig. 1). The ridge is underlain by Cretaceous and Tertiary rocks, covered with loess deposits and separates the Mississippi Alluvial Plain into distinct surface- and ground-water basins.

The Interior Highlands, which includes the Ozark Plateaus and the Ouachita Province, encompasses approximately 31,000 mi^2 in western and northern Arkansas, and is underlain by thick sequences of consolidated rock of Paleozoic age and older (figs. 1 and 2). These rocks are predominantly limestone, dolomite, sandstone, and shale. In the Ouachita Mountains, these rocks are extensively folded and faulted. The primary porosity of these rocks has been greatly reduced by compaction and cementation. Ground water occurs mainly in fractures and joints in the sandstone and in solution openings in the limestone and dolomite. This secondary porosity within these rocks is locally important as sources of water, although yields greater than 25 gallons per minute are rare (Bryant and others, 1985).

The Quaternary alluvium of the Arkansas River valley, the Roubidoux Formation, and the Gunter Sandstone member of the Van Buren Formation constitute the only substantial water-bearing hydrogeologic units in the Interior Highlands. With the exception of the Quaternary alluvium of the Arkansas River valley, these units occur only in the subsurface within Arkansas, having their outcrop areas in southern Missouri.

A generalized description of the hydrogeologic units of Arkansas is provided in table 1. This table is organized by the USGS Hydrogeologic Unit Code (American Commission on Stratigraphic Nomenclature, 2005) rather than by stratigraphic order, and includes only those units with hydraulic data listed within this report.

Methods

Knowledge of a hydrogeologic unit's transmissivity and storage coefficient is necessary when determining the yield of the hydrogeologic unit or the fate of ground-water contaminants. Aquifer tests analyze the change, with time, in water levels in a hydrogeologic unit caused by withdrawals through wells. Data collected from aquifer tests are used to calculate the transmissivity and storage coefficient of a hydrogeologic unit. Over the years, the USGS has used various methods to analyze aquifer test data to determine the transmissivity, storage coefficient, and other hydrologic properties of hydrogeologic units. The methods used to analyze aquifer test data included in this report are listed in table 2 and include equations/methods developed by Jacob, Theis, Neuman, and Dominico and Schwartz for multi-well test and specific capacity determined from single-well tests. A computer program called Aqtesolve was used to analyze aquifer test data for some tests (Hydrosolve, Inc., 2008). Aqtesolve uses the same equations/methods listed above. All of these equations/methods are discussed in numerous ground-water publications including Freeze and Cherry (1979), Heath (1982), and Todd (1980) and hence are not discussed in detail in this report.

Aquifer test results are analyzed statistically and spatially for each hydrogeologic unit, and hydraulic conductivity values are compared with published values based on material type. Descriptive statistics for each hydrogeologic unit include the calculation of mean, minimum, median, maximum, and standard deviation values for specific capacity, transmissivity, hydraulic conductivity, and storage coefficient. Spatial analysis examines the distribution of aquifer tests within Arkansas by county, and the distribution and locations of specific capacity and transmissivity values. Hydraulic conductivity values also are compared to published values by the Bureau of Reclamation (1977), Domenico and Schwartz (1990), and Freeze and Cherry (1979) by hydrogeologic unit material type.

Data and Limitations

A successful aquifer test requires: (1) determination of the prepumping water-level trend (regional trend), (2) a carefully controlled constant pumping rate, and (3) accurate water-level measurements made at precisely known times during both the drawdown and the recovery periods (Heath, 1982). All aquifer tests included in this report were judged to have met these three requirements.

The locations of USGS aquifer tests are plotted by hydrogeologic unit codes in figure 2 and a complete listing of aquifer test data for this report is included in table 2. Data listed in table 2 include the hydrogeologic unit code, well location (latitude, longitude, USGS site identification number, local well number, and county), date of test, discharge, static water level, water-level drawdown, specific capacity, transmissivity, hydraulic conductivity, storage coefficient, and the method of analysis.

Data from tests yielding anomalous low or high transmissivity values are not included if there was not sufficient documentation to support the apparent anomalous values. Selected specific-capacity data are presented where aquifer tests are sparse or nonexistent.

Table 1. Generalized hydrogeologic descriptions.

[Only hydrogeologic units with aquifer test data listed; Modified from Baker, 1955; Caplan, 1960; Joseph, 1998; Kilpatrick and Ludwig, 1990a; Kilpatrick and Ludwig, 1990b; McFarland, 1998; Petersen and others, 1985; Pugh, 1998; Pugh and others, 1998]

Hydrogeologic unit name	Hydrogeologic unit code	Geologic time period	Physiographic location	Description
Quaternary alluvium	110ALVM	Quaternary	Mississippi Alluvial Plain	Unconsolidated sediments that grade from gravel and coarse sand in the lower sections to silt and clay in the upper sections. The coarse sands and gravels in the lower sections are the materials that compose the alluvial aquifer. Maximum thickness is about 200 feet. Yields 50 to more than 500 gallons per minute.
Quaternary alluvium	110ALVM	Quaternary	Arkansas Valley	Unconsolidated sediments that grade from gravel at the base to sand, silt, and clay in the upper sections. Maximum thickness is about 80 feet. Yields 300 to 700 gallons per minute.
Terrace deposits	112TRRC	Quaternary	Mississippi Alluvial Plain	Complex sequence of unconsolidated gravels, sandy gravels, sands, silty sands, silts, clayey silts, and clays. Deposits are often lenticular and discontinuous. At least three terrace levels are recognized. Fossils are rare. The lower contact is unconformable and the thickness is variable, ranging from 0 to 50 feet. Commonly yields 1,000 gallons per minute but may yield as little as 20 gallons per minute or as much as 3,000 gallons per minute.
Claiborne Group	124CLBR	Tertiary	Mississippi Alluvial Plain and West Gulf Coastal Plain	Medium- to very fine-grained sand, silt, and silty clay. Maximum thickness is about 1,500 feet. The Claiborne Group includes the Cockfield Formation, Cook Mountain Formation, Sparta Sand, Cane River Formation, and Carrizo Sand. Refer to individual formations for detailed descriptions.
Cockfield Formation	124CCKF	Tertiary	Western Mississippi Alluvial Plain and eastern West Gulf Coastal Plain	Discontinuous fine- to medium-grained sand interbedded with silt, clay, and lignite, all of nonmarine origin. Thickness generally ranges from 100 to 400 feet near outcrop areas but reaches 625 feet in northeastern Chicot County where it subcrops. Commonly yields less than 100 gallons per minute but can yield as much as 750 gallons per minute

Table 1. Generalized hydrogeologic descriptions.—Continued

[Only hydrogeologic units with aquifer test data listed; Modified from Baker, 1955; Caplan, 1960; Joseph, 1998; Kilpatrick and Ludwig, 1990a; Kilpatrick and Ludwig, 1990b; McFarland, 1998; Petersen and others, 1985; Pugh, 1998; Pugh and others, 1998]

Hydrogeologic unit name	Hydrogeologic unit code	Geologic time period	Physiographic location	Description
Sparta Sand of Claiborne Group	124SPRT	Tertiary	Mississippi Alluvial Plain and West Gulf Coastal Plain	Fine- to medium-grained sand near top to coarse-grained sand at bottom, some interbeds of clay. Maximum thickness nearly 900 feet. Commonly yields 1,000 gallons per minute. Yield from some wells may exceed 1,900 gallons per minute. North of latitude 35 degrees, the Sparta Sand is part of the Memphis Sand.
Cane River Formation	124CRVR	Tertiary	Mississippi Alluvial Plain and West Gulf Coastal Plain	Interbedded sand and clay in updip areas, mostly clay in downdip areas. Maximum thickness nearly 800 feet. Relatively uniform confining bed in downdip areas. Source of water only in or near its outcrop area where it has been weathered. Yields as much as 35 gallons per minute. North of about latitude 35 degrees, the formation is sand and is part of the Memphis Sand.
Wilcox Group	124WLCX	Tertiary	Mississippi Alluvial Plain and West Gulf Coastal Plain	In southern Arkansas, the aquifer is discontinuous consisting of interbedded layers of clay, sandy clay, sand, and lignite. In northeastern Arkansas, sand beds of the middle to lower part of the Wilcox Group have been referred to as the “1,400-foot sand” or the “lower Wilcox aquifer”, composed of thin interbedded layers of lignitic sand and clays. Maximum thickness is about 1,100 feet. Commonly yields over 50 gallons per minute.
Clayton Formation	125CLTN	Tertiary	Mississippi Alluvial Plain and West Gulf Coastal Plain	Calcareous sandstone and limestone at the base of the Midway Group. In some places there is appreciable sand. Thickness is generally about 35 feet and yields as much as 350 gallons per minute.
Midway Group	125MDWY	Tertiary	Mississippi Alluvial Plain and West Gulf Coastal Plain	Composed generally of dense marine clay; locally contains calcareous sand in basal part in outcrop area. Maximum thickness about 600 feet. Extensive confining unit. Will yield water in outcrop area.

Table 1. Generalized hydrogeologic descriptions.—Continued

[Only hydrogeologic units with aquifer test data listed; Modified from Baker, 1955; Caplan, 1960; Joseph, 1998; Kilpatrick and Ludwig, 1990a; Kilpatrick and Ludwig, 1990b; McFarland, 1998; Petersen and others, 1985; Pugh, 1998; Pugh and others, 1998]

Hydrogeologic unit name	Hydrogeologic unit code	Geologic time period	Physiographic location	Description
Nacatoch Sand	211NCTC	Upper Cretaceous	West Gulf Coastal Plain	Three distinct units. A lower unit consisting of interbedded gray clay, sandy clay and marl, dark clay-rich fine-grained sand, and hard irregular concretionary beds. A middle unit consists of dark-green sand that contains coarse grains of glauconite and weathers to lighter shades of green. This unit is generally fossiliferous where it is glauconitic. The upper unit is composed of unconsolidated, gray, fine-grained quartz sand that is commonly cross bedded. This upper unit contains the primary aquifer of the Nacatoch Sand. Maximum thickness about 250 feet. Yields 50 to 500 gallons per minute.
McAlester Formation	325MCAL	Middle Pennsylvanian	Arkansas Valley and Ouachita Mountains	Dark, gritty shale with interbedded sandstone, siltstone, and coal. Maximum thickness about 300 feet. Yields small quantities of water to wells in the weathered zones in outcrop areas. Most wells yield less than 10 gallons per minute.
Atoka Formation	326ATOK	Middle Pennsylvanian	Ozark Plateaus, Arkansas Valley and Ouachita Mountains	Light-gray sandstone, medium-grained, interbedded with dark shale. Maximum thickness about 600 feet. Yields small quantities of water to wells in the weathered zones in outcrop areas. Most wells yield less than 10 gallons per minute.
Jackfork Sandstone	328JKFK	Lower Pennsylvanian	Arkansas Valley and Ouachita Mountains	Light-gray to brown, fine- to coarse-grained sandstone. Maximum thickness about 6,000 feet. Yields small quantities of water to wells in the weathered zones in outcrop areas. Most wells yield less than 10 gallons per minute.
Arkansas Novaculite	330ARKS	Mississippian	Arkansas Valley and Ouachita Mountains	Upper division: novaculite, gray to black, calcareous, massive. Middle division: novaculite, dark, thinly bedded, interbedded shale. Lower division: novaculite, white, dense, massive. Maximum thickness about 950 feet. Yields small quantities of water to wells in the weathered zones in outcrop areas. Most wells yield less than 10 gallons per minute.
Pitkin Limestone	331PTKN	Upper Mississippian	Ozark Plateaus	Light-gray to gray-black, dense, crystalline limestone. Maximum thickness about 220 feet. Commonly yields 5 to 10 gallons per minute from solution channels, bedding planes, and fractures.

Table 1. Generalized hydrogeologic descriptions.—Continued

[Only hydrogeologic units with aquifer test data listed; Modified from Baker, 1955; Caplan, 1960; Joseph, 1998; Kilpatrick and Ludwig, 1990a; Kilpatrick and Ludwig, 1990b; McFarland, 1998; Petersen and others, 1985; Pugh, 1998; Pugh and others, 1998]

Hydrogeologic unit name	Hydrogeologic unit code	Geologic time period	Physiographic location	Description
Womble Shale	367WMBL	Lower Ordovician	Ouachita Mountains	Black shale, with some sandstone and black limestone. Maximum thickness about 1,000 feet. Yields small quantities of water in the weathered zones in the outcrop areas.
Cotter Dolomite	367CTTR	Lower Ordovician	Ozark Plateaus	Light-gray to brown, cherty dolomite. Maximum thickness about 525 feet. Solution channels and fractures yield 5 to 10 gallons per minute. Yields in some wells may exceed 50 gallons per minute.
Roubidoux Formation	367RBDX	Lower Ordovician	Ozark Plateaus	Light-colored, finely granular to medium-crystalline dolomite, dolomitic sandstone, and chert. Maximum thickness about 455 feet. Average yield is less than 150 gallons per minute but as much as 450 gallons per minute is possible.
Van Buren Formation	367VNBR	Lower Ordovician	Ozark Plateaus	Light brown-gray, finely granular to medium-crystalline dolomite containing white, light-gray, or blue-gray, dense chert. Maximum thickness about 600 feet. Wells commonly yield 150 to 300 gallons per minute.
Gunter Sandstone member of Van Buren Formation	367GNTR	Lower Ordovician	Ozark Plateaus	White to gray quartz sandstone. Maximum thickness about 100 feet. Wells commonly yield 150 to 300 gallons per minute.
Potosi Dolomite	371POTS	Upper Cambrian	Ozark Plateaus	Light colored, finely to coarsely crystalline dolomite with white to light gray, dense chert, sometimes containing siliceous oolites. Maximum thickness about 390 feet. Yields range from 15 to 700 gallons per minute, but may exceed 1,000 gallons per minute.

Table 2. Aquifer test data for Arkansas, 1940-2006.

[See table 1 for correlation between hydrogeologic unit and code; --, missing data, NGVD of 1929, National Geodetic Vertical Datum of 1929; Horizontal datum is NAD of 1983]

Hydrogeologic unit code	Latitude (degrees, minutes, seconds)	Longitude (degrees, minutes, seconds)	U.S. Geological Survey site identification number	Local well number (township, range, section, 1/4, 1/4, 1/4)	Date of test (year, month, day)	Discharge (gallons per minute)	Static water-level (feet below land surface)	Water-level drawdown (static level - production level in feet)	Specific capacity (gallons per minute per foot)	Transmissivity (square feet per day)	Hydraulic conductivity (feet per day)	Storage coefficient (dimensionless)	Method of analysis (see Freeze and Cherry (1979), Heath (1982), and Todd (1980)
Arkansas County													
110ALVM	340704	911451	340704091145101	07S02W04BBB1	194202--	570	--	--	--	14,700	--	0.018	Jacob / permeability test
110ALVM	342742	912604	342742091260401	03S04W04DDD1	19550818	725	--	--	--	122,000	--	0.034	Theis / Jacob / performance test
110ALVM	342752	912501	342752091250101	03S04W03DDA1	--	650	--	--	--	44,100	--	--	Jacob / permeability test
124SPRT	342321	912955	342321091295501	04S05W01BAA1	--	2,250	37	11	205	1,700	--	--	--a
124SPRT	342632	913227	342632091322701	03S05W15CBB1	--	1,460	--	--	--	19,100	--	--	Jacob recovery test
124SPRT	342839	913032	342839091303201	03S05W02AAB1	--	1,150	--	--	--	17,400	--	--	--a
Baxter County													
367GNTR	361714	923025	361714092302501	19N14W29DBC1	--	400	--	132	3.03	1,110	0.40	--	Specific capacity test
367GNTR	361932	922257	361932092225701	19N13W16BAB1	--	185	--	53	3.49	1,300	0.48	--	Specific capacity test
367RBDX	360007	922426	360007092242601	16N13W30BAC1	--	54	--	237	0.23	89	0.20	--	Specific capacity test
367VNBR	361725	922913	361725092291301	19N14W28DBA1	--	581	--	184	3.15	1,290	0.44	--	Specific capacity test
Benton County													
367GNTR	361956	940614	361956094061401	19N29W07DAB1	19660511	275	--	--	--	204	1.00	--	Specific capacity test
367GNTR	362009	942757	362009094275701	19N33W11CDA1	--	--	--	--	--	794	0.38	--	Specific capacity test
367GNTR	362032	942752	362032094275201	19N33W11BAD1	--	500	--	--	--	1,170	0.56	--	Specific capacity test
367GNTR	362344	935500	362344093550001	20N28W13CCD1	19730213	240	--	115	2.08	614	0.31	--	Specific capacity test
367GNTR	362706	941340	362706094134002	21N31W36ACC2	19811201	248	--	22	15.8	4,000	1.90	--	Specific capacity test
367GNTR	362740	941203	362740094120301	21N30W29CCB1	19820325	299	--	127	2.35	601	0.29	--	Specific capacity test
367GNTR	362901	940749	362901094074901	21N30W24BBD1	19820507	319	--	32	9.90	1,640	1.26	--	Specific capacity test
371POTS	362035	942808	362035094280801	19N33W11BAC1	19780418	50	--	--	--	242	0.12	--	Specific capacity test
371POTS	362425	940121	362425094012101	20N29W13BCA1	19740815	230	--	50	4.60	1,200	0.60	--	Specific capacity test
Boone County													
367GNTR	361025	930051	361025093005101	18N19W33BBB1	19740728	200	333.29	157	1.27	457	0.15	--	Specific capacity test

Table 2. Aquifer test data for Arkansas, 1940-2006.—Continued

[See table 1 for correlation between hydrogeologic unit and code; --, missing data, NGVD of 1929, National Geodetic Vertical Datum of 1929; Horizontal datum is NAD of 1983]

Hydrogeologic unit code	Latitude (degrees, minutes, seconds)	Longitude (degrees, minutes, seconds)	U.S. Geological Survey site identification number	Local well number (township, range, section, 1/4, 1/4, 1/4)	Date of test (year, month, day)	Discharge (gallons per minute)	Static water-level (feet below land surface)	Water-level drawdown (static level - production level in feet)	Specific capacity (gallons per minute per foot)	Transmissivity (square feet per day)	Hydraulic conductivity (feet per day)	Storage coefficient (dimensionless)	Method of analysis (see Freeze and Cherry (1979), Heath (1982), and Todd (1980)
						Boone County—Continued							
367GNTR	361150	930256	361150093025601	18N19W19BCD1	19670606	96	--	115	0.83	310	0.11	--	Specific capacity test
367GNTR	361257	930525	361257093052501	18N19W19DDD1	19690801	88	--	198	0.44	133	0.05	--	Specific capacity test
371POTS	362702	925503	362702092550301	21N18W20CCD1	19800205	264	208	22	12.0	4,980	1.78	--	Specific capacity test
						Bradley County							
124SPRT	333648	920421	333648092042101	13S09W06ACB1	19610619	750	--	--	--	27,400		0.0006	Jacob / aquifer performance test
						Carroll County							
367GNTR	362739	934349	362739093434901	21N26W27ADA1	19720707	502	--	85	5.91	1,390	0.69	--	Specific capacity test
367GNTR	362937	934411	362937093441101	21N26W15BAA1	19701119	500	136.44	60	8.33	3,150	1.58	--	Specific capacity test
367RBDX	362013	932603	362013093260301	19N23W04BAC1	19660825	60	--	--	--	48	0.02	--	Specific capacity test
367RBDX	362757	934346	362757093434601	21N26W22DDC1	19770630	500	--	--	7.73	2,780	1.39	--	Specific capacity test
367RBDX	362920	934638	362920093463801	21N26W17BCC1	19701119	600	86.40	68	8.82	2,530	1.76	--	Specific capacity test
371POTS	362312	934252	362312093425201	20N26W23ACA1	19760908	254	--	29	8.80	2,180	1.09	--	Specific capacity test
						Chicot County							
110ALVM	330031	911321	330031091132101	19S01W29DCD1	19520129	1,450	--	--	--	15,300	--	0.0043	Theis / Jacob recovery test
110ALVM	332210	911907	332210091190701	15S02W29AAD1	19521105	1,100	--	--	--	26,700	--	0.002	Theis / Jacob / aquifer test
124CCKF	333104	912600	333104091260002	14S03W05BBA3	--	590	--	--	--	5,300	--	0.0016	Jacob / aquifer performance test
124CCKF	333141	912531	333141091253101	13S03W33ACD1	--	710	42	30	23.7	6,290	--	--	Jacob-estimated
124CCKF	333141	912531	333141091253101	13S03W33ACD1	19690702	710	43.7	--	23.6	--	--	--	--
						Clark County							
110ALVM	340513	930423	340513093042301	07S19W31ACD1	19630524	30	--	--	--	450	--	--	Jacob
211NCTC	340322	930230	340322093023001	08S19W09ACC1	19620829	1	--	--	--	161	--	--	Jacob

Table 2. Aquifer test data for Arkansas, 1940-2006.—Continued

[See table 1 for correlation between hydrogeologic unit and code; --, missing data, NGVD of 1929, National Geodetic Vertical Datum of 1929; Horizontal datum is NAD of 1983]

Hydrogeologic unit code	Latitude (degrees, minutes, seconds)	Longitude (degrees, minutes, seconds)	U.S. Geological Survey site identification number	Local well number (township, range, section, 1/4, 1/4, 1/4)	Date of test (year, month, day)	Discharge (gallons per minute)	Static water-level (feet below land surface)	Water-level drawdown (static level - production level in feet)	Specific capacity (gallons per minute per foot)	Transmissivity (square feet per day)	Hydraulic conductivity (feet per day)	Storage coefficient (dimensionless)	Method of analysis (see Freeze and Cherry (1979), Heath (1982), and Todd (1980)
Clay County													
110ALVM	362356	900633	362356090063301	20N09E04ACA1	19690815	1,800	--	--	--	22,100	--	--	Jacob / aquifer performance test
110ALVM	362849	903045	362849090304501	21N05E02CCC1	--	--	--	--	--	30,500		0.0011	Theis / recovery test
Columbia County													
124SPRT	330604	932722	330604093272201	19S23W11DDB1	19670411	100	--	--	--	4,560	--	0.00023	Aqtesolve
124SPRT	331609	931449	331618093144603	17S21W11DCC3	19951212	930	--	--	--	6,300	29.0	0.0005	Aqtesolve: Theis method
Craighead County													
110ALVM	354923	903026	354923090302601	14N05E24DCC1	19710127	871	16	2.3	379	24,800	--	0.0015	Jacob
124WLCX	354857	902612	354857090261201	14N06E27ACB2	19680906	638	13	26	24.5	20,700	--	0.0001	Jacob
124WLCX	354857	902612	354857090261201	14N06E27ACB2	19750703	677	14.53	3.1	218	--	--	--	--
Crittenden County													
110ALVM	345628	902110	345628090211001	04N07E22BCC1	19691124	80	16.92	0.03	3,200	35,400	--	0.001	Observation well
110ALVM	351956	901458	351956090145801	08N08E09BCA1	19500521	1,500	--	--	--	18,400	--	--	--a
124WLCX	351238	901147	351238090114701	07N08E24CAB1	19680620	656	--	--	--	15,500	--	0.0002	Jacob
Cross County													
110ALVM	352249	903709	352249090370901	09N04E25ABC1	19721026	1,790	24.15	2.73	656	44,200		0.025	Jacob
Dallas County													
124SPRT	334832	922455	334832092245502	10S13W34ACA2	19500509	400	94.60	4.84	82.6	3,210	--	0.0003	Jacob
124SPRT	340429	923332	340429092333201	07S14W31AAA1	19620927	246	--	--	--	15,400	--	--	Jacob
124SPRT	340429	923332	340429092333201	07S14W31AAA1	19640630	--	73.93	24.38	--	--	--	--	--
Desha County													
110ALVM	334832	911625	334832091162502	10S02W27AAA2	19700515	2,020	18.21	46.82	43.0	11,500	--	--	--a
110ALVM	334847	911502	334847091150201	10S02W24CCA1	--	1,390	--	--	--	71,000	--	--	--a
110ALVM	335355	913236	335355091323601	09S04W30BAA1	--	1,850	--	--	--	160,000	--	0.00069	--a

Table 2. Aquifer test data for Arkansas, 1940-2006.—Continued

[See table 1 for correlation between hydrogeologic unit and code; --, missing data, NGVD of 1929, National Geodetic Vertical Datum of 1929; Horizontal datum is NAD of 1983]

Hydrogeologic unit code	Latitude (degrees, minutes, seconds)	Longitude (degrees, minutes, seconds)	U.S. Geological Survey site identification number	Local well number (township, range, section, 1/4, 1/4, 1/4)	Date of test (year, month, day)	Discharge (gallons per minute)	Static water-level (feet below land surface)	Water-level drawdown (static level - production level in feet)	Specific capacity (gallons per minute per foot)	Transmissivity (square feet per day)	Hydraulic conductivity (feet per day)	Storage coefficient (dimensionless)	Method of analysis (see Freeze and Cherry (1979), Heath (1982), and Todd (1980)
Desha County—Continued													
110ALVM	335517	912852	335517091285201	09S04W14BCC1	19700506	1,275	14.13	1.93	661	21,700	--	0.0201	Jacob
110ALVM	335801	912337	335801091233701	08S03W33ABD1	19580708	--	3.99	0.69	--	14,300	--	0.0115	Jacob
Faulkner County													
110ALVM	345801	923326	345801092332601	04N15W24CAD1	19591202	70	19.74	0.28	251	15,800		0.0054	Jacob
Franklin County													
110ALVM	352848	934958	352848093495801	09N27W02CAD1	--	5	38	1	5	17,000	--	--	--a
110ALVM	352849	934950	352849093495001	09N27W02DBC1	--	--	--	--	--	86,000	--	--	--a
110ALVM	352849	935018	352849093501802	09N27W02CBD2	--	--	--	--	--	49,000	--	--	--a
110ALVM	352849	935025	352849093502501	09N27W03DAD1	--	--	--	--	--	39,000	--	--	--a
110ALVM	352850	935013	352850093501301	09N27W02CBD1	--	--	--	--	--	100,000	--	--	--a
Grant County													
124CCKF	340958	922115	340958092211501	06S12W29CBC1	19640730	10	25.37	8.59	0.76	--	--	--	--
124CCKF	341536	922943	341536092294301	05S14W26BCC1	19640724	10	57.30	--	0.63	325	--	--	Jacob
124CCKF	341842	922551	341842092255101	05S13W05DBD1	19640723	5	119.39	9.72	0.48	--	--	--	--
124CCKF	341858	922203	341858092220301	05S13W01BDB1	19640925	11	57.35	-2.64	4.05	1,400	--	--	Jacob
124CCKF	341858	922203	341858092220301	05S13W01BDB1	19641203	11	56.66	2.64	3.90	--	--	--	--
124CCKF	342255	922254	342255092225401	04S13W11CDA1	19640722	2	50.45	13.50	0.15	--	--	--	--
124CCKF	342309	922629	342309092262901	04S13W07DAA1	19640804	4	--	21.98	0.20	--	--	--	--
124CCKF	342704	921739	342704092173901	03S12W15CDA1	19640806	4	35.21	3.99	1.31	--	--	--	--
124CCKF	342736	922052	342736092205201	03S12W18BCA1	19640827	--	44.45	13.45	0.16	--	--	--	--
124SPRT	341024	923545	341024092354501	06S15W26ACA1	19640402	250	--	--	--	6,680	--	--	Jacob / well performance
124SPRT	341218	923726	341218092372601	06S15W26AAA1	19640528	4	--	--	6.85	4,960	--	--	--a
124SPRT	341245	923251	341245092325101	06S14W08BDC1	196410	40	--	--	--	78	--	--	--a

Table 2. Aquifer test data for Arkansas, 1940-2006.—Continued

[See table 1 for correlation between hydrogeologic unit and code; --, missing data, NGVD of 1929, National Geodetic Vertical Datum of 1929; Horizontal datum is NAD of 1983]

Hydrogeologic unit code	Latitude (degrees, minutes, seconds)	Longitude (degrees, minutes, seconds)	U.S. Geological Survey site identification number	Local well number (township, range, section, 1/4, 1/4, 1/4)	Date of test (year, month, day)	Discharge (gallons per minute)	Static water-level (feet below land surface)	Water-level drawdown (static level - production level in feet)	Specific capacity (gallons per minute per foot)	Transmissivity (square feet per day)	Hydraulic conductivity (feet per day)	Storage coefficient (dimensionless)	Method of analysis (see Freeze and Cherry (1979), Heath (1982), and Todd (1980)
Grant County—Continued													
124SPRT	341245	923251	341245092325101	06S14W08BDC1	19641105	15	--	--	1.45	544	--	--	--a
124SPRT	341703	923312	341703092331201	05S14W18DDB1	196009	517	--	--	--	3,880	--	--	Jacob / well performance
124SPRT	341855	923249	341855092324901	05S14W05CBB1	19640622	102	--	--	--	23	--	--	Theis / well performance
124SPRT	342015	923748	342015092374801	04S15W33BCA1	19630425	4	--	--	--	1,610	--	--	Jacob / well performance
124SPRT	342015	923748	342015092374801	04S15W33BCA1	19640620	42	--	--	0.88	--	--	--	--
124SPRT	342150	921932	342150092193202	04S12W17DCC2	19640721	4	--	--	0.13	--	--	--	--
124SPRT	342559	923345	342559092334501	03S15W26DAA1	19641020	5	--	--	0.74	77	--	--	--a
124SPRT	342702	923146	342702092314601	03S14W20ADB1	19641026	5	--	--	0.84	--	--	--	--
Greene County													
112TRRC	360112	904235	360112090423501	16N03E13ADA1	19690820	1,570	--	--	--	19,400	--	0.001	--a
112TRRC	360112	904235	360112090423501	16N03E13ADA1	19700421	1,580	54.73	7.26	218	--	--	--	--
112TRRC	360925	902415	360925090241501	18N06E35BAA1	19720208	1,030	22.28	6.89	149	13,600	--	0.001	--a
124WLCX	360330	902902	360330090290201	17N06E31DBC1	19500208	1,000	--	--	--	17,000	--	--	Jacob
124WLCX	360330	902902	360330090290201	17N06E31DBC1	19750806	1,606	69.22	15.87	101	--	--	--	--
124WLCX	360437	902912	360437090291201	17N06E30BDC1	19680306	18	--	--	--	13,600	--	0.0001	Jacob
124WLCX	360437	902912	360437090291201	17N06E30BDC1	19750807	1,809	68.78	2.82	641	--	--	--	--
Hot Spring County													
110ALVM	341359	925529	341359092552901	06S18W03DBC1	19640416	5	5.18	1.79	0.98	--	--	--	--
110ALVM	342045	924924	342045092492401	04S17W27CDB1	19650318	6	9.07	4.14	1.41	--	--	--	--
124CRVR	341247	924634	341247092463401	06S16W07CAC1	19640818	2	--	8.99	0.26	--	--	--	--
124CRVR	341710	924531	341710092453101	05S16W17CCB1	19640508	4	--	--	--	20	--	--	Jacob
124CRVR	341710	924531	341710092453101	05S16W17CCB1	19640525	4	40.05	17.7	0.21	--	--	--	--
124CRVR	341718	924415	341718092441501	05S16W16CDB1	19630313	18	--	--	--	9,160	--	--	--a
124CRVR	341718	924415	341718092441501	05S16W16CDB1	19640618	18	46.60	13.65	1.33	--	--	--	--
124WLCX	341613	924841	341613092484102	05S17W22DDD2	195002--	152	--	--	--	2,650	--	0.00001	Jacob

Table 2. Aquifer test data for Arkansas, 1940-2006.—Continued

[See table 1 for correlation between hydrogeologic unit and code; --, missing data, NGVD of 1929, National Geodetic Vertical Datum of 1929; Horizontal datum is NAD of 1983]

Hydrogeologic unit code	Latitude (degrees, minutes, seconds)	Longitude (degrees, minutes, seconds)	U.S. Geological Survey site identification number	Local well number (township, range, section, 1/4, 1/4, 1/4)	Date of test (year, month, day)	Discharge (gallons per minute)	Static water-level (feet below land surface)	Water-level drawdown (static level - production level in feet)	Specific capacity (gallons per minute per foot)	Transmissivity (square feet per day)	Hydraulic conductivity (feet per day)	Storage coefficient (dimensionless)	Method of analysis (see Freeze and Cherry (1979), Heath (1982), and Todd (1980)
Hot Spring County—Continued													
124WLCX	341613	924841	341613092484102	05S17W22DDD2	19630305	157	220.78	8.85	17.7	--	--	--	--
124WLCX	341715	925201	341715092520101	05S17W18DDC1	19630328	6	--	--	--	236	--	--	Jacob
124WLCX	341715	925201	341715092520101	05S17W18DDC1	19630528	6	49.78	4.88	1.18	--	--	--	--
124WLCX	341752	925104	341752092510401	05S17W17AAA1	19640526	7	--	1.84	3.74	157	--	--	Jacob
124WLCX	342121	924954	342121092495401	04S17W28AAC1	19630622	5	13.76	19.17	0.25	39	--	--	Jacob
124WLCX	342157	924702	342157092470201	04S16W19BCD1	19630220	6	--	--	--	262	--	1.62	Jacob
124WLCX	342157	924702	342157092470201	04S16W19BCD1	19640817	4	51	4.19	1.24	--	--	--	--
124WLCX	342716	924350	342716092435001	03S16W21BDA1	19640616	21	--	--	--	2,200	--	--	Jacob / well performance
125CLTN	341950	925459	341950092545901	05S18W03AAA1	1954----	8	--	--	--	147	--	--	Jacob
125CLTN	341950	925459	341950092545901	05S18W03AAA1	19640526	8	19.32	3.3	2.60	--	--	--	--
328JKFK	341342	930050	341342093005001	06S19W10DAB1	19630503	26	--	--	--	6	--	--	Jacob / well performance
328JKFK	341342	930050	341342093005001	06S19W10DAB1	19640819	7	--	--	0.10	--	--	--	--
328JKFK	341359	930009	341359093000901	06S19W11ABC1	19640819	6	39	--	--	27	--	--	Jacob / well performance
328JKFK	341423	925747	341423092574702	06S18W05BAD2	19640511	8	--	2.34	3.42	20	--	--	Jacob / well performance
328JKFK	341423	925747	341423092574702	06S18W05BAD2	19640605	8	1.30	--	0.00	--	--	--	--
330ARKS	342856	924900	342856092490001	03S17W10DCA1	19640604	13	--	--	0.20	9	--	--	--a
367WMBL	342900	924554	342900092455401	03S16W07AAA1	19640824	6	--	--	0.80	--	--	--	--
Izard County													
367CTTR	361324	915550	361324091555001	18N09W15ACA1	19630828	40	132.1	28.40	1.41	147			Jacob
Jackson County													
112TRRC	353829	911145	353829091114501	12N02W28DDC1	19640527	150	--	--	--	10,600	--	0.08	Jacob
112TRRC	353829	911145	353829091114501	12N02W28DDC1	19641207	--	17.89	0.56	--	--	--	--	--
112TRRC	355035	911034	355035091103401	14N02W23BBB1	19690818	1,080	--	--	--	41,700	--	0.0041	Jacob
112TRRC	355035	911034	355035091103401	14N02W23BBB1	19700207	954	23.3	1.32	723	--	--	--	--

Table 2. Aquifer test data for Arkansas, 1940-2006.—Continued

[See table 1 for correlation between hydrogeologic unit and code; --, missing data, NGVD of 1929, National Geodetic Vertical Datum of 1929; Horizontal datum is NAD of 1983]

Hydrogeologic unit code	Latitude (degrees, minutes, seconds)	Longitude (degrees, minutes, seconds)	U.S. Geological Survey site identification number	Local well number (township, range, section, 1/4, 1/4, 1/4)	Date of test (year, month, day)	Discharge (gallons per minute)	Static water-level (feet below land surface)	Water-level drawdown (static level - production level in feet)	Specific capacity (gallons per minute per foot)	Transmissivity (square feet per day)	Hydraulic conductivity (feet per day)	Storage coefficient (dimensionless)	Method of analysis (see Freeze and Cherry (1979), Heath (1982), and Todd (1980)
Jefferson County													
124SPRT	342059	920614	241859092091401	04S10W20DAD1	--	1,122	--	--	--	13,500	--	0.00052	Aqtesolve: Theis method
124SPRT	342536	920832	342536092083202	03S11W25ADC2	19750321	1,000	186	26	39.1	16,000	--	0.03	Jacob
Lafayette County													
124CRVR	332145	932804	332145093280402	16S23W10DCA2	19520610	550	44.01	3.90	141	5,750	--	0.0003	Jacob
Lee County													
112TRRC	344341	904600	344341090460001	01N03E02BBC1	19580613	1,900	--	--	--	12,700	--	0.0007	Jacob
112TRRC	344341	904600	344341090460001	01N03E02BBC1	19691118	1,290	49.65	8.04	160	--	--	--	--
124SPRT	344629	904558	344629090455802	02N03E14CCC2	19640904	350	--	--	--	264	--	0.00002	Jacob
124SPRT	344629	904558	344629090455802	02N03E14CCC2	19670613	460	62.75	36.87	12.5	--	--	--	--
Lincoln County													
110ALVM	335901	913059	335901091305901	08S04W32BCC1	--	1,100	--	--	--	14,200	--	0.0014	Jacob
110ALVM	340025	914337	340025091433701	08S06W29BBB1	--	1,350	--	--	--	51,400	--	0.0005	Jacob
110ALVM	340110	914232	340110091423201	08S06W21BBC1	--	1,040	--	--	--	10,200	--	--	Jacob
110ALVM	340110	914232	340110091423201	08S06W21BBC1	19700429	1,760	25.57	4.83	364	--	--	--	--
110ALVM	340631	913814	340631091381401	07S05W19BBB1	--	1,750	--	--	--	15,900	--	0.0425	Jacob
110ALVM	340631	913814	340631091381401	07S05W19BBB1	19580625	110	15.31	5.22	21.1	--	--	--	--
Little River County													
112TRRC	334027	940738	334027094073804	12S29W32CAB4	19520807	80	35.65	6.46	12.4	627		0.0015	Jacob
Logan County													
110ALVM	352139	934433	352139093443301	08N26W15DAB1	--	900	--	--	--	90,000		0.0700	--a
Lonoke County													
110ALVM	345057	915300	345057091530001	03N08W32ABB3	19980814	980	--	--	--	16,500	300.0	0.004	Aqtesolve: Neuman method
110ALVM	345410	914934	345410091493401	03N08W11ACA2	19981201	820	--	--	0.06	24,000	400.0	--	Dominico and Schwartz equation

Table 2. Aquifer test data for Arkansas, 1940-2006.—Continued

[See table 1 for correlation between hydrogeologic unit and code; --, missing data, NGVD of 1929, National Geodetic Vertical Datum of 1929; Horizontal datum is NAD of 1983]

Hydrogeologic unit code	Latitude (degrees, minutes, seconds)	Longitude (degrees, minutes, seconds)	U.S. Geological Survey site identification number	Local well number (township, range, section, 1/4, 1/4, 1/4)	Date of test (year, month, day)	Discharge (gallons per minute)	Static water-level (feet below land surface)	Water-level drawdown (static level - production level in feet)	Specific capacity (gallons per minute per foot)	Transmissivity (square feet per day)	Hydraulic conductivity (feet per day)	Storage coefficient (dimensionless)	Method of analysis (see Freeze and Cherry (1979), Heath (1982), and Todd (1980)
Lonoke County—Continued													
110ALVM	345506	915029	345506091502901	03N08W03ADB1	--	650	--	--	--	8,610	166.0	--	Dominico and Schwartz equation
110ALVM	345833	915120	345833091512002	04N08W15BCB2	19550904	450	--	2.63	171	12,000	--	0.0016	--a
112TRRC	345055	920324	345055092032401	03N10W35BBC1	19590518	800	35	4.67	35.0	9,400	--	0.04	Jacob
124WLCX	345624	915837	345624091583701	04N09W28CCD1	19551017	45	24.05	5.00	3.00	2,700	--	--	--a
Madison County													
367GNTR	360453	934321	360453093432101	16N26W03CAA1	19810427	41	--	124	0.33	71	--	0.03	--a
367GNTR	360453	934321	360453093432101	16N26W03CAA1	19810528	41	510	124	0.33	--	--	--	--
367GNTR	361041	934326	361041093432601	18N26W35CAC1	19750315	219	265	233	0.94	319	--	0.16	--a
Marion County													
367GNTR	361511	924138	361511092413801	19N16W32ADA1	--	61	--	195	0.30	144	0.04	--	Specific capacity test
367RBDX	361512	925045	361512092504501	19N18W36BDC1	19751115	236	38.00	216	1.09	538	0.17	--	Specific capacity test
367RBDX	362309	923522	362309092352201	20N15W08CDD1	19670214	75	--	375	0.26	182	0.07	--	Specific capacity test
367RBDX	362636	923742	362636092374201	20N15W06ABC1	19730515	100	--	200	0.50	529	0.21	--	Specific capacity test
Miller County													
124CRVR	331540	935304	331540093530402	17S27W22DBB2	19651229	100	110	36	2.78	--	--	--	--
Mississippi County													
110ALVM	352848	901322	352848090132201	10N08E22ABB1	19551130	1,100	--	--	--	19,000	--	0.0006	Theis and Jacob
110ALVM	352848	901322	352848090132201	10N08E22ABB1	19560306	1,050	16.62	1.41	745	--	--	--	--
124WLCX	355703	895736	355703089573601	15N11E06CBA1	19500207	375	14.03	0.85	441	21,000	--	0.00018	Jacob
Monroe County													
112TRRC	344901	911434	344901091143401	02N02W05CBB1	19611102	1,200	--	--	--	24,000	--	--	--a
112TRRC	345313	911147	345313091114701	03N02W10DBC1	19620518	550	39.8	2.38	231	23,000	--	0.00038	Jacob
124SPRT	345313	911014	345313091101401	03N02W12CBC1	--		--	--	--	31,000	--	--	--a

Table 2. Aquifer test data for Arkansas, 1940-2006.—Continued

[See table 1 for correlation between hydrogeologic unit and code; --, missing data, NGVD of 1929, National Geodetic Vertical Datum of 1929; Horizontal datum is NAD of 1983]

Hydrogeologic unit code	Latitude (degrees, minutes, seconds)	Longitude (degrees, minutes, seconds)	U.S. Geological Survey site identification number	Local well number (township, range, section, 1/4, 1/4, 1/4)	Date of test (year, month, day)	Discharge (gallons per minute)	Static water-level (feet below land surface)	Water-level drawdown (static level - production level in feet)	Specific capacity (gallons per minute per foot)	Transmissivity (square feet per day)	Hydraulic conductivity (feet per day)	Storage coefficient (dimensionless)	Method of analysis (see Freeze and Cherry (1979), Heath (1982), and Todd (1980)
						Monroe County—Continued							
124SPRT	345616	911502	345616091150201	04N02W30BAD1	19770719	750	12.15	4.57	164	14,000	--	0.0004	--a
124SPRT	345618	911509	345618091150901	04N02W30BAC1	19760603	1,000	11.64	2.28	439	14,000	--	0.0008	--a
						Newton County							
367GNTR	360607	931802	360607093180201	well OZC-19	19810908	52	975	323	0.16	42	0.02	--	Specific capacity test
367GNTR	360656	930706	360656093070601	17N20W21BCA1	19720915	222	--	--	1.98	1,170	0.42	--	Specific capacity test
367RBDX	355722	930934	355722093093401	15N21W13BDD1	19770122	62	--	--	0.49	180	0.06	--	Specific capacity test
						Ouachita County							
124SPRT	333320	925015	333320092501506	0214S17WCB6	--	440	--	--	--	1,910	8.67	0.0003	Aqtesolve: Theis method
124SPRT	333907	924234	333907092423401	12S16W26ABC1	--	--	--	--	--	4,500	--	0.00020	Jacob
124SPRT	333920	924225	333920092422501	12S16W26AAB1	--	--	--	--	--	4,000	--	0.00015	Jacob
124SPRT	333923	924137	333923092413701	12S16W25BDD1	19491115	817	--	--	--	500	--	--	Jacob
124SPRT	333923	924137	333923092413701	12S16W25BDD1	19500413	817	27.0	63.73	12.8	--	--	--	--
124SPRT	333927	924243	333927092424301	12S16W26AAA1	19491115	576	--	--	--	3,800	--	--	--a
124SPRT	333927	924243	333927092424301	12S16W26AAA1	19500410	576	39.38	99.7	5.78	--	--	--	--
124SPRT	333933	924208	333933092420801	12S16W26ABB1	--	--	--	--	--	4,800	--	0.00020	Jacob
124SPRT	334325	923715	334325092371501	11S15W35CAC2	--	385	--	--	--	752	1.70	0.0002	Aqtesolve: Theis method
						Phillips County							
112TRRC	342916	910058	342916091005801	02S01E28CCB1	19720223	1,080	19.06	2.61	414	34,000	--	0.001	Jacob
124SPRT	342754	903621	342754090362101	03S05E05BAB1	19660712	550	--	--	--	7,100	--	--	--a
124SPRT	343324	905454	343324090545401	01S02E32DCD1	19661201	532	--	--	--	5,700	--	0.0004	--a
						Pointsett County							
110ALVM	353120	910211	353120091021101	10N01E06CBB1	19710119	1,543	39.02	--	--	48,000	--	0.001	Jacob
110ALVM	353804	903231	353804090323101	12N05E34ABA1	19710213	772	4.17	0.66	1,170	9,500	--	--	Jacob
124WLCX	353629	901955	353629090195501	11N07E03BDD1	19680410	540	8.67	2.11	256	22,000	--	0.0001	Jacob

Table 2. Aquifer test data for Arkansas, 1940-2006.—Continued

[See table 1 for correlation between hydrogeologic unit and code; --, missing data, NGVD of 1929, National Geodetic Vertical Datum of 1929; Horizontal datum is NAD of 1983]

Hydrogeologic unit code	Latitude (degrees, minutes, seconds)	Longitude (degrees, minutes, seconds)	U.S. Geological Survey site identification number	Local well number (township, range, section, 1/4, 1/4, 1/4)	Date of test (year, month, day)	Discharge (gallons per minute)	Static water-level (feet below land surface)	Water-level drawdown (static level - production level in feet)	Specific capacity (gallons per minute per foot)	Transmissivity (square feet per day)	Hydraulic conductivity (feet per day)	Storage coefficient (dimensionless)	Method of analysis (see Freeze and Cherry (1979), Heath (1982), and Todd (1980)
						Prairie County							
112TRRC	345842	913336	345842091333601	04N05W08CCD1	19610403	890	--	--	--	17,000	--	--	--a
						Pulaski County							
110ALVM	344124	920756	344124092075602	01N11W25AAD2	19580407	1,900	--	--	--	32,000	--	--	Jacob
110ALVM	344850	922410	344850092241001	02N13W16BAC1	--	--	--	--	--	16,000	--	0.025	Theis
						Saline County							
125MDWY	343013	923757	343013092375701	02S15W32DCA1	19630314	1	--	--	--	26	--	--	Theis
125MDWY	343013	923757	343013092375701	02S15W32DCA1	19630529	0.46	1.15	9.48	0.05	--	--	--	--
						Searcy County							
331PTKN	354924	923254	354924092325403	14N15W26DBC3	19580503	75	10.3	5.1	6.30	1,400	--	--	--a
331PTKN	354924	923254	354924092325403	14N15W26DBC3	19580624	50	13.77	--	8.31	--	--	--	--
331PTKN	354954	923325	354954092332501	14N15W26BBB1	19561002	5	--	--	--	34	--	0.04	Theis / Jacob
331PTKN	354954	923325	354954092332501	14N15W26BBB1	19571002	4	20.07	15.43	0.26	--	--	--	--
						Sebastian County							
325MCAL	351055	942617	351055094261701	06N32W20DCB1	19600712	116	0	0.9	129	2,000	--	--	--a
						Sharp County							
367GNTR	361325	913637	361325091363701	18N06W10DCC1	19661117	180	--	--	5.40	2,470	0.75	--	--a
						St. Francis County							
110ALVM	350337	902927	350337090292701	05N06E18AAA1	19610425	1,030	--	--	--	36,000	--	0.0009	Theis
110ALVM	345910	904827		04N03E05DBB	20061211	2,600	--	--	--	33,800	225	0.0008	Aqtesolve: Neuman method
112TRRC	345848	905219	345848090521903	04N02E03DDD3	19610410	2,900	28.46	4.36	665	43,000	--	0.04	--a
124CLBR	350020	904711	350020090471101	05N03E33ABA3	19600728	300	--	--	--	7,700	--	--	Jacob
124CLBR	350020	904713	350020090471301	05N03E33ABA2	19600726	273	--	--	--	7,400	--	0.001	Theis
124WLCX	345650	902808	345650090280802	04N06E21BAD2	19661116	495	--	--	--	32,000	--	--	Jacob

Table 2. Aquifer test data for Arkansas, 1940-2006.—Continued

[See table 1 for correlation between hydrogeologic unit and code; --, missing data, NGVD of 1929, National Geodetic Vertical Datum of 1929; Horizontal datum is NAD of 1983]

Hydrogeologic unit code	Latitude (degrees, minutes, seconds)	Longitude (degrees, minutes, seconds)	U.S. Geological Survey site identification number	Local well number (township, range, section, 1/4, 1/4, 1/4)	Date of test (year, month, day)	Discharge (gallons per minute)	Static water-level (feet below land surface)	Water-level drawdown (static level - production level in feet)	Specific capacity (gallons per minute per foot)	Transmissivity (square feet per day)	Hydraulic conductivity (feet per day)	Storage coefficient (dimensionless)	Method of analysis (see Freeze and Cherry (1979), Heath (1982), and Todd (1980)
Stone County													
367GNTR	355804	921352	355804092135201	15N12W02BCA1	19770513	40	--	--	0.18	49	0.01	--	Specific capacity test
Union County													
124SPRT	331424	924002	331424092400201	17S15W17DAD1	19470218	117	198.38	21.35	5.48	3,900	--	0.0003	Jacob
124SPRT	331550	924253	331550092425301	17S16W12BB1	--	460	--	--	--	25,000	--	0.0003	Aqtesolve: Theis method
124SPRT	332211	924337	332211092433701	16S16W02BAA1	19580716	440	130	42	10.5	--	--	--	--
Washington County													
367GNTR	355901	941814	355901094181401	15N31W17BBC1	19670609	60	--	--	--	129	0.06	--	--a
367GNTR	360946	940427	360946094042701	17N29W09ABD1	19730821	400	--	--	--	333	0.17	--	--a
White County													
112TRRC	350559	914740	350559091474001	06N06W31ACC1	19550808	100	23.99	0.87	115	9,100		0.09	Jacob
Woodruff County													
110ALVM	350551	910601	350551091060101	06N01W33ADC1	19551212	1,400	--	--	--	32,000	--	0.01	Jacob
110ALVM	350551	910601	350551091060101	06N01W33ADC1	19700226	1,300	46.38	13.79	94.3	--	--	--	--
112TRRC	351643	912015	351643091201501	08N03W32BCD1	19690818	1,510	--	--	--	41,000	--	--	Jacob
112TRRC	351643	912015	351643091201501	08N03W32BCD1	19691215	20	24.11	9.9	2.02	--	--	--	--
Yell County													
110ALVM	350758	930610	350758093061001	06N20W35BBC1	19600308	69	18.92	4.07	17.0	16,000	--	0.004	Jacob
326ATOK	345908	931759	345908093175901	04N22W24BDD1	19630517	17	--	--	--	96	--	--	--a
326ATOK	345908	931759	345908093175901	04N22W24BDD1	19630520	16	-2	155	0.10	--	--	--	--
326ATOK	350234	932027	350234093202701	05N22W33DBD1	19920728	95	61.15	38.77	2.46	160	--	--	--a

[a] Reported by driller.

Aquifer tests provide the most reliable information when the wells used for testing have been developed properly, completely penetrate the water-bearing hydrogeologic unit, and are open only to the water-bearing hydrogeologic unit being analyzed. Data are less representative when wells are open to only short intervals of the water-bearing hydrogeologic unit or when wells are open to multiple water-bearing hydrogeologic units.

The effects of pumping time, pumping rate, and inadequate well development can produce substantial differences in specific-capacity values (Ratzack and Huntley, 1991) and consequently produce errors in estimates of transmissivity derived from specific-capacity data. Because no corrections for these effects can be made with the available data, transmissivity estimates derived from specific-capacity data tend to be underestimated. Aquifer tests provide the most accurate estimates of transmissivity.

The nature of the available data required several assumptions to be made: (1) the wells being used for testing were properly constructed and developed; (2) wells being tested were open to a substantial interval of the water-bearing hydrogeologic unit being analyzed; (3) wells being tested were open only to the water-bearing hydrogeologic unit being analyzed; and (4) aquifer tests were properly conducted.

The absence of well construction and testing procedure documentation for some of the aquifer tests leads to uncertainty in the quality of the data. A number of aquifer test results are not reported because of data irregularities that may reflect improper well construction or testing procedures. The method of analysis for some transmissivity values in table 2 were not documented, but the values are included because they are reasonable compared to other values that have documented methods.

Aquifer Test Data

Aquifer test data are presented by way of discussions of descriptive statistics for specific capacity, transmissivity, hydraulic conductivity and storage; a discussion of the spatial distribution of aquifer test locations and hydrogeologic units; and a discussion comparing calculated hydraulic conductivity values with published values.

Descriptive Statistics

Descriptive statistics (mean, minimum, median, maximum and standard deviation values) for specific capacity, transmissivity, hydraulic conductivity, and storage coefficient were calculated for each hydrogeologic unit with two or more tests (table 3). When only one aquifer test was available for a hydrogeologic unit, the value for the test is listed as the mean for ease of comparison.

Descriptive statistics for specific capacity were calculated from 116 aquifer tests in 19 hydrogeologic units. Seven hydrogeologic units had one test value and another two units had no test values for specific capacity. Specific capacity values ranged from 0.0025 gallon per minute per foot (gal/min/ft) in the Jackfork Sandstone to 3,200 gal/min/ft in the Quaternary alluvium. The three hydrogeologic units with the largest mean values for specific capacity were the Quaternary alluvium (17 tests, 458 gal/min/ft), the Terrace deposits (11 tests, 248 gal/min/ft), and the Wilcox Group (12 tests, 142 gal/min/ft).

Descriptive statistics were calculated for transmissivity from 160 aquifer tests in 20 hydrogeologic units. Seven hydrogeologic units had one test value and one unit had no test value for transmissivity. Transmissivity results range from 6 square feet per day (ft^2/day) in the Jackfork Sandstone to 160,000 ft^2/day in the Quaternary alluvium. The Quaternary alluvium also has the largest mean for transmissivity at 35,800 ft^2/day, calculated from 41 tests. The hydrogeologic units with the second and third largest mean values for transmissivity were the Terrace deposits (14 tests, 21,400 ft^2/day), and the Wilcox Group (14 tests, 10,700 ft^2/day) respectively.

Descriptive statistics were calculated for hydraulic conductivity from 41 aquifer tests in 6 hydrogeologic units. One hydrogeologic unit, the Van Buren Formation, had only one test value for hydraulic conductivity (0.44 ft/day) and another 15 units had no hydraulic conductivity values. Hydraulic conductivity values ranged from 0.01 foot per day (ft/day), in the Gunter Sandstone, to 400 ft/day, in the Quaternary Alluvium. The three hydrogeologic units with the largest mean values for hydraulic conductivity are the Quaternary alluvium (4 tests, 273 ft/day), the Sparta Sand (3 tests, 13.1 ft/day), and the Roubidoux Formation, (8 tests, 1.49 ft/day).

Descriptive statistics were calculated for storage coefficient from 66 tests in 9 hydrogeologic units. Four hydrogeologic units had one test value and another 12 units have no test values for the storage coefficient. Storage coefficient values ranged from 0.000014 (dimensionless) in the Wilcox Group to 1.62 also in the Wilcox Group. The three hydrogeologic units with the largest mean values for the storage coefficient are the Gunter Sandstone (2 tests, 0.0950), the Pitkin Limestone (1 test, 0.0400), and the Terrace deposits (11 tests, 0.0236).

Spatial Analysis

Data compiled for this report are from 206 aquifer tests in 21 hydrogeologic units spread across 51 Arkansas counties (fig. 3 and table 4). Of the 21 hydrogeologic units with test data, 10 units are within the Atlantic Plain of Arkansas, consisting mostly of unconsolidated and semi-consolidated material, while the remaining 11 hydrogeologic units are within the Interior Highlands, consisting mainly of consolidated rock. Out of Arkansas's 75 counties, 24 counties have no aquifer test data, while another 13 counties have only one set of test data (fig. 3 and table 4).

Table 3. Descriptive statistics of aquifer test data in Arkansas.

[*Note that when only one test is available, the reported value is listed as the mean for comparison purposes]

Hydrogeologic unit	Hydrogeologic unit code	Specific capacity (gallons per minute per foot)						Transmissivity (square feet per day)					
		Number of sites	Mean *	Minimum	Median	Maximum	Standard deviation	Number of sites	Mean *	Minimum	Median	Maximum	Standard deviation
Quaternary alluvium	110ALVM	17	458	0.06	171	3,200	785	41	35,800	450	24,000	160,000	33,300
Terrace deposits	112TRRC	11	248	2.02	160	723	250	14	21,400	627	18,200	43,000	13,700
Claiborne Group	124CLBR	0						2	7,550	7,400	7,550	7,700	212
Cockfield Formation	124CCKF	11	5.36	0.15	0.76	23.7	9.15	4	3,330	325	3,350	6,280	2,910
Sparta Sand of Claiborne Group	124SPRT	16	61.7	0.13	8.66	439	118	33	7,990	23	7,560	31,000	8,480
Cane River Formation	124CRVR	5	29.1	0.21	1.33	141	62.6	3	4,980	20	5,750	9,180	4,630
Wilcox Group	124WLCX	12	142	0.25	21.1	641	210	14	10,700	39	8,170	32,000	10,800
Clayton Formation	125CLTN	1	2.60	(not calculated)				1	147	(not calculated)			
Midway Group	125MDWY	1	0.05	(not calculated)				1	26	(not calculated)			
Nacatoch Sand	211NCTC	0						1	161	(not calculated)			
McAlester Formation	325MCAL	1	129	(not calculated)				1	2,000	(not calculated)			
Atoka Formation	326ATOK	2	1.28	0.10	1.28	2.46	1.67	2	128	96	128	160	45
Jackfork Sandstone	328JKFK	3	1.17	0.0025	0.100	3.42	1.94	3	18	6	20	27	11
Arkansas Novaculite	330ARKS	1	0.20	(not calculated)				1	8.9	(not calculated)			
Pitkin Limestone	331PTKN	3	4.96	0.26	6.30	8.31	4.19	2	717	34	717	1,400	966
Womble Shale	367WMBL	1	0.80	(not calculated)				0					
Cotter Dolomite	367CTTR	1	1.41	(not calculated)				1	147	(not calculated)			
Roubidoux Formation	367RBDX	7	2.73	0.23	0.50	8.82	3.81	8	983	48	356	3,530	1,370
Van Buren Formation	367VNBR	1	3.15	(not calculated)				1	1,290	(not calculated)			
Gunter Sandstone member of Van Buren Formation	367GNTR	19	3.32	0.16	1.98	15.82	4.16	23	981		601	3,990	1,090
Potosi Dolomite	371POTS	3	8.47	4.60	8.80	12.00	3.71	4	2,150	242	1,690	4,980	2,050

Table 3. Descriptive statistics of aquifer test data in Arkansas.—Continued

[*Note that when only one test is available, the reported value is listed as the mean for comparison purposes]

Hydrogeologic unit	Hydrogeologic unit code	Hydraulic conductivity (feet per day)						Storage coefficient (dimensionless)					
		Number of sites	Mean *	Minimum	Median	Maximum	Standard deviation	Number of sites	Mean *	Minimum	Median	Maximum	Standard deviation
Quaternary alluvium	110ALVM	4	273	166	263	400	101	25	0.0115	0.000500	0.00400	0.0700	0.0169
Terrace deposits	112TRRC	0						11	0.0236	0.000379	0.00150	0.0900	0.0340
Claiborne Group	124CLBR	0						1	0.00095		(not calculated)		
Cockfield Formation	124CCKF	0						1	0.00026				
Sparta Sand of Claiborne Group	124SPRT	3	13.1	1.70	8.67	29	14.2	17	0.00209	0.000017	0.00032	0.0300	0.00720
Cane River Formation	124CRVR	0						1	0.00026		(not calculated)		
Wilcox Group	124WLCX	0						7	0.0232	0.000014	0.00012	1.62	0.612
Clayton Formation	125CLTN	0						0					
Midway Group	125MDWY	0						0					
Nacatoch Sand	211NCTC	0						0					
McAlester Formation	325MCAL	0						0					
Atoka Formation	326ATOK	0						0					
Jackfork Sandstone	328JKFK	0						0					
Arkansas Novaculite	330ARKS	0						0					
Pitkin Limestone	331PTKN	0						1	0.0400		(not calculated)		
Womble Shale	367WMBL	0						0					
Cotter Dolomite	367CTTR	0						0					
Roubidoux Formation	367RBDX	8	1.49	0.02	0.19	1.76	0.68	0					
Van Buren Formation	367VNBR	1	0.44		(not calculated)			0					
Gunter Sandstone member of Van Buren Formation	367GNTR	21	0.51	0.01	0.38	1.90	0.53	2	0.0950	0.0300	0.0950	0.0160	0.0919
Potosi Dolomite	371POTS	4	0.85	0.12	0.85	1.78	0.71	0					

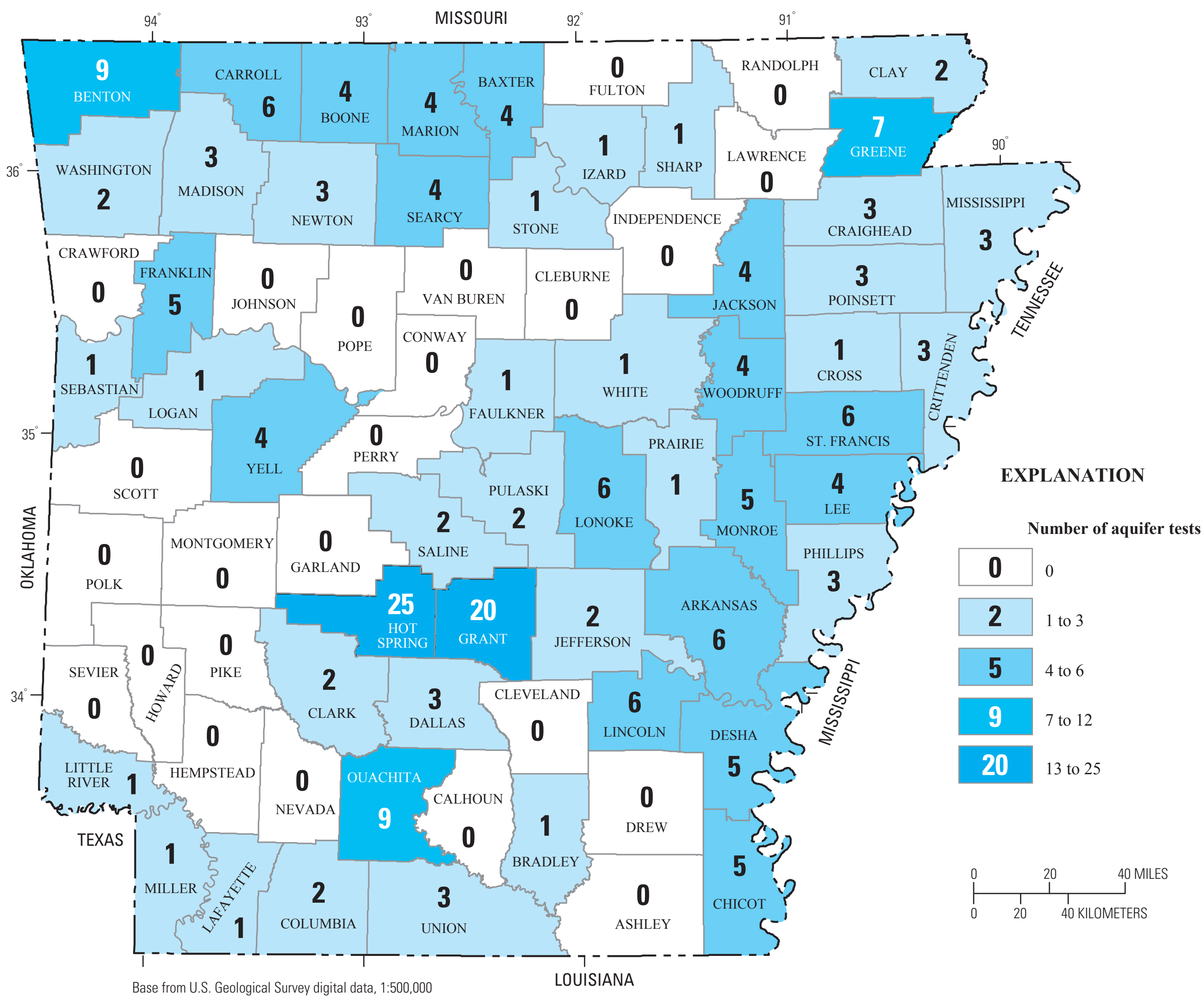

Figure 3. Number of aquifer tests by county.

Table 4. Number of aquifer tests by county and hydrogeologic unit.

[-, no data]

County	County code	Hydrogeologic unit: Quaternary alluvium (110ALVM)	Terrace deposits (112TRRC)	Claiborne Group (124CLBR)	Cockfield Formation (124CCKF)	Sparta Sand of Claiborne Group (124SPRT)	Cane River Formation (124CRVR)	Wilcox Group (124WLCX)	Clayton Formation (125CLTN)	Midway Group (125MDWY)	Nacatoch Sand (211NCTC)	McAlester Formation (325MCAL)	Atoka Formation (326ATOK)	Jackfork Sandstone (328JKFK)	Arkansas Novaculite (330ARKS)	Pitkin Limestone (331PTKN)	Womble Shale (367WMBL)	Cotter Dolomite (367CTTR)	Roubidoux Formation (367RBDX)	Van Buren Formation (367VNBR)	Gunter Sandstone member of Van Buren Formation (367GNTR)	Potosi Dolomite (371POTS)	Total for county
Arkansas	1	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
Ashley	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Baxter	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	-	4
Benton	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	2	9
Boone	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1	4
Bradley	11	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Calhoun	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Carroll	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	2	1	6
Chicot	17	2	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Clark	19	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	2
Clay	21	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Cleburne	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cleveland	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Columbia	27	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Conway	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Craighead	31	1	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Crawford	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Crittenden	35	2	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Cross	37	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Dallas	39	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Desha	41	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Drew	43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Faulkner	45	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Franklin	47	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Fulton	49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Garland	51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Grant	53	-	-	-	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20
Greene	55	-	3	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
Hempstead	57	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0

Table 4. Number of aquifer tests by county and hydrogeologic unit.—Continued

[-, no data]

		Hydrogeologic unit																					
County	County code	Quaternary alluvium (110ALVM)	Terrace deposits (112TRRC)	Claiborne Group (124CLBR)	Cockfield Formation (124CCKF)	Sparta Sand of Claiborne Group (124SPRT)	Cane River Formation (124CRVR)	Wilcox Group (124WLCX)	Clayton Formation (125CLTN)	Midway Group (125MDWY)	Nacatoch Sand (211NCTC)	McAlester Formation (325MCAL)	Atoka Formation (326ATOK)	Jackfork Sandstone (328JKFK)	Arkansas Novaculite (330ARKS)	Pitkin Limestone (331PTKN)	Womble Shale (367WMBL)	Cotter Dolomite (367CTTR)	Roubidoux Formation (367RBDX)	Van Buren Formation (367VNBR)	Gunter Sandstone member of Van Buren Formation (367GNTR)	Potosi Dolomite (371POTS)	Total for county
Hot Spring	59	2	-	-	-	-	5	9	2	-	-	-	-	5	1	-	1	-	-	-	-	-	25
Howard	61	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Independence	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Izard	65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
Jackson	67	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Jefferson	69	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Johnson	71	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Lafayette	73	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Lawrence	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Lee	77	-	2	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Lincoln	79	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
Little River	81	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Logan	83	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Lonoke	85	4	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
Madison	87	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	3
Marion	89	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	1	-	4
Miller	91	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Mississippi	93	2	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Monroe	95	-	2	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Montgomery	97	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Nevada	99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Newton	101	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	-	3
Ouachita	103	-	-	-	-	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
Perry	105	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Phillips	107	-	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Pike	109	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Poinsett	111	2	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Polk	113	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Pope	115	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0

Table 4. Number of aquifer tests by county and hydrogeologic unit.—Continued

[-, no data]

County	County code	Hydrogeologic unit																					
		Quaternary alluvium (110ALVM)	Terrace deposits (112TRRC)	Claiborne Group (124CLBR)	Cockfield Formation (124CCKF)	Sparta Sand of Claiborne Group (124SPRT)	Cane River Formation (124CRVR)	Wilcox Group (124WLCX)	Clayton Formation (125CLTN)	Midway Group (125MDWY)	Nacatoch Sand (211NCTC)	McAlester Formation (325MCAL)	Atoka Formation (326ATOK)	Jackfork Sandstone (328JKFK)	Arkansas Novaculite (330ARKS)	Pitkin Limestone (331PTKN)	Womble Shale (367WMBL)	Cotter Dolomite (367CTTR)	Roubidoux Formation (367RBDX)	Van Buren Formation (367VNBR)	Gunter Sandstone member of Van Buren Formation (367GNTR)	Potosi Dolomite (371POTS)	Total for county
Prairie	117	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Pulaski	119	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Randolph	121	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
St Francis	123	2	1	2	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
Saline	125	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	2
Scott	127	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Searcy	129	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	4
Sebastian	131	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1
Sevier	133	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Sharp	135	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Stone	137	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Union	139	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Van Buren	141	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Washington	143	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	2
White	145	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Woodruff	147	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Yell	149	1	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	4
Number of tests		47	19	2	12	41	7	20	2	2	1	1	3	5	1	4	1	1	8	1	24	4	206
Number of counties		20	11	1	2	11	3	8	1	1	1	1	1	1	1	1	1	1	4	1	10	3	51

The majority of aquifer tests are concentrated within three regions. The largest concentrations of aquifer tests are in and around Grant and Ouachita Counties of the West Gulf Coastal Plain and Hot Spring County, which is in both the West Gulf Coastal Plain and the Ouachita Mountains. Tests also were concentrated in the Mississippi Alluvial Plain, especially in Arkansas, Greene, Lincoln, Lonoke, and St. Francis Counties; and the Springfield-Salem Plateaus, in Benton and Carroll Counties.

Five hydrogeologic units account for 73 percent (151 tests) of the aquifer tests. These 151 aquifer tests are spread across 45 counties. Twenty-three of the counties with test data have data from 2 or more different hydrogeologic units. The Quaternary alluvium had 47 tests in 20 counties; the Sparta Sand had 41 tests in 11 counties; the Gunter Sandstone had 24 tests in 10 counties; the Terrace deposits had 19 tests in 11 counties; and the Wilcox Group had 20 tests in 8 counties.

Generally, those hydrogeologic units consisting of unconsolidated, Quaternary- and Tertiary-age sand and gravel within the Mississippi Alluvial Plain and the Arkansas Valley have higher values for specific capacity and transmissivity (figs. 4 and 5). Many tests conducted in the West Gulf Coastal Plain, which consists of semi-consolidated Tertiary-age sand and gravel, and the Springfield-Salem Plateaus, which consists of sandstone, limestone, and dolomite with large secondary porosity, produced moderate values for specific capacity and transmissivity. The older, more consolidated and cemented siliceous rocks of the Ouachita and Boston Mountains have few aquifer tests and generally have lower specific capacity and transmissivity values.

Comparisons with Published Hydraulic Conductivity Values

Of the 21 hydrogeologic units with aquifer test data, 6 units have reported hydraulic conductivity values (tables 3 and 5). Based on their respective aquifer material types, the six hydrogeologic units have mean reported values that fall within

Table 5. Estimated hydraulic conductivity values.

[Values estimated by dividing the arithmetic mean transmissivity (table 3) by the unit's maximum thickness (table 1). Reported hydraulic conductivity values from arithmetic means (table 3); -, no data]

Hydrogeologic Unit	Hydrogeologic unit code	Mean transmissivity (square feet per day)	Maximum thickness (feet)	Estimated hydraulic conductivity (feet per day)	Mean reported hydraulic conductivity (feet per day)
Quaternary Alluvium	110ALVM	35,800	200	179	273
Terrace Deposits	112TRRC	21,400	50	428	-
Claiborne Group	124CLBR	7,550	1,500	5.03	-
Cockfield Formation	124CCKF	3,330	400	8.33	-
Sparta Sand of Claiborne Group	124SPRT	8,050	900	8.94	13.1
Cane River Formation	124CRVR	4,980	800	6.23	-
Wilcox Group	124WLCX	10,700	1,100	9.73	-
Clayton Formation	125CLTN	147	35	4.20	-
Midway Group	125MDWY	26	600	0.043	-
Nacatoch Sand	211NCTC	161	250	0.64	-
McAlester Formation	325MCAL	2,000	300	6.67	-
Atoka Formation	326ATOK	128	600	0.21	-
Jackfork Sandstone	328JKFK	18	6,000	0.003	-
Arkansas Novaculite	330ARKS	9	950	0.0095	-
Pitkin Limestone	331PTKN	717	220	3.26	-
Womble Shale	367WMBL	-	1,000	-	-
Cotter Dolomite	367CTTR	147	525	0.28	-
Roubidoux Formation	367RBDX	983	455	2.16	1.49
Van Buren Formation	367VNBR	1,290	600	2.15	0.44
Gunter Sandstone member of Van Buren Formation	367GNTR	981	100	9.81	0.51
Potosi Dolomite	371POTS	2,150	390	5.51	0.85

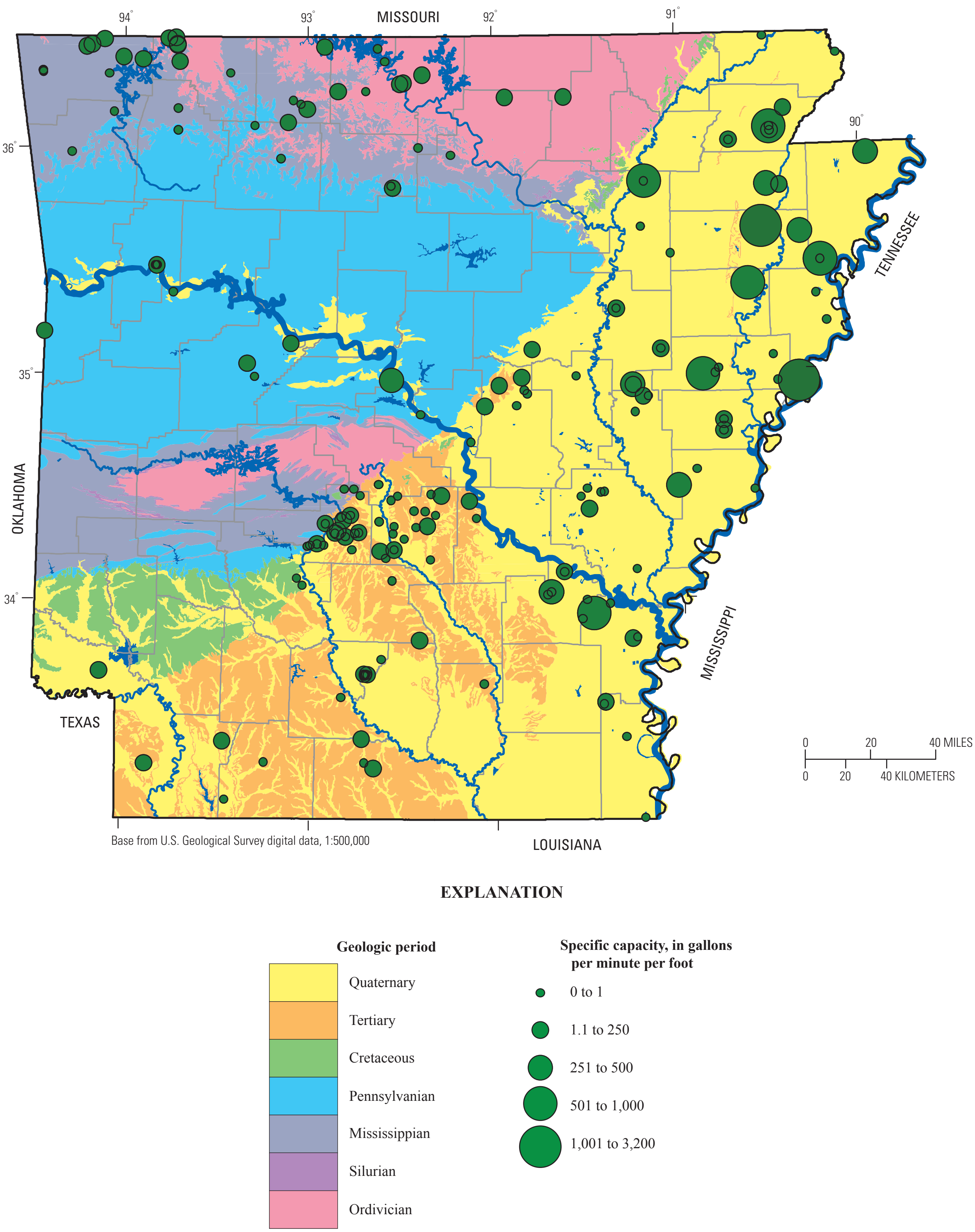

Figure 4. Distribution of specific capacity values.

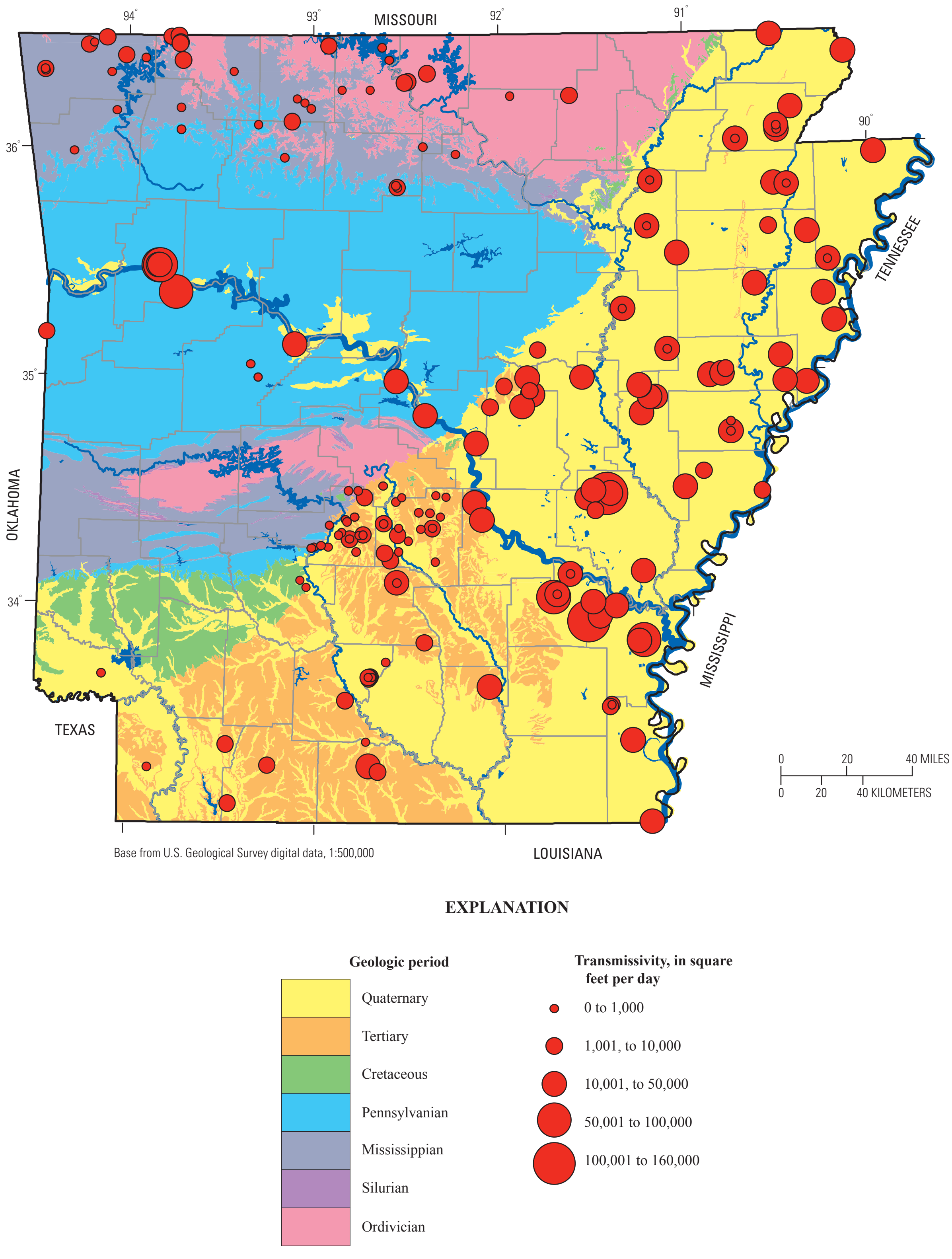

Figure 5. Distribution of transmissivity values.

the expected range of hydraulic conductivity values published by the Bureau of Reclamation (BOR) (1977), Domenico and Schwartz (1990), and Freeze and Cherry (1979) (fig.6).

Because few hydraulic conductivity values were reported in the original aquifer test data, values for hydraulic conductivity were estimated for 20 hydrogeologic units by dividing the mean transmissivity value by the maximum hydrogeologic unit thickness (tables 1, 3 and 5). The estimated hydraulic conductivity values for each hydrogeologic unit also were compared with published hydraulic conductivity values (Bureau of Reclamation, 1977; Domenico and Schwartz, 1990; and Freeze and Cherry, 1979), by material type (fig. 6). Hydraulic conductivity values for the Womble Shale were not estimated because transmissivity values were not available from the original data.

Of the 20 hydrogeologic units with estimated hydraulic conductivity values, 12 units have estimated values that fall within the expected range of hydraulic conductivity values published by Bureau of Reclamation (1977), Domenico and Schwartz (1990), and Freeze and Cherry (1979) (fig. 6). The 12 hydrogeologic units include the Quaternary alluvium (110ALVM), Terrace deposits (112TRRC), Claiborne Group (124CLBR), Cockfield Formation (124CCKF), Sparta Sand (124SPRT), Cane River Formation (124CRVR), Wilcox Group (124WLCX), Clayton Formation of the Midway Group (125CLTN), Midway Group (125MDWY), Nacatoch Sand (211NCTC), Atoka Formation (326ATOK), and Gunter Sandstone (367GNTR).

Of the 20 hydrogeologic units with estimated hydraulic conductivity values, 5 units have estimated values that fall within the expected range of hydraulic conductivity values published by Domenico and Schwartz (1990) and Freeze and Cherry (1979), but not within the range of values published by the Bureau of Reclamation (1977). In all five instances, the BOR suggests these units should be sandstone, shale, or mudstone; when in fact these units are limestone or dolomite. This appears to be a product of the method by which the BOR has arranged their values for hydraulic conductivity, not allowing values to “overlap” from one material type to another. The five hydrogeologic units include the Pitkin Limestone (331PTKN), Cotter Dolomite (367CTTR), Roubidoux Formation (367RBDX), Van Buren Formation (367VNBR), and Potosi Dolomite (371POTS).

The Jackfork Sandstone (328JKFK) and the Arkansas Novaculite (330ARKS) units disagree with all three sets of published hydraulic conductivity values based on material type. In the case of the Jackfork Sandstone, the estimated hydraulic conductivity value was calculated using an aquifer thickness of 6,000 ft (table 1). This thickness is greater than the unit is at potable water-bearing locations, and, accordingly, produces a low hydraulic conductivity value. This hydraulic conductivity value is not representative of the Jackfork Sandstone. In the case of the Arkansas Novaculite, the estimated hydraulic conductivity value was calculated by using the transmissivity value from a single aquifer test conducted in a part of the unit consisting of massive novaculite, producing a low hydraulic conductivity value.

The Quaternary alluvium (110ALVM) and Sparta Sand (124SPRT), consisting of unconsolidated deposits and having reported and estimated hydraulic conductivity values, have reported mean values approximately 150 percent larger than the estimated values. This may be the result of using the unit’s maximum thickness when estimating the hydraulic conductivity. The maximum thickness is likely greater than the actual thickness at the aquifer test location producing a low estimate of hydraulic conductivities.

In contrast, the Roubidoux Formation (367RBDX), Van Buren Formation (367VNBR), Gunter Sandstone (367GNTR), and Potosi Dolomite (371POTS) units, consisting of consolidated deposits and having both reported and estimated hydraulic conductivity values, all have mean reported hydraulic conductivity values that are from 5 percent to 69 percent smaller than the estimated values.

Summary

Between 1940 and 2006, the USGS performed over 300 well and aquifer tests in Arkansas. Much of these data have never been published. This report presents the results from 206 aquifer tests spread across 51 Arkansas counties, including data on specific capacity, transmissivity, hydraulic conductivity, and storage coefficient.

The well and aquifer tests presented are from 21 hydrogeologic units. Ten of the hydrogeologic units are within the Atlantic Plain of Arkansas and consist mostly of unconsolidated and semi-consolidated materials. The remaining 11 units are within the Interior Highlands and consist mainly of consolidated rock.

Descriptive statistics are reported for each hydrogeologic unit with two or more tests, and include the mean, minimum, median, maximum and standard deviation values for specific capacity, transmissivity, hydraulic conductivity, and storage coefficient. Specific capacity values ranged from 0.0025 gal/min/ft in the Jackfork Sandstone to 3,200 gal/min/ft in the Quaternary alluvium. Transmissivity results ranged from 6 ft^2/day in the Jackfork Sandstone to 160,000 ft^2/day in the Quaternary alluvium. Hydraulic conductivity values ranged from 0.01 ft/day in the Gunter Sandstone to 400 ft/day in the Quaternary alluvium. Storage coefficient values ranged from 0.000014 (dimensionless) in the Wilcox Group to 1.62 also in the Wilcox Group.

Spatially, the tests were spread across 51 counties. Twenty-four counties have no aquifer test data and another 13 counties have only one set of test data. The largest concentration of tests was in and around Grant, Hot Spring, and Ouachita Counties of the West Gulf Coastal Plain. Tests also were concentrated in the Mississippi Alluvial Plain, especially in Arkansas, Greene, Lincoln, Lonoke, and St. Francis Coun-

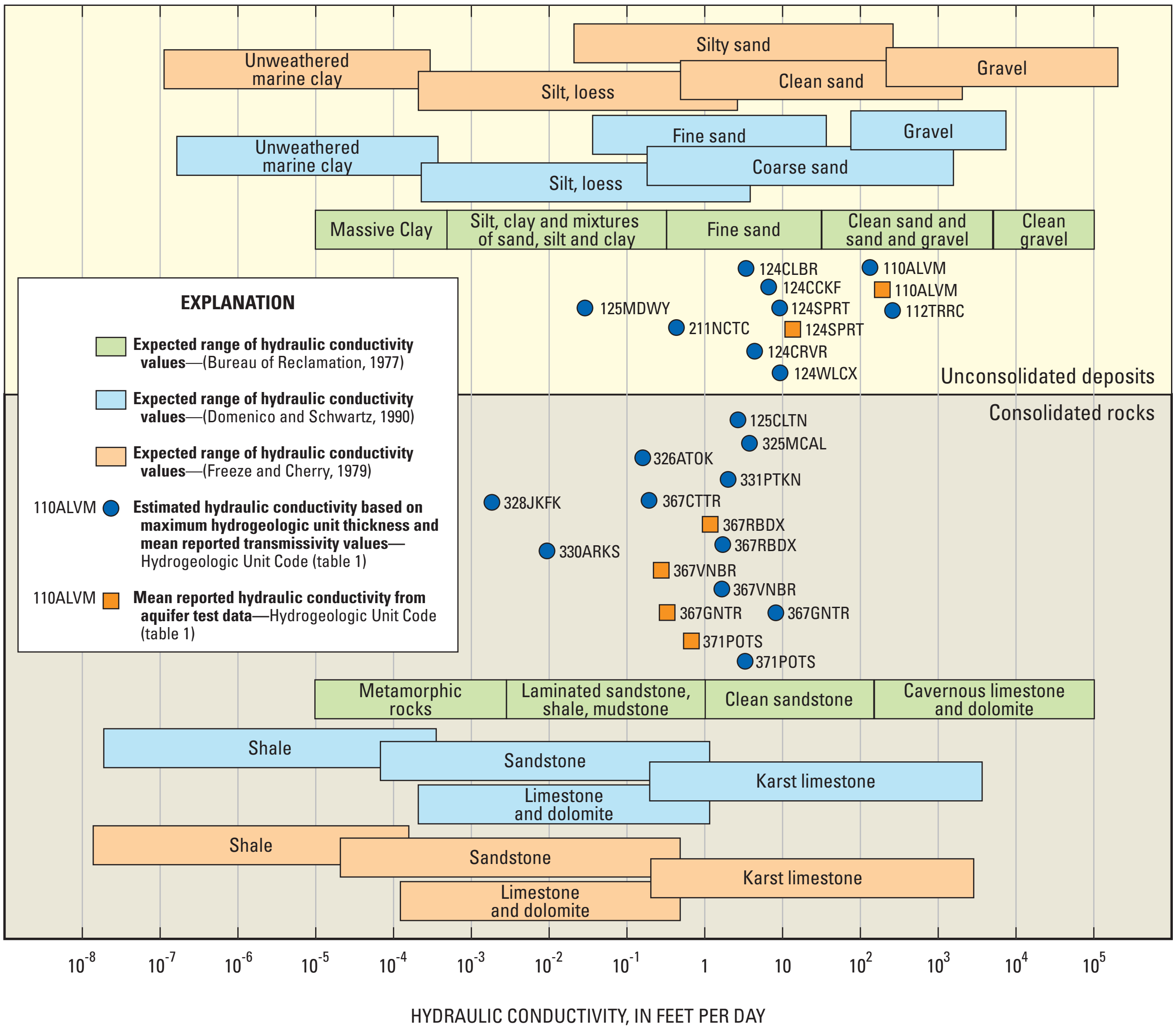

Figure 6. Range of values of hydraulic conductivity from scientific literature and from aquifer test data for 1940-2006 (modified from Bureau of Reclamation, 1977; Domenico and Schwartz, 1990; and Freeze and Cherry, 1979).

ties; and the Springfield-Salem Plateaus, in Benton and Carroll Counties.

Because few hydraulic conductivity values were available in the original aquifer test data, hydraulic conductivity values were estimated using transmissivity and maximum unit thickness data. Most estimated hydraulic conductivity values fall within the ranges of values of published hydraulic conductivity based on hydrogeologic unit material types.

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