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CERCLA SECTION

Water Resources of Mississippi

THAD N. SHOWS

BULLETIN 113

MISSISSIPPI GEOLOGICAL, ECONOMIC AND TOPOGRAPHICAL SURVEY

WILLIAM HALSELL MOORE
DIRECTOR AND STATE GEOLOGIST

JACKSON, MISSISSIPPI
1970

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Table 18.—Stratigraphic column and water resources in Area VI.

ERA	SYSTEM	SERIES	GROUP	STRATIGRAPHIC UNIT	THICKNESS (feet)	WATER RESOURCES
Cenozoic	Quaternary	Holocene		Alluvium	0-80	Not an important aquifer. A few large wells may be possible along some of the major streams in local areas. Salt water has intruded this aquifer adjacent to the Mississippi Sound.
		Pleistocene		Terrace Deposits	0-100	Some local wells tap this aquifer, but is not used over a very extensive area. Large quantities of water may be available in the southern part where a number of these deposits are developed in a staircase fashion. Salty water is present along the coast in some of these deposits.
				Citronelle	0-100	Supplies shallow domestic wells throughout most of the area. A few municipal wells are completed in this aquifer. Quality of water is fair. The water usually contains low dissolved solids and has a low pH.
	Tertiary	Pliocene		Graham Ferry	0-200	Main source of water supply for municipal and industrial wells in the vicinity of Pascagoula. A number of wells in western Jackson and eastern Harrison Counties utilize this aquifer. Quality of water is generally good. Water is slightly alkaline and iron is seldom a problem in the wells at Pascagoula.
		Miocene		Pascagoula	0-1000	An important source of water supply for the municipal, industrial and domestic wells in Hancock, Harrison and Jackson Counties. The Pascagoula, Hattiesburg and the Catahoula are difficult to differentiate in the subsurface. Recent publications have placed all of the aquifers into "Miocene aquifers." Quality of water is good from this aquifer. Color is high in a number of wells adjacent to the Mississippi Sound. Hydrogen sulfide content may be a local problem.
				Hattiesburg	0-400	An important source of water supply for the municipal wells at Lucedale. This aquifer has the potential of supplying large volumes of water to wells in Pearl River, Stone and George Counties. Numerous domestic wells tap this aquifer in the central part of the area (southern Forrest, Greene, Perry, Pearl River, Stone and George Counties). The quality of water is generally good.
				Catahoula	500-900	An important source of water in the northern half of the area. The aquifer supplies numerous municipal, industrial, and domestic water supplies as far south as northern Pearl River, Stone and George Counties. The aquifer is fresh farther south but because of the depth and availability of shallower aquifers is not generally used. The quality of water is generally good.

Area VI and to the north in Area V. The base of fresh water is shallow over some of the domes. Therefore caution should be exercised in drilling deep water wells on these structures. Deep aquifers are present in Harrison and Hancock Counties which have the ability of supplying large volumes of fresh water to properly constructed wells. A test well 2,460 feet deep (USGS) located in Gulfport's industrial park had a water level of about 100 feet above land surface.

CATAHOULA AQUIFER

Most of the water supplies in the northern part of Area VI are from the Catahoula aquifer. The wells are generally shallow (100 to 1,000 feet deep) and yield large volumes of water. The aquifer consists of beds of sand or gravel separated by clay layers. The sand and gravel beds thicken toward the Gulf and are several hundred feet thick in south Mississippi.

Numerous municipal, industrial, and domestic water supplies are completed in the Catahoula aquifer across this area. The aquifer is used as far south as northern Pearl River, Stone and George Counties. The use of this aquifer has been limited south of the above mentioned area because of the availability of shallower aquifers. Wells yielding up to 2,000 gpm are possible from this aquifer at some locations such as Carson in Jefferson Davis County and Wiggins in Stone County. The sands are generally lenticular in the northern part of Area VI. Test drilling is recommended for most locations because of the lenticular deposits.

Large volumes of water are pumped from the Catahoula aquifer at Hattiesburg, Richton, Purvis, and McComb. A large number of wells for rural water systems and domestic supplies utilize this aquifer in the northern part of Area VI.

Water levels are above the land surface along some of the streams. Flowing wells are primarily located in the Bogue Chitto, Okatoma Creek, Pearl River, Pascagoula River, Chickasawhay River, and some of the smaller creeks across the area. Some of the deeper water levels reported are from 250 to 380 feet. A well which is 796 feet deep in the Catahoula aquifer at Baxterville, Lamar County, had a water level of 264 feet in 1964. A well 425 feet deep at Bassfield, Jefferson Davis County, had a water level of 380 feet in 1964. Slightly deeper water levels may be expected on tops of high hills. Water levels are depressed in areas of heavy pumpage in a small area such as the Hattiesburg well field located at the new water plant.

HATTIESBURG AQUIFER

The Hattiesburg aquifer is not as widely used as the Catahoula aquifer. The Hattiesburg aquifer has the potential of supplying large wells in the central and southern part of Area VI. A number of shallow domestic and small municipal wells utilize this aquifer in southern Lamar, southern Forrest, Perry and Greene Counties. The municipal wells at Lucedale and two community supply wells north of Lucedale are completed in the Hattiesburg aquifer at a depth of about 1,000 feet. Most of the ground-water development from this aquifer is in Pearl River, Stone and George Counties and slightly north of these counties. The extreme depth is the limiting factor south of these counties. The aquifer is presently being used for ground-water supplies in Wilkinson, Amite, Pike, Walthall, and Marion Counties, which are along the Louisiana boundary.

Separating the Hattiesburg from the underlying Catahoula or the overlying Pascagoula is extremely difficult in the subsurface in Area VI. One solution to this problem is to refer to these units as "Miocene aquifers" and not designate particular aquifers.

Water levels will be similar to those in the Catahoula aquifer. The higher water levels will be located along the streams. A well 1,008 feet deep for the Town of Lucedale had a water level of 100 feet in 1960.

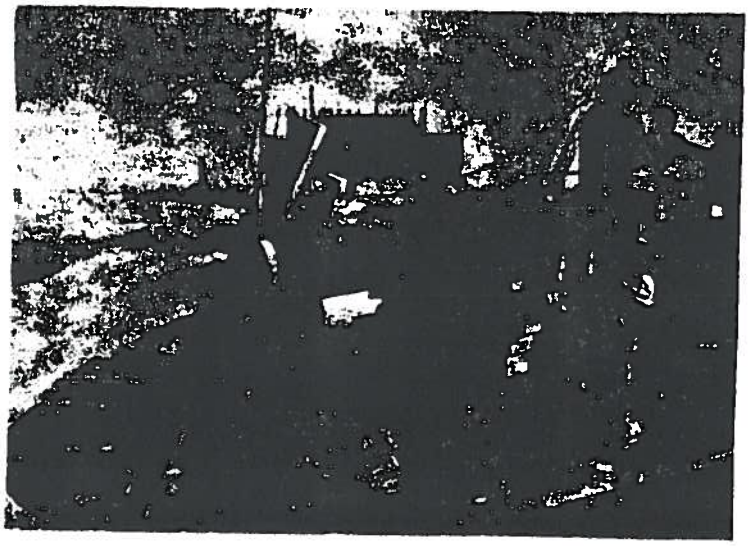
PASCAGOULA AQUIFER

The Pascagoula aquifer is an important source of water supply in the three coastal counties, Hancock, Harrison, and Jackson. Numerous municipal, industrial and domestic wells utilize this aquifer in these counties. Most of the municipalities along the coast have wells completed in this aquifer. Yields from this aquifer are as much as 3,000 gpm at the NASA Test Site. The aquifer consists of thick sands and gravels at a number of locations along the coast. Multiple aquifers or zones of sands are present at most locations.

Water levels are generally above or near the land surface except in areas of concentrated withdrawals. A number of the

Results of Aquifer Tests in Mississippi

Compiled by
Roy Newcome, Jr.



Prepared by the
U. S. Geological Survey
Water Resources Division

in cooperation with the
Mississippi Board of Water Commissioners

Bulletin 71-2
1971

ABBREV.	ABBREV.	STANDARD FULL NAME	REMARKS
TRCS	110TRCS	Terrace dposits, undifferentiated	(111,112)
MRVA	112MRVA	Mississippi River alluvial aquifer	
CRNL	121CRNL	Citronelle aquifers	
GRMF	121GRMF	Graham Ferry aquifer	
MOCN	122MOCN	Miocene aquifer system	
PCGL	122PCGL	Pascagoula aquifer	
HBRG	122HBRG	Hattiesburg aquifer	
CTHL	122CTHL	Catahoula aquifer	
OLGC	123OLGC	Oligocene aquifer system	
MSPG	123MSPG	Mint Spring aquifer	
FRHL	123FRHL	Forest Hill aquifer	
MDBC	124MDBC	Moodys Branch aquifer	
CCKF	124CCKF	Cockfield aquifer	
CKMN	124CKMN	Cook Mountain aquifer	
SPRT	124SPRT	Sparta aquifer system	
WNON	124WNON	Winona aquifer	
TLLT	124TLLT	Tallahatta aquifer	
MUWX	124MUWX	Meridian-upper Wilcox aquifer	
WLCXU	124WLCXU	Upper Wilcox aquifer	
WLCXM	124WLCXM	Middle Wilcox aquifer	
WLCXL	124WLCXL	Lower Wilcox aquifer	
WLCX	124WLCX	Wilcox aquifer	(undifferentiated
RPLY	211RPLY	Ripley aquifer	
COFF	211COFF	Coffee Sand aquifer	
EUTW	211EUTW	Eutaw aquifer	
MCSN	211MCSN	McShan aquifer	
?ETMS	?	Eutaw-McShan aquifer	
GORD	211GORD	Gordo aquifer	
COKR	211COKR	Coker aquifer	
PLZC	300PLZC	Paleozoic aquifer system	

GEOLOGIC UNIT CODE FOR MISSISSIPPI

Alphabetical List

Aquifers

Alluvial aquifer, Mississippi River	QGMA
Alluvium, Pleistocene	QGOA
Alluvium, Quaternary, undifferentiated	Q-OA
Alluvium, Recent	QROA
Byram Formation, Glendon Limestone Member	TØGM
Camden Chert	DZCA
Catahoula Sandstone	TMCA
Catahoula Sandstone, upper part	TMUM
middle part	TMMM
lower part	TMBM
Citronelle Formation	TPCI
Claiborne Group	TECG
Clayton Formation	TLCL
Coastal Deposits	QBCD
Cockfield Formation	TECØ
Cook Mountain Formation	TECK
Potterchitto Sand Member	TEDM
Coffee Sand	K3CS
Coker Formation	K3CØ
upper unnamed member	K37M
Eoline member	K3EM
"massive sand"	K3MM
Eocene Series, undifferentiated	TESE
Eutaw Formation, (unrestricted)	K3EE
Tombigbee Sand Member	K3TM
Unnamed member	K36M
Eutaw Formation, (restricted)	K3EU
lower part	K38M
Forest Hill Sand	TØFH
Fort Payne Chert	M1FP
Gordo Formation	K3GØ
Graham Ferry Formation	TPGF
Hatchetigbee Formation	TEHA
Hattiesburg Formation	TMHA
High terrace deposits	QGHT
Intermediate terrace deposits	QGIT
Low terrace deposits	QGLT
Lower Cretaceous	K1
Lower Tuscaloosa	K3TL
Lower Wilcox aquifer	TELW
Marianna Limestone	TØMA
Mint Spring Marl Member	TØMS
McShan Formation	K3MS
Meridian-upper Wilcox aquifer	TEMW
Middle Tuscaloosa	K3TC
Middle Wilcox aquifer	TETW
Midway Group	TLMG
Miocene Series, undifferentiated	TMMZ
Mississippi River alluvial aquifer	QGMA
Moodys Branch Formation	TEMB
Naheola Formation	TLNA
Nanafalia Formation	TENA
Fearn Springs Member	TEFM
Paleozoic rocks	Y
Pascagoula Formation	TMPA
Fort Adams Member	TMFM
Homochitto Sand	TMHM
lower part	TMLM
Paynes Hammock Sand	TMPH
Pleistocene	QG
Pleistocene-Pliocene	AQ
Pleistocene-Recent	QB
Pliocene	TP
Porters Creek Clay, Tippah Sand Lentil	TLTL
Matthews Landing Marl Member	TLMM
Pottsville Formation	N6PO
Quaternary alluvium	Q-OA
Quaternary deposits	Q-OD
Quaternary sand, undifferentiated	Q-1S
Quaternary sand and gravel, undifferentiated	Q-1G
Quaternary terraces, undifferentiated	Q-OT
Recent alluvium	QROA
Recent terrace deposits	QROT
Ripley Formation	K3RI
Chiwapa Member	K3CM
McNairy Sand Member	K3SM
Coon Creek Tongue	K3KM
Selma Group	K3SG
Sparta Sand	TESS
upper part	TEST
middle part	TESX
lower part	TESB
Tallahatta Formation	TETA
Neshoba Sand Member	TEJM
Basic City Shale Member	TETM
Meridian Sand Member	TEMM
Tertiary	T
Tertiary-Quaternary	A
Tuscahoma Formation	TETU
Tuscaloosa Group	K3TG
Unnamed Group (Eutaw and McShan Formations)	K32G
Upper Wilcox aquifer	TEUW
Upper Cretaceous	K3
Upper Tuscaloosa	K3TU
Vicksburg Group	TØVG
Wilcox Group	TEWG
Winona-Neshoba aquifer	TEWN
Winona Sand	TEWS
Yazoo Clay, Cocoa Sand Member	TECM
Zilpha Clay	TEZC

SUMMARY OF PUMPING TESTS IN COVINGTON COUNTY

WELL NO.	OWNER	DATE	DEPTH FT	AQUI-FER	AQUI-FER THICK-NESS FT	SCREEN LENGTH FT	PUMP. PERIOD HRS	TEST YIELD GPM	SPEC. CAPA-CITY GPM/FT 1-DAY	TRANS-MISSI-BILITY GPD/FT	PERMEA-BILITY GPD/FT2	STOR. COEF.	TRANS-MISS-IVITY FT2/D	HYDR. CON-DUCT-IVITY FT/D
F002	COLLINS	5-67	217	TMUM	100	60	5	435	22	37000	370	.0004	4900	49
F003	COLLINSWOOD PRO	5-67	741	TMCA			1	740	37	80000			10000	
F005	COLLINSWOOD PRO	2-67	164	TMCA	100		4	711		17000	170	.0003	2200	22
K001	SEMINARY	N-66	249	TMCA	95	67	2	351	29	80000	840		10000	110
N001	SANFORD	4-66	802	TMMZ	43	30	1	111		25000	580		3300	77

SUMMARY OF PUMPING TESTS IN DE SOTO COUNTY

NO TESTS

SUMMARY OF PUMPING TESTS IN FORREST COUNTY

WELL NO.	OWNER	DATE	DEPTH FT	AQUI-FER	AQUI-FER THICK-NESS FT	SCREEN LENGTH FT	PUMP. PERIOD HRS	TEST YIELD GPM	SPEC. CAPA-CITY GPM/FT 1-DAY	TRANS-MISSI-BILITY GPD/FT	PERMEA-BILITY GPD/FT2	STOR. COEF.	TRANS-MISS-IVITY FT2/D	HYDR. CON-DUCT-IVITY FT/D
A023	HATTIESBURG C C	3-65	752	TMCA	50		4	84	7.3	27000	540		3600	72
B017	HATTIESBURG	1-65	607	TMCA	80		9	995	9.7	48000	600	.0003	6400	80
D001	HATTIESBURG AP	6-42	194	TMHA	100	30	3	297	24	120000	1200	.0001	16000	160
D004	HATTIESBURG	4-64	485	TMCA	130	50	12	1030	40	170000	1300		22000	170
D005	HATTIESBURG	4-64	678	TMCA	80	50	11	1050	13	30000	370	.0001	4000	50
D029	E FORREST UTIL	N-62	134	O-OA	100	31	12	750		200000	2000	.0006	26000	260
D038	HERCULES POWDER	9-65	687	TMCA	105	96	8	1016	7.5	15000	140		2000	18
D039	COASTAL CHEM CO	5-65	353	TMCA	150	40	2	483	5.7	70000	460		9300	62
D042	PALMERS CROSSNG	3-66	642	TMCA	216	42	2	285	20	110000	500	.0002	14000	68
D045	CENTRAL UTILITY	4-66	694	TMCA	90	40	1	206	12	39000	430		5200	57
D046	CENTRAL UTILITY	4-66	672	TMCA	90	40	1	252	11	39000	430	.0002	5200	57
G014	CAMP SHELBY	5-43	402	TMHA	86	80	73	550	29	70000	810	.0004	9300	100
G016	CAMP SHELBY	5-43	409	TMHA		80	26	532	19	70000			9300	
G022	CAMP SHELBY	5-43	404	TMHA	83	80	31	522	26	69000	830		9200	110
H006	PAUL B JOHNSON	1-68	330	TMHA	47	20	1	80	4.7	34000	720		4500	96
L017	BROOKLYN W A	5-66	580	TMHA	170	40	1	240	22	230000	1300		30000	180
M035	CARNES UTILITY	0-70	820	TMCA	70	40	2	145		36000	510		4800	68

CERCLA
SECTION

CHARACTERIZATION OF AQUIFERS DESIGNATED AS POTENTIAL DRINKING-WATER SOURCES IN MISSISSIPPI

U. S. GEOLOGICAL SURVEY
WATER RESOURCES INVESTIGATIONS
OPEN-FILE REPORT 81-550

Prepared in cooperation with the
MISSISSIPPI DEPARTMENT OF NATURAL RESOURCES
BUREAU OF POLLUTION CONTROL

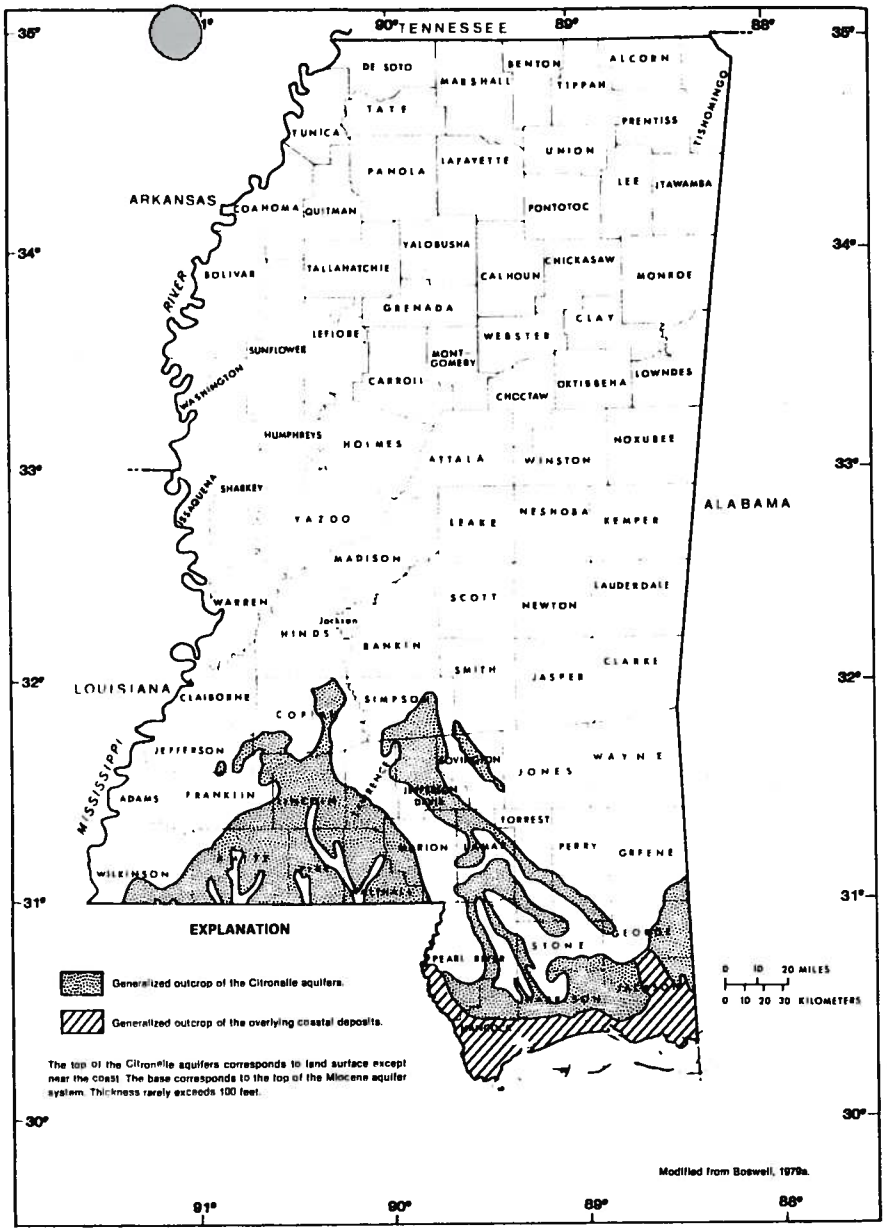


Figure 8. — Outcrop of the Citronelle aquifers and overlying coastal deposits.

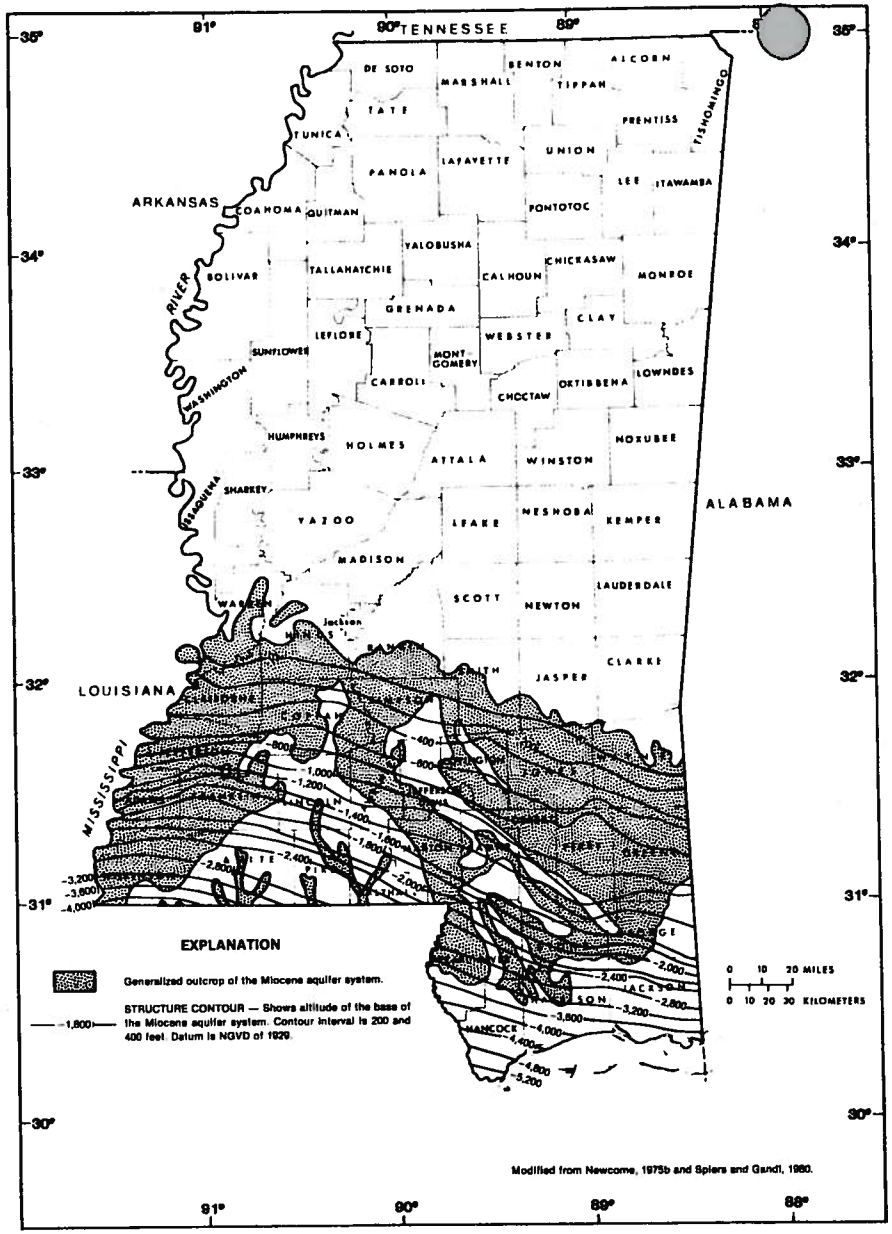


Figure 9. — Configuration of the base of the Miocene aquifer system.

the Pascagoula and Hattiesburg Formations, and the Catahoula Sandstone. Because of their interbedded nature, the formations cannot be reliably separated and correlated either on the surface or in the subsurface. The formations dip southwestward at 30 to 100 ft/mi and the dip steepens towards the coast. The aquifer system thickens as the dip steepens (fig. 10), and the thickness exceeds 3,000 feet near the coast. Within that 3,000 feet, the sand beds alone are over 1,000 feet thick, although the deepest beds do not contain freshwater (fig. 11).

The shallowest sands of the Miocene aquifer system are water-table aquifers, but the deeper sands are confined and are fully saturated. Water levels in the Miocene aquifers vary, but usually range from a few feet above land surface to 100 feet below land surface. Water levels have been regionally declining by 1 to 2 ft/yr, although the decline is greater near some centers of pumpage.

Recharge to the Miocene aquifers is from rainfall directly on the outcrop, seepage from the overlying Citronelle Formation, and leakage between aquifer units of the Miocene aquifer system.

Water movement is downdip, towards center of pumpage, and between aquifers of the system. The underlying Oligocene formations and in particular the clay of the Bucatunna Formation prevents movement between the Miocene and Oligocene aquifer systems.

The Miocene aquifers are a very prolific source of ground water. Aquifer test results have indicated transmissivity values averaging 13,000 ft^2/d. Hydraulic conductivities determined from the tests average 95 ft/d, and specific capacities are as high as 30 (gal/min)/ft of drawdown (Newcome, 1975b).

Wells in the Miocene usually tap only the upper aquifers because abundant water is available at shallow depths. Much freshwater in the deeper aquifers is available but undeveloped. The aquifers are utilized for small domestic wells and large municipal and industrial wells.

Water in the Miocene aquifers commonly is a soft sodium-bicarbonate type. Excessive iron is found in samples from some locations, but this is at places due to corrosion of pipes. Downdip near the coast, water in the deeper sand beds is saline (fig. 11). However, freshwater may be available on the offshore islands at estimated depths as great as 2,200 feet below sea level in some places.

The shallow Miocene aquifers have been contaminated in places by improperly sealed surface disposal sites and by leakage from disposal sites in the overlying Citronelle Formation (Boswell, 1979a). The deepest Miocene aquifer, the Catahoula Sandstone, is used for brine disposal in Adams, Wilkinson, and Hancock Counties (Bicker, 1972).

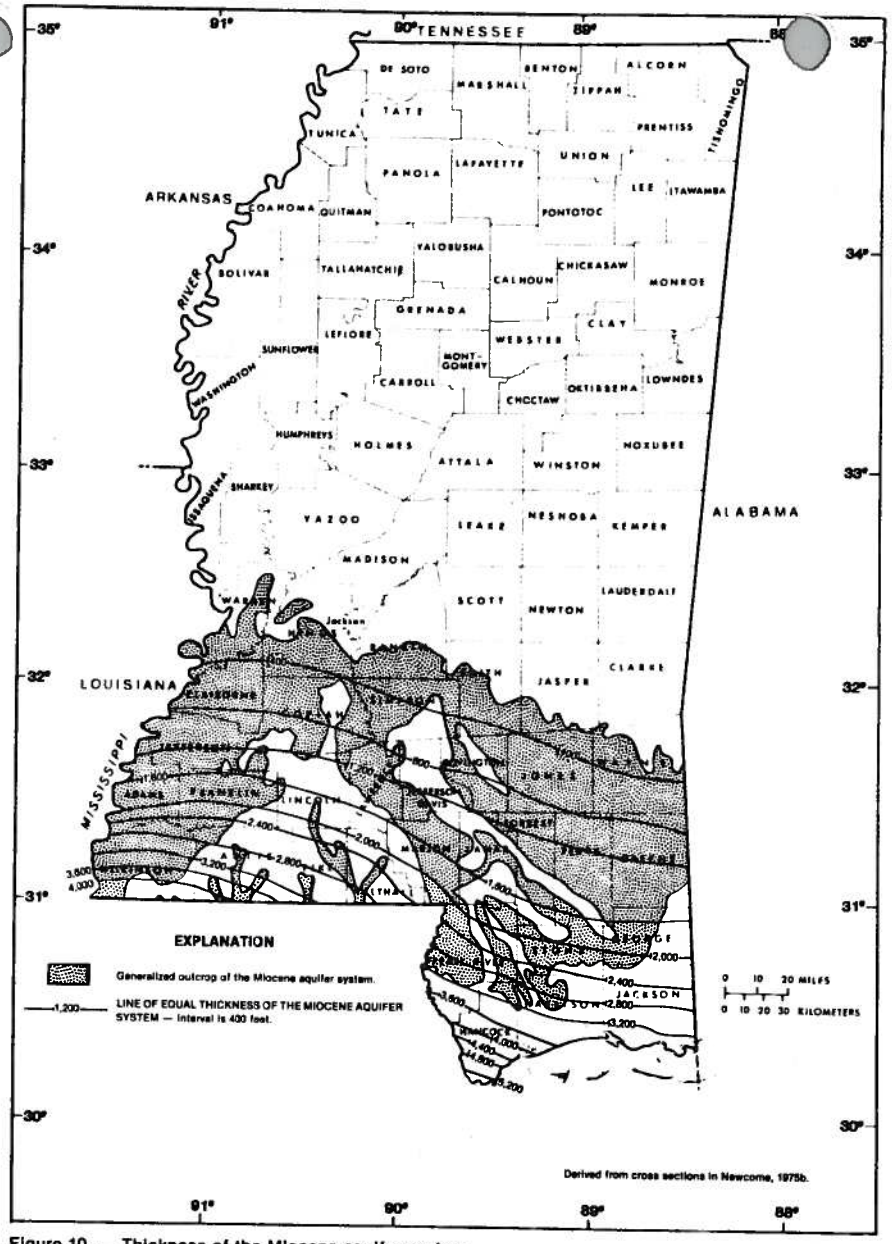


Figure 10. — Thickness of the Miocene aquifer system.