This map of the potentiometric surface of the Pleistocene aquifers of southern Louisiana shows generalized contours of water-level elevations for 1980. The map was prepared as part of the Gulf Coast Regional Aquifer-System Analysis study (Grubb, 1984). Most water-level measurements used in compiling the map were made in 1980; however, in parts of the State where water levels from 1980 were unavailable and where evidence indicated little change in water levels, some measurements from as early as 1961 were used. In areas where water-table conditions occur and the streams control ground-water levels, land-surface contours were used to define the water-level contours near the streams.

The Pleistocene deposits in southern Louisiana consist of alternating beds of sand, gravel, silt, and clay deposited under fluvial, deltaic, and near-shore marine conditions. The deposits range from 0 to approximately 200 feet in thickness along the northern edge of the mapped area. Water in the sand and gravel is confined in places, but water-table conditions commonly occur near streams. The deposits thicken southward, and the sand and gravel may be divided into two or more distinct beds by intervening clay layers. Average grain size of the sand and gravel decreases southward. Artesian conditions prevail in the southern part of the mapped area. The alluvium of the Mississippi River, which cuts into the older Pleistocene deposits, is not treated as a separate aquifer in the mapped area because of the lithologic and hydrologic similarity and the good hydraulic connection between the alluvium and the older Pleistocene deposits.

Several names have been applied to the Pleistocene aquifers within the mapped area. Those names in most common use are shown in table 1. The names in each column are arranged from youngest at the top to oldest at the bottom. Horizontal alignment across the table indicates general relative age and position and does not necessarily imply age equivalence.

The regional flow in the Pleistocene aquifers is primarily southward and ground-water gradients vary. Gradients average 6 to 8 feet per mile in unstressed locations and range up to 15 feet per mile in and near pumping centers such as Baton Rouge. The lowest gradients occur across the Atchafalaya River basin in south-central Louisiana. The aquifers are heavily pumped in the Baton Rouge, Lake Charles, and New Orleans metropolitan areas and in the rice-irrigation area of southwestern Louisiana. Areally definable cones of depression resulting from heavy pumpage in these regions affect the regional flow direction.

Water levels differ vertically within the Pleistocene aquifers in some areas, especially where layers of clay separate sand or gravel beds within the aquifer and pumpage from individual beds differs. Significant vertical water-level differences occur in the regions of heavy pumpage. Where vertical water-level differences exist, the lowest water levels in the vertical section were chosen because these levels usually represent the thickest and most heavily pumped unit in the aquifer. The map provides a good representation of regional water levels in the Pleistocene aquifers, but additional data are needed for analysis of local conditions near pumping centers.

SELECTED REFERENCES

Buono, Anthony, 1983, The Southern Hills regional aquifer system of southeastern Louisiana and southwestern Mississippi: U.S. Geological Survey Water-Resources Investigations 83-4189, 38 p.

Cardwell, G. T., Bollin, J. R., and Long, R. A., 1963, Basic ground-water data for the Mississippi River parishes south of Baton Rouge, Louisiana: Louisiana Department of Public Works, 5 p.

Cone, H. L., III, 1979, Ground-water resources of Washington Parish, Louisiana: Louisiana Department of Transportation and Development, Office of Public Works Water Resources Technical Report 18, 33 p.

Dial, D. C., 1983, Ground-water data for the Mississippi River Parishes in the Greater New Orleans area, Louisiana: Louisiana Department of Transportation and Development, Office of Public Works Water Resources Basic Records Report 11, 47 p.

Grubb, H. F., 1984, Planning report for the Gulf Coast Regional Aquifer-System Analysis in the Gulf of Mexico coastal plain, United States: U.S. Geological Survey Water-Resources Investigations 84-4219, 30 p.

Jones, P. H., Turcan, A. N., Jr., and Skibitzke, H. E., 1954, Geology and ground-water resources of southwestern Louisiana: Louisiana Department of Conservation Geological Bulletin 30, 285 p.

Morgan, C. O., 1963, Ground-water resources of East Feliciana and West Feliciana Parishes, Louisiana: Louisiana Department of Public Works, 58 p.

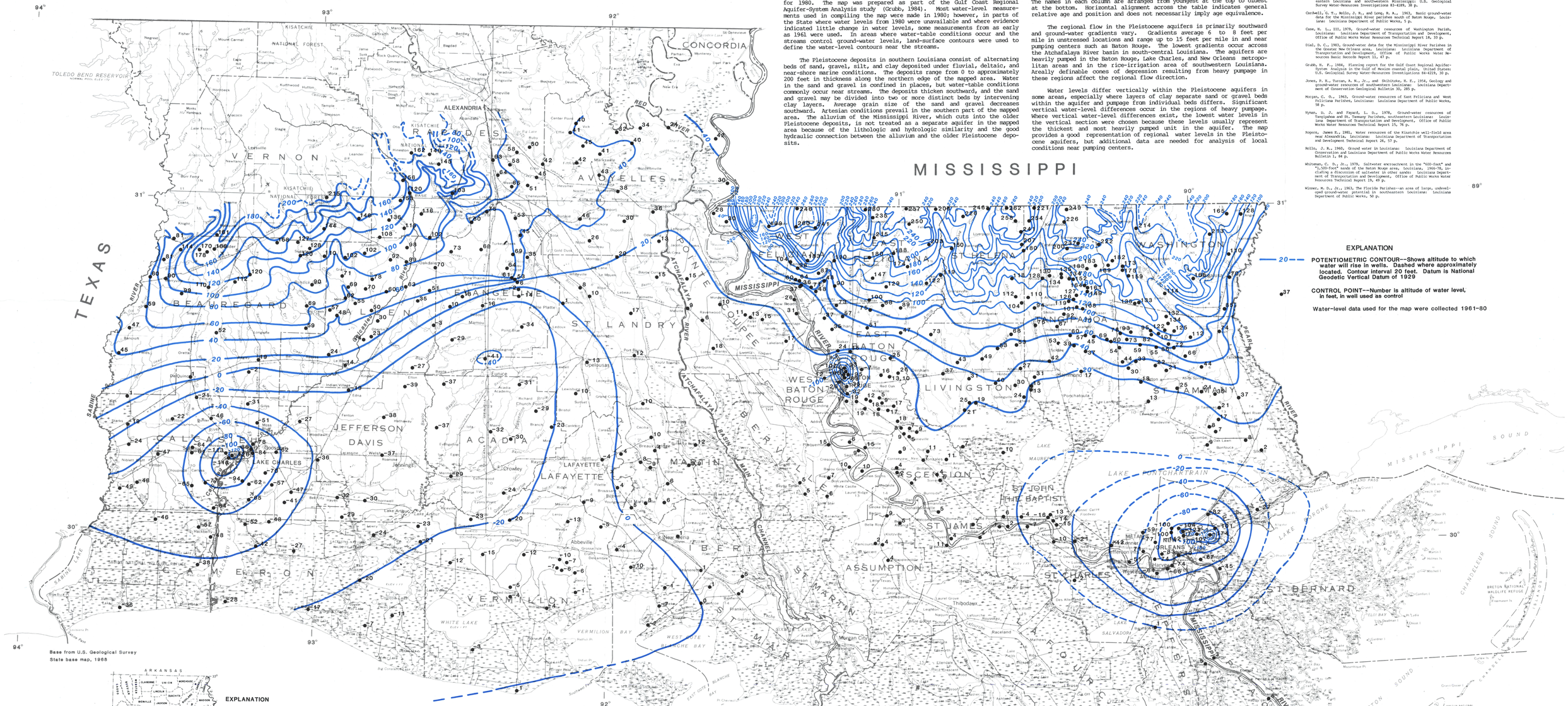
Nyman, D. J. and Fayard, L. D., 1978, Ground-water resources of Tangipahoa and St. Tammany Parishes, southeastern Louisiana: Louisiana Department of Transportation and Development, Office of Public Works Water Resources Technical Report 15, 76 p.

Rogers, James E., 1981, Water resources of the Kisatchie well-field area near Alexandria, Louisiana: Louisiana Department of Transportation and Development Technical Report 26, 57 p.

Rollo, J. R., 1960, Ground water in Louisiana: Louisiana Department of Conservation and Louisiana Department of Public Works Water Resources Bulletin 1, 84 p.

Whiteman, C. D., Jr., 1979, Saltwater encroachment in the "600-foot" and "1,500-foot" sands of the Baton Rouge area, Louisiana, 1966-78, including a discussion of saltwater in other sands: Louisiana Department of Transportation and Development, Office of Public Works Water Resources Technical Report 19, 49 p.

Winner, M. D., Jr., 1963, The Florida Parishes--an area of large, undeveloped ground-water potential in southeastern Louisiana: Louisiana Department of Public Works, 50 p.



Base from U.S. Geological Survey
State base map, 1968

Hydrology modified from D.J. Nyman and L.D. Fayard (1978); D.C. Dial (1983)

EXPLANATION

POTENTIOMETRIC CONTOUR--Shows altitude to which water will rise in wells. Dashed where approximately located. Contour interval 20 feet. Datum is National Geodetic Vertical Datum of 1929

CONTROL POINT--Number is altitude of water level, in feet, in well used as control

Water-level data used for the map were collected 1961-80

Index map

Table 1.--Aquifer names applied to deposits of Pleistocene age in southern Louisiana

Central Louisiana and northern southeast Louisiana		Southwest Louisiana: Lake Charles area	Mississippi River flood plain	Baton Rouge area	River parishes between Baton Rouge and New Orleans	New Orleans area	North of Lake Pontchartrain
Upland terrace deposits	Chicot aquifer: Shallow sand	"200-foot" sand	Mississippi River alluvium and Atchafalaya aquifer	"400-foot" sand	Shallow sands: Gramercy aquifer, Norco aquifer, Gonzales-New Orleans aquifer	Shallow aquifer, Gramercy aquifer, Norco aquifer, Gonzales-New Orleans aquifer	Shallow aquifer ("100-foot" sand at Bogalusa)
	Chicot aquifer: Upper	"500-foot" sand	Older deltaic deposits	"600-foot" sand	Older deltaic deposits	"1,200-foot" sand	Upper Pontchatoula aquifer
	Chicot aquifer: Lower	"700-foot" sand					

GENERALIZED POTENTIOMETRIC SURFACE OF AQUIFERS OF PLEISTOCENE AGE, SOUTHERN LOUISIANA, 1980

By Angel Martin, Jr. and Charles D. Whiteman, Jr.

1985