

**EXPLANATION**

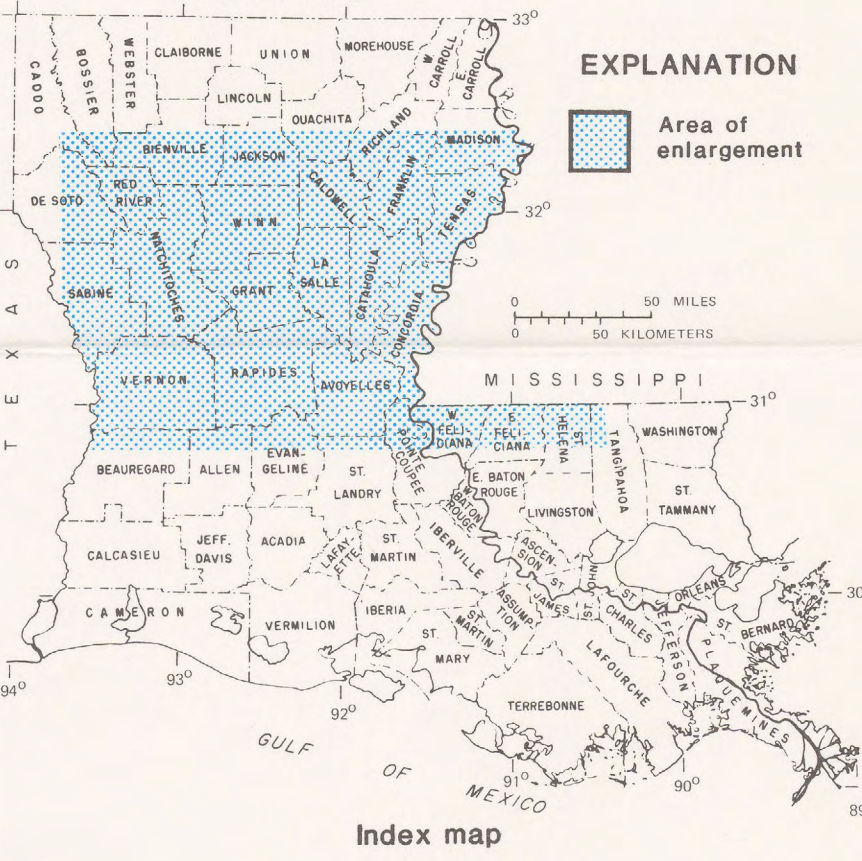
OUTCROP OF THE CATAHOULA AQUIFER

OUTLIER OF TERRACE DEPOSITS

POTENTIOMETRIC CONTOUR--Shows altitude to which water will rise in tightly cased wells. Dashed where approximately located. Contour interval 20 feet. Datum is sea level.

CONTROL POINT --Top number is altitude of potentiometric surface, in feet above sea level. Bottom number is depth of well, in feet below land surface.

Water-level data are largely from 1980, but data from 1961-82 were used for areas where 1980 data were unavailable and evidence indicated little change.

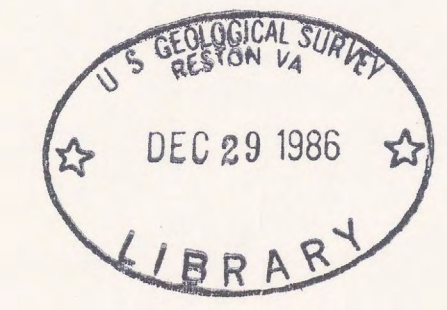
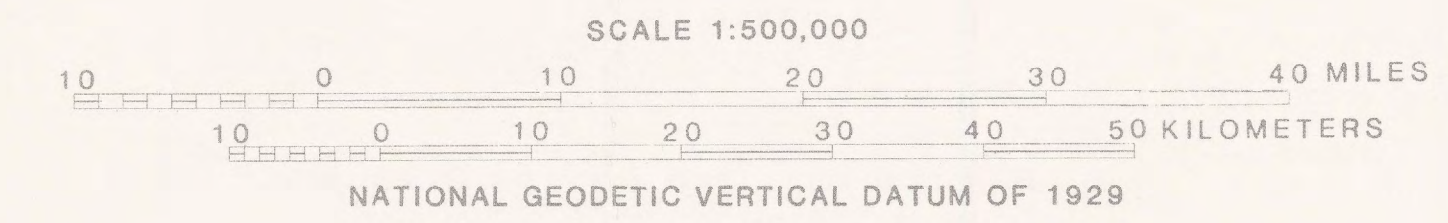


**EXPLANATION**

Area of enlargement

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

Hydrology modified (Smoot, C.W., U.S. Geological Survey, written commun., 1985) Geology from Geologic Map of Louisiana, 1984, Louisiana Geological Survey



GENERALIZED POTENTIOMETRIC SURFACE OF THE CATAHOULA AQUIFER IN CENTRAL LOUISIANA, 1980

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1986

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C282m  
c.1

WR 86-4059

SELECTED REFERENCES

This map shows generalized contours of the altitude of water-levels in wells completed in the Catahoula aquifer in central Louisiana. 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 level, some measurements from as early as 1961 and as late as 1982 were used.

The Catahoula aquifer comprises the permeable beds of the Catahoula Formation (Veatch, 1906), the oldest exposed beds of Oligocene and Miocene age in Louisiana. The Catahoula Formation consists of alternating and interfingering beds of sand, silt, and clay deposited under predominantly non-marine conditions in the outcrop area and under deltaic, littoral, and near-shore marine conditions elsewhere. Many of the beds are surfaceless. The Catahoula Formation overlies the predominantly marine clays and silts of the Vicksburg and Jackson Groups. Sand beds in the Catahoula Formation, although generally unconsolidated in the subsurface, are typically cemented to form ledges of friable white sandstone at their outcrop. Induration of the sand beds causes the Catahoula Formation to be more resistant to erosion than the clays of the underlying Vicksburg and Jackson Groups, so outcrops of the Catahoula Formation typically form hills and ridges rising above stream valleys that cut into the softer underlying clays.

The Catahoula Formation crops out in a band across north-central Louisiana from the Sabine-Werner Parish line on the west to Sicily Island, Catahoula Parish on the east, and continues northeastward beneath the alluvium of the Mississippi River to the eastern boundary of the State in Tensas Parish. The outcrop band is broken by deposits of alluvium in the valleys of the Red, Little, and Ouachita Rivers. In Grant, La Salle, and Catahoula Parishes, thin veneers of terrace deposits of Quaternary age cover the Catahoula Formation in the upland areas between the major stream channels. The Catahoula Formation dips southward to southeastward at about 50 to 70 feet per mile in the outcrop area, with the dip increasing in the subsurface to approximately 100 feet per mile near the southern edge of the mapped area.

Sands of the Catahoula Formation typically are white to light gray and range from coarse to fine-grained. The sands are discontinuous, lenticular, and interbedded with silts and clays. Few of the sand beds can be traced far either in the outcrop areas or in the subsurface. Because the individual sands are not areally extensive, they have not been given aquifer names; instead, all of the permeable sands and the associated clay units within the Catahoula Formation are referred to as the Catahoula aquifer.

The regionally extensive clays of the Vicksburg and Jackson Groups in the mapped area south of the outcrop area, the calcareous clays of the Lena Member of Fisk (1940) of the Fleming Formation form an upper confining layer over most of the mapped area south of the outcrop-subcrop band of the Catahoula aquifer. Beneath the upland areas, within the outcrop-subcrop band, water-table conditions commonly are unconsolidated in the upper part of the aquifer. The lower part of the aquifer beneath the upland areas and the disconformities of the aquifer beneath the alluvium are generally under artesian conditions.

Ground-water levels in and near the outcrop areas fluctuate 2 feet or less yearly and no significant long-term declines have occurred. This is shown by the hydrograph of observation well Sa-287 (fig. 1). The slow downward trend in water-level altitude since early 1976 shown by the hydrograph of well R-879 (fig. 1) may be caused by pumping from the Catahoula aquifer by a rural water system approximately 3 miles away.

Recharge to the Catahoula aquifer occurs by rainfall on the upland outcrop-subcrop areas. Much of the water entering the aquifer in the uplands is discharged along nearby streams; springs and seeps are common where sands are cut by streams draining the upland areas. Water that is not discharged locally to streams moves downgradient toward discharge areas at lower altitudes to the south and beneath the major river valleys. Water flowing southward in the aquifer between the stream valleys is discharged by leakage upward through the upper confining layer to the overlying younger sediments. The water-level contour pattern shows that the valleys of the Mississippi, Ouachita, Little, Red, and Sabine Rivers are discharge areas for the Catahoula aquifer. The ground-water mound in northern Catahoula Parish occurs at Sicily Island, an erosional remnant of the uplands to the west. The rainfall recharges the Catahoula aquifer through a thin cap of terrace deposits and moves downward to discharge in the surrounding alluvium.

Saltwater occurs throughout the Catahoula aquifer downgradient from the outcrop area. The approximate limit of freshwater" line on the map indicates the downgradient limit of water with a concentration of chloride less than 250 milligrams per liter; the line was determined using water-quality data and analysis of resistivity curves from geophysical well logs. The presence of saltwater beneath the major stream valleys confirms the flow pattern indicated by the water-level contours--flow from the uplands to discharge areas along the edges of the valleys, with little down-valley or across-valley flow. Freshwater at the eastern edge of the map is the western edge of a large area of freshwater in the Catahoula aquifer of central Mississippi.

Water from the Catahoula aquifer is used for municipal, industrial, and domestic purposes. Total pumping from the aquifer in Louisiana was slightly over 1.1 million gallons per day in 1980. Local cones of depression result from pumping just east of Jackson in Vernon Parish and northwest of Jonesville in Catahoula Parish.

The map was prepared as part of the Gulf Coast Regional Aquifer-System Analysis study (Grubb, 1984).

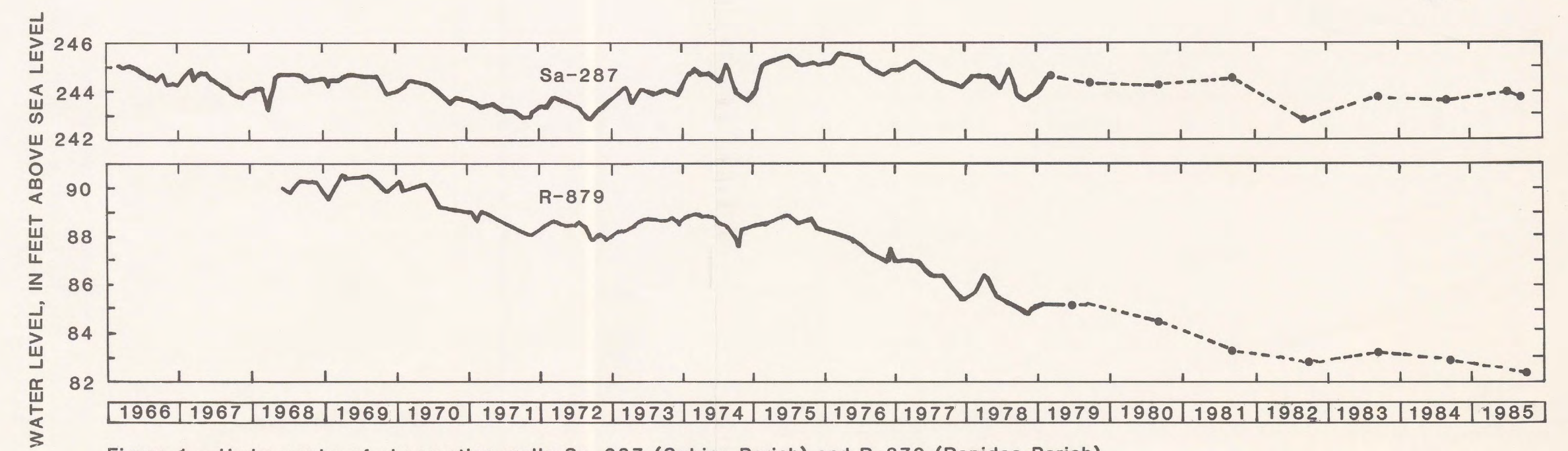


Figure 1.--Hydrographs of observation wells Sa-287 (Sabine Parish) and R-879 (Rapides Parish).

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1980  
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