

Table 3.--Selected chemical analyses of water from the Eutaw-McShan aquifer

INTRODUCTION

A study of the hydraulic characteristics of an aquifer is useful in designing wells and for predicting the effects of pumping on either the pumped well or other wells in the vicinity. Specific-capacity graphs (fig. 7) are useful in planning pump settings and discharge if water-level data are available. Pumping rates and well spacing can be approximated by use of time-discharge-discharge graphs (fig. 8) prepared using methods described by Lohman (1972).

GEOLOGY

The dissolved-solids concentration in water in the Eutaw-McShan aquifer is low in the outcrop area and increases as the water moves down the dip (fig. 9 and table 3). In Tishomingo and Itawamba Counties the water is slightly acidic, a calcium-sodium bicarbonate type, and generally contains less than 100 mg/l (milligrams per liter) of dissolved solids. In sections in which the water is under artesian pressure, it changes to a sodium-chloride bicarbonate type as distance from the outcrop increases. The Eutaw-McShan aquifer is used extensively as a source of water in areas where the dissolved-solids concentration exceeds 500 mg/l and to some extent where the concentration exceeds 1,000 mg/l. In these areas the Eutaw-McShan is the shallowest source of ground water.

Water in the Tombigbee Sand Member, a unit characterized by very low hydraulic conductivity, generally is more highly mineralized than water in the underlying beds. Much of the recharge area of the Tombigbee Sand Member occurs at low altitudes and the combination of low hydraulic conductivity and small head differences (low hydraulic gradient) has prevented thorough "flushing" of the saline water from the aquifer.

Fluoride occurs in water in the aquifer in every county in the area. The higher concentrations occurred in samples from deep wells in the western and southern parts of the area.

WATER USE

POTENTIAL FOR FUTURE DEVELOPMENT

The Futaw-McShan aquifer is used as a source of water in most of the areas where its dissolved-solids concentration is less than 1,000 mg/l, and in some areas where the concentration is 1,000 to 1,500 mg/l (of dissolved solids). Future development of the aquifer is restricted to those areas where the dissolved-solids concentration is less than 500 mg/l because elsewhere the underlying Tuscaloosa aquifer system is capable of higher yields to wells and the water is of better quality. Development of the Futaw-McShan to the optimum will require redistribution of the concentrated withdrawals at Aberdeen, Tupelo, and West Point, and judgment in the selection of sites for new large water supplies. New public and industrial water-supply wells in the Tupelo and West Point areas are being sited away from the present centers of development. Development of the water supply now augmented by a well field that was constructed for an industry during World War II about 5 mi (8 km) west of the city.

Based on a study of the water resources of Lee County the potential yield of the Bataw-McShan aquifer in the county was estimated as about 9 m³/d (2.4 m³/s) under the specified conditions (Wasson and Thomson, 1970, pp. 42-43). Using the same criteria, the potential yield of the aquifer in Mississippi has a potential yield of about 40 Mgal/d (1.5 m³/s). The present withdrawal from the aquifer is about 18 Mgal/d (0.7 m³/s). The present withdrawal is about 45% of the potential yield that could be increased by about 22 Mgal/d (0.96 m³/s).

An indication of the need for management of the water resources of the Bataw-McShan aquifer is evident from the fact that the public and industrial wells in operation in 1975 had a combined capacity of about 10 Mgal/d (0.4 m³/s) if operated at full capacity. Wells in Lee County alone can produce about 16 Mgal/d (700 l/s).

HYDROLOGY

The most favorable areas for new withdrawals from the Rutaw-McShan aquifer are eastern Pontotoc and Chickasaw Counties, western Lowndes and Monroe Counties, central and western Clay County, and eastern Oktibbeha County. Geologic sections (figs. 10-16) and a map showing the thickness and distribution of the aquifer (fig. 17) are included. This report provides a guide for use in planning new water-supply developments in the aquifer. The geologic sections illustrate the thickness and lithology of the aquifer. The contour map provides data for estimating the maximum depth of the aquifer—assuming that the altitude of the site is known.

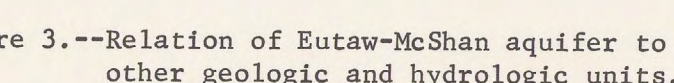
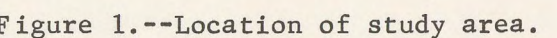


Figure 2.--Area of outcrop and configuration of the top of the Eutaw-McShan aquifer.

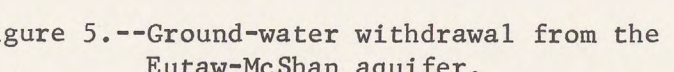


Figure 4.--Areas where the Eutaw-McShan aquifer overlies the Tuscaloosa Group or Paleozoic rocks.

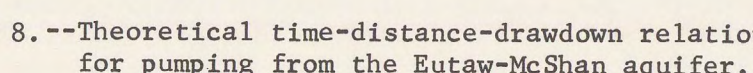


Figure 7.--Transmissivity-specific capacity relation for a fully efficient well.

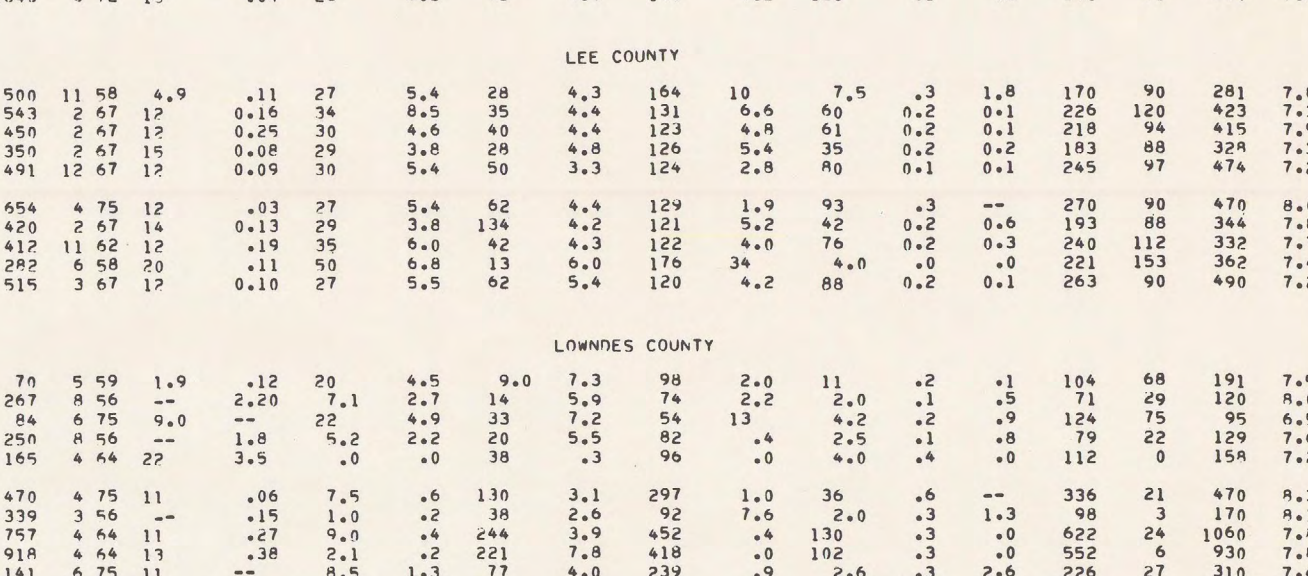


Figure 6.--Water-level trends in observation wells in the Eutaw-McShan aquifer.

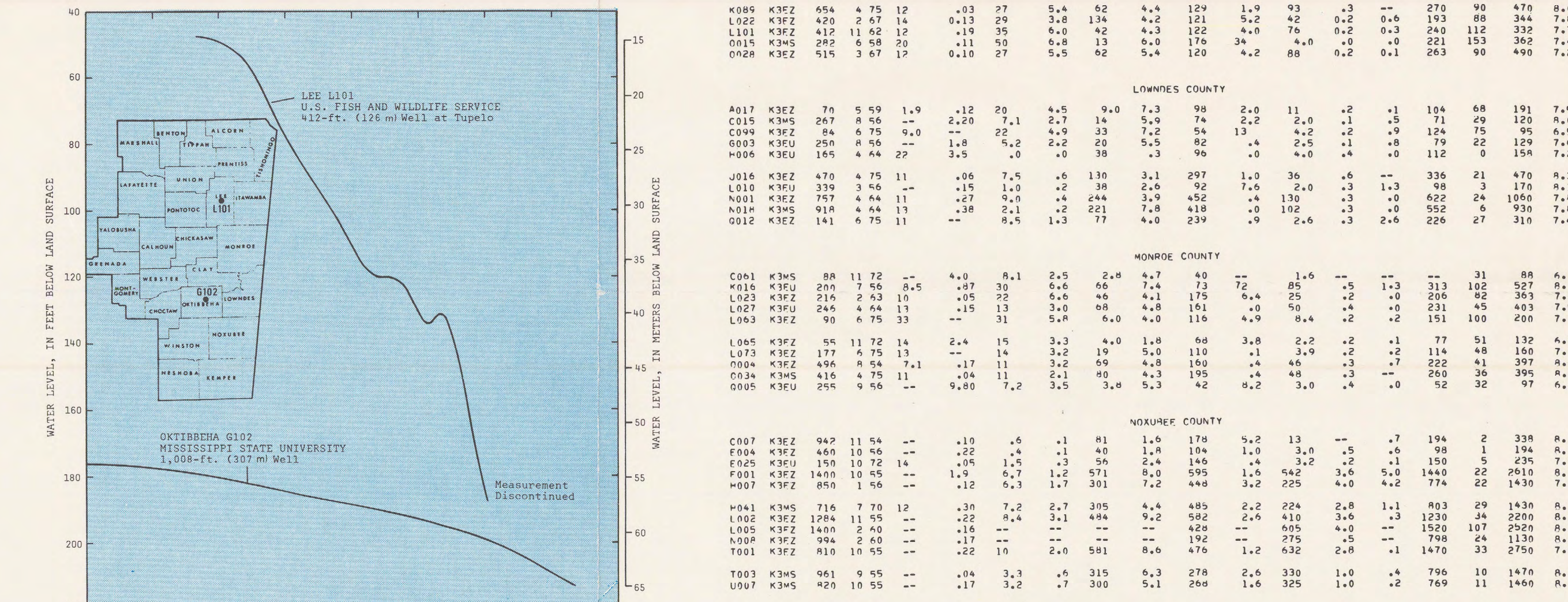


Figure 5.--Ground-water withdrawal from the Eutaw-McShan aquifer.

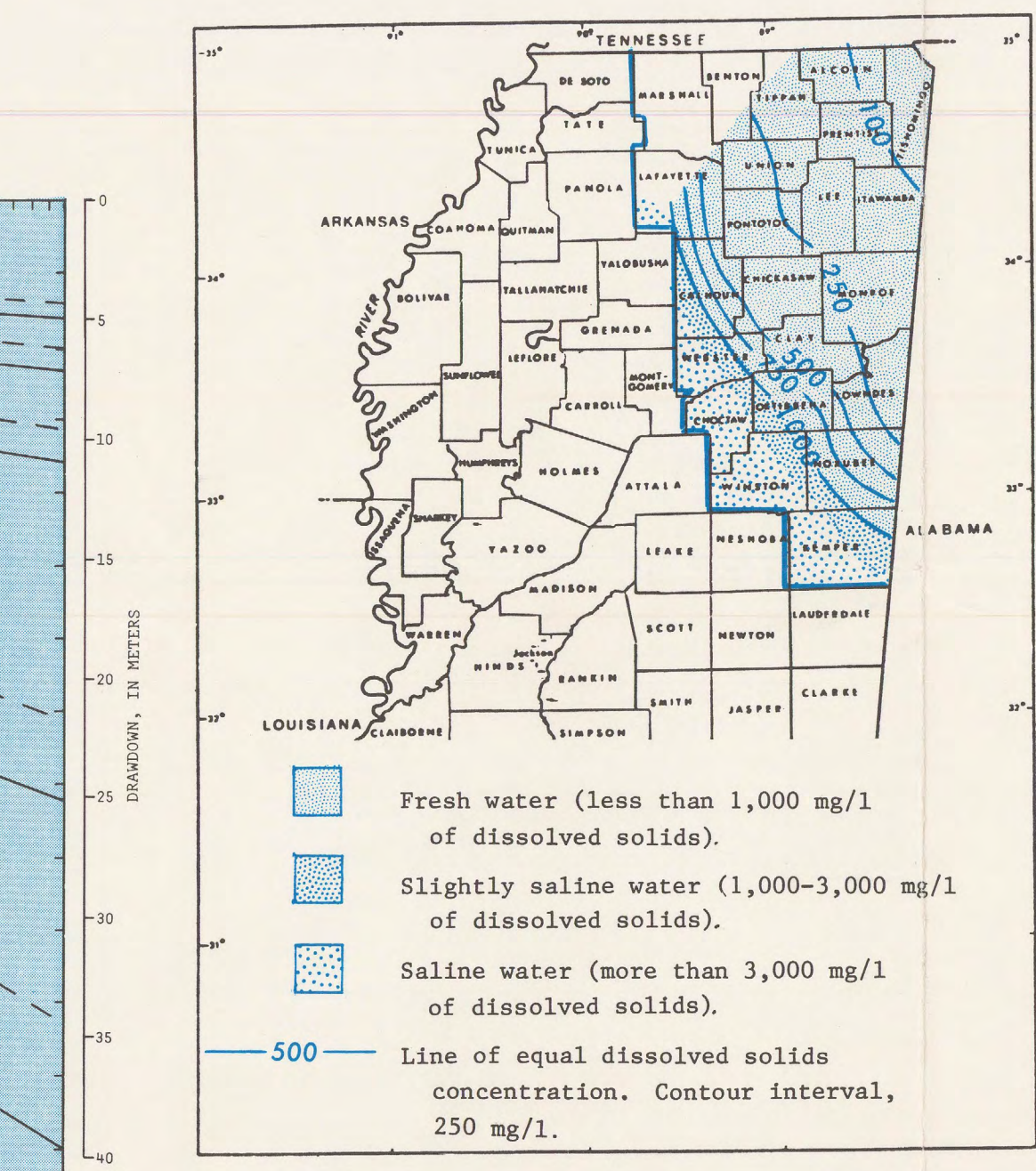


Figure 9.--Areal distribution of fresh, slightly saline, and saline water in the Eutaw-McShan aquifer in the area of study.

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