DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

HYDROLOGIC INVESTIGATIONS
ATLAS HA-711-K (SHEET 1 OF 4)

INDEX MAP

EXPLANATION

- Outcrop area of Ozark aquifer
- Subsurface area of the Ozark aquifer
- Outcrop area of rocks comprising geohydrologic units older than Ozark aquifer

Geologic contact—Contact between aquifer and older geohydrologic units also is boundary for water type in aquifer

Approximate boundary of Ozark Plateaus aquifer system

Water type boundary—Dashed where approximately located. Water type boundaries are based on sparse data that can be interpreted differently

NA **Water type**[1]—Major chemical constituents are shown using the following symbols:

	calcium	magnesium	sodium	mixed cation
bicarbonate	CA	MA	NA	XAC,M,N)
chloride	CC	MC	NC	C(C,M,N)
sulfate	CS	MS	NS	CS(C,M,N)
mixed anion	CX(A,C,S)	MX(A,C,S)	NX(A,C,S)	XX

A two-letter code is used to designate the cation and anion that are present in concentrations (in milliequivalents per liter) as large as 50 percent. If a cation or anion is not present in a concentration as large as 50 percent, the species is designated by X and the cation or anion existing in the largest concentration is listed as a third symbol. Thus, XAN indicates a bicarbonate-type water with no cation concentration as large as 50 percent, but sodium present in the largest concentration.

Control point[1]

[1]Control points beyond the approximate boundary of the Ozark Plateaus aquifer system are for units stratigraphically equivalent to those that comprise the Ozark aquifer.

INTRODUCTION

The Ozark aquifer is a thick sequence of water-bearing dolostone, limestone, and sandstone of latest Cambrian through Middle Devonian age that is widely used as a source of water throughout the Ozark Plateaus province (index map). The Ozark aquifer is the largest of three aquifers that form part of the Ozark Plateaus aquifer system. The aquifer was studied as part of the Central Midwest Regional Aquifer-System Analysis (CMRASA; Jorgensen and Signor, 1981), a study of regional aquifer systems in the midcontinent United States that includes parts of 10 States. Because of its significance as a source of freshwater in parts of Missouri, Arkansas, Kansas, and Oklahoma, a subregional project was established to investigate the Ozark Plateaus aquifer system in more detail than the regional study could provide.

The geologic and hydrologic relation between the Ozark Plateaus aquifer system and other regional aquifer systems of the Midwest is presented in Jorgensen and others (in press). The relation of the Ozark aquifer to the Ozark Plateaus aquifer system is explained in Imes [in press (a)]. A companion publication, Imes [1990 (b)], contains contour maps of the altitude of the top, thickness, and potentiometric surface of the Ozark aquifer. This report contains maps that show water type and concentrations of dissolved solids, chloride, and sulfate in water from the Ozark aquifer. Most of the data from which these maps are compiled is stored in the CMRASA hydrochemical data base (R.B. Leonard, U.S. Geological Survey, written commun., 1986). Data for Oklahoma were also taken from data published by Havens (1978). The maps in this report on the Ozark subregion may contain small differences from maps in other CMRASA publications because the criteria for data selection may be different and the subregional maps may contain additional data. However, regional trends in these maps are consistent with other maps published as part of the regional project.

WATER TYPE

Water type is determined by the relative concentrations of major cations (calcium, magnesium, and sodium) and anions (bicarbonate, chloride, and sulfate) in the water. Water-type maps can contain general information on the chemical evolution of ground water as it moves through the rock matrix. Several factors collectively determine the distribution and concentration of chemical constituents in ground water. The more significant factors include the concentration of carbon dioxide in the infiltrated water as it reaches the water table and enters the ground-water flow system, the minerals present in each of the various lithologic units encountered along the ground-water flow path, the order in which ground water encounters the lithologic units, and the residence time of the ground water in each rock unit.

Because the Ozark aquifer is the thickest and most permeable of the three aquifers that comprise the Ozark Plateaus aquifer system, most municipal, agricultural, and domestic wells in the study area are completed in the Ozark aquifer. The chemical composition of water in the Ozark aquifer mainly results from dissolution of dolostone and limestone. The most common water type in the Ozark aquifer is calcium bicarbonate or mixed calcium magnesium bicarbonate with calcium as the most prevalent cation. The north-central part of the Salem Plateau (index map) contains a large area in which the water type is magnesium bicarbonate. Water that is of a mixed cation bicarbonate type, with either magnesium or calcium predominant, forms a transition zone between many of the areas that contain calcium bicarbonate or magnesium bicarbonate water. Most of the calcium bicarbonate water in the Salem Plateau contains a substantial percentage of magnesium.

Along the western and southern flanks of the Ozark Plateaus province are small areas in which the water type is sodium bicarbonate or mixed sodium calcium bicarbonate. These water types are indicative of a transition between the predominately bicarbonate freshwater of the Ozark Plateaus aquifer system and the predominately sodium chloride water of regional aquifer systems that encircle the Ozark Plateaus aquifer system to the west, south, and east.

Water-quality data not available

Water-quality data not available

Base from U.S. Geological Survey
State base maps, 1:500,000; Arkansas, 1967; Kansas, 1983; Missouri, 1973; Oklahoma, 1972

SCALE 1:750 000

25 0 25 50 75 100 MILES
25 0 25 50 75 100 KILOMETERS

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Water type

WATER TYPE AND CONCENTRATION OF DISSOLVED SOLIDS, CHLORIDE, AND SULFATE IN WATER FROM THE OZARK AQUIFER IN MISSOURI, ARKANSAS, KANSAS, AND OKLAHOMA

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