DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE
MISSOURI GEOLOGICAL SURVEY AND WATER RESOURCES

HYDROLOGIC INVESTIGATIONS
ATLAS HA-372 (SHEET 1 OF 4)

PHYSICAL SETTING

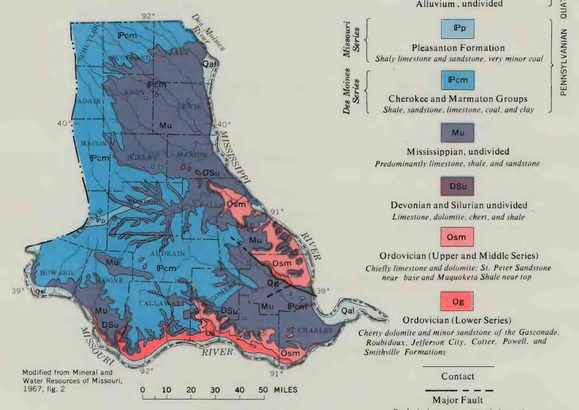
INTRODUCTION

THE PURPOSE OF THIS ATLAS IS TO PRESENT A GENERAL SUMMARY OF INFORMATION CONCERNING THE AVAILABILITY, DISTRIBUTION, AND QUALITY OF WATER IN NORTHEASTERN MISSOURI.

In addition, a definition of the problems and possibilities related to the development of the water resources of the area is presented.

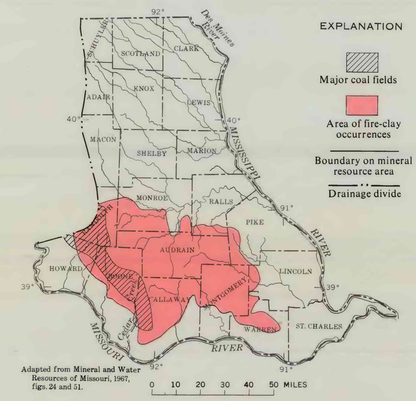
This is the first of a series of atlases planned for the State of Missouri. The investigation was made in cooperation with the Missouri Geological Survey and Water Resources. Information and assistance was also provided by many individuals, public utilities, and private industries in the area and by representatives of other States and Federal agencies.

The nomenclature used in this atlas follows that of the U.S. Geological Survey and the Missouri Geological Survey and Water Resources. However there are some variations from the current usage of the Missouri Geological Survey.



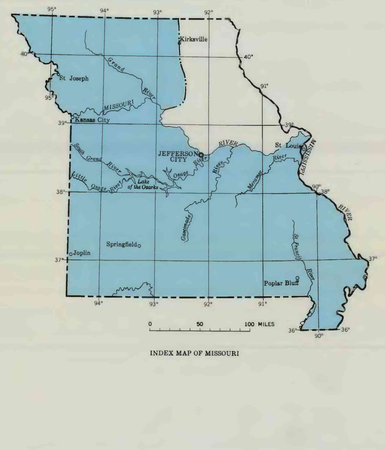
Modified from Mineral and Water Resources of Missouri, 1967, fig. 2

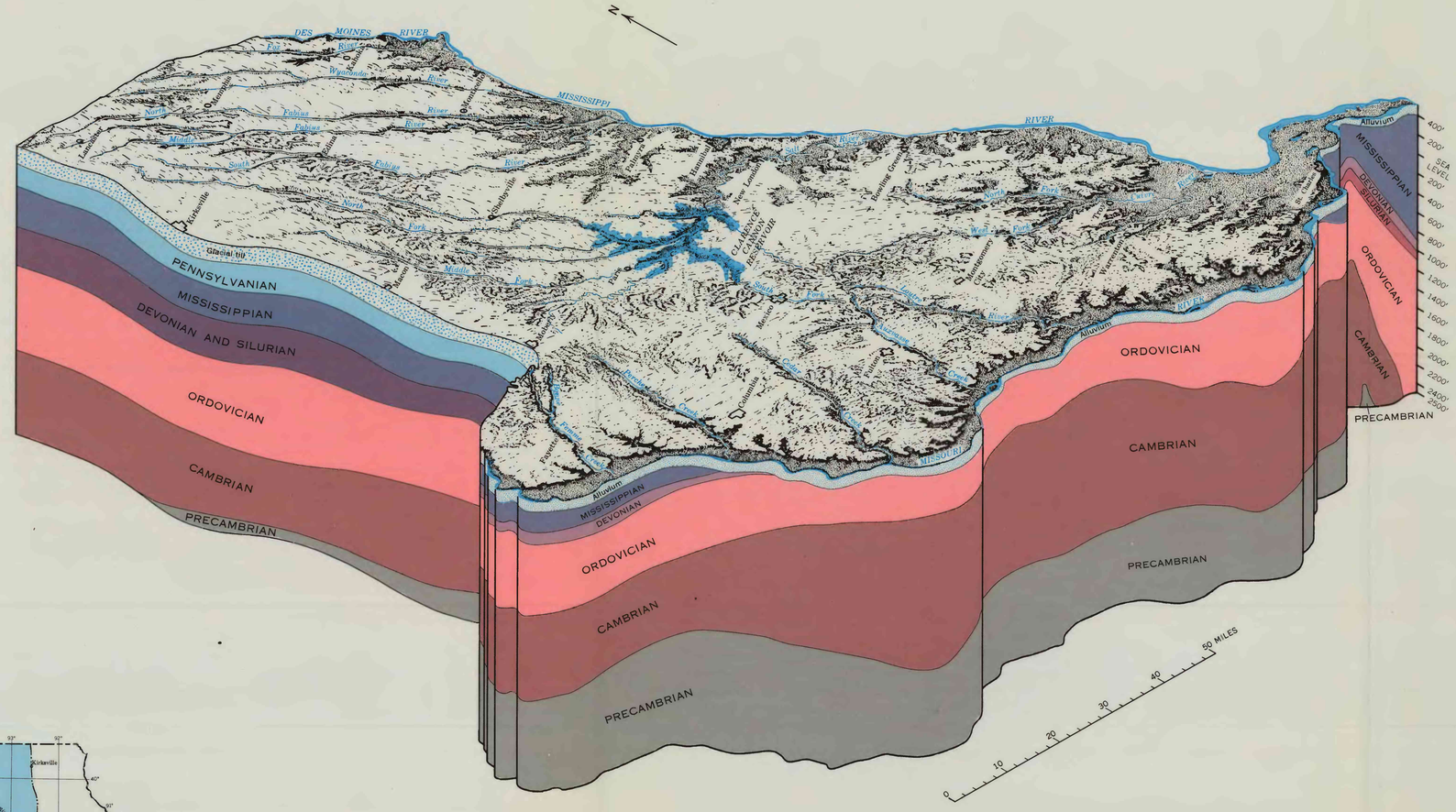
APPROXIMATELY 90 PERCENT OF THE AREA IS UNDERLAIN BY PENNSYLVANIAN AND MISSISSIPPIAN BEDROCK.—*Water movement into and through the Pennsylvanian bedrock is slow. Areas near the Mississippi and Missouri Rivers underlain by Mississippian and older rocks, however, contain numerous sinks, caves, and springs. These features indicate a comparatively rapid movement of ground water, especially in the vicinity of the major fault in the southeastern part of the area.*



Adapted from Mineral and Water Resources of Missouri, 1967, figs. 24 and 51.

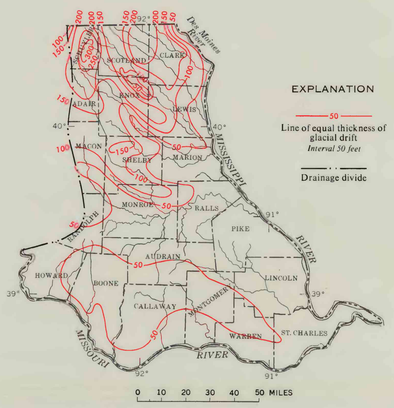
MINING OF MINERAL RESOURCES CAN AFFECT THE WATER RESOURCES OF AN AREA.—*Acid drainage from coal-mining areas has resulted in fish kills on Cedar Creek. Abandoned strip-mined areas are potential sites for water-based recreation.*



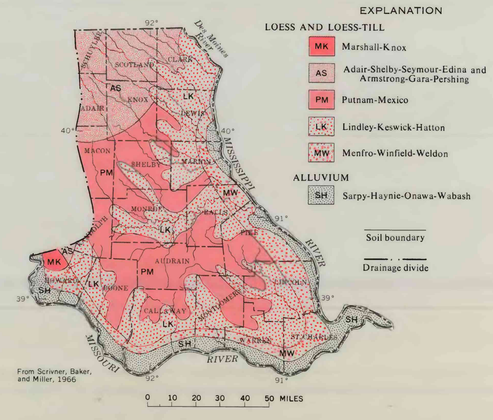


THE LAND SURFACE IN NORTHEASTERN MISSOURI IS GENTLY UNDULATING WITH GREATEST RELIEF NEAR THE MISSISSIPPI AND MISSOURI RIVERS AND THEIR PRINCIPAL TRIBUTARIES.

Land surface altitudes range from 1000 feet in the northwestern part of the area to 120 feet in the southeastern part. The principal drainage is toward the southeast into the Mississippi River and south into the Missouri River. Glacial till, and loess (which mantle most of the area) have modified the relief resulting from the differential erosion of the various rock types. The relatively flat, upland plains have been developed into a primarily agricultural economy. Although most towns are relatively small, several major industries are located along the Mississippi and Missouri Rivers where convenient water supplies are available from both the rivers and their alluvial valleys. Clarence Cannon Reservoir on the Salt River, a multiple-purpose reservoir scheduled for completion in 1975, will have a total storage capacity of 1,428,000 acre-feet to be allocated for flood control, power, water supply, and inactive storage.



THICKNESS OF GLACIAL DRIFT RANGES FROM LESS THAN 50 FEET IN THE SOUTHERN PART OF THE AREA TO 300 FEET IN THE NORTHWESTERN PART.



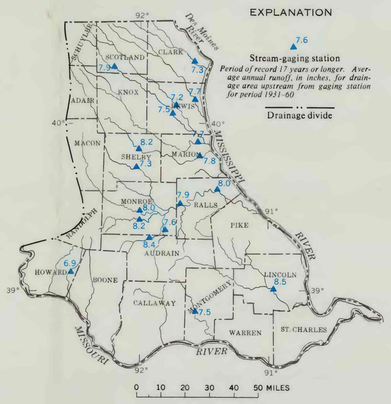
From Scrivner, Baker, and Miller, 1966

MOST SOILS WERE DERIVED FROM LOESS OR GLACIAL TILL.—*The Adair, Edina, Armstrong, Putnam, and Mexico soils that occur in the upland plains are underlain by clayey subsoils and have only moderate to very slow permeabilities, which together with the relatively level topography of much of the area, results in drainage problems during rainy seasons. The water-storage potential of these soils is only moderate, and crop yields may be reduced during moderately dry seasons because of water shortages. The Lindley, Keswick, and Hatton soils generally occupy the steeply sloping areas between the upland plains and the river bluffs. These soils are generally low in fertility and normally support either forests or pasture. The Menfro, Winfield, and Weldon soils occupy the bluff area along the Mississippi and Missouri Rivers and generally have high water-storage capacities. The fertility of these soils ranges from low to high, but steep slopes with resulting erosion limit the agricultural use of the land. The Sarpy and associated soils are bottom-land soils composed of either loamy sand, silt, or clay. The good to rapid permeability and high fertility of these soils make the land valuable as cropland.*

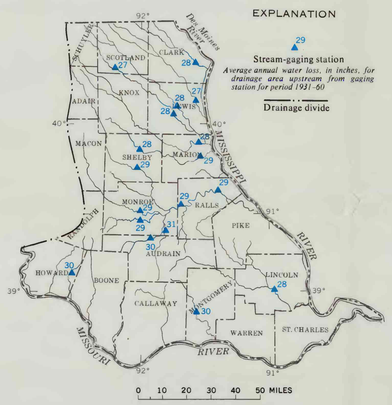
THE WATER SYSTEM

WATER BUDGET

Precipitation
36.1 inches



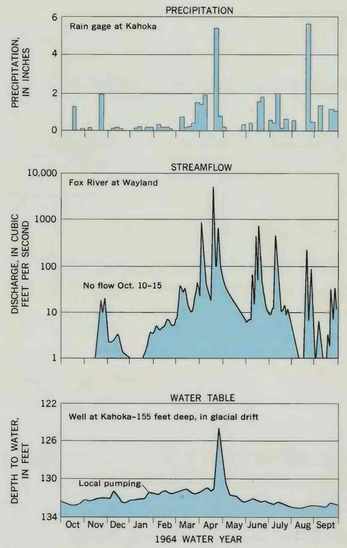
Runoff
7.8 inches



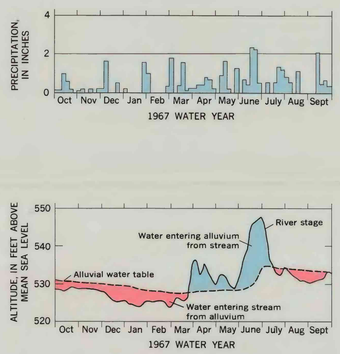
Water Loss
28.3 inches

APPROXIMATELY 22 PERCENT OF THE AVERAGE ANNUAL PRECIPITATION APPEARS AS STREAMFLOW AND THE REMAINING 78 PERCENT IS LOST PRIMARILY TO EVAPOTRANSPIRATION.—*Approximately 5 percent of the average annual precipitation, however, may escape from basins in the southwestern part of the area as subsurface flow. Long-term change in storage is assumed zero.*

HYDROLOGIC RELATIONSHIPS



PRECIPITATION DURING THE SUMMER MONTHS, WHEN EVAPOTRANSPIRATION AND SOIL-MOISTURE REQUIREMENTS ARE GREATEST, IS SEEN TO HAVE LESS EFFECT ON STREAMFLOW AND THE WATER TABLE THAN DOES PRECIPITATION DURING THE SPRING.



THE RELATIONSHIP OF PRECIPITATION, STREAMFLOW, AND WATER TABLE SHOWN FOR THE MISSOURI RIVER AT JEFFERSON CITY, IS TYPICAL OF THE RELATIONSHIP EXISTING ALONG THE MISSOURI AND MISSISSIPPI RIVERS.—*Similar relationships exist along other streams in northeastern Missouri where relatively broad, deep alluvial deposits are found adjacent to the streams.*

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WATER RESOURCES OF NORTHEASTERN MISSOURI

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Missouri Geological Survey and Water Resources

1971

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