

FIGURE 1.—BEDROCK GEOLOGIC SYSTEMS.



FIGURE 2.—PHYSIOGRAPHIC DIVISIONS AND LIMIT OF GLACIATION.

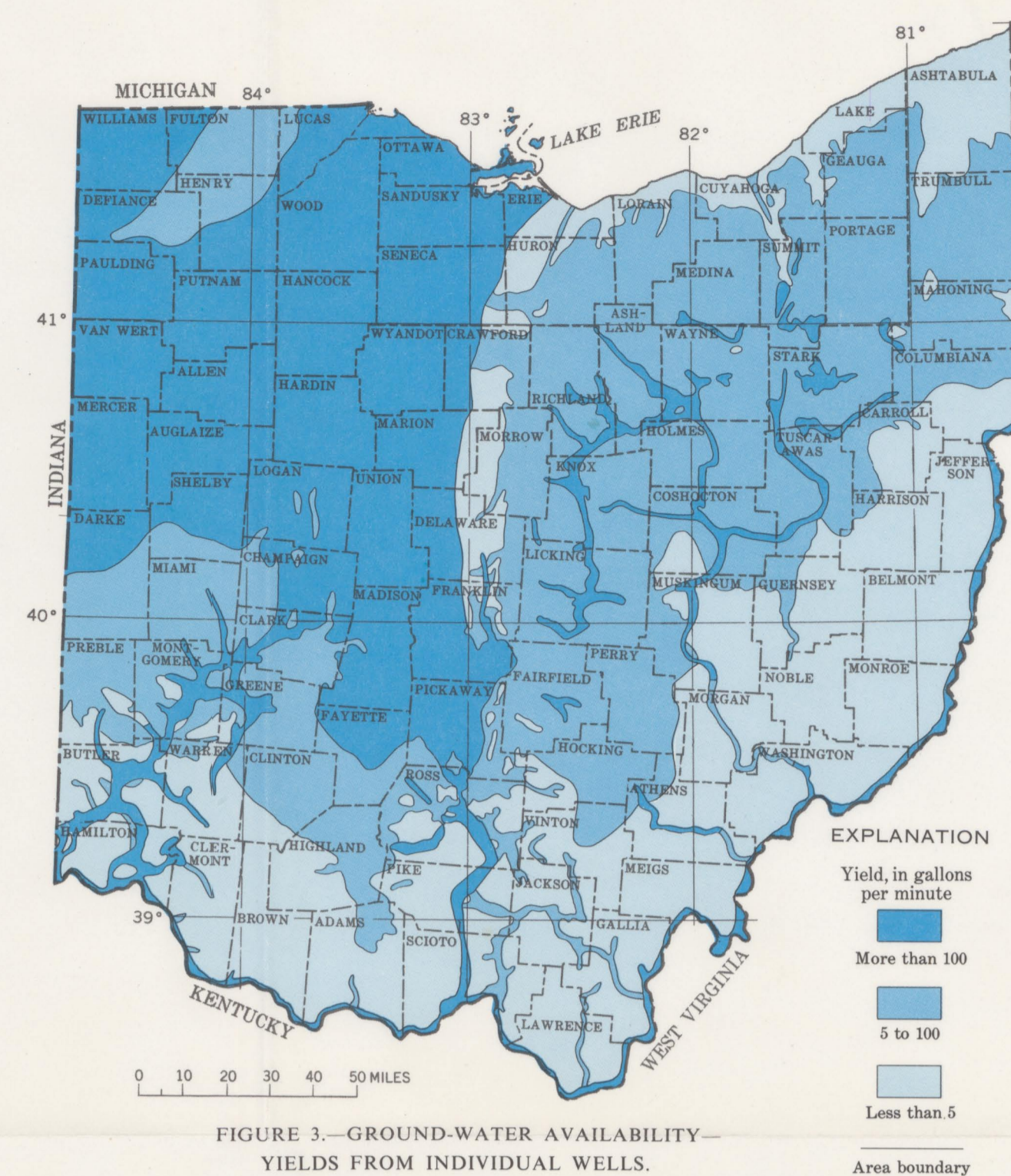


FIGURE 3.—GROUND-WATER AVAILABILITY—  
YIELDS FROM INDIVIDUAL WELLS.

TABLE 1.—ROCK UNITS USED IN MAPPING  
THE BASE OF POTABLE WATER IN OHIO.

Table listing rock units such as Pennsylvania: Monongahela Formation, Onondaga Formation, etc., and their corresponding symbols and colors.

TABLE 2.—CHEMICAL ANALYSES OF WATER NEAR THE BASE OF THE POTABLE ZONE.

Large data table with columns for well number, aquifer composition, geographic age, date of sampling, temperature, siliceous matter, iron, manganese, calcium, magnesium, sodium, potassium, bicarbonate, sulfate, chloride, fluoride, nitrate, dissolved solids, hardness as CaCO3, specific conductance, pH, and color.

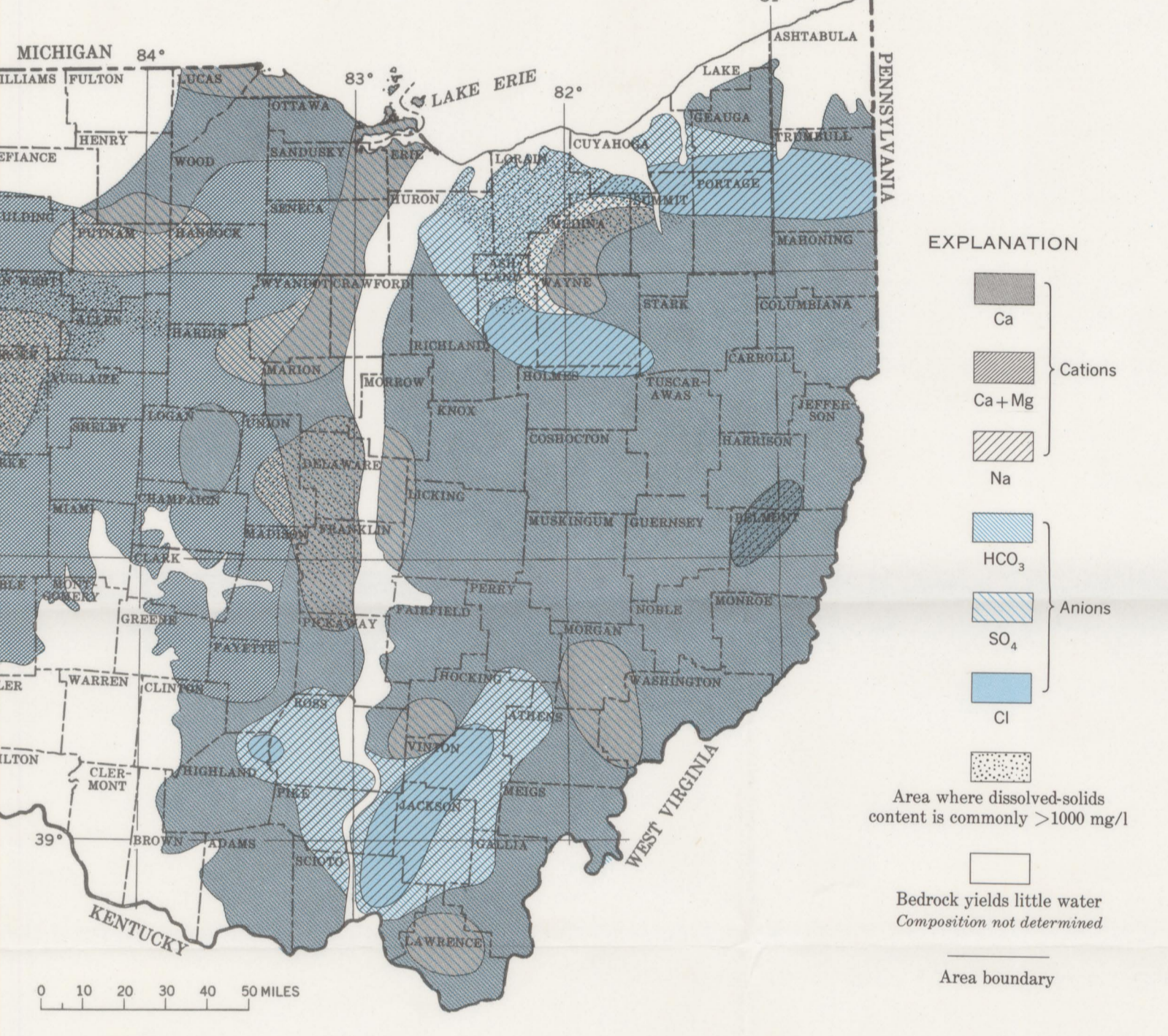


FIGURE 4.—CHEMICAL CHARACTER OF WATER IN BEDROCK  
NEAR THE BASE OF THE POTABLE ZONE.

INTRODUCTION

Recent advances in desalting techniques have enhanced the water-supply potential of saline aquifers, especially in areas where only meager supplies of fresh water are available. Disposal of liquid wastes in saline aquifers is a potentially conflicting use...

Many domestic wells in Ohio yield water with dissolved solids contents considerably in excess of the recommended limits for drinking water. Some of the waters are in the slightly saline category, based on the above classification. That people develop a tolerance for such water is evidenced by the fact that more than 100 public water supplies in the United States have a dissolved-solids content of 2,000 mg/l (milligrams per liter) or more (U.S. Public Health Service, 1962, p. 33).

STANDARDS OF POTABILITY

Standards recommended by the Federal Water Pollution Control Administration (1968, p. 18-20) for raw water to be used for drinking purposes are essentially the same as those recommended by the U.S. Public Health Service (1962) for drinking water subject to Federal regulation. Limits for constituents pertinent to this study are as follows:

Table showing recommended limits in milligrams per liter for Chloride (250), Iron (3), Manganese (0.05), Nitrate (45), Sulfate (250), Dissolved solids (500), and water quality classifications (Fresh, Slightly saline, Moderately saline, Very saline) in terms of dissolved solids content.

PHYSICAL SETTING

The bedrocks of Ohio (fig. 1) are consolidated Paleozoic sediments which are essentially horizontal or gently dipping. Western Ohio is underlain by interbedded shales and limestones of Ordovician age and limestone and dolomite of Silurian age. The oldest rocks, of Ordovician age, are exposed in southwestern Ohio as a result of erosion along the top of the north-plunging Cincinnati arch...

PRINCIPAL SOURCES OF POTABLE WATER

The bedrock terrain in Ohio has been significantly modified by continental glaciers which covered about two-thirds of the State (fig. 2) and left deposits of unconsolidated sediments throughout the glaciated region. Except for the featureless lake plains in the north, the glaciated part of Ohio is largely a flat to gently rolling surface of ground moraine marked by belts of more hilly end moraines. At their southernmost limits, the glaciers overrode and modified the northern part of the eroded Appalachian plateau...

APPROXIMATE BASE OF POTABLE WATER

The contour map of the base of potable water in Ohio (sheet 1) is based on chemical analyses of water in deep bedrock wells, and on the geology of the producing aquifer systems. Above the altitude shown by the contours, water of sufficient quantity and acceptable quality can be obtained from aquifers for domestic use. For the purpose of this study, a yield of 1 gpm from individual wells has been set as the arbitrary limit for sufficient quantity, and a dissolved-solids content of 3,000 mg/l has been set as the upper limit of acceptable quality.

APPROXIMATE BASE OF POTABLE WATER (continued)

The aquifer in which the base of potable water is believed to occur is named on the map, and the area of occurrence in that aquifer is outlined by heavy solid lines. The rock units used in preparing the map, and listed in table 1, comprise only a generalized stratigraphic section for the State. Because of the scale of mapping used, it was not practical to include in this study many other minor rock units which may actually contain the base of potable water in places. For this reason, the contours on sheet 1 represent the approximate base of potable water.

GEOGRAPHIC DISTRIBUTION OF WATER TYPES

Figure 4 shows the principal cations and anions in water near the base of the potable zone. In general, the most common anion is bicarbonate. Over most of the State calcium is the predominant cation although the cations are usually a mixture of calcium, magnesium, and sodium.

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SALINE GROUND-WATER RESOURCES OF OHIO

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1970