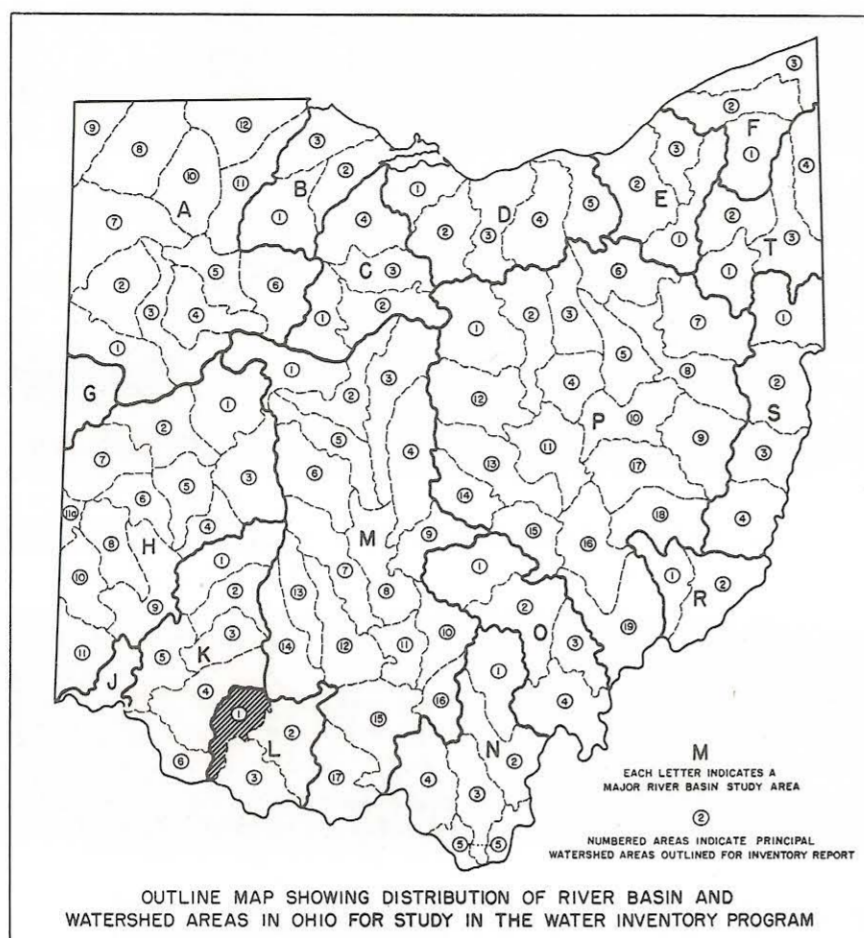


OHIO WATER PLAN INVENTORY
1960

WHITEOAK CREEK BASIN

UNDERGROUND WATER RESOURCES

Prepared by HENRY L. PRÉE, JR., Geologist,
Ohio Division of Water



The amount of water available to wells in any area depends upon the kinds of rocks present in the area and the conditions under which they were deposited. Most rocks contain numerous very small openings, but some are characterized by larger openings, such as joints or crevices. The movement of water through the rocks is dependent upon the size, kind, and number of pores or cracks in the rocks. Crevices or solution channels in limestone and dolomite and joints or bedding planes in shale may be either isolated or connected. If connected, they may permit water to flow from one part of these consolidated rocks to another. Water in the unconsolidated deposits, such as gravel, sand, silt, and clay, occurs in the spaces between the individual grains or fragments. The rate of movement of water through gravel and sand is generally greater than through silt and clay; hence, the water is more readily available to wells.

The geologic formations which occur at or near the surface in the Whiteoak Creek Basin comprise consolidated deposits of limestone, dolomite, and shale, and unconsolidated deposits of gravel, sand, silt, and clay. The generalized stratigraphic sequence summarizes briefly the physical and water-bearing characteristics of the materials.

The yield of water to wells in the Whiteoak Creek Basin is generally small throughout most of the basin except for two areas, - the area north of Sardinia and east of Strausburg and Pricetown, shown in green on the availability map, and the area included within the flood plain of the Ohio River, shown in blue. Water-bearing strata in the northeastern part of the Whiteoak Creek valley yield amounts of water ranging from less than 1 gpm (gallon per minute) to 40 gpm and averaging about 10 gpm. Yields in excess of 5 gpm are available from about one third of the wells in this area on which records are available. These records show that wells in this area average about 100 feet in depth; about 90 per cent of them are finished in limestone.

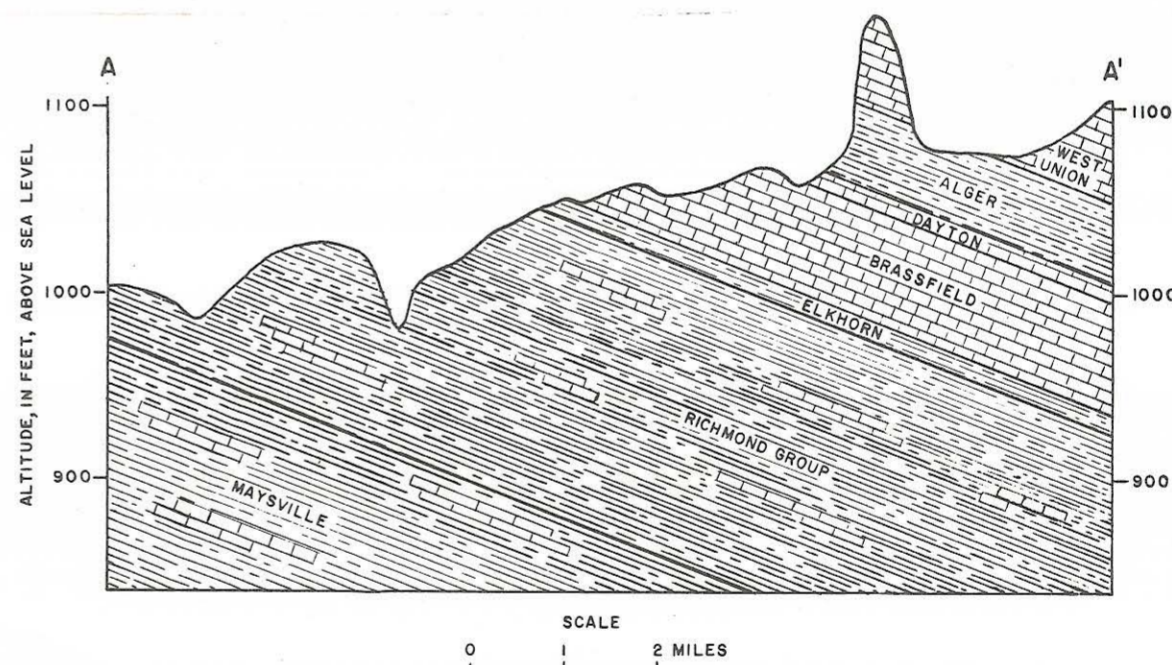
Although most of the wells in the Whiteoak Creek Basin are finished in bedrock, a few of the wells terminate in lenses or stringers of sand and gravel within the less permeable deposits of glacial drift which cover most of the basin. Those wells that are finished above the bedrock do not generally provide more than meager supplies of water, although an occasional well may encounter a lens of sand and gravel from which yields up to 5 gpm may be obtained. Generally, wells must be supplemented by cisterns to provide sufficient water for domestic use in most of this basin.

The accompanying geologic cross-section shows the sequence of eastward-dipping rocks which underlie the northern part of this basin. The youngest rocks which underlie the southern part of the basin belong to the Maysville group, the younger rocks having been removed by erosion.

FILE INDEX
1-1

GENERALIZED STRATIGRAPHIC SEQUENCE OF THE
ROCKS IN WHITEOAK CREEK BASIN

System or Series	Group or Formation	Character of Material	Water-bearing Characteristics
Quaternary	Recent	Clay, silt, sand deposited on flood plains of Ohio River and Whiteoak Creek.	Generally yield only small supplies of water to wells.
	Pleistocene	Thick layers of clay, silt, sand, gravel deposited as glacial outwash.	Yields of as much as 1000 gpm may be obtained from permeable deposits beneath Ohio River flood plain; yields may be increased by induced infiltration from river.
Silurian	Peebles West Union Alger	Dolomite containing shale layers in lower portion.	Not an important source of water because of its lack of thickness and areal extent in this basin.
	Dayton	Light greenish gray limy dolomite.	Little or no water available.
	Brassfield	Massive to thin-bedded limestone with thin shaly partings.	Yields of 5 to 25 gpm may be obtained in northeastern part of basin; yields only small amounts of water in remainder of basin.
	Elkhorn	Soft red to variegated shale.	Not water-bearing.
Ordovician	Richmond	Calcareous shales with thin beds of limestone.	Yields of 5 to 25 gpm may be obtained from thin limestone beds in northeastern part of basin; yields only small amounts of water in remainder of basin.
	Maysville		
	Eden	Calcareous shales with small amount of shaly limestone.	Not water-bearing.
	Utica		
Trenton	Thin-bedded limestone with partings of calcareous shale.	Little or no water is available from these rocks.	



GENERALIZED CROSS SECTION SHOWING GEOLOGY
OF UPPER PART OF WHITEOAK CREEK BASIN

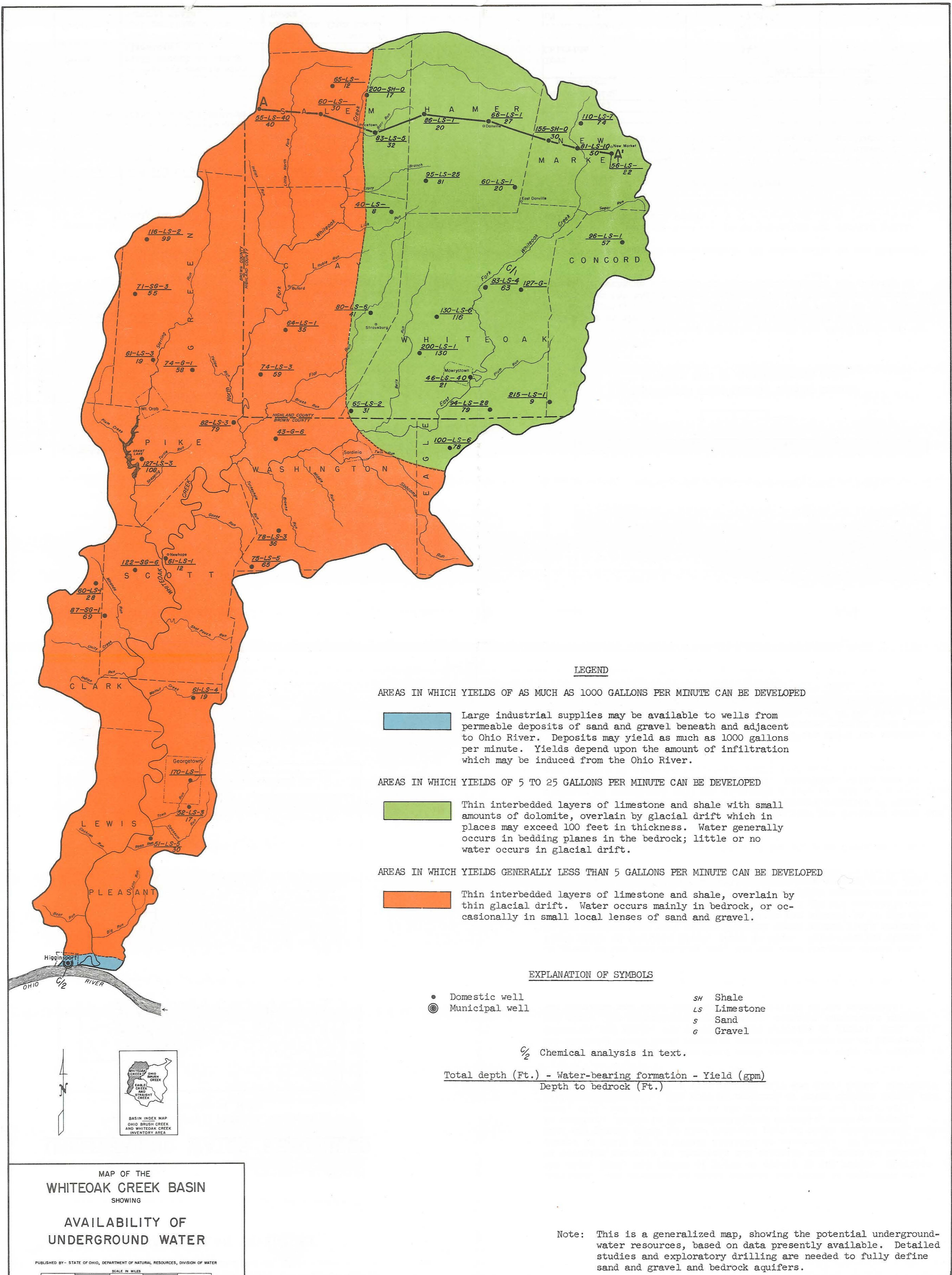
The unconsolidated deposits beneath the flood plain of the Ohio River at the lower end of this basin may yield as much as 1,000 gpm to properly constructed drilled wells. The yields of the deposits depend upon the thickness and areal extent of the sand and gravel, the amount of recharge available to these deposits, and the ability of these materials to transmit water to properly developed wells.

The logs of approximately 150 water wells in the Whiteoak Creek Basin are on file at the Ohio Division of Water. Locations of typical wells are indicated on the accompanying map showing availability of underground water.

QUALITY OF WATER

Partial analyses of water from two wells, - one finished in the limestone bedrock in Taylorsville, and the other finished in the sand and gravel in the Ohio River at Higginsport, - are tabulated below.

Well Number	C-1	C-2
Depth (feet)	83	78
Water-bearing formation	Limestone	Sand and gravel
	Parts per million	
Iron	0.10	0.05
Chloride	14.	6.
Dissolved solids	550.	355.
Total hardness	367.	315.
pH	7.2	7.3



LEGEND

AREAS IN WHICH YIELDS OF AS MUCH AS 1000 GALLONS PER MINUTE CAN BE DEVELOPED

Large industrial supplies may be available to wells from permeable deposits of sand and gravel beneath and adjacent to Ohio River. Deposits may yield as much as 1000 gallons per minute. Yields depend upon the amount of infiltration which may be induced from the Ohio River.

AREAS IN WHICH YIELDS OF 5 TO 25 GALLONS PER MINUTE CAN BE DEVELOPED

Thin interbedded layers of limestone and shale with small amounts of dolomite, overlain by glacial drift which in places may exceed 100 feet in thickness. Water generally occurs in bedding planes in the bedrock; little or no water occurs in glacial drift.

AREAS IN WHICH YIELDS GENERALLY LESS THAN 5 GALLONS PER MINUTE CAN BE DEVELOPED

Thin interbedded layers of limestone and shale, overlain by thin glacial drift. Water occurs mainly in bedrock, or occasionally in small local lenses of sand and gravel.

EXPLANATION OF SYMBOLS

- Domestic well
- ⊙ Municipal well
- SH Shale
- LS Limestone
- S Sand
- G Gravel

$\frac{C}{2}$ Chemical analysis in text.

$$\frac{\text{Total depth (Ft.) - Water-bearing formation - Yield (gpm)}}{\text{Depth to bedrock (Ft.)}}$$

MAP OF THE
WHITE OAK CREEK BASIN
SHOWING
AVAILABILITY OF
UNDERGROUND WATER

PUBLISHED BY - STATE OF OHIO, DEPARTMENT OF NATURAL RESOURCES, DIVISION OF WATER
SCALE IN MILES

Note: This is a generalized map, showing the potential underground-water resources, based on data presently available. Detailed studies and exploratory drilling are needed to fully define sand and gravel and bedrock aquifers.