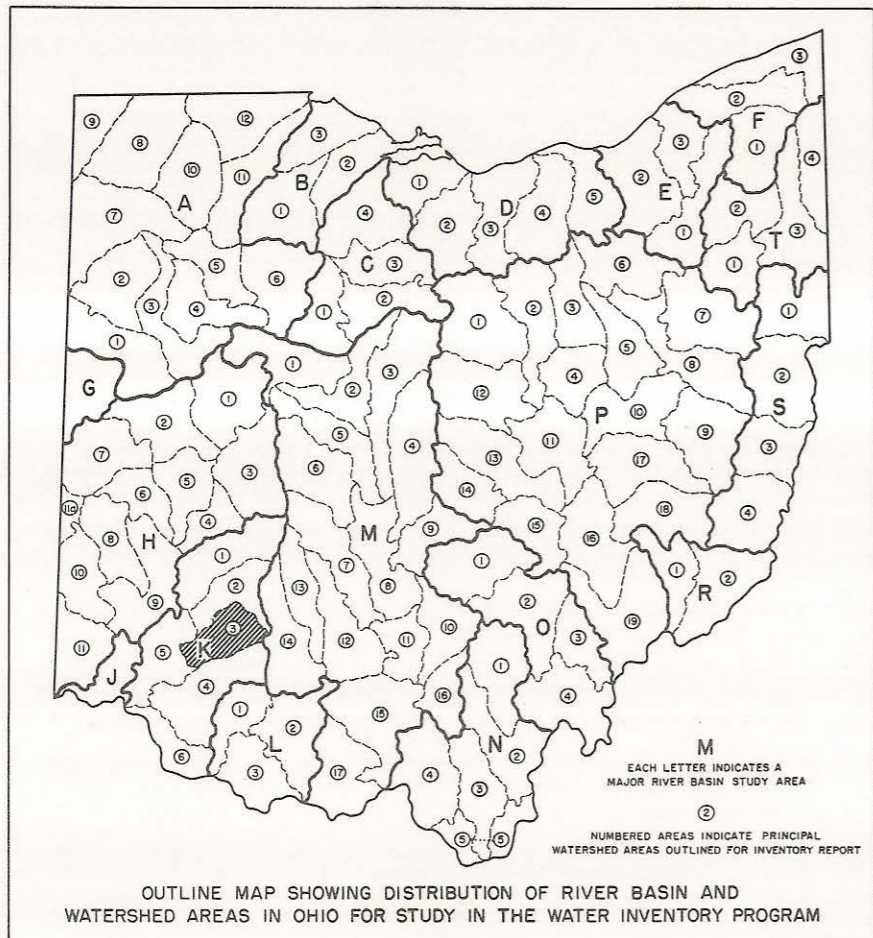


OHIO WATER PLAN INVENTORY
1960

TODD FORK BASIN

UNDERGROUND WATER RESOURCES

Prepared by ALFRED C. WALKER, Geologist,
Ohio Division of Water



The amount of water available to wells depends upon the types of geologic formations present in the area. Underground water is contained in small open spaces that are present in the rocks. The number, kind and size of these openings in a formation determine its water-bearing characteristics. Therefore, wide variations in underground-water conditions are found as the geology differs from place to place. Shale is a dense rock and a poor source of underground water. Limestone may be a good water source depending on the number and extent of joints and fractures present. Sand and gravel deposits, because of their permeability, are often important sources of underground water.

The basin area is covered with glacial deposits which range in thickness from a few feet to as much as 300 feet. These deposits are largely clay with discontinuous sand and gravel layers. The underlying bedrock consists of limestones and dolomites of Silurian age and Ordovician shales with thin limestone layers. Section AA' shows the relative positions and thicknesses of these formations from northeast to southwest across the basin.

An old buried valley is present south of Wilmington. This is a broad, deep channel that was cut into the bedrock by early streams and has since been completely filled with glacial till. In this valley, as elsewhere in the basin, good farm and domestic water supplies can be developed where the till contains interbedded sand and gravel deposits. Where the glacial deposits are thin or predominately clay, however, very small supplies are available.

Limestone, underlying the extreme northeastern part of the basin is a good water source. Adequate supplies can generally be obtained for farm and small industrial uses.

The poorest underground-water conditions occur in the southern half of the area, where thin clay till overlies non-water-bearing Ordovician shales. Many of the wells drilled in this portion of the basin are dry and dug wells or cisterns are common sources of domestic water supplies.

Records of approximately 600 water wells in the basin are on file at the Ohio Division of Water. Locations of typical wells are indicated on the availability of underground-water map.

GENERALIZED STRATIGRAPHIC SEQUENCE OF THE ROCKS
IN THE TODD FORK BASIN

System or Series	Group or Formation	Character of Material	Water-bearing Characteristics
Quaternary	Recent	Silts and gravels deposited on flood plains of the major valleys.	Generally a poor water source because deposits are thin and impermeable.
	Pleistocene	Till, largely clay, with buried sand or gravel beds in places. Ranges in thickness from a few feet to as much as 300 feet.	Good farm and domestic supplies available from sand and gravel layers. Poor supplies where clay predominates or where deposits are thin.
Silurian	Niagaran	Massive to thin-bedded limestones and dolomites with some dense, calcareous shale beds.	Adequate supplies for farm, domestic and possibly small industrial needs. Water is hard.
	Clinton	Massive to irregularly-bedded limestone.	
Ordovician	Richmond and Maysville	Interbedded soft shales and thin, hard limestones.	Poor source of water. Water, where present, generally occurs in top few feet of strata. May be high in iron, sulfur and hardness.

The following three well logs show the typical sequence of formations encountered in areas of limestone, thick glacial deposits and shale.

Limestone well, Green Twp., Clinton Co.
glacial drift 0 to 39 feet
limestone 39 to 100 feet
water level 12 feet below surface
well diameter 6 inches
capacity 20 gallons per minute

Glacial deposits, Washington Twp., Clinton Co.
yellow clay 0 to 25 feet
blue clay, gravel 25 to 130 feet
coarse sand 130 to 139 feet
water level 60 feet below surface
well diameter 5 inches
capacity 5 gallons per minute

Shale well, Harlan Twp., Warren Co.
clay 0 to 33 feet
blue shale 33 to 75 feet
water level 60 feet below surface
well diameter 4 inches
capacity dry

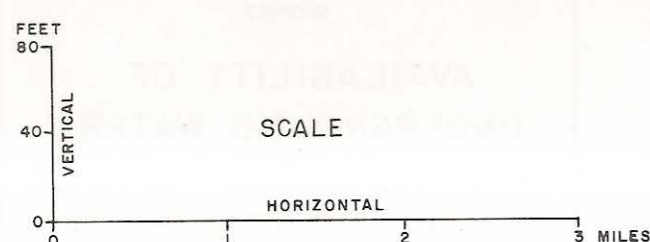
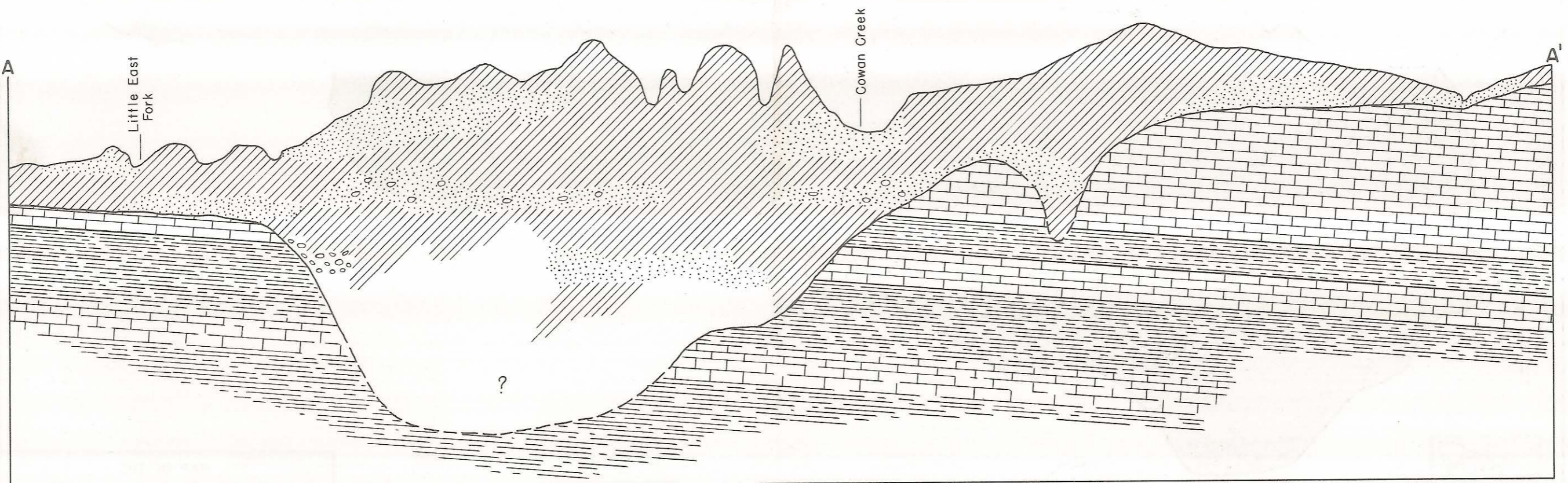
QUALITY OF WATER

Partial analyses of the water from two wells are given in the following table.

Well number	C-1	C-2
Depth (feet)	247	112
Water-bearing formation	Limestone	Gravel
	Parts per million	
Iron (Fe)	0.9	0.81
Chloride (Cl)	9.0	4.7
Dissolved solids	396.	297.
Total hardness	350. *	144.
pH	7.7	8.1

*Would require treatment for most uses.

FILE INDEX
K-3

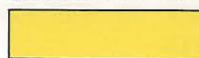


GENERALIZED CROSS SECTION SHOWING
THE GEOLOGY OF THE TODD FORK BASIN





LEGEND

AREAS IN WHICH YIELDS OF 25 TO 100 GALLONS PER MINUTE CAN BE DEVELOPED


 Limestone, covered with an average of 60 feet of glacial drift. Adequate domestic supplies are available from sand and gravel layers in the drift. Small industrial yields may be obtained from the underlying limestone.

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

 Drift, from 50 ft. to over 200 feet thick in places, covers shales and thin limestones. Farm and domestic supplies available from sand and gravel interbedded in the drift or from the bedrock.

 Similar to above, but with thinner drift covering. Where sand or gravel deposits are present, farm and domestic supplies are available. Little or no water where clay predominates. Small yields may be available from the bedrock.

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

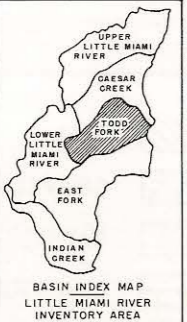
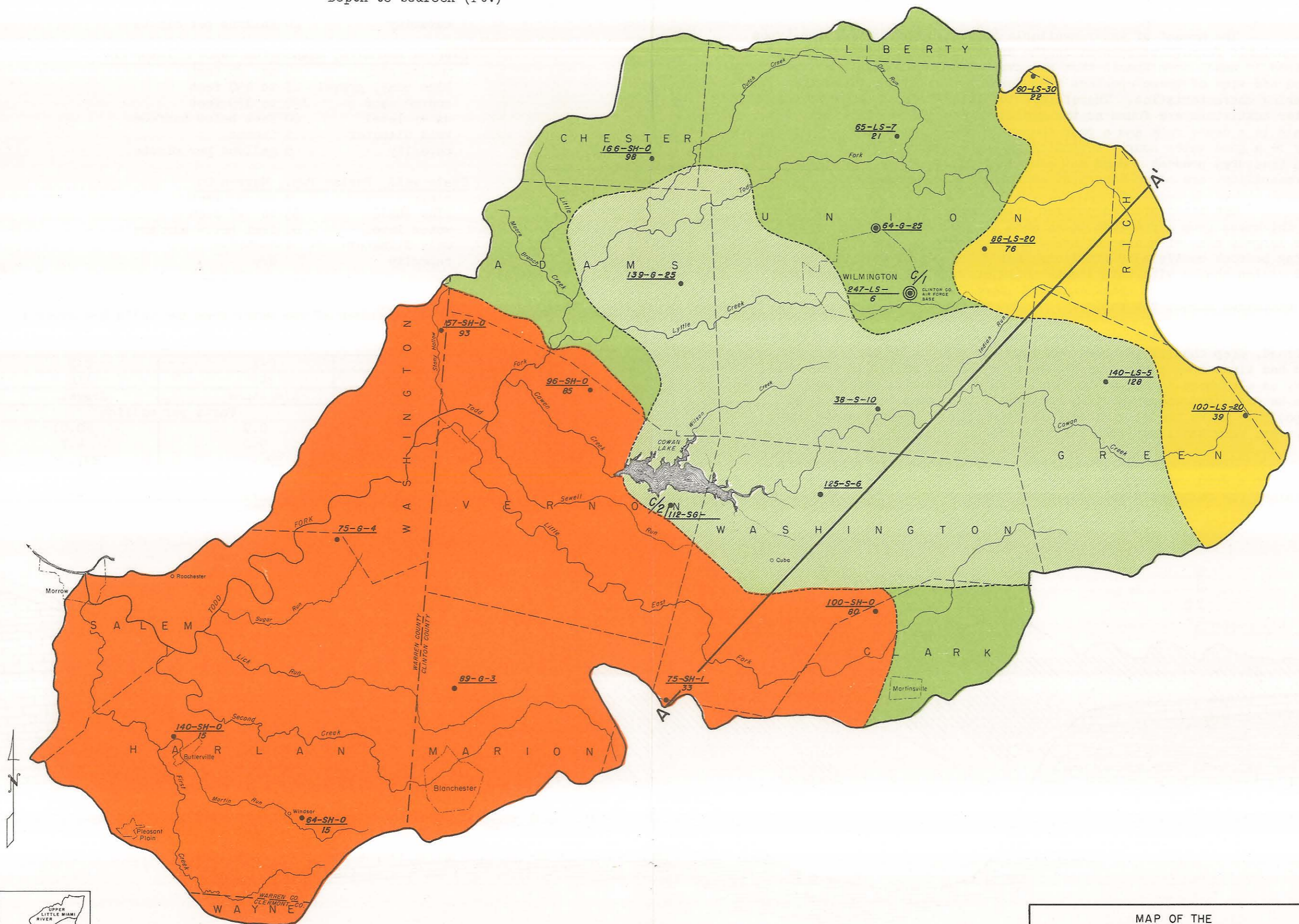
 Poor source of underground water. Impermeable glacial till overlying non-water-bearing shales. Many drilled wells are failures.

EXPLANATION OF SYMBOLS

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

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

Total depth (Ft.) - Water-bearing formation - Yield (gpm)
Depth to bedrock (Ft.)



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 buried valleys and bedrock aquifers.

MAP OF THE
TODD FORK BASIN
 SHOWING
**AVAILABILITY OF
 UNDERGROUND WATER**

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

SCALE IN MILES