OHIO DEPARTMENT OF NATURAL RESOURCES, DIVISION OF WATER
1562 W. First Ave., Columbus 12, Ohio

OHIO WATER PLAN INVENTORY
1961

LOWER PAINT CREEK BASIN

UNDERGROUND WATER RESOURCES

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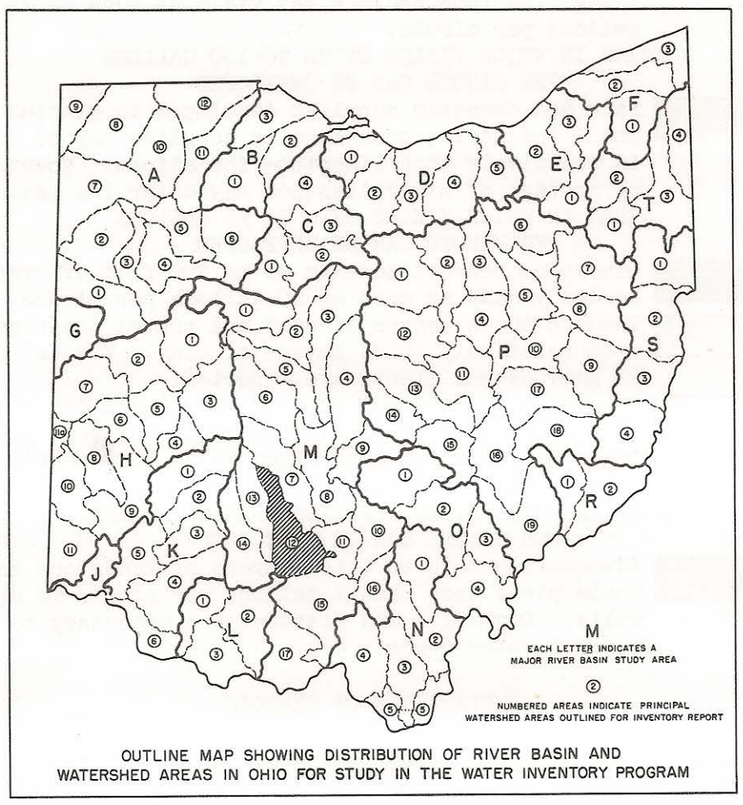


OUTLINE MAP SHOWING DISTRIBUTION OF RIVER BASIN AND WATERSHED AREAS IN OHIO FOR STUDY IN THE WATER INVENTORY PROGRAM

GENERALIZED STRATIGRAPHIC SEQUENCE OF THE ROCKS IN THE LOWER PAINT CREEK BASIN

System or Series		Group or Formation	Character of Material	Water-bearing Characteristics
Pleistocene	Recent		Clay, silt and sand deposited on the floodplains of the principal valleys.	Thin and relatively impermeable. Small yields may be developed from dug wells.
	Quaternary		Interbedded and interlensing layers of sand, gravel, and clay deposited beneath principal valleys.	Quantity of underground water available depends on character of material and source of recharge. Yields from properly constructed wells range from 100 to more than 1000 gpm.
			Alluvial sand and gravel deposited in the forms of hills and ridges.	Yields of as much as 25 gpm may be developed.
			Heterogeneous mixture of sand, gravel, and clay, interbedded with thin lenses of sand and gravel.	Few domestic wells developed in these glacial deposits. Adequate industrial supplies developed in underlying limestone bedrock.
Mississippian		Undifferentiated	Thin layers of fine sandstone, siltstone, and clayey shale.	Poor source of underground water.
Devonian		Ohio	Black carbonaceous shale.	Non-water-bearing formation. Meager quantities developed in fractures. Wells frequently go dry.
Silurian		Bass Islands	Thin to massive impure limestone which thins to the south.	Municipal and industrial wells have developed more than 100 gpm in the Bass Island formations and upper portion of the Niagaran. Chemical quality may deter use for specific purposes.
		Niagaran	Thin to massive bedded dolomite with layers of shale in the lower portion.	

Underground water owes its origin to precipitation which soaks into the soil and is temporarily stored in permeable rock formations. The quantity of water available for man's specific use depends on the number, kind, and size of the cracks, crevices, or pore spaces in the rocks and the regional distribution of the rocks. Limestone formations may yield sizable quantities of ground water to drilled wells, if these formations are interlaced with cracks, crevices, and solution channels. Formations such as shale or clay yield meager quantities of ground water to drilled wells. However, formations that absorb, temporarily store, and transmit water freely, are permeable deposits of sand and gravel or some sandstone formations.

The geologic formations, which occur near the surface in the Lower Paint Creek Basin comprise two general classes. The consolidated layers of sandstone, shale, and limestone, and the unconsolidated deposits of clay, sand, and gravel. The stratigraphic table briefly describes the physical and water-bearing characteristics of the principal formations.

The bedrock which yields ground water to drilled wells in the Lower Paint Creek Basin is limited to the limestone formations. The yield ranges from more than 100 gallons per minute in the northern portion of the basin to less than 20 gallons per minute in the southern portion. The thin to massive layered limestone formations in the northern portion are as much as 325 feet thick and are overlain with as much as 140 feet of unconsolidated glacial deposits. These unconsolidated deposits are associated with glacial moraines and drilled wells have reported yields of as much as 25 gallons per minute. The limestone formations, that thin to the south and are associated with shale, are not more than 125 feet thick. The unconsolidated deposits above these thin, water-bearing, bedrock formations are as much as 200 feet thick. They consist of undifferentiated clay, sand, silt, and gravel, and usually yield less than 10 gallons per minute to drilled wells.

The unconsolidated materials beneath the valleys of the Scioto River, North Fork of Paint Creek, and Paint Creek are the principal water-bearing deposits in the Lower Paint Creek Basin. Thick, permeable deposits of sand and gravel occur at the confluence of Paint Creek and the Scioto River. The deposits have a potential yield in excess of 1000 gallons per minute to properly constructed drilled wells. Proven supplies of as much as 500 gallons per minute have been developed from the permeable deposits beneath the valley of Paint Creek. The deposits beneath the floodplain of the North Fork of Paint Creek should yield more than 100 gallons per minute to properly constructed drilled wells. Data are limited to the wells developed for the Village of Frankfort. The glacial deposits are not as thick or permeable as the deposits beneath Paint Creek. However, the bedrock beneath these unconsolidated deposits west of Frankfort is limestone. This combination of relatively permeable sand and gravel above limestone is an excellent area for future test drilling to definitely prove the existence of an industrial aquifer.

The deposits beneath the floodplains of the tributaries to Paint Creek yield ample domestic water supplies. These deposits are as much as 90 feet thick and consist of thin lenses of sand and gravel interbedded in thick layers of clay. Yields are limited to not more than 10 gallons per minute, owing to the limited regional extent of these aquifers.

The bedrock beneath the ridges in the southern portion of the basin is basically shale. Thin layers of sandstone may cap these ridges and yield meager quantities of water to large diameter dug wells. Since these bedrock formations are well above drainage, wells are frequently dry during the late summer and fall. The average yield of wells dug and drilled into these bedrock formations is less than 2 gallons per minute. Cisterns are generally the principal source of water in these upland regions.

The legend accompanying the underground-water resources map describes the types of water-bearing formations and the potential yields in various parts of the basin. This information is based on the logs of more than 600 water wells located in the Lower Paint Creek Basin, and recorded with the Ohio Division of Water. Data from more than 125 typical logs are shown on the map. The reported yields, as shown on the map were estimated by the driller. These yields are not necessarily the sustained yield for the various wells. The map may be used as a guide for locating drilled wells in this basin. However, extensive test drilling and pumping tests are necessary to evaluate the maximum yield of the water-bearing formations in this basin.

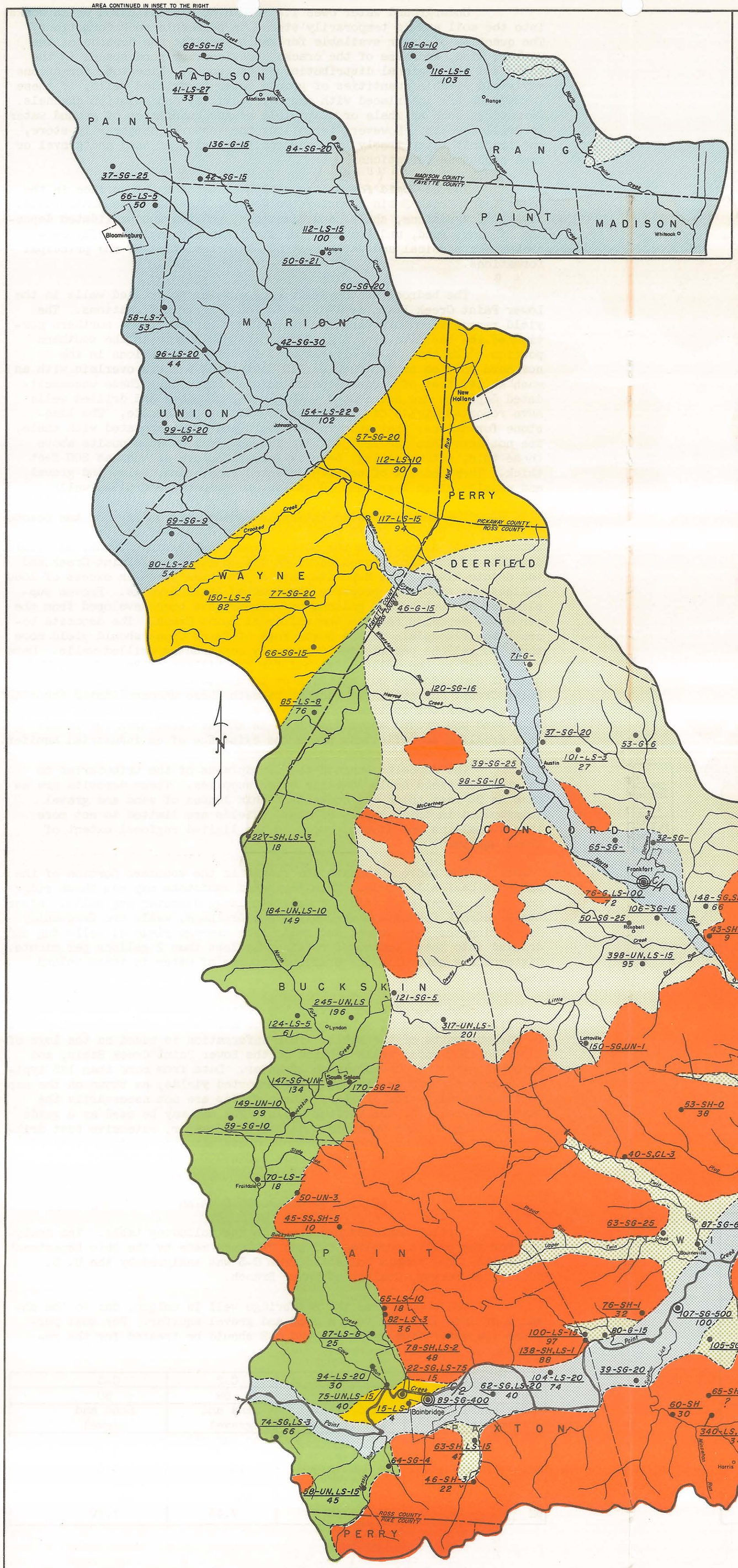
QUALITY OF UNDERGROUND WATER

Partial analyses are shown in the following table. The analyses for the public supplies C-1 and C-2 were made by the Ohio Department of Health. The sample collected from C-3 was analyzed by the U. S. Geological Survey, Quality of Water Branch.

The sample from the Bainbridge well is unique, due to the absence of iron in water from a sand and gravel aquifer. For most purposes the water from wells C-1 and C-2 should be treated for the reduction of iron and hardness.

Well Number	C-1	C-2	C-3
Depth (ft.)	76	89	80
Water-bearing formation	Sand, gravel and limestone	Sand and gravel	Sand and gravel
	Parts per million		
Iron	1.5	0.00	3.6
Chloride	6	13	3.0
Dissolved solids	438	475	594
Total hardness	380	356	480
pH	7.35	7.45	7.40

AREA CONTINUED IN INSET TO THE RIGHT



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

Thick permeable sand and gravel deposits adjacent to the Scioto River. Large sustained yields may be recharged by stream infiltration.

AREAS IN WHICH YIELDS OF MORE THAN 100 GALLONS PER MINUTE CAN BE DEVELOPED

Permeable layers of sand and gravel deposited beneath the valleys of the principal systems of drainage. Proven wells have reported yields of as much as 500 gallons per minute.

Limestone aquifer. Farm and domestic supplies are often developed in relatively thick glacial deposits above the bedrock.

Glacial deposits more than 130 feet thick yield farm and domestic supplies. Wells developed in the underlying limestone bedrock may yield as much as 150 gallons per minute.

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

Farm and domestic supplies developed in glacial drift. Small industrial ground-water supplies may be developed in relatively thin limestone formations. However, high percentage of mineralization may deter its use.

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

Limestone bedrock beneath 25 to 200 feet of overburden yields as much as 20 gallons per minute.

Thin to thick lenses of sand and gravel interbedded with relatively thick layers of clay. Yields of 5 to 25 gallons per minute are reported.

Irregular thin lenses of sand and gravel interbedded in thick layers of clayey till. The average yield of large diameter dug or drilled wells is generally less than 10 gallons per minute.

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

Alternating thin to thick layers of sandstone and shale yield less than 2 gallons per minute to drilled wells. Dug wells and cisterns are necessary to supplement water needs.

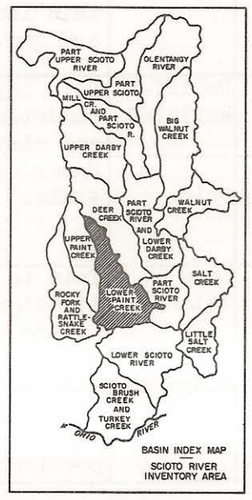
EXPLANATION OF SYMBOLS

- Domestic well
- Industrial well
- Municipal well

S	Sand	SH	Shale
G	Gravel	SS	Sandstone
CL	Clay	LS	Limestone
UN	Clay, sand, gravel		

C/2 Chemical analysis in text.

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



BASIN INDEX MAP
SCIOTO RIVER INVENTORY AREA

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 the hydrologic characteristics of the buried valleys and bedrock aquifers.

MAP OF THE
LOWER PAINT CREEK BASIN
SHOWING
AVAILABILITY OF UNDERGROUND WATER

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

SCALE IN MILES