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

OHIO WATER PLAN INVENTORY
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SALT CREEK BASIN

UNDERGROUND WATER RESOURCES

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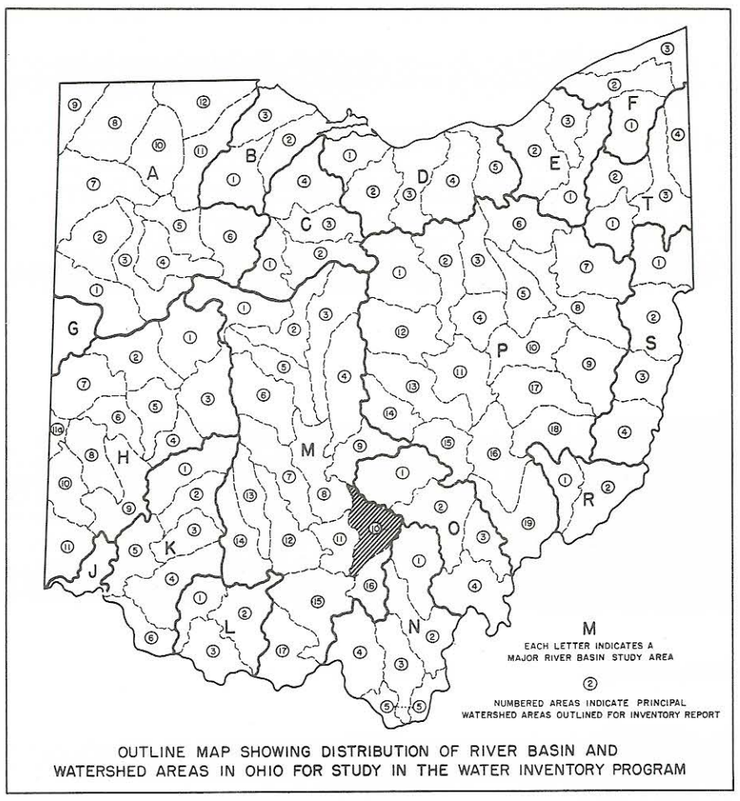

OUTLINE MAP SHOWING DISTRIBUTION OF RIVER BASIN AND WATERSHED AREAS IN OHIO FOR STUDY IN THE WATER INVENTORY PROGRAM

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Water beneath the surface of the ground owes its origin to that portion of the precipitation which seeps into and saturates the cracks and pore spaces in the earth's crust. The quantity of water available to drilled wells, depends on the size, kind, and number of water-bearing pores or cracks in the earth's crust. Therefore, a variation in the physical characteristics of the earth's crust presents a change in the availability of the underground water.

The geologic formations which occur near the surface in the Salt Creek Basin are of sedimentary origin. They comprise two classes: (1) Consolidated layers of shale and sandstone, and (2) the unconsolidated deposits of clay, sand, silt, and gravel. Sandstone formations may yield sizable quantities of water; however, the degree of cementation of the individual grains and the composition of the formation often deters the flow of water through it. Sandstone formations often grade from a permeable formation to a non-water-bearing sandy shale or shaly sandstone from one locality to another. Shale formations may temporarily store large quantities of water; however, owing to the composition of this type of bedrock, water does not readily pass through it. Clay and silt may be likened to an unconsolidated shale, whereas sand and gravel, to sandstone. The ability of the unconsolidated deposits to yield water depends on the size, shape and arrangement of the individual grains of sand and gravel. The quantity of water available is governed by the permeability, thickness, and regional extent of the water-bearing formation.

The generalized stratigraphic table briefly describes the physical and water-bearing characteristics of the formations in the Salt Creek Basin.

Industrial ground-water supplies in the Salt Creek Basin are extremely limited. Wells developed within the small area at the confluence of Salt Creek and the Scioto River have a potential yield of as much as 1000 gallons per minute. The thick deposits of sand and gravel beneath the floodplain of the Scioto River were deposited as deeply buried outwash, resulting from the melting of the glacier. Similar deposits exist in the vicinity of Laurelville; however, these permeable deposits are relatively shallow. Yields reported, range from 40 to 100 gallons per minute, sufficient for small municipal or industrial use. Test drilling and pumping tests are necessary to fully define the regional extent and hydrologic characteristics of these shallow outwash deposits near Laurelville.

Relatively thick glacial deposits were laid down along the frontal portion of the Appalachian Plateau in northern Ross and a portion of southern Pickaway Counties. These glacial deposits are essentially clay, sand, and gravel interbedded with thin lenses or layers of sand and gravel. Farm and domestic supplies of as much as 25 gallons per minute are developed from the permeable lenses of sand and gravel.

The relatively narrow floodplains adjacent to Salt Creek, Pine Creek, Laurel Run, and Pike Run offer a limited area for the development of 5 to 10 gallons per minute. The narrow floodplains are underlain with shallow unconsolidated deposits of clay, sand, and gravel, which are often interbedded with thin water-bearing layers of sand and gravel. The broad area in Liberty and Jefferson Townships, Ross County, is a remnant of the ancient Teays River, which was the principal system of drainage prior to glaciation. The broad valley of the Teays has since been filled with a mixture of clay, silt, fine sand, and sand and gravel. Wells drilled in these deposits yield less than 20 gallons per minute, owing to the fine grained characteristics of these deposits.

The sandstone and shale bedrock formations beneath the extreme northern portion of the basin yield larger quantities of ground water than the formations beneath the central and southern portions of the basin. Wells drilled for farm and domestic use range in depth from 66 feet to as much as 440 feet and yields of as much as 8 gallons per minute are reported. Although meager quantities are reported, the average regional yield for this area is greater than wells developed in bedrock elsewhere in the basin. Owing to these variable yields from the bedrock, homeowners rely on dug wells and cisterns to supplement their needs.

The records of more than 300 water wells in the Salt Creek Basin are on file at the Ohio Division of Water. Locations of 81 typical wells are shown on the availability of underground-water map.

GENERALIZED STRATIGRAPHIC TABLE OF THE ROCKS IN THE SALT CREEK BASIN

System or Series		Group or Formation	Character of Material	Water-bearing Characteristics
Quaternary	Recent		Clay, silt, and alluvium deposited on flood plains of the principal valleys.	Thin and relatively impermeable. Meager supplies are developed from dug wells.
Quaternary	Pleistocene		Relatively thick deposits of sand and gravel, and clay deposited at edge of glacier as moraines.	Yields depend on thickness and regional extent of water-bearing formations.
			Basically silt and clay interbedded with thin lenses of sand and gravel.	Yields of 5 to 20 gpm developed in the thin water-bearing formations.
			Thick layers of sand and gravel deposited by glacier meltwaters as surficial or deeply buried outwash.	Yields are governed by thickness of water-bearing formation and source of recharge.
Pennsylvanian		Pottsville	Variable sequence of shale, clay, sandstone, and coal.	Locally, domestic supplies are developed from the thicker sandstones.
Mississippian		Cuyahoga	Massive sandstone and shale layers.	Fair supplies locally.
			Interbedded sandstone and shale.	Poor source of water.

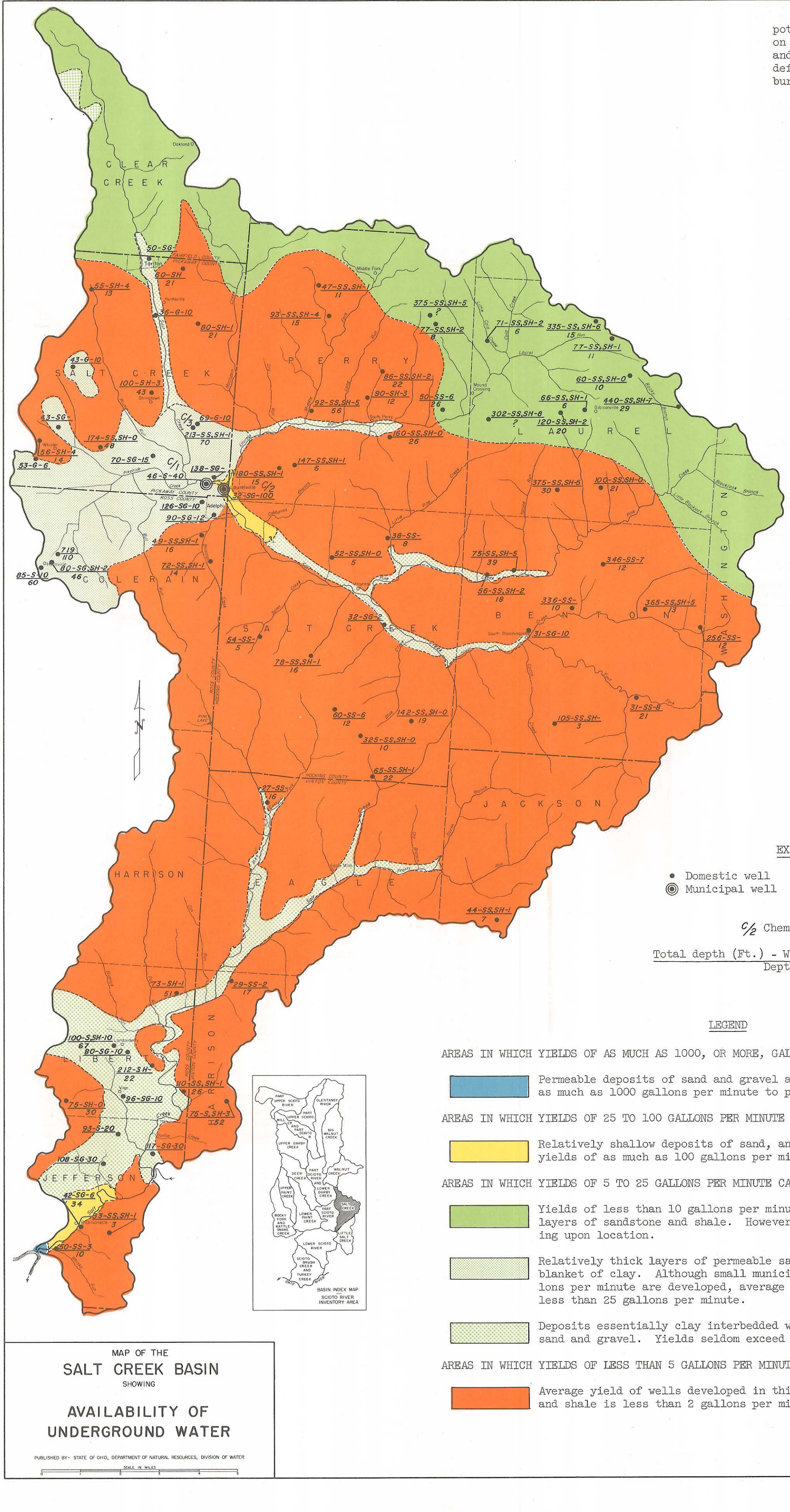
QUALITY OF WATER

Partial analyses are shown in the following table. The analyses for C-1 and 2 (Adelphi and Laurelville) were analyzed by the Ohio Department of Health in 1959 and 1960, respectively. The U.S. Geological Survey, Quality of Water Branch, analyzed the sample of water for C-3 in 1955.

Although the wells for Adelphi and Laurelville are located approximately 2500 feet apart, drilled to about the same depth, and developed in sand and gravel, the analyses are quite dissimilar. The water for Adelphi is treated for the removal of iron, yet neither supply is softened. The amount of chloride in water from C-2 has gradually increased during the past five years from 17 parts per million (ppm) to 65 ppm. This is not deleterious, yet, if it continues to increase, the source of this potential contaminant should be determined. The water from the bedrock well is not fit for consumption, owing to the high sodium chloride content.

Well Number	C-1	C-2	C-3
Depth (ft.)	46	32	213
Water-bearing formation	Sand and Gravel	Sand and Gravel	Sandstone and Shale
	Parts per million		
Iron	2.0	.00	1.3
Dissolved solids	376.	630.	2571.
Total hardness	320.	450.	262.
pH	7.8	7.4	7.7
Chloride	8.	65.	1350.
Sodium			896.

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

SALT CREEK BASIN

SHOWING

AVAILABILITY OF UNDERGROUND WATER

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

SCALE IN MILES 0 1 2 3 4 5

EXPLANATION OF SYMBOLS

- ● Domestic well
- ◉ Municipal well
- S Sand
- G Gravel
- UN Clay, Sand, Gravel
- SH Shale
- SS Sandstone

C/2 Chemical analysis in text.

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

LEGEND

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

Permeable deposits of sand and gravel adjacent to Scioto River may yield as much as 1000 gallons per minute to properly constructed drilled wells.

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

Relatively shallow deposits of sand, and sand and gravel have reported yields of as much as 100 gallons per minute.

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

Yields of less than 10 gallons per minute are developed in the alternating layers of sandstone and shale. However, wells may exceed 400 feet depending upon location.

Relatively thick layers of permeable sand and gravel beneath a thick blanket of clay. Although small municipal supplies of as much as 40 gallons per minute are developed, average regional yield of drilled wells is less than 25 gallons per minute.

Deposits essentially clay interbedded with thin water-bearing lenses of sand and gravel. Yields seldom exceed 10 gallons per minute.

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

Average yield of wells developed in thin alternating layers of sandstone and shale is less than 2 gallons per minute.