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

OHIO WATER PLAN INVENTORY
1962

KOKOSING RIVER BASIN

UNDERGROUND WATER RESOURCES

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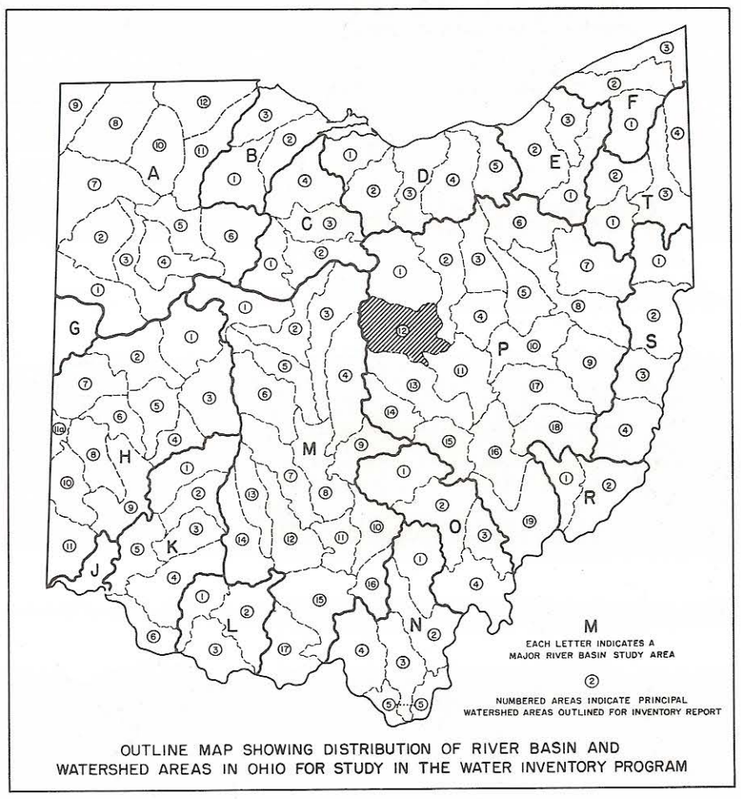


OUTLINE MAP SHOWING DISTRIBUTION OF RIVER BASIN AND WATERSHED AREAS IN OHIO FOR STUDY IN THE WATER INVENTORY PROGRAM

The development of supplies of underground water which are satisfactory from the standpoint of both quantity and quality depends upon the kinds of rocks in which the water occurs and the size, shape, and arrangement of the openings in the rocks. The many openings in most rocks are usually small, although some openings such as joints or crevices may be large. Water in deposits of sandstone and shale occurs in the small spaces between the individual grains and also along joints and bedding planes. Water in deposits of gravel, sand, silt, and clay occurs in the spaces between the individual grains or fragments, which may be larger than the openings in sandstone and shale. Unconsolidated sand and gravel deposits generally yield water to wells more readily than do consolidated rocks.

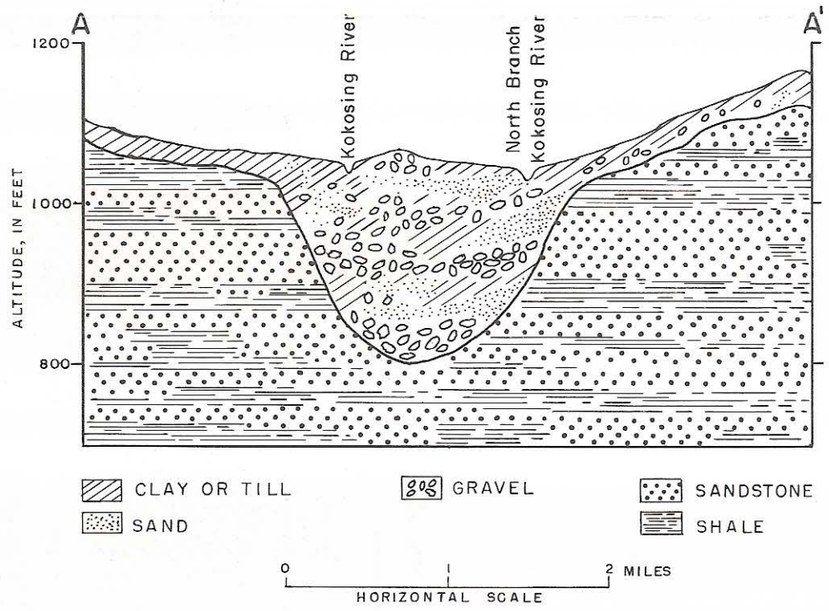
The consolidated rock formations which occur near the surface in the Kokosing River Basin are of sedimentary origin and include sandstone and shale. The youngest of these rocks which yield appreciable quantities of water to wells are alternating sandstone and shale and fine-grained sandstones with interbedded shales in which most of the deeper wells are finished. These rocks are the principal source of underground water supply in this basin. The wells through which the water is pumped from these rocks are generally less than 200 feet deep, although a few are more than 250 feet deep. Because available records of wells in this basin do not include any data on wells drilled for municipal or industrial use, the maximum potential yield of the sandstone in this basin is not known. Test drilling and careful analysis of the water-bearing potential of the sandstone would be necessary to determine whether it would yield more than 25 gpm (gallons per minute) for an indefinite period of time. The rocks which underlie the water-bearing sandstones referred to above, which include sandstone and shale, are not utilized as a source of water in this basin.

The unconsolidated deposits of gravel, sand, silt, and clay which overlie the bedrock in the upland areas and which partially fill the valleys cut into the bedrock surface yield variable amounts of water to wells. The materials deposited on the irregular surface of the bedrock consist principally of clay and silt, with only small amounts of sand or gravel. Available data indicate that few wells are finished successfully in these materials and that yields of more than 25 gpm are not available from these deposits. The deposits which do yield large amounts of water to wells are the coarser materials in the buried valleys, which are shown in the cross-section. That segment of buried valley between Fredericktown and Mount Vernon, a distance of about 8.5 miles, contains unconsolidated materials which are more than 233 feet thick. Logs of wells in this valley show from 13 to more than 30 feet of water-bearing gravel. Yields obtained during pumping tests on wells of large capacity in this valley range from 700 gpm to 1400 gpm. The materials in the buried valleys to the northeast of Fredericktown, to the southeast of Mount Vernon, between Chesterville and Fredericktown, and between Mount Vernon and the mouth of the Kokosing River, may yield more than 100 gpm to wells which penetrate coarse, permeable materials. The thickness of the unconsolidated materials within these valleys is more than 200 feet in places.

Other buried valley areas in this basin include the valleys west of Fredericktown, shown in yellow on the map, and valleys shown in a green pattern. Most of these valleys are shorter and shallower and contain a larger proportion of fine-grained materials than the valleys discussed above. The yields of individual wells in any of these valleys will depend upon the thickness and coarseness of the water-bearing materials.

GENERALIZED STRATIGRAPHIC SEQUENCE OF
THE ROCKS IN THE KOKOSING RIVER BASIN

System or Series		Group or Formation	Character of Material	Water-bearing Characteristics
Quaternary	Recent		Alluvium, composed primarily of clay and silt, with few thin lenses of sand and gravel, deposited on flood plains of principal rivers.	Yields generally small.
Quaternary	Pleistocene		Thick deposits of sand and gravel interbedded with thin layers of till in buried valleys.	Yields range from 100 to 1000 gpm or more.
			Thick morainal deposits of till containing thin lenses of sand and gravel.	Yields range from 5 to 25 gpm.
			Till, consisting predominantly of clay with few thin lenses or beds of sand and gravel of limited areal extent.	Yields generally less than 5 gpm; most wells finished in underlying sandstone.
			Thin lenses or beds of sand and gravel interbedded with thick layers of till in buried valleys.	Yields generally less than 20 gpm.
Pennsylvanian		Pottsville	Thin sandstone and shale, with some coal, clay, and small amounts of coarse sand.	No water available because of limited thickness and areal extent of rocks.
Mississippian		Logan	Fine-grained sandstones with interbedded shales.	Yields range from 5 to 25 gpm.
Mississippian		Cuyahoga	Alternating sandstone and shale.	Sandstones generally yield up to 25 gpm; thicker sandstones may yield more than 100 gpm; shales yield little or no water.



CROSS SECTION OF KOKOSING RIVER VALLEY

QUALITY OF UNDERGROUND WATER

Water pumped from both sand and gravel and sandstone aquifers in the Kokosing River Basin, as shown in the accompanying table, is of good quality. Although the constituents shown are present in concentrations too high to make it readily usable without treatment, the water can be treated effectively for most uses. The iron content is variable, although only moderately high. The dissolved solids content, although variable, is generally low. Total hardness is great enough to necessitate reduction prior to use for most purposes.

Well number	C-1	C-2	C-3	C-4
Depth (Ft.)	133	68	235	83
Water-bearing formation	Sand and gravel	Sandstone	Sandstone	Sand and gravel
	Parts per million			
Iron (Fe)	0.03	0.47	0.1	0.9
Chloride (Cl)	4.	.5	2.	6.
Dissolved solids	355.	173.	232.	350.
Total hardness	283.	156.	194.	289.
pH	7.3	7.2	7.3	7.5

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.

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

Thick deposits of permeable sand and gravel filling buried valleys beneath major perennial streams. Large yields sustained through stream infiltration.

AREAS IN WHICH YIELDS OF 100 TO 500 GALLONS PER MINUTE CAN BE DEVELOPED

Thick, permeable sand and gravel deposits within buried valleys.

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

Moderately permeable sand and gravel deposits, with interbedded clayey till, in buried valleys.

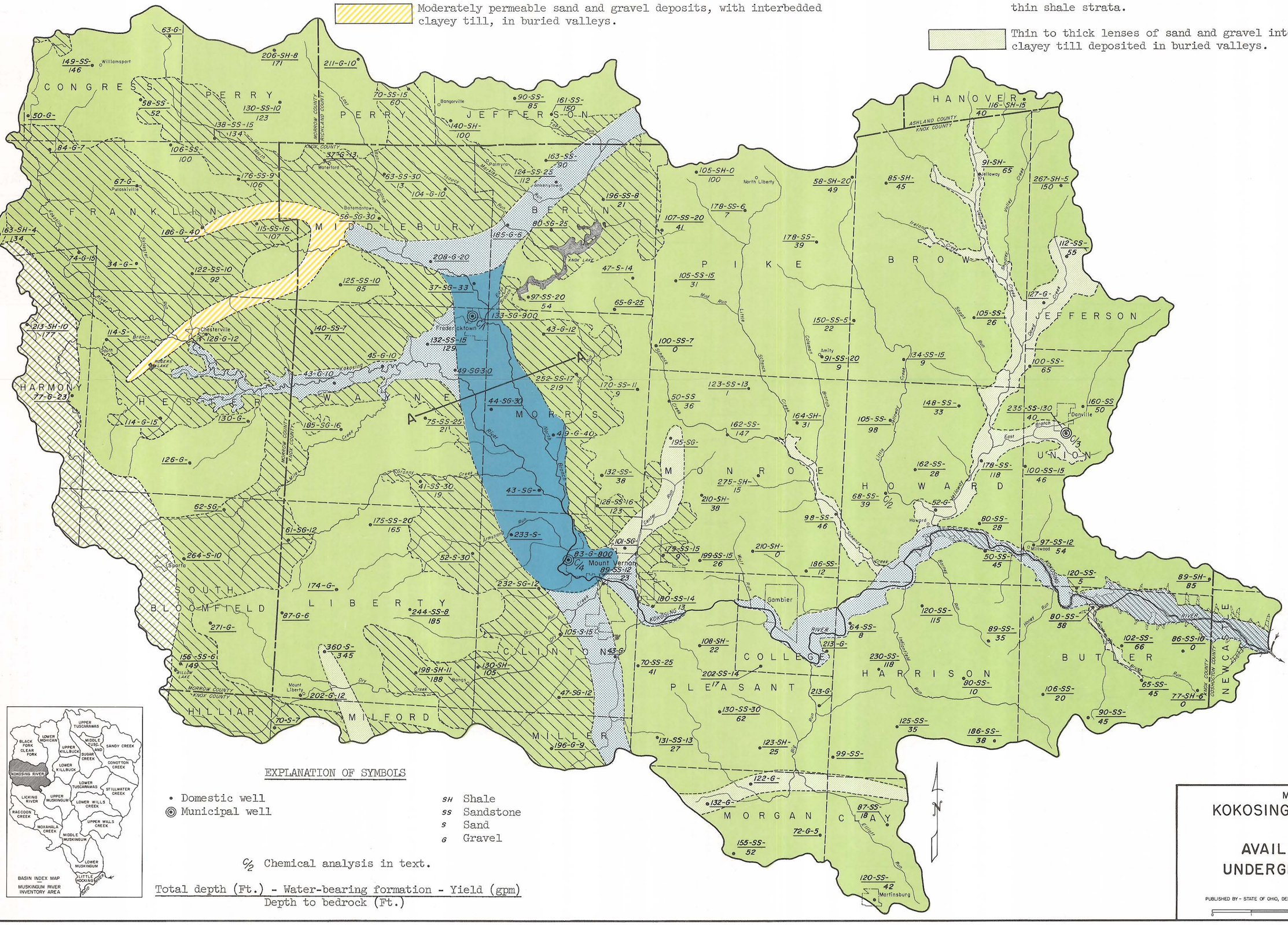
AREAS IN WHICH YIELDS OF 5 TO 25 GALLONS PER MINUTE CAN BE DEVELOPED

Sandstone aquifer of variable thickness, with interbedded shale, beneath glacial drift of variable thickness.

Thin to thick glacial moraine deposits consisting of thin lenses of sand and gravel interbedded with thick layers of clayey till. Moraine and till overlie non-water-bearing shale.

Thin to thick glacial moraine deposits consisting of thin lenses of sand and gravel interbedded with thick layers of clayey till. Moraine and till overlie thin to thick sandstones interbedded with thin shale strata.

Thin to thick lenses of sand and gravel interbedded in thick clayey till deposited in buried valleys.



EXPLANATION OF SYMBOLS

- Domestic well
- Municipal well

SH Shale
SS Sandstone
S Sand
G Gravel

C/2 Chemical analysis in text.

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

MAP OF THE KOKOSING RIVER 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