UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

WATER-RESOURCES INVESTIGATIONS REPORT 85-4149
PLATE 4--GENERALIZED SOIL PERMEABILITY

78°52'30" 50' 47'30" 45' 42'30" 40' 78°37'30"
42° 12' 30" 10' 07' 30" 05' 42° 03' 30"

SOIL PERMEABILITY

This map classifies the soils of the area in terms of the approximate rate at which water percolates vertically downward through the A and B horizons (generally less than 30 inches) of the soil profile. The values shown are in relation to the least permeable horizon (A or B) as determined from infiltration rates obtained in recent soil surveys in Broome, Chemung, Genesee, and Wyoming Counties and applied to the soils of Cattaraugus County in maps by Pearson and others (1940).

The soil-permeability units do not always coincide with the surficial geologic units. Soils on the valley flats are derived mainly from fine-grained postglacial flood deposits and, although moderately permeable, they may retard infiltration into the more permeable underlying outwash deposits. The most permeable soils are where outwash deposits have not been covered by the fine-grained alluvial sediments, typically on the higher outwash terraces. Steep, narrow valleys may contain soils with a wide range of permeability, but the area covered by each type, for example, soils developed from gravel bars, swamps, and old stream channels, may be too small to show on the map.

Highly permeable soils have developed along the glacial margins from deposits that, in places, appear to be of kame origin. Even though water may readily infiltrate through these soils, they may contain substrata that are sufficiently compact or that contain enough fine-grained material to divert this recharge as overland runoff or as horizontal interflow. Elsewhere, such as where ablation till overlies ground moraine in the northeastern part of the study area, the ground moraine is sufficiently impermeable to direct recharge through overlying ablation till as shallow, horizontal ground-water flow.

Most of the mapped area was not glaciated; consequently, most soils developed either from direct weathering of exposed shale and sandstone or from colluvial deposits from higher slopes. The nonglaciated areas on flat hilltops and gentle upland slopes have developed a thick, tight, impermeable clayey soil of the type that developed at the base of the valley walls in the colluvial deposits. The uplands, in contrast, have developed a thin, stony, and more permeable soil. On very steep slopes, where soil is thin, very little precipitation infiltrates the underlying material before running off as surface flow.

[1] Soil horizons are layers of soil, approximately parallel to the surface, having distinct physical and chemical characteristics produced by soil-forming processes. The "A" horizon is a mineral layer formed at or near the surface in which an accumulation of organic matter is mixed in with the mineral matter. The "A" horizon commonly has a high concentration of sand and silt with little or no clay. Clay minerals, iron, and aluminum are usually leached from the "A" horizon and accumulate in the underlying "B" horizon. The A and B horizons together form what is called the "soil solum" or true soil; underlying horizons are not affected by soil-forming processes and are thus more representative of the soil's parent material.

SELECTED REFERENCES

Giddings, R. B., Flora, D. F., and Olson, G. W., 1971, Soil survey of Broome County, New York: U.S. Department of Agriculture, Soil Conservation Service, 93 p.

Pearson, C. S., Bryant, S. C., Secor, W., Bacon, S. R., Camp, W. S., and Beadles, C. R., 1940, Soil survey of Cattaraugus County, New York: United States Department of Agriculture, Bureau of Plant Industry, Series 1935, no. 12, 65 p.

1973, Soil survey of Chemung County, New York: U.S. Department of Agriculture, Soil Conservation Service, 100 p.

Wolforst, J. P., and others, 1968, Soil survey of Genesee County, New York: U.S. Department of Agriculture, Soil Conservation Service, 179 p.

1974, Soil survey of Wyoming County, New York: U.S. Department of Agriculture, Soil Conservation Service, 199 p.

EXPLANATION

Number on map	Infiltration classification	Infiltration rate in inches per hour
1	low	less than 0.60
2	moderate	0.60 to 2.0
3	high	2.0 to 6.0
4	very high	greater than 6.0
W	OPEN WATER--ponds and lakes; does not include rivers and streams	

Base from New York State Department of Transportation, 1:24,000 series:
Limestone, N.Y., 1975; Little Valley, N.Y., 1975; Red House, N.Y., 1975; Salamanca, N.Y., 1975

Modified from Pearson and others, 1940

NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD of 1929)--a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called "Mean Sea Level".

0 ½ 1 2 MILES
0 ½ 1 2 KILOMETERS

HYDROGEOLOGY OF THE SALAMANCA AREA, CATTARAUGUS COUNTY, NEW YORK

by
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GENERALIZED SOIL PERMEABILITY