INTRODUCTION

Geologically, New York is a complex area with a variety of bedrock and unconsolidated deposits that influence groundwater quality. Aquifers in New York are primarily confined and unconfined deposits, with the unconfined deposits being the most susceptible to contamination. Management decisions that affect surface water quality can adversely affect ground-water quality over large areas.

A natural area with a potential for contaminant leakage and contamination from urban and agricultural runoff and other nonpoint sources can adversely affect ground-water quality over large areas. Such development over highly permeable geologic materials or bedrock valley fill material or bedrock. This provides an ideal location for cities, towns, industries, and other uses.

The stratified-drift aquifer system underlies the Mohawk River and parts of Oriskany, Saquoit, and Mud Creeks. This area is in southeastern Oneida County, in east-central New York. This map shows the locations of wells and test holes from sheet 3.

LOCATION OF WELLS AND TEST HOLES

This map shows the location of wells and test holes from sheet 3. A companion set presents similar information for the U.S. Environmental Protection Agency (EPA). This set of data is an important element in the development of the Ground Water Site Inventory data base.

Hydrogeology of the Stratified-Drift Aquifers in the Utica Area, Oneida County, New York—Part 1 (West)

By George D. Casey and Richard J. Reynolds

1988

Sheet 1. Location of Wells and Test Holes

REFERENCES CITED


HYDROGEOLOGY OF THE STRATIFIED-DRIFT AQUIFERS IN THE UTICA AREA, ONEIDA COUNTY, NEW YORK—PART 1 (WEST)

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Sheet 1. Location of Wells and Test Holes

To view the full map, please refer to the scanned copy provided.
The Mohawk sublobe deposited a layer of till during its subsequent westward retreat. The maximum extent of this readvance is located within 1 or possibly 2 miles east of Rome (Wright, 1972), where it deposited a layer of till. The Oneida sublobe retreated to the west, while the Mohawk sublobe retreated to the east. A proglacial lake formed between the retreating ice lobes and the northern margin of the Laurentide Ice Sheet and drained to the east through Saquoit Creek and the Mohawk River. The eastern margin of the retreating Mohawk sublobe is indicated by the Saquoit Creek Valley, which trends southwest of Utica. As the ice front retreated from the moraine, meltwater flowed through the present-day Mud Creek, which lies adjacent to the eastern margin of the Mohawk sublobe. The Saquoit Creek Valley, trending Mud Creek through the valley southwest of Utica, was temporarily blocked by an ice-contact sand and gravel deposit that formed during the Hinkley readvance, followed by the Barneveld readvance, both of which left sheets of till and ice-contact sand and gravel.

**References:**

- Reynolds, R. J., 1989, Availability of ground water from unconsolidated deposits within river and stream flood plains. In Larger valleys that are subject to frequent flooding, may be overlain by silt of variable thickness.
- Reynolds, R. J., 1989, Availability of ground water from unconsolidated deposits within river and stream flood plains. In Larger valleys that are subject to frequent flooding, may be overlain by silt of variable thickness.
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Sheet 3. Geologic Sections
WATER-TABLE ALTITUDE

This map shows the configuration and average altitude of the water table, in feet above sea level, in the surficial stratified-drift aquifer. The map is based on water levels measured at wells that were inventoried by the U.S. Geological Survey during the late 1940's and late 1960's. The altitudes of perennial streams were used to augment well data, mainly in the tributary valleys. In some areas, potentiometric head data from wells finished in bedrock were used to estimate the approximate position of the water table in the surficial sand and gravel aquifer. Water-table contours are drawn with a 10-ft contour interval where water-level and stream altitude data is adequate, while a contour interval of 20 feet was used in areas where data are lacking.

Direction of Ground-Water Flow

Ground water in valley aquifers generally flows downvalley along natural gradients and toward major streams under relatively steep cross-valley gradients. Ground water in the Mohawk River valley in the Utica area flows predominantly cross-valley (toward the river), with only a small downvalley gradient. Ground water in the Saquoit Creek valley moves predominantly northward (downvalley). In the upper reaches of the Oriskany Creek valley, the major component of ground-water flow is down-valley, but in its lower reaches it has a stronger cross-valley component, partly because the stream is more deeply incised in this area.

The stratified-drift aquifers in the Saquoit and the Oriskany valleys are connected by two through valleys, both of which contain local ground-water divides that separate ground-water flow in the Oriskany valley from that in the Saquoit valley. Because the gradients in this area are shallow and shift in response to local fluctuations in recharge, the locations of these divides are inferred.

EXPLANATION

- WELL Shallow well that taps stratified-drift aquifer and yielded water-level data. Number is water-table altitude, in feet above sea level.
- WELL Well that taps bedrock aquifer and yielded potentiometric head data. Number is altitude of potentiometric surface of bedrock aquifer, in feet above sea level.
- WATER-TABLE CONTOUR Shows water-table altitude in the stratified-drift (water-table) aquifer. Contour interval 10 feet where data permit, otherwise 20 feet. Datum is sea level.
- DIRECTION OF GROUND-WATER FLOW Shows general direction of ground-water flow in the surficial stratified-drift aquifer.
- GROUND-WATER DIVIDE Shows inferred location of water-table divide.
- AQUIFER BOUNDARY Approximate limit of stratified-drift aquifer.

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Sheet 4. Water-Table Altitude
Bedrock in the Utica area consists primarily of two units, the Utica Shale and Frankfort Shale, both of Late Ordovician age. The Utica Shale, overlain by the Frankfort Shale, dips gently to the south-southwest. Both preglacial and postglacial fluvial processes dissected the Silurian sandstones and shales that form the northern margin of the Allegheny Plateau south of Utica (Dale, 1953). The area was uplifted and tilted before the onset of glaciation, and a drainage divide formed in the bedrock surface near Little Falls, 20 miles east of the study area between the west-flowing Rome River and the east-flowing Mohawk River. The merging of the Rome and Mohawk rivers at this divide during the Pleistocene formed an eastward drainage for meltwater from the glacial Great Lakes that caused downcutting and produced erosional channels in the wide Mohawk bedrock valley.

In this part of the Mohawk valley, the bedrock surface has been downcut to about 200 feet below land surface (about 200 feet above sea level). In contrast, the bedrock surface beneath the tributary valley of the Saquoit, Oriskany, and Mud Creeks ranges from only about 50 to 100 feet below land surface. The scant data from the area near Westmoreland suggest a buried bedrock channel that may be continuous with one that trends northwestward, as suggested by Kantrowitz (1970, pi. 1, section 5).

SELECTED REFERENCES


This map depicts the total saturated thickness of the unconsolidated valley-fill material, which includes sand, gravel, lacustrine silt, clay, and till. The saturated thickness shown here includes deeper outwash deposits in the Mohawk River valley, which are separated from the upper aquifer by a layer of till. In many areas, the extent and distribution of permeable and impermeable materials are uncertain due to a lack of data; consequently, lines of equal thickness in these areas are inferred.

The Mohawk River valley proper contains two stratified-drift aquifer systems—a confined aquifer that consists of clean sand and gravel overlain by a till, and a surficial unconfined aquifer composed of outwash sand, gravel, and lacustrine and fluvial sand that is interbedded with lacustrine silt and clay. The confined aquifer has an average thickness of about 75 feet; it is thickest in the center of the valley and thins toward the valley walls. The unconfined aquifer, which is the aquifer of primary interest in this area, ranges from 20 to 75 feet in thickness. On the Mohawk River flood plain it is covered by a veneer of recent alluvium. This flood plain was once covered by a proglacial lake; tributary streams now enter it where meltwater streams once deposited sand that now ranges from 20 to 100 feet in thickness.

The Saquoit Creek valley contains outwash sand and gravel and lacustrine sand deposits overlain in places by recent alluvium and till. These deposits have a saturated thickness of 20 to 80 feet and are thickest in the center of the valley and thin near the valley walls. The aquifer material in the Oriskany Creek valley is primarily outwash and ice-contact sand and gravel. These deposits range in saturated thickness from 20 to 60 feet in the upper reaches of the valley and thicken to approximately 200 feet downstream near the Mohawk River valley.
GENERALIZED SOIL PERMEABILITY

This map classifies the soils of the area as to the approximate rate at which water passes vertically through the A and B horizons (generally less than 30 inches) of the soil profile. The values are given in relation to the less permeable soil horizon (A or B) as determined from infiltration rates obtained in recent soil surveys of Oneida and Herkimer Counties.

Soil permeability does not always coincide with surficial geologic units. Soils that developed on the valley floor of the Mohawk River are derived mainly from fine-grained flood-plain alluvium and, although moderately permeable, they may retard infiltration into the more permeable underlying outwash deposits. The outwash deposits that form high terraces and have not been covered with a fine-grained alluvium typically have higher permeability than those on the flood plain. Steep, narrow valleys may contain soils with a wide range of permeability, but the area covered by each type may be too small to show at this scale. The upland areas are generally covered with a virtually impermeable, clay-rich till. Steep slopes, which have only a thin soil cover, allow most precipitation to run off as surface flow and thus have extremely low infiltration rates.

SELECTED REFERENCES


Person, C. S., Feuer, R., and Cline, M. G., 1960, Oneida County Soils: New York State College of Agriculture, 1 sheet, 1:125,000 scale.

EXPLANATION

Number on map

1

2

3

Infiltration-rate classification

low

moderate

high

Infiltration rate, in inches per hour

0.06 - 0.2

0.2 - 6

6 - 20

SOIL-PERMEABILITY BOUNDARY Approximately located.

Defined as the contact between soils with differing permeabilities.

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Sheet 7. Generalized Soil Permeability
LAND USE

Land outside urbanized areas in or near the Mohawk River valley and its larger tributaries is used mainly for farming, but some forest remains. Throughout the rural area are small hamlets, wetlands, and areas excavated for sand and gravel. The villages of Yorkville, New York Mills, Clark Mills, Clinton, and Oriskany are mostly residential but contain some industrial, commercial, and open lands. The city of Utica is principally residential but uses a larger percentage of land for industrial and commercial endeavors than the other developed areas. The Mohawk River valley is a major transportation corridor and contains a section of the New York State Thruway (I-90), the New York State Barge Canal, and the main east-west rail line. The Mohawk River at Utica has a mean annual discharge of approximately 1,000 cubic feet per second (G. D. Firda, U.S. Geological Survey, oral commun., 1986).

Land use is an important consideration in the development of a groundwater-protection program for this area. The high permeability of the surficial aquifer and relatively shallow depth to water in most places makes groundwater in this area susceptible to contamination from surface sources such as landfills, salt-storage stockpiles, hydrocarbon-fuel storage, chemical plants, and other facilities having a potential for contaminant leakage.

The land-use classification shown here is based primarily on 1967-68 data that were published as Land Use and Natural Resources Inventory (LUNR) maps by Cornell University (1968), then updated from New York State Department of Transportation 1:24,000 scale topographic maps.

REFERENCE CITED

Cornell University, 1968, Land use and natural resources inventory (LUNR) map series, Utica west, Clinton, Rome, and Oriskany quadrangle, New York State Cooperative Extension, 4 sheets, 1:24,000 scale.

EXPLANATION

INDUSTRIAL light and heavy manufacturing, petroleum- and chemical-storage facilities

EXTRACTIVE sand and gravel mining (both active and abandoned)

COMMERCIAL AND SERVICES includes urban areas, shopping centers, commercial strip development, communications facilities, and facilities without extensive grounds, such as hospitals, municipal buildings, government centers, schools, and universities.

LANDFILLS includes both active and abandoned landfills, open dumps, and junkyards

SEWAGE-TREATMENT FACILITIES land application of sewage; includes settling lagoons, both active and abandoned

TRANSPORTATION (land and air) includes limited-access highways, airports, truck and train terminals and yards

TRANSPORTATION (waterways) includes barge canals, channels, locks, ports, docks, dams, and shipyards

FARMLAND (crops and pasture) includes both active and inactive agricultural area, and area used for horticulture or domestic livestock

FARMLAND orchards and vineyards

FOREST includes forest stands exceeding 30 feet in height, and brush, tree, and shrub cover less than 30 feet high; forested public areas; forested recreation areas such as public and private campgrounds, ski resorts, public parks, and also wooded hospital grounds, school campuses and correctional facilities.

RESIDENTIAL includes high-, medium-, low-density residential areas, trailer parks, rural hamlets, estates of 5 acres or more, farm-labor camps, developed shoreline, and commercial strip development that is at least two-thirds residential

OPEN LAND includes open recreation areas and open public areas such as parks, golf courses, reservation facilities, and mensuration facilities. Also includes recreational areas and open public areas not specifically designated as recreation areas.

WATER AND WETLANDS includes natural or manmade ponds, lakes, or reservoirs, streams and rivers averaging 100 feet wide or more, bogs and shrub wetlands, wooded wetlands, and marine wetlands

LAND-USE BOUNDARY Approximately located. Defined as a contact between areas of differing land use.