



POTENTIAL YIELDS OF WELLS IN UNCONSOLIDATED AQUIFERS IN UPSTATE NEW YORK--ADIRONDACK SHEET

By  
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**INTRODUCTION**

New York State's increasing need to develop ground-water-protection and management policies has led to an effort to identify and delineate the location and extent of its significant aquifers--those that consist of sand and gravel and yield substantial amounts of water to wells. Bedrock aquifers, although significant sources of water in some areas, are not addressed here.

A review of several maps and reports on the ground-water resources of New York State counties and river basins that were prepared from the 1930's through the mid-1960's by the U.S. Geological Survey, in cooperation with the New York State Department of Environmental Conservation, revealed that the maps were inconsistent in scale, format, and amount of detail. The only two statewide maps that show aquifers are Heath (1964) at 1:1,000,000 scale and Kantrowitz and Shively (1982) at 1:750,000 scale; both have insufficient detail for use in the development of aquifer-protection plans.

In the mid-1980's, the U.S. Geological Survey, in cooperation with the New York State Department of Environmental Conservation, compiled a set of five maps showing at uniform scale the locations and potential well yields of the unconsolidated aquifers in upstate New York (excluding Long Island).

**Purpose and Scope**

This map is one in a set of five that shows unconsolidated aquifers in New York State excluding Long Island. These maps delineate unconsolidated aquifers at a scale of 1:250,000, are based on the most recent information available, and use the same symbols to identify unconsolidated aquifers and potential well-yield ranges. The small map to the right identifies the major river basins and indicates other areas that are described in the ground-water reports that were used in this data compilation.

The scale of 1:250,000 was selected for this map series because it is the one used by the New York State Geological Survey for its bedrock geology map (Fisher and others, 1970) and its proposed surficial geology map of the Adirondack region. Together these maps form a consistent set of geologic and ground-water maps for use in regional management of the ground-water resources of the State.

These maps indicate only the general extent of the unconsolidated aquifers; they are not intended for detailed site evaluations. Additional information that may be needed for site evaluation is given in the reports cited in the list of related publications (far right). Determination of the precise location of aquifer boundaries or of well yields may require additional data.

Ground water may be obtained from unconsolidated aquifers that are too small to be shown at this scale and also from till, from buried unconsolidated aquifers not yet identified, and from underlying bedrock. Wells that have an adequate yield for domestic use (up to 10 gallons per minute) can be constructed almost anywhere within the mapped area. In some areas, bedrock aquifers are significant sources of water and warrant consideration in any appraisal of ground-water conditions. Several reports cited in the list of related publications include information on bedrock aquifers.

**ACKNOWLEDGMENTS**

The New York State Geological Survey provided a draft showing the surficial geology of selected parts of the Adirondack region for use in delineating some aquifer boundaries.

**WELL YIELDS**

Since the mid-1940's, the U.S. Geological Survey, in cooperation with many State and local government agencies, has mapped and appraised several aquifer systems in New York. The locations of the unconsolidated aquifers and the ranges of potential well yields shown here were compiled from information given in several publications, from well-yield data from the U.S. Geological Survey's computerized Ground Water Site Inventory data base, and from an inventory of private and domestic wells. Aquifer boundaries were derived from hydrogeologic and surficial geology maps, numerous well records, and interpretation of topographic maps.

The well-yield ranges represent the potential yields that may be obtained from properly constructed wells screened and developed in the aquifer. The given values may not represent sustained withdrawals from the deposit but, rather, the potential short-term withdrawal. The yields shown for many areas are based on aquifer-test and well-capacity-test data and on yields reported by drillers and homeowners. Yields in some areas are estimates based on geologic logs, saturated thickness, and hydraulic conductivity. Actual yields may differ slightly from those indicated.

Some aquifers are in areas from which data on wells or hydraulic properties were insufficient to determine the range of yields. Those that consist of coarse, granular material are assigned a yield of 10 to 100 gallons per minute (light green).

The blue shading represents unconsolidated water-table aquifers from which high well yields can be obtained. These aquifers are recharged rapidly by water percolating through the permeable overlying material.

Uncolored areas are underlain by till, lake clay, silt and silted sand, sand and gravel, or bedrock. Some sand and gravel aquifers may be present that are too small to plot at this scale. Wells dug in till or drilled in bedrock are generally capable of yielding 1 to 10 gallons per minute. Larger yields are available from some bedrock units such as limestone, dolomite, highly fractured shale, or sandstone.

**REFERENCES CITED**

Fisher, D. W., Isaacson, Y. W., and Richard, L. V., 1971, Geologic map of New York: New York State Museum and Science Service, Map and Chart Series No. 15, 6 sheets, scale 1:250,000.

Heath, R. C., 1964, Ground water in New York: New York State Water Resources Commission Bulletin GW-31, 1 sheet, scale 1:1,000,000.

Kantrowitz, I. W., and Shively, D.H., 1982, Availability of water from aquifers in upstate New York: U.S. Geological Survey Open-File Report 82-437, 2 sheets, scale 1:750,000.

**EXPLANATION**

1 REFERENCE NUMBER--Indicates river basins and aquifer areas about which ground-water reports have been published. Numbers refer to related publications listed at right.

--- DRAINAGE-BASIN DIVIDE

Drainage areas and reference numbers.

**EXPLANATION**

POTENTIAL YIELD OF WATER TO WELLS IN UNCONSOLIDATED AQUIFERS

UNCONSOLIDATED AQUIFERS, 10 TO 100 GALLONS PER MINUTE--Sand and gravel with saturated zone generally less than 10 ft thick, or thicker but with less permeable silty sand and gravel. Yields in areas adjacent to streams may exceed 100 gal/min through pumping-induced infiltration, but these areas are too small to show at this scale.

UNCONSOLIDATED AQUIFERS, MORE THAN 100 GALLONS PER MINUTE--Sand and gravel of high transmissivity and with saturated thickness greater than 10 ft. Many such areas are associated with surface-water sources that can provide additional water through pumping-induced recharge.

CONFINED AQUIFER, 5 TO MORE THAN 500 GALLONS PER MINUTE--Areas where a relatively impermeable till, very fine sand, silt, or clay layer separates the buried sand and gravel aquifer from an overlying surficial aquifer.

**RELATED PUBLICATIONS**

(Numbers on left correspond to numbers on main map and on small map on left)

- Atkins-Tidwell Associates and Stearns and Wheeler, Civil and Sanitary Engineers, 1968, St. Lawrence County comprehensive water supply study: New York State Department of Health, CPWS-3a, 315 p.
- Bugliosi, E. F., 1987, Ground-water availability from the unconsolidated deposits of the St. Lawrence River basin, New York: U.S. Geological Survey Water Resources Investigations Report 87-4028, 1 sheet, scale 1:250,000.
- 1987, Availability of ground-water in unconsolidated aquifers in the Hudson River basin, New York: U.S. Geological Survey Water Resources Investigations Report 87-4029, 1 sheet, scale 1:250,000.
- Gleason, G. L., and Bobba, W. A., 1970, Water resources of the Champlain-upper Hudson basins in New York State: New York State Conservation Department, Division of Water Resources, 153 p., 2 plates, scale 1:250,000.
- Reynolds, R. J., 1986, Hydrogeology of the Fort Drum area, Jefferson, Lewis, and St. Lawrence Counties, New York: U.S. Geological Survey Water Resources Investigations Report 85-4119, 6 sheets, scale 1:48,000.
- Trainer, F. W., and Salvan, 1962, Ground-water resources of the Massena-Juddington area, St. Lawrence County, New York, with emphasis on the effect of Lake St. Lawrence on ground water: U.S. Geological Survey Bulletin GW-47, 227 p., 4 plates, scale 1:62,000.