



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

By  
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**INTRODUCTION**

Development of ground-water-protection and management policies by Federal, State and local agencies requires information on the location and extent of unconsolidated aquifers. (Bedrock aquifers, although a source of water in many areas, are not addressed here.) A review of ground-water-resource maps of many New York State counties and river basins that were prepared by the U.S. Geological Survey in cooperation with New York State Department of Environmental Conservation during the 1950's and the 1960's revealed that the maps are inconsistent in scale, format, and amount of detail. Statewide maps that show aquifers at scales of 1:1,000,000 (Heath, 1964) and 1:750,000 (Kantrowitz and Snavely, 1982) have insufficient detail for development of most aquifer-protection plans.

In 1986, the U.S. Geological Survey, in cooperation with the New York State Department of Environmental Conservation, began a study to compile and publish a set of five maps at scale 1:250,000 showing the location and potential well yield of the unconsolidated aquifers in upstate New York (excluding New York City and Long Island). The maps also indicate the parts of those aquifers that are heavily used for public water supplies and that have been designated as "Primary Water Supply Aquifers" by the State (New York State Department of Environmental Conservation, 1985).

This map is one in that series of five that together show the distribution of unconsolidated aquifers in upstate New York. To meet the needs of State and local water-resource managers and policymakers, the maps have a uniform scale of 1:250,000, are based on the most recent information publicly available, and use the same symbols to identify the unconsolidated aquifers and potential well yields.

The "primary" aquifers, which were mapped in detail during a study in the early 1980's in cooperation with New York State Department of Health and others, 1970). Together these maps present a consistent set of geologic and hydrologic information for use in regional management of the ground-water resources of the State.

These maps show the general extent of the unconsolidated aquifers but are not intended to replace detailed site evaluations. Additional information for use in site-specific evaluations is given in the list of related references above, but to determine the precise location and well yield from a given aquifer may require onsite investigations. Ground water also may be obtained from unconsolidated aquifers that are too small to be shown at this scale and from till, from buried unconsolidated aquifers not yet identified, and from the underlying bedrock. Construction of wells that have an adequate yield for domestic use (3 to 5 gallons per minute) may be developed in any of these geologic settings. In some areas, bedrock aquifers are important and warrant consideration in the appraisal of ground-water resources. Several reports cited in the list of related publications include information on bedrock aquifers.

**WELL YIELDS**

The U.S. Geological Survey, in cooperation with many State and local government agencies, has mapped and appraised several aquifer systems in New York since the mid-1940's. The aquifer boundaries shown here were determined from published hydrogeologic and surficial-geology maps, numerous well records, and interpretation of topographic maps. Potential well yields were estimated from information presented in eight published reports and from pumpage data on file with the U.S. Geological Survey.

Well yields represent the range of potential yields from individual wells properly screened and developed in the aquifer. Yields may not represent sustained withdrawals from the aquifer but, rather, the potential short-term withdrawal. Yields in many areas are based on aquifer and well-capacity-test data and on reported yields from drillers and homeowners. Yields in some areas are estimates based on geologic logs, saturated thickness, and relation between grain size and hydraulic conductivity. Actual yields may differ from those indicated.

Aquifers to which no range of yield is assigned are in areas from which data on wells or hydrogeologic properties were insufficient to estimate the yield. These areas are underlain by coarse granular material, however, (Miller, 1977) and should be considered aquifers of unknown potential.

The colored areas represent unconsolidated aquifers of sand and gravel. Dark blue indicates aquifers with high potential well yields; green indicates aquifers with moderate potential well yields. High well yields are defined here as greater than 100 gallons per minute (gal/min), and moderate as 10 to

100 gal/min. These aquifers are recharged rapidly by water that infiltrates through the permeable overlying material to the zone of saturation. The stippled pattern indicates the location of confined aquifers of sand and gravel; these aquifers are confined beneath a relatively impermeable layer of till or lacustrine very fine sand, silt, and clay that minimizes direct recharge from land surface. A stippled pattern within a colored area indicates the presence of both an unconfined and confined aquifer. Uncolored areas with a letter designation represent sand and gravel deposits (Miller, 1977) that may be aquifers but have insufficient data to provide estimates of yield. The letters designate the type of material, as indicated in the explanation. Uncolored areas without letter designations are underlain by till, or by lacustrine very fine sand, silt, and clay, or by bedrock. Small patches of unconsolidated aquifers (0.5 square mile or less) may underlie the area but are too small to plot at this scale. dug wells in till or lacustrine deposits may be capable of yielding 1 to 5 gal/min.

**REFERENCES CITED**

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