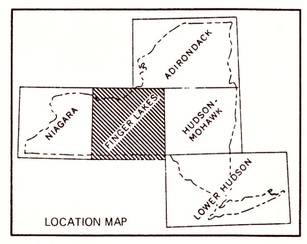
TED STATES DEPARTMENT OF THE INTERIOR
OLOGICAL SURVEY

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

WATER-RESOURCES INVESTIGATIONS REPORT 87-
FINGER LAKES SH



LAKE ONTARIO

0 5 10 15 MILES
0 5 10 15 KILOMETERS
CONTOUR INTERVAL 100 FEET
DATUM IS MEAN SEA LEVEL

OSWEGO
FULTON
ROCHESTER
SYRACUSE
AUBURN
ITHACA
CORTLAND
COHOCTON
BATH
CORNING
ELMIRA
WAVERLY
OWEGO
BINGHAMTON

19
16
18
15
12
11
13
22
21
4

SENECA LAKE
CAYUGA LAKE
ONEIDA LAKE
KEUKA Lake
West Branch Keuka Lake
Canandaigua Lake
Honeoye Lake
Conesus Lake
Hemlock Lake
Canadice Lake
Otisco Lake
Skaneateles Lake
Owasco Lake

e from U.S. Army Map Service, 1:250,000

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INTRODUCTION

New York State's increasing need to develop ground-water protection and nagement policies has led to an effort by the State to identify and delin-te the location and extent of significant unconsolidated aquifers--those at consist of sand and gravel and yield large supplies of water to wells. drock aquifers, although significant in some areas, are not addressed here. review of several reports on the ground-water resources of many New York ate counties and river basins that were prepared by the U.S. Geological rvey in cooperation with New York State Department of Environmental nservation during the 1950's and 1960's revealed that the available maps re inconsistent in scale, format, and amount of detail. Other statewide ps showing aquifers at 1:1,000,000 scale (Heath, 1965) and at 1:750,000 ale (Kantrowitz and Snavely, 1982) had insufficient detail for development aquifer-protection plans.

In 1986, the U.S. Geological Survey, in cooperation with the New York ate Department of Environmental Conservation, began a study to compile and blish a set of five maps showing the location and potential well yield of e unconsolidated aquifers in upstate New York and to indicate the parts of ose aquifers that are heavily used by community water systems (New York ate Department of Environmental Conservation, 1985) and that have been signated as "Primary Water Supply Aquifers" by the State.

Purpose and Scope

This map is the first of five that together represent all of New York cept for Long Island. To meet the needs of water managers and policy kers, these maps delineate unconsolidated aquifers at a uniform scale of 250,000, are based on the most recent information available, and use the me symbols to identify unconsolidated aquifers and potential well yields.

The primary aquifers are outlined on the map showing unconsolidated uifers and are keyed by number to the corresponding references. The inset p shows the major river basins, the primary aquifers (which were mapped in tail during a study in the early 1980's in cooperation with New York State partment of Health and published at 1:24,000 scale), and other areas that re described in reports used in this data compilation; they are keyed by mber to their corresponding references.

The scale of 1:250,000 was selected for this map series because it is the ale used by the New York State Geological Survey for its bedrock geology ps (Fisher and others, 1970) and surficial geology maps of the State uller, 1977, Muller and Cadwell, 1986). Together these maps form a con-istent set of geologic and ground-water maps for use in regional management the ground-water resources of the State.

These maps provide a regional view of the extent of the unconsolidated uifer systems; they are not intended for detailed site evaluations. Addi-ional sources of information for use in site evaluation are given in the eferences, but to determine the precise location of aquifer boundaries or tual well yields would require more site-specific information. Ground water y be obtained from areas other than those indicated on these sheets, such as nconsolidated aquifers too small to be shown at this scale, from till, from ried unconsolidated aquifers not yet identified, and from underlying drock. Wells with an adequate yield for domestic use (less than 5 gallons r minute) are feasible in all of these geologic settings. Some areas con-in important bedrock aquifers that warrant consideration in the appraisal of round-water conditions. The river-basin reports cited in the references clude information on bedrock aquifers.

Acknowledgments

The New York State Geological Survey provided a preliminary copy of the rficial geology of the Finger Lakes sheet, which was used to delineate uifer 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 aquifer systems in New York. The locations of the unconsolidated aquifers and range of potential well yields shown on this sheet were compiled from information from 20 reports and the well-yield data from the U.S. Geological Survey's computer files. Aquifer boundaries were derived from hydrogeologic and surficial-geology maps, well records, and interpretation of topographic maps.

Well yields represent the potential range of yields from properly constructed individual wells screened and developed in the aquifer. Yields may not represent sustained withdrawals from the deposit but, rather, the potential short-term withdrawal. Yields in many areas are based on aquifer 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.

The dark- and light-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 surficial sediment to the zone of saturation. The stippled pattern indicates the location of confined, unconsolidated aquifers. These aquifers are beneath an impermeable, confining layer of silt and clay or till that minimizes recharge from land surface. Colored and stippled patterns represent areas where a confining bed separates a water-table aquifer from a confined aquifer. Uncolored areas with letter designations represent known sand and gravel deposits (Muller and Cadwell, 1986) that have insufficient data to provide estimates of yield. The letters designate the type of material, as indicated in the explanation. Uncolored areas without letter designators are underlain by till, lake clay, silt and silty sand, or bedrock, and may contain small sand and gravel aquifers that are too small to plot at this scale. Dug wells in till or drilled wells in most bedrock units are generally capable of yielding 1 to 5 gallons per minute to wells. Larger yields are available from some types of bedrock units such as limestone, dolomite, and sandstone.

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(Number at left corresponds to numbers on map above and inset on right.)

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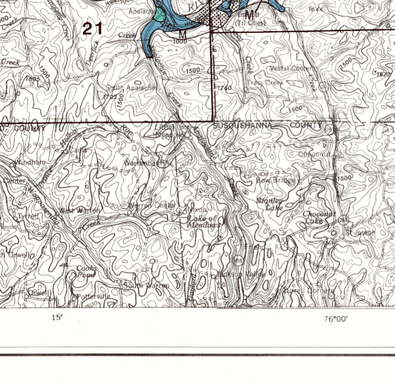
21. Owego area. A primary aquifer with no published report.
22. Waverly area. A primary aquifer with no published report.



Drainage areas and reference numbers

EXPLANATION

POTENTIAL YIELD OF WATER FROM WELLS THAT TAP UNCONSOLIDATED AQUI

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

UNCONFINED AQUIFER, MORE THAN 100 GALLONS PER MINUTE--Sand gravel of high transmissivity and with saturated thickne greater than 10 ft. Many such areas are associated with surface-water source that can provide pumping-induced recharge.

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

CONFINED AQUIFER, 5 TO MORE THAN 500 GALLONS PER MINUTE--Sa and gravel overlain by till, very fine sand, silt, or cl but without a surficial aquifer.

AQUIFERS OF UNKNOWN POTENTIAL--Areas of sand or sand and gravel for which little or no well data are on file to determine yield potential. Letter symbols, explained below, indicate the type of deposit.

L — Lacustrine or eolian deposit--Fine to medium sand that probably yields less than 10 gal/min.

G — Kame, kame terrace, outwash, or alluvium.--Sand and grave of unknown thickness or saturation. Yield potential is greater where streams are present.

M — Moraine.--Mostly till and lacustrine deposits (fine sand, silt, and clay) capped in some places with unsaturated sand and gravel. Thin, scattered confined aquifers of sand and gravel in some places.

U — Confined aquifer.--Areas of lake deposits or till possibly underlain by sand and gravel aquifers. Depth and satura ted thickness of aquifer not investigated.

1 — PRIMARY WATER-SUPPLY AQUIFER--A highly productive aquifer that is being used as a source of water supply by major public-supply systems. Number indicates name of aquife area (see key below) and report number in list of refer-ences. Reports and maps cited in the list of references describe these aquifers in detail.

Reference number	Aquifer area	Reference number	Aquifer area
16	Baldwinsville	4	Endicott-Johnson City
15	Bath	1	Fulton
18	Cohocton	19	Irondogenesee
11	Corning	21	Owego
12	Cortland-Homer-Preble	22	Waverly
13	Elmira-Horseheads-Big Flats		

UNCONSOLIDATED AQUIFERS IN UPSTATE NEW YORK--FINGER LAKES SHEET

By
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