

EXPLANATION

5.50 Well field, or multiple well fields within an area of about 1 square mile, where pumping has at some time averaged 5 million gallons per day or more for at least a year—Number in rounded parentheses that corresponds to a reference cited in the list of sources.

6.14A Stratified-drift aquifers—Fine to very coarse sand and/or gravel that were deposited preferentially by or in glacial meltwater and in general have been interpreted to have a saturated thickness of at least 10 feet and/or to be capable of yielding at least 10 gallons per minute to individual wells. Most of these aquifers are surficial (unconfined); some are buried (confined) beneath silt or clay deposited in postglacial lakes. Aquifer extent was compiled from more detailed maps as described in the adjacent list of maps.

Surficial or buried aquifers capable of a sustained yield of at least 5 million gallons per day, according to a geohydrologic evaluation or model simulation described in a reference cited in the adjacent list of sources. Number is estimated yield in million gallons per day, followed by a number in parentheses that corresponds to the number of a reference listed for the appropriate State in the list of sources.

Surficial aquifers that are estimated to be capable of yielding at least 5 million gallons per day, sustained by induced infiltration, as inferred from the following criteria: (1) saturated thickness of sand and gravel exceeds 40 feet and/or transmissivity exceeds 4,000 feet squared per day, as indicated in published reports in most cases, and (2) the adjacent stream has a 7-day mean low flow with a 10-year recurrence interval (7Q10) of 20 million gallons per day or greater as extrapolated from streamflow records.

Headwater aquifers—Surficial aquifers at or near watershed divides, drained only by small streams and composed of sand and gravel that probably exceeds 40 feet in saturated thickness in all or part of each aquifer under non-pumping conditions. These aquifers are capable of supplying large short-term withdrawals from storage during dry seasons with only slight depletion of streamflow downvalley. Headwater aquifers typically grade downvalley into valley-fill aquifers as stream size and watershed area increase. Headwater aquifers identified on this map have watershed areas less than about 30 square miles and are greater than about 1 square mile in aquifer area.

Outwash plain or large sand-plain aquifers—Surficial sand and gravel, greater than 1 square mile in aquifer area, not generally bounded by uplands and commonly greater than 40 feet in saturated thickness but locally interrupted by hills of till and bedrock, drained only by small streams originating within the area. Precipitation is the only source of recharge. Storage within these aquifers could supply short-term seasonal withdrawals much larger than normal discharge to streams; such withdrawals might eliminate that discharge but would not further deplete streamflow.

Aquifers whose potential for sustained or seasonal withdrawals is smaller than that of aquifers in the categories above, or could not be determined from the information available. Some aquifers have relatively small saturated thickness and/or are crossed by streams of moderate size whose flow could be greatly depleted by induced infiltration under low-flow conditions. If more information on aquifer properties had been available, or if criteria regarding streamflow and drainage area less restrictive than those cited above had been used, some of these aquifers would have been shown as potentially capable of sustained withdrawals of 5 million gallons per day, or large seasonal withdrawals.

Limit of Wisconsin glaciation, after White (1982), Shreve and others (1959), Crowl and Sevon (1980), and Stanford and others (1990).

Arbitrary limit of study area where not at limit of Wisconsin glaciation.

MAPS FROM WHICH AREAL EXTENT OF AQUIFERS WAS COMPILED

State	Principal source(s) from which areal extent of stratified-drift aquifers was compiled	Categories of stratified-drift selected for this compilation from the cited sources	Agency that provided digital coverage
Connecticut	Masde (1978), based on a series of water-resources inventory reports (Randall and others, 1966 and subsequent reports on other river basins published by the Connecticut Department of Environmental Protection)	Stratified drift that has saturated thickness of 10 feet or more	Connecticut Dept. of Environmental Protection
Maine	Tolman and others (1983) and subsequent maps in the series "Hydrogeology of significant sand and gravel aquifers" compiled through 1990 by the U.S. Geological Survey; also Prescott (1966, 1973)	Stratified drift that yields 10 gallons per minute or more to individual wells	Maine Low-Level Radioactive Waste Authority
Massachusetts	Dalany and Masoody (1980), based on U.S. Geological Survey Hydrologic Investigations Atlas that cover individual river basins	Sand and gravel deposits that have more than 10 feet saturated thickness and/or yield more than 30 gallons per minute to individual wells	U.S. Geological Survey (New York)
Connecticut River Valley	U.S. Geological Survey Hydrologic Investigations Atlas	Do.	U.S. Geological Survey (Massachusetts)
New Hampshire	Cotton (1975) and subsequent U.S. Geological Survey Water Resources Investigations maps of individual river basins published through 1977	Sand and gravel with enough saturated thickness for medium to high potential yield	Complex Systems Resource Center, Durham, New Hampshire
Southern and central parts	Topin (1987) and subsequent reports on other river basins compiled through 1990, prepared for the U.S. Geological Survey Water Resources Investigations series	Coarse stratified drift with saturated thickness greater than 10 (or 20) feet or transmissivity greater than 500 (or 1,000) feet squared per day; limits vary among reports cited	U.S. Geological Survey (New Hampshire)
New Jersey	Stanford and others (1990), a map of unconsolidated aquifers adapted from maps of surficial geology in preparation	Deltaic, subaqueous fan, fluvial, and ice-contact deposits	U.S. Geological Survey (New York)
New York	Miller (1988), h and 3 subsequent maps in the series "Potential yields of wells in unconsolidated aquifers in upstate New York"	Sand and gravel deposits that yield more than 10 gallons per minute to individual wells	New York Low-Level Radioactive Waste Siting Commission
Ohio	Compiled from several sources, chiefly Crowl (1978) and subsequent maps of the ground-water resources of individual counties published 1978-80 by Ohio Dept. of Natural Resources; also Ohio Drilling Co. (1971) and White (1982)	Areas underlain by sand and gravel deposits that yield more than 25 gallons per minute to individual wells, where these deposits are surficial; boundaries follow those of White (1982)	U.S. Geological Survey (New York)
Pennsylvania	Shapps and others (1959)	Ice-contact deposits (barres, etc.), outwash, and river terraces	U.S. Geological Survey (New York)
Eastern part	Compiled from several sources, chiefly Williams and others in press, Wight Associates (1992), Hollowell (1971), and Lloyd and Casswell (1981)	Valley-fill stratified drift (several lithofacies or saturated thickness subdivisions defined in some reports were combined)	U.S. Geological Survey (New York)
Rhode Island	Quinn and others (1948) and subsequent reports published through 1959 in the Rhode Island Geologic Bulletin series; also Johnson and Marks (1959) and subsequent maps published through 1962 in the Rhode Island ground-water map series	Outwash (medium to coarse sand and gravel interbedded with fine sand, silt, and clay) that yields more than 10 (or 30) gallons per minute to screened wells	The University of Rhode Island
Vermont	Hodges (1966) and subsequent maps of other river basins by the same author in a series published by the Vermont Dept. of Water Resources (1964-68)	Areas underlain by coarse-grained stratified drift with low to excellent potential for development of ground-water supplies	U.S. Geological Survey (New York)
Most areas	Hodges and others (1976a,b) and subsequent reports on ground-water resources of selected areas	Coarse to moderately coarse stratified drift that has more than 20 feet saturated thickness and can supply industrial or light industrial use	Do.

SOURCES FROM WHICH NUMBERS SHOWN FOR AQUIFER AND WELL-FIELD YIELD WERE COMPILED

[Pumpage from well fields and estimates of sustained yield from some aquifers are shown as numerical values on the map, as indicated in the explanation. These values were obtained from the references cited below. A number in parentheses following each value of pumpage or yield on the map corresponds to a number in parentheses preceding one of the references in the following list for the appropriate state. All publications cited here are included in the list of references in the text. Where a range of yields is given in the cited publication, the average appears on the map.]

Connecticut
(1) Crady and Handman (1983)
(2) Handman and others (1986)
(3) Mazzalero (1986a)
(4) Mazzalero (1986b)
(5) Mazzalero and others (1979)
(6) Randall and others (1966)
(7) Ryder and others (1970)
(8) Ryder and others (1981)
(9) Wilson and others (1974)
(10) Mahr (1974)
(11) Well field manager (oral commun., 1991)
(12) U.S. Geological Survey unpublished records

Maine
No published estimates larger than 5 million gallons per day

Massachusetts
(1) Nemish and others (1968)
(2) Myette and Simcox (1989)
(3) Lapham (1988)
(4) Williams (1968)
(5) H. Hamrah (City of Attleboro, oral commun., 1991)

New Hampshire
(1) Topin (1987)
(2) Cotton (1989)

New Jersey
(1) Crain (1966)
(2) Bergeson (1987)
(3) Walker and Finch (1982)
(4) Crain (1974)
(5) USGS unpublished records
(6) Randall (1977)
(7) Randall (1986)
(8) Frampton (1972)

New York
(1) Topin (1987)
(2) Cotton (1989)

Ohio
(1) Ohio Drilling Co. (1971)
(2) Cummins (1959)
(3) Sewell and White (1963)
(4) Walker (1979a,b)

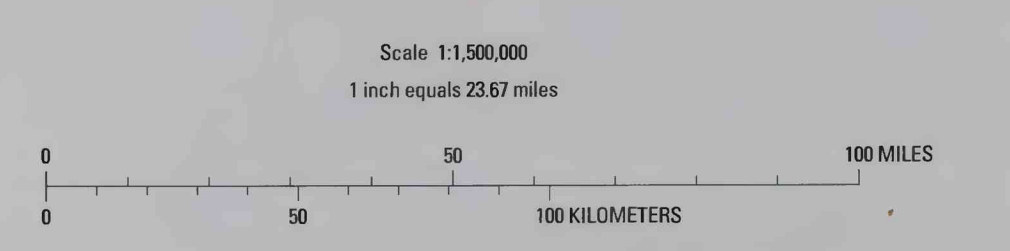
Pennsylvania
(1) Schaner and Gallaher (1979; citing Jacob, 1949)
(2) Lohman (1939)

Rhode Island
(1) Dickerman, D.C. (U.S. Geological Survey, oral commun., 1990)
(2) Dickerman and others (1990)
(3) Corbier and others (1974)
(4) Johnston and Dickerman (1974a)
(5) Johnston and Dickerman (1974b)
(6) Roberts and Breakears (1945)

Vermont
No published estimates larger than 5 million gallons per day

DISTRIBUTION OF STRATIFIED-DRIFT AQUIFERS IN THE GLACIATED NORTHEASTERN UNITED STATES

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Base map from U.S. Geological Survey digital data, 1:250,000, NAD 1983, Lambert conformal projection, standard parallels at 41°15' and 46°15', central meridian at 74°15'