88-139

# WATER FACT SHEET

*U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR*

# U.S. GEOLOGICAL SURVEY GROUND-WATER STUDIES IN RHODE ISLAND

## GROUND-WATER ISSUES

Freshwater usage in Rhode Island in 1985 averaged 148 million gallons per day. Ground water supplied 18 percent of this total. Drinking water for 24 percent of the State's nearly 1 million residents is supplied by ground water. Public water-supply systems were the largest users of ground water (57 percent). The remainder of ground-water withdrawals were for self-supplied domestic and commercial uses (20.7 percent), industrial and mining uses (10.9 percent), agricultural uses (6.8 percent), and other uses (4.6 percent). The major issues related to ground water in Rhode Island are:

- Protection and management of ground-water quality,
- Contamination of ground water by hazardous wastes, and
- Availability of ground water.

## U.S. GEOLOGICAL SURVEY PROGRAMS

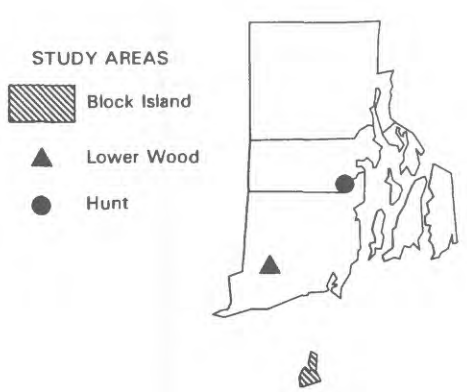
The U.S. Geological Survey (USGS), established in 1879, is the principal source of scientific and technical expertise in the earth sciences within the Federal government. USGS activities include research and services in the fields of geology, hydrology, and cartography. The mission of the Water Resources Division of the USGS is to develop and disseminate information on the Nation's water resources. The activities of the Water Resources Division in Rhode Island are conducted by scientists, technicians, and support staff headquartered in Providence.

Hydrologic-data stations at selected locations throughout Rhode Island record stream discharge and stage, ground-water levels, and the quality of surface water. The data-collection network includes 16 continuous-recording stream gages, 14 partial-record stream-gaging sites, 21 water-level monitoring wells, 6 sites on major rivers where comprehensive water-quality data are obtained monthly, and 1 site where stream quality is monitored continuously. The data from these stations, and selected data from hydrologic studies, are stored in the USGS National Water Data Storage and Retrieval System data base. These data are used by water planners and others involved in making decisions that affect the water resources of Rhode Island. Operation and maintenance of the data-collection network is supported largely by joint-funding agreements with the Rhode Island Water Resources Board, the Rhode Island Department of Environmental Management, the Narragansett Bay Water Quality Commission, and the U.S. Army Corps of Engineers.

The USGS has conducted more than 65 hydrologic investigations in Rhode Island since 1945. During fiscal year 1988, the USGS entered into joint-funding agreements with three agencies—two State, and one local—to conduct hydrologic studies. Of the several hydrologic studies in progress in fiscal year 1988, two deal with availability of ground water, two with management of ground-water quality, and one with hazardous chemicals in ground water. These investigations will provide information needed to answer hydrologic questions that are specific to the State's principal ground-water issues. Some also will provide information relevant to regional and national hydrologic problems. Three examples of ground-water studies by the USGS that address ground-water issues in Rhode Island are discussed in the following sections.

### Development Alternatives in the Lower Wood Ground-Water Reservoir

Since 1974, the USGS, in cooperation with the Rhode Island Water Resources Board (WRB), has been engaged in a series of studies to assess the quantitative effect of ground-water withdrawals on streamflow and on ground-water levels in major ground-water reservoirs in the Pawcatuck basin. These studies include an assessment of the quality of ground water. Information resulting from the studies is needed by the WRB to plan for development and management of the basin's ground-water resources. The study of the Lower Wood ground-water reservoir is the third of five such studies in the Pawcatuck River basin. Maps showing the thickness, permeability, and water-table configuration were used to prepare a computer model of



ground-water flow in the reservoir. The model was used to simulate the stream-depletion and water-level responses to various rates of pumping from hypothetical and real wells. The model will be used to determine the amount of ground water that can be withdrawn without causing excessive streamflow depletion or excessive lowering of ground-water levels.

### Recharge Areas to the Hunt Ground-Water Reservoir

Using ground-water maps prepared by the USGS, the WRB has delineated 21 major areas with high potential for water yield to wells within Rhode Island's glacial valley-fill aquifers. These 21 areas, delineated on the basis of aquifer thickness and transmissivity, are the most favorable areas in the State to obtain adequate yields for municipal or industrial supplies. Accordingly, State and local officials are interested in protecting the quality of water in these ground-water reservoirs and their recharge areas. In 1982, the USGS, in cooperation with the Department of Environmental Management, developed methods to delineate and classify recharge areas to major ground-water reservoirs. The study of the Hunt ground-water reservoir is one of three localities for which recharge areas were classified and delineated. The results of the study are being used by State and local officials to create zoning regulations to protect ground-water quality.

### Ground Water on Block Island

Block Island (the town of New Shoreham) is located about 9 miles off the coast of mainland Rhode Island. This 9.5-square-mile island is formed of glacial deposits that overlie older coastal-plain sediments. Ground water from these sediments constitutes the only source of freshwater to island residents. Owing to increasing land development, town officials are concerned with protection of the island's limited freshwater resources from contamination by septic systems, saltwater intrusion, and landfills. In fiscal year 1988, the USGS, in cooperation with the town of New Shoreham, began an investigation of the geology, hydrology, and water quality of Block Island. The objectives of the study are to determine the quality of ground water, the recharge areas for its public-supply wells, the geohydrologic framework of the island, and paths of ground-water flow (including those that carry contaminants) between points of recharge and discharge. These objectives are being met by water-quality sampling, by drilling several test wells to get information on lithology and water levels, by use of surface and borehole geophysical methods to improve understanding of lithologic and freshwater-saltwater relations, and by interpretation of data from about 900 wells. The study results will provide Block Island officials with information needed to develop regulations to protect ground-water quality.

## GROUND-WATER MANAGEMENT

The principal State agencies responsible for ground-water management in Rhode Island are the Water Resources Board and the Department of Environmental Management. The Water Resources Board formulates long-range plans and implements programs to develop the State's major ground- and surface-water resources needed for public supply. The board is also empowered to develop policies to control the allocation, interbasin transfers, and conservation of water resources. The Department of Environmental Management is the State's designated water-pollution control agency. It regulates wastewater discharges to ground and surface water, and is developing a comprehensive plan to protect ground-water quality. Both agencies use ground-water data and the results of ground-water studies provided by the USGS to manage and protect ground-water resources in the State. During 1987–88, the following State and local agencies entered into cooperative cost-sharing agreements with the USGS to conduct ground-water investigations in Rhode Island:

Rhode Island Department of Environmental Management
Rhode Island Water Resources Board
Town of New Shoreham

## SELECTED REFERENCES


Allen, W.B., Hahn, G.W., and Brackley, R.A, 1966, Availability of ground water in the upper Pawcatuck River basin, Rhode Island: U.S. Geological Survey Water-Supply Paper 1821, 66 p., 3 pl.

Gonthier, J.B., Johnston, H.E., and Malmberg, G.T., 1974, Availability of ground water in the lower Pawcatuck River basin, Rhode Island: U.S. Geological Survey Water-Supply Paper 2033, 40 p., 4 pl.

U.S. Geological Survey, 1984, National water summary 1983—Hydrologic events and issues: U.S. Geological Survey Water-Supply Paper 2250, 243 p.

_____1985, National water summary 1984—Hydrologic events, selected water-quality trends, and ground-water resources: U.S. Geological Survey Water-Supply Paper 2275, 467 p.


Information on technical reports and data related to ground water in Rhode Island can be obtained from:


Chief, Rhode Island Office
U.S. Geological Survey
Water Resources Division
237 J.O. Pastore Federal Bldg.
Providence, Rhode Island 02903

Director Rhode Island Water Resources Research Center
University of Rhode Island
Kingston, Rhode Island 02881



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