

United States Geological Survey Programs in Rhode Island



The USGS provides maps, reports, and information to help others meet their needs to manage, develop, and protect America's water, energy, mineral, and land resources. We help find natural resources needed to build tomorrow, and supply scientific understanding needed to help minimize or mitigate the effects of natural hazards and environmental damage caused by human activities. The results of our efforts touch the daily lives of almost every American.

Water-Resources Development

Water supplies in Rhode Island are not an unlimited resource. Consulting firms and State and town officials need basic hydrologic data to plan and regulate water-resources development. The U.S. Geological Survey (USGS) collects data from an extensive network of surface-water and ground-water-monitoring sites. The data from these networks are critical for assessing current water availability and predicting future water availability during drought.

In the late 1960's, the Rhode Island Water Resources Board (WRB) determined that ground water was the only viable source of additional water for public supply in southern Rhode Island. The USGS, in cooperation with the WRB, has studied ground water in each of five study areas in the Pawcatuck River Basin (fig. 1). These studies identified areas in which hydrogeologic conditions are favorable for development of ground-water supplies and the potential effects of ground-water withdraw-

als on streamflow. This information proved vital when water pumped from private wells in a Richmond neighborhood became contaminated. Because areas with potential for development of ground water were identified in USGS studies, the WRB was able to rapidly locate and install a new public-supply well.

Because Block Island derives its water supply from ponds and wells on the island, protection of the ground-water resources is of paramount concern. The USGS conducted a thorough study of the ground water on the island. Results of the study assisted water-resources managers in determining how much water was available and how it could best be developed.

Competition for limited water resources by domestic, industrial, commercial, and agricultural users makes it necessary to determine how much water is available in river basins. The USGS has determined the minimum streamflows that can be expected in many basins in Rhode Island. These basins include the Hunt and the Chipuxet Rivers, which are two of the most highly stressed basins in the State, and the Scituate reservoir, which supplies water to more than one-half of the State's population. Also, the USGS has developed a water-use data base that describes where, how, and in what quantities water in the State is currently being used. These data were used in a case study in Cumberland that demonstrated the integration of water-use data collected by State agencies, water suppliers, and wastewater-treatment facilities.

Together, information from the basic-data networks, the river-basin studies, the low-streamflow studies, and the water-use program provide the basis for the optimal use and management of water resources for the overall benefit of the people of Rhode Island.

Monitoring Radon

Faculty and students from the Department of Geology, University of Rhode Island (URI) and the State geologist of

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Rhode Island are working cooperatively with the USGS to develop a geographic information system (GIS) analysis of surface radioactivity, geology, and the occurrence of indoor radon. This cooperative project is part of a larger effort involving the USGS, the U.S. Department of Energy, and the U.S. Environmental Protection Agency to develop a method to determine the location of areas where homes have radon concentrations that exceed the occupational radiation limit, which is equivalent to 20 picocuries per liter of radon. Measurements of soil/gas radon and gamma-ray activity were made, and samples of soil and rock were collected. The data have been entered into the GIS along with surficial geology information and data from a new bedrock geology map of Rhode Island. A soil/gas radon monitoring station has been installed on the URI campus.

Evaluating Man's Effects on Water Resources

Development throughout Rhode Island has affected water quality. The USGS water-quality-monitoring program provides data on streams that can be used to determine the quality of surface water and the long- and short-term trends in water quality; to monitor compliance with Federal and State water-quality standards; and to demonstrate the effects of land-use practices on water quality (fig. 2). The water-quality data are vital to the Rhode Island Department of Environmental Management (DEM) to comply with Federal monitoring requirements. USGS state-of-the-art sampling protocols,

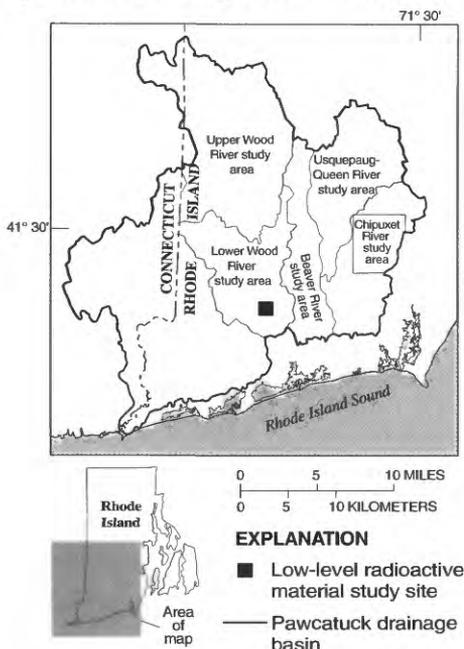


Figure 1. Detailed ground-water study areas in the Pawcatuck River Basin.

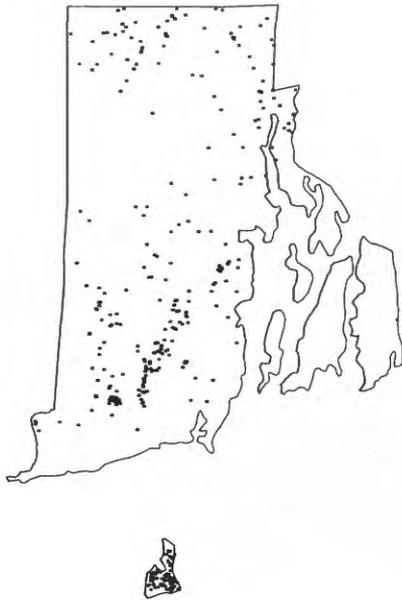


Figure 2. Water-quality data-collection sites.

equipment, and laboratory facilities assure that the State will receive the most accurate and complete information possible.

As part of a nationwide research program on ground-water contamination by toxic substances, the USGS conducted an intensive study in an area of southern Rhode Island that was contaminated by liquid wastes from an enriched-uranium, cold-scrap recovery plant. During this study, hydrologists sampled the local ground water and mapped a plume of low-level radioactive contamination (fig. 3). Computer simulations were run to estimate how long it would take for the contamination to be flushed naturally from the ground-water system.

Development of rural areas creates the need to install new septic systems. The ability to predict the highest elevation that the water table will attain is critical for ensuring that septic-system leach fields will not be flooded. Ground-water levels typically are highest in the spring and,

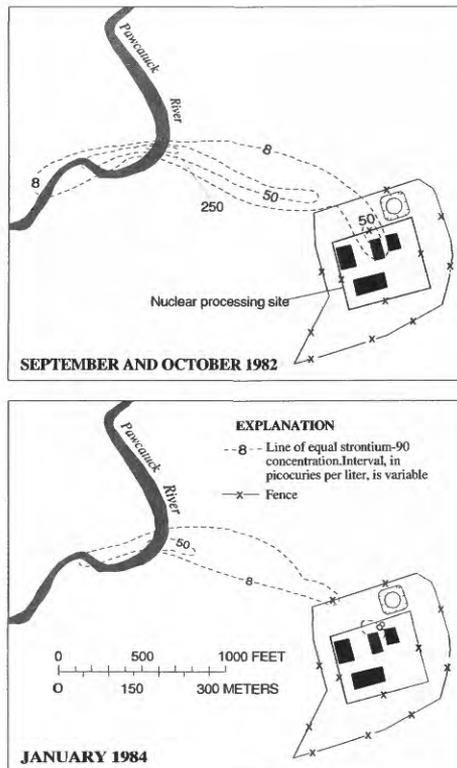


Figure 3. Strontium-90 concentration in ground water. Location shown in figure 1.

until recently, almost all proposed septic-system sites in rural areas of the State were required to be tested in the spring. The USGS, in cooperation with DEM, has developed a method by which a single water-level measurement made at any time during the year at a site of interest can be used to estimate the long-term high water level at that site.

National Mapping Program

Among the most popular and versatile products of the USGS are its 1:24,000-scale topographic maps (1 inch on the map represents 2,000 feet on the ground). These maps depict natural and cultural features of the landscape, such as lakes and streams, highways and railroads, boundaries, and geographic names. Topo-

graphic contour lines depict the elevation and shape of terrain. Rhode Island is covered by 37 maps that are used for civil engineering, land-use planning, natural-resource monitoring, and other technical applications. These maps also are favorites with the general public for outdoor uses, including hiking, camping, exploring, and back-country fishing expeditions.

Marine Research Center

The USGS conducts a wide range of geological and geophysical research and mapping investigations of the continental margins of the United States and around the world through its office in Woods Hole, Massachusetts. These marine geologic studies identify environmental problems and geologic hazards in offshore areas and assess critical nearshore processes that affect erosion, wetland loss, and polluted sediments. These studies also improve our understanding of the Nation's energy and mineral resources, document the past record of climate change, and help develop a predictive capability to guide and assess the consequences of the use of these margins.

Cooperative Programs

The USGS works in cooperation with local, State, and Federal agencies to ensure that data collection and scientific investigations are relevant to public needs. Some current and recent cooperators in the cost-sharing program are: the Rhode Island Department of Environmental Management, the Rhode Island Water Resources Board, the Providence Water Supply Board, and the Town of New Shoreham (Block Island).

The USGS provides support to the Rhode Island Water Resources Center, which conducts a program of research, education, and information and technology transfer.

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Additional earth science information can be found by accessing the USGS "Home Page" on the World Wide Web at "<http://www.usgs.gov>".

For more information on all USGS reports and products (including maps, images, and computerized data), call 1-800-USA-MAPS.