



# PROTECT YOUR DRINKING WATER

*Safe and healthy lives in safe and healthy communities*

## Block Island Drinking Water Assessment Results

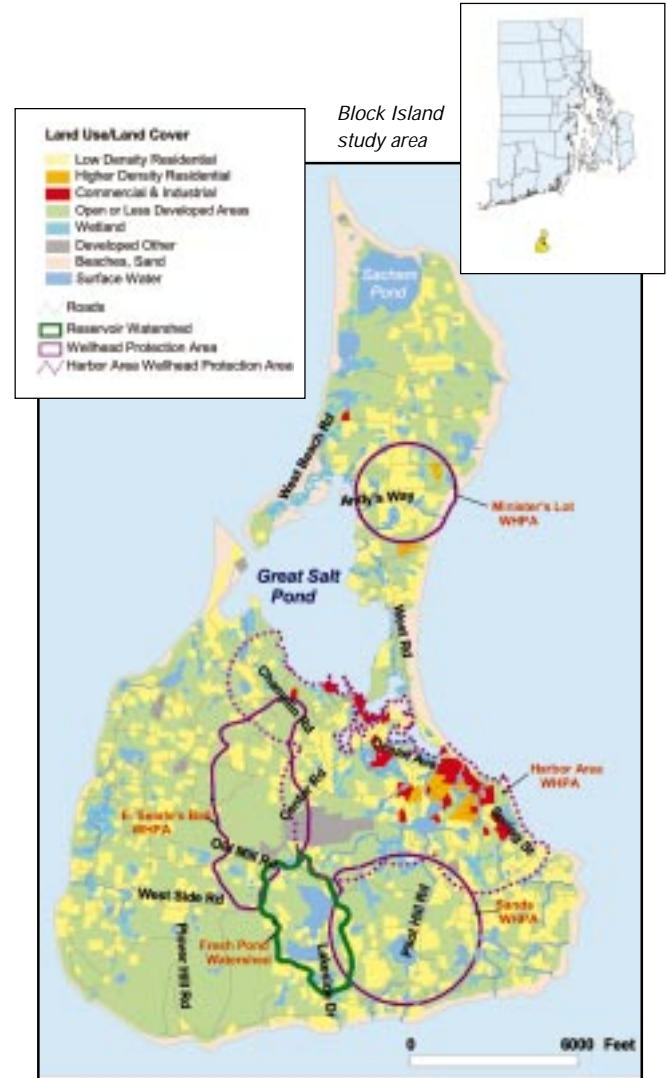
As an island ecosystem, Block Island depends on a limited supply of freshwater replenished only by rainfall. The Block Island Water Company serves the island's commercial district, providing almost 50 percent of the annual supply from July through August. This municipal water system relies on 5 active wells located in the Sands Pond wellhead protection area. Fresh Pond serves as an auxiliary reservoir.

Other public groundwater supplies on the island include: One community system operated by E. Searles Ball Memorial Housing serving year round residents; and twenty-six "non-community" supplies operated by restaurants, marinas, inns and hotels. These small public wells are located in the Minister's Lot Homeowner's Association and Harbor wellhead protection areas. The 1,200-acre Harbor wellhead area encompasses 29 wells located in or near the downtown commercial district that are maintained by 25 water suppliers. Here individual wellhead protection areas are so close together that most overlap, forming one protection area.

### Key Findings

Block Island's groundwater supplies are finite, irreplaceable, and essential to the town's quality of life and economic well being. The Town of New Shoreham has a long record of action to protect this critical resource, serving as a model for other communities.

- Island groundwater quality is currently excellent. A primary goal of the town's community comprehensive plan is to maintain the current high water quality for water supply and protection of unique habitat.
- Low density zoning for much of the island limits both development potential and future risk to water resources, particularly when coupled with other groundwater protection regulations. However, nitrogen levels in many of the public wells are slightly elevated, underscoring the need for continued implementation of the town's comprehensive wastewater management program.
- Leaks from underground fuel tanks and other hazardous material spills are an ongoing concern, especially in the Harbor Area wellhead protection area, which encompasses the downtown commercial district. Sewers in much of this area reduce risk of contamination from wastewater discharges provided sewer lines are watertight. However, sewers also reduce groundwater recharge, which can lower groundwater levels and promote salt water intrusion.
- More than 90 percent of island residents rely on private wells. Consequently, management practices to protect public water supplies also benefit residents and visitors relying on private well water.



### Source Water

The focus of this assessment is on public drinking water supply "source" areas – the wellhead protection area that recharges a well or the watershed that drains to a surface water reservoir. Source water is untreated water from streams, lakes, reservoirs, or underground aquifers that is used to supply drinking water.

This fact sheet summarizes results of a source water assessment conducted for the Block Island Water Company, the E. Searles Ball Memorial Housing supply, and the 26 water suppliers operating small public wells on the island. The assessment identified known and potential sources of pollution in these drinking water supply areas. The goal of this study is to help water suppliers, local officials and residents living in drinking water supply areas to take steps to keep water supplies safe.

# Land Use & Threats to Water Quality

To locate pollution threats most likely to affect water quality, this study evaluated and ranked each of the four wellhead protection areas and the Fresh Pond watershed based on land use and landscape features. These features include the percentage of high intensity land use, the number of sites where hazardous materials are used, and estimated nutrient sources such as septic systems and fertilizers. A rating from high to low was assigned to each factor and summed to create a pollution risk score for individual study areas.

## Susceptibility to Contamination



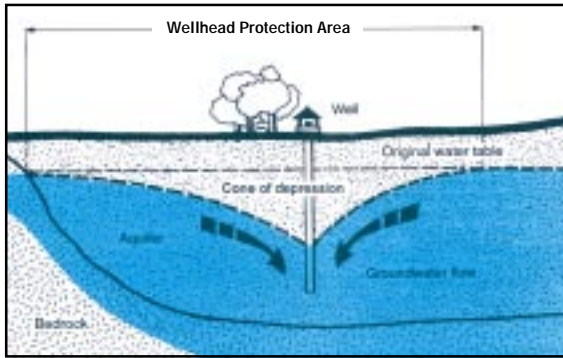
All public water supplies on the island are ranked as having a low susceptibility to contamination. This is an average ranking based on land use and existing water quality.

Note: A low ranking does not mean that the source is free from contamination risk. Some contaminants can affect taste, odor, and cost of water treatment at levels below safe drinking water standards. Without sufficient protection, any water supply can become contaminated.

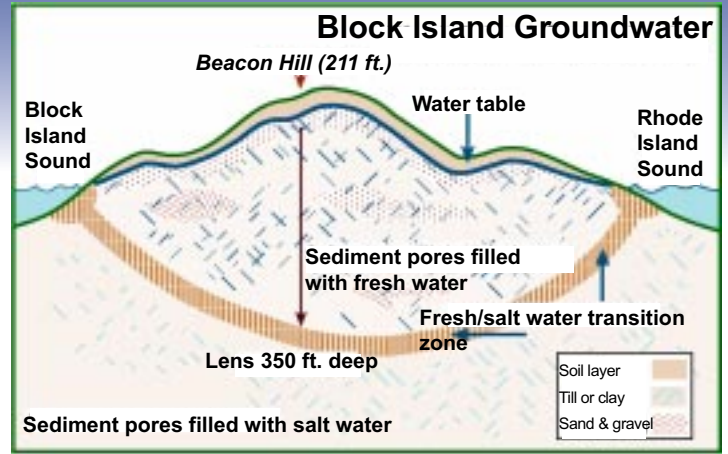
A **Wellhead Protection Area** is the land surrounding a well where rainwater seeping into the ground recharges groundwater flowing toward a pumping well or cluster of wells. Land use in this area directly influences groundwater quality and quantity.

Wellhead protection areas for wells drilled in bedrock and smaller wells, such as those located in the Minister's Lot and Harbor Wellhead Protection Areas, are delineated using a standard ground-water flow equation that generates a circle with a radius of 1,750 feet.

Wellhead areas for larger gravel wells, such as the E. Searles Ball Housing well, are delineated using mapped topography and a more complex groundwater model that generates an irregular shape based on ground-water flow rates in the aquifer sediments specific to the area.

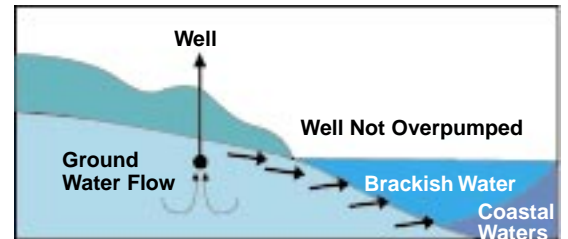


Fresh Pond slope. For maximum protection of Sands and Fresh Ponds, the shoreline area within 200 feet of the pond should be left naturally vegetated.

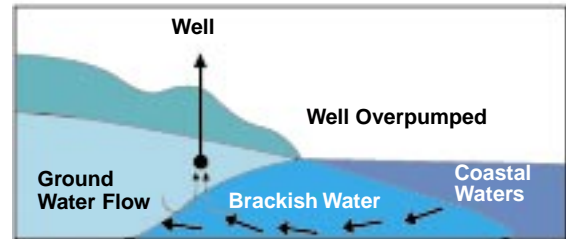


Block Island is made up of multiple layers of silt, clay and sand and gravel laid down by glaciers. Rainwater seeping into the ground is held in the pore spaces among these sediments, forming a lens-shaped body of water that "floats" on saltwater because its density is less than the surrounding saltwater. Within this freshwater lens, sediment pore spaces are filled with freshwater. Below the lens and at the shoreline edges, sediment spaces are filled with saltwater. The freshwater lens ranges from about 350 feet deep near the highest parts of the island, and thins dramatically at the perimeter. Over-pumping wells can draw saltwater into the freshwater lens, and contaminate well water, especially at the perimeter of the island, where the freshwater layer is thinnest. Source: Veeger, 1994. *Hydrogeology and Water Resources of Block Island, RI.*

## Natural Freshwater Flow



## Saltwater Intrusion



Aerial of northern Block Island looking northeast. Includes the Great Salt Pond and northern portions of the Harbor wellhead protection area.



## The Water-Wastewater Connection

Island groundwater quality is directly related to the quality of septic system effluent. Septic systems are a cost effective, environmentally sound treatment option for much of the island, helping to recharge groundwater and prevent saltwater intrusion.

- Approximately 85 percent of year round residents, and 54 percent of the summer population rely on septic systems.
- Keeping sewer service in the village area is a “smart growth” policy that concentrates sewers where needed most. Septic systems outside of the village center help recharge groundwater supplies.
- About 20 percent of homes were built before adoption of State septic system standards in 1970 and are most likely to have cesspools or other substandard systems. Under the town’s wastewater management program, cesspools must be replaced by 2005.
- Rental and seasonal homes with high occupancy have the potential to overload septic systems. Water conservation, up-to-date system design, and regular maintenance are needed to avoid system failure.
- Even properly functioning conventional septic systems are not designed to treat all pollutants in septic effluent. Nitrogen from septic systems can over-fertilize coastal ponds, leading to loss of shellfish habitat at levels far below drinking water standards. High nitrogen levels in groundwater can also mean bacteria and other wastewater pollutants are reaching groundwater. Advanced septic systems reduce bacteria and/or nutrients before effluent is discharged to the ground.

*Sands Pond. The town’s primary water supply wells are associated with Sands Pond.*



*Aerial of southern Block Island looking northeast. Area shown includes much of the commercial district within the Harbor wellhead protection area, the Sands Pond wellhead protection area, and the Fresh Pond watershed.*

## Current Conditions

- The Sands Pond wellhead area and the Fresh Pond watershed are both ranked as having a low susceptibility to contamination from potential sources of pollution in the surrounding wellhead and watershed areas. Land within 400 feet of each well is also protected by the Block Island Water Company. Future low-impact development, protection of naturally vegetated shorelines, and continued implementation of local groundwater protection measures will help ensure long-term drinking water quality.
- Sands Pond is not meeting State water quality standards due to turbidity, excess algal growth, and phosphorus. The RI Department of Environmental Management (RIDEM) is conducting field studies to determine the cause of impairment. Although nearby wells may draw in water from the pond, the risk to drinking water is very low given natural filtering in subsurface sediments and final treatment using reverse osmosis technology.
- RI HEALTH monitoring data shows that public water supplies are meeting all state and federal drinking water standards. Nitrates are, however, slightly elevated in many of the small public wells, indicating inputs of wastewater and fertilizers. Septic systems are estimated to contribute up to 70 percent of the nitrogen entering groundwater in the study areas.
- Sandy, well-drained soils found in 77 percent of the source water areas provide little defense against direct movement of pollutants into groundwater. In addition, the Island’s layered geology makes groundwater flow and pollutant movement unpredictable. These natural factors increase risk of contamination from sources such as underground storage tanks and outdated septic systems.
- The Harbor Area wellhead protection zone is the most urban and at greatest risk of spills and leaks from underground storage tanks and businesses that use or store hazardous materials. The amount of high intensity land use and impervious cover, each representing about 17 percent of the wellhead area, is considered a high risk to water quality. In 1999, RIDEM had listed six leaking underground storage tanks in this protection area. Continued removal of underground storage tanks, treatment and infiltration of stormwater, and use of managed septic systems outside of the existing sewer area, will help maintain groundwater recharge volume and water quality. These practices will also minimize pollutant inputs in areas draining to the Great Salt Pond.

## What You Can Do to Protect Water Quality

Because all island residents depend on groundwater as the only source of water supply, the town applied for and received U.S. Environmental Protection Agency designation as a "Sole Source Aquifer". This recognizes island groundwater as the "sole or principal" source of drinking water, justifying the highest level of protection.

### Local Government

The Town of New Shoreham has a longstanding environmental protection program that includes comprehensive planning, establishment of a town-wide computer mapping (GIS) system, \$300 re-imbursement to residents for the removal of underground home heating oil tanks, and a prohibition on new underground storage tanks. The town has also established the first comprehensive wastewater management program in Rhode Island. This includes mandatory inspection, repair and upgrading of septic systems, cesspool phase-out, and zoning performance standards requiring use of advanced treatment. As a result of action by the town and non profit organizations, more than a third of the island is permanently protected.

### Town Planning and Land Use Ordinances

Continued implementation of existing ordinances will help ensure long term water quality. Management of water supply, sewers, septic systems, and stormwater should be closely coordinated to maintain groundwater quantity and quality.

### Hazardous Materials

- In drinking water supply areas, retrofit stormwater systems to treat runoff from gas stations, convenience stores and other high-use areas.
- Coordinate with RIDEM annually to review facility inspection results, monitoring, and compliance records. Require employee education. Encourage voluntary participation in pollution prevention inspections.

### Controlling runoff and nutrients

- Use zoning setbacks for maximum protection of public and private wells, surface waters and wetlands in critical areas.
- Set targets for average impervious cover at current levels or no more than 10 percent in less developed areas. Limit site disturbance and keep runoff volume at pre-development levels. Update site design and stormwater runoff controls to treat and infiltrate runoff.

- Use "Conservation Development" subdivision design to preserve permeable soils as open space for stormwater recharge.

### Community Education and Good Housekeeping

Expand community pollution prevention education. Start by making this fact sheet available to residents and renters. Continue private well protection education; promote private well testing.

### Managing Wastewater/Keeping Septic Systems Functioning

- Inspect and maintain sewers to prevent leakage and infiltration.
- Ensure sewer and water service boundaries are consistent with Comprehensive Plan Goals for infill and expansion of the downtown area.

### Water Supplier

- Continue to acquire land for protection. Coordinate with other town offices to implement pollution prevention and public education programs.
- Inspect water supply and protection area regularly for potential pollution sources.

### Homeowners

Recycle oil and dispose of other hazardous materials properly. Remove underground fuel tanks. Maintain wooded buffers or restore natural vegetation along wetlands or surface waters located on your property. Carefully manage fertilizer and pesticide use. Limit watering. Comply with town wastewater management requirements. If you have a private well, have it tested annually. For more information contact URI Home\*A\*Syst (401) 874-5398, [www.uri.edu/ce/wq](http://www.uri.edu/ce/wq)

### Farmers and Landowners

Work with the USDA Natural Resource Conservation Service to develop a conservation plan that addresses proper nutrient, manure, pest, and irrigation water management. Contact them at (401) 828-1300, [www.ri.nrcs.usda.gov](http://www.ri.nrcs.usda.gov)

### Commercial and Industrial Businesses

Adhere to all laws, regulations, and recommended practices for hazardous waste management, above and underground storage tanks, and wastewater discharges. Check local regulations with town hall and state regulations with the RI DEM Office of Water Resources (401) 222-4700, [www.state.ri.us/DEM/program/benviron/water/index.htm](http://www.state.ri.us/DEM/program/benviron/water/index.htm)

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### For More Information

- **R.I. Department of Health, Office of Drinking Water Quality**, (401) 222-6867, [www.HEALTH.ri.gov/environment/dwq/Home.htm](http://www.HEALTH.ri.gov/environment/dwq/Home.htm)
- **URI Cooperative Extension Nonpoint Education for Municipal Officials (NEMO)** (401) 874-2138, [www.uri.edu/ce/wq](http://www.uri.edu/ce/wq)
- **Block Island Water Company** (401) 466-3232, [www.town.new-shoreham.ri.us](http://www.town.new-shoreham.ri.us)

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