

South Kingstown Drinking Water Assessment Results

All South Kingstown residents and businesses rely on groundwater as the only source of drinking water. Fifty percent of residents use private wells. The remaining 50 percent buy their water from one of four public water suppliers drawing groundwater from wells locating in the town's deep sand and gravel aquifers.

- The South Kingstown Water Division wells are located in the South Shore wellhead protection area, adjacent to Factory Pond. This system serves coastal areas from Green Hill to East Matunuck. The town also purchases water from United Water to supply Middlebridge residents.

- The University of Rhode Island has its own water system, relying on wells sited in the Chipuxet groundwater aquifer to serve approximately 14,000 students and staff during the school year.

- The Kingston Water District supplies the Kingston and West Kingston areas, pumping from two wells sharing the Chipuxet aquifer. Because Kingston and URI wells are relatively close by, their wellhead areas overlap, forming one combined wellhead protection area.

- United Water Rhode Island maintains six wells located in the Mink Brook aquifer. This private water company supplies about 19,000 persons – half the combined population of Wakefield and Narragansett.

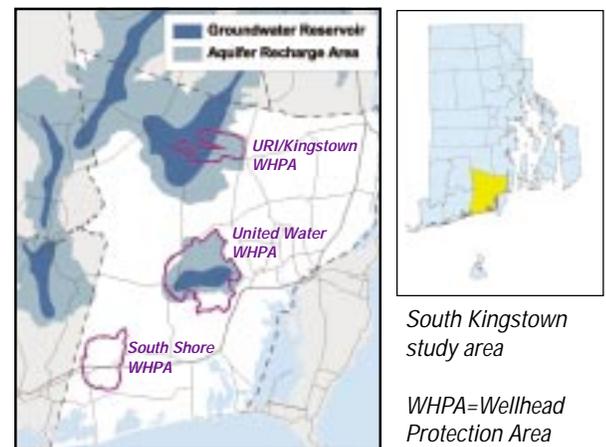
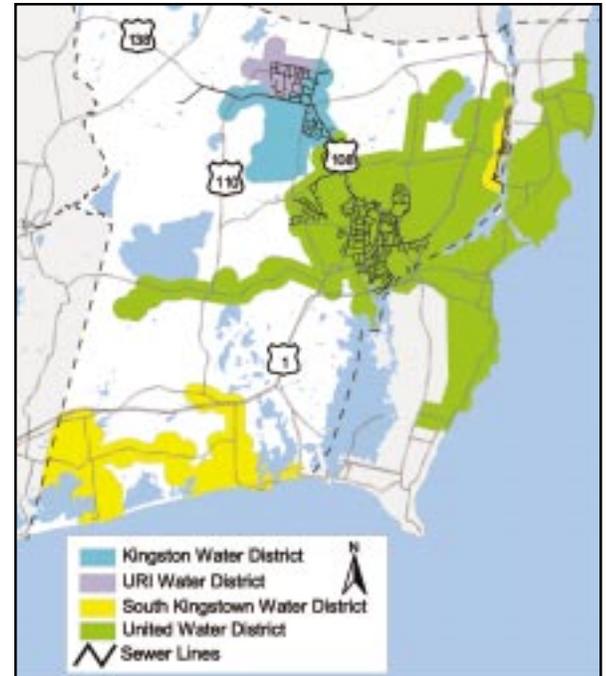
Key Findings

South Kingstown's groundwater supplies are finite, irreplaceable and highly vulnerable to contamination. The Town has a long record of action to protect this critical resource, including adoption of groundwater plans and overlay zoning.

- Low density zoning limits development potential and minimizes future pollution risks. However, actual impacts are difficult to predict and depend on how landowners manage their property, as well as continued implementation of local protection measures.

- The URI and Kingston wellhead protection areas are at greater risk of contamination due to intense campus and village development. In recent years URI has taken aggressive action to enhance groundwater protection through new safety procedures and training, planning for sustainable development, and use of permeable parking to maintain groundwater recharge.

- South Kingstown's groundwater aquifers yield a high quality and reliable supply. Continued adoption of protection measures will help ensure future drinking water quality. Because groundwater recharge areas are associated with unique aquatic habitat and recreational waters, steps taken to protect water supplies will also protect these sensitive resources.



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 major water suppliers in South Kingstown. It identifies known and potential sources of pollution in drinking water supplies and ranks their susceptibility to future contamination. To support town planning, the Chipuxet groundwater protection overlay district in the northeast corner of town was also evaluated. 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 high-risk features most likely to affect water quality, this study evaluated and ranked each wellhead protection area considering factors such as: the intensity of development, the number of sites where hazardous materials are used, how easily contaminants may move through soils, the sampling history of the water, 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 each study area, and an average susceptibility rank for each water supplier.

Note: A wellhead protection area for a new Kingston Water well was delineated after this study was completed and was not assessed. This wellhead is almost entirely forest and wetland and would have a low risk of contamination.

Susceptibility to Contamination



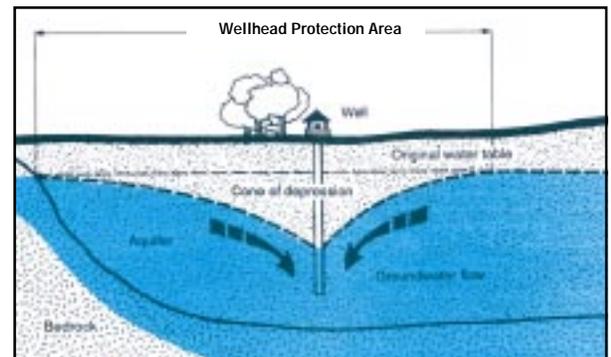
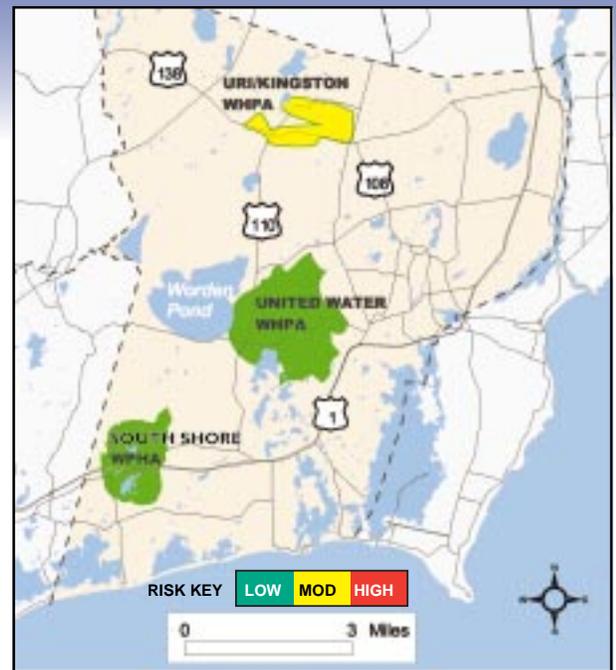
South Kingstown Water District and United Water



Kingston Water and University of Rhode Island

The results show that the South Kingstown Water District and United Water have a low susceptibility to contamination overall. The Kingston Water and University of Rhode Island supplies are moderately susceptible to contamination. This is an average ranking for each water supplier based on land use features and existing water quality. Additional land use factors used to assess major supplies may result in higher risk ratings for specific features and locations.

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 infiltrating rainwater recharges groundwater flowing to a well or cluster of wells. Within a wellhead protection area pollutants entering groundwater can easily reach a pumping well. Source: Center for the Environment, Cornell University



The Queens River overlies the Chipuxet River Aquifer, part of South Kingstown's groundwater protection district in the northwest corner of South Kingstown. The river system and surrounding lands are a regionally significant unique natural habitat with rare and endangered dragonflies and sensitive fresh water mussels. The US Geological Survey is currently studying low flow problems caused by water withdrawals. Because the river system is connected to the groundwater aquifer, actions taken to safeguard groundwater quality will also protect this valuable habitat. Photo by Lisa L. Gould.



The University of Rhode Island campus covers about 40 percent of the Kingston Water/URI wellhead protection area. URI has recently adopted sustainable development plans. Implementing these "green campus" policies will help reduce risks to groundwater resources.

United Water and South Kingstown South Shore Wellhead Protection Areas

Highly permeable, sandy soils found in over 75 percent of the South Shore wellhead area increase the risk that polluted runoff and septic system effluent will rapidly seep into the ground without adequate treatment.

Nitrate concentrations are slightly elevated in the United Water wells and also the URI/Kingston wellhead. In each case, agricultural fertilizers are estimated to contribute about 70 percent of the share. RIDEM field monitoring confirms that nitrate concentrations in shallow groundwater below south county turf fields are relatively high, and increase in response to high fertilizer rates and overwatering. However, proper fertilizer management can effectively reduce fertilizer losses. Long term water supply monitoring records show that nitrates in one United Water well has actually declined from an average of 5 mg/l to levels below 2 mg/l, most likely due to the shift from more intensive potato farming to turf production. Similar trends can be expected in other wells.

Because these groundwater resources are associated with unique aquatic habitat and shellfishing waters, actions taken to protect water supplies have the dual benefit of protecting these sensitive resources.



Kingston Water and University of Rhode Island Wellhead Protection Areas

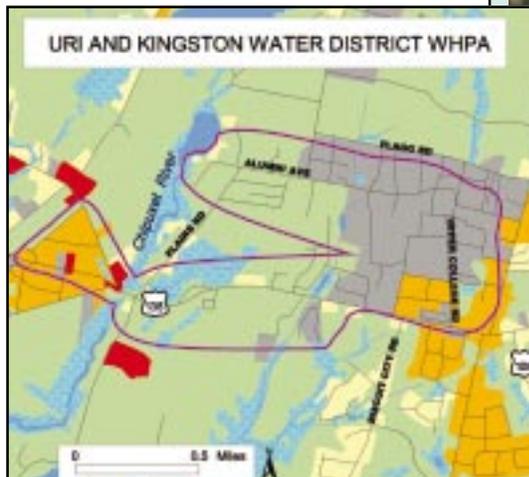
The URI and Kingston wellhead protection area encompasses most of the campus, with about forty percent of the wellhead highly developed institutional land or village. Much of the remaining land is turf or playing fields where fertilizers are used.

Extensive pavement and other impervious cover is considered a high risk to surface waters, while also reducing groundwater recharge potential. Facilities where hazardous materials are used or generated increase the threat of spills or improper disposal.

Sewers extending through 75 percent of this wellhead reduce the risk of groundwater contamination provided sewer lines and pump stations are checked for leaks.

Water resources are showing signs of impact from watershed activities. Nitrogen levels are slightly elevated in two Kingston /URI wells, indicating the presence of fertilizers or wastewater. In addition, the Chipuxet River is not meeting State water quality standards due to impaired aquatic habitat, most likely due to water withdrawals which exceed safe yields. Turf producers and water suppliers are working with the Rhode Island Resources Board to set sustainable water use rates.

With future development little change in risk is expected. Our build out estimates are based on local zoning, however, and do not take into account new construction on the URI campus. With expansion, impervious cover and runoff would continue to increase unless the University adopts policies to limit runoff and restore stormwater infiltration.



Future threats

Water suppliers, the town, and local land trusts have been working to protect open space in groundwater recharge areas. Yet, between 26 to 44 percent of forest and cropland in these areas could still be converted to low density residential use. An additional 50 acres of industrially zoned land could be built in the Chipuxet aquifer protection district. Actual loss of forest and farmland will depend on the proportion of new development reserved as open space and whether land owners keep large lots wooded. Conservation subdivision design could be used to preserve 50 percent of more of this developable land as open space.

Build out projections show that nutrient inputs are likely to remain the same or decrease but runoff, septic systems and lawn fertilizers will become more significant sources. Impacts are likely to be greater if landowners develop their properties intensively and if highly marginal sites are developed. With most new development occurring outside the sewer district, the shift from agricultural to residential sources underscores the need for proper siting and maintenance of septic systems.



Farmland typical of the United Water wellhead protection area. Photo courtesy of South County Land Trust.



What You Can Do to Protect Water Quality

Municipal Boards and Government

Because South Kingstown depends 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 groundwater as the "sole or principal" source, justifying the highest level of protection. The town's complete dependence on sole source aquifers and existing high risk development point to the need for continued implementation of protection measures.

Town Planning and Land Use Ordinances

- Designate a working group to review assessment results, select priorities, and incorporate key recommendations into town plans and ordinances. Coordinate regionally on water quantity and quality issues. Coordinate drinking water protection with Phase 2 Stormwater Plans.
- Expand community pollution prevention education. Start by mailing this fact sheet to aquifer residents. Adopt model practices at municipal garages, schools and parks.

Hazardous Materials

- Review and update groundwater zoning as needed to prohibit new facilities using or storing hazardous materials. Require existing facilities to upgrade to state-of-the-art pollution prevention controls with expansion or redevelopment. Retrofit stormwater systems to treat runoff from gas stations, convenience stores and other high-use areas.
- Coordinate with RI DEM annually to review facility inspection results, monitoring, and compliance records. Promote employee education and voluntary participation in pollution prevention inspections.
- Prohibit disposal of "clean fill" and other construction waste in aquifer areas.

Controlling Runoff and Nutrients

- Use zoning setbacks for maximum protection of public and private wells, small headwater streams and wetlands.
- Set targets for maximum 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 to preserve permeable soils as open space for stormwater recharge.

Managing wastewater/keeping septic systems functioning

- Inspect and maintain sewers to prevent leakage and infiltration
- Continue to implement the town's wastewater management program, to prevent new construction in marginal sites, oversee system maintenance, and require advanced treatment for large systems and those in critical locations.

Water Supplier

- Implement recommendations of the latest water supply system management plan.
- Continue to acquire land for protection. Work with local officials to implement land use protection measures and education programs.
- Inspect water supply and protection area regularly for potential pollution sources.

Homeowners

- Recycle oil and dispose of other hazardous materials properly. Maintain wooded buffers or restore natural vegetation along wetlands or watercourses that run through your property. Reduce fertilizer and pesticide use. Limit watering.
- All septic systems need regular care to function properly and avoid costly repairs. Comply with town wastewater management requirements. For information contact URI Home*A*Syst (401) 874-5398, 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.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 city/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

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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
- **URI Cooperative Extension Nonpoint Education for Municipal Officials (NEMO)** (401) 874-2138, www.uri.edu/ce/wq
- **South Kingstown Water Division** (401) 789-9331, www.southkingstownri.com/code/pw_water.cfm
- **Kingston Water District** (401) 783-5494
- **University of Rhode Island Utilities Management** (401) 874-7896, www.uri.edu/facilities2.html
- **United Water Rhode Island** (401) 789-0271, www.unitedwater.com/uwri/default.html

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