

# Jamestown Brook Watershed Plan

February 2021



North Pond Reservoir

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Office of Water Resources  
RI Department of Environmental Management

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**Acknowledgements:**

This watershed plan was prepared by David Augustyn, Seasonal Policy Intern with the Rhode Island Department of Environmental Management Office of Water Resources with guidance and assistance provided by Ernie Panciera, Jon Zwarg and Jenny Paquet, all from the Office of Water Resources.

## **I. Introduction**

The Jamestown Brook Watershed has long been recognized by the residents of Jamestown and the state of Rhode Island as an essential natural resource. Its waters provide drinking water for the Jamestown Water District. The Jamestown Brook watershed encompasses the North Pond Reservoir (aka Carr Pond), Jamestown Brook, South Pond Reservoir (aka Watson Reservoir), and the town's public wells. Additionally, the wetland complex connecting the two reservoirs and the significant portions of open space in the watershed are important ecological resources.

Protecting these water resources is critical for the health and welfare of the town of Jamestown. Although the reservoirs provide excellent water quality, RI Department of Environmental Management (DEM) has determined that Jamestown Brook alone does not meet water quality standards for bacteria, copper, iron, and lead.

### **A. Purpose of Plan**

This is a small, well protected watershed in which Jamestown has undertaken many actions to ensure high quality water and aquatic habitat. However, this plan is provided to the Town as a tool to use in the continuing efforts to maintain and improve protection and restoration of water quality and aquatic habitat in the Jamestown Brook watershed.

The watershed plan provides an opportunity to:

- Identify and prioritize water quality issues within the watershed;
- Collaborate across all levels of the public and private sectors to determine and implement actions that are supported by sound science;
- Compile actions or initiatives from other plans and reports into one unifying and integrated vision and action plan for the protection and restoration of water quality and aquatic habitat in the watershed; and
- Identify partners and stakeholders.

In addition, this Plan will enable the town to be eligible for USEPA Section 319 funds that are administered by DEM.

### **B. Compelling Issues in the Watershed**

#### 1) Protect Drinking Water Supplies

The Jamestown Brook Watershed supplies high quality drinking water to the Jamestown village and approximately 58% of Jamestown's residents with the service area extending from Weeden Lane south to Beavertail Point (Water Supply System Management Plan 2017). The North Pond Reservoir is the primary source of drinking water for the town, supplemented by 2 nearby bedrock wells and South Pond Reservoir. The Jamestown Water System has an emergency connection with the town of North Kingstown that can be established by connecting a hose between the systems over the Jamestown Verrazano Bridge.

It is vital to the health of Jamestown's citizens and in providing economic prosperity that good water quality be maintained in the source waters. Protecting the source of supply is far cheaper than treating the water to remove contaminants.

## 2) Wetlands Protection

The extensive wetlands complex surrounding the Jamestown Brook is considered one of the most important wildlife habitats on Conanicut Island. These wetlands support both threatened species and species of interest from a state perspective, most notably the Leopard Frog (Jamestown Comprehensive Plan 2015). The survival and population robustness of this wildlife depends upon diligent management of the ecological resources surrounding the Jamestown Brook.

Freshwater wetlands and adjacent upland buffers provide significant and economically valuable contributions to clean water, scenic beauty, and wildlife habitat. These wetlands not only filter pollutants from water flowing between North Pond and South Pond, they also store and slowly discharge storm water runoff from surrounding areas. These aquatic habitats can be degraded by excess nutrients, fragmentation, and disturbance.

## **II. Watershed Description**

### **A. Surface Water**

The Jamestown Brook watershed is located in the central portion of Conanicut Island, a 6,185-acre bedrock island located at the mouth of the Narragansett Bay. The watershed covers an area of approximately 640 acres, or 1.1 square miles, and encompasses the sub-watersheds of the island's two public water supply reservoirs and a large portion of the town's wellhead protection area.

The North Pond Reservoir is a 27.5 acre waterbody created by an impoundment that is located north of Rt. 138 and east of North Main Road with a sub-watershed area of 192 acres. It is a relatively shallow reservoir and experiences water level declines in the dry summer months. The outlet of North Pond forms the Jamestown Brook, a 1.4 -mile long stream that flows into the South Pond Reservoir. South Pond is a 7.3-acre impoundment at the southern end of the Jamestown Brook, which has a sub-watershed area of 448 acres. The outlet at the South Pond dam is a small stream that flows into Dutch Island Harbor. The South Pond Reservoir has experienced dramatic growth of phragmites, a resilient invasive species, in recent years.

Figure 1. Jamestown Brook Watershed Overview



## **B. Groundwater**

Groundwater and surface water in the watershed are closely interconnected. Groundwater is recharged by precipitation that filters down through the soils and then moves underground. At some point the groundwater will discharge to the ponds, brook, or wetland. Because surface waters and groundwater are closely connected, changes in water flow and pollutant inputs affect both resources.

Infiltrating rainwater will seep into the cracks of the Island's underlying bedrock. This freshwater in the Conanicut Island bedrock aquifer forms a lens-shaped body of water that floats on saltwater. Thus, the Island's bedrock aquifer has limited yield and over pumping near the coast can draw salt into wells. Because the public wells in the watershed are located in the middle of the Island just south of North Pond, the risk of salt water intrusion is unlikely. DEM established a circular wellhead protection area that is an approximation based on the well's pump rate of the area in which groundwater in the bedrock may flow towards the pumping wells. (See Figure 1.)

In 2008, after receiving a petition from the North End Concerned Citizens, the US Environmental Protection Agency designated the entire Conanicut Island aquifer system as a Sole Source Aquifer (EPA Sole Source Aquifer Designation, Federal Register August 14, 2008). The Sole Source Aquifer designation means that the Island's aquifer system and its connected surface waters are the sole source of drinking water for the residents and businesses on Conanicut Island. Furthermore, there are no viable alternative sources of sufficient supply and if contamination were to occur it would pose a significant public health hazard and a serious financial burden to the area's residents. Due to this designation, any project involving federal funds is subject to a review by US EPA to determine if there will be impacts to groundwater.

## **C. Drinking Water in the Watershed**

Groundwater drawn from on-site wells serves as the sole source of drinking water for property owners in the watershed. Homeowners and businesses are responsible for testing their own water supply and taking actions to protect it on their property from septic systems, lawn care, and other homeowner activities that may involve potential pollutants. Private well owners should test their wells on a regular basis.

## **D. Wastewater Treatment in the Watershed**

All of the residences and business in the Jamestown Brook watershed utilize onsite wastewater treatment systems (OWTS). The town operates a wastewater treatment facility and collection system that serves only a small portion of the town centered around the village area. According to the 2003 "Facilities Plan Update, Wastewater Treatment & Collection System" (Siegmond & Associates, Inc.), which is the most recent Plan, "The service area has essentially remained the same for the past 20 years and no change is forecasted in the next 20 years since current policy in



the Town’s comprehensive plan only allows properties fronting existing sewer mains to connect to the collection system.”

### Jamestown Brook Drinking Water: Reservoirs to Village

The Jamestown Water System consists of two surface reservoirs, two bedrock supply wells, a pretreatment facility, a treatment plant put into service in 2010, two water storage facilities, and the distribution piping network.

Raw water from North Pond and from the bedrock wells near North Pond flows via gravity through a 7,500-foot long, 10-inch PVC pipe following the Jamestown Brook stream corridor to the pretreatment station located at South Pond. The pretreatment station can pump water from either the North Pond pipe or directly from South Pond to the water treatment plant, depending on the water quantity in the reservoirs. Operation norms suggest that South Pond is typically not drawn upon directly. Instead water from South Pond is regularly pumped to the surface waters of North Pond for the purpose of reducing sludge waste during the treatment process. At the pretreatment stage, the water supply receives primary treatment in the form of chlorine dioxide and pH adjustments to kill bacteria and microorganisms, as well as to modify color, odor, and taste, before it is pumped to the primary water treatment facility.

The state-of-the-art membrane filtration plant located at 295 North Road was put into service in 2010 next to the site of the previous water treatment plant. The water received from the pretreatment facility enters a raw water wetwell where it is passed through a basket screener and then subsequently pumped into chemical mixing tanks containing potassium hydroxide for pH adjustment and alum as a coagulant addition. Following the chemical mixing tanks, the water is pumped through a membrane filtration tank. Treated water is pumped from the treatment plant to two 1.0 MG standpipes located on Howland Avenue for distribution into the system. Water then flows through distribution piping consisting of approximately 20.5 miles of mostly 6- and 8-inch water main to properties from Weeden Lane south to Beavertail Point.

The Jamestown Water District maintains an emergency interconnection with the North Kingstown water system through a 6-inch flexible water line running from a hydrant on Tashtassuck Road in Jamestown to a hydrant on Lorelei Drive in North Kingstown. The connection is installed by driving a trailer with mounted hoses across the Jamestown Verrazano Bridge to connect the hydrants.

Source: Jamestown Water Supply System Management Plan, 2017

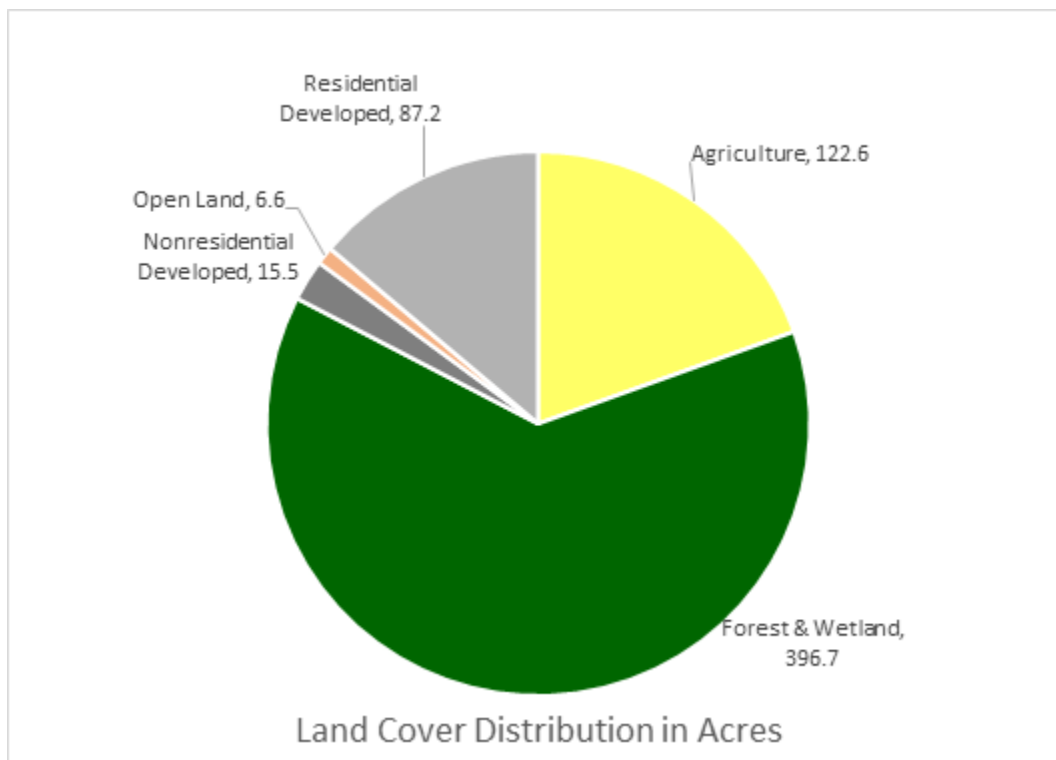


## E. Land Cover

Land cover refers to what is present on the land surface in comparison to land use, which is what is permitted, practiced or intended for a given area. What is on the land and the activities that occur on the land influence the quality of the surface waters and groundwater in the watershed. In areas with good vegetation cover and little disturbance, most rainfall soaks into the soil rather than running off the ground, stream flows tend to be steady, and water quality is good. In developed areas with a lot of hard surfaces such as pavement and buildings however, water runs off quickly, so that little rainfall soaks into the soil, stream flows have high peaks (floods) during storms and low flows in between, and water quality is much poorer. (See discussion of impervious cover under Stormwater Management in Section IV(A).)

The type of activity will also influence the threat to water quality – for example, there is a far greater likelihood of chemical pollution of groundwater or surface water from spills, leaks in commercial and industrial areas than from residential areas. Conversely, residential areas will likely be a greater source of nutrients than commercial areas.

Forests and wetlands cover 63.1% of the Jamestown Brook watershed. Agriculture and developed areas (mostly residential) cover 19.5% and 16.4% of the land area respectively.



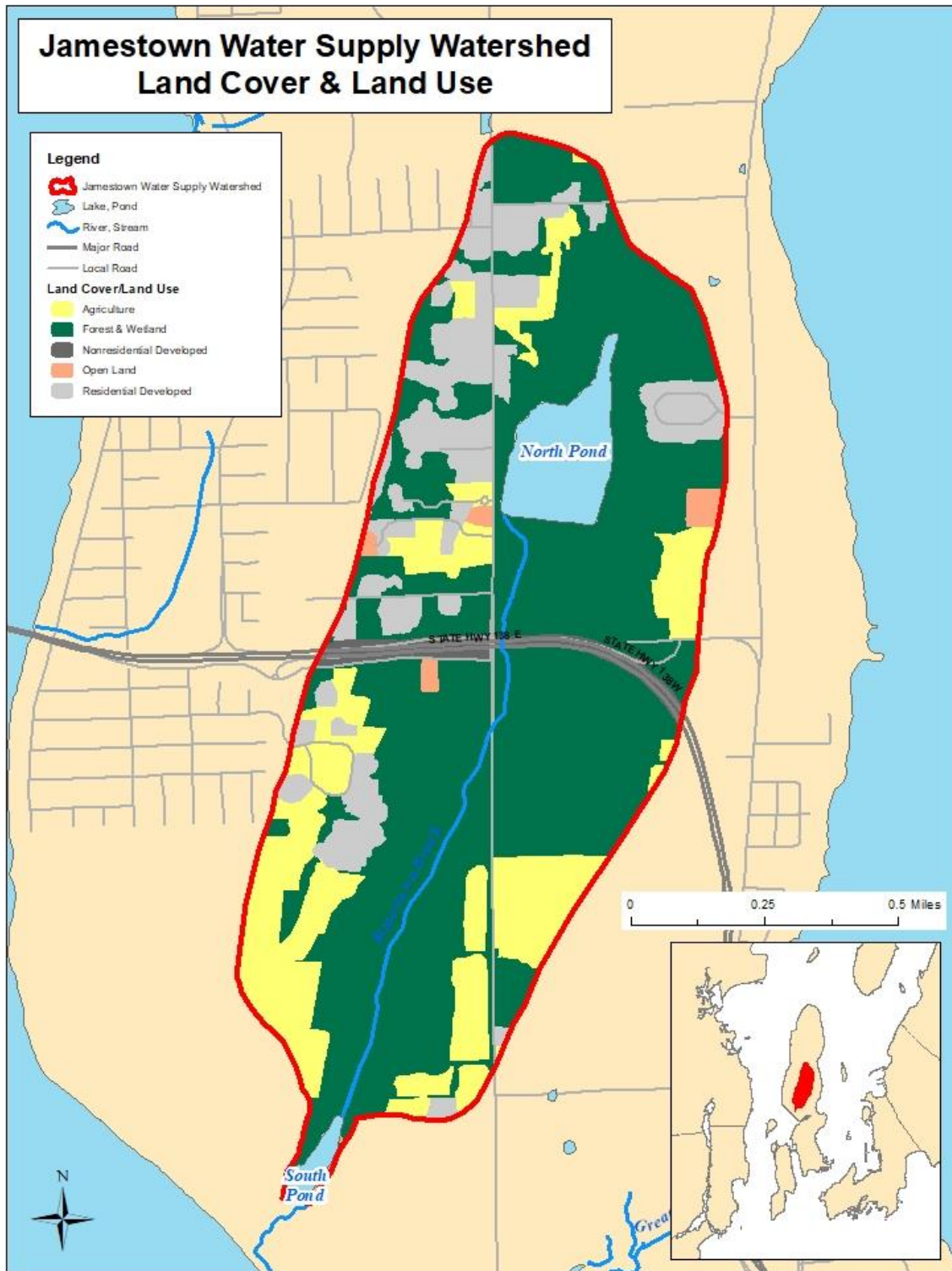
Land Use	Watershed Area (Acres)	Percent of the Watershed
Agriculture	122.6	19.5%
Forest & Wetland	396.7	63.1%
Nonresidential Developed	15.5	2.5%
Open Land	6.6	1.1%
Residential Developed	87.1	13.9%
<b>Total</b>	<b>628.5</b>	<b>100.00%</b>

Note: Totals and percentages for this do not include the open water portion of the watershed (total watershed area including open water is 661.3 acres).



Public Well near North Pond

Figure 2. Jamestown Brook Watershed Land Cover





### **III. Water Quality Conditions**

#### **A. Surface Water**

The DEM Rhode Island Water Quality Rules specify the criteria and designated use for each waterbody in the State. DEM has identified and listed 3 waterbodies in the Jamestown Brook watershed – North Pond, Jamestown Brook and South Pond. All 3 waterbodies have a designated use classification of AA, which means that these waters should meet water quality standards and support the following uses:

- Public drinking water supply
- Fish and wildlife habitat
- Fish consumption
- Primary and secondary contact recreation

When a waterbody is determined to not meet its designated use, it is considered “impaired”, and listed on the State of RI’s ‘Impaired Waterbody List.’ A Water Quality Restoration Plan, also called a Total Maximum Daily Load (TMDL) analysis, is then scheduled to be developed for that waterbody for its specific pollutant and impairment. Key elements of a TMDL include identifying the pollutant sources and the degree of pollutant reduction necessary to attain the applicable water quality standards. Additionally, TMDL’s include recommended mitigation actions to achieve the necessary water quality improvements.

Regular water quality sampling of North Pond and South Pond shows that the ponds are meeting water quality goals. However, sampling of Jamestown Brook from the 1990s and early 2000s showed that the Brook exceeded water quality criteria and did not support use for primary and secondary recreation due to fecal coliform levels and did not support fish and wildlife habitat due to elevated levels of copper, iron and lead. This resulted in the Jamestown Brook being listed by DEM as impaired for bacteria and metals (see further discussion below). DEM had planned to conduct updated sampling of the Brook in 2020 but this sampling effort was postponed to 2021.

**Despite the listed impairments in Jamestown Brook, water supplied from North Pond and South Pond meets drinking water standards.**

#### ***Bacteria (fecal coliform)***

Fecal coliform is often utilized as an indicator bacterium to measure a waterbody’s potential for disease transmission. Elevated fecal coliform levels in surface waters increase the likelihood that associated pathogens are also present. Pathogens can adversely affect human health through skin contact, such as swimming, or through ingestion of water or contaminated fish.

The sampling for bacteria in Jamestown Brook was done from 2000 to 2003, and DEM developed a TMDL for Fecal Coliform bacteria in the Jamestown Brook as part of the ‘Rhode

Island Statewide TMDL For Bacteria Impaired Waters (2011). The TMDL determined that a 23% pollutant load reduction is necessary to meet the water quality standard for bacteria.

Potential sources of fecal coliform to waters in the Jamestown Brook watershed are:

- Stormwater runoff  
Stormwater transports bacteria to the receiving waters from domestic animals (pet waste), wildlife, and failed septic systems that has accumulated on streets, parking lots and lawns.
- Malfunctioning OWTS
- Agricultural activities  
Agricultural practices such as allowing livestock to graze near streams, crossing livestock through waterbodies, spreading manure as fertilizer, and improper disposal of manure can contribute to bacterial contamination.
- Waterfowl, wildlife, and domestic animal waste

#### Metals (Copper, Iron, and Lead)

Copper, iron and lead are naturally occurring metals in soil, however, they were detected in the late 1990s and early 2000s in Jamestown Brook at levels that may impact fish and wildlife habitat. The likely source for the metals is stormwater runoff from Route 138 and North Main Road.

## **B. Groundwater**

Because groundwater contamination is usually localized in nature, no ambient groundwater monitoring network has been established in RI. Groundwater quality monitoring presents particular challenges due to the manner in which pollutants move in different aquifer settings. Once introduced into an aquifer, groundwater contaminants may form plumes that move very slowly, with very little mixing and at different depths depending on the topography, subsurface geology, contaminant and types of soils. The best source of available information on ambient groundwater quality in RI has been the RI Department of Health's data on public drinking water wells that are regularly tested to ensure compliance with drinking water standards.

Aside from the 2 public wells near North Pond that meet drinking water standards there is no data on groundwater in the watershed. Although there is no suspicion of groundwater contamination in the watershed, potential threats to groundwater quality in the watershed include:

- Failing and sub-standard OWTS
- Improper use of OWTS for disposal of household hazardous waste
- Fertilizer and pesticide application (farms and home)
- Stormwater infiltration

## IV. Pollution Source Management

Pollution source management techniques include regulatory actions, best management practices, voluntary actions, and education/outreach. Below is a description of potential pollution sources and how they have been managed in the Jamestown Brook watershed.

### A. Stormwater Management

Stormwater has been identified as a conveyor of pollutants to the Jamestown Brook watershed in the Rhode Island Statewide TMDL for Bacteria Impaired Waters. The pollutants typically washed off the ground and carried by stormwater come from all around us:

- Bacteria and other pathogens that may limit recreational use of waters from:
  - Failing septic systems and cesspools
  - Pet waste left on the ground,
  - Farm animal and wildlife (in particular, resident Canadian geese are a problem in RI);
- Nutrients (nitrogen and phosphorus) that can result in algal blooms (including toxic cyanobacteria) that can lead to cloudiness in water and low dissolved oxygen that harms aquatic life from:
  - Farm and lawn fertilization
  - Septic systems and cesspools
  - Waste from pets, farm animals and wildlife
- Salt and sand from winter road safety maintenance;
- Soil and sediment from construction sites, plowed farm land, and eroding areas can result in changes in aquatic habitat conditions, and other pollutants (such as metals) can be attached to and transported with the sediments;
- Petroleum products and metals from automobiles;
- Combustion of fossil fuels also contributes nitrogen, phosphorus, mercury, and other contaminants that are deposited from the atmosphere directly into waterbodies or on the ground where it is transported in stormwater.

The degree to which stormwater impacts water quality in any particular watershed is a function of the amount of impervious cover and how stormwater generated from the impervious cover is managed. In developed areas, large areas of natural landscape cover have been replaced with non-porous, or impervious, surfaces (e.g. buildings, streets, and parking areas, and even highly compacted soils from over use or poor landscaping). Impervious cover is used as an indicator of the intensity of land development and has been scientifically linked to adverse impacts on surface water quality. The negative impacts result from both the pollutant loadings transported by stormwater runoff and the physical changes that occur with increased volumes and velocities of runoff; e.g. eroded stream channels and reduced biodiversity of existing streams. Because water runs more rapidly off an impervious area, flooding also becomes both more common and more intense downstream. Meanwhile, because less water is soaking into the ground, water tables may be altered which may result in impacts to wetlands, streams and wells. In brief, impervious surfaces may significantly change both the *quality* and *quantity* of runoff.

Further, rain events are becoming “flashier” due to climate change—they are often shorter in duration but produce much more rain than in the past. This causes the negative impacts of impervious surfaces to be even greater.

The Jamestown Brook watershed has an impervious area coverage of 6.5% (see Figure 3). Typically, watersheds with impervious cover of less than 10% have generally good to excellent water quality and aquatic habitat. The water quality impairments in the Jamestown Brook indicates perhaps a localized impact from stormwater from North Road.

Stormwater discharges are regulated under the DEM Pollutant Discharge Elimination System Program (RIPDES) General Permit for Stormwater Discharge from Small Municipal Separate Storm Sewer Systems (MS4s). The Town of Jamestown and the Rhode Island Department of Transportation are MS4 operators in the Jamestown Brook watershed and both have prepared the required Stormwater Management Program Plans (SWMPP). The Stormwater management Program Plan (SWMPP) describes the Best Management Practices (BMPs) utilized for each of the following six minimum measures:

1. Public Education and Outreach
2. Public Involvement/Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Runoff Control
5. Post Construction Runoff Control
6. Pollution Prevention/Good Housekeeping

Pursuant to the MS4 permit, Jamestown submits an MS4 Annual Report documenting stormwater management activities townwide. One of the more significant recent accomplishments was the construction of water quality basins on North Road that treat stormwater before it enters North Pond. North Road is a town road from Cedar Lane north and a state road south from Cedar Lane.

RIDOT has significant responsibilities for stormwater management in the watershed due to runoff from Rt 138 and North Road. As part of the design of Rt 138, all of the stormwater from Rt 138 in the watershed is collected in a closed drainage system and is pumped out of the watershed and discharged after treatment to the West Passage. A pump station recommissioning project was completed in 2015. As noted above stormwater from North Road, which crosses Jamestown Brook, is likely adversely impacting water quality in the Brook.

Proper design, siting and installation of stormwater BMPs as property is developed or redeveloped are not enough to achieve water quality goals. Two additional challenges associated with stormwater management include:

- Proper maintenance of BMPs: Ensuring maintenance of the existing stormwater infrastructure is critical and can be an often overlooked task; and
- Improving treatment of stormwater from existing developed lands. The responsibility for upgrading stormwater infrastructure in the watershed rests largely with the Town and the RI DOT.



## Low Impact Development

Low impact development (LID) is a comprehensive approach to project design that minimizes the impacts of development or re-development on our water resources by improving stormwater management. The goal of LID is to design a site so that water moves over and through the site similarly to how it would move under natural conditions. Stormwater treatment practices are placed throughout the site to decrease, infiltrate, manage and treat runoff as close to the point where it is generated as possible.

To assist in incorporating LID into community planning processes, DEM, University of RI and RIDOT have developed “LID Site Planning and Design Techniques: A Municipal Self-Assessment.” (See DEM webpage at <http://www.dem.ri.gov/programs/benviron/water/permits/ripdes/stwater/t4guide/lid-checklist-primer.pdf> ) The self-assessment contains questions covering a variety of topics related to low impact development (LID). These topics range from open space and land disturbance to impervious surfaces and soil erosion control. Working through the assessment allows an in-depth review of the local regulations that shape development in the community and a comparison to LID benchmark techniques and practices. The intent is to identify which LID techniques are in place and which techniques could be improved or employed.

## Stormwater Utility

One way to address local funding shortfalls for BMP maintenance is to explore the feasibility of establishing a sustainable local funding source such as a stormwater enterprise or utility fund that will assess property owners a stormwater fee. A stormwater fee is based on the demand placed on the municipal stormwater system by each user, not on property’s assessed value. It is therefore considered more equitable than other funding methods since users with a large burden on the stormwater system will pay their fair share. As with a water or sewer utility, a stormwater utility fee generates revenue based upon the amount of stormwater generated on a property and conveyed to a public stormwater system. These fees are assessed by measuring the amount of impervious cover within a parcel and are determined by the stormwater management financing needs of the municipality. They can be adjusted over time to continually meet those needs. A stormwater utility provides a means for:

- Consolidating or coordinating responsibilities that were previously dispersed among several departments and divisions;
- Generating funding that is adequate, stable, equitable and dedicated solely to managing stormwater; and
- Developing stormwater management programs that are comprehensive, cohesive and consistent year-to-year.



North Pond Stormwater BMP

Figure 3. Jamestown Brook Watershed Impervious Cover





## **B. Onsite Wastewater Treatment Systems**

Onsite Wastewater Treatment Systems (OWTS) are used to receive, treat, and disperse sanitary wastewater into the soil. Wastewater moves downward through the soil into groundwater carrying with it bacteria and viruses, nutrients, pharmaceuticals and personal care products and other contaminants that may be improperly disposed of in the system. The level of treatment provided by an OWTS depends on many factors, such as system design and installation, system use and maintenance and the local soil and site characteristics. A properly sited, designed, installed and maintained OWTS will provide decades of use and provide treatment such that the system does not adversely impact public health or the environment.

All OWTS are regulated and permitted by DEM through implementation of the DEM “Rules Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Onsite Wastewater Treatment Systems.” These rules set prescriptive standards for the OWTS components, size of systems based on intended use and soil conditions on each site, and the location of systems based on maintaining minimum separation distances from drinking water wells, wetlands and waterbodies, property lines, and other structures. Private sector professionals are licensed by DEM to conduct an evaluation of the proposed site soil conditions, design, and install the systems.

Operation and maintenance of existing systems is the responsibility of the property owner. State regulatory oversight is limited except in cases where OWTS fail and an enforcement action is needed. Local governments can play an important role in OWTS maintenance. Jamestown has been actively implementing an Onsite Wastewater Management Program since 2001. Highlights of this Program include:

- Required regular inspections and pump outs when necessary.
- Award of low interest loans to property owners for OWTS repair/replacement from the State’s Community Septic System Loan Program. To date the Town has borrowed a total of \$600,000 from this Program.
- Required phase-out of cesspools and steel tanks by January 1, 2016.
- Adoption of the High Groundwater and Impervious Cover Overlay District Ordinance that requires advanced treatment OWTS. A small portion of this District is in the Jamestown Brook watershed.

Jamestown has had a local regulation requiring OWTS setbacks from water bodies and wetlands that are greater than DEM requirements. Recent state law requires DEM and RI Coastal Resources Management Council (CRMC) to revise its freshwater wetland regulations to establish new buffer distances and regulatory procedures for permitting new development. However, this state law prohibits local governments from establishing more stringent buffers and setbacks than the state rules. These revised rules are expected to be promulgated in 2021.

## **C. Agriculture**

Rhode Island's farms contribute to the state's economic development and provide Rhode Islanders with local food and farm landscapes, as well as tourism opportunities and wildlife habitat. However, it is important to ensure that these operations are conducted in a manner that avoids water quality impacts. 19.51% of the land within the Jamestown Brook watershed is used for agriculture (see Figure 2.). This farmed land consists partially of Watson Farm, Hodgkiss Farm, Dutra Farm, and the Jamestown Community Farm.

The potential surface water and groundwater pollutants from agricultural operations include nutrients (nitrogen and phosphorus) from fertilizers and animal wastes; pathogens and organic materials primarily from animal wastes; sediment from field erosion; pesticides; and petroleum products. Well managed farms can operate with minimal negative effect on water resources.

Farmers are encouraged to contact the local US Department of Agriculture Natural Resources Conservation Service office and their local Conservation District for information on grants for installing best management practices and developing conservation plans to prevent impacts to water quality. These plans should ensure that there are sufficient stream buffers, fertilizer and pesticides are managed properly, that fencing exists to restrict access of livestock to streams and wetlands, and that animal waste handling and disposal BMPs are in place.

## **D. Road Salt and Sand**

Road salt washes into surface waters impacting aquatic life, and can enter groundwater and contaminate drinking water wells. Not only is contaminated water not suitable for drinking, but the salt corrodes the pipes, and can cause harmful metals, such as lead, to leach out into the water.

The sand that is applied on the roads during winter is either washed into our waters, changing aquatic life and streambed habitat dramatically, or it becomes a major contributor to stormwater BMP failure by clogging the systems. Generally, only a small percent of the sand applied to the road is recovered as street sweepings. Increasing the frequency of street sweeping, particularly on mild winter days, can help prevent more of this sand from entering waterbodies.

Improved technology and best management practices can be utilized to reduce the amount of salt and sand applied to roads without compromising winter travel safety. In addition, the sand and salt must be stored in a manner to reduce impacts to water quality, however no salt or sand is stored in the Jamestown Brook watershed. Signs have been posted on North Road near Jamestown Brook stating that the driver is entering a reduced salt application zone.

Strategies the Town and RI DOT can take include:

- Use of liquid brine (23.3% salt-water solution) applied before or early in a snowfall prevents the formation of frost and bonding between snow and ice and pavement.

- Pre-wetting the salt and sand mixture allows the material dispersed to stick to the road instead of bouncing and blowing off to the shoulder.
- Improved Spreader Technology that allows the operators to accurately administer and monitor the exact amount of salt applied.
- Using real-time information systems capable of monitoring road temperatures.
- Reducing salt use within the watershed.



### **E. Pet Waste**

Pet waste can be a significant contributor of bacteria and other pathogens and nutrients (nitrogen and phosphorus) to surface waters. The primary issue is dog waste, although other backyard pets (horses, goats, etc.) and wildlife can cause localized problems. Pet waste in urban and suburban areas that is left on the sidewalk or on grass near the street can be washed into stormwater drainage systems. Dog waste can harbor a host of different bacteria, parasites, and viruses that can cause human illness and disease.

Jamestown has an ordinance (Section 10-72) “Removal of Dog Feces” that states: “No person in control of a dog shall knowingly permit such dog to defecate on any sidewalk, park, public place or building. The person in control of any dog which defecates on any of these sites must immediately remove the feces.” Pet waste poses a risk to water quality due to walking paths

along the south shore of North Pond. The town should continue to distribute a pet waste management brochure with pet license renewals.

## **F. Lawn and Grounds Management**

The care and maintenance of landscaped areas can contribute to water quality degradation. Turf is a major feature of all but the highest density urban landscapes, and how it is managed affects water quality. Excessive amounts of fertilizer (nutrients) and pesticides, inappropriate formulations of fertilizer, and poor timing of fertilizer and pesticide applications can result in losses to the environment via stormwater runoff and/or leaching to groundwater. Lawn areas adjacent to waterbodies also attract geese and other waterfowl.

Most homeowners are not aware of the appropriate best management practices to reduce the impacts to water quality in managing their lawns. Landscape contracting businesses can also overapply fertilizers. Aside from professional pesticide application (which requires a license) no certification or educational requirements exist for lawn care management. Education of homeowners and landscape contractors on proper turf management continues to be the primary strategy to minimize water quality impacts.

## **G. Other Threats from Residential Development**

Threats to water quality from residential land use include several of the topics that are further discussed elsewhere in this section (i.e., onsite wastewater treatment systems, lawn management, and pet waste). Other potential sources of groundwater and surface water contamination from residential uses include:

- Household cleaning chemicals, automotive fluids (oil and gasoline), paints and solvents disposed of down the drain or onto the land surface (aka, Household Hazardous Waste);
- Heating oil storage (above and below ground tanks, further discussed below), and spills; and
- Abandoned wells (can illegally be used as direct conduits for pollution into groundwater).

If taken on an individual basis, the threat from a single residence is normally less than the threat from other land uses, but when factoring in all residences, they form a significant source of potential contamination. Most citizens are unaware of the effects of numerous potential contaminants stored, used, and disposed of around the home.

Although most heating oil tanks sized less than 1,100 gallons that are located at residences and on farms are likely above ground (outside or in a basement), an unknown, but suspected significant number of heating oil tanks are buried and will eventually leak. Jamestown has adopted an



underground storage tank ordinance which prohibits construction of new underground storage tanks townwide.

## **V) Aquatic Habitat Management/Restoration**

### **A. Freshwater Wetlands**

Freshwater wetlands are one of our most valuable natural resources. They are transition zones between land and water where the flow of water and the cycling of nutrients meet to produce a unique ecosystem -- making these areas very important features of a watershed. Wetlands are the most biologically fertile and diverse landscapes in RI. All wetlands in RI are protected by law, as are the bordering lands adjacent to certain wetlands, which serve as buffers for water quality and important habitat. (Note: in RI, DEM and CRMC Freshwater Wetland Rules, surface waters, i.e., lakes, ponds, rivers and streams, are also considered “wetlands” for regulation purposes.) See Figure 1. for general locations of wetlands in the Jamestown Brook watershed.

Wetlands have many important functions. They:

- Help control floodwaters by storing excess water during heavy periods of rain and snowmelt;
- Provide key links in the water cycle by helping to maintain stream flow and water resources through much of the year by releasing water from both surface and ground water storage;
- Naturally filter polluted runoff;
- Serve as important habitat for many mammals, amphibians, reptiles, birds, and plants;
- Support recreational activities including fishing, hunting, hiking, photography, bird watching, education, and nature studies.

When wetlands are altered, these services are diminished or lost. Direct disturbance to wetlands includes activities such as cutting of vegetation, filling, illegal dumping, excavating, water diversion, or roads and crossings (section V.D below). Indirect impacts include the loss of vegetated upland buffers (see section V.B. below).

### **B. Vegetated Upland Buffers**

A vegetated upland buffer bordering a pond or lake, a stream or wetland will act to:

- Filter out sediments, nutrients, pesticides and other pollutants coming off the landscape;
- Provide valuable habitat for plants and animals;
- Absorb stormwater and therefore mitigate potential streambank erosion and flooding; and
- Moderate water temperature by providing shade.

Buffers can be characterized as completely intact throughout most of the Jamestown Brook Watershed. It is important that the vegetated buffers are maintained to maximize the benefits they provide.

Although pursuant to state law local governments cannot adopt more stringent setbacks from water bodies and wetlands, local governments can play a role in protecting aquatic habitat with buffers by promoting buffer restoration where possible and through land acquisition.

### **C. Invasives**

Aquatic invasive species (AIS), also called ‘non-native aquatic species,’ can out-compete native plants and disrupt ecosystems. Once established, AIS are difficult and expensive to control. Management of AIS is often necessary to improve habitat and public use of a waterbody. However, the best strategy is to prevent AIS from spreading to uncolonized areas. It is much easier to intervene and contain a small population than attempt to abate and control a widespread, well-established population of aquatic invasive species. Impacts from aquatic invasive species generally include:

- Reduced diversity of native plants and animals
- Impairment of recreational uses such as swimming, boating, and fishing
- Degradation of water quality
- Degradation of wildlife habitat
- Increased threats to public health and safety
- Diminished property values
- Declines in finfish and shellfish populations
- Local extinction of rare and endangered species
- Increased expenditures on prevention, eradication or control

DEM has been assessing publicly accessible waterbodies in RI, but since the North and South Ponds are not accessible for public use, the watershed has not been investigated for the presence AIS. However, phragmites has become an emerging problem for the aquatic habitat and water flow in South Pond.

### **D. Stream Connectivity**

Stream connectivity is about ensuring the free movement of fish and other wildlife up and down a stream corridor. Barriers to this movement can be caused by dams and sub-standard road/driveway culverts, thus preventing wildlife from using certain portions of the river system resulting in fragmented aquatic habitat. In some cases, undersized culverts can also cause localized flooding. Acknowledging the importance of the dams in the Jamestown Brook watershed, the focus here should be evaluating the North Road crossing of Jamestown Brook.



North Road crossing Jamestown Brook

## **VI. Implementation -- Protection and Restoration Actions**

### **A) Public Information and Outreach**

Watershed protection and restoration can only be successful when those that live and work in the watershed realize that they are a crucial part of their watershed. Individual actions may not seem to have much of an effect by themselves, but the overall cumulative impact (positive or negative) on water quality in the watershed by individuals can be dramatic. Actions that can be taken include:

- Take steps identified in the DEM brochure “Simple Ways YOU Can Help Keep Rhode Island’s Waters Clean” in Appendix 1.
- Participate in local activities that benefit the environment.
- Attend public meetings on water related issues.
- Advocate for strong municipal government actions for water resources and open space protection.
- Volunteer and support the efforts of land trusts and other local/regional/statewide non-profit groups that can help make a difference in the Jamestown Brook watershed:

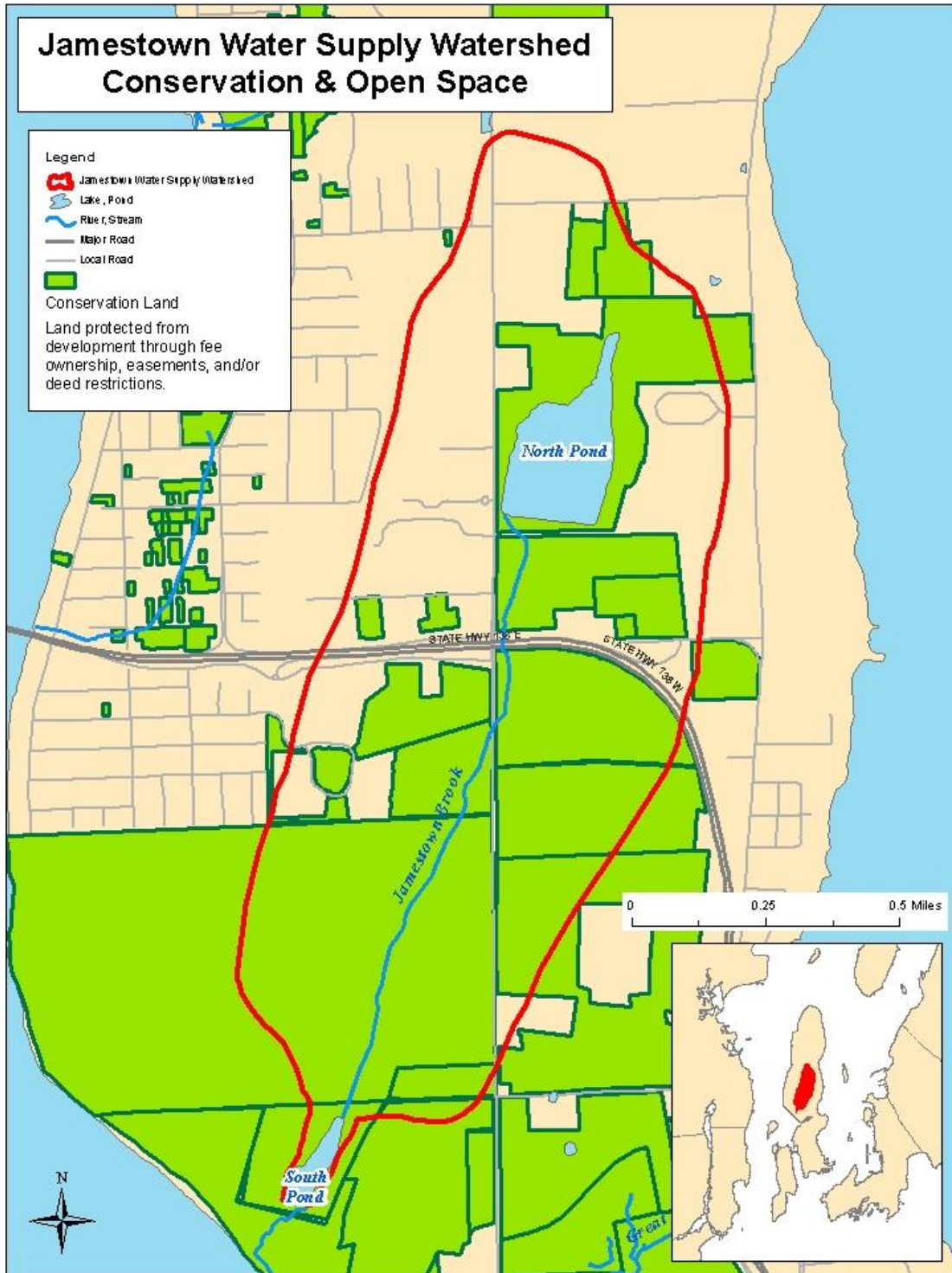
### **B) Open Space**

Preserving land in the watershed in its natural state is an important tool in protecting water quality and aquatic habitat. The Jamestown Brook watershed has been a focus of active land preservation activities by the Town, the Conanicut Island Land Trust and others. According to the Jamestown Comprehensive Plan (2015) approximately 70% of the watershed area is permanently protected, and the Town’s goal is to “purchase the remaining undeveloped land that falls within this protective watershed and to permanently protect this land for the Town residents.”

Some of this protected open space in the watershed is being actively used for agricultural operations. While this land is protected from more intensive development, agricultural activities present their own risks to water quality and aquatic habitat that need to be managed as discussed earlier.



Figure 4. Watershed Conservation and Open Space Lands



### **C) Implementation Table**

This Implementation Table identifies actions for water quality and aquatic habitat protection and restoration in the Jamestown Brook watershed. The action items are derived from the development of the Plan and from review of the following:

- Jamestown Water Supply System Management Plan
- RI Department of Health Jamestown Source Water Assessment and Wastewater Needs Analysis (See Summary below)
- Rhode Island Statewide TMDL For Bacteria Impaired Waters
- Municipal Stormwater Management Plan
- Municipal Onsite Wastewater Management Plan
- Municipal Comprehensive Plan
- RI State Guide Plan Elements:
  - Water Quality 2035: Rhode Island Water Quality Management Plan
  - Rhode Island Water 2030: Management of Drinking Water Supply Resources in Rhode Island
  - Land Use 2025: Rhode Island's State Land Use Policies and Plan

The Implementation Table is divided by management topic, and includes the following information:

- Action Item  
NOTE: Unless otherwise specified, all actions are the responsibility of the Town. Supporting agencies are identified at the end of the Action description.
- Timeframe: on-going, 1-2 years, 3-5 years, 5-10 years. When target completion dates are known, these are included.
- Cost Estimate: Relative indication of estimated cost as follows:
  - \$ = <\$25,000;
  - \$\$ = \$25,000 -- \$100,000;
  - \$\$\$ = >\$100,000
- Priority, as follows:
  - Required
  - H – High
  - M – Medium
  - L – Low

## Implementation Table

<b>Action Items</b> - Listed by Management Topic - Unless otherwise specified, all actions are the responsibility of the Town. Supporting agencies are identified at the end of the Action description.	<b>Time-frame</b>	<b>Cost Estimate</b>	<b>Priority</b>
<b>Stormwater Management</b>			
Implement the RIPDES Phase II MS4 Stormwater Water Management Program Plan (SWMPP) and enforce existing requirements. Review and update as necessary.	On-going	\$\$\$	Required
Consider adopting local stormwater requirements, including soil erosion control, for development projects smaller than one acre (smaller than the state minimum requirement) for new and redevelopment applications.	1-2 years	\$	L
Complete the LID Self-Assessment. Review existing planning and development ordinances to evaluate what LID techniques are included, decide what LID techniques would be appropriate for the community to incorporate, and adopt the use of the selected LID techniques into local development regulations for use in proposed development and redevelopment projects.	1-2 years	\$	M
Ensure adequate Town resources to properly maintain stormwater BMPs.	On-going	\$\$	H
Conduct an analysis of sustainable funding options to meet stormwater management needs, including the feasibility of establishing a stormwater utility district.	3-5 years	\$	M
Reduce stormwater runoff by encouraging construction of rain gardens and dry wells which facilitate groundwater infiltration on private and public properties.	1-2 years	\$	M
RIDOT to maintain the pump station for pumping Rt 138 stormwater out of the watershed.	On-going	\$\$	H



<b>Action Items</b> - Listed by Management Topic - Unless otherwise specified, all actions are the responsibility of the Town. Supporting agencies are identified at the end of the Action description.	<b>Time-frame</b>	<b>Cost Estimate</b>	<b>Priority</b>
Identify and prioritize locations for stormwater BMP retrofits throughout the watershed with particular attention to North Road stormwater. Install retrofits as opportunities and needs arise. Town and RIDOT	On-going	\$\$\$	H
<b>Onsite Wastewater Management</b>			
Continue to participate in the Community Septic System Loan Program.	On-going	\$	M
Continue to implement and enforce the local OWTS ordinance and wastewater management plan.	On-going	\$\$	H
Enhance the local educational program for OWTS maintenance.	1-2 years	\$	L
<b>Pet Waste Management</b>			
Install pet waste signage at North Pond Reservoir. Consider a pet waste bag dispenser.	1-2 years	\$	L
Inform the public about the impact of pet waste on water quality. Continue to provide pet waste educational materials with dog licensing renewals.	On-going	\$	M
<b>Heating Oil Storage Tanks</b>			
Enforce the underground storage tank ordinance which prohibits construction of new underground storage tanks for home heating oil.	On-going	\$	M
Inform homeowners of the threat to water quality from existing above-ground and underground home heating oil tanks and the steps to take to minimize risk.	1-2 years	\$	L

<b>Action Items</b> - Listed by Management Topic - Unless otherwise specified, all actions are the responsibility of the Town. Supporting agencies are identified at the end of the Action description.	<b>Time-frame</b>	<b>Cost Estimate</b>	<b>Priority</b>
<b>Lawn and Turf</b>			
Inform residents on proper amounts and application of fertilizers and pesticides to lawns and gardens to minimize water quality impacts.	1-2 (then on-going)	\$	M
<b>Agriculture</b>			
Encourage agricultural producers to work with the DEM Division of Agriculture and the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) to develop conservation plans for their farming activities within the watershed. Support: NRCS	3-5 years	\$	M
Farmers install BMPs to prevent adverse impacts to water quality. Farmers, NRCS, Eastern RI Conservation District.	3-5 years	\$\$	M
Adopt municipal ordinances with BMPs for backyard livestock owners to properly control animal wastes.	3-5 years	\$	L
<b>Road Salt and Sand</b>			
Identify strategies and technology innovations that can be used to minimize use of road salt and sand throughout the watershed. Implement such actions. Town and RIDOT	3-5 years	\$\$\$\$	M
Continue to reduce salt application as noted on road signs on North Road. RIDOT	On-going	\$	M
Continue to perform street sweeping at a frequency that minimizes water quality impacts.	On-going	\$\$	H

<b>Action Items</b> - Listed by Management Topic - Unless otherwise specified, all actions are the responsibility of the Town. Supporting agencies are identified at the end of the Action description.	<b>Time-frame</b>	<b>Cost Estimate</b>	<b>Priority</b>
<b>Vegetated Upland Buffer Protection</b>			
Ensure that the extensive wetland and pond buffers in the watershed are maintained.	On-going	\$	L
<b>Invasive Species</b>			
Consider developing a regular monitoring program for aquatic invasive species in the watershed.	1-2 years	\$	L
Evaluate need for control of phragmites around South Pond. Prepare and implement control strategy as necessary.	3-5 years	\$ - \$\$\$	M
<b>Stream Connectivity</b>			
Conduct an assessment of the North Road crossing of Jamestown Brook and upgrade as necessary.	3-5 years	\$ - \$\$\$	L
<b>Open Space/Conservation</b>			
Preserve as much of the remaining open space in the watershed that is possible.	On-going	\$\$\$	H
<b>Public Information and Outreach</b>			
Inform residents and promote actions that can be taken by homeowners and others to protect water resources and aquatic habitats.	On-going	\$	M

## VII. Financial Support/Implementation Tools

Funding assistance for water quality and aquatic habitat protection and restoration actions is available from various government and private sources. This section provides a brief program overview and contact agency for financial and technical assistance that may be used to implement some of the actions in this plan.

### A. Federal Clean Water Act, Section 319 Nonpoint Source Implementation Grants

Section 319 Grants are available for projects to protect and restore water quality through reducing and managing nonpoint source pollution and for projects restoring aquatic habitat. Projects must be consistent with the goals and actions in the USEPA approved RI Nonpoint Source Management Program Plan. These grants are made possible by federal funds provided to DEM by the USEPA under Section 319 of the Clean Water Act.

**Eligible applicants:** Projects must be in watershed with a watershed plan; municipal, state, or regional governments, quasi-state agencies, public schools and universities, and non-profit watershed, environmental, or conservation organizations.

**Contact:** DEM's Office of Water Resources

### B. R.I. Infrastructure Bank, Clean Water State Revolving Fund Loans

The Clean Water State Revolving Fund is a federal/state partnership designed to finance the cost of infrastructure needed to achieve compliance with the Clean Water Act. The program is available to fund a wide variety of water quality projects including: 1) Traditional municipal wastewater treatment projects; 2) contaminated runoff from urban and agricultural areas; 3) wetlands restoration; 4) groundwater protection; 5) Brownfields remediation; and 6) estuary management. Through this program, Rhode Island maintains revolving loan funds to provide low-cost financing for a wide range of water quality infrastructure projects. Funds to establish or capitalize these programs are provided through federal government grants and state matching funds. The interest rate charged to the Clean Water State Revolving Fund is one-third off the borrower's market rate.

**Eligible applicants:** Statewide, including municipal, state, or regional governments, quasi-state agencies. Funds are awarded to projects based on ranking of environmental benefits of the project, readiness to proceed, and availability of funds.

**Contact:** DEM Office of Water Resources; Rhode Island Infrastructure Bank

In addition to the overall Program described above, the Rhode Island Infrastructure Bank manages the following OWTS related program:

### Community Septic System Loan Program

The Community Septic System Loan Program allows homeowners in participating communities to obtain no-interest loans to repair or replace failed, failing, or substandard onsite wastewater treatment systems. These individual loans are funded from a Clean Water State Revolving Fund loan to a community and are administered locally by Rhode Island Housing. The loans to homeowners are interest-free, with borrowers only subject to a \$300 loan origination fee and a 1% annual servicing fee on the outstanding loan balance. Residents may borrow up to \$25,000 with a term of up to ten years (maximum loan amount varies by community).

**Eligible applicants:** Statewide. Municipal participation requires DEM approval of an onsite wastewater management plan. Funds are awarded to communities based on ranking of environmental benefits of the project, readiness to proceed, and availability of funds.

**Contact:** Rhode Island Infrastructure Bank; DEM Office of Water Resources

## **C. Narragansett Bay and Watershed Restoration Bond Fund**

State funds approved by RI voters are periodically available from this Bond Fund to restore and protect the water quality, and enhance the economic viability, environmental sustainability and resiliency of Narragansett Bay and the state's watersheds. The Fund is meant to provide funding assistance for the feasibility analysis, design, and construction of means to control nonpoint sources of pollution, stormwater pollution control projects, riparian buffer and aquatic habitat restoration projects.

**Eligible applicants:** Statewide; municipal, state, or regional governments; quasi-state agencies, public schools and universities, and non-profit watershed, environmental, or conservation organizations; and non-governmental for-profit businesses, private schools.

**Contact:** DEM Office of Water Resources

## **D. U.S. Department of Agriculture Natural Resources Conservation Service Grants**

### Environmental Quality Incentives Program (EQIP)

This is a voluntary conservation grant program designed to promote and stimulate innovative approaches to environmental enhancement and protection, while improving agricultural production. Through EQIP, farmers and forestland managers may receive financial and technical help to install or implement structural and management conservation practices on eligible agricultural and forest land. Examples of eligible EQIP activities include practices for farm waste storage, nutrient management, riparian buffers and stream bank improvements, wetland restrictions, and groundwater and surface water conservation activities. EQIP payment rates may cover up to 75 percent of the costs of installing certain conservation practices.

**Eligible applicants:** Any person engaged in livestock, agricultural production, aquaculture, shellfishing, or forestry on eligible land.

**Contact:** USDA NRCS – RI State Office/Service Center

Wildlife Habitat Incentives Program (WHIP)

This program is a voluntary program for landowners who want to develop and improve fish and wildlife habitat on private agricultural land, non-industrial private forest land, and tribal land. Through WHIP, farmers and forestland managers may receive financial and technical help to develop upland, wetland, aquatic, and other types of wildlife habitat on their property. The current focus of WHIP in RI is on coastal habitats, freshwater wetlands, vernal pools, riparian habitats, upland habitats of State significance (early successional habitats), and the restoration of native habitats impacted by invasive species.

**Eligible applicants:** Any person owning private agricultural land, non-industrial private forest land, or tribal land.

**Contact:** USDA NRCS – RI State Office/Service Center

Easement Programs

NRCS offers various easement programs to landowners who want to maintain or enhance their land in a way beneficial to agriculture and/or the environment. NRCS provides technical help and financial assistance to protect private lands through a variety of programs. These programs include the Farm and Ranch Land Protection Program, the Grasslands Reserve Program, the Healthy Forests Reserve Program, and the Wetlands Reserve Program.

**Eligible applicants:** Private landowners.

**Contact:** USDA NRCS – RI State Office/Service Center

**E. Community Development Block Grants**

Title 1 of the Housing and Community Development Act of 1974 authorized the Community Development Block Grant program. The program is sponsored by the US Department of Housing and Urban Development, and the Rhode Island program is administered through the State of Rhode Island Office of Housing and Community Development. These grants include water and sewer system improvements.

**Eligible applicants:** Municipalities

**Contact:** R.I. Department of Administration, Division of Planning, Office of Housing and Community Development

**F. State Open Space Grants**

DEM administers a grant program to facilitate land conservation relying on State bond funding and Federal program funds. Local Open Space Grants provide up to 50% matching funds to preserve valuable open space through ownership or easements.

**Eligible Applicants:** Municipalities, land trusts, watershed councils, and non-profit organizations.

**Contact:** DEM Office of Planning and Development

## **G. Land Trusts**

Land trusts seek to preserve open spaces, natural areas, scenic character, watersheds, drinking water sources, farmland, forests, historic sites, and shorelines that uniquely define communities. Land can be held by a land trust in outright ownership or by means of holding a conservation easement that permanently limits the use of the land in order to protect its conservation value. The Conanicut Island Land Trust currently serves in this capacity.

## **H. Technical Assistance Organizations**

### University of Rhode Island Cooperative Extension

As a function of URI's Land Grant mission, URI's Cooperative Extension Water Quality Programs include the following four areas of activity:

- New England Onsite Wastewater Training Program
- RI Nonpoint Education for Municipal Officials (NEMO)- provides information, education, and assistance to local land use officials regarding how they can accommodate growth while protecting their water resources
- URI Home\* A\* Syst – provides information and training on pollution prevention for homeowners
- Watershed Watch Program– coordination of volunteer water quality monitoring

Website: <https://web.uri.edu/coopext/water/>

### Eastern Rhode Island Conservation District

The mission of the ERICD is “to provide information and technical assistance in order to encourage the people of Newport and Bristol Counties to conserve their natural resources and generate farm viability.”

Website: <http://easternriconservation.org/>

## **VIII. Evaluation- Monitoring and Measuring Progress**

There are several indicators of progress that can be used to measure and document improvements in water quality and aquatic habitat protection and restoration in the watershed. The most direct indicators are water quality measurements. The two ponds are regularly sampled to ensure compliance with the Department of Health drinking water standards. As noted earlier, Jamestown Brook should be sampled to determine if it is still impaired for metals and bacteria. Monitoring can extend to biological indicators such as species population levels and species composition.

An additional way to measure progress is to systematically track the implementation of the actions in the Implementation Table. Although these actions are not a direct measure of environmental quality, they will contribute to water quality and aquatic habitat improvements.



## IX. Next Steps

This plan is provided to the Town as a tool to use in the long-term protection and restoration of water quality and aquatic habitat in the Jamestown Brook watershed. Offices of the Town government have been provided with the opportunity to review and comment on the Plan's initial draft.

The Plan will satisfy the requirements for eligibility for USEPA Section 319 funds that are administered by DEM. Projects requesting Section 319 funds must be either identified in the Plan's implementation section or at minimum consistent with the intent of the Plan, in addition to meeting the criteria of the DEM Section 319 funding program. The Plan will also be useful in showing support for applications to other sources of funding for implementation.

*This Plan should be continually evaluated and updated in order to guide appropriate actions to protect and restore water quality and aquatic habitat in the Jamestown Brook watershed.*



## Appendix 1. DEM Water Quality Brochure

**REDUCE YOUR LAWN** by creating “no-mow zones” of native wildflowers, grasses, shrubs, and trees, especially as buffers near ponds and streams. This reduces water, fertilizer, and pesticide use and provides a welcoming habitat for wildlife.



**FERTILIZE SMART** Have your soil tested before applying fertilizer to your lawn to see if it even needs it. Don’t over-fertilize - more is not better. During rainstorms, nutrients from fertilizers can wash off lawns into local waters where the excess nutrients promote algae blooms, including some algae that are harmful to people and pets. Algae blooms cause a decrease in oxygen in the water which endangers aquatic life and can cause fish kills. Use phosphorus fertilizer for new lawns only, unless the soil test shows a need for phosphorus on an established lawn. Sweep up fertilizer that spills on hard surfaces. Leaving grass clippings on your lawn can reduce your fertilizer needs by up to 25%. For more information on soil testing see [www.URIMasterGardeners.org](http://www.URIMasterGardeners.org)



**REDUCE USE OF LAWN AND GARDEN PESTICIDES** Investigate use of biological controls and products with natural ingredients. Read the labels—apply the right amount at the right time and be aware of the toxicity warnings.



**REDUCE RUNOFF** Increase the amount of stormwater absorbed into the ground by directing downspouts onto your lawn, not onto paved surfaces where the runoff could pick up oil, yard waste, and other debris. Install a rain barrel— use the water for plantings. Install a rain garden to increase the amount of stormwater absorbed into the ground. For more information, see [www.RIStormwaterSolutions.org](http://www.RIStormwaterSolutions.org)



**DON’T DRAIN YOUR SWIMMING POOL** into storm drains, wetlands, rivers, or ponds. Instead drain it onto the ground away from your drinking water well. Drain your pool only when your test kit does not detect chlorine levels so that it won’t harm vegetation.



**PUMP IT, DON’T DUMP IT!** If you own a boat, have your holding tank emptied at one of the local pumpout stations around Rhode Island. For a list of pumpout locations contact DEM.



**VOLUNTEER** with clean-up efforts or water quality monitoring. Participate in local activities that benefit the environment. Find out if there is a watershed council for your area. YOUR opinion counts! Attend public meetings. Your participation makes the statement that your community is concerned about local waterways. If you see a problem or want something done, say something! If you don’t have time to attend meetings, call or contact a city or town official, a state representative, or DEM.



**NOW...GET OUT AND ENJOY THE WATER !**



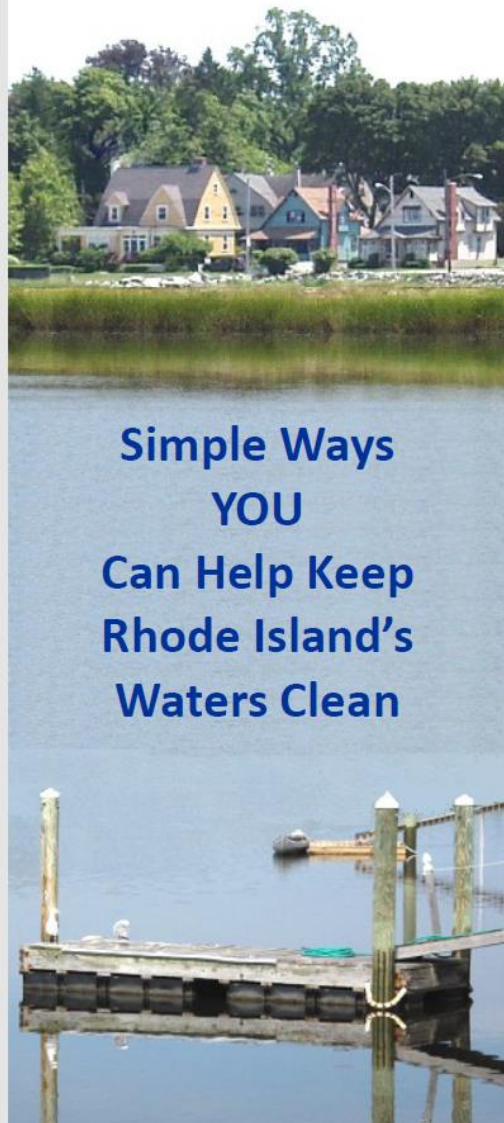
Swim, sail, surf, kayak, fish, boat, shellfish, go birding or walk along the shore. Explore Rhode Island’s waters.

If you need more information on any of these topics contact DEM Water Resources

RI Department of Environmental Management  
Office of Water Resources  
235 Promenade Street  
Providence, RI 02908-5767  
401-222-4700  
[www.dem.ri.gov](http://www.dem.ri.gov)



Rev 3/2015



Simple Ways  
**YOU**  
Can Help Keep  
Rhode Island’s  
Waters Clean



# YOU Can Make A Difference!

- **DO YOU EVER STOP AND WONDER** what you can do to make a difference in keeping our waters safe enough to swim in, fish from, or use for drinking? What you can do to protect the groundwater that supplies your drinking water well?
- **WHEN IT RAINS** water travels across our properties collecting pollutants such as animal feces, fertilizers, soil, oil, and chemicals. This runoff then flows untreated into local rivers, lakes, and streams; polluting water for human use as well as plant and animal life.

**LEARN ABOUT YOUR LOCAL WATERS** Everyone lives in a watershed, which is the area that drains to a nearby river, stream, lake, or pond. Think about washing everything in a sink then letting it go down the drain. The sink is your watershed and the drain is your local river or stream. Find out what waters are closest to you and where they flow.



**TAKE CARE OF YOUR SEPTIC SYSTEM** Faulty septic systems can pollute local waters. Systems should be inspected every three to five years and tanks pumped as recommended. Don't drive or park anywhere on your septic system. Plant only grass over and near the system. If you have a cesspool, consider replacing it with a septic system.



**DON'T FEED THE DUCKS!** Feeding geese, ducks, gulls, and other waterfowl can cause large populations of birds to become concentrated in areas that are incapable of supporting them. The waste they produce contributes bacteria to our waterways and results in beach closures and pollution of shellfishing areas.



**SCOOP THE POOP** Pet waste left on sidewalks, streets or yards can be washed away by rainwater and carried into storm drains and drainage ditches which flow untreated to nearby rivers, ponds and beaches. Pet waste contains bacteria that can cause human illness and contribute to the closing of beaches and shellfish beds. Always carry a baggie - scoop up waste, bag it, and put it in the trash.



**DON'T FLUSH MEDICATIONS** Old or unwanted prescription drugs and over the counter medications flushed down the toilet or drain can end up in our waters and harm organisms living there. Check to see if you can drop off medications at your police station. If not, properly dispose of them in the trash. Crush pills and tablets. Put the medicine into a sealable plastic bag. Place the sealed bag in the trash.



**MINIMIZE THE USE OF HAZARDOUS PRODUCTS** as much as possible. Cleaning and other household products contain many hazardous chemicals. Read labels and try to use the least harmful products available. Don't dispose of products down the toilet or drain. Dispose of household hazardous chemicals (e.g., oil based paint, pesticides, drain cleaner, oven cleaner, pool chemicals) using the RI Eco-Depot Program. See [www.rirrc.org](http://www.rirrc.org)



**DRIVEWAY CARE** Driveway sealant can be either an asphalt or a coal tar mixture. Coal tar has much higher levels of chemicals harmful to human health and aquatic life. As sealants wear down, particles wash off in stormwater. If you must seal your driveway, use an asphalt sealant.



**WASH VEHICLES ON YOUR LAWN** (away from your drinking water well) or use a commercial car wash. Washing on your lawn minimizes the amount of dirty, soapy water flowing into the storm drains that run directly into our waterbodies. If you are unable to wash your car on your lawn, use only biodegradable, phosphate-free cleaners. If washing near a storm drain, temporarily divert the water towards grassy areas. Commercial car washes typically use far less water, recycle their wash water, and treat their water prior to releasing it into the sewer system.



**RECYCLE USED MOTOR OIL AND ANTIFREEZE** Don't dump automotive fluids down the storm drain or dispose of them in your trash. Contact your local Department of Public Works or see the RI Eco-Depot Program at [www.rirrc.org](http://www.rirrc.org)



**CONSERVE WATER** Don't overwater your lawn. Lawns need only one inch of water per week (from either watering or rain). Excessive water use, especially in summer, can dramatically reduce flow in rivers and streams, harming aquatic life.



If your house is connected to a public sewer, conserving water will help reduce the discharge from your wastewater treatment facility into local waters AND save you money! If you use a septic system, water conservation helps prevent system failures.

## Appendix 2. Jamestown Drinking Water Assessment Results (2003)



# PROTECT YOUR DRINKING WATER

*Safe and healthy lives in safe and healthy communities*

## Jamestown Drinking Water Assessment Results

As an island ecosystem, Jamestown depends on a limited supply of fresh water replenished only by rainfall. Forty-three percent of residents rely on municipal water provided by the Jamestown Water District (JWD). The main water service area is the village and Beavertail section of town. Fifty-seven percent of residents live outside this area and depend solely on private wells. Public water comes from two surface reservoirs, both part of the Jamestown Brook watershed, and bedrock wells closely associated with the northern reservoir. The Carr Pond Reservoir, also known as North Pond, is the primary supply. Its outlet forms Jamestown Brook. The Watson Pond Reservoir, or South Pond, is a 7-acre impoundment at the southern end of Jamestown Brook. Although the watershed is much larger, this is a secondary supply with much lower yield. The Jamestown Wellhead Protection Area (WHPA) overlaps large portions of the Jamestown Brook watershed. Groundwater pumped from wells just south of Carr Pond is discharged directly into the reservoir intake to augment the surface supply.

### Key Findings

#### Public Water Supplies

- As a result of proactive town watershed management, 73 percent of the Jamestown Brook Watershed is preserved. Large minimum lot sizes further limit development potential.
- Future development threats are low provided runoff and fertilizer use is controlled and buffers to surface waters and wetlands are protected.
- The Jamestown water system has limited safe yield; increasing capacity is not possible without affecting water quality. Due to naturally occurring organic solids and low flow, water supplies are highly vulnerable to any additional stress.

#### Island Groundwater

- Groundwater is the only source of supply for most residents, however the island's bedrock wells have limited yield and are subject to saltwater intrusion with overpumping. Other threats to private wells include polluted runoff, loss of recharge with new construction, and substandard septic systems. Impacts are magnified in densely developed areas.
- Protecting private wells reserves public water capacity for the existing service area.
- Protecting the quality and quantity of the island's freshwater supplies depends on how landowners manage their property, as well as continued implementation of town protection measures.



#### 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.

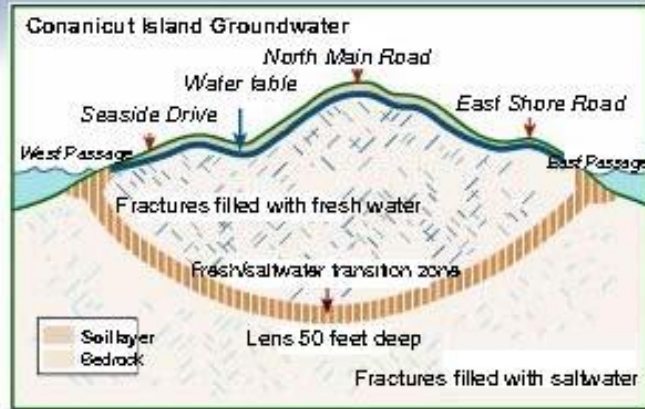
This fact sheet summarizes results of a source water assessment conducted for the JWD. It identifies known and potential sources of pollution in drinking water supplies and ranks their susceptibility to future contamination. To support town wastewater management planning, the Jamestown Shores neighborhood and the island as a whole were 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.





## Jamestown's Groundwater Lens

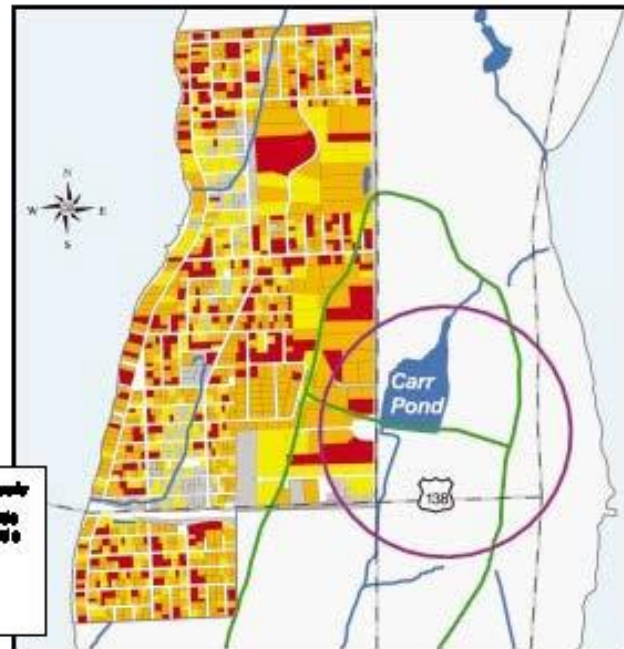
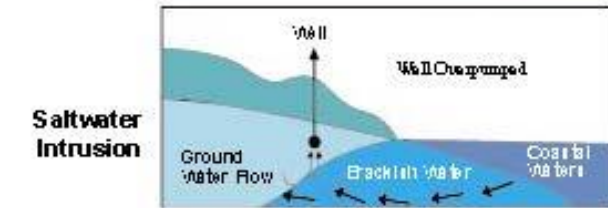
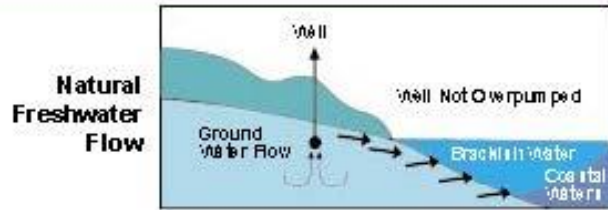
Freshwater in the island's fractured bedrock aquifer forms a lens-shaped body of water that "floats" on salt water because its density is less than the surrounding saltwater. Within this freshwater lens bedrock fractures are filled with fresh water. Below the lens and at the shoreline edges, bedrock fractures and sediments are filled with saltwater. The lens is thickest at about 500 feet, near the middle of the island, and thins to about 25 feet near the perimeter. Over-pumping wells can draw salt water into the freshwater lens, and contaminate wellwater, especially at the perimeter of the island where the freshwater layer is thinnest.



### 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. But in densely developed areas, private wells can be contaminated by septic systems and runoff entering the wells.

- In Jamestown Shores up to 32 percent of septic systems are probably substandard. These present the greatest hazard to private wells, especially when located within 100 feet of wells, in high-water table, and on lots smaller than 1 acre.
- Recycled septic system effluent is estimated to make up 16 percent of total groundwater recharge in the Jamestown Shores area, possibly increasing to 24 percent in the future. At these high levels ensuring proper septic system maintenance and treatment is critical for public health protection. Maintaining groundwater recharge keeps the proportion of wastewater closer to present levels through dilution.
- Seventy-four percent of Jamestown residents rely on septic systems. Since most new development is outside the sewer district, the total number of systems is expected to double with future development, increasing the need for proper septic system care.
- The town has already taken steps to protect drinking water by establishing a wastewater management program and adopting development standards for high water tables in selected areas.



ISOS = Individual Sewage Disposal System

## Land Use & Threats to Water Quality Jamestown Brook Watershed and Wellhead

The Jamestown Brook watershed and wellhead were examined using landscape features to evaluate threats most likely to affect water quality, including percentage of pavement and other impervious surfaces, protected shoreline buffers, estimated nutrient sources in the watershed, and number of septic systems per acre. A rating from low to high was assigned to each factor and summed to create an average pollution risk score for the whole supply.

### Susceptibility to Contamination\*



The Jamestown public water supply has a low susceptibility to contamination. This is an average ranking based on land use and existing water quality. Individual study areas may be more or less susceptible to contamination.

### Current Conditions

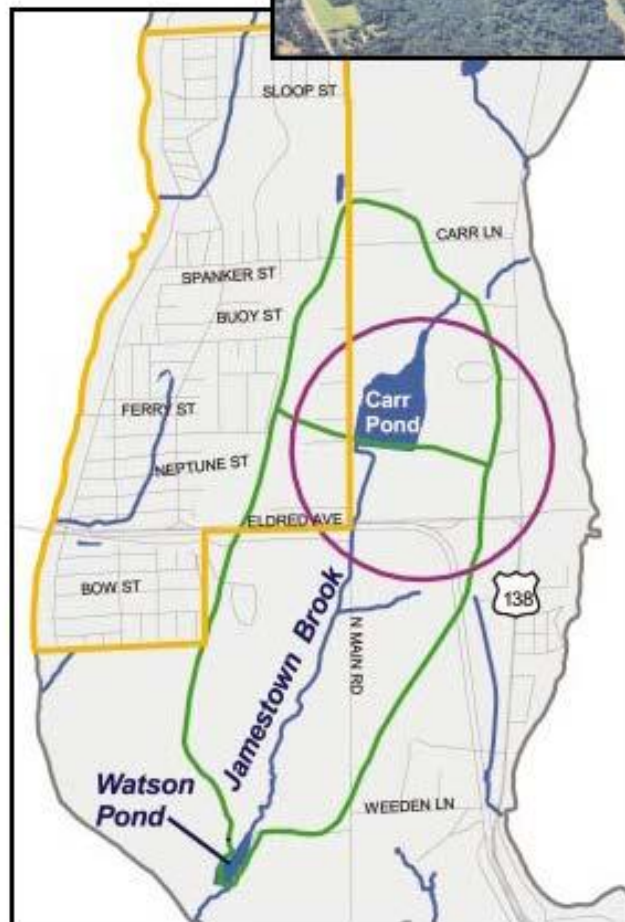
- About one-half of the Jamestown Brook watershed is forest and wetland. There are no known pollution sources.
- Development is limited to mostly low density residential in the Carr Pond watershed. The Watson Pond watershed has about one-third farmland where fertilizers may be used or animals grazed. Much of this sub-watershed is permanently protected open space.
- Route 138 cuts across the water supply area, however storm drains designed to divert runoff from the water supplies, minimize risk of hazardous spills.
- Jamestown Brook is not meeting state water quality standards for aquatic habitat and bacteria. Naturally occurring organic solids and low flow are considered responsible.

### Future threats

- With future development, about 20 percent of the forest and pasture in sourcewater areas could eventually shift to low-density residential in the water supply areas, and about 14 percent island wide. Pollution from nutrients and runoff is expected to remain about the same, provided runoff and fertilizer use is controlled and wetland and stream buffers are well protected.
- Most remaining vacant land is wet, with seasonal high-water tables making development impacts more difficult to control. In water supply areas, any increase in runoff or disturbance of wetland buffers is a concern given existing sensitivity and low flow stress.

*Aerial view looking south showing Carr Pond (lower center) and Watson Pond (upper center).*

*Photo courtesy Jamestown Water District*



\*Note: Low rating does not mean that the source is free from contamination risk. Without sufficient protection, any water supply can become contaminated. Even at levels well below safe drinking water standards, some contaminants can affect taste, odor and cost of water treatment.



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## What You Can Do to Protect Water Quality

### Local Government

Implementing the town wastewater management program and high-water table ordinance are the two most effective steps the town can take to protect groundwater quality. In addition:

- Require phase-out of cesspools, beginning in densely developed areas.
- Expand the high-water table ordinance to include water supply sources and areas served by private wells.
- Monitor effectiveness of runoff control practices and update standards as needed.
- Evaluate effects of leaky sewer pipes to island groundwater levels and seal leaks as necessary. Leaky pipes drain between 200,000 to 1.3 million gallons of groundwater per day from the island.
- Apply limits of disturbance and strict erosion controls with development in critical areas. Assign field inspectors.

### Water Supplier

- Implement recommendations in the latest water supply system management plan.
- Work with local officials to implement land use protection measures and education programs.
- Inspect water supply and protection area regularly for potential pollution sources.
- Expand reservoir sampling to monitor nutrient enrichment levels; track frequency and duration of algal blooms.

### Homeowners

- Support the town wastewater management program. If you have a cesspool plan to replace it.
- Maintain wooded buffers or restore natural vegetation along wetlands or watercourses. Reduce fertilizer and pesticide use.
- For information about protecting your well, contact the University of Rhode Island Cooperative Extension (URI CE) Home\*A\*Syst Program at (401) 874-5398, [www.uri.edu/ce/wq](http://www.uri.edu/ce/wq).

### Farmers and Landowners

Work with the U.S. Department of Agriculture (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 R.I. Department of Environmental Management (R.I. DEM) Office of Water Resources at (401) 222-4700, [www.state.ri.us/DEM/program/benviron/water/index.htm](http://www.state.ri.us/DEM/program/benviron/water/index.htm).

This assessment was conducted by the University of Rhode Island Cooperative Extension with funding from the R.I. Department of Health, Source Water Assessment Program, established under the 1996 amendments to the Federal Safe Drinking Water Act.

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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 (401) 874-2138, [www.uri.edu/ce/wq](http://www.uri.edu/ce/wq)
- Jamestown Water District (401) 423-7220, [www.jamestownri.net](http://www.jamestownri.net)

Report prepared by URI Cooperative Extension.  
Editing and graphic design by Rhode Island Sea Grant (2003).



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