

# Wesquage Pond Watershed Management Plan

August 2024



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## **Wesquage Pond Watershed Management Plan**

Wesquage Pond is a coastal pond adjacent to Bonnet Shores Beach in the Northern part of the town of Narragansett, RI. The watershed is relatively small and drains to Narragansett Bay. The area of Narragansett Bay that this watershed drains to is not designated by the Rhode Island Department of Environmental Management (RIDEM) as impaired. The purpose of this plan is to:

- 1) Identify actions to protect water quality and aquatic habitat in the watershed using 319 or other funds as available; and
- 2) Fulfill requirements of the federal Nonpoint Source Program and thereby qualify the watershed as eligible for financial assistance for implementation activities via Clean Water Act Section 319 funds administered by RI.

*This Plan assumes a basic understanding of water pollution and water resources management. Other resources are available to provide education and supporting information on pollution sources and aquatic habitat issues and management.*

*The water quality restoration plans (aka "TMDLs") that are referred to in Section II Water Quality should be referred to for more detailed information on water quality, sources of pollution, and implementation activities.*

### **Executive Summary**

This watershed plan was developed with the assistance of the Bonnet Shores Land Trust, the Town of Narragansett, and some members of the Bonnet Shores Fire District. Its intent is to provide managers and organizations with information that may be used in the protection of water quality in the watershed. The majority of the watershed is within the Bonnet Shores Fire District (BSFD), which is a quasi-municipality located entirely within the town of Narragansett. The BSFD is granted the authority for purposes of maintenance, improvement, and upkeep of private streets in the Bonnet Shores area, among other responsibilities. As such, some of the responsibilities laid out in the implementation table within this plan, especially regarding infrastructure, are delegated to the Fire District, and not the Town. Some actions listed, such as working with NRCS, or proper lawn and grounds management, would need to be implemented by private residents, but may also be encouraged and promoted by other entities.

Water quality in Wesquage Pond currently meets standards for recreation and fish and wildlife habitat. To maintain acceptable water quality and prevent degradation this plan addresses the water quality threats of stormwater runoff, lawn and grounds management, and wastewater issues, though most of the watershed is sewered. This plan is focused on addressing nonpoint sources of pollution in the Wesquage Pond watershed, but also addresses flooding concerns as a connected issue. It is acknowledged that little data exists on the water quality of the pond and associated streams and tributaries, but the data that does exist show that the pond supports its designated uses. The intention of this plan is to protect the water quality of the pond and watershed, and therefore recommends additional data to be collected and for increased monitoring efforts but offers no specific load reductions. Actions are identified for the priority threats to Wesquage Pond's water quality and habitat conditions.

As part of the planning process, the Bonnet Shores Land Trust, the Town of Narragansett, and the public have had the opportunity for comment.

## **I. Watershed Description**

The Wesquage pond Watershed is a subwatershed of the larger HUC 12 Lower West Passage Watershed. This subwatershed was delineated with the assistance of RIDEM Water Resources staff using available hydrologic and elevation data.

The entirety of the watershed, approximately 800 acres, lies within the town of Narragansett. The watershed borders Narragansett Bay on its southern point, as it flows out to Bonnet Shores Beach and Kelly Beach, but does not border the Bay on its eastern or northern ends, as the topography rises sharply from the bay. The topography of the watershed consists of gently rolling terrain throughout, with Wesquage Pond present in the lowest point. The highest point in the watershed is approximately 115 feet above sea level in the southwestern portion of the watershed along Route 1A. Ledge formations near the surface in the watershed present a common constraint to development, including septic system functioning. The soils in the watershed are generally dense, slowly permeable till and are characterized by an underlying restrictive layer and high water tables.

Due to the size and topography of the watershed, there are limited surface waters present. There are a handful of small, unnamed streams that travel through residential neighborhoods, forested areas, and wetlands, and then outlet into Wesquage Pond. The pond, categorized as a coastal barrier lagoon, will often see natural breaches during storm events, but has seen manual breaching efforts as a way to maintain water levels and address flooding concerns.

### **Watershed Info:**

- The Wesquage Pond Watershed covers 800 acres, all of which are within the town of Narragansett, RI.
- Land Cover in the watershed is 42% developed (See table below and Figure 2)
- There are no cold-water fisheries in the watershed.
- There are two natural heritage areas (one in the southern portion and one in the north) within the watershed. (2021 RI Natural Heritage Data, RIDEM, TNC, RIGIS)
- Wesquage Pond is the only pond of note within the watershed, which is approximately 75 acres in area. The pond is separated by Bonnet Point Rd on its western side, but is hydrologically connected via a culvert.
- The southern portion of the watershed surrounding Wesquage pond is densely developed.
- Approximately 67% of the watershed is sewerred. (See Figure 4)
- There are approximately 117 acres (14% of watershed) of locally conserved land, which includes the pond itself. All of the conserved land is owned either by the Bonnet Shores Land Trust or the Audubon Society of Rhode Island.
- Public water is available to all residents of the watershed and there are no known drinking water wells mapped within the watershed. Private water supplies in Narragansett are not regulated by the town or by the state and it is possible that wells exist within the watershed. There are eleven private water wells known in the service area of the Narragansett Water District.

<b>Land Cover</b>	<b>Area (Acres)</b>	<b>% of Watershed</b>
Developed- Residential	256.7	32%
Developed- Non-residential	78	10%
Agriculture	3	>1%
Forest & Wetlands	384	48%
Open (Cemeteries, developed recreation areas, mixed barren areas, etc.)	2.3	>1%
Water	75	9%
Impervious Surface	224	28%

Figure 1. Surface Water Resources

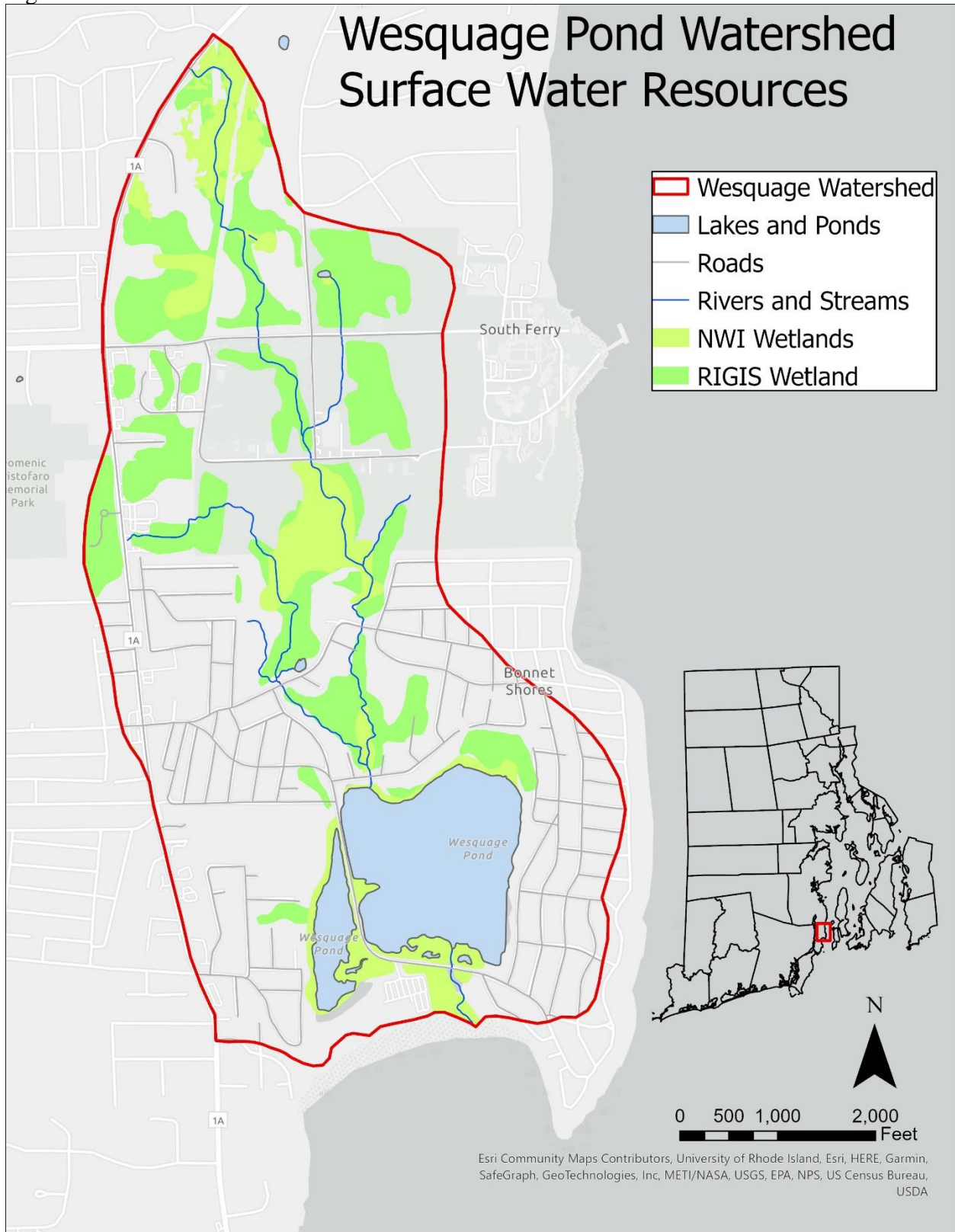


Figure 2. Land Cover

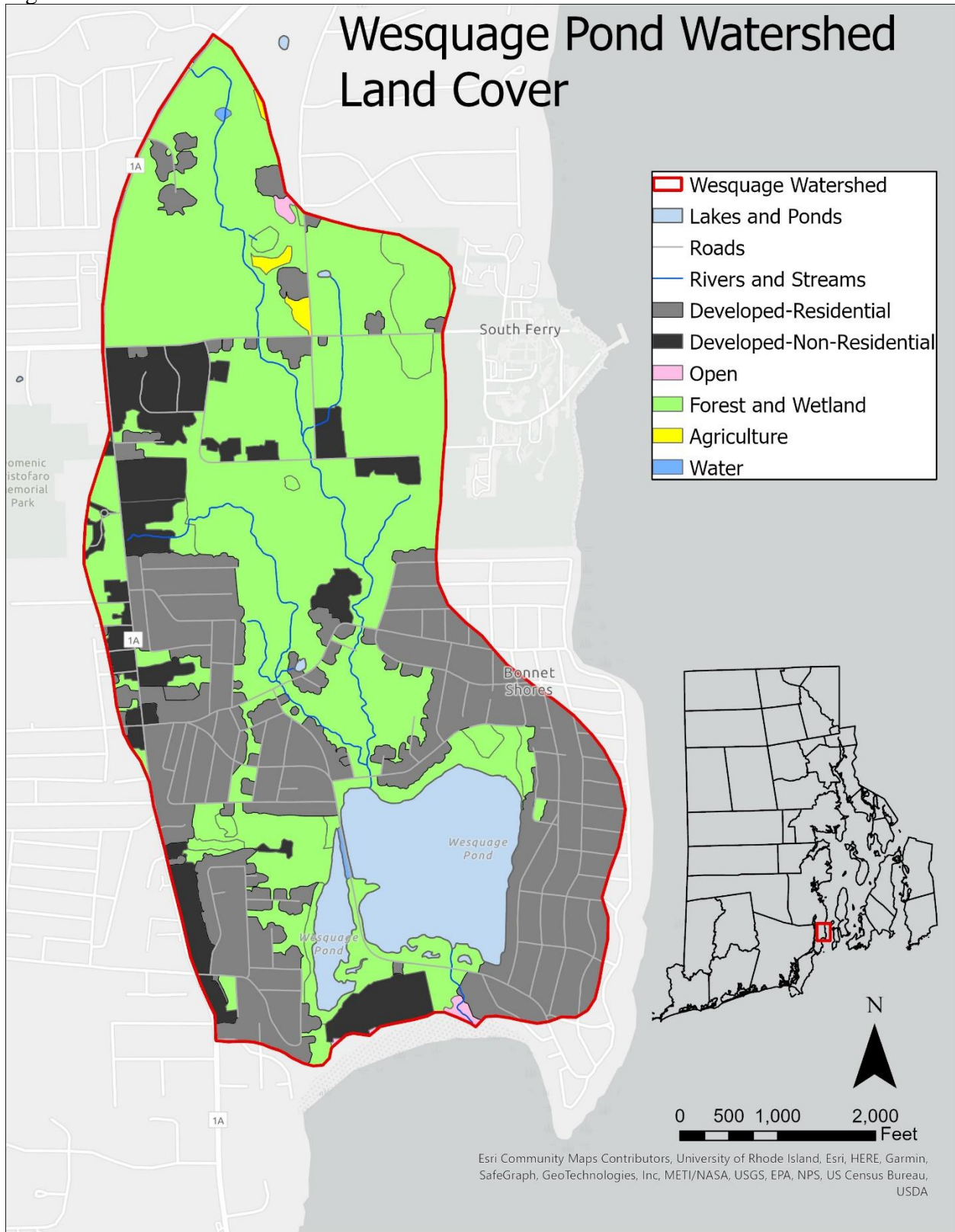




Figure 3. Natural Heritage Areas

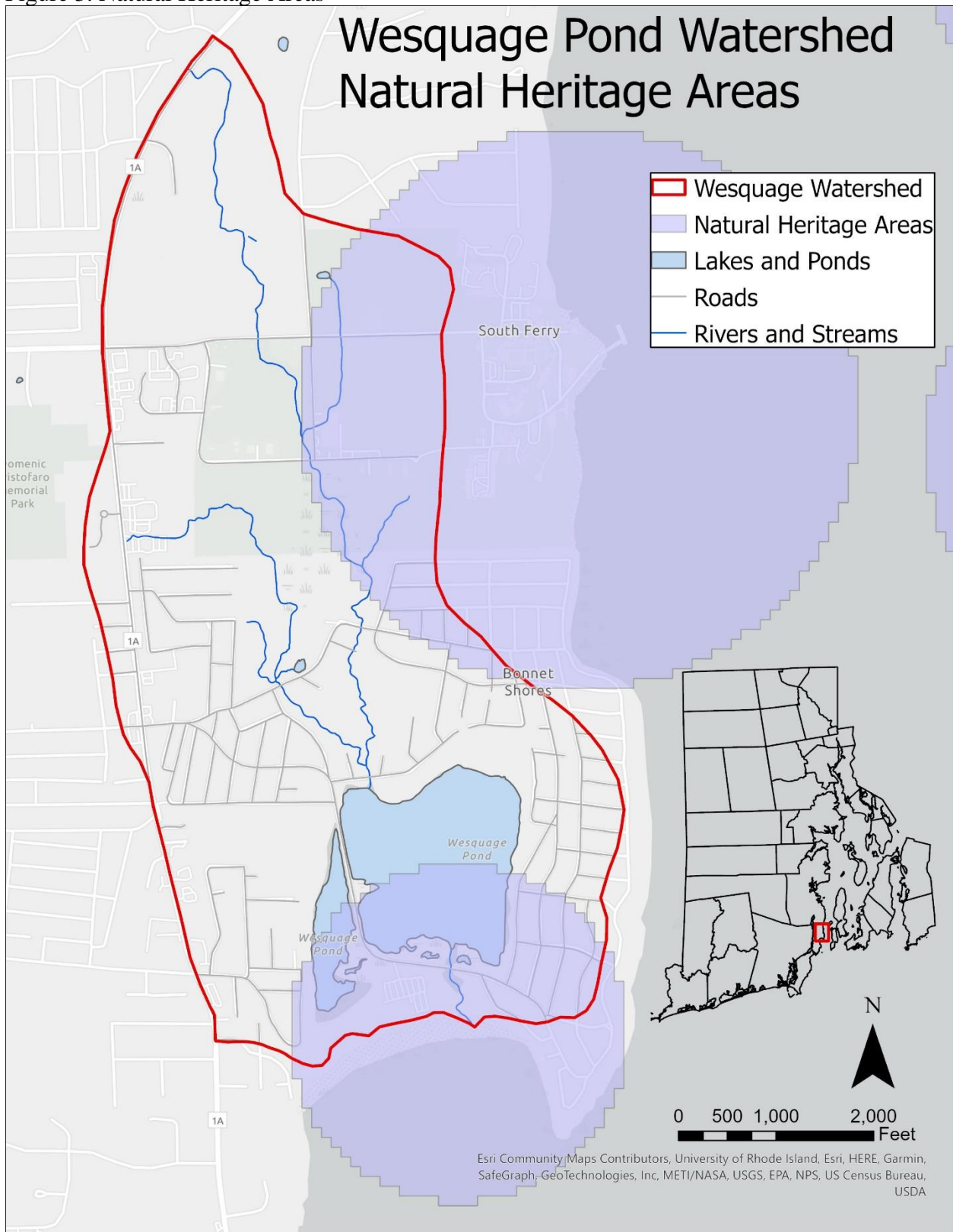


Figure 4. Sewered Areas

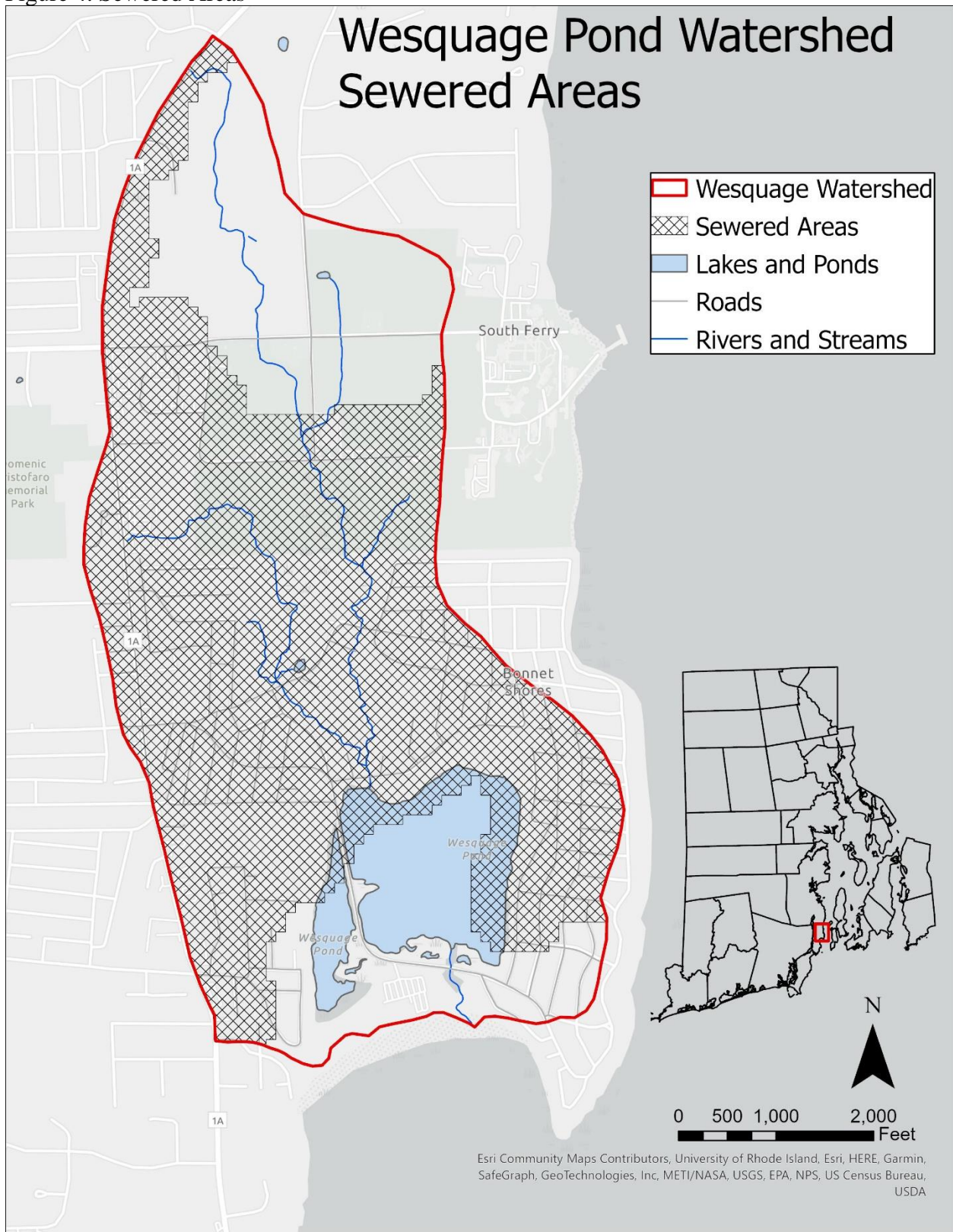
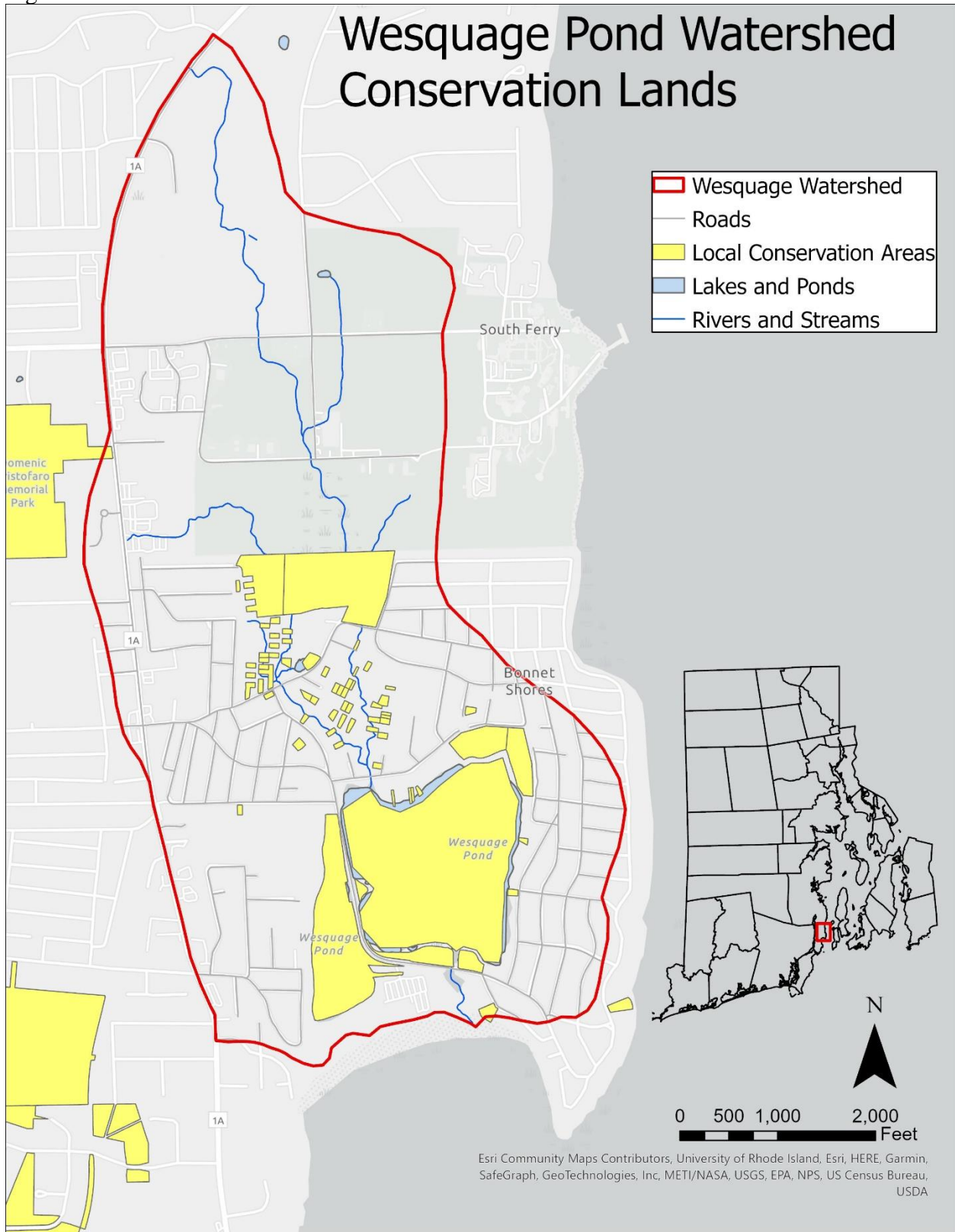


Figure 5. Conservation Lands



## II. Water Quality

### A. Surface Water

The RI Water Quality Rules specify the criteria each waterbody in the State shall meet based on its designated uses. When a waterbody does not support one (or more) of its designated uses (does not meet water quality criteria for that use), it is considered “impaired” for that use and the cause of the impairment is identified. Wesquage pond is an assessed water body within this watershed and is identified as waterbody segment RI0007027E-07.

The three uses assessed for all water bodies in Rhode Island include: fish and wildlife habitat, fish consumption, and recreation. For saltwater bodies, shellfish consumption is also included as a designated use in estuarine waters. Excess total nitrogen is considered an impairment to fish and wildlife habitat due to its ability to cause an overstimulation of growth of aquatic plants and algae, which can reduce dissolved oxygen present in a water body.

Table 1. Wesquage Pond Use Assessment Status (Source: RIDEM Final Integrated Water Quality Monitoring and Assessment Reporting (March, 2022))

<b>Wesquage Pond</b>	<b>RI0007027E-07</b>	<b>0.11 Square</b>	<b>CLASS SA</b>
Wesquage Pond, Narragansett			
<u><b>Use Description</b></u>		<u><b>Use Attainment Status</b></u>	
Fish and Wildlife habitat		Fully Supporting	
Fish Consumption		Insufficient Information	
Primary Contact Recreation		Fully Supporting	
Secondary Contact Recreation		Fully Supporting	
Shellfish Consumption		Not Assessed	

Water testing of Wesquage Pond has been done episodically by several organizations. A summary of data prepared in 2018 (See Appendix A) by the University of Rhode Island Watershed Watch indicated that the pond exhibited higher nutrient amounts in the summers of 2016 and 2017, conditions which can reduce habitat quality for wildlife and reduce the aesthetic quality of the pond. The highest concentrations of nitrogen and phosphorous generally occur in July and August, the time period characterized by a lack of outflow from the pond and reduced volumes of water associated with higher temperatures, less inflow, and increased evaporation. Bacterial levels also increase during this period, associated with the more stagnant and nutrient rich waters. The data indicated some improvement in quality between 2016 and 2017, although differing weather conditions must be considered when interpreting the data. The Bonnet Shores area within the watershed is somewhat of a seasonal community, with more houses being occupied in the summer months, which likely also impacts the seasonality of the changes in nutrient input.

The unnamed tributaries to Wesquage Pond included in this assessment and identified as waterbody segment RI0007027R-22, but were “Not Assessed” for any uses. The lack of assessment data on the unnamed streams in this watershed does not indicate that there is no risk of impairment to those streams.

Table 2: Unnamed tribs to Wesquage Pond Use Assessment Status (Source: RIDEM Final Integrated Water Quality Monitoring and Assessment Reporting (March, 2022))

<b>Unnamed Tribs to Wesquage Pond</b>		RI0007027R-22	1.76 Miles	CLASS A
Unnamed Tributaries to Wesquage Pond. Narragansett				
<u>Use Description</u>	<u>Use Attainment Status</u>			
Fish and Wildlife habitat	Not Assessed			
Fish Consumption	Not Assessed			
Primary Contact Recreation	Not Assessed			
Secondary Contact Recreation	Not Assessed			

## B. Groundwater

As shown in Figure 6, the groundwater in the watershed is entirely classified GA. Groundwater classified GA is to be protected in order to be suitable for drinking water without treatment, even in those areas where it is not currently consumed.

There is no available groundwater quality data, however, one of the primary reasons to be concerned about groundwater quality is the transport of pollutants from groundwater to surface waters as part of the stream baseflow. The groundwater resources in this watershed are associated with bedrock aquifers and overlaying till deposits.

Private and public wells do exist in the watershed. Aging underground oil tanks and failing septic systems are concerns for the quality of the groundwater,

## C. Habitat

Phragmites Australis, or common reed, is present in much of the area surrounding Wesquage Pond. There is an estimated 22 acres of phragmites in the watershed, which can displace native plants species, impede fish passage, and impede the flow of water. Although fish and wildlife is assessed as “fully supporting,” attention should be given to addressing the presence of invasive species in the watershed so that further impacts may be mitigated.

Other physical and hydrological changes can occur in this watershed due to the deposition of sand from the breachway and channel connected to Narragansett Bay. These changes can impact the habitat quality of the pond by changing the movement of water and increasing the risk of flooding.



### **III. Pollution Sources**

#### **A. Stormwater**

Stormwater runoff associated with developed land is a major source of water quality degradation in the watershed. 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:
  - Pet waste left on the ground
  - Surface backup from failing septic systems and cesspools
  - Pets and wildlife (in particular, resident Canada geese)
- Nutrients (nitrogen and phosphorus) that can result in algal blooms (including toxic cyanobacteria) from:
  - Agricultural and lawn fertilization
  - Waste from pets, farm animals and wildlife
  - Surface backup from failing septic systems and cesspools
- Salt and sand from winter road safety maintenance;
- Runoff as a result of soil and sediment from construction sites, plowed farmland, 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;
- Nitrogen, phosphorus, mercury, and other contaminants from the combustion of fossil fuels are deposited from the atmosphere directly into waterbodies or on the ground where they are 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 that stormwater generated from the impervious cover is managed. The Wesquage Pond watershed is approximately 28% impervious surface, which is generally considered a high degree of landscape alteration. (See Figure 7). Research indicated that watersheds often begin showing signs of degraded water quality and habitat with impervious cover exceeds 10%. There is high impervious cover in the southeastern unsewered area of the watershed.

The negative impacts of this impervious cover 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 and streams, as well as reduced water table recharge. In brief, impervious surfaces may significantly change both the quality and quantity of runoff.

Proper design, siting, and installation of stormwater best management practices (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 a critical and often-overlooked task; and

- Improving treatment of stormwater from existing developed lands. New development is required to meet certain stormwater management controls, but these typically do not apply to existing development. The responsibility for upgrading stormwater infrastructure in the watershed rests largely with the Town and the Rhode Island Department of Transportation (RIDOT).

Stormwater discharges are regulated under RIDEM Pollutant Discharge Elimination System Program (RIPDES) General Permit for Stormwater Discharge from Small Municipal Separate Storm Sewer Systems (MS4s). The Town of Narragansett and the Rhode Island Department of Transportation are MS4 operators in the Wesquage Pond watershed, and as such are responsible for preparing and implementing required Stormwater Management Program Plans (SWMPP). The Stormwater Management Program Plan describes the Best Management Practices (BMPs) for each of the following required six minimum measures, including goals and implementation schedules. The six minimum measures are:

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

The Town of Narragansett submitted to DEM a revised Stormwater Management Program Plan on March 10, 2006. Within this plan are a series of planned goals and deliverables to reduce stormwater runoff within the town. The town should update its SWMPP periodically to address the most pertinent issues.

As new stormwater permit requirements and regulations developed by RIDEM go into effect, the Town should update its ordinances and regulations accordingly.

### Low Impact Development

Low impact development (LID) is a comprehensive approach to project design that minimizes the impacts of development or re-development on water quality and aquatic habitats 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, pre-developed 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, RIDEM, University of RI (URI), and RIDOT have developed “LID Site Planning and Design Techniques: A Municipal Self-Assessment.”

(<https://dem.ri.gov/sites/g/files/xkgbur861/files/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 conserving open space and minimizing land disturbance to reducing impervious surfaces and controlling soil erosion. Working through the assessment tool 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. Nature Based solutions such as LID have multiple benefits beyond



stormwater control that add value to the communities and environmental conditions of the watershed.

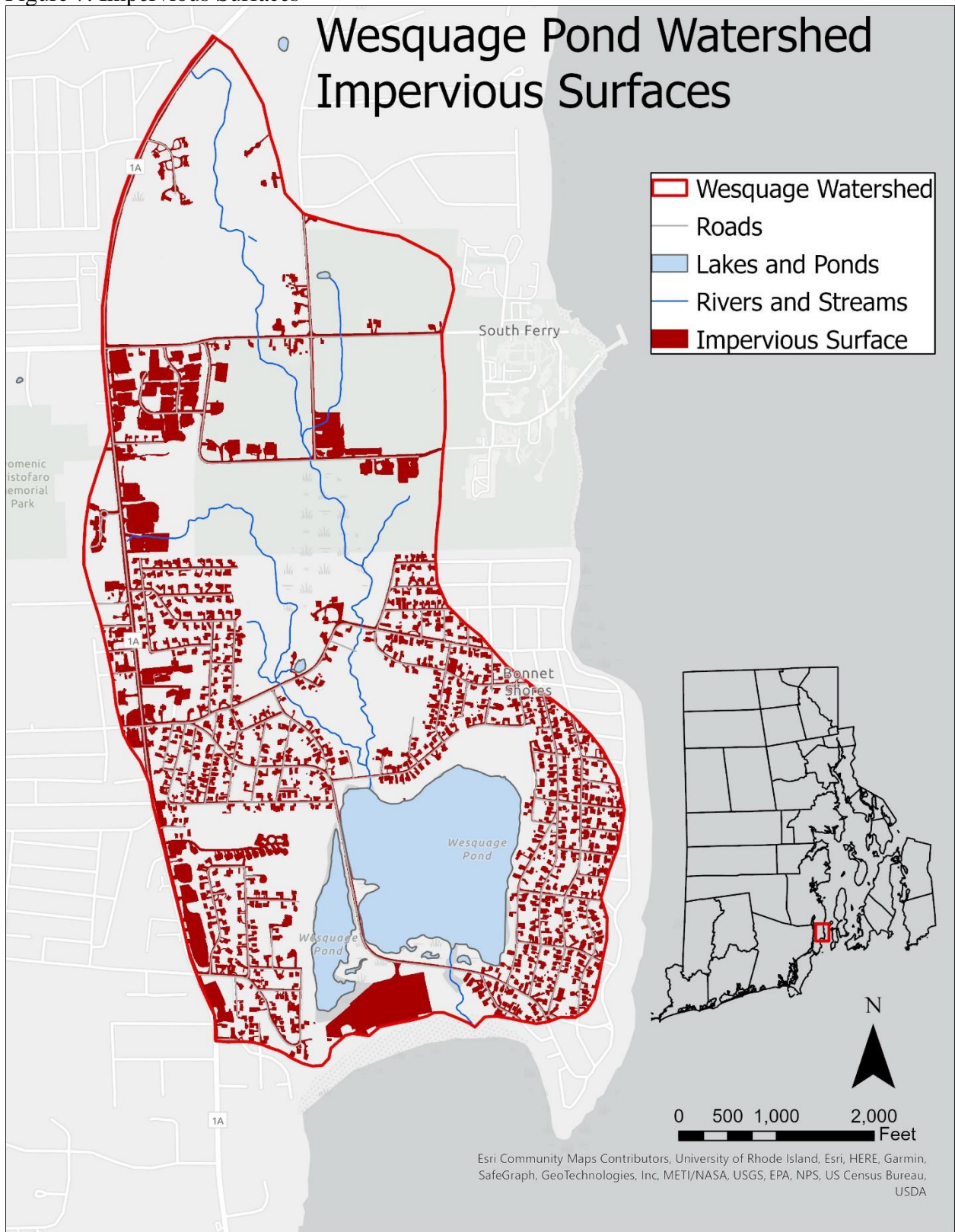
The town's 2016 Comprehensive Action Plan calls for the review of the "Town's Zoning Ordinance (Section 7.7) Supplemental Drainage Requirements and other ordinances that require stormwater management and, where appropriate, incorporate by reference the Rhode Island Stormwater Design and Installation Standards Manual (2010)." The most up to date stormwater and design rules from RIDEM were completed in 2018 and the town should use these new guidelines in future reviews or action plans.

#### Sustainable Funding for Stormwater Management

One way for a community to address local funding shortfalls for stormwater management 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: (cont.)

- 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;
- Creating incentives for property owners to reduce the stormwater generated on their properties; and
- Developing stormwater management programs that are comprehensive, cohesive, and consistent year-to-year.

Figure 7. Impervious Surfaces



## **B. Wastewater**

Pollutants in wastewater from domestic, commercial, and industrial use include excess nutrients (nitrogen and phosphorus), pathogens (bacteria and viruses), pharmaceuticals, personal care products, chemical pollutants (including household hazardous materials), metals, and other contaminants of emerging concern.

The watershed is mainly sewered and is served by the Narragansett Wastewater Division. The town's treatment system includes 19 pumping stations and the Scarborough Wastewater Treatment Facility to the south of this watershed. Approximately 67% of the watershed is sewered, leaving 33% serviced by onsite wastewater treatment systems or cesspools. Note that these percentages do not indicate the amount of households serviced or not serviced, but rather the geographic area.

The Town of Narragansett has been active in the Rhode Island Infrastructure Bank's Community Septic System Loan Program (CCSLP) since at least 2006. CCSLP is a lending program that provides low-cost, long-term financing to residential property owners for the repair or replacement of substandard or failing septic systems or to replace cesspools when the homeowner wishes to upgrade to a septic system. Municipalities must opt in to provide this service to their residents. One of the criteria needed in order to be eligible for this program is for the Town to develop an RIDEM approved Onsite Wastewater Plan (OWMP). Narragansett has an approved OWMP and does not have an onsite wastewater management ordinance, but utilities ordinance requires septic system pumping at least every 4 years, with records submitted to the town.

The Onsite Wastewater Management Plan (OWMP) helps to "ensure the proper design, location, construction, function and maintenance of onsite sewage disposal systems." The OWMP also outlines the locations, causes, and impacts of Individual Sewage Disposal Systems (ISDS), possible sources of funding to address these impacts, as well as goals and recommendations. The town of Narragansett submitted a revised OWMP plan in April, 2002. It is recommended that the Town updates this plan to account for the requirements of the state Cesspool Act and the availability of new nitrogen-reducing systems. In addition, the sewered area in the Wesquage Pond watershed has been expanded significantly since the writing of the 2002 OWMP.

The Rhode Island Cesspool Act of 2007 requires cesspools to be upgraded to a new OWTS or connected to a sewer line if available based on geographic proximity to shoreline, public wells, water bodies providing drinking water supply, as well as for properties subject to sale or transfers. An updated OWMP should include these requirements.

The town should consider updating their Onsite Wastewater Plan periodically so that it accurately describes current conditions, outlines completed projects, and updates goals and recommended actions.

Some means by which wastewater may not be properly treated include the following:

- Overflow of wastewater sewer facilities (pump station, manholes, etc.) due to extraneous water inputs from stormwater or groundwater.

- Cracks in wastewater sewer pipes (wastewater seeps into groundwater, and may subsequently enter surface waterbodies or stormwater drainage pipes)
- Illicit connections of wastewater to the stormwater pipe system. This may be through direct connections or through cracks.
- Failing OWTS or cesspools (cesspools do not provide any treatment)

### **C. Road Salt and Sand**

Road salt washes into surface waters, changing the salinity and impacting aquatic life. The sand is either washed into the waters impacting 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.

The salt and sand should also be stored in a manner to reduce impacts to water quality. RIDEM regulations for salt storage require salt and salt/sand mixtures to be covered if the groundwater at the site is classified GAA or GA. The Town of Narragansett does not store its sand and salt within the Wesquage Pond watershed. The town conducts street sweeping operations and catch basin cleaning for the entire town annually. The use of new techniques, such as New Hampshire’s “green SnoPro” program, where operators are certified and trained on the most up to date removal technologies, should be explored.

### **D. Pet Waste and Waterfowl**

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, chickens, 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 is often washed into stormwater drainage systems. Dog waste can harbor a host of different bacteria, parasites, and viruses that can cause human illness and disease.

Concentrations of geese, gulls, and ducks are of particular concern because they often deposit their waste directly into surface waters. Therefore, they can be major sources of pathogens, particularly near lakes and ponds where large resident populations have become established in the area.

Non-migratory geese are reported frequently along the shorelines of Wesquage Pond. The geese are known as resident geese, as they do not migrate in the winter, and are well adapted to the urban-residential areas of the watershed.

### **E. Lawn and Grounds Management**

The care and maintenance of landscaped areas can contribute to water quality degradation. 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.

Many homeowners are not aware of the appropriate best management practices to reduce the impacts to water quality in managing their lawns. Landscape contracting businesses may 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 from lawn and grounds management.

#### **F. Agriculture**

Less than 1% of the land within the Wesquage Pond watershed is used for agriculture. Most of this land is classified as “pasture” and is generally not suitable for tillage. 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 that address the following can operate with minimal negative effect on water resources:

- Provide sufficient stream/wetland buffers,
- Manage fertilizer and pesticides properly,
- Provide fencing to restrict access of livestock to streams and wetlands,
- Properly manage animal waste (handling and disposal).

#### **G. Other Pollution Threats from Residential Land Use**

Threats to water quality from residential land use include several of the topics that are further discussed elsewhere in this section (i.e., stormwater runoff, 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), and paints and solvents disposed of down the drain or onto the land surface (aka, Household Hazardous Waste). Most citizens are unaware of the effects of numerous potential contaminants stored, used, and disposed of around the home;
- Heating oil storage (above and below ground tanks) and spills -- Although most heating oil tanks sized to hold less than 1,100 gallons that are located at residences are likely above ground (outside or in a basement), an unknown, but potentially significant number of heating oil tanks are buried and will eventually leak. The RI UST Financial Responsibility Fund can help defray some of the costs of UST removal through an application and reimbursement program.

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.

## **IV. Aquatic Habitat Management**

#### **A. Wetlands**

Wetlands (freshwater and saltwater) 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, under RIDEM and the Coastal Resources Management Council (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 Wesquage Pond 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 streamflow and water resources through much of the year by releasing water from both surface and groundwater storage,
- Naturally filter polluted runoff,
- Help mitigate the effects of climate change and are natural sinks for greenhouse gases,
- Serve as important habitat for many plants, animals, and fish,
- 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 IV.D below). Indirect impacts include the loss of vegetated upland buffers (see section IV.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.

In this heavily developed watershed, there are only a few riparian areas, which are generally surrounded by greenspace. It is important that these vegetated buffers are maintained to maximize the benefits they provide. In areas where a minimal to no buffer exists, buffer restoration should be promoted wherever possible.

## **C. Invasive Species**

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, and
- Increased expenditures for prevention, eradication or control.

Invasive plant species currently degrade the habitat of Wesquage Pond and occur throughout the watershed. *Phragmites australis* (common reed) dominates much of the shoreline of the pond and displaces native plant species critical to the health of the ecosystem. Bamboo (*Phyllostachys* spp) and Japanese knotweed (*Fallopia japonica*) are also common in the area and further reduce habitat quality by crowding out native plants. *Phragmites* can also cause impediments to fish passage and impede the flow of water, leading to more flooding issues in the watershed. As a recent example, there was a large scale phragmites removal project in the Buckeye Brook watershed in Warwick, RI that has seen some success.

#### **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 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.

There are 5 unnamed streams present in the watershed, all of which appear to be hydrologically connected to Wesquage Pond. A review of aerial photographs and hydrologic data identified 7 potential stream crossings in the watershed. The condition of these crossings relative to connectivity for aquatic life has not been determined. The RI Department of Transportation has developed a “Road-Stream Crossing Assessment Handbook” to systematically assess road crossing conditions for flooding impact and aquatic organism passage ([https://www.dot.ri.gov/documents/about/protecting/stormwater/RIDOT\\_RoadStream\\_Crossing\\_Assessment\\_Handbook.pdf](https://www.dot.ri.gov/documents/about/protecting/stormwater/RIDOT_RoadStream_Crossing_Assessment_Handbook.pdf) ). Further work is needed to identify and prioritize the upgrades to stream crossings that may be needed. The stream crossings identified in the watershed are located along the following roads:

- Lake Road
- Bonnet Shores Road
- Dean Knauss Drive
- Ray Trainor Drive
- South Ferry Road

Wesquage pond is considered to be potential habitat for anadromous fish species of commercial and recreational value. Maintenance of adequate connectivity between the pond and the ocean will maximize the potential for the target populations to use the habitat area. The 2002 “Strategic Plan for the Restoration of Anadromous Fishes to Rhode Island Coastal Streams” from RIDEM states that

*“Wesquage Pond (suitable for river herring and white perch) is a coastal barrier lagoon in close proximity to Narragansett Bay. Because there is limited saltwater intrusion, salinity levels range from brackish to fresh. Passage into barrier ponds requires either natural or manual breaching of the barrier beach at least twice annually at appropriate times. Springtime manual breaching will allow migrating adult alewives and white perch access to spawning areas and a fall breach will allow juveniles to exit the system. A cooperative agreement with the Bonnet*

*Shores Fire District is established to maintain this passage method and should be maintained.”*  
(Erkan, 2002)

## **V. Additional Climate Change Concerns**

Among the myriad concerns of climate change in New England is the increase in frequency and scale of flooding due to rising sea levels, larger precipitation events, and wetland loss. Coastal communities will often be impacted the most in these flooding events, as the loss of coastal wetland functions exacerbates the already larger storm surges and high tide flooding. These coastal wetlands can act as a hydrologic sponge and can provide resistance to the flow of water.

Flooding of roads and homes occurs somewhat frequently in the areas around Wesquage Pond, causing property damage, restrictions to travel, and high costs to address the problems that result from these events. This has been a problem historically and is one that is worsening. Increases in impervious area, rising sea levels, and an increased frequency of significant storm events add urgency to the need to address this issue in the watershed.

Environmental Strategies & Management submitted a dredging application with CRMC to alter the outflow of the pond.

*“The Town of Narragansett’s Bonnet Shores Fire District was awarded a RIDEM Narragansett Bay Watershed Restoration Fund Grant to implement flood mitigation and pond restoration to remedy flooding along the Bonnet Point Road Causeway caused by sediment build up in the Wesquage Pond.*

*ES&M was contracted by the Bonnet Shores Fire District to complete the Coastal Resources Management Council permit application and to prepare bid documents. ES&M conducted elevation and field surveys, collected soil samples, and evaluated the flooding and water quality issues in the area. Based on the data, ES&M then performed hydraulic modeling and analysis. Dredging is planned to be undertaken in early 2019.”*

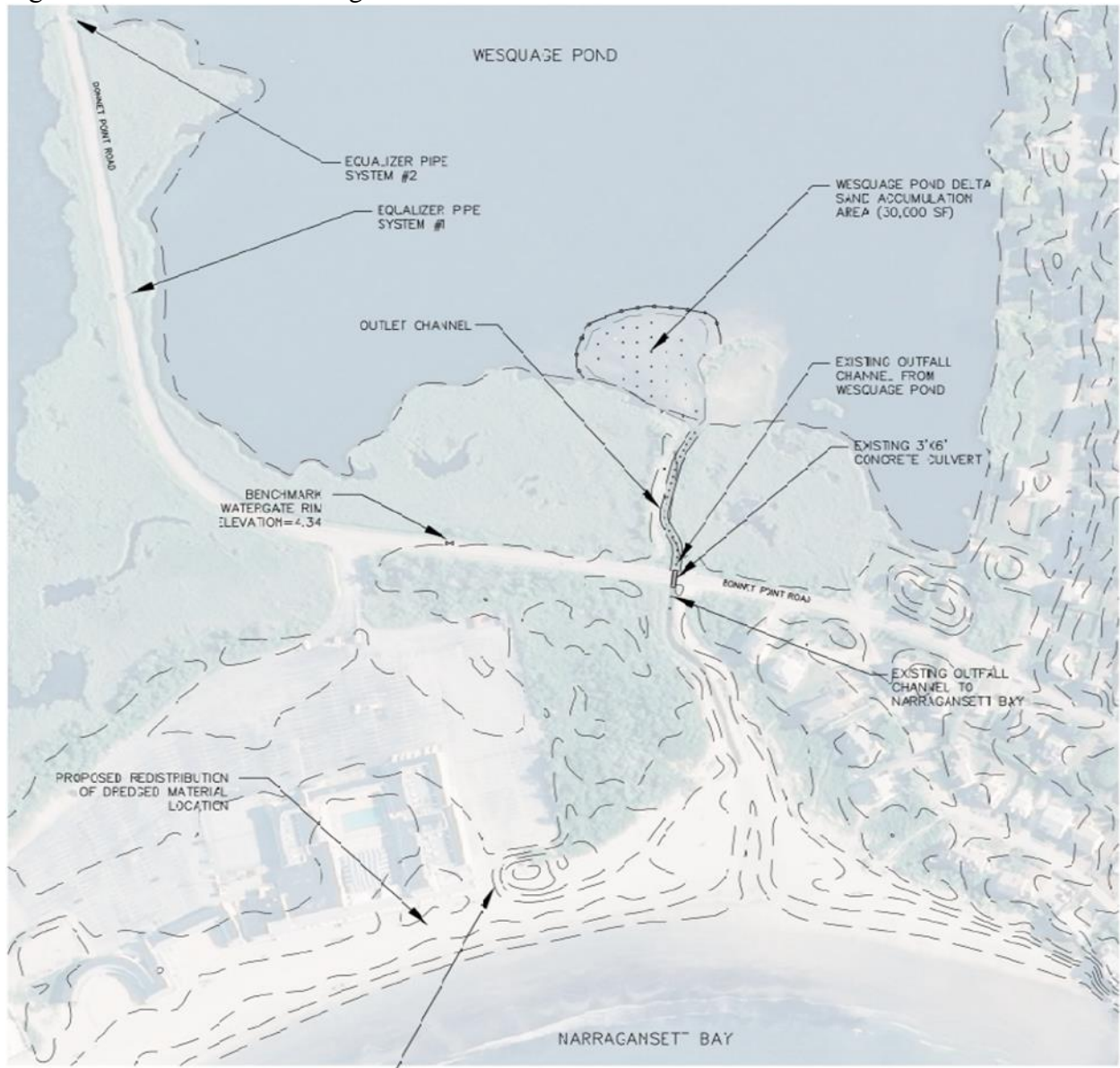
The plan for this effort is shown in Figure 8. This work was completed and changed the flow patterns in the southern portion of the pond, although it appears that outflows were channeled through the existing culvert which continues to restrict outflows during and after storm events. Since the dredging, the sand accumulation in the delta area has continued, and this portion of the pond is exposed during periods of low flow.

The outflow from Wesquage Pond is currently controlled by a channel lined with rock above (North of) Bonnet Point Road which flows for approximately 275 feet into the pond. The channel connects to a 3’ by 6’ concrete culvert passing under the road which flows through another channel into the beach. High seas and storms frequently fill the channel below the road, which is then cleared using a backhoe. The culvert itself can also be blocked by sand and debris during storm events which causes flooding of the road and upstream properties. During the summer, current practice closes the channel to allow for movement of people and raking equipment on the beach, increasing the potential for flooding during storm events.



Nonpoint source impacts from flooding can include a change in ecosystem resilience by changing the hydrology of a watershed and can result in the transport of nutrients from areas that would otherwise be relatively isolated or protected from average precipitation events. A hydrological evaluation of the channel and the watershed should be conducted to minimize the nonpoint source impacts during flooding events.

Figure 8. ES&M's Flood Mitigation Work Plan



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

### **A. Citizen Action**

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 B.
- 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 local/regional/statewide non-profit groups that can help make a difference in the Wesquage Pond watershed.

### **B. Implementation Table**

This Implementation Table identifies priority actions for water quality and aquatic habitat protection and restoration in the Wesquage Pond watershed. The action items are derived from the development of the Plan. The Implementation Table is organized by management topic and includes the information below for each action. Unless otherwise specified, all actions are the responsibility of the Town.

- Action Item
- Timeframe: ongoing, 1-2 years, 3-5 years, 5-10 years.
- Cost Estimate: Relative indication of estimated cost as follows:
  - \$ = <\$25,000;
  - \$\$ = \$25,000 -- \$100,000;
  - \$\$\$ = >\$100,000
- Priority:
  - H – High
  - M – Medium
  - L – Low

\*NGO = non-governmental organizations

\*BSFD = Bonnet Shores Fire District

## Implementation Table

Action Items - Listed by Management Topic - Unless otherwise specified, actions are the responsibility of the Town	Timeframe	Cost Estimate	Priority
<b>Stormwater Management</b>			
Continue to implement the RIPDES Phase II MS4 Stormwater Management Program Plan. (Town, BSFD and DEM)	Ongoing	\$\$\$	H
<ul style="list-style-type: none"> <li>Consider reviewing 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.</li> </ul>	3-5 Years	\$	L
<ul style="list-style-type: none"> <li>Establish illicit discharge detection sampling program and address unauthorized connections that contribute pollutants.</li> </ul>	Ongoing	\$	M
<ul style="list-style-type: none"> <li>Continue public outreach programs to encourage residential BMPs that improve management of stormwater runoff, such as rain gardens.</li> </ul>	Ongoing	\$	L
<ul style="list-style-type: none"> <li>Identify and prioritize locations for stormwater BMP retrofits throughout the watershed.</li> </ul>	Ongoing	\$\$\$	H
<ul style="list-style-type: none"> <li>Increase frequency of stormwater BMP Maintenance.</li> </ul>	Ongoing	\$\$	H
Reduce stormwater runoff by encouraging construction of rain gardens and dry wells which facilitate groundwater infiltration on private and public properties.	Ongoing	\$	M
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	\$	H
<b>Wastewater Management</b>			
Update Onsite Wastewater Management Plan to better address current issues and ongoing projects.	1-2 Years	\$	H
Extend the existing sewerage system to include those properties currently served by onsite wastewater treatment system.	5-10 Years	\$\$\$	H

Action Items <ul style="list-style-type: none"> <li>- Listed by Management Topic</li> <li>- Unless otherwise specified, actions are the responsibility of the Town</li> </ul>	Timeframe	Cost Estimate	Priority
<b>Climate Change Concerns</b>			
Explore potential long-term solutions for the pond outflow channel sediment build-up and conduct a hydrologic evaluation to minimize nonpoint source impacts. (BSFD)	Ongoing	\$\$	M
<b>Road Salt and Sand</b>			
Conduct street sweeping at a frequency that minimizes water quality impacts. Consider increased sweeping on mild winter days. (Town, BSFD and RIDOT)	Ongoing	\$\$	M
Identify strategies and technology innovations minimize the use of road salt and sand throughout the watershed. Implement such actions. (Town and RIDOT)	5-10 Years	\$-\$\$\$	L
<b>Pet Waste and Waterfowl</b>			
Educate the public about the impact of pet waste on water quality. Consider providing pet waste educational materials with dog licensing renewals. (Town and NGO)	Ongoing	\$	M
Install pet waste signage at high intensity use locations in the watershed. (Town and BSFD)	1-2 Years	\$	M
Install signage instructing the public not to feed the waterfowl at public areas where feeding may occur. (BSFD)	1-2 Years	\$	M
<b>Lawn and Grounds Management</b>			
Inform residents and landscaping companies on proper amounts and application of fertilizers and pesticides to lawns and gardens to minimize water quality impacts. (Town, BSFD and NGO)	1-2 Years (then ongoing)	\$	M

Action Items - Listed by Management Topic - Unless otherwise specified, actions are the responsibility of the Town	Timeframe	Cost Estimate	Priority
<b>Agriculture</b>			
Encourage landowners to work with the RIDEM Division of Agriculture and the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) to adopt best farm conservation practices and develop a conservation plan for their farming activities within the watershed, if applicable. (Farmer with NRCS support)	3-5 Years	\$	L
<b>Heating Oil Storage Tanks</b>			
Educate 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 and identify funding sources to help remove the tanks. (Town, BSFD and NGO)	3-5 Years	\$	L
<b>Wetlands and Vegetated Upland Buffer Protection</b>			
Maintain and restore wetlands and associated wetland/stream/pond upland buffers in the watershed. (Town, BSFD, State, and NGO)	Ongoing as opportunities arise	\$	H
<b>Invasive Species</b>			
Conduct invasive species management best management practices. (BSFD and NGO)	Ongoing	\$	L
<b>Stream Connectivity</b>			
Assess stream connectivity at road crossings in the watershed. (Town, BSFD, State, and NGO)	3-5 Years	\$\$	H
<b>Open Space/ Conservation</b>			
Adopt appropriate land stewardship practices for town open spaces. As feasible, acquire additional open space. (BSFD and NGO)	Ongoing (as opportunities and funding arise)	\$\$\$	M

Action Items <ul style="list-style-type: none"> <li>- Listed by Management Topic</li> <li>- Unless otherwise specified, actions are the responsibility of the Town</li> </ul>	Timeframe	Cost Estimate	Priority
<b>Water Quality Monitoring</b>			
RIDEM continues to monitor water quality in accordance with statewide monitoring strategy, including the ongoing sampling of shellfish growing areas. (RIDEM)	Ongoing	\$	H
<b>Public Information and Outreach</b>			
Inform residents about the watershed and promote actions that can be taken by homeowners and others to protect water resources and aquatic habitats. (Town and BSFD)	Ongoing	\$	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 RIDEM by the USEPA under Section 319 of the Clean Water Act.

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

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

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

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, and 5) brownfields remediation. 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.

One program that utilizes federal dollars from the Clean State Water Revolving Fund is the Community Septic System Loan Program (CSSLP). CSSLP is a lending program that provides low-cost, long-term financing to residential property owners for the repair or replacement of substandard or failing septic systems or to replace cesspools when the homeowner wishes to upgrade to a septic system. Municipalities must opt in to provide this service to their residents and must have a DEM approved On-Site Wastewater Management Plan.

The Municipal Resilience Program (MRP) is another program from the RI Infrastructure Bank that provides support for cities and towns to complete a municipal driven workshop process that identifies challenges, hazard and strengths pertaining to climate resiliency. Upon completion of the MRP workshop, municipalities are designated as "Resilient Rhody Municipalities" and can then apply for MRP Action grants to implement identified projects. Examples of programs that may be eligible for grants can include but are not limited to, dam repair and removal, road elevation, hardening or elevation of pump stations, berms and levies, culvert repair, green stormwater infrastructure, solar & battery storage back-up power, energy efficiency, watershed restoration, urban tree planting, and coastal erosion control.

In addition to the programs described above, the Infrastructure Bank has a Sewer Tie-In Loan Fund for homeowners to access funds to connect to the local sewer system. Individual loans are funded from a Clean Water State Revolving Fund loan to a sewer system owner and are administered locally by Rhode Island Housing. Loans to homeowners up to \$10,000 are offered at a 2% interest rate for up to a five-year term.

Finally, the Infrastructure Investment and Jobs Act (IIJA) is an historically large opportunity for municipalities to potentially address issues and fund projects that they may have otherwise not been able to accomplish.

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

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

### **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. \$3 million was allocated in 2022. 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:** RIDEM Office of Water Resources

### **D. U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) 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. EPA Southeast New England Program (SNEP)

The US EPA Southeast New England Program for Coastal Watershed Restoration brings together partnerships to protect and restore coastal watersheds of southeast New England from Westerly to Cape Cod. Through its SNEP Watershed Implementation Grants (SWIG), the Program provides competitive funding for projects that leverage multiple resources to implement innovative solutions for water quality improvement, habitat restoration, and climate resilience. Through its SNEP Network, the program also provides free training and assistance to municipalities, organizations, and tribes to advance stormwater and watershed management, ecological restoration, and climate resilience in Rhode Island and Massachusetts.

Restore America's Estuaries (RAE) is a non-profit conservation organization that partners with EPA to support the goals of the SNEP Strategic plan by managing the annual SWIG project solicitation via RFPs.

**Eligible applicants:** Municipalities, non-profit organizations, states, and research/educational institutions. **Contact:** US EPA, Southeast New England Program

#### F. State Open Space Grants

RIDEM 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:** RIDEM Office of Planning and Development

### **G. Narragansett Bay Estuary Program**

The Narragansett Bay Estuary Program is a stakeholder-led organization pursuing place-based conservation across the three-state Narragansett Bay region. Program work spans boundaries to provide independent convening, scientific data analysis, and watershed project funding. The Program supports often under-funded pre-project steps, including studies, assessments, and engineering design.

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

**Contact:** Narragansett Bay Estuary Program

### **H. 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

### **I. Technical Assistance Organizations**

University of Rhode Island (URI) 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

Southern Rhode Island Conservation District (ERICD)

The mission of the Southern RI Conservation District is to promote and achieve a healthy environment and sustainable use of natural resources for the people of Kent and Washington counties and the State of Rhode Island, now and for the future, by coordinating partners to provide technical, educational, and financial resources.

### **J. USDA Rural Services Water and Environmental Programs**

Through Rural Utilities Service Water and Environmental Programs (WEP), rural communities obtain the technical assistance and financing necessary to develop drinking water and waste disposal systems. Safe drinking water and sanitary waste disposal systems are vital not only to public health, but also to the economic vitality of rural America. Rural Development is a leader

in helping rural America improve the quality of life and increase the economic opportunities for rural people.

WEP provides funding for the construction of water and waste facilities in rural communities and is the only Federal program exclusively focused on rural water and waste infrastructure needs of rural communities with populations of 10,000 or less. WEP also provides funding to organizations that provide technical assistance and training to rural communities in relation to their water and waste activities. WEP is administered through National Office staff in Washington, DC, and a network of field staff in each State.

**Eligible applicants:** (Grant depending) Typically, individuals, public bodies, municipalities, tribes, nonprofit organizations

**Contact:** USDA Rural Development

### **K. RI Rural Water Association**

The Rhode Island Rural Water Association was incorporated in 2021 to serve as not only an advocate for the association members of the state, but a partner in their missions to provide their essential services to the public. They are a non-profit trade association that provides training, technical assistance, and source water protection to the rural and small utilities in RI.”

This assistance is supported through NRWA by the United States Congress and is provided in partnership with USDA Rural Utilities Service, the Farm Service Agency, and the Environmental Protection Agency. They will also represent rural and small utilities in the regulatory and legislative process.

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

### **A. Monitoring**

To fulfill the requirement of the RIPDES Storm Water General Permit, the Town of Narragansett must submit its Small Municipal Separate Storm Sewer System (MS4) Annual Report to DEM. Part of the requirements for any MS4 includes an illicit discharge detection and monitoring program. MS4s are not designed to accept or process illicit discharges (non-stormwater waste). These illicit discharges often enter the system through direct connections, such as mistaken or deliberately connected piping to stormwater drains, malfunctioning sanitary systems, or spills collected by drain outlets. The pollutants from these discharges can be high enough to significantly degrade water quality. Part of the requirements of the MS4 illicit detection and elimination program include a robust sewer system and outfall map, prohibitions on non-stormwater discharges into the MS4, a plan to detect and address non-stormwater discharges, the creation of appropriate BMPs to meet permit requirements, and the education of the public and businesses on the hazards of illicit discharges.

### **B. 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 and straightforward indicators are water quality measurements. Water quality monitoring data can be compared with the water quality criteria for the waterbody classification. Monitoring can

extend to biological indicators, such as aquatic macroinvertebrates. Biological monitoring can look at species population levels, species composition, and/or contaminant levels in tissues.

An additional way to measure progress is to systematically track the implementation of the actions in the Implementation Table in Section V. Taking this a step further, the programmatic performance indicators below may be used to measure plan implementation. Although these actions are not a measure of direct environmental improvements, they are assumed to contribute to water quality and aquatic habitat improvements. Some potential performance indicators for water quality and aquatic habitat improvements include:

- Number of stormwater BMPs installed.
- Increase in impervious area that is connected to stormwater treatment (area that is disconnected).
- Number of illicit discharges discovered.
- Acreage of open space/percent of watershed in conservation.
- Number of properties/existing dwellings connected to sewer system.
- Acreage of wetlands protected, and acreage of restored wetlands.
- Number of watershed projects implemented to improve and protect wetlands.
- Acreage of buffers protected, and acreage of restored buffers.
- Number of watershed projects implemented to improve and protect riparian buffers.
- Number of stream connectivity projects implemented to improve connectivity.
- Number of contact hours of educational outreach attained for board members, elected officials, and municipal staff.
- Awareness among residents and other targeted audiences as measured by surveys.

## **IX. Next Steps**

This plan is provided to the Bonnet Shores Land Trust and the Town of Narragansett to guide in the long-term protection and restoration of water quality and aquatic habitat in the Wesquage Pond watershed.

The Plan will satisfy the requirements for eligibility for USEPA Section 319 funds that are administered by RIDEM. 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 RIDEM Section 319 funding program. The Plan will also be useful in showing support for applications to other sources of funding for implementation.

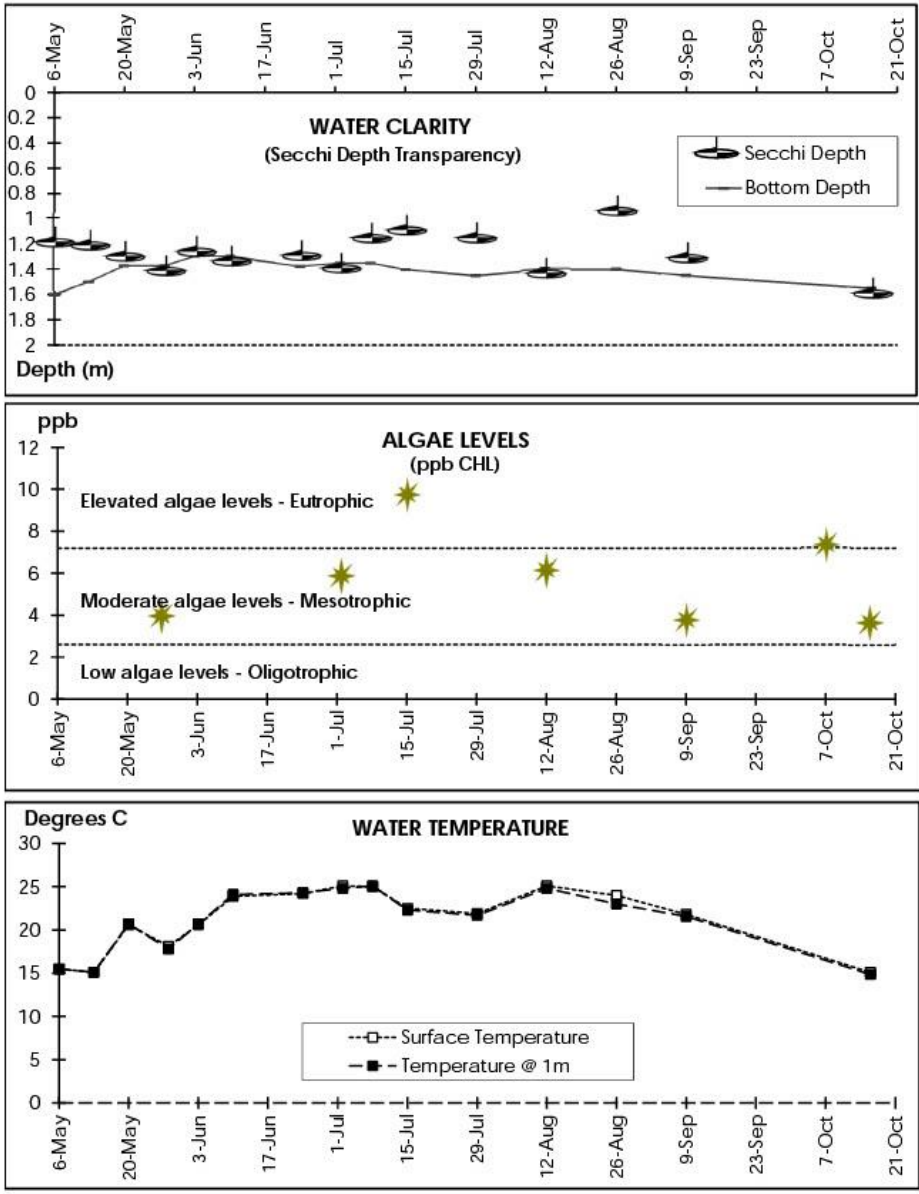
## **Nine Elements of Watershed Planning:**

- 1. Identification of the causes of impairment:**  
Sections III and IV, Pages 15 to 23
- 2. An estimate of the load reductions expected from management measures:**  
There is no existing TMDL or estimated load reduction recommendation for Wesquage Pond. It currently supports its designated uses, and this plan is intended to protect and monitor the watershed.
- 3. Descriptions of the nonpoint source management measures that will need to be implemented:**  
Implementation Table, Section VI, Pages 26 to 30
- 4. Estimate the amounts of technical and financial assistance needed, and responsible parties:**  
Implementation Table, Section VI, Pages 26 to 30
- 5. An information and education component:**  
Sections II-IV, Pages 12-23.  
Section VIa, Page 26
- 6. Schedule for implementing the nonpoint source management measure:**  
Implementation Table, Section VI, Pages 26 to 30
- 7. A description of interim measurable milestones for determining whether actions have been implemented:**  
Section VIII, Pages 35 to 36
- 8. A set of criteria that can be used to determine whether loading reductions are being achieved:**  
There is no existing TMDL or estimated load reduction recommendation for Wesquage Pond. It currently supports its designated uses, and this plan is intended to protect and monitor the watershed.
- 9. A monitoring component to evaluate the effectiveness of the implementation efforts:**  
Section VIII, Pages 35 to 36

***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  
Wesquage Pond Watershed***

Appendix A: Watershed Watch Data

2017 Wesquage Pond



2017

## 2017 Wesquage Pond Water Quality Measurements

URI Watershed Watch, 2/07/18



	MAY	JULY	AUG.	OCT	
-----Total Phosphorus (ppb) -----					
<b>Wesquage Pond</b>	23	29	41	14	<b>Avg. 27</b>
<i>RIDEM recommended lake maximum average TP value 25 ppb</i>					
-----Dissolved Phosphorus (ppb) -----					
<b>Wesquage Pond</b>	6	6	10	5	<b>Avg. 7</b>
----- Total Nitrogen (ppb) -----					
<b>Wesquage Pond</b>	575	820	1030	740	<b>Avg. 791</b>
<i>Total nitrogen levels in lakes and ponds above 750 ppb considered elevated.</i>					
----- Nitrate-Nitrogen (ppb) -----					
<b>Wesquage Pond</b>	ND	nd	nd	ND	<b>Avg. ND</b>
<i>ND = &lt; 15 ppb</i>					
----- Ammonia-Nitrogen (ppb) -----					
<b>Wesquage Pond</b>	35	35	55	45	<b>Avg. 43</b>
<i>ND = No Detect Limit of Detection = 15 ppb</i>					
----- Enterococci Bacteria (per 100 mLs) -----					
<b>Wesquage Pond</b>	<1	10	<10	16.4	<b>Maximum &lt;1</b>
<i>RIHealth Standard for Recreational Contact: Maximum 61 Enterococci per 100 mLs</i>					
----- pH -----					
<b>Wesquage Pond</b>	7.3	7.4	7.9	6.6	<b>Minimum 7.3</b>
<i>pH of 6 - 9 considered normal</i>					
----- Alkalinity (mg/l CaCO3) -----					
<b>Wesquage Pond</b>	23	36	39	39	<b>Minimum 23</b>

USEPA Alkalinity Classification:

ACIDIFIED: (< 1 ppm with pH < 5.0)  
 CRITICAL: (< 2 ppm)  
 ENDANGERED (2-5 ppm)

HIGHLY SENSITIVE: ( 5-10 ppm)  
 SENSITIVE: ( 10-20 ppm)  
 NOT SENSITIVE (>20 ppm)

## Appendix B. RIDEM 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 !**



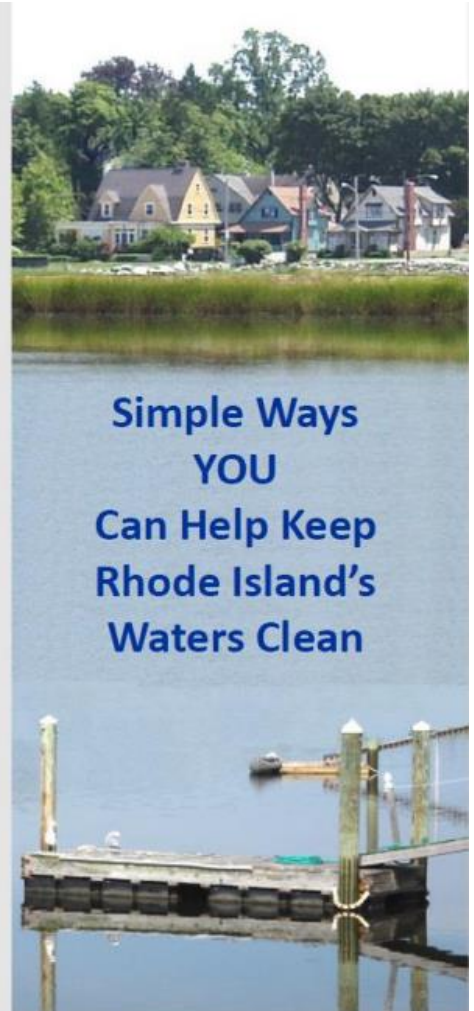
Swim, sail, surf, kayak, fish, boat, shellfish, go birding or walk along the shore. Explore Rhode Island's waters.

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.