

Tributary to Nonquit Pond



Watershed Description

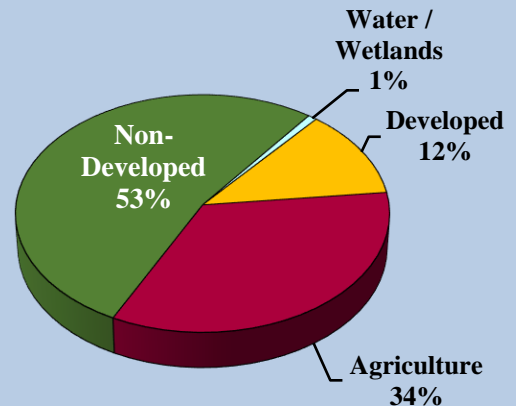
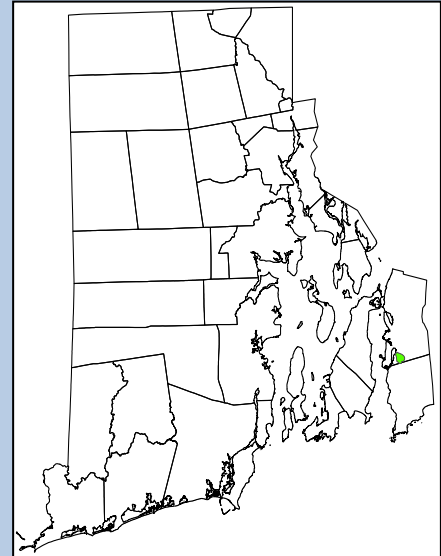
This TMDL applies to the unnamed tributary stream system (RI0010031R-20) that ultimately discharges into Nonquit Pond (RI0007035L-08). The pond is one of nine source water reservoirs for the Newport Water System. The Newport Water System is comprised of a complex network that provides drinking water to all of Aquidneck Island with customers in Newport, Middletown, and a portion of Portsmouth, RI. It also provides drinking water to the Portsmouth Water and Fire District and to Naval Station Newport.

The unnamed tributary to Nonquit Pond is a stream system that measures 1.80 miles, of which 0.38 miles are mapped and tracked for assessment purposes. The unnamed tributary stream system to Nonquit Pond is composed of two forks. The northeastern fork originates from a wetland area, located within a cow pasture. The stream flows past a couple of residences before crossing Main Road, where it skirts the northern edge of a crop field. The northeastern fork then flows along the rear edge of several residential lawns, prior to its confluence with the southwestern fork of the unnamed tributary (Figure 1, Figure 2).

The southwestern fork of the unnamed tributary to Nonquit Pond originates from a large linear wetland. Upland forest as well as hay fields border the wetland corridor. As it exits the wetland, the southwestern fork flows along the rear of a lawn associated with a large-lot residential property. Downstream of Main Road, the southwest fork bisects a crop field, prior to its confluence with the northeast fork of the tributary, just upstream of the cul-de-sac at the end of Peaceful Way (Figure 1, Figure 3).

Assessment Unit Facts *(RI0010031R-20)*

- **Towns:** Tiverton
- **Impaired Segment**
Length: 0.38 miles
- **Classification:** Class AA
- **Direct Watershed:**
0.59 mi² (375 acres)
- **Impervious Cover:** 3 %



Watershed Land Uses

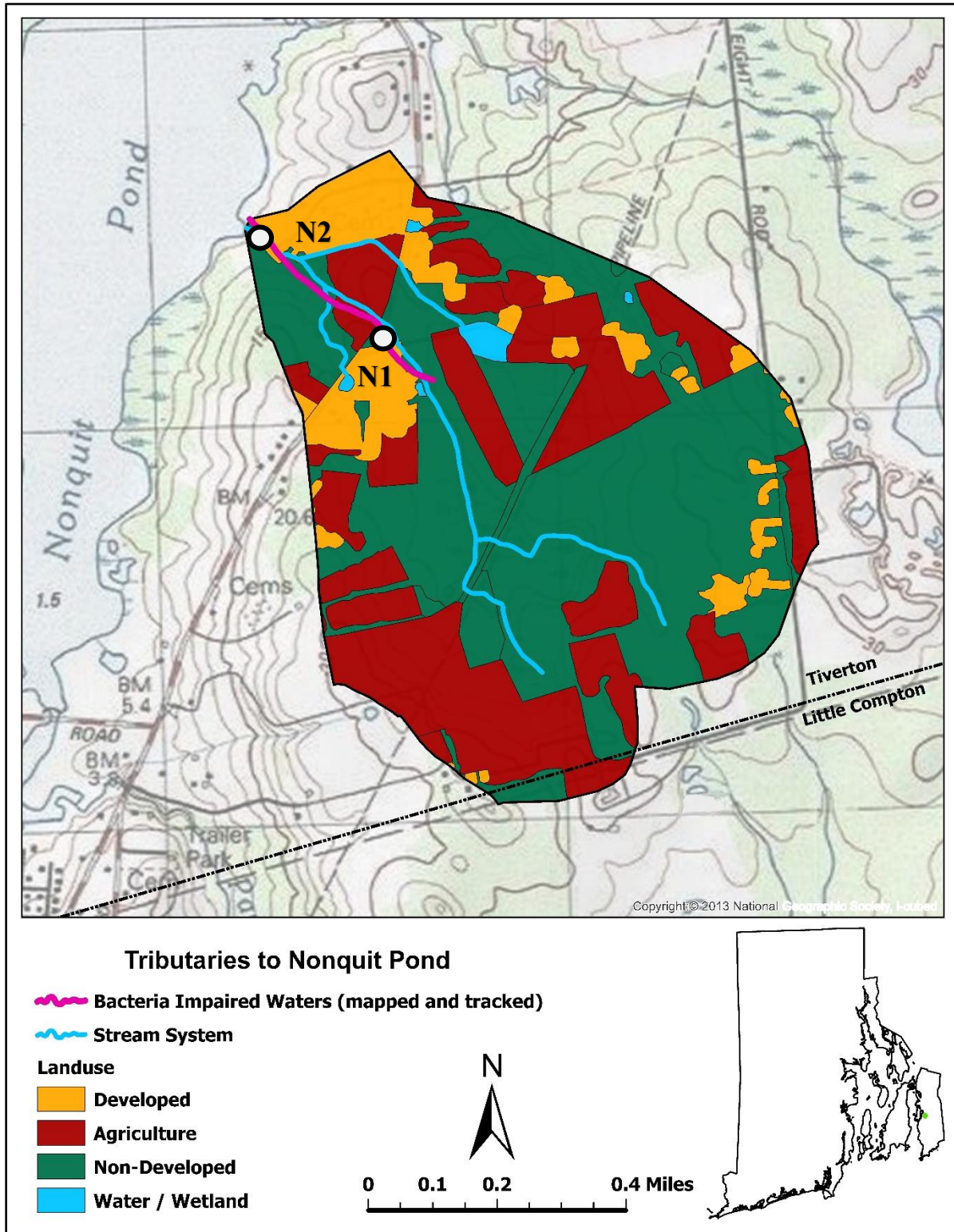


Figure 1. Unnamed Tributaries to Nonquit Pond with Land Cover and Impaired Waters

Why is a TMDL Needed?

Under Section 303(d) of the federal Clean Water Act, states, territories, and authorized tribes, are required to develop lists of impaired waters. The law also requires states, territories, and authorized tribes to develop total maximum daily loads (TMDLs), a calculation of the maximum amount of a pollutant that can be present in a waterbody and still meet water quality standards for those impaired waters. Based on data collected as described below, Tributary to Nonquit Pond is not meeting Water Quality Standards and must receive a TMDL.

During 2017, water samples were collected on selected tributaries to Nonquit Pond, including Tributary to Nonquit Pond (RI0010031R-20), as part of the National Water Quality Initiative (NWQI)¹. The NWQI is collaborative effort between the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), US Environmental Protection Agency (EPA), and the Rhode Island Department of Environmental Management (RIDEM) to work in partnership to restore water quality in watersheds affected by agricultural pollution sources.

There were two sampling stations (Figure 1) located on the unnamed tributary to Nonquit Pond. One station (Station N1) is located near the headwaters of the northeast fork of the stream where the stream passes under Barn Swallow Drive. The other sampling station (Station N2) is located at the cul-de-sac of Peaceful Way, immediately downstream of the confluence of the northeast fork and the southwest forks of the stream.

Station N1 at Barn Swallow Drive

Station N1 (Figure 2) is located at Barn Swallow Drive, on the northeast fork of the unnamed tributary to Nonquit Pond. The stream originates from a wetland, south of Bettencourt Lane and flows past the northeast corner of a pasture, just south of Bettencourt Lane. It then flows through a small wetland area and upland forest.

Inspection of aerial photographs as well as field observations in 2018 revealed that cows graze within the wetland at the headwaters of the stream. Cattle have access to saturated and flooded areas along much of the perimeter of the wetland. There is an earthen berm, along the perimeter of the corner of the wetland, where it lies closest to the eastern pasture. During most of the year, cattle graze within the wetland, particularly in a significant area of standing water to the north of the forested portion of the wetland, including a small farm pond. Cows also graze in wet meadows on the southeastern side of the

¹ Nonquit Pond Tributaries: Water Quality Study and Pollutant Source Identification National Water Quality Initiative <http://www.dem.ri.gov/programs/benviron/water/quality/rest/pdfs/tdml-nonquit.pdf>

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wetland. In September 2022, field observations showed the pasture field is enclosed by an electric fence presumably to keep the cows from accessing the field as it is being used as cropland instead of pasture.

There are a few 2-3-acre residential lots (former farmland) located to the north of Bettencourt Lane and most have vegetated buffers. There is a single residential lot, to the immediate north of Bettencourt Lane, where there is no vegetative buffer in place.

The sub-watershed to the southeast of the wetland and surrounding pasture areas consists largely of forested area. Pastures and a residential area, located at the southeastern end of the sub-watershed are located far from the headwaters of the stream and any surface waters.

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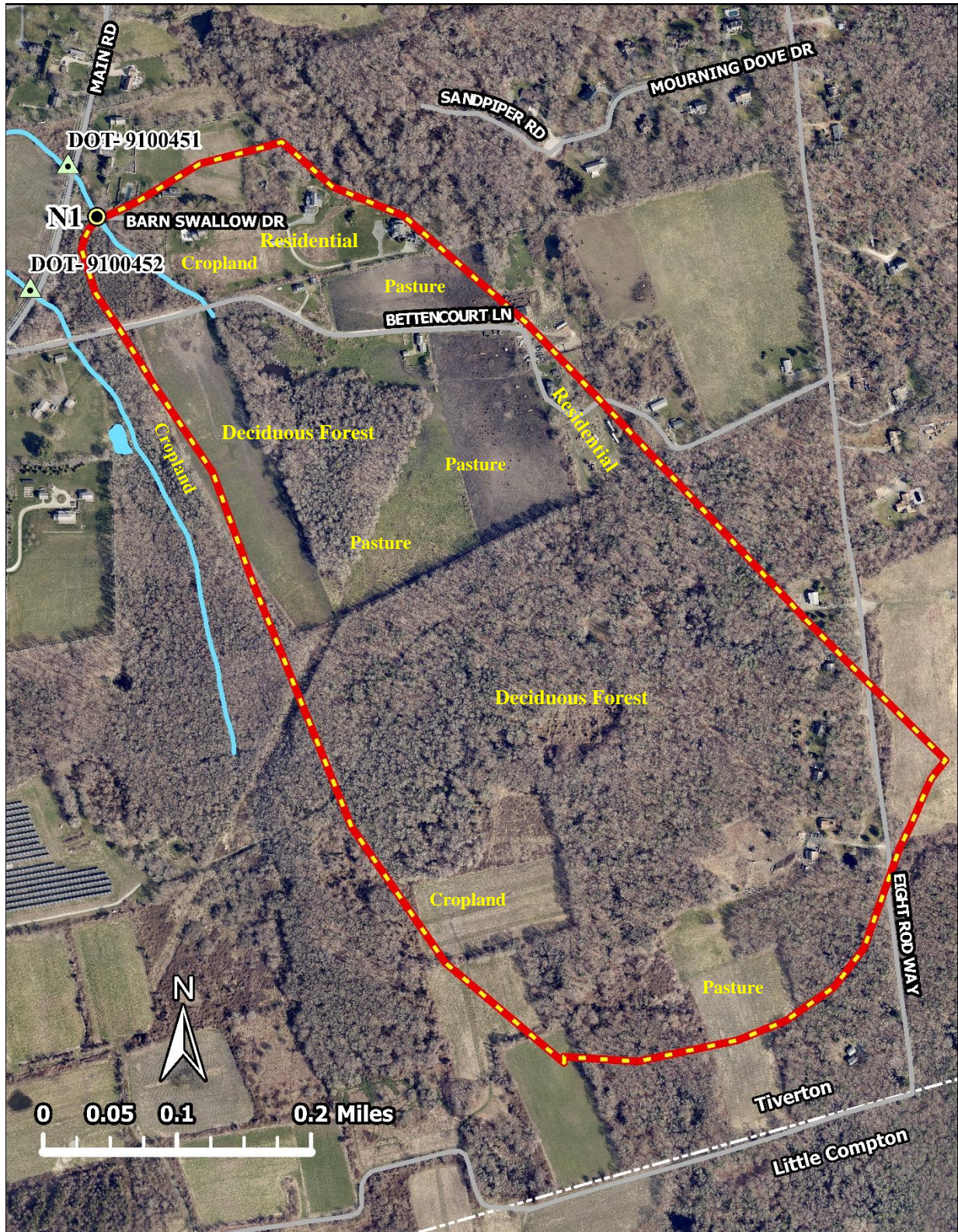


Figure 2. Station N1 Sub-watershed

Station N2. Peaceful Way Cul-de-sac

The southwest fork of the unnamed tributary to Nonquit Pond arises from a large linear wetland (Figure 3). Except for a residential area to the immediate south of Bettencourt Lane, the stream flows through a wetland corridor, which is bordered mainly by upland forest.

Agricultural areas at the southern end of the wetland are more than 500 feet away from the stream headwaters. These areas bordering the southern end of the wetland consists of hay field that is largely fallow and infrequently mowed. There is a small sliver of pasture located south of Bettencourt Lane and east of the stream but is separated from the stream by a 70-foot forested buffered.

There are crop fields located to the west of the headwaters of the stream but are separated from the wetland by hedgerow, a stone wall, and a buffer of closely cropped grass and trees. A small farm pond is located more than 200 feet from the crop fields but doesn't appear to receive any runoff from rain events. Further north is another area of crop field, but it is separated from the wetland by upland forest, which is a least 100 ft. wide. Immediately south of Bettencourt Lane, the stream flows along the edge of a six-acre residential lawn and past an old farm pond on the residential property. This pond is hydrologically connected to the stream by two short swales. Downstream of Main Road, the southwest fork of the unnamed tributary flows through a crop field, with an approximately 15-foot-wide vegetated buffer along the stream.

Downstream of Station N1, the northeast fork of the unnamed tributary flows along the edge of a residential lawn before passing under Main Road. The stream continues along the northern edge of a crop field with 0-15 ft. of vegetated buffer. The stream then flows across a stone wall, forming a property boundary between the crop field and residential lots. The tributary continues parallel to the stone wall, at the rear of several residential lots. Except for one residential lot with a 50-ft. vegetative buffer, the remaining lots have lawns that extend to the bank of the tributary. Turbid runoff was observed in an erosional swale at the northern edge of the cornfield, which discharges to the tributary near the confluence of its two forks. The two forks of the unnamed tributary converge just upstream of Station N2, which is located approximately 400 ft. upstream of Nonquit Pond.

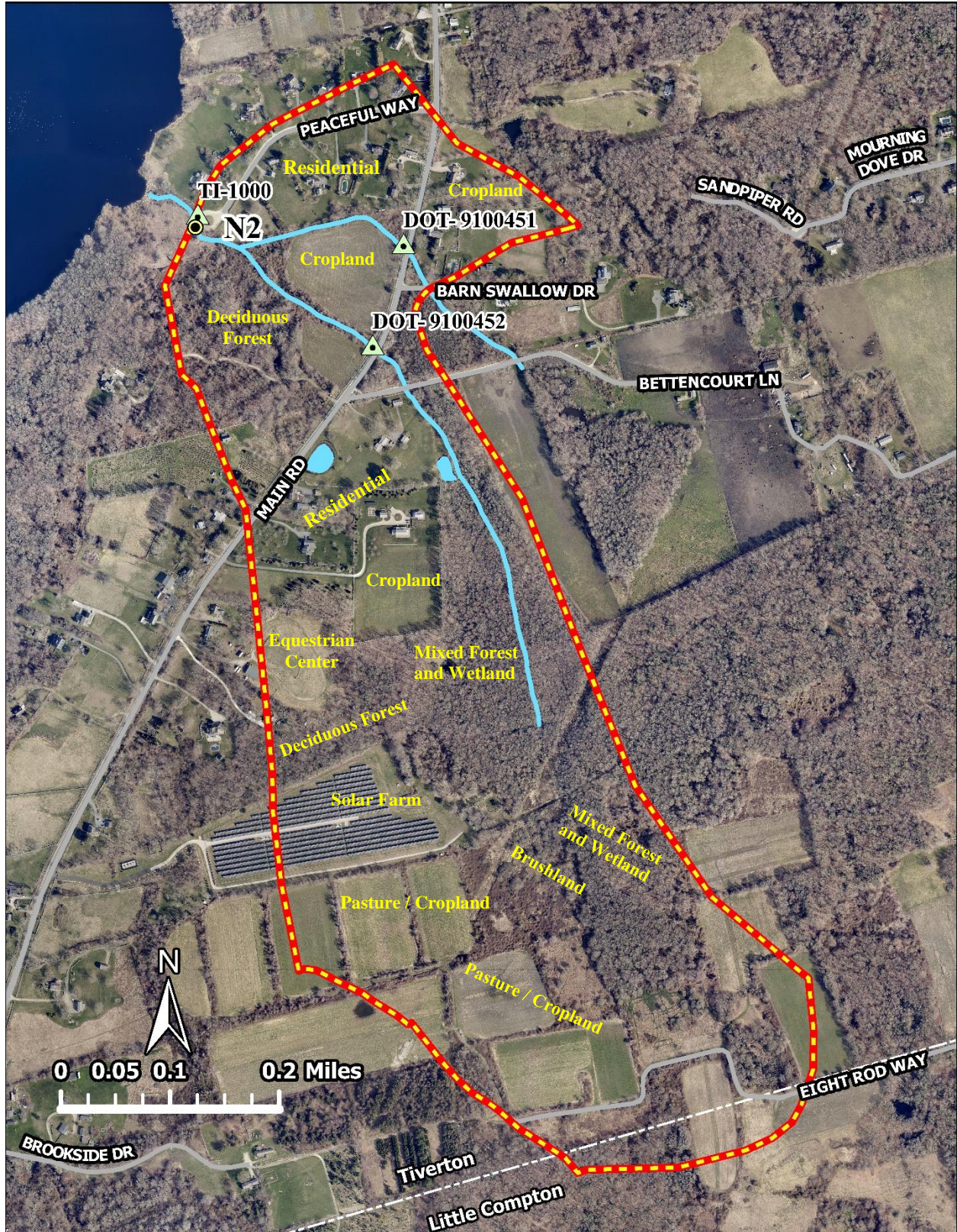


Figure 3. Station N2 Sub-watershed

Sampling Conditions

Instream sampling surveys were collected under dry and wet weather conditions at Stations N1 and N2 in 2017. Dry weather was defined as less than 0.25 inches of rainfall during the 48-hour period preceding a sampling event. Wet weather was defined as greater than 0.25 inches of rainfall during the preceding 48-hour period prior to sampling. Daily rainfall data reported from the Newport State Airport Weather Underground Station KUUU was used to determine if a survey was conducted under wet or dry conditions. Enterococci samples were collected over five survey dates as shown in **Error! Reference source not found.** along with the rainfall data reported for those days and the previous 48-hour period.

Table 1. Sampling Dates and Rainfall Amounts

Newport State Airport (KUUU)		
Date	Rain 48-hrs Prior (In)	Rain on Sampling Date (In)
10/25/17	0.03	0.23
6/1/17	0.47	0.62
5/4/17	0.55	0
4/26/17	0.06	2.00
3/22/17	0	0

Exceedances and Potential Pollution Sources

As described in the Consolidated Assessment and Listing Methodology², the assessment of recreational use is based on data for enterococci, fecal coliform, and/or *Escherichia coli* (*E. coli*). Enterococci is the primary bacteria indicator for assessing recreational use attainment. For non-designated beach waters, the geometric mean should be less than 54 MPN/100mL. Typically, the geometric mean is calculated using samples collected over the recreational bathing period of May through October; however, with the limited dataset, all samples collected were used to assess recreational use for this assessment and TMDL development.

Geometric mean values were calculated for each station for both dry and wet weather days as well as the geomean for each station using all survey data (Table 2). Both stations all samples (dry and wet) geomeans exceeded 54 MPN/100mL. There was a single dry weather enterococci sample taken at both stations. While a direct comparison to the geomean criteria is not appropriate, it was below 54 MPN/100mL. The enterococci geomeans for wet weather at both stations exceeded 54 MPN/100mL.

² 2022 Consolidated Assessment and Listing Methodology <http://www.dem.ri.gov/programs/benviron/water/quality/pdf/calm22.pdf>

Stormwater Runoff

Studies have shown that the first flush of stormwater runoff from urban and rural areas can contain significant levels of pollution. The Town of Tiverton and the Rhode Island Department of Transportation have applied for coverage under the Rhode Island Phase II Stormwater General Permit (issued in 2003) and have prepared the required Phase II Stormwater Management Plans (SWMPP).

As part of the Phase II MS4 requirements, municipalities and RIDOT are required to confirm ownership, map outfalls and catch basins, among other information required by the general permit, and submit this information to RIDEM. However, there is little information, other than pipe diameter, that would allow for evaluation of accurate water quality impacts from specific outfalls. It should be noted that information related to these outfalls has not been independently confirmed by RIDEM staff.

There are three outfalls in the watershed that discharge stormwater into the Tributary to Nonquit Pond stream system. Two are outfalls owned by RIDOT located at the stream culverts on Main Road. The Town of Tiverton has a single municipal outfall located at the cul-de-sac at the end of Peaceful Way. These locations are likely sources of bacteria to the Tributary to Nonquit Pond. Priority outfalls should be subject to Illicit Discharge Detection and Elimination (IDDE) protocols. All illicit discharges will be eliminated.

Table 2. Priority Outfalls in Tributary to Nonquit Watershed

Outfall ID	Direct Discharge to	LAT	LONG	Pipe Diameter (inches)	Interpreted Responsibility
9100452	Trib to Nonquit	41.562174	-71.187246	24	RIDOT
9100451	Trib to Trib to Nonquit	41.563715	-71.186725	18	RIDOT
TI-1000	Trib to Nonquit	41.563941	-71.190325	Unknown	Tiverton

Agricultural Activities

It is widely recognized that agricultural operations contribute to pollution when not properly managed. Animal manure is a source of bacterial pollution from agricultural land uses. Agricultural runoff is generally defined as water leaving agricultural operations because of rain, melted snow, or irrigation and may be associated with soil erosion. Agricultural runoff in the Nonquit Pond watersheds includes that

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originating from soil erosion, feeding operations, grazing, plowing, animal waste, irrigation water, and fertilizer. The NWQI investigation showed that polluted runoff from agricultural activities was flowing into the stream system during storm events. Field observations from 2018 found cattle could access flooded areas and to areas adjacent to the stream system itself, and one of the residential areas along the stream had no vegetated buffer zone.

For Station N1, the most likely source of enterococci may be from contaminated runoff from those areas used for cattle grazing. There is an earthen berm around most of the perimeter of the wetland area upstream of the station, but it appears that the stormwater runoff from the pasture areas flows into the wetland area downstream of the berm. It is difficult to identify specific sources due to the variability of the samples, but the wetland itself may be a source of bacteria along with the stormwater runoff contaminated by cattle.

Onsite Wastewater Treatment Systems

Most of Tiverton is unsewered, so reliance for wastewater disposal is on onsite wastewater treatment systems (OWTS), such as septic systems and potentially cesspools. Failing OWTS can be a significant source of bacteria by allowing improperly treated waste to reach surface waters. Additionally, cesspools are not considered treatment systems and were the subject of the Rhode Island Cesspool Act of 2007 (RIGL § 23-19.15), as amended in 2015, which mandates that all cesspools within the State of Rhode Island must, over time, be removed from service. Cesspools contribute directly to groundwater and surface water contamination and environmental impacts. No OWTS Notices of Violation/Notices of Intent to Violate have been issued by the RIDEM Office of Compliance and Inspection in the Tributary to Nonquit watershed; however, maintaining OWTS that are properly sited and sized is important in this watershed, as well as elimination of cesspools and upgrade of improperly sited and/or sized septic systems.

Waterfowl, Wildlife, and Domestic Animal Waste

Waterfowl, wildlife, and domestic animals within the Tributary to Nonquit Pond watershed represent another potential source of bacteria. Over fifty percent of the watershed is undeveloped land that consists of upland forest and wetlands which provide a habitat for wildlife and waterfowl, both of which can contribute to the pathogen pollution observed in the stream system. Areas within the watershed that are impervious or constructed may not retain the waste on the land but instead convey it via stormwater to the nearest surface water. Food sources encouraging proliferation of waterfowl and wildlife where stormwater is likely to uptake waste and its associated bacterial source should be removed or secured. Domestic animal waste should be properly disposed.

Reasonable Assurance

RIDEM acknowledges that it will take significant effort to reduce bacteria loading to the maximum extent practicable from as many sources as possible, given the variable nature of bacteria sourcing and tracking. In some cases, reductions from individual sources (e.g. manure piles, direct animal access to waterbody) can and should be given greater priority. Reasonable assurance that non-point loads will be reduced include enforcement of Rhode Island’s existing water quality regulations (RIDEM 2018³) and the recently enacted Wetlands Regulations (RIDEM 2022⁴) includes expanded jurisdiction, with exception to certain agricultural activities, and strengthened buffer protection for future changes. Because the streams included in this update are tributaries to water supply reservoir, they received the maximum buffer of 200’ in the 2022 Wetlands Regulations for new activities. There are also requirements for creating new buffer for new activities.

Additionally, the collaborative efforts of RIDEM, NRCS, ERICD, municipalities, and many agricultural producers in the Newport Water Supply watersheds, as evidenced in Section 6.0 Implementation in the TMDL update cover document, which contains a table of non-point source watershed activities being undertaken. Furthermore, recent inspections of accessible locations in September 2022 documented in this appendix confirm changes in agricultural practices that support reduction of likely large bacteria sources, such as manure pilings and direct animal access to waterbody.

³ State of Rhode Island Water Quality Regulations <https://rules.sos.ri.gov/regulations/part/250-150-05-1>

⁴ State of Rhode Island Rules and Regulations Governing the Administration and Enforcement of the Fresh Water Wetlands Act <https://rules.sos.ri.gov/regulations/part/250-150-15-1>

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Table 2. Tributary to Nonquit Pond

Waterbody ID: RI0010031R-20

Characteristics: Freshwater, Class AA, Tributary within a Public Drinking Supply, Primary and Secondary Contact Recreation

Impairment: Enterococci (MPN/100mL)

Water Quality Criteria for Enterococci: Geometric Mean: 54 MPN/100 mL

Percent Reduction to meet TMDL: 77% (Includes 5% Margin of Safety)

Data: 2017 from RIDEM NWQI Sampling Surveys

Single Sample Enterococci (MPN/100 mL) Results for the Trib to Nonquit Pond (2017) with Geometric Mean Statistics

Station Name	Station Location	Date	Result	Wet/Dry	Geometric Mean
N1	Trib to Nonquit Pond at Barnswallow Drive	10/25/2017	No Flow	Wet	122
		6/1/2017	81	Wet	
		5/4/2017	20	Wet	
		4/26/2017	4,350	Wet	
		3/22/2017	31	Dry	
N2	Trib to Nonquit Pond at Peaceful Way Cul-de-Sac	10/25/2017	15,500	Wet	190[^] (77%)*
		6/1/2017	140	Wet	
		5/4/2017	<10	Wet	
		4/26/2017	1,140	Wet	
		3/22/2017	10	Dry	

[^]- Geometric Mean Used to determine percent Reduction
 * - Includes 5% Margin of Safety; Bold values exceed the 54 MPN/100ml Geomean criteria.
 Shaded indicates the sample was below 10 MPN/100ml DL. Following the National Shellfish Sanitation Program (NSSP) Protocol a value of 10 was used for values <10 for geomean calculations.

Wet and Dry Weather Geometric Mean Enterococci Values for each Station

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean (MPN/100ml)		
			Wet	Dry*	All	Wet	Dry*
N1	Trib at Barnswallow Drive	2017	3	1	122	192	31
N2	Trib at Peaceful Way Cul-de-Sac	2017	4	1	190	396	10

* Dry Weather Geometric Mean value is from a single sample and not a geomean value.