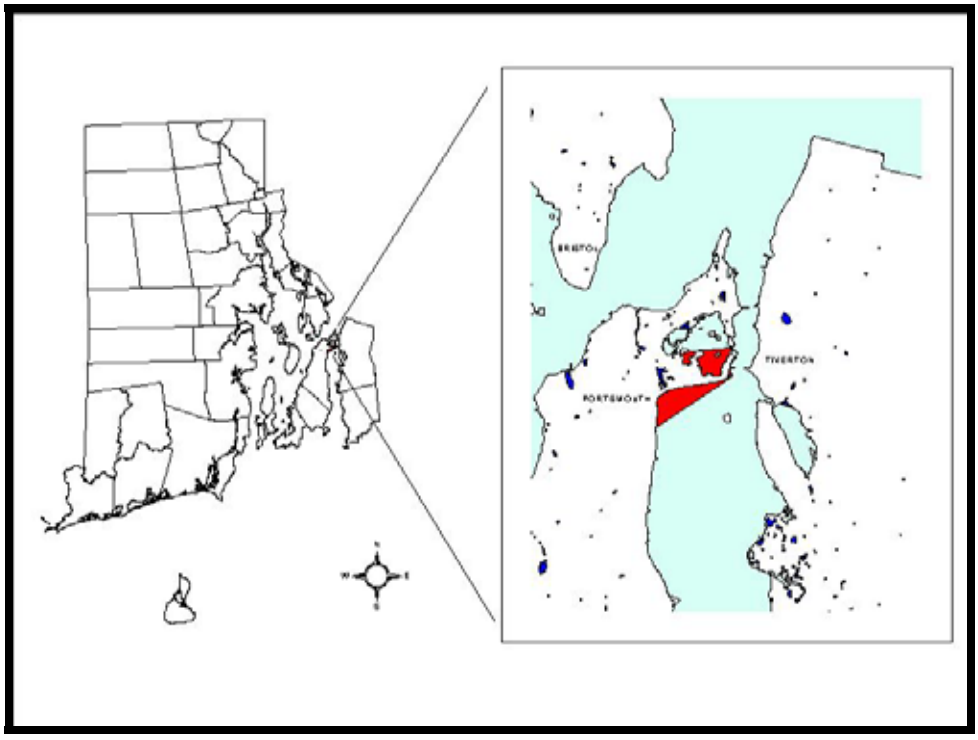
Rhode Island Department of Environmental Management
Office of Water Resources
235 Promenade Street
Providence, RI 02908

FINAL
Total Maximum Daily Load
The Sakonnet River – Portsmouth Park and The Cove – Island Park

March 2005



Key Feature:	**TMDL assessment for Fecal Coliform Bacteria**
Location:	**Portsmouth, RI**
Impaired Area:	**Sakonnet River: 180 acres; The Cove: 109 acres**
Land Type:	**New England Coastal Region, Coastal Waters**
Land Uses:	**Urban: - Residential / Commercial - Industrial**
Pollutants / Stressor:	**Pathogens**
Data Sources:	**RIDEM, RIDOH**

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1.0 INTRODUCTION

The Clean Water Act (CWA) Section 303(d) and federal regulation 40CFR 130.7(c)(1) direct each state to develop Total Maximum Daily Loads (TMDLs) for waterbodies that are not meeting water quality standards. The goal of the TMDL process is to reduce pollutant loadings to a waterbody to improve water quality such that State Water Quality Standards are met and designated uses are attained and maintained. The Sakonnet River (Portsmouth Park) and The Cove - Island Park were both identified as a Group 1 waterbody (highest priority) on Rhode Island's 1998 and 2000 303(d) lists. The pollutant of concern is fecal coliform, a parameter used by Rhode Island as an indicator of human pathogens.

The impaired portion of the Sakonnet River (Portsmouth Park) are the waters north of a line extending from the southwestern-most corner of the stone bridge in Tiverton to the eastern-most extension of Morningside Lane in Portsmouth. The portion of The Cove – Island Park that is impaired are those waters south of a line from the southern end of Hummock Point to the RIDEM range marker located at the eastern extremity of a point of land on the western shore of The Cove.

Based on monitoring data from the Rhode Island Department of Environmental Management's (RIDEM) Shellfish Program, these waters are closed to shellfishing due to the potential public health risk associated with direct discharges of groundwater seeps and storm drain outfalls contaminated by human waste. In addition to the shellfish closures, RIDOH has issued a swimming advisory relative to these two shoreline areas. Available water quality data at nearby offshore monitoring stations located in the Sakonnet River and the southern portion of "The Cove" indicates safe swimming conditions The identified pollution sources, however, are variable in nature and may cause localized areas of contamination, the extent of which is unknown. Consistent with established Department of Health policy to not swim within 200 feet of stormwater discharges, it is advised that individuals also avoid swimming in the vicinity of areas where water seeps from the ground.

No additional monitoring was carried out for this TMDL. Instead, this TMDL relies upon data obtained through various studies conducted by DEM staff over the past ten years. This document extensively quotes the findings from those reports and monitoring activities.

2.0 APPLICABLE WATER QUALITY STANDARDS

The primary goal of a TMDL is to bring a waterbody into compliance with applicable water quality regulations. All surface waters of Rhode Island have been categorized according to a system of water quality classification based on consideration for public health, recreation, propagation and protection of fish and wildlife, and economic and social benefit. Each class is identified by the most sensitive and therefore governing use to be protected. Surface waters may be suitable for other beneficial uses, but are regulated to protect and enhance designated water uses. It should be noted that water quality classifications reflect water quality goals for a waterbody and may not represent existing water quality conditions (RI Water Quality Regulations, 1997).

Both "The Sakonnet River (Portsmouth Park)" and "The Cove - Island Park" are designated as Class SA waters (saltwater). Designated uses for Class SA waters are described in Rhode Island's Water Quality Regulations, as follows:

> ***"Class SA waters:*** These waters are designated for shellfish harvesting for direct human consumption, primary and secondary contact recreational activities, and fish and wildlife habitat. They shall be suitable for aquacultural uses, navigation and industrial cooling. These waters shall have good aesthetic value."

The fecal coliform standard for Class SA waters is established in Rule 8.D of the Water Quality Regulations. That standard specifies that the maximum allowable level of fecal coliform bacteria (Most Probable Number (MPN) per 100 milliliter) may not exceed a geometric mean MPN value of 14, and not more than 10% of the samples shall exceed an MPN value of 49, for a three-tube decimal dilution (RI Water Quality Regulations, 1997).

Also applicable is Rhode Island's antidegradation policy, which requires that, at a minimum, the water quality necessary to support existing uses be maintained. If existing water quality is better than what is necessary to support the protection and propagation of fish, shellfish, and wildlife, and recreation in and out of the water, the quality should be maintained and protected unless, through a public process, some lowering of water quality is deemed necessary to allow important economic and social development to occur. (RIDEM, 1997). The goal of the TMDL is to restore all designated uses to these waters impacted by fecal coliform pollution.

The closure of shellfish areas to harvesting is not solely based on the ambient water quality data calculations. In accordance with the National Shellfish Sanitation Program (NSSP), a shellfish growing area shall be classified as "Prohibited" if no current sanitary survey has been performed or if a sanitary survey or other monitoring program data indicates that fecal material may reach the area in excessive concentrations. If it has been determined that there is a good potential for harvested shellfish to be contaminated due to the nature of an upland source, then a growing area is closed. (National Shellfish Sanitation Program, Guide for the Control of Molluscan Shellfish, 1997)

The results of in-stream sampling by the state's Shellfish Program indicate that the waters of the Sakonnet River and The Cove have a background average geo mean fecal coliform count of 4.5 col / 100 ml. This average was obtained from 30 samples at 7 stations within the study area adjacent to Shellfish Program Growing Area 4 – The Sakonnet River, as reported January 2001. This large watershed is comprised of a diverse mix of typical urban land uses. These waterbodies receive discharges from a variety of sources both point and non-point, including stormwater and natural sources

such as wildlife, from locations throughout the watershed. These waterbodies may also be influenced by the discharge of permitted wastewater facilities and combined sewer overflows into Mt. Hope Bay. However, the geometric mean indicates that the volume of water combined with tidal flushing within the Sakonnet River provides sufficient travel time, dilution and dispersion of fecal coliform bacteria to a level that is well within the state's water quality standards within the main waterbody. It was not possible to separate natural background from the total nonpoint source load due to a lack of site specific data on fecal coliform contributions from wildlife in the watershed.

3.0 DESCRIPTION OF WATERSHED

The Sakonnet River (Portsmouth Park) and The Cove - Island Park are coastal waters located in the Narragansett Bay watershed along the northeast coastline of Aquidneck Island and the Town of Portsmouth, Rhode Island. The impaired area designated as The Cove - Island Park encompasses the southern half of the cove or 109 acres (0.17 sq. miles) called Blue Bill Cove. The impaired area accounts for approximately 50% of the total area of "The Cove". The impaired area designated as "The Sakonnet River (Portsmouth Park)" encompasses 180 acres (0.28 sq. miles) of the upper Sakonnet River. The impaired area accounts for less than 5% of the total area of the Sakonnet River. Refer to Figure 1 for a map of the two areas.

The impaired waters are adjacent to Portsmouth Park and Island Park, two densely developed areas composed predominately of high-density residential development with a mix of commercial and industrial facilities, some of which are located directly adjacent to the shorelines. There is a closed beach area referred to as Teddy's Beach which is located along the north west shore of the Sakonnet River. The numerous boat moorings located in the shallow waters offshore are evidence of the popularity of the protected waters of The Cove and this area of the Sakonnet River.

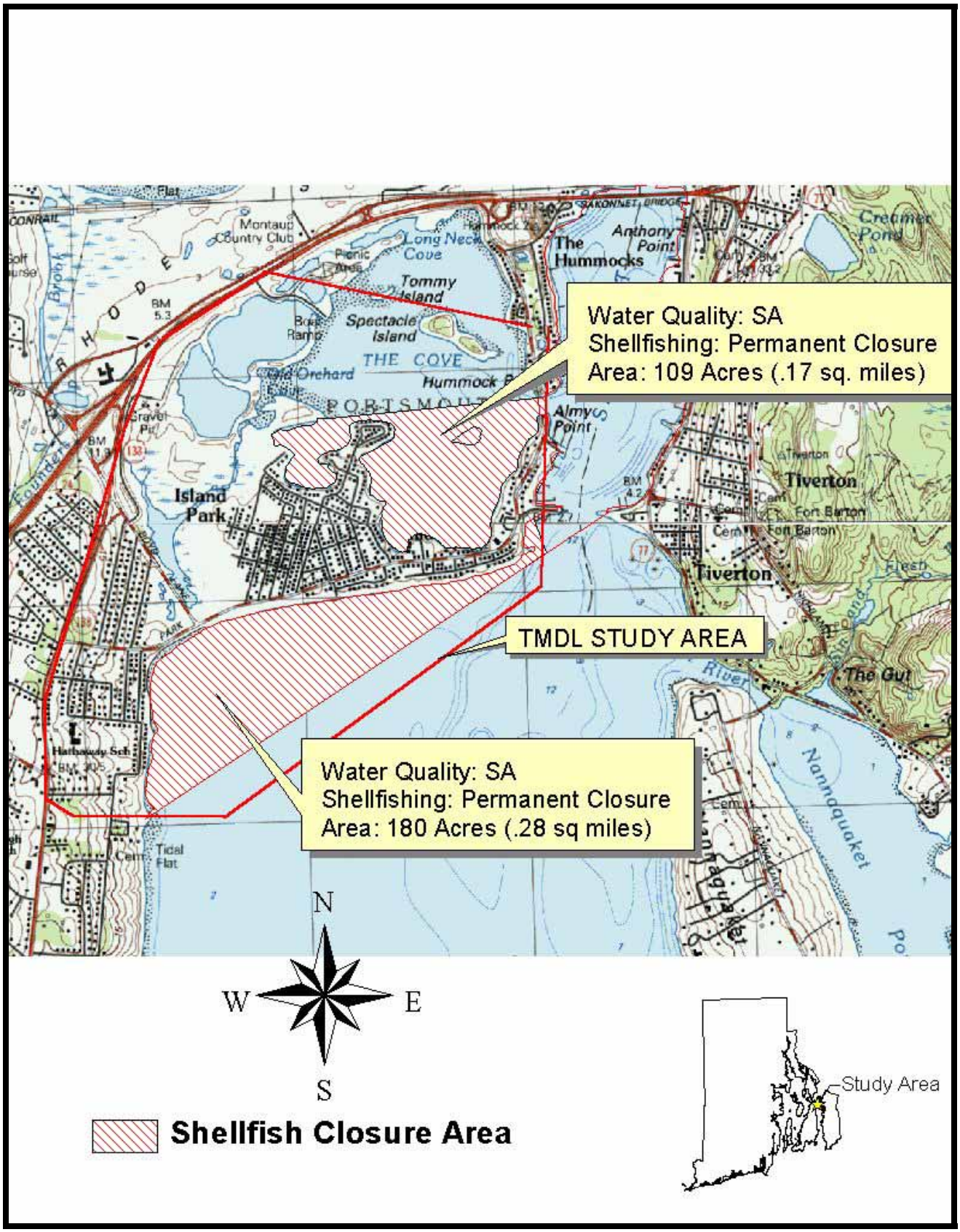
The watershed of the two targeted waterbodies encompasses approximately 550 acres and drains the neighborhoods of Portsmouth Park and Island Park. There are numerous stormdrain discharge pipes and culverts located along the two shorelines. In addition, other discharge pipes from various known and unknown sources dot the shorelines of both neighborhoods. There are no wastewater treatment plant or industrial discharges, in the watershed.

3.1. Groundwater

The Portsmouth Park neighborhood is known to have poorly drained soils and a relatively shallow depth to groundwater due to an impervious layer of shale. These site conditions have contributed to the failure of septic systems in the area. DEM investigations have revealed the presence of the following discharges to stormdrains in the Portsmouth Park neighborhood: sump pumps to remove groundwater from basements, overflow pipes to redirect overflows from failing septic systems, and direct piping of graywater discharges.

In Island Park, sandy rapidly drained soils that are affected by a tidally influenced water table quickly draw septage to the shoreline prior to proper treatment by individual septic systems. Suspected direct discharge pipes buried under sand and rocks may also contribute to the impairment of these waters.

Figure 1 - Sakonnet River – Portsmouth Park / Island Park Shellfish Closure Lines



3.2. Landuse

The most prevalent land use in Portsmouth Park, and Island Park, is urban-residential. The Island Park area along the Sakonnet River shoreline is mixed residential, commercial and industrial. This results in a significant percentage of impervious surface area. Paved roads, parking areas, buildings and other community developments have been constructed in areas with soils that are poorly drained or too rapidly drained and, therefore unsuitable for high-density development where onsite sewage disposal is the only means of wastewater disposal available.

3.3. Soils

Portsmouth Park and Island Park are comprised of two distinctly different soil types. Soil types were verified through additional core samples taken in the Portsmouth/Island Park area and were confirmed to be of two different types. Portsmouth Park soil is poorly drained and has a dense shale impervious layer close to the surface. These conditions cause seasonally high groundwater and are evident by the area's upland and beach "springs". Island Park in contrast, is a sand bar with rapid water movement through the soil.

The available information regarding the geological conditions of these two areas indicate that the Portsmouth Park neighborhood is primarily underlain with a layer of shale. Because of the inability of water to penetrate this shale, groundwater is isolated in the upper soil layer close to the surface. This hillside community slopes from the west to the east toward the shoreline, which serves to convey groundwater from the upland area to the point of discharge along the shore.

According to the soil survey, the soils present within the Upper Sakonnet area are generally not suitable for the disposal of sanitary wastes. Soils in the Portsmouth Park area are classified as primarily Newport-Urban land complex. This soil complex is characterized as having a moderately rapid to rapid permeability in the upper soil layers, while having a slow to very slow permeability in the substrate. Presumably, groundwater moves rapidly, both vertically and horizontally through the upper layers, yet is restricted by the substrate. This uneven permeability can result in an extended wet surface soil condition after rain events and could explain Portsmouth Park's wet and constantly draining condition. The Soil Survey considers the soil complex underlying Portsmouth Park as "limited" for onsite sewage disposal systems due to the slow permeability in the substratum.

The Island Park area is a coastal sandbank that over the years has been artificially connected to the mainland by the filling of tidal ways and the construction of culverts and bridges. In contrast to the soils within Portsmouth Park, soils in the Island Park Plat are classified as Merrimac Urban Land Complex, which consists of about 40 percent well-drained Merrimac soils and 40% Urban land (SCS, 1981). This soil type demonstrates a moderately rapid permeability in the surface layer and upper part of the subsoil, moderately rapid to rapid in the lower part of the subsoil and rapid in the substratum. The Soil Survey recommends that installation of onsite septic systems in this soil include careful design to prevent pollution of groundwater.

3.4. Septic System Failures

The development of the beachfront communities in Portsmouth Park and Island Park pre-dates the inception of current ISDS regulations. Due to the small lot size, conventional septic system design parameters are unattainable in many cases. In addition, cottages were initially constructed for summer use only, and the ISDSs installed were probably not designed to handle year-round occupancy and flows.

Excess flows from an abundance of groundwater springs and heavy rainfall runoff are handled by a storm drainage network, incrementally constructed over the years. The high water table and inability of ISDS to function properly have prompted some homeowners to tap into the storm drains with residential french drains and/or laundry hoses in order to remove pooled water from around homes or to discharge gray water away from the ISDS.

A study conducted by Save The Bay (STB) in 1983 indicated a high rate of failing septic systems in Portsmouth due to unsuitable soil conditions, small lot sizes, overloading due to inadequate design, improper construction and poor maintenance. The reported septic system failure rate of 8.3% as reported was nearly twice the state average. During the period of 1990-1999, 132 septic system complaints were filed with the RIDEM ISDS section (refer to Appendix A).

4.0 DESCRIPTION OF WATER QUALITY MONITORING ACTIVITIES

4.1. RIDEM Shellfish Program Overview

RIDEM's Office of Water Resources is responsible for the classification and survey of the state's marine waters for Mulluscan shellfish harvesting. The Shellfish Water Quality Monitoring Program (Shellfish Program) is also responsible for implementing a portion of the State of Rhode Island's agreement with the U.S. Food and Drug Administration National Shellfish Sanitation Program (NSSP). The primary objective of the NSSP is to maintain national health standards through regulation of the interstate shellfish industry. In accordance with NSSP requirements, the RIDEM's Shellfish Program employs routine ambient water quality sampling of growing area (overlying) waters, and conducts regularly scheduled shoreline sanitary surveys to identify potential sources of pollution.

4.1.1 RIDEM Shellfish Program Shoreline Surveys

Every three years, shoreline surveys are conducted to identify and quantify all actual and potential sources of pollution which may directly or indirectly affect a growing area and, as a result, render shellfish harvested from that area as unsafe for human consumption. Any evidence of human waste contamination are documented and samples are taken from all creeks, streams, ground water seeps and discharge pipes/culverts found flowing during the survey. The samples are analyzed at the RI Department of Health (RIDOH) Laboratory for fecal coliform bacteria. An annual analysis of the data is used to determine whether water quality within the growing area meets water quality standards and complies with NSSP requirements. Figure 6 is a map indicating the water quality monitoring station locations in the Sakonnet River growing area.

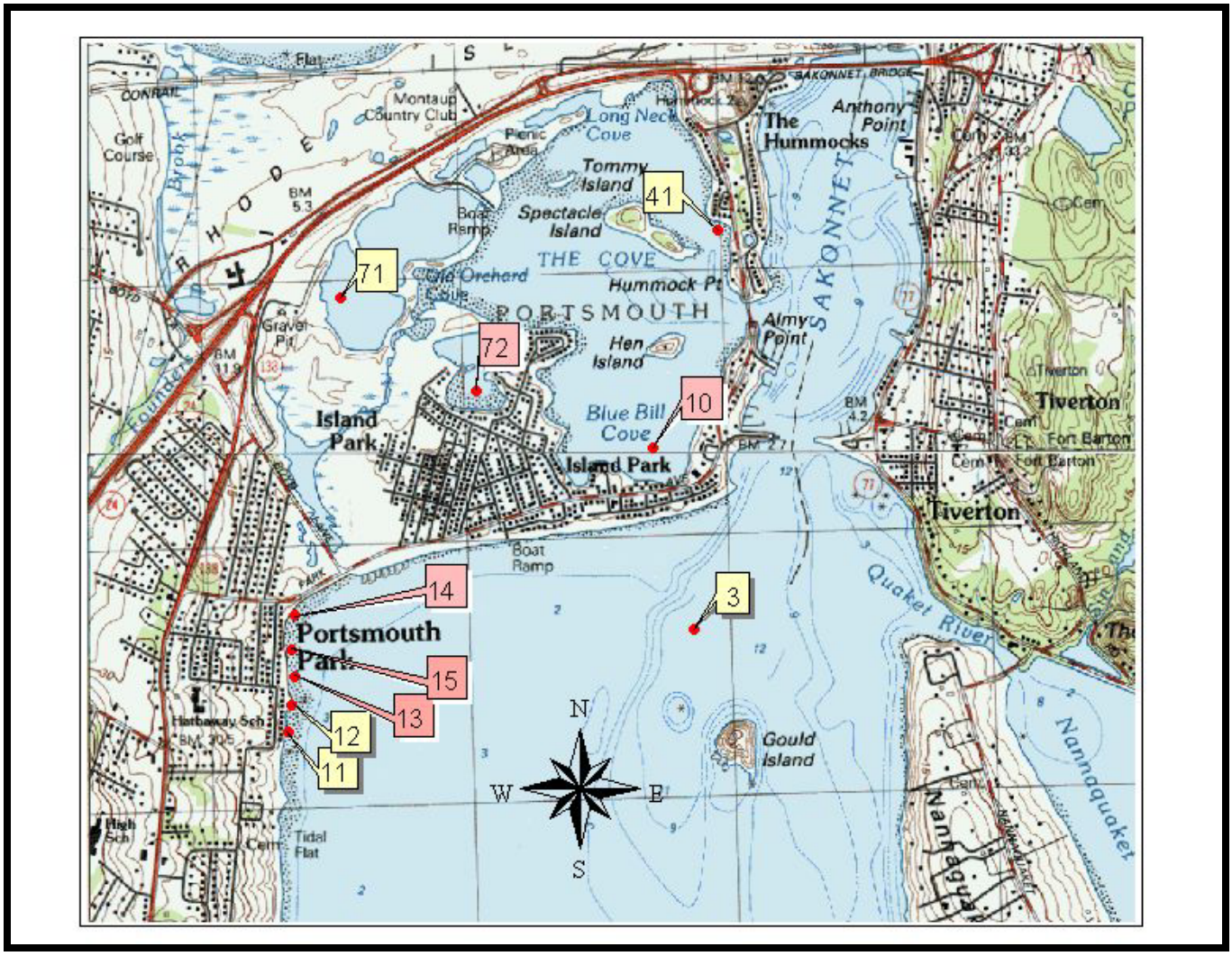
4.1.2 Spring 1987 Upper Sakonnet River Shoreline Survey

Shellfish Program staff conducted a routine shoreline and follow-up survey of the Upper Sakonnet River on July 28, 29 and August 6, 1987. The study area included the beachfront from Portsmouth Park to Island Park, continuing north to the Sakonnet Bridge and The Cove in Portsmouth; as well as the shoreline from the Sakonnet Bridge south to the mouth of the Quaket River and Nannaquaket Pond in Tiverton (Figure 3). The weather on all survey days was sunny and clear and no significant rainfall occurred during the two weeks prior to the survey.

Twenty-one culverts and pipes, and two creeks were located throughout the survey area during the survey, and samples of all discharges were collected and analyzed for fecal coliform bacteria. The report notes that several of the pipes were submerged, necessitating a sampling of the surrounding water directly at the mouth of the pipe. Five samples were taken along the Portsmouth Park shoreline (Sample 11, 12, 13, 14, and 15), and four samples were taken in The Cove (Sample 10, 41, 71, and 72). A routine ambient water quality sampling location (Sample 3, in the Sakonnet River north of Gould Island) was also sampled.

Three problem discharges were identified in the Portsmouth Park Area (Sample 13, 14, 15) and two were located in The Cove (sample 10, 72) (Table 1, Locations Figure 2).

Figure 2 - 1987 Shoreline Survey Problem Discharge Sample Locations



Note: (Red Boxes indicate problem discharges, Yellow boxes indicate samples meet standards)

Table 1. Problem Discharges in the Sakonnet River (Portsmouth Park) and Island Park - The Cove. RIDEM Shellfish Program Upper Sakonnet River Shoreline Survey - July 1987.

Location	Station #	Sample Location Description	Fecal coliform MPN / 100 ml
Portsmouth Park	13	Discharge pipe: 62 Aquidneck Road	>23,000*
Portsmouth Park	14	Discharge pipe: 48 Aquidneck Road	9,300
Portsmouth Park	15	Stormdrain discharge culvert	>23,000*
Island Park/The Cove	10	Discharge pipe: 636 Park Avenue	>23,000*
Island Park/The Cove	72	Discharge pipe: 197 Cedar Avenue	>23,000*

* The RIDOH laboratory did not take dilutions far enough to enumerate beyond 23,000 MPN/100 ml.

Four of the five pipes discharged flow containing fecal coliform counts of 23,000 MPN/100 ml or more. The remaining pipe was discharging a fecal coliform count of 9,300 MPN/100 ml. The follow-up investigation of the five problem discharges identified in the Portsmouth Park/Island Park area took place on August 6, 1987, and involved both dye testing of ISDS's and interviews with residents. Discharge pipes at locations 13, 14 and 72 tested positive with dye tracing from nearby homes. Discharge pipe 10 resulted in a negative dye test, however the report suggested that the slow seepage rate from this pipe may necessitate a longer period of inspection than what was allotted for this survey. Station 15 was located at the outflow of a stormwater drainage culvert. Faulty septic system and illegal tie-ins were cited as possible sources for the high coliform counts at this location.

The July 1987 shoreline survey report recommended that the area adjacent to the Island Park Plat and west to the Portsmouth Park Plat should be closed indefinitely to shellfishing until the sources of bacterial input to the area were identified and mitigated. The report also recommended mitigation of the verified discharges (through dye testing and admissions by owners). The high fecal coliform inputs and the rapid flow rate present in the storm drain system of the Portsmouth Park Plat suggested a possible upland contamination problem that warranted further investigation.

The 1987 report also identified the lines that delineate the current closure area. The report recommended a comprehensive dye study of the entire area in order to locate the sources of fecal coliform into the storm drainage network.

4.1.3 Follow-up Investigations

On November 5, 1987, RIDEM Shellfish Program conducted a follow-up visit to further investigate the Portsmouth Park stormwater culvert (Station 15) and to survey the eastern-most end of Morningside Lane, which is the westernmost point of the new closure line. The first uphill drop inlet (from the discharge point into the Sakonnet River) located on Aquidneck Road was inspected. This location is approximately 150-feet from the point of discharge to the river. The inspection of the drop inlet revealed four pipes, all of which were flowing moderately to rapidly. The report noted the lack of rainfall during the previous seven days, therefore pipes should have been dry or had very low flows. A strong sewage

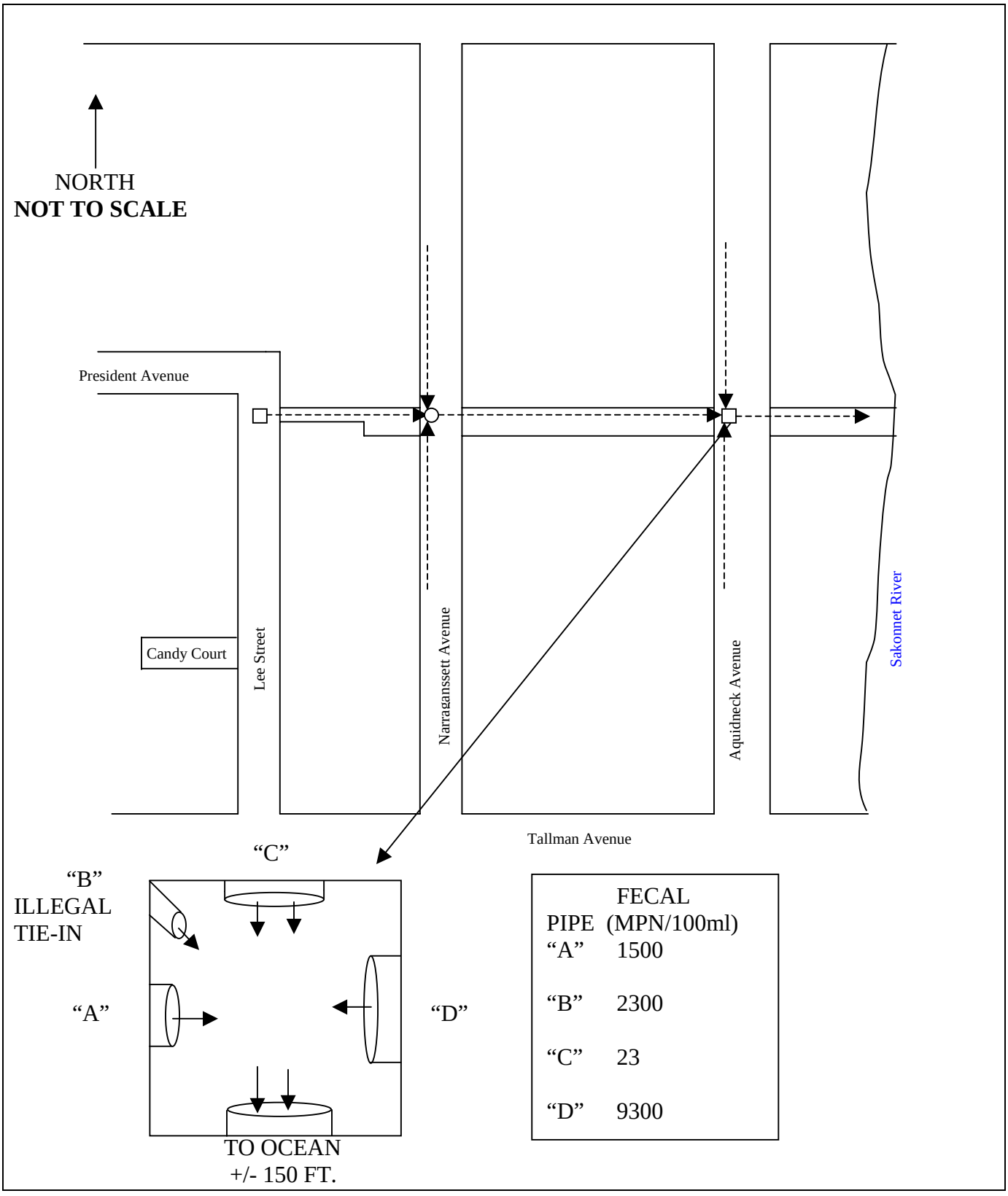
smell was also reported. Samples were taken from each of the three incoming storm drain pipes and from the fourth incoming pipe, a three to four inch diameter black plastic pipe from an unknown source. A review of the Portsmouth Park storm drain plans on file at town offices did not indicate the presence of this pipe, and as such it represents an illegal discharge into the system.

The fecal coliform sample results are shown in Table 2, and a view of the pipes is shown in Figure 3. The three incoming stormdrain pipes were discharging fecal coliform concentrations of 1,500, 23 and 9,300 MPN/100 ml. The unknown tie-in pipe contained a fecal coliform concentration of 2,300 MPN/100 ml.

Table 2. Sample Results from the November 1987 Aquidneck Road Drop Inlet Survey,

Pipe Label	Aquidneck Road drop inlet pipe locations	Fecal coliform MPN/100 ml
A	Incoming stormdrain pipe from the south	1,500
C	Incoming stormdrain pipe from the west	23
D	Incoming stormdrain pipe from the north	9,300
B	Illegal tie-in from the south-west	2,300

Figure 3 - Schematic of Portsmouth Park Storm Drains Contributing Dry Weather Flows to the Outfall at Station 15



The subsequent investigation of another drop inlet on Aquidneck Road, located south of the one described above, revealed another suspected illegal pipe discharging into the stormdrain system. This pipe was also flowing and smelled of sewage, however a sample of this discharge was not taken due to a lack of sample bottles. A resident indicated that a persistent sewage odor emanates from the drop inlet.

Reconnaissance of the shoreline along the eastern-most end of Morningside Lane revealed a twenty-four inch stormwater culvert discharging a moderate flow. No sewage smell was detected, however algae growth was noted within the pipe. It was recommended that future sampling of this discharge would be justified considering that this culvert is located directly on the shellfish area closure line.

A Shellfish Program report dated May 10, 1988 summarized further investigations of illegal tie-ins into the Aquidneck Road storm sewers. The area was revisited four times subsequent to the November 1987 visit and twenty-eight samples were taken twenty-one from the storm sewer, associated pipes and outfalls into the Sakonnet River. Additionally, two samples were taken from Tallman Avenue, three samples from Park Avenue, and one each at the storm drain outfalls of Morningside Lane and Child Street. Inflows from "apparently unapproved" tie-ins to the Aquidneck Road storm sewer system had low fecal coliform densities. However, samples taken directly from the storm sewer did have high counts. This study was unsuccessful at locating a source of the high coliform counts, however the report does note discussions with area residents that indicate that the Portsmouth Park area is chronically wet. This report noted that two residential septic systems were currently under mitigation for violation of discharging septic overflow directly to the Sakonnet River shoreline.

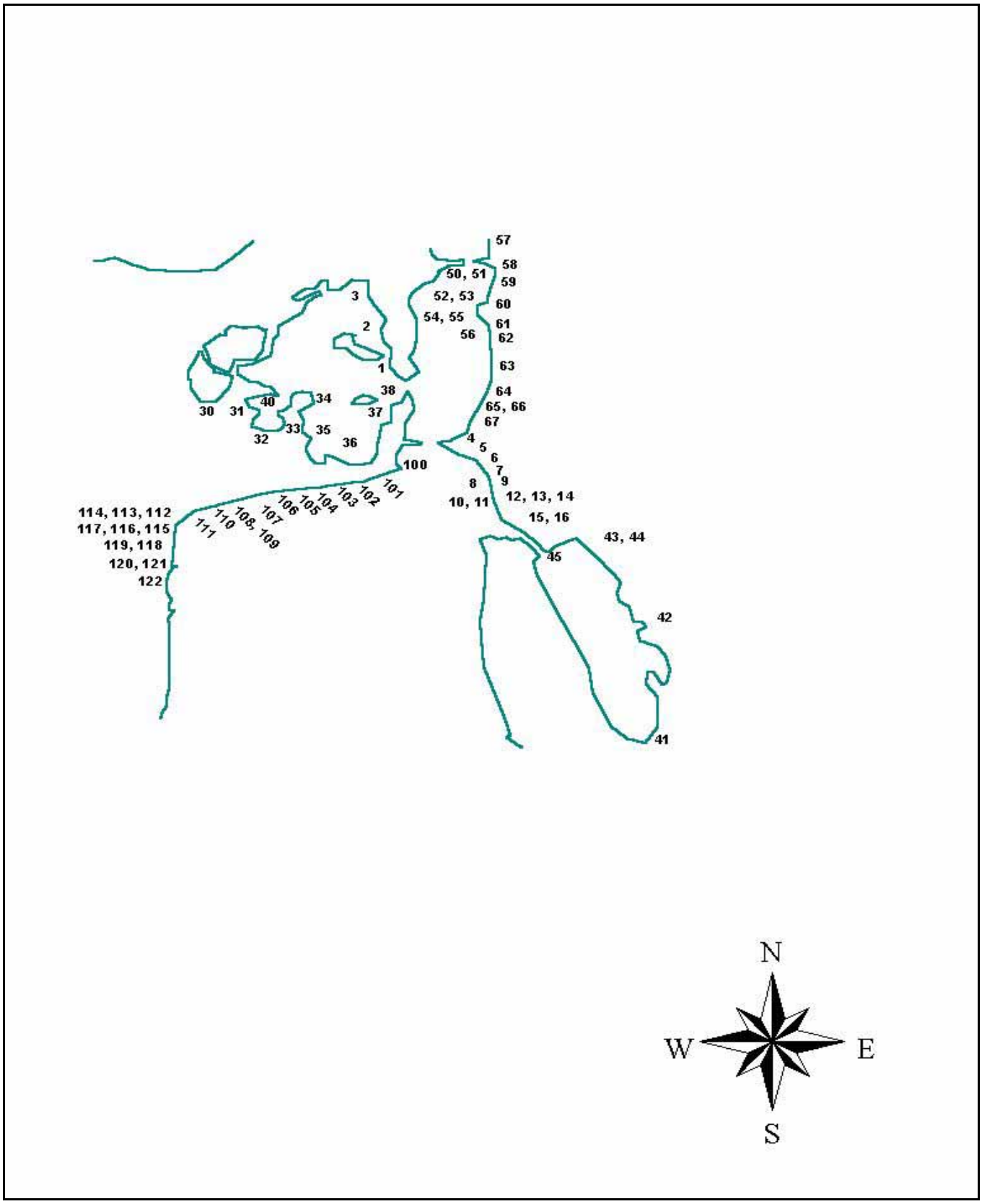
The Shellfish Program concluded that the fecal inputs to the storm sewers were from non-point sources associated with the high-density housing, and the existence of old, malfunctioning and undersized septic systems. Furthermore, contaminated discharges from the storm sewers posed a threat to the management of the area for safe consumption of shellfish. As a result, the two areas were permanently closed to shellfishing as of May 1988.

4.1.4 Spring 1990 Shoreline Survey

Another routine shoreline survey was conducted during the period from May 9, 1990 to May 15, 1990. As shown in Figure 4, there were eleven sampling stations in the Portsmouth Park area (Station 114, 113, 112, 117, 116, 115, 119, 118, 120, 121, 122) and twelve sampling stations along the shoreline from Portsmouth Park to Island Park (Station 111, 110, 109, 108, 107, 106, 105, 104, 103, 102, 101, 100). Thirteen stations were located in The Cove (Station 1, 2, 3, 30, 31, 32, 33, 34, 35, 36, 37, 38, 40). The remaining stations in the survey are located outside the study area. Of the thirty-six stations within the study area, six discharges, as shown in Table 3, were identified as contributing elevated fecal coliform counts to the Upper Sakonnet River.

Four samples from stations 112, 115, 119 and 121 had fecal counts of 43 MPN/100ml which were due to non-point sources or stagnation occurring within the pipes due to low flows. However, these sources would probably have a minimal impact on the overall ambient water quality of the area. The remaining stations either had no flow at the time of the survey or sample results did not exceed the standard.

Figure 4 - Spring 1990 Shoreline Survey Sampling Locations



Sample 118 was taken from a six-inch cast iron pipe at the base of the seawall at 62 Aquidneck Avenue in Portsmouth Park. It was recommended that a follow-up investigation be conducted to locate the origin of the pipe and to perform a dye test. It was suspected to be an antiquated septic system or overflow from a graywater discharge.

In The Cove area, four sample locations (Station 30, 40, 36, and 37) were all identified as possibly failing septic systems, because several of these stations were located adjacent to salt marshes and in other areas with extremely saturated soils. None of the stations were sampled and therefore it was recommended that dye tests be conducted to confirm the suspected failing ISDSs.

Table 3. Spring 1990 Upper Sakonnet River Shoreline Survey Results of Problem Discharges in Portsmouth Park.

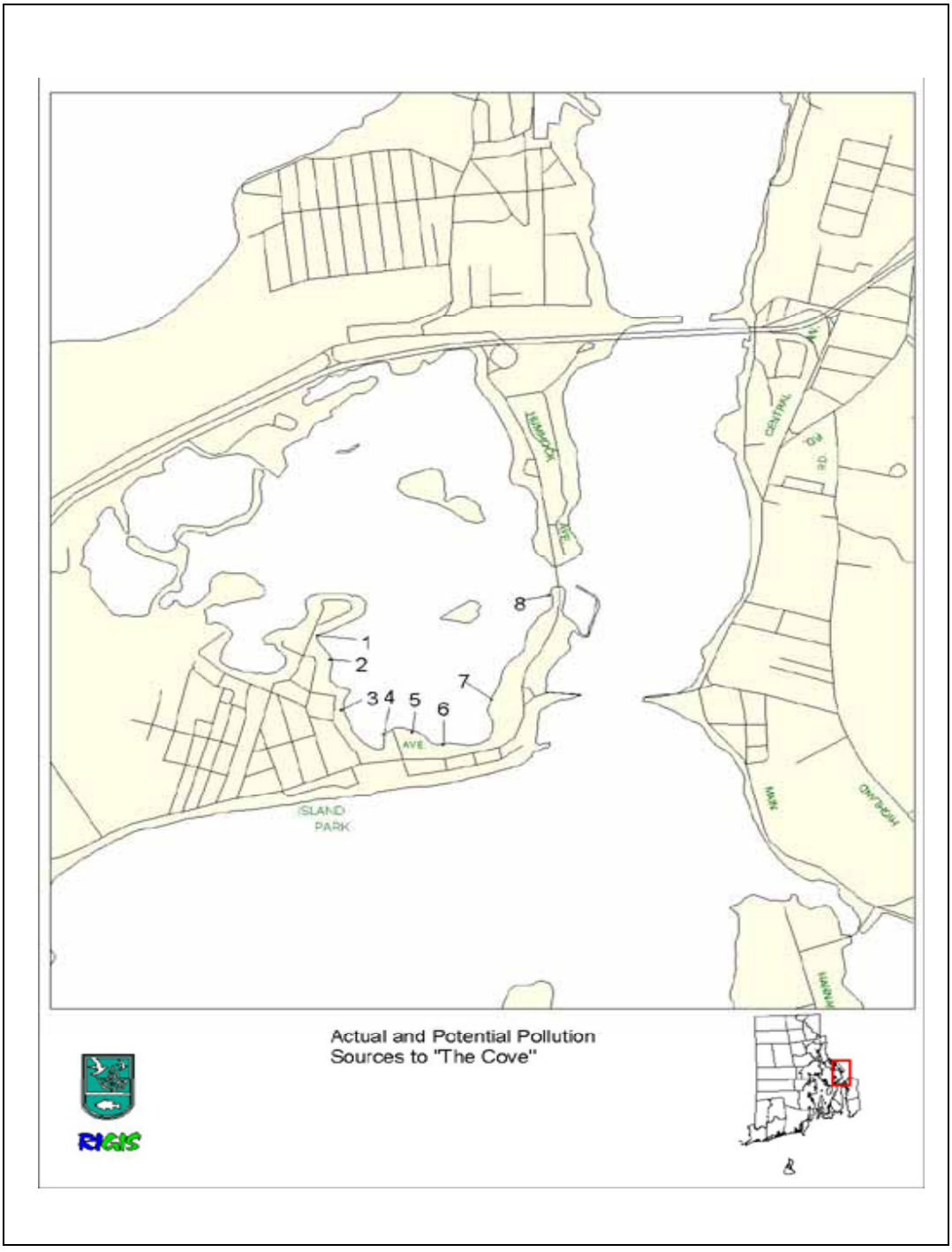
Station #	Description & Location	Fecal Coliform MPN/100 ml
118	6-inch cast iron pipe at base of seawall on south side of property located at 62 Aquidneck Ave.	4,300
106	12-inch storm drain located opposite pole #403 Park Ave.	15,000
107	12-inch concrete drain pipe located at intersection of Mason Ave. and Park Ave.	4,300
111	24-inch concrete drainpipe with evidence of gray water discharge located at pole #420, Park Ave.	230,000
117	36" Concrete drain at right of way at 48 Aquidneck Ave.	1500
122	24" Concrete drain pipe found approx. 150" above beach at Child St.	430

This report additionally recommended investigating the uplands for contributions of contamination to the storm drains and also recommended adding two additional water quality monitoring stations: one within the southern section of The Cove and one within the closed area of the northwest section of the river.

4.1.5 Spring 2000 Island Park Shoreline Survey

A routine shoreline survey of the closed portion of "The Cove" was conducted on April 14, 2000. This survey was conducted during dry weather. Seven of the eight stations inspected were not flowing at the time of the survey. The one source sampled was a groundwater seep within the vicinity of a house located at 606 Point Street, station 5 as shown on Figure 5. The seep had an apparent septic odor, and fecal coliform results for this source were high (23,000 MPN/100 ml). The source is most likely attributed to a failing septic system.

Figure 5 - Spring 2000 Shoreline Survey Station Locations



4.2. RIDEM Shellfish Program Ambient Water Quality Sampling

Approved growing areas are sampled six times per year. Conditionally approved and conditional/seasonally approved areas require monthly sampling when they are open for harvesting, and seasonally approved areas are sampled three times per year when they are open for harvesting. There are no NSSP monitoring requirements for stations that are classified as "prohibited". Generally, stations that are located in prohibited zones located close to approved growing areas are also sampled six times per year based on the NSSP's systematically random sampling procedures. As such, routine ambient water quality sampling at the Sakonnet (Portsmouth Park) and The Cove - Island Park shellfishing areas are typically conducted six times per year.

The Shellfish Program compiles an annual report that summarizes program activities and makes recommendations for changing the classification of growing areas. The Shellfish Program uses the most current thirty sample results to calculate the geometric mean and 90th percentile values and compares the data statistically to the stated criteria. Table 5 presents the results of the shellfish monitoring programs sampling of the targeted areas. There are presently four routine ambient water quality monitoring stations (Stations 2,3,19 & 20) located in the permanently closed areas of the Sakonnet River and The Cove.

Two of these sampling stations were added to the routine ambient water quality monitoring program in 1998. Station 19 is located within the southern portion of The Cove, and Station 20 is located west of existing Station 3 (Refer to Figure 2). Since 1998, a total of fourteen samples have been collected at the new station 19 and fifteen samples at station 20. As this sampling is done on a random sampling schedule, the results shown in Table 4 are representative of all weather conditions. Of the fourteen samples, six were collected during dry weather (seven for station 20) and eight were collected during wet weather.

As shown in Table 4, fecal coliform data collected by the Shellfish Program show that the two waterbodies do not exceed the Class SA water quality criteria under wet or dry conditions.

Figure 6 - Shellfish Program Water Quality Monitoring Stations in the Sakonnet River

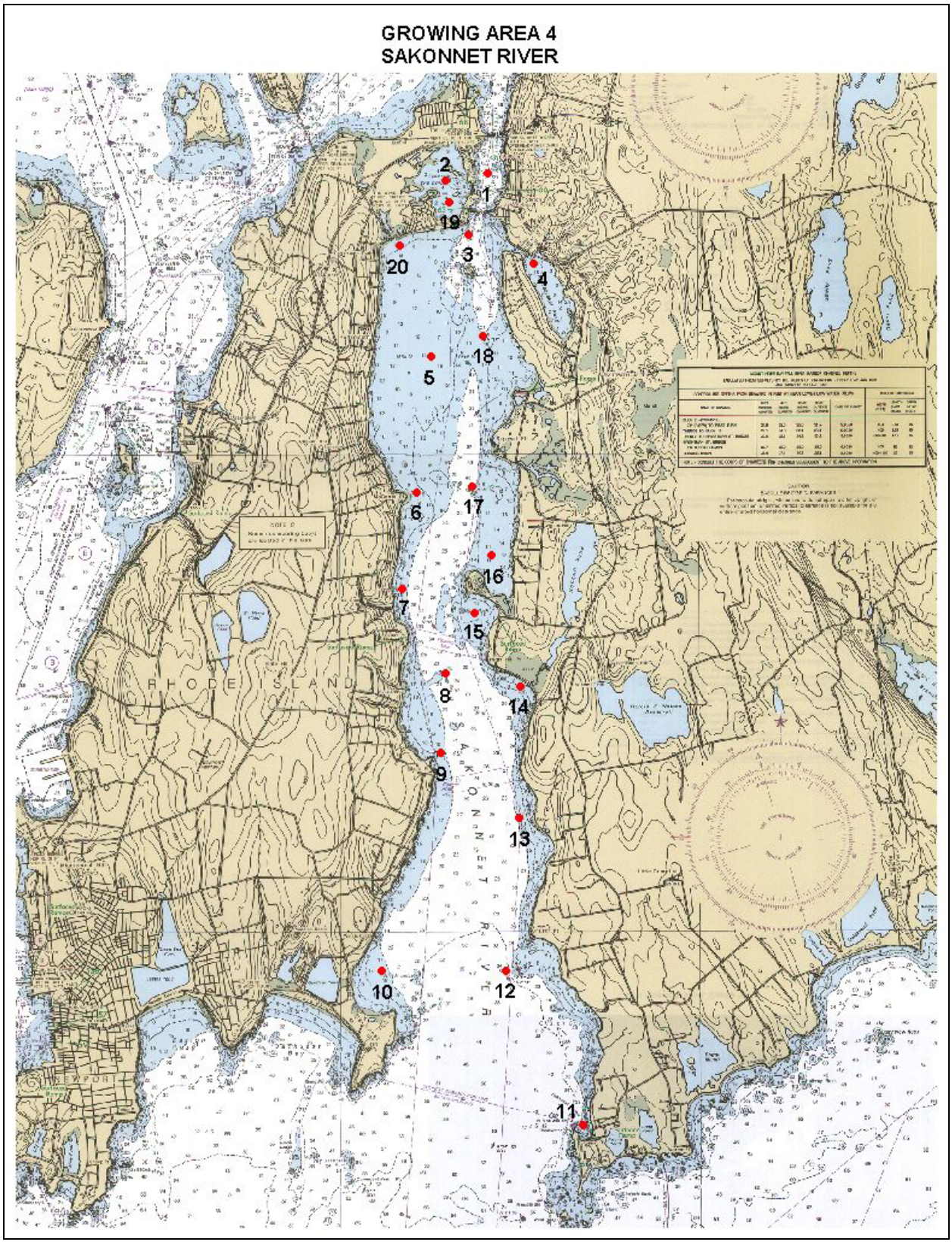


Table 4. RIDEM Shellfish Program Growing Area Monitoring Results (through 2001) for Growing Area 4 (as reported 1/9/2001)

Station No.	Location	Number of Samples		Fecal Coliform Geo. Mean MPN / 100 ml		% > 49 MPN / 100 ml
		DRY	WET	DRY	WET	ALL SAMPLES
2	The Cove	8	10	2.5	4.3	0.00
19	The Cove	6	8	4.8	4.0	7.14
3	Sakonnet R.	8	10	4.0	5.9	3.33
20	Sakonnet R.	7	8	4.5	4.0	0.00

Notes:
"Geo. Mean" is the geometric mean of the sample results.

The "% > crit 49" is the percentage of values that are greater than 49 MPN/100 ml.

4.3. RIDEM Office of Water Resources Studies

A 1992 EPA-funded project entitled " Development and Implementation of Methods to Identify Fecal Coliform Contamination of Storm Sewers" laid the ground work for a follow-up 1995 EPA-funded project entitled "Development of Remediation Methodology to Mitigate Sewage Contamination of Community Watersheds".

The two studies involved four key components: 1) a pollution questionnaire which was sent to homeowners, 2) stormdrain mapping and monitoring, 3) ISDS inspections and dye investigations using a pollution indexing method to identify suspect septic systems, and 4) an assessment of new/alternative sewage treatment technologies. A description of each activity is provided below.

4.3.1 Pollution Questionnaire

In March and April of 1994, RIDEM developed a questionnaire to be sent to residents of the Portsmouth Park / Island Park neighborhoods. The objective of the questionnaire was to provide a mechanism for residential participation in the pollution identification process. A total of five hundred fourteen (514) questionnaires were mailed, 46 were returned with incorrect addresses, and one hundred thirty two (132) were returned completed. Thus, the response of delivered questionnaires was 29%.

The conclusions from this survey are that a majority of the respondents live in homes that are typically year round dwellings that are at least twenty-five years old. A large percentage of the respondents are unsure of the age or the type of individual septic disposal system that they currently use. Maintenance and repair or replacement of systems varies throughout the two neighborhoods. At the time, respondents were undecided as to what direction should be taken to address the pollution problem.

4.3.2 Storm Drain Mapping And Monitoring

Between December 1993 and March 1998, a method of identifying, locating, mapping and monitoring of storm drains and suspected sources of fecal contamination was developed by RIDEM. Using that method, locations were identified and sampling was conducted by Office of Water Resources' staff on a variety of potential sources, including in-line, end-of-pipe and various shoreline pipe outfalls.

Figure 7 shows the locations of pipes, and Table 5 is a compilation of the sampling data collected during the study. Sampling was done during both dry and wet weather conditions. The Portsmouth Park neighborhood contains a network of old drainpipes originally installed to lower the water table on this hillside neighborhood. Portsmouth Park has six concrete stormdrains that discharge on the shoreline and one that is buried by sand off Boyd's Lane. Some of these pipes flow continuously, even in dry weather.

The stormdrains at Aquidneck Avenue and Morningside Lane flowed throughout the year with minimal dry weather rates of 4 gallons per minute and 0.2 gallons per minute, respectively. The 1992 study report noted that the Aquidneck storm drain flow smelled strongly of sewage. Discussions with residents provided information about the history of the water flow in the area. The report also noted that the land downhill from Carter's Seafood was the site of a seasonal wetland and pond prior to the development of condominiums. French drains were installed to intercept groundwater and lower the water table to allow for the construction of septic systems. The source of the Morningside Lane flow was traced to a cul-de-sac at the top of the hill behind the Citizens Bank property.

The study found no sewage odors emanating from the Child Street (Portsmouth Park) storm drain during dry weather and found it experienced infrequent seasonal flows, indicating it was an unlikely dry weather source of fecal coliform contamination. However, during rain events, the flow conveyed runoff that originates from East Main Road with high fecal coliform concentrations.

Figure 7 - Portsmouth Park Sampling Locations

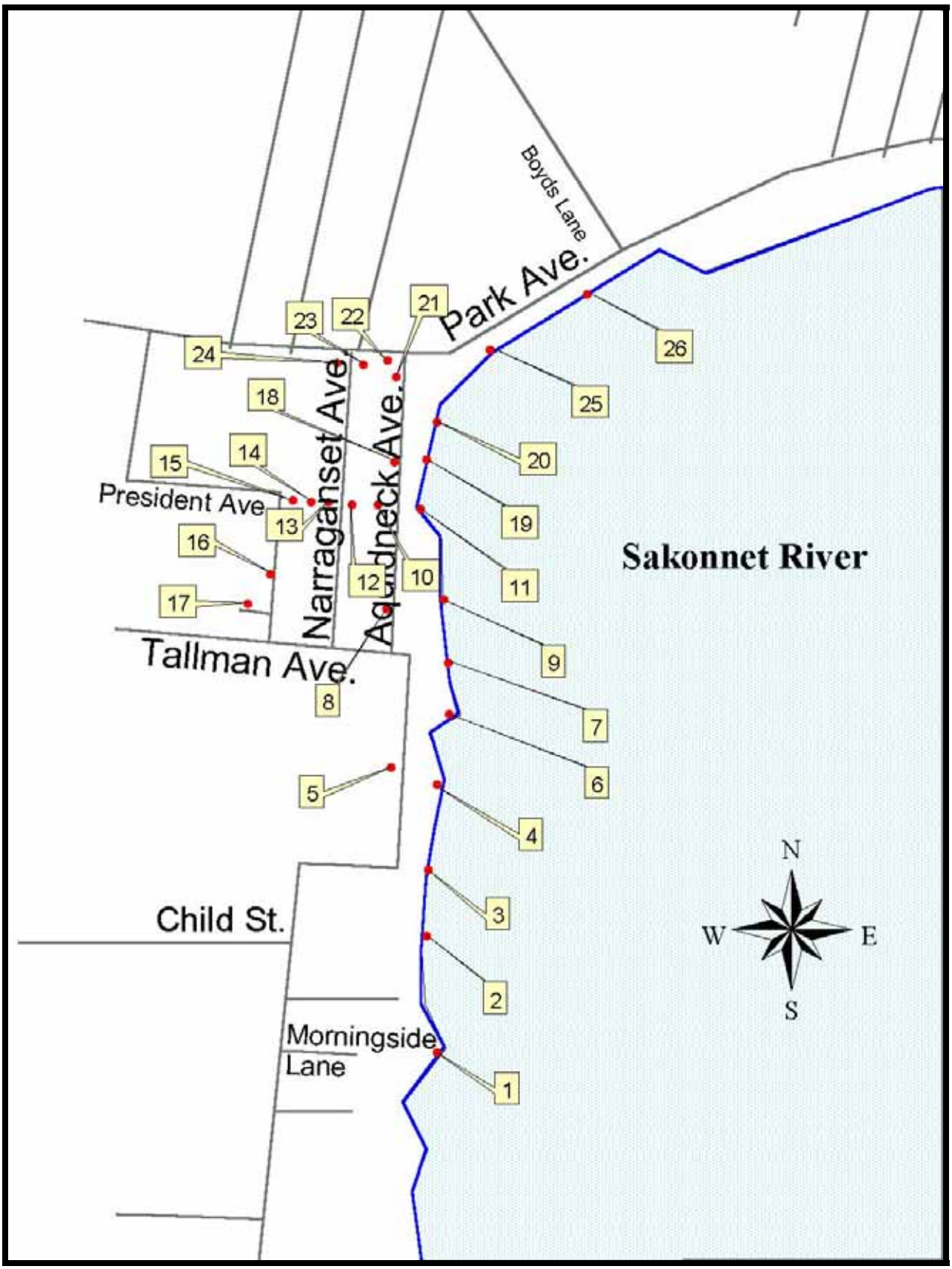


Table 5. Results of OWR Sampling in Portsmouth Park (1993 – 1994)

Station ID	Date	Description	Type	Fecal Coliform (MPN/100 ml)	Weather Conditions	Flow Rate (GALS/MIN.)
1	5/17/94	Morningside Outfall	Outfall	1,500	Lt. Rain	25
	5/24/94			9	Dry	25
	6/14/94			9,300	Wet	225
2	5/17/94	Child Street	Outfall	230	Lt. Rain	250
	6/14/94			43,000	Wet	9000
3	12/22/93	East Cory's Lane	Outfall	43,000	Dry	No Flow
	5/17/94			430	Lt. Rain	45
	5/24/94			23	Dry	25
	6/14/94			23,000	Wet	175
	6/15/94			230	Dry	12
4	8/21/94	25 Atlantic Ave.	Seawall 4" PVC	230,000	Wet	
5	6/15/94	Atlantic Ave.	Catch Basin	430	Dry	No Flow
6	12/22/93	49 Atlantic Ave.	Seawall Seepage	430,000	Dry	
7	12/22/93	Tallman/ Atlantic Ave	Outfall	23	Dry	
	5/17/94			43,000	Lt. Rain	25
	5/24/94			23	Dry	0.4
	6/14/94			9,300	Start Rain	175
	6/14/94			23,000	End Rain	45
8	5/17/94	77 Aquidneck Ave.	Catch Basin	390	Lt. Rain	
9	12/22/93	76 Aquidneck Ave.	Seawall 3" PVC	ND	Dry	
10	2/8/94	62 Narraganset Ave. (Rear)	French Drain?	230	Lt. Rain	
	6/22/94	62 Narraganset Ave.	4" Pipe In Basin	9	Dry	1.5
	6/22/94		24" Pipe In Basin	2,100	Dry	18
	6/22/94		8" Pipe In Basin	43,000	Dry	0.15
	6/22/94		8" Pipe In Basin	2,100	Dry	5
11	12/22/93	48 Aquidneck Ave.	Outfall	230	Dry	
	5/17/94			2,300	Lt. Rain	65
	5/24/94			9,300	Dry	150
	6/14/94			23,000	Wet	175
	6/22/94			43,000	Dry	18

ND – Non-Detect

TABLE 5 - CONTINUED

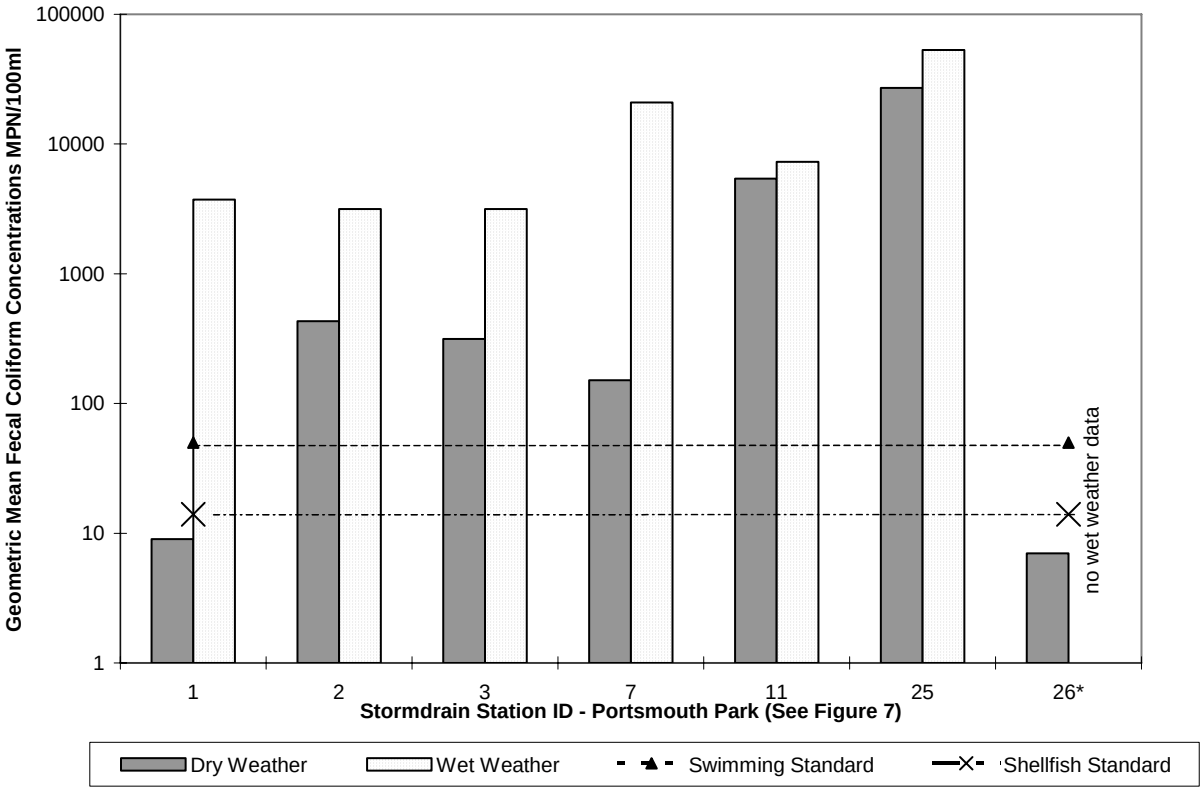
Station ID	Date	Description	Type	Fecal Coliform (MPN/100 ml)	Weather Conditions	Flow Rate (GALS/MIN.)
12	5/31/94	62 Narraganset Ave.	4" PVC In Catch Basin	430	Dry	1.5
	5/31/94		MAIN PIPE	23	Dry	65
	3/1/94			93	Dry	
	3/1/94		MAIN PIPE	9	Dry	
13	6/22/94	47 Narraganset Ave.	Catch Basin	150	Dry	No Flow
14	6/22/94	47 Narraganset Ave. Rear	Catch Basin	93	Dry	64
15	2/21/94	Lee/President	Catch Basin	93	Lt. Rain	
	6/22/94	Lee/President Carter's Seafood	PVC Pipe	ND	Dry	6.5
	6/22/94	Lee/President	Clay Pipe	ND	Lt. Rain	1.5
16	3/11/94	81 Lee Avenue	Sump Pump	4	Dry	
17	3/11/94	12 Candy Court	Catch Basin	3	Lt. Rain	
18	2/8/94	37 Aquidneck Ave.	PVC Pipe	ND	Lt. Rain	
	2/21/94	37 Aquidneck Ave.	Cement Pipe	9,300	Lt. Rain	
19	2/21/94	38 Aquidneck Ave.	Seawall	430,000	Lt. Rain	
20	2/21/94	34 Aquidneck Ave.	Seawall	1,500,000	Lt. Rain	
21	2/7/94	13 Aquidneck Ave.	Clay Pipe In Drain	ND	Dry	3
22	2/7/94	106 Park Ave.	Catch Basin	7,500	Dry	
23	6/22/94	16 Narraganset Ave.	Catch Basin	150	Dry	Stagnant
24	6/22/94	13 Narraganset Ave.	Catch Basin	430	Dry	Stagnant
25	12/22/93	Park Ave.	Outfall	430	Dry	
	5/17/94			43,000	Lt. Rain	55
	6/14/94			23,000	Start Rain	15
	6/14/94			150,000	End Rain	40
	6/15/94			200,000	Dry	Drip
26[1]	5/9/90	Park Ave.	Outfall	7	Dry	

[1]Data from 1990 Shoreline Survey only data available for this storm drain outfall.

ND – Non-detect

Figure 8 - Geometric Mean Fecal Coliform Concentrations

Geometric Mean Fecal Coliform Concentrations at Stormdrain Outfalls During Dry and Wet Weather in Portsmouth Park



* Data from 1990 Shoreline Survey only data available for this storm drain
** Geomean calculated with less than the recommended 5 data points

4.3.3 Pollution Indexing

A pollution indexing method, known as the RHODY#, was developed by RIDEM as a tool for identifying sources of fecal coliform contamination. This was a study to develop a method to indicate potential failure sites, based on certain existing parameters such as water usage, lot size, and general soil types. Site suitability analysis of individual developed homesites in these densely populated neighborhoods was not economically feasible. Therefore, the RHODY# was used as an indicator to prioritize sites to be further investigated for potential septic failure. Typically, a percolation test is done as part of the septic system permitting process to determine the ability of a soil to transmit water vertically. The sources of contamination to the shoreline from the study neighborhoods concluded that it is a community wide problem rather than a single site or a limited number of specific sites causing contamination. A prioritized list was developed to divide users into groups ranging from lowest to the highest potential for failure. The list was utilized to initiate septic system dye test investigations, carried out as part of the study.

Dye tests were performed at locations indicated by the RHODY# as potentially failing. Pre-dissolved Fluorescein dye (Uranine; Acid Yellow 73) was poured into toilets and open septic systems. Where needed, a garden hose was used to increase the dye movement rate across the bio-solids mat of the septic systems.

In addition to the RHODY#, RIDEM's Shellfish Program shoreline survey reports were utilized to identify suspected pollution sources. Pipes with accumulations of algae or other deposits were located. Flow rates (in gallons per minute) were estimated by measuring the inside diameter and the depth of the cross sectional flow. Fecal coliform samples were collected during both dry weather and wet weather in hot spot locations. Upland areas were also investigated for visual evidence of failed septic systems, which included unusually lush or burnt lawn sections.

4.3.4 Conclusions

The overall conclusion of the indexing method based on the calculated high RHODY # and subsequent positive dye results, is that septic system failures in Portsmouth Park and Island Park are strongly associated with high water use, small lot size, and impervious soils. This study also indicated that the loading rate (water use) of an ISDS most likely exceeds the design capacity when installed in densely developed old neighborhoods like Portsmouth Park and Island Park, which contain soils with unsuitable assimilative capability. Onsite wastewater treatment systems operating in Portsmouth Park and Island Park are a mix of old cesspools, conventional septic systems, and modified and repaired systems. Some of the old septic systems consist of buried perforated 55 gallon drums. All of these systems can be a source of water pollution if overloaded or if subject to groundwater infiltration.

In Island Park, waterfront lots were discovered to have hidden pipes in the sand and rocks of the cove. Homes set back one or more lots from the shore failed to show any evidence of excessive sewage application rates, presumably due to the rapidly drained soils. It is suspected that plumes of poorly treated sewage are created which discharge pathogens to The Cove.

The draft report for the 1995 study, concluded that the Portsmouth Park storm drainage network discharges sewage-contaminated groundwater directly into the Sakonnet River. This study also concluded that conventional Rhode Island septic system designs would fail on many of these sites due to the seasonally high groundwater table in Portsmouth Park and the insufficient retention time in the rapidly drained soils of Island Park.

4.4. RIDOH Beach Monitoring Program

The Rhode Island Department of Health currently samples licensed, public beaches for total and fecal coliform bacteria. The results are used to help manage the beaches to protect swimmers from water-borne illness. The samples are collected from the shoreline during the regular monitoring season that runs from mid-May to mid-September. All beaches that currently hold a license are monitored at varying intervals depending on the historical water quality conditions at the site. Only limited testing is conducted at closed licensed beaches.

Teddy's Beach located at the eastern end of Island Park on the Sakonnet River shore is a licensed, closed beach. Table 8 represents the results of the most recent testing at Teddy's Beach. The current annual sample results suggest that the fecal coliform concentrations at Teddy's Beach are well within the beach recreational water quality standards of 50 fecal coliform MPN/100ml for saltwater bathing beaches. No sampling took place in 2000.

Though available water quality data at the beach and nearby offshore monitoring stations located in the Sakonnet River and the southern portion of "The Cove" indicates safe swimming conditions, a swimming advisory is in place for these two shoreline areas due to the potential for localized areas of contamination resulting from the identified pollution sources. Consistent with established Department of Health policy to not swim within 200 feet of stormwater discharges, it is advised that individuals also avoid swimming in the vicinity of areas where water seeps from the ground.

Table 6. Teddy's Beach, Portsmouth, RI – Fecal Coliform Results, 1995 – 1999

Sample Date	Fecal Coliform MPN / 100
June 20, 1995	4
May 22, 1996	0
May 12, 1997	15
May 14, 1998	4
May 20, 1999	9

4.5. RIDEM FWA Investigations

In this experiment, a portable field fluorometer was used to determine the concentrations of fluorescent whitening agents (FWAs) in storm drains in the Morningside Lane and Aquidneck Avenue, Narragansett Avenue neighborhood in Portsmouth, Rhode Island.

FWAs are chemical additives to laundry detergent. While FWAs show strong absorbency to fabrics, some FWAs may remain in the washing liquor and be extruded into the environment with the wastewater. Therefore, the presence of FWAs in the environment is an indicator of anthropogenic sources of pollution in the region from which the FWAs were isolated.

FWAs are primarily removed from the environment by photodegradation. The half-life of FWAs on the surface of a body of water may be as short as 5 hours under noon sunlight. However when wastewater is released into the surface waters below the photic zone or into groundwater, FWAs can persist in the environment.

Past RIDEM studies had determined that failing septic systems, along with illegal sewer connections to storm drains, have contributed to anthropogenic pollution impacting receiving waters. This research was designed to test for FWAs in the storm drains emptying into the receiving waters, and confirm the prior observations made by RIDEM.

Initially, samples were collected from four different "pristine" areas located in other parts of the state. These locations were chosen because they were either serviced by sewers, or were located a substantial distance from any septic systems. Levels believed to be "static" or background instrument readings were recorded in the range of 3.23 ppb to 5.01 ppb for these sites.

Two separate field surveys were conducted in the Portsmouth study area. A survey on September 9, 1999 was conducted under dry weather conditions, and samples from nine stations were analyzed. FWA concentrations ranged from 7.07 ppb to 31.58 ppb. A second survey on October 22, 1999 was conducted after a heavy rainstorm and, therefore, considered a wet weather survey. Seven stations were analyzed and concentrations of FWAs ranged from 5.79 ppb to 12.96 ppb. Figure 9 is a layout of the sampling locations within the Portsmouth Park area.

Concentrations of FWAs were decreased during the wet weather survey for stations 2, 3, 5, and 6 (refer to Figure 9). Station 2 is the outflow of a storm drain. Flow from stations 3, 4, 5, 5a, and 6 all empty into the Sakonnet River at station 2. The decrease in FWA concentrations in wet weather is due to dilution from an increase in stormwater volume in the storm drains. Station 1 was an outflow pipe that drains ground water and was therefore unaffected by the rainstorm. The concentration of FWAs was only slightly less from this station in the wet weather survey.

During both surveys it was observed that concentrations of FWAs decreased from station 2 to 6. FWA concentration was also decreased when moving away from the storm drain (station 4, which is a branch from another upstream storm drain). The topography of the area allows for accumulation of pollutants at the outflow of the drainage basin. FWA concentrations are in agreement with this observation.

Results from stations 7, 8, and 9 were used to identify an illegal wastewater discharge into a storm drain (refer to Figure 9). A garden hose was discharging water that had a strong bleach smell into the drain between stations 8 and 9. Station 7 is the outflow of the storm drain where the wastewater was being discharged. Stations 7 and 8 had FWA concentrations significantly higher than station 9. Without knowing of the illegal discharge into the storm drains, one could conclude that there was a significant point source of FWAs between stations 8 and 9. The illegal discharge could account for the elevated levels of FWAs into the storm drain.

Findings indicate that FWAs are present within the Portsmouth Park stormdrain system (Figure 10). The concentration of FWAs is highest at the outlet and steadily decreases moving up into the drainage system. Dry weather flows parallel FWA concentrations with flows heaviest at the outlet and decreasing moving up into the system. The decrease in FWA concentrations in wet weather is thought to be due to dilution from an increase in stormwater volume.

Constant, year round flows observed in the drainage system indicate that these flows may be attributable to groundwater infiltration and illegal connections. Direct observations and high concentrations of both pathogens and FWAs further indicate that the contamination is from anthropogenic sources. Based on these observations, it can be concluded that the sewage contamination that is found in the storm drain network is from a combination of sources. Potential sources include illicit connections or contaminated groundwater inflows.

4.6. ISDS Repair Records

According to RIDEM records, over 75 septic systems in the two neighborhoods have been repaired to some extent during the past ten years. A review of these records indicates that a significant number of those systems were unable to be repaired to an extent that would meet the requirements for new construction. These systems were "repaired" using a variety of techniques to solve site specific constraints and problems. Some of these alternative solutions required the installation of water tight holding tanks, the use of compost toilets, the installation of galley systems for gray water discharges only, and a handful of innovative/alternative designs. This is further documentation that the existing conditions in the two neighborhoods render them unsuitable for conventional ISDSs on a wide spread community basis. It may also indicate that even the installation of innovative/ alternative septic systems that would properly treat septic waste would be difficult.

Figure 9 Sampling Locations Sampled For FWAs in 1999

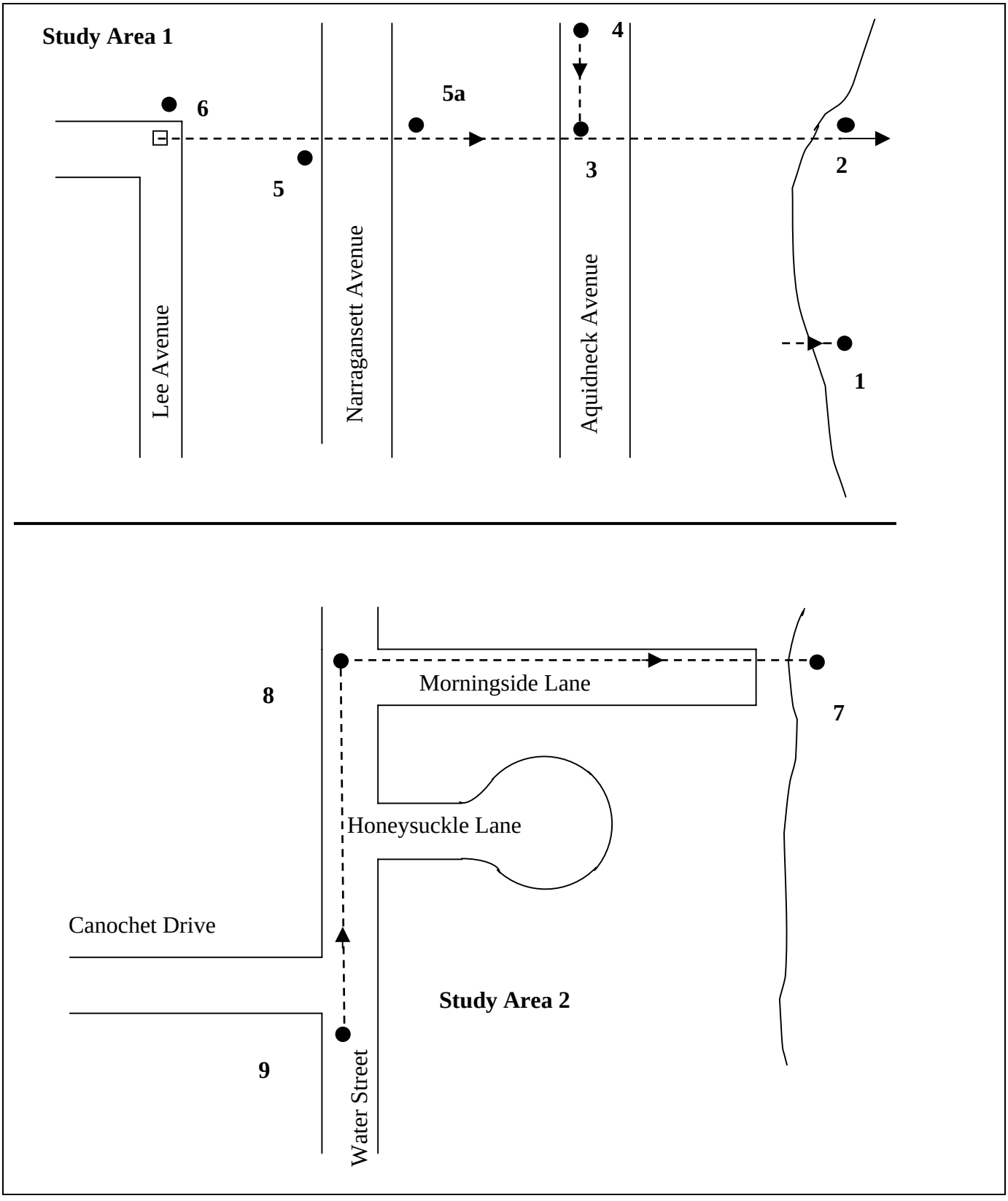
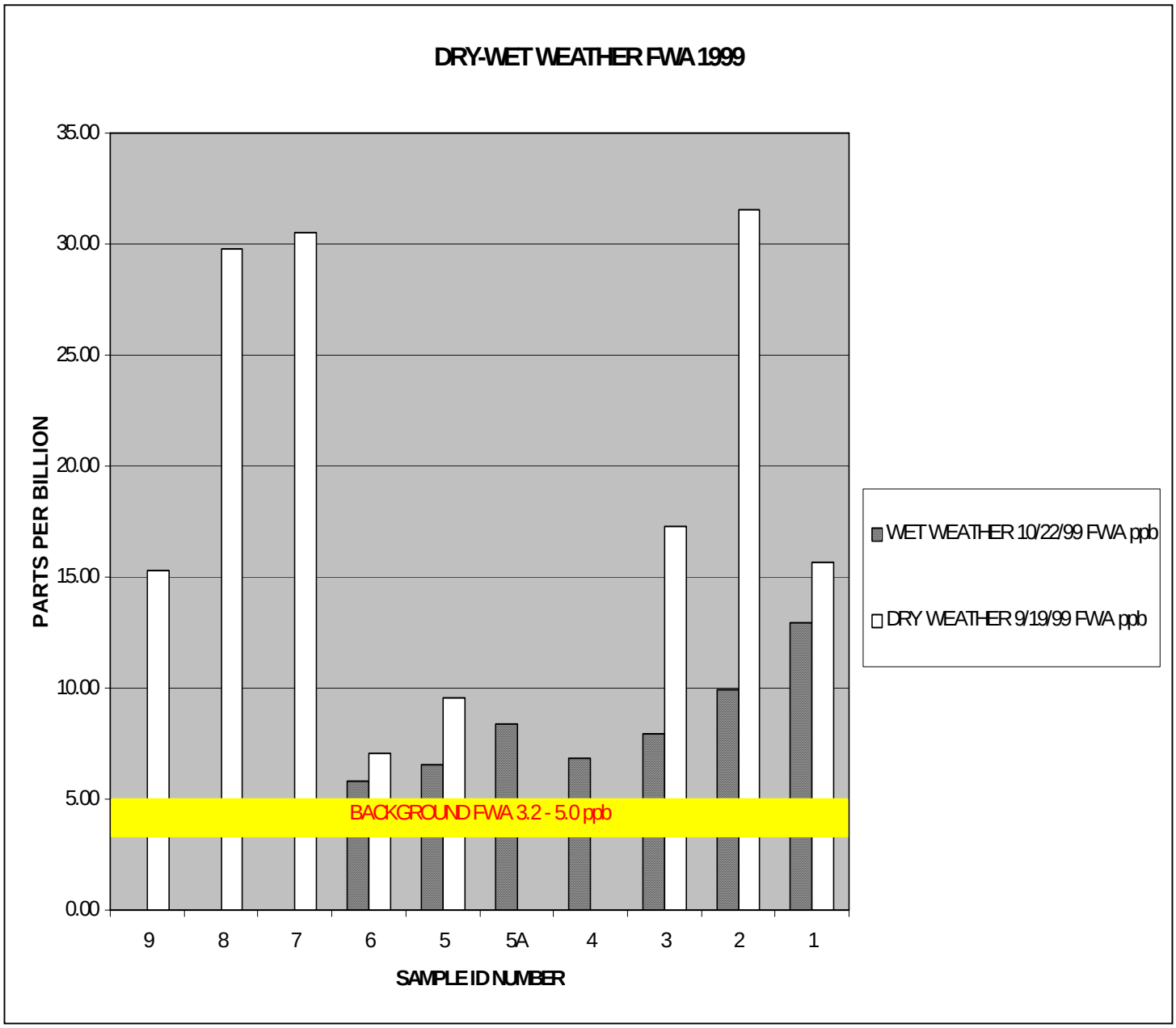


Figure 10 - Dry-Wet Weather FWA Sampling Results



5.0 WATER QUALITY CHARACTERIZATION

RIDEM Shellfish Program's ambient water quality monitoring data show that fecal coliform concentrations at the Program's sampling stations in the shellfish growing areas do not exceed Class SA standards under wet or dry conditions. However, the potential public health risk associated with direct discharge of human septage waste from failing septic systems into the waters along the shoreline of the Portsmouth Park and Island Park neighborhoods prompted the closure of the areas to shellfishing. This closure directly impacts the designated shellfishing use for the two Class SA waterbodies and resulted in the listing of the two areas on the 1998 and 2000 303(d) Lists of Impaired Waters.

The threats to water quality identified by Shellfish Program shoreline surveys include illicit connections to stormdrains and failing septic systems located in areas of high groundwater in Portsmouth Park and in unsuitable soils in Island Park. In addition, runoff from the two densely developed neighborhoods may contribute to elevated fecal coliform levels during wet weather, however data indicate that standards are met in wet weather. This will be further evaluated after the illicit connections and failing septic systems are corrected. The continued water quality monitoring and future shoreline surveys will be used to help evaluate the effectiveness of the recommendations of the TMDL in restoring designated uses and attaining water quality standards. Below is a brief characterization of sources and water quality conditions in both of the targeted areas.

5.1. The Sakonnet River (Portsmouth Park)

Data from the Shellfish Program's shoreline surveys and other RIDEM studies were evaluated. As shown in Table 4, the geometric means of both wet and dry weather data were less than 6 MPN/ 100 ml, easily meeting the Class SA limit of 14 MPN/100 ml. Similarly, less than 10% of the samples exceeded a concentration of 49 MPN/100 ml. Also, the results of sampling at Teddy's Beach indicate that the swimming standards are being met. Overall, the volume and tidal flushing of the Sakonnet River appear to provide dilution of the stormdrain inputs.

However, Table 7 is a listing of sources along the shoreline that have been identified as contributing pollutants to the river as indicated by the fecal coliform counts from samples obtained during the numerous surveys. Supporting data for each of these locations are in section 4.

Table 7 Identified Sources of Pollution in Portsmouth Park

Type	Location	Source of Information
12” Storm drain	Pole # 403 Park Ave.	1990 Shoreline Survey
12” Concrete drain	Mason & Park Ave.	1990 Shoreline Survey
24” Concrete drain	Pole #420 Park Ave.	1990 Shoreline Survey
Stormdrain discharge culvert	? Aquidneck Ave.	1987 Shoreline Survey
Seep	20 Aquidneck Ave.	1990 Shoreline Survey
6” PVC pipe	34 Aquidneck Ave.	1990 Shoreline Survey
Seawall	34 Aquidneck Ave.	1993/1994 R. Schmidt Report
Seawall	38 Aquidneck Ave.	1993/1994 R. Schmidt Report
Discharge pipe	48 Aquidneck Ave.	1987 Shoreline Survey
36” Concrete drain	48 Aquidneck Ave.	1990 Shoreline Survey
Outfall	48 Aquidneck Ave.	1993/1994 R. Schmidt Report
Discharge pipe	62 Aquidneck Ave.	1987 Shoreline Survey
6” Cast Iron pipe	62 Aquidneck Ave.	1990 Shoreline Survey
24” Concrete drain	Atlantic / Tallman	1990 Shoreline Survey
Outfall	Tallman / Atlantic	1993/1994 R. Schmidt Report
18” Concrete storm drain	7 Atlantic Ave.	1990 Shoreline Survey
4” PVC pipe	25 Atlantic Ave.	1993/1994 R. Schmidt Report
Seepage	49 Atlantic Ave.	1993/1994 R. Schmidt Report
Outfall	E. Cory’s Lane	1993/1994 R. Schmidt Report
24” Concrete drain	Child Street	1990 Shoreline Survey
Outfall	Child Street	1993/1994 R. Schmidt Report
Outfall	Morningside Lane	1993/1994 R. Schmidt Report
Outfall	Park Ave.	1993/1994 R. Schmidt Report

5.2. The Cove - Island Park

Ambient water quality monitoring carried out by the Shellfish Program indicates that Class SA standards for fecal coliforms are also being met in The Cove - Island Park. Geometric means of the fecal coliform data collected in the waterbody were less than 5.0 MPN/ 100 ml under both wet and dry weather conditions (Table 4).

As shown in Table 8, two discharge pipes (636 Park Avenue and 197 Cedar Avenue) where identified as dry weather discharges in the 1987 shoreline survey. The 1990 shoreline survey notes four locations in the Cove that were identified as possibly failing septic systems. One possible source identified in the most recent shoreline survey (2000) was a groundwater seep within the vicinity of a house located on Point Street. The seep was identified as a possible failing septic system due to a septic odor and high fecal coliform count. No wet weather sampling data is available for this portion of The Cove.

Table 8 Identifies Sources of Pollution in Island Park

Discharge pipe	636 Park Ave.	1987 Shoreline Survey
Discharge pipe	197 Cedar Ave.	1987 Shoreline Survey
Seep	606 Point St.	2000 Shoreline Survey

As noted in Appendix A, a variety of enforcement efforts are presently underway by DEM's Office of Compliance and Inspection to address identified pollution sources.

For example, in 1986 a complaint was received by RIDEM regarding a cesspool located in the salt marsh adjacent to 227 Cedar Avenue in the Island Park neighborhood. Because the cesspool was actually located in the Cove, it would have been a direct source of contamination to the Cove. Due to the extremely small lot and the inability to site a conventional ISDS on this property, approval was granted for the installation of a holding tank as a means to eliminate this pollution source to the cove. With the issuance of a Certificate of Conformance by RIDEM in January 1993, this pollution source has been eliminated**.**

6.0 WATER QUALITY IMPAIRMENT

Rhode Island's 1998 and 2000 303(d) Lists of Impaired Waters identifies the Sakonnet River (Portsmouth Park) and The Cove – Island Park as impacted by pathogens. However, as previously discussed the numeric criteria for fecal coliform concentrations are met at the four sampling stations located in the two shellfishing areas. The two waterbodies are classified as prohibited and closed to shellfishing due to the presence of direct discharges of human waste along the shoreline that pose a public health risk. This TMDL aims to eliminate this source of pollution and thus reopen the two areas to shellfishing and swimming.

7.0 TARGETED WATER QUALITY GOALS

The Sakonnet River (Portsmouth Park) and The Cove - Island Park are designated as Class SA waterbodies. Rhode Island's standards for Class SA waters requires that the maximum allowable level of fecal coliform bacteria may not exceed a geometric mean of 14 MPN/100 ml, and not more than 10% of the samples shall exceed a value of 49 MPN/100ml. Results of the Shellfish Program's water quality monitoring indicate that this standard is met at the four sampling stations located within the two shellfishing areas.

However, in addition to Rhode Island Water Quality Standards, NSSP regulations require that there shall be no direct pollution sources that result in a potential for a public health risk. Since several direct discharges containing septage from failing septic systems and other human waste have been identified along the shoreline of the two areas, the Shellfish Program determined that there is a public health risk, and closed the two areas to shellfishing.

The objective of this phased TMDL for the Sakonnet River (Portsmouth Park) and The Cove - Island Park is the elimination of all discharges of untreated and inadequately treated wastewater including illegal discharges, illicit connections to stormdrains, and contaminated groundwater seeps. Elimination of these nonpoint sources of contamination should address the causes of impairment for which these waterbodies were included on the state's 303(d) list. Upon implementation of measures to resolve the discharge of untreated or inadequately treated wastewater, monitoring shall be conducted to determine compliance with water quality standards during both wet and dry weather conditions. More specifically, in accordance with approved NSSP procedures, follow-up shoreline surveys and in-stream water quality monitoring will be conducted.

8.0 TOTAL MAXIMUM DAILY LOAD ALLOCATIONS

This section describes the TMDL load allocations that were developed for The Sakonnet River (Portsmouth Park) and The Cove – Island Park. Section 303 (d) of the Federal Clean Water Act (CWA) requires states to place water bodies that do not meet the water quality standards on a list of impaired waterbodies. The CWA requires each state to establish Total Maximum Daily Loads (TMDLs) for listed waters and the pollutant contributing to the impairment(s). TMDLs determine the amount of a pollutant that a waterbody can safely assimilate without violating the water quality standards. Both point and nonpoint pollution sources are accounted for in a TMDL analysis.

Point sources of pollution receive a waste load allocation (WLA) specifying the amount of pollutant each point source can release to the waterbody. Nonpoint sources of pollution receive a load allocation (LA) specifying the amount of a pollutant that can be released to the waterbody by this source. In accordance with the CWA, a TMDL must account for seasonal variations and a margin of safety, which accounts for any lack of knowledge concerning the relationship between effluent limitations and water quality. Thus:

TMDL = WLAs + LAs + MOS

Where:

WLA = Waste Load Allocation which is the portion of the receiving water's loading capacity that is allocated to each existing and future point source of pollution.
LA = Load Allocation which is the portion of the receiving water's loading capacity that is allocated to each existing and future nonpoint source of pollution.
MOS = Margin of Safety

8.1. Loading Capacity

As described within EPA's guidance, a TMDL identifies the loading capacity of a waterbody for a particular pollutant. EPA regulations define loading capacity as the greatest amount of loading that a waterbody can receive without violating water quality standards (40 C.F.R. 130.2). The loadings are required to be expressed as either mass-per-time, toxicity, or other appropriate measures (40 C.F.R. 130.2(I)). For this TMDL, the loading capacity will be expressed as a concentration. This approach establishes clear objectives that can be easily understood by the public and individuals responsible for monitoring activities.

For Class SA waters the fecal coliform TMDL includes two components: (1) the geometric mean of a representative set of fecal coliform samples shall not exceed 14 organisms per 100 ml; and (2) no more than 10% of the samples shall exceed 49 organisms per 100 ml.

This TMDL for the Sakonnet River (Portsmouth Park) and The Cove – Island Park differs from the typical TMDL in that the identified water quality impairment is not based on ambient water quality violations but on the presence of a threat to public health, in the form of direct and indirect discharges of untreated and inadequately treated wastewater. Therefore, to restore the targeted waterbodies' designated use as shellfishing waters, the goal of this phased TMDL is the elimination of all discharges of untreated or inadequately treated wastewater.

Additional monitoring is required to ensure that water quality standards are met as remedial actions are accomplished. Monitoring by RIDEM will be the principle method of obtaining the data necessary to track water quality conditions in the watershed. Also, as proposed BMPs are installed in the watershed, post construction influent and effluent sampling may be required to assess the effectiveness of the selected technology.

In accordance with National Shellfish Sanitation Program (NSSP) requirements, the RIDEM Shellfish Monitoring Program will monitor water quality and conduct shoreline surveys. RIDEM will ensure that ambient sampling stations are located adjacent to point sources and effectively evaluate all nonpoint sources of pollution, including the addition and/or modification of sampling locations, as necessary. Shoreline surveys entail the evaluation of the effect of each actual and potential source of pollution on shellfish waters including as necessary, the collection of ambient water quality samples. In addition, non-shellfish program data (such as information on potential sources, beach and volunteer monitoring) will be considered and followed up with confirmatory monitoring by RIDEM, following NSSP approved methods, as appropriate.

The continued water quality monitoring and future shoreline surveys will be used to help evaluate the effectiveness of the recommendations of the TMDL in restoring designated uses and attaining water quality standards. Ultimately, attainment of the designated shell fishing use requires compliance with the Rhode Island water quality standards including ambient water quality criteria and all NSSP requirements (including evaluation of non-shellfish program data/surveys, special sampling site data, beach and volunteer monitoring, as appropriate).

8.2. Waste Load Allocation for Point Sources

There are no RIPDES-permitted point sources in the targeted watershed. The only known potential point sources are municipal storm sewers and illegal discharge pipes. A Wasteload Allocation (WLA) of zero is set for failing septic systems that flow (via groundwater seeps and/or overland flow) into storm drains, illegal connections to storm drains, and illegal direct discharges. Given the fact that high contamination levels measured in municipal storm sewers are the result of failing septic systems and illegal connections, and sampling data demonstrates that water quality standards are achieved in wet weather, a separate waste load allocation for stormwater is not being developed at this time. As further described in Section 10.1.2 of this report, the Town of Portsmouth and the RI Department of Transportation will be required to develop and implement a stormwater management plan for a Phase II RIPDES permit for all stormwater discharge. Consistent with US EPA's determination (documented in the preamble to the final Phase II regulations published in the Federal Register on December 8, 1999) that implementation of the six minimum measures designed to reduce pollutants to the maximum extent practicable will protect water quality and satisfy appropriate water quality requirements of the Clean Water Act, it is expected that once the TMDLs recommendations including Phase II's six minimum measures are implemented that no further pollutant reduction controls will be necessary. To confirm

that water quality standards have been achieved, follow-up shoreline surveys and in-stream water quality monitoring will be conducted in accordance with NSSP procedures once adequate wastewater disposal practices are accomplished and the Phase II stormwater management plans are implemented. Should it be necessary, a specific load allocation for stormwater will be established at that time.

8.3. Load Allocation for Nonpoint Sources

Untreated and inadequately treated wastewater that discharge as non-point sources either as groundwater seeps or overland stormwater flow directly into the surface waters are to be eliminated. The Load Allocation (LA) for these sources is set equal to zero. Upon implementation of measures to resolve the discharge of untreated or inadequately treated human waste, shoreline surveys and in-stream water quality monitoring will be conducted in accordance with NSSP procedures to determine compliance with water quality standards during both wet and dry weather conditions. Consistent with a phased TMDL approach, should follow-up monitoring indicate that water quality standards are not being attained, and that reductions in other nonpoint sources are necessary, a load allocation for these sources will be established.

It was not possible to separate natural background from the total nonpoint source load at this time, due to a lack of site specific data on fecal coliform contributions from wildlife in the watershed.

8.4. Margin of Safety

A margin of safety (MOS) is a required element of a TMDL in recognition of the fact that there are scientific and technical uncertainties when efforts are made to characterize the water quality of natural systems. More specifically, our knowledge of the exact nature and magnitude of pollutant loads from the variety of sources is incomplete. Specific impacts from pollutants on the chemical or biological quality of complex natural systems are difficult to evaluate, and therefore our effectiveness in addressing these impacts is an inexact science.

A MOS is intended to account for this inability to characterize the water quality conditions with relative certainty by providing conservative avenues to approach the load allocations in a TMDL. EPA has allowed two approaches to achieving this MOS within a TMDL. The first approach is to incorporate the margin of safety as part of conservative assumptions made during the development of point and non-point source load allocations. The second approach is to reserve a portion of the loading capacity as a separate term in the TMDL equation.

The target for this TMDL is the elimination of any discharge of untreated or inadequately treated wastewater via illegal discharges, illicit connections to stormdrains, and contaminated groundwater seeps. Given that the TMDL requires the complete elimination of these sources, RIDEM believes that an implicit margin of safety is provided for in this TMDL.

8.5. Seasonality

TMDLs must also account for seasonal variability. This TMDL has set allocations for all known and suspected sources equal to the fecal coliform criteria independent of seasonal conditions. This will ensure the attainment of water quality standards regardless of seasonal and climatic conditions. Any

controls that are necessary will be in place throughout the year, and, therefore, will be protective of water quality year round. Follow-up monitoring conducted consistent with NSSP requirements will evaluate seasonal variability.

9.0 PUBLIC PARTICIPATION

Public participation is an important component of the TMDL process. The following description of past and future public involvement addresses this element.

9.1. Past Public Participation

RIDEM has, over a period of approximately ten years, conducted numerous studies and outreach programs to educate and inform the public as to the water quality issues impacting these two waterbodies. In 1996, with the support of EPA grant monies, and as part of two studies conducted in the area, a mailed questionnaire was sent to the residents of the two neighborhoods. Also, as part of the presentation of data collected within these studies, a public meeting was held at the Portsmouth Town Hall to provide guidance to homeowners and to solicit input from these local residents.

DEM staff have established a list of stakeholders that includes representatives from the Town of Portsmouth, concerned citizens, local environmental groups, and other State and Federal agencies. On December 12, 2000, staff from RIDEM, and representatives of the Town of Portsmouth held a public meeting to introduce the TMDL process to the public. Several concerned residents attended the meeting, along with perspective consultants interested in the pending award of the Town's Wastewater Facilities Plan project. RIDEM staff presented information on water quality to the audience and fielded questions regarding the TMDL process. Town officials discussed their upcoming Wastewater Facilities Plan update. A Preliminary Data Report containing information collected by RIDEM was also made available to the public via RIDEM's web site and as a hard copy available upon request.

Technical staff and managers from the Office of Water Resources have met on two occasions with town officials to discuss the TMDL findings and proposed actions to resolve the area's documented wastewater and stormwater problems. In October 2001, a meeting was held at DEM offices between Office of Water Resources technical staff and managers and the town administrator, town planner, and consultants hired to prepare the community's Wastewater Facilities Plan. In November 2001, Office of Water Resources staff attended a meeting of the Portsmouth Town Council to discuss concerns with management alternatives proposed in the draft TMDL implementation section.

9.2. Future Efforts

The public outreach process for this TMDL will include another public meeting and a public comment period of at least 30 days, prior to the submittal of the draft document to EPA by DEM. Also, DEM staff will be available to make additional presentations to the public of its findings and recommendations during the wastewater facilities plan update process, if deemed necessary. Also within this update plan, there is a significant element of public participation mandated by the town to be completed by their consultant.

10.0 IMPLEMENTATION

10.1. Recommendations

EPA guidance on the development of TMDLs states that implementation plans may be submitted as revisions to State water quality management plans, coupled with a proposed TMDL, or as part of an equivalent watershed or geographic planning process. Implementation plans shall include " *reasonable assurances that the nonpoint source load allocations established in TMDLs (for waters impaired solely or primarily by non-point sources) will in fact be achieved. These assurances may be non-regulatory, or incentive-based, consistent with applicable laws and programs."* (EPA, 1991)

The goal for the Sakonnet River (Portsmouth Park) and The Cove – Island Park TMDL is to eliminate the discharge of bacterial contamination to these waterbodies. Though the source of pollution is similar, the route by which contaminates make their way into surface waters during dry weather varies between the two areas. In Portsmouth Park, illegal direct discharges to the river and indirect discharge of contaminated groundwater inflows and illicit connections via stormdrains to the river are thought to be the major pollution sources. Catch basins and storm drains in the vicinity of Narragansett, Lee, President and Aquidneck Avenues are all suspected of having illicit connections. Other storm drains containing contaminated flows include the drains from Morningside Lane, Child Street, Tallman Avenue, Aquidneck Avenue, Atlantic Avenue, and Park Avenue. Several small pipes located along the seawalls adjacent to Aquidneck Avenue and Atlantic Avenue are suspected of being illegal discharge pipes either from french drain systems transporting contaminated groundwater or direct overflow pipes from improperly functioning septic systems. The presence of Fluorescent Whitening Agents (FWAs), a constituent found detergents, in the storm drain pipes along Water Street contributing to the Morningside Lane outfall are also an indication of either illicit connections or failing septic systems.

In Island Park, the high-density residential and commercial development on sandy, rapidly drained soils is thought to be contributing untreated or inadequately treated wastewater via groundwater to The Cove, though illegal direct discharges have also been identified. Even using I/A systems, effective treatment of wastewater may be difficult to achieve due to the extremely small lot sizes, high groundwater table, excessively transmissive soils, or proximity to the shoreline.

The discharge of untreated or inadequately treated human waste into stormdrains and subsequently into the State's water or via direct discharges or groundwater seeps is a violation of the state's water quality regulations and ISDS regulations. Responsibility for correction of these problems lies with both the property owners and the owners of the stormdrains in question. Property owners are responsible for the proper treatment and disposal of wastewater. The owners of the stormdrain systems in question, the Town of Portsmouth for the town-owned storm drains and RIDOT for any state-owned systems, also share responsibility for the elimination of these contaminated flows.

The goal of this phased TMDL is the elimination of any and all discharges of untreated and inadequately treated wastewater via illegal discharges, illicit connections to stormdrains, and contaminated groundwater seeps. To meet this TMDL's goals, a comprehensive community-wide strategy should be prepared which documents the commitment by the responsible parties to implement enforceable wastewater and stormwater management alternatives to eliminate all untreated and inadequately treated wastewater discharges in the most timely manner possible. It is recommended that the Town of Portsmouth, given its responsibilities, custody and control over public streets and drainage systems in

the neighborhoods, and its ability to provide governmental services to affected property owners, take the lead in preparation of this strategy, in coordination with the Rhode Island Department of Transportation and as appropriate, that relevant elements of the strategy be incorporated into the town's Wastewater Facilities Plan, onsite wastewater management plan, and both the town's and RIDOT's Stormwater Management Program Plans. In this context, specific actions are identified in Table 9 and further elaborated upon in the following sections.

10.1.1 Wastewater Facilities Plan Update

The Town of Portsmouth is currently in the process of updating its Wastewater Facilities Plan to address wastewater issues in the neighborhoods of Portsmouth Park and Island Park. The project will develop guidance and implementation plans for addressing the issues of contaminated groundwater, illicit discharges, and failed or failing septic systems on a neighborhood-wide basis. The stated project goal is to identify a cost-effective plan to reduce or eliminate wastewater and contaminated stormwater discharges caused by inadequate public and private facilities in these two neighborhoods. The project contractor has determined wastewater flow volumes, reviewed alternatives, and analyzed the cost factors associated with each alternative. The wastewater facilities plan update also includes the task of locating and mapping the stormdrain systems for these two neighborhoods. As part of this task, system configuration, contributing watersheds and illicit connections are to be identified and located. Presently, the illicit connections have not been traced to their sources, but only located and identified within the storm drain system.

If the recommended alternative involves the continued use of ISDS, the town should establish a wastewater management district. Though potentially less costly than a community-wide wastewater collection and treatment system, a site by site approach to dealing with septic system failures in these areas has many challenges to overcome. Contaminated seeps and polluted groundwater infiltrating into storm drains are difficult to trace back to the source and the responsible property owners. Notwithstanding, a large number of lots would undoubtedly be identified as having severe limitations for septic systems. Small lot sizes, poor soils, high groundwater and the proximity to waterbodies are all conditions that present serious limitations for many of these properties. Successful implementation of a solution that relies upon the continued use of ISDS entails adoption of a local ordinance creating a wastewater management district which includes at a minimum: mandatory functional inspections as described in Septic System Check-up (to be performed in the Spring at high groundwater level), identification of any failed systems[1], and mandatory repair and/or replacement of cesspools and any

[1] "Failed System" means any individual sewage disposal system that does not adequately treat and dispose of sewage so as to create a public or private nuisance or threat to public health and/or environmental quality, as evidenced by, but not limited to, one or more of the following conditions:

(1) Failure to accept sanitary sewage into the building sewer;
(2) Discharge of sanitary sewage to a basement, subsurface drain, surface drain or surface water unless expressly permitted by the Department of Environmental Management;
(3) Sanitary sewage rising to the surface of the ground over or near any part of an individual sewage disposal system or seeping from the absorption area at any change in grade, bank or road cut;
(4) The inlet to a cesspool is submerged or the inlet or outlet for a septic tank is submerged; or
(5) Any deterioration or damage to any individual sewage disposal system that would preclude adequate treatment and disposal of wastewater. (For example, contact between the bottom of the ISDS and the groundwater table.)

failed systems. The program should include a schedule of enforcement and means to implement it. It is essential that the town commit sufficient personnel resources to successfully administer the management district (including technical assistance to homeowners) and a program of homeowner financial assistance (e.g. Community Septic System Loan Program (CSSLP) available through the Clean Water Finance Agency).

Should contaminated discharges continue to be evident following implementation of these actions, additional control measures will be required, as appropriate. Until such time as a comprehensive community wide wastewater management approach has been implemented, RIDEM's Office of Compliance and Inspection will continue to address individual complaints and notice of failures as allowed for under current statute and policy.

10.1.2 Phase II Stormwater Permit Program

As noted previously, the dry weather contaminated flows discharged from the identified storm drain outfalls are in violation of state regulations, and therefore, are not permitted. Normal stormwater flows not contaminated by human waste are subject to permitting under the Rhode Island Pollution Discharge Elimination System (RIPDES) program.

As mandated by EPA, RIDEM has amended the existing Rhode Island Pollution Discharge Elimination System (RIPDES) regulations to include Phase II Storm Water regulations (effective March 19, 2002). The regulations require operators of municipal separate storm sewer systems (MS4s) within urbanized areas (UAs) or densely populated areas (DPAs) to develop a storm water management program plan (SWMPP) and obtain permits for areas in their UA or DPA. The MS4s that discharge to the Sakonnet River and The Cove are owned and operated by the Town of Portsmouth and the Rhode Island Department of Transportation (RIDOT). The two neighborhoods of Portsmouth Park and Island Park are both located within an Urban Area (UA).

The Phase II Program establishes six minimum measures that must be addressed by all SWMPP as follows:

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 SWMPP must contain the measurable goals for each minimum control measure (narrative or numeric, used to measure the success of the program) as well as an implementation schedule including interim milestones and frequency of activities, and reporting of results.

In summary, the Town of Portsmouth and RIDOT are required to develop SWMPPs and apply for RIPDES permits for those portions of their MS4s located within the UA by March 10, 2003. The SWMPPs must set forth actions to address the goals of this TMDL, in addition to the six minimum measures.

10.1.3 Public Outreach

RIDEM recommends that the Town develops and implements public outreach programs aimed at informing and educating citizens about the sources and consequences of pathogen and nutrient loadings to the two waterbodies and ways to eliminate or reduce those sources. A major objective of the project would be to build public support for the implementation of the updated Wastewater Facilities Plan. More specifically, outreach efforts should include information on the impacts of poorly functioning septic systems, the negative consequences of illicit connections, and the importance of properly maintaining ISDSs. Local residents ought to be encouraged to follow a few simple good housekeeping practices such as: proper maintenance of septic systems, disposal of pet waste away from storm drains and the shoreline, minimized use of fertilizers and no feeding of waterfowl to discourage their prolonged residence in the area.

Public outreach activities are required by the Phase II stormwater program. However, due to the timing of the implementation of that program, RIDEM recommends that the Town proceed with a public outreach project in the near term, instead of waiting for final issuance of the Phase II permit. Even though it is difficult to assign reductions to these types of programs, RIDEM believes that, once the public is aware of the potential health threats from elevated pathogen levels, residents will be willing to take corrective actions that will result in improved water quality.

10.1.4 Stormwater Management BMPs

Following the phased approach to implementation, once the recommendations listed above are implemented, a determination will be made whether additional corrective actions need to be taken to address wet weather pollutant loads from stormwater runoff. Structural Best Management Practices (BMPs) may be recommended at that time.

Table 9 **Pollution Reduction Recommendations for The Sakonnet River and The Cove.**

Recommendation	NEIGHBORHOOD / LOCATION	Waterbody	Responsible Entity
Complete and implement comprehensive community-wide wastewater and stormwater management strategy	Portsmouth Park / Island Park	The Sakonnet River / The Cove	Town of Portsmouth
Eliminate contaminated groundwater loadings from septic systems, which include but are not limited to: 48 Aquidneck Ave. 49 Atlantic Ave. 38 Aquidneck Ave. 34 Aquidneck Ave 606 Point Street 385 Park Ave. 197 Peace St. 636 Park Ave 222 Peace St. 20 Aquidneck Ave.	Portsmouth Park / Island Park	The Sakonnet River / The Cove	Town of Portsmouth, Property owners
Identify and eliminate illegal direct discharge pipes to shoreline which include but are not limited to: 25 Atlantic Ave. 640 Park Ave. 76 Aquidneck Ave. 62 Aquidneck Ave 9 Atlantic Ave. 34 Aquidneck Ave. 28 Aquidneck Ave. 30 Aquidneck Ave. 295 Bay Street 111 Seaconnet Blvd. 43 Fountain St.	Portsmouth Park / Island Park	The Sakonnet River / The Cove	RIDEM, Town of Portsmouth, Property owners

Table 9 (continued)

Recommendation	NEIGHBORHOOD / LOCATION	Waterbody	Responsible Entity
Identify and eliminate illicit connections to storm drains which include but are not limited to: 62 Narraganset Ave. Lee / President Lanes 81 Lee Avenue 37 Aquidneck Ave. 13 Aquidneck Ave. Aquidneck Ave & Right of Way Water St. & Morningside Lane	Portsmouth Park	The Sakonnet River	Town of Portsmouth, Property Owners
Identify and eliminate illicit connections to storm drains servicing state roads, including but not limited to: Boyds Lane Park Ave.	Portsmouth Park / Island Park	The Sakonnet River	RIDOT Property owners
Provide public outreach to area residents	Portsmouth Park / Island Park	The Sakonnet River / The Cove	Town of Portsmouth

10.2. Follow-up Monitoring

Additional monitoring is required to ensure that water quality standards are met as remedial actions are accomplished. Monitoring by RIDEM will be the principle method of obtaining the data necessary to track water quality conditions in the watershed. Also, as proposed BMPs are installed in the watershed, post construction influent and effluent sampling may be required to assess the effectiveness of the selected technology.

In accordance with National Shellfish Sanitation Program (NSSP) requirements, the RIDEM Shellfish Monitoring Program will monitor water quality and conduct shoreline surveys. RIDEM will ensure that ambient sampling stations are located adjacent to point sources and effectively evaluate all nonpoint sources of pollution, including the addition and/or modification of sampling locations, as necessary. Shoreline surveys entail the evaluation of the effect of each actual and potential source of pollution on shellfish waters including as necessary, the collection of ambient water quality samples. In addition, non-shellfish program data (such as information on potential sources, beach and volunteer monitoring)

will be considered and followed up with confirmatory monitoring by RIDEM, following NSSP approved methods, as appropriate.

The continued water quality monitoring and future shoreline surveys will be used to help evaluate the effectiveness of the recommendations of the TMDL in restoring designated uses and attaining water quality standards. Ultimately, attainment of the designated shell fishing use requires compliance with the Rhode Island water quality standards including ambient water quality criteria and all NSSP requirements (including evaluation of non-shellfish program data/surveys, special sampling site data, beach and volunteer monitoring, as appropriate).

During the interim process of developing this TMDL, staff of the Office of Water Resources shellfishing program commenced the start of the NSSP required tri-annual shoreline survey for this growing area. The results of initial sampling from this survey have been included as an addendum to this document. These most recent results provide further evidence of the stormwater and direct discharge contamination problem in this area.

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APPENDIX A

Office of Compliance and Inspection (OCI) Enforcement Actions in Portsmouth Park and Island Park

Study Area:

IP - Island Park
PP - Portsmouth Park

The following key applies to the current status descriptions:

CONFORMED-	The system has been made to conform to applicable standards
FNOTICE-	Failure notice issued
NOI-	Notice of Intent
NOI-C	Notice of Intent (Non-Compliance)
NOI-I	Notice of Intent (Illegal)
NOI-N	Notice of Intent (Sewerage Overflow)
RELEASE NOI	Release of Notice of Intent or Violation
FNOTICE	Final Notice
UNF	Unfounded Complaint

Note that the following is a list of enforcement cases and actions taken as a result of complaints received in the Office of Compliance and Inspection. It should not be construed as a complete list of possible septic system problems, failures, illegal systems, or other septic system issues that may exist within the Portsmouth Park and Island Park neighborhoods.

Enforcement Number	Street Number	Street Name	Study Area	Current Status
C194-0003	36	COVE STREET	IP	CONFORMED
C191-0180	494	PARK AVENUE	IP	CONFORMED
C194-0127	362	PARK AVENUE	IP	CONFORMED
C192-128	16	RIVERSIDE STREET	IP	CONFORMED
C199-0052	14	COTTAGE AVENUE	IP	FNOTICE
C194-0014	501	PARK AVENUE	IP	NOI-C
C194-0013	20	POINT ROAD	IP	NOI-C
C192-0062	91	RUSSELL AVENUE	IP	NOI-C
C199-0076	126	SEACONNET BLVD	IP	NOI-C
C194-0400	109	POINT ROAD	IP	NOI-I
C100-0227	35	COVE STREET	IP	NOI-N
C191-0324	32	MORGAN STREET	IP	NOI-N
IS86-0067	227	CEDAR AVENUE	IP	NOV-N
IS89-0039	197	CEDAR AVENUE	IP	NOV-N
IS87-0082	562	PARK AVENUE	IP	NOV-N
C195-0210	97	MASON AVENUE	IP	RELEASENOI
C191-0017	657	PARK AVENUE	IP	RELEASENOI
C194-0089	364	PARK AVENUE	IP	RELEASENOI
C193-0610	15	POINT ROAD	IP	RELEASENOI
C191-0325	227	CEDAR AVENUE	IP	RELEASENOV
IS88-0075	640	PARK AVENUE	IP	RELEASENOV
C192-0242	636	PARK AVENUE	IP	RELEASENOV
C198-0147	23	BLUE BILL WAY	IP	UNF
C191-0317	227	CEDAR AVENUE	IP	UNF
C194-0380	163	CEDAR AVENUE	IP	UNF
C195-0219	122	COTTAGE AVENUE	IP	UNF
C195-0323	75	FOUNTAIN AVENUE	IP	UNF
C197-0173	44	GORMLEY STREET	IP	UNF
C100-0038	9	ISLAND STREET	IP	UNF
C191-0351	104	MASON AVENUE	IP	UNF
C192-0160	382	PARK AVENUE	IP	UNF
C193-0319	478	PARK AVENUE	IP	UNF
C199-0142	324	PARK AVENUE	IP	UNF
C196-0291		RIVERSIDE STREET	IP	UNF
C197-0211	22	MORGAN STREET	IP	
IS80-0042	168	RIVERSIDE STREET	IP	
C193-0609	2829	EAST MAIN ROAD	PP	CONFORMED
C194-0002	3001	EAST MAIN ROAD	PP	CONFORMED
C199-0219	62	PRESIDENT'S AVENUE	PP	NOI-G
C194-0422	38	AQUIDNECK AVENUE	PP	NOI-I
C194-0044	2793	EAST MAIN ROAD	PP	NOI-N
C193-0439	38	MORNINGSIDE LANE	PP	NOI-N
C192-0309	145	VALHALLA DRIVE	PP	NOI-N
C100-0095	67	NORSEMAN DRIVE	PP	PENDING
C193-0335	29	AQUIDNECK AVENUE	PP	RELEASENOI
C191-0093	3352	EAST MAIN ROAD	PP	RELEASENOV
IS89-0057	2787	EAST MAIN ROAD	PP	RELEASENOV
C192-0029	30	AQUIDNECK AVENUE	PP	UNF
C199-0186	56	DOUGLAS AVENUE	PP	UNF
C193-0346	3030	EAST MAIN ROAD	PP	UNF
C100-0003	2719	EAST MAIN ROAD	PP	UNF
C198-0243		EDUCATION ROAD	PP	UNF
C192-0190	47	NARRAGANSET AVENUE	PP	UNF

C191-0067	136	NORSEMAN DRIVE	PP	UNF
C193-0283	114	VALHALLA DRIVE	PP	UNF
C193-0271	113	VIKING DRIVE	PP	UNF
C100-0272	97	BIRCHWOOD DRIVE	PP	
C199-0194	370	NARRAGANSET AVENUE	PP	

Addendum

2003 SHORELINE SURVEY RESULTS GROWING AREA 4