2013 Shellfish Program Classification Report

Rhode Island Department of Environmental Management
Office of Water Resources
Shellfish Program
May 2014

Upper Narragansett Bay
Growing Area 1
2013 Annual Update

A sanitary survey of the Upper Narragansett Bay Growing Area 1 was conducted in 2009. A triennial update was completed in 2012. There were a total of seventy-seven (77) actual or potential sources identified during this shoreline survey, excluding marinas. A total of twenty-eight of the seventy-seven sources were not actively flowing at the time of the shoreline survey with the remaining forty-nine having flows warranting sampling. In 2012 follow-up sampling was done of 13 sources of actual or potential pollution that were identified in the 2009 shoreline survey report. Each of these sources had results that were equal to or exceeded the recommended follow-up threshold of 240 MPN outlined in the shellfish programs standard operating procedures. All sources in which flow was observed were sampled. As a result of the sampling in 2012, four sources had results greater than 240 MPN and were sampled for this annual review.

The four sources were located in Conditional Area "A". Results of sampling in 2012 were all less than 2400 but greater than 240 and were re-sampled. Two sources had no flows at the time of sampling while the other two sources did have flows.

The first source with flows was a 36" dia. CMP (2013-1-075) at the end of the R.O.W. at Fales Road in Bristol. The results were 1070 fc/100ml but the source was only a drip and not impacting the receiving waters. The second source was a stream north of Grove Ave. in Warwick (2013-1-040) with sample results of 258 fc/100 ml and flows of only 0.007 cfs again not impacting the receiving waters.

Neither of these sources appears to be having any negative impacts on the current classification of area "A".

HIGHLIGHTS

*** All Areas Open Sampled 8X in 2013, 6X in 2012 and 1X in 2014 N=15 for 2013**
*** Statistics represent most recent data >08/01/12 (N=15) for Conimicut Triangle stations**
*** Statistics represent most recent data >09/15/12 (N=15) for "Area A" stations**
*** Statistics represent most recent data >10/01/12 (N=15) for "Area B" stations 2, 3C and 6A**
*** Statistics represent most recent data > 08/08/12 (N=15) for temporary "Area B" stations 13 and 14**
*** All conditionally approved stations in compliance when open**
*** mTEC = 15 (<31 cfu/100ml)**
**** Data run 4/30/14***

COMMENTARY

The Upper Narragansett Bay (Growing Area 1) was sampled eight times in 2013. Additional targeted sampling was also completed in 2013 to analyses areas under a variety of rain conditions. All samples in the analysis were collected during dry weather conditions when the areas were "open/approved" for shellfish harvesting. Some samples were also collected in the Conimicut Triangle when it was closed and Area A was open to try to confirm that the Triangle is properly classified. Additional

samples were collected at the new stations in area B under wet conditions (>1.5”) in an attempt to quantify an upper limit to the rain closure criteria. The statistical evaluation for the Upper Narragansett Bay incorporates the most recent 15 (the minimum number required by NSSP Manual of Operations guidelines for conditionally approved areas) dry weather samples collected for each station in the Conimicut Triangle, Area "A” and “Area” B.

Results of this year’s review demonstrates that Station 12, located on the line between the Conimicut Triangle and the Providence River, should still be closed at the 0.5” mark because of the variability in the available samples.

RECOMMENDATIONS

* All conditionally approved stations are in compliance and conformance

RIDEM SHELLFISH GROWING AREA MONITORING RESULTS

Conimicut Triangle when open (08/01/12 – 03/31/14, 5 X 2012, 9 X 2013, 1 x 2014)

Station Name	*Status*	*N*	*FECAL-GEO MEAN*	*%>CRITICAL 31*
GA1-12	CA	15	2.8	0.00

Area A when open (09/15/12 – 03/31/14, 4 X 2012, 10 X 2013, 1 x 2014)

GA1-5C	CA	15	2.6	6.67
GA1-6A	CA	15	2.7	6.67
GA1-7	CA	15	2.7	6.67
GA1-8A	CA	15	3.5	6.67
GA1-10	CA	15	3.0	6.67
GA1-11A	CA	15	2.8	6.67
GA1-12	CA	15	3.1	0.00
GA1-1	CA	15	3.0	0.00
GA1-4	CA	15	2.8	0.00

Area B when open (10/01/12 – 03/31/14, 4 X 2012, 11 X 2013)

Station Name	*Status*	*N*	*FECAL-GEO MEAN*	*%>CRITICAL 31*
GA1-2	CA	15	2.0	0.00
GA1-3C	CA	15	2.1	0.00
GA1-6A	CA	15	2.6	0.00

New Stations Area B Stations 13, 14 when open (08/08/12 – 03/31/14, 1 X 2014, 10 X 2013, 4 X 2012)

GA1-13	CA	15	2.0	0.00
GA1-14	CA	15	2.0	0.00

Conimicut Triangle when closed and Area A open (2011 THRU 2013 all data, >0.5" < 0.8" less than 7 days)

GA1-12	CA	5	10.6	20.00

Area B new Stations 13, 14 (<8 days >1.5" Rain, 8/17/2012, 11/29/2013)

GA1-13	CA	2	10.0	50.00
GA1-14	CA	2	15.5	50.00

Currently there are no changes recommended to the closure criteria currently in place for the Conimicut Triangle, sub-area "A" or sub-area "B". No other changes to the current conditionally approved classification are recommended at this time. An annual update is scheduled for 2014. The following is the current classification map for GA1 with the location of routine monitoring stations.

Shellfish Growing Area Classification Codes

Growing Area Boundary

Upper Narragansett Bay Conditional Area - A

Upper Narragansett Bay Conditional Area - B

Upper Narragnasett Bay Conditional Conimicut Triangle

Approved

Seasonal Closure

Shellfishing Prohibited

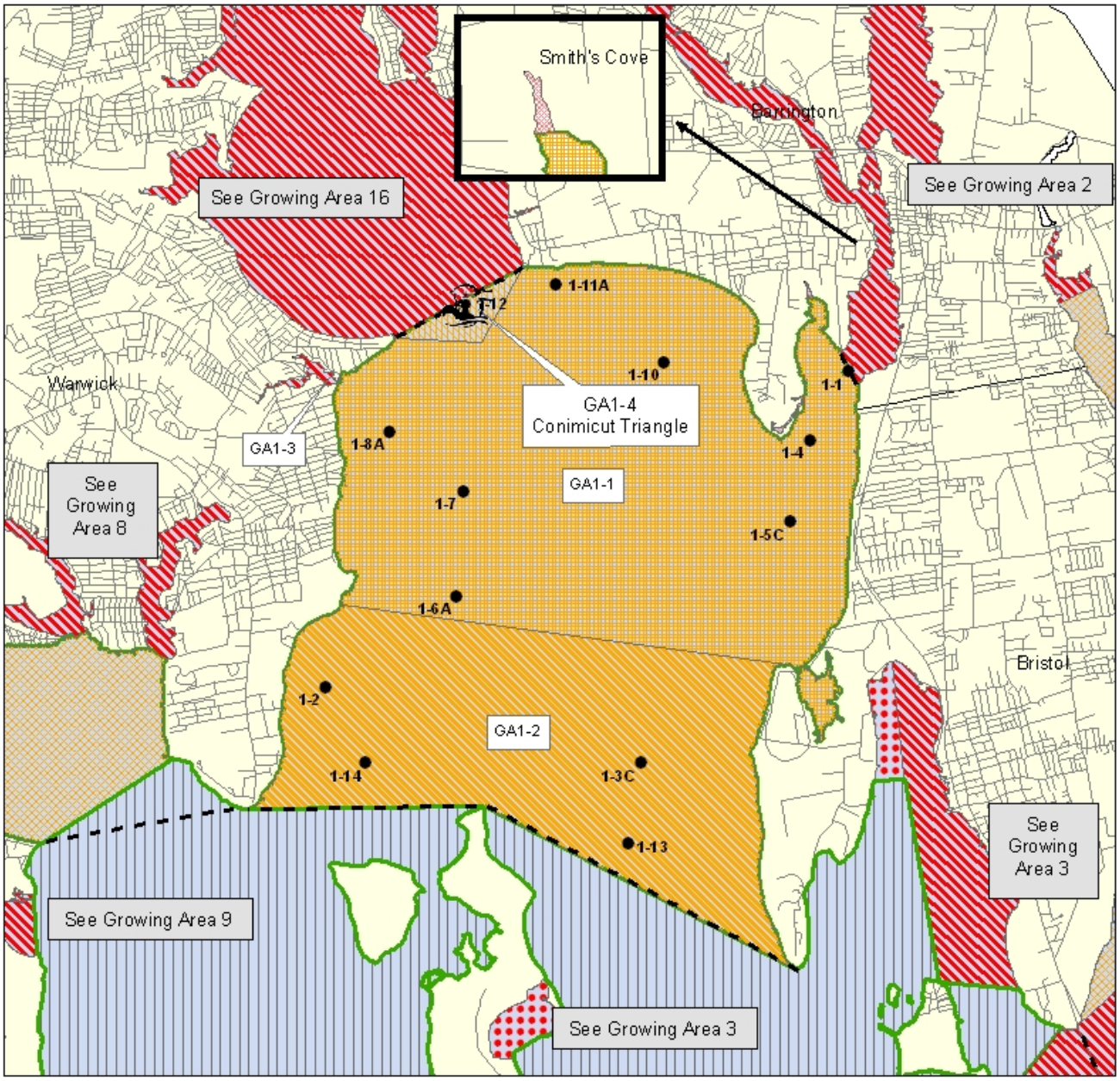
Un-assessed - Shellfishing Prohibited

Rhode Island Department of Environmental Management Office of Water Resources Shellfish Program

0 0.3 0.6 1.2 Miles

This map is provided only as a a general reference for the areas listed as prohibited, seasonal closure or conditional closure in the publication entitled "Notice of Polluted Shellfishing Grounds May 2013" Please refer to that document for the complete legal description of the numbered shellfish closure areas shown here. This map also serves as the legal description for the areas open to shellfishing. Taking of shellfish is prohibited from any waters located on the landward side of the boundary line of waters listed as approved (high tide mark) and the landward side of the boundary line of waters listed as prohibited, conditional closure or seasonal closure, regardless of whether the specific waters are shown or noted as prohibited on the attached maps. At locations where the boundary line crosses water, the boundary shall be a straight line connecting the high tide mark on either side of the water along the main shoreline.

Upper Narragansett Bay Growing Area 1 May 2013 - May 2014



Growing Area 2
Barrington, Palmer and Warren Rivers
2013 Annual Update

All waters of the Barrington, Palmer and Warren Rivers, Growing Area 2 are currently prohibited to shellfishing. The area was sampled twice in 2013 during both wet and dry conditions. Results from sampling indicate that the area is out of compliance during wet weather and generally out of compliance during dry weather. The area is therefore correctly classified as prohibited. The monitoring of this area will continue in 2014 as recommended by the TMDL in order to gather a more comprehensive database of water quality under various conditions.

A joint effort by the states of Massachusetts and Rhode Island to identify sources of pollution along with watershed sources to the Palmer River is slated for the summer of 2014.

The results of the routine monitoring stations indicate that this growing area is properly classified and therefore no changes to the classification are recommended at this time.

HIGHLIGHTS

*** Sampled 2x in 2013 (1 wet and 1 dry weather)**
*** Statistics represent combined wet and dry weather data >06/02/09 (N=15)**
*** Statistics represent dry weather only >7/25/05 (N=15)**
*** Area is presently classified as prohibited**
*** MTEC = 4**
**** Data run 2/19/14***

COMMENTARY

The Barrington, Palmer, and Warren Rivers (Growing Area 2) were sampled two times during the 2013 sampling season. One run was conducted during wet weather conditions and one during dry weather. The sampling boat could not fit under the bridge due to high tide conditions co only 14 samples for stations 6, 6A, 7 and 7A were obtained under dry conditions.

The stations located in the Barrington River (Stations 1 – 5), and the Palmer River (Stations 6 – 8), were downgraded from conditionally approved to prohibited about twelve years ago. The TMDL for the area was completed in 2002 and the recommendations involving the shellfish program call for monitoring the area bimonthly (refer to TMDL).

Results of the limited statistical evaluation for the area, conducted since the completion of the TMDL (>1/1/03), indicate that the area is out of compliance during wet weather and generally out of compliance during dry weather. Additional wet and dry weather data is recommended to better generally characterize the area.
The area is properly classified.

RECOMMENDATIONS

*** Maintain closure of all the Barrington River and Hundred Acre Cove**
*** Even though area is closed, attempt six systematic random samplings to support TMDL recommendations.**

RIDEM SHELLFISH GROWING AREA MONITORING RESULTS
Wet/Dry Combined

Station Name	*Status*	*N*	*FECAL-GEO MEAN*	*%>CRITICAL 31/ 49*
GA2-1	P	15	48.2	40.00
GA2-1A	P	15	17.3	26.67
GA2-2	P	15	9.1	13.33
GA2-3	P	15	11.0	13.33
GA2-4	P	15	8.3	13.33
GA2-5	P	15	6.8	13.33
GA2-6	P	14	56.6	35.71
GA2-6A	P	14	228.8	85.71
GA2-7	P	14	15.1	14.29
GA2-7A	P	14	20.9	14.29
GA2-8	P	15	9.5	13.33
GA2-9	P	15	8.0	6.67
GA2-10	P	15	5.7	6.67
GA2-13	P	15	5.3	6.67

Dry Weather Only most recent 15

Station Name	*Status*	*N*	*FECAL-GEO MEAN*	*%>CRITICAL 31/ 49*
GA2-1	P	15	15.0	20.0
GA2-1A	P	15	10.1	13.33
GA2-2	P	15	7.5	13.33
GA2-3	P	15	6.1	13.33
GA2-4	P	15	6.5	6.67
GA2-5	P	15	6.5	6.67
GA2-6	P	15	21.7	20.0
GA2-6A	P	15	117.6	66.67
GA2-7	P	15	6.2	0.00
GA2-7A	P	15	10.8	6.67
GA2-8	P	15	8.7	0.00
GA2-9	P	15	6.8	13.33
GA2-10	P	15	5.3	0.0
GA2-13	P	15	8.7	13.33

The following closure map is for the May 2013 – May 2014 season and also depicts the routine monitoring station locations. No changes to existing prohibited classification recommended.

Shellfish Growing Area Classification Codes

Approved

Shellfishing Prohibited

Upper Narragansett Bay Conditional Area - A

Upper Narragansett Bay Conditional Area - Conimicut Triangle

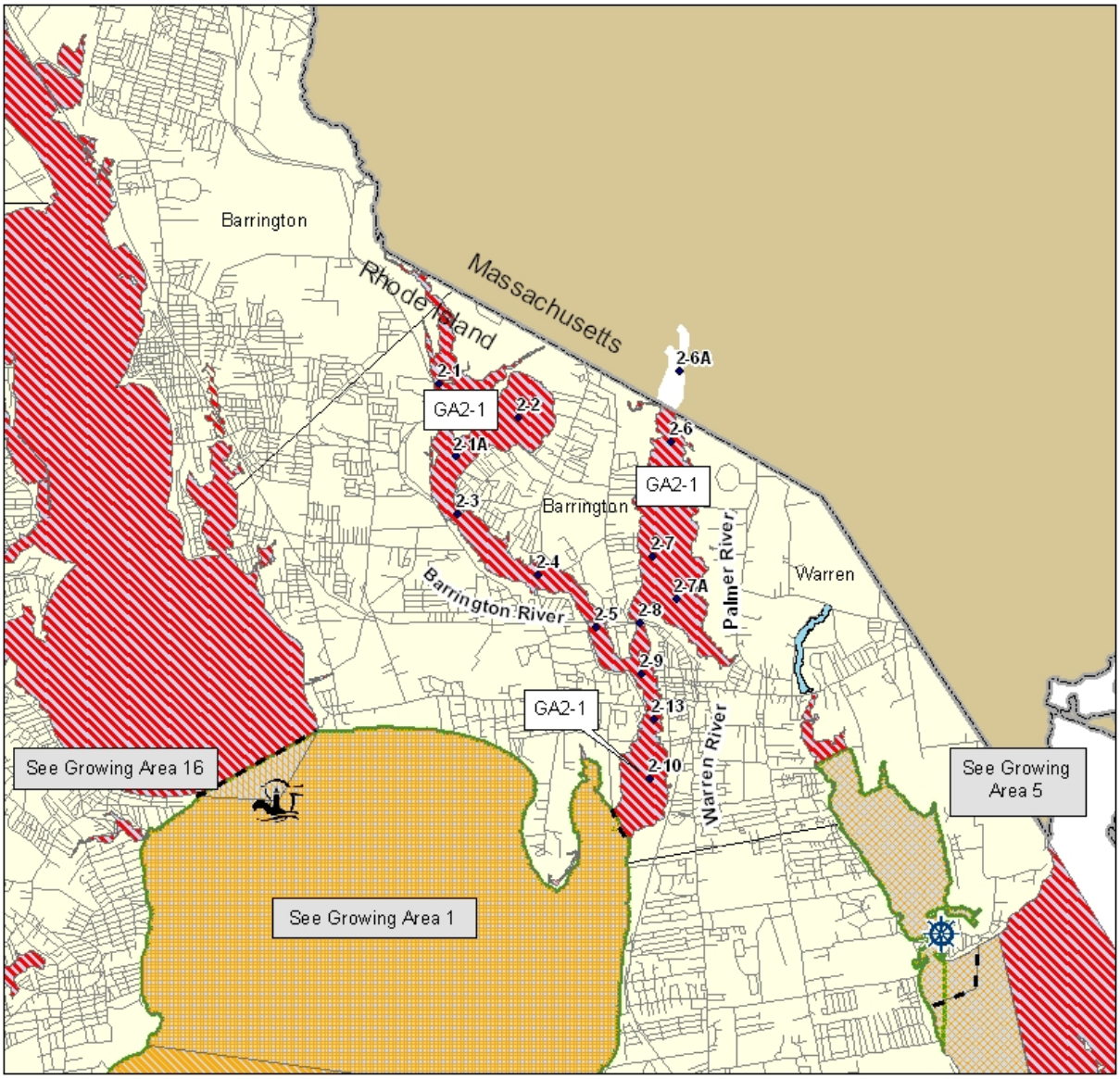
Growing Area Boundary

Rhode Island Department of Environmental Management Office of Water Resources Shellfish Program

0 0.375 0.75 1.5 Miles

This map is provided only as a a general reference for the areas listed as prohibited, seasonal closure or conditional closure in the publication entitled "Notice of Polluted Shellfishing Grounds May 2013" Please refer to that document for the complete legal description of the numbered shellfish closure areas shown here. This map also serves as the legal description for the areas open to shellfishing. Taking of shellfish is prohibited from any waters located on the landward side of the boundary line of waters listed as approved (high tide mark) and the landward side of the boundary line of waters listed as prohibited, conditional closure or seasonal closure, regardless of whether the specific waters are shown or noted as prohibited on the attached maps. At locations where the boundary line crosses water, the boundary shall be a straight line connecting the high tide mark on either side of the water along the main shoreline.

Barrington, Palmer and Warren Rivers Growing Area 2 May 2013- May 2014



East Middle Bay

Growing Area 3
Triennial Re-Evaluation
2013

Sandy Point – Prudence Island - Lighthouse Friends

Rhode Island

Department of Environmental Management
Office of Water Resources
Shellfish Program

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1.0 Introduction

A triennial re-evaluation shoreline survey of East Middle Bay was conducted in order to comply with National Shellfish Sanitation Program (NSSP) requirements for shellfish growing area classification. The primary objective of this shoreline survey is to identify and characterize sources of pollution affecting the area and re-evaluate point and non-point sources previously identified during prior surveys. This triennial update of Area 3 (Figure 1-1) was conducted in the summer of 2013. The survey involved follow-up sampling of previously identified sources that resulted in fecal coliform counts exceeding 240 MPN / 100ml. These sources were evaluated to determine the bacteriological impact into the growing area.

The survey area encompasses all of the shoreline south of a line from Providence Point on Prudence Island to Poppasquash Point in Bristol, north of a line from the southern tip of Prudence Island to Carr Point in Portsmouth and west of the Mt. Hope Bridge, including Bristol Harbor.

Growing Area 3 is presently comprised of sections classified as approved, seasonal, and prohibited for shellfishing (Figure 1-1). There is a 658-acre section on the eastern side of Bristol harbor that is prohibited due to influences from a number of recreational boating facilities and a 349-acre section in the Melville marina area which is also prohibited. The waters south of a line from the Mount Hope Bridge in Bristol to the Hog Island shoal to Arnolds point in Portsmouth are prohibited to shellfishing due to influences from Mt. Hope Bay. Two seasonal closures are currently in effect between Memorial Day weekend and Columbus Day weekend one on the western side of Bristol Harbor and the other in Potter Cove on Prudence Island due to the large number of recreational boat facilities and transient moorings in these two areas during peak summer months. The two areas measure approximately 94 acres and 105 acres respectively.

Hydrographic Characteristics

Total area of the East Middle Bay Growing Area 3	9414 Acres
Widest Reach	4.48 miles
Deepest Point	112 feet

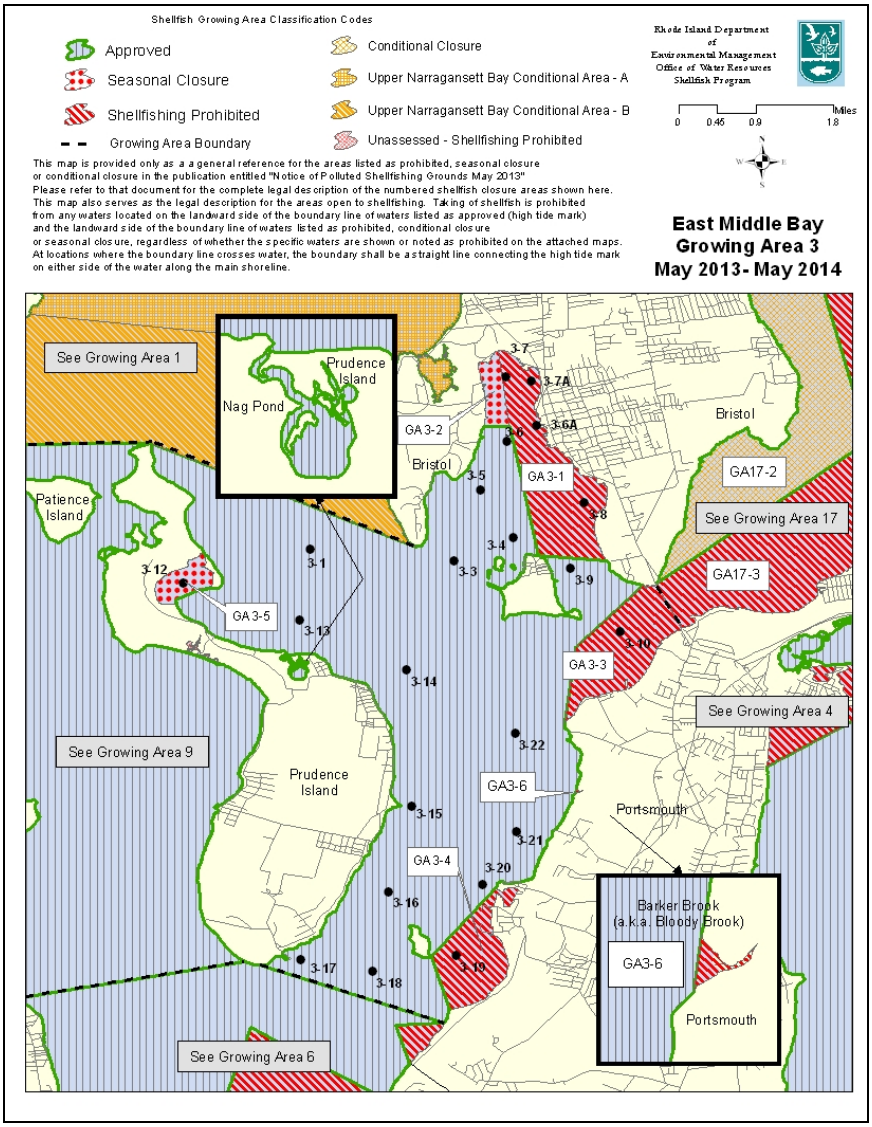
The majority of Prudence Island, 750 acres of the northern end and 1645 acres of the southern end are protected open space with little or no development resulting in virtually no human impacts upon the surrounding ambient water quality. The central eastern portion of the island is developed as primarily medium high-density residential which are mostly seasonal in nature due to the remoteness of the island and limited ferry service. The eastern side of the growing area (the Portsmouth mainland) is sparsely developed while the area within Bristol Harbor is more heavily developed with a mix of commercial and residential development. There are currently several marinas operating within the growing area, the East Passage Yachting Center with 370 slips and the Little Harbor Marina (Hunt Yachts) with 100 slips. Both of these facilities are located on the

Portsmouth mainland within the confines of the permanently closed shellfishing area in Melville. There are two fixed pump out facilities, one at Hunt Yachts and the other at the East Passage Yachting Center that provide marine head pump out service to the boats in this area.

The eastern half of Bristol Harbor is prohibited to shellfishing due to the town docks, the numerous moorings and the safety closure zone associated with the Bristol Wastewater Treatment Facility that discharges into Walkers Cove.

The seasonal closure in the northwest portion of Bristol Harbor is due to the numerous slips and moorings associated with the Bristol Marina and Yacht Club. In addition to a pump-out boat at the marina, the Town of Bristol operates both a boat and a fixed dock-side pump out facility at the Town Piers on the east shore of Bristol Harbor.

Figure 1-1 Growing Area 3 – East Middle Bay



2.0 Pollution Source Survey

Survey Procedures

Lucinda Hannus, Senior Environmental Scientist conducted the review for the triennial update of the shoreline of East Middle Bay.

This review involved follow-up sampling on all previously identified sources in which bacterial results from sampling exceeded the 240 MPN/100 ml threshold established in the shellfish programs standard operating procedures. Sterile 4 ounce nalgene bottles were used to collect samples and then stored in a portable cooler (4° C) during field surveys. At the completion of the field day, samples were transported to the Rhode Island Department of Health Laboratories for analysis. The mTEC method as described in Standard Methods for the Examination of Water and Wastewater was used to analyze all samples.

Identification and Evaluation of Pollution Sources

Follow-up bacteriological samples were taken of all previously identified sources from creeks, streams, pipes/culverts or groundwater seeps that resulted in bacteria counts that exceeded 240 MPN/100ml. In 2012 there were five sources two of which are outside of the prohibited areas that exceeded this threshold. Sampling took place in December of 2012 during a routine bay run and the sample was taken in the receiving water at its confluence with the source water. The first is a small stream at the south of Hog Island, (2013-3-060). The source was sampled on December 20, 2013 with results of <2 CFU/100ml. The second source is a RCP on Prudence Island north of the landing dock (201-3-301) it also had results of <2 CFU/100ml. It would appear that neither of these sources have a negative impact on the growing area.

Wastewater Treatment Facilities (WWTF)

The most significant point source discharge into this growing area is from the Bristol wastewater treatment facility located in Bristol Harbor discharging to Walker Cove (routine monitoring station 3-8). The facility is permitted to discharge a maximum daily load of 3.79 mg/d of treated effluent. The average flow for 2013 was 2.99 MGD, within the permit limits. However they also report three (3) flow violations of 4.3, 5.9 and 4.8 MGC in February, March and June respectively. The fecal coliform discharge daily average was 34.2 MPN/100ml well below the permit level of 200 MPN/100ml and reported only one daily max violation of 1,299 MPN/100ml due to high flow from heavy rains and disinfection equipment failures. A multi-year project to replace aging equipment was completed which has all but eliminated SSOs in the collection system which had previously caused emergency closure. Bristol Harbor was not closed under emergency conditions for any period in 2013.

The other permitted discharge is in the prohibited area adjacent to the Melville shipyards. This is a non-sanitary water release pipe associated with the defense fuel depot.

Mooring Fields and Marinas

There are several recreational and commercial boating areas that have the potential to have a negative impact on the ambient waters of East Middle Bay. In 1998 the State of Rhode Island designated all their coastal waters as a No Discharge Area (NDA). The Rhode Island waters include territorial seas within three miles of shore, including all of Narragansett Bay. A No Discharge Area is a designated body of water in which the discharge of *treated* and *untreated* boat sewage is prohibited (this does not include greywater or sink water). There are currently three pump out facilities located within the area of Bristol Harbor, one stationary dockside facility and two pump-out boats that service moored vessels. For additional information refer to the 2013 RIDEM Pump-out Facilities Report which evaluates the areas compliance with Rhode Island's "No Discharge" policies. The Bristol Harbor boating facilities operated by the town consists of approximately 150 fixed harbor structures and 491 moorings. There are approximately 294 vessels greater than 25' in length within the Bristol Harbor mooring field as reported in 2004. There is a seasonal closure to shellfishing of the western area of the harbor that includes the mooring field and a permanent closure of the eastern portion of the harbor due to the influence from boating facilities and the Bristol Wastewater Treatment facility. As stated previously a seasonal closure is in effect for the waters of Potters Cove on Prudence Island due to the influence of boating facilities in that area.

A new small private marina has been built at the Carnegie Abby development on the western shores of Portsmouth in the general area of former source #4. This marina has slips for 41 vessels and also has a pump out facility to service these vessels.

3.0 Water Quality Studies

The Shellfish Growing Area program is a result of the State of Rhode Island's agreement with the US Food and Drug Administration managed National Shellfish Sanitation Program (NSSP). The purpose of these programs is to maintain national health standards by regulating the interstate shellfish industry. The NSSP is designed to oversee the shellfish producing state's management program and to enforce and maintain an industry

standard. As part of this agreement the State of Rhode Island is required to conduct continuous bacteriological monitoring of the shellfish harboring waters in order to maintain certification of these waters shellfish harvesting for the direct human consumption of shellfish.

Water samples are collected at twenty-two monitoring stations in Growing Area 3 (Figure 1-1) located in closed, approved and seasonal areas. Sampling runs are conducted by boat a minimum of six times per year during both wet and dry weather conditions throughout the year. Analytical results received from The Rhode Island Department of Health laboratories are entered into the programs database by water resource staff. The data is compiled and reviewed according to NSSP requirements stating that at least the most recent thirty data sets be utilized. Table 3-1 demonstrates the areas ability to conform to NSSP statistical criteria. The statistical evaluation of the compliance monitoring data in Table 3-1 confirms that all stations located in approved waters of growing area 3 conform to median fecal coliform NSSP standards. The area was sampled six times in 2013, under both wet and dry conditions.

HIGHLIGHTS

*** Sampled 6x in 2013**
*** Statistics represent combined wet and dry weather data >01/01/09 (N = 30)**
*** Statistics represent combined wet and dry weather, open season data >03/15/09 (N = 15) for conditional/seasonally approved Sta.'s 7 and 12**
*** All approved and conditional/seasonally approved stations in compliance and conformance**
*** MTEC = 9 (90% = 43cfu/100ml)**
**** Data run 2/6/14***

COMMENTARY

The East Middle Bay (Growing Area 3) was sampled six times in 2013, complying with the minimum systematic random sampling (SRS) monitoring requirement for approved areas. Sample results are representative of wet and dry weather conditions. The statistical evaluation for the East Middle Bay incorporates the most recent 30 samples collected for the area, the minimum number required for analysis according to SRS guidelines.

Results of the statistical evaluation demonstrate that all approved and conditional/seasonally approved stations are in program compliance. The area is properly classified.

RECOMMENDATIONS

*** No action recommended based on ambient monitoring results**

RIDEM SHELLFISH GROWING AREA MONITORING RESULTS

Station Name	*Status*	*N*	*FECAL-GEO MEAN*	*90TH PERC(<43)*
GA3-1	A	30	2.3	4.0
GA3-3	A	30	2.5	8.1
GA3-4	A	30	2.6	5.4
GA3-5	A	30	3.2	16.8
GA3-6	A	30	3.1	12.1
GA3-6A	P	30	5.8	51.5
GA3-7	SA	30	3.0	14.9
GA3-7A	P	30	6.0	43.4
GA3-8	P	30	10.7	106.9
GA3-9	A	30	3.3	10.9
GA3-10	P	30	2.6	4.6
GA3-12	SA	30	3.0	6.8
GA3-13	A	30	2.1	2.5
GA3-14	A	30	2.2	3.7
GA3-15	A	30	2.5	4.4
GA3-16	A	30	2.3	3.5
GA3-17	A	30	2.3	3.2
GA3-18	A	30	2.2	2.9
GA3-19	P	30	2.2	3.0
GA3-20	A	30	2.4	3.6
GA3-21	A	30	2.2	3.0
GA3-22	A	30	2.4	3.6

Most recent seasonal wet/dry combined open season data

Station Name	*Status*	*N*	*FECAL-GEO MEAN*	*%>CRITICAL<31*
GA3-7 (OPEN)	SA	15	2.5	0.00
GA3-12 (OPEN)	SA	15	2.8	0.00

In addition to routine water sampling in the growing area, certain small embayments and coves were re-assessed in 2007. RIDEM established a landward approved line, referred to casually as the "green line" in which all waters landward of this line as shown on the appropriate classification map are prohibited from the taking of shellfish. In GA3 there were two areas designated as needing additional sampling for proper classification, Jenny's Creek and Nag Pond. As a result of sampling of these areas Nag Pond should be re-classified as Prohibited to shellfishing due to elevated results that appear to be wet weather influenced and Jenny's Creek shall remain un-assessed shellfishing prohibited. Additional sampling of these two areas will continue dependent upon available resources to complete this offshore task.

4.0 Conclusions and Recommendations

The triennial update of the East Middle Bay (Growing Area 3) reevaluated several point sources in the study area. However, none of the sources appear to have any impact on the high quality ambient waters.

Due to the insignificant amount and impact of sources reevaluated during the triennial update of East Middle Bay, and the water quality statistical evaluation of the growing area, no changes other than the re-classification of Nag Pond to Prohibited, in the growing area classification are recommended. The results of this update, combined with previous water quality statistical evaluations of East Middle Bay, indicate that the survey area conforms to all requirements set forth by the National Shellfish Sanitation Program (NSSP) and is properly classified. No other changes for reclassification are recommended at this time.

Sakonnet River

Growing Area 4

12 Year Sanitary Shoreline Survey

Calendar Year 2013

Sakonnet Point – RIDEM

Rhode Island
Department of Environmental Management

Office of Water Resources

Shellfish Program

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Acronyms and Terms

FDA: Food and Drug Administration

ISSC: Interstate Shellfish Sanitation Conference

MPN: Most Probable Number

NOAA: National Oceanographic and Atmospheric Administration

NSSP: National Shellfish Sanitation Program

OWTS: On-site Waste Water Treatment Systems

RIDEM: Rhode Island Department of Environmental Management

SGAM: Shellfish Growing Area Monitoring

SSCA: State Shellfish Control Authority

1.0 Introduction

A shoreline survey of the Sakonnet River was conducted during the summer and fall of 2013 by staff from RIDEM's Office of Water Resources Shellfish Program. The survey involved a shoreline reconnaissance of the study area to locate and catalog pollution sources and collect bacteriological samples from all sources actively flowing into the survey area.

The primary objective of the shoreline survey was to identify and characterize any new sources of pollution impacting the growing area, to reevaluate point and non-point sources identified during previous surveys, and to update information regarding the sampling of previously identified sources.

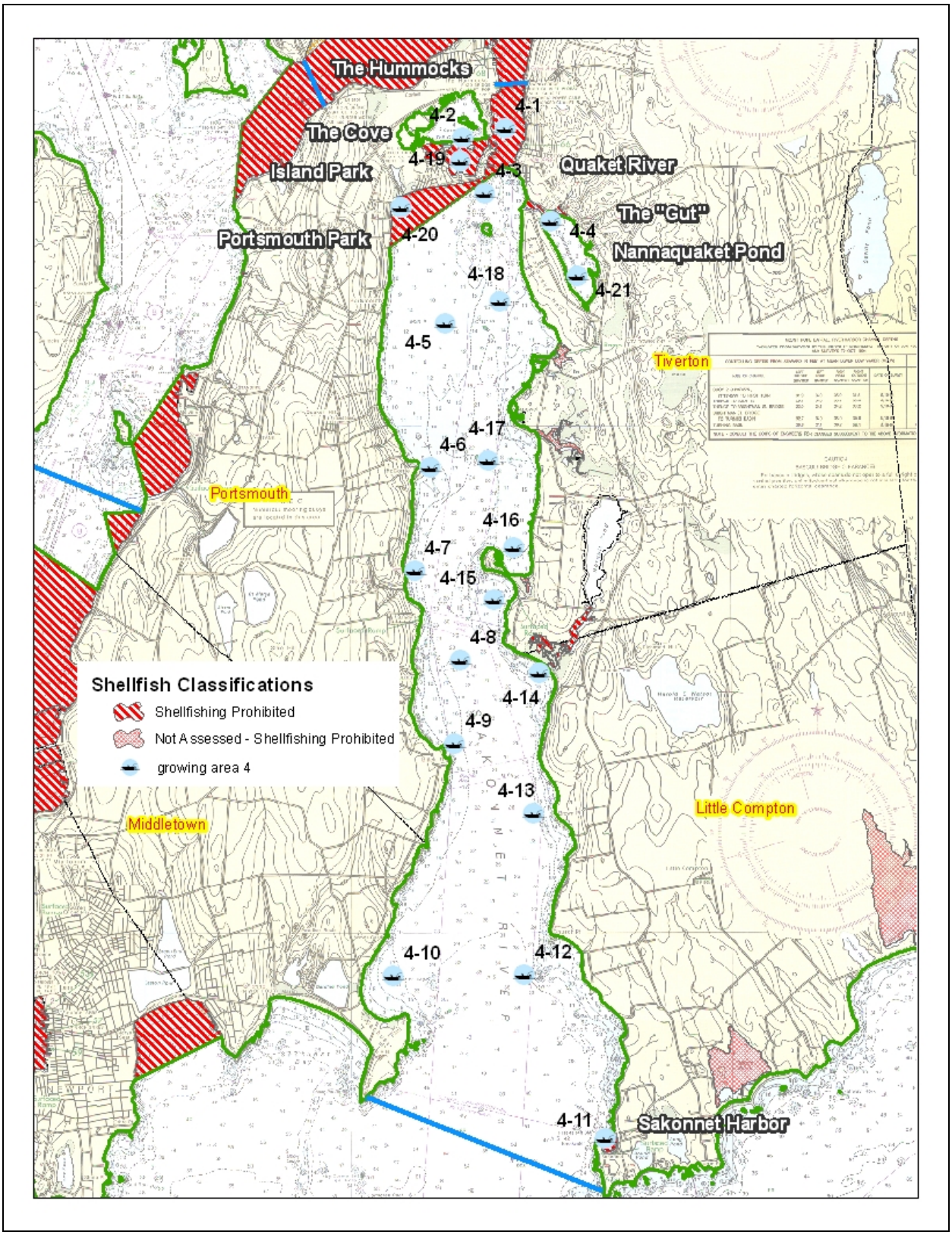
2.0 Description of the Growing Area

2.1 Location

The Sakonnet River is actually not a river but the eastern most opening of Narragansett Bay, an inlet of the Atlantic Ocean. This 14 mile long saltwater strait separates Aquidneck Island on the west from the mainland on the east. The communities of Tiverton and Little Compton on the mainland and Portsmouth and Middletown on Aquidneck Island abut this inlet.

Growing Area 4 is presently comprised of sections classified as either approved or prohibited for shellfishing (Figure 2-1). Several distinct portions of this growing area are prohibited to shellfishing. The first is the northern boundary of the growing area adjacent to Portsmouth Park, Island Park, and the Hummocks in Portsmouth and encompasses the marina areas along the shore of Tiverton and Portsmouth south of the Sakonnet River Bridge. The second area is the Quaket River and inlet to Nannaquaket Pond including the "Gut. Additionally, Sakonnet Harbor, Little Compton was previously classified as seasonally approved but in May of 2012 the area was reclassified as prohibited due to consistently elevated results during October and November which would be the seasonally open time frame. Finally the area referred to as Almy Brook, the estuarine area below the dam of Nonquit Pond in Tiverton was reclassified as prohibited in May 2010 also due to consistently elevated bacteria results from sampling.

Figure 2-1 Sakonnet River Growing Area 4



2.2 Description of the Area

2.2.1 Physical Description

The Sakonnet River growing area encompasses approximately 17,500 acres. The majority of the shoreline within the Sakonnet River consists of urban built up lands (42%) and secondly agricultural land uses (26%). The remaining shoreline landuse is a mixture of beaches and barren land, forest, water, and wetlands. The vast majority of the adjoining towns rely upon On-site Waste Water Systems (OWTS) for wastewater treatment.

Growing area 4 contains several distinctive prohibited areas. The prohibited areas remain closed to shellfishing because of numerous marinas and boat moorings in the area of the Sakonnet Bridge and the inlet to Nannaquaket Pond and elevated bacteria results in Sakonnet Harbor and Almy Brook. The other prohibited areas are the southern portion of "The Cove" at Island Park in Portsmouth and the northern shoreline of the Sakonnet River along the Portsmouth Park neighborhood in Portsmouth. In 1987, a shoreline survey of the area by the Rhode Island Department of Environmental Management's (RIDEM) Shellfish Program documented direct discharges of groundwater seeps and storm drain outfalls contaminated by human sewage. As a result, these waters were closed in 1988 to shellfishing due to the potential public health risk associated with the high-density residential development and the direct evidence (high fecal coliform counts in dry weather stormwater flows) of failing septic systems, incomplete treatment of wastewater, illegal discharges, illicit connections and contaminated groundwater.

There are numerous storm drain 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. In Portsmouth Park, a storm drainage network, constructed incrementally over the years, handles excess flows from an abundance of groundwater springs and heavy rainfall runoff. The high water table and inability of OWTS 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 OWTS. 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. In September of 2010 RIDEM's Office of Compliance and Inspection issued the Town of Portsmouth an N.O.V. (Notice of Violation) for properties located in the Island Park and Portsmouth Park neighborhoods. Currently this action is before the state Supreme Court and has yet to be resolved.

2.2.2 Latest Survey

RIDEM's Office of Water Resources personnel conducted a shoreline survey in 2006 to assess the relative importance of pollution sources impacting the growing area water quality. All areas including prohibited areas were included in the survey.

2.2.3 Previous Classification Maps

The 2006 classification map does vary from the current map. In addition to those areas classified as prohibited in 2006, the Sakonnet Harbor and Almy Brook have been added. The 2006 classification map is shown in Figure 2-2.

In addition, a shellfish management area has been established in the southern section of the Sakonnet River referred to as the Sakonnet Management Area. RIDEM's Division of Fish and Wildlife has declared this area a special Shellfish Management Area with applicable special regulations. The special management plan regulates commercial harvesting of shellfish.

2.2.4 Current Classification Map

The most recent (May 2013-May 2014 revised annually) RIDEM document entitled Shellfish Closure Areas documents the four prohibited shellfish areas in the Sakonnet River. The legal description of these closure areas are described below, and shown in Figure 2-3 and 2-4.

Figure 2-2 Historic Closure Map

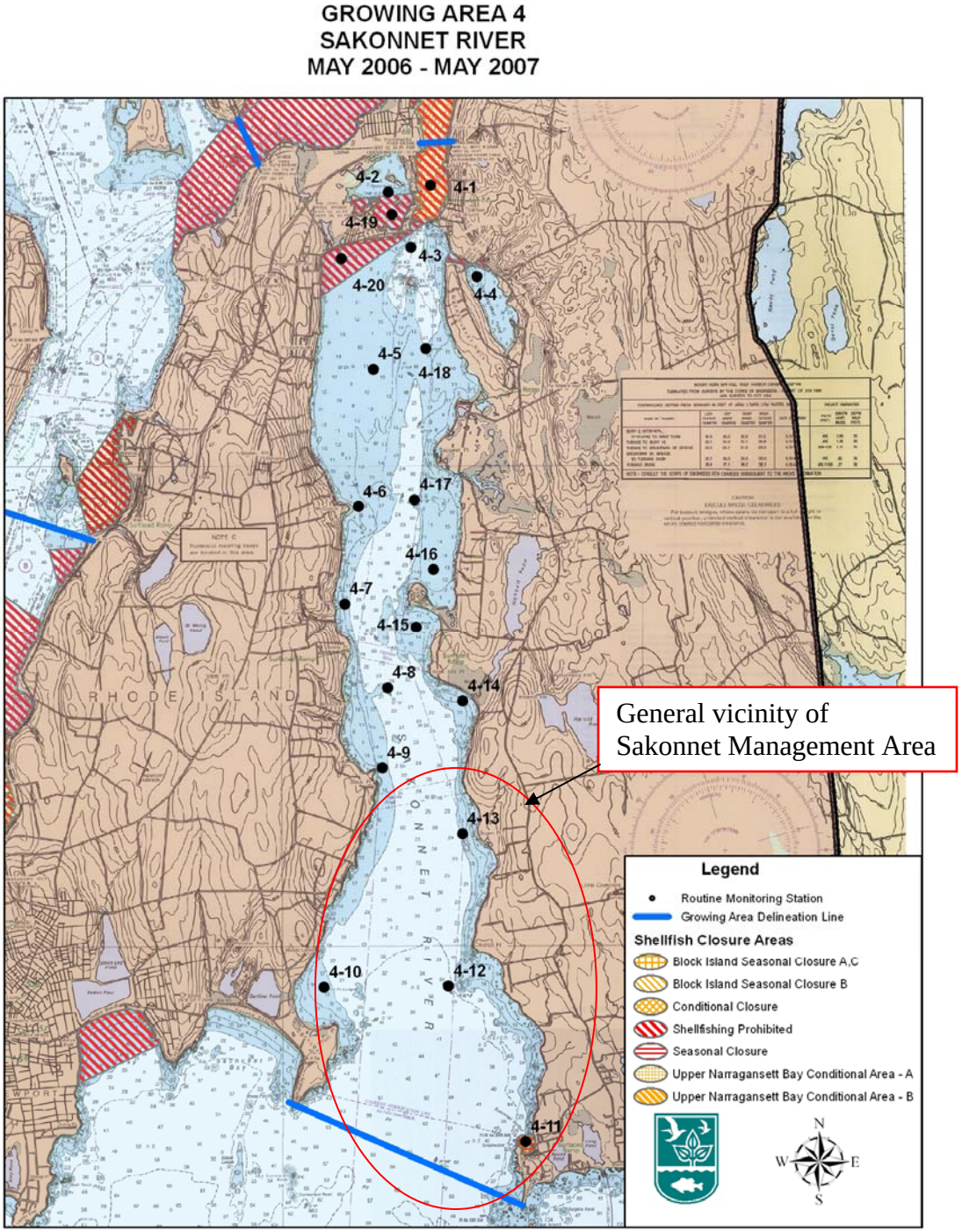


Figure 2-3 May 2013 – May 2014 Classification Map Sakonnet River North

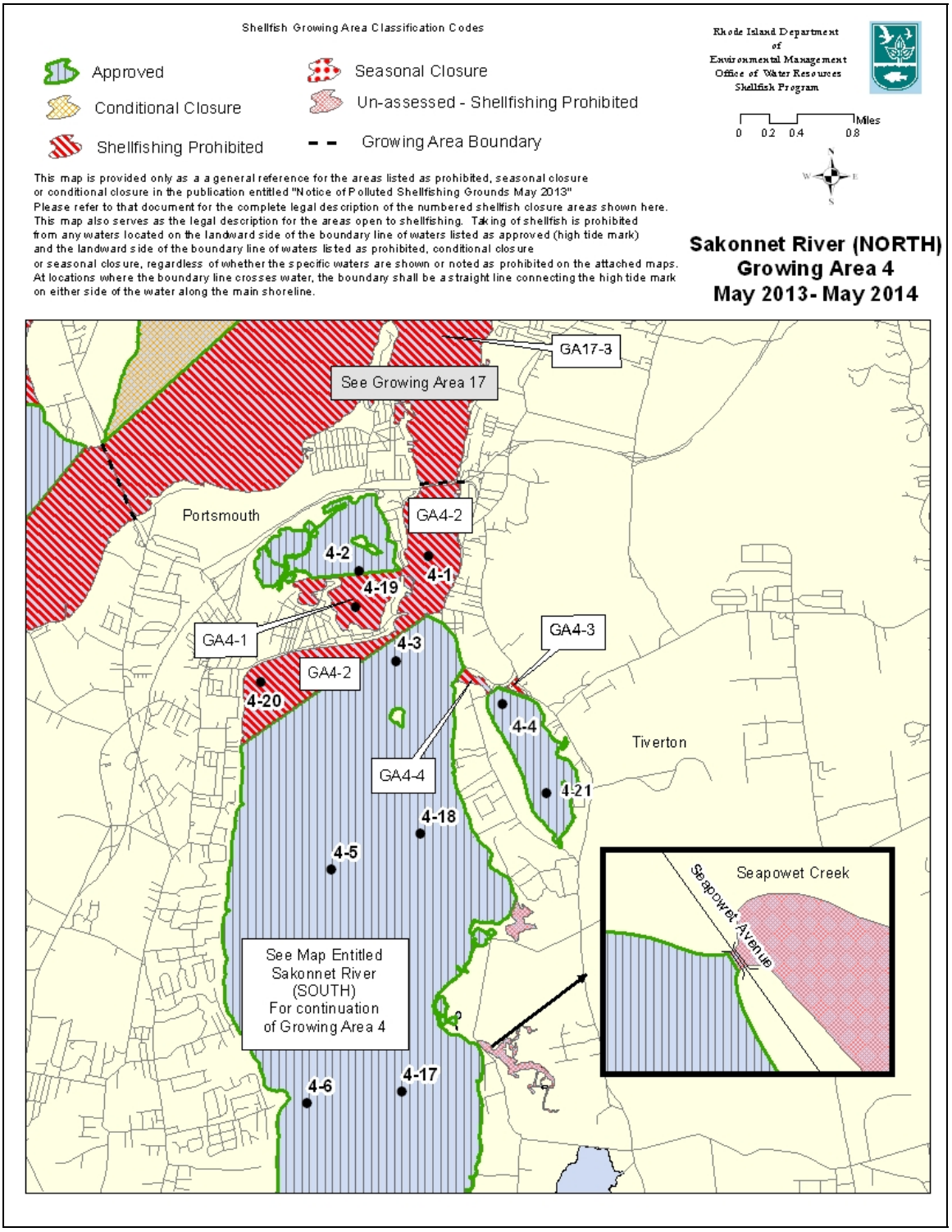
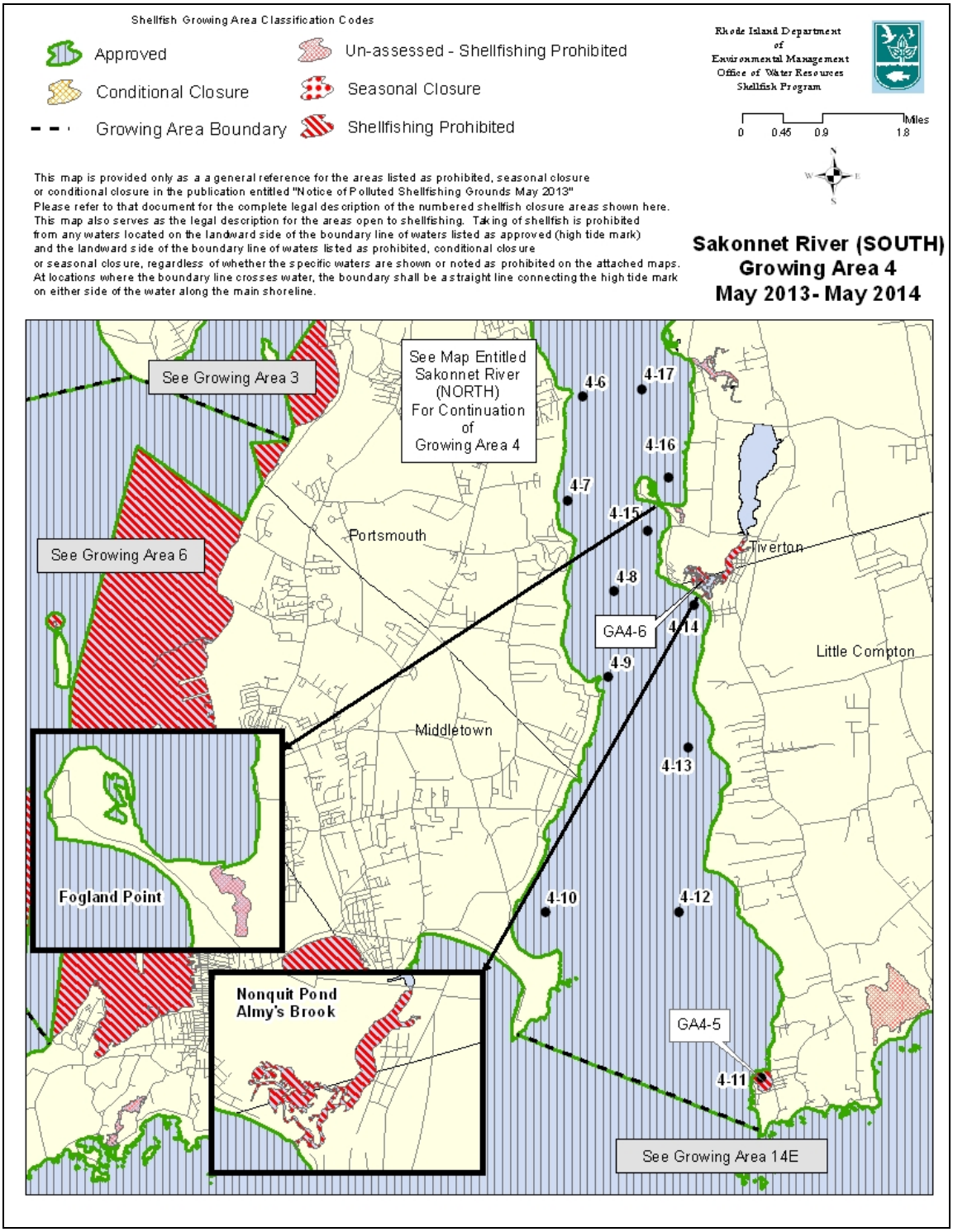


Figure 2-4 May 2013 – May 2014 Classification Map Sakonnet River South



Shellfishing Prohibited

GA4-1 That portion of the "Cove" in Portsmouth south of a line from the Rhode Island Department of Environmental Management range marker located on the southern end of Hummock Point (Latitude 41° 37.82500' N, Longitude 71° 13.15733' W) to the Rhode Island Department of Environmental Management range marker located at the eastern extremity of a point of land on the western shore of the cove.

GA4-2 The Sakonnet River south and west of a line from the north-western most corner to the north-eastern most corner of the abutments of the former railroad bridge between Portsmouth and Tiverton and north of a line extending from the Rhode Island Department of Environmental Management painted marker on the south-western most corner of the Stone Bridge in Tiverton to the Rhode Island Department of Environmental Management range marker at the eastern-most extension of Morningside Lane in Portsmouth.

GA4-3 All tidal waters of the "Gut" (so called), located at the north end of Nannaquaket Pond, north of the northern side of Rt. 77 (Main Road) in Tiverton.

GA4-4 All waters of the Quaket River east of a line extending from the northwestern most point of Nannaquaket Neck to the Rhode Island Department of Environmental Management range marker located on a pole on the opposite shore in Tiverton and east to the eastern most side of the Nannaquaket Bridge in Tiverton.

GA4-5 Sakonnet Harbor south of a line from the light at the end of the Sakonnet breakwater to a point of land near the end of Goodrich Lane on the eastern shore of the Harbor.

GA4-6 All waters of Almy's Brook, the Mary C. Donovan Marsh and the tidally influenced waters of Nonquit Pond south of the dam located at Pond Bridge Road on the eastern shore of Little Compton and Tiverton.

3.0 Pollution Source Survey

3.1 Personnel

Lucinda Hannus, Senior Environmental Scientist, of the RIDEM Office of Water Resources coordinated and conducted a shoreline reconnaissance of the Sakonnet River with the assistance of other staff members at RIDEM within the Office of Water Resources.

3.2 Survey procedures

Special attention was given to all types of pipes, drainage ditches, culverts, and streams in order to classify them as a direct (discharges directly to the growing area), indirect (does not discharge directly to the growing area but may contribute to pollution), actual (discharging at the time of the survey), or potential (not actively discharging at the time of the survey but considered a possible source of pollution). Bacteriological samples were collected in sterile, four ounce (125mL) Nalgene bottles from all sources that were actively flowing at the time of the field study. Samples were stored in a portable cooler and transported to the Rhode Island Department of Health Laboratory at the end of each field day. The membrane filter (mTEC) method, as described in Standard Methods Of Water and Wastewater, was used for analysis.

3.3 Summary of Sources and Locations

There were a total of one hundred and sixty-seven (167) actual or potential sources identified during this shoreline survey, excluding marinas. A total of one-hundred and eight (108) sources were not actively flowing at the time of the shoreline survey with the remaining fifty-nine (59) having flows warranting sampling. All sources in which flow was observed were sampled. As illustrated in Figure 3-1 all potential or actual sources of pollution within the Sakonnet River are located on the map. Table 3-1 is a listing detailing the sources located in the Sakonnet River.

Figure 3-1 2013 Potential & Actual Shoreline Survey Sources

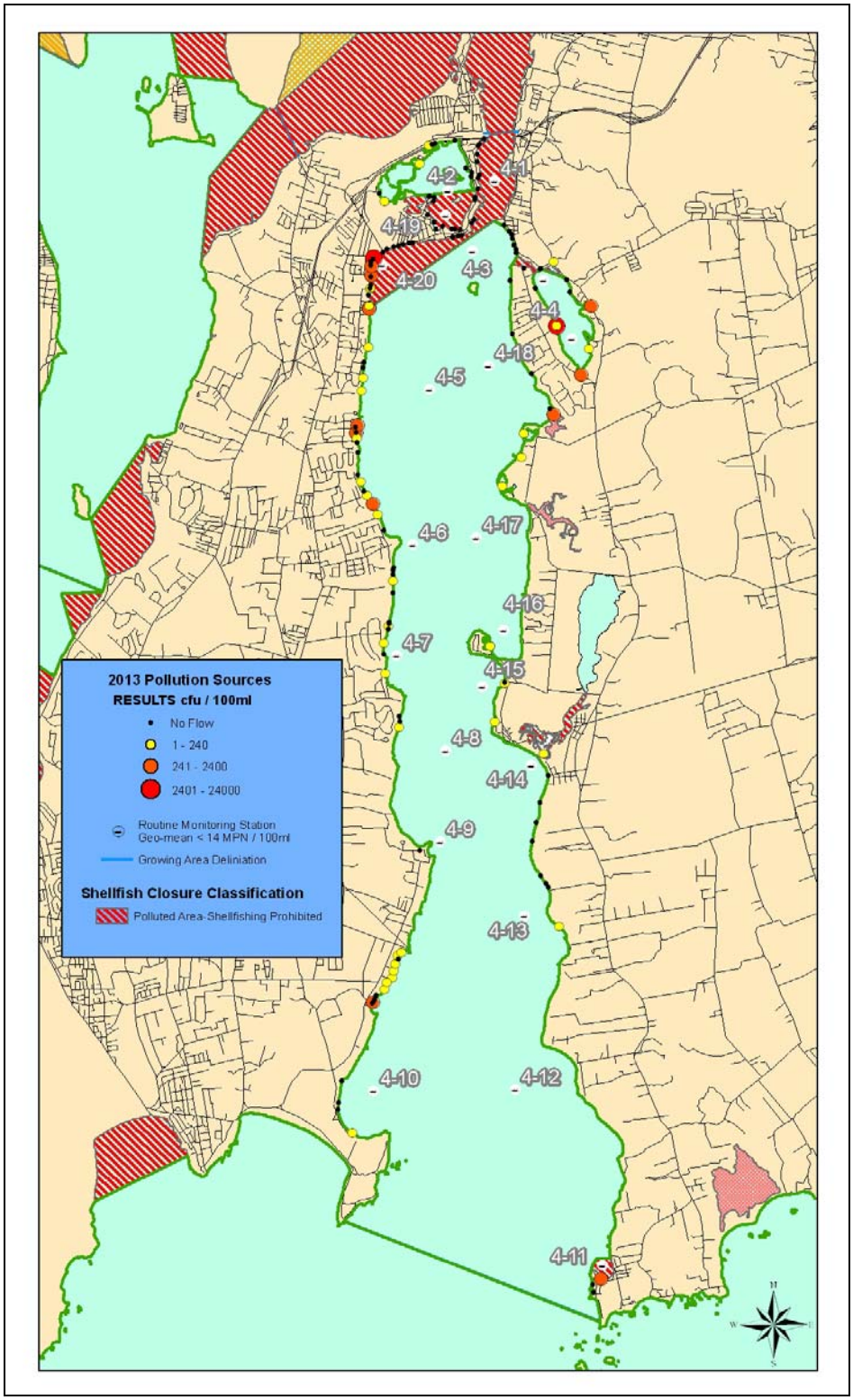


Table 3-1 Pollution Sources in the Sakonnet River

Red highlighted sources > 240 cfu / 100ML

2013 Source ID	Survey Date	Description and location	Actual/ Potential	Direct/ Indirect	2013 Fecal	2013 Volume cfs	Lat	Long
2013-4-000	7/18/2013	ASSF Teddy's Beach Portsmouth	P	D	0	nf	41.62584	-71.21935
2013-4-001	7/18/2013	ASSF south end of Teddy's Beach	P	D	0	nf	41.62526	-71.21978
2013-4-002	7/18/2013	3" dia PVC pipe in seawall Park Ave (2) other 4" dia weep holes	P	D	0	nf	41.62331	-71.22196
2013-4-003	7/18/2013	18" dia RCP in stone seawall Park Ave	P	D	0	nf	41.62323	-71.22266
2013-4-004	7/18/2013	3" dia PVC pipe in concrete seawall	P	D	0	nf	41.62309	-71.22368
2013-4-005	7/18/2013	12" dia clay pipe in seawall Park Ave	P	D	0	nf	41.62305	-71.22377
2013-4-006	7/18/2013	24" dia RCP stormdrain opp. 382 Park Ave	P	D	0	nf	41.62218	-71.23191
2013-4-007	7/18/2013	18" dia RCP stormdrain opp. 264 Park Ave	P	D	0	nf	41.62217	-71.23257
2013-4-008	7/18/2013	Buried stormdrain outfall opp. Gormley Ave	P	D	0	nf	41.62195	-71.23392
2013-4-009	7/18/2013	18" dia RCP stormdrain outfall opp. Mason Ave	P	D	0	nf	41.62178	-71.23489
2013-4-010	7/18/2013	18" dia RCP stormdrain outfall opp. pole # 408 Park Ave	P	D	0	nf	41.62164	-71.23569
2013-4-011	7/18/2013	18" dia clay storm drain opp. (north) of Boyd Lane	P	D	0	nf	41.62123	-71.23710
2013-4-012	7/18/2013	1' X 2' cut in retaining was south of Boyd's Lane	A	D	0	nf	41.62086	-71.23797
2013-4-013	7/18/2013	24" dia RCP at corner of Park Ave	P	D	8000	**Prohibited**	41.61988	-71.23997
2013-4-100	7/18/2013	Groundwater flow from under stormdrain at Park Ave	A	D	0	nf	41.61978	-71.23992
2013-4-101	7/18/2013	4" dia steel pipe at base of retaining wall	A	D	0	nf	41.61926	-71.24037
2013-4-103	7/18/2013	1' X 9" cutout at base of seawall	A	D	0	nf	41.61884	-71.24049
2013-4-104	7/18/2013	36" RCP stormdrain at end of ROW/ steel pipe underneath	A	D	440	**Prohibited**	41.61859	-71.24050
2013-4-105	7/18/2013	4" dia clay pipe at base of seawall	A	D	-1	NS	41.61816	-71.24054
2013-4-106	7/18/2013	3" dia PVC pipe at base of retaining wall	A	D	-1	NS	41.61797	-71.24051
2013-4-107	7/18/2013	24" dia RCP stormdrain at end of ROW corner Atlantic/Tallman	A	D	2220	trickle **Prohibited**	41.61715	-71.24046
2013-4-108	7/18/2013	4" dia PVC pipe at base of seawall and groundwater seep	A	D	0	nf	41.61705	-71.24044
2013-4-109	7/18/2013	Groundwater seep out of wall and pipe at edge of stairs Atlantic Ave	A	D	0	nf	41.61578	-71.24052
2013-4-110	7/18/2013	4" dia PVC pipe at base of seawall and groundwater seep	A	D	0	nf	41.61528	-71.24053
2013-4-111	7/18/2013	6" dia PVC pipe in middle of seawall	A	D	3		41.61528	-71.24062
2013-4-112	7/18/2013	18" dia RCP at end of ROW	A	D	67		41.61505	-71.24073

2013-4-113	7/18/2013	24" dia RCP at end of Child St north of Morningside	P	D	0	nf	41.61427	-71.24091
2013-4-114	7/18/2013	18" dia RCP at closure line Morningside Lane	A	D	34		41.61248	-71.24088
2013-4-115	7/18/2013	4' dia RCP at end of ROW Power St	A	D	57		41.60623	-71.24116
2013-4-116	7/18/2013	Stream from upland woods	A	D	0	nf	41.60401	-71.24182
2013-4-117	7/18/2013	Groundwater seep at base of rock outcropping	A	D	0	nf	41.60319	-71.24199
2013-4-118	7/18/2013	stream between 2 houses from wetlands 54-66 Macomber Lane	A	D	123		41.60159	-71.24215
2013-4-119	7/18/2013	Groundwater seep thru rocks	A	D	-1	NS	41.59982	-71.24220
2013-4-120	7/18/2013	Groundwater seep thru rocks	A	D	3		41.59959	-71.24247
2013-4-250	7/18/2013	Stream (pipe?) thru wood north of McCorrie Pt	A	D	0	nf	41.57829	-71.23795
2013-4-251	7/18/2013	Stream from woods	A	D	93		41.58067	-71.23933
2013-4-252	7/18/2013	Stream thru housing development	A	D	290	.001	41.58229	-71.24030
2013-4-253	7/18/2013	24" dia RCP stormdrain	A	D	3		41.58358	-71.24150
2013-4-254	7/18/2013	12" - 15" dia clay pipe in retaining wall	P	D	0	Nf	41.58422	-71.24197
2013-4-255	7/18/2013	24" dia RCP stormwater pipe in headwall	A	D	0	Nf	41.58684	-71.24319
2013-4-256	7/18/2013	24" dia RCP adj. to stairs concrete headwall	A	D	0	Nf	41.59026	-71.24318
2013-4-257	7/18/2013	Stormdrain? Can't find pipe - stream	A	D	0	Nf	41.59178	-71.24335
2013-4-258	7/18/2013	24" dia RCP stormdrain in headwall	A	D	235		41.59237	-71.24354
2013-4-259	7/18/2013	Stream from uplands south of Lawrence Dr	A	D	110		41.58568	-71.24277
2013-4-260	7/18/2013	Small stream dispersed thru underbrush	A	D	933	.001	41.59310	-71.24360
2013-4-261	7/18/2013	6" dia PVC pipe south of Lawrence Dr	A	D	0	Nf	41.59321	-71.24356
2013-4-262	7/18/2013	6" dia PVC pipe at stonewall at end of Lawrence Dr ROW	A	D	0	Nf	41.59402	-71.24358
2013-4-263	7/18/2013	4" dia black PVC pipe north of Lawrence Lane south of jetty	A	D	680	0.01	41.59433	-71.24340
2013-4-300	7/18/2013	Stream south of McCorrie Pt from upland woods	A	D	0	nf	41.57257	-71.23597
2013-4-301	7/18/2013	Groundwater over rocks from upland woods	A	D	0	nf	41.57214	-71.23609
2013-4-302	7/18/2013	Groundwater over rocks from upland woods	A	D	0		41.57145	-71.23605
2013-4-303	7/18/2013	Approx. 100' of groundwater seepage from rocks several areas steady stream	A	D	3		41.57048	-71.23622
2013-4-304	7/18/2013	Groundwater seep over rocks	A	D	0	nf	41.56865	-71.23612
2013-4-305	7/18/2013	Groundwater seep from rock face	A	D	0	nf	41.56431	-71.23685
2013-4-306	7/18/2013	Groundwater seep from rock face	A	D	0	nf	41.56405	-71.23699
2013-4-307	7/18/2013	Area of significant groundwater overland runoff	A	D	3		41.56354	-71.23730
2013-4-308	7/18/2013	6" dia clay pipe at top of hill	A	D	0	nf	41.56326	-71.23711
2013-4-309	7/18/2013	24" dia RCP north of dock/stairs	A	D	3		41.56097	-71.23812
2013-4-310	7/18/2013	6" dia clay pipe under old boat house	A	D	0	nf	41.55932	-71.23797
2013-4-311	7/18/2013	Stream north of Sandy Point	A	D	207		41.55627	-71.23790

2013-4-312	7/18/2013	mooring field at Sandy Point	P	D	-1	NS	41.55503	-71.23737
2013-4-400	7/19/2013	24" dia RCP stormwater outfall south of Sandy Point	P	D	0	nf	41.54993	-71.23492
2013-4-401	7/19/2013	18" dia RCP storm water outfall	P	D	0	nf	41.54908	-71.23478
2013-4-402	7/19/2013	6" dia PVC pipe in seawall draining upland stream	A	D	3		41.54811	-71.23512
2013-4-500	7/19/2013	12" dia CI pipe thru stone wall	P	D	0	nf	41.50595	-71.24063
2013-4-501	7/19/2013	Stream thru stone archway Taggerts Ferry	A	D	400	2.83	41.50606	-71.24061
2013-4-502	7/19/2013	10" dia CI at base of wall, 2" dia CI in wall, 4" dia CI in wall	P	D	0	nf	41.50630	-71.24024
2013-4-503	7/19/2013	1/2 doz. 2" dia CI pipes in base of retaining wall	A	D	0	nf	41.50663	-71.24013
2013-4-504	7/19/2013	4" dia PVC pipe along side of wall	A	I	0	nf	41.50725	-71.23978
2013-4-505	7/19/2013	Stream from spring in rocks	A	D	232		41.50801	-71.23828
2013-4-506	7/19/2013	Stream from groundwater thru embankment	A	D	59		41.50911	-71.23772
2013-4-507	7/19/2013	multiple groundwater streams out of rocks	A	D	152		41.50981	-71.23671
2013-4-508	7/19/2013	stream from rocks	A	D	3		41.51082	-71.23634
2013-4-509	7/19/2013	groundwater thru rocks	A	D	3		41.51196	-71.23599
2013-4-510	7/19/2013	6" dia PVC pipe at top of embankments next to stairway	P	D	0	nf	41.51278	-71.23521
2013-4-511	7/19/2013	stream out of embankment over rocks	A	D	3		41.51369	-71.23481
2013-4-512	7/19/2013	steady groundwater stream over rocks	A	D/I	30		41.51319	-71.23564
2013-4-520	7/19/2013	groundwater stream from under seawall at tide line	A	D	0	nf	41.52934	-71.23080
2013-4-535	9/19/2013	Stagnant stream from upland salt marsh	P	D	0	nf	41.49412	-71.24680
2013-4-540	9/19/2013	Stream from uplands wetland	A	D	0	nf	41.49079	-71.24750
2013-4-545	9/19/2013	mooring field at Third beach	P	D	0	nf	41.48970	-71.24771
2013-4-550	9/19/2013	Outlet from upland tidal pond, 2 gates	A	D	18		41.48610	-71.24490
2013-4-600	8/15/2013	Driveway drain out of retaining wall 4 " dia PVC	P	D	0	nf	41.63050	-71.21860
2013-4-601	8/15/2013	Groundwater seep across from small pond	A	D	0	nf	41.63212	-71.21861
2013-4-602	8/15/2013	2 1/2" dia CI pipe in retaining wall	P	D	0	nf	41.63260	-71.21833
2013-4-603	8/15/2013	(2) 4" dia CI pipes on to beach from under deck	P	D	0	nf	41.63451	-71.21868
2013-4-604	8/15/2013	6" dia PVC 4" dia OB at top of wall	P	D	0	nf	41.63567	-71.21879
2013-4-605	8/15/2013	Groundwater seep	A	D	0	nf	41.63700	-71.21851
2013-4-606	8/15/2013	Groundwater seep	A	D	0	nf	41.63723	-71.21823
2013-4-607	8/15/2013	12" dia RCP drain at end of turnaround at RT 24 bridge	A	D	0	nf	41.63809	-71.21729
2013-4-619	8/15/2013	12" dia CMP stormdrain Grinnells Beach Tiverton	A	D	0	nf	41.62479	-71.21339
2013-4-620	8/15/2013	24" dia CMP storm drain Tiverton	P	I	0	nf	41.62393	-71.21230
2013-4-621	8/15/2013	Storm flow from under wall from remains of 18" dia CMP	A	D	0	nf	41.62346	-71.21184
2013-4-622	8/15/2013	18" dia CMP old storm drain	P	D	0	nf	41.62281	-71.21160
2013-4-623	8/15/2013	18" dia CMP old storm drain	P	D	0	nf	41.62181	-71.21125

2013-4-624	8/15/2013	12" dia CMP stormdrain	P	D	0	nf	41.62106	-71.21090
2013-4-625	8/15/2013	12" dia CMP stormdrain	P	D	0	nf	41.62067	-71.21086
2013-4-700	8/16/2013	10" dia PVC pipe at end of road appears to be draining wetland at boat ramp	A	D	35		41.60590	-71.19622
2013-4-701	8/16/2013	Stream at south end of pond at Nannaquaket Road	A	D	400	.177	41.60188	-71.19784
2013-4-702	8/16/2013	4" dia PVC pipe from yard	A	D	8000	.004	41.60937	-71.20287
2013-4-702A	9/17/2013	4" dia PVC pipe from yard (re-sample)	A	D	15		41.60937	-71.20287
		In-stream near above source	IS	IS	8/1100			
2013-4-703	8/16/2013	4" dia clay pipe from yard	A	D	0	nf	41.61528	-71.20690
2013-4-704	8/16/2013	groundwater seep	A	D	0	nf	41.61528	-71.20690
2013-4-705	8/16/2013	18" dia RCP stormdrain at intersection	P	D	0	nf	41.61815	-71.20610
2013-4-706	8/16/2013	10" dia CI storm drain from across street	P	D	0	nf	41.61817	-71.20583
2013-4-707	8/16/2013	24" dia CPVC just north of Evelyn's restaurant crosses road to open gutter	A	D	0	nf	41.61651	-71.20063
2013-4-708	8/16/2013	ASSF from road water breaks out at shoreline	A	D	0	nf	41.61648	-71.20055
2013-4-709	8/16/2013	4" dia PVC south of Evelyn's restaurant	A	D	0	nf	41.61467	-71.19996
2013-4-710	8/16/2013	White Wine Brook at road crossing 24" dia CMP	A	D	1500	.213	41.61236	-71.19585
2013-4-711	8/16/2013	Sin & Flesh Brook upstream of gut	A	D	73		41.61925	-71.20332
2013-4-817	9/6/2013	2" dia PVC pipe in embankment south of boat house	A	D	0	Nf	41.61638	-71.21211
2013-4-818	9/6/2013	Small stream draining uplands disperses prior to waterline	A	D	3		41.58490	-71.21400
2013-4-819	9/6/2013	Outlet from tidal pond under Seapowet bridge	A	D	15		41.59290	-71.20954
2013-4-820	9/6/2013	Outlet from tidal pond	A	D	3		41.56049	-71.21651
2013-4-821	9/6/2013	Outlet from tidal pond south of breakwater	A	D	19		41.58932	-71.21011
2013-4-822	9/6/2013	Outlet from tidal marsh below goat farm	A	D	7		41.59290	-71.20954
2013-4-824	9/6/2013	Outlet from tidal pond	A	D	14		41.62851	-71.23769
2013-4-825	9/6/2013	Outlet from tidal pond	P	D	0	Nf	41.59677	-71.20410
2013-4-826	9/6/2013	Outlet from upland tidal pond	A	D	700	**Prohibited**	41.59579	-71.20353
2013-4-827	9/6/2013	ASSF @ end of N Court	P	D	0	Nf	41.60215	-71.20785
2013-4-830	8/19/2013	4" dia pipe at top of embankment	P	D	0	Nf	41.60487	-71.20997
2013-4-831	8/19/2013	12" dia RCP stormdrain from MH in street	P	D	0	Nf	41.60513	-71.20992
2013-4-832	8/19/2013	2" dia black PVC pipe thru rocks most likely pool discharge	P	D	0	Nf	41.60821	-71.21175
2013-4-833	8/19/2013	6" dia clay pipe at base of wall other pipes abandoned	P	D	0	Nf	41.61638	-71.21211
2013-4-834	8/19/2013	5" dia steel pipe sealed into water no visible signs of flow	P	D	0	Nf	41.61826	-71.20930
2013-4-835	8/19/2013	6" dia steel pipe with small flow	A	D	0	NS	41.61789	-71.20768
2013-4-900	9/16/2013	Tidal stream draining salt marsh north of Fogland Beach	A	D	3		41.56049	-71.21651

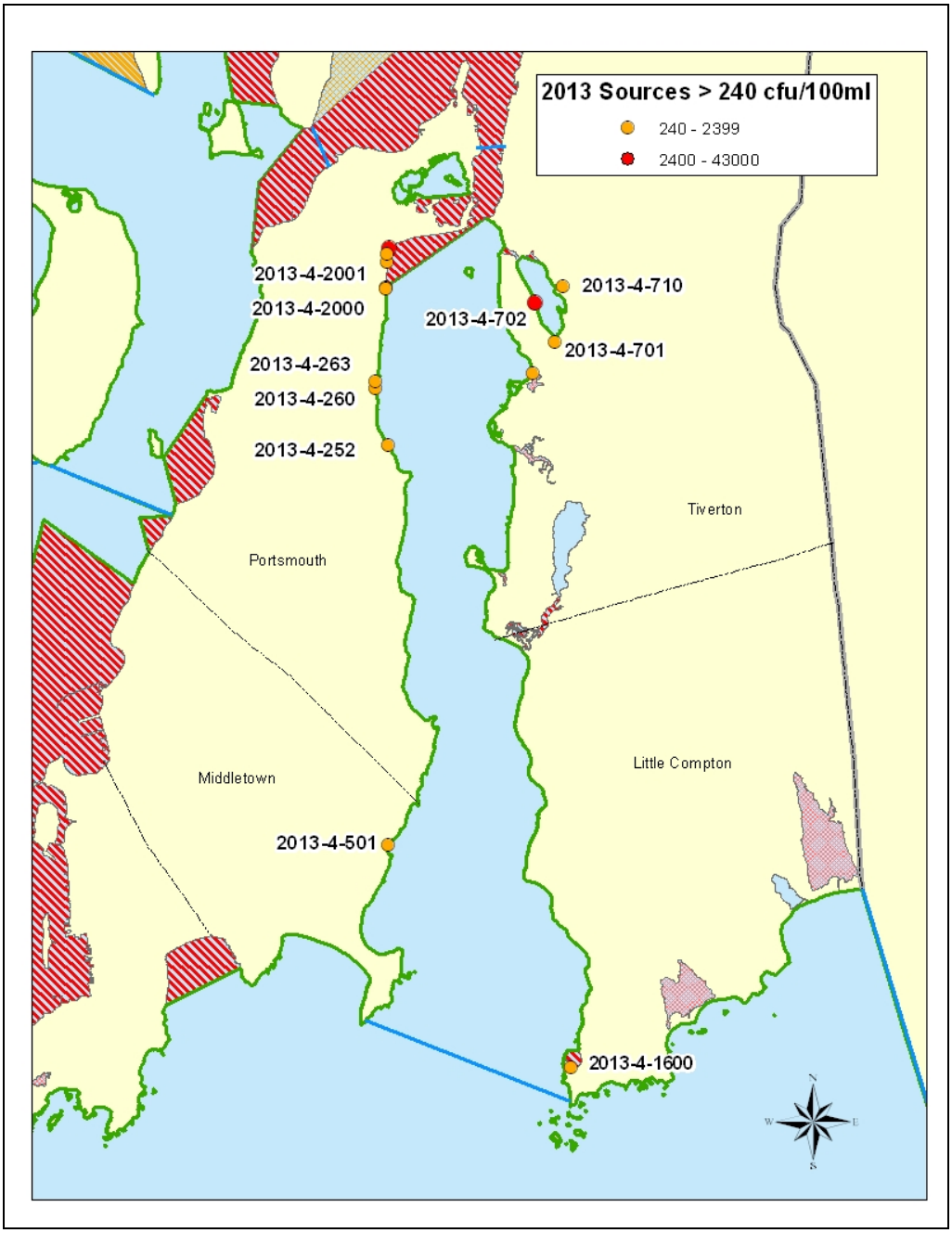
		Tiverton outgoing tide						
2013-4-901	9/16/2013	8" dia PVC pipe at north side of boat ramp Fogland Tiverton	P	D	0	Nf	41.55497	-71.21352
2013-4-950	9/16/2013	Small GW seep south of boat ramp Fogland Beach south	A	D	2		41.55471	-71.21363
2013-4-951	9/16/2013	6" CI pipe with steady flow just north of light house	A	D	3		41.54887	-71.21561
2013-4-1000	9/17/2013	Stream Almy Brook north of town line	A	D	133	Large	41.54402	-71.20576
2013-4-1001	9/17/2013	Groundwater seep several locations	A	D	0	Nf	41.53665	-71.20638
2013-4-1002	9/17/2013	Groundwater seep	A	D	0	Nf	41.53355	-71.20715
2013-4-1003	9/17/2013	Groundwater seep	A	D	0	Nf	41.53067	-71.20794
2013-4-1004	9/17/2013	Groundwater seep	A	D	0	Nf	41.52540	-71.20625
2013-4-1005	9/17/2013	Groundwater seep	A	D	0	Nf	41.52422	-71.20520
2013-4-1006	9/17/2013	Small stream	A	D	0	Nf	41.52359	-71.20479
2013-4-1007	9/17/2013	Groundwater outfall from upland marsh	A	D	107		41.51756	-71.20274
2013-4-1008	9/17/2013	Small stream along south side of Town Road	A	D	0	Nf	41.54069	-71.20468
2013-4-1200	8/15/2013	Numerous 3-4" dia pipes in seawalls evidence of previous flows	P	D	0	Nf	41.62863	-71.22758
2013-4-1201	8/15/2013	12" dia CMP storm drain from between 301 & 303 Bay St	P	D	0	Nf	41.62918	-71.22742
2013-4-1202	8/15/2013	6" dia clay & 4" dia clay and end of ROW off Bay St north of #1201	P	D	0	Nf	41.62934	-71.22833
2013-4-1203	8/15/2013	4" dia black PVC pipe at top of retaining wall	P	D	0	Nf	41.62937	-71.22855
2013-4-1204	8/15/2013	12" dia CMP at ROW	P	D	0	Nf	41.62646	-71.22881
2013-4-1205	8/15/2013	12" dia PVC pipe at ROW	P	D	0	Nf	41.62537	-71.22755
2013-4-1206	8/15/2013	15" dia RCP at ROW	P	D	0	Nf	41.62424	-71.22723
2013-4-1207	8/15/2013	6" dia PVC pipe in top of retaining wall	P	D	0	Nf	41.62477	-71.22572
2013-4-1208	8/15/2013	Numerous 4" dia pipes in retaining wall	P	D	0	Nf	41.62423	-71.22389
2013-4-1209	8/15/2013	15" dia CMP stormdrain Park Ave	P	D	0	Nf	41.62433	-71.22332
2013-4-1210	8/15/2013	? Size drain from Park Ave at the Sakonnet Fish Co indications of heavy flow	P	D	0	Nf	41.62415	-71.22214
2013-4-1211	8/15/2013	18" dia CMP stormdrain south of bridge at Hummocks	P	D	0	Nf	41.62886	-71.21928
2013-4-1212	8/15/2013	12" dia CMP stormdrain at bridge abutment	P	D	0	Nf	41.62912	-71.21918
2013-4-1213	8/15/2013	4' dia RCP at headwall north of Hummocks bridge	P	D	0	Nf	41.63230	-71.21993
2013-4-1214	8/15/2013	24" dia CMP stormdrain	P	D	0	Nf	41.63293	-71.21989
2013-4-1215	8/15/2013	1' X 1' cutout in bottom of steps and 6" dia clay pipe at base	P	D	0	Nf	41.63366	-71.22099
2013-4-1216	8/15/2013	12" dia RCP from Rt. 24	P	D	0	Nf	41.63789	-71.22315
2013-4-1217	8/15/2013	12" dia RCP from Rt. 24	P	D	0	Nf	41.63741	-71.22724
2013-4-1218	8/15/2013	12" dia RCP from Rt. 24	P	D	0	Nf	41.63726	-71.22796

2013-4-1219	8/15/2013	Groundwater stream from under Rt. 24	A	D	3		41.63706	-71.22868
2013-4-1220	8/15/2013	Outfall stream from tidal pond south of parking area	A	D	3		41.63425	-71.23055
2013-4-1221	8/15/2013	ASSF from Cardi concrete plant	P	D	0	Nf	41.62975	-71.23870
2013-4-1222	8/15/2013	Stream draining upland marsh	A	D	10		41.62851	-71.23769
2013-4-1600	9/18/2013	36" dia flared end draining upland pond	A	D	420	**Prohibited**	41.46366	-71.19449
2013-4-1601	9/16/2013	6" dia CI pipe at top of seawall	P	D	0	Nf	41.46283	-71.19602
2013-4-1602	9/16/2013	6" dia CI pipe at top of seawall	P	D	0	Nf	41.46168	-71.19587
2013-4-2000	7/18/2013	Small stream south of Morningside Lane	A	I	908	trickle	41.61210	-71.24096
2013-4-2001	7/18/2013	Small stream south of Morningside Lane	A	I	1730	trickle	41.61225	-71.24093

3.3.1 Locations of Major Sources

Figure 3-2 is a detailed map of the sources in the Sakonnet River that exceeded the 240 cfu/100ml standard operating procedure minimum criteria for follow-up review..

Figure 3-2 Sources Requiring Follow-up



3.4 Identification and Evaluation of Pollution Sources

Of the fourteen sources exceeding the 240 MPN / 100 ml minimum criteria, five of these sources (#013, #104, #107, #826, and #1600) are located in prohibited portions of the growing area and do not require additional consideration for follow-up sampling or analysis of potential impacts to the growing area. The remaining seven sources however need to be evaluated for their potential impacts to the current open classification. The following detailed evaluation of each of these sources is provided.

Source # 2013-4-252

Source # 252 is a small stream that emanates from upland woods in Portsmouth. The results from sampling were 290 cfu / 100ML with a trickle flow. The flow from this source was minimal as indicated in the picture and discharges into the sand. This source would not appear to have any significant impacts on the classification of this portion of the growing area.

Source # 2006-4-260

Source #260 is stream that becomes diverse thru thick underbrush at the shore line. Results from sampling were 933 cfu/100ml but flows were very small at .001 cfs. Due to the low volume and relatively low bacteria counts this source does not appear to be having an adverse impact upon the receiving waters.

Source # 2013-4-263

Source #263 is a black corrugated PVC pipe that is located north of Lawrence Drive and south of the stone jetty in Portsmouth. Results from sampling had bacteria counts of 680 cfu/100ml and flows of .01 cfs. Upstream of this source is a cluster of three buildings surrounded by open fields. The bacteria levels were slightly lower than from the 2006 sampling of 930 MPN/100ml. Although slightly elevated the results are not high enough to indicate this source is impacted by septic systems but is more likely a groundwater diversion pipe and does not represent a significant risk to the receiving waters.

Source # 2006-4-501

Source # 501 is a stream that flows through a stone archway near Taggerts Ferry Road in Middletown. Sampling results of 400 cfu/100ml and flows of 2.83 cfs were measured during the survey. Upland is a large stream and wetland complex with minimal developed property. It would appear that there are no significant anthropogenic influences that are impacting the receiving waters.

Source # 2006-4-701

Source #701 is the culvert flowing under Nannaquaket Road in Tiverton. Results were bacteria counts of 400 cfu/100ml with flows of .177 cfs. Although a larger volume of flow exists, bacteria counts were relatively low. Upland of this stream is an undeveloped wetland complex. This source would not appear to be of an anthropogenic origin and therefore not impacting the receiving waters of Nannaquaket Pond.

Source 2013-4-702

Source #702 is a 4" diameter pvc pipe from an upland yard. Results from sampling were bacteria counts of 8000 cfu/100ml and flows of .004 cfs. The source is from an area at the end of a private driveway that discharges into Nannaquaket Pond. Due to the initial elevated bacteria counts the source was re-sampled in 2013 with significantly reduced results of 15 cfu/100ml. An in stream sample of 3 and 1100 cfu/100ml north and south of the source respectively were also taken. This is a million dollar single family residence situated on a little over 3 acres of land built in 1954. The adjacent lot is owned by the same property owner and contains three shed/garage type buildings and a small pond. A soil evaluation for the adjacent vacant property was received from the property owner in 2001 in which water table elevations were in the less than 2 foot range. There is no record of the application being pursued any further. It would appear that there is elevated ground water in this area and this most likely is a diversion pipe. Follow-up sampling should be conducted again in 2014 to ensure that this is not intercepting the residence's septic system but is only relatively clean ground water.

Source 2013-4-710

Source #710 is White Wine Brook and samples were taken at the outfall of the culvert that passes under Main Road in Tiverton. Results from sampling were bacteria counts of 1500 and flows of .213 cfs. Upstream of this stream is a very large wooded wetland complex with minimal development. Although slightly elevated the upland source of this stream would indicate that it is not causing any adverse impacts to the receiving waters in Nannaquaket Pond.

Source # 2006-4-2000 and 2001

Sources #2000 and 2001 are two very small streams just south of Morningside Lane. Results of sampling were bacteria counts of 908 and 1730 cfu/100ml respectively. Flows were barely a trickle and faded into the shoreline above the high tide mark. Due to the low flows these two sources would not appear to be having a negative impact on the receiving waters.

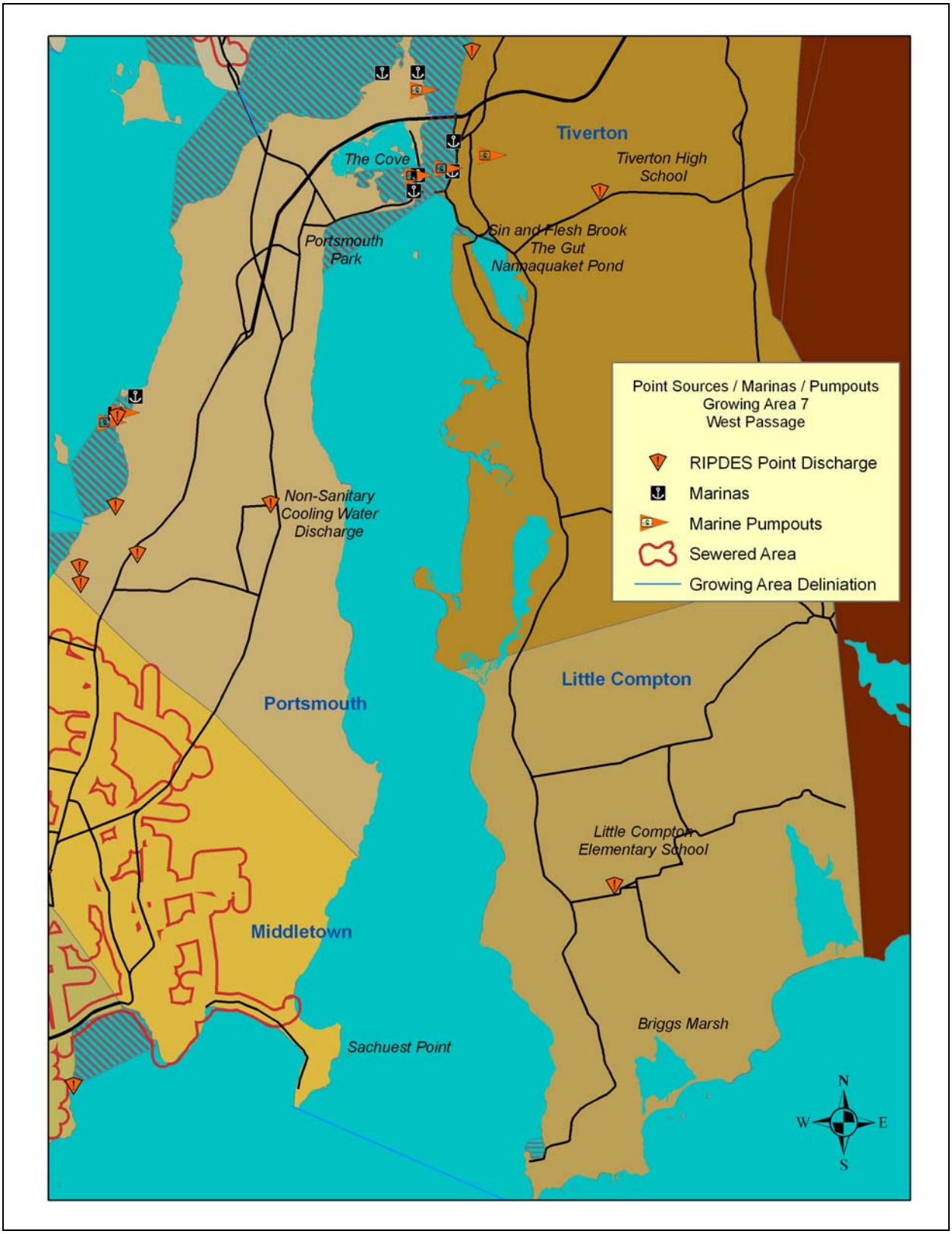
3.4.1 Domestic Wastes

Public sewers service only a very small portion of the growing area watershed in a portion of Middletown near the Sachuest Point area. All other areas of the watershed are serviced by on-site wastewater treatment systems (OWTSs). There are current issues with failing or failed ISDS systems in the Portsmouth Park, Island Park area documented in the TMDL entitled "FINAL Total Maximum Daily Load, The Sakonnet River – Portsmouth Park and The Cove – Island Park, March 2005". The prohibited areas currently established in these two portions of growing area 4 are still being affected by discharges to these waters. The town of Portsmouth is currently considering solutions to these difficult wastewater issues, and until such time there is a successful solution, these areas will remain prohibited and close attention will be given to sampling in the receiving waters and along the shoreline to insure no expansion of the prohibited classification is warranted.

A review of the Office of Compliance and Inspection's (OC&I) database of open OWTS complaints revealed that there were seven (7) open complaints within the Sakonnet River growing area within 1500 ft of a source that had bacteria counts greater than 240 cfu/100ml. Upon further review and locating these complaints six (6) of them are in the vicinity of prohibited areas of the growing area, 4 in Portsmouth Park and 2 in Sakonnet Harbor. The one that is "near" approved waters is actually 700 to 800 feet from the shoreline and has not been confirmed as a failing OWTS as an inspector from OC&I has yet to make that determination. If it proves to be a failing OWTS the location would indicate that the overland flow would be to a large wetland complex that feeds the drain that discharges into the closed portion of Sakonnet Harbor. These three systems may be the reason we are having issues with water quality compliance within the harbor.

There are currently three RIPDES permits that discharge into the general area (Figure 3-4). Two of the discharges are minor sanitary discharges while the other is a non-sanitary discharge. The Tiverton High School has a permit to discharge treated sanitary waste into a wooded marsh in the headwaters of Sin and Flesh Brook that ultimately drains to The Gut and Nannaquaket Pond. This portion of the growing area is currently classified as prohibited. As for the other two permitted discharges one is non-sanitary in nature, and the other minor sanitary discharge is from an elementary school in Little Compton that discharges to Dundery Brook which does not discharge to the Sakonnet River but rather to Briggs Marsh and subsequently the Atlantic Ocean.

Figure 3-3 RIPDES Discharges / Marinas / Pump Out Facilities



3.4.2 Stormwater

Although stormwater is attributable to closures of shellfishing waters, the stormwater runoff from this growing area's watershed in the area classified as open does not appear to have a significant or accountable effect on the water quality. Samples for the routine monitoring protocol are taken randomly and would be representative of the water quality under all conditions, favorable or adverse. Since the statistical evaluation of the routine monitoring results indicates that all stations significantly comply with the water quality criteria there is no indication that this area is classified incorrectly or is impacted by random weather events.

3.4.3 Marinas

There are currently four marinas and one mooring area that contain substantial numbers of boats warranting the year round prohibited area south of the Sakonnet Bridge and through the Stonebridge gap along with the recently reclassified area of Sakonnet Harbor.

Rhode Island coastal waters are federally designated as "No Discharge" mandating that the discharge of *treated* and *untreated* boat sewage is prohibited (not including greywater or sink water) in these designated areas. These designated areas encompass the entire Sakonnet River growing area. The four marina areas currently have three pump-out facilities.

3.4.4 Agricultural Waste

Currently there are agricultural lands within the watershed to growing area 4. The largest area of agricultural pasture is on the east shore of the Sakonnet River in the town of Little Compton. In addition there are several large areas of agricultural land on the west shore in southern Portsmouth. Samples for the routine monitoring protocol are taken randomly and would be representative of the water quality under all conditions, favorable or adverse. Resultant runoff from these agricultural lands would therefore be sampled during routine monitoring of the receiving waters. Since the statistical evaluation of the routine monitoring results indicates that all stations significantly comply with the water quality criteria there is no indication that this area is classified incorrectly or is impacted by runoff from agricultural lands.

3.4.5 Wildlife

The shores of the Sakonnet River growing area are relatively undeveloped. No appreciable numbers of waterfowl or wildlife were observed during the numerous days of shoreline surveying.

4.0 Hydrographic and Meteorological Characteristics

4.1 Tides

Tides in Rhode Island are semi-diurnal. This means that the tides have a period or cycle of approximately one-half of a tidal day (12.84 hrs.), characterized by two similar high waters and two similar low waters each tidal day. The tidal current is said to be semi-diurnal when there are two flood and two ebb periods each day. A semi diurnal constituent has two maxima and two minima each constituent day.

The shoreline survey was scheduled to coincide with ebb and/or low tide, which represents the most opportune time for observing stormwater outfalls that, may otherwise be hidden by tidal water, and sampling streams and pipes that, may otherwise be receiving tidal waters.

4.2 Rainfall

In Rhode Island there are normally no seasonal patterns in the frequency and amounts of precipitation during the year, however two major storm patterns exist. Storms that occur between October and May are primarily extra-tropical cyclones. The most famous are the "nor-easters:" low-pressure systems that typically develop off the North and South Carolina coasts and move northeast along the Atlantic seaboard, occasionally colliding with colder and drier air (from Canada) in the New England region. This results in the development of heavy rain and/or snow. These storms are more widespread in their range. The second type of storm, occurring between June and October, are primarily tropical cyclones. The biggest storms are hurricanes, which have hit Rhode Island more than 71 times during the last 350 years. In the summer, most precipitation results from thunderstorms and smaller convective systems. These typically produce short-duration high-intensity precipitation events, and are more localized than nor-easters.

Growing area response to these precipitation events varies according to storm duration, storm intensity, and watershed characteristics such as land use, vegetative cover, and soil characteristics. Changes in land use and vegetative cover are typically accompanied by increases in impervious areas. Of particular concern for the growing area is the close proximity of impervious surfaces to stream channels. This allows for the rapid and efficient transport of runoff of concomitant pollutants including fecal coliform bacteria to river and stream channels that ultimately drain to the growing area.

The shoreline survey dates for the Sakonnet River growing area was over a period of ten days during the summer and early fall of 2013.

The following rainfall data was observed at the NOAA weather station at Taunton, MA just north of the growing area. Yellow highlighted days are shoreline survey dates.

Table 4-1 Rainfall Data July 2013

Day	Max Temp Deg. F	Min Temp Deg. F	Avg. Temp Deg. F	Total Precipitation Inches
1	80	71	76	.23
2	83	72	78	T
3	88	71	80	T
4	90	74	82	0
5	93	75	84	0
6	93	75	84	0
7	95	75	85	0
8	92	70	81	0
9	79	68	74	.07
10	85	73	79	T
11	79	71	75	.43
12	78	67	73	T
13	79	66	73	.07
14	92	72	82	T
15	94	76	85	0
16	95	76	86	0
17	89	73	81	0
18*	96	77	87	0
19	98	77	88	0
20	95	75	85	.11
21	83	69	76	.12
22	84	69	77	T
23	88	73	81	.17
24	87	71	79	0
25	71	60	66	.72
26	73	61	67	.33
27	85	63	74	T
28	84	68	76	.01
29	84	69	77	T
30	83	66	75	0
31	82	60	71	0
Max/Min/Total	95	60	78.6	2.26

*** Date of routine bay run**

Table 4-2 Rainfall Data August 2013

Day	Max Temp Deg. F	Min Temp Deg. F	Avg. Temp Deg. F	Total Precipitation Inches
1	80	63	72	.03
2	84	66	75	.2
3	78	65	72	.01
4	81	57	69	.02
5	78	57	68	0.00
6	80	54	67	0.00
7	78	56	67	0.00
8	81	67	74	T
9	76	72	74	1.74
10	84	64	74	0.00
11	80	57	69	0.00
12	81	64	73	0.00
13	73	64	69	.04
14	74	60	67	0.00
15	77	56	67	0.00
16	79	55	67	0.00
17	82	59	71	0.00
18	79	60	70	T
19	82	59	71	0.00
20	86	64	75	0.00
21	89	66	78	0.00
22	84	67	76	.63
23	80	65	73	0.00
24	77	57	67	0.00
25	82	55	69	0.00
26	81	66	74	.32
27	81	67	74	.88
28	84	63	74	0.00
29	70	61	66	T
30	80	60	70	0.00
31	80	70	75	0.00
Max/Min/Total	84	54	71.2	3.87

Table 4-3 Rainfall Data September 2013

Day	Max Temp Deg. F	Min Temp Deg. F	Avg. Temp Deg. F	Total Precipitation Inches
1	82	70	76	.67
2	76	69	73	2.82
3	78	63	71	0.09
4	79	59	69	0.00
5	74	56	65	T
6	70	50	60	0.00
7	77	49	63	0.00
8	79	54	67	0.00
9	68	48	58	0.00
10	74	56	65	.02
11	92	68	80	0.00
12	84	69	77	.59
13	79	61	70	.05
14	70	53	62	0.00
15	71	49	60	0.00
16	69	49	59	.08
17	63	44	54	0.00
18	71	44	58	0.00
19	81	49	65	0.00
20	77	49	63	0.00
21	75	53	64	0.00
22	72	52	62	.27
23	65	48	57	0.00
24	68	43	56	0.00
25	70	46	58	0.00
26	66	52	59	0.00
27	67	50	59	0.00
28	74	48	61	0.00
29	69	46	58	0.00
30	70	51	61	0.00
Max/Min/Total	92	43	64.03	4.59

Based on the NOAA data, the survey dates in July and August were considered dry weather conditions since it was at least five days following a greater than .5" rain storm. All other survey dates in September were considered wet weather conditions in which samples were taken within 1 to 4 days following over a half inch of rainfall.

4.3 Winds/Climate

Rhode Island's climate may be summarized as having an equitable distribution of precipitation throughout the four seasons, large ranges of temperature, both daily and annually, great differences in the same season of different years and considerable diversity of the weather over short periods of time, or as we say in New England, if you don't like the current weather wait a minute it will change. These varying conditions are greatly influenced across the state by the nearness to Narragansett Bay or the Atlantic Ocean and by elevation and nature of the local terrain. Day to day variety is the norm with no particular regular or persistent rhythm to the changes in weather other than a tendency to a roughly twice-weekly alternation from fair weather to cloudy or stormy weather.

Weather averages in Rhode Island are not very useful for important planning purposes due to the large variety of weather patterns. However, the following averages can be used for general understanding of the areas climate.

The mean annual temperature ranges from 48° F to 51 ^{o} F with the higher mean temperature more representative of the areas of Narragansett Bay. The average daily minimum temperature in January and February is 25 ^{o} F in coastal sections.

Precipitation is evenly distributed throughout the year, with annual averages of 42 to 46 inches with the southeastern bay areas tending to be more like 40 inches. Average yearly snowfall along the shoreline is about 20 inches and the region is known to have years in which snowfall totals can be significantly less than average because of milder winters. Total precipitation however averages around 3 to 3.5 inches per month regardless of season with the lesser amounts in the period between May and July.

4.4 River Discharges

There are eight named streams and numerous unnamed streams that discharge directly to the Sakonnet River Growing Area. Pachet Brook and Borden Brook drain into Nonquit Pond. The outlet from the pond is sample ID 2006-4-1000 with results of 133 cfu / 100 ml. Routine monitoring station 4-14 is located directly offshore of this stream outlet. Paradise Brook drains into the Maidford River and the outlet is sample ID 2006-4-550 with results of 18 cfu /100 ml. Routine monitoring station 4-10 is located within the cove that this river drains into. Quaker Creek is sample ID 2006-4-701 with results of 400 MPN / 100 ml adjacent to monitoring station 4-4, Little Creek is sample ID 2006-4-501with results of 400 MPN / 100ml, Sin & Flesh Brook is Sample ID 2006-4-711with results of 73 MPN / 200 ml and White Wine Brook is sample ID 2006-4-710 with results of 1500 MPN / 100 ml. Quaket Creek, Sin & Flesh and White Wine Brook all drain into Nannaquaket Pond in which routine monitoring station 4-4 and 4-21 are located. All routine monitoring stations noted above are in statistical compliance with NSSP standards.

5.0 Water Quality Studies

5.1 Overview

The RIDEM Shellfish Program participates in the Shellfish Growing Area Monitoring (SGAM) program, which is the result of an agreement between the State of Rhode Island and the Food and Drug Administration (FDA), and managed by the National Shellfish Sanitation Program (NSSP). The purpose of these programs is to maintain national health standards by regulating the interstate shellfishing industry. The NSSP is designed to oversee the shellfish producing states' management programs and to enforce and maintain an industry standard. As part of this agreement, the state of Rhode Island is required to conduct continuous bacteriological monitoring of shellfish harvesting waters for direct human consumption in order to maintain certification.

Water samples are collected at twenty-one (21) monitoring stations throughout the growing area (Figure 2-1). Four of these stations are in prohibited areas while the other seventeen are in the approved portions of the growing area.

Samples are collected 1-2 feet below the water surface (using 4 ounce sterile Nalgene bottles) after which they are stored in a cooler packed with ice. They are then transported to the Rhode Island Department of Health Laboratories for analysis. Beginning in June of 2012 the membrane filtration technique, also known as mTEC is used to analyze the samples. The results are sent to the RIDEM Shellfish Program at which time they are reviewed and incorporated into a database. A summary report is written and recommendations regarding the classification of the growing area are made on a yearly basis. The 2013 report is incorporated into this report in the following section. Routine monitoring data is also part of this report and is shown in Table 5-1. Until such time as a full data set of the most recent 30 samples have been collected using the mTEC method, the variability component (90th %) of the water quality criteria is a weighted value based on the number of samples from each method.

5.2 RIDEM Shellfish Program Monitoring

5.2.1 2013 Annual Report of Statistical Evaluations and Comments

HIGHLIGHTS

*** Sampled 5x in 2013 and 1X in 2014 for 2013**
*** Statistics represent combined wet and dry weather data >03/25/09 (N = 30)**
*** Statistics represent combined wet and dry weather, open season data >12/01/09 (N=15) for downgraded conditional/seasonally approved Station 11 Sakonnet Harbor**
*** All approved stations in compliance and conformance**
*** Prohibited Station 11 back in compliance**
*** MTEC = 9 (90% = 43 cfu/100ml)**
**** Data run 2/6/14***

COMMENTARY

The Sakonnet River (Growing Area 4) was sampled six times for the 2013 sampling season, complying with the minimum SRS monitoring requirement for approved areas. Sample results are representative of wet and dry weather conditions. The statistical evaluation for the Sakonnet River incorporates the most recent 30 samples collected for the area, the minimum number required for analysis according to SRS guidelines.

A review of this year's seasonally approved data (N=15) demonstrate that Station 11, located in Sakonnet Harbor, which has been out of compliance for the last several years, is once again back in compliance.

Results of the statistical evaluation demonstrate that all other approved, stations are in program compliance. The area is properly classified.

RECOMMENDATIONS

*** Maintain downgrade of Station 11 (Sakonnet Harbor) from Approved to Prohibited for another year of monitoring**
*** No other action recommended based on ambient monitoring results**

Tab le 5-1 Monitoring Results Reported February 6, 2014

RIDEM SHELLFISH GROWING AREA MONITORING RESULTS

Station Name	*Status*	*N*	*FECAL-GEO MEAN*	*90TH PERC(<43)*
GA4-1	P	30	2.7	5.5
GA4-2	A	30	2.4	3.7
GA4-3	A	30	2.8	6.4
GA4-4	A	30	5.2	21.0
GA4-5	A	30	3.6	9.8
GA4-6	A	30	2.4	5.1
GA4-7	A	30	2.3	3.1
GA4-8	A	30	2.1	2.8
GA4-9	A	30	2.4	4.5
GA4-10	A	30	2.5	7.7
GA4-11	P	30	3.6	17.7
GA4-12	A	30	2.0	2.4
GA4-13	A	30	2.4	4.7
GA4-14	A	30	2.5	4.9
GA4-15	A	30	2.5	5.2
GA4-16	A	30	2.5	6.7
GA4-17	A	30	2.4	5.3
GA4-18	A	30	3.2	10.4
GA4-19	P	30	3.4	7.8
GA4-20	P	30	2.6	5.8
GA4-21	A	29	2.9	6.8

Station Name	*Status*	*N*	*FECAL-GEO MEAN*	*%>CRITICAL<31*
GA4-11	P	15	3.3	6.67

(IF OPEN)

A- Approved P – Prohibited SA – Seasonally Approved

5.3 Sampling Plan and Justification

Growing Area 4 is an approved, prohibited, and seasonally approved growing area. Therefore, the RIDEM Shellfish Program monitors Growing Area 4 in accordance with the guidelines set forth in the NSSP Manual of Operations for systematic random sampling. Water quality monitoring stations within the growing area are sampled six times per year and are statistically evaluated utilizing the most recent thirty samples (N=30). This represents the most recent 5-years of collected data. The geomean and 90th percentile values are used for statistical evaluation.

A random sampling plan for the growing area is scheduled yearly, with a statistically representative cross section of all meteorological, hydrographic, and/or other pollution events that may affect water quality and subsequent shellfish contamination. The growing area is normally monitored every two months throughout the year. A reasonable attempt is made to collect samples on the pre-established days

5.4 RIDEM TMDL Studies

The EPA has approved a TMDL for the prohibited area of the Sakonnet River that addresses the bacteria contamination to the portion of the Sakonnet River that is currently 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 entitled "FINAL Total Maximum Daily Load, The Sakonnet River –Portsmouth Park and The Cove – Island Park, March 2005.

Currently implementation strategies as recommended within the plan to address the pathogen impairment are underway by the responsible parties. The shellfish program's routine monitoring along with any additional focused monitoring that may be deemed necessary will continue, and the area will remain closed to shellfishing until such time monitoring results and a definitive solution to the Town of Portsmouth's wastewater issues have been successfully completed such that results would indicate that the area may be considered for re-opening.

5.5 RIDOH Beach Monitoring Data

Currently there are three licensed beaches within the Sakonnet River Growing area. These three beaches; Sandy Point Beach in Portsmouth and Fogland Beach and Grinnell Beach in Tiverton are monitored during the summer months by the Rhode Island Department of Health (RIDOH). Recently following EPA guidance the indicator for bacteria contamination of recreational swimming changed from fecal coliform to enterococci. Fecal coliform samples are no longer taken at licensed beaches and enterococci can not be compared to it with any relative analysis. The details of this sampling program and results can be found at the following web site: http://www.health.ri.gov/programs/beachmonitoring/index.php .

Table 5-2 2013 RIDOH Monitoring Results

Beach Name	Beach ID	Laboratory	# Closures between 2000 and 2013	# Days Closed
GRINELLS BEACH	RI757756-01	RIDOH	1	1
SANDY POINT BEACH	RI695386-02	RIDOH	3	4
FOGLAND BEACH	RI813834-01	RIDOH	1	2

6.0 Interpretation of Data

6.1 Effects of Meteorological and Hydrographic Conditions

A more extensive investigation would be required to link meteorological and hydrographic conditions to bacterial loading. Based on the statistical results from routine monitoring under all weather and hydrographic conditions there does not appear to be a direct link between an increase in bacteria loadings and meteorological events within this growing area in areas other than those currently closed to shellfishing.

6.2 Recommendations

6.2.1 Monitoring Schedule

The current monitoring schedule is adequate for maintaining correct classification.

6.2.2 Comments

Water quality statistical evaluations indicate that the area conforms to the NSSP requirements as an approved and seasonally approved growing area during all weather periods. There are no recommendations for change in classification at this time.

6.2.3 Legal Description

Based on regular RIDEM Shellfish Program monitoring data and the data acquired during this 12-year shoreline survey, it is recommended that the existing legal description of the growing area be maintained.

Prohibited shellfish closure areas are described below:

Mount Hope Bay; Kickemuit River and Vicinity

Mount Hope Bay and vicinity south and west of the Rhode Island-Massachusetts state line including the waters north and east of a line from Bristol Point to the Hog Island Shoal Light, to the southwestern extremity of Arnold Point in Portsmouth, where a Rhode Island Department of Environmental Management range marker has been established, and the waters of the Kickemuit River, south of a line from the eastern extension of Kickemuit Avenue in Bristol to the Department of Environmental Management range marker located on the western tip of Little Neck in Touisset (so called Bristol Narrows), and the waters of the Sakonnet River north of a line extending from the south-western most corner of the Stone Bridge in Tiverton to the eastern-most extension of Morningside Lane in Portsmouth; and the waters of the Quaket River east of a

line extending from the northwestern most point of Nannaquaket Neck to the Rhode Island Department of Management range marker located on a pole on the opposite shore in Tiverton and east to the eastern most side of the Nannaquaket Bridge in Tiverton.

That portion of the cove in Portsmouth south of a line from the southern end of Hummock Point to the Rhode Island Department of Environmental Management range marker located at the eastern extremity of a point of land on the western shore of the cove.

Sakonnet Harbor

Sakonnet Harbor south of a line from the light at the end of the Sakonnet breakwater to a point of land near the end of Goodrich Lane on the eastern shore of the Harbor.

7.0 Current Classification Map

The following map depicts the current classification of waters within the Sakonnet River Growing Area 4. No changes to the classifications are recommended at this time.

Figure 7-1 2013 - 2014 Classification Map GA 4 North

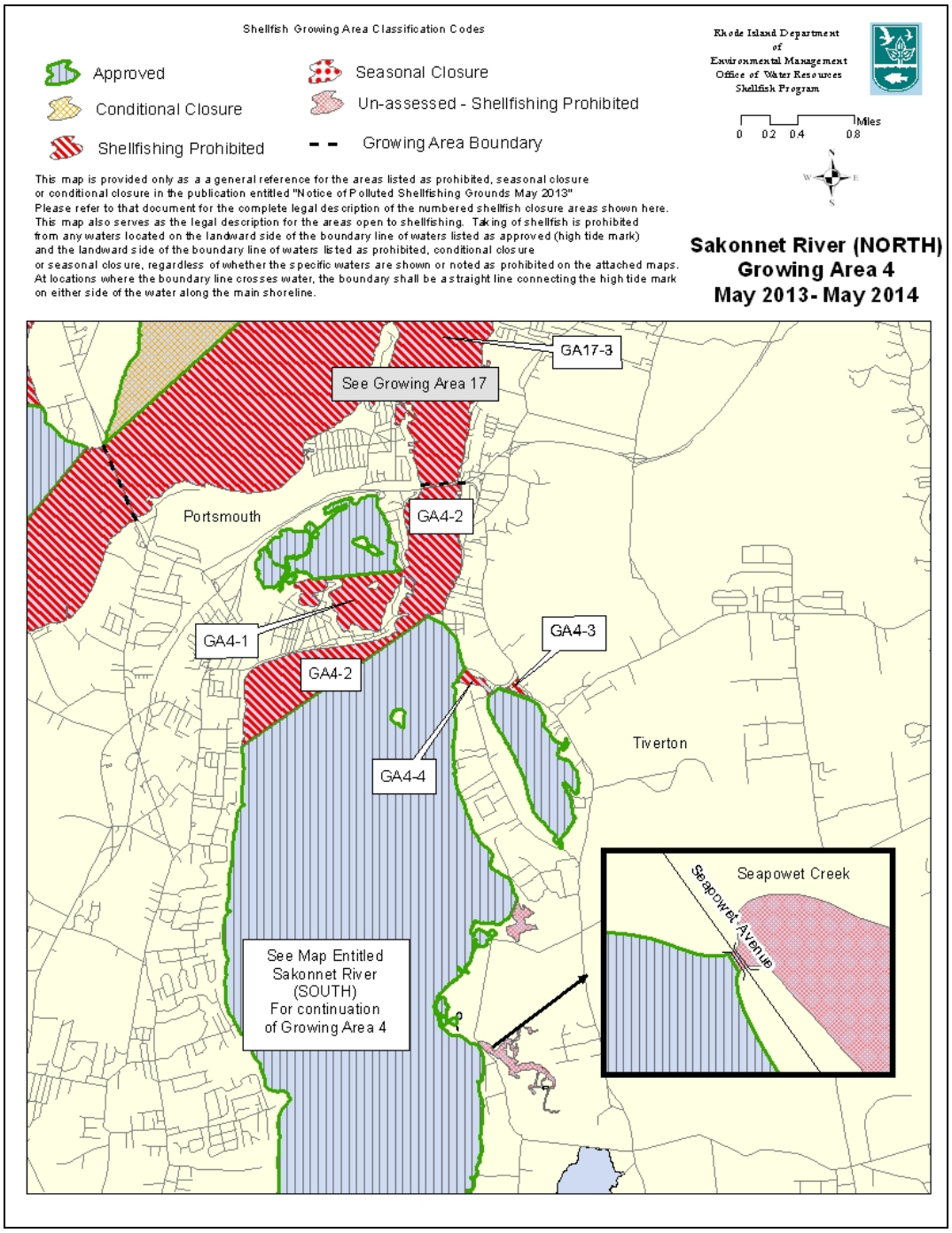
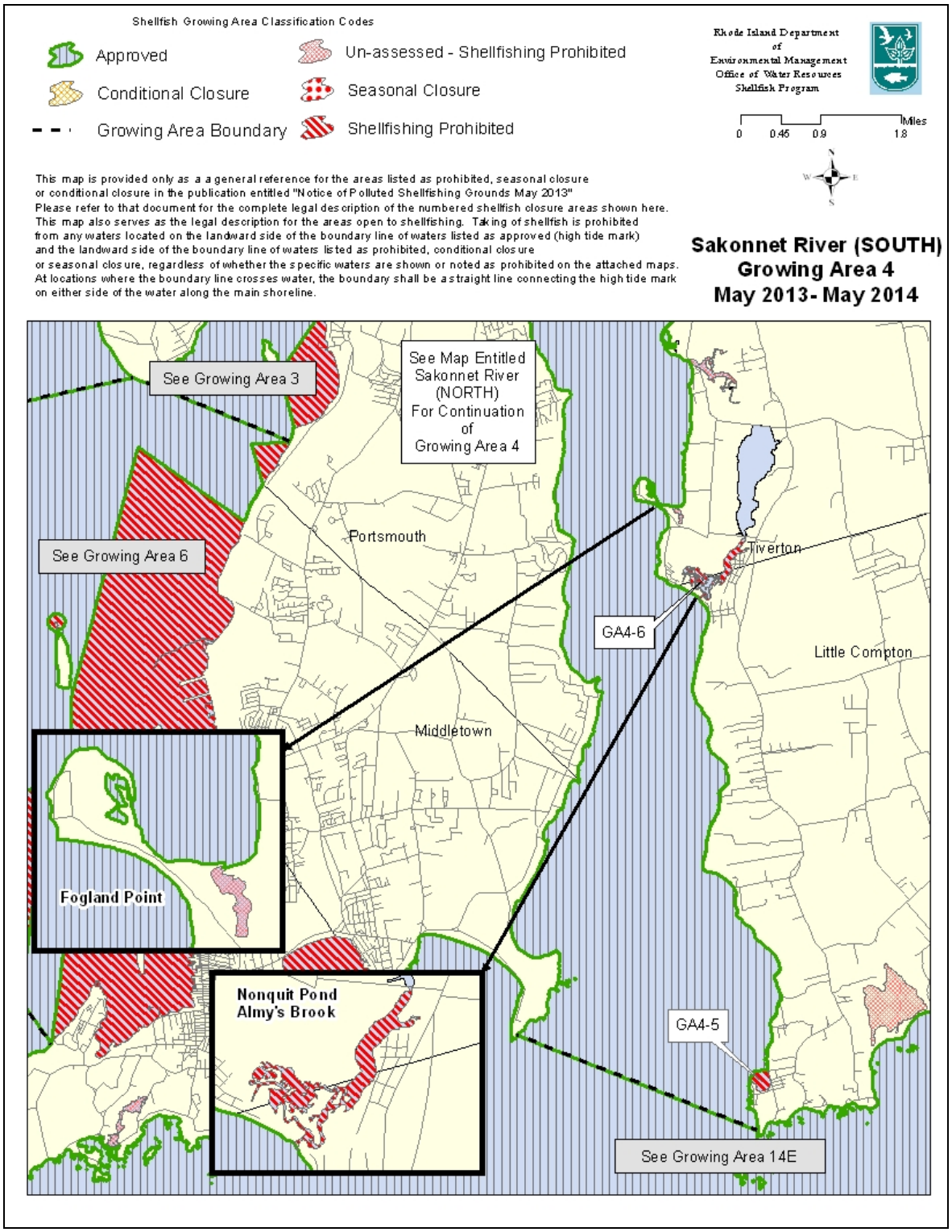


Figure 7-2 2013 – 2014 Classification Map GA 4 South



The next scheduled survey would be an annual review in 2014.

Kickemuit River
Growing Area 5
2013 Annual Update

A 12 year sanitary shoreline survey of the Kickemuit River Growing Area 5 was completed in 2008. A triennial update was completed in 2011.

No sources sampled as part of the triennial update exceeded the 2400 cfu/100ml criteria requiring follow-up sampling for this annual review. Two sources, 5-103 and 5-014 that had elevated counts in 2008 were re-sampled for the annual review in 2012. Both sources had substantially reduced bacteria counts, 19 and 56 fc/100ml respectively. One source identified in previous surveys was re-sampled after locating a semi-buried PVC pipe at the point of what was previously believed to be a groundwater seep at the R.O.W. at the end of Chace Ave. Sample results were 60 CFU/100ml at just a trickle flow. The second source (2013-5-014) previously had high fc counts prior to 2012. There were no observed flows at the time of sampling in 2013. No additional sources or follow-ups were sampled for this annual review.

A TMDL for Mount Hope Bay and the estuarine portion of the Kickemuit River was approved by the EPA on January 14, 2010. All waterbody segments in the Kickemuit River experience elevated levels of fecal coliform bacteria following rain events, hence the "conditional classification" of this growing area. This TMDL provides a detailed plan for reducing bacterial pollution so that the Kickemuit River can meet numeric water quality targets for all designated uses affected by bacteria pollution: shellfishing and primary and secondary contact recreational use under all weather conditions.

In 2013 the mooring fields in the Kickemuit River were classified as seasonally approved, closed during summer months. After further analysis it was determined that these areas are not typical of overnight occupation but rather as "parking lots" for adjacent property owners and therefore not posing the risks associated with transient or overnight mooring fields, these areas were reclassified as Conditionally Approved. One area on the shoreline of Touisset however was determined to be a marina under the definition of dockage that is capable of handling ten or more boats. This smaller area at the Narrows now has a seasonal Marina closure associated with it.

HIGHLIGHTS

*** Sampled 9x in 2013, 1 X in 2014, 5 X 2012 (N=15) for 2013**
*** Statistics represent dry weather, approved data >08/01/12 (N = 15)**
*** Samples collected 11/16/2012 "suspect"**
*** Station 3 exceeds variability criteria when 11/16/2012 data included**
*** All other conditionally approved stations in compliance and conformance**
*** mTEC=15 (<31 cfu/100ml)**
**** Data run 4/14/14***

COMMENTARY

The Kickemuit River (Growing Area 5) was sampled nine times for 2013. All samples were collected during dry weather when the area was "open/approved" for shellfish harvesting. The statistical evaluation for the Kickemuit River incorporates the most recent 15 dry weather samples collected for the area, the minimum number required by NSSP Manual of Operations guidelines for conditionally approved areas.

Results of the statistical evaluation demonstrate that Station 2 is in compliance for the second year in a row. However, Station 3, located in the Narrows, is out of compliance for variability again if we incorporate the 11/16/2012 results. That sampling

run yielded suspiciously high fecal results for the entire Kickemuit as well as all of Mt. Hope Bay. It appears suspiciously high because rarely if ever have <u>all</u> the results of an entire days sampling, which covers a lot of area, be reported as high as these were. When the data is run excluding these extreme results, all conditionally approved stations are in compliance. Last year RIDEM did not include the 11/16/2012 data for the final decision making based on the questionability of the entire data set for that bay run.

Results of the statistical evaluation demonstrate that all conditionally approved stations are in compliance with NSSP guidelines.

A TMDL study of the area was completed in January 2010.

RECOMMENDATIONS

*** Consider "ignoring" 11/16/2012 data again this year**
*** No other action recommended based on ambient monitoring results**

RIDEM SHELLFISH GROWING AREA MONITORING RESULTS

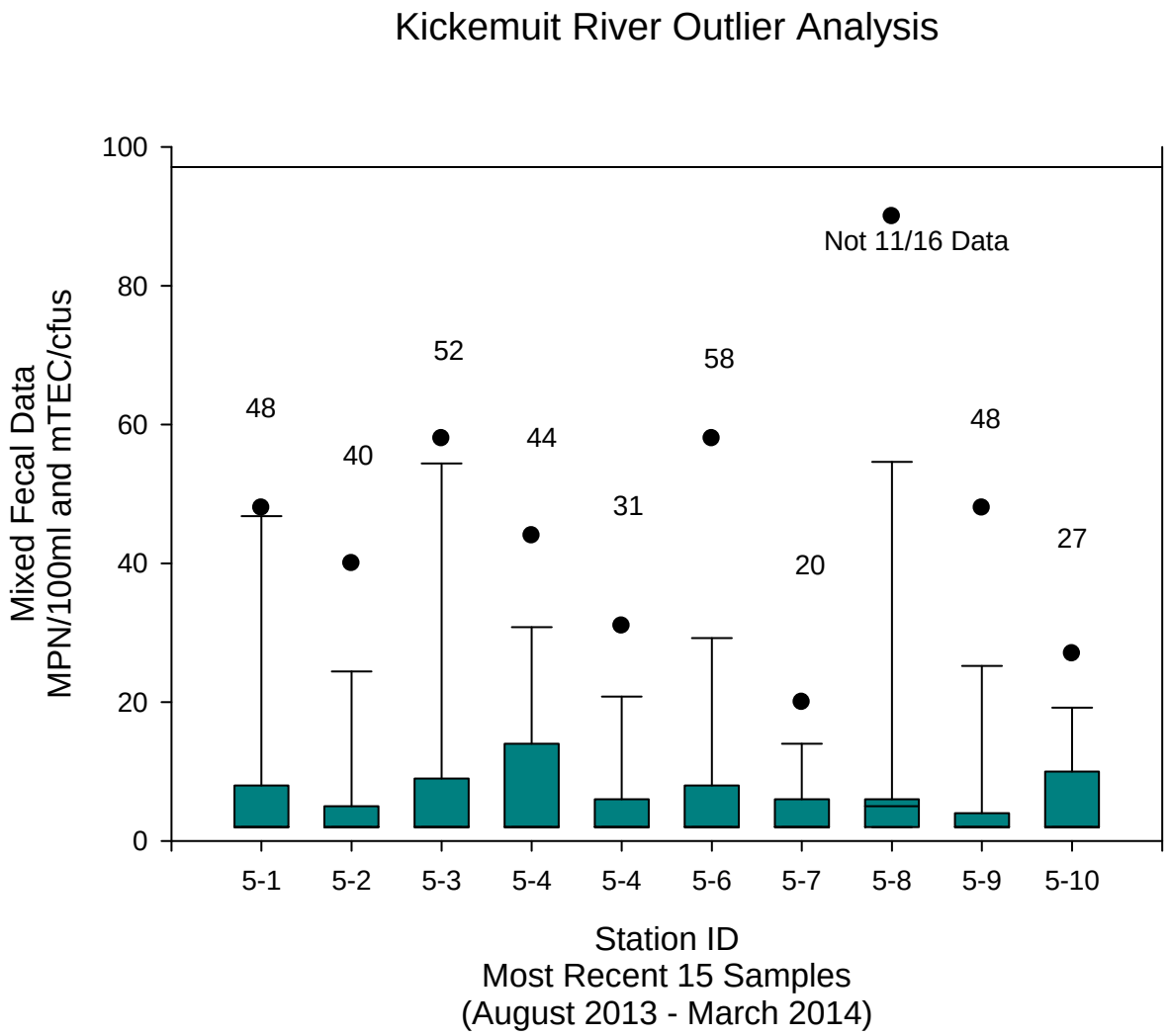
Station Name	Status	N	FECAL-GEO MEAN	%>CRITICAL 31
GA5-1	CA	15	3.8	0.00
GA5-2	CA	15	3.5	0.00
GA5-3	CA	15	4.2	13.33
GA5-4	CA	15	4.5	0.00
GA5-5	CA	15	3.3	0.00
GA5-6	CA	15	4.2	6.67
GA5-7	CA	15	3.2	0.00
(GA5-8)	P	14*	5.3	7.14
GA5-8	P	15	5.0	6.67
GA5-9	CA	15	3.2	0.00
GA5-10	CA	15	3.9	0.00

***Since station is prohibited additional data points were not included for N=15**

RIDEM SHELLFISH GROWING AREA MONITORING RESULTS
Excluding 11/16/2012

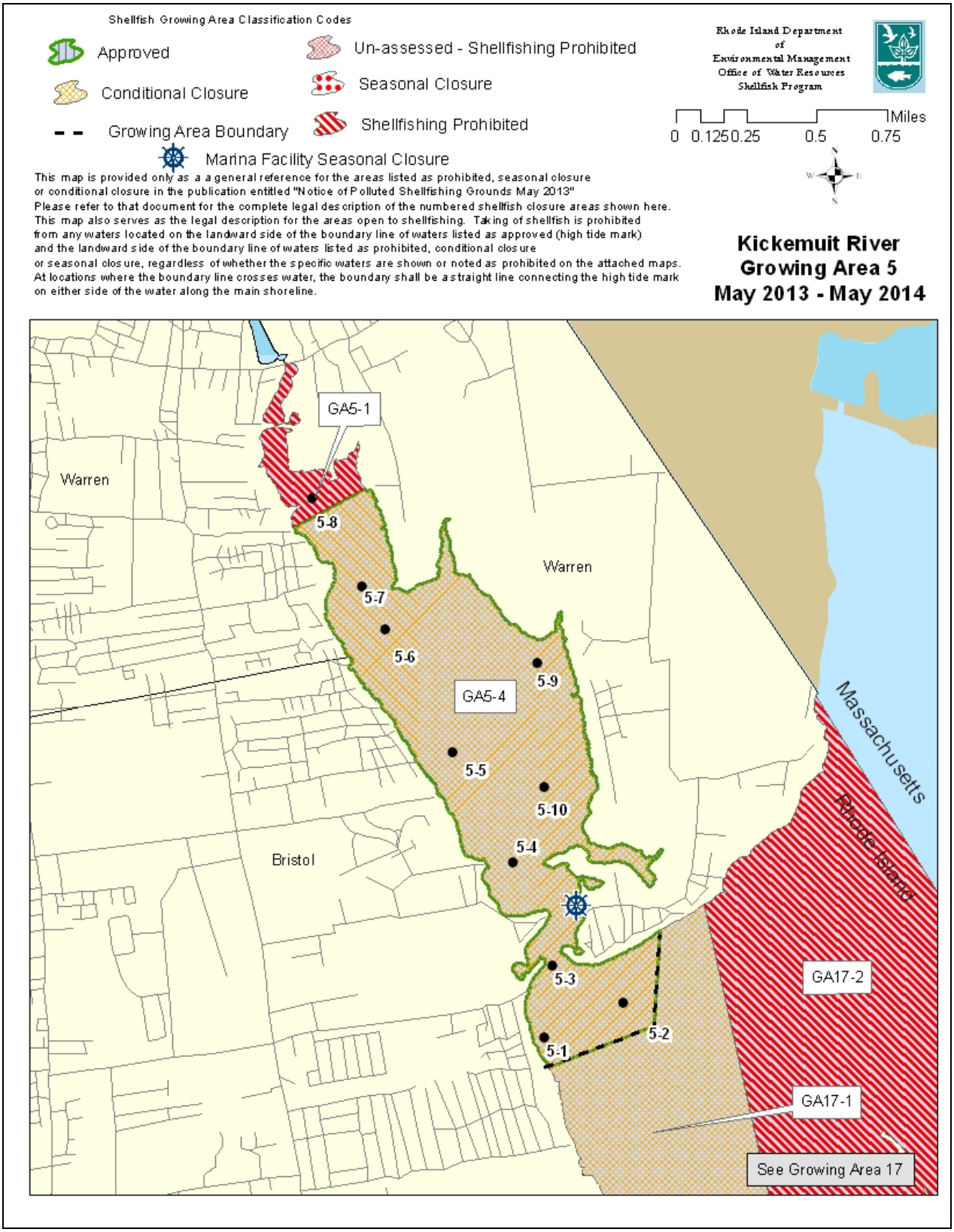
Station Name	Status	N	FECAL-GEO MEAN	%>CRITICAL 31
GA5-1	CA	15	3.1	0.00
GA5-2	CA	15	2.9	0.00
GA5-3	CA	15	3.4	6.67
GA5-4	CA	15	3.6	0.00
GA5-5	CA	15	2.8	0.00
GA5-6	CA	15	3.3	0.00
GA5-7	CA	15	2.7	0.00
GA5-8	p	15	4.4	6.67
GA5-9	CA	15	2.6	0.00
GA5-10	CA	15	3.3	0.00

The following graph is produced in support of the decision to not include the monitoring results from 11/16/2012 in the data set. As can be seen 9 out of the 10 stations (90%) in the Kickemuit, the outlier is the result from that particular bay run. The one station (5-3), that is not in statistical compliance when including the 11/16/12 result is in compliance when the 11/16/12 result is removed from the data set. Based on the decision to not use these results in the analysis all approved stations are in statistical compliance.



Since at least 2000 the stations located within the seasonal closures off Laurel Park and in the Bristol Narrows have been in program compliance, including during the high usage summer months. A survey of the types of boating activity in this area reveals that these moorings are more of a “parking lot” nature rather than a destination mooring for day or overnight use and used primarily by the residents of the surrounding neighborhood. The harbor management plans for the towns of Warren and Bristol include the requirement that the municipal pump out boat service any needs of boaters within the Kickemuit River. Based on this new analysis the removal of the seasonal closure is warranted in all areas of the Kickemuit except for the docking area adjacent to the Touisset shoreline just north of the narrows. This dock is for the Touisset neighborhood and has the potential to dock at least 10 boats, which based on the NSSP definition would be considered a marina. A 25’ marina seasonal closure is recommended for this area. The 2013 -2014 classification map has been revised to reflect these two changes.

The following figure is the classification map with monitoring stations shown for the 2013-2014 season for Growing Area 5, the Kickemuit River. A triennial review of this growing area is scheduled for 2014.



The next scheduled survey will be a triennial update in 2014.

East Passage
Growing Area 6
2013 Annual Update

A 12 year sanitary shoreline survey of the East Passage Growing Area 6 was conducted in 2006. A triennial update was completed in 2012. The shoreline survey identified sixty-three (63) actual or potential sources excluding marinas. Thirty two (32) or almost half of the sources were not actively flowing at the time of the shoreline survey with the remaining thirty-one (31) having flows warranting sampling.

A triennial update was completed in 2012 in which all elevated sources identified in 2006 were re-sampled. Thirteen sources had elevated bacteria results in the 12 year survey; four of them were within prohibited areas and were not re-sampled as part of this annual review. In 2012 of the nine remaining sources, six had no flows and the remaining three sources that had flows had bacteria counts of less than 240 CFU/100 ml. The results from this sampling with additional results from 2013 sampling are in the following table. The area where these sources are located had been problematic in the past and so an effort was made to re-sample even though bacteria counts were relatively low in 2012. Additionally two larger streams that flow under the road and discharge into Cranston Cove at Wright Lane were also sampled. These three samples identified as 2013-6-100, 100N and 100S had results of 243, 110 and 48 CFU/100ml respectively. Although they do have heavier flows bacteria counts are fairly low which would indicate that these sources are not having a negative impact on the growing area. Routine monitoring station 6-10 located just to the east of this cove was well in compliance water quality standards with a geo-mean of 2.2 and a 90th percentile < 43 of 3.5. No sources re-sampled had elevated results warranting any additional investigation.

The results of the routine monitoring stations indicate that this growing area is properly classified and therefore no changes to the classification are recommended at this time. The 2013 -2014 classification map is included in this report on page three. The next schedule survey would be an annual update in 2014.

Elevated sources in the East passage

Source ID	Description	Actual/ Potential	Direct/ Indirect	2006 Results	FLOW	January 2007 Results	August 2008 Results	Size	2009 Results	2010 Results	Add'tl. 2011 Results	2011 Follow-up Results	2012 Follow-up Results	2013 Follow-up Results
2006-6-001	Stream north of Wright Lane	A	D	460	1.42 cfs	NS	NS	4' wide 3" deep	1500. 85 cfs	230 < 3 in stream		NS	20 trickle flow	<3
2006-6-002	Small stream thru woods, actually (2) 6" PVC pipes	A	D	11,000	Trickle	<3	NF	2' wide ¼" deep	930 Trickle	NF		750 IS 3	NF	136
2006-6-003	Stream thru woods, actually (2) 4" PVC pipes	A	D	110,000	.002 cfs	1,100 .027 cfs	39 Trickle	6" wide ½" deep	230 Trickle	Unable to locate		1100 IS 11	NF	NF
2006-6-107	Small stream thru woods, actually 6" PVC pipe	A	D	23,000	Trickle	15 Trickle	75 Drip		4 Steady small stream		93	<3 <3 N 4 S	110 trickle flow	NF
2006-6-108	Groundwater/ very small stream from uplands, actually 6" PVC pipe	A	D	12,000	Trickle	23	93,000 Stagnant		230 Steady stream		210	4 <3 N 4 S	NF	NF
2006-6-210	Stone headwall w/ standing water most likely from retention pond	A	D	11,000	Stagnant	430 .013 cfs			1500 In stream headwall submerged	NF		NF	NF	NS

NF – No Flow NS – No Sample

N – North in stream S- South in stream IS – Instream directly in front of source

Shellfish Growing Area Classification Codes

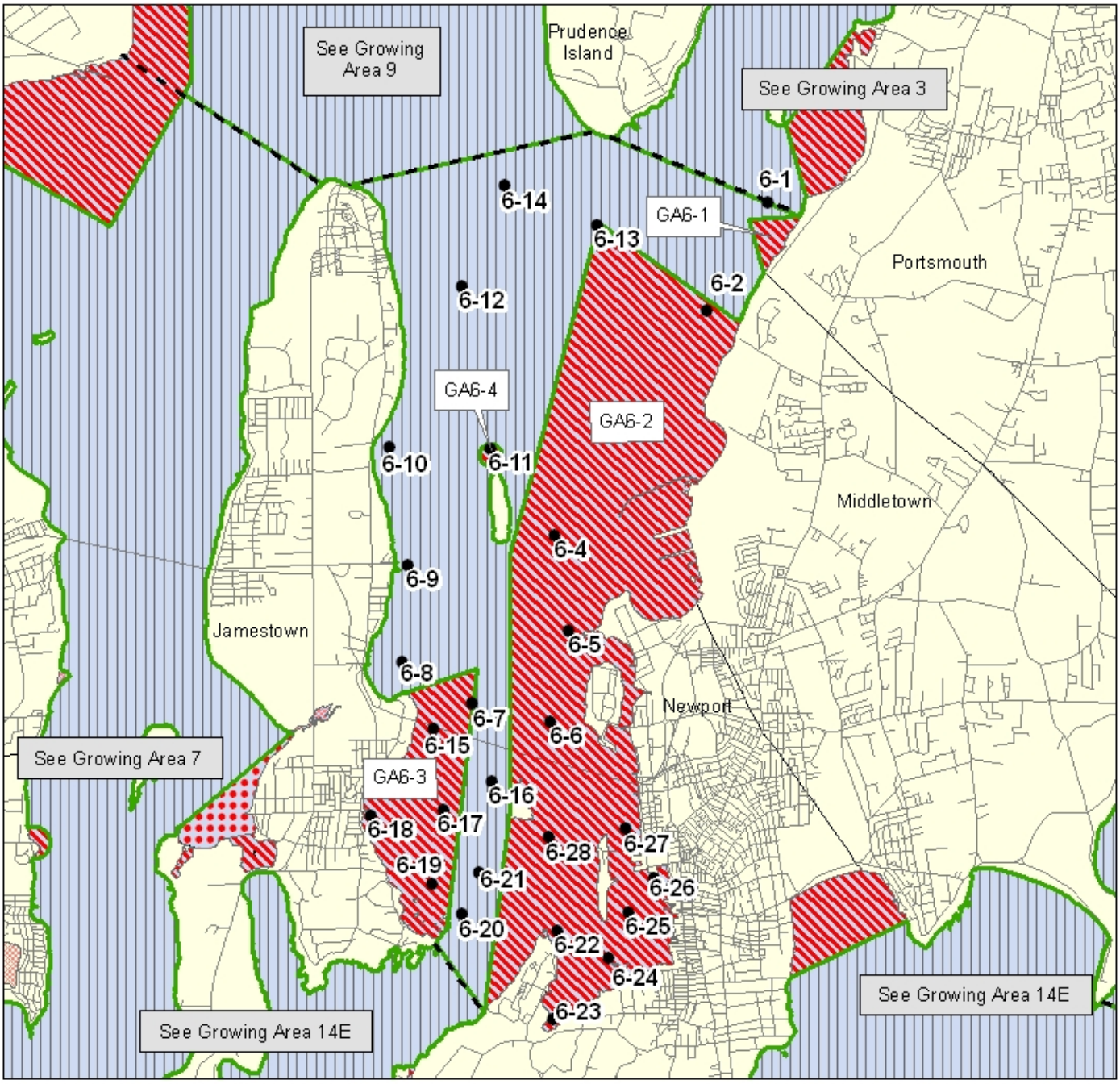
- Growing Area Boundary
- Approved
- Shellfishing Prohibited
- Un-assessed - Shellfishing Prohibited
- Seasonal Closure

Rhode Island Department of Environmental Management Office of Water Resources Shellfish Program

0 0.45 0.9 1.8 Miles

This map is provided only as a a general reference for the areas listed as prohibited, seasonal closure or conditional closure in the publication entitled "Notice of Polluted Shellfishing Grounds May 2013" Please refer to that document for the complete legal description of the numbered shellfish closure areas shown here. This map also serves as the legal description for the areas open to shellfishing. Taking of shellfish is prohibited from any waters located on the landward side of the boundary line of waters listed as approved (high tide mark) and the landward side of the boundary line of waters listed as prohibited, conditional closure or seasonal closure, regardless of whether the specific waters are shown or noted as prohibited on the attached maps. At locations where the boundary line crosses water, the boundary shall be a straight line connecting the high tide mark on either side of the water along the main shoreline.

East Passage Growing Area 6 May 2013 - May 2014



HIGHLIGHTS

*** Sampled 5x in 2013 and 1X in 2014 for 2013**
*** Statistics represent combined wet and dry weather data >01/01/09 (N = 30)**
*** All approved stations in compliance and conformance**
*** MTEC = 9 (90% = 43 cfu/100ml)**
**** Data run 2/6/14***

COMMENTARY

The East Passage (Growing Area 6) was sampled six times for the 2013 sampling season, complying with the minimum SRS monitoring requirement for approved areas. Sample results are representative of wet and dry weather conditions. The statistical evaluation for the East Passage incorporates the most recent 30 samples collected for the area, the minimum number required for analysis according to SRS guidelines.

Results of the statistical evaluation demonstrate that all approved stations are in program compliance. The area is properly classified.

RECOMMENDATIONS

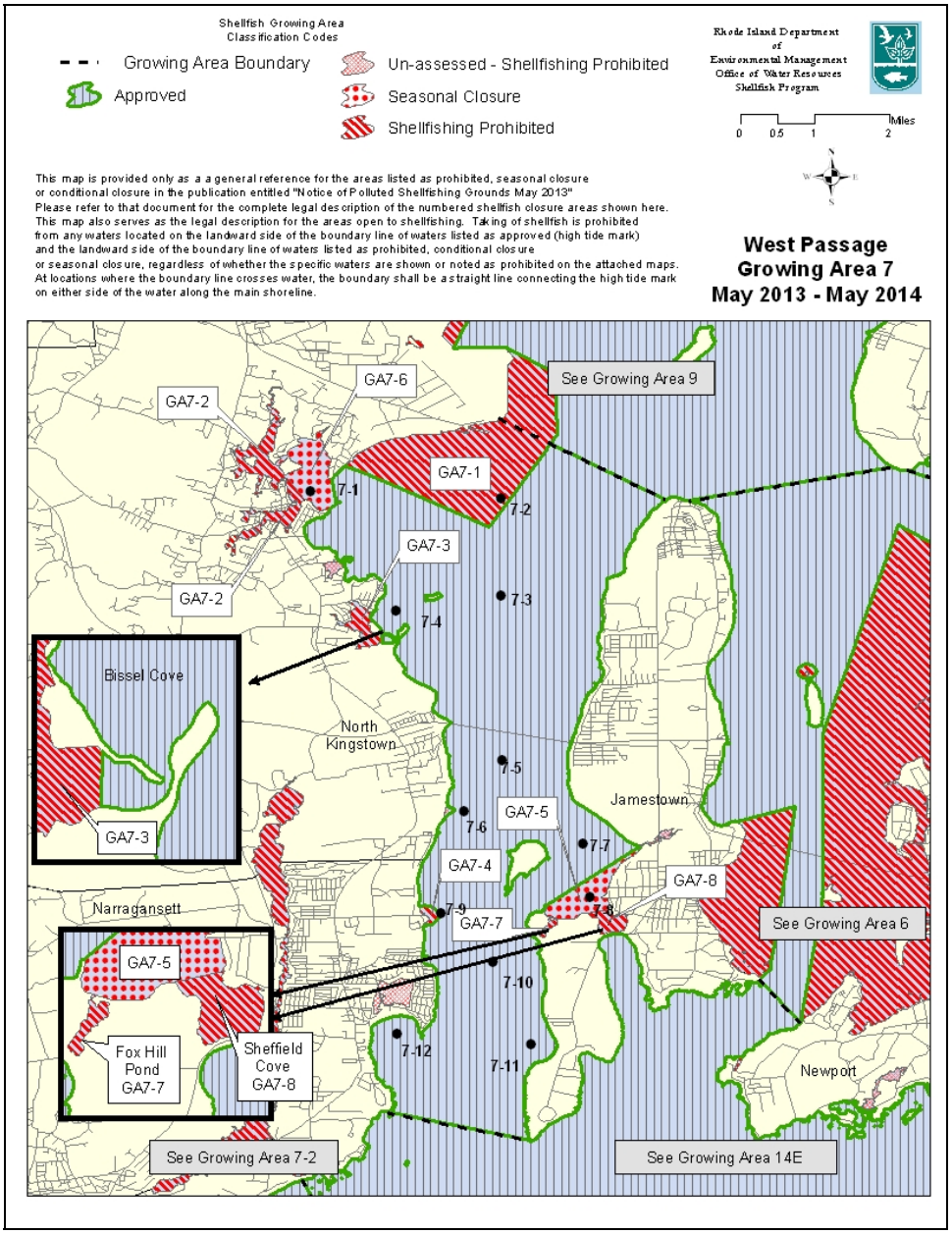
*** No action recommended based on ambient monitoring results**

RIDEM SHELLFISH GROWING AREA MONITORING RESULTS

Station Name	*Status*	*N*	*FECAL-GEO MEAN*	*90TH PERC(<43)*
GA6-1	A	30	2.4	4.3
GA6-2	P	30	2.5	4.8
GA6-4	P	30	2.0	2.4
GA6-5	P	30	2.8	8.9
GA6-6	P	30	2.8	5.9
GA6-7	P	30	2.2	3.2
GA6-8	A	30	2.2	3.3
GA6-9	A	30	2.0	2.0
GA6-10	A	30	2.2	3.5
GA6-11	P	30	2.2	3.2
GA6-12	A	30	2.2	3.4
GA6-13	A	30	2.4	4.3
GA6-14	A	30	2.1	2.7
GA6-15	P	30	2.3	3.4
GA6-16	A	29	2.5	4.3
GA6-17	P	30	2.3	3.4
GA6-18	P	30	2.3	3.9
GA6-19	P	30	2.4	4.2
GA6-20	A	30	2.4	3.8
GA6-21	A	30	2.2	3.1
GA6-22	P	30	2.7	5.7
GA6-23	P	30	2.5	4.1
GA6-24	P	30	3.2	13.0
GA6-25	P	30	7.1	43.5
GA6-26	P	30	9.6	74.0
GA6-27	P	30	4.1	30.5
GA6-28	P	29	2.6	6.0

West Passage
Growing Area 7
2013 Annual Update

A shoreline survey of the West Passage Growing Area 7 was conducted in 2005. A total of 105 sources were identified during this shoreline survey, excluding marinas. A total of thirty-seven of the one hundred and five sources were not actively flowing at the time of the shoreline survey with the remaining 68 having flows warranting sampling. All sources in which flow was observed were sampled. A triennial update was completed in 2011, fourteen sources were sampled. Of those fourteen only 3 exhibited elevated bacteria counts that required follow-up sampling in 2012. Only one in the 2012 follow-up sampling exceeded 2400 CFU/100ml requiring follow-up sampling for this annual review.



No changes to the classification of the West Passage growing area are recommended. The next scheduled survey is a triennial update in 2014.

Source ID	Description	Actual	Direct	2005 Results Fc/MPN FLOW	2006 Results Fc/MPN	2007 Results Fc/MPN	2009 Results Fc/MPN	2010 Results Fc/MPN	2011 Results Fc/MPN	2012 Results CFU/mTEC	2013 Results CFU/100ml
2005-7-109	Flow thru upland vegetation Plum Beach	A	D	>=2400 STEADY	43	430	43	NF	4300	208	NS
2005-7-118	2 1/2" dia PVC pipe in seawall Griffith Road north of stream	A	D	>/=240003 SEC 125 ML	NF	NS	930	NF	2300	**8000**	420 .001 cfs
2005-7-302	24" dia RCP from storm drain west of #71 Colonel John Gardner Road buried under rocks	A	D	11000 TRICKLE	93	NS	NF	NF	NF	NF	NF

NF – No Flow NS – No Sample

As noted above the results from sampling for source 7-118 were 8000 cfu/100ml in 2012 and greatly reduced when sampled in 2013. This a small 2 ½" diameter pipe located at the base of a concrete seawall. At times this source is buried and other times exposed. The flows from this pipe have never been more than a mere trickle and because of these low flows (.001 cfs), this source does not appear to have an impact on the quality of the West Passage receiving waters. This source should be re-inspected and sampled and upland reconnaissance completed if warranted.

HIGHLIGHTS

*** Sampled 5x in 2013, 1 X in 2014 for 2013**
*** Statistics represent combined wet and dry weather data >01/01/09 (N = 30)**
*** Statistics represent combined wet and dry weather, open season data >03/01/10 (N=15) for conditional/seasonally approved Sta.'s 1 and 8**
*** All approved and conditional/seasonally approved stations in compliance and conformance**
*** MTEC = 9 (90% = 43 cfu/100ml)**
**** Data run 2/6/14***

COMMENTARY

The West Passage (Growing Area 7) was sampled six times for the 2013 season, complying with the minimum SRS monitoring requirement for approved areas. Sample results are representative of wet and dry weather conditions. The statistical evaluation for the West Passage incorporates the most recent 30 samples collected for the area, the minimum number required for analysis according to SRS guidelines.

Results of the statistical evaluation demonstrate that all approved and conditional/seasonally approved stations are in program compliance. The area is properly classified.

RECOMMENDATIONS

- **No action recommended based on ambient monitoring results**

RIDEM SHELLFISH GROWING AREA MONITORING RESULTS

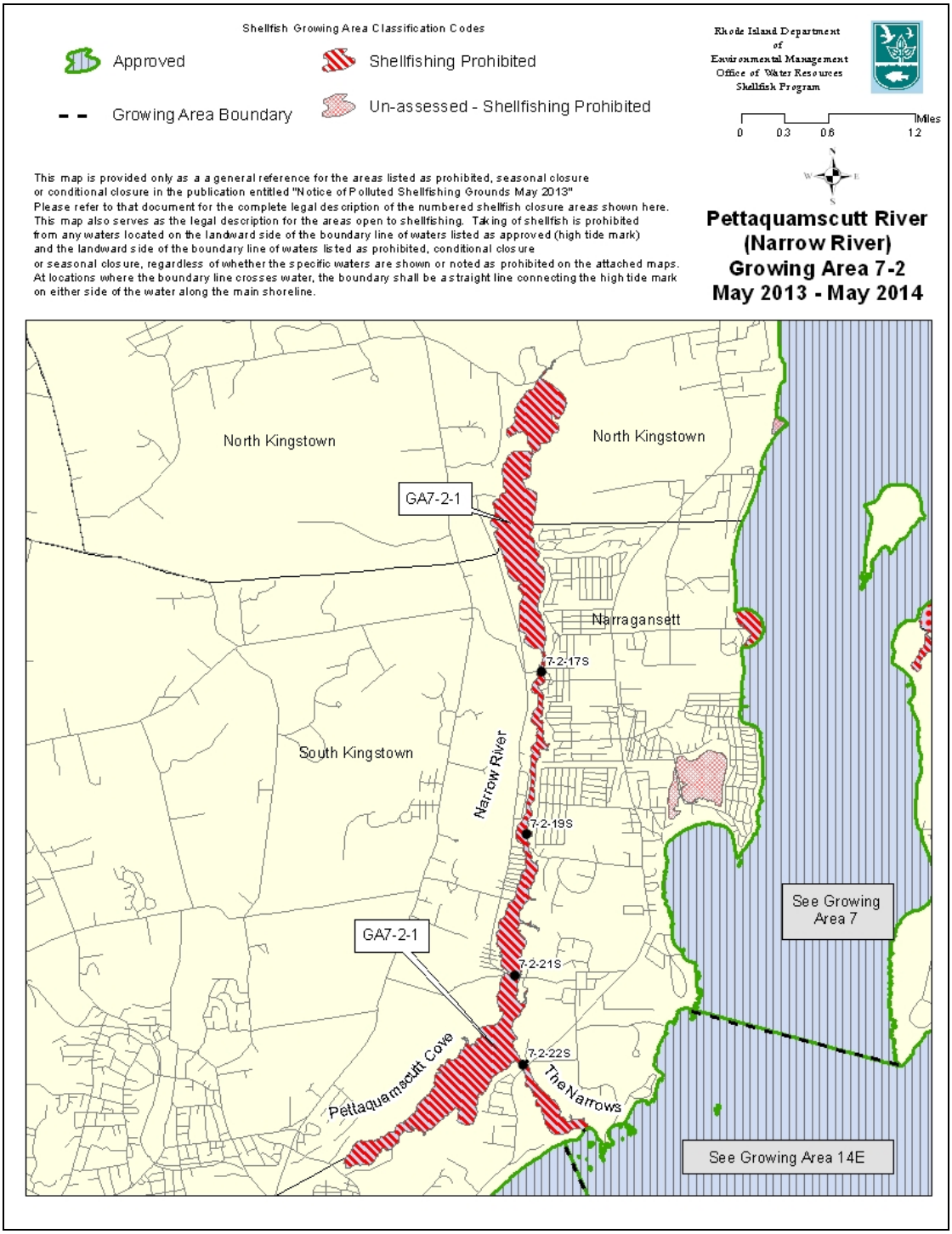
Station Name	*Status*	*N*	*FECAL-GEO MEAN*	*90TH PERC(<43)*
GA7-1	SA	30	5.1	26.6
GA7-2	P	30	2.0	2.4
GA7-3	A	30	2.2	3.4
GA7-4	A	30	3.0	7.9
GA7-5	A	30	2.2	2.9
GA7-6	A	30	2.3	4.9
GA7-7	A	30	2.3	3.8
GA7-8	SA	30	2.4	4.7
GA7-9	P	30	2.0	2.4
GA7-10	A	30	2.0	2.0
GA7-11	A	29	2.1	2.9
GA7-12	A	29	2.4	7.4

Most recent seasonal wet/dry combined open season data

Station Name	Status	N	FECAL-GEO MEAN	%>CRITICAL<31
GA7-1 (OPEN)	SA	15	3.4	0.00
GA7-8 (OPEN)	SA	15	2.4	0.00

Growing Area 7-2
Narrow (Pettaquamscutt) River
2013 Annual Update

All waters of the Narrow River, Growing Area 7-2 are currently prohibited to shellfishing. The area was sampled three times in 2013. The following map shows the sampling station locations and the current classification of this growing area. Results from the statistical evaluation of all stations exceed the shellfish standard during both wet and dry conditions, therefore the area is properly classified as prohibited as detailed in the following statistical evaluation summary.



HIGHLIGHTS

*** Sampled 3x in 2013**
*** Statistics represent wet and dry weather data >08/31/09 (N = 15) (w=7; d=8)**
*** Dry weather statistics data > 8/1/08 (N = 15)**
*** All stations out of compliance under all conditions**
*** Area is prohibited**
*** mTEC = 6 (90 % =45 cfu/100ml)**
*** mTEC = 3 for dry only data (90% = 47 cfu/100ml)**
**** Data run 2/26/14***

COMMENTARY

The Pettaquamscutt River (Growing Area 7-2) was sampled three times in 2013. Since the area is classified as prohibited, there is no minimum sampling requirement. The area has been closed to shellfish harvesting for direct human consumption since 1985 due to unpredictable and elevated fecal coliform levels. This area is unique from other growing areas because it is sampled exclusively from shore-accessed stations, mostly from bridges spanning the River. The statistical evaluation for the Pettaquamscutt River incorporates the most recent 15 samples. No NSSP compliance guidelines exist for statistically evaluating prohibited areas. The TMDL for the area was completed in 2002. The recommendations call for additional monitoring to be conducted by NRPA volunteers through the URI Watershed Watch program.

Results of the statistical evaluation demonstrate that all stations exceed shellfish harvesting criteria during combined wet and dry weather. The dry weather only data also exceeds harvesting criteria. The area is properly classified as prohibited.

RECOMMENDATIONS

*** No action recommended**

RIDEM SHELLFISH GROWING AREA MONITORING RESULTS

COMBINED WET AND DRY DATA

Station Name	Status	N	FECAL-GEO MEAN	90TH PERC(<45)
GA72-17S	P	15	25.4	238.8
GA72-19S	P	15	32.0	276.7
GA72-21S	P	15	20.6	130.9
GA72-22S	P	15	15.9	160.6

DRY WEATHER ONLY

Station Name	Status	N	FECAL-GEO MEAN	90TH PERC(<47)
GA72-17S	P	15	20.2	173.8
GA72-19S	P	15	32.8	341.2
GA72-21S	P	15	12.7	126.7
GA72-22S	P	15	19.3	207.5

Greenwich Bay
Growing Area 8
2013 Annual Update

A shoreline survey of the Greenwich Bay Growing Area 8 was conducted in 2005. A total of 161 potential or actual sources were identified during this shoreline survey. Ninety of these sources had flows while the remaining 71 were not flowing at the time of the survey. Six of these sources had results greater than 2400 MPN /100 ml however they were all located in prohibited sections of the growing area and therefore do not warrant follow-up as per the standard operating procedures. A triennial update was completed in 2011. No source was identified that exceeded the 2400 MPN/100 ml criteria for follow-up sampling. All other sources that exceeded the follow-up threshold are located in prohibited areas and were not re-sampled as part of this review.

In July of 2012 the RIDOH converted from the MPN multi tube fermentation process to the mTEC membrane filtration method for analyzing shellfish water samples. The data is compiled and reviewed according to NSSP requirements stating that at least the most recent 15 data sets be used. During the conversion process and until such time as the full set of 15 samples have been collected and analyzed using the mTEC method a distributed set of sample results shall be combined to determine the percent greater than element of the standard. Refer to the document entitled RIDEM Office of Water Resources, Shellfish Program "Transition to Membrane Filtration (mTEC) for Analysis of Fecal Coliform in Seawater and Pollution Source Samples", August 2012. Twelve or thirteen sets of samples have been analyzed using the mTEC method for Greenwich Bay depending on the station.

HIGHLIGHTS

*** Sampled 1X in 2014, 8 X in 2013 and 6 X in 2012 N=15 for 2013**
*** Statistics represent dry weather, approved data >06/02/12 (N=15) for Sta.'s 4,5,12, 15**
*** Statistics represent dry weather, approved data >05/31/12 (N=15) for Sta.'s 13, 18, 25A**
*** Statistics represent dry weather, approved data >04/01/12 (N=15) for Sta. 17**
*** December only data 2000 – 2011 significantly exceeds criteria**
*** All conditionally approved stations in compliance for January – November**
*** mTEC = 13 or 12 for different stations due to sampling restrictions**
**** Data run 4/15/14***

COMMENTARY

Greenwich Bay (Growing Area 8) was sampled eight times in 2013. The statistical evaluations for Greenwich Bay incorporate the most recent 15 dry weather samples collected for the area when open/approved for shellfish harvesting, which is the minimum number required by NSSP Manual of Operations guidelines for conditionally approved areas.

All the stations in Greenwich Bay show significant elevations in both geometric means and variability criteria in the month of December, enough to knock many conditionally approved stations out of compliance. The November and January data, as well as the warm months of the year, are in compliance. Based on these results, the western portion of Greenwich Bay should remain closed for the month of December as it has for the last two years and until additional data is collected in December. Station 8-17 is in program compliance and remains conditionally approved during the month of December.

RECOMENDATIONS

*** Maintain closure of western portion of Greenwich Bay during the month of December**
*** Target December sampling during dry weather conditions (open status)**
*** No other action recommended**

RIDEM SHELLFISH GROWING AREA MONITORING RESULTS

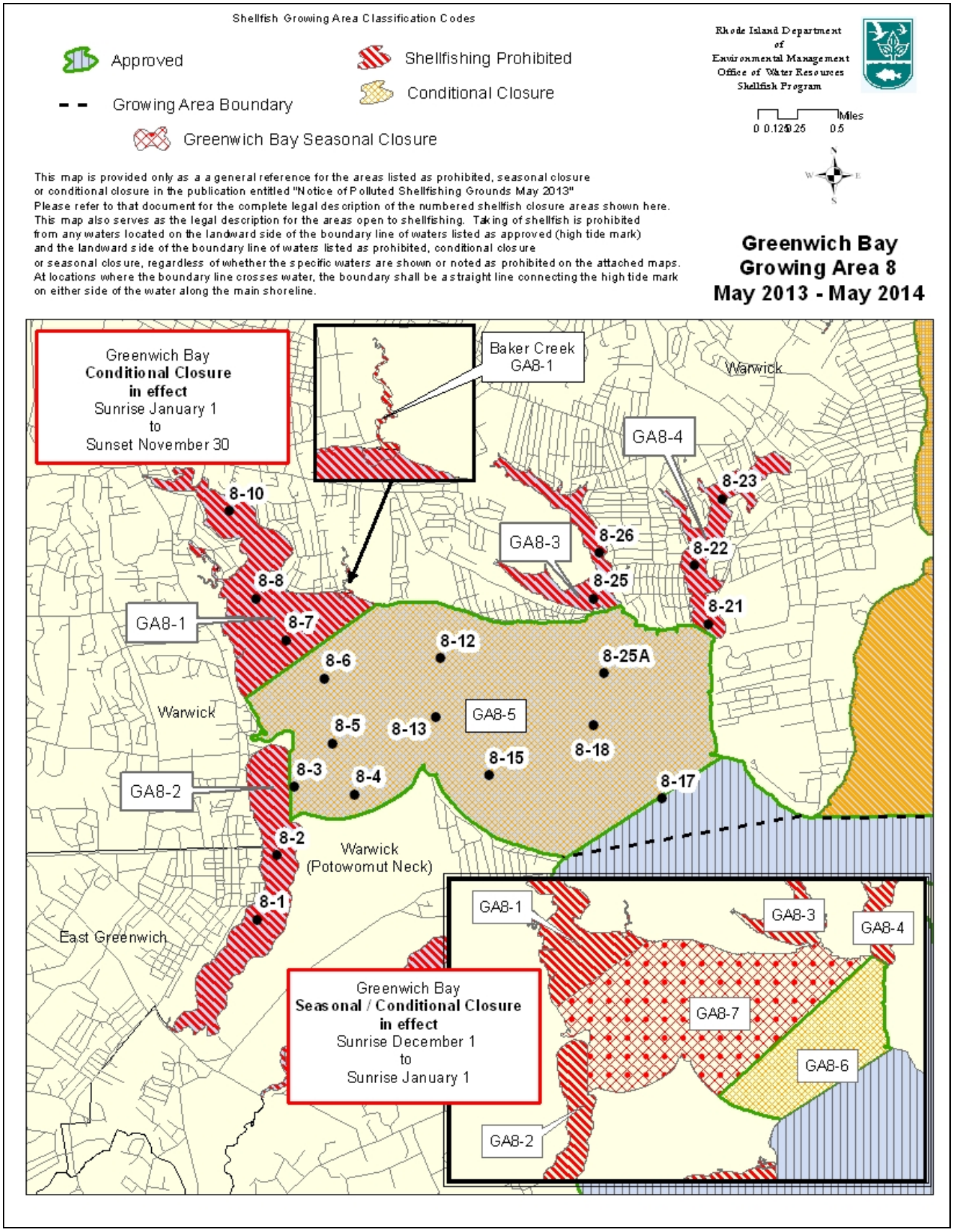
Station Name	*Status*	*N*	*FECAL-GEO MEAN*	*%>CRITICAL(31/49)*
GA8-1	P	15	3.5	0.00
GA8-2	P	15	5.5	6.67
GA8-3	P	15	2.8	0.00
GA8-4	CA	15	2.0	0.00
GA8-5	CA	15	2.6	0.00
GA8-6	P	15	2.6	0.00
GA8-7	P	15	3.5	0.00
GA8-8	P	15	6.9	6.67
GA8-10	P	15	14.4	26.67
GA8-12	CA	15	2.4	0.00
GA8-13	CA	15	2.4	0.00
GA8-15	CA	15	2.4	0.00
GA8-17	CA	15	2.3	0.00
GA8-18	CA	15	2.7	0.00
GA8-21	P	15	3.6	6.67
GA8-22	P	15	6.4	0.00
GA8-23	P	15	7.6	13.33
GA8-25	P	14*	3.2	0.00
GA8-26	P	14*	7.1	14.28
GA8-25A	CA	15	3.4	6.67

*Since stations are prohibited additional data points were not included for N=15

December only data 2000 to present

RIDEM SHELLFISH GROWING AREA MONITORING RESULTS

Station Name	*Status*	*N*	*FECAL-GEO MEAN*	*%>CRITICAL(31/49)*
GA8-1	P	9	13.0	11.11
GA8-2	P	10	17.1	30.00
GA8-3	P	11	18.9	18.18
GA8-4	CA	11	13.9	9.09
GA8-5	CA	11	23.3	27.27
GA8-6	CA	11	35.3	27.27
GA8-7	P	11	112.6	54.55
GA8-8	P	11	122.0	81.82
GA8-10	P	10	102.0	80.00
GA8-12	CA	11	18.5	27.27
GA8-13	CA	11	30.5	45.45
GA8-15	CA	11	5.5	9.09
GA8-17	CA	11	11.5	9.09
GA8-18	CA	11	12.9	9.09
GA8-21	P	10	14.9	10.00
GA8-22	P	9	23.1	22.22
GA8-23	P	9	14.5	11.11
GA8-25	P	10	14.1	10.00
GA8-26	P	9	47.4	44.44
GA8-25A	CA	7	18.8	14.29



The next scheduled survey would be a triennial update to be completed in 2014.

West Middle Bay

Growing Area 9

2013 Triennial Re-Evaluation

Calf Pasture Point Beach - ProJo

Rhode Island
Department of Environmental Management
Office of Water Resources
Shellfish Program

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1.0 Introduction

A triennial re-evaluation shoreline survey of West Middle Bay was conducted in order to comply with National Shellfish Sanitation Program (NSSP) requirements for shellfish growing area classification. The primary objective of this shoreline survey is to identify and characterize sources of pollution affecting the area and re-evaluate point and non-point sources previously identified during prior surveys. This triennial update of Area 9 (Figure 1) was conducted in the summer of 2013. The survey involved follow-up sampling of previously identified sources that resulted in fecal coliform counts exceeding 240 MPN / 100ml. These sources were evaluated to determine the bacteriological impact into the growing area.

The survey area encompasses all of the waters of the West Middle Bay east from Sandy Point on Potowomut Neck south to Quonset Point including the Potowomut River and the waters of the west side of Prudence Island from Providence Point to the "T-Wharf" at the southern end of Prudence Island. The study area is located within the towns of Warwick, North Kingston and Portsmouth.

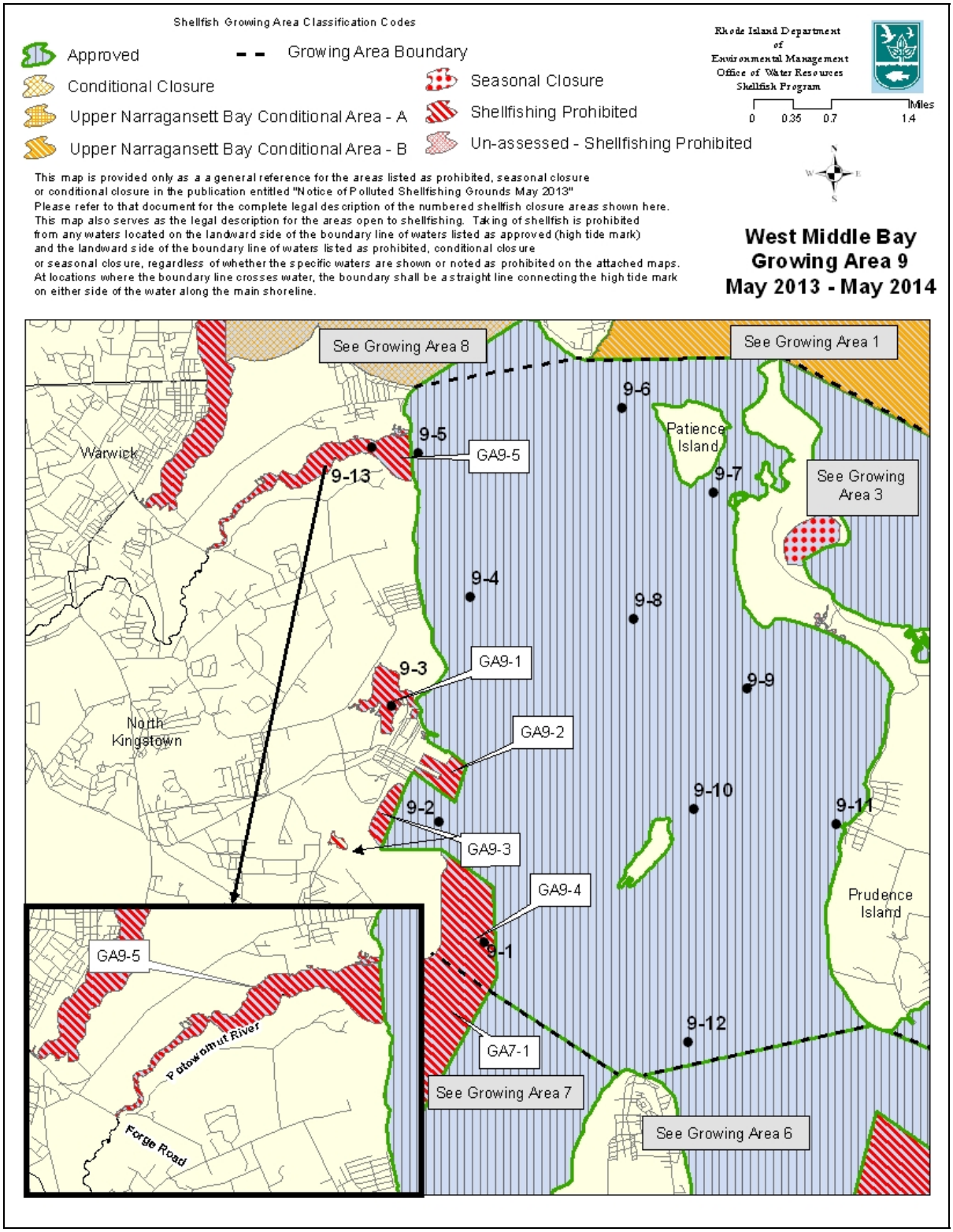
Growing Area 9 is presently comprised of sections classified as approved and prohibited for shellfishing (Figure 1). Three areas of this growing area are permanently closed to shellfishing. Allen Harbor, an 83-acre section is classified as prohibited because of the high density of recreational boats, and the existence of an abandoned navy dumpsite proximal to the harbor. There is a 66-acre closure in the Davisville area due to commercial shipyard activities that occur there. A portion of a 1320-acre permanent closure exists in the area surrounding the bulkhead and docks in the vicinity of Quonset Point because of the location of the Quonset Point Wastewater Treatment Facility discharge as well as the presence of commercial shipyards is within growing area 9 while the remainder of the closure is in growing area 7, referred to as the West Passage. All other sections of the West Middle Bay growing area are classified as approved for shellfish harvesting. The shoreline adjacent to the approved areas is sparsely developed. Only the Quonset Point Industrial Park has sewers.

Hydrographic Characteristics

Total area of the West Middle Bay Growing Area	13, 735 Acres
Widest Reach	3.9 Miles
Deepest Point	70 Feet

The majority of Prudence Island, 750 acres of the northern end and 1645 acres of the southern end and primarily along the western shoreline is protected open space with little or no development resulting in virtually no human impacts upon the surrounding ambient water quality. Along the western boundary of the growing area you have the Quonset Point Industrial area, The Davisville and Allen Harbor areas, and some higher density residential areas on Potowomut and in North Kingston.

Figure 1-1 West Middle Bay Growing Area 9



2.0 Description of Growing Area

The West Middle Bay growing area encompasses approximately 14,300 acres. The shoreline immediately adjacent to the growing area consists of a mixture of primarily urban/built-up lands, forest, and brush-lands marked by a drastic variance between the virtually un-developed shoreline of Prudence Island compared to the commercial ports and developed landscape along the western shoreline. The adjoining towns rely upon On-site Wastewater Treatment Systems (OWTS) for wastewater treatment except for the Davisville Depot and the Quonset Point Port and Commerce Park which discharges treated effluent from their wastewater treatment facility.

In 2007 a sanitary survey of the entire growing area was completed.

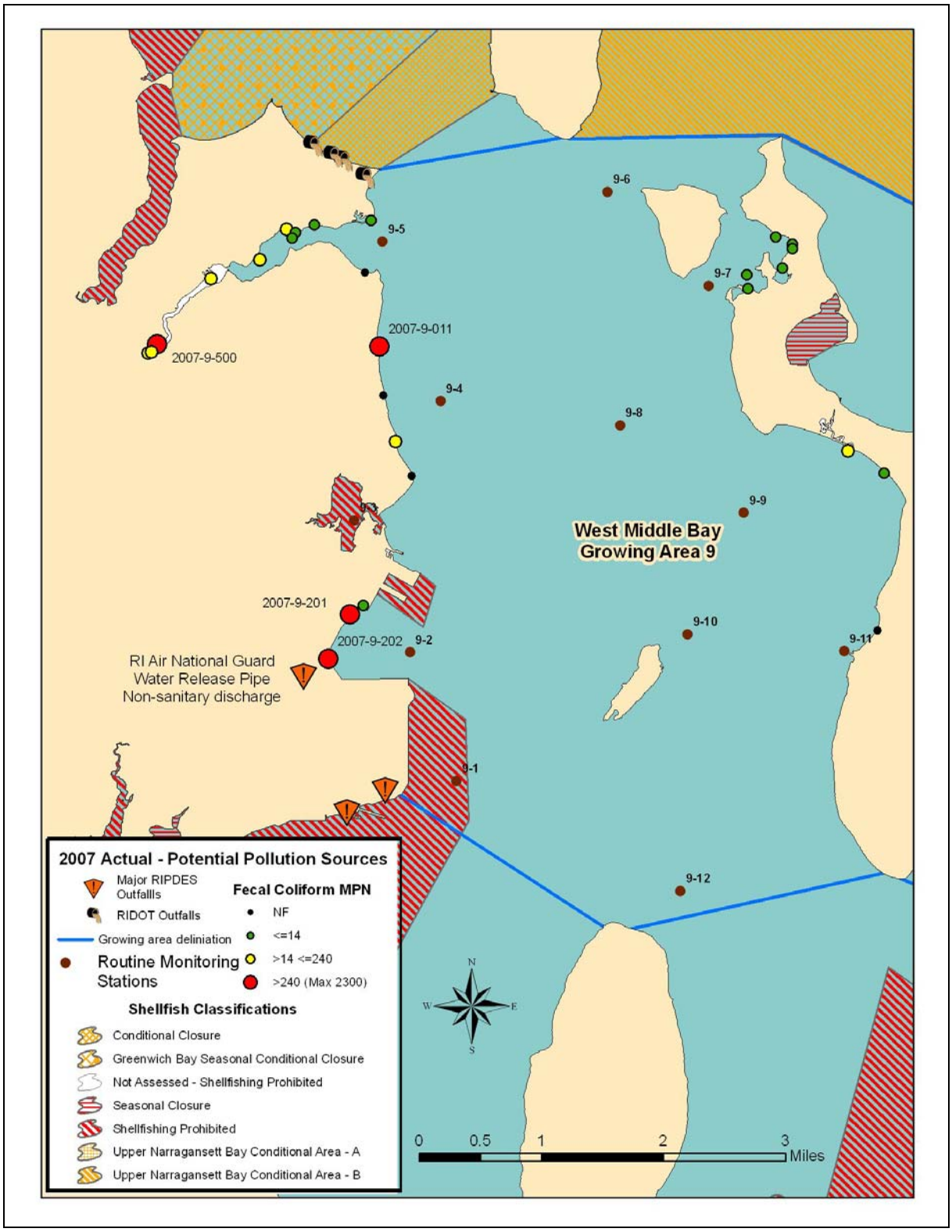
3.0 Pollution Source Surveys

There were twenty-seven (27) actual or potential sources identified during this shoreline survey, excluding marinas. Four (4) of these sources were not actively flowing at the time of the shoreline survey with the remaining twenty-three (23) having flows warranting sampling. All sources in which flow was observed were sampled. Only three sources located in approved waters exceeded the 240 fc/MPN criteria requiring follow-up sampling for a triennial update.

Source 9-011 is Tibbets Creek discharging to the bay from the Quidnesset Country Club, south of the Potowomut River on the western shoreline. This source was determined to not be causing adverse impacts and is no longer considered as a source requiring additional follow-up sampling.

The other two sources that had previously elevated bacteria counts discharge in the area of Davisville/Quonset Point. Subsequent re-classification of this area from Approved to Prohibited was instituted in 2012. See Figure 1-1 for a depiction of closure GA9-3 as it now currently exists. This closure also includes Frys Pond.

Figure 3-1 2007 Source Locations



Note: This is not a current classification map.

4.0 Mooring Fields and Marinas

Allen Harbor is the only safe anchorage within the West Middle Bay capable of sheltering pleasure craft. There are slips for 80 boats and moorings for another 70 boats. In 1998 the State of Rhode Island designated all their coastal waters as a No Discharge Area (NDA). The Rhode Island waters include territorial seas within three miles of shore, including all of Narragansett Bay. A No Discharge Area is a designated body of water in which the discharge of *treated* and *untreated* boat sewage is prohibited (this does not include greywater or sink water). There is a fixed station pump out facility operated by the Town of North Kingston at the Allen Harbor Marina to accommodate these non-transient vessels. This area is currently permanently closed to shellfish harvesting due to the adjacent former Navy dump area and the presence of seasonal boating impacts.

5.0 Wastewater Treatment Facilities (WWTF)

There is one major sanitary discharge and two non-sanitary discharges permitted by the Rhode Island Discharge Elimination Program (RIPDES) within this growing area. The Quonset Point wastewater treatment facility located on Quonset Point is operated by the RI Economic Development Corporation. The facility is permitted to discharge 1.78 mg/d of treated effluent. The average flow for 2013 was .44 mgd well within the permit limits. The fecal coliform discharge average for 2013 was 3.11 MPN/100ml well below the permit level of 200 MPN/100ml.

6.0 Water Quality Studies

The Shellfish Growing Area program is a result of the State of Rhode Island's agreement with the US Food and Drug Administration managed National Shellfish Sanitation Program (NSSP). The purpose of these programs is to maintain national health standards by regulating the interstate shellfish industry. The NSSP is designed to oversee the shellfish producing state's management program and to enforce and maintain an industry standard. As part of this agreement the State of Rhode Island is required to conduct continuous bacteriological monitoring of the shellfish harboring waters in order to maintain certification of these waters shellfish harvesting for the direct human consumption of shellfish.

Water samples are collected at twelve monitoring stations in Growing Area 9 located in closed and approved areas. Sampling runs are conducted by boat a minimum of six times per year during both wet and dry weather conditions throughout the year. Analytical results received from The Rhode Island Department of Health laboratories are entered into the programs database by water resource staff. The data is compiled and reviewed according to NSSP requirements stating that at least the most recent thirty data sets be utilized. Table 2 demonstrates the areas ability to conform to NSSP statistical criteria. The statistical evaluation of the compliance monitoring data confirms that all stations located in approved waters as well as prohibited areas of growing area 9 conform to median fecal coliform NSSP standards indicating that the area is properly classified.

In July of 2012 the RIDOH converted from the MPN multi tube fermentation process to the mTEC membrane filtration method for analyzing shellfish water samples. The protocol for collecting and storing samples is the same as it is for the MPN 3 tube method, however the mTEC method allows for an extended holding period, 30 hours versus 6 hours. The mTEC membrane filtration method as described in Standard Methods for the Examination of Saltwater and Shellfish is now used to analyze these samples. The data is compiled and reviewed according to NSSP requirements stating that at least the most recent 30 data sets be used. During the conversion process and until such time as the full set of 30 samples have been collected and analyzed using the mTEC method a distributed set of sample results shall be combined to determine the percent greater than element of the standard. Refer to the document entitled RIDEM Office of Water Resources, Shellfish Program "Transition to Membrane Filtration (mTEC) for Analysis of Fecal Coliform in Seawater and Pollution Source Samples", August 2012. The 90th percentile is used for "Approved" areas and the value is scaled to represent the combination of method samples. The following tables demonstrate the areas ability to conform to NSSP statistical criteria.

HIGHLIGHTS

*** Sampled 5x in 2013, 1x in 2014 for 2013**
*** Statistics represent combined wet and dry weather data >01/01/09 (N = 30)**
*** Station 13 (Upper Potowomut River), still exceeding all variability criteria**
*** All other approved stations in compliance and conformance**
*** MTEC = 9 (90% = 43 cfu/100ml)**
**** Data run 2/19/14***

COMMENTARY

The West Middle Bay (Growing Area 9) was sampled six times for 2013, complying with the minimum SRS monitoring requirement for approved areas. Sample results are representative of wet and dry weather conditions. The statistical evaluation for the West Middle Bay incorporates the most recent 30 samples collected for the area, the minimum number required for analysis according to SRS guidelines.

Station 13 was established in the Upper Potowomut River six years ago in order to determine whether that portion of the River is suitable for approved shellfish harvesting. Sampling of this station indicated that it was out of compliance and as a result, the line was moved further out towards the approved waters. Results of the 2013 composite sampling (N = 30) Station 13 exceeds the 90th percentile variability criteria. Station 5 remains in compliance at the entrance to the Potowomut River. The Upper Potowomut was closed five years ago and should remain closed.

Results of the statistical evaluation demonstrate that all approved stations are in program compliance. The area is properly classified.

RECOMMENDATIONS

*** Maintain closure of Upper Potowomut River**
*** No other action recommended based on ambient monitoring results**

RIDEM SHELLFISH GROWING AREA MONITORING RESULTS

Station Name	*Status*	*N*	*FECAL-GEO MEAN*	*90TH PERC(<43)*
GA9-1	P	30	2.4	5.5
GA9-2	A	30	2.3	3.8
GA9-3	P	29	3.4	12.5
GA9-4	A	30	2.2	3.0
GA9-5	A	30	4.5	15.1
GA9-6	A	30	2.4	4.2
GA9-7	A	30	2.3	3.8
GA9-8	A	30	2.2	3.1
GA9-9	A	30	2.2	3.2
GA9-10	A	30	2.4	3.8
GA9-11	A	30	2.1	2.5
GA9-12	A	30	2.1	2.8
GA9-13	P	30	11.7	113.5

7.0 Conclusions and Recommendations

The triennial update of the West Middle Bay (Growing Area 9) did not reevaluate point sources in the study area since there were no sources that appeared to have any impact on the high quality ambient waters.

Due to the insignificant amount and impact of sources during the triennial update of West Middle Bay, and the water quality statistical evaluation of the stations within the approved portions of the growing area, no changes in growing area classification are recommended. The results of this update, combined with previous water quality statistical evaluations of West Middle Bay, indicate that the survey area conforms to all requirements set forth by the National Shellfish Sanitation Program (NSSP) and is properly classified.

Point Judith Pond / Potters Pond
Growing Area 10
2013Annual Update

A 12 year sanitary shoreline survey of the Point Judith Pond / Potters Pond Growing Area 10 was conducted in 2011. There were a total of ninety-seven (97) actual or potential sources identified during this shoreline survey, excluding marinas. A total of forty-seven (47) were not actively flowing at the time of the shoreline survey with the remaining fifty having flows warranting sampling. All sources in which flow was observed were sampled. Only five sources in open areas identified in previous surveys exceeded the 2400 MPN threshold requiring follow-up sampling in 2012. In 2013 only three sources were re-sampled with results listed in the following table.

Source ID	Description	Actual/ Potential	Direct/ Indirect	2011 Results Fc/100ml	2012 Results Fc/100ml	2013 Results cfu/100ml
10-011	RCP outfall Harbor Island at E. Cedar	A	D	4300 NF	NF Wet weather source	NS
10-018	Stormdrain outfall Great Island Starfish Dr	A	D	43000 430 43 IS	NF (drip)	NS
10-025	(2) 2” PVC pipes at Carver Lane	A	D	24000 93 4300 IS	1500 Trickle, only 1 pipe flowing	NF
10-062	36” dia. Flared end outfall at Pond View Ave	A	I/D	46000 43 9 IS	4600 Can’t measure fades out prior to tide line 240 IS in front of outfall	113
10-200	Culvert crossing Kenyon Farm Rd	A	I/D	4600 93	750 Can’t measure from roadway, drains into small tidal creek into cove.	250

IS – In stream sample NS – Not sampled NF – No Flow

Source 2012-10-011 is a RCP outfall located on Harbor Island adjacent to the Harbor Island Assoc. marina. There is 25’ marina radius closure associated with these docks that is in effect from Memorial Day to Columbus Day. It appears that this is a wet weather source as there were no flows observed on several sampling runs. Routine monitoring station GA10-10 representing the receiving waters is located just offshore of this source and does not indicate that this source is causing a negative impact. Current year geo-means and variability 90th percentile are 4.9 cfu/100ml and 15.9 respectively. Point Judith Pond is currently closed during rainfall events exceeding 5” due to results from wet weather sampling that indicate violations of water quality criteria under these conditions.

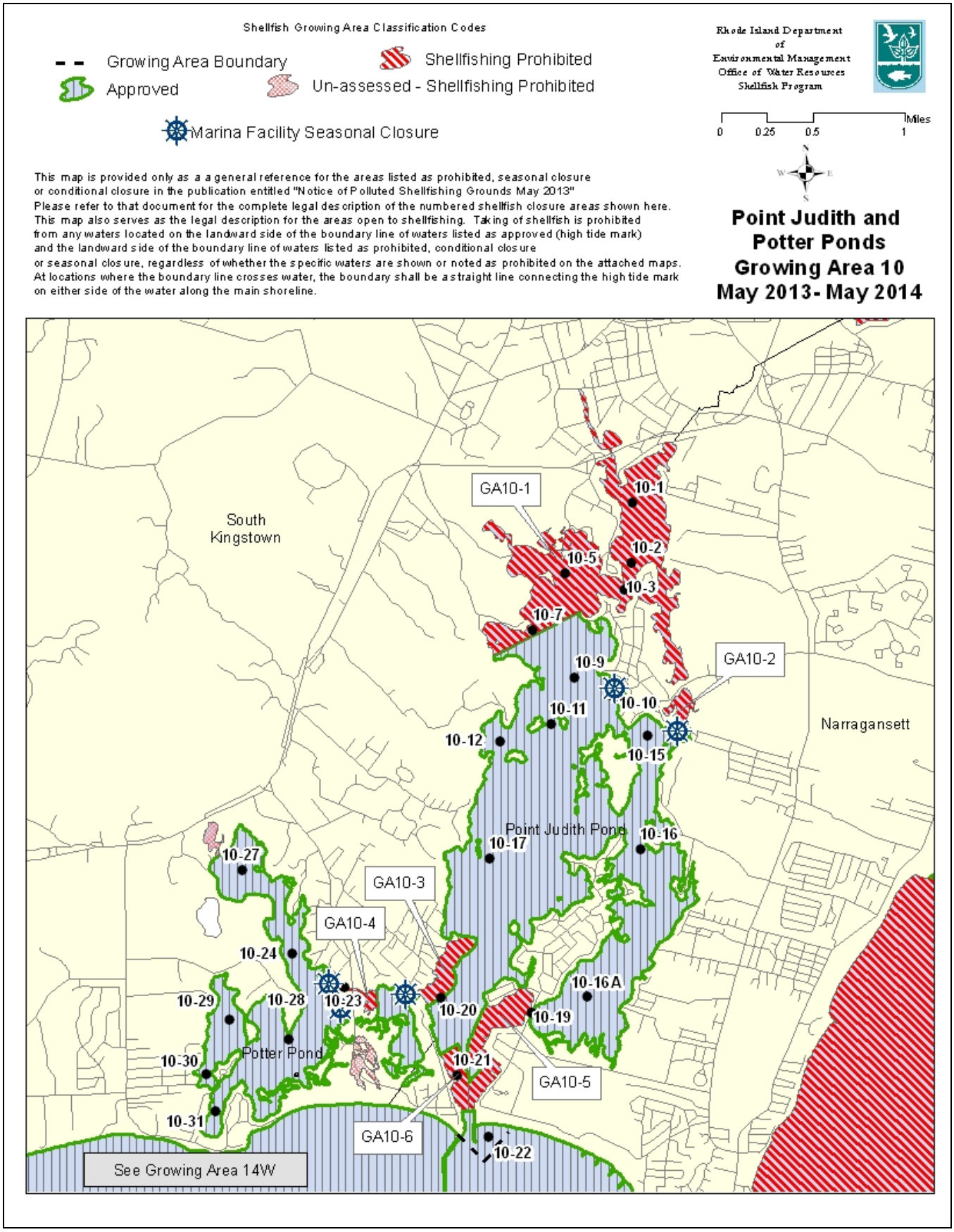
Source 2012-10-018 is a stormdrain outfall on Great Island. It too was not flowing or was only a drip. Previous sampling did not indicate that this source was causing any negative impacts to the receiving waters. Most likely waters dripping from this tide gated outfall during dry weather are the result of flooding during periods of high tide.

Source 2012-10-025 are two small PVC pipes buried in the hillside above the pond. For this years' sampling run both pipes were buried under grass clippings and were not flowing. These pipes do not directly discharge into the pond rather they are into the embankment approximately 15 ft above it. Currently property owners are dumping landscape debris and lawn clippings over the top of these pipes in essence, burying them and making it difficult to locate and also dispersing any flows.

Source 2012-10-062 is a flared end outfall at the extension of Pond View Ave. Again this appears to be a wet weather source or may be intercepting small amounts of groundwater. Previous sampling in 2011 indicated elevated bacteria counts, but follow-up sampling results were greatly reduced. In 2012 this source had slightly elevated bacteria counts with in-stream results of 240 fc/100ml. An attempt was made to re-sample this source but there were no flows at the time of inspection. The source opens to daylight approximately 30 feet above the high tide line and flows were not reaching the pond but rather were dispersing into the rock sea wall and embankment. This source was re-inspected on October 2, 2012 and the source had no flows. An extensive study and sampling analysis is included in the 2011 shoreline survey report. This source was re-sampled as part of the 2013 annual update with reduced bacteria results.

Source 10-200 results were from the culvert under Kenyon Farm Rd that drains a small upland pond. The culvert is approximately 270 feet from the confluence with the edge of Pt Judith Pond. Access to this location is limited across private property and therefore sampled at the road culvert. Upland of the source pond is a large wooded wetland with no anthropogenic sources. Results from sampling in 2013 indicated reduced bacteria levels, this source would not appear to be having a negative impact on the receiving waters.

The following is the current classification map with the locations of routine monitoring stations for this growing area.



The results of the routine monitoring stations indicate that this growing area is properly classified and therefore no changes to the classification are recommended at this time.

The following are the highlights and annual statistical evaluation of the routine monitoring results.

HIGHLIGHTS

*** Sampled 6x in 2013**
*** Statistics represent combined wet and dry weather data >03/29/09(N = 30)**
*** All approved stations in compliance and conformance**
*** MTEC = 10 (90% = 42 cfu/100ml)**
**** Data run 2/19/14***

COMMENTARY

Pt. Judith Pond and Potter Pond (Growing Area 10) were sampled six times in 2013, complying with the minimum SRS monitoring requirement for approved areas. Sample results are representative of wet and dry weather conditions. The statistical evaluation for Pt. Judith Pond and Potter Pond incorporates the most recent 30 samples collected for the area, the minimum number required for analysis according to SRS guidelines.

Results of the statistical evaluation demonstrate that Station 7, located off Buttonwood Point, and just outside of Smelt Brook Cove, which exceeded the percentile variability criteria for six straight years running, is in statistical compliance for the fourth consecutive year. A review of the shellfish data in past years had demonstrated that Station 7 and the stations located north of it in the Upper Pond (presently classified as prohibited) are adversely influenced by wet weather. A TMDL study of the area was completed in June 2008.

All approved stations are in program compliance.

RECOMMENDATIONS

*** No other action recommended based on ambient monitoring results**

RIDEM SHELLFISH GROWING AREA MONITORING RESULTS

Station Name	*Status*	*N*	*FECAL-GEO MEAN*	*90TH PERC(<42)*
GA10-1	P	30	65.7	508.3
GA10-2	P	30	48.9	435.2
GA10-3	P	30	25.4	211.1
GA10-5	P	30	11.9	66.3
GA10-7	P	30	7.3	25.1
GA10-9	A	30	5.2	23.9
GA10-10	A	30	3.9	15.9
GA10-11	A	30	4.3	13.9
GA10-12	A	30	4.1	12.4
GA10-15	A	30	4.4	18.0
GA10-16	A	29	3.2	9.9
GA10-16A	A	30	7.2	35.5
GA10-17	A	30	3.9	11.9
GA10-19	P	30	8.0	41.2
GA10-20	P	30	4.4	12.3
GA10-21	P	30	4.9	19.5
GA10-22	A	29	2.8	5.6
GA10-23	P	30	3.8	12.6
GA10-24	A	30	5.9	23.7
GA10-27	A	30	2.7	4.7
GA10-28	A	30	2.9	6.2
GA10-29	A	30	3.4	8.1
GA10-30	A	30	4.9	20.5
GA10-31	A	30	3.6	11.2

A triennial update is scheduled for 2014.

Ninigret and Green Hill Ponds
Growing Area 11 NG
2013 Annual Update

A shoreline survey of the Ninigret and Green Hill Ponds Growing Area 11 NG was conducted in 2012. The shoreline survey identified a total of ten (10) actual or potential sources, five (5) in each pond excluding marinas. Of those five sources located in Green Hill Pond discharge or potentially discharge into waters that are currently classified as Prohibited. Of the five sources discharging or potentially discharging into Ninigret Pond, four of them do so into waters that are approved for shellfishing, the fifth source discharges into the prohibited waters of the pond. All sources in which flow was observed were sampled with no sources within the open areas exceeded the 2400 MPN fecal coliform standard threshold for follow-up sampling. The two major sources identified in the Office of Water Resource's TMDL report; Teal Brook and Factory Pond Brook discharge into the prohibited portion of Green Hill Pond and therefore did not warrant follow-up sampling for this annual review.

Shellfish Growing Area Classification Codes

Rhode Island Department of Environmental Management Office of Water Resources Shellfish Program

Growing Area Boundary

Marina Facility Seasonal Closure

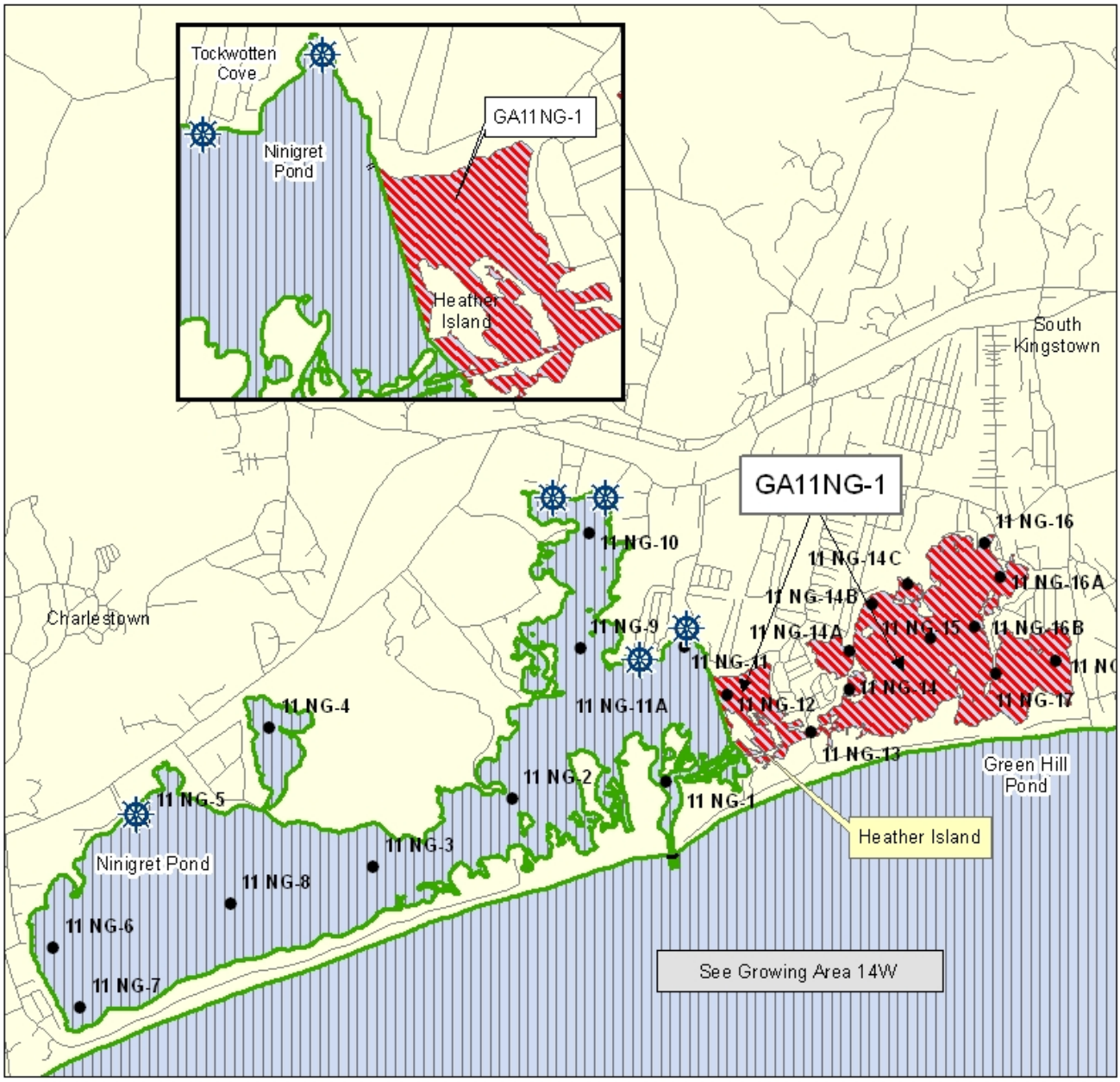
Approved

Shellfishing Prohibited

0 0.25 0.5 1 Miles

This map is provided only as a a general reference for the areas listed as prohibited, seasonal closure or conditional closure in the publication entitled "Notice of Polluted Shellfishing Grounds May 2013" Please refer to that document for the complete legal description of the numbered shellfish closure areas shown here. This map also serves as the legal description for the areas open to shellfishing. Taking of shellfish is prohibited from any waters located on the landward side of the boundary line of waters listed as approved (high tide mark) and the landward side of the boundary line of waters listed as prohibited, conditional closure or seasonal closure, regardless of whether the specific waters are shown or noted as prohibited on the attached maps. At locations where the boundary line crosses water, the boundary shall be a straight line connecting the high tide mark on either side of the water along the main shoreline.

Ninigret and Green Hill Ponds Growing Area 11NG May 2013 - May 2014



The following are the highlights and results of the annual statistical evaluations with recommendations on classifications made prior to the annual review.

HIGHLIGHTS

*** Sampled 6x in 2013**
*** Statistics represent combined wet and dry weather data >01/01/09 (N = 30)**
*** All approved stations in compliance and conformance**
*** MTEC = 10 (90% = 42 cfu/100ml)**
**** Data run 2/19/14***

COMMENTARY

Ninigret Pond was sampled six times and Green Hill Pond was sampled six times (Growing Area 11NG), complying with the minimum SRS monitoring requirement for approved areas. Sample results are representative of wet and dry weather conditions. The statistical evaluation for Ninigret Pond and Green Hill Pond incorporates the most recent 30 samples collected for the area, the minimum number required for analysis according to SRS guidelines.

The TMDL for Green Hill Pond and the eastern portion of Ninigret Pond was approved in February 2006. All approved stations are in program compliance. The area is properly classified.

RECOMMENDATIONS

*** No action recommended based on ambient monitoring results**

RIDEM SHELLFISH GROWING AREA MONITORING RESULTS

Station Name	*Status*	*N*	*FECAL-GEO MEAN*	*90TH PERC(<42)*
GA11NG-1	A	30	3.0	8.0
GA11NG-2	A	30	2.9	7.1
GA11NG-3	A	30	2.7	6.7
GA11NG-4	A	30	5.1	19.4
GA11NG-5	A	30	2.6	5.3
GA11NG-6	A	30	3.0	6.7
GA11NG-7	A	30	2.6	4.7
GA11NG-8	A	30	2.4	4.5
GA11NG-9	A	31	4.0	13.4
GA11NG-10	A	31	3.8	12.9
GA11NG-11	A	31	4.5	20.2
GA11NG-12	P	30	7.7	47.2
GA11NG-13	P	30	7.0	34.7
GA11NG-14	P	29	9.5	106.6
GA11NG-14A	P	29	8.6	44.3
GA11NG-14B	P	29	6.9	51.1
GA11NG-15	P	29	5.8	35.1
GA11NG-16	P	29	9.2	82.1
GA11NG-16A	P	29	9.5	73.7
GA11NG-16B	P	29	5.9	29.7
GA11NG-17	P	29	7.5	51.4
GA11NG-18	P	29	3.8	15.3
GA11NG-14C	P	30	19.8	206.8

The next schedule survey would be an annual update scheduled for 2014.

Quonochontaug and Winnapaug Ponds
Growing Area 11 QW
2013 Annual Update

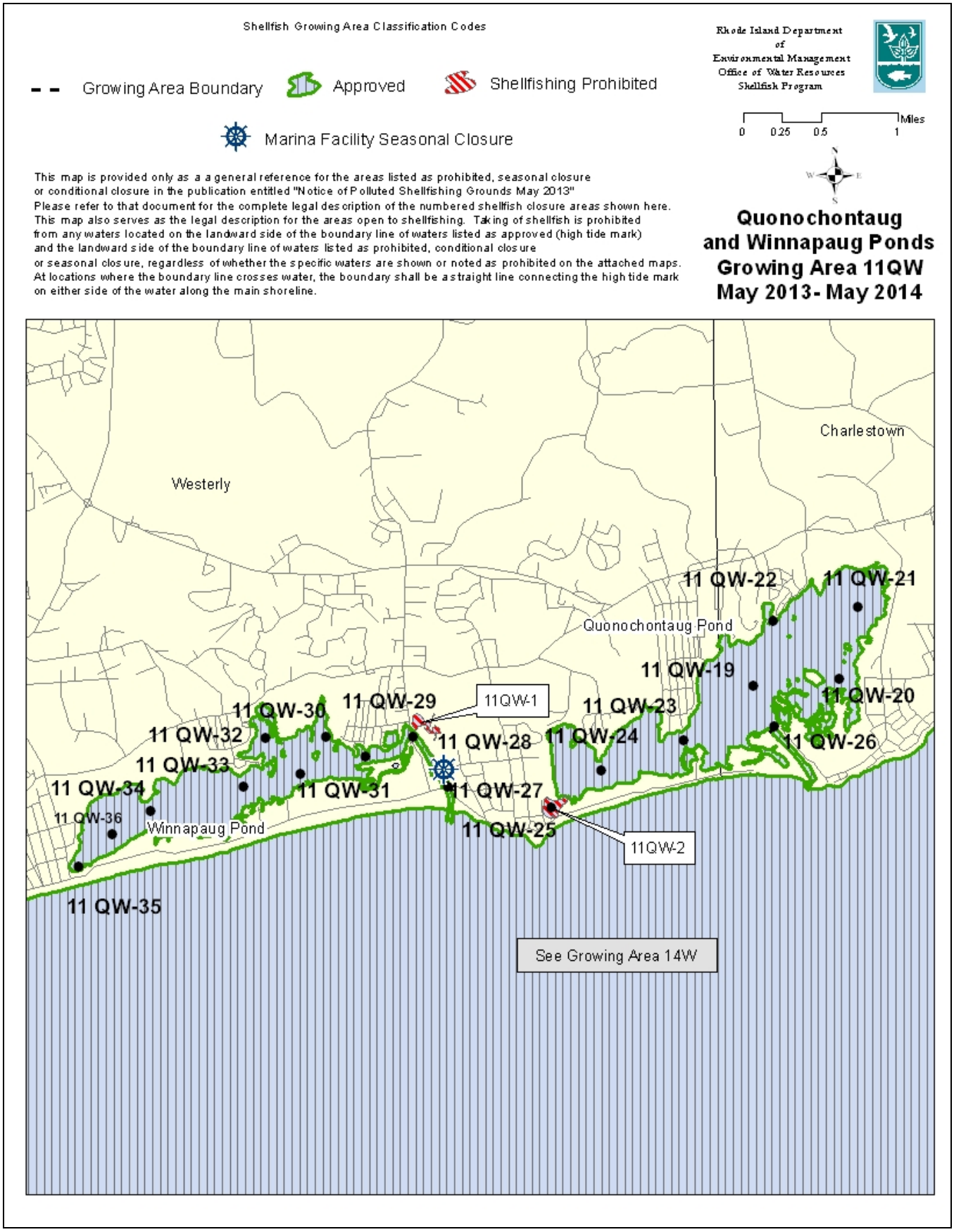
A shoreline survey of Quonochontaug and Winnapaug Ponds Growing Area 11QW was conducted in 2012. This shoreline survey identified a total of twenty-six (26) actual or potential sources, seventeen in Quonochontaug Pond and nine in Winnapaug Pond excluding marinas.

Of the 26 identified sources from 2012, ten (10) either had no flows or surveyors were unable to locate the source that had been identified in previous surveys. Sixteen (16) sources had flows of which only one had elevated bacteria counts greater than 2400 CFU/100ml requiring follow-up sampling for this annual review.

Source W40 is a small stream that originates from a swale that is adjacent to a stormwater detention basin opposite Misquamicut State Beach. Results were 3400 CFUs/100ml in 2012. This source was reinvestigated in 2013. At numerous times the basin was inspected and clean up work had not been completed. It is still unknown what the status of this basin and drainage system is.

A new in pond station 11QW-36 has been established just off shore of these outfalls and has been sampled 9 times since September 2012. The geo-mean for these samples is 2 and the 90th % is 3.0 with no samples greater than 42 cfu/100ml. The new station located offshore of the discharge will continue to be monitored and wet weather sampling of the basin will also begin once confirmation is received that it is back to full operational condition per their water quality certificate.

In 2008 the western end of Quonochontaug Pond in the vicinity of station 25 was out of program compliance and a small closure was incorporated. The most recent data shows this station is back in program compliance but towards the higher limits of acceptance. Based on this data the area should remain closed to shellfishing.



The following highlights and results of the statistical evaluation of the routine monitoring stations indicate that the rest of this growing area is properly classified and therefore no additional changes are recommended at this time.

HIGHLIGHTS

*** Sampled 6x in 2013**
*** Statistics represent combined wet and dry weather data >01/01/09 (N = 30)**
*** Station 25 back in 90th percentile compliance for fifth year, but still elevated**
*** Temporary Station 36 good (See Results)**
*** All other approved stations in compliance and conformance**
*** MTEC = 11 (90% = 41 cfu/100ml)**
**** Data run 2/19/14***

COMMENTARY

Quonochontaug Pond and Winnapaug Pond (Growing Area 11) was sampled six times in 2013, complying with the minimum SRS monitoring requirement for approved areas. Sample results are representative of wet and dry weather conditions. The statistical evaluation for Quonochontaug Pond and Winnapaug Pond incorporates the most recent 30 samples collected for the area, the minimum number required for analysis according to SRS guidelines.

Station 25 continues to remain towards the upper limit for the variability criteria as it has for the last few years and should remain closed.

The results of the statistical evaluation demonstrate that all other approved stations are in program compliance.

RECOMMENDATIONS

*** No action recommended based on ambient monitoring results**

RIDEM SHELLFISH GROWING AREA MONITORING RESULTS

Station Name	*Status*	*N*	*FECAL-GEO MEAN*	*90TH PERC(<41)*
GA11QW-19	A	29	2.6	5.2
GA11QW-20	A	30	2.4	4.8
GA11QW-21	A	30	2.6	5.3
GA11QW-22	A	30	3.5	10.5
GA11QW-23	A	30	3.1	7.5
GA11QW-24	A	30	2.6	4.9
GA11QW-25	p	30	7.1	35.9
GA11QW-26	A	30	2.4	4.0
GA11QW-27	A	30	3.5	10.1
GA11QW-28	A	30	3.6	10.8
GA11QW-29	A	30	2.8	6.0
GA11QW-30	A	30	5.8	21.2
GA11QW-31	A	30	3.6	11.0
GA11QW-32	A	30	4.3	11.4
GA11QW-33	A	30	3.5	12.0
GA11QW-34	A	30	2.9	7.1
GA11QW-35	A	30	4.7	17.4
Temp. Sta. 36	A	9	2	3.0

An annual up-date is scheduled for 2014.

Growing Area 12
Little Narragansett Bay
2013 Annual Update

All waters of the Little Narragansett Bay, Growing Area 12 are currently prohibited to shellfishing. The area was sampled five times in 2013. A TMDL study of Little Narragansett Bay was approved by EPA in December of 2010. The recommended implementation activities for the study area focus on stormwater, wastewater, and waterfowl management. The area is properly classified as prohibited.

HIGHLIGHTS

*** Sampled 5x in 2013**
*** Statistics represent combined wet and dry weather data >09/01/08 (N=15)**
*** Area is prohibited**
*** MTEC = 9 (90% = 43)**
**** Data run 2/24/14***

COMMENTARY

Little Narragansett Bay (Growing Area 12) was sampled five times in 2013. Since the area is classified as prohibited, there is no minimum sampling requirement. The area has been closed to shellfish harvesting for direct human consumption for the last 19 years due to unpredictable and elevated fecal coliform levels. A TMDL study of Little Narragansett Bay was completed on December 1, 2010.

At the present time the area is properly classified as prohibited.

RECOMMENDATIONS

*** Continue monitoring area**
*** No action recommended**

RIDEM SHELLFISH GROWING AREA MONITORING RESULTS

Station Name	Status	N	FECAL-GEO MEAN	90TH PERC(43)
GA12-1	P	15	251.1	1833.0
GA12-2	P	15	184.5	999.9
GA12-3	P	15	233.6	1104.3
GA12-4	P	15	66.7	529.9
GA12-5	P	15	94.9	738.3
GA12-6	P	15	51.5	365.2
GA12-7	P	15	33.4	278.5
GA12-8	P	15	22.7	128.8
GA12-9	P	15	4.5	18.7
GA12-10	P	15	7.7	32.9
GA12-11	P	15	5.9	26.6
GA12-14	P	15	4.1	12.8
GA12-15	P	15	9.3	57.0
GA12-16	P	15	15.8	84.3
GA12-17	P	15	125.5	831.2

2013 - 2014Classification Map

Shellfish Growing Area Classification Codes

Growing Area Boundary

Shellfishing Prohibited

Approved

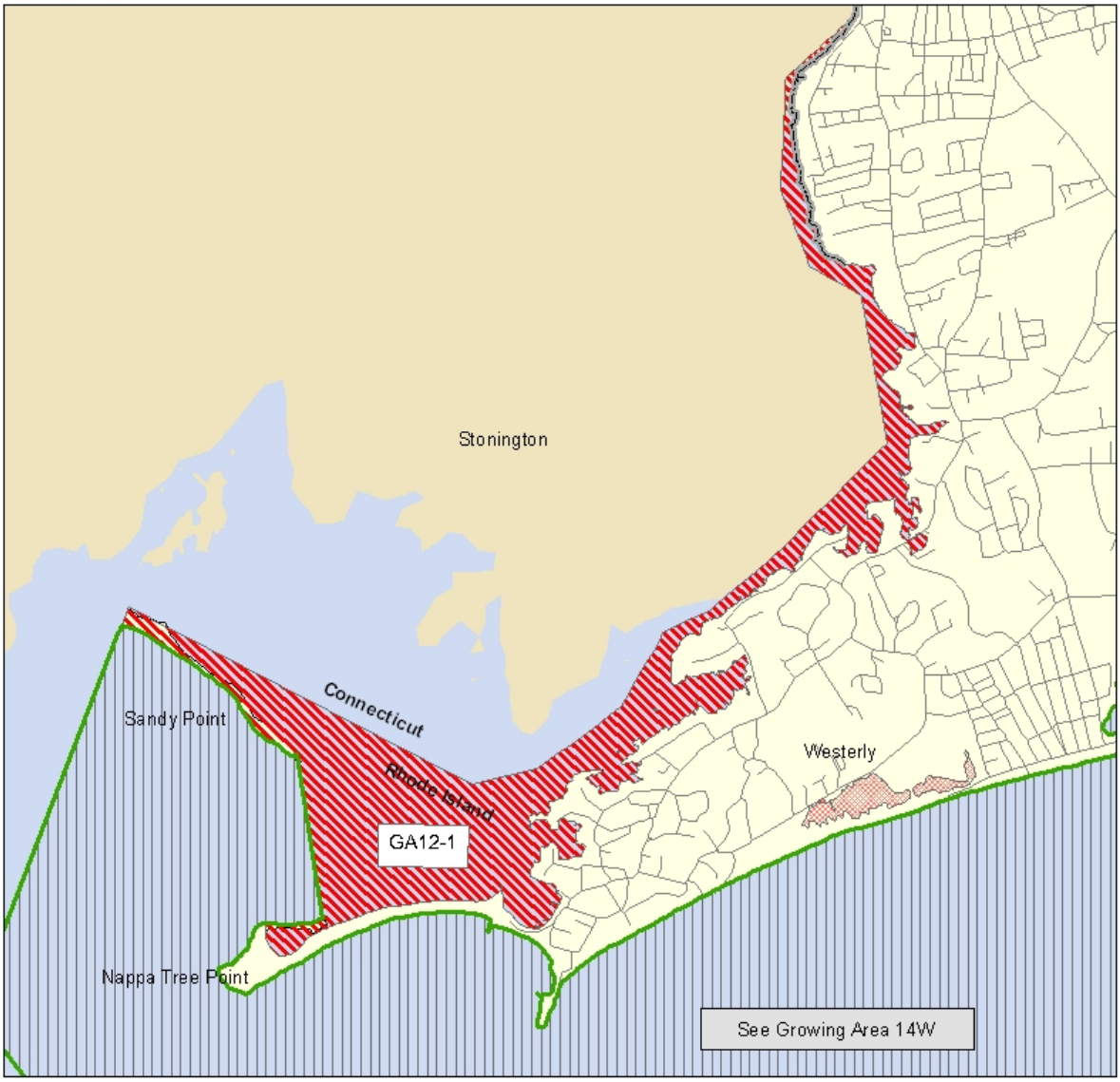
Un-assessed - Shellfishing Prohibited

Rhode Island Department of Environmental Management Office of Water Resources Shellfish Program

0 0.2 0.4 0.8 Miles

This map is provided only as a a general reference for the areas listed as prohibited, seasonal closure or conditional closure in the publication entitled "Notice of Polluted Shellfishing Grounds May 2013" Please refer to that document for the complete legal description of the numbered shellfish closure areas shown here. This map also serves as the legal description for the areas open to shellfishing. Taking of shellfish is prohibited from any waters located on the landward side of the boundary line of waters listed as approved (high tide mark) and the landward side of the boundary line of waters listed as prohibited, conditional closure or seasonal closure, regardless of whether the specific waters are shown or noted as prohibited on the attached maps. At locations where the boundary line crosses water, the boundary shall be a straight line connecting the high tide mark on either side of the water along the main shoreline.

Little Narragansett Bay Growing Area 12 May 2013 - May 2014



Block Island
Growing Area 13
2013 Annual Update

A complete sanitary shoreline survey of the Block Island Growing Area 13 was conducted in 2006. A triennial update was completed in 2012. In 2013 three sources were re-sampled as part of this annual update.

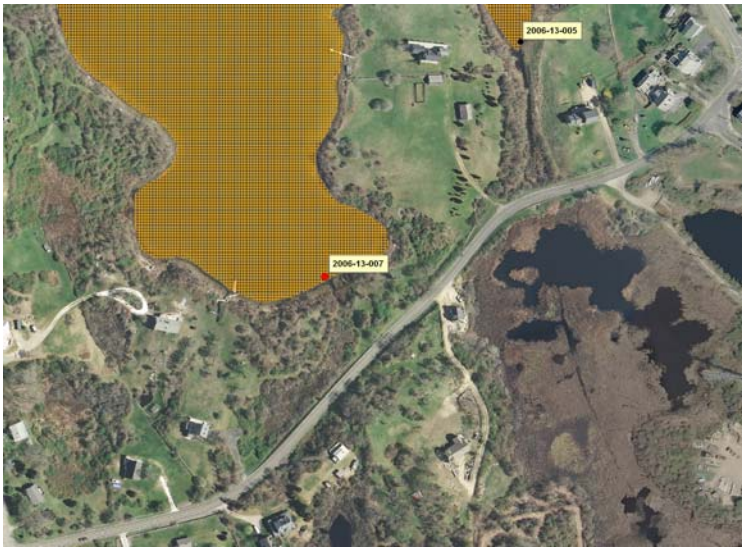
Source ID	Description	Actual	Direct	2006 Results	2009 Results	2010 Results	2011 Results	2012 Results	2013 Results
2006-13-001	Tributary Upper Harbor Pond	A	D	430	1,100 Low flow	23 fc/MPN .31 cfs*	NS	525	8000 25.5 cfs*
2006-13-008	Great Salt Pond Andy's Way seep. Green growth.	A	D	2100	460 Low flow	9 fc/MPN 1.27 cfs*	NS	NF	NS
2006-13-011	West of harbor master shack. Drains Wetland	A	D	1500	1,100 Low flow	2100 fc/MPN 2.12 cfs*	7	818	654 0.70 cfs*
2006-13-007	Trim Pond Tributary	A	D	1100	NF	NS	NS	8000	8000 0.32 cfs*

* Indicates that flow measurements were taken by non-shellfish program personnel and seem suspect in their dimensions. Previously observed flow from these sources were noted as seeps, trickles and low flows, the dimensions provided by the sampler indicated streams 5 ft wide by up to 2 ft deep which is significantly bigger than a "seep or a trickle".

Source 2009-13-001

Source 2009-13-011

Source 2009-13-007



All three of the sources discharge to the seasonally closed area of the Great Salt Pond. Sources 001 and 007 had elevated bacteria counts while source 011 results were lower than previous samples. Although these elevated results cause concern the upland sources are non-anthropogenic in nature as they are all from wetlands with minimal adjacent development. They should however be re-sampled in 2014 and more accurate flow dimensions taken.

The area currently closed in Cormorant Cove was sampled twelve times in 2013 and more than thirty times since sampling began along with the routine monitoring station runs. The following are the results from that sampling.

Now labeled Station GA13-17

Station ID	Sampling Period	Geo-Mean all samples Fc/MPN
15 at outfall	Oct 2012 - Dec 2013	**5.2** n=30 10.0 % of results > 37
16 outside buoys	Oct 2012 - Dec 2013	**3.2** n=30 3.33 % of results >37
17 inside buoys (Formally sta. 15A)	Oct 2012 - Dec 2013	**5.1** n=30 13.33 % of results >37

(mTEC N=18)

Currently there does not appear to be a significant influence to the cove from this upland wetland although the variability of station 15 is right at 10 % and station 17 which is actually the outfall not an in stream station does exceed 10%. It is recommended that we continue sampling and leave this small closure in effect.

The results of the routine monitoring stations indicate that this growing area is properly classified and therefore no changes to the classification are recommended at this time. See the attached Block Island Growing Area 13 classification map and the 2013 RI Shellfish Program Routine Monitoring report.

The next required survey would be an annual update to be completed in 2014.

HIGHLIGHTS

*** Sampled 12x in 2013**
*** Statistics represent all combined wet and dry weather data >10/01/12 (N=30) approved Sta.'s 9, 10, 11, 13 and 16**
*** Statistics represent combined wet and dry weather, open season data >01/01/12 (N=15) for conditional/seasonally approved Sta.'s 1-7 and 14**
*** Statistics represent combined wet and dry weather, open season data >04/01/12 (N=15) for conditional/seasonally approved Sta.'s 8 and 12**
*** All approved and seasonally approved stations in compliance and conformance**
*** MTEC = 18 (90% = 37cfu/100ml)**
**** Data run 2/24/14***

COMMENTARY

Block Island's Great Salt Pond (Growing Area 13) was sampled twelve times in 2013, complying with the monthly minimum monitoring requirement for conditional/seasonally approved areas. The Town of New Shoreham, Harbormaster's Office, collected all samples through cooperative agreement with this office. Sample results are representative of wet and dry weather conditions. The statistical evaluation for the Great Salt Pond incorporates the most recent 15 combined wet and dry weather, open season samples collected for the area, the minimum number required by NSSP Manual of Operations guidelines for conditional/seasonally approved areas. The statistical evaluation for the four permanently approved stations incorporate the most recent 15 and 30 combined wet and dry weather samples collected for the area.

All approved and conditional/seasonally approved stations are in program compliance. The area is properly classified.

RECOMMENDATIONS

*** No action recommended**

RIDEM SHELLFISH GROWING AREA MONITORING RESULTS

Station Name	*Status*	*N*	*FECAL-GEO MEAN*	*90TH PERC(<37)*
GA13-9	**A**	**30**	**4.9**	**20.3**
GA13-10	**A**	**30**	**2.5**	**5.0**
GA13-11	**A**	**30**	**2.4**	**4.2**
GA13-13	**A**	**30**	**2.5**	**5.4**
GA13-16	**A**	**30**	**3.3**	**9.0**

N = 30 ALL SEASONS DATA STA 9, 10, 11, 13, 16 7/1/11–12/31/13 MTEC=18

The following stations are conditional/seasonally approved and results are for reference only and not for compliance

GA13-1	SA	30	8.5	60.2
GA13-2	SA	30	5.2	22.1
GA13-3	SA	30	3.4	14.8
GA13-4	SA	30	3.6	15.0
GA13-5	SA	30	3.5	12.6
GA13-6	SA	30	2.6	5.3
GA13-7	SA	30	3.4	10.8
GA13-8	SA	30	2.3	3.9
GA13-12	SA	30	2.6	4.8
GA13-14	SA	30	7.5	33.4
GA13-17	P	28	5.6	33.7

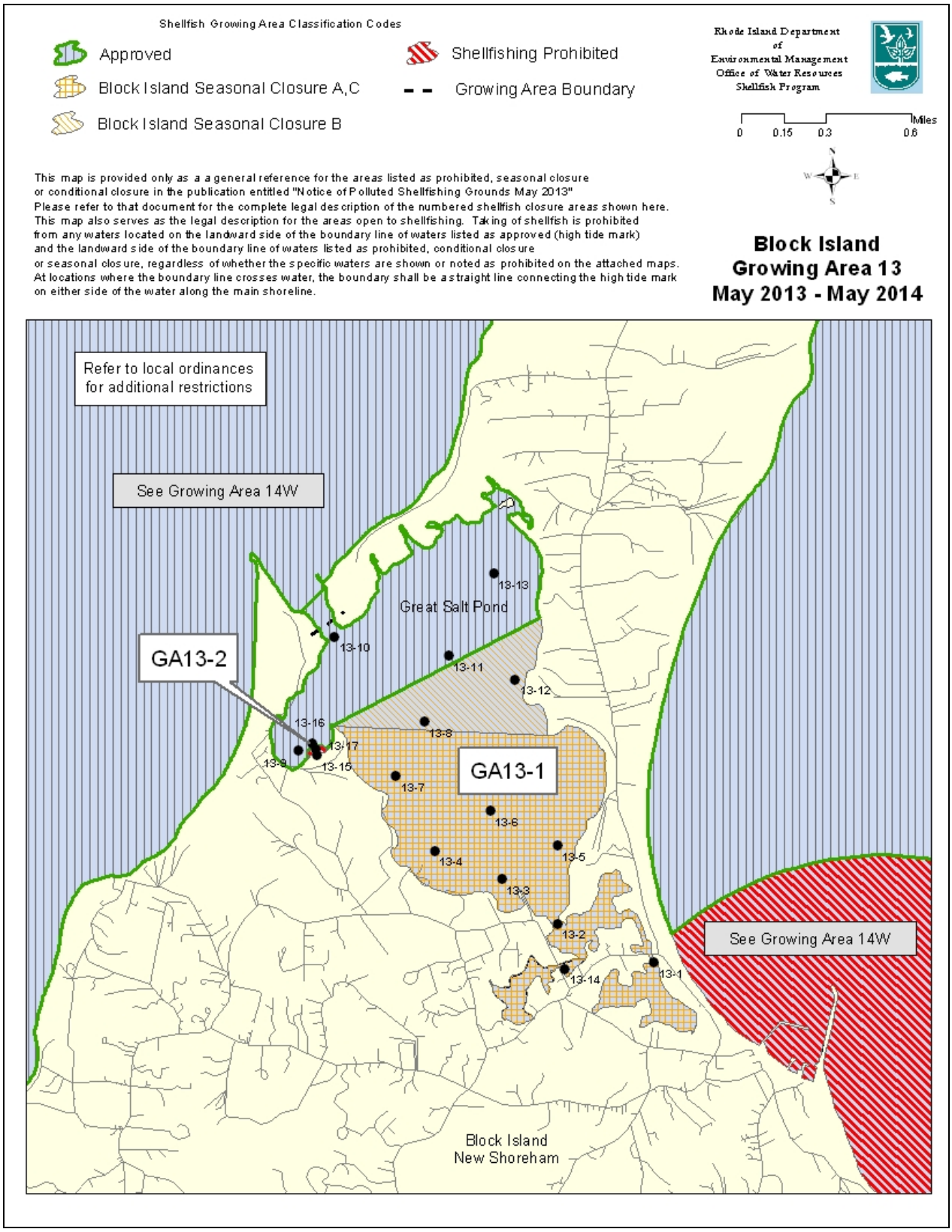
Open season data >01/01/12 (N=15) for conditional/seasonally approved Sta.'s 1-7 and 14

Station Name	*Status*	*N*	*FECAL-GEO MEAN*	*%>CRITICAL 31*
GA13-1	SA	15	3.7	6.67
GA13-2	SA	15	2.5	0.00
GA13-3	SA	15	2.1	0.00
GA13-4	SA	15	2.2	0.00
GA13-5	SA	15	2.1	0.00
GA13-6	SA	15	2.2	0.00
GA13-7	SA	15	2.2	0.00
GA13-14	SA	15	3.8	6.67

Open season data >04/01/12 (N=15) for conditional/seasonally approved Sta.'s 8 and 12

Station Name	*Status*	*N*	*FECAL-GEO MEAN*	*%>CRITICAL 31*
GA13-8	SA	15	2.2	0.00
GA13-12	SA	15	2.1	0.00

Current Classification Map



Offshore including Offshore Block Island
Growing Area 14E and 14W
2013 Annual Update

A shoreline survey of the Offshore Growing Area 14E and 14W was conducted in 2006. There were one hundred and sixty-three (163) actual or potential sources identified during this shoreline survey, excluding marinas. A total of ninety of the one hundred and sixty-three sources were not actively flowing at the time of the shoreline survey with the remaining seventy-three having flows warranting sampling. All sources in which flow was observed were sampled. A triennial update of the growing area was completed in 2012. Of the seventy-three flowing sources sampled, thirty-four had results greater than 240 MPN. Thirteen of those were located in prohibited waters within the growing area and were not re-sampled as part of the 2012 triennial update. Source 14W-302 is the potential discharge from Cards Pond a small pond located above the high water mark along Moonstone Beach in South Kingstown. This source is not an actual but a potential source to the growing area and was not resampled as part of the 2012 triennial update. Of the remaining 20 sources only two had results greater than 2400 fc/MPN warranting follow-up sample for this annual review. Source 14E-412 was inaccessible during the 2013 sampling and attempts to access this private property in 2014 should be attempted. Source 14E-717 is the oval concrete drain at Ruggles Ave in Newport; results from the 2013 sampling were bacteria counts of 2300 cfu/100ml with flows of 0.001 cfs and dissipating in the sand prior to reaching the waters edge even at high tide.

HIGHLIGHTS

*** Sampled 2X for 2013 season**
*** Statistical evaluation represents some limited data**
*** Area considered remote**
*** MTEC = 3 (90% = 47cfu/100ml)**
**** Data run 2/24/14***

COMMENTARY

In order to comply with NSSP Manual of Operations requirements regarding approved areas, a semi-annual sampling schedule was initiated in 1994 to monitor the offshore waters that are permanently open to shellfish harvesting. These offshore stations (Growing Area 14) are considered "remote". They have been determined to be physically distant enough from land to not be adversely influenced by any land based point and/or non-point sources. According to NSSP Manual of Operations guidelines, remote areas are required to be sampled only twice a year. Stations 1 – 15 and 22, located along the south shore from the Connecticut border to the Massachusetts border, were sampled 2x for 2013 by DEM staff, complying with Manual of Operations guidelines for remote areas. Stations 16 – 21, located around the perimeter of Block Island, were sampled 2x in 2013 by the Town of New Shoreham Harbor Masters Office. The statistical evaluation for Growing Area 14 represents all data collected for the area, but is presently incomplete and requires more data to comply with statistical requirements.

Station 22, located due west of Napatree Point, was established six years ago at the location of the former Little Narragansett Bay station 13.

Results of the statistical evaluation, albeit incomplete for Block Island offshore, demonstrate that the area is in program compliance. The area is properly classified.

RECOMMENDATIONS

*** No action recommended based on ambient monitoring results**

RIDEM SHELLFISH GROWING AREA MONITORING RESULTS

Station Name	*Status*	*N*	*FECAL-GEO MEAN*	*90TH PERC(<47)*
GA14-1	A	30	2.1	2.5
GA14-2	A	30	2.4	4.9
GA14-3	A	30	2.0	2.4
GA14-4	A	30	2.1	2.6
GA14-5	A	30	2.0	2.4
GA14-6	A	30	2.3	4.4
GA14-7	A	29	2.6	6.8
GA14-8	A	30	2.4	4.5
GA14-9	A	30	2.1	3.0
GA14-10	P	30	3.1	10.5
GA14-11	A	30	2.2	3.2
GA14-12	A	30	2.0	2.4
GA14-13	A	30	2.4	5.8
GA14-14	A	30	2.1	3.0
GA14-15	A	30	2.2	3.2
GA14-16	A	29	2.0	2.0
GA14-17	A	29	2.0	2.4
GA14-18	A	29	2.0	2.0
GA14-19	A	29	2.3	4.0
GA14-22	A	14	2.9	5.4
GA14-20	P	29	2.4	4.0
GA14-21	A	29	2.0	2.0

Shellfish Growing Area Classification Codes

Approved

Shellfishing Prohibited

Growing Area Boundary

Seasonal Closure

Un-assessed - Shellfishing Prohibited

Marina Facility Seasonal Closure

Rhode Island Department of Environmental Management Office of Water Resources Shellfish Program

0 1.25 2.5 5 Miles

Offshore Nappatree Point to Point Judith (Narragansett) Including Offshore Block Island Growing Area 14W May 2013 - May 2014

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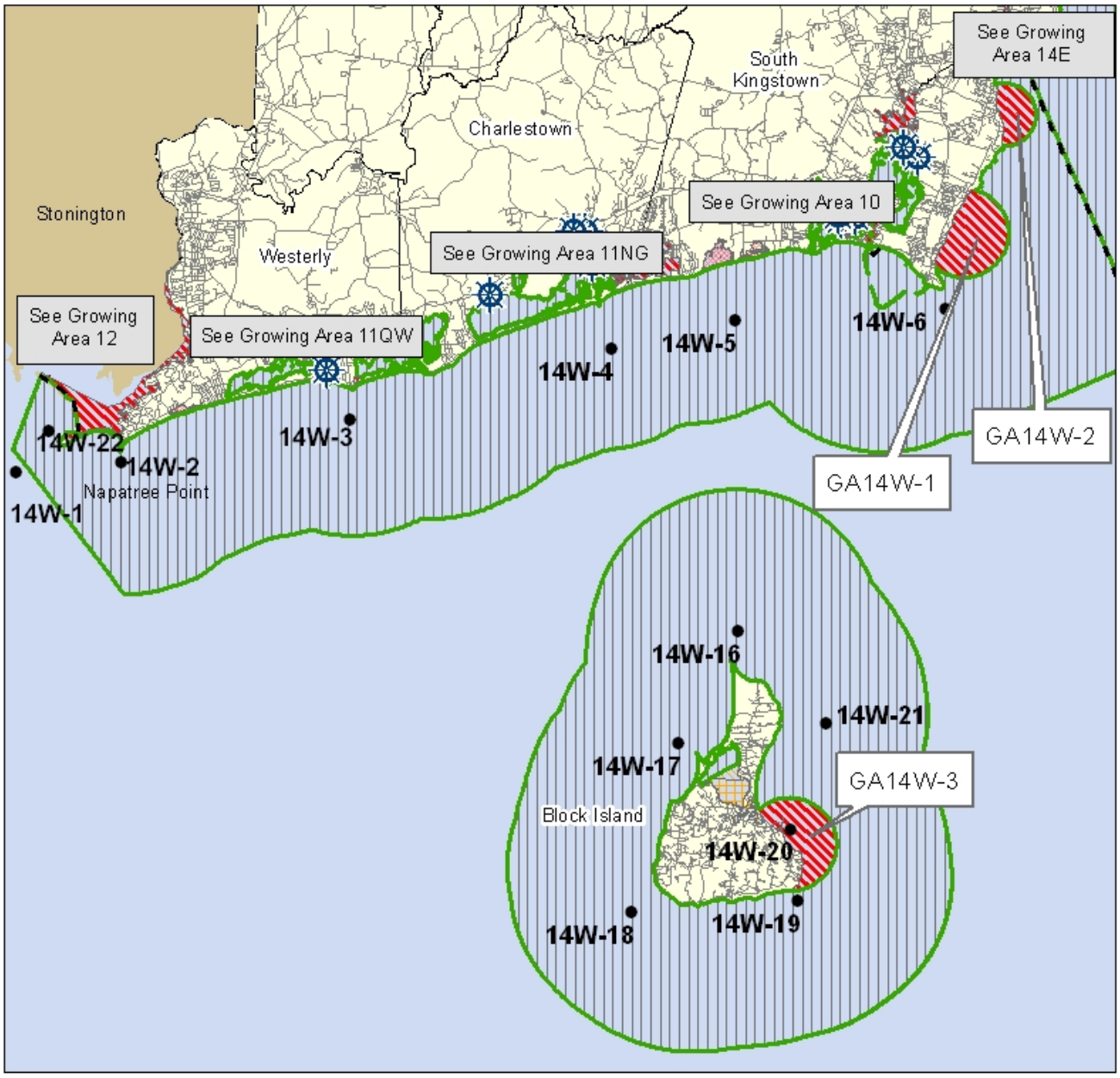


Shellfish Growing Area Classification Codes

Approved

Growing Area Boundary

Marina Facility Seasonal Closure

Shellfishing Prohibited

Un-assessed - Shellfishing Prohibited

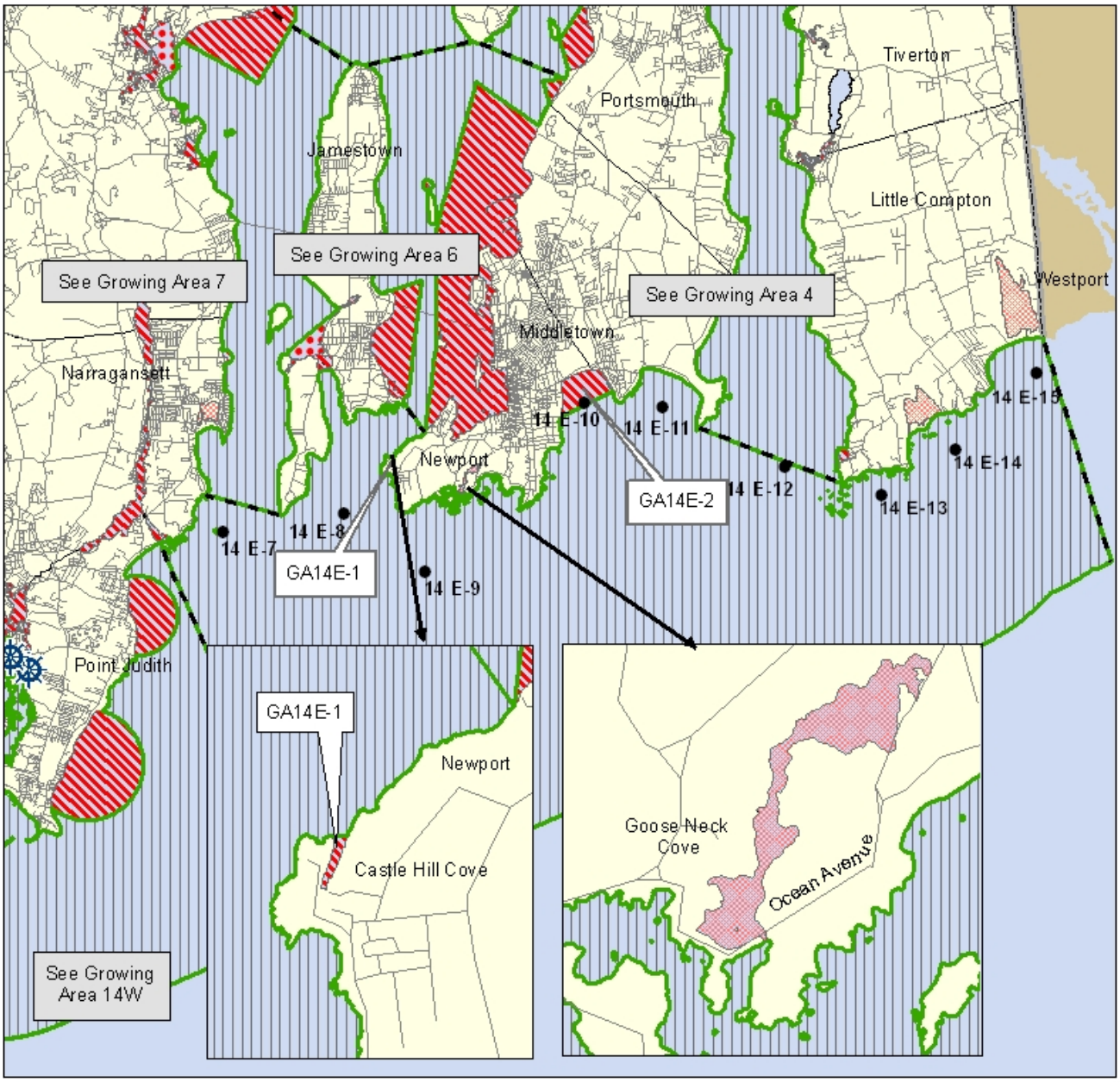
Seasonal Closure

Rhode Island Department of Environmental Management Office of Water Resources Shellfish Program

Miles 0 1 2 4

This map is provided only as a a general reference for the areas listed as prohibited, seasonal closure or conditional closure in the publication entitled "Notice of Polluted Shellfishing Grounds May 2013" Please refer to that document for the complete legal description of the numbered shellfish closure areas shown here. This map also serves as the legal description for the areas open to shellfishing. Taking of shellfish is prohibited from any waters located on the landward side of the boundary line of waters listed as approved (high tide mark) and the landward side of the boundary line of waters listed as prohibited, conditional closure or seasonal closure, regardless of whether the specific waters are shown or noted as prohibited on the attached maps. At locations where the boundary line crosses water, the boundary shall be a straight line connecting the high tide mark on either side of the water along the main shoreline.

Offshore Point Judith (Narragansett) to Westport Growing Area 14E May 2013 - May 2014



Growing Area 15
Seekonk River
2013 Annual Update

All waters of the Seekonk River, Growing Area 15 are currently prohibited to shellfishing. The area was not sampled in 2013. The area has always been closed to shellfish harvesting because of consistently elevated bacteriological levels, and the area's juxtaposition to a large urban environment. The area is properly classified as prohibited.

HIGHLIGHTS

*** Sampled 0x in 2013**
*** Area is prohibited**

COMMENTARY

The Shellfish Program was not able to sample the Seekonk River (Growing Area 15) in 2013. Since the area is classified as prohibited, there is no minimum sampling requirement. The area has always been closed to shellfish harvesting because of consistently elevated bacteriological levels, and the area's juxtaposition to a large urban environment. The Seekonk River is considered a lower priority growing area, because of its prohibited status presently, to be sampled only as extra time and resources (i.e. staff) allow.

The area is properly classified as prohibited.

RECOMMENDATIONS

*** No action recommended**

Shellfish Growing Area Classification Codes

Shellfishing Prohibited

Growing Area Boundary

Rhode Island Department of Environmental Management
Office of Water Resources
Shellfish Program

0 0.2 0.4 0.8 Miles

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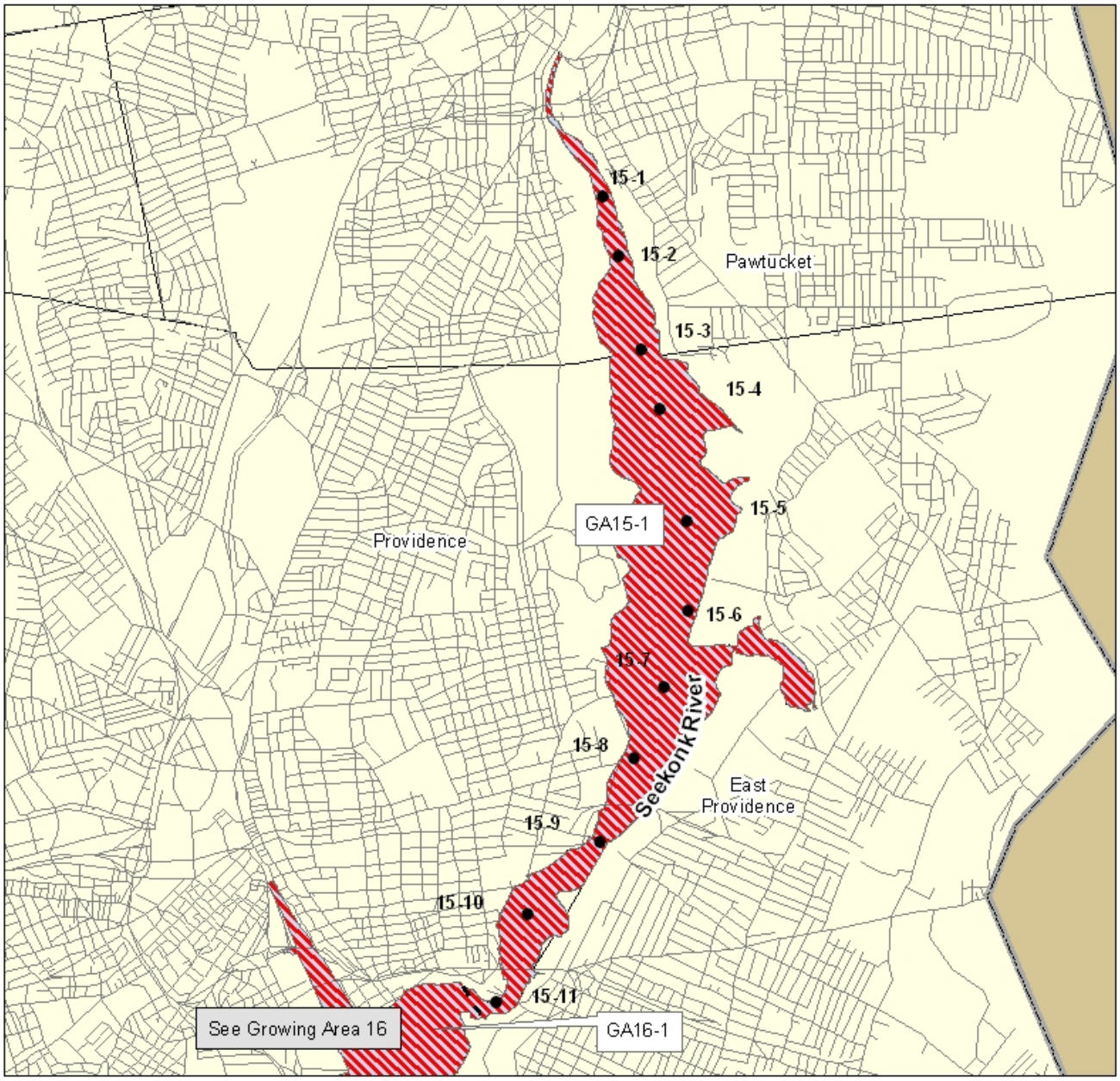
Please refer to that document for the complete legal description of the numbered shellfish closure areas shown here.
This map also serves as the legal description for the areas open to shellfishing. Taking of shellfish is prohibited from any waters located on the landward side of the boundary line of waters listed as approved (high tide mark) and the landward side of the boundary line of waters listed as prohibited, conditional closure or seasonal closure, regardless of whether the specific waters are shown or noted as prohibited on the attached maps.
At locations where the boundary line crosses water, the boundary shall be a straight line connecting the high tide mark on either side of the water along the main shoreline.

Seekonk River Growing Area 15 May 2013 - May 2014



Growing Area 16
Providence River
2013 Annual Update

All waters of the Providence River, Growing Area 16 are currently prohibited to shellfishing. The area has always been closed to shellfish harvesting because of consistently elevated bacteriological levels, and the area's juxtaposition to a large urban environment. Two major wastewater treatment facilities discharge directly to the Providence River along with flows from upstream tributaries that are impacted by either additional wastewater treatment facilities or combined sewer overflows. Currently the entire area is properly classified as prohibited. The Providence River and its tributaries have a direct impact on the conditionally operated Upper Narragansett Bay Growing Area 1.

In order to assess the area for use as a relay area a shoreline survey of the lower reaches of the Providence River south of Gaspee and Bullocks Points was completed in 2009. Of the total thirty-two sources identified in the 2009 survey none of the sources exceeded the 2400 fc/MPN criteria which would normally determine the need for follow-up sampling. Only five sources were equal to or exceeded the 240 fc/MPN criteria and following further investigation it was determined that they do not have a negative impact on the area for its limited use as a relay area by the department's Division of Fish and Wildlife under the current restrictions and standard operating procedures for relaying and depuration.

Currently in a cooperative effort between RIDEM, the Narragansett Bay Commission, the shellfish industry and the RIDOH, shellfish prior to being harvested from this limited relay area are sampled to establish baseline contamination levels. The shellstock is then harvested and transplanted to the previously established approved spawning/management areas in which they are unavailable for re-harvest for a minimum of six – twelve months. Prior to the opening of these management areas to the harvest of the relayed stock, they are re-sampled to insure the depuration period has been sufficient to decrease previous contamination levels to acceptable standards. The program has successfully replenished depleted areas of the bay and provides a bountiful winter harvest.

Extensive wet weather sampling of the Providence River was completed in 2010 to assist in the analysis of its impacts to the water quality of the Upper Narragansett Bay Growing Area 1. A detailed report entitled "Upper Bay GA1 Closure Criteria Analysis" is available for review in the programs permanent files.

HIGHLIGHTS

*** Station GA16-3 collected along with Upper Bay samples**
*** Sampled 10x in 2013, 1x in 2014 and 4x in 2012 for 2013**
*** Statistics represent dry weather only data >7/01/12 (N=15)**
*** Area is prohibited**
*** mTEC = 15 (<31 cfu/100ml)**
**** Data run 5/5/14***

COMMENTARY

The Shellfish Program sampled the Providence River (Growing Area 16) ten times in 2013. The area has undergone an intensive monitoring effort by both this office and the Narragansett Bay Commission in order to evaluate the Providence River and Upper Narragansett Bay water quality as a result of the operation of the NBC Wet Weather Tunnel. The results for that monitoring effort are stored separately from the strictly

Shellfish database because of the need to segregate the data for various reasons. (See documentation for Providence River post-storm supplemental monitoring and targeted wet weather event monitoring).

It was decided to add Station #3 in the Providence River to the Upper Bay monthly monitoring runs too see what sort of bacteriological background we are seeing in the lower portion of the Providence River north of Conimicut Point should the area ever be considered for shellfish management purposes. For the 2012 and 2013 seasons, however, the results actually demonstrate that Station 3 meets the SA standard for both standards (Geo. Mean = 3.9 and 0.00% exceed 31 respectively). The area clearly is impacted by wet weather, surface water run-off, and WWTF effects, and needs to be monitored further.

The area is properly classified as prohibited.

RECOMMENDATIONS

*** Continue monitoring at Station 3 add additional station between 1 and 3 for a better profile of the area at the southern end of the Providence River**

*** No action recommended**

RIDEM SHELLFISH GROWING AREA MONITORING RESULTS

Station Name	Status	N	FECAL-GEO MEAN	%>CRITICAL 31
GA16-3	P	15	3.9	0.00

Shellfish Growing Area Classification Codes

Growing Area Boundary

Conditional Closure

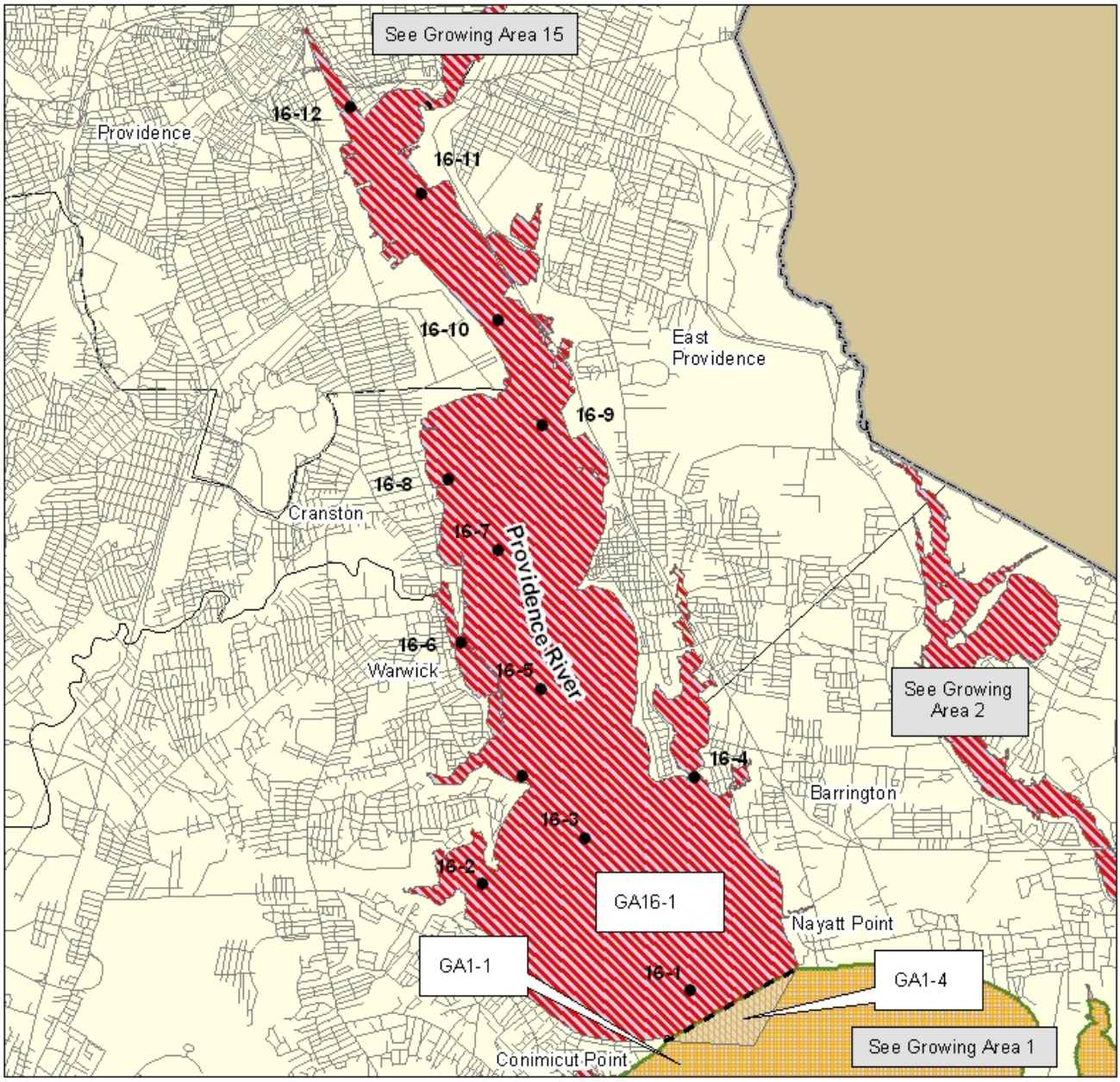
Shellfishing Prohibited

Rhode Island Department of Environmental Management
Office of Water Resources
Shellfish Program

0 0.35 0.7 1.4 Miles

This map is provided only as a a general reference for the areas listed as prohibited, seasonal closure or conditional closure in the publication entitled "Notice of Polluted Shellfishing Grounds May 2013"
Please refer to that document for the complete legal description of the numbered shellfish closure areas shown here.
This map also serves as the legal description for the areas open to shellfishing. Taking of shellfish is prohibited from any waters located on the landward side of the boundary line of waters listed as approved (high tide mark) and the landward side of the boundary line of waters listed as prohibited, conditional closure or seasonal closure, regardless of whether the specific waters are shown or noted as prohibited on the attached maps.
At locations where the boundary line crosses water, the boundary shall be a straight line connecting the high tide mark on either side of the water along the main shoreline.

Providence River Growing Area 16 May 2013 - May 2014



Mount Hope Bay
Growing Area 17
2013 Annual Update

A shoreline survey of the Mount Hope Bay Growing Area 17 was conducted in 2002. This shoreline survey identified thirty-nine (39) actual and potential pollution sources to this growing area.

A triennial re-evaluation shoreline survey of the Mount Hope Bay shellfish growing area was conducted in 2011 to comply with National Shellfish Sanitation Program (NSSP) requirements for shellfish growing area classification. Only one source exceeded the 2400 MPN/100 ml criteria and was re-sampled in 2011 with secondary results of 3 MPN/100 ml. It was determined that this source is not having a negative impact on the receiving water due to its isolated location from a large wooded wetland. No other sources sampled during the triennial update exceeded the 2400 MPN / 100ml criteria necessitating annual follow-up sampling.

A TMDL for Mount Hope Bay and the Kickemuit River was approved by the EPA on January 14, 2010. All waterbody segments in Mount Hope Bay experience elevated levels of fecal coliform bacteria following rain events, hence the "conditional classification" of this growing area. This TMDL provides a detailed plan for reducing bacterial pollution so that the Rhode Island portion of Mount Hope Bay can meet numeric water quality targets for all designated uses affected by bacteria pollution: shellfishing and primary and secondary contact recreational use under all weather conditions.

HIGHLIGHTS

*** Sampled 9x in 2013, 1 X in 2014, 5 X 2012 (N=15) for 2013**
*** Statistics represent dry weather, approved data >08/01/12 (N = 15)**
*** Samples collected 11/16/2012 "suspect"**
*** All conditionally approved stations are in compliance and conformance**
*** mTEC=15 (<31 cfu/100ml)**
**** Data run 4/14/14***

COMMENTARY

Mt. Hope Bay (Growing Area 17) was sampled nine times for 2013. All samples were collected during dry weather conditions when the area was "open/approved" for shellfish harvesting. The statistical evaluation for Mt. Hope Bay incorporates the most recent 15 dry weather samples collected for the area, the minimum number required by NSSP Manual of Operations guidelines for conditionally approved areas.

The results of this seasons statistical evaluation has Station 16 is in statistical compliance for the second year in a row. A sampling run on 11/16/2012 yielded suspiciously high fecal results for the entire Kickemuit as well as all of Mt. Hope Bay. I say suspiciously high because I have rarely if ever seen all the results of an entire days sampling, which covers a lot of area, reported as high as these were. The results for the approved stations in Mt Hope Bay are in compliance using this data.

Results of the statistical evaluation demonstrate that all conditionally approved stations are in compliance with NSSP guidelines.

RECOMMENDATIONS

***Consider "ignoring" 11/16/2012 data**
***All conditionally approved stations in compliance in spite of above**

RIDEM SHELLFISH GROWING AREA MONITORING RESULTS

Station Name	*Status*	*N*	*FECAL-GEO MEAN*	*%>CRITICAL 31*
GA17-1	P	15	3.5	6.67
GA17-2	P	15	4.6	6.67
GA17-3	P	15	12.3	33.33
GA17-4	P	15	3.8	6.67
GA17-5	P	15	4.6	13.33
GA17-6	P	15	3.6	0.00
GA17-7	P	15	3.3	6.67
GA17-8	P	15	2.9	6.67
GA17-9	P	15	3.1	6.67
GA17-10	P	15	3.8	6.67
GA17-11	P	15	3.4	6.67
GA17-12	P	15	2.8	6.67
GA17-13	P	15	3.1	6.67
GA17-14	CA	15	3.5	0.00
GA17-15	P	15	5.7	13.33
GA17-16	CA	15	3.3	6.67

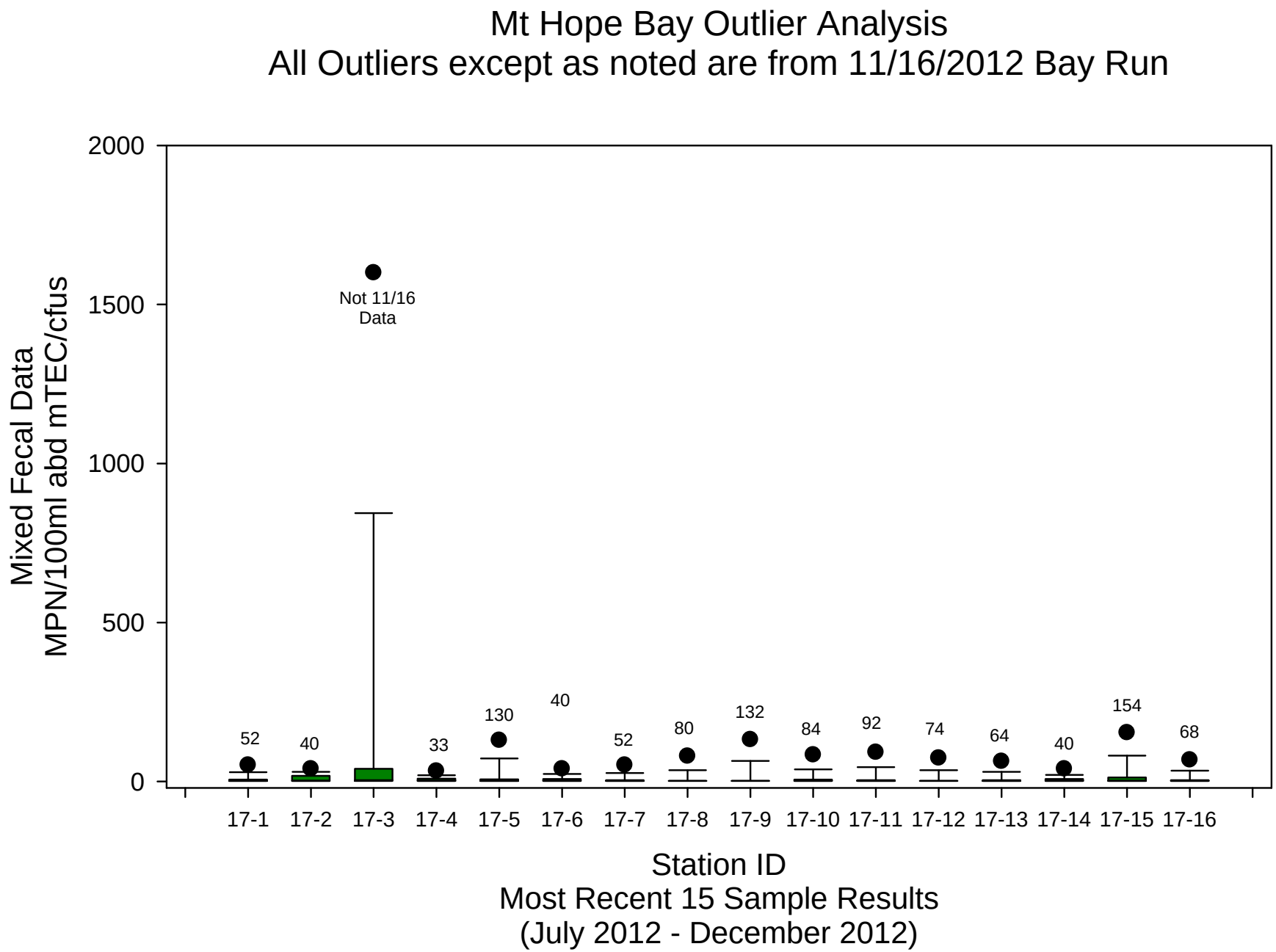
RIDEM SHELLFISH GROWING AREA MONITORING RESULTS
Excluding 11/16/2012
FECAL-GEO

Station Name	*Status*	*N*	*MEAN*	*%>CRITICAL 31*
GA17-1	P	15	2.9	0.00
GA17-2	P	15	3.8	0.00
GA17-3	P	15	10.0	26.67
GA17-4	P	15	3.2	0.00
GA17-5	P	15	3.5	6.67
GA17-6	P	15	3.0	0.00
GA17-7	P	15	2.6	0.00
GA17-8	P	15	2.3	0.00
GA17-9	P	15	2.9	0.00
GA17-10	P	15	2.9	0.00
GA17-11	P	15	2.6	0.00
GA17-12	P	15	2.2	0.00
GA17-13	P	15	2.5	0.00
GA17-14	CA	15	2.9	0.00
GA17-15	P	15	4.3	6.67
GA17-16	CA	15	2.6	0.00

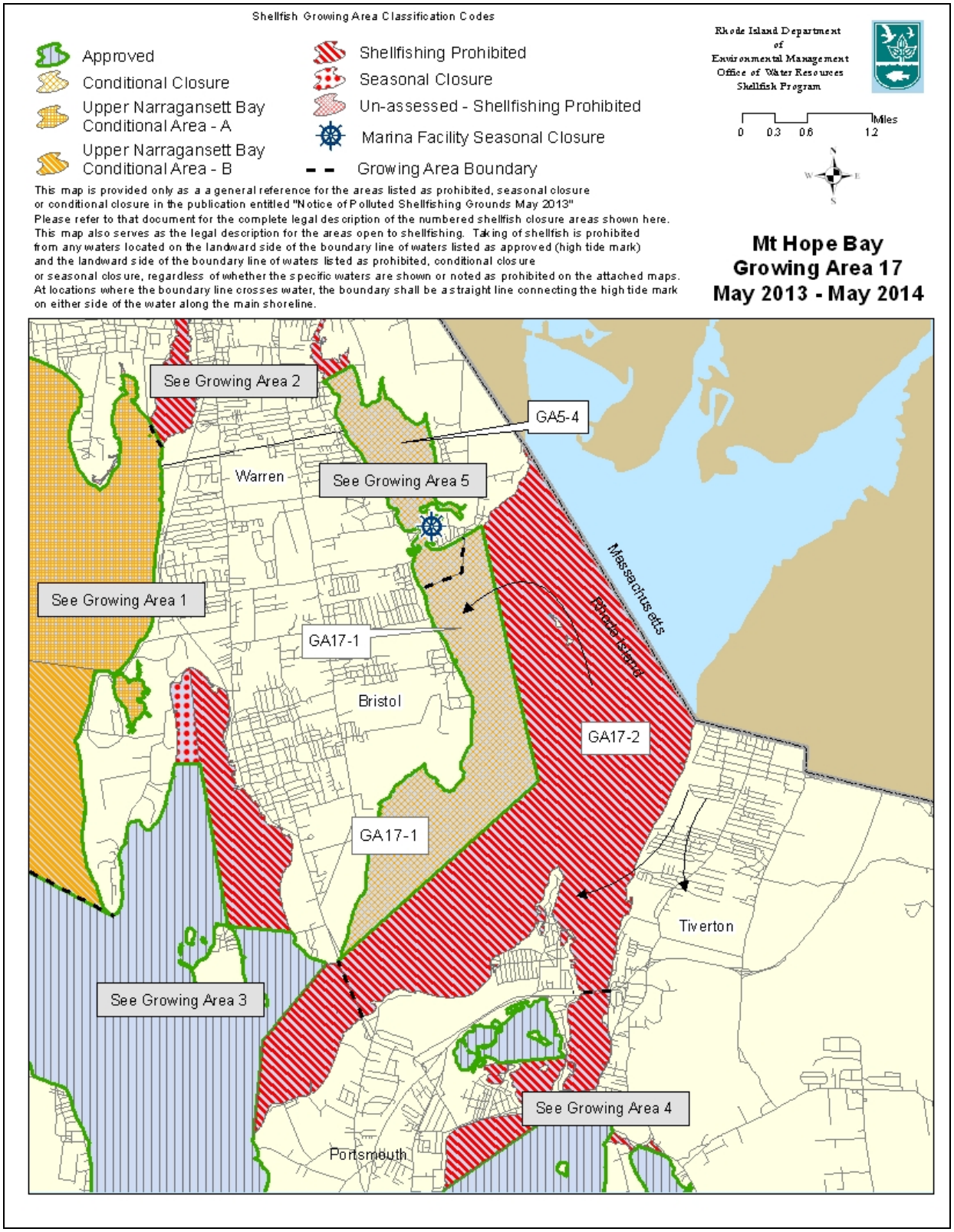
>07/01/12 data N=15

The following graph is produced in support of the decision to not include the monitoring results from 11/16/2012 in the data set. Based on the fact that fourteen out of sixteen or 87.5% of the most recent 15 sampling results are the data set outliers it would appear that this data set (11/16/2012) is definitely unusual for Mt Hope Bay and should not be considered as routine results.

The new description for Mt Hope Bay prohibited area will revert back to how it was prior to closing station 17-16 in 2010 as per the following classification map.


Mt Hope Bay Outlier Analysis
All Outliers except as noted are from 11/16/2012 Bay Run
Mixed Fecal Data
MPN/100ml abd mTEC/cfus
2000
1500
1000
500
0
Not 11/16
Data
52
40
33
130
40
52
80
132
84
92
74
64
40
154
68
17-1
17-2
17-3
17-4
17-5
17-6
17-7
17-8
17-9
17-10
17-11
17-12
17-13
17-14
17-15
17-16
Station ID
Most Recent 15 Sample Results
(July 2012 - December 2012)

2013 – 2014 Shellfish Classification Map Mt Hope Bay GA 17



The next required survey would be a twelve year shoreline survey scheduled for 2014.