GROWING AREA WR
Bristol, South Bristol

ANNUAL REVIEW for 2010

Report Date: 03-14-2011

Eric Sroka

APPROVAL

Division Director:

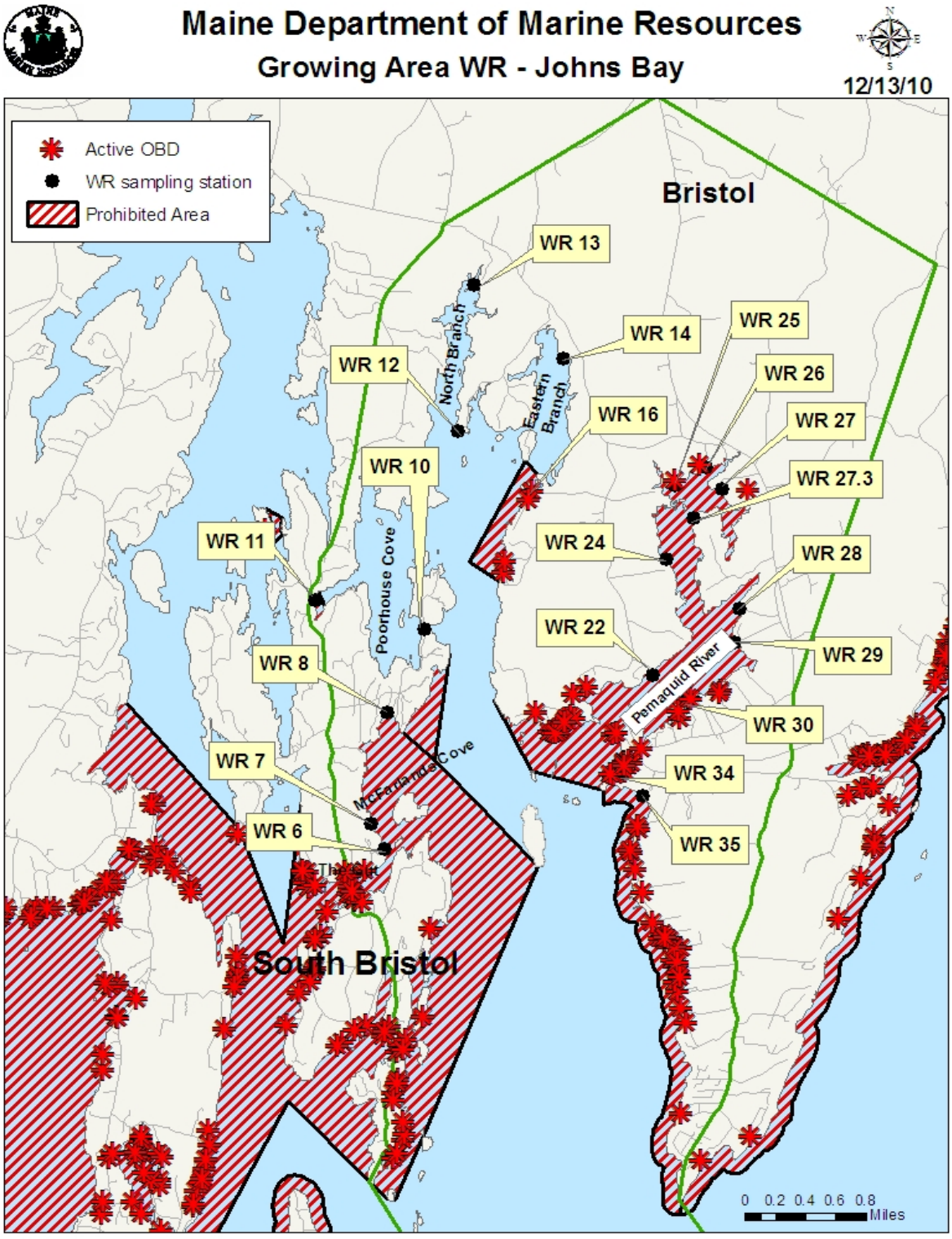
_____ _____ Date: _____
Print name signature

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figure 1. Growing Area WR, with Active Water Stations



Executive Summary

This is an annual report for growing area WR written in compliance with the requirements of the 2007 Model Ordinance and the National Shellfish Sanitation Program.

Growing area WR includes Johns Bay and Pemaquid River. Major sources of pollution in this area include private septic systems, licensed over board discharges (OBDs) and outhouses; there are no municipal waste water facilities in this area. Based on the results of the 2010 annual growing area review, all water quality stations classified as approved are meeting their appropriate NSSP classification standard, however, stations WR 12 and 13, both currently classified as approved, have displayed an upward trend in P90 scores. The cause for the increases is not immediately evident. During the 2010 review year, no new stations were added and no stations were deactivated. Threes OBDs, one in South Bristol discharging in to McFarlands Cove, and two in Bristol, discharging into Pemaquid Harbor, were removed in 2010.

One upward classification change is being recommended, based on a remediation of a malfunctioning septic system on the western shore of Bradstreet Cove in South Bristol (WR 11). No downward classification changes are required.

The next triennial report is due in 2015; the next sanitary survey report is due in 2012.

Growing Area Description

Growing Area WR (Johns Bay) is located in Lincoln County, mid-coast Maine, approximately 60 miles north of Portland (Figure 1). The growing area lies between the Damariscotta River and Muscongus Bay, and includes coastal areas of the towns of Bristol and South Bristol. A complete boundary description for this growing area can be found in DMR central files.

The shoreline is typical of mid-coast Maine, with rockbound points and shoreline separating shallow coves and harbors. The muddy and gravel bottoms in these coves frequently provide excellent habitat for soft shell clams. Within Area WR, the coves most likely to support significant populations of soft shell clams include McFarlands Cove, Poorhouse Cove, Bradstreet Cove, the North Branch, the Eastern Branch, the upper Pemaquid River, Coombs Cove and Fossetts Cove. Fresh water influence is minimal in this growing area, with no major river drainages, although small brooks and streams, many of which are intermittent, can be found throughout the growing area.

Based on the results of the 2000 Census, the town of Bristol had 1203 households and a year-round population of 2844. South Bristol had 410 households, with a year-round population of 897. The population of the towns has increased 6% and 2% respectively since 2000. Primary sources of employment in both towns are retail, construction, fishing, and manufacturing. The towns of Bristol and South Bristol both have 17 commercial shellfish license holders.

Land use in the study area is dominated by a mix of seasonal and year-round residential properties. Sections of moderate shoreline development are punctuated by large tracts of undeveloped land. Seasonal properties are being converted to year-round use throughout the

area. Heaviest development is found near the Bristol Gut, along MacFarlands Cove, Bradstreet Cove, Riverview Rd, Sunset Loop and Pemaquid Harbor, and in the area from Pemaquid Beach to Pemaquid Point. Rutherford Island and Pemaquid Point both have increased summer populations with numerous groupings of old cottages on very small lots.

The northern side of the Bristol Gut is an area of heavy marine/fishing activity. It has several docks with lobster buying businesses, some of which offer support services for fishermen (fuel, bait, gear). An inactive aquaculture lease site is located at the northern end of High Island. Pemaquid Harbor has a fisherman's co-op, two seasonal restaurants, a small boat building facility, and the historic site of Fort William Henry, in Pemaquid. A building supply company operates at the upper end of the Pemaquid River.

Current Classification(s)

At the end of the 2010 review year, shellfish growing area WR currently had areas classified as:

Approved: 4 Stations (WR 10, 12, 13 and 14)

Prohibited: 15 stations

Area No. 24-A: Johns River and Pemaquid River (South Bristol and Bristol)
- Section A: John River (WR 16), due to OBDs
- Section B: McFarlands Cove (WR 6, 7, and 8); due to OBDs and lack of shellfish resource
- Section C: Pemaquid River (WR 22, 24, 25, 26, 27, 27.3, 28, 29, 30, 34 and 35); due to OBDs and other identified pollution sources)
- Section D: Bradstreet Cove (WR 11)- due to a septic system malfunction

Area No. 24-B: John Bay (South Bristol and Bristol)- no stations, due to OBDs

Please visit the DMR website to view legal notices:

Area No. 24-A: Johns River and Pemaquid River (South Bristol and Bristol)

Area No. 24-B: John Bay (South Bristol and Bristol)

http://www.maine.gov/dmr/rm/public_health/closures/closedarea.htm#R

Activity and Classification Changes during Review Period

There were no classification changes in 2010.

The DEP has reported that 3 OBDs in Growing Area WR were removed in 2010 (Table 1).

Table 1. OBDs in Growing Area WR Removed in 2010

DEP ID	Location	Flow	Reported Removal Date
003948	Bristol	300 gpd	2/22/2010
003594	Bristol	300 gpd	4/21/2010
001463	South Bristol	600 gpd	6/29/2010

Water Quality Review and Discussion

Table 2 lists all active approved and prohibited stations in Growing Area WR, with their respective geometric means (geomean) and P90 calculations for 2010. Please refer to Appendix A for a key to interpreting the headers on the columns of Table 2. The approved standard for each station is also displayed in Table 2. All approved stations met their NSSP classification standard in 2010. Station WR 11, which is currently classified as prohibited, meets the approved standard. An analysis for an upward classification for this station is presented later in this report.

Table 2. Geomean and P90 Scores, Growing Area WR, 2005-2010

Station	Class	Count	MFCount	GM	SDV	MAX	P90	Appd_Std	Min_Date
WR006.00	P	30	27	2.4	0.23	16	4.8	32	4/19/2006
WR007.00	P	30	27	2	0.07	4	2.5	32	4/19/2006
WR008.00	P	30	27	2.7	0.41	88	9.5	32	4/19/2006
WR010.00	A	30	27	2.8	0.34	40	7.6	32	5/15/2006
WR011.00	P	30	27	4.5	0.53	114	21.7	32	5/15/2006
WR012.00	A	30	27	4.7	0.62	180	29.8	32	5/15/2006
WR013.00	A	30	27	5.5	0.53	78	26.8	32	5/15/2006
WR014.00	A	30	27	3.5	0.39	44	11.5	32	4/19/2006
WR016.00	P	30	27	3.4	0.43	140	12.1	32	4/19/2006
WR022.00	P	30	28	2.5	0.26	20	5.6	31	5/15/2006
WR024.00	P	30	28	8.2	0.7	1700	65.2	31	5/15/2006
WR025.00	P	30	26	12.7	0.58	98	71.5	32	10/24/2005
WR026.00	P	30	27	12.6	0.58	240	70.2	32	4/19/2006
WR027.00	P	30	28	14	0.68	460	104.4	31	7/10/2006
WR027.30	P	30	28	7.6	0.6	460	45	31	5/15/2006
WR028.00	P	30	28	3.9	0.47	93	15.7	31	5/15/2006
WR029.00	P	30	28	6.4	0.67	500	47.9	31	5/15/2006
WR030.00	P	30	28	4.3	0.49	108	18.9	31	5/15/2006
WR034.00	P	30	27	4.7	0.49	74	20.2	32	4/19/2006
WR035.00	P	30	27	3.4	0.41	68	11.9	32	4/19/2006

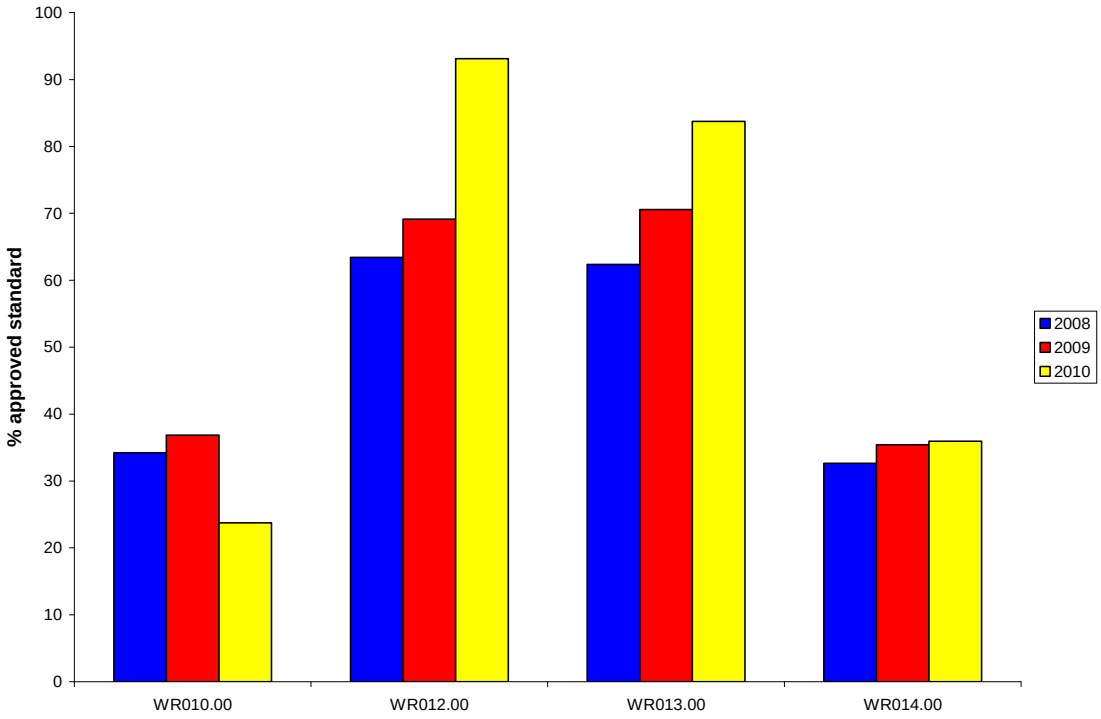
All approved and prohibited stations that were active at the beginning of 2010 were sampled at least 6 times following the systematic random sampling (SRS) schedule (Table 3). Station WR 13 serves as a flood closure re-opening sample station and was sampled additionally under adverse conditions.

Table 3. Growing Area WR Samples Collected in 2010

Station	Class	Adverse		Random		Extra	Grand Total	Notes
		Closed	Open	Closed	Open			
WR006.00	P			6			6	
WR007.00	P			6			6	
WR008.00	P			6			6	
WR010.00	A				6		6	
WR011.00	P			6			6	
WR012.00	A				6		6	
WR013.00	A	23	1		7		31	Flood Station
WR014.00	A				6		6	
WR016.00	P			6			6	
WR022.00	P			6		1	6	
WR024.00	P			6		1	6	
WR025.00	P			6			6	
WR026.00	P			6			6	
WR027.00	P			6			6	
WR027.30	P			6		1	6	
WR028.00	P			6		1	6	
WR029.00	P	1		6		1	7	
WR030.00	P			6		1	6	
WR034.00	P			6			6	
WR035.00	P			6			6	

P90 trends for Approved stations in growing area WR sampling stations from 2008-2010 are displayed in Figure 2. All stations meet their NSSP classifications. Over the past three review years stations WR 12 and 13 have shown upward trends, indicating deterioration in water quality. It is unknown why these stations have degraded, however, survey work performed by DEP in 2008 found several questionable systems in the vicinity. These systems provide a starting point for further investigation into this area.

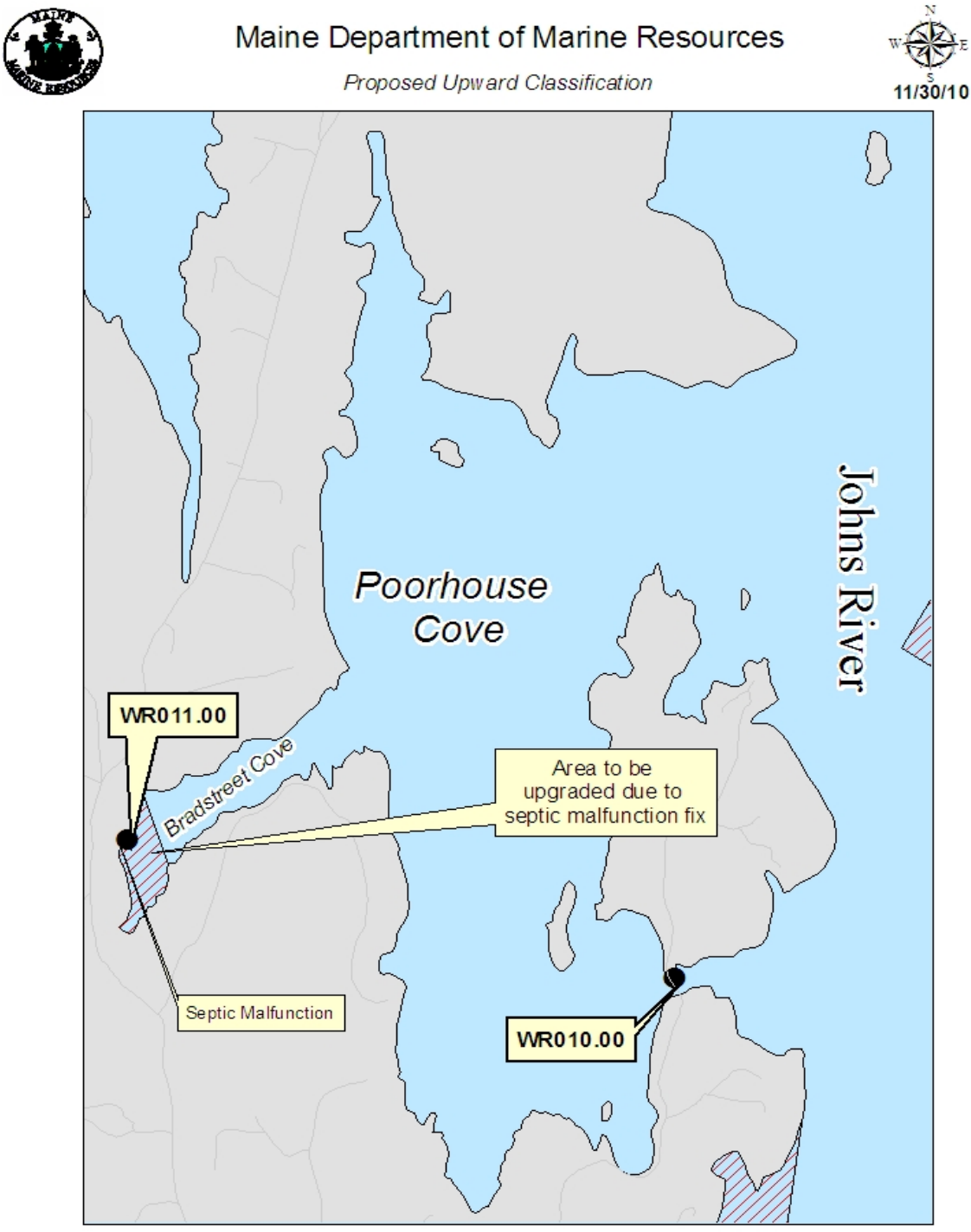
Figure 2. Area WR P90 Trends for Approved Stations (expressed as the percent of the approved standard), 2008-2010



Recommendations for Upward Classification

Bradstreet Cove is located off the western bank of Poorhouse Cove in South Bristol. On February 11, 2009, DMR staff reported a septic malfunction (in the vicinity of station WR11) to the CEO, which caused the DMR to enact a closure for the cove. On June 22nd, 2010 DMR staff re-surveyed the septic system in question. At the time of this inspection, no evident malfunction was noted; this was communicated to the LPI for the town of South Bristol who agreed to inspect the system. On January 11, 2011 DMR received confirmation that the septic system was no longer malfunctioning. With this problem remediated, the portion of Bradstreet Cove that is currently closed to shellfish harvesting is being proposed for an upgrade in classification, from Prohibited to Approved (Figure 3).

Figure 3. Proposed Classification Upgrade of Station WR11 (Bradstreet Cove)



Water quality at station WR 11 has continued to meet the approved standard for classification. Figure 4 shows P90 trends for Station WR 11 and WR 10 (the nearest approved station, shown for comparison) over the past three review years. The 2010 data at station WR11 show a slight improvement in water quality over the previous years.

Figure 4. P90 Scores for Stations WR10 and WR11, expressed as a percent of the approved standard

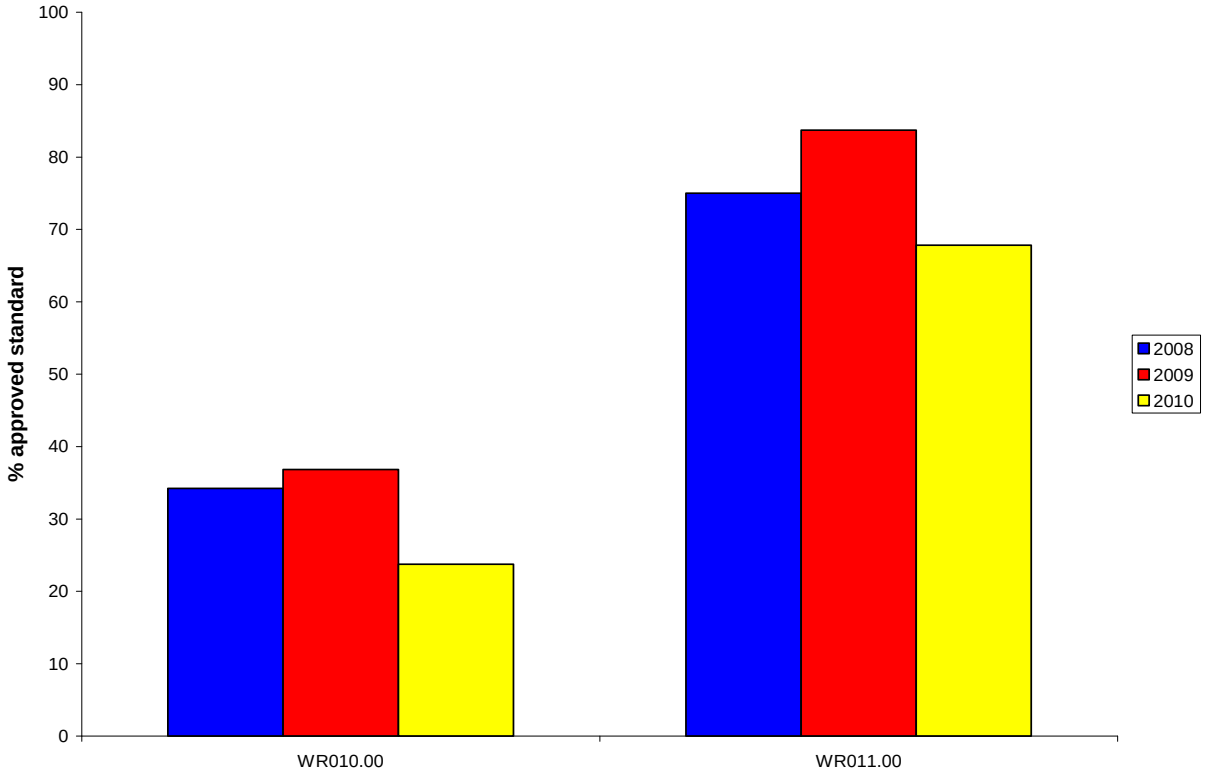


Table 4 shows individual fecal scores for Station WR 11, collected from 2003 through 2010;; cumulative rainfall (in inches) within 3 days and 4 days of collection is also noted in this table. The data are split by month of collection, and are presented in ascending order by cumulative rainfall amounts. Since 2003, this station has received a total of three scores that have exceeded the approved variability standard (49 prior to Aug. 2006, 31 after Aug. 2006). A fecal score of 44 was recorded on October 2, 2006 and fecal scores of 40 and 114 were recorded on July 1, and October 22, 2008, respectively. While the cause of the 2006 elevated score is unknown, the elevated scores observed in 2008 were likely caused by the nearby septic system malfunction. An additional assessment was completed for station WR11 to determine the effect of precipitation (cumulative rainfall of >0.5 inches within 4 days of collection and on collection day) on the geometric mean and P90 scores (Table 5). Data collected during flood closures were not considered. Using this dataset, station WR 11 met the approved standard, indicating that the impact from rainfall does not cause this station to exceed the approved classification standard.

Table 4. Seasonal and Rainfall Assessment of Station WR11, 2003-2010

Date	Rain 3	Rain 4	Tide	Sal	Strategy	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
10-Mar-04	0	0	F	32	R			<3									
27-Sep-04	0	0	HE	30	R									3.6			
31-Jan-05	0	0	HE	32	R	3.6											
24-Mar-05	0	0	HE	32	R			<3									
18-Jul-05	0	0	E	30	R							9.1					
13-Dec-05	0	0.01	HE	32	R												<3
10-Jul-06	0	0	F	30	R							43					
10-Apr-07	0	0	E	26	R				2								
31-Jul-07	0	0.01	F	30	R							28					
18-Sep-07	0	0.15	F	32	R									2			
17-Aug-09	0	0	HF	30	R								4				
20-Feb-07	0.01	0.01	F	32	R		2										
09-Jan-08	0.01	0.01	HF	30	R	<2											
17-Feb-09	0.01	0.01	F	28	R		<2										
11-Aug-03	0.02	0.21	H	32	R								15				
06-Nov-06	0.02	0.02	H	28	R											<2	
03-May-10	0.02	0.02	F	30	R					<2							
27-Sep-10	0.03	0.56	E	32	R									18			
16-Nov-10	0.03	0.03	H	27	R											2	
15-Nov-04	0.05	0.05	HF	32	R											<3	
08-Aug-06	0.05	0.05	HE	30	R								9.1				
18-Jun-03	0.06	0.21	F	26	R						3.6						
28-Nov-05	0.09	0.13	E	28	R											43	
09-Aug-10	0.12	0.12	F	31	R								<2				
22-Jun-10	0.15	0.15	HE	30	R						<2						
16-Sep-09	0.21	0.31	H	30	R									6			
27-Mar-03	0.22	0.22	E	25	R			<3									
22-Oct-08	0.23	0.23	E	31	R										114		
19-Aug-08	0.29	0.29	F	30	R								6				
23-Jun-04	0.32	0.32	H	34	R						<3						
01-Sep-04	0.33	0.47	F	30	R									<3			
14-Oct-09	0.37	0.37	E	29	R										5.5		
21-Aug-06	0.4	0.4	H	30	R								2				
20-Apr-04	0.42	0.42	F	30	R				<3								
02-Oct-06	0.45	1.15	E	20	R										44		
05-Mar-08	0.75	0.76	HF	26	R			6									
05-Dec-07	0.82	0.82	E	30	R												<2
05-Nov-03	0.84	0.89	E	30	R											<3	
28-Apr-03	0.87	0.92	E	28	R				<3								
19-May-09	0.9	0.9	HE	29	R					<2							
30-Sep-03	0.93	0.96	F	32	R									<3			
15-Mar-10	0.95	0.95	H	24	R			2									

Date	Rain 3	Rain 4	Tide	Sal	Strategy	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
06-May-08	0.98	1.02	F	25	R					<2							
01-Jul-08	1.11	1.11	H	31	R							40					
15-May-06	1.25	1.59	F	25	R					<3							
06-Jun-07	1.29	2.52	HF	28	R						<2						
24-Oct-05	1.39	1.39	F	10	R										43		
09-May-05	1.59	1.59	H	30	R					<3							
31-Mar-09	1.71	1.71	HF	22	R			<2									

Table 5. Geomean and P90 Scores on Data Collected After Cumulative Rainfall >0.50 Inches of Rain, 2003-2010

Station	Class	Count	MFCount	GM	SDV	MAX	P90	Appd_Std	Min_Date
WR011.00	P	16	10	4.8	0.52	44	23	36	4/28/2003

Due to water quality meeting the approved standard, the improvement in water quality, the lack of impact by rainfall, and confirmation by the South Bristol LPI of the malfunctioning septic system having been remediated, Bradstreet Cove is proposed for an upgrade in classification, from Prohibited to Approved. This classification change was implemented on March 3, 2011.

Shoreline Survey Activity

A drive-through survey of growing area WR was completed on June 22nd, 2010. No new development or malfunctions were detected. Two areas were visited more thoroughly to follow up on pollution source codes:

On June 22, 2010, DMR staff followed up on a property on Bradstreet Cove that had been flagged as a pollution source for a failing septic. The property was supposedly unoccupied, though the owner was in residence. The house is used during the summer months. The owner was aware of the failed septic, but he believed it to be the outcome of a broken backflow to the water conditioner. This property was referred to the town LPI for further investigation.

On August 16, 2010 DMR staff observed approximately 25 boats of live aboard size in the Pemaquid River, just north of the Pemaquid Co-Op. The boats were counted from standing in the water at sampling station WR30. This number of boats requires a marina closure of 41.39 acres, however, these boats are located within a much larger Prohibited area, and no additional closure is required.

Aquaculture/Wet Storage Activity

There are three active aquaculture lease sites in area WR (two limited and one experimental). There are no wet storage sites or activities in area WR.

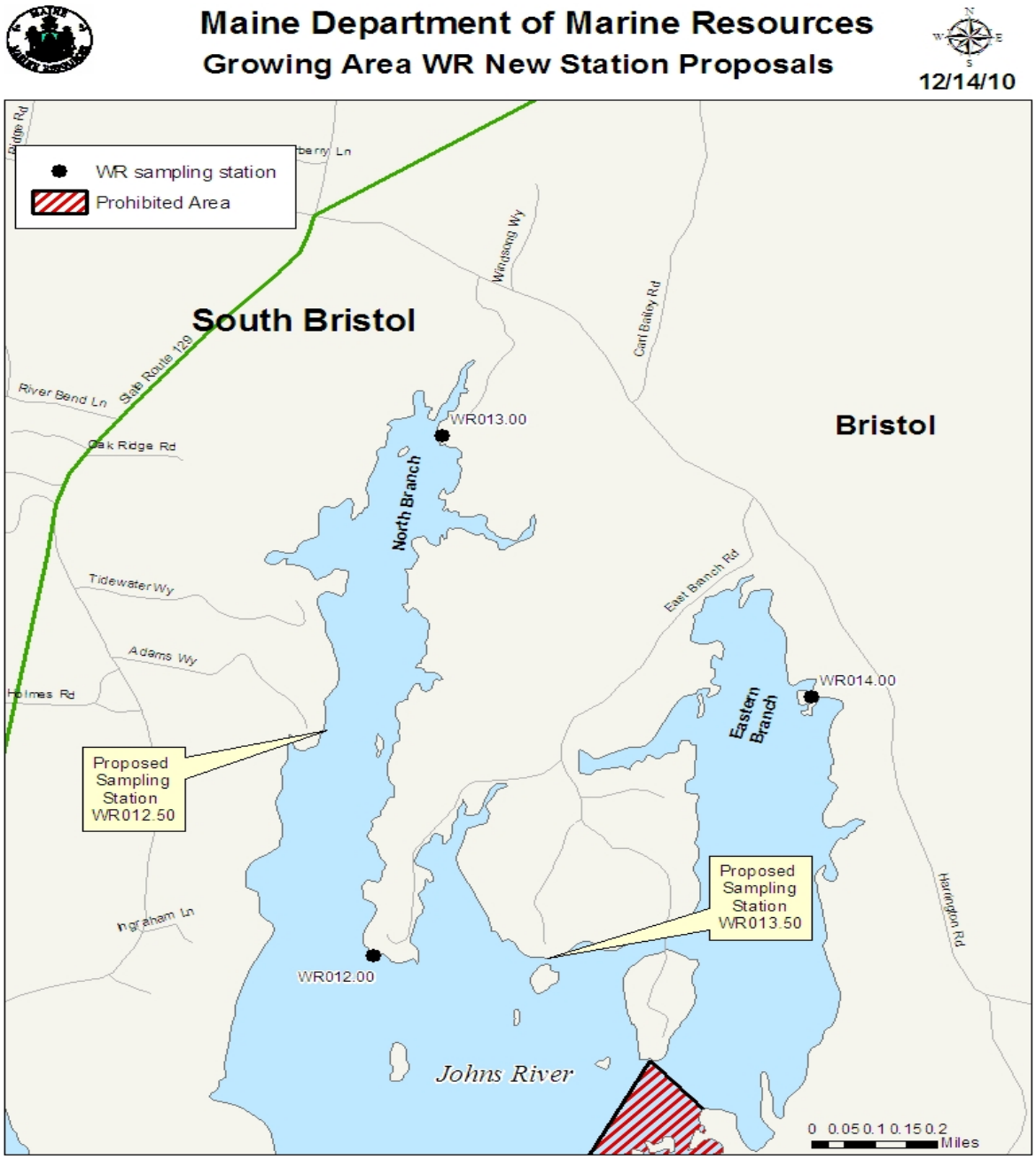
For more information on aquaculture leases, please visit the DMR website:

http://www.maine.gov/dmr/aquaculture/leaseinventory/index.htm

Recommendation for Future Work

Future work will focus on the shoreline in the vicinity of stations WR 12 and 13. These are currently classified as approved, however, given the increase in P90 trends at both stations (23% at WR12 and 8.5% at WR13), a continued upward trend will result in a classification downgrade. Though WR is not yet due for a shoreline survey review, these two areas should be surveyed early to investigate the potential adverse impacts to these two stations. The DMR also recommends establishing two new sampling stations, pending homeowner approval (Figure 5). In addition to the proposed new stations, there are several streams in the area which should be sampled under a variety of conditions (rainfall events, etc.).

Figure 5. New Stations Proposed for Growing Area WR



Appendix A. Key to Water Quality Table Headers

Station = water quality monitoring station

Class = classification assigned to the station; prohibited (P), restricted (R), conditionally restricted (CR), conditionally approved (CA) and approved (A).

Count = the number of samples evaluated for classification, must be a minimum of 30.

MFCNT = the number of samples evaluated with the MTec method (included in the total Count column)

Geo_Mean = means the antilog (base 10) of the arithmetic mean of the sample result logarithm (base 10).

SDV = standard deviation
Max = maximum score of the 30 data points in the count column

P90 = 90th percentile

APPD_STD = the 90th percentile, at or below which the station would meet approved criteria in the absence of pollution sources or poisonous and deleterious substances.

RESTR_STD = the 90th percentile, at or below which the station would meet restricted criteria