



**GROWING AREA WT**  
**Towns of Friendship and Cushing**  
**ANNUAL REVIEW for 2010**

**Report Date: 03-28-12**

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**APPROVAL**

Division Director:

A handwritten signature in blue ink, appearing to read "Kohl Kanwit", is written over a light blue rectangular background.

Kohl Kanwit

3/28/12

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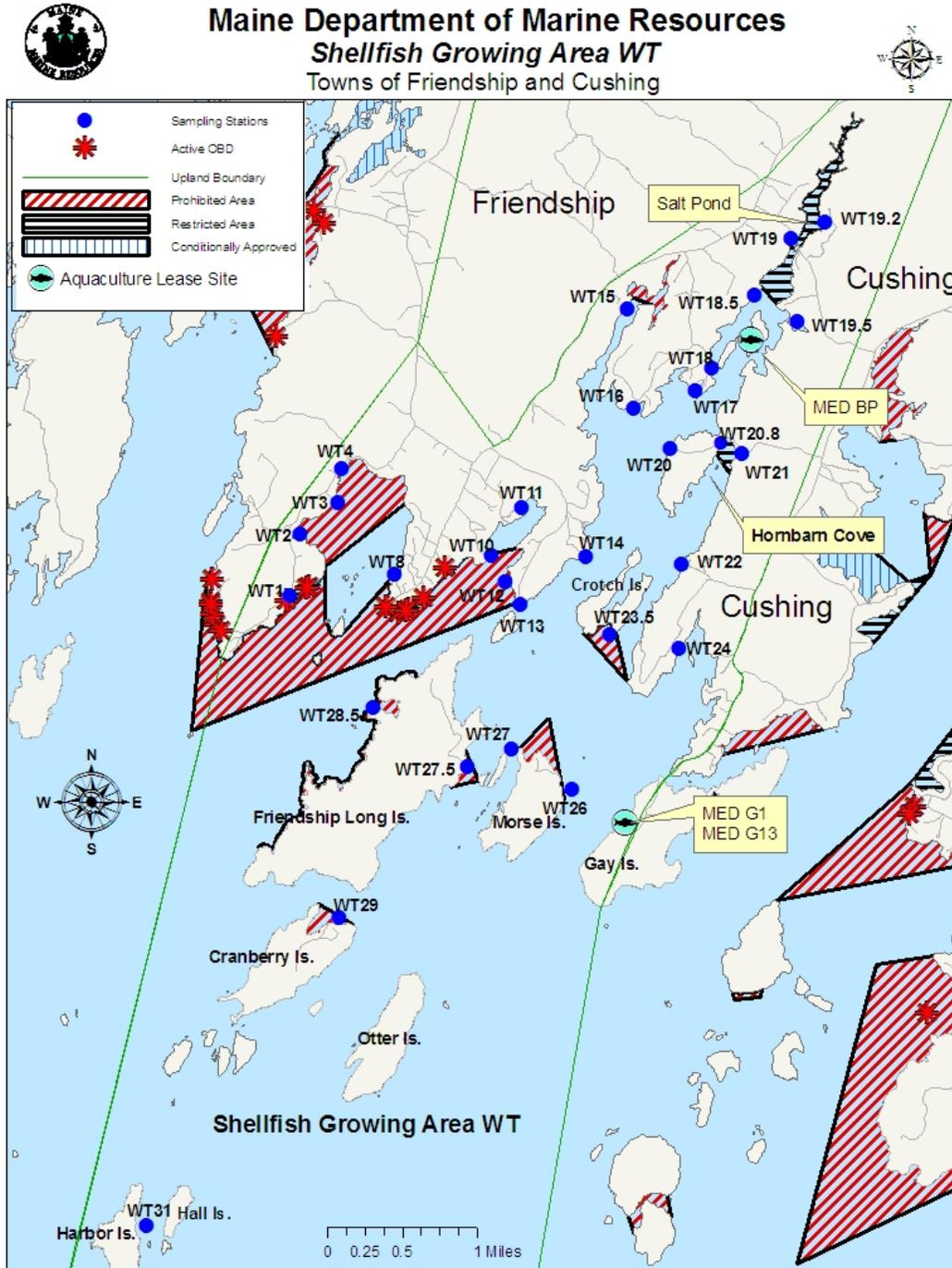
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Figure 1. Growing Area WT, With Active Sampling Stations





## Executive Summary

This is an annual report for growing area WT written in compliance with the requirements of the 2009 Model Ordinance and the National Shellfish Sanitation Program.

Shellfish growing area WT covers portions of the shores of the towns of Friendship and Cushing. On January 10, 2010, Hornbarn Cove, Cushing (Figure 1) was reclassified as restricted due to poor water quality scores. A new sampling station (WT 20.8) was created in the cove on March 18, 2010 to monitor water quality away from the stream at the head of the cove. The shellfish Warden for the town of Cushing sampled the original station (WT21) and the stream at the head of the cove on an accelerated schedule to try to determine if a small closure at the head of the cove would be adequate (allowing the remainder of the cove to reopen). Hornbarn Cove was proposed for a reclassification and subsequently reclassified on March 18, 2011. Sampling station WT1 was deactivated on May 18, 2010 at the request of the property owner.

The next triennial report is due in 2012, the next sanitary survey report is due in 2021.

## Growing Area Description

Growing Area WT is located in Knox County in the area between the southern tip of Martin Point Friendship and the southern tip of Gay Island Cushing (Figure 1). This growing area also contains numerous small islands. Islands with dwellings on them include: Harbor, Hall, Cranberry, Otter, Friendship Long Island, Morse, Gay, Garrison and Crotch. A detailed boundary description for growing area WT can be found in DMR central files.

The entire region is very rural. There are no municipal treatment facilities, marinas or industries in Growing Area WT. The dwellings in this area utilize private in-ground septic systems or licensed overboard discharge systems (OBDs); several outhouses can still be found in this growing area. Shellfish Growing Area WT has a total of 10 OBDs, all of the OBDs are located in Hatchet Cove and Friendship Harbor.

The most common sources of employment are construction, agriculture/forestry, and fishing. The town of Friendship has a municipal shellfish ordinance in place to manage the shellfish resources of the town. Friendship has 30 licensed, resident commercial diggers and four non-resident commercial diggers. Clam harvesters from the town of Cushing also have a municipal shellfish ordinance in place to manage the shellfish resources of their town. Cushing clam harvesters are part of a five town management group which allows licensed diggers to dig in any of the participating five towns in the St George River management group. Towns participating in the five town group include Cushing, Warren, Thomaston, South Thomaston and St George.



## Current Classification(s)

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

### Approved

- 13 Approved stations – WT8, 11, 13, 14, 15, 16, 17, 18, 19.5, 20, 24, 27, and 31

### Conditionally Approved

- There are no conditional areas in Growing Area WT

### Restricted

- Stations 18.5 (new), 19, 19.2, 20.8 (new), 21 and 22 water quality scores do not meet approved standards, due to non-point pollution. Station 22 was classified restricted due to a potential pollution source in the area. The pollution source was fixed and the area was returned to approved classification (March 18, 2011).

### Conditionally Restricted

- There are no conditionally restricted areas in Growing Area WT

### Prohibited

- Pollution Area No. 26B, Friendship and Cushing, eleven prohibited stations, due to licensed OBDs, pollution sources identified during 2009 shoreline survey and potential pollution sources at island sites – Stations 1, 2, 3, 4, 10, 12, 23.5, 26, 27.5, 28.5, and 29

Please visit the DMR website to view legal notices:

[http://www.maine.gov/dmr/rm/public\\_health/closures/closedarea.htm#](http://www.maine.gov/dmr/rm/public_health/closures/closedarea.htm#)

## Activity during Review Period

Hornbarn Cove was reclassified as restricted on January 10, 2010 due to poor water quality scores. A new sampling station (WT20.8) was created in Hornbarn Cove on March 18, 2010 to monitor water quality in the cove away from the stream. A further review of the stream data along with the station data revealed that the restricted area in the cove could be reduced in size based on a stream dilution calculation. The area was reclassified on March 18, 2011.

Station WT21 was reclassified from approved to restricted on January 10, 2010

Station WT22 was reclassified from approved to restricted due to a potential; pollution source in the area. The pollution source was fixed and the area was returned to approved classification (March 18, 2011).

Station WT 1 was made inactive due to the property owner not wanting DMR staff on his property.



### Conditionally Managed Area(s)

There are no conditional areas in shellfish growing area WT.

### Water Quality Review and Discussion

The water quality in shellfish growing area WT has continued to be quite good. Currently only two stations in the growing area have water quality scores that do not meet approved standards (WT 19.2 and 21). Several of the stations in the growing area are classified prohibited due to actual or potential pollution sources that were identified during the 2009 shoreline survey of the area. Stations that are being proposed for reclassification due to pollution remediation are highlighted in yellow. A key to the water quality P90 table headers can be found in Appendix A.

**Table 1. Shellfish Growing Area WT, P90 Data 2006-2010**

Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WT002.00	P	30	26	2.9	0.35	42	8.4	32	176	4/4/2006
WT003.00	P	30	26	2.8	0.33	62	7.7	32	176	4/4/2006
WT004.00	P	30	26	2.9	0.35	60	8.5	32	176	4/4/2006
WT008.00	A	30	26	3.3	0.54	1100	17	32	176	4/4/2006
WT010.00	P	30	26	4	0.51	156	18.5	32	176	4/4/2006
WT011.00	A	30	26	3.4	0.37	24	10.5	32	176	4/25/2006
WT012.00	P	30	26	3.6	0.41	54	12.4	32	176	4/4/2006
WT013.00	A	30	26	3.2	0.37	58	9.7	32	176	4/4/2006
WT014.00	A	30	26	2.7	0.35	76	7.8	32	176	4/4/2006
WT015.00	A	30	26	3	0.39	50	9.6	32	176	4/25/2006
WT016.00	A	30	26	2.6	0.27	18	6	32	176	4/25/2006
WT017.00	A	30	26	2.7	0.32	24	7.1	32	176	4/25/2006
WT018.00	A	30	26	2.8	0.22	10	5.4	32	176	4/25/2006
WT018.50	R	21	21	2.8	0.3	31	7	31	163	8/1/2007
WT019.00	R	30	26	5.7	0.57	200	30.8	32	176	4/25/2006
WT019.20	R	30	26	8.8	0.67	380	64.1	32	176	4/4/2006
WT019.50	A	30	26	4.9	0.6	400	29.2	32	176	4/25/2006
WT020.00	A	30	26	2.3	0.15	9.1	3.7	32	176	4/4/2006
WT020.80	R	14	14	3.6	0.45	56	13.9	31	163	3/17/2010
WT021.00	R	30	30	9.4	0.83	960	109.9	31	163	6/11/2007
WT022.00	R	30	26	2.8	0.38	132	9	32	176	4/4/2006
WT023.50	P	30	27	2	0.06	3.6	2.4	32	173	4/26/2006
WT024.00	A	30	26	3.4	0.49	140	14.9	32	176	4/4/2006
WT026.00	P	30	27	1.9	0.05	2.9	2.3	32	173	4/26/2006
WT027.00	A	30	27	2	0.07	3.6	2.5	32	173	4/26/2006
WT027.50	P	30	27	2	0.07	4	2.5	32	173	4/26/2006



Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WT028.50	P	30	27	1.9	0.05	2.9	2.3	32	173	4/26/2006
WT029.00	P	30	27	1.9	0.05	2.9	2.3	32	173	4/26/2006
WT031.00	A	30	27	2.1	0.12	7.3	3.1	32	173	4/26/2006

Table 2 shows the sampling effort for 2010. All stations were sampled a minimum of six times over the course of the sampling season.

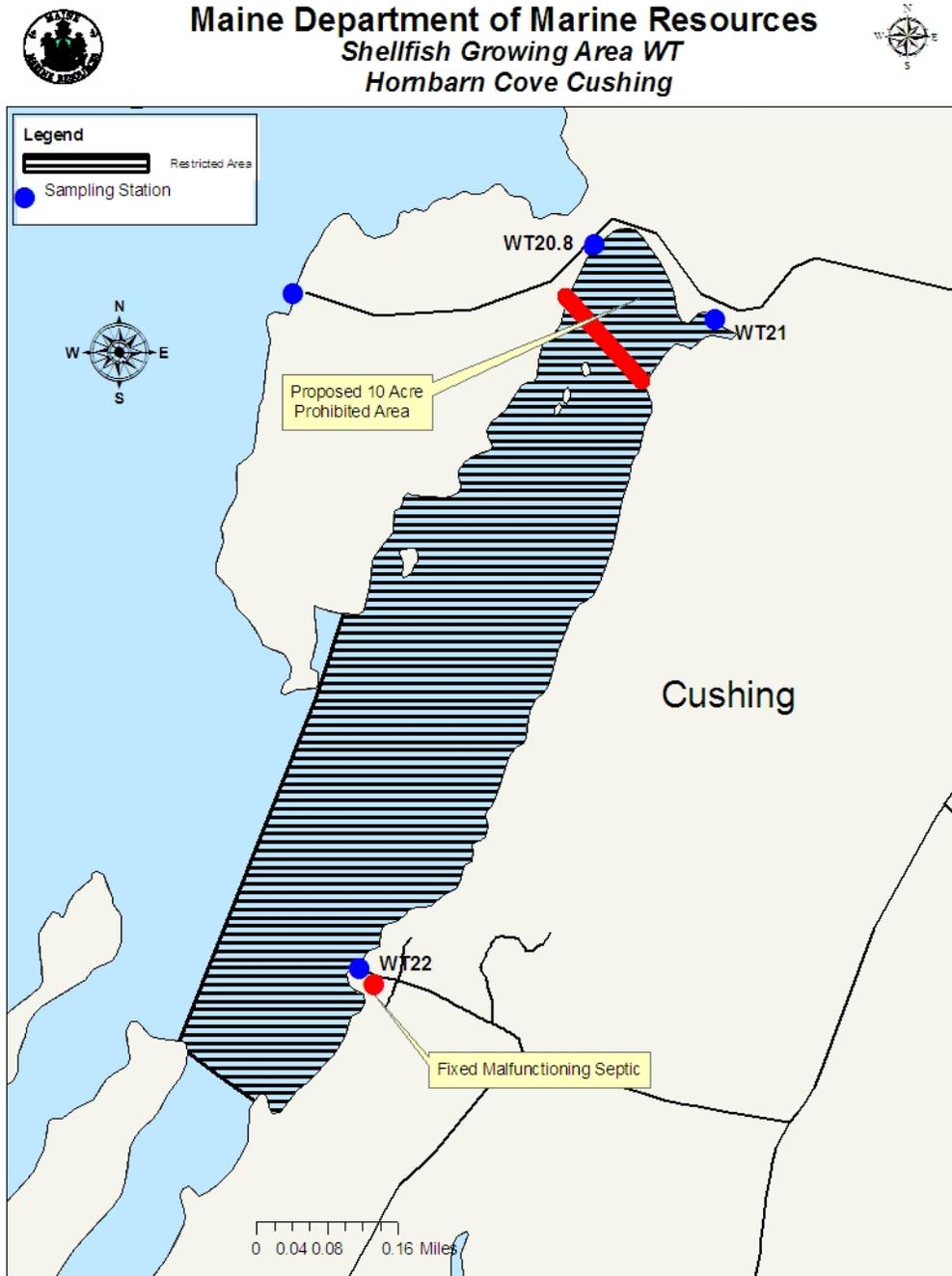
**Table 2. WT Sampling Effort 2010**

Station	Class	Adverse		Random		Total	Comments
		Closed	Open	Closed	Open		
WT001.00	P			2		2	Station deactivated
WT002.00	P			6		6	
WT003.00	P			6		6	
WT004.00	P			6		6	
WT008.00	A				6	6	
WT010.00	P			6		6	
WT011.00	A				6	6	
WT012.00	P			6		6	
WT013.00	A				6	6	
WT014.00	A				6	6	
WT015.00	A	26			6	32	Flood Station
WT016.00	A				6	6	
WT017.00	A				6	6	
WT018.00	A	23			6	29	Flood Station
WT018.50	R				6	6	
WT019.00	R				6	6	
WT019.20	R				6	6	
WT019.50	A				6	6	
WT020.00	A				6	6	
WT020.80	R		8		6	14	New station - accelerated sampling
WT021.00	R		7		6	13	Accelerated sampling
WT022.00	R				6	6	
WT023.50	P			6		6	
WT024.00	A				6	6	
WT026.00	P			6		6	
WT027.00	A				6	6	
WT027.50	P			6		6	
WT028.50	P			6		6	
WT029.00	P			6		6	
WT031.00	A				6	6	



## Upward Classification Changes

Figure 2. Hornbarn Cove, Reclassified March 14, 2011





*Reclassification of Hornbarn Cove, Cushing, Effective March 14, 2011*

Hornbarn Cove, Cushing has three water sampling stations located along the shore of the cove. Station WT21 monitors water quality in the northeast corner of the cove near the mouth of a stream and station WT22 monitors the southern portion of the cove. In 2010, a new station WT20.8 was created to monitor the water quality on the northwest side of the head of the cove. The water quality at station WT 21 deteriorated in 2010 and failed to meet the approved standard, and Hornbarn Cove was reclassified as restricted on January 12, 2010. The area was surveyed in 2009 and no actual or potential pollution sources were identified. There is one dwelling at the head of the cove at the site of sample station WT21. The septic system for this dwelling is located away from the shore. One pollution source was identified at the southern end of the cove (in the vicinity of station WT 22). A dwelling was identified with a tank and no apparent leach field. This pollution source was remediated in the late fall of 2009. Station WT 21 is located at the mouth of a stream. Following the 2009 shoreline survey of the area, no pollution sources were found in the immediate area of the station and it is probable that the stream is the only source of non-point pollution contributing to elevated fecal scores at station WT 21. The stream was sampled nine times in 2010 and once in 2008. The scores confirmed that the stream becomes elevated following rainfall. A new sample station, WT 20.8 was established further away from the mouth of the stream; this station has been sampled on an accelerated schedule. At the end of 2010, station WT 20.8 was sampled a total of 14 times. The stream (S1WT21) was sampled a total of 9 times. Table 3 shows the stream data collected in 2010 (and one sample from 2008) along with sample station data that was collected on the same date as the stream. A flow rate for the stream under moderate-high flow conditions was measured using a Gurley Precision Instrument flow meter; the flow rate was determined to be 545,156 gallons per day. The daily fecal load of the stream was determined using the average stream water concentration of 341 FC/100 ML. The average stream fecal concentration was determined by averaging the sample scores of samples collected following rainfall of .50 or more inches within three days of sample collection. Based on this daily load, and the mid-tide depth of receiving waters (4 ft), a dilution calculation was completed, showing that a total of 10 acres are required to dilute the fecal pollution associated with the stream to the approved standards. Since the stream has been determined to be the only source of pollution impacting Hornbarn Cove, the restricted area in Hornbarn Cove is recommended for a reduction in size, to enclose the mouth of the stream. Figure 2 shows the configuration of this new restricted area.

Water quality at the southern end of the cove at station WT22 has continued to meet approved standards and currently has a P90 score of 9 (Table 4). An additional assessment (Table 5) was completed for station WT22 to determine the effect of precipitation (cumulative rainfall of >0.5 inches within 3 days of collection and on collection day) on the geometric mean and P90 scores. For this assessment, all SRS, extra, and adverse data from samples specifically scheduled to target precipitation events were considered (2000-2010); data collected during flood closures were not considered. Using this dataset, the P90 score was 37.3, with an approved standard of 39 (Table 3). While the P90 score increased, it still met the approved standard. Since there are no known pollution sources in the vicinity of this station, and water quality meets the approved standards, the restricted area surrounding station WT 22 may be repealed.



**Table 3. Stream S1WT21 and Sample Station WT21 Fecal Coliform Results**

Collect Date	Stream Fecal Score	Stream Salinity	Station Fecal Score	Station Salinity	rain 3 days	Flood Closure
4/12/2010	6	0	<2	22	0.03	
5/11/2010	5.7	0	<2	28	0.1	
6/2/2010	82	0	no sample		0.21	
6/7/2010	122*	0	no sample		2.25	
6/9/2010	24	5	no sample		0.23	
6/16/2010	1.9	26	4	30	0.01	
6/30/2010	48	0	2	28	0	
7/14/2010	560*	0	208	28	2.13	
8/3/2010	18	0	3.6	28	0.08	
9/8/2008	720	0	no sample		5.75	Yes

\* These scores were used to determine stream fecal load

**Table 4. P90 Scores Hornbarn Cove, Cushing**

Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WT020.80	R	14	14	3.6	0.45	56	13.9	31	163	3/17/2010
WT021.00	R	30	30	9.4	0.83	960	109.9	31	163	6/11/2007
WT022.00	R	30	26	2.8	0.38	132	9	32	176	4/4/2006

**Table 5. Sample Station WT22 Rainfall Assessment 2000-2010**

Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WT022.00	R	18	8	5.4	0.65	240	37.3	39	228	9/15/2000



Figure 3. P90 Trends, Stations WT21 and WT22

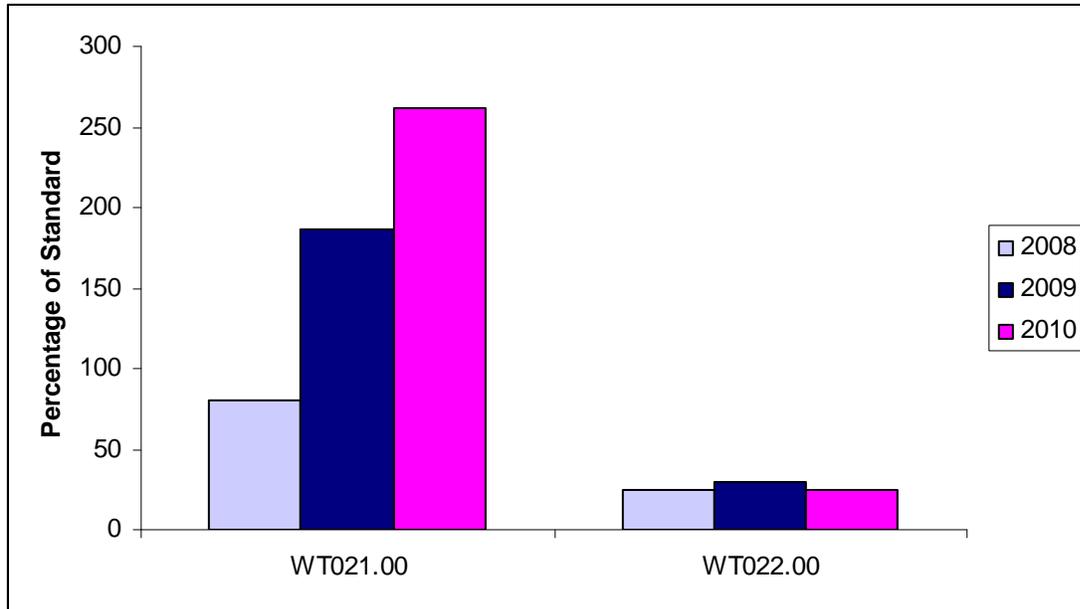
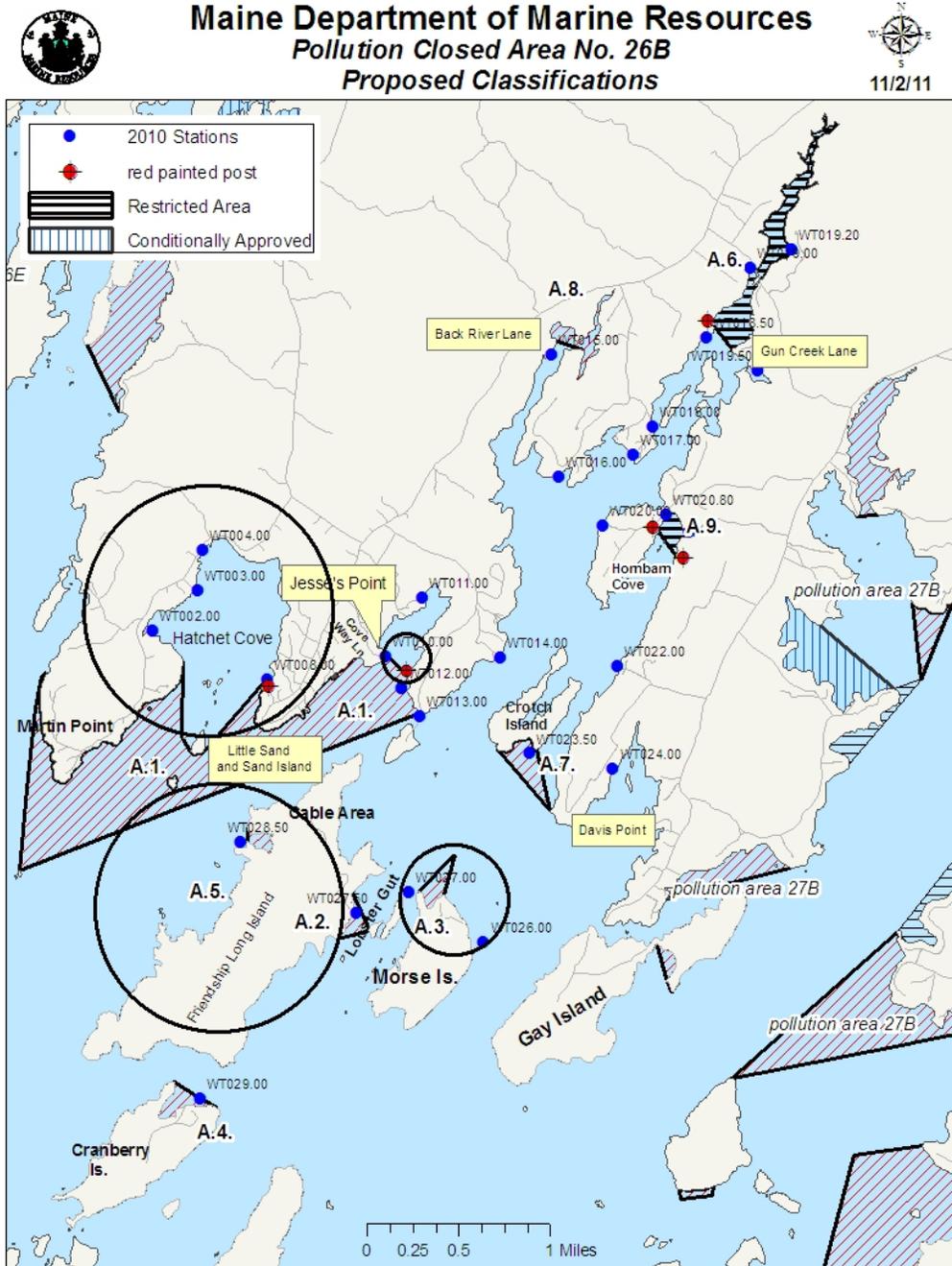




Figure 4. Proposed Reclassifications Stations WT2, 3, 4, 12, 26, and 28.5





*Proposed Reclassification Hatchet Cove, Friendship (Stations WT2, 3, and 4)*

The area surrounding stations WT 2, 3 and 4 (Figure 4), was reclassified from approved to prohibited in 2009, due to pollution sources that were identified during the updated shoreline survey of the area. On December 10, 2010, the plumbing inspector and site evaluator for the town of Friendship notified DMR that the identified problems in this area had been inspected and all actual pollution sources in Hatchet Cove had been remediated.

The stations that monitor this area, currently meet the approved standard (Table 6); even with the malfunctions present, these stations never surpassed the approved standard for approved classification (Tables 7 and 8 and Figure 4). All three stations have continued to maintain good P90 scores with none of the stations showing upward trends in 2010 (Figure 5). Stations WT 3 and WT4 did show upward trends in 2009; 2009 was an extremely wet year with a total of seven flood closures that impacted shellfish areas in Friendship.

**Table 6. Hatchet Cove Current P90 Scores 2006-2010**

Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WT002.00	P	30	26	2.9	0.35	42	8.4	32	176	4/4/2006
WT003.00	P	30	26	2.8	0.33	62	7.7	32	176	4/4/2006
WT004.00	P	30	26	2.9	0.35	60	8.5	32	176	4/4/2006

**Table 7. Hatchet Cove P90 Scores 2005-2009**

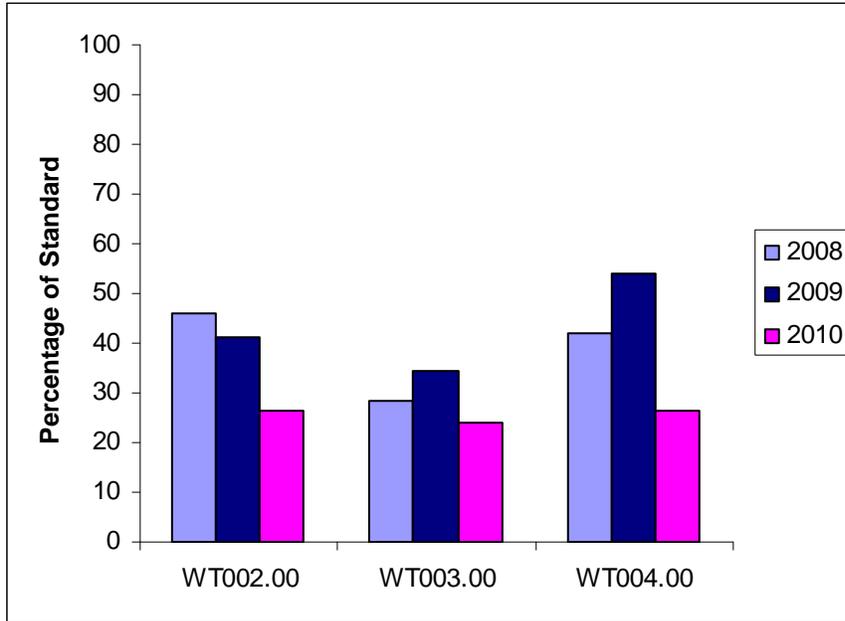
Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WT002.00	P	30	20	3.5	0.48	240	14.8	36	199	3/17/2005
WT003.00	P	30	20	3.4	0.43	93	12.4	36	199	3/17/2005
WT004.00	P	30	20	4	0.53	460	19.4	36	199	3/17/2005

**Table 8. Hatchet Cove P90 Scores 2004-2008**

Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WT002.00	P	30	14	3.9	0.51	240	17.9	39	225	1/5/2004
WT003.00	P	30	14	3.3	0.4	93	11.1	39	225	1/5/2004
WT004.00	P	30	14	3.9	0.48	460	16.4	39	225	1/5/2004



Figure 5. Hatchet Cove P90 Trends



**Additional Reclassification Proposals**

Three smaller areas are also recommended for reclassification (Figure 4). All of these areas should be classified as approved for shellfish harvest. The areas include the western shore of Friendship Long Island (Station WT 28.5), the northeast shore of Morse Island (Station WT 26) and a small mud flat at the northeast end of Friendship Harbor (closest station is WT 12). The water quality for these three stations has continued to meet approved standards even during the period when each of these areas was classified as prohibited (Table 6).

**Table 6. P90 Data for Stations Proposed for Upgrade in Classification**

Station	Class	Count	MF Count	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WT012.00	P	30	26	3.6	0.41	54	12.4	32	176	4/4/2006
WT026.00	P	30	27	1.9	0.05	2.9	2.3	32	173	4/26/2006
WT028.50	P	30	27	1.9	0.05	2.9	2.3	32	173	4/26/2006

**Friendship Long Island – Surveyed August 2009**

The water quality along the western shore of Friendship Long Island is monitored by sampling station WT28.5. This area has been classified as prohibited for shellfish harvest for at least 12 years. When the area was previously surveyed, three grey water discharge pipes were noted as flowing directly from the dwellings to the surface of the ground. The property owners were asked to fix the surface discharges. The properties were revisited during the 2009 survey of the area and the discharges have all been fixed. The water quality has continued to be very good and



currently the P90 score is a 2.3FC/100ml. The P90 trends for this station have also continued to be very good for the past three years (Figure 5).

#### Morse Island – Surveyed August 2009

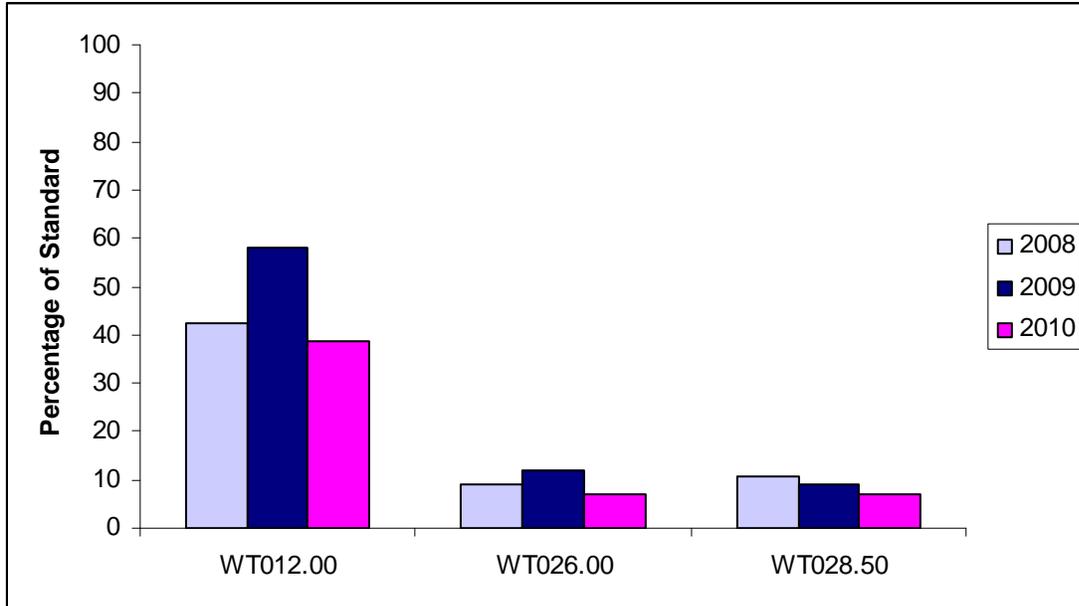
One pollution source was identified during the 2009 survey of Morse Island. The pollution source is located at the northwest end of the island nearby the island dock. A seasonal dwelling at the head of the dock has an alternative toilet with a drain that goes overboard. The owners stated that the property is used infrequently. A closure is in place around this property. At the northeast end of the island there is a large old summer home on a rise above the shore. This property has been visited several times but the septic location has never been identified. The shore in front of the property has been inspected and no pipes or pollution sources have been identified. Sampling station WT 26 is sampled directly in front of this dwelling. This site currently has a P90 score of 2.3FC/100ml. The P90 trends for this station have continued to be very good for the past three years (Figure 5).

#### Northeast end of Friendship Harbor – Surveyed June 2009

This area was surveyed during the 2009 survey of the growing area. Three pollution sources and an animal operation were identified in the immediate area. All of the domestic pollution sources have been visited by the local plumbing inspector. One pollution source was described as “pooling smelly water alongside the driveway below the drainage field”. There is a distance of ten feet from the drainage to the ocean. The LPI visited the property on November 12<sup>th</sup> and 24<sup>th</sup> and found the system to be functioning properly during both of these inspections. He thought that the smelly water could have been caused by free range chickens on the property. The second noted malfunction was a grey water line from a washing machine that was not connected to the septic system. This system was fixed in November of 2009. The third noted malfunction was an obvious breakout caused by the field being flooded by a curtain drain. This system was also corrected in late November. The animal operation consists of a dwelling with 20 free range chickens and 2 goats. Behind the dwelling there is a small stream that the chickens like to wander in and out of. The goat enclosure also borders on this stream. All of these systems and the dwelling with animals are located above the area that will remain classified as prohibited. Sampling station WT12 is located directly below the animal enclosure. This station currently has a P90 score of 12.4/100ML. This station showed an upward trend in 2009 (deteriorating water quality); however in 2010 the P90 showed a downward trend indicating improved water quality. It is likely that due to the extremely wet year in 2009, runoff contributed to slightly more elevated scores. A small mud flat north of this prohibited area should be reclassified as approved for shellfish harvest. The area around station WT12 will remain classified as prohibited as a precautionary closure due to the animals and their proximity to the stream.



Figure 6. P90 Trends of Stations Proposed For Reclassification



### Shoreline Survey Activity

No shoreline survey work was conducted in 2010. A drive through inspection was conducted on August 3, 2010 when several streams were sampled in the area.

### Aquaculture/Wet Storage Activity

There are three aquaculture lease sites in shellfish growing area WT (Figure 1). Gay Island Oyster has two sites. Site MED BP is located north of Bradford Point on the Meduncook River in the town of Cushing. This site cultivates eastern and American oysters using a suspended culture technique. This site became effective on February 6, 2006 and will expire on February 5, 2016. Site MED GI is located on the west side of Gay Island in the outer Meduncook River, Cushing. This site also uses suspended culture. Eastern and American oysters and sea scallops are cultivated at this site. This site became effective on August 26, 2004 and will expire on August 25, 2014.

The third site (MED G13) is operated by Paul Farmer. This site is also located west of Gay Island in the outer Meduncook River. This site also uses suspended culture. Blue mussels, eastern and American oysters, sea scallops, hen clams, and soft shelled clams are cultivated at this site. This site became effective March 27, 2006 and will expire on February 27, 2021.

Additional information on these lease sites is available at the Department of Marine Resources Aquaculture Program web site at:

<http://www.maine.gov/dmr/aquaculture/leaseinventory/muscongusbay.htm>



### **Recommendation for Future Work**

The actual and potential pollution source list created during the 2009 shoreline survey of Growing Area WT should be updated by the local plumbing inspector each year to assure that the information remains current.



## 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 = 90<sup>th</sup> percentile

APPD\_STD = the 90<sup>th</sup> 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 90<sup>th</sup> percentile, at or below which the station would meet restricted criteria.