



GROWING AREA EF

**Blue Hill Bay
Brooklin, Blue Hill and Sedgwick**

ANNUAL REVIEW for 2010

Report Date: 04-20-2011

Erick Schaefer

APPROVAL

Kohl Kanwit

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8/16/11

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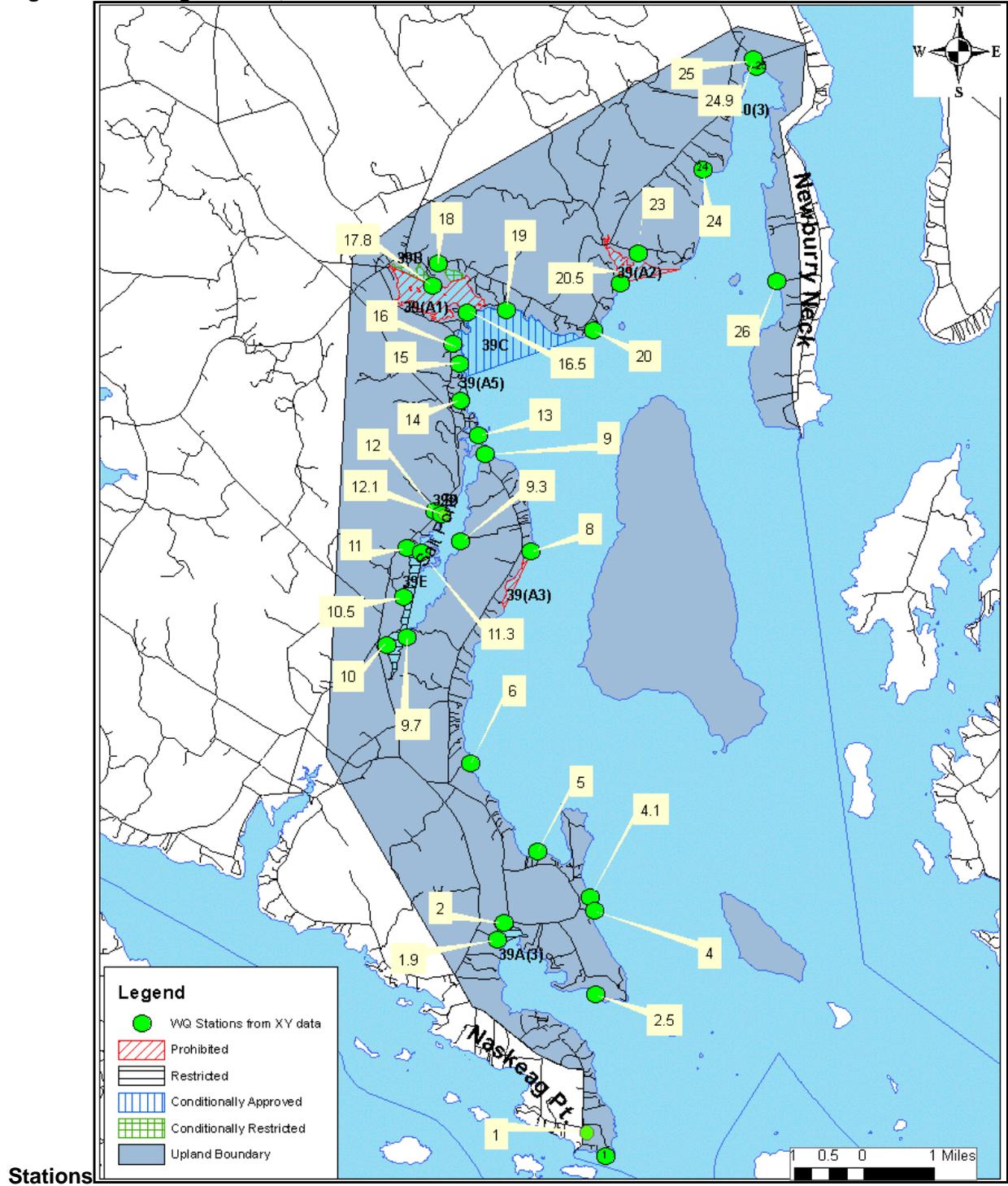
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Figure 1. Growing Area EF, with Active Water





Executive Summary

This is an annual report for growing area EF written in compliance with the requirements of the 2007 Model Ordinance and the National Shellfish Sanitation Program (NSSP). Sections of the growing area have been classified as prohibited based on clusters of residential licensed overboard discharges (OBDs) in Blue Hill Harbor (Blue Hill) and Curtis Cove (East Blue Hill) and a waste water treatment plant in the town of Blue Hill. Several areas showing non-point pollution without identifiable point sources are classified as restricted. There is also one conditionally approved and one conditionally restricted area located in Blue Hill Harbor based on the operation of the local waste water treatment plant (WWTP). A new seasonal conditional area was established in the Blue Hill Salt Pond; this change was approved and went into effect on 10/1/10. During the 2010 review year, no stations were added or deactivated. A conditional area based on season is being proposed as a result of this 2010 report.

The next triennial report is due in 2011; the next sanitary survey report is due in 2019.

Growing Area Description

Growing area EF extends from the southern tip of Naskeag Point in Brooklin to the southern tip of Newbury Neck, Surry in western Hancock County (Figure 1). The area includes the western portion of Blue Hill Bay, including all of Blue Hill Harbor, Blue Hill Salt Pond, and Morgan Bay. It includes the shoreline in the towns of Brooklin, Sedgwick, Blue Hill, and Surry.

Pollution sources in growing area EF include a municipal WWTP located in Blue Hill, along with 11 active OBDs. There are three small private agricultural areas adjacent to the shores of this growing area. One is a small organic farm located at the southern end of the Salt Pond the other is a horse pasture located in the upland boundary area near Bragdon Brook which drains into the outer portion of Blue Hill Harbor, and the third one was a single horse pasture that is no longer active.

There is one yacht club and sailing school with facilities for fuel, ice, a pumpout boat, three guest moorings and approximately 75 seasonal moorings located in the inner portion of Blue Hill Harbor. In the town of Blue Hill, in the inner harbor, there are numerous private moorings and East Blue Hill and South Blue Hill also have mooring fields. Numerous other anchorages and private mooring areas were noted throughout the growing area which serves local lobster boats and private pleasure craft. There are two boat yards in this growing area one in Blue Hill Harbor and one in East Blue Hill. Area EF has four licensed shellfish aquaculture lease sites. Three of these sites are commercial suspended culture for mussels, oysters, scallops and surf clams, while the fourth is a private site for oysters using tray racks.

Current Classification(s)

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



Approved:

15 sample sites (EF 2.5, 4, 4.1, 5, 6, 9, 9.3, 9.7, 11.3, 12, 12.1, 13, 20.5, 24, 25, and 26)

Conditionally Approved:

Area No. 39 (B1) Blue Hill Harbor, based on operation of Blue Hill WWTP; 5 sample sites (EF 15, 16, 16.5, 19, and 20)

Area No. 39 (B2) Blue Hill Salt Pond based on seasonal water quality; 3 sample sites EF 11, 10.5, and 10

Conditionally Restricted:

Area No. 39 (B1) Blue Hill Harbor, based on operation of Blue Hill WWTP; 2 sample sites (EF17.8, 18)

Restricted:

Area No. 39 (A4) Bragdon Brook, Blue Hill (non point source pollution); 1 sample sites (EF 14)

Area No. 39A (A2) Herrick Bay, Brooklin (non point source pollution); 2 sample sites (EF1.9, 2)

Area No. 40 (A3) Morgan Bay Surry (non point source pollution); 1 sample site (EF 24.9)

Prohibited:

Area No. 39 (A1) Blue Hill Harbor, Blue Hill (WWTP outfall)

Area No. 39 (A2) McHeard and Curtis Coves (OBD's), East Blue Hill; 1 sample sites (EF 23)

Area No. 39 (A3) Sand Point, Blue Hill (OBD); 1 sample site (EF 8)

New Stations, with less than 30 samples (not evaluated for classification)

2 sample sites: EF 1 and 12.1

Please visit the DMR website to view legal notices:

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

Activity during Review Period

There was one classification change in the Blue Hill Salt Pond based on 2009 year end data. This change occurred on 10/1/10 and made a new seasonal conditional area in the Blue Hill Salt Pond.

Conditionally Managed Area(s)

There are two conditionally managed areas in Growing area EF.

Area No. 39(C), Blue Hill Harbor, Blue Hill: Conditionally Approved based on WWTP function. The following stations are associated with this classification: EF 15, 16, 16.5, 17.8, 18, 19, 20.



This Conditionally approved area was in compliance in 2010. The complete annual review is in Appendix A.

Area No. 39 (B2), Blue Hill Salt Pond, Blue Hill/Sedgwick: Conditionally Approved based on seasonal water quality. The following stations are associated with this area: EF 10, 10.5, 11 are CA. This seasonal conditional area became effective 10/1/10. The complete annual review is in Appendix B.

The management plan for the EF conditional areas can be found in DMR's central files. The Blue Hill WWTP conditional area management plan (CAMP) requires reporting by the plant operator; this plan was last updated on August 22, 2008. The Salt Pond seasonal conditional area is based on seasonal water quality and was last updated August 18, 2010.

Water Quality Review and Discussion

Table 1 lists all active approved, restricted and prohibited stations in growing area EF, with their respective Geomean and P90 calculations for 2010. All conditional samples are shown with a P90 during their open period. Please refer to Appendix C for a key to interpreting the headers on the columns of Table 1. The approved and restricted standards for each station are also displayed in Table 1. These standards will fluctuate yearly as a result of the DMR transition from a most probable number (MPN) fecal coliform test method to a membrane filtration (MF) method and are dependent on the number of sample analyzed by MPN versus MF. The total number of data points used in the calculations is displayed in the Count column and includes both MPN and MF values. The number of data points analyzed by MF is displayed in the MFCNT column. This fluctuating standard will cease when all 30 data points have been analyzed by the MF method. A more detailed explanation of this transition can be found in DMR central files.

All approved stations met their NSSP classification standard in 2010. Stations EF 1.9 and 2, highlighted in blue, now meet the approved standard; these stations have shown high variability year round and will be recommended for a seasonal conditional area later in this report. Station EF 23 highlighted in yellow below is currently classified as prohibited and now meets the standard for approved harvest. A seasonal data analysis will be completed for this station in the spring of 2011 along with a shoreline survey and if the data and survey supports a change in classification one will proposed at that time. Station EF 8, highlighted in green is currently classified as prohibited and meets the standard for approved classification. The station will remain prohibited as it is located in the dilution zone for an OBD.



Table 1. Growing Area EF Geometric Means and P90 for 2010

| Station | Class | Count | MFCCount | GM | SDV | MAX | P90 | Appd_Std | Restr_Std |
|----------|-------|-------|----------|-----|------|-----|------|----------|-----------|
| EF001.00 | New | 24 | 24 | 2.3 | 0.26 | 18 | 5.2 | 31 | 163 |
| EF001.90 | R | 30 | 26 | 5.6 | 0.56 | 142 | 29.7 | 32 | 176 |
| EF002.00 | R | 30 | 26 | 5.7 | 0.53 | 110 | 27.4 | 32 | 176 |
| EF002.50 | A | 30 | 28 | 2.3 | 0.3 | 66 | 5.8 | 31 | 169 |
| EF004.00 | A | 30 | 26 | 2.7 | 0.29 | 33 | 6.4 | 32 | 176 |
| EF004.10 | A | 30 | 26 | 3 | 0.48 | 122 | 12.7 | 32 | 176 |
| EF005.00 | A | 30 | 26 | 3.2 | 0.46 | 154 | 12.9 | 32 | 176 |
| EF006.00 | A | 30 | 26 | 2.7 | 0.35 | 64 | 7.7 | 32 | 176 |
| EF008.00 | P | 30 | 26 | 3.3 | 0.46 | 142 | 13 | 32 | 176 |
| EF009.00 | A | 30 | 27 | 2.3 | 0.17 | 14 | 3.9 | 32 | 173 |
| EF009.30 | A | 30 | 27 | 2.9 | 0.32 | 33 | 7.6 | 32 | 173 |
| EF009.70 | A | 30 | 27 | 3.1 | 0.4 | 108 | 10.2 | 32 | 173 |
| EF011.30 | A | 30 | 26 | 4.7 | 0.51 | 75 | 21.4 | 32 | 176 |
| EF012.00 | A | 30 | 30 | 3.9 | 0.49 | 128 | 16.8 | 31 | 163 |
| EF012.10 | New | 28 | 28 | 3.4 | 0.47 | 106 | 14.3 | 31 | 163 |
| EF013.00 | A | 30 | 26 | 2.7 | 0.36 | 58 | 8.1 | 32 | 176 |
| EF014.00 | R | 30 | 26 | 5 | 0.65 | 760 | 35.4 | 32 | 176 |
| EF020.50 | A | 30 | 28 | 3.1 | 0.43 | 116 | 11.1 | 31 | 169 |
| EF023.00 | P | 30 | 26 | 4.2 | 0.54 | 124 | 21.1 | 32 | 176 |
| EF024.00 | A | 30 | 26 | 3.5 | 0.45 | 46 | 13.6 | 32 | 176 |
| EF024.90 | R | 30 | 30 | 9 | 0.64 | 320 | 59.8 | 31 | 163 |
| EF025.00 | A | 30 | 30 | 4.5 | 0.59 | 340 | 26.7 | 31 | 163 |
| EF026.00 | A | 30 | 26 | 3.5 | 0.45 | 84 | 13.2 | 32 | 176 |

Table 2 Area EF CA and CR P90 most recent 30 samples

| Station | Class | Count | MFCCount | GM | SDV | MAX | P90 | Appd_Std | Restr_Std |
|----------|-------|-------|----------|-----|------|-----|------|----------|-----------|
| EF010.00 | CA | 30 | 11 | 3.1 | 0.23 | 14 | 6.3 | 41 | 239 |
| EF010.50 | CA | 23 | 11 | 3.1 | 0.33 | 44 | 8.4 | 39 | 224 |
| EF011.00 | CA | 30 | 11 | 3 | 0.27 | 43 | 7 | 41 | 239 |
| EF015.00 | CA | 30 | 30 | 2.5 | 0.31 | 25 | 6.6 | 31 | 163 |
| EF016.00 | CA | 30 | 30 | 2.5 | 0.28 | 20 | 5.8 | 31 | 163 |
| EF016.50 | CA | 30 | 30 | 2.5 | 0.34 | 120 | 7.1 | 31 | 163 |
| EF019.00 | CA | 30 | 30 | 2.1 | 0.2 | 18 | 3.9 | 31 | 163 |
| EF020.00 | CA | 30 | 30 | 2.1 | 0.16 | 10 | 3.4 | 31 | 163 |
| EF017.80 | CR | 30 | 30 | 3.3 | 0.47 | 62 | 13.7 | 31 | 163 |
| EF018.00 | CR | 30 | 30 | 4 | 0.43 | 66 | 14.5 | 31 | 163 |

All stations that were active at the beginning of 2010 were sampled at least 6 times following the systematic random sampling (SRS) schedule (Table 2 and Appendix C). At some stations, additional samples were collected under adverse conditions and other stations received an additional sample effort (extra) to help build the data set.



Table 3. 2010 Sample Count

| Station | Class | Adverse | | Extra | Random | | Total | Comments |
|----------|-------|---------|------|-------|--------|------|-------|-----------------|
| | | Closed | Open | Open | Closed | Open | | |
| EF001.00 | New | | | | | 6 | 6 | |
| EF001.90 | R | | 1 | | | 6 | 7 | |
| EF002.00 | R | | 1 | | | 6 | 7 | |
| EF002.50 | A | | | | | 6 | 6 | |
| EF004.00 | A | | | | | 6 | 6 | |
| EF004.10 | A | | | | | 6 | 6 | |
| EF005.00 | A | | | | | 6 | 6 | |
| EF006.00 | A | | | | | 6 | 6 | |
| EF008.00 | P | | | | 6 | | 6 | |
| EF009.00 | A | 21 | 2 | | | 6 | 29 | |
| EF009.30 | A | 21 | | | | 6 | 27 | |
| EF009.70 | A | | 1 | | | 6 | 7 | |
| EF010.00 | A | | | | | 5 | 5 | A to CA 10/1/10 |
| | CA | | | | | 3 | 3 | |
| EF010.50 | CA | | | | | 3 | 3 | R to CA 10/1/10 |
| | R | | | | | 6 | 6 | |
| EF011.00 | CA | | | | | 3 | 3 | R to CA 10/1/10 |
| | R | | 1 | | | 6 | 7 | |
| EF011.30 | A | | | | | 6 | 6 | |
| EF012.00 | A | | | | | 7 | 7 | |
| EF012.10 | New | | | | | 6 | 6 | |
| EF013.00 | A | | | | | 6 | 6 | |
| EF014.00 | R | | | | | 6 | 6 | |
| EF015.00 | CA | | | | | 12 | 12 | |
| EF016.00 | CA | | | | | 12 | 12 | |
| EF016.50 | CA | | | | | 12 | 12 | |
| EF017.80 | CR | | | | | 12 | 12 | |
| EF018.00 | CR | | | | | 12 | 12 | |
| EF019.00 | CA | | | | | 12 | 12 | |
| EF020.00 | CA | | | | | 12 | 12 | |
| EF020.50 | A | | | | | 6 | 6 | |
| EF023.00 | P | | | | 6 | | 6 | |
| EF024.00 | A | 21 | 2 | | | 6 | 29 | |
| EF024.90 | R | | 1 | 6 | | 6 | 13 | |
| EF025.00 | A | | 1 | 6 | | 6 | 13 | |
| EF026.00 | A | | | | | 6 | 6 | |

Figure 2 shows the P90 trends over the past three years for approved and restricted stations, Figures 3 and 4 show trends for the conditionally approved and conditionally restricted stations during the open status. During the transition from MPN to MF analysis method, the approved standard will decrease every year, until all samples have been analyzed by the MF method. In order to show the trend of the P90 value over the years, the calculated P90 scores are



expressed as a percentage of the approved standard (for approved, restricted and conditionally approved in the open status); any station showing the 2010 column on or above the 100 percent line does not meet the standard for approved classification.

Figure 2. P90 Trends for Approved and Restricted Stations

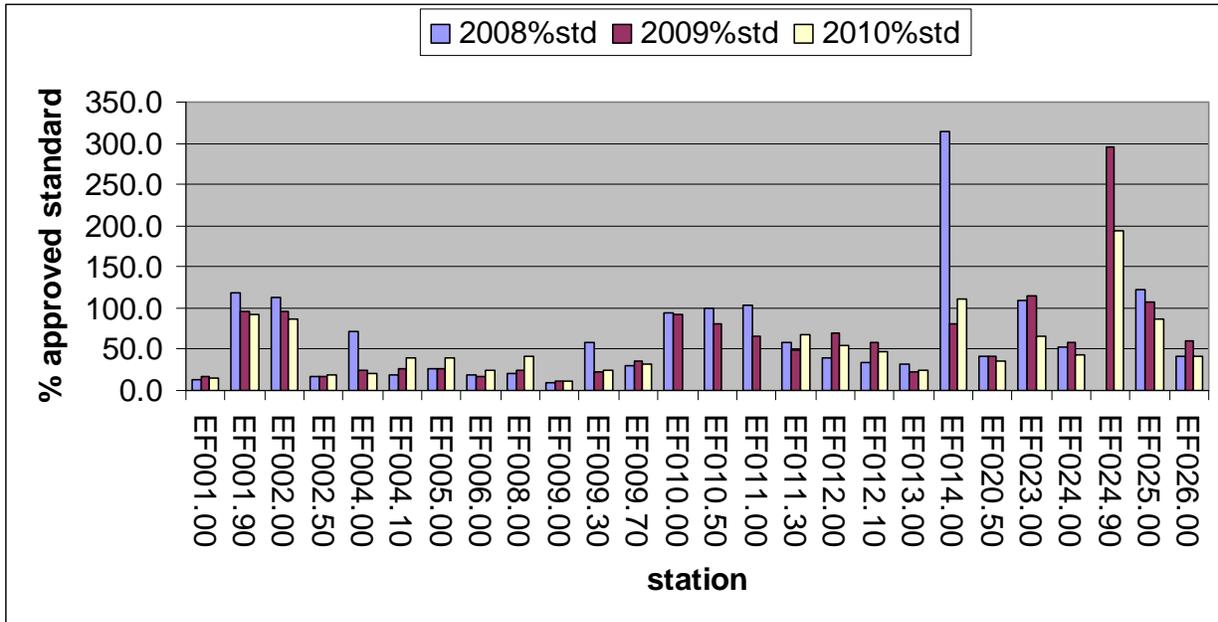
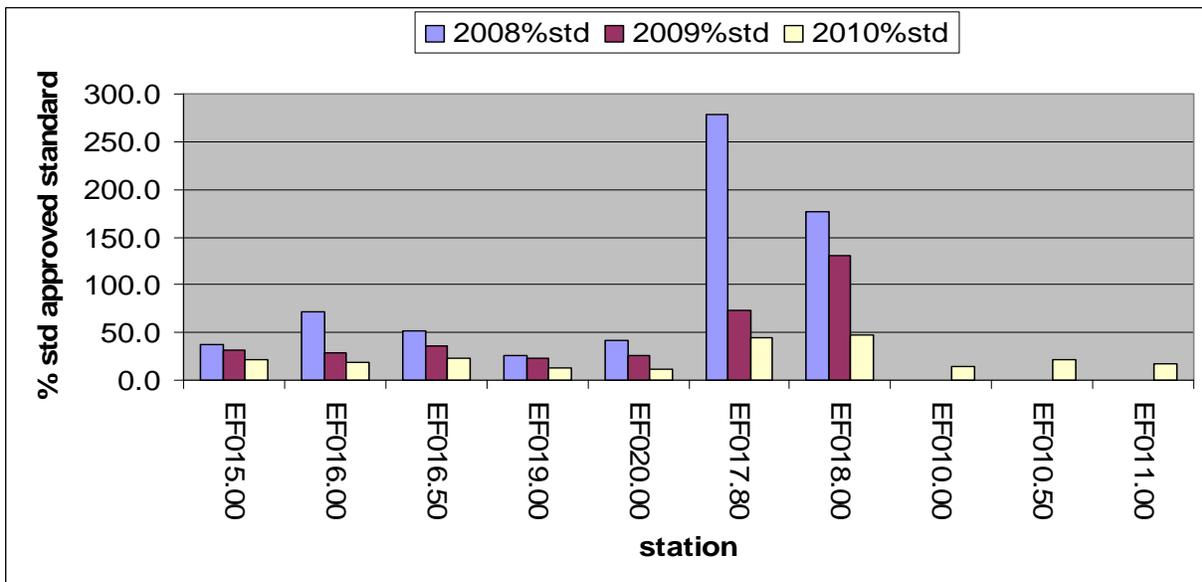


Figure 3 . P90 Trends for Conditionally Approved and Conditionally Restricted Stations



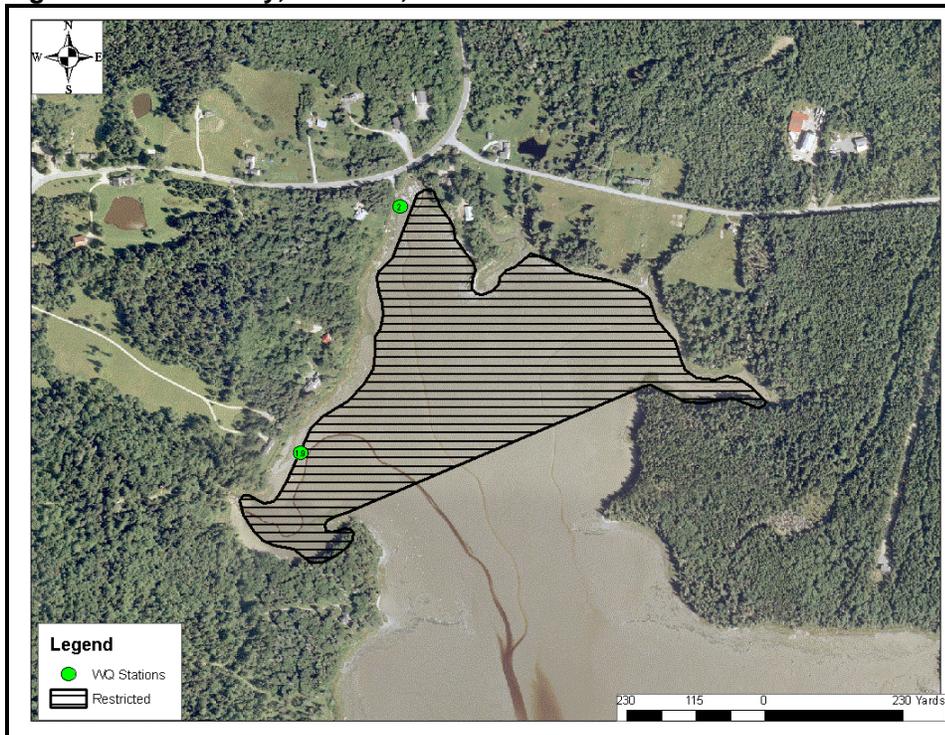


Upward Classification Changes

Herrick Bay, Brooklin

Pollution Area 39A (A2), Northwest Herrick Bay, Brooklin, is a restricted area that has been in place since 2003 due to water quality not meeting the approved standard (Figure 4). A sanitary survey that took place during the 2003 season found no identifiable pollution sources. In December of 2004, a new station EF 1.9 was activated to define the margin of the current restricted area in Herrick Bay. In 2008, area EF under went another complete shoreline survey and again no identifiable pollution sources were identified. A review of the P90 trends over the past five years shows that this area has shown an improvement in water quality over the last three years (Figure 5).

Figure 4. Herrick Bay, Brooklin, with current classification



A look at the seasonal rainfall data analysis for the last five years can be seen in Table 4. This table shows all data collected over the last five years and the rainfall amounts that occurred within 48 hours of sample collection. All scores exceeding 31 CFU are highlighted in yellow and occur between the months of July through November. Rainfall does not appear to be a contributing factor as five out of the seven high scores occurred during a 48 hour period of no rain.



Figure 5. P90 Trends for Herrick Bay

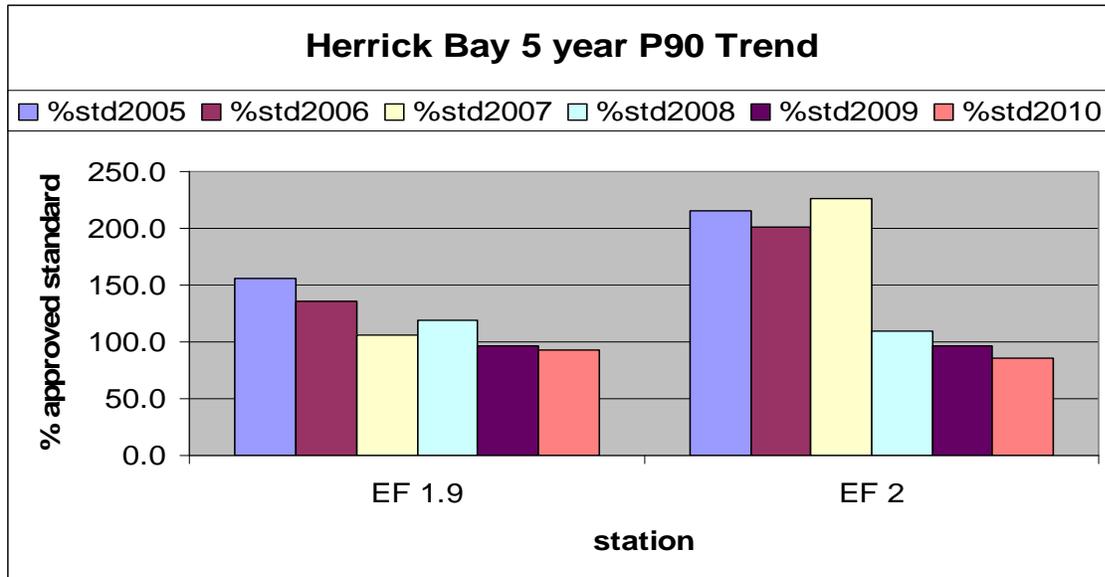


Table 4. Seasonal Data Analysis 2006-2010

| Station | Date | 48 H rain total | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov |
|----------|------------|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| EF001.90 | 2/15/2006 | 0 | | 2.9 | | | | | | | | | |
| | 4/3/2006 | 0.1 | | | | 2.9 | | | | | | | |
| | 5/22/2006 | 0.25 | | | | | 2.9 | | | | | | |
| | 7/17/2006 | 0 | | | | | | | 93 | | | | |
| | 9/11/2006 | 0.2 | | | | | | | | | 1.9 | | |
| | 10/23/2006 | 0.65 | | | | | | | | | | 64 | |
| | 1/8/2007 | 1.45 | 12 | | | | | | | | | | |
| | 5/2/2007 | 0.48 | | | | | 1.9 | | | | | | |
| | 6/6/2007 | 1.55 | | | | | | 1.9 | | | | | |
| | 7/10/2007 | 0.05 | | | | | | | 1.9 | | | | |
| | 9/10/2007 | 1.05 | | | | | | | | | 25 | | |
| | 10/30/2007 | 0.03 | | | | | | | | | | 1.9 | |
| | 2/25/2008 | 0 | | 2 | | | | | | | | | |
| | 4/16/2008 | 0 | | | | 3.6 | | | | | | | |
| | 6/24/2008 | 0.3 | | | | | | 1.9 | | | | | |
| | 7/29/2008 | 0.2 | | | | | | | | 12 | | | |
| | 9/16/2008 | 0.21 | | | | | | | | | | 8 | |
| | 11/5/2008 | 0 | | | | | | | | | | | 142 |
| | 3/23/2009 | 0 | | | 1.9 | | | | | | | | |
| | 5/11/2009 | 1.03 | | | | | 1.9 | | | | | | |
| 7/7/2009 | 0.36 | | | | | | | | 16 | | | | |
| 8/5/2009 | 0 | | | | | | | | | 31 | | | |



| Station | Date | 48 H rain total | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov |
|----------|------------|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | 9/23/2009 | 0 | | | | | | | | | 1.9 | | |
| | 11/16/2009 | 1.49 | | | | | | | | | | | 5.4 |
| | 4/28/2010 | 0.51 | | | | 1.9 | | | | | | | |
| | 6/9/2010 | 0.06 | | | | | | 1.9 | | | | | |
| | 6/30/2010 | 0.89 | | | | | | 10 | | | | | |
| | 7/14/2010 | 0.91 | | | | | | | 12 | | | | |
| | 8/23/2010 | 0 | | | | | | | | 7.3 | | | |
| | 9/29/2010 | 0.27 | | | | | | | | | 4 | | |
| EF002.00 | 2/15/2006 | 0 | | 2.9 | | | | | | | | | |
| | 4/3/2006 | 0.1 | | | | 2.9 | | | | | | | |
| | 5/22/2006 | 0.25 | | | | | 2.9 | | | | | | |
| | 7/17/2006 | 0 | | | | | | | 43 | | | | |
| | 9/11/2006 | 0.2 | | | | | | | | | 1.9 | | |
| | 10/23/2006 | 0.65 | | | | | | | | | | 32 | |
| | 1/8/2007 | 1.45 | 4 | | | | | | | | | | |
| | 5/2/2007 | 0.48 | | | | | 2 | | | | | | |
| | 6/6/2007 | 1.55 | | | | | | 28 | | | | | |
| | 7/10/2007 | 0.05 | | | | | | | 1.9 | | | | |
| | 9/10/2007 | 1.05 | | | | | | | | | 14 | | |
| | 10/30/2007 | 0.03 | | | | | | | | | | 2 | |
| | 2/25/2008 | 0 | | 2 | | | | | | | | | |
| | 4/16/2008 | 0 | | | | 1.9 | | | | | | | |
| | 6/24/2008 | 0.3 | | | | | | 1.9 | | | | | |
| | 7/29/2008 | 0.2 | | | | | | | 12 | | | | |
| | 9/16/2008 | 0.21 | | | | | | | | | 5.4 | | |
| | 11/5/2008 | 0 | | | | | | | | | | | 110 |
| | 3/23/2009 | 0 | | | 1.9 | | | | | | | | |
| | 5/11/2009 | 1.03 | | | | | 2 | | | | | | |
| | 7/7/2009 | 0.36 | | | | | | | 9.1 | | | | |
| | 8/5/2009 | 0 | | | | | | | | 40 | | | |
| | 9/23/2009 | 0 | | | | | | | | | 1.9 | | |
| | 11/16/2009 | 1.49 | | | | | | | | | | | 2 |
| | 4/28/2010 | 0.51 | | | | 4 | | | | | | | |
| | 6/9/2010 | 0.06 | | | | | | 8 | | | | | |
| | 6/30/2010 | 0.89 | | | | | | 16 | | | | | |
| | 7/14/2010 | 0.91 | | | | | | | 25 | | | | |
| | 8/23/2010 | 0 | | | | | | | | 1.9 | | | |
| | 9/29/2010 | 0.27 | | | | | | | | | 12 | | |

Because there is no data for the month of December and limited data for January through March they must be included in the proposed closed period. If we can build up enough data in



the winter over the next few years this month can then be revisited to see if it could be included in the open period.

As this area has two streams that flow into the bay near both water quality stations, a stream dilution analysis was conducted. The dilution is based on the average flow of the streams, the average fecal score for each stream and a mid-tide depth of two feet (Table 6). The dilution zone for each stream is presented in Figure 6 and the raw data used can be seen in table 6.

Table 5. Stream Dilution Calculation

| Stream ID | Sample Count | Mid-tide depth (feet) | Flow Rate (GPD) | Fecal Score (FC/100 ML) | Dilution Area (Acres) |
|------------|--------------|-----------------------|-----------------|-------------------------|-----------------------|
| EF00139.00 | 12 | 2 | 644,040.00 | 18.2 | 1.28 |
| EF00146.00 | 11 | 2 | 465,774.54 | 25.4 | 1.29 |

Table 6. Raw Stream Data 1990-2010

| Stream ID | Date | FECAL | Flow GPM |
|-------------|------------|-------|----------|
| EF00139.001 | 3/19/1990 | 2.9 | 500 |
| EF00139.001 | 9/24/1997 | 9.1 | 75 |
| EF00139.001 | 4/13/1998 | 3.6 | 75 |
| EF00139.001 | 10/20/1999 | 3.6 | 500 |
| EF00139.001 | 6/13/2000 | 2.9 | 250 |
| EF00139.001 | 8/9/2000 | 29 | 50 |
| EF00139.001 | 6/13/2001 | 9.1 | 100 |
| EF00139.001 | 11/12/2002 | 2.9 | 375 |
| EF00139.001 | 10/8/2003 | 43 | 30 |
| EF00139.001 | 6/15/2004 | 23 | 350 |
| EF00139.001 | 12/21/2005 | 2.9 | 100 |
| EF00139.001 | 7/28/2008 | 86 | 2962 |
| EF00146.001 | 3/19/1990 | 93 | 500 |
| EF00146.001 | 9/24/1997 | 23 | 250 |
| EF00146.001 | 4/13/1998 | 2.9 | 250 |
| EF00146.001 | 10/20/1999 | 23 | 300 |
| EF00146.001 | 6/13/2000 | 2.9 | 200 |
| EF00146.001 | 6/13/2001 | 23 | 75 |
| EF00146.001 | 11/12/2002 | 6.2 | 300 |
| EF00146.001 | 10/8/2003 | 39 | 10 |
| EF00146.001 | 6/15/2004 | 2.9 | 275 |
| EF00146.001 | 12/21/2005 | 3.6 | 125 |
| EF00146.001 | 7/28/2008 | 60 | 1273 |



Next the tide data for both stations were looked at during the proposed open period of April through June. The results can be seen in Tables 7 and 8. There was only one high score during the flood tide period and that is highlighted in yellow in table 8.

Table 7. Ebb Tide P90 April-June

| Station | Date | Ebb Tide stage | Score |
|----------|-----------|----------------|-------|
| EF001.90 | 22-May-06 | E | 2.9 |
| EF001.90 | 16-Apr-08 | E | 2.9 |
| EF001.90 | 28-Apr-10 | HE | 3.6 |
| EF001.90 | 09-Jun-10 | HE | 1.9 |
| EF002.00 | 22-May-06 | HE | 1.9 |
| EF002.00 | 16-Apr-08 | HE | 4 |
| EF002.00 | 28-Apr-10 | E | 1.9 |
| EF002.00 | 09-Jun-10 | E | 8 |

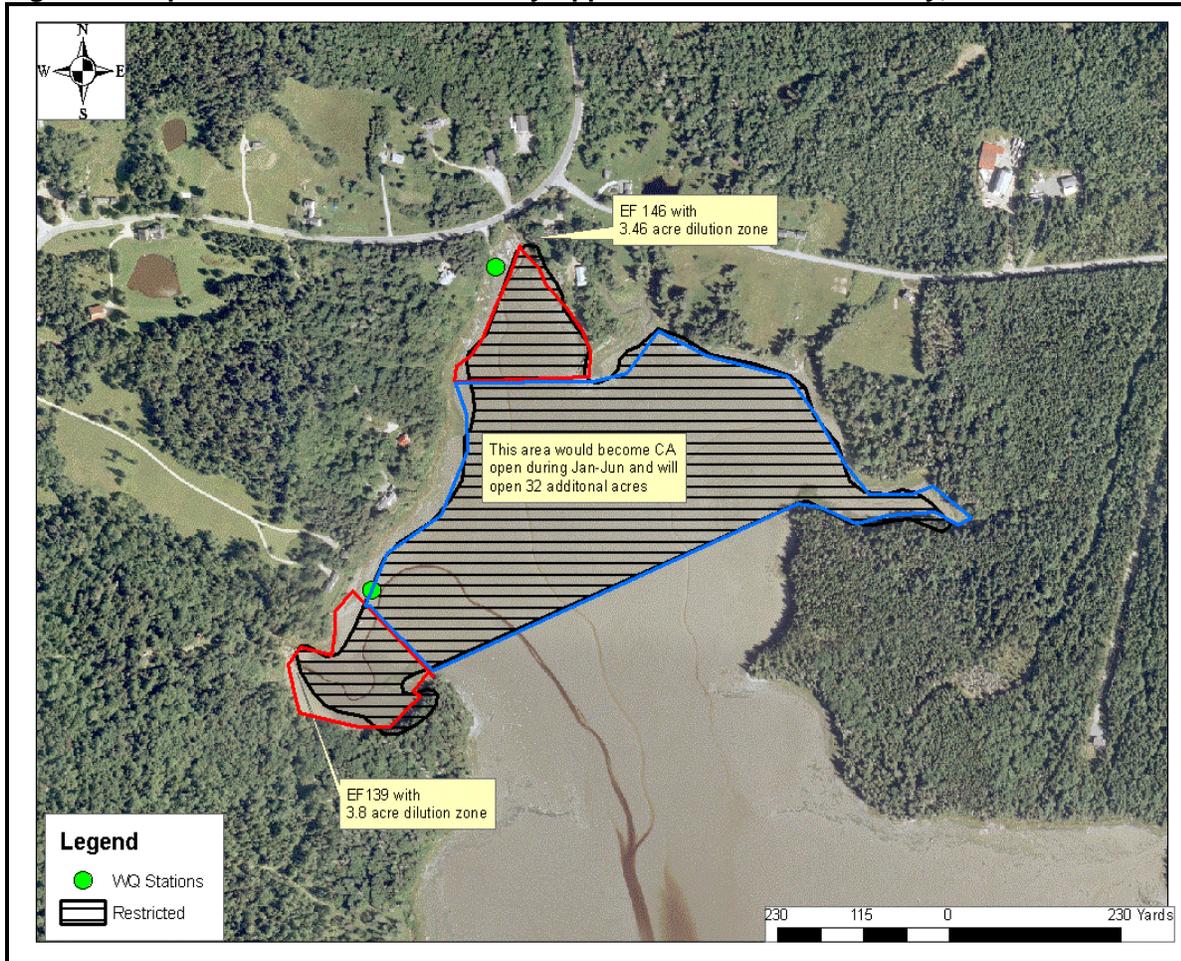
Table 8. Flood Tide P90 Jan-Jun

| Station | Date | Flood Tide Stage | Score |
|----------|-----------|------------------|-------|
| EF001.90 | 23-May-05 | HF | 93 |
| EF001.90 | 03-Apr-06 | HF | 2.9 |
| EF001.90 | 02-May-07 | F | 2.9 |
| EF001.90 | 06-Jun-07 | F | 2.9 |
| EF001.90 | 24-Jun-08 | F | 1.9 |
| EF001.90 | 11-May-09 | F | 2 |
| EF001.90 | 30-Jun-10 | HF | 1.9 |
| EF002.00 | 23-May-05 | HF | 28 |
| EF002.00 | 03-Apr-06 | H | 1.9 |
| EF002.00 | 02-May-07 | H | 1.9 |
| EF002.00 | 06-Jun-07 | H | 1.9 |
| EF002.00 | 24-Jun-08 | HF | 2 |
| EF002.00 | 11-May-09 | F | 10 |
| EF002.00 | 30-Jun-10 | F | 16 |

Based on this data analysis, and the results of the 2008 shoreline survey, this area is proposed to be reclassified from restricted to a seasonal conditional area with the open period during April through June.



Figure 6. Proposed Seasonal Conditionally Approved Area for Herrick Bay, Brooklin



Shoreline Survey Activity

A drive through survey was conducted in October 2010. It was noted that a sewer line in Blue Hill is in the process of being extended north along Route 172 towards the fairground. No other changes in pollution sources were noted. Four stream samples were taken at Emerton Stream at the head of Morgan Bay as part of a follow up survey in that area and six extra samples were taken at EF 24.9 and EF 25 also located at the head of Morgan Bay.

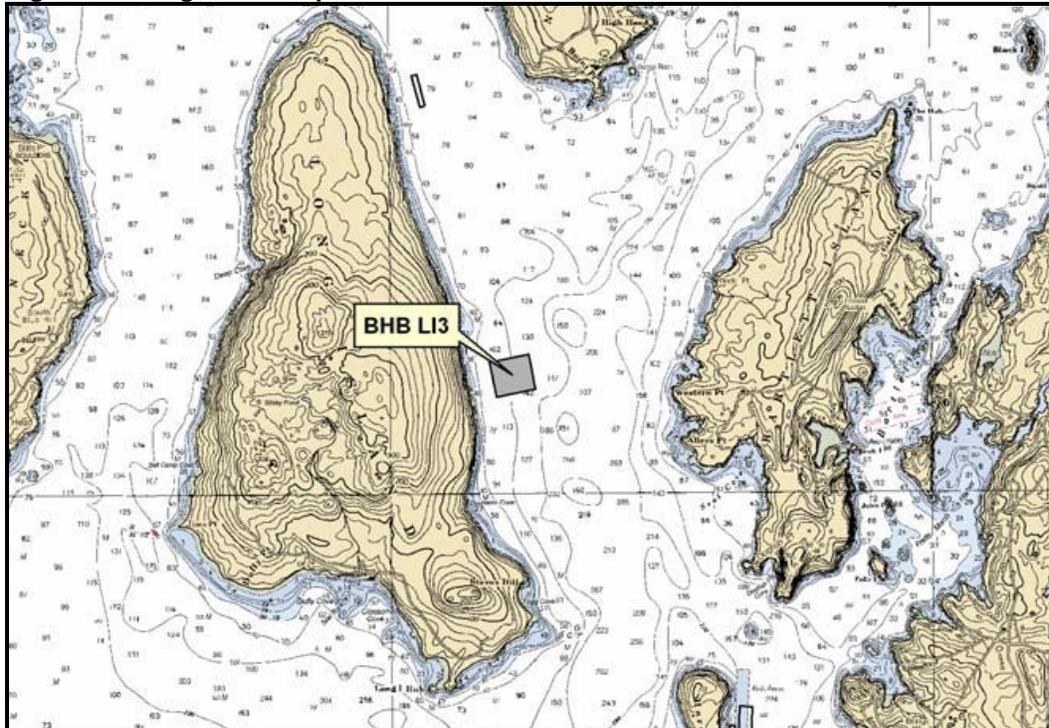
Aquaculture/Wet Storage Activity

Area EF has four licensed shellfish aquaculture lease sites. Three of these sites are commercial suspended culture for mussels, oysters, scallops and surf clams while the fourth is a private site for oysters using tray racks. The three commercial sites are shown below in Figures 7 through 9.



Location: East of Long Island Blue Hill Bay Blue Hill Hancock County
Acreage: 51.42
Species Cultivated: mussel blue sea (*Mytilus edulis*)
Cultivation Technique(s): Suspended

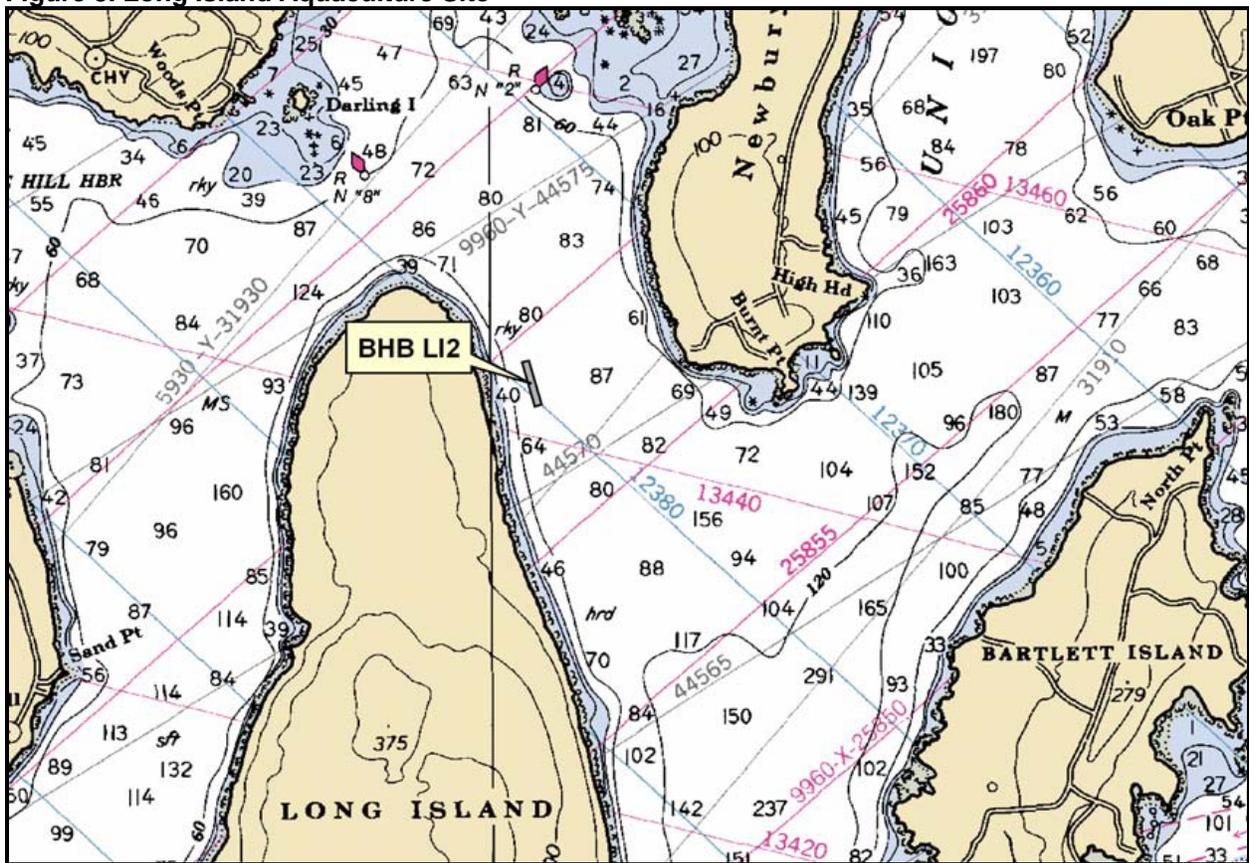
Figure 7. Long Island Aquaculture Site



Location: East of Long Island Blue Hill Bay Blue Hill Hancock County
Acreage: 6
Species Cultivated: mussel blue sea (*Mytilus edulis*)
Cultivation Technique(s): Suspended



Figure 8. Long Island Aquaculture Site



Location: Blue Hill Salt Pond Blue Hill Bay Blue Hill Hancock County

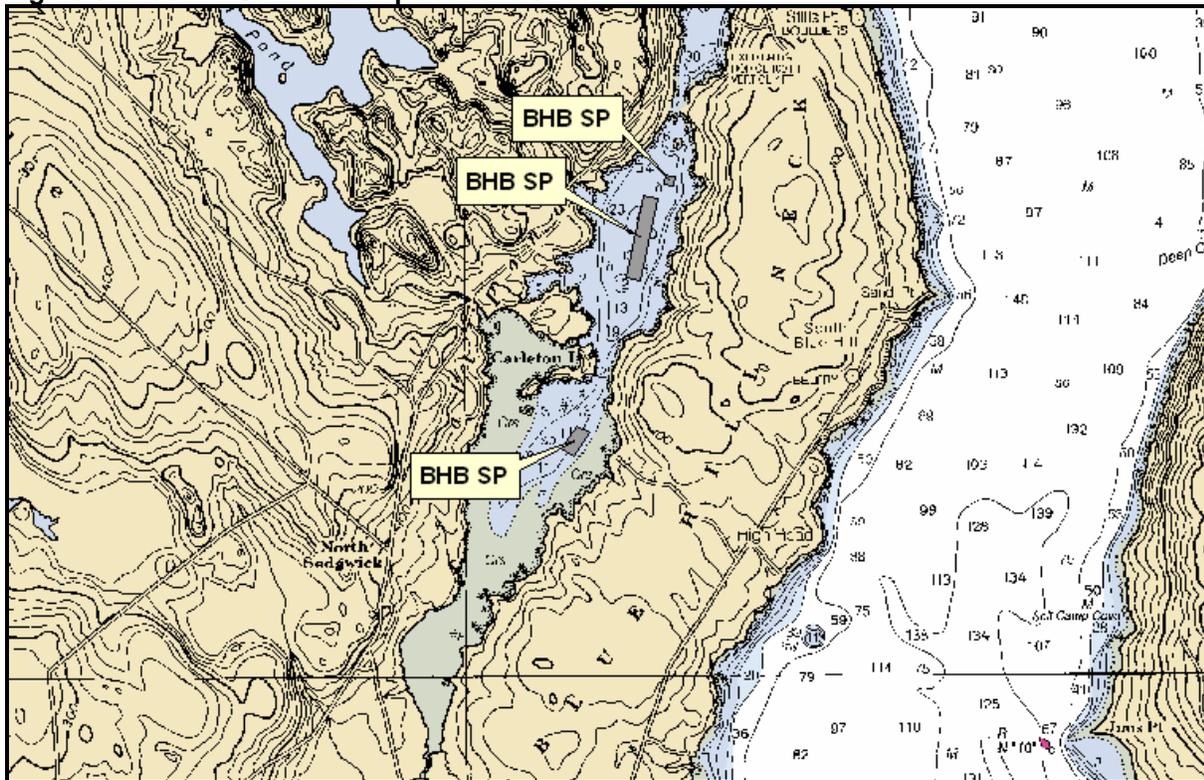
Acreage: 19

Species Cultivated: oyster eastern / american (*Crassostrea virginica*) - oyster european flat (*Ostrea edulis*) - mussel blue sea - (*Mytilus edulis*) - scallop sea (*Placopecten magellanicus*) - clam surf / hen (*Spisula solidissima*) - kelp fingered / horsetail (*Laminaria digitata*) - kelp hollow-stemmed / oarweed (*Laminaria longicuris*) - kelp sugar (*Laminaria saccharina*) - kelp winged (*Alaria esculenta*) - dulse (*Palmaria palmata*) - nori/laver (*Porphyra*) - sea lettuce (*Ulva lactuca*)

Cultivation Technique(s): Suspended



Figure 9. Blue Hill Salt Pond Aquaculture Sites



Recommendation for Future Work

Conduct a seasonal and rainfall data analysis at Curtis Cove Beach (EF 23) along with a shoreline survey of the area to see if it may be recommended for an upgrade in classification. At the request of the town of Surry, extra sampling will be continued at EF 24.9 and 25 at the head of Morgan Bay along with more stream samples taken at EF 824 (Emerton Stream, Morgan Bay). In conjunction with this extra sampling, DMR will assist DEP with an intensive shoreline survey of this area to try and determine what may be impacting the water quality at station EF 24.9.

References

Maine DMR Aquaculture. 2010. Aquaculture Lease Inventory. Accessed 2/10/11
<http://www.maine.gov/dmr/aquaculture/leaseinventory/index.htm>

Blue Hill WWTP phone interview with operator Dave Dietrich conducted on 2/10/11

Maine Office of GIS 2011.

2009 NSSP Guide To Molluscan Shellfish website: <http://www.issc.org/NSSP/Default.aspx>



Appendix A. Annual Review of 39 Conditional Area Management Plan

Scope

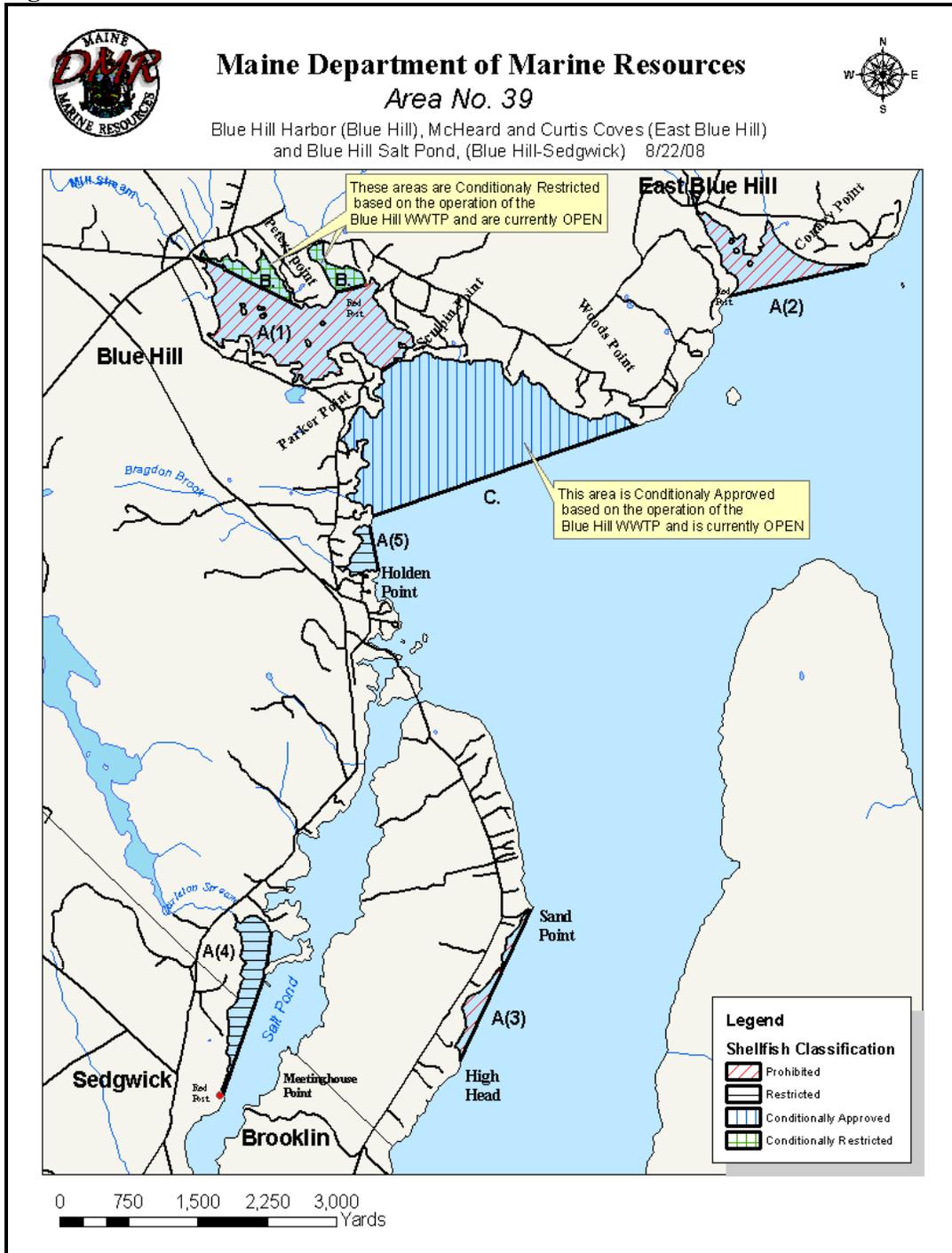
This area has been divided into a conditionally approved and a conditionally restricted area because of the Blue Hill Wastewater Treatment Facility which discharges secondary treated seasonally chlorinated effluent into Blue Hill Harbor. The two areas are described below from the most recent legal notice, dated November 17, 2009:

B. Effective immediately, because of pollution, the shores, flats and waters of Blue Hill Harbor, north of a line that starts at the eastern side of the Mill Stream Bridge on Route 172 in downtown Blue Hill, then extends southeast approximately 1300 yards to the western prominence of Peters Point; AND north of a line starting from the eastern prominence of Peters Point and extending east approximately 370 yards to a red painted marker located on the north shore of Blue Hill Harbor. These areas include Peters Cove and the flats north of Hub Island. They are classified "Conditionally Restricted" and harvesting requires a special MDMR permit and shall be closed to all harvest following a malfunction of the Blue Hill WWTP. These areas are currently OPEN.

C. Effective immediately, because of pollution, the shores, flats and waters of Blue Hill Harbor north of a line that begins at the west tip of Woods Point and runs west approximately 2800 yards to Holden Point; AND south of a line that begins at the west tip of Sculpin Point and runs west approximately 260 yards to the east tip of Parker Point have been classified as "Conditionally Approved" and shall be closed to all harvest following a malfunction of the Blue Hill WWTP. The area is currently OPEN.



Figure 1.





Compliance with management plan

The wastewater treatment facility has met compliance criteria that included peak effluent flow, fecal coliform levels, physical and chemical effluent quality, lack of mechanical failures and effective sewage treatment during conditionally open and approved periods. The facility has upgraded the alarm systems at the pump stations as well as adding duplicate pumps. At present pump stations are equipped with duplicate pumps and a generator in case of failure. The facility has also installed a generator that will run the entire plant in case of a power failure. Reporting of noncompliance events was in accordance with the management plan with closures enacted immediately upon DMR notification.

Adequacy of reporting and cooperation of involved persons

Review of WWTP and DMR records show management plan violations have been reported by the municipal treatment plant staff to the Department of Marine Resources public health laboratory staff within acceptable time limits and with adequate detail to initiate action. For the year 2010 there were no reported bypasses at the Blue Hill WWTP. The effectiveness of this management plan is excellent due to the close working relationship between the treatment plant staff, local law enforcement agencies and the Maine Department of Marine Resources Water Quality Laboratory, Lamoine. The timetable of events, details of noncompliance issues, estimates of repair intervals and updates of the plant's treatment effectiveness reporting fall within management plan compliance limits. Maine Marine Patrol officers have alerted local shellfish harvesters to any regulation changes. Legal closure of the area is automatically enacted immediately at the time of notification, with written regulation repeal and amendment dependent on administrative staffing and violation event timing (regular work hours, nighttime hours, weekends, and holidays). No anecdotal evidence (failing water testing criteria, shoreline survey, and reported illness) suggests that a public health risk exists when the treatment plant is operating correctly.

Compliance with approved growing area criteria

All stations within the conditional area meet the standard for approved classification. The entire Growing Area EF had a triennial survey in 2006 and a sanitary survey in 2008.

Table 1 2010 P90 Open Phase

| Station | Class | Count | MFCCount | GM | SDV | MAX | P90 | Appd_Std |
|----------|-------|-------|----------|-----|------|-----|------|----------|
| EF015.00 | CA | 30 | 30 | 2.5 | 0.31 | 25 | 6.6 | 31 |
| EF016.00 | CA | 30 | 30 | 2.5 | 0.28 | 20 | 5.8 | 31 |
| EF016.50 | CA | 30 | 30 | 2.5 | 0.34 | 120 | 7.1 | 31 |
| EF019.00 | CA | 30 | 30 | 2.1 | 0.2 | 18 | 3.9 | 31 |
| EF020.00 | CA | 30 | 30 | 2.1 | 0.16 | 10 | 3.4 | 31 |
| EF017.80 | CR | 30 | 30 | 3.3 | 0.47 | 62 | 13.7 | 31 |
| EF018.00 | CR | 30 | 30 | 4 | 0.43 | 66 | 14.5 | 31 |



Field inspection of critical pollution sources

The pollution source influencing the conditional area is the outfall pipe from the Blue Hill Wastewater Treatment Facility. The status of the outfall pipe, to include the volume or composition of the plant effluent, has not changed during this review period. Annual sewage treatment plant and licensed overboard discharge operation standards are reviewed by the Maine Department of Environmental Protection. There is an ongoing cooperative review of the treatment plant operation by the Department of Marine Resources and Maine Department of Environmental Protection (DEP) based on annual inspection documents, site visit and DEP inspector interviews.

Water sampling compliance history

Conditional area sampling was completed monthly during open and approved status (Table 2). Monitoring stations are part of a monthly scheduled CA sampling run. When a closure is enacted samples from stations 15, 16, 16.5, 17.80, 18, 19, and 20 are taken two weeks after the treatment facility noncompliance event has been resolved along with 3 shellfish samples from the CA, to determine if it may be reopened.

Table 2 Sample Count for 2010

| Station | Class | Adverse | | Extra Open | Random | | Total |
|----------|-------|---------|------|---------------|--------|------|-------|
| | | Closed | Open | | Closed | Open | |
| EF015.00 | CA | | | | | 12 | 12 |
| EF016.00 | CA | | | | | 12 | 12 |
| EF016.50 | CA | | | | | 12 | 12 |
| EF017.80 | CR | | | | | 12 | 12 |
| EF018.00 | CR | | | | | 12 | 12 |
| EF019.00 | CA | | | | | 12 | 12 |
| EF020.00 | CA | | | | | 12 | 12 |

Analysis-recommendations

Water quality scores from sampling within the conditional area (Blue Hill Bay) do not indicate any public health impact from the Blue Hill Wastewater Treatment Plant when it is operating effectively. The above review of the management plan indicates an effective operation and enforcement of this management plan.



Appendix B. Annual Review of 39 (B2), Conditional Area Management Plan

Scope

This area of the Blue Hill Salt Pond has been made into a conditionally approved area on 10/1/10 because of seasonal failing water quality. The open period for this area is November through April. A seasonal data analysis of this area shows that the area meets the standard for approved harvest during the open period.

Compliance with management plan

The water quality met the seasonal compliance criteria during the open period of November through April as seen in Table 1 below.

Adequacy of reporting and cooperation of involved persons

The impact was determined to be the months of May through October and a new seasonal conditional area has been promulgated in this area to account for the water quality not meeting the approved standard. A survey of the area has not identified any point source pollution that may account for this and the source of this fecal contamination remains unknown. At this time, it is believed that the pollution is coming from non point runoff during the summer and fall.

The management plan calls for the sampling of this area at least once a month during both the conditionally approved and restricted periods. The area must be sampled a minimum of 6 times during the restricted portion of its classification as per NSSP; and the area must be sampled monthly during the open period as per NSSP. The data for 1998-2010 supports conditionally approved from November 1 thru April 31 and restricted from May 1 thru October 30. The restricted period is during the period when high scores have occurred.

Compliance with approved growing area criteria

All stations within the conditional area met the approved classification standard during the open status (Table 1). The entire Growing Area EF had a sanitary survey in 2008.

Table 1 P90 Scores most recent 30 samples, Open Status

| Station | Class | Count | MFCCount | GM | SDV | MAX | P90 | Appd_Std | Restr_Std |
|----------|-------|-------|----------|-----|------|-----|-----|----------|-----------|
| EF010.00 | CA | 30 | 11 | 3.1 | 0.23 | 14 | 6.3 | 41 | 239 |
| EF010.50 | CA | 23 | 11 | 3.1 | 0.33 | 44 | 8.4 | 39 | 224 |
| EF011.00 | CA | 30 | 11 | 3 | 0.27 | 43 | 7 | 41 | 239 |

Field inspection of critical pollution sources

The pollution sources influencing the conditional area coming from non point source runoff from the surrounding uplands and from data analysis are confined to the closed period of May through October.



Water sampling compliance history

Conditional area sampling was attempted monthly during open and approved status (Table 2). All stations were missed in February because of ice. As the CA came into effect in October it was only sampled three times during the open portion of 2010 which was October- December.

Table 2 Sample Count for 2010

| Station | Class | Adverse | | Extra Open | Random | | Total | Comments |
|---------|-------|---------|------|------------|--------|------|-------|------------------------------------|
| | | Closed | Open | | Closed | Open | | |
| EF10.00 | A | | | | | 5 | 8 | Changed class from A to CA 10-1-10 |
| | CA | | | | | 3 | | |
| EF10.50 | CA | | | | | 3 | 9 | Changed class from A to CA 10-1-10 |
| | R | | | | | 6 | | |
| EF11.00 | CA | | | | | 3 | 10 | Changed class from A to CA 10-1-10 |
| | R | | 1 | | | 6 | | |

Analysis-recommendations

Additional (extra) samples should be collected during the open status in 2011. Furthermore, extra samples should be collected in the closed status in 2011 and if the water scores continue to improve and show clean scores during the summer and fall months, this area can be re-evaluated for an upgrade in classification to Approved year round.



Appendix C. 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.