GROWING AREA WW

Owls Head to Cape Jellison

ANNUAL REVIEW for 2010

Report Date: 05-24-2011

Eric Sroka

APPROVAL

Division Director:

Linda Mercer	Linda Mercer	August 10, 2011
Print Name	Signature	Date

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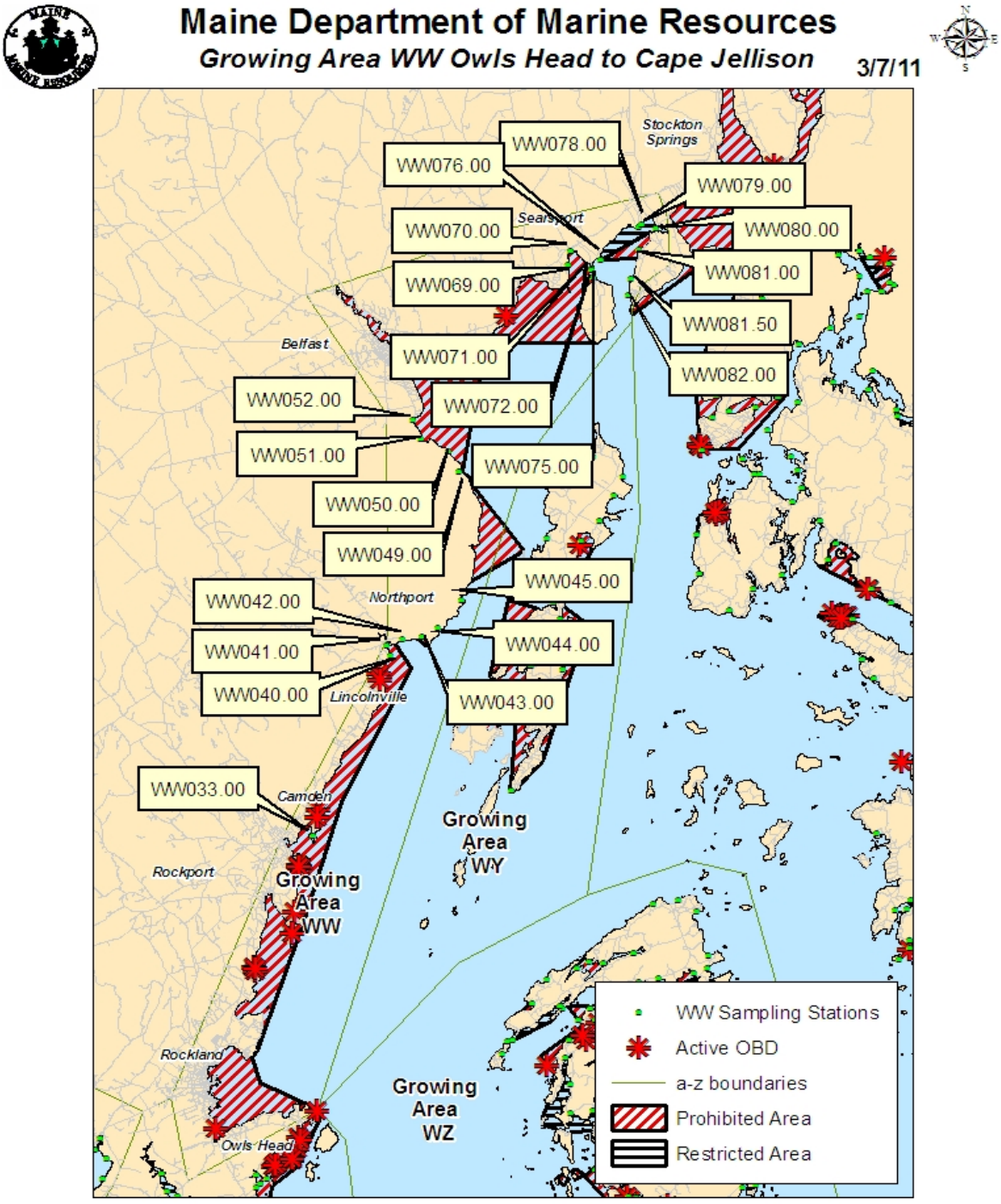


Executive Summary

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

Growing area WW includes the area from the tip of Owls Head (at Owls Head lighthouse) to the southern tip of Rocky Point (formerly known as Squaw Point), Cape Jellison. Major sources of pollution in this area include municipal waste water facilities, private septic systems, licensed over board discharges (OBDs) and outhouses. 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. Two stations were reclassified in 2010; WW43 was downgraded from approved to prohibited following the discovery of a malfunctioning septic system, and WW81 was downgraded from approved to prohibited due to the large number of boats over 24 feet in length in Stockton Harbor. During the 2010 review year, no new stations were added and no stations were deactivated.

Long Cove, Searsport, immediately to the west of the Sears Island Causeway and Stockton Harbor, between Searsport and Stockton Springs are recommended for upward classification based on improvements in water quality and completion of shoreline survey work. No downward classification changes are required.

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

Growing Area Description

Shellfish Growing Area WW includes the area from the tip of Owls Head (at Owls Head lighthouse) to the southern tip of Rocky Point (formerly known as Squaw Point), Cape Jellison. The following towns are included in this growing area: Owls Head, Rockland, Rockport, Camden, Northport, Belfast, Searsport, and Stockton Springs. Land use in the study area is dominated by year-round residential properties. Some seasonal properties remain but many of the seasonal properties are being converted to year-round use throughout the area. The coastline in this region is typical of much of the coast of Maine, with rocky coast separating small coves and harbors which contain mud or rocky beach areas. Portions of this growing area have historically contained large soft shell clam populations; several of these historically productive shellfish areas have experienced considerable die off in recent years due to unknown causes.

Current Classification(s)

Shellfish growing area WW currently has areas classified as:

Approved – 6 stations

- WW 42, 44, 45, 75, 81.5, 82

Restricted – 6 stations

- Long Cove, Searsport WW 71, 72 due to variability in water quality

- Searsport- WW 76 (boundary), 78, 79 and 80 due to variability in water quality

Prohibited – 10 stations

- Rockland Harbor, Broad Cove, and Deep Cove (prohibited due to active OBDs, a WWTP outfall, and non point source pollution); no active stations
- Rockport (prohibited due to active OBDs and non point source pollution); no active stations
- Rockport to Ducktrap River, Lincolnville- WW 33, 40 and 41 (prohibited due to active OBDs, a WWTP outfalls and non point source pollution)
- Northport- WW 43 (due to malfunctioning septic system)
- Great Spruce Head, Northport to Kelly's Cove, Northport; no active stations
- Belfast Bay, Belfast- WW 49, 50, 51, and 52 (due to a WWTP outfall and water quality not meeting the approved standard)
- Searsport- WW 69 (due to WWTP outfalls) and 70 (prohibited due to non point source pollution and water quality not meeting the approved standard) Stockton Springs- WW81 (prohibited due to marina)

Please visit the DMR website to view legal notices:

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

Activity During Review Period

On August 2, 2010 a portion of Stockton Harbor, including Station WW81, was reclassified as prohibited due to boating activity, following a discussion with the harbor master which revealed that there are approximately 75 boats ≥ 24' in length. He stated the average water depth was 15 feet; based on these estimates, and assuming two-person occupancy, the required closure size is 116 acres.

On September 15, 2010 Station WW 43 (Wales Beach) was reclassified from approved to prohibited due to a septic system malfunction.

Conditionally Managed Area(s)

There are no conditionally managed areas in Growing Area WW.

Water Quality Review and Discussion

Table 1 lists all active approved and prohibited stations in Growing Area WW, 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 1.

All approved and restricted stations met their NSSP classification standard in 2010 (Table 1).

Table 1. Geomean and P90 scores Growing Area WW, 2006-2010

Station	Class	Count	MFCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WW033.00	P	30	27	3.5	0.43	70	13	32	173	4/11/2006
WW040.00	P	30	27	4	0.51	150	19	32	173	4/11/2006
WW041.00	P	30	28	5.2	0.55	93	27	31	169	6/5/2006

Station	Class	Count	MFCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WW042.00	A	30	27	3.3	0.38	56	10	32	173	4/11/2006
WW043.00	P	30	27	3	0.41	93	10	32	173	4/11/2006
WW044.00	A	30	27	4.4	0.47	93	18	32	173	4/11/2006
WW045.00	A	30	27	3.3	0.48	74	14	32	173	4/11/2006
WW049.00	P	30	26	6	0.62	900	38	32	176	4/12/2006
WW050.00	P	30	26	5.2	0.67	220	38	32	176	4/12/2006
WW051.00	P	30	26	9.7	0.73	320	85	32	176	4/12/2006
WW052.00	P	30	26	7.4	0.57	240	40	32	176	4/12/2006
WW069.00	P	30	26	3.5	0.42	52	12	32	176	4/12/2006
WW070.00	P	30	27	3.9	0.51	150	18	32	173	4/12/2006
WW071.00	R	30	26	3.4	0.38	43	11	32	176	4/12/2006
WW072.00	R	30	26	4.1	0.68	1700	31	32	176	4/12/2006
WW075.00	A	30	26	2.8	0.34	29	7.8	32	176	4/12/2006
WW076.00	R	30	26	2.7	0.3	16	6.5	32	176	4/12/2006
WW078.00	R	30	26	6.3	0.6	93	38	32	176	4/12/2006
WW079.00	R	30	27	3.9	0.35	23	11	32	173	4/12/2006
WW080.00	R	30	27	4	0.53	240	20	32	173	4/12/2006
WW081.00	P	30	26	3.2	0.32	21	8.5	32	176	4/12/2006
WW081.50	A	30	26	4	0.54	440	20	32	176	4/12/2006
WW082.00	A	30	26	5	0.48	84	21	32	176	4/12/2006

All approved, restricted 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 2). Stations WW 42, 44, and 82 served as a flood closure re-opening sample stations and were sampled additionally under adverse conditions. WW 43 was sampled five times in the open status and once in closed status after sanitary survey work uncovered a malfunctioning septic system in the area and the NSSP classification was downgraded from approved to prohibited. WW 81 was sampled four times in the open status and twice in the closed status, after it was reclassified from approved to prohibited due to the presence of an active marina.

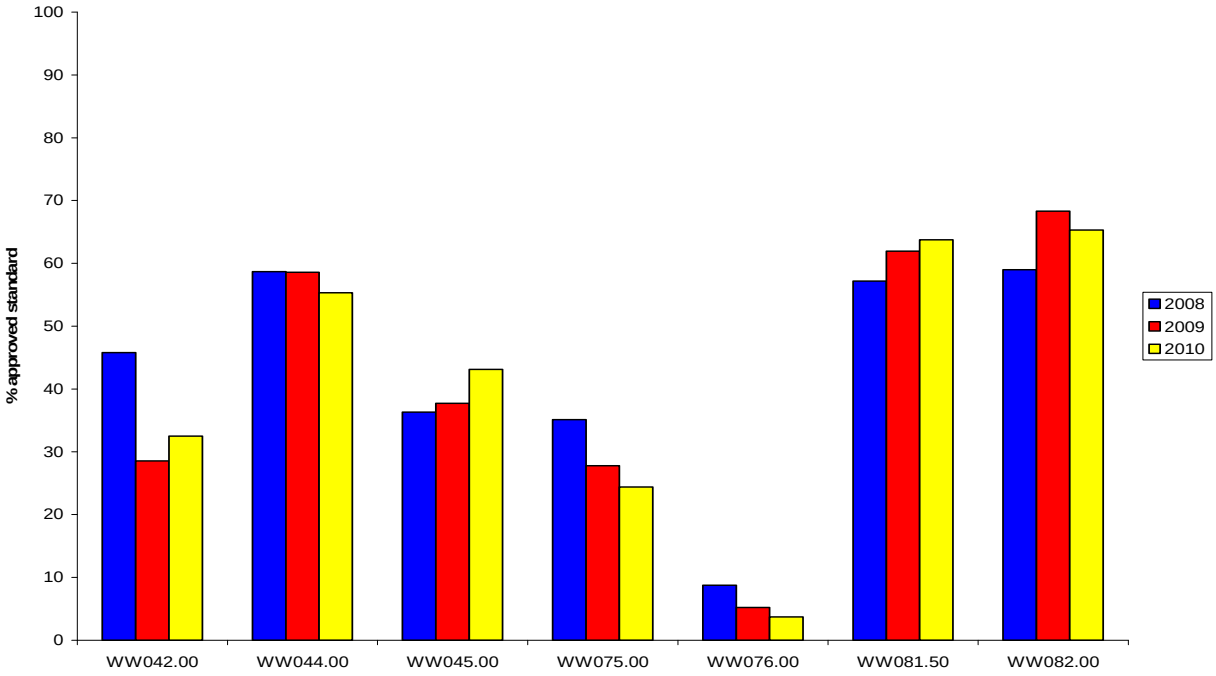
Table 2. 2010 Sampling Effort

Station	Class	Adverse	Random		Total	Comments
		Closed	Closed	Open		
WW033.00	P		6		6	
WW040.00	P		6		6	
WW041.00	P		6		6	
WW042.00	A	21		6	27	Flood Station
WW043.00	A			5	5	Reclassified to Prohibited 9/15/10
	P		1		1	
WW044.00	A	20		6	26	Flood Station
WW045.00	A			6	6	
WW049.00	P		6		6	
WW050.00	P		6		6	

		Adverse	Random			
WW051.00	P		6		6	
WW052.00	P		6		6	
WW069.00	P		6		6	
WW070.00	P		6		6	
WW071.00	R			6	6	
WW072.00	R			6	6	
WW075.00	A			6	6	
WW076.00	R			6	6	
WW078.00	R			6	6	
WW079.00	R			6	6	
WW080.00	R			6	6	
WW081.00	A		2	4	6	Reclassified To Prohibited 8/2/2010
	P					
WW081.50	A			6	6	
WW082.00	A	23		6	29	Flood Station

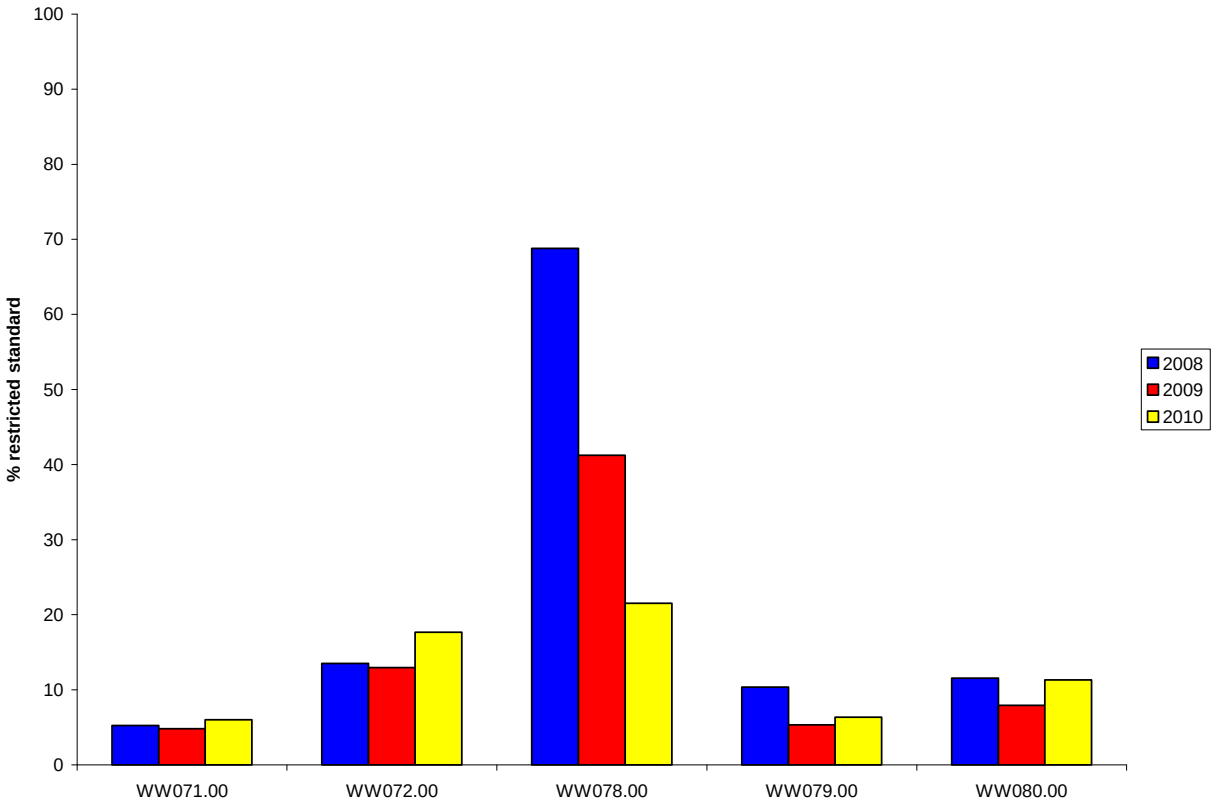
P90 trends for approved stations in growing area WW sampling stations from 2008-2010 are displayed in Figure 2. All stations meet their NSSP classifications. Station WW76 is classified as restricted, however it is included in the approved trend chart because it is a boundary station for a restricted/approved closure line. As a boundary station, it must meet the stricter approved standard.

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



P90 trends for restricted sampling stations in growing area WW from 2008-2010 are displayed in Figure 3. All stations meet their NSSP classifications.

Figure 3. Area WW P90 Scores for Restricted Stations (expressed as the percent of the restricted standard), 2008-2010



Upward Classification Changes

Two areas in Growing Area WW (Long Cove and Stockton Harbor) are being reviewed for potential classification upgrades. The following section details the areas being proposed for upgrades and the justifications for doing so.

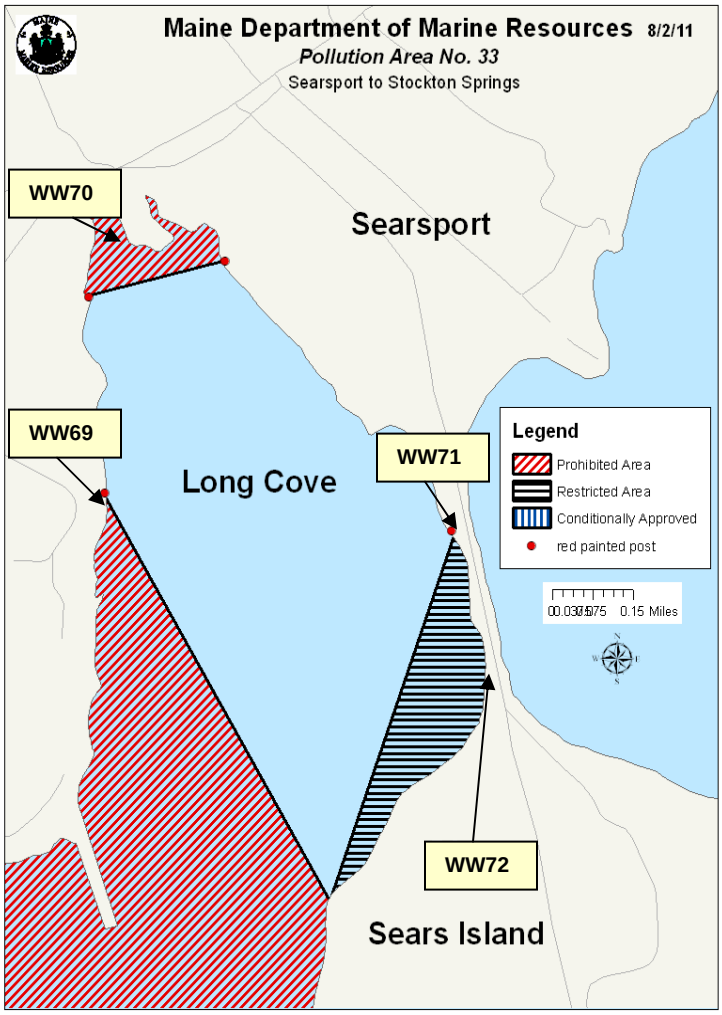
Long Cove

Long Cove is located in the town of Searsport, west of Sears Island. This cove is monitored by stations WW 69, 70, 71 and 72. Station WW69 is located on the western bank of the cove, and is classified as prohibited. Station WW70 is located at the head of the cove, and is also classified as prohibited. Two streams flank the head of Long Cove on either side of station WW70. Stations WW71 and 72 are located on the west side of the Sears Island Causeway; both are classified as restricted (Figure 1).

Recent improvements in water quality have prompted assessments into a possible upgrade of Long Cove. Figure 4 shows the middle of the cove, which is proposed for an upgrade from,

prohibited to approved, using WW69 as a boundary station. Two wastewater outfalls are located approximately 100 yards south of WW69, at the Irving Oil facility (Pierce, 2011). These are not septic effluent discharges. The wastewater is passed through a controlled oil and water separator, after which the water is discharged overboard. The discharges are sampled quarterly, and the results are recorded by the Maine Department of Environmental Protection (DEP) and DMR. There have been no spills or compliance issues for almost a decade (Pierce, 2011). These discharges are encompassed by the prohibited area, which is in place to mitigate the effects of dredging at the Irving Facility. The new line is proposed to be drawn from WW69 southeast to a point of land on Sears Island. The head of the cove (WW70) will remain prohibited until more data can be collected on streams entering the cove. Any impact from these streams appears to be minimal, as WW70 is below the approved standard. The restricted area west of the Sears Island Causeway is proposed for a reduction, redrawn from WW71 southwest to a point of land on Sears Island, encompassing WW72 (Figure 4). Justifications for these proposals follow.

Figure 4. Proposed Approved Area in Long Cove



All Long Cove stations currently meet the approved standard (Table 3) based on the 30 most recent data points. Stations WW69 and 70, located on the west side and at the head of Long Cove, respectively, have been classified as prohibited due to nonpoint source pollution and water quality not meeting the approved standard. In 2007, sewers were installed north of WW 70 on Old Route 1. Five years of P90 trends illustrate the improvement in water quality (Figure 5). The sewer work may have helped decrease pollution at WW70 and possibly WW69. Stations WW 71 and 72 are located on the west side of the Sears Island causeway. Both are classified as restricted due to variability in water quality (non-point source pollution). This causeway is a popular recreation spot particularly for dog walking, which may be impacting water quality. The Searsport Shellfish committee has been very active in cleaning up the area and providing receptacles for dog waste.

Figure 5. P90 Scores for Long Cove Stations (expressed as the percent of the approved standard), 2006-2010

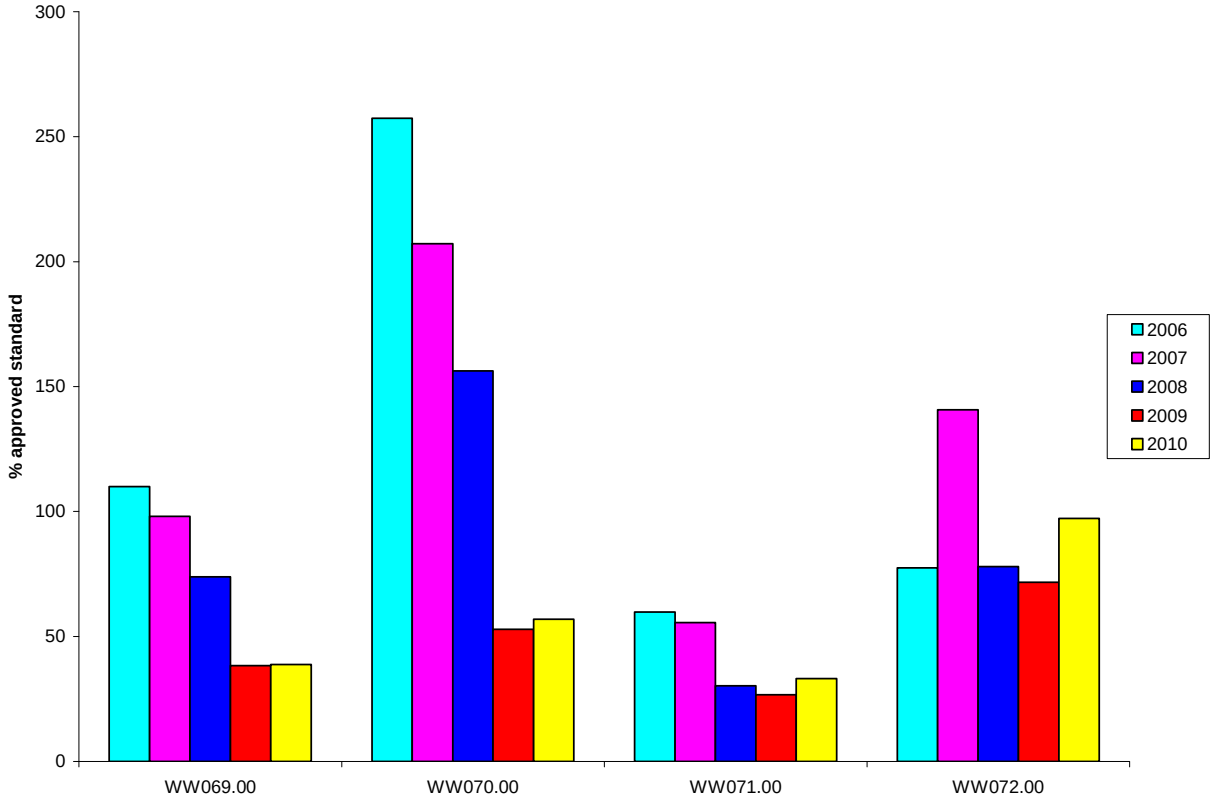


Table 3. Geomean and P90 scores Long Cove Stations, 2006-2010

Station	Class	Count	MFCount	GM	SDV	MAX	P90	Appd_Std	Min_Date
WW069.00	P	30	26	3.5	0.42	52	12	32	4/12/2006
WW070.00	P	30	27	3.9	0.51	150	18	32	4/12/2006
WW071.00	R	30	26	3.4	0.38	43	11	32	4/12/2006
WW072.00	R	30	26	4.1	0.68	1700	31	32	4/12/2006

There is not enough data at present to do a full analysis of the impact of ebb tide on stations in Long Cove. A preliminary review of geomean and P90 scores at ebb tide (using available data) shows an increase at WW69 and 70; however, under this condition, neither station exceeds the approved standard. West of the causeway, at stations WW71 and 72, there is no measurable impact due to ebb tide, as the P90 scores actually decrease under this condition. More data regarding ebb tide can be found in Tables 6 and 7.

Flood tide increases P90 scores at all Long Cove stations, to the extent that stations WW70 and 72 exceed the approved standard (Table 5). The impact of various stages of flood tide and other adverse conditions at these two stations will be further discussed in Tables 6, 7 and 8.

Table 4. Tidal Assessment Long Cove Stations, Flood Tide, 2003-2010

Station	Class	Count	MFCount	GM	SDV	MAX	P90	Appd_Std	Min_Date
WW069.00	P	31	13	4.6	0.57	240	25	40	4/30/2003
WW070.00	P	32	14	6.2	0.76	1100	59	40	4/30/2003
WW071.00	R	31	13	5.2	0.51	150	24	40	4/30/2003
WW072.00	R	31	13	5.3	0.76	1700	52	40	4/30/2003

Table 6 shows the percentage of samples impacted at each flood stage for stations WW70 and 72. Station WW70 has low percent of impact at all flood tide stages, except at low flood, for which there were no samples. WW72 is most negatively impacted at high flood, though the reason for this is unknown.

Table 5. Flood Tide Stage Impact

Station	Class	Flood Tide							
		Flood	% Flood	High	% High	High Flood	%High Flood	Low Flood	%Low Flood
		N	Exceed	N	Exceed	N	Exceed	N	Exceed
WW070.00	P	18	11.1	7	14.3	7	14.3	0	
WW072.00	R	17	5.6	8		5	80	1	

In tables presented in this section, 'Rain 3 Days' refers to cumulative rainfall occurring three days before sample was collected; 'Rain 4 Days' refers to cumulative rainfall 3 days prior, plus the day of collection. P90 scores are calculated using the 30 most recent SRS and extra data points collected through the end of 2010[1].

Table 7 shows seasonal and rainfall data from 2003 through 2010. P90 scores have exceeded the approved standard six times in that time period. Of those 6 times, all but one occurred after greater than 0.5 inches of rain. Elevated stream flow from Cove Brook during these events may have contributed to the pollution. Additionally, all but one sample was taken before the installation of a sewer line on Old Route 1, in 2007, which appears to have reduced pollution entering the cove. WW70 is not being proposed for upgrade at this time. There are two streams that enter into both sides of the head of Long Cove. A preliminary dilution calculation requires a

[1] The current approved standard for shellfish harvesting is ≤ 31 CFU/100 mL, based on using the membrane filtration (MF) method of analysis. Prior to summer 2006, the approved standard was ≤ 49 CFU/100 mL, based on the Most Probable Number (MPN) method of bacterial analysis.

closure of 5 acres, but in order to mitigate any impact of high stream flow, a prohibited area of about 14 acres at the head of the cove, encompassing WW70, is recommended until more data can be collected (Figure 4).

Table 6. Station WW70 Seasonal and Rainfall Assessment, 2003-2010

Date	Rain 3	Rain 4	Tide	Sal	Strategy	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
30-Apr-03	0	0.9	HF	20	R				<3								
20-May-03	0	0	F	20	R					<3							
19-Jun-03	0	0	HF	20	R						22						
24-Sep-03	0	0	HF	26	R									3.6			
10-Feb-04	0	0.44	F	30	R		<3										
15-Mar-04	0	0.13	F	27	R			9.1									
11-Apr-05	0	0	HF	19	R				<3								
13-Jun-05	0	0	F	18	R						3.6						
11-Aug-05	0	0	F	25	R								3.6				
12-Apr-06	0	0	H	4	R				<3								
02-Aug-06	0	0	F	22	R								3.6				
18-Sep-06	0	0	E	16	R									35			
11-Oct-06	0	0	H	28	R										<2		
27-Nov-06	0	0	F	18	R											<2	
23-Apr-07	0	0	F	0	R				<2								
13-Jun-07	0	0	HE	20	R						8						
02-Oct-07	0	0	F	30	R										4		
23-Jan-08	0	0	H	27	R	<2											
19-Mar-08	0	0	HE	10	R			<2									
15-Jul-08	0	0	E	24	R							<2					
03-Sep-08	0	0	F	29	R									<2			
18-Mar-09	0	0	F	27	R			<2									
13-Apr-09	0	0	HF	30	R				<2								
05-May-09	0	0.05	HE	16	R					<2							
17-Aug-09	0	0	E	21	R								<2				
22-Mar-10	0	0	F	18	R			<2									
30-Aug-10	0	0	HF	28	R								<2				

Date	Rain 3	Rain 4	Tide	Sal	Strategy	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
20-May-08	0.05	0.15	H	20	R					<2							
20-Jul-10	0.07	0.07	HE	27	R							4					
11-Dec-07	0.11	0.26	HE	22	R												<2
15-May-07	0.12	0.12	HE	18	R					2							
07-Apr-10	0.22	0.22	E	4	R				16								
01-Nov-10	0.27	0.27	E	30	R											<2	
02-Jun-10	0.3	0.3	F	28	R						<2						
30-Sep-09	0.39	1.82	H	26	R									14			
29-Jul-04	0.55	0.55	H	10	R							460					
22-Jul-09	0.64	0.64	HE	18	R							40					
07-Aug-07	0.67	0.67	F	22	R								31				
10-May-05	0.86	1.54	F	2	R					<3							
25-Jul-05	0.88	0.88	F	28	R							<3					
28-Oct-08	0.91	0.91	HE	28	R										4		
27-May-04	1.00	1.57	E	3	R					43							
24-May-05	1.56	1.56	H	10	R					15							
17-May-06	1.58	1.58	F	2	R					150							
15-Apr-04	1.64	1.64	HE	25	R				15								
31-Aug-04	1.72	1.72	HF	5	R								1100				
28-Oct-03	1.8	1.8	F	10	R										240		

WW72 has also exceeded the approved standard six times since 2003. Five out of the six times exceeding the approved standard occurred after greater than 0.6 inches of rain (Table 8). It is assumed that this was due to dog waste being not cleaned up, and being washed into the surrounding waters during a rain event. No sample has exceed the approved standard since 2007, most likely due to the efforts of the Searsport Shellfish Commission, which has provided waste receptacles and bags for dog walkers since that time.

Table 7. Station WW72 Seasonal and Rainfall Assessment, 2003-2010

Date	Rain 3	Rain 4	Tide	Sal	Strategy	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
30-Apr-03	0	0.9	H	18	R				2.9								
20-May-03	0	0	F	20	R					3.6							
19-Jun-03	0	0	F	30	R						2.9						
24-Sep-03	0	0	HF	28	R									460			

Date	Rain 3	Rain 4	Tide	Sal	Strategy	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
10-Feb-04	0	0.44	F	29	R		2.9										
15-Mar-04	0	0.13	L	28	R			2.9									
11-Apr-05	0	0	HF	19	R				2.9								
13-Jun-05	0	0	F	18	R						3.6						
11-Aug-05	0	0	F	25	R								3.6				
12-Apr-06	0	0	H	22	R				2.9								
02-Aug-06	0	0	F	20	R								3				
18-Sep-06	0	0	E	25	R									1.9			
20-Nov-06	0	1.1	E	14	R											20	
26-Feb-07	0	0	LF	30	R		1.9										
23-Apr-07	0	0	F	14	R				2								
13-Jun-07	0	0	E	28	R						2						
02-Oct-07	0	0	F	30	R										2		
23-Jan-08	0	0	H	25	R	2											
19-Mar-08	0	0	HE	24	R			1.9									
15-Jul-08	0	0	E	24	R							1.9					
03-Sep-08	0	0	F	30	R									1.9			
02-Feb-09	0	0	F	26	R		1.9										
18-Mar-09	0	0	F	22	R			2									
05-May-09	0	0.05	E	20	R					1.9							
17-Aug-09	0	0	E	21	R								6				
22-Mar-10	0	0	F	22	R			1.9									
30-Aug-10	0	0	F	26	R								1.9				
20-May-08	0.05	0.15	H	22	R					1.9							
20-Jul-10	0.07	0.07	E	27	R							20					
11-Dec-07	0.11	0.26	HE	24	R												2
07-Apr-10	0.22	0.22	E	10	R				1.9								
01-Nov-10	0.27	0.27	E	28	R											29	
02-Jun-10	0.3	0.3	F	28	R						1.9						
30-Sep-09	0.39	1.82	H	26	R									1.9			
29-Jul-	0.55	0.55	H	27	R							9.1					

Date	Rain 3	Rain 4	Tide	Sal	Strategy	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
04																	
22-Jul-09	0.64	0.64	HE	21	R							33					
07-Aug-07	0.67	0.67	F	27	R								1700				
10-May-05	0.86	1.54	F	15	R					3.6							
25-Jul-05	0.88	0.88	F	30	R							2.9					
28-Oct-08	0.91	0.91	HE	28	R										1.9		
08-Dec-03	0.97	0.97	H	30	R												2.9
27-May-04	1.00	1.57	E	21	R					2.9							
24-May-05	1.56	1.56	H	28	R					2.9							
17-May-06	1.58	1.58	HF	18	R					93							
15-Apr-04	1.64	1.64	HE	31	R				2.9								
31-Aug-04	1.72	1.72	HF	24	R								93				
28-Oct-03	1.8	1.8	HF	20	R										93		
05-Jun-06	2.63	3.07	LE	24	R						2.9						

The review of the water quality data shows that for most stations, any elevated scores are from older data, prior to known infrastructure improvements and better community awareness regarding dog waste, and that more recent data has shown sufficient improvement in water quality. There are still areas that require more work (WW70 at the head of the cove and at WW72 on the southwestern side of the causeway); however, based to the data analyses discussed here, there is sufficient support for the middle area of Long Cove, as detailed in Figure 4, to be proposed for an upgrade in classification from prohibited and restricted to approved.

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Stockton Harbor

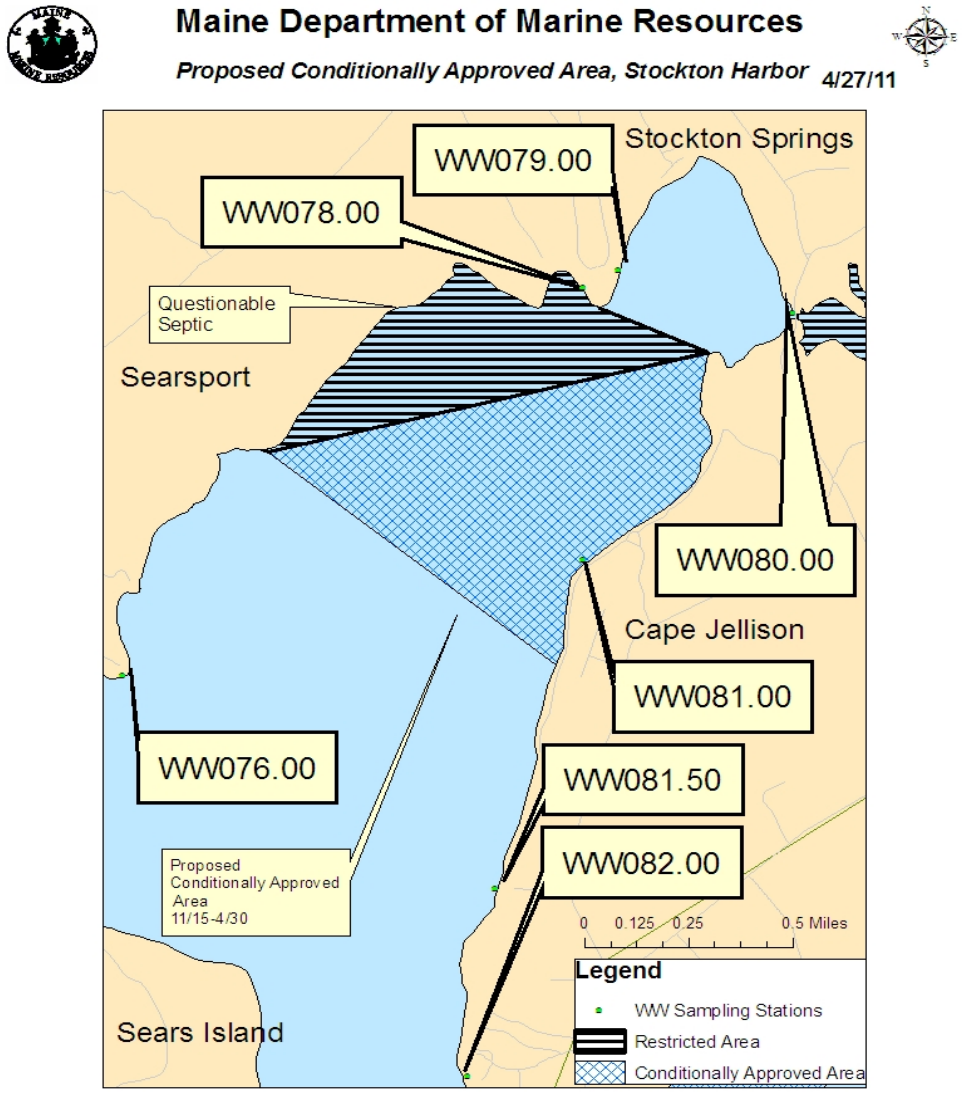
Stockton Harbor is located in Searsport and Stockton Springs. The extreme northeast section of the harbor is known as Mill Cove. Just east of Mill Cove, in Cape Jellison, is Mill Pond. Stations WW76, 78, 79, 80, 81, 81.5 and 82 all monitor the harbor. This is a large area, with several opportunities for classification upgrades, as detailed in Figure 6.

Beginning at WW76, at the southwestern edge of the harbor (Figure 6), the approved area is proposed to be extended to the northeast, up the coast, to reflect the results from the recently completed sanitary survey, and the lack of development in the area. The proposed reduction in the restricted area is still large enough to include a property with a questionable septic system, as well as encompass station WW78, which does not meet the approved standard, and is not being proposed for an upgrade at this time. Mill Cove, at the northeast of Stockton Harbor, is monitored by stations WW79 and WW80 (Figure 6). Both of these stations are being proposed

for an upgrade, which would open the entire cove. East of Mill Cove is Mill Pond; this area will remain restricted, due to questionable septic systems in the area.

Station WW81 is located on Cape Jellison on the eastern edge of the harbor at the Stockton Harbor Marina. This area is being proposed for an upgrade to conditionally approved, to reflect the seasonal nature of the marina (Figure 6).
Justifications for these proposed upgrades are presented in this section (WW81 is presented separately due to the proposed upgrade being a conditionally approved area).

Figure 6. Proposed Upgrades in Stockton Harbor and Mill Cove



Of the sampling stations located within Stockton Harbor, only WW78 exceeds the approved Standard (Figure 7, Table 9); however, it is showing a steady downward trend in P90 scores. WW76 is also showing a downward trend, though this station is below the Approved standard (Figure 7, Table 9). WW79, 80 and 81 have all increased slightly over 2009 levels, but remain below the Approved standard (Figure 7, Table 9).

Figure 7. P90 Scores for WW76, WW78, WW79, WW80 and WW81 (expressed as the percent of the approved standard), 2008-2010

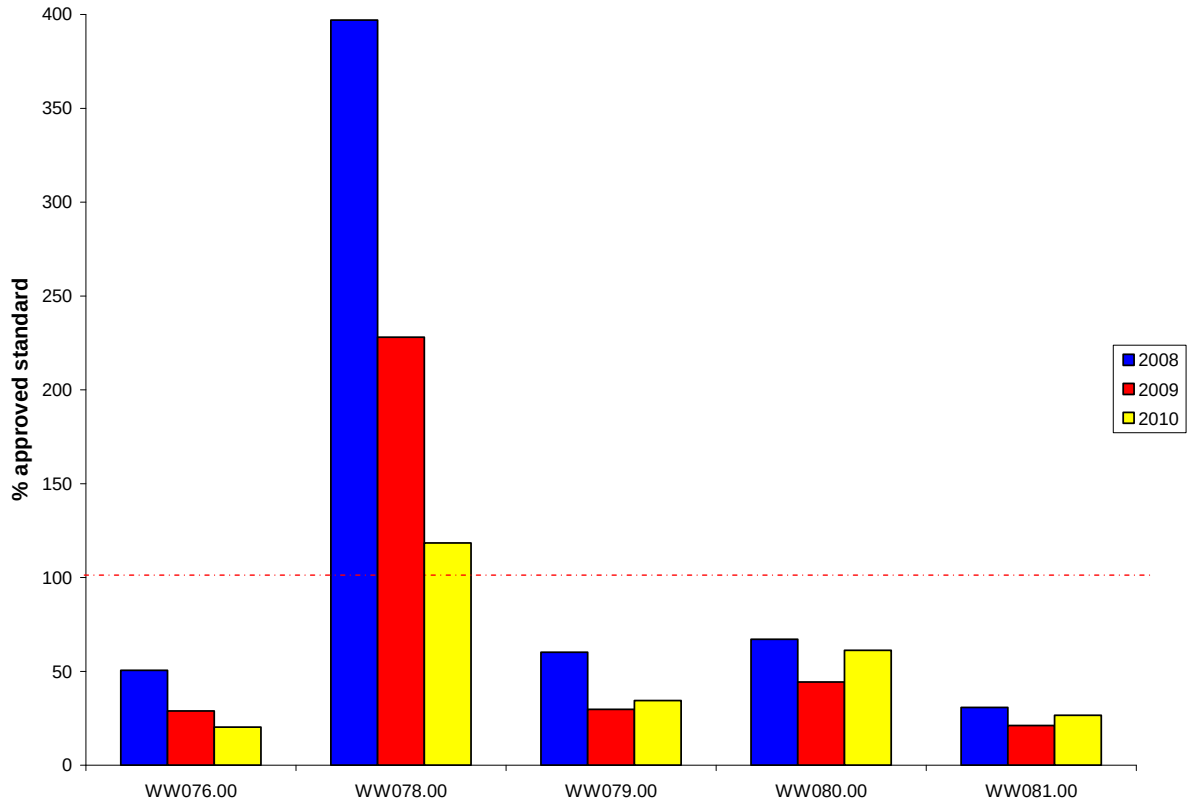


Table 8. Geomean and P90 scores for Stockton Harbor Stations, 2006-2010

Station	Class	Count	MFCount	GM	SDV	MAX	P90	Appd_Std	Min_Date
WW076.00	R	30	26	2.7	0.3	16	6.5	32	4/12/2006
WW078.00	R	30	26	6.3	0.6	93	38	32	4/12/2006
WW079.00	R	30	27	3.9	0.35	23	11	32	4/12/2006
WW080.00	R	30	27	4	0.53	240	20	32	4/12/2006
WW081.00	P	30	26	3.2	0.32	21	8.5	32	4/12/2006

There is not enough data at present to do a full analysis of rainfall or tides for stations located in Stockton Harbor. The available data suggests that rainfall of greater than 0.5 inches negatively impacts all stations (excluding station WW78 which is not being proposed for upgrade at this time and WW81 which does not appear to be impacted by rainfall).

Available data suggests ebb tide increases P90 scores beyond the approved standard only at WW80. Flood tide appears to increase P90 scores beyond the approved standard at WW78, 79 and 80. WW76 is not affected by tides as much, most likely due to the exposed location of the station. Current data pertaining to rainfall and tidal impact on fecal coliform scores will be examined more fully in Tables 9 to 12.

In all tables presented in this section, 'Rain 3 Days' refers to cumulative rainfall occurring three days before sample was collected; 'Rain 4 Days' refers to cumulative rainfall 3 days prior, plus the day of collection.

Since 2003, station WW76 has exceeded the Approved limit twice (Table 12). Both of these samples were taken after greater than 0.5 inches of rain. The higher of the two samples, taken on August 31, 2004, was sampled after 1.72 inches of rain. The other sample, taken July 25, 2005, was collected after 0.88 inches of rain. WW76 has not exceeded the approved standard since the occurrence in 2005, even after similar rainfall amounts. WW76 is not negatively impacted by rainfall.

Table 9. Seasonal and Rainfall Analysis, WW76, 2003-2010

Date	Rain 3	Rain 4	Tide	Sal	Strategy	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
30-Apr-03	0	0.9	H	18	R				<3								
20-May-03	0	0	F	22	R					<3							
19-Jun-03	0	0	F	26	R						<3						
24-Sep-03	0	0	H	26	R									23			
10-Feb-04	0	0.44	F	28	R		<3										
15-Mar-04	0	0.13	LF	29	R			<3									
11-Apr-05	0	0	HF	18	R				<3								
13-Jun-05	0	0	F	20	R						7.3						
11-Aug-05	0	0	F	25	R								<3				
12-Apr-06	0	0	HE	20	R				<3								
02-Aug-06	0	0	F	22	R								11				
18-Sep-06	0	0	E	25	R									<2			
20-Nov-06	0	1.1	E	18	R											4	
23-Apr-07	0	0	F	14	R				<2								
13-Jun-07	0	0	E	28	R						4						
02-Oct-07	0	0	F	30	R										<2		
23-Jan-08	0	0	H	26	R	<2											
19-Mar-08	0	0	HE	24	R			<2									
15-Jul-	0	0	E	24	R							2					

Date	Rain 3	Rain 4	Tide	Sal	Strategy	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
08																	
03-Sep-08	0	0	HF	29	R									<2			
02-Feb-09	0	0	HF	27	R		<2										
13-Apr-09	0	0	HF	28	R				<2								
05-May-09	0	0.05	E	15	R					<2							
17-Aug-09	0	0	E	22	R								2				
22-Mar-10	0	0	F	22	R			<2									
30-Aug-10	0	0	F	28	R								<2				
20-May-08	0.05	0.15	H	22	R					<2							
20-Jul-10	0.07	0.07	E	26	R							16					
11-Dec-07	0.11	0.26	E	26	R												<2
15-May-07	0.12	0.12	HE	20	R					2							
07-Apr-10	0.22	0.22	E	10	R				<2								
01-Nov-10	0.27	0.27	E	28	R											15	
02-Jun-10	0.3	0.3	F	28	R						2						
30-Sep-09	0.39	1.82	H	25	R									<2			
29-Jul-04	0.55	0.55	HE	23	R							15					
22-Jul-09	0.64	0.64	E	23	R							2					
07-Aug-07	0.67	0.67	F	26	R								2				
10-May-05	0.86	1.54	HF	16	R					3.6							
25-Jul-05	0.88	0.88	F	30	R							93					
28-Oct-08	0.91	0.91	HE	26	R										<2		
08-Dec-03	0.97	0.97	H	31	R												<3
27-May-04	1.00	1.57	LE	21	R					<3							
24-May-05	1.56	1.56	H	29	R					23							
17-May-06	1.58	1.58	HF	20	R					<3							
15-Apr-04	1.64	1.64	HE	26	R				<3								
31-Aug-04	1.72	1.72	HF	20	R								240				
28-Oct-03	1.8	1.8	HF	20	R										43		
05-Jun-06	2.63	3.07	LE	24	R						15						

WW79 has exceeded the approved standard three times since 2003; twice in 2003, and once in 2004 (Table 13). Two samples, October 28, 2003 and August 31, 2004 were collected after greater than 1.7 inches of rain. The third sample, collected September 24, 2003, is not associated with rainfall. It is not known what caused the high level of bacteria. Since 2004, WW79 has not exceeded the approved standard.

Table 100. Seasonal and Rainfall Analysis, WW79, 2003-2010

Date	Rain 3	Rain 4	Tide	Sal	Strategy	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
30-Apr-03	0	0.9	H	16	R				<3								
20-May-03	0	0	F	22	R					<3							
19-Jun-03	0	0	F	27	R						9.1						
24-Sep-03	0	0	H	26	R									1100			
10-Feb-04	0	0.44	HF	28	R		<3										
15-Mar-04	0	0.13	F	28	R			3									
11-Apr-05	0	0	H	19	R				<3								
13-Jun-05	0	0	F	19	R						<3						
11-Aug-05	0	0	F	25	R								3.6				
12-Apr-06	0	0	HE	20	R				<3								
02-Aug-06	0	0	F	22	R								<3				
18-Sep-06	0	0	LE	25	R									<2			
11-Oct-06	0	0	H	28	R										4		
27-Nov-06	0	0	F	20	R											2	
23-Apr-07	0	0	F	12	R				4								
13-Jun-07	0	0	E	27	R						20						
02-Oct-07	0	0	F	30	R										6		
23-Jan-08	0	0	HE	25	R	<2											
19-Mar-08	0	0	E	22	R			4									
15-Jul-08	0	0	E	24	R							<2					
03-Sep-08	0	0	HF	29	R									4			
02-Feb-09	0	0	HF	27	R		<2										
18-Mar-09	0	0	F	21	R			4									
05-May-09	0	0.05	E	15	R					<2							
17-Aug-09	0	0	E	21	R								2				
22-Mar-10	0	0	F	22	R			<2									

Date	Rain 3	Rain 4	Tide	Sal	Strategy	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
30-Aug-10	0	0	F	28	R								4				
20-May-08	0.05	0.15	H	20	R					<2							
20-Jul-10	0.07	0.07	E	27	R							<2					
11-Dec-07	0.11	0.26	E	28	R												<2
15-May-07	0.12	0.12	HE	20	R					4							
07-Apr-10	0.22	0.22	E	10	R				4								
01-Nov-10	0.27	0.27	E	28	R											16	
02-Jun-10	0.3	0.3	HF	28	R						14						
30-Sep-09	0.39	1.82	HE	24	R									6			
29-Jul-04	0.55	0.55	HE	23	R							9.1					
22-Jul-09	0.64	0.64	E	22	R							20					
07-Aug-07	0.67	0.67	F	26	R								6				
10-May-05	0.86	1.54	HF	15	R					15							
25-Jul-05	0.88	0.88	F	30	R							3.6					
28-Oct-08	0.91	0.91	E	28	R										2		
08-Dec-03	0.97	0.97	HE	31	R												9.1
27-May-04	1.00	1.57	E	20	R					<3							
24-May-05	1.56	1.56	H	30	R					9.1							
17-May-06	1.58	1.58	HF	16	R					23							
15-Apr-04	1.64	1.64	HE	28	R				<3								
31-Aug-04	1.72	1.72	HF	24	R								1100				
28-Oct-03	1.8	1.8	HF	20	R										93		

WW80 has exceeded the approved standard five times since 2003 (Table 14). Twice (once in 2003 and most recently in 2010) the impacted samples were not taken after significant rainfall. It is unknown what caused the increase in scores. The remaining three impacted samples were collected after greater than 0.5 inches of rain. Though there is an apparent impact, three of the impacted samples are from older data (twice in 2003 and once in 2004). Recently, there have been two elevated samples; however, the year round P90 has remained below the approved standard for several years (Figure 7).

Table 111. Seasonal and Rainfall Analysis, WW80, 2003-2010

Date	Rain 3	Rain 4	Tide	Sal	Strategy	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
30-Apr-03	0	0.9	H	18	R				<3								
20-May-03	0	0	F	22	R					<3							
19-Jun-03	0	0	F	21	R						3.6						
24-Sep-03	0	0	H	26	R									240			
10-Feb-04	0	0.44	HF	28	R		<3										
15-Mar-04	0	0.13	F	26	R			<3									
11-Apr-05	0	0	H	19	R				<3								
13-Jun-05	0	0	F	19	R						3.6						
11-Aug-05	0	0	F	25	R								3.6				
12-Apr-06	0	0	HE	20	R				<3								
02-Aug-06	0	0	F	22	R								23				
18-Sep-06	0	0	LE	25	R									2			
11-Oct-06	0	0	H	28	R										2		
27-Nov-06	0	0	F	20	R											4	
23-Apr-07	0	0	F	12	R				<2								
13-Jun-07	0	0	E	28	R						5.5						
02-Oct-07	0	0	F	30	R										<2		
23-Jan-08	0	0	HE	25	R	4											
19-Mar-08	0	0	E	23	R			4									
15-Jul-08	0	0	E	24	R							<2					
03-Sep-08	0	0	HF	28	R									<2			
02-Feb-09	0	0	HF	27	R		<2										
18-Mar-09	0	0	F	22	R			<2									
05-May-09	0	0.05	E	16	R					<2							
17-Aug-09	0	0	E	21	R								14				
22-Mar-10	0	0	HF	22	R			<2									
30-Aug-10	0	0	F	28	R								<2				
20-May-08	0.05	0.15	HE	20	R					<2							
20-Jul-10	0.07	0.07	E	26	R							116					
11-Dec-07	0.11	0.26	E	26	R												<2

Date	Rain 3	Rain 4	Tide	Sal	Strategy	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
15-May-07	0.12	0.12	E	19	R					4							
07-Apr-10	0.22	0.22	E	10	R				<2								
01-Nov-10	0.27	0.27	E	28	R											16	
02-Jun-10	0.3	0.3	HF	27	R						<2						
30-Sep-09	0.39	1.82	HE	25	R									2			
29-Jul-04	0.55	0.55	HE	27	R							43					
22-Jul-09	0.64	0.64	E	22	R							240					
07-Aug-07	0.67	0.67	F	26	R								3.6				
10-May-05	0.86	1.54	HF	16	R					7.3							
25-Jul-05	0.88	0.88	F	30	R							23					
28-Oct-08	0.91	0.91	E	28	R										1.9		
08-Dec-03	0.97	0.97	HE	31	R												9.1
27-May-04	1.00	1.57	E	21	R					9.1							
24-May-05	1.56	1.56	H	29	R					2.9							
17-May-06	1.58	1.58	HF	18	R					9.1							
15-Apr-04	1.64	1.64	E	30	R				3.6								
31-Aug-04	1.72	1.72	HF	20	R								1100				
28-Oct-03	1.8	1.8	H	20	R										240		

For the portions of Stockton Harbor that are being proposed for upgrade, the majority of elevated scores occurred in 2004 and before, with few exceptions, most notably at WW80 (WW78 is not being proposed for upgrade). WW80 has remained below the approved standard even with the two instances of elevated scores. The areas of Stockton Harbor as detailed in Figure 6 are being proposed for an upgrade in classification from prohibited and restricted, to approved.

Stockton Harbor Marina

Station WW81 is being proposed for an upgrade from prohibited to conditionally approved, based on a seasonally active marina in Stockton Harbor. WV81 currently meets the approved standard during the open status, from November 15 through May 15 (Figure 6, Table 15). A seasonal and rainfall assessment shows that WW81 has only exceeded the approved standard once since 2003 (Table 16). It is unknown what caused this increase in fecal score, however over the eight year period similar and greater amounts of rain did not increase the fecal score above the approved standard.

Table 122. Geomean and P90 Scores for Station WW81, 2003-2010

Station	Class	Count	MFCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WW081.00	P	19	11	2.9	0.31	23	7.6	37	210	4/30/2003

Table 133. Seasonal and Rainfall Analysis for Station WW81, 2003-2010

Date	Rain3	Rain4	Tide	Sal	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
30-Apr-03	0	0.9	H	18				2.9								
20-May-03	0	0	F	22					2.9							
19-Jun-03	0	0	F	30						2.9						
24-Sep-03	0	0	H	26									3.6			
28-Oct-03	1.8	1.8	H	20										43		
08-Dec-03	0.97	0.97	E	30												2.9
10-Feb-04	0	0.44	HF	28		2.9										
15-Mar-04	0	0.13	LF	25			23									
15-Apr-04	1.64	1.64	E	24				2.9								
27-May-04	1	1.57	E	22					2.9							
29-Jul-04	0.55	0.55	E	26							2.9					
31-Aug-04	1.72	1.72	H	25								93				
11-Apr-05	0	0	H	19				2.9								
10-May-05	0.86	1.54	HF	16					2.9							
24-May-05	1.56	1.56	HE	28					2.9							
13-Jun-05	0	0	F	19						3.6						
25-Jul-05	0.88	0.88	F	27							3.6					
11-Aug-05	0	0	F	25								2.9				
12-Apr-06	0	0	HE	20				2.9								
17-May-06	1.58	1.58	HF	18					3.6							
05-Jun-06	2.63	3.07	L	21						21						
02-Aug-06	0	0	F	21								3				
18-Sep-06	0	0	LE	24									1.9			
20-Nov-06	0	1.1	E	15											20	
23-Apr-07	0	0	F	12				1.9								
15-May-07	0.12	0.12	E	19					1.9							
13-Jun-07	0	0	E	28						4						
07-Aug-	0.67	0.67	F	26								4				

Date	Rain3	Rain4	Tide	Sal	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
07																
02-Oct-07	0	0	F	30										1.9		
11-Dec-07	0.11	0.26	E	26												2
23-Jan-08	0	0	HE	25	1.9											
19-Mar-08	0	0	E	24			1.9									
20-May-08	0.05	0.15	HE	20					2							
15-Jul-08	0	0	E	24							6					
03-Sep-08	0	0	H	29									1.9			
28-Oct-08	0.91	0.91	E	26										1.9		
02-Feb-09	0	0	HF	26		1.9										
18-Mar-09	0	0	F	23			1.9									
05-May-09	0	0.05	E	16					1.9							
22-Jul-09	0.64	0.64	E	23							11					
17-Aug-09	0	0	LE	21								8				
30-Sep-09	0.39	1.82	HE	25									4			
22-Mar-10	0	0	HF	22			2									
07-Apr-10	0.22	0.22	E	10				4								
02-Jun-10	0.3	0.3	HF	27						1.9						
20-Jul-10	0.07	0.07	E	26							4					

The prohibited area around the Stockton Harbor Marina was enacted to mitigate any pollution originating from the boats that are moored there. Based on the seasonality of this marina and water quality meeting the approved standard, it is proposed that a portion of Stockton Harbor, including Station WW81, be upgraded from prohibited to conditionally approved, with an open status from 11/15 through 5/15, as detailed in Figure 7. The required closure area for the marina is 116 acres. The proposed closure area is 336 acres, which encompasses the marina.

Shoreline Survey Activity

On September 9, 2010 DMR and DEP staff did shoreline survey work in the Ducktrap River area. The area surveyed was shorefront, from just north of Lincolnville Beach to the mouth of the Ducktrap River, at Howe Point Road. No malfunctioning systems were found.

DMR and DEP staff completed survey work in the Ducktrap River area (Lincolnville) on September 10, 2010 and began survey work in Northport. DEP staff had surveyed the east side of the Ducktrap River in 2009, and no septic systems were identified as failing.

DMR and DEP staff continued shoreline survey work in Northport on September 15, 2010. A major breakout was discovered at a property where water sample station WW43 is located. The owner was notified, and DEP staff reported the malfunction to the town and DHHS. Survey work was finished up to the south side of Little Harbor, with no other malfunctions being found. On October 22, 2010, DMR and DEP staff continued survey work in Northport. Survey work for tax maps R8 and R6 were completed, with much of map U15 finished as well. A suspicious system consisting of only a tank, and no leach field was identified. The system is in a prohibited area, and showed no signs of malfunction. This will be a system to revisit in for the next triennial in 2012.

Aquaculture/Wet Storage Activity

There is one mussel raft in shellfish growing area WW. This lease site is located >1300 feet from shore in >50 feet of water. The site is approximately 1.6 miles from the Bayside treatment facility in the town of Northport, south of sampling station WW 49. This area was surveyed in 2004, and no pollution sources were identified in the area. The survey was conducted to check for pollution sources in the immediate area of the mussel raft because the raft is located just outside of a closure along the shore in this area. Mussels from the raft were sampled and tested for the presence of fecal coliform bacteria. All of the samples received clean scores. Details on the mussel raft are shown below. To view additional information on this and other aquaculture sites, go to the DMR aquaculture website at:

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

Mussel Raft Site off of Northport Shore:

PEN BB
Original Date: 6/2/2004 Effective Date: 6/2/2004 Expiration Date: 6/1/2014
NOAA Chart: 13302
Description: Belfast Bay Penobscot Bay Northport Waldo County
Acreage: 6
Species Cultivated: mussel blue sea (*Mytilus edulis*)
Cultivation Technique(s): Suspended
Bayside Mussel Farm

Recommendation for Future Work

Wales Beach
For the 2011 season, there will be follow up on the remediation of a known failing septic system. Once corrected, this area may be reclassified, pending water quality meeting the approved standard.

Long Cove

More data will be collected at the two stream sites at the head of Long Cove, with a focus on rainfall events to assess the bacteria levels being transported into the cove.

Station WW72 is located on the southwest edge of the Sears Island causeway. This is a popular area for outdoor activities, especially dog walking. The Searsport Shellfish Commission has provided receptacles for dog waste and a PortaPotty at the end of the Sears Island Causeway since 2007 in an effort to improve water quality in the area. The current data shows some variability, though this is likely due to older data, before the waste receptacles were in place. This station is proposed for accelerated sampling to assess any improved water quality.

Stockton Harbor
WW78, located in Stockton Harbor, is also a popular recreation area. The sampling station is at a small beach in a residential area. It is popular for dog walkers as well. To the northwest of the station, there is a stream that enters the cove. This should be sampled and flow data taken to assess the impact on the cove.

References

Pierce, Fran, 2011. *Growing Area WW 2009 Sanitary Survey Report*. Department of Marine Resources, W. Boothbay Harbor, ME. pp. 16-17

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.