GROWING AREA WH – Spurwink River

Towns of Scarborough and Cape Elizabeth

TRIENNIAL REVIEW for 2007

Final Report Date: January 8, 2009

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APPROVAL

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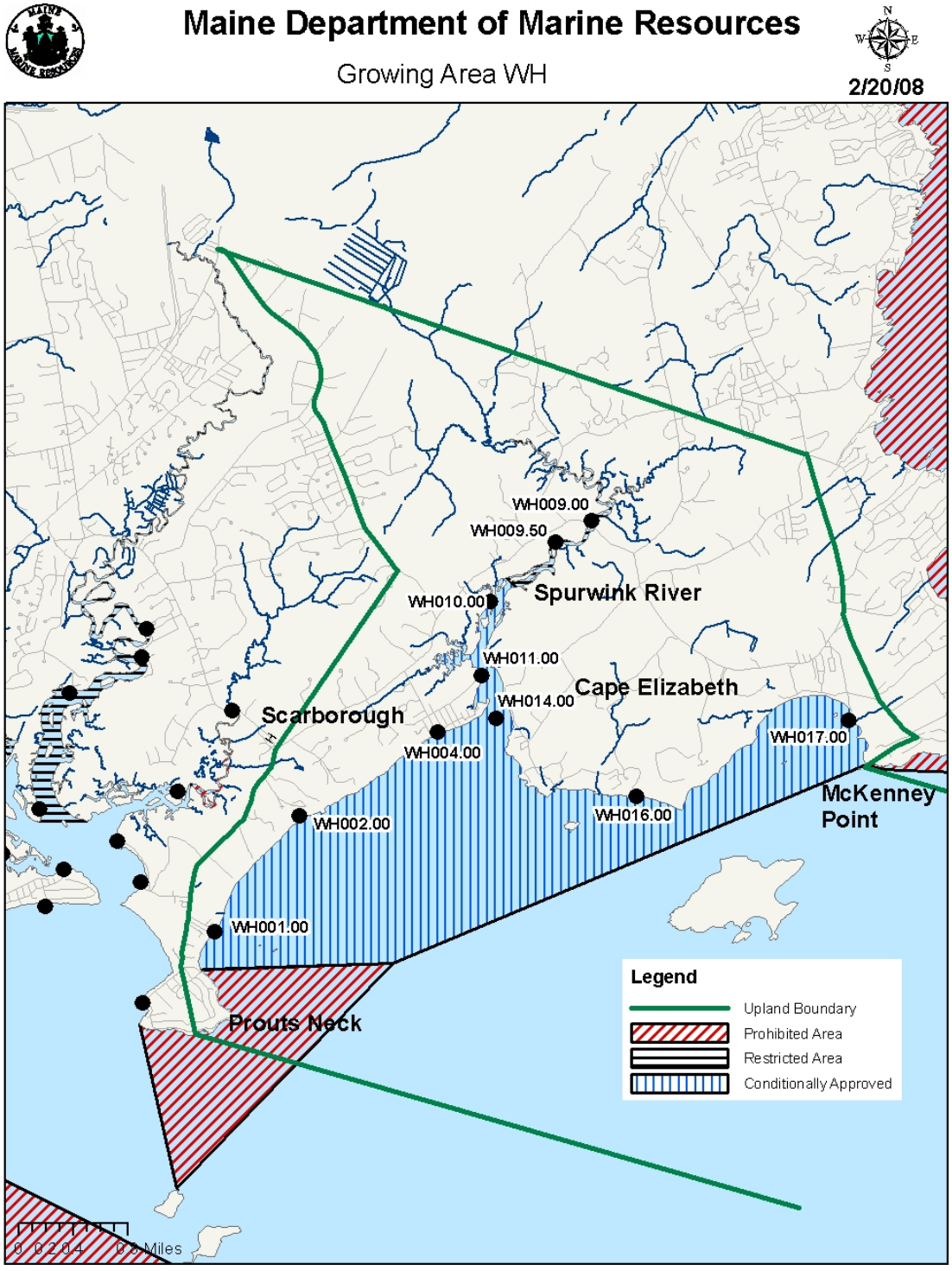


Executive Summary

This is a triennial report written in compliance with the requirements of the 2005 Model Ordinance and the National Shellfish Sanitation Program. The next sanitary survey report will be completed in 2011.

Growing Area WH is located between Prouts Neck, Scarborough and McKenney Point, Cape Elizabeth. (Figure 1). A complete description can be found in the central files. The growing area has long stretches of public sandy beaches, an island preserve (Richmond Island) that is accessible on foot at low tide, and a stretch of tidal river (Spurwink River) which is less than 5 miles long and a border between Scarborough and Cape Elizabeth. The beaches include Scarborough Beach and Higgins Beach in the town of Scarborough, and Crescent Beach in Cape Elizabeth.

The Scarborough Sanitary District outfall is located 800 feet from the southeast end of Prouts Neck. Non-point pollution comes from the increase in shore usage during the summer months and from wildlife in the tidal marshland at the head of the Spurwink River. The Spurwink River has no significant fresh water source and is sandy and shallow. There are two mooring fields located in Cape Elizabeth between Crescent Beach and Kettle Cove.

There were no classification changes in 2007 and no stations were created or deactivated. During the 2006 FDA PEER Review it was noted that for the past five years WH had been sampled primarily during the months when the Spurwink River conditional area was in the open status, December through May. Due to the lack of data from June through November, the seasonal conditional area was expanded to include the Scarborough and Cape Elizabeth beaches. All stations are now collected on a systematic random sample schedule throughout the year, but there are still few samples covering the period from June through October. Based on the current WH review, one classification change is required. A review of the Scarborough Sanitary District outfall prohibited area was completed and the prohibited area size must be increased from 825 acres to 1,166 acres in order to adequately protect public health.

Current Classification(s)

Shellfish growing area WH currently has areas classified as:

Conditionally Approved: (seasonal variation in water quality with limited summer data)
Scarborough Beach, Higgins Beach and Spurwink River, Scarborough (6 stations: WH 1, 2, 4, 10, 11, and 14)
Crescent Beach, Cape Elizabeth (2 stations: WH 16 and 17)
Restricted: (non-point pollution from expansive marshland)
Spurwink River, Scarborough (2 stations: WH 9 and 9.5)
Prohibited: (Scarborough Sanitary District outfall)
Prouts Neck, Scarborough (no sample stations)

The prohibited area encompasses a portion of growing area WG, as well as WH.

Please visit the DMR website to view Legal Notice:

DMR Regulation 95.03H, Area No. 12. Spurwink River, Prouts Neck, Cape Elizabeth (Saco, Scarborough and Cape Elizabeth)

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

Classification Changes during Review Period (2005-2007)

Activity in 2005

July 28, 2005, Area No. 12 was amended to increase the size of the wastewater treatment plant outfall prohibited area.

Activity in 2006

June 5, 2006, Area No. 13 was amended to reclassify the upper Spurwink River from prohibited to restricted.

August 10, 2006, Area No. 13 was amended to change the conditionally approved area which is closed from June 1 to November 30. It expanded the conditionally approved area to include Scarborough Beach and Crescent Beach (Cape Elizabeth).

Area No. 12 was amended on November 14, 2006 to administratively combine the areas previously described in Area No. 12 and 13 with a new rule which includes the area from Prouts Neck, Scarborough to McKenney Point, Cape Elizabeth. There were no classification changes in the rule amendment.

Activity in 2007

There were no classification changes in 2007.

Current Management Plan for Conditional Areas

There is one management plan for the conditional area in WH, which covers most of the growing area. The conditional area is closed to harvesting between June 1st and December 1st per the management plan. Prior to each year's reopening, a review of data must be completed to ensure that water quality meets the approved standard in the open status. A copy of the management plan can be found in the central files.

Current Annual Review of Management Plan

Per the management plan, a review of the seasonal data was completed in November 2007 to confirm that all conditional stations continued to meet the appropriate standard as defined in the DMR Shellfish Area Growing Area Classification SOP. All stations met the appropriate standard and the area reopened as defined. The complete annual review can be found in Appendix A.

Water Quality Review and Discussion

Table 1 lists all active restricted area stations in Growing Area WH, with their respective Geomean and P90 calculations for 2007. Please refer to Appendix B for a key to interpreting the headers on the columns of Tables 1 and 3. The approved and restricted standards for each station are also displayed in Table 2. 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 verses 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 Appendix C.

The two restricted stations, WH 9 and WH 9.5 met restricted standards at the end of 2007. Due to the lack of data from June through November, the seasonal conditional area was expanded to include the Scarborough and Cape Elizabeth beaches. All stations are now collected on a systematic random sample schedule throughout the year. There are few data points for all stations during the closed status due to scheduling from 2002 through 2007, few or no water samples were collected during the months of June, July, August, September and October. Table 2 shows the breakdown of samples by month and by year at Station WH 10. The 30 most recent data points have a disproportionately lower number of data points collected during the seasonally closed status, therefore, a P90 calculation using year-round data is not appropriate at this time. As of 2007, the conditional area is being sampled year-round and more closed status samples will be collected each year. All conditionally approved stations met the approved standard during the open status of December 1 through May 31 (Table 3).

Table 1. Geomean and P90 Scores, Year Round Data Analysis for Growing Area WH

STATION	CLASS	CNT	MFCNT	GM	SDV	MAX	P90	APPD_STD	RESTR_STD
WH009.00	R	30	9	14.9	0.63	240	95.3	43	250
WH009.50	R	30	9	15.8	0.67	460	112.3	43	250

Table 2. Sample Collection Counts by Month, Station WH 10, 2002-2007

Month	2002	2003	2004	2005	2006	2007	Monthly Grand Total
January	1		1	1	1	1	5
February	1	1	1	1	1	1	6
March	1	1	1	1	1	1	6
April	1	1	1		1	1	5
May		1	1	1	1	1	5
July						1	1
August	1				1	1	3
September					1	1	2
October	1						1
November	1	1	1	1	2	1	7
December	1	1	1	2	1	1	7
Grand Total by Year	**8**	**6**	**7**	**7**	**10**	**10**	**48**

Table 3. Geomean and P90 Scores, Open Status Data Analysis for Conditional Areas

STATION	CLASS	CNT	MFCNT	GM	SDV	MAX	P90	APPD_STD	RESTR_STD
WH001.00	CA	30	7	2.9	0.18	15	5.0	44	260
WH002.00	CA	30	7	3.4	0.21	23	6.2	44	260
WH004.00	CA	30	7	3.5	0.21	9.1	6.5	44	260
WH010.00	CA	30	7	5.8	0.60	240	33.8	44	260
WH011.00	CA	30	7	4.3	0.42	93	14.7	44	260
WH014.00	CA	30	7	3.5	0.34	43	9.4	44	260
WH016.00	CA	30	6	3.1	0.21	23	5.9	45	266
WH017.00	CA	30	7	4.2	0.37	93	12.7	44	260

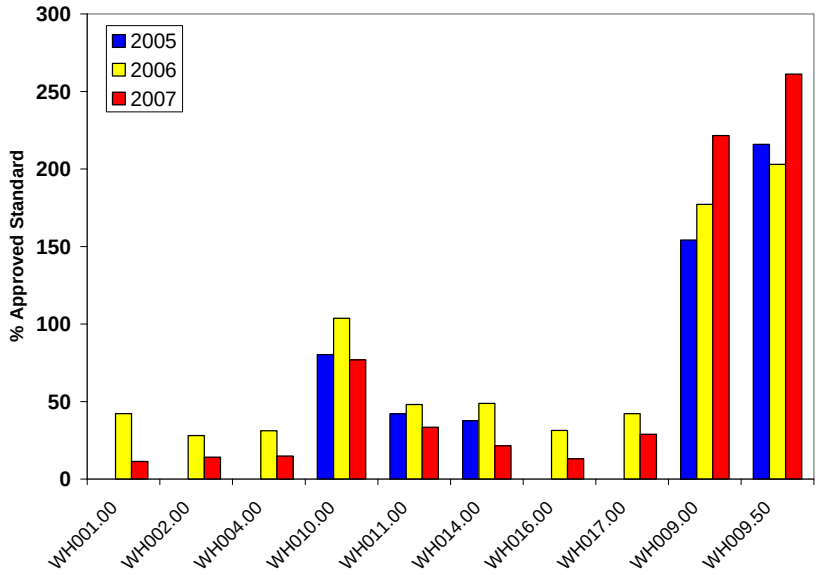
All active restricted stations in WH were sampled at least 6 times in 2007 following the systematic random sampling schedule (Table 4 and Appendix D). Stations that were classified conditionally approved at the beginning of the year were sampled 6 times in the open status, except station WH 16, which was only sampled 5 times, due to site inaccessibility in December (snow block).

Table 4. Sample Counts for Stations in Growing Area WH

Strategy		Adverse	Extra	Random			
Station	CL	Closed	Closed	Closed	Open	Total	Comments
WH001.00	CA		1	3	6	10	
WH002.00	CA		1	3	6	10	
WH004.00	CA	6	1	3	6	16	Flood Station
WH009.00	R				6	6	
WH009.50	R				6	6	
WH010.00	CA		1	3	6	10	
WH011.00	CA		1	3	6	10	
WH014.00	CA		1	3	6	10	
WH016.00	CA			3	5	8	No Access in December
WH017.00	CA			3	6	9	

The trends in P90 scores over the past three years are shown in Figure 2. During the transition from MPN to MF data points, each year the approved standard will be lower than the previous year until all samples have been analyzed by the MF method. In order to show the trends of the P90 value over the years, the calculated P90s are expressed as a percentage of the approved standard. Stations that show the 2007 column at or above the 100 percent line no longer meet approved standards. All conditionally approved stations have shown improvement in water quality over the 2007 review period, in comparison to the scores at the end of 2006 review period. The P90 trends for the conditional area stations (WH 1 - 7) are for the time period when the area was in the open status. Restricted stations WH 9 and 9.5 have shown an increase in their scores, however both stations are well below the NSSP restricted standard.

Figure 2. P90 Trends for 2005-2007



Pollution Source Assessment

Evaluation of New Pollution Sources

During the current review period, no new pollution sources were documented in growing area WH. Most of the shoreline in WH has been developed for many years and construction projects are typically renovations of existing properties. New development in growing area WH tends to occur beyond 500 feet from the shore. Development on the west side of the river has been sparse, though the number of new homes has increased in recent years.

Re-Evaluation of Existing Pollution Sources

Scarborough Wastewater Treatment Plant/Scarborough Sanitary District

The Scarborough Sanitary District provides wastewater collection and treatment services to over 4500 customers that are connected to the District's collection system, and another 400 customers that utilize the Sanitary District's wastewater treatment facility each year to discharge septic tank waste. The District owns approximately 68.1 miles of gravity sewer lines and 22.4 miles of force mains, 2,006 manholes, 23 pump stations, and a 2.5 million gallon per day wastewater treatment facility. There is approximately 6.1 miles of private gravity sewer lines and 6.6 miles of private force mains connected to the District's system. There are no combined sewer overflows in the system. The plant was last reviewed on March 14, 2008. This plant is a secondary treatment plant that has no bypass capability. Since the last review period, the current design flow has increased from 1.8 to 2.5 million gallons per day (MGD), with an average daily flow of 1.3 MGD and peak wet weather flow of 2.6 MGD.

Sanitary wastewater generated in Scarborough is conveyed via a sewer collection system and 23 pump stations to the headworks building where coarse screening of influent occurs followed

by a 20,000 gallon aerated grit chamber. After the headworks building, wastewater flows by gravity to two 50-foot diameter, 132,000 gallon primary clarifiers, followed by nine fine bubble membrane diffused aeration tanks with a total volume of 0.938 million gallons. Wastewater then flows by gravity to three 55-foot diameter, 213,000 gallon secondary clarifiers. The effluent pumping station has three pumps each with a capacity of 2,750 gallons per minute. Sodium hypochlorite is added in the twenty-inch diameter, 9,400 foot long effluent discharge pipe, which provides the chlorine contact time necessary for disinfection. Treated effluent is discharged 800 feet offshore on the south end of Prout's Neck, 40 feet below mean low water. The outfall equipment consists of a 16-inch diameter; 360 foot long 'T' shaped diffuser header with thirty-four, 3-inch diffuser ports located 10 feet on center.

A review of the prohibited area size calculation for 2007, using the NSSP approved dilution calculation was completed as part of the current triennial review. Using a fecal concentration of 140,000 fc/100ml, an average flow rate of 1.52 MGD, and the depth of receiving water of 40ft, the dilution calculation requires a 1,166 acre prohibited area surrounding the outfall. The current prohibited area is 825 acres, and must be increase to the appropriate size to protect public health.

Sanitary District Activity in 2005

The wastewater treatment facility processed an average daily flow of 1.69 MGD (million gallons per day) in 2005 compared to 1.58 MGD in 2004 (up 6.9%) and 1.42 MGD in 2003. There were some minor violations of the license, due to high flows and construction activities, which were addressed and corrected (Scarborough Sanitary District, 2006).

The upgrades completed in 2005 involved two new pump stations, renovation of the headworks building, a new grit chamber, three new aeration tanks, renovation of the blower building, one new secondary clarifier, additional sludge storage capacity, and renovation of the sludge processing building. The existing primary clarifiers, aeration tanks, secondary clarifiers and aerated sludge holding tanks were refurbished (US EPA 2004).

DEP conducted an inspection of the facility on April 5, 2005. There were no formal enforcement actions taken (US EPA, 2008).

Sanitary District Activity in 2006

The wastewater treatment facility processed an average daily flow of 1.52 MGD (million gallons per day) in 2006, compared to 1.69 MGD in 2005 (down 10 %). The decrease in flow was a result of replacing some older lines during the Haigis Parkway project and the district staff aggressively pursuing infiltration and inflow (I&I) (Scarborough Sanitary District, 2007).

DEP conducted an inspection of the facility on March 14, 2006. There were no formal enforcement actions taken (US EPA 2008). There was one compliance schedule violation for not submitting discharge monitoring reports in February 2006; these reports were submitted in March 2006.

Sanitary District Activity in 2007

DEP conducted an inspection of the facility on November 29, 2007 (Scarborough Sanitary District, 2008). There were no formal enforcement actions taken. There were no compliance schedule violations (US EPA 2008).

Marinas/Boat Activity

There are no marinas in growing area WH, but there are 43 moorings located between Crescent Beach and Kettle Cove, Cape Elizabeth (Figure 2). There are no dock and no marina facilities on site. Most of the moorings are used by local residents, and many of the moored boats are small fishing boats (14' – 19'). The Cape Elizabeth harbormaster confirmed the presence of up to ten boats with heads in the summer (21 boats in the 20'-40' range), but that none of such boats had overnight use.

Figure 3. Mooring Fields Growing Area WH

Industrial Discharges

There are no industrial discharges in Growing Area WH.

Agricultural Activities

There are two large agricultural farms and one large animal (horses/cows) farm in growing area WH. Jordan's Farm is located on 120 rolling acres, overlooking the Spurwink River in Cape Elizabeth, Maine (http://www.jordansfarm.com/). Maxwell's Farm is a strawberry farm in Cape Elizabeth on the Spurwink River (http://www.maxwellsfarm.com/strawberries.html). 2007 has brought a number of changes to Maxwell's Inc, including the closing of Maxwell's Farm Market. Maxwell's Inc. will continue to grow "Pick Your Own Strawberries " and will wholesale a variety of vegetables. The farms may use manure on the hay fields for fertilizer. The farms are in the drainage area and may contribute to non-point source pollution from storm water runoff. Additional work in the area to determine if the farms are having an effect on WH is needed prior to the next triennial review or sanitary survey report.

Figure 4. Maxwell's Farm in Growing Area WH

Photo courtesy of : http://www.maxwellsfarm.com/strawberry_pop/straw_a_view.html

Spurwink Farm, located on the lower east side of the Spurwink River, has 17 horses and a herd of belted Galloway cows which, though located more than 500 ft from the shore, may be contributing to the non-point pollution in the stream samples and the river directly, from overland runoff as the shore is very steep (>45° slope).

Domestic Animal and Wildlife Activity

The Town of Scarborough has an ordinance regarding dog presence on beaches (Town of Scarborough, 2004). The ordinance states that no dog shall be present on any beach between the hours of 9:00 a.m. and 5:00 p.m. from June 15th through September 15th. The remainder of the year, dogs are allowed on the beach. Furthermore, dog waste pick-up and disposal is required under the town ordinance, and applies to all town sidewalks, streets, beaches and public and private property, other than the property of the owner of the animal or of a person who has consented to the presence of the animal on his or her property. The ordinance requires dog owners to have plastic bags or other appropriate containers in their possession at all times that the animal is present on any property where waste pick-up is required.

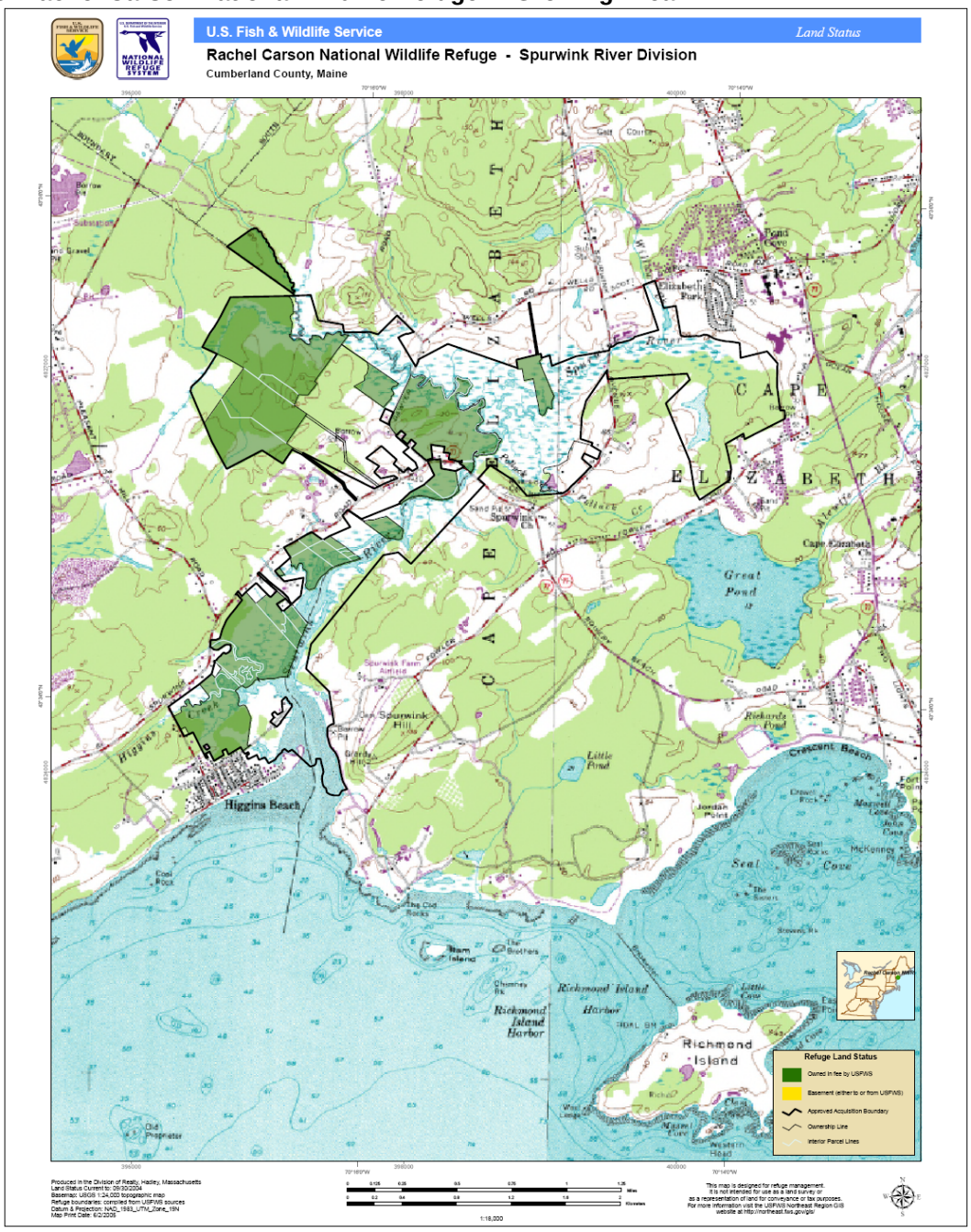
Horses are not allowed on the beaches within growing area WH, with one notable exception to this rule. Spurwink Farm allows 100 riders each fall to come and travel its carriage trails, hayfields and along the beach (Equest, 2007).

There is a large presence of waterfowl, wading birds and migratory bird species on the Spurwink River, which may have a significant effect on fecal pollution loading to the growing area. Most of the west shore of the Spurwink River is owned and managed by the U.S. Fish and Wildlife Service as the Rachel Carson National Wildlife Refuge land (Figure 3). This refuge was established in cooperation with the State of Maine in order to protect valuable salt marshes and estuaries for migratory birds. The Audobon Society (2008) reported that “the Spurwink River is a foraging site for a variety of wading birds, including Great Blue Herons, Great Egrets, Snowy Egrets and Glossy Ibises. The river and tidal flats are a key migration stopover for both shorebirds and a diverse array of waterfowl (including Mallards, American Black Ducks, Red-breasted Mergansers, Buffleheads, Common Goldeneyes) in the spring and fall, as well as a foraging area for Common and Least Terns that nest on nearby islands and beaches. In some winters, the uplands around the river attract Snowy Owls.”

Conservation Areas

The east side of the Spurwink River and its associated uplands lie within Cape Elizabeth’s Town Farm District, which is intended to recognize and protect the special nature of the area representing historic, cultural, scenic, natural, and open space qualities (Audubon Society, 2008). Threat from major development is therefore limited, at least on the Cape Elizabeth side of the river.

Figure 5. Rachel Carson National Wildlife Refuge in Growing Area WH



Non-Point Source Pollution (Streams)

Stream samples were collected on November 28, 2007, as part of the drive-through survey for the area. Table 5 shows the fecal coliform results of the stream samples. The flow rates for streams were estimated on the day of collection. Within four days of stream sample collection, there was a cumulative total of 1.02 inches of rain, leading to a moderate amount of runoff and heavy flows through road culverts.

The year 2007 was the first year that streams in growing area WH were sampled as part of the annual survey review and the results obtained from stream samples in 2007 are a preliminary baseline assessment. Only streams that were easily accessible and flowing on the day of the survey were sampled and were located on the west side of the Spurwink River (Figure 5). Results of those samples and rainfall which occurred the day of sampling and within 72 hours of the sample date are included in Table 5. Sample results show that elevated fecal scores on November 28, 2007 at stations WHA0138, WHA0149, WHA0151 and WHA0179 were found after 1.02" of rain within 72 hours of sample collection. Land use in the area is characterized as very low density residential, large tracts of undeveloped forest and pasture which is used for hay. Additional sampling must be done in the area to determine the loading on the Spurwink River. Based on the limited sampling at these stations, it is hard to make a determination on what the actual direct impact is on water quality in the Spurwink River.

Sample WHA0149 is impacted by non-point pollution from a field attracting wildlife. Sample WHA0151 is impacted by non-point pollution from small ponds located in the field. Runoff from the ponds and the field drain through two road culverts into a tidal channel by Station WH 10. Sample WHA0138 is impacted by non-point pollution from a small stream on the west side of road. The stream drains into a small cove between stations WH 10 and WH 11.

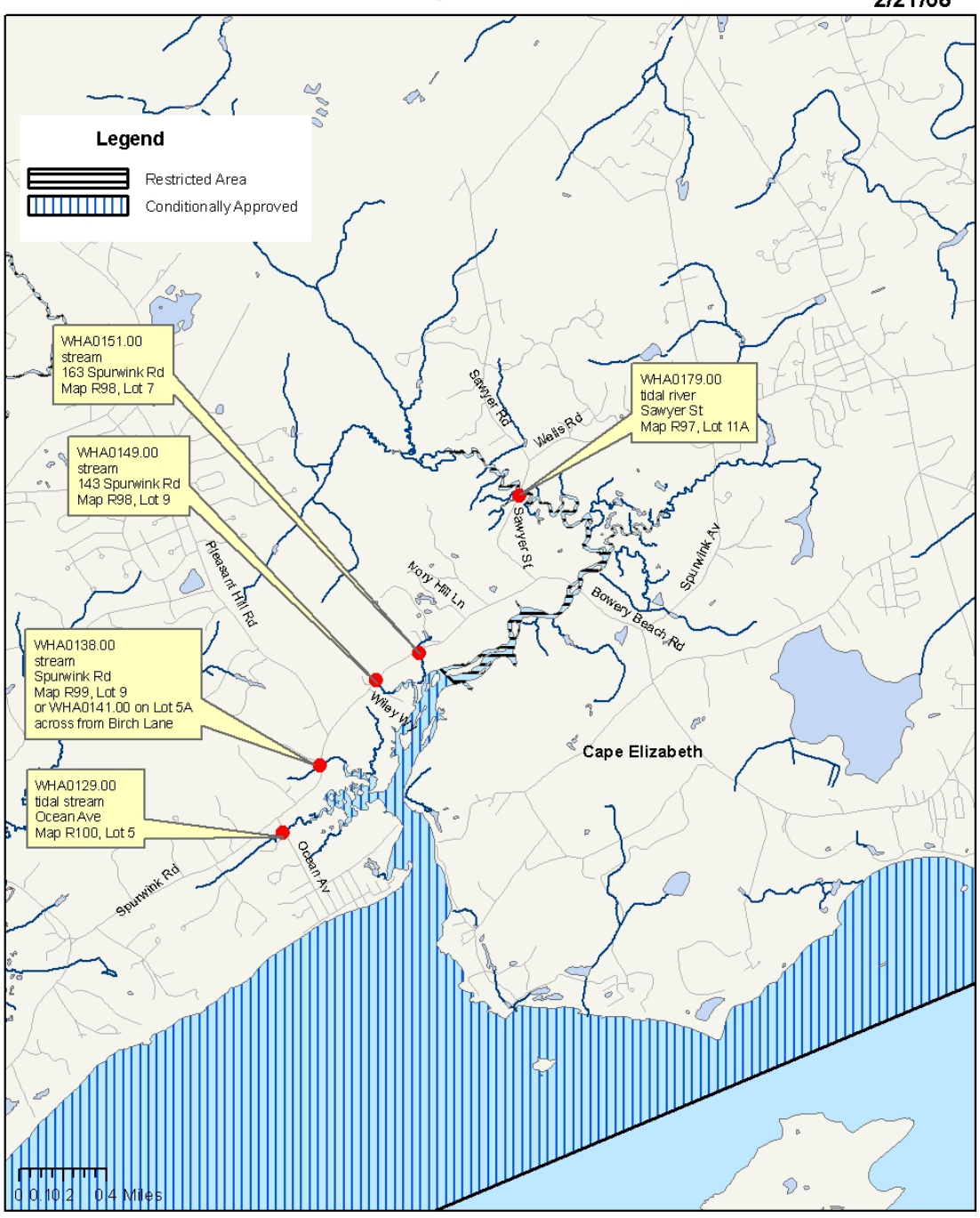
For the next triennial assessment, the three fresh water drainages will be sampled a minimum of four times, two during wet weather and two during normal weather conditions. Flow rates will also be assessed with each stream sample to calculate fecal coliform loading to the growing area.

Table 5. Spurwink River Stream Samples, Collected 11/28/07

Map #	Salinity ppt	Fecal Score CFU/100ml	Rain on Sample Day	Rain 24hours	Rain 48hours	Rain 72hours	Flow Rates
WHA0129	0	2	0”	0.35”	0.67”	0”	Tidal Creek – High Flood Tide
WHA0138	0	340					Heavy Flow thru Culvert
WHA0149	0	104					Heavy Flow thru Culvert
WHA0151	0	40					Heavy Flow thru Culvert
WHA0179	1	100					Head of Spurwink River-Tidal

Rain amounts provided by www.wunderground.com at :
http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KMESCARB1&day=25&year=2007&month=11

Figure 6. Stream Sampling Location, Growing Area WH



Meteorological/Hydrographical Information

A preliminary review of rainfall and sampling data showed that most of the stations in growing area WH had their highest scores on November 28, 2005 with only 0.041 inches of rain within 72 hours of sample collection. All other sampling scores at the beach stations were much lower and showed little to no variability. Stations WH 9 and 9.5, which are classified restricted due to non-point pollution, may be impacted by rainfall, as well as fresh water sources which drain into the headwaters of the Spurwink River. The highest scores at these two stations were associated with low salinities, ranging from 0 to 14 ppt. A comprehensive rainfall and salinity assessment will be done for the next sanitary survey report scheduled in 2011.

Shoreline Survey Activity

On the Scarborough shore in growing area WH, 109 properties were surveyed in 2003 and on the Cape Elizabeth shore in growing area WH, 60 properties were surveyed in 2002. The Higgins Beach area is connected to the Scarborough town sewer, but the rest of the properties have in-ground septic systems. No septic problems were found during the surveys. A drive through survey was done on November 28, 2007, when streams along the Spurwink River were sampled. No septic changes near the shoreline were observed; no new housing developments, businesses or drainage alterations were observed during the current review year.

Aquaculture/Wet Storage Activity

There are no active aquaculture lease sites or wet storage sites in shellfish growing area WH.

Classification Changes Required

Based on the updated NSSP dilution calculation, the prohibited area around the Scarborough Sanitary District outfall must be increased from 825 acres to 1,166 acres.

Summary

Water quality in growing area WH continues to support its current classifications under the NSSP. One classification change is required at this time. The prohibited area around the Scarborough Sanitary District outfall must be increased from 825 acres to 1,166 acres.
In the future, three fresh water streams need additional sampling and flow rates need to be documented to further assess the impact on the growing area.

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Appendix A. Annual Review of Management Plan-Spurwink River

2007 Annual Review
Spurwink River Conditional Area 12
Growing Area WH

Scope

A portion of Growing Area WH is conditionally approved due to seasonal variability of water quality, possibly due to an increase in shore usage during the summer months. The Spurwink River, monitored by stations WH 10.0, 11.0, and 14.0, was classified conditionally approved based on seasonal variation in water quality in 1998. DMR evaluated the Spurwink River data in December 1998, and made the assessment that there is greater variation in water quality during the summer months. Many of the homes along this shore are occupied year round, as well as nearby seasonal rental cottages. There are designated parking areas for summer residents, and there is an increase in shore usage during June, July and August. The area has met approved standards during open status from December 1st to May 31st.

The size of the area increased substantially in August 2006. The area monitored by stations WH 1.0, 2.0, 4.0, 16.0 and 17.0, located along the beaches in Scarborough and Cape Elizabeth was classified approved prior to August 10, 2006. This area was reclassified to conditionally approved due to lack of fecal coliform data from June 1st to November 30th. The lack of summer and fall seasonal data was the result of scheduling sample collection based on the open period of the conditionally approved area. This has lead to insufficient year round data at the approved stations within growing area WH. The entire area is now conditionally approved based on an open season of December 1 to May 31, and is being sampled year-round, during both the open and closed status.

Compliance with management plan

In 2007, the conditional area closed on June 1 and reopened on December 1. The conditional area data was reviewed in November 2007, prior to the reopening date and all of the conditional stations continued to meet approved standards during the open season.

Adequacy of reporting and cooperation of involved persons

This management plan does not require reporting. The seasonal closure is enforced the MDMR Marine Patrol and the local Shellfish Warden. Cooperation between the involved parties has been excellent.

Compliance with approved growing area criteria

The annual review of the water quality for all active stations met approved standards during the open status.

Field inspection of critical pollution sources

The potential for pollution in growing area WH comes from increased shore usage (swimming, walking pets, etc.) and the influx of summer residents to their seasonal homes. Visual observations are made throughout the year during the course of random sampling and shoreline surveying.

Water sampling compliance history

All stations were collected 6 times when in the open status, except Station WH 16 was only collected 5 times in the open status. Snow blocked access to the station in December 2007.

Analysis-Recommendations

Water quality scores at all conditionally approved stations met approved criteria during the open season (Table 1).

Table 1. Conditional Area Geomean and P90 Scores, Open Status

STATION	CLASS	CNT	MFCNT	GM	SDV	MAX	P90	APPD_STD	RESTR_STD
WH001.00	CA	30	7	2.9	0.18	15	5.0	44	260
WH002.00	CA	30	7	3.4	0.21	23	6.2	44	260
WH004.00	CA	30	7	3.5	0.21	9.1	6.5	44	260
WH010.00	CA	30	7	5.8	0.60	240	33.8	44	260
WH011.00	CA	30	7	4.3	0.42	93	14.7	44	260
WH014.00	CA	30	7	3.5	0.34	43	9.4	44	260
WH016.00	CA	30	6	3.1	0.21	23	5.9	45	266
WH017.00	CA	30	7	4.2	0.37	93	12.7	44	260

Appendix B. 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.

Appendix C. Transitioning to Membrane Filtration for Seawater and Pollution Source Samples

The Maine Department of Marine Resources has switched to a Membrane Filtration (MF) method for Fecal Coliforms using mTEC agar with a two hour resuscitation step. The geometric mean and the 90th percentile are calculated on 30 data points extending over a five year period. During the transition from MPN to MF, we will be accumulating MF data points. The statistical calculations will be a combination of MPN and MF data points.

During this transition the P90 standard for approved and restricted classification will migrate from the MPN standard to the MF standard. The FDA has determined that the best way to handle the data is to perform the calculations as always for the data set, but to compare the data set to a hybrid weighted 90th percentile. This hybrid standard is calculated by weighting the relative contributions of each method to the database. This will mean that as the number of MPN data points reduce and the number of MF data points increase the 90th percentile standard that the sample site is compared to will change over time. Once all 30 data points are analyzed using MF, the 90th percentile for approved classification will be 31 and for restricted (for depuration) will be 163. The geomean approved standard of 14 fecal coliforms per 100 ml and geomean restricted standard of 88 fecal coliforms per 100 ml will remain the same for both methods.

Reports that display 90th percentiles will show the number of data points derived from MF analysis and will show the appropriate 90th percentile standard for that MPN/MF combination for approved and restricted classifications. It must be remembered that this weighted standard is only used for data sets encompassing data from the two different test methods, MF and MPN (3 tube/3 dilution). If decisions are to be made on a single test result analyzed by the MF method or a multiple number of test results all exclusively analyzed by the MF method, the 90th percentile standard is 31 fecal coliforms per 100 ml.

This was the second year the water quality program documented, in the database, the inability to collect a sample based on the following parameters: if the tide stage was too low to collect the sample, there was a safety issue with collecting the sample, the location was inaccessible or “other” which was accompanied by a comment on the data sheet. Stations that were unable to be sampled due to any of these parameters show 999 in the salinity column and have no data recorded in any of the columns except the time which is recorded so the actual tide stage can be computed. Stations that were missed due to the above parameters were required to be made up to assure that each station would receive the required six samples during the sampling season.

Appendix D. Water Quality Data Collected in 2007

	Station	Date	Collector	Tide	Temp	Sal	Strat	ADV	Stat	CL	MFCOL	WIND
1		01/08/07	LL	F	6	32	R	P	O	CA	<2.0	NE
2		02/05/07	DEC	H	-3	32	R	-	O	CA	<2.0	-
3		03/05/07	FP	H	0	33	R	-	O	CA	<2.0	S
4		04/02/07	DAH	F	4	32	R	P	O	CA	<2.0	NE
5	WH001.00	05/22/07	DAH	LE	9	30	R	W	O	CA	<2.0	S
6		07/18/07	DEC	LE	16	30	R	P	C	CA	<2.0	CL
7		09/10/07	DAH	F	4	30	R	-	C	CA	2	-
8		11/19/07	DAH	LE	10	32	R	-	C	CA	<2.0	W
9		12/19/07	EXT	L	2	30	R	-	O	CA	<2.0	CL
1		01/08/07	LL	F	6	32	R	P	O	CA	4	NE
2		02/05/07	DEC	H	-3	32	R	-	O	CA	<2.0	-
3		03/05/07	FP	H	0	32	R	-	O	CA	<2.0	S
4		04/02/07	DAH	F	4	32	R	P	O	CA	<2.0	NE
5	WH002.00	05/22/07	DAH	L	9	30	R	-	O	CA	<2.0	CL
6		07/18/07	DEC	L	16	30	R	P	C	CA	4	CL
7		09/10/07	DAH	HF	4	30	R	-	C	CA	4	-
8		11/19/07	DAH	LE	10	32	R	-	C	CA	<2.0	W
9		12/19/07	EXT	L	1	31	R	-	O	CA	6	CL
1		01/08/07	LL	F	6	32	R	P	O	CA	<2.0	NE
2		02/05/07	DEC	H	-3	32	R	-	O	CA	<2.0	-
3		03/05/07	FP	HE	0	33	R	-	O	CA	2	S
4		04/02/07	DAH	F	4	30	R	P	O	CA	2	NE
5	WH004.00	05/22/07	DAH	L	8	30	R	W	O	CA	8	S
6		07/18/07	DEC	L	17	28	R	P	C	CA	8	CL
7		09/10/07	DAH	HF	4	30	R	-	C	CA	4	-
8		11/19/07	DAH	LE	10	32	R	-	C	CA	<2.0	W
9		12/19/07	EXT	LE	1	30	R	-	O	CA	8	CL
1		04/02/07	DAH	HF	5	30	R	P	O	R	<2.0	NE
2		05/03/07	LL	F	10	1	R	-	O	R	25	NW
3	WH009.00	05/30/07	DAH	F	15	15	R	-	O	R	18	CL
4		07/18/07	DEC	L	17	8	R	P	O	R	120	CL
5		09/10/07	DAH	HF	4	30	R	-	O	R	2	-
6		11/19/07	DAH	F	13	2	R	-	O	R	22	-
1		04/02/07	DAH	HF	4	20	R	PW	O	R	6	NE
2		05/03/07	LL	F	10	2	R	-	O	R	34	NW
3	WH009.50	05/30/07	DAH	F	13	25	R	-	O	R	11	CL
4		07/18/07	DEC	L	17	8	R	P	O	R	200	CL
5		09/10/07	DAH	HF	4	30	R	-	O	R	6	-
6		11/19/07	DAH	F	13	4	R	W	O	R	11	-

	Station	Date	Collector	Tide	Temp	Sal	Strat	ADV	Stat	CL	MFCOL	WIND
1		01/08/07	LL	F	6	20	R	P	O	CA	5.5	NE
2		02/05/07	DEC	HE	-4	32	R	-	O	CA	<2.0	-
3		03/05/07	FP	HE	1	33	R	W	O	CA	<2.0	S
4		04/02/07	DAH	HF	4	30	R	PW	O	CA	<2.0	NE
5	WH010.00	05/30/07	DAH	F	12	29	R	W	O	CA	<2.0	CL
6		07/18/07	DEC	LF	17	26	R	P	C	CA	20	CL
7		09/10/07	DAH	HF	4	30	R	W	C	CA	9.1	-
8		11/19/07	DAH	F	13	26	R	W	C	CA	16	-
9		12/19/07	EXT	E	-2	28	R	-	O	CA	<2.0	CL
1		01/08/07	LL	F	6	32	R	P	O	CA	4	NE
2		02/05/07	DEC	HE	-4	32	R	-	O	CA	<2.0	-
3		03/05/07	FP	HE	1	32	R	-	O	CA	<2.0	S
4		04/02/07	DAH	HF	4	32	R	P	O	CA	<2.0	NE
5	WH011.00	05/30/07	DAH	F	12	30	R	-	O	CA	4	CL
6		07/18/07	DEC	LF	17	26	R	P	C	CA	16	CL
7		09/10/07	DAH	HF	4	30	R	W	C	CA	4	-
8		11/19/07	DAH	F	15	29	R	W	C	CA	48	-
9		12/19/07	EXT	E	0	30	R	-	O	CA	2	CL
1		01/08/07	LL	F	6	30	R	P	O	CA	<2.0	NE
2		02/05/07	DEC	HE	-3	32	R	-	O	CA	<2.0	-
3		03/05/07	FP	HE	1	33	R	-	O	CA	1.6	S
4		04/02/07	DAH	F	4	30	R	P	O	CA	<2.0	NE
5	WH014.00	05/30/07	DAH	F	12	30	R	W	O	CA	2	W
6		07/18/07	DEC	LF	16	28	R	P	C	CA	9.1	CL
7		09/10/07	DAH	HF	4	31	R	W	C	CA	4	-
8		11/19/07	DAH	F	15	32	R	W	C	CA	<2.0	-
9		12/19/07	EXT	E	0	30	R	-	O	CA	<2.0	NW
1		01/08/07	LL	F	6	32	R	P	O	CA	2	NE
2		02/05/07	DEC	HE	-3	32	R	-	O	CA	<2.0	-
3		03/05/07	FP	E	1	32	R	-	O	CA	<2.0	S
4		04/02/07	DAH	HF	4	30	R	PW	O	CA	<2.0	NE
5	WH016.00	05/22/07	DAH	L	9	30	R	-	O	CA	<2.0	S
6		07/18/07	DEC	L	16	28	R	P	C	CA	4	CL
7		09/10/07	DAH	HF	4	30	R	W	C	CA	<2.0	-
8		11/19/07	DAH	L	10	32	R	-	C	CA	<2.0	-
		12/19/07									Missed	
1	WH017.00	01/08/07	LL	F	6	32	R	P	O	CA	4	NE
2		02/05/07	DEC	HE	-3	32	R	-	O	CA	<2.0	-
3		03/05/07	FP	E	1	32	R	-	O	CA	<2.0	S
4		04/02/07	DAH	H	4	32	R	P	O	CA	<2.0	NE
5		05/22/07	DAH	L	9	30	R	BW	O	CA	4	S
6		07/18/07	DEC	L	16	28	R	P	C	CA	6	CL

	Station	Date	Collector	Tide	Temp	Sal	Strat	ADV	Stat	CL	MFCOL	WIND
7		09/10/07	DAH	H	4	31	R	BW	C	CA	<2.0	-
8		11/19/07	DAH	L	10	32	R	-	C	CA	<2.0	-
9		12/19/07	EXT	LE	2	31	R	-	O	CA	<2.0	CL