GROWING AREA WA
Towns of South Berwick, Eliot and Kittery

ANNUAL REVIEW for 2007

Final Report Date: 7/17/08

LAURA LIVINGSTON

APPROVAL

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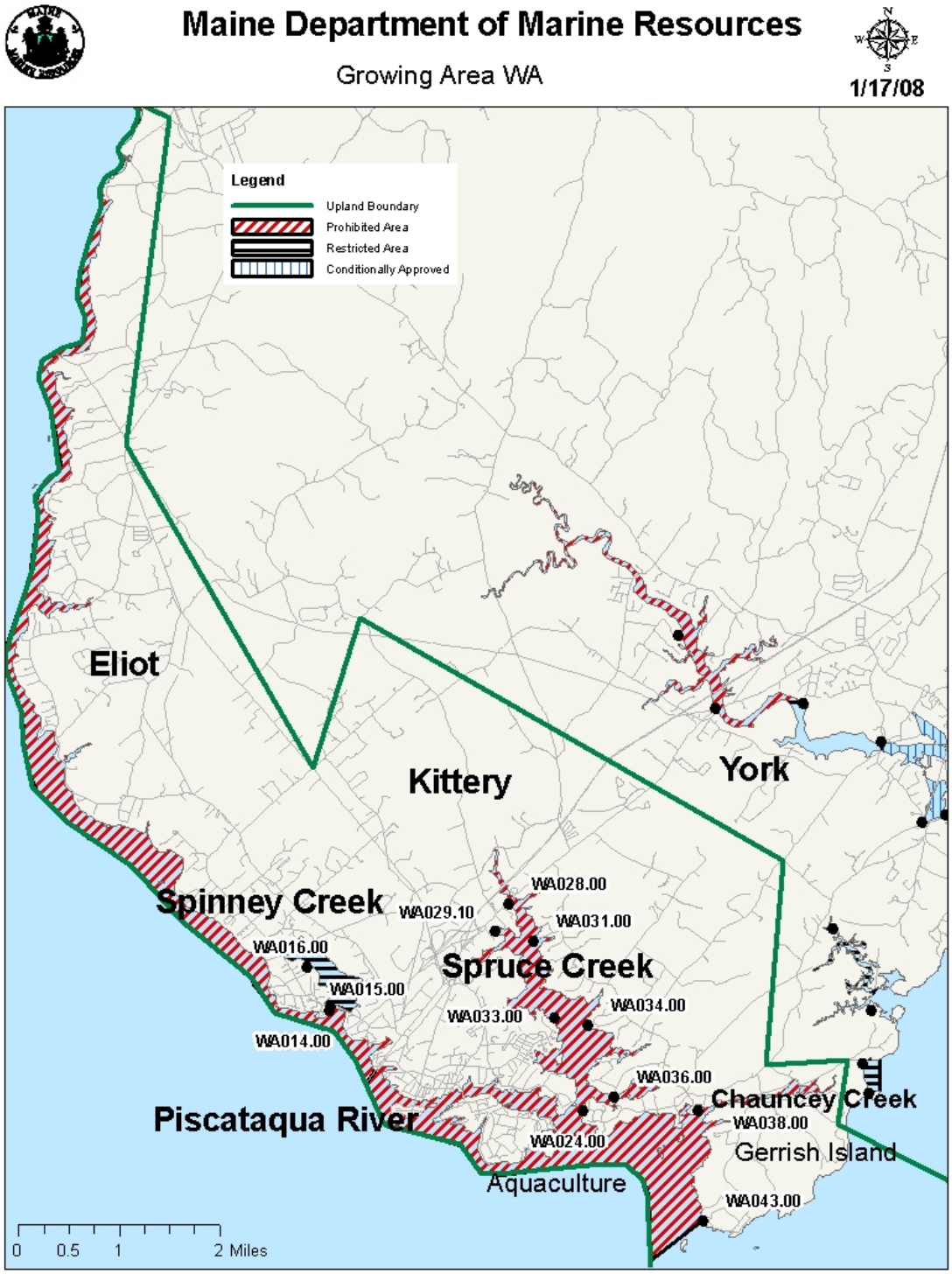
Table of Contents

List of Tables

List of Figures

Figure 1. Growing Area WA with Sampling Stations



Executive Summary

This is an annual report written in compliance with the requirements of the 2005 Model Ordinance and the National Shellfish Sanitation Program. The next triennial review will be written in 2008 and the next sanitary survey report will be written in 2009.

Growing area WA is located between the Piscataqua River, at the Maine/New Hampshire border, and Sisters Point, Kittery. The area also includes the Isle of Shoals. A complete boundary description can be found in the central files. On 4/20/07, the upper portion of Spruce Creek, which was classified restricted, was closed to do a sewage bypass. This area did not reopen because the shoreline needs to be resurveyed. It was reclassified as prohibited on 2/1/08. The lower portion of Spruce Creek was reclassified from conditionally approved to prohibited in 2005, because of continuous elevated fecal scores in clam samples and stream samples. It remains prohibited because of unremediated point sources and elevated fecal coliforms in stream samples that feed into Spruce Creek requiring further investigation.

Station WA 29.1 was reactivated in 2007 to continue monitoring water quality from Chickering Creek, and no stations were deactivated. No overboard discharges were removed in 2007, and no classification changes are required at this time.

Current Classification(s)

Shellfish growing area WA has areas classified as:
Approved:
Gerrish Island, Kittery (1 station)
Restricted:
Spinney Creek, Elliot and Kittery (2 stations) (Non-point Pollution)
Prohibited:
Spruce Creek, Kittery (6 Stations) (Outdated Shoreline Survey/Non-point Pollution)
Piscataqua River, Kittery, Elliot and South Berwick (3 stations) (WWTP outfalls)

Please visit the DMR website to view legal notices:

DMR Regulation 95.10A, Closed Area No. 1, Piscataqua River, Kittery, Eliot, South Berwick and DMR Regulation 95.10H, Closed Area No. 1-B, Jaffrey Point, NH. to Brave Boat Harbor, York.

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

Current Management Plan(s)

There are no conditional areas in Growing Area WA.

Water Quality Review and Discussion

Table 1 lists all active stations in Growing Area WA, with their respective Geomean and P90 calculations for 2007. Please refer to Appendix A 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 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 B. In 2007, the one approved station met the approved standard and the restricted stations met the restricted standards.

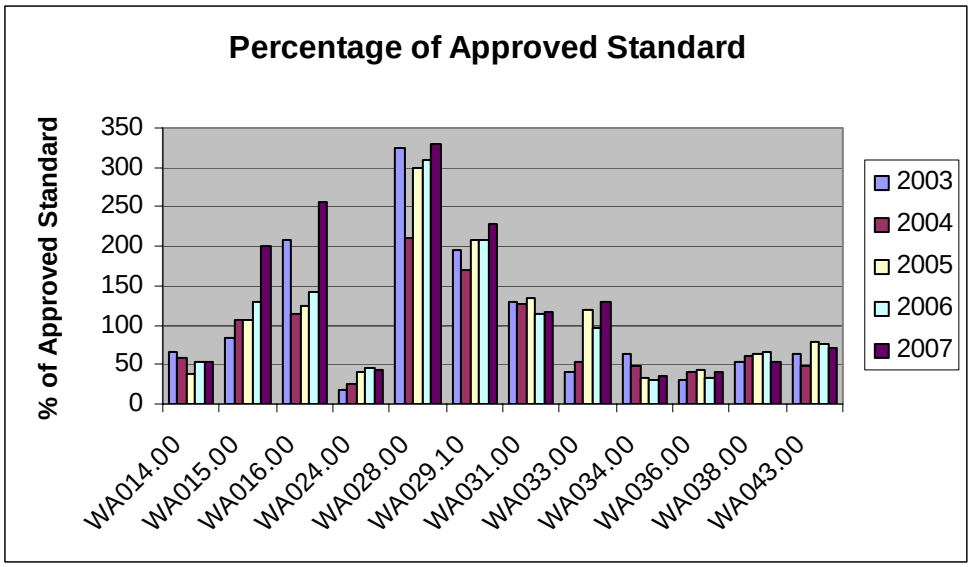
Table 1. Geomean and P90 Scores for Growing Area WA

STATION	CLASS	CNT	MFCNT	GM	SDV	MAX	P90	APPD_STD	RESTR_STD
WA014.00	P	30	8	6.3	0.44	93	23.1	43	255
WA015.00	R	30	8	9.8	0.74	460	85.8	43	255
WA016.00	R	30	8	11.2	0.78	1100	110.4	43	255
WA024.00	P	30	8	5.5	0.42	93	19.0	43	255
WA028.00	R	30	8	18.4	0.69	460	142.1	43	255
WA029.10	R	30	6	18.0	0.59	460	102.5	45	266
WA031.00	R	30	8	10.0	0.55	180	50.4	43	255
WA033.00	P	30	8	9.6	0.60	460	55.6	43	255
WA034.00	P	30	8	4.8	0.38	46	14.8	43	255
WA036.00	P	30	8	5.4	0.39	43	17.0	43	255
WA038.00	P	30	8	6.3	0.43	93	22.4	43	255
WA043.00	A	30	8	6.6	0.52	93	30.4	43	255

Approved and restricted stations that were active at the beginning of the year were sampled six times in 2007, following the systematic random sampling schedule (Appendix C). Stations WA 28, 29.1 and 31 were closed on 4/20/07 due to a sewage bypass and did not re-open due to an outdated survey; these stations were only sampled 2, 1 and 2 times, respectively, when in the open status.

Figure 3 shows the P90 scores as a percentage of the approved standard for each year's data set. DMR has switched from MPN fecal coliform test method to a membrane filtration (MF) fecal coliform test method. The precision of the MF method far exceeds that of MPN with a resulting lower P90 approved standard (MPN P90 49 verses MF P90 31). 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 trend of the P90 over the years, the calculated P90s are expressed as a percentage of the approved standard. Stations with 2007 scores at or above 100 percent are not meeting the approved standard. The chart shows an increase in scores in the Spinney Creek stations WA 15 and 16. This area is classified as restricted due to non-point pollution; the upward trend in fecal coliform scores is indicating that pollution loading to the site is increasing. Station WA 33, located at Spruce Creek, has also undergone an increase in fecal coliform loading over the past 3 years, and no longer meets the approved standard. This station was created to monitor water quality in the low tide channel in the middle of the Creek. The trend suggests that fecal pollution from the north end of the creek is coming down the channel and impacting the south end of the creek.

Figure 2. P90 Scores as Percentage of Approved Standard, 2003-2007



Shoreline Survey Activity

Spinney Creek was surveyed in 1997, the north end of Spruce Creek was surveyed in 1996 and the south end Spruce Creek was surveyed in 2002 and 2005. Gerrish Island was surveyed in 1998. A drive through survey was conducted on 11/7/07, at which time streams in the Spruce Creek and Spinney Creek areas were sampled. One new business was being constructed on Route 1 near Chickering Creek; otherwise no changes in drainage alterations or additional pollution sources were identified. Septic problems that were identified in the 2006 annual review have not yet been remediated. The MDEP and the Code Enforcement Officer were notified of the problems, but remediation progress has been slow.

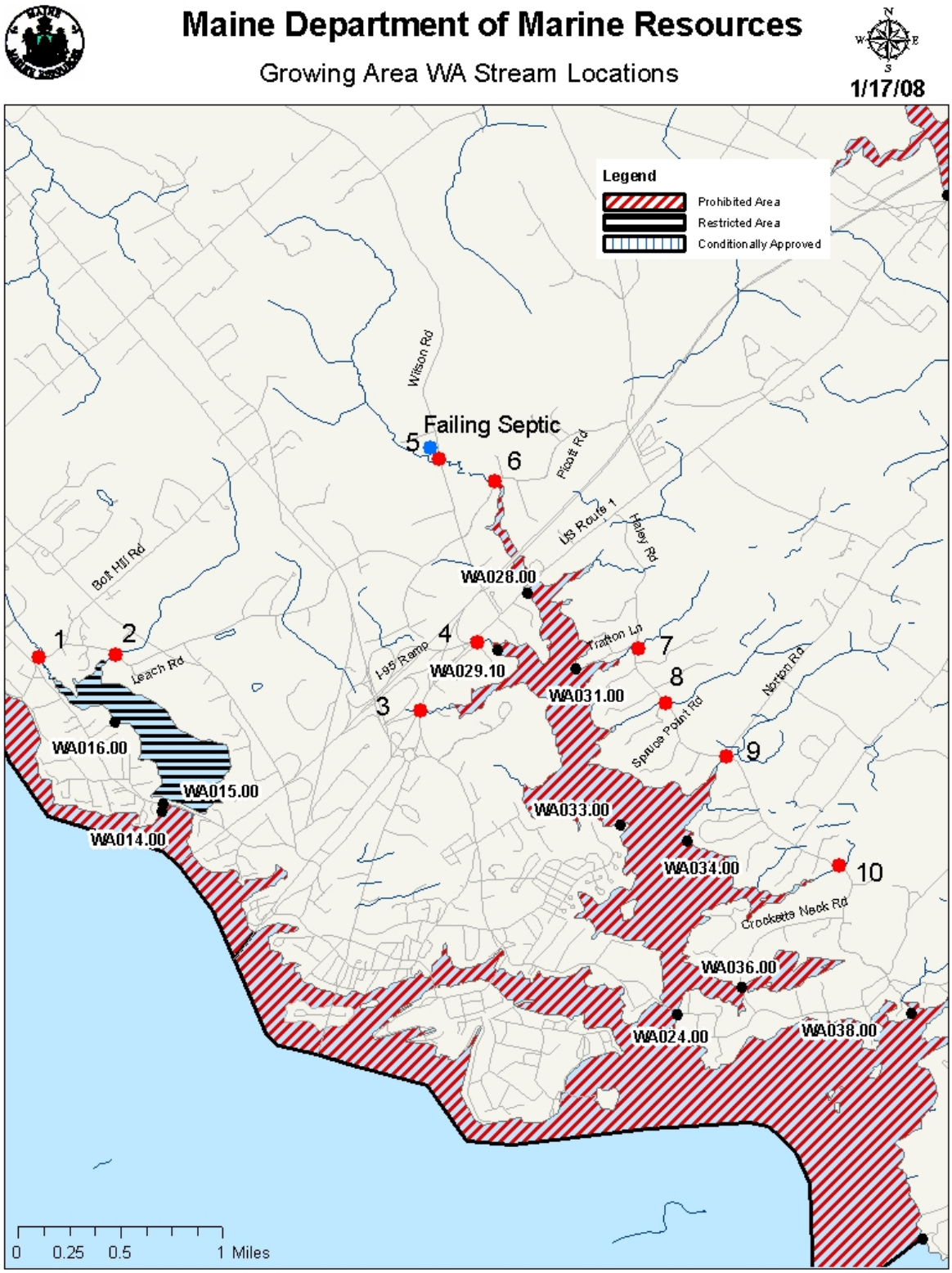
There is an overboard discharge located on Chickering Creek, above the head of Spruce Creek, and one at the mouth of Spruce Creek, by Station WA 24, that are on the MDEP OBD priority removal list, but have no septic alternatives. The discharges are being maintained by the owners and inspected annually by MDEP. The overboard discharge in Eliot and the discharges located in Chauncey Creek (Station WA 38) are low on the priority list.

Table 2 shows fecal coliform scores for samples collected at road culverts and streams on 11/7/07. Flow rates are estimates. On 11/6/07, it rained 0.68 inches in 24 hours. Samples #5 and 6 were collected upstream of the tide gate on Spruce Creek, where there is a failing septic system by Site #5 (Figure 2). All receiving water bodies are classified restricted or prohibited. In 2008, for the upcoming triennial, stream sites 1, 4, 5, 7, and 10 should be routinely monitored, flow rates documented, and the impact on the growing area assessed. Other sites are intermittent road culverts.

Table 2. Fecal Scores from Stream Samples Collected 11/7/07

Sample #	DMR ID #	Location	Fecal Score CFU/100ml	Approx. Flow Gal/min
1	WAB0288.50	Woods stream to culvert Bolt Hill Rd and Rt. 103W	980	50
2	WAC0002.00	Road culvert North of 148 Leach Rd	66	100
3	WAC0273.00	Road culvert Mailbox 222W at Rt. 95 on Ramp	74	50
4	WAC0288.00	Chickering Creek North of Adams Dr on Rt. 1	1580	100
5	WAC0299.50	Spruce Creek West of 45 Wilson Rd on Rt. 101	>1600	Tidal
6	WAC0303.00	Spruce Creek Picott Rd	>1600	Tidal
7	WAC0328.00	Fuller Brook Trafton La and Haley Rd	108	100
8	WAC0335.50	Road culvert Spruce Pt Rd and Haley Rd	520	500
9	WAC0350.00	Road culvert Norton Rd and Haley Rd	260	500
10	WAC0374.00	Crocketts Neck Brook at Haley Rd	1280	500

Figure 3. Growing Area WA Stream Locations



Aquaculture/Wet Storage Activity

There is one aquaculture lease in growing area WA, and the area is classified prohibited. There are no wet storage areas in growing area WA.

PISC WI
Original Date: 5/29/2001 **Effective Date:** 5/29/2001 **Expiration Date:** 5/28/2011
NOAA Chart: 13283
Description: Southeast of Wood Island Portsmouth Harbor Kittery York County
Acreage: 3.76
Conditions:
Transfer/Renewal History:
Species Cultivated: sea urchins green (*Strongylocentrotus droebachiensis*)
Cultivation Technique(s): Bottom
Hill, Chris
Chris Hill
425 Newington Road
Newington, NH 03801
207-752-2625 Fax:
http://www.maine.gov/dmr/aquaculture/leaseinventory2006/documents/PISCWI.pdf

Classification Changes Required

No classification changes are required at this time.

Summary

Water quality in growing area WA supports its current classifications under the NSSP. Spinney Creek needs to be resurveyed in 2008 to maintain the restricted classification. The north end of Spruce Creek needs to be surveyed to find and remediate pollution sources that are impacting water quality on the north end of the creek, and the streams in growing area WA need to be sampled during wet and dry weather, flow rates recorded, and bacterial loads assessed. Potential and actual pollution sources that have already been identified in Spruce Creek need to be addressed by the town and MDEP. No classification changes are required at this time. A triennial review will be written at the end of 2008.

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.

Appendix B. 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 the 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 C. Water Quality Data Collected in 2007

Station	Date	Collector	Tide	Temp	Sal	Strat	ADV	Stat	CL	MFCOL	WIND
WA014.00	01/02/07	EXT	H	6	30	R	P	C	P	4	NW
WA014.00	03/05/07	LL	F	-1	28	R	-	C	P	<2.0	CL
WA014.00	06/18/07	JMCA	F	18	22	R	P	C	P	2	W
WA014.00	07/24/07	JMCA	HE	16	29	R	PM	C	P	6	CL
WA014.00	08/13/07	JMCA	F	17	30	R	M	C	P	<2.0	SW
WA014.00	10/09/07	JMCA	E	15	31	R	M	C	P	26	E
WA015.00	01/02/07	EXT	H	2	24	R	P	O	R	40	NW
WA015.00	03/05/07	LL	F	1	2	R	-	O	R	20	CL
WA015.00	06/18/07	JMCA	F	22	25	R	P	O	R	4	NW
WA015.00	07/24/07	JMCA	HE	21	29	R	P	O	R	<2.0	CL
WA015.00	08/13/07	JMCA	F	18	30	R	-	O	R	2	NW
WA015.00	10/09/07	JMCA	F	16	30	R	-	O	R	108	N
WA016.00	01/02/07	EXT	H	3	25	R	P	O	R	15	NW
WA016.00	03/05/07	LL	F	-1	1	R	-	O	R	340	CL
WA016.00	06/18/07	JMCA	F	22	26	R	P	O	R	10	N
WA016.00	07/24/07	JMCA	HE	21	29	R	P	O	R	12	N
WA016.00	08/13/07	JMCA	F	23	30	R	-	O	R	20	NW
WA016.00	10/09/07	JMCA	F	16	30	R	-	O	R	12	N
WA024.00	01/02/07	EXT	E	4	29	R	P	C	P	4	NW
WA024.00	03/05/07	LL	HE	1	32	R	-	C	P	2	SW
WA024.00	06/18/07	BHO	LF	16	28	R	P	C	P	<2.0	CL
WA024.00	07/24/07	BHO	E	17	30	R	P	C	P	4	CL
WA024.00	08/13/07	BHO	F	17	30	R	-	C	P	2	CL
WA024.00	10/09/07	JMCA	E	14	30	R	-	C	P	3.6	NE
WA028.00	01/02/07	EXT	HE	4	26	R	P	O	R	20	NW
WA028.00	03/05/07	LL	F	1	27	R	-	O	R	2	CL
WA028.00	06/18/07	OROY	LF	19	23	R	P	C	R	240	NE
WA028.00	07/24/07	OROY	E	18	29	R	P	C	R	12	CL
WA028.00	08/13/07	OROY	F	21	30	R	-	C	R	62	SW
WA028.00	10/09/07	OROY	HF	14	30	R	-	C	R	42	NE
WA029.10	03/05/07	LL	F	1	25	R	-	O	R	24	CL
WA029.10	06/18/07	MHE	H	18	26	R	-	C	R	2	CL
WA029.10	07/24/07	OROY	E	18	29	R	P	C	R	3.6	CL
WA029.10	08/13/07	OROY	F	20	28	R	-	C	R	35	SW
WA029.10	10/09/07	OROY	HF	14	30	R	-	C	R	56	NE
WA029.10	11/07/07	LL	E	7	28	R	P	C	R	108	CL
WA031.00	01/02/07	EXT	HE	4	25	R	P	O	R	180	NW
WA031.00	03/05/07	LL	F	1	30	R	-	O	R	4	CL

Station	Date	Collector	Tide	Temp	Sal	Strat	ADV	Stat	CL	MFCOL	WIND
WA031.00	06/18/07	MHE	HF	18	26	R	-	C	R	9.1	S
WA031.00	06/18/07	OROY	LF		-	R	P	C	R	-	-
WA031.00	07/24/07	OROY	E	18	31	R	P	C	R	6	CL
WA031.00	08/13/07	OROY	F	20	30	R	-	C	R	22	SW
WA031.00	10/09/07	OROY	HF	15	30	R	W	C	R	22	NE
WA033.00	01/02/07	EXT	E	4	26	R	P	C	P	20	NW
WA033.00	03/05/07	LL	HE	1	31	R	-	C	P	<2.0	SW
WA033.00	06/18/07	JMCA	F	18	26	R	P	C	P	64	N
WA033.00	07/24/07	FGA	E	19.5	33	R	P	C	P	11	SW
WA033.00	08/13/07	FGA	LF	19.5	30	R	-	C	P	22	SW
WA033.00	10/09/07	JMCA	H	13	30	R	-	C	P	8	NE
WA034.00	01/02/07	EXT	E	4	28	R	P	C	P	11	NW
WA034.00	03/05/07	LL	HF	1	30	R	-	C	P	<2.0	CL
WA034.00	06/18/07	JMCA	F	15	26	R	P	C	P	4	NW
WA034.00	07/24/07	JMCA	E	17	32	R	P	C	P	<2.0	S
WA034.00	08/13/07	JMCA	F		-	R	-	C	P	-	-
WA034.00	08/13/07	JMCA	F	17	30	R	-	C	P	2	N
WA034.00	10/09/07	JMCA	F	13	30	R	-	C	P	46	N
WA036.00	01/02/07	EXT	E	4	28	R	P	C	P	6	NW
WA036.00	03/05/07	LL	HF	1	30	R	-	C	P	<2.0	CL
WA036.00	06/18/07	BHO	F	19	26	R	P	C	P	8	CL
WA036.00	07/24/07	BHO	E	18	30	R	P	C	P	<2.0	CL
WA036.00	08/13/07	BHO	F	18	30	R	-	C	P	10	CL
WA036.00	10/09/07	JMCA	F	13	30	R	-	C	P	14	CL
WA038.00	01/02/07	EXT	E	4	26	R	P	C	P	14	NW
WA038.00	03/05/07	LL	HF	1	30	R	-	C	P	4	CL
WA038.00	06/18/07	JMCA	F	19	25	R	P	C	P	35	SW
WA038.00	07/24/07	JMCA	E	17	30	R	P	C	P	<2.0	SW
WA038.00	08/13/07	JMCA	F	16	31	R	-	C	P	4	SW
WA038.00	10/09/07	JMCA	HE	15	31	R	-	C	P	6	E
WA043.00	01/02/07	EXT	E	4	28	R	P	O	A	6	NW
WA043.00	03/05/07	LL	HF	1	32	R	-	O	A	<2.0	SW
WA043.00	06/18/07	BHO	F	15	28	R	P	O	A	2	CL
WA043.00	07/24/07	BHO	E	17	30	R	P	O	A	5.5	CL
WA043.00	08/13/07	BHO	F	15	32	R	-	O	A	6	CL
WA043.00	10/09/07	JMCA	HE	14	31	R	-	O	A	<2.0	NE