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Wet Weather Water Quality Study Portland and South Portland, Maine: Project Report

Tim Bridges

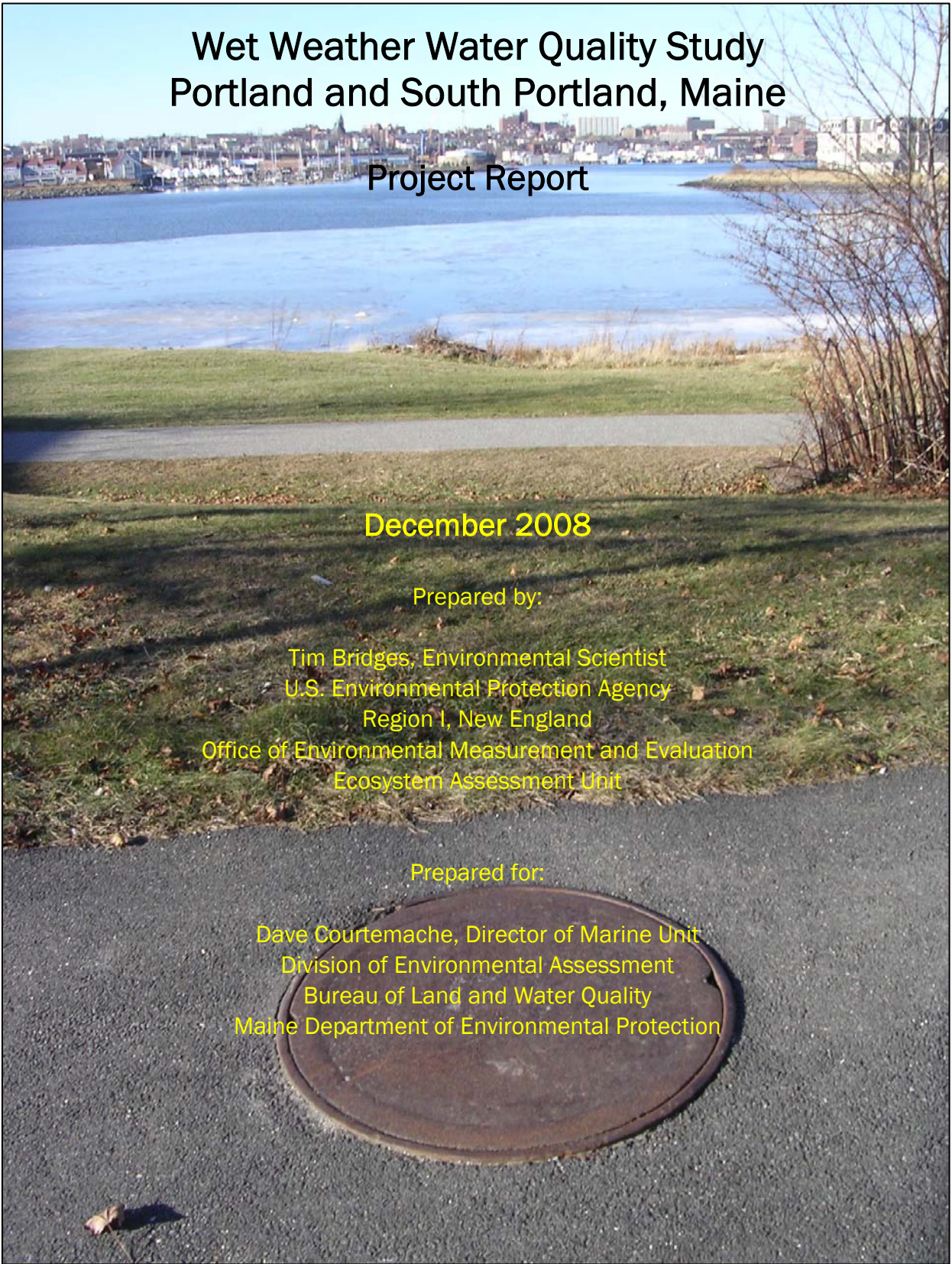
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Wet Weather Water Quality Study Portland and South Portland, Maine

Project Report

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INTRODUCTION

A. Overview

The Portland and South Portland watershed area is considered a priority by EPA New England and Maine Department of Environmental Protection (MEDEP). The rich diversity of plants and animals, the natural beauty, water quality, and the many special qualities of the urban estuarine habitat of the Portland area have placed this among the highest environmental priorities listed for protection.

The EPA Regional laboratory was requested to undertake a baseline wet weather study in the cities of South Portland and Portland, Maine. The Portland vicinity is Maine's largest urbanized area which presents challenges of point and non-point source pollution, encroachment, combined sewer overflows, recreational boating, and other stressors of historical origin. These may contribute to possible impairments in the watersheds and estuary. Even though the water quality of the Portland area has improved markedly over the past three decades, there is still cause for concern as development and populations expand within the local watersheds.

The chemical and physical characterization of wet weather conditions is of interest because wet weather runoff is often a good indicator of worst case scenario of aquatic system health. Persistent contaminants associated with past and present cultural influences enter aquatic systems from stormwater pipes which contribute to the pollutant load in the estuary areas. Persistent stormwater discharges can be a major environmental problem because the pollutant loads can accumulate in bottom dwelling organisms, fish, and other animals higher in the food chain including humans. As an initial screening effort, wet weather concentrations of various contaminants can be compared to stormwater water quality levels known to be detrimental to biological systems.

B. Purpose and Scope

EPA's Regional, Office of Environmental Protection in Boston and MEDEP, Bureau of Land and Water, requested that EPA's Office of Environmental Measurement and Evaluation undertake a study of the wet weather water quality in the Portland area in the City of Portland and the town of South Portland. The purpose was to characterize the condition and contaminant levels during wet weather, establish a baseline data set, and provide information with which to make decisions relative to the management and protection of the estuarine and rivers as valuable natural resources. Samples that were collected for analyses include: metals, pesticides, PCBs, Poly Aromatic Hydrocarbons and field parameters which include pH, conductivity, dissolved oxygen and temperature.

Eleven sampling locations were selected in each of Portland and South Portland as a result of discussions with the Portland DPW and South Portland Water Resources. Based on their input and knowledge of local conditions several possible survey sample locations were identified. In general, the sampling goal was to get as much area coverage as possible while locating the potential “hot spots” of concern.

Field reconnaissance was conducted prior to sampling by EPA with Portland and South Portland to determine access points and assess sample locations. The field sampling was conducted during the spring of 2006 during five different rain days by a team of OEME personnel with the assistance of South Portland Water Resources when in South Portland and the Portland DPW in Portland. Sample locations were accessed by manhole or culvert. Sampling was performed according to an approved Quality Assurance Project Plan (QAPP) which is attached as Appendix F.

Sites were also selected based on an Urban Streams Non-point Source Assessments in Maine.(DEPLW0699) report from 2005 indicated Barberry Creek in South Portland and Capisic Brook in Portland as potential sources of pollutants. Barberry Creek was captured at Station SPRT06 @ CSO #6 which is at the location of Broadway Ave and Evans Street. Two samples were performed in Capisic Brook in Portland at PORT09, the end of Rockland Ave, and PORT11 on Taft Street.

SAMPLING METHODS

Record rainfall was recorded in the Portland area during the spring of 2006 with May being the wettest on record, and June being the third wettest on record. Five rain events from April to June were monitored by EPA and the cities of Portland and South Portland. All locations were sampled when flow was present in the pipe or outfall. Five separate rain event days were needed to complete sampling at the twenty one locations. Not all sample locations could be sampled during each storm event due to the duration of the storm and holding times for bacteria.

On site measurements for dissolved oxygen (DO), pH, temperature, and specific conductance were made using YSI 6920 multi-parameter Water Quality Sondes. The data was logged both electronically and manually in a bound field book as well as maintaining daily calibrations and post calibration verifications.

Samples were collected with a precleaned bucket or directly grabbed from the flowing stream so that enough sample was taken to assure quantities necessary for analysis. Samples were preserved in accordance to the QAPP in Appendix F. Containers used were precleaned sample containers, properly labeled, packed and preserved for transport according to chain of custody guidelines and the specifications in the approved quality plan.

Between sample stations, all equipment coming in contact with the sample equipment was decontaminated using a procedure which included a soapy water wash and deionized water rinse.

A rinsate blank was taken to check possible carry over field contamination between collecting samples for metals and organics. Wet chemistry samples were delivered to the USEPA New England Regional Laboratory (NERL) in North Chelmsford, Massachusetts and logged in for analysis. Bacteria samples were signed over to Portland or South Portland for analysis on a chain of custody form.

A. Locational Data

Locations are spread throughout the cities to produce an initial representative sampling of the storm water pipes as seen on the maps in Appendix E attached. Location type is identified as well as influence from tides.

Table 1: Sampling Site Summary PORTLAND

Site	Discharge Location	Sample Location	Tidal	Latitude (decdeg)	Longitude (decdeg)
PORT01	Across from Quebec St, Near Ball field center	manhole	no	43.670264	-70.246026
PORT02	Somerset and Franklin intersection	manhole	no	43.664186	-70.258826
PORT03	End of Coyle ST into Back Cove	outfall	no	43.670822	-70.277472
PORT04	Randall ST and Baxter Blvd on Back Cove side	outfall	yes	43.678681	-70.262407
PORT05	Hawthorne ST @ end	culvert	no	43.686906	-70.256192
PORT06	Milliken, back side of baptist church, Canco Rd	culvert	no	43.690954	-70.280100
PORT07	Auburn ST, after Longview, before Wash ST ext	culvert	no	43.720695	-70.293722
PORT08	Nottingham Ave, #22,	manhole	no	43.693831	-70.275423
PORT09	Rockland Ave at end	culvert	no	43.668154	-70.305867
PORT10	Douglas ST by Gastroenterology	culvert	no	43.655975	-70.288825
PORT11	189 Holmes Ave	stream	no	43.681605	-70.321222

Table 2: Sampling Site Summary SOUTH PORTLAND

Site	Discharge Location	Sample Location	Tidal	Latitude (decdeg)	Longitude (decdeg)
SPRT01	Philbrook Ave behind Macaroni Grill	swail	no	43.633612	-70.330916
SPRT02	Country Garden's off Broadway, Sokokus ST	manhole	no	43.629162	-70.314226
SPRT03	Right @ rt9 sign, by pump station, Long Creek	outfall	no	43.634236	-70.312315
SPRT04	Sunset Park before Pond	manhole	no	43.614196	-70.313964
SPRT05	Trunk Line B, Rite AID parking lot, by cemetery	stream	no	43.631200	-70.291515
SPRT06	Barberry Creek @ CSO # 006, Broadway @ Evans	stream	no	43.628702	-70.277890
SPRT07	Knightville Drainage, Blockbuster Parking Lot,	manhole	yes	43.635600	-70.256328
SPRT08	Clemons ST @ Clemons and Broadway	manhole	no	43.638357	-70.245358
SPRT09	Willard Beach	outfall	yes	43.628708	-70.277893
SPRT10	Picket/Fort Road Drainage, Front ST	manhole	yes	43.650066	-70.239017
SPRT11	Brooklyn Heights Stormwater System, Dyer ST	manhole	yes	43.647869	-70.241920

B. Physical and Chemical Analysis

Chemical analysis of wet weather samples were performed following EPA Region I Laboratory, Standard Operating Procedures. All organic and inorganic analyses were performed by the NERL chemistry laboratory. South Portland performed bacteria analyses, while Portland sent theirs to a contract laboratory.

RESULTS and DISCUSSION

A. Dissolved Oxygen, pH, Conductivity, Temperature

Dissolved Oxygen ranged from a low concentration of 6.1 mg/l at station SPRT11, Dyer Street in South Portland to high concentrations of 13.5 mg/l at station PORT04 at Randall Street in Portland. Specific conductance ranged from a low of 13 us/cm at PORT10, Douglas Street to 16,400 at station SPRT11, Dyer Street which appears to be tidally influenced. The pH results were all in a range of 6 to 8.3. These results are presented below in Table 3 and 4.

On April 5th, the dissolved oxygen membrane fell off under high flow conditions at station PORT08, Nottingham Avenue, during in-stream sampling. Therefore, no dissolved oxygen readings were able to be recorded the rest of the day for stations: PORT09; PORT10; and PORT11. Station SPRT10 on Front Street in South Portland was not sampled due to lack of flow in pipe when checked. A total of ten stations were sampled in South Portland and eleven in Portland.

Optical Brighteners were sampled at three Portland Sites; PORT01, PORT02 and PORT07. Results indicate a possible presence of optical brighteners during the rain event on June 8th. Results are in the range of 100 to 500 ug/l indicates a possible human source. Over 500 ug/l which is considered to be a high optical brightener signal while less than 100 ug/l is considered a weak signal.

Table 3 - Field Results Portland

Station ID	PORT01	PORT02	PORT03	PORT04	PORT05	PORT06	PORT07	PORT08	PORT09	PORT10	PORT11
Date	6/8/2006	6/8/2006	4/4/2006	4/4/2006	4/4/2006	4/4/2006	6/8/2006	4/5/2006	4/5/2006	4/5/2006	4/5/2006
Time	1230	1330	1020	1040	1105	1135	1150	1022	1135	1200	1110
Sample #	81139	81140	81133	81134	81131	81132	81148	81138	81136	81141	81135
Temperature(degrees C)	14.8	13.3	5.4	5.5	5.4	3.7	13.6	4.1	5.7	5.8	6.0
pH (SU)	7.5	8.1	7.9	7.7	8.1	7.9	7.4	8.0	7.8	7.5	6.0
Dissolved Oxygen (mg/l)	9.6	12.7	13.4	13.5	13.5	13.3	9.6	*	*	*	*
Dissolved Oxygen (%)	95	135	106	108	107	100	93	*	*	*	*
Specific Conductivity (us/cm)	123	1312	155	2512	76	138	191	158	492	13	676
Optical Brighteners (ug/l)	223	279					182				

10:51AM Low Tide

* Membrane on DO probe fell off at station PORT08 due to high flows.

Table 4 - Field Results South Portland

Station ID	SPRT01	SPRT02	SPRT03	SPRT04	SPRT05	SPRT06	SPRT07	SPRT08	SPRT09	SPRT11
Date	5/10/2006	5/10/2006	5/10/2006	5/10/2006	5/10/2006	5/10/2006	6/7/2006	5/10/2006	5/10/2006	6/7/2006
Time	1235	1155	1215	1040	1110	1055	1150	945	850	1300
Sample #	81129	81143	81144	81145	81147	81146	81151	81149	81150	81137
Temperature(degrees C)	11.2	10.8	11.3	10.2	9.7	9.9	15.7	10.3	9.7	13.5
pH (SU)	6.5	6.3	6.7	6.2	6.5	7.6	7.2	7.5	7.7	7.1
Dissolved Oxygen(mg/l)	9.1	9.9	10.2	9.8	8.5	9.8	10.4	10.9	10.6	6.1
Spec. Conductivity (us/cm)	99	196	496	180	547	412	932	343	238	16391
Rain (inches)	0.49	0.49	0.49	0.49	0.49	0.49	1.83	0.49	0.49	1.83

B. Inorganic Metals

Twenty one metals including; the heavy metals Cadmium(Cd), Chromium(Cr), Copper(Cu), Lead(Pb), Nickel(Ni), and Zinc(Zn), were analyzed at each site(Tables 5 and 6). These metals have often been associated with potential toxicity in water and sediments. Mercury results are in Table 9 for Portland. Mercury was not detected in South Portland. See Appendix A for the metals laboratory reports.

Table 5 - Portland Metals

Station ID	PORT01	PORT02	PORT03	PORT04	PORT05	PORT06	PORT07	PORT08	PORT09	PORT10	PORT11
Date	6/8/06	6/8/06	4/4/06	4/4/06	4/4/06	4/4/06	6/8/06	4/5/06	4/5/06	4/5/06	4/5/06
Time	1230	1330	1020	1040	1105	1135	1150	1022	1135	1200	1110
Sample #	81139	81140	81133	81134	81131	81132	81148	81138	81136	81142	81135

<i>Aluminum</i>	43	200	47	44	140	320	48	470	170	140	130
<i>Antimony</i>	ND (0.5)	1	6.5	2.2	ND (0.5)	ND (0.5)	0.77	ND (0.5)	ND (0.5)	ND (0.5)	7
<i>Arsenic</i>	0.95	2	0.53	2	0.59	0.52	1.4	0.68	1.7	1.2	0.57
<i>Barium</i>	4.3	40	2.2	14	2.6	16	16	7.6	15	27	23
<i>Beryllium</i>	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
<i>Cadmium</i>	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
<i>Calcium</i>	3300	34000	3200	1600	1900	8600	15000	12000	29000	30000	15000
<i>Chromium</i>	0.68	4.5	5.8	8.1	0.58	0.57	2.6	0.78	0.65	0.6	1
<i>Cobalt</i>	5.8	6.2	1	0.94	0.3	0.59	1	1.3	7.5	8.1	1.8
<i>Copper</i>	4.1	6.2	5.6	11	2.7	2.7	24	3.2	3.6	4.9	7
<i>Iron</i>	57	130	170	120	130	410	390	350	180	940	670
<i>Lead</i>	2.6	2.5	0.82	1.2	0.57	0.56	2.1	0.65	0.46	0.87	0.44
<i>Magnesium</i>	320	20000	1800	4100	860	1600	15	2900	4600	6.6	2900
<i>Manganese</i>	16	83	27	30	14	92	190	70	120	320	270
<i>Molybdenum</i>	ND (0.5)	2.5	ND (0.5)	0.79	ND (0.5)	ND (0.5)	0.96	ND (0.5)	0.72	ND (0.5)	ND (0.5)
<i>Nickel</i>	1.2	2.4	2.4	1.7	0.83	1.4	2.4	3.6	4.9	4.1	3
<i>Selenium</i>	ND (1.0)	3.8	ND (1.0)	6	ND (1.0)	ND (1.0)	2.5	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
<i>Silver</i>	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
<i>Thallium</i>	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
<i>Vanadium</i>	0.79	1.7	1.1	0.34	0.6	0.66	2.3	0.95	0.6	0.6	0.83
<i>Zinc</i>	20	6.7	130	67	16	13	64	13	24	48	170

Table 6 - South Portland Metals

Station ID	SPRT01	SPRT02	SPRT03	SPRT04	SPRT05	SPRT06	SPRT07	SPRT08	SPRT09	SPRT11
Date	5/10/2006	5/10/2006	5/10/2006	5/10/2006	5/10/2006	5/10/2006	6/7/2006	5/10/2006	5/10/2006	6/7/2006
Time	1235	1155	1215	1040	1110	1055	1150	945	850	1300
Sample #	81129	81143	81144	81145	81147	81146	81151	81149	81150	81137
Aluminum	44	260	120	510	5	250	16	11	22	ND 50
Antimony	ND 0.50	ND 0.50	ND 0.50	ND 0.50	ND 0.50	ND 0.50	4.6	ND 0.50	4	ND 5.0
Arsenic	2.8	0.87	3.1	0.92	2.4	1.5	1.1	0.84	ND 0.50	16
Barium	26	7.8	14	15	11	12	16	14	19	13
Beryllium	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 2.0
Cadmium	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 2.0
Calcium	45000	13000	28000	9300	17000	19000	35000	21000	19000	140000
Chromium	3.2	ND 0.50	ND 0.50	0.53	1.1	0.67	0.68	ND 0.50	ND 0.50	ND 5.0
Cobalt	6.3	1.3	6.9	5.5	0.9	8	1.1	4.6	0.6	5
Copper	4.2	3.6	3.9	2.7	4.2	3.7	5.6	2	6	130
Iron	4200	430	470	780	1200	820	73	150	190	ND 500
Lead	0.73	0.67	0.56	1.8	1.4	0.95	ND 0.20	ND 0.20	0.36	ND 2.0
Magnesium	15000	2100	6800	2000	3200	4200	4000	4300	3700	360000
Manganese	800	75	140	160	180	300	6.7	69	62	120
Molybdenum	0.8	ND 0.50	ND 0.50	ND 0.50	ND 0.50	ND 0.50	0.51	ND 0.50	ND 0.50	ND 5.0
Nickel	3.2	2.7	3.4	2.5	3.9	3.8	3.1	1.7	2.4	7.5
Selenium	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	60
Silver	ND 0.50	ND 0.50	ND 0.50	ND 0.50	ND 0.50	ND 0.50	ND 0.50	ND 0.50	ND 0.50	ND 2.0
Thallium	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.50	ND 0.20	ND 0.20	ND 5.0
Vanadium	0.53	0.8	0.75	2.0	1.6	1.4	ND 0.50	0.23	0.39	ND 5.0
Zinc	65	260	24	27	26	26	83	10	120	ND 50

Concentrations are in ug/l

C. Organic Compounds

1. Pesticides/PCBs

No Pesticides or PCBs results were detected above the associated detection limits for Portland and South Portland. Appendix B provides a complete list of the pesticides and PCB Aroclors that were analyzed.

2. Polynuclear Aromatic Hydrocarbons(PAHs)

The polynuclear aromatic hydrocarbons(PAHs) are widely distributed in aquatic systems as they are often associated with byproducts of combustion or processing of petroleum products. Air pollution, runoff from paving and parking lots, as well as leaking storage tanks are all potential sources. PAH's were found in measurable concentrations at some locations in this survey. Individual PAH's are presented in Appendix C. Total PAH's are presented in Tables 7 and 8. Station PORT10 in Portland and station SPRT08 in South Portland had the highest total PAH's measured of any of the stations. These higher results may be linked to recent repaving operations in the drainage basin. On April 4th the bottles at Station PRT03 were found broken in the cooler.

Table 7 -Portland PAHs

Station ID	PORT01	PORT02	PORT03	PORT04	PORT05	PORT06	PORT07	PORT08	PORT09	PORT10	PORT11
Date	6/8/2006	6/8/2006	4/4/2006	4/4/2006	4/4/2006	4/4/2006	6/8/2006	4/5/2006	4/5/2006	4/5/2006	4/5/2006
Time	1230	1330	1020	1040	1105	1135	1150	1022	1135	1200	1110
Sample #	81139	81140	81133	81134	81131	81132	81148	81138	81136	81142	81135
<i>Acenaphthene</i>	ND 0.9	ND 1.0		ND 0.1	ND 0.1	ND 0.1	ND 1.0	ND 0.1	ND 0.1	ND 0.1	ND 0.1
<i>Acenaphthylene</i>	ND 0.9	ND 1.0		ND 0.1	ND 0.1	ND 0.1	ND 1.0	ND 0.1	ND 0.1	ND 0.1	ND 0.1
<i>Anthracene</i>	ND 0.9	ND 1.0		ND 0.1	ND 0.1	ND 0.1	ND 1.0	ND 0.1	ND 0.1	0.11	ND 0.1
<i>Benzo(a)anthracene</i>	ND 0.9	ND 1.0		0.17	0.17	0.13	ND 1.0	ND 0.1	ND 0.1	0.60	ND 0.1
<i>Benzo(a)pyrene</i>	ND 0.9	ND 1.0		0.20	0.23	0.18	ND 1.0	ND 0.1	ND 0.1	0.55	ND 0.1
<i>Benzo(b)fluoranthene</i>	ND 0.9	ND 1.0		0.40	0.47	0.35	ND 1.0	ND 0.1	ND 0.1	1.03	ND 0.1
<i>Benzo(g,h,i)perylene</i>	ND 0.9	ND 1.0		0.19	0.23	0.18	ND 1.0	ND 0.1	ND 0.1	0.49	ND 0.1
<i>Benzo(k)fluoranthene</i>	ND 0.9	ND 1.0		0.15	0.17	0.13	ND 1.0	ND 0.1	ND 0.1	0.36	ND 0.1
<i>Chrysene</i>	ND 0.9	ND 1.0		0.36	0.4	0.29	ND 1.0	ND 0.1	ND 0.1	0.81	ND 0.1
<i>Dibenzo(a,h)anthracene</i>	ND 0.9	ND 1.0		ND 0.1	ND 0.1	ND 0.1	ND 1.0	ND 0.1	0.10	ND 0.1	ND 0.1
<i>Fluoranthene</i>	ND 0.9	1.3		0.70	0.85	0.52	ND 1.0	ND 0.1	ND 0.1	1.88	ND 0.1
<i>Fluorene</i>	ND 0.9	ND 1.0		ND 0.1	ND 0.1	ND 0.1	ND 1.0	ND 0.1	ND 0.1	ND 0.1	ND 0.1
<i>Indeno(1,2,3-cd)pyrene</i>	ND 0.9	ND 1.0		0.19	0.24	0.19	ND 1.0	ND 0.1	ND 0.1	0.51	ND 0.1
<i>Naphthalene</i>	ND 0.9	ND 1.0		ND 0.1	ND 0.1	ND 0.1	ND 1.0	ND 0.1	ND 0.1	ND 0.1	ND 0.1
<i>Phenanthrene</i>	ND 0.9	ND 1.0		ND 0.1	0.34	0.18	ND 1.0	ND 0.1	ND 0.1	1.04	ND 0.1
<i>Pyrene</i>	ND 0.9	1.14		0.48	0.57	0.39	ND 1.0	ND 0.1	ND 0.1	1.39	ND 0.1

Concentrations are in ug/l

Table 8 – South Portland PAHs

Station ID	SPRT01	SPRT02	SPRT03	SPRT04	SPRT05	SPRT06	SPRT07	SPRT08	SPRT09	SPRT11
Date	5/10/2006	5/10/2006	5/10/2006	5/10/2006	5/10/2006	5/10/2006	6/7/2006	5/10/2006	5/10/2006	6/7/2006
Time	1235	1155	1215	1040	1110	1055	1150	945	850	1300
Sample #	81129	81143	81144	81145	81147	81146	81151	81149	81150	81137
<i>Acenaphthene</i>	ND 0.1	ND 0.1	ND 0.1	ND 0.1	J 0.06	ND 0.1	ND 1.0	ND 0.1	ND 0.1	ND 1.0
<i>Acenaphthylene</i>	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 1.0	ND 0.1	ND 0.1	ND 1.0
<i>Anthracene</i>	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 1.0	J 0.08	ND 0.1	ND 1.0
<i>Benzo(a)anthracene</i>	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 1.0	0.53	ND 0.1	ND 1.0
<i>Benzo(a)pyrene</i>	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 1.0	0.49	ND 0.1	ND 1.0
<i>Benzo(b)fluoranthene</i>	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 1.0	0.91	ND 0.1	ND 1.0
<i>Benzo(g,h,i)perylene</i>	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 1.0	0.46	ND 0.1	ND 1.0
<i>Benzo(k)fluoranthene</i>	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 1.0	0.32	ND 0.1	ND 1.0
<i>Chrysene</i>	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 1.0	0.69	ND 0.1	ND 1.0
<i>Dibenzo(a,h)anthracene</i>	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 1.0	0.12	ND 0.1	ND 1.0
<i>Fluoranthene</i>	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	1.40	1.17	J 0.05	ND 1.0
<i>Fluorene</i>	ND 0.1	ND 0.1	ND 0.1	ND 0.1	J 0.07	ND 0.1	ND 1.0	ND 0.1	ND 0.1	ND 1.0
<i>Indeno(1,2,3-cd)pyrene</i>	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 1.0	0.49	ND 0.1	ND 1.0
<i>Naphthalene</i>	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 1.0	ND 0.1	ND 0.1	ND 1.0
<i>Phenanthrene</i>	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 0.1	ND 1.0	0.44	ND 0.1	ND 1.0
<i>Pyrene</i>	ND 0.1	ND 0.1	ND 0.1	ND 0.1	J 0.06	ND 0.1	ND 1.0	0.88	ND 0.1	ND 1.0

J = Approximate, less than calibration range

Concentrations are in ug/l

D. Mercury and Bacteria

One slightly elevated mercury reading of 1.2 ug/l was obtained at station PORT02, which is at the junction of Somerset and Franklin Streets. Other sites did not have mercury present above the 0.20 ug/l detection limit. Bacteria results were lost by the city of South Portland.

Table 9 Portland Bacteria and Mercury Results

Station ID	PORT01	PORT02	PORT03	PORT04	PORT05	PORT06	PORT07	PORT08	PORT09	PORT10	PORT11
Date	6/8/2006	6/8/2006	4/4/2006	4/4/2006	4/4/2006	4/4/2006	6/8/2006	4/5/2006	4/5/2006	4/5/2006	4/5/2006
Time	1230	1330	1020	1040	1105	1135	1150	1022	1135	1200	1110
Sample #	81139	81140	81133	81134	81131	81132	81148	81138	81136	81141	81135
<i>E. coli</i> (#/100ml)			1720	810	2120	140		80	200	330	520
<i>Fecal Coliform</i> (#/100ml)			1740	800	6000	514		160	160	480	920
Mercury (ug/l)	ND 0.2	1.2	ND 0.2	ND 0.2	ND 0.2	ND 0.2	ND 0.2	ND 0.2	ND 0.2	ND 0.2	ND 0.2

E. Data Usability

Chain of custody records were maintained for all collected samples. Holding times were met for all parameters analyzed by the EPA New England Regional Laboratory. All reported compounds from the duplicate samples met the relative percent difference goals established in the Quality Assurance Project Plan (Appendix F).

Rinsate and Method blanks were analyzed for metals, PCBs, and pesticides. The results indicate no laboratory contamination. Meeting the above quality assurance parameters indicate that the use of the data resulting from this project for the purposes of water quality stormwater screening and targeting future investigations is appropriate.

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