

# Halifax Harbour Water Quality Monitoring Project

## Weekly Summary #1

### Preamble

This report is a summary of preliminary results from the first survey of an ongoing (weekly) water quality monitoring program. On all weeks, bacteriological water samples are taken and in-situ profile data (conductivity, temperature, dissolved oxygen and fluorescence) are measured (Bacteriological Survey). On odd weeks, a suite of chemical and biological samples are collected as well (Complete Survey). This report presents data from the first Complete Survey.

Where applicable, interpretation of the data is based on the Harbour Water Quality Guidelines, reproduced in the table on the right. Guideline limits do not exist for several of the monitored metals. Specifically these are: Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cobalt, Lithium, Iron, Molybdenum, Selenium, Strontium, Thallium, Tin, Titanium, Uranium, and Vanadium. Detectable quantities of these metals will be summarized in a table below. Additionally, there are biochemical parameters; Carbonaceous Biochemical Oxygen Demand (CBOD<sub>5</sub>), Ammonia Nitrogen, Chlorophyll (fluorescence), for which no Halifax Harbour-specific criteria exist. These parameters are plotted and interpreted on a relative basis. Parameters with no detectible (<EQL) values are not graphically displayed, but are tabulated below.

For each survey duplicate samples are taken at random for purposes of laboratory QA/QC. In addition, the lab conducts QA/QC on submitted samples. These values, for relevant parameters are compared with primary samples below.

All lab results are included in the accompanying spreadsheet files labeled with the convention: "HHWQMP\_datannn\_yymmdd", where "nnn" is the serial survey identifier.

<b>Halifax Harbour Water Quality Guidelines Halifax Harbour Task Force, 1990</b>		
<u>Dissolved Oxygen:</u>		
	SA	8.0 mg/L
	SB	7.0 mg/L
	SC	6.0 mg/l
<u>Fecal Coliform:</u>		
Shellfishing		14/100mL
Swimming		200/100mL
<u>Suspended Particulate Matter (SPM):</u>		
		10% above ambient
<u>Metals:</u>		
Copper		2.9 µg/L
Lead		5.6 µg/L
Zinc		86.0 µg/L
Cadmium		9.3 µg/L
Chromium		50.0 µg/L
Mercury		0.025 µg/L
Manganese		100.0 µg/L
Nickel		8.3 µg/L
<u>Organic Chemicals:</u>		
Total PCB		0.03 µg/L
Total PAH		5.0 µg/L
Oil and Grease		10.0 µg/L

**Survey Number:** 001

**Survey Date:** 23 Jun 04

**Nature of Survey:** Complete Survey

**Data Return:** 61%

**Data File:** HHWQMP\_data001\_040623

**Data Notes:** No Profile Data acquired. The CTD was turned on to operate, though internal corrosion interfered with activation of the unit. This CTD did not include a Chlorophyll sensor. The project CTD had not yet arrived from the SEABIRD Electronics Inc. factory.

**QA/QC samples:** Fecal coliform duplicate samples were taken at sites EE3 and F1. Fecal coliform at EE3 was 300cfu/100ml and the primary sample was 500cfu/100ml. This is within the range of natural variability. Both duplicate and primary samples from site F1 had coliform levels of 0cfu/100ml. The duplicate ammonia sample at B2 was 1.6mg/L, compared with the primary sample, which was less than the detectable limit.

**Parameters with Criteria including all Samples Below EQL:**

Parameter	EQL	Parameter	EQL	Parameter	EQL
Copper	20 µg/L	Cadmium	3 µg/L	Manganese	20 µg/L
Lead	5 µg/L	Chromium	20 µg/L	Nickel	20 µg/L
Zinc	50 µg/L	Chromium	20 µg/L	Oil and Grease	5 µg/L
CBOD <sub>5</sub>	5 mg/L				

**Detectable Metals without Criteria**

Metal	EQL (µg/L)	Mean (µg/L)	Range (µg/L)
Boron	500	3900	3400-4600
Lithium	20	180	160-200
Strontium	50	6900	6200-7200
Titanium	20	79	69-96
Uranium	1	3	2.7-3.5

**Preliminary Interpretation:**

In the Inner Harbour, fecal coliform values are generally high, well above the primary body contact limit of 200 cfu/100 ml. These high values extend down harbour to line D and up harbour to the entrance to Bedford Basin (line F). Outside this area, the values were generally undetectable except in Northwest Arm, Eastern Passage (EP) and Herring Cove. In Northwest Arm, the values seemed to increase with proximity to the Chain Rock outfall. In Eastern Passage all sites indicated somewhat elevated values with two sites showing higher values at depth. This may be due to trapping of the plume from the

EP sewage treatment plant. Unfortunately CTD data is unavailable to confirm this. Most ammonia values are below detection limit save two sites in the Inner Harbour and the QA/QC sample, which appears spurious. The TSS values appear generally elevated over mean conditions (1-2 mg/l), particularly in Bedford Basin (G2). This could be due to a phytoplankton bloom.

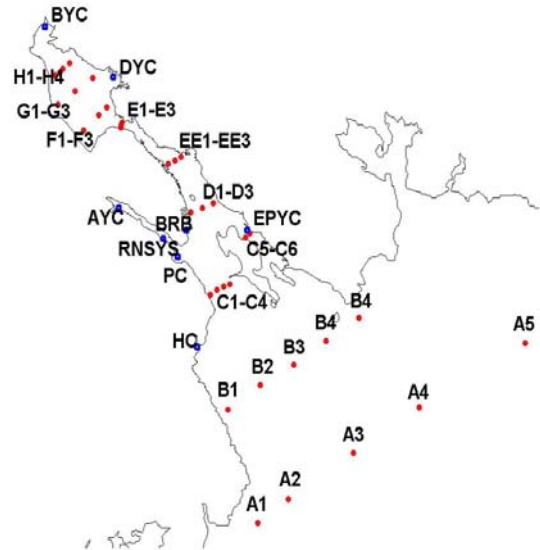
**Additional Notes:**

This draft report contains tabulated data that will eventually be presented graphically (values will always be available on accompanying spreadsheet). The graphic displays are under development. When complete this report will be reissued with appropriate graphics.

# FECAL COLIFORM

## Bedford Basin

Site	Depth	Time	cfu/100mL
BYC	1m	9:34	0
	10m	9:34	0
H1 Qa/Qc	1m	10:37	0
	1m	10:37	0
	10m	10:37	0
H2	1m	10:18	0
	10m	10:18	0
H3	1m	10:03	0
	10m	10:03	0
G2	1m	10:47	0
	10m	10:47	0
DYC	1m	11:00	0
	10m	11:00	0
F1 Qa/Qc	1m	11:36	0
	1m	11:36	0
	10m	11:36	0
F2	1m	11:25	3400
	10m	11:25	300
F3	1m	11:15	0
	10m	11:15	100

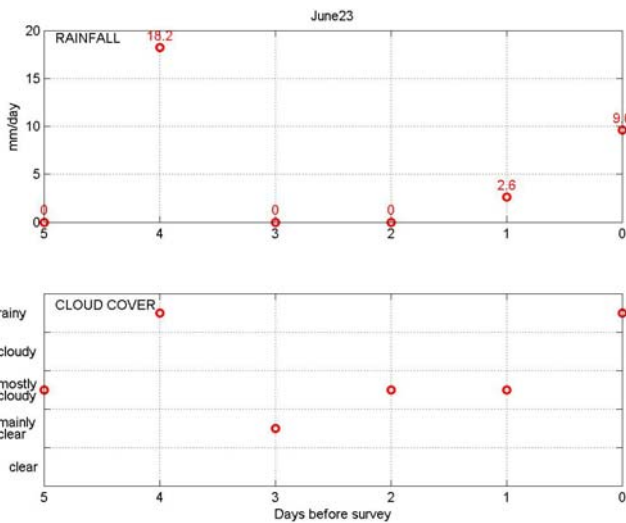


## Inner Harbour

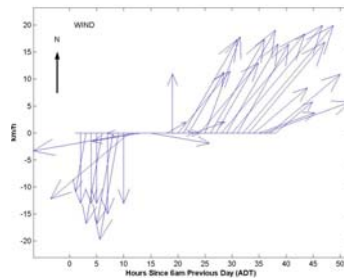
Site	Depth	Time	cfu/100mL
E1	1m	11:50	15000
	10m	11:50	1400
E2	1m	11:58	7100
	10m	11:58	200
E3	1m	12:14	3400
	10m	12:14	700
EE1	1m	12:55	100
	10m	12:55	500
EE2	1m	12:37	800
	10m	12:37	200
EE3 Qa/Qc	1m	12:24	5100
	10m	12:24	500
	10m	12:24	300
D1	1m	13:25	900
	10m	13:25	500
D2	1m	13:37	100
	10m	13:37	0
D3	1m	13:59	200
	10m	13:59	0
BRB	1m	14:36	0
	10m	14:36	0

## NW Arm and Outer Harbour

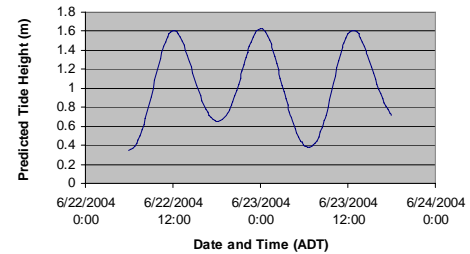
Site	Depth	Time	cfu/100mL
AYC	1m	16:31	100
	10m	16:31	100
RNSYS	1m	16:20	4200
	10m	16:20	0
PC	1m	16:10	0
	10m	16:10	0
EPYC	1m	14:22	100
	10m	14:22	200
C2	1m	14:48	0
	10m	14:48	0
C5	1m	14:05	100
	10m	14:05	0
C6	1m	14:15	100
	10m	14:15	200
HC	1m	15:05	300
	10m	15:05	0
B2	1m	15:30	0
	1m	15:30	0
	10m	15:30	0



## Wind Direction

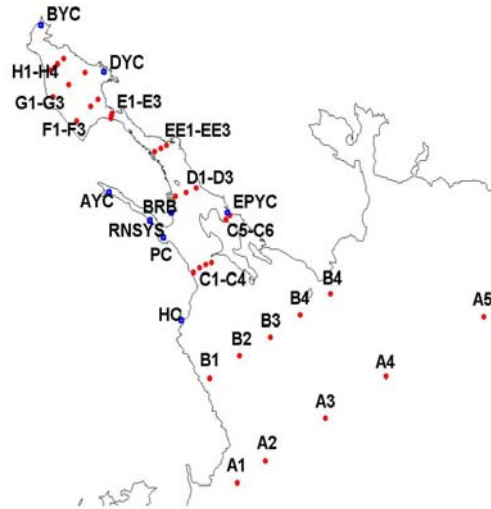


## Predicted Tides



**CHEMISTRY**

*Harbour Water Quality Monitoring Program  
Draft Report for June 23, 2004*



Site	Depth	Time	Parameter:	Ammonia (as N)	TSS	Manganese
			EQL:	0.05	0.5	20
			mg/l	mg/l	µg/L	
H2	1m	10:18	< 0.05	2.6	<20	
	10m	10:18	< 0.05	3.1	<20	
G2	1m	10:47	< 0.05	13.8	<20	
	10m	10:47	< 0.05	5.8	<20	
F2	1m	11:25	< 0.05	< 1	<20	
	10m	11:25	0.22	1.4	<20	
E2	1m	11:58	0.14	2.9	<20	
	10m	11:58	< 0.05	3	<20	
EE2	1m	12:37	< 0.05	1.8	<20	
	10m	12:37	< 0.05	2.4	<20	
D2	1m	13:37	< 0.05	2	20	
	10m	13:37	< 0.05	2.8	<20	
B2 Qa/Qc	1m	15:30	< 0.05	2	<20	
	1m	15:30	1.6	3.8	<20	
	10m	15:30	< 0.05	1.6	<20	

