Halifax Harbour Water Quality Monitoring Project
Survey Summary #137

Survey Date: 29 August 2007
Nature of Survey: Complete Survey
Report File (this document): HHWQMP_report137_070829.doc
Data File: HHWQMP_data137_070829.xls
Data Return:

Profile:	100%
Bacteria:	100%
Chemical:	100%
Overall:	**100%**

Sample Notes:

A replacement CTD (Dalhousie Univ.) was used as regular CTD was out for service. A CTD cast was taken at the LOBO buoy (NW Arm) for intercomparison purposes. A sample of opportunity was taken in front of Harbourside (HS). The results for HS that are above detection limits are as follows:

Parameter	Units	Values		Parameter	Units	Values
Fecal Coliform	cfu/100ml	360		Manganese	ug/L	3
TSS	mg/L	4.6		Zinc	ug/L	6
Copper	ug/L	2.2		Lead	ug/L	0.2
Iron	ug/L	19		Nickel	ug/L	0.6

QA/QC samples:

Chemical Analysis

		B2 – 10m					
Detectable Parameter	**Units**	**reference sample**	**QA/QC**	**Detectable Parameter**	**Units**	**reference sample**	**QA/QC**
Ammonia (as N)	mg/L	0.06	0.08	Iron	ug/L	6	7
TSS	mg/L	1.2	1.8	Manganese	ug/L	1	1
Copper	ug/L	0.4	0.5	Zinc	ug/L	1	1

Fecal Coliform (CFU/100ml)

Site	BRB-1m	H3-10m	DYC-10m	B2-10m
Reference	59	24	36	0
QA/QC	9	3	18	0

Comments:

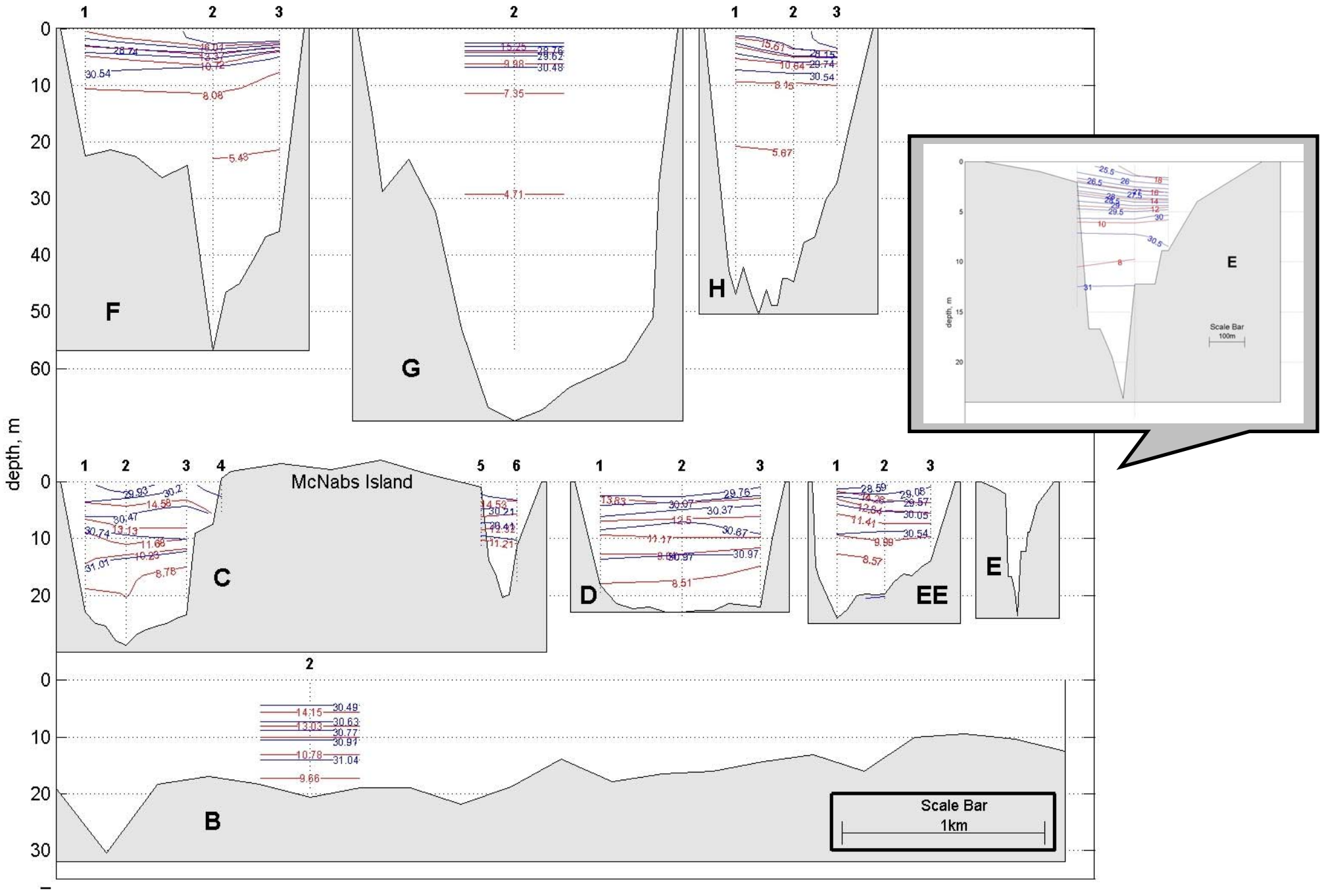
General: Overall the Harbour is somewhat warmer and fresher than in the previous survey. The density stratification is somewhat stronger, particularly in the Basin and northern Inner Harbour. This is partially a response to large rainfall event (43+mm) five days earlier. There is a lens of fresher water in the Narrows and southern Basin, perhaps associated with the ongoing bypass to the Fairview Cove storm outfall. This is consistent with the fc distribution that shows relatively high concentrations in the surface waters in this area. In the Inner Harbour, the fc values are high in the surface water, with the distribution seemingly displaced up-harbour. Field notes indicate a green colour over much of the harbour. There were also noted patches of detritus. The water in front of Harbourside appeared particularly dirty. The concentrations measured in a sample of this water were unremarkable, except that copper and lead concentrations were the highest measured in the survey.

Fluorescence: Elevated levels, similar in magnitude to the previous survey, exist throughout the harbour. The highest observed value of > 60 mg/L occurs at BYC. Values as high as the mid 30's mg/m^3 occur in sections from the head of the Basin to section EE. However, maximum values tend to be deeper and values at the surface are not quite as high. There are high values in spots, most notably at EE3, where values of > 32 mg/L led to the observation of very green water in the field notes.

Ammonia: The ammonia nitrogen levels are somewhat higher than average, with only one value below the detection limit. The highest values observed (ca. 0.1 mg/L), not unusually, is in the 10m samples in the Basin.

TSS: Near surface values in the Inner Harbour and Basin are about 3 mg/L. These values decrease to less than 1 mg/L in the Outer Harbour (B2).

Dissolved Oxygen: The DO distribution is somewhat unusual. The highest values (>12 mg/L) occur in the near surface in the Northern Basin. There is quite a steep vertical gradient in the Basin with the DO dropping a few mg/L in the top 10m. The surface values decrease and the deeper values increase going out of the Harbour. At B2 the DO is quite uniform, increasing from 9.1 mg/L at the surface to 9.5 mg/L at the bottom. The only values below the use specific guidelines are the deeper waters (>35 m) of the Basin. The DO data is not ground-truthed, however this data was obtained with a just factory calibrated instrument. (see DO discussion in QR#1). The value measured at the LOBO buoy is 11.5 mg/L which compares with 11.3 mg/L measured by the buoy.


depth, m
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McNabs Island
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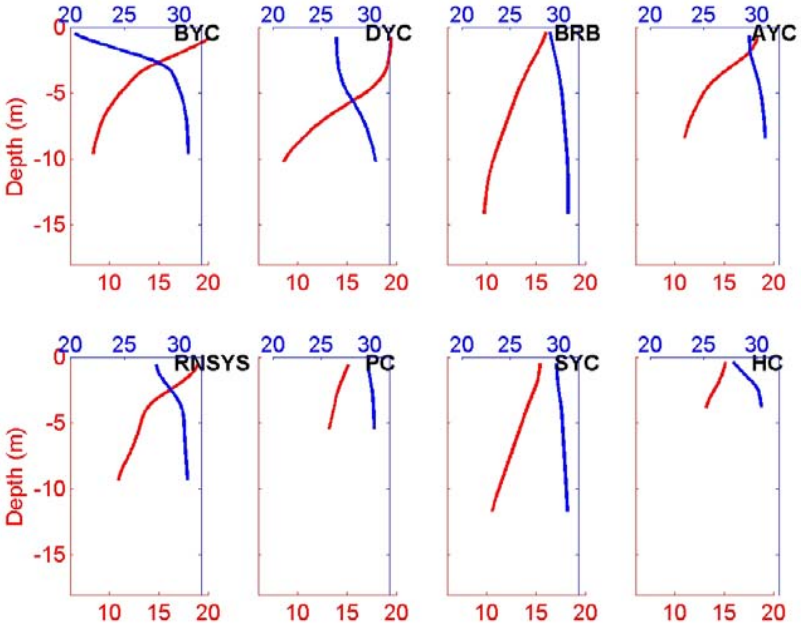
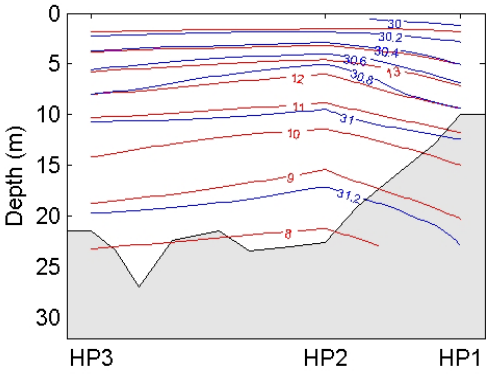
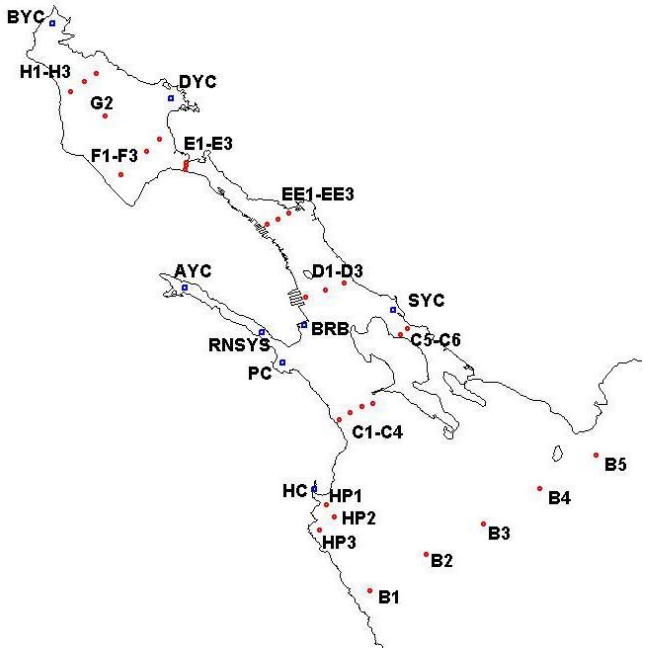
EE
E
B
Scale Bar
1km
Scale Bar
100m

Yacht Clubs

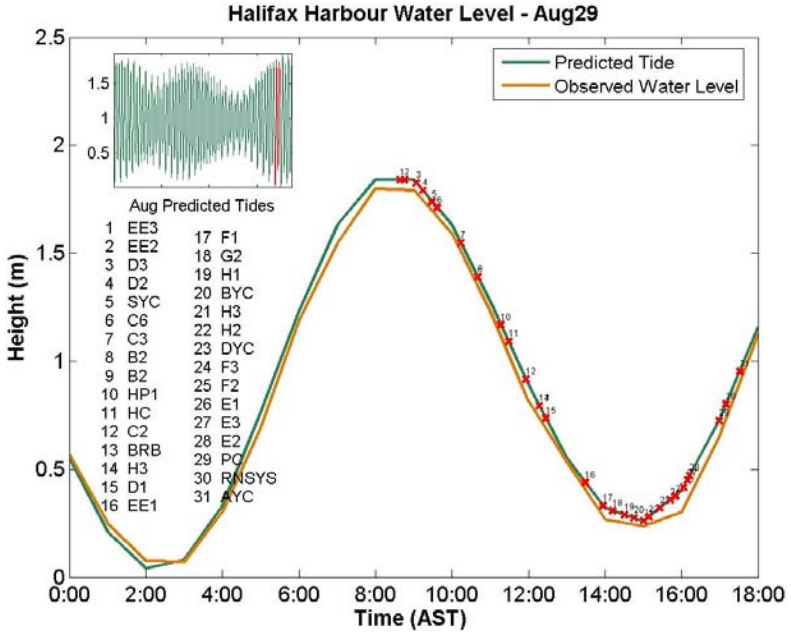


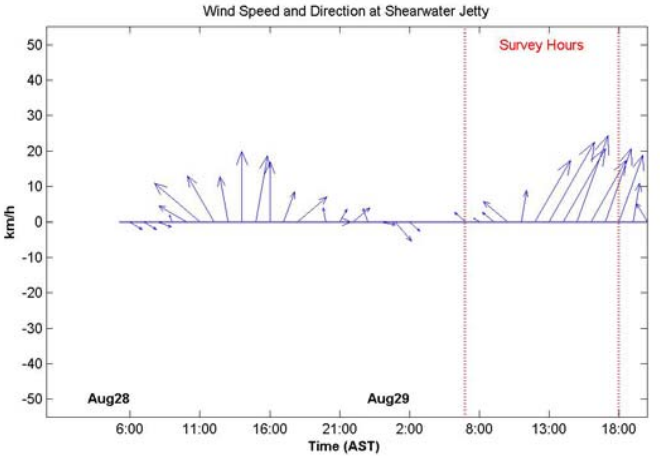


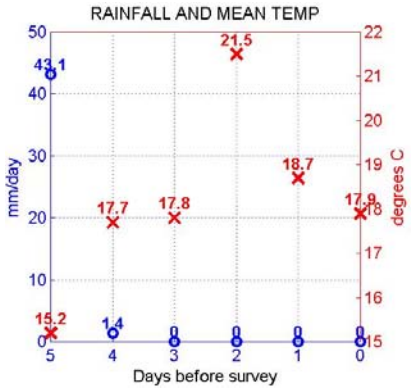


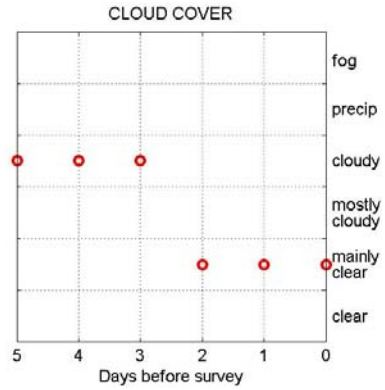
Rainfall and temperature data collected at Shearwater Autoport.

Cloud cover data collected at Shearwater Airport

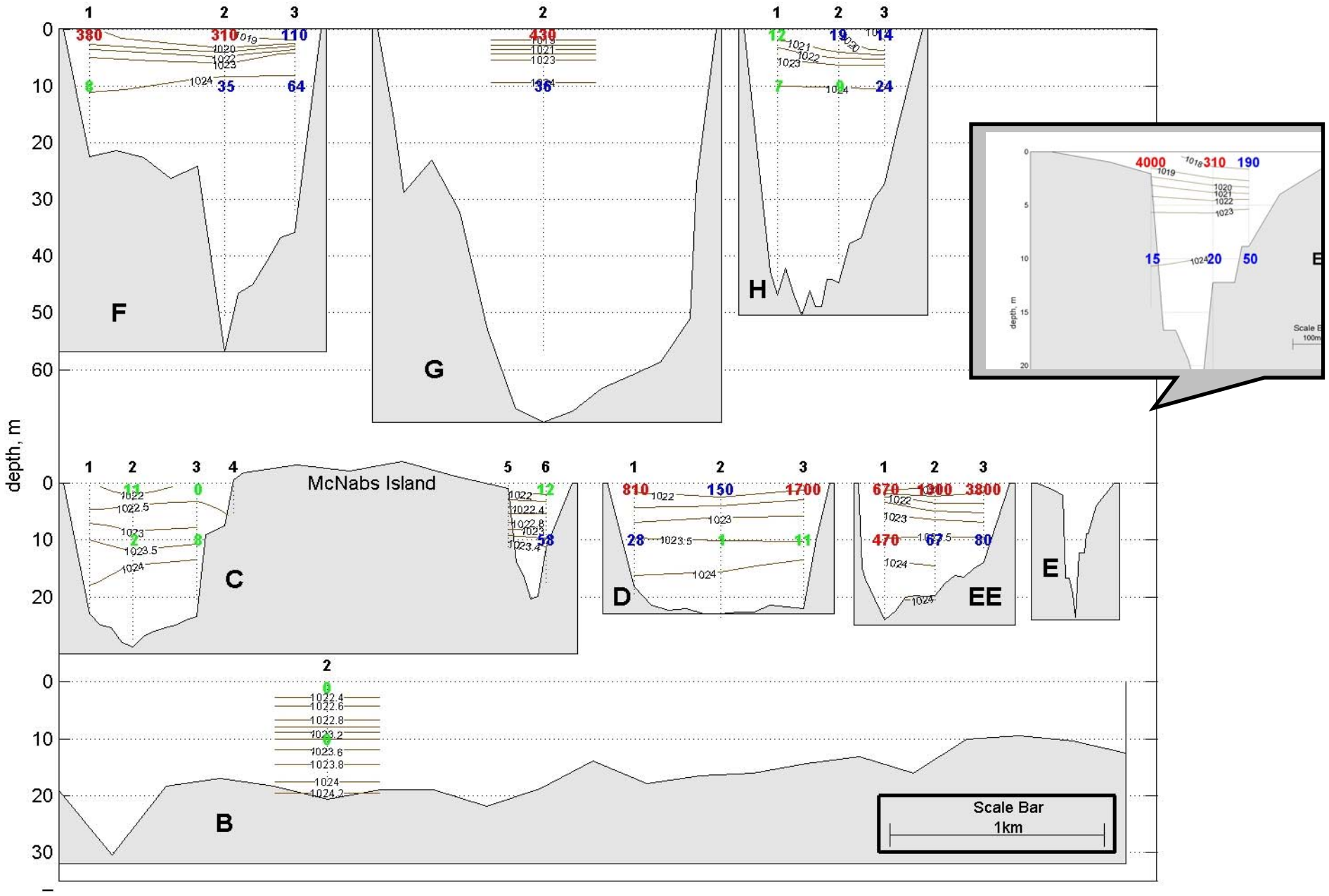








Salinity in PSU **Temperature in ^{o}C**


depth, m
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McNabs Island
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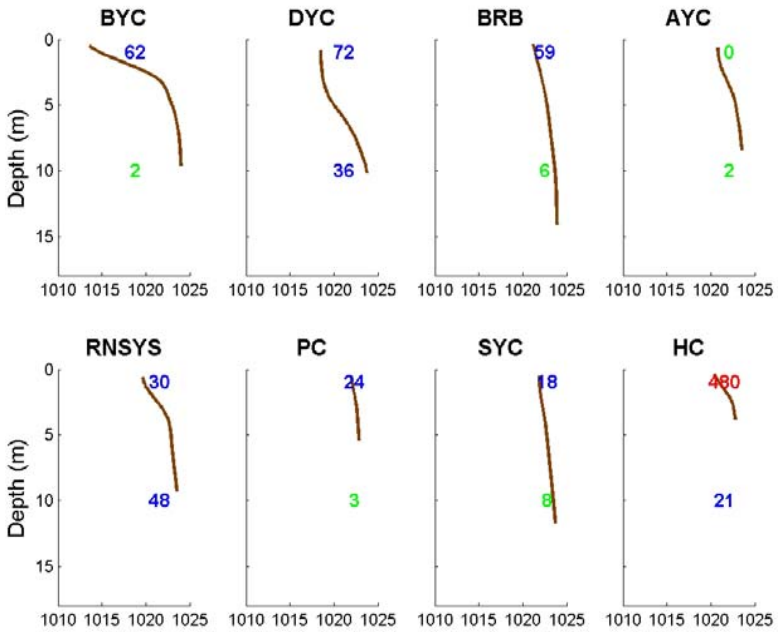
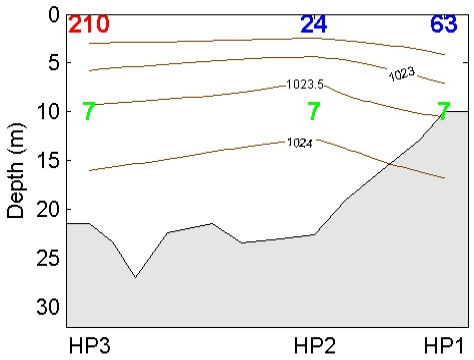
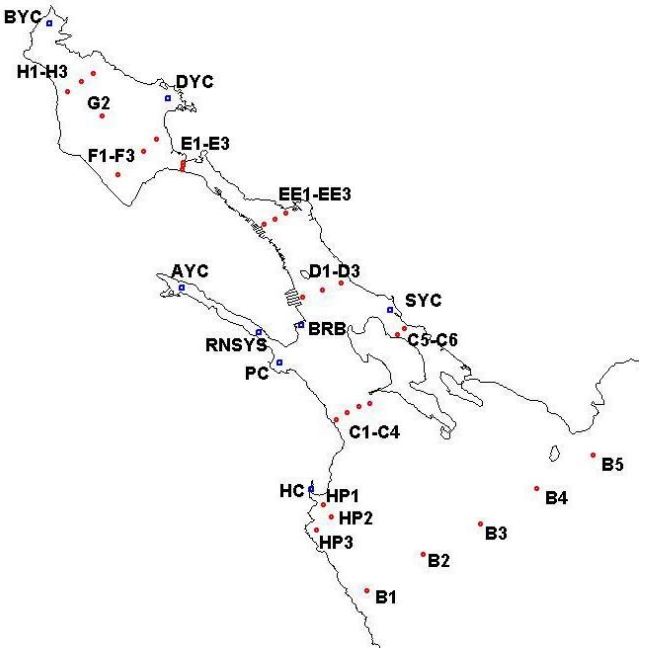
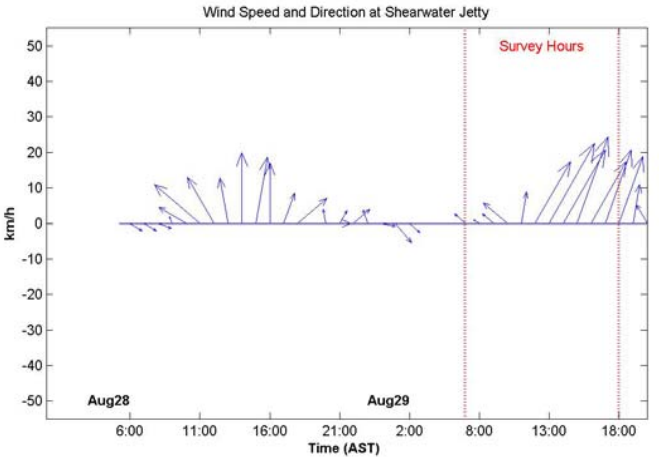
EE
B
Scale Bar
1km

Yacht Clubs









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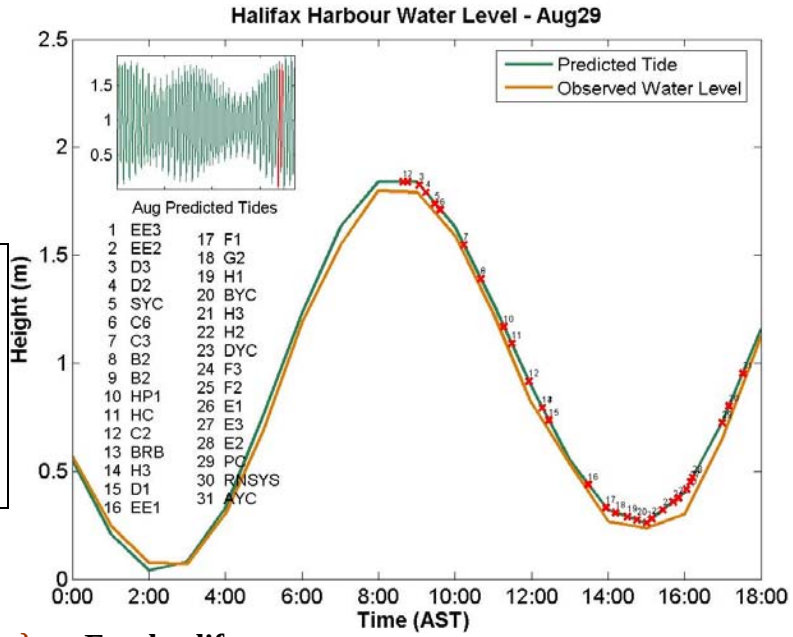
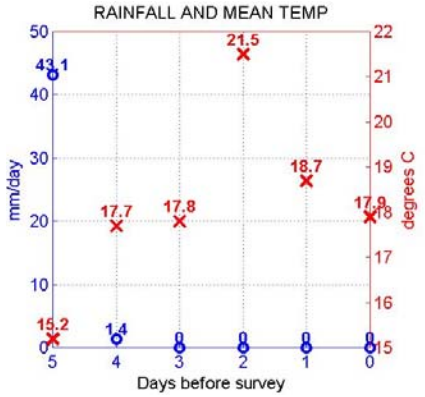
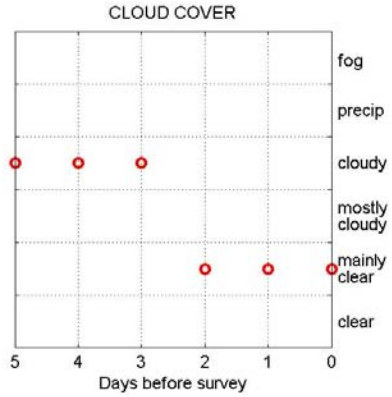
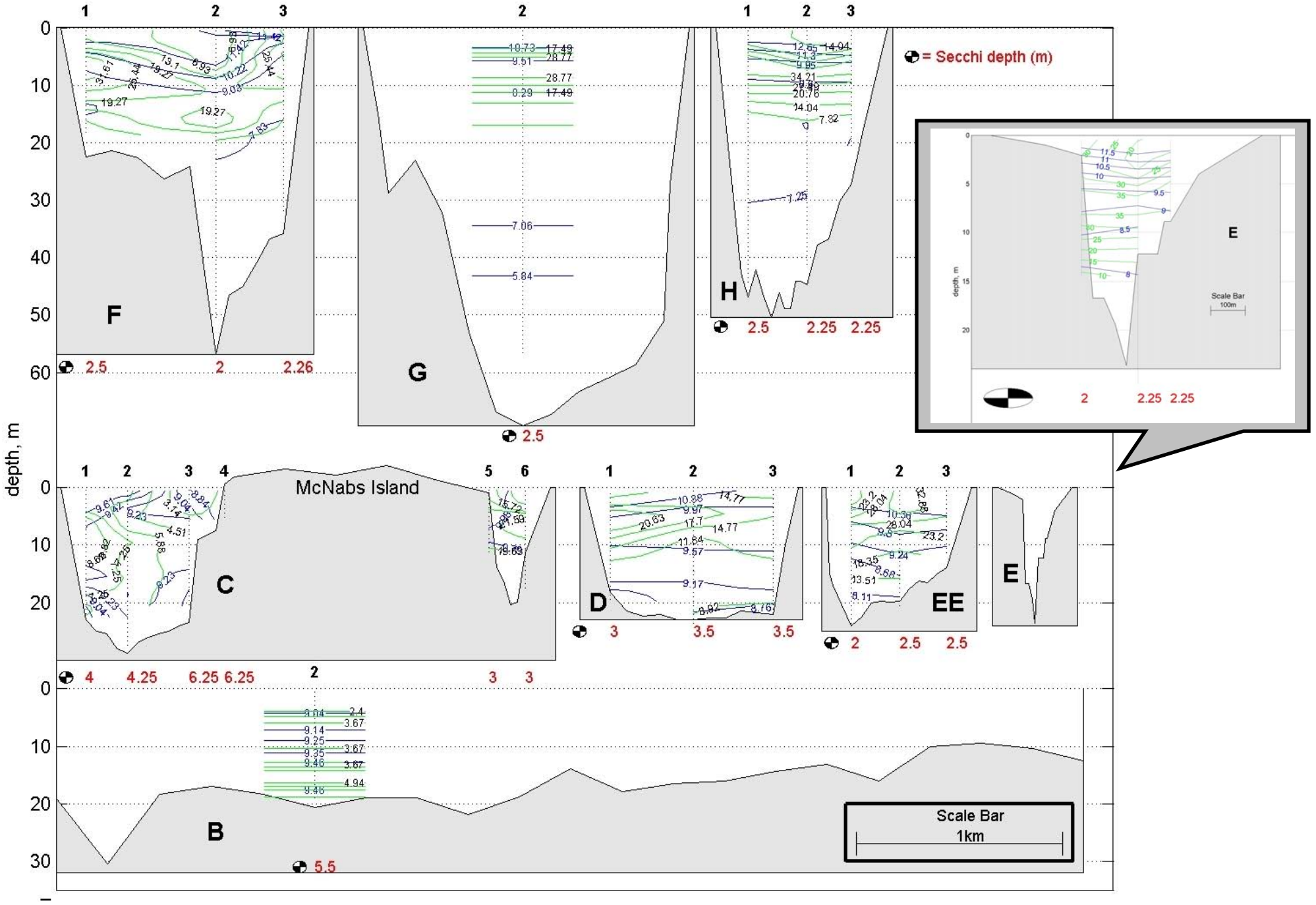






Potential Density in kg/m^3

Fecal coliform: **above swimming limit (200 cfu/100mL)**
above shellfish limit (14 cfu/100mL)
below limits


depth, m
= Secchi depth (m)
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McNabs Island
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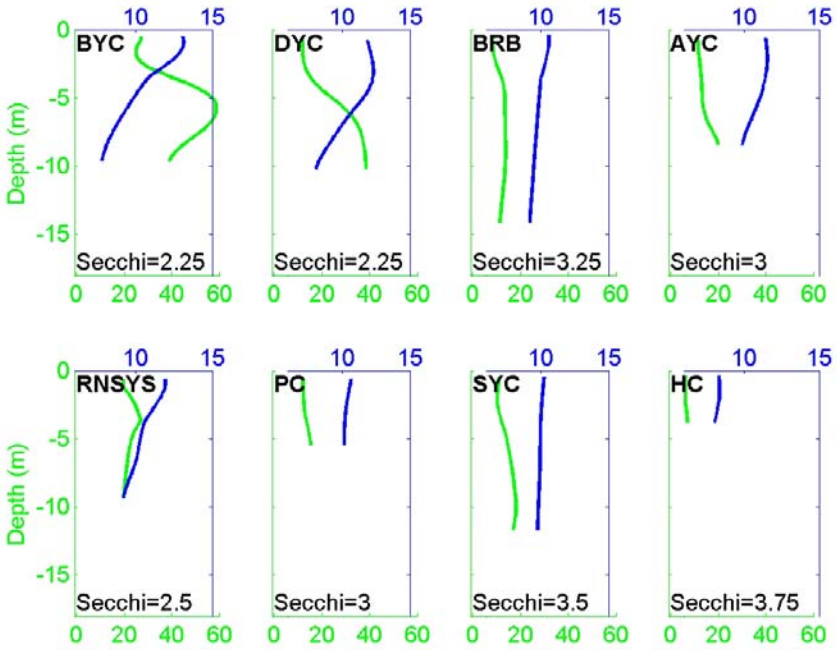
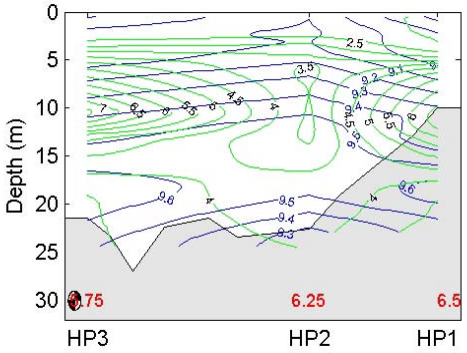
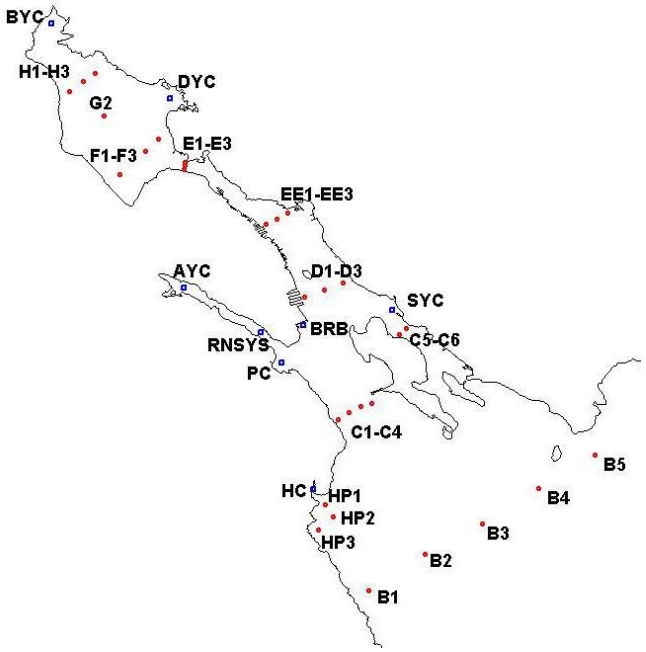
Scale Bar
1km
Scale Bar
100m

Yacht Clubs







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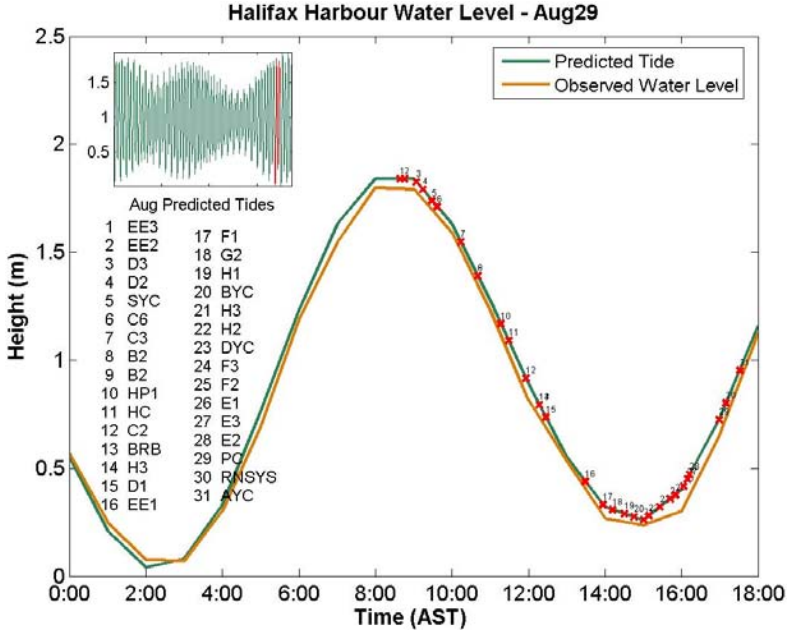
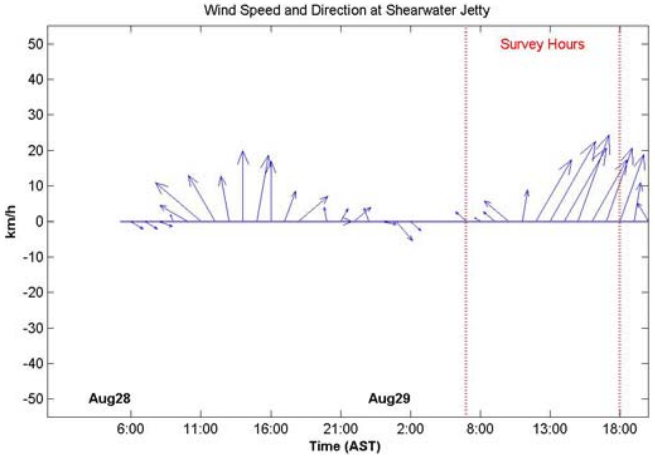
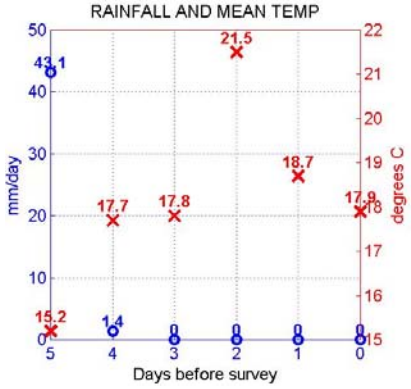
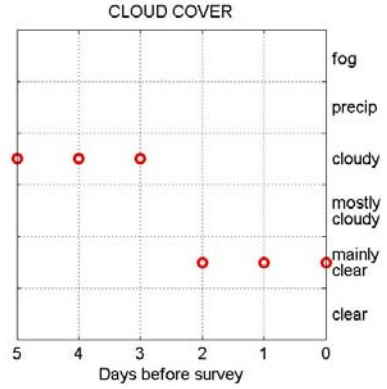
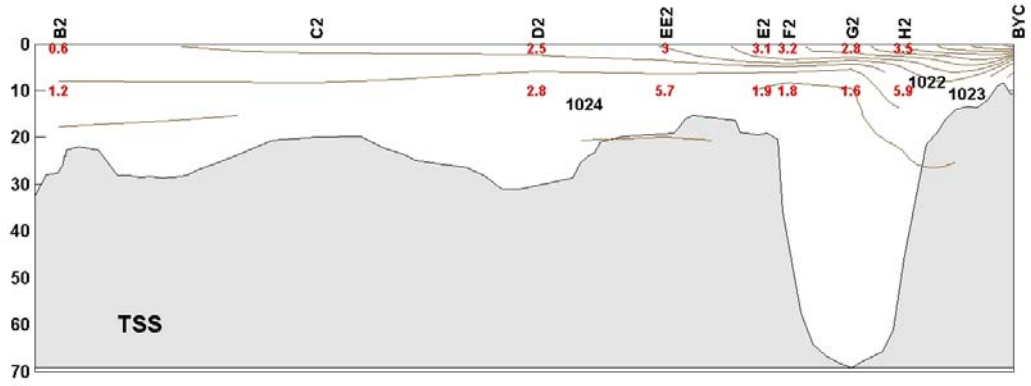


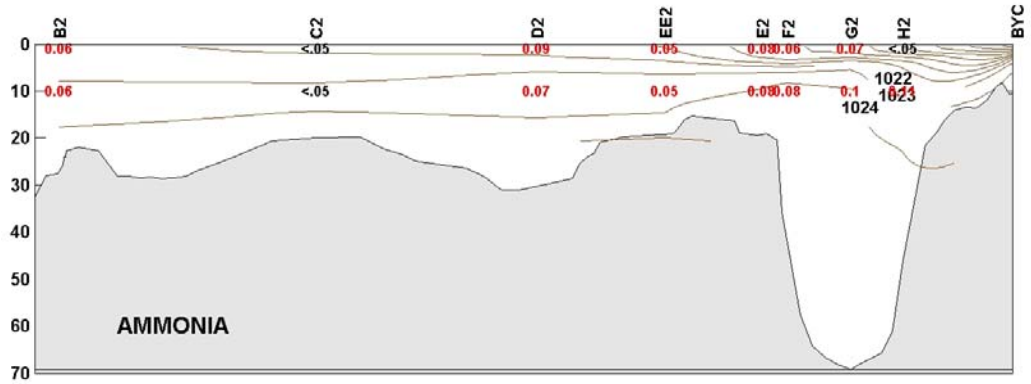


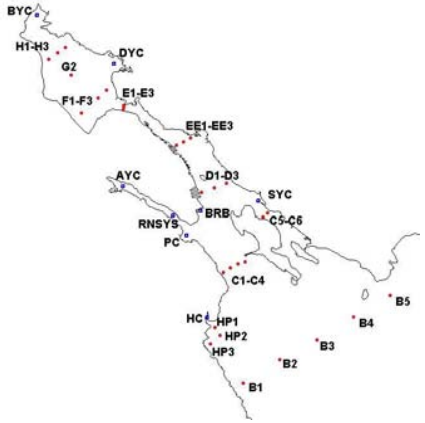




DO in mg/L **Chlorophyll in mg/m^3**







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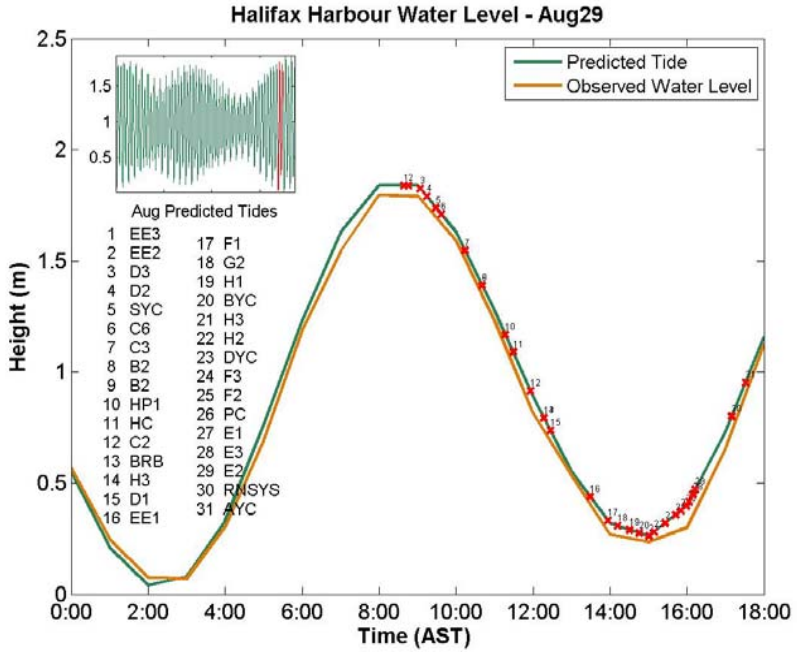
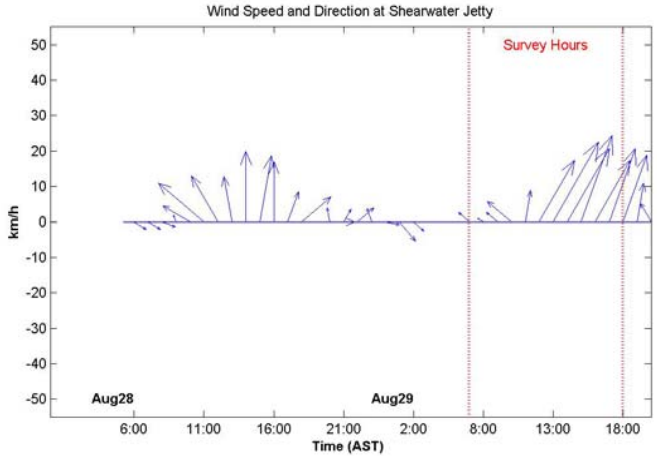
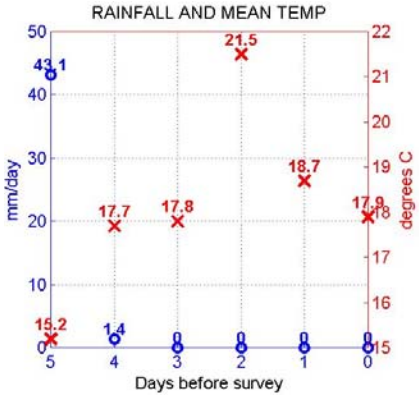
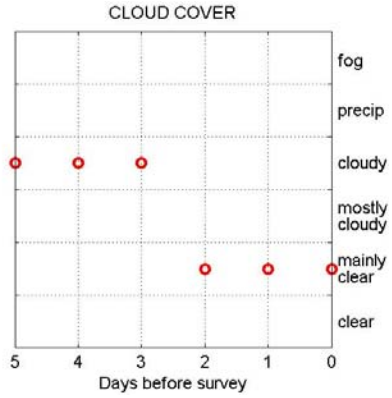
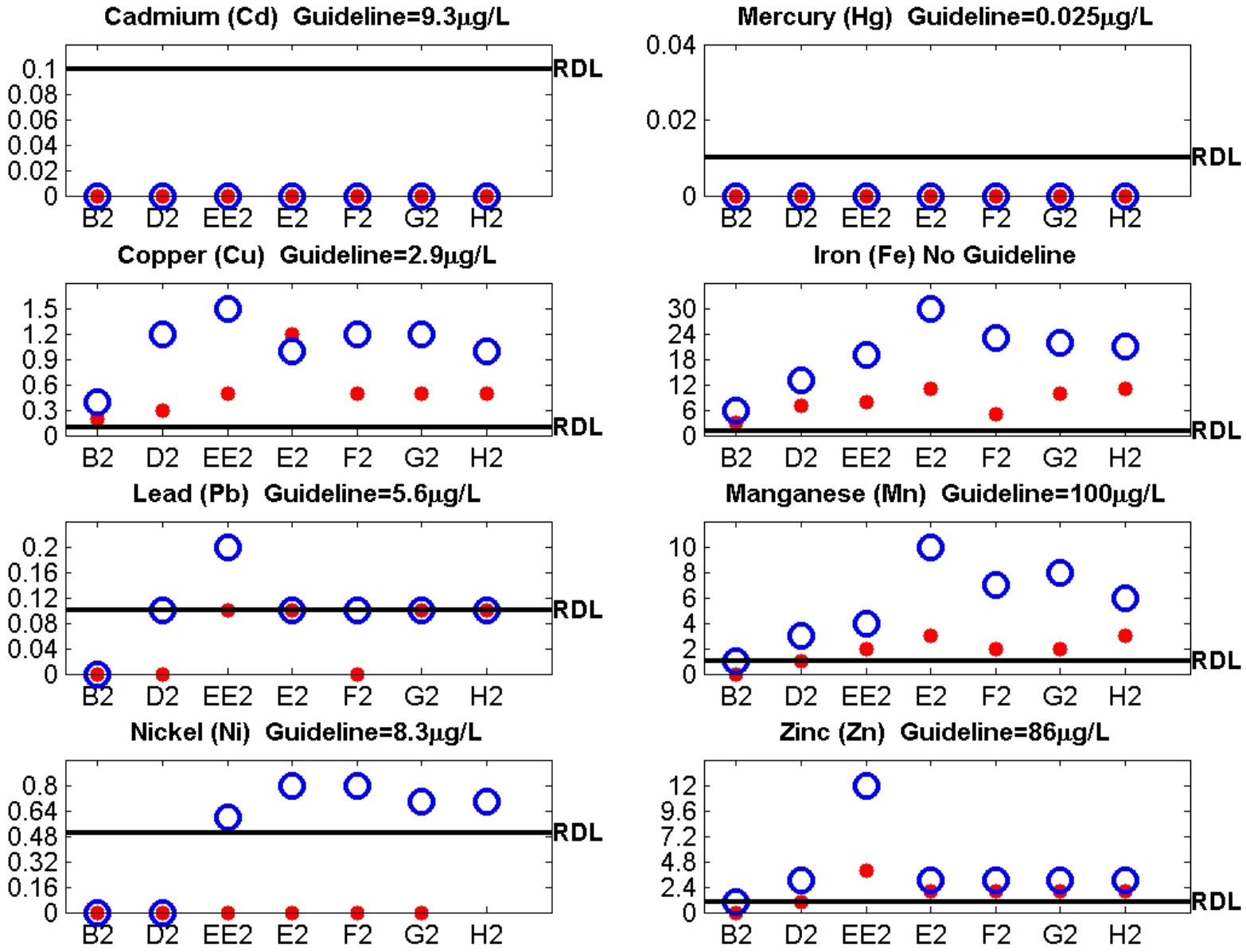








Potential Density in kg/m^3 **Ammonia in mg/L** **TSS in mg/L**


Cadmium (Cd) Guideline=9.3µg/L
0.1
0.08
0.06
0.04
0.02
0
RDL
B2 D2 EE2 E2 F2 G2 H2
Mercury (Hg) Guideline=0.025µg/L
0.04
0.02
0
RDL
B2 D2 EE2 E2 F2 G2 H2
Copper (Cu) Guideline=2.9µg/L
1.5
1.2
0.9
0.6
0.3
0
RDL
B2 D2 EE2 E2 F2 G2 H2
Iron (Fe) No Guideline
30
24
18
12
6
0
RDL
B2 D2 EE2 E2 F2 G2 H2
Lead (Pb) Guideline=5.6µg/L
0.2
0.16
0.12
0.08
0.04
0
RDL
B2 D2 EE2 E2 F2 G2 H2
Manganese (Mn) Guideline=100µg/L
10
8
6
4
2
0
RDL
B2 D2 EE2 E2 F2 G2 H2
Nickel (Ni) Guideline=8.3µg/L
0.8
0.64
0.48
0.32
0.16
0
RDL
B2 D2 EE2 E2 F2 G2 H2
Zinc (Zn) Guideline=86µg/L
12
9.6
7.2
4.8
2.4
0
RDL
B2 D2 EE2 E2 F2 G2 H2
LEGEND
= Ten Metre Sample
= One Metre Sample
RDL = Reportable Detection Limit