

Halifax Harbour Water Quality Monitoring Project Survey Summary #144

Survey Date: 05 December 2007
Nature of Survey: Complete Survey
Report File (this document): HHWQMP_report144_071205.doc
Data File: HHWQMP_data144_071205.xls

Data Return:
 Profile: 97%
 Bacteria: 98%
 Chemical: 100%
Overall: 98%

Sample Notes:

The fecal coliform sample from B2-1m was broken in the lab.
 A CTD cast was taken at the LOBO buoy location (44.6291 N, 63.5915 W) at 0800.
 The CTD profile at C3 failed quality control (pump lost prime). The data is plotted here but has been deleted from the data file.
 Supplementary samples were taken inside a visible plume over the Halifax STP outfall (44°39.23'N 63°34.49'W) detectable values follow:

Parameter	Units	1m	10m	Parameter	Units	1m	10m
Fecal Coliform	cfu/100 ml/L	540	370	Lead	ug/L	0.1	<0.1
Ammonia	mg/L	0.12	0.09	Manganese	ug/L	3	4
TSS	mg/L	4.7	2.4	Nickel	ug/L	0.6	<0.5
Copper	ug/L	0.9	0.6	Zinc	ug/L	5	2
Iron	ug/L	16	30	Mercury	ug/L	<0.01	0.01

QA/QC samples:

Chemical Analysis		EE2 - 1m	
Detectable Parameter	Units	reference sample	QA/QC
Ammonia (as N)	mg/L	0.05	<0.05
Total Suspended Solids	mg/L	1.4	2
Copper	ug/L	1.5	0.5
Iron	ug/L	12	12
Manganese	ug/L	2	3
Zinc	ug/L	3	1

Fecal Coliform (CFU/100ml)

Site	H1-10m	F3-1m	C3-1m	D2-1m
Reference	61	22	93	350
QA/QC	300	19	12	400

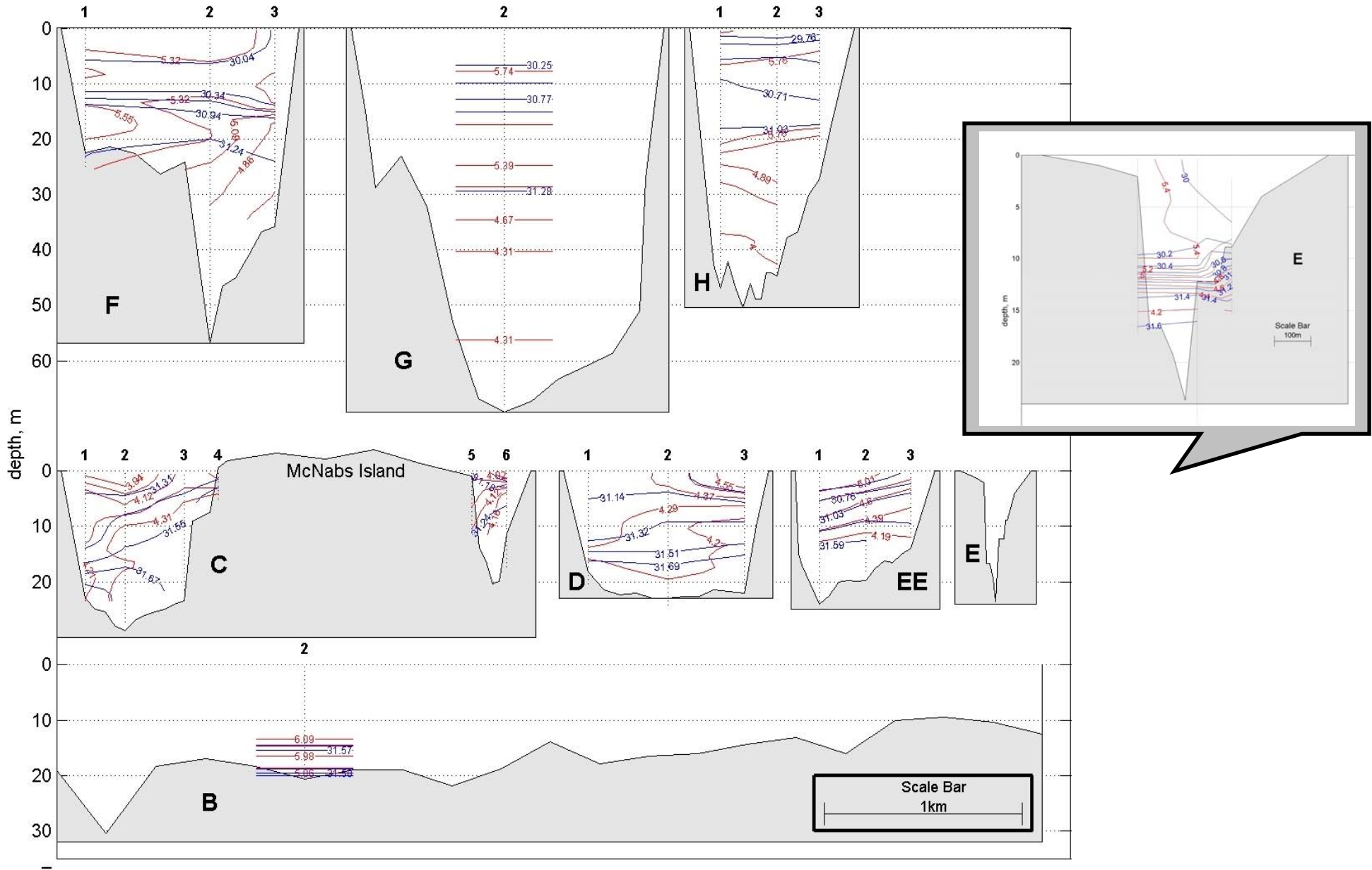
General: The moderate rainfall (total 26 mm) two days previous to survey has an obvious surface signature only in the Basin up to Narrows. There is an ongoing intrusion of warmer, more saline (approx. 4 C and 31.9 PSU), shelf water into the Harbour, that is displacing the 2.9 C, 31.2 PSU Basin bottom water observed last survey. The intrusion is ongoing, likely driven by upwelling winds. There is bottom water more dense than the Basin bottom water everywhere in the Inner Harbour including the bottom 10-15 m at the sill (site E2). The stepwise commissioning of the Halifax STP is continuing, The bacteria levels are generally unremarkable, but the distribution is shifted seaward from the more normal distribution and higher values are located deeper than has been the norm. This is likely due to the upwelling event and/or the changing source distribution due to treatment plant commissioning. The values in the NW Arm are relatively high everywhere perhaps influenced by the rainfall in the previous two days

Fluorescence: The fluorescence values are low and vertically uniform with maximums of about 1-2 mg/m³ everywhere. The exception is near bottom at EE2 where the relatively high value (18 mg/L) is likely caused by sediment interference.

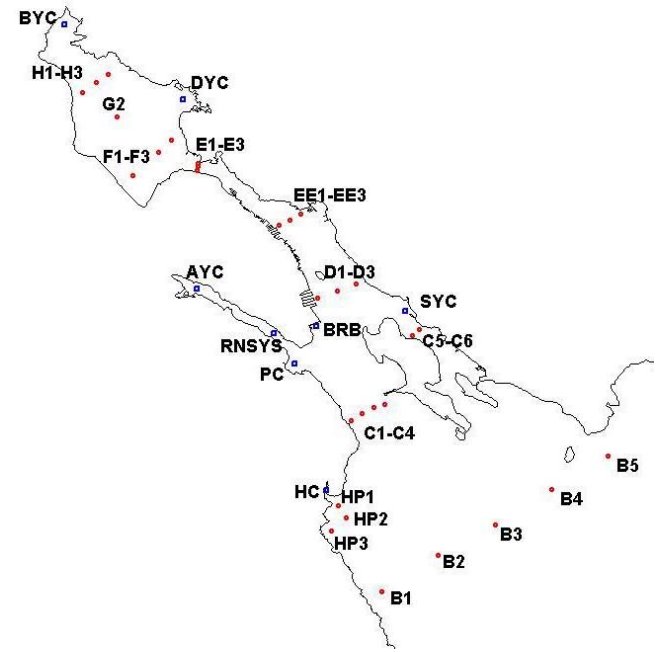
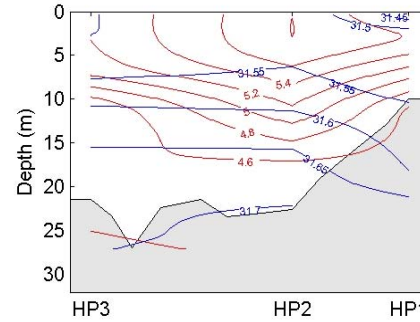
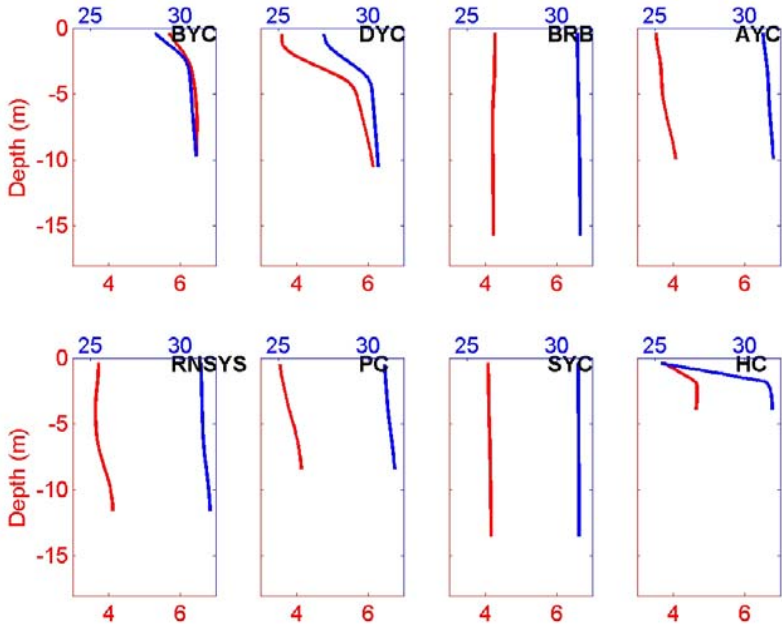
TSS: TSS values are relatively low with values generally between 1 and 4 mg/L. An exception is the highest value in the 1m sample in the Outer Harbour (4.7 mg/L). There is not a clear spatial pattern.

Metals: There is one value exceeding guidelines. A copper concentration of 7.0 ug/L at D2-1m, is above the guideline of 2.9 ug/L. Other than this there is a relatively high value of copper (2.7 ug/L at G2-1) and two values of Mercury (0.02 ug/L at B2-1m and F2-10m) that approach the guidelines.

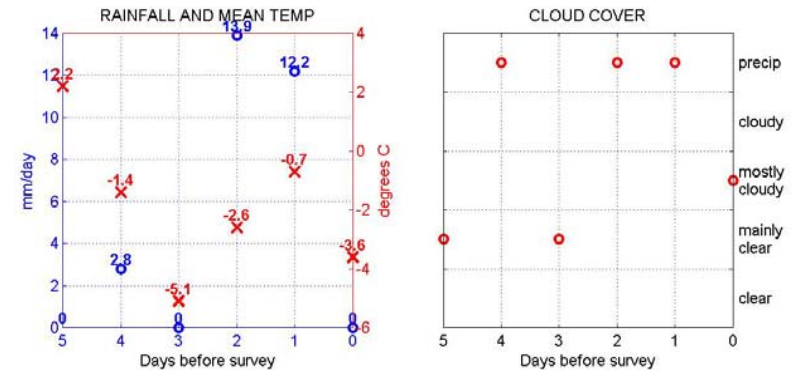
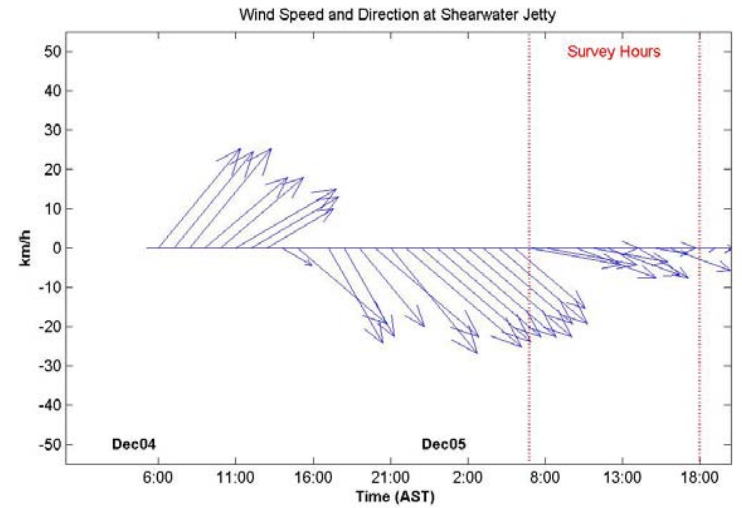
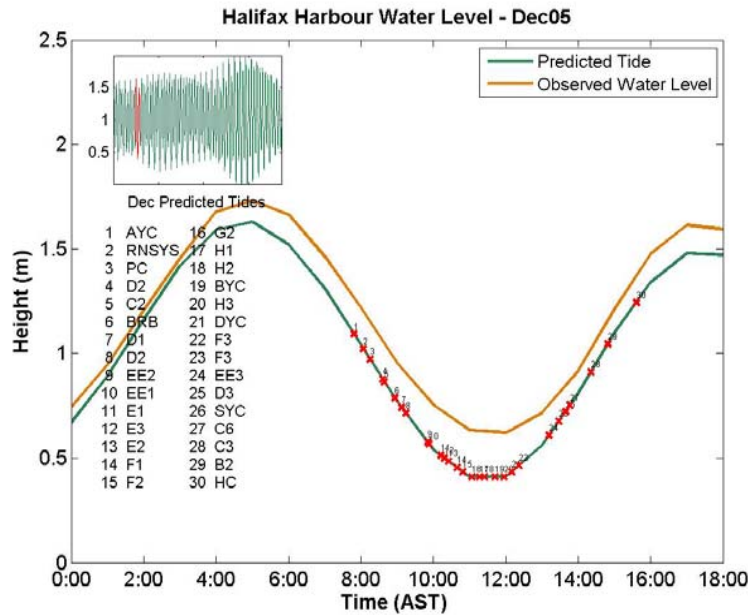
Dissolved Oxygen: The DO levels remain relatively high (9.0 – 10.0 mg/L). Levels are slightly higher in the Outer Harbour and vertically uniform throughout the Inner and Outer Harbour. In the Basin the intrusion has raised the bottom DO levels from approximately 1.4 mg/L last survey to 7.4 mg/L. The only values below the use specific guidelines are in midwater in the Basin, with a minimum of about 4.6 mg/L at 40 m. The DO data is not ground-truthed, however this data was obtained with a recently factory calibrated instrument. (see DO discussion in Quarterly Reports).
 LOBO DO = 8.4 mg/L, CTD DO = 9.5 mg/L.



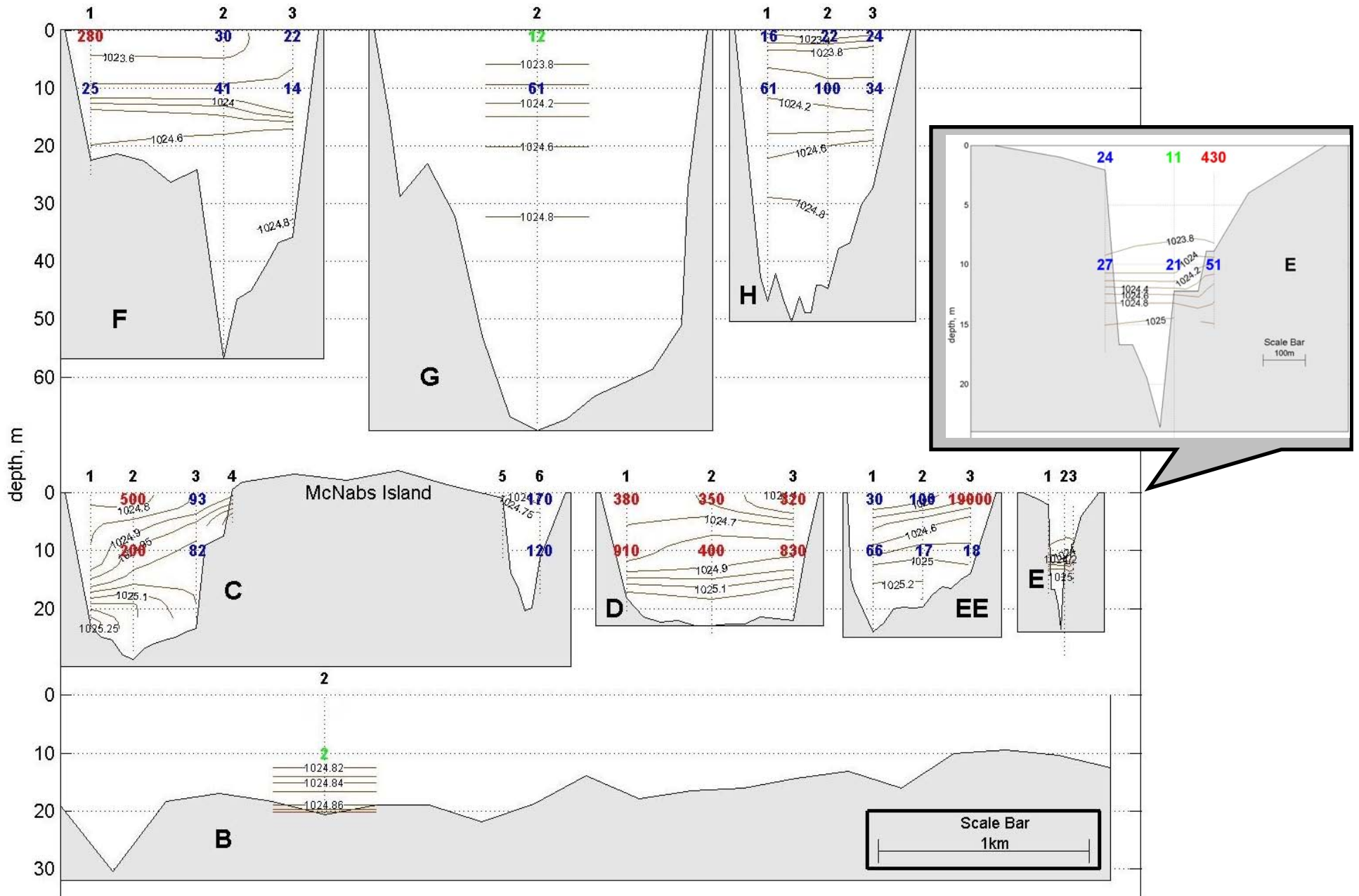
Yacht Clubs



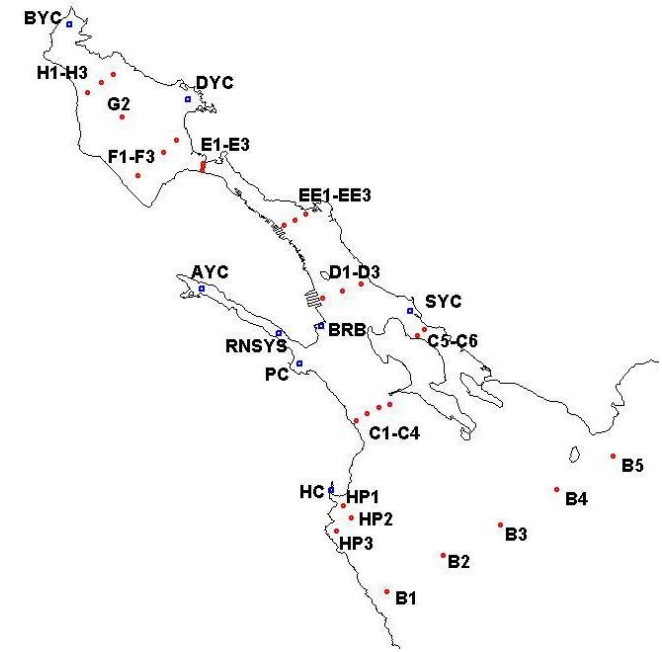
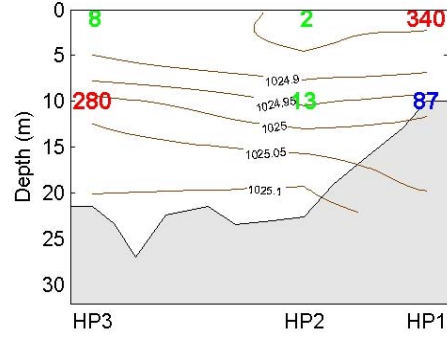
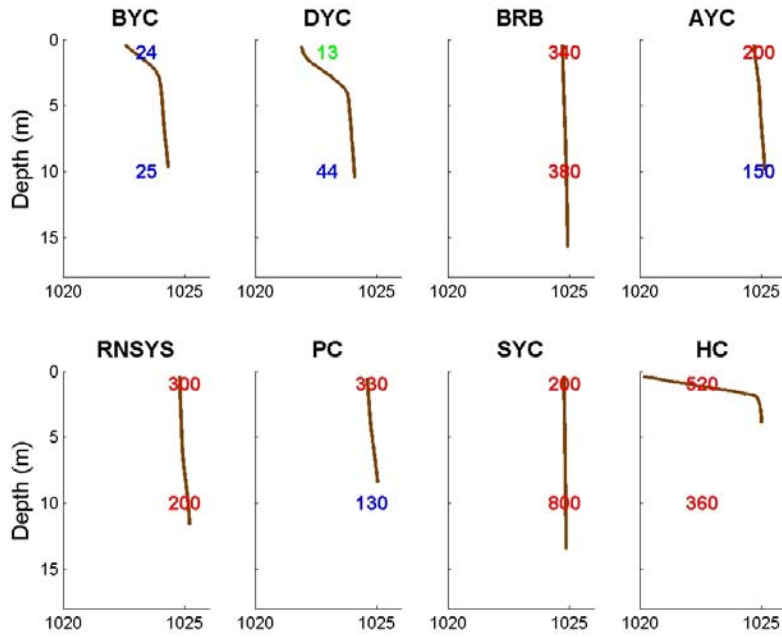
Rainfall and temperature data collected at Shearwater Autoport.
Cloud cover data collected at Shearwater Airport



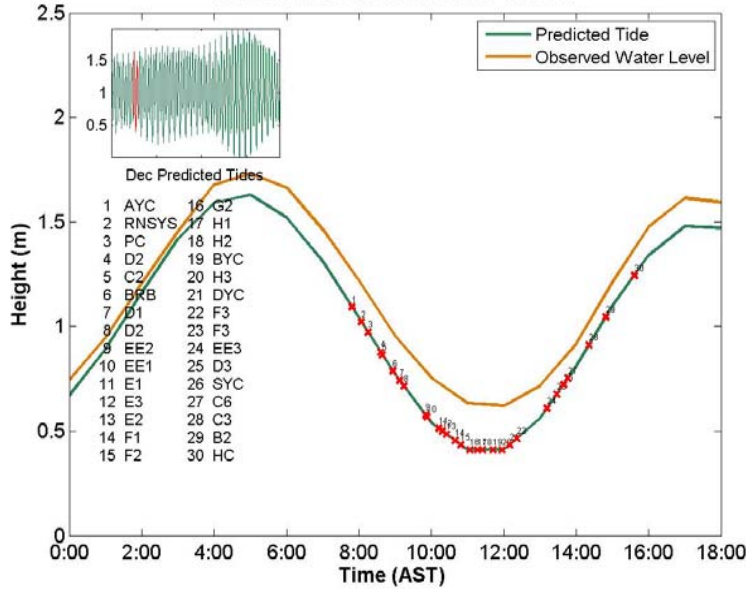
Salinity in PSU Temperature in °C



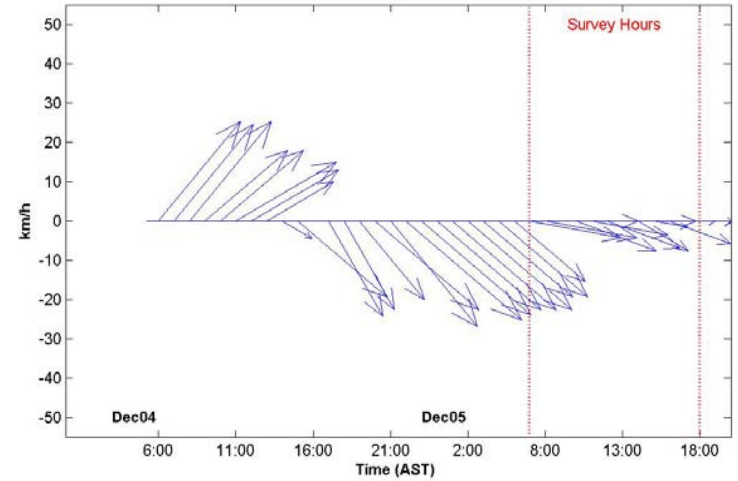
Yacht Clubs



Halifax Harbour Water Level - Dec05



Wind Speed and Direction at Shearwater Jetty



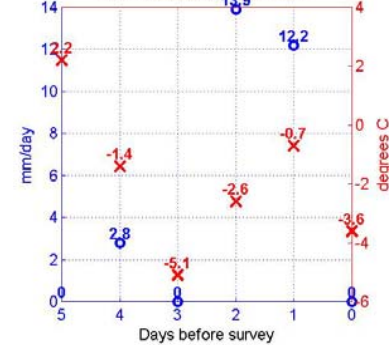
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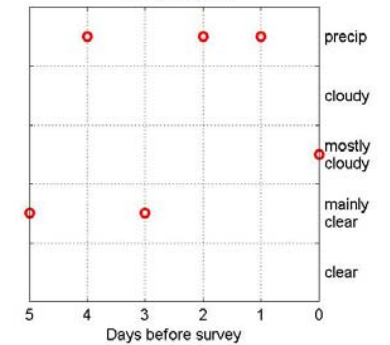
Potential Density in kg/m^3

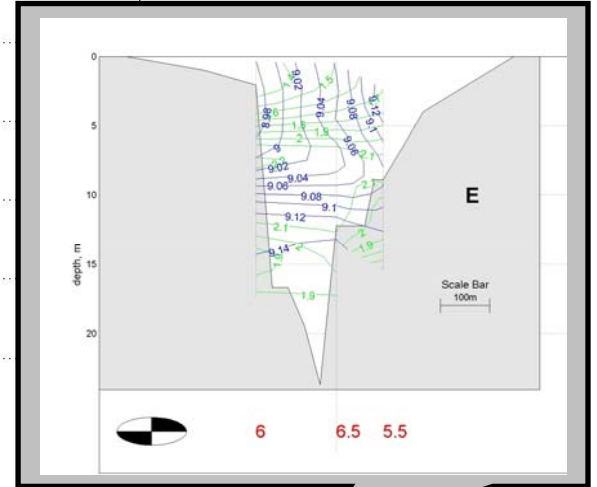
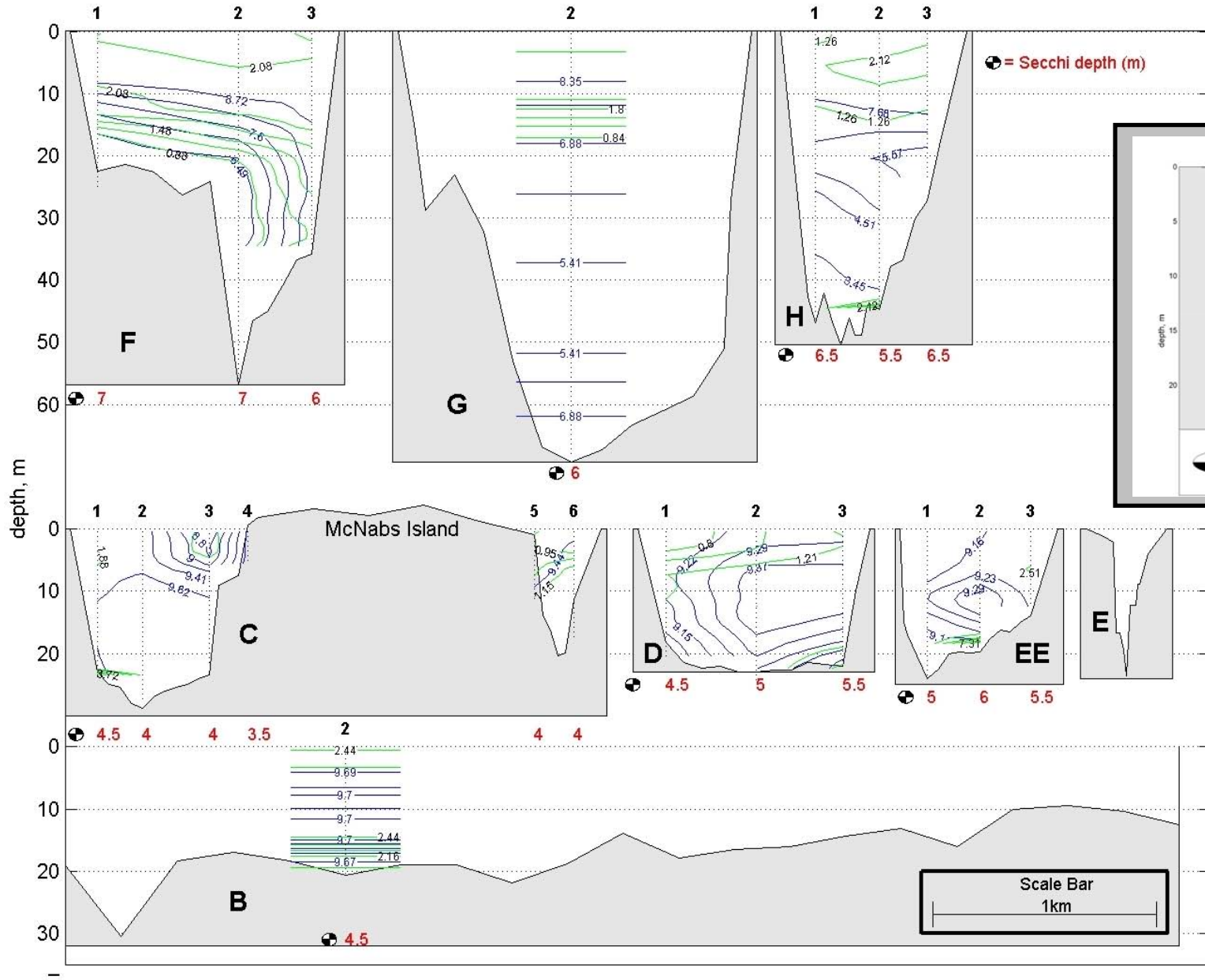
Fecal coliform: **above swimming limit (200 mpn/100mL)**
above shellfish limit (14 mpn/100mL)
 below limits

RAINFALL AND MEAN TEMP

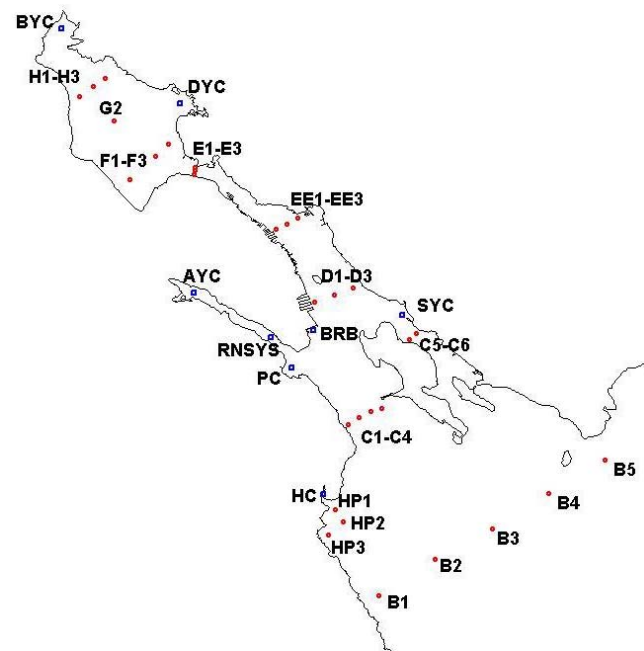
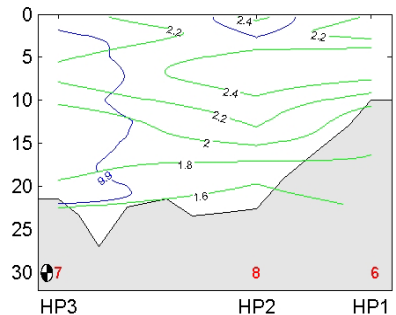
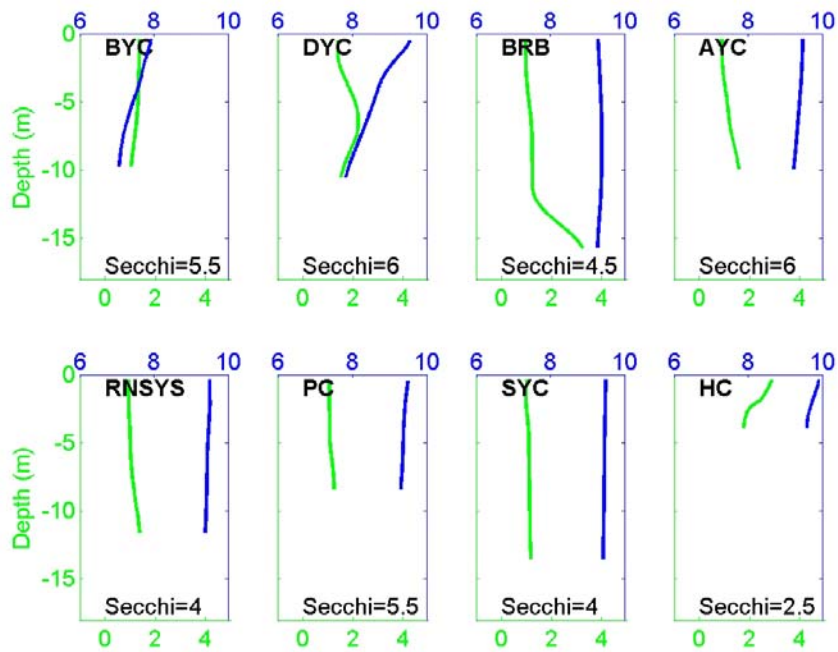


CLOUD COVER

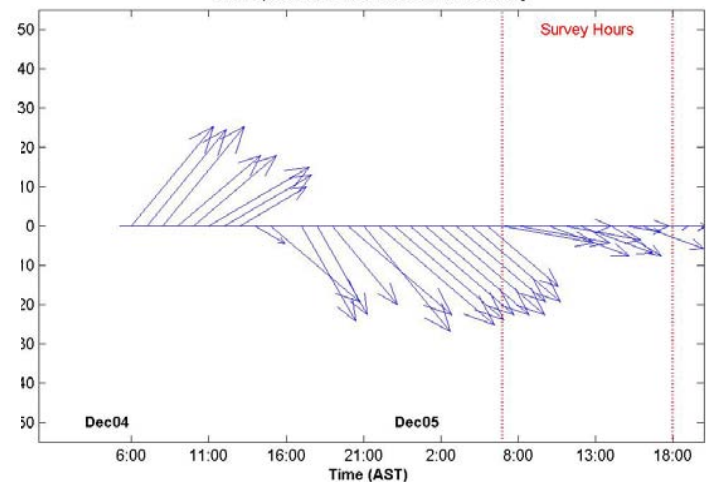




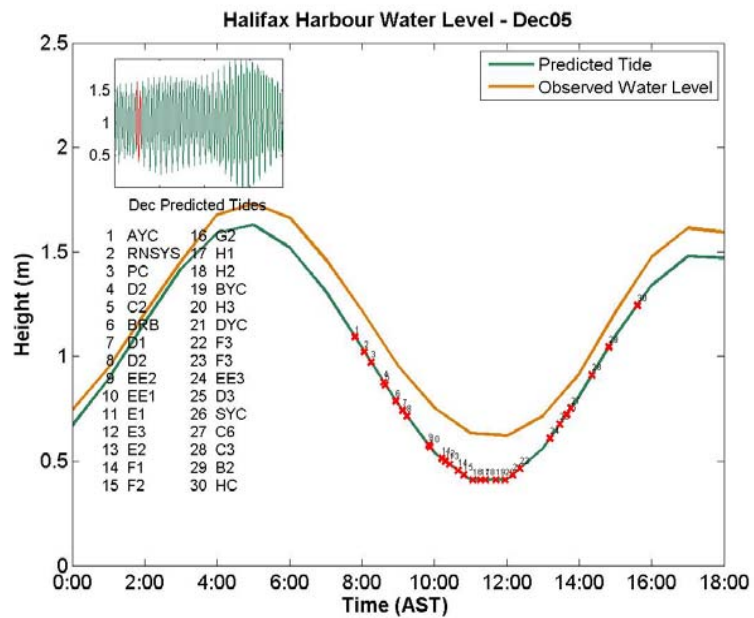
Yacht Clubs



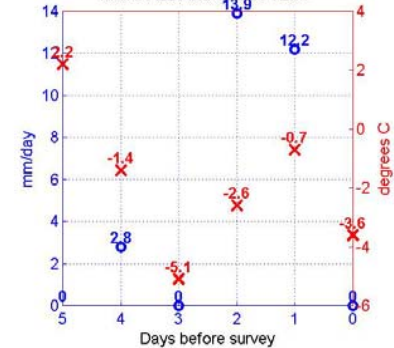
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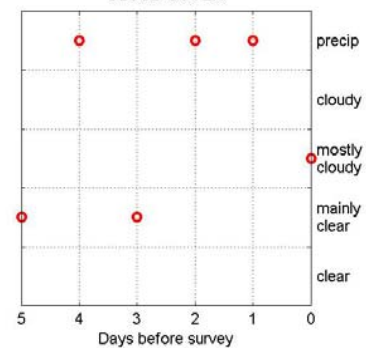
Rainfall and temperature data collected at Shearwater Autoport.
Cloud cover data collected at Shearwater Airport



RAINFALL AND MEAN TEMP



CLOUD COVER

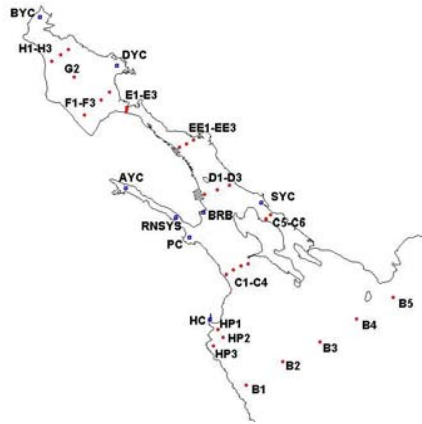
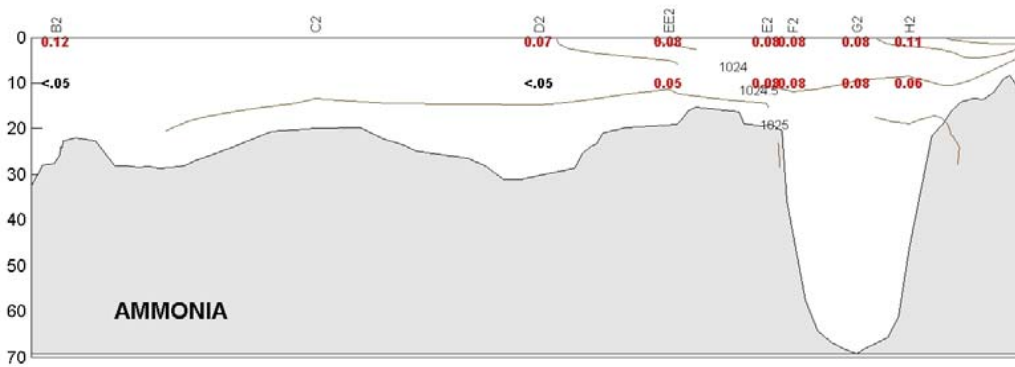
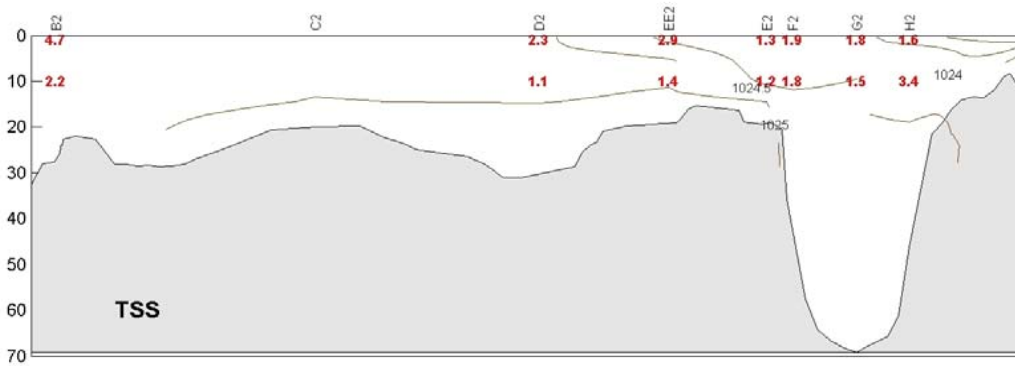


DO in mg/L

Chlorophyll in mg/m³

Harbour Water Quality Monitoring Program

CHEMISTRY



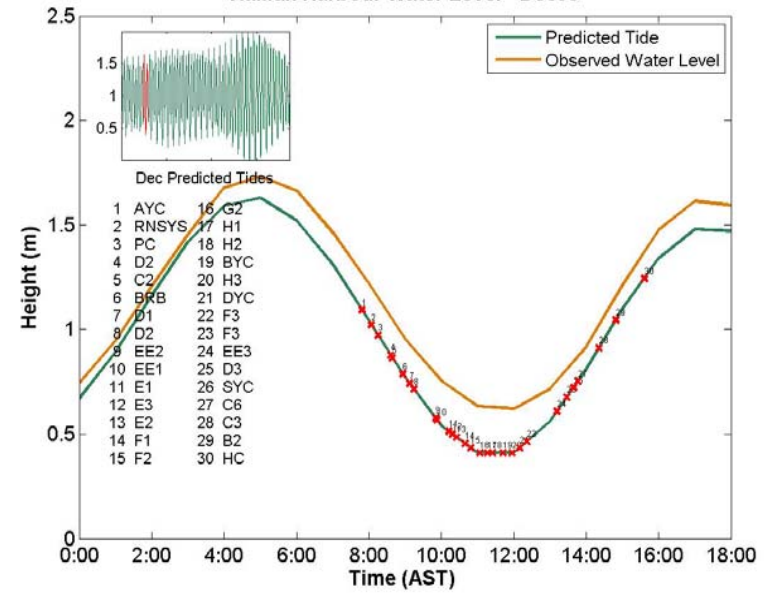
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Cloud cover data collected at Shearwater Airport

Potential Density in kg/m^3

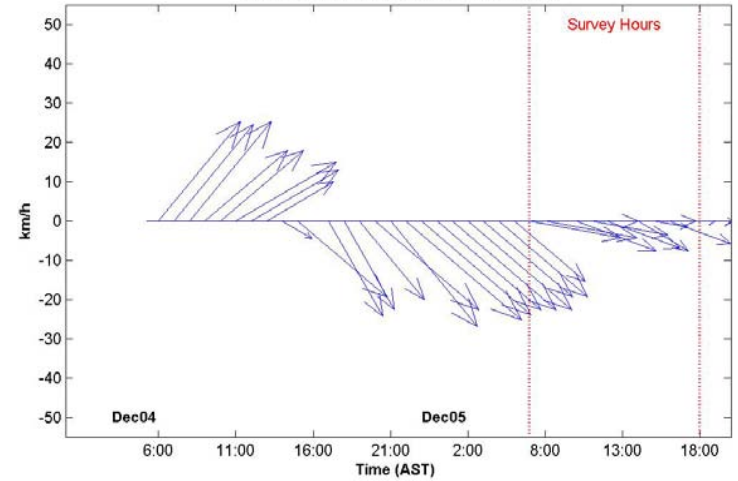
Ammonia in mg/L

TSS in mg/L

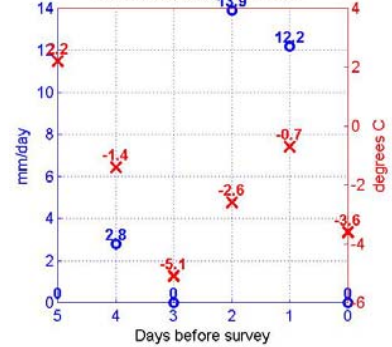
Halifax Harbour Water Level - Dec05



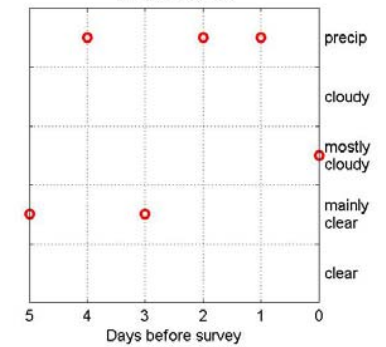
Wind Speed and Direction at Shearwater Jetty

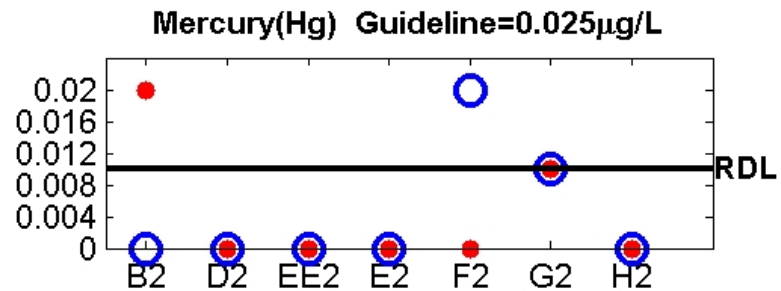
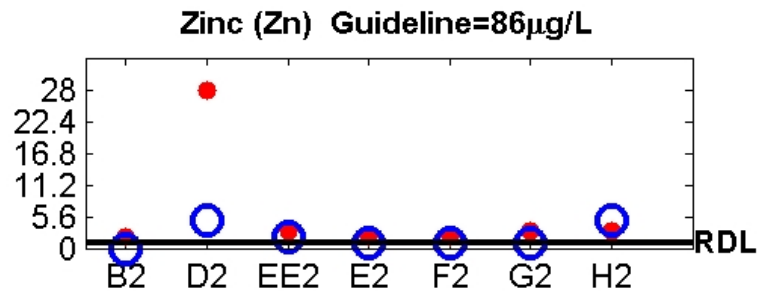
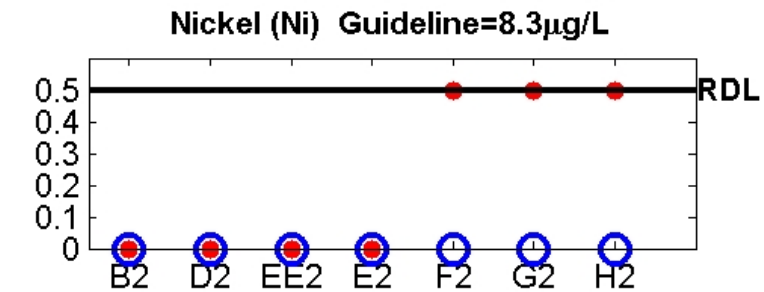
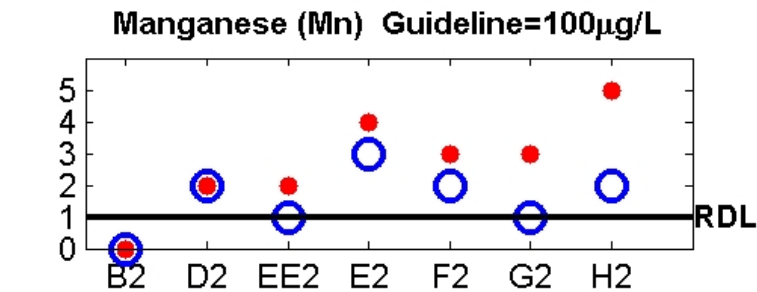
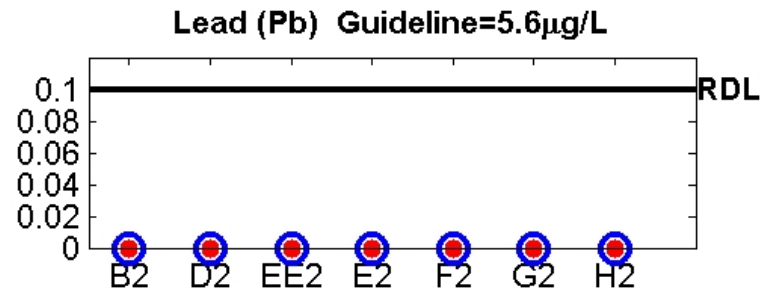
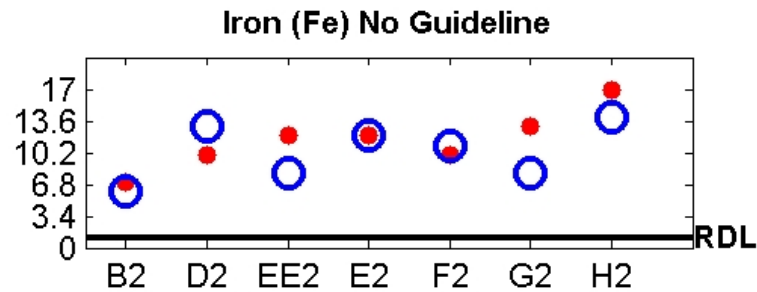
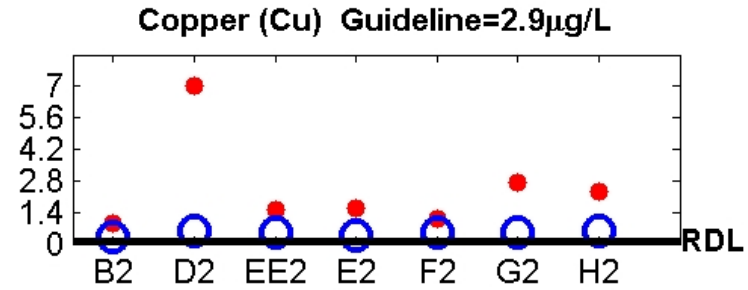
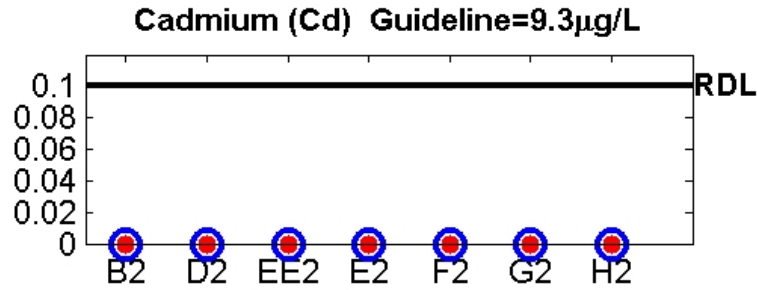


RAINFALL AND MEAN TEMP



CLOUD COVER





LEGEND
 ○ = Ten Metre Sample
 ● = One Metre Sample
 RDL = Reportable Detection Limit

FECAL COLIFORM SUMMARY

