

Halifax Harbour Water Quality Monitoring Project

Survey Summary #180

Survey Date: 25 March 2009
Nature of Survey: Complete Survey
Report File (this document): HHWQMP_report180_090325.doc
Data File: HHWQMP_data180_090325.xls
Data Return: Chemical: 57%
 Bacteria: 71%
 Profile: 50%
Overall: 58%

Sample Notes:

The south central Basin (G2 and F2) and the Outer Harbour (C1-3, HP1-3, HC, B2) were not sampled due to sea state.

The CTD experienced flow problems on two occasions. The data from E1, EE1, C5, C6, SYC and RNSYS did not pass quality control. It is plotted here but has been deleted in the data file.

There was a spike in the DO profiles at E3. This is in the data is plotted here, but the spike has been edited out and annotated in the data file.

The processing routine missed the tops of the profiles at DYC, F1 and F3. These are missing from the plots but have been fixed in the data file.

A supplementary CTD cast was taken at the LOBO buoy location (44.6291 N, 63.5915 W) at 13:40 local time (AST).

To match the collected reference data, the presented DO values should be scaled by a factor of 1.4 (see data file cover sheet).

QA/QC samples:

Chemical Analysis		E2-1m	
		Reference Sample	QA/QC
Detectable Parameter	Units		
Ammonia (as N)	mg/L	0.11	0.05
Total Suspended Solids	mg/L	2.7	4.9
Copper	ug/L	0.9	0.5
Iron	ug/L	22	18
Lead	ug/L	0.2	<0.1
Manganese	ug/L	4.0	3.0
Zinc	ug/L	6.0	3.0

Fecal Coliform (CFU/100ml)

Site	C6-10m	DYC-1m	PC-10m	E2-1m
Reference	9	3	77	13
QA/QC	8	6	56	82

Comments:

General: The field notes indicate that the survey occurred during a northerly gale. The strong winds have mixed the already quite uniform water column further. The Basin is now very unusually well mixed. Based on BBPMP data from the following day, the temperature is essentially uniform at about 1.4 °C and the difference between surface and bottom salinity is less than 1 PSU. The overturning caused by the cross harbour component of the wind seems to have resulted in a cross harbour gradient in T and S greater than the vertical gradient in the southern Inner Harbour (section D). The unusual pattern in the long-harbour density section (TSS and NH₃ plots) is partly due to the missing data from F2 and G2. The fecal coliform levels are moderate, likely reflecting the enhanced mixing/flushing. The highest values are on the Halifax side and there is a hint, in the limited sites sampled, that the distribution is displaced down-Harbour. There are elevated levels at in both samples at BRB, the furthest south site sampled in the main Harbour.

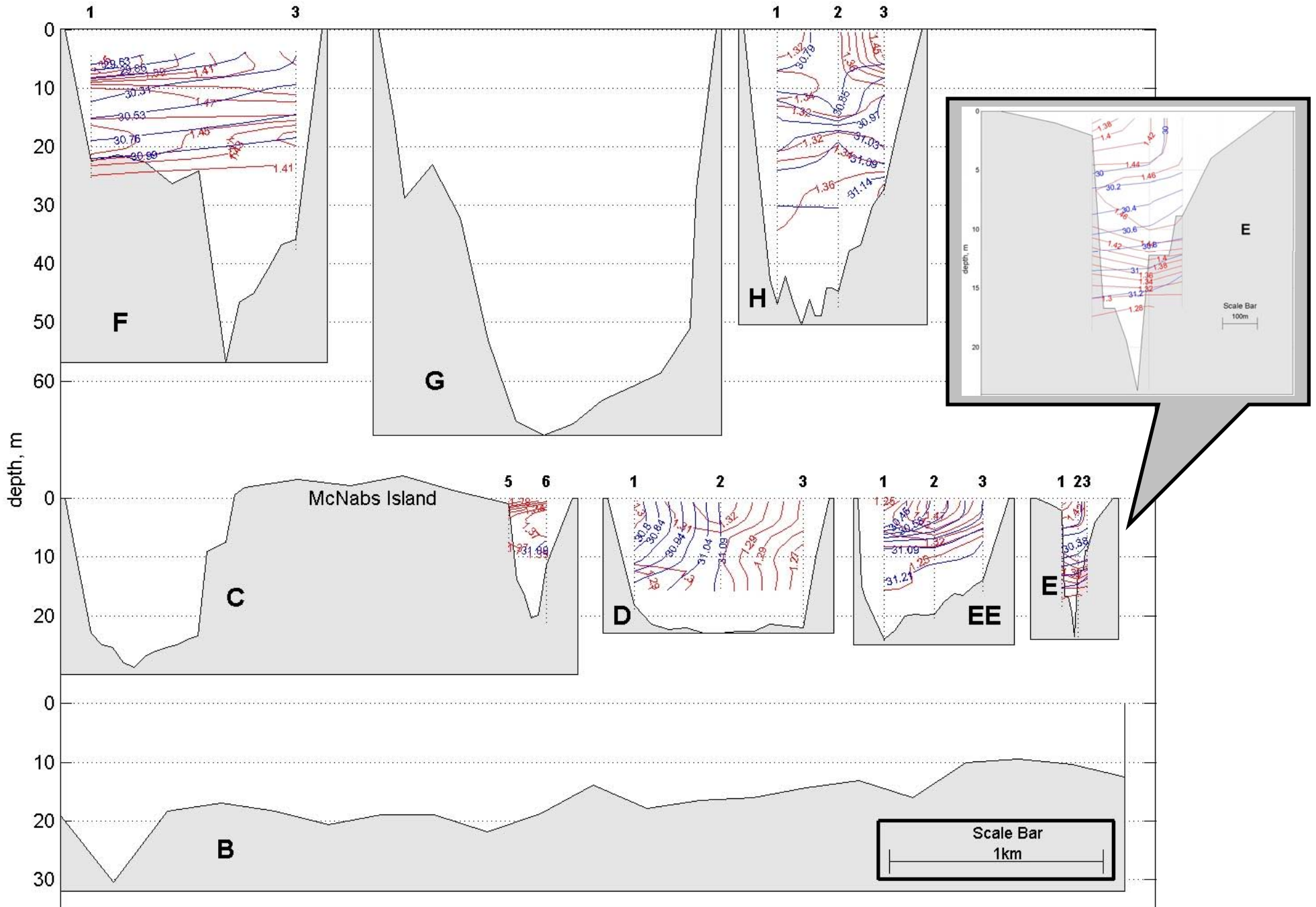
Fluorescence: The spring bloom has begun in earnest. There are profile maximum levels in excess of 30 mg/m³ in the southern Basin and Narrows. In the Inner Harbour the maximum values levels drop to mid teens.

TSS: The average TSS level is relatively low (3.8 mg/L). There are values as high as 6.2 mg/L but there appears to be no coherent spatial pattern.

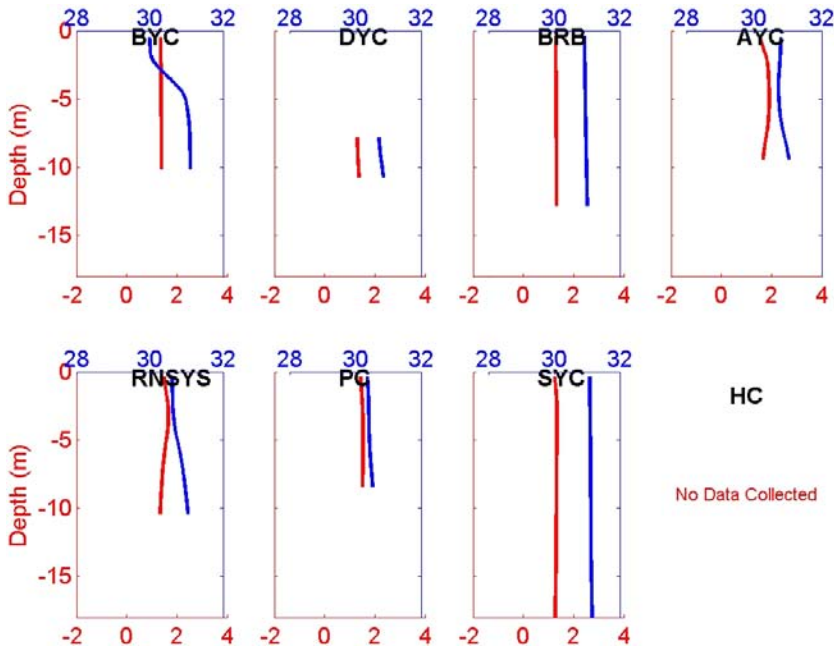
Ammonia: The ammonia levels are moderate, with detectable concentrations (>0.05 mg/L) in all samples collected. The mean value is about 0.7 mg/L. The highest value (0.11 mg/L) is in the freshest water, the 1 m sample in the Narrows.

Metals: There are no guideline exceedences. The closest metal to guideline exceedence levels is copper, with all collected 1 m values at about 30% of the 2.9 µg/L guideline.

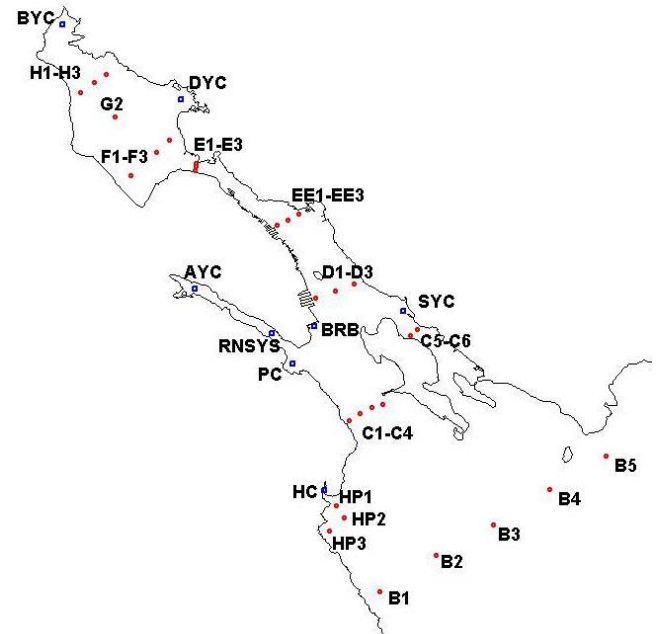
Dissolved Oxygen: The dissolved oxygen data, scaled appropriately by a factor of 1.4, indicates that the DO levels are everywhere quite uniform between 10-11.0 mg/L. The exception is in the Basin where it appears there is upwelling of slightly less oxygenated deeper water. At section H the DO is uniform at about 9.2 mg/L. There were no guideline exceedences observed.



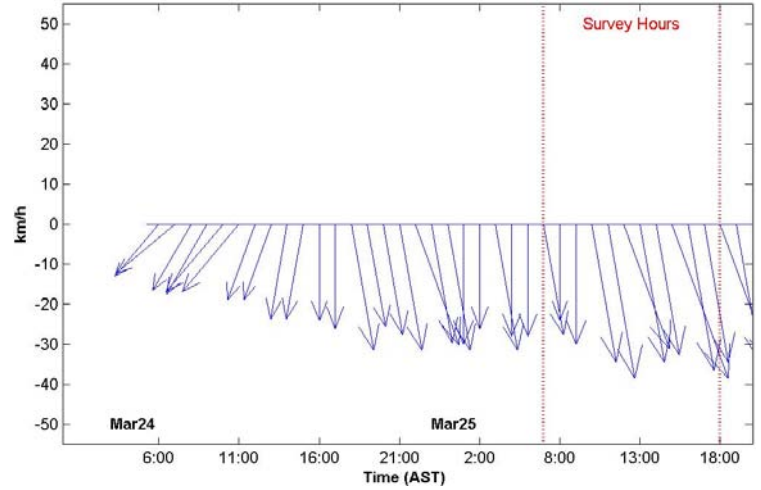
Yacht Clubs



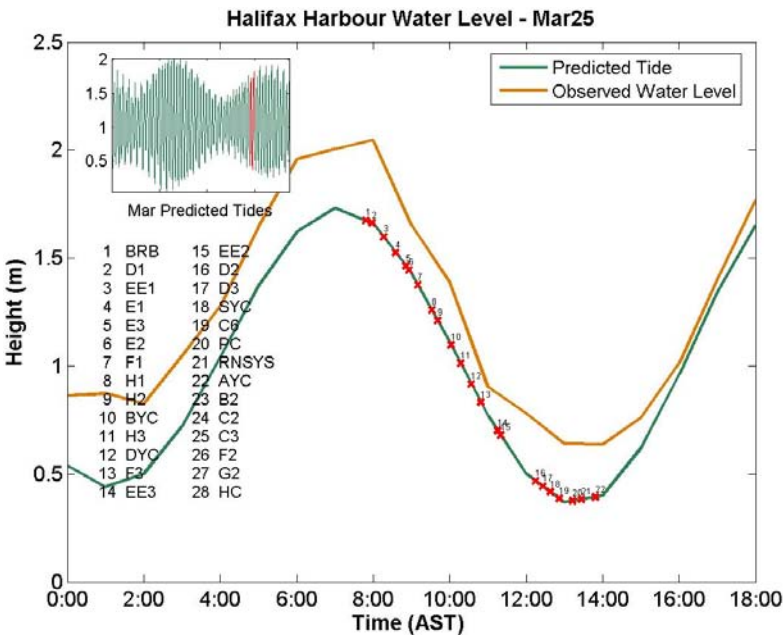
HC
No Data Collected



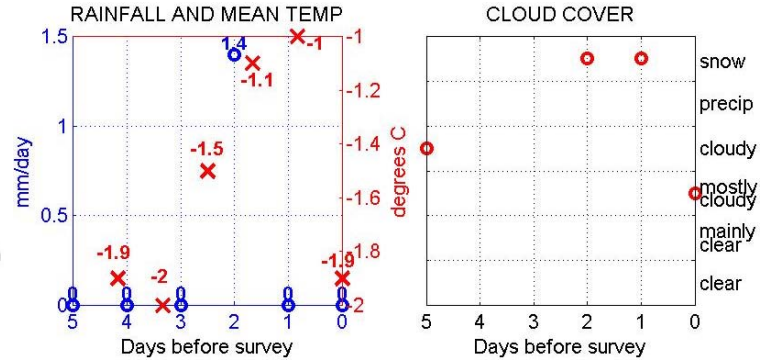
Wind Speed and Direction at Shearwater Jetty

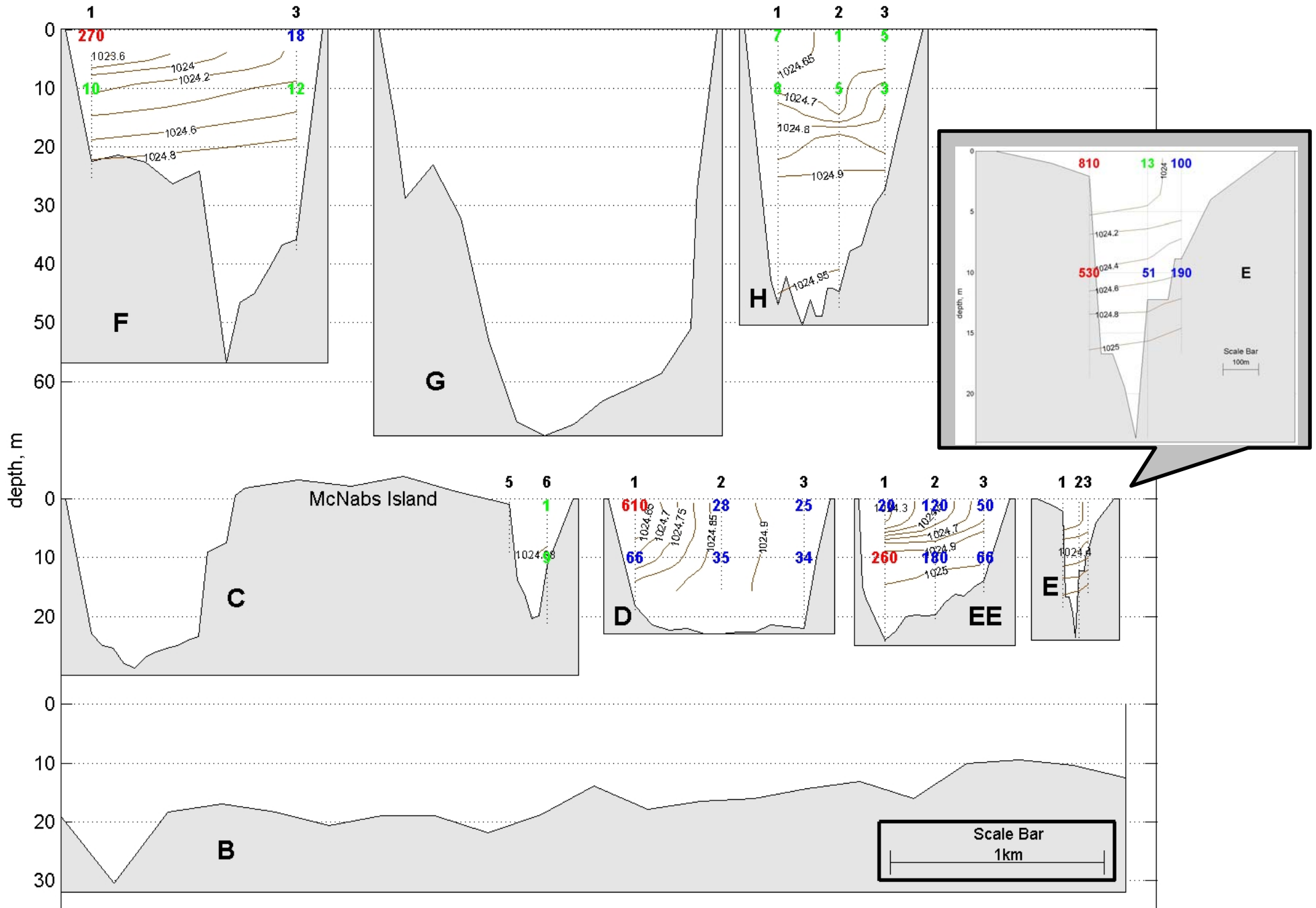


Rainfall and temperature data collected at Shearwater Autoport.
Cloud cover data collected at Shearwater Airport

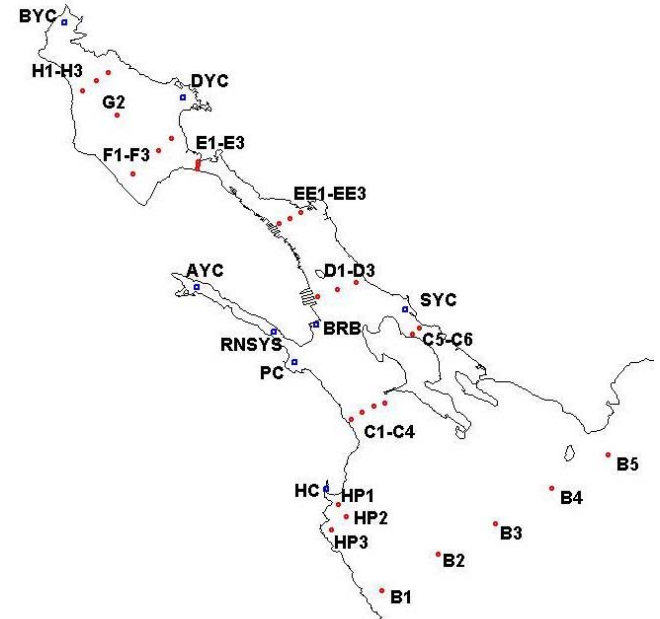
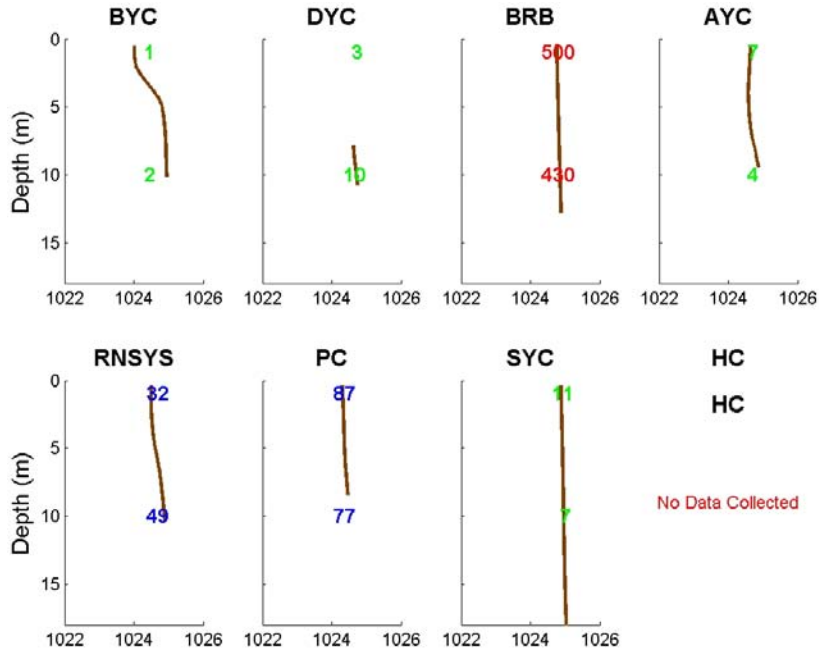


Salinity in PSU Temperature in °C

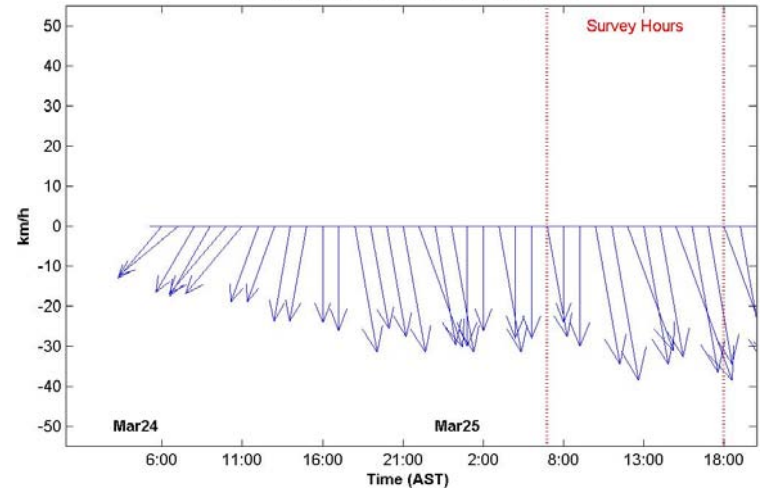




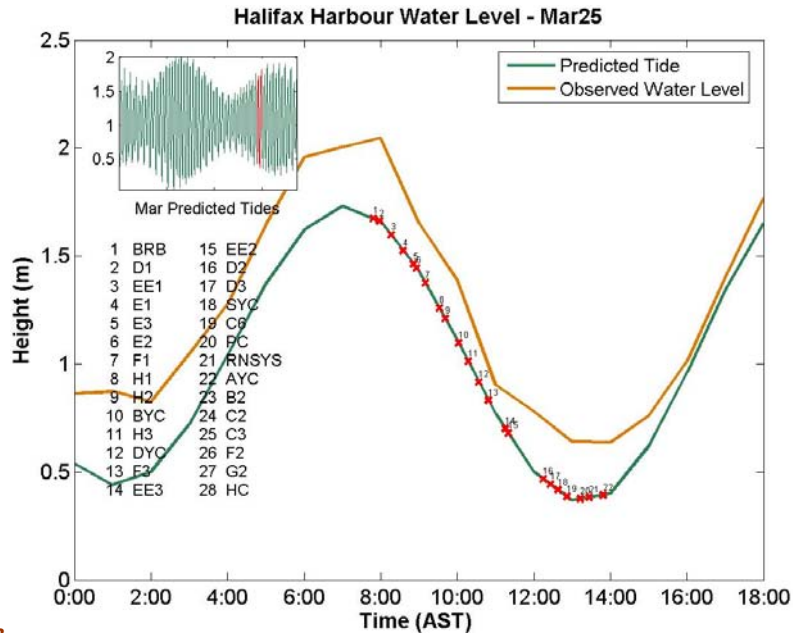
Yacht Clubs



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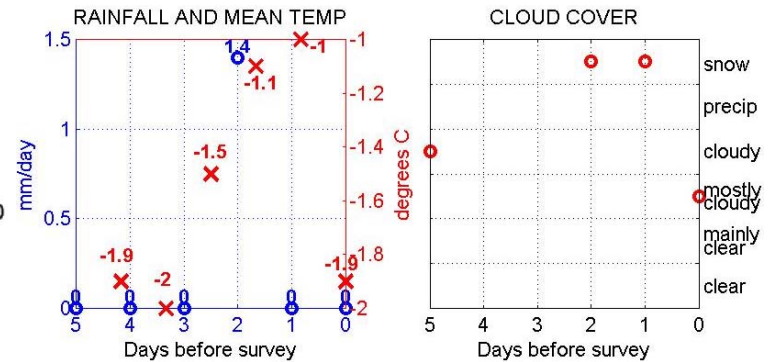


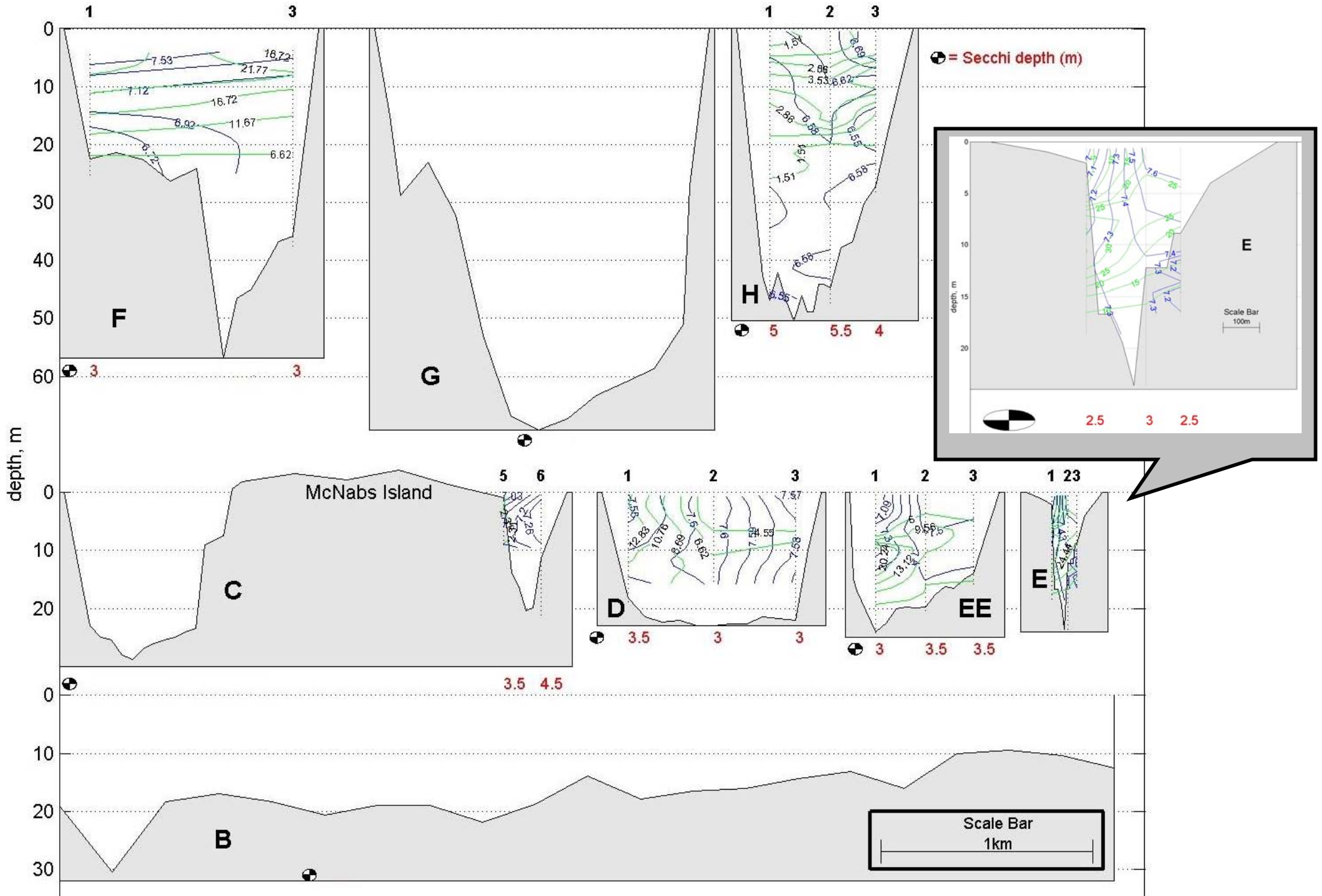
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Cloud cover data collected at Shearwater Airport



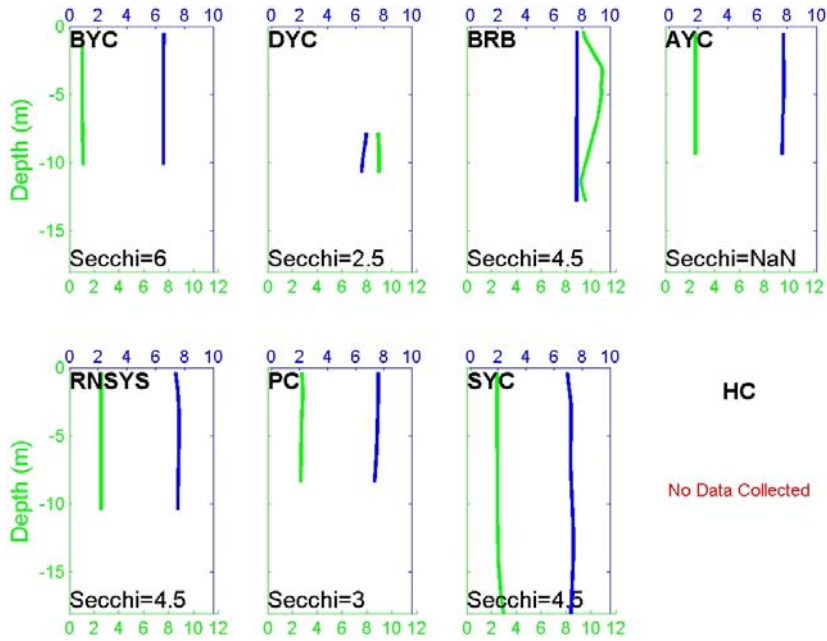
Potential Density in kg/m^3

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

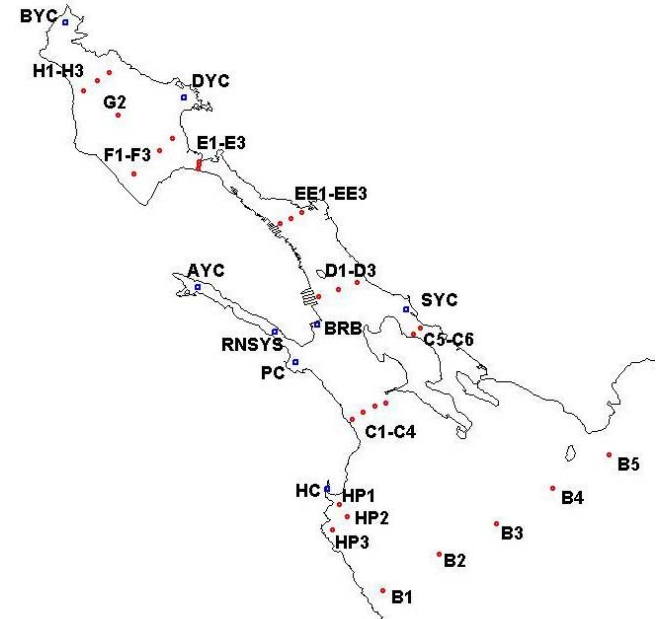




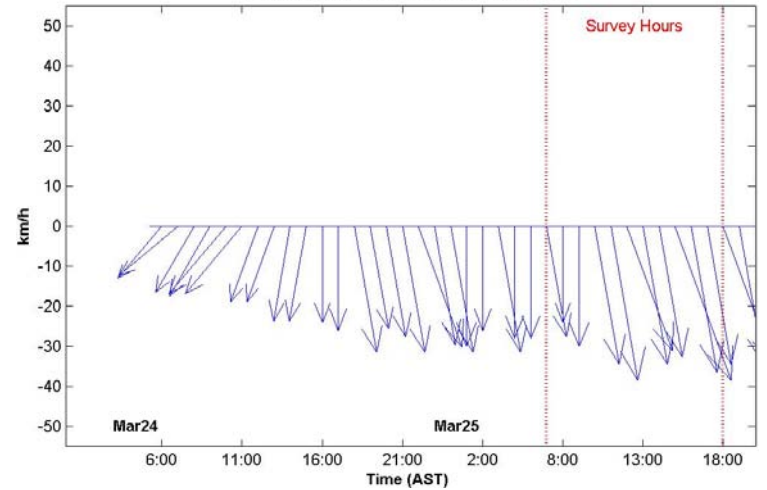
Yacht Clubs



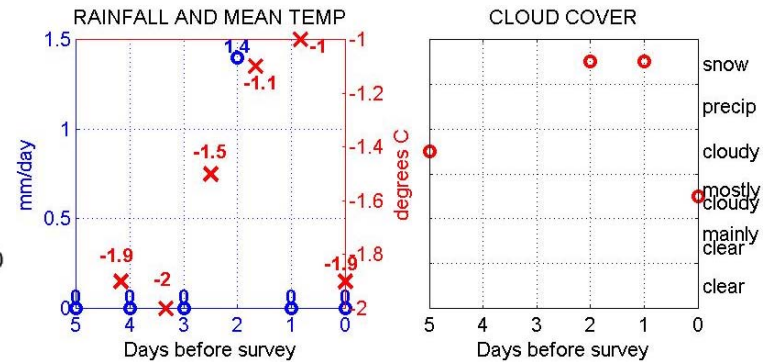
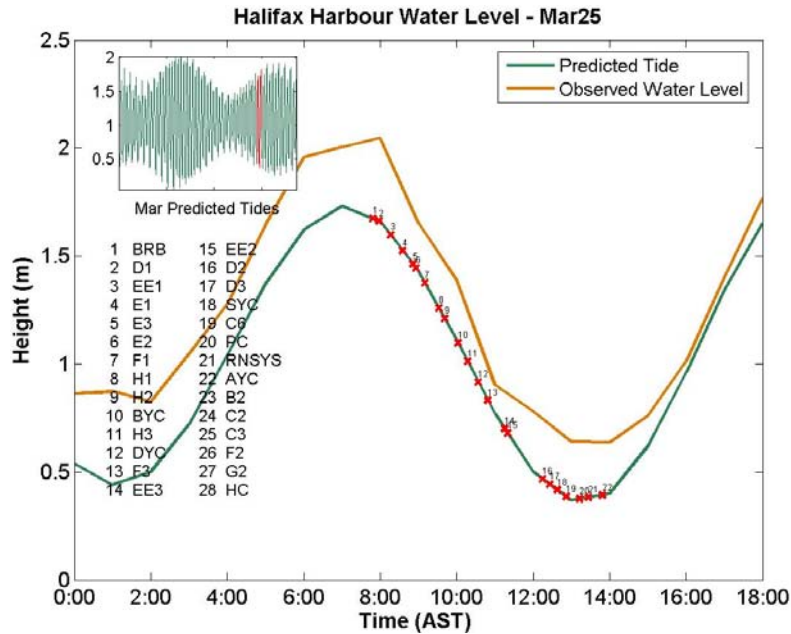
HC
No Data Collected



Wind Speed and Direction at Shearwater Jetty

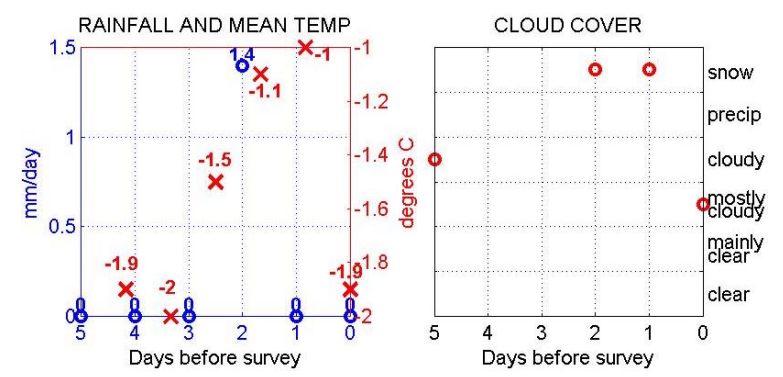
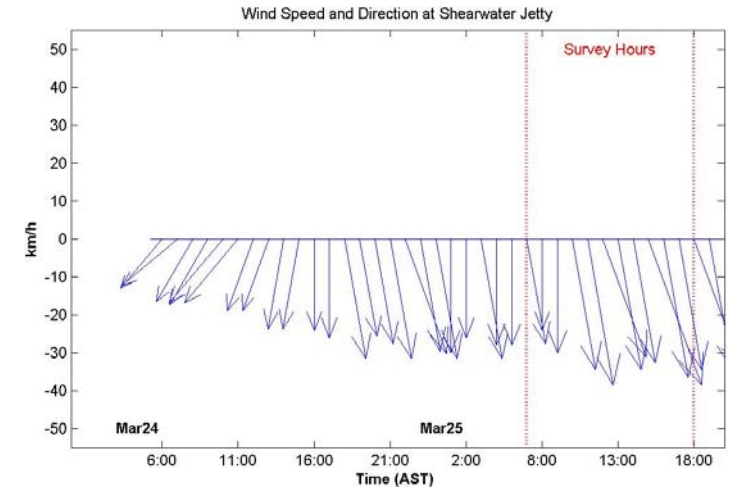
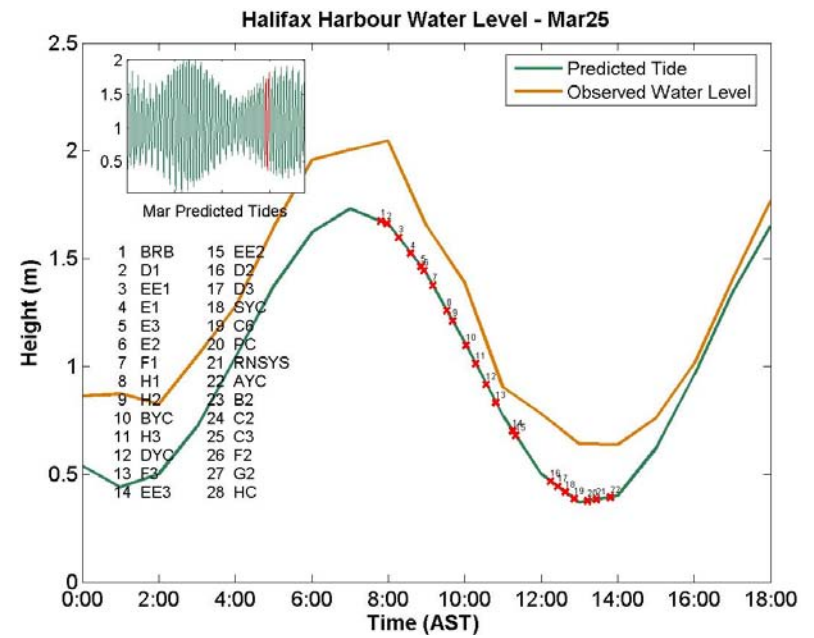
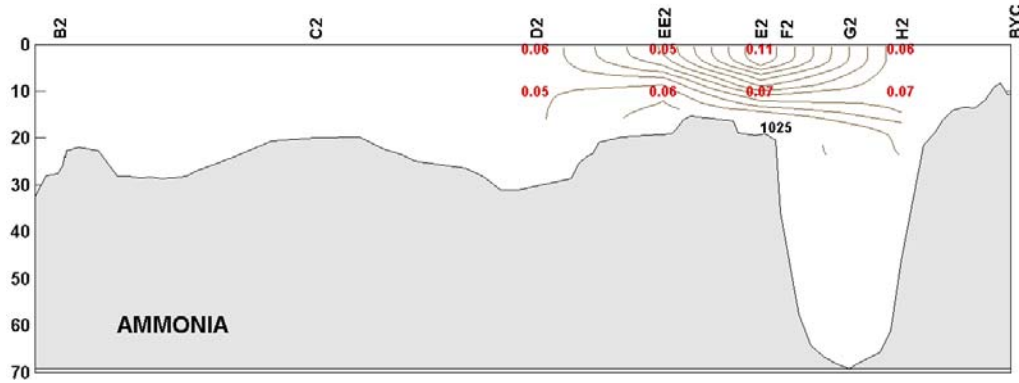
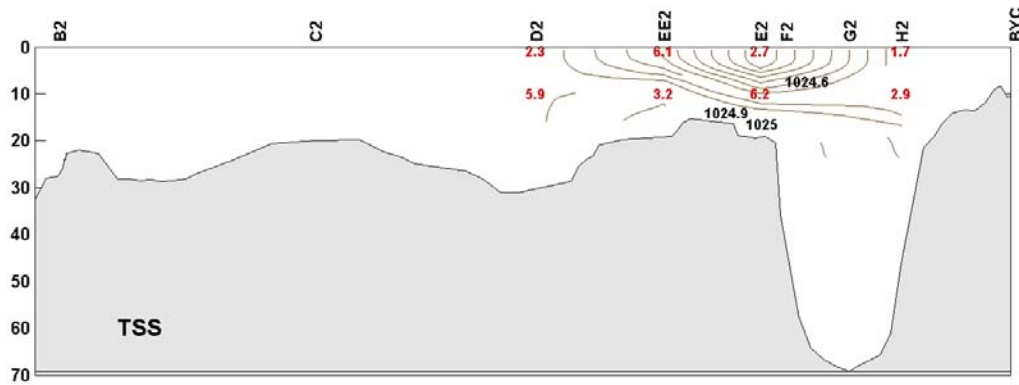


Rainfall and temperature data collected at Shearwater Autoport.
Cloud cover data collected at Shearwater Airport



DO in mg/L

Chlorophyll in mg/m³

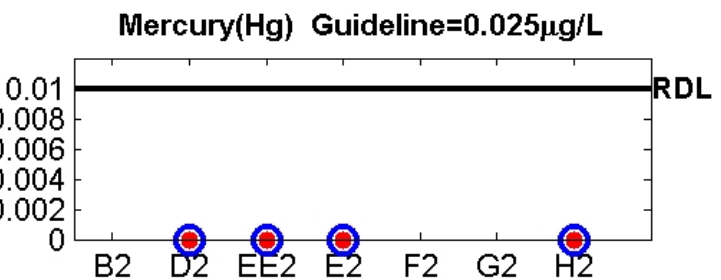
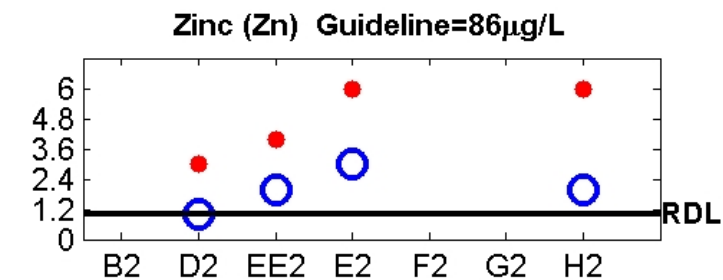
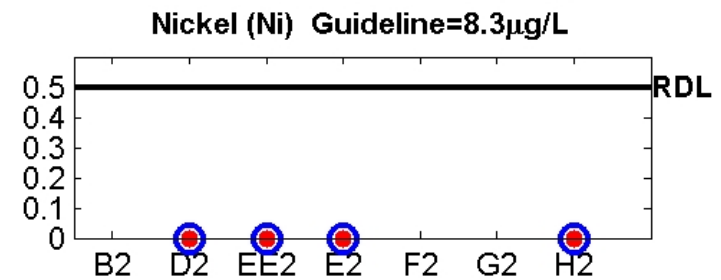
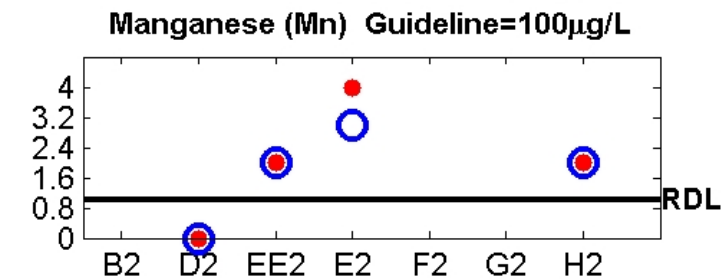
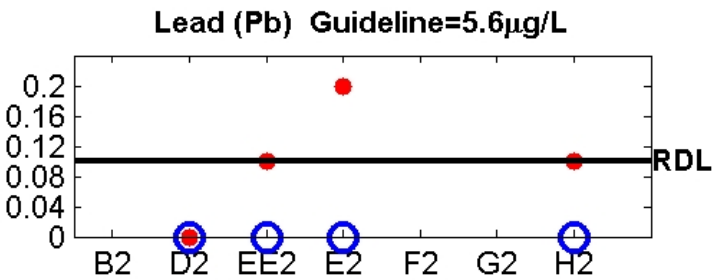
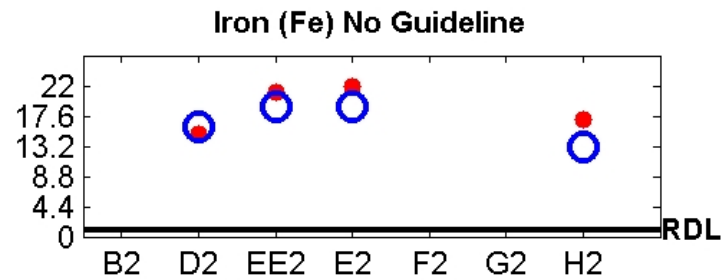
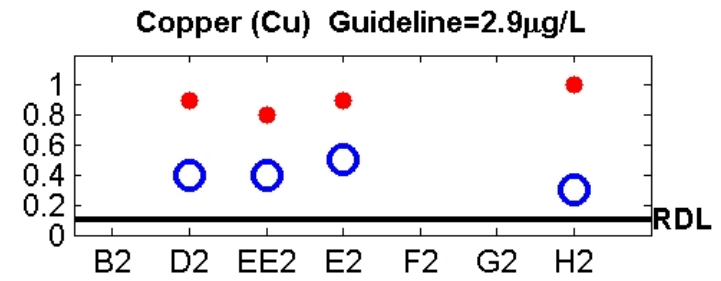
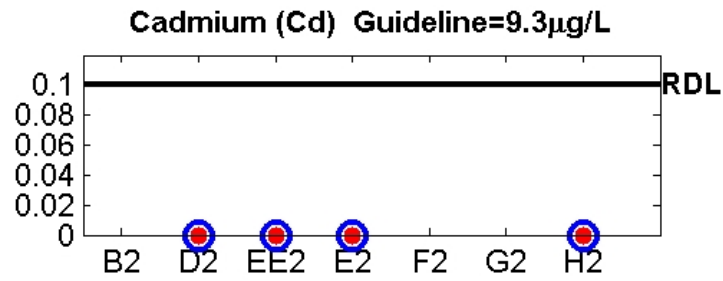


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Potential Density in kg/m^3

Ammonia in mg/L

TSS in mg/L



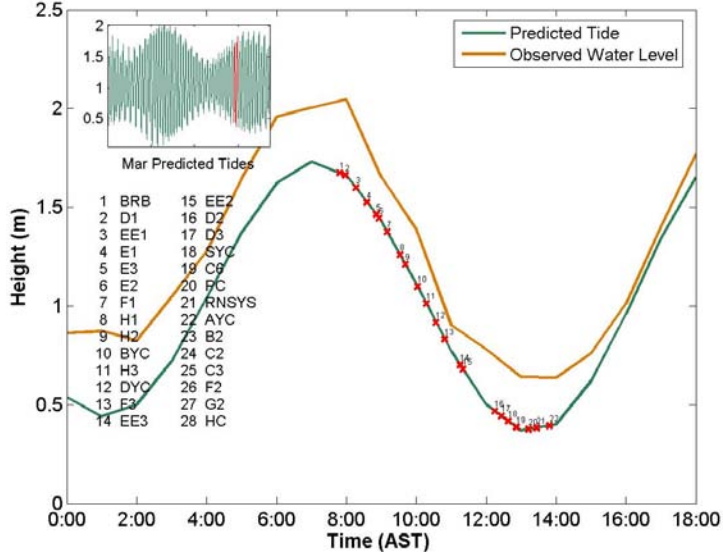
LEGEND

- = Ten Metre Sample
- = One Metre Sample
- RDL = Reportable Detection Limit

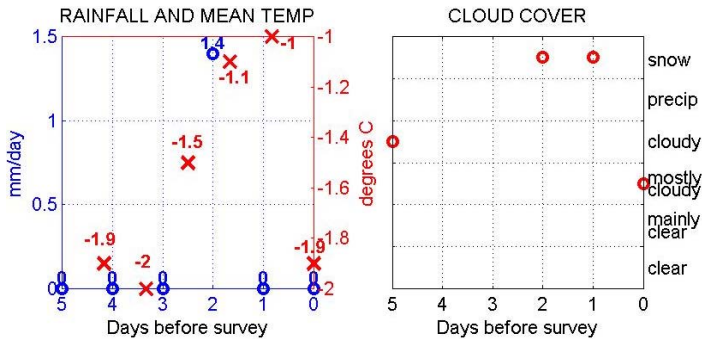
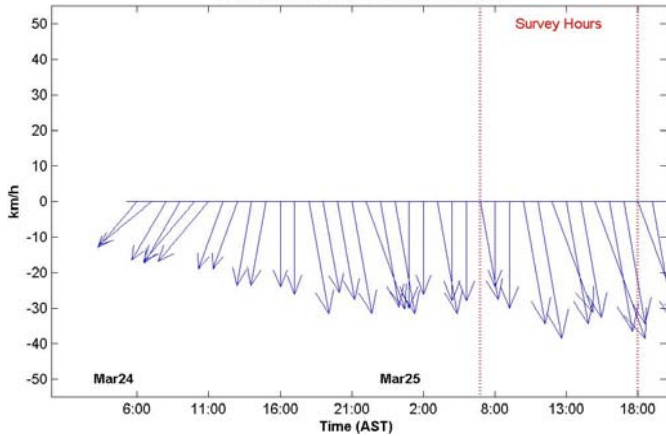
HRM Water Quality Monitoring

Fecal Coliform Summary – March 25, 2009

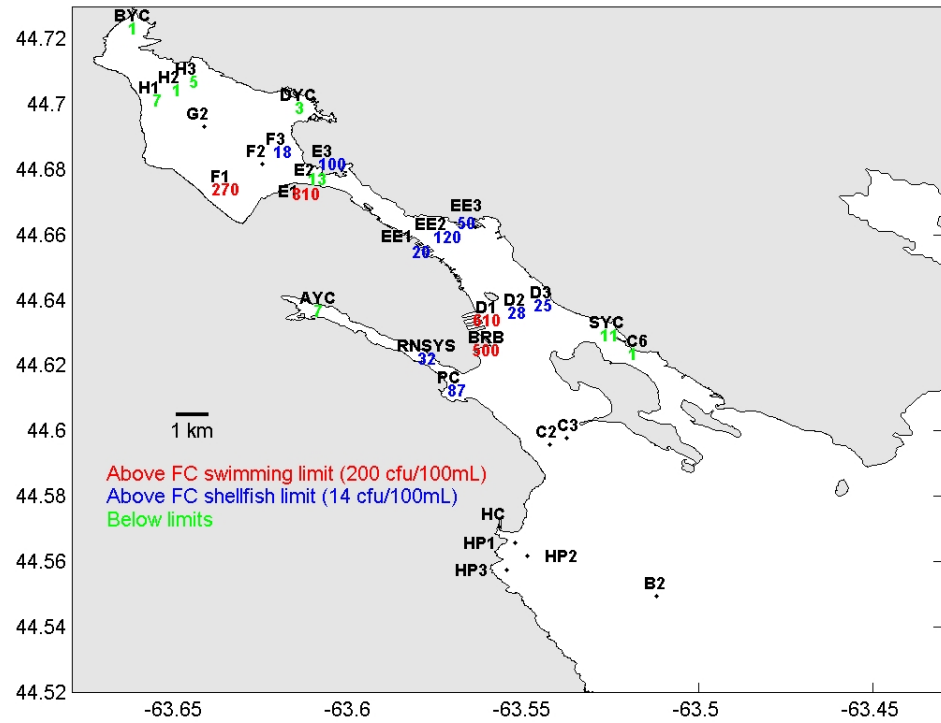
Halifax Harbour Water Level - Mar25



Wind Speed and Direction at Shearwater Jetty



Fecal Coliform 1 m



Fecal Coliform 10 m

