

# Halifax Harbour Water Quality Monitoring Project

## Survey Summary #188

**Survey Date:** 17 November 2009  
**Nature of Survey:** Complete Survey  
**Report File (this document):** HHWQMP\_report188\_091117.doc  
**Data File:** HHWQMP\_data188\_091117.xls

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

### Sample Notes:

A supplementary CTD cast was taken at the LOBO buoy location (44.6291 N, 63.5915 W) at 16:00 local time (AST).

To match the collected reference data, the presented DO values should be scaled by a factor of 1.2 (see data file cover sheet).

### QA/QC samples:

#### Chemical Analysis

Detectable Parameter	Units	E2-1m	
		Reference Sample	QA/QC
Ammonia (as N)	mg/L	0.4	0.17
Total Suspended Solids	mg/L	3.2	5.7
Copper	ug/L	0.7	0.5
Iron	ug/L	8.0	6.0
Manganese	ug/L	2.0	2.0
Nickel	ug/L	0.6	0.6
Zinc	ug/L	3.0	3.0
Mercury	ug/L	0.022	0.018

#### Fecal Coliform (CFU/100ml)

Site	C6-10m	DYC-1m	PC-10m	E2-1m
Reference	100	3	22	240
QA/QC	280	4	29	110

### Comments:

**General:** It has been relatively dry, with only light rainfall (5.7 mm) in the five days prior to the survey. The only significant freshwater signature is near stream input in

the Basin (i.e. BYC and DYC). Elsewhere, the surface salinity is quite uniform, varying gradually from just over 29 psu in the surface water of the Basin to just under 30 psu in the Outer Harbour (B2). The temperature is also uniform, between 9.3 and 10.1 C in the top 20 m everywhere. Overall, the harbour is relatively weakly density stratified, with the strongest stratification occurring below 20 m in the Basin. The fecal coliform concentrations are quite high in the Inner Harbour. The centre of the distribution seems displaced somewhat down harbour, probably in part due to the persistent down-harbour moderate breeze. This is supported by the presence of detectable concentrations in the 1m sample at B2 in the Outer Harbour. While there are moderate bacteria concentrations in the Basin, the historic tendency for higher values in the 10m samples in the Narrows and southern Basin is not evident. There are elevated bacteria levels associated with a freshwater feature at HP1. This is likely associated with the nearby Tribune Head outfall.

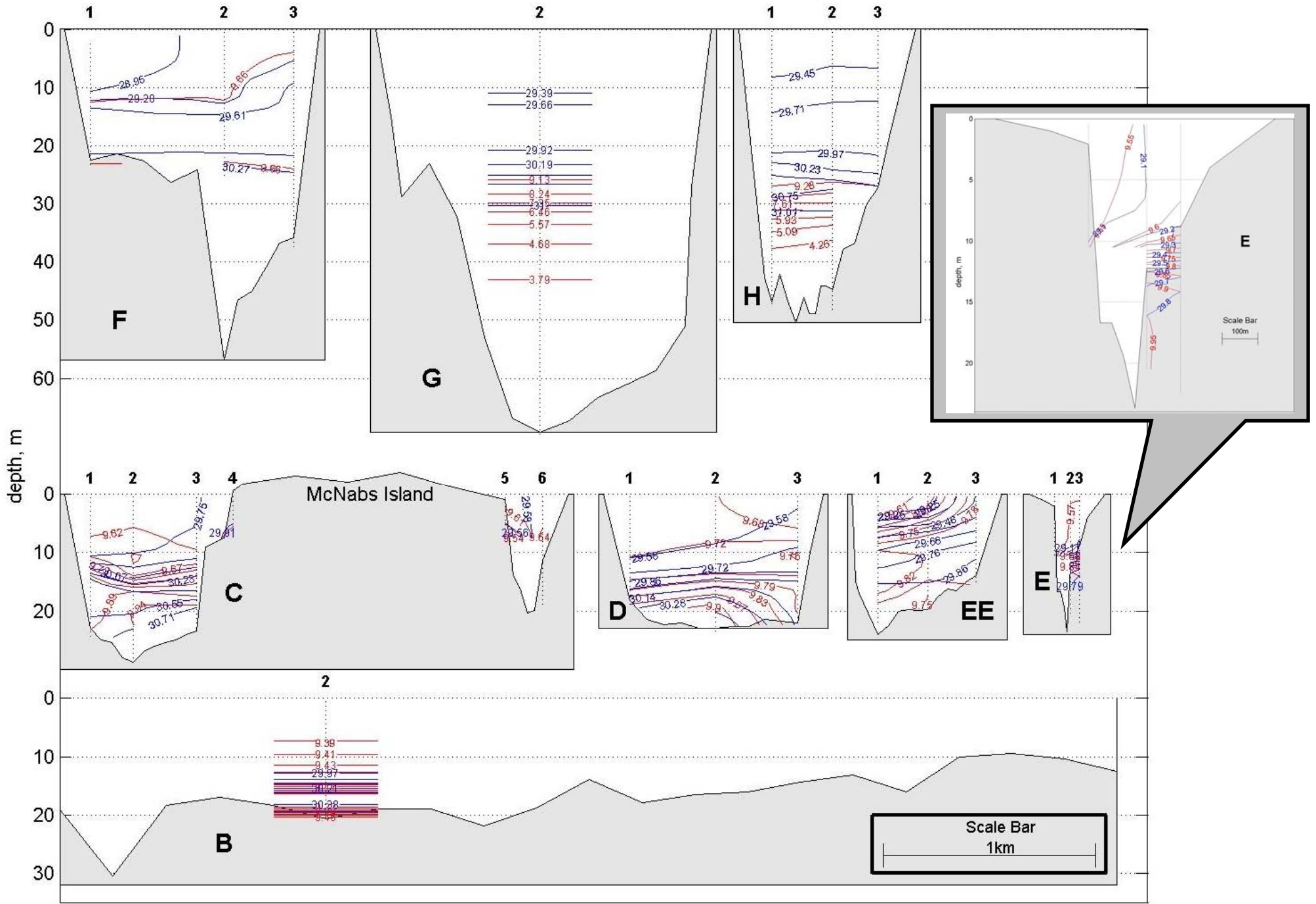
**Fluorescence:** The fluorescence levels are relatively low but above the winter minimums. The profile maximum values in the Basin are about 8 mg/m<sup>3</sup>. These values drop monotonically going out of the harbour to about 3.5 mg/m<sup>3</sup> in the Outer Harbour, (sections C, HP and B).

**TSS:** The average TSS levels are relatively low (2.3 mg/L) and uniform. Unusually, the highest single measurement (4.2 mg/L) is at B2 (10m).

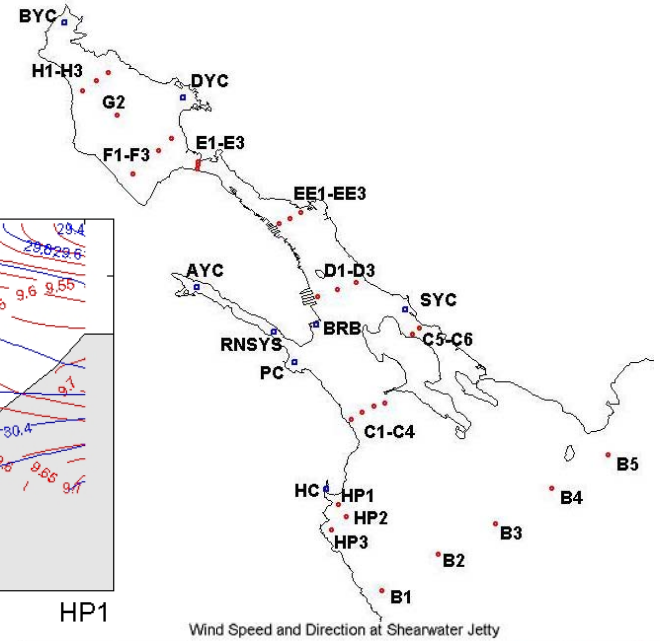
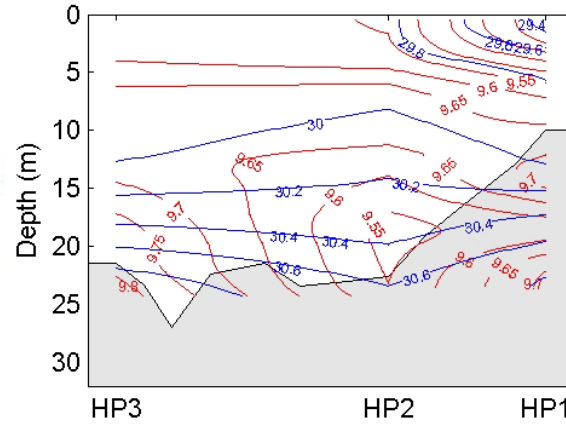
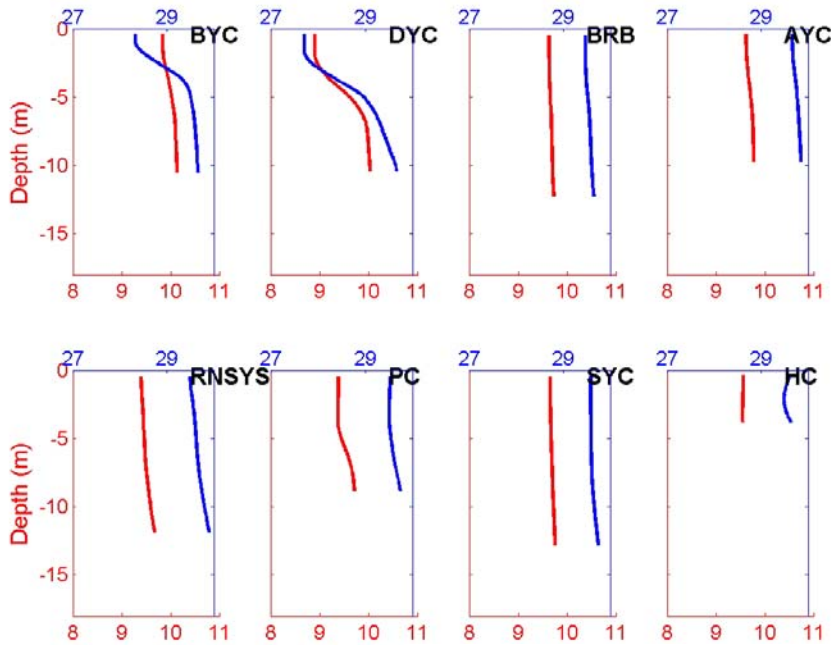
**Ammonia:** The ammonia levels are relatively very high (mean 0.25 mg/L). In the Basin and Inner Harbour most values are > 0.30 mg/L.

**Metals:** The mercury concentrations are elevated throughout the harbour with all values at or above the detection limit of 0.013 µg/L. There are three samples in the Inner Harbour with concentrations at or above the 0.25 µg/L guideline. There are no other metals guideline exceedences.

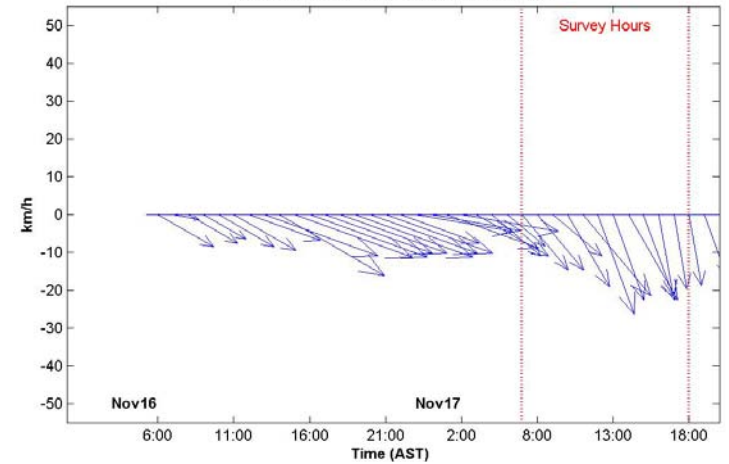
**Dissolved Oxygen:** The dissolved oxygen data, scaled appropriately by a factor of 1.2, indicates that south of the Narrows (section E) the DO levels are very uniform and relatively low (from 7.2 to 7.9 mg/L – see notes in the data file). This represents an exceedence of the 8.0 mg/L class SA guideline in the Outer Harbour. In the Basin the nearsurface values are similar to the rest of the harbour, but the vertical gradient is very steep and the deep water is almost completely anoxic. The applicable 7.0 mg/L class SB guideline is exceeded at a depth between 5-10 m throughout the Basin.



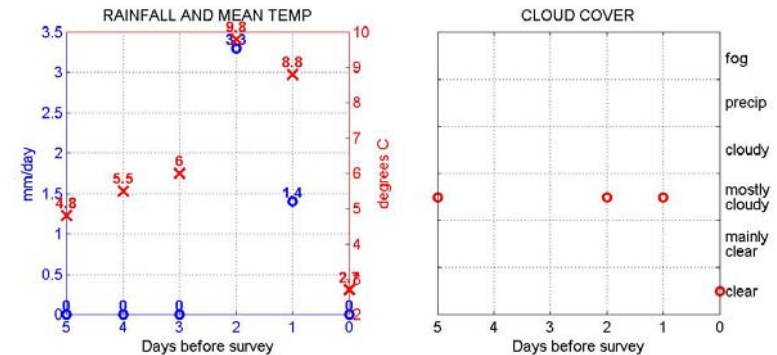
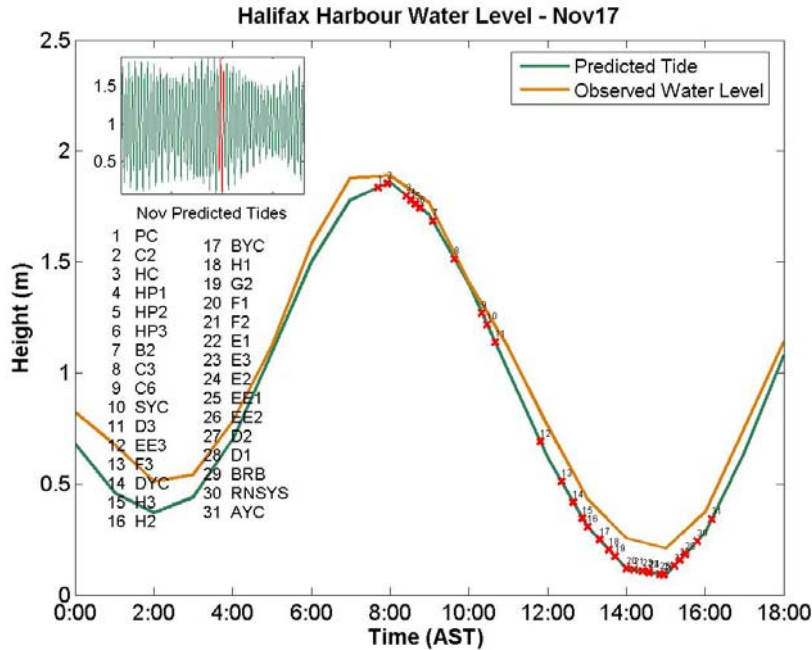
# Yacht Clubs



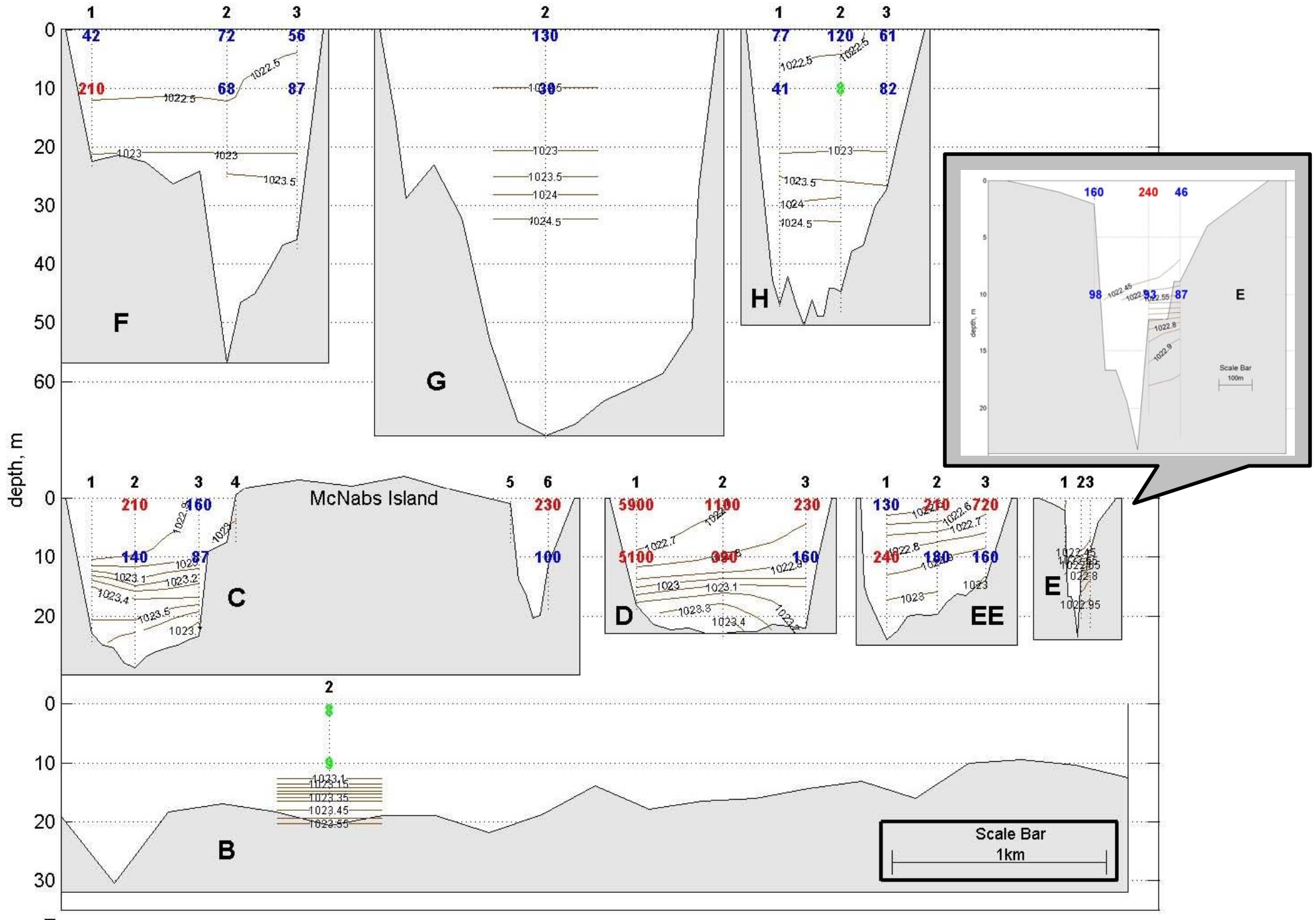
Wind Speed and Direction at Shearwater Jetty



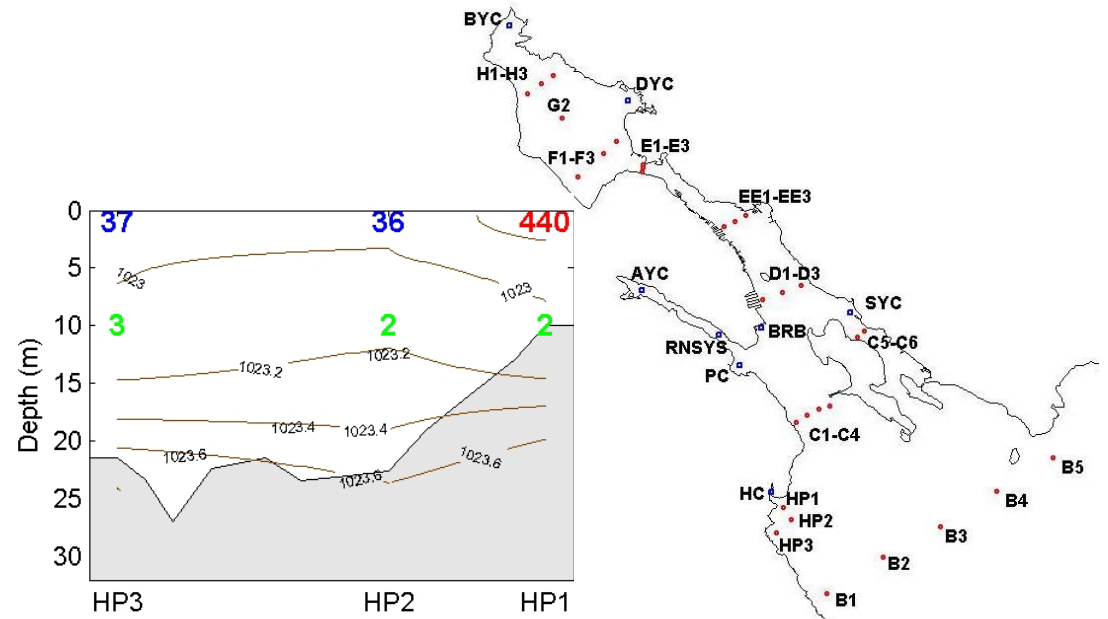
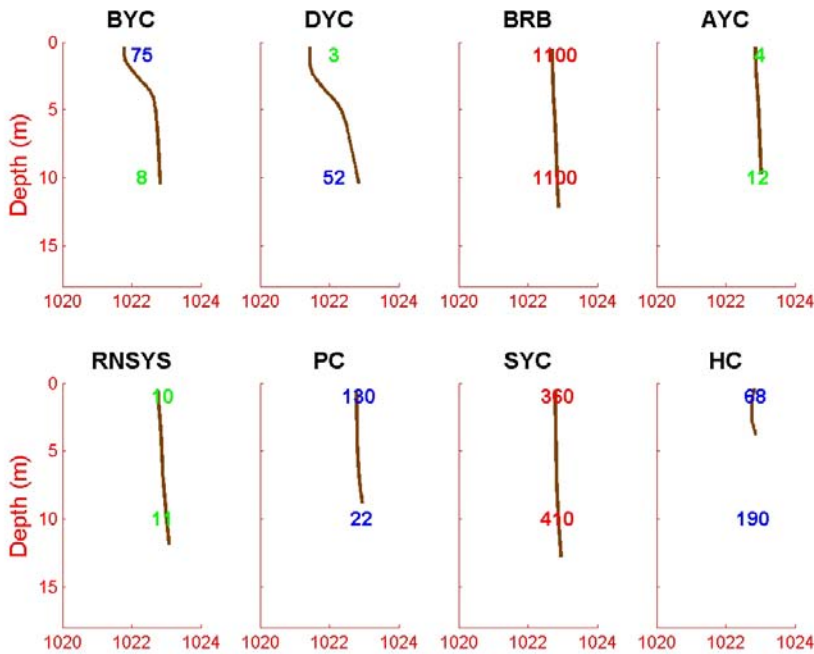
Rainfall and temperature data collected at Shearwater Autoport.  
Cloud cover data collected at Shearwater Airport



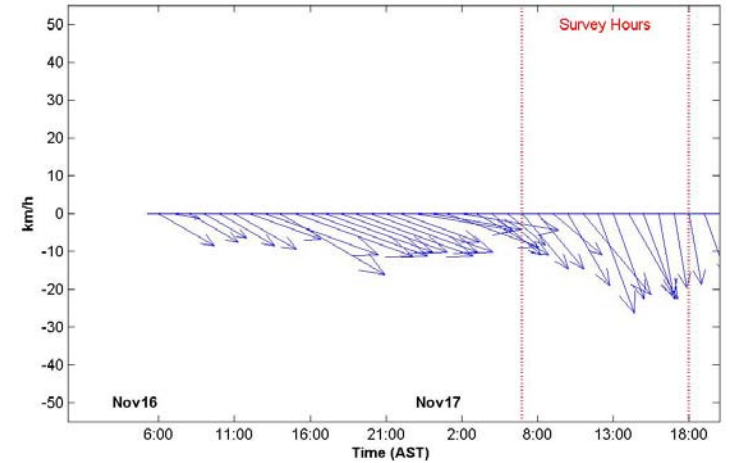
Salinity in PSU      Temperature in °C



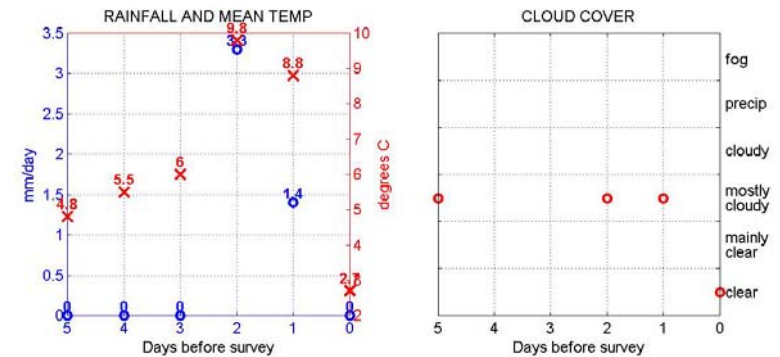
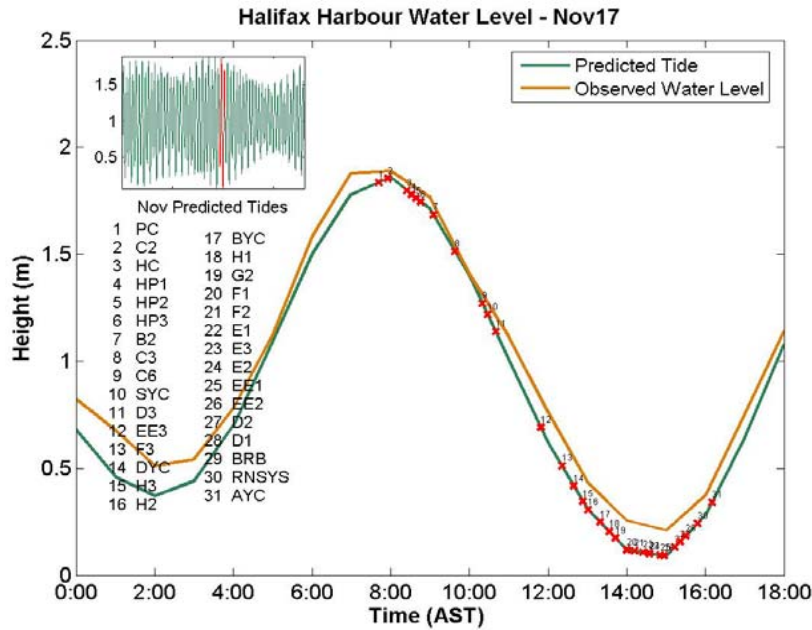
# Yacht Clubs



Wind Speed and Direction at Shearwater Jetty

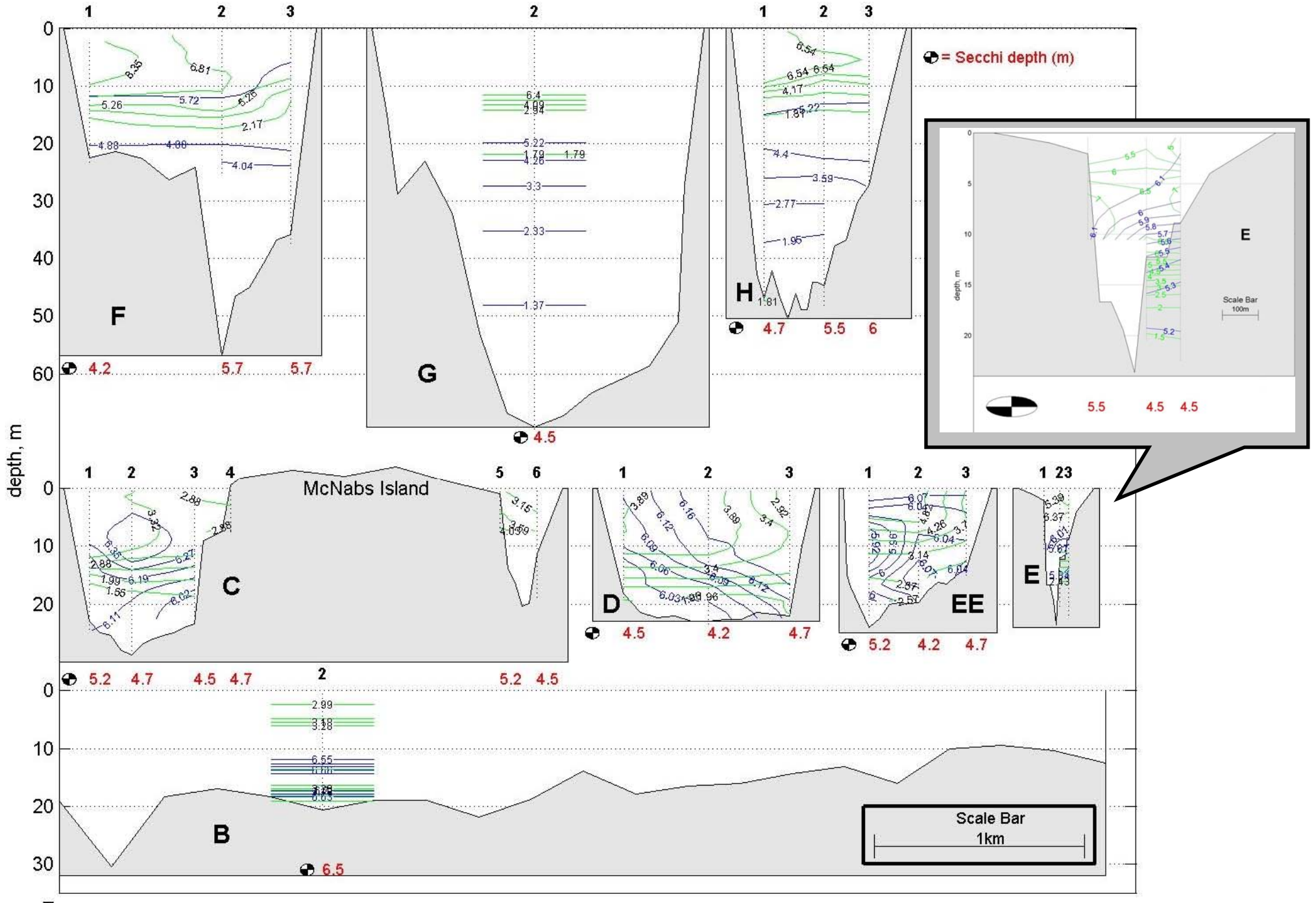


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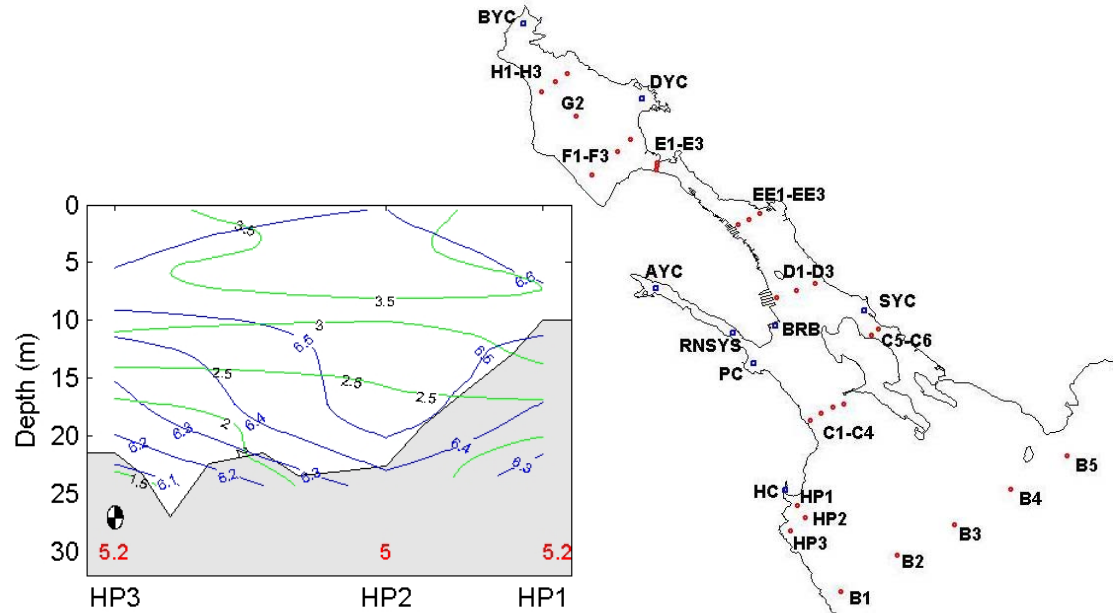
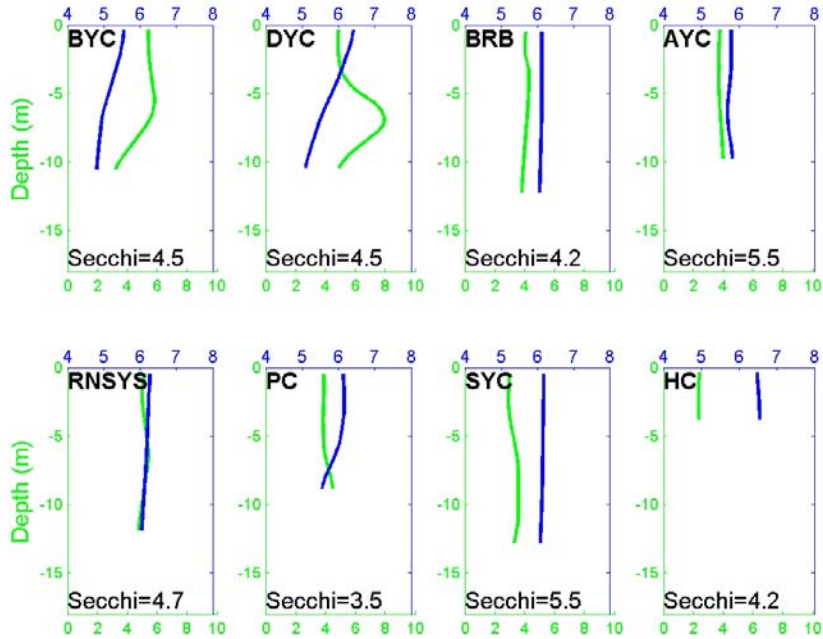


Potential Density in kg/m<sup>3</sup>

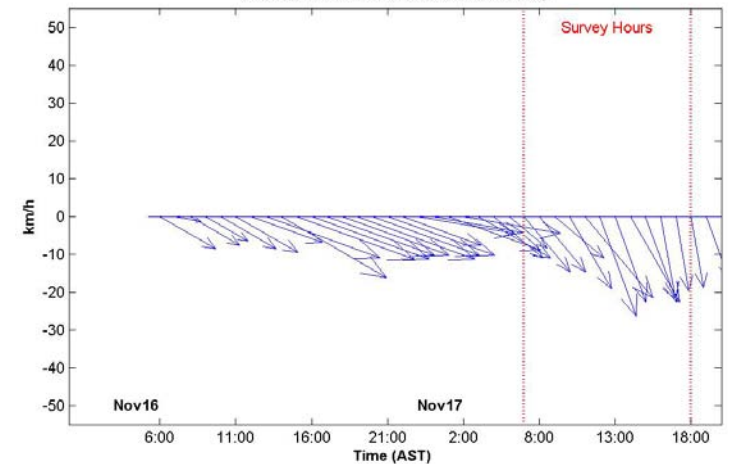
Fecal coliform: **above swimming limit (200 CFU/100mL)**  
**above shellfish limit (14 CFU/100mL)**  
below limits



# Yacht Clubs

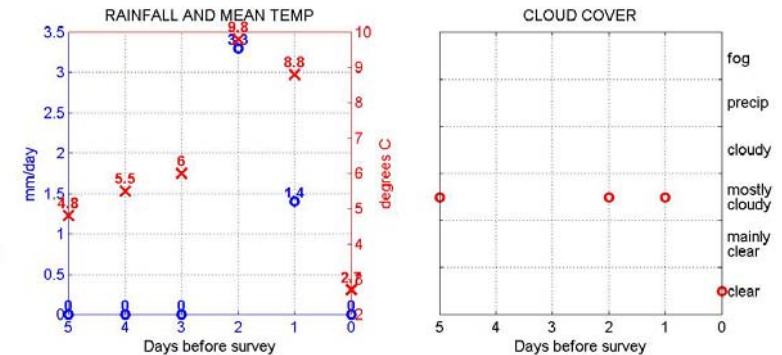
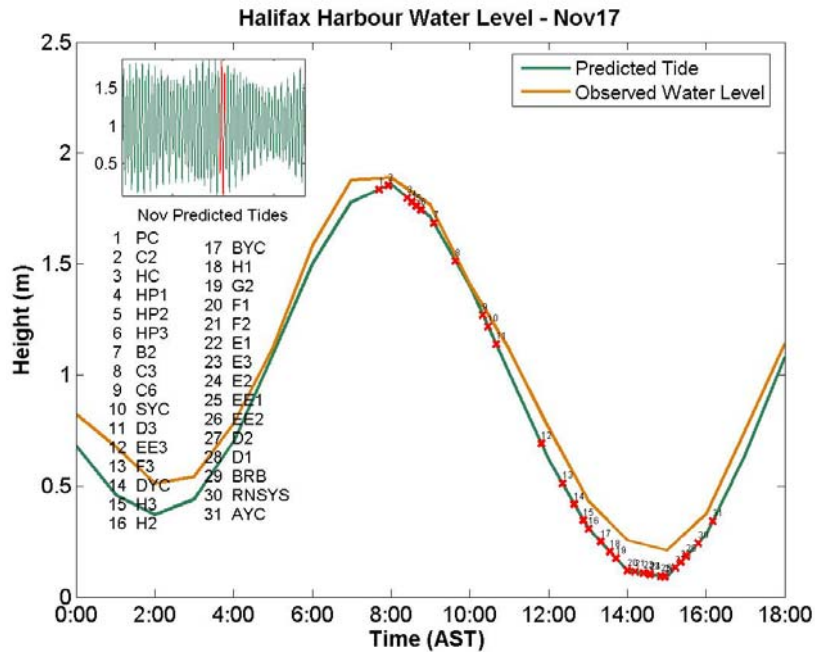


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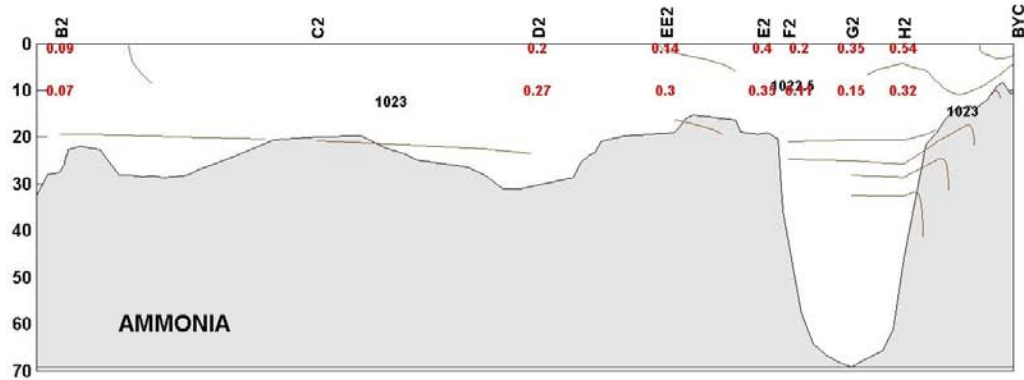
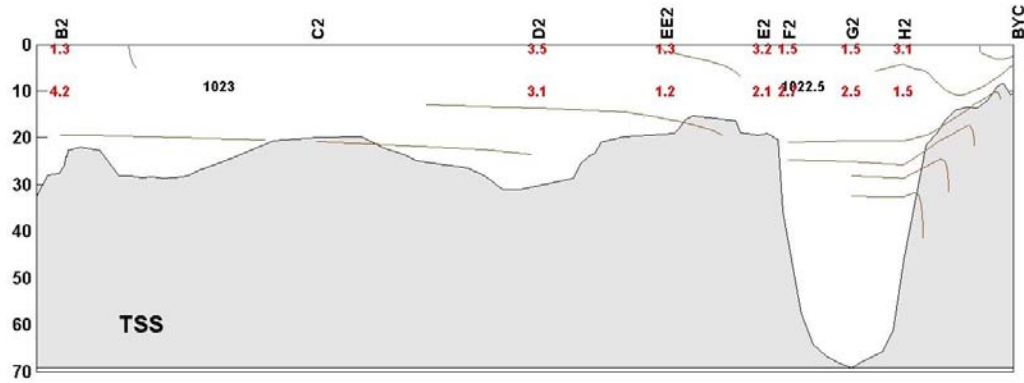
Rainfall and temperature data collected at Shearwater Autoport.

Cloud cover data collected at Shearwater Airport



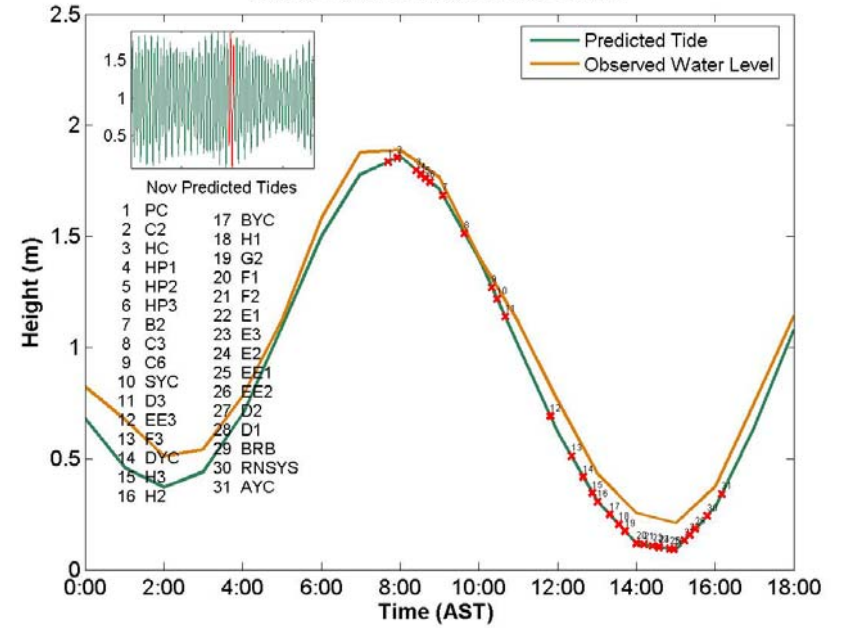
DO in mg/L      Chlorophyll in mg/m<sup>3</sup>

CHEMISTRY



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

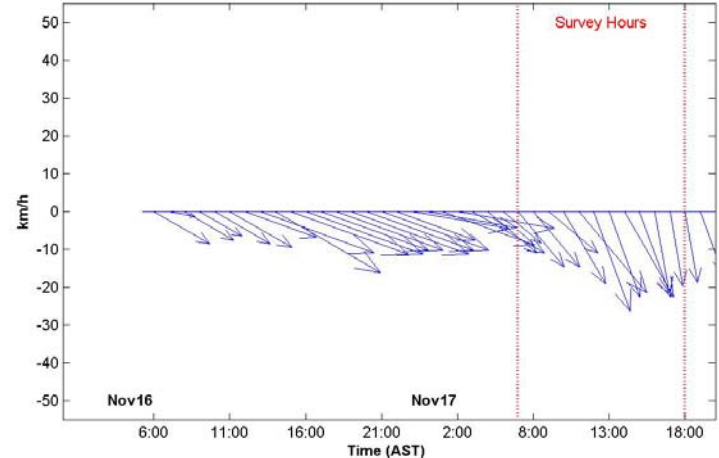
Halifax Harbour Water Level - Nov17



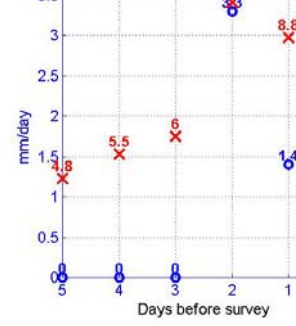
Nov Predicted Tides

- 1 PC
- 2 C2
- 3 HC
- 4 HP1
- 5 HP2
- 6 HP3
- 7 B2
- 8 C3
- 9 C6
- 10 SYC
- 11 D3
- 12 EE3
- 13 F3
- 14 DYC
- 15 H3
- 16 H2
- 17 BYC
- 18 H1
- 19 G2
- 20 F1
- 21 F2
- 22 E1
- 23 E3
- 24 E2
- 25 EE1
- 26 EE2
- 27 D2
- 28 D1
- 29 BRB
- 30 RNSYS
- 31 AYC

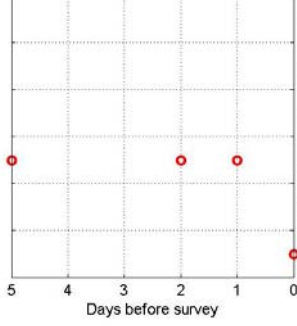
Wind Speed and Direction at Shearwater Jetty



RAINFALL AND MEAN TEMP



CLOUD COVER

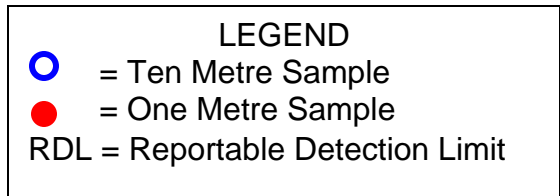
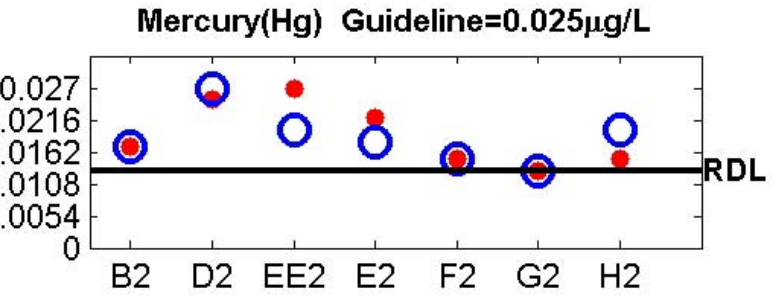
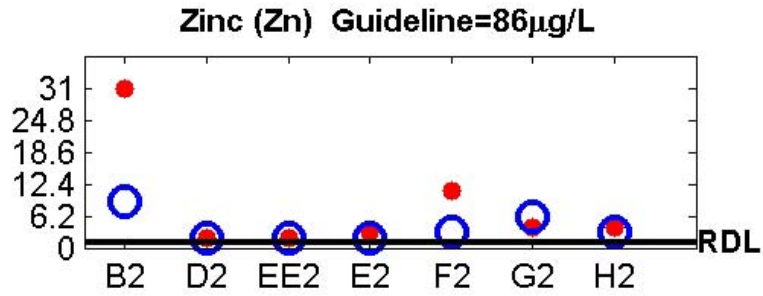
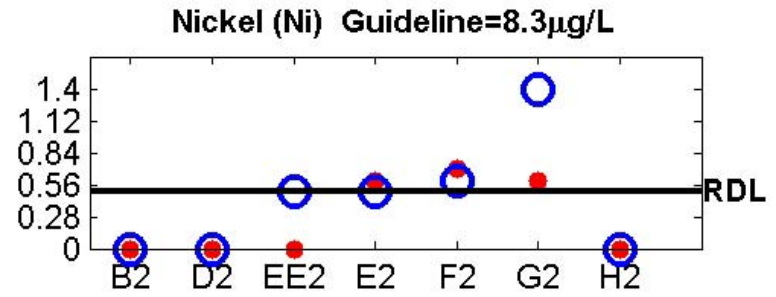
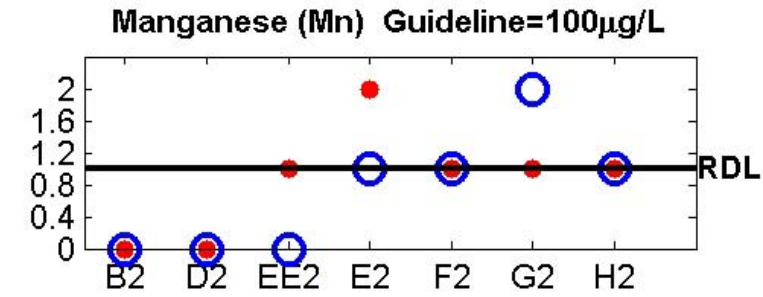
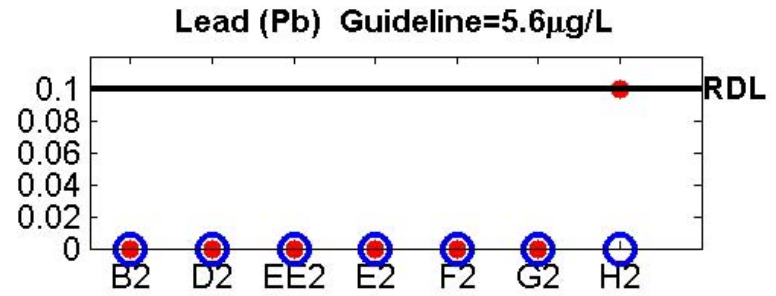
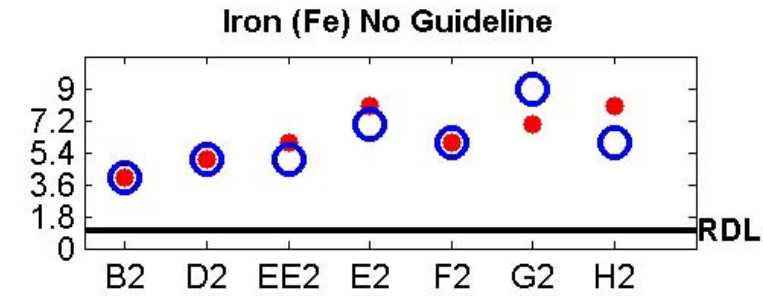
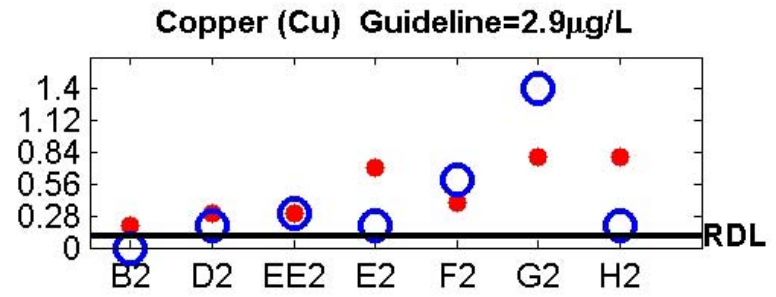
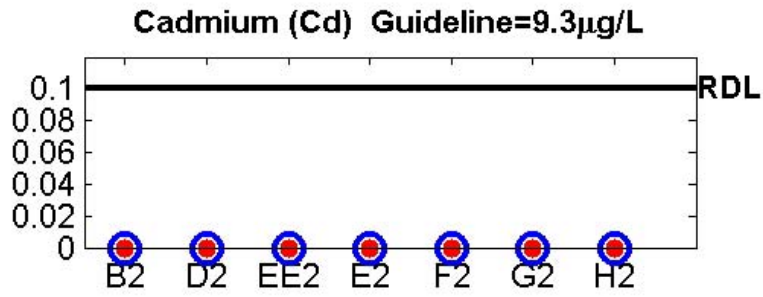


Potential Density in  $kg/m^3$

Ammonia in mg/L

TSS in mg/L





# HRM Water Quality Monitoring

## Fecal Coliform Summary – November 17, 2009

