

# Halifax Harbour Water Quality Monitoring Project Survey Summary #193

**Survey Date:** 24 August 2010  
**Nature of Survey:** Complete Survey  
**Report File (this document):** HHWQMP\_report193\_100824.doc  
**Data File:** HHWQMP\_data193\_100824.xls

**Data Return:**  
 Chemical: 86%  
 Bacteria: 90%  
 Profile: 94%  
**Overall: 91 %**

### Sample Notes:

Sites B2, HP1 and HP2 were not sampled due to rough surface water conditions. At site B2, only salinity and temperature profile data are available. A YSI 6600V2 multi-parameter water quality sonde was used in place of the usual Seabird 19plus CTD unit. As a result of rough weather conditions, some CTD profiles span a lower depth range than usual. A supplementary CTD cast was taken at the LOBO buoy location (44.6291 N, 63.5915 W) at 1743 local time (ADT).

### QA/QC samples:

#### Chemical Analysis

Detectable Parameter	Units	E2-1m	
		Reference Sample	QA/QC
Ammonia Nitrogen	mg/L	0.20	0
Total Suspended Solids	mg/L	2	7.8
Cobalt	ug/L	0	0
Copper	ug/L	0.4	0.9
Iron	ug/L	17	16
Manganese	ug/L	3	3
Mercury	ug/L	0	0
Zinc	ug/L	2	2

0 = Not Detected

#### Bacteria (cells/100ml)

Fecal Coliform	Site	C6-10m	DYC-1m	PC-10m	E2-1m
	Reference	24	69	2	13
Enterococci	QA/QC	27	110	2	5
	Reference	5	0	1	0
	QA/QC	2	1	0	0

0 = Not Detected

### Comments:

**General:** There has been a period of relatively high temperatures, no precipitation and sustained wind from the northeast and east during the days preceding the survey. This has resulted in a well-mixed water column, with temperatures between 16 and 20 °C down to 10m water depth at most sites. This warmer, mixed layer is particularly noticeable in the Outer Harbour, where it extends through most of the water depth and down to 20m at station B2. There is relatively more stratification in the Bedford Basin because of the supply of colder and more saline water that is subjected to tidal mixing at the sill near the Narrows. The surface water density is maximum in section E, with a slight gradient toward the Bedford Basin, and a steeper gradient southward through the harbour. The down harbour water density gradient is observed in deeper water as well. The bacteria levels are generally low, with a few values in excess of shellfishing limits. Swimming limits for fecal coliform are exceeded at stations BRB, HC and SYC.

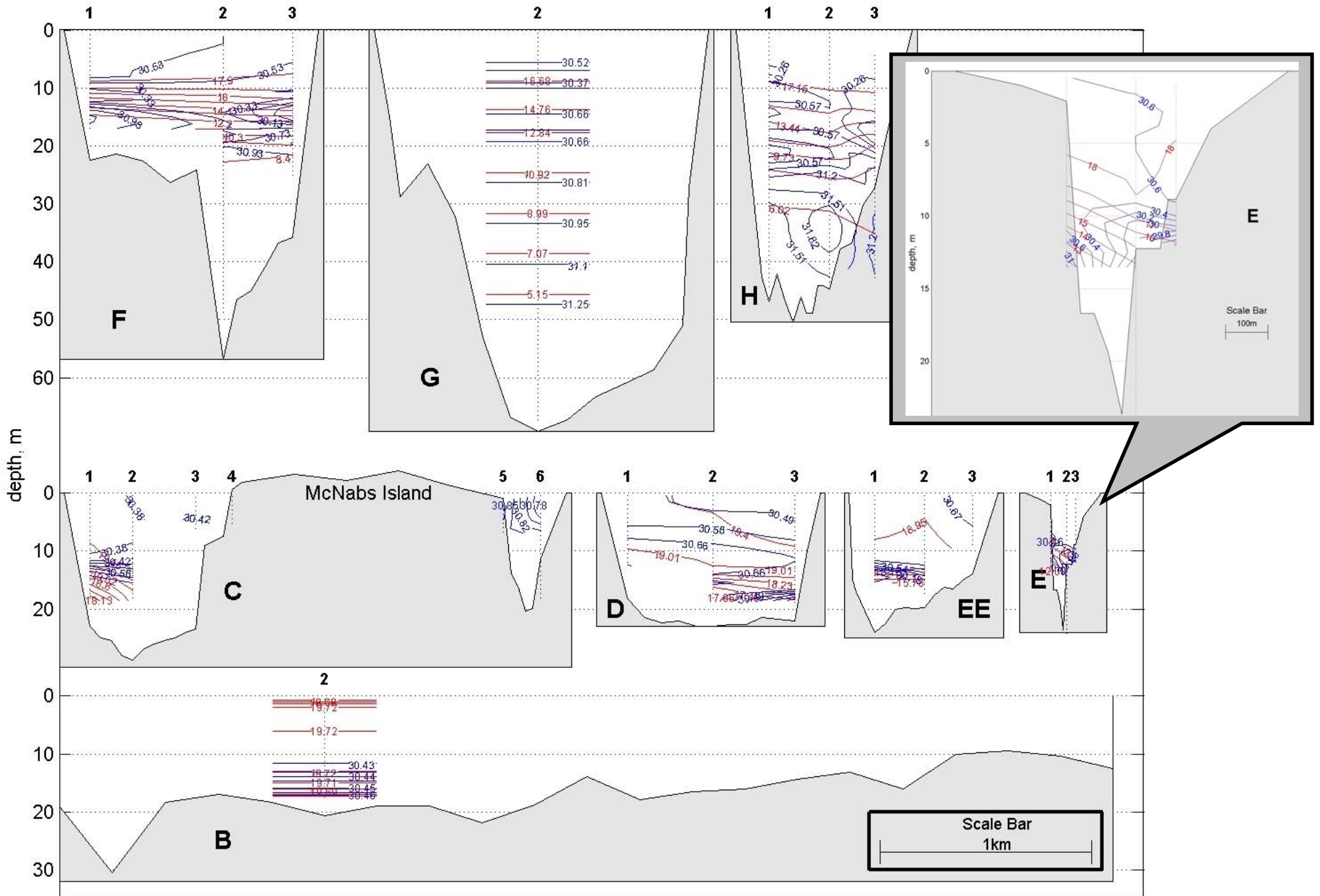
**Fluorescence:** The fluorescence levels indicate low to moderate phytoplankton activity. The profile maximum values of nearly 7 mg/m<sup>3</sup> are found throughout the water column in the Inner Harbour (section EE), and values of about 5 mg/m<sup>3</sup> are found at water depths of about 10 m in the Basin and the Northwest Arm. Throughout the rest of the Harbour the values are generally low.

**TSS:** The average TSS levels are moderate (2.1 mg/L). The highest value (5.2 mg/L) is in the Basin (H2- 10m) but there is no clear spatial pattern.

**Ammonia:** The ammonia-nitrogen levels are moderate with an average value of about 0.1 mg/L. There is no discernible pattern of ammonia levels. The maximum ammonia concentration of 0.17 mg/L is found at the surface and 10m water samples in the Basin, but where three values below the 0.05 mg/L detection limit are also noted.

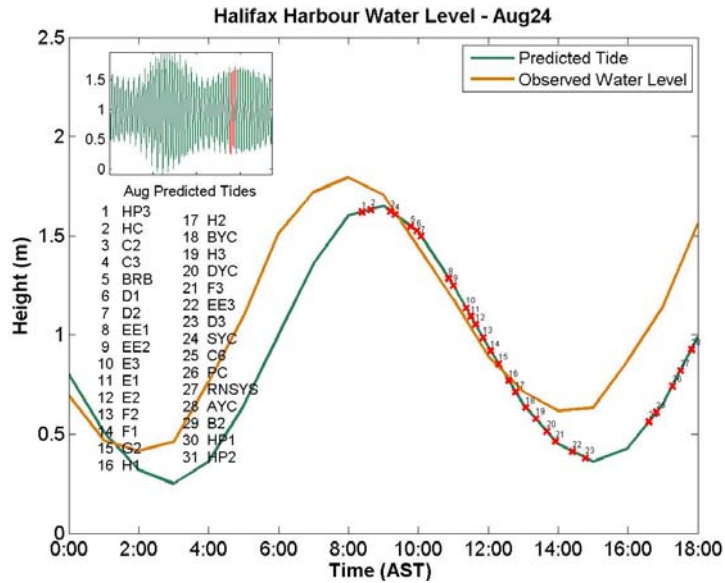
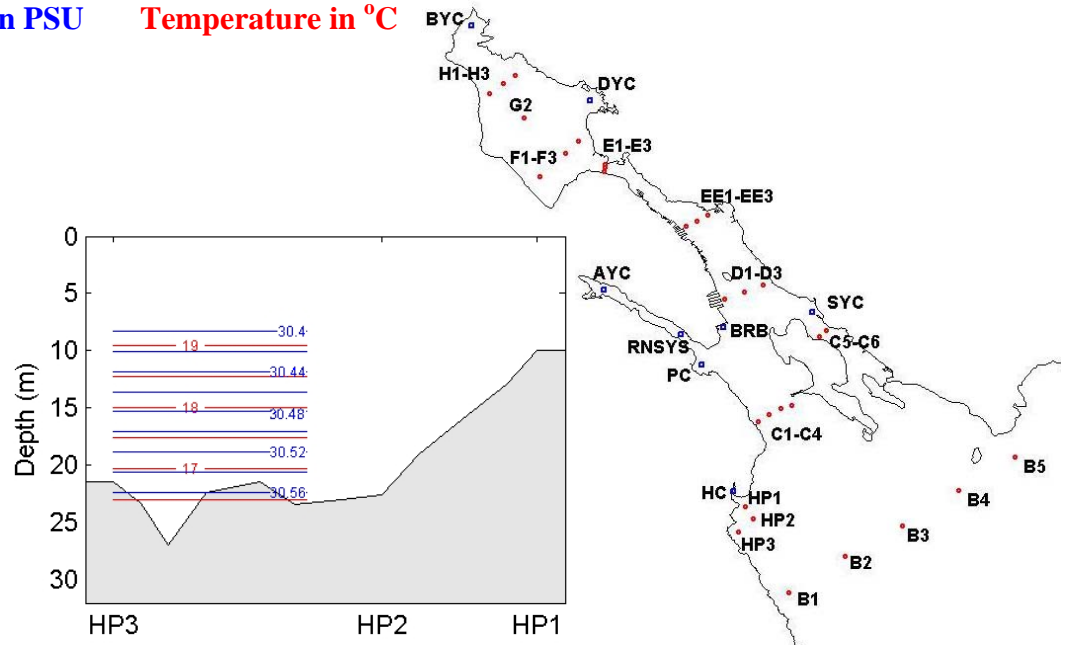
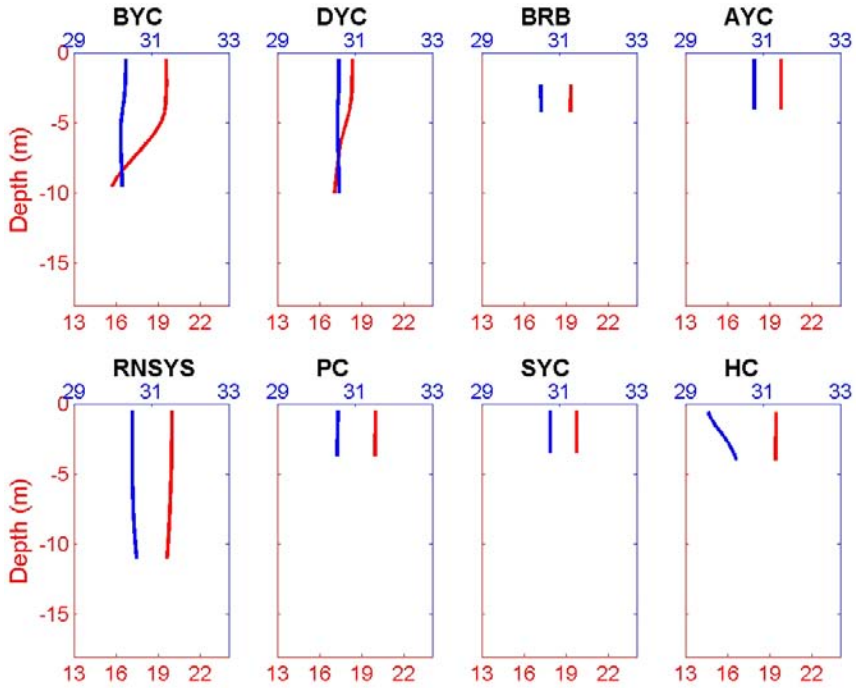
**Metals:** There were no guideline exceedances for metals, and most metals exhibit typical levels below the guideline. The mercury levels are somewhat elevated throughout the harbour with a few values close to the guideline of 0.025 ug/L. The highest value of 0.023 ug/L is observed in the 1m water sample at station D2.

**Dissolved Oxygen:** The profile measurements indicate that the dissolved oxygen is relatively high (8-10 mg/L) throughout most of the water column and at all sites, and above applicable guidelines. The BBPMP data (comparable to site G2) from August 25 is consistent with the survey observations. The data collected the week before (18 August) indicate that the DO at the bottom of Bedford Basin has remained relatively stable at about 5.0 mg/L.

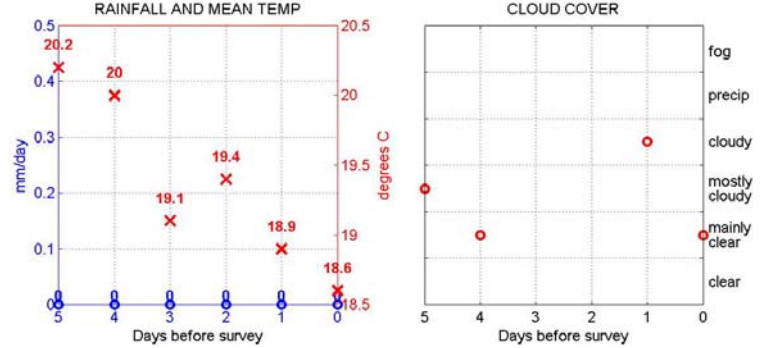
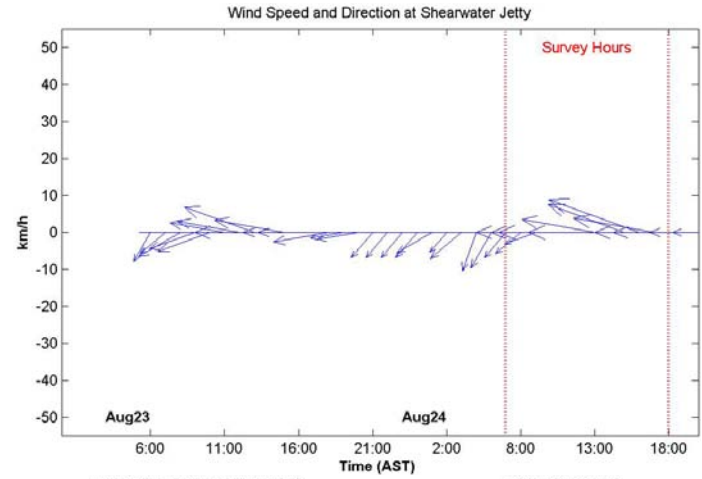


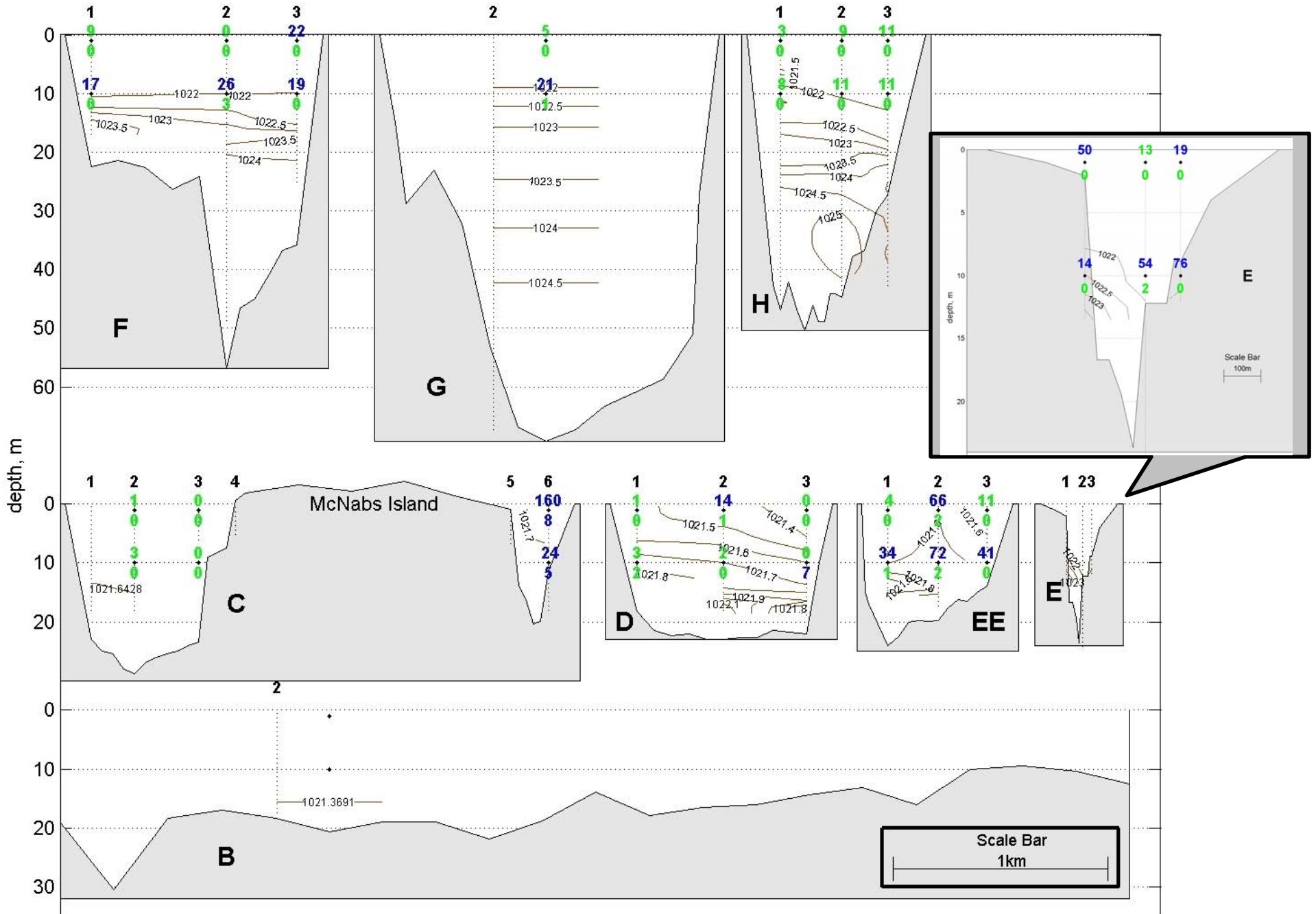
# Yacht Clubs

Salinity in PSU      Temperature in °C



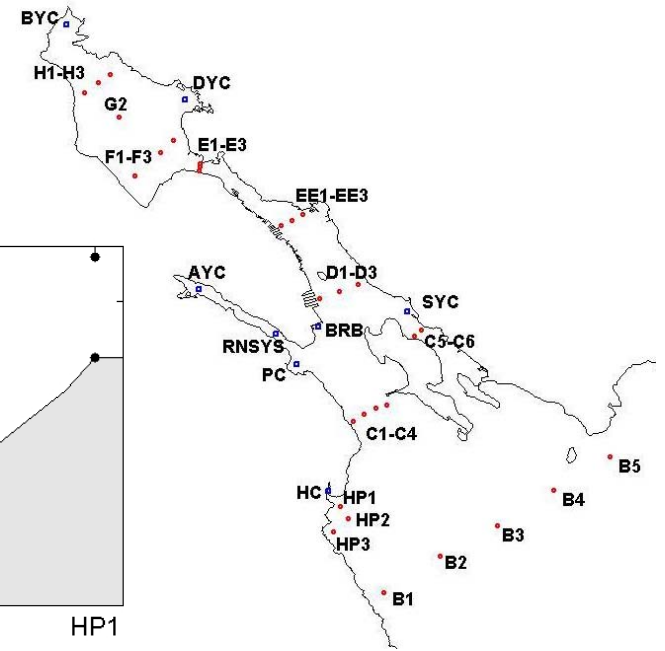
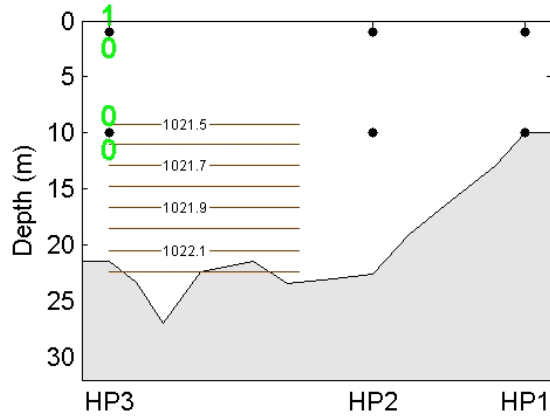
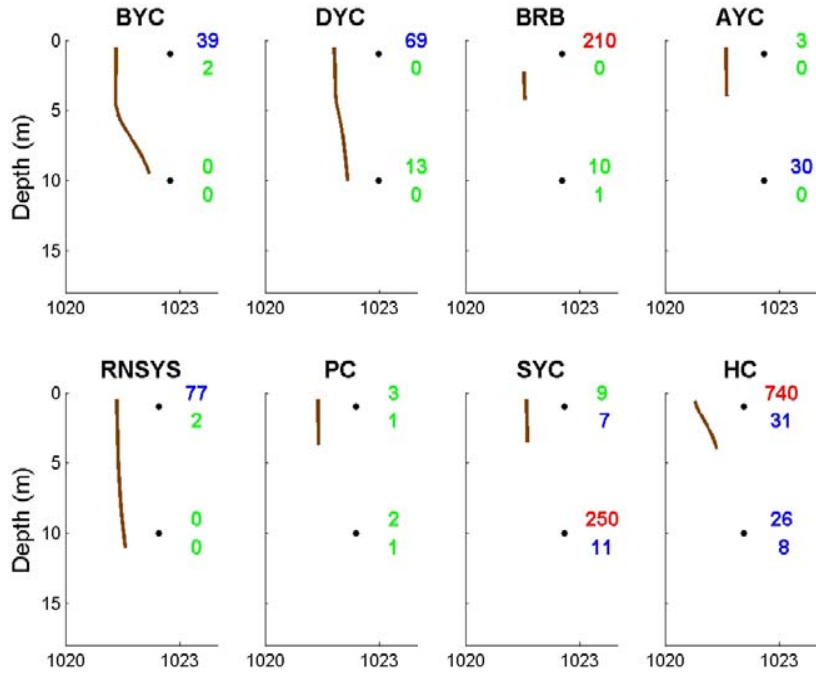
Rainfall and temperature data collected at Shearwater RCS.  
Cloud cover data collected at Shearwater Airport



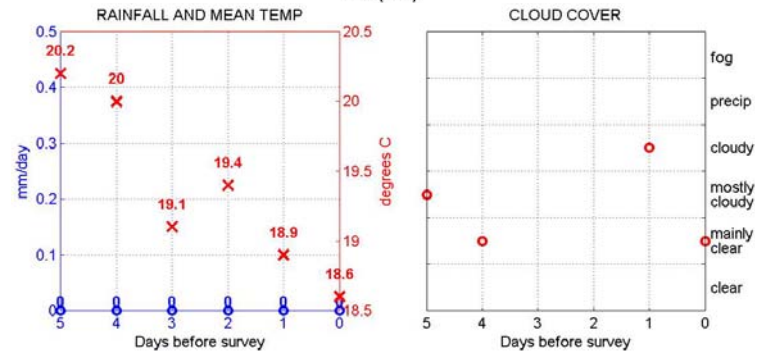
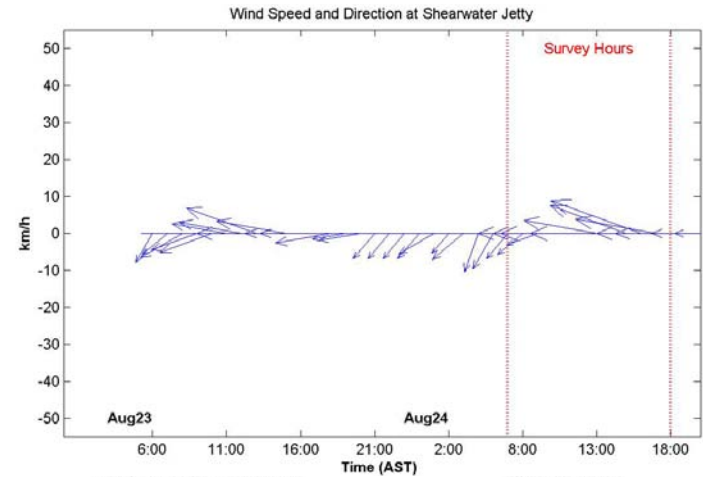
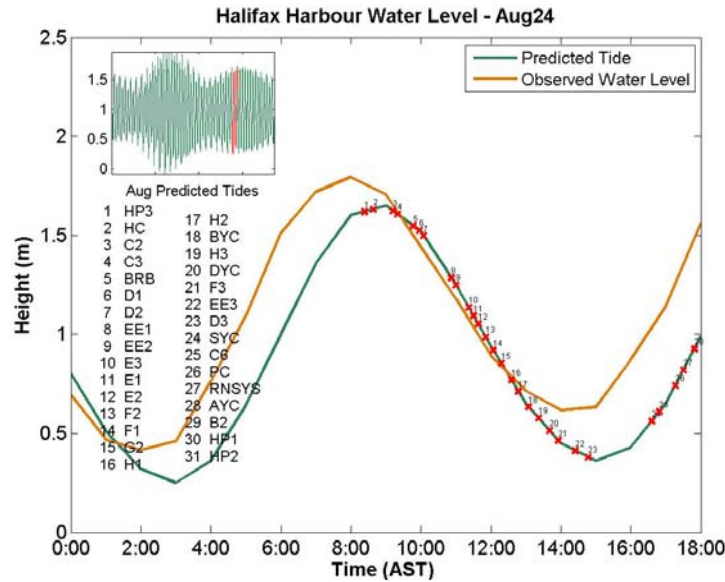


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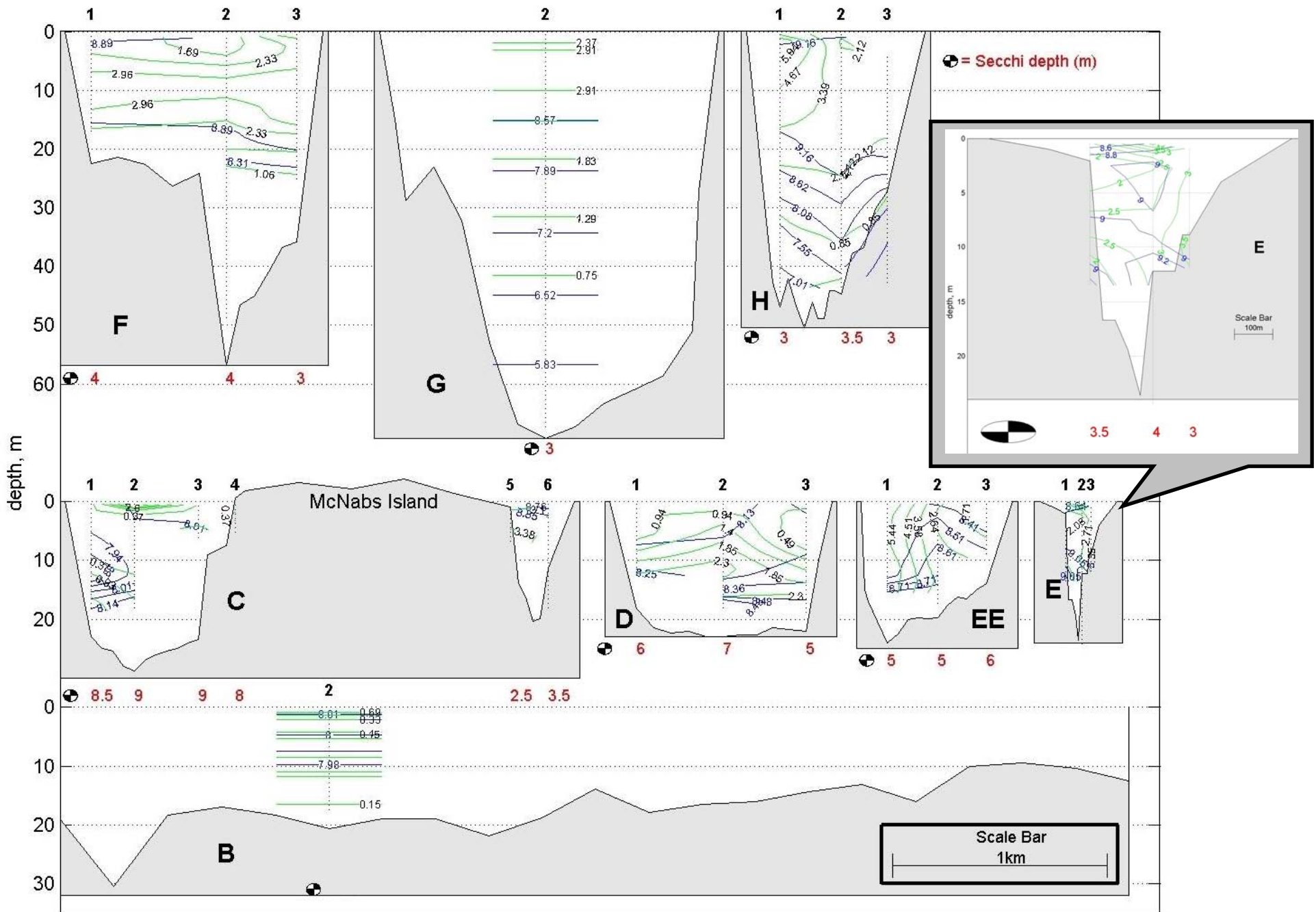
# Potential Density in kg/m<sup>3</sup>



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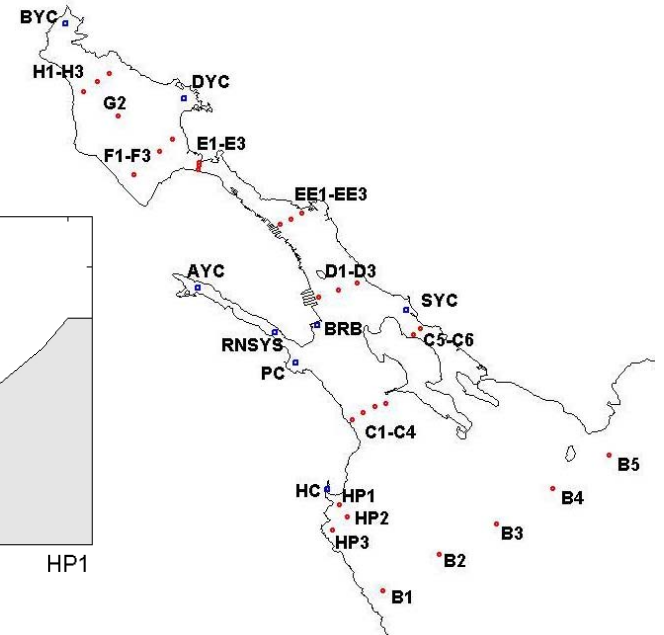
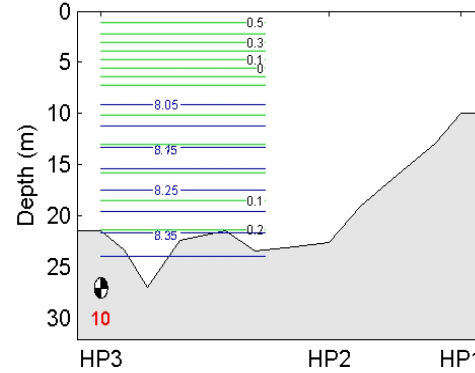
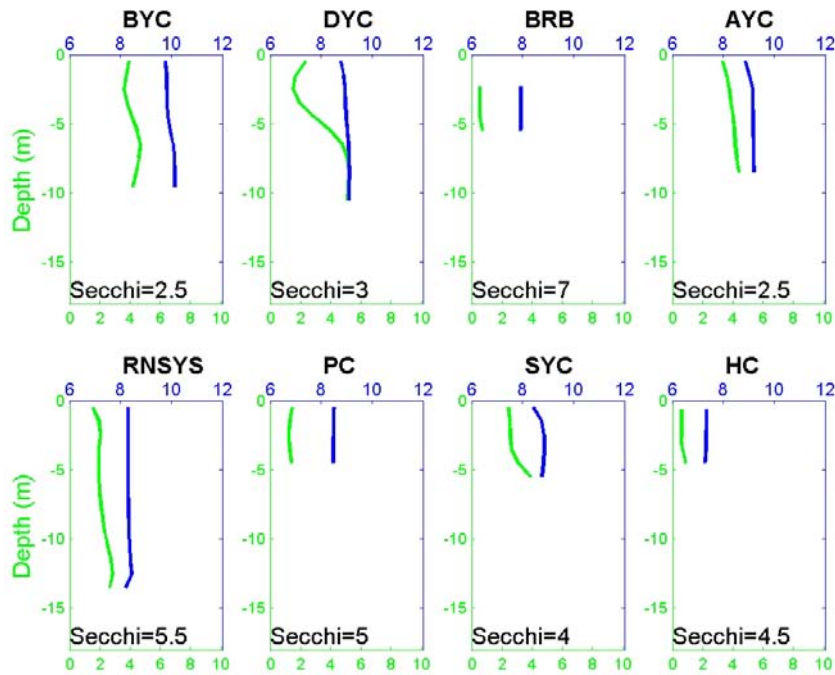
Fecal Coliform ● Above swimming limit 200 MPN/100mL Above shellfish limit 14 MPN/100mL Below limits  
Enterococci ● 35 CFU/100mL 4 CFU/100mL



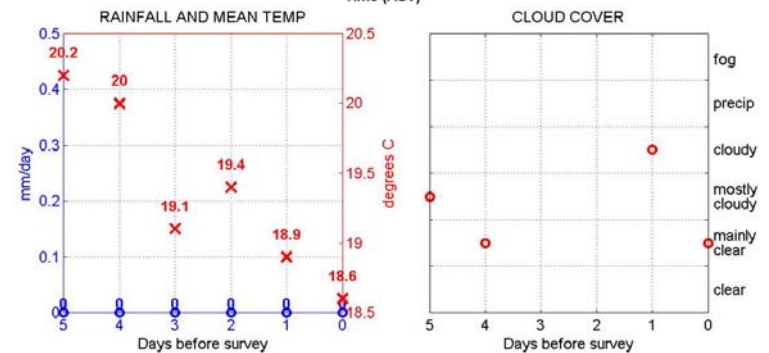
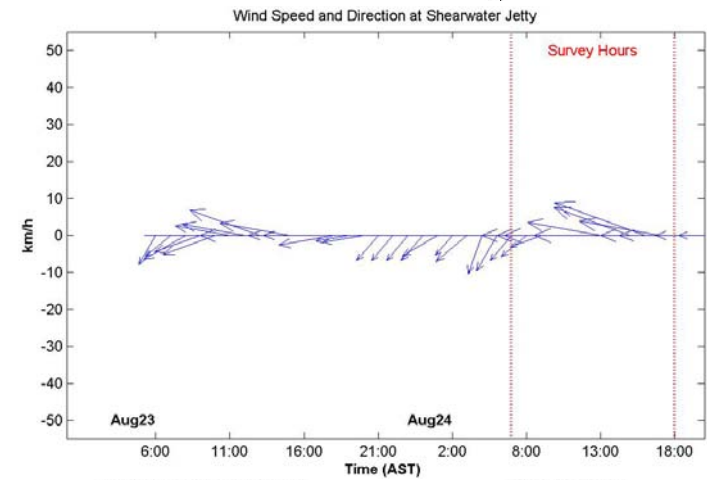
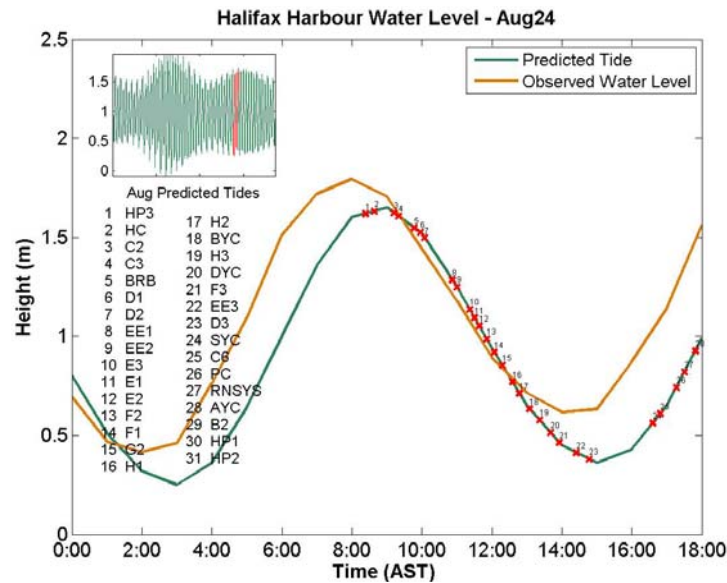
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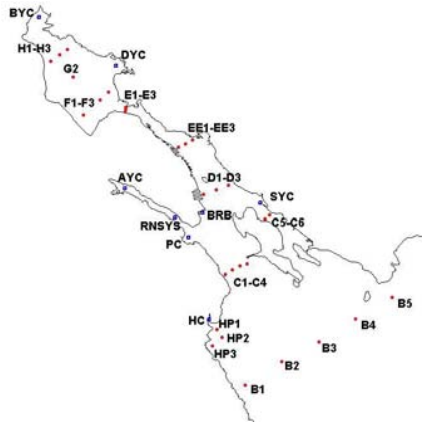
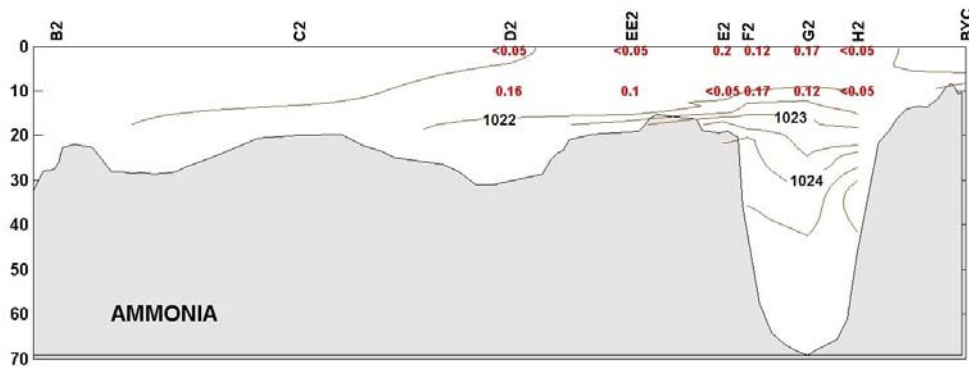
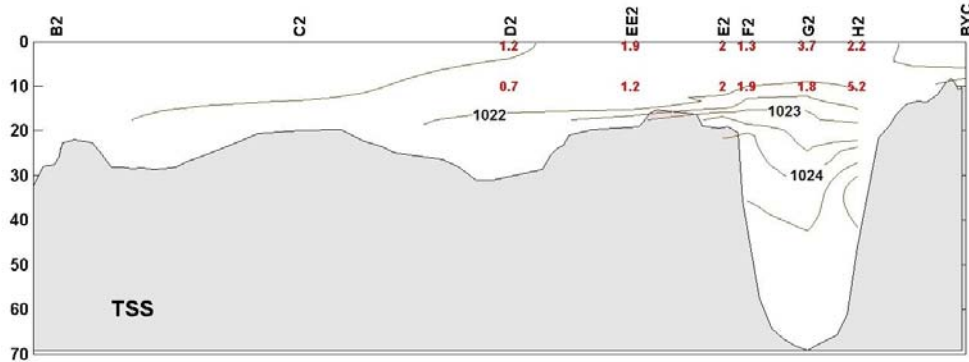
DO in mg/L

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

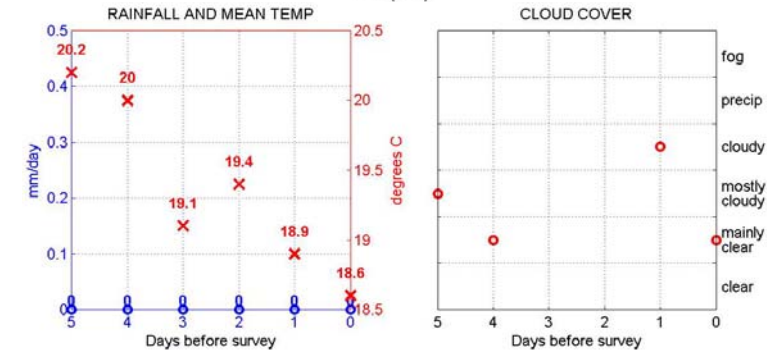
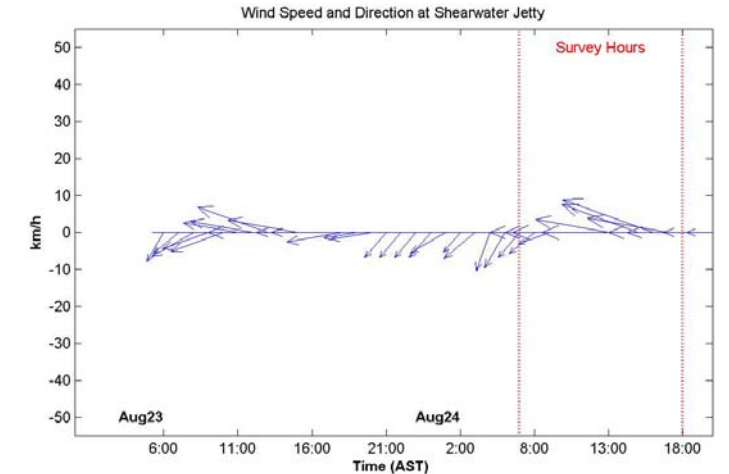
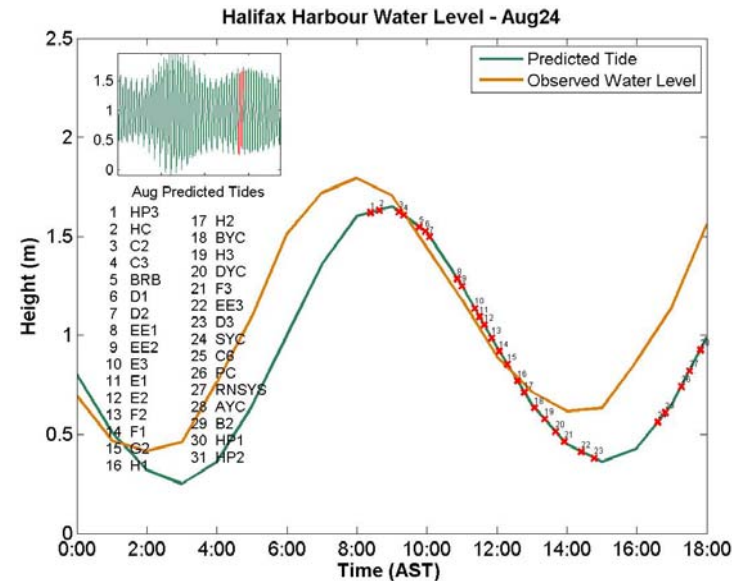


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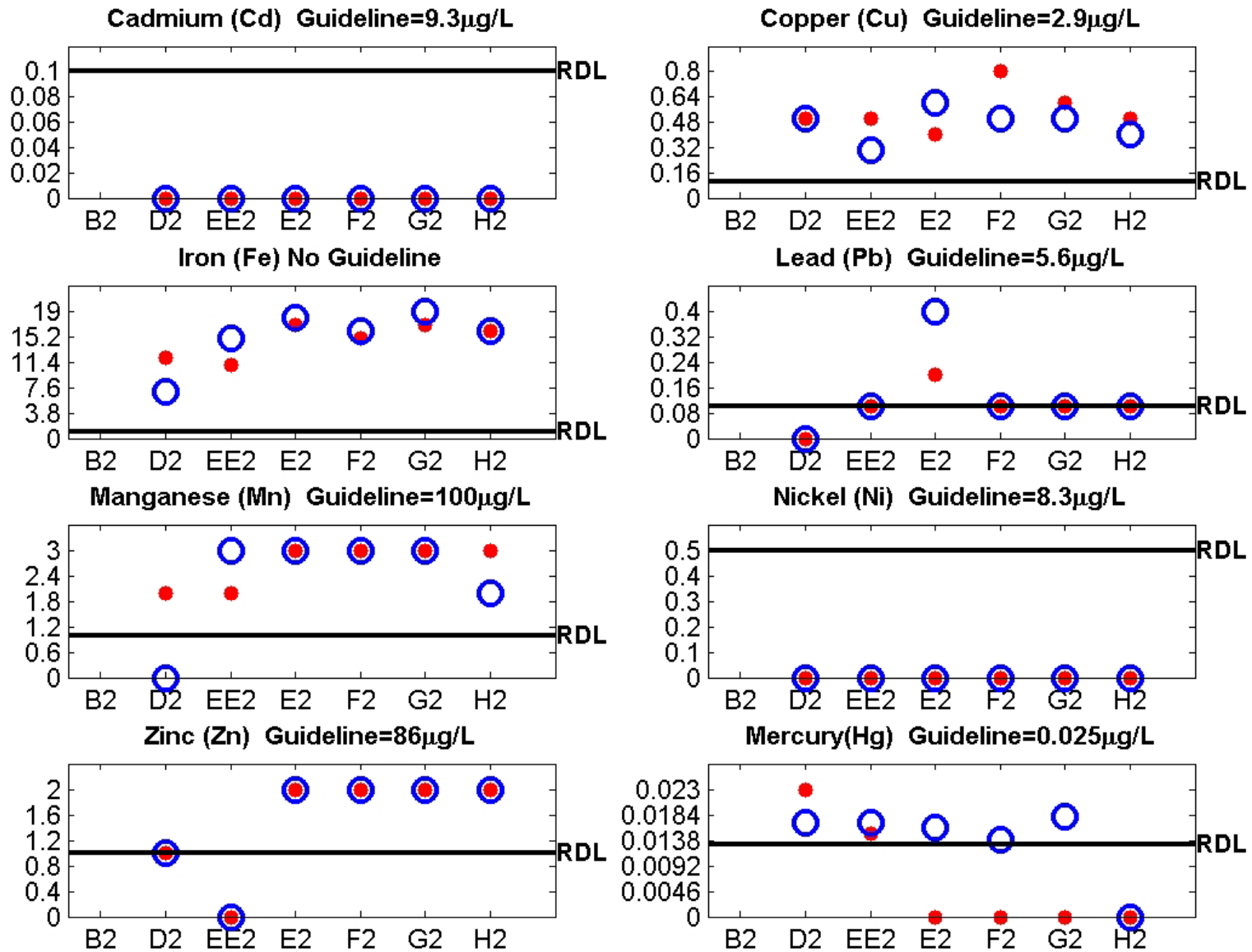


Potential Density Contours in  $\text{kg/m}^3$

Ammonia in  $\text{mg/L}$

TSS in  $\text{mg/L}$





○ = Ten Metre Water Sample  
● = One Metre Water Sample  
 RDL = Reportable Detection Limit  
 0 = Not Detected

# HRM Water Quality Monitoring Bacteria Summary – August 24, 2010

