Cruise Report
P6314 Conception Bay Study: Leg 3

Group 6
Julio Salcedo
Sarah Graham
Brian Claus

Table of Contents

1. INTRODUCTION 1
2. LOGISTICS: 2
2.1 Vessel used 2
2.2 Personnel 2
2.3 Equipment 3
3. WORK ACCOMPLISHED 4
4. PROBLEMS ENCOUNTERED 7
5. DATA COLLECTED 8
5.1 Biosonics echosounder data 8
5.2 RDI ADCP Towed data 9
5.3 Sub-Bottom Sonar (CHIRP) data 10
5.4 SideScan Sonar data 11
5.5 Seabird CTD data 13
5.6 Secchi disk data 14
5.7 Grab data 14
5.8 Ring (zooplankton) net data 15
5.9 RDI Moored ADCP data 18
5.10 Moored Thermistors Chain data 19
6. PLANS FOR SCIENTIFIC ANALYSIS 20

Table of Figures

Figure 1: Ship track October 9, 2008. The green is the towed ADCP run. 5
Figure 2: Ship track October 10, 2008. 5
Figure 3: Echosounder Track 8
Figure 4: Observations collected with the Biosonics echo-sounder 8
Figure 5: RDI ADCP Towed Velocities from Towed ADCP: 47°31.254N 53°8.716W to 47°33.487N53°1.410W 9
Figure 6: Ship Track for the SubBottom Profiler 10
Figure 7: Observations Collected with the Sub-Bottom Sonar (CHIRP) from 47°35.0522N 10
Figure 8: Observations Collected with the SideScan Sonar 11
Figure 9: Mulibeam Sonar with Waterfall Display 11
Figure 10: Echosounder display of Multibeam Sonar data 12
Figure 11: Information gathered from CTD casts at Stations OCT09S4, OCT09S5, OCT09S6, OCT10S1 and OCT10S2 13
Figure 12: Sample Images of Identified Organisms Collected with the Plankton Net 16
Figure 13: Percentage composition of zooplankton in shallow (above) and deep (samples) 17
Figure 14: Velocities measured from the Moored ADCP at 47°34.086N 53°1.046W 18
Figure 15: Temperatures measured from the Thermistor Chain at 47°34.086N 53°1.046W 19

Tables

Table 1: Coordinates of sampling stations 4
Table 2: Work Accomplished on Leg 3 of Conception Bay Study 6
Table 3: Secchi Disk Measurements Collected During Leg 3 14
Table 4:Grab stations accomplished during Leg 3 14
Table 5: Groups of zooplankton found during Leg 3 15
Table 6: Concentration (ind/m3) of zooplankton found during Leg 3 15

1. INTRODUCTION

As part of the graduate course *Field Oceanography P6314*, a two days field trip was accomplished in Conception Bay. The objectives of these activities are: 1) to develop a general understanding of the operating principles of a variety of oceanographic instruments, 2) to learn how to design an oceanographic field sampling program, 3) to provide hands-on learning experiences at sea, 4) to learn how to analyze and interpret oceanographic measurements in an interdisciplinary context.

The field trip consisted in making samples and measurements in Conception Bay from October 9 to 10, encompassing physical, geological and biological data, on board of the *Anne Pierce* vessel.

The results of this research will be analyzed and synthesized in order to make a poster presentation and a journal-quality paper as part of the activities in this course.

The following document is the report of the activities done during the field trip, with a description of the personnel participating, instruments used, type of data collected and plans for scientific analysis of this data.

2. LOGISTICS:

2.1 Vessel used

Ship Name: **Anne S. Pierce**
Official Ship Number: **802013** *(Transport Canada)*
Port of Registry: **ST. JOHN'S**
Date of Registry: **1982/08/10**
Usage: **Cargo** *(Primary)*

Dimensions
Gross Tonnage: **296 t**
Net Tonnage: **89 t**
Dead Weight Tonnage:
Length: **29.90 m**
Breadth: **8.00 m**
Depth: **4.20 m**
Draught:
Self-Propelled Power: **1,125 brake horsepower**
Speed: **10.0 knots**
Fuel Type: **Diesel**

2.2 Personnel

Leg 3 of the Conception Bay Study began October 9, 2008 at 9:00 am Local time in Long Pond, Conception Bay and ended October 10, 2008 at 4:00pm in St.John's Harbour. For this leg Daniel Bourgault was the lead scientist and the science crew consisted of

- Ralf Bachmayer
- Daniel Bourgault
- Brenda Boake
- Jack Foley
- Peter Hulse
- Lina Stolze
- Madlena Hakobyan
- Alison Kennedy
- Julio Salcedo
- Brian Claus
- Sarah Graham

The ships crew was

- Captain: Henry
- Cook: Vern
- Engineers: Bob, Gene????

2.3 Equipment

1) RDI ADCP

2) BioSonics Echosounder

3) IMAGENEX Multibean sonar

4) EDGETECH Sidescan sonar

5) EDGETECH Sub-bottom profiler

6) Zooplankton samples were taken with a ring net (300 μm sieve) and a flowmeter.

7) Benthic samples were taken with a grab

8) Seabird CTD with sensor for conductivity (salinity), temperature, pressure (depth), turbidity, irradiance, dissolved oxygen and fluorescence (chlorophyll a).

9) Secchi disk

10) Moored RDI ADCP and 11 thermistors moored between Bell Island and Kellys Island.

3. WORK ACCOMPLISHED

The work was accomplished on October 9 to 10 and encompassed the following activities:

1) The following instruments were towed along transects in Bell Island tickle area:
   a) RDI ADCP
   b) BioSonics Echosounder
   c) IMAGENEX Multibean sonar
   d) EDGETECH Sidescan sonar
   e) EDGETECH Sub-bottom profiler

2) Zooplankton samples were taken in 3 stations with a ring net (300 μm sieve) equipped with a flowmeter.

3) Benthic samples were taken in 4 stations with a grab.

4) Recovering of ADCP and thermistors moored between Bell Island and Kellys Island.

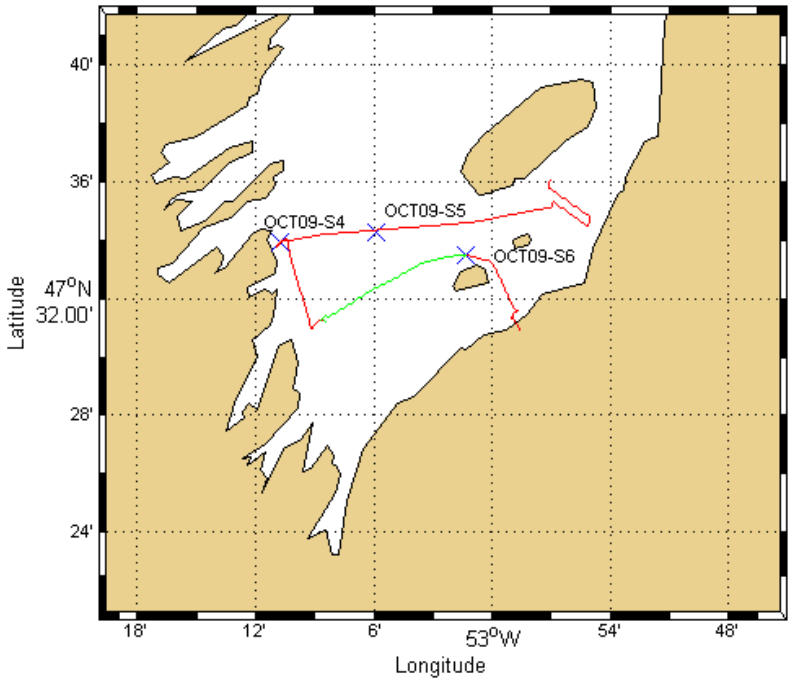
5) CTD profiles at 5 stations around Bell Island and Kellys Island.

The data type and amount collected from this work is shown in Table 1.

Table 1: Coordinates of sampling stations

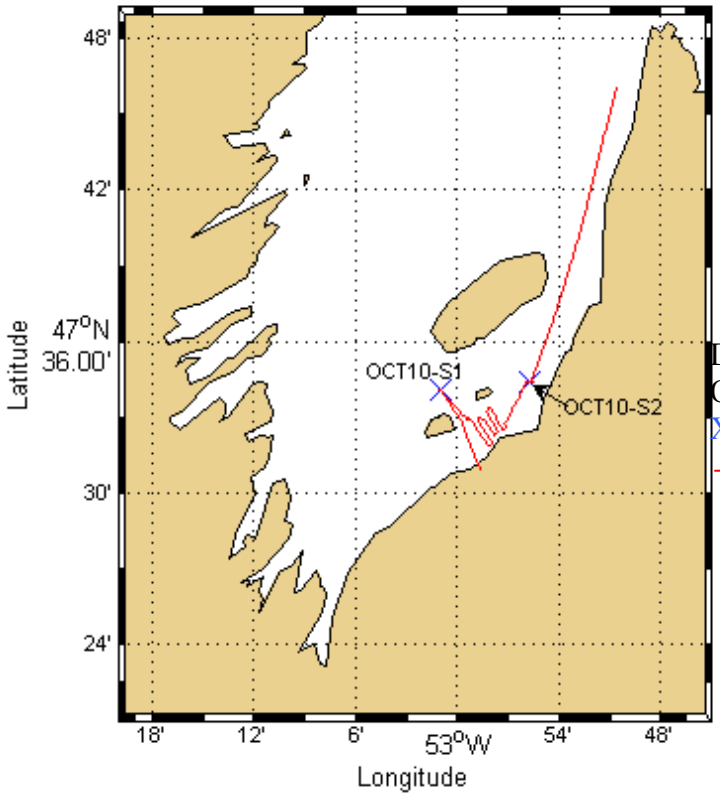
Station	Date	Latitude	Longitude
OCT09S4	October 9	N47°33.937	W53°10.746
OCT09S5	October 9	N47°31.501	W53°07.984
OCT09S6	October 9	N47°33.514	W53°01.317
OCT10S1	October 10	N47°34.113	W53°01.008
OCT10S2	October 10	N47°34.422	W52°55.773

The ship track for Leg 3 for October 9th and 10th are shown in Figures 1 and 2 respectively.



Day 4: Thursday, October 9, 2008
X : Stations
—— : Tracks
----- : Plotted ADCP Track

Figure 1: Ship track October 9, 2008. The green is the towed ADCP run.



Day 5: Friday, October 10, 2008
X : Stations
—— : Tracks

Figure 2: Ship track October 10, 2008.

Table 2: Work Accomplished on Leg 3 of Conception Bay Study

Type	Day 4	Day 5
Biosonics Echosounder	-3 Transects -Measurements taken while CTD and grab bucket lowered(OCT09S4 and OCT09S5) -Towed between OCT09S5 and OCT09S6 -Between OCT09S6 and harbor	-5 Transects -Turns recorded between transects
DeltaT Multibeam Sonar	-3 Transects -Measurements taken while grab bucket and CTD lowered; OCT09S4 -Measurements taken while other instruments turned off ; ship stationary -Measurements taken between OCT09S5 and OCT09S6 -Between OCT09S6 and harbour	-5 Transects -Turns recorded between transects
EdgeTech Sidescan Sonar	-3 Transects	-5 Transects -Turns recorded between transects
EdgeTech SubBottom Profiler	-3 Transects -Towed between OCT09S5 and second grab bucket sample location -Between OCT09S6 and harbor	-5 Transects -Turns recorded between transects
RDI Towed ADCP	-3 Transects -Measurements taken while ctd and grab bucket lowered ; OCT09S4 and OCT09S5 - Measurements between OCT09S5 and OCT09S6 -Between OCT09S6 and harbour	-4 Transects; Transect 3 not recorded for ADCP -Turns recorded between transects
Seabird CTD	-3 Casts; OCT09S4, OCT09S5, OCT09S6	-2 Casts; OCT10S1 and OCT10S2
Secchi Disk	-1 Measurement, OCT09S4	-1 Measurement; OCT10S2
Plankton Net	-4 Samples; shallow and deep at OCT09S4,OCT09S5.	-2 samples; shallow and deep; OCT10S2
Grab Bucket	-3 Samples; OCT09S4, OCT09S6, in front of harbor	-1 sample; OCT10S2
Moored RDI ADCP	-continuous sampling	-Retrieved -~4 days measurements
Thermistor Chain	-continuous sampling -11 elements	-Retrieved -~4 days measurements

4. PROBLEMS ENCOUNTERED

During Leg 3 some problems were encountered. There was interference between signals coming form different instruments working at the same time. This led to noise in the data. Another problem was that the Multibeam Maximum range was 100m. Therefore the data dropped out occasionally because the bottom was too deep for the instrument to gather the data. High waves also caused problems with some of the equipment. For example the towed ADCP has trouble recording in rough conditions and we were unable to use the plankton net in some locations due to the waves and the wind.

5. DATA COLLECTED

The following points (5.1 to 5.9) show examples of type of data collected and preliminary results.

5.1 Biosonics echosounder data

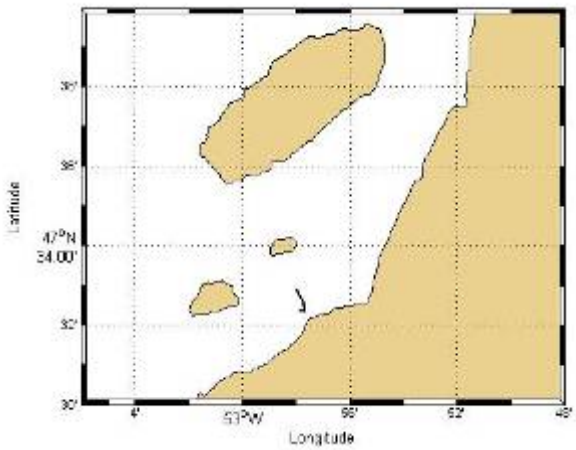


Figure 3: Echosounder Track

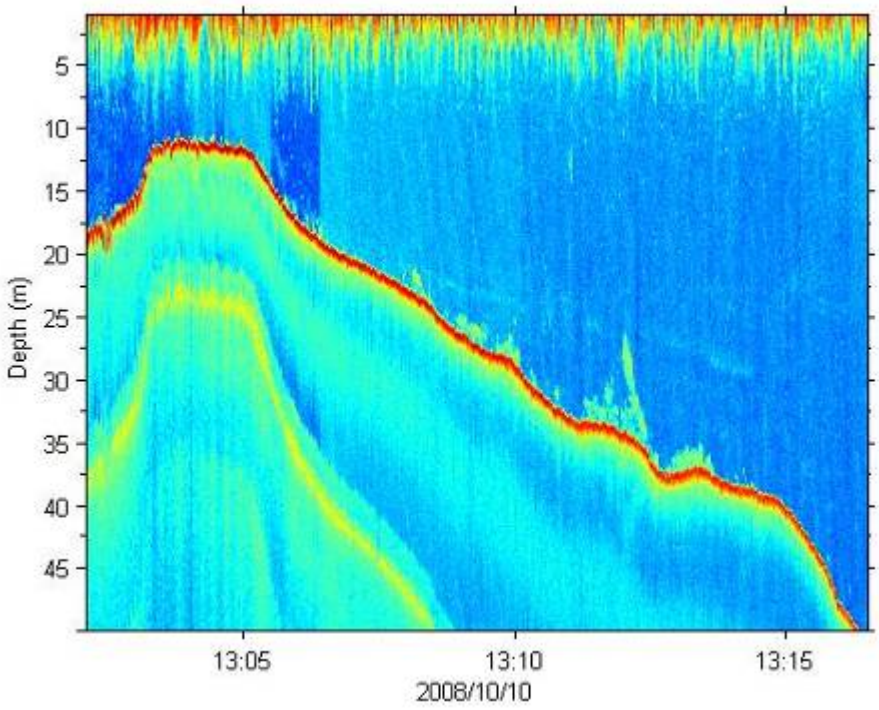


Figure 4: Observations collected with the Biosonics echo-sounder

5.2 RDI ADCP Towed data

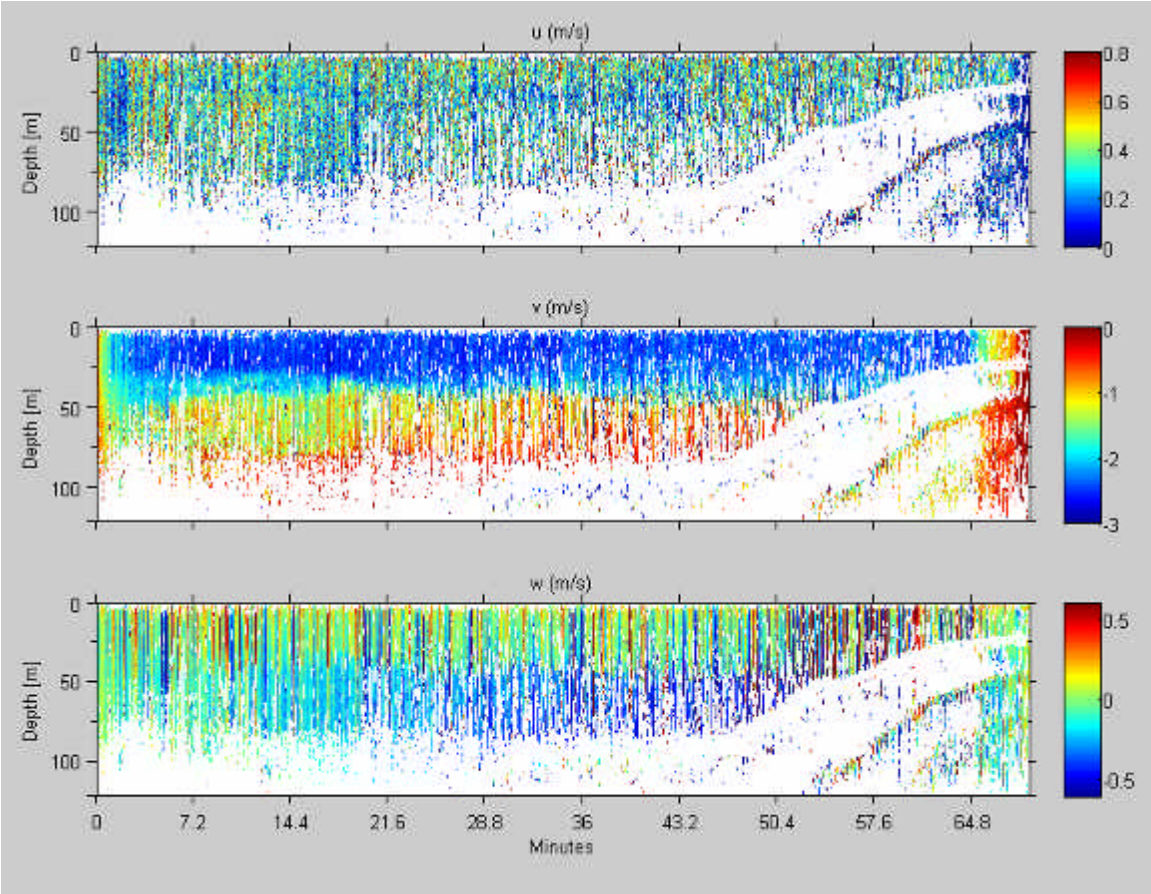


Figure 5: RDI ADCP Towed Velocities from Towed ADCP: 47°31.254N 53°8.716W to 47°33.487N53°1.410W

5.3 Sub-Bottom Sonar (CHIRP) data

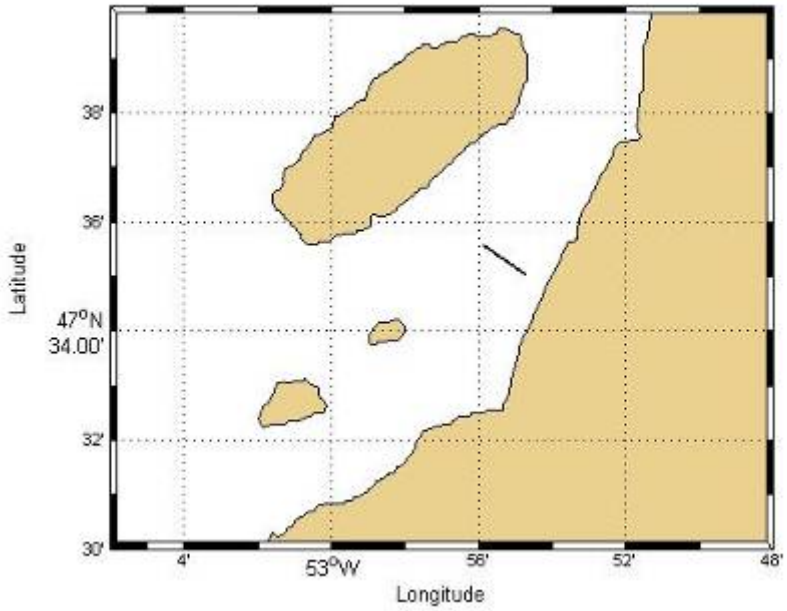


Figure 6: Ship Track for the SubBottom Profiler

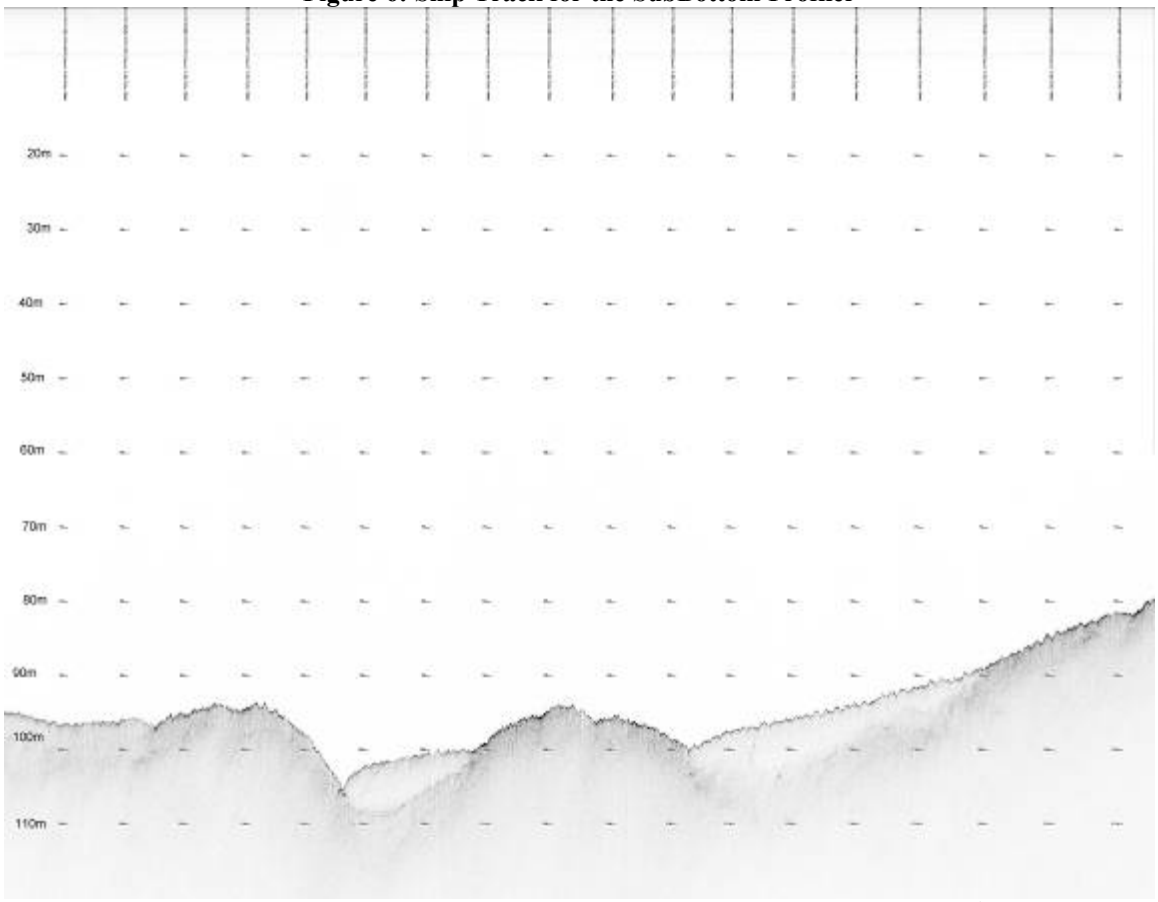


Figure 7: Observations Collected with the Sub-Bottom Sonar (CHIRP) from 47°35.0522N

5.4 SideScan Sonar data

52° 54.7187W to 47°35.5717N 52° 55.8416W

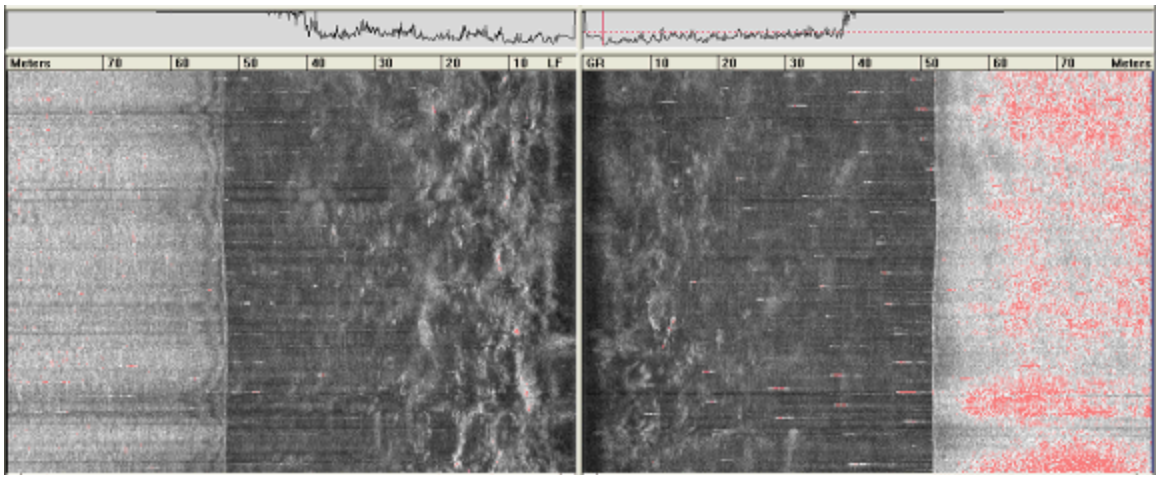


Figure 8: Observations Collected with the SideScan Sonar

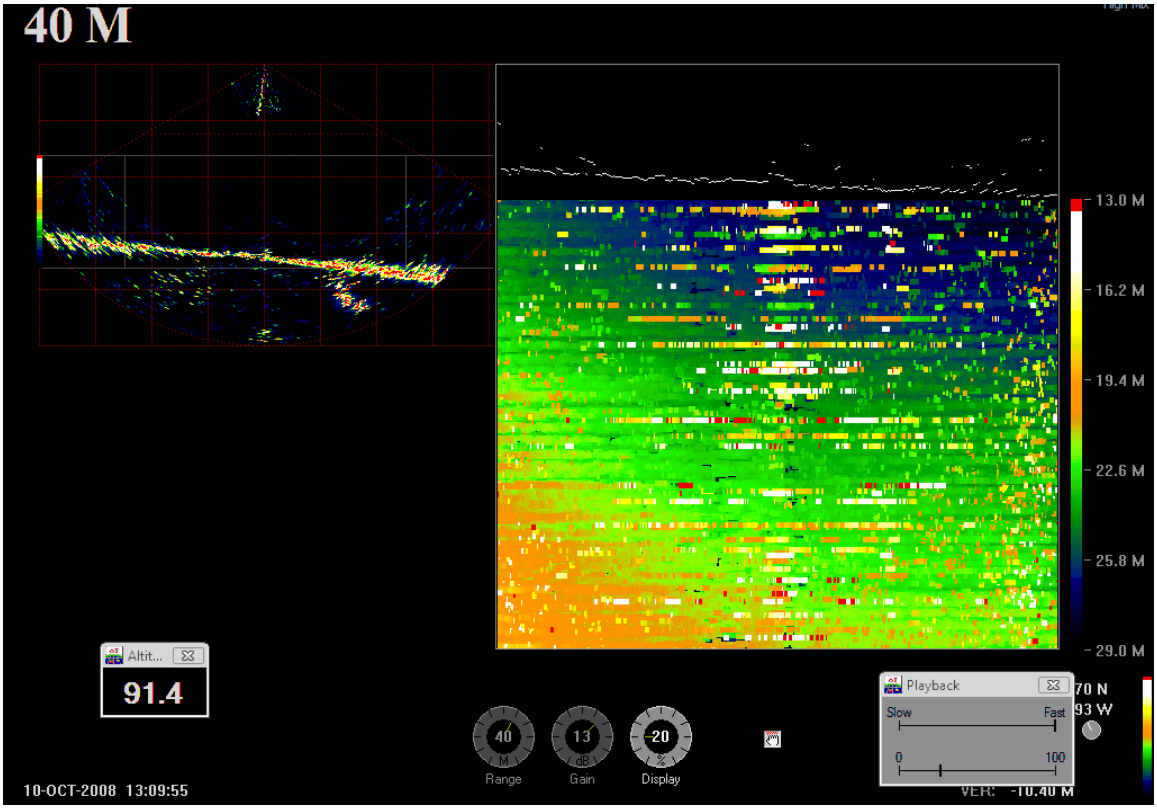


Figure 9: Mulibeam Sonar with Waterfall Display

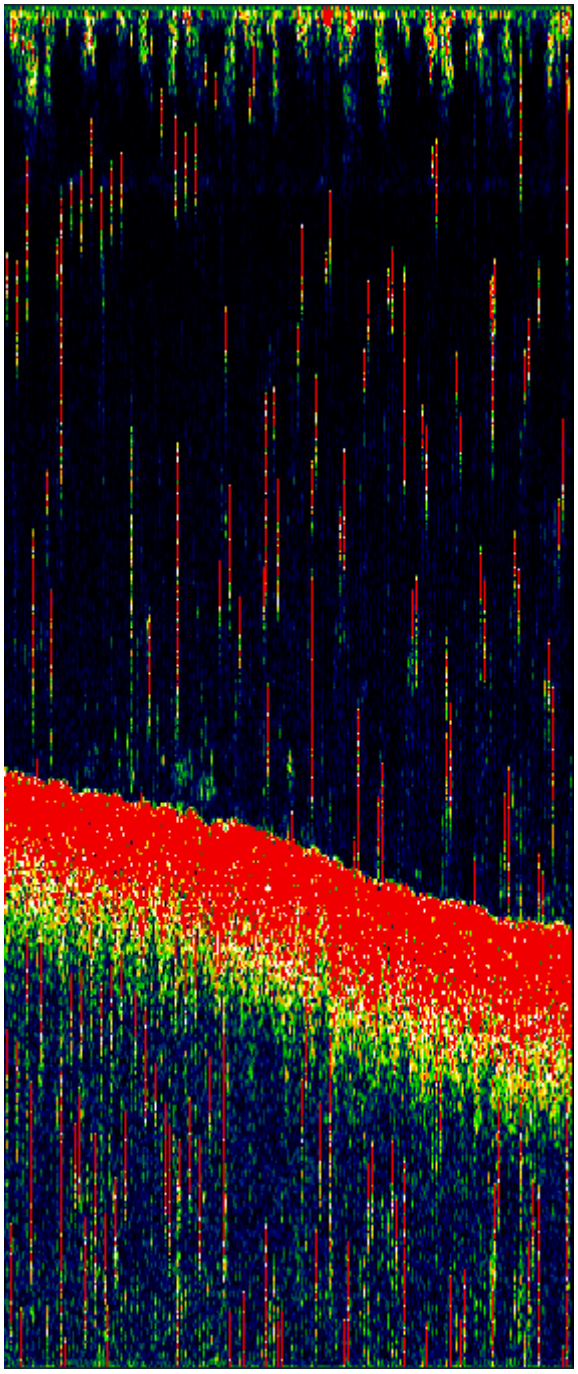


Figure 10: Echosounder display of Multibeam Sonar data

5.5 Seabird CTD data

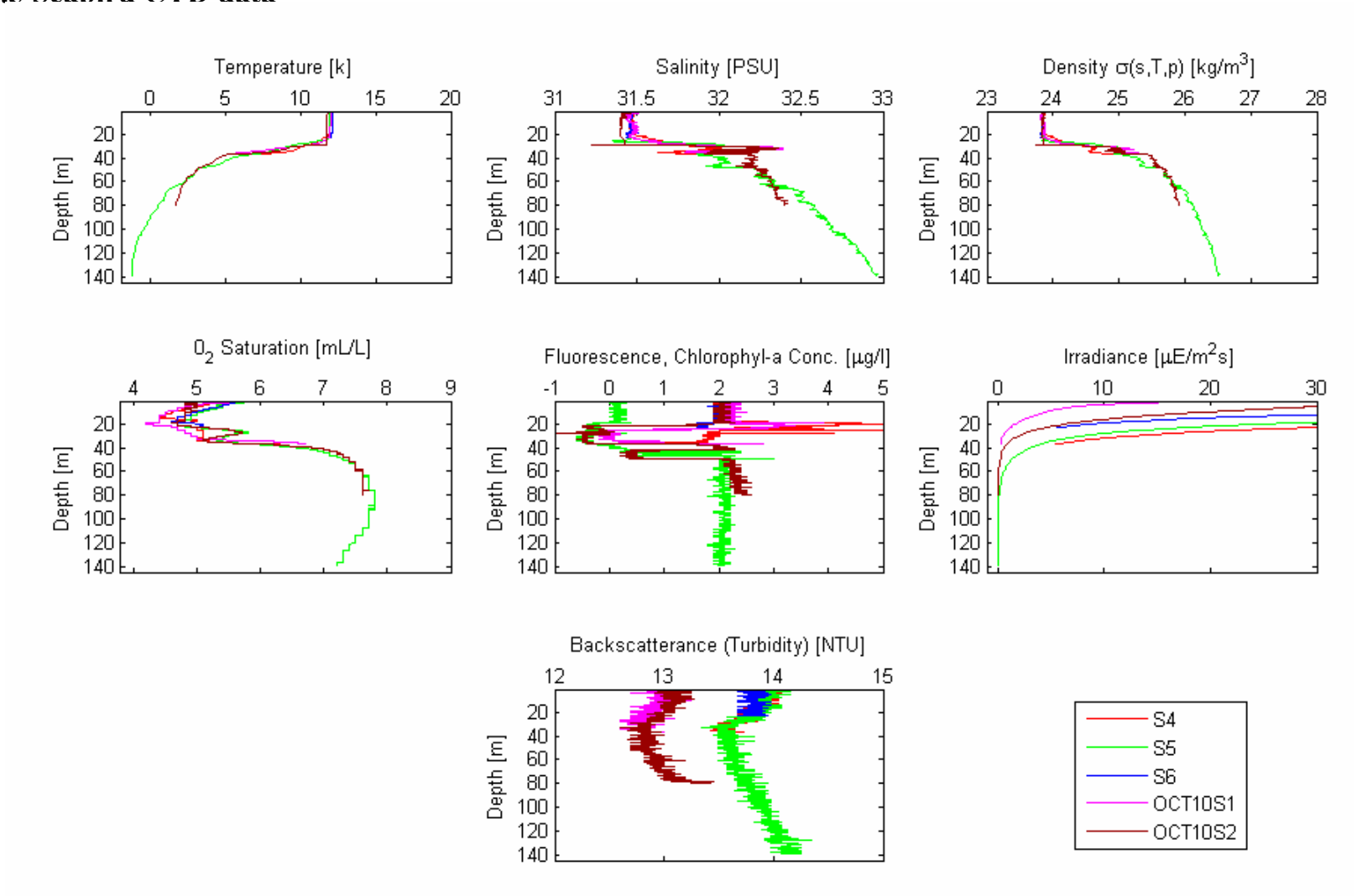


Figure 11: Information gathered from CTD casts at Stations OCT09S4, OCT09S5, OCT09S6, OCT10S1 and OCT10S2

5.6 Secchi disk data

Table 3: Secchi Disk Measurements Collected During Leg 3

Station	Date	Secchi Disk depth (m)	Latitude	Longitude
OCT09S4	October 9	11	N47°33.937	W53°10.746
OCT10S2	October 10	11	N47°34.422	W52°55.773

5.7 Grab data

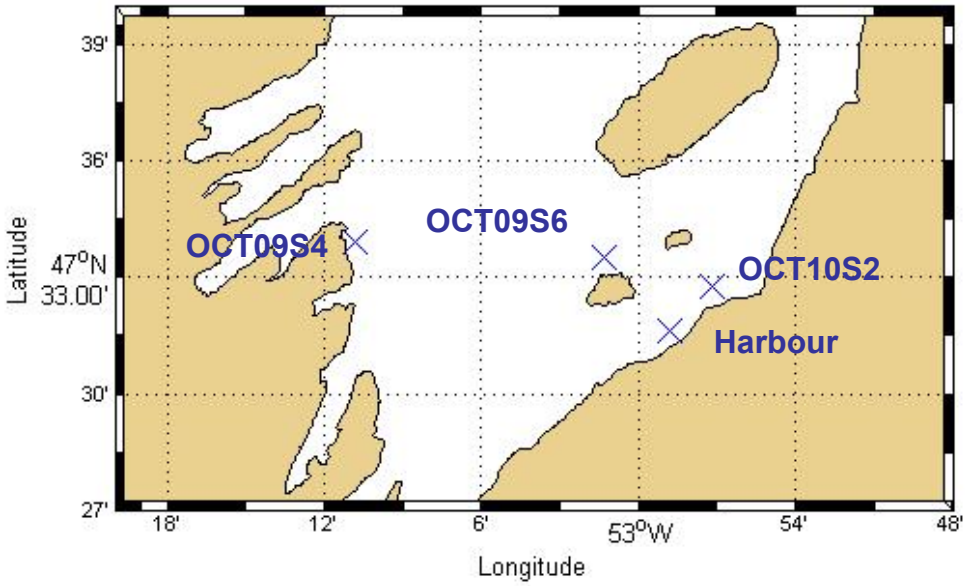


Table 4:Grab stations accomplished during Leg 3

Station	Latitude	Longitude	Substrate	Date	Depth
OCT09S4	47°33.914N	53°10.814W	Rocky	9-Oct	21 m
OCT09S6	47°33.514N	53°01.317W	Rocky	9-Oct	25 m
Harbour	47°31.619N	52°58.774W	Sample to be analyzed	9-Oct	22 m
OCT10S2	47°32.777N	52°57.155W	Sea urchin, coral, seaweeds	10-Oct	24 m

5.8 Ring (zooplankton) net data

Table 5: Groups of zooplankton found during Leg 3

Groups	Code
Copepods	**COPE**
Cladoceran	**CLAD**
Gastropod Larvae	**GASL**
Chaetognath	**CHAE**
Larvacean	**LARV**
Starfish Larvae	**STAL**
Echinoderm Larvae	**ECHL**
Jelly	**JELL**
Shrimp Larvae	**SHPL**
Pteropod	**PTER**
Mysid	**MYSI**
Polychaete Larvae	**POLY**

Table 6: Concentration (ind/m3) of zooplankton found during Leg 3

Station	**OCT09S4**		**OCT09S5**		**OCT10S2**	
Depth	**Shallow (20 m)**	**Deep (60 m)**	**Shallow (30 m)**	**Deep (70 m)**	**Shallow (30 m)**	**Deep (70 m)**
Latitude	**47°33.961N**	**47°33.997N**	**47°31.228N**	**47°31.015N**	**47°34.418N**	**47°31.015N**
Longitude	**53°10.707W**	**53°10.616W**	**53°08.767W**	**53°09.081W**	**52°55.931W**	**53°09.081W**
COPE	7329	2169	2446	2323	1221	977
CLAD	1537	630	614	96	1764	929
GASL	963	868	255	134	1434	647
CHAE	51	59	12	58	0	29
LARV	84	137	70	202	19	19
STAL	51	24	12	67	19	19
ECHL	17	12	81	10	174	77
JELL	0	24	46	58	10	5
SHPL	0	0	12	0	0	0
PTER	0	0	12	0	0	0
MYSI	0	6	0	10	0	0
POLY	17	0	0	0	0	5
TOTAL	10047	3928	3558	2957	4641	2707

Some organisms that were collected in this leg are shown in Fig. 12.

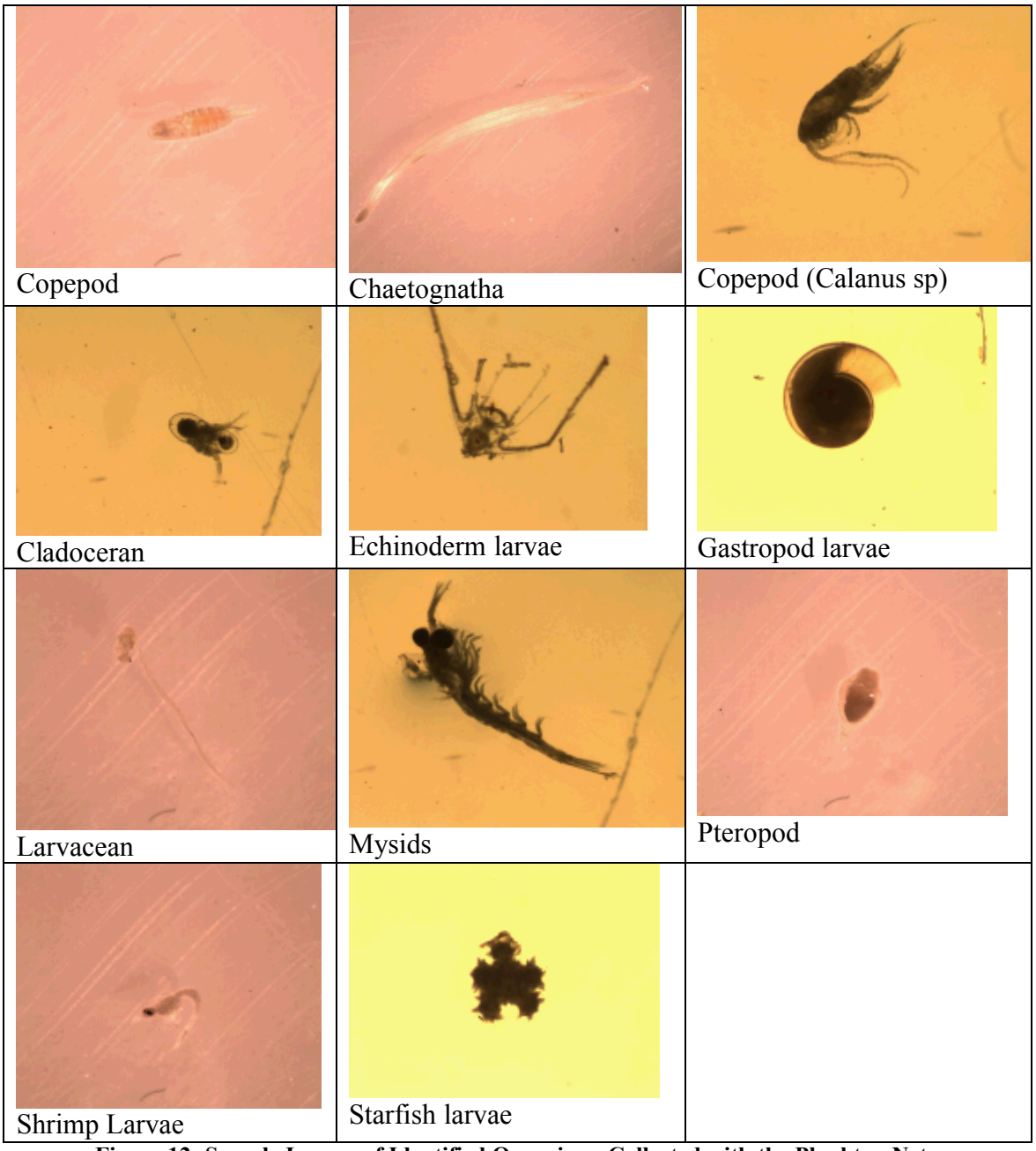
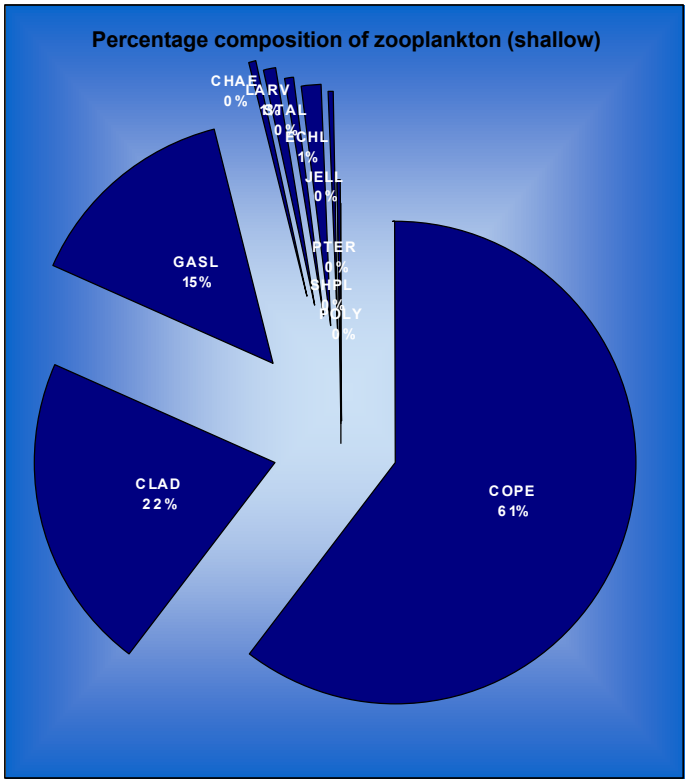


Figure 12: Sample Images of Identified Organisms Collected with the Plankton Net



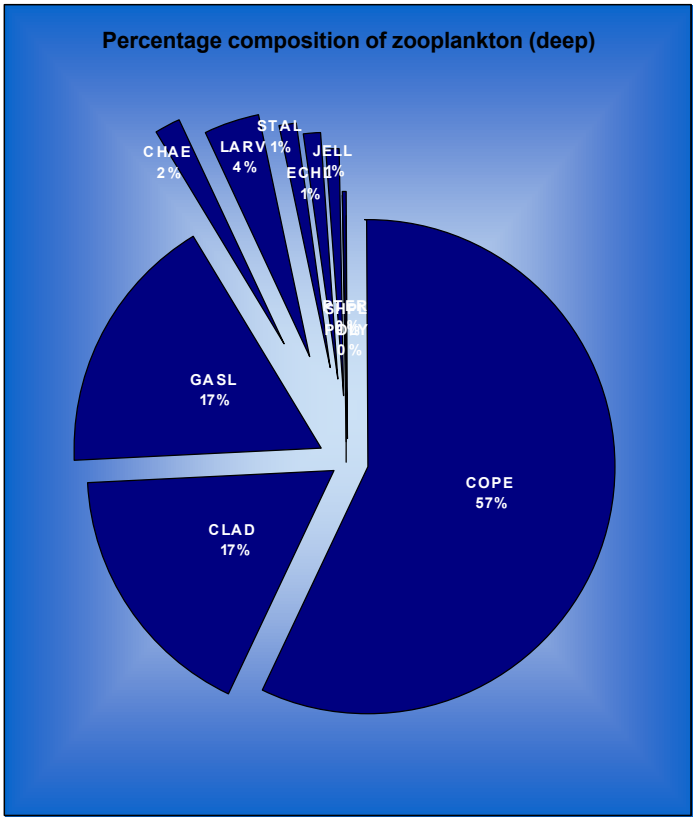


Figure 13: Percentage composition of zooplankton in shallow (above) and deep (samples)

5.9 RDI Moored ADCP data

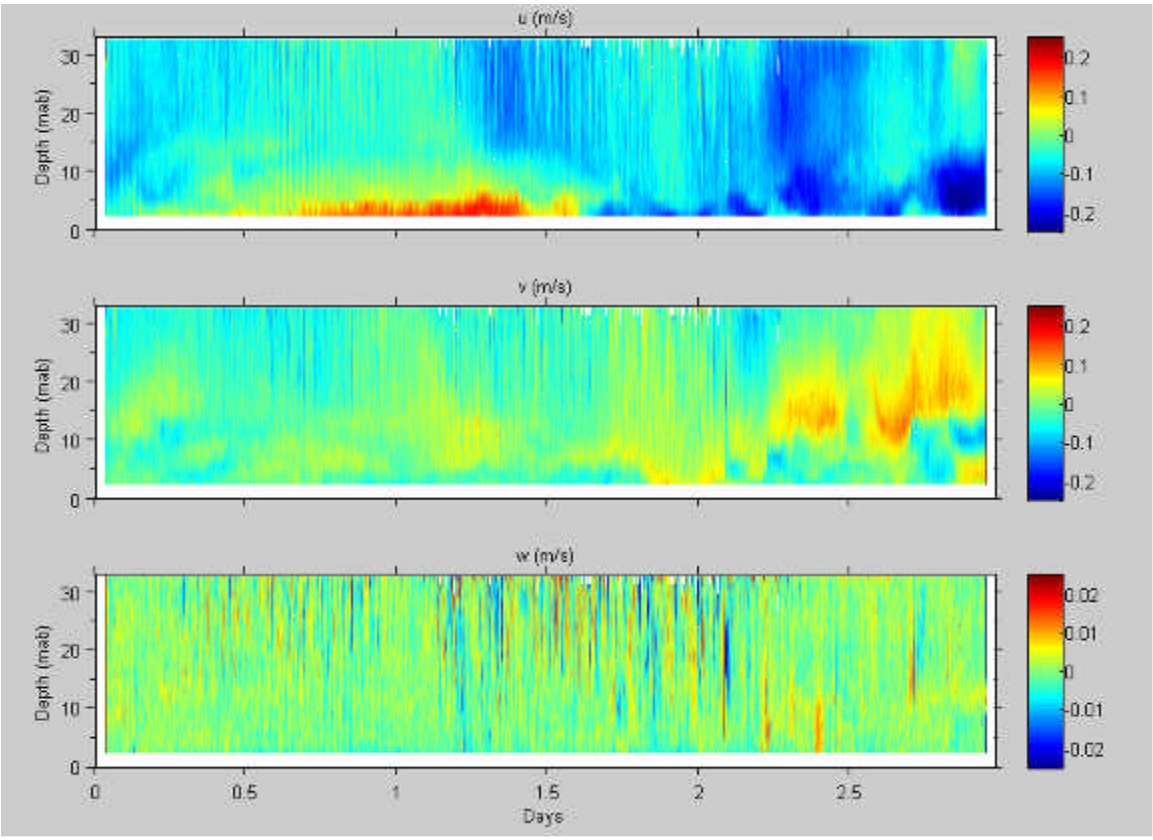


Figure 14: Velocities measured from the Moored ADCP at 47°34.086N 53°1.046W

5.10 Moored Thermistors Chain data

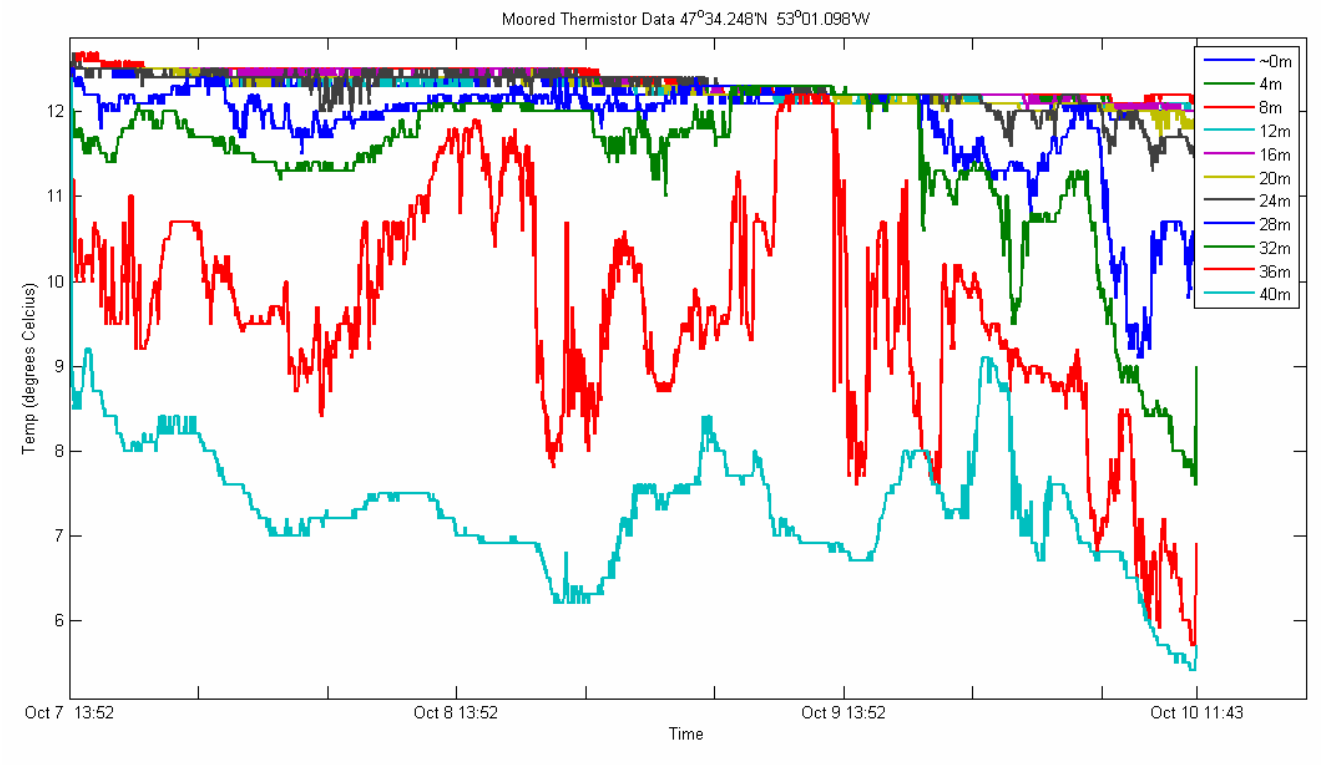


Figure 15: Temperatures measured from the Thermistor Chain at 47°34.086N 53°1.046W

6. PLANS FOR SCIENTIFIC ANALYSIS

The data collected was collected in the hope that a further understanding of Conception Bay could be developed and so that students of Physics 6314 could learn about oceanographic data collection and analysis. The data needs to be further analyzed. The Multibeam and ADCP data needs to filtered and then interpreted. Plotting the ADCP data as a function of distance as well as time to help gain a better understanding of Conception Bay would also be of interest. Since the sub-bottom and echo sounder give us information about bottom density, this data could be used to fully understand the results given by the Multibeam.

Some comparisons could also be made. We could determine if the CTD temperature measurements at the moored thermistors chain location are valid by comparing them to the thermistors chain data. We would like to see how salinity, temperature, etc. effect plankton distributions by comparing the CTD data to the plankton net data at the stations. The thermistors chain data and moored ADCP data will hopefully give us a better understanding of the circulation in the Bell Island Tickle region. A closer look needs to be taken around the mouth of Manuel's River to see if the freshwater flux effects the plankton, the geology (silt outflow) or currents (internal waves) in the area.