

Excellence scientifique • Protection et conservation des ressources • Bénéfices aux Canadiens
Scientific Excellence • Resource Protection & Conservation • Benefits for Canadians

Biological, chemical and physical oceanographic conditions in the Southern Gulf of Saint Lawrence, 1992

L.E. Waite, J.C. Smith, P. Cormier and K. Pauley

Fisheries and Oceans Canada
Science Branch, Maritimes Region
Gulf Fisheries Centre
P.O. Box 5030
Moncton, New Brunswick
Canada E1C 9B6

1998

Canadian Data Report of Fisheries and Aquatic Sciences 1034



Pêches
et Océans

Fisheries
and Oceans

Canada

Imprimé sur du
papier recyclé



Printed on recycled paper

© Minister of Supply and Services Canada 1998
Cat. No. Fs 98-13/1034E ISSN 0706-6465

Correct citation for this publication:

L.E. Waite, J.C. Smith, P. Cormier and K. Pauley. 1998. Biological, chemical and physical oceanographic conditions in the Southern Gulf of Saint Lawrence, 1992. Can. Data Rep. Fish. Aquat. Sci. 1034: viii + 160 p.

TABLE OF CONTENTS

ABSTRACT.....	vii
RÉSUMÉ	vii
1.0 INTRODUCTION	1
1.1 Background	1
2.0 MATERIAL AND METHODS	2
2.1 Sampling Sites.....	2
2.2 Data and Sample Collection	2
2.3 SECCHI Depth.....	2
2.4 Irradiance.....	3
2.5 Manual Salinity and Temperature.....	3
2.6 SEACAT SBE-19 CTD Data.....	3
2.7 Temperature Profiles	4
2.8 Temperature Moorings	4
2.9 Nutrient Analysis.....	4
2.9.1 Ammonia and Urea Analysis	4
2.9.1.1 Ammonia Analysis	5
2.9.1.2 Urea Analysis.....	5
2.9.2 Nitrates, Phosphate and Silicate Analysis	6
2.10 Particulate Organic Carbon and Nitrogen Analysis.....	6
2.11 Chlorophyll <i>a</i> and Phaeophytin <i>a</i> Analysis	7
2.11.1 Perkin Elmer LS3 Spectrofluorometer Pigment Analysis	7
2.11.2 Turner Designs Fluorometer Pigment Analysis	9
2.12 Fluorescence Response Index (<i>FRI</i>).....	10
3.0 ACKNOWLEDGMENTS	11
4.0 REFERENCES	11
APPENDIX 1.0 List of Symbols and Abbreviations.....	13
APPENDIX 2.0 1992 Sampling Summary.....	15
APPENDIX 3.0 1992 Sampling Locations	17
Appendix 3.1 Survey 92-01 sampling locations.....	17
Appendix 3.2 Survey 92-02 sampling locations.....	17
Appendix 3.3 1992 Cardigan, PEI fixed sampling sites	18
APPENDIX 4.0 Physical and biological parameters collected during 1992.....	19
Appendix 4.1 Physical and biological data collected from Cardigan, PEI, 15-Sep-92 to 17-Sep-92.....	19
Appendix 4.2 Physical and biological data collected from Cardigan, PEI, 01-Oct-92 to 02-Oct-92.....	23

Appendix 4.3	Physical and biological data collected from Cardigan, PEI, 14-Oct-92 to 15-Oct-92	27
Appendix 4.4	Physical and biological data collected from Cardigan, PEI, 04-Nov-92 to 05-Nov-92.....	31
Appendix 4.5	Physical and biological data collected from Cardigan, PEI, 18-Nov-92 to 19-Nov 92.....	35
Appendix 4.6	Physical and biological data collected during Survey 92-01, 05-Jun-92 to 08-Jun-92.	39
Appendix 4.7	Physical and biological data collected during Survey 92-02, 20-Oct-92 to 23-Oct-92.....	47
Appendix 4.8	Average, minimum, maximum, standard deviation and variance of chlorophyll ($C_{a^{PE}}$) , phaeophytin ($P_{a^{PE}}$) , ammonia (NH_3), UREA, nitrates ($N0_2 + N0_3$), phosphate ($P0_4$) silicate ($Si0_4$), particulate organic carbon (POC) , particulate organic nitrogen (PON) and carbon nitrogen ratio ($C : N$) by sampling event and for the year 1992.....	57
Appendix 4.4.1	Correlation between the chlorophyll a and phaeophytin a concentrations obtained with a Perkin Elmer spectrofluorometer and a Turner Designs fluorometer in sea water samples ($\mu g L^{-1}$) from Survey 92-01.	59
Appendix 4.4.2	Average and standard deviation of chlorophyll a and phaeophytin a concentrations obtained with a Perkin Elmer spectrofluorometer and a Turner Designs fluorometer in sea water samples ($\mu g L^{-1}$) from Survey 92-01.	61
APPENDIX 5.0	Profiles of temperature (°C), salinity (PSU), density (kg m ⁻³) and fluorescence (relative) - 1992.....	63
Appendix 5.1	Cardgian, PEI CTD profiles of temperature (°C), salinity (PSU) and density (kg m ⁻³) - 1992.....	63
Appendix 5.2	Survey 92-02 CTD profiles of temperature (°C), salinity (PSU) and density (kg m ⁻³)......	73
Appendix 5.3	Minimum, maximum and average of temperature (°C), salinity (PSU) and density (kg m ⁻³) of the 1992 CTD profiles by stations.....	83
APPENDIX 6.0	Temperature (°C) depth (m) profiles -1992.....	87
Appendix 6.1	Survey 92-01 temperature (°C) depth (m) profiles....	87
APPENDIX 7.0	Irradiance ($\mu mol s^{-1} m^{-2}$) profiles -1992.....	97
Appendix 7.1	Cardigan, PEI irradiance ($\mu mol s^{-1} m^{-2}$) profiles - 1992...97	97
Appendix 7.2	Survey 92-01 irradiance ($\mu mol s^{-1} m^{-2}$) profiles.	107
Appendix 7.3	Survey 92-02 irradiance ($\mu mol s^{-1} m^{-2}$) profiles.	117

Appendix 7.4 Number of data points, slope ($-k_2$), intercept, standard error of coefficients, standardized regression coefficients and R^2 for the regression of $\ln(\text{WaterIrradiance}/\text{SkyIrradiance})$ versus depth (m) for the 1992 irradiance profiles.....	127
APPENDIX 8.0 Temperature Moorings - 1992.....	129
Appendix 8.1.1 Cardigan, PEI site C1 water temperature (°C) mooring at 4m, 16-Sep-92 to 18-Nov-92.....	129
Appendix 8.1.2 Daily and monthly average, minimum and maximum water temperature (°C) at Cardigan, PEI site C1 at 4m, 16-Sep-92 to 18-Nov-92	131
Appendix 8.2.1 Cardigan, PEI site C1 water temperature (°C) mooring at 7m, 16-Sep-92 to 18-Nov-92.....	133
Appendix 8.2.2 Daily and monthly average, minimum and maximum water temperature (°C) at Cardigan, PEI site C1 at 7m, 16-Sep-92 to 18-Nov-92.	135
Appendix 8.3.1 Cardigan, PEI site C1 water temperature (°C) mooring at 11m, 16-Sep-92 to 18-Nov-92.....	137
Appendix 8.3.2 Daily and monthly average, minimum and maximum water temperature (°C) at Cardigan, PEI site C1 at 11m, 16-Sep-92 to 18-Nov-92.	139
Appendix 8.4.1 Cardigan, PEI site C3 water temperature (°C) mooring at 1m, 16-Sep-92 to 18-Nov-92.....	141
Appendix 8.4.2 Daily and monthly average, minimum and maximum water temperature (°C) at Cardigan, PEI site C3 at 1m, 16-Sep-92 to 18-Nov-92.	143
Appendix 8.5.1 Cardigan, PEI site C3 water temperature (°C) mooring at 4m, 16-Sep-92 to 18-Nov-92.....	145
Appendix 8.5.2 Daily and monthly average, minimum and maximum water temperature (°C) at Cardigan, PEI site C3 at 4m, 16-Sep-92 to 18-Nov-92.	147
Appendix 8.6.1 Cardigan, PEI site C3 water temperature (°C) mooring at 7m, 16-Sep-92 to 18-Nov-92.....	149
Appendix 8.6.2 Daily and monthly average, minimum and maximum water temperature (°C) at Cardigan, PEI site C3 at 7m, 16-Sep-92 to 18-Nov-92.	151
APPENDIX 9.0 Irradiance Moorings - 1992.....	153
Appendix 9.1.1 Sky irradiance ($\mu\text{mol s}^{-1} \text{m}^{-2}$) averaged every 15 minutes, 05-Jun-92 to 08-Jun-92, Survey 92-01.....	153
Appendix 9.1.2 Hourly sky irradiance ($\mu\text{mol s}^{-1} \text{m}^{-2}$) averaged every 15 minutes, 05-Jun-92 to 08-Jun-92, Survey 92-01.....	155
Appendix 9.2.1 Sky irradiance ($\mu\text{mol s}^{-1} \text{m}^{-2}$) averaged every 15 minutes, 30-Sep-92 to 02-Oct-92, Cardigan, PEI.	157

Appendix 9.2.2 Hourly sky irradiance ($\mu\text{mol s}^{-1} \text{m}^{-2}$) averaged every 15 minutes, 30-Sep-92 to 02-Oct-92, Cardigan, PEI.....	159
-----------------------------------------------------------------------------------------------------------------------------------------------------------	-----

ABSTRACT

L.E. Waite, J.C. Smith, P. Cormier and K. Pauley. 1998. Biological, chemical and physical oceanographic conditions in the Southern Gulf of Saint Lawrence, 1992. Can. Data Rep. Fish. Aquat. Sci. 1034: viii + 160p.

A broad-scale oceanographic program was developed for the Southern Gulf of Saint Lawrence to help address DFO issues relating to the occurrence and possible proliferation of Harmful Algal Blooms (HABs) in the region. The program was designed to develop a comprehensive database on the biological chemical and physical properties in the Southern Gulf in support of its objectives to (1) describe the biogeography, floristics composition, taxonomy, life cycles and dynamics of populations of harmful and coincident phytoplankton in the region, (2) determine the impacts of harmful phytoplankton on the habitat by observing their effects on various molluscan shellfish and (3) explore the influence of anthropogenic habitat impacts, either global, long-term (such as climate change or large-scale nutrient loadings) or local, short-term (such as agricultural and aquacultural activities), on the frequency and severity of harmful algal blooms. This report summarizes the oceanographic survey data in the Southern Gulf of Saint Lawrence for 1992.

RÉSUMÉ

L.E. Waite, J.C. Smith, P. Cormier and K. Pauley. 1998. Biological, chemical and physical oceanographic conditions in the Southern Gulf of Saint Lawrence, 1992. Can. Data Rep. Fish. Aquat. Sci. 1034: viii + 160p.

Un programme océanographique à grande échelle a été mis au point pour le sud du golfe du Saint-Laurent afin d'aider à régler les problèmes auxquels le MPO est confronté en ce qui touche aux manifestations et à l'éventuelle prolifération des poussées d'algues toxiques (PAT) dans la région. Le programme a été conçu en vue de l'élaboration d'une base de données exhaustives sur les caractéristiques biologiques, chimiques et physiques du sud du golfe, base de données qui sera consacrée à la poursuite des objectifs suivants : 1) décrire la biogéographie, la composition floristique, la taxonomie, les cycles biologiques et la dynamique des populations de phytoplanctons nuisibles et des phytoplanctons coïncidents dans la région; 2) déterminer les incidences du phytoplancton nuisible sur l'habitat en observant ses effets sur divers mollusques; et 3) explorer l'influence des effets anthropiques sur l'habitat - ou les effets planétaires à long terme (comme les changements climatiques ou la charge de nutriments sur une grande échelle) ou les effets localisés à court terme (comme les activités agricoles et aquacoles) sur la fréquence et la gravité des proliférations d'algues toxiques. Le présent rapport résume les résultats des relevés des variables océanographiques effectués dans le sud du golfe du Saint-Laurent en 1992.

1.0 INTRODUCTION

The data summarized in this report are the outcome of a major research program developed for the Southern Gulf of Saint Lawrence to respond to environmental issues related to the occurrence and possible proliferation of Harmful Algal Blooms (HABs) in the region. This report summarizes the results from surveys of biological, chemical and physical oceanographic variables in the Southern Gulf of Saint Lawrence in 1992.

1.1 Background

In late 1987, consumption of mussels contaminated by domoic acid resulted in several human deaths and many illnesses. It was shown that the mussels accumulated the domoic acid by feeding on *Nitzchia pungens forma multiseries*, an algal species not previously known to produce this neurotoxin. Since then it has been shown that other toxin-producing phytoplankton are present in the Gulf Region from whence they were formerly thought to be absent. These include the PSP-producer *Alexandrium excavatum* and the DSP-producers (various species of *Dinophysis* and *Prorocentrum*). It now appears, moreover, that several phytoplankton species are capable of producing domoic acid in small quantities. Further, both toxic and certain non-toxic algae seem to adversely affect molluscan shellfish while other important commercial species have been shown to accumulate phycotoxins in various organs. Under these circumstances, it was clear that DFO needed a much better understanding of the ecology and habitat relations of such harmful phytoplankton and their effects on shellfish in order to acquire the ability to predict such blooms and mitigate their effects. The objectives of the program were to:

- (1) Describe the biogeography, floristics composition, taxonomy, life cycles and dynamics of populations of harmful and coincident phytoplankton, to document occurrences of toxicity in the microplankton and to understand the physiochemical, ecological and physiological mechanisms underlying blooms of toxic and other harmful algae in the Gulf Region so as to acquire the abilities to predict such events and to provide advice to regulatory authorities concerning the optimal methods of monitoring harmful blooms.
- (2) Determine the impacts of harmful phytoplankton on the habitat by observing their effects on various molluscan shellfish (this includes toxin uptake, accumulation and depuration) and by monitoring the fate of phycotoxins in the food web.
- (3) Explore the problem of anthropogenic habitat impacts, either global, long-term (such as climate change or large-scale nutrient loadings) or local, short-term (such as agricultural and aquacultural activities), to determine whether these are affecting the frequency and severity of harmful algal blooms.

2.0 MATERIAL AND METHODS

2.1 Sampling Sites

The inshore sampling sites in 1992 included 5 fixed stations at Cardigan, PEI. There were 2 research surveys conducted during 1992: (1) Survey 92-01 with 14 stations, 05-Jun-92 to 08-Jun-92 aboard the C.C.G.C. Navicula from St. Georges Bay to Pictou Island, NS then across the Northumberland Strait to Cardigan, PEI and (2) Survey 92-02 with 17 stations, 20-Oct-92 to 23-Oct-92 aboard the C.C.G.C. Navicula off southeast PEI. Water samples were collected when weather permitted while at anchor.

2.2 Data and Sample Collection

Data and samples collected at most stations included location, date, local time, total depth, SECCHI depth, air temperature, surface water temperature, irradiance profile, latitude and longitude, *in situ* fluorescence, fluorescence response index (*FRI*); depth profiles of temperature, salinity and density; chlorophyll *a*; phaeophytin *a*; ammonia (NH_3); UREA; nitrates (NO_2 and NO_3); phosphate (PO_4); silicate (SiO_4); particulate organic carbon (*POC*) and particulate organic nitrogen (*PON*). Initial water sample depth was 1m or 2m with additional sample depths added depending on the total depth of the water column.

The date, local time, total depth and latitude and longitude were taken from ship board instruments when possible. The total depth for small boat stations was taken by lowering a weighted, measured rope. The latitude and longitude for small boat stations were taken from SPANS Geographic Information System. A 1:50,000 scale base map was used for New Brunswick based sites and a 1:250,000 scale base map was used for Prince Edward Island based sites.

Surveys are identified with the last 2 digits of the year followed by a consecutive number for that year starting at 1. For example, the first survey in 1992 was labeled "Survey 92-01".

Discrete water samples were collected using a polyethylene hand pump or a 12V Rule submersible bilge pump attached to a vinyl garden hose. All water samples were stored in clean polyethylene containers in the dark until samples were processed.

2.3 SECCHI Depth

Light attenuation was measured with a SECCHI disk. The extinction coefficient ($-k_I$) was calculated as described by Vollenweider (1969):

where:

$$\text{SECCHI} \text{ (m)} = \text{SECCHI depth}$$

2.4 Irradiance

The instantaneous irradiance in the sky ($\mu\text{mol s}^{-1} \text{m}^{-2}$) was averaged every 15 minutes during Survey 92-01 and from 30-Sep-92 to 02-Oct-92 in Cardigan, PEI with a LI-COR LI-192SA Quantum sensor.

The instantaneous irradiance ($\mu\text{mol s}^{-1} \text{m}^{-2}$) was measured and recorded at the water surface (I_o , $<0.5\text{m}$) and every 1m down the water column $\langle I_D \rangle$ with a LI-COR underwater LI-193SA Spherical Quantum Sensor attached to a 2009S lowering frame and a LI-1000 DataLogger. At the same time, the instantaneous irradiance in the sky was obtained with a LI-COR LI-192SA Quantum Sensor attached to the same DataLogger as the underwater sensor. The mean irradiance for the euphotic zone $\langle I_z \rangle$ was calculated as described by Platt *et. al.* (1988):

$$\langle I_z \rangle = 0.22I_o \quad (2)$$

In addition, the extinction coefficient ($-k_2$) was calculated as the slope of the regression of $\ln(\text{WaterIrradiance} / \text{SkyIrradiance})$ against depth.

2.5 Manual Salinity and Temperature

Manual salinity was measured using a hand held salinity refractometer (Atago Co.) with a precision of $\pm 0.2 \text{ ‰}$. The air and water surface temperature was measured using a Fisher (#15030) thermometer with a range of -50°C to 50°C .

2.6 SEACAT SBE-19 CTD Data

Temperature ($^\circ\text{C}$), salinity (PSU) and density (kg m^{-3}) profiles were obtained using a SEABIRD electronics SEACAT SBE-19 pumped conductivity, temperature and pressure profiler (CTD).

In order to maintain data accuracy the conductivity, temperature and pressure sensors were factory calibrated every 2 years. The accuracy of the SBE-19 CTD conductivity, temperature and pressure sensors is better than 0.001 S/m/month, 0.01 $^\circ\text{C}/6$ months and 0.25% of full scale range respectively and the resolution is better than 0.0001 S/m, 0.001 $^\circ\text{C}$ and 0.015% of full scale range respectively.

2.7 Temperature Profiles

Temperature (°C) profiles were obtained using a SEALOG-TD-EXCON probe (VEMCO LTD.). This probe was factory preset to measure between -4.4 °C to 20.4 °C and a maximum depth of 45.5 m. The temperature and pressure sensors have a resolution of 0.1 °C and 0.5 m respectively and an accuracy of ±0.3 °C and ±2.0 m respectively.

2.8 Temperature Moorings

In addition to regular sampling stations, temperature moorings were placed at selected sites in Cardigan, PEI using a series of SEALOG-T temperature probes (VEMCO LTD.). These probes were factory preset to measure between -5 °C to 20 °C with a resolution of 0.1 °C and an accuracy of ±0.3 °C.

2.9 Nutrient Analysis

2.9.1 Ammonia and Urea Analysis

Samples for the determination of ammonium were analysed according to Solórzano (1969) and urea by the urease method of McCarthy (1970). The urea method combines the urease reaction with the ammonia assay.

The following procedures were employed in order to reduce sample volume and contamination. The 25 x 150 mm screw capped culture tubes used for sample storage were cleaned prior to use by running the complete ammonia and urea determination with deionized water. Sea water was filtered through clean 47mm Whatman GF/F filters that were precombusted at 450 °C for 4 hours in order to remove plant material and detritus. The tubes and caps were rinsed twice with the sample water then 20 mL of the filtered sea water introduced into the tubes. The tubes were then sealed with parafilm, capped and the sample frozen at -20 °C for subsequent analysis. There were three sub-samples taken for each method. Analysis was performed in the same tubes in order to avoid sample transfer contamination (Glibert and McCarthy, 1984).

Working stocks were prepared in the following manner. For ammonia analysis a primary stock solution of 50 mM (3.3035 g of ammonium sulphate in 1 L of deionized water) was prepared and stored in a dark bottle with 1 mL of chloroform at 4 °C. A working stock of 50 µM was than prepared from the primary stock by a 1/1000 dilution. For urea analysis a primary stock solution of 7.51 mM urease (0.4511 g of urea in 1 L of deionized water) was prepared and stored in a dark bottle with 1 mL of chloroform at 4 °C. A working stock of 15.02 µM was than prepared from the primary stock by a 1/500 dilution.

Fresh working stocks and standards were prepared daily during sample analysis. From the working stocks, dilution series in the appropriate range were prepared. Two linear calibrations were obtained by regressing the absorbance readings from the Beckman DU-64 spectrophotometer at 640 nm against known concentrations of the primary ammonia and urease stocks. Blanks were determined in triplicate.

For ammonia, the detection limit was 0.25 µM, and a precision of ±0.01 µM based on a 4 point analysis over the concentration range 0.5 to 4.0 µM ammonium. For urea, the detection limit was 0.15 µM, and a precision of ±0.01 µM based on a 4 point analysis over the concentration range 0.3 to 2.4 µM urea.

2.9.1.1 Ammonia Analysis

The method was scaled down for a 20 mL sample using 0.8 mL of phenol solution, 0.8 mL of nitroprusside solution and 2 mL of oxidising solution. The reaction was carried out in the screw-capped test tubes and incubated in the dark in a 50 ±2 °C water bath for 20 minutes in order to ensure reaction completion. Samples were then cooled and their measurements taken at 640 nm in a spectrophotometer equipped with a flow through 5 cm path length cell. The cell was zeroed with deionized water. All absorbance readings were blank corrected before calculating corresponding concentrations. Ammonia concentration of the sample is derived by solving for x (where $x = [NH_3]$) in the straight line equation:

$$NH_3 = \frac{(R_{640^A} - b_{640^A})}{a_{640^A}} \quad (3)$$

where:

NH_3 (µM) = ammonia concentration of the sample

R_{640^A} = absorbance reading at 640 nm of the ammonia sample

a_{640^A} = slope of the ammonia calibration regression

b_{640^A} = intercept of the ammonia calibration regression

2.9.1.2 Urea Analysis

To each sample tube, 0.2 mL of urease preparation (48 mg urease, Sigma type VII, Sigma Chemical Co. in 50 mL of 1% EDTA pH 6.5, 45 mL glycerin and 5 mL of 0.2% Dithiothreitol in deionized water) was added and the tubes incubated in the dark in a 50 ±2 °C water bath for 20 minutes in

order to ensure reaction completion. Samples were then cooled and their measurements read at 640 nm in a spectrophotometer equipped with a flow through 5 cm path length cell. The cell was zeroed with deionized water.

This method involves the addition of urease and the subsequent measurement of the liberated ammonia. Therefore, the urea concentration of the sample is derived by solving for x (where $x = \text{urea}$) in a straight line equation and subtracting out the corresponding ammonia sample determined by the ammonia assay:

$$\text{UREA} = \frac{(R_{640^U} - b_{640^U})}{a_{640^U}} - \text{NH}_3 \quad (4)$$

where:

- $\text{UREA} (\mu\text{M})$ = urea concentration of the sample
- R_{640^U} = absorbance reading at 640 nm of the urea sample
- a_{640^U} = slope of the urease regression
- b_{640^U} = intercept of the urease regression

2.9.2 Nitrates, Phosphate and Silicate Analysis

Unfiltered samples for nitrates ($\text{NO}_2 + \text{NO}_3$), phosphate (PO_4) and silicate (SiO_4) determinations were stored in 30 mL high-density polyethylene bottles that were previously cleaned. They were kept at -20 °C for 2 to 6 months until analysed using colorimetric techniques on a Technicon AutoAnalyzer II (Strain and Clement, 1996).

2.10 Particulate Organic Carbon and Nitrogen Analysis

For particulate organic carbon (POC) and particulate organic nitrogen (PON), three sub-samples of a known volume were filtered onto pre-combusted (450°C for 24 hours) 25mm GF/F filters that were folded and stored at -20 °C in petri plates until analysis.

The samples were dried overnight at 70 °C and analyzed with a Perkin Elmer 2400 series elemental analyzer. All chemicals and materials for analysis were supplied by Europa Scientific. Known quantities of acetanilide (NBS) were used as a carbon and nitrogen standard. Standard milligram quantities were weighed on a Cahn microbalance with a precision of ±0.1 mg. The calibration standard was 71.09% carbon, 6.71% hydrogen and 10.36% nitrogen. Samples were analyzed using a Perkin-Elmer 2400 CHN elemental analyzer according to the method outlined by Sharp (1974).

2.8 Chlorophyll *a* and Phaeophytin *a* Analysis

For chlorophyll *a* and phaeophytin *a* analysis, three sub-samples of a known volume of seawater were gently filtered onto 25 mm GFC filters prewashed with 5 mL of 5% Na₂HPO₄ in order to buffer the filter. The filters were then frozen in scintillation vials at -20 °C for subsequent analysis. Pigments were extracted from the filter with 10 mL of 90% acetone overnight at -20 °C (Parsons *et. al.* 1984 and Yentsch and Menzel, 1963).

For fluorometric calibration, a dilution series of the primary standard was prepared from pure spinach chlorophyll *a* (1 mg Sigma) which was dissolved in 250 mL of 90% acetone. The chlorophyll *a* concentration of the primary standard was determined spectrophotometrically at 663.5 nm using the extinction coefficient E^M(1) 8.36 • 10⁴ at 659 nm in ether supplied by Sigma. It was assumed that the supplied chlorophyll *a* was 100% pure, i.e. that it contained no chlorophyll *a* degradation products such as phaeophytin *a*.

Two pigment analysis were performed on chlorophyll *a* samples taken during Survey 92-01. Two independent samples were taken, one for each method. Pigment analysis was performed using a Perkin Elmer LS3 spectrofluorometer and a Turner Designs fluorometer equipped with a chlorophyll *a* accessory kit. The results were adjusted from the volume of the acetone extract to the volume of sea water filtered. The same chlorophyll *a* standard was used for both techniques to ensure intercalibration.

2.8.1 Perkin Elmer LS3 Spectrofluorometer Pigment Analysis

The method described here is as suggested by Parsons *et. al.* (1984) and Yentsch and Menzel, (1963). Fluorescence using the Perkin Elmer LS3 spectrofluorometer were taken at excitation wavelengths of 408 nm for phaeophytin *a* and 430 nm for chlorophyll *a* before and after the samples were acidified with 2 drops of 5% HCl. The emission wavelength was 670 nm for all readings. Slit widths for the instrument were set at 10 nm for excitation and emission. The 1 cm sample cell was zeroed with 90% acetone.

Based on the spectrofluorometer monochromator calibration a pure chlorophyll *a* standard exhibited an emission peak at 670 nm and excitation peaks at 408 nm and 430 nm. Following acidification of the standard with 2 drops of 5% HCl, the excitation peak at 430 nm nearly disappeared (relative to the acetone blank) while the 408 nm peak was largely unaffected. The acidification completely converted the chlorophyll *a* to phaeophytin *a*. Since both chlorophyll *a* and phaeophytin *a* give equivalent fluorescence for 408 nm excitation, this gives a good estimate of the total concentration of *a* pigments (chlorophyll *a* + phaeophytin *a*) in a sample solution. In practice, we use an acidified sample for this purpose. The calibrations are based on acidified standards and the absorbance at 408 nm ([standards], R_{408a}). The relation

between 408 nm excited fluorescence and total α pigment levels is highly linear, with quenching occurring only at concentrations greater than 400 $\mu\text{g L}^{-1}$.

To determine the proportions of chlorophyll α and phaeophytin α in a sample, we assume that for a pure chlorophyll α standard the ratio between the 430 nm excited fluorescence before and after acidification (R_{430} / R_{430a}) is characteristic of a solution of 100% pure chlorophyll α . A value of unity for this ratio is characteristic of a 100% pure phaeophytin α or 0% chlorophyll α solution. The slope of the line between these 2 sets of points $\left[(0,1), \left(\frac{\sum_{i=1}^n R_{430_i}}{n}, 100 \right) \right]$ can be used to calculate the percentage of chlorophyll α present in a sample by:

$$\%C_{\alpha^{\text{PE}}} = a_{430/430a} \cdot \left(\frac{R_{430}}{R_{430a}} \right) + b_{430/430a} \quad (5)$$

where:

$\%C_{\alpha^{\text{PE}}}$	= percentage of chlorophyll α in the sample
$a_{430/430a}$	= slope of (R_{430} / R_{430a}) regression
$b_{430/430a}$	= intercept of (R_{430} / R_{430a}) regression
R_{430}	= absorbance reading at 430 nm
R_{430a}	= absorbance reading at 430 nm with sample acidified

Then, using the coefficients from the regression of the acidified standard concentrations against the fluorescence at 408 nm, calculate the total amount of α pigment in the sample and adjust the results from the volume of the extract to the volume of sea water filtered by:

$$T_{\alpha^{\text{PE}}} = ((a_{408a} \cdot R_{408a}) + b_{408a}) \cdot E' \cdot \frac{v}{V} \quad (6)$$

where:

$T_{\alpha^{\text{PE}}} (\mu\text{g L}^{-1})$	= total α pigment in the sample
a_{408a}	= slope of ([standards] / R_{408a}) regression
b_{408a}	= intercept of ([standards] / R_{408a}) regression
E'	= normalized expansion factor (100 / expansion)
R_{408a}	= absorbance reading at 408 nm with sample acidified
v (mL)	= volume of the sample extract
V (mL)	= volume of sea water filtered

From these 2 equations (5, 6) the concentration of chlorophyll *a* and phaeophytin *a* in the sample can be calculated by:

$$C_{a^{PE}} = T_{a^{PE}} \cdot \left(\frac{\% C_{a^{PE}}}{100} \right) \quad (7)$$

and

$$P_{a^{PE}} = T_{a^{PE}} - C_{a^{PE}} \quad (8)$$

where:

$C_{a^{PE}}$ ($\mu\text{g L}^{-1}$) = concentration of chlorophyll *a* in the sample

$P_{a^{PE}}$ ($\mu\text{g L}^{-1}$) = concentration of phaeophytin *a* in the sample

2.8.2 Turner Designs Fluorometer Pigment Analysis

The method described here is as suggested by Parsons *et. al.* (1984) and Yentsch and Menzel, (1963). The background (or blank) was read for each setting using 90% acetone and the fluorometer "zeroed". A linear calibration was obtained by regressing known concentrations of chlorophyll *a* against normalized fluorescence readings i.e. ((100/expansion)•fluorescence).

The fluorescence of the sample was measured before and after acidification. The average of the ratios of the fluorescence readings of the acid standard to the non-acid standard (R'_B/R'_A) equalled 2.2 which matches that suggested by Parsons *et. al.* (1984). This is the drop in fluorescence intensity before and after acid treatment of a pure chlorophyll extract which previously did not contain phaeo-pigments. Taking the intensity drop into account, chlorophyll *a* and phaeophytin *a* are calculated as follows:

$$C_{a^{TD}} = (a_{TD} \cdot 1.83(R_B - R_A) - b_{TD}) \cdot \frac{V}{V'} \quad (9)$$

$$P_{a^{TD}} = (a_{TD} \cdot 1.83(2.2R_A - R_B) - b_{TD}) \cdot \frac{V}{V'} \quad (10)$$

where:

$C_{a^{TD}}$ ($\mu\text{g mL}^{-1}$) = concentration of chlorophyll *a* in the acetone extract

$P_{a^{TD}}$ ($\mu\text{g mL}^{-1}$) = concentration of phaeophytin *a* in the sample

$$2.2 = \frac{\sum_{i=1}^n R'_B / R'_A}{n}$$

$$1.83 = \frac{\frac{\sum_{i=1}^n R'_B / R'_A}{n}}{\frac{\sum_{i=1}^n R'_B / R'_A}{n} - 1}$$

a_{TD} = slope of ([standards] / R'_B) regression
 b_{TD} = intercept of ([standards] / R'_B) regression
 R_A = normalized fluorescence of the sample before acidification
 R_B = normalized fluorescence of the sample after acidification
 R'_A = normalized fluorescence of the standard after acidification
 R'_B = normalized fluorescence of the standard before acidification
 v (mL) = volume of sample extract
 V (mL) = volume of sea water filtered

2.12 Fluorescence Response Index (FRI)

In situ fluorescence (F_o) and 3-(3,4-dichlorophenyl)-1,1-dimethyl urea (DCMU) enhanced *in situ* fluorescence (F_{dcmu}) was measured by introducing 5 mL of the seawater sample into a fluorometer cuvette. An initial fluorometer reading (F_o) was taken. The cuvette was then removed and DCMU added to a final concentration of 5 $\mu\text{mol L}^{-1}$. The sample was then mixed by inversion and the fluorometer reading taken again (F_{dcmu}). A Turner Designs fluorometer equipped with a chlorophyll *a* accessory kit was used for these readings. The fluorescence readings were normalized (i.e. ((10,000/ setting)•fluorescence)) then the fluorescence response index (FRI) (Roy and Legendre, 1979) calculated by the following equation:

$$FRI = \frac{(F_{dcmu} - F_o)}{F_o} \quad (11)$$

where:

FRI	= <i>in situ</i> fluorescence response index
F_{dcmu}	= normalized DCMU enhanced <i>in situ</i> fluorescence
F_o	= normalized <i>in situ</i> fluorescence

3.0 ACKNOWLEDGMENTS

We would like to thank Mr. Pierre Clement for autoanalyzer nutrient analysis; Tina Johanssen for her contributions to sampling and laboratory analysis; the crew of the S.S. Navicula and S.S. Opilio for their aid and cooperation, in not always favorable weather; Denise Belliveau for her help in editing; Randy Angus for his generous support and John Legault for his graphic support. We would especially like to thank Dr. William G. Harrison for all his contributions.

4.0 REFERENCES

- Gallegos C.L. and T. Platt. 1981. Photosynthesis measurements on natural populations of phytoplankton: numerical analysis. In: Platt, T. (ed) *Physiological bases of phytoplankton ecology*. Can Bull Fish Aquat Sci 210:103-112.
- Glibert P.M. and J.J. McCarthy. 1984. Uptake and assimilation of ammonium and nitrate by phytoplankton: indices of nutritional status for natural assemblages. *J. of Plank. Res.*, Vol. 6(4), pp. 677-697.
- Jassby A.D. and T. Platt. 1976. Mathematical formulation of the relationship between photosynthesis and light for phytoplankton. *Limnology and Oceanography*, Vol. 21, pp. 540-547.
- McCarthy, J.J., 1970. A urease method for urea in seawater. *Limnology and Oceanography*, Vol. 15, pp. 309-313.
- Parsons T.R., Y. Maita, and C.M. Lalli. 1984. A manual of chemical and biological methods for seawater analysis. *Pergamon Press, New York*.
- Platt, T., S. Sathyendranath, C. Caverhill, and M. Lewis. 1988. Ocean primary production and available light: further algorithms for remote sensing. *Deep Sea Research*, Vol. 35, No. 6, pp. 855-879.
- Richardson, K. (Ed.). 1987. Primary production: Guidelines for measurement by ^{14}C incorporation. Prepared by the ICES Working Group on Primary Production, in: *Techniques in marine environmental sciences, No. 5, Denmark*.
- Roy, S. and L. Legendre. 1979. DCMU- Enhanced fluorescence as an index of photosynthetic activity in phytoplankton. *Mar. Biol.*, Vol. 55, pp. 93-101.
- Sharp, J.H. 1974. Improved analysis for "particulate organic carbon and nitrogen" from seawater. *Limnol. Oceanogr.* Vol. 14, pp. 799-801.

- Solorzano, L. 1969. Determination of ammonia in natural waters by the phenolhypochlorite method. *Limnol. Oceanogr.* Vol. 19, pp. 984-989.
- Strickland, J.D.H. and T.R. Parsons. 1968. A practical handbook of seawater analysis. *Bulletin 167, Fisheries Research Board of Canada.*
- Strain, P.M., and P.M. Clement. 1996. Nutrient and dissolved oxygen concentrations in the Letang Inlet, New Brunswick, in the summer of 1994. *Can. Data Rep. Fish. Aquat. Sci.* 1004.
- Vollenweider, R.A. 1969. A manual on methods for measuring primary production in aquatic environments. *IBP Handbook No 12*, Blackwell Scientific Publications, Oxford, 213 p.
- Yentsch, C.S. and D.W. Menzel. 1963. A method for the determination of phytoplankton chlorophyll and phaeophytin by fluorescence. *Deep-sea Res.*, Vol. 10, pp. 221-231.

APPENDIX 1.0 List of Symbols and Abbreviations

a_{408a}	slope of ([standards] / R_{408a}) regression to determine $T_{a_{PE}}$
$a_{430/430a}$	slope of (R_{430} / R_{430a}) regression to determine $\%C_{a_{PE}}$
a_{640^A}	slope of calibration regression to determine NH_3
a_{640^U}	slope of calibration regression to determine <i>UREA</i>
a_{TD}	slope of ([standards] / R_B') regression to determine $C_{a_{TD}}$ and $P_{a_{TD}}$
b_{408a}	intercept of ([standards] / R_{408a}) regression to determine $T_{a_{PE}}$
$b_{430/430a}$	intercept of (R_{430} / R_{430a}) regression to determine $\%C_{a_{PE}}$
b_{640^A}	intercept of calibration regression to determine NH_3
b_{640^U}	intercept of calibration regression to determine <i>UREA</i>
b_{TD}	intercept of ([standards] / R_B') regression to determine $C_{a_{TD}}$ and $P_{a_{TD}}$
$\%C_{a_{PE}}$	percentage of chlorophyll a in the sample (Perkin Elmer method)
$C_{a_{PE}}$ ($\mu\text{g L}^{-1}$)	concentration of chlorophyll a in the sample (Perkin Elmer method)
$C_{a_{TD}}$ ($\mu\text{g L}^{-1}$)	concentration of chlorophyll a in the sample (Turner Designs method)
CTD	conductivity, temperature and depth
DCMU	3-(3,4-dichlorophenyl)-1,1-dimethyl urea
E'	normalized expansion factor to calculate $T_{a_{PE}}$
F_o	normalized <i>in situ</i> fluorescence to determine <i>FRI</i>
F_{dcmu}	normalized DCMU enhanced <i>in situ</i> fluorescence to determine <i>FRI</i>
FRI	fluorescence response index
$\langle I_o \rangle$ ($\mu\text{mol s}^{-1} \text{m}^{-2}$)	instantaneous irradiance measured at the water surface (< 0.5m depth) with a LI-COR quantum sensor
$\langle I_D \rangle$ ($\mu\text{mol s}^{-1} \text{m}^{-2}$)	instantaneous irradiance measured at depth with a LI-COR quantum sensor
$\langle I_z \rangle$ ($\mu\text{mol s}^{-1} \text{m}^{-2}$)	mean irradiance for the euphotic zone (Platt <i>et. al.</i> 1988)
$-k_1$	extinction coefficient calculated using SECCHI depth
$-k_2$	extinction coefficient calculated using the irradiance data
NH_3 (μM)	concentration of ammonia in the sample
$NO_2 + NO_3$ (μM)	amount of nitrates in the sample
PO_4 (μM)	amount of phosphate in the sample
$P_{a_{PE}}$ ($\mu\text{g L}^{-1}$)	concentration of phaeophytin a in the sample (Perkin Elmer method)

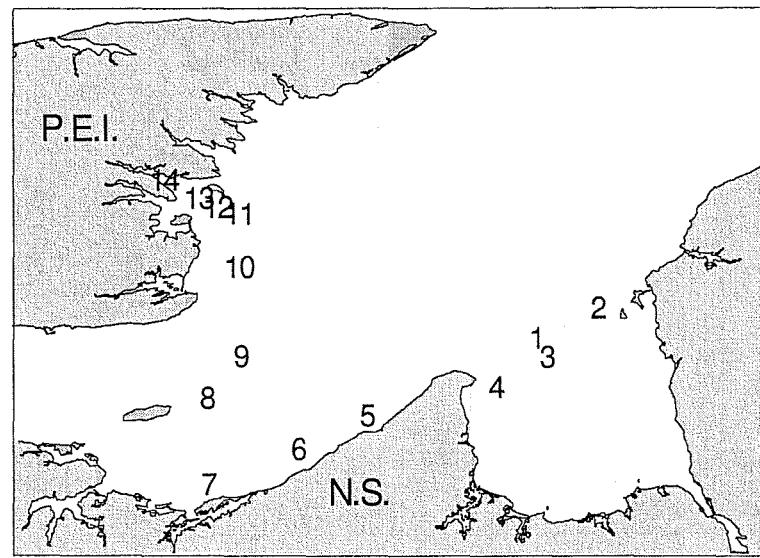
$P_{a^{\text{TD}}}$ ($\mu\text{g L}^{-1}$)	concentration of phaeophytin a in the sample (Turner Designs method)
PAR	photosynthetically active radiation
POC (μg)	amount of particulate organic carbon in the sample
PON (μg)	amount of particulate organic nitrogen in the sample
R_{408a}	absorbance reading at 408 nm with sample acidified to determine $T_{a^{\text{PE}}}$
R_{430}	absorbance reading at 430 nm to determine $\%C_{a^{\text{PE}}}$
R_{430a}	absorbance reading at 430 nm with sample acidified to determine $\%C_{a^{\text{PE}}}$
$R_{640^{\text{A}}}$	absorbance reading at 640 nm to determine NH_3
$R_{640^{\text{U}}}$	absorbance reading at 640 nm to determine <i>UREA</i>
R_A	normalized fluorescence of the sample after acidification to determine $C_{a^{\text{TD}}}$ and $P_{a^{\text{TD}}}$
R_B	normalized fluorescence of the sample before acidification to determine $C_{a^{\text{TD}}}$ and $P_{a^{\text{TD}}}$
R'_A	normalized fluorescence of the standard after acidification to determine $C_{a^{\text{TD}}}$ and $P_{a^{\text{TD}}}$
R'_B	normalized fluorescence of the standard before acidification to determine $C_{a^{\text{TD}}}$ and $P_{a^{\text{TD}}}$
Sal (PSU)	salinity from the CTD
SECCHI (m)	SECCHI depth
σ_τ (kg m^{-3})	density (sigma-theta) from the CTD
SiO_4 (μM)	amount of silicate in the sample
$T_{a^{\text{PE}}}$ ($\mu\text{g L}^{-1}$)	concentration of total a pigment in the sample
T	SEALOG temperature ($^{\circ}\text{C}$) probe
TD	SEALOG temperature ($^{\circ}\text{C}$) depth (m) probe
v (mL)	volume of sample extract
V (mL)	volume of sea water filtered

APPENDIX 2.0 1992 Sampling Summary.

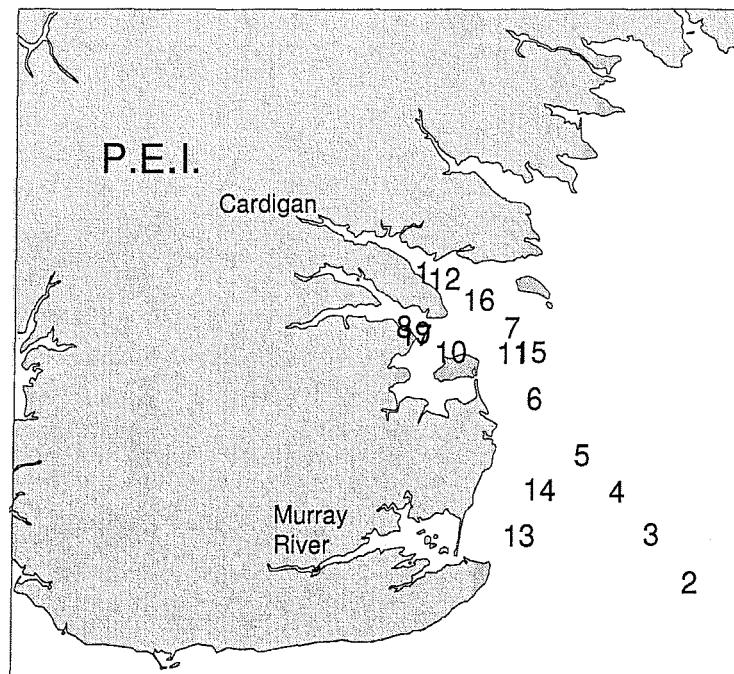
Survey	Survey Description	Start Date	End Date	Number of Stations	Number of CTD Profiles	Number of Irradiance Profiles	Number of TD Profiles
Cardigan, P.E.I.	1992 Cardigan, P.E.I. field sample collection	15-Sep-92	17-Sep-92	5	5	5	0
Cardigan, P.E.I.	1992 Cardigan, P.E.I. field sample collection	01-Oct-92	02-Oct-92	5	5	5	0
Cardigan, P.E.I.	1992 Cardigan, P.E.I. field sample collection	14-Oct-92	15-Oct-92	5	5	5	0
Cardigan, P.E.I.	1992 Cardigan, P.E.I. field sample collection	04-Nov-92	05-Nov-92	5	5	5	0
Cardigan, P.E.I.	1992 Cardigan, P.E.I. field sample collection	18-Nov-92	19-Nov-92	5	5	5	0
Survey 92-01	1992 Navicula June Research Survey sample collection	05-Jun-92	08-Jun-92	14	0	13	13
Survey 92-02	1992 Navicula October Research Survey sample collection	20-Oct-92	23-Oct-92	17	16	16	0
Total for Year:				56	41	54	13

APPENDIX 3.0 1992 Sampling Locations.

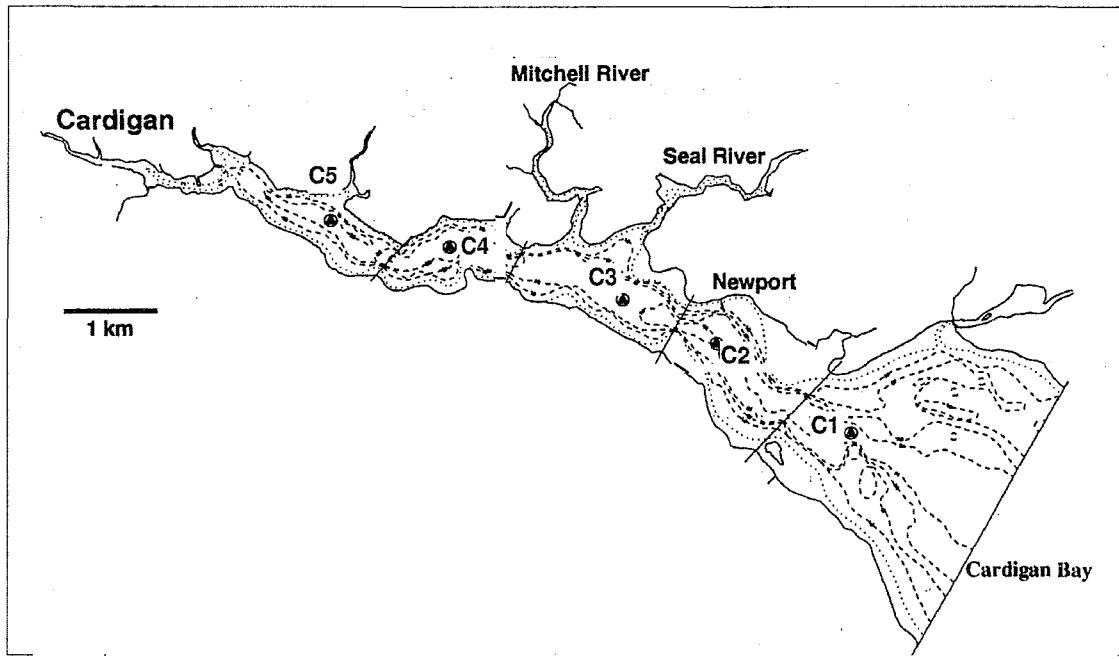
Appendix 3.1 Survey 92-01 sampling locations.



Appendix 3.2 Survey 92-02 sampling locations.



Appendix 3.3 1992 Cardigan, PEI fixed sampling sites.



Appendix 4.1 Physical and biological data collected from Cardigan, P.E.I
15-Sep-92 to 17-Sep-92

Cardigan, P.E.I.

STATION -01

Location C4 - CARDIGAN RIVER, P.E.I.

		Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)		Surface Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude						
Date	15-Sep-92				22		16	464	102	46°13.28'	62°34.30'						
Time	3:28 PM	7.00	4.5	0.3													
Depth (m)	Temp. (°C)	F_o	F_{dcmu}	FRI	$\langle I_D \rangle$ ($\mu\text{mol}/\text{s}/\text{m}^2$)	Sal (PSU)	σ_t (kg/m ³)	C_a^{PE} ($\mu\text{g}/\text{L}$)	P_a^{PE} ($\mu\text{g}/\text{L}$)	NH_3 (μM)	UREA (μM)	N_02+N_03 (μM)	PO_4 (μM)	SiO_4 (μM)	POC (μg)	PON (μg)	POC:PON
1	16.87	15	33	0.54	353	28.66	20.69	0.68	0.93	0.34	0.27	0.02	0.67	1.98	173.17	20.93	8.33
4	16.86	16	40	0.60	136	28.72	20.73	0.77	1.12	0.08	0.65	0.02	0.66	1.82	171.97	24.17	7.13

Weather: Sunny; light clouds

Comment: 2 CTD casts

Cardigan, P.E.I.**STATION 02****Location C5 - CARDIGAN RIVER, P.E.I.**

Date	15-Sep-92	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)		Surface Temperature (°C)		$< I_o >$		$< I_z >$		Latitude	Longitude			
		(m)	(m)		(°C)	(°C)	(°C)	(°C)	(μM)	(μM)	(μM)	(μM)	(μM)	(μM)			
Time	4:12 PM	4.90	3	0.5	22		17		376	83	46°13.37'	62°35.42'					
Depth (m)	Temp. (°C)	F_o	F_{dcmu}	FRI	$< I_D >$ (μmol/s/m²)	Sal (PSU)	σ_τ (kg / m³)	$C_{a^{PE}}$ (μg / L)	$P_{a^{PE}}$ (μg / L)	NH_3 (μM)	UREA (μM)	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)	POC (μg)	PON (μg)	POC:PON
1	16.97	12	23	0.47	170	28.59	20.61	0.59	0.79	0.01	0.63	0.02	0.67	1.87	159.80	18.97	8.51
4	15.16	13	33	0.62	84	29.09	21.39	0.67	0.87	0.09	0.71	0.01	0.64	1.58	151.25	20.20	7.49

Weather: Sunny; cloudy periods**Comment:** 2 CTD casts**Cardigan, P.E.I.****STATION 03****Location C1 - CARDIGAN RIVER, P.E.I.**

Date	16-Sep-92	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)		Surface Temperature (°C)		$< I_o >$		$< I_z >$		Latitude	Longitude			
		(m)	(m)		(°C)	(°C)	(°C)	(°C)	(μM)	(μM)	(μM)	(μM)	(μM)	(μM)			
Time	3:49 PM	11.50	5.5	0.3					1135	250	46°12.06'	62°30.36'					
Depth (m)	Temp. (°C)	F_o	F_{dcmu}	FRI	$< I_D >$ (μmol/s/m²)	Sal (PSU)	σ_τ (kg / m³)	$C_{a^{PE}}$ (μg / L)	$P_{a^{PE}}$ (μg / L)	NH_3 (μM)	UREA (μM)	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)	POC (μg)	PON (μg)	POC:PON
1	17.30	7	15	0.50	721	28.76	20.66	0.31	0.42	0.00	0.86	0.03	0.29	0.59	90.47	9.63	9.84
4	16.89	9	16	0.44	305	28.83	20.81	0.33	0.46	n.d.	0.92	0.02	0.29	0.43	83.83	10.43	8.04
7	16.37	8	13	0.38	105	28.88	20.96	0.30	0.44	n.d.	0.34	0.03	0.26	0.43	78.35	8.40	9.34

Weather: Sunny; little cloud cover**Comment:** Mooring station; sediment traps 1, 4, 7 and 11 metres; last set of row of trees of farm aligned with point across from house with Mansard roof; before the green buoy ~1/2 km shoreward; forgot thermometer.

Cardigan, P.E.I.**STATION 04****Location C2 - CARDIGAN RIVER, P.E.I.**

Date	Time	Total Depth (m)		SECCHI Depth (m)	$-k_I$	Air Temperature (°C)		Surface Temperature (°C)		$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude		Longitude			
		16-Sep-92	4:45 PM			9.00	4.5	0.3		985	217	46°12.45'	62°31.49'				
Depth (m)	Temp. (°C)	F_o	F_{dcmu}	FRI	$\langle I_D \rangle$ ($\mu\text{mol}/\text{s}/\text{m}^2$)	Sal (PSU)	σ_t (kg/m^3)	$C_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	$P_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	NH_3 (μM)	UREA (μM)	N_2+N_3 (μM)	P_4 (μM)	SiO_4 (μM)	POC (μg)	PON (μg)	POC:PON
1	17.66	8	14	0.45	611	28.58	20.44	0.36	0.45	n.d.	0.07	0.01	0.48	0.88	80.80	11.55	7.00
4	16.80	9	18	0.48	210	28.74	20.76	0.40	0.56	0.11	0.23	0.00	0.35	0.54	104.70	11.40	9.18
7	16.59	9	16	0.43	80	28.80	20.85	0.32	0.52	n.d.	0.08	0.01	0.31	0.39	103.60	11.60	8.92

Weather: Sunny; light scattered clouds**Comment:****Cardigan, P.E.I.****STATION 05****Location C3 - CARDIGAN RIVER, P.E.I.**

Date	Time	Total Depth (m)		SECCHI Depth (m)	$-k_I$	Air Temperature (°C)		Surface Temperature (°C)		$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude		Longitude			
		17-Sep-92	9:16 AM			8.50	5.75	0.3	16		17	156	34	46°13.07'	62°32.57'		
Depth (m)	Temp. (°C)	F_o	F_{dcmu}	FRI	$\langle I_D \rangle$ ($\mu\text{mol}/\text{s}/\text{m}^2$)	Sal (PSU)	σ_t (kg/m^3)	$C_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	$P_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	NH_3 (μM)	UREA (μM)	N_2+N_3 (μM)	P_4 (μM)	SiO_4 (μM)	POC (μg)	PON (μg)	POC:PON
1	16.99	8	22	0.64	109	28.63	20.64	0.61	0.77	0.39	0.11	0.03	0.58	1.49	78.55	11.10	7.07
4	16.75	9	23	0.60	48	28.73	20.76	0.71	0.98	0.27	0.93	0.01	0.53	1.00	79.70	12.30	6.49
7	16.38	10	27	0.63	18	28.81	20.91	0.97	1.21	0.30	0.96	0.02	6.03	1.83	89.05	14.15	6.30

Weather: Overcast; mild; touch of fog**Comment:** Mooring station in on Sept. 16 at 17:20 (sunny); water taken at 4m for media and incubation experiments

**Appendix 4.2 Physical and biological data collected from Cardigan, PEI
01-Oct-92 to 02-Oct-92**

Cardigan, P.E.I.

STATION -06

Location C1 - CARDIGAN RIVER, P.E.I.

Date	01-Oct-92	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	Surface Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude				
Time	10:55 AM	13.00	5	0.3	6.5	9	263	58	46°12.06'	62°30.36'				
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg/m³)	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a\text{PE}}$ ($\mu\text{g/L}$)	$P_{a\text{PE}}$ ($\mu\text{g/L}$)	NH_3 (μM)	$UREA$ (μM)	$N_{O_2+N_O_3}$ (μM)	P_{O_4} (μM)	SiO_4 (μM)	POC (μg)	PON (μg)	$POC:PON$
1	14.59	28.39	20.97	185	0.46	0.74	n.d.	0.08	0.15	0.62	4.73	94.40	11.40	9.43
4	14.58	28.94	21.39	124	0.50	0.80	n.d.	0.10	0.11	0.56	4.79	66.05	11.00	6.02
7	14.52	28.96	21.42	53	0.50	0.79	0.16	0.05	0.10	0.77	4.73	91.57	12.50	7.36

Weather: Scattered showers; clouds; cold

Comment:

Cardigan, P.E.I.

STATION -07

Location C2 - CARDIGAN RIVER, P.E.I.

Date	01-Oct-92	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	Surface Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude				
Time	11:39 AM	7.50	3.5	0.4	5	13.5	261	57	46°12.45'	62°31.49'				
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg/m³)	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a\text{PE}}$ ($\mu\text{g/L}$)	$P_{a\text{PE}}$ ($\mu\text{g/L}$)	NH_3 (μM)	$UREA$ (μM)	$N_{O_2+N_O_3}$ (μM)	P_{O_4} (μM)	SiO_4 (μM)	POC (μg)	PON (μg)	$POC:PON$
1	14.23	27.52	20.37	265	0.61	1.10	0.41	0.53	0.08	0.75	6.28	106.93	12.63	8.57
4	14.23	28.76	21.33	236	0.62	1.10	0.66	0.40	0.08	0.76	6.24	89.20	12.20	7.35
7				100	0.71	1.18	0.57	0.34	0.08	0.72	6.14	96.77	15.27	6.40

Weather: Cloudy; cold; windy

Comment: 5 minute vertical tow

Cardigan, P.E.I.

STATION 08

Location C4 - CARDIGAN RIVER, P.E.I.

	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	Surface Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude					
Date	01-Oct-92													
Time	12:28 PM	5.00	2.5	0.6		13.8	73	16	46°13.28'					
Depth	Temp.	Sal	σ_t	$\langle I_D \rangle$	$C_{a^{PE}}$	$P_{a^{PE}}$	NH_3	UREA	$N\theta_2 + N\theta_3$					
(m)	(°C)	(PSU)	(kg/m³)	(μmol/s/m²)	(μg/L)	(μg/L)	(μM)	(μM)	(μM)	$P\theta_4$	$Si\theta_4$	POC	PON	POC:PON
1	13.90	27.30	20.27	101	1.11	1.70	0.17	0.73	0.11	0.94	8.04	150.20	21.00	7.20
4				111	1.19	1.66	0.32	0.52	0.10	0.96	7.98	133.95	20.70	6.48

Weather: Sunny; brisk windComment:

Cardigan, P.E.I.

STATION 09

Location C5 - CARDIGAN RIVER, P.E.I.

	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	Surface Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle \rangle$	Latitude	Longitude					
Date	01-Oct-92													
Time	1:20 PM	5.00	2.5	0.6	7		13.7	415	91					
Depth	Temp.	Sal	σ_t	$\langle I_D \rangle$	$C_{a^{PE}}$	$P_{a^{PE}}$	NH_3	UREA	$N\theta_2 + N\theta_3$					
(m)	(°C)	(PSU)	(kg/m³)	(μmol/s/m²)	(μg/L)	(μg/L)	(μM)	(μM)	(μM)	$P\theta_4$	$Si\theta_4$	POC	PON	POC:PON
1	14.08	28.36	21.05	368	1.04	1.62	0.51	0.77	0.14	1.03	8.41	129.30	20.30	6.34
4	14.18	28.41	21.07	217	1.05	1.68	0.53	0.05	0.14	1.03	8.37	109.70	20.97	5.30

Weather: Sunny; some clouds; brisk windComment:

Cardigan, P.E.I.**STATION 10****Location C3 - CARDIGAN RIVER, P.E.I.**

Date	02-Oct-92	Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude				
Time	9:20 AM	7.50	2.5	0.6	3.5	13			46°13.07'	62°32.57'				
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg/m^3)	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a\text{PE}}$ ($\mu\text{g/L}$)	$P_{a\text{PE}}$ ($\mu\text{g/L}$)	NH_3 (μM)	UREA (μM)	$N\text{O}_2+N\text{O}_3$ (μM)	$P\text{O}_4$ (μM)	$Si\theta_4$ (μM)	POC (μg)	PON (μg)	$POC:PON$ (μg)
1	13.67	28.73	21.42	142	0.91	1.41	0.38	0.40	0.07	0.88	7.04	112.27	16.23	6.92
4	13.68	28.79	21.45	49	0.99	1.42	0.30	0.66	0.06	0.83	6.95	93.37	13.90	6.90
7	13.68	28.81	21.47	19	0.74	1.21	0.54	0.35	0.09	0.84	6.90	102.63	12.60	8.10

Weather: Overcast; light wind**Comment:** Incubation experiment done for 4m depth; 2 horizontal tows (20μm and 233μm); 1 bottle + 10mL FAA 233μm retentate; 233μm retentate on GFF frozen; 20μm concentrated on 120μm Nitex - >120μm fraction for domoic acid and heavy metals; (cont'd on data sheet)

Appendix 4.3 Physical and biological data collected from Cardigan, PEI

14-Oct-92 to 15-Oct-92

Cardigan, P.E.I.

STATION 11

Location C1 - CARDIGAN RIVER, P.E.I.

Date	Time	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	Surface Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude				
14-Oct-92	11:39 AM	14.00	4.5	0.3	18.5	12.5	1235	272	46°12.06'	62°30.36'				
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg/m³)	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a\text{PE}}$ ($\mu\text{g/L}$)	$P_{a\text{PE}}$ ($\mu\text{g/L}$)	NH_3 (μM)	$UREA$ (μM)	$N_0_2+N_0_3$ (μM)	P_0_4 (μM)	SiO_4 (μM)	POC (μg)	PON (μg)	POC:PON
1	13.01	28.62	21.46	824	0.46	0.50	0.29	0.09	0.05	0.49	2.86	77.10	7.30	10.53
4	12.93	28.66	21.50	240	0.42	0.53	0.17	n.d.	0.04	0.44	2.63	75.80	9.50	7.98
7	12.49	29.08	21.91	93	0.78	0.80	0.21	0.10	0.11	0.55	4.01	80.97	11.90	7.29

Weather: Light wind; sunny; some clouds

Comment: Mooring still OK; mooring cut at C3; calibrated TD probe

Cardigan, P.E.I.

STATION 12

Location C2 - CARDIGAN RIVER, P.E.I.

Date	Time	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	Surface Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude				
14-Oct-92	12:51 PM	7.00	4.5	0.3	14	12.2	282	62	46°12.45'	62°31.49'				
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg/m³)	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a\text{PE}}$ ($\mu\text{g/L}$)	$P_{a\text{PE}}$ ($\mu\text{g/L}$)	NH_3 (μM)	$UREA$ (μM)	$N_0_2+N_0_3$ (μM)	P_0_4 (μM)	SiO_4 (μM)	POC (μg)	PON (μg)	POC:PON
1	12.96	28.29	21.21	255	0.60	0.66	0.15	0.15	0.06	0.49	3.40	74.35	12.80	5.82
4	12.90	28.73	21.56	143	0.59	0.61	0.11	0.44	0.06	0.49	3.37	75.05	8.70	8.63
7				60	0.59	0.65	0.38	0.71	0.04	0.48	3.18	84.55	14.90	5.68

Weather: Overcast; blue sky; light breeze

Comment: Did tow while sailing from C1 to C2

Cardigan, P.E.I.**STATION 13****Location C4 - CARDIGAN RIVER, P.E.I.**

Date	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	Surface Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude					
14-Oct-92	10.00	4.5	0.3	15	12.5	433	95	46°13.28'	62°34.30'					
<hr/>														
Depth	Temp. (°C)	Sal (PSU)	σ_t (kg/m³)	$\langle I_D \rangle$ (μmol/s/m²)	$C_{a^{PE}}$ (μg/L)	$P_{a^{PE}}$ (μg/L)	NH_3 (μM)	UREA $N0_2+N0_3$ (μM)	$P0_4$ (μM)	$Si0_4$ (μM)	POC (μg)	PON (μg)	POC:PON	
1	13.13	27.71	20.73	445	0.77	0.60	0.23	0.28	0.06	0.53	5.03	77.35	13.30	5.82
4	12.67	28.71	21.59	197	0.75	0.73	n.d.	0.60	0.08	0.54	4.35	101.45	13.55	7.50

Weather: Thin cloud cover; blue sky in spots**Comment:** On the edge of the channel off of green buoy

Cardigan, P.E.I.**STATION 14****Location C5 - CARDIGAN RIVER, P.E.I.**

Date	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	Surface Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude					
14-Oct-92	5.50	4	0.4	13.5	12.5	1288	283	46°13.37'	62°35.42'					
<hr/>														
Depth	Temp. (°C)	Sal (PSU)	σ_t (kg/m³)	$\langle I_D \rangle$ (μmol/s/m²)	$C_{a^{PE}}$ (μg/L)	$P_{a^{PE}}$ (μg/L)	NH_3 (μM)	UREA $N0_2+N0_3$ (μM)	$P0_4$ (μM)	$Si0_4$ (μM)	POC (μg)	PON (μg)	POC:PON	
1	13.14	28.26	21.15	901	0.74	0.72	0.05	0.19	0.08	0.54	4.56	97.13	15.37	6.52
4	12.78	28.68	21.55	255	0.76	0.81	0.19	0.13	0.07	0.55	4.38	97.93	14.03	7.26

Weather: Blue sky; few BIG CLOUDS! Breeze starting up**Comment:** Last station today; tomorrow rig up new float on mooring at station C3; sample C3; do an inoculation

Cardigan, P.E.I.**STATION 15****Location C3 - CARDIGAN RIVER, P.E.I.**

Date	15-Oct-92	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	Surface Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude				
Time	9:14 AM	8.00	3.5	0.4	5.5	11	120	26	46°13.07'	62°32.57'				
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg/m^3)	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a\text{-PE}}$ ($\mu\text{g/L}$)	$P_{a\text{-PE}}$ ($\mu\text{g/L}$)	NH_3 (μM)	$UREA$ (μM)	NO_2+NO_3 (μM)	PO_4 (μM)	SiO_4 (μM)	POC (μg)	PON (μg)	$POC:PON$
1	12.18	28.42	21.46	74	0.84	0.83	n.d.	0.01	0.08	0.56	4.16	88.07	11.30	7.99
4	12.28	28.68	21.64	94	0.94	0.85	n.d.	0.04	0.10	0.56	4.19	87.20	10.70	8.71
7	12.42	28.97	21.84	31	0.83	0.80	0.02	0.03	0.11	0.57	4.15	98.90	8.90	11.12

Weather: Clear sky; light breeze**Comment:** Calm; replaced buoy on mooring; took 6 large carboys of water at 4m for John Smith; 2 horizontal tows

Appendix 4.4 Physical and biological data collected from Cardigan, P.E.I
04-Nov-92 to 05-Nov-92

Cardigan, P.E.I.

STATION 16

Location C2 - CARDIGAN RIVER, P.E.I.

Date	04-Nov-92	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude		
Time	11:00 AM	6.50	4.5	0.3	7.5	460	101	46°12.45'	62°31.49'		
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg / m³)	$\langle I_D \rangle$ ($\mu\text{mol}/\text{s}/\text{m}^2$)	$C_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	$P_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	NH_3 (μM)	UREA (μM)	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)
1	8.17	27.94	21.71	281	0.78	0.80	0.73	0.08	0.48	0.48	3.83
4	8.42	28.85	22.39	115	0.61	0.68	0.56	0.09	0.49	0.51	4.03
6	9.15	29.02	22.42	76	0.45	0.57	0.82	0.15	0.59	0.51	4.15

Weather: Overcast

Comment: C:N sample not analyzed

Cardigan, P.E.I.

STATION 17

Location C1 - CARDIGAN RIVER, P.E.I.

Date	04-Nov-92	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude		
Time	12:04 PM	13.00	6.5	0.2	9.5	201	44	46°12.06'	62°30.36'		
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg / m³)	$\langle I_D \rangle$ ($\mu\text{mol}/\text{s}/\text{m}^2$)	$C_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	$P_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	NH_3 (μM)	UREA (μM)	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)
1	8.38	28.37	22.02	164	0.68	0.72	0.72	0.10	0.37	0.46	3.77
4	8.71	28.79	22.30	249	0.67	0.73	0.74	n.d.	0.32	0.46	3.79
7	9.05	28.99	22.41	112	0.64	0.82	1.49	0.04	0.48	0.52	4.99

Weather: Scattered clouds; sunny; slight breeze; clouding over

Comment: Did tows towards station; C:N sample not analyzed

Cardigan, P.E.I.

STATION 18

Location C3 - CARDIGAN RIVER, P.E.I.

		Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude		
Date	04-Nov-92										
Time	12:40 PM	8.25	4.75	0.3	11	259	57	46°13.07'	62°32.57'		
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg/m³)	$\langle I_D \rangle$ ($\mu\text{mol}/\text{s}/\text{m}^2$)	$C_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	$P_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	NH_3 (μM)	UREA (μM)	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)
1	8.20	28.24	21.94	168	0.92	0.82	0.66	0.34	0.34	0.45	3.80
4	8.25	28.61	22.23	86	0.73	0.77	0.59	0.05	0.33	0.46	3.90
7	9.10	28.89	22.32	42	0.60	0.68	0.80	0.02	0.37	0.49	4.22

Weather: Overcast; slight breezeComment: C:N not analyzed; C:N sample not analyzed

Cardigan, P.E.I.

STATION 19

Location C4 - CARDIGAN RIVER, P.E.I.

		Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude		
Date	05-Nov-92										
Time	8:49 AM	11.00	4	0.4	11	56	12	46°13.28'	62°34.30'		
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg/m³)	$\langle I_D \rangle$ ($\mu\text{mol}/\text{s}/\text{m}^2$)	$C_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	$P_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	NH_3 (μM)	UREA (μM)	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)
1	8.46	28.49	22.10	33	0.83	0.96	1.85	n.d.	0.40	0.46	4.32
4	8.48	28.48	22.09	14	0.87	0.93	0.84	n.d.	0.40	0.46	4.38

Weather: Overcast; breeze; warmComment: C-1 jars for net tows; C:N sample not analyzed

Cardigan, P.E.I.**STATION 20****Location C5 - CARDIGAN RIVER, P.E.I.**

Date	05-Nov-92	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude		
Time	9:46 AM	4.25	3.5	0.4	11	126	28	46°13.37'	62°35.42'		
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg/m³)	$\langle I_D \rangle$ ($\mu\text{mol}/(\text{s m}^2)$)	$C_{a\text{PE}}$ ($\mu\text{g/L}$)	$P_{a\text{PE}}$ ($\mu\text{g/L}$)	NH_3 (μM)	UREA (μM)	NH_2+NH_3 (μM)	Po_4 (μM)	SiO_4 (μM)
1	8.74	28.04	21.71	96	0.94	1.21	1.24	n.d.	0.53	0.45	4.72
4	8.64	28.41	22.02	34	0.95	1.25	1.15	n.d.	0.39	0.77	4.62

Weather: Overcast; breeze; sun coming out**Comment:** C:N sample not analyzed

Appendix 4.5 Physical and biological data collected from Cardigan, PEI

18-Nov-92 to 19-Nov-92

Cardigan, P.E.I.

STATION 21

Location C1 - CARDIGAN RIVER, P.E.I.

Date	18-Nov-92	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude		
Time	10:54 AM	8.25	4.5	0.3	-2	183	40	46°12.06'	62°30.36'		
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg / m³)	$\langle I_D \rangle$ ($\mu\text{mol}/\text{s}/\text{m}^2$)	$C_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	$P_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	NH_3 (μM)	UREA (μM)	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)
1	5.09	27.61	21.82	122	0.95	0.81	0.23	0.74	0.10	0.51	1.30
4	5.33	27.72	21.87	56	1.18	0.87	0.25	2.97	0.11	0.46	1.50
7	6.45	28.85	22.64	28	1.09	0.74	0.90	0.58	0.13	0.36	1.72

Weather: Windy; snow flurries

Comment: Calm; pulled mooring; VEMCO missing from 1m marker; C:N sample not analyzed

Cardigan, P.E.I.

STATION 22

Location C2 - CARDIGAN RIVER, P.E.I.

Date	18-Nov-92	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude		
Time	12:19 PM	8.50	4.5	0.3	-2	185	41	46°12.45'	62°31.49'		
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg / m³)	$\langle I_D \rangle$ ($\mu\text{mol}/\text{s}/\text{m}^2$)	$C_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	$P_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	NH_3 (μM)	UREA (μM)	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)
1	5.44	27.88	21.99	132	1.01	0.83	0.02	1.28	0.07	0.62	1.73
4	5.88	28.69	22.59	59	1.03	0.82	0.05	0.83	0.19	0.45	1.98
7	6.59	28.91	22.68	29	0.89	0.71	0.05	0.50	0.35	0.58	2.94

Weather: Snow flurries; windy

Comment: Calm; C:N sample not analyzed

Cardigan, P.E.I.**STATION 23****Location C3 - CARDIGAN RIVER, P.E.I.**

	Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude
Date	18-Nov-92							
Time	12:55 PM	8.50	4.5	0.3	-2	128	28	46°13.07'
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg / m³)	$\langle I_D \rangle$ (μmol/s/m²)	$C_{a^{PE}}$ (μg / L)	$P_{a^{PE}}$ (μg / L)	NH_3 (μM)	UREA (μM)
1	5.00	27.43	21.68	63	0.87	0.80	n.d.	0.44
4	5.95	28.62	22.52	37	0.93	0.90	n.d.	0.50
7	6.47	28.69	22.52	17	1.29	0.84	0.37	0.75
							$N\theta_2 + N\theta_3$ (μM)	$P\theta_4$ (μM)
								$Si\theta_4$ (μM)

Weather: Snow flurries; windyComment: Calm; taking up mooring; C:N sample not analyzed**Cardigan, P.E.I.****STATION 24****Location C4 - CARDIGAN RIVER, P.E.I.**

	Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude
Date	19-Nov-92							
Time	8:42 AM	6.50	3.75	0.4	-3.5	51	11	46°13.28'
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg / m³)	$\langle I_D \rangle$ (μmol/s/m²)	$C_{a^{PE}}$ (μg / L)	$P_{a^{PE}}$ (μg / L)	NH_3 (μM)	UREA (μM)
1	4.14	26.79	21.25	51	1.42	1.07	0.59	1.14
4	6.13	26.03	20.46	26	1.25	1.08	0.32	1.83
							$N\theta_2 + N\theta_3$ (μM)	$P\theta_4$ (μM)
								$Si\theta_4$ (μM)

Weather: Overcast; light breezeComment: Calm; C:N sample not analyzed

Cardigan, P.E.I.**STATION 25****Location C5 - CARDIGAN RIVER, P.E.I.**

Date	19-Nov-92	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude		
Time	9:52 AM	4.00	3.5	0.4	-3.5	180	40	46°13.37'	62°35.42'		
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg / m³)	$\langle I_D \rangle$ ($\mu\text{mol}/\text{s}/\text{m}^2$)	$C_{a^{\text{PE}}}$ ($\mu\text{g}/\text{L}$)	$P_{a^{\text{PE}}}$ ($\mu\text{g}/\text{L}$)	NH_3 (μM)	UREA (μM)	$N\theta_2 + N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)
1	5.07	26.77	21.15	128	1.67	1.30	0.19	0.84	0.10	0.33	1.17
4	5.92	28.06	22.08	51	2.17	1.52	0.47	6.74	0.00	0.50	0.99

Weather: Snow flurries; wind picking up; cold**Comment:** Calm; C:N sample not analyzed

Appendix 4.6 Physical and biological data collected during Survey 92-01.
05-Jun-92 to 08-Jun-92

Survey 92-01

STATION 01

Location MIDDLE OF ST. GEORGE'S BAY, N.S.

Date	Time	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude		Longitude						
								1551	341	45°57.27'	61°46.88'					
Depth (m)	TD Temp. (°C)	Manual Salinity (‰)	F_o	F_{dcmu}	FRI	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a^{\text{PE}}}$ ($\mu\text{g/L}$)	$P_{a^{\text{PE}}}$ ($\mu\text{g/L}$)	NH_3 (μM)	UREA (μM)	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)	POC (μg)	PON (μg)	POC:PON
2	7.7	31.0	5	8	0.43		0.06	0.09	0.69	1.70	0.11	0.35	0.46	35.70	4.43	8.09
12	7.1	30.0	7	13	0.49	260	0.18	0.17	0.10	0.15	0.15	0.45	1.85	43.27	7.07	6.13
25	0.5	30.5	9	15	0.41	37	0.15	0.09	0.17	0.08	0.11	0.57	1.46	32.90	4.90	6.72

Weather: Clear sky; light breeze; hazy; a few clouds on horizon

Comment: No horizontal tow done; vertical tows 3 x 32m - total volume 600mL

Survey 92-01**STATION 02****Location 2 MILES WEST OF HENRY ISLAND, N.S.**

Date	Time	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude		Longitude						
		(m)	(m)													
05-Jun-92	3:20 PM	40.00	14	0.1	11.5	2015	443	46°00.33'	61°39.22'							
Depth (m)	TD Temp. (°C)	Manual Salinity (‰)	F_o	F_{dcmu}	FRI	$\langle I_D \rangle$ (µmol/s/m²)	$C_{a^{PE}}$ (µg/L)	$P_{a^{PE}}$ (µg/L)	NH_3 (µM)	UREA (µM)	N_2+N_3 (µM)	P_4 (µM)	SiO_4 (µM)	POC (µg)	PON (µg)	POC:PON
2	7.6	30.5	3	15	0.81	667	0.11	0.08	0.06	0.04	0.10	0.35	0.66	61.17	7.63	8.24
19	2.3	33.0	7	28	0.74	68	0.28	0.11	0.26	n.d.	0.11	0.48	0.86	34.93	4.43	8.12
25		33.0	5	20	0.74	44	0.12	0.07	0.26	n.d.	0.38	0.57	1.59	22.73	2.73	8.65

Weather: Sunny; haze**Comment:** Fish tow done for BIO staff prior to sampling; vertical tow 3 x 32m - 600mL total volume**Survey 92-01****STATION 03****Location 6.5 MILES NE OF CAPE GEORGE, N.S.**

Date	Time	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude		Longitude						
		(m)	(m)													
05-Jun-92	6:00 PM	38.00	9.5	0.2	16	589	130	45°55.34'	61°45.41'							
Depth (m)	TD Temp. (°C)	Manual Salinity (‰)	F_o	F_{dcmu}	FRI	$\langle I_D \rangle$ (µmol/s/m²)	$C_{a^{PE}}$ (µg/L)	$P_{a^{PE}}$ (µg/L)	NH_3 (µM)	UREA (µM)	N_2+N_3 (µM)	P_4 (µM)	SiO_4 (µM)	POC (µg)	PON (µg)	POC:PON
2	8.2	30.0	4	18	0.78	173	0.18	0.08	0.60	0.33	0.11	0.38	0.53	38.93	5.13	7.55
15	3.5	31.0	8	44	0.83	50	0.22	0.25	0.04	n.d.	0.11	0.41	0.61	38.07	6.73	5.71
25	-1.0	33.0	6	31	0.81	13	0.17	0.12	0.18	0.20	0.43	0.55	1.07	32.63	3.90	8.48

Weather: Sunny; clouds starting to form; wind picking up**Comment:** At 15m very large (~6 on scale) initial Fdcmu response rapidly fades to ~4.4; whole water stabilized at ~3.3 in ~5 minutes

Survey 92-01**STATION 04****Location ST. GEORGE'S BAY, N.S.**

Date	Time	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude		Longitude						
								$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude					
06-Jun-92	7:20 AM	30.00	10	0.2	3.5			45°52.30'	61°51.70'							
Depth (m)	TD Temp. (°C)	Manual Salinity ($^{\circ}/_{\text{oo}}$)	F_o	F_{dcmu}	FRI	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a^{\text{PE}}}$ ($\mu\text{g/L}$)	$P_{a^{\text{PE}}}$ ($\mu\text{g/L}$)	NH_3 (μM)	UREA	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)	POC (μg)	PON (μg)	POC:PON
10	32.0	5	24	0.80		0.14	0.17	0.07	0.02		0.14	0.54	0.64	40.87	6.50	6.41

Weather: Windy; cold; cloudyComment: Sample for incubation; no irradiance or temperature profile**Survey 92-01****STATION 05****Location ON ROUTE TO PICTOU, N.S.**

Date	Time	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude		Longitude						
								$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude					
06-Jun-92	9:30 AM	30.00	10	0.2	6	320	70	45°49.70'	62°07.01'							
Depth (m)	TD Temp. (°C)	Manual Salinity ($^{\circ}/_{\text{oo}}$)	F_o	F_{dcmu}	FRI	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a^{\text{PE}}}$ ($\mu\text{g/L}$)	$P_{a^{\text{PE}}}$ ($\mu\text{g/L}$)	NH_3 (μM)	UREA	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)	POC (μg)	PON (μg)	POC:PON
2	7.1	32.0	5	11	0.53	337	0.16	0.19	0.42	n.d.	0.09	0.39	0.66	31.93	4.80	7.06
12	4.1	32.0	8	16	0.48	135	0.19	0.16	0.36	n.d.	0.09	0.46	0.71	35.03	5.77	6.34
25	-0.6	34.0	28	76	0.63	14	0.90	0.78	0.37	n.d.	1.36	0.79	4.47	62.30	10.73	5.79

Weather: Sunny; light windComment: Calm

Survey 92-01**STATION .06****Location NORTH OF LISMORE, N.S.**

Date	Time	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude		Longitude						
		28.00	9	0.2		5	187	41	45°46.06'	62°15.66'						
Depth (m)	TD Temp. (°C)	Manual Salinity ($^{\circ}/_{\text{oo}}$)	F_o	F_{dcmu}	FRI	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a\text{PE}}$ ($\mu\text{g/L}$)	$P_{a\text{PE}}$ ($\mu\text{g/L}$)	NH_3 (μM)	UREA (μM)	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)	POC (μg)	PON (μg)	POC:PON
2	7.1	30.0	9	11	0.25	757	0.19	0.15	0.56	n.d.	0.09	0.42	0.80	30.33	4.87	6.40
12	4.1	31.0	8	11	0.26	82	0.24	0.18	0.43	n.d.	0.10	0.46	0.89	33.13	5.10	6.59
25	-0.1	32.0	48	16	-2.03	9	1.06	0.71	0.69	n.d.	0.50	0.70	2.83	58.40	9.77	6.00

Weather: Broken cloud**Comment:** Sun directly overhead; boat moving around**Survey 92-01****STATION .07****Location NORTH OF MERIGOMISH, N.S.**

Date	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude		Longitude							
	2:45 PM	19.00	7		1929	424	45°42.77'	62°26.35'								
Depth (m)	TD Temp. (°C)	Manual Salinity ($^{\circ}/_{\text{oo}}$)	F_o	F_{dcmu}	FRI	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a\text{PE}}$ ($\mu\text{g/L}$)	$P_{a\text{PE}}$ ($\mu\text{g/L}$)	NH_3 (μM)	UREA (μM)	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)	POC (μg)	PON (μg)	POC:PON
2		31.0	9	16	0.46		0.28	0.23	0.46	n.d.	0.09	0.40	0.58	33.00	4.57	7.25
12	5.1	31.0	7	14	0.53	85	0.21	0.20	0.37	n.d.	0.09	0.43	0.74	35.50	5.63	6.31
18	4.1	31.0	20	45	0.56	36	0.49	0.40	0.56	n.d.	0.14	0.48	1.37	45.33	7.03	6.49

Weather: Windy; cold; cloudy**Comment:** No net tows; filtered POC/PON at wharf

Survey 92-01**STATION -08**Location EAST OF PICTOU ISLAND, N.S.

Date	Time	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)		$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude		Longitude					
					$\langle I_D \rangle$ (μmol/s/m²)	$C_{a\text{PE}}$ (μg/L)	$P_{a\text{PE}}$ (μg/L)	NH_3 (μM)	UREA (μM)	$N_0_2+N_0_3$ (μM)	P_0_4 (μM)	SiO_4 (μM)	POC (μg)	PON (μg)	$POC:PON$	
07-Jun-92	10:05 AM	18.00	7	0.2	8	116	26		45°51.18'	62°26.65'						
Depth (m)	TD Temp. (°C)	Manual Salinity (‰)	F_o	F_{dcmu}	FRI	$\langle I_D \rangle$ (μmol/s/m²)	$C_{a\text{PE}}$ (μg/L)	$P_{a\text{PE}}$ (μg/L)	NH_3 (μM)	UREA (μM)	$N_0_2+N_0_3$ (μM)	P_0_4 (μM)	SiO_4 (μM)	POC (μg)	PON (μg)	$POC:PON$
2	4.9	32.0	12	29	0.59	162	0.30	0.27	0.79	n.d.	0.26	0.42	1.09	39.47	5.37	7.46
12	4.0	33.5	16	38	0.58	54	0.45	0.48	n.d.	0.20	0.36	0.46	1.54	45.17	7.63	5.91
17	3.1	33.5	16	28	0.43	13	0.36	0.35	0.06	0.12	0.54	0.51	1.60	37.40	5.63	6.72

Weather: FogComment: Strong tide running; too much tide for vertical tow; combined vertical and horizontal tow - 20m**Survey 92-01****STATION -09**Location MID STRAIT EN ROUTE TO GEORGETOWN, P.E.I.

Date	Time	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)		$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude		Longitude					
					$\langle I_D \rangle$ (μmol/s/m²)	$C_{a\text{PE}}$ (μg/L)	$P_{a\text{PE}}$ (μg/L)	NH_3 (μM)	UREA (μM)	$N_0_2+N_0_3$ (μM)	P_0_4 (μM)	SiO_4 (μM)	POC (μg)	PON (μg)	$POC:PON$	
07-Jun-92	11:39 AM	38.00	11	0.1	11	152	33		45°55.60'	62°22.34'						
Depth (m)	TD Temp. (°C)	Manual Salinity (‰)	F_o	F_{dcmu}	FRI	$\langle I_D \rangle$ (μmol/s/m²)	$C_{a\text{PE}}$ (μg/L)	$P_{a\text{PE}}$ (μg/L)	NH_3 (μM)	UREA (μM)	$N_0_2+N_0_3$ (μM)	P_0_4 (μM)	SiO_4 (μM)	POC (μg)	PON (μg)	$POC:PON$
2	7.2	31.0	6	13	0.55	101	0.18	0.21	0.02	n.d.	0.12	0.35	0.69	28.27	4.23	6.68
15	2.8	33.5	7	9	0.27	82	0.14	0.21	0.08	n.d.	0.34	0.44	0.47	22.63	3.40	6.90
25	0.9	34.5	11	13	0.19	33	0.12	0.22	0.23	n.d.	0.81	0.55	1.08	23.90	3.57	7.04

Weather: Light wind; overcast; fogComment: Calm; some tide running; strong currents

Survey 92-01**STATION 10****Location EAST OF MURRAY HARBOUR NORTH, P.E.I.**

Date	Time	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude		Longitude						
								$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude					
07-Jun-92	2:30 PM	28.00	12	0.1	11	1709	376	46°04.50'	62°22.91'							
Depth (m)	TD Temp. (°C)	Manual Salinity ($^{\circ}/\text{oo}$)	F_o	F_{dcmu}	FRI	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a^{\text{PE}}}$ ($\mu\text{g/L}$)	$P_{a^{\text{PE}}}$ ($\mu\text{g/L}$)	NH_3 (μM)	UREA	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)	POC	PON	POC:PON
2	7.1	31.5	4	6	0.22	1327	0.07	0.18	0.28	0.54	0.20	0.72	0.42	102.57	9.53	11.04
15	2.1	34.5	12	18	0.34	235	0.13	0.27	0.15	n.d.	0.19	0.46	0.85	41.90	5.27	8.24
25	1.6	34.5	9	20	0.52	48	0.12	0.28	0.15	n.d.	0.25	0.50	1.16	30.13	4.13	7.30

Weather: Hazy; light wind; sunny**Comment:** Calm; tore up plankton net; used smaller net; vertical tow 3 x 25m - 240mL**Survey 92-01****STATION 11****Location SE OF BOUGHTON POINT, P.E.I.**

Date	Time	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude		Longitude						
								$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude					
08-Jun-92	8:00 AM	15.00	10	0.2	10	153	34	46°09.99'	62°22.89'							
Depth (m)	TD Temp. (°C)	Manual Salinity ($^{\circ}/\text{oo}$)	F_o	F_{dcmu}	FRI	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a^{\text{PE}}}$ ($\mu\text{g/L}$)	$P_{a^{\text{PE}}}$ ($\mu\text{g/L}$)	NH_3 (μM)	UREA	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)	POC	PON	POC:PON
2	5.3	32.0	6	10	0.38	105	0.10	0.23	0.04	n.d.	0.14	0.44	1.17	29.83	4.57	6.52
8	3.9	32.0	6	13	0.50	56	0.13	0.24	0.09	n.d.	0.15	0.43	0.86	58.47	9.30	6.37
14	3.8	32.5	13	22	0.43	32	0.16	0.31	0.20	n.d.	0.15	0.48	1.12	38.27	6.20	6.21

Weather: Overcast; sun breaking through**Comment:** No horizontal tow

Survey 92-01**STATION 12****Location** SOUTH OF BOUGHTON ISLAND, P.E.I.

Date	Time	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude		Longitude						
		08-Jun-92	12.00	9		9.5	204	45	46°10.44'	62°25.25'						
Depth (m)	TD Temp. (°C)	Manual Salinity ($^{\circ}/_{\text{oo}}$)	F_o	F_{dcmu}	FRI	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a^{\text{PE}}}$ ($\mu\text{g/L}$)	$P_{a^{\text{PE}}}$ ($\mu\text{g/L}$)	NH_3 (μM)	UREA (μM)	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)	POC (μg)	PON (μg)	POC:PON
2	5.5	32.0	13	16	0.23	139	0.15	0.28	0.06	n.d.	0.10	0.40	1.40	38.63	7.20	5.43
6	5.2	32.0	8	15	0.46	90	0.14	0.27	0.07	n.d.	0.10	0.41	0.95	40.57	6.77	5.99
11	5.0	32.0	11	19	0.40	53	0.20	0.36	0.07	n.d.	0.09	0.42	1.04	34.97	5.27	6.66

Weather: Overcast; clearing**Comment:** Calm; no horizontal tow**Survey 92-01****STATION 13****Location** SOUTH OF BOUGHTON SPIT, P.E.I.

Date	Time	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude		Longitude						
		08-Jun-92	11.00	8		11	304	67	46°11.32'	62°27.59'						
Depth (m)	TD Temp. (°C)	Manual Salinity ($^{\circ}/_{\text{oo}}$)	F_o	F_{dcmu}	FRI	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a^{\text{PE}}}$ ($\mu\text{g/L}$)	$P_{a^{\text{PE}}}$ ($\mu\text{g/L}$)	NH_3 (μM)	UREA (μM)	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)	POC (μg)	PON (μg)	POC:PON
2	7.9	32.0	8	12	0.32	127	0.14	0.24	n.d.	0.08	0.09	0.40	0.86	37.13	6.03	6.15
5	6.3	32.0	7	9	0.19	213	0.12	0.17	0.02	0.05	0.12	0.39	1.34	45.23	7.43	6.11
9	4.9	32.0	12	20	0.39	145	0.28	0.40	n.d.	0.20	0.08	0.43	1.29			

Weather: Blue sky; cloud in spots; light breeze**Comment:** No horizontal tow; 9m C:N sample lost

Survey 92-01**STATION 14****Location OFF MAITLAND FLAT, P.E.I.**

Date	08-Jun-92	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude		Longitude						
								$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude					
Time	11:20 AM	9.00	5	0.3	20.5	716	157	46°13.14'	62°31.92'							
Depth (m)	TD Temp. (°C)	Manual Salinity ($^{\circ}/_{\text{oo}}$)	F_o	F_{dcmu}	FRI	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a^{\text{PE}}}$ ($\mu\text{g/L}$)	$P_{a^{\text{PE}}}$ ($\mu\text{g/L}$)	NH_3 (μM)	UREA (μM)	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)	POC (μg)	PON (μg)	POC:PON
1	10.3	28.0	10	18	0.45	543	0.33	0.33	0.06	n.d.	0.12	0.46	1.77	51.77	9.00	5.78
4	7.2	30.0	16	30	0.47	429	0.61	0.61	0.01	0.00	0.08	0.49	1.18	70.73	13.63	5.22
7	5.3	31.0	22	44	0.50	232	0.54	0.60	0.15	n.d.	0.07	0.52	1.93	69.40	12.30	5.66

Weather: Sky clearing; warm**Comment:** No horizontal tow

**Appendix 4.7 Physical and biological data collected during Survey 92-02
20-Oct-92 to 23-Oct-92**

Survey 92-02

STATION -01

Location C2 - CARDIGAN RIVER, P.E.I.

Date	20-Oct-92	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude					
Time	2:17 PM	9.00	3.5	0.4	4	1187	261	46°12.67'	62°31.70'					
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg/m³)	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a\text{PE}}$ ($\mu\text{g/L}$)	$P_{a\text{PE}}$ ($\mu\text{g/L}$)	NH_3 (μM)	UREA (μM)	N_2+N_3 (μM)	Po_4 (μM)	SiO_4 (μM)	POC (μg)	PON (μg)	POC:PON
1	10.41	28.67	21.95	843	0.80	0.96	0.48	0.57	0.14	4.25	3.28	112.13	15.43	7.36
4	10.41	28.67	21.95	148	0.73	0.94	0.19	0.93	0.08	3.85	3.32	82.60	14.50	5.98
7	10.42	28.65	21.94	59	0.90	0.98	n.d.	0.14	0.07	0.75	3.18	86.45	11.80	7.32

Weather: Light breeze; blue skies; clouds

Comment: Michelle Wood and Nicole (visiting from Oregon) and J.C. Smith joined us just for this day

Survey 92-02

STATION -02

Location NORTHUMBERLAND STRAIT - FISHERMAN'S BANK

Date	21-Oct-92	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude					
Time	9:43 AM	15.00	5	0.3	5	458	101	46°00.93'	62°16.81'					
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg/m³)	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a\text{PE}}$ ($\mu\text{g/L}$)	$P_{a\text{PE}}$ ($\mu\text{g/L}$)	NH_3 (μM)	UREA (μM)	N_2+N_3 (μM)	Po_4 (μM)	SiO_4 (μM)	POC (μg)	PON (μg)	POC:PON
1	11.66	29.26	22.19	255	0.38	0.49	0.96	0.99	0.50	10.55	4.41	56.95	3.60	15.87
7	11.64	28.99	21.99	43	0.44	0.46	0.66	0.14	0.47	3.59	4.41	43.07	3.40	18.78
14	11.65	28.96	21.97	6	0.45	0.45	0.70	0.25	0.47	1.54	4.41	40.15	4.50	11.95

Weather: Light breeze; blue sky; scattered clouds

Comment: Water for enrichment experiment from 7 metres

Survey 92-02

STATION 03

Location NORTHUMBERLAND STRAIT - FISHERMAN'S BANK

		Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude					
Date	21-Oct-92													
Time	12:30 PM	30.00	11	0.1	10	339	75	46°02.68'	62°18.96'					
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg/m^3)	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a^{\text{PE}}}$ ($\mu\text{g/L}$)	$P_{a^{\text{PE}}}$ ($\mu\text{g/L}$)	NH_3 (μM)	UREA (μM)	$N\theta_2 + N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)	POC (μM)	PON (μg)	$POC:PON$ (μg)
1	11.58	29.11	22.10	311	0.46	0.50	0.71	0.34	0.47	1.03	4.73	45.15	7.50	6.02
14	11.58	28.96	21.97	13	0.50	0.58	0.66	0.17	0.46	0.98	4.77	50.20	5.97	12.34
28	11.58	28.94	21.96	1	0.53	0.56	0.70	0.61	0.47	0.60	4.81	50.13	7.43	9.45

Weather: Cloudy; light breezeComment:

Survey 92-02

STATION 04

Location NORTHUMBERLAND STRAIT

		Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude					
Date	21-Oct-92													
Time	1:56 PM	26.00	5	0.3	10	174	38	46°04.05'	62°20.90'					
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg/m^3)	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a^{\text{PE}}}$ ($\mu\text{g/L}$)	$P_{a^{\text{PE}}}$ ($\mu\text{g/L}$)	NH_3 (μM)	UREA (μM)	$N\theta_2 + N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)	POC (μM)	PON (μg)	$POC:PON$ (μg)
1	11.63	28.98	21.98	119	0.51	0.57	0.60	0.26	0.46	1.15	4.72	45.67	5.27	11.15
14	11.63	28.95	21.96	9	0.56	0.63	0.54	0.71	0.42	0.62	4.13	53.23	7.90	7.36
24	11.63	28.95	21.96	1	0.53	0.59	0.68	0.24	0.46	0.74	4.53	48.07	5.07	10.50

Weather: Blue sky; scattered clouds; bit of a breezeComment: Did horizontal tow on way to station

Survey 92-02**STATION 05**Location NORTHUMBERLAND STRAIT

Date	Time	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude					
		21-Oct-92	3:20 PM	25.00	5	0.3	10	547	120	46°05.74'	62°22.76'			
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg/m³)	$\langle I_D \rangle$ ($\mu\text{mol}/\text{s}/\text{m}^2$)	$C_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	$P_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	NH_3 (μM)	UREA (μM)	$N_0_2+N_0_3$ (μM)	P_0_4 (μM)	$Si\theta_4$ (μM)	POC (μg)	PON (μg)	POC:PON
1	11.70	28.94	21.94	112	0.53	0.58	0.61	0.27	0.37	0.63	3.73	49.93	7.00	7.34
14	11.71	28.92	21.93	6	0.52	0.56	0.55	0.20	0.36	0.58	3.95	49.30	4.30	11.45
24				0	0.53	0.59	0.50	n.d.	0.34	0.56	3.84	41.03	3.50	15.93

Weather: Clouding over; light breezeComment: Slight swell**Survey 92-02****STATION 06**Location WEST OF PANMURE ISLAND, P.E.I.

Date	Time	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude		Longitude				
		21-Oct-92	4:45 PM	15.00	4	0.4	12			46°07.95'	62°25.23'			
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg/m³)	$\langle I_D \rangle$ ($\mu\text{mol}/\text{s}/\text{m}^2$)	$C_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	$P_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	NH_3 (μM)	UREA (μM)	$N_0_2+N_0_3$ (μM)	P_0_4 (μM)	$Si\theta_4$ (μM)	POC (μg)	PON (μg)	POC:PON
1	11.21	29.13	22.17	37	0.46	0.60	0.44	0.25	0.22	0.63	3.44	53.93	7.70	7.39
7	11.22	28.89	21.99	5	0.54	0.63	0.44	n.d.	0.20	0.67	3.31	52.10	7.50	7.07
14	11.22	28.87	21.97	0	0.44	0.57	0.22	0.54	0.21	0.53	3.36	59.10	9.35	6.29

Weather: OvercastComment: Swell

Survey 92-02**STATION 07****Location SW OF BOUGHTON ISLAND, P.E.I.**

Date	22-Oct-92	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude					
Time	9:00 AM	9.00	3	0.5	11.5	139	31	46°10.49'	62°26.74'					
<hr/>														
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg / m ³)	$\langle I_D \rangle$ (μmol/s/m ²)	$C_{a^{PE}}$ (μg / L)	$P_{a^{PE}}$ (μg / L)	NH_3 (μM)	UREA (μM)	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)	POC (μg)	PON (μg)	POC:PON
1	10.74	29.68	22.68	30	0.56	0.69	0.30	0.63	0.11	0.53	2.55	87.53	10.80	8.15
4	10.73	28.83	22.02	9	0.64	0.74	0.14	0.31	0.12	5.86	2.85	65.80	10.10	6.98
7	10.73	28.84	22.03	4	0.68	0.72	0.16	0.52	0.11	3.33	2.79	66.30	9.97	7.13

Weather: Blew hard last night; NE breeze; overcast**Comment:** Swell; started inoculation ~0900 with water from 4m; doing Brudenell - too rough outside**Survey 92-02****STATION 08****Location OFF BRUDENELL POINT, P.E.I.**

Date	22-Oct-92	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude					
Time	11:12 AM	8.00	3	0.5	8.5	187	41	46°10.58'	62°32.71'					
<hr/>														
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg / m ³)	$\langle I_D \rangle$ (μmol/s/m ²)	$C_{a^{PE}}$ (μg / L)	$P_{a^{PE}}$ (μg / L)	NH_3 (μM)	UREA (μM)	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)	POC (μg)	PON (μg)	POC:PON
1	9.71	28.11	21.62	112	1.54	0.99	0.06	0.77	0.09	2.39	3.32	79.50	12.00	6.62
4	9.72	28.16	21.66	33	1.63	1.03	n.d.	0.39	0.07	1.65	3.08	92.70	15.90	5.83
7	9.75	28.25	21.72	12	1.75	1.25	0.06	n.d.	0.09	1.24	3.00	105.97	18.77	5.68

Weather: Overcast; breeze**Comment:** Swell; did horizontal tow on approach to station

Survey 92-02**STATION 09**Location THRUMCAP SPIT, P.E.I.

Date	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude
Time	1:00 PM	9.00	2.5	0.6	10	336	74	46°10.18' 62°31.68'
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg/m^3)	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a\text{PE}}$ ($\mu\text{g/L}$)	$P_{a\text{PE}}$ ($\mu\text{g/L}$)	NH_3 (μM)	UREA (μM)
1	9.77	28.48	21.90	192	1.66	1.15	0.09	$N_{O_2+NO_3}$ (μM)
4	9.76	28.35	21.80	40	1.46	1.26	0.21	P_{O_4} (μM)
8	9.70	28.48	21.92	8	1.37	1.25	n.d.	SiO_4 (μM)
						n.d.	0.08	POC (μg)
							0.80	PON (μg)
							2.45	$POC:PON$
							112.20	19.10
								5.87

Weather: Overcast; breeze; sun coming throughComment: Swell down**Survey 92-02****STATION 10**Location PANMURE SPIT, P.E.I.

Date	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude
Time	2:30 PM	20.00	2	0.8	10	208	46	46°09.60' 62°30.04'
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg/m^3)	$\langle I_D \rangle$ ($\mu\text{mol/s/m}^2$)	$C_{a\text{PE}}$ ($\mu\text{g/L}$)	$P_{a\text{PE}}$ ($\mu\text{g/L}$)	NH_3 (μM)	UREA (μM)
1	9.87	28.79	22.13	152	1.07	1.13	0.06	$N_{O_2+NO_3}$ (μM)
12	9.81	28.64	22.02	1	1.10	1.16	n.d.	P_{O_4} (μM)
						0.21	0.08	SiO_4 (μM)
						1.36	1.93	POC (μg)
						2.02	1.95	PON (μg)
						108.07	100.50	$POC:PON$
						17.83	13.30	7.57

Weather: Overcast; breezeComment: Swell; did horizontal tow on approach to station; only 2 depths; drifted onto shoal; too rough to anchor

Survey 92-02

STATION 11

Location NE OF PANMURE ISLAND, P.E.I.

		Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude					
Date	22-Oct-92													
Time	3:30 PM	18.00	2.5	0.6	7.5	96	21	46°09.52'	62°26.95'					
<hr/>														
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg/m³)	$\langle I_D \rangle$ ($\mu\text{mol}/\text{s}/\text{m}^2$)	$C_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	$P_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	NH_3 (μM)	UREA (μM)	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)	POC (μg)	PON (μg)	POC:PON
1	10.27	28.78	22.06	53	0.74	0.78	0.21	0.12	0.15	0.83	2.65	60.05	9.90	6.11
7	10.26	28.77	22.05	6	0.82	0.86	n.d.	0.12	0.10	0.76	2.26	68.43	10.03	6.90
15	10.38	28.80	22.05		0.82	0.77	0.02	n.d.	0.11	0.82	2.40	63.80	8.60	7.57

Weather: Overcast; breezyComment: Drifting - not anchoring

Survey 92-02

STATION 12

Location C1 - CARDIGAN RIVER, P.E.I.

		Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude					
Date	23-Oct-92													
Time	9:00 AM	9.00	2.5	0.6	7.5	892	196	46°12.25'	62°30.69'					
<hr/>														
Depth (m)	Temp. (°C)	Sal (PSU)	σ_t (kg/m³)	$\langle I_D \rangle$ ($\mu\text{mol}/\text{s}/\text{m}^2$)	$C_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	$P_{a\text{PE}}$ ($\mu\text{g}/\text{L}$)	NH_3 (μM)	UREA (μM)	$N\theta_2+N\theta_3$ (μM)	$P\theta_4$ (μM)	$Si\theta_4$ (μM)	POC (μg)	PON (μg)	POC:PON
1	9.58	28.74	22.13	456	1.04	0.98	0.42	0.73	0.09	0.60	2.21	79.67	12.27	6.91
4	9.60	28.74	22.13	92	0.93	0.98	0.07	0.71	0.10	0.57	2.14	76.30	13.20	5.81
7	9.76	28.83	22.18	24	0.76	0.86	2.47	0.58	0.18	0.75	3.94	80.80	14.00	5.77

Weather: Blue sky; no clouds; slight breezeComment: Calm; filtered Wednesday's incubation; took water from 7m for another incubation

Survey 92-02**STATION 13****Location NE OF MURRAY HEAD, P.E.I.**

Date	23-Oct-92	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude					
Time	12:30 PM	13.00	4.25	0.4	9	1365	300	46°02.61'	62°26.20'					
Depth	Temp.	Sal	σ_t	$\langle I_D \rangle$	$C_{a^{PE}}$	$P_{a^{PE}}$	NH_3	UREA	N_2+N_3	P_4	SiO_4	POC	PON	POC:PON
(m)	(°C)	(PSU)	(kg/m³)	(μmol/s/m²)	(μg/L)	(μg/L)	(μM)	(μM)	(μM)	(μM)	(μM)	(μM)	(μg)	(μg)
1	11.13	29.19	22.24	805	0.52	0.53	0.71	0.18	0.45	0.77	4.12	47.65	4.60	10.38
7	10.89	28.92	22.06	73	0.53	0.57	0.65	0.58	0.46	0.64	4.25	51.80	7.30	7.16
12	10.72	28.89	22.07	10	0.51	0.70	0.73	0.10	0.39	0.89	3.70	77.60	10.87	7.42

Weather: Sunny; light breeze; scattered clouds**Comment:** Did horizontal tow steaming to station (16m)**Survey 92-02****STATION 14****Location DES BARRES POINTE, P.E.I.**

Date	23-Oct-92	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude					
Time	1:20 PM	18.00	5.25	0.3	10			46°04.19'	62°25.01'					
Depth	Temp.	Sal	σ_t	$\langle I_D \rangle$	$C_{a^{PE}}$	$P_{a^{PE}}$	NH_3	UREA	N_2+N_3	P_4	SiO_4	POC	PON	POC:PON
(m)	(°C)	(PSU)	(kg/m³)	(μmol/s/m²)	(μg/L)	(μg/L)	(μM)	(μM)	(μM)	(μM)	(μM)	(μM)	(μg)	(μg)
1	11.26	28.95	22.02	943	0.64	0.59	0.70	0.17	0.40	0.48	4.21	46.50	7.97	5.92
8	11.23	28.91	22.00	77	0.59	0.57	0.56	0.30	0.40	0.59	4.25	48.05	7.70	6.26
17				6	0.46	0.48	0.60	0.02	0.38	0.85	3.62	46.25	10.00	4.63

Weather: Sunny; few scattered clouds; light breeze**Comment:**

Survey 92-02

STATION 15

Location MOUTH OF CARDIGAN BAY, P.E.I.

		Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude					
Date	23-Oct-92													
Time	1:00 PM	17.00	4.5	0.3	11	941	207	46°09.60'	62°25.95'					
Depth	Temp.	Sal	σ_t	$\langle I_D \rangle$	$C_{a^{PE}}$	$P_{a^{PE}}$	NH_3	UREA	$N0_2+N0_3$	$P0_4$	$Si0_4$	POC	PON	POC:PON
(m)	(°C)	(PSU)	(kg / m ³)	(μmol/s/m ²)	(μg / L)	(μg / L)	(μM)	(μM)	(μM)	(μM)	(μM)	(μg)	(μg)	(μg)
1	10.38	28.78	22.04	852	0.79	0.77	n.d.	0.64	0.13	0.53	2.43	62.90	12.00	5.24
8	10.40	28.79	22.05	38	0.75	0.74	0.35	0.36	0.19	0.59	2.69	68.65	13.20	5.21
17	10.84	28.89	22.05	3	0.51	0.57	0.81	0.06	0.34	0.53	3.34	46.30	7.40	6.30

Weather: Blue sky; very little clouds; light breezeComment: Did horizontal tow on way to station

Survey 92-02

STATION 16

Location OFF RED POINT, P.E.I.

		Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude					
Date	23-Oct-92													
Time	4:00 PM	12.00	3.5	0.4	9.5	457	101	46°11.61'	62°28.85'					
Depth	Temp.	Sal	σ_t	$\langle I_D \rangle$	$C_{a^{PE}}$	$P_{a^{PE}}$	NH_3	UREA	$N0_2+N0_3$	$P0_4$	$Si0_4$	POC	PON	POC:PON
(m)	(°C)	(PSU)	(kg / m ³)	(μmol/s/m ²)	(μg / L)	(μg / L)	(μM)	(μM)	(μM)	(μM)	(μM)	(μg)	(μg)	(μg)
1	10.55	28.87	22.08	354	0.77	0.76	0.27	n.d.	0.09	0.47	2.54	61.77	9.20	6.92
7	10.54	28.87	22.09	32	0.71	0.80	0.11	0.03	0.09	0.48	2.71	77.77	13.27	6.39
11	10.52	28.88	22.09	8	0.76	0.72	0.17	0.04	0.14	0.47	2.70	58.83	9.13	6.76

Weather: Clear; sunnyComment:

Survey 92-02**STATION 17****Location BRUDENELL RIVER, P.E.I.**

	Total Depth (m)	SECCHI Depth (m)	$-k_I$	Air Temperature (°C)	$\langle I_o \rangle$	$\langle I_z \rangle$	Latitude	Longitude
Date	23-Oct-92							
Time							46°10.05'	62°32.02'

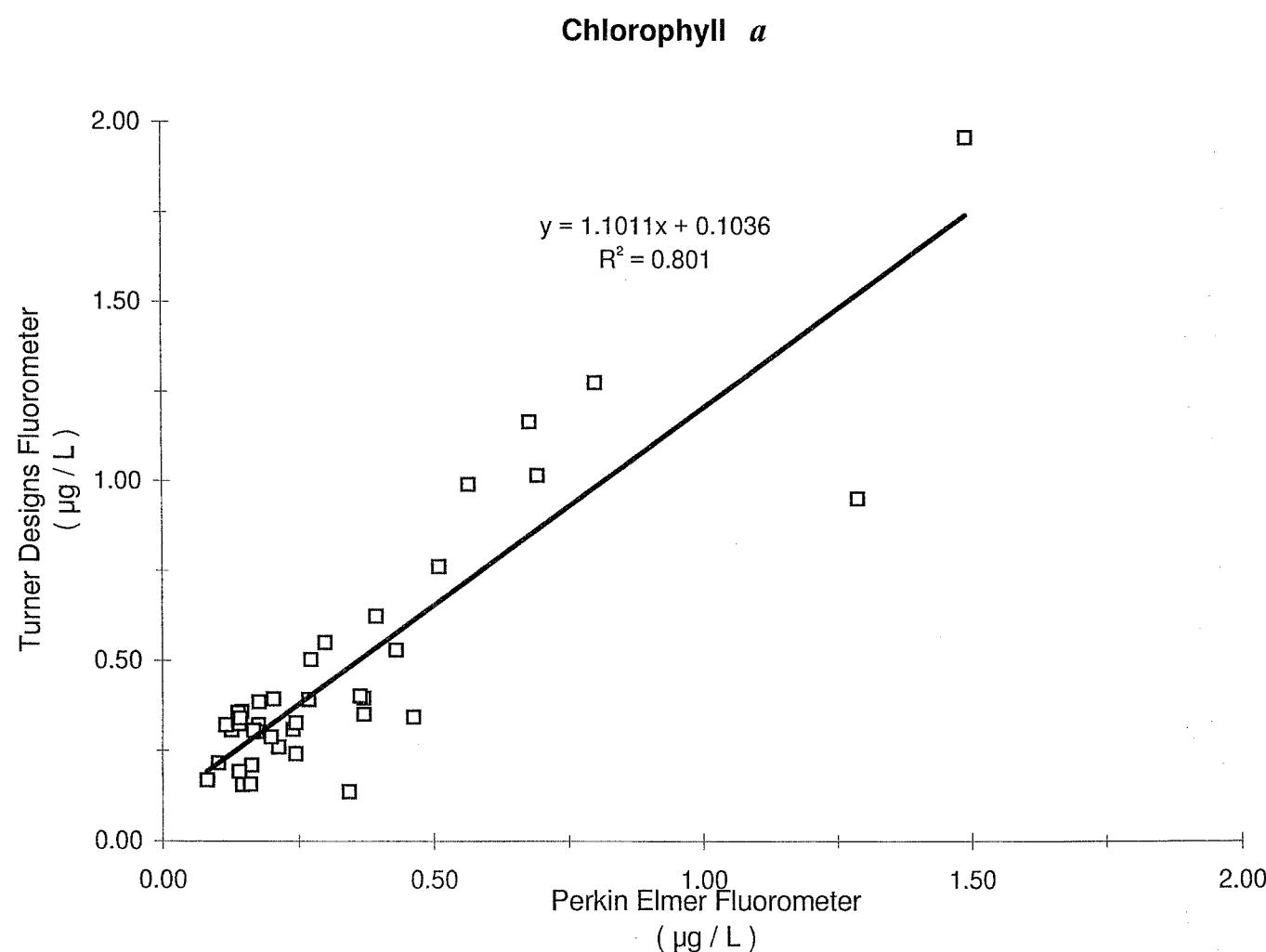
Weather: Clear; sunny**Comment:** 2 x 6m vertical net tows for isolates and life history; last station

Appendix 4.3 Average, minimum, maximum, standard deviation and variance of chlorophyll ($C_{a^{PE}}$), phaeophytin ($P_{a^{PE}}$), ammonia (NH_3), UREA, nitrates ($N0_2 + N0_3$), phosphate ($P0_4$), silicate (SiO_4), particulate organic carbon (POC), particulate organic nitrogen (PON) and particulate organic carbon and nitrogen ratio ($POC:PON$) by sampling event and for the year 1992 (Variance = ((Std. dev. / Avg.) x 100)).

Survey	$C_{a^{PE}}$ (μM)	$P_{a^{PE}}$ (μM)	NH_3 (μM)	UREA (μM)	$N0_2+N0_3$ (μM)	$P0_4$ (μM)	SiO_4 (μM)	POC (μM)	PON (μM)	$POC:PON$
Cardigan, P.E.I.										
15-Sep-92 to 17-Sep-92										
Average:	0.54	0.73	0.11	0.52	0.02	.091	1.14	111.17	14.22	7.97
Minimum:	0.30	0.42	n.d.	0.07	0.00	0.26	0.39	78.35	8.40	6.30
Maximum:	0.97	1.21	0.39	0.96	0.03	6.03	1.98	173.17	24.17	9.84
St. Dev.:	0.22	0.28	0.17	0.35	0.01	1.55	0.63	38.00	5.06	1.15
Variance:	40	38	168	68	53	171	56	34	36	14
Cardigan, P.E.I.										
01-Oct-92 to 02-Oct -92										
Average:	0.80	1.26	0.35	0.38	0.10	0.82	6.66	105.87	15.44	7.11
Minimum:	0.46	0.74	n.d.	0.05	0.06	0.56	4.73	66.05	11.00	5.30
Maximum:	1.19	1.70	0.66	0.77	0.15	1.03	8.41	150.20	21.00	9.43
St. Dev.:	0.26	0.35	0.25	0.26	0.03	0.15	1.34	22.00	3.95	1.11
Variance:	32	28	72	68	28	18	20	21	26	16
Cardigan, P.E.I.										
14-Oct-92 to 15-Oct -92										
Average:	0.70	0.70	0.12	0.21	0.07	0.52	3.87	85.83	11.71	7.76
Minimum:	0.42	0.50	n.d.	n.d.	0.04	0.44	2.63	74.35	7.30	5.68
Maximum:	0.94	0.85	0.38	0.71	0.11	0.57	5.03	101.45	15.37	11.12
St. Dev.:	0.15	0.12	0.15	0.24	0.02	0.04	0.71	10.07	2.56	1.70
Variance:	22	17	126	114	33	8	18	12	22	22
Cardigan, P.E.I.										
04-Nov-92 to 05-Nov -92										
Average:	0.74	0.84	0.94	n.d.	0.42	0.50	4.19			
Minimum:	0.45	0.57	0.56	n.d.	0.32	0.45	3.77			
Maximum:	0.95	1.25	1.85	0.34	0.59	0.77	4.99			
St. Dev.:	0.15	0.20	0.39	0.26	0.08	0.09	0.40			
Variance:	21	24	41	n.d.	20	17	9			

Survey	C_a^{PE} (μM)	P_a^{PE} (μM)	NH_3 (μM)	UREA (μM)	$N0_2+N0_3$ (μM)	$P0_4$ (μM)	SiO_4 (μM)	POC (μM)	PON (μM)	$POC:PON$
Cardigan, P.E.I.										
18-Nov-92 to 19-Nov-92										
Average:	1.21	0.95	0.26	1.47	0.13	0.43	1.61			
Minimum:	0.87	0.71	n.d.	0.44	0.00	0.31	0.93			
Maximum:	2.17	1.52	0.90	6.74	0.35	0.62	2.94			
St. Dev.:	0.37	0.24	0.28	1.73	0.11	0.10	0.59			
Variance:	30	25	108	118	84	23	37			
Survey 92-01										
05-Jun-92 to 08-Jun-92										
Average:	0.25	0.27	0.23	n.d.	0.22	0.47	1.16	41.86	6.36	6.81
Minimum:	0.06	0.07	n.d.	n.d.	0.07	0.35	0.42	22.63	2.73	5.22
Maximum:	1.06	0.78	0.79	1.70	1.36	0.79	4.47	102.57	13.63	11.04
St. Dev.:	0.21	0.17	0.22	0.34	0.24	0.10	0.72	15.51	2.43	1.12
Variance:	84	63	98	n.d.	112	21	62	37	38	16
Survey 92-02										
20-Oct-92 to 23-Oct-92										
Average:	0.76	0.76	0.41	0.29	0.24	1.41	3.35	67.19	10.06	7.86
Minimum:	0.38	0.45	n.d.	n.d.	0.07	0.47	1.95	40.15	3.40	4.63
Maximum:	1.75	1.26	2.47	0.99	0.50	10.55	4.81	112.20	19.10	18.78
St. Dev.:	0.36	0.23	0.42	0.29	0.16	1.78	0.85	21.12	4.21	3.00
Variance:	47	31	103	100	65	126	25	31	42	38
1992:										
Average:	0.64	0.69	0.34	0.30	0.20	0.83	2.84	69.82	10.07	7.45
Minimum:	0.06	0.07	n.d.	n.d.	0.00	0.26	0.39	22.63	2.73	4.63
Maximum:	2.17	1.70	2.47	6.74	1.36	10.55	8.41	173.17	24.17	18.78
St. Dev.:	0.39	0.36	0.37	0.70	0.19	1.15	1.82	32.04	4.74	2.12
Variance:	60	53	111	233	96	139	64	46	47	28

Appendix 4.9.1 Correlation between the chlorophyll *a* concentrations obtained with a Perkin Elmer spectrofluorometer and a Turner Designs fluorometer in sea water samples from Survey 92-01 ($\mu\text{g} / \text{L}$).



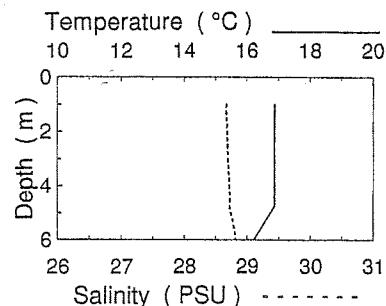
Appendix 4.9.2 Average and standard deviation of chlorophyll a and phaeophytin a concentrations obtained with a Perkin Elmer spectrofluorometer and a Turner Designs fluorometer in sea water samples from Survey 92-01 ($\mu\text{g/L}$).

Station	Sample Depth (m)	$C_{a^{\text{PE}}}$	$C_{a^{\text{TD}}}$		$C_{a^{\text{TD}}} / C_{a^{\text{PE}}}$	
		($\mu\text{g/L}$) 1 sub-sample only	Avg.	Std. Dev.	Avg.	Std. Dev.
01	12	0.21	0.26	0.01	1.23	0.03
	25	0.16	0.21	0.00	1.30	0.01
02	2	0.15	0.16	0.01	1.07	0.10
	19	0.46	0.34	0.07	0.74	0.16
03	25	0.16	0.16	0.01	0.98	0.06
	2	0.20	0.29	0.02	1.45	0.13
04	15	0.37	0.40	0.00	1.07	0.01
	10	0.18	0.32	0.01	1.84	0.07
05	2	0.24	0.31	0.01	1.29	0.05
	12	0.34	0.14	0.01	0.40	0.02
06	25	1.29	0.95		0.74	
	2	0.24	0.33	0.00	1.34	0.01
07	12	0.37	0.35	0.03	0.95	0.07
	25	1.49	1.96		1.32	
08	2	0.36	0.40	0.06	1.11	0.15
	12	0.27	0.39	0.01	1.46	0.02
09	18	0.69	1.02	0.04	1.47	0.05
	2	0.39	0.62	0.00	1.59	0.01
10	12	0.56	0.99	0.00	1.75	0.00
	17	0.51	0.76	0.12	1.50	0.23
11	2	0.18	0.39	0.01	2.18	0.05
	15	0.17	0.30	0.02	1.76	0.14
12	25	0.13	0.31	0.01	2.45	0.06
	2	0.08	0.17	0.00	2.07	0.02
11	15	0.14	0.32	0.01	2.30	0.06
	25	0.14	0.36	0.01	2.48	0.04
11	2	0.10	0.22	0.00	2.13	0.03
	8	0.14	0.36	0.01	2.58	0.04
12	14	0.20	0.39	0.02	1.94	0.11
	2	0.14	0.34	0.01	2.40	0.04

Station	Sample Depth	$C_{a^{PE}}$	$C_{a^{TD}}$	$C_{a^{TD}}/C_{a^{PE}}$	
		($\mu\text{g/L}$) 1 sub-sample only	($\mu\text{g/L}$)	Avg.	Std. Dev.
12	6	0.12	0.32	0.01	2.77 0.07
	11	0.27	0.50	0.04	1.85 0.14
13	2	0.17	0.31	0.01	1.84 0.07
	5	0.14	0.19	0.03	1.38 0.19
14	9	0.30	0.55	0.10	1.84 0.33
	1	0.43	0.53	0.07	1.23 0.16
	4	0.80	1.28	0.05	1.60 0.06
	7	0.68	1.17	0.05	1.72 0.08

Appendix 5.1 Cardigan, PEI CTD profiles of temperature (°C), salinity (PSU), and density (kg / m³) - 1992.

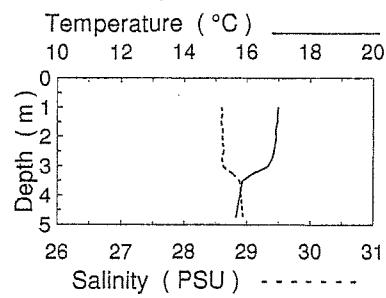
1992 Cardigan, PEI



Station 1

Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m ³)
1	16.87	28.66	20.69
2	16.86	28.68	20.70
3	16.85	28.69	20.71
4	16.86	28.71	20.73
5	16.86	28.71	20.73
6	16.42	28.75	20.86

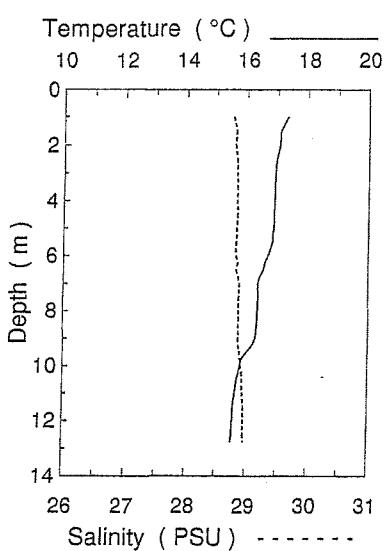
1992 Cardigan, PEI



Station 2

Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m ³)
1	16.98	28.59	20.60
2	16.88	28.61	20.64
3	16.48	28.68	20.78
4	15.16	29.09	21.39
5	15.62	28.93	21.17

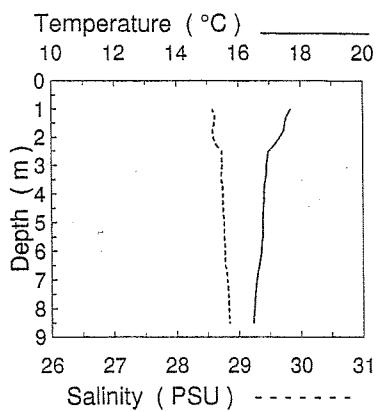
1992 Cardigan, PEI



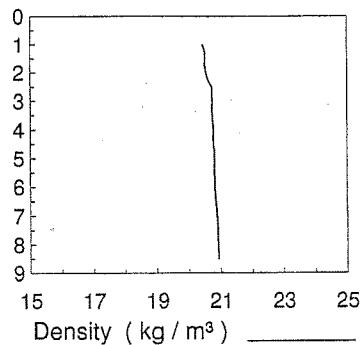
Station 3

Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m ³)
1	17.27	28.76	20.67
2	17.02	28.81	20.76
3	16.91	28.83	20.81
4	16.88	28.83	20.81
5	16.86	28.83	20.82
6	16.67	28.82	20.86
7	16.40	28.86	20.94
8	16.36	28.87	20.96
9	16.30	28.86	20.97
10	15.80	28.92	21.12
11	15.64	28.94	21.17
12	15.59	28.95	21.19
13	15.53	28.97	21.22

1992 Cardigan, PEI

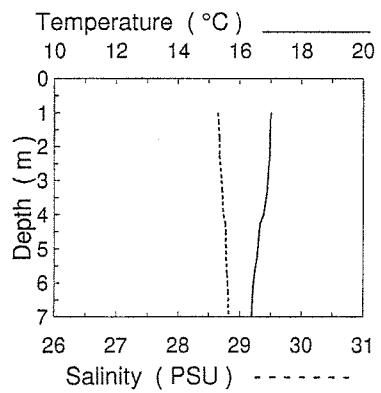


Station 4

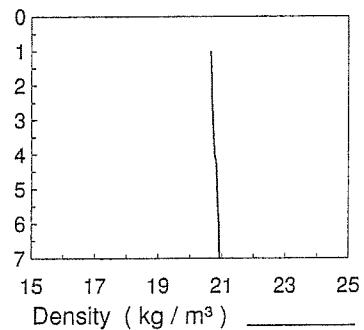


Depth (m)	Temp. ($^{\circ}\text{C}$)	Sal. (PSU)	Density (kg/m^3)
1	17.64	28.60	20.46
2	17.28	28.61	20.56
3	16.93	28.71	20.71
4	16.81	28.74	20.76
5	16.76	28.76	20.78
6	16.71	28.77	20.81
7	16.57	28.81	20.86
8	16.48	28.83	20.90
9	16.43	28.84	20.92

1992 Cardigan, PEI

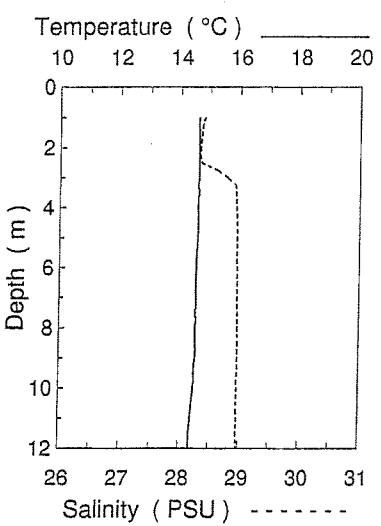


Station 5

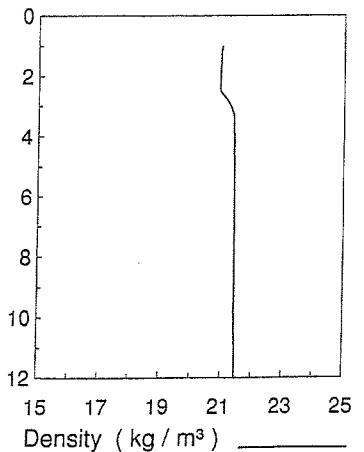


Depth (m)	Temp. ($^{\circ}\text{C}$)	Sal. (PSU)	Density (kg/m^3)
1	17.00	28.73	20.71
2	16.96	28.66	20.67
3	16.89	28.70	20.71
4	16.71	28.74	20.78
5	16.55	28.78	20.85
6	16.43	28.80	20.89
7	16.38	28.81	20.91

1992 Cardigan, PEI

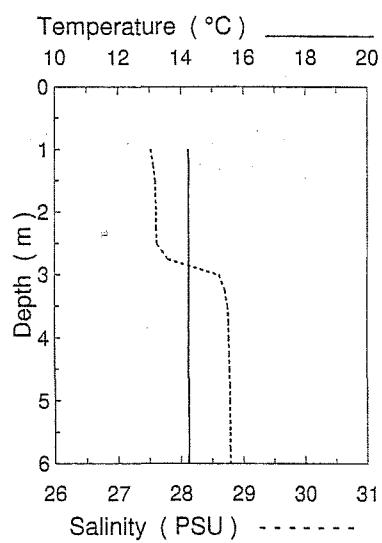


Station 6

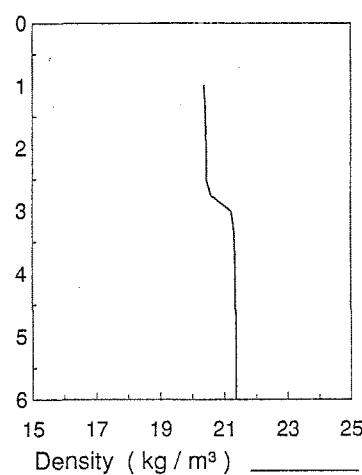


Depth (m)	Temp. ($^{\circ}\text{C}$)	Sal. (PSU)	Density (kg/m^3)
1	14.59	28.39	20.97
2	14.60	28.33	20.92
3	14.59	28.73	21.23
4	14.58	28.94	21.39
5	14.58	28.95	21.40
6	14.53	28.95	21.41
7	14.52	28.96	21.42
8	14.52	28.96	21.42
9	14.51	28.96	21.43
10	14.46	28.96	21.43
11	14.37	28.96	21.45
12	14.33	28.96	21.46

1992 Cardigan, PEI



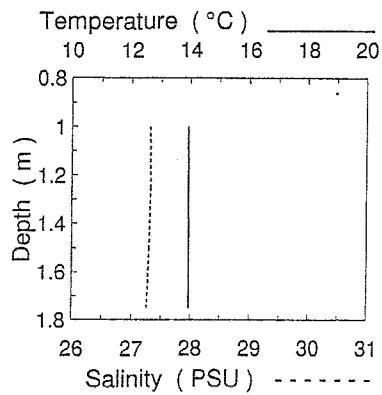
Station 7



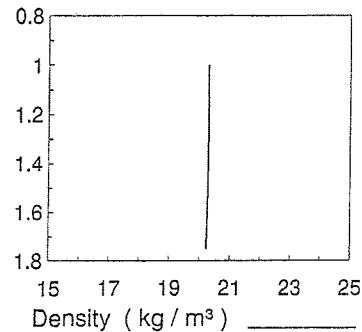
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
-------------	--------------	--------------	---------------------

1	14.23	27.52	20.37
2	14.23	27.59	20.42
3	14.23	28.29	20.96
4	14.23	28.75	21.32
5	14.23	28.78	21.34
6	14.23	28.78	21.34

1992 Cardigan, PEI



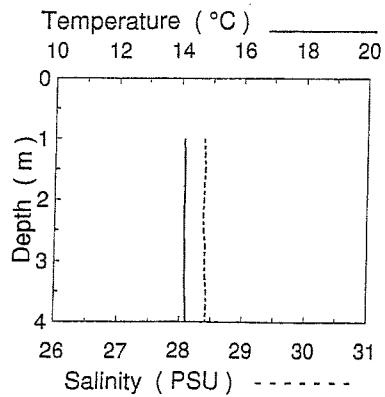
Station 8



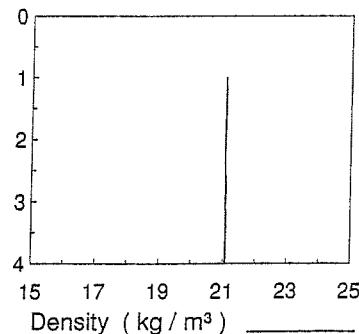
Depth (m)	Temp. (C)	Salinity (PSU)	Density (kg / m³)
-------------	-------------	------------------	---------------------

1	13.90	27.32	20.28
2	13.93	27.26	20.23

1992 Cardigan, PEI



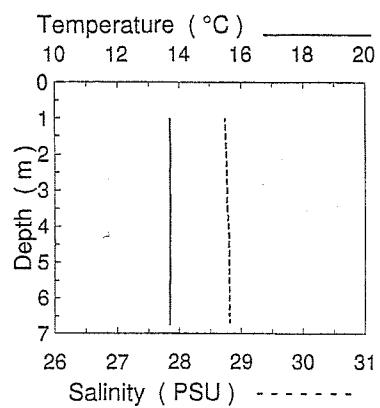
Station 9



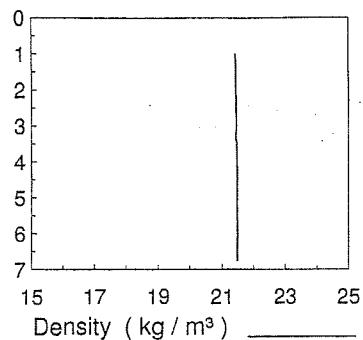
Depth (m)	Temp. (C)	Salinity (PSU)	Density (kg / m³)
-------------	-------------	------------------	---------------------

1	14.09	28.36	21.05
2	14.10	28.37	21.05
3	14.12	28.39	21.06
4	14.17	28.42	21.07

1992 Cardigan, PEI

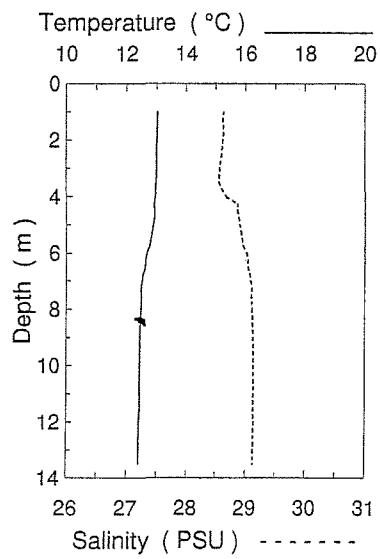


Station 10

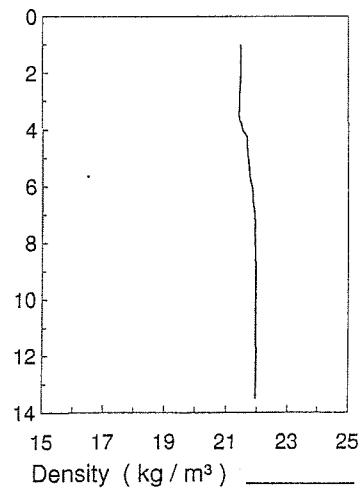


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m ³)
1	13.67	28.73	21.41
2	13.68	28.75	21.43
3	13.69	28.76	21.44
4	13.68	28.79	21.45
5	13.68	28.80	21.46
6	13.67	28.80	21.47
7	13.68	28.81	21.47

1992 Cardigan, PEI

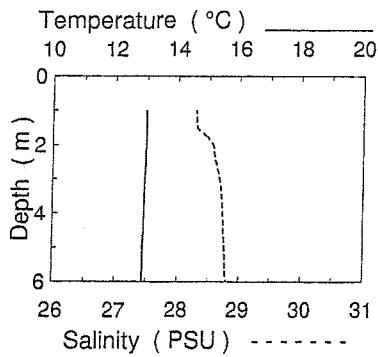


Station 11

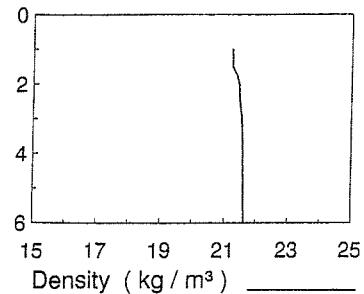


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m ³)
1	13.01	28.62	21.45
2	12.99	28.61	21.45
3	12.98	28.56	21.42
4	12.93	28.68	21.51
5	12.86	28.89	21.69
6	12.67	28.99	21.81
7	12.51	29.07	21.90
8	12.46	29.10	21.93
9	12.42	29.12	21.95
10	12.42	29.12	21.95
11	12.42	29.12	21.95
12	12.41	29.12	21.96
13	12.40	29.12	21.95

1992 Cardigan, PEI

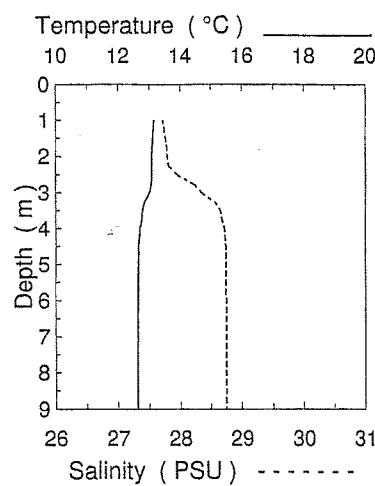


Station 12

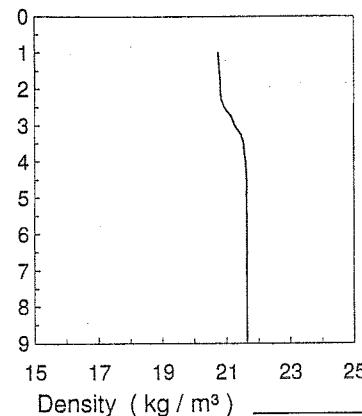


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m ³)
1	12.95	28.32	21.23
2	12.95	28.53	21.39
3	12.92	28.67	21.51
4	12.90	28.73	21.56
5	12.87	28.76	21.59
6	12.85	28.79	21.61

1992 Cardigan, PEI

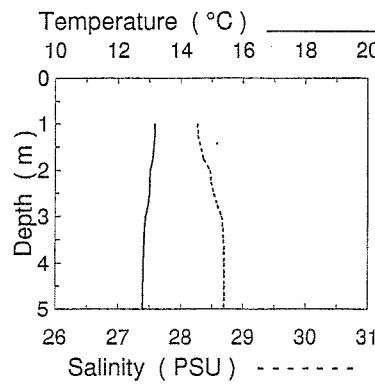


Station 13

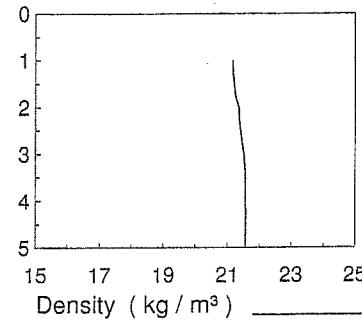


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	13.13	27.72	20.74
2	13.07	27.80	20.81
3	12.94	28.37	21.27
4	12.69	28.69	21.57
5	12.63	28.73	21.61
6	12.62	28.74	21.62
7	12.61	28.74	21.62
8	12.60	28.74	21.62
9	12.60	28.74	21.62

1992 Cardigan, PEI

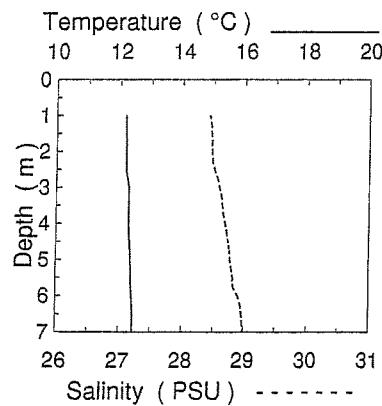


Station 14

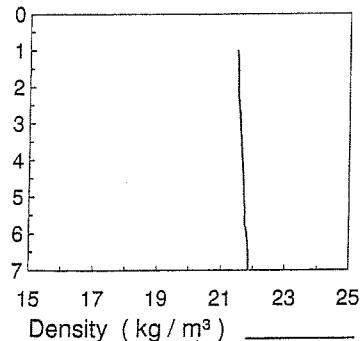


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	13.15	28.25	21.15
2	13.02	28.43	21.30
3	12.87	28.63	21.49
4	12.77	28.69	21.55
5	12.76	28.69	21.56

1992 Cardigan, PEI

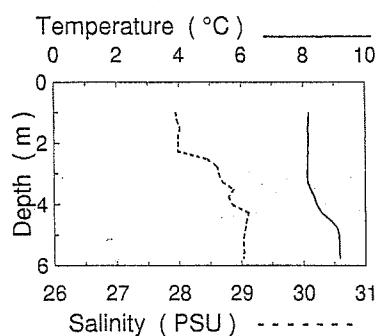


Station 15

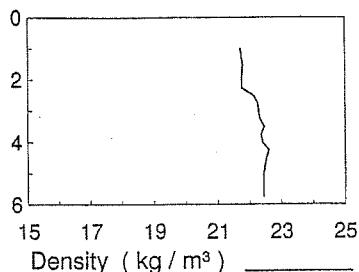


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	12.17	28.48	21.50
2	12.18	28.47	21.49
3	12.26	28.59	21.57
4	12.28	28.68	21.64
5	12.34	28.77	21.70
6	12.39	28.89	21.78
7	12.43	28.98	21.84

1992 Cardigan, PEI

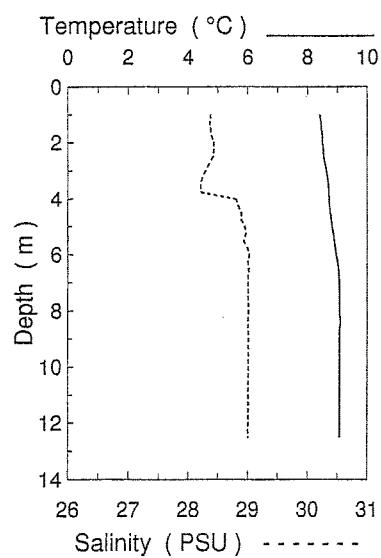


Station 16

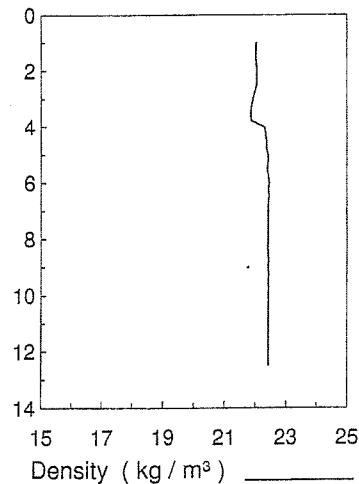


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	8.16	27.96	21.73
2	8.14	28.10	21.84
3	8.12	28.67	22.29
4	8.46	28.93	22.45
6	9.09	29.04	22.44

1992 Cardigan, PEI

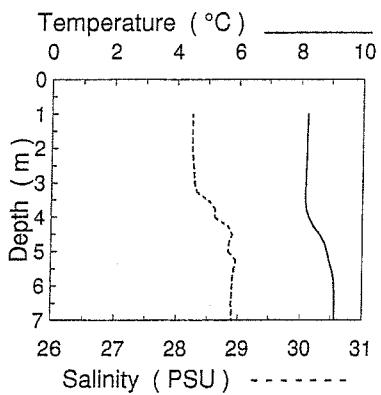


Station 17

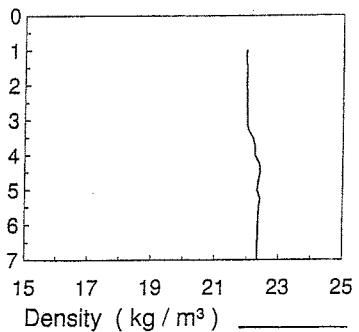


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	8.39	28.36	22.01
2	8.50	28.40	22.03
3	8.62	28.29	21.92
4	8.71	28.60	22.15
5	8.81	28.91	22.38
6	8.96	28.99	22.42
7	9.05	28.99	22.41
8	9.06	28.99	22.41
9	9.06	29.00	22.41
10	9.06	29.00	22.42
11	9.06	29.00	22.41
12	9.06	29.00	22.41
13	9.06	28.99	22.41

1992 Cardigan, PEI

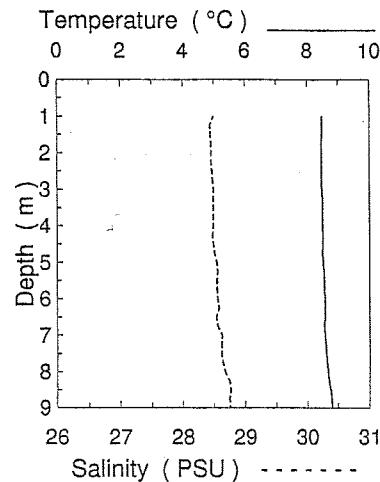


Station 18

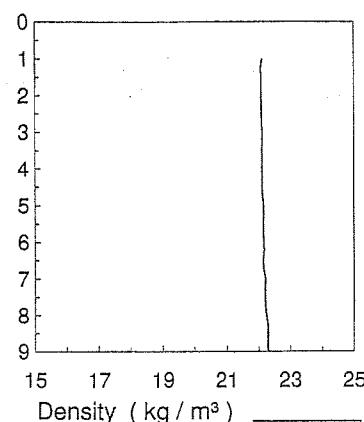


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	8.20	28.22	21.93
2	8.17	28.25	21.95
3	8.15	28.30	22.00
4	8.29	28.69	22.29
5	8.83	28.88	22.35
6	9.07	28.90	22.33
7	9.10	28.89	22.32

1992 Cardigan, PEI

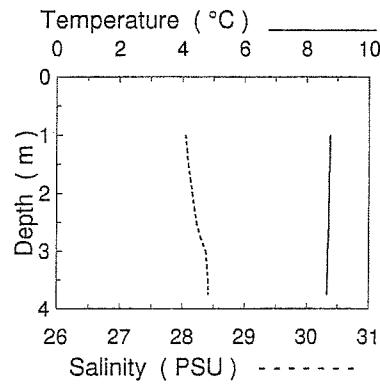


Station 19

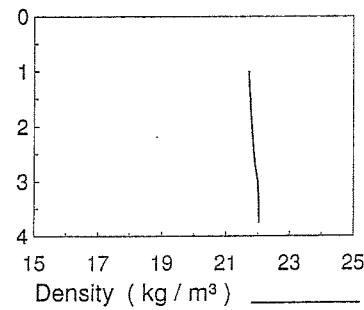


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	8.46	28.48	22.10
2	8.45	28.45	22.07
3	8.46	28.48	22.10
4	8.48	28.48	22.09
5	8.51	28.53	22.13
6	8.55	28.55	22.14
7	8.56	28.58	22.16
8	8.66	28.69	22.23
9	8.78	28.75	22.26

1992 Cardigan, PEI

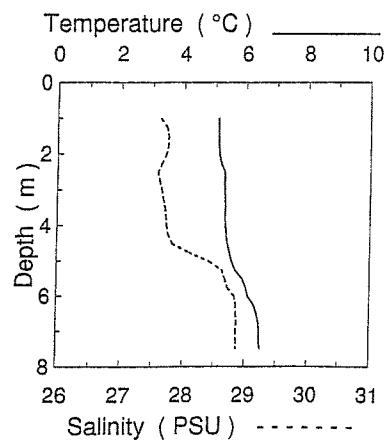


Station 20

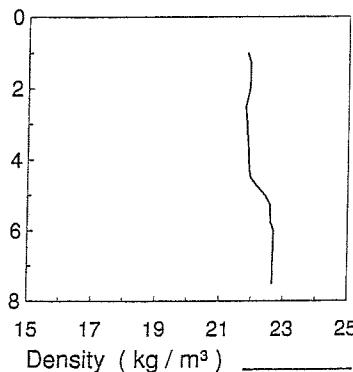


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	8.74	28.04	21.71
2	8.72	28.16	21.81
3	8.67	28.35	21.96
4	8.64	28.41	22.01

1992 Cardigan, PEI

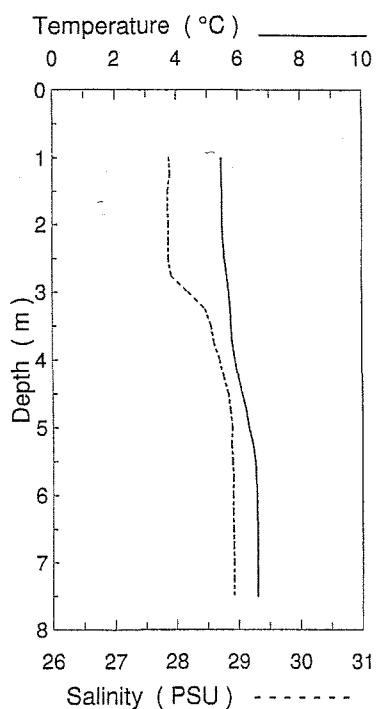


Station 21

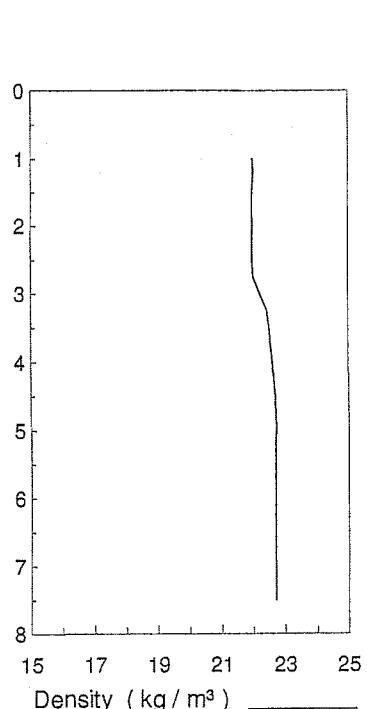


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	5.09	27.62	21.82
2	5.14	27.69	21.87
3	5.30	27.63	21.81
4	5.33	27.73	21.88
5	5.58	28.33	22.34
6	6.12	28.78	22.63
7	6.44	28.86	22.65
8	6.51	28.86	22.64

1992 Cardigan, PEI

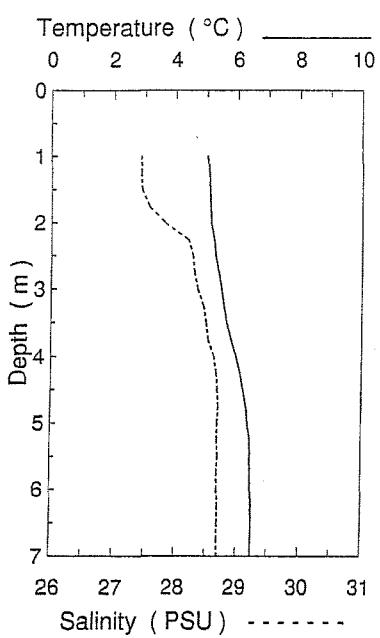


Station 22

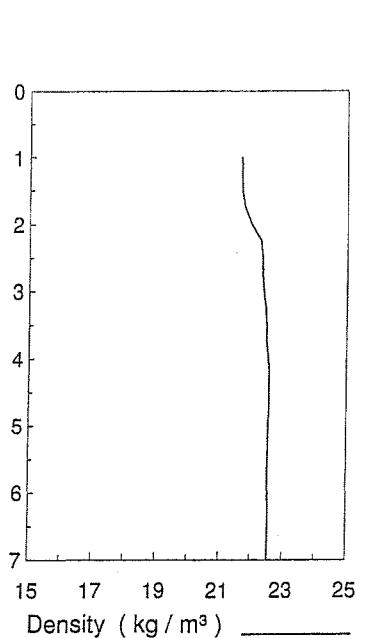


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m ³)
1	5.45	27.82	21.94
2	5.49	27.86	21.97
3	5.68	28.19	22.21
4	5.89	28.69	22.58
5	6.34	28.87	22.68
6	6.56	28.90	22.67
7	6.59	28.91	22.68
8	6.60	28.92	22.68

1992 Cardigan, PEI

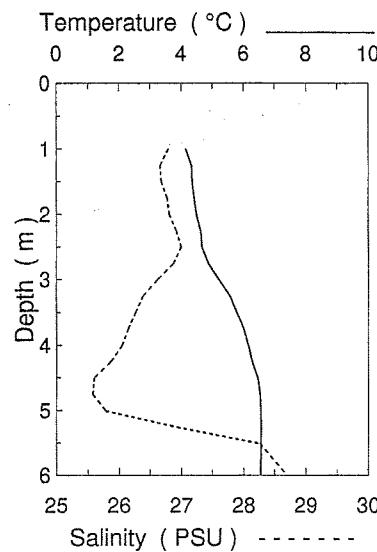


Station 23

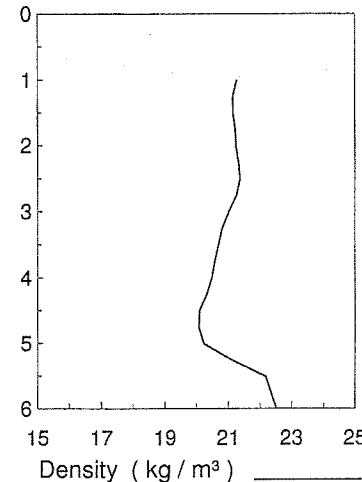


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m ³)
1	4.99	27.44	21.69
2	5.14	27.85	22.00
3	5.45	28.35	22.36
4	5.93	28.60	22.50
5	6.33	28.69	22.53
6	6.45	28.69	22.52
7	6.47	28.69	22.52

1992 Cardigan, PEI

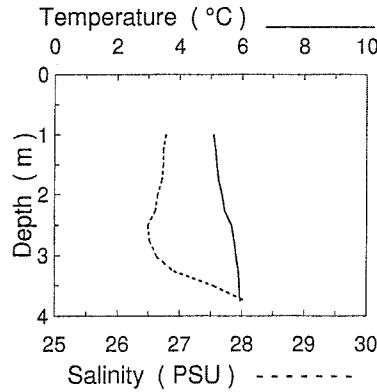


Station 24

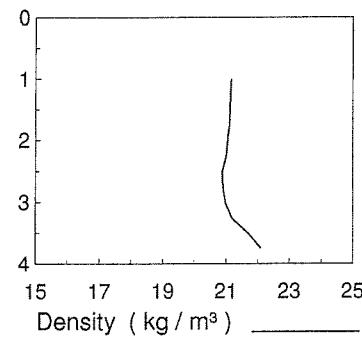


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m ³)
1	4.10	26.81	21.27
2	4.49	26.83	21.25
3	5.21	26.60	21.01
4	6.12	25.99	20.43
5	6.51	26.36	20.67
6	6.53	28.78	22.58

1992 Cardigan, PEI



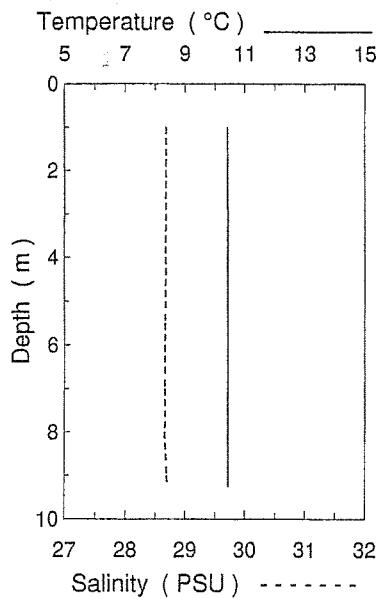
Station 25



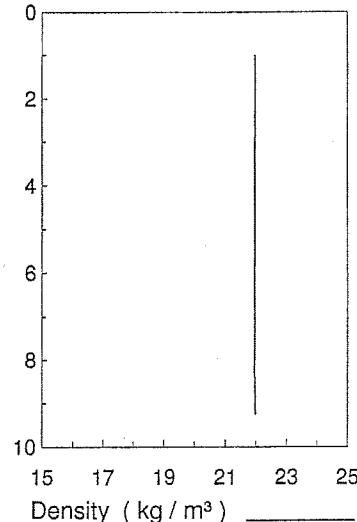
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m ³)
1	5.08	26.79	21.17
2	5.37	26.63	21.01
3	5.79	26.75	21.07
4	5.95	28.39	22.34

Appendix 5.2 Survey 92-02 CTD profiles of temperature (°C), salinity (PSU), and density (kg / m³).

Survey 92-02

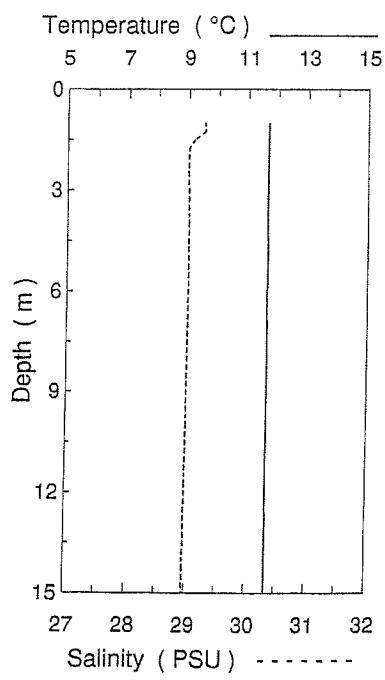


Station 1

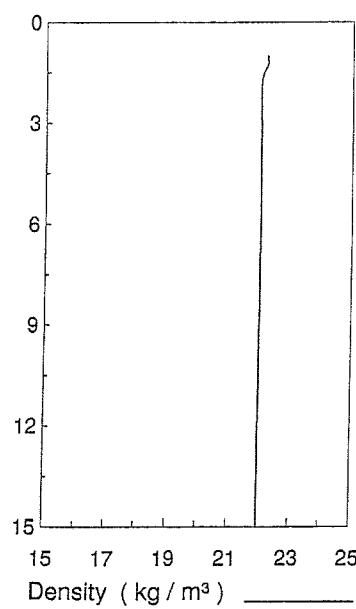


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m ³)
1	10.41	28.67	21.95
2	10.41	28.67	21.95
3	10.41	28.67	21.95
4	10.41	28.67	21.95
5	10.41	28.67	21.95
6	10.42	28.66	21.94
7	10.42	28.66	21.94
8	10.42	28.66	21.94
9	10.41	28.68	21.96

Survey 92-02



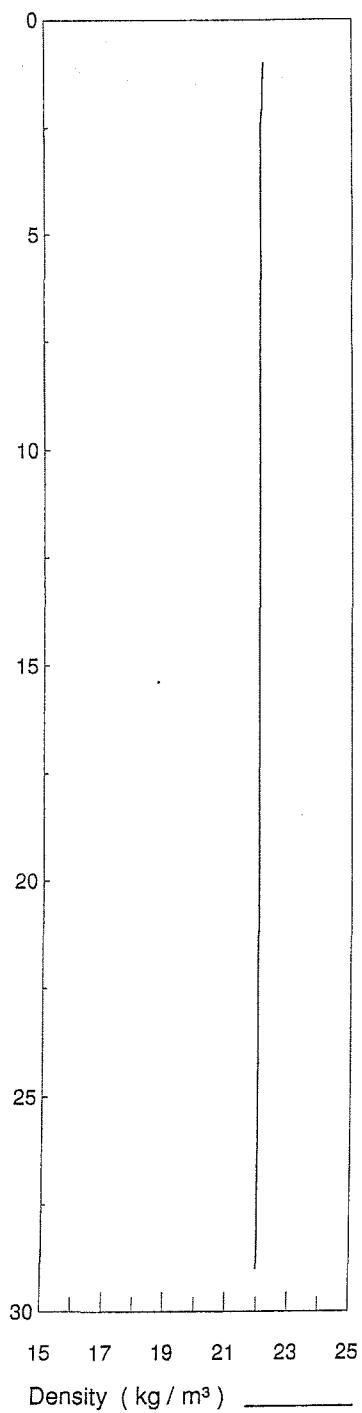
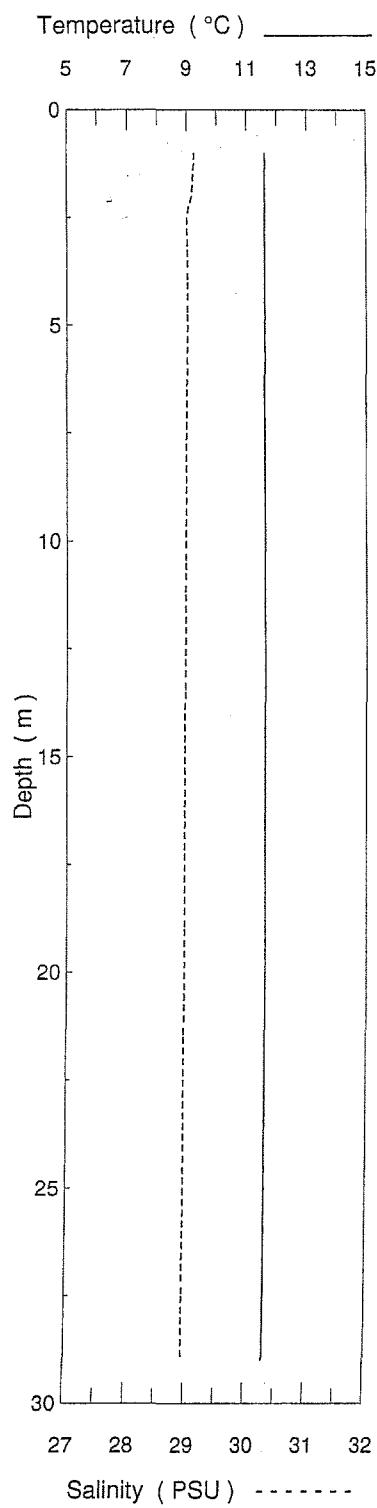
Station 2



Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m ³)
1	11.65	29.22	22.17
2	11.65	29.00	22.00
3	11.64	29.00	21.99
4	11.64	29.00	22.00
5	11.64	29.00	22.00
6	11.64	29.00	22.00
7	11.64	28.99	21.99
8	11.64	28.99	21.99
9	11.64	28.98	21.98
10	11.64	28.98	21.98
11	11.65	28.97	21.98
12	11.65	28.97	21.97
13	11.65	28.96	21.97
14	11.65	28.96	21.97
15	11.65	28.96	21.96

Survey 92-02

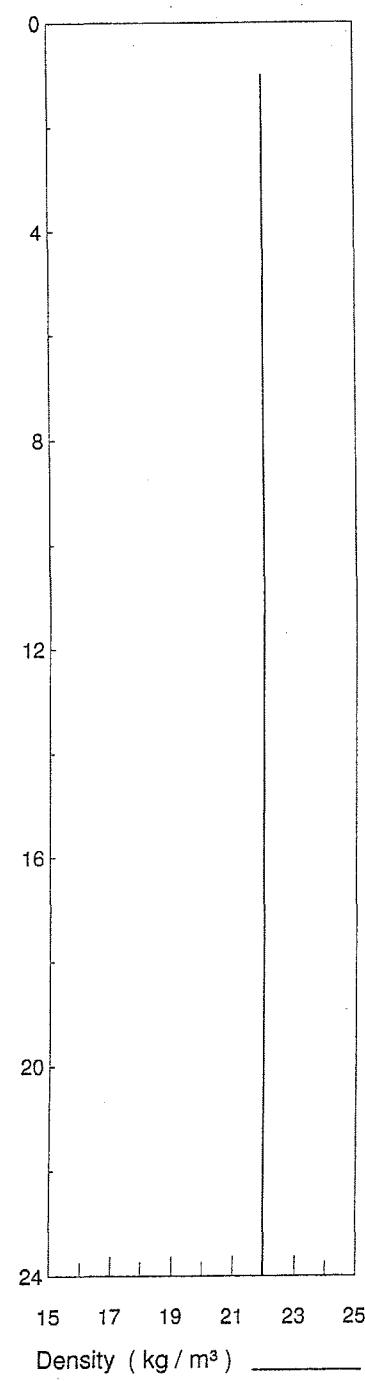
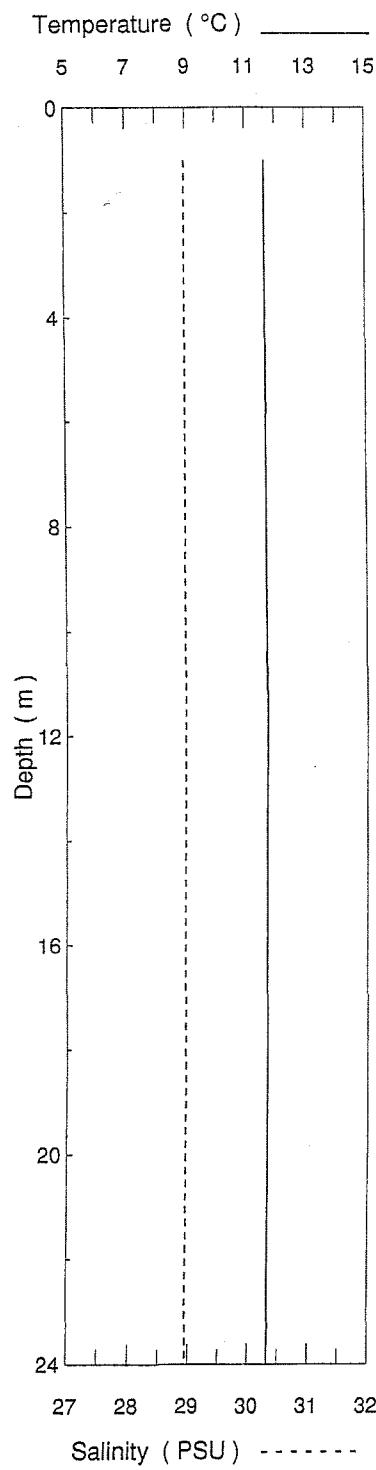
Station 3



Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	11.58	29.08	22.07
2	11.58	29.06	22.05
3	11.58	29.00	22.01
4	11.58	29.00	22.01
5	11.58	29.00	22.01
6	11.58	29.00	22.00
7	11.58	28.99	22.00
8	11.58	28.98	21.99
9	11.58	28.98	21.99
10	11.58	28.97	21.98
11	11.58	28.97	21.98
12	11.58	28.96	21.98
13	11.58	28.96	21.98
14	11.58	28.96	21.97
15	11.59	28.95	21.97
16	11.59	28.95	21.97
17	11.59	28.95	21.97
18	11.59	28.95	21.97
19	11.59	28.95	21.97
20	11.59	28.94	21.96
21	11.58	28.94	21.96
22	11.58	28.94	21.96
23	11.58	28.94	21.96
24	11.58	28.94	21.96
25	11.58	28.94	21.96
26	11.58	28.94	21.96
27	11.58	28.94	21.96
28	11.58	28.94	21.96
29	11.58	28.94	21.96

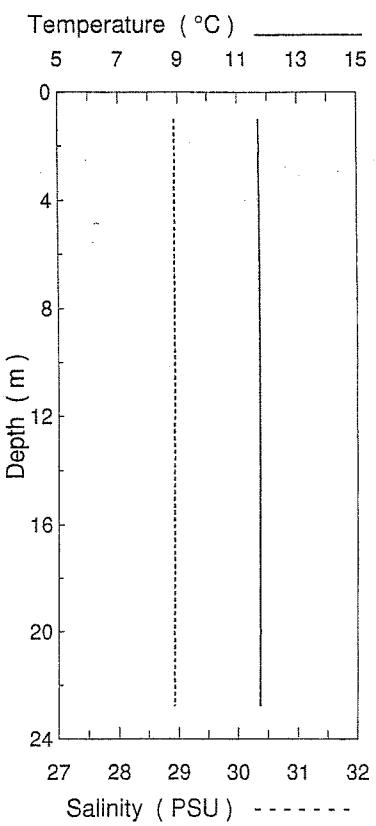
Survey 92-02

Station 4

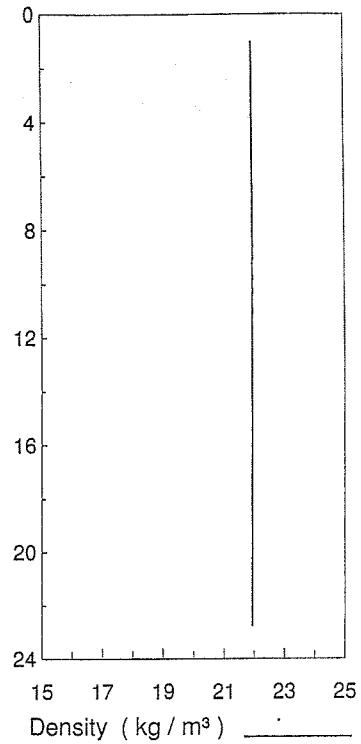


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	11.63	29.04	22.03
2	11.64	28.97	21.98
3	11.64	28.97	21.98
4	11.64	28.97	21.97
5	11.64	28.97	21.97
6	11.64	28.96	21.97
7	11.64	28.96	21.97
8	11.63	28.96	21.97
9	11.63	28.96	21.96
10	11.64	28.95	21.96
11	11.64	28.95	21.96
12	11.64	28.95	21.96
13	11.64	28.95	21.96
14	11.63	28.95	21.96
15	11.64	28.95	21.96
16	11.64	28.95	21.96
17	11.63	28.95	21.96
18	11.63	28.95	21.96
19	11.63	28.95	21.96
20	11.63	28.95	21.96
21	11.63	28.95	21.96
22	11.63	28.95	21.96
23	11.63	28.94	21.96
24	11.63	28.94	21.96

Survey 92-02

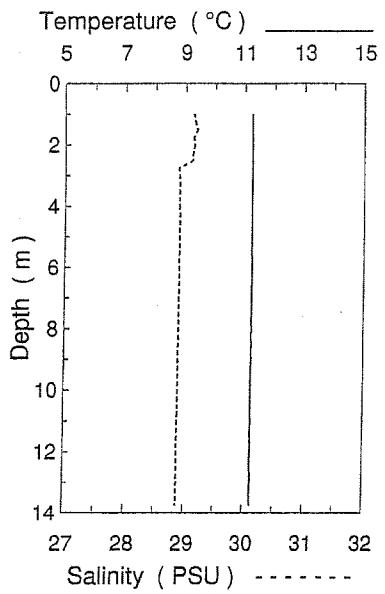


Station 5

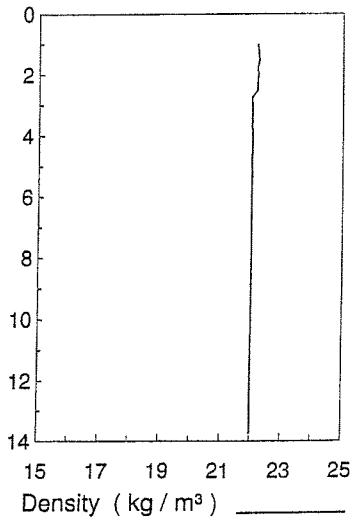


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	11.70	28.94	21.94
2	11.70	28.94	21.94
3	11.70	28.93	21.94
4	11.70	28.93	21.93
5	11.70	28.93	21.93
6	11.71	28.93	21.93
7	11.71	28.93	21.93
8	11.70	28.93	21.93
9	11.71	28.93	21.93
10	11.71	28.93	21.93
11	11.71	28.92	21.93
12	11.71	28.92	21.93
13	11.71	28.92	21.93
14	11.71	28.92	21.93
15	11.71	28.92	21.93
16	11.71	28.92	21.93
17	11.71	28.92	21.93
18	11.71	28.92	21.93
19	11.71	28.92	21.92
20	11.71	28.92	21.92
21	11.71	28.92	21.92
22	11.71	28.92	21.92
23	11.71	28.92	21.92

Survey 92-02

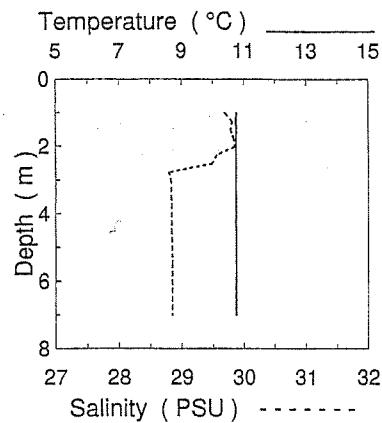


Station 6

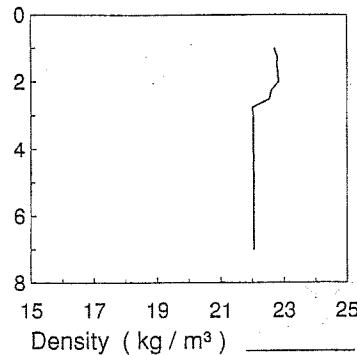


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	11.21	29.12	22.16
2	11.22	29.12	22.16
3	11.22	28.90	22.00
4	11.21	28.90	21.99
5	11.21	28.90	21.99
6	11.22	28.89	21.99
7	11.22	28.89	21.99
8	11.22	28.89	21.98
9	11.22	28.88	21.98
10	11.21	28.88	21.98
11	11.22	28.88	21.98
12	11.22	28.88	21.98
13	11.22	28.88	21.98
14	11.22	28.88	21.97

Survey 92-02

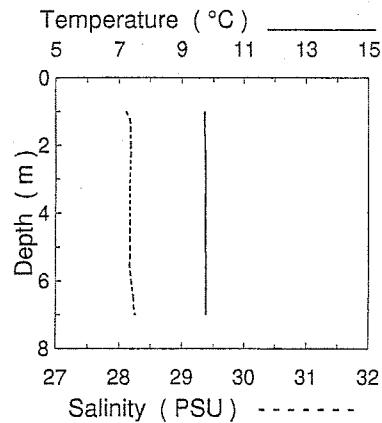


Station 7

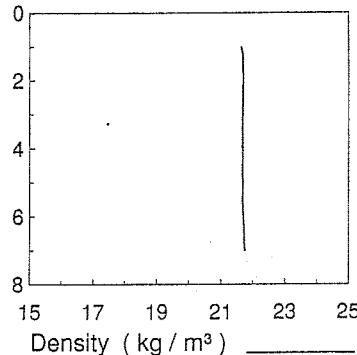


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	10.74	29.63	22.64
2	10.73	29.72	22.71
3	10.73	28.83	22.02
4	10.73	28.82	22.01
5	10.73	28.84	22.02
6	10.73	28.84	22.03
7	10.73	28.84	22.03

Survey 92-02

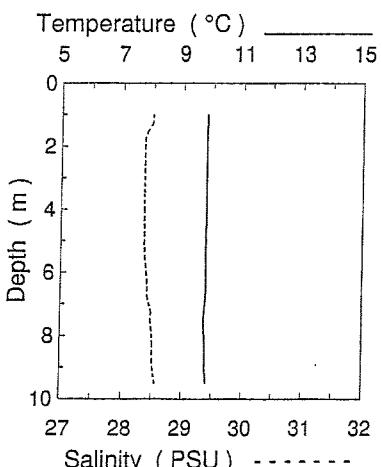


Station 8

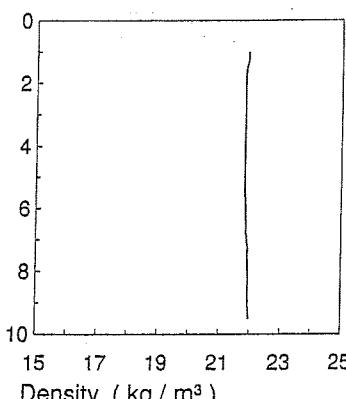


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	9.71	28.11	21.79
2	9.73	28.16	21.66
3	9.74	28.16	21.66
4	9.73	28.16	21.66
5	9.74	28.16	21.66
6	9.75	28.18	21.67
7	9.75	28.23	21.71

Survey 92-02

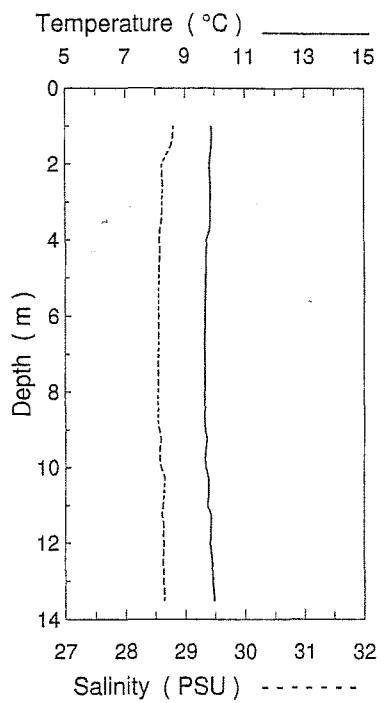


Station 9

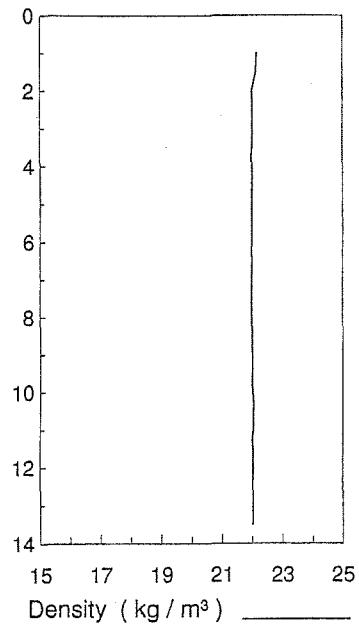


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	9.77	28.49	21.91
2	9.76	28.35	21.80
3	9.76	28.35	21.80
4	9.76	28.35	21.80
5	9.75	28.36	21.81
6	9.76	28.39	21.84
7	9.73	28.44	21.88
8	9.72	28.49	21.92
9	9.75	28.51	21.93
10	9.82	28.57	21.97

Survey 92-02

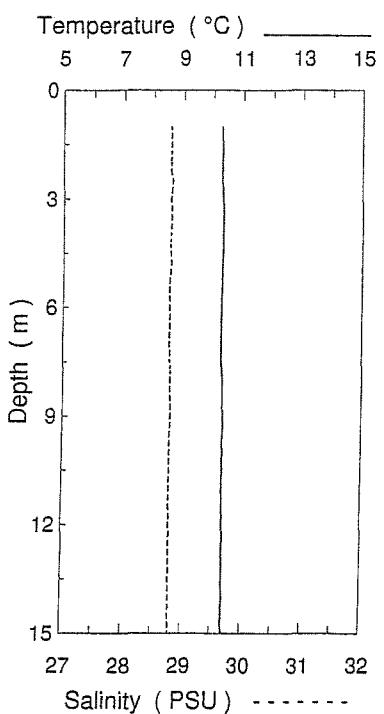


Station 10

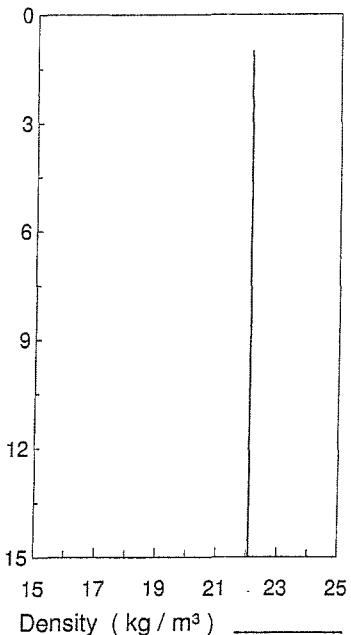


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m ³)
1	9.88	28.76	22.10
2	9.82	28.63	22.02
3	9.83	28.61	21.99
4	9.73	28.57	21.98
5	9.63	28.55	21.98
6	9.64	28.54	21.97
7	9.64	28.54	21.97
8	9.64	28.54	21.97
9	9.65	28.56	21.98
10	9.68	28.59	22.00
11	9.76	28.62	22.01
12	9.84	28.63	22.01
13	9.90	28.63	22.00

Survey 92-02

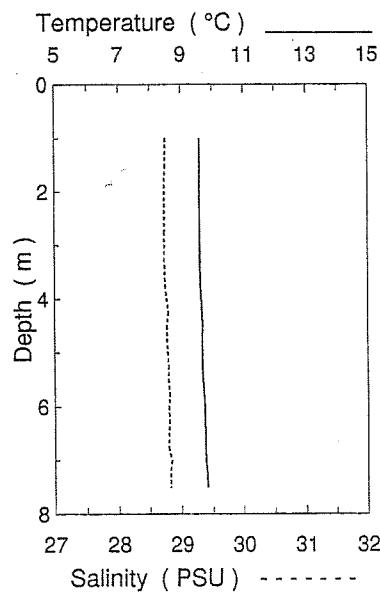


Station 11

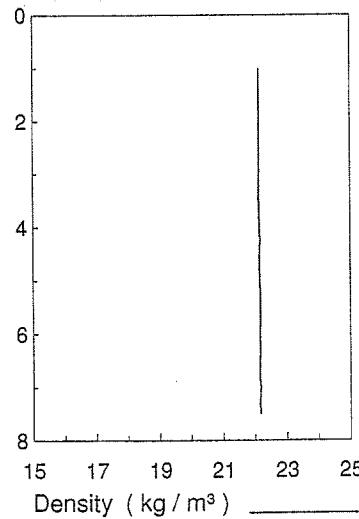


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m ³)
1	10.26	28.77	22.05
2	10.28	28.78	22.06
3	10.30	28.79	22.06
4	10.31	28.78	22.05
5	10.28	28.78	22.05
6	10.26	28.77	22.05
7	10.26	28.77	22.05
8	10.29	28.77	22.05
9	10.32	28.79	22.05
10	10.32	28.78	22.05
11	10.32	28.78	22.05
12	10.34	28.78	22.05
13	10.34	28.78	22.05
14	10.36	28.79	22.05
15	10.36	28.79	22.05

Survey 92-02

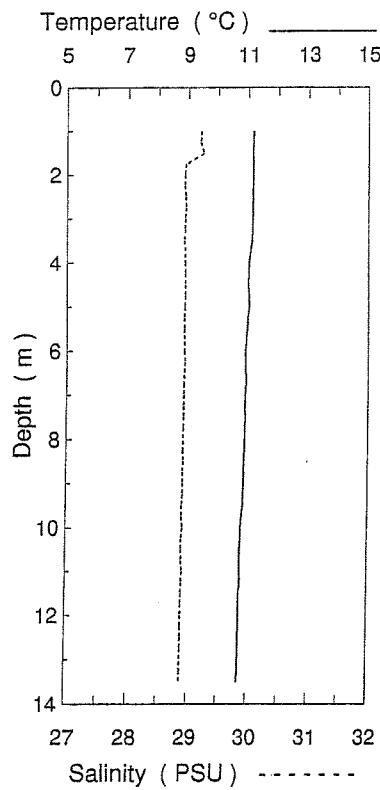


Station 12

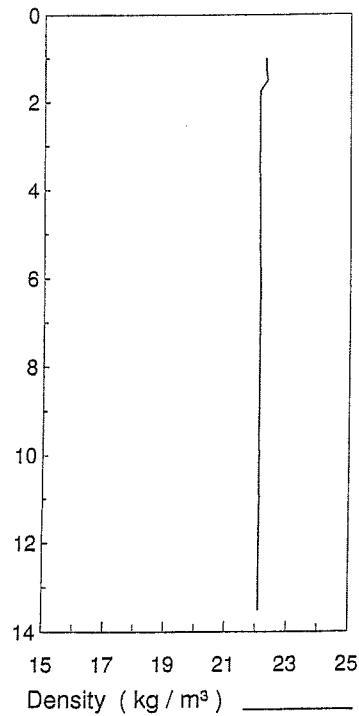


Depth (m)	Temp. ($^{\circ}\text{C}$)	Sal. (PSU)	Density (kg/m^3)
1	9.58	28.74	22.13
2	9.58	28.72	22.12
3	9.58	28.73	22.12
4	9.63	28.76	22.14
5	9.67	28.77	22.15
6	9.72	28.80	22.16
7	9.77	28.80	22.15

Survey 92-02

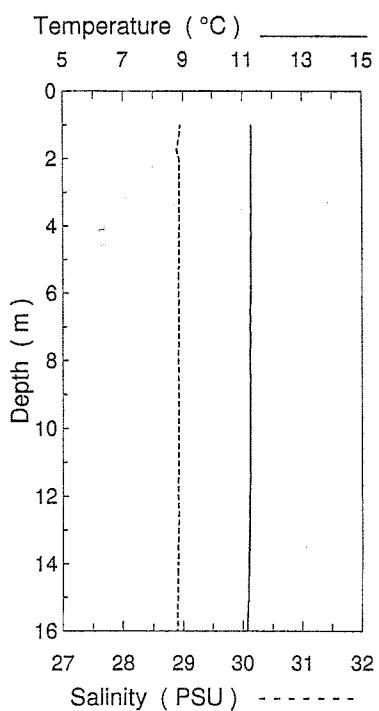


Station 13

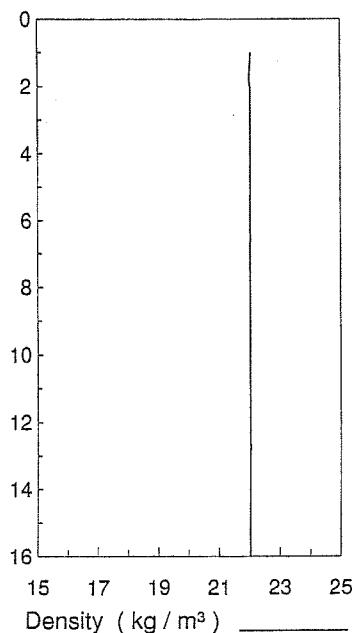


Depth (m)	Temp. ($^{\circ}\text{C}$)	Sal. (PSU)	Density (kg/m^3)
1	11.13	29.21	22.25
2	11.12	28.95	22.05
3	11.11	28.93	22.04
4	11.01	28.93	22.05
5	10.97	28.93	22.06
6	10.90	28.93	22.07
7	10.89	28.92	22.06
8	10.87	28.91	22.06
9	10.84	28.91	22.06
10	10.77	28.89	22.06
11	10.74	28.90	22.07
12	10.72	28.89	22.07
13	10.70	28.89	22.07
14	10.66	28.89	22.08

Survey 92-02

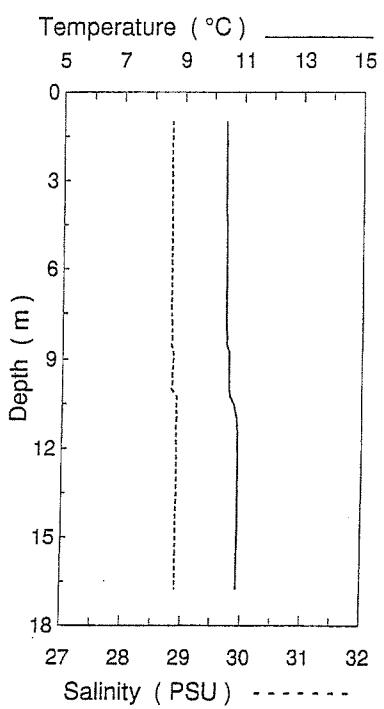


Station 14

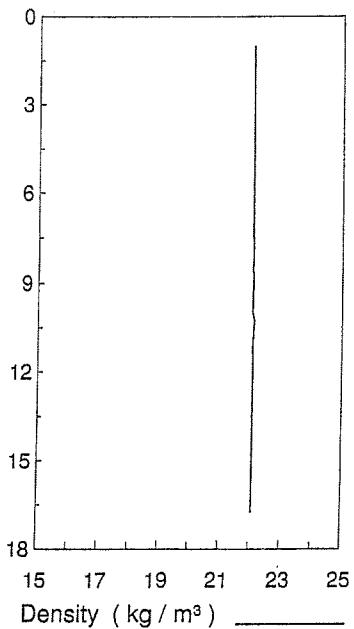


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	11.26	28.94	22.01
2	11.26	28.91	21.99
3	11.25	28.93	22.01
4	11.25	28.92	22.01
5	11.24	28.92	22.01
6	11.24	28.92	22.00
7	11.23	28.91	22.00
8	11.23	28.91	22.00
9	11.23	28.91	22.00
10	11.22	28.91	22.00
11	11.22	28.91	22.00
12	11.21	28.91	22.00
13	11.20	28.90	22.00
14	11.18	28.90	22.00
15	11.16	28.90	22.00
16	11.12	28.90	22.01

Survey 92-02

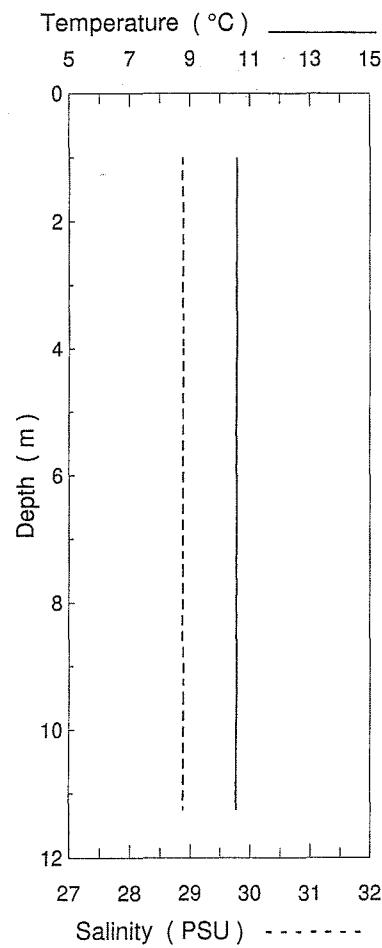


Station 15

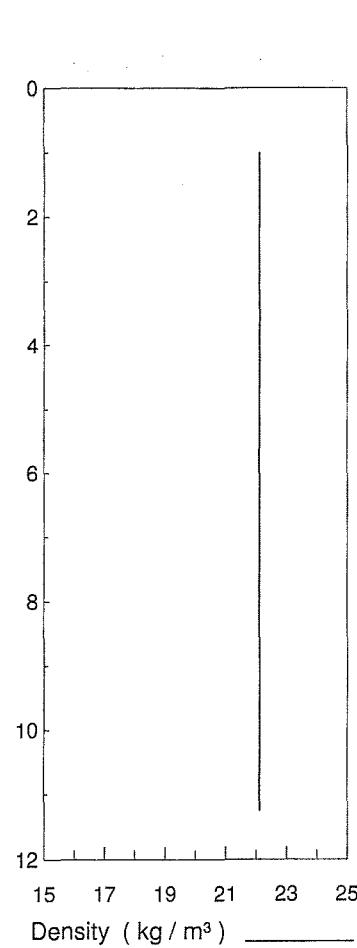


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	10.38	28.78	22.04
2	10.37	28.78	22.04
3	10.38	28.78	22.04
4	10.39	28.78	22.04
5	10.40	28.79	22.04
6	10.40	28.79	22.04
7	10.40	28.78	22.04
8	10.42	28.80	22.05
9	10.53	28.83	22.05
10	10.55	28.84	22.06
11	10.75	28.87	22.05
12	10.83	28.89	22.05
13	10.84	28.89	22.05
14	10.84	28.89	22.05
15	10.84	28.89	22.05
16	10.84	28.89	22.05
17	10.84	28.89	22.05

Survey 92-02



Station 16



Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	10.55	28.88	22.09
2	10.55	28.88	22.09
3	10.55	28.88	22.09
4	10.55	28.88	22.09
5	10.54	28.88	22.09
6	10.54	28.87	22.09
7	10.54	28.87	22.09
8	10.54	28.87	22.08
9	10.53	28.87	22.09
10	10.53	28.88	22.09
11	10.52	28.88	22.09

Appendix 5.3 Minimum, maximum and average of temperature (°C), salinity (PSU) and density(kg / m³) of the 1992 CTD profiles by station.

Survey	Station	Min. Temp. (°C)	Max. Temp. (°C)	Avg. Temp. (°C)	Min. Salinity (PSU)	Max. Salinity (PSU)	Avg. Salinity (PSU)	Min. Density (kg / m³)	Max. Densit (kg / m³)	Avg. Density (kg / m³)
Cardigan, P.E.I.	15-Sep-92 to 17-Sep-92									
	01	16.19	16.87	16.79	28.64	28.81	28.70	20.69	20.95	20.73
	02	15.63	16.97	16.60	28.58	28.93	28.67	20.60	21.17	20.75
	03	15.54	17.30	16.46	28.76	28.97	28.86	20.66	21.21	20.93
	04	16.45	17.66	16.86	28.58	28.84	28.73	20.44	20.92	20.74
	05	16.38	16.99	16.70	28.63	28.81	28.73	20.64	20.91	20.78
	Average:	16.04	17.16	16.68	28.64	28.87	20.79	20.61	21.03	20.79
Cardigan, P.E.I.	01-Oct-92 to 02-Oct-92									
	06	14.33	14.60	14.53	28.31	28.97	28.84	20.91	21.46	21.32
	07	14.23	14.24	14.23	27.52	28.78	28.35	20.37	21.34	21.01
	08	13.90	13.93	13.91	27.26	27.32	27.29	20.22	20.28	20.26
	09	14.08	14.18	14.12	28.36	28.41	28.38	21.04	21.07	21.06
	10	13.67	13.69	13.68	28.73	28.81	28.78	21.42	21.47	21.45
	Average:	14.04	14.13	14.09	28.04	28.46	21.02	20.79	21.12	21.02
Cardigan, P.E.I.	14-Oct-92 to 15-Oct-92									
	11	12.40	13.01	12.63	28.54	29.12	28.95	21.40	21.96	21.78
	12	12.83	12.96	12.90	28.29	28.81	28.65	21.21	21.63	21.50
	13	12.60	13.13	12.75	27.71	28.74	28.50	20.73	21.62	21.41
	14	12.76	13.14	12.90	28.26	28.69	28.56	21.15	21.56	21.43
	15	12.17	12.43	12.30	28.42	28.97	28.69	21.46	21.84	21.64
	Average:	12.55	12.93	12.70	28.25	28.87	21.55	21.19	21.72	21.55

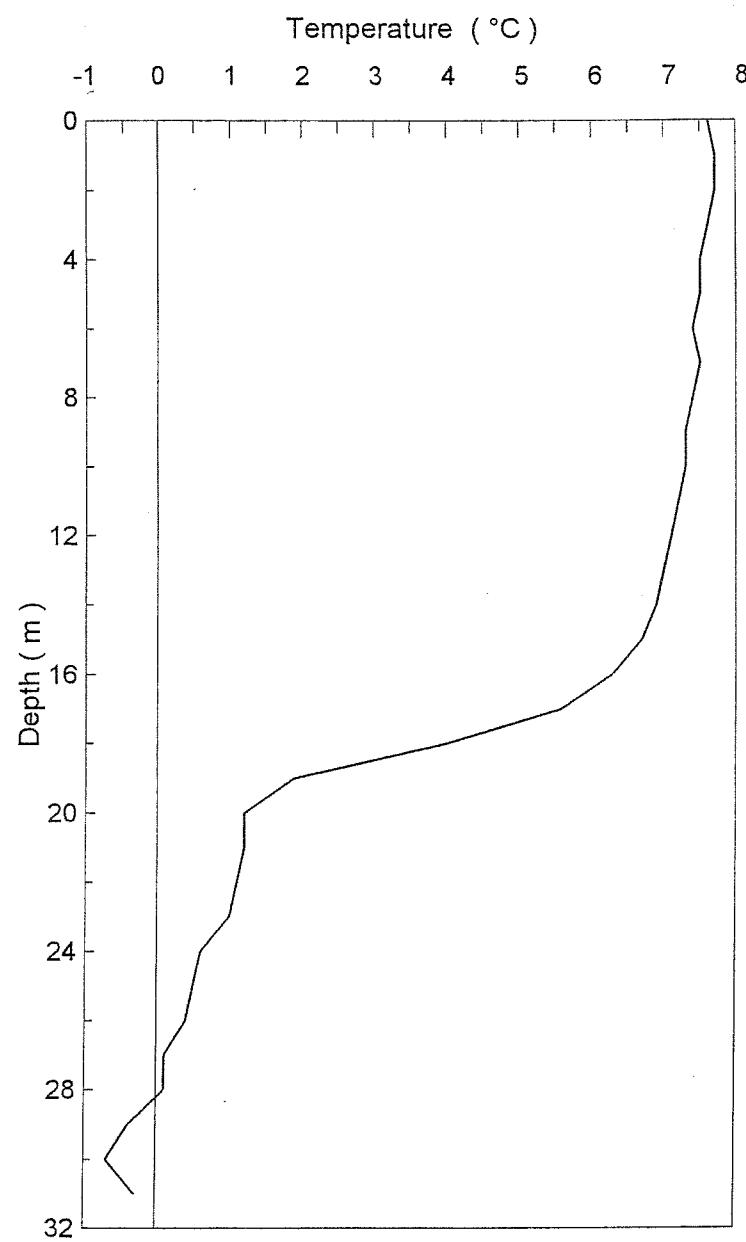
Survey	Station	Min. Temp. (°C)	Max. Temp. (°C)	Avg. Temp. (°C)	Min. Salinity (PSU)	Max. Salinity (PSU)	Avg. Salinity (PSU)	Min. Density (kg / m³)	Max. Density (kg / m³)	Avg. Density (kg / m³)
Cardigan, P.E.I.	04-Nov-92 to 05-Nov-92									
	16	8.11	9.15	8.47	27.94	29.11	28.60	21.71	22.58	22.19
	17	8.38	9.07	8.88	28.20	29.02	28.81	21.84	22.45	22.29
	18	8.14	9.11	8.55	28.24	28.95	28.61	21.94	22.40	22.18
	19	8.45	8.78	8.54	28.43	28.76	28.55	22.06	22.27	22.14
	20	8.64	8.74	8.70	28.04	28.41	28.23	21.71	22.02	21.86
	Average:	8.34	8.97	8.63	28.17	28.85	22.13	21.85	22.34	22.13
Cardigan, P.E.I.	18-Nov-92 to 19-Nov-92									
	21	5.09	6.48	5.62	27.57	28.86	28.14	21.76	22.67	22.17
	22	5.44	6.59	6.04	27.85	28.92	28.51	21.97	22.69	22.42
	23	5.00	6.48	5.86	27.42	28.69	28.37	21.66	22.54	22.33
	24	4.14	6.54	5.49	25.57	28.69	26.63	20.06	22.51	20.99
	25	5.07	5.92	5.52	26.48	28.06	26.86	20.87	22.08	21.17
	Average:	4.95	6.40	5.71	26.98	28.65	21.82	21.26	22.50	21.82

Survey	Station	Min. Temp. (°C)	Max. Temp. (°C)	Avg. Temp. (°C)	Min. Salinity (PSU)	Max. Salinity (PSU)	Avg. Salinity (PSU)	Min. Density (kg / m³)	Max. Density (kg / m³)	Avg. Density (kg / m³)
Survey 92-02	20-Oct-92 to 23-Oct-92									
	01	10.40	10.42	10.41	28.65	28.69	28.67	21.94	21.97	21.95
	02	11.63	11.66	11.64	28.96	29.27	28.99	21.96	22.20	21.99
	03	11.57	11.59	11.58	28.94	29.11	28.97	21.96	22.10	21.98
	04	11.62	11.64	11.63	28.94	28.98	28.95	21.96	21.98	21.96
	05	11.70	11.71	11.71	28.92	28.94	28.93	21.92	21.94	21.93
	06	11.21	11.22	11.22	28.87	29.19	28.92	21.97	22.22	22.01
	07	10.72	10.74	10.73	28.78	29.84	29.09	21.99	22.81	22.22
	08	9.71	9.76	9.74	28.11	28.25	28.17	21.62	21.72	21.67
	09	9.69	9.79	9.75	28.35	28.55	28.41	21.80	21.95	21.85
	10	9.62	9.94	9.76	28.53	28.79	28.60	21.97	22.13	22.00
	11	10.26	10.38	10.31	28.76	28.81	28.78	22.04	22.08	22.05
	12	9.58	9.80	9.68	28.72	28.83	28.77	22.12	22.18	22.14
	13	10.68	11.13	10.90	28.88	29.24	28.93	22.03	22.27	22.07
	14	11.10	11.26	11.22	28.89	28.95	28.91	21.98	22.02	22.00
	15	10.37	10.84	10.59	28.78	28.89	28.83	22.03	22.10	22.05
	16	10.51	10.56	10.54	28.86	28.88	28.87	22.08	22.09	22.09
	Average:	10.65	10.78	10.71	28.75	28.95	22.00	21.96	22.11	22.00

Appendix 6.1 Survey 92-01 temperature (°C) depth (m) profiles.

Survey 92-01

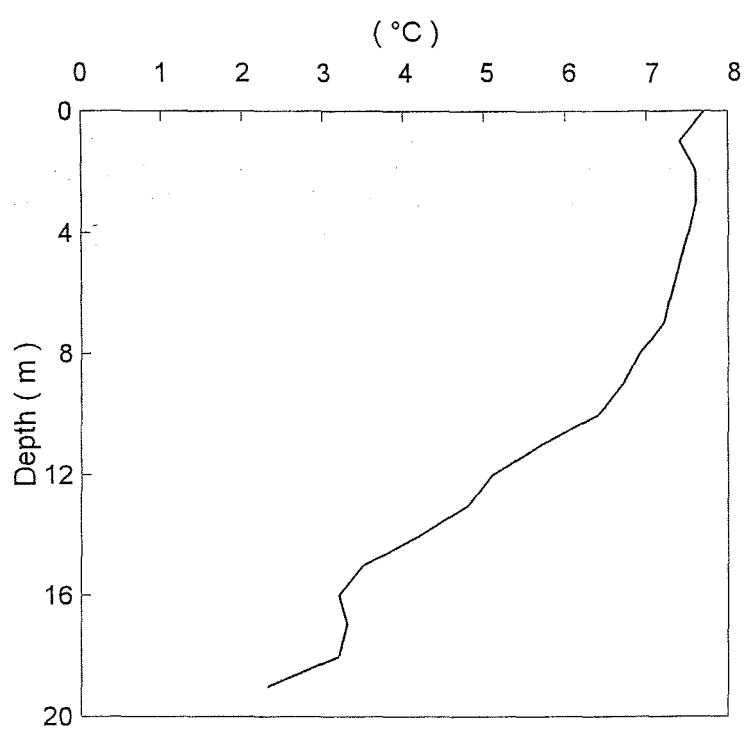
Station 1



Depth (m)	Temperature (°C)
0	7.6
1	7.7
2	7.7
3	7.6
4	7.5
5	7.5
6	7.4
7	7.5
8	7.4
9	7.3
10	7.3
11	7.2
12	7.1
13	7.0
14	6.9
15	6.7
16	6.3
17	5.6
18	4.0
19	1.9
20	1.2
21	1.2
23	1.0
24	0.6
25	0.5
26	0.4
27	0.1
28	0.1
29	-0.4
30	-0.7
31	-0.3

Survey 92-01

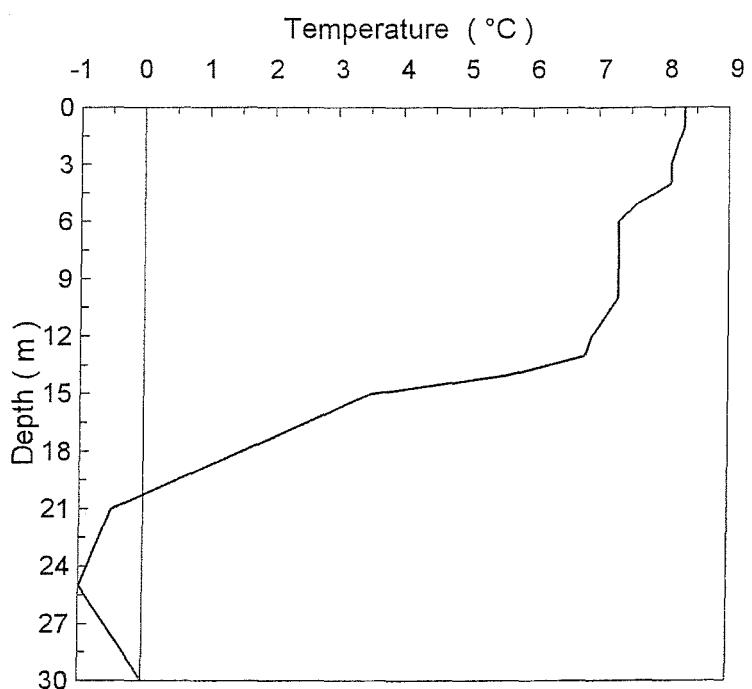
Station 2



Depth (m)	Temperature (°C)
0	7.7
1	7.4
2	7.6
3	7.6
4	7.5
5	7.4
6	7.3
7	7.2
8	6.9
9	6.7
10	6.4
11	5.7
12	5.1
13	4.8
14	4.2
15	3.5
16	3.2
17	3.3
18	3.2
19	2.3

Survey 92-01

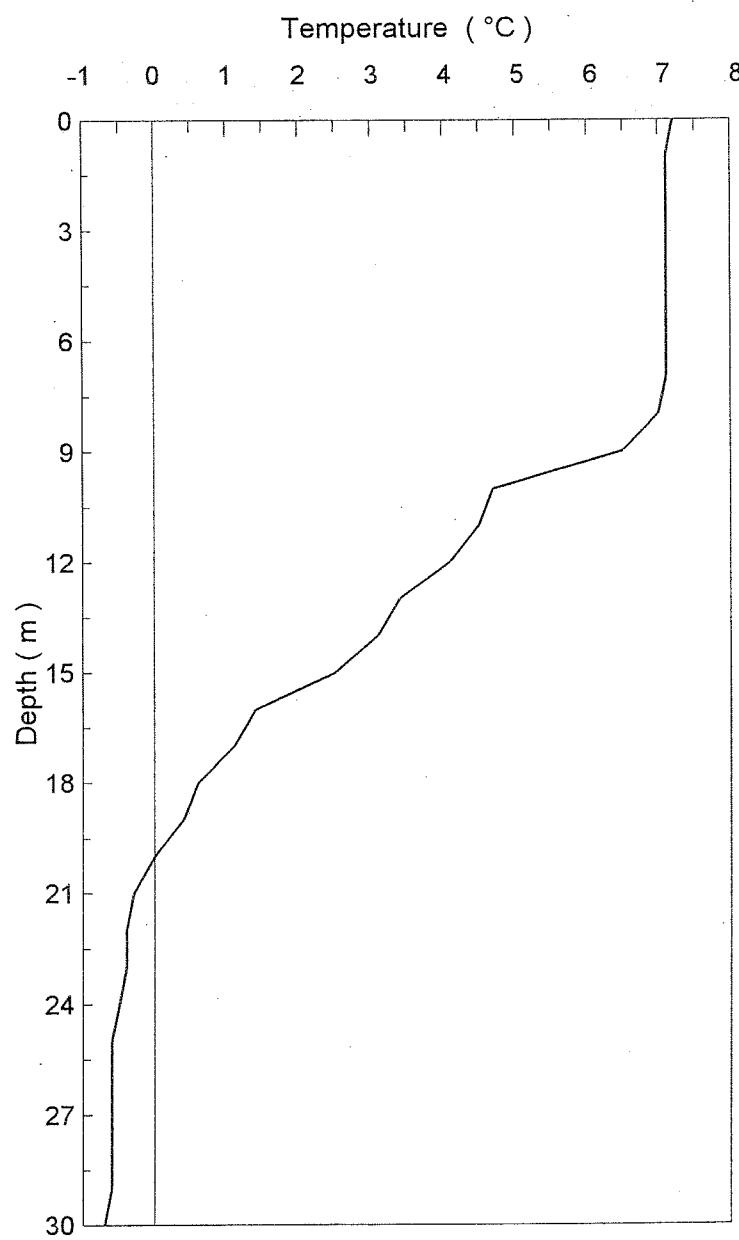
Station 3



Depth (m)	Temperature (°C)
0	8.3
1	8.3
2	8.2
3	8.1
4	8.1
5	7.6
6	7.3
7	7.3
8	7.3
9	7.3
10	7.3
11	7.1
12	6.9
13	6.8
14	5.6
15	3.5
21	-0.5
25	-1.0
30	0.0

Survey 92-01

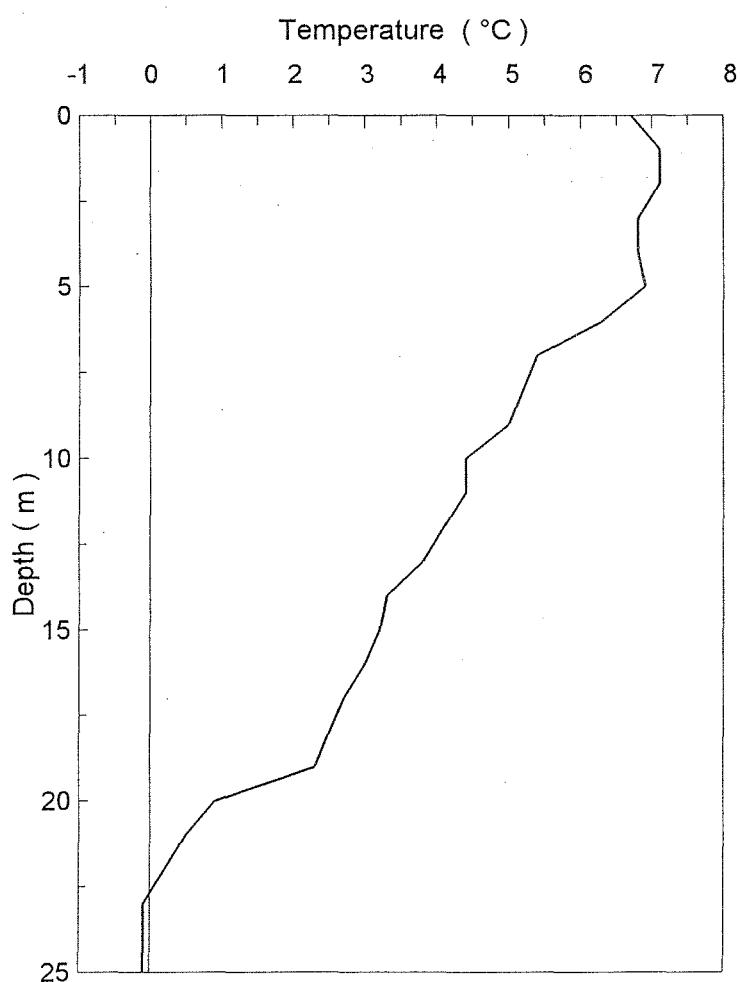
Station 5



Depth (m)	Temperature (°C)
0	7.2
1	7.1
2	7.1
3	7.1
4	7.1
5	7.1
6	7.1
7	7.1
8	7.0
9	6.5
10	4.7
11	4.5
12	4.1
13	3.4
14	3.1
15	2.5
16	1.4
17	1.1
18	0.6
19	0.4
20	0.0
21	-0.3
22	-0.4
23	-0.4
24	-0.5
25	-0.6
26	-0.6
27	-0.6
28	-0.6
29	-0.6
30	-0.7

Survey 92-01

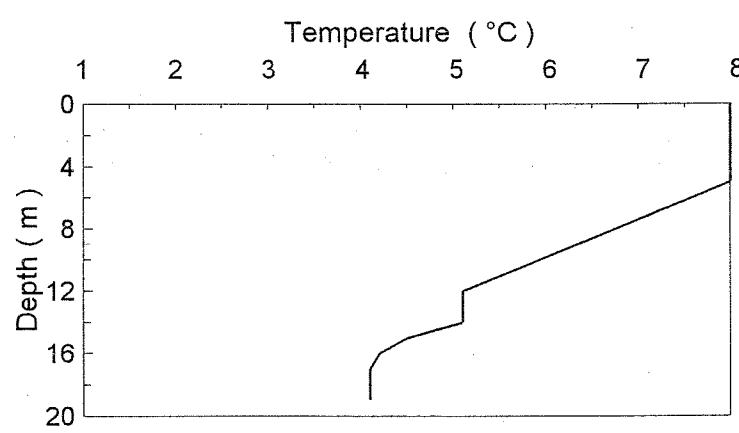
Station 6



Depth (m)	Temperature (°C)
0	6.7
1	7.1
2	7.1
3	6.8
4	6.8
5	6.9
6	6.3
7	5.4
8	5.2
9	5.0
10	4.4
11	4.4
12	4.1
13	3.8
14	3.3
15	3.2
16	3.0
17	2.7
18	2.5
19	2.3
20	0.9
21	0.5
22	0.2
23	-0.1
24	-0.1
25	-0.1

Survey 92-01

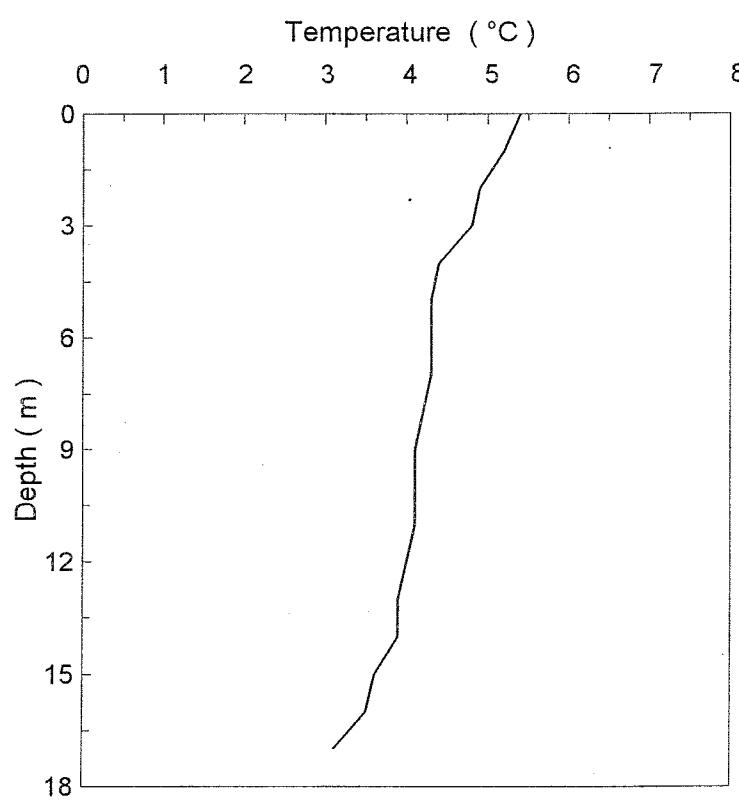
Station 7



Depth (m)	Temperature (°C)
0	8.0
5	8.0
12	5.1
13	5.1
14	5.1
15	4.5
16	4.2
17	4.1
18	4.1
19	4.1

Survey 92-01

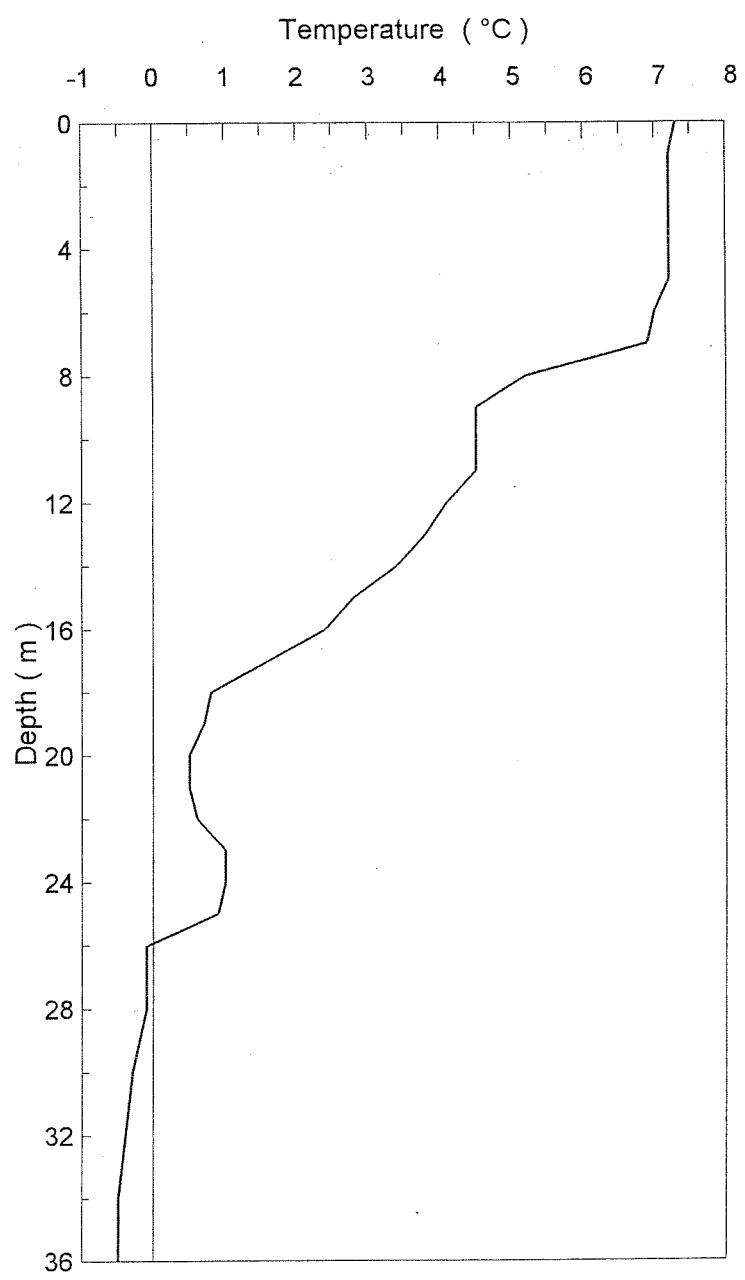
Station 8



Depth (m)	Temperature (°C)
0	5.4
1	5.2
2	4.9
3	4.8
4	4.4
5	4.3
6	4.3
7	4.3
8	4.2
9	4.1
10	4.1
11	4.1
12	4.0
13	3.9
14	3.9
15	3.6
16	3.5
17	3.1

Survey 92-01

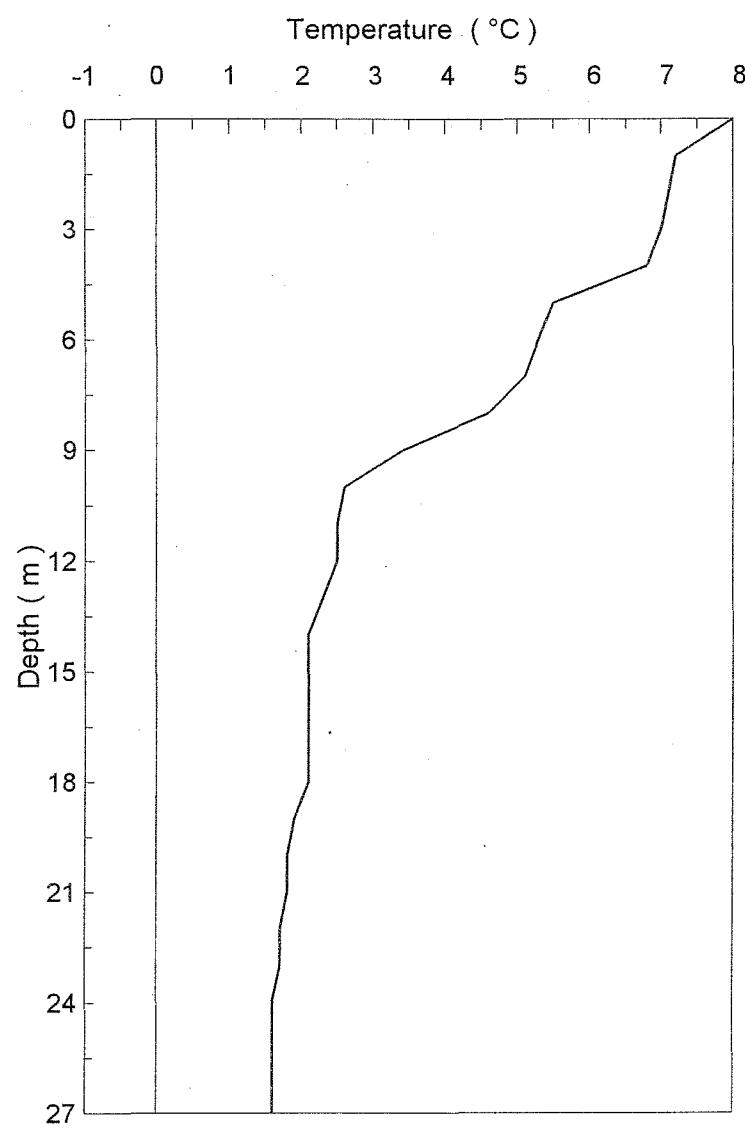
Station 9



Depth (m)	Temperature (°C)
0	7.3
1	7.2
2	7.2
3	7.2
4	7.2
5	7.2
6	7.0
7	6.9
8	5.2
9	4.5
10	4.5
11	4.5
12	4.1
13	3.8
14	3.4
15	2.8
16	2.4
17	1.6
18	0.8
19	0.7
20	0.5
21	0.5
22	0.6
23	1.0
24	1.0
25	0.9
26	-0.1
28	-0.1
30	-0.3
32	-0.4
34	-0.5
36	-0.5

Survey 92-01

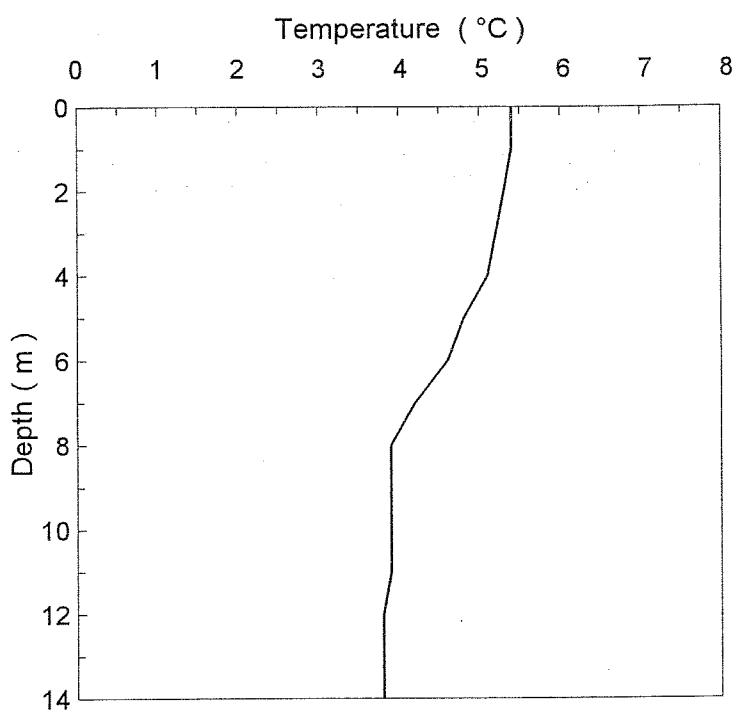
Station 10



Depth (m)	Temperature (°C)
0	8.0
1	7.2
2	7.1
3	7.0
4	6.8
5	5.5
6	5.3
7	5.1
8	4.6
9	3.4
10	2.6
11	2.5
12	2.5
13	2.3
14	2.1
15	2.1
16	2.1
17	2.1
18	2.1
19	1.9
20	1.8
21	1.8
22	1.7
23	1.7
24	1.6
25	1.6
26	1.6
27	1.6

Survey 92-01

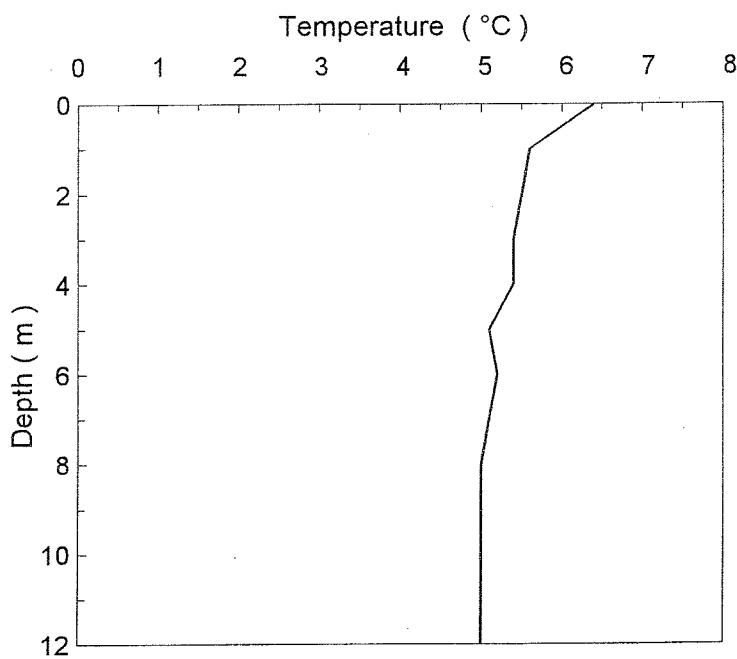
Station 11



Depth (m)	Temperature (°C)
0	5.4
1	5.4
2	5.3
3	5.2
4	5.1
5	4.8
6	4.6
7	4.2
8	3.9
9	3.9
10	3.9
11	3.9
12	3.8
13	3.8
14	3.8

Survey 92-01

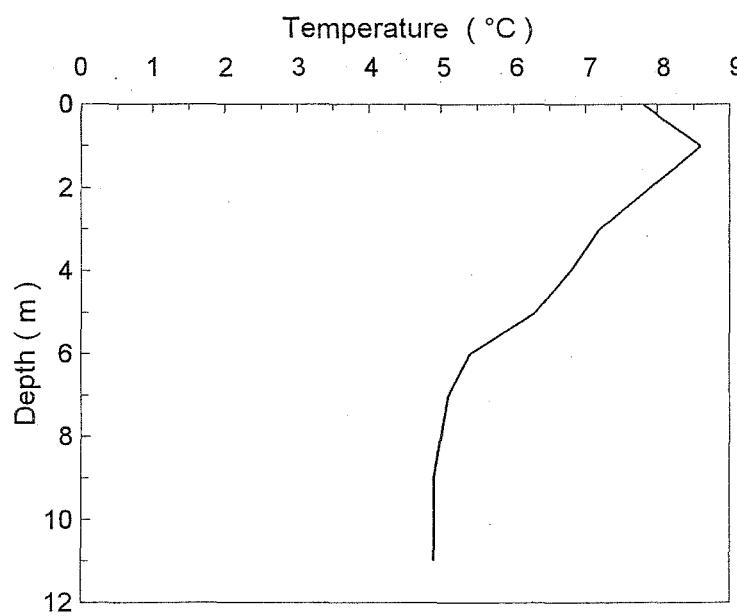
Station 12



Depth (m)	Temperature (°C)
0	6.4
1	5.6
2	5.5
3	5.4
4	5.4
5	5.1
6	5.2
7	5.1
8	5.0
9	5.0
10	5.0
11	5.0
12	5.0

Survey 92-01

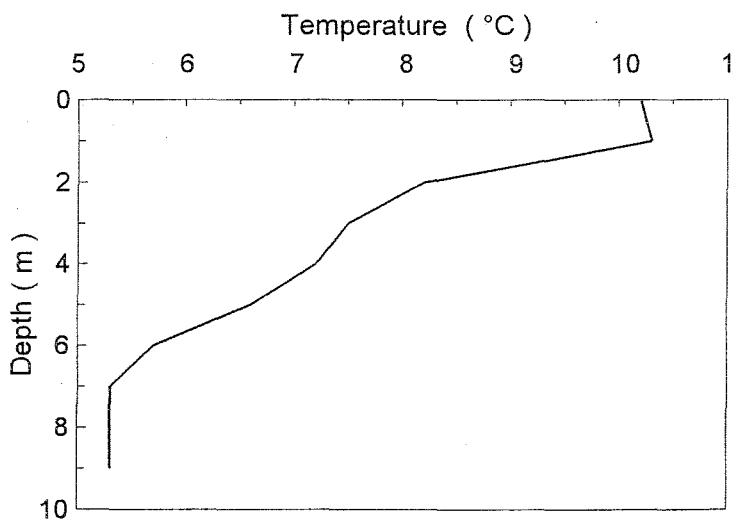
Station 13



Depth (m)	Temperature (°C)
0	7.8
1	8.6
2	7.9
3	7.2
4	6.8
5	6.3
6	5.4
7	5.1
8	5.0
9	4.9
10	4.9
11	4.9

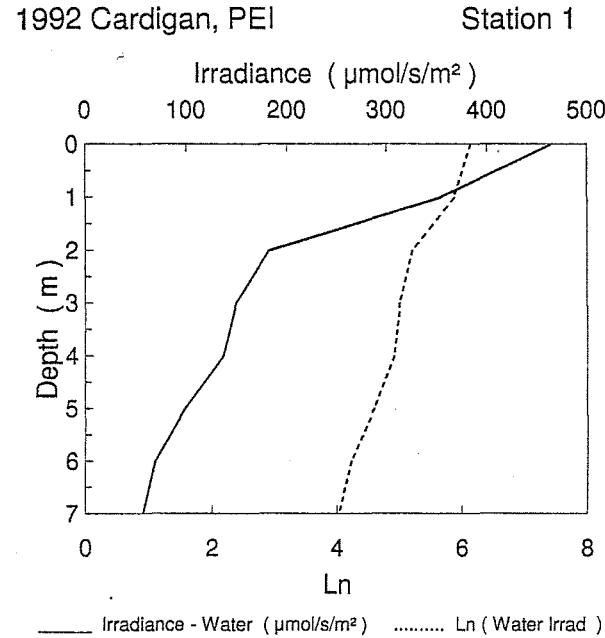
Survey 92-01

Station 14

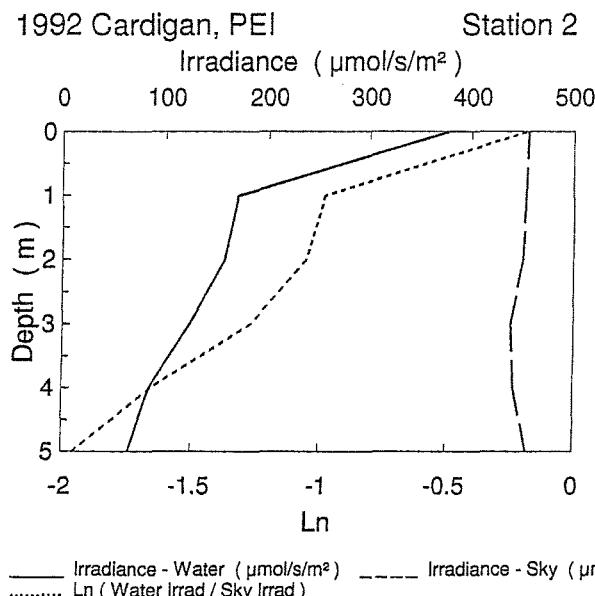


Depth (m)	Temperature (°C)
0	10.2
1	10.3
2	8.2
3	7.5
4	7.2
5	6.6
6	5.7
7	5.3
8	5.3
9	5.3

Appendix 7.1 Cardigan, PEI irradiance ($\mu\text{mol} / \text{s} / \text{m}^2$) profiles - 1992.



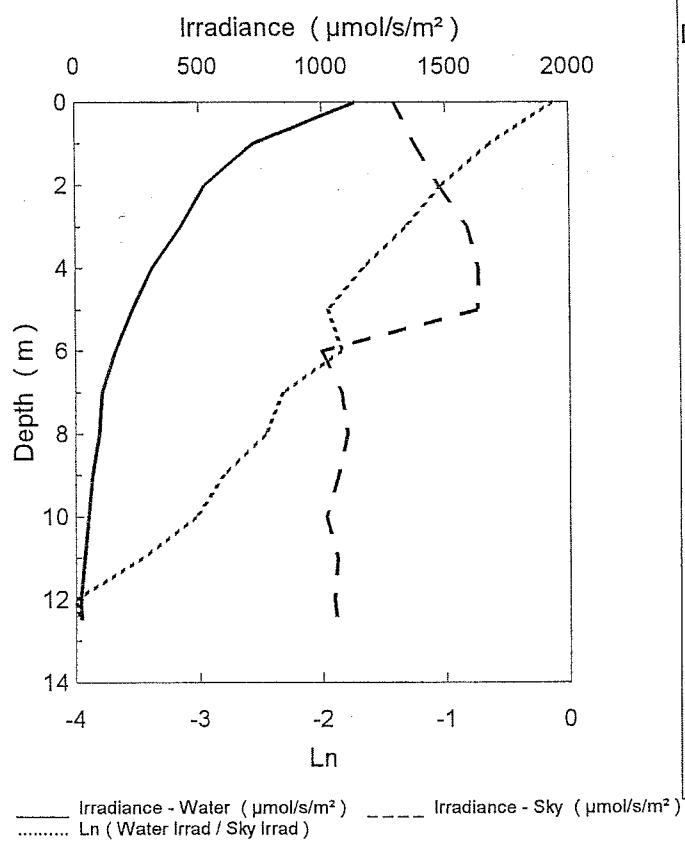
Depth (m)	Irradiance Water ($\mu\text{mol}/\text{s}/\text{m}^2$)	\ln Water Irrad.
0	464	6.14
1	353	5.87
2	181	5.20
3	149	5.00
4	136	4.91
5	98	4.59
6	68	4.22
7	56	4.03



Depth (m)	Irradiance Water ($\mu\text{mol}/\text{s}/\text{m}^2$)	Irradiance Sky ($\mu\text{mol}/\text{s}/\text{m}^2$)	\ln Water / Sky
0	376	455	-0.19
1	170	453	-0.98
2	157	450	-1.05
3	123	438	-1.27
4	84	441	-1.66
5	64	454	-1.96

1992 Cardigan, PEI

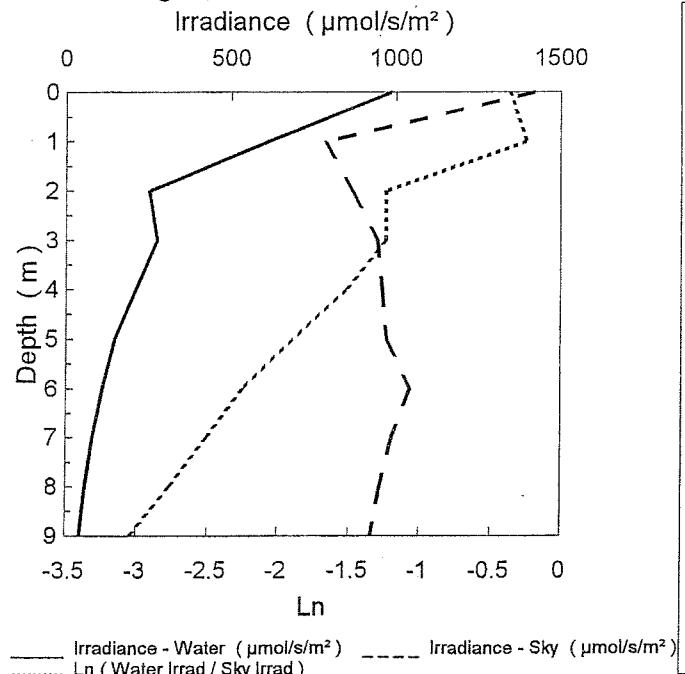
Station 3



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	1135	1290	-0.13
1	721	1372	-0.64
2	520	1468	-1.04
3	421	1585	-1.33
4	305	1630	-1.68
5	229	1627	-1.96
6	157	994	-1.85
7	105	1075	-2.33
8	94	1099	-2.46
9	64	1063	-2.81
10	49	1013	-3.03
11	33	1058	-3.47
12	19	1045	-4.01
12.5	20	1055	-3.97

1992 Cardigan, PEI

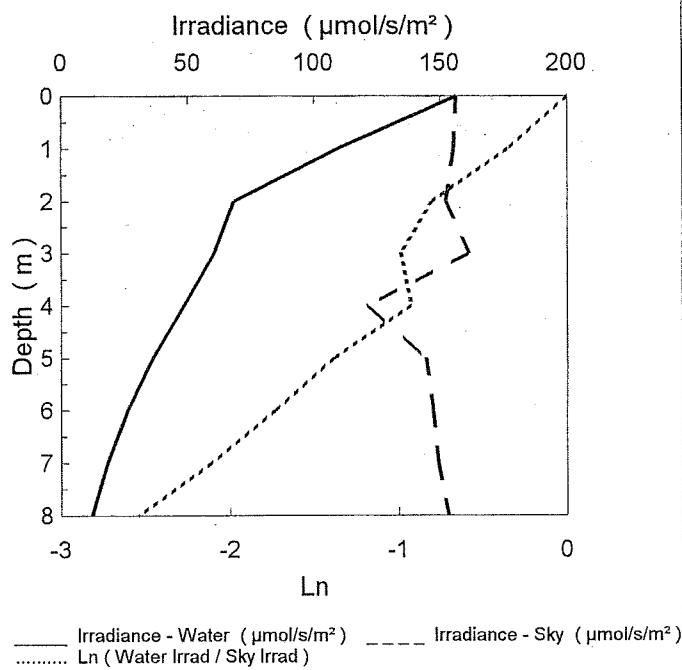
Station 4



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	985	1419	-0.37
1	611	783	-0.25
2	250	865	-1.24
3	273	944	-1.24
4	210	957	-1.52
5	146	971	-1.89
6	109	1041	-2.26
7	80	987	-2.51
8	60	952	-2.77
9	44	925	-3.05

1992 Cardigan, PEI

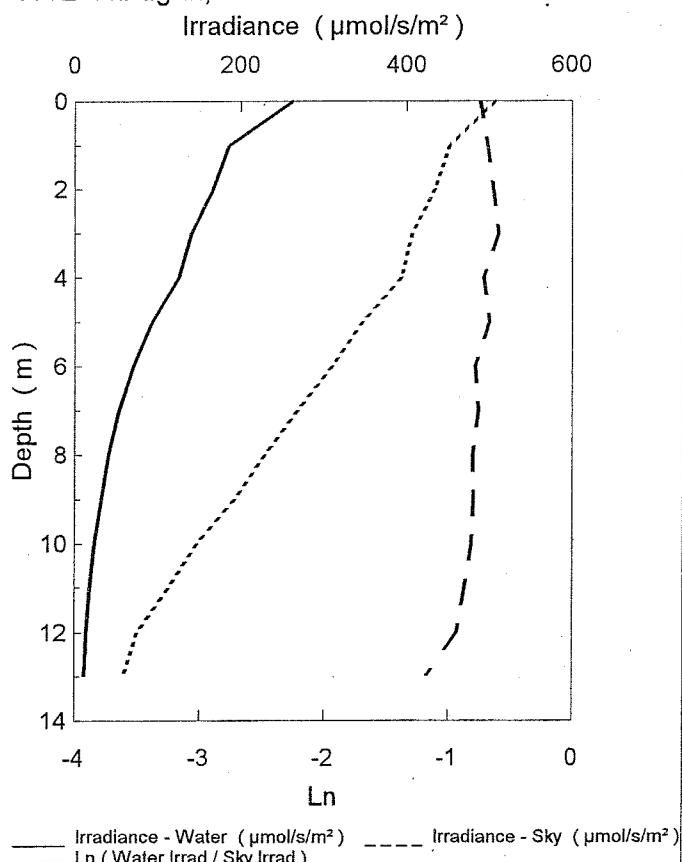
Station 5



Depth (m)	Irradiance Water (μmol/s/m ²)	Irradiance Sky (μmol/s/m ²)	Ln Water / Sky
0	156	156	0.00
1	109	155	-0.35
2	68	152	-0.80
3	60	161	-0.99
4	48	121	-0.92
5	36	144	-1.39
6	26	147	-1.73
7	18	149	-2.11
8	12	153	-2.55

1992 Cardigan, PEI

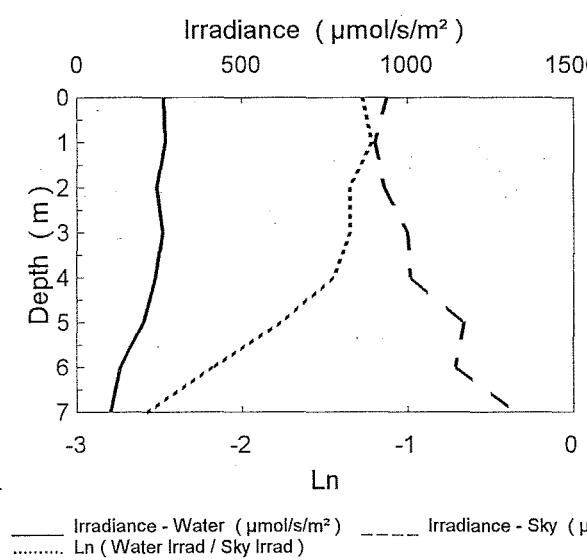
Station 6



Depth (m)	Irradiance Water (μmol/s/m ²)	Irradiance Sky (μmol/s/m ²)	Ln Water / Sky
0	263	488	-0.62
1	185	498	-0.99
2	166	504	-1.11
3	139	510	-1.30
4	124	493	-1.38
5	92	499	-1.69
6	70	483	-1.93
7	53	487	-2.21
8	40	479	-2.47
9	32	480	-2.72
10	23	478	-3.03
11	18	470	-3.25
12	14	460	-3.50
13	11	423	-3.61

1992 Cardigan, PEI

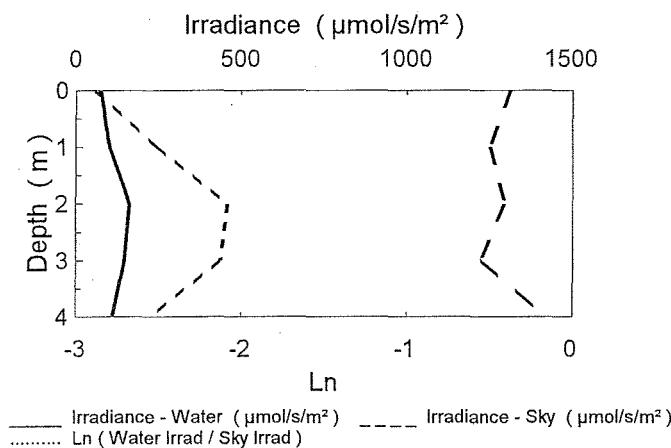
Station 7



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	261	936	-1.28
1	265	899	-1.22
2	240	928	-1.35
3	258	998	-1.35
4	236	1007	-1.45
5	199	1168	-1.77
6	130	1143	-2.18
7	100	1326	-2.58

1992 Cardigan, PEI

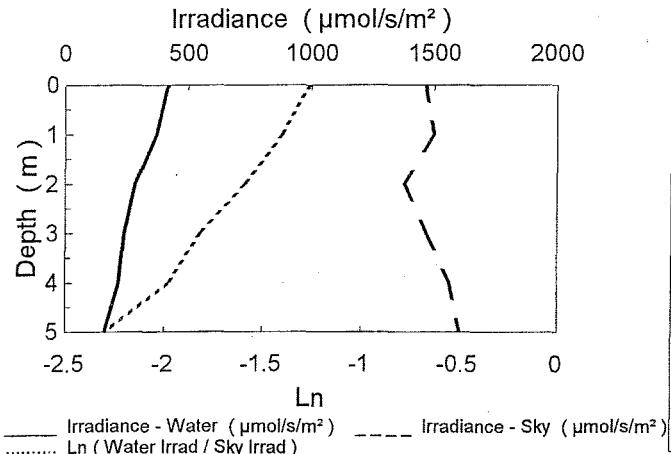
Station 8



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	73	1312	-2.89
1	101	1251	-2.51
2	160	1294	-2.09
3	146	1223	-2.13
4	111	1422	-2.55

1992 Cardigan, PEI

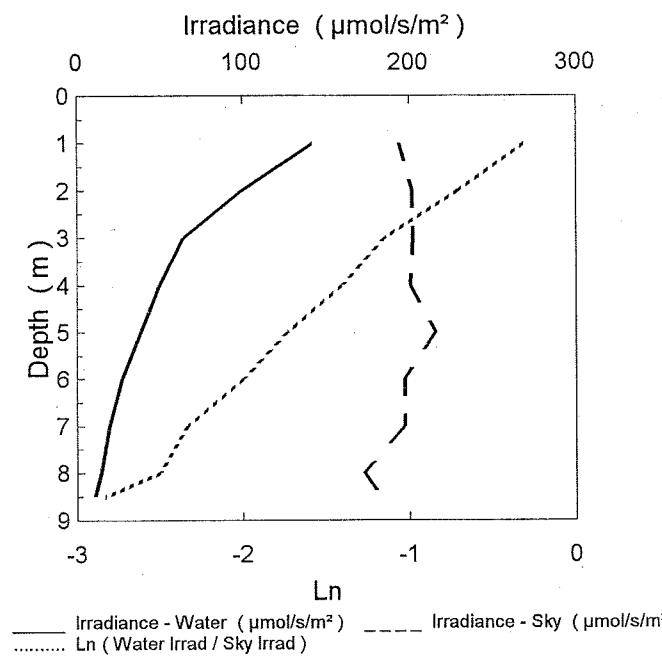
Station 9



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	415	1464	-1.26
1	368	1497	-1.40
2	282	1379	-1.59
3	237	1466	-1.82
4	217	1560	-1.97
5	160	1602	-2.30

1992 Cardigan, PEI

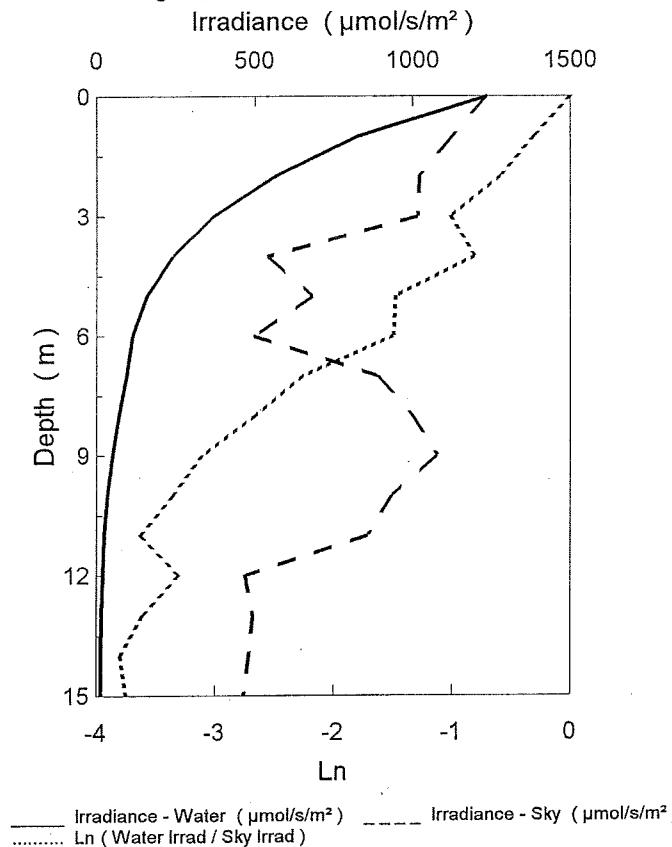
Station 10



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
1	142	194	-0.31
2	99	202	-0.71
3	64	202	-1.15
4	49	200	-1.40
5	38	216	-1.74
6	27	197	-2.00
7	19	197	-2.34
8	14	173	-2.50
8.5	11	182	-2.84

1992 Cardigan, PEI

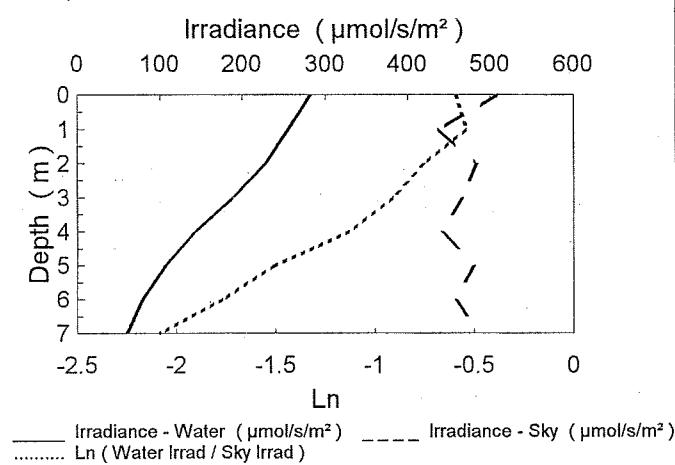
Station 11



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	1235	1233	0.00
1	824	1125	-0.31
2	563	1021	-0.60
3	367	1016	-1.02
4	240	540	-0.81
5	156	683	-1.48
6	111	496	-1.49
7	93	887	-2.26
8	70	999	-2.66
9	48	1077	-3.11
10	32	933	-3.36
11	23	857	-3.64
12	17	468	-3.31
13	13	494	-3.62
14	11	481	-3.81
15	11	463	-3.76

1992 Cardigan, PEI

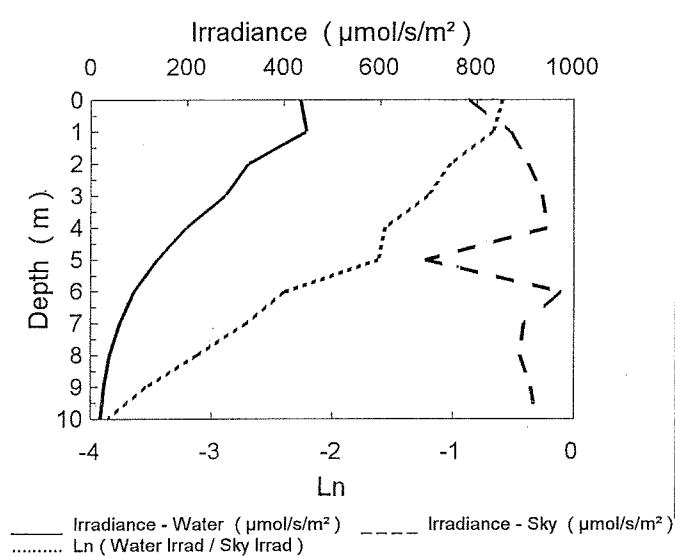
Station 12



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	282	509	-0.59
1	255	437	-0.54
2	228	483	-0.75
3	188	466	-0.91
4	143	442	-1.13
5	106	479	-1.51
6	78	458	-1.77
7	60	484	-2.09

1992 Cardigan, PEI

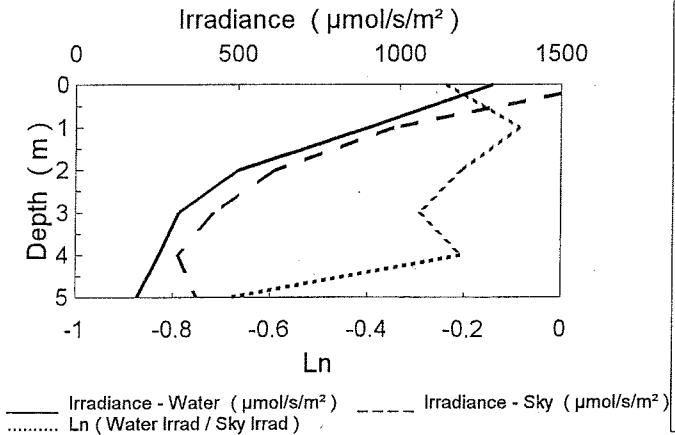
Station 13



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	433	784	-0.59
1	445	869	-0.67
2	326	904	-1.02
3	279	935	-1.21
4	197	944	-1.57
5	137	692	-1.62
6	88	974	-2.40
7	59	895	-2.71
8	39	887	-3.12
9	26	911	-3.54
10	19	922	-3.86

1992 Cardigan, PEI

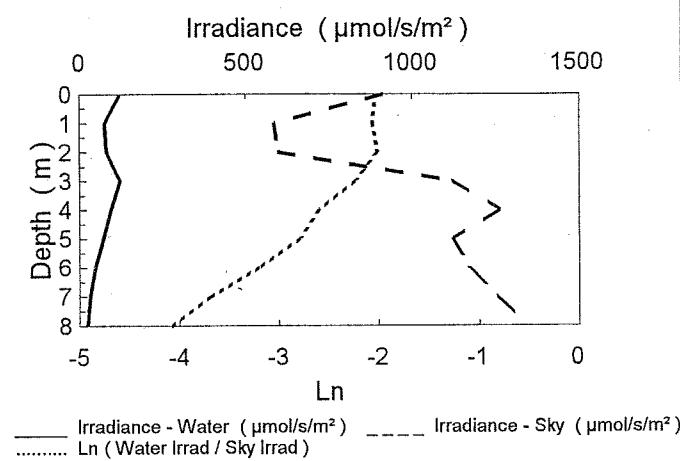
Station 14



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	1288	1635	-0.24
1	901	981	-0.09
2	500	614	-0.21
3	316	423	-0.29
4	255	314	-0.21
5	187	372	-0.69

1992 Cardigan, PEI

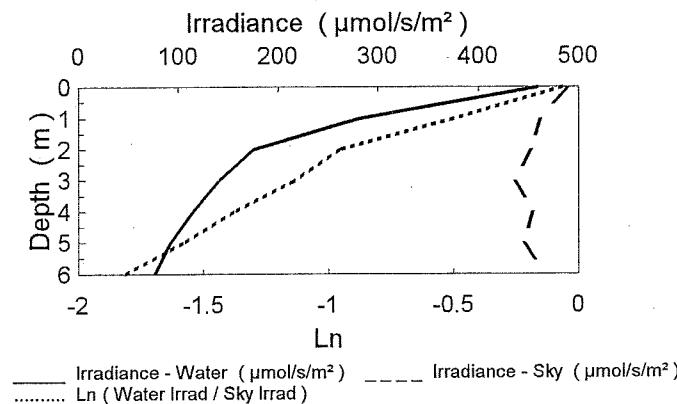
Station 15



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	120	913	-2.03
1	74	585	-2.07
2	80	596	-2.01
3	120	1117	-2.23
4	94	1264	-2.60
5	69	1120	-2.79
6	48	1170	-3.20
7	31	1252	-3.69
8	23	1349	-4.08

1992 Cardigan, PEI

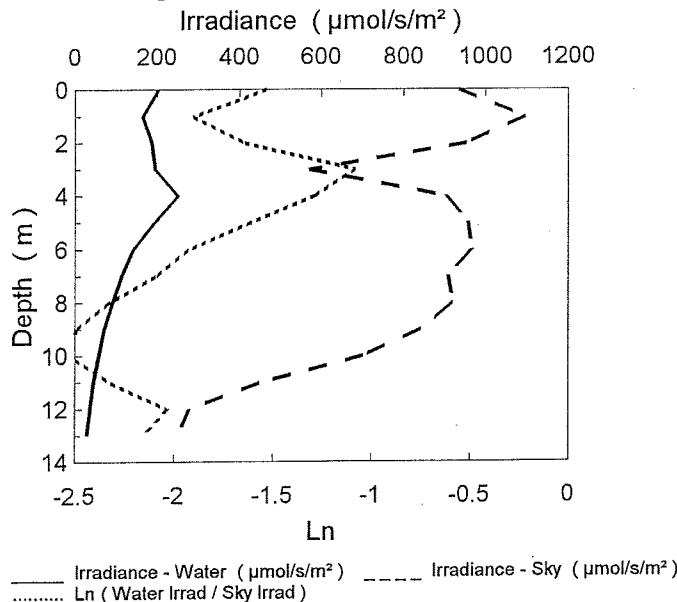
Station 16



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	460	490	-0.06
1	281	462	-0.50
2	175	453	-0.95
3	140	437	-1.14
4	115	454	-1.38
5	92	445	-1.58
6	76	465	-1.82

1992 Cardigan, PEI

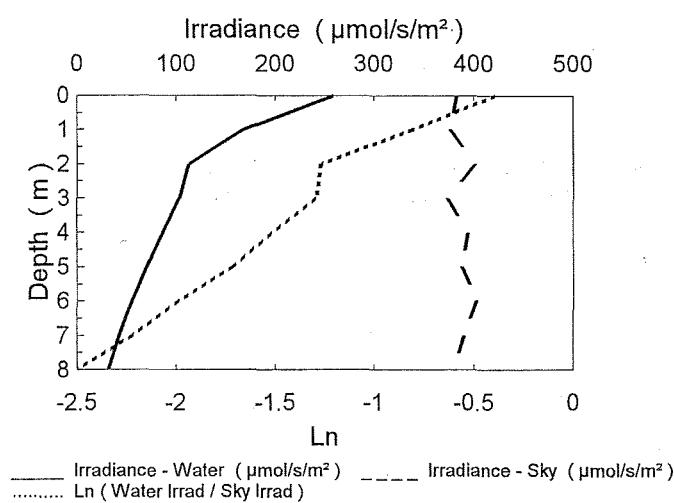
Station 17



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	201	934	-1.53
1	164	1096	-1.90
2	185	953	-1.64
3	193	569	-1.08
4	249	903	-1.29
5	191	956	-1.61
6	140	965	-1.93
7	112	907	-2.10
8	89	918	-2.33
9	69	840	-2.50
10	56	700	-2.52
11	44	447	-2.32
12	36	276	-2.04
13	29	249	-2.16

1992 Cardigan, PEI

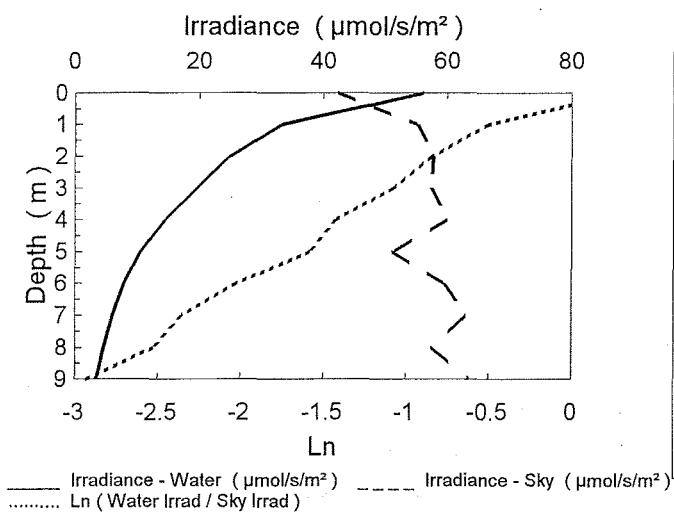
Station 18



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	259	383	-0.39
1	168	376	-0.81
2	112	401	-1.27
3	103	374	-1.29
4	86	394	-1.52
5	70	388	-1.72
6	55	403	-1.99
7	42	390	-2.22
8	31	380	-2.51

1992 Cardigan, PEI

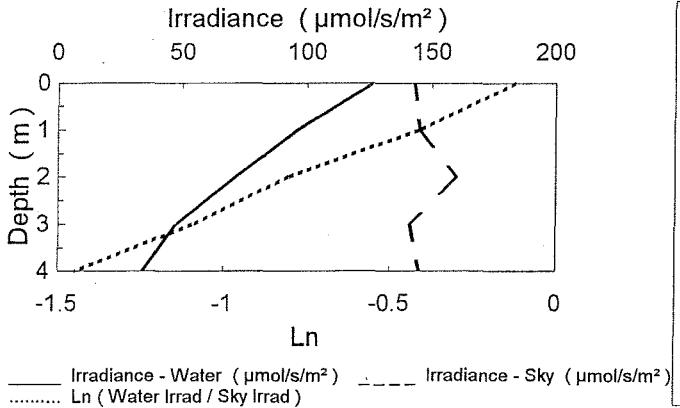
Station 19



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	56	42	-3.0
1	33	55	-2.5
2	25	58	-2.0
3	20	57	-1.5
4	14	60	-1.0
5	10	51	-0.5
6	8	60	0.0
7	6	63	0.3
8	5	57	0.6
9	3	64	0.9

1992 Cardigan, PEI

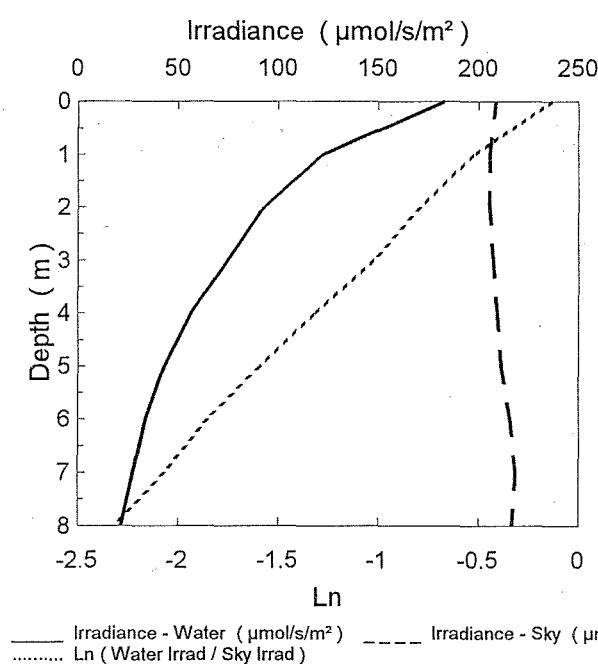
Station 20



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	126	143	-1.5
1	96	145	-1.0
2	71	160	-0.5
3	47	141	0.0
4	34	145	0.4

1992 Cardigan, PEI

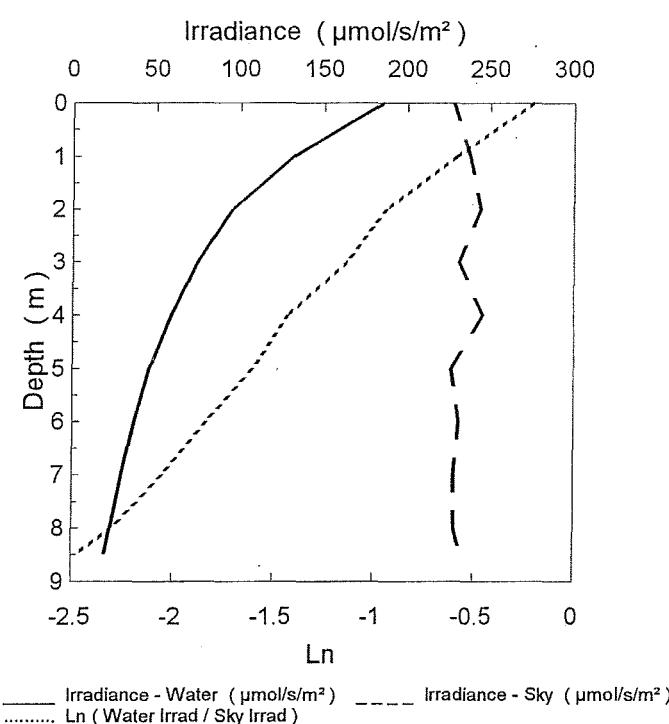
Station 21



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	183	209	-0.13
1	122	206	-0.52
2	93	205	-0.80
3	74	207	-1.02
4	56	210	-1.32
5	43	211	-1.59
6	34	216	-1.86
7	28	218	-2.07
8	21	217	-2.32

1992 Cardigan, PEI

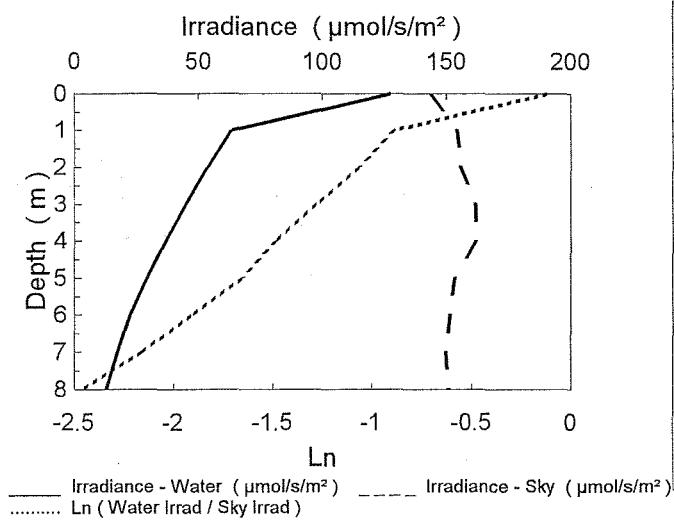
Station 22



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	185	227	-0.20
1	132	237	-0.59
2	95	244	-0.94
3	74	231	-1.13
4	59	245	-1.43
5	46	227	-1.60
6	37	231	-1.83
7	29	228	-2.05
8	23	228	-2.30
8.5	19	232	-2.48

1992 Cardigan, PEI

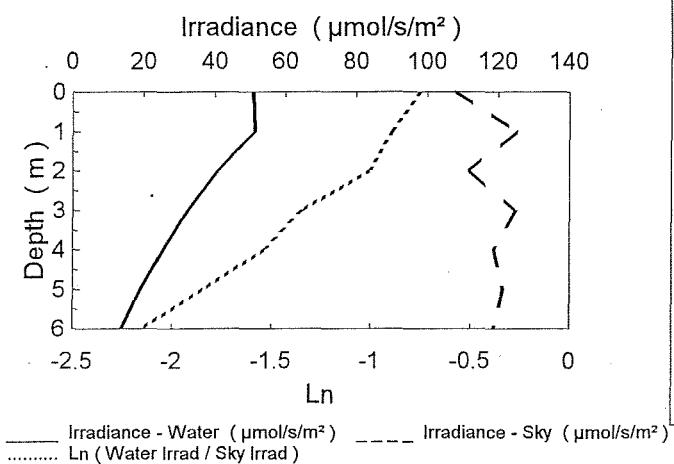
Station 23



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	128	144	-0.12
1	63	154	-0.89
2	54	156	-1.06
3	45	162	-1.28
4	37	162	-1.49
5	29	153	-1.66
6	22	151	-1.91
7	17	150	-2.16
8	13	151	-2.47

1992 Cardigan, PEI

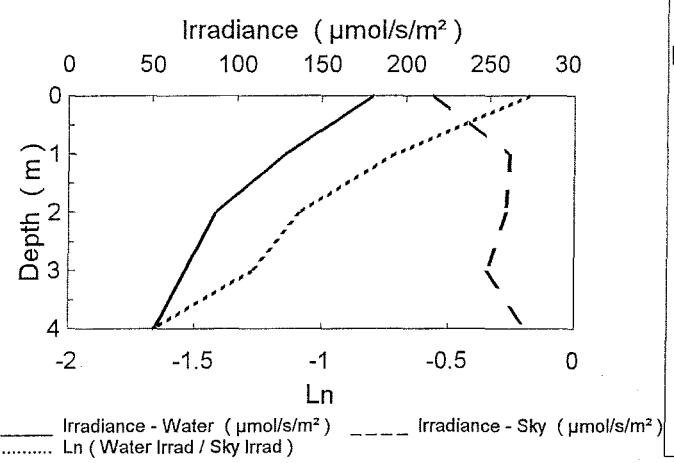
Station 24



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	51	108	-0.75
1	51	125	-0.89
2	41	111	-1.00
3	32	125	-1.35
4	26	119	-1.54
5	19	121	-1.85
6	14	119	-2.16

1992 Cardigan, PEI

Station 25

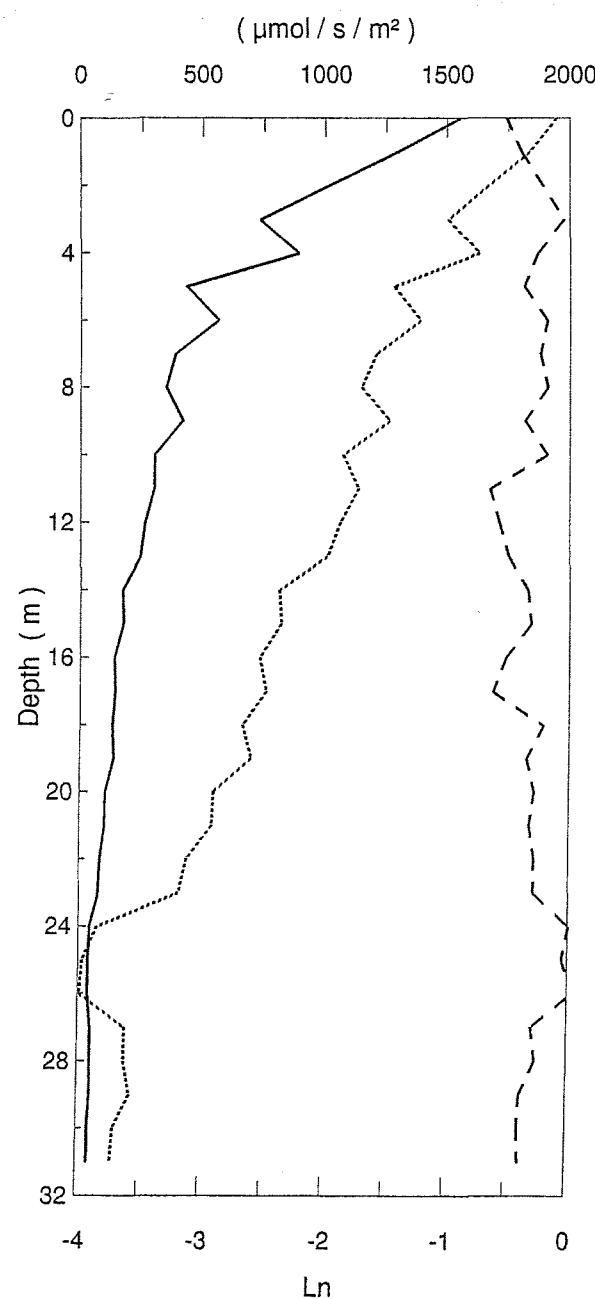


Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	180	216	-0.18
1	128	261	-0.71
2	87	259	-1.09
3	69	248	-1.27
4	51	271	-1.67

Appendix 7.2 Survey 92-01 irradiance ($\mu\text{mol/s/m}^2$) profiles.

Survey 92-01

Station 1

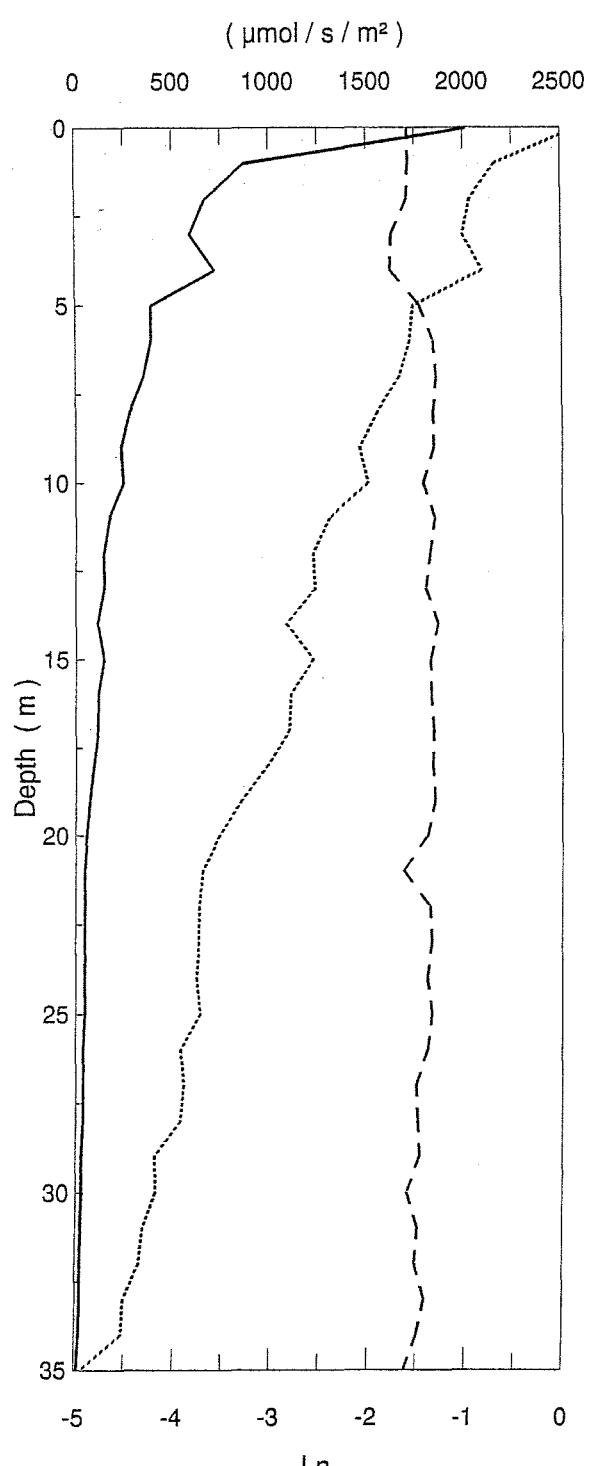


Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln (Water / Sky)
0	1551	1740	-0.11
1	1293	1802	-0.33
3	730	1975	-1.00
4	888	1866	-0.74
5	428	1810	-1.44
6	560	1906	-1.22
7	384	1878	-1.59
8	346	1909	-1.71
9	415	1816	-1.48
10	297	1908	-1.86
11	297	1673	-1.73
12	260	1711	-1.88
13	241	1751	-1.98
14	169	1828	-2.38
15	173	1841	-2.37
16	137	1739	-2.54
17	141	1687	-2.49
18	130	1895	-2.68
19	135	1825	-2.60
20	101	1857	-2.91
21	99	1837	-2.92
22	81	1859	-3.13
23	76	1853	-3.19
24	42	2001	-3.86
25	37	1974	-3.97
26	37	2019	-3.99
27	49	1852	-3.62
28	50	1869	-3.63
29	51	1808	-3.57
30	44	1801	-3.71
31	44	1807	-3.72

— Irradiance - Water
 - - - Irradiance - Sky $\ln(\text{Water Irrad} / \text{Sky Irrad})$

Survey 92-01

Station 2

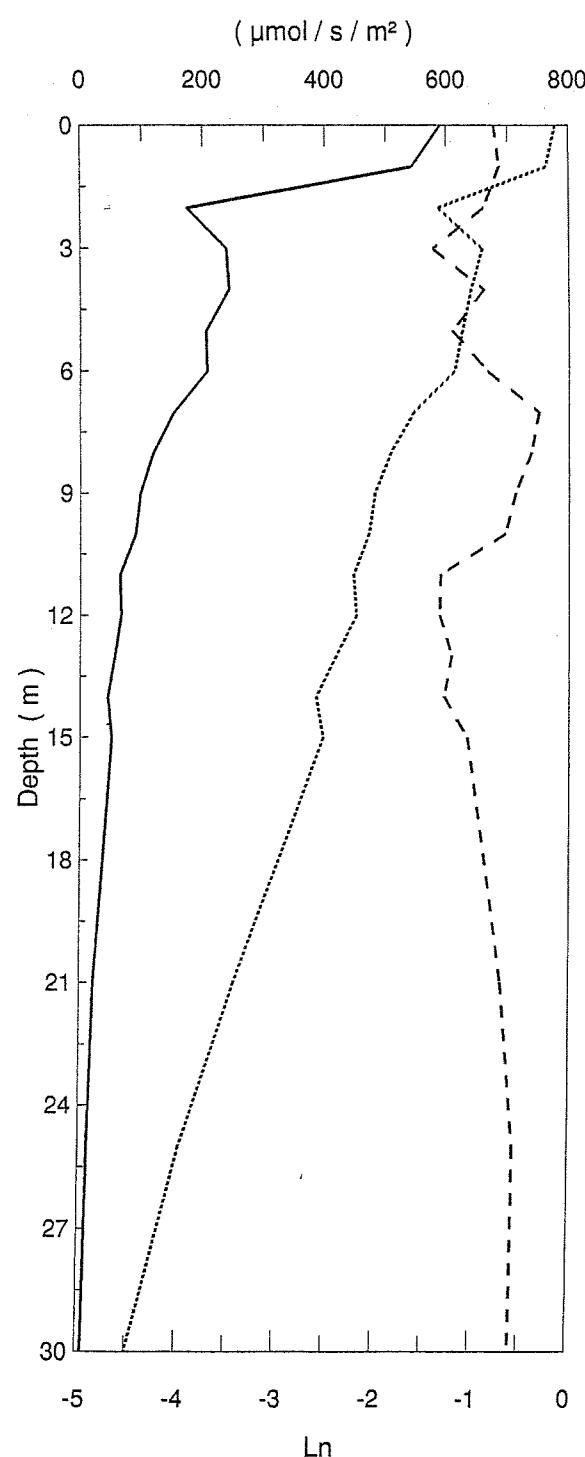


— Irradiance - Water
 - - - Irradiance - Sky Ln (Water Irrad / Sky Irrad)

Depth (m)	Irradiance Water ($\mu\text{mol}/\text{s}/\text{m}^2$)	Irradiance Sky ($\mu\text{mol}/\text{s}/\text{m}^2$)	Ln (Water / Sky)
	(Water / Sky)		
0	2015	1712	0.16
1	871	1716	-0.68
2	667	1704	-0.94
3	588	1625	-1.02
4	717	1618	-0.81
5	382	1767	-1.53
6	382	1835	-1.57
7	345	1851	-1.68
8	272	1833	-1.91
9	228	1837	-2.09
10	241	1783	-2.00
11	167	1839	-2.40
12	139	1816	-2.57
13	141	1796	-2.55
14	108	1860	-2.84
15	140	1818	-2.57
16	111	1822	-2.80
17	110	1837	-2.81
18	88	1830	-3.04
19	68	1843	-3.30
20	53	1807	-3.53
21	41	1681	-3.70
22	43	1816	-3.74
23	43	1827	-3.74
24	42	1802	-3.77
25	44	1827	-3.73
26	35	1807	-3.93
27	35	1746	-3.90
28	34	1754	-3.94
29	26	1763	-4.20
30	26	1696	-4.20
31	23	1752	-4.32
32	22	1739	-4.36
33	20	1789	-4.52
34	19	1752	-4.53
35	12	1688	-4.95

Survey 92-01

Station 3

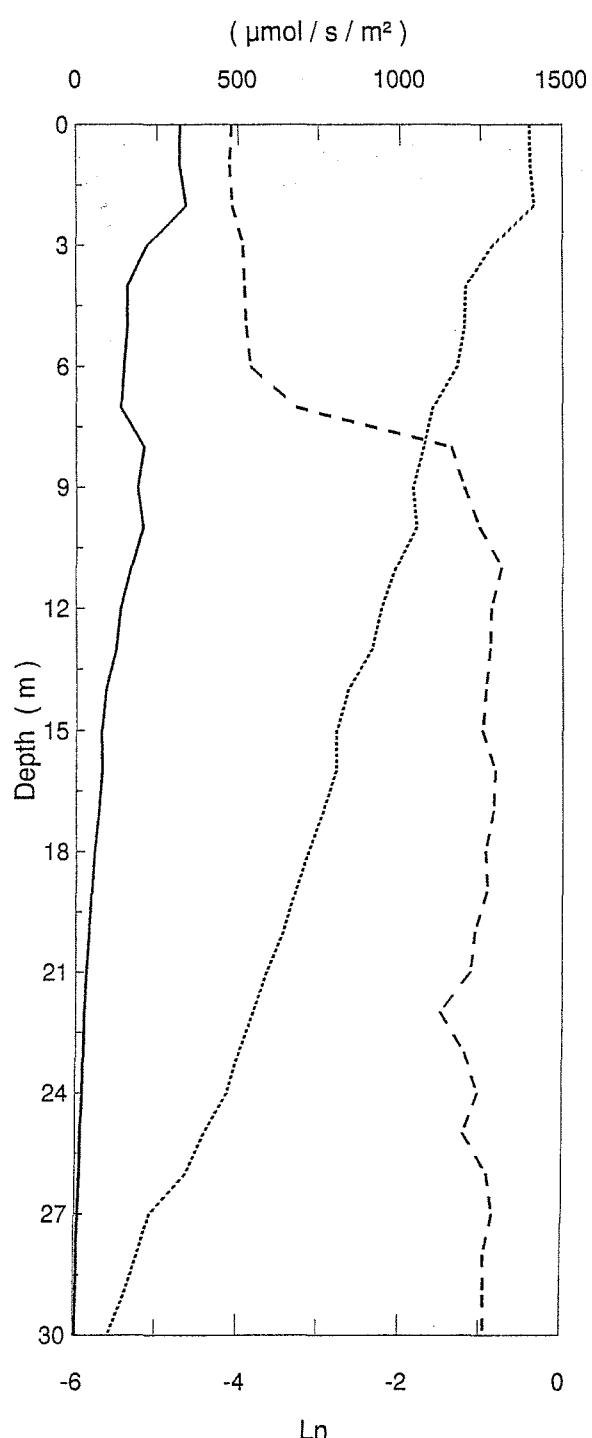


— Irradiance - Water
- - - Irradiance - Sky Ln (Water Irrad / Sky Irrad)

Depth (m)	Irradiance Water ($\mu\text{mol}/\text{s}/\text{m}^2$)	Irradiance Sky ($\mu\text{mol}/\text{s}/\text{m}^2$)	Ln (Water / Sky)
0	589	677	-0.14
1	542	686	-0.24
2	173	660	-1.34
3	237	577	-0.89
4	242	660	-1.01
5	204	609	-1.09
6	206	666	-1.17
7	152	750	-1.60
8	118	738	-1.83
9	97	712	-2.00
10	89	695	-2.06
11	64	589	-2.21
12	66	587	-2.19
13	55	607	-2.39
14	44	594	-2.60
15	50	633	-2.53
21	22	688	-3.44
25	13	709	-3.99
30	8	706	-4.50

Survey 92-01

Station 5

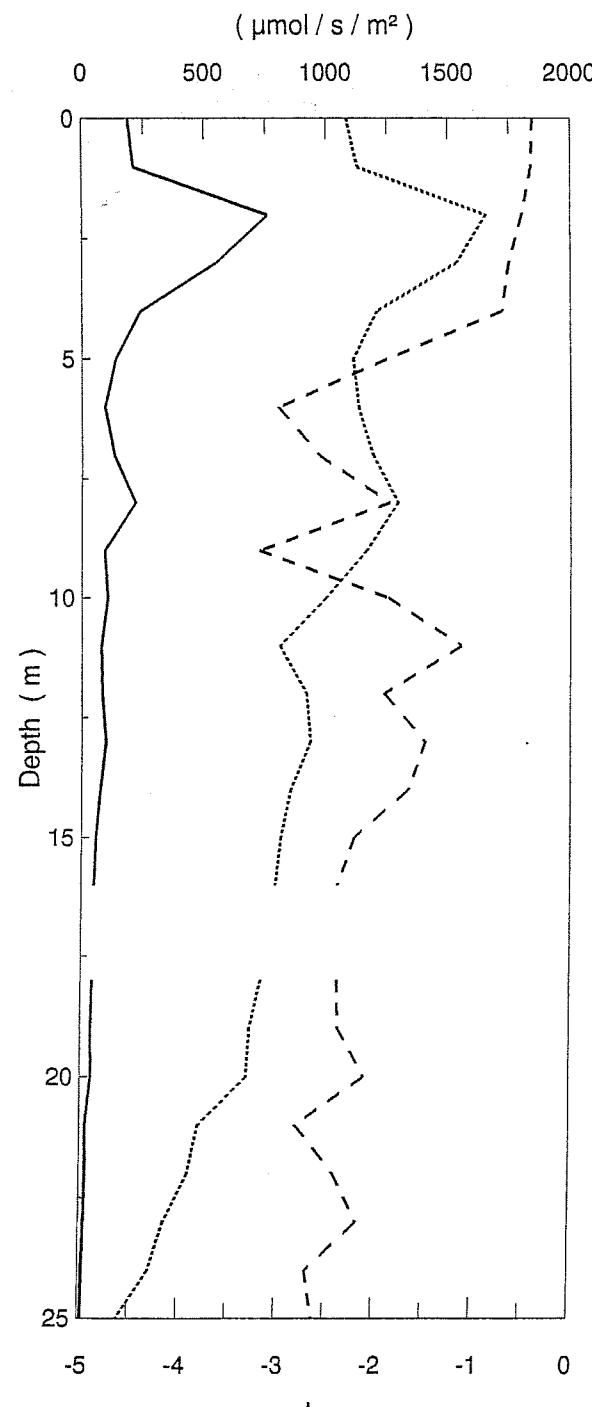


— Irradiance - Water
 - - - Irradiance - Sky Ln (Water Irrad / Sky Irrad)

Depth (m)	Irradiance Water (μmol/s/m²)	Irradiance Sky (μmol/s/m²)	Ln (Water / Sky)
0	320	478	-0.40
1	317	472	-0.40
2	337	479	-0.35
3	216	513	-0.86
4	156	518	-1.20
5	155	521	-1.21
6	145	534	-1.31
7	136	676	-1.61
8	207	1155	-1.72
9	187	1194	-1.86
10	203	1241	-1.81
11	166	1310	-2.07
12	135	1278	-2.25
13	120	1274	-2.36
14	88	1261	-2.66
15	76	1251	-2.80
16	78	1291	-2.81
17	66	1285	-2.96
18	54	1260	-3.15
19	46	1265	-3.31
20	39	1229	-3.45
21	31	1215	-3.66
22	25	1122	-3.82
23	22	1196	-4.00
24	20	1238	-4.14
25	14	1193	-4.42
26	12	1267	-4.65
27	8	1285	-5.09
28	7	1261	-5.23
29	6	1262	-5.39
30	5	1264	-5.58

Survey 92-01

Station 6

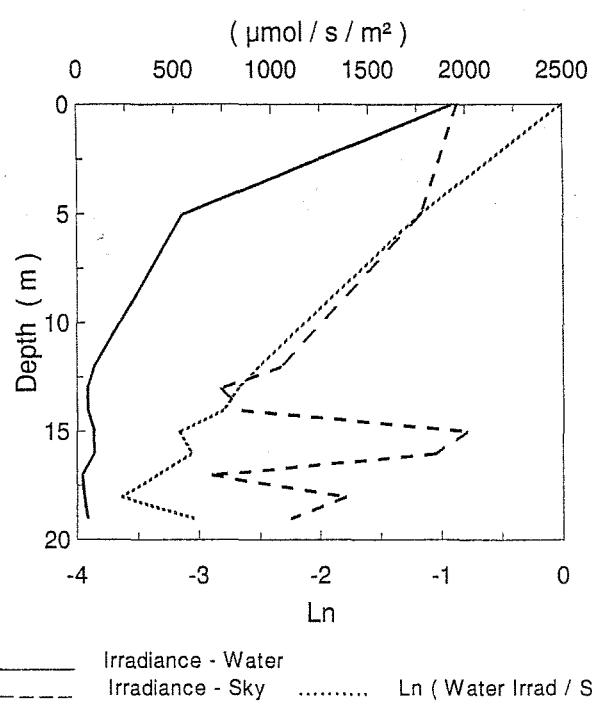


— Irradiance - Water
 - - - Irradiance - Sky Ln (Water Irrad / Sky Irrad)

Depth (m)	Irradiance Water ($\mu\text{mol}/\text{s}/\text{m}^2$)	Irradiance Sky ($\mu\text{mol}/\text{s}/\text{m}^2$)	Ln (Water / Sky)
0	187	1843	-2.29
1	208	1839	-2.18
2	757	1800	-0.87
3	546	1747	-1.16
4	237	1720	-1.98
5	134	1246	-2.23
6	91	800	-2.17
7	128	968	-2.02
8	214	1259	-1.77
9	90	723	-2.09
10	102	1254	-2.51
11	79	1554	-2.99
12	82	1236	-2.71
13	97	1405	-2.67
14	75	1336	-2.87
15	57	1115	-2.97
16	51	1047	-3.03
17			
18	44	1046	-3.17
19	39	1051	-3.28
20	42	1158	-3.31
21	20	877	-3.80
22	21	1035	-3.91
23	18	1132	-4.15
24	13	923	-4.30
25	9	955	-4.62

Survey 92-01

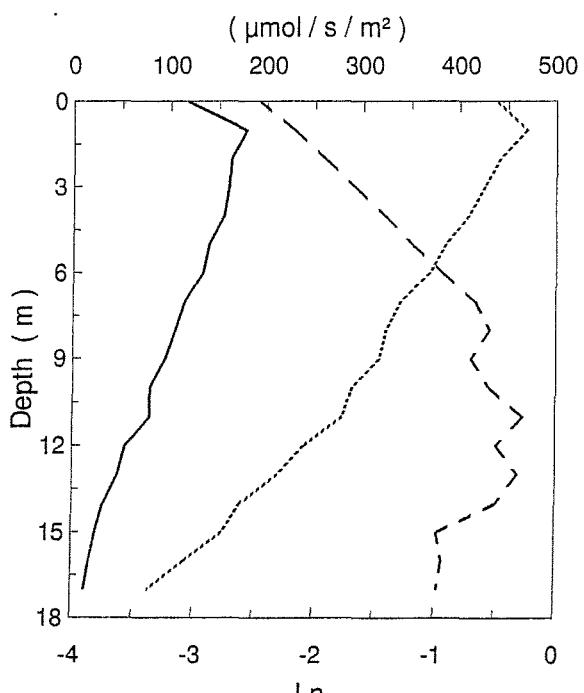
Station 7



Depth (m)	Irradiance Water ($\mu\text{mol}/\text{s}/\text{m}^2$)	Irradiance Sky ($\mu\text{mol}/\text{s}/\text{m}^2$)	Ln (Water / Sky)
0	1929	1957	-0.01
5	540	1765	-1.18
12	85	1046	-2.51
13	50	734	-2.68
14	51	842	-2.80
15	85	2006	-3.16
16	86	1841	-3.06
17	24	690	-3.34
18	36	1380	-3.64
19	53	1094	-3.04

Survey 92-01

Station 8

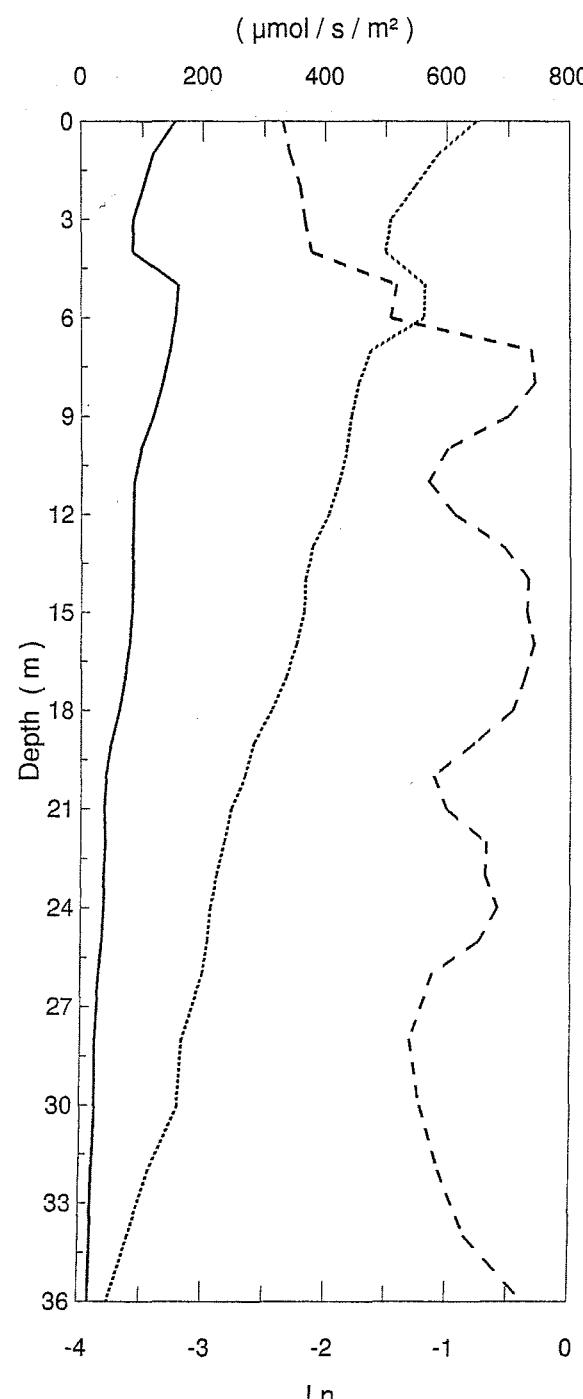


Depth (m)	Irradiance Water ($\mu\text{mol}/\text{s}/\text{m}^2$)	Irradiance Sky ($\mu\text{mol}/\text{s}/\text{m}^2$)	Ln (Water / Sky)
0	116	191	-0.50
1	177	228	-0.25
2	162	260	-0.47
3	160	291	-0.60
4	155	322	-0.73
5	139	350	-0.92
6	133	382	-1.05
7	115	416	-1.29
8	105	431	-1.41
9	95	412	-1.47
10	79	430	-1.69
11	79	466	-1.77
12	54	438	-2.09
13	46	461	-2.31
14	32	438	-2.61
15	24	377	-2.76
16	18	383	-3.08
17	13	378	-3.37

— Irradiance - Water
- - - Irradiance - Sky $\ln(\text{Water Irrad} / \text{Sky Irrad})$

Survey 92-01

Station 9

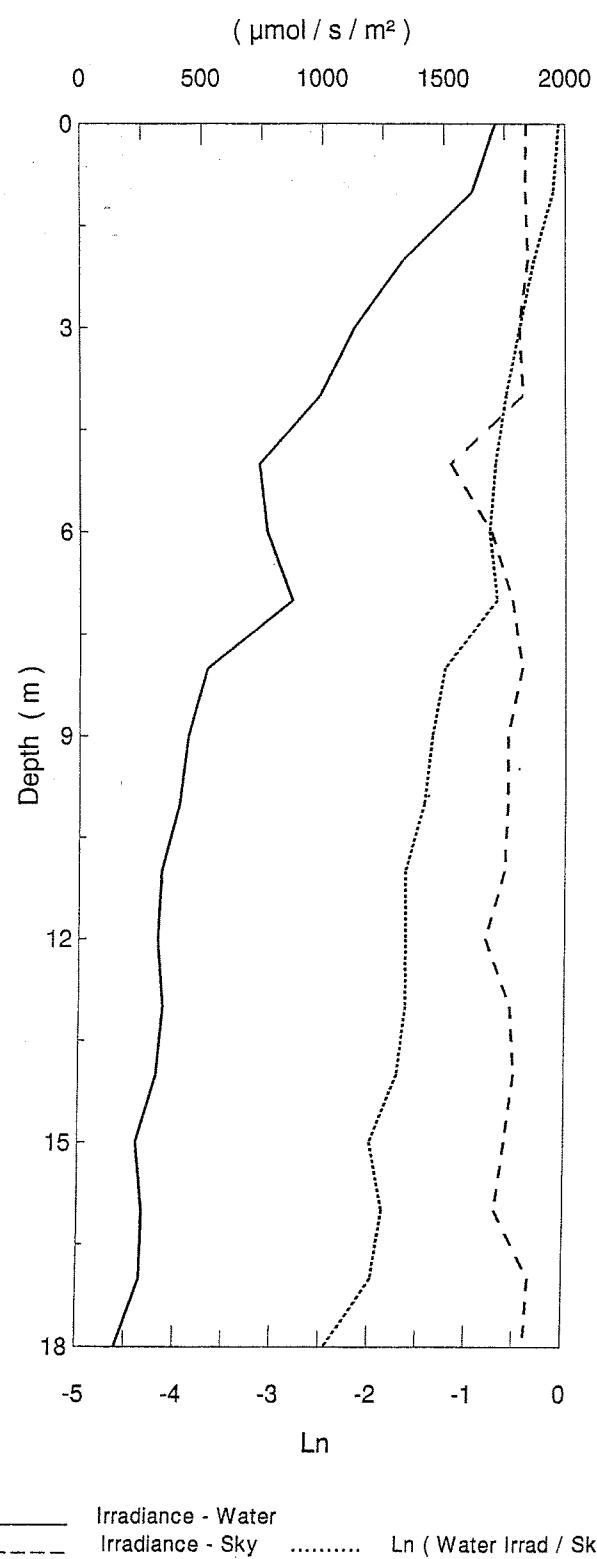


— Irradiance - Water
 - - - Irradiance - Sky Ln (Water Irrad / Sky Irrad)

Depth (m)	Irradiance Water (μmol/s/m²)	Irradiance Sky (μmol/s/m²)	Ln (Water / Sky)
0	152	329	-0.77
1	116	341	-1.08
2	101	358	-1.27
3	84	365	-1.46
4	83	375	-1.51
5	157	516	-1.19
6	153	506	-1.20
7	143	736	-1.64
8	131	742	-1.73
9	116	699	-1.79
10	96	598	-1.83
11	85	568	-1.90
12	84	610	-1.98
13	83	690	-2.11
14	83	731	-2.18
15	82	728	-2.19
16	78	740	-2.25
17	70	724	-2.34
18	61	706	-2.45
19	48	642	-2.60
20	40	575	-2.67
21	37	597	-2.78
22	39	662	-2.84
23	36	660	-2.90
24	36	679	-2.95
25	33	649	-2.98
26	28	574	-3.02
28	22	537	-3.18
30	22	554	-3.22
32	19	585	-3.45
34	17	628	-3.61
36	17	727	-3.76

Survey 92-01

Station 10

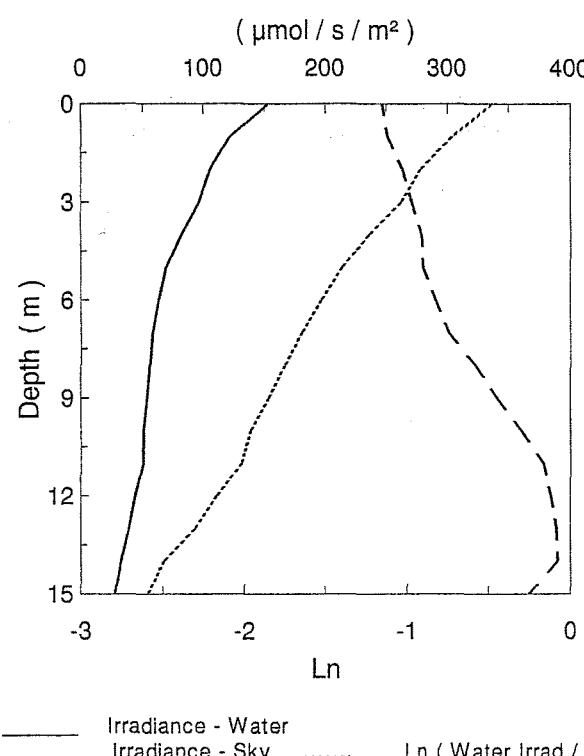


Depth (m)	Irradiance Water ($\mu\text{mol}/\text{s}/\text{m}^2$)	Irradiance Sky ($\mu\text{mol}/\text{s}/\text{m}^2$)	$\ln(\text{Water Irrad} / \text{Sky Irrad})$
0	1709	1837	-0.07
1	1613	1835	-0.13
2	1327	1844	-0.33
3	1126	1808	-0.47
4	987	1824	-0.61
5	734	1524	-0.73
6	766	1692	-0.79
7	870	1779	-0.71
8	520	1820	-1.25
9	443	1761	-1.38
10	408	1762	-1.46
11	335	1748	-1.65
12	321	1671	-1.65
13	342	1774	-1.65
14	316	1791	-1.74
15	235	1754	-2.01
16	264	1715	-1.87
17	257	1860	-1.98
18	159	1844	-2.45
19	157	1889	-2.49
20	114	1805	-2.76
21	89	1739	-2.97
22	83	1662	-3.00
23	65	1507	-3.15
24	53	1515	-3.35
25	48	1611	-3.51
26	44	1638	-3.61
27	37	1686	-3.82

— Irradiance - Water
 - - - Irradiance - Sky $\ln(\text{Water Irrad} / \text{Sky Irrad})$

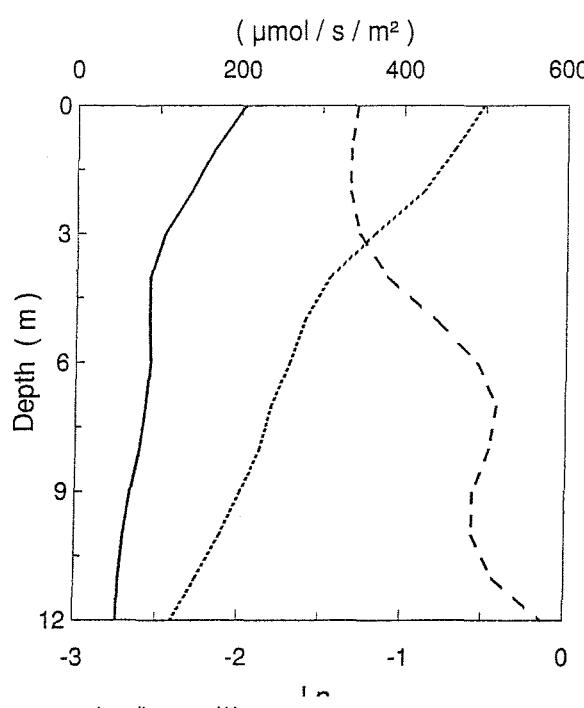
Survey 92-01

Station 11



Survey 92-01

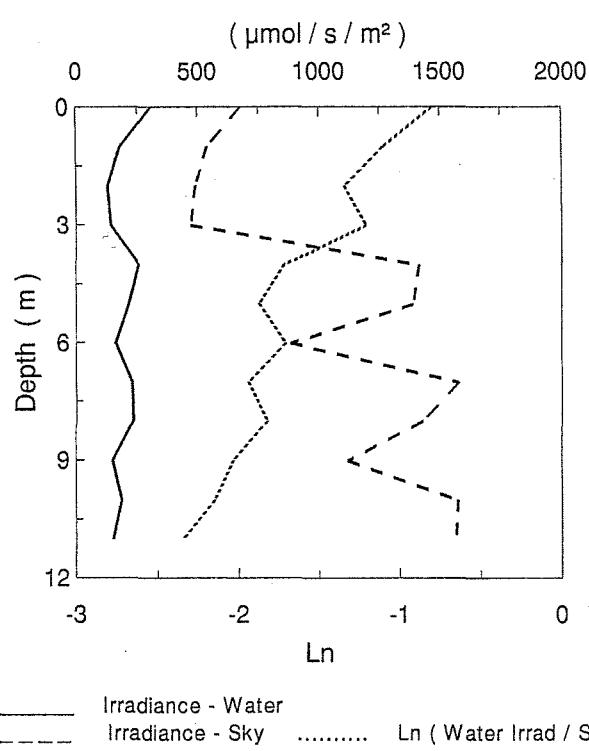
Station 12



— Irradiance - Water
- - - Irradiance - Sky $\ln(\text{Water Irrad} / \text{Sky Irrad})$

Survey 92-01

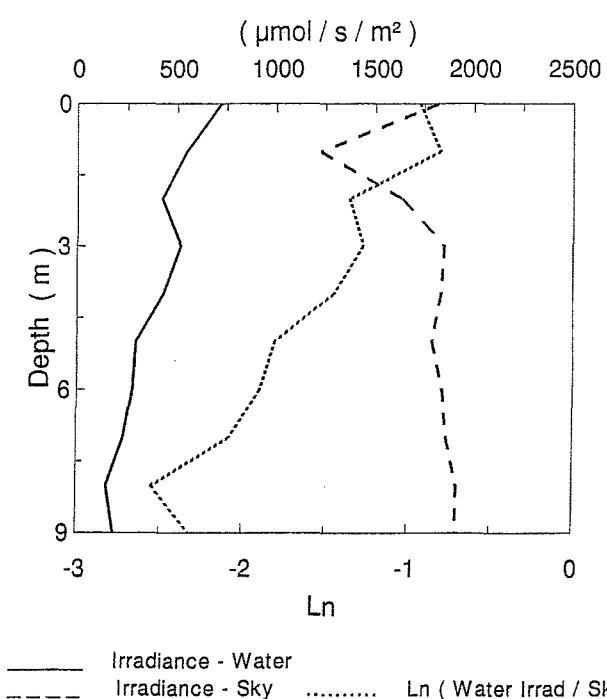
Station 13



Depth (m)	Irradiance Water ($\mu\text{mol}/\text{s}/\text{m}^2$)	Irradiance Sky ($\mu\text{mol}/\text{s}/\text{m}^2$)	Ln (Water / Sky)
0	304	676	-0.80
1	178	536	-1.11
2	127	488	-1.35
3	139	467	-1.21
4	253	1413	-1.72
5	213	1388	-1.87
6	159	880	-1.71
7	226	1573	-1.94
8	229	1424	-1.83
9	145	1114	-2.04
10	182	1570	-2.15
11	149	1561	-2.35

Survey 92-01

Station 14

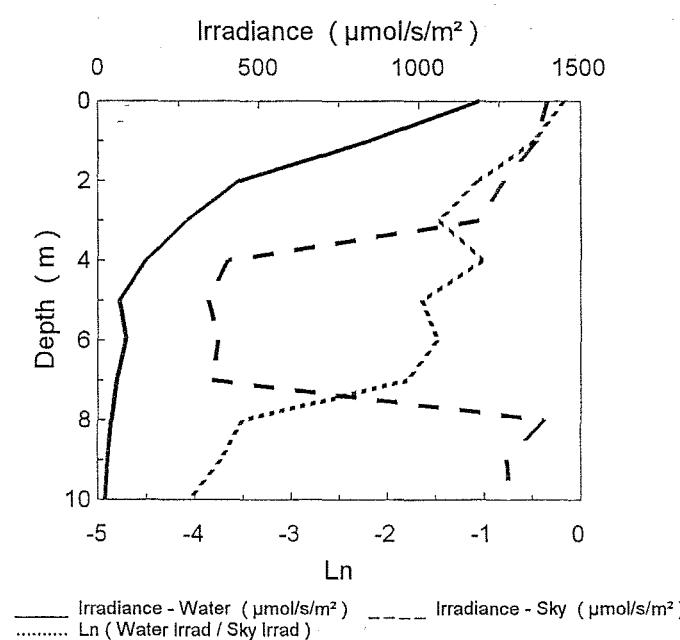


Depth (m)	Irradiance Water ($\mu\text{mol}/\text{s}/\text{m}^2$)	Irradiance Sky ($\mu\text{mol}/\text{s}/\text{m}^2$)	Ln (Water / Sky)
0	716	1816	-0.93
1	543	1220	-0.81
2	419	1633	-1.36
3	516	1849	-1.28
4	429	1832	-1.45
5	293	1788	-1.81
6	276	1839	-1.90
7	232	1862	-2.08
8	149	1914	-2.55
9	188	1909	-2.32

Appendix 7.3 Survey 92-02 irradiance ($\mu\text{mol} / \text{s} / \text{m}^2$) profiles.

Survey 92-02

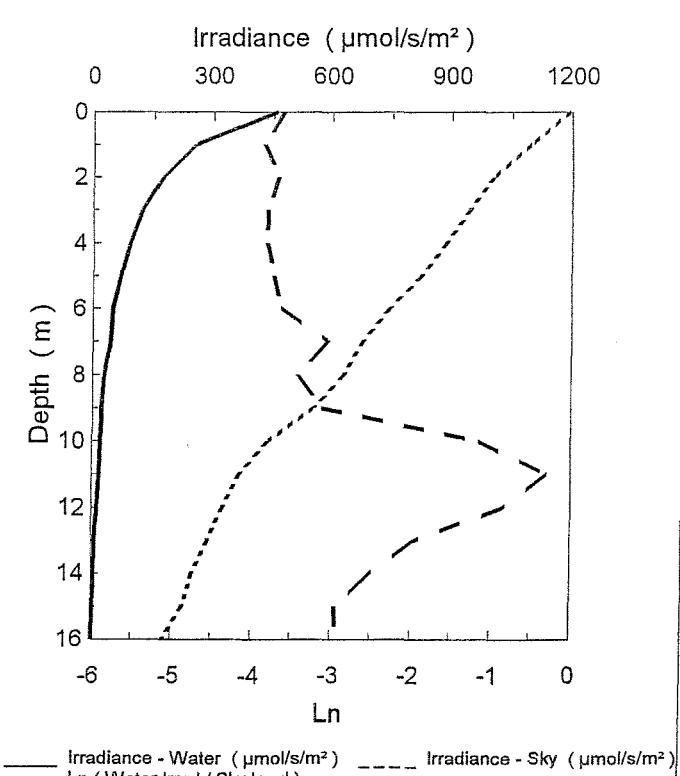
Station 1



Depth (m)	Irradiance Water ($\mu\text{mol}/\text{s}/\text{m}^2$)	Irradiance Sky ($\mu\text{mol}/\text{s}/\text{m}^2$)	Ln Water / Sky
0	1187	1398	-0.16
1	843	1364	-0.48
2	440	1263	-1.05
3	273	1186	-1.47
4	148	404	-1.00
5	67	343	-1.63
6	85	373	-1.47
7	59	354	-1.79
8	42	1388	-3.50
9	31	1271	-3.73
10	22	1281	-4.06

Survey 92-02

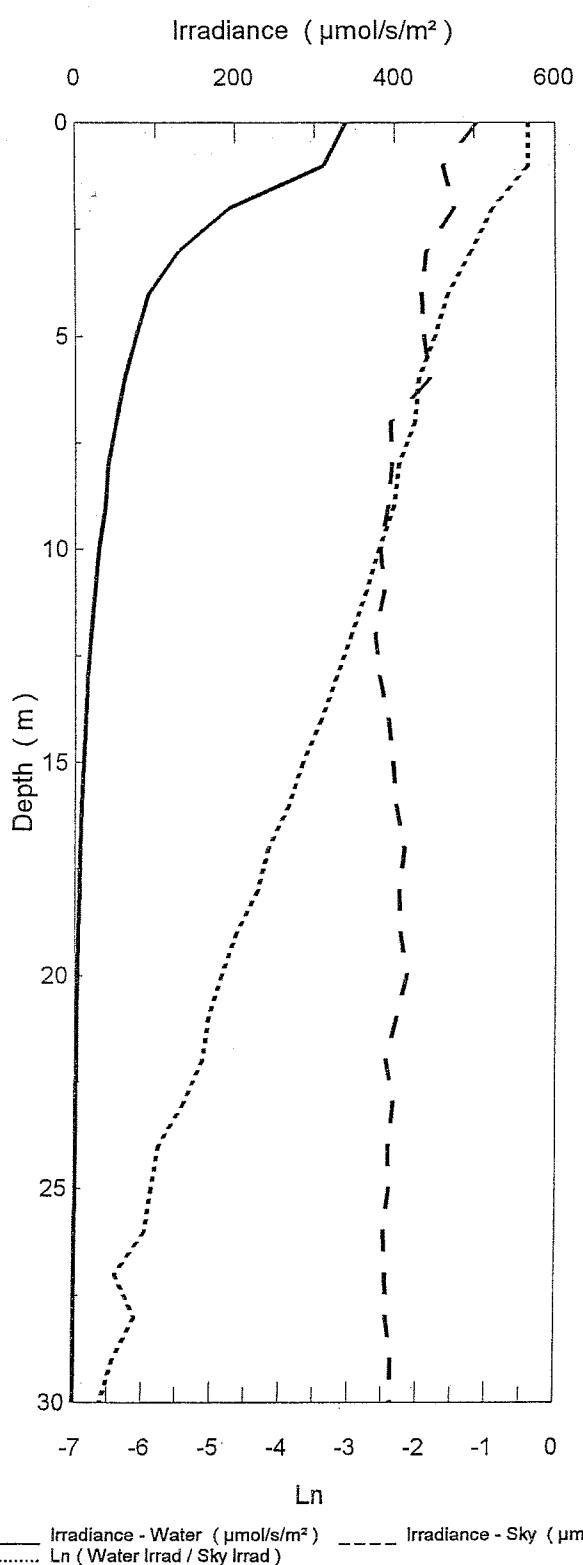
Station 2



Depth (m)	Irradiance Water ($\mu\text{mol}/\text{s}/\text{m}^2$)	Irradiance Sky ($\mu\text{mol}/\text{s}/\text{m}^2$)	Ln Water / Sky
0	458	476	-0.04
1	255	428	-0.52
2	172	462	-0.99
3	122	436	-1.28
4	90	435	-1.57
5	69	452	-1.89
6	48	470	-2.28
7	43	589	-2.62
8	30	514	-2.85
9	22	573	-3.24
10	22	969	-3.81
11	18	1140	-4.16
12	13	1030	-4.37
13	9	808	-4.55
14	6	697	-4.74
15	5	611	-4.86
16	4	615	-5.11

Survey 92-02

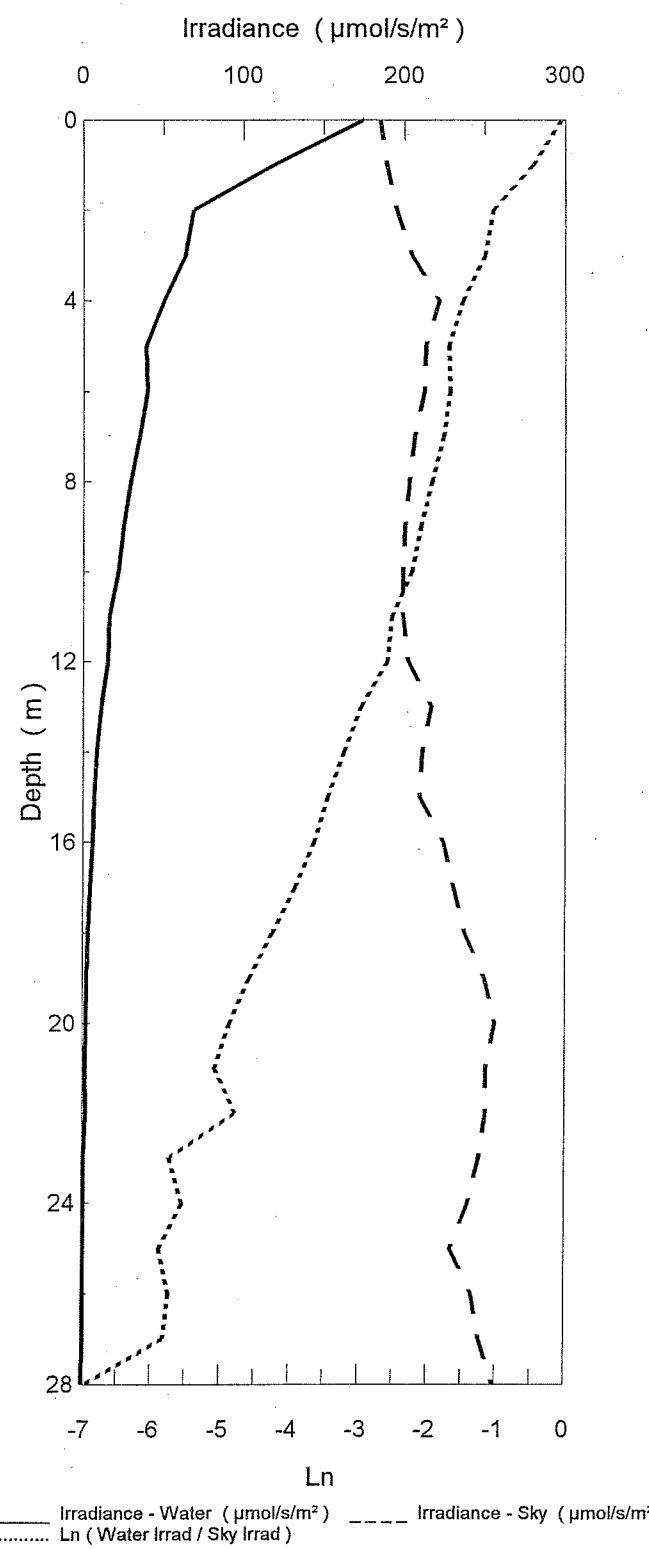
Station 3



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	339	503	-0.39
1	311	460	-0.39
2	192	474	-0.90
3	129	439	-1.22
4	91	433	-1.56
5	75	436	-1.76
6	61	442	-1.99
7	51	394	-2.05
8	40	395	-2.28
9	37	391	-2.35
10	29	381	-2.57
11	24	386	-2.76
12	19	375	-2.97
13	16	380	-3.19
14	13	392	-3.41
15	10	397	-3.69
16	8	401	-3.89
17	6	412	-4.18
18	5	405	-4.35
19	4	406	-4.65
20	3	415	-4.87
21	3	402	-5.05
22	2	389	-5.14
23	2	398	-5.40
24	1	392	-5.78
25	1	393	-5.88
26	1	387	-5.97
27	1	389	-6.40
28	1	391	-6.11
29	1	397	-6.42
30	1	397	-6.60

Survey 92-02

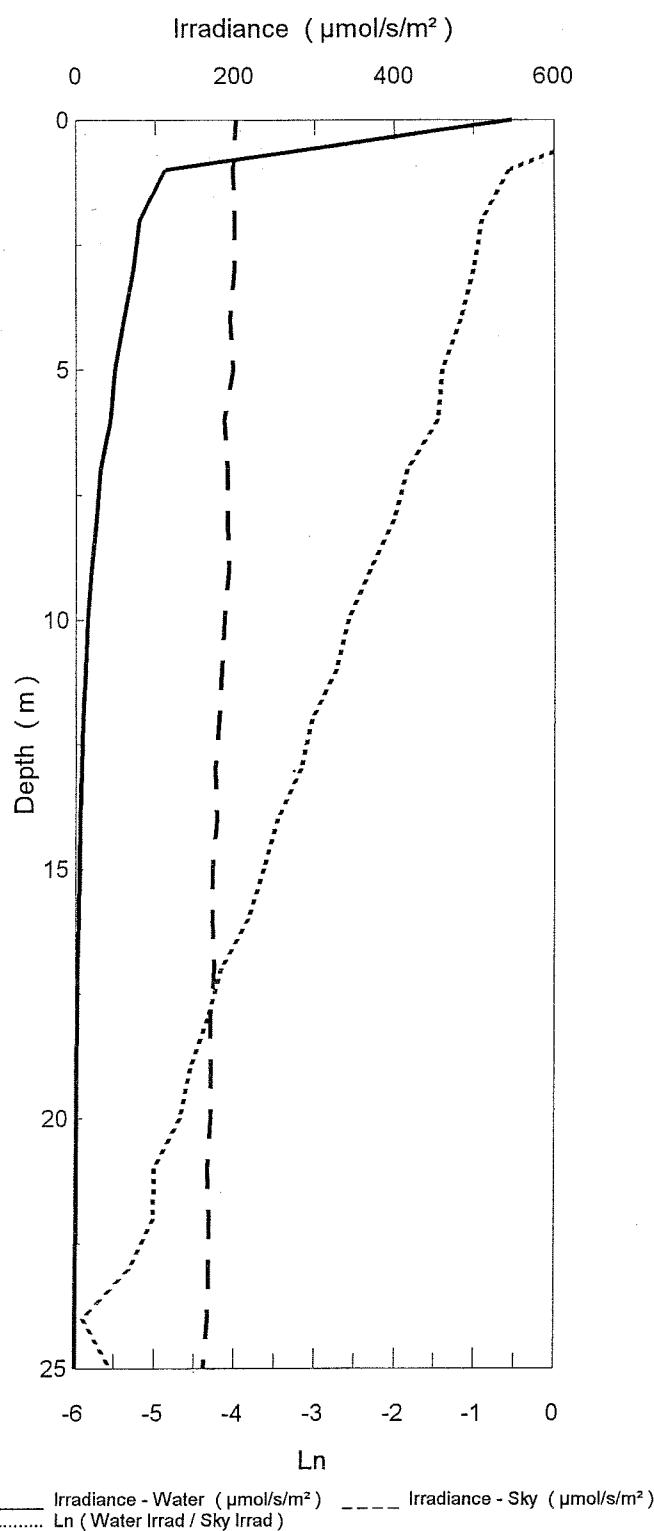
Station 4



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	\ln Water / Sky
0	174	185	-0.06
1	119	189	-0.47
2	68	195	-1.05
3	63	205	-1.17
4	50	221	-1.49
5	39	213	-1.70
6	40	212	-1.67
7	35	206	-1.77
8	29	203	-1.94
9	25	200	-2.09
10	21	199	-2.23
11	16	199	-2.52
12	15	202	-2.58
13	11	216	-2.96
14	9	211	-3.21
15	7	209	-3.45
16	6	224	-3.64
17	5	231	-3.92
18	3	237	-4.25
19	3	250	-4.59
20	2	256	-4.86
21	2	251	-5.08
22	2	251	-4.79
23	1	247	-5.74
24	1	240	-5.55
25	1	229	-5.88
26	1	242	-5.74
27	1	247	-5.81
28	0	256	-6.96

Survey 92-02

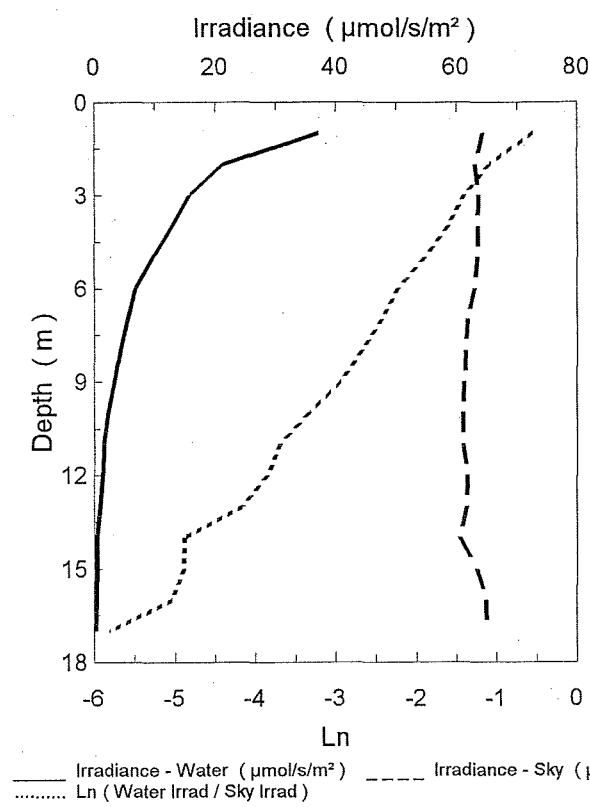
Station 5



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	$\ln(\text{Water Irrad} / \text{Sky Irrad})$
0	547	202	1.00
1	112	197	-0.56
2	81	199	-0.90
3	72	199	-1.01
4	60	194	-1.17
5	48	197	-1.40
6	43	186	-1.46
7	30	190	-1.84
8	25	190	-2.02
9	19	192	-2.31
10	14	186	-2.58
11	12	183	-2.74
12	9	180	-3.04
13	7	175	-3.18
14	6	177	-3.46
15	4	172	-3.65
16	4	171	-3.84
17	3	174	-4.17
18	2	170	-4.34
19	2	170	-4.55
20	2	170	-4.69
21	1	166	-5.00
22	1	168	-5.02
23	1	168	-5.31
24	0	167	-5.90
25	1	162	-5.55

Survey 92-02

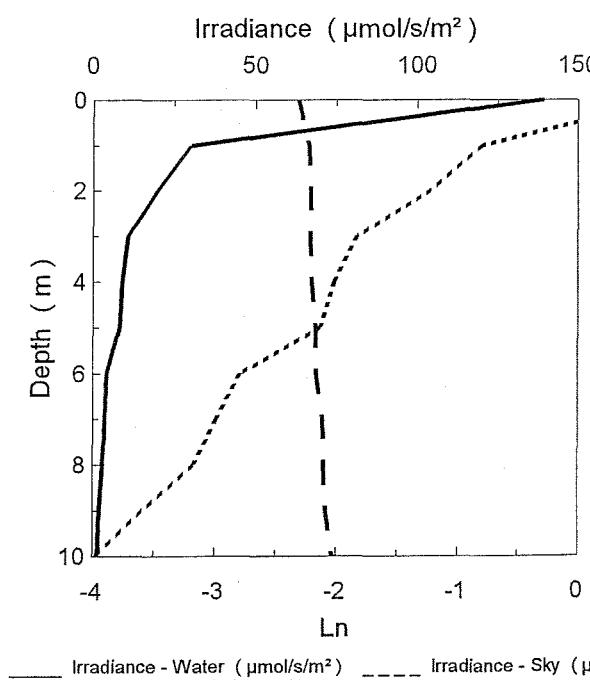
Station 6



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
1	37	64	-0.55
2	21	63	-1.09
3	16	64	-1.40
4	13	64	-1.61
5	10	64	-1.89
6	7	63	-2.23
7	5	62	-2.43
8	4	61	-2.68
9	3	61	-2.93
10	2	61	-3.33
11	2	61	-3.70
12	1	62	-3.85
13	1	62	-4.17
14	0	61	-4.89
15	0	63	-4.90
16	0	65	-5.03
17	0	65	-5.82

Survey 92-02

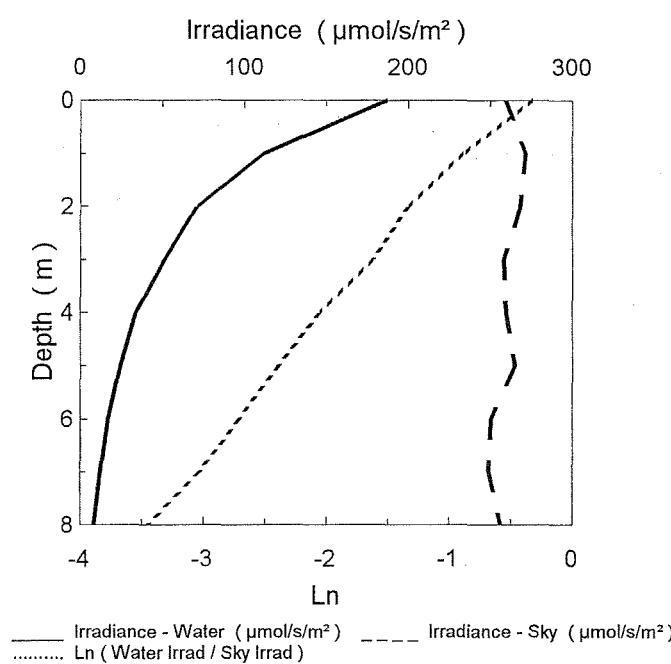
Station 7



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	139	63	0.79
1	30	67	-0.79
2	20	67	-1.22
3	11	67	-1.83
4	9	68	-2.01
5	8	69	-2.13
6	4	69	-2.79
7	4	71	-2.99
8	3	71	-3.17
9	2	72	-3.60
10	1	74	-3.98

Survey 92-02

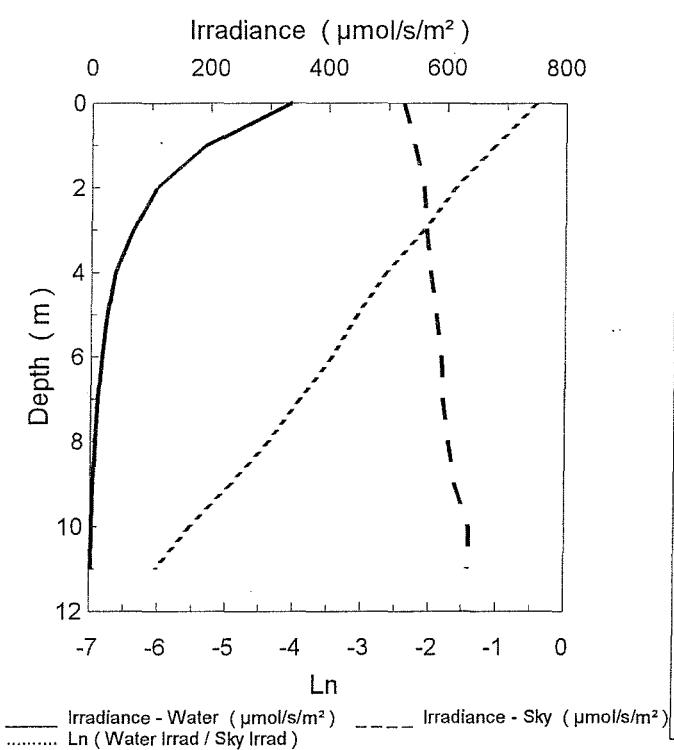
Station 8



Depth (m)	Irradiance Water (μmol/s/m²)	Irradiance Sky (μmol/s/m²)	Ln Water / Sky
0	187	259	-0.33
1	112	271	-0.89
2	70	268	-1.34
3	51	258	-1.62
4	33	260	-2.05
5	24	265	-2.39
6	17	250	-2.71
7	12	249	-3.04
8	8	256	-3.46

Survey 92-02

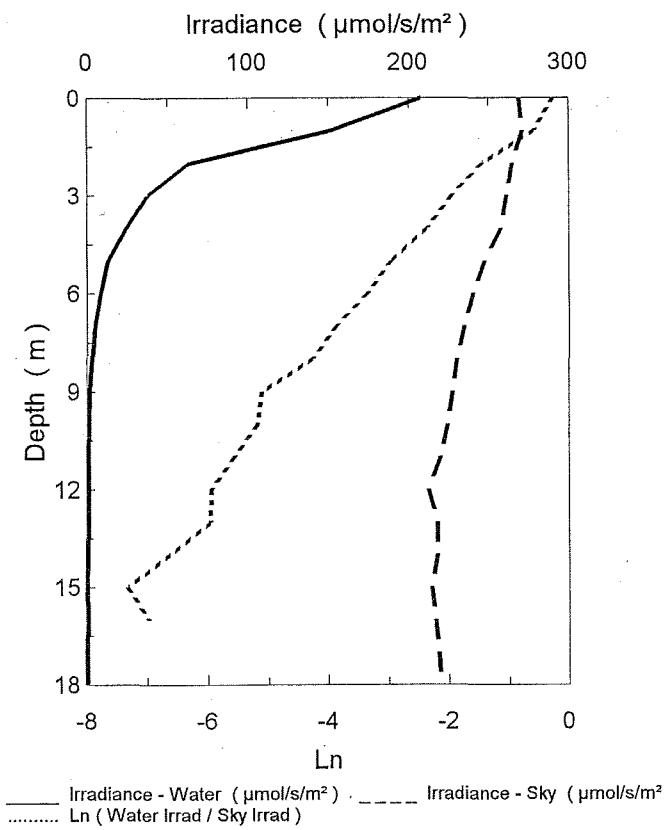
Station 9



Depth (m)	Irradiance Water (μmol/s/m²)	Irradiance Sky (μmol/s/m²)	Ln Water / Sky
0	336	525	-0.45
1	192	545	-1.04
2	109	560	-1.63
3	70	565	-2.09
4	40	572	-2.65
5	27	582	-3.07
6	19	591	-3.45
7	12	595	-3.91
8	8	603	-4.37
9	4	615	-4.92
10	3	639	-5.54
11	2	637	-6.03

Survey 92-02

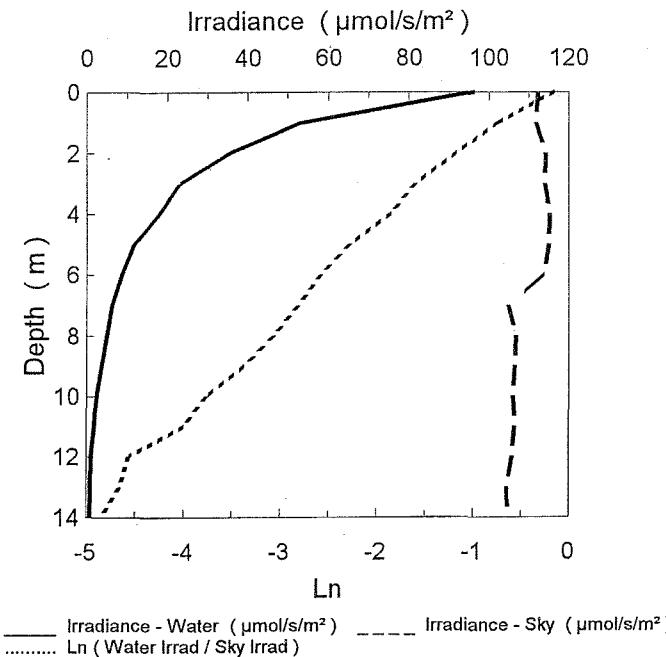
Station 10



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	208	269	-0.26
1	152	271	-0.58
2	63	265	-1.44
3	37	261	-1.95
4	24	258	-2.37
5	13	248	-2.96
6	8	240	-3.35
7	5	235	-3.87
8	3	230	-4.25
9	1	227	-5.10
10	1	224	-5.18
11	1	220	-5.56
12	1	212	-5.95
13	1	218	-5.96
14	0	218	-6.63
15	0	214	-7.34
16	0	217	-6.97
17	0	219	ERR
18	0	220	ERR

Survey 92-02

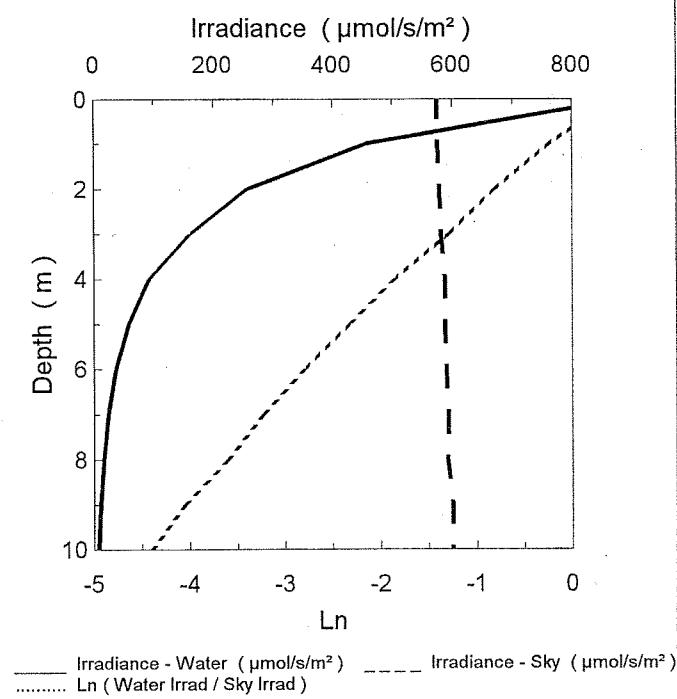
Station 11



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	96	112	-0.15
1	53	112	-0.75
2	35	114	-1.17
3	23	114	-1.60
4	18	115	-1.86
5	12	115	-2.28
6	9	114	-2.58
7	6	105	-2.81
8	5	107	-3.07
9	4	107	-3.38
10	2	106	-3.77
11	2	107	-4.00
12	1	106	-4.57
13	1	105	-4.66
14	1	105	-4.85

Survey 92-02

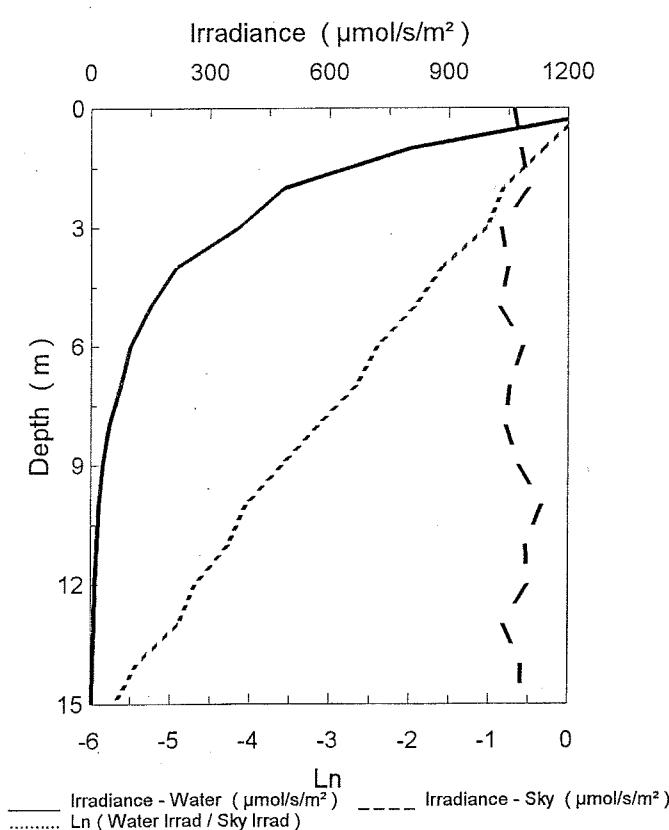
Station 12



Depth (m)	Irradiance Water (μmol/s/m²)	Irradiance Sky (μmol/s/m²)	Ln Water / Sky
0	892	574	0.44
1	456	575	-0.23
2	257	579	-0.81
3	161	581	-1.29
4	92	587	-1.85
5	58	587	-2.32
6	36	590	-2.80
7	24	592	-3.23
8	16	591	-3.59
9	10	600	-4.05
10	7	601	-4.39

Survey 92-02

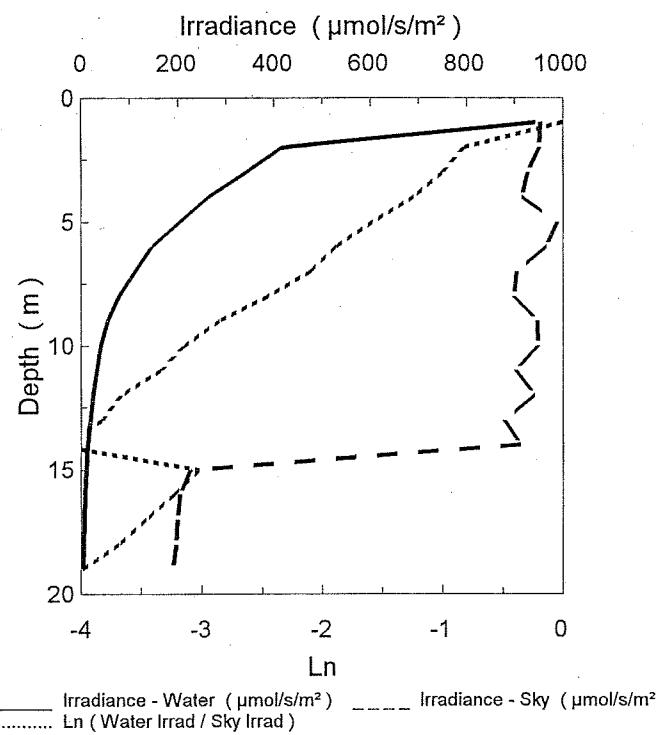
Station 13



Depth (m)	Irradiance Water (μmol/s/m²)	Irradiance Sky (μmol/s/m²)	Ln Water / Sky
0	1365	1063	0.25
1	805	1081	-0.29
2	486	1100	-0.82
3	371	1031	-1.02
4	215	1049	-1.58
5	148	1028	-1.94
6	98	1086	-2.40
7	73	1052	-2.66
8	45	1043	-3.15
9	29	1075	-3.60
10	20	1132	-4.06
11	15	1092	-4.28
12	10	1097	-4.69
13	8	1036	-4.90
14	5	1081	-5.42
15	4	1079	-5.69

Survey 92-02

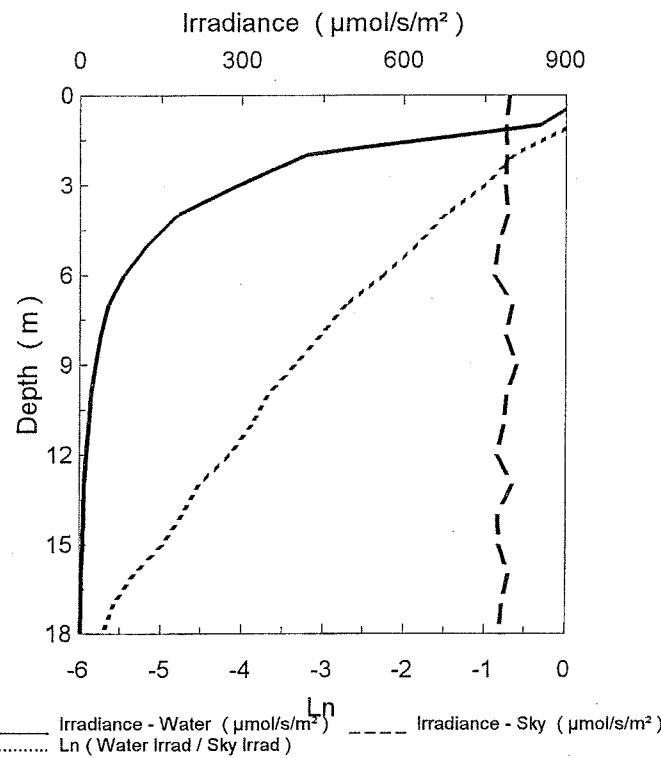
Station 14



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
1	943	954	-0.01
2	416	950	-0.83
3	341	927	-1.00
4	264	914	-1.24
5	203	987	-1.58
6	146	965	-1.89
7	111	904	-2.10
8	77	898	-2.46
9	55	947	-2.85
10	41	948	-3.15
11	32	902	-3.34
12	24	940	-3.68
13	19	878	-3.83
14	14	912	-4.21
15	11	226	-3.02
16	8	205	-3.23
17	6	200	-3.46
18	5	196	-3.69
19	3	189	-3.99

Survey 92-02

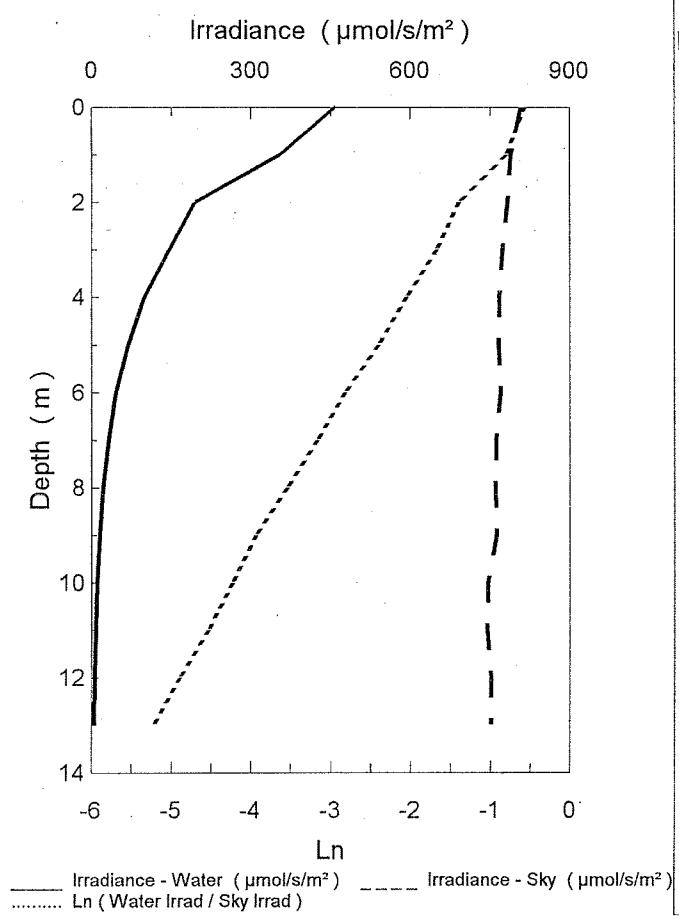
Station 15



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	941	796	0.17
1	852	790	0.08
2	419	791	-0.64
3	293	789	-0.99
4	180	793	-1.48
5	124	775	-1.84
6	81	768	-2.25
7	53	802	-2.72
8	38	789	-3.03
9	29	810	-3.35
10	20	791	-3.69
11	16	786	-3.88
12	12	773	-4.15
13	9	802	-4.52
14	7	775	-4.73
15	5	776	-4.97
16	4	794	-5.32
17	3	783	-5.57
18	3	777	-5.71

Survey 92-02

Station 16



Depth (m)	Irradiance Water ($\mu\text{mol/s/m}^2$)	Irradiance Sky ($\mu\text{mol/s/m}^2$)	Ln Water / Sky
0	457	808	-0.57
1	354	788	-0.80
2	194	782	-1.40
3	145	773	-1.67
4	99	767	-2.05
5	69	766	-2.41
6	46	769	-2.82
7	32	761	-3.16
8	22	760	-3.55
9	15	762	-3.93
10	11	745	-4.22
11	8	744	-4.53
12	6	751	-4.89
13	4	752	-5.22

Appendix 7.4 Number of data points, slope ($-k_2$) , intercept, standard error of coefficients, standardized regression coefficients and R^2 for the regression of $\ln(\text{WaterIrrad} / \text{Skylrrad})$ vs. depth (m) for the 1992 irradiance profiles.

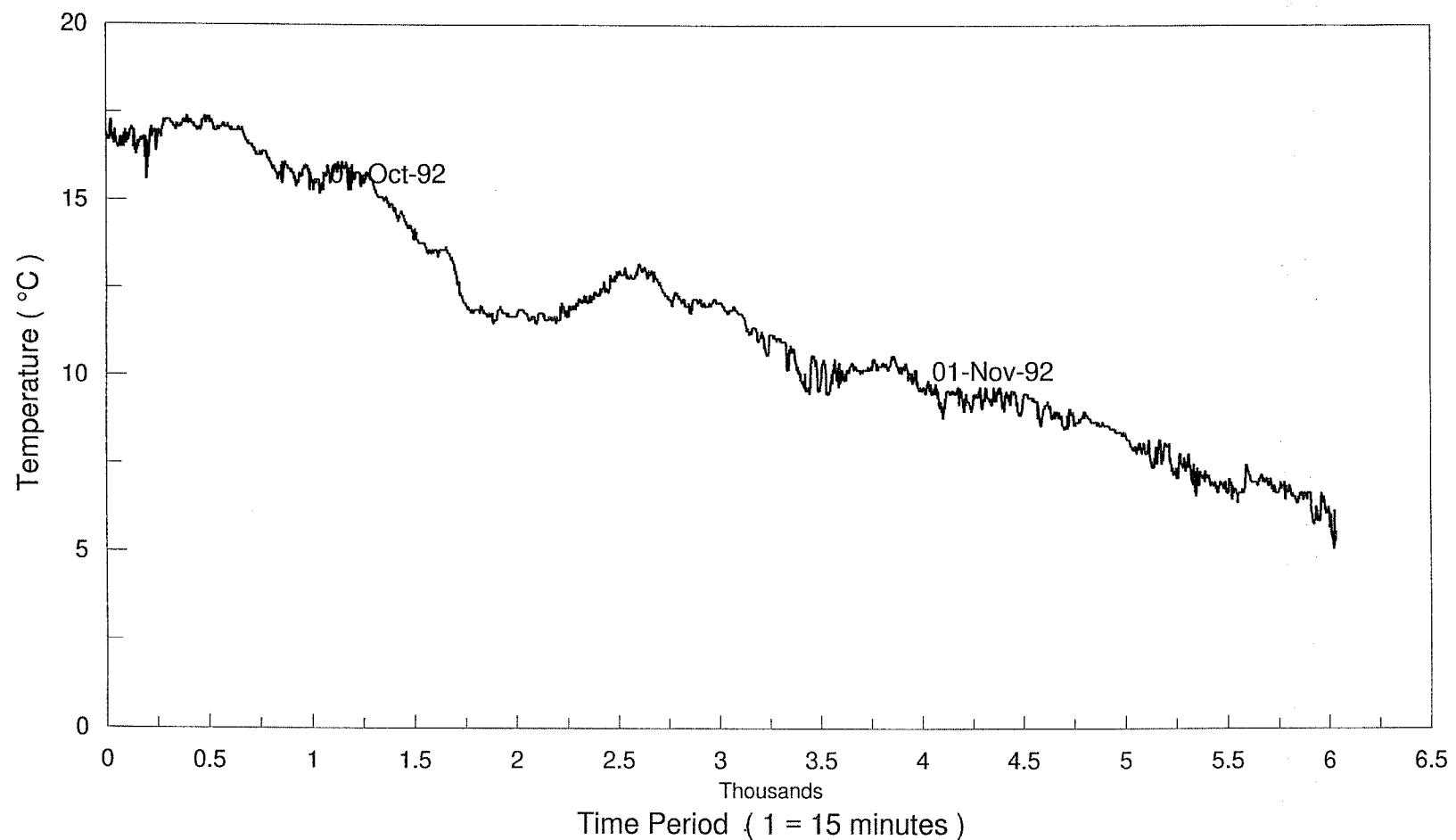
(Cardigan, P.E.I. Station 1: $(-k_2) = \ln(\text{WaterIrrad})$)

Survey	STATION	No. of data points	Slope $(-k_2)$	Intercept	Standard Error of Coefficients	Standardized Regression Coefficients	R^2
Cardigan, P.E.I.							
01		8	-0.30	6.03	0.09	0.02	0.97
02		6	-0.32	-0.39	0.13	0.04	0.94
03		14	-0.29	-0.34	0.08	0.01	0.98
04		10	-0.31	-0.30	0.10	0.02	0.97
05		9	-0.30	-0.02	0.09	0.02	0.97
06		14	-0.24	-0.60	0.04	0.01	0.99
07		8	-0.18	-1.01	0.15	0.04	0.82
08		5	0.11	-2.65	0.26	0.10	0.25
09		6	-0.20	-1.21	0.04	0.01	0.98
10		9	-0.32	-0.09	0.06	0.01	0.99
11		16	-0.28	-0.10	0.15	0.02	0.95
12		8	-0.23	-0.36	0.09	0.02	0.95
13		11	-0.35	-0.30	0.11	0.02	0.98
14		6	-0.08	-0.09	0.12	0.04	0.48
15		9	-0.27	-1.68	0.15	0.03	0.91
16		7	-0.28	-0.22	0.08	0.02	0.97
17		14	-0.08	-1.44	0.17	0.02	0.50
18		9	-0.24	-0.55	0.07	0.01	0.98
19		10	-0.33	-0.04	0.09	0.02	0.98
20		5	-0.33	-0.11	0.02	0.01	1.00
21		9	-0.27	-0.22	0.03	0.01	1.00
22		10	-0.25	-0.34	0.04	0.01	0.99
23		9	-0.25	-0.43	0.10	0.02	0.96
24		7	-0.24	-0.65	0.06	0.02	0.98
25		5	-0.35	-0.28	0.08	0.03	0.97

Survey	STATION	No. of data points	Slope ($-k_2$)	Intercept	Standard Error of Coefficients	Standardized Regression Coefficients	R²
Survey 92-01							
	01	31	-0.12	-0.54	0.09	0.01	0.95
	02	36	-0.12	-0.79	0.09	0.00	0.96
	03	19	-0.14	-0.52	0.09	0.01	0.96
	05	31	-0.17	-0.26	0.06	0.00	0.99
	06	25	-0.11	-1.40	0.14	0.01	0.84
	07	10	-0.18	-0.22	0.20	0.01	0.95
	08	18	-0.18	-0.08	0.08	0.01	0.97
	09	32	-0.08	-1.04	0.04	0.00	0.98
	10	28	-0.14	-0.01	0.05	0.00	0.99
	11	16	-0.13	-0.65	0.03	0.00	0.99
	12	13	-0.15	-0.66	0.06	0.01	0.97
	13	12	-0.12	-1.00	0.08	0.01	0.90
	14	10	-0.19	-0.82	0.09	0.02	0.93
Survey 92-02							
	01	11	-0.37	0.01	0.29	0.05	0.87
	02	17	-0.32	-0.30	0.09	0.01	0.99
	03	31	-0.21	-0.54	0.05	0.00	0.99
	04	29	-0.22	-0.29	0.09	0.01	0.98
	05	26	-0.23	-0.14	0.10	0.01	0.98
	06	17	-0.30	-0.35	0.08	0.01	0.99
	07	11	-0.40	-0.16	0.23	0.04	0.92
	08	9	-0.37	-0.48	0.05	0.01	0.99
	09	12	-0.49	-0.56	0.05	0.01	1.00
	10	17	-0.44	-0.59	0.14	0.01	0.98
	11	15	-0.33	-0.48	0.07	0.01	0.99
	12	11	-0.48	0.20	0.08	0.01	0.99
	13	16	-0.39	0.06	0.05	0.01	1.00
	14	19	-0.20	-0.64	0.25	0.02	0.83
	15	19	-0.33	-0.08	0.10	0.01	0.99
	16	14	-0.36	-0.59	0.03	0.00	1.00

Appendix 8.1.1

Water Temperature (°C) 16-Sep-92 to 18-Nov-92
C1 - 4m, Cardigan, P.E.I.



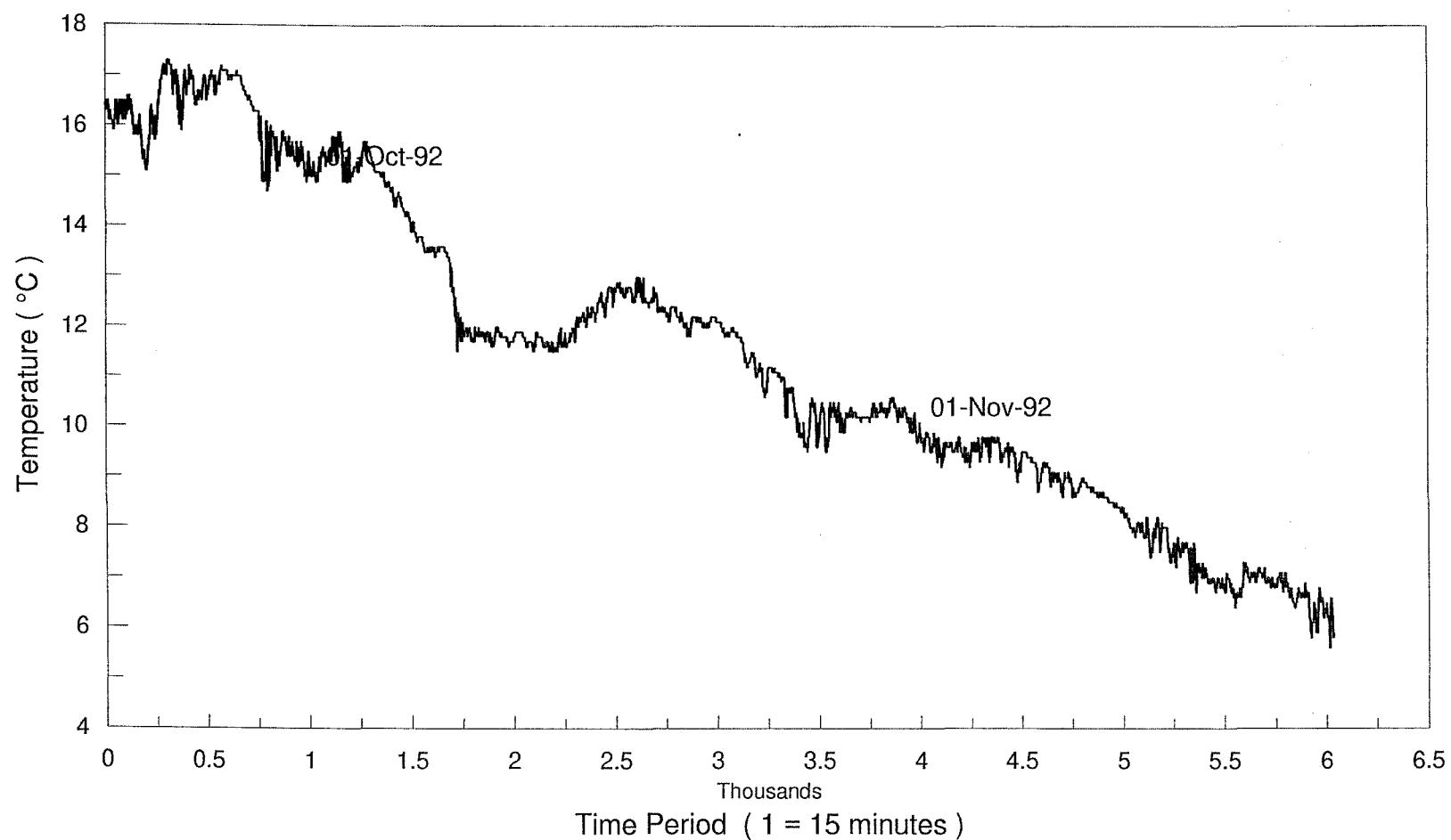
APPENDIX 8.1.2 Daily and monthly average, minimum and maximum water temperature (°C) at Cardigan, PEI site C1 at 4m, 16-Sep-92 to 18-Nov-92.

Month	Day	Avg. Temp. (°C)	Min. Temp. (°C)	Max. Temp. (°C)	Month	Day	Avg. Temp. (°C)	Min. Temp. (°C)	Max. Temp. (°C)
Sep					Oct				
	16	16.91	16.70	17.30		1	14.64	14.20	14.90
	17	16.76	16.50	17.10		2	13.95	13.60	14.30
	18	16.66	15.60	17.10		3	13.57	13.40	13.70
	19	17.07	16.40	17.30		4	12.81	12.00	13.60
	20	17.19	17.00	17.40		5	11.89	11.80	12.00
	21	17.19	17.00	17.40		6	11.76	11.50	12.00
	22	17.11	17.00	17.30		7	11.78	11.70	11.90
	23	16.90	16.60	17.10		8	11.70	11.50	11.80
	24	16.37	16.10	16.60		9	11.70	11.50	12.10
	25	15.89	15.50	16.10		10	12.00	11.70	12.20
	26	15.78	15.40	16.00		11	12.29	12.10	12.60
	27	15.60	15.20	16.00		12	12.74	12.40	13.00
	28	15.88	15.30	16.10		13	12.93	12.80	13.20
	29	15.69	15.30	15.90		14	12.85	12.50	13.10
	30	15.25	14.90	15.70		15	12.27	12.00	12.50
Sep		16.39	14.90	17.40		16	12.10	11.80	12.20
						17	12.08	12.00	12.20
						18	11.92	11.80	12.10
						19	11.43	11.00	11.80
						20	11.04	10.60	11.30
						21	10.73	10.20	11.10
						22	10.05	9.50	10.60
						23	9.96	9.50	10.50
						24	10.15	9.70	10.40
						25	10.24	10.10	10.50
						26	10.36	10.20	10.60
						27	10.16	9.80	10.40
						28	9.71	9.50	10.20
						29	9.41	8.80	9.80
						30	9.38	9.00	9.70
						31	9.41	9.10	9.70
					Oct		11.52	8.80	14.90

Month	Day	Avg. Temp. (°C)	Min. Temp. (°C)	Max. Temp. (°C)
Nov				
	1	9.46	9.00	9.70
	2	9.32	8.90	9.60
	3	9.09	8.60	9.40
	4	8.79	8.50	9.10
	5	8.81	8.60	9.00
	6	8.64	8.50	8.70
	7	8.37	8.10	8.50
	8	7.96	7.80	8.20
	9	7.81	7.40	8.20
	10	7.45	7.10	7.80
	11	7.15	6.60	7.50
	12	6.89	6.70	7.10
	13	6.85	6.40	7.50
	14	7.06	6.90	7.30
	15	6.84	6.50	7.10
	16	6.64	6.40	6.90
	17	6.26	5.80	6.70
	18	5.78	5.10	6.30
Nov		7.79	5.10	9.70

Appendix 8.2.1

Water Temperature (°C) 16-Sep-92 to 18-Nov-92
C1 - 7m, Cardigan, P.E.I.



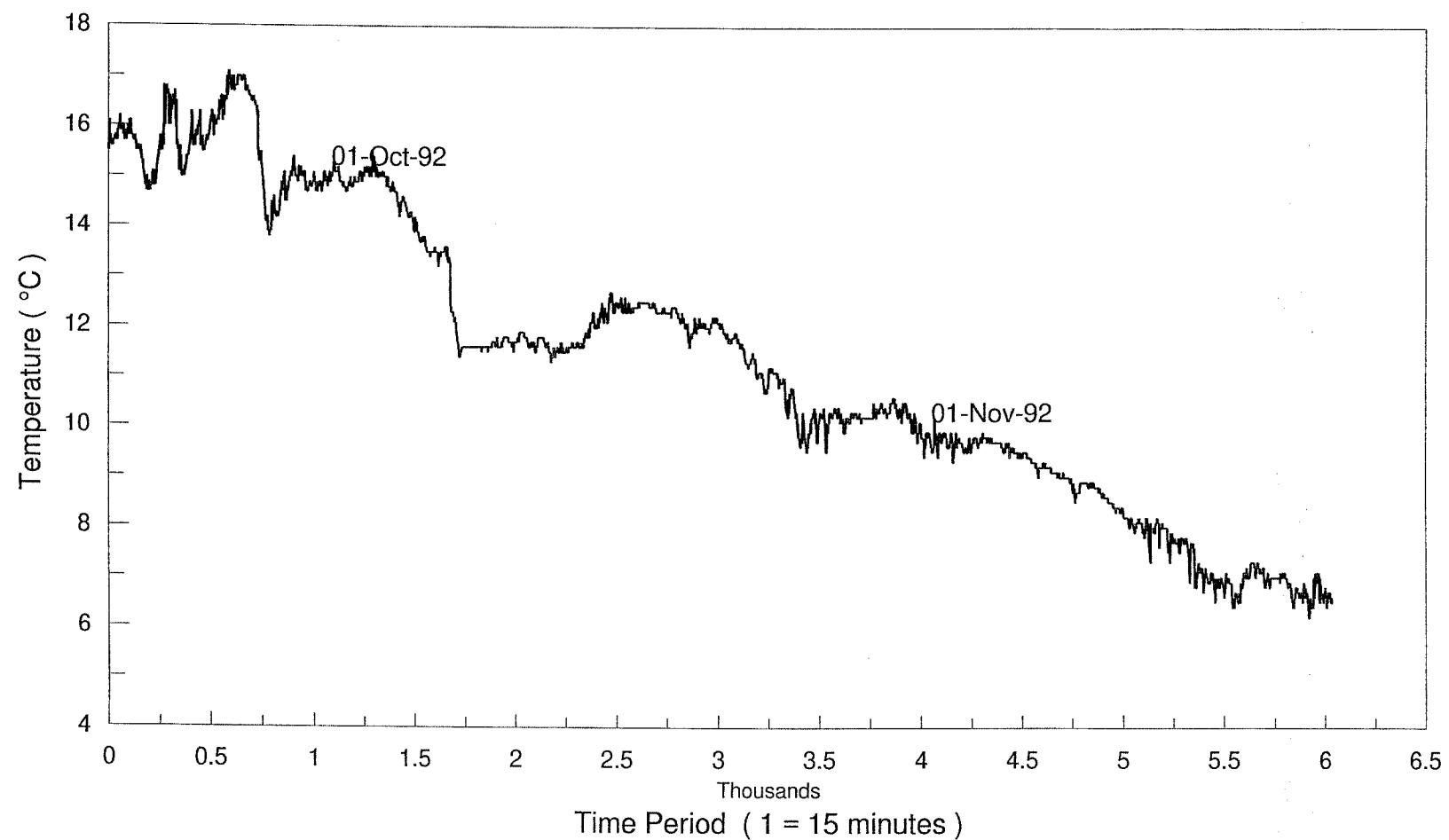
APPENDIX 8.2.2 Daily and monthly average, minimum and maximum water temperature (°C) at Cardigan, PEI site C1 at 7m, 16-Sep-92 to 18-Nov-92.

Month	Day	Avg. Temp. (°C)	Min. Temp. (°C)	Max. Temp. (°C)	Month	Day	Avg. Temp. (°C)	Min. Temp. (°C)	Max. Temp. (°C)
Sep					Oct				
	16	16.28	16.10	16.50		1	14.61	14.20	14.90
	17	16.28	15.90	16.60		2	13.94	13.50	14.30
	18	15.74	15.10	16.40		3	13.54	13.40	13.60
	19	16.68	15.70	17.30		4	12.62	11.50	13.60
	20	16.76	15.90	17.20		5	11.87	11.70	12.00
	21	16.72	16.40	17.10		6	11.82	11.60	12.00
	22	16.99	16.60	17.20		7	11.80	11.60	11.90
	23	16.89	16.50	17.10		8	11.73	11.50	11.90
	24	15.96	14.90	16.60		9	11.65	11.50	12.00
	25	15.58	14.70	16.00		10	11.87	11.60	12.20
	26	15.39	15.00	15.80		11	12.30	12.00	12.70
	27	15.19	14.90	15.60		12	12.66	12.20	12.90
	28	15.48	14.90	15.90		13	12.73	12.50	13.00
	29	15.23	14.90	15.70		14	12.55	12.30	13.00
	30	15.23	14.90	15.70		15	12.31	12.10	12.40
Sep		16.01	14.70	17.30		16	12.09	11.80	12.30
						17	12.10	12.00	12.20
						18	11.93	11.80	12.10
						19	11.45	11.00	11.80
						20	11.05	10.60	11.30
						21	10.72	10.20	11.10
						22	10.02	9.50	10.60
						23	10.08	9.50	10.50
						24	10.20	9.90	10.50
						25	10.23	10.10	10.50
						26	10.38	10.20	10.60
						27	10.23	9.90	10.50
						28	9.78	9.50	10.30
						29	9.59	9.20	9.90
						30	9.52	9.20	9.80
						31	9.61	9.30	9.80
					Oct		11.52	9.20	14.90

Month	Day	Avg. Temp. (°C)	Min. Temp. (°C)	Max. Temp. (°C)
Nov				
	1	9.59	9.20	9.80
	2	9.38	8.90	9.60
	3	9.17	8.70	9.40
	4	8.96	8.60	9.10
	5	8.82	8.60	9.00
	6	8.68	8.50	8.80
	7	8.38	8.10	8.50
	8	7.99	7.80	8.20
	9	7.87	7.40	8.20
	10	7.56	7.20	7.90
	11	7.25	6.70	7.70
	12	6.90	6.70	7.10
	13	6.83	6.40	7.30
	14	7.07	6.90	7.20
	15	6.91	6.70	7.10
	16	6.68	6.40	7.10
	17	6.38	5.80	6.90
	18	6.24	5.60	6.60
Nov		7.86	5.60	9.80

Appendix 8.3.1

Water Temperature (°C) 16-Sep-92 to 18-Nov-92
C1 - 11m, Cardigan, P.E.I.



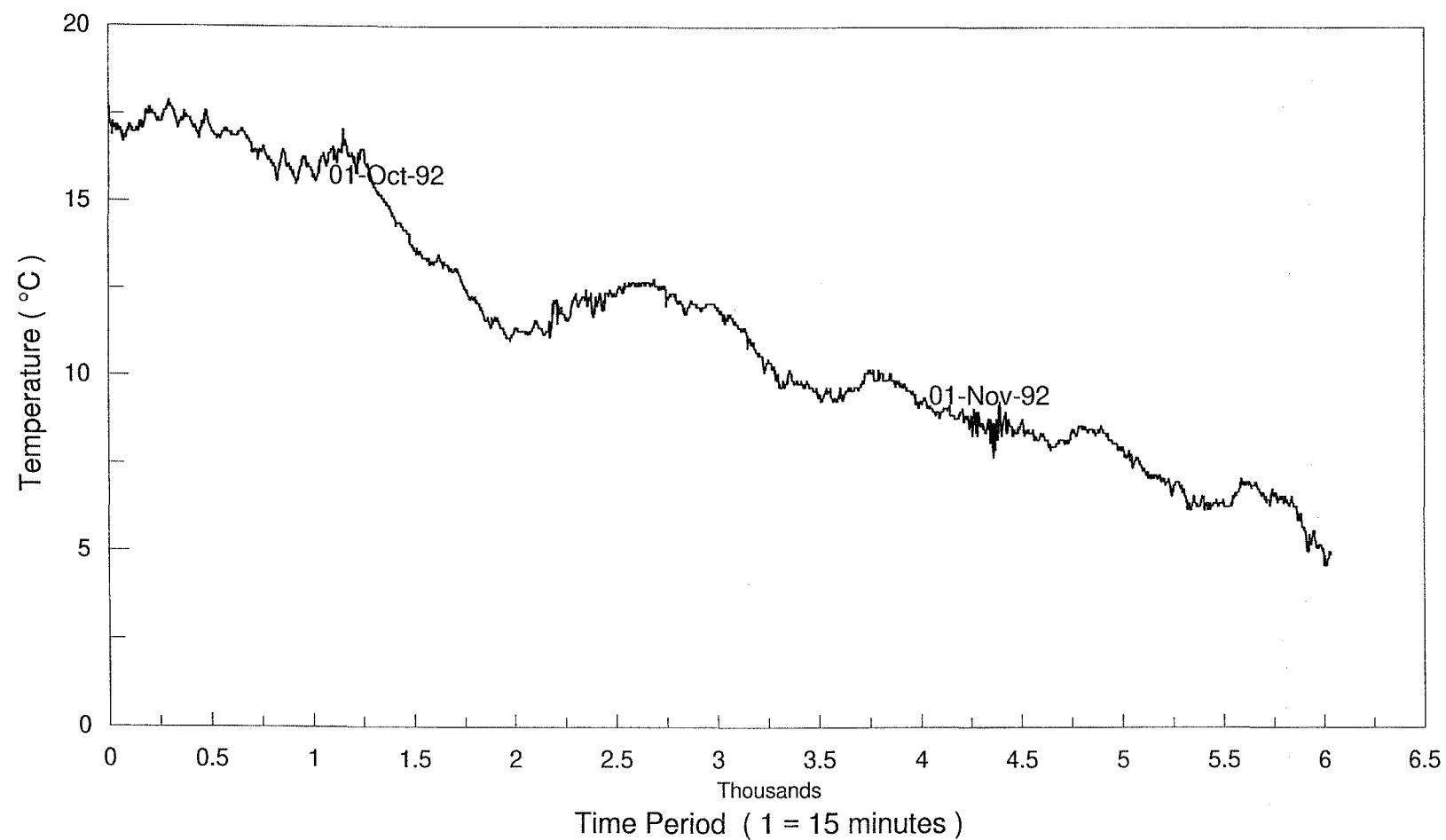
APPENDIX 8.3.2 Daily and monthly average, minimum and maximum water temperature (°C) at Cardigan, PEI site C1 at 11m, 16-Sep-92 to 18-Nov-92.

Month	Day	Avg. Temp. (°C)	Min. Temp. (°C)	Max. Temp. (°C)	Month	Day	Avg. Temp. (°C)	Min. Temp. (°C)	Max. Temp. (°C)
Sep					Oct				
	16	15.71	15.50	16.10		1	14.57	14.20	14.90
	17	15.88	15.70	16.20		2	13.90	13.50	14.30
	18	15.14	14.70	15.80		3	13.49	13.20	13.60
	19	15.98	14.80	16.80		4	12.05	11.40	13.50
	20	15.57	15.00	16.70		5	11.60	11.50	11.60
	21	15.83	15.50	16.30		6	11.66	11.50	11.80
	22	16.48	15.80	17.10		7	11.77	11.50	11.90
	23	16.82	16.50	17.00		8	11.71	11.50	11.80
	24	15.10	13.80	16.60		9	11.54	11.30	11.70
	25	14.62	14.10	15.10		10	11.60	11.50	11.70
	26	15.01	14.70	15.40		11	12.04	11.60	12.50
	27	14.90	14.70	15.10		12	12.42	12.10	12.70
	28	14.96	14.70	15.30		13	12.41	12.30	12.60
	29	14.99	14.80	15.20		14	12.42	12.30	12.50
	30	15.06	14.80	15.50		15	12.32	12.20	12.40
Sep		15.46	13.80	17.10		16	12.00	11.60	12.30
						17	12.08	11.90	12.20
						18	11.86	11.70	12.10
						19	11.40	11.00	11.70
						20	11.02	10.70	11.20
						21	10.66	10.20	11.10
						22	9.95	9.50	10.40
						23	10.14	9.50	10.40
						24	10.20	9.90	10.40
						25	10.23	10.10	10.50
						26	10.39	10.20	10.60
						27	10.28	9.90	10.50
						28	9.83	9.40	10.30
						29	9.77	9.30	10.20
						30	9.63	9.30	9.90
						31	9.77	9.60	9.90
					Oct		11.44	9.30	14.90

Month	Day	Avg. Temp. (°C)	Min. Temp. (°C)	Max. Temp. (°C)
Nov				
	1	9.64	9.40	9.70
	2	9.47	9.40	9.60
	3	9.23	9.00	9.40
	4	9.05	9.00	9.20
	5	8.82	8.50	9.00
	6	8.75	8.50	8.90
	7	8.37	8.20	8.50
	8	8.05	7.80	8.20
	9	7.96	7.30	8.20
	10	7.71	7.30	8.00
	11	7.26	6.70	7.80
	12	6.90	6.50	7.10
	13	6.77	6.40	7.10
	14	7.15	6.90	7.30
	15	6.99	6.80	7.10
	16	6.76	6.40	7.10
	17	6.71	6.20	7.10
	18	6.62	6.40	6.80
Nov		7.94	6.20	9.70

Appendix 8.4.1

Water Temperature (°C) 16-Sep-92 to 18-Nov-92
C3 - 1m, Cardigan, P.E.I.



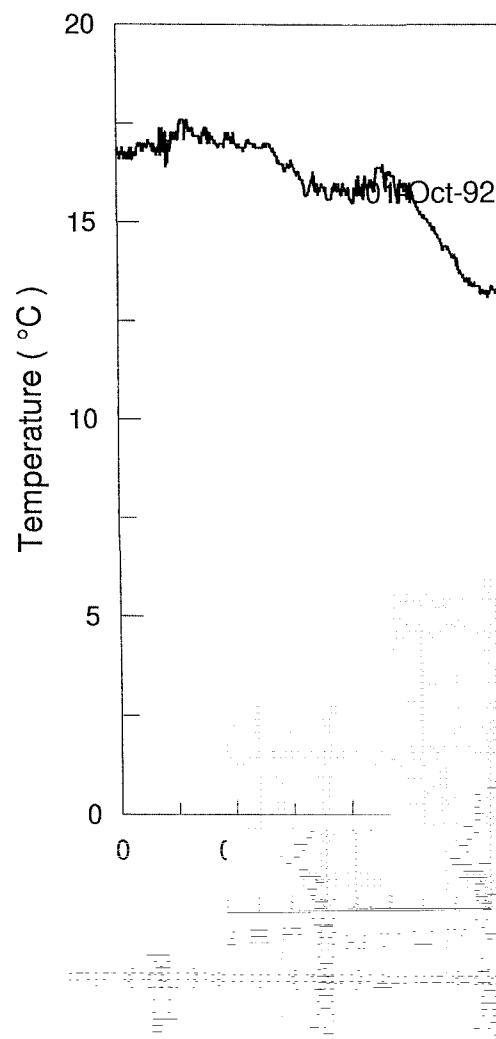
APPENDIX 8.4.2 Daily and monthly average, minimum and maximum water temperature (°C) at Cardigan, PEI site C3 at 1m, 16-Sep-92 to 18-Nov-92.

Month	Day	Avg. Temp. (°C)	Min. Temp. (°C)	Max. Temp. (°C)	Month	Day	Avg. Temp. (°C)	Min. Temp. (°C)	Max. Temp. (°C)
Sep					Oct				
	16	17.25	16.90	17.70		1	14.50	14.20	14.90
	17	17.02	16.70	17.20		2	13.68	13.40	14.20
	18	17.29	17.00	17.70		3	13.31	13.10	13.50
	19	17.53	17.30	17.90		4	12.99	12.50	13.20
	20	17.37	17.10	17.60		5	12.19	11.80	12.60
	21	17.19	16.80	17.60		6	11.55	11.40	11.80
	22	16.96	16.80	17.10		7	11.24	11.00	11.40
	23	16.92	16.70	17.10		8	11.37	11.20	11.60
	24	16.43	16.20	16.70		9	11.62	11.10	12.20
	25	16.08	15.60	16.50		10	11.95	11.60	12.40
	26	15.94	15.50	16.30		11	12.15	11.70	12.50
	27	15.98	15.60	16.40		12	12.32	11.90	12.60
	28	16.49	16.10	17.10		13	12.60	12.40	12.70
	29	16.25	15.80	16.50		14	12.66	12.50	12.80
	30	15.37	14.90	16.10		15	12.40	12.00	12.60
Sep		16.64	14.90	17.90		16	12.04	11.80	12.20
						17	12.04	11.90	12.10
						18	11.72	11.50	12.00
						19	11.20	10.80	11.50
						20	10.44	10.10	10.70
						21	9.89	9.70	10.20
						22	9.77	9.60	9.90
						23	9.49	9.30	9.70
						24	9.50	9.30	9.70
						25	9.90	9.60	10.20
						26	9.97	9.90	10.20
						27	9.73	9.50	9.90
						28	9.29	9.10	9.60
						29	9.02	8.80	9.20
						30	8.85	8.50	9.10
						31	8.66	8.30	9.10
					Oct		11.23	8.30	14.90

Month	Day	Avg. Temp. (°C)	Min. Temp. (°C)	Max. Temp. (°C)
Nov				
	1	8.56	7.70	9.30
	2	8.51	8.30	8.80
	3	8.29	8.10	8.50
	4	8.09	7.90	8.20
	5	8.44	8.10	8.60
	6	8.45	8.30	8.60
	7	8.06	7.70	8.40
	8	7.59	7.30	7.90
	9	7.16	7.00	7.30
	10	6.90	6.60	7.10
	11	6.40	6.20	6.70
	12	6.36	6.20	6.50
	13	6.54	6.30	7.10
	14	6.89	6.60	7.00
	15	6.56	6.30	6.80
	16	6.35	5.90	6.60
	17	5.42	5.00	6.10
	18	4.91	4.60	5.20
Nov		7.25	4.60	9.30

Appendix 8.5.1

Water Temperature (°C) 16-Sep-92 to 18-Nov-92
C3 - 4m, Cardigan, P.E.I.



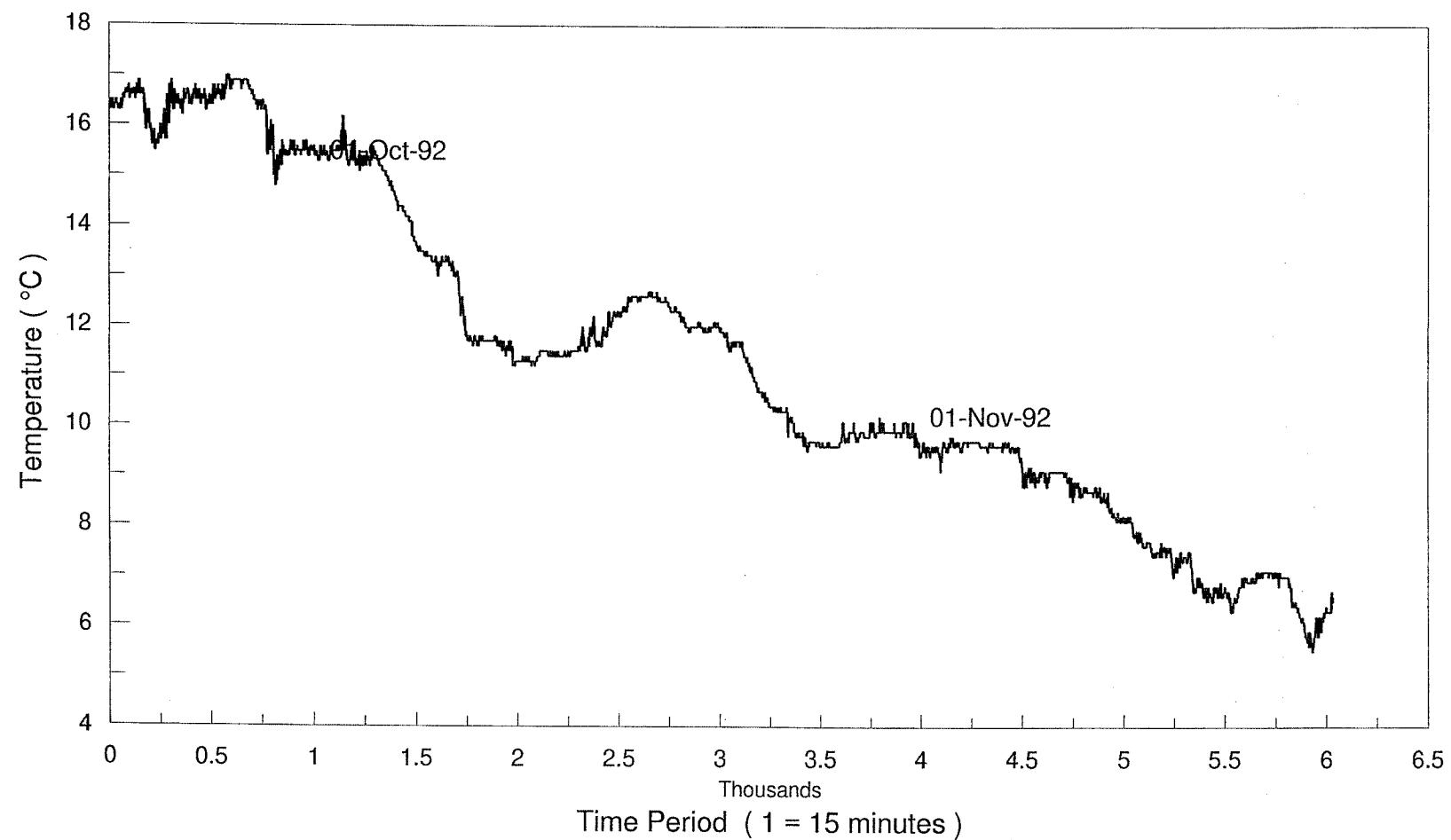
APPENDIX 8.5.2 Daily and monthly average, minimum and maximum water temperature (°C) at Cardigan, PEI site C3 at 4m, 16-Sep-92 to 18-Nov-92.

Month	Day	Avg. Temp. (°C)	Min. Temp. (°C)	Max. Temp. (°C)	Month	Day	Avg. Temp. (°C)	Min. Temp. (°C)	Max. Temp. (°C)
Sep					Oct				
	16	16.78	16.60	16.90		1	14.49	14.10	14.90
	17	16.81	16.60	17.00		2	13.66	13.40	14.20
	18	16.96	16.40	17.40		3	13.30	13.10	13.40
	19	17.28	16.50	17.60		4	12.99	12.60	13.30
	20	17.25	17.00	17.40		5	12.20	11.80	12.60
	21	17.09	16.90	17.30		6	11.65	11.40	11.90
	22	16.98	16.80	17.30		7	11.23	11.00	11.40
	23	16.91	16.70	17.00		8	11.32	11.20	11.50
	24	16.44	16.20	16.70		9	11.40	11.20	11.70
	25	15.94	15.70	16.30		10	11.72	11.40	12.20
	26	15.81	15.60	16.00		11	11.91	11.70	12.30
	27	15.77	15.50	16.20		12	12.12	11.80	12.30
	28	16.12	15.80	16.50		13	12.52	12.30	12.60
	29	15.98	15.50	16.30		14	12.61	12.50	12.70
	30	15.34	14.90	16.00		15	12.37	12.10	12.50
Sep		16.48	14.90	17.60		16	12.04	11.90	12.20
						17	12.00	11.90	12.10
						18	11.72	11.50	12.00
						19	11.19	10.70	11.60
						20	10.48	10.30	10.70
						21	10.05	9.60	10.30
						22	9.74	9.60	9.90
						23	9.53	9.40	9.60
						24	9.60	9.40	9.80
						25	9.85	9.60	10.10
						26	9.94	9.80	10.10
						27	9.78	9.60	9.90
						28	9.38	9.20	9.80
						29	9.14	9.00	9.40
						30	9.26	8.90	9.60
						31	9.46	9.10	9.60
					Oct		11.25	8.90	14.90

Month	Day	Avg. Temp. (°C)	Min. Temp. (°C)	Max. Temp. (°C)
Nov				
	1	9.45	9.10	9.60
	2	8.92	8.40	9.50
	3	8.45	8.30	8.70
	4	8.40	8.10	8.90
	5	8.47	8.10	8.70
	6	8.50	8.30	8.70
	7	8.11	7.90	8.40
	8	7.69	7.30	8.00
	9	7.28	7.10	7.50
	10	7.02	6.80	7.20
	11	6.59	6.30	7.00
	12	6.43	6.30	6.60
	13	6.55	6.20	7.10
	14	6.89	6.80	7.00
	15	6.77	6.60	6.90
	16	6.40	5.90	6.80
	17	5.60	5.30	6.10
	18	5.73	5.50	6.30
Nov		7.44	5.30	9.60

Appendix 8.6.1

Water Temperature (°C) 16-Sep-92 to 18-Nov-92
C3 - 7m, Cardigan, P.E.I.

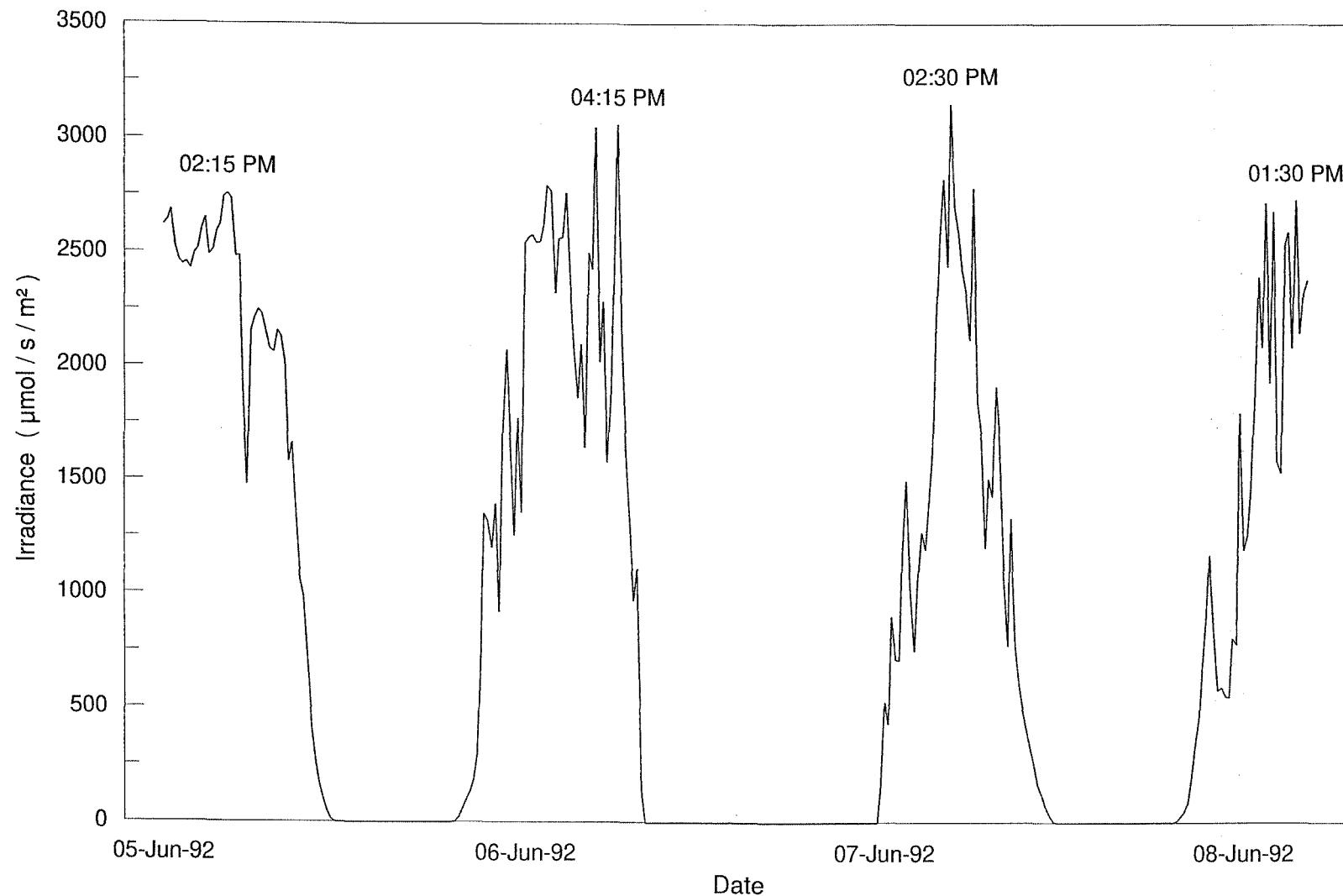


APPENDIX 8.6.2 Daily and monthly average, minimum and maximum water temperature (°C) at Cardigan, PEI site C3 at 7m, 16-Sep-92 to 18-Nov-92.

Month	Day	Avg. Temp. (°C)	Min. Temp. (°C)	Max. Temp. (°C)	Month	Day	Avg. Temp. (°C)	Min. Temp. (°C)	Max. Temp. (°C)
Sep					Oct				
	16	16.37	16.30	16.50		1	14.50	14.20	14.90
	17	16.52	16.30	16.80		2	13.67	13.40	14.20
	18	16.36	15.60	16.90		3	13.31	13.00	13.40
	19	16.03	15.50	16.90		4	12.80	11.80	13.40
	20	16.50	16.20	16.70		5	11.72	11.60	11.80
	21	16.55	16.30	16.80		6	11.67	11.50	11.80
	22	16.70	16.40	17.00		7	11.40	11.20	11.70
	23	16.86	16.70	16.90		8	11.37	11.20	11.50
	24	16.32	15.40	16.70		9	11.43	11.40	11.50
	25	15.41	14.80	16.10		10	11.53	11.40	12.00
	26	15.53	15.40	15.70		11	11.74	11.50	12.20
	27	15.45	15.30	15.60		12	12.12	11.80	12.30
	28	15.57	15.20	16.20		13	12.51	12.30	12.60
	29	15.34	15.10	15.70		14	12.61	12.50	12.70
	30	15.25	14.90	15.60		15	12.38	12.20	12.60
Sep		16.03	14.80	17.00		16	12.03	11.90	12.20
						17	11.98	11.90	12.10
						18	11.75	11.50	12.00
						19	11.26	10.70	11.70
						20	10.52	10.30	10.80
						21	10.19	9.80	10.40
						22	9.72	9.50	9.90
						23	9.62	9.60	9.70
						24	9.78	9.60	10.10
						25	9.88	9.70	10.10
						26	9.93	9.80	10.20
						27	9.93	9.80	10.10
						28	9.61	9.40	10.10
						29	9.56	9.10	9.80
						30	9.66	9.50	9.80
						31	9.64	9.50	9.70
					Oct		11.29	9.10	14.90

Month	Day	Avg. Temp. (°C)	Min. Temp. (°C)	Max. Temp. (°C)
Nov				
	1	9.61	9.50	9.70
	2	9.31	8.80	9.60
	3	9.02	8.80	9.20
	4	9.08	8.90	9.10
	5	8.78	8.50	9.00
	6	8.65	8.40	8.80
	7	8.21	8.10	8.70
	8	7.86	7.60	8.20
	9	7.55	7.40	7.70
	10	7.34	7.00	7.60
	11	7.02	6.60	7.50
	12	6.69	6.50	6.90
	13	6.64	6.30	7.00
	14	6.98	6.90	7.10
	15	7.06	6.80	7.10
	16	6.61	6.10	7.00
	17	5.89	5.50	6.20
	18	6.34	6.10	6.70
Nov		7.73	5.50	9.70

Appendix 9.1.1 Sky irradiance ($\mu\text{mol} / \text{s} / \text{m}^2$) averaged every 15 minutes, 05-Jun-92 to 08-Jun-92, Survey 92-01.

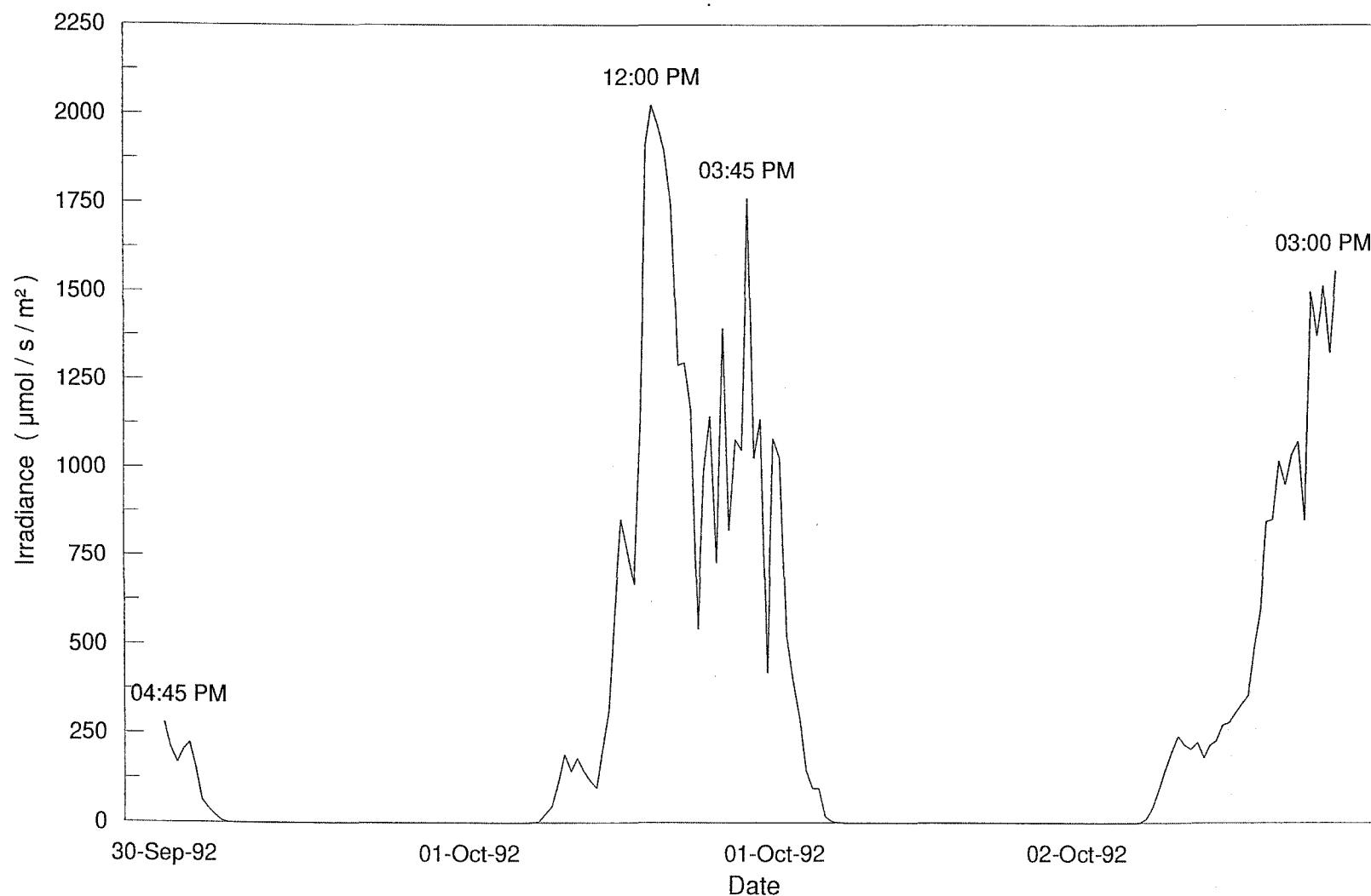


Appendix 9.1.2 Sky irradiance ($\mu\text{mol} / \text{s} / \text{m}^2$) averaged every 15 minutes,
05-Jun-92 to 08-Jun-92, Survey 92-01.

Date	Time	Hourly Average Irradiance ($\mu\text{mol} / \text{s} / \text{m}^2$)	Date	Time	Hourly Average Irradiance ($\mu\text{mol} / \text{s} / \text{m}^2$)
05-Jun-92			06-Jun-92		
10	2618		0	0	
11	2450		1	0	
12	2566		2	0	
13	2555		3	0	
14	2680		4	0	
15	1995		5	21	
16	2210		6	177	
17	2108		7	1147	
18	1650		8	1531	
19	795		9	1518	
20	145		10	2561	
21	4		11	2684	
22	0		12	2554	
23	0		13	2100	
Daily Average:	1555		14	2405	
			15	1945	
			16	2325	
			17	889	
			18	0	
			19	0	
			20	0	
			21	0	
			22	0	
			23	0	
			Daily Average:	911	

Date	Time	Hourly Average Irradiance ($\mu\text{mol} / \text{s} / \text{m}^2$)	Date	Time	Hourly Average Irradiance ($\mu\text{mol} / \text{s} / \text{m}^2$)
07-Jun-92	0	0	08-Jun-92	0	0
	1	0		1	0
	2	0		2	0
	3	0		3	0
	4	0		4	0
	5	0		5	9
	6	0		6	164
	7	0		7	798
	8	0		8	641
	9	40		9	983
	10	644		10	1441
	11	1104		11	2283
	12	1066		12	2086
	13	1950		13	2390
	14	2778		14	2355
	15	2362		Daily Average:	877
	16	1883			
	17	1633			
	18	991			
	19	457			
	20	150			
	21	10			
	22	0			
	23	0			
Daily Average:		628			

Appendix 9.2.1 Sky irradiance ($\mu\text{mol} / \text{s} / \text{m}^2$) averaged every 15 minutes, 30-Sep-92 to 02-Oct-92, Cardigan Bay, PEI.



**Appendix 9.2.2 Sky irradiance ($\mu\text{mol} / \text{s} / \text{m}^2$) averaged every 15 minutes,
30-Sep-92 to 02-Oct-92, Cardigan, PEI**

Date	Time	Hourly Average Irradiance ($\mu\text{mol} / \text{s} / \text{m}^2$)	Date	Time	Hourly Average Irradiance ($\mu\text{mol} / \text{s} / \text{m}^2$)
30-Sep-92			01-Oct-92		
	16	280		0	0
	17	202		1	0
	18	69		2	0
	19	2		3	0
	20	0		4	0
	21	0		5	0
	22	0		6	0
	23	0		7	8
Daily Average:		69		8	123
				9	135
				10	496
				11	1115
				12	1909
				13	1075
				14	1066
				15	1180
				16	918
				17	560
				18	89
				19	2
				20	0
				21	0
				22	0
				23	0
Daily Average:			362		

Date	Time	Hourly Average Irradiance ($\mu\text{mol} / \text{s} / \text{m}^2$)	Date	Time	Hourly Average Irradiance ($\mu\text{mol} / \text{s} / \text{m}^2$)
02-Oct-92					
	0	0			
	1	0			
	2	0			
	3	0			
	4	0			
	5	0			
	6	0			
	7	14			
	8	172			
	9	209			
	10	251			
	11	375			
	12	830			
	13	980			
	14	1429			
	15	1558			
Daily Average:		364			