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Biological, chemical and physical oceanographic conditions in the Southern Gulf of Saint Lawrence, 1991

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

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ABSTRACT

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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 results from surveys of oceanographic variables in the Southern Gulf of Saint Lawrence in 1991.

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, 1991. Can. Data Rep. Fish. Aquat. Sci. 1033: vi + 235p.

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 1991.

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 1991.

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 1991 included 2 fixed stations at Brudenell River, 5 fixed stations at Cardigan, 8 stations at Murray River, and 6 stations at New London Bay, PEI. There were 3 research surveys conducted during 1991: (1) Survey 91-01 with 30 stations, 20-Jun-91 to 25-Jun-91 aboard the C.C.G.C. Navicula in St. Georges Bay, NS, (2) Survey 91-02 with 27 stations, 20-Sep-91 to 27-Sep-91 aboard the C.C.G.C. Navicula in St. Georges Bay, NS and the southeast end of PEI and (3) Survey 91-03 with 18 stations, 06-Nov-91 to 11-Nov-91 in Cardigan Bay, 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 (F_o); depth profiles of temperature (Temp), salinity (Sal) and density (σ_τ); chlorophyll a ($C_{a^{PE}}$); phaeophytin a ($P_{a^{PE}}$); ammonia (NH_3); $UREA$; nitrates ($N0_2$ and $N0_3$); phosphate ($P0_4$); silicate ($Si0_4$); particulate organic carbon (POC), particulate organic nitrogen (PON), amino acids (A) and proteins (P). 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 latitudes and longitudes 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 1991 was labeled "Survey 91-01".

Discrete water samples were collected using a polyethylene hand pump or a 12V Rule submersible bilge pump attached to a vinyl garden hose. Integrated water samples were collected using a Tygon tube sampler. 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 $(-k_1)$ was calculated as described by Vollenweider (1969):

$$-k_1 = \frac{\ln(0.01)}{3 \cdot SECCHI} \qquad (1)$$

where:

$SECCHI$ (m) = SECCHI depth

2.4 Irradiance

Instantaneous Irradiance in the sky (µmol s^{-1} m^{-2}) was averaged every 15 minutes during Survey 91-01 and Survey 91-03 with a LI-COR LI-192SA Quantum Sensor.

Instantaneous irradiance (µmol s^{-1} m^{-2}) was measured and recorded at the water surface (I_o , < 0.5m) and every 1m down the water column $<I_D>$ with a LI-COR underwater LI-193SA Spherical Quantum Sensor attached to a 2009S lowering frame and a LI-1000 DataLogger. 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 $< I_z >$ was calculated as described by Platt *et. al.* (1988):

$$<I_z> = 0.22 I_o \qquad (2)$$

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

2.5 Manual Salinity and Temperature

Manual salinity was measured using a hand held salinity refractometer (Atago Co.) with a precision of ±0.2 $^{o}/_{oo}$. 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 (°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 °C/6 months and 0.25% of full scale range respectively and the resolution is better than 0.0001 S/m, 0.001 °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 0.5m respectively and an accuracy of ±0.3 °C and ±2.0m respectively.

2.8 Temperature Moorings

In addition to regular sampling stations, temperature moorings were placed at station 16 during Survey 91-02 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 filtered sea water then a 20 mL sample introduced into the tubes. The tubes were then sealed with parafilm, capped and 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 than 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:

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

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 than 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 $x = urea$) in a straight line equation and subtracting out the corresponding ammonia sample determined by the ammonia assay:

$$UREA = \frac{\left(R_{640^{U}} - b_{640^{U}}\right)}{a_{640^{U}}} - NH_3 \qquad (4)$$

where:

$UREA$ (µM)	= 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 $(N0_2 + N0_3)$, phosphate $(P0_4)$ and silicate $(Si0_4)$ 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 micro-balance 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).

2.11 Particulate Protein Analysis

For particulate protein analysis, a known volume of seawater was filtered through a precombusted (450 °C, 24 hrs) 47mm Whatman GF/F filter. The filter was then frozen at -20 °C in scintillation vials until analysis.

Samples were analyzed by a modification of the Lowry et. al. (1951) method and amino acids by the Bohlen et. al. (1973) fluorescamine method. Both methods are described in Clayton et. al. (1988). This method extracts, separates and analyzses proteins and total free amino acids from a common phytoplankton sample. It involves the initial homogenization of the sample in trichloroacetic acid (TC) then the addition of sodium deoxycholate (DOC) followed by centrifugation to separate protein and free amino acid fractions. Procedures were as described in Figure 1 and all solutions were prepared according to Clayton, et. al. (1988). The results were adjusted from the volume of the extracts to the volume of sea water filtered.

Two linear regressions, one for the protein calibration curve and the other for the amino acid calibration curve, were obtained. For the protein curve, the absorbance at 750 nm of known concentrations of the standard, bovine serum albumen (BSA) , was measured at different dilutions with a spectrophotometer. For the amino acid curve, the fluorescence of known concentrations of the standard, glutamate, was measured at different dilutions with a spectrofluorometer.

Protein concentration of the sample was derived by solving for y (where $y = [P]$) in the straight line equation:

$$P = (a_P \cdot R_{750}) + b_P \cdot \frac{v}{V} \qquad (5)$$

where:

P (μg mL^{-1})	= concentration of protein in the sample
a_P	= slope of ([BSA] / R_{750}) regression
R_{750}	= absorbance reading at 750 nm of the protein sample
b_P	= intercept of ([BSA] / R_{750}) regression
v (mL)	= volume of sample extract
V (mL)	= volume of sea water filtered

Amino acid concentration of the sample was derived by solving for y (where $y = [A]$) in the straight line equation:

$$A = \frac{(a_A \bullet F_A) + b_A}{v'} \bullet \frac{v}{V} \qquad (6)$$

where:

A (ng mL^{-1})	= concentration of amino acid in the sample
a_A	= slope of ([glutamate] / F_A) regression
F_A	= normalized fluorescence reading of the amino acid sample
b_A	= intercept of ([glutamate] / F_A) regression
v' (mL)	= volume of sample sub-extract
v (mL)	= volume of sample extract
V (mL)	= volume of sea water filtered

2.12 Perkin Elmer LS3 Spectrofluorometer Pigment Analysis

For chlorophyll a and phaeophytin a analysis, three sub-samples of a known volume of seawater were gently filtered onto 25 mm GF/F filters prewashed with 5 mL of 5% Na_2HPO_4 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) $8.36 \bullet 10^4$ 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.

Pigment analysis was performed using a Perkin Elmer LS3 spectrofluorometer. The results were adjusted from the volume of the acetone extract to the volume of sea water filtered.

The method described here is as suggested by Parsons *et. al.* (1984) and Yentsch and Menzel, (1963). Fluorescence was 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.

Particulate Protein Analysis

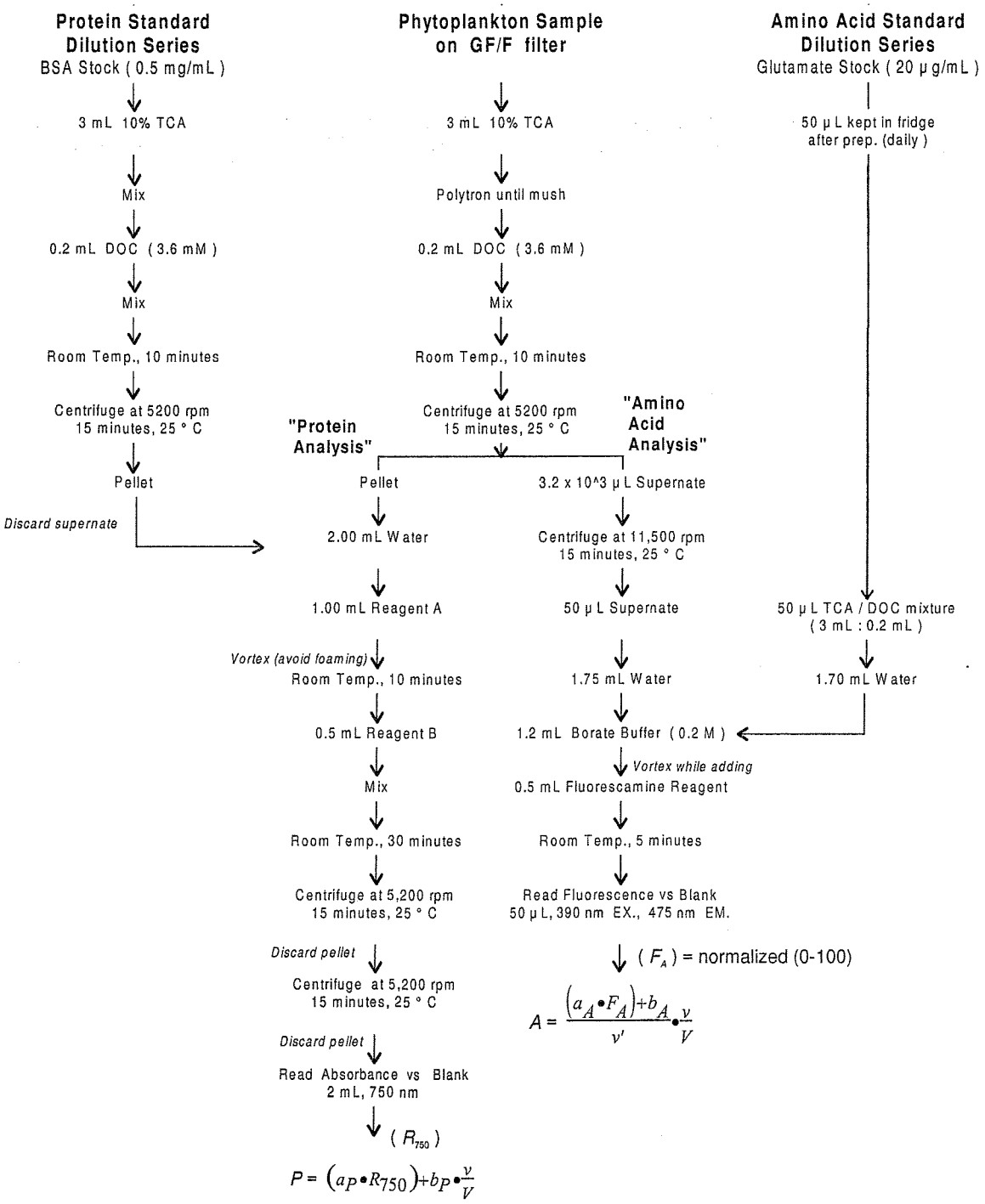

Figure 1. Analytical scheme for extraction, separation and analysis of proteins (P) and amino acids (A) from a common phytoplankton sample.

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 a pigment levels is highly linear, with quenching occurring only at concentrations greater than 400 µg L^{-1}.

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

$$\%C_{a^{PE}} = a_{430/430a} \bullet \left(\frac{R_{430}}{R_{430a}}\right) + b_{430/430a} \qquad (7)$$

where:

$\%C_{a^{PE}}$ = percentage of chlorophyll a 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 a pigment in the sample and adjust the results from the extract volume to the volume of sea water filtered by:

$$T_{a^{PE}} = ((a_{408a} \bullet R_{408a}) + b_{408a}) \bullet E' \bullet \frac{v}{V} \qquad (8)$$

where:

$T_{a^{PE}}$ (µg L^{-1}) = total a 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 factor)

R_{408a} = absorbance reading at 408 nm with sample acidified

v (mL) = volume of sample extract

V (mL) = volume of sea water filtered

From these 2 equations (7, 8) the concentration of chlorophyll a and phaeophytin a in the sample can be calculated by:

$$C_{a^{PE}} = T_{a^{PE}} \bullet \left(\frac{\%C_{a^{PE}}}{100} \right) \quad (9)$$

and

$$P_{a^{PE}} = T_{a^{PE}} - C_{a^{PE}} \quad (10)$$

where:

$C_{a^{PE}}$ (µg L^{-1}) = concentration of chlorophyll a in the sample

$P_{a^{PE}}$ (µg L^{-1}) = concentration of phaeophytin a in the sample

2.13 *In situ* Fluorescence

In situ fluorescence (F_o) was measured by introducing 5 mL of the seawater sample into a fluorometer cuvette and the fluorescense taken by a Turner Designs fluorometer equipped with a chlorophyll a accessory kit. The fluorescence readings were normalized (i.e. $((10{,}000/setting) \bullet fluorescence)$).

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APPENDIX 1.0 List of Symbols and Abbreviations

A (ng mL^{-1})	concentration of amino acid in the sample
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 $UREA$
a_A	slope of ([glutamate] / F_A) regression to determine A
a_P	slope of ([BSA] / R_{750}) regression to determine P
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 $UREA$
b_A	intercept of ([glutamate] / F_A) regression to determine A
b_P	intercept of ([BSA] / R_{750}) regression to determine P
$\%C_{a^{PE}}$	percentage of chlorophyll a in the sample (Perkin Elmer method)
$C_{a^{PE}}$ (µg L^{-1})	concentration of chlorophyll a in the sample (Perkin Elmer method)
CTD	conductivity, temperature and depth
E'	normalized expansion factor to determine $T_{a^{PE}}$
F_o	normalized *in situ* fluorescence
F_A	normalized fluorescence reading at 750 nm to determine A
$<I_D>$ (µmol s^{-1} m^{-2})	instantaneous irradiance measured at depth with a LI-COR quantum sensor
$<I_o>$ (µmol s^{-1} m^{-2})	instantaneous irradiance measured at the water surface (< 0.5m depth) with a LI-COR quantum sensor
$<I_z>$ (µmol s^{-1} m^{-2})	mean irradiance for the euphotic zone (Platt *et. al.* 1988)
$-k_1$	extinction coefficient calculated using SECCHI depth
$-k_2$	extinction coefficient calculated using the irradiance data
NH_3 (µM)	amount of ammonia in the sample
$N0_2 + N0_3$ (µM)	amount of nitrates in the sample
P (µg mL^{1})	concentration of protein in the sample
$P0_4$ (µM)	amount of phosphate in the sample
$P_{a^{PE}}$ (µg L^{-1})	concentration of phaeophytin a in the sample (Perkin Elmer 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 $T_{a^{PE}}$
R_{430}	absorbance reading at 430 nm to determine $\%C_{a^{PE}}$
R_{430a}	absorbance reading at 430 nm with sample acidified to determine $\%C_{a^{PE}}$
R_{640^A}	absorbance reading at 640 nm to determine NH_3
R_{640^U}	absorbance reading at 640 nm to determine $UREA$
R_{750}	absorbance reading at 750 nm to determine P
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
$T_{a^{PE}}$ (µg L^{-1})	concentration of total a pigment in the sample
T	SEALOG-T temperature (°C) probe (VEMCO LTD.)
TD	SEALOG-TD EXCON temperature (°C) depth probe (VEMCO LTD.)
v' (mL)	volume of sample sub-extract
v (mL)	volume of sample extract
V (mL)	volume of sea water filtered

APPENDIX 2.0 1991 Sampling Summary.

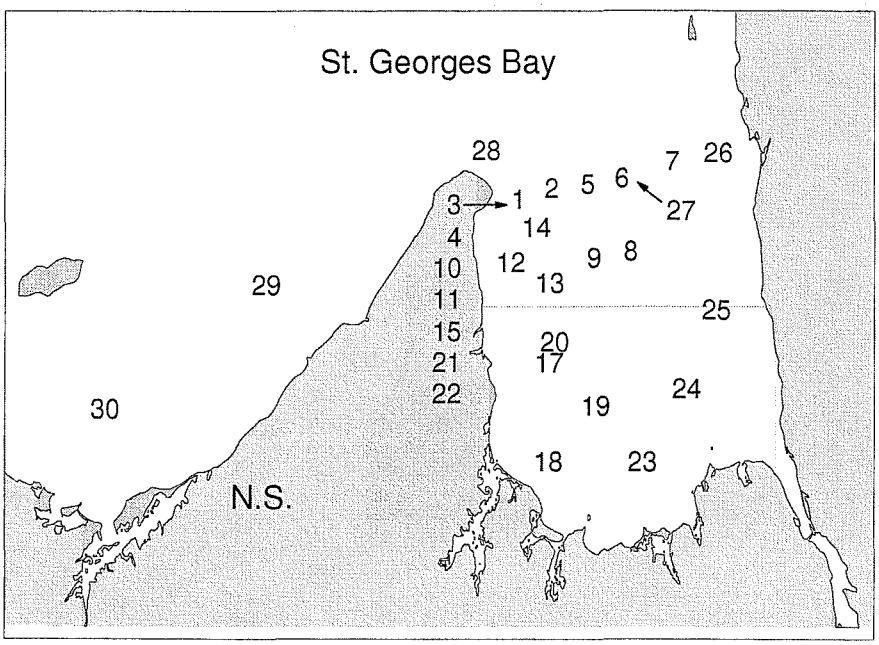
Survey	Survey Description	Start Date	End Date	Number of Stations	Number of CTD Profiles	Number of Irradiance Profiles	Number of TD Profiles
Brudenell River, P.E.I.	1991 Brudenell River, P.E.I. field sample collection	05-Nov-91	09-Apr-92	78	0	0	0
Cardigan, P.E.I.	1991 Cardigan, P.E.I. field sample collection	04-Apr-91	04-Apr-91	1	0	0	0
Cardigan, P.E.I.	1991 Cardigan, P.E.I. field sample collection	14-May-91	14-May-91	4	0	0	0
Cardigan, P.E.I.	1991 Cardigan, P.E.I. field sample collection	05-Jun-91	05-Jun-91	2	0	0	0
Cardigan, P.E.I.	1991 Cardigan, P.E.I. field sample collection	04-Jul-91	05-Jul-91	7	0	1	0
Cardigan, P.E.I.	1991 Cardigan, P.E.I. field sample collection	01-Oct-91	02-Oct-91	6	0	6	6
Cardigan, P.E.I.	1991 Cardigan, P.E.I. field sample collection	21-Oct-91	21-Oct-91	5	0	5	0
Cardigan, P.E.I.	1991 Cardigan, P.E.I. field sample collection	12-Nov-91	12-Nov-91	5	0	1	5

Appendix 2.0 (cont'd)

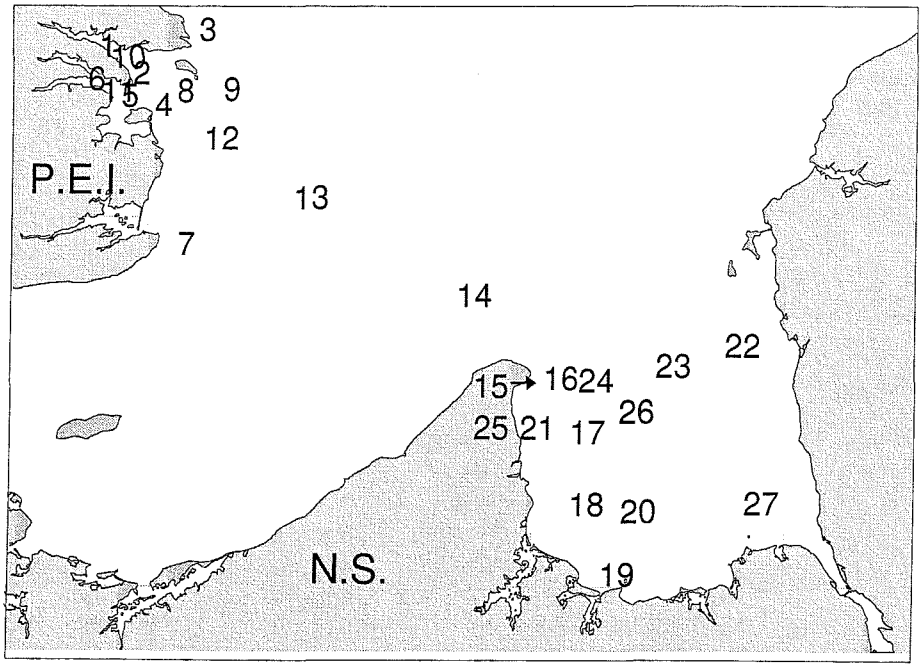
Survey	Survey Description	Start Date	End Date	Number of Stations	Number of CTD Profiles	Number of Irradiance Profiles	Number of TD Profiles
Cardigan, P.E.I.	1991 Cardigan, P.E.I. field sample collection	21-Nov-91	21-Nov-91	2	0	0	0
Murray River, P.E.I.	1991 Murray River, P.E.I. field sample collection	04-Apr-91	05-Jul-91	8	0	0	0
New London Bay, P.E.I.	1991 New London Bay, P.E.I. field sample collection	03-Oct-91	20-Nov-91	6	0	0	0
Survey 91-01	1991 Navicula June Research Survey sample collection	20-Jun-91	25-Jun-91	30	21	2	0
Survey 91-02	1991 Navicula September Research Survey sample collection	20-Sep-91	27-Sep-91	27	27	23	0
Survey 91-03	1991 Navicula November Research Survey sample collection	06-Nov-91	11-Nov-91	18	15	6	0
			Total for Year:	199	63	44	11

APPENDIX 3.0 1991 Sampling Locations.

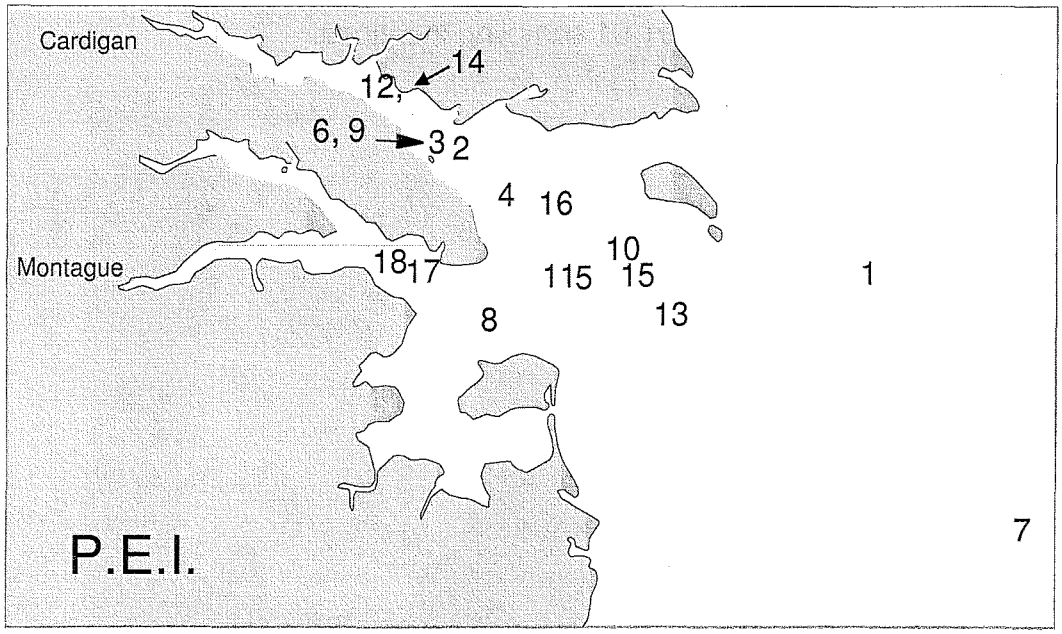
Appendix 3.1 Survey 91-01 sampling locations.



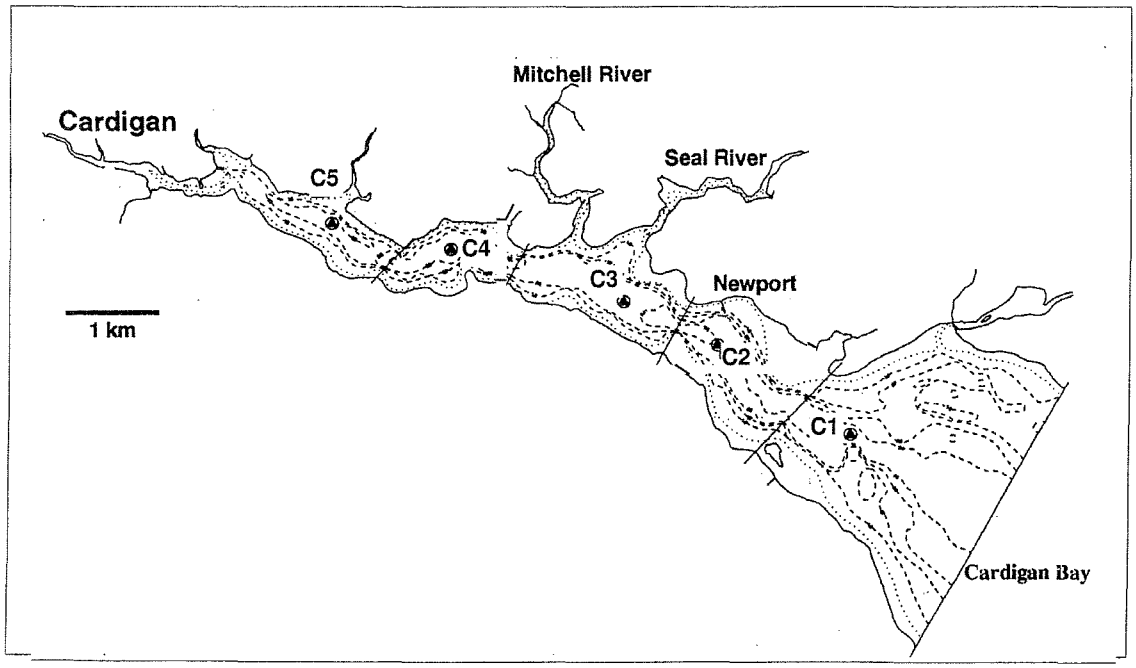
Appendix 3.2 Survey 91-02 sampling locations.



Appendix 3.3 Survey 91-03 sampling locations.



Appendix 3.4 1991 Cardigan, PEI fixed sampling sites.



Appendix 4.1 Physical and biological data collected from Brudenell River, PEI 05-Nov-91 to 09-Apr-92

Brudenell River, P.E.I.

STATION 01

Location UPPER BRUDENELL RIVER, P.E.I.

		Air Temperature (°C)	Latitude	Longitude
Date	05-Nov-91			
Time	9:30 AM		46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	9.1	29.0	4.16	2.12	2.89	11.77	1.95	0.44	1.51

Weather: Sunny; 5 km west wind

Comment: Mid tide; time sample processed: 13:00; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 02

Location LOWER BRUDENELL RIVER, P.E.I.

		Air Temperature (°C)	Latitude	Longitude
Date	05-Nov-91			
Time	9:45 AM		46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	9.5	29.0	3.27	2.49	3.63	11.92	1.66	2.64	1.84

Weather: Sunny; 5 km west wind

Comment: Mid tide; time sample processed: 13:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 03

Location LOWER BRUDENELL RIVER, P.E.I.

Date	06-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	5:30 PM	-0.5	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	5.1		3.48	2.29	3.63	12.77	0.68	0.32	1.08

Weather: Clear; 2 km west wind

Comment: Near high tide; time sample processed: 19:10; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 04

Location UPPER BRUDENELL RIVER, P.E.I.

Date	06-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	5:45 PM	-0.5	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	5.1		2.75	2.08	2.93	11.08	0.77	0.28	1.00

Weather: Clear; 2 km west wind

Comment: Near high tide; time sample processed: 20:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 05

Location LOWER BRUDENELL RIVER, P.E.I.

Date	07-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	3:15 PM	5	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	5.8		4.41	2.46	3.43	12.01	0.16	0.26	0.60

Weather: Sunny; 10km west wind

Comment: Mid tide; time sample processed: 16:55; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 06

Location UPPER BRUDENELL RIVER, P.E.I.

		Air Temperature (°C)	Latitude	Longitude
Date	07-Nov-91			
Time	5:00 PM	5.2	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)
STATION	5.6		4.79	2.11	2.79	10.67	0.44	0.24	0.58

Weather: Sunny; 15 km west wind

Comment: Mid tide; time sample processed: 18:45; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 07

Location UPPER BRUDENELL RIVER, P.E.I.

		Air Temperature (°C)	Latitude	Longitude
Date	08-Nov-91			
Time	5:05 PM	2.8	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)
STATION	5.8	27.5	6.89	3.14	3.25	11.77	0.20	0.28	0.40

Weather: Overcast; 5 km west wind

Comment: Rising tide; time sample processed: 19:00; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 08

Location LOWER BRUDENELL RIVER, P.E.I.

		Air Temperature (°C)	Latitude	Longitude
Date	08-Nov-91			
Time	5:35 PM	2.4	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)
STATION	5.6	27.5	5.07	2.65	3.13	11.89	0.15	0.31	0.37

Weather: Overcast; 5 km west wind

Comment: Rising tide; time sample processed: 19:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 09

Location UPPER BRUDENELL RIVER, P.E.I.

Date	12-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	7:00 AM	6.8	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	6.1	27.1	5.25	2.65	2.99	12.45	0.15	0.50	0.62

Weather: Cloudy; 8 km SE wind

Comment: Rising tide; time sample processed: 08:15; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 10

Location LOWER BRUDENELL RIVER, P.E.I.

Date	12-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	7:30 AM	6.9	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	6.0	25.8	5.68	2.94	3.48	13.51	0.17	0.29	0.57

Weather: Cloudy; 8 km SE wind

Comment: Rising tide; time sample processed: 09:45; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 11

Location UPPER BRUDENELL RIVER, P.E.I.

Date	13-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	5:00 PM	3	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	5.2	29.0	3.02	1.56	2.97	11.43	0.41	0.29	0.67

Weather: Overcast; 5 km NW wind

Comment: High tide; time sample processed: 18:00; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 12

Location LOWER BRUDENELL RIVER, P.E.I.

Date	13-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	5:00 PM	3	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	5.4	28.5	1.75	1.20	2.95	11.53	1.92	0.29	1.55

Weather: Overcast; 5 km NW wind

Comment: High tide; time sample processed: 18:20; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 13

Location UPPER BRUDENELL RIVER, P.E.I.

Date	14-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	5:15 PM	1.2	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	4.2	30.5	3.21	1.74	2.63	11.27	0.88	0.94	1.10

Weather: Overcast; light rain; 5 km NW wind

Comment: Time sample processed: 18:15; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 14

Location LOWER BRUDENELL RIVER, P.E.I.

Date	14-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	5:30 PM	1.2	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	4.8	31.0	3.33	1.59	2.83	11.11	0.37	0.28	0.55

Weather: Overcast; light rain; 5 km NW wind

Comment: Time sample processed: 18:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 15

Location UPPER BRUDENELL RIVER, P.E.I.

Date	15-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	5:30 PM	1.8	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	3.8	30.0	2.76	1.85	2.75	11.71	1.75	0.42	2.30

Weather: Cloudy; 5 km NW wind

Comment: High tide; time sample processed: 19:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 16

Location LOWER BRUDENELL RIVER, P.E.I.

Date	15-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	5:45 PM	1.8	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	3.8	29.0	2.38	1.76	2.87	12.05	1.26	0.44	2.18

Weather: Cloudy; 5 km NW wind

Comment: High tide; time sample processed: 19:50; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 17

Location UPPER BRUDENELL RIVER, P.E.I.

Date	18-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	7:15 AM	2.4	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	6.4	30.5	2.13	1.36	2.81	12.14	2.23	0.55	3.73

Weather: Cloudy; 30 km NW wind; rain

Comment: High tide; time sample processed: 08:20; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 18

Location LOWER BRUDENELL RIVER, P.E.I.

Date	18-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	7:25 AM	2.4	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	6.4	31.0	2.74	1.34	2.89	11.84	1.88	0.50	3.41

Weather: Cloudy; 30 km NW wind; rain

Comment: High tide; time sample processed: 08:40; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 19

Location UPPER BRUDENELL RIVER, P.E.I.

Date	19-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	3:00 PM	4	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	5.0	30.0	2.20	1.36	2.91	12.00	1.64	0.49	3.96

Weather: Clear; 10 km SW wind

Comment: High tide; time sample processed: 17:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 20

Location LOWER BRUDENELL RIVER, P.E.I.

Date	19-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	3:15 PM	4	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	5.0	30.5	2.19	1.28	2.83	12.69	2.51	0.53	3.55

Weather: Clear; 10 km SW wind

Comment: High tide; time sample processed: 17:45; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 21

Location UPPER BRUDENELL RIVER, P.E.I.

Date	20-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time		5.9	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	7.6	30.0	1.42	1.11	2.59	10.93	4.21	0.68	4.34

Weather: Clear; 5 km SW wind

Comment: Mid tide; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 22

Location LOWER BRUDENELL RIVER, P.E.I.

Date	20-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	3:30 PM	5.9	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	7.4	30.5	1.68	1.10	3.36	16.03	3.62	0.73	3.97

Weather: Clear; 5 km SW wind

Comment: Mid tide; time sample processed: 19:00; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 23

Location UPPER BRUDENELL RIVER, P.E.I.

Date	21-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	5:00 PM	5.8	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	7.2	30.0	2.32	1.54	2.79	11.95	3.07	0.86	4.28

Weather: Clear; 5 km west wind

Comment: High tide; time sample processed: 18:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 24

Location LOWER BRUDENELL RIVER, P.E.I.

Date	21-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time		5.8	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_{a}PE (µg / L)	P_{a}PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	7.1	30.5	1.75	1.31	2.90	12.25	2.77	1.41	4.20

Weather: Clear; 5 km west wind

Comment: High tide; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 25

Location UPPER BRUDENELL RIVER, P.E.I.

Date	22-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	7:15 AM	3	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_{a}PE (µg / L)	P_{a}PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	5.9		2.57	1.55	2.89	12.50	3.23	0.62	4.13

Weather: Clear; 5 km west wind

Comment: High tide; time sample processed: 08:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 26

Location LOWER BRUDENELL RIVER, P.E.I.

Date	22-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	7:30 AM	3	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_{a}PE (µg / L)	P_{a}PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	5.9		2.44	1.55	2.57	11.32	4.05	0.65	4.65

Weather: Clear; 5 km west wind

Comment: High tide; time sample processed: 09:20; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 27

Location UPPER BRUDENELL RIVER, P.E.I.

Date	26-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	5:00 PM	0.2	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	5.8	28.5	2.52	2.32	2.97	13.45	4.41	0.67	3.87

Weather: Cloudy; 15 km west wind

Comment: Time sample processed: 18:00; No sample collected Nov. 25/91 due to high wind; high tide; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 28

Location LOWER BRUDENELL RIVER, P.E.I.

Date	26-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	5:15 PM	0.1	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	5.6	30.1	2.75	2.42	2.91	11.97	2.20	1.20	3.15

Weather: Cloudy; 15 km west wind

Comment: High tide; time sample processed: 19:20; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 29

Location UPPER BRUDENELL RIVER, P.E.I.

Date	27-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	4:45 PM	-0.2	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	6.3	30.5	2.57	2.17	2.65	11.28	4.17	0.52	4.41

Weather:

Comment: Time sample processed: 17:20; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 30

Location LOWER BRUDENELL RIVER, P.E.I.

Date	27-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	5:00 PM	-0.2	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	6.2	30.5	2.00	1.85	2.76	12.07	4.24	0.50	4.64

Weather:

Comment: Time sample processed: 18:00; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 31

Location UPPER BRUDENELL RIVER, P.E.I.

Date	28-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	5:15 PM		46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION		30.0	2.51	1.94	2.85	11.43	3.21	0.58	3.63

Weather:

Comment: Time sample processed: 18:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 32

Location LOWER BRUDENELL RIVER, P.E.I.

Date	28-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time			46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION		30.5	2.46	1.81	2.59	11.11	2.97	0.48	3.63

Weather:

Comment: Samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 33

Location LOWER BRUDENELL RIVER, P.E.I.

Date	29-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	2:00 PM	2.2	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	6.1	30.5	1.72	1.43	2.77	12.54	4.06	0.53	4.85

Weather: Cloudy; 25 km west wind

Comment: High tide; time sample processed: 14:45; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 34

Location UPPER BRUDENELL RIVER, P.E.I.

Date	29-Nov-91	Air Temperature (°C)	Latitude	Longitude
Time	2:15 PM	2.2	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	6.2	30.0	1.84	1.38	2.53	11.85	3.75	0.51	4.37

Weather: Cloudy; 25 km west wind

Comment: High tide; time sample processed: 15:10; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 35

Location UPPER BRUDENELL RIVER, P.E.I.

Date	02-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	9:05 AM	0	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	5.1	30.0	2.49	1.79	2.98	12.18	3.97	0.51	4.41

Weather: Sunny; 30 km SW wind

Comment: High tide; time sample processed: 14:00; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 36

Location LOWER BRUDENELL RIVER, P.E.I.

Date	02-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	10:00 AM	0	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	5.2	30.0	3.89	2.29	3.03	13.31	3.26	0.53	4.02

Weather: Sunny; 30 km SW wind

Comment: High tide; time sample processed: 14:25; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 37

Location UPPER BRUDENELL RIVER, P.E.I.

Date	03-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	3:00 PM	-3.2	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	2.2	30.0	2.79	1.89	3.18	14.38	2.78	0.57	3.63

Weather: Cloudy; 10 km east wind

Comment: High tide; time sample processed: 17:00; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 38

Location LOWER BRUDENELL RIVER, P.E.I.

Date	03-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	3:15 PM	-3.2	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	2.2	31.0	2.65	1.86	2.93	13.66	2.65	0.55	3.43

Weather: Cloudy; 10 km east wind

Comment: High tide; time sample processed: 17:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 39

Location UPPER BRUDENELL RIVER, P.E.I.

Date	04-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	11:00 AM	0	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	3.0	30.0	3.66	3.51	3.64	17.84	2.57	4.04	3.76

Weather: Cloudy; 40 km east wind

Comment: Mid tide; time sample processed: 17:00; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 40

Location LOWER BRUDENELL RIVER, P.E.I.

Date	04-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	11:15 AM	0	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	3.0	30.0	3.22	3.35	4.54	24.01	2.58	0.60	3.27

Weather: Cloudy; 40 km east wind

Comment: Mid tide; time sample processed: 17:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 41

Location UPPER BRUDENELL RIVER, P.E.I.

Date	06-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	2:00 PM	-6	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	0.2	30.5	1.57	1.95	3.08	14.01	6.55	0.61	4.98

Weather: Sunny; clear; 25 km SW wind

Comment: Mid tide; time sample processed: 16:00; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 42

Location LOWER BRUDENELL RIVER, P.E.I.

Date	06-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	2:10 PM	-6	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	0.2	31.0	1.95	2.05	3.32	15.49	3.85	0.59	4.03

Weather: Sunny; clear; 25 km SW wind

Comment: Mid tide; time sample processed: 16:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 43

Location LOWER BRUDENELL RIVER, P.E.I.

Date	07-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	4:00 PM	-2.2	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	0.2	31.0	1.26	1.46	2.51	11.56	4.93	0.57	5.35

Weather: Sunny; clear; 10 km SW wind

Comment: Low tide; time sample processed: 17:00; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 44

Location UPPER BRUDENELL RIVER, P.E.I.

Date	07-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	4:15 PM	-2.2	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	0.2	30.5	1.55	1.40	2.65	11.72	6.88	0.57	5.82

Weather: Sunny; clear; 10 km SW wind

Comment: Low tide; time sample processed: 17:20; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 45

Location LOWER BRUDENELL RIVER, P.E.I.

Date	09-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	3:15 PM	4	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	2.0	30.0	1.90	1.38	2.83	12.47	5.41	0.61	6.23

Weather: Overcast; 45 km SW wind

Comment: Low tide; time sample processed: 18:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 46

Location UPPER BRUDENELL RIVER, P.E.I.

Date	09-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	5:00 PM	4	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	2.0	30.0	2.24	1.33	2.67	12.69	3.54	0.61	5.03

Weather: Overcast; 45 km SW wind

Comment: Low tide; time sample processed: 18:00; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 47

Location LOWER BRUDENELL RIVER, P.E.I.

		Air Temperature (°C)	Latitude	Longitude
Date	12-Dec-91			
Time	3:00 PM	1.9	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	2.0	30.0	7.78	5.70	4.66	16.26	6.37	0.88	6.55

Weather: Sunny; 15 km west wind

Comment: High tide; some ice on river; time sample processed: 19:00; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 48

Location UPPER BRUDENELL RIVER, P.E.I.

		Air Temperature (°C)	Latitude	Longitude
Date	12-Dec-91			
Time	3:15 PM	1.9	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	2.0	31.0	5.74	2.07	3.58	12.83	6.67	0.86	6.95

Weather: Sunny; 15 km west wind

Comment: High tide; some ice on river; time sample processed: 19:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 49

Location UPPER BRUDENELL RIVER, P.E.I.

		Air Temperature (°C)	Latitude	Longitude
Date	13-Dec-91			
Time	1:00 PM	6	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	3.0	30.0	2.78	1.54	3.07	12.25	24.49	0.65	6.22

Weather: Overcast; light rain; 25 km SE wind

Comment: High tide; time sample processed: 14:10; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 50

Location LOWER BRUDENELL RIVER, P.E.I.

Date	13-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	1:00 PM	6	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	3.1	30.5	2.82	1.60	2.75	11.92	4.58	0.68	6.25

Weather: Overcast; light rain; 25 km SE wind

Comment: High tide; time sample processed: 14:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 51

Location UPPER BRUDENELL RIVER, P.E.I.

Date	14-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	3:00 PM	2	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	2.2	28.0	3.62	2.55	3.86	12.93	8.15	0.70	7.34

Weather: Overcast; 0 km wind

Comment: High tide; time sample processed: 16:00; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 52

Location LOWER BRUDENELL RIVER, P.E.I.

Date	14-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	3:15 PM	2	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	2.2	30.0	1.93	1.53	4.02	16.88	5.82	0.64	6.53

Weather: Overcast; 0 km wind

Comment: High tide; time sample processed: 16:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 53

Location UPPER BRUDENELL RIVER, P.E.I.

		Air Temperature (°C)	Latitude	Longitude
Date	15-Dec-91			
Time	11:30 AM	2.2	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	3.0	30.0	3.17	1.49	3.25	13.77	4.34	0.64	6.09

Weather: Overcast; 60 km west wind

Comment: High tide; time sample processed: 13:25; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 54

Location LOWER BRUDENELL RIVER, P.E.I.

		Air Temperature (°C)	Latitude	Longitude
Date	15-Dec-91			
Time	11:40 AM	2.2	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	3.0	30.5	8.01	2.73	3.51	12.63	4.09	1.00	6.06

Weather: Overcast; 60 km west wind

Comment: High tide; time sample processed: 13:55; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 55

Location UPPER BRUDENELL RIVER, P.E.I.

		Air Temperature (°C)	Latitude	Longitude
Date	16-Dec-91			
Time	1:30 PM	-5.4	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	0.1	30.5	1.91	1.07	2.85	12.21	5.18	0.53	5.86

Weather: Sunny; clear; 20 km west wind

Comment: High tide; time sample processed: 16:00; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 56

Location LOWER BRUDENELL RIVER, P.E.I.

Date	16-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	1:45 PM	-4.4	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	1.0	31.0	2.09	1.04	2.75	11.20	5.13	0.60	6.59

Weather: Sunny; clear; 20 km west wind

Comment: High tide; time sample processed: 16:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 57

Location UPPER BRUDENELL RIVER, P.E.I.

Date	17-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	2:00 PM	-3.4	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	2.2	30.8	1.44	0.70	2.73	11.86	3.05	0.69	6.91

Weather: Overcast; 15 km north wind

Comment: High tide; time sample processed: 16:00; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 58

Location LOWER BRUDENELL RIVER, P.E.I.

Date	17-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	2:20 PM	-4	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	2.4	31.0	2.16	0.82	2.61	12.23	3.01	0.71	7.16

Weather: Overcast; 15 km north wind

Comment: High tide; time sample processed: 16:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 59

Location UPPER BRUDENELL RIVER, P.E.I.

Date	18-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	11:00 AM	-1.2	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	1.0	30.5	1.53	0.76	2.72	12.15	2.94	0.72	7.10

Weather: Overcast; 60 km east wind

Comment: Mid-tide; time sample processed: 12:00; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 60

Location LOWER BRUDENELL RIVER, P.E.I.

Date	18-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	11:15 AM	-1.2	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	1.0	30.5	1.56	0.77	2.65	11.28	2.81	0.70	7.46

Weather: Overcast; 60 km east wind

Comment: Mid-tide; time sample processed: 12:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 61

Location UPPER BRUDENELL RIVER, P.E.I.

Date	19-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	10:05 AM	0	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	0.2	30.0	1.55	1.30	2.67	12.64	3.30	0.67	7.59

Weather: Sunny; 30 km west wind

Comment: Low tide; time sample processed: 11:00; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 62

Location LOWER BRUDENELL RIVER, P.E.I.

Date	19-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	10:25 AM	0	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	0.2	30.2	4.00	2.27	3.43	14.47	3.24	0.78	7.21

Weather: Sunny; 30 km west wind

Comment: Low tide; time sample processed: 11:45; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 63

Location UPPER BRUDENELL RIVER, P.E.I.

Date	20-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	9:00 AM	-6.2	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	0.0	30.2	1.61	1.30	2.71	12.77	3.83	0.72	7.94

Weather: Sunny; clouds; 20 km west wind

Comment: Low tide; time sample processed: 10:05; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 64

Location LOWER BRUDENELL RIVER, P.E.I.

Date	20-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	9:20 AM	-6.2	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	0.0	30.8	1.90	1.29	2.61	13.19	3.67	0.68	7.64

Weather: Sunny; cloudy periods; 20 km west wind

Comment: Low tide; time sample processed: 10:35; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 65

Location UPPER BRUDENELL RIVER, P.E.I.

Date	21-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	9:30 AM	-7.2	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	-1.0	29.5	1.32	1.03	2.69	12.96	4.51	0.69	7.91

Weather: Overcast; 10 km NW wind

Comment: Mid-tide; time sample processed: 10:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 66

Location LOWER BRUDENELL RIVER, P.E.I.

Date	21-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	9:45 AM	-7.2	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	-1.0	30.5	1.38	1.00	2.41	12.23	4.43	0.69	7.75

Weather: Overcast; 10 km NW wind

Comment: Mid-tide; time sample processed: 10:50; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 67

Location UPPER BRUDENELL RIVER, P.E.I.

Date	23-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	4:00 PM	-5	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	0.2	29.0	1.14	0.76	2.22	11.54	5.64	0.63	8.18

Weather: Overcast; 5 km west wind

Comment: Low tide; time sample processed: 17:45; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 68

Location LOWER BRUDENELL RIVER, P.E.I.

Date	23-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	4:30 PM	-5	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	0.2	28.0	0.98	0.75	2.09	11.05	11.53	0.79	12.39

Weather: Overcast; 5 km west wind

Comment: Low tide; time sample processed: 18:00; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 69

Location UPPER BRUDENELL RIVER, P.E.I.

Date	24-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	10:30 AM	-1	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	0.2	29.5	1.32	0.78	2.28	11.87	6.17	0.65	8.57

Weather: Overcast; 10 km west wind

Comment: Mid-tide; time sample processed: 12:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 70

Location LOWER BRUDENELL RIVER, P.E.I.

Date	24-Dec-91	Air Temperature (°C)	Latitude	Longitude
Time	10:45 AM	-1	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	0.2	30.0	1.54	0.90	2.67	13.09	5.85	0.65	8.71

Weather: Overcast; 10 km west wind

Comment: Mid-tide; time sample processed: 12:50; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 71

Location UPPER BRUDENELL RIVER, P.E.I.

Date	Time	Air Temperature (°C)	Latitude	Longitude
26-Dec-91	10:30 AM	-8	46°10.46'	62°32.48'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	0.0	30.0	1.70	0.87	2.47	12.25	3.94	0.66	7.68

Weather: Sunny; clear; 25 km west wind

Comment: Low tide; time sample processed: 11:20; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 72

Location LOWER BRUDENELL RIVER, P.E.I.

Date	Time	Air Temperature (°C)	Latitude	Longitude
26-Dec-91	10:40 AM	-8	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	0.0	31.0	1.49	0.91	2.55	12.06	3.81	0.65	7.48

Weather: Sunny; clear; 25 km west wind

Comment: Low tide; time sample processed: 12:00; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 73

Location LOWER BRUDENELL RIVER, P.E.I.

Date	13-Jan-92	Air Temperature (°C)	Latitude	Longitude
Time	10:30 AM	-9.2	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	0.1	29.0	2.59	1.33	5.76	14.12			

Weather: Overcast; 10 km SW wind

Comment: Low tide; light ice cover (2 cm) on ice; time sample processed: 12:00; samples taken by G. Keith - Contractor; NPSi sample lost

Brudenell River, P.E.I.

STATION 74

Location LOWER BRUDENELL RIVER, P.E.I.

Date	26-Feb-92	Air Temperature (°C)	Latitude	Longitude
Time	2:30 PM	3	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	0.0		1.39	0.91	4.71	12.29	4.43	0.79	8.04

Weather: Cloudy

Comment: Ice = 22 " thick; time sample processed: 16:00; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 75

Location LOWER BRUDENELL RIVER, P.E.I.

		Air Temperature (°C)	Latitude	Longitude
Date	14-Mar-92			
Time	2:00 PM	-5	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	-0.5		4.18	1.48	5.13	13.62			

Weather: Sunny

Comment: Ice = 35 " thick; time sample processed: 15:00; samples taken by G. Keith - Contractor; NPSi sample lost

Brudenell River, P.E.I.

STATION 76

Location LOWER BRUDENELL RIVER, P.E.I.

		Air Temperature (°C)	Latitude	Longitude
Date	23-Mar-92			
Time	12:30 PM	-1	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	0.0		6.49	3.19	5.55	12.81	1.91	0.54	1.51

Weather: Light snow; 10 km NW wind

Comment: Ice = 36" thick; time sample processed: 13:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 77

Location LOWER BRUDENELL RIVER, P.E.I.

		Air Temperature (°C)	Latitude	Longitude
Date	31-Mar-92			
Time	10:30 AM	0.4	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
STATION	0.1		7.20	2.47	5.64	12.37	0.47	0.43	0.62

Weather: Sunny; 10 km west wind

Comment: Ice = 31" thick; time sample processed: 11:30; samples taken by G. Keith - Contractor

Brudenell River, P.E.I.

STATION 78

Location LOWER BRUDENELL RIVER, P.E.I.

		Air Temperature (°C)	Latitude	Longitude
Date	09-Apr-92			
Time	10:00 AM	0.5	46°11.02'	62°33.15'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)
STATION	0.2		1.20	0.99	4.11	11.45	2.01	0.46	1.54

Weather: Sunny; 15 km SW wind

Comment: Ice= 24" thick; time sample processed: 13:00; samples taken by G. Keith - Contractor

Appendix 4.2 Physical and biological data collected from Cardigan, PEI 04-Apr-91 to 04-Apr-91

Cardigan, P.E.I.

STATION 01

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

Date	04-Apr-91	**Latitude**	**Longitude**
Time	1:00 PM	46°12.80'	62°31.80'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a\,PE}$ (µg / L)	$P_{a\,PE}$ (µg / L)	NH_3 (µM)	UREA (µM)
6	0.0	32.5	2.06	1.34	0.48	0.16

NOTE: INTEGRATED SAMPLE

Weather: Sunny; windy; cool

Comment: 6m integrated sample (multiple casts); ice hole ~100' off Newport Wharf

Appendix 4.3 Physical and biological data collected from Cardigan, PEI 14-May-91 to 14-May-91

Cardigan, P.E.I.

STATION 02

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

Date	14-May-91	**Latitude**	**Longitude**
Time	1:12 PM	46°13.10'	62°32.70'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	NH_3 (µM)	*UREA* (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	*POC* (µg)	*PON* (µg)	*POC:PON*
1	5.0	31.0	1.60	1.55	3.48	11.14	0.21	n.d.	0.00	0.41	0.60	160.20	21.43	7.49
4	3.5	31.0	1.47	1.51	3.64	11.52	0.13	0.01	0.00	0.42	0.58	161.93	20.00	8.13
7	4.0	31.0	1.11	1.10	3.67	12.87	0.67	n.d.	0.11	0.37	0.78	132.15	16.50	8.01

Weather: Sunny

Comment: Regular site off Seal River mid-channel

Cardigan, P.E.I.

STATION 03

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

Date	14-May-91	**Latitude**	**Longitude**
Time	1:12 PM	46°13.10'	62°32.70'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	NH_3 (µM)	*UREA* (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	*POC* (µg)	*PON* (µg)	*POC:PON*
7		30.0	1.42	1.42	3.49	11.55	0.12	n.d.	0.00	0.39	0.63	140.80	18.60	7.57

NOTE: INTEGRATED SAMPLE

Weather: Sunny

Comment: Intergrated sample; regular site

Cardigan, P.E.I.

STATION 04

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

Date	14-May-91	**Latitude**	**Longitude**
Time		46°13.50'	62°34.45'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	NH_3 (µM)	*UREA* (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	*POC* (µg)	*PON* (µg)	*POC:PON*
6	3.0	30.3	1.63	1.87	5.44	17.67	0.23	n.d.	0.07		0.35	157.20	16.90	9.30

NOTE: INTEGRATED SAMPLE

Weather:

Comment: Integrated sample; 1/3 in from regular site

Cardigan, P.E.I.

STATION 05

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

Date	14-May-91	**SECCHI Depth (m)**	$-k_1$	**Air Temperature (°C)**	**Latitude**	**Longitude**
Time					46°13.65'	62°35.55'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	NH_3 (µM)	*UREA* (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	*POC* (µg)	*PON* (µg)	*POC:PON*
5	3.5	31.5	1.71	2.00	5.66	19.50	0.16	n.d.	0.00	0.00	0.51	140.60	16.70	8.42

NOTE: INTEGRATED SAMPLE

Weather: Sunny

Comment: Integrated sample; 2/3 in from regular site off small cove

Appendix 4.4 Physical and biological data collected from Cardigan, PEI
05-Jun-91 to 05-Jun-91

Cardigan, P.E.I.

STATION 06

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

		SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Latitude	Longitude
Date	05-Jun-91					
Time		5	0.3	8	46°13.10'	62°32.70'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	NH_3 (µM)	*UREA* (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	*POC* (µg)	*PON* (µg)	*POC:PON*
1	8.0	31.0	1.65	0.84	4.26	15.72	0.53	0.09	0.00	0.15	0.86	130.10	12.45	10.46
4		32.0	1.66	1.03	4.07	15.65	0.60	0.05	0.00	0.16	0.91	148.25	14.35	10.36
7		33.0	1.72	0.97	4.44	16.71	0.97	n.d.	0.08	0.16	0.85	132.05	14.90	8.86

Weather:

Comment: Site off Seal River; 15N, 13C profiles

Cardigan, P.E.I.

STATION 07

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

		SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Latitude	Longitude
Date	05-Jun-91					
Time					46°13.65'	62°35.55'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	NH_3 (µM)	*UREA* (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	*POC* (µg)	*PON* (µg)	*POC:PON*
1		31.5	1.94	1.05					0.00	0.27	1.21			
4		32.0	1.75	1.29					0.00	0.29	0.98			
6		32.0	1.45	1.45					0.00	0.36	0.96			

Weather:

Comment: '2/3 in - Sephton's site - our site C5

Appendix 4.5 Physical and biological data collected from Cardigan, PEI 04-Jul-91 to 05-Jul-91

Cardigan, P.E.I.

STATION 08

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	04-Jul-91							
Time	12:00 PM	13.70	5	0.3	20	15	46°12.06'	62°30.36'

Depth (m)	Manual Temp. (°C)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	NH_3 (µM)	*UREA* (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
1	15.0		0.21	0.31					0.00	0.32	2.69
4	14.0		0.27	0.42					0.00	0.47	2.91
7	14.0		0.33	0.53	4.48	17.88	0.32	0.08	0.00	0.28	3.00

Weather: Sunny; light wind; warm

Comment: Center of channel off end of field; buildings of farm just starting to be obscured by trees at end of field; mooring set off end of road in field (clump of trees); 3 thermographs 1m, 7m, 1m from bottom; in at 12:49

Cardigan, P.E.I.

STATION 09

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	04-Jul-91							
Time	3:20 PM	10.50			18		46°12.45'	62°31.49'

Depth (m)	Manual Temp. (°C)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	NH_3 (µM)	*UREA* (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
1	15.5		0.25	0.38					0.00	0.35	2.87
4	15.0		0.27	0.44					0.00	0.35	2.79
7	14.0		0.53	0.83					0.00	0.53	3.76

Weather: Sunny; wind ~15 kph; cool

Comment: Off Newport Wharf

Cardigan, P.E.I.

STATION ·10

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	04-Jul-91							
Time		10.50	5	0.3		15	46°13.07'	62°32.57'

Depth (m)	Manual Temp. (°C)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	NH_3 (µM)	*UREA* (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
1	16.0	1213	0.28	0.50	4.39	16.81	0.38	n.d.	0.00	0.45	2.88
4	14.5	517	0.61	0.82	4.38	16.58	0.49	0.03	0.00	0.42	3.06
7	14.0	264	0.62	1.00	4.61	17.02	0.39	0.02	0.00	0.48	3.73

Weather: Sunny; wind ~10 kph; cool

Comment: Inoculation: 14C 1:45; incubate: 14C 1:55; filter time zero: 3:55; end incubation: 19:10; filtration: 20:25; enhanced dark 14C profile; 250ml Ahlstrom filters for each bottle; 1ml of whole water for det. conc. in incubation bottle; each bottle 25µCi/250ml

Cardigan, P.E.I.

STATION ·11

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	04-Jul-91							
Time	7:20 PM	10.00					46°13.28'	62°34.30'

Depth (m)	Manual Temp. (°C)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	NH_3 (µM)	*UREA* (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
1	15.0		0.60	0.95					0.00	0.58	2.93
4	15.0		0.68	0.95					0.00	0.58	3.10
7	15.0		0.84	1.39					0.00	0.56	3.11

Weather:

Comment: Inside shoal off green buoy

Cardigan, P.E.I.

STATION ·12

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	04-Jul-91							
Time	4:25 PM	4.50	3.5	0.4			46°13.37'	62°35.42'

Depth (m)	Manual Temp. (°C)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	NH_3 (µM)	*UREA* (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
1	16.0		0.80	1.11					0.00	0.60	3.58
4	15.0		0.90	1.52					0.00	0.63	3.37

Weather: Sunny; wind ~10 kph; cool

Comment:

Cardigan, P.E.I.

STATION ·13

Location CARDIGAN RIVER, P.E.I. - FRESH WATER

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	05-Jul-91							
Time								

Depth (m)	Manual Temp. (°C)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	NH_3 (µM)	*UREA* (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
0							0.82		25.42	2.33	59.11

Weather:

Comment: Surface freshwater samples for nutrients - not filtered; below hatchery = FWD (880330 FWD);

Cardigan, P.E.I.

STATION 14

Location CARDIGAN RIVER, P.E.I. - FRESH WATER

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	05-Jul-91							
Time								

Depth (m)	Manual Temp. (°C)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	NH_3 (µM)	*UREA* (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)
0							3.65		24.56	2.34	60.38

Weather:

Comment: Surface freshwater samples for nutrients - not filtered; above hatchery = FWU (880330 FWU)

Appendix 4.6 Physical and biological data collected from Cardigan, PEI 01-Oct-91 to 02-Oct-91

Cardigan, P.E.I.

STATION 15

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

		Total Depth (m)	Air Temperature (°C)	Surface Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	01-Oct-91							
Time	12:30 PM	12.20	8	13	118	26	46°12.10'	62°30.40'

Depth (m)	TD Temp. (°C)	Manual Salinity (‰)	F_o	$< I_D >$ (µmol/s/m²)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	14.2	29.0	76	66	1.96	2.91	2.72	10.55	0.70		0.46	0.63	5.43	128.67	16.57	7.93	0.02	0.04
4	14.4	29.0	86	31	2.17	3.34	2.99	12.16	0.33		0.38	0.57	5.30	134.30	17.65	7.62	0.01	0.02
7	14.4	29.0	76	7	2.08	3.49	2.83	11.21	0.43		0.36	0.57	5.19	118.17	14.90	7.95	0.01	0.03

Weather: Overcast

Comment: Calm; 2 VEMCO T-D profiles; processed sample 13:00; picked up and reset Ryan recorders;

Cardigan, P.E.I.

STATION 16

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

		Total Depth (m)	Air Temperature (°C)	Surface Temperature (°C)	$<I_o>$	$<I_z>$	Latitude	Longitude
Date	01-Oct-91							
Time	1:45 PM	9.00		13.5	110	24	46°12.45'	62°31.49'

Depth (m)	TD Temp. (°C)	Manual Salinity (‰)	F_o	$<I_D>$ (µmol/s/m²)	C_aPE (µg / L)	P_aPE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2$+$N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	14.2	29.0	77	44	2.71	4.43	2.99	11.24	0.68		0.50	0.60	5.41	120.07	16.27	7.39	0.01	0.02
4	14.4	29.0	84	20	2.46	4.04	3.07	11.21	0.69		0.50	0.62	5.62	109.93	16.33	6.77	0.04	0.03
7	14.4	28.0	59	11	2.17	3.13	2.77	11.41	0.92		0.41	0.55	5.52	75.80	10.90	7.01	0.01	0.03

Weather:

Comment: Newport wharf

Cardigan, P.E.I.

STATION 17

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

Date	01-Oct-91	Total Depth (m)	Air Temperature (°C)	Surface Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Time	2:30 PM	8.00	8	13	163	36	46°13.10'	62°32.70'

Depth (m)	TD Temp. (°C)	Manual Salinity (‰)	F_o	$< I_D >$ (µmol/s/m²)	C_aPE (µg / L)	P_aPE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	14.1	29.0	89	101	2.57	4.19	2.94	11.31	2.68		0.48	0.64	5.78	124.90	19.00	6.57	0.01	0.02
4	14.5	30.0	95	27	2.88	4.41	3.17	11.44	0.81		0.45	0.61	5.35	130.90	19.70	6.66	0.02	0.02
7		30.0	88	11	2.79	4.18	2.89	11.83	0.85		0.52	0.64	5.89	104.03	17.03	6.12	0.02	0.03

Weather:

Comment: Took up mooring

Cardigan, P.E.I.

STATION 18

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

Date	01-Oct-91	Total Depth (m)	Air Temperature (°C)	Surface Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Time	3:45 AM	8.50	12		86	19	46°13.50'	62°34.45'

Depth (m)	TD Temp. (°C)	Manual Salinity (‰)	F_o	$< I_D >$ (µmol/s/m²)	C_aPE (µg / L)	P_aPE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	14.1	29.0	34	52	3.32	4.72	3.52	11.17	1.26		0.57	0.80	5.67	139.60	22.50	6.20	0.02	0.02
5	14.3	30.0	253	2	2.50	4.10	3.57	12.06	1.22		0.48	0.65	5.28	123.20	19.27	6.44	0.02	0.02

Weather:

Comment:

Cardigan, P.E.I.

STATION 19

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

		Total Depth (m)	Air Temperature (°C)	Surface Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	01-Oct-91							
Time	4:25 PM	5.50	8.5	14	34	7	46°13.65'	62°35.55'

Depth (m)	TD Temp. (°C)	Manual Salinity (‰)	F_o	$< I_D >$ (µmol/s/m²)	C_aPE (µg / L)	P_aPE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	14.3		90	21	2.54	4.58	3.33	10.95	2.46		0.67	0.77	6.28	150.05	21.65	6.94	0.02	0.02
4	14.8		76	10	2.30	4.52	2.90	10.93	2.57		0.67	0.79	6.24	134.35	20.75	6.47	0.02	0.02

Weather:

Comment:

Cardigan, P.E.I.

STATION 20

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

		Total Depth (m)	Air Temperature (°C)	Surface Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	02-Oct-91							
Time	12:45 PM	11.00	16	14	328	72	46°12.80'	62°31.80'

Depth (m)	TD Temp. (°C)	Manual Salinity (‰)	F_o	$< I_D >$ (µmol/s/m²)	C_aPE (µg / L)	P_aPE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	14.5	30.0	250	181	3.65	5.49	3.02	11.37	0.53	n.d.	0.44	0.66	5.16	150.15	23.20	6.47	0.02	0.02
4		30.0	68	72	2.55	4.30	3.32	12.00	0.90	0.00	0.45	0.67	5.29	80.93	13.00	6.25	0.02	0.01
7		30.0	32	26	2.61	4.19	2.90	11.67	1.07	0.25	0.44	0.64	5.31	100.00	18.35	5.45	0.02	0.02

Weather: Cloudy; rain heavy

Comment: Calm; inoculations 13:20 - 13:55; incubation started: 14:00; site of second thermograph

Appendix 4.7 Physical and biological data collected from Cardigan, PEI
21-Oct-91 to 21-Oct-91

Cardigan, P.E.I.

STATION 21

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

		Total Depth (m)	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	21-Oct-91						
Time	12:05 PM	11.00	6.5	179	39	46°12.06'	62°30.36'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	F_o	$< I_D >$ (µmol/s/m²)	C_aPE (µg / L)	P_aPE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2$+$N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	10.5	31.0	38	118	2.39	2.15	4.10	18.11	2.28	0.03	2.00	0.82	6.69	81.65	9.60	8.50	0.01	0.02
4	10.0	32.0	58	69	2.70	2.39	3.43	12.59	2.19	n.d.	2.09	0.78	6.87	92.30	11.75	7.86	0.02	0.02
7	11.0	32.0		32	3.24	2.74	3.33	13.01	2.14	n.d.	2.13	0.83	7.04	85.73	12.00	7.20	0.01	0.01

Weather:

Comment:

Cardigan, P.E.I.

STATION 22

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

		Total Depth (m)	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	21-Oct-91						
Time	12:45 PM	7.00	8	347	76	46°12.45'	62°31.49'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	F_o	$< I_D >$ (µmol/s/m²)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	10.5	32.0	76	217	4.16	4.53	3.37	11.51	1.64	0.03	0.98	0.66	3.91	122.70	14.15	8.66	0.01	0.02
4	10.5	32.0	82	31	4.34	4.17	3.24	11.53	1.68	n.d.	1.06	0.68	3.99	112.23	14.07	8.02	0.02	0.03
7	10.2	32.0	89		4.17	4.41	3.51	12.35	1.81	n.d.	1.17	0.71	4.25	122.05	14.55	8.38	0.02	0.03

Weather: Overcast; cold; wind coming off land

Comment:

Cardigan, P.E.I.

STATION 23

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

Date	21-Oct-91	Total Depth (m)	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Time	1:20 PM	13.00	7	158	35	46°13.07'	62°32.57'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	F_o	$< I_D >$ (µmol/s/m²)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	10.5	31.0	88	119	4.86	4.96	3.48	10.55	0.96	0.08	0.40	0.58	1.95	122.05	14.95	8.16	0.02	0.02
4	10.5	30.0	88	33	4.44	5.17	3.23	10.96	1.59	n.d.	0.41	0.59	1.98	135.05	16.10	8.37	0.02	0.01
7	11.0	30.0	89	11	4.49	5.06	3.23	10.53	1.73	0.04	0.60	0.61	2.34	126.50	17.00	7.44	0.02	0.02

Weather:

Comment:

Cardigan, P.E.I.

STATION 24

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

Date	21-Oct-91	Total Depth (m)	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Time	2:55 PM	7.50	8	253	56	46°13.28'	62°34.30'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	F_o	$< I_D >$ (µmol/s/m²)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	11.0	30.0	98	122	5.46	5.63	3.36	10.75	1.92	0.04	0.56	0.60	2.23	134.70	17.20	7.84	0.03	0.03
4	11.0	30.0	98	66	5.34	5.53	3.31	11.13	1.70	0.26	0.63	0.66	2.46	136.05	17.95	7.58	0.03	0.03

Weather: Cold; overcast

Comment:

Cardigan, P.E.I.

STATION 25

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

Date	21-Oct-91	Total Depth (m)	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Time	2:20 PM	6.50	10	172	38	46°13.37'	62°35.42'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	F_o	$< I_D >$ (µmol/s/m²)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	10.8	29.0	111	111	6.22	7.00	3.37	10.92	3.10	0.44	0.41	0.74	1.87	148.90	19.35	7.69	0.04	0.04
4	10.8	30.0	113	45	6.53	6.92	3.33	6.91	3.12	0.43	0.39	0.83	1.89	155.05	19.95	7.75	0.03	0.02

Weather:

Comment:

Appendix 4.8 Physical and biological data collected from Cardigan, PEI 12-Nov-91 to 12-Nov-91

Cardigan, P.E.I.

STATION 26

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

Date	12-Nov-91	Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Time	12:44 PM		1.5	1.0	8.25	215	47	46°12.06'	62°30.36'

Depth (m)	TD Temp. (°C)	Manual Salinity (‰)	F_o	$< I_D >$ (µmol/s/m²)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	8.2	30.0	66	75	3.41	2.84	4.75	19.98	0.24	0.25	0.04	0.43	0.73	119.40	15.30	7.80	0.03	0.03
4	8.2	30.0	63		3.57	3.19	4.86	21.93	0.25	0.38	0.10	0.44	0.75	126.20	18.45	6.84	0.03	0.03
7	8.1	30.0	51		3.44	3.19	6.05	27.90	0.31	0.26	0.30	0.50	1.01	101.70	13.80	7.37	0.03	0.06

Weather: Cloudy

Comment: Light sea; very silty following storm

Cardigan, P.E.I.

STATION 27

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	12-Nov-91								
Time	1:15 PM	9.00	1.75	0.9	8.25			46°12.45'	62°31.49'

Depth (m)	TD Temp. (°C)	Manual Salinity (‰)	F_o	$< I_D >$ (µmol/s/m²)	C_aPE (µg / L)	P_aPE (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	NH_3 (µM)	*UREA* (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	*POC* (µg)	*PON* (µg)	*POC:PON*	*A* (ng / mL)	*P* (µg / mL)
1	8.3	30.0	76		4.49	2.94	5.00	23.15	0.22	0.13	0.10	0.44	0.80	88.50	11.80	7.50	0.05	0.04
4	8.2	30.0	76		4.98	2.90	4.71	23.16	0.32	0.05	0.09	0.43	0.75	87.00	12.50	6.96	0.05	0.03
7	8.2	30.0	70		5.31	2.90	4.91	23.95	0.77	0.20	0.22	0.47	0.94	85.60	12.50	6.85	0.05	0.03

Weather: Cloudy

Comment: Light sea; very silty following storm

Cardigan, P.E.I.

STATION 28

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	12-Nov-91								
Time	1:44 PM	9.00	1.6	1				46°13.07'	62°32.57'

Depth (m)	TD Temp. (°C)	Manual Salinity (‰)	F_o	$< I_D >$ (µmol/s/m²)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	8.3	30.0	68		5.12	2.88	4.89	23.59	0.21	0.34	0.11	0.43	0.88	87.60	12.20	7.18	0.07	0.03
4	8.3	30.0	60		5.54	3.06	5.08	24.49	0.26	0.26	0.14	0.43	0.84	95.30	12.40	7.69	0.07	0.02
7	8.3	30.0	78		6.60	2.88	5.09	22.51	0.30	0.36	0.19	0.44	0.88	188.00	14.50	12.97	0.07	0.02

Weather: Cloudy

Comment: Light sea; very silty following storm

Cardigan, P.E.I.

STATION 29

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	12-Nov-91								
Time	2:14 PM	12.00	2.8	0.5				46°13.28'	62°34.30'

Depth (m)	TD Temp. (°C)	Manual Salinity (‰)	F_o	$< I_D >$ (µmol/s/m²)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	8.5	28.0	71		4.09	2.56	5.92	20.80	0.54	0.29	0.56	0.43	2.23	99.60	12.20	8.16	0.08	0.04
4	8.1	30.0	70		6.09	3.15	5.98	20.79	0.96	0.04	0.40	0.44	1.13	72.10	11.30	6.38	0.06	0.03

Weather:

Comment:

Cardigan, P.E.I.

STATION 30

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	12-Nov-91								
Time	2:33 PM	5.00	2.25	0.7				46°13.37'	62°35.42'

Depth (m)	TD Temp. (°C)	Manual Salinity (‰)	F_o	$< I_D >$ (µmol/s/m²)	C_aPE (µg / L)	P_aPE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2$+$N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	7.8	27.5	87		6.15	3.46	4.84	18.75	0.30	0.19	1.03	0.40	2.65	97.70	14.40	6.78	0.09	0.03
4	7.9	29.0	76		6.72	3.09	4.81	19.85	0.39	0.37	0.32	0.40	0.79	88.70	13.10	6.77	0.07	0.06

Weather:

Comment:

Appendix 4.9 Physical and biological data collected from Cardigan, PEI 21-Nov-91 to 21-Nov-91

Cardigan, P.E.I.

STATION 31

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

		Air Temperature (°C)	Latitude	Longitude
Date	21-Nov-91			
Time	10:00 AM	8	46°13.07'	62°32.57'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	NH_3 (µM)	*UREA* (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	*POC* (µg)	*PON* (µg)	*POC:PON*	*A* (ng / mL)	*P* (µg / mL)
1	5.5	26.0	2.53	2.63	4.90	22.13	1.90	0.33	1.99	0.98	5.67	81.95	10.05	8.16	0.04	0.02

Weather: Wind 40-50 SW

Comment: Very high tide (neap); electric pump sent oout with buoys

Cardigan, P.E.I.

STATION 32

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

		Air Temperature (°C)	Latitude	Longitude
Date	21-Nov-91			
Time	10:30 AM	7	46°12.45'	62°31.49'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	NH_3 (µM)	*UREA* (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	*POC* (µg)	*PON* (µg)	*POC:PON*	*A* (ng / mL)	*P* (µg / mL)
1	6.0	31.5	2.28	1.58	4.85	23.39	1.36	0.15	1.75	0.90	4.55	64.90	7.65	8.49	0.02	0.06

Weather: Wind 40-50 SW

Comment: Very high tide; electric pump sent away from wharf with buoys

Appendix 4.10 Physical and biological data collected from Murray River, PEI
04-Apr-91 to 05-Jul-91

Murray River, P.E.I.

STATION 01

Location MURRAY RIVER, P.E.I. - SITE 1

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Surface Temperature (°C)	Latitude	Longitude
Date	04-Apr-91						
Time	11:40 AM					46°01.50'	62°33.55'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
5.5	0.0	27.0	2.91	4.31			1.22	n.d.						

NOTE: INTEGRATED SAMPLE

Weather: Sunny; windy; cool

Comment: Regular ice hole; integrated sample

Murray River, P.E.I.

STATION 02

Location MURRAY RIVER, P.E.I. - SITE 1

Date	15-May-91	Total Depth (m)	SECCHI Depth (m)	$-k_1$	Surface Temperature (°C)	Latitude	Longitude
Time	10:30 AM					46°01.50'	62°33.55'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
1	8.5	29.0	1.08	0.66	4.12	16.09	0.43	0.15	0.02	0.47	1.43	128.90	16.87	7.75
4	8.0	30.0	0.67	0.54	4.00	15.73	0.50	0.00	0.01	0.39	1.16	99.80	11.90	8.39
7	6.0	30.5	0.73	0.60	4.23	15.97	0.26	n.d.	0.00	0.38	1.15	95.37	11.23	8.57

Weather:

Comment: 10 minute net tow taken

Murray River, P.E.I.

STATION 03

Location MURRAY RIVER, P.E.I. - SITE 2

Date	15-May-91	Total Depth (m)	SECCHI Depth (m)	$-k_1$	Surface Temperature (°C)	Latitude	Longitude
Time	11:15 AM					46°02.21'	62°31.46'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
1	8.5	30.0	0.31	0.59	4.10	16.77	0.35	0.04	0.00	0.33	1.42	81.90	9.03	9.18
4	6.5	31.0	1.39	1.60	5.32	19.09	0.39		0.62	0.40	1.19	157.97	16.80	9.41

Weather: Sunny; warm

Comment:

Murray River, P.E.I.

STATION 04

Location MURRAY RIVER, P.E.I. - SITE 1

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Surface Temperature (°C)	Latitude	Longitude
Date	04-Jun-91						
Time	1:30 PM				13	46°01.50'	62°33.55'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	NH_3 (µM)	*UREA* (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	*POC* (µg)	*PON* (µg)	*POC:PON*
1	13.0	29.5	1.80	1.07	4.97	17.78	0.55	0.11	0.00	0.23	1.39	188.33	20.50	9.23
4		30.0	1.42	0.52	4.36	15.82	0.63	0.32	0.00	0.17	0.60	167.87	17.13	9.87
7		32.0	3.43	1.62	4.86	17.26	0.59	0.13	0.00	0.17	1.64	180.83	16.70	10.97

Weather: Partly sunny

Comment: Samples processed: 13:50 to 15:30

Murray River, P.E.I.

STATION 05

Location MURRAY RIVER, P.E.I. - SITE 2

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Surface Temperature (°C)	Latitude	Longitude
Date	04-Jun-91						
Time						46°02.21'	62°31.46'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	NH_3 (µM)	*UREA* (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	*POC* (µg)	*PON* (µg)	*POC:PON*
1		29.5	1.95	0.76	4.45	15.55	0.59	0.12	0.00	0.18	2.74	183.97	17.50	10.64
4		32.5	2.60	1.09	4.80	16.08	0.78	0.35	0.00	0.13	1.09	200.67	20.47	9.95

Weather:

Comment:

Murray River, P.E.I.

STATION 06

Location MURRAY RIVER, P.E.I. - SITE 1

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Surface Temperature (°C)	Latitude	Longitude
Date	05-Jul-91						
Time		5.50				46°01.50'	62°33.55'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
1	18.5		1.01	0.87	4.13	16.04	0.58	0.90	0.00	0.44	1.28			
4	17.0		1.06	1.44	4.30	17.44	0.20	0.27	0.00	0.42	1.39			
7	17.0		1.23	1.33	4.85	19.87	0.14	0.28	0.00	0.35	1.57			

Weather: Sunny; 5-10 km SW light wind

Comment: Inside site

Murray River, P.E.I.

STATION 07

Location MURRAY RIVER, P.E.I. - SITE 2

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Surface Temperature (°C)	Latitude	Longitude
Date	05-Jul-91						
Time	10:30 AM	4.00	3.5	0.4	19	46°02.21'	62°31.46'

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
1	18.0		0.64	0.82	4.36	17.67	0.09	0.16	0.00	0.30	1.41			
10	17.5		0.80	1.20	4.84	18.12	0.16	0.08	0.00	0.20	1.40			

Weather: Sunny; warm

Comment: Calm; mouth of Mink River

Murray River, P.E.I.

STATION 08

Location MURRAY RIVER, P.E.I.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Surface Temperature (°C)	Latitude	Longitude
Date	05-Jul-91						
Time	11:00 AM						

Weather: Sunny; warm

Comment: Calm; horizontal net tow / DSP sample only; tow in channel off Mink River; towing towards Site 1 (M-1) ~10 minutes

Appendix 4.11 Physical and biological data collected from New London Bay, PEI 03-Oct-91 to 20-Nov-91

New London Bay, P.E.I.

STATION 01

Location NEW LONDON BAY, P.E.I. - OUTSIDE RIGHT ON LEASE BUOY

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)
Date	03-Oct-91					
Time	10:30 AM	4.75			17	13.25

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	F_o	C_a PE (µg / L)	P_a PE (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	NH_3 (µM)	*UREA* (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	*POC* (µg)	*PON* (µg)	*POC:PON*
4.75	13.3	28.0	66	2.37	3.99	3.78	13.59	0.27	0.18	0.00	0.34	0.30	134.17	16.17	8.32

NOTE: INTEGRATED SAMPLE

Weather: Light breeze; blue sky; clouds

Comment:

New London Bay, P.E.I.

STATION 02

Location NEW LONDON BAY, P.E.I. - OUTSIDE LEFT ON BOB ANDREW'S LEASE

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)
Date	03-Oct-91					
Time	10:55 AM	3.50			18	13

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	F_o	C_a^{PE} (µg / L)	P_a^{PE} (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
3.5	13.0	27.5	60	2.19	3.57	3.44	11.64	0.07	0.20	0.00	0.36	0.35	103.43	12.80	8.13

NOTE: INTEGRATED SAMPLE

Weather: Wind picking up; blue sky; clouds

Comment:

New London Bay, P.E.I.

STATION 03

Location NEW LONDON BAY, P.E.I. - INSIDE ON LEASE M0203

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)
Date	03-Oct-91					
Time	11:11 AM	4.50			18	13

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	F_o	C_a^{PE} (µg / L)	P_a^{PE} (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
4.5	13.0	27.5	80	3.14	4.36	3.35	12.83	0.10	0.05	0.01	0.36	0.28	139.45	16.65	8.38

NOTE: INTEGRATED SAMPLE

Weather: Breezy; sunny; clouds

Comment:

New London Bay, P.E.I.

STATION 04

Location NEW LONDON BAY, P.E.I. - INSIDE ON DAVID COLE'S LEASE P0048

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)
Date	03-Oct-91					
Time	11:30 AM	4.50			19	

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	F_o	C_aPE (µg / L)	P_aPE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2$+$N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
4.5	13.5	26.5	92	4.55	5.58	4.89	19.07	0.10	0.01	0.28	0.40	0.41	144.47	19.77	7.32

NOTE: INTEGRATED SAMPLE

Weather: Sunny; clouds; light breeze

Comment:

New London Bay, P.E.I.

STATION 05

Location NEW LONDON BAY, P.E.I. - INSIDE PAST THE BRIDGE

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)
Date	03-Oct-91					
Time	11:50 AM	4.50			19	14

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	F_o	C_aPE (µg / L)	P_aPE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2$+$N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
4.5	14.0	25.0	127	7.33	6.46	5.10	17.54	0.32	0.04	1.28	0.45	0.66	161.15	23.75	6.77

NOTE: INTEGRATED SAMPLE

Weather: Light breeze; sunny; clouds

Comment:

New London Bay, P.E.I.

STATION 06

Location NEW LONDON BAY, P.E.I. - LEASE M0059

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)
Date	20-Nov-91					
Time	10:00 AM	5.00	2.25	0.7		5

Depth (m)	Manual Temp. (°C)	Manual Salinity (‰)	F_o	C_aPE (µg / L)	P_aPE (µg / L)	*POM* (µg / L)	*PIM* (µg / L)	NH_3 (µM)	*UREA* (µM)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)	*POC* (µg)	*PON* (µg)	*POC:PON*
5	6.0	27.5	6	1.93	1.33	3.61	17.30	1.51	0.38	8.14	0.43	7.82	87.95	9.30	9.44

NOTE: INTEGRATED SAMPLE

Weather: Sunny; light wind

Comment: Calm; integrated sample; fluorometer reading taken at 22:20; sample kept in dark and in cooler until this time

Appendix 4.12 Physical and biological data collected during Survey 91-01 20-Jun-91 to 25-Jun-91

Survey 91-01

STATION 01

Location ST. GEORGES BAY, N.S. - EAST OF CAPE GEORGE

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	20-Jun-91							
Time	10:54 AM	30.00	9.5	0.2	26		45°52.21'	61°51.48'

Depth (m)	Temp. (°C)	Sal (PSU)	σ_τ (kg / m^3)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	NH_3 (µM)	$UREA$ (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	$POC:PON$
2	12.92	28.41	21.31	0.30	0.49	0.24		0.01	0.29	1.56	82.60	9.75	8.51
10	11.47	28.76	21.83	0.30	0.53	0.34		0.00	0.25	1.33	66.30	8.00	8.29
25	8.88	28.90	22.37	0.17	0.40	0.45		0.01	0.36	1.80	52.50	6.50	8.08

Weather: Sunny; warm

Comment: Calm; irradiance - 1mn mean (5sec); 2 CTD cast - NAVSTN01 (suspect) + NAVSTN1A

Survey 91-01

STATION 02

Location ST. GEORGES BAY, N.S. - EAST OF CAPE GEORGE

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	20-Jun-91							
Time	2:50 PM	35.00	8.5	0.2			45°53.04'	61°48.54'

Depth (m)	Temp. (°C)	Sal (PSU)	σ_τ (kg / m^3)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	NH_3 (µM)	$UREA$ (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	$POC:PON$
2	13.20	28.53	21.35	0.23	0.46	0.30		0.00	0.33	1.33	64.15	8.45	7.60
10	11.67	28.71	21.76	0.29	0.44	0.33		0.00	0.30	1.09	50.45	5.70	8.85
25	9.23	28.86	22.28	0.51	0.78	0.08		0.00	0.25	1.39	68.05	8.65	7.87

Weather:

Comment:

Survey 91-01

STATION 03

Location ST. GEORGES BAY, N.S. - EAST OF CAPE GEORGE

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	20-Jun-91							
Time	4:50 PM						45°52.16'	61°52.01'

Weather:

Comment: 2nd mooring installed near 1st and 233µm 1/2m net oblique tow from 20m only activities; sampling time: 17:02

Survey 91-01

STATION 04

Location ST. GEORGES BAY, N.S. - EAST OF CAPE GEORGE

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	21-Jun-91							
Time	7:45 AM	29.00	5	0.3	17	14.9	45°52.08'	61°51.50'

Depth (m)	Temp. (°C)	Sal (PSU)	σ_τ (kg / m^3)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	NH_3 (µM)	$UREA$ (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	$POC:PON$
0				0.30	0.54	0.74	3.13	0.00	0.36	1.44	56.03	6.90	8.29
1	13.53	28.31	21.12	0.32	0.57	0.51	1.55	0.00	0.27	1.53	40.80	6.00	6.80
4	13.51	28.26	21.08	0.26	0.49	0.25	0.51	0.00	0.26	1.52	45.45	6.05	7.51
7	13.51	28.30	21.11	0.30	0.53	0.48	0.63	0.00	0.26	1.57	34.60	4.75	7.28
10	13.20	28.64	21.43	0.23	0.41	0.64	0.22	0.00	0.24	1.26	39.30	5.40	7.28
17.5	9.39	28.84	22.24	0.51	0.70	0.47	0.51	0.01	0.25	1.33	48.00	6.30	7.64
25	8.64	28.91	21.41	0.22	0.41	0.69	2.93	0.06	0.31	2.14	47.70	5.10	9.41

Weather: Overcast; light wind

Comment: Profile station; 2nd mooring site; no fluoresence; time zero: 08:45;; filtered: 09:40; start incubation: 09:10; end incubation: 17:40

Survey 91-01

STATION 05

Location ST. GEORGES BAY, N.S. - EAST OF CAPE GEORGE

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	21-Jun-91							
Time		36.00	8.5	0.2	21	15	45°53.33'	61°45.10'

Depth (m)	Temp. (°C)	Sal (PSU)	σ_τ (kg / m^3)	C_aPE (µg / L)	P_aPE (µg / L)	NH_3 (µM)	UREA (µM)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)	POC (µg)	PON (µg)	POC:PON
2	13.69	28.42	21.17	0.27	0.42	0.14		0.00	0.25	1.16	44.90	5.85	7.70
10	12.72	28.29	21.24	0.62	0.96	0.16		0.00	0.24	1.14	58.25	8.35	6.98
25	9.43	28.83	22.22	0.26	0.46	0.42		0.00	0.28	1.13	44.70	5.35	8.42

Weather: Hazy sun; warm

Comment: Calm

Survey 91-01

STATION 06

Location ST. GEORGES BAY, N.S. - SITE 4

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	21-Jun-91							
Time	1:00 PM	38.00	7.5	0.2	19.5		45°53.74'	61°42.05'

Depth (m)	Temp. (°C)	Sal (PSU)	σ_τ (kg / m^3)	C_aPE (µg / L)	P_aPE (µg / L)	NH_3 (µM)	UREA (µM)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)	POC (µg)	PON (µg)	POC:PON
2	13.66	28.44	21.19	0.36	0.61	0.20		0.00	0.26	1.10	50.50	6.70	7.54
10	11.15	28.33	21.55	0.51	0.89	0.30		0.00	0.27	1.18	64.10	9.60	6.68
25	9.42	28.88	22.27	0.34	0.66	0.32		0.00	0.27	1.02	46.90	5.90	7.95

Weather: Sunny; 10-15 WSW wind

Comment: Standard 3 x Z survey station; small chop

Survey 91-01

STATION 07

Location ST. GEORGES BAY, N.S. - SITE 7

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	21-Jun-91							
Time	2:10 PM	23.00	6.5	0.2	17	15	45°54.22'	61°37.94'

Depth (m)	Temp. (°C)	Sal (PSU)	σ_τ (kg / m³)	C_a PE (µg / L)	P_a PE (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
2	13.82	28.42	21.14	0.36	0.60	0.08		0.00	0.29	1.19	65.20	7.90	8.25
10	12.51	28.35	21.33	0.42	0.74	0.05		0.00	0.28	1.25	51.30	7.20	7.12
25				0.48	0.80	0.00		0.00	0.26	0.76	54.30	7.15	7.58

Weather:

Comment: Tide beginning to run strong into Bay; switched to 125mL nalgene bottles for NH3/urea

Survey 91-01

STATION 08

Location ST. GEORGES BAY, N.S. - SITE 8

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	21-Jun-91							
Time	3:20 PM	35.00	7.5	0.2	21.5	15	45°50.85'	61°41.43'

Depth (m)	Temp. (°C)	Sal (PSU)	σ_τ (kg / m³)	C_a PE (µg / L)	P_a PE (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
2	13.95	28.50	21.18	0.32	0.52	0.16		0.00	0.28	0.95	52.75	6.90	7.64
10	10.40	29.32	22.45	0.30	0.50	0.96		0.00	0.28	0.84	44.95	5.30	8.48
25	9.27	29.03	22.41	0.33	0.49	0.72		0.00	0.27	0.65	42.60	4.80	8.88

Weather: Sunny; warm

Comment: Calm

Survey 91-01

STATION 09

Location ST. GEORGES BAY, N.S.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	21-Jun-91							
Time	4:15 PM	29.00	8.5	0.2	15		45°50.41'	61°44.94'

Depth (m)	Temp. (°C)	Sal (PSU)	σ_τ (kg / m^3)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
2	14.98	28.42	20.91	0.32	0.55	0.18		0.01	0.24	1.11	51.85	6.90	7.52
10	10.86	28.71	21.90	0.44	0.82	0.13		0.00	0.23	1.04	51.70	6.25	8.24
25	9.07	28.90	22.33	0.19	0.37	0.52		0.13	0.32	2.01	46.07	4.57	10.36

Weather: Sunny; warm

Comment: Calm; 5-10 mph north wind

Survey 91-01

STATION 10

Location ST. GEORGES BAY, N.S.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	21-Jun-91							
Time	5:15 PM	30.00					45°52.16'	61°52.01'

Weather:

Comment: 3 x 30m vertical net tows at second mooring at same time as picking up incubation; filtered on 233µm (1.9L); sampling time: 17:45

Survey 91-01

STATION 11

Location ST. GEORGES BAY, N.S. - EAST OF CAPE GEORGE

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	22-Jun-91							
Time	8:35 AM	28.00			10.5	14.2	45°52.01'	61°51.49'

Depth (m)	Temp. (°C)	Sal (PSU)	σ_τ (kg / m^3)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	NH_3 (µM)	$UREA$ (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	$POC:PON$
0				0.50	0.90	0.57		0.00	0.28	1.44	62.50	6.90	9.09
1	13.04	28.23	21.15	0.54	0.95	0.56	0.37	0.00	0.23	1.20	64.97	6.87	9.62
4	13.03	28.27	21.18	0.51	0.87	1.58	3.34	0.00	0.27	1.21	75.85	10.10	7.51
7	13.03	28.27	21.18	0.46	0.83	1.27	n.d.	0.00	0.29	1.53	49.10	6.70	7.33
10	12.96	28.27	21.20	0.40	0.79	0.47	0.24	0.00	0.28	1.61	55.20	6.87	8.25
17.5	12.04	28.44	21.49	0.47	0.86	0.54	1.42	0.00	0.26	1.63	74.07	7.50	9.90
25	9.41	28.77	22.17	0.28	0.61	0.64	1.27	0.00	0.29	1.66	63.23	6.33	10.40

Weather: Cloudy

Comment: Swell running; in situ incubation station; 7 x Z profile at second mooring

Survey 91-01

STATION 12

Location ST GEORGE'S BAY, N.B. - SITE 10

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	22-Jun-91							
Time	1:15 PM	12.00	8.5	0.2	13	14.5	45°49.57'	61°53.82'

Depth (m)	Temp. (°C)	Sal (PSU)	σ_τ (kg / m^3)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	NH_3 (µM)	$UREA$ (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	$POC:PON$
2	13.22	28.23	21.11	0.51	1.09	0.33		0.00	0.34	1.98	62.25	8.50	7.32
5	13.15	28.21	21.11	0.53	1.06	0.14		0.00	0.27	1.89	67.25	9.00	7.47
10	13.05	28.25	21.16	0.49	1.02	0.07		0.00	0.28	1.94	61.43	8.13	7.64

Weather: Sunny; 10-15 mph NW wind

Comment: Choppy

Survey 91-01

STATION 13

Location ST GEORGE'S BAY, N.S. - SITE 9

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	22-Jun-91							
Time	2:30 PM	28.00	8.5	0.2	13	14.9	45°49.86'	61°49.76'

Depth (m)	Temp. (°C)	Sal (PSU)	σ_τ (kg / m^3)	C_aPE (µg / L)	P_aPE (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2$+$N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
2	13.69	28.41	21.16	0.44	0.94	0.20		0.00	0.27	1.85	64.87	9.30	7.10
15	12.70	28.63	21.52	0.45	0.82	0.09		0.00	0.22	1.52	55.40	7.17	7.70
25	9.43	28.88	22.25	0.52	0.69	0.29		0.00	0.24	1.06	56.83	6.03	9.39

Weather: Sunny

Comment: Swells

Survey 91-01

STATION 14

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	22-Jun-91							
Time	4:00 PM	25.00				14.9	45°51.68'	61°51.51'

Weather: Sunny

Comment: Picking up mooring; swells; CTD cast

Survey 91-01

STATION 15

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	23-Jun-91							
Time	8:50 AM	29.00	8.5	0.2	13.5	14.6	45°52.19'	61°51.68'

Depth (m)	Temp. (°C)	Sal (PSU)	σ_τ (kg / m^3)	C_aPE (µg / L)	P_aPE (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2$+$N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
2	13.13	28.19	21.10	0.52	1.03	0.24		0.00	0.23	2.22	54.45	7.10	7.70
15	10.97	28.25	21.52	0.58	1.11	0.68		0.00	0.21	1.78	59.77	7.37	8.23
25	8.29	29.15	22.64	0.29	0.57	0.69		0.00	0.24	1.66	62.25	6.95	9.01

Weather: Cloudy; occasional drizzle; light and variable winds

Comment: Flat calm; mooring site 1; regular station procedure; finished sampling: 09:50

Survey 91-01

STATION 16

Location ST. GEORGE'S BAY, N.S. - NEAR SITE 9

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	23-Jun-91							
Time								

Weather:

Comment: 20µ vertical tow only; 1120 ml concentrate with 20µm filtered on 233µm for DSP and frozen

Survey 91-01

STATION 17

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	23-Jun-91							
Time	11:40 AM	18.00	11	0.1	13.5		45°46.15'	61°49.82'

Depth (m)	Temp. (°C)	Sal (PSU)	σ_τ (kg / m^3)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	NH_3 (µM)	$UREA$ (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	$POC:PON$
2	13.10	28.65	21.46	0.32	0.56	1.23		0.00	0.21	1.31	64.45	6.95	9.27
10	12.95	28.67	21.50	0.41	0.74	0.81		0.00	0.21	1.37	59.77	6.53	9.11
15	10.63	28.75	21.97	0.47	0.97	0.25		0.00	0.27	1.70	52.35	6.80	7.70

Weather:

Comment: Sampling time: 11:45

Survey 91-01

STATION 18

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	23-Jun-91							
Time		12.00	10	0.2	21.5	15	45°42.26'	61°49.88'

Depth (m)	Temp. (°C)	Sal (PSU)	σ_τ (kg / m^3)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	NH_3 (µM)	$UREA$ (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	$POC:PON$
2	13.84	28.24	21.00	0.50	1.08	0.95		0.00	0.29	1.75	61.50	8.35	7.36
5	13.40	28.37	21.19	0.51	1.09	0.36		0.00	0.27	1.69	66.27	9.57	7.03
10	13.38	28.43	21.24	0.44	0.83	0.54		0.00	0.33	1.56	62.85	7.70	8.16

Weather: Sunny; warm

Comment: Flat calm; air temperature taken in the sun

Survey 91-01

STATION 19

Location ST. GEORGE'S BAY, N.S. - OFF POMQUET BANK

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	23-Jun-91							
Time	2:35 PM	23.00			13.8	14.2	45°44.64'	61°45.50'

Depth (m)	Temp. (°C)	Sal (PSU)	σ_τ (kg / m^3)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	NH_3 (µM)	$UREA$ (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	$POC:PON$
2	12.99	28.80	21.60	0.26	0.41	0.49		0.00	0.24	1.30	65.15	6.55	9.95
10	12.76	28.79	21.63	0.39	0.61	0.25		0.00	0.25	1.39	68.90	7.55	9.13
20	9.58	28.82	22.20	0.45	0.77	0.76		0.00	0.39	1.96	63.75	7.40	8.66

Weather: Sunny; warm

Comment: Calm; air temperature taken in the shade

Survey 91-01

STATION 20

Location ST. GEORGE'S BAY, N.S. - SOUTH OF SITE 9

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	23-Jun-91							
Time	3:35 PM						45°47.51'	61°49.26'

Weather: Sunny; warm

Comment: Calm; 10 minute horizontal tow only; 5 minutes at 20m, 5 minutes at 15m

Survey 91-01

STATION 21

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	24-Jun-91							
Time	8:50 AM	30.00			17	15.5	45°52.24'	61°51.56'

Depth (m)	Temp. (°C)	Sal (PSU)	σ_τ (kg / m^3)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
0				0.16	0.42	1.23		0.00	0.28	1.77	60.15	8.45	7.21
1	14.36	28.22	20.88	0.23	0.45	0.44		0.00	0.25	1.00	64.60	7.20	9.09
4	13.23	28.18	21.06	0.42	0.80	0.50		0.00	0.28	2.17	58.93	8.07	7.40
7	12.85	28.22	21.17	0.41	0.81	0.44		0.00	0.29	2.16	70.27	9.30	7.60
10	11.89	28.30	21.40	0.48	0.87	0.42		0.00	0.31	2.48	76.57	9.00	8.38
17.5	9.85	28.68	22.04	0.57	0.96	0.54		0.00	0.38	2.05	50.13	5.93	8.48
25	9.27	29.07	22.44	0.33	0.51	0.41		0.00	0.26	1.31	43.87	5.60	7.94

Weather: Sunny; warm

Comment: Calm; 14C profile station with size factionation; 2 net tows for DSP etc.; integrated sample for J. McLachlan; air temperature taken in the shade; inoculation: 09:00; start incubation: 09:05; end incubation: 18:05; end filtration: 19:00

Survey 91-01

STATION 22

Location ST. GEORGE'S BAY, N.S. - SOUTH OF SITE 9

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	24-Jun-91							
Time							45°52.24'	61°51.56'

Weather:

Comment: Net tow only

Survey 91-01

STATION 23

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	24-Jun-91							
Time	12:15 PM	16.00	10.5	0.1	14.5	15.5	45°42.24'	61°41.22'

Depth (m)	Temp. (°C)	Sal (PSU)	σ_τ (kg / m^3)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	NH_3 (µM)	$UREA$ (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	$POC:PON$
2	14.42	28.41	21.02	0.24	0.43	0.26		0.00	0.26	1.34	48.05	5.90	8.15
8	13.51	28.50	21.27	0.33	0.70	0.19		0.00	0.25	1.26	59.23	8.43	7.33
14	13.26	28.66	21.44	0.43	0.89	0.13		0.00	0.30	1.32	53.77	6.20	8.71

Weather: Sunny; warm; slight NNW breeze

Comment: Calm; air temperature taken in the shade

Survey 91-01

STATION 24

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	24-Jun-91							
Time	1:41 PM	27.00	10.5	0.1	15.5	15	45°45.09'	61°37.35'

Depth (m)	Temp. (°C)	Sal (PSU)	σ_τ (kg / m^3)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	NH_3 (µM)	$UREA$ (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	$POC:PON$
2	13.84	28.64	21.32	0.24	0.47	0.01		0.00	0.28	1.05	62.85	7.35	8.56
12	11.66	28.63	21.70	0.39	0.85	0.13		0.00	0.27	1.00	65.60	8.35	7.84
25	9.53	28.85	22.22	0.49	0.84	0.18		0.00	0.31	1.29	58.60	6.85	8.57

Weather: Sunny; warm

Comment: Calm; air temperature taken in the shade

Survey 91-01

STATION 25

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	24-Jun-91							
Time	2:45 PM	16.00	9.5	0.2	15.5	15.5	45°48.32'	61°34.94'

Depth (m)	Temp. (°C)	Sal (PSU)	σ_τ (kg / m^3)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	NH_3 (µM)	$UREA$ (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	$POC:PON$
2	14.82	28.50	20.99	0.19	0.34	0.19		0.00	0.25	1.04	58.75	7.15	8.19
8	13.63	28.66	21.36	0.26	0.47	0.48		0.00	0.24	0.75	63.35	7.35	8.64
14	11.10	28.62	21.77	0.46	0.92	0.21		0.00	0.26	0.81	70.45	9.80	7.30

Weather: Sunny; warm

Comment: Calm; air temperature taken in the shade

Survey 91-01

STATION 26

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	24-Jun-91							
Time	4:00 PM	22.00	9.5	0.2	14.5	15	45°54.73'	61°34.67'

Depth (m)	Temp. (°C)	Sal (PSU)	σ_τ (kg / m^3)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	NH_3 (µM)	$UREA$ (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	$POC:PON$
2	13.72	28.54	21.24	0.18	0.29	0.23		0.00	0.25	0.78	51.60	6.35	8.13
12	11.05	28.76	21.92	0.45	0.85	0.19		0.00	0.19	2.18	83.25	11.60	7.28
20	11.01	28.75	21.91	0.41	0.90	0.17		0.00	0.27	1.04	63.00	7.90	7.98

Weather: Sunny; warm

Comment: Calm; air temperature taken in the shade

Survey 91-01

STATION 27

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	24-Jun-91							
Time	5:11 PM						45°53.63'	61°42.35'

Weather: Hazy sun; warm

Comment: Calm; horizontal net tow deep for Dinophysis only

Survey 91-01

STATION 28

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	25-Jun-91							
Time	6:39 AM	38.00					45°54.91'	61°55.27'

Weather:

Comment: Net tow only

Survey 91-01

STATION 29

Location ENROUTE TO PICTOU, N.S. - WEST OF GEORGVILLE, N.S.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	25-Jun-91							
Time	8:08 AM	32.00					45°49.32'	62°13.50'

Weather:

Comment: Net tow only

Survey 91-01

STATION 30

Location ENROUTE TO PICTOU, N.S. - NORTH OF MERIGOMISH HARBOUR, N.S.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	Surface Temperature (°C)	Latitude	Longitude
Date	25-Jun-91							
Time	9:28 AM	21.00					45°44.42'	62°29.54'

Weather:

Comment: Net tow only

Appendix 4.13 Physical and biological data collected during Survey 91-02 20-Sep-91 to 27-Sep-91

Survey 91-02

STATION 01

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	20-Sep-91								
Time	12:45 PM	10.00	2.6	0.6	10	202	44	46°13.13'	62°31.91'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)	POC (µg)	PON (µg)	POC:PON
1	16.49	58	27.15	19.62	105	3.87	3.60	2.56	9.33	0.87	0.12	0.52	1.70	145.60	16.77	8.95
4	16.44	58	28.04	20.31	31	2.96	2.90	2.63	8.88	1.16	0.08	0.48	1.69	111.45	16.35	6.82
7	16.11	47	28.20	20.50	11	2.88	2.53	2.67	9.02	1.60	0.12	0.54	2.54	99.63	12.47	8.09

Weather: Overcast; cloudy; ~20mm rain

Comment: Samples for L. Fritz from net tows; new bulb in fluorometer not calibrated; span knob on fluorometer not to be touched ?until calibration done??; sampling time: 13:00

Survey 91-02

STATION 02

Location OFF CARDIGAN POINT, P.E.I.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	20-Sep-91								
Time	4:35 PM	16.00	3.8	0.4	10	83	18	46°11.63'	62°28.87'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$< I_D >$ (µmol/s/m²)	C_a^{PE} (µg / L)	P_a^{PE} (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
1	16.41	50	26.47	19.11	46	2.22	2.23	2.37	9.14	0.40	0.13	0.55	2.59	113.43	11.87	9.54
5	16.19	58	27.77	20.15	8	2.53	1.89	2.33	8.86	0.17	0.04	0.37	0.94	104.73	10.93	9.63
13		34				1.99	1.06	1.92	9.10	2.18	1.05	0.59	7.06	51.15	6.80	7.53

Weather: Raining; cloudly; 30mm rain yesterday

Comment: Calm; 5', 10', 15', 20', 25', 30', 35' and 40' thermographs (VEMCO) (one of these not on line - check with PC)

Survey 91-02

STATION 03

Location OFF BOUGHTON ISLAND, P.E.I.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	21-Sep-91								
Time		14.00	4	0.4	11	1062	234	46°14.20'	62°22.99'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$< I_D >$ (µmol/s/m²)	C_a^{PE} (µg / L)	P_a^{PE} (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
1	15.40	48	28.13	20.60	720	2.06	1.86	2.37	8.97	0.57	0.22	0.35	2.74	68.70	10.13	6.81
5	15.41	44	28.18	20.64	186	2.03	1.83	2.20	9.29	1.14	0.19	0.34	2.73	74.33	11.37	6.60
10	15.36	36	28.17	20.64		2.14	1.82	2.22	9.81	0.48	0.18	0.31	2.40	69.10	9.57	7.36

Weather: Sunny; clear sky

Comment: Calm

Survey 91-02

STATION 04

Location OFF PANMURE ISLAND, P.E.I.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	21-Sep-91								
Time		18.00	3.5	0.4	12	1209	266	46°09.69'	62°26.90'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
1	15.86	48	28.00	20.40	790	2.09	1.86	2.77	9.47	0.22	0.03	0.30	1.18	90.80	11.70	7.77
5	15.84	52	28.13	20.51	216	2.23	2.07	2.60	9.04	0.44	0.02	0.33	1.25	82.90	11.90	6.96
13	15.51	36	28.26	20.67		2.00	1.23	2.13	9.89	0.95	0.49	0.41	3.79	59.90	8.10	7.73

Weather: Clouds; sunny; wind picking up

Comment:

Survey 91-02

STATION 05

Location WHEELER BAR, P.E.I.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	21-Sep-91								
Time	1:55 PM	23.00	2.5	0.6	8	212	47	46°10.01'	62°29.94'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
1	15.72	54	27.13	19.77	143	2.76	2.62	2.78	9.33	0.33	0.14	0.44	1.81	120.40	15.70	7.79
7	15.81	52	27.92	20.35	18	3.41	2.36	2.69	9.45	0.68	0.19	0.48	2.97	101.50	15.07	6.89
15	14.95	28	28.45	20.94		1.81	1.36	2.08	9.92	2.15	1.04	0.56	7.04	57.77	8.60	6.85

Weather: Overcast; windy; sunny spots

Comment:

Survey 91-02

STATION 06

Location BRUDENELL POINT, P.E.I.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	21-Sep-91								
Time	3:20 PM	10.50	3	0.5	10	886	195	46°11.03'	62°32.91'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$< I_D >$ (µmol/s/m²)	C_a^{PE} (µg / L)	P_a^{PE} (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)	POC (µg)	PON (µg)	POC:PON
1	15.92	54	26.87	19.45	708	3.01	2.96	2.67	9.15	0.72	0.47	0.60	3.64	117.43	18.37	6.48
4	15.90	60	27.51	20.02	94	2.67	2.92	2.31	9.26	1.03	0.30	0.56	3.85	108.53	18.37	6.12
7	15.86	44	28.22	20.57	32	2.40	2.69	2.20	9.88	1.57	0.31	0.55	4.52	72.57	11.80	6.29

Weather: Clearing; cloudy; wind dying down

Comment:

Survey 91-02

STATION 07

Location MURRAY HEAD BELL, P.E.I.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	22-Sep-91								
Time	9:25 AM	18.00	5	0.3	9	2001	440	46°02.65'	63°26.50'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$< I_D >$ (µmol/s/m²)	C_a^{PE} (µg / L)	P_a^{PE} (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)	POC (µg)	PON (µg)	POC:PON
1	15.06	38	28.03	20.59	1920	1.58	2.22	2.18	9.73	0.36	0.15	0.39	3.29	75.60	13.15	5.75
7	15.06	40	28.29	20.79	1669	1.64	2.03	2.39	9.24	0.41	0.21	0.39	3.53	71.37	11.63	6.32
15	15.00	30	28.35	20.85		1.45	1.90	2.22	9.45	0.70	0.44	0.42	4.37	61.13	12.00	5.24

Weather: Clouds; sunny

Comment: Calm

Survey 91-02

STATION 08

Location BOUGHTON POINT, P.E.I.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	22-Sep-91								
Time	11:10 AM	14.00	3	0.5	13	916	201	46°10.45'	62°24.96'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
1	15.21	50	27.92	20.48	776	2.14	2.41	2.09	9.15	0.52	0.08	0.35	2.20			
5	15.19	48	28.20	20.69	549	2.07	2.44	2.50	9.03	0.17	0.04	0.34	2.59	87.05	11.60	7.50
11	15.11	34	28.26	20.76		1.91	2.19	2.28	9.18	0.72	0.45	0.44	3.74	55.80	7.40	7.56

Weather: Clouds; sunny; light breeze

Comment: When irradiance was taken, sun in and out of clouds

Survey 91-02

STATION 09

Location OFF BOUGHTON POINT, P.E.I.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	22-Sep-91								
Time	12:50 PM	21.00	3	0.5	13	1862	410	46°10.57'	62°20.75'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
1	15.24	42	28.05	20.57	1463	1.75	2.19	2.52	8.99	0.67	0.22	0.42	3.28	79.00	9.60	8.23
8	15.16	45	28.30	20.78	285	1.97	2.40	2.80	10.21	0.42	0.35	0.43	3.44	76.70	10.90	7.03
18	15.04	28	28.35	20.85		1.48	1.74	2.02	9.02	0.80	0.52	0.54	4.06	56.90	8.30	6.85

Weather: Sunny; light wind; few clouds

Comment:

Survey 91-02

STATION 10

Location MAITLAND POINT, P.E.I.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	22-Sep-91								
Time	2:30 PM	21.00	2.5	0.6	14	1494	329	46°12.64'	62°30.94'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$< I_D >$ (µmol/s/m²)	C_a^{PE} (µg / L)	P_a^{PE} (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)	POC (µg)	PON (µg)	POC:PON
1	15.10	47	27.90	20.44	1037	2.41	2.93	2.29	9.34	0.92	0.60	0.58	5.27	87.60	11.95	7.33
4	15.06	44	28.11	20.66	359	2.26	2.69	2.13	9.11	1.26	0.61	0.56	5.99	75.40	10.73	7.04
7	14.94	38	28.46	20.95	148	1.72	2.17	2.13	9.44	1.68	0.93	0.55	6.56	60.20	8.43	7.16

Weather: Sunny; some clouds

Comment: Calm

Survey 91-02

STATION 11

Location BRUDENELL, P.E.I. - OFF ST. ANDREWS POINT

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	23-Sep-91								
Time	8:30 AM	15.00	5	0.3	10	699	154	46°10.46'	62°31.65'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$< I_D >$ (µmol/s/m²)	C_a^{PE} (µg / L)	P_a^{PE} (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)	POC (µg)	PON (µg)	POC:PON
1	14.89	48	27.60	20.30	314	2.47	3.38	2.17	8.80	0.69	0.42	0.56	4.03	127.80	15.05	8.45
6	15.02	52	28.03	20.60	59	2.93	3.16	2.46	9.29	1.20	0.41	0.51	4.10	102.87	16.57	6.26
12	14.99	37	28.31	20.82		2.23	2.28	2.34	9.51	1.00	0.52	0.52	4.85	74.90	8.80	8.51

Weather: Sunny

Comment: Calm; CTD cast label NACC11 renamed NAVSEP11; sampling time: 08:45

Survey 91-02

STATION 12

Location NORTHUMBERLAND STRAIT

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	23-Sep-91								
Time	10:25 AM	22.00	2	0.8	11			46°07.54'	62°22.25'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)	POC (µg)	PON (µg)	POC:PON
1	14.91	48	27.28	20.60							0.11	0.72	3.59			
8	14.91	46	28.35	20.87							0.08	0.41	3.34			
16	14.90	45	28.36	20.88							0.11	0.40	3.42			

Weather: Sunny

Comment: Heading from Cardigan, PEI to St - Georges Bay, NS; sampling time: 10:30

Survey 91-02

STATION 13

Location NORTHUMBERLAND STRAIT

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	23-Sep-91								
Time	11:40 AM	22.00	3.5	0.4	13			46°03.92'	62°14.06'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)	POC (µg)	PON (µg)	POC:PON
1	15.16	43	27.82	20.42							0.12	0.43	4.00			
8	15.17	40	28.33	20.80							0.11	0.43	3.99			
16	15.16	39	28.34	20.81							0.09	0.39	3.63			

Weather: Sunny; windy (25-30 km)

Comment: Sampling time: 11:45

Survey 91-02

STATION 14

Location NORTHUMBERLAND STRAIT

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	23-Sep-91								
Time	2:05 PM	45.00	4	0.4	17			45°57.81'	61°59.47'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
1	15.33	35	28.28	20.73							0.02	0.21	1.80			
8	15.30	31	28.34	20.78							0.03	0.21	1.83			
16	15.24	31	28.34	20.80							0.03	0.21	1.76			

Weather: Sunny

Comment: Rough; sampling time: 14:15

Survey 91-02

STATION 15

Location NORTHUMBERLAND STRAIT

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	23-Sep-91								
Time	3:30 PM	29.00	4	0.4	13			45°52.44'	61°52.59'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
1	16.06	57	28.16	20.48							0.02	0.38	2.95			
8	15.98	63	28.19	20.53							0.02	0.39	2.94			
16	15.79	49	28.21	20.58							0.05	0.40	2.98			

Weather: Sunny

Comment: Calm; sampling time: 15:45

Survey 91-02

STATION 16

Location CAPE GEORGE, N.S.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	24-Sep-91								
Time	9:00 AM	31.00	4	0.4	15	132	29	45°52.56'	61°51.72'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	$\sigma\tau$ (kg / m^3)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
1	15.71	34	28.82	20.60	99	1.86	2.52	2.28	8.93	0.42	0.07	0.40	3.40	75.40	10.30	7.31
8	15.65	34	28.22	20.62	27	1.92	2.60	2.14	8.59	0.62	0.06	0.39	2.88	69.55	10.70	6.50
16	15.62	36	28.22	20.63		1.89	2.62	2.13	8.63	0.33	0.03	0.40	2.72	66.77	10.13	6.62

Weather: Overcast; wind picking up; misting rain

Comment:

Survey 91-02

STATION 17

Location 4 MILES SE CAPE GEORGE, N.S.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	24-Sep-91								
Time	11:15 AM	31.00	4.5	0.3	15	500	110	45°49.00'	61°49.00'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	$\sigma\tau$ (kg / m^3)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
1	15.80	51	28.39	20.71	277	2.33	3.24	2.01	8.65	0.50	0.16	0.41	2.86	86.25	9.60	8.99
8	15.78	51	28.24	20.60	36	2.39	3.06	2.20	8.52	0.78	0.07	0.39	2.81	74.20	11.10	6.68
24	15.63	42	28.23	20.63		1.58	2.85	2.13	8.45	1.05	0.14	0.40	2.89	62.55	9.60	6.51

Weather: Overcast; light breeze; sun coming through clouds

Comment: Loran off the air for 3 hours

Survey 91-02

STATION 18

Location CRIBBEAN HEAD, N.S.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	24-Sep-91								
Time	1:10 PM	20.00	4	0.4	16.5	404	89	45°44.80'	61°49.00'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	$\sigma\tau$ (kg / m³)	$< I_D >$ (µmol/s/m²)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
1	16.04	52	28.00	20.54	203	2.24	2.92	2.18	8.39	0.31	0.04	0.35	3.10	84.15	8.60	9.80
10	15.95	48	28.14	20.49		2.30	2.87	2.16	8.19	0.18	0.02	0.35	3.14	78.53	10.00	7.92
18	15.85	30	28.23	20.58		1.14	1.82	2.02	8.41	0.72	0.49	0.42	4.44	59.70	5.90	10.13

Weather: Overcast; light breeze

Comment: Loran C still not working - used charts to determine position

Survey 91-02

STATION 19

Location ST. GEORGE'S BAY, N.S. - OFF POMQUET ISLAND

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	24-Sep-91								
Time	2:40 PM	20.00	3.5	0.4	16.5	426	94	45°40.12'	61°46.31'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	$\sigma\tau$ (kg / m³)	$< I_D >$ (µmol/s/m²)	C_a PE (µg / L)	P_a PE (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
1	16.08	56	28.02	20.37	277	2.32	3.23	2.21	8.41	0.25	0.02	0.32	3.08	84.65	8.80	9.62
8	16.07	60	27.93	20.30	78	2.36	3.05	2.29	8.61	0.16	0.01	0.31	3.07	80.95	10.50	7.72
16	15.97	36	28.17	20.51		1.70	2.34	2.03	9.51	0.31	0.10	0.36	3.74	63.95	7.15	8.94

Weather: Overcast; windy

Comment: Loran C back on

Survey 91-02

STATION 20

Location ST. GEORGE'S BAY, N.S. - POMQUET BANK

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$<I_o>$	$<I_z>$	Latitude	Longitude
Date	24-Sep-91								
Time	3:45 PM	18.00	3.5	0.4	16	453	100	45°44.09'	61°44.55'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$<I_D>$ (µmol/s/m²)	C_a^{PE} (µg / L)	P_a^{PE} (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)	POC (µg)	PON (µg)	POC:PON
1	16.00	58	28.13	20.47	273	2.16	2.96	2.27	8.33	0.18	0.05	0.35	3.18	80.63	9.70	8.31
8	15.97	58	28.07	20.43	38	2.24	2.94	2.19	8.80	0.16	0.05	0.35	3.05	82.25	8.65	9.51
15	15.98	36	28.25	20.57		1.49	2.15	2.12	8.96	0.43	0.13	0.35	3.31	55.55	7.50	7.41

Weather: Skies clearing; windy

Comment:

Survey 91-02

STATION 21

Location SOUTH OF BALLANTYNES COVE, N.S.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$<I_o>$	$<I_z>$	Latitude	Longitude
Date	24-Sep-91								
Time	5:05 PM	18.00	4	0.4	17	69	15	45°49.46'	61°53.84'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$<I_D>$ (µmol/s/m²)	C_a^{PE} (µg / L)	P_a^{PE} (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)	POC (µg)	PON (µg)	POC:PON
1	15.93	52	28.27	20.59	63	2.30	3.11	2.12	8.63	0.25	0.07	0.39	3.17	76.20	8.15	9.37
8	15.90	58	28.18	20.54	14	2.22	3.15	2.06	8.65	0.28	0.10	0.37	3.02	77.20	7.80	9.88
16	15.56	34	28.24	20.65		1.18	1.92	1.96	8.60	1.12	0.46	0.47	2.60	53.15	5.90	9.01

Weather: Overcast; wind subsiding

Comment: Thermocline 13m

Survey 91-02

STATION 22

Location MACKAY POINT, N.S.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	25-Sep-91								
Time	8:30 AM	27.00	4.5	0.3	13	31	7	45°54.57'	61°35.33'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m^3)	$< I_D >$ (µmol/s/m²)	C_a^{PE} (µg / L)	P_a^{PE} (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
1	15.68	35	28.31	20.68	18	1.59	2.44	2.40	8.37	0.39	0.17	0.35	2.72	65.00	7.15	9.08
10	15.67	38	28.29	20.66		1.77	2.33	2.31	8.29	0.40	0.17	0.32	2.68	57.30	7.25	7.91
20	15.67		28.29	20.66		1.51	2.28	2.31	8.32	0.25	0.18	0.31	2.70	60.15	7.75	7.77

Weather: Overcast; storm warnings

Comment: Calm

Survey 91-02

STATION 23

Location MID MOUTH OF ST. GEORGE'S BAY, N.S.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	25-Sep-91								
Time	9:45 AM	41.00	4	0.4	15	72	16	45°53.18'	61°41.54'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m^3)	$< I_D >$ (µmol/s/m²)	C_a^{PE} (µg / L)	P_a^{PE} (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON
1	15.66	34	28.25	20.64	59	1.62	2.39	2.37	8.38	0.32	0.16	0.34	2.54	60.95	10.10	6.03
10	15.66	36	28.28	20.66		1.54	2.20	2.23	8.81	0.37	0.14	0.31	2.49	58.85	7.45	8.03
20	15.43	24	28.29	20.72		0.99	1.52	2.04	8.12	0.58	0.23	0.31	2.76	55.90	5.25	10.53

Weather: Overcast; wind easterly; starting to rain

Comment:

Survey 91-02

STATION 24

Location EAST OF CAPE GEORGE, N.S.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	25-Sep-91								
Time	11:10 AM	37.00	4.5	0.3		113	25	45°52.35'	61°48.38'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m^3)	$< I_D >$ (µmol/s/m²)	C_a^{PE} (µg / L)	P_a^{PE} (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)	POC (µg)	PON (µg)	POC:PON
1	15.45	42	28.09	20.56	85	1.66	2.78	2.54	8.38	0.36	0.12	0.29	2.20	74.00	9.55	7.75
10	15.44	43	28.26	20.69		1.54	2.65	2.32	8.97	0.31	0.11	0.32	2.24	69.15	9.10	7.59
20	15.16	28	28.34	20.81		1.00	1.61	2.02	8.12	0.47	0.12	0.24	1.83	55.70	5.65	9.80

Weather: Overcast; misting rain; 15 knots SE wind and increasing

Comment: Heading back to port; storm warnings this afternoon

Survey 91-02

STATION 25

Location CAPE GEORGE, N.S.

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Date	26-Sep-91								
Time	11:05 AM	32.00	4.5	0.3	17.5	145	32	45°52.41'	61°51.63'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m^3)	$< I_D >$ (µmol/s/m²)	C_a^{PE} (µg / L)	P_a^{PE} (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)	POC (µg)	PON (µg)	POC:PON
1	15.88	27	28.67	20.91	101	2.24	2.78	2.52	7.80	0.63	0.36	0.52	3.45	90.25	10.55	8.59
8	15.82	22	28.19	20.55	29	2.10	2.63	2.10	8.27	1.24	0.34	0.39	3.66	71.20	7.90	9.07
16	15.68	15	28.24	20.63		1.75	2.41	2.02	8.00	0.79	0.31	0.35	2.94	64.75	8.20	7.88

Weather: Overcast; light breeze; raining; storm warnings

Comment: Salinity (REF) had to be zeroed; previous readings may be off

Survey 91-02

STATION 26

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

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$<I_o>$	$<I_z>$	Latitude	Longitude
Date	26-Sep-91								
Time	1:10 PM	33.00	4.5	0.3	18	146	32	45°50.45'	61°44.97'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$<I_D>$ (µmol/s/m²)	C_a^{PE} (µg / L)	P_a^{PE} (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)	POC (µg)	PON (µg)	POC:PON
1	16.00	39	28.51	20.77	122	1.97	2.76	2.45	8.04	0.29	0.18	0.32	2.74	78.70	8.90	8.83
10	15.68	24	28.24	20.63		1.75	2.66	2.09	7.98	0.32	0.17	0.31	2.49	72.45	7.55	9.72
20	15.59		28.28	20.67		1.41	2.04	2.27	8.11	0.69	0.21	0.31	2.69	67.50	7.75	8.71

Weather: Overcast; 15-20 knots SE wind

Comment: Swell starting

Survey 91-02

STATION 27

Location ST. GEORGE'S BAY, N.S. - NORTH OF CAPE JACK

		Total Depth (m)	SECCHI Depth (m)	$-k_1$	Air Temperature (°C)	$<I_o>$	$<I_z>$	Latitude	Longitude
Date	27-Sep-91								
Time	8:35 AM	28.00			19	132	29	45°44.90'	61°33.68'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$<I_D>$ (µmol/s/m²)	C_a^{PE} (µg / L)	P_a^{PE} (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)	POC (µg)	PON (µg)	POC:PON
1	16.17	28	28.33	20.57	78	1.64	2.52	2.45	8.99	0.29	0.23	0.34	3.01	69.35	7.65	9.06
10	15.99	26	28.21	20.53		1.62	2.58	2.40	8.90	0.53	0.26	0.36	3.04	72.95	8.65	8.52
20	15.90	26	28.22	20.56		1.76	2.59	2.07	8.53	0.73	0.22	0.33	2.73	61.75	11.15	5.55

Weather: Overcast; clearing in spots

Comment: Calm; lost SECCHI disc in storm yesterday

Appendix 4.14 Physical and biological data collected during Survey 91-03 06-Nov-91 to 11-Nov-91

Survey 91-03

STATION 01

Location CARDIGAN, P.E.I. - OUTER MOORING

		Total Depth (m)	Air Temperature (°C)	$<I_o>$	$<I_z>$	Latitude	Longitude
Date	06-Nov-91						
Time	9:00 AM	20.00	8.5	1070	235	46°10.15'	62°20.22'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$<I_D>$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	9.53	13			770	0.78	0.83	3.97	16.29	1.89	0.39	1.38	0.57	4.00	62.30	6.70	9.32	0.00	0.02
8	9.51	9			70	0.39	0.56	3.90	16.82	1.84	0.46	1.35	0.50	3.96	47.45	5.55	8.61	0.00	0.04
16	9.52	11				0.30	0.51	3.41	16.60	2.00	0.00	1.36	0.58	4.01	42.63	4.97	8.86	0.00	0.06

Weather: Sunny

Comment: Slight chop; outer mooring at this station; VEMCOs x 4 (1, 6, 12, 18m); sediment traps x 4 (1, 6, 12, 18m); 1 large carboy for S. Guildford; CTD cast 2 (salinity bad); sampling time: 09:15

Survey 91-03

STATION 02

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

Date	06-Nov-91	Total Depth (m)	Air Temperature (°C)	$<I_o>$	$<I_z>$	Latitude	Longitude
Time						46°12.06'	62°30.36'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$<I_D>$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1		41				1.57	1.64	3.68	15.73	2.13	0.48	1.03	0.49	3.20	68.23	8.13	8.53	0.02	0.02

Weather:

Comment: Only 1 small carboy for us and 1 large carboy for S. Guildford at 1 m; also took temperature, salinity and fluorescence at 1m

Survey 91-03

STATION 03

Location BETWEEN C2 + C4 - CARDIGAN RIVER, P.E.I.

Date	06-Nov-91	Total Depth (m)	Air Temperature (°C)	$<I_o>$	$<I_z>$	Latitude	Longitude
Time	1:00 PM	12.00	7.5	656	144	46°12.78'	62°31.81'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$<I_D>$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	8.95	42			263	1.95	1.69	3.79	16.29	2.24	n.d.	1.05	0.41	3.33	62.40	8.60	7.33	0.01	0.03
4	9.52	30			58	1.04	1.13	4.00	16.26	2.76	0.25	1.18	0.57	4.19	50.40	7.80	6.46	0.01	0.04
7	9.61	22			21	0.78	1.01	3.63	16.80	2.64	0.14	1.18	0.62	4.21	41.00	6.00	6.97	0.00	0.03

Weather: Sunny; broken clouds

Comment: Calm; CTD cast 3 (salinity bad); sampling time: 13:10; fluorometer blank 0.75 following station

Survey 91-03

STATION 04

Location BETWEEN RED POINT AND CARDIGAN POINT, P.E.I.

Date	06-Nov-91	Total Depth (m)	Air Temperature (°C)	$<I_o>$	$<I_z>$	Latitude	Longitude
Time	2:20 PM	15.00	8	166	37	46°11.52'	62°29.12'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$<I_D>$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	9.12	58			105	2.07	1.74	3.66	15.42	1.24	n.d.	0.85	0.43	2.42	71.33	9.37	7.69	0.02	0.03
7	9.58	32			12	1.13	1.03	3.51	16.00	1.61	0.27	1.07	0.51	3.14	44.40	5.20	8.52	0.01	0.02
13	9.62	14				0.67	1.00	3.96	16.56	2.72	n.d.	1.21	0.55	4.14	36.05	6.25	5.77	0.00	0.03

Weather: Sunny; broken cloud

Comment: Calm; CTD cast 4 (salinity bad); sampling time: 14:30

Survey 91-03

STATION 05

Location ON LINE BETWEEN BOUGHTON ISLAND AND PANMURE SPIT OFF BOUGHTON ISLAND, P.E.I.

Date	06-Nov-91	Total Depth (m)	Air Temperature (°C)	$<I_o>$	$<I_z>$	Latitude	Longitude
Time	3:30 PM	15.00	4	240	53	46°10.05'	62°27.25'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$<I_D>$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	9.41	40			115	1.88	1.21	3.54	16.15	0.71	0.13	0.75	0.48	2.03	65.00	8.30	7.83	0.01	0.01
6	9.51	35			13	0.96	0.96	3.97	16.96	1.64	0.00	1.08	0.51	3.18	41.75	5.25	7.98	0.01	0.06
13	9.54	28				0.68	0.89	3.86	16.88	1.90	n.d.	1.19	0.52	3.48	27.80	3.60	7.72	0.01	0.07

Weather: Sunny; cool; broken cloud

Comment: CTD cast 5 (salinity bad); zeroing bad on fluorometer all day; sampling time: 15:35

Survey 91-03

STATION 06

Location MOORING STATION BETWEEN C2 AND C3 - CARDIGAN RIVER, P.E.I.

Date	07-Nov-91	Total Depth (m)	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Time	8:13 AM	11.00	7			46°12.87'	62°31.85'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	9.35	49	28.85	22.25		4.00	2.22	4.42	16.32	1.57	0.23	0.93	0.48	2.61	77.60	12.10	6.41	0.02	0.03
4	9.49	37	28.82	22.21		2.73	1.69	3.61	15.49	1.93		1.03	0.58	3.30	63.90	10.55	6.05	0.01	0.02
7	9.62	23	28.96	22.30		1.50	1.11	3.28	15.14	2.68		1.25	0.58	4.36	47.03	7.00	6.86	0.01	0.05

Weather: Partly sunny

Comment: Calm; CTD cast No. 7; more off Newport than C3; sampling time: 08:20

Survey 91-03

STATION 07

Location NORTHUMBERLAND STRAIT

Date	07-Nov-91	Total Depth (m)	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Time	11:30 AM	30.00	6.5			46°06.06'	62°16.53'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	9.37	22	28.83	22.24		1.12	0.94	3.81	19.11	1.36		1.89	0.73	6.79	40.60	6.00	6.76	0.02	0.02
14	9.41	11	28.90	22.28		1.01	0.91	4.07	15.41	1.16		1.94	0.78	3.81	46.15	6.30	7.35	0.00	0.06
26	9.34	8	29.22	22.55		0.43	0.53	3.80	17.40	1.62		1.80	0.67	5.55	43.97	5.97	7.71	0.01	0.04

Weather: Light overcast

Comment: Choppy; drifting; CTD cast 8; sampling time: 11:32

Survey 91-03

STATION 08

Location OFF PANMURE SPIT, P.E.I.

Date	07-Nov-91	Total Depth (m)	Air Temperature (°C)	$<I_o>$	$<I_z>$	Latitude	Longitude
Time	3:00 PM	25.00	5.8			46°09.62'	62°29.85'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$<I_D>$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	9.06	42	28.62	22.12		3.67	2.40	3.90	16.13	0.74		0.56	0.46	1.87	86.55	12.10	7.16	0.03	0.02
12	9.41	16	28.98	22.35		1.35	0.77	3.30	15.79	1.58		1.19	0.56	3.36	41.65	6.35	6.54	0.00	0.05
23	9.42	15	29.02	22.37		0.89	0.79	3.89	17.41	2.04		1.23	0.60	3.92	43.60	5.35	8.20	0.01	0.02

Weather:

Comment: CTD cast No. 9

Survey 91-03

STATION 09

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

Date	08-Nov-91	Total Depth (m)	Air Temperature (°C)	$<I_o>$	$<I_z>$	Latitude	Longitude
Time	9:00 AM	10.40	13	46	10	46°12.83'	62°31.75'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$<I_D>$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	8.87	39	28.46	22.02	22	4.00	3.36	4.51	19.27	0.95		0.69	0.52	2.27	93.63	13.70	6.93	0.03	0.05
4	8.85	42	28.55	22.10	5	4.07	3.46	4.29	19.20	1.02		0.75	0.46	2.37	96.70	14.43	6.72	0.03	0.01
7	8.83	40	28.56	22.10	2	3.63	3.31	4.87	19.72	1.46		0.79	0.51	2.67	92.87	14.00	6.68	0.03	0.02

Weather: Cloudy; drizzle

Comment: Calm; CTD cast No. 10; incubation station; sampling time: 09:04

Survey 91-03

STATION 10

Location NORTH END OF LINE BETWEEN BOUGHTON ISLAND AND CARDIGAN POINT - CARDIGAN BAY, P.E.I.

Date	08-Nov-91	Total Depth (m)	Air Temperature (°C)	$<I_o>$	$<I_z>$	Latitude	Longitude
Time		12.00	7.5			46°10.79'	62°26.88'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$<I_D>$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	9.16	38	28.79	22.24		3.82	2.16	3.56	17.41	0.58		1.02	0.49	2.39	79.00	12.30	6.42	0.03	0.03
4	9.16	41	28.79	22.24		4.08	1.88	3.75	17.45	0.67		0.90	0.48	2.33	76.10	11.00	6.97	0.02	0.02
10		29				3.54	1.70	3.90	17.56	0.88		1.06	0.51	2.50	61.97	9.50	6.57	0.02	0.02

Weather: Cloudy; drizzle

Comment: Moderate swell; CTD cast No. 11

Survey 91-03

STATION 11

Location SOUTH END OF LINE BETWEEN BOUGHTON ISLAND AND CARDIGAN POINT - CARDIGAN BAY, P.E.I.

Date	08-Nov-91	Total Depth (m)	Air Temperature (°C)	$<I_o>$	$<I_z>$	Latitude	Longitude
Time	2:00 PM	18.00	6			46°10.09'	62°28.16'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$<I_D>$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	NO_2+NO_3 (µM)	PO_4 (µM)	SiO_4 (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	9.18	43	28.73	22.19		4.59	2.05	3.46	16.23	0.44		0.84	0.45	2.21	77.80	11.03	7.16	0.03	0.02
8	9.23	38	28.79	22.23		3.81	2.12	3.78	17.02	0.76		0.82	0.45	2.36	69.53	9.80	7.15	0.02	0.11
10	9.29		28.94	22.34		2.43	1.15	4.35	17.04	1.39		1.20	0.49	3.16	51.85	8.25	6.29	0.01	0.01

Weather: Cloudy; colder

Comment: Whitecaps; CTD cast 12; sampling time: 14:05

Survey 91-03

STATION 12

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

Date	09-Nov-91	Total Depth (m)	Air Temperature (°C)	$<I_o>$	$<I_z>$	Latitude	Longitude
Time		11.00	3			46°13.20'	62°31.93'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$<I_D>$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	8.55	48	28.28	21.92		5.56	2.71	4.71	18.00	0.84		0.78	0.44	2.10	93.80	14.00	6.77	0.04	0.02
4	8.49	57	28.32	21.96		5.70	2.90	3.79	16.93	0.57		0.73	0.42	2.09	91.10	14.10	6.60	0.04	0.03
7	8.54	41	28.57	22.15		4.38	2.47	4.66	19.52	0.90		0.75	0.44	1.98	80.47	11.90	6.90	0.04	0.01

Weather: Overcast

Comment: Calm; CTD cast No. 13; 2 moorings for incubation at this station; 1 for 14C, 15N uptake rate; 1 for indicators of nutrient limitation; TCO2 omitted; IRRPROF forgotten; following this station picked up outer mooring at ~12:00

Survey 91-03

STATION 13

Location MIDDLE OF LINE BETWEEN OUTER BOUGHTON ISLAND AND PANMURE SPIT - CARDIGAN BAY, P.E.I.

Date	09-Nov-91	Total Depth (m)	Air Temperature (°C)	$<I_o>$	$<I_z>$	Latitude	Longitude
Time		19.00	5.5			46°09.75'	62°25.56'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$<I_D>$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	9.01	27	28.96	22.39		2.52	1.37	3.37	16.64	0.87		1.30	0.54	3.23	72.53	8.27	8.93	0.02	0.02
9	9.00	28	28.95	22.38		2.54	1.28	3.80	16.52	0.89		1.36	0.56	3.42	59.65	11.25	5.81	0.02	0.01
10	8.99	19	28.95	22.38		1.75	1.26	3.51	16.66	1.20		1.46	0.55	3.51	49.30	6.80	7.25	0.01	0.03

Weather: Cloudy; cold

Comment: Swell running; CTD cast 14; refractometer damp inside

Survey 91-03

STATION 14

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

Date	10-Nov-91	Total Depth (m)	Air Temperature (°C)	$<I_o>$	$<I_z>$	Latitude	Longitude
Time		10.00	3	151	33	46°13.14'	62°31.92'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$<I_D>$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	8.03	73	28.28	21.99	91	6.27	3.94	3.97	16.28	0.27	n.d.	0.33	0.42	1.42	141.70	19.20	7.38	0.05	0.02
4	8.36	68	28.64	22.24	20	5.46	3.10	3.81	17.15	0.38	0.00	0.54	0.43	1.68	98.85	14.05	7.03	0.04	0.03
7	8.64	57	28.74	22.27	5	5.43	2.84	3.84	16.77	0.44	0.00	0.68	0.44	1.70	80.80	10.90	7.41	0.03	0.03

Weather: Sunny

Comment: Calm; 2 moorings; 1 with 14C, 15N; 1 with nutrient limitation studies; CTD casts 15 (NAVNV14A.DAT), 16 (NAVNV14B.DAT); irradiance profile for this station done when mooring picked up; irradiance/day interrupted for profile just previous to 15:30

Survey 91-03

STATION 15

Location CARDIGAN BAY, P.E.I.

Date	10-Nov-91	Total Depth (m)	Air Temperature (°C)	$<I_o>$	$<I_z>$	Latitude	Longitude
Time		14.00				46°10.10'	62°26.27'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$<I_D>$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1		38				3.04	1.75	3.46	16.48	0.85	n.d.	1.36	0.59	3.25	64.20	7.20	8.92	0.01	0.01
7		32				2.83	1.53	3.45	16.60	0.98	n.d.	1.45	0.59	3.45	63.40	6.70	9.46	0.03	0.02
12		23				2.81	1.47	3.30	17.02	1.13	n.d.	1.49	0.61	3.81	61.30	7.60	8.07	0.03	0.03

Weather: Cloudy; bright

Comment: Calm; CTD 17 and 18 both failed to record - CTD memory full; for this station POC/PON 1 replicate only to conserve filters

Survey 91-03

STATION ·16

Location CARDIGAN BAY, P.E.I.

Date	10-Nov-91	Total Depth (m)	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Time	2:30 PM	14.00				46°11.32'	62°28.32'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1		47				4.07	2.24	4.04	16.40	0.36	0.14	0.78	0.49	2.01	82.00	10.70	7.66	0.05	0.03
7		47				4.25	2.18	3.58	16.63	0.45	n.d.	0.94	0.51	2.24	82.40	9.60	8.58	0.04	0.04
12		40				3.81	1.89	3.40	16.32	0.79	0.15	1.16	0.54	2.65	60.60	7.10	8.54	0.02	0.01

Weather:

Comment: CTD memory full; problem not recognized; problem fixed

Survey 91-03

STATION ·17

Location BRUDENELL RIVER, P.E.I.

Date	11-Nov-91	Total Depth (m)	Air Temperature (°C)	$< I_o >$	$< I_z >$	Latitude	Longitude
Time	8:50 AM	13.00	12			46°10.21'	62°31.78'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m³)	$< I_D >$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	8.00	92	28.25	21.98		7.18	4.44	5.16	20.34	0.51	0.02	0.05	0.36	0.47	130.70	15.10	8.66	0.05	0.02
6	8.02	81	28.25	21.98		7.58	4.25	4.73	19.38	0.31	0.41	0.03	0.34	0.33	130.10	15.60	8.34	0.05	0.02
11	8.57	62	28.79	22.32		7.43	2.85	3.93	16.50	1.06	0.22	0.64	0.50	1.58	84.60	12.40	6.82	0.04	0.03

Weather: Windy; heavy rain; very overcast

Comment: Mooring for 14C, 15N; sampling time: 08:55

Survey 91-03

STATION 18

Location BRUDENELL RIVER, P.E.I.

Date	11-Nov-91	Total Depth (m)	Air Temperature (°C)	$<I_o>$	$<I_z>$	Latitude	Longitude
Time	11:25 AM	12.00				46°10.46'	62°32.48'

Depth (m)	Temp. (°C)	F_o	Sal (PSU)	σ_τ (kg / m^3)	$<I_D>$ (µmol/s/m²)	$C_{a^{PE}}$ (µg / L)	$P_{a^{PE}}$ (µg / L)	POM (µg / L)	PIM (µg / L)	NH_3 (µM)	UREA (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µg)	PON (µg)	POC:PON	A (ng / mL)	P (µg / mL)
1	7.90	99	28.16	21.92		7.68	4.68	5.34	16.57	0.35	1.87	0.00	0.32	0.36	151.40	15.50	9.77	0.04	0.03
5	7.90	96	28.10	21.87		7.62	4.62	5.85	18.51	0.14	0.30	0.00	0.32	0.39	147.90	14.50	10.20	0.05	0.02
10		79				9.17	4.56	5.16	19.11	0.87	0.22	0.32	0.49	1.21	131.30	17.60	7.46	0.05	0.05

Weather: Heavy rain; strong wind

Comment: Rough sea; attempted another station but cancelled due to heavy rain; rough seas; strong winds

Appendix 4.15 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 particulate organic carbon and nitrogen ratio (*POC*: *PON*) by sampling event and for the year 1991 (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)	$Si0_4$ (µM)	*POC* (µM)	*PON* (µM)	*POC:PON*
Brudenell River, P.E.I.										
25-Nov-91 to 09-Apr-92										
Average:	2.83	1.74			3.62	0.67	4.57			
Minimum:	0.98	0.70			0.15	0.24	0.37			
Maximum:	8.01	5.70			24.49	4.04	12.39			
St. Dev.:	1.60	0.81			3.18	0.50	2.62			
Variance:	56	46			88	74	57			
Cardigan, P.E.I.										
04-Apr-91 to 04-Apr-91										
Average:	2.06	1.34	0.48	0.16						
Minimum:	2.06	1.34	0.48	0.16						
Maximum:	2.06	1.34	0.48	0.16						
St. Dev.:										
Variance:										
Cardigan, P.E.I.										
14-May-91 to 14-May-91										
Average:	1.49	1.58	0.25	n.d.	0.03	0.32	0.57	148.81	18.36	8.15
Minimum:	1.11	1.10	0.12	n.d.	0.00	0.00	0.35	132.15	16.50	7.49
Maximum:	1.71	2.00	0.67	0.01	0.11	0.42	0.78	161.93	21.43	9.30
St. Dev.:	0.22	0.32	0.21	0.06	0.05	0.18	0.14	12.50	2.03	0.66
Variance:	14	21	82		160	56	24	8	11	8
Cardigan, P.E.I.										
05-Jun-91 to 05-Jun-91										
Average:	1.70	1.11	0.70	n.d.	0.01	0.23	0.96	136.80	13.90	9.89
Minimum:	1.45	0.84	0.53	n.d.	0.00	0.05	0.85	130.10	12.45	8.86
Maximum:	1.94	1.45	0.97	0.09	0.08	0.36	1.21	148.25	14.90	10.46
St. Dev.:	0.16	0.22	0.24	0.16	0.03	0.09	0.13	9.96	1.29	0.90
Variance:	9	20	34		245	38	14	7	9	9

Survey	C_a^{PE} (µM)	P_a^{PE} (µM)	NH_3 (µM)	$UREA$ (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µM)	PON (µM)	$POC:PON$
Cardigan, P.E.I.										
04-Jul-91 to 05-Jul-91										
Average:	0.51	0.80	1.01	0.03	3.12	0.70	10			
Minimum:	0.21	0.31	0.32	n.d.	0.00	0.28	2.69			
Maximum:	0.90	1.52	3.65	0.08	25.42	2.34	60.38			
St. Dev.:	0.24	0.38	1.30	0.04	8.54	0.64	19.34			
Variance:	47	48	130	133	273	91	190			
Cardigan, P.E.I.										
01-Oct-91 to 02-Oct-91										
Average:	2.58	4.13	1.13	0.06	0.49	0.65	5.54	120.32	17.94	6.77
Minimum:	1.96	2.91	0.33	n.d.	0.36	0.55	5.16	75.80	10.90	5.45
Maximum:	3.65	5.49	2.68	0.25	0.67	0.80	6.28	150.15	23.20	7.95
St. Dev.:	0.44	0.65	0.76	0.18	0.09	0.08	0.35	21.71	3.34	0.68
Variance:	17	16	67	300	18	12	6	18	19	10
Cardigan, P.E.I.										
21-Oct-91 to 21-Oct-91										
Average:	4.49	4.67	1.99	0.03	0.99	0.70	3.65	121.15	15.28	7.96
Minimum:	2.39	2.15	0.96	n.d.	0.39	0.58	1.87	81.65	9.60	7.20
Maximum:	6.53	7.00	3.12	0.44	2.13	0.83	7.04	155.05	19.95	8.66
St. Dev.:	1.24	1.53	0.60	0.24	0.67	0.09	2.01	22.87	3.05	0.44
Variance:	28	33	30	800	68	13	55	19	20	6
Cardigan, P.E.I.										
12-Nov-91 to 12-Nov-91										
Average:	5.04	3.00	0.39	0.24	0.28	0.44	1.11	102.88	13.42	7.63
Minimum:	3.41	2.56	0.21	0.04	0.04	0.40	0.73	72.10	11.30	6.38
Maximum:	6.72	3.46	0.96	0.38	1.03	0.50	2.65	188.00	18.45	12.97
St. Dev.:	1.17	0.22	0.23	0.11	0.27	0.03	0.61	29.29	1.92	1.68
Variance:	23	7.35	59	46	97	6	55	28	14	22
Cardigan, P.E.I.										
21-Nov-91 to 21-Nov-91										
Average:	2.41	2.10	1.63	0.24	1.87	0.94	5.11	73.43	8.85	8.33
Minimum:	2.28	1.58	1.36	0.15	1.75	0.90	4.55	64.90	7.65	8.16
Maximum:	2.53	2.63	1.90	0.33	1.99	0.98	5.67	81.95	10.05	8.49
St. Dev.:	0.18	0.74	0.38	0.13	0.17	0.05	0.79	12.06	1.70	0.23
Variance:	7	35	23	54	9	5	16	16	19	3

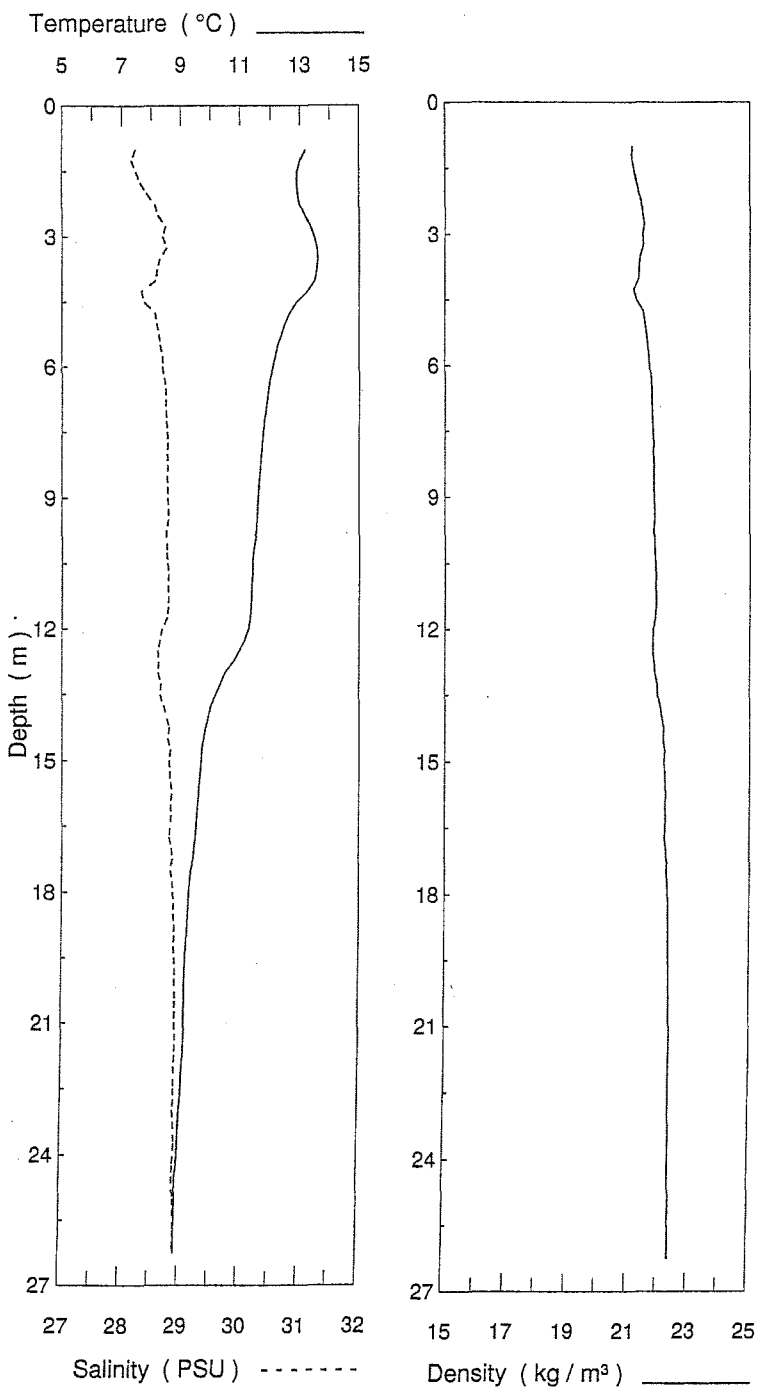
Survey	C_aPE (µM)	P_aPE (µM)	NH_3 (µM)	*UREA* (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	*POC* (µM)	*PON* (µM)	*POC:PON*
Murray River, P.E.I.										
04-Apr-91 to 04-Apr-91										
Average:	2.91	4.31	1.22	n.d.						
Minimum:	2.91	4.31	1.22	n.d.						
Maximum:	2.91	4.31	1.22	n.d.						
St. Dev.:										
Variance:										
Murray River, P.E.I.										
15-May-91 to 15-May-91										
Average:	0.83	0.80	0.39	0.00	0.13	0.39	1.27	112.79	13.17	8.66
Minimum:	0.31	0.54	0.26	n.d.	0.00	0.33	1.15	81.90	9.03	7.75
Maximum:	1.39	1.60	0.50	0.15	0.62	0.47	1.43	157.97	16.87	9.41
St. Dev.:	0.41	0.45	0.09	0.14	0.27	0.05	0.14	30.52	3.51	0.66
Variance:	49	56	23		211	13	11	27	27	7.61
Murray River, P.E.I.										
04-Jun-91 to 04-Jun-91										
Average:	2.24	1.01	0.63	0.20	0.00	0.18	1.49	184.33	18.46	10.13
Minimum:	1.42	0.52	0.55	0.11	0.00	0.13	0.60	167.87	16.70	9.23
Maximum:	3.43	1.62	0.78	0.35	0.00	0.23	2.74	200.67	20.50	10.97
St. Dev.:	0.79	0.41	0.09	0.12	0.00	0.04	0.80	11.90	1.87	0.69
Variance:	35	41	15	60		22	53	6	10	7
Murray River, P.E.I.										
05-Jul-91 to 05-Jul-91										
Average:	0.95	1.13	0.24	0.34	0.00	0.34	1.41			
Minimum:	0.64	0.82	0.09	0.08	0.00	0.20	1.28			
Maximum:	1.23	1.44	0.58	0.90	0.00	0.44	1.57			
St. Dev.:	0.23	0.28	0.19	0.32	0.00	0.10	0.10			
Variance:	24	25	82	94		29	7			

Survey	$C_{a^{PE}}$ (µM)	$P_{a^{PE}}$ (µM)	NH_3 (µM)	$UREA$ (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µM)	PON (µM)	$POC:PON$
New London Bay, P.E.I.										
03-Oct-91 to 03-Oct-91										
Average:	3.92	4.79	0.17	0.10	0.31	0.38	0.40	136.53	17.83	7.79
Minimum:	2.19	3.57	0.07	0.01	0.00	0.34	0.28	103.43	12.80	6.77
Maximum:	7.33	6.46	0.32	0.20	1.28	0.45	0.66	161.15	23.75	8.38
St. Dev.:	2.12	1.20	0.11	0.09	0.55	0.04	0.15	21.09	4.13	0.71
Variance:	54	25	65	90	176	11	38	15	23	9
New London Bay, P.E.I.										
20-Nov-91 to 20-Nov-91										
Average:	1.93	1.33	1.51	0.38	8.14	0.43	7.82	87.95	9.30	9.44
Minimum:	1.93	1.33	1.51	0.38	8.14	0.43	7.82	87.95	9.30	9.44
Maximum:	1.93	1.33	1.51	0.38	8.14	0.43	7.82	87.95	9.30	9.44
St. Dev.:										
Variance:										
Survey 92-01										
20-Jun-91 to 25-Jun-91										
Average:	0.38	0.70	0.42	1.22	0.00	0.27	1.43	58.10	7.24	8.13
Minimum:	0.16	0.29	0.00	n.d.	0.00	0.19	0.65	34.60	4.57	6.68
Maximum:	0.62	1.11	1.58	3.34	0.13	0.39	2.48	83.25	11.60	10.40
St. Dev.:	0.12	0.22	0.32	1.21	0.02	0.04	0.41	9.95	1.40	0.84
Variance:	31	32	76	99	544	14	29	17	19	10
Survey 91-02										
20-Sep-92 to 27-Sep-92										
Average:	2.03	2.44	0.66		0.22	0.40	3.18	77.35	10.14	7.85
Minimum:	0.99	1.06	0.16		0.01	0.21	0.94	51.15	5.25	5.24
Maximum:	3.87	3.60	2.18		1.05	0.72	7.06	145.60	18.37	10.53
St. Dev.:	0.53	0.53	0.45		0.22	0.10	1.14	19.51	2.97	1.25
Variance:	26	22	69		101	25	36	25	29	16
Survey 91-03										
06-Nov-91 to 11-Nov-91										
Average:	3.31	2.02	1.20	0.16	0.98	0.51	2.81	73.26	9.84	7.54
Minimum:	0.30	0.51	0.14	n.d.	0.00	0.32	0.33	27.80	3.60	5.77
Maximum:	9.17	4.68	2.76	1.87	1.94	0.78	6.79	151.40	19.20	10.20
St. Dev.:	2.27	1.17	0.70	0.38	0.44	0.09	1.25	29.90	3.71	1.04
Variance:	69	58	58	237	46	18	45	41	38	14

Survey	C_a^{PE} (µM)	P_a^{PE} (µM)	NH_3 (µM)	$UREA$ (µM)	$N0_2+N0_3$ (µM)	$P0_4$ (µM)	$Si0_4$ (µM)	POC (µM)	PON (µM)	$POC:PON$
1991:										
Average:	2.21	1.93	0.76	0.26	1.16	0.48	3.26	83.51	10.76	7.89
Minimum:	0.16	0.29	0.00	n.d.	0.00	0.00	0.28	27.80	3.60	5.24
Maximum:	9.17	7.00	3.65	3.34	25.42	4.04	60.38	200.67	23.75	12.97
St. Dev.:	1.76	1.28	0.66	0.59	2.68	0.31	4.60	34.64	4.39	1.14
Variance:	80	66	87	227	231	66	141	41	41	14

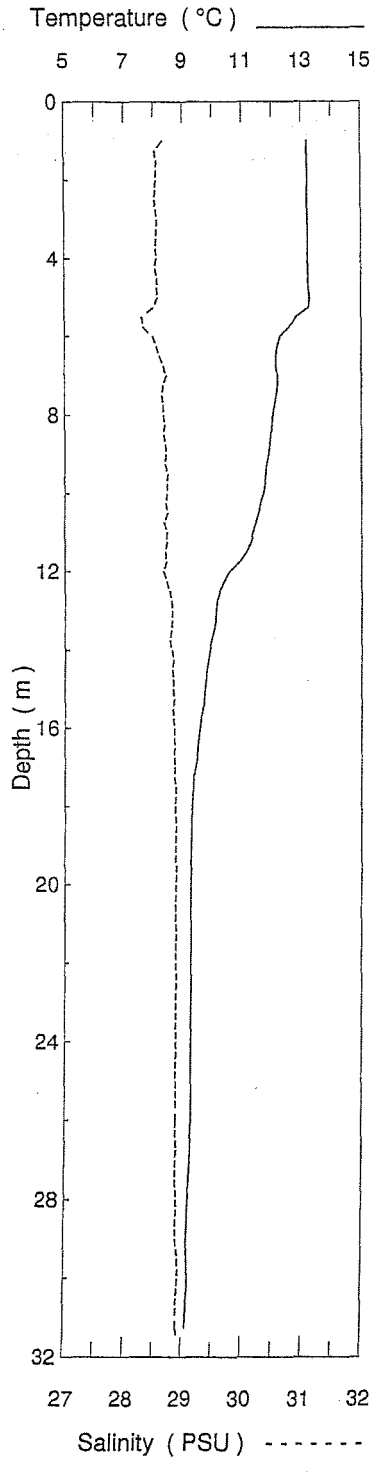
Appendix 5.1 Survey 91-01 CTD profiles of temperature (°C), salinity (PSU), and density (kg / m³).

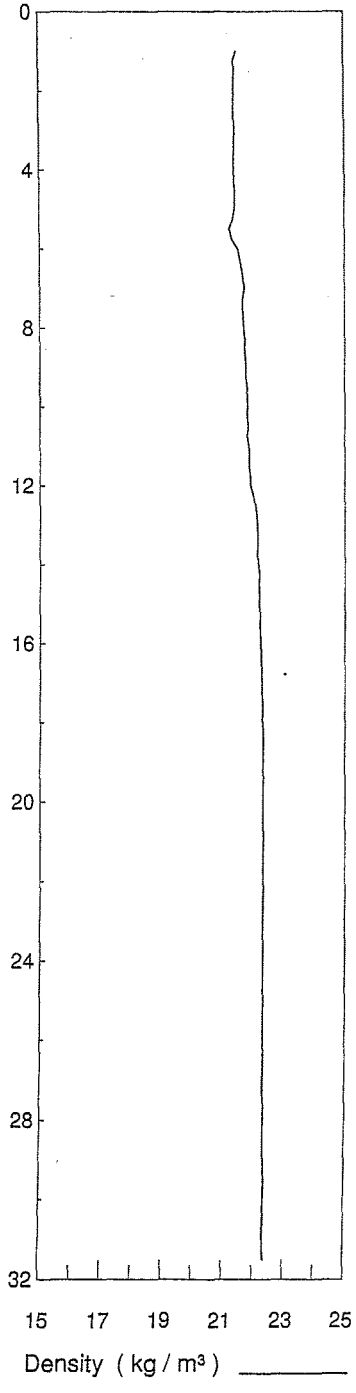
Survey 91-01 Station 1



Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	13.17	28.21	21.11
2	12.92	28.41	21.32
3	13.44	28.71	21.46
4	13.44	28.50	21.27
5	12.53	28.59	21.50
6	12.08	28.69	21.67
7	11.83	28.75	21.77
8	11.69	28.77	21.81
9	11.58	28.78	21.83
10	11.47	28.76	21.83
11	11.37	28.78	21.87
12	11.23	28.70	21.82
13	10.55	28.62	21.87
14	9.92	28.74	22.07
15	9.67	28.81	22.17
16	9.56	28.84	22.21
17	9.44	28.83	22.22
18	9.27	28.86	22.27
19	9.20	28.89	22.31
20	9.14	28.91	22.33
21	9.12	28.91	22.34
22	9.08	28.90	22.34
23	9.00	28.90	22.34
24	8.94	28.91	22.36
25	8.88	28.91	22.37
26	8.87	28.91	22.38

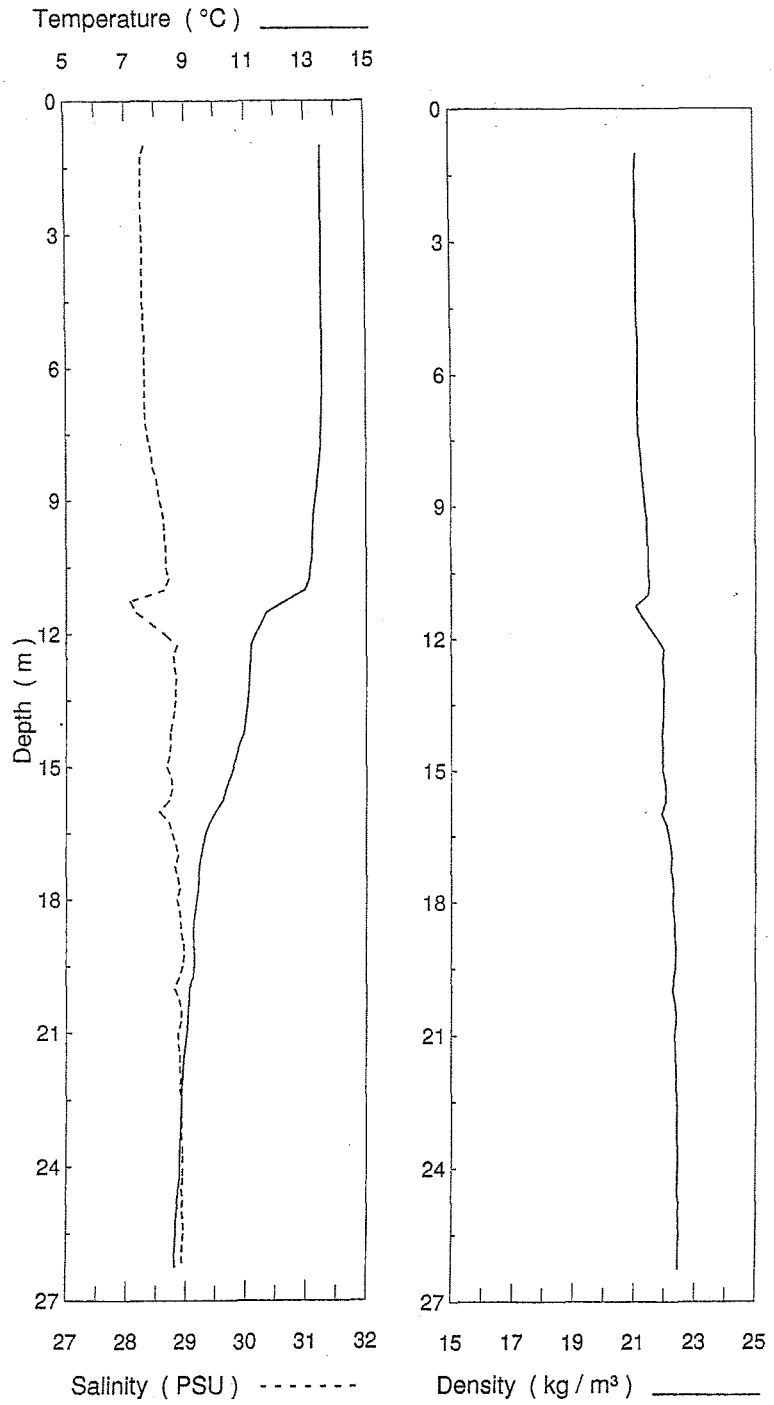
Survey 91-01 Station 2





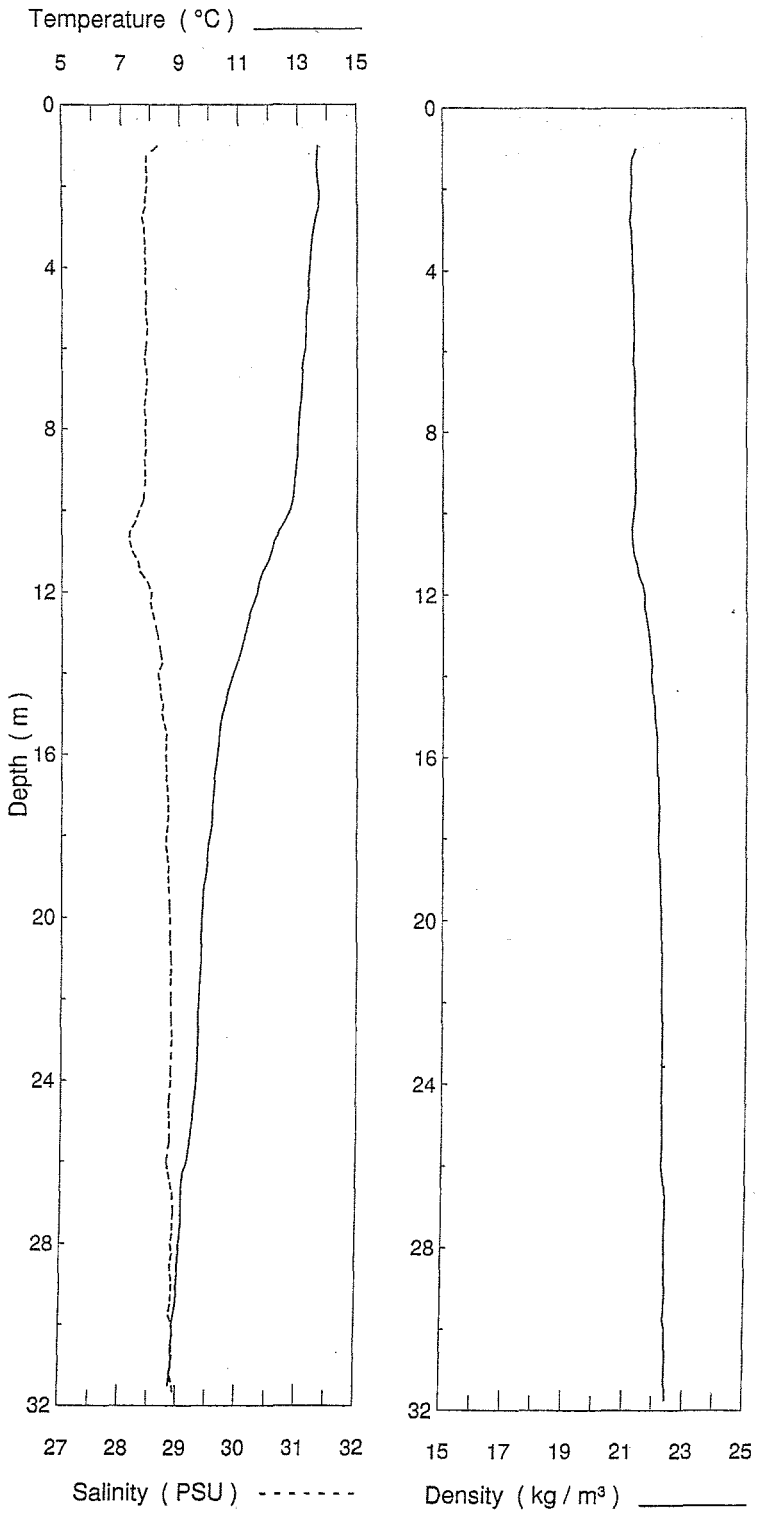
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	13.20	28.62	21.42
2	13.19	28.53	21.35
3	13.18	28.53	21.35
4	13.20	28.53	21.35
5	13.17	28.49	21.32
6	12.29	28.44	21.43
7	12.11	28.66	21.65
8	12.02	28.65	21.66
9	11.84	28.69	21.72
10	11.65	28.71	21.77
11	11.33	28.70	21.81
12	10.62	28.69	21.91
13	10.08	28.79	22.09
14	9.88	28.79	22.13
15	9.71	28.82	22.18
16	9.54	28.83	22.21
17	9.38	28.84	22.24
18	9.28	28.86	22.27
19	9.25	28.86	22.28
20	9.24	28.86	22.28
21	9.24	28.87	22.28
22	9.23	28.86	22.28
23	9.23	28.86	22.28
24	9.23	28.86	22.28
25	9.23	28.86	22.28
26	9.22	28.86	22.28
27	9.20	28.86	22.29
28	9.15	28.87	22.30
29	9.12	28.88	22.31
30	9.15	28.91	22.34
31	9.12	28.89	22.32

Survey 91-01 Station 4



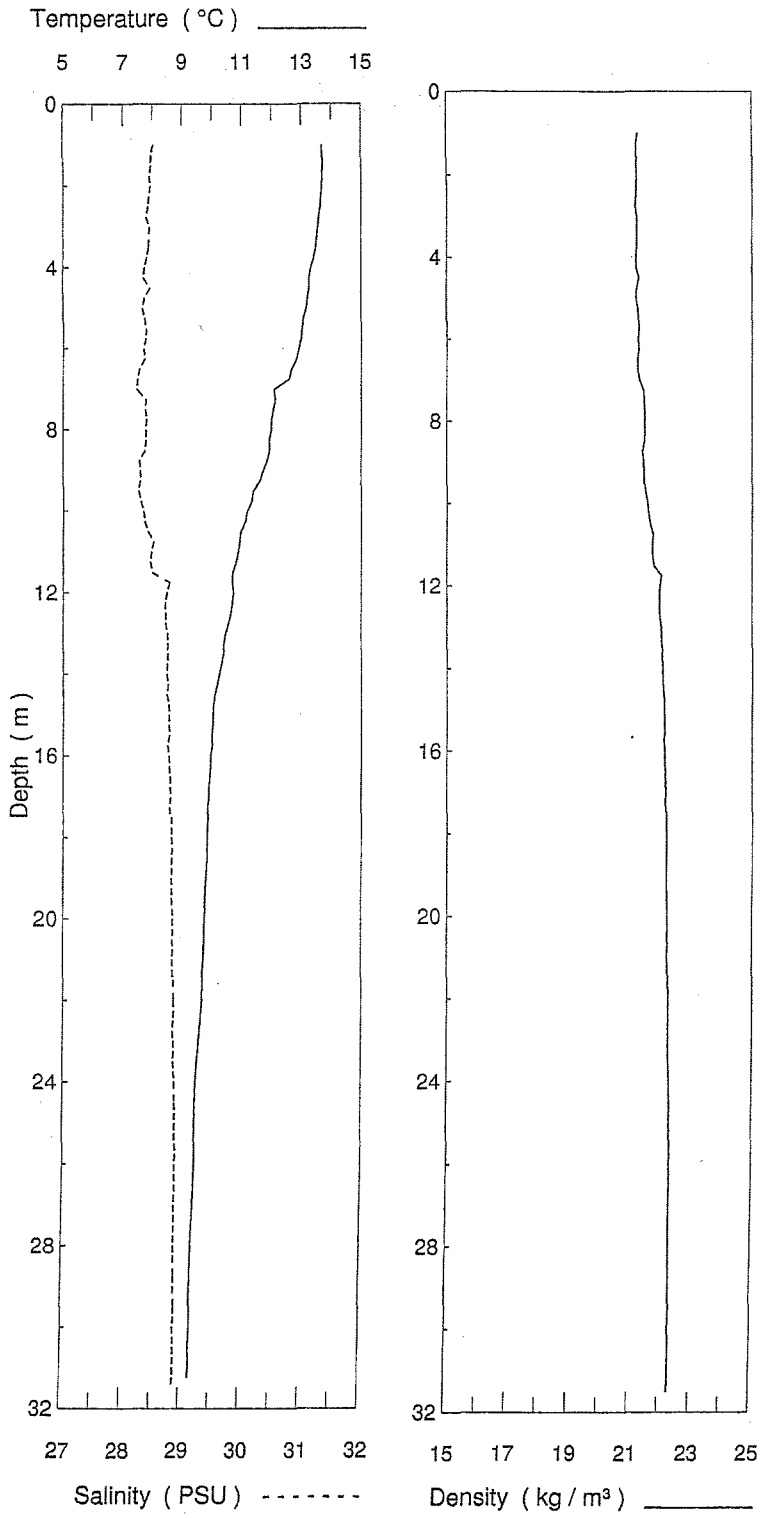
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	13.55	28.31	21.12
2	13.53	28.27	21.09
3	13.52	28.26	21.08
4	13.51	28.26	21.08
5	13.52	28.28	21.10
6	13.52	28.29	21.10
7	13.51	28.30	21.11
8	13.43	28.40	21.20
9	13.28	28.55	21.34
10	13.19	28.63	21.42
11	12.81	28.49	21.35
12	11.22	28.61	21.74
13	11.06	28.81	21.95
14	10.91	28.76	21.93
15	10.54	28.72	21.95
16	9.96	28.69	22.02
17	9.48	28.83	22.21
18	9.32	28.86	22.27
19	9.22	28.92	22.33
20	9.14	28.87	22.30
21	8.99	28.88	22.33
22	8.87	28.90	22.36
23	8.80	28.91	22.38
24	8.75	28.92	22.40
25	8.65	28.93	22.42
26	8.62	28.93	22.42

Survey 91-01 Station 5



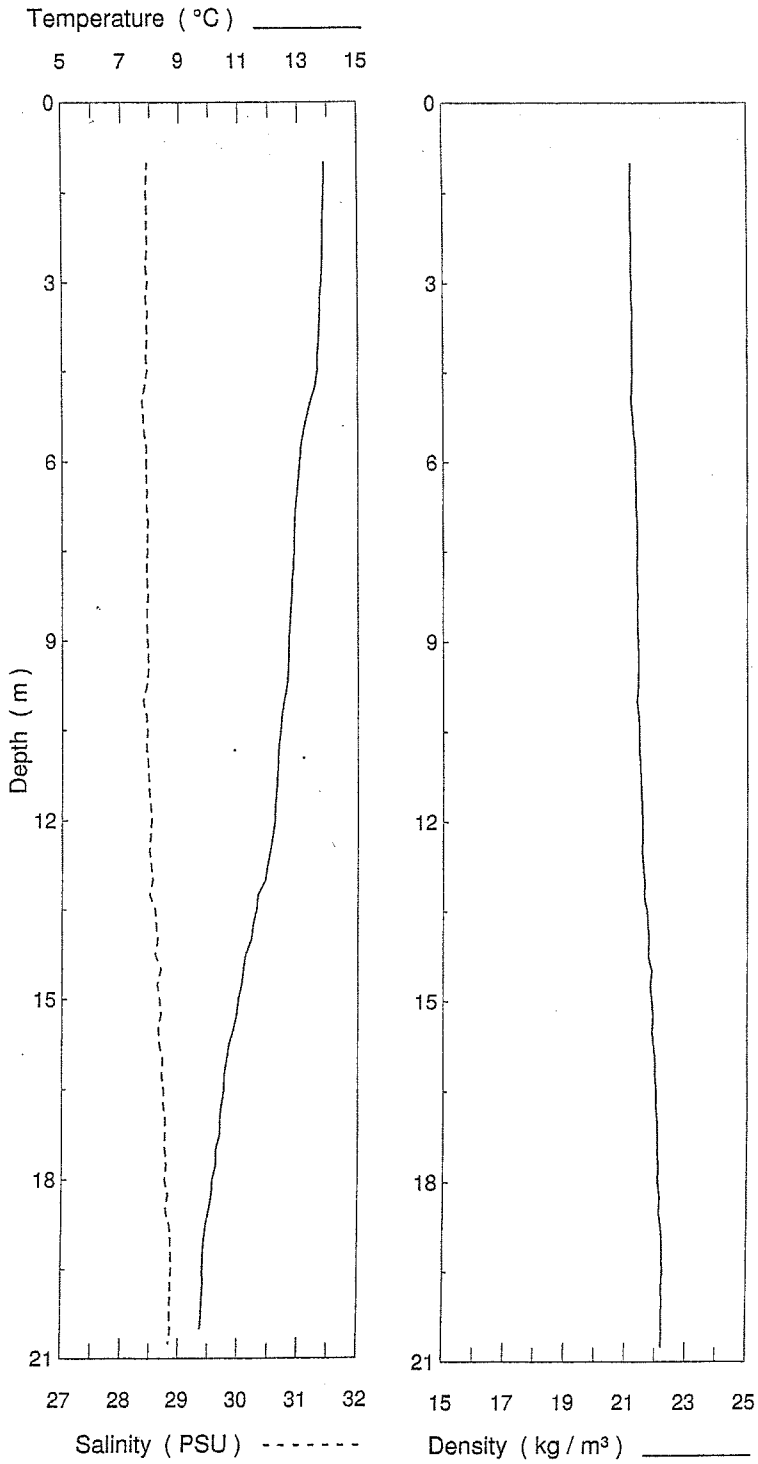
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	13.69	28.61	21.34
2	13.68	28.41	21.17
3	13.55	28.37	21.15
4	13.38	28.40	21.21
5	13.29	28.41	21.23
6	13.22	28.40	21.24
7	13.10	28.41	21.27
8	13.01	28.40	21.28
9	12.91	28.38	21.29
10	12.66	28.29	21.25
11	12.08	28.21	21.29
12	11.58	28.45	21.57
13	11.20	28.59	21.74
14	10.81	28.66	21.86
15	10.43	28.70	21.96
16	10.26	28.77	22.04
17	10.13	28.79	22.08
18	10.02	28.78	22.09
19	9.87	28.80	22.13
20	9.74	28.83	22.18
21	9.71	28.85	22.20
22	9.65	28.85	22.21
23	9.62	28.87	22.23
24	9.56	28.85	22.22
25	9.43	28.83	22.22
26	9.23	28.82	22.24
27	9.09	28.89	22.32
28	9.03	28.89	22.33
29	8.96	28.89	22.34
30	8.85	28.89	22.36
31	8.79	28.91	22.38
32	8.68	28.96	22.44

Survey 91-01 Station 6



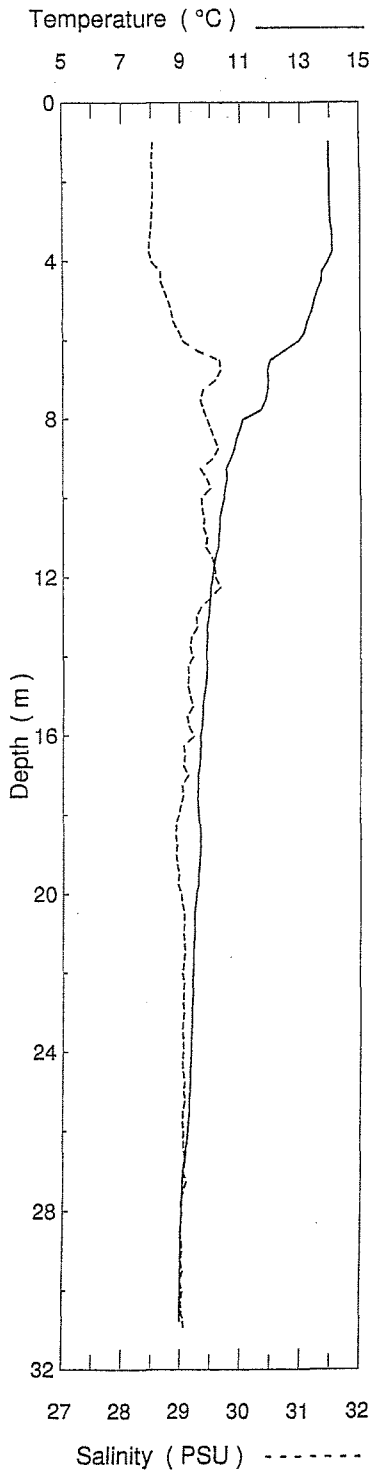
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	13.69	28.50	21.23
2	13.66	28.44	21.19
3	13.53	28.42	21.20
4	13.33	28.39	21.21
5	13.13	28.35	21.22
6	12.89	28.35	21.26
7	12.28	28.27	21.31
8	11.92	28.38	21.47
9	11.68	28.29	21.43
10	11.19	28.33	21.55
11	10.86	28.45	21.70
12	10.66	28.70	21.93
13	10.46	28.73	21.99
14	10.21	28.73	22.03
15	10.01	28.77	22.09
16	9.95	28.77	22.10
17	9.86	28.79	22.13
18	9.82	28.81	22.15
19	9.78	28.81	22.16
20	9.73	28.83	22.18
21	9.70	28.83	22.19
22	9.64	28.85	22.21
23	9.55	28.84	22.22
24	9.46	28.86	22.25
25	9.42	28.88	22.27
26	9.41	28.88	22.27
27	9.38	28.88	22.27
28	9.34	28.88	22.28
29	9.31	28.89	22.29
30	9.30	28.89	22.29
31	9.29	28.89	22.30

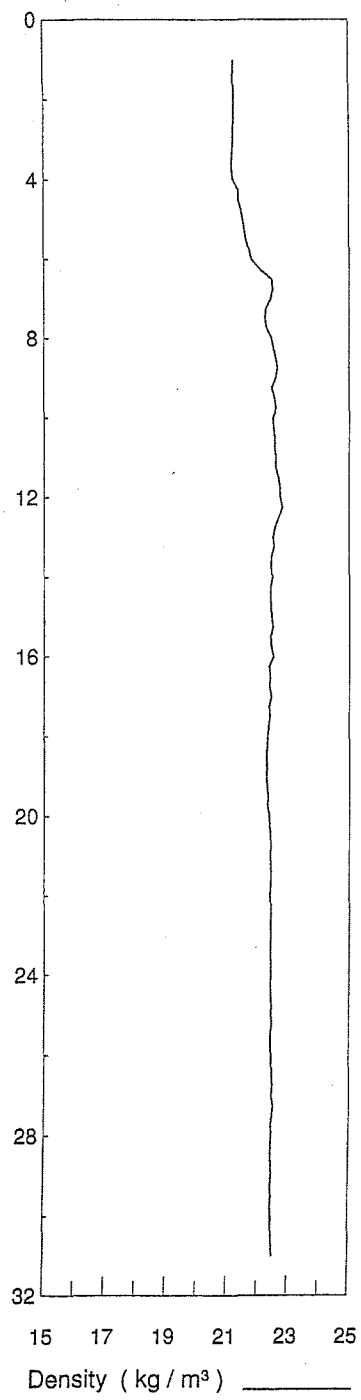
Survey 91-01 Station 7



Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	13.84	28.45	21.16
2	13.82	28.42	21.15
3	13.76	28.42	21.16
4	13.66	28.42	21.18
5	13.41	28.37	21.18
6	13.02	28.41	21.29
7	12.86	28.43	21.33
8	12.78	28.42	21.34
9	12.66	28.43	21.37
10	12.51	28.41	21.38
11	12.30	28.44	21.44
12	12.17	28.48	21.50
13	11.81	28.51	21.58
14	11.36	28.60	21.73
15	10.99	28.63	21.82
16	10.58	28.66	21.90
17	10.36	28.73	22.00
18	10.12	28.76	22.06
19	9.84	28.84	22.17
20	9.77	28.84	22.18
21	9.68	28.85	22.21

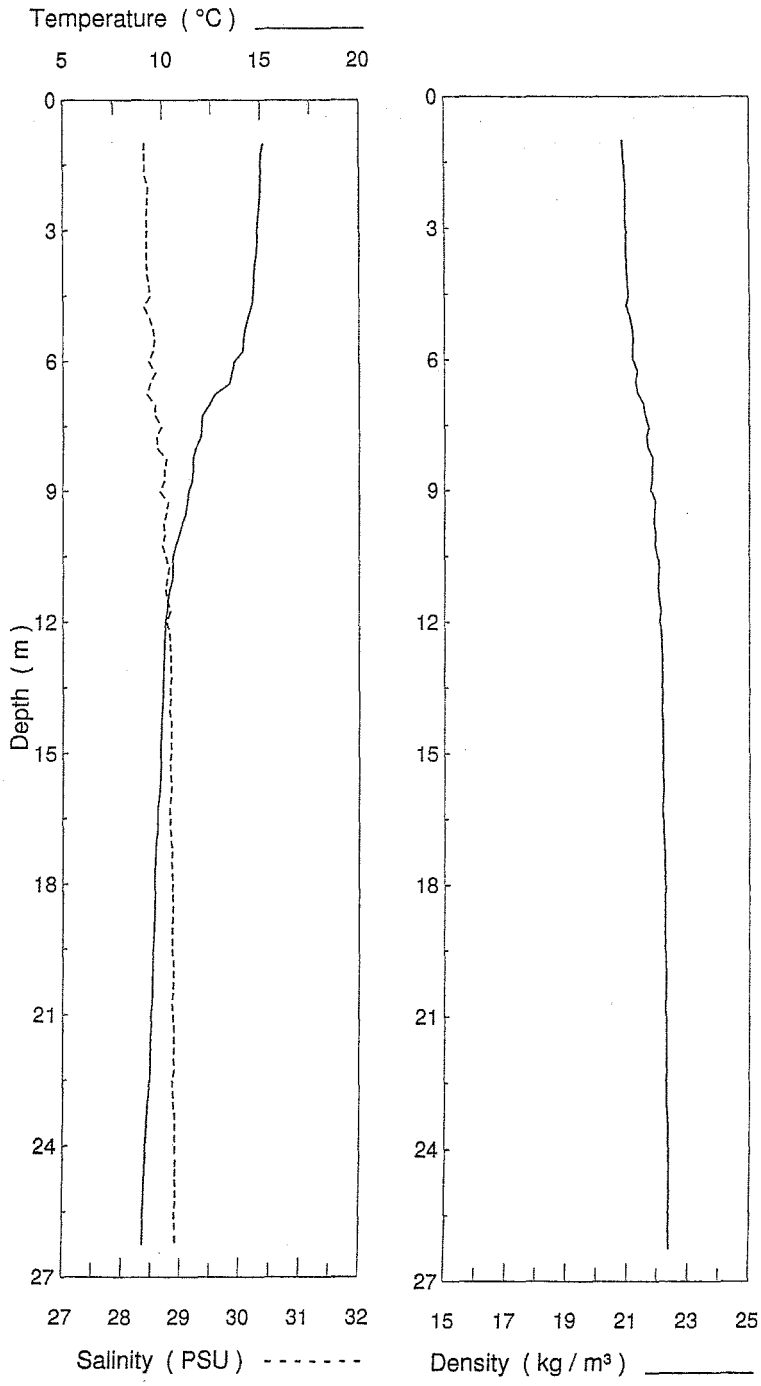
Survey 91-01 Station 8





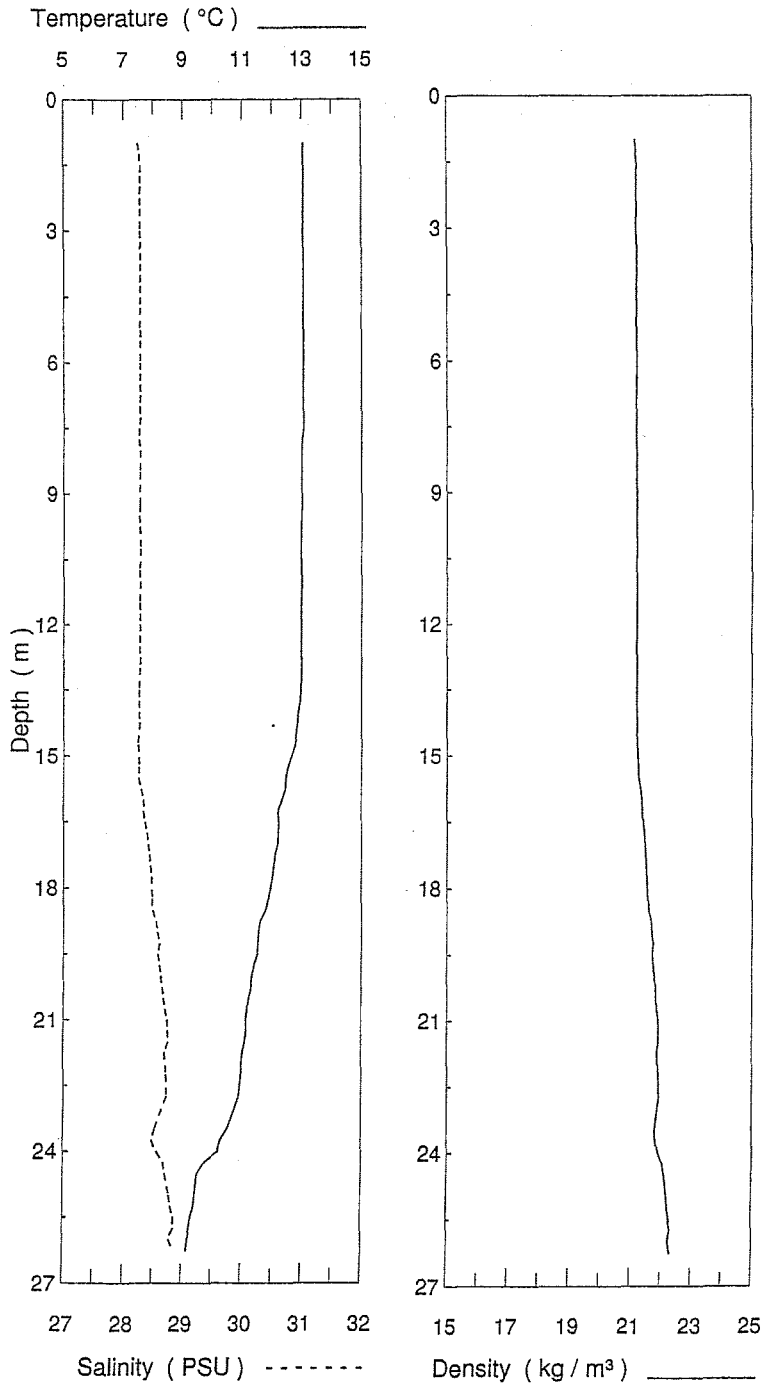
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	13.95	28.53	21.20
2	13.95	28.50	21.18
3	13.99	28.48	21.16
4	13.89	28.52	21.20
5	13.44	28.76	21.48
6	12.81	29.07	21.83
7	11.82	29.55	22.39
8	11.29	29.40	22.37
9	10.64	29.47	22.53
10	10.39	29.38	22.50
11	10.23	29.38	22.53
12	10.00	29.59	22.73
13	9.89	29.26	22.49
14	9.81	29.13	22.40
15	9.73	29.11	22.40
16	9.63	29.07	22.38
17	9.55	29.04	22.37
18	9.56	28.94	22.29
19	9.58	28.91	22.26
20	9.49	28.97	22.33
21	9.40	29.04	22.39
22	9.37	29.03	22.39
23	9.34	29.02	22.39
24	9.30	29.02	22.39
25	9.27	29.04	22.41
26	9.20	29.02	22.41
27	9.04	29.03	22.44
28	8.99	29.00	22.43
29	8.96	29.01	22.44
30	8.97	29.01	22.44
31	8.95	29.03	22.46

Survey 91-01 Station 9



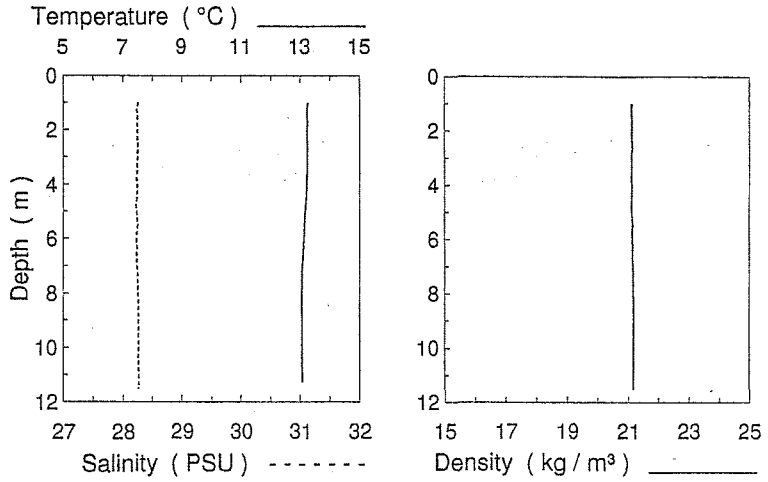
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	15.19	28.38	20.83
2	14.99	28.40	20.89
3	14.84	28.39	20.92
4	14.68	28.41	20.96
5	14.35	28.45	21.05
6	13.73	28.49	21.20
7	12.46	28.47	21.41
8	11.72	28.66	21.72
9	11.37	28.69	21.80
10	10.84	28.69	21.88
11	10.49	28.73	21.98
12	10.16	28.78	22.07
13	10.06	28.81	22.11
14	9.98	28.80	22.12
15	9.91	28.82	22.14
16	9.82	28.80	22.14
17	9.70	28.82	22.17
18	9.63	28.84	22.21
19	9.58	28.84	22.21
20	9.51	28.86	22.24
21	9.45	28.85	22.24
22	9.39	28.87	22.26
23	9.26	28.86	22.27
24	9.15	28.89	22.31
25	9.07	28.90	22.33
26	9.02	28.90	22.34

Survey 91-01 Station 11



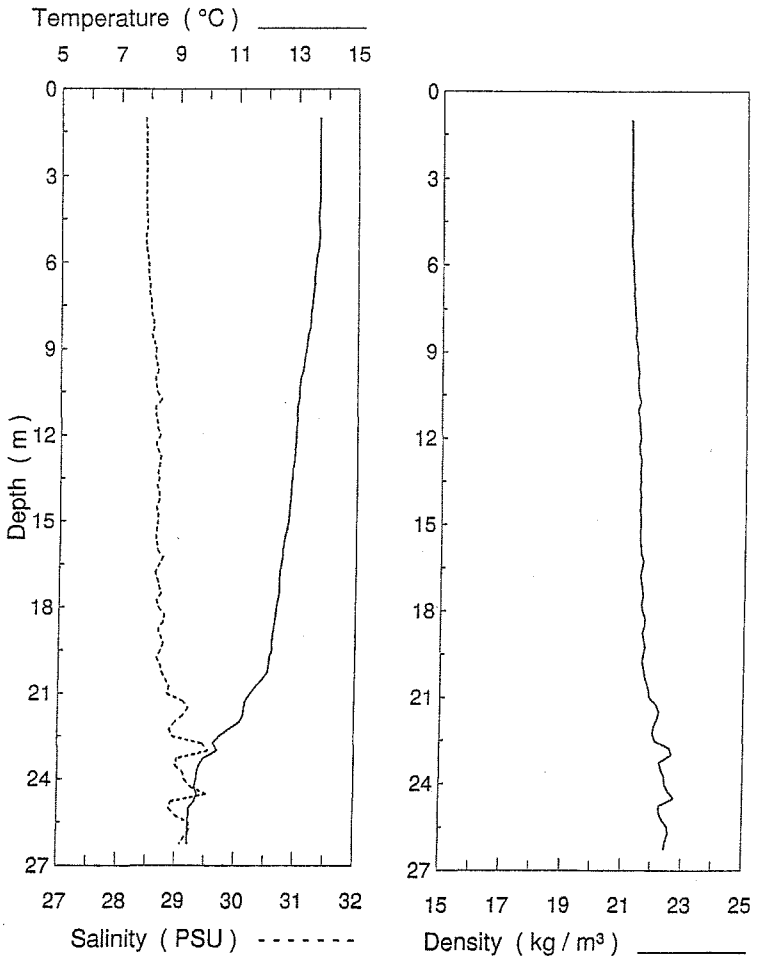
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	13.04	28.23	21.15
2	13.03	28.27	21.18
3	13.03	28.27	21.18
4	13.03	28.27	21.18
5	13.03	28.27	21.18
6	13.03	28.27	21.18
7	13.03	28.27	21.18
8	13.00	28.25	21.17
9	12.99	28.26	21.18
10	12.96	28.27	21.19
11	12.97	28.26	21.19
12	12.96	28.26	21.19
13	12.97	28.26	21.19
14	12.91	28.25	21.19
15	12.68	28.23	21.21
16	12.32	28.31	21.33
17	12.15	28.40	21.44
18	11.93	28.47	21.53
19	11.57	28.56	21.66
20	11.34	28.63	21.76
21	11.14	28.72	21.86
22	10.98	28.71	21.88
23	10.80	28.70	21.90
24	9.97	28.60	21.94
25	9.50	28.76	22.15
26	9.17	28.85	22.28

Survey 91-01 Station 12



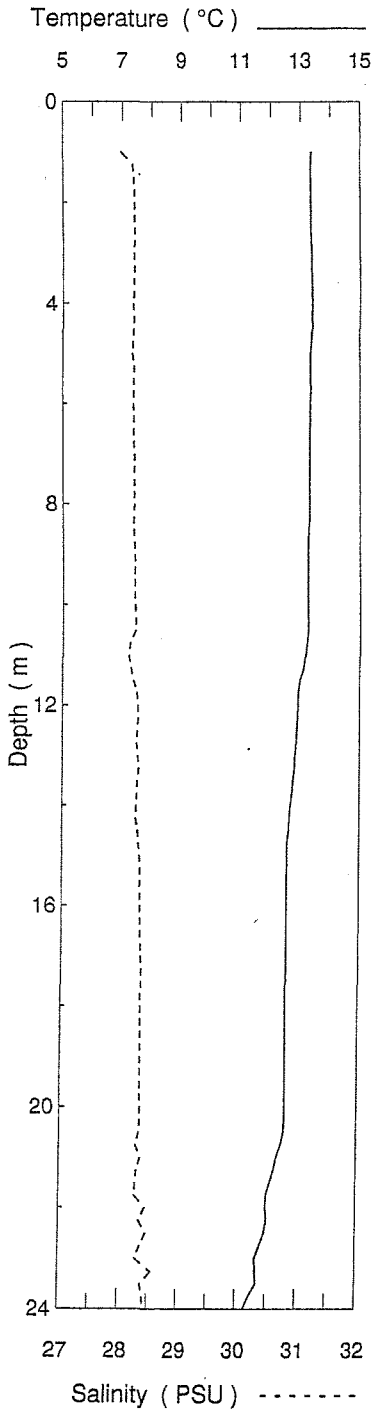
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	13.28	28.26	21.13
2	13.22	28.23	21.11
3	13.23	28.23	21.11
4	13.21	28.22	21.11
5	13.16	28.22	21.11
6	13.12	28.22	21.12
7	13.06	28.22	21.14
8	13.04	28.24	21.16
9	13.04	28.24	21.16
10	13.05	28.25	21.16
11	13.05	28.25	21.16
12		28.25	21.16

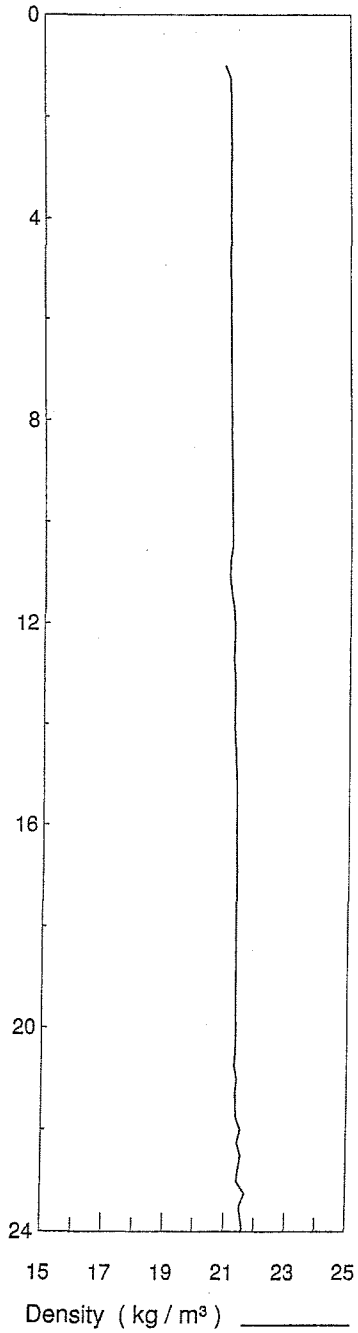
Survey 91-01 Station 13



Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	13.69	28.39	21.15
2	13.69	28.40	21.16
3	13.69	28.40	21.16
4	13.67	28.41	21.16
5	13.66	28.41	21.17
6	13.58	28.44	21.21
7	13.49	28.48	21.25
8	13.40	28.53	21.31
9	13.25	28.58	21.37
10	13.11	28.61	21.43
11	13.00	28.64	21.47
12	12.92	28.63	21.48
13	12.85	28.65	21.51
14	12.77	28.64	21.51
15	12.69	28.63	21.52
16	12.54	28.69	21.60
17	12.43	28.67	21.60
18	12.32	28.71	21.65
19	12.22	28.71	21.67
20	12.08	28.70	21.68
21	11.51	28.96	21.97
22	11.04	29.06	22.14
23	10.15	29.42	22.56
24	9.78	29.36	22.58
25	9.51	28.98	22.32
26	9.43	29.09	22.43

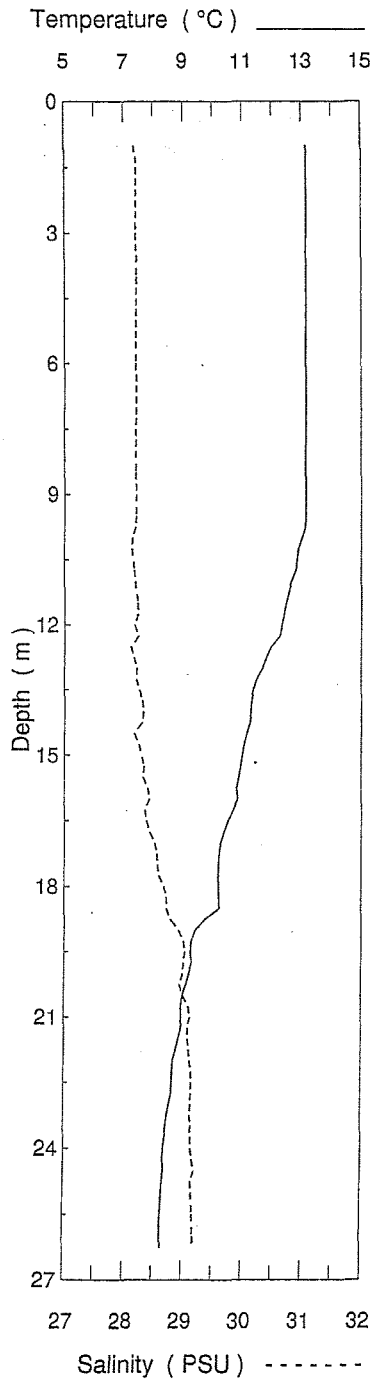
Survey 91-01 Station 14

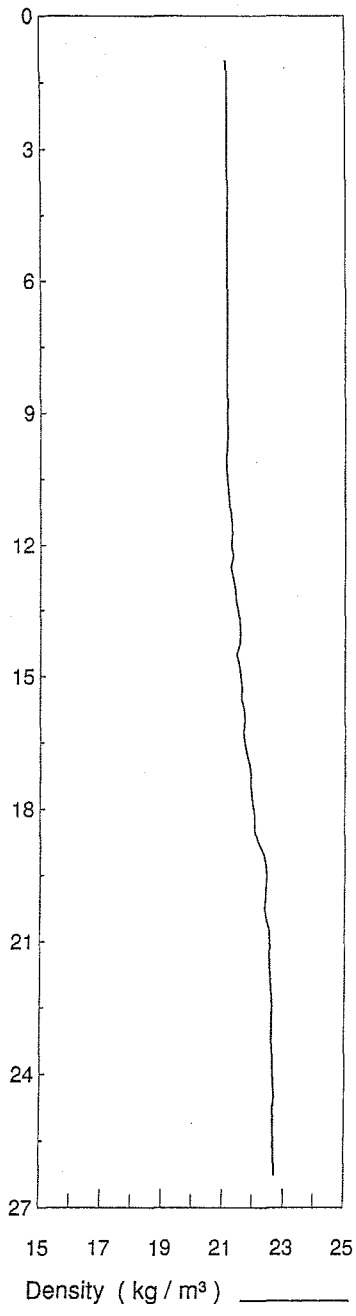




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	13.34	27.99	20.91
2	13.33	28.18	21.05
3	13.35	28.18	21.05
4	13.38	28.17	21.04
5	13.34	28.17	21.04
6	13.33	28.18	21.05
7	13.29	28.18	21.06
8	13.29	28.18	21.06
9	13.23	28.19	21.08
10	13.23	28.20	21.09
11	13.20	28.11	21.02
12	12.97	28.22	21.15
13	12.90	28.23	21.17
14	12.69	28.22	21.21
15	12.58	28.28	21.27
16	12.56	28.29	21.29
17	12.56	28.32	21.31
18	12.56	28.33	21.31
19	12.56	28.33	21.31
20	12.56	28.33	21.32
21	12.48	28.27	21.28
22	12.12	28.31	21.38
23	11.84	28.38	21.48
24	10.96	28.56	21.77

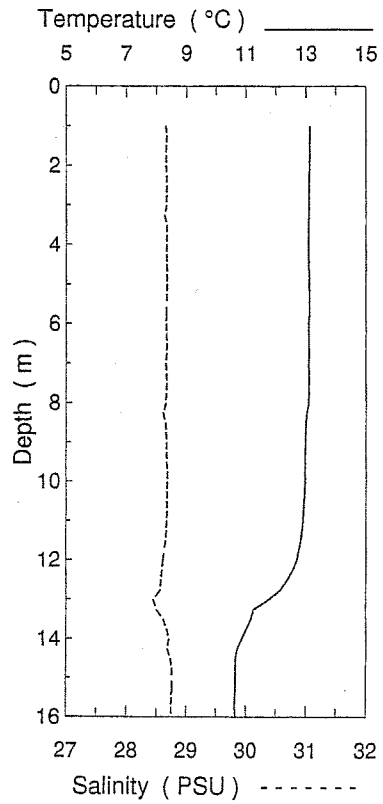
Survey 91-01 Station 15

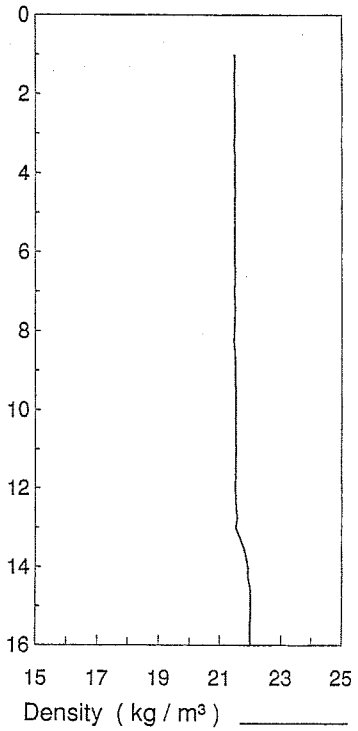




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	13.13	28.10	21.03
2	13.13	28.19	21.10
3	13.13	28.19	21.10
4	13.12	28.19	21.10
5	13.12	28.19	21.10
6	13.12	28.19	21.10
7	13.12	28.19	21.10
8	13.12	28.19	21.10
9	13.12	28.19	21.10
10	13.04	28.16	21.09
11	12.68	28.20	21.18
12	12.32	28.22	21.27
13	11.64	28.18	21.35
14	11.23	28.29	21.52
15	10.97	28.25	21.52
16	10.76	28.38	21.66
17	10.28	28.49	21.82
18	10.18	28.65	21.97
19	9.47	28.89	22.25
20	9.17	29.00	22.40
21	8.94	29.07	22.49
22	8.69	29.10	22.55
23	8.55	29.14	22.59
24	8.39	29.16	22.63
25	8.29	29.14	22.63
26	8.27	29.18	22.67

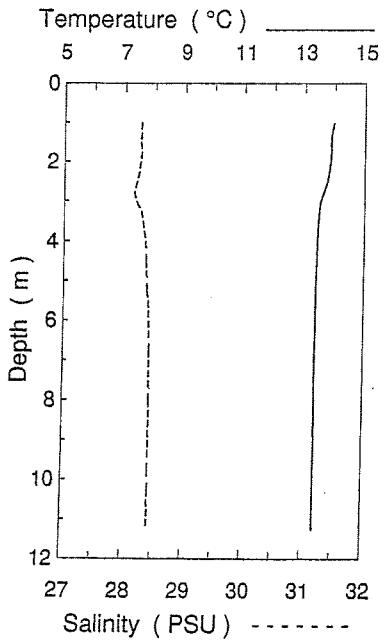
Survey 91-01 Station 17

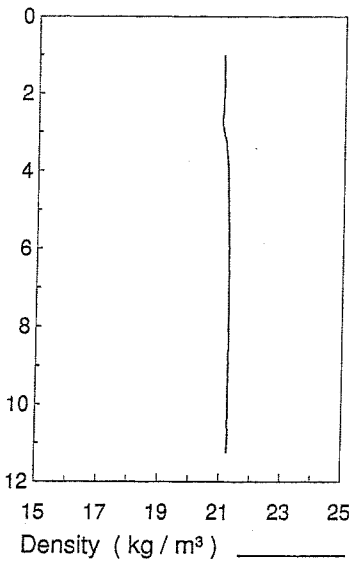




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	13.11	28.61	21.43
2	13.10	28.65	21.46
3	13.08	28.65	21.46
4	13.06	28.66	21.48
5	13.09	28.66	21.47
6	13.08	28.66	21.47
7	13.08	28.66	21.47
8	13.06	28.64	21.46
9	12.97	28.66	21.49
10	12.94	28.66	21.50
11	12.88	28.66	21.51
12	12.65	28.60	21.50
13	11.78	28.52	21.57
14	10.84	28.68	21.87
15	10.61	28.76	21.99
16	10.59	28.74	21.97

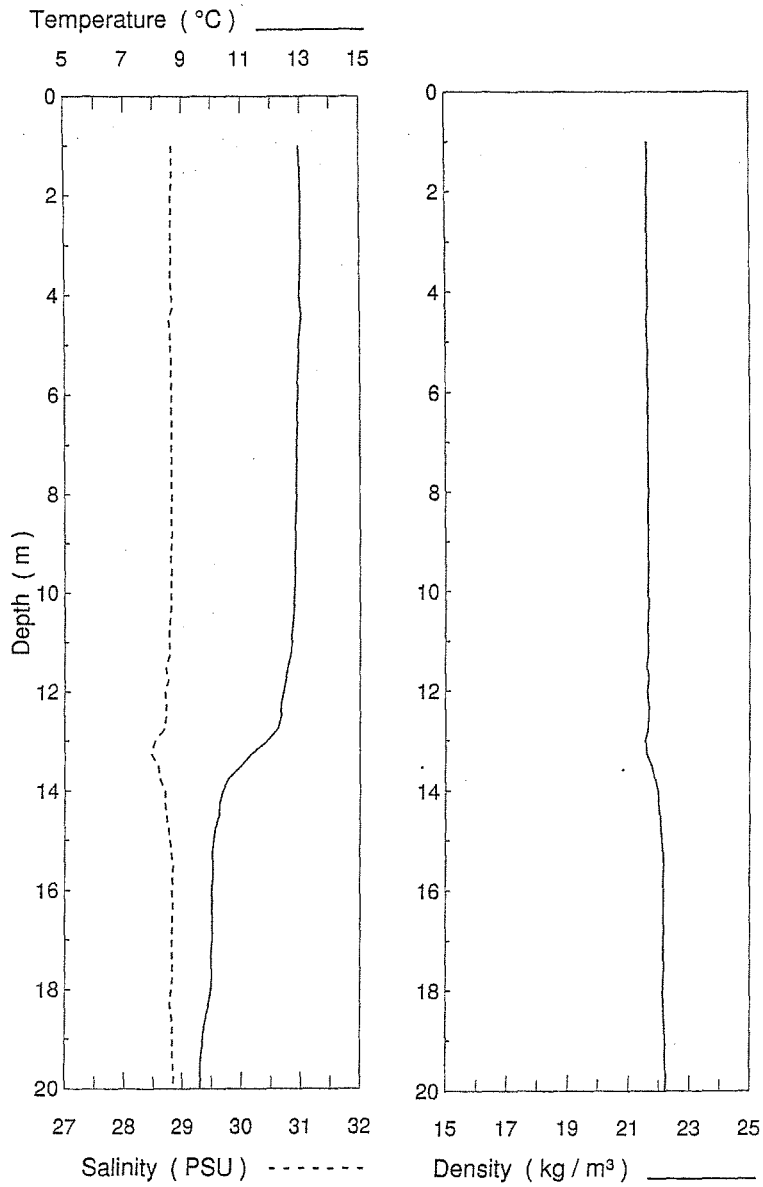
Survey 91-01 Station 18





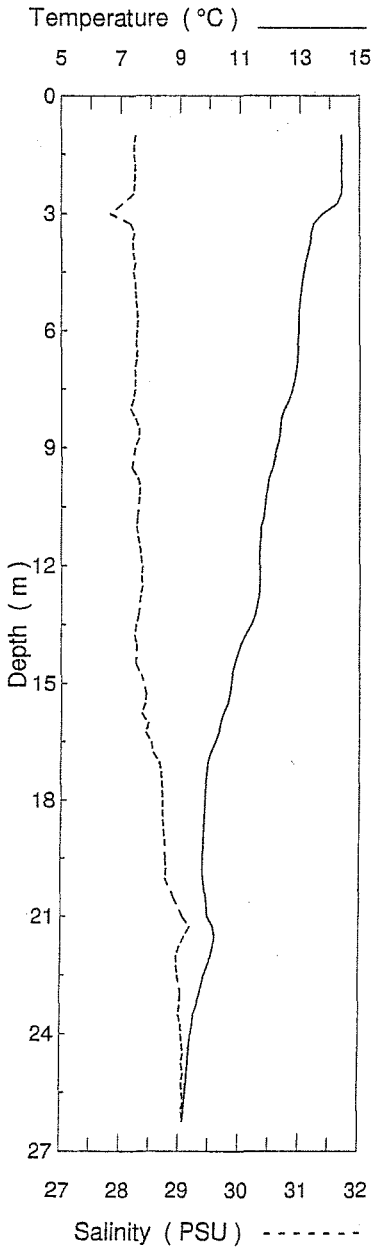
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	13.94	28.25	20.99
2	13.83	28.24	21.00
3	13.56	28.21	21.02
4	13.42	28.34	21.16
5	13.40	28.38	21.19
6	13.38	28.41	21.22
7	13.37	28.43	21.24
8	13.37	28.43	21.24
9	13.38	28.43	21.24
10	13.38	28.43	21.24
11	13.39	28.43	21.24

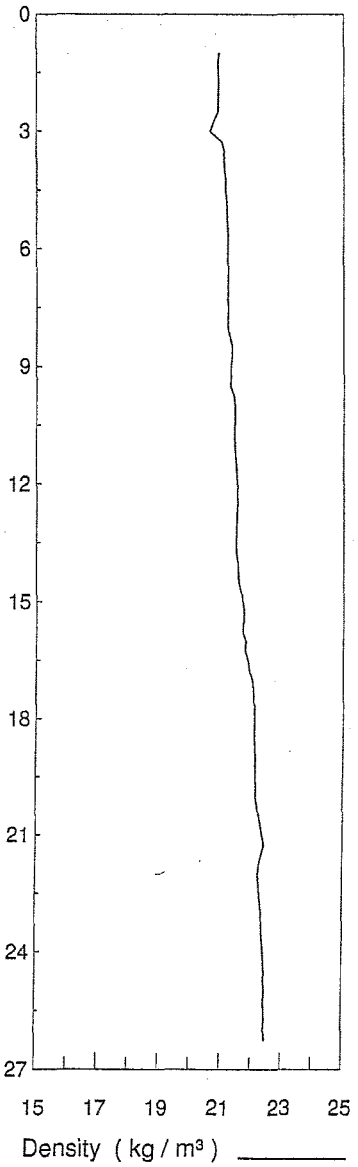
Survey 91-01 Station 19



Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	12.97	28.87	21.66
2	12.98	28.80	21.60
3	12.98	28.80	21.60
4	12.96	28.80	21.60
5	12.92	28.79	21.60
6	12.87	28.80	21.62
7	12.85	28.80	21.62
8	12.82	28.79	21.62
9	12.79	28.79	21.63
10	12.76	28.79	21.63
11	12.66	28.76	21.62
12	12.40	28.71	21.63
13	11.78	28.57	21.61
14	10.51	28.67	21.92
15	10.03	28.77	22.08
16	9.98	28.82	22.14
17	9.97	28.81	22.12
18	9.90	28.79	22.12
19	9.66	28.81	22.18
20	9.57	28.83	22.20

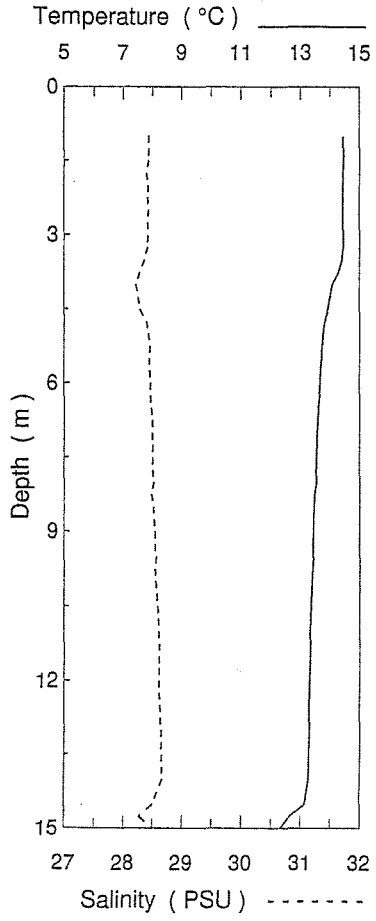
Survey 91-01 Station 21

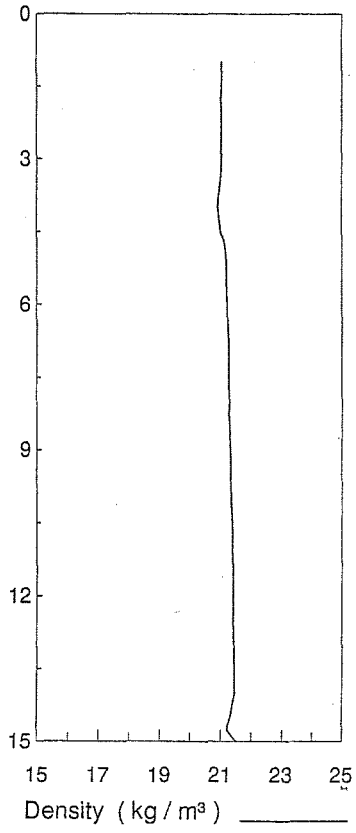




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	14.36	28.23	20.88
2	14.37	28.21	20.88
3	13.83	28.07	20.85
4	13.24	28.19	21.07
5	13.01	28.23	21.15
6	12.93	28.25	21.18
7	12.84	28.23	21.18
8	12.49	28.21	21.22
9	12.19	28.24	21.30
10	11.88	28.28	21.39
11	11.70	28.26	21.40
12	11.61	28.33	21.49
13	11.54	28.30	21.47
14	11.04	28.23	21.49
15	10.68	28.37	21.66
16	10.37	28.39	21.72
17	9.95	28.61	21.96
18	9.81	28.69	22.06
19	9.77	28.73	22.10
20	9.76	28.75	22.11
21	10.00	29.06	22.33
22	10.03	28.97	22.24
23	9.64	28.98	22.30
24	9.39	29.03	22.39
25	9.27	29.05	22.42
26	9.15	29.05	22.44

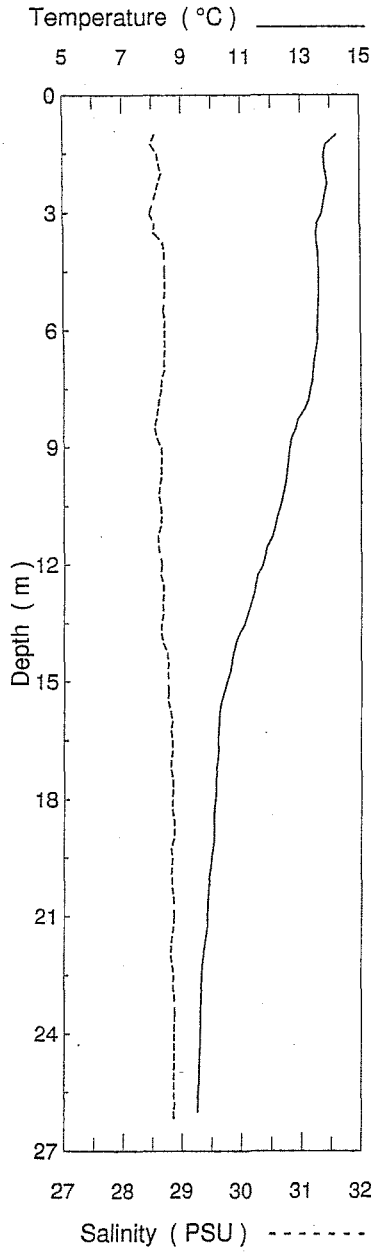
Survey 91-01 Station 23

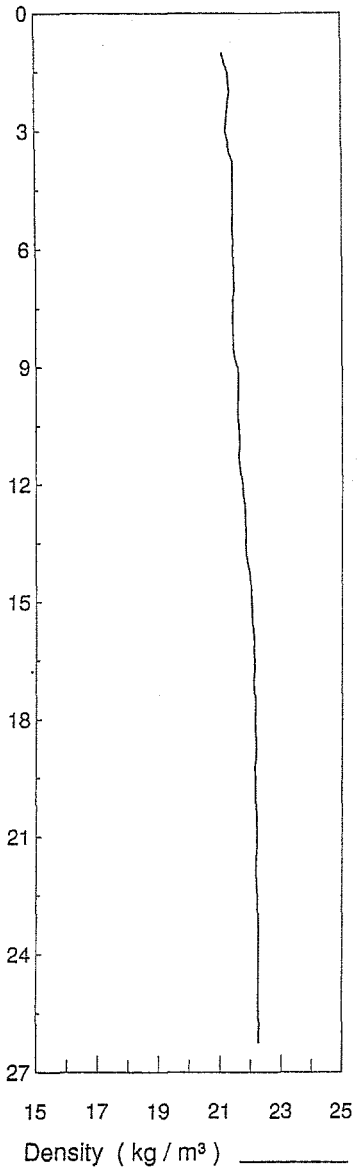




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	14.42	28.48	21.07
2	14.42	28.41	21.01
3	14.43	28.42	21.02
4	14.13	28.26	20.93
5	13.77	28.41	21.14
6	13.65	28.45	21.20
7	13.55	28.49	21.25
8	13.49	28.49	21.26
9	13.43	28.53	21.31
10	13.37	28.55	21.33
11	13.32	28.59	21.37
12	13.30	28.60	21.39
13	13.27	28.63	21.41
14	13.22	28.60	21.40
15	12.28	28.57	21.55

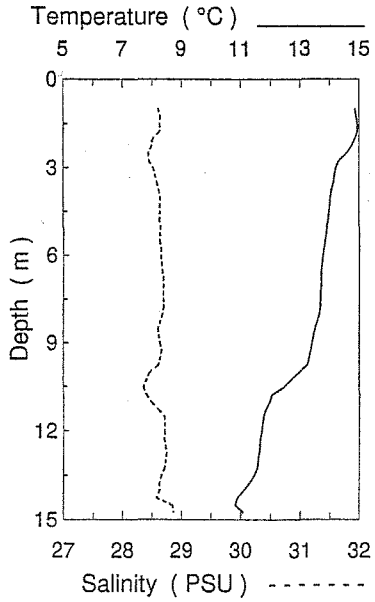
Survey 91-01 Station 24

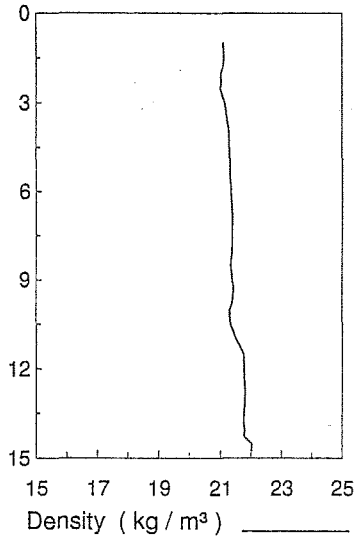




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	14.21	28.53	21.08
2	13.85	28.60	21.28
3	13.66	28.49	21.22
4	13.50	28.64	21.38
5	13.57	28.69	21.40
6	13.52	28.69	21.41
7	13.38	28.66	21.41
8	13.08	28.57	21.39
9	12.56	28.58	21.50
10	12.38	28.61	21.56
11	12.09	28.61	21.61
12	11.60	28.61	21.69
13	11.26	28.65	21.79
14	10.80	28.67	21.88
15	10.47	28.75	21.99
16	10.18	28.79	22.07
17	10.14	28.81	22.10
18	10.07	28.82	22.12
19	10.02	28.83	22.14
20	9.88	28.81	22.14
21	9.80	28.84	22.18
22	9.68	28.81	22.17
23	9.59	28.84	22.21
24	9.56	28.85	22.22
25	9.53	28.85	22.22
26	9.48	28.85	22.23

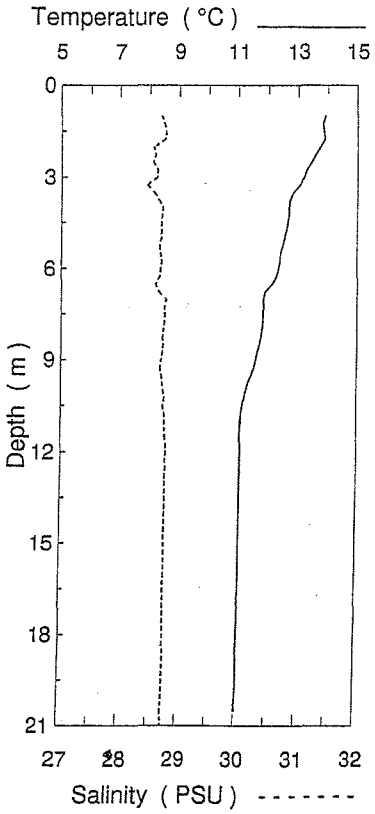
Survey 91-01 Station 25

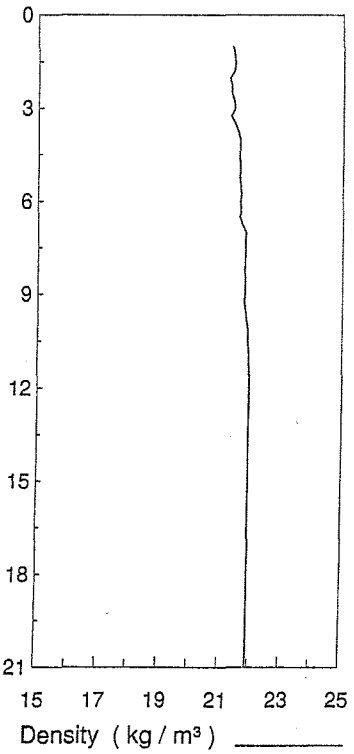




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	14.79	28.57	21.06
2	14.79	28.51	21.00
3	14.25	28.47	21.08
4	13.98	28.62	21.27
5	13.89	28.62	21.28
6	13.75	28.64	21.32
7	13.69	28.68	21.37
8	13.62	28.65	21.35
9	13.38	28.62	21.37
10	12.88	28.45	21.31
11	11.97	28.50	21.52
12	11.66	28.73	21.78
13	11.55	28.70	21.78
14	11.09	28.64	21.79
15	10.96	28.94	22.09

Survey 91-01 Station 26

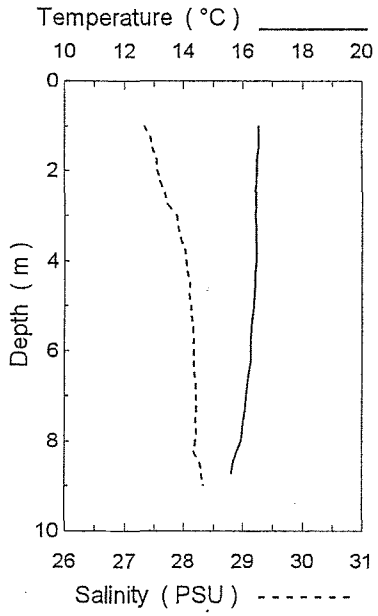


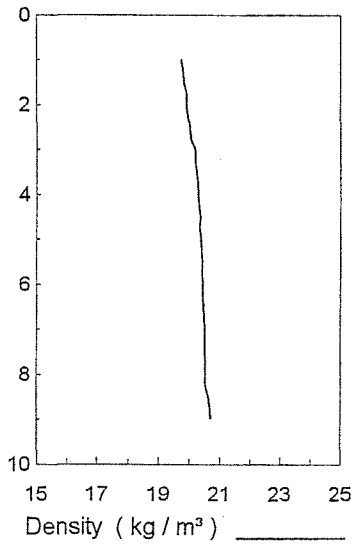


Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	13.88	28.68	21.33
2	13.70	28.60	21.29
3	13.14	28.53	21.34
4	12.70	28.66	21.54
5	12.52	28.67	21.58
6	12.32	28.67	21.62
7	11.86	28.68	21.70
8	11.77	28.73	21.77
9	11.57	28.69	21.76
10	11.25	28.71	21.84
11	11.06	28.75	21.90
12	11.04	28.76	21.92
13	11.04	28.76	21.92
14	11.05	28.76	21.91
15	11.05	28.76	21.91
16	11.05	28.76	21.91
17	11.04	28.75	21.91
18	11.01	28.75	21.92
19	11.01	28.76	21.92
20	11.01	28.75	21.91
21	10.99	28.74	21.91

Appendix 5.2 Survey 91-02 CTD profiles of temperature (°C), salinity (PSU), density (kg / m³) and fluorescence (relative).

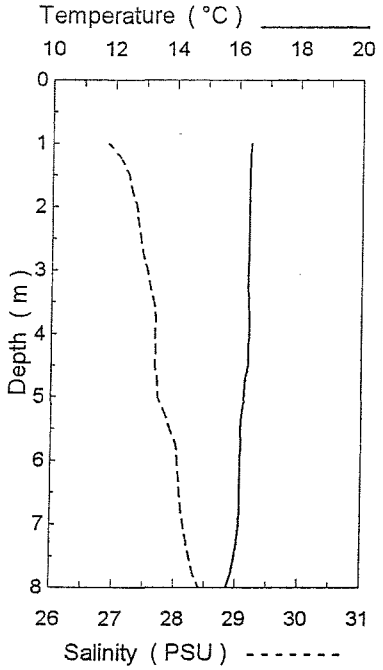
Survey 91-02 Station 1

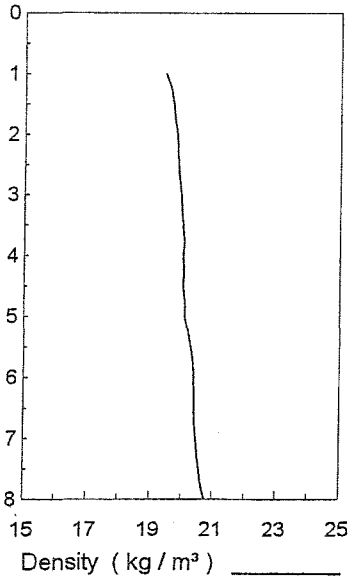




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	16.49	27.15	19.62
2	16.47	27.55	19.92
3	16.42	27.83	20.15
4	16.44	28.04	20.31
5	16.35	28.12	20.38
6	16.25	28.17	20.45
7	16.11	28.20	20.50
8	15.88	28.21	20.56
9	15.50	28.34	20.74

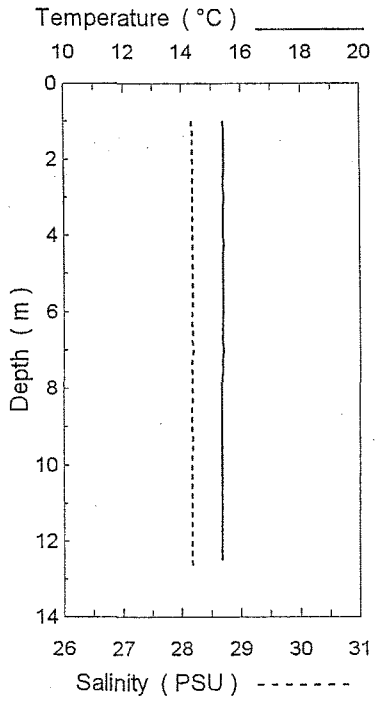
Survey 91-02 Station 2

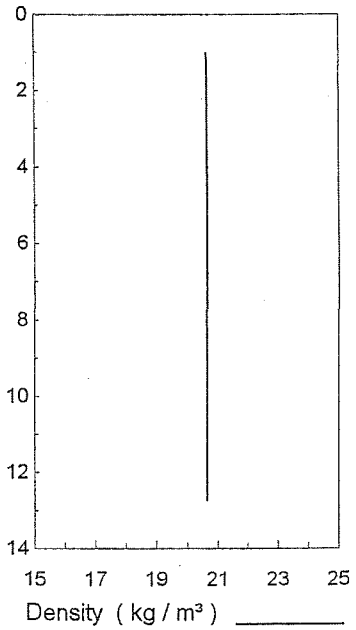




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	16.41	26.47	19.11
2	16.36	27.32	19.77
3	16.34	27.52	19.93
4	16.37	27.67	20.04
5	16.19	27.77	20.15
6	16.12	28.03	20.37
7	16.07	28.14	20.47
8	15.76	28.39	20.72
9	15.42	28.59	20.95
8	15.58	28.58	20.90

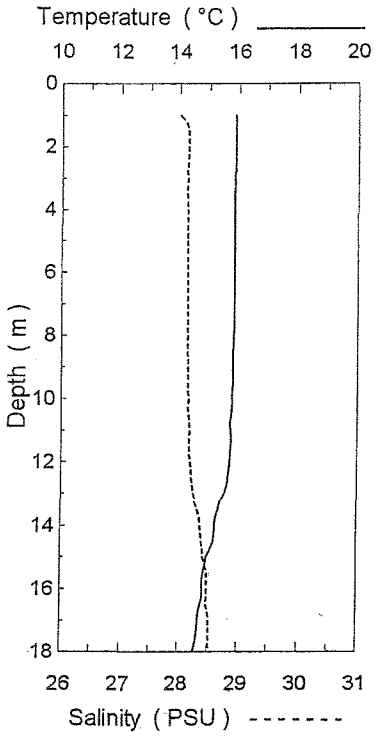
Survey 91-02 Station 3

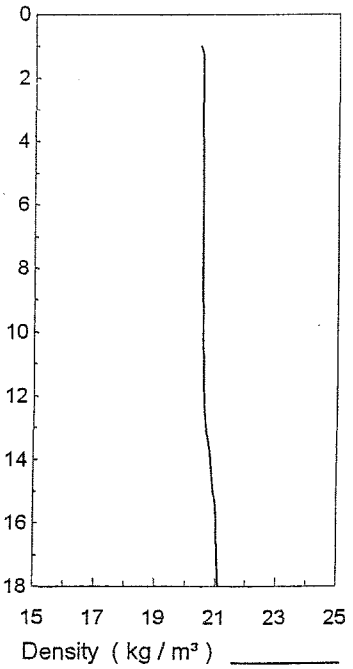




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	15.40	28.13	20.60
2	15.41	28.18	20.63
3	15.41	28.18	20.64
4	15.41	28.18	20.64
5	15.41	28.18	20.64
6	15.39	28.17	20.64
7	15.38	28.18	20.64
8	15.36	28.17	20.64
9	15.36	28.17	20.64
10	15.36	28.17	20.64
11	15.35	28.17	20.64
12	15.35	28.17	20.64
13	15.36	28.18	20.65

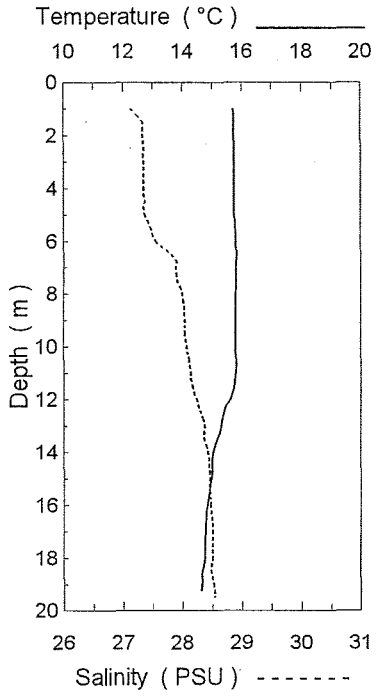
Survey 91-02 Station 4

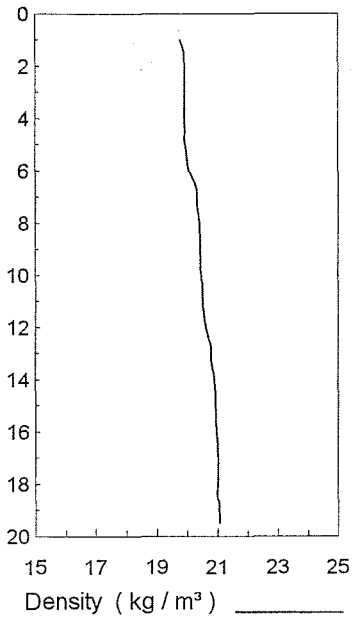




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	15.86	28.00	20.40
2	15.86	28.12	20.50
3	15.86	28.13	20.50
4	15.85	28.13	20.51
5	15.84	28.13	20.51
6	15.84	28.13	20.51
7	15.84	28.13	20.51
8	15.83	28.14	20.51
9	15.81	28.14	20.52
10	15.79	28.15	20.53
11	15.74	28.18	20.56
12	15.70	28.18	20.58
13	15.51	28.26	20.67
14	15.24	28.37	20.82
15	15.01	28.44	20.92
16	14.82	28.50	21.00
17	14.69	28.52	21.04
18	14.53	28.54	21.09

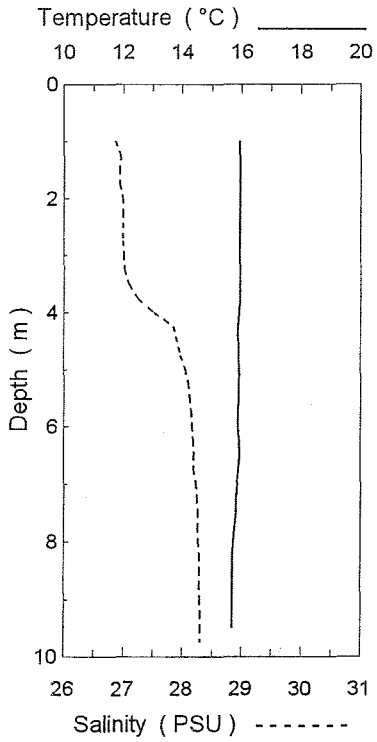
Survey 91-02 Station 5

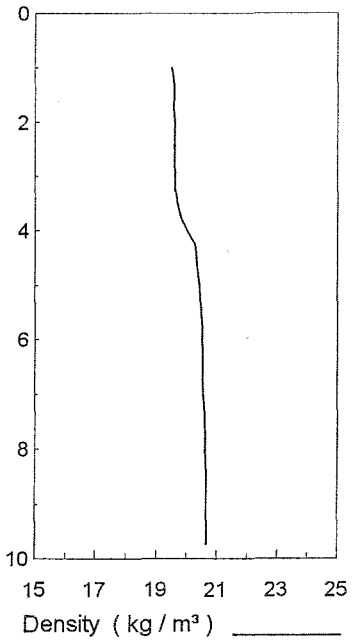




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	15.72	27.13	19.77
2	15.73	27.32	19.91
3	15.73	27.34	19.93
4	15.74	27.35	19.93
5	15.76	27.39	19.96
6	15.81	27.55	20.07
7	15.81	27.92	20.35
8	15.79	27.99	20.41
9	15.79	28.03	20.44
10	15.79	28.07	20.47
11	15.78	28.13	20.51
12	15.56	28.23	20.63
13	15.30	28.35	20.79
14	15.04	28.42	20.89
15	14.95	28.45	20.94
16	14.83	28.47	20.98
17	14.76	28.50	21.02
18	14.73	28.50	21.02
19	14.63	28.53	21.07

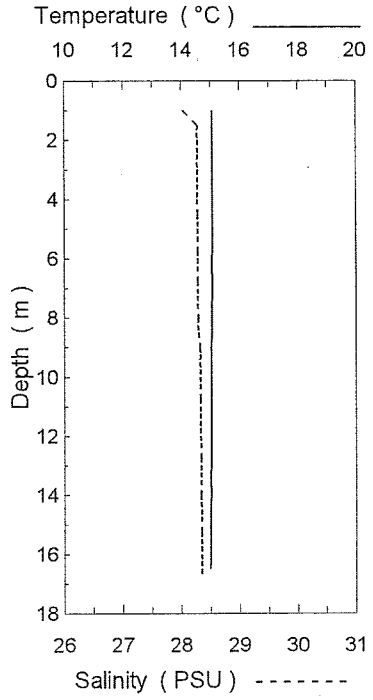
Survey 91-02 Station 6

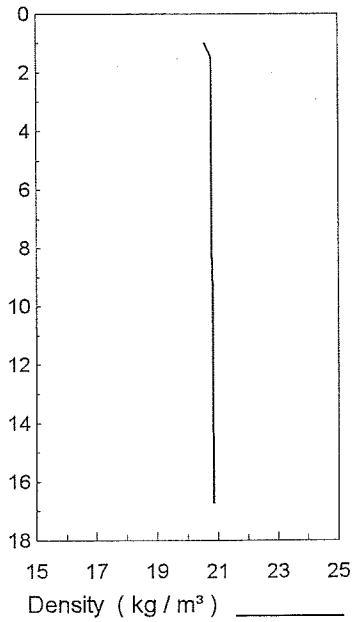




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	15.92	26.87	19.45
2	15.94	26.97	19.59
3	15.94	27.01	19.62
4	15.90	27.51	20.02
5	15.89	28.01	20.40
6	15.89	28.16	20.52
7	15.86	28.22	20.57
8	15.73	28.27	20.63
9	15.69	28.29	20.66
10		28.29	20.67

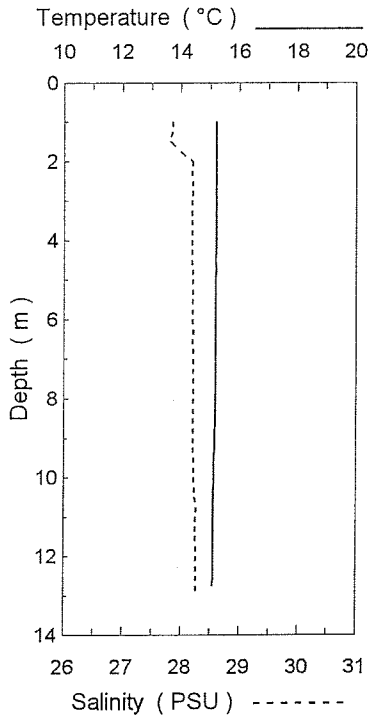
Survey 91-02 Station 7

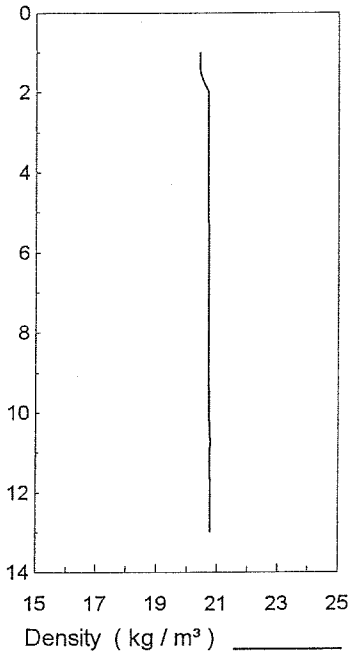




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	15.06	28.03	20.59
2	15.06	28.28	20.79
3	15.06	28.28	20.79
4	15.06	28.28	20.79
5	15.06	28.28	20.79
6	15.06	28.29	20.79
7	15.06	28.29	20.79
8	15.05	28.29	20.80
9	15.04	28.31	20.82
10	15.03	28.33	20.83
11	15.03	28.33	20.83
12	15.02	28.33	20.83
13	15.02	28.34	20.84
14	15.01	28.34	20.84
15	15.00	28.35	20.85
16	15.00	28.35	20.85
17	14.98	28.35	20.85

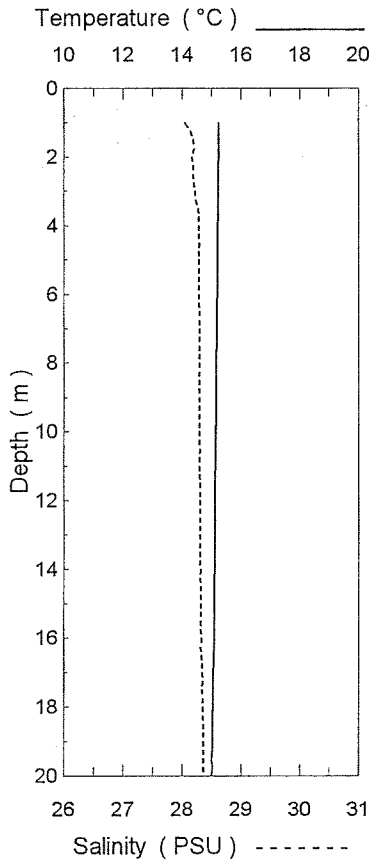
Survey 91-02 Station 8

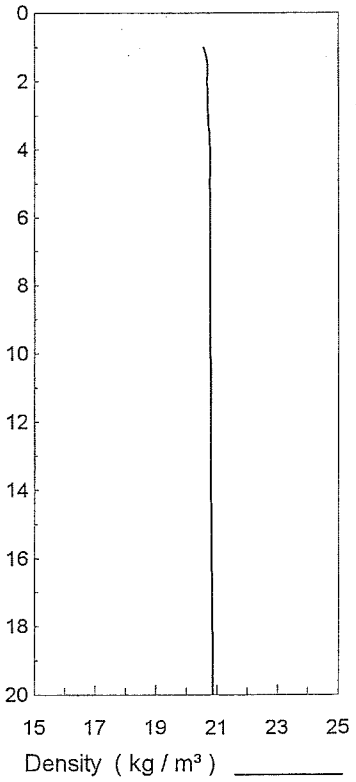




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	15.21	27.92	20.48
2	15.21	28.11	20.62
3	15.21	28.21	20.70
4	15.20	28.19	20.69
5	15.19	28.20	20.69
6	15.18	28.20	20.70
7	15.18	28.21	20.70
8	15.17	28.21	20.71
9	15.16	28.21	20.71
10	15.14	28.23	20.73
11	15.11	28.26	20.76
12	15.11	28.26	20.76
13	15.10	28.26	20.77

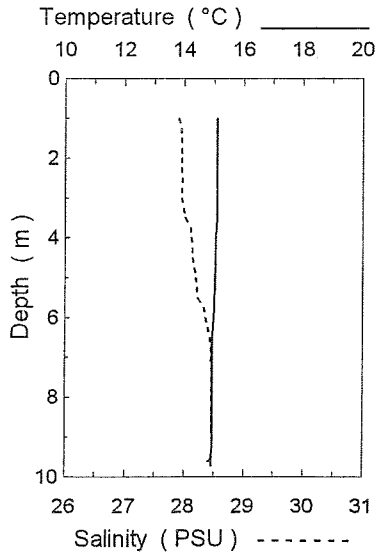
Survey 91-02 Station 9

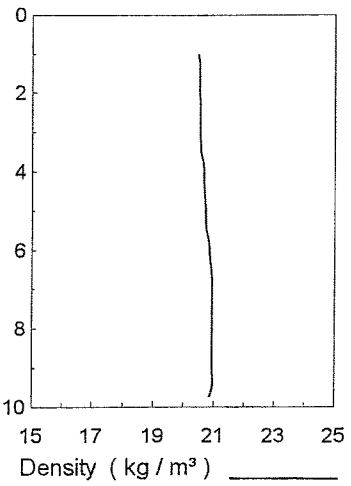




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	15.24	28.05	20.57
2	15.23	28.17	20.66
3	15.23	28.22	20.70
4	15.21	28.29	20.76
5	15.21	28.29	20.76
6	15.19	28.29	20.77
7	15.18	28.29	20.77
8	15.16	28.30	20.78
9	15.16	28.30	20.78
10	15.14	28.30	20.78
11	15.13	28.30	20.79
12	15.12	28.31	20.79
13	15.11	28.31	20.80
14	15.11	28.31	20.80
15	15.10	28.32	20.81
16	15.09	28.32	20.81
17	15.06	28.34	20.83
18	15.04	28.35	20.85
19	15.02	28.36	20.86
20	15.01	28.37	20.86

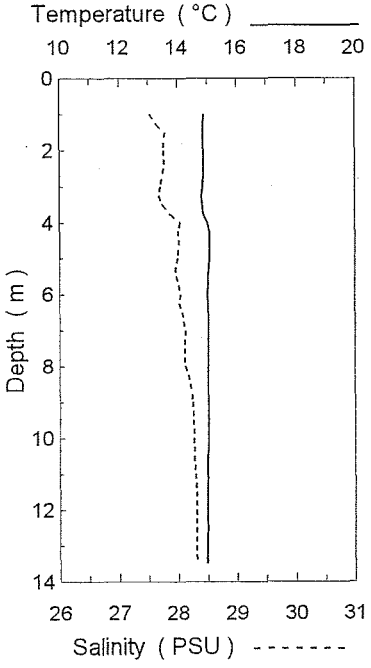
Survey 91-02 Station 10

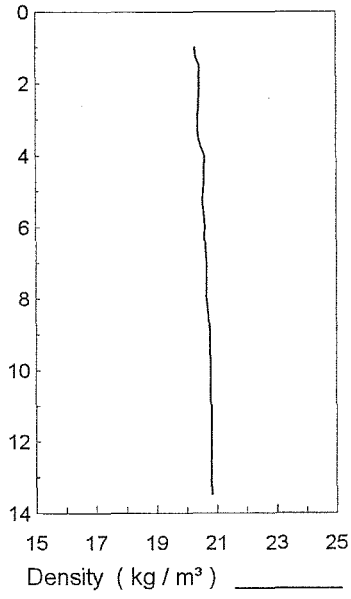




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	15.10	27.90	20.44
2	15.10	27.94	20.52
3	15.10	27.96	20.53
4	15.06	28.11	20.66
5	15.03	28.19	20.72
6	14.98	28.36	20.86
7	14.94	28.46	20.95
8	14.94	28.46	20.95
9	14.93	28.47	20.96
10	14.91	28.26	20.80

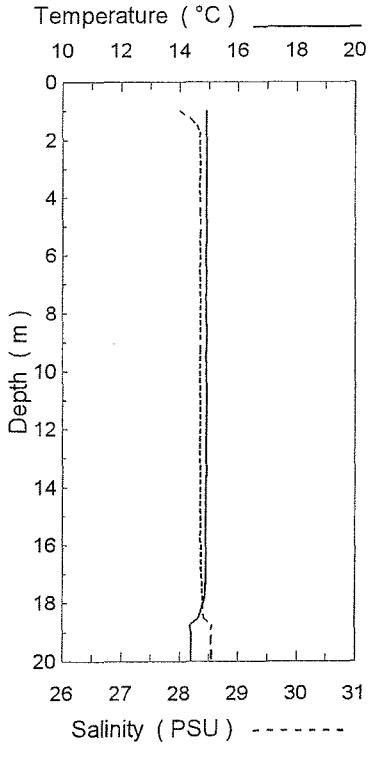
Survey 91-02 Station 11

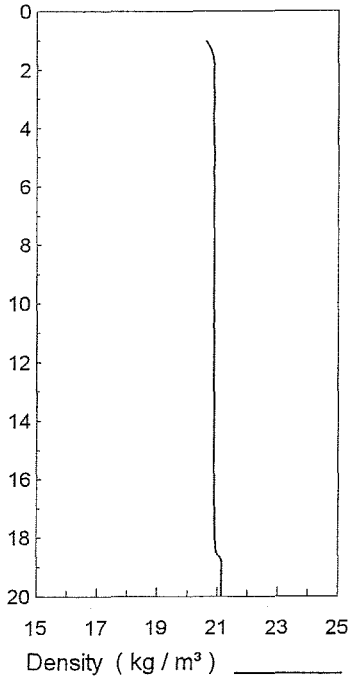




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	14.89	27.60	20.30
2	14.87	27.75	20.41
3	14.84	27.71	20.39
4	14.97	27.94	20.55
5	15.06	28.00	20.57
6	15.02	28.03	20.60
7	15.02	28.11	20.66
8	15.02	28.14	20.69
9	15.02	28.24	20.76
10	15.02	28.27	20.79
11	15.00	28.30	20.81
12	14.99	28.31	20.82
13	14.99	28.31	20.82
14	14.94	28.35	20.87

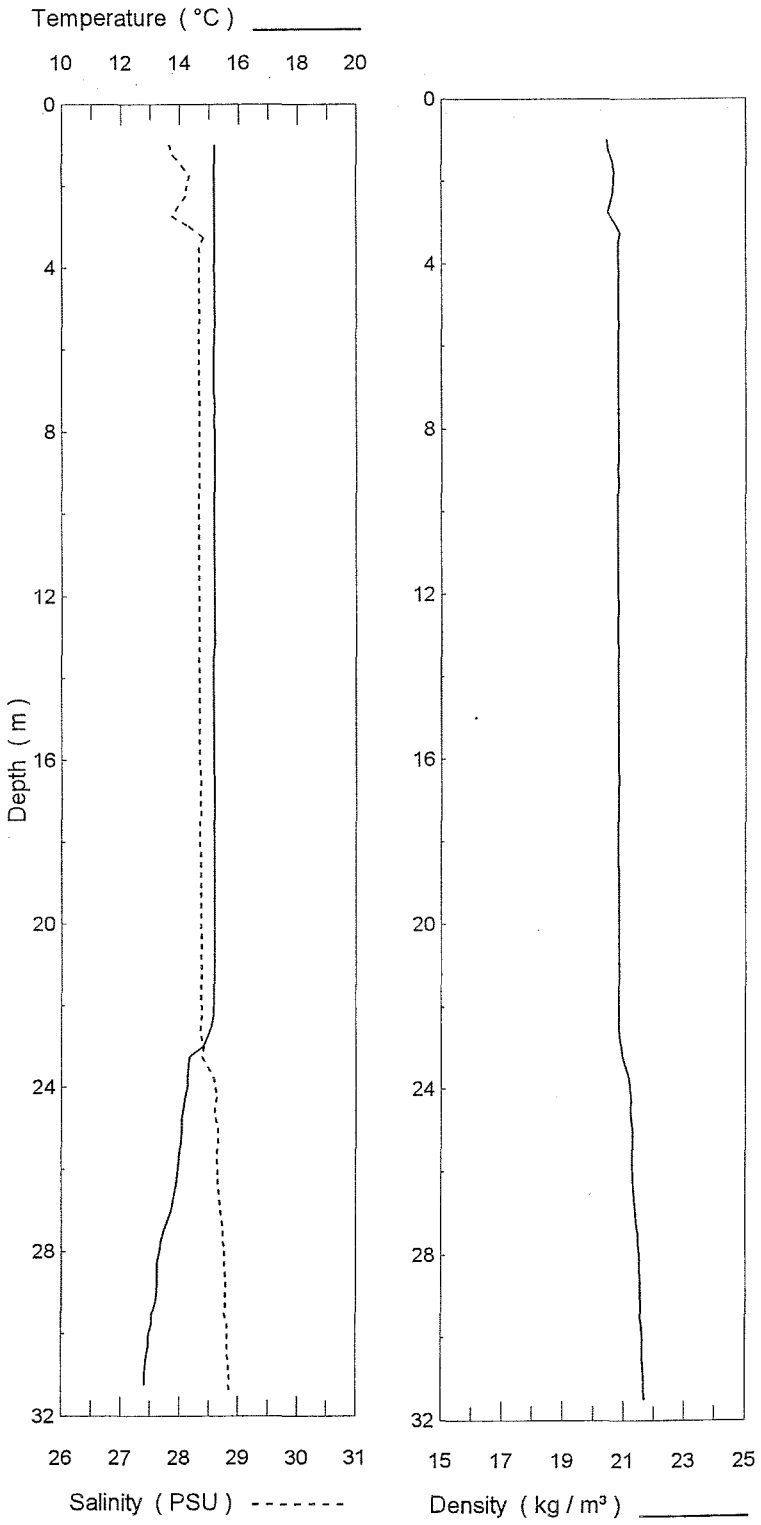
Survey 91-02 Station 12





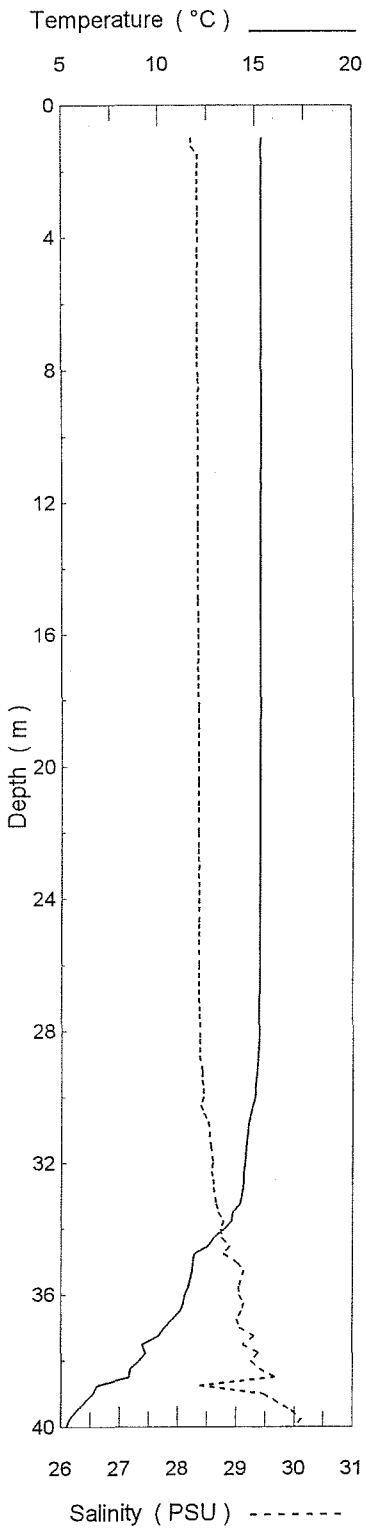
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	14.91	27.28	20.60
2	14.92	28.37	20.88
3	14.92	28.35	20.87
4	14.91	28.34	20.87
5	14.91	28.35	20.87
6	14.91	28.35	20.87
7	14.91	28.35	20.87
8	14.91	28.35	20.87
9	14.91	28.35	20.87
10	14.91	28.35	20.87
11	14.91	28.35	20.87
12	14.91	28.35	20.87
13	14.91	28.35	20.87
14	14.90	28.35	20.87
15	14.90	28.36	20.88
16	14.90	28.36	20.88
17	14.89	28.37	20.89
18	14.78	28.40	20.93
19	14.40	28.54	21.13
20	14.39	28.55	21.13

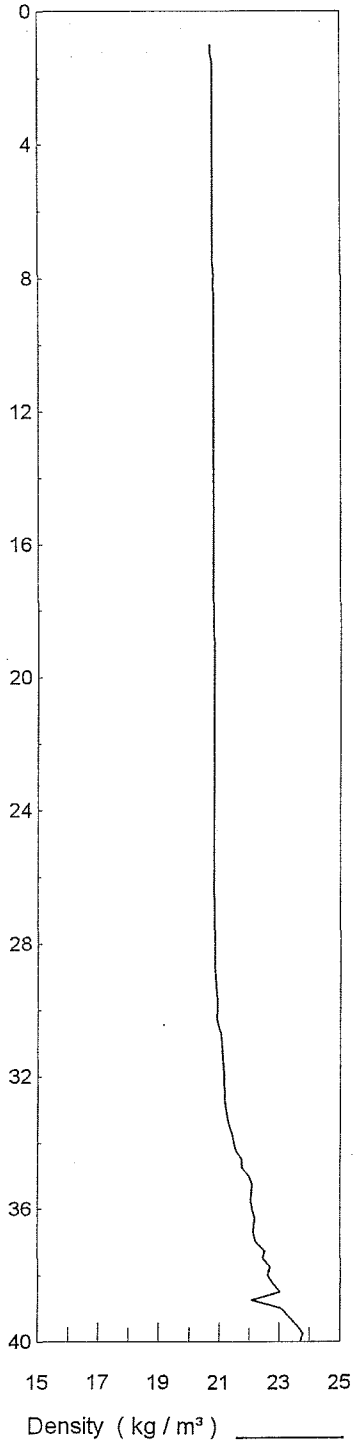
Survey 91-02 Station 13



Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	15.16	27.82	20.42
2	15.17	28.10	20.63
3	15.18	28.16	20.67
4	15.17	28.35	20.82
5	15.17	28.33	20.80
6	15.17	28.33	20.80
7	15.17	28.33	20.80
8	15.17	28.33	20.80
9	15.17	28.33	20.80
10	15.17	28.33	20.80
11	15.17	28.33	20.80
12	15.17	28.33	20.80
13	15.17	28.33	20.80
14	15.16	28.34	20.81
15	15.16	28.34	20.81
16	15.16	28.34	20.81
17	15.17	28.35	20.82
18	15.17	28.35	20.82
19	15.18	28.36	20.83
20	15.18	28.37	20.83
21	15.18	28.37	20.83
22	15.16	28.38	20.84
23	14.80	28.38	20.89
24	14.28	28.59	21.18
25	14.09	28.63	21.25
26	13.95	28.66	21.30
27	13.67	28.70	21.39
28	13.28	28.76	21.51
29	13.20	28.78	21.54
30	12.99	28.81	21.60
31	12.81	28.85	21.67

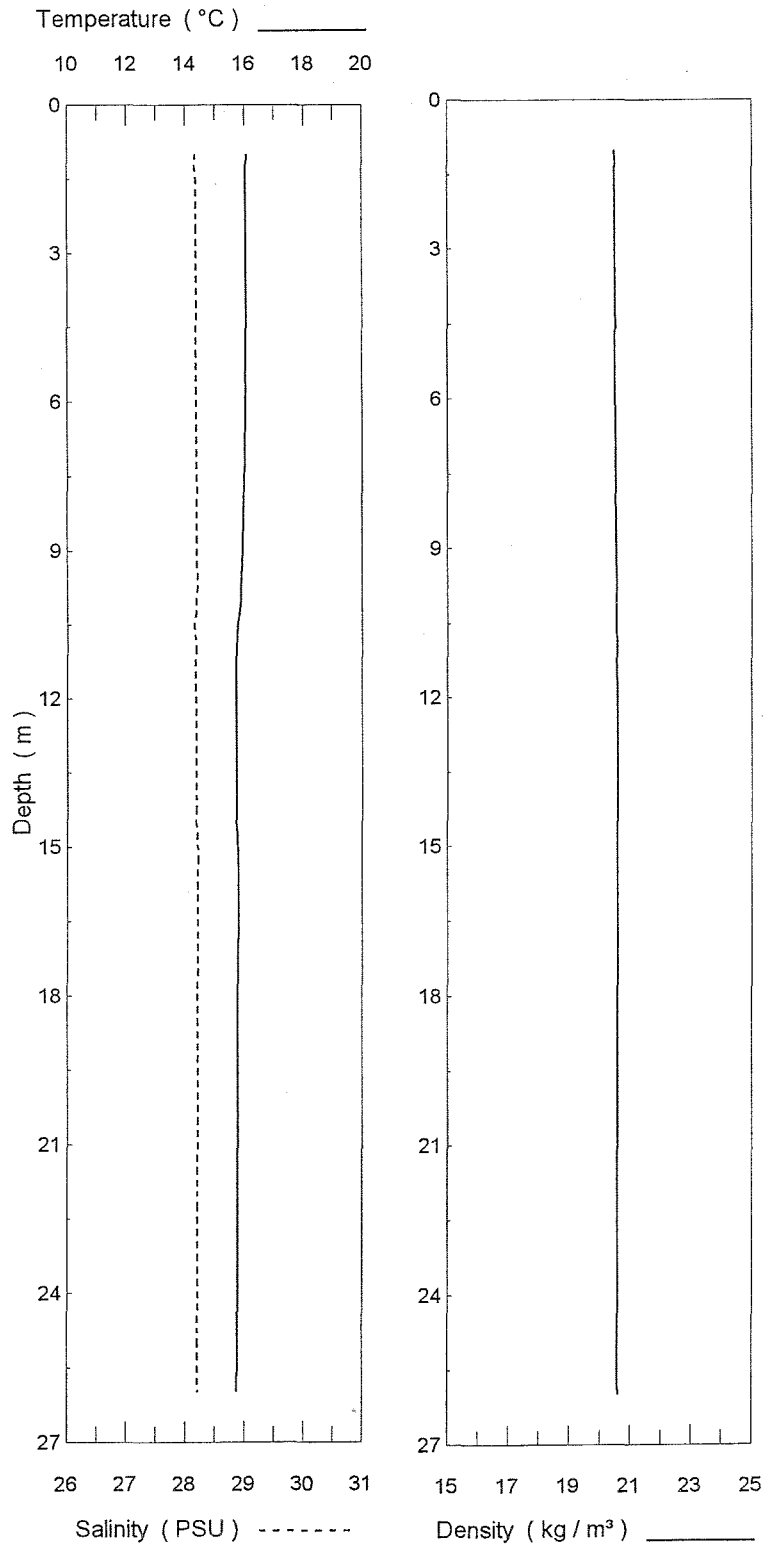
Survey 91-02 Station 14





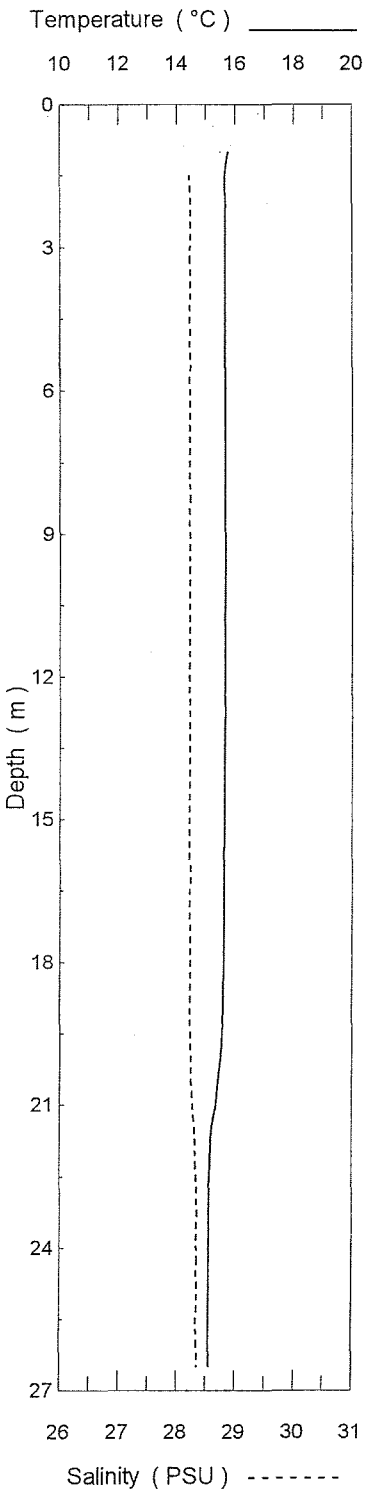
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	15.33	28.28	20.73
2	15.33	28.35	20.78
3	15.33	28.34	20.78
4	15.33	28.34	20.78
5	15.33	28.34	20.78
6	15.32	28.34	20.78
7	15.31	28.34	20.78
8	15.30	28.34	20.78
9	15.29	28.34	20.79
10	15.28	28.34	20.79
11	15.27	28.34	20.79
12	15.26	28.34	20.79
13	15.26	28.34	20.79
14	15.26	28.34	20.79
15	15.25	28.34	20.79
16	15.24	28.34	20.80
17	15.24	28.35	20.80
18	15.24	28.35	20.80
19	15.23	28.35	20.80
20	15.22	28.35	20.81
21	15.21	28.35	20.81
22	15.21	28.35	20.81
23	15.21	28.36	20.81
24	15.21	28.36	20.82
25	15.20	28.36	20.82
26	15.20	28.36	20.82
27	15.20	28.37	20.82
28	15.18	28.37	20.83
29	15.12	28.39	20.86
30	14.96	28.43	20.92
31	14.60	28.55	21.08
32	14.46	28.60	21.15
33	14.28	28.65	21.22
34	13.32	28.75	21.48
35	11.87	29.01	21.95
36	11.39	29.11	22.12
37	10.36	29.16	22.32
38	9.03	29.42	22.73
39	6.62	29.47	23.09
40	5.27	30.14	23.80

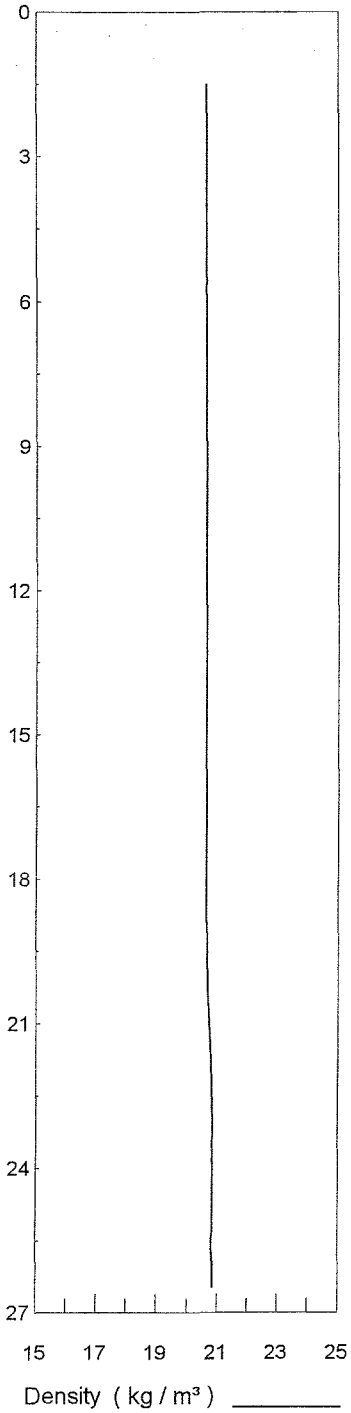
Survey 91-02 Station 15



Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	16.06	28.16	20.48
2	16.06	28.19	20.50
3	16.05	28.19	20.50
4	16.04	28.19	20.50
5	16.04	28.19	20.51
6	16.03	28.19	20.51
7	16.00	28.19	20.52
8	15.98	28.19	20.53
9	15.93	28.20	20.54
10	15.85	28.19	20.55
11	15.74	28.18	20.57
12	15.72	28.18	20.57
13	15.73	28.19	20.58
14	15.73	28.19	20.58
15	15.78	28.22	20.59
16	15.79	28.21	20.58
17	15.78	28.21	20.58
18	15.77	28.21	20.59
19	15.77	28.21	20.59
20	15.77	28.21	20.59
21	15.77	28.21	20.59
22	15.77	28.21	20.59
23	15.77	28.21	20.59
24	15.76	28.21	20.59
25	15.76	28.21	20.59
26	15.74	28.22	20.59

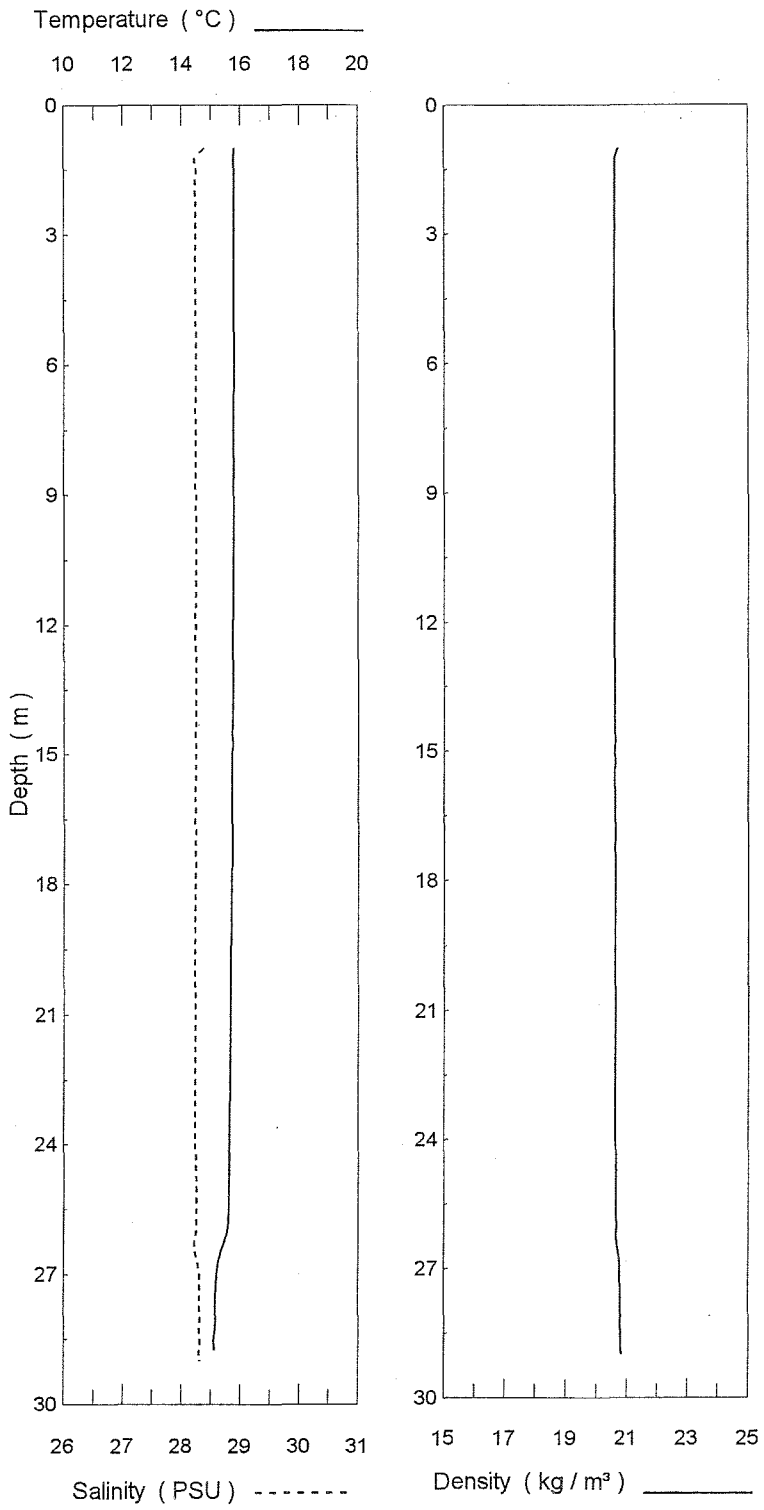
Survey 91-02 Station 16





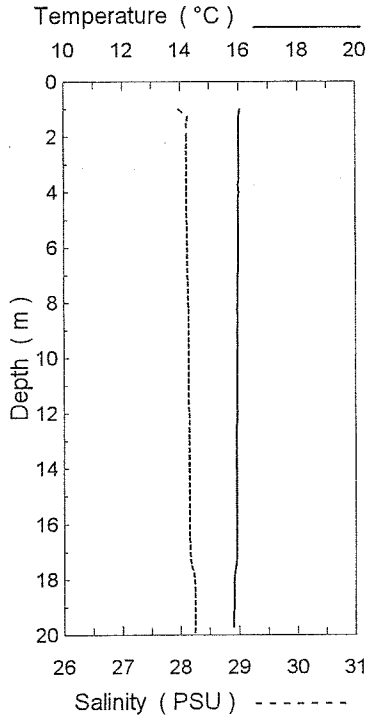
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	15.71	28.82	20.60
2	15.66	28.24	20.63
3	15.66	28.23	20.62
4	15.65	28.22	20.62
5	15.66	28.23	20.62
6	15.66	28.22	20.61
7	15.65	28.22	20.62
8	15.65	28.22	20.62
9	15.65	28.22	20.62
10	15.65	28.22	20.62
11	15.65	28.22	20.62
12	15.65	28.22	20.62
13	15.65	28.22	20.62
14	15.65	28.22	20.62
15	15.64	28.22	20.62
16	15.62	28.22	20.63
17	15.62	28.22	20.63
18	15.61	28.23	20.63
19	15.59	28.23	20.64
20	15.50	28.24	20.66
21	15.33	28.27	20.72
22	15.17	28.32	20.80
23	15.12	28.34	20.82
24	15.12	28.34	20.82
25	15.12	28.35	20.83
26	15.12	28.34	20.82
27	15.12	28.35	20.83

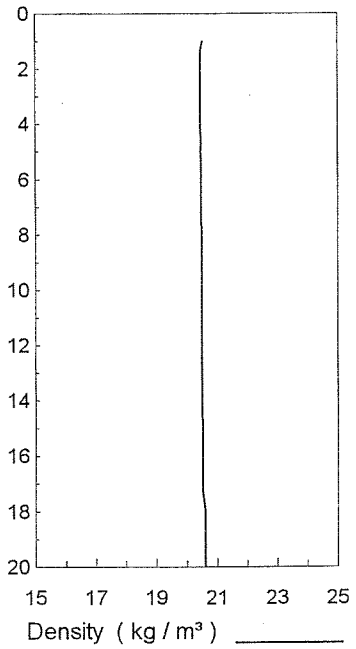
Survey 91-02 Station 17



Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	15.80	28.39	20.71
2	15.79	28.24	20.61
3	15.79	28.24	20.60
4	15.79	28.24	20.60
5	15.78	28.24	20.60
6	15.78	28.24	20.60
7	15.78	28.24	20.60
8	15.78	28.24	20.60
9	15.77	28.24	20.60
10	15.76	28.24	20.61
11	15.76	28.24	20.61
12	15.76	28.24	20.61
13	15.74	28.24	20.61
14	15.74	28.24	20.61
15	15.73	28.24	20.61
16	15.73	28.23	20.61
17	15.72	28.23	20.61
18	15.71	28.23	20.62
19	15.70	28.23	20.62
20	15.68	28.23	20.62
21	15.66	28.23	20.62
22	15.66	28.23	20.62
23	15.65	28.23	20.62
24	15.63	28.23	20.63
25	15.62	28.25	20.65
26	15.51	28.24	20.65
27	15.20	28.29	20.76
28	15.14	28.31	20.79
29	15.10	28.30	20.79

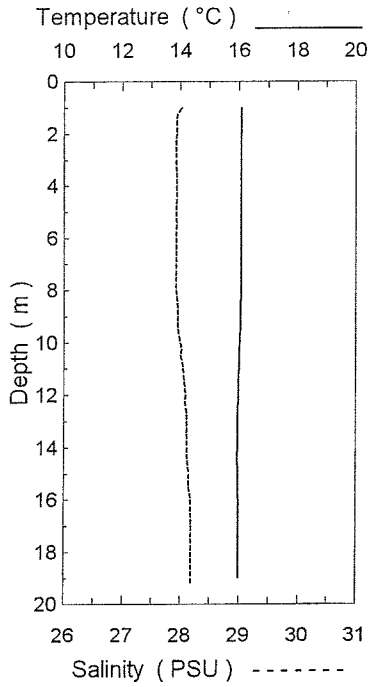
Survey 91-02 Station 18

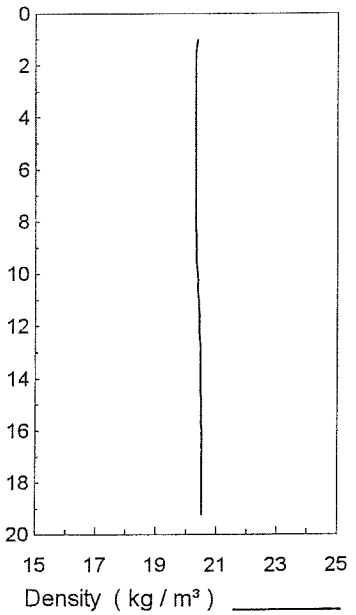




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	16.04	28.00	20.54
2	16.01	28.13	20.47
3	16.00	28.11	20.46
4	15.99	28.12	20.46
5	15.99	28.12	20.46
6	15.98	28.12	20.47
7	15.97	28.12	20.47
8	15.96	28.14	20.49
9	15.95	28.14	20.49
10	15.95	28.14	20.49
11	15.94	28.15	20.50
12	15.93	28.15	20.50
13	15.93	28.15	20.50
14	15.93	28.15	20.50
15	15.92	28.15	20.51
16	15.92	28.16	20.51
17	15.91	28.17	20.52
18	15.85	28.23	20.58
19	15.82	28.25	20.60
20	15.82	28.25	20.60

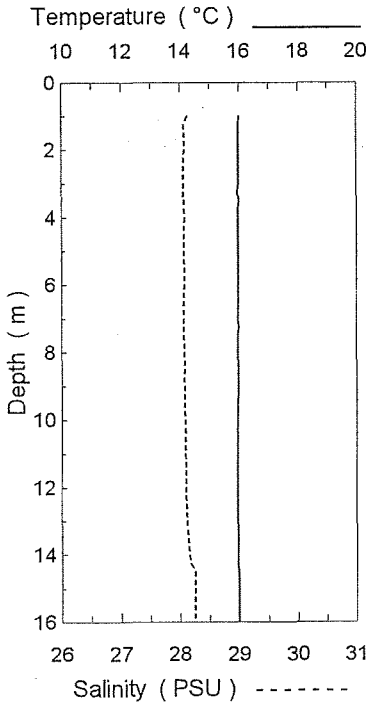
Survey 91-02 Station 19

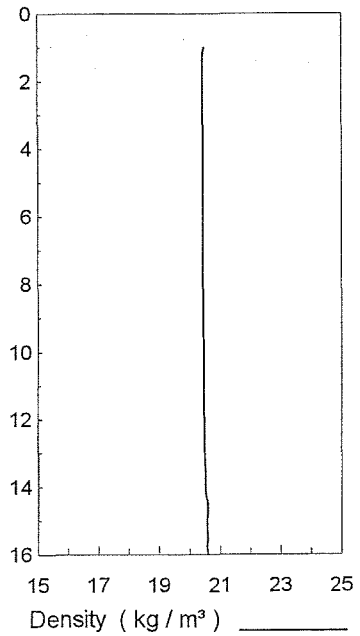




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	16.08	28.02	20.37
2	16.08	27.94	20.31
3	16.07	27.93	20.30
4	16.07	27.93	20.31
5	16.07	27.93	20.30
6	16.07	27.93	20.30
7	16.07	27.93	20.30
8	16.07	27.93	20.30
9	16.04	27.96	20.33
10	16.02	28.00	20.36
11	16.00	28.04	20.41
12	15.98	28.08	20.44
13	15.96	28.11	20.47
14	15.95	28.12	20.47
15	15.96	28.14	20.49
16	15.97	28.17	20.51
17	15.98	28.18	20.52
18	15.98	28.19	20.52
19	15.98	28.19	20.52

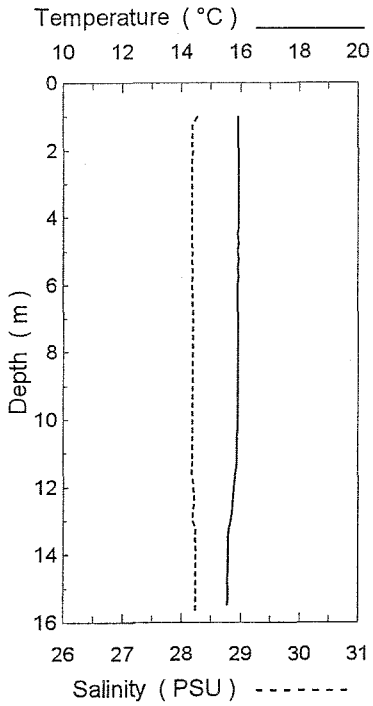
Survey 91-02 Station 20

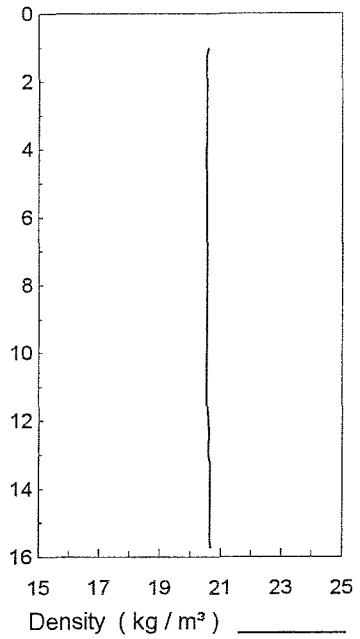




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	16.00	28.13	20.47
2	15.99	28.08	20.43
3	15.98	28.07	20.43
4	15.97	28.07	20.43
5	15.97	28.07	20.43
6	15.97	28.07	20.43
7	15.97	28.07	20.43
8	15.97	28.07	20.43
9	15.96	28.07	20.44
10	15.95	28.09	20.45
11	15.94	28.10	20.46
12	15.94	28.10	20.46
13	15.94	28.12	20.48
14	15.95	28.17	20.51
15	15.98	28.25	20.57
16	15.99	28.26	20.57

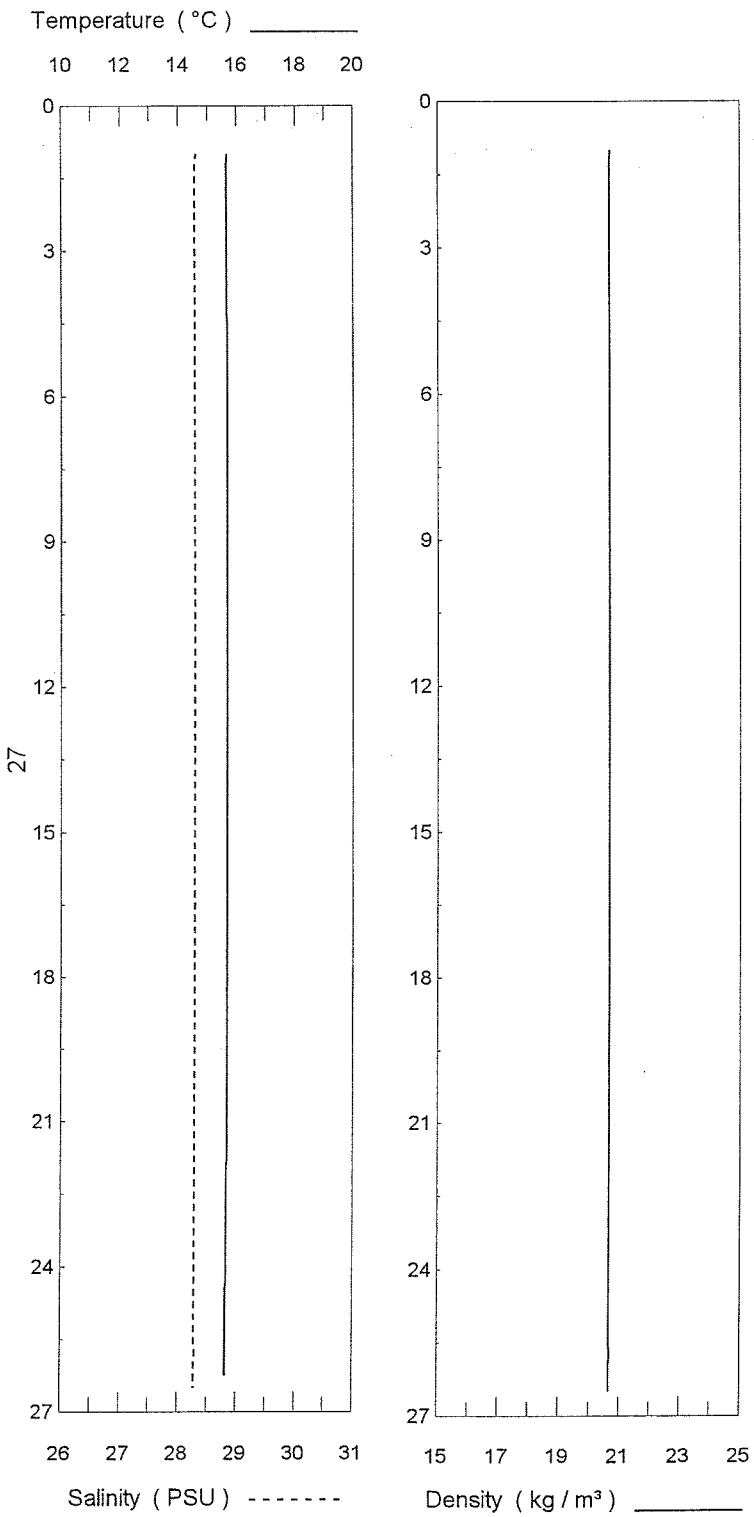
Survey 91-02 Station 21





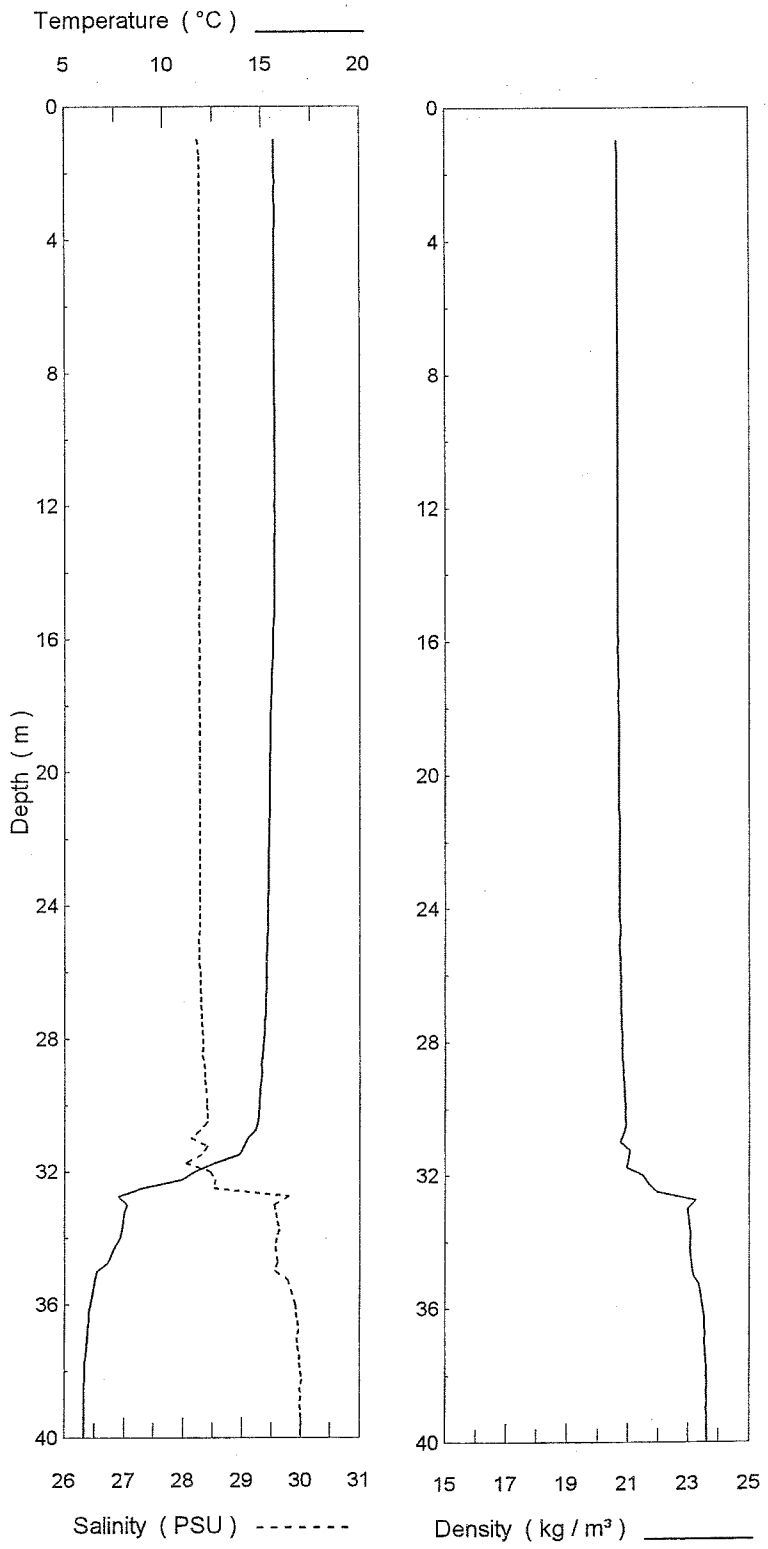
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	15.93	28.27	20.59
2	15.92	28.19	20.54
3	15.92	28.18	20.53
4	15.92	28.18	20.53
5	15.91	28.18	20.53
6	15.91	28.18	20.53
7	15.90	28.18	20.54
8	15.90	28.18	20.54
9	15.89	28.19	20.54
10	15.89	28.19	20.54
11	15.88	28.19	20.54
12	15.77	28.20	20.57
13	15.65	28.20	20.60
14	15.57	28.24	20.65
15	15.56	28.24	20.65
16	15.56	28.24	20.65

Survey 91-02 Station 22



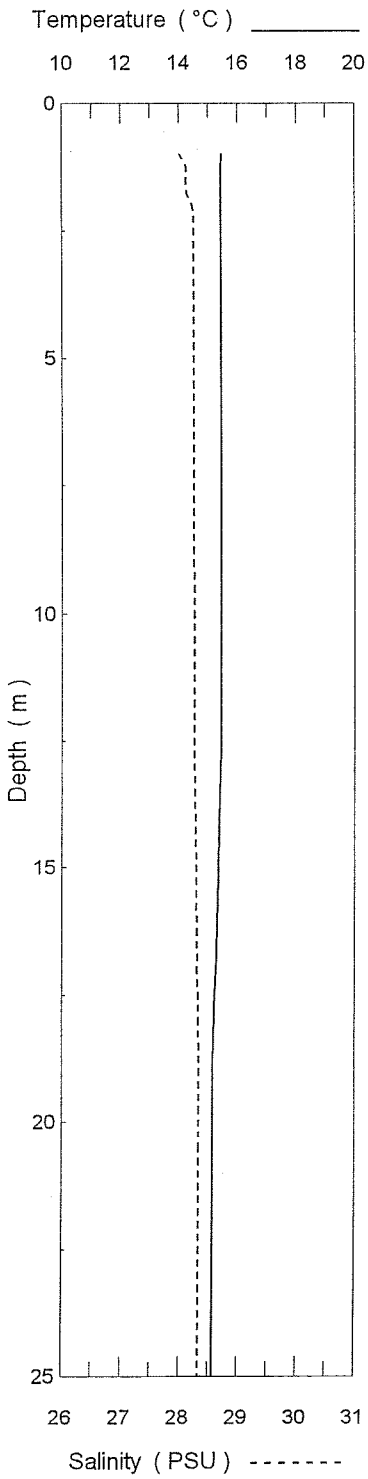
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	15.68	28.31	20.68
2	15.67	28.29	20.66
3	15.67	28.29	20.66
4	15.67	28.29	20.66
5	15.67	28.29	20.66
6	15.67	28.29	20.66
7	15.67	28.29	20.66
8	15.67	28.29	20.66
9	15.67	28.29	20.66
10	15.67	28.29	20.66
11	15.67	28.29	20.66
12	15.67	28.29	20.66
13	15.67	28.29	20.66
14	15.67	28.29	20.66
15	15.67	28.29	20.66
16	15.67	28.29	20.66
17	15.67	28.29	20.66
18	15.67	28.29	20.66
19	15.67	28.29	20.66
20	15.67	28.29	20.66
21	15.67	28.29	20.66
22	15.67	28.29	20.66
23	15.67	28.29	20.67
24	15.66	28.29	20.67
25	15.64	28.29	20.67
26	15.64	28.29	20.67
27		28.29	20.67

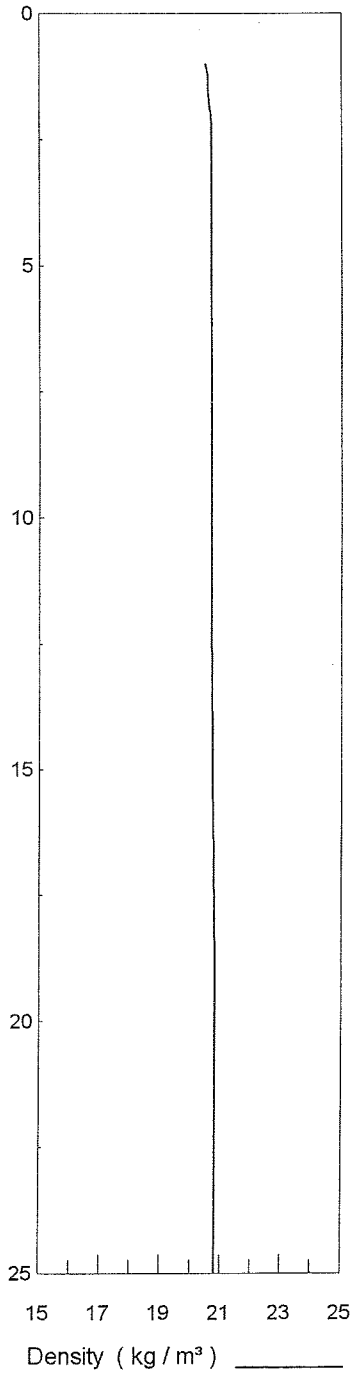
Survey 91-02 Station 23



Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	15.66	28.25	20.64
2	15.66	28.25	20.64
3	15.66	28.28	20.66
4	15.66	28.28	20.66
5	15.66	28.28	20.66
6	15.66	28.28	20.66
7	15.66	28.28	20.66
8	15.66	28.28	20.66
9	15.66	28.28	20.66
10	15.66	28.28	20.66
11	15.66	28.28	20.66
12	15.66	28.28	20.66
13	15.66	28.28	20.66
14	15.65	28.28	20.66
15	15.64	28.28	20.66
16	15.59	28.28	20.67
17	15.53	28.28	20.69
18	15.47	28.28	20.70
19	15.43	28.29	20.71
20	15.43	28.29	20.72
21	15.41	28.29	20.72
22	15.38	28.29	20.73
23	15.34	28.28	20.73
24	15.32	28.28	20.74
25	15.29	28.27	20.73
26	15.25	28.29	20.75
27	15.21	28.31	20.78
28	15.11	28.34	20.82
29	15.02	28.37	20.86
30	14.87	28.41	20.92
31	14.49	28.35	20.93
32	11.74	28.35	21.39
33	8.44	29.43	22.82
34	7.74	29.59	23.06
35	6.82	29.65	23.21
36	6.25	29.91	23.50
37	6.14	29.94	23.54
38	6.00	29.99	23.59
39	5.98	29.99	23.60
40	5.99	30.00	23.61

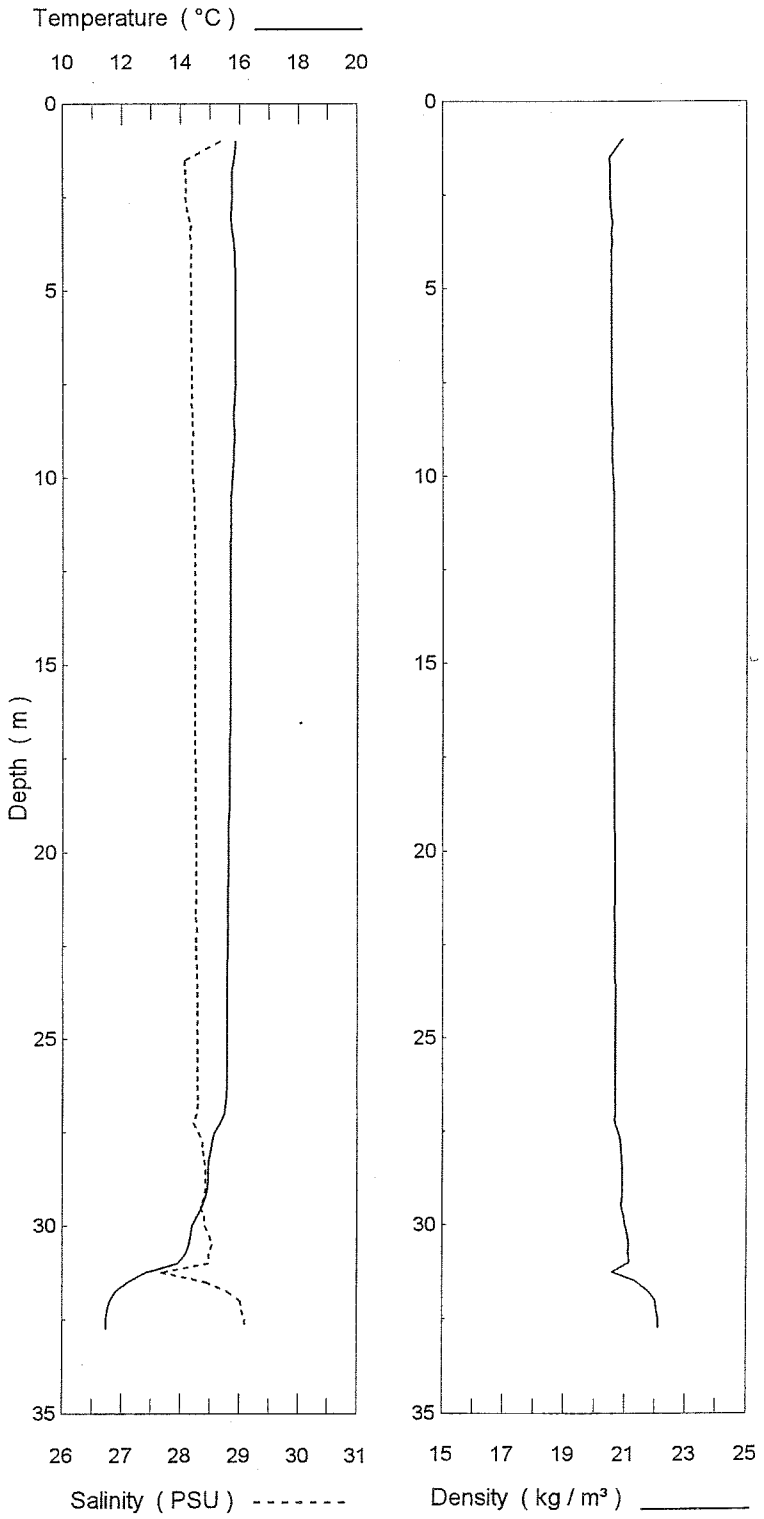
Survey 91-02 Station 24





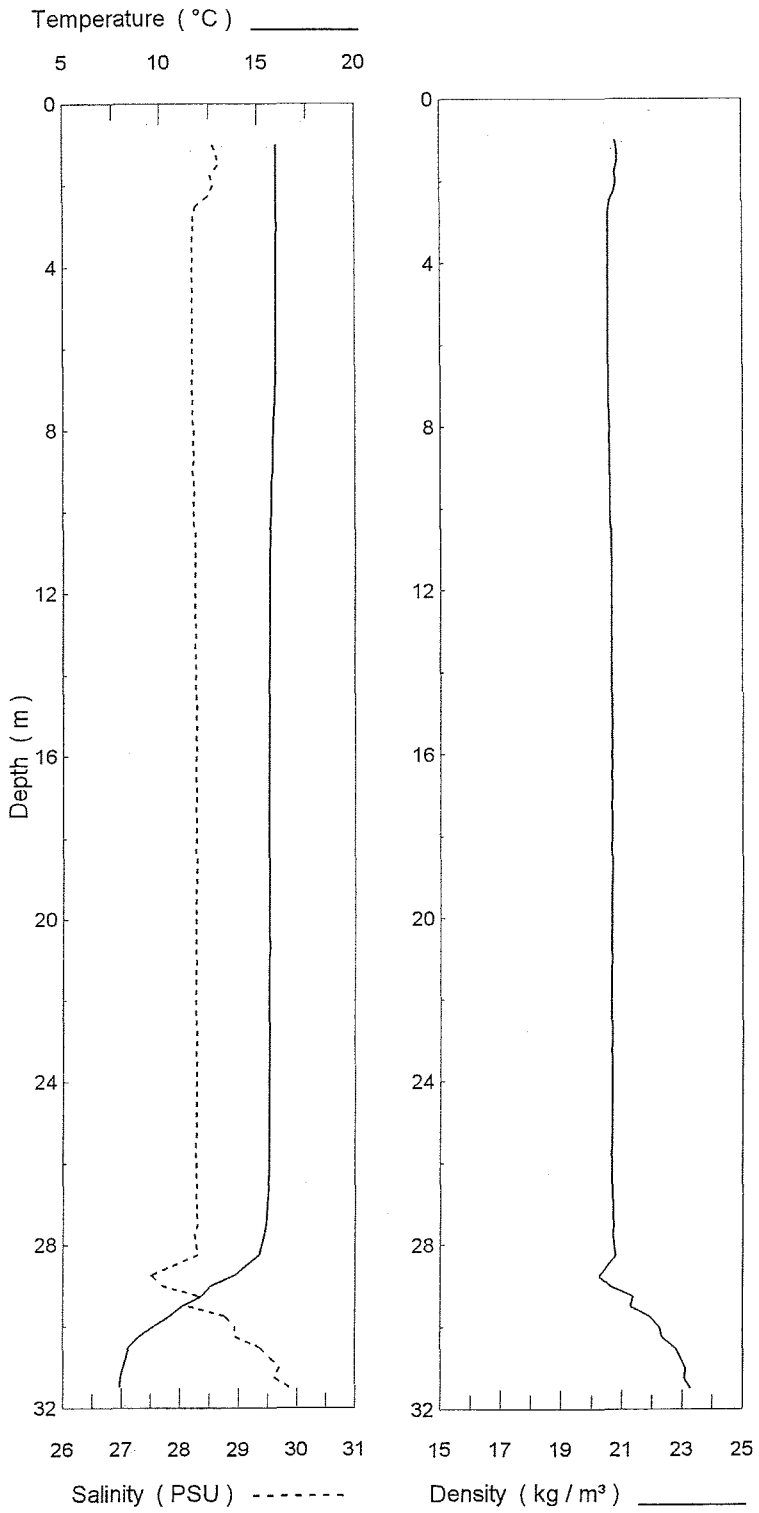
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	15.45	28.09	20.56
2	15.43	28.21	20.66
3	15.44	28.25	20.68
4	15.44	28.25	20.68
5	15.44	28.25	20.69
6	15.44	28.25	20.69
7	15.44	28.26	20.69
8	15.44	28.26	20.69
9	15.44	28.26	20.69
10	15.44	28.26	20.69
11	15.44	28.26	20.69
12	15.44	28.26	20.69
13	15.42	28.27	20.70
14	15.39	28.28	20.72
15	15.36	28.29	20.73
16	15.32	28.30	20.75
17	15.26	28.32	20.77
18	15.20	28.33	20.80
19	15.17	28.34	20.81
20	15.16	28.34	20.81
21	15.16	28.34	20.81
22	15.16	28.34	20.81
23	15.15	28.34	20.81
24	15.15	28.34	20.81
25	15.15	28.34	20.81

Survey 91-02 Station 25



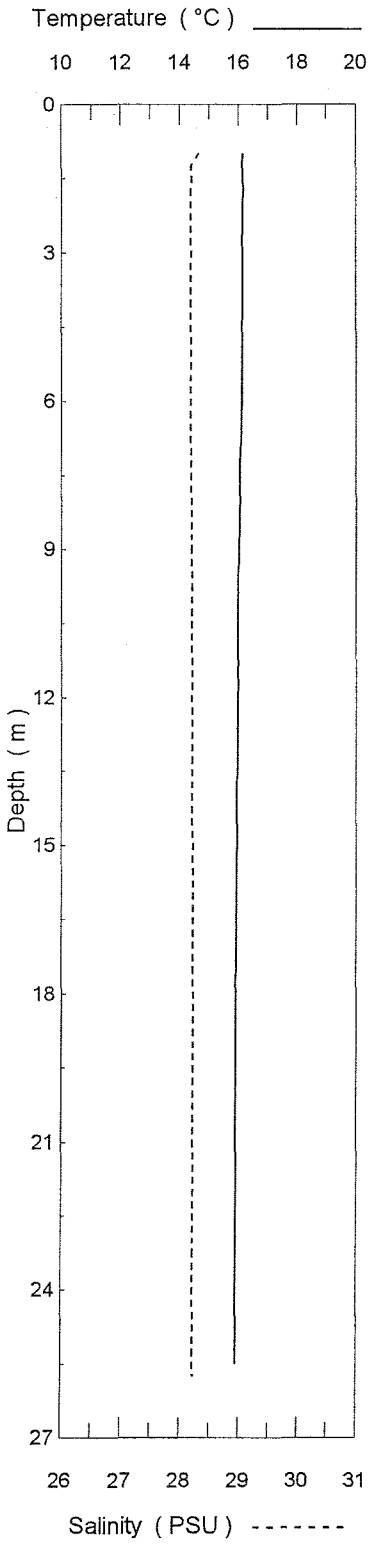
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	15.88	28.67	20.91
2	15.76	28.12	20.51
3	15.73	28.12	20.52
4	15.82	28.17	20.55
5	15.85	28.17	20.54
6	15.85	28.18	20.54
7	15.85	28.18	20.54
8	15.82	28.19	20.55
9	15.80	28.20	20.57
10	15.74	28.21	20.59
11	15.70	28.23	20.62
12	15.69	28.24	20.62
13	15.69	28.24	20.62
14	15.69	28.24	20.62
15	15.68	28.24	20.62
16	15.68	28.24	20.63
17	15.67	28.24	20.63
18	15.66	28.25	20.64
19	15.64	28.25	20.65
20	15.61	28.27	20.66
21	15.60	28.27	20.66
22	15.60	28.26	20.66
23	15.58	28.27	20.67
24	15.57	28.28	20.68
25	15.57	28.29	20.69
26	15.56	28.29	20.69
27	15.45	28.28	20.70
28	15.01	28.38	20.87
29	14.91	28.42	20.92
30	14.46	28.42	21.00
31	13.76	28.41	21.11
32	11.67	28.94	21.93
33	11.40	29.16	22.17

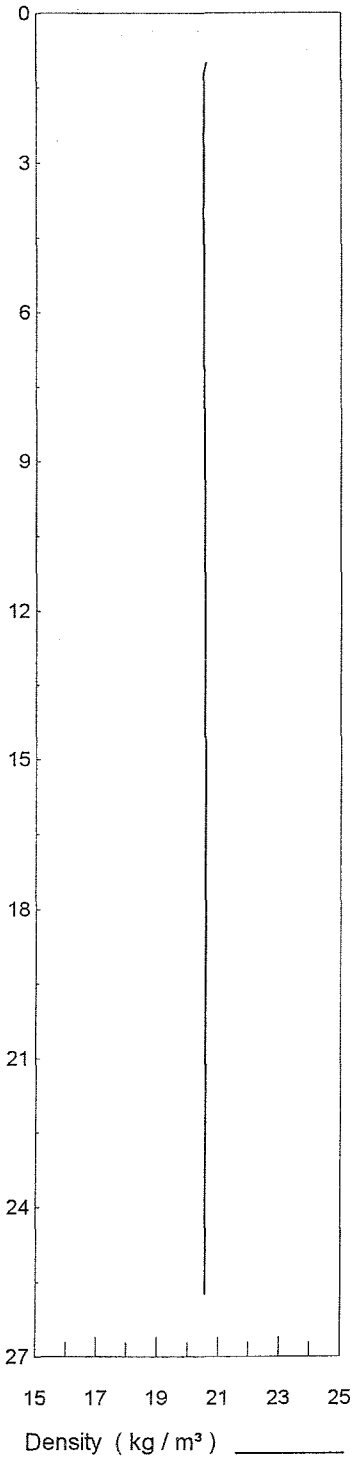
Survey 91-02 Station 26



Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	16.00	28.51	20.77
2	15.96	28.53	20.78
3	15.95	28.22	20.55
4	15.94	28.22	20.55
5	15.93	28.22	20.56
6	15.93	28.22	20.56
7	15.89	28.22	20.56
8	15.81	28.24	20.59
9	15.75	28.23	20.60
10	15.68	28.24	20.63
11	15.62	28.26	20.65
12	15.61	28.27	20.66
13	15.60	28.27	20.66
14	15.60	28.27	20.67
15	15.59	28.28	20.68
16	15.59	28.28	20.67
17	15.59	28.28	20.68
18	15.59	28.28	20.68
19	15.59	28.28	20.68
20	15.59	28.28	20.67
21	15.60	28.28	20.67
22	15.59	28.28	20.67
23	15.59	28.28	20.68
24	15.59	28.28	20.68
25	15.59	28.28	20.68
26	15.57	28.28	20.68
27	15.49	28.28	20.70
28	15.21	28.30	20.76
29	12.86	28.06	20.95
30	9.55	28.87	22.18
31	8.30	29.50	22.90

Survey 91-02 Station 27

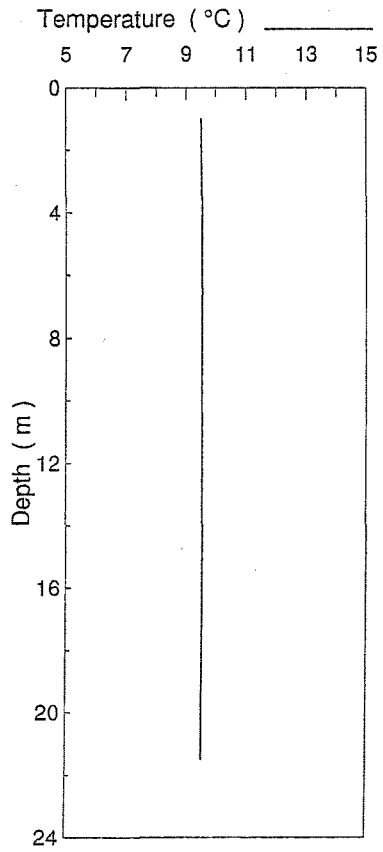




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	16.17	28.33	20.57
2	16.15	28.21	20.50
3	16.13	28.19	20.49
4	16.13	28.19	20.49
5	16.12	28.19	20.49
6	16.11	28.19	20.50
7	16.08	28.19	20.50
8	16.04	28.20	20.52
9	16.01	28.20	20.52
10	15.99	28.21	20.53
11	15.98	28.21	20.53
12	15.97	28.21	20.54
13	15.96	28.21	20.54
14	15.95	28.21	20.54
15	15.93	28.21	20.55
16	15.92	28.22	20.56
17	15.91	28.22	20.56
18	15.91	28.22	20.56
19	15.90	28.22	20.56
20	15.90	28.22	20.56
21	15.90	28.22	20.56
22	15.90	28.22	20.56
23	15.90	28.22	20.56
24	15.90	28.22	20.56
25	15.90	28.22	20.56
26	15.89	28.22	20.57

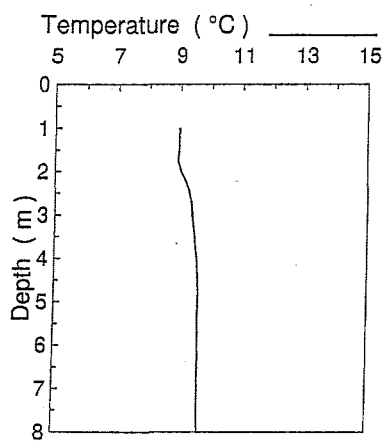
Appendix 5.3 Survey 91-03 CTD profiles of temperature (°C), salinity (PSU), density (kg / m³) and fluorescence (relative).

Survey 91-03 Station 1



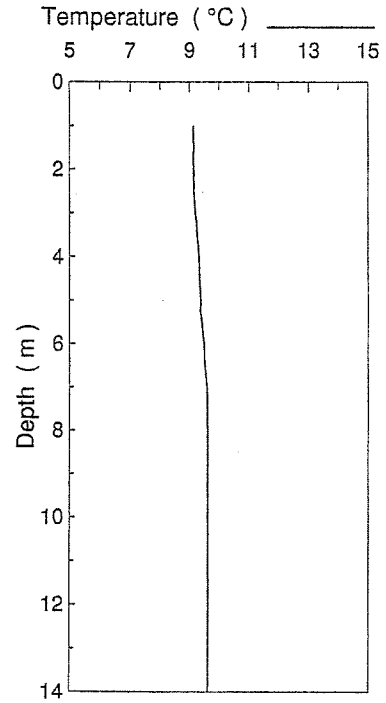
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	9.53		
2	9.50		
3	9.51		
4	9.51		
5	9.51		
6	9.51		
7	9.51		
8	9.51		
9	9.51		
10	9.51		
11	9.52		
12	9.52		
13	9.52		
14	9.52		
15	9.52		
16	9.52		
17	9.52		
18	9.52		
19	9.52		
20	9.52		
21	9.52		
22	9.52		

Survey 91-03 Station 3



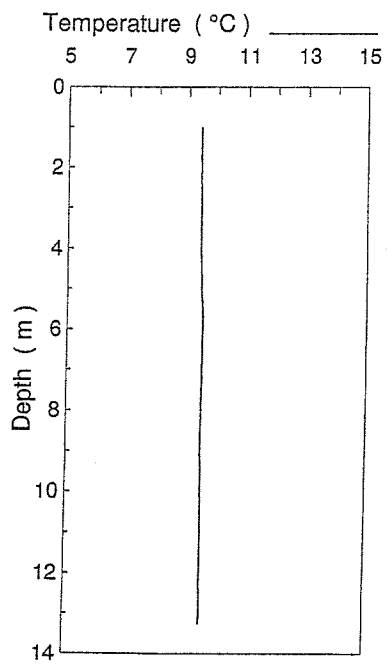
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	8.94		
2	9.07		
3	9.38		
4	9.52		
5	9.58		
6	9.59		
7	9.61		
8	9.63		

Survey 91-03 Station 4



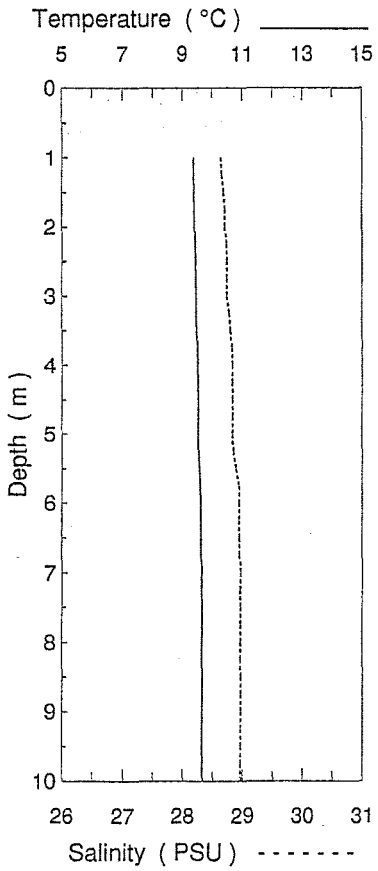
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	9.12		
2	9.13		
3	9.19		
4	9.30		
5	9.36		
6	9.48		
7	9.57		
8	9.60		
9	9.61		
10	9.61		
11	9.61		
12	9.62		
13	9.62		
14	9.61		

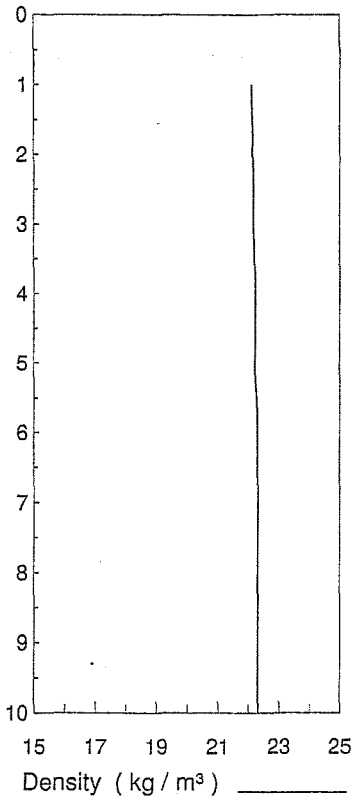
Survey 91-03 Station 5



Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	9.41		
2	9.42		
3	9.42		
4	9.43		
5	9.46		
6	9.51		
7	9.49		
8	9.49		
9	9.48		
10	9.50		
11	9.52		
12	9.52		
13	9.54		

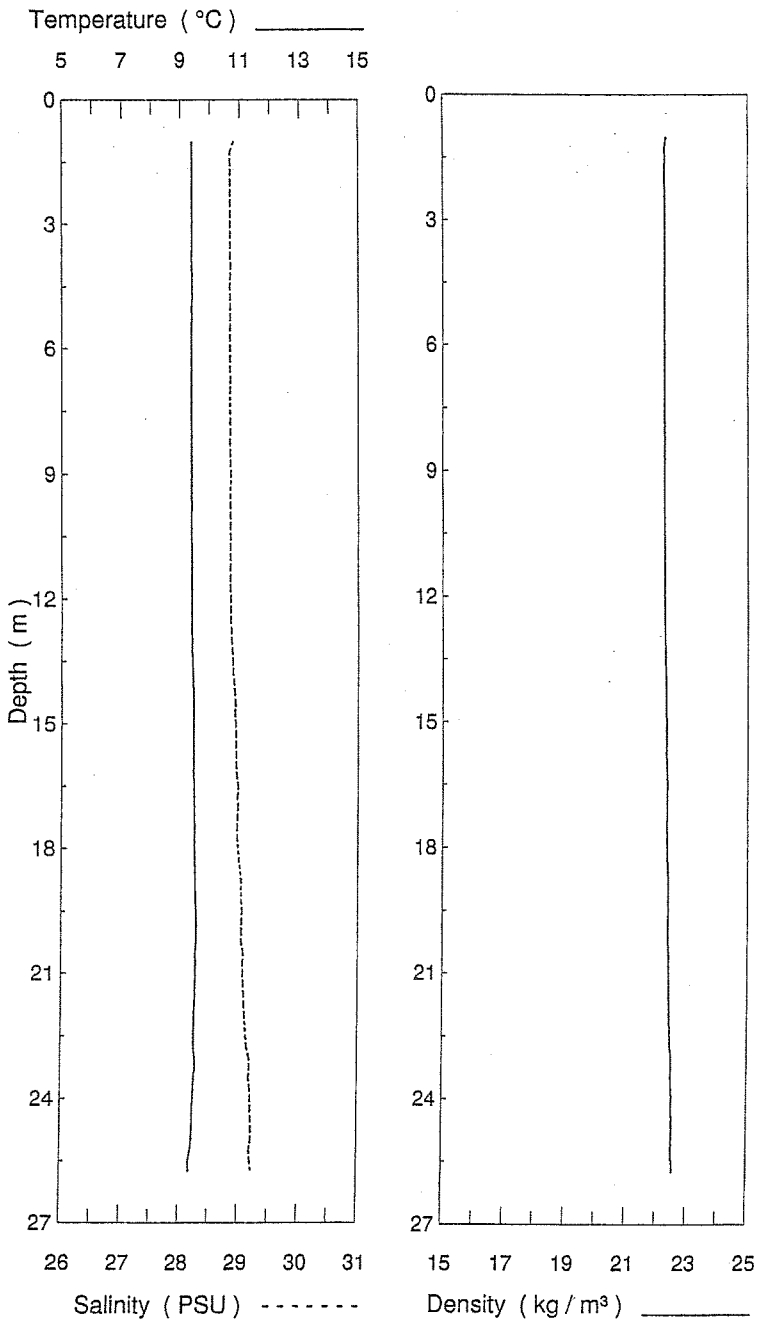
Survey 91-03 Station 6





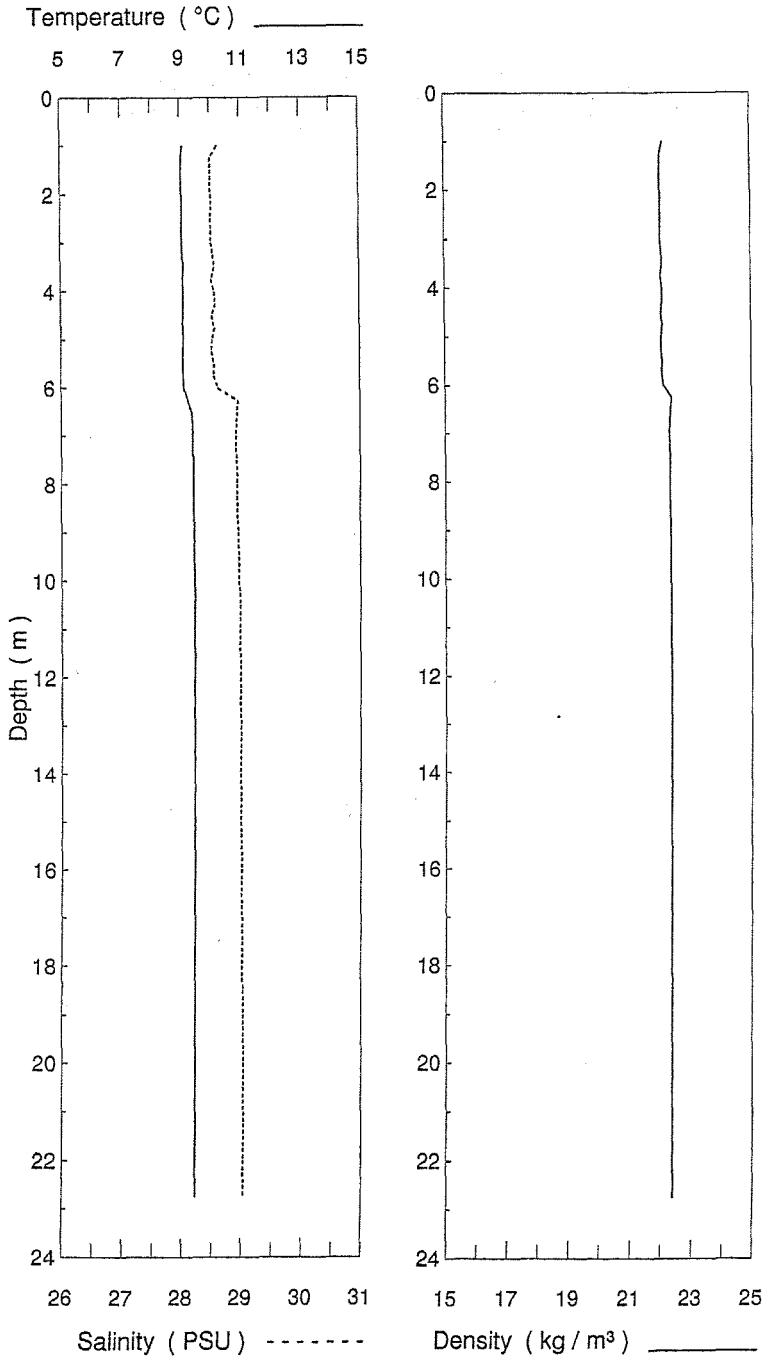
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	9.36	28.85	22.25
2	9.39	28.73	22.15
3	9.43	28.74	22.16
4	9.49	28.82	22.21
5	9.51	28.83	22.21
6	9.58	28.93	22.28
7	9.62	28.95	22.29
8	9.63	28.95	22.30
9	9.63	28.96	22.30
10	9.64	28.95	22.29

Survey 91-03 Station 7



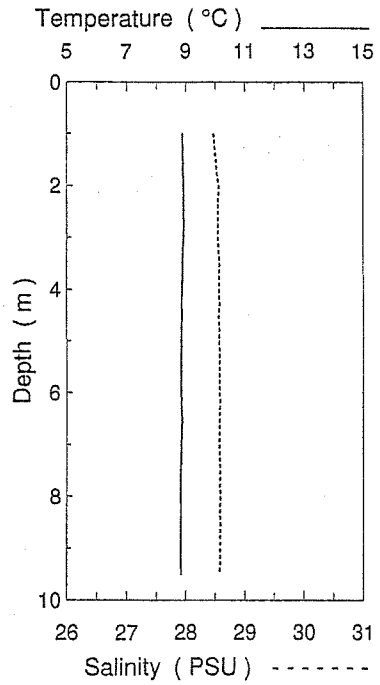
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	9.35	28.83	22.24
2	9.36	28.84	22.24
3	9.36	28.83	22.24
4	9.37	28.83	22.24
5	9.37	28.83	22.24
6	9.36	28.83	22.24
7	9.36	28.83	22.24
8	9.36	28.83	22.24
9	9.36	28.84	22.24
10	9.36	28.83	22.24
11	9.36	28.83	22.24
12	9.36	28.84	22.24
13	9.37	28.86	22.26
14	9.41	28.90	22.28
15	9.43	28.93	22.30
16	9.43	28.94	22.32
17	9.46	28.96	22.32
18	9.47	28.97	22.33
19	9.50	29.01	22.36
20	9.53	29.03	22.37
21	9.52	29.06	22.39
22	9.49	29.09	22.42
23	9.50	29.16	22.47
24	9.46	29.19	22.51
25	9.41	29.20	22.52
26	9.29	29.22	22.55

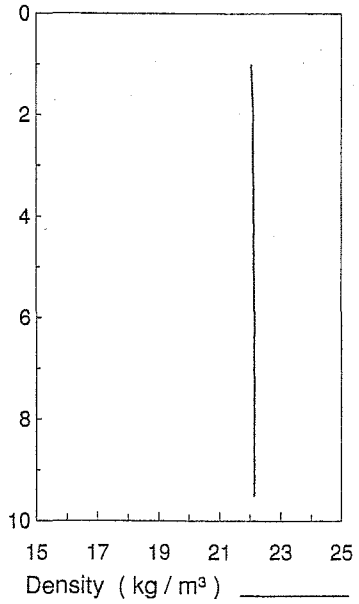
Survey 91-03 Station 8



Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	9.07	28.66	22.15
2	9.03	28.52	22.04
3	9.04	28.52	22.05
4	9.06	28.54	22.06
5	9.05	28.53	22.05
6	9.12	28.70	22.18
7	9.38	28.93	22.32
8	9.38	28.92	22.31
9	9.39	28.94	22.32
10	9.40	28.96	22.33
11	9.41	28.97	22.34
12	9.41	28.98	22.34
13	9.41	28.98	22.35
14	9.41	28.98	22.35
15	9.41	28.98	22.35
16	9.42	28.99	22.36
17	9.42	29.00	22.36
18	9.42	29.00	22.36
19	9.42	29.01	22.37
20	9.42	29.02	22.38
21	9.42	29.02	22.38
22	9.42	29.02	22.38
23	9.42	29.02	22.37

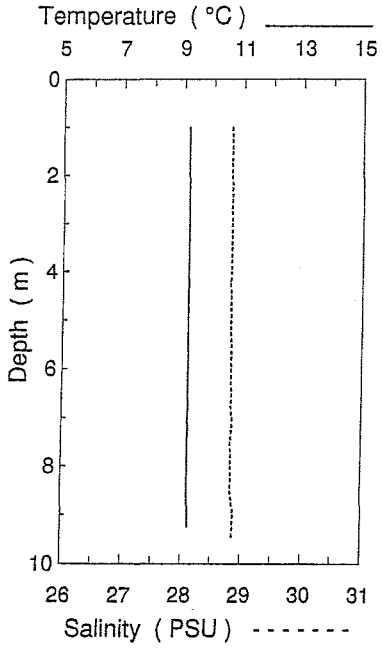
Survey 91-03 Station 9

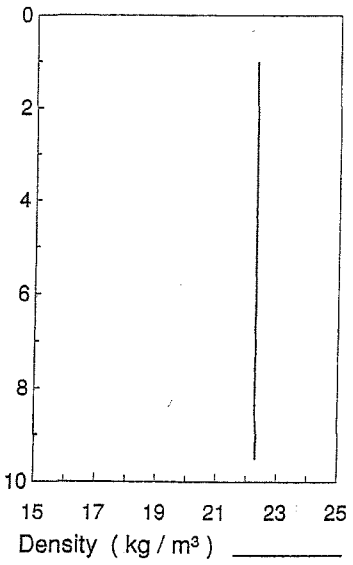




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	8.87	28.47	22.02
2	8.89	28.53	22.07
3	8.89	28.54	22.08
4	8.86	28.55	22.10
5	8.84	28.56	22.11
6	8.84	28.57	22.11
7	8.83	28.56	22.11
8	8.82	28.57	22.12
9	8.81	28.57	22.11
10	8.83	28.56	22.11

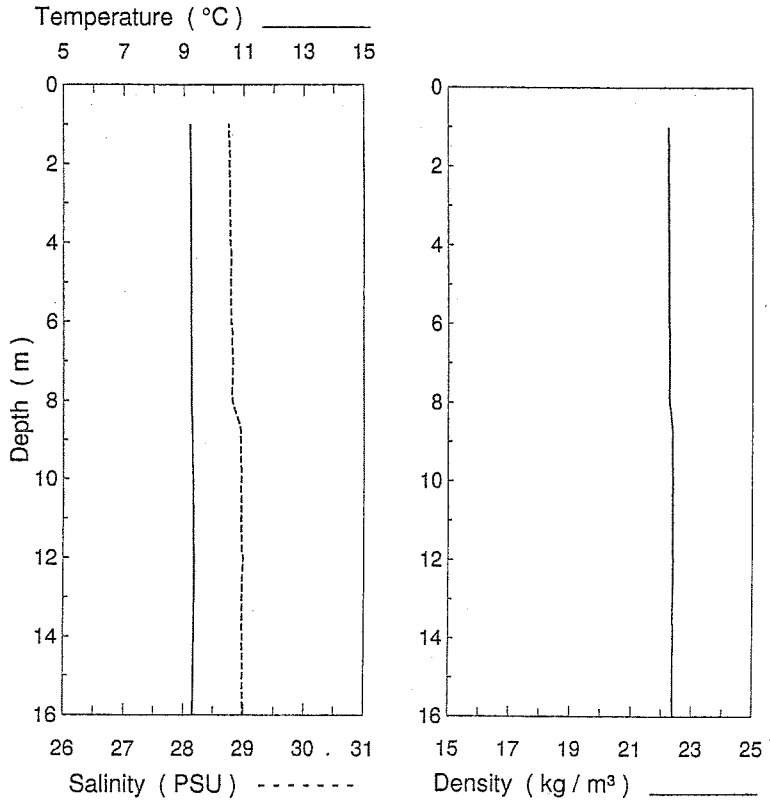
Survey 91-03 Station 10





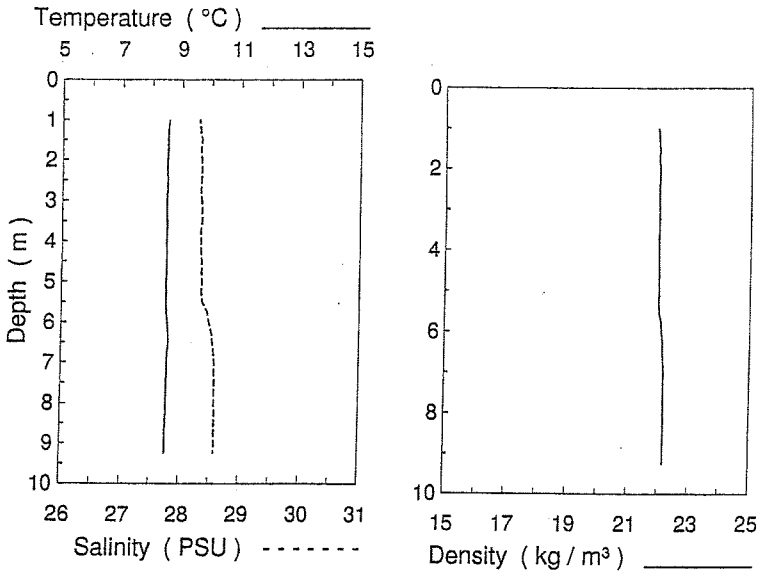
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	9.16	28.79	22.24
2	9.16	28.79	22.24
3	9.16	28.79	22.24
4	9.16	28.79	22.24
5	9.16	28.79	22.24
6	9.16	28.81	22.25
7	9.17	28.82	22.26
8	9.18	28.82	22.26
9	9.19	28.85	22.28

Survey 91-03 Station 11



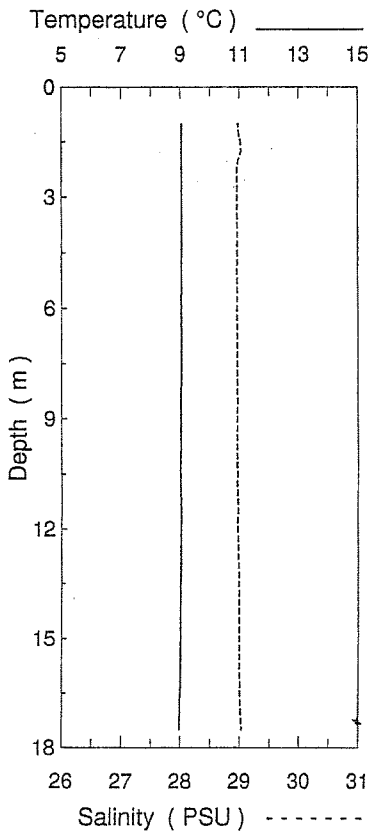
Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	9.18	28.74	22.19
2	9.20	28.75	22.20
3	9.21	28.75	22.20
4	9.21	28.76	22.21
5	9.22	28.77	22.21
6	9.22	28.78	22.22
7	9.23	28.80	22.23
8	9.23	28.81	22.24
9	9.27	28.94	22.34
10	9.29	28.94	22.34
11	9.30	28.94	22.34
12	9.32	28.96	22.35
13	9.33	28.96	22.34
14	9.31	28.96	22.35
15	9.31	28.97	22.35
16	9.30	28.97	22.36

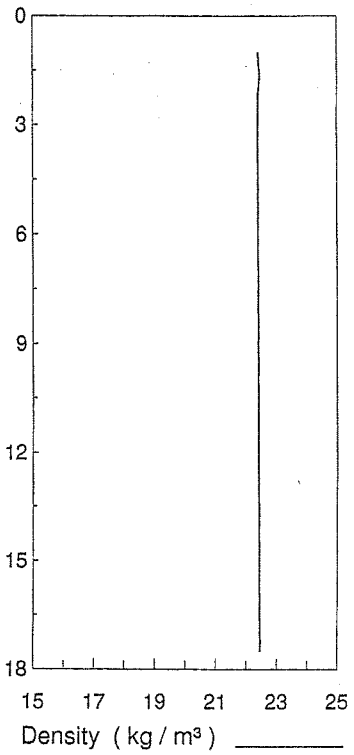
Survey 91-03 Station 12



Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	8.55	28.28	21.92
2	8.50	28.32	21.96
3	8.48	28.32	21.97
4	8.49	28.32	21.97
5	8.49	28.34	21.98
6	8.54	28.46	22.07
7	8.54	28.56	22.14
8	8.52	28.58	22.16
9	8.51	28.58	22.17

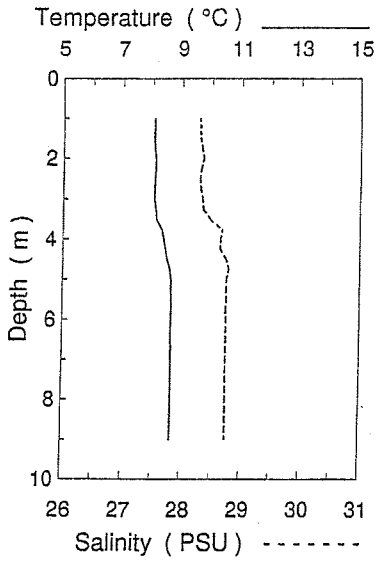
Survey 91-03 Station 13

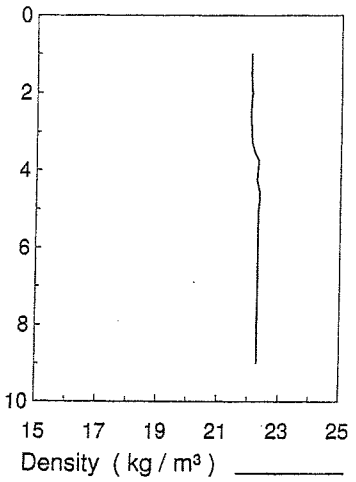




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	9.01	28.98	22.40
2	9.02	28.98	22.40
3	9.01	28.94	22.38
4	9.01	28.95	22.38
5	9.01	28.95	22.38
6	9.01	28.95	22.38
7	9.00	28.95	22.38
8	9.00	28.95	22.38
9	9.00	28.95	22.38
10	8.99	28.95	22.39
11	8.99	28.95	22.39
12	9.00	28.96	22.39
13	8.99	28.97	22.40
14	8.99	28.98	22.41
15	8.99	28.98	22.41
16	8.98	28.99	22.42
17	8.96	29.00	22.43

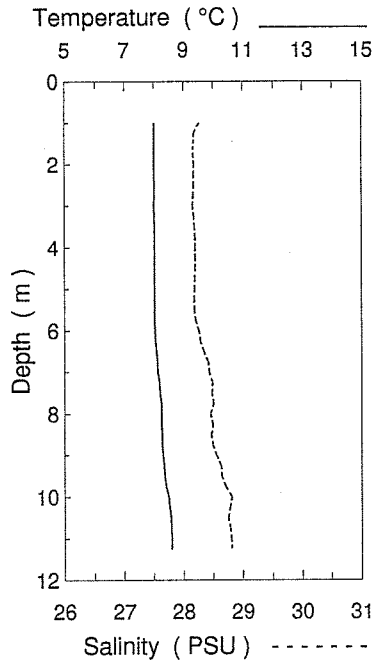
Survey 91-03 Station 14

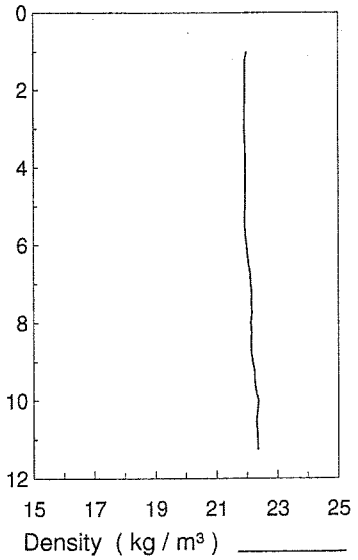




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	8.03	28.28	22.00
2	8.05	28.31	22.02
3	8.05	28.32	22.03
4	8.34	28.64	22.24
5	8.60	28.76	22.30
6	8.64	28.74	22.27
7	8.64	28.74	22.27
8	8.65	28.74	22.28
9	8.65	28.75	22.28

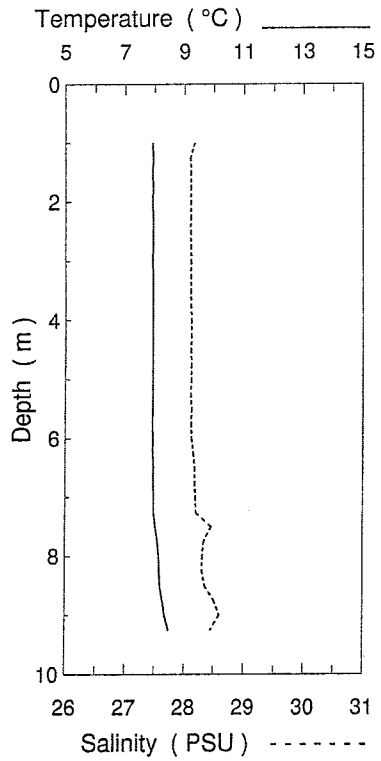
Survey 91-03 Station 17

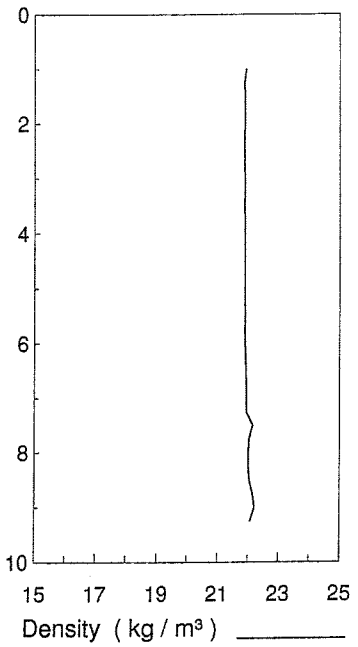




Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	8.00	28.25	21.98
2	7.99	28.18	21.92
3	7.99	28.16	21.91
4	8.01	28.19	21.93
5	8.01	28.18	21.92
6	8.03	28.24	21.97
7	8.13	28.42	22.10
8	8.24	28.47	22.12
9	8.29	28.54	22.17
10	8.45	28.73	22.30
11	8.57	28.78	22.32

Survey 91-03 Station 18





Depth (m)	Temp. (°C)	Sal. (PSU)	Density (kg / m³)
1	7.91	28.17	21.93
2	7.90	28.09	21.86
3	7.91	28.09	21.87
4	7.91	28.10	21.87
5	7.90	28.10	21.87
6	7.91	28.12	21.89
7	7.95	28.20	21.95
8	8.11	28.31	22.01
9	8.35	28.48	22.11

Appendix 5.4 Minimum, maximum and average of temperature (°C), salinity (PSU) and density(kg / m^3) of the 1991 CTD profiles by station.

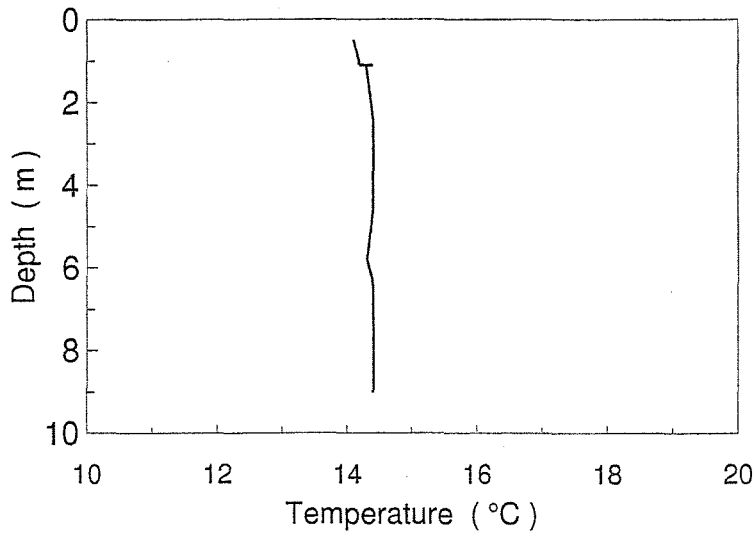
Survey	Station	Min. Temp. (°C)	Max. Temp. (°C)	Avg. Temp. (°C)	Min. Salinity (PSU)	Max. Salinity (PSU)	Avg. Salinity (PSU)	Min. Density (kg / m^3)	Max. Density (kg / m^3)	Avg. Density (kg / m^3)
Survey 91-01	**20-Jun-91 to 24-Jun-91**									
	01	8.86	13.60	10.76	28.16	28.92	28.75	21.10	22.38	21.94
	02	9.10	13.25	10.49	28.27	28.93	28.76	21.19	22.35	21.99
	04	8.58	13.53	11.19	28.05	28.95	28.63	21.04	22.43	21.77
	05	8.73	13.71	11.02	28.13	28.95	28.64	21.11	22.43	21.81
	06	9.29	13.69	10.71	28.21	28.89	28.66	21.15	22.30	21.88
	07	9.73	13.88	12.03	28.33	28.86	28.54	21.13	22.20	21.56
	08	8.95	14.04	10.45	28.45	29.64	29.05	21.12	22.78	22.23
	09	9.02	15.14	11.08	28.35	28.90	28.71	20.83	22.35	21.84
	11	9.14	13.04	12.11	28.23	28.85	28.41	21.15	22.29	21.45
	12	13.04	13.25	13.12	28.21	28.25	28.23	21.10	21.16	21.13
	13	9.41	13.69	12.36	28.39	29.53	28.69	21.15	22.73	21.62
	14	11.04	13.38	12.80	27.96	28.69	28.26	20.88	21.94	21.21
	15	8.25	13.13	11.12	28.11	29.19	28.51	21.06	22.68	21.69
	17	10.60	13.11	12.51	28.44	28.75	28.65	21.44	21.98	21.57
	18	13.37	13.95	13.49	28.15	28.44	28.36	20.96	21.25	21.16
	19	9.55	12.99	11.76	28.44	28.85	28.77	21.54	22.22	21.79
	21	9.11	14.39	11.36	27.81	29.15	28.49	20.62	22.45	21.63
	23	12.30	14.44	13.61	28.20	28.66	28.49	20.89	21.48	21.23
	24	9.47	14.21	11.41	28.22	28.86	28.71	20.87	22.24	21.80
	25	10.80	14.93	13.13	28.35	28.85	28.61	20.98	22.01	21.40
	26	11.00	13.87	11.73	28.43	28.77	28.71	21.24	21.92	21.75
	Average:	**9.97**	**13.77**	**11.82**	**28.23**	**28.90**	**21.64**	**21.07**	**22.17**	**21.64**

Survey	Station	Min. Temp. (°C)	Max. Temp. (°C)	Avg. Temp. (°C)	Min. Salinity (PSU)	Max. Salinity (PSU)	Avg. Salinity (PSU)	Min. Density (kg / m^3)	Max. Density (kg / m^3)	Avg. Density (kg / m^3)
Survey 91-02	**20-Sep-91 to 27-Sep-91**									
	01	15.60	16.52	16.27	27.03	28.33	27.96	19.52	20.72	20.29
	02	15.57	16.46	16.17	26.31	28.51	27.75	18.97	20.85	20.15
	03	15.35	15.41	15.38	27.98	28.19	28.17	20.50	20.65	20.64
	04	14.45	15.86	15.53	27.48	28.56	28.23	20.01	21.13	20.65
	05	14.62	15.83	15.43	27.13	28.53	28.00	19.47	21.07	20.49
	06	15.68	15.94	15.85	26.87	28.29	27.79	19.52	20.67	20.24
	07	14.99	15.07	15.04	27.81	28.35	28.29	20.43	20.86	20.80
	08	15.10	15.21	15.17	27.71	28.26	28.18	20.32	20.77	20.68
	09	15.01	15.24	15.14	27.80	28.37	28.29	20.39	20.87	20.78
	10	14.92	15.10	15.01	27.65	28.48	28.23	20.29	20.96	20.76
	11	14.81	15.08	14.98	27.53	28.33	28.08	20.24	20.84	20.65
	12	14.39	15.05	14.88	28.00	28.56	28.36	20.60	21.14	20.89
	13	12.82	15.18	14.73	27.69	28.87	28.42	20.31	21.68	20.96
	14	5.23	15.36	14.12	28.04	30.17	28.54	20.54	23.83	21.14
	15	15.71	16.06	15.86	28.03	28.22	28.20	20.38	20.60	20.55
	16	15.12	16.00	15.54	28.21	28.35	28.25	20.60	20.83	20.66
	17	15.09	15.80	15.68	28.22	28.31	28.24	20.28	20.80	20.63
	18	15.82	16.06	15.94	27.97	28.25	28.15	20.32	20.61	20.50
	19	15.95	16.09	16.02	27.92	28.19	28.03	20.30	20.52	20.39
	20	15.94	16.01	15.97	28.06	28.26	28.11	20.42	20.58	20.46
	21	15.56	15.93	15.83	28.17	28.28	28.20	20.52	20.65	20.56
	22	15.63	15.68	15.67	28.28	28.31	28.29	20.66	20.68	20.66
	23	5.97	15.67	13.67	28.04	30.01	28.59	20.64	23.62	21.24
	24	15.15	15.46	15.33	28.02	28.34	28.28	20.50	20.81	20.73
	25	11.47	15.88	15.34	27.67	29.10	28.28	20.47	22.10	20.72
	26	7.91	15.98	15.16	27.51	29.87	28.33	20.24	23.28	20.78
	27	15.89	16.16	15.99	28.18	28.32	28.21	20.48	20.59	20.54
	Average:	**14.07**	**15.71**	**15.40**	**27.75**	**28.58**	**20.65**	**20.26**	**21.17**	**20.65**

Survey	Station	Min. Temp. (°C)	Max. Temp. (°C)	Avg. Temp. (°C)	Min. Salinity (PSU)	Max. Salinity (PSU)	Avg. Salinity (PSU)	Min. Density (kg / m^3)	Max. Density (kg / m^3)	Avg. Density (kg / m^3)
Survey 91-03	**06-Nov-91 to 11-Nov-91**									
	01	9.49	9.52	9.51						
	03	8.90	9.63	9.42						
	04	9.12	9.62	9.46						
	05	9.41	9.54	9.48						
	06	9.35	9.64	9.54	28.63	28.96	28.86	22.08	22.30	22.23
	07	9.32	9.54	9.41	28.82	29.22	28.94	22.23	22.55	22.31
	08	9.03	9.42	9.32	28.50	29.02	28.87	22.03	22.38	22.28
	09	8.81	8.91	8.85	28.46	28.57	28.55	22.02	22.12	22.10
	10	9.15	9.20	9.16	28.78	28.86	28.81	22.23	22.29	22.25
	11	9.18	9.33	9.26	28.73	28.98	28.86	22.19	22.36	22.28
	12	8.48	8.58	8.51	28.28	28.58	28.42	21.92	22.17	22.04
	13	8.95	9.02	9.00	28.94	29.02	28.96	22.38	22.45	22.40
	14	8.02	8.65	8.42	28.28	28.78	28.60	21.99	22.32	22.20
	17	7.98	8.57	8.16	28.15	28.80	28.38	21.90	22.35	22.06
	18	7.90	8.46	7.98	28.08	28.58	28.18	21.86	22.20	21.93
	Average:	**8.87**	**9.18**	**9.03**	**28.51**	**28.85**	**22.19**	**22.08**	**22.32**	**22.19**

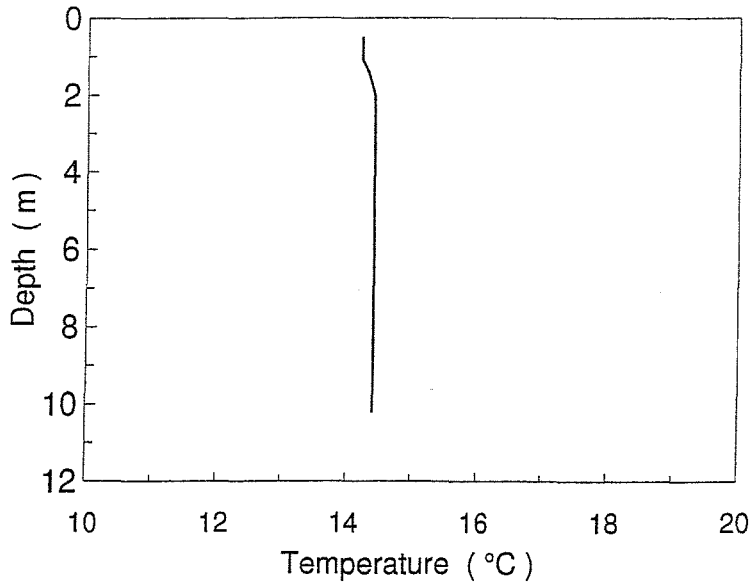
Appendix 6.1 Cardigan, PEI temperature (°C) depth (m) profiles - 1991.

1991 Cardigan, PEI Station 15



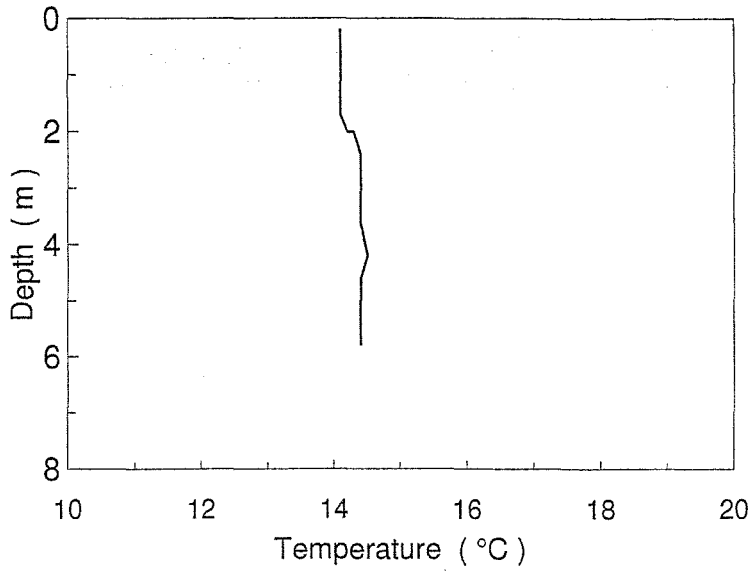
Depth (m)	Temp. (°C)
1	14.3
2	14.4
3	14.4
4	14.4
5	14.4
6	14.4
7	14.4
8	14.4
9	14.4

1991 Cardigan, PEI Station 16



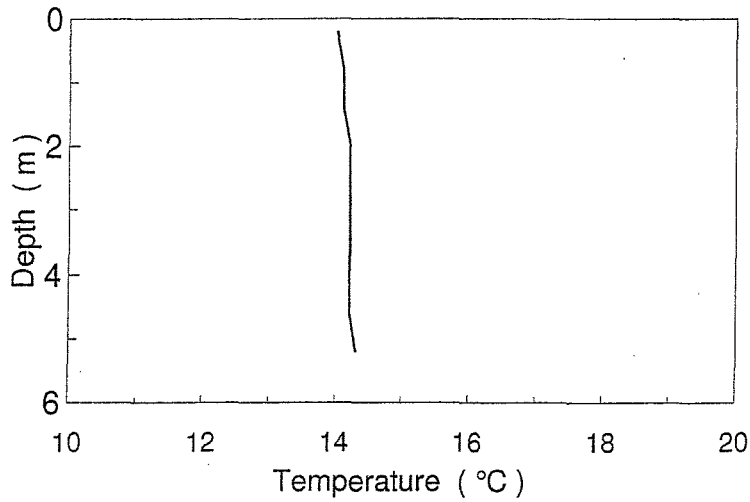
Depth (m)	Temp. (°C)
1	14.2
2	14.4
3	14.4
4	14.4
5	14.4
6	14.4
7	14.4
8	14.4
9	14.4
10	14.4

1991 Cardigan, PEI Station 17



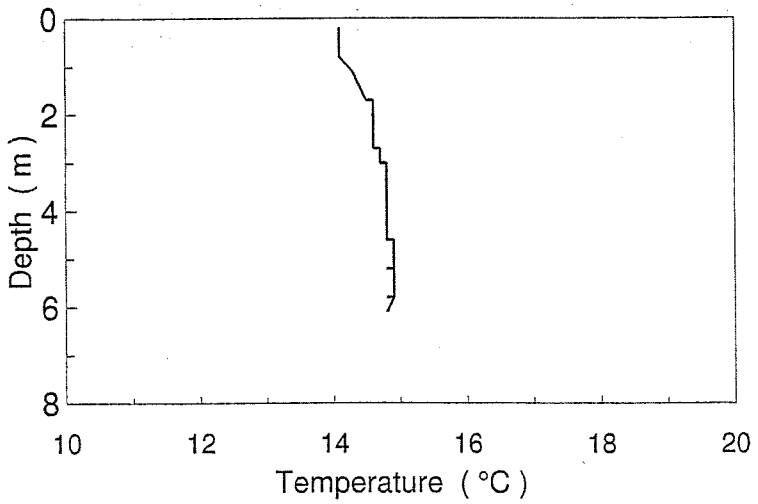
Depth (m)	Temp. (°C)
0	14.1
1	14.1
2	14.3
3	14.4
4	14.5
5	14.4
6	14.4

1991 Cardigan, PEI Station 18



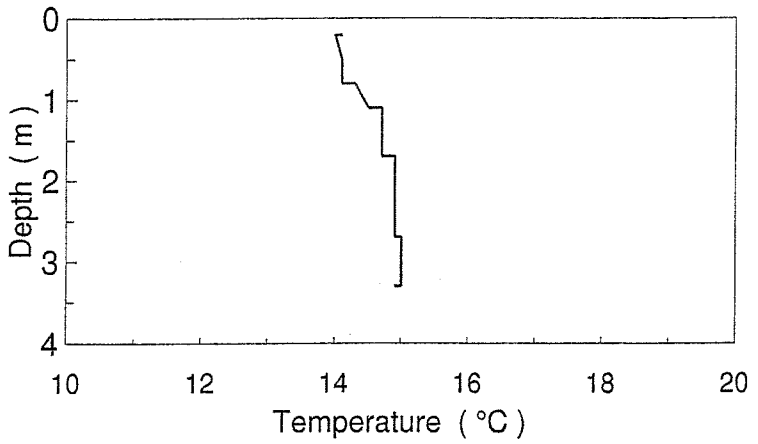
Depth (m)	Temp. (°C)
0	14.0
1	14.1
2	14.2
3	14.2
4	14.2
5	14.3

1991 Cardigan, PEI Station 19



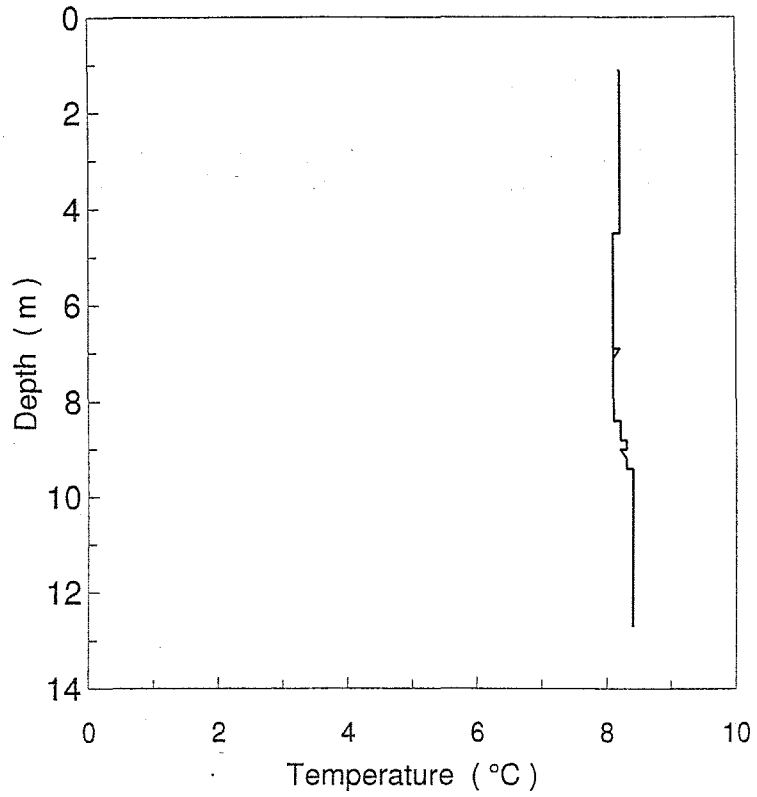
Depth (m)	Temp. (°C)
0	14.1
1	14.2
2	14.6
3	14.7
4	14.8
5	14.9
6	14.9

1991 Cardigan, PEI Station 20



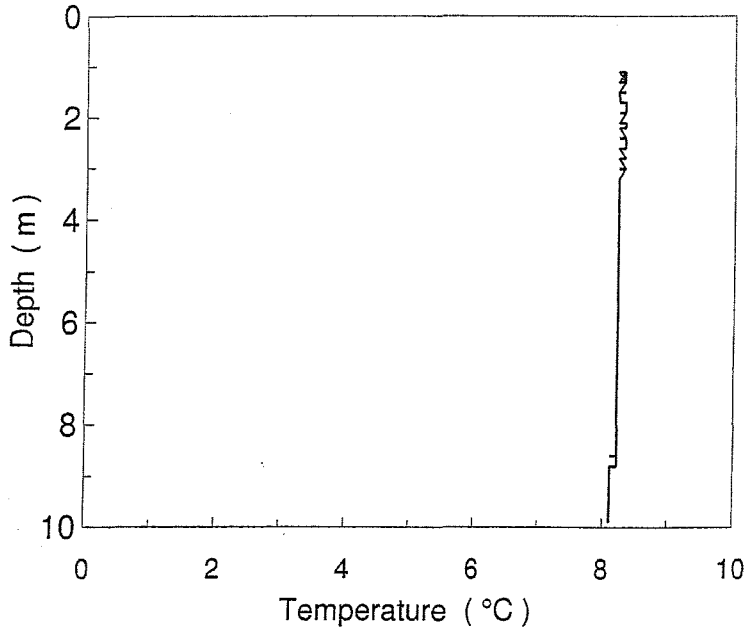
Depth (m)	Temp. (°C)
0	14.1
1	14.3
2	14.9
3	15.0

1991 Cardigan, PEI Station 26



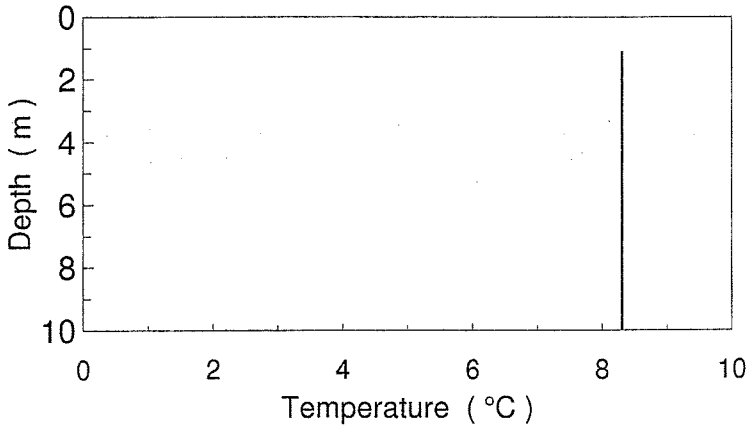
Depth (m)	Temp. (°C)
1	8.2
2	8.2
3	8.2
4	8.2
5	8.1
6	8.1
7	8.1
8	8.1
9	8.3
10	8.4
11	8.4
12	8.4
13	8.4

1991 Cardigan, PEI Station 27



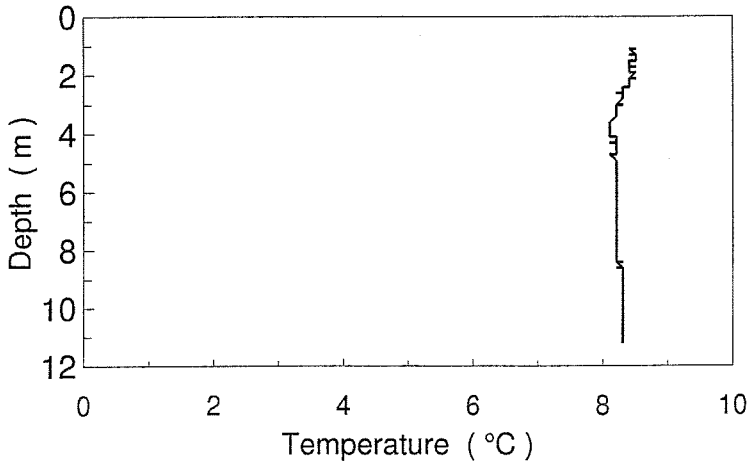
Depth (m)	Temp. (°C)
1	8.3
2	8.3
3	8.2
4	8.2
5	8.2
6	8.2
7	8.2
8	8.2
9	8.1
10	8.1

1991 Cardigan, PEI Station 28



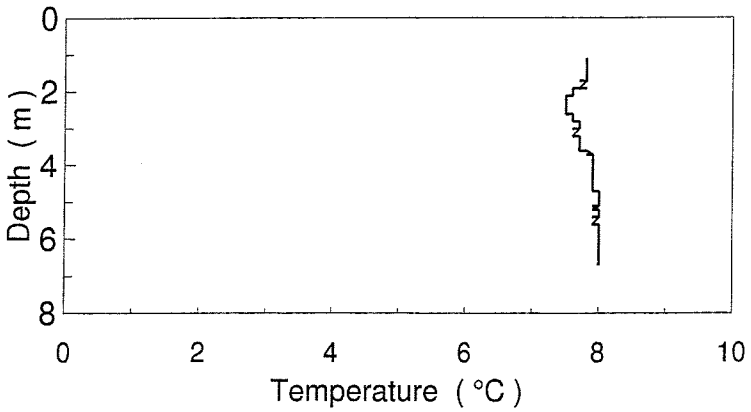
Depth (m)	Temp. (°C)
1	8.3
2	8.3
3	8.3
4	8.3
5	8.3
6	8.3
7	8.3
8	8.3
9	8.3
10	8.3

1991 Cardigan, PEI Station 29



Depth (m)	Temp. (°C)
1	8.5
2	8.4
3	8.2
4	8.1
5	8.2
6	8.2
7	8.2
8	8.2
9	8.3
10	8.3
11	8.3

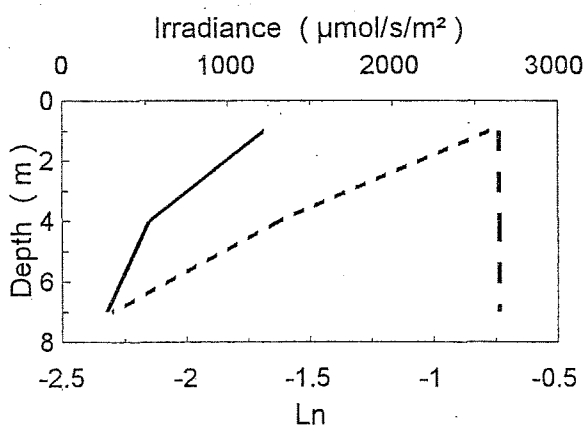
1991 Cardigan, PEI Station 30



Depth (m)	Temp. (°C)
1	7.8
2	7.7
3	7.6
4	7.9
5	8.0
7	8.0

Appendix 7.1 Cardigan, PEI irradiance (µmol / s / m²) profiles - 1991.

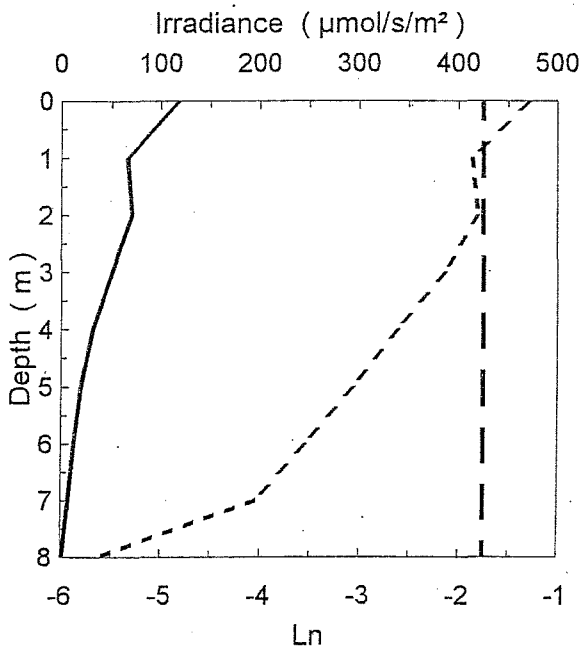
1991 Cardigan, PEI Station 10



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
1	1213	2641	-0.78
4	517	2641	-1.63
7	264	2641	-2.30

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

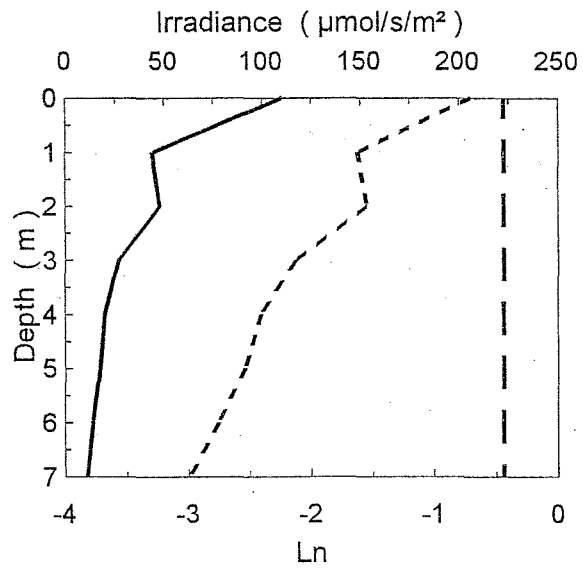
1991 Cardigan, PEI Station 15



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	118	425	-1.28
1	66	425	-1.86
2	70	425	-1.80
3	50	425	-2.13
4	31	425	-2.61
5	20	425	-3.06
6	12	425	-3.54
7	7	425	-4.04
8	2	425	-5.64

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

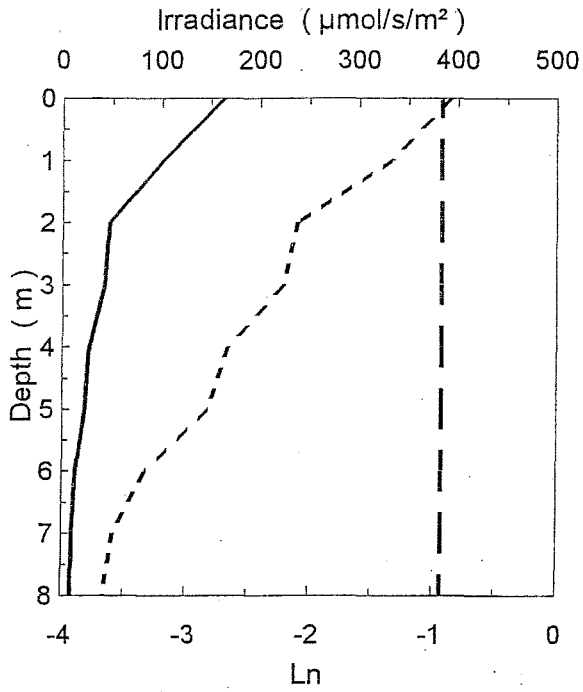
1991 Cardigan, PEI Station 16



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	110	223	-0.70
1	44	223	-1.63
2	47	223	-1.55
3	27	223	-2.12
4	20	223	-2.41
5	18	223	-2.54
6	14	223	-2.75
7	11	223	-3.00

_____ Irradiance - Water (µmol/s/m²) - - - - Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

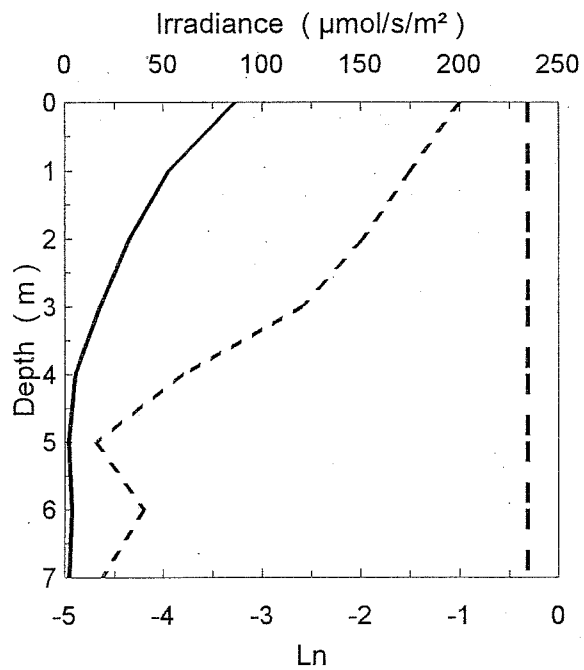
1991 Cardigan, PEI Station 17



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	163	384	-0.86
1	101	384	-1.33
2	47	384	-2.10
3	42	384	-2.21
4	27	384	-2.66
5	23	384	-2.82
6	14	384	-3.34
7	11	384	-3.59
8	10	384	-3.66

_____ Irradiance - Water (µmol/s/m²) - - - - Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

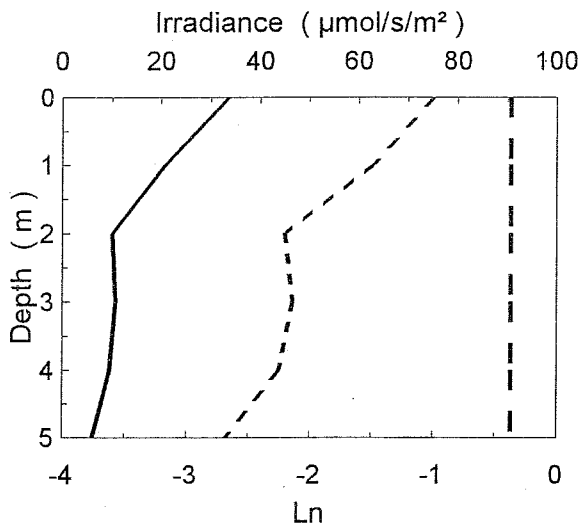
1991 Cardigan, PEI Station 18



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	86	234	-1.00
1	52	234	-1.50
2	32	234	-1.98
3	18	234	-2.59
4	5	234	-3.81
5	2	234	-4.69
6	4	234	-4.20
7	2	234	-4.62

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

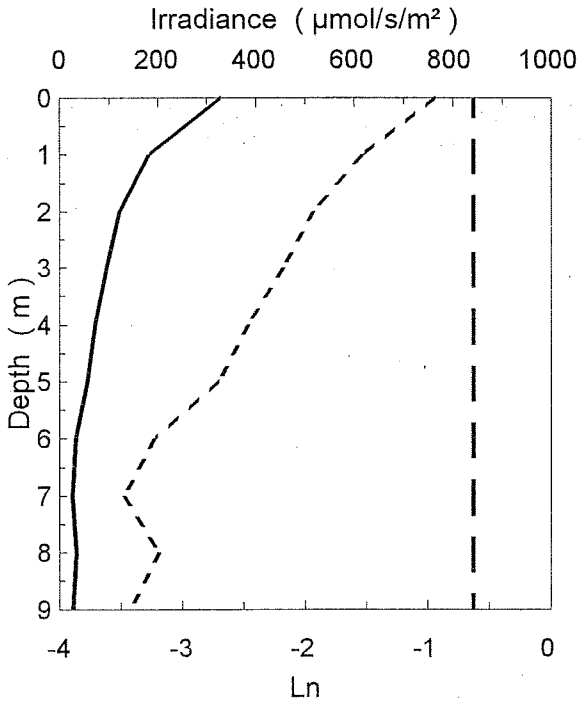
1991 Cardigan, PEI Station 19



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	34	91	-0.99
1	21	91	-1.48
2	10	91	-2.20
3	11	91	-2.14
4	10	91	-2.25
5	6	91	-2.68

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

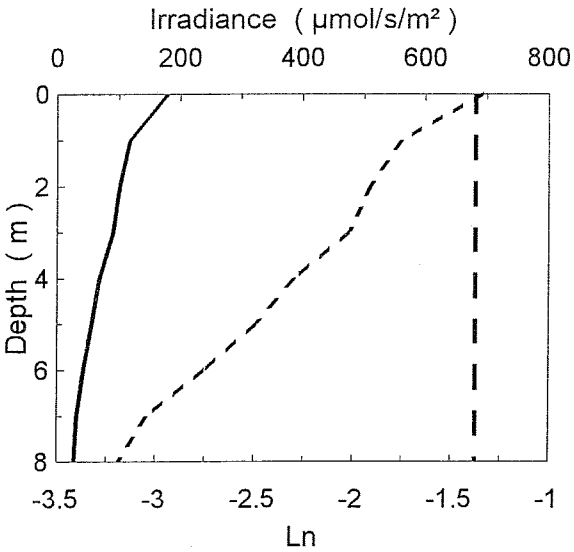
1991 Cardigan, PEI Station 20



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	328	842	-0.94
1	181	842	-1.53
2	122	842	-1.94
3	96	842	-2.18
4	72	842	-2.46
5	56	842	-2.70
6	33	842	-3.23
7	26	842	-3.47
8	35	842	-3.19
9	28	842	-3.42

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

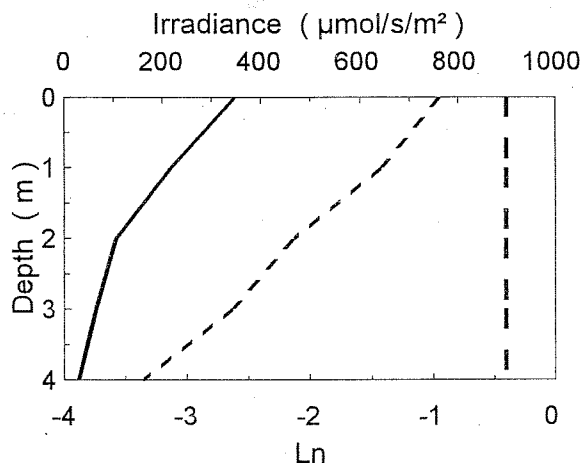
1991 Cardigan, PEI Station 21



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	179	681	-1.34
1	118	681	-1.75
2	101	681	-1.91
3	91	681	-2.01
4	69	681	-2.30
5	56	681	-2.49
6	43	681	-2.76
7	32	681	-3.05
8	28	681	-3.19

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

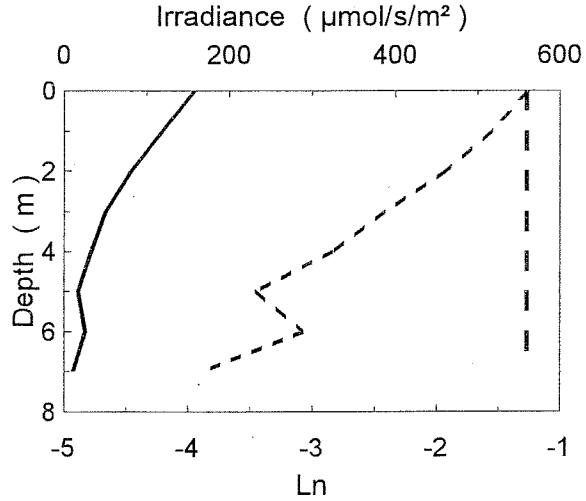
1991 Cardigan, PEI Station 22



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	347	898	-0.95
1	217	898	-1.42
2	106	898	-2.14
3	65	898	-2.62
4	31	898	-3.36

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

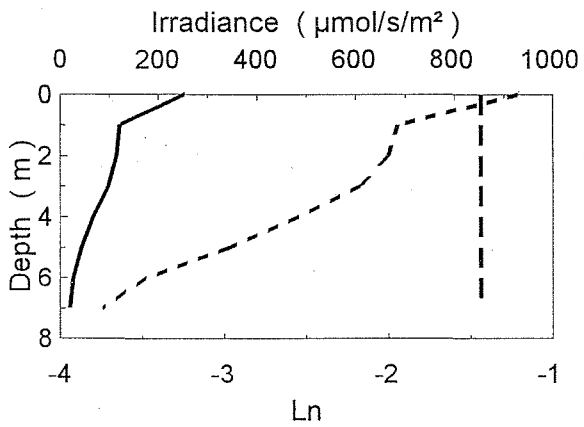
1991 Cardigan, PEI Station 23



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	158	559	-1.27
1	119	559	-1.55
2	82	559	-1.92
3	50	559	-2.42
4	33	559	-2.84
5	18	559	-3.46
6	26	559	-3.08
7	11	559	-3.89

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

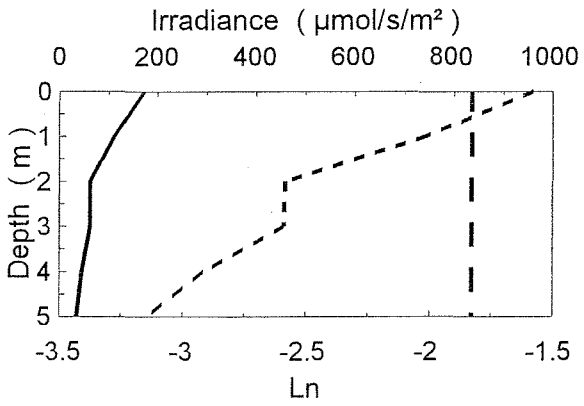
1991 Cardigan, PEI Station 24



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	253	853	-1.22
1	122	853	-1.95
2	115	853	-2.01
3	97	853	-2.17
4	66	853	-2.55
5	44	853	-2.98
6	26	853	-3.48
7	20	853	-3.75

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

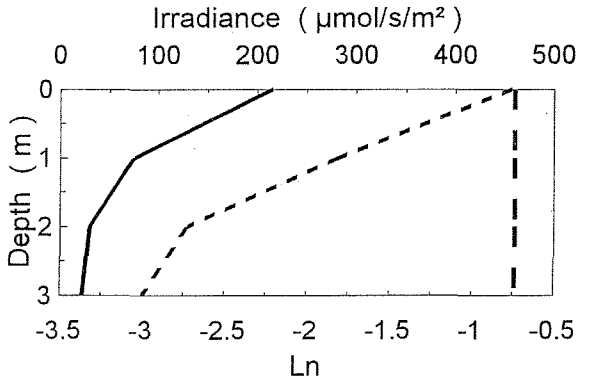
1991 Cardigan, PEI Station 25



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	172	835	-1.58
1	111	835	-2.02
2	63	835	-2.58
3	63	835	-2.59
4	45	835	-2.92
5	36	835	-3.15

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

1991 Cardigan, PEI Station 26

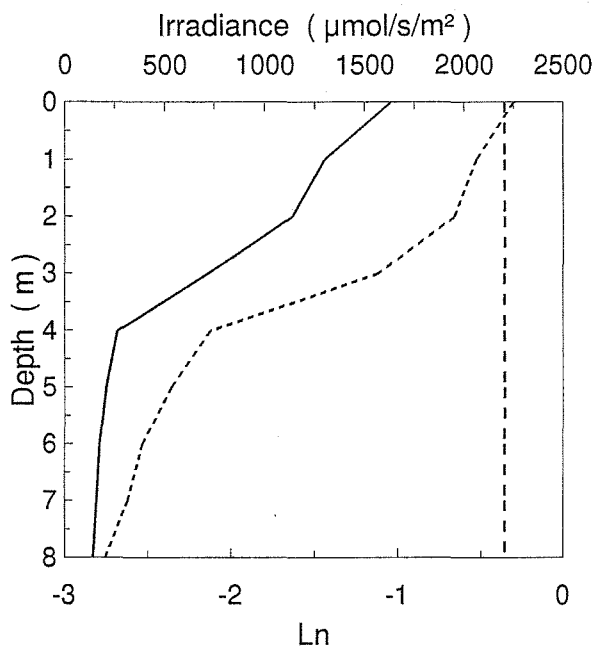


Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	215	460	-0.76
1	75	460	-1.81
2	30	460	-2.73
3	23	460	-3.00

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

Appendix 7.2 Survey 91-01 irradiance (µmol / s / m²) profiles.

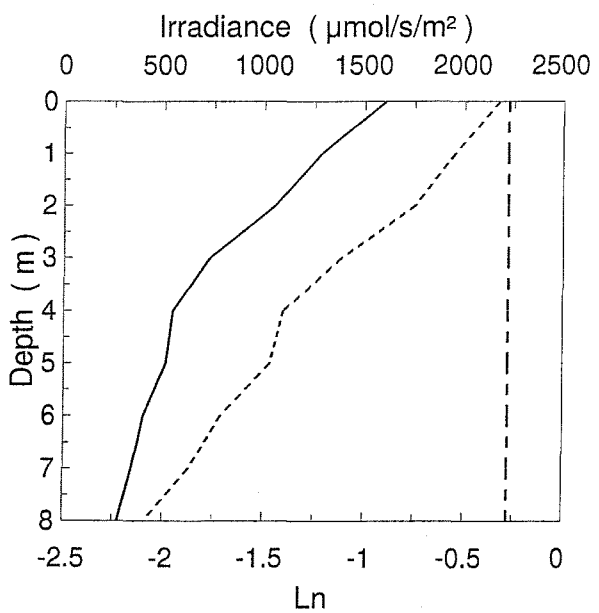
Survey 91-01 Station 1



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	1632	2202	-0.30
1	1298	2202	-0.53
2	1137	2202	-0.66
3	719	2202	-1.12
4	264	2202	-2.12
5	208	2202	-2.36
6	175	2202	-2.54
7	160	2202	-2.62
8	140	2202	-2.76

_____ Irradiance - Water (µmol/s/m²) ____ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

Survey 91-01 Station 2

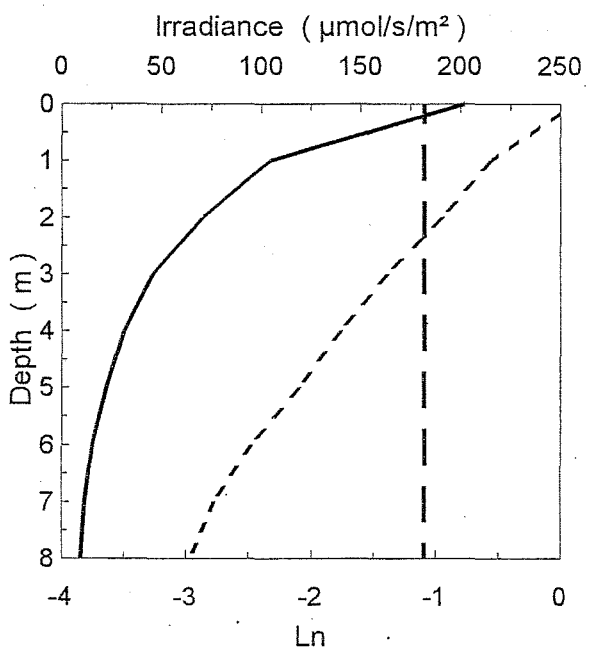


Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	1602	2222	-0.33
1	1284	2222	-0.55
2	1052	2222	-0.75
3	727	2222	-1.12
4	546	2222	-1.40
5	511	2222	-1.47
6	400	2222	-1.71
7	342	2222	-1.87
8	274	2222	-2.09
9	232	2222	-2.26

_____ Irradiance - Water (µmol/s/m²) ____ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

Appendix 7.3 Survey 91-02 irradiance (µmol / s / m²) profiles.

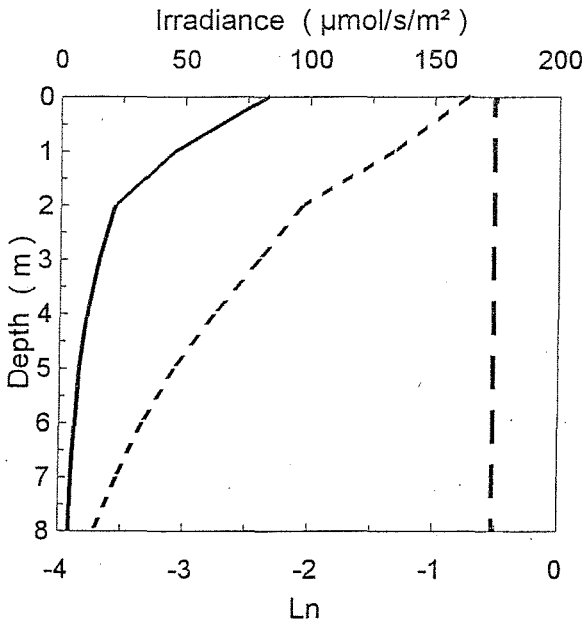
Survey 91-02 Station 1



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	202	182	0.11
1	105	182	-0.55
2	71	182	-0.95
3	45	182	-1.39
4	31	182	-1.76
5	22	182	-2.10
6	15	182	-2.48
7	11	182	-2.78
8	9	182	-2.97

——— Irradiance - Water (µmol/s/m²) - - - - Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

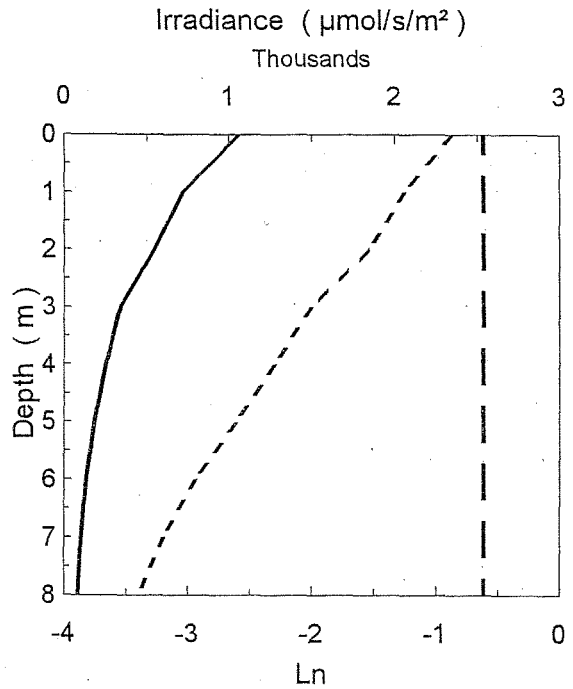
Survey 91-02 Station 2



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	83	174	-0.74
1	46	174	-1.33
2	22	174	-2.06
3	16	174	-2.40
4	11	174	-2.76
5	8	174	-3.09
6	6	174	-3.33
7	5	174	-3.53
8	4	174	-3.71

——— Irradiance - Water (µmol/s/m²) - - - - Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

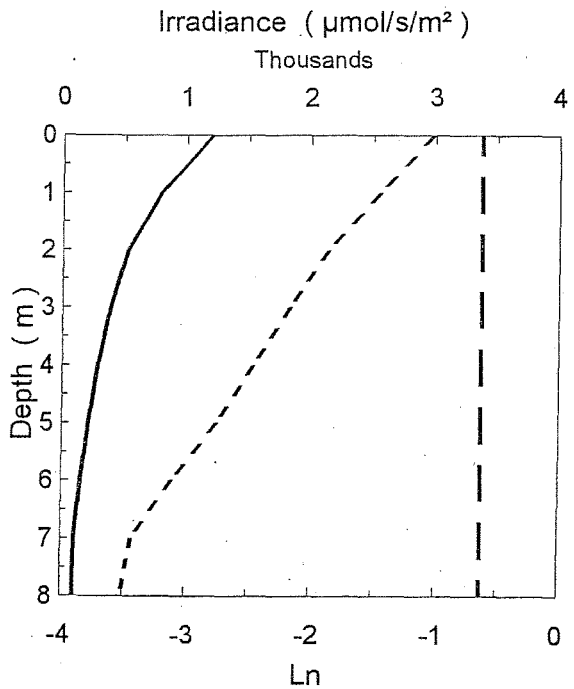
Survey 91-02 Station 3



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	1062	2535	-0.87
1	720	2535	-1.26
2	544	2535	-1.54
3	342	2535	-2.00
4	255	2535	-2.30
5	186	2535	-2.61
6	134	2535	-2.94
7	104	2535	-3.20
8	85	2535	-3.40

——— Irradiance - Water (µmol/s/m²) - - - - Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

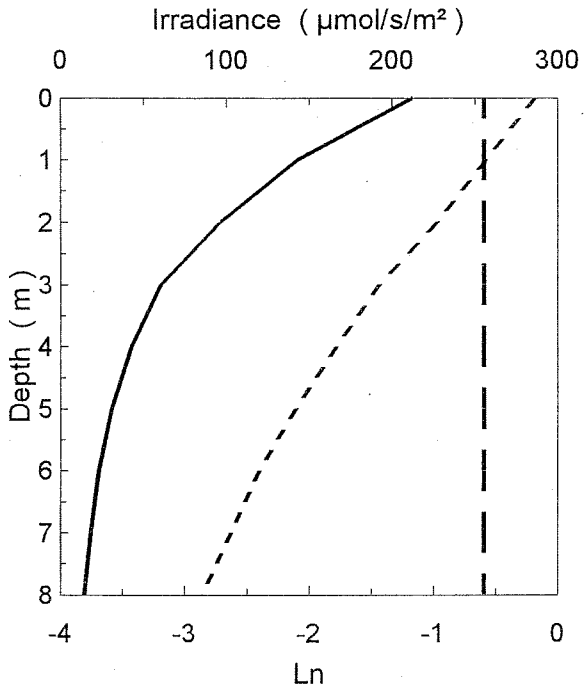
Survey 91-02 Station 4



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	1209	3367	-1.02
1	790	3367	-1.45
2	520	3367	-1.87
3	385	3367	-2.17
4	289	3367	-2.46
5	216	3367	-2.75
6	150	3367	-3.11
7	108	3367	-3.44
8	100	3367	-3.51

——— Irradiance - Water (µmol/s/m²) - - - - Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

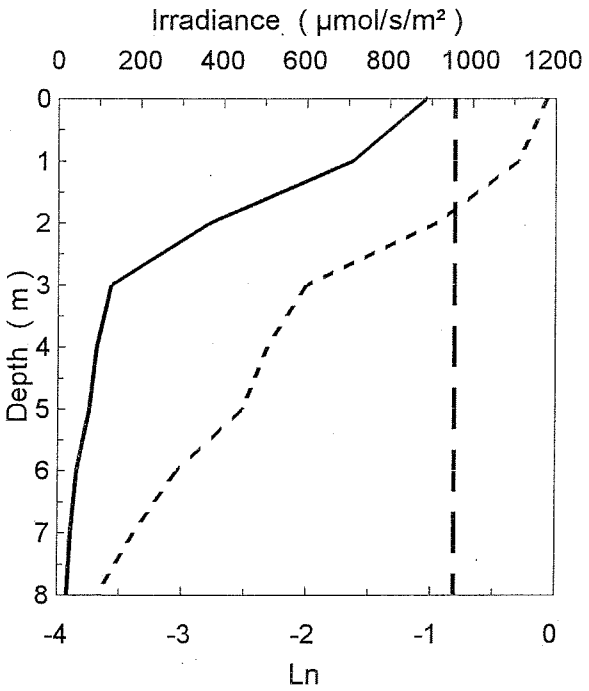
Survey 91-02 Station 5



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	212	255	-0.19
1	143	255	-0.58
2	96	255	-0.98
3	60	255	-1.44
4	43	255	-1.78
5	31	255	-2.11
6	23	255	-2.41
7	18	255	-2.63
8	15	255	-2.86

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

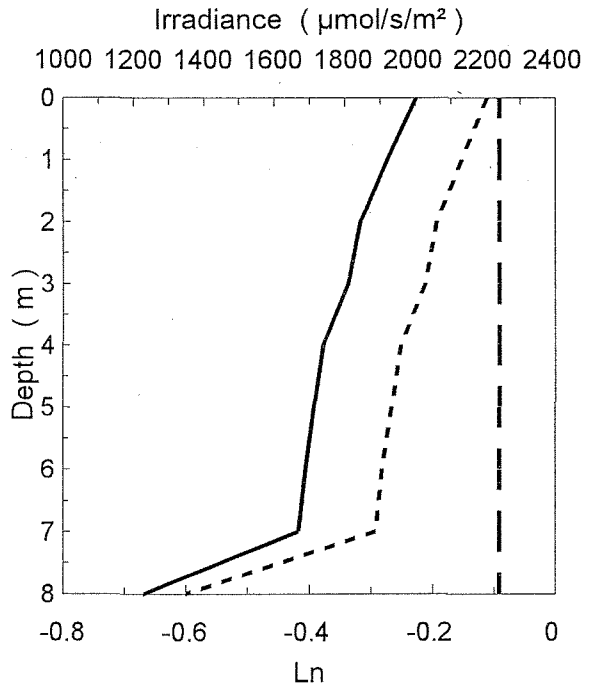
Survey 91-02 Station 6



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	886	955	-0.07
1	708	955	-0.30
2	365	955	-0.96
3	129	955	-2.01
4	94	955	-2.32
5	77	955	-2.52
6	45	955	-3.05
7	32	955	-3.38
8	24	955	-3.68

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

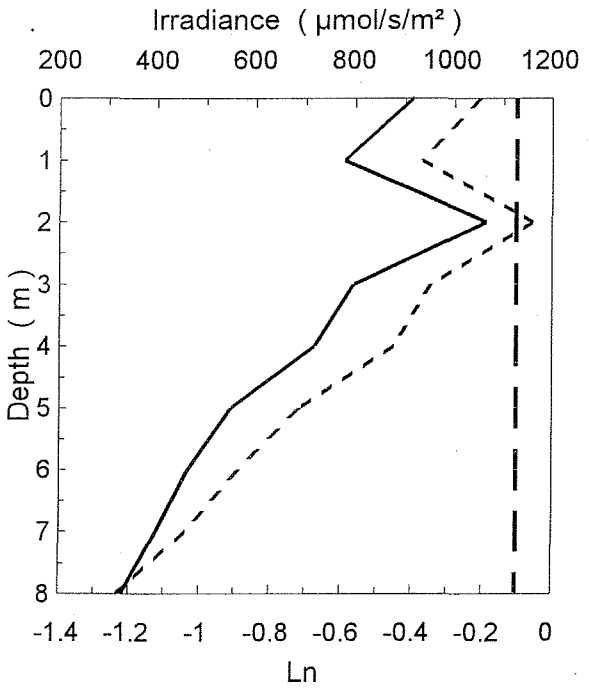
Survey 91-02 Station 7



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	2001	2238	-0.11
1	1920	2238	-0.15
2	1843	2238	-0.19
3	1809	2238	-0.21
4	1738	2238	-0.25
5	1713	2238	-0.27
6	1688	2238	-0.28
7	1669	2238	-0.29
8	1227	2238	-0.60

_____ Irradiance - Water (µmol/s/m²) - - - - Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

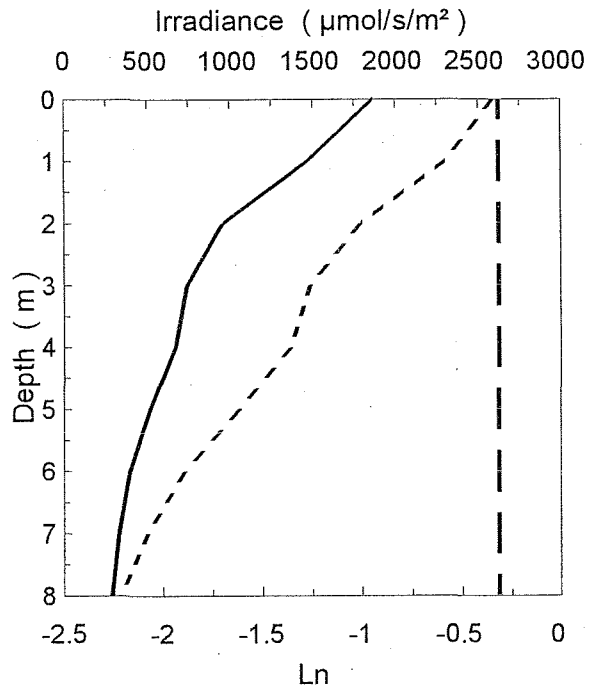
Survey 91-02 Station 8



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	916	1126	-0.21
1	776	1126	-0.37
2	1065	1126	-0.06
3	796	1126	-0.35
4	718	1126	-0.45
5	549	1126	-0.72
6	462	1126	-0.89
7	398	1126	-1.04
8	328	1126	-1.23

_____ Irradiance - Water (µmol/s/m²) - - - - Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

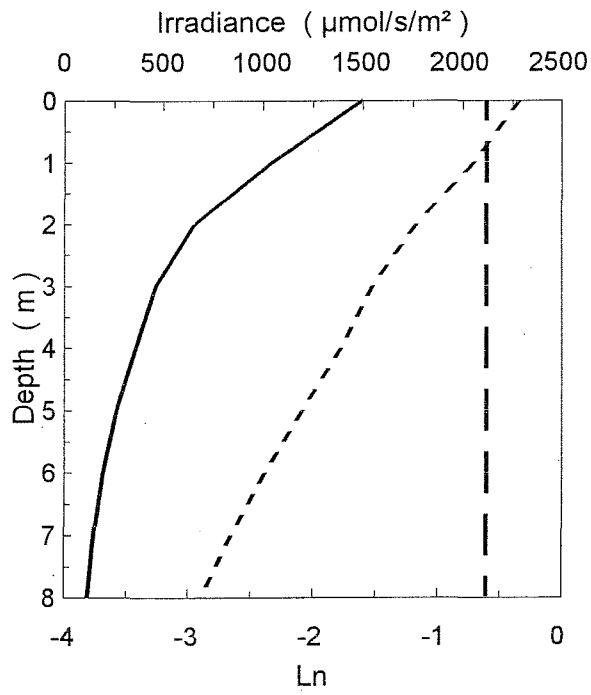
Survey 91-02 Station 9



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	1862	2623	-0.34
1	1463	2623	-0.58
2	956	2623	-1.01
3	742	2623	-1.26
4	672	2623	-1.36
5	519	2623	-1.62
6	394	2623	-1.89
7	328	2623	-2.08
8	285	2623	-2.22

_____ Irradiance - Water (µmol/s/m²) - - - - Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

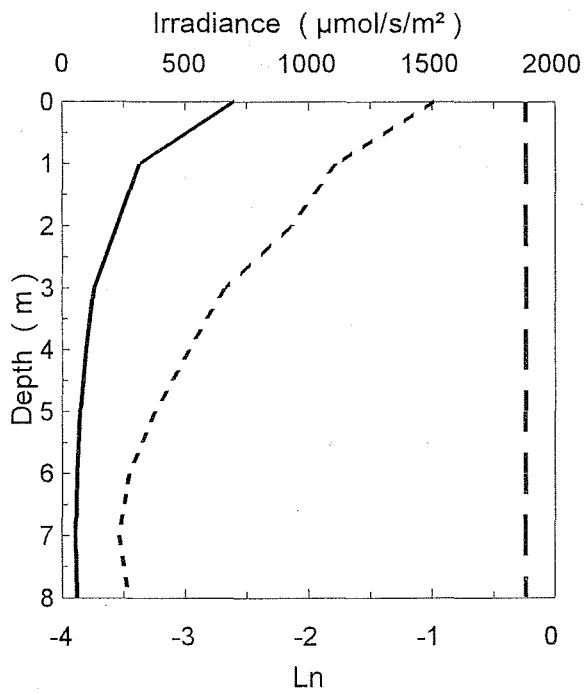
Survey 91-02 Station 10



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	1494	2118	-0.35
1	1037	2118	-0.71
2	655	2118	-1.17
3	460	2118	-1.53
4	359	2118	-1.78
5	262	2118	-2.09
6	194	2118	-2.39
7	148	2118	-2.66
8	117	2118	-2.90

_____ Irradiance - Water (µmol/s/m²) - - - - Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

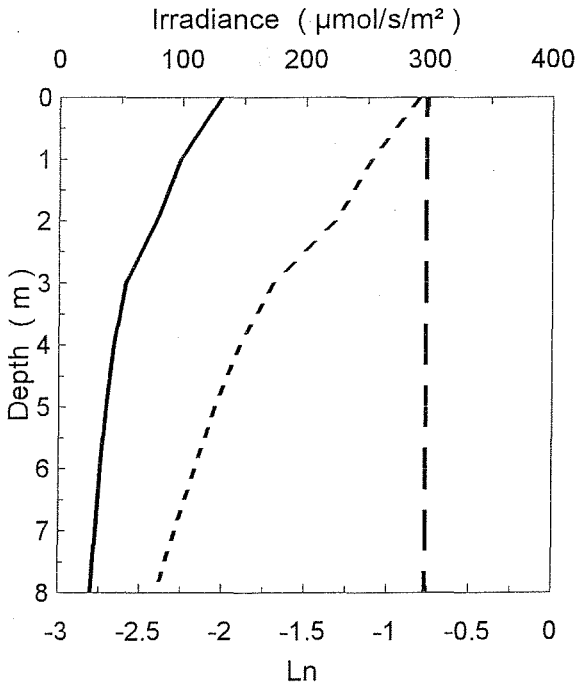
Survey 91-02 Station 11



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	699	1878	-0.99
1	314	1878	-1.79
2	221	1878	-2.14
3	128	1878	-2.68
4	97	1878	-2.97
5	73	1878	-3.24
6	59	1878	-3.46
7	55	1878	-3.54
8	59	1878	-3.46

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

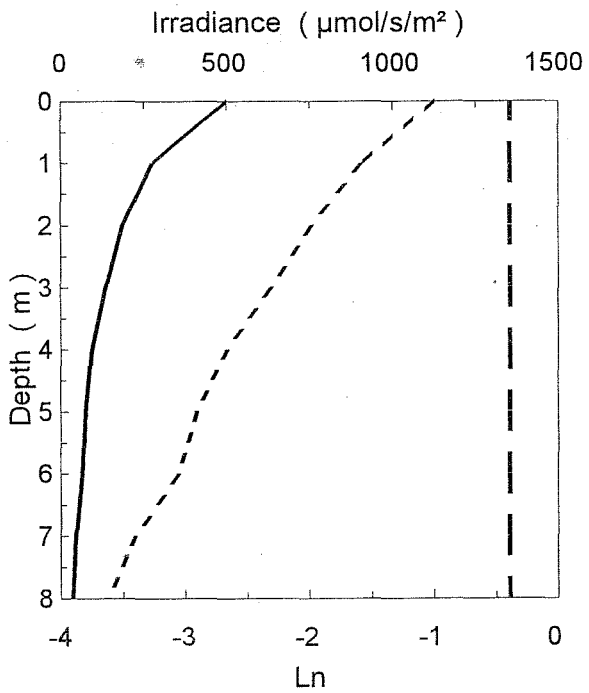
Survey 91-02 Station 16



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	132	297	-0.81
1	99	297	-1.10
2	79	297	-1.32
3	54	297	-1.70
4	45	297	-1.90
5	38	297	-2.05
6	34	297	-2.17
7	30	297	-2.29
8	27	297	-2.40

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

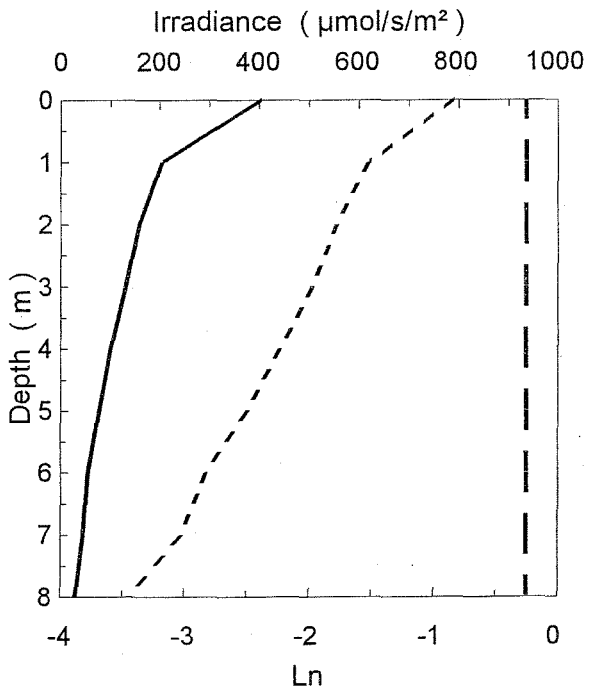
Survey 91-02 Station 17



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	500	1352	-0.99
1	277	1352	-1.59
2	185	1352	-1.99
3	135	1352	-2.31
4	94	1352	-2.66
5	74	1352	-2.91
6	64	1352	-3.05
7	45	1352	-3.40
8	36	1352	-3.62

——— Irradiance - Water (µmol/s/m²) - - - - Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

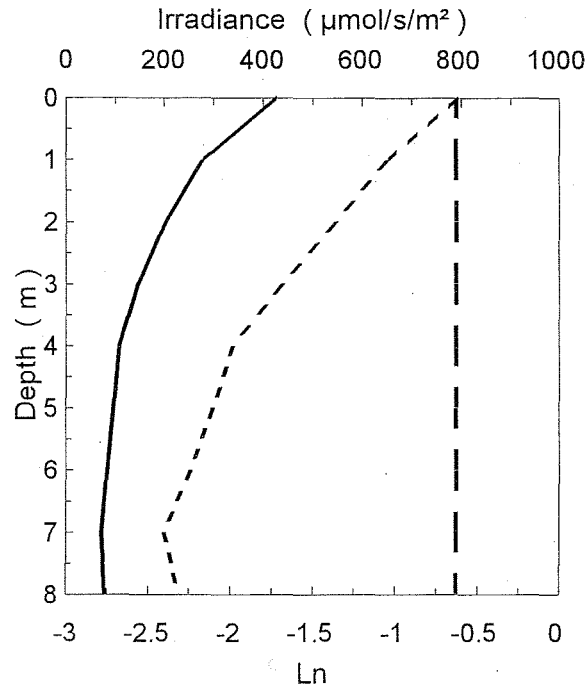
Survey 91-02 Station 18



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	404	936	-0.84
1	203	936	-1.53
2	158	936	-1.78
3	130	936	-1.97
4	100	936	-2.24
5	77	936	-2.50
6	55	936	-2.83
7	45	936	-3.02
8	29	936	-3.46

——— Irradiance - Water (µmol/s/m²) - - - - Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

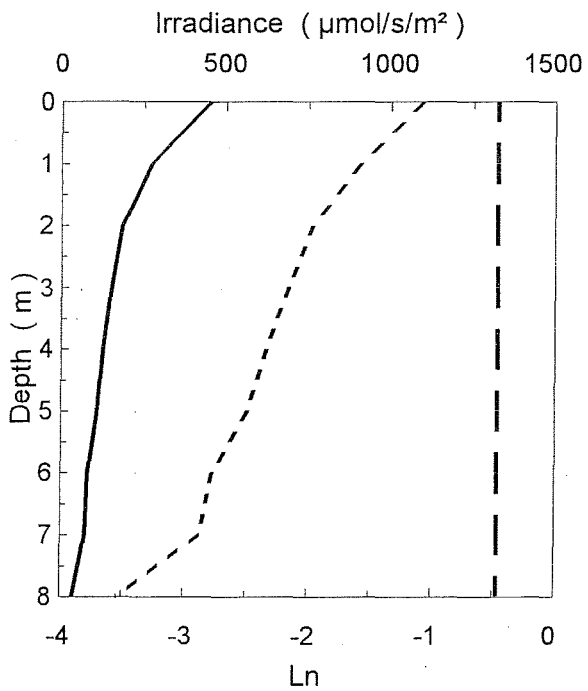
Survey 91-02 Station 19



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	426	791	-0.62
1	277	791	-1.05
2	202	791	-1.37
3	146	791	-1.69
4	109	791	-1.98
5	96	791	-2.10
6	84	791	-2.24
7	72	791	-2.40
8	78	791	-2.31

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

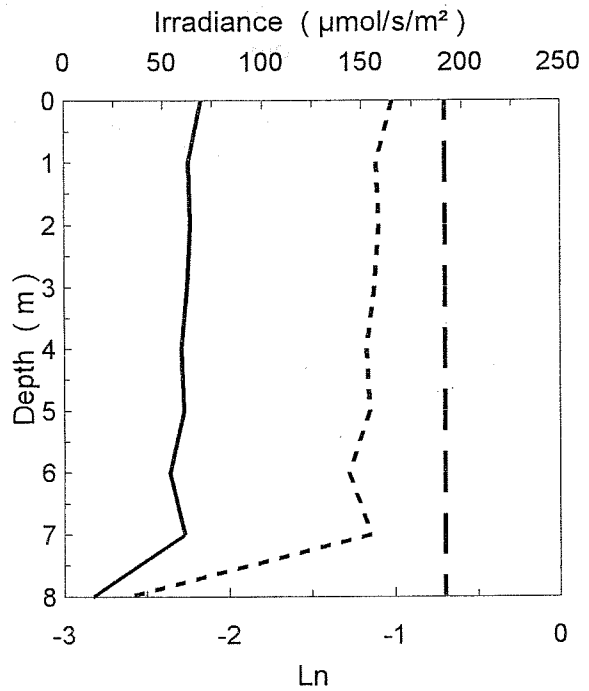
Survey 91-02 Station 20



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	453	1324	-1.07
1	273	1324	-1.58
2	186	1324	-1.96
3	152	1324	-2.17
4	128	1324	-2.34
5	110	1324	-2.49
6	83	1324	-2.77
7	75	1324	-2.87
8	38	1324	-3.55

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

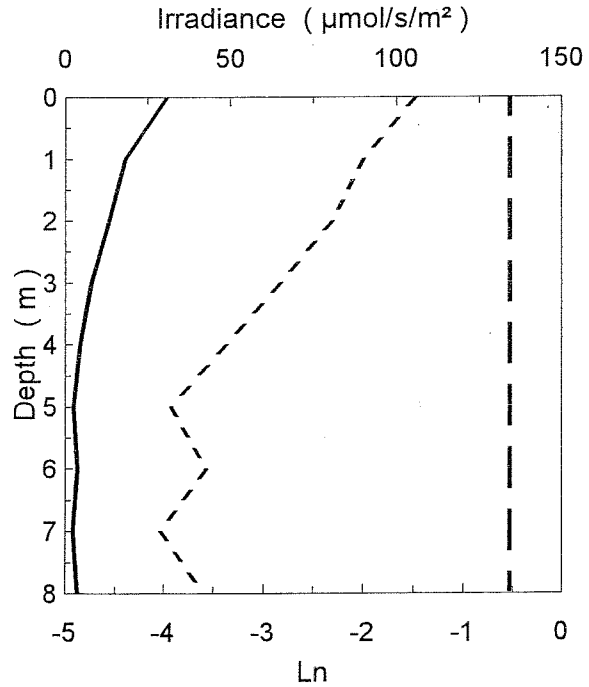
Survey 91-02 Station 21



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	69	192	-1.02
1	63	192	-1.11
2	64	192	-1.10
3	62	192	-1.13
4	59	192	-1.17
5	61	192	-1.15
6	53	192	-1.28
7	61	192	-1.14
8	14	192	-2.62

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

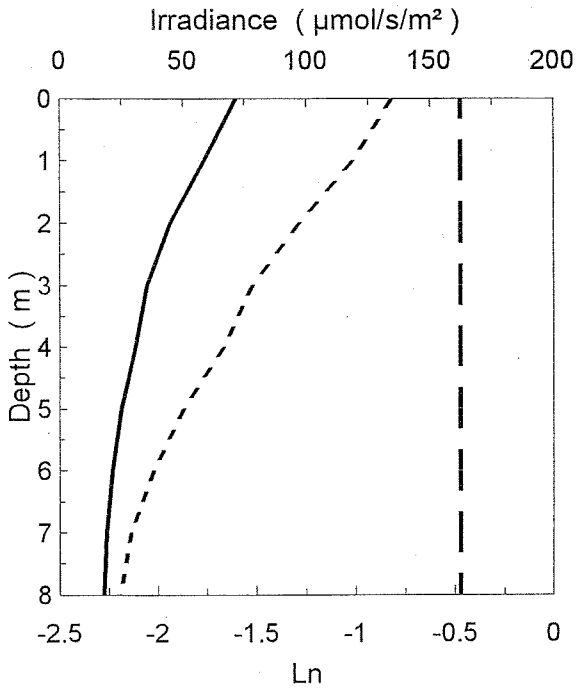
Survey 91-02 Station 22



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	31	134	-1.47
1	18	134	-2.00
2	13	134	-2.31
3	8	134	-2.83
4	5	134	-3.37
5	3	134	-3.93
6	4	134	-3.57
7	2	134	-4.04
8	4	134	-3.60

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

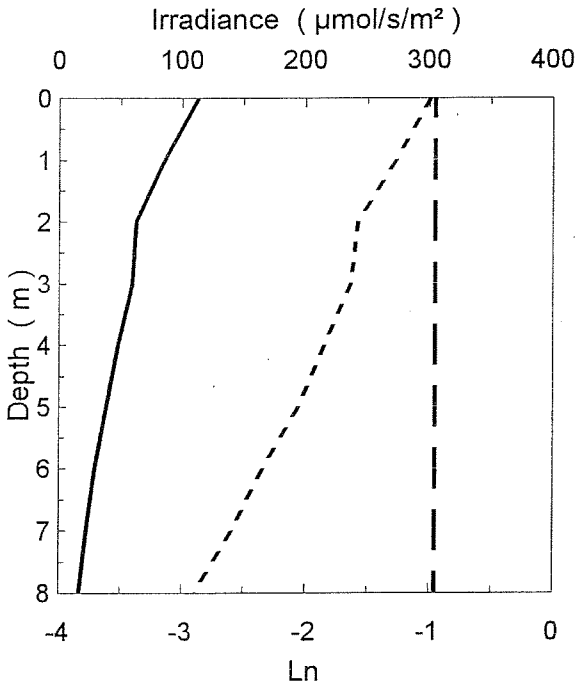
Survey 91-02 Station 23



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	72	162	-0.82
1	59	162	-1.02
2	45	162	-1.29
3	35	162	-1.52
4	31	162	-1.67
5	25	162	-1.87
6	21	162	-2.02
7	19	162	-2.14
8	18	162	-2.20

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

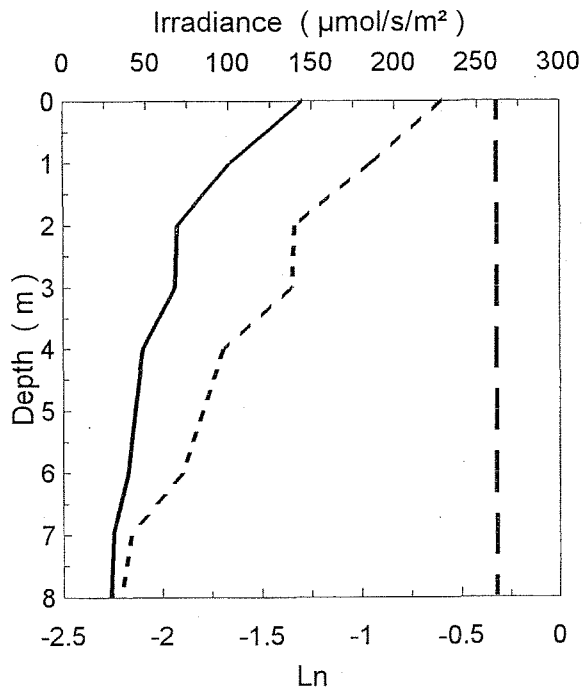
Survey 91-02 Station 24



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	113	304	-0.99
1	85	304	-1.27
2	63	304	-1.58
3	59	304	-1.63
4	48	304	-1.85
5	39	304	-2.06
6	29	304	-2.35
7	23	304	-2.60
8	17	304	-2.90

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

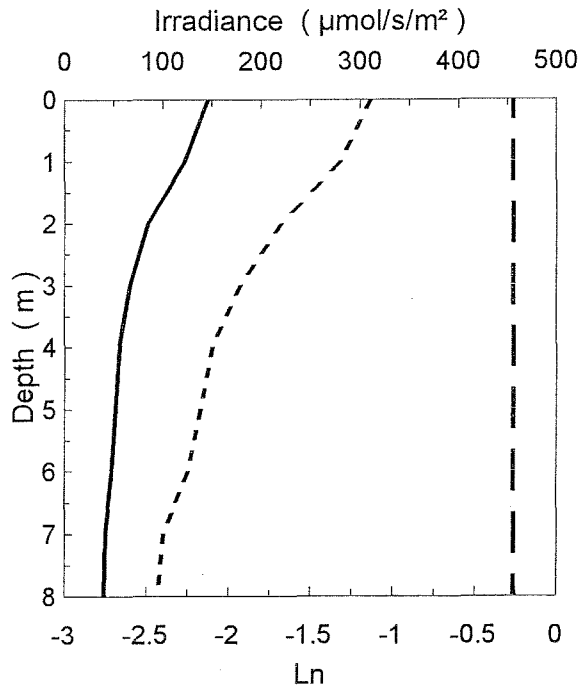
Survey 91-02 Station 25



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	145	262	-0.59
1	101	262	-0.95
2	69	262	-1.34
3	68	262	-1.35
4	48	262	-1.69
5	43	262	-1.80
6	39	262	-1.90
7	30	262	-2.16
8	29	262	-2.21

_____ Irradiance - Water (µmol/s/m²) - - - - Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

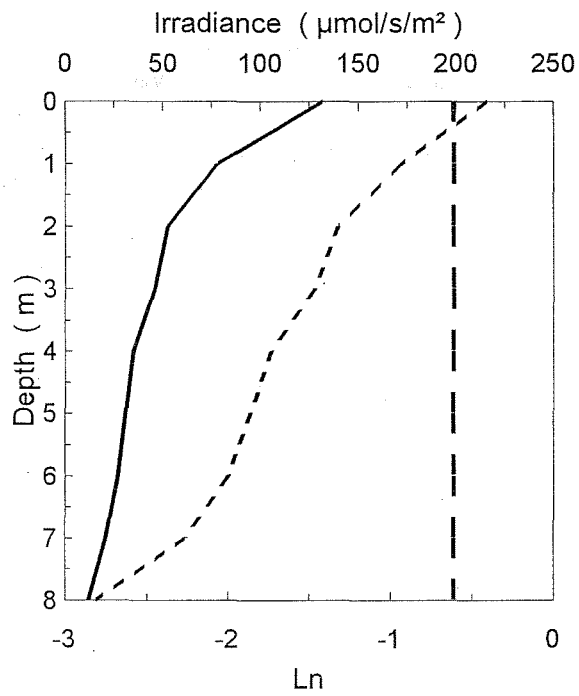
Survey 91-02 Station 26



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	146	456	-1.14
1	122	456	-1.31
2	85	456	-1.68
3	66	456	-1.93
4	56	456	-2.10
5	52	456	-2.17
6	48	456	-2.25
7	41	456	-2.40
8	40	456	-2.43

_____ Irradiance - Water (µmol/s/m²) - - - - Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

Survey 91-02 Station 27

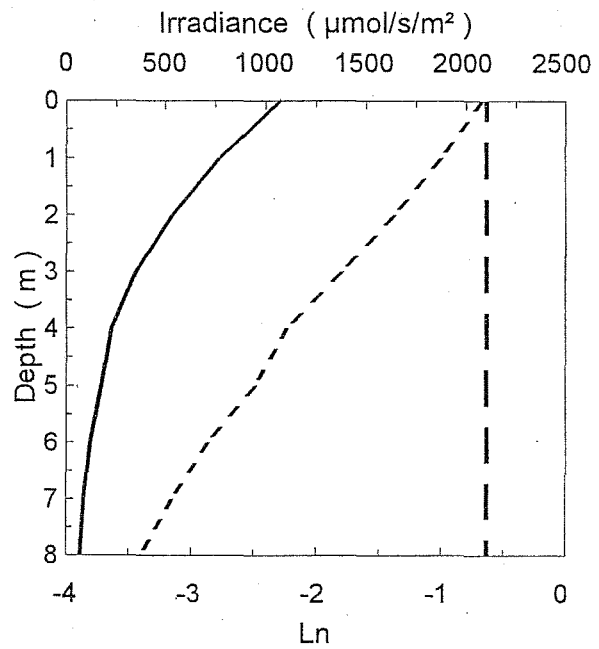


Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	132	199	-0.41
1	78	199	-0.94
2	53	199	-1.33
3	46	199	-1.46
4	35	199	-1.73
5	31	199	-1.86
6	27	199	-2.00
7	21	199	-2.26
8	12	199	-2.81

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

Appendix 7.4 Survey 91-03 irradiance (µmol / s / m²) profiles.

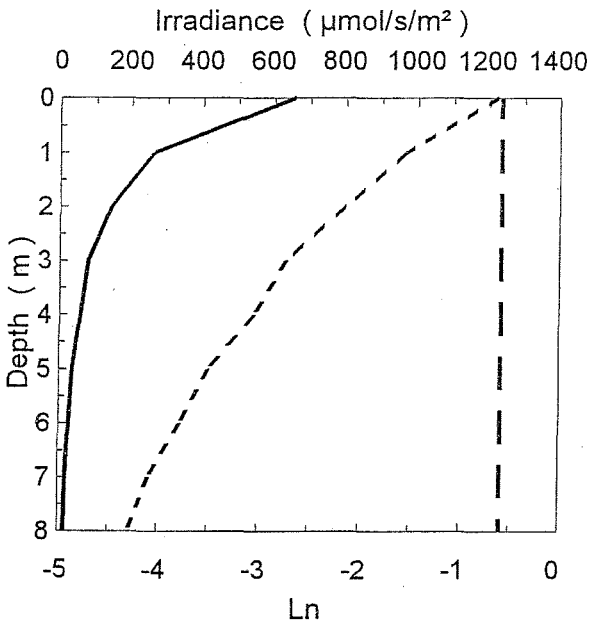
Survey 91-03 Station 1



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	1070	2100	-0.67
1	770	2100	-1.00
2	530	2100	-1.38
3	350	2100	-1.79
4	225	2100	-2.23
5	175	2100	-2.48
6	120	2100	-2.86
7	90	2100	-3.15
8	70	2100	-3.40

——— Irradiance - Water (µmol/s/m²) - - - - Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

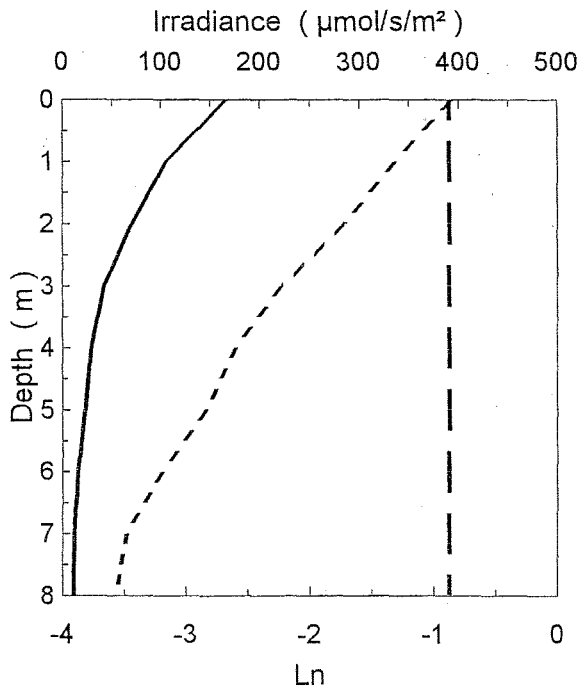
Survey 91-03 Station 3



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	656	1235	-0.63
1	263	1235	-1.55
2	144	1235	-2.15
3	80	1235	-2.73
4	58	1235	-3.06
5	37	1235	-3.50
6	28	1235	-3.79
7	21	1235	-4.10
8	17	1235	-4.30

——— Irradiance - Water (µmol/s/m²) - - - - Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

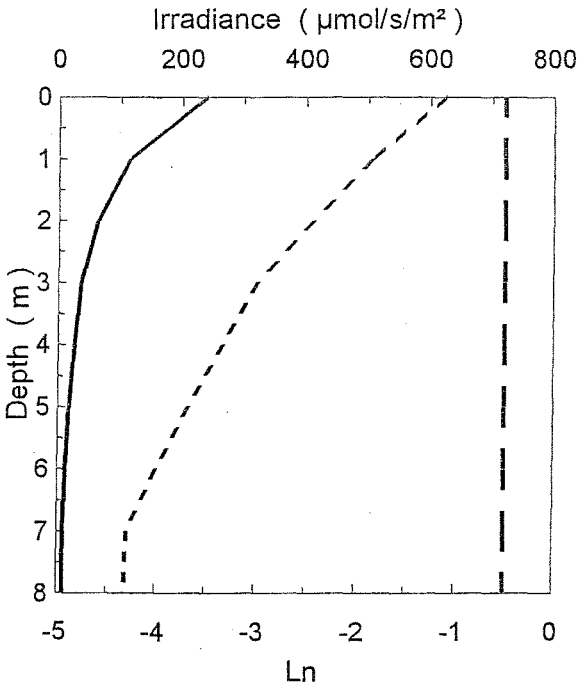
Survey 91-03 Station 4



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	166	390	-0.85
1	105	390	-1.31
2	70	390	-1.72
3	42	390	-2.23
4	29	390	-2.60
5	23	390	-2.83
6	16	390	-3.19
7	12	390	-3.48
8	11	390	-3.57

——— Irradiance - Water (µmol/s/m²) - - - - Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

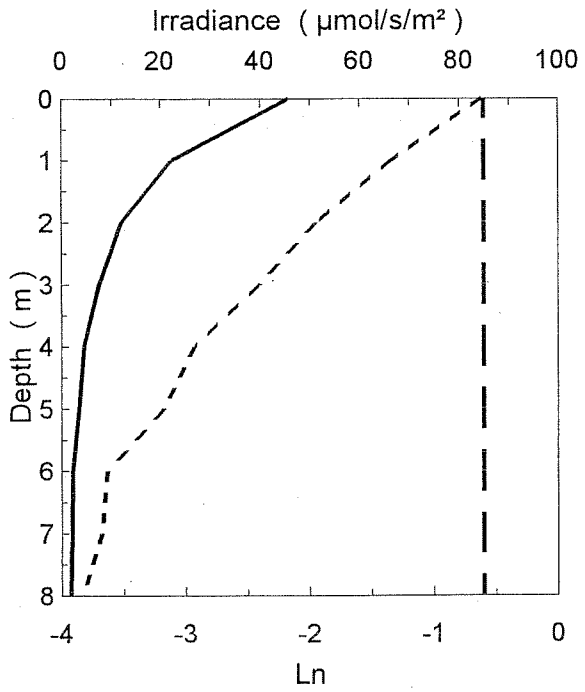
Survey 91-03 Station 5



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	240	720	-1.10
1	115	720	-1.83
2	64	720	-2.42
3	36	720	-2.99
4	26	720	-3.33
5	18	720	-3.68
6	13	720	-4.00
7	10	720	-4.30
8	10	720	-4.32

——— Irradiance - Water (µmol/s/m²) - - - - Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

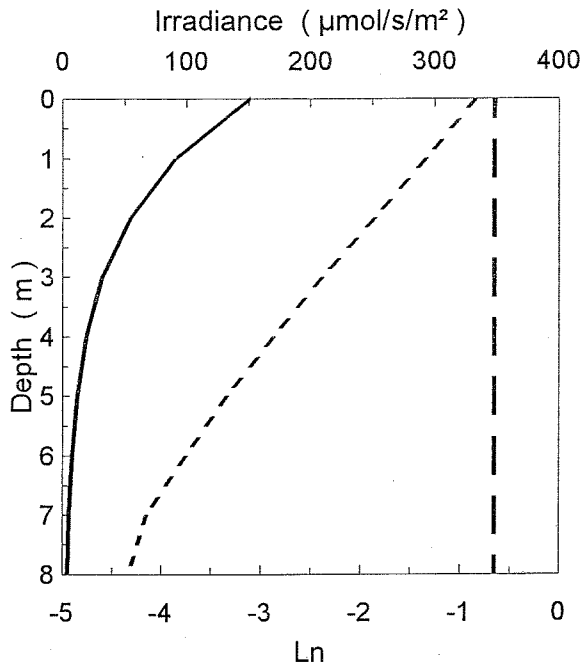
Survey 91-03 Station 9



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	46	85	-0.62
1	22	85	-1.35
2	12	85	-1.96
3	8	85	-2.41
4	5	85	-2.93
5	4	85	-3.18
6	2	85	-3.64
7	2	85	-3.68
8	2	85	-3.83

_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

Survey 91-03 Station 14



Depth (m)	Irradiance Water (µmol/s/m²)	Irradiance Sky (µmol/s/m²)	Ln Water/Sky
0	151	348	-0.83
1	91	348	-1.34
2	55	348	-1.85
3	32	348	-2.39
4	20	348	-2.87
5	12	348	-3.34
6	8	348	-3.76
7	5	348	-4.16
8	5	348	-4.34

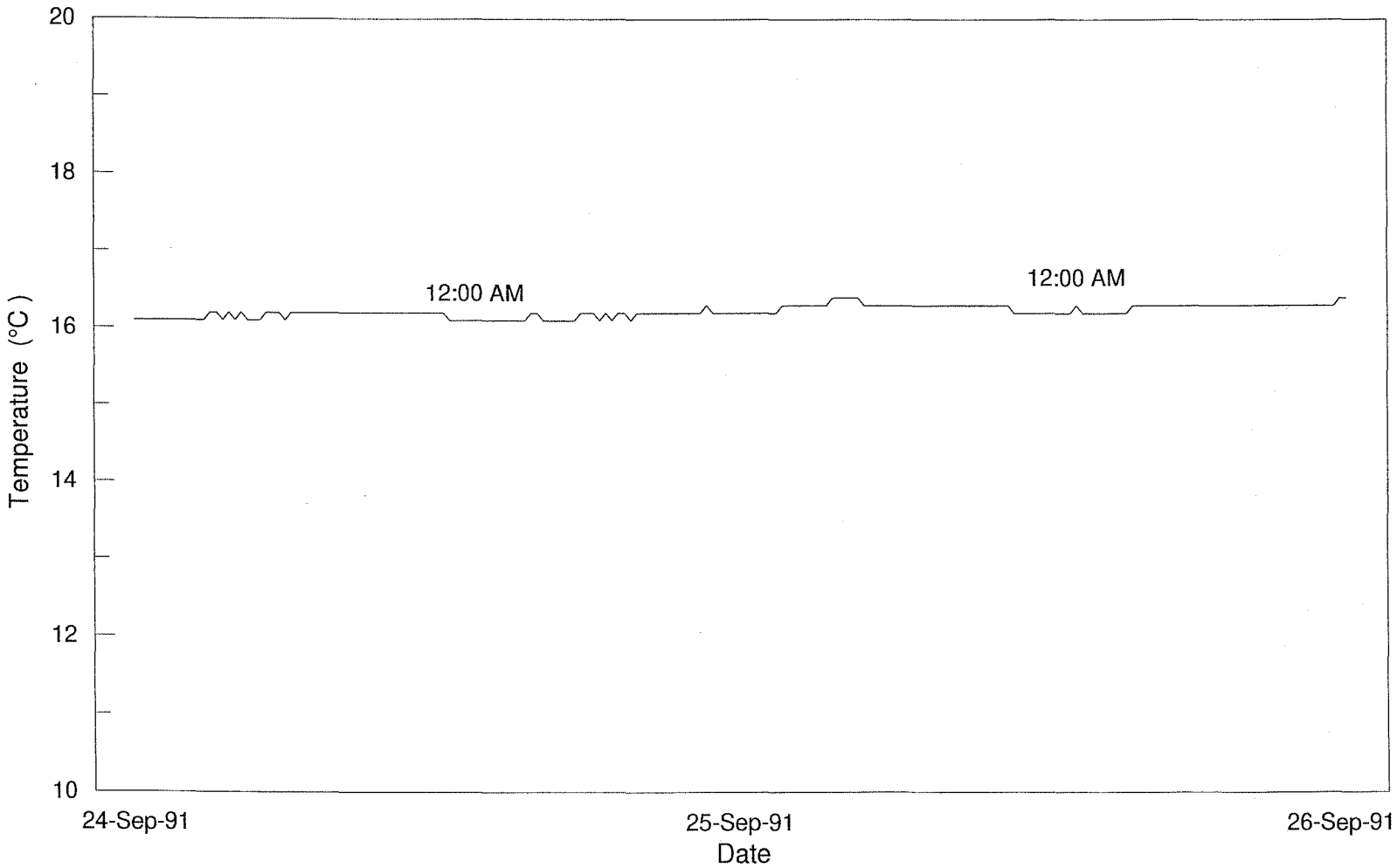
_____ Irradiance - Water (µmol/s/m²) _ _ _ _ Irradiance - Sky (µmol/s/m²)
..... Ln (Water Irrad / Sky Irrad)

Appendix 7.5 Number of data points, slope $(-k_2)$, intercept, standard error of coefficients, standardized regression coefficients and R^2 for the regression of Ln(WaterIrrad / SkyIrrad) vs. depth (m) for the 1991 irradiance profiles.

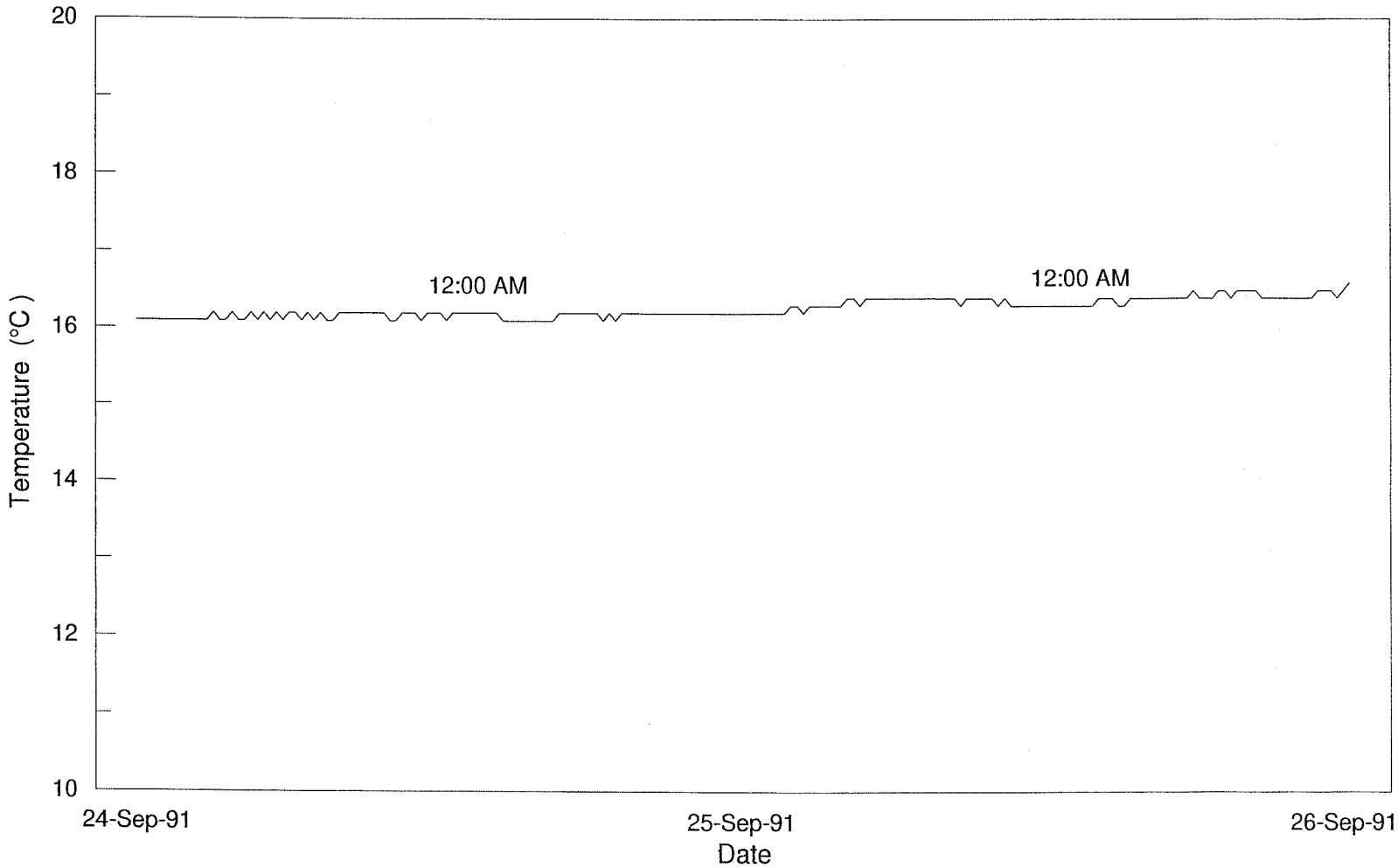
Survey	STATION	No. of data points	Slope $(-k_2)$	Intercept	Standard Error of Coefficients	Standardized Regression Coefficients	R^2
Cardigan, P.E.I.							
	10	3	-0.25	-0.55	0.08	0.02	1.00
	15	9	-0.47	-0.99	0.27	0.06	0.91
	16	8	-0.30	-1.05	0.14	0.03	0.93
	17	9	-0.35	-1.10	0.12	0.03	0.96
	18	8	-0.57	-1.04	0.29	0.07	0.92
	19	6	-0.31	-1.19	0.17	0.06	0.88
	20	10	-0.27	-1.28	0.15	0.03	0.93
	21	9	-0.22	-1.41	0.04	0.01	0.99
	22	5	-0.60	-0.90	0.06	0.03	0.99
	23	8	-0.37	-1.26	0.15	0.04	0.95
	24	8	-0.34	-1.32	0.10	0.02	0.97
	25	6	-0.30	-1.72	0.11	0.04	0.94
	26	4	-0.76	-0.93	0.24	0.13	0.95
Survey 91-01							
	01	9	-0.35	-0.26	0.18	0.04	0.93
	02	10	-0.22	-0.38	0.05	0.01	0.99

Survey	STATION	No. of data points	Slope $(-k_2)$	Intercept	Standard Error of Coefficients	Standardized Regression Coefficients	R^2
Survey 91-02							
	01	9	-0.38	-0.14	0.09	0.02	0.98
	02	9	-0.36	-1.10	0.15	0.03	0.95
	03	9	-0.32	-0.95	0.05	0.01	0.99
	04	9	-0.32	-1.15	0.06	0.01	0.99
	05	9	-0.34	-0.31	0.07	0.01	0.99
	06	9	-0.47	-0.14	0.16	0.03	0.97
	07	9	-0.04	-0.09	0.05	0.01	0.72
	08	9	-0.14	-0.05	0.10	0.02	0.86
	09	9	-0.24	-0.43	0.05	0.01	0.98
	10	9	-0.32	-0.46	0.05	0.01	0.99
	11	9	-0.31	-1.47	0.19	0.04	0.89
	16	9	-0.20	-0.95	0.07	0.02	0.96
	17	9	-0.31	-1.26	0.09	0.02	0.97
	18	9	-0.29	-1.07	0.08	0.02	0.98
	19	9	-0.22	-0.88	0.12	0.03	0.91
	20	9	-0.26	-1.26	0.10	0.02	0.96
	21	9	-0.11	-0.84	0.25	0.05	0.40
	22	9	-0.30	-1.80	0.24	0.05	0.84
	23	9	-0.18	-0.90	0.05	0.01	0.98
	24	9	-0.23	-1.01	0.04	0.01	0.99
	25	9	-0.19	-0.78	0.07	0.02	0.96
	26	9	-0.16	-1.28	0.08	0.02	0.93
	27	9	-0.26	-0.62	0.10	0.02	0.96
Survey 91-03							
	01	9	-0.35	-0.71	0.04	0.01	0.99
	03	9	-0.44	-1.11	0.17	0.04	0.96
	04	9	-0.35	-1.03	0.09	0.02	0.98
	05	9	-0.40	-1.50	0.17	0.03	0.95
	09	9	-0.40	-1.02	0.17	0.04	0.94
	14	9	-0.45	-0.95	0.08	0.02	0.99

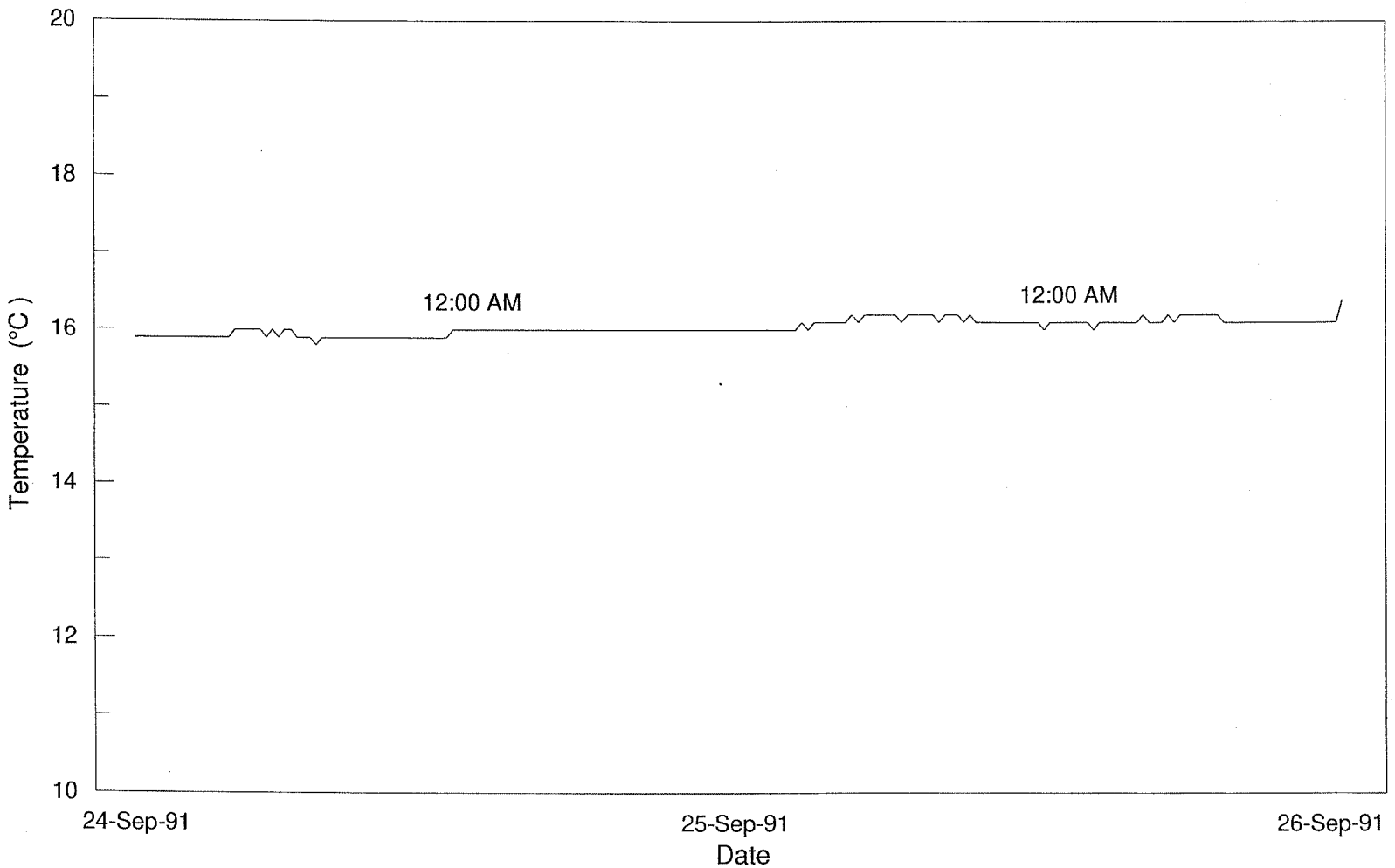
Appendix 8.1.1 Survey 91-02 station 16 temperature (°C) mooring at 2m, 24-Sep-91 to 26-Sep-91.



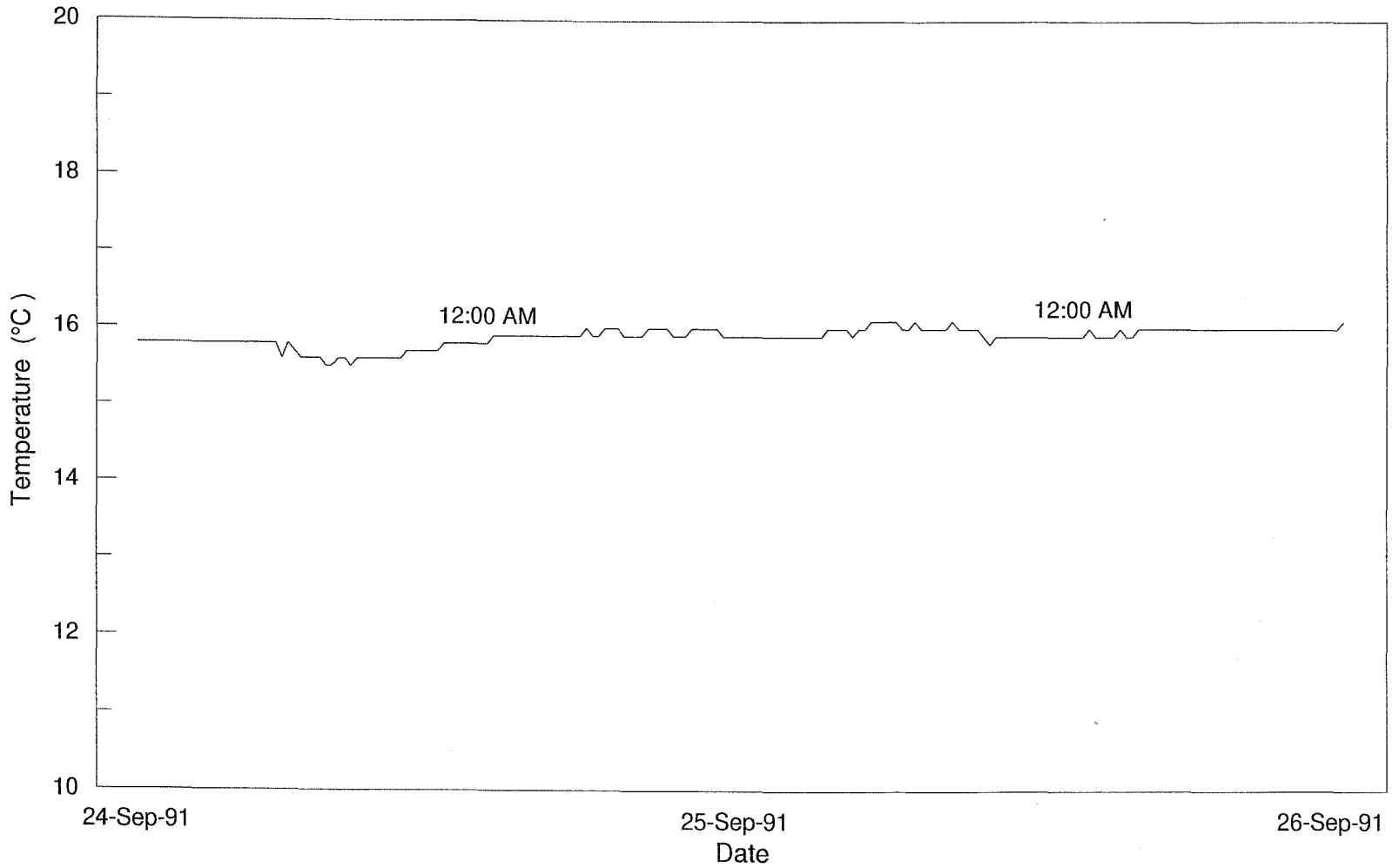
Appendix 8.1.2 Survey 91-02 station 16 temperature (°C) mooring at 6m, 24-Sep-91 to 26-Sep-91.



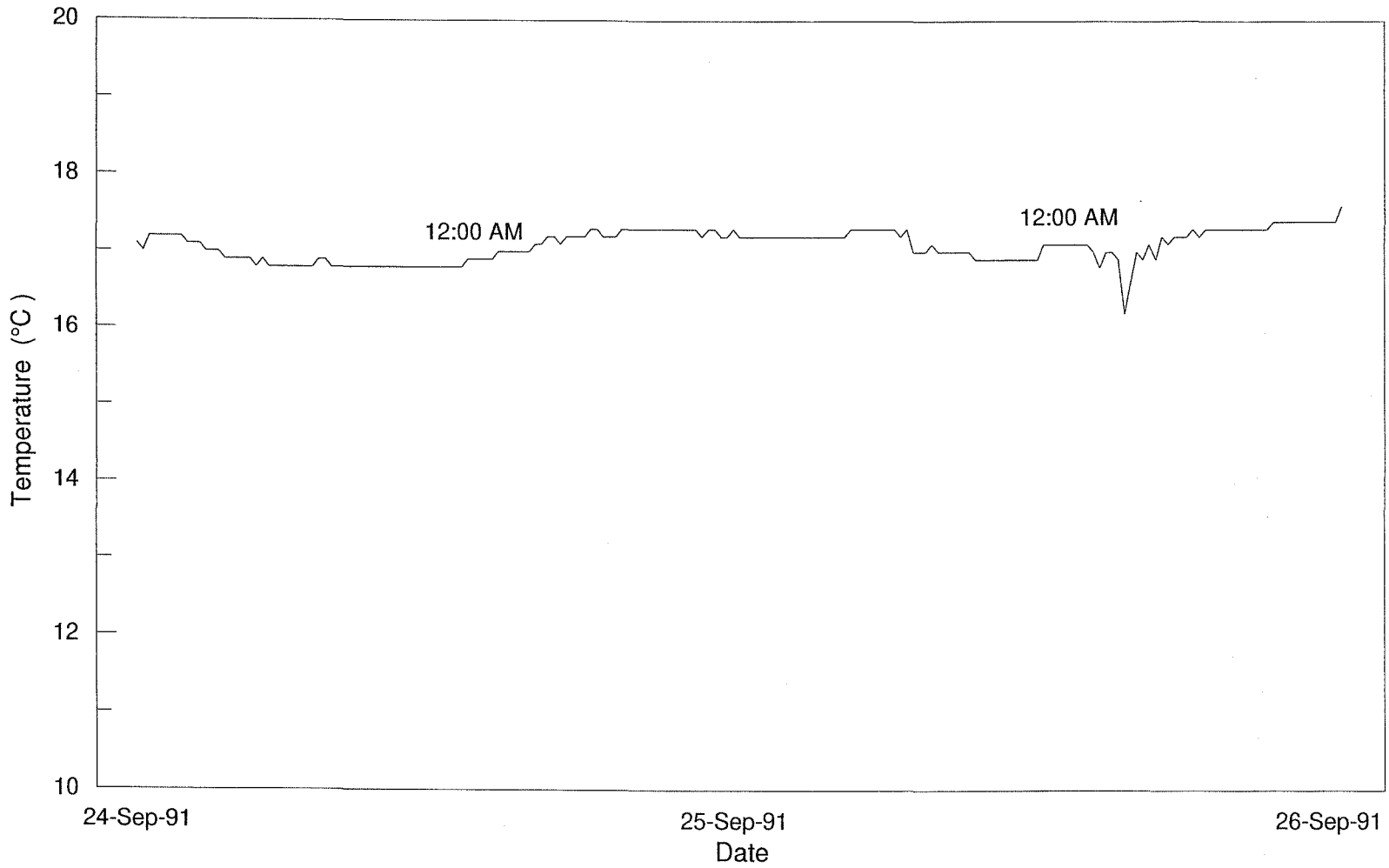
Appendix 8.1.3 Survey 91-02 station 16 temperature (°C) mooring at 10m, 24-Sep-91 to 26-Sep-91.



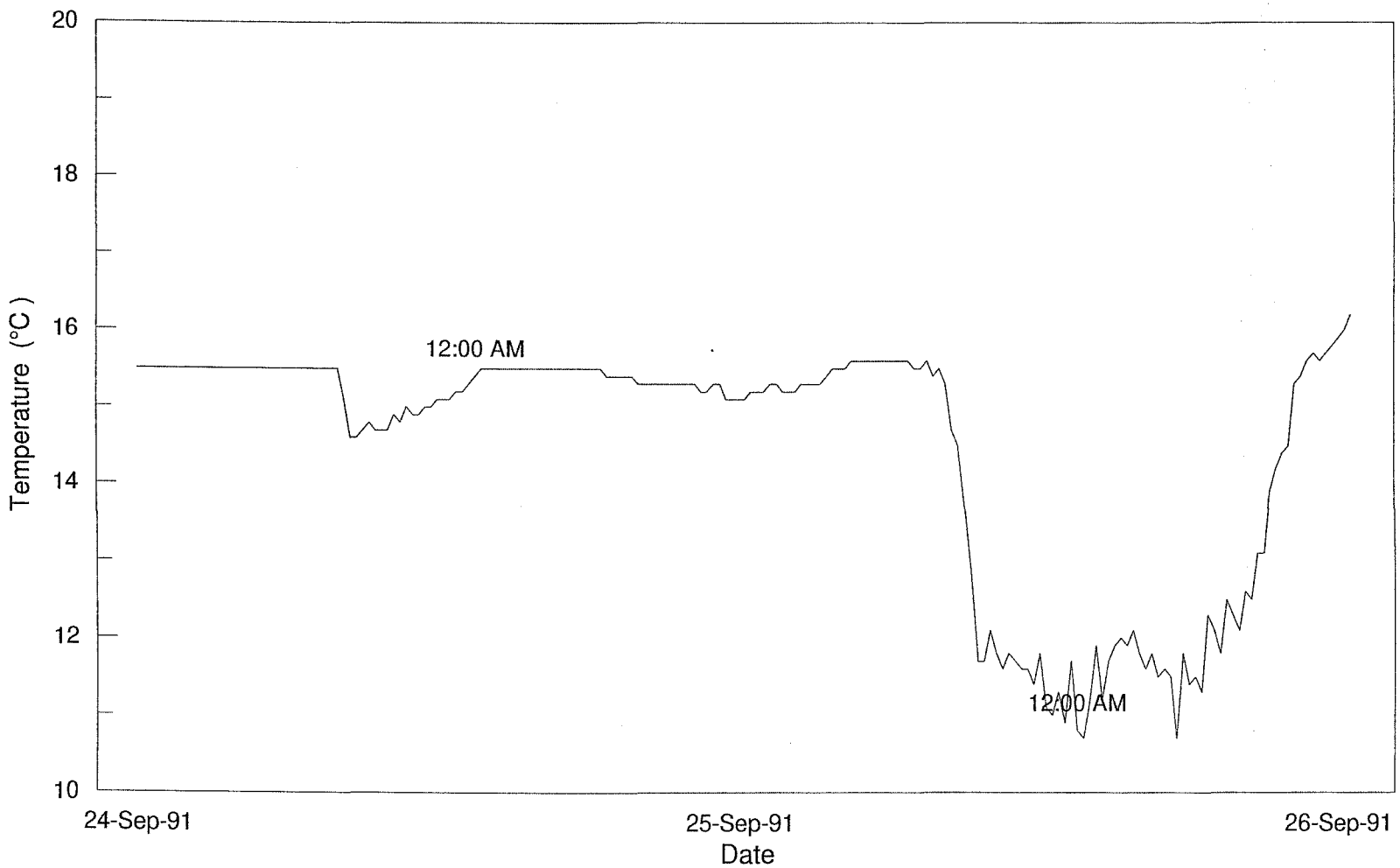
Appendix 8.1.4 Survey 91-02 station 16 temperature (°C) mooring at 14m, 24-Sep-91 to 26-Sep-91.



Appendix 8.1.5 Survey 91-02 station 16 temperature (°C) mooring at 20m, 24-Sep-91 to 26-Sep-91.



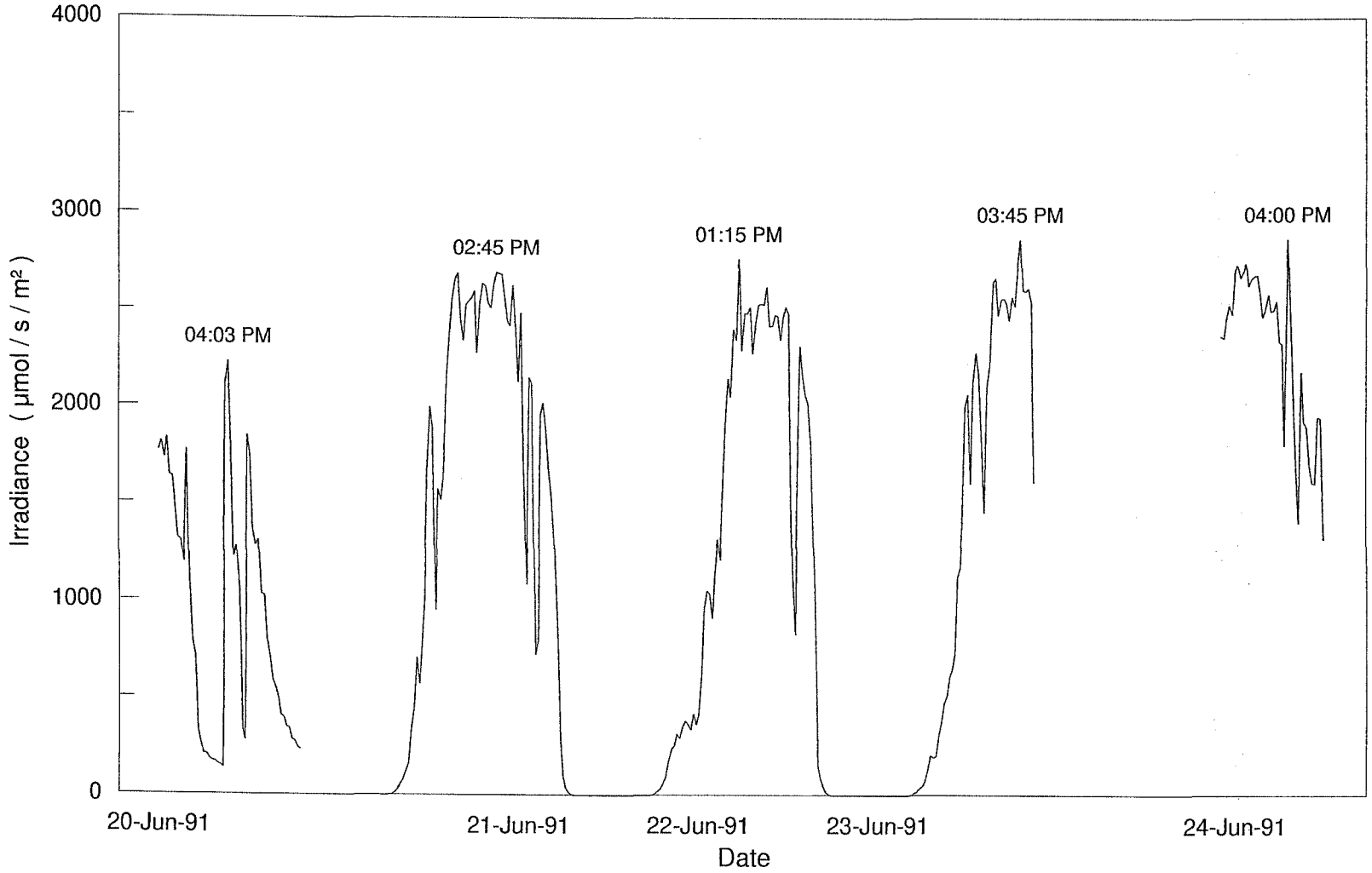
Appendix 8.1.6 Survey 91-02 station 16 temperature (°C) mooring at 26m, 24-Sep-91 to 26-Sep-91.



APPENDIX 8.1.7 Daily average, minimum and maximum water temperature (°C), Survey 91-02 station 16 at 2, 6, 10, 14, 20 and 26m 24-Sep-91 to 26-Sep-91.

Depth (m)	Day	Average Temperature (°C)	Miniumum Temperature (°C)	Maximum Temperature (°C)
2				
	24	16.16	16.10	16.20
	25	16.23	16.10	16.40
	26	16.29	16.20	16.40
	Average:	**16.22**	**16.10**	**16.40**
6				
	24	16.15	16.10	16.20
	25	16.26	16.10	16.40
	26	16.42	16.30	16.60
	Average:	**16.26**	**16.10**	**16.60**
10				
	24	15.92	15.80	16.00
	25	16.06	16.00	16.20
	26	16.12	16.00	16.20
	Average:	**16.03**	**15.80**	**16.20**
14				
	24	15.71	15.50	15.80
	25	15.94	15.80	16.10
	26	15.98	15.90	16.00
	Average:	**15.89**	**15.50**	**16.10**
20				
	24	16.90	16.80	17.20
	25	17.14	16.90	17.30
	26	17.18	16.20	17.40
	Average:	**17.08**	**16.20**	**17.40**
26				
	24	15.28	14.60	15.50
	25	14.70	10.90	15.60
	26	12.83	10.70	16.00
	Average:	**14.43**	**10.70**	**16.00**

Appendix 9.1.1 Instantaneous sky irradiance (µmol / s / m²) averaged every 15 minutes, 20-Jun-91 to 24-Jun-91, Survey 91-01.



Appendix 9.1.2 Instantaneous sky irradiance (µmol / s / m²) averaged every hour, 20-Jun-91 to 24-Jun-91, Survey 91-01.

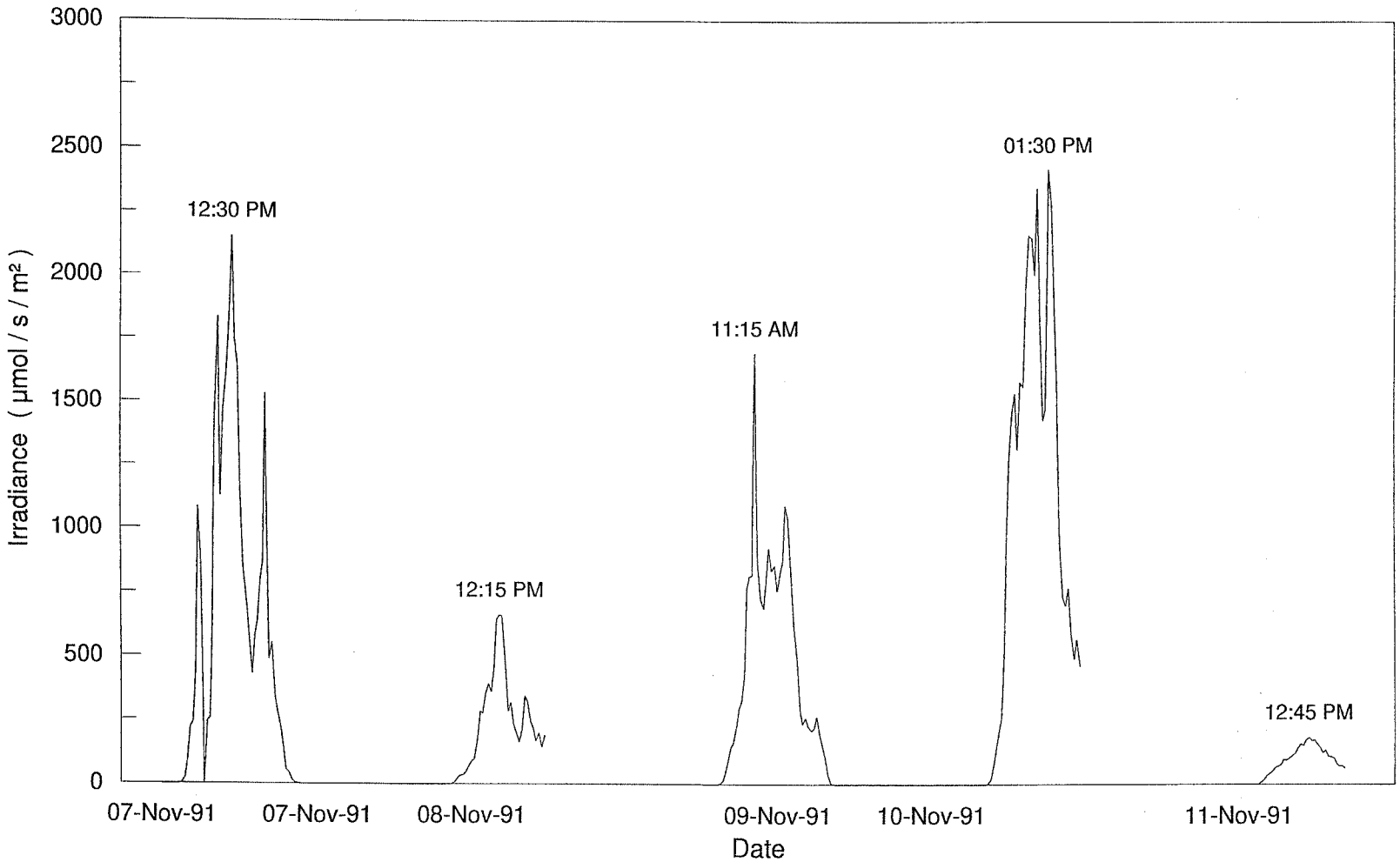
Date	Time	Hourly Average Irradiance (µmol / s / m²)	Date	Time	Hourly Average Irradiance (µmol / s / m²)
20-Jun-91			**21-Jun-91**		
	1:06 PM	1699		4:15 AM	0
	2:06 PM	1397		5:00 AM	12
	3:06 PM	1024		6:00 AM	107
	4:01 PM	1017		7:00 AM	514
	5:01 PM	603		8:00 AM	1367
	6:01 PM	500		9:00 AM	1482
	7:01 PM	415		10:00 AM	2182
	8:01 PM	286		11:00 AM	2532
	9:01 PM	233		12:00 PM	2555
	Daily Average:	**797**		1:00 PM	2518
				2:00 PM	2591
				3:00 PM	2591
				4:00 PM	2390
				5:00 PM	1849
				6:00 PM	1400
				7:00 PM	1779
				8:00 PM	646
				9:00 PM	14
				10:15 PM	0
				11:00 PM	0
				Daily Average:	**1326**

Date	Time	Hourly Average Irradiance (µmol / s / m²)
22-Jun-91		
	12:00 AM	0
	1:00 AM	0
	2:00 AM	0
	3:00 AM	0
	4:00 AM	0
	5:00 AM	7
	6:00 AM	90
	7:00 AM	273
	8:00 AM	357
	9:00 AM	455
	10:00 AM	989
	11:00 AM	1303
	12:00 PM	1215
	1:00 PM	2469
	2:00 PM	2425
	3:00 PM	2550
	4:00 PM	2443
	5:00 PM	2451
	6:00 PM	1454
	7:00 PM	2008
	8:15 PM	458
	9:00 PM	15
	10:00 PM	0
	11:00 PM	0
Daily Average:		**873**

Date	Time	Hourly Average Irradiance (µmol / s / m²)
23-Jun-91		
	12:00 AM	0
	1:00 AM	0
	2:00 AM	0
	3:00 AM	0
	4:00 AM	0
	5:00 AM	7
	6:00 AM	72
	7:00 AM	226
	8:00 AM	491
	9:00 AM	831
	10:00 AM	1661
	11:00 AM	2043
	12:00 PM	1894
	1:00 PM	2583
	2:00 PM	2513
	3:00 PM	2649
	4:00 PM	2338
Daily Average:		**1018**

Date	Time	Hourly Average Irradiance (µmol / s / m²)	Date	Time	Hourly Average Irradiance (µmol / s / m²)
24-Jun-91					
	10:00 AM	2425			
	11:00 AM	2645			
	12:00 PM	2681			
	1:00 PM	2600			
	2:00 PM	2518			
	3:00 PM	2251			
	4:00 PM	2296			
	5:00 PM	1850			
	6:00 PM	1715			
	7:00 PM	1629			
	Daily Average:	**2261**			

Appendix 9.2.1 Instantaneous sky irradiance (µmol / s / m²) averaged every 15 minutes, 07-Nov-91 to 11-Nov-91, Survey 91-03.



Appendix 9.2.2 Instantaneous sky irradiance (µmol / s / m²) averaged every hour, 07-Nov-91 to 11-Nov-91, Survey 91-03.

Date	Time	Hourly Average Irradiance (µmol / s / m²)	Date	Time	Hourly Average Irradiance (µmol / s / m²)
07-Nov-91			**08-Nov-91**		
	6:15 AM	0		12:00 AM	1
	7:00 AM	0		1:00 AM	1
	8:00 AM	88		2:00 AM	1
	9:00 AM	657		3:00 AM	0
	10:00 AM	284		4:00 AM	0
	11:00 AM	1469		5:00 AM	0
	12:00 PM	1837		6:00 AM	0
	1:00 PM	1089		7:00 AM	0
	2:00 PM	561		8:00 AM	18
	3:00 PM	923		9:00 AM	62
	4:00 PM	349		10:00 AM	207
	5:00 PM	66		11:00 AM	387
	6:00 PM	2		12:00 PM	614
	7:00 PM	1		1:00 PM	257
	8:00 PM	1		2:00 PM	260
	9:00 PM	1		3:00 PM	207
	10:00 PM	1		4:00 PM	168
	11:00 PM	1	**Daily Average:**		**128**
Daily Average:		**407**			

Date	Time	Hourly Average Irradiance (µmol / s / m²)	Date	Time	Hourly Average Irradiance (µmol / s / m²)
09-Nov-91			**10-Nov-91**		
	6:15 AM	0		12:00 AM	0
	7:00 AM	0		1:00 AM	0
	8:00 AM	37		2:00 AM	0
	9:00 AM	206		3:00 AM	0
	10:00 AM	584		4:00 AM	0
	11:00 AM	1025		5:00 AM	0
	12:00 PM	814		6:00 AM	0
	1:00 PM	828		7:00 AM	0
	2:00 PM	891		8:00 AM	56
	3:00 PM	322		9:00 AM	490
	4:00 PM	229		10:00 AM	1392
	5:00 PM	122		11:00 AM	1812
	6:00 PM	2		12:00 PM	2080
	7:00 PM	0		1:00 PM	1899
	8:00 PM	0		2:00 PM	1288
	9:00 PM	0		3:00 PM	637
	10:00 PM	0		4:00 PM	514
	11:00 PM	0		**Daily Average:**	**598**
	Daily Average:	**281**			

Date	Time	Hourly Average Irradiance (µmol / s / m²)	Date	Time	Hourly Average Irradiance (µmol / s / m²)
11-Nov-91					
	6:15 AM	1			
	7:00 AM	1			
	8:00 AM	8			
	9:00 AM	49			
	10:00 AM	86			
	11:00 AM	118			
	12:00 PM	166			
	1:00 PM	161			
	2:00 PM	118			
	3:00 PM	83			
	4:00 PM	65			
	Daily Average:	**78**			