

Phytoplankton Productivity and Nutrient Measurements At the Edge of the Continental Shelf off Nova Scotia between June 3 and June 6, 1978

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Canadian Data Report of Fisheries and Aquatic Sciences

No. 174

November 1979

PHYTOPLANKTON PRODUCTIVITY AND NUTRIENT MEASUREMENTS
AT THE EDGE OF THE CONTINENTAL SHELF OFF NOVA SCOTIA
BETWEEN JUNE 3 and June 6, 1978

by

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Department of Fisheries and Oceans

Ocean and Aquatic Sciences

Marine Ecology Laboratory

Dartmouth, Nova Scotia

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ABSTRACT

Irwin, B. and T. Platt. 1979. Phytoplankton productivity and nutrient measurements at the edge of the continental shelf off Nova Scotia between June 3 and June 6, 1978. Can. Data Rep. Fish. Aquat. Sci. No. 174: 50 pp.

A series of primary production experiments and related nutrient determinations were made on CSS Dawson during a cruise to the edge of the Nova Scotian Shelf over the period 3 June to 6 June 1978. In this report we make available the raw data and also the fitted light saturation parameters with confidence limits.

SOMMAIRE

Irwin, B. and T. Platt. 1979. Phytoplankton productivity and nutrient measurements at the edge of the continental shelf off Nova Scotia between June 3 and June 6, 1978. Can. Data Rep. Fish. Aquat. Sci. No. 174: 50 pp.

Durant la période de 3 Juin au 6 Juin, des séries d'expériences sur la détermination de la production primaire et des sels nutritifs furent réalisées à bord du CSS Dawson, le long de la marge du plateau continental, au large de la Nouvelle Ecosse. Dans le présent rapport nous présentons les données brutes sur ces expériences, ainsi que les paramètres avec leur intervalles de confiance qui furent calculés pour représenter les courbes de production en fonction de la lumière.

INTRODUCTION

This is the third in a series of data reports presenting the results of photosynthesis experiments on natural phytoplankton populations of the Scotian Shelf and its adjacent oceanic waters. In the first study (Denman *et al.* 1977) an area bounded between longitude 63°00'W and 64°00'W and latitude 41°30'N 43°30'N was studied. The second study (Irwin *et al.* 1978) was a series of transects along longitude 63°25'W between 42°00'N and 43°00'N. This present study is a repeat of the 1978 work. The northern limit of this transect is approximately 90 nautical miles south of Halifax (Fig. 1).

Water samples were collected from CSS *Dawson* between June 3 and June 6 1978. The transect was occupied on 3 consecutive days - June 4, June 5 and June 6. No strong thermal fronts were located within the sampled area.

In this report we make available the results of these experiments, the fitted parameters and their confidence intervals, to the light saturation curves, and the values of some measured environmental variables.

SAMPLING

Samples for light saturation experiments were collected from 10 and 40 m with a 30 l niskin bottle and were dispensed into darkened carboys to prevent light shocking. Surface samples were collected with a plastic bucket and all other samples were collected from Knudsen reversing bottles.

METHODS

a) Productivity

The ¹⁴C method as described in Strickland and Parsons (1972) was used. Aliquots of water were dispensed into clear and darkened 125 ml pyrex glass bottles. 1 ml of sodium bicarbonate ¹⁴C containing approximately 5 µci was added to each bottle. A total of 40 light bottles and 4 dark bottles from 10 m and 20 light and 2 dark bottles from 40 m were filled. The 40 m bottles and 20 light bottles and 2 dark bottles from 10 m were placed in temperature controlled incubators (Jassby and Platt 1976) and illuminated for 3 hours by 150 watt floodlights [GTE Sylvania PAR 150]. The remaining 20 light bottles and 2 dark bottles from 10 m were illuminated in similar temperature controlled incubators by 2000 watt floodlights [Atlas OHS 2000].

At the end of the incubation period the samples were filtered immediately onto 2.5 cm, 0.45 µ pore size membrane filters. The filters were dried in a desiccator, exposed to HCl fumes for 10 minutes and counted in a scintillation counter. Counting efficiencies were calculated by the channels ratio method.

b) Chlorophyll

Replicate samples were filtered onto glass fibre filters and stored at -20°C in a desiccator. The chlorophyll concentration was measured using the fluorometric technique of Yentsch and Menzel (1963) as modified by Holm-Hansen *et al.* (1965). A model 111 Turner fluorometer was used and was calibrated with extracts of pure chlorophyll a (Sigma Chemicals).

c) Light intensity

Total radiation in each compartment of the incubators was measured with an International Light IL 700 radiometer. Light quality was measured with an ISCO spectroradiometer.

d) Nutrients

Four inorganic nutrient concentrations were measured from all depths sampled. Phosphate, nitrate and silicate were measured on a Technican II autoanalyzer and ammonia concentrations were measured with a spectrophotometer. The following methods were used:

- 1) Silicate - industrial method 186-71W
- 2) Phosphate - industrial method 155-71W
- 3) Nitrate - industrial method 158-71W
- 4) Ammonia - the phenolhypochlorite method described by Solorzano (1969).

e) Nucleic acids

Replicate samples were filtered onto glass fibre filters and were stored at -20°C. The filters were homogenized in a buffered sodium chloride solution and then centrifuged. A measured amount of the dye ethidium bromide [2, 7 - diamino - 9 - phenylphenanthridine - 10 - ethyl bromide] was added to the clear supernatant. The fluorescence was measured in a Turner III fluorometer [excitation filter Corning 7-60, emission filter Wratten 23A]. The solution was decanted back into the reaction vessel and 0.05 ml of RNase solution added with mixing. Mixture was heated at 50°C for 30 minutes, cooled to room temperature and fluorescence remeasured. This second reading was a measure of Deoxyribonucleic acid concentration and the difference between the two readings was a measure of Ribonucleic acid concentration.

f) Light saturation parameter

Production rates were normalized to unit chlorophyll and plotted against light intensity.

Three parameters were calculated (Platt *et al.* 1975, Jassby and Platt, 1976):

- 1) the initial slope, α
- 2) the respiration, R^D
- 3) the assimilation number P_m^D .

ACKNOWLEDGEMENTS

We thank P. Dickie, P. Evans, L. Harris, M. Hodgson and D. Rudderham for their excellent technical assistance.

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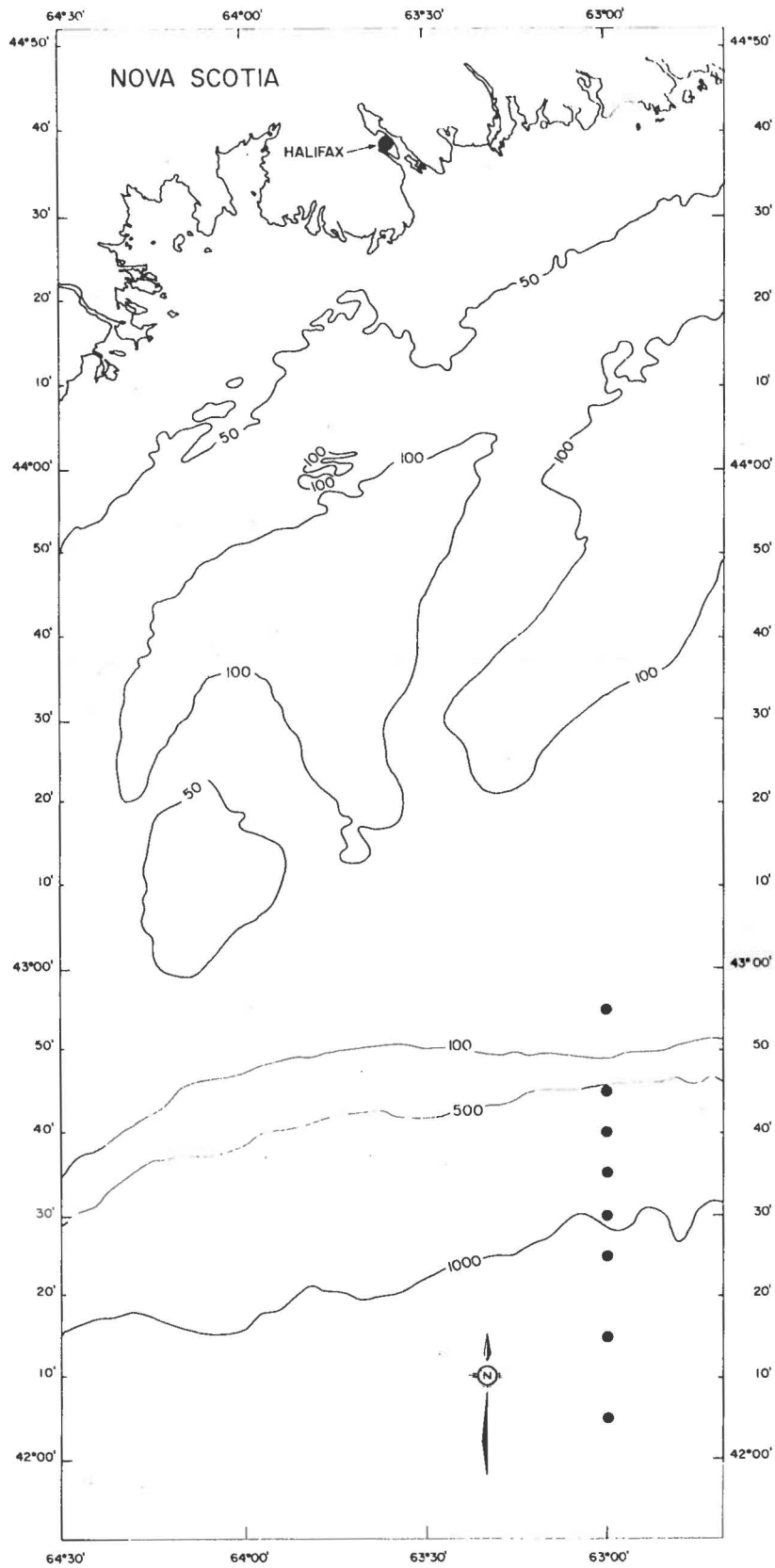


Fig. 1 Area of cruise and station locations. Depth contours are labelled in fathoms (1 fm - 1.83 m).

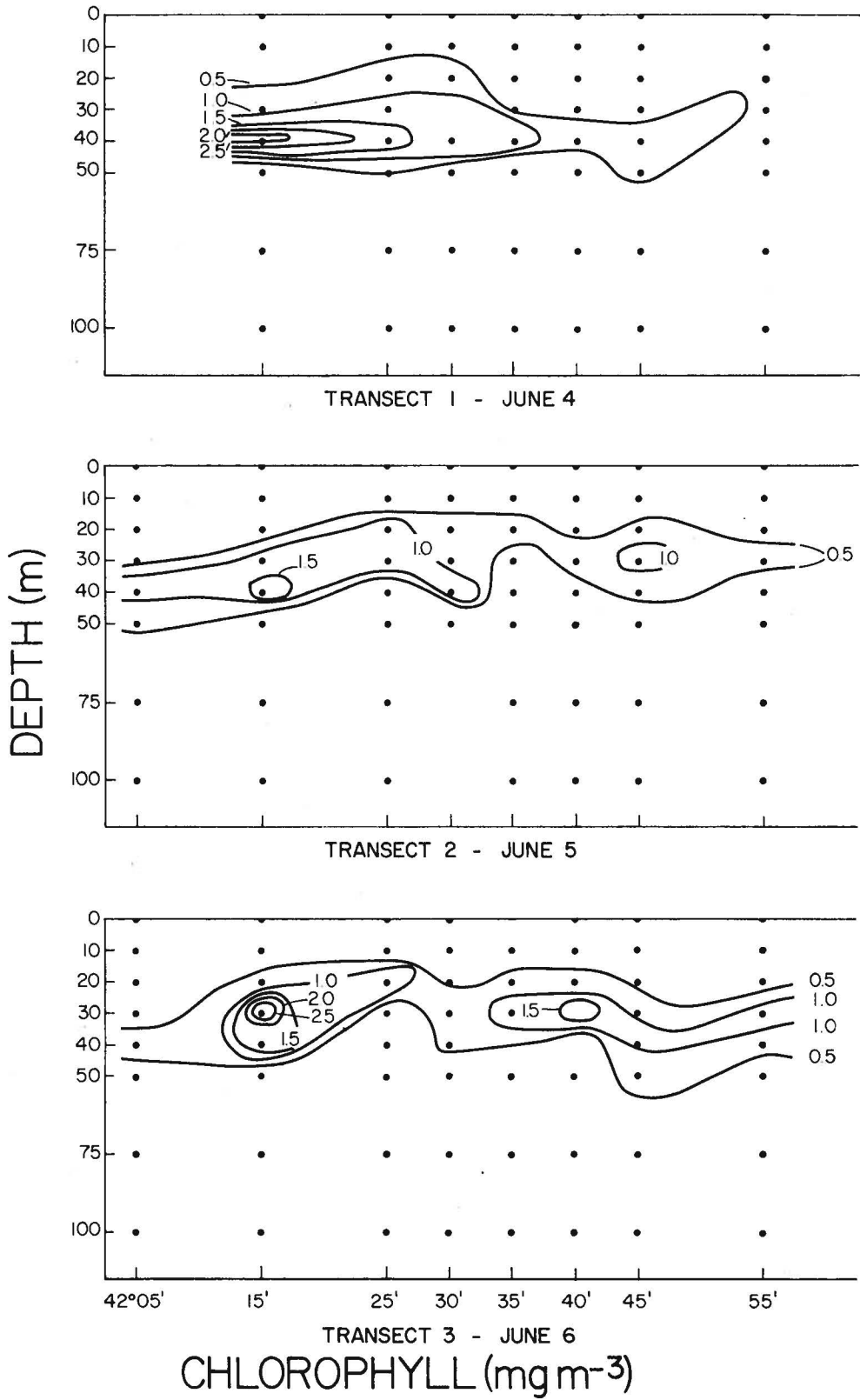


Fig. 2 Chlorophyll concentrations (mg m^{-3}) along the transect, June 4, June 5 and June 6.

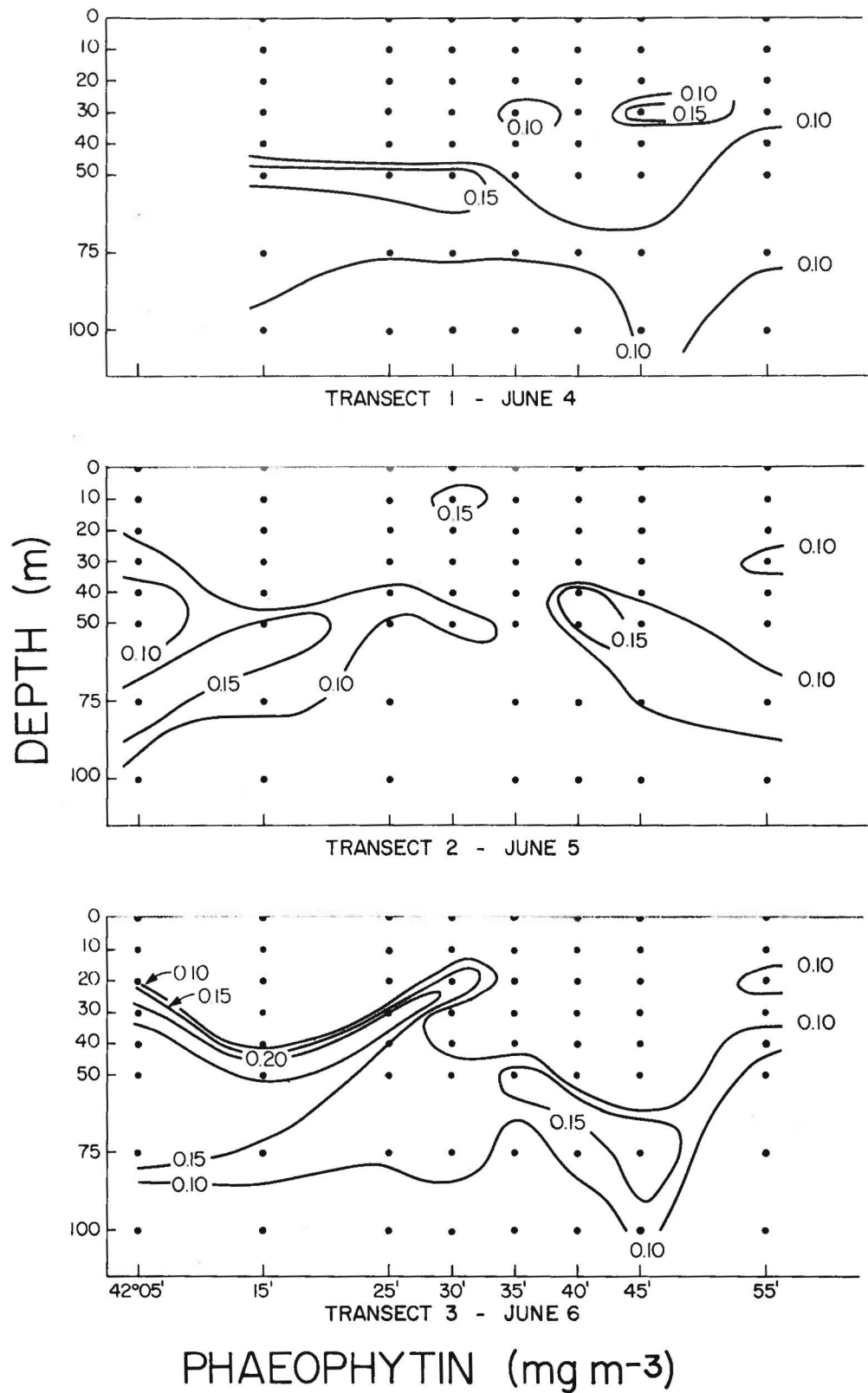


Fig. 3 Phaeophytin concentrations (mg m^{-3}) along the transect, June 4, June 5, and June 6.

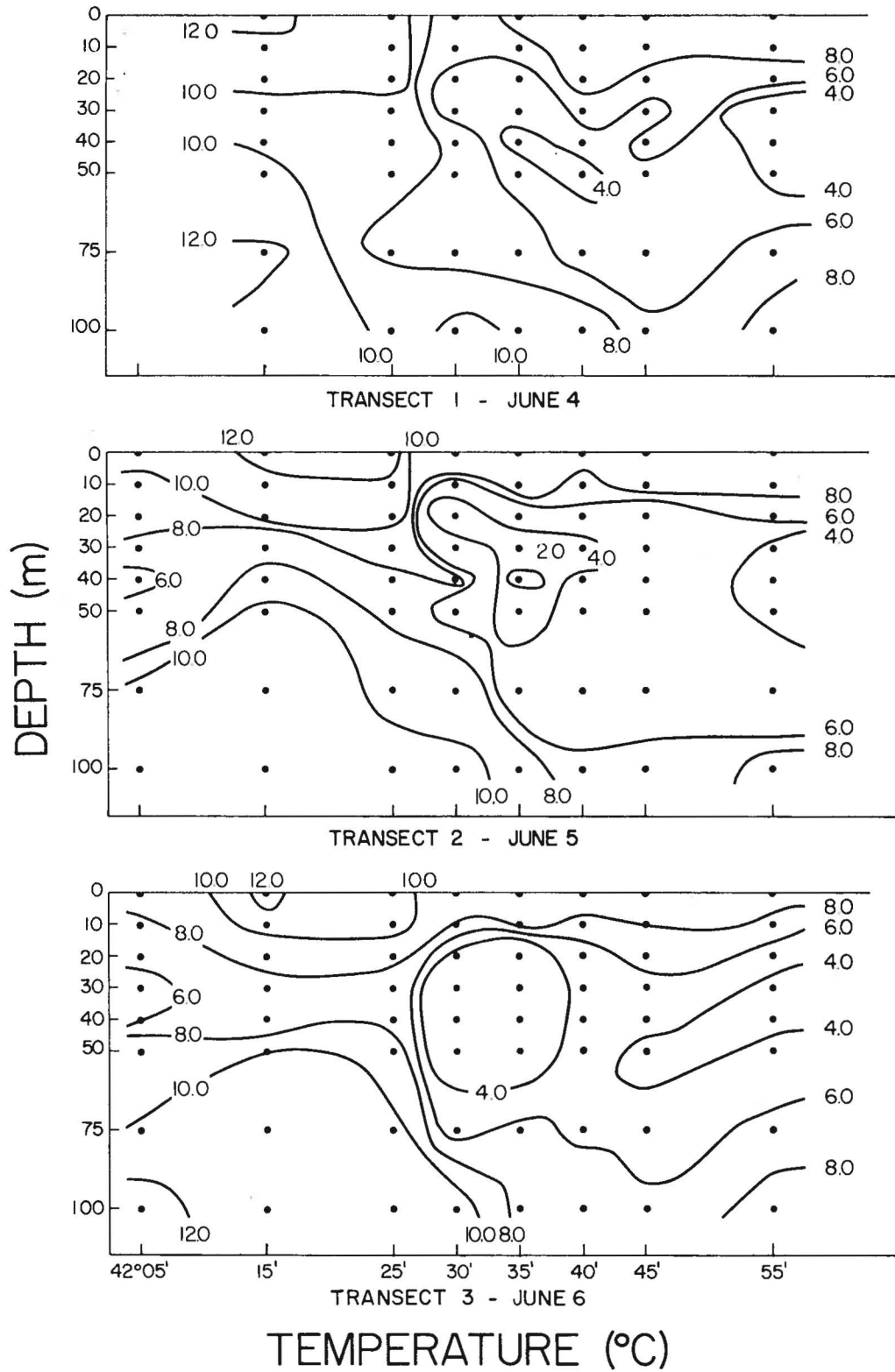


Fig. 4 Temperature distribution ($T^{\circ}\text{C}$) along the transect June 4, June 5 and June 6.

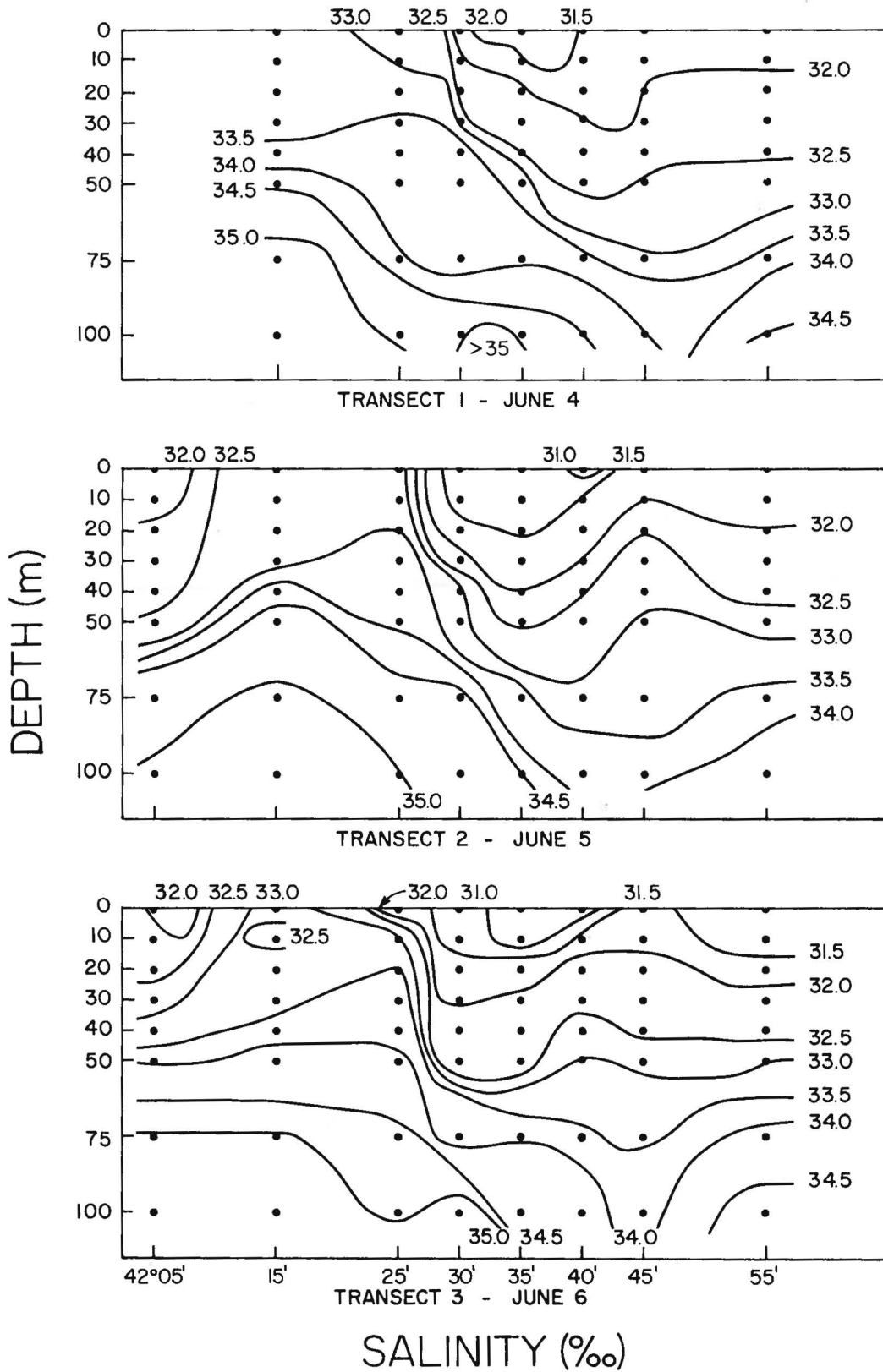


Fig. 5 Salinity distribution ($S^{\circ}/\text{‰}$) along the transect June 4, June 5 and June 6.

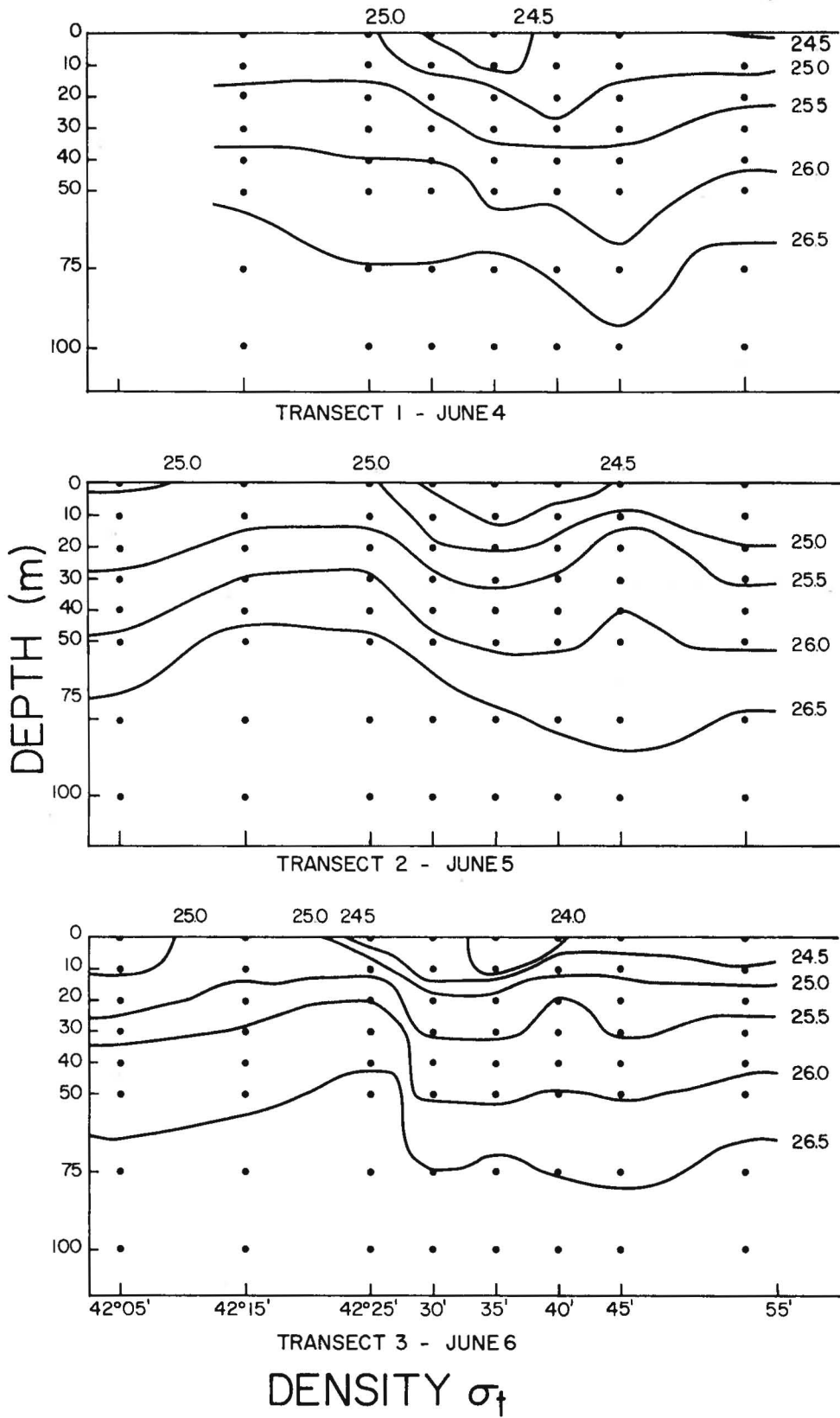


Fig. 6 Density distribution (σ_t) along the transect June 4, June 5 and June 6.

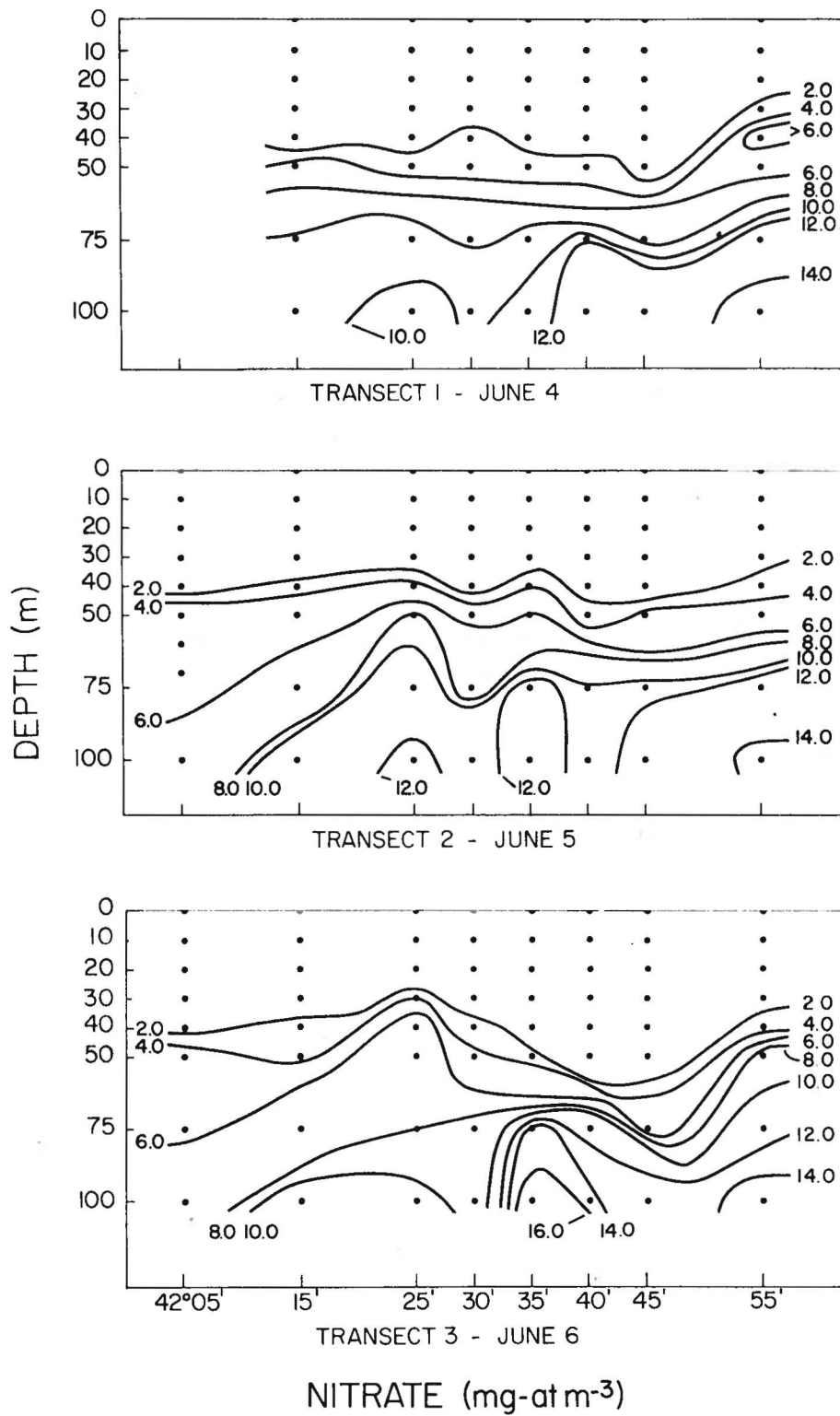


Fig. 7 Nitrate concentration (mg-at m^{-3}) along the transect June 4, June 5 and June 6.

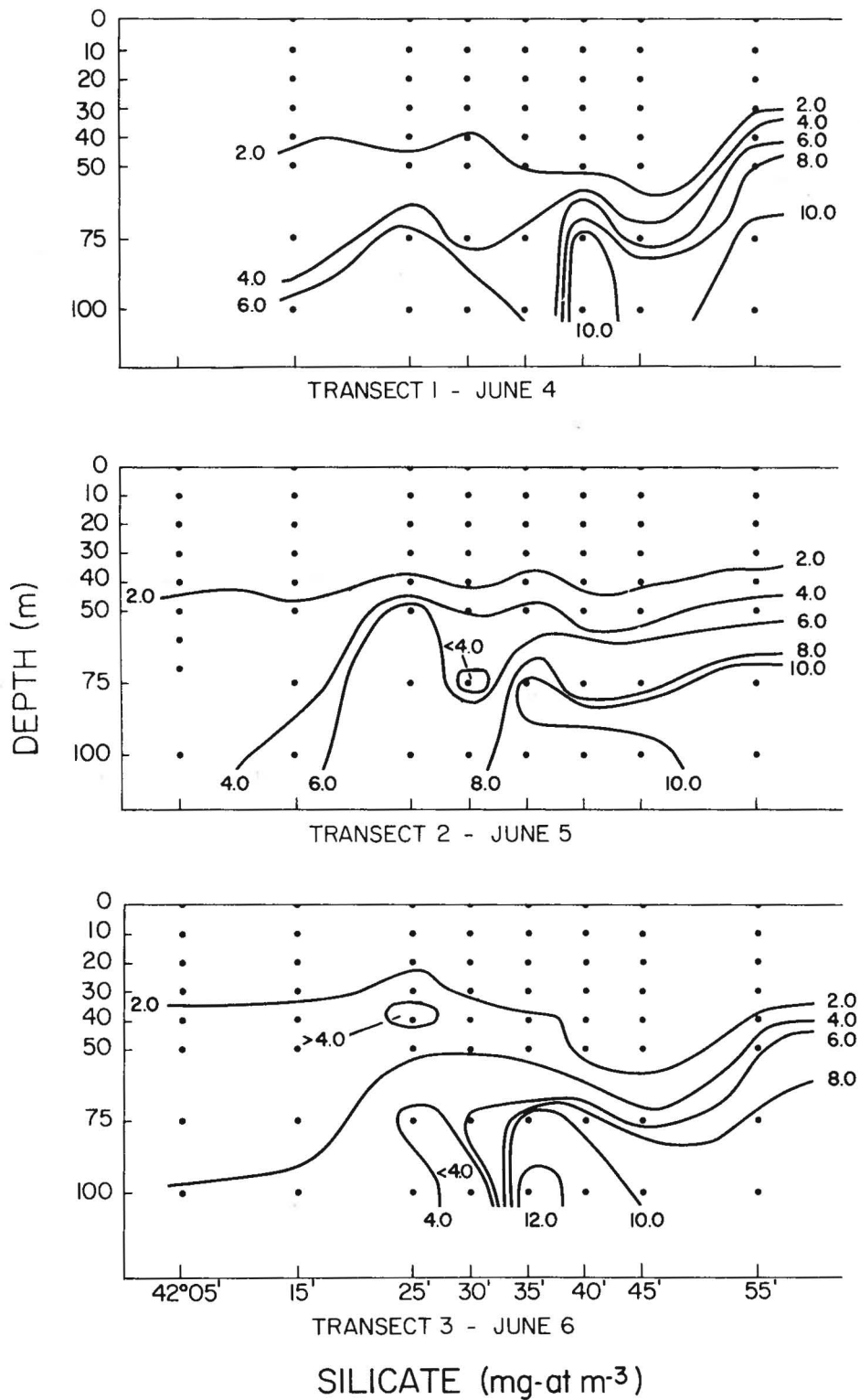


Fig. 8 Silicate concentrations (mg-at m⁻³) along the transect June 4, June 5 and June 6.

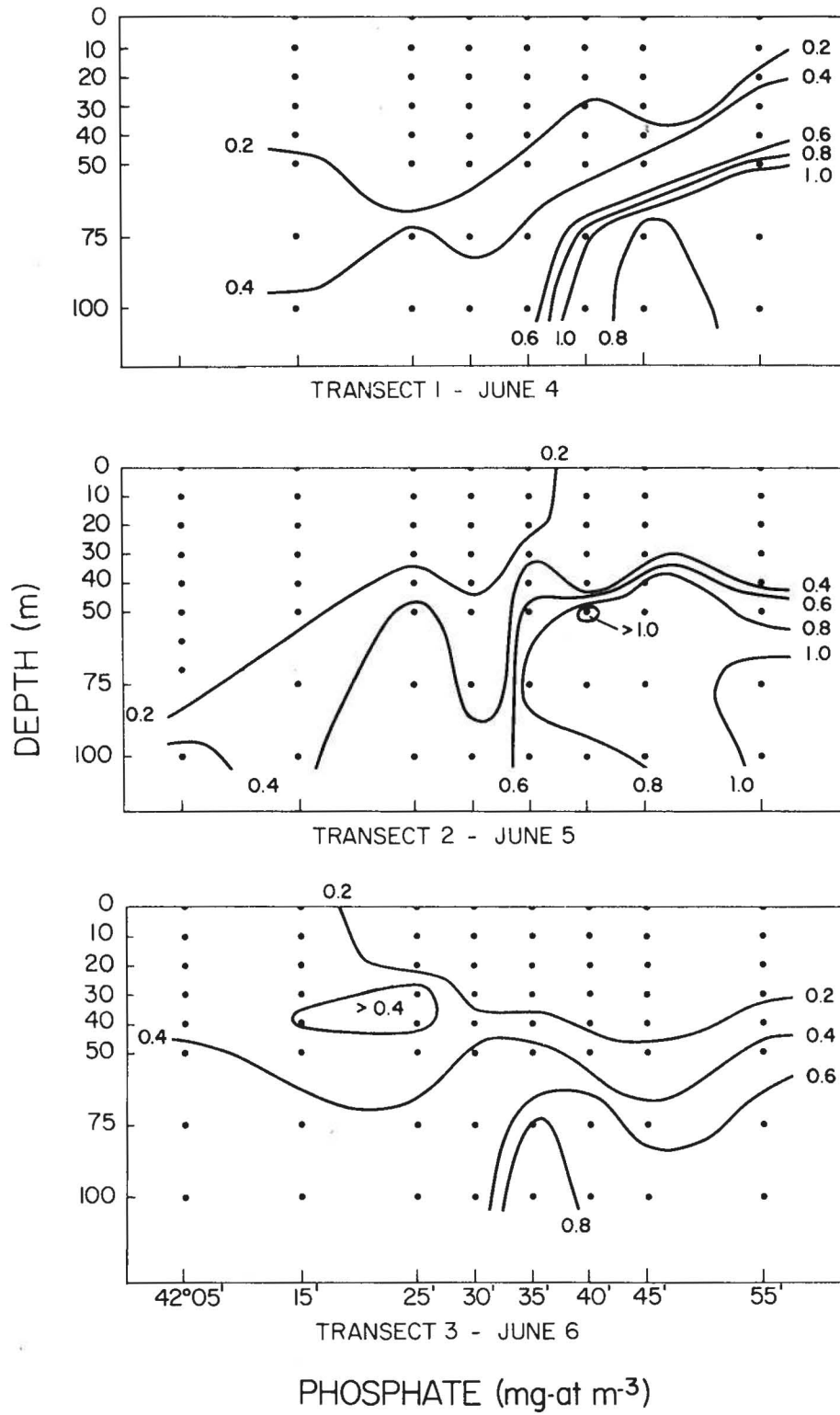


Fig. 9 Phosphate concentrations (mg-at m⁻³) along the transect June 4, June 5 and June 6.

LIGHT SATURATION TABLES

STATION NO.: Dawson 1

DATE: 03/06/78

LAT.: 44°57.2'N

LONG.: 63°37.7'W

DEPTH: 0 m

TIME: 1340 Z

Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹
219.2	7.23	267.4	7.12	708.0	8.72	788.0	7.88
84.7	5.89	92.7	5.58	508.0	9.57	549.0	8.16
34.6	2.66	36.2	2.81	322.0	8.90	331.0	7.90
14.3	0.97	18.8	1.30	160.2	8.55	159.0	7.73
5.8	0.41	7.9	0.52	83.5	7.04	88.7	6.90
3.3	0.13	5.4	0.22	56.9	5.43	57.2	5.46
1.8	0.06	3.0	0.01	30.5	4.60	26.8	3.51
1.3	0.02	1.9	0.06	22.1	2.79	20.9	2.45
0.9	0.04	1.4	0.02	15.6	1.86	15.3	1.56
0.5	0.02	0.7	0.02	11.3	1.30	10.9	0.84

Sample Temperature: 7.5°C

mg at m⁻³

Nitrate: 0.06
 Ammonia: 1.16
 Phosphate: 0.18
 Silicate: 0.30
 Salinity: 30.565 ‰

mg m⁻³

RNA: 7.12
 DNA: 4.02
 Chlorophyll: 0.34
 Particulate C: 354
 Particulate N: 30
 ATP: 0.27

90% Confidence Interval

Lower Upper

 α (mg C(mg Chl α)⁻¹hr⁻¹(W m⁻²)⁻¹)

0.13

0.12

0.15

R^B mg C(mg Chl α)⁻¹hr⁻¹

-0.32

-0.51

-0.12

P_m^B mg C(mg Chl α)⁻¹hr⁻¹

8.29

7.87

8.71

STATION NO.: Dawson 2

DATE: 04/06/78

LAT.: 42°25'N

LONG.: 63°25'W

DEPTH: 10 m

TIME: 0934 Z

Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹
397.6	3.59	267.2	3.76	504.0	2.76	783.0	2.37
125.6	3.33	94.0	3.62	298.0	3.20	504.0	2.67
42.0	2.49	34.9	2.17	154.0	2.96	298.0	3.49
17.2	1.22	14.1	1.00	69.0	3.10	154.0	2.94
9.2	0.56	7.0	0.42	46.0	2.57	69.0	2.87
5.0	0.25	3.3	0.15	35.7	1.94	46.0	2.79
2.9	0.10	2.1	0.07	18.1	1.40	35.7	1.91
1.7	0.10	1.4	0.02	12.4	0.91	18.1	1.51
1.0	0.12	1.1	0.05	8.8	0.71	12.4	1.13
0.6	0.00	0.6	0.00	-	-	8.8	0.69

Sample Temperature: 10.5 °C

	mg at m ⁻³	
Nitrate:	0.24	
Ammonia:	0.87	
Phosphate:	0.10	
Silicate:	0.84	
Salinity:	32.842	‰

	mg m ⁻³
RNA:	7.80
DNA:	4.98
Chlorophyll:	0.44
Particulate C:	148
Particulate N:	18
ATP:	0.94

90% Confidence Interval
Lower Upper

α (mg C(mg Chl α) ⁻¹ hr ⁻¹ (W m ⁻²) ⁻¹)	0.08	0.08	0.09
R ^B mg C(mg Chl α) ⁻¹ hr ⁻¹	-0.07	-0.12	-0.02
P _m ^B mg C(mg Chl α) ⁻¹ hr ⁻¹	3.41	3.29	3.53

STATION NO.: Dawson 2

DATE: 04/06/78

LAT.: 42°25'N

LONG.: 63°25'W

DEPTH: 40 m

TIME: 0934 Z

Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹
217.6	1.75	267.2	1.41				
87.0	1.67	93.0	1.63				
29.8	1.56	31.5	1.47				
12.3	0.95	15.7	1.06				
4.8	0.53	7.4	0.66				
3.0	0.32	4.3	0.38				
1.6	0.13	2.7	0.23				
1.0	0.10	1.8	0.13				
0.7	0.05	1.4	0.09				
0.4	0.03	0.8	0.03				

Sample Temperature: 9.2 °C

	mg at m ⁻³	
Nitrate:	0.06	
Ammonia:	0.07	
Phosphate:	0.18	
Silicate:	1.69	
Salinity:	33.712	‰

	mg m ⁻³
RNA:	10.14
DNA:	4.57
Chlorophyll:	1.84
Particulate C:	156
Particulate N:	24
ATP:	0.75

90% Confidence Interval
Lower Upper

α (mg C(mg Chl α) ⁻¹ hr ⁻¹ (W m ⁻²) ⁻¹)	0.10	0.09	0.11
R ^B mg C(mg Chl α) ⁻¹ hr ⁻¹	-0.02	-0.05	0.01
P _m ^B mg C(mg Chl α) ⁻¹ hr ⁻¹	1.66	1.60	1.72

STATION NO.: Dawson 5

DATE: 04/06/78

LAT.: 42°40'N

LONG.: 63°25'W

DEPTH: 10 m

TIME: 1314 Z

Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹
397.6	11.85	267.2	11.82	783.0	8.99	783.0	10.73
125.6	10.73	94.0	10.07	504.0	9.34	504.0	10.23
42.0	7.36	34.9	5.27	298.0	0.72	298.0	9.88
17.2	3.48	14.1	2.25	154.0	10.19	154.0	10.73
9.2	1.43	7.0	1.05	69.0	9.49	69.0	10.07
5.0	0.62	3.3	0.23	46.0	7.40	46.0	7.52
2.9	0.27	2.1	0.04	35.7	5.54	35.7	5.07
1.7	0.08	1.4	0.00	18.1	4.11	18.1	3.79
1.0	0.04	1.1	0.00	12.4	2.48	12.4	2.05
0.6	0.00	0.6	0.00	8.8	1.66	8.8	1.16

Sample Temperature: 9.1°C

mg at m⁻³

Nitrate: 0.00
 Ammonia: 0.00
 Phosphate: 0.19
 Silicate: 0.76
 Salinity: 31.822 ‰

mg m⁻³

RNA: 6.20
 DNA: 3.36
 Chlorophyll: 0.19
 Particulate C: 84
 Particulate N: 11
 ATP: 0.43

		90% Confidence Interval	
		Lower	Upper
α (mg C(mg Chl α) ⁻¹ hr ⁻¹ (W m ⁻²) ⁻¹)	0.22	0.20	0.23
R ^B mg C(mg Chl α) ⁻¹ hr ⁻¹	-0.35	-0.49	-0.20
P _m ^B mg C(mg Chl α) ⁻¹ hr ⁻¹	11.06	10.68	11.43

STATION NO.: Daswon 5

DATE: 04/06/78

LAT.: 42°40'N

LONG.: 63°25'W

DEPTH: 40 m

TIME: 1314 Z

Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹
217.6	2.67	267.2	2.52				
87.0	3.02	93.0	3.16				
29.8	2.06	31.5	2.59				
12.3	1.51	15.7	1.97				
4.8	0.71	7.4	1.00				
3.0	0.39	4.3	0.60				
1.6	0.22	2.7	0.41				
1.0	0.10	1.8	0.25				
0.7	0.05	1.4	0.14				
0.4	0.02	0.8	0.07				

Sample Temperature: 4.1°C

mg at m⁻³

Nitrate: 0.53
 Ammonia: 0.38
 Phosphate: 0.26
 Silicate: 1.29
 Salinity: 32.253 ‰

mg m⁻³

RNA: 5.06
 DNA: 4.24
 Chlorophyll: 0.70
 Particulate C: 92
 Particulate N: 15
 ATP: 0.32

90% Confidence Interval
 Lower Upper

α(mg C(mg Chl α)⁻¹hr⁻¹(W m⁻²)⁻¹) 0.13 0.12 0.13

R^B mg C(mg Chl α)⁻¹hr⁻¹ 0.01 -0.02 0.04

P_m^B mg C(mg Chl α)⁻¹hr⁻¹ 2.97 2.79 3.15

STATION NO.: Dawson 12

DATE: 05/06/78

LAT.: 42°35'N

LONG.: 63°25'W

DEPTH: 10 m

TIME: 1256 Z

Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹
397.6	8.77	267.2	8.05	783.0	10.73	783.0	10.76
125.6	7.42	94.0	7.06	504.0	10.24	504.0	10.63
42.0	4.18	34.9	3.81	298.0	9.98	298.0	9.73
17.2	2.10	14.1	1.65	154.0	9.25	154.0	9.31
9.2	0.84	7.0	0.75	69.0	8.32	69.0	7.96
5.0	0.30	3.3	0.27	46.0	6.07	46.0	6.28
2.9	0.09	2.1	0.18	35.7	4.18	35.7	4.38
1.7	0.06	1.4	0.06	18.1	2.91	18.1	3.07
1.0	0.00	1.1	0.09	12.4	1.68	12.4	2.16
0.6	0.00	0.6	0.06	8.8	0.93	8.8	1.20

Sample Temperature: 8.2°C

mg at m⁻³

Nitrate: 0.02
 Ammonia: 1.38
 Phosphate: 0.17
 Silicate: 0.41
 Salinity: 31.421 ‰

mg m⁻³

RNA: 5.59
 DNA: 4.08
 Chlorophyll: 0.24
 Particulate C: 106
 Particulate N: 14
 ATP: 0.39

90% Confidence Interval
 Lower Upper

α (mg C(mg Chl α)⁻¹hr⁻¹(W m⁻²)⁻¹) 0.16 0.14 0.17
 R^B mg C(mg Chl α)⁻¹hr⁻¹ -0.20 -0.38 -0.07
 P_m^B mg C(mg Chl α)⁻¹hr⁻¹ 9.74 9.32 10.16

STATION NO.: Dawson 12

DATE: 05/06/78

LAT.: 42°35'N

LONG.: 63°25'W

DEPTH: 40 m

TIME: 1256 Z

Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹
217.6	8.80	267.2	7.87				
87.0	8.80	93.0	8.80				
29.8	6.40	31.5	8.80				
12.3	4.93	15.7	6.40				
4.8	4.40	7.4	2.93				
3.0	1.00	4.3	1.93				
1.6	0.47	2.7	1.47				
1.0	0.00	1.8	1.00				
0.7	0.00	1.4	0.47				
0.4	0.00	0.8	0.00				

Sample Temperature: 1.5°C

	mg at m ⁻³	
Nitrate:	4.00	
Ammonia:	1.88	
Phosphate:	0.36	
Silicate:	2.35	
Salinity:	32.034	‰

	mg m ⁻³
RNA:	2.38
DNA:	1.93
Chlorophyll:	0.02
Particulate C:	85
Particulate N:	10
ATP:	0.24

19

		90% Confidence Interval	
		Lower	Upper
α (mg C(mg Chl α) ⁻¹ hr ⁻¹ (W m ⁻²) ⁻¹	0.42	0.34	0.50
R ^B mg C(mg Chl α) ⁻¹ hr ⁻¹	-0.08	-0.44	0.60
P _m ^B mg C(mg Chl α) ⁻¹ hr ⁻¹	8.86	8.07	9.68

STATION NO.: Dawson 15

DATE: 05/06/78

LAT.: 42°15'N

LONG.: 63°25'W

DEPTH: 10 m

TIME: 1632 Z

Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹
360.0	4.64	233.6	4.30	651.0	4.88	651.0	4.79
125.0	4.02	100.0	3.78	504.0	5.34	504.0	5.01
45.0	2.10	34.8	1.88	333.0	4.62	333.0	5.31
21.8	1.03	17.6	0.86	170.0	4.37	170.0	5.19
10.4	0.36	7.7	0.38	84.0	4.13	84.0	4.24
5.5	0.09	3.9	0.05	54.0	3.01	54.0	3.22
3.4	0.04	2.4	0.05	31.8	2.48	31.8	2.47
1.9	0.00	1.4	0.00	19.2	1.56	19.2	1.47
1.5	0.00	1.3	0.00	11.8	0.89	11.8	0.91
0.5	0.02	0.7	0.00	8.2	0.48	8.2	0.65

Sample Temperature: 11.6°C

	mg at m ⁻³	
Nitrate:	0.00	
Ammonia:	0.00	
Phosphate:	0.03	
Silicate:	0.98	
Salinity:	33.215	‰

	mg m ⁻³
RNA:	5.79
DNA:	4.07
Chlorophyll:	0.43
Particulate C:	144
Particulate N:	16
ATP:	0.59

90% Confidence Interval
Lower Upper

α (mg C(mg Chl α) ⁻¹ hr ⁻¹ (W m ⁻²) ⁻¹)	0.08	0.07	0.08
R ^B mg C(mg Chl α) ⁻¹ hr ⁻¹	-0.16	-0.26	-0.05
P _m ^B mg C(mg Chl α) ⁻¹ hr ⁻¹	4.88	4.67	5.09

STATION NO.: Dawson 15

DATE: 05/06/78

LAT.: 42°15'N

LONG.: 63°25'W

DEPTH: 40 m

TIME: 1632 Z

Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹
202.4	1.81	258.4	1.53				
78.0	1.84	68.0	1.97				
29.2	1.62	28.3	1.81				
14.6	1.11	13.8	1.30				
8.2	0.62	7.8	0.71				
4.3	0.33	4.4	0.41				
2.7	0.24	2.8	0.25				
1.7	0.13	1.7	0.15				
1.1	0.07	1.2	0.06				
0.7	0.03	0.7	0.04				

Sample Temperature: 9.3°C

	mg at m ⁻³	
Nitrate:	2.15	
Ammonia:	0.20	
Phosphate:	0.08	
Silicate:	1.76	
Salinity:	34.095	‰

	mg m ⁻³
RNA:	6.66
DNA:	5.51
Chlorophyll:	1.70
Particulate C:	154
Particulate N:	23
ATP:	0.88

90% Confidence Interval
Lower Upper

α (mg C(mg Chl α) ⁻¹ hr ⁻¹ (W m ⁻²) ⁻¹)	0.08	0.08	0.09
R ^B mg C(mg Chl α) ⁻¹ hr ⁻¹	-0.01	-0.5	0.03
P _m ^B mg C(mg Chl α) ⁻¹ hr ⁻¹	1.99	1.86	2.12

STATION NO.: Dawson 19

DATE: 05/06/78

LAT.: 42°40'N

LONG.: 63°25'W

DEPTH: 10 m

TIME: 1149 Z

Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹
360.0	6.51	233.6	7.21	651.0	5.80	651.0	6.62
125.0	5.06	100.0	6.45	504.0	5.50	504.0	6.60
45.6	3.66	34.8	5.19	333.0	6.58	333.0	7.19
21.8	2.21	17.6	2.83	170.0	6.30	170.0	6.97
10.4	0.99	7.7	1.30	84.0	6.10	84.0	6.67
5.5	0.43	3.9	0.59	54.0	4.85	54.0	5.61
3.4	0.17	2.4	0.35	31.8	3.87	31.8	4.26
1.9	0.09	1.4	0.17	19.2	2.55	19.2	3.36
1.5	0.04	1.3	0.06	11.8	1.71	11.8	2.14
0.5	0.04	0.7	0.02	8.2	1.12	8.2	1.43

Sample Temperature: 6.6°C

	mg at m ⁻³	
Nitrate:	0.14	
Ammonia:	0.49	
Phosphate:	0.08	
Silicate:	0.58	
Salinity:	31.734	‰

	mg m ⁻³
RNA:	5.06
DNA:	4.88
Chlorophyll:	0.34
Particulate C:	118
Particulate N:	16
ATP:	0.50

90% Confidence Interval
Lower Upper

α (mg C(mg Chl α) ⁻¹ hr ⁻¹ (W m ⁻²) ⁻¹)	0.16	0.15	0.18
R ^B mg C(mg Chl α) ⁻¹ hr ⁻¹	-0.15	-0.31	0.04
P _m ^B mg C(mg Chl α) ⁻¹ hr ⁻¹	6.63	6.31	6.96

STATION NO.: Dawson 19

DATE: 05/06/78

LAT.: 42°40'N

LONG.: 63°25'W

DEPTH: 40 m

TIME: 1149 Z

Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹
202.4	1.96	258.4	1.83				
78.0	2.20	68.0	2.42				
29.2	1.94	28.3	2.18				
14.6	1.27	13.8	1.60				
8.2	0.67	7.8	1.06				
4.3	0.43	4.4	0.60				
2.7	0.21	2.8	0.37				
1.7	0.11	1.7	0.17				
1.1	0.02	1.2	0.09				
0.7	0.00	0.7	0.02				

Sample Temperature: 4.9°C

	mg at m ⁻³	
Nitrate:	1.30	
Ammonia:	0.05	
Phosphate:	0.18	
Silicate:	1.82	
Salinity:	32.644	‰

	mg m ⁻³
RNA:	3.52
DNA:	2.15
Chlorophyll:	0.40
Particulate C:	96
Particulate N:	10
ATP:	0.30

90% Confidence Interval
Lower Upper

α (mg C(mg Chl α) ⁻¹ hr ⁻¹ (W m ⁻²) ⁻¹)	0.10	0.09	0.12
R ^B mg C(mg Chl α) ⁻¹ hr ⁻¹	-0.02	-0.12	0.08
P _m ^B mg C(mg Chl α) ⁻¹ hr ⁻¹	2.40	2.20	2.60

STATION NO.: Dawson 22

DATE: 06/06/78

LAT.: 42°25'N

LONG.: 63°25'W

DEPTH: 10 m

TIME: 1439 Z

Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹
219.2	7.50	123.0	8.41	628.0	8.49	628.0	8.49
90.0	5.75	41.3	7.22	511.0	8.52	511.0	7.98
37.1	3.28	18.6	4.16	316.0	7.95	316.0	8.92
18.2	1.58	7.9	1.92	168.0	7.81	168.0	7.98
7.4	0.48	4.4	0.82	74.0	6.71	74.0	6.34
4.3	0.20	2.8	0.25	47.0	5.41	47.0	4.90
2.9	0.03	1.6	0.03	31.8	3.82	31.8	3.65
1.8	0.03	1.2	0.00	22.8	2.49	22.8	2.21
1.4	0.06	0.7	0.00	13.0	1.53	13.0	1.44
0.9	0.03	-	-	9.8	1.29	9.8	0.96

Sample Temperature: 11.1°C

	mg at m ⁻³	
Nitrate:	0.05	
Ammonia:	0.00	
Phosphate:	0.26	
Silicate:	0.82	
Salinity:	33.267	‰

	mg m ⁻³
RNA:	6.12
DNA:	3.99
Chlorophyll:	0.26
Particulate C:	122
Particulate N:	14
ATP:	0.69

90% Confidence Interval
Lower Upper

α (mg C(mg Chl α) ⁻¹ hr ⁻¹ (W m ⁻²) ⁻¹)	0.12	0.10	0.14
R ^B mg C(mg Chl α) ⁻¹ hr ⁻¹	-0.06	-0.35	0.24
P _m ^B mg C(mg Chl α) ⁻¹ hr ⁻¹	8.30	7.85	8.75

STATION NO.: Dawson 22

DATE: 06/06/78

LAT.: 42°25'N

LONG.: 63°25'W

DEPTH: 40 m

TIME: 1439 Z

Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹	Light W m ⁻²	Specific Production mg C(mg Chl α) ⁻¹ hr ⁻¹
148.8	10.27	251.2	10.24				
54.0	10.11	97.0	9.73				
18.8	7.36	33.7	8.93				
8.8	4.48	15.3	6.08				
4.4	2.49	7.6	3.36				
2.9	1.06	4.0	1.86				
1.8	0.51	2.4	1.06				
1.0	0.26	1.6	0.42				
0.7	0.07	1.2	0.19				
0.4	0.00	0.7	0.00				

Sample Temperature: 7.1°C

	mg at m ⁻³	
Nitrate:	6.97	
Ammonia:	0.54	
Phosphate:	0.40	
Silicate:	4.68	
Salinity:	33.742 ‰	

	mg m ⁻³
RNA:	2.92
DNA:	1.52
Chlorophyll:	0.23
Particulate C:	52
Particulate N:	6
ATP:	0.21

90% Confidence Interval
Lower Upper

α (mg C(mg Chl α) ⁻¹ hr ⁻¹ (W m ⁻²) ⁻¹)	0.53	0.49	0.57
R ^B mg C(mg Chl α) ⁻¹ hr ⁻¹	-0.32	-0.48	-0.17
P _m ^B mg C(mg Chl α) ⁻¹ hr ⁻¹	10.27	10.09	10.52

NUTRIENT AND BIOMASS TABLES

STATION NO. Dawson 1

DATE: 03/06/78

LAT.: 44°57'N

LONG.: 63°38'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m^{-3}	PHAEOPHYTIN mg m^{-3}
0	7.5	30.56	23.88	0.34	0.10
10					
20					
30					
40					
50					
75					
100					

DEPTH m	PHOSPHATE mg-at m^{-3}	SILICATE mg-at m^{-3}	NITRATE mg-at m^{-3}	AMMONIA mg-at m^{-3}
0	0.18	0.30	0.06	1.16
10				
20				
30				
40				
50				
75				
100				

STATION NO. Dawson 2

DATE: 04/06/78

LAT.: 42°25'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m ⁻³	PHAEOPHYTIN mg m ⁻³
0	10.2	32.73	25.16	0.38	0.00
10	10.58	32.84	25.20	0.44	0.00
20	10.48	33.35	25.61	0.95	0.00
30	9.72	33.59	25.92	1.49	0.00
40	9.23	33.71	26.09	1.84	0.00
50	9.08	33.92	26.28	0.50	0.16
75	7.33	33.95	26.57	0.08	0.10
100	9.49	34.72	26.84	0.03	0.04

DEPTH m	PHOSPHATE mg-at m ⁻³	SILICATE mg-at m ⁻³	NITRATE mg-at m ⁻³	AMMONIA mg-at m ⁻³
0	0.06	1.22	0.06	0.07
10	0.10	0.84	0.24	0.87
20	0.06	1.08	0.18	0.00
30	0.08	1.22	0.10	0.47
40	0.18	1.69	0.06	0.07
50	0.08	2.15	2.22	0.16
75	0.52	6.14	9.72	0.00
100	0.54	7.22	10.62	0.30

STATION NO. Dawson 3

DATE: 04/06/78

LAT.: 42°30'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m^{-3}	PHAEOPHYTIN mg m^{-3}
0	7.5	31.28	24.45	0.28	0.01
10	7.83	31.83	24.84	0.21	0.06
20	5.91	32.26	25.42	0.64	0.02
30	4.38	32.44	25.74	1.20	0.00
40	7.93	33.36	26.01	1.35	0.01
50	7.72	33.62	26.25	0.32	0.16
75	6.88	33.84	26.54	0.04	0.11
100	10.86	35.04	26.86	0.04	0.08

DEPTH m	PHOSPHATE mg-at m^{-3}	SILICATE mg-at m^{-3}	NITRATE mg-at m^{-3}	AMMONIA mg-at m^{-3}
0	0.21	0.30	0.09	0.18
10	0.10	0.54	0.06	0.00
20	0.14	0.46	0.03	0.04
30	0.10	1.54	0.69	0.42
40	0.34	3.07	3.04	0.64
50	0.18	2.76	3.20	0.09
75	0.26	3.14	7.35	0.00
100	0.57	6.76	9.42	0.04

STATION NO. Dawson 4

DATE: 04/06/78

LAT.: 42°35'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m ⁻³	PHAEOPHYTIN mg m ⁻³
0	8.2	31.23	24.31	0.39	0.04
10	7.66	31.28	24.42	0.28	0.04
20	4.88	31.91	25.26	0.22	0.07
30	4.62	32.11	25.45	0.33	0.11
40	3.92	32.18	25.57	1.13	0.00
50	4.04	32.54	25.85	0.40	0.09
75	7.84	34.09	26.60	0.06	0.10
100	9.99	34.83	26.84	0.03	0.02

DEPTH m	PHOSPHATE mg-at m ⁻³	SILICATE mg-at m ⁻³	NITRATE mg-at m ⁻³	AMMONIA mg-at m ⁻³
0	0.18	0.30	0.00	0.27
10	0.28	0.30	0.03	0.00
20	0.11	0.76	0.06	0.00
30	0.18	0.92	0.10	0.29
40	0.18	0.92	0.00	0.00
50	0.22	1.91	2.38	0.47
75	0.44	4.83	8.26	0.04
100	0.57	5.50	11.38	0.00

STATION NO. Dawson 5

DATE: 04/06/78

LAT.: 42°40'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m ⁻³	PHAEOPHYTIN mg m ⁻³
0	9.0	31.88	24.70	0.25	0.06
10	9.08	31.82	24.64	0.19	0.03
20	8.06	31.98	24.92	0.20	0.01
30	7.09	31.95	25.03	0.26	0.09
40	4.11	32.25	25.62	0.70	0.00
50	3.84	32.49	25.83	0.31	0.08
75	5.47	33.51	26.46	0.03	0.12
100	8.20	34.38	26.78	0.01	0.09

DEPTH m	PHOSPHATE mg-at m ⁻³	SILICATE mg-at m ⁻³	NITRATE mg-at m ⁻³	AMMONIA mg-at m ⁻³
0	0.49	0.68	0.20	0.69
10	0.19	0.76	0.00	0.00
20	0.15	0.38	0.00	0.62
30	0.22	0.54	0.00	0.98
40	0.23	1.29	0.53	0.38
50	0.30	1.83	2.28	0.48
75	1.07	10.06	12.28	0.00
100	1.16	10.36	12.40	0.67

STATION NO. Dawson 6

DATE: 04/06/78

LAT.: 42°45'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m ⁻³	PHAEOPHYTIN mg m ⁻³
0	8.8	31.66	24.56	0.19	0.04
10	8.14	31.86	24.82	0.21	0.03
20	6.98	32.12	25.18	0.38	0.04
30	5.74	32.29	25.47	0.46	0.19
40	6.04	32.46	25.58	0.61	0.08
50	5.45	32.61	25.75	0.86	0.00
75	4.54	33.03	26.18	0.16	0.11
100	6.55	33.90	26.63	0.03	0.12

DEPTH m	PHOSPHATE mg-at m ⁻³	SILICATE mg-at m ⁻³	NITRATE mg-at m ⁻³	AMMONIA mg-at m ⁻³
0	0.18	0.61	0.03	0.44
10	0.28	0.72	0.00	0.00
20	0.08	0.61	0.00	0.07
30	0.16	0.61	0.00	0.44
40	0.28	0.92	0.00	0.72
50	0.44	0.92	0.00	0.22
75	0.85	4.87	7.40	0.10
100	0.78	9.70	12.72	0.00

STATION NO. Dawson 7

DATE: 04/06/78

LAT.: 42°55'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m^{-3}	PHAEOPHYTIN mg m^{-3}
0	9.1	31.64	24.50	0.21	0.01
10	8.30	31.63	24.61	0.24	0.02
20	6.11	32.31	25.44	0.40	0.06
30	2.98	32.20	25.68	0.42	0.06
40	2.71	32.48	25.92	0.26	0.13
50	3.62	32.86	26.14	0.08	0.12
75	6.54	33.90	26.63	0.01	0.14
100	8.57	34.57	26.87	0.01	0.09

DEPTH m	PHOSPHATE mg-at m^{-3}	SILICATE mg-at m^{-3}	NITRATE mg-at m^{-3}	AMMONIA mg-at m^{-3}
0	0.64	0.54	0.11	0.00
10	0.12	0.62	0.09	0.00
20	0.26	0.78	0.09	0.32
30	0.55	2.38	2.40	0.18
40	0.57	5.16	6.68	0.47
50	1.06	8.02	4.84	0.05
75	0.96	10.72	13.22	0.00
100	1.04	10.13	14.16	0.00

STATION NO. Dawson 8

DATE: 04/06/78

LAT.: 42°15'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m^{-3}	PHAEOPHYTIN mg m^{-3}
0	12.5	33.17	25.10	0.51	0.00
10	11.56	33.26	25.34	0.33	0.00
20	10.46	33.31	25.57	0.47	0.00
30	9.70	33.34	25.72	0.54	0.07
40	9.06	33.87	26.24	2.91	0.00
50	10.18	34.55	26.59	0.40	0.15
75	12.02	35.29	26.83	0.03	0.12
100	11.83	35.29	26.87	0.01	0.07

DEPTH m	PHOSPHATE mg-at m^{-3}	SILICATE mg-at m^{-3}	NITRATE mg-at m^{-3}	AMMONIA mg-at m^{-3}
0	0.20	1.08	0.13	0.18
10	0.24	0.46	0.11	0.00
20	0.19	1.00	0.09	0.40
30	0.06	1.11	0.00	0.00
40	0.16	1.50	0.04	0.00
50	0.21	2.54	4.99	0.02
75	0.38	3.58	8.04	0.14
100	0.42	-	8.44	0.16

STATION NO. Dawson 9

DATE: 05/06/78

LAT.: 42°55'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m ⁻³	PHAEOPHYTIN mg m ⁻³
0	9.0	31.75	24.60	0.25	0.02
10	8.75	31.82	24.69	0.25	0.00
20	7.08	32.03	25.10	0.24	0.04
30	3.82	32.04	25.47	0.56	0.11
40	3.12	32.33	25.77	0.45	0.08
50	3.57	32.69	25.99	0.36	0.05
75	5.43	33.56	26.51	0.01	0.12
100	8.16	34.42	26.82	0.01	0.07

DEPTH m	PHOSPHATE mg-at m ⁻³	SILICATE mg-at m ⁻³	NITRATE mg-at m ⁻³	AMMONIA mg-at m ⁻³
0	-	0.38	0.09	0.00
10	0.28	0.46	0.16	0.00
20	0.25	0.93	0.09	0.00
30	-	1.18	0.03	0.14
40	0.38	2.38	3.02	0.47
50	0.68	4.52	5.62	0.67
75	1.10	10.32	12.63	0.00
100	1.04	10.61	14.70	1.04

STATION NO. Dawson 10

DATE: 05/06/78

LAT.: 42°45'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m^{-3}	PHAEOPHYTIN mg m^{-3}
0	9.5	31.75	24.52	0.26	0.04
10	6.35	32.03	25.19	0.29	0.00
20	5.80	32.49	25.62	0.67	0.06
30	5.79	32.80	25.86	1.21	0.00
40	5.69	32.96	26.00	0.60	0.08
50	5.56	33.07	26.10	0.35	0.11
75	5.04	33.32	26.36	0.08	0.10
100	6.39	33.77	26.56	0.04	0.09

DEPTH m	PHOSPHATE mg-at m^{-3}	SILICATE mg-at m^{-3}	NITRATE mg-at m^{-3}	AMMONIA mg-at m^{-3}
0	0.56	0.39	0.17	0.98
10	-	0.62	0.11	0.00
20	0.26	0.78	0.09	0.00
30	0.32	1.32	0.06	0.29
40	0.84	1.90	1.44	0.42
50	0.76	2.94	4.22	0.88
75	0.98	7.94	10.89	0.00
100	0.94	8.57	12.69	0.20

STATION NO. Dawson 11

DATE: 05/06/78

LAT.: 42°40'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m^{-3}	PHAEOPHYTIN mg m^{-3}
0	8.8	30.98	24.03	0.33	0.01
10	7.23	31.50	24.66	0.28	0.04
20	4.19	31.85	25.29	0.39	0.07
30	3.14	32.09	25.58	0.93	0.00
40	4.40	32.50	25.78	0.33	0.18
50	4.43	32.67	25.92	0.28	0.16
75	5.00	33.29	26.34	0.11	0.08
100	6.94	33.97	26.64	0.04	0.09

DEPTH m	PHOSPHATE mg-at m^{-3}	SILICATE mg-at m^{-3}	NITRATE mg-at m^{-3}	AMMONIA mg-at m^{-3}
0	0.22	0.31	0.13	0.72
10	0.38	0.31	0.09	0.14
20	0.29	0.70	0.09	0.02
30	0.30	1.58	0.98	0.24
40	0.26	1.94	1.26	0.65
50	1.18	2.46	2.70	1.04
75	0.84	7.30	10.17	0.00
100	0.60	8.86	11.30	0.88

STATION NO. Dawson 12

DATE: 05/06/78

LAT.: 42°35'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m^{-3}	PHAEOPHYTIN mg m^{-3}
0	8.7	31.29	24.24	0.30	0.05
10	8.22	31.42	24.46	0.24	0.04
20	5.51	31.48	24.85	0.54	0.00
30	3.42	31.86	25.37	0.08	0.00
40	1.50	32.03	25.66	0.02	0.02
50	2.41	32.46	25.93	0.01	0.02
75	5.89	33.71	26.57	0.00	0.02
100	8.91	34.55	26.80	0.01	0.00

DEPTH m	PHOSPHATE mg-at m^{-3}	SILICATE mg-at m^{-3}	NITRATE mg-at m^{-3}	AMMONIA mg-at m^{-3}
0	0.42	0.16	0.08	0.49
10	0.17	0.41	0.02	1.38
20	0.18	0.24	0.04	0.00
30	0.34	1.06	0.06	0.04
40	0.56	2.35	4.00	1.88
50	0.60	5.62	6.65	0.98
75	0.90	11.67	14.04	0.14
100	0.67	8.56	12.52	0.04

STATION NO. Dawson 13

DATE: 05/06/78

LAT.: 42°30'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m^{-3}	PHAEOPHYTIN mg m^{-3}
0	9.0	31.38	24.31	0.26	0.09
10	4.64	31.43	24.91	0.28	0.13
20	3.02	31.63	25.22	0.72	0.09
30	5.74	32.35	25.52	0.92	0.07
40	8.18	33.19	25.85	1.50	0.00
50	5.76	33.14	26.14	0.31	0.12
75	9.64	34.67	26.78	-	-
100	10.44	34.95	26.86	-	-

DEPTH m	PHOSPHATE mg-at m^{-3}	SILICATE mg-at m^{-3}	NITRATE mg-at m^{-3}	AMMONIA mg-at m^{-3}
0	0.10	0.33	0.00	0.09
10	0.12	0.41	0.00	0.10
20	0.14	0.82	0.00	0.07
30	0.10	0.98	0.00	0.22
40	0.09	1.26	0.39	0.05
50	0.36	4.12	4.40	0.12
75	0.30	3.61	7.35	0.87
100	0.56	6.49	11.08	0.00

STATION NO. Dawson 14

DATE: 05/06/78

LAT.: 42°25'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m ⁻³	PHAEOPHYTIN mg m ⁻³
0	12.0	33.18	25.19	0.45	0.00
10	11.45	33.21	25.32	0.47	0.00
20	10.13	33.50	25.78	1.31	0.00
30	8.84	33.68	26.12	1.32	0.00
40	7.22	33.63	26.33	0.35	0.11
50	7.36	33.96	26.57	0.06	0.06
75	9.01	34.58	26.80	0.28	0.02
100	10.54	35.02	26.89	0.01	0.05

DEPTH m	PHOSPHATE mg-at m ⁻³	SILICATE mg-at m ⁻³	NITRATE mg-at m ⁻³	AMMONIA mg-at m ⁻³
0	0.01	0.66	0.02	0.90
10	0.04	0.82	0.00	0.10
20	0.04	1.06	0.00	0.25
30	0.10	1.64	0.87	0.32
40	0.24	3.36	4.66	0.00
50	0.54	6.12	9.74	0.36
75	0.59	6.88	11.34	0.36
100	0.60	6.55	12.04	0.00

STATION NO. Dawson 15

DATE: 05/06/78

LAT.: 42°15'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m^{-3}	PHAEOPHYTIN mg m^{-3}
0	12.3	33.22	25.17	0.38	0.00
10	11.65	33.22	25.29	0.43	0.00
20	10.10	33.33	25.66	0.48	0.02
30	7.74	33.42	26.09	1.25	0.00
40	9.36	34.10	26.37	1.70	0.00
50	10.48	34.65	26.61	0.27	0.18
75	11.88	35.22	26.80	0.04	0.13
100	11.90	35.27	26.83	0.03	0.07

DEPTH m	PHOSPHATE mg-at m^{-3}	SILICATE mg-at m^{-3}	NITRATE mg-at m^{-3}	AMMONIA mg-at m^{-3}
0	0.02	1.22	0.00	0.29
10	0.03	0.98	0.00	0.00
20	0.20	0.90	0.00	0.00
30	0.01	0.98	0.00	0.09
40	0.08	1.76	2.15	0.20
50	0.18	2.86	5.68	0.04
75	0.36	3.36	7.75	0.44
100	0.39	4.28	10.11	0.60

STATION NO. Dawson 16

DATE: 05/06/78

LAT.: 42°05'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m^{-3}	PHAEOPHYTIN mg m^{-3}
0	10.0	32.37	24.92	0.25	0.05
10	9.38	32.39	25.04	0.25	0.00
20	8.11	32.58	25.38	0.31	0.05
30	7.80	32.76	25.57	0.49	0.14
40	5.14	32.62	25.80	1.20	0.00
50	6.03	33.16	26.12	0.65	0.04
75	11.28	34.97	26.72	0.11	0.18
100	11.62	35.14	26.78	0.04	0.09

DEPTH m	PHOSPHATE mg-at m^{-3}	SILICATE mg-at m^{-3}	NITRATE mg-at m^{-3}	AMMONIA mg-at m^{-3}
0	0.04	0.65	0.00	0.47
10	0.05	0.46	0.00	0.00
20	0.02	0.49	0.00	0.00
30	0.16	0.82	0.00	0.12
40	0.12	1.26	0.28	1.98
50	0.32	3.78	4.16	0.30
75	0.13	2.18	4.78	0.02
100	0.42	3.28	7.48	0.90

STATION NO. Dawson 17

DATE: 06/06/78

LAT.: 42°55'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m^{-3}	PHAEOPHYTIN mg m^{-3}
0	8.9	31.34	24.30	0.26	0.04
10	7.50	31.36	24.52	0.18	0.04
20	4.32	31.77	25.21	0.29	0.13
30	3.57	32.13	25.57	1.29	0.00
40	3.32	32.39	25.80	0.51	0.10
50	4.12	32.97	26.18	0.21	0.06
75	7.20	34.11	26.71	0.15	0.00
100	9.21	34.74	26.90	0.01	0.07

DEPTH	PHOSPHATE mg-at m^{-3}	SILICATE mg-at m^{-3}	NITRATE mg-at m^{-3}	AMMONIA mg-at m^{-3}
0	0.13	0.33	0.20	0.04
10	0.08	0.33	0.02	0.00
20	0.08	0.66	0.00	0.76
30	0.20	1.48	0.23	0.18
40	0.34	2.80	3.38	0.40
50	0.73	7.00	9.74	0.00
75	0.73	9.06	11.74	0.60
100	0.74	8.65	14.16	0.44

STATION NO. Dawson 18

DATE: 06/06/78

LAT.: 42°45'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m ⁻³	PHAEOPHYTIN mg m ⁻³
0	9.3	31.62	24.45	0.14	0.01
10	8.38	31.71	24.66	0.15	0.02
20	6.70	32.15	25.24	0.18	0.04
30	4.98	32.22	25.50	0.54	0.02
40	4.58	32.34	25.64	1.14	0.00
50	5.42	32.63	25.78	0.99	0.00
75	5.03	33.34	26.38	0.08	0.17
100	6.22	33.80	26.60	0.01	0.10

DEPTH	PHOSPHATE mg-at m ⁻³	SILICATE mg-at m ⁻³	NITRATE mg-at m ⁻³	AMMONIA mg-at m ⁻³
0	0.14	0.41	0.00	0.07
10	0.12	0.41	0.00	-
20	0.26	0.49	0.00	0.00
30	0.23	0.66	0.00	0.07
40	0.17	1.48	0.71	0.45
50	0.22	1.15	0.35	0.00
75	0.51	4.70	4.76	0.16
100	0.65	9.89	13.58	0.22

STATION NO. Dawson 19

DATE: 06/06/78

LAT.: 42°40'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m ⁻³	PHAEOPHYTIN mg m ⁻³
0	8.5	30.86	23.98	0.27	0.01
10	6.62	31.73	24.92	0.34	0.01
20	5.21	32.22	25.53	0.76	0.02
30	4.98	32.38	25.63	1.71	0.00
40	4.92	32.64	25.84	0.40	0.09
50	5.94	33.05	26.04	0.40	0.03
75	5.92	33.60	26.48	0.08	0.14
100	7.44	34.16	26.72	0.41	0.06

DEPTH	PHOSPHATE mg-at m ⁻³	SILICATE mg-at m ⁻³	NITRATE mg-at m ⁻³	AMMONIA mg-at m ⁻³
0	0.16	0.41	0.00	-
10	0.08	0.58	0.14	0.49
20	0.12	0.99	0.07	0.18
30	0.13	1.15	0.00	0.09
40	0.18	1.82	1.30	0.05
50	0.21	1.65	1.53	0.20
75	0.72	8.16	11.39	0.38
100	0.76	10.30	14.16	0.00

STATION NO. Dawson 20

DATE: 06/06/78

LAT.: 42°35'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m ⁻³	PHAEOPHYTIN mg m ⁻³
0	8.8	30.80	23.88	-	-
10	8.10	30.80	23.99	0.17	0.05
20	2.95	31.56	25.17	0.53	0.08
30	3.41	32.02	25.50	1.31	0.04
40	3.20	32.14	25.61	-	-
50	2.88	32.67	25.82	0.13	0.15
75	6.34	33.90	26.67	0.06	0.04
100	7.42	34.22	26.77	0.03	0.07

DEPTH	PHOSPHATE mg-at m ⁻³	SILICATE mg-at m ⁻³	NITRATE mg-at m ⁻³	AMMONIA mg-at m ⁻³
0	0.07	0.24	0.00	0.16
10	0.05	0.33	0.00	0.92
20	0.15	0.41	0.00	0.12
30	0.18	1.40	0.32	0.00
40	0.28	2.06	1.46	0.29
50	0.47	2.78	5.43	0.34
75	0.88	10.72	13.69	0.09
100	0.98	13.44	16.64	0.00

STATION NO. Dawson 21

DATE: 06/06/78

LAT.: 42°30'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m^{-3}	PHAEOPHYTIN mg m^{-3}
0	8.9	31.18	24.17	0.18	0.04
10	7.97	31.28	24.38	0.19	0.06
20	3.89	31.55	25.08	0.40	0.19
30	3.12	31.90	25.43	0.95	0.01
40	2.90	32.16	25.65	0.72	0.06
50	2.52	32.32	25.81	0.31	0.14
75	3.87	33.63	26.50	0.01	0.14
100	11.64	35.21	26.94	0.04	0.08

DEPTH	PHOSPHATE mg-at m^{-3}	SILICATE mg-at m^{-3}	NITRATE mg-at m^{-3}	AMMONIA mg-at m^{-3}
0	0.27	0.16	0.09	0.58
10	0.06	0.32	0.00	0.05
20	0.08	0.49	0.00	0.42
30	0.15	1.32	0.21	0.00
40	0.34	2.48	2.52	0.36
50	0.59	3.98	4.63	0.94
75	0.59	6.73	9.61	0.00
100	0.38	3.46	9.75	0.20

STATION NO. Dawson 22

DATE: 06/06/78

LAT.: 42°25'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m^{-3}	PHAEOPHYTIN mg m^{-3}
0	10.0	31.66	24.37	0.18	0.01
10	11.08	33.27	25.44	0.26	0.01
20	8.08	33.50	26.10	1.25	0.00
30	6.80	33.58	26.35	0.15	0.20
40	7.09	33.74	26.44	0.23	0.10
50	8.48	34.22	26.61	0.08	0.10
75	10.64	34.97	26.83	0.03	0.12
100	10.56	34.99	26.86	0.00	0.08

DEPTH m	PHOSPHATE mg-at m^{-3}	SILICATE mg-at m^{-3}	NITRATE mg-at m^{-3}	AMMONIA mg-at m^{-3}
0	0.10	0.98	0.05	0.44
10	0.26	0.82	0.05	0.00
20	0.12	1.97	1.45	0.36
30	0.46	2.38	4.98	0.30
40	0.40	4.68	6.97	0.54
50	0.36	3.89	7.32	0.10
75	0.49	2.62	8.06	0.56
100	0.50	4.40	10.55	0.16

STATION NO. Dawson 23

DATE: 06/06/78

LAT.: 42°15'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m^{-3}	PHAEOPHYTIN mg m^{-3}
0	12.0	33.04	25.09	0.33	0.07
10	11.56	32.96	25.11	0.21	0.03
20	8.56	33.11	25.73	0.70	0.09
30	7.64	33.29	26.01	2.66	0.00
40	7.72	33.55	26.20	1.46	0.00
50	10.00	34.34	26.46	0.46	0.24
75	11.64	35.10	26.76	0.10	0.14
100	11.92	35.32	26.87	0.03	0.06

DEPTH m	PHOSPHATE mg-at m^{-3}	SILICATE mg-at m^{-3}	NITRATE mg-at m^{-3}	AMMONIA mg-at m^{-3}
0	0.22	0.86	0.11	0.54
10	-	0.99	0.00	0.40
20	0.23	1.32	0.00	0.22
30	0.22	1.52	0.09	0.00
40	0.40	2.46	2.12	0.04
50	0.24	2.04	3.78	0.00
75	0.48	3.14	7.24	0.00
100	0.49	4.41	10.16	0.47

STATION NO. Dawson 24

DATE: 06/06/78

LAT.: 42°05'N

LONG.: 63°25'W

DEPTH m	TEMP. °C	SALINITY ‰	DENSITY σ_t	CHLOROPHYLL mg m^{-3}	PHAEOPHYTIN mg m^{-3}
0	9.5	31.90	24.64	0.13	0.04
10	7.83	31.86	24.85	0.14	0.05
20	6.25	32.28	25.40	0.15	0.10
30	5.50	32.62	25.76	0.40	0.22
40	6.00	33.24	26.19	0.60	0.10
50	8.25	33.94	26.43	0.29	0.15
75	11.65	35.06	26.72	0.14	0.15
100	12.17	35.35	26.84	0.04	0.08

DEPTH	PHOSPHATE mg-at m^{-3}	SILICATE mg-at m^{-3}	NITRATE mg-at m^{-3}	AMMONIA mg-at m^{-3}
0	0.49	0.66	0.00	0.24
10	0.30	0.53	0.00	0.00
20	-	1.38	0.06	0.00
30	0.26	1.19	0.00	0.00
40	0.38	3.64	4.91	0.10
50	0.45	3.73	5.71	0.00
75	0.58	2.96	6.50	0.00
100	0.47	4.07	11.81	0.47