Rec'd 6/17/98

USGS
science for a changing world

DISSOLVED NUTRIENT DATA FOR THE SAN FRANCISCO BAY ESTUARY, CALIFORNIA, JANUARY THROUGH NOVEMBER 1995

U. S. GEOLOGICAL SURVEY

Open - File Report OFR 97 - 359

DISSOLVED NUTRIENT DATA FOR THE SAN FRANCISCO BAY ESTUARY, CALIFORNIA, JANUARY THROUGH NOVEMBER 1995

By Stephen W. Hager and Laurence E. Schemel

U.S. GEOLOGICAL SURVEY

Open-File Report OFR 97-359

Prepared as part of a continuing study of the
San Francisco Bay estuary

Menlo Park, California
1997

U.S. DEPARTMENT OF THE INTERIOR

BRUCE BABBITT, Secretary

U.S. GEOLOGICAL SURVEY

Gordon P. Eaton, Director

For additional information write to:

U.S. Geological Survey, WRD
345 Middlefield Road
Menlo Park, California 94025

Copies of this report can be purchased from:

U.S. Geological Survey
Information Services
Box 25286
Denver Federal Center
Denver, Colorado 80225

CONTENTS

ILLUSTRATIONS

TABLES

Data for northern San Francisco Bay

Data for southern San Francisco Bay
Channel stations

continued...

Data for southern San Francisco Bay
Shallow stations

CONVERSION FACTORS

Multiply	by	to obtain
μm (micrometers)	0.00003937	inches
mm (millimeters)	0.03937	inches
L (liters)	0.2642	gallons (U.S)
kPa (kiloPascals)	0.147	pounds per in2
μM (micromolar)	1	micromoles per liter
for NO_2^-, NO_3^-+ NO_2^-, and NH_4^+;		
μM	14.01	μg N per liter
for DRP;		
μM	30.97	μg P per liter
for DSi;		
μM	60.08	μg SiO2 per liter

DISSOLVED NUTRIENT DATA FOR THE SAN FRANCISCO BAY ESTUARY, CALIFORNIA, JANUARY THROUGH NOVEMBER 1995

By Stephen W. Hager and Laurence E. Schemel

ABSTRACT

The U.S. Geological Survey conducted hydrologic investigations in San Francisco Bay between January and November of 1995. Dissolved inorganic plant nutrients, nitrate, nitrite, ammonium, silica, and reactive phosphorus were measured in surface and in near-bottom waters at previously established locations in the channel portions of both northern and southern reaches of the bay, and at shallow water stations in the southern reach. This report presents the sampling and analytical methods and the data from these studies. Measured salinity values for the nutrient samples are also reported. Data on the variability due to sampling and sample handling procedures, and on the precision of the analytical methods are also presented.

INTRODUCTION

As part of a continuing study of the San Francisco Bay estuary, cruises were conducted between January and November 1995 (table 1). The main objective of these cruises was to examine the effects of different amounts of freshwater inflow to the bay on phytoplankton dynamics, and thus on the concentrations of the dissolved plant nutrients (nitrite, nitrate, ammonium, reactive phosphorus, silica, organic nitrogen and organic phosphorus). Sampling was also carried out in shallow water areas in the southern reach of the estuary to assess the differences and interactions between the deep water and shallow water areas. Salinity values, also routinely measured, are given for reference. The basic hydrologic data for these cruises are given by Edmunds and others (1997).

This report presents the sampling and analytical methods used for these studies and the data.

METHODS

Data were collected at previously established stations throughout the bay (table 2, fig. 1). At each channel station, a two-liter surface water sample for dissolved nutrients was collected from the bow pump of the R/V Polaris, simultaneously with the lowering of sensors for conductivity, temperature and depth (CTD, Sea-Bird Electronics model 9/11). The salinity of the pumped stream was continuously measured by a Sea-Bird Electronics Seacat thermosalinograph Model SBE 21, and averaged for each sampling interval by a Multiple Input Data Acquisition System, MIDAS (Oasis Associates, Waveland, MS). As a check on the adequacy of this sampling protocol, salinity bottles were also occasionally filled from the bulk

nutrient sample. These samples were analyzed in the laboratory using an Guildline Autosal 8400A salinometer. Where available, the bottle salinities are reported. Salinity is given in practical salinity units (psu; Lewis, 1980).

Bottom water samples were collected with an Interoceans Niskin bottle, suspended on a polypropylene line 1 meter above a lead weight. Water from the bottle was drained into a 2 L polyethylene bottle, after two rinses. Thereafter, surface and bottom water samples were treated identically. The protocol was for a salinity bottle to be filled from the 2 L nutrient sample bottle for the bottom salinity reading. When this was not done, however, bottom salinities were taken to be the bottom reading from the CTD cast.

The Guildline Autosal salinometer was calibrated with a secondary standard of Pacific Ocean seawater. Approximately 20 L of filtered seawater (designated LML94) were collected from the offshore pumping system at Long Marine Laboratory north of Santa Cruz, California. Salinity bottles (250 mL) were filled sequentially from the bulk sample, while stirring. Five bottles equally spaced in the filling sequence were compared with a primary standard, P99 (K15 = 0.99997, IAPSO Standard Seawater Service). All five bottles of secondary standard gave a salinity of 33.546 psu within the resolution of the instrument (+/- 0.001 psu). Intercomparisons with previous sets of secondary standard showed differences on the order of 0.01 psu. A new bottle of LML94 secondary standard was used for each analytical run.

At each shallow water station, the two-liter nutrient sample bottle was rinsed twice, and filled by holding it just below the surface of the water. These water samples were placed immediately into an opaque cooler containing ice from a -20°C freezer, and held there until filtered, usually within two to three hours. Except for this additional holding time, shallow and channel samples were processed identically. In January through May, salinity in the shallows was measured with an Ocean Sciences Model 200 CTD, which logged pressure (depth), temperature, and conductivity while being lowered over the side of the small boat. Later, this CTD was not available, and all salinities were bottle salinities taken from the bulk nutrient sample.

Channel samples for dissolved inorganic nutrient analysis were filtered within 15 minutes of sampling through 47 mm diameter, 0.4 μm pore-sized, Nuclepore, polycarbonate, membrane filters under vacuum (less than 14 kPa). Filtered samples were stored in 30 mL, high-density polyethylene bottles (Nalgene 2002-0001), that had been rinsed with acetone, and then rinsed with and stored filled with a 2500 M solution of sodium bicarbonate. These samples were normally refrigerated from the time of processing until analysis the next morning, except that the samples from the first day of a two day cruise (see table 1) were refrigerated for an extra day. On some cruises, samples were frozen for later analysis, in which case the water level in the 30 mL bottles was carefully checked before freezing so that brine would not be forced out of the bottles' closure during freezing. These samples were stored at -20°C. At least 14 hours before analysis, samples were removed from the freezer and allowed to thaw at room temperature. After being shaken twice, they were analyzed similarly to fresh samples.

Concentrations of ammonium (NH4), nitrate plus nitrite (N+N), nitrite (NO2), dissolved reactive phosphate (DRP), and dissolved silica (DSi) were measured simultaneously on a Technicon AutoAnalyzer II system.

Analyzer responses were usually linear over the ranges of concentrations encountered in this study. Blanks and single concentration upscale standards were analyzed at two- to four-hour intervals. Standards were prepared in artificial river water (1.0 meq/L solution of sodium bicarbonate) and artificial seawater (Strickland and Parsons (1972, p. 76), except for NH4 for which natural seawater was used. The analyzer was maintained at constant temperature by circulating 37°C water through tubes inserted through the centers of the glass mixing coils on each manifold.

The NH4 method uses a 0.8 mL/min sample pump tube to which is added 0.23 mL/min salicylate reagent (140 g sodium salicylate and 0.90 g sodium nitroferricyanide to 1 L of distilled water), and 0.32 mL/min air. Immediately thereafter, 0.42 mL/min of oxidizing/complexing reagent (200 mL of stock solution [90 g sodium citrate dihydate and 6 g sodium hydroxide to 1 L of distilled water], 0.120 g sodium dichloroisocyanurate and 8 drops of Brij-35 surfactant) is added. Flowing through a ten turn mixing coil, the stream enters the 37°C heating bath, followed by two 20-turn coils thermostatted at 37°C. The stream then passes through a 10-turn coil at room temperature before entering the colorimeter. Absorbance is determined at 630 nm in a 15 mm flowcell. Blanks vary non-linearly with salinity and were estimated using a six-point calibration curve consisting of mixtures of natural seawater and artificial river water (0, 20, 40, 60, 80, and 100 percent seawater). This method is preliminary, and was based on work by Verdouw and others (1978), Bower and Holm-Hansen (1980), and others.

The N+N method was the Technicon (1973) method number 100-70W with one twenty-turn coil added to increase reaction time for better color stability. Copper sulfate (0.121 g per 20 liters) was added to the ammonium chloride reagent, as suggested by Connors and Beland (1976). The pH of this reagent was not adjusted. Preparation of cadmium for the reduction columns was similar to that described by Wood and others (1967). When concentrations of N+N exceeded 80 μM, samples were diluted by weight to bring the expected concentration below 20 μM, and rerun. Nitrate can be calculated by subtracting the corresponding concentration of NO2 from the results of this analysis.

The NO2 method was an adaptation of the Technicon (1973) method number 100-70W with the cadmium column removed.

The DSi method was a modification of the Technicon (1976) method number 105-71W. The acid-molybdate reagent was diluted and its flow rate increased, keeping the acid- and molybdate-to-sample ratios unchanged. Additional mixing coils were added to give more complete color development.

The method for DRP was a modification of that of Atlas and others (1971), using ascorbic acid (70 g plus 50 mL acetone per liter of solution) as a reductant. To increase reaction time for maximum color development, ten-turn coils replaced the five-turn coils and a twenty-turn coil replaced the ten-turn coil in the manifold design.

FACTORS AFFECTING THE QUALITY OF THE DATA

Sampling Error

Nutrient as a function of salinity plots are often used as an aid to understanding the behavior of the nutrients in the estuary. Thus, the salinity values used for most of the channel data set ("MIDAS salinities") were compared with bottle salinities to indicate the amount of variation in nutrient/salinity plots which might be attributed to the sampling protocol.

The results are shown in figure 2, plotted as the difference between the MIDAS salinity and the corresponding bottle salinity versus the bottle salinity. There was no systematic difference between the two measurements (n = 89). The median difference was 0.00. The mean difference was -0.030, due to the influence of the two outliers. There was no evidence for a sample mixup or an instrument problem to explain the outliers, both of which occurred on the same day, but not at adjacent stations. Linear regression analysis of the Midas data on the bottle data gave an r-squared of 0.9990, a slope of 0.9973, and an intercept of 0.011.

Analytical Precision

Between January and November of 1995, a regular program of replication was performed which involved duplicate filtrations from the bulk sample aboard the research vessel. Additionally, sometimes re-analysis of previously analyzed samples was performed in the laboratory, each re-analysis being generally within 4 hours of the original analysis. The pooled standard deviations for the reanalyzed samples (Ku, 1969) and their coefficients of variation are shown in table 3. The same statistics for the duplicate filtrations are shown in table 4.

Comparing overall means between tables 3 and 4, it does not seem that the filtration procedure is a major source of variation in the data. Although the overall mean pooled standard deviations for DRP and NH4 are larger for the duplicated samples than for the reanalyzed samples, the coefficients of variation do not show a similar effect.

In general, the precision of these data is not as good as that reported earlier (Hager, 1994 and 1997). Although there may have been some effects due to a number of people doing the sampling and due to freezing of a larger fraction of the samples taken, the data on reanalyzed samples indicate that analytical practices probably introduced some of the variation as well. On the other hand, the reanalyses were usually performed in response to an observed problem in one of the analyses, and thus the variation seen in the reanalyzed samples may be greater than the variation in the data set as a whole.

DATA TABLES

Table 5 identifies the measurements made, and the abbreviations and units used in the data tables. The data for northern San Francisco Bay are presented chronologically in tables 6 through 12, the data from the deep waters of southern San Francisco Bay in tables 13 through 33, and the data from the shallow waters of southern San Francisco Bay in tables 34 through 60. Notes placed at the beginnings of tables give information specific to all the data in the table. Notes placed at the ends of the tables give information concerning specific samples.

REFERENCES CITED

Atlas, E.L., Hager, S.W., Gordon, L.I., and Park, P.K., 1971, A practical manual for use of the Technicon Autoanalyzer in seawater nutrient analysis, revised: Department of Oceanography, Oregon State University, Technical Report 215, OSU Ref 71-22, 49 p.

Bower, C.E., and Holm-Hansen, T., 1980, A salicylate-hypochlorite method for determining ammonia in seawater. Canadian Journal of Fisheries and Aquatic Sciences, v. 37, p. 794-798.

Connors, J.J., and Beland, J., 1976, Analytical note: Journal of the American Water Works Association, v. 68, p. 55-56.

Edmunds, J.L., Cole, B.E., Cloern, J.E., Caffrey, J.M., and Jassby, A.D., 1997, Studies of the San Francisco Bay, California, estuarine ecosystem. Pilot regional monitoring results, 1995: U.S. Geological Survey Open-File Report 97-15, 16 p. and 2 appendices.

Hager, S.W., 1994, Dissolved nutrient and suspended particulate matter data for the San Francisco Bay estuary, California, October 1991 through November 1993. U.S. Geological Survey Open-File Report 94-471, 53 p.

Hager, S.W., 1997, Dissolved nutrient data for the San Francisco Bay estuary, California, February through November 1994. U.S. Geological Survey Open-File Report 97-17, 34 p.

Ku, H.H., 1969, Statistical Concepts in Meteorology, In Ku, H.H, ed., Precision Measurement and Calibration: U.S. Dept. of Commerce, National Bureau of Standards, NBS Special Publication 300, p. 296-20 - 326-50.

Lewis, E.L., 1980, The practical salinity scale 1978 and its antecedents: IEEE Journal of Oceanic Engineering, v. OE-5, no. 1, p. 3-8.

Strickland, J.D.H., and Parsons, T.R., 1972, A manual of seawater analysis (2nd ed.): Fisheries Research Board of Canada, Bulletin 167, 310 p.

Technicon Instruments Corporation, 1973, Nitrate and nitrite in water and wastewater: Technicon Autoanalyzer II Industrial Method No. 100-70W, released September 1973, New York, 3 p.

Technicon Instruments Corporation, 1976, Silicates in water and wastewater: Technicon Autoanalyzer II Industrial Method No. 105-71W, revised January 1976, New York, 2 p.

Verdouw, H., Echteld, C.J.A. van, and Dekkers, E.M.J., 1978, Ammonia determination based on indophenol formation with sodium salicylate. Water Research, v. 12, p. 399-402.

Wood, E.D., Armstrong, F.A.J., and Richards, F.A., 1967, Determination of nitrate in sea water by cadmium-copper reduction to nitrite: Journal of the Marine Biological Association of the United Kingdom, v. 47, p. 23-31.

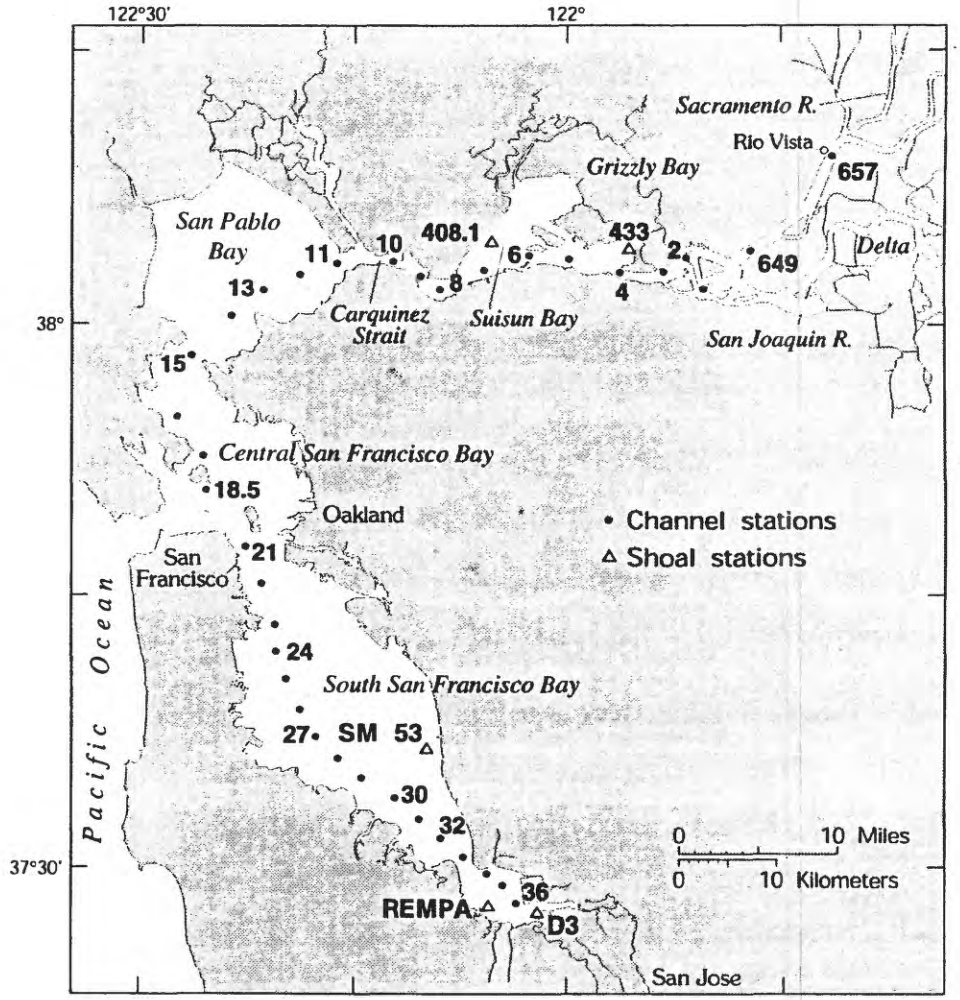

Figure 1. Location map of the San Francisco Bay estuarine system.

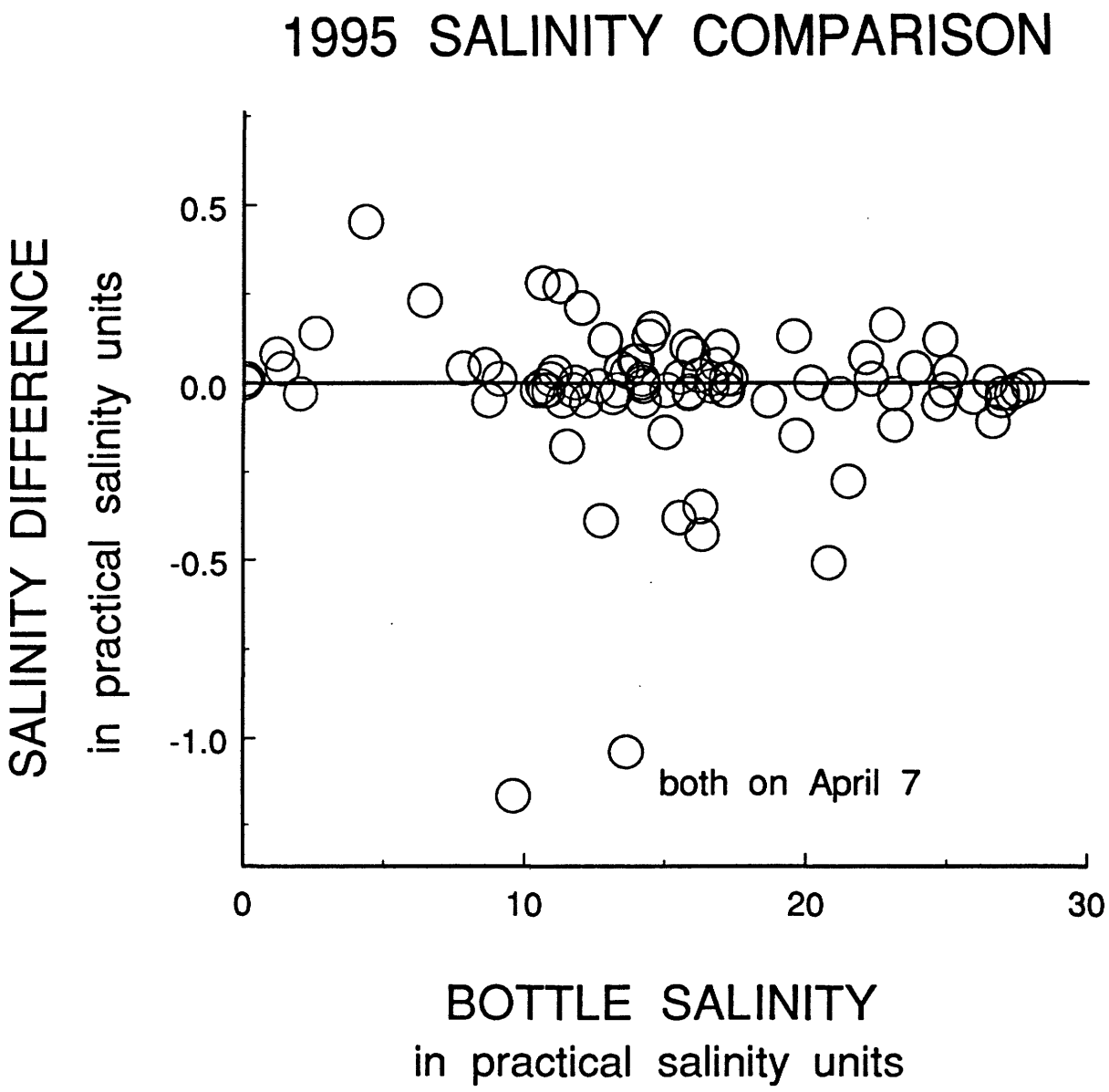

Figure 2. The difference between the MIDAS (on-line) salinities and the bottle salinities (MIDAS minus bottle), plotted against the bottle salinity. The outliers from April 7th are of unknown etiology.

Table 1: Cruise dates and station coverage

Date	Station Coverage		
	North Bay	South Bay	Shallows
24 January 95	--	--	SM50 to H36
07 February 95	18.5 to 657	20 to 36	--
09 February 95	--	--	SM55 to H36
15 February 95	--	21 to 36	SM50 to H36
22 February 95	--	21 to 36	SM50 to H36
28 February 95	--	24, 27, 30 32, 36	SM50 to H36
06 March 95	--	--	SM50 to H36
07 March 95	18.5 to 657	21 to 36	408, 433
16 March 95	--	21 to 36	SM55 to H36
23 March 95	--	21 to 36	SM50 and SM53
30 March 95	--	21 to 36	SM50 and H33
03 April 95	--	--	SM50 to H33
04 April 95	18.5 to 657	20 to 36	--
07 April 95	--	21 to 36	--
11 April 95	--	21 to 36	SM55 to H36
19 April 95	--	21, 24, 27 30, 32, 36	SM50 to H30
27 April 95	--	21 to 33	SM50 to H36
02 May 95	18.5 to 657	20 to 36	--
09 May 95	--	21 to 36	SM55 to H36
16 May 95	--	21 to 36 some	SM50 to H36
13 June 95	18.5 to 657	24 to 36	--
19 June 95	--	--	SM55 to H36

continued ...

Cruise dates and station coverage, continued.

Date	Station Coverage		
	North Bay	South Bay	Shallows
18 July 95	18.5 to 657	20 to 36	--
20 July 95	--	--	SM53 to SWH1
16 August 95	--	18.5 to 36	--
22 August 95	--	--	SM53 to SWH1
30 August 95	--	--	SM50 to H36
07 September 95	--	--	SM50 to H36
13 September 95	--	--	SM50 to H36
20 September 95	--	--	SM53 to SWH1
21 September 95	18.5 to 657	21 to 36	--
29 September 95	--	--	SM50 to H36
05 October 95	--	--	SM50 to H36
12 October 95	--	--	SM50 to H36
19 October 95	--	--	SM50 to H36
25 October 95	--	21 to 36	--
28 November 95	--	--	SM50 to H36

Table 2. San Francisco Bay station locations.
(N.= north, W.= west, deg.= degrees, min.= minutes).

Area	Station Number	N. Latitude deg.	min.	W. Longitude deg.	min.
Sacramento River	657	38	9.2	121	41.3
	655	38	7.2	121	42.3
	653	38	5.8	121	42.0
	651	38	4.7	121	45.8
	649	38	3.6	121	47.8
North Bay					
Chain Island	2	38	3.8	121	51.3
Pittsburgh	3	38	3.0	121	52.7
Simmon's Point	4	38	2.9	121	56.1
Middle Ground	5	38	3.6	121	58.8
Roe Island	6	38	3.9	122	2.1
Avon Pier	7	38	2.9	122	5.8
Martinez	8	38	1.8	122	9.1
Benicia	9	38	3.0	122	10.4
Crockett	10	38	3.6	122	12.5
Mare Island	11	38	3.7	122	15.8
N. of Pinole Point	13	38	1.9	122	21.9
Pt. San Pablo	15	37	58.2	122	26.2
Red Rock	16	37	54.9	122	27.0
Raccoon Strait	17	37	52.9	122	25.6
Angel Island	18.5	37	50.8	122	25.2
Shallows	408.1	38	4.7	122	3.4
	433	38	4.3	121	56.0
South Bay					
Blossom Rock	20	37	49.0	122	24.3
Bay Bridge	21	37	48.0	122	22.2
Potrero Point	22	37	45.7	122	21.5
Hunters Point	23	37	43.6	122	20.2
Candlestick Point	24	37	42.0	122	20.3
Oyster Point	25	37	40.3	122	19.5
San Bruno Shoal	26	37	38.2	122	19.0
San Francisco Airport	27	37	37.1	122	17.5
N. San Mateo Bridge	28	37	36.0	122	16.2
S. San Mateo Bridge	29	37	34.9	122	14.8
	29.5	37	34.2	122	13.5
Redwood Creek	30	37	33.3	122	11.5
Coyote Hills	31	37	31.8	122	9.4
Ravenswood Point	32	37	31.1	122	8.1
Dumbarton Bridge	33	37	30.6	122	7.4
Newark Slough	34	37	29.6	122	5.3
Palo Alto	35	37	28.9	122	4.7
Calaveras Point	36	37	28.3	122	3.8
Shallows	SM24	37	30.90	122	9.60
	SM28++	37	32.78	122	8.35
	SM30	37	32.23	122	11.05

continued ...

San Francisco Bay station locations - continued.
(N.= north, W.= west, deg.= degrees, min.= minutes).

Area	Station Number	N. Latitude deg.	min.	W. Longitude deg.	min.
	SM32	37	33.12	122	10.12
	SM35	37	33.62	122	9.27
	SM41	37	34.63	122	9.77
	SM42	37	33.70	122	14.00
	SM46	37	35.58	122	9.93
	SM47	37	31.62	122	9.13
	SM50	37	35.37	122	13.72
	SM53	37	36.47	122	10.00
	SM55	37	34.92	122	16.67
	SM56	37	35.62	122	15.82
	SM59	37	37.08	122	12.61
	SM61	37	37.54	122	10.26
	SM62	37	34.37	122	15.36
	SM65	37	35.73	122	12.50
	SM72	37	33.15	122	12.08
	SWH1	37	31.63	122	7.63

Note: In the data tables, station numbers preceded by an "H" are channel stations sampled from the small boat during a shallow water transect.

Table 3. Pooled standard deviations / coefficients of variation for reanalyzed samples on various sampling dates in 1995. The number of samples on which reanalysis was performed is given as n.

DATE	n	NO2	N+N	DRP	DSi	NH4
		micromolar / percent				
08 February	none					
23 February	none					
24 March	11	0.05	0.23	0.02	0.36	0.04
		5.20	1.21	1.12	0.34	1.58
05 April	8	0.06	0.16	0.06	0.75	0.08
		13.36	1.88	6.60	0.49	4.79
25 April	5	0.05	0.54	0.01	0.61	0.10
		8.59	6.45	0.69	0.50	4.87
03 May	2	0.01	0.10	0.01	0.04	0.15
		2.72	0.76	1.07	0.02	4.31
16 July	none					
19 July	1	0.002	0.002	0.04	--	0.24
		0.24	0.01	1.85	--	5.47
02 November	1	0.02	0.57	0.02	0.18	0.002
		1.54	1.94	0.22	0.20	0.03
Overall means	28	0.05	0.26	0.03	0.49	0.08
		7.7	2.3	2.6	0.4	3.4

Table 4. Pooled standard deviations / coefficients of variation for duplicated samples on various sampling dates in 1995. Samples from the northern reach (NB) and the southern reach (SB) are separated because of their different ranges of concentrations. The number of bulk samples for which duplicate filtrations were performed is given as n.

DATE	LOCATION	n	NO2	N+N	DRP	DSi	NH4
			micromolar / percent				
07 February	NB	5	0.01 0.7	0.08 0.3	0.02 1.3	0.15 0.1	0.05 1.3
07 February	SB	5	0.00 0.3	0.17 0.3	0.01 0.3	0.21 0.1	0.06 0.6
09 February		none					
15 February		none					
22 February	SB	2	0.02 1.0	1.04 1.4	0.08 1.2	2.38 1.9	0.09 0.7
28 February		none					
06 March		none					
07 March	NB	5	0.01 0.7	0.09 0.3	0.01 0.5	0.41 0.2	0.02 0.3
07 March	SB	5	0.01 0.8	0.06 0.2	0.07 1.9	0.15 0.2	0.16 7.1
16 March		none					
23 March		none					
30 March		none					
03 April		none					
04 April	NB	5	0.05 6.4	0.13 0.5	0.10 6.7	0.19 0.1	0.09 2.6
04 April	SB	5	0.01 0.9	0.08 0.2	0.02 0.6	0.20 0.1	0.06 1.2
07 April (frozen)	SB	5	0.01 0.7	0.28 0.7	0.05 1.1	0.96 0.7	0.12 2.0
11 April (frozen)	SB	5	0.03 2.5	0.14 0.9	0.20 6.3	2.99 2.4	0.14 11.0
19 April (frozen)	SB	5	0.01 0.6	0.07 0.2	0.04 1.2	0.87 0.1	0.05 0.8
27 April (frozen)	SB	2	0.00 0.6	0.03 0.2	0.05 2.4	0.28 0.3	0.05 6.3

continued ...

Statistics for duplicated samples, continued.

02 May	NB	4	0.00	0.12	0.08	0.10	0.27
			1.1	0.7	7.8	0.1	7.3
02 May	SB	5	0.00	0.17	0.06	0.12	0.13
			0.2	0.4	1.4	0.1	2.8
09 May	SB	5	0.06	1.01	0.15	1.26	0.07
(frozen)			3.6	3.4	3.3	1.0	1.4
16 May	SB	5	0.08	0.16	0.24	0.70	0.26
(frozen)			3.2	0.3	3.7	0.5	3.1
13 June	NB	6	0.03	0.16	0.10	1 39	0.10
(frozen)			6.4	1.2	5.8	0.7	2.6
13 June	SB	5	0.06	0.08	0.23	0.33	0.30
(frozen)			2.3	0.2	2.2	0.3	4.9
18 July	NB	5	0.03	0.03	0.07	0.14	0.06
			4.3	0.2	4.2	0.1	1.9
18 July	SB	4	0.00	0.03	0.06	0.10	0.82
			0.1	0.1	0.7	0.1	13.8
20 July		none					
16 August	SB	5	0.02	0.06	0.03	0.75	0.09
(frozen)			1.3	0.2	0.4	0.6	1.3
22 August		none					
30 August		none					
07 September		none					
13 September		none					
20 September		none					
21 September	NB	5	0.03	0.03	0.08	0.31	0.34
(frozen)			3.1	0.2	3.9	0.2	7.1
21 September	SB	6	0.03	0.19	0.07	1.06	0.15
(frozen)			1.1	0.3	0.6	0.8	3.0
29 September		none					
05 October		none					
12 October		none					
19 October		none					
25 October	SB	5	0.01	0.05	0.05	0.42	0.28
(frozen)			0.9	0.1	0.6	0.5	4.8
Overall means		109	0.02	0.17	0.08	0.66	0.16
			2.0	0.5	2.5	0.5	3.7
Overall set medians		23	0.01	0.09	0.07	0.33	0.10
			1.0	0.3	1.4	0.2	2.6

Table 5. Summary of measurements, abbreviations, and units

Measurement	Column Title	Units
Local time	TIME	hours : minutes, 24 hour clock
Station	STA	--
Depth	DEP	meters, m
Salinity (2 meter, CTD)	SAL	practical salinity units, scale of 1978, psu
Dissolved reactive phosphorus	DRP	micromolar, μM
Dissolved silica	DSi	micromolar, μM
Nitrate plus nitrite	N+N	micromolar, μM
Nitrite	NO2	micromolar, μM
Ammonium	NH4	micromolar, μM
Dissolved inorganic nitrogen	DIN	micromolar, μM

Data for northern San Francisco Bay

Table 6. Nutrient data for February 7, 1995

TIME h:m	STA	DEP m	SAL psu	Concentrations DRP micromolar	SiO2 micromolar	N+N micromolar	NO2 micromolar	NH3 micromolar	DIN micromolar
10:12	18.5	1.5	11.33	2.14	164.38	27.27	1.22	7.84	35.11
10:41	17	1.5	8.99	1.86	196.06	26.61	1.12	6.00	32.61
11:06	16	1.5	6.25	1.83	219.50	28.54	1.09	6.01	34.55
11:44	15	1.5	4.17	1.80	230.90	28.54	1.08	5.69	34.23
12:07	14	1.5	3.24	1.77	239.82	28.81	1.08	5.40	34.21
12:25	13	1.5	6.46[1]	1.80	213.88	27.16	1.08	5.73	32.89
13:11	12	1.5	3.71	1.75	233.62	28.47	1.07	5.66	34.13
13:40	11	1.5	2.03[1]	1.71	246.78	28.01	1.03	5.55	33.56
14:11	10	1.5	1.08	1.66	254.49	27.41	0.99	5.23	32.64
14:26	9	1.5	0.39	1.65	258.82	27.08	0.99	4.82	31.90
14:49	8	1.5	0.09	1.69	258.87	29.79	1.01	4.44	34.23
15:14	7	1.5	0.09	1.74	259.72	30.87	1.05	4.95	35.82
15:42	6	1.5	0.08	1.55	262.28	26.06	0.93	3.84	29.90
16:12	5	1.5	0.08	1.42	262.22	23.40	0.86	2.97	26.37
16:35	4	1.5	0.08	1.48	260.44	25.06	0.88	3.32	28.38
16:58	3	1.5	0.08	1.76	259.50	31.99	1.04	5.04	37.03
17:14	2	1.5	0.08	1.24	263.26	20.02	0.75	2.70	22.72
17:33	649	1.5	0.07	1.18	272.55	20.56	0.73	2.31	22.87
17:53	651	1.5	0.08	1.19	283.11	20.52	0.73	1.41	21.93
18:07	653	1.5	0.08	1.57	278.74	21.28	0.84	1.67	22.95
18:20	655	1.5	0.09	1.40	276.74	21.71	0.82	1.62	23.33
18:38	657	1.5	0.09	1.37	276.08	21.76	0.80	1.66	23.42
--	312	1.5	3.00	2.06	245.25	35.59	1.34	7.48	43.07
--	408	1.5	0.10	1.58	261.08	27.64	0.98	3.88	31.52
--	433	1.5	0.08	1.52	265.76	23.91	0.88	2.62	26.53

1. Bottle salinity.

Table 7. Nutrient data for March 7, 1995

				Concentrations					
TIME h:m	STA	DEP m	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
11:01	18.5	1.5	21.16	1.51	100.74	15.36	0.89	3.34	18.70
11:25	17	1.5	11.53	1.74	181.85	24.35	1.13	4.25	28.60
11:47	16	1.5	9.98	1.79	195.37	25.94	1.26	4.51	30.45
12:19	15	1.5	8.36	1.66	204.82	26.04	1.32	3.44	29.48
12:39	14	1.5	11.38	1.77	183.54	24.38	1.25	3.91	28.29
12:56	13	1.5	9.13	1.80	205.52	26.98	1.30	5.48	32.46
13:40	11	1.5	4.21	1.80	246.20	31.18	1.37	6.62	37.80
14:04	10	1.5	1.28	1.77	266.82	33.39	1.36	7.16	40.55
14:17	9	1.5	0.73	1.70	271.92	33.43	1.38	6.98	40.41
14:36	8	1.5	0.20	1.63	272.48	33.81	1.29	6.74	40.55
15:06	7	1.5	0.12	1.73	272.45	35.09	1.32	7.92	43.01
15:30	6	1.5	0.11	1.56	266.50	33.72	1.30	7.08	40.80
16:09	4	1.5	0.11	1.60	271.27	36.68	1.36	6.74	43.42
16:31	3	1.5	0.10	1.48	269.15	34.90	1.30	5.54	40.44
16:44	2	1.5	0.11	1.60	275.09	39.76	1.40	5.72	45.48
17:02	649	1.5	0.08	1.04	247.85	24.07	1.09	4.87	28.94
17:28	653	1.5	0.07	1.07	246.69	22.58	1.08	5.01	27.59
17:54	657	1.5	0.09	1.18	243.04	26.12	1.15	5.76	31.88
--	408	1.5	0.1 [1]	1.59	272.04	34.00	1.32	7.41	41.41
--	433	1.5	0.1 [1]	1.55	265.88	32.57	1.30	6.93	39.50

1. Estimated salinity.

Table 8. Nutrient data for April 4, 1995

				Concentrations					
TIME h:m	STA	DEP m	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
11:04	18.5	1.5	13.57	1.36	152.76	16.34	0.83	3.26	19.60
11:27	17	1.5	5.60	1.71	215.81	24.26	1.01	4.65	28.91
11:49	16	1.5	4.65	1.77	223.97	25.52	1.02	4.99	30.51
12:41	14	1.5	4.99	1.89	217.51	24.52	0.99	4.24	28.76
13:10	13	1.5	2.13	1.80	245.53	29.17	1.04	5.03	34.20
13:32	12	1.5	1.55	1.73	251.44	30.57	1.07	5.05	35.62
13:51	11	1.5	0.80	1.86	256.16	31.55	1.10	5.64	37.19
14:14	10	1.5	0.13	1.63	262.60	30.53	0.99	3.36	33.89

continued ...

Nutrient data for April 4, 1995, continued

14:26	9	1.5	0.12	1.89	263.32	30.44	1.02	4.02	34.46
14:46	8	1.5	0.11	2.10	254.28	36.69	1.17	5.12	41.81
15:05	7	1.5	0.12	2.19	253.77	37.70	1.19	5.81	43.51
15:28	6	1.5	0.10	1.42	266.17	27.62	0.81	3.25	30.87
15:47	5	1.5	0.11	2.21	252.00	38.14	1.19	5.77	43.91
16:04	4	1.5	0.11	2.01	255.48	34.94	1.12	5.33	40.27
16:29	3	1.5	0.11	2.07	254.45	35.51	1.11	5.26	40.77
16:40	2	1.5	0.12	2.62	242.88	43.37	1.37	6.65	50.02
16:58	649	1.5	0.08	0.89	278.30	19.64	0.47	2.71	22.35
--	653	1.5	0.11	1.01	265.81	20.66	0.54	2.07	22.73
17:51	657	1.5	0.12	0.99	260.25	20.64	0.53	1.58	22.22

Table 9. Nutrient data for May 2, 1995

				Concentrations					
TIME h:m	STA	DEP m	SAL psu	DRP	SiO2	N+N micromolar	NO2	NH3	DIN
10:09	18.5	1.5	15.00	1.55	103.10	14.00	0.47	2.05	16.05
10:32	17	1.5	10.88	1.44	169.27	15.34	0.47	1.47	16.81
10:52	16	1.5	8.42	1.52	173.87	14.62	0.42	1.64	16.26
11:20	15	1.5	7.42	1.48	181.18	15.77	0.46	1.49	17.26
--	15	22.0	22.20[1]	1.53	89.17	14.11	0.45	1.99	16.10
11:42	14	1.5	9.06	1.34	184.22	16.86	0.49	2.40	19.26
12:12	13	1.5	2.08	1.51	222.13	18.92	0.59	4.07	22.99
12:42	11	1.5	0.20	1.50	231.49	19.59	0.61	4.34	23.93
13:03	10	1.5	0.12	1.43	231.20	20.36	0.51	4.36	24.72
13:14	9	1.5	0.12	1.27	234.66	20.02	0.45	3.52	23.54
13:33	8	1.5	0.12	1.25	235.24	19.97	0.45	2.91	22.88
14:00	7	1.5	0.11	1.16	230.96	19.82	0.46	3.59	23.41
14:23	6	1.5	0.10	1.10	230.12	19.25	0.41	4.14	23.39
14:43	5	1.5	0.10	1.36	216.40	20.48	0.46	4.01	24.49
15:01	4	1.5	0.12	1.36	209.83	20.52	0.48	3.67	24.19
15:20	3	1.5	0.10	1.39	210.85	21.10	0.48	3.75	24.85
15:35	2	1.5	0.10	1.37	210.72	20.49	0.46	3.51	24.00
16:02	649	1.5	0.07	0.56	227.35	8.12	0.21	3.00	11.12
--	653	1.5	0.08	0.56	224.18	9.64	0.31	4.26	13.90
16:58	657	1.5	0.08	0.58	219.34	11.36	0.34	3.64	15.00

1. Bottle salinity.

Table 10. Nutrient data for June 13, 1995

[These samples were filtered soon after collection, and frozen until analysis, on 16 July 1995.]

				Concentrations					
TIME h:m	STA	DEP m	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
10:57	18.5	1.5	23.27	2.45	95.06	22.91	0.68	4.03	26.94
11:15	17	1.5	21.16	2.30	104.42	20.28	0.60	4.14	24.42
11:52	15	1.5	14.56	2.40	147.72	19.48	0.65	4.48	23.96
12:25	13	1.5	11.27[1]	2.30	160.00	18.03	0.63	4.73	22.76
13:04	11	1.5	4.68	2.07	199.59	15.06	0.61	5.06	20.12
13:35	9	1.5	1.39[1]	2.12	211.15	13.14	0.61	4.19	17.33
15:03	6	1.5	0.08[1]	1.70	221.11	11.27	0.37	2.56	13.83
15:58	3	1.5	0.06	1.35	221.00	10.03	0.30	2.37	12.40
16:24	649	1.5	0.06	1.22	221.81	9.83	0.29	2.62	12.45
17:18	657	1.5	0.06	0.99	243.40	9.89	0.35	5.72	15.61

1. Bottle salinity.

Table 11. Nutrient data for July 18, 1995

				Concentrations					
TIME h:m	STA	DEP m	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
10:28	18.5	1.5	23.78	2.31	85.55	14.22	0.58	4.46	18.68
10:58	17	1.5	21.36	2.42	104.67	14.53	0.61	4.66	19.19
11:24	16	1.5	16.65	2.27	138.47	14.83	0.64	4.36	19.19
11:59	15	1.5	13.56	2.44	150.25	14.85	0.65	4.14	18.99
12:23	14	1.5	13.09	2.52	156.22	14.94	0.64	4.95	19.89
12:45	13	1.5	9.06[1]	2.42	177.46	14.91	0.61	4.91	19.82
13:20	12	1.5	7.57	2.31	194.75	14.94	0.60	4.70	19.64
13:44	11	1.5	5.96	2.28	198.82	14.83	0.60	4.49	19.32
14:12	10	1.5	2.87	2.14	220.84	14.17	0.58	3.85	18.02
14:31	9	1.5	1.20[1]	2.00	224.48	13.86	0.58	3.07	16.93
14:55	8	1.5	0.58	1.72	227.97	13.50	0.66	2.03	15.53
15:25	7	1.5	0.13	1.63	229.34	12.92	0.78	1.45	14.37
15:48	6	1.5	0.07	1.42	228.79	12.20	0.82	1.76	13.96
16:10	5	1.5	0.06	1.17	228.24	11.98	0.76	2.25	14.23
16:31	4	1.5	0.06	1.45	225.07	12.17	0.63	2.63	14.80
16:54	3	1.5	0.06	1.50	226.56	12.05	0.64	2.43	14.48

continued ...

Nutrient data for July 18, 1995, continued

17:15	2	1.5	0.07	1.41	222.60	12.39	0.55	2.50	14.89
17:35	649	1.5	0.06	0.83	242.52	10.92	0.83	6.81	17.73
--	653	1.5	0.06	1.04	241.09	10.27	0.61	5.48	15.75
18:26	657	1.5	0.05	0.89	219.27	8.85	0.68	4.98	13.83

1. Bottle salinity.
2. Sample frozen. Analyzed on 2 November 1995.

Table 12. Nutrient data for September 21, 1995

[These samples were filtered soon after collection, and frozen until analysis, on 2 November 1995.]

				Concentrations					
TIME h:m	STA	DEP m	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
11:26	18.5	1.5	30.57	2.12	36.25	13.69	0.74	6.23	19.92
11:46	17	1.5	27.85	2.63	57.63	15.38	0.84	7.27	22.65
12:05	16	1.5	28.15	2.48	54.93	15.05	0.80	7.00	22.05
12:30	15	1.5	22.81	2.59	95.54	16.50	0.79	5.70	22.20
12:51	14	1.5	23.11	2.65	89.36	16.38	0.81	5.97	22.35
13:05	13	1.5	23.19[1]	2.67	88.61	16.42	0.82	5.97	22.39
14:30	11	1.5	17.89	2.81	128.09	17.23	0.80	6.48	23.71
15:05	9	1.5	12.77[1]	2.66	159.63	17.34	0.80	6.29	23.63
16:56	7	1.5	6.90	2.69	198.22	16.78	0.88	5.94	22.72
17:27	6	1.5	2.58[1]	2.08	218.34	15.14	0.84	2.82	17.96
18:11	4	1.5	0.40	2.09	247.42	13.01	0.92	2.61	15.62
18:47	3	1.5	0.16[1]	1.84	250.63	12.18	0.77	2.44	14.62
19:24	649	1.5	0.08	1.67	261.05	11.54	0.65	5.81	17.35
20:24	657	1.5	0.07[1]	1.57	263.32	10.19	0.50	6.34	16.53

1. Bottle salinity.

Data for southern San Francisco Bay
Channel stations

Table 13. Nutrient data for February 7, 1995

TIME h:m	STA	DEP m	SAL psu	Concentrations DRP	SiO2	N+N micromolar	NO2	NH3	DIN
6:27	36	1.5	15.53[1]	7.70	147.63	92.58	2.47	9.19	101.77
6:38	35	1.5	15.28	7.78	148.32	93.25	2.48	9.04	102.29
6:47	34	1.5	15.50[2]	7.35	145.70	87.23	2.39	8.76	95.99
6:58	33	1.5	15.80	7.06	142.49	83.06	2.30	8.02	91.08
7:06	32	1.5	16.30[1]	6.07	139.44	69.04	2.16	9.88	78.92
7:16	31	1.5	16.29	4.80	138.17	48.83	1.90	12.06	60.89
7:31	30	1.5	15.76	3.92	141.20	40.72	1.77	10.36	51.08
7:43	29.5	1.5	15.35	3.42	145.12	36.65	1.51	9.54	46.19
7:53	29	1.5	14.91	3.32	147.79	35.07	1.42	8.79	43.86
8:16	27	1.5	15.04[1]	3.22	146.66	35.24	1.46	8.95	44.19
8:27	26	1.5	14.99	3.18	147.35	34.62	1.45	9.51	44.13
8:41	25	1.5	15.50	3.58	142.67	37.77	1.57	10.12	47.89
8:56	24	1.5	13.66[1]	2.55	158.16	30.19	1.30	8.38	38.57
9:11	23	1.5	13.15	2.27	163.40	28.22	1.19	7.72	35.94
9:24	22	1.5	12.91	2.31	162.81	28.41	1.21	8.23	36.64
9:38	21	1.5	13.01	2.12	164.35	27.08	1.15	7.31	34.39
9:56	20	1.5	12.92	2.21	164.08	27.32	1.18	7.80	35.12

1. Bottle Salinity.
2. Salinity at 2m. depth on concurrent CTD drop.

Table 14. Nutrient data for February 15, 1995
[These samples were filtered soon after collection, and frozen until analysis on 23 February 1995.]

TIME h:m	STA	DEP m	SAL psu	Concentrations DRP	SiO2	N+N micromolar	NO2	NH3	DIN
9:46	36	1.5	14.16[1]	8.95	145.55	113.06	2.43	2.39	115.45
10:09	35	1.5	14.65	7.64	140.04	93.66	2.10	1.76	95.42
10:20	34	1.5	14.97	6.84	138.93	82.96	1.93	1.95	84.91
10:37	33	1.5	15.60	5.21	134.50	61.37	1.61	2.27	63.64
10:45	32	1.5	15.71	5.00	133.95	58.17	1.64	2.99	61.16

continued ...

Nutrient data for February 15, 1995, continued

10:58	31	1.5	15.85	4.57	133.03	52.36	1.57	3.86	56.22
11:18	30	1.5	16.42	3.78	130.07	41.52	1.53	5.60	47.12
11:31	29.5	1.5	16.50	3.51	132.28	38.36	1.36	5.48	43.84
11:50	29	1.5	16.74	3.53	130.08	37.77	1.52	6.22	43.99
12:05	28	1.5	17.02	3.20	127.50	34.44	1.44	6.03	40.47
12:20	27	1.5	17.84	2.84	123.79	30.09	1.35	6.41	36.50
12:31	26	1.5	18.29	2.60	121.21	27.56	1.29	6.35	33.91
12:48	25	1.5	18.57	2.08	120.29	22.18	1.16	5.70	27.88
13:01	24	1.5	17.24	1.87	133.40	20.35	1.06	6.24	26.59
13:16	23	1.5	17.58	1.80	130.64	20.14	1.05	5.54	25.68
13:33	22	1.5	17.33	1.84	131.22	20.13	1.04	5.57	25.70
13:44	21	1.5	18.92	1.96	117.93	20.70	1.10	5.90	26.60

1. Bottle Salinity.

Table 15. Nutrient data for February 22, 1995

				Concentrations					
TIME h:m	STA	DEP m	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
10:38	21	1.5	18.16	2.86	122.43	27.58	1.21	9.76	37.34
10:59	22	1.5	18.77	1.86	121.29	20.08	0.96	4.30	24.38
11:18	23	1.5	18.61	2.18	122.40	23.67	1.01	3.81	27.48
11:35	24	1.5	18.34	2.19	124.98	23.03	1.00	4.64	27.67
11:53	25	1.5	17.73	2.48	121.16	26.03	1.01	2.07	28.10
12:09	26	1.5	17.25	2.45	113.65	25.29	0.94	0.47	25.76
12:23	27	1.5	16.78	3.01	116.98	31.56	1.05	0.77	32.33
12:37	28	1.5	16.53	3.19	115.16	32.60	1.03	0.59	33.19
12:53	29	1.5	16.23	3.09	108.19	28.59	0.89	0.37	28.96
13:15	29.5	1.5	16.07	3.76	114.81	38.82	1.05	0.90	39.72
13:29	30	1.5	15.61	4.24	112.08	44.39	1.13	0.46	44.85
13:39	31	1.5	15.10	5.20	112.29	56.25	1.32	0.50	56.75
14:08	32	1.5	14.85	5.36	107.52	56.33	1.36	0.87	57.20
14:14	33	1.5	14.41	6.10	109.01	67.69	1.61	0.29	67.98
14:36	35	1.5	13.32	8.40	115.68	106.60	2.33	0.63	107.23
14:46	36	1.5	12.59	10.77	128.39	138.67	3.22	1.03	139.70

Table 16. Nutrient data for February 28, 1995
[These samples were filtered soon after collection, and frozen until analysis on 8 March 1995.]

TIME h:m	STA	DEP m	SAL psu	Concentrations DRP	SiO2	N+N micromolar	NO2	NH3	DIN
10:45	36	1.5	15.22	4.80	90.79	40.07	0.92	0.59	40.66
11:30	32	1.5	17.14	2.85	100.62	21.42	0.80	1.48	22.90
12:18	30	1.5	17.82	2.14	101.69	17.22	0.78	0.82	18.04
13:14	27	1.5	19.30	2.01	102.56	16.73	0.82	2.32	19.05
13:54	24	1.5	21.84	1.75	94.73	15.71	0.84	3.90	19.61

Table 17. Nutrient data for March 7, 1995

TIME h:m	STA	DEP m	SAL psu	Concentrations DRP	SiO2	N+N micromolar	NO2	NH3	DIN
6:41	36	1.5	14.70	7.12	95.28	61.94	1.52	3.25	65.19
7:01	34	1.5	15.30	5.91	92.18	46.54	1.20	2.79	49.33
7:40	32	1.5	16.13	4.59	87.94	29.97	0.85	1.91	31.88
7:56	31	1.5	16.77	3.89	86.84	20.61	0.73	1.96	22.57
8:15	30	1.5	17.30	3.12	86.75	14.60	0.64	3.07	17.67
8:27	29.5	1.5	17.61	1.88	76.66	1.37	0.24	0.43	1.80
8:38	29	1.5	18.17	2.12	85.79	9.49	0.67	1.31	10.80
9:05	27	1.5	18.70	1.87	83.67	8.03	0.68	1.49	9.52
9:28	25	1.5	19.64	1.45	83.34	8.51	0.69	0.46	8.97
9:43	24	1.5	20.38	1.62	85.53	11.14	0.76	2.12	13.26
10:09	22	1.5	21.48	1.86	93.71	14.69	0.78	4.49	19.18
10:21	21	1.5	20.42	2.12	86.56	12.15	0.83	5.72	17.87

Table 18. Nutrient data for March 16, 1995

[These samples were filtered soon after collection, and frozen until analysis on 24 March 1995.]

TIME h:m	STA	DEP m	SAL psu	Concentrations DRP	SiO2	N+N micromolar	NO2	NH3	DIN
8:40	21	1.5	10.39	1.69	145.06	17.23	0.97	5.76	22.99
9:09	23	1.5	10.74	1.61	150.05	17.65	0.94	5.15	22.80
9:23	24	1.5	9.70	1.69	154.31	18.00	0.98	5.33	23.33
9:35	25	1.5	15.20	1.84	120.12	14.78	0.93	4.00	18.78
9:48	26	1.5	14.21	1.51	119.64	14.36	0.91	1.85	16.21
10:01	27	1.5	14.05	1.51	131.43	15.55	0.89	2.26	17.81
10:14	28	1.5	13.86	1.45	125.31	13.75	0.91	0.94	14.69
10:30	29	1.5	13.06	1.51	131.30	15.88	0.92	2.18	18.06
10:46	29.5	1.5	14.38	1.44	126.26	14.70	0.87	1.80	16.50
11:00	30	1.5	16.32	1.12	101.26	7.47	0.66	0.32	7.79
11:16	31	1.5	18.01	1.12	92.64	6.10	0.62	0.23	6.33
11:33	32	1.5	18.36	1.16	85.78	5.24	0.61	0.27	5.51
11:43	33	1.5	18.56	1.20	84.10	4.90	0.58	0.32	5.22
11:56	34	1.5	19.17	2.38	85.05	20.58	0.93	1.90	22.48
12:09	35	1.5	18.99	2.71	89.67	23.99	1.03	1.62	25.61
12:20	36	1.5	18.36	4.37	107.83	45.39	1.42	6.34	51.73

Table 19. Nutrient data for March 23, 1995

TIME h:m	STA	DEP m	SAL psu	Concentrations DRP	SiO2	N+N micromolar	NO2	NH3	DIN
8:40	36	1.5	4.36[1]	5.13	167.55	76.59	1.55	7.80	84.39
8:48	35	1.5	9.66	4.49	145.26	56.83	1.34	4.33	61.16
8:59	34	1.5	7.22	7.31	162.65	109.40	2.09	9.25	118.65
9:12	33	1.5	9.11[1]	5.65	144.30	68.56	1.65	5.15	73.71
9:17	32	1.5	10.13	5.75	143.04	70.44	1.64	4.99	75.43
9:32	31	1.5	11.15	4.77	135.18	57.19	1.33	3.09	60.28
9:47	30	1.5	13.18[1]	2.87	112.59	26.08	0.77	0.60	26.68
10:01	29.5	1.5	14.20[1]	1.11	98.51	3.25	0.25	0.29	3.54
10:13	29	1.5	13.87	0.87	94.59	0.42	0.10	0.30	0.72
10:21	28.5	1.5	14.02	0.76	98.68	0.26	0.10	0.30	0.56
10:32	28	1.5	13.49	0.32	101.81	0.07	0.06	0.25	0.32
10:43	27	1.5	13.30[1]	0.31	103.14	0.10	0.05	0.17	0.27

continued ...

Nutrient data for March 23, 1995, continued

10:55	26	1.5	13.21	0.53	107.21	0.22	0.06	0.31	0.53
11:12	25	1.5	13.07	0.47	111.74	0.27	0.05	0.13	0.40
11:27	24	1.5	12.61[1]	0.42	121.52	1.12	0.26	0.19	1.31
11:42	23	1.5	11.91	0.89	133.20	7.12	0.69	0.80	7.92
12:00	22	1.5	10.57	1.07	151.88	11.46	0.87	3.05	14.51
12:13	21	1.5	10.21	1.19	154.41	12.03	0.88	3.28	15.31

1. Bottle Salinity.

Table 20. Nutrient data for March 30, 1995

[These samples were filtered soon after collection, and frozen until analysis on 5 April 1995.]

				Concentrations					
TIME h:m	STA	DEP m	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
9:32	21	1.5	12.27	1.19	147.74	12.90	0.73	3.01	15.91
9:43	22	1.5	10.77	1.53	158.74	16.27	0.94	3.73	20.00
9:59	23	1.5	10.75	1.39	161.61	15.04	0.92	3.41	18.45
10:13	24	1.5	11.38[1]	0.98	147.01	11.80	0.79	1.96	13.76
10:28	25	1.5	12.61	0.70	138.48	7.40	0.63	0.63	8.03
10:42	26	1.5	11.30	0.42	138.18	1.72	0.27	0.19	1.91
10:55	27	1.5	10.85[1]	0.25	129.46	0.10	0.03	0.15	0.25
11:06	28	1.5	10.80	0.47	119.43	0.13	0.02	0.17	0.30
11:27	29	1.5	10.72	0.64	121.99	0.16	0.06	0.18	0.34
11:42	29.5	1.5	10.74[1]	0.46	118.29	0.10	0.04	0.15	0.25
11:54	30	1.5	10.62[1]	0.47	115.87	0.09	0.03	0.13	0.22
12:11	31	1.5	9.66	1.43	127.73	10.73	0.66	0.18	10.91
12:36	32	1.5	9.98	1.18	109.92	5.60	0.49	0.24	5.84
12:45	33	1.5	8.75[1]	3.13	137.52	31.93	1.15	0.32	32.25
13:00	34	1.5	8.61[1,2]	4.27	139.88	50.23	1.58	1.83	52.06
13:13	35	1.5	8.64	3.34	138.03	36.63	1.25	0.87	37.50
13:22	36	1.5	7.84[1,2]	4.66	150.20	53.96	1.70	2.55	56.51

1. Bottle Salinity.
2. These salinity samples were apparently mislabelled by either the person sampling or the analyst. Assignment based on comparison with MIDAS salinities.

Table 21. Nutrient data for April 4, 1995

TIME h:m	STA	DEP m	SAL psu	Concentrations DRP	SiO2	N+N micromolar	NO2	NH3	DIN
6:49	36	1.5	6.21	9.23	178.55	101.11	3.51	7.79	109.13
7:11	34	1.5	7.00	7.15	162.33	68.76	2.82	6.43	75.19
--	33	1.5	7.46	6.25	155.63	57.42	2.42	6.08	63.50
7:30	32	1.5	7.85	5.77	152.18	51.71	2.17	5.48	57.24
7:41	31	1.5	8.12	5.17	147.35	42.57	1.90	5.12	47.69
7:55	30	1.5	8.48	4.33	141.18	32.10	1.52	6.04	38.26
8:11	29.5	1.5	9.06	3.81	132.52	22.75	4.05	6.91	29.66
8:25	29	1.5	9.97	2.38	127.67	7.86	0.59	6.59	14.45
8:33	28	1.5	9.94	2.87	129.47	11.75	0.75	6.46	18.21
8:51	27	1.5	10.45	1.75	127.60	3.35	0.32	5.75	9.27
9:16	25	1.5	11.95	1.10	127.87	1.37	0.15	1.69	3.06
9:32	24	1.5	11.74	0.46	127.84	0.00	0.01	0.04	0.06
9:46	23	1.5	11.95	0.79	138.05	4.89	0.33	0.61	5.50
10:06	22	1.5	12.08	0.68	136.93	4.31	0.34	0.49	4.80
10:21	21	1.5	12.19	0.93	134.61	4.25	0.33	2.61	6.86
10:43	20	1.5	8.66	1.60	197.06	21.52	0.91	4.19	25.71

Table 22. Nutrient data for April 7, 1995
[These samples were filtered soon after collection, and frozen until analysis on 25 April 1995.]

TIME h:m	STA	DEP m	SAL psu	Concentrations DRP	SiO2	N+N micromolar	NO2	NH3	DIN
9:23	36	1.5	10.65[1]	8.66	158.49	98.08	2.88	12.49	110.57
9:23	36	8.0	15.87[1]	1.80	117.03	8.25	0.72	9.34	17.59
9:37	35	1.5	12.01	4.20	132.77	32.40	1.70	9.44	43.17
9:46	34	1.5	6.86	11.13	172.62	111.54	4.62	10.66	120.47
10:04	33	1.5	7.89	9.01	160.51	52.61	3.75	8.11	60.72
10:14	32	1.5	9.64[1]	7.14	147.74	61.10	2.91	8.63	69.73
10:14	32	11.0	17.75	1.54	110.01	7.37	0.66	8.05	15.42
10:27	31	1.5	9.35	7.52	150.16	67.05	3.00	8.48	75.53
10:43	30	1.5	11.55[1]	4.33	133.99	31.65	1.74	6.09	37.74
10:43	30	11.0	18.61	1.43	105.82	7.55	0.63	7.22	14.77
10:58	29.5	1.5	11.34	3.16	128.52	19.94	1.20	4.52	24.46
11:10	29	1.5	11.83	2.41	124.10	12.52	0.93	3.13	15.65

continued ...

Nutrient data for April 7, 1995, continued

11:19	29	14.0	20.45	1.37	95.33	7.98	0.68	6.13	14.11
11:29	28	1.5	11.65	1.86	122.03	8.62	0.68	2.09	10.71
11:44	27	1.5	12.21[1]	1.97	120.78	9.00	0.73	1.75	10.75
11:44	27	10.0	22.52	1.32	86.44	8.40	0.70	5.46	13.86
11:56	26	1.5	12.96	1.34	118.17	4.23	0.47	0.42	4.65
12:12	25	1.5	12.21	1.37	120.49	4.34	0.46	0.85	5.19
12:29	24	1.5	13.66[1]	0.48	117.07	0.08	0.08	0.19	0.27
12:29	24	9.0	25.99	1.23	67.48	9.31	0.76	4.34	13.65
12:47	23	1.5	12.22	1.24	120.63	3.14	0.42	1.46	4.60
13:06	22	1.5	12.54	1.09	120.01	3.03	0.37	0.63	3.66
13:18	21	1.5	12.53	0.91	118.61	0.88	0.24	0.26	1.25
13:18	21	17.0	27.33	1.12	53.04	9.23	0.62	2.55	11.78

1. Bottle Salinity. The agreement betwen MIDAS and bottle salinities on this cruise was poor.

Table 23. Nutrient data for April 11, 1995

[These samples were filtered soon after collection, and frozen until analysis on 25 April 1995.]

				Concentrations					
TIME h:m	STA	DEP m	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
10:10	36	1.5	10.46[1]	7.24	140.40	56.10	2.70	4.93	61.29
10:22	35	1.5	10.83	4.69	125.14	24.79	1.48	0.72	25.51
10:34	34	1.5	10.88	3.54	120.06	15.76	1.09	0.26	16.02
11:10	33	1.5	11.04	3.53	118.68	13.86	1.11	0.59	14.45
11:21	32	1.5	11.08[1]	3.31	118.96	13.14	1.06	0.38	13.54
11:35	31	1.5	11.03	3.86	117.82	14.78	1.19	0.53	15.31
11:54	30	1.5	11.83[1]	3.00	117.40	8.72	1.02	0.62	9.58
12:08	29.5	1.5	11.67	3.23	116.57	12.09	1.13	0.51	12.60
12:29	29	1.5	12.41	2.77	116.16	3.79	0.72	0.67	4.46
12:50	28	1.5	13.36	1.38	113.30	0.87	0.28	0.27	1.14
13:04	27	1.5	13.43[1]	1.31	120.06	1.02	0.30	0.26	1.17
13:17	26	1.5	13.75	1.51	112.32	0.12	0.16	0.49	0.61
13:33	25	1.5	13.98	1.43	115.10	0.16	0.19	0.38	0.54
13:50	24	1.5	14.01[1]	0.92	114.38	0.04	0.08	0.26	0.24
14:04	23	1.5	14.09	1.06	123.80	1.10	0.31	0.36	1.46
14:21	22	1.5	15.12	1.15	124.05	6.17	0.57	0.34	6.51
14:33	21	1.5	14.97	1.21	119.89	2.98	0.40	0.48	3.46

1. Bottle Salinity.

Table 24. Nutrient data for April 19, 1995

[These samples were filtered soon after collection, and frozen until analysis on 25 April 1995.]

				Concentrations					
TIME h:m	STA	DEP m	SAL psu	DRP	SiO2	N+N micromolar	NO2	NH3	DIN
10:51	21	1.5	17.14[1]	1.93	109.01	6.92	0.53	4.40	11.32
11:37	24	1.5	17.00[1,2]	2.46	106.90	7.90	0.69	4.35	12.25
12:21	27	1.5	15.19	3.56	110.64	12.75	1.14	6.29	19.04
14:06	30	1.5	13.93[1]	4.49	116.22	20.42	1.59	6.63	27.05
14:37	32	1.5	12.87[1]	5.35	122.07	31.11	2.11	6.21	37.32
15:23	36	1.5	10.94[1]	8.87	139.06	78.69	4.53	7.61	86.30

1. Bottle Salinity.
2. Hydrogen sulfide smell evident in salinity sample.

Table 25. Nutrient data for April 27, 1995

[These samples were filtered soon after collection, and frozen until analysis on 3 May 1995.]

				Concentrations					
TIME h:m	STA	DEP m	SAL psu	DRP	SiO2	N+N micromolar	NO2	NH3	DIN
8:37	21	1.5	19.89	1.67	105.29	13.99	0.58	0.79	14.78
8:46	22	1.5	19.84	1.67	107.34	15.84	0.57	0.69	16.53
9:01?	23	1.5	19.33	1.55	105.24	9.37	0.61	0.18	9.55
9:18	24	1.5	19.69[1]	1.72	103.58	13.06	0.66	0.40	13.44
9:34	25	1.5	19.27	1.72	104.71	12.58	0.67	0.32	12.90
9:49	26	1.5	17.41	2.58	107.11	13.20	0.97	0.96	14.16
10:00	27	1.5	16.86[1]	2.87	108.46	14.01	1.10	1.22	15.15
--	-	1.5	16.80	2.91	105.53	7.99	0.83	0.45	8.44
10:12	28	1.5	16.74	2.92	108.19	14.30	1.13	1.22	15.52
14:08	29	1.5	16.60	2.97	111.88	13.30	1.08	2.44	15.74
14:30	29.5	1.5	16.53	3.00	109.58	14.43	1.15	3.23	17.66
14:47	30	1.5	16.18[1]	3.56	111.33	17.46	1.46	2.90	20.36
15:07	31	1.5	15.49	4.46	116.49	23.47	2.04	4.41	27.88
15:23	32	1.5	14.44[1]	6.05	124.07	37.72	2.97	4.60	42.32
15:34	33	1.5	13.83	7.47	127.33	58.44	3.69	3.00	61.44

1. Bottle Salinity.

Table 26. Nutrient data for May 2, 1995

TIME h:m	STA	DEP m	SAL psu	Concentrations DRP	SiO2	N+N micromolar	NO2	NH3	DIN
6:28	36	1.5	12.04[1]	10.90	151.50	122.93	5.65	9.07	132.00
6:44	34	1.5	13.93	8.55	138.63	73.94	4.13	7.57	81.51
7:02	32	1.5	14.58[1]	7.27	131.10	59.52	3.06	6.99	66.51
7:25	30	1.5	16.00[1]	5.09	121.46	34.15	2.11	6.53	40.68
7:45	29	1.5	17.37	3.55	113.65	19.50	1.31	5.70	25.20
8:07	27	1.5	18.36	2.93	111.03	16.34	1.11	4.48	20.82
8:30	25	1.5	19.28	2.37	107.26	13.25	0.84	3.31	16.56
8:45	24	1.5	20.20[1,2]	1.75	101.90	9.79	0.52	0.81	10.60
9:13	22	1.5	20.40	1.73	103.96	11.35	0.61	2.25	13.60
9:28	21	1.5	20.00	1.77	105.89	8.63	0.52	1.80	10.43
9:48	20	1.5	15.52	1.55	135.66	15.21	0.47	1.51	16.72

1. Bottle Salinity.
2. Strong hydrogen sulfide smell in salinity sample.

Table 27. Nutrient data for May 9, 1995
[These samples were filtered soon after collection, and frozen until analysis on 16 July 1995.]

TIME h:m	STA	DEP m	SAL psu	Concentrations DRP	SiO2	N+N micromolar	NO2	NH3	DIN
10:03	36	1.5	14.23[1]	9.14	151.54	77.36	3.47	5.99	83.35
10:15	35	1.5	14.50	8.71	149.71	70.12	3.27	5.54	75.66
10:32	34	1.5	15.08[1]	7.38	143.97	54.43	2.67	4.79	59.22
10:46	33	1.5	15.20	7.14	142.65	52.82	2.61	5.01	57.83
10:55	32	1.5	15.85[1]	5.81	133.21	38.33	2.04	4.95	43.28
11:06	31	1.5	16.23	5.55	134.14	35.71	1.99	6.02	41.73
11:25	30	1.5	17.16[1]	4.60	125.48	27.18	1.79	8.46	35.64
11:38	29.5	1.5	17.26	4.25	123.30	23.78	1.63	9.29	33.07
11:50	29	1.5	17.28	4.01	121.78	21.36	1.85	15.83	37.19
12:04	28	1.5	16.97	2.85	120.95	16.87	1.16	4.20	21.07
12:18	27	1.5	16.67[1]	2.38	122.03	16.07	1.01	3.14	19.21
12:30	26	1.5	16.43	2.35	123.68	15.28	0.98	3.69	18.97
12:46	25	1.5	16.57	2.41	122.94	15.75	0.97	3.88	19.63

continued ...

Nutrient data for May 9, 1995, continued

13:01	24	1.5	15.84[1]	2.24	126.20	14.69	0.89	4.52	19.21
13:15	23	1.5	14.14	1.71	133.59	12.64	0.69	2.91	15.55
13:32	22	1.5	15.43	1.97	127.05	13.28	0.78	5.46	18.74
13:45	21	1.5	14.65	1.82	131.36	12.75	0.70	4.71	17.46

1. Bottle Salinity.

Table 28. Nutrient data for May 16, 1995

[These samples were filtered soon after collection, and frozen until analysis on 16 July 1995.]

				Concentrations					
TIME h:m	STA	DEP m	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
9:15	21	1.5	17.55	2.17	120.90	16.89	1.17	9.65	26.54
10:01	24	1.5	17.34[1]	2.32	120.73	17.54	1.21	7.35	24.89
10:42	27	1.5	16.67[1]	4.39	128.22	27.11	1.84	9.23	36.34
11:06	29	1.5	16.45	5.32	132.24	34.14	1.99	8.64	42.78
11:31	30	1.5	16.23[1]	6.15	136.63	40.48	2.16	8.28	48.76
12:10	32	1.5	15.55[1]	7.85	143.76	57.16	2.68	8.01	65.17
12:32	34	1.5	14.25[1]	10.64	154.21	91.54	4.03	8.53	100.07
12:57	36	1.5	14.20[1]	9.20	153.95	92.21	4.16	8.57	100.78

1. Bottle Salinity.

Table 29. Nutrient data for June 13, 1995

[These samples were filtered soon after collection, and frozen until analysis on 16 July 1995.]

				Concentrations					
TIME h:m	STA	DEP m	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
6:38	36	1.5	11.76[1]	23.12	181.64	247.80	8.41	12.27	260.07
7:02	34	1.5	14.21	17.62	157.50	140.20	5.17	8.13	148.33
7:20	32	1.5	16.35[1]	12.19	135.20	71.50	2.48	5.46	76.96
7:46	30	1.5	17.24[1]	9.16	121.64	42.58	1.49	4.51	47.09
8:10	29	1.5	17.90	6.93	111.91	29.11	1.05	4.75	33.86
8:35	27	1.5	18.69[1]	5.61	107.12	23.96	0.94	5.26	29.22

continued ...

Nutrient data for June 13, 1995, continued

9:20	24	1.5	21.53[1]	2.96	98.86	20.91	0.71	3.28	24.19

1. Bottle Salinity.

Table 30. Nutrient data for July 18, 1995

				Concentrations					
TIME h:m	STA	DEP m	SAL psu	DRP	SiO2	N+N micromolar	NO2	NH3	DIN
6:40	36	1.5	19.59[1,2]	13.46	151.78	52.21	3.51	8.41	60.62
7:00	34	1.5	20.68	10.29	138.80	37.26	1.53	7.45	44.71
7:19	32	1.5	21.19[1]	8.80	132.63	31.70	1.32	5.97	37.67
7:45	30	1.5	22.30[1]	6.38	114.73	24.66	1.06	6.94	31.60
8:07	29	1.5	22.42	6.53	115.96	24.58	1.09	9.00	33.58
8:30	27	1.5	22.85[1]	5.13	108.19	21.70	0.83	3.70	25.40
8:55	25	1.5	24.03	4.35	91.90	18.72	0.84	5.27	23.99
9:09	24	1.5	24.76[1]	3.80	85.42	17.54	0.83	5.67	23.21
9:37	22	1.5	25.51	2.81	76.00	15.26	0.71	5.31	20.57
9:51	21	1.5	25.42	3.50	82.89	17.04	0.91	7.26	24.30
10:09	20	1.5	25.53	2.49	74.22	14.48	0.64	5.36	19.84

1. Bottle Salinity.
2. Strong hydrogen sulfide smell in salinity sample.

Table 31. Nutrient data for August 16, 1995
[These samples were filtered soon after collection, and frozen until analysis on 2 November 1995.]

				Concentrations					
TIME h:m	STA	DEP m	SAL psu	DRP	SiO2	N+N micromolar	NO2	NH3	DIN
6:30	36	1.5	22.13[1]	14.97	170.06	50.80	2.30	8.94	59.74
6:51	34	1.5	22.69	12.64	153.38	39.49	1.71	8.14	47.63
7:10	32	1.5	23.15[1]	11.33	145.34	34.58	1.46	7.55	42.13
7:36	30	1.5	23.87[1]	8.68	121.86	25.98	1.22	7.09	33.07
7:58	29	1.5	24.50	7.16	105.36	20.27	1.04	8.28	28.55
8:20	27	1.5	24.94[1]	5.88	95.24	17.38	0.90	5.52	22.90
8:45	25	1.5	25.32	5.34	90.68	15.80	0.86	5.80	21.60

continued ...

Nutrient data for August 16, 1995, continued

9:02	24	1.5	26.64[1]	3.75	76.33	10.76	0.84	7.04	17.80
9:30	22	1.5	27.61	2.81	62.68	5.91	0.64	7.72	13.63
9:43	21	1.5	27.01	3.60	74.92	9.97	0.85	7.74	17.71
10:02	20	1.5	28.34	2.35	60.27	4.30	0.50	6.38	10.68
10:20	18.5	1.5	28.14	2.60	58.92	2.40	0.39	4.25	6.65

1. Bottle Salinity.

Table 32. Nutrient data for September 21, 1995

[These samples were filtered soon after collection, and frozen until analysis on 2 November 1995.]

				Concentrations					
TIME h:m	STA	DEP m	SAL psu	DRP	SiO2	N+N micromolar	NO2	NH3	DIN
7:07	36	1.5	20.86[1]	22.60	199.60	153.13	4.66	6.64	159.77
7:28	34	1.5	23.18	18.01	174.37	91.18	2.71	4.22	95.40
7:49	32	1.5	24.73[1]	14.12	148.05	58.48	1.64	3.01	61.49
8:20	30	1.5	25.96[1]	10.27	115.17	35.93	1.23	4.81	40.74
8:47	29	1.5	26.76	7.45	79.85	25.92	1.41	5.50	31.42
9:16	27	1.5	27.50[1]	5.51	55.95	20.50	1.22	2.65	23.15
9:44	25	1.5	27.36	4.61	65.37	19.71	1.28	6.27	25.98
10:02	24	1.5	26.97[1]	3.19	64.90	16.44	1.03	8.28	24.72
10:37	22	1.5	26.90	2.86	65.61	16.15	0.88	7.70	23.85
10:51	21	1.5	27.11	2.85	62.61	15.96	0.88	8.10	24.06

1. Bottle Salinity.

Table 33. Nutrient data for October 25, 1995

[These samples were filtered soon after collection, and frozen until analysis on 2 November 1995.]

				Concentrations					
TIME h:m	STA	DEP m	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
9:25	21	1.5	28.40	2.82	54.57	17.56	0.93	4.98	22.54
9:38	22	1.5	28.02	3.46	54.98	18.33	0.99	5.61	23.94
10:05	24	1.5	27.87[1]	3.54	53.26	19.42	1.05	5.74	25.16
10:18	25	1.5	27.35	4.63	45.50	20.74	1.07	3.57	24.31
10:42	27	1.5	27.30[1]	5.52	49.67	23.93	0.98	1.46	25.39
11:03	29	1.5	27.13	7.19	80.36	28.29	1.17	8.04	36.33
11:09	29.5	1.5	27.08	7.64	85.73	29.55	1.16	8.78	38.33
11:23	30	1.5	26.96[1]	8.54	93.75	31.75	1.19	8.63	40.38
11:46	32	1.5	26.52[1]	10.48	109.39	38.59	1.22	7.07	45.66
11:52	33	1.5	26.46	10.92	113.53	40.21	1.16	5.76	45.97
12:03	34	1.5	25.92	12.59	123.80	52.22	1.41	6.26	58.48
12:21	36	1.5	25.11[1]	14.56	137.10	66.73	1.82	6.79	73.52

1. Bottle Salinity.

Data for southern San Francisco Bay
Shallow stations

Table 34. Nutrient data for January 24, 1995
[These samples were filtered soon after collection, and frozen until analysis on 23 February 1995. All salinities were measured with the Ocean Sciences model 200 CTD.]

				Concentrations					
TIME h:m	STA	DEPTH	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
8:34	H36	sfc	17.50	8.43	128.87	103.39	2.67	14.57	117.96
8:56	H33	sfc	18.77	7.48	120.65	85.36	2.36	13.32	98.68
9:29	SWH1	sfc	18.70	4.65	116.90	48.62	1.81	12.49	61.11
9:37	SM28++	sfc	19.08	5.38	117.08	54.77	1.88	11.40	66.17
9:52	SM47	sfc	18.99	6.16	121.11	66.21	2.06	12.90	79.10
10:07	SM30	sfc	18.97	5.43	120.68	54.12	1.86	12.67	66.79
10:09	SM32	sfc	19.02	5.99	121.77	60.76	1.98	12.75	73.51
10:31	SM35	sfc	18.96	5.32	115.07	53.93	1.88	11.28	65.21
10:49	H30	sfc	18.62	4.95	118.97	48.07	1.81	13.07	61.14
11:00	SM42	sfc	18.59	5.03	119.64	48.10	1.79	13.00	61.10
11:23	SM44	sfc	18.92	5.22	113.25	51.87	1.74	11.24	63.11
11:33	SM46	sfc	18.49	5.43	117.87	54.91	1.81	11.36	66.27
11:37	SM53	sfc	18.04	5.57	122.68	59.68	1.93	11.53	71.21
11:56	SM50	sfc	18.43	4.54	116.53	46.47	1.83	13.95	60.42

Table 35. Nutrient data for February 9, 1995
[These samples were filtered soon after collection, and frozen until analysis on 23 February 1995. All salinities were measured with the Ocean Sciences model 200 CTD.]

				Concentrations					
TIME h:m	STA	DEPTH	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
7:52	SM55	sfc	13.83	2.71	151.12	30.35	1.27	7.65	38.00
7:57	SM56	sfc	13.78	2.82	152.68	30.25	1.26	8.93	39.18
8:08	SM59	sfc	16.56	3.93	128.34	40.94	1.48	6.85	47.79
8:16	SM61	sfc	16.27	5.48	127.65	61.33	1.49	0.71	62.04
8:33	SM50	sfc	13.91	2.80	149.88	31.39	1.37	8.17	39.56
8:44	SM65	sfc	15.99	3.88	134.61	41.06	1.59	7.59	48.65
8:53	SM53	sfc	15.80	5.62	130.73	65.03	1.65	0.50	65.53

continued ...

Nutrient data for February 9, 1995, continued

9:10	SM46	sfc	15.48	5.51	132.70	66.46	1.81	0.61	67.07
9:16	SM70	sfc	16.00	4.29	133.37	46.74	1.65	7.27	54.01
9:32	SM42	sfc	14.02	2.78	148.19	32.10	1.36	7.62	39.72
9:54	SM72	sfc	15.60	3.84	135.15	40.39	1.53	5.92	46.31
9:58	H30	sfc	14.64	3.01	139.69	34.14	1.50	6.81	40.95
10:13	SM35	sfc	15.28	5.78	127.83	70.48	1.68	0.29	70.77
10:24	SM32	sfc	14.85	3.23	142.78	35.79	1.55	8.11	43.90
10:26	SM30	sfc	15.57	4.25	137.13	46.56	1.70	8.30	54.86
10:38	SM24	sfc	15.34	7.48	133.67	85.10	2.10	0.64	85.74
10:42	SM47	sfc	15.60	6.84	135.66	81.19	2.18	6.98	88.17
10:53	SM28++	sfc	15.59	7.03	133.83	85.14	1.92	2.33	87.47
10:57	SWH1	sfc	15.48	7.00	138.77	84.25	2.17	6.30	90.55
11:07	H33	sfc	14.79	8.48	143.75	105.07	2.50	7.07	112.14
11:34	H36	sfc	9.90	14.55	188.46	209.70	5.00	18.69	228.39

Table 36. Nutrient data for February 15, 1995

[These samples were filtered soon after collection, and frozen until analysis on 23 February 1995. All salinities were measured with the Ocean Sciences model 200 CTD.]

				Concentrations					
TIME h:m	STA	DEPTH	SAL psu	DRP	SiO2	N+N micromolar	NO2	NH3	DIN
8:20	H36	sfc	12.98	11.54	159.51	157.82	3.57	5.67	163.49
8:54	H33	sfc	14.99	6.77	140.32	82.68	1.90	1.60	84.28
9:05	SWH1	sfc	15.48	5.41	131.26	64.21	1.47	1.78	65.99
9:26	SM28++	sfc	15.21	5.52	130.56	66.35	1.18	0.24	66.59
9:35	SM47	sfc	15.51	5.31	132.23	63.84	1.63	2.21	66.05
9:50	SM30	sfc	16.00	4.30	131.14	49.49	1.55	3.90	53.39
9:53	SM32	sfc	16.22	3.95	132.21	44.61	1.49	5.17	49.78
10:01	SM35	sfc	15.86	3.39	134.58	39.48	1.28	1.06	40.54
10:07	SM41	sfc	16.06	3.78	135.32	44.48	1.38	2.50	46.98
10:17	H30	sfc	16.35	3.74	128.93	42.16	1.49	5.46	47.62
10:30	SM42	sfc	16.51	3.58	132.06	39.27	1.50	5.71	44.98
10:52	SM46	sfc	15.72	3.85	134.99	44.51	1.16	0.42	44.93
10:55	SM53	sfc	15.75	5.20	123.45	53.94	0.95	0.85	54.79
11:12	SM50	sfc	16.62	3.56	130.79	39.34	1.51	6.38	45.72

Table 37. Nutrient data for February 22, 1995.
[All salinities were measured with the Ocean Sciences model 200 CTD.]

TIME h:m	STA	DEPTH	SAL psu	Concentrations DRP micromolar	SiO2 micromolar	N+N micromolar	NO2 micromolar	NH3 micromolar	DIN micromolar
13:11	SM50	sfc	16.22	3.63	115.13	36.36	1.02	0.73	37.09
13:29	SM53	sfc	15.38	1.14	56.19	0.07	0.08	0.08	0.15
13:34	SM46	sfc	15.19	1.49	52.67	0.05	0.10	0.10	0.15
13:49	H29.5	sfc	16.10	3.69	113.30	36.61	0.99	0.58	37.19
13:55	SM42	sfc	16.87	1.19	67.45	0.38	0.08	0.01	0.39
14:06	H30	sfc	15.74	4.01	112.77	42.28	1.09	0.27	42.55
14:13	SM41	sfc	15.22	1.31	49.27	0.07	0.13	0.26	0.33
14:16	SM35	sfc	14.78	1.58	50.56	0.03	0.09	0.19	0.22
14:27	SM32	sfc	15.44	4.42	109.67	43.87	1.10	0.57	44.44
14:30	SM30	sfc	15.76	3.25	100.83	26.94	0.84	0.22	27.16
14:39	SM24	sfc	15.65	3.15	99.37	22.91	0.83	0.30	23.21
14:45	SM47	sfc	15.00	5.16	111.17	55.12	1.40	0.21	55.33
14:59	SM28++	sfc	14.93	2.06	67.80	0.26	0.07	0.32	0.58
15:02	SWH1	sfc	15.64	3.37	98.24	24.48	0.73	0.28	24.76
15:14	H33	sfc	14.78	5.48	111.36	59.38	1.49	0.26	59.64
15:40	H36	sfc	13.03	9.45	121.75	120.73	2.72	0.37	121.10

Table 38. Nutrient data for February 28, 1995
[These samples were filtered soon after collection, and frozen until analysis on 8 March 1995. All salinities were measured with the Ocean Sciences model 200 CTD.]

TIME h:m	STA	DEPTH	SAL psu	Concentrations DRP micromolar	SiO2 micromolar	N+N micromolar	NO2 micromolar	NH3 micromolar	DIN micromolar
7:39	SM50	sfc	17.30	2.66	99.91	20.43	0.90	1.93	22.36
8:10	SM53	sfc	16.01	1.00	56.53	0.13	0.11	0.20	0.33
8:16	SM46	sfc	16.49	2.47	84.95	7.25	0.26	0.68	7.93
8:37	H29.5	sfc	17.61	2.26	94.87	17.95	0.81	1.58	19.53
8:51	SM42	sfc	17.49	2.37	98.80	17.34	0.81	1.30	18.64
9:05	H30	sfc	17.41	2.51	102.05	19.36	0.89	0.73	20.09
9:17	SM41	sfc	16.59	2.34	90.28	13.23	0.37	0.25	13.48
9:22	SM35	sfc	16.28	1.87	76.55	3.10	0.18	0.60	3.70
9:35	SM32	sfc	17.57	2.65	103.18	19.87	0.85	1.96	21.83

continued ...

Nutrient data for February 28, 1995, continued

9:40	SM30	sfc	17.49	2.65	102.11	20.19	0.86	3.12	23.31
10:10	SM24	sfc	16.72	2.72	96.16	20.55	0.77	1.20	21.75
10:17	SM47	sfc	16.35	3.15	93.39	22.67	0.79	0.72	23.39
10:33	SM28++	sfc	15.81	2.38	78.32	5.22	0.25	0.79	6.01
10:38	SWH1	sfc	15.82	2.91	86.32	20.71	0.62	0.52	21.23
10:53	H33	sfc	16.15	3.07	91.85	22.05	0.77	0.55	22.60
11:17	H36	sfc	14.79	5.83	91.01	47.67	1.11	0.63	48.30

Table 39. Nutrient data for March 6, 1995

[These samples were filtered soon after collection, and frozen until analysis on 8 March 1995. All salinities were measured with the Ocean Sciences model 200 CTD, except as noted.]

				Concentrations					
TIME h:m	STA	DEPTH	SAL psu	DRP	SiO2	N+N micromolar	NO2	NH3	DIN
10:15	SM50	sfc	17.67[1]	2.75	88.80	13.43	0.57	2.77	16.20
11:00	SM53	sfc	15.46[1]	1.66	67.66	0.07	0.06	0.29	0.36
11:10	SM46	sfc	15.20[1]	1.86	68.52	0.14	0.07	0.41	0.55
11:28	H29.5	sfc	17.35[1]	2.69	86.37	11.55	0.53	0.77	12.32
11:37	SM42	sfc	17.63[1]	1.82	81.27	2.24	0.31	0.19	2.43
11:50	H30	sfc	16.65[1]	3.55	87.60	20.32	0.62	0.76	21.08
12:15	SM41	sfc	15.78	1.47	73.94	0.09	0.06	0.16	0.25
12:20	SM35	sfc	15.45[1]	1.87	78.96	0.21	0.09	0.23	0.44
12:34	SM32	sfc	16.36[1]	3.75	87.70	22.17	0.69	0.35	22.52
12:38	SM30	sfc	17.50	4.22	83.90	8.23	0.43	1.05	9.28
13:38	SM24	sfc	16.59	3.40	87.01	18.80	0.59	0.78	19.58
13:45	SM47	sfc	16.41	3.67	87.44	19.99	0.71	0.19	20.18
14:00	SM28++	sfc	15.60	1.97	82.86	0.25	0.10	0.23	0.48
14:06	SWH1	sfc	16.81	3.11	89.46	14.63	0.61	0.29	14.92
14:50	H36	sfc	14.78	3.72	95.40	60.56	1.42	2.08	62.64

1. Bottle salinity.

Table 40. Nutrient data for March 16, 1995

[These samples were filtered soon after collection, and frozen until analysis on 24 March 1995. All salinities were measured with the Ocean Sciences model 200 CTD.]

TIME h:m	STA	DEPTH	SAL psu	Concentrations DRP micromolar	SiO2 micromolar	N+N micromolar	NO2 micromolar	NH3 micromolar	DIN micromolar
7:09	H36	sfc	10.28	8.17	168.10	119.89	2.36	14.76	134.65
7:48	H33	sfc	17.57	4.34	108.81	43.14	1.42	6.76	49.90
8:03	SWH1	sfc	18.28	1.69	89.16	11.56	0.76	0.84	12.40
8:10	SM28++	sfc	16.24	3.07	107.72	27.10	1.15	5.88	32.98
8:19	SM47	sfc	18.66	1.84	85.41	14.65	0.86	6.82	21.47
8:27	SM24	sfc	19.19	1.64	83.60	11.93	0.88	6.17	18.10
8:37	SM30	sfc	18.83	1.81	85.41	12.16	0.82	7.74	19.90
8:42	SM32	sfc	18.28	1.26	86.67	6.68	0.74	6.33	13.01
8:56	SM35	sfc	16.71	1.97	91.58	16.18	0.89	0.47	16.65
9:01	SM41	sfc	16.36	1.72	93.07	16.49	0.95	0.31	16.80
9:15	H30	sfc	15.46	1.10	117.06	8.46	0.95	5.33	13.79
9:20	SM72	sfc	17.40	1.37	95.89	6.46	0.78	7.91	14.37
9:41	SM42	sfc	15.20	1.46	114.68	17.00	0.90	5.90	22.90
9:49	H29.5	sfc	13.53	1.41	118.69	15.70	1.05	11.91	27.61
10:08	SM46	sfc	17.19	1.94	91.60	14.95	0.94	0.32	15.27
10:14	SM53	sfc	15.93	3.61	114.64	34.28	1.38	8.71	42.99
10:28	SM65	sfc	17.47	0.86	79.84	0.88	0.16	6.44	7.32
10:40	SM50	sfc	12.74	1.48	133.37	15.85	0.83	14.63	30.48
10:51	SM55	sfc	13.01	1.48	124.50	16.00	0.88	9.37	25.37
10:55	SM56	sfc	12.82	1.37	133.14	15.04	0.83	13.64	28.68
11:11	SM59	sfc	16.32	0.85	94.42	3.42	0.66	0.43	3.85
11:20	SM61	sfc	16.35	2.60	102.14	29.03	1.12	1.74	30.77

Table 41. Nutrient data for March 23, 1995

[All salinities were measured with the Ocean Sciences model 200 CTD.]

TIME h:m	STA	DEPTH	SAL psu	Concentrations DRP micromolar	SiO2 micromolar	N+N micromolar	NO2 micromolar	NH3 micromolar	DIN micromolar
13:25	SM50	sfc	14.00	0.20	105.11	0.07	0.03	0.11	0.18
14:05	SM53	sfc	13.00	2.01	115.99	10.68	0.43	0.77	11.45

Table 42. Nutrient data for March 30, 1995

[These samples were filtered soon after collection, and frozen until analysis on 5 April 1995. All salinities were measured with the Ocean Sciences model 200 CTD.]

				Concentrations					
TIME h:m	STA	DEPTH	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
8:26	SM50	sfc	10.32	0.81	121.27	1.04	0.32	0.15	1.19
8:44	SM65	sfc	10.38	2.15	121.27	0.48	0.43	0.90	1.38
8:56	SM53	sfc	7.15	1.45	135.52	12.74	0.95	0.75	13.49
9:02	SM46	sfc	8.45	0.77	129.45	2.62	0.60	0.30	2.92
9:21	H29.5	sfc	10.38	0.77	120.92	0.37	0.23	0.28	0.65
9:28	SM42	sfc	10.49	0.71	123.74	0.20	0.10	0.14	0.34
9:40	H30	sfc	9.78	1.35	122.70	5.75	0.62	0.30	6.05
9:51	SM41	sfc	8.54	1.11	124.87	7.61	0.76	0.32	7.93
9:55	SM35	sfc	8.19	1.22	132.91	10.22	0.84	0.23	10.45
10:07	SM32	sfc	9.85	1.25	112.79	6.91	0.58	0.32	7.23
10:10	SM30	sfc	10.05	1.37	120.57	6.22	0.56	0.76	6.98
10:24	SM24	sfc	9.58	1.87	127.89	13.59	0.82	0.29	13.88
10:31	SM47	sfc	9.46	1.78	129.67	13.69	0.83	0.26	13.95
10:40	SM28++	sfc	7.74	2.00	139.10	21.34	1.07	0.53	21.87
10:45	SWH1	sfc	8.81	2.18	132.08	20.95	1.17	0.23	21.18
10:58	H33	sfc	9.06	2.62	127.61	24.86	1.09	0.24	25.10

Table 43. Nutrient data for April 3, 1995

[These samples were filtered soon after collection, and frozen until analysis on 5 April 1995. All salinities were measured with the Ocean Sciences model 200 CTD, except as noted.]

				Concentrations					
TIME h:m	STA	DEPTH	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
8:58	SM50	sfc	9.49[1,2]	2.90	129.28	15.94	0.94	5.92	21.86
9:46	SM65	sfc	9.59	2.42	125.82	10.33	0.70	5.10	15.43
10:09	SM53	sfc	9.09	2.32	128.42	4.41	0.54	0.75	5.16
10:26	SM46	sfc	9.05	2.43	127.51	4.26	0.54	0.57	4.83
10:56	H29.5	sfc	9.41[1,2]	2.85	129.24	17.35	0.96	4.74	22.09
11:02	SM42	sfc	9.23	2.63	129.23	11.64	0.75	2.74	14.38
11:29	H30	sfc	9.29[1,2]	3.10	132.77	19.29	1.34	5.95	25.24

continued ...

Nutrient data for April 3, 1995, continued

12:14	SM41	sfc	10.11	1.61	121.20	3.06	0.40	0.46	3.52
12:18	SM35	sfc	10.22	1.41	120.85	0.88	0.25	0.25	1.13
12:29	SM32	sfc	9.14	3.32	133.88	21.45	1.12	3.35	24.80
12:37	SM30	sfc	9.31	3.49	131.64	17.54	1.08	6.09	23.63
12:42	SM24	sfc	8.98	3.72	128.12	23.91	1.27	5.54	29.45
12:51	SM47	sfc	9.05	3.39	133.51	22.69	1.20	3.94	26.63
13:07	SM28++	sfc	8.27	2.60	129.10	11.18	0.84	3.14	14.32
13:13	SWH1	sfc	8.65	3.36	130.25	23.64	1.47	5.50	29.14
13:26	H33	sfc	8.42[1,2]	4.58	141.51	36.83	1.69	4.73	41.56

1. Bottle salinity.
2. Hydrogen sulfide smell evident in salinity sample.

Table 44. Nutrient data for April 11, 1995

[These samples were filtered soon after collection, and frozen until analysis on 25 April 1995. All salinities were measured with the Ocean Sciences model 200 CTD.]

				Concentrations					
TIME h:m	STA	DEPTH	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
6:41	SM55	sfc	11.77	2.41	115.51	7.02	0.74	0.40	7.42
6:46	SM56	sfc	11.96	2.55	116.45	10.87	0.97	0.51	11.38
7:01	SM59	sfc	12.89	1.38	118.24	0.29	0.15	0.41	0.70
7:10	SM61	sfc	10.73	1.64	125.64	0.12	0.10	0.22	0.34
7:29	SM62	sfc	12.98	4.65	121.96	2.56	0.54	1.44	4.00
7:34	SM50	sfc	11.92	2.59	117.06	11.19	0.97	0.16	11.35
7:46	SM65	sfc	12.56	1.24	117.06	0.07	0.08	0.25	0.32
7:58	SM53	sfc	10.57	1.84	126.15	0.03	0.05	0.08	0.11
8:07	SM46	sfc	10.66	2.66	131.84	0.10	0.26	1.05	1.15
8:25	H29.5	sfc	11.95	2.75	116.46	11.62	0.98	0.67	12.29
8:32	SM42	sfc	11.92	2.96	115.32	12.70	1.08	0.54	13.24
8:42	SM72	sfc	11.73	3.17	118.15	14.95	1.17	0.65	15.60
8:50	H30	sfc	11.51	3.10	115.51	14.95	1.20	0.42	15.37
9:20	SM41	sfc	11.24	1.54	114.89	0.11	0.14	0.34	0.45
9:25	SM35	sfc	11.06	1.63	114.58	0.07	0.12	0.19	0.26
9:40	SM32	sfc	11.62	2.93	116.01	12.72	1.18	0.47	13.19
9:46	SM30	sfc	11.70	3.35	117.46	14.52	1.23	0.18	14.70
9:57	SM24	sfc	10.86	3.24	116.93	11.36	1.10	0.38	11.74
10:04	SM47	sfc	11.28	2.91	112.61	13.06	1.14	0.32	13.38
10:13	SM28++	sfc	10.66	2.16	122.53	0.07	0.21	0.33	0.40
10:21	SWH1	sfc	10.19	3.29	121.42	3.81	0.55	0.40	4.21
10:35	H33	sfc	10.79	2.70	116.26	8.04	0.92	0.13	8.17
11:25	H36	sfc	9.64	19.96	205.29	255.23	6.37	20.34	275.57

Table 45. Nutrient data for April 19, 1995

[These samples were filtered soon after collection, and frozen until analysis on 25 April 1995. All salinities were measured with the Ocean Sciences model 200 CTD.]

				Concentrations					
TIME h:m	STA	DEPTH	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
10:53	SM50	sfc	13.91	4.82	117.84	20.78	1.71	10.22	31.00
11:21	SM65	sfc	14.23	3.86	115.34	15.87	1.15	5.74	21.61
11:44	H29.5	sfc	13.74	4.58	110.23	21.62	1.72	6.89	28.51
12:50	SM70	sfc	14.94	3.86	111.53	11.46	0.99	6.37	17.83
14:02	H30	sfc	13.84	4.60	116.21	20.91	1.69	6.73	27.64
14:16	SM41	sfc	14.61	3.69	109.85	13.69	0.99	5.37	19.06
14:20	SM35	sfc	14.16	4.11	116.16	17.13	1.20	6.21	23.34

Table 46. Nutrient data for April 27, 1995

[These samples were filtered soon after collection, and frozen until analysis on 3 May 1995. All salinities were measured with the Ocean Sciences model 200 CTD.]

				Concentrations					
TIME h:m	STA	DEPTH	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
8:37	SM50	sfc	15.93	3.55	105.14	17.66	1.52	3.69	21.35
8:50	SM65	sfc	15.30	4.31	117.55	24.04	2.02	4.95	28.99
9:01	SM53	sfc	14.89	4.35	127.25	11.86	0.67	0.38	12.24
9:06	SM46	sfc	14.99	4.11	123.56	11.36	0.52	0.36	11.72
9:26	H29.5	sfc	15.82	3.97	112.59	18.34	1.62	3.57	21.91
9:42	SM42	sfc	15.65	3.94	107.86	19.33	1.60	3.11	22.44
9:56	H30	sfc	15.80	3.68	113.34	19.63	1.64	3.94	23.57
10:15	SM41	sfc	15.14	4.31	116.51	22.55	1.35	1.29	23.84
10:20	SM35	sfc	15.00	4.56	120.23	23.13	1.25	1.11	24.24
10:41	SM32	sfc	15.94	3.68	113.55	18.61	1.59	3.76	22.37
10:46	SM30	sfc	15.71	3.95	114.58	19.84	1.69	5.82	25.66
11:03	SM24	sfc	14.82	5.07	114.69	29.96	2.48	5.17	35.13
11:10	SM47	sfc	14.91	4.89	119.60	28.78	2.47	5.30	34.08
11:20	SM28++	sfc	14.62	5.10	123.36	27.42	1.98	3.27	30.69
11:27	SWH1	sfc	13.64	6.90	123.26	52.57	3.55	3.97	56.54
11:42	H33	sfc	14.56	5.47	119.39	34.90	2.73	5.00	39.90

continued ...

Nutrient data for April 27, 1995, continued

12:12	H36	sfc	13.16	8.00	130.58	66.00	4.07	3.12	69.12

Table 47. Nutrient data for May 9, 1995

[These samples were filtered soon after collection, and frozen until analysis on 16 July 1995. All salinities were measured with the Ocean Sciences model 200 CTD, except as noted.]

				Concentrations					
TIME h:m	STA	DEPTH	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
6:00	SM55	sfc	16.95	1.95	119.88	12.49	0.64	0.90	13.39
6:05	SM56	sfc	16.92[1]	2.67	121.39	17.57	1.14	5.06	22.62
6:20	SM59	sfc	18.10	2.73	114.93	14.71	0.97	6.14	20.85
6:29	SM61	sfc	16.66	3.19	132.55	7.06	0.44	1.68	8.74
6:49	SM62	sfc	17.91	2.79	116.64	12.88	0.93	3.34	16.22
6:53	SM50	sfc	16.90[1]	2.51	121.78	16.61	1.06	4.51	21.12
7:05	SM65	sfc	18.48	3.27	115.97	17.31	1.00	6.54	23.85
7:16	SM53	sfc	16.36[1]	2.14	141.32	0.20	0.11	0.41	0.61
7:20	SM46	sfc	17.21	3.46	131.61	10.75	0.56	1.47	12.22
7:43	SM42	sfc	17.55[1,2]	4.08	122.11	23.40	1.70	10.76	34.16
8:10	SM41	sfc	18.64	3.41	116.63	16.52	0.82	6.43	22.95
8:16	SM35	sfc	18.19	3.58	121.33	14.68	0.55	5.11	19.79
8:26	SM32	sfc	17.09	4.53	123.75	26.69	1.79	8.25	34.94
8:31	SM30	sfc	16.75	3.93	122.34	23.18	1.60	8.59	31.77
8:42	SM24	sfc	15.81	5.79	135.47	38.57	2.12	5.55	44.12
8:54	SM47	sfc	16.66[1,2]	4.95	130.15	30.73	1.86	6.37	37.10
9:03	SM28++	sfc	15.10[1,2]	2.08	146.94	0.28	0.11	0.86	1.14
9:09	SWH1	sfc	15.54	6.22	138.70	42.04	2.22	5.30	47.34
9:21	H33	sfc	15.94	5.54	135.94	36.23	2.00	5.11	41.34
9:53	H36	sfc	14.11[1]	9.55	152.03	80.73	3.60	6.33	87.06

1. Bottle salinity.
2. Hydrogen sulfide smell evident in salinity sample.

Table 48. Nutrient data for May 16, 1995

[These samples were filtered soon after collection, and frozen until analysis on 16 July 1995. All salinities were measured with the Ocean Sciences model 200 CTD.]

TIME h:m	STA	DEPTH	SAL psu	Concentrations DRP micromolar	SiO2 micromolar	N+N micromolar	NO2 micromolar	NH3 micromolar	DIN micromolar
10:13	SM50	sfc	16.20	5.99	135.95	38.00	2.15	8.34	46.34
10:33	SM65	sfc	16.42	4.77	125.58	26.49	1.03	1.68	28.17
--	SM46	sfc	16.41	5.56	136.42	33.07	1.36	3.43	36.50
11:07	H29.5	sfc	16.22	5.97	135.43	37.59	2.14	8.32	45.91
11:15	SM42	sfc	16.41	5.15	130.56	26.70	1.95	16.97	43.67
11:37	H30	sfc	16.18	6.15	137.37	40.02	2.19	8.45	48.47
11:52	SM41	sfc	15.43	5.85	143.05	35.29	1.35	4.34	39.63
11:58	SM35	sfc	14.84	6.17	148.61	37.80	1.45	3.34	41.14
12:10	SM32	sfc	16.30	5.92	135.17	36.57	2.13	8.61	45.18
12:14	SM30	sfc	16.11	6.75	136.24	39.35	2.38	10.66	50.01
12:23	SM24	sfc	15.72	7.35	141.89	50.97	2.45	8.64	59.61
12:29	SM47	sfc	15.88	6.64	139.10	44.96	2.34	8.58	53.54
12:41	SM28++	sfc	15.17	7.42	147.39	52.72	2.40	7.26	59.98
12:46	SWH1	sfc	15.06	8.83	147.19	67.26	3.10	8.58	75.84
13:02	H33	sfc	15.79	6.83	140.00	47.98	2.41	8.55	56.53
13:48	H36	sfc	14.46	10.43	151.84	87.08	3.87	8.51	95.59

Table 49. Nutrient data for June 19, 1995

[These samples were filtered soon after collection, and frozen until analysis on 16 July 1995. All salinities are bottle salinities.]

TIME h:m	STA	DEPTH	SAL psu	Concentrations DRP micromolar	SiO2 micromolar	N+N micromolar	NO2 micromolar	NH3 micromolar	DIN micromolar
6:15	SM41	sfc	18.73	6.33	109.88	30.38	1.02	4.80	35.18
6:25	SM35	sfc	18.92	6.15	109.46	29.11	1.00	5.16	34.27
--	SM32	sfc	17.81	7.05	120.22	34.18	1.33	6.07	40.25
6:45	H36	sfc	16.38	10.93	136.54	68.28	2.61	8.22	76.50
6:50	SM30	sfc	19.02	6.57	114.01	31.96	1.44	10.24	42.20
7:06	SM24	sfc	18.03	8.27	123.71	43.40	1.71	8.24	51.64
--	SM47	sfc	17.74	8.78	126.29	47.40	1.86	7.97	55.37
7:44	SM28++	sfc	18.65	6.42	107.65	27.13	0.90	3.69	30.82

continued ...

Nutrient data for June 19, 1995, continued

7:55	SWH1	sfc	17.64	8.13	125.23	38.34	1.39	6.60	44.94
8:10	H33	sfc	17.74	7.70	121.49	37.47	1.45	6.73	44.20
9:09	H32	sfc	17.60	9.04	127.88	49.12	1.90	7.90	57.02
9:34	SM42	sfc	20.00	5.28	104.14	24.07	1.00	6.98	31.05
10:34	SM55	sfc	20.18	4.90	101.11	24.20	1.02	7.95	32.15
10:53	SM59	sfc	18.74	6.05	112.51	28.09	0.91	3.82	31.91
10:59	H30	sfc	17.95	8.32	123.71	43.36	1.72	8.02	51.38
--	H29.5	sfc	18.13	8.00	122.39	41.64	1.64	7.78	49.42
--	SM50	sfc	18.62	7.16	118.14	35.86	1.47	8.68	44.54

Table 50. Nutrient data for July 20, 1995

[These samples were filtered soon after collection, and frozen until analysis on 2 November 1995. All salinities are bottle salinities.]

				Concentrations					
TIME h:m	STA	DEPTH	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
8:17	SM53	sfc	21.31	7.10	154.32	0.69	0.18	2.32	3.01
8:32	SM46	sfc	21.40	7.89	154.17	12.92	0.48	3.20	16.12
8:58	SM42	sfc	21.76	7.86	124.46	28.33	1.11	7.18	35.51
9:37	SM41	sfc	21.31	8.23	157.76	15.55	0.54	3.55	19.10
9:42	SM35	sfc	21.50	7.51	144.00	11.94	0.33	2.27	14.21
9:58	SM30	sfc	21.47	8.46	131.58	29.15	1.10	6.40	35.55
10:04	SM24	sfc	20.92	9.92	140.06	34.51	1.28	7.63	42.14
10:22	SM28++	sfc	21.35	8.93	151.37	24.51	0.73	4.30	28.81
10:31	SWH1	sfc	20.92	10.56	155.35	31.14	1.23	5.95	37.09

Table 51. Nutrient data for August 22, 1995

[These samples were filtered soon after collection, and frozen until analysis on 2 November 1995. All salinities are bottle salinities.]

				Concentrations					
TIME h:m	STA	DEPTH	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
6:53	SM53	sfc	23.80	8.72	175.67	4.50	0.65	7.23	11.73
7:06	SM46	sfc	23.57	9.66	173.74	1.50	0.35	6.17	7.67
7:28	SM42	sfc	24.23	8.82	124.92	25.33	0.95	5.10	30.43
7:52	SM41	sfc	23.74	10.72	174.74	11.86	0.68	7.72	19.58

continued ...

Nutrient data for August 22, 1995, continued

7:55	SM35	sfc	23.81	10.93	175.15	17.09	0.79	7.88	24.97
8:13	SM30	sfc	23.54	11.15	149.68	32.76	1.23	6.48	39.24
8:21	SM24	sfc	23.00	12.85	163.25	39.80	1.50	7.64	47.44
8:34	SM28++	sfc	23.64	10.35	166.78	24.07	0.67	5.40	29.47
8:38	SWH1	sfc	23.40	12.34	174.70	28.43	1.11	6.11	34.54

Table 52. Nutrient data for August 30, 1995

[These samples were filtered soon after collection, and frozen until analysis on 2 November 1995. All salinities are bottle salinities, except as noted.]

				Concentrations					
TIME h:m	STA	DEPTH	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
10:58	SM50	sfc	24.46	10.57	138.54	32.16	1.23	7.13	39.29
11:28	SM53	sfc	24.75	9.97	134.69	27.84	1.05	6.24	34.08
11:35	SM46	sfc	25.06	9.10	121.25	25.21	0.94	5.92	31.13
11:54	SM42	sfc	24.85	9.63	125.00	27.58	1.04	7.23	34.81
12:08	H30	sfc	24.33	11.18	144.14	35.08	1.31	7.70	42.78
12:20	SM41	sfc	24.69	9.67	134.72	28.05	0.87	5.70	33.75
12:23	SM35	sfc	24.61	10.46	137.95	30.09	1.00	6.73	36.82
12:32	SM32	sfc	24.15	11.43	146.79	35.59	1.34	7.60	43.19
12:35	SM30	sfc	24.36	11.01	141.89	32.99	1.25	8.25	41.24
12:42	SM24	sfc	23.57	13.24	162.27	44.85	1.66	7.99	52.84
--	SM28++	sfc	24.60	10.41	140.63	29.71	0.90	5.37	35.08
13:00	SWH1	sfc	--(1)	13.11	165.15	40.75	1.52	7.78	48.53
13:10	H33	sfc	23.58	13.28	160.63	45.42	1.66	7.92	53.34
13:37	H36	sfc	21.91	18.75	194.20	83.01	3.25	10.76	93.77

1. Salinity sample lost.

Table 53. Nutrient data for September 7, 1995
[These samples were filtered soon after collection, and frozen until analysis on 2 November 1995. All salinities are bottle salinities.]

TIME h:m	STA	DEPTH	SAL psu	Concentrations DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
9:01	SM50	sfc	26.19	7.38	86.94	21.79	1.04	6.56	28.35
9:19	SM53	sfc	25.11	10.41	136.73	32.67	0.99	6.08	38.75
9:24	SM46	sfc	24.96	10.86	138.63	35.37	1.06	5.53	40.90
9:50	H30	sfc	25.89	8.15	98.05	24.87	1.10	6.88	31.75
9:58	SM41	sfc	24.86	11.36	139.58	37.00	1.21	6.42	43.42
10:10	SM32	sfc	25.81	8.58	101.10	25.76	1.17	6.92	32.68
10:12	SM30	sfc	25.66	8.90	106.04	27.04	1.21	7.84	34.88
10:19	SM24	sfc	24.82	11.50	135.01	38.55	1.49	8.00	46.55
10:32	SM28++	sfc	25.08	10.89	138.68	34.83	0.96	3.93	38.76
10:36	SWH1	sfc	24.43	12.88	148.25	46.10	1.75	8.25	54.35
10:46	H33	sfc	24.90	11.09	130.39	37.90	1.42	7.23	45.13
11:07	H36	sfc	22.78	17.97	179.00	84.63	3.23	9.94	94.57

Table 54. Nutrient data for September 13, 1995
[These samples were filtered soon after collection, and frozen until analysis on 2 November 1995. All salinities are bottle salinities.]

TIME h:m	STA	DEPTH	SAL psu	Concentrations DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
13:13	H36	sfc	23.29	17.00	169.63	85.38	3.13	8.64	94.02
13:35	H33	sfc	25.18	11.56	131.38	43.55	1.61	7.04	50.59
13:44	SWH1	sfc	25.14	11.79	134.95	33.78	1.61	6.83	40.61
13:49	SM28++	sfc	25.87	9.67	114.13	32.20	1.07	5.37	37.57
13:56	SM47	sfc	25.64	10.32	116.78	35.85	1.47	7.70	43.55
14:00	SM24	sfc	25.56	10.37	119.03	36.66	1.43	7.83	44.49
14:07	SM30	sfc	25.96	9.21	104.63	30.94	1.35	8.90	39.84
14:09	SM32	sfc	26.02	8.97	102.91	30.39	1.29	7.54	37.93
14:17	SM35	sfc	26.02	9.08	106.13	30.69	1.12	6.03	36.72
14:20	SM41	sfc	26.12	8.74	103.84	29.33	1.13	6.37	35.70
14:28	H30	sfc	26.49	7.54	86.20	24.51	1.16	7.37	31.88
14:37	SM42	sfc	26.58	7.41	81.68	23.59	1.18	7.51	31.10
14:53	SM46	sfc	26.11	9.87	131.24	28.25	0.69	0.04	28.29

continued ...

Nutrient data for September 13, 1995, continued

14:57	SM53	sfc	25.65	8.76	105.86	29.40	1.05	5.52	34.92
15:16	SM50	sfc	26.92	6.40	72.98	20.62	1.08	6.61	27.23

Table 55. Nutrient data for September 20, 1995

[These samples were filtered soon after collection, and frozen until analysis on 2 November 1995. All salinities are bottle salinities, except as noted.]

				Concentrations					
TIME h:m	STA	DEPTH	SAL psu	DRP	SiO2	N+N micromolar	NO2	NH3	DIN
6:47	SM53	sfc	26.45	9.40	116.50	26.05	0.63	2.17	28.22
6:51	SM46	sfc	26.52	8.08	100.71	21.25	0.60	0.84	22.09
7:09	SM42	sfc	26.18	8.66	82.61	27.57	1.08	1.38	28.95
7:26	SM41	sfc	--(1)	8.47	100.91	24.77	0.66	1.17	25.94
7:31	SM35	sfc	26.46	8.52	100.93	24.81	0.58	1.03	25.84
7:44	SM30	sfc	26.35	10.21	115.17	35.35	1.24	5.23	40.58
7:49	SM24	sfc	25.27	12.19	134.05	46.88	1.42	4.25	51.13
8:00	SM28++	sfc	25.90	9.57	114.60	28.03	0.57	0.83	28.86
8:05	SWH1	sfc	26.27	12.38	140.83	46.29	1.34	1.59	47.88

1. Apparently salinity sample not taken.

Table 56. Nutrient data for September 29, 1995

[These samples were filtered soon after collection, and frozen until analysis on 2 November 1995. All salinities are bottle salinities.]

				Concentrations					
TIME h:m	STA	DEPTH	SAL psu	DRP	SiO2	N+N micromolar	NO2	NH3	DIN
7:07	SM50	sfc	26.87	7.79	86.49	26.46	1.14	5.81	32.27
7:25	SM53	sfc	26.72	9.48	108.61	30.28	0.90	6.66	36.94
7:29	SM46	sfc	26.65	9.42	107.29	31.56	0.89	4.97	36.53
7:46	SM42	sfc	26.61	9.00	96.88	27.44	0.97	4.84	32.28
7:56	H30	sfc	26.44	9.50	103.27	31.99	1.08	4.37	36.36
8:05	SM41	sfc	26.77	8.99	100.26	29.55	0.85	5.09	34.64
8:08	SM35	sfc	26.72	9.17	101.04	30.38	0.90	5.44	35.82
8:16	SM32	sfc	26.25	10.22	109.91	34.47	1.04	3.68	38.15

continued ...

Nutrient data for September 29, 1995, continued

8:19	SM30	sfc	26.07	11.01	118.07	36.90	1.01	3.80	40.70
8:25	SM24	sfc	25.62	12.63	131.89	42.02	0.97	2.76	44.78
8:30	SM47	sfc	25.68	12.23	126.41	43.68	1.06	2.67	46.35
8:37	SM28++	sfc	26.08	11.42	123.09	32.95	0.98	4.47	37.42
8:42	SWH1	sfc	26.15	10.77	115.65	36.60	1.01	3.63	40.23
8:53	H33	sfc	24.64	15.33	147.76	64.38	1.36	2.73	67.11
9:13	H36	sfc	25.29	20.63	183.61	115.53	2.91	5.15	120.68

Table 57. Nutrient data for October 5, 1995

[These samples were filtered soon after collection, and frozen until analysis on 2 November 1995. All salinities are bottle salinities.]

				Concentrations					
TIME h:m	STA	DEPTH	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
7:10	SM50	sfc	26.82	8.25	90.16	28.48	1.20	5.77	34.25
7:26	SM53	sfc	26.68[1]	8.98	103.56	23.38	0.71	0.99	24.37
7:30	SM46	sfc	26.73	9.07	103.77	13.02	0.61	0.29	13.31
7:47	SM42	sfc	26.79	8.48	89.47	27.24	1.31	7.47	34.71
8:04	SM41	sfc	26.62	9.02	102.63	18.13	0.62	0.88	19.01
8:07	SM35	sfc	26.61	9.06	101.50	22.58	0.72	0.92	23.50
8:15	SM32	sfc	26.59[1]	9.20	99.21	30.33	1.10	4.92	35.25
8:16	H30	sfc	26.58	9.17	99.39	30.80	1.12	4.47	35.27
--	SM30	sfc	26.40	9.84	103.77	31.65	1.06	4.05	35.70
8:26	SM24	sfc	25.91	11.47	115.69	36.65	1.02	2.47	39.12
8:34	SM47	sfc	26.22	10.48	111.37	34.04	1.01	2.98	37.02
--	SM28++	sfc	26.54	9.41	106.27	18.23	0.64	0.68	18.91
8:51	SWH1	sfc	26.30	10.48	112.34	33.32	1.02	2.32	35.64
9:02	H33	sfc	26.09	11.15	115.58	36.06	1.00	2.93	38.99
--	H36	sfc	24.75	15.03	142.90	59.77	1.38	2.83	62.60

1. Hydrogen sulfide smell evident in salinity sample.

Table 58. Nutrient data for October 12, 1995

[These samples were filtered soon after collection, and frozen until analysis on 2 November 1995. All salinities are bottle salinities.]

TIME h:m	STA	DEPTH	SAL psu	Concentrations DRP	SiO2	N+N micromolar	NO2	NH3	DIN
8:24	SM50	sfc	26.96	7.99	92.34	29.14	1.29	7.59	36.73
8:41	SM53	sfc	26.86	9.12	101.19	30.23	1.04	5.78	36.01
8:45	SM46	sfc	26.68	10.53	118.14	22.85	0.67	2.88	25.73
9:12	SM42	sfc	27.08	8.41	97.47	29.03	1.20	10.12	39.15
9:25	H30	sfc	26.26	10.82	112.36	37.71	1.13	4.35	42.06
9:37	SM41	sfc	26.73[1]	10.05	110.54	25.50	0.65	1.51	27.01
9:58	SM32	sfc	26.15	11.23	114.64	39.37	1.15	3.81	43.18
10:01	SM30	sfc	26.46	10.29	108.99	34.46	1.13	5.73	40.19
10:07	SM24	sfc	26.12	11.61	115.62	39.89	1.20	5.80	45.69
10:20	SM47	sfc	25.96	11.76	119.03	42.71	1.21	3.71	46.42
10:33	SM28++	sfc	26.47	10.83	118.54	23.09	0.64	0.00	23.09
10:44	SWH1	sfc	26.04	11.87	123.79	35.63	0.98	0.21	35.84
10:52	H33	sfc	25.34	13.86	130.27	54.53	1.54	3.79	58.32
11:22	H36	sfc	23.36	17.81	156.34	97.60	2.71	5.94	103.54

1. Hydrogen sulfide smell evident in salinity sample.

Table 59. Nutrient data for October 19, 1995

[These samples were filtered soon after collection, and frozen until analysis on 2 November 1995. All salinities are bottle salinities.]

TIME h:m	STA	DEPTH	SAL psu	Concentrations DRP	SiO2	N+N micromolar	NO2	NH3	DIN
7:07	SM50	sfc	26.97	8.25	94.41	30.26	1.31	8.35	38.61
7:26	SM53	sfc	27.07	8.29	112.91	15.38	0.58	1.27	16.65
7:30	SM46	sfc	26.93	8.57	138.45	24.46	0.78	1.11	25.57
7:47	SM42	sfc	26.91	8.56	95.36	30.61	1.27	10.82	41.43
7:56	H30	sfc	26.83	8.86	98.09	31.68	1.19	6.87	38.55
8:04	SM41	sfc	26.95	8.52	138.27	25.77	0.79	0.20	25.97
8:09	SM35	sfc	26.93	8.48	136.38	24.63	0.76	0.49	25.12
8:17	SM32	sfc	26.76	9.25	100.18	32.49	1.19	6.28	38.77
8:20	SM30	sfc	26.68	9.54	102.47	33.18	1.18	6.49	39.67

continued ...

Nutrient data for October 19, 1995, continued

8:27	SM24	sfc	26.42	10.58	111.18	36.13	1.08	4.38	40.51
8:33	SM47	sfc	26.46	10.32	108.55	35.83	1.09	3.97	39.80
8:40	SM28++	sfc	26.85	9.10	134.10	25.18	0.69	1.26	26.44
8:45	SWH1	sfc	26.45	10.57	112.16	32.89	0.92	0.81	33.70
8:55	H33	sfc	26.00	11.94	118.62	44.25	1.16	2.77	47.02
9:18	H36	sfc	24.19	16.10	144.61	80.29	1.98	3.29	83.58

Table 60. Nutrient data for November 28, 1995

[These samples were filtered soon after collection, and frozen until analysis on 19 February 1996. All salinities are bottle salinities.]

				Concentrations					
TIME h:m	STA	DEPTH	SAL psu	DRP	SiO2	N+N	NO2	NH3	DIN
				micromolar					
8:02	SM50	sfc	27.74	6.63	84.84	34.24	1.45	9.60	43.84
8:16	SM53	sfc	27.00	8.99	104.17	45.58	1.43	10.34	55.92
9:10	SM41	sfc	26.56	10.32	114.32	54.54	1.45	9.56	64.10
8:41	SM42	sfc	27.15	8.36	99.45	43.71	1.54	12.45	56.16
9:13	SM35	sfc	26.17	11.21	123.44	62.21	1.60	9.42	71.63
9:24	SM32	sfc	26.85	9.09	103.58	49.70	1.65	10.97	60.67
9:29	SM30	sfc	26.63	9.84	107.97	54.34	1.73	11.28	65.62
9:57	SM28++	sfc	25.69	10.94	123.07	66.75	1.96	10.61	77.36
9:35	SM24	sfc	26.15	11.05	116.77	65.65	1.98	11.29	76.94
9:48	SM47	sfc	26.17	11.01	113.31	65.56	1.98	11.09	76.65
10:05	SWH1	sfc	26.70	9.59	106.44	52.87	1.70	10.83	63.70
10:13	H33	sfc	24.61	13.90	138.56	105.4	3.03	12.31	117.7
10:34	H36	sfc	23.08	15.51	155.84	134.3	3.75	13.03	147.3